

The Roles of Local Organizations in Collaborative Resource Governance: A Qualitative Case Study of Lake Associations

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Abstract (Academic)

Human communities across the globe are currently facing an epidemic of lake water quality degradation, primarily resulting from resource and land-use decisions that introduce excessive amounts of nutrients into the lake system. In many of these communities, local volunteer groups called lake associations work to protect these cherished lake resources. Lake associations and similar groups commonly respond to issues that are most prevalent in their respective watersheds including, but not limited to, algae blooms, declines in water transparency, and fish kills. Yet, there is little research on the role these groups actively or potentially play in lake governance and management. This study investigates the specific structures and strategies lake associations use to address lake water quality challenges using a comparative case analysis of two organizations: Lake Sunapee Protective Association (LSPA; Sunapee, NH) and Clean Lakes Alliance (CLA; Madison, WI). I performed a content analysis of self-published newsletters, annual reports, and news publications mentioning either lake association, and supplemented this data with semi-structured interviews of key individuals from each organization. I characterized and compared the missions, capacity, and activity of the two case studies by applying a conceptual framework as a lens through which to better understand the function these groups serve in their communities and what makes them effective. I found that, although the two groups structure themselves differently, take on distinct activity pathways, and orient themselves differently with respect to lake conservation, they have both been effective in achieving decision-making or management outcomes. This is a first step in identifying the diversity of ways community-based conservation organizations, such as lake associations, can meaningfully contribute to collaborative environmental governance processes on the local scale.

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Abstract (General Audience)

Around the world, people who live on lakes are dealing with significant declines in lake water quality. These declines have been linked to various land management decisions, which can introduce excess nutrients to the lake system that promote excessive algal or bacterial growth, and to the ways people choose to use the lake resource, which can introduce non-native, or invasive, plant and animal species. In many lake communities, local volunteer groups called lake associations work to protect their local lake resource. Lake associations can respond to the specific problems facing their lake and act to manage the lake resource and the land around it. Yet, there is little research on the role these groups actively or potentially play in lake management and conservation. This study investigates the specific organizational structures and strategies lake associations and similar groups use to address water quality declines in lake communities. I collected historic documentation and completed oral interviews for two case study associations, Lake Sunapee Protective Association (LSPA; Sunapee, NH) and Clean Lakes Alliance (CLA; Madison, WI), to characterize and compare their missions, organizational capacities, and activities. This analysis allows me to better understand what makes these groups effective and the functions they serve in their communities. I found that, although the two groups are structured differently and implement different strategies to achieve outcomes, they both have been effective in achieving lake management and conservation outcomes in line with their respective missions. This is a first step in identifying the diversity of ways community-based conservation organizations, such as lake associations, can meaningfully contribute to local environmental management and conservation.

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List of Abbreviations

In order of appearance:

LSPA	Lake Sunapee Protective Association
CLA	Clean Lakes Alliance
SES	Socio-ecological systems
NSF	National Science Foundation
CNH	Coupled Natural-Human
NGO	Non-governmental Organization
IAD	Institutional Analysis and Development
VT-IRB	Virginia Tech Institutional Review Board
NH-DES	New Hampshire Department of Environmental Services
NH-FG	New Hampshire Fish & Game Department
VLAP	Volunteer Lake Assessment Program
GLEON	Global Lake Ecological Observatory Network
NHLA	New Hampshire Lakes Association
NH-DRED	New Hampshire Department of Resources & Economic Development
SAMAT	Sunapee Area Milfoil Attack Team
Yahara CLEAN	Yahara Capital Lakes Environmental Assessment and Needs
YPF	Yahara Pride Farms
WI-DNR	Wisconsin Department of Natural Resources
UW-CFL	University of Wisconsin Center for Limnology
WI-DATCP	Wisconsin Department of Agriculture, Trade and Consumer Protection

Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it is the only thing that ever has.

– Margaret Mead

1. Introduction

The decline of water quality in freshwater lakes is a complex global phenomenon threatening the wellbeing of human communities in myriad ways (Dodds et al. 2008; Smith and Schindler 2009). Two of the most common forms of lake degradation include lake eutrophication and invasive species introductions. These phenomena can lead to harmful algal blooms, decreased water transparency, fish kills, changes to food webs, and changes to biogeochemical cycling (Smith & Schindler 2009; Carpenter et al. 2007; Smith et al. 2006). These changes threaten the benefits people receive from lake resources, which can include drinking water and food sources, recreational opportunities and aesthetics, desirable community and cultural sites, and many other ecosystem services. Lakes provide an interesting area of socio-ecological study because the very aspects of lake systems that draw human communities to them are sensitive to human impact (Keeler et al. 2012; Secchi et al. 2011). Human communities across the globe struggle to adapt their social systems and manage these watersheds in ways that allow for continued and sustainable resource use without causing further degradation. This socio-ecological challenge makes lake systems a compelling topic to investigate the linkage between environmental change and human behavior (Hudnell 2010; Dodds et al. 2008; Steffensen et al. 1999).

As humans experience changes or threats to the ecosystem services that lakes provide, they are presented with the social dilemma of how best to manage their own behavior to prevent or reduce lake degradation. In a democratic society, it is important to identify the management strategies that will prevent over-exploitation of a shared resource by a minority of users. Some communities choose to approach this dilemma by relying on top-down regulations and “command and control” governance regimes (e.g. state or federal regulations/mandates and enforcement). Other communities self-organize into groups (e.g. grassroots movements and civic associations) that

collectively work towards ecosystem protection (Ostrom 1990). Even without explicit rule-making power, these collective action groups may contribute to resource governance by asking stakeholders to self-regulate their behavior, changing societal norms, and driving policy change. Collaborative approaches, which connect local stakeholders to those with rule-making power, and which allow for public involvement in decision-making, are the most effective at addressing complex and widespread environmental problems (Koontz & Newig 2014; Bodin 2017; Layzer 2008).

The concept of collaborative governance is characterized by a shift away from an exclusive top-down, agency-dominated approach, to one that emphasizes discourse, negotiation, and joint problem solving among stakeholders and policy makers (Lubell 2004; Sabatier et al. 2005; Layzer 2008). At least some aspects of collaborative governance processes are occurring in lake systems across the U.S. For example, many communities are engaging stakeholders to willingly take part in sustainable management of lake catchments (ILEC 2005; Bell et al. 2013; Snell et al. 2013). Sometimes this engagement is facilitated by governing agencies through offering incentives to landowners (e.g. cost-share programs), but another catalyst for engagement comes through collective action in the form of grassroots movements and stakeholder groups.

One type of collective action group commonly formed around lake resources in the U.S. to protect water quality is a lake association (Kramer 2007). Lake associations are voluntary, community-based, civic organizations that often respond to threats or changes in lake ecosystem services and work to conserve those services. While lake associations can be motivated to protect water quality for different reasons, and may choose to focus on different types of ecosystem services, many strive to achieve their goals by acting to influence policy, human behavior, or the environment directly. Lake associations also commonly engage in resource monitoring, allowing them to interpret and respond to local ecological shifts. With missions to achieve certain environmental and social outcomes, they are embedded within their communities such that they are well positioned to make meaningful contributions to resource governance and management.

While there has been some research on the general importance of public involvement in natural resource decision-making in the U.S. (e.g. Stern et al. 2013 & Margerum 2008), there has been little assessment of the possible role groups like lake associations are playing in lake management decision-making processes. Because collaborative governance requires participation of various stakeholders in the decision-making process, and lake associations are key players at the local level, with a potential to bridge between different sectors of society and leverage large amounts of social capital, there is a need for better understanding of the exact motivations, strategies, and outcomes of lake association activity.

The purpose of my study is to investigate the roles lake associations are playing in their communities and the extent to which they are poised to contribute to collaborative environmental governance processes. I explore this through a case study approach that considers how the combination of mission, capacity, and activity of lake associations is related to the concept of effectiveness in the organizational literature. Specifically, I examine two lake associations, argue that they are indeed effective, identify the unique strategies they use to achieve outcomes, and describe how they evolve to address the specific needs of their respective lake catchments. By comparing across cases I argue that the concept of *equifinality* is in play in these systems, through presenting evidence that both organizations are effective at achieving outcomes despite substantive differences in structure, function, and environmental context. This study has implications for best practices in collaborative environmental governance and adaptive management.

2. Conceptual Framework

The theoretical framework used in conducting this research is laid out here in three sections. First, I provide a background literature review on commons dilemma and governance theory (Section 2.1). Next, I describe how I conceptualized the positioning of lake associations within socio-ecological systems, and provide a review of the pre-existing literature on lake associations (Section 2.2). Finally, I describe three models from the organizational literature that can be used to assess organizational effectiveness, and end by showing how I combined all three models to develop a conceptual diagnosis for lake association activity (Section 2.3).

2.1 Commons dilemma and governance processes

Commons dilemmas are inherent in many socio-ecological systems. They are social dilemmas that occur when multiple stakeholders share a particular resource, and the resource has the potential to be exploited by a minority of resource users, who often degrade it at the expense of other users (Ostrom 1990). Any time people are dealing with a *common pool resource* this inherent social dilemma follows. In these situations, the social system surrounding the resource may ask how that resource should be managed so that ecosystem services are maintained and preserved over the long term. Communities may strive to stall, prevent, slow, or reverse degradation to the shared resource in question.

Maintaining water quality in lakes is an example of a commons dilemma. Freshwater lakes are common pool resources, which can be exploited and degraded by a few individuals at the expense of others who use or depend on the lake. Because lakes quite literally pool the water from throughout their catchments, surrounding land-use decisions are often captured in changes to lake water quality (Kramer 2007). Major causes of lake water quality degradation in the U.S. include the addition of excess nutrients and sediments to lake basins, and the introduction of invasive species (Keeler et al. 2012). Scientists have long established methods for measuring water quality, and surrounding communities may notice and react to drastic water quality changes, so

water quality is a particularly useful metric to consider for gauging lake degradation and environmental change in these shared systems (Kramer 2007).

The commons dilemma occurs because people utilize and depend on lakes and their surrounding lands for a large variety of purposes. Certain reasonable land- and resource-use decisions can ultimately lead to the addition of nutrients to lake waters, which in turn, can cause lake eutrophication. This commonly results in the degradation of water quality over time, significantly impacting the *ecosystem services* provided by lake resources (Keeler et al. 2012). Ecosystem services are the benefits people receive from the environment (Millennium Ecosystem Assessment 2005). For lake resources, these can include, but are not limited to: recreational usage, cultural identity, drinking water, fisheries, shoreline property values, etc. The dilemma that arises around lakes stems from certain individuals making land-use decisions that benefit themselves, but degrade the water quality of the lake over time, affecting the ecosystem services provided by the lake at the expense of many others, who also rely on those services.

In 1968, Hardin published his *Tragedy of the Commons* theory, which suggests that common pool resources will inevitably be degraded over time due to the individual selfishness of resource stakeholders (Hardin 1968). He proposed that the only way to avoid this tragedy is for outside governmental authority to intervene through one of two mechanisms: through coercing resource users to limit their resource use, or through privatization of the resource so that private owners would manage more sustainably when it is in their own self-interest.

But, in 1990 Elinor Ostrom refuted Hardin's claim that these were the only two solutions to the Tragedy of the Commons by showing that people are capable of managing commonly held resources effectively, without degrading them, and without relying on external authorities. She showed that people do this through the formation of *collective action groups* made up of resource stakeholders (Ostrom 1990; Ostrom 2000). Collective action groups are voluntarily formed to work towards positive gains, shield group members against risks, and "to create and enforce rules that protect natural resources" (Ostrom 2000). By participating as actors that strive to influence various decision-making processes, collective action groups can contribute to natural resource governance (Matson et al. 2016).

Governance should not be confused with *government* and is instead a concept that encapsulates all of the decision-making processes involved when there is a collective problem, which lead to the “creation, reinforcement, or reproduction of social norms and institutions” (Hufty 2011). Government is just one type of governing body within governance structures (albeit the most formal), as there are often other actors outside of government that are contributing to rule-making and engaging in political processes, especially in democratic societies (Matson et al. 2016). As the environmental problems faced by societies become increasingly widespread and complex, effective and cooperative governance becomes more essential for sustainable development and for maintaining resilient socio-ecological systems. The type of governance that responds to collective environmental degradation problems, and which pertains to sustainable development and natural resource management decisions is known as *environmental governance* (Lemos & Agrawal 2006).

Matson et al. (2016) presents five stages as part of a governance framework (Fig. 1) where multiple players (*actors*) with varying degrees of *agency*¹ seek to influence *political processes*, which are the collective decision making procedures available within a system. When actors engage in political processes, it leads to changes in, or establishment of, rules, regulations, incentives, or social norms (i.e. *institutional arrangements*). Institutional arrangements then lead to changes in human *actions*, or the behaviors, decisions, and management processes of people in the system. This finally results in changes to the *capital asset stocks* of the community, which are the amount and quality of resources available (Matson et al. 2016; Fig. 1).

¹ Agency is “the degree to which individual actors have the capacity to act independently and to make their own decisions” (Matson et al. 2016).

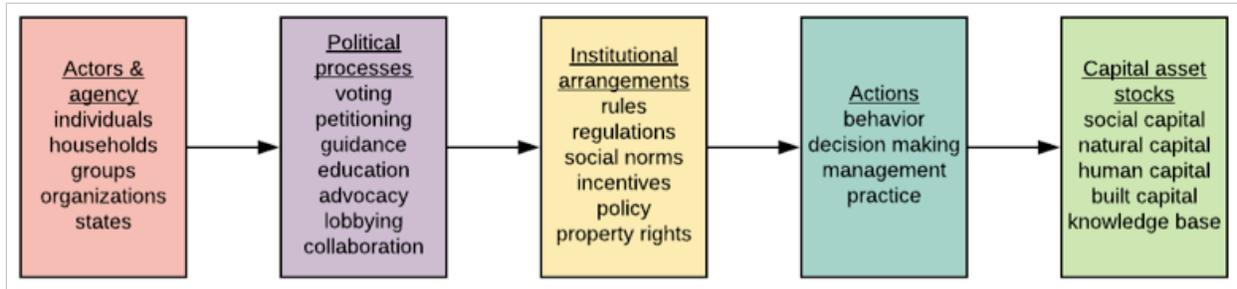


Figure 1: Governance framework diagram

This is a modified version of the governance framework for social-ecological systems from Matson et al. (2016). The underlined titles and uniquely colored boxes represent each stage in the governance process. Examples of the affected factors in each stage are listed below the stage titles. It should be noted that forces external to the system, as well as internal monitoring, enforcement, learning, and adaptation, also influence each stage.

In this way, governance does not necessitate formal policy change, as there are other types of institutional arrangements that can be changed or reinforced through the governance process that, in turn, affect human behavior, decision making, or practice. For example, social norms are considered to be one type of institutional arrangement in governance, but since measuring changes to social norms can be very difficult to do, tracking changes to policy, regulations, or resource management actions can be a more feasible way to study governance processes in socio-ecological systems.

According to descriptions of environmental governance in the literature, the process outlined by Matson et al. (2016) must include environmental consideration during each stage to really be considered *environmental* governance (Lemos & Agrawal 2006). This means that, in order for environmental governance to occur, actors must be engaging in political processes with the intention of affecting some sort of environmental change. In turn, if a system is displaying environmental governance, there should be evidence that the political processes and institutional arrangements in that system are targeting environmental outcomes, and that the actions that take place in response to those processes and arrangements also relate to the environment. Any of the capital asset stocks in a system may be altered or preserved through environmental governance processes (not just natural capital), but in environmental governance systems, changes to capital assets are seen and described as taking place within a socio-ecological context. This means that changes to any type of capital are

conceptualized as being related to, and having an impact on, the ecological system in addition to the social system.

As I have defined it here, the concept of environmental governance is aligned nicely with the *systems thinking* paradigm. In human ecology literature, the systems thinking approach conceptualizes human communities, economies, and political decisions as being part of the larger environmental system, rather than existing and operating separately from it (Dyball & Newell 2014). This marks a recent shift in social science theory that has altered the ways human systems are modeled in relation to ecological systems. *Socio-ecological systems theory* (SES theory) is currently the predominant theory under the systems thinking paradigm (Collins et al. 2011). In the SES theoretical model, feedbacks from the ecological system are often felt on the local scale by social systems through changes in ecosystem services. Likewise, social systems often impact ecological systems on the local scale through changes in land use and resource management. Therefore, in SES theory, *local or traditional knowledge*² is a key component for understanding and interpreting the feedbacks between the ecology of the system and the social component of the system (Berkes et al. 2008; see Section 2.2 and Fig. 4 for further illustration of SES theory).

It is theorized that socio-ecological systems which integrate local knowledge into decision making will be more resilient over time, since local communities that are embedded within a certain ecological system are thought to have the most relevant and recent knowledge of the dynamics of that system (Berkes et al. 2003). Incorporating local knowledge in governance can also bring a cultural awareness to rule making that may be necessary for effective implementation of those rules (Leach et al. 1997). Layzer 2008 points out that when there is some degree of stakeholder collaboration in resource management decisions, the results tend to be more readily accepted and followed, more easily implemented, and longer-lasting. This suggests that collaborative methods in environmental governance will yield better decision-making outcomes, especially when there is public involvement.

² Local knowledge, also known as traditional ecological knowledge, is information about the relationship between humans and their immediate environment, which is maintained and passed down by cultural transmission through generations (Berkes 1999; Fraser et al. 2006). This concept is referred to as “local knowledge” from this point forward.

Collaborative and joint decision-making is increasingly supported in the environmental management literature as contributing to greater success in resource conservation and sustainable development (Decaro et al. 2017; Layzer 2008; Leach 2006). The governance type that emphasizes collaboration, public involvement, and joint decisions is called *collaborative governance* (Gerlak et al. 2013; Ansell & Gash 2008; Bodin 2017). An important distinguishing feature of collaborative governance is that it is often thought of in the literature as a formal and deliberate system, intentionally put into place to facilitate joint decision making (Gerlak et al. 2013; Bodin 2017). While environmental governance can occur whenever environmental consideration is emphasized through the governance process, collaboration in governance processes can occur without it really being considered collaborative governance. It is possible for environmental and collaborative governance to occur simultaneously in any governance system if a focus on environmental issues and formal structures of collaborative decision-making are both present in the governance process (Fig. 2).

I argue that systems that effectively carry out collaborative environmental governance would have the best chance of increasing environmental integrity over the long term. This is because, even in systems where environmental governance is taking place, effective and sustainable decisions are not guaranteed. By introducing collaboration to the environmental governance process, the chances of achieving feasible, innovative, and effective solutions are increased (Layzer 2008). Likewise, incorporating environmental consideration and SES thinking into collaborative governance approaches may highlight various feedbacks and leverage points within the system that are key for strategic resource management. Therefore, although they can occur separately from one another, a combination of environmental and collaborative governance may be the best approach for dealing with complex and widespread environmental issues.



Figure 2: Diagram of the theorized relationship between environmental and collaborative governance

Environmental and collaborative governance are two types of governance that can occur separately or simultaneously, depending on the system. Environmental management and collaborative decision making are examples of actions that may occur within environmental or collaborative governance systems. Adaptive management is a type of environmental management, but not all environmental management is adaptive. Likewise, stakeholder involvement may occur during collaborative decision-making, but not always. The star indicates the space in this diagram where the SES literature theorizes the most effective environmental decision making would take place.

The extent to which management decisions take place within environmental or collaborative governance structures may be unknown, but all management decisions are actions that fall within the larger umbrella of governance in general. In theory, *environmental management* can occur within governance structures where environmental governance isn't necessarily taking place. Likewise, *collaborative decision making* can exist in governance systems that are not fully exhibiting collaborative governance. However, the literature suggests that environmental management decisions made within a collaborative environmental governance structure with stakeholder involvement are likely to be the most effective at promoting resilience within these systems (Fig. 2; Layzer 2008; Baird et al. 2019; Koontz & Newig 2014).

Furthermore, *adaptive management* is a specific type of environmental management that is also emphasized in the natural resources management literature as best practices for increasing system resilience (Chapin et al. 2009; Folke et al. 2005; Kofinas 2009). Adaptive management requires constant monitoring, evaluation, learning, and adjustment throughout the environmental management process and

strives to improve long-term outcomes through learning from past management decisions (Pahl-Wostl 2009; Holling 1978). Not all environmental management is adaptive, and adaptive management may or may not occur within an environmental governance context (Fig. 2). Like environmental management in general, adaptive management seems to be most successful when it involves stakeholders in decisions and monitoring.

2.2 Positioning of lake associations as collective action groups

Lake associations are examples of collective action groups that form to address the dilemmas of shared lake resources by working to maintain and improve environmental conditions of the lake and its catchment (Kramer 2007; Fig. 3). The lake is an example of a common pool resource that is shared by a variety of stakeholders with differing interests and values. Some of those stakeholders make rational decisions in their own interest that result in the addition of nutrients into the lake. When enough nutrients are added, usually due to the activity of a wide variety of property owners, lake eutrophication can occur, decreasing the water quality of the lake and impacting the ecosystem services available to lake resource users. Therefore, the communities surrounding the lake are faced with the dilemma of how to manage human behavior and the lake itself to reduce or prevent future degradation. In answer to this dilemma, local communities form collective action groups called lake associations, which may or may not effectively contribute to the management of their lake system (Fig. 3).

Although the goals and missions of lake associations vary, my research is most interested in how lake associations go about addressing local water quality issues and what makes them effective at achieving social or environmental outcomes. Since collaborative environmental governance is theorized to promote sustainable environmental management solutions in socio-ecological systems, an analysis of lake association effectiveness and their potential contributions to collaborative environmental governance may provide a good template for diagnosing the role of community-based conservation groups in promoting system wellbeing.

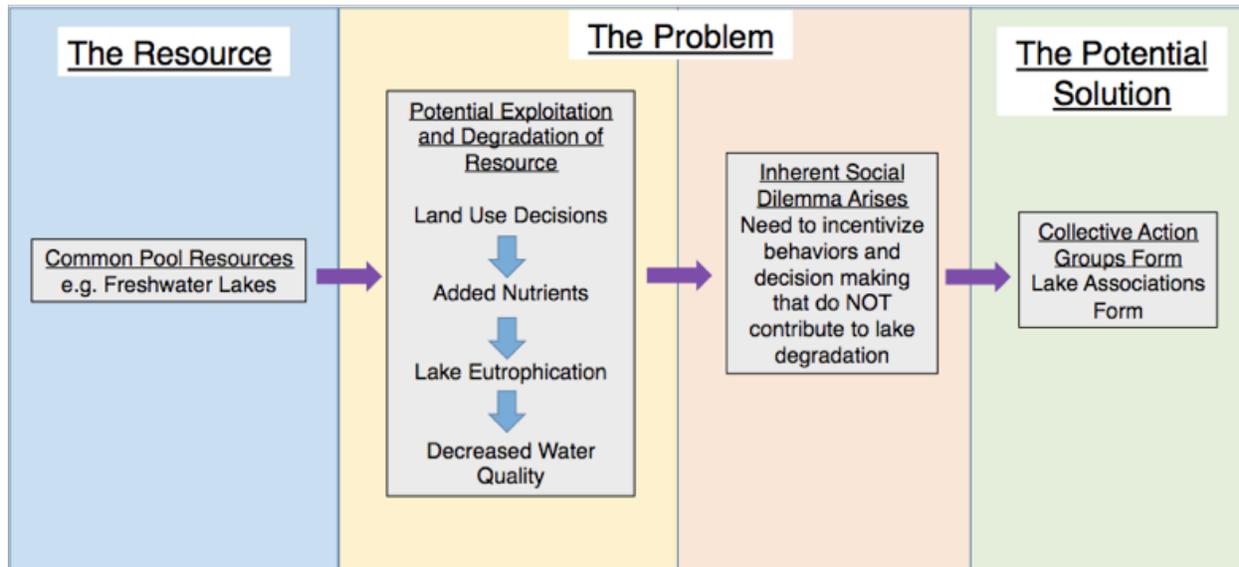


Figure 3: From common pool resource to collective action

Freshwater lakes are examples of common pool resources shared among a variety of stakeholders. Stakeholders potentially exploit and degrade the lake resource by making land-use decisions that add nutrients to the lake, causing excessive bacterial or algal growth, and leading to a decline in water quality. An inherent social dilemma arises in the communities that benefit from the lake resource when they realize they want to prevent degradation of their lake. Lake associations represent the collective interests of local community members and protect water quality through working to incentivize conservation behaviors and decision making that is in line with those collective interests.

Relating the collective action of lake associations to water quality as a metric for environmental change is especially necessary since my research is situated within a larger contextual framework of socio-ecological system dynamics (Fig. 4). The Collins et al. (2011) framework demonstrates the feedback loop that occurs between social and biophysical systems. A National Science Foundation (NSF) Coupled Natural-Human (CNH) Systems Grant funded this thesis research, so I worked collaboratively with a large team of multidisciplinary researchers who are modeling many of the other feedbacks encapsulated in this framework. This research team is modeling how changes in land use affect the structure and function of each case study lake, and how property values are impacted by changes in water quality (monetary ecosystem services) for each lake, but my thesis work adds to an understanding about the social system: how changes to ecosystem services can drive human behavior and how changes to human behavior can, in turn, affect human outcomes (Fig. 4).

I wanted to understand more about how local communities perceive and react to changes in the environment. The activities of lake associations can give us important

insights into their communities at-large. Lake associations are positioned such that they are translating human outcomes (i.e. altered wellbeing due to changes in ecosystem services) to alterations in human behavior (Fig. 4). Collective action fits into the Collins et al. (2011) framework nicely, since it is sometimes necessary when individual behavior is not enough on its own, or is too diffuse to have impact. Collective action may act as a catalyst for human systems to respond to environmental feedbacks and incentivize changes in human behavior. The lake association outputs and outcomes that I identify through this study may be used in future research as inputs to management and policy scenario analyses, completing the human-natural systems feedback loop as displayed in Figure 4.

When voluntary collective action groups like lake associations form in the social dimension of socio-ecological systems, they have the potential to contribute to environmental governance. Voluntary groups that form surrounding a particular resource that recruit and engage a membership base, aim to be heard in the public arena, contain elected citizen leaders, and that strive to contribute to governance through decentralized decision-making processes are known as **civic associations** (Andrews et al. 2010). A collaborative group like this is well situated to serve as an effective intermediary between the general public and governing agencies. This positioning indicates the importance of civic associations within democratic systems, where they can accurately relay the prevalence of resource issues within a context of local values and perceptions to external agents that may be able to allocate the resources needed to solve such issues. I argue here that, in addition to being examples of collective action, lake associations are also a type of civic association that form around lake resources. In their capacity as collective action groups and civic associations, lake associations are serving as organized pathways through which the collective voice of the general public may be heard and connected to environmental decision making. They are poised as contributing actors within a larger governance system (Fig. 1).

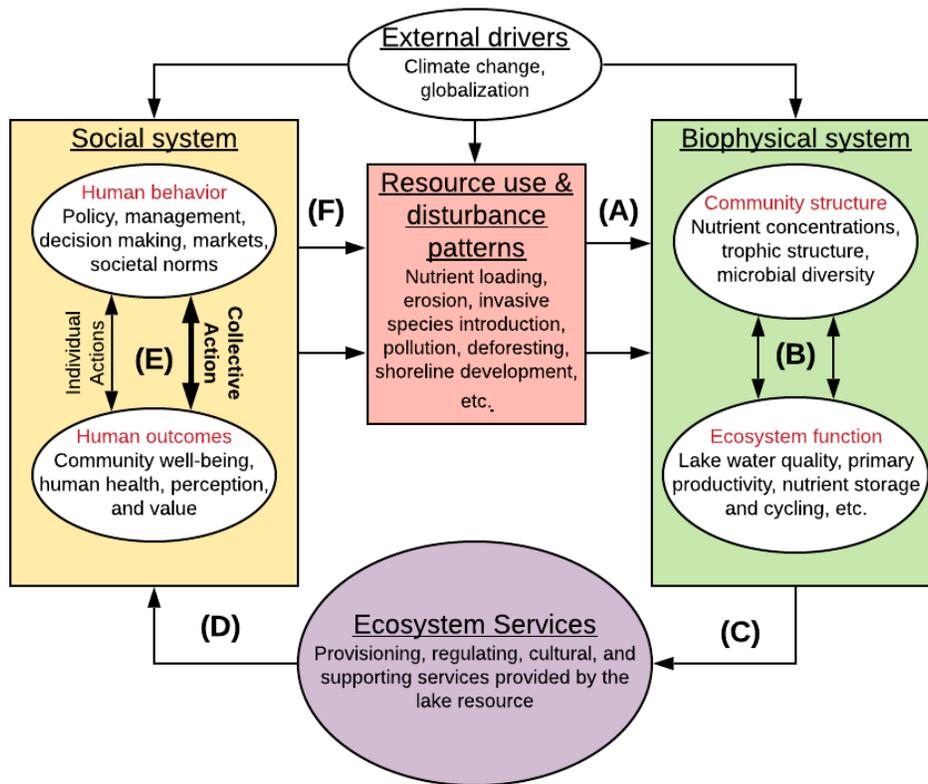


Figure 4: Modified version of the Socio-Ecological Systems framework from Collins et al. (2011)

Collective action was missing from the original framework, but it is highlighted here to emphasize the area of research focus. Arrow (A) represents the land and resource-use changes that impact the ecological system. Box (B) reflects the internal dynamics and functioning of the ecological system (e.g. lake structure and functioning). Arrow (C) shows how changes in the ecological system impact the ecosystem services provided, and arrow (D) indicates how changes in those services impact human communities. Box (E) represents the dynamics of the social system, which perceives changes in the environment through changes in ecosystem services. This alters socio-cultural wellbeing (i.e. human outcomes), spurring people to take action. People can act individually or in collective action groups to influence human behavior and decision-making. Alterations in human behavior influence land and resource use (F), thereby starting the cycle over again. The entire system is always susceptible to external forces such as climate change and globalization.

Governance occurs at multiple spatial and temporal scales. Some environmental governance occurs on the local scale and, according to SES theory, local governance may even be better suited for delivering sustainable development outcomes than state-driven governance processes, especially if local knowledge is incorporated to address the nuance in any given system (Leach et al. 1997). Non-governmental organizations (NGOs) are already recognized as viable actors in environmental governance systems

that can enhance democratic participation, advocate for policy change, and bring environmental degradation issues to the attention of other actors (Compas 2012; Chapin et al. 2009). If environmental governance can occur on the local scale, and NGOs can be important actors in environmental governance processes, lake associations are likely contributing to environmental governance processes to some degree. However, while some form of governance is always occurring in socio-ecological systems, formal collaborative environmental governance is *not* always occurring in every system. While this study is not centered within a formal collaborative governance context, I assess the extent to which lake associations are poised to contribute to collaborative environmental governance if it were in place.

Since lake associations are local institutions that focus on local issues, they can be valuable sources of local knowledge for other governance actors (see Section 2.1 for the definition of governance “actors”) which may have more agency than the lake associations themselves. The knowledge held by lake associations and their memberships could yield important insights into the feedbacks occurring between lake ecology and lake communities. Since integrating local knowledge into decision making can yield better outcomes, those with rule-making power may need to consider collaborating with or involving lake associations in governance processes if they are not already doing so. Lake associations have the capacity to act as catalysts for public involvement in decision making and for bringing principles of SES thinking to governance processes. This study is interested in identifying the environmental management and collaborative decision-making outcomes of lake association activities, as these outcomes can indicate the extent to which they are poised to contribute as key actors in collaborative environmental governance systems.

Lake associations contribute to lake management and governance in a number of ways. Lake associations engage in educational outreach efforts, environmental stewardship efforts, advocacy efforts, and partnerships with other groups and scientists. These multifaceted roles may indicate that lake associations are already participating actors in political processes that result in various institutional arrangements. Some of the ways through which lake associations can attempt to influence these political processes are by educational initiatives to inform voters, guidelines issued to shift social

norms, advocacy for formal changes in policy, and fostering multi-stakeholder collaborations. In this study, I am most interested in how lake associations are engaging in political processes and how this may be linked to changes in natural capital assets in the form of lake water quality.

The roles of lake associations in lake governance and management have not been completely overlooked in the scientific literature, but very few scholars have written about how effective lake associations are in their roles. Korth and Klessig (1990) compared the activities and finances of three kinds of institutions surrounding lakes in Wisconsin: sanitary districts, lake districts, and lake associations. They found that these three institutions primarily engage in monitoring activities, followed by the publishing of newsletters, fish management efforts, support for local ordinances, and weed harvesting activities. They also note that the primary difference between lake associations and sanitary and lake districts is that lake associations truly are grassroots organizations, relying on membership dues and fundraisers for their finances, rather than the tax dollars which fund sanitary and lake districts. This study provides insights into what types of activities lake associations become involved in and how they build financial capital, but it says little about lake association effectiveness.

Gabriel & Lancaster (2004) also examined Wisconsin lake associations, characterizing them in terms of their management objectives, issues dealt with, activities undertaken, and use of financial and social capital, to compare them to lake districts. This was the first study to actually compare effectiveness of lake associations and lake districts. They found that, although lake associations have less financial resources at their disposal than lake districts, lake associations report significantly higher effectiveness of their management actions. The authors are not very clear on how they are conceptualizing organizational effectiveness for this study, but they seem to be utilizing a system resources model in their assessment (Liket and Maas 2015; see Section 2.3.2 for more detailed explanation of this model), as their results mostly correlate the number of lake management activities undertaken with the amount of capital assets available, including a significant positive correlation for lake associations partnered with the Wisconsin Association of Lakes (Gabriel & Lancaster 2004).

Kramer (2007) also examined organizational effectiveness as it pertains to Minnesota lake associations, but this study focused primarily on the relationship between social capital and effectiveness. Kramer does relate water quality and water clarity to lake association effectiveness, and shows that both are significantly and positively correlated with greater social capital in lake associations. This study argues that social capital can be thought of as one proxy for organizational effectiveness, and that building social capital will likely result in greater effectiveness, but these results do not consider the many other indicators theorized in the conceptual literature to be linked to organizational effectiveness and management success.

Snell et al. (2013) argues that lake associations display the potential to play a vital role in natural resource management by utilizing their many aspects of their capacity to influence social and environmental change on the local level. These authors claim lake associations to be interesting units of study due to their power in promoting voluntary participation in conservation-friendly behaviors among stakeholders. They applied a governance framework, called the Institutional Analysis Development (IAD) framework, to conduct a study on the factors that determine the presence/absence and management success of lake associations in Maine. They found that lake associations are most likely to be present on lakes that have had prior environmental impairment, have public boat launches, recreational fisheries, volunteer lake monitoring programs, and multiple political jurisdictions. They also found lake association management success to be positively correlated with the level of attention (i.e. focus) given to a particular management issue (Snell et al. 2013). This analysis seems to be in greater alignment with the goal attainment model for organizational effectiveness (Hunter 2014; See Section 2.3.1 for a more detailed explanation of this model) insofar as lake association attention indicates something about their goals, or aim, as an organization, but the study reveals little else about what other outputs and factors could be influencing management success.

The literature shows that lake associations do play a role in resource governance, though there is limited discussion as to how significant this role can be, or exactly how lake associations go about fulfilling it (Carpenter et al. 2007). Some studies have correlated the presence of lake associations with lake management successes,

but much less is published in the literature about the diversity of roles undertaken by these organizations, the intricacies of how lake associations are responding to changes in water quality, the individual histories of lake associations, and how they evolve over time (Snell et al. 2013, Carpenter et al. 2007). Snell et al. (2013) were able to show that the amount of attention lake associations give to an issue is correlated with success in managing the issue, but we have little to no understanding of the full breadth of a lake association's focus over time. Some studies have revealed insights as to what types of activities lake associations are commonly engaged in, but they do not include analysis or discussion of how effective those activities are in achieving intended outcomes (Korth and Klessing 1990). While studies do address organizational effectiveness in their analysis of lake association activities, they focus on the relationship between lake association effectiveness and capital assets rather than performing multi-dimensional analyses (Gabriel and Lancaster 2004; Kramer 2007).

The limited amount of literature available on the roles and effectiveness of lake associations in lake management clearly illustrates the significant lack of understanding surrounding lake association governance potential (Kramer 2007). I developed my conceptual framework such that I might be able to address this gap in knowledge by performing a comprehensive, multi-dimensional analysis that explores the full breadth and nuance of lake association activity and effectiveness in collaborative environmental governance.

2.3 Organizational effectiveness diagnostic

Lake association effectiveness can vary across cases, depending on the specific structure, function, and strategy of any one group. Some lake associations are more effective at achieving outcomes, promoting environmental sustainability, and contributing to decision-making than others. There are a few models proposed in the literature for assessing organizational effectiveness. I have combined three of these models - the goal attainment model, the system resources model, and the reputational model - to create the conceptual framework applied to lake associations in this study. In

addition to understanding something about the effectiveness of lake associations, I characterized the role these groups are playing in their communities through tracking the types of activities they are engaged in and the outcomes they achieve as a result. I determined that knowing something about where a lake association is aiming (mission), what resources are at its disposal (capital assets & capacity), and what actions they are engaged in (activity) are necessary for a better understanding of their potential to contribute as collective action groups to resource governance (Fig. 5).

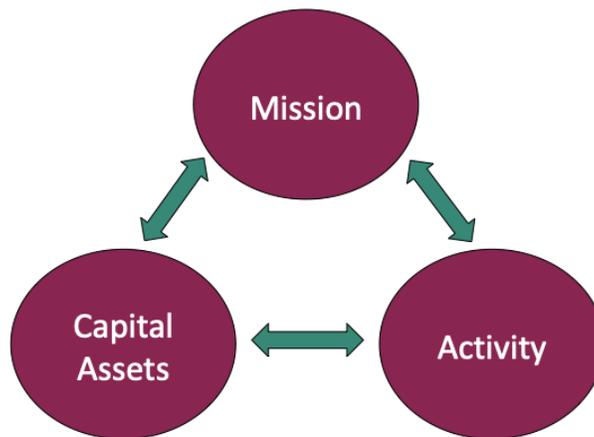


Figure 5: Conceptual framework diagram

The conceptual framework used in this study to assess the contributions of lake associations to collaborative environmental governance includes models for understanding organizational focus and aim (mission), organizational capacity and capital (capital assets), and organizational action (activity). All three of these organizational components influence and shape one another, as indicated by the arrows in this figure.

2.3.1 Goal Attainment Model and Organizational Mission

Since lake associations are examples of civic associations, their missions are often reflective of public needs, so it is all the more important to understand to what degree these organizations are achieving their missions, if at all (Hunter 2014). This is examined through an assessment of their ability to produce intended outcomes reliably and sustainably (i.e. their organizational effectiveness; Hunter 2014). Their ability to do this has implications for their continued viability as a trusted and respected organization, and for the degree of agency they are likely to have within the larger governance

system. Characterizing a lake association's mission based on motivations can also yield important insights into how these organizations are oriented towards problems in their watershed and the focus of their particular organizational strategies.

One model for assessing organizational effectiveness is the goal attainment model. This model defines organizational effectiveness as "the achievement of self-selected goals" (Liket & Maas 2015; Forbes 1998). Lake associations typically evaluate their goals through outputs, which are the tangible services provided by the organization including the people served, activities performed, and items produced (e.g. educational programs offered, numbers of volunteers recruited for water quality monitoring, meetings with political officials, etc.; Westcott 2008; Hunter 2014). Outcomes are the impacts of these provided services, or the results of organizational outputs (Westcott 2008). Outcomes can be intended or unintended, and are only considered intended if they can be "directly linked to the organization's intentional efforts and be a key metric through which the organization holds itself and its staff accountable" (Hunter 2014). Using this model, effectiveness can be determined by the degree that outputs, which are guided by lake association mission and goals, result in intended outcomes (Hunter 2014; Liket and Maas 2015).

However, I am also interested in how effective lake associations are at achieving water quality outcomes, and the degree to which these water quality outcomes are in line with intended outcomes of the lake association (Fig. 6). Water quality outcomes can be thought of as the environmental change in a lake system that results from lake association activities (Kramer 2007). I am mostly interested in understanding what type of organizational behavior leads to higher water quality and water clarity (i.e. positive water quality outcomes) in a system. It should be noted that unintended outcomes may also result from lake association outputs, which may have unintended implications for water quality, but these outcomes are more difficult to link to organizational effectiveness, or lack thereof (Fig. 6). Instead, I partially conceptualize effectiveness by the number of intended outcomes achieved by each lake association. By investigating how effective lake associations are at achieving their missions, and what this means for water clarity and water quality in their respective lakes, we can gain further insight to their roles in collaborative lake governance (Kramer 2007).

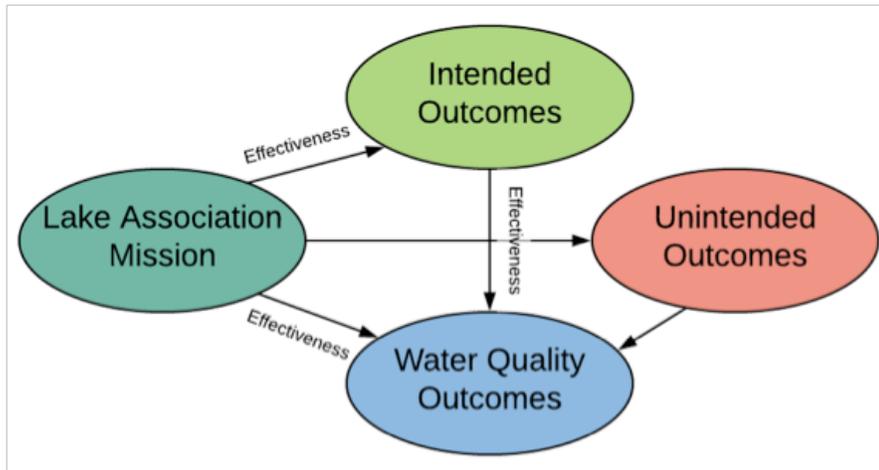


Figure 6: Modes of organizational effectiveness

This figure displays the modes of organizational effectiveness that are under investigation in this study. Each arrow represents outputs of the organization. Outputs that are inspired by lake association mission can result in intended outcomes, unintended outcomes, or water quality outcomes. Intended outcomes can be in line with water quality outcomes, or the lake association could specifically call for water quality outcomes in their mission. Other water quality outcomes could be unintentional. Organizational effectiveness determines to what degree lake association outputs are resulting in intended outcomes. Lake governance effectiveness determines to what degree lake association outputs are resulting in positive water quality outcomes.

Many lake associations have missions to protect the lake resource, but specific missions and goals can vary. Organizational missions are expressions of the core purpose and values of the organization. I suggest that lake association missions can be characterized along three complementary dimensions to better understand the exact motivations and orientation of particular groups. Missions can be social-altruistic, biospheric, or self-enhancing depending on the language used and the values expressed in charter documents, mission and vision statements, and the major goals of the organization (Stern 2000; Van Vugt 2009). Social-altruistic missions seek to conserve aspects of the ecological system because of what it means for human communities and the quality of life human experience. Biospheric missions, in contrast, strive to protect environmental quality because the ecological system is seen as having intrinsic value which human communities are morally obligated to protect. Finally self-enhancing missions express the need to protect natural resources for some outside gain. For example, a lake association with a self-enhancing mission might express the need to protect lake water quality because of what it means for lakeside property values. These three mission motivations can co-occur, interacting to shape the ways

lake associations identify and define issues, the stances they take as collective action groups, and the outcomes they pursue.

2.3.2 Systems Resources Model and Organizational Capacity

The next model for assessing organizational effectiveness is the system resources model. This model relies on measures of organizational survival and growth as proxies for effectiveness (Liket and Maas 2015; Forbes 1998). The survival and growth of an organization is contingent on the resources, capabilities, and knowledge that an organization has access to, i.e. organizational capacity (Laraia et al. 2003; Andrews et al. 2010; Flora and Bregendahl 2012). While goal attainment, public recognition, member engagement, leader development, and bridging activity are all factors of organizational effectiveness, they are also dependent on the capacity of the organization in question.

The system resources model views the relationship between organizational capacity and effectiveness as a positive feedback loop where increases in capacity lead to increases in effectiveness, which in turn, builds more capacity (Fig. 7; Andrews et al. 2010). Andrews et al. (2010) highlights the ability of effective civic associations to engage in capacity-building activities. This is when a civic organization leverages currently held resources to generate or maintain new ones, preventing organizational decline and increasing effectiveness through expanding “the breadth and quality of program activity” (Andrews et al. 2010; Fig. 7). Lake associations all possess a certain amount of organizational capacity, which they can leverage according to their missions to grow their organization, advocate for policy change, provide educational services, or take direct action to affect environmental change (Fig. 9). The leveraging of capacity produces outputs that may or may not lead to governance outcomes.

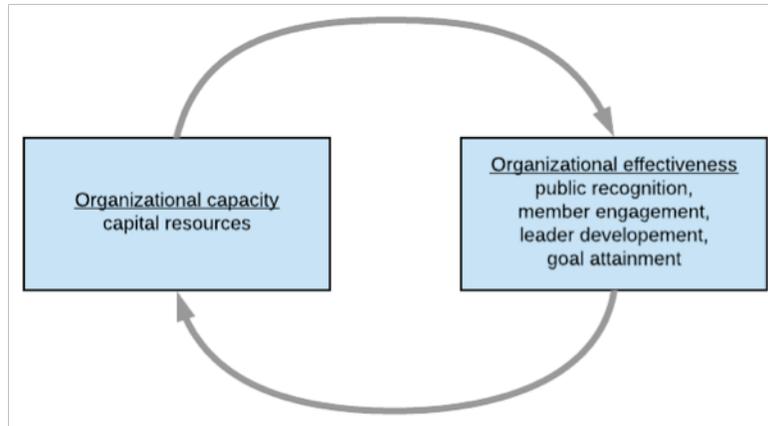


Figure 7: Relationship between organizational capacity and effectiveness

Organizational capacity and effectiveness support one another. Lake associations have a certain amount of capacity in the form of capital assets, or resources, at any given time. They can leverage this capacity to produce outputs aimed towards effectiveness outcomes (top arrow). As organizational effectiveness is increased, the lake association can engage in more capacity building activities (bottom arrow) to further grow their capacity and reinforce the positive feedback loop.

The community capitals framework provides a mechanism for describing organizational capacity (Flora et al. 2005; Fey et al. 2006). Although the framework was originally developed to describe the health and wellbeing of an entire community, I applied it on the organizational scale for this research. It was essential to use this framework to assess each lake association for two primary reasons: firstly, to *contextualize* each case, and secondly to *categorize* the types of outputs produced by each organization. Contextualization is a way of establishing a baseline of operations (or starting conditions) for each lake association, and it is key for tracking change over time. Structural similarities and differences between each case study can be defined through contextualization and categorization as well. Categorizing organizational actions into the seven capital types can illuminate where each organization is focusing their efforts, and which resources they are relying on the most heavily to do so. This can provide useful information about the scope of an organization’s effort in addition to the nature of that effort (Pigg et al. 2013). Lake association effectiveness is considered within the context of organizational capacity in this research, and that capacity is characterized through the community capitals framework.

The community capitals framework encompasses the variety of assets social systems can gain or loose over time. According to the framework, assets can be

grouped into seven categories: (1) *natural capital*, (2) *cultural capital*, (3) *human capital*, (4) *social capital*, (5) *political capital*, (6) *financial capital*, and (7) *built capital*. These seven types of capital can be thought of as asset reservoirs from which valuable goods and services flow.

The community capitals framework also describes the fact that there is much overlap between each of the capital asset types in society. The same holds true when the framework is applied on the organizational level. For more specifics on how this overlap was addressed in my research methods, refer to Section 3.3. I conceptualized the differences between the seven capital types when applied to lake associations as follows: *Natural capital* of lake associations includes aspects of the lake resource and surrounding area that make it harder or easier to manage, harder or easier to rally support for, or that present unique challenges/benefits to the association. *Built capital* for lake associations would include any buildings or infrastructure owned, managed, or used by the association. *Financial capital* for lake associations includes any monetary assets in possession of the association such as donations, collected membership dues, or fundraiser profits. *Political capital* could be demonstrated by formal partnerships or relationships with regulatory or government agencies. *Social capital* can be evidenced in lake associations through community partnerships, indicators of social trust, or through public recognition. *Human capital* is acquired by lake associations through their recruitment and development of membership, staff, volunteers, people in leadership positions, and people involved in the organization with specific skill sets (e.g. scientists). Finally, *cultural capital* may be evidenced by a lake association's participation or presence at community festivals or their acquisition of cultural artifacts. Through this lens of capital assets acquired or achieved by lake associations, it will be possible to describe an indication of organizational structure and wellbeing for each case study (Flora et al. 2005).

2.3.3 Reputational Model and Social Capital

Another model for assessing effectiveness is the reputational model. The reputational model states that an organization is only as effective as people, particularly

the relevant stakeholders, perceive it to be. (Liket and Maas 2015; Herman and Renz 1999; Jun and Shiau 2012). This type of effectiveness can be assessed through measures of *public recognition* and *social trust*. Public recognition reflects an organization's social capital, and consists of the perceptions the community at-large have for a particular group. Public recognition can be categorized into perceptions of legitimacy, saliency, reliability, and credibility (Sternlieb et al. 2013). Indicators of public recognition include how much a civic association is consulted or asked to represent their constituency by decision makers, the media, and the general public (Andrews et al. 2010). It can also be indicated through honors, praise, citations, or invitations granted to a particular group by outside groups or individuals. Social trust is contingent upon how much people believe the organization shares the same values that are important to them (i.e. salience), how reliable the organization is in delivering intended outcomes (i.e. goal attainment), and how legitimate and credible the organization is perceived to be (Decaro et al. 2017; Siegrist and Cvetkovich 2000; Stern 2008).

Partnerships are another key piece of social capital that lake associations commonly maintain to increase social trust, recognition, and impact (Leach and Pelkey 2001). Since lake associations are known to form partnerships, and are well situated to represent their membership in the governance process, partnering behavior has implications for contributions to collaborative governance outcomes. We increasingly understand socio-ecological systems to be evermore interconnected, complex, and dynamic, in need of interdisciplinary and nuanced management approaches. Some organizations have embraced this need by functioning in a way that spans between human-demarcated and physical boundaries, as well as between the traditional disciplines of science, policy, and practice (Crona & Parker 2012; Sternlieb et al. 2013). Organizations that operate at the interface between these three disciplines are referred to as *bridging organizations* in the literature and researchers have shown such organizations to be conceptually linked to natural resource governance through their capacity to contribute significantly to learning processes, and to promote cooperation and collaboration between various governance actors in a system (Crona & Parker 2012).

In addition to being positioned well for contributing to governance on their own, lake associations are positioned just as well within their communities to act as bridging organizations. My research assesses whether or not lake associations are functioning in this capacity, since it has further implications for the integrity of lake associations' roles in the governance process. If lake associations are indeed functioning in a boundary-spanning manner, there should be evidence that they are connecting people across the science-policy-management nexus (Fig. 8). They can do this by linking resource users, lake managers, scientists, and policy makers through the facilitation of collaboration, learning processes, information transfer, and conflict mediation (Sternlieb et al. 2013). These mechanisms are theorized in the literature to indicate effective boundary-spanning institutions along with characteristics of legitimacy, saliency, urgency, and credibility (Safford et al. 2017; Sternlieb et al. 2013; Matson et al. 2016).



Figure 8: The bridging capacity of lake associations adapted from Sorice et al. (In prep)

Lake associations are positioned such that they may mediate communication, collaborations, and/or information between science, policy, and society. Lake associations may or may not be formally partnered with groups or individuals within each of these sectors. The extent to which lake associations act in a capacity to facilitate these interactions indicates something about their potential contributions to collaborative governance and the adaptive management process.

One important way community-based environmental organizations can communicate across the science-policy-management nexus is by linking stakeholders with local knowledge of changes in ecosystem services to policy makers, resource managers, or scientists. Community groups tend to have an intimate understanding of cultural and monetary ecosystem services provided by local resources. This local knowledge can be very useful to scientists, so that they can investigate questions that are salient to the public, and it can be extremely relevant for decision makers, so that they can better understand the wants, needs, and dynamics of these communities. Since water quality inherently involves many stakeholder groups, collaborative management is readily implemented in watershed planning (Koontz & Newig 2014).

Lake associations that are sharing local knowledge of ecosystem services and facilitating the co-production of knowledge through acting in a bridging capacity are in line with best practices for the governance of ecosystem services (Bennett et al. 2015; Niles and Lubell 2012). If lake associations successfully communicate local knowledge to scientists and academics, researchers will be better equipped to collect and analyze the data that is most useful to lake users and managers. Likewise, if lake associations can accurately represent and convey the ecosystem services values of their communities to political leaders and managers, they will be more likely to come up with sustainable and well-suited policies or practices. If lake associations can serve to keep these lines of communication open over decades of time, they can further contribute to the continuous adaptive learning process that is required to effectively manage systems, enhancing both ecosystem functioning and human well-being (Bennett et al. 2015; Crona and Parker 2012; Folke et al. 2005; Kofinas 2009; Niles and Lubell 2012).

Although social capital can be built through bridging and partnering activity of lake associations, the success of that bridging activity, and the overall reputation of a lake association, is largely dependent on internal organizational dynamics as well. Andrews et al. (2010) built and tested an empirical framework of organizational effectiveness for civic associations. These authors showed that organizational leadership practices explain many of the differences in effectiveness between civic associations. They performed multivariate analyses to test whether patterns of effectiveness could best be explained by external factors or internal organizational

practices and found that, although the external resources available to an organization are important, the internal organizational dynamics and practices have a stronger relationship with organizational effectiveness (Andrews et al. 2010).

In addition to building social capital and public recognition, Andrews et al. (2010) identifies two aspects of a civic association's human capital, *leader development* and *member engagement*, to be two more essential factors for organizational effectiveness. Leader development is the continuous process of augmenting the capacity of new and current leaders to be skilled, motivated, and effective in their work. Member engagement is how much the organization "generates active participation by members in voluntary group activities" (Andrews et al. 2010). Developed leaders and engaged members can be leveraged to achieve other external purposes and further the organization's goal attainment and reputational effectiveness.

2.3.4 Lake association activity

Understanding the sorts of activities and initiatives lake associations are engaged in is the final piece of my conceptual framework. Knowing where an organization is aiming and what resources it has at its disposal does not hold much relevance for governance without investigating something about what the organization is actually *doing* and what role those actions play in the larger system. There are a few specific actions through which lake associations may be influencing lake water quality and contributing to lake management decision making (Fig. 4). First, they can act directly to influence the condition of the lake or its catchment. For example, they can do this by engaging their membership to conduct shoreline cleanups, perform invasive species removals, create shoreline buffers, etc. Secondly, they can strive to influence social norms and behavior of the general public, or individual behaviors of their members, through educational initiatives and the issuing of guidance advisories. Thirdly, they can seek to affect formal policy change through engaging in political advocacy, or even lobbying in some cases. The changes in laws, regulations, and public education programs that can result from formal policy change affect societal behavior in turn. Changes in societal behavior alter land use, resource use, and other management

practices that impact the water quality of lakes. Finally, lake associations can act to perform resource monitoring to aid in the identification of specific problems and translate monitoring information into targeted and scientifically informed strategies for further action. These are the four pathways lake associations can take to potentially contribute to environmental governance of the lake resource and affect change in lake water quality (Fig. 4).

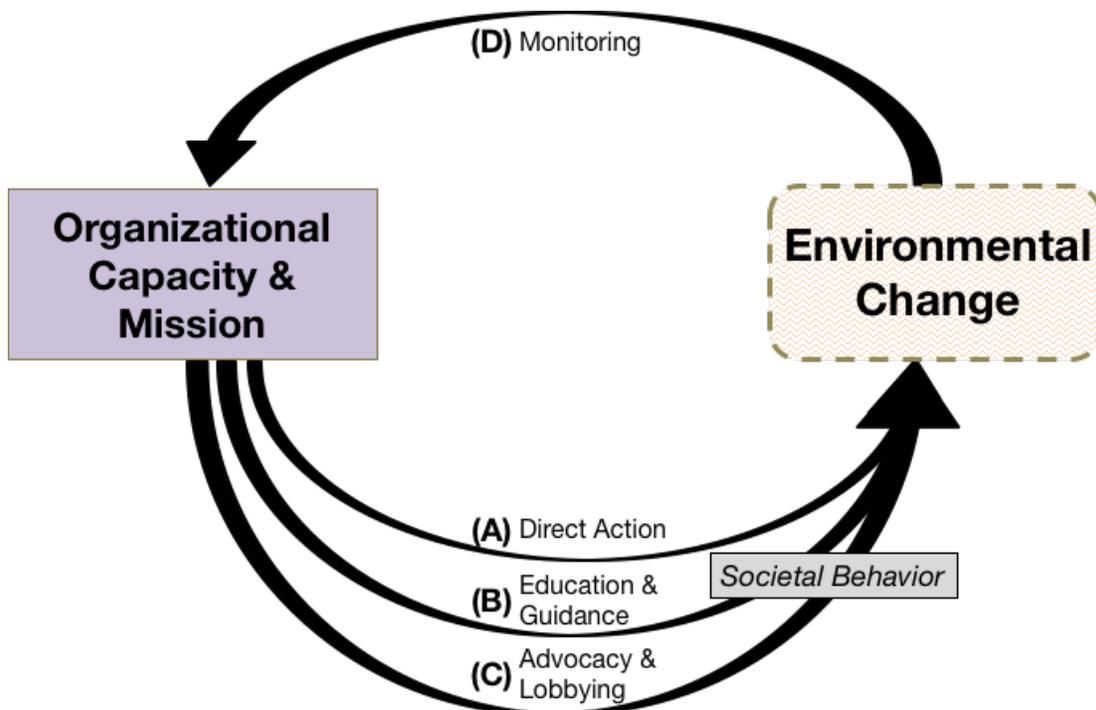


Figure 9: Conceptual diagram of lake associations actions and their connection to environmental change

Lake Associations perceive feedbacks from the environment through the lens of ecosystem services, which motivates them to affect change in the environment through various types of actions and initiatives. They may take actions to directly influence lake water quality (A). They may develop educational programming, issue educational materials, or distribute guidance principles to the public to influence individual and societal behavior (B). They may invest in political advocacy or lobbying to influence laws, regulations, or public education, which in turn influences societal behavior and human decision-making (C). Finally, they may monitor the resource to better understand ecosystem dynamics and environmental change and translate this information into strategic action (D). Partnerships are another important mechanism for governance that can be implemented on any one, or all four, of these pathways.

Note that lake associations can leverage their partnerships to engage in each of these pathways as well. Lake associations can partner with other environmental groups to increase their capacity for direct action, environmental stewardship, and educational initiatives. They can partner with other community groups to further influence social

behavior and local policy change. They can partner with political advocacy groups or government agencies to strengthen their influence on formal policy change, and they can partner with scientists or natural resource agencies to assist in resource monitoring efforts.

2.4 Applying the framework

My study will apply theories of environmental governance, boundary-spanning organizations, organizational capacity, and organizational effectiveness as lenses through which to describe and characterize two lake associations (Table 1). I will be using a *multi-dimensional model* to assess organizational effectiveness and capacity for each case study, which combines effectiveness indicators from the goal attainment, reputational, and system resources models. This is because, while Andrews et al. (2010) argues that the strategic way in which a civic organization is led and operated is a better predictor of organizational effectiveness than the amount of resources available to the organization, the system resources model is useful for comparability between cases. Jun and Shiau (2012) also claim that organizational effectiveness cannot be purely objectively measured, so subjective perceptions of effectiveness will be captured through implementing the reputational model. However, I am also interested in hypothesizing universal proxies for organizational effectiveness, so I am defining the concept of organizational effectiveness largely through the goal attainment model (Liket and Maas 2015).

Prior to Andrews et al.'s 2010 work, previous research mostly focused on how factors external to civic associations affect their outcomes and successes. In practice, there is a lack of understanding for how civic associations can assess their own effectiveness, so financial measures are often used as a proxy for organizational effectiveness and capacity. However, the literature largely demonstrates that financial measures alone are inadequate to describe effectiveness of non-profit or voluntary civic associations (Liket & Maas 2015; Andrews et al. 2010; Laraia et al. 2003; Hunter 2014). In my research, I am interested in focusing on the wide variety of internal factors that

can influence the contributions of lake associations to governance and environmental outcomes.

Guiding Theory	Research Questions Addressed	Most Relevant Concepts, Frameworks, or Measures	Most Relevant Sources
Environmental governance	<p>How do lake associations contribute to lake governance?</p> <p>Where do lake associations focus their attention?</p> <p>What are the outcomes of lake association activity?</p>	Outreach, advocacy, partnerships, guidance, direct resource management, political processes	<p>Matson et al. (2016)</p> <p>Folke et al. (2005)</p> <p>Pahl-Wostl (2009)</p> <p>Folke (2006)</p> <p>Hardin (1968)</p> <p>Ostrom (1990, 2005)</p> <p>Ostrom et al. (1999)</p>
Boundary-spanning organizations	<p>How are lake associations acting in a bridging capacity?</p> <p>What actions are lake associations taking?</p>	Partnerships, network building, collaboration, co-production of knowledge, information sharing, social trust, legitimacy, saliency, urgency, credibility	<p>Crona & Parker (2012)</p> <p>Sternlieb et al. (2013)</p> <p>Safford et al. (2017)</p> <p>Bennett et al. (2015)</p> <p>Koontz & Newig (2014)</p>
Organizational effectiveness	<p>What are the missions of lake associations and to what extent do they fulfill those missions?</p> <p>Where do they focus their attention?</p> <p>What does this mean for water quality?</p> <p>What are the outcomes of lake association activities?</p>	Outputs, outcomes, goal attainment model, reputational model, system resources model, multi-dimensional model, public recognition, member engagement, leader development, social trust	<p>Andrews et al. (2010)</p> <p>Hunter (2014)</p> <p>Liket & Maas (2015)</p> <p>Laraia et al. (2003)</p> <p>Forbes (1998)</p>
Organizational capacity	<p>What capacity do lake associations have?</p>	Community capitals framework: human capital, natural capital, political capital, built capital, financial capital, social capital, cultural capital	<p>Flora et al. (2005)</p> <p>Emery & Flora (2006)</p> <p>Fey et al. (2006)</p> <p>Flora & Bregendahl (2012)</p>

Table 1: Major guiding theories of this study and most relevant sources

Through my literature review, I identified applicable theories that informed the analysis of each concept listed. There is some overlap between theories, as they are interconnected in various ways.

The conceptual framework I have developed here combines many theoretical concepts taken from the literature to assess the potential role lake associations are playing in their communities (Table 1). To answer my primary research question about how lake associations might contribute to collaborative environmental governance, my study considers the extent to which lake associations are participating in lake governance through tracking their involvement in collaborative decision-making processes, advocacy work, direct resource management efforts, and partnerships with decision makers. To understand how these organizations might be acting in a bridging, or boundary-spanning capacity, my research will examine the involvement of lake associations in partnerships, information sharing across sectors of society, and collaborative efforts. To reach insights about what makes collective action groups (such

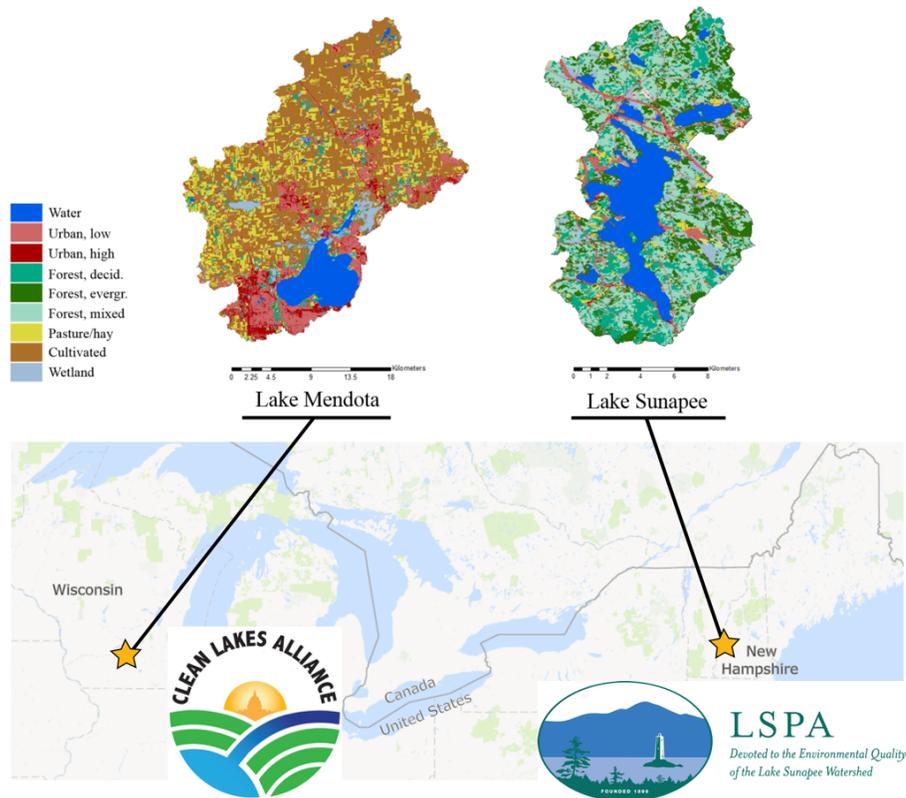
as lake associations) effective, I will analyze mission statements and compare them to outcomes, I will assess instances of public recognition, I will perform an analysis of each lake association's capital assets, and I will document the extent to which these organizations engage their membership and develop leaders.

3. Methods

3.1 Selection and description of case studies

I applied the framework described above to characterize and assess the strategies and roles of two case study lake associations: Lake Sunapee Protective Association in Sunapee, NH on Lake Sunapee, and Clean Lakes Alliance in Madison, WI on Lake Mendota. Both of these lake associations are relatively high-functioning, with paid staffs, published annual reporting, and the production of regular newsletters. They both claim to have achieved significant social and ecological outcomes, so I wanted to further investigate how these two groups are strategically structured and functioning. They are both situated on glacially formed lakes at similar latitudes, with mixed land-use in the surrounding areas. The exact composition and location of land use varies between the two lakes, as does the water quality of each lake. The missions and general activities of these two lake associations vary as well, providing interesting contrasts to explore in examining the operations of lake associations within unique lake ecosystems and community settings.

Lake Sunapee Protective Association (LSPA), is an established, member-driven organization, founded in 1898 to protect lake water quality. The land surrounding Lake Sunapee is currently mostly forested, but the area has been experiencing an increased rate of development along the shoreline and elsewhere in the catchment. Sunapee, NH, and the other small towns around Lake Sunapee are primarily known as resort towns, which attract tourists and summer residents each year. Lake Sunapee is oligotrophic, meaning it is relatively clean and clear compared to many U.S. lakes, with a history of providing drinking water to resource users, in addition to recreational opportunities. Therefore, LSPA is positioned on a lake with high water quality, so the organization is tasked with preserving that water quality and preventing any serious degradation from occurring (Table 2).



<u>Lake association name:</u>	Clean Lakes Alliance (CLA)	Lake Sunapee Protective Association (LSPA)
<u>Lake name, State; Size:</u>	Lake Mendota, WI; 15.21 mi ²	Lake Sunapee, NH; 6.463 mi ²
<u>Year founded; reason for formation:</u>	2009; to assist in running the Clean Lakes Festival	1898; to preserve water quality
<u>Main characterization:</u>	Agricultural recreational lake	Forested resort lake
<u>Major categories for surrounding land-use:</u>	55% agriculture, 1% forested, 20% developed	4% agriculture, 81% forested, 8% developed
<u>Membership:</u>	~300 donors	>1000 members
<u>Dominant focus:</u>	Preventing algal blooms	Water clarity
<u>Major partnerships:</u>	>130 local businesses; North Temperate Lakes Long-Term Ecological Research network; University of Wisconsin	Scientific Advisory Committee; several local colleges; K-12 schools in the watershed

Table 2: Outline of case study lake associations

These two case study lake associations were selected based on their similarities and differences, which provide interesting contrasts to further analyze. This context is important to explore the diversity of ways lake associations can orient themselves and act to respond to differing resource challenges, and differing community needs and desires.

LSPA has accrued more than 1000 members and it reaches approximately 5000 people per year through outreach programming. Its mission is as follows: “LSPA, founded in 1898, is a member supported nonprofit organization dedicated to preserving and enhancing the special environment of the Lake Sunapee Region through education, research and collaborative action.” (<http://www.lakesunapee.org/>). LSPA runs a water quality laboratory that performs water quality sampling and testing for the NH Department of Environmental Services, and it partners with several nearby colleges and K-12 schools in its scientific and outreach efforts.

The Clean Lakes Alliance (CLA), is a relatively young organization, founded in 2009, originally to assist a local water ski team in running the Clean Lakes Festival, an event which raises money to clean up the lakes in the Yahara River lakes chain. Within the first two years of its existence, CLA quickly transformed itself into a donor-driven partnership, and expanded its mission to include lake water quality issues and community engagement far beyond the Clean Lakes Festival alone. Its mission now states that the “Clean Lakes Alliance strives to continue building a community of people, businesses, organizations, and government agencies dedicated to improving and protecting water quality in the Yahara River watershed.” (<https://cleanlakesalliance.org/>).

Lake Mendota is the largest and first lake in the Yahara River chain of lakes and CLA’s offices are located on its shores. Land use in the Lake Mendota catchment is primarily agricultural and urban, and the lake itself is eutrophic, meaning it has already shifted into a degraded state, with too many nutrients and not enough oxygen to support historic levels of plant and animal life. Lake Mendota also experiences low water clarity and seasonal blue-green algae blooms, so CLA is situated on a lake where there is a need to prevent of further degradation and restore water quality (Table 2).

CLA is run by a board of directors, has over 300 active donors, and is partnered with over 130 local businesses. Together they run educational programs, facilitate stakeholder communication, and advocate for land-use changes. Notably, CLA does not self identify as a lake association, or an environmental group. To remain inclusive and avoid political connotations, CLA calls itself a “partnership”, an “alliance”, or even a “quality-of-life organization” in their self-published documentation, but I am considering them as a case study in this research because they meet the definition of lake

associations as it has been defined for this study (see 'Introduction' for definition). When asked why CLA does not identify as an environmental group, this long-time staff member said:

“You know, if the vision of the organization is we see a future where everybody thinks lakes are the most important asset, it was more of an education, get people involved with the lakes. And so the best way to do that was not to be adversarial and not do a lot of lobbying, but more work on creating a cultural shift. So we're a quality of life organization. When you think about the recycling movement, or the nonsmoking movement or the biking movement, that's creating a cultural shift of how people live their lives. And that's what we're doing. It's a cultural shift. So we're a quality of life organization versus an environmental organization.”

3.2 Data Collection and Sampling

This research was conducted through a qualitative content analysis of historic documentation and supplemented with field observations and semi-structured interviews from both case study lake associations (Babbie 2013; Merriam & Tisdell 2016; Marshall & Rossman 2016). The historic documentation I collected, and subsequently analyzed, consisted of self-published annual reports and newsletters from both organizations, as well as newspaper articles mentioning either lake association (Figure 10.a). I focused on documentation published from 2000 - 2017 for LSPA and from 2010 - 2017 for CLA in my qualitative content analysis (Figure 10.b). I limited my analysis to these documents and this time frame due to logistical constraints that came with needing to complete the project within the two-year graduate program time frame. In addition, applying my conceptual framework to these documents required an in-depth content analysis, requiring me to trade off examining longer time spans for greater depth of analysis. The 2000 – 2017 time period of focus was chosen based on the decades where my research collaborators have the best ecological data for these two

case study sites, which matters for coupling my results within the greater context of the NSF-funded project.

I initially performed an inductive first pass of the collected documentation to familiarize myself with the contents (Fig. 10.c). The newsletters contained information about issues that were of importance or interest to each lake association during the time period of analysis, as well as stories of lake association activities and community engagement. Annual reports contained records of human and financial capital assets possessed by these groups through the reporting of donors, membership, volunteers, staff, and finances. Since newsletters and annual reports were primarily intended for an audience of lake association members or donors, they contained many advertisements for lake association programming and events, the sharing of important news or information, and evidence of the various services these groups provide to their constituents. Both newsletters and annual reports contained reminders and updates on lake association mission statements and goals. I decided to focus on these types of documents for their comparative value, since both case studies produce these documents and I was able to collect a complete set during the time period of analysis for both groups.

LSPA issues between 2 and 6 newsletters per year, which are titled *the Beacon*, and which can vary in length, but are usually around 12-15 pages long. I collected and analyzed 67 regular issues of the *Beacon*, 3 special edition newsletters, and 1 membership memo, for a total of 71 documents that were published from 2000 - 2017 and distributed to LSPA's members via mail. CLA issues 3 to 12 *Lake-O-Gram* newsletters each year, which are distributed by email to those on its listserv. The listserv audience includes donors, partners, board members, event attendees, and any interested community members. I collected and analyzed the 57 *Lake-O-Gram* newsletters published from 2011 - 2017 (no newsletters were published during 2009 or 2010).

I also collected and analyzed the 17 annual reports published by LSPA during the 2001 - 2017 time period, which reported on the years of 2000 - 2016 (one for each year). The CLA combines the organization's annual report with an annual report on the water quality of each of the lakes in the Yahara River lakes chain. All together, this

document is called the *State of the Lakes* report. CLA produces one of these reports each year, with the exception of 2012 where it published two separate documents, a *State of the Lakes* report and an *Annual Report*. I analyzed a total of 8 annual reporting documents for CLA published from 2012 - 2017 (there was no annual reporting published in 2010 or 2011). Since I am focused on Lake Mendota for this study, I only analyzed the portion of the *State of the Lakes* reports that pertained to Lake Mendota.

In addition, I performed an archival search of news publications containing mentions of each lake association to better triangulate self-reported information and identify evidence of public perceptions and outcomes. I utilized two online databases: *Access World News* from *NewsBank* and *Factiva*, to locate news documents published during the 2000 – 2017 time period. These databases include newspaper articles, magazine articles, television and radio transcripts, photos from news services, financial reports, and more. On 05/29/18 I performed a search on *Access World News* with the search terms of any article containing the phrase “Lake Sunapee Protective Association” published from 2000-2017, yielding 262 results. On 06/05/18 I performed a search on *Factiva* using the same search criteria and this yielded 76 results. On 06/05/18 I searched for any publication containing the phrase “Clean Lakes Alliance” on both *Access World News* and *Factiva* for the time period of 2000-2017, and these searches yielded 225 and 155 results respectively (there were no results from either database published prior to 2010 for CLA). After downloading these news documents I cross referenced the results from the *NewsBank* and *Factiva* searches and removed any duplicate articles published on the same day by the same news source that were turned up by both databases. I kept articles containing the same content, but were published by more than one news source. After cross referencing the results of both databases, the total yield was 262 separate news publications mentioning “Lake Sunapee Protective Association,” and 249 separate news publications mentioning “Clean Lakes Alliance.” Each of these news mentions were analyzed for this study. News mentions were particularly helpful for identifying indicators of public recognition and social capital, and for further examining the role of these groups within the context of their larger communities, and identifying the goals or achievements they were most known for.

I used these documents to track each of the concepts described in my conceptual framework over time, including mission/goal statements, capacity indicators, and reporting out of actions (Fig.10.d). I also inductively developed codes that were specific to each lake association, so that I could track important events, projects, issues, and key individuals for both groups (Fig.10.e).

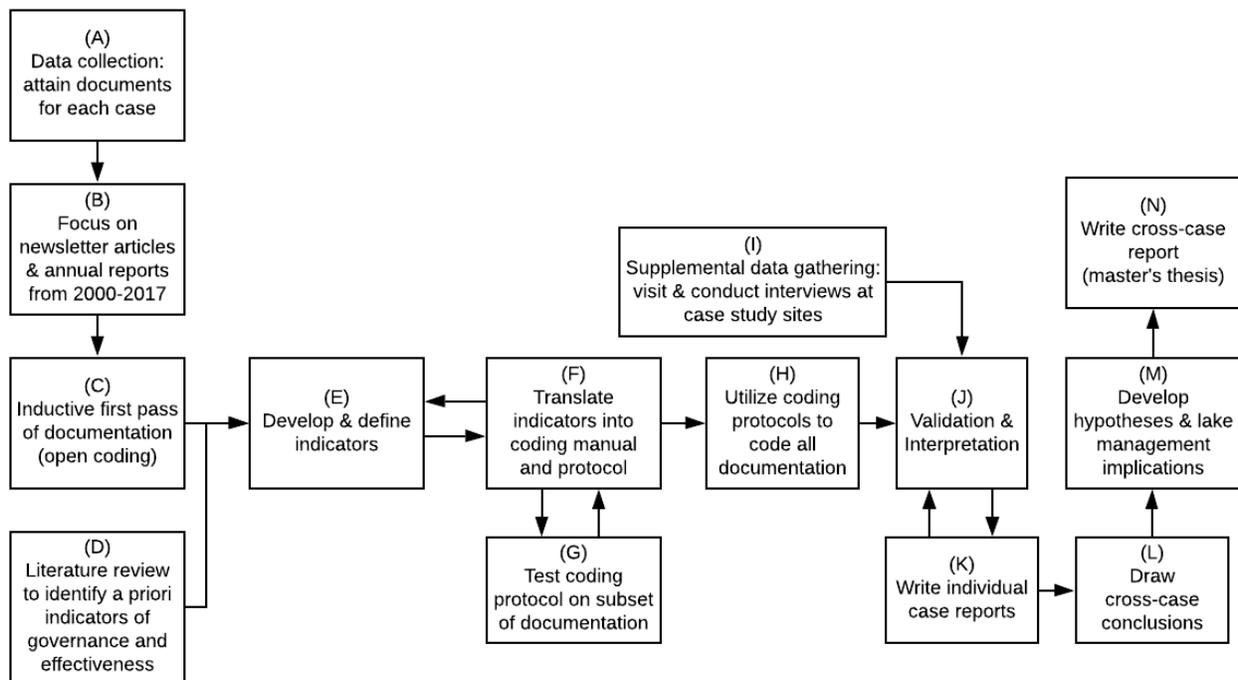


Figure 10: Methods progression

This chart represents the progression of my research methods. Adapted from Yin (1994).

Although I found indicators of organizational structure, function and effectiveness in the documentation produced by the two case study lake associations, this documentation did not always contain the full story for either lake association. To address the relevant gaps in the document content analysis, I visited both lake associations and conducted semi-structured interviews with key individuals to supplement the analysis (Fig 10.i; see Appendix E for interview scripts). Supplementing the document analysis with interviews was necessary to adequately track certain indicators and events over time for each group. The sample of interview participants

included staff and those with leadership positions within each organization. I received approval from the Virginia Tech Institutional Review Board (VT-IRB) to conduct and audio record interviews with consenting participants from both lake association sites on 08/06/18. I conducted and audio-recorded 10 interviews at CLA with a total of 10 participants all taking place within the week of 10/22/18 - 10/26/18, and conducted and audio recorded 10 interviews at LSPA with a total of 11 participants taking place from 12/19/18 - 12/21/18 with one additional interview taking place over the phone with a 12th participant from LSPA on 01/07/19. With further approval from the VT-IRB, I hired a 3rd party research assistant to transcribe all interviews.

I also spent time in the field at each lake association site to observe daily operations and to get a better feel for the organizational culture and attitudes present at each location (Fig.10.i). During my time spent with each lake association, I sat in on meetings and attended events hosted by these groups. I took detailed observational field notes, which allowed me to gather additional information on the current functions and perceptions of each lake association. Interviews and field observations provided context and essential background information for the two case studies and strongly aided in the validation and interpretation of the coded documentation (Fig.10.j).

3.3 Measurement and Analytical Techniques

The primary method for exploring the research questions of this study was performing a content analysis on the collected historic documentation and qualitative data. This type of analysis allowed me to track governance and organizational effectiveness indicators over time for each case study. I arrived at a list of indicators from the factors identified in the literature review to hold relevance for contributions to governance, bridging activity, organizational effectiveness, and organizational capacity (Fig.10.d; Appendix A). I also used the open coding technique to further determine which indicators would be feasible to track in the data (Fig.10.c). As I developed and defined these indicators, I began to compile and categorize them, assigning the indicators to a series of codes, and creating a coding manual and a set of three coding protocols, one for each document type (Fig.10.f; Appendices B, C, & D). Developing

and defining the indicators along with the creation of the coding manual and protocols was an iterative process, taking place over a number of months. The coding protocols consist of systematic instructions for assigning a priori codes pertaining to the function and focus of each article, as well as creating and assigning inductively determined codes.

The coding protocols provide instruction on coding each article holistically, based on the main purpose and concepts of the article, as well as coding for all relevant concepts that lie within the internal content of each article. I developed a series of “article function” codes to designate the main purpose of each self-published article, since putting together these articles for publication in newsletters or annual reports is also part of each lake association’s activity. For news publications I developed a series of “article type” codes to designate the function each news articles was serving (e.g. I coded news articles differently if it was an obituary or a calendar event ad, versus an objective news article). I also included “magnitude codes” to indicate whether the article contained clear evidence of an increase or decrease in capital assets (Saldaña, 2013).

Initially, I performed multiple rounds of coding on a subset of the documentation to refine my code assignments and coding scheme with each round (Fig.10.g). The primary tool used for qualitative coding analysis was the Atlas.ti software (<http://atlasti.com/>), which allowed me to upload all of the collected documents and organize documents and codes into groups, so that patterns and themes could be more readily identified. Testing the coding protocols on a subset of documents allowed me to further develop the coding manual and protocols (Fig.10.f & 10.g).

Once the coding manual and protocols were sufficiently developed with clear definitions for each code and instructions on when it is appropriate to assign them, I proceeded to code all sampled documentation (Fig.10.h). Through the coding and memoing process, I identified themes, missions, focuses, capital assets, and actions taken over the time period of analysis for both lake associations. I compiled my coding memos into a series of analytical insights for each year, summarizing the key issues and events of the year for each lake association and identifying the conceptual themes emerging from the data (Fig.10j). I used observational field notes and the interview transcripts to further assist in the interpretation and validation of trends I identified in the

coded data (Fig.10.i). I also memoed any comparative insights I had about the similarities and differences between the two cases as I went through the coding analysis.

Once I had coded all documentation and summarized the key issues and concepts for each lake association for each year, I then compiled the coded data across all years of the analysis period to develop rich characterizations of each group's mission, capital assets, and actions taken. I wrote out these characterizations for each lake association in two separate case reports (Fig.10.k). I validated these characterizations by reviewing the instances where I assigned mission, capital asset, and activity codes in the documentation, and further verified my conclusions by reviewing interview transcripts and field notes (Fig.10.j). I also identified the key issues for each lake association by looking at the inductive subject codes that were assigned most frequently in each group's documentation.

By analyzing the a priori concept codes that co-occurred most often with the subject codes pertaining to key issues, I was able to determine which themes played out over time as the lake associations dealt with these issues and the outcomes achieved. This led to the identification of two distinct strategies implemented by each lake association when dealing with major issues in their lake system. These strategies were then incorporated into the case reports for both organizations (Fig.10.k).

I then performed a comparative case analysis by comparing the missions, capital assets, themes and outcomes identified in the memos, analytical insights, and individual case reports for the two lake associations. I also compared the timelines over which shared themes played out for each group, allowing me to draw cross-case conclusions about the similarities and differences between the structure and function of these two cases (Fig.10.l). From these conclusions I arrived at some hypotheses based on comparing my findings to best practices according to the environmental governance literature (Fig.10.m) and compiled these findings and implications into Sections 4 and 5 of this thesis manuscript (Fig.10.n).

4. Results & Analysis

Through reading, coding, and analyzing the qualitative data collected for this study, I have been able to characterize both case studies according to the conceptual framework outlined in Section 2 of this thesis, identify the key issues and leverage points for both cases, and perform a comparative analysis between the two groups. By tracking lake association activity along with the identified key issues, I was able to also characterize the systematic pathways each organization takes when addressing environmental issues. I argue that each organization follows these activity pathways when they decide to take action on an issue in their watershed. During identification of the activity pathways, it became clear that the two organizations operate from different reference points towards environmental problems in their respective catchments, which holds interesting implications for what it means to be an effective collective action group. In addition, I found themes of leveraging human capital for issue tracking, incorporating science and scientific data into strategic decision making, and bridging behavior to be prevalent for both cases (see Section 5 for further discussion of major themes). Finally, this examination of the qualitative data allowed me to identify some of the social and environmental management outcomes of lake association activity, which can be compared to environmental and collaborative governance frameworks to assess the potential contributions these lake associations make to governance processes.

I will begin with in-depth characterizations of each lake association and an illustration of their respective strategic pathways (Sections 4.1 and 4.2) followed by a comparative analysis between the two cases (Section 4.3). Within each lake association's results, I have organized the characterizations based on mission, capital assets, and actions (Sections 4.1.1 and 4.2.1), followed by a case-specific example to illustrate my understanding of their strategic pathways (Sections 4.1.2 and 4.2.2). I conclude each characterization section with a brief summary (Sections 4.1.3 and 4.1.4) before continuing on to the comparative results. Comparative results are also organized according to mission, capital assets, actions, and finally strategy (Sections 4.3.1, 4.3.2, 4.3.3, and 4.3.4).

4.1 Lake Sunapee Protective Association

Originally founded in 1898 over concerns about water level fluctuations (due to mill owners downstream) and sawdust and trash pollution, LSPA claims to be the oldest environmental organization in New Hampshire. In 2016, its membership included over 800 individuals and families, which is thought to include approximately 50% of lakefront property owners in the area. Over its history the organization has expanded its mission to increasingly focus on educational outreach and science while developing a vigilant water quality monitoring network on Lake Sunapee. LSPA has enjoyed some success in combating issues threatening the lake, including shoreline development and invasive species. It continues to engage with scientists and policy makers to strategically address environmental issues, grow and leverage its large volunteer base to monitor and collect data around the lake, and increase its role as environmental educators in the community throughout the time period of analysis.

4.1.1 Characterization of LSPA

Mission & Vision

LSPA's mission statement as printed in its 2016 Annual Report, published in April 2017 is:

“LSPA, founded in 1898, is a member-supported nonprofit organization dedicated to preserving and enhancing the special environment of the Lake Sunapee region, through education, research, and collaborative action.”

LSPA's current mission is primarily motivated by biospheric values, with an emphasis on the preservation and enhancement of the “special environment of the Lake Sunapee region,” presumably because its members see these environmental qualities as having intrinsic value. It defines itself as a “member-supported nonprofit organization” that seeks to achieve its mission through community engagement. LSPA's board decided to change the mission statement in 2005 from a previous one, which was originally stated in 1988. The 1988 mission statement was as follows:

“The Lake Sunapee Protective Association is a non-profit, educational organization bringing together people who care about preserving and enhancing the environmental qualities of the Lake Sunapee region.”

The board removed the phrase “bringing together people,” but kept the part about “preserving and enhancing the environmental qualities of the Lake Sunapee region” adding the word “special” to describe those qualities. The newer mission statement also added a phrase: “...through education, research, and collaborative action.” While this suggests greater value ascribed to community engagement, scientific involvement, and collaboration than the previous mission statement, it still retains an emphasis on biospheric values, indicating the need to engage the community as means to achieve goals focusing on maintaining environmental quality for the sake of the environment.

LSPA also amended its vision statement in 2005. The following is an abbreviated version of the 2005 vision statement, which continued to be used throughout the time period of analysis:

“The special qualities of the Sunapee Lake Region contain the seeds of its destruction. We are all its caretakers. We are responsible for the quality of our environment, now and for the future. The Lake Sunapee Protective Association will play a leadership role in providing knowledge that facilitates environmentally sound decisions. Our love of this region calls us to action today. ”

This vision statement describes biospheric values as well, especially in phrases that convey a sense of obligation towards the resource, such as, “We are all it’s caretakers” and “We are responsible for...” The full text of LSPA’s vision statement contains language attributing aesthetic and recreational values to the resource, which provides some explanation for the need to protect the resource outside of intrinsic value, for example, “Its beauty, its quiet vistas, its refreshing waters, and the recreational opportunities it offers are powerful magnets to many users. The impact of human behavior puts the watershed environment at risk.” But, there is little else in either the mission or vision statements that offer any particular social, cultural, or self-enhancing reason why LSPA is engaged in working to protect the lake. This indicates

there are some implied intrinsic values in addition to aesthetic or recreational values, that make up the “special qualities” and “love of this region” that LSPA also refers to in its vision statement.

The vision statement conveys some aspects of the systems thinking paradigm, as LSPA notes that the same qualities that attract people to the Lake Sunapee region can also “contain the seeds of its destruction.” This displays an understanding that the human and ecological elements of the system are interconnected and deeply impact each other. The idea that people have a responsibility to care for the quality of the lake ecosystem not only indicates biospheric values, but also an understanding that human impact has an effect on the ecosystem services that make the region “special” to those that spend time there.

Capacity

My coding analysis showed the degree to which LSPA possesses and employs assets for each of the seven capital types. Financially, the LSPA is especially well endowed, primarily due to the large number of wealthy seasonal residents who live on Lake Sunapee and make regular donations to the group (Appendix F). LSPA is also well established and well known primarily due to its long history and its strong role in educational outreach within the community. Still, to take full advantage of the assets of the local community at-large, LSPA has to be effective at attracting and engaging members, and strategically leveraging or elevating its social capital. This analysis of LSPA’s organizational capacity indicates that it does these things quite well. By coding for each of the seven types of capital assets, I provide a profile of LSPA’s structure and capacity below (Appendix G; Appendix I).

First, LSPA has a large amount of **financial capital** at its disposal. Having over \$3 million in total liabilities and net assets in 2016, LSPA likely stands out from what would be expected to be typical of most lake associations in the U.S. The vast majority of LSPA’s financial capital comes from membership dues and individual contributions. According to LSPA’s annual reports, membership contributions made up anywhere from 65% to 94% of its income during the years of analysis. LSPA also receives funds through grants, fundraising events, and some investments, but by and large it is

dependent on its human capital to generate the majority of its funding. Starting off the millennium with \$213,528 in revenue, LSPA increased its annual operating income to over \$600,000 during the 2012 – 2016 period (\$652,890 reported in 2016; Fig. 11). According to the annual reports, the majority of its expenses each year go towards educational programming, watershed protection and planning, and water quality sampling (Appendix F).



Figure 11: Chart of LSPA's annual revenue and expenses over time

As of 2016, LSPA's **human capital** was made up of a large membership (816 individuals and families paid membership dues), a small, full-time, paid staff of 8 people (which grew from 5 staff members in 2007), a 29-member board, and an average of over 150 volunteers who engage with the organization each year. As of 2017, LSPA had recruited about 50% of shoreline property owners to be in its membership. It focuses on recruiting members by providing new homeowners with information packets, maintaining databases of property owners, canvassing, and sending out multiple

solicitation letters each year. Many of LSPA's members are engaged through the board, participating in various committees, attending adult educational programs, attending meetings and events put on by LSPA, or through the many volunteer opportunities and citizen science programs LSPA offers each year (Appendix F; Appendix G).

LSPA holds **political capital** primarily in its connections with town boards of the three municipalities surrounding Lake Sunapee, and its relationship with state regulatory agencies, such as New Hampshire Department of Environmental Services (NH-DES). Representatives from LSPA attend town committee meetings at times, and some of LSPA's members also serve in town governments. These relationships have allowed LSPA to work closely with towns on water resource protection ordinances, development and zoning issues, and compliance. Sometimes the organization is specifically sought out and consulted by local and state departments. For example, when New Hampshire's Fish and Game Department (NH-FG) wanted to construct a new boat launch on an undeveloped piece of land known as the Wild Goose site, many newsletter articles and news publications spoke of LSPA working closely with the Town of Newbury to combat the development plan, and LSPA was invited to attend several meetings with local representatives and state government officials over the years as the development plan was being discussed (Appendix G; Appendix I).

LSPA maintains a close relationship with NH-DES, and performs water sampling for the agency as a part of the Volunteer Lake Assessment Program (VLAP), and NH-DES uses the water sampling data to make its annual water quality report. This relationship with NH-DES has provided LSPA with some assistance and support from the state during times when Lake Sunapee was facing particular threats (e.g. invasive species), and it has received grants and funding for various projects from NH-DES, including a \$50,000 grant under Section 319 of the federal Clean Water Act to update its existing watershed management plan and a \$5721 grant for a new de-ionized, reverse-osmosis water system for its water quality lab at Colby-Sawyer College.

LSPA's **social capital** has been established over its long history and century-old legacy of presence within the community. I considered the social capital of a lake association to include public recognition of legitimacy, saliency, and credibility of the organization, as well as evidence of lake association activity in partnerships,

collaborations, bridging, and community engagement. Field observations provided the first indication of LSPA's legitimacy, being such an old organization it has had a sustained presence in the community, and many long-time residents are participating members with family histories tied to involvement with LSPA. However, due to the transient population of summer vacationers and part-time residents, LSPA still works to maintain its presence and name recognition. One senior staff member spoke of her perception of LSPA's increase in recognition since she was initially hired:

“Anecdotally speaking, and I've been here a long time, I think more people know about the organization than did back then, our name recognition, if you will, is greater. More people know, more people are familiar with what's done, where we are, what our basic programs are, what our basic premises are. So I mean, in that regard there's much greater visibility.”

News articles offer additional evidence of public recognition for LSPA. Out of 262 holistically coded LSPA news publications, 9 were found to be irrelevant to the study, and 31 articles were duplicated and published by more than one news source. Duplicate articles were not coded to avoid redundancy, meaning that one of each of the 37 duplicated articles were coded, leaving a total of 50 duplicates that were left un-coded. 24 of the coded news articles were focused on LSPA as the main subject of the article, while 179 mentioned LSPA (i.e. LSPA was specifically mentioned in the article, but was not the main subject of the article).

Out of 253 news publications mentioning LSPA, 71 articles indicated at least one instance of LSPA or a representative of LSPA being consulted on an issue or credited for information or actions. For example, one newspaper article documented when NH-DES asked LSPA's water quality lab manager to train water sampling lab managers for other sites in the VLAP program. LSPA was highly recognized in the news media for its involvement with the Wild Goose public boat launch development plan: 64 news articles mentioned LSPA within the context of the Wild Goose public boat access issue (Appendix I).

Field observations indicated further recognition by area residents and visitors that LSPA is seen as a legitimate source of information and support. LSPA receives many

phone calls each year from its constituents when there are concerns or complaints about lake issues. Representatives from LSPA have been asked to serve on committees and meet with advisory boards for local development and management projects (e.g. the Mount Sunapee Advisory Committee and the Public Water Access Advisory Board), and it is consulted on these issues by the news media.

During the analysis period, LSPA increased its educational programming and presence in local schools, hiring two full-time staff members to run these programs (one staff member had been working part-time for LSPA since 1995, then was moved to a full-time position in 2008, and the other was hired in 2013), and increasing its social capital through fostering relationships with schools, teachers, students, and their parents. One of LSPA's educational staff members spearheaded deeper involvement with the region's school system, and it was her efforts that eventually led to long-standing relationships between LSPA and various area schools and teachers. In the early 2000s, she had been producing an educational play about Lake Sunapee titled "Gift of the Glacier" with fourth graders every year, when she was invited to join the elementary science curriculum committee for Kearsarge Regional Elementary Schools in 2003. She contributed heavily to the development of a new watershed unit that became a part of fourth grade curriculum, largely inspired by the content of the play. In 2016, over 4,500 students and families participated in educational programs offered by LSPA. One staff member described how LSPA has also built partnerships in an effort to reach more people:

"We try to partner with people and often we'll partner with a library or we'll partner with a garden club, or we'll partner with some other organization, and that also helps get more people, a wider audience."

Through educational outreach, LSPA is able to engage and interact with a large number of permanent and seasonal community members and visitors each year, often providing them with environmental education.

LSPA also has a variety of **built capital**, primarily consisting of offices and educational space in prime location overlooking Sunapee Harbor, a water quality laboratory housed on the campus of Colby-Sawyer College (New London, NH), water

sampling and educational equipment, the GLEON buoy, and two boats used mostly for water sampling and buoy maintenance. Its offices and “learning center” is located in a historic home in Sunapee Harbor (Sunapee, NH), called the Knowlton House. The house was sold to LSPA in 2007 at a very reduced price. After purchase, the association quickly moved its staff into the offices, transformed some upstairs bedrooms into dorms for visiting researchers, and created meeting and educational space. Over time it started to use the property as a demonstration of best practices for lakeside properties by re-landscaping, planting a rain garden, and even installing solar panels to provide some power to the house. One long-time staff member expressed the benefit of having the Knowlton House for educational space saying, “I think organizationally there’s a sense of sharing the value of place with people by bringing them here.” This building has become central to many of LSPA’s activities, allowing it to host meetings, events, and fundraisers. It also aids in generating social capital, since it allows other local non-for-profit groups to reserve and utilize the meeting area for free.

In many ways LSPA has high **natural capital**, as defined in my conceptual framework.³ Although Lake Sunapee has a history of some issues with *E. coli*, and more recently with cyanobacterial blooms, it also has a history of maintaining a class A drinking water quality status as determined by the state of New Hampshire, as well as high levels of water clarity (Fig.12). Lake Sunapee’s oligotrophic status can attract some stakeholders to engage with LSPA, especially those who perceive that status to be under threat, but LSPA struggles to communicate the salience and urgency of their mission to others. This was evidenced in interviews with staff members. Many expressed a sense of concern about the vulnerability of Lake Sunapee and a frustration with the perceived lack of understanding of the community at-large in regards to this vulnerability. For example, one staff member who has been with the organization for over five years expressed the following when asked about the challenges LSPA faces:

“You know, this is a vacation center. People come from around Massachusetts or Connecticut to come up and vacation here. So I think we deal a lot with an

³ *Natural capital* of lake associations includes aspects of the lake resource and surrounding area that make it harder or easier to manage, harder or easier to rally support for, or that present unique challenges/benefits to the association (section 2.3.3).

attitude that is – how do we say that nicely? You know, it’s a privilege to be on the lake, and they know that, but it’s also, we need to try to introduce the concept that yes, this is a beautiful lake, but you have a role in keeping it clean. And so that’s a hard one.”

Another long-time employee said, “It is really hard to convince people that this is of such critical importance that you need to pay attention.” This puts LSPA at both an advantage and a disadvantage. On one hand, it can be easier to maintain an environment in its current condition than to successfully restore a degraded environment (Walker et al. 2004), but on the other hand, it can present a greater challenge for LSPA to engage the community and accurately identify Lake Sunapee’s biggest threats. As a result, LSPA devotes a lot of space in its newsletters to reporting on and tracking issues in its watershed (13.6% of Beacon newsletter articles were holistically coded as reporting on issues and updating the readership about them; Appendix G). LSPA typically does not immediately engage in acting to combat these threats, but rather monitors them and updates the readership on them (sometimes for years), before deciding whether the issue is of sufficient threat to act on.

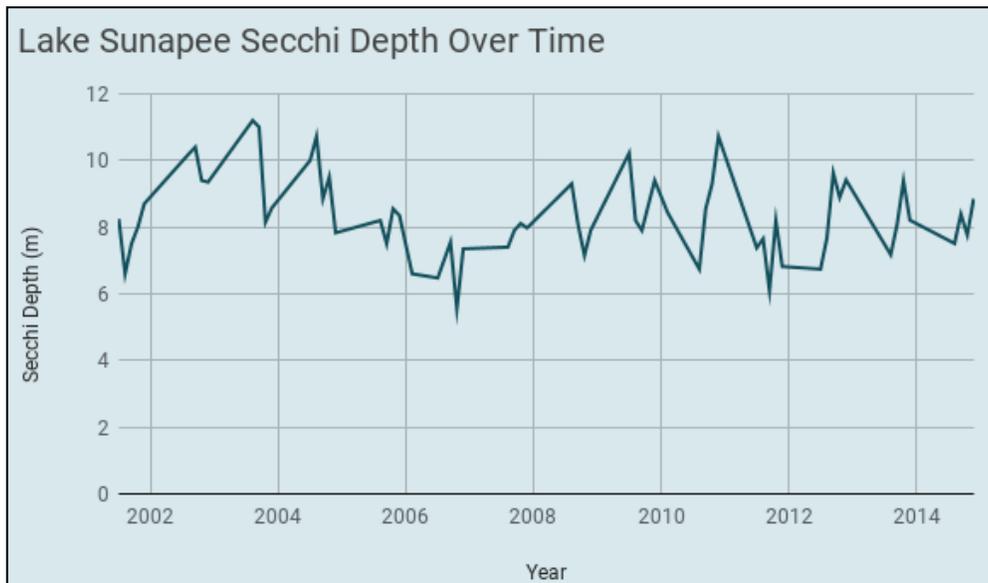


Figure 12: Water clarity in Lake Sunapee from 2001-2014

This is from Lake Sunapee’s North Deep Site location (Coordinates: -72.0438, 43.4039).
Data courtesy of Weizhe Wang & Kevin Boyle, Virginia Tech.

Another important part of LSPA's natural capital consists of some of the wild animals that call Lake Sunapee home, most notably: the Common Loon (*Gavia immer*). Many New England residents cherish this species of waterfowl and it feeds and occasionally nests on Lake Sunapee. Area residents feel strongly about keeping the species on the lake, seeing it as a symbol of the natural quality of the area. As one long-time board member put it:

“But we love the loon, the loon is an iconic wild figure. It has a call, right, an eerie beautiful call. They're a beautiful big bird. It represents the wild in nature. We have people with their summer homes who love seeing the loon.”

The presence of this charismatic megafauna on Lake Sunapee has, in some cases, increased engagement for LSPA, with some members getting involved or showing support because of the strong emotions tied to this bird species and a desire to maintain lake conditions such that loons will continue to call Lake Sunapee home. LSPA often includes educational articles about loons in its newsletters, and whenever nesting pairs are sighted on Lake Sunapee, the newsletters also contain regular updates on the status of these birds. LSPA regularly provides educational programs and offers up guidance information (e.g. advisories on how to behave around loons & the importance of using lead-free fishing tackle) focused around these birds as well. Loons represent a leverage point for LSPA, where it can leverage this part of its natural capital to increase community and member engagement in educational programming, events, and in getting involved with the organization in general.

Finally, LSPA also holds **cultural capital** through the maintenance of three historic lighthouses on the lake. Although technically owned by the state of New Hampshire, LSPA repairs and maintains the lighthouses, and it takes this responsibility seriously, highlighting efforts to renovate and maintain them in its newsletters. LSPA often relies on the donated time and skills of some of its members to perform maintenance and improvements to the structures. The lighthouses are significant cultural artifacts for LSPA to take charge of, as they are symbols that distinguish Lake Sunapee, and LSPA even includes a picture of one in its logo.

LSPA furthers its cultural capital through hosting the annual Love Your Lakes Day & Antique Boat Parade event. Free to the public, these events have become valued cultural festivals for the Town of Sunapee every summer. While the Love Your Lakes Day event does provide some fundraising for LSPA, it is mostly a community engagement opportunity, where there are crafts and activities, educational outreach and demonstrations, and an opportunity for LSPA to associate with the cultural scene of the area. The Antique Boat Parade has additional cultural relevance as it gives lake recreationists a chance to celebrate their history on the lake.

Overall, LSPA's documentation provides examples of each of the seven capital assets possessed by the organization. Although it does possess larger amounts of financial capital than most community-based non-profits, it strategically invests that capital in growing and diversifying its other assets.

Actions

LSPA's capital is closely tied to the specific actions it takes to achieve its mission and affect change in lake water quality. In addition to a significant amount of capacity building, LSPA regularly engages in monitoring, education, and guidance actions and takes action in direct resource management or political advocacy.

Resource monitoring actions are a central focus for LSPA. LSPA deploys volunteer water quality monitors to regularly sample Lake Sunapee's coves and tributaries. LSPA staff also handles water sampling at four deep basin sites throughout the lake, and all water samples are analyzed at LSPA's Water Quality Laboratory. The results are shared with NH-DES for its annual water quality report. The Water Quality Laboratory also processes water samples for approximately 25 regional lakes and ponds that are also a part of the VLAP program for NH-DES. LSPA also monitors for invasive species in Lake Sunapee through its volunteer "Weed Watchers" program (i.e. "Invasive Watch Program"). The volunteers for this program are trained and then assigned to different sections of the shoreline to monitor throughout the summer, looking for any signs of aquatic invasive species establishment. In a similar vein, LSPA began its "Cyano Count Program" in 2014, where it provides instructions for volunteers

to record their observations on the presence/absence of cyanobacteria in Lake Sunapee throughout the summer. This program marks another collaboration with NH-DES, as LSPA began working with the agency on locating and better understanding cyanobacteria blooms ever since the issue was initially brought to LSPA's attention by area scientists. Monitoring Lake Sunapee and its watershed is high priority for LSPA as it strives to maintain a sense of vigilance at all times, and it leans heavily on its human capital to do so.

LSPA also takes **direct action** to manage the Lake Sunapee catchment. Probably LSPA's most prominent initiative of direct action is the "Lake Host" program, which LSPA started in 2000. This resulted from actions it took specifically to combat an invasive species in the lake (see Section 4.1.2). Lake hosts are employed to monitor Lake Sunapee's five public boat launch sites and inspect boats for aquatic invasive species and to remove any plants or animals found on boats or trailers. The program also provides free lead-free fishing weights to those who swap in their old lead tackle. This program for managing what goes into the lake was eventually picked up by the New Hampshire Lakes Association (NHLA) and administered on lakes statewide.

In addition to the Lake Host program, LSPA has engaged in direct action on a few other occasions during the time period of analysis. In the early 2000s LSPA performed erosion control projects and worked with a local land trust to preserve a 140-acre wetland area in the watershed. LSPA partnered with this land trust on a few more occasions to help put properties in the watershed into conservation easements, and provided financial assistance to the cause. One of LSPA's staff members even worked with road salt crews at one point to help them come up with techniques to reduce the salt runoff into Lake Sunapee.

On a few occasions LSPA has become **politically engaged** in its actions. To expand upon the Wild Goose public access issue initially mentioned in the Capital Assets Section above, LSPA not only monitored the situation closely when the New Hampshire Fish and Game Department (NH-FG) began making plans in 2000 to develop a piece of forested shore land on Lake Sunapee into a public access boat launch site, but it advocated strongly against the idea to the state of New Hampshire. The association determined that the site was not large enough for motorized boats and

boat trailer parking and expressed concern about erosion and runoff issues that could incur if the site were to be developed. It also sided with the Town of Newbury that there were traffic safety concerns on the highway where the boat launch entrance would be. Its stance on the issue was widely cited in the news publication documentation, with 47 of the 67 articles mentioning LSPA in relation to the Wild Goose issue containing a statement about LSPA's opinion on the subject.

LSPA formed a special committee to continue monitoring the issue and met with representatives from the New Hampshire Department of Resources and Economic Development (NH-DRED) to discuss an alternative site for the public boat ramp. LSPA leveraged its financial capital to hire engineering consultants to design a boat launch at the already-developed Sunapee State Park Beach, and then utilized this design to further advocate against development of the site originally proposed by NH-FG. NH-FG pushed back and the issue continued to be debated for over a decade. During that time LSPA went so far as to repeatedly voice its concerns about the site choice for the boat ramp, hire a lawyer to help them with appeals, produce voting guides, participate in an NH-DES hearing, and communicate regularly with local and state government officials. This issue took up many front-page articles in LSPA's newsletters and representatives from LSPA published opinion pieces speaking out against the development project and clarifying its stance on the issue. LSPA was also consulted regularly by the news media on the subject. Of the news articles coded, 24% were focused on this topic (Appendix I). Eventually, in 2017, the New Hampshire governor removed the plans for adding an additional public boat access point to Lake Sunapee from the state's agenda. LSPA cheered this as a victorious outcome after a long battle filled with political advocacy actions.

Education is another area of major action focus for LSPA. As mentioned previously, LSPA played a major role in introducing watershed science into fourth grade curriculum for students throughout the region. LSPA offers free school programs to students of all grade-levels that are tailored to the NH Science Frameworks and science standards. It offers field trip opportunities to teachers and their students, it brings programs to community libraries and after-school programs, and it hosts adult educational programs open to the public at its Learning Center. LSPA puts on an NH-

FG outreach program called “Trout in the Classroom” at four area schools, and it puts on an annual field day called “Watershed Discovery Day” for participating schools. Many of LSPA’s newsletter articles are actual educational outreach articles, covering a wide range of ecological topics to help keep its membership knowledgeable about different aspects of the lake system. Changing societal norms through educating the public is embedded in LSPA’s mission and vision statements, and I determined that 14.7% of holistically coded newsletter articles were primarily functioning to educate the readership (Appendix G). A majority of events advertised were educational programs, and educational staff and their activities were frequently highlighted in The Beacon newsletters. One staff member expressed the ever-present focus on education for LSPA:

“One of our main goals is education. We’re doing a lot of science research right now, focusing on scientists coming, so that has taken center stage. But again, it’s also education.”

LSPA also utilizes newsletters to distribute advisories to its membership. Almost every newsletter contained at least one piece of **guidance**, advising its membership on environmentally friendly behaviors (87% of newsletters were found to contain at least one article or blurb holistically coded for guidance). Everything from best practices for lawn and septic system maintenance, to proper use and disposal of household products, to using lead-free tackle, to reducing light pollution on the lake. It encourages dock owners to properly utilize bubblers (devices placed under the water to prevent ice from encroaching on and damaging dock structures) in the winter to reduce their impact on the natural freezing cycle of the lake, and offer guidance to prevent the spreading of invasives in the summer. LSPA further advises its readership on compliance with new policy and regulations, and on how to stay safe while recreating on the lake. LSPA’s headquarters has several kiosks filled with pamphlets containing guidance information and which are free for the taking to any curious visitors.

In summary, LSPA’s newsletters, annual reports, and interviews paint a picture of LSPA emphasizing educational outreach, guidance, and resource monitoring actions. While LSPA did engage in advocacy and direct management actions, it only did so in

relation to what it viewed as primary threats to lake water quality (i.e. watershed development & invasive species). When LSPA engaged in these primary threats, or key issues, these marked periods of high activity for the organization.

4.1.2 Understanding pathways: eliminating an invasive species

Now that I have characterized LSPA to be motivated by biospheric values, with a structure heavily dependent on volunteer human capital and high amounts of financial and built capital, I examine how LSPA dealt with a particular issue to characterize its approach to problem solving. One major issue that marked an important turning point for LSPA was the threat of invasive Eurasian watermilfoil (*Myriophyllum spicatum*; *abbr. milfoil*) establishing in Lake Sunapee in the early 2000s. LSPA recognized this particular issue to be an important leverage point for its organization and concentrated its activity to deal with the problem effectively. I will use this example as a way to illustrate the activity pathway LSPA tends to engage in whenever there is a particular issue at the forefront of its organizational attention.

Eurasian milfoil is a green, submersed aquatic plant that can grow as a noxious weed in U.S. lakes. While there are native species of milfoil in New Hampshire lakes, Eurasian milfoil can form dense mats that outcompete native plants, significantly reducing water transparency, affecting water flow, and it can even attach itself to boats and other recreational equipment, impeding their use. Once established in a lake, invasive milfoil can be very difficult, if not impossible, to remove. The species had become established on several other lakes in New Hampshire and Vermont in the 1990s. LSPA became aware of the encroaching issue from observing the plight of other lakes in the region already dealing with invasive milfoil, as well as from communications with NH-DES, which was concerned about the problem reaching Lake Sunapee.

Leveraging human capital for issue tracking: focus on prevention of degradation

Once LSPA became aware of the issue, it kept track of it and took preventative steps (Fig.13). Starting in 2000, it updated its membership on the threat of milfoil regularly in the Beacon newsletters. It also began the “Weed Watchers” program in 1999, where volunteer members were trained on what to look for along Lake Sunapee’s

shoreline, where invasive milfoil was likely to establish, and began monitoring its own lake in a preventative manner. LSPA also took the initiative to begin a boat launch monitor program in 2000, which later became known as the “Lake Host” program, where it stationed people at every public boat ramp during the summer months to inspect incoming boats for aquatic plants and animals, and remove any that they found. Tracking the potential issue and leveraging human capital to monitor for the threat are preventative steps in LSPA’s activity pathway (Fig.13).

Bridging activity: goals of preservation

Then, in 2001, a volunteer Weed Watcher identified Eurasian milfoil in Lake Sunapee. This spurred a sudden flurry of activity, where LSPA immediately reached out to NH-DES and a group called the Sunapee Selectmen for help. The Sunapee Selectmen are a statewide group of 45 legislators including area representative and state senators, lake association representatives, interested citizens, and town representatives. LSPA invited this group to meet with it to provide an overview of the milfoil problem. This meeting resulted in discussions of bills the legislature may address to provide funding for milfoil education and prevention, and in the formation of the Sunapee Area Milfoil Attack Team (SAMAT). LSPA was appointed as the leader of this team, specially formed to combat the milfoil issue on Lake Sunapee. SAMAT worked to get town representatives to pledge to include funds to fight milfoil in their town budgets.

LSPA worked with NH-DES to begin directly managing the issue in Lake Sunapee. NH-DES helped LSPA install specially designed bottom barriers to contain the already established milfoil, but LSPA deployed several of its own volunteers alongside of NH-DES workers to install the barriers and hand pull the plant. These collaborations with the Sunapee Selectmen and NH-DES to address the milfoil issue, and direct management action were taken immediately in the summer of 2001 when milfoil was first discovered in Lake Sunapee, but were continued in the summer of 2002, as milfoil was still present in the lake the following year. By the end of 2002, LSPA announced that it believed the invasive milfoil to be successfully contained.

All of this action took place because of LSPA’s mission to preserve Lake Sunapee in its current state. It responded strongly to the threat of an invasive species

because of how the establishment of that species might alter the lake's water quality and overall condition.

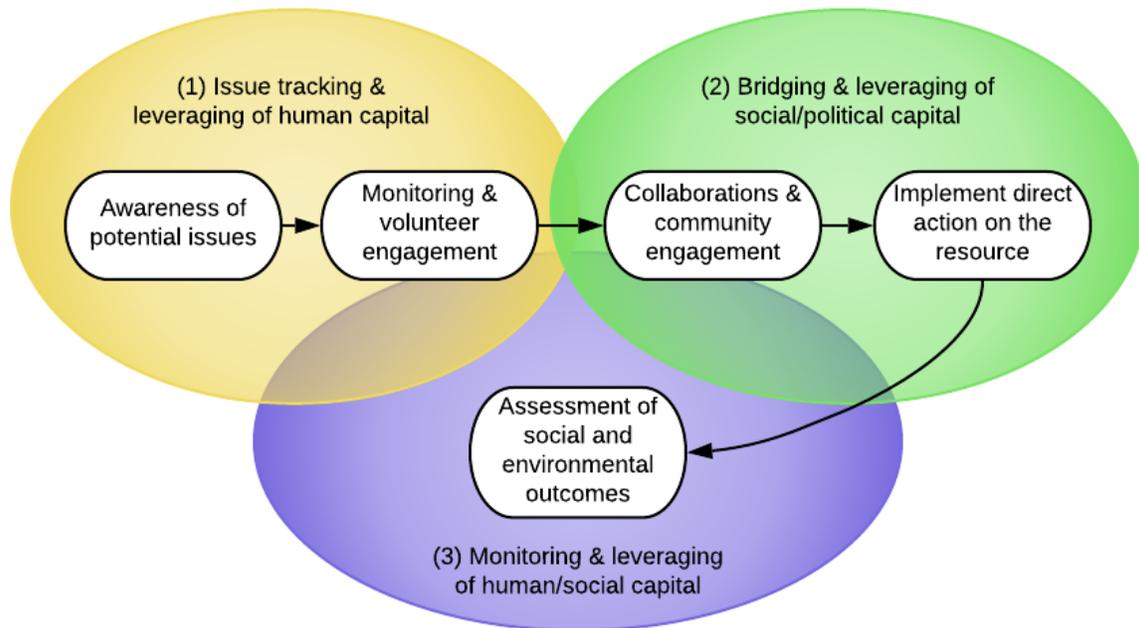


Figure 13: LSPA's strategic pathway and emergent themes

LSPA's activity pathway begins with an awareness of the potential issues facing Lake Sunapee and then proactive monitoring and volunteer engagement (phase 1). If the issue is determined to be a present threat for Lake Sunapee, then LSPA quickly moves to leverage social and political capital to form collaborations to address the threat and directly manage the resource to remove the issue (phase 2). After taking direct action, LSPA continues to monitor the resource to ensure the issue is no longer a threat, and it reports out on what they believe the social and environmental outcomes are from their actions in addressing the issue (phase 3).

Continued monitoring and incorporating science

Collaborating with fellow community members and town and state officials aided LSPA in the actions it took to address the milfoil that established in Lake Sunapee, but the organization's activity certainly did not stop there. LSPA continued to monitor and remove invasive milfoil in 2003, and by the end of that summer LSPA declared Lake Sunapee to be milfoil free. This was communicated as a huge triumph for the organization and marked an important turning point for them. It claimed the successful removal of milfoil from Lake Sunapee and the prevention of invasion as a major

outcome in alignment with its mission. Almost every interview participant mentioned the milfoil invasion event as a big outcome of LSPA's activity and effectiveness.

LSPA continued its Weed Watchers and Lake Host programs after milfoil was eradicated, remaining vigilant against many types of invasive species in addition to milfoil. It even started referring to the "Weed Watchers" as "Invasive Watchers" in 2014, presumably to reflect that the program volunteers are trained to look for more than just invasive plants (i.e. weeds). Since LSPA maintained these vigilant monitoring efforts, in 2005 a lake host identified and removed Eurasian milfoil on an incoming boat, which was proclaimed as another positive outcome for LSPA. In 2008, a Weed Watcher positively identified Eurasian milfoil in the lake again, and it was promptly removed prior to any major establishment. LSPA has continued to monitor for milfoil in every year since, and it strives to maintain a sense of awareness towards all other potential issues facing Lake Sunapee, so that it can continue to fulfill its mission of "preserving and enhancing the special qualities of the Lake Sunapee region".

Also, during the time period of analysis, LSPA incorporated increasing amounts of scientific research into its activity, as indicated by the increasing frequency of newsletter articles holistically coded with science involvement indicators. Although, the data did not indicate that this was a direct result of successful milfoil eradication in 2003, the event did correspond with a rise in newsletter articles devoted to the scientific involvement of the organization. In 2002, only 9% of the codes assigned to newsletter articles were science indicator codes (i.e. codes indicating mention of science communication, scientific data, a scientific study, or citizen science). In 2003, this percentage increased to 15%, and in 2004 it rose again to 31%.

This change also corresponds to a turning point in LSPA's focus: the invitation to an ecosystem ecologist to spend a sabbatical with LSPA and a new threat of algal blooms (*Gleotrichia echinulata*) brought to LSPA's attention by a Weed Watcher. Through engagement with this biologist and her ideas, LSPA became a part of the Global Lake Ecological Observatory Network (GLEON), which is a network of scientists and lake communities involved in high-resolution sensory data collection and sharing. GLEON promotes collaborative research across disciplines and fosters relationships between scientists, educators, policy makers, and citizens (gleon.org). Since LSPA

initially became involved with GLEON, it also formed partnerships with other area scientists at nearby universities Colby-Sawyer College and Dartmouth College to conduct research on Lake Sunapee, and it launched a buoy that continuously collects water quality data, making this data publically available online. This scientific involvement allowed LSPA to monitor lake conditions more rigorously and to expand the scope of knowledge on the various issues threatening the water quality of Lake Sunapee.

4.1.3 Summary

With a mission that is motivated by intrinsic value in nature and a large capacity characterized by high amounts of human and financial capital, LSPA has been able to successfully address some threats facing its lake. The organization successfully contributed to fending off a shoreline development project through leveraging its social and political capital and engaging in advocacy work. It also successfully eradicated invasive Eurasian milfoil from Lake Sunapee through engaging human capital in preventative monitoring and planning efforts, acting quickly when the threat became real, collaborating with the community at-large and government officials to take management actions, and subsequently continuing to monitor the issue throughout the rest of the time period of analysis. It focused on incorporating science to continue to strategically combat the issues and threats facing the lake, and it engaged in bridging activity to increase awareness and advocate for societal change.

4.2 Clean Lakes Alliance

In this section, I describe the mission of CLA and the pathways it uses to achieve its mission. In sum, CLA is working to restore water quality on a degraded lake by identifying the root causes of degradation and investing in partnerships to work towards reducing those causes. It is primarily motivated by social-altruistic values, working to improve lake water quality because its members believe the enjoyment of the lakes is central to the well being of the community. CLA is primarily a bridging organization, putting in a lot of effort to build and sustain social capital by empowering groups, forming coalitions and developing partnerships. CLA acts to directly manage the lake resource by empowering partnered groups, connecting them to the resources they need, and bridging with policy makers. All of this is evidenced by the strategy CLA uses to combat blue-green algal blooms in Lake Mendota. Using this case study example, I demonstrate CLA's approach to problem solving in its catchment.

4.2.1 Characterization of CLA

Mission & Vision

CLA's mission as printed in its 2017 State of the Lakes & Clean Lakes Alliance Annual Report is:

“Clean Lakes Alliance strives to continue building a community of people, businesses, organizations, and government agencies dedicated to improving and protecting water quality in the Yahara River watershed and its lakes.”

Coming up with a mission and vision statement required a couple of years work after the founding of the organization. Initially, CLA was formed in 2009 to assist the Mad-City Water Ski Team in running a local summer festival called the Clean Lakes Festival, which was raising money to clean up the Yahara Chain of Lakes. In 2010 CLA became a 501(c)(3) nonprofit organization. It held its first board meeting in January 2011, when it expanded its role beyond the Clean Lakes Festival to fill a gap it saw in the community, and began articulating mission and vision statements in its documentation for the first time. Establishing an identity and expanding its reputation

was a major focus for CLA in the early years. Having a clearly articulated mission and vision was important to carve out a place in a larger, urban community where there were already many environmental non-profit groups in existence. When asked what makes CLA effective, one senior-level employee answered:

“I think, starting from the beginning, I think that first it was having vision and being able to articulate that vision. ...Because that’s sort of selling the idea of the mission and the organization’s charge to those that would really ultimately be financing the sustainability of the organization and its work.”

CLA’s mission statement emphasizes a community-oriented approach and social-altruistic values. It sees its role as one of community engagement, striving to “continue building a community of people, businesses, organizations, and government agencies...” (2017 mission statement). This is something that was further expressed by many of the staff interviewees when asked about what role they think CLA plays in the community. For example, this staff member said:

“I think in the community we are, I’ve used this analogy before. We’re the straw that stirs the drink. And so we’re bringing...we have this skill of bringing a lot of people into one room or into the conversation. We work with government. We work with all sides, Democrats and Republicans. We work with community groups. We work with businesses. We work with regular citizens. We work with lakefront property owners; we work with Boys and Girls Clubs, who’s not a lakefront property owner. And we’re trying to bring all these people together and come up with a common goal of, how do we achieve clean water?”

Another CLA employee who has been involved since CLA’s founding stated the following when asked about the role of the organization:

“But now over time, we’re really known for bringing the community together, bringing nonprofits, for-profits, citizens, and the government together to work on the project collaboratively. We’re known as informing people and educating people, so you know, people understand, people love and understand things if they’re educated about them. And so that’s happened. And so I think at this point

we're known for doing some projects, and really known for informing people what the issues are, and we're known as bringing the community together to do the work."

CLA's vision statement takes this sentiment even further, stating "We see a future in which everyone realizes that our lakes are the center of our community. Healthy lakes. Healthy community." (2017 vision statement). This also indicates some amount of systems thinking for CLA, since it sees the quality of the lakes as being closely tied to the quality of life for human communities. It communicates to the public a need to clean up the lakes because of what it will mean for the community at-large.

Although not explicitly contained in its formal mission or vision statements, CLA has a central goal that it is recognized for in the community. In 2012, CLA commissioned an engineering report to figure out the cost and mechanisms for reducing phosphorus runoff in the Yahara Lakes called the Yahara Capital Lakes Environmental Assessment and Needs Strategic Action Plan (Yahara CLEAN plan) and, in that report pronounced what it considered to be a feasible, yet ambitious goal for cutting phosphorus loading in half by 2025 by implementing 14 specific actions in the watershed. This very concrete and numerical goal was strongly advertised by the organization itself in newsletters and annual reports, as well as the by news media. Mention of the name "Clean Lakes Alliance" in news publications very often went hand-in-hand with mention of its goal to reduce phosphorus by 50%. CLA expects to achieve this goal primarily through leveraging social capital and partnerships, rather than purely by itself. I mention this because 50% phosphorus reduction has become a keystone objective for CLA and it has advertised this objective as a leverage point for rallying further financial and social support.

Capacity

As a young organization, CLA has had to build its capital assets from scratch during the time period of analysis. Within such a short amount of time, it has been successful at generating all seven types of capital assets (Appendix F; Appendix H;

Appendix J). There was a large focus on building capacity during CLA’s first three years or so. As one senior staff member put it:

“You know, it’s not until you can really build your own capacity before you can sort of prop up the capacity of others as individuals or as groups doing good work out there, so the earlier years of Clean Lakes Alliance, because we’re only 8 years old, have been largely focused on that.”

From 2009-2017 CLA was able to grow its **financial capital** substantially, reaching total liabilities and net assets of \$863,726 and unrestricted revenues of \$990,989 in 2017 (Fig.14). Considering that in 2011 they only reported \$36,796 total liabilities and net assets, and \$395,149 in unrestricted revenue and support, this is considerable growth. According to the annual reports, almost every year the majority of CLA’s revenue came from the release of restricted funds, which made up anywhere from 40.4%-48% of their revenue between 2014 – 2017, but CLA has also relied heavily on programs, sponsorships, and event fees for income. Each year, the vast majority of CLA’s expenses went to program services, with the rest going towards administration and fundraising.

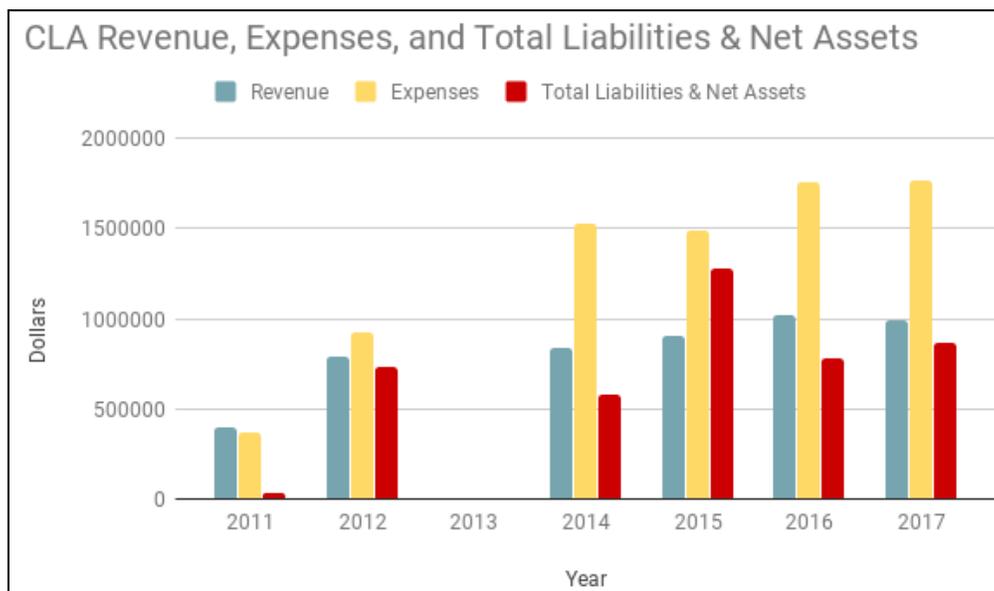


Figure 14: Chart of CLA's annual financial capital from 2011-2017

This data was retrieved from CLA’s annual reports published from 2012 – 2018. I was unable to recover financial data from 2013 in the documentation collected. The revenue shown in this graph pertains to annual totals of unrestricted revenue and support.

CLA's **human capital** is largely made up of a board (starting out with 29 members in 2011, and growing to 43 members in 2017) and a paid staff (growing from 3 in 2011 to 13 people in 2017). It has an executive board, which handles administrative and budgetary tasks for CLA, and a community board, which is comprised of a variety of stakeholders and experts and manages the implementation of the Yahara CLEAN plan. It also has over 10 committees that community members can volunteer to serve on, which handle CLA's various initiatives and capacity-building activities (the total number of board and committee members in 2017 was 120).

CLA does not have a membership per se, but it does have individual donors who support the organization in addition to its corporate sponsors and business partners. CLA set up an avenue for individuals or families to become a "Friend of Clean Lakes" by making an annual donation. It also has an avenue for making monthly donations called the "63 Club." When in need of volunteers, CLA largely reaches out to corporate sponsors and partners. Two of CLA's most notable corporate sponsors, as well as founding partners, are Lands' End and Spectrum Brands. These companies have consistently contributed to CLA events and initiatives, either through the provision of financial or human capital, or both. CLA had four "Sustaining Founders" as of 2016, which are businesses that provide resources totaling over \$100,000 annually. In 2016 this included Lands' End, Spectrum Brands, Madison Community Foundation, and Foley & Lardner LLP. CLA grew its number of business sponsors from 25 in 2011, to 163 in 2014, to 208 in 2017 (according to those listed in CLA's annual reports).

CLA devoted much energy to building **social capital** during the analysis period, and it focused on this very early on in its history. Building partnerships was a huge part of this focus. CLA has gained recognition by associating with reputable businesses, community leaders, and contributing to community events. In 2014, CLA reported 7 corporate partners, and by 2017, it had grown this number to 27. But overall, developing partnerships with corporations, other area non-profits and lake associations, and leadership in the community has increased its legitimacy and credibility. For example, the Dane County Executive, UW-CFL researchers, the Mayor of Madison, mayors of several other cities surrounding the Yahara Lakes, and representatives from Yahara Pride Farms have all written letters and endorsements in CLA's State of the Lakes and

Annual Reports. These partnerships also help it to build its other capital assets. CLA leverages its partnerships when it needs financial, human, or political capital.

CLA was also publically recognized in the news media based on my news publication analysis (Appendix J). Out of 246 holistically coded CLA news publications, 6 were found to be irrelevant to the study, and 37 articles were duplicated and published by more than one news source. Duplicate articles were not coded to avoid redundancy, meaning that one of each of the 37 duplicated articles were coded, leaving a total of 43 duplicates that were left un-coded. 22 of the coded news articles were focused on CLA as the main subject of the article, while 183 articles contained mention of CLA (i.e. CLA was specifically mentioned in the article, but was not the main subject of the article). They were commonly mentioned in the news publication documentation in relation to events and fundraisers, partnerships with other entities, and collaborative projects. The news media also contained many statements about CLA's identity as a group (i.e. statements defining what kind of organization they are), and they were frequently identified along with their goal to reduce phosphorus by 50% (Appendix J).

Much of CLA's **political capital** is held by professional relationships between CLA's executive director, and political figures in the Madison, WI area. As a state capital, Madison places CLA at a geographical advantage for connecting with city and state leadership. For example, as early as 2011 CLA's executive director was regularly meeting with the Mayor of Madison, Wisconsin, Dane County officials, and other community leaders according to its Lake-O-Gram newsletters. These meetings have resulted in public support of CLA's initiatives by political leadership, including budget amendments and grant funding. Some of CLA's annual reports feature letters written by political leadership in support of the work CLA does, particularly Joe Parisi, the Dane County Executive, and Paul Soglin, Mayor of Madison, along with mayors of other municipalities in the Yahara Lakes region. These letters grant CLA further legitimacy in the community, as well as display the close relationships CLA has formed with prominent local politicians.

CLA's **built capital** is made up primarily of headquarters in a lakeside corporate building. This office space, which was donated by one of CLA's sustaining founders, Foley & Lardner LLP, provides space for CLA's staff to work, and meeting space that

CLA uses for board and committee meetings, or meetings with partners and potential partners. It is located right on Lake Mendota, with views of the lake, but also near downtown Madison. Other than this office space, CLA has built capital in the form of technological equipment and office supplies it needs to perform its work, including computer software for graphic design utilized for marketing and advertising, and GIS used for mapping. It is notable that CLA does not possess much built capital in the form of scientific equipment or water sampling equipment.

CLA's **cultural capital** mostly consists of its role in hosting several big annual events that have become cultural staples for the area (Appendix H; Appendix J). CLA's founding assets may have been primarily made up of cultural capital, since it started as an organization to help run a cultural event: the Clean Lakes Festival. Since its founding, the organization has continued to participate in cultural events in the community and to celebrate and protect the ways in which Madison's natural capital is tied to its cultural capital. CLA's own cultural capital comes from its role in the annual Frozen Assets Festival, Loop the Lake Bike Ride, Mendota Freeze Contest, and several other smaller festivals and celebrations throughout the year. Many newsletter articles are devoted to highlighting these events each year, and many times when CLA is mentioned in news publications, it has to do with advertising or reporting on these events. These events often serve as part of CLA's social and financial capital as well, giving them further recognition in the community and sometimes serving as fundraisers for the group and its initiatives.

CLA continued to help with the Clean Lakes Festival from 2010 - 2013, but starting in 2013, CLA decided to host its own winter festival called the Frozen Assets Festival, so as not to compete with the many other summertime events occurring in Madison. The Frozen Assets Festival has been a huge success for CLA and it is promoted as a way to engage the community to discover the value of the lakes, even during the wintertime, by getting people to engage in recreational and cultural activities on Lake Mendota, such as ice skating, pond hockey games, vendors, face painting, scavenger hunts, etc. After 2013, it was clear from the newsletters that CLA shifted away from involvement with the Clean Lakes Festival and devoted more resources to the Frozen Assets festival instead.

CLA's **natural capital** consists of a large chain of eutrophic lakes and a watershed mostly made up of agricultural and urban lands. This presents many challenges to the organization in attempting to fulfill its mission to restore these lakes to higher water quality. Restoration on this scale is a massive undertaking for a community-based group such as CLA. This study primarily focuses on Lake Mendota, the first and largest lake in the Yahara Chain of Lakes. When CLA was formed, Lake Mendota was already facing many known issues with nutrient loading and runoff, invasive species, and blue-green algae blooms. Lake Mendota's water clarity declines seasonally, as productivity is higher in the summer months (Fig.15). Dealing with such a large body of water with a long shoreline, a large catchment with complex and widespread problems, and a large population of diverse stakeholders living around it presents a significant challenge for a group that strives to improve lake water quality.

However, there are some positive aspects to CLA's natural capital as well, since Lake Mendota is so centrally located for City of Madison residents, and the problems facing Lake Mendota are often quite visible with significant impacts to ecosystem services, the most pressing problems were easily identifiable for CLA, and it has less issue with communicating the salience of its purpose as an organization. Its challenge in engaging the community does not come from lack of issue awareness as much as a lack of optimism, general confusion on what can be done, or a lack of understanding the value of what the lakes could be were they to be restored.

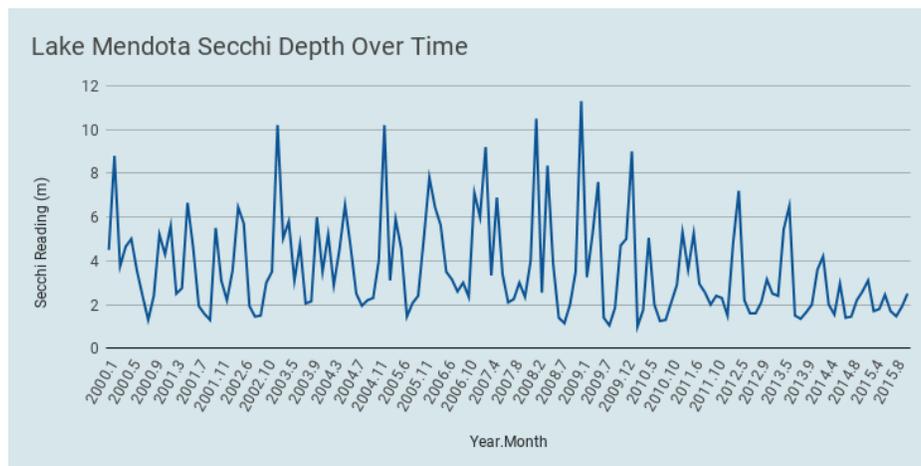


Figure 15: Water clarity in Lake Mendota from 2000-2015

Data courtesy of Weizhe Wang & Kevin Boyle, Virginia Tech.

Actions

CLA leverages its capital assets to take actions aimed at fulfilling its mission of increasing the water quality in Lake Mendota. As a young organization, CLA has focused heavily on capacity-building actions, but in more recent years, it has focused more on direct management actions and advocacy work, in addition to some educational outreach and monitoring activity (Appendix H; Appendix J).

Direct resource management actions are a big focus for CLA, but CLA primarily works with, or through, its partners for most direct action initiatives. A prime example of this is the “Renew the Blue Volunteer Days” program CLA puts on. In this initiative, CLA coordinates volunteer activities, ranging from clearing invasive species to undertaking shoreline and beach cleanups, for local businesses and organizations to participate in. This is an effort coordinated by CLA, but the human capital required to carry the out these actions is donated by CLA’s partners. In a similar vein, CLA engages in various direct actions on agricultural lands, but it primarily does so through another group that it helped found in 2012 called Yahara Pride Farms (YPF). YPF is a farmer-led nonprofit group working to promote the adoption of conservation practices on farmlands in the Lake Mendota catchment (for more detail on Yahara Pride Farms, see section 4.1.2).

In 2012, CLA brought out-of-state experts together to discuss alternative strategies for reducing phosphorus in the watershed; this resulted in the City of Madison adopting a new strategy of adding “alum” treatments to storm water ponds to remove sediment and phosphorus before it runs off into the lakes. In this case, it was through CLA’s ability to bridge between city officials and resource management experts that a new direct action was taken by one of CLA’s partners (i.e. the City of Madison).

Another common way CLA engaged in direct action during the time period of analysis was by funding management initiatives. For example, in 2010 and 2013 CLA funded the design and installation of storm water treatment ponds to capture sediment and phosphorus runoff. Since 2012, it has also contributed hundreds of thousands of funding dollars to the Yahara Pride Farms group to allow it to expand its reach and implement various sustainable management initiatives on agricultural lands in the Yahara River watershed. In 2013, CLA worked with Dane County officials to purchase

conservation lands in the headwaters of the Yahara River north of Lake Mendota, and a few years later, in 2016, it began funding Dane County's purchase of land easements to create 3.4 miles of vegetation buffer strips along streams feeding into the Yahara lakes to aid in the prevention of phosphorus and sediment runoff. Finally, in 2016 it began funding a pilot project to explore the water quality impacts of manure composting techniques, and in 2017 it helped fund the purchase of a manure injector machine that is rented out for use by farmers and which helps reduce manure runoff.

In addition to event advertising and reporting, CLA devotes some newsletter space to **advocacy** for its priorities (Appendix H). CLA uses its newsletter and annual reports to report out on advocacy work, indicating CLA advocates its cause through communications with community and government partners, and in one-on-one meetings with policy makers. Through these advocacy actions it gains support (financial, political, or built capital) for the initiatives outlined in the Yahara CLEAN Plan. These initiatives include improving leaf management, maintaining permitted stormwater facilities, improving in-field agricultural practices, updating manure management, and stabilizing rural stream banks. It reports out on advocacy and direct action outcomes in its State of Lakes Annual Reports and Lake-O-Gram newsletters. It has been successful in its advocacy efforts in receiving grants for certain initiatives and in getting the City of Madison or Dane County to develop permitting programs and implement stormwater projects.

CLA also engages in **educational outreach** actions through hosting educational events or through publishing informative articles in its newsletters and annual reports. In 2013, CLA began hosting a lecture series called "Yahara Lakes 101" where it invites different speakers (usually scientists) to give public lectures. It also offers a more intensive educational experience through its "Yahara Watershed Academy," where community members are invited to apply and participate in a five-month-long course. During the course they are trained and empowered to become leaders in watershed conservation advocacy for their community.

A big part of CLA's **guidance** activity was the commissioning and production of the Yahara CLEAN plan. This plan outlines 14 projects needed to reach the goal of 50% phosphorus loading reduction and the total cost required for doing so. This plan and

some of the numbers it produced are constantly referenced in the news media in relation to CLA. While the plan guides CLA's own actions and strategy, and it was also made publicly available as a guiding document for the entire community, it is notable that this guidance is primarily targeting policy makers and land managers rather than targeting CLA's own donor base or human capital. In this way, the Yahara CLEAN plan is an example of a tool CLA produced to communicate across sectors of society. The Yahara CLEAN plan contains guidance for both agricultural and urban land management.

Another important guidance initiative for CLA began around 2013 and addressed leaf management in urban environments. CLA included many guidance articles in its newsletters targeted towards advising the urban public on how to properly rake and dispose of fall leaf litter (Appendix H). This guidance initiative occurred after CLA was made aware through a connection with a USGS scientist that leaf litter was the biggest contributor to urban phosphorus runoff in the watershed. CLA also ended up taking direct action on this issue by developing a community behavior-change campaign called "Rake-for-the-Lakes" and implementing it as a pilot project in the City of Madison and the neighboring Village of DeForest. CLA even worked to communicate scientific research on the water quality impacts of leaf litter in the streets to Wisconsin Department of Natural Resources (WI-DNR) in 2017, resulting in a stormwater permit incentive for municipalities to improve leaf collection efforts.

When it comes to **monitoring** actions, CLA is situated on one of the most closely monitored and studied lakes in the world due to the presence of the University of Wisconsin Madison Center for Limnology (UW-CFL) on Lake Mendota (known as the birthplace of limnology in North America). CLA has certainly taken advantage of the data and scientists based at UW, as much of the monitoring data published in its annual State of the Lakes reports comes directly from UW-CFL and CLA regularly engages with UW-CFL limnologists on projects, events, and educational outreach initiatives. One senior staff member explained CLA's interest and involvement with UW-CFL as follows:

"So we're all about coalition building, you know, reaching out to the community, talking to the University of Wisconsin-Madison because they have this great Limnology Department, and hearing their ideas, going to their, you know, when

they have a capstone project or if they have a Ph.D. student that's giving a presentation we go, we bring that back, and we just try and like build coalitions around solutions for the lakes."

In addition to receiving monitoring data from UW-CFL, CLA does also lead a citizen monitoring initiative of its own. In 2012, CLA launched a project called "lakeforecast.org" with the help of a retired UW-CFL scientist. This project is a monitoring program for the Yahara lakes where citizen scientists are trained to go out to all the various beaches surrounding the lakes and log monitoring data through an app on various measures of lake water quality and beach conditions. The program started off with volunteer monitors checking on 10 nearshore stations, but during the time period of analysis this grew to 72 nearshore monitoring sites, and 7 offshore ones on all five of the Yahara lakes. Data is gathered from each site at least once a week from Memorial Day to Labor Day each year. The project and the data generated from it is heavily advertised by CLA in its newsletters and annual reports, as well as in the news. The organization sees it as a way to provide a service to the community as well as promote awareness about the lakes and its own mission. As one of CLA's marketing staff put it when asked about lakeforecast.org:

"We've got one of the meteorologists talking about it on the weekend, we've got some signage at the Union. It is on social media, we are just shoving it down people's throats between Memorial Day and Labor Day. For me, the reason I think that's important is: the more people use it, the more people will see what we do. The more people, whenever they see an opportunity maybe to donate to Clean Lakes, they'll say oh yeah, well they're telling us water quality everywhere. Yeah, they're great. Keep doing the good work!"

Through collaborations and partnerships, CLA is engaging in advocacy, monitoring, outreach, and direct management actions to achieve its mission to promote healthy lakes. The content analysis provided insight into specific projects, many of which were outlined above, that fit into each of these activity types and also revealed the prevalence of partnering and bridging actions CLA takes part in. The next step is to

investigate how these actions play out over time when CLA is faced with a particular challenge in its socio-ecological system.

4.2.2 Understanding pathways: reducing blue-green algae blooms

CLA displays a mission based on social-altruistic motivations and a strong emphasis on partnering and leveraging social capital, so I examined, in greater detail, the strategy CLA uses to actually carry out actions and achieve outcomes. One major issue that concerns CLA and which seems to focus many of its actions and initiatives is the prominence of blue-green algae blooms in Lake Mendota in the summer. Like LSPA with invasive milfoil, CLA seems to have identified these blooms as an important leverage point for engagement in the community. I will use the problem of blue-green algae blooms in Lake Mendota as an example to illustrate CLA's activity pathway.

Blue-green algae, or cyanobacteria, are microscopic organisms that may live as single cells or colonies in aquatic environments. When a large enough colony is formed, this can create a blue-green filament or mass close to the surface of the water that is visible to the human eye. A sudden growth of blue-green algae colonies is called a "bloom," and these blooms are often caused by excess amounts of nutrients (i.e. phosphorus and nitrogen) in the water. If blooms persist, or occur frequently, they can deplete the oxygen in the water and release toxins that can harm wildlife populations, causing fish kills, and even become toxic to humans who swim in or drink the water. Lake Mendota had been experiencing issues with blue-green algae for years before CLA's formation, so this was a known and obvious problem occurring in the area every summer when CLA took up the initiative to clean up the Yahara lakes.

Leveraging human capital for issue tracking: focus on promotion of water quality

In its first years CLA knew from involvement with the Clean Lakes Festival and the Mad-City Water Ski Team that blue-green algae blooms were one of the most salient issues facing the Yahara Lakes and that this would be a cause the regional community could rally behind. Its next step as a newly formed organization with a small amount of human capital was to identify the main cause of the blooms and incorporate

the problem source into its goals and mission as an organization (Fig. 12). CLA's staff identified phosphorus loading as being the main culprit behind the blooms for the Yahara Lakes, citing scientific studies coming out of UW-CFL, and perhaps being further assisted in determining the main causes of phosphorus loading through collaboration with a retired UW-CFL research scientist.

Choosing phosphorus reduction as a focal issue, CLA began moving forward with the development of a road map for reducing phosphorus levels in the lakes in 2011. In 2012 CLA published its first State of the Yahara Lakes annual report presenting monitoring data on the lakes, identifying blue-green algae blooms as the primary problem and phosphorus as the primary cause, and announcing partnerships with local and state agencies committed to cleaning up the lakes that eventually became the Yahara CLEAN initiative. Later that year, the Yahara CLEAN plan was published with 14 problem areas for CLA and its partners to address in order to achieve phosphorus reduction goals. Through this initiative CLA is focusing on promoting various gains in the watershed.

Bridging activity: goals of restoration

CLA began leveraging social capital and collaborating on phosphorus reduction projects even before the Yahara CLEAN plan was published. It had already begun work on alum treatments with the City of Madison, but it also began networking and collaborating with area farmers, engaging with them to come up with land management solutions that might reduce phosphorus loading in the lakes. In 2011 CLA helped found the Yahara Pride Farms group as a strategic committee. CLA provided the group with resources in its early years, including funding and office space, giving YPF time to self-organize and engage more of the farm community. YPF identified best land-management practices and developed an incentive and recognition-based plan for area farmers. It started a farm certification program, which links farmers to cost-share programs and conservation resource managers, so that farmers can receive assistance with enrollment in conservation programs and implementation of sustainable agricultural practices. CLA helped YPF start an adaptive management pilot project in part of the

watershed, but after that YPF began implementing direct action initiatives on its own, though it did continue to be partially funded by CLA. CLA essentially launched YPF, which is now a separate, but affiliate organization to CLA.

CLA also worked with the City of Madison, Dane County, WI-DNR and WI Department of Agriculture, Trade, and Consumer Protection (WI-DATCP) to implement direct watershed management actions, but it did this primarily by contributing funding dollars. The outcomes of these partnerships and CLA’s funding have included the installation of two stormwater treatment ponds in the watershed, the adoption of alum treatments to stormwater in the area, working with Dane County to acquire conservation lands, the Rake-for-the-Lakes pilot projects, implementation of 3.4 miles of harvestable stream buffers, a manure composting pilot project, and state approval of phosphorus crediting for leaf-management in urban municipalities. The reporting out on these initiatives in the State of the Lakes reports and Lake-O-Gram newsletters does not suggest that CLA implements the direct action itself; rather, it empowered its partners to take that action through providing vision, information and resources.

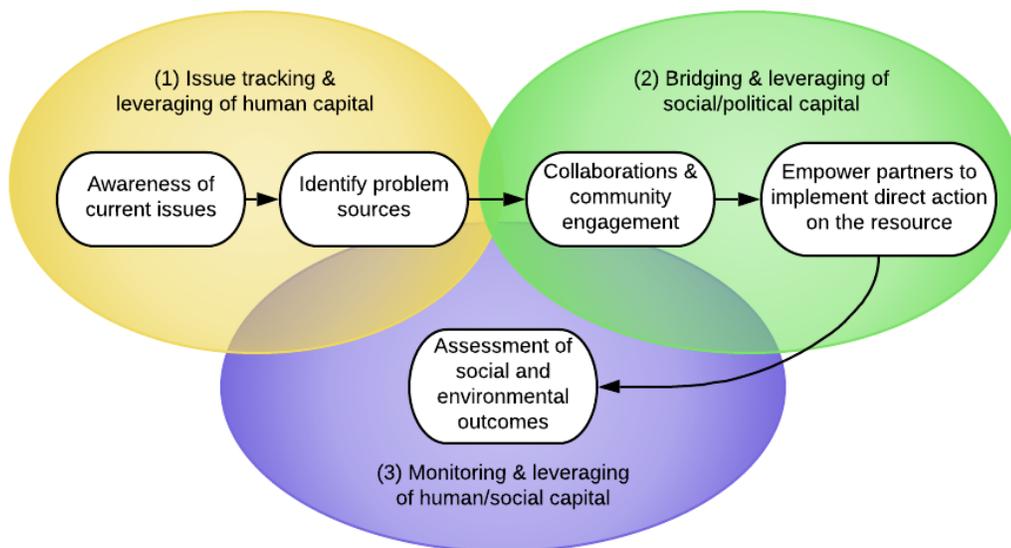


Figure 16: CLA's strategic pathway and emergent themes

CLA’s activity pathway begins with an awareness of the current issues facing Lake Mendota and then an effort to pinpoint the major sources of these issues (phase 1). Once the sources of an issue are pinpointed, then CLA leverages social and political capital to form collaborations to address the problem source. CLA rarely takes direct management action itself, but empowers partners to do so through funding and connecting them to the information they need (phase 2). After CLA’s partners take direct action, CLA does continue to play a role in monitoring and assessing the condition of the lake resource through the State of the Lakes Report Card (phase 3).

Continued monitoring and incorporating science

CLA keeps track of the accomplishments of these initiatives and partnerships and it began reporting out the pounds of phosphorus diverted by Yahara CLEAN projects each year in its State of the Lakes reports beginning in 2015 (Fig.17). This is a form of monitoring the outcomes of its work as an organization, but it also relies on its partners for much of the data reported in the State of the Lakes reports, citing government agencies and UW-CFL scientists. CLA is compiling the scientific data from these sources and putting it together into a cohesive report each year, which is published so that community members, property owners, government officials, and resource managers alike can understand it for themselves. Compiling data and continuing to keep track of the issues facing Lake Mendota and the rest of the Yahara lakes is also useful to CLA as it continues to update the Yahara CLEAN plan, so that it can utilize this information to develop new management initiatives or adjust the ones it already has in place.

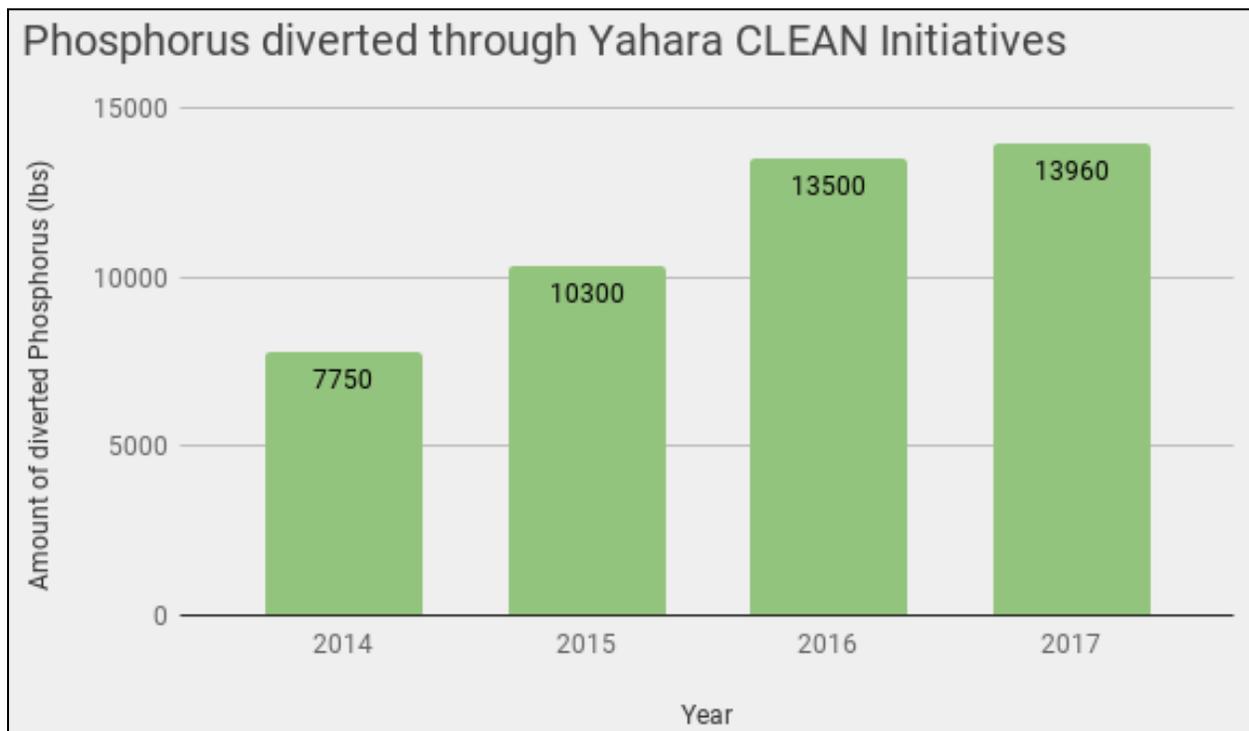


Figure 17: Reported pounds of phosphorus diverted through Yahara CLEAN initiatives

These data were reported in CLA's State of the Lakes and Annual Reports published between 2015 – 2018. There was no data published in documentation prior to 2015.

4.2.3 Summary

CLA is motivated to improve lake water quality because it believes doing so will lead to improvement of the community as a whole. With a capacity primarily made up of strategic partnerships with businesses and government officials, CLA has been able to quickly identify problem areas and work towards addressing the pervasive and pre-existing issues of phosphorus loading and blue-green algae blooms in Lake Mendota. CLA has successfully engaged in sharing information and resources across sectors of society, and leveraging its social and political capital to contribute to a number of on-the-ground management projects, with the goal of diverting phosphorus runoff. It continues to compile scientific water quality monitoring data from partners and volunteer citizen scientists, making that data publically available, so that it can track environmental outcomes, raise awareness, and foster community engagement.

4.3 Comparative Results

The application of the conceptual framework outlined in Section 2 of this thesis as a lens through which to better understand these case study systems allows me not only to characterize both cases, but also provides a grounds for comparison between them. Below I identify key differences in their respective missions (Section 4.3.1), compare and contrast each of the seven capital asset types for the two groups (Section 4.3.2), compare the types of actions these groups choose to focus on (Section 4.3.3), and finally, I identify key differences in their strategic pathways for problem solving (Section 4.3.4). Comparing how these two associations operate with a purpose for understanding commonalities and differences in how effective organizations function will set up a basis for further understanding their potential for contributing to collaborative environmental governance.

4.3.1 Mission Comparison

It was evident from the mission statements of both groups that CLA is driven more by social-altruistic values, with an emphasis on community building and healing the lakes because of what it means for the community at-large; whereas LSPA is driven more by biospheric values. LSPA shares social-altruistic values, but its mission and vision statements mostly emphasize protecting Lake Sunapee because of its “special environmental qualities,” or its intrinsic value. Neither group was found to express self-enhancing motivations in their missions, visions, or goals, but occasionally each would include small reminders of self-enhancing motivations when trying to generate community support around a particular cause. CLA was found to be more concrete and clear in its goals of reducing phosphorus loading by 50%, whereas LSPA was usually more vague in its goals, allowing it to adjust their initiatives and efforts according to whatever issue seemed to them to be the most pressing at the time.

CLA comes from a different reference point than LSPA, since CLA is positioned on a lake already facing many problems. CLA was already aware of what the major problems were for its catchment even as the organization was still being formed. So, CLA was focused on identifying the main *sources* of these problems in its early years. The organization is primarily reacting to pre-existing issues on the lake, with goals of restoration. LSPA, on the other hand, is positioned on a relatively clean and clear lake, which faces many ever-present threats, and is vulnerable to significant degradation, but is not currently in a degraded state. LSPA is tasked with identifying the most pressing threats, or the threats that are starting to become problems, and taking proactive steps to prevent these threats from becoming major problems, with goals of lake preservation (Table 3). The two case studies are oriented in different ways towards their respective lake resources due to the condition of lake water quality, and this is evidenced in the major differences between organizational missions and goals.

4.3.2 Capital Assets Comparison

In terms of lake association structure and resources, there are some major differences between LSPA and CLA. Although they both have relatively high amounts of **financial capital** and paid staffs, they are structured quite differently. LSPA is primarily funded through its membership dues and individual/family donations, while business sponsors and community donors primarily fund CLA. CLA's **human capital** is made up of a comparatively large board and paid staff, while LSPA has much greater human capital in its large membership, which serves as an expansive volunteer base for the organization. LSPA also has a board and paid staff, though both consist of fewer individuals than that of CLA. CLA does not have an internal volunteer base to draw from, so instead it must reach out to the community at large, or to partnered organizations and businesses, when it needs volunteers for an event or initiative.

Both groups have sufficient **built capital** for their needs, including office space for their staffs and office equipment. LSPA has more built capital than CLA in some areas. For example, LSPA's newsletters refer to the slew of scientific equipment it has at its disposal, including a water quality laboratory, the GLEON buoy, two boats, and water sampling equipment. CLA does not mention anything of the like. LSPA's access to scientific equipment allows the organization to perform resource monitoring and even some scientific research "in house," while CLA instead relies on its relationship with UW-CFL to provide monitoring and scientific data.

Both groups have established levels of **political capital**, but they leverage this political capital in slightly different ways. While both LSPA and CLA have political capital with local governments, as well as on the state level, CLA strives to form personal relationships and alliances with political leadership, while LSPA tends to engage politically primarily through public forums and through exercising democratic rights when necessary. CLA's political capital has resulted in increased budgeting for lake water quality conservation, and LSPA draws on political capital when specific issues arise.

Both groups also display some amount of **cultural capital** through playing a role in cultural festivals throughout the year. CLA participates in, or hosts a large number of cultural events every year - it's a big part of what they do as an organization - but since

LSPA is in a less populated area, it focuses only on one event each year. LSPA, on the other hand, cares for cultural artifacts in the maintenance they do for Lake Sunapee's three historic lighthouses.

LSPA and CLA differ considerably in **natural capital**. LSPA is situated on a lake with high water quality that leads LSPA to focus on preservation and protection. CLA is situated on a much larger eutrophic lake, which faces significant challenges from agricultural and urban runoff that lead to blue-green algae blooms each summer. CLA's consequently focuses on restoration by pinpointing the biggest drivers of degradation in the lake and targeting them in its efforts. Thus, CLA has more clearly articulated goals such as reducing phosphorous by 50% in 2025. In contrast, LSPA's focus on preservation requires it to monitor myriad threats to its lake, which could come from any source or direction. This has implications for the **social capital** of the two cases as well, as CLA is dealing with issues in Lake Mendota that are consistently salient to the public, especially as the public around Lake Mendota experience beach closures and green, murky waters in the summertime, making it slightly easier to engage and capture the attention of community members. LSPA has greater challenges when it comes to communicating salience and recruiting new members.

The differences in social capital do not stop there. LSPA and CLA have very different methods for building social capital, which can largely be traced to their respective ages and the social systems where they are located. CLA, being a young organization, built its reputation and recognition from the ground up during the time period of analysis. It did this through networking and forming partnerships and aligning itself with the business sector, other local non-profits, and prominent political figures in its community. As a result, its formed into a partnership, hence the name "Alliance," and it works to connect its partners under the common cause of cleaning up the Yahara lakes. This was a strategic way for CLA to structure itself in a densely populated area that already had a presence of many well-established environmental non-profits and agencies. Instead of trying to compete with them, CLA structured itself to fill in the gaps and act as a liaison between other groups.

In contrast, LSPA had a well-established legacy coming into the time period of analysis and a historic presence in its community. Some of LSPA's legitimacy and

credibility comes from this historic presence, but LSPA grew its social capital during the time period of analysis primarily by engaging with scientists in an unprecedented level for its organization and through expanding its educational efforts. It networked with scientists and researchers, which was associated with increasing amounts of bridging activity, since the organization now had access to greater amounts of scientific data and it was able to regularly communicate the concerns of local stakeholders to scientific researchers. LSPA exists in a less-populated context, so it structured itself in a self-sufficient manner, with a focus on growing its internal capacity so that it might be able to actively monitor and manage the lake. LSPA's goal is to leverage social capital to bring more people into the organization as members and volunteers, rather than CLA's approach of leveraging social capital to engage the community at-large, fundraise, achieve policy change, and implement direct resource management.

From this comparison of each group's capital assets, it is evident that CLA is more outwardly focused and is structured as a partnership and bridging organization, relying heavily on partners for financial, social, and human capital and working through its partners to achieve its goals. LSPA is more internally focused and self-contained, with a large membership and volunteer base to draw from, displaying the structure of a voluntary association. LSPA primarily seeks to bring more people into the organization, rather than partner with external entities, though it does still mobilize its financial and human capital to collaborate with scientists and regulatory agencies on certain projects. LSPA primarily works within its own organization to achieve its goals.

CLA, with a mission focused on benefitting the community as a whole and a strategy to leverage large amounts of social capital to achieve goals of restoration, developed as a *bridging organization*. Bridging organizations are groups that work at the science-society-policy nexus to allow for information sharing and transfer (Folke et al. 2005; Crona & Parker 2012). They contribute to "lowering the transaction costs of cooperation and collaboration" and "help establish communities of practice" (Kowalski & Jenkins 2015). CLA fits this description because it focuses on partnering with scientists, farmers, community groups, businesses, and policy makers, sharing information between them and transferring resources to where they are needed most for phosphorus reduction efforts. The organization lowers transaction costs by facilitating

and funding projects that are accessible to these various groups of stakeholders, and it helps establish communities of practice through its community outreach efforts, the formation of the Yahara Pride Farms group, and support for various Friends groups around the Yahara Lakes region.

In contrast, LSPA follows a mission focused on preserving and protecting the intrinsic value of its relatively clean and clear lake. This strategy leverages a large volunteer-membership base to maintain a monitoring network around the lake so that it can take proactive steps to track potential threats, to quickly identify when threats become realized on the lake, and to prevent degradation. This structure heavily relies on a social network of voluntary members and social trust in the community. LSPA's focus on the intrinsic value of nature, scientific involvement, and educational outreach places it in line with more traditional environmental groups. In this way, LSPA typically acts as a *voluntary association*. Voluntary associations are groups that "create networks that allow for social trust to spread throughout society" and that promote civic engagement and overall social capital in their communities (Wollebaek & Selle 2002; Putnam 2000). While LSPA also functions as a bridging organization at times, and regularly engages in boundary-spanning activity, this is not their primary function as a group. Its focus is less on forming partnerships and facilitating partners to act, the way that CLA does, and it is more internally focused on engaging its membership through volunteerism and education. It empowers its members to become scientifically literate through outreach contained in newsletters and a strong citizen science program. Its goal is to spread awareness throughout the community and to influence social norms towards sustainable behavior that it hopes, in turn, will protect the lake from degradation. In sum, LSPA focuses on membership engagement and education with the promise of lake protection, while CLA focuses on community engagement and bridging partnerships with the promise of lake restoration. Both organizations demonstrate their effectiveness despite these different foci.

4.3.3 Action Focus Comparison

Stemming from different goals, contexts, and structures, LSPA and CLA tend to focus on different types of actions. Comparatively, LSPA conducts more educational programming, guidance, and lake monitoring than CLA. Being focused on prevention, LSPA constantly and rigorously monitors the water quality of the watershed, and it promotes societal awareness of potential threats and risks of degradation, in hopes that community members will change their behavior before it is too late. Although LSPA has taken direct action and has occasionally engaged in advocacy, its primary role in the community is as an educational and monitoring organization.

CLA focuses less on education and monitoring than LSPA and more on coordinating direct action and engaging in advocacy efforts. While it does have educational and monitoring initiatives, being positioned on a lake in need of significant restoration drives CLA to focus on actions that result in concrete resource management and policy change. CLA allows other groups in the community to focus on educational programming and resource monitoring, while it has carved out its own role as a group that brings people together to make land management and policy changes, which result in phosphorus loading reduction. It also focuses much more on creating and building partnerships to help achieve its goals.

4.3.4 Strategic Pathways Comparison

Differences in LSPA and CLA's activity pathways are most evident in their relationship to either organization's respective natural capital and structure. LSPA, being situated on an oligotrophic lake, focuses on keeping the socio-ecological system stable and preventing degradation as much as possible, such as preventing the establishment of invasive species (Table 3). This is notably in line with the prevention focus of Higgins' Regulatory Focus Theory on achievement motivation (Higgins 1997; 2008). Higgins outlined two motivational models for human behavior for regulating pleasure and pain: a promotion focus and a prevention focus. The prevention focus is focused on safety, stability, and responsibilities, whereas the promotion focus is on

advancements, gains, and accomplishments (Higgins 1997; Higgins et al. 2001). I suggest that this theory can be applied on the organizational level, rather than on the individual level, to help frame the findings of this research. LSPA is focused on keeping its lake safe from threats, maintaining oligotrophic stability, and encouraging responsible behavior in its membership, demonstrating a prevention focus on lake regulation. In contrast, CLA is focused on achieving gains and accomplishments in its lake system. CLA is open to change, rather than trying to prevent it, and so it demonstrates more of a promotion focus. CLA is primarily aimed towards promoting positive change in its lake system, whereas LSPA is primarily concerned with preventing negative change to its system.

LSPA focuses primarily on Phase I of its strategic activity pathway (Issue tracking & leveraging of human capital; Fig.18). There is evidence throughout its newsletters that it is constantly engaged in this phase regarding one potential issue or another. When a potential issue becomes realized on its lake, the organization acts fairly quickly to collaborate and engage with its social and political capital to eliminate the problem as soon as possible (Phase II: bridging & leveraging of social/political capital). In Phase III of its activity pathway (monitoring & leveraging of human/social capital), LSPA is diligent about closely monitoring environmental conditions, but I did not find as much evidence in the data that it is assessing the social outcomes of its own activity.

CLA is differently situated on a eutrophic lake, and is oriented towards combating pre-existing and known problems on its lake. The organization's challenge is to identify the main sources of a known problem, or at least sources that it believes can be feasibly addressed or fixed through collaborative action (Fig. 18). CLA focused more on Phase II of its strategic pathway, strongly relying on bridging and leveraging social and political capital to achieve direct management outcomes. CLA is more focused on enabling others to implement direct actions and on providing them with the appropriate resources they need to do those actions successfully, whereas LSPA tends to engage in direct action somewhat independently. LSPA plays more of an immediate role in direct action than CLA does in many of its management initiatives. In Phase III, CLA tends to monitor both social and environmental outcomes to some degree, though it also relies on reported information from its partners for this. While CLA is less self-

contained in its activity, it is leveraging social and political capital on a large scale to achieve a variety of direct action initiatives all at once, whereas LSPA is much more targeted and specific about the direct action initiatives it chooses to engage in.

<u>Case Study</u>	<u>Organization Structure</u>	<u>The Major Problem</u>	<u>Motivational Model</u>	<u>The Goal</u>	<u>Social Outcomes</u>	<u>Environmental Outcomes</u>
LSPA	Primarily a voluntary association	Threat of invasive Eurasian milfoil	Prevention	Preservation; Stability; Safety	Lake Host program; Weed Watchers program; SAMAT	Control and removal of milfoil from the lake
CLA	Primarily a bridging organization	Pre-existing seasonal blue-green algae blooms	Promotion	Restoration; Gains	Formation of Yahara Pride Farms; Yahara CLEAN plan & partnerships	Over 13,960lbs of phosphorus diverted through Yahara CLEAN initiatives

Table 3: Comparison of case study structure, motivational models, and associated outcomes

LSPA and CLA are structured and oriented differently towards their respective lake resources and the issues they face. Though they come from different reference points, take different approaches, and use different strategies, they have both been effective at achieving social and environmental outcomes in line with their respective missions.

LSPA and CLA both displayed distinct systematic ways of handling complex environmental issues on the local scale through the activity pathways characterized in Section 4 of this thesis. While CLA primarily acts as a bridging organization, and LSPA as a voluntary association, both displayed themes of issue tracking, bridging activity, and scientific involvement in the pathways they use for problem solving, leading to outcomes associated with each theme (Table 3).

For LSPA, the activity of addressing the threat of invasive milfoil on its lake resulted in social outcomes that included the formation and continuation of two monitoring programs: the Weed Watchers and Lake Hosts programs. The collaborations formed during LSPA’s involvement in the SAMAT and the Sunapee Selectmen groups could also be thought of as social outcomes of this activity. Environmentally, LSPA achieved the outcome of successfully controlling and removing invasive milfoil from

Lake Sunapee, and it continued to be successful in preventing invasive species establishment through the rest of the analysis period.

For CLA, the actions the organization took in response to seasonal blue-green algae blooms occurring on its lake resulted in social and environmental outcomes as well. The formation and fostering of a new partner organization, Yahara Pride Farms, was a big social outcome of CLA's activity, along with the creation of the Yahara CLEAN plan, the State of Lakes Report Cards, and the partnerships CLA formed with government officials and scientific experts throughout the process. Environmentally speaking, CLA achieved reported outcomes of diverting over 13,960 pounds of phosphorus from 2012 – 2017 (combined totals reported in the 2017 State of the Lakes Report Card) through its Yahara CLEAN initiatives. This reported outcome includes phosphorus reductions accomplished by Yahara Pride Farms, Dane County, and other partners of CLA.

In their activity pathways, both groups initially relied on their human capital to keep track of *potential* problems (in LSPA's case), or *pre-existing* problems (in CLA's case; Fig.18). Since LSPA began mobilizing its human capital to monitor the lake and plan what to do in response to invasion before milfoil was ever sighted, I characterized the motivation of this behavior as prevention focused. LSPA took action in response to a threat, rather than waiting to act until after the problem already became established on its lake. This behavior is strategic for LSPA because it is situated on a lake that is currently in a fairly desirable socio-ecological condition (e.g. oligotrophic, high water quality), but which is susceptible to transformation or collapse into a degraded state. LSPA strives to prevent transformation of its lake from a clear to turbid regime, so preventative behavior is feasible and effective for preserving water quality and promoting resilience, since such a transformation could be very difficult to reverse (Folke 2016; Cumming 2011; Walker et al. 2004).

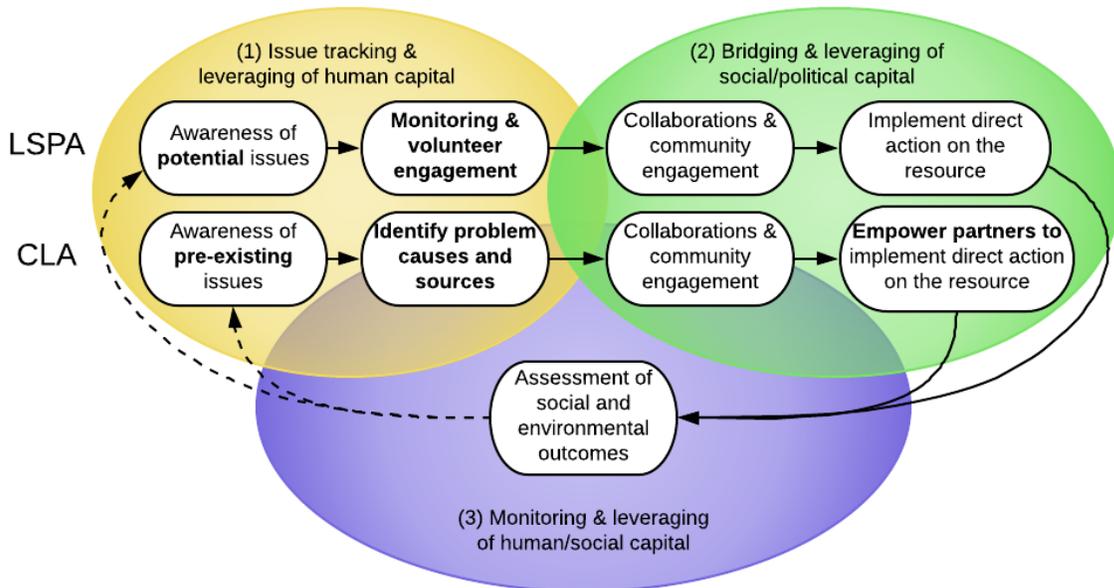


Figure 18: Strategic pathways comparison

CLA, on the other hand, chose to act on the pre-existing and pervasive problem of blue-green algae blooms in its lake by mobilizing its human capital to track, compile, and record the causes of these blooms through the development of the Yahara CLEAN plan. It also laid out 14 action initiatives in this plan to reduce phosphorus loading and decrease the impact of algal blooms. I characterized the motivation of this behavior as primarily promotional focused because CLA is working towards gains and concrete accomplishments through the Yahara CLEAN initiatives rather than working towards security or safety in its socio-ecological system. Since it is situated on a lake that is in a degraded state (e.g. eutrophic), promoting positive change is necessary for socio-ecological restoration. Therefore, promotional steps are effective for water quality restoration goals in CLA's case. While both lake associations can display some aspects of both preventative and promotional focuses, overall LSPA acts under preventative motivations and CLA acts under promotional ones to best address their respective goals of preservation and restoration.

After leveraging human capital to track potential threats and problem sources in their lake systems, both groups began to leverage social and political capital to engage in collaborative processes once the threat became realized (in LSPA's case) or once problem areas were identified (in CLA's case; Fig.18). Both groups displayed bridging

activity during this phase. LSPA acted in a bridging capacity when it invited the Sunapee Selectmen to meet so that LSPA could brief them about the milfoil problem at Lake Sunapee. Since the Sunapee Selectmen is a group of stakeholders and politicians, and LSPA was connecting them with scientific information about invasive species and Eurasian milfoil, LSPA acted in a boundary-spanning capacity. It continued to bridge between science, policy, and society during its involvement with SAMAT, which is also a collaborative group with representatives from each of these sectors.

CLA displayed bridging capacity through the formation and implementation of the Yahara CLEAN plan, the launching of the Yahara Pride Farms group, and the distribution of the State of the Lakes Report Cards. CLA worked with partners from policy and science sectors to develop the Yahara CLEAN plan and linked urban and rural community members to financial and political support for implementing the conservation initiatives outlined in the plan. Through the formation of the Yahara Pride Farms group, CLA helped bring farming community members together and provided them with the scientific information they needed to make data-driven land management decisions. CLA also helped communicate the needs of farmers and urban community members to political leadership in local municipalities, so that local government funds could be allocated appropriately and so that government officials could take Yahara CLEAN initiatives into account when reviewing standard practices and ordinances for their communities. Both the State of the Lakes Report Cards and the Yahara CLEAN report were produced by CLA to be used as tools to communicate across sectors of society and to connect policy makers and stakeholders with scientific monitoring data.

LSPA and CLA both continued to monitor their respective lakes during and after taking action on the problems at hand (Fig.18). LSPA continued the Weed Watchers and Lake Hosts programs long after milfoil was eradicated, and CLA keeps up with the conditions in the Yahara Lakes through the process of compiling its annual State of the Lakes Report Cards. A theme of scientific incorporation or involvement emerged from the data for both groups as well, along with continued resource monitoring.

LSPA had implemented scientifically informed management strategies to contain, remove, and monitor for milfoil. The organization also continued to communicate scientific information regarding Eurasian milfoil and other invasive species in newsletter

articles in the years following the milfoil invasion. It received much of this information in the early 2000s from NH-DES. However, LSPA's scientific involvement increased in the years immediately following the milfoil eradication as it expanded monitoring in the lake to include efforts to better understand cyanobacteria, efforts to contribute to the GLEON network (beginning in 2006), and the continuous data collection of the GLEON buoy (beginning in 2007). It is unclear in the data if the milfoil scare inspired any of this increase in scientific involvement, but the incorporation of science certainly became a major theme for LSPA throughout the rest of the analysis period immediately following the milfoil eradication event.

CLA incorporates science in the continued monitoring of the Yahara Lakes by relying on scientific data from UW-CFL, NOAA, USGS, local and state government departments, and other community organizations to compile the annual State of the Lakes Report Cards. It also utilized scientific information from city, county, and state departments in the formation of the Yahara CLEAN report. CLA communicated this information to farmers during the establishment of Yahara Pride Farms. Its scientific involvement primarily occurs in the form of scientific communication and data sharing with the general public and government officials.

These groups both demonstrated continual monitoring of the conditions of lake resources and surrounding watersheds, along with record keeping of their own activity (e.g. LSPA keeps track of the number of boats inspected for the lake host program; CLA keeps track of the pounds of phosphorus diverted through Yahara CLEAN initiatives). However, the data did not reveal that either group was monitoring the impact or effectiveness of organizational activity per se. In other words, these groups track outputs and lake conditions, but are not always specifically linking their own activity to water quality outcomes, or self-assessing the effectiveness of their management initiatives. In order for these groups to be performing adaptive management, they would need to monitor the environmental impact of organizational actions and utilize that information to readjust their strategy the next time around (i.e. demonstrate organizational learning; dotted arrows Fig.18). Both groups have evolved in their strategies over time, but it is unclear from the data whether or not these evolutions occurred due to formal organizational learning.

To assess organizational effectiveness for these two lake associations, I return to the multi-dimensional model I describe in Section 2.3 of my thesis. I tracked indicators of mission, capacity, and activity for both lake associations so that I could evaluate them against three effectiveness models, the first of which was the goal attainment model. In the goal attainment model, effectiveness is determined through the ability of an organization to achieve its goals. LSPA had goals of “preserving and enhancing the special environment of the Lake Sunapee region through education, research and collaborative action.” I argue that in eradicating the presence of invasive milfoil in the lake, LSPA achieved its goal of lake preservation, since they have been able to maintain Lake Sunapee in an invasive-free state. The evidence of LSPA’s focus on educational programming and guidance puts them in line with the mention of education in their mission statement. The themes of scientific involvement and collaboration that emerged from LSPA’s activity pathway also support the “research and collaborative action” portion of its mission statement.

CLA’s mission of striving “to continue building a community of people, businesses, organizations, and government agencies dedicated to improving and protecting water quality in the Yahara River watershed” is supported by its extensive bridging and social networking activity and its development of the Yahara CLEAN plan. This activity allows CLA to engage the community at-large and across sectors of society. It has indeed engaged with businesses, other organizations, government agencies, and both rural and urban stakeholders in its work, which is directly in line with its mission. The Yahara CLEAN plan allowed CLA to bring different entities together for the specific purpose of protecting water quality. CLA is also working towards achieving its goal of reducing phosphorus loading by 50% by 2025 through the pounds of phosphorus Yahara CLEAN initiatives are diverting each year. In its 2017 State of the Lakes & Clean Lakes Alliance Annual Report, CLA claimed that they had made it 30% of the way to that goal. In this sense, CLA has been very effective at reporting out its progress in achieving self-determined goals.

The next model for organizational effectiveness is the system resources model, which says that the capital assets and growth of an organization can be thought of as proxies for effectiveness (Liket & Maas 2015; Forbes 1998). Both groups were found to

display substantive amounts of all seven types of capital assets derived from the community capitals theory, with especially high levels of financial capital, human capital (paid staffs), and built capital. These data also showed evidence of capital growth for both groups. LSPA and CLA grew their full-time staff members over the analysis period (human capital), and their overall financial capital. CLA grew in the number of cultural events it participated in or hosted (cultural capital), the number of volunteers it engaged (social/human capital), and in its total number of board members (human capital). LSPA grew substantially in built capital through acquiring The Knowlton House and the GLEON buoy. It also grew in the amount of grant monies received each year (financial/social capital), and in the number of community partnerships held (social capital). As far as maintaining and growing resources can be thought of as a proxy for effectiveness, both LSPA and CLA demonstrate successful outcomes in developing capital assets in a well-rounded manner.

The final model for organizational effectiveness is the reputational model, which states that an organization is only as effective as people perceive it to be (Liket & Maas 2015; Jun & Shiau 2012). To address this model, I developed codes for public recognition, legitimacy, saliency, and credibility. Both LSPA and CLA were publically recognized through consultation by the news media on various events or issues. They were mentioned positively in opinion columns, credited for information they provided to news sources, and mentioned in news articles alongside salient socio-environmental issues. Both groups built their reputations by engaging in partnerships and collaborations, applying for and receiving grants, producing and communicating useful data to the public, and through putting on major public events each year. Bridging activity was also associated with public recognition across sectors of society. While my data to assess public perceptions was limited in this study, I did find evidence that both groups achieved recognition for legitimacy, saliency, and credibility in their respective communities.

5. Discussion

My research applied organizational and systems thinking theories, including concepts from environmental governance, organizational effectiveness, and community capitals theories, to two case studies as a lens through which to better understand and describe these systems. Using the conceptual framework outlined in Section 2, I identified the mission orientations, structures, and activities of both lake associations, and investigated how these aspects interacted when the focal lake associations faced particular problems in their lake catchments. While my research did not test a hypothesis about organizational effectiveness or environmental governance, it did track and describe indicators of effectiveness and governance derived from the theoretical literature. My findings illustrate what makes lake associations effective and have implications for their integration into governance systems.

LSPA and CLA were found to orient themselves (through their mission and capacity) and strategize (through their activity pathways) differently given the needs of their respective communities and lakes. Despite these different orientations and strategies, both organizations displayed themes of issue tracking, bridging activity, collaboration, monitoring, and scientific engagement, which led to social and environmental outcomes. My comparative results walked through each stage of the governance process and noted the areas where LSPA and CLA engage with it. The next steps are to consider the ways these groups might be positioned to contribute to *collaborative environmental* governance processes. This discussion assesses the extent to which the activity of these lake associations aligns with best practices for environmental and collaborative governance. I then present the contributions of this study to the literature and conclude with limitations and future directions.

These case study lake associations displayed important characteristics of collective action groups and demonstrated themes in line with best practices for environmental governance. Both CLA and LSPA demonstrate through their activity pathways that they are responding to changes or threats to ecosystem services (i.e. water clarity, water quality, aesthetics) and the human outcomes that result from those changes or threats (i.e. beach closures, impediments to recreation). They are then both taking action to modify or change human behavior in some way to address problems in

their catchments (i.e. Yahara CLEAN initiatives, boat inspections), and influence resource management. This activity places these groups nicely in line with the role collective action groups play in SES theory. While some definitions of collective action include the ability to create and enforce rules (Ostrom 2000), these lake associations do not have explicit rule-making power. However, they are groups that are voluntarily formed and are made up of resource stakeholders, and they strive to influence decision-making or rule-making processes. Therefore, I argue that these groups are situated as collective action groups in their communities, and participate as actors in governance processes, even without explicit rule-making power.

The governance process is made up of actors engaging in political processes that lead to institutional arrangements (e.g. rules and regulations), which lead to social actions, finally resulting in changes to the capital asset stocks of the entire socio-ecological community (Matson et al. 2016). CLA and LSPA both engaged in some political processes through their production of guidance materials, educational outreach efforts, advocacy work, and collaborations with other governance actors. The extent to which LSPA and CLA engage in institutional arrangements was less clear from the data. While the goal of advocacy work at times was to contribute policy outcomes, the extent to which these groups contributed to actual policy change was unclear from the data. However, the implied goal of much of the educational outreach and guidance work performed by these organizations was to influence social norms, which is considered to be a type of institutional arrangement. This study did not investigate the extent to which these organizations influenced social norms in their communities over time. Further research and a community-wide study would be needed to assess the specific role lake associations play in the formation or revision of institutional arrangements.

These lake associations did demonstrate contributions to the social action phase of the governance process. Social behavior, decision making, management and practice are each considered to fall under this phase in the process. CLA and LSPA participated in decision-making regarding how best to address invasive species and blue-green algae blooms in their lakes, and they also contributed to the implementation of specific management practices. CLA and LSPA may have also influenced societal

behavior in other ways as a result of education and guidance initiatives, but the data for this organizational study did not provide much evidence for this.

The outcomes of CLA and LSPA's activity pathways point towards contributions to the final stage in the governance process: changes to community capital asset stocks. While this research is not able to determine exactly to what extent these groups altered the capital assets of their socio-ecological system at-large, these lake associations have boosted the social capital of their communities through the formation of partnerships, collaborations, and stakeholder engagement. I also argue that the removal of invasive milfoil from Lake Sunapee and the diversion of approximately 14,000 lbs of phosphorus from the Yahara Lakes catchment impacted the natural capital asset stocks of both systems. Furthermore, CLA and LSPA likely contributed to the overall knowledge base of the surrounding communities through compiling scientific data, sharing it publically, and reporting on lake conditions.

By the very fact that both these lake associations have missions focused around lake water quality, I argue that their involvement in governance brings more environmental consideration to the process. Environmental consideration is necessary during each stage of the governance process for it to be considered *environmental* governance (Lemos & Agrawal 2006). By having missions to protect water quality, lake associations facilitate environmental consideration in each of the governance stages they are involved in.

How might these groups then contribute to *collaborative* governance processes? Collaborative governance occurs when there is a formal structure of collaboration, public involvement, and joint decision making in the stages of the governance process (Gerlak et al. 2013; Ansell & Gash 2008). While I did not find evidence that such formal structures were in place in either Madison, WI or Sunapee, NH, the fact that both LSPA and CLA are groups made up of stakeholders with local knowledge of lake resources, and that both engage in bridging activity, community engagement, member engagement, and information sharing, suggests that they are well positioned to act as key players in collaborative governance systems. These lake associations inherently involve stakeholders, and they are bringing people and information together across sectors of society, as well as contributing to joint decision-making processes and

management actions, so if a larger collaborative governance network were to be put in place, these groups could be meaningful contributors.

Although these two lake associations are dealing with very different lake conditions, are structured differently, and even function differently in their communities, they have also both achieved outcomes in line with their missions. They have grown their resources over time, and worked to develop reputations as legitimate and credible organizations. I conclude that both of these organizational structures and their associated strategies are effective, but that they are effective in different ways. LSPA relies much more heavily on an internal volunteer-membership base to achieve organizational goals, whereas CLA focuses more externally on building partnerships and social capital, by comparison. LSPA is particularly effective at monitoring its resource for potential threats, taking preventative steps, and engaging its membership. On the other hand, CLA is particularly effective at engaging the community at-large, marketing its goals, and getting other groups to be on board with its vision. Both LSPA and CLA use strategies of bridging between sectors of society to achieve on-the-ground land management change, and in attempt to affect societal behavior.

The in-depth analysis performed on these two case study lake associations, the identification of major themes in lake association activity, and the assessment of organizational effectiveness and role in governance processes provides meaningful contribution to the scientific literature on human ecology, lake management, and environmental governance. My literature review revealed few studies on lake associations and the role they play in socio-ecological systems. To address this gap, this research contributes an in-depth investigation of the structures and functioning of two case studies and their histories of effectiveness in achieving outcomes. This research also revealed two distinct strategic pathways these organizations implement to contribute to lake management and conservation, and that both strategic pathways led to significant social and environmental outcomes.

Equifinality is a principle that has been demonstrated in a number of different fields, from business to psychology to environmental modeling. Cummings and Worley (2014) define the concept when applied to biological or social systems as the idea that “similar results or outputs may be achieved with different initial conditions and in many

different ways.” The analysis of the case studies points to this principle because similar themes emerged from the data, though the lake associations demonstrated those themes in very different ways. Both cases achieved results in line with best practices for collaborative environmental governance and demonstrated organizational effectiveness according to a multi-dimensional effectiveness model, though they started with very different initial conditions. Both demonstrated environmental and social outcomes, but they leveraged different qualities and strategies to do so.

This indicates that context matters for effective organizational structure and strategy. In other words, the exact strategies lake associations use to effectively engage with governance processes and achieve outcomes will depend on the socio-ecological context within which they are operating. Different strategies may be more effective for contributing to governance in different contexts. The CLA case study demonstrated that an organizational structure and strategy that is externally focused on bridging and building social capital in the greater community is effective within a socio-ecological context where there is a large and diverse population of stakeholders. On the other hand, the LSPA case study demonstrates an organizational structure and strategy that is more internally focused on building and engaging a membership, and bridging that membership to external entities. This was effective for LSPA, which operates within a small-town socio-ecological context where there is a smaller and more homogenous population of stakeholders.

Based on this understanding of the strategies and contexts of these case studies, I arrive at the hypotheses that in areas where social capital is likely to be lower (large, diverse communities with urban-rural divides), collective action groups that focus on building social capital through community engagement events, and fostering connections and collaborations across sectors of society, are more likely to achieve greater resource management outcomes. In contrast, in areas where social capital is likely to be higher (small town settings with relatively homogenous populations), collective action groups that focus more on volunteerism, inclusion and membership engagement are more likely to achieve greater resource management outcomes.

Since this research finds lake associations to be poised to act effectively in collaborative environmental governance structures, this study also contributes to the

literature as an investigation of the ways NGO governance actors can strategically operate and structure themselves. Most studies in the governance literature focus on entire governance networks (Lemos & Agrawal 2006; Newig & Fritsch 2009; Gerlak et al. 2012; Ansell & Gash 2008; Bodin 2017), and there are few studies that hone in on the role of individual actors and the strategies they implement to contribute (Bernauer & Betzold 2012). By looking at the role of individual actors, I noticed that the socio-ecological regime of a particular system affects the goals and methods actors use to engage in the governance process. Depending on the conditions of a shared resource, a collective action group identifies and utilizes different leverage points to engage in decision-making.

LSPA, which is situated on a lake in relatively good condition, is oriented towards preserving and protecting its lake resource from degradation. LSPA identified and brought attention to leverage points of what it considered to be significant *threats* to lake water quality (e.g. shoreline development and invasive species) and strategized around goals of closely monitoring and preventing these threats. In contrast, CLA, which is situated on a lake in relatively poor condition, is oriented towards reversing lake water quality degradation. CLA identified and brought awareness to leverage points of what it considered to be major *sources* of lake pollution, and formulated concrete goals and strategies on how to eliminate or reduce these sources (e.g. agricultural runoff and urban stormwater runoff). Both of these case studies utilized the leverage points they identified to communicate across sectors of society and engage in decision-making processes.

From these findings on how conditions of a shared resource influences the ways a particular collective action group engages in governance processes, I arrived at two more hypotheses. I hypothesize that in socio-ecological systems that are in a state of significant degradation, collective action groups that formulate clear goals and feasible plans of action will be more effective in garnering widespread social support of organizational initiatives and in contributing to natural resource restoration. I also hypothesize that in socio-ecological systems that are currently in relatively good condition, or in a state of desired quality, collective action groups that focus on creating widespread monitoring networks and scientific collaborations will be more effective in

quickly responding when a threat becomes realized in their system, ultimately contributing to natural resource preservation. Future research can explore these strategies, among others, in relation to various socio-ecological regimes to gain further insights as to which strategies are best suited to lake systems in different stages of degradation.

Some limitations of this study include the fact that I focused on two cases that had access to high amounts of financial and human capital, which is not likely to be true for most lake associations in the U.S. Both LSPA and CLA were well endowed by large donor bases, and both have paid staffs, whereas many similar groups are completely volunteer-driven with limited funds. Though this is a limitation to this study, and I would recommend future research that investigates a larger sample of lake associations with varying degrees of financial capital, financial capital alone does not determine the success or effectiveness of non-profit or voluntary civic organizations (Liket & Maas 2015; Andrews et al. 2010; Laraia et al. 2003; Hunter 2014). I found that the strategic pathways LSPA and CLA implemented and the themes that arose out of these pathways were better explanations for the social and environmental outcomes these groups achieved, rather than the amount of financial capital they had at their disposal. However, it must be noted that these groups would not have been able to engage in many initiatives without financial resources. Therefore, an important part of an organization's effectiveness is its ability to grow its capital assets. My results indicate that both LSPA and CLA engage in a substantial amount of fundraising and soliciting to grow and maintain their capital assets.

My discovery that CLA does not self-identify as a lake association is another limitation of my two case study sample. While I consider CLA to be a lake association based on the definition of the term as a voluntary, community-based, civic organization that responds to threats or changes in lake ecosystem services and works to conserve those services, as outlined in Section 1 of this thesis, the term "lake association" does have different connotations in the common vernacular of various social contexts. I was unaware that CLA prefers not to be identified as a lake association, or as an environmental group, until the study was well under way. Upon this discovery, I attempted to find another term to better encapsulate the two case-study groups, but was

unable to find a more accurate descriptor in the scientific literature, ultimately deciding to continue to use “lake association” as I have defined it here. This is a limitation to the comparative utility of these two case studies. Although the major differences in identity, structure, and function provided useful points of contrast to investigate between the two groups, it presented great challenges when it came to comparing their effectiveness and contributions to governance, since both organizations had very different goals and saw themselves as playing different roles in their respective communities.

Another limitation of this study arises from the methods used. Qualitative case study approaches make it difficult to generate causal claims and results cannot be generalized beyond the case study organizations themselves. This study could be supplemented with a mixed method approach where lake association participants, partners, and leaders, along with unaffiliated community members are surveyed to better understand the perceptions people have on the reputations of lake associations and the impacts of lake association activity. Furthermore, this sort of approach could be implemented as a form of organizational performance evaluation, where those involved with the lake association are asked to self-assess the effectiveness of the organization as a whole, based on a series of performance factors, and those outside of the organization are surveyed on their opinions of the effectiveness of their local lake association. Further research could also perform a scaling-up analysis where larger samples of lake associations across a larger geographical range are assessed using the conceptual framework developed as part of this research, or based on the themes identified in my results.

Despite these limitations, my research was able to identify major themes related to outcomes for each case study. The themes of issue tracking, acting in a bridging capacity, and incorporating science were found to be relevant for both groups, though each lake association engaged with these concepts in distinct ways and to differing degrees. These themes played out in similar ways in the strategic pathways for both groups and were associated with social and environmental outcomes in both cases. Although the two lake associations were situated in two very different socio-ecological systems, dealing with different lake conditions and socio-environmental problems, they were both effective in achieving outcomes in line with their missions, growing their

organization's resources, building their reputation, and taking actions in accordance with best practices for collaborative environmental governance.

Lakes are complex common pool resources facing significant management challenges today. As environmental problems facing lake socio-ecological systems become increasingly characterized by high complexity and uncertainty, collaborative environmental governance networks promise more sustainable decision-making outcomes. Furthermore, collaborative environmental governance may be the only feasible mechanism for preventing or reversing the *Tragedy of the Commons* in democratic societies. Collective action groups, such as lake associations, are key actors in governance processes and they are poised to contribute environmental consideration and stakeholder involvement to collaborative governance systems. In conclusion, I hypothesize that the themes uncovered in this study, which include issue tracking, bridging activity, and scientific engagement, lead to greater potential for community-based groups to contribute in meaningful ways to collaborative environmental governance. Continued research is needed to test these hypotheses and to better understand what strategies or factors make lake associations and other collective action groups effective at achieving outcomes and further contributing to environmental governance.

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7. Appendices

7.1 Appendix A: Coding Manual (list of codes and their definitions)

Code type	Category 1	Category 2	Concept	Code	Definition	Rules for code usage
Holistic			Holistic quotation	holistic		This code should be assigned to every article or blurb headline to signify coding that applies to the whole article. All codes co-occurring with the code "holistic" will also be considered holistic codes for that article or blurb. This code should only be applied to article or blurb headlines that contain relevant information for the study.
Holistic	Primary Article Function		Advertising	function_ad	This code indicates an article or blurb that functions primarily as an advertisement for an event, opportunity, or deal. Articles or blurbs displaying calendar events would be considered to be functioning as advertisements for those events.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Persuading	function_persuade	This code indicates an article or blurb that functions primarily to encourage the readership to take a certain stance or view towards an issue or subject matter. Opinion pieces or articles that convey the stance of the lake association on a certain subject and provide justification for that stance would be considered persuasive articles and should be assigned this holistic code.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		General informing	function_inform	The code indicates an article or blurb that functions primarily to generally inform the readership of some topic or subject matter. This holistic article function code is somewhat of an "other" category for the primary function of an article. All articles or blurbs convey information, so if there is an article or blurb that is not advertising an event, not attempting to persuade the readership, not a piece that is purposefully functioning in an educational capacity, not soliciting for capital, not expressing appreciation or reporting the results of LA activity, and not reporting on any particular issue or event, this code would be assigned. This code may also be used to indicate articles or blurbs that primarily serve as brief reminders to the readership that don't otherwise qualify as guidance, event ads, activity briefs, or updates.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Reporting out	function_reportout	This code should be used when the primary function of the article or blurb is informing readership on news and results regarding lake association activity. This is a form of information sharing and it provides evidence of the LA's efforts to build a knowledge base. Reporting out requires that the LA a) do something, and b) share the news of what they did. This code should only be used when the article is about the results of LA activity, or the discussion of LA activity and outcomes from that activity. It should not be used when results are shared without mention that they are the result of LA activity.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate. The rules for using this code include evidence within the article of 1) that the LA itself was investigating or actively pursuing something, and 2) the LA is sharing their results from this particular investigation or knowledge pursuit.
Holistic	Primary Article Function		Manifesting guidance	function_guide	This code indicates an article or blurb that is functioning primarily to provide guidance to the readership. These articles are manifestations of guidance. These are like advisories on how people should behave, act, and/or manage their property. These are articles that provide suggestions or advice to the readership and they may be persuasive in nature, but if there are actual pieces of advice on how the readership should change their behavior, or actionable steps, then this function code should be used over function_persuade.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Soliciting for capital	function_solicit	This code indicates an article or blurb that is functioning primarily to solicit for some kind of capital gain. These are usually blurbs where the lake association is calling for donations, volunteers, or some other form of resources that are needed at the time. Articles that primarily function to ask for resources indicate something about the organization's needs over time.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Expressing appreciation	function_appreciate	This code indicates an article or blurb that is functioning primarily to express appreciation or gratitude in one form or another. Whenever there is an article or segment primarily dedicated to giving thanks, this code should be applied.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Briefing	function_brief	This code indicates an article or blurb that is functioning primarily to briefly outline a variety of lake association activities or current events. These are activity briefs, and this code should only be used if a number of different lake association activities/events are discussed within the article or blurb. These articles function to give the readership an overview of the different activities the organizations is currently or has recently been involved in.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Reporting on weather, climate, or environmental conditions	function_envreport	This code indicates an article or blurb that is functioning primarily to report on environmental conditions. These could be articles that are sharing information about weather, climate, or other environmental concerns that are seen to have a local affect. If there is a particular environmental issue facing the local area and the lake association has an article or blurb with a status update on that issue, this would be considered to be an article that is functioning to share news about environmental conditions and should be coded with this code. These are exposition pieces where the article is serving to educate the readership on a particular environmental issue.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Reporting on issues	function_issuereport	This code indicates an article or blurb that is functioning primarily to report on political or societal issues facing the local region, area, or community. If there is a particular non-environmental issue facing the local area and the lake association has an article or blurb with a status update on that issue, then this code would be used. These are articles that are meant to inform the readership on a particular non-environmental issue facing the community.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Reporting on events	function_eventreport	This code indicates an article or blurb that is functioning primarily to report on community events, gatherings, or functions. These could be fundraising events or social functions or any other notable event that the lake association is raising awareness about and reporting on the outcomes of. If there is an article about an event that has not happened yet, then that article should be coded with the function_ad code, not this code. If the event has already happened and the LA is reporting on it, then this code should be used. If it was an event that the LA was directly involved with, you may use this code along with the function_reportout code to indicate that the article was reporting out about an event that the LA helped to put on. This code could also be used to indicate articles that are about events that the LA did not necessarily have involvement with.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.

Code type	Category 1	Category 2	Concept	Code	Definition	Rules for code usage
Holistic	Primary Article Function		Manifesting education	function_educate	This code indicates an article or blurb that is functioning primarily to educate the readership on a particular subject matter. This code is used when the subject matter is more general than specific political or environmental issues facing the local community (in which case, codes function_issuereport or function_envreport should be used). If the LA is generally informing its readership on a particular activity or subject matter in an explanatory fashion with a purpose of teaching the readership about said subject matter, then this code should be used. Usually, some amount of background information is required for an article to be considered to have an educational function.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Celebrating	function_celebrate	This code indicates an article or blurb that is functioning primarily to celebrate something going on within the organization or local community. These are often articles that are functioning as a type of self-recognition, where the lake association is applauding themselves, or some aspect of themselves and their successes. These are articles which function to highlight and applaud the people and successes of the organization.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Primary Article Function		Updating on the status of particular activities, issues, or events	function_update	This code indicates an article or blurb that is primarily functioning to update the readership on the status of a particular activity, issue, or event that the LA is either directly involved with or paying close attention to. Sometimes these are follow-up articles to previous articles that were coded with function_envreport, function_issuereport, or function_eventreport. These articles are not necessarily articles that are reporting out because the event, activity, function, or issue may not be completed or fully resolved yet, so there may not be any results of LA activity discussed. Also, articles coded with this function code may not have anything to do with LA activity at all; they could just be articles about issues the LA is paying close attention to, without being involved in any way. These are articles where the LA is keeping tabs on something of concern, or where the LA is providing a status report on a certain activity they are engaged in without having arrived at any outcomes yet. If there is an article that contains a status update on LA activity and also contains evidence of outcomes or results from that activity, even if the activity is not yet completed, the function_reportout code should be used instead.	This code can only be holistically assigned to an article or blurb along with the code "holistic". These should not be used as internal codes. Only one function code should be used for each article, except in rare cases where two may be appropriate.
Holistic	Evidence of LA Activity		Past activity	activity_past	This code indicates an article containing evidence of a lake association activity that has already taken place. This should be used only when it is clear that the activity or action has already been completed to its entirety. If the activity partially took place in the past, but is not yet completed, then the activity_ongoing code should be used instead.	Activity codes can only be holistically assigned to articles or blurbs and should be assigned to any articles containing evidence of at least one lake association activity, or an activity performed by an individual acting in their capacity as an affiliate of the lake association. More than one activity code can be assigned holistically if there is evidence of more than one lake association activity occurring within the article or blurb along different time scales.
Holistic	Evidence of LA Activity		Ongoing or "current" activity	activity_ongoing	This code indicates an article containing evidence of some lake association activity or activities that is currently ongoing. Any action or activity disclosed in an article or blurb that is started, but not yet completed, should be indicated by the usage of this holistic code.	Activity codes can only be holistically assigned to articles or blurbs and should be assigned to any articles containing evidence of at least one lake association activity, or an activity performed by an individual acting in their capacity as an affiliate of the lake association. More than one activity code can be assigned holistically if there is evidence of more than one lake association activity occurring within the article or blurb along different time scales.
Holistic	Evidence of LA Activity		Future activity	activity_future	This code indicates an article containing evidence of a lake association activity that is set for the future. This is an activity that the lake association as a whole, or particular individual(s) acting in their capacity to represent the lake association, has already planned and scheduled. It is an activity that is seemingly decided upon as a sure thing for the future, but this code can be used to denote an article that indicates the activity will most likely happen, but lacks evidence that it actually did happen, an instance that usually occurs due to the article being published prior to the time when the activity was to take place.	Activity codes can only be holistically assigned to articles or blurbs and should be assigned to any articles containing evidence of at least one lake association activity, or an activity performed by an individual acting in their capacity as an affiliate of the lake association. More than one activity code can be assigned holistically if there is evidence of more than one lake association activity occurring within the article or blurb along different time scales.
Holistic	Evidence of LA Activity		Planning activity	activity_plan	This code indicates an article or blurb that contains evidence of a possible future lake association activity. These are activities that are still in the planning phase and are still ideas, instead of scheduled future activities.	Activity codes can only be holistically assigned to articles or blurbs and should be assigned to any articles containing evidence of at least one lake association activity, or an activity performed by an individual acting in their capacity as an affiliate of the lake association. More than one activity code can be assigned holistically if there is evidence of more than one lake association activity occurring within the article or blurb along different time scales.
Magnitude			Evidence or indication of capital growth	+	This code indicates an article, blurb, or sentence that contains of a net capital gain for the organization. This can be a capital gain of any kind or an increase in assets the lake association has attained through any means.	Magnitude codes can be used holistically, and also internally. A magnitude code should be assigned holistically anytime there is an internal magnitude code assigned. If two internal magnitude codes cancel each other out EXACTLY (meaning that capital loss is precisely equal to the capital gain in type and amount), then internal magnitude codes should be assigned to their respective statements, but a holistic magnitude code should not be used. Anytime a magnitude code is assigned, it should ALWAYS be paired with at least one concept focus code to represent the capital asset or other concept that was lost or gained.
Magnitude			Evidence or indication of capital loss	-	This code indicates an article, blurb, or sentence that contains a net capital loss or decrease for the organization. This can be any type or kind of capital loss or decrease in assets, occurring for any reason.	Magnitude codes can be used holistically, and also internally. A magnitude code should be assigned holistically anytime there is an internal magnitude code assigned. If two internal magnitude codes cancel each other out EXACTLY (meaning that capital loss is precisely equal to the capital gain in type and amount), then internal magnitude codes should be assigned to their respective statements, but a holistic magnitude code should not be used. Anytime a magnitude code is assigned, it should ALWAYS be paired with at least one concept focus code to represent the capital asset or other concept that was lost or gained.

Code type	Category 1	Category 2	Concept	Code	Definition	Rules for code usage
Concept Focus	Mission, Ideals, & Aspirations		Mission statement	mission	This code should be used to indicate a statement of organizational mission, or an article or blurb focused around the organization's current driving goals and principles. These statements are usually formal and calculated, but there are instances where an informal mission statement can be made. These statements are summaries of the goals and values driving the existence of the organization at the present time. Individual goals are more specific than a mission statement, and statements about the future prospects of the organization are more broad, so the statements of mission fit somewhere in the middle. They are a collection of goals and principles that give purpose to the organization currently.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Mission, Ideals, & Aspirations		Vision statement	vision	This code should be used to indicate a statement of organizational vision, or an article focused around future directions or objectives of the organization. A vision statement is broader and/or more vague than a mission statement. These types of statements can encapsulate the guiding objectives, principles, and/or beliefs that inspire the organization's mission. Vision statements may also be mentions of how the organization, or key individuals within the organization, view the role or direction of the organization in the future.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Mission, Ideals, & Aspirations		Defined goals	goals	This code should be used whenever there are statements of organizational goals or objectives. These can be more specific or shorter term goals than what might be contained in a mission or vision statement. The key qualifying factor for the usage of this code, however, is that the goal is organization-wide, or on the organizational level. It is a goal for the organization as a whole, or a goal to benefit the organization as a whole, rather than goals for specific individuals or other groups. Sometimes goals of key individuals should be coded with this code, as key individuals within the organization may have goals that will impact the whole organization, not just them individually. This code may also be used holistically if there is an article focused around a collection of organizational goals that is too specific to be considered a mission or vision focused article.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Mission, Ideals, & Aspirations		LA Stance or belief statements	stance	This code should be used whenever there is a statement of beliefs or organizational opinion on something. Organizational stance is more general and less defined than organizational goals, but these are statements where the organization is advertising their opinion or specific thoughts about an issue. Sometimes the stance of an organization can lead to goals, but other times, the organization may just let their stance be known so that the readership can have knowledge of the organization's opinion on something even if the org has no particular goals to do anything about a particular issue. In theory, organizational stance should be inspired by the organization's mission. Mismatch between stance, goal, and mission statements in an organization can indicate something about the organization's alignment and clarity.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Capital Assets	Natural capital	capital_natural	This code should be used whenever there is a statement or article about the natural capital of the organization. Natural capital is considered to be the condition of the land, water, biodiversity, and scenery the lake association is trying to protect. It reflects the capacity of the natural system to provide ecosystem services and it can reflect the salience of certain issues the lake association is trying to manage.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Capital Assets	Built capital	capital_built	This code should be applied whenever there is a statement or article about a significant material item, or infrastructure owned by or accessible to the lake association. This can include mentions of lake association property, buildings, equipment, hardwares, or other technologies.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Capital Assets	Financial capital	capital_financial	This code should be used whenever there is mention of the lake associations financial, or monetized, assets. This could be cash, investments, grants, memorial funds, and savings.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Capital Assets	Cultural capital	capital_cultural	This code should be used whenever there is a statement or article about the cultural assets possessed by the lake association. This can include culturally significant artifacts, or the cultural festivals, ceremonies, heritage events, traditions, and other celebrations the lake association plays a role in maintaining, performing, sponsoring, creating, or participating in.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Capital Assets	Political capital	capital_political	This code should be used whenever there is indication of the political status, standing, influence, or favor of the lake association. This can result from a lake associations' advocacy work or engagement with political processes and leadership.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Capital Assets	Social capital	capital_social	This code should be used whenever there is strong indication of the lake associations' social standing and/or influence. This can be indicated through a lake association's relationships with partners or collaborators, and through public recognition of legitimacy, saliency, credibility and reliability of the lake association.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Capital Assets	Human capital	capital_human	The education level, skills, creativity, diversity, and numbers of people involved in the organization through membership, volunteering, leadership positions. Reflects the capacity of the individuals that contribute to the organization.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.

Code type	Category 1	Category 2	Concept	Code	Definition	Rules for code usage
Concept Focus	Capacity & Relationships	Human capital	Core activist	core_activist	This code should be used whenever there is evidence of a particular volunteer that goes above and beyond and increasingly takes on leadership roles within the organization without being recruited into the staff or formal leadership.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Human capital	Membership engagement	engage_memb	This code should be used whenever there is indication that the lake association is putting forth effort to engage their membership in lake association activities and events. This code should only be used when there is indication of engagement of the membership beyond making financial contributions or other simple donations. Instances where members are donating their skills, time, energy, knowledge, or effort to take part in a lake association activity can be considered membership engagement.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Human capital	Leadership development	leader_development	This code should be used whenever there is indication that the lake association is investing in helping their leadership learn new skills and develop their knowledge in some way. If there is evidence of lake association staff or board leadership participating in training sessions, educational opportunities, or workshops funded or encouraged by the lake association, this could be considered leadership development.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Human capital	Training of membership, volunteers, or leaders	training	This code should be used whenever there is indication of the lake association putting in time, energy, effort, and/or funding to help develop the technical skills or knowledge of their membership, volunteers, or leaders.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Social capital	Bridging	bridging	This code should be used whenever there is indication of the lake association playing a role in sharing information, or bringing people together across distinct sectors of society.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Social capital	Partnerships	partners	This code should be used to indicate whenever there is evidence of a formal partnership shared between the lake association and some other entity.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Social capital	Public recognition	publ_recog	This code should be used to indicate instances where people, organizations, or entities outside of the organization make statements or take actions related to the legitimacy, saliency, credibility, or reliability to the lake association. This can come in the form of verbal statements, awards, invitations, consultations, or grants.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Social capital	Community engagement	engage_comm	This code should be used whenever there is indication that the lake association is putting forth effort to engage people in the community at-large in lake association activities and events. This code should only be used when there is indication of engagement of the community beyond making financial contributions or other simple donations. Instances where community members are donating their skills, time, energy, knowledge, or effort to take part in a lake association activity can be considered community engagement.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Capacity & Relationships	Social capital	Collaborative work or decision making	collaborate	A.k.a. informal partnership. This code should be used whenever there is evidence that the lake association is working with another group or entity on a project, activity, or event. This code may be most appropriate when there is not enough evidence to suggest a formal partnership, but it is clear that the lake association is working with another person or group on an activity of some sort.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities		Direct management action	direct_mgmt	This code should be used whenever there is indication that the lake association is involved in on-the-ground land or resource management of some sort. Direct management activity or direct resource management can take place within the lake itself, along the shoreline, or in the surrounding catchment or watershed. This could be anything from shoreline cleanups, to aiding in the acquisition conservation easements, to conservation practices on agricultural lands, to implementing rain gardens or shoreline buffer strips to name a few examples.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Outreach	Educational programming	ed_programming	This code should be used whenever the lake association is directly involved in providing formal educational programming or outreach to its membership or the general public.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Outreach	Guidance	guidance	This code should be used whenever the lake association is advising its readership or the general public on what it considers to be best practices and appropriate behavior. Guidance typically includes instructions on how to act, behave, or properly manage property to protect the lake resource.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Outreach	Advocacy	advocacy	A.k.a. political engagement. This code should be used when there is indication that the lake association is attempting to influence institutional arrangements, rules, or regulations. Advocacy activity can include petitioning, advertising political opinions or recommendations, taking legal action, formal lobbying efforts, or forming partnerships with government officials or political leadership.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.

Code type	Category 1	Category 2	Concept	Code	Definition	Rules for code usage
Concept Focus	Actions & Activities	Outreach	Fundraising & outreach event involvement/participation	event	This code should be used whenever there is indication of an event the lake association is directly involved in. This code can be used if a lake association is hosting an event, collaborating or partnering to put on an event, directly participating in an event, or sponsoring an event. This code should NOT be used if the lake association is simply advertising a community event that it is not directly involved in, or if the lake association's only relation to the event is that they were selected to be the beneficiary. Events can include any planned public or social occasion, such as festivals, celebrations, conferences, cultural events, fundraisers, meetings, or competitions.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Monitoring efforts	Environmental monitoring	monitor_env	This code should be used whenever there is evidence that the lake association is formally monitoring some aspect(s) of the environment or the non-human ecological realm.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Monitoring efforts	Societal monitoring	monitor_soc	This code should be used whenever there is evidence that the lake association is formally monitoring some aspect(s) of society or the human social realm.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Science	Citizen science	sci_citizen	This code should be used whenever there is indication that the lake association is involved in citizen science or a citizen science program.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Science	Engagement with scientific research	sci_study	This code should be used whenever there is indication that the lake association is involved in formal scientific research. This code should only be used if the lake association seems to be involved on some level with each stage of the scientific method for a particular research project.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Science	Discussion of scientific data/information	sci_data	This code should be used whenever there is indication that the lake association is involved with the production, utilization, or sharing of scientific data, or information acquired via the scientific method or scientific equipment.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Concept Focus	Actions & Activities	Science		sci_communication	This code should be used whenever there is indication that the lake association is involved in communicating science, scientific concepts, or scientific data to others.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this concept was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this concept for the lake association.
Subject		CLA Subject Codes	Specific & notable topic or subject particular to CLA	CLA_"topicname"	This is the phrasing for inductively determined codes. Replace "topicname" with whatever you wish to call the inductive code. Inductive codes can be names, events, concepts, or any subject matter that seems to be important to track for the lake association, but is not covered in the concept focus codes. Inductive codes should also be created and assigned to further specify the concept focus codes by relating them to a specific topic or subject matter.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this subject matter was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this subject matter for the lake association.
Subject		LSPA Subject Codes	Specific & notable topic or subject particular to LSPA	LSPA_"topicname"	This is the phrasing for inductively determined codes. Replace "topicname" with whatever you wish to call the inductive code. Inductive codes can be names, events, concepts, or any subject matter that seems to be important to track for the lake association, but is not covered in the concept focus codes. Inductive codes should also be created and assigned to further specify the concept focus codes by relating them to a specific topic or subject matter.	This code can be used holistically as well as internally for each article and it's content. When utilized as a holistic code along with the code "holistic" and a primary article function code, it indicates that this subject matter was a major emphasis or focus of the article or blurb. When utilized internally it means that the quotation indicates something about this subject matter for the lake association.

7.2 Appendix B: Newsletter Coding Protocol

Lake Association Newsletter Coding Schema & Protocol for Document Content Analysis

Step 1: Holistically code each article or blurb in every document

- A. Create quotation around article or blurb headline/title
- B. Assign the code “holistic” to the quotation
- C. Assign 1-3 primary function codes to the quotation:
 - a. *Function_ad*
 - b. *Function_persuade*
 - c. *Function_inform*
 - d. *Function_reportout*
 - e. *Function_guide*
 - f. *Function_solicit*
 - g. *Function_appreciate*
 - h. *Function_brief*
 - i. *Function_envreport*
 - j. *Function_issuereport*
 - k. *Function_eventreport*
 - l. *Function_educate*
 - m. *Function_celebrate*
 - n. *Function_update*
- D. Assign 0-2 activity codes to the quotation (only assign if there is clearly stated evidence of a past, current, or future lake association activity somewhere in the article)
 - a. *Activity_past*
 - b. *Activity_ongoing*
 - c. *Activity_future*
 - d. *Activity_plan*
- E. Assign 0-2 magnitude code to the quotation if there is evidence within the article or blurb of net capital gain or loss
 - a. +
 - b. -
- F. Assign relevant concept focus codes to the quotation that represent the holistic meaning of the article or blurb
 - a. See coding manual spreadsheet for a list of concept focus codes
- G. Assign relevant topic/subject codes to the quotation that are necessary to represent the holistic meaning of the article or blurb
 - a. Format = “LANAME_topicname”

Step 2: Internally code each article or blurb in every document

- A. Assign concept focus codes to any internal quotations that contain indicators of the relevant concepts
- B. Assign magnitude codes to any quotation that contains evidence of capital growth or decline.
 - a. Always pair an internal magnitude code with the relevant concept focus code that is increasing or decreasing.

- b. There should never be more than one magnitude code per quotation. There *can* be more than one internal magnitude code per article, but separate quotations should be made for the different qualities that are changing in magnitude.
- C. Create and assign subject codes to any quotation that mentions an LA specific subject or topic that may be of interest to track.

Step 3: Revisit specific concept codes to categorize further (e.g. mission, bridging, partner, publ_recog, ed_programming, direct_mgmt, advocacy, and monitor_env codes)

Step 4: Revisit subject codes and memo to tell their story over time

7.3 Appendix C: Annual Reports Coding Protocol

Lake Association Annual Reports Coding Schema & Protocol

Step 1: Holistically code any letters, articles, or blurbs found in the annual reports (only the ones relating to Lake Mendota in CLA's case)

- A. Create quotation around article or blurb headline/title
- B. Assign the code "holistic" to the quotation
- C. Assign 1-3 primary function codes to the quotation:
 - a. *Function_ad*
 - b. *Function_persuade*
 - c. *Function_inform*
 - d. *Function_reportout*
 - e. *Function_guide*
 - f. *Function_solicit*
 - g. *Function_appreciate*
 - h. *Function_brief*
 - i. *Function_envreport*
 - j. *Function_issuereport*
 - k. *Function_eventreport*
 - l. *Function_educate*
 - m. *Function_celebrate*
 - n. *Function_update*
- D. Assign 0-2 activity codes to the quotation (only assign if there is clearly stated evidence of a past, current, or future lake association activity somewhere in the article)
 - a. *Activity_past*
 - b. *Activity_ongoing*
 - c. *Activity_future*
 - d. *Activity_plan*
- E. Assign 0-2 magnitude code to the quotation if there is evidence within the article or blurb of net capital gain or loss
 - a. +
 - b. -
- F. Assign relevant concept focus codes to the quotation that represent the holistic meaning of the article or blurb
 - a. See coding manual spreadsheet for a list of concept focus codes
- G. Assign relevant topic/subject codes to the quotation that are necessary to represent the holistic meaning of the article or blurb
 - a. Format = "*LANAME_topicname*"

Step 2: Internally code each article or blurb in every document

- A. Assign concept focus codes to any internal quotations that contain indicators of the relevant concepts
- B. Assign magnitude codes to any quotation that contains evidence of capital growth or decline.
 - a. Always pair an internal magnitude code with the relevant concept focus code that is increasing or decreasing.

- b. There should never be more than one magnitude code per quotation. There *can* be more than one internal magnitude code per article, but separate quotations should be made for the different qualities that are changing in magnitude.
- C. Create and assign subject codes to any quotation that mentions an LA specific subject or topic that may be of interest to track.

Step 3: Memo on any evidence of lake association structure and organization for each year (number and names of the various boards and committees and how many members in each one)

Step 4: Record quantitative data from annual reports in a spreadsheet

- A. Include counts of revenue, expenditures, number of paid staff, number of volunteers, number of members/donors, number of sponsors/partnerships, and any other relevant data mentioned for each year that the information is available
- B. For the years when one of the categories of information is not available, enter an “Unk” to fill the cell, symbolizing that the data in that cell is “unknown”.
- C. For data categories or cells that are not applicable for a particular lake association or year, enter an “N/A” in the cell to symbolize the category to be “not applicable”.

7.4 Appendix D: News Publications Coding Protocol

Lake Association News Publications Coding Schema & Protocol

Step 1: Holistically code each article

- A. Create quotation around article headline/title
- B. Assign the code “holistic” to the quotation
- C. Assign 1 article focus code to the quotation indicating whether the lake association is the focus of the article, or if it is only mentioned:
 - a. *LA_focal*
 - b. *LA_mention*
- D. Assign 1 news article type code to the quotation (in rare cases, usage of 2 of these codes may be appropriate if the article is effectively acting in two ways)
 - a. *News_obituary*
 - b. *News_calendar*
 - c. *News_FrontPage*
 - d. *News_event*
 - e. *News_editorial*
 - f. *News_opinion*
 - g. *News_photo*
 - h. *News_other*
- E. If the article is an opinion piece or an editorial:
 - a. Assign one of the following magnitude codes to indicate whether the lake association was spoken about in a positive, negative, or neutral way:
 - i. *POS*
 - ii. *NEG*
 - iii. *NEUT*
 - b. Assign 0-2 issue codes if the opinion piece mentions the lake association in the context of a larger environmental, social, or political issue. Use one or more of these codes to indicate that the article isn't really about the lake association or lake association activity, but instead is primarily about another issue
 - i. *Env_issue*
 - ii. *Pol_issue*
 - iii. *Soc_issue*
- F. Assign 0-2 magnitude code to the quotation if there is evidence within the article or blurb of net capital gain or loss for the lake association
 - a. +
 - b. -
- G. Assign 1-5 concept focus codes to the quotation if there is evidence within the article of the lake association displaying indications of any of the relevant concepts
 - a. See coding manual spreadsheet for a list of concept focus codes
- H. Assign 0-5 specific topic/subject codes to the quotation
 - a. Format = “*LANAME_topicname*”

Step 2: Internally code each article or blurb in every document

- A. Assign concept focus codes to any internal quotations that contain indicators of the relevant concepts

- B. Assign magnitude codes to any quotation that contains evidence of capital growth or decline.
 - a. Always pair an internal magnitude code with the relevant concept focus code that is increasing or decreasing.
 - b. There should never be more than one magnitude code per quotation. There can be more than one internal magnitude code per article, but separate quotations should be made for the different qualities that are changing in magnitude.
- C. Create and assign subject codes to any quotation that mentions an LA specific subject or topic that may be of interest to track.
- D. The only articles types that are exempt from internal coding are duplicate articles and obituaries.
 - a. For duplicate articles, you only need to internally code one article. Thereafter, if an article is found to have the same content as a previous article, the title should be quoted and assigned the “*holistic*” code along with “*duplicate###*”. Number duplicate articles sequentially, but all articles with the same content should contain a duplicate code with the same number. Make sure to go back to the original article that was both holistically and internally coded, and holistically code with the appropriate duplicate code. Any subsequent duplicates should be holistically coded as just described, but should not be repeatedly coded with internal codes/quotations.
 - b. Obituaries do not need to be coded internally. They should be coded holistically with the codes “*holistic*”, “*LA_mention*”, and “*News_Obituary*”.

Step 3: Revisit specific concept codes to categorize further (e.g. mission, bridging, partner, publ_recog, ed_programming, direct_mgmt, advocacy, and monitor_env codes)

Step 4: Revisit subject codes and memo to tell their story over time

7.5 Appendix E: Interview script

Open-ended Interview Guide

Interviewer ID: _____

Interviewee ID Number: _____

1. Let me start by first asking how you initially came to be connected to [organization name]? Why did you initially get involved with [organization name]?
2. How long have you been with [organization name]?
3. Can you describe your current role with [organization]? Please describe any previous roles you have held with [organization name] other than your current role, if any.
4. In your experience, did you have to go through any sort of process to arrive at your current role with the organization? If so, can you describe what that process was like?
5. I asked you previously why you initially became involved with [organization name], but now I'd like to know why you think you have continued to be involved in this organization?
6. How would you describe the role of [your organization]? What is [your organization's] mission? What does [your organization] do? Describe the types of issues your organization tackles?
7. Tell me what ways your organization has changed since you become involved with it. What are the biggest changes that have occurred since you became involved? How have they affected the ability of the organization to achieve its mission?
8. What do you think makes [your organization] effective?
9. What are the biggest challenges that [your organization] faces?
10. In what ways do you think [your organization] could be more effective?
11. What does [your organization] mean to you?
12. Have you noticed any major changes or shifts with [your organization] over the years that you have been involved with it? These can be structural, philosophical, or activity related turning points or changes in trajectory for [your organization]?
13. Do you have a sense for the purpose or role of your organization during the years prior to your involvement with it? Do you know of any differences between what the organization was like in the past versus how it functions now?
14. For the final question I would like to shift the focus away from [your organization] and onto [your lake] and lake community more broadly. What does [your lake] mean to you?

7.6 Appendix F: Annual Reports Data Tables

Date of publication	Year of report	Total unrestricted revenue & support (\$)	Total expenses (\$)	Total liabilities & net assets (\$)	Percent income received by membership (%)	Number of members	Number of business members	Number of paid staff members	Total number of board members	Number of volunteers	Number of corporate & community partners
2001.02	2000	213528	209582	900,000	91	898	Unk	6	27	263	Unk
2002.02	2001	247530	232645	900,000	87	792	Unk	5	28	292	Unk
2003.02	2002	225819	236769	Unk	93	830	Unk	5	28	302	Unk
2004.02	2003	254187	252762	Unk	90	860	Unk	5	28	276	Unk
2005.03	2004	259012	270254	Unk	93	822	Unk	5	28	163	3
2006.02	2005	261534	229741	Unk	94	810	52	5	28	133	4
2007.02	2006	296113	280601	Unk	90	793	69	5	28	165	8
2008.02	2007	894349	402301	2579393	85.7	786	66	5	28	141	9
2009.03	2008	508668	433536	2654525	Unk	798	54	6	28	144	13
2010.04	2009	744851	533645	2865731	Unk	785	50	6	28	141	15
2011.04	2010	705372	705394	2815710	79.3	781	52	6	28	147	22
Unk	2011	555852	537413	2884149	91	792	52	7	28	172	23
2012.04	2012	670817	569709	Unk	87	786	60	7	27	135	22
2014.04	2013	676662	630369	3157703	65	796	53	8	28	150	37
2015.04	2014	649576	618400	3175026	78.8	770	60	8	27	165	37
2016.04	2015	631789	619456	3187804	77.2	799	53	8	26	168	42
2017.04	2016	652890	633330	3207339	71.2	816	52	8	29	160	47

Table 4: Lake Sunapee Protective Association Annual Reports Data

“Unk” = Unknown value

Date of publication	Year of report	Total unrestricted revenue & support (\$)	Total expenses (\$)	Total liabilities & net assets (\$)	Percent income received by donors (%)	Number of individual donors	Number of business donors	Number of paid staff members	Total number of board members	Number of community volunteers	Number of corporate & community partners	lbs Phosphorus diverted
2012.04	2011	\$395,149	368,724	36796	Unk	Unk	25	3	29	Unk	Unk	N/A
2013.09	2012	\$790,069	\$927,696	733575	24.5	468	129	3	36	Unk	Unk	N/A
2014.04	2013	Unk	Unk	Unk	Unk	Unk	Unk	6	34	290	Unk	N/A
2015.05	2014	838098	1531283	582119	12	609	163	9	40	593	7	7750
2016.04	2015	903216	1488531	1275935	23	713	243	8	42	801	23	10300
2017.05	2016	1018654	1759067	783116	16	819	175	9	44	900	24	13500
2018.05	2017	990989	1767195	863726	17.4	886	208	13	43	947	27	13960

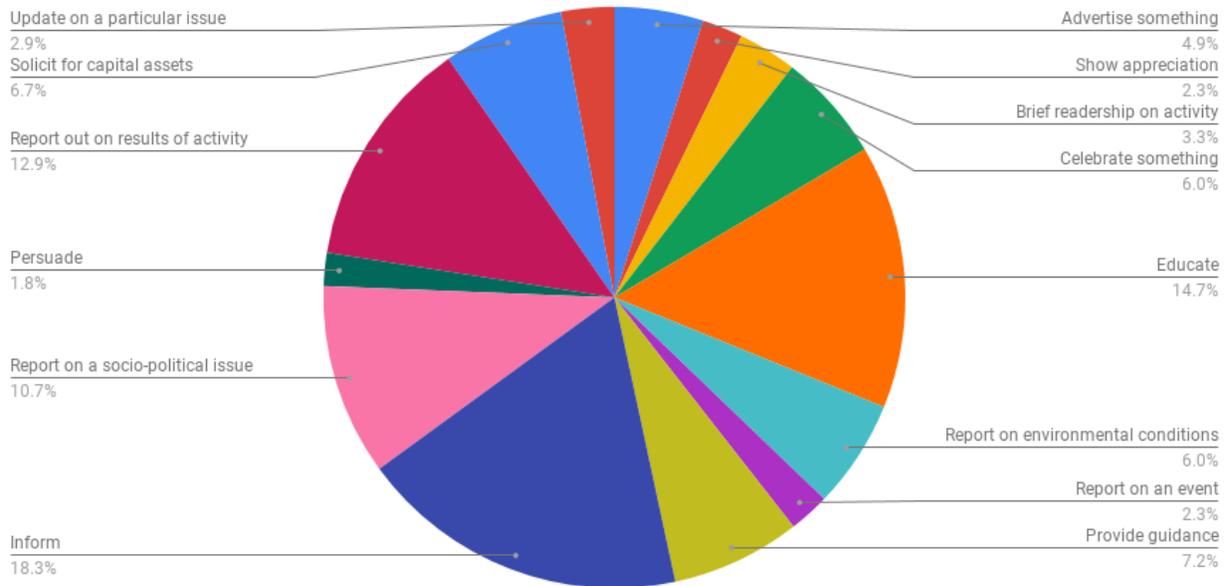
Table 5: Clean Lakes Alliance Annual Reports Data

“Unk” = Unknown value

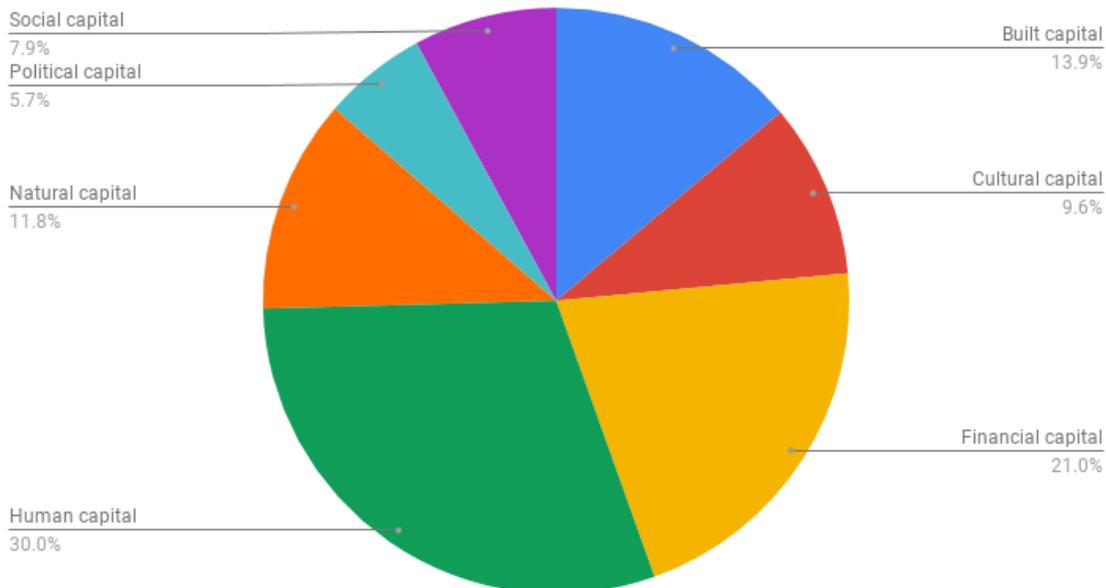
“N/A” = Not applicable

7.7 Appendix G: LSPA Newsletter Data

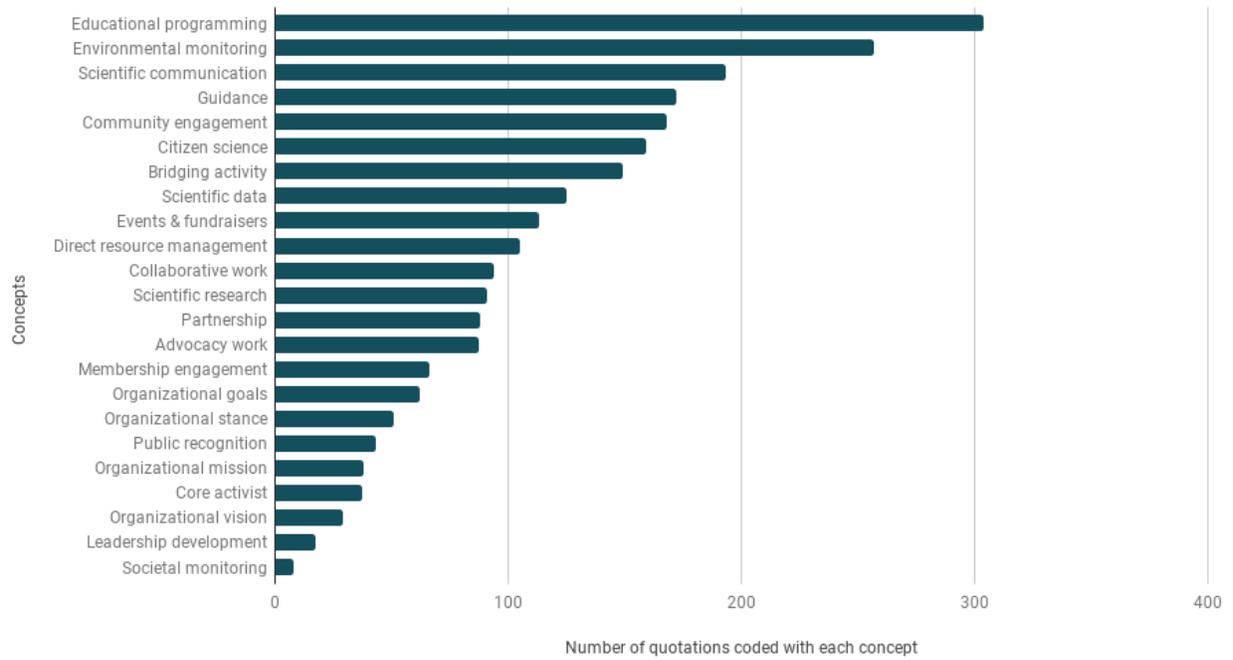
Percentage of LSPA newsletter articles that function to...



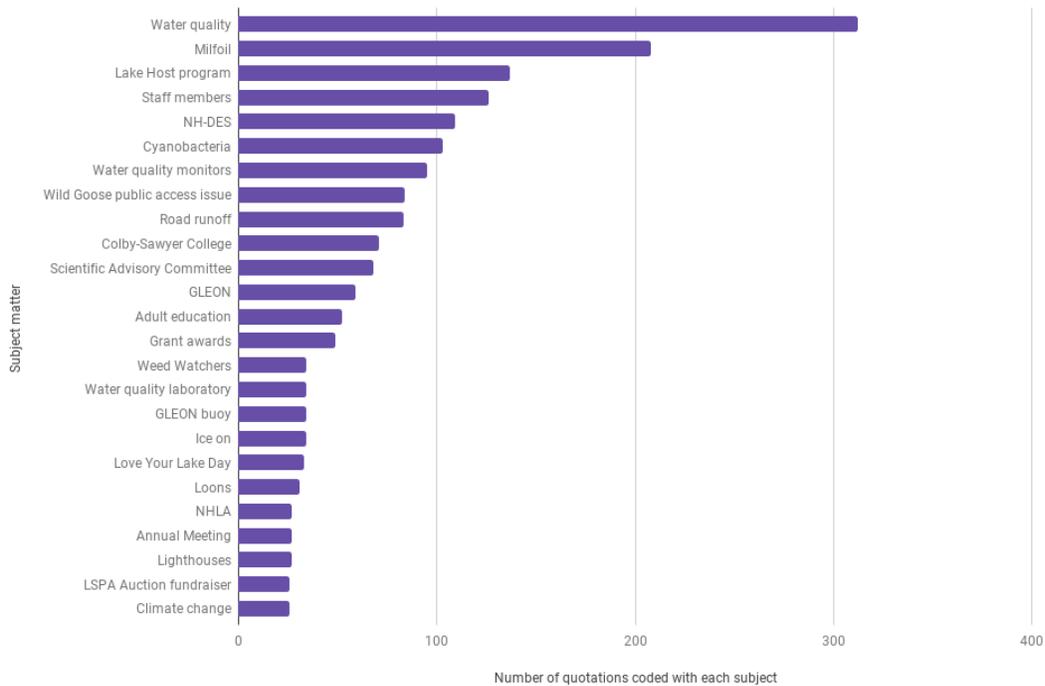
Percentage of LSPA newsletter quotations pertaining to the capital assets



Distribution of concepts coded in Beacon articles and blurbs

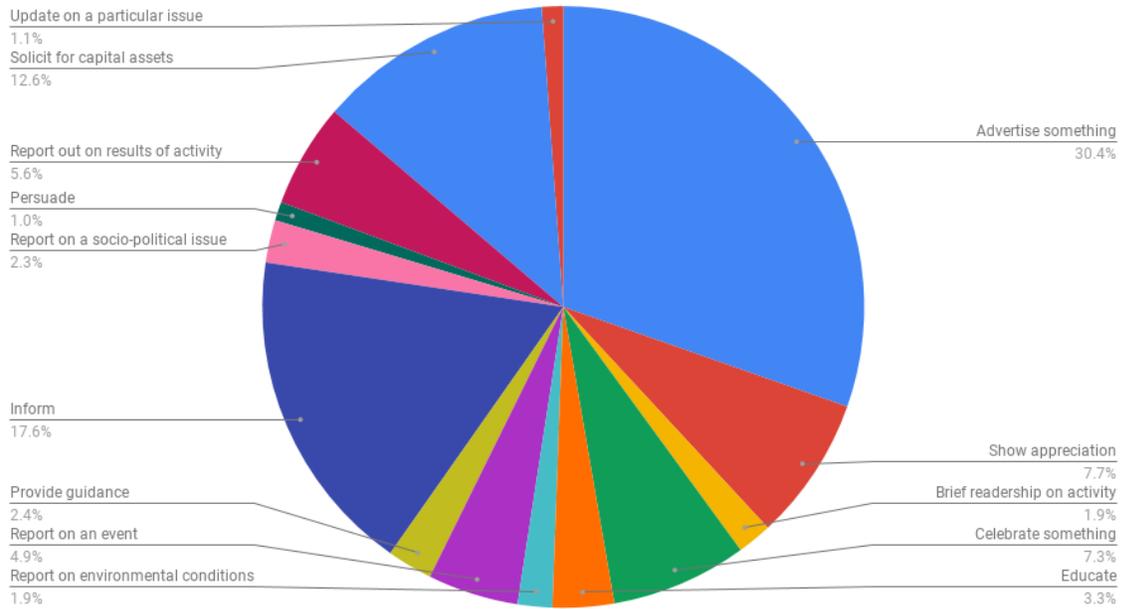


Top 25 subjects coded for in Beacon articles and blurbs

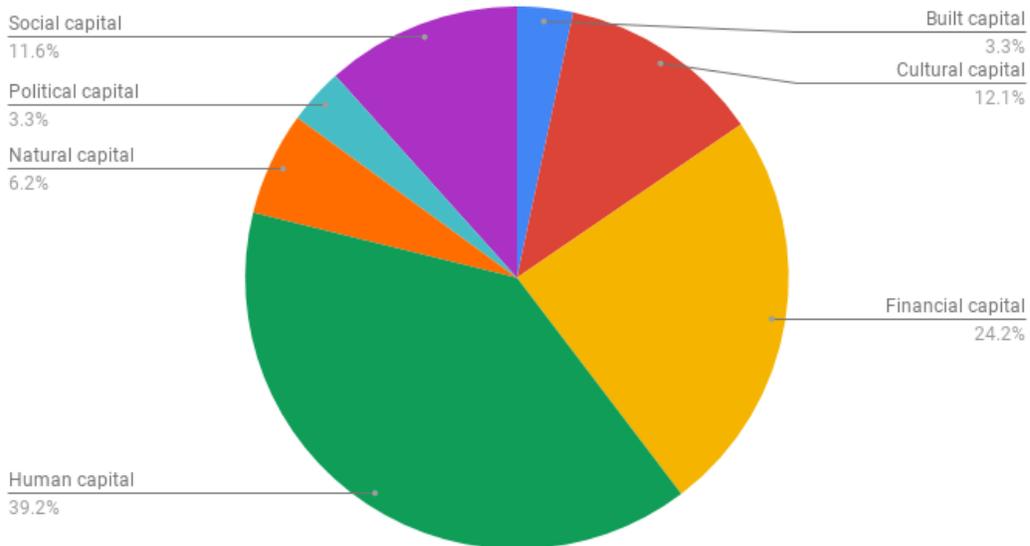


7.8 Appendix H: CLA Newsletter Data

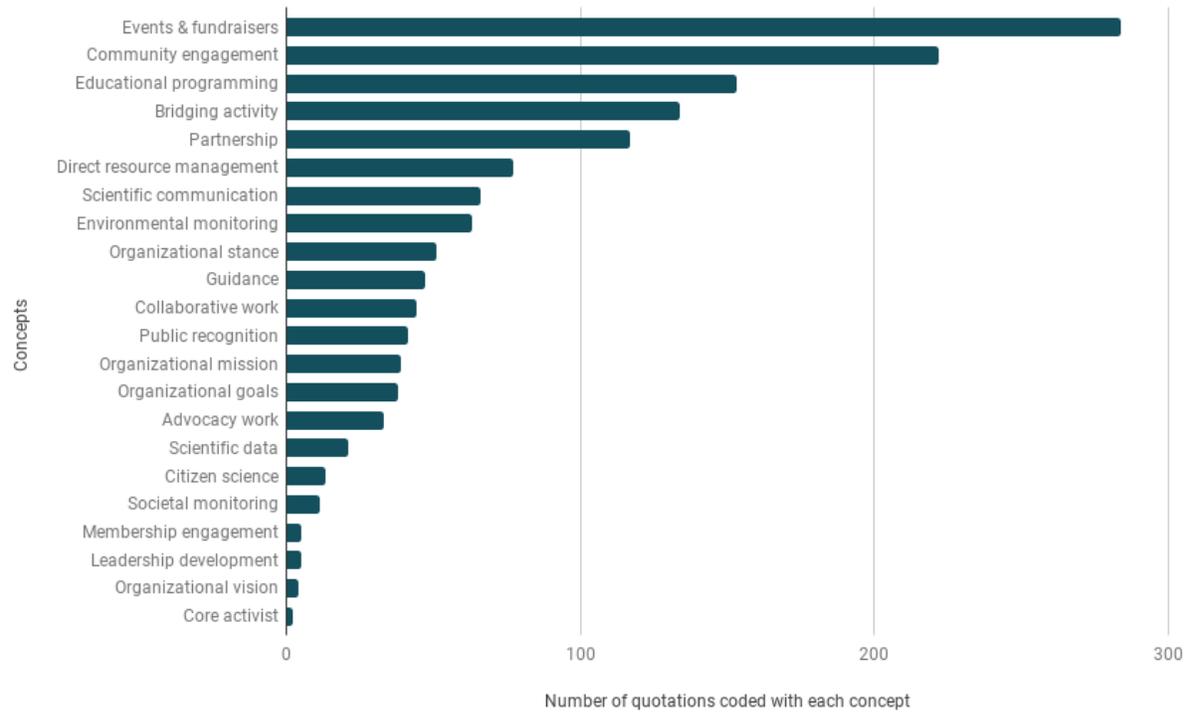
Percentage of CLA newsletter articles that function to...



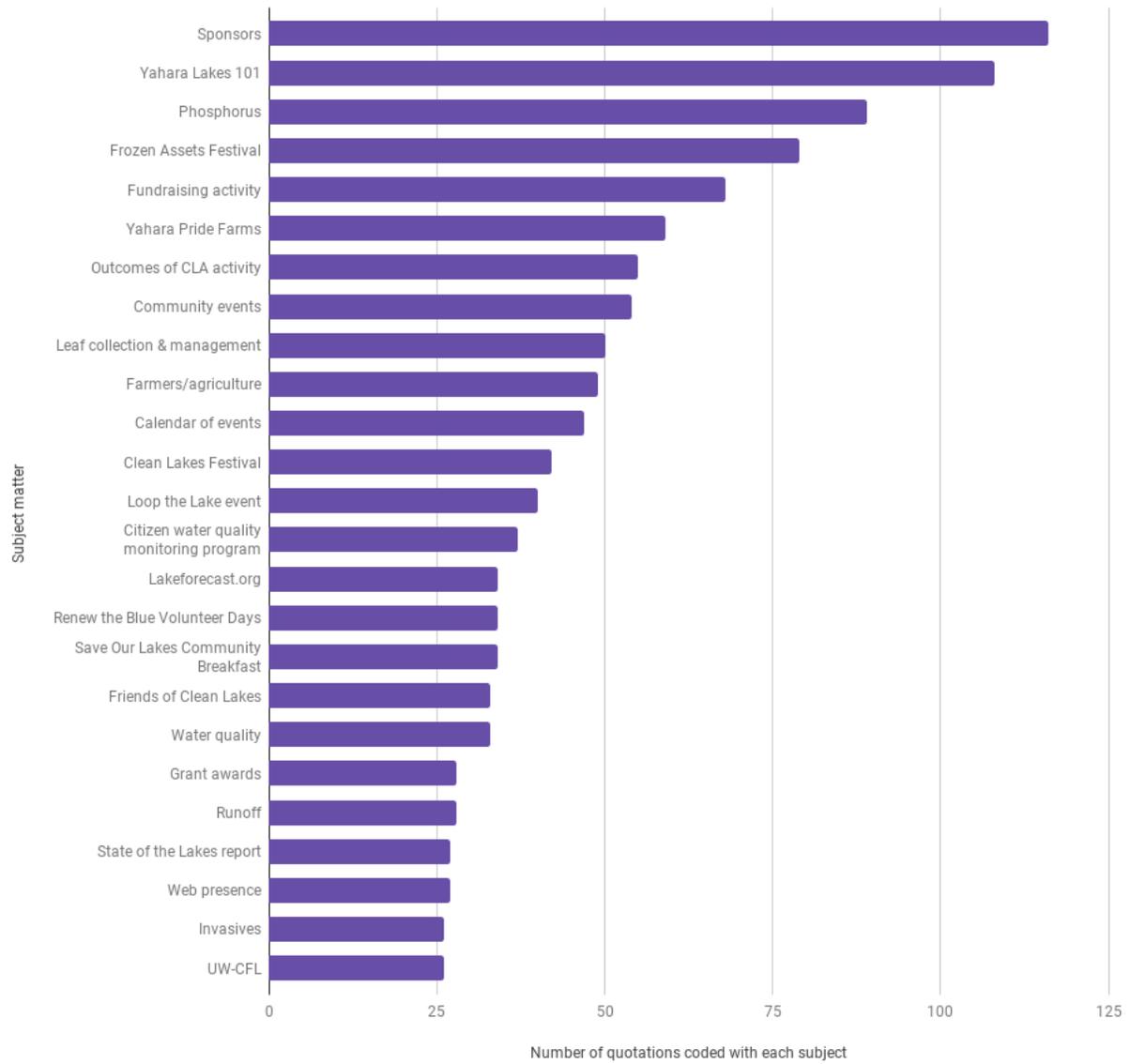
Percentage of CLA newsletter quotations pertaining to the capital assets



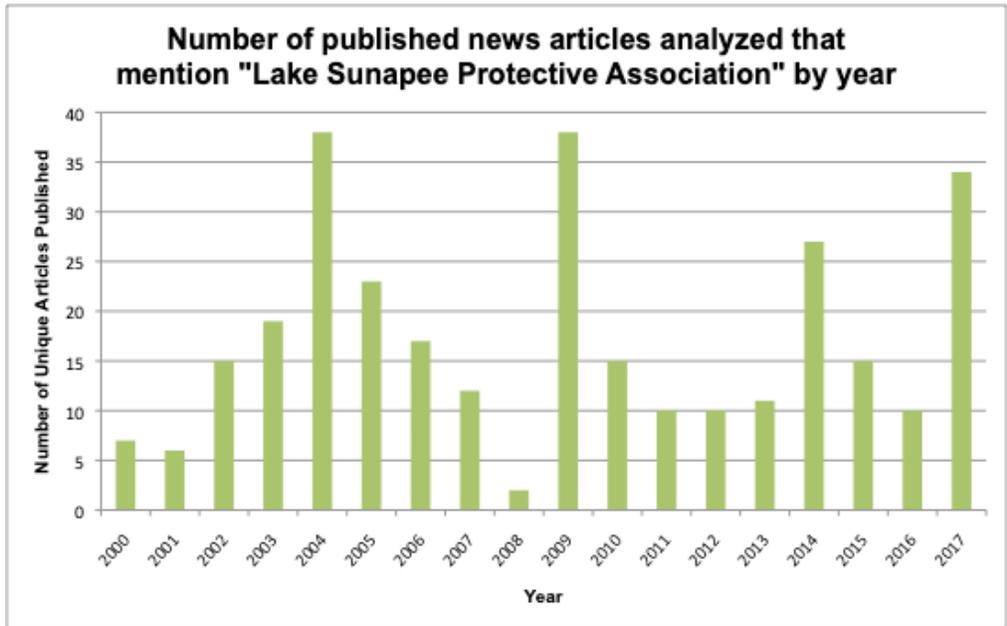
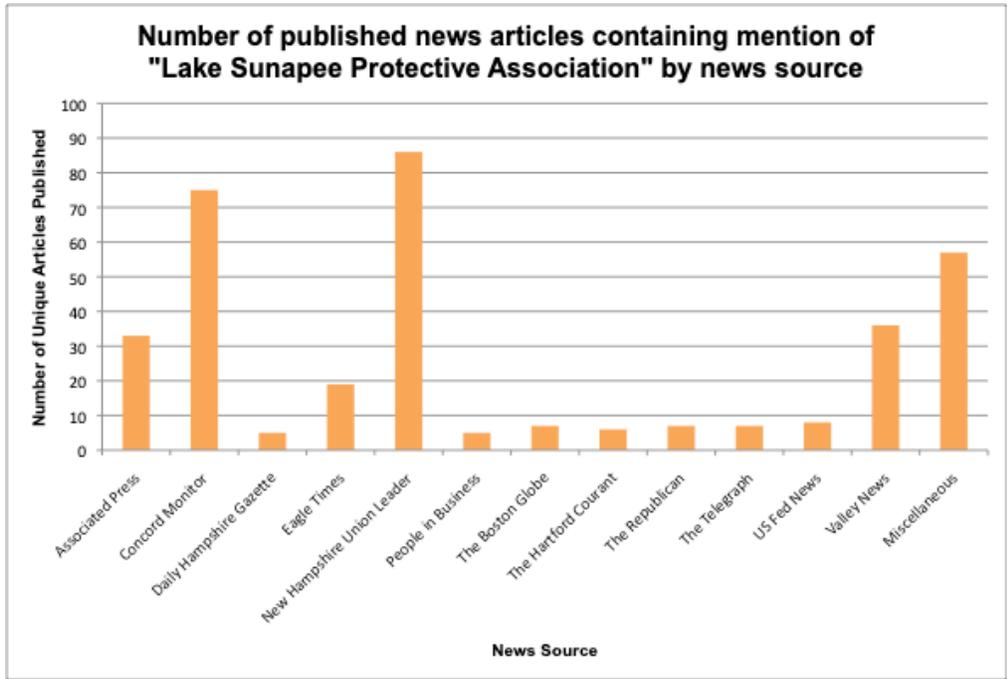
Distribution of concepts coded in Lake-O-Gram articles or blurbs



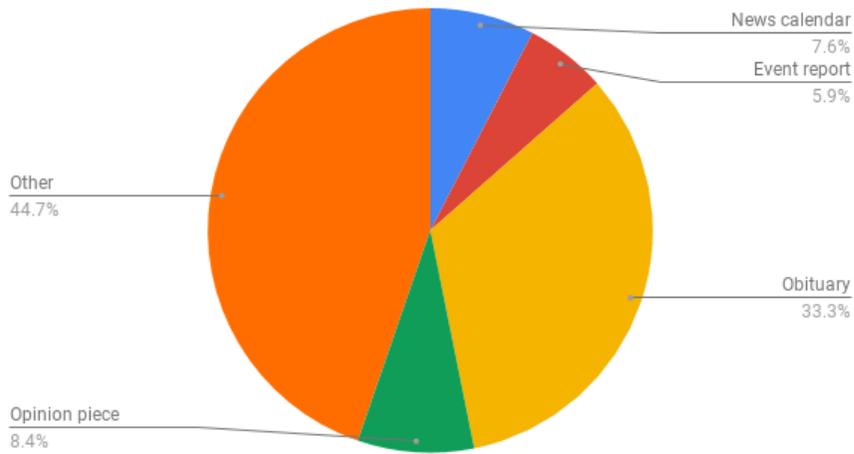
Top 25 subjects coded for in Lake-O-Gram articles and blurbs



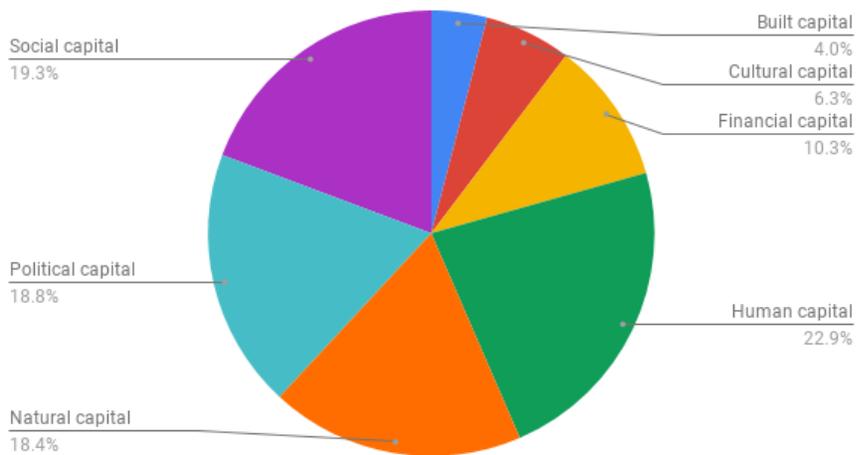
7.9 Appendix I: LSPA News Publications Data



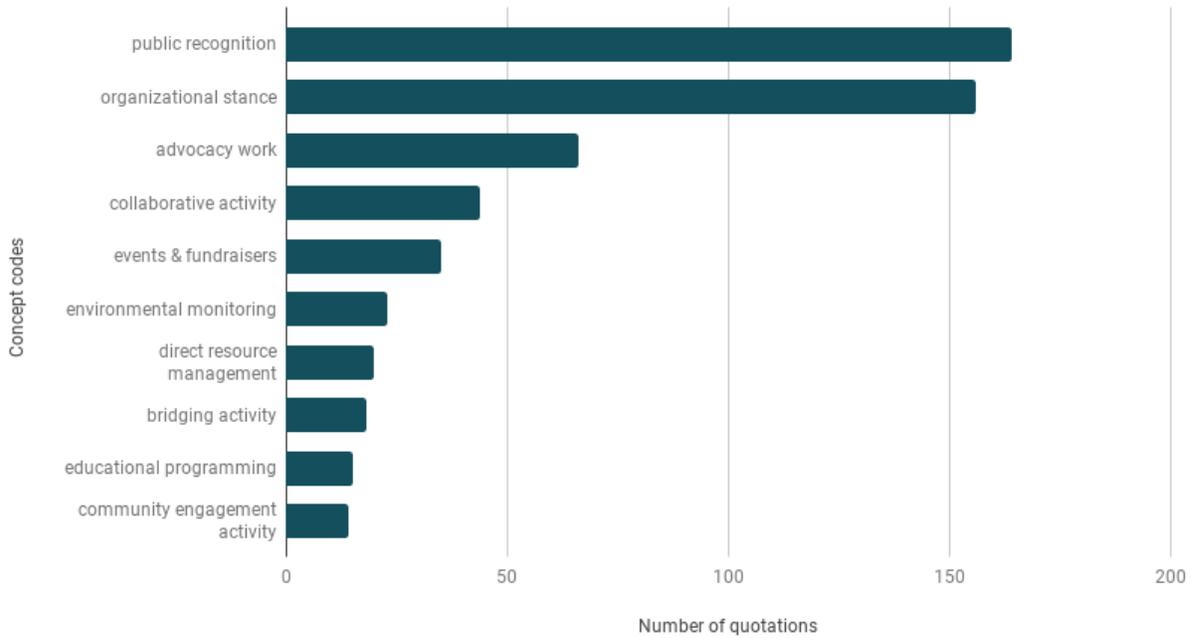
Types of news articles mentioning LSPA



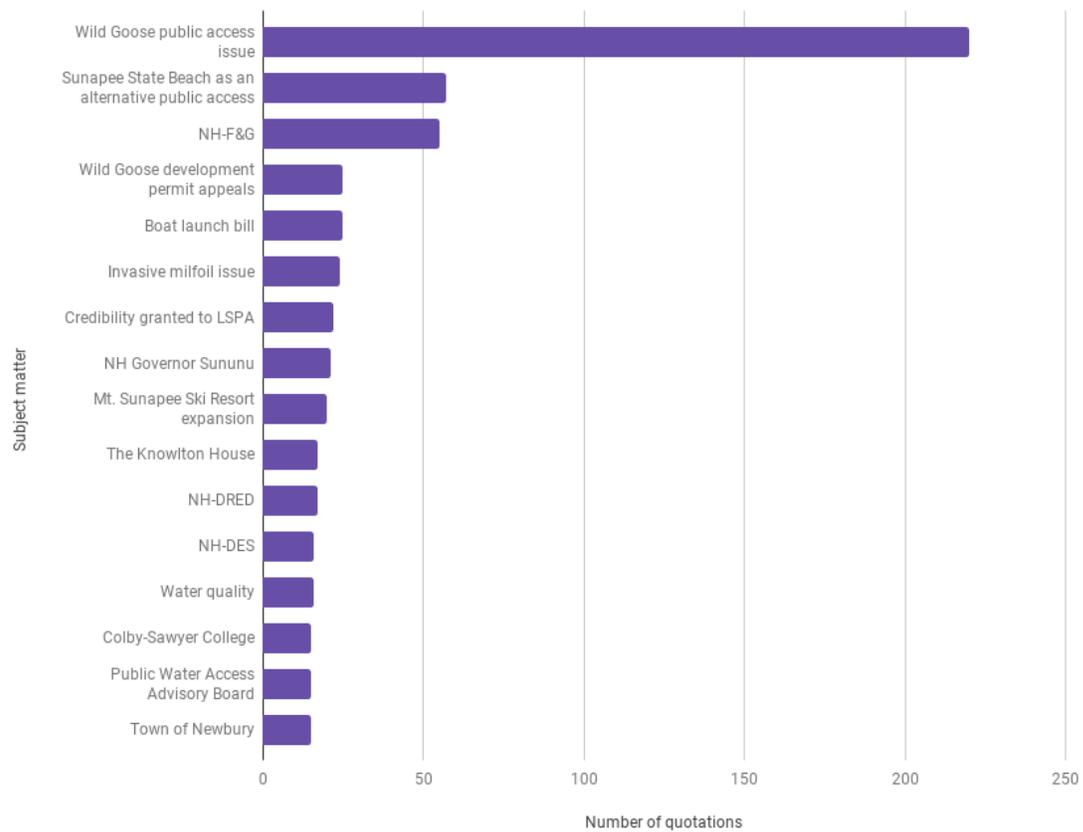
Mentions of LSPA's capital assets in news articles



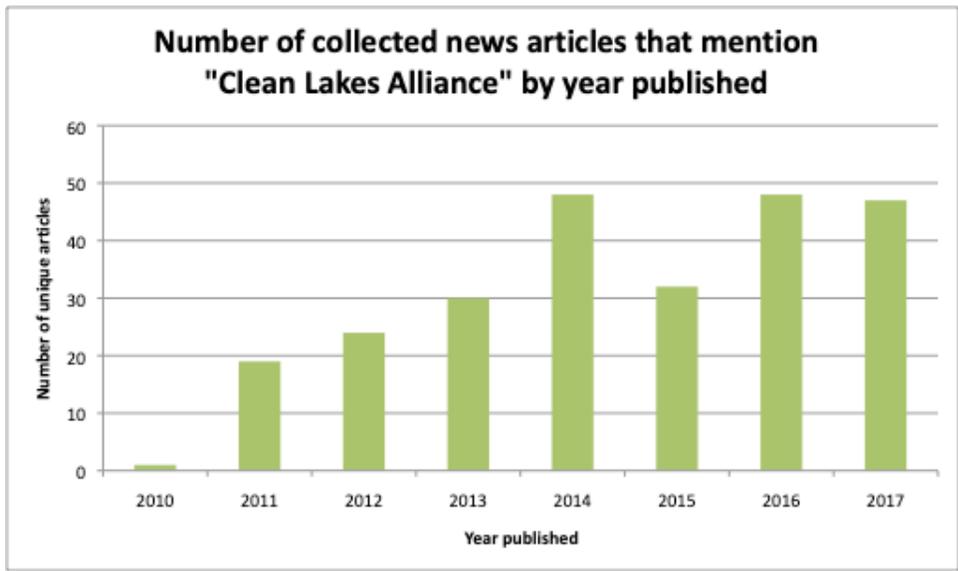
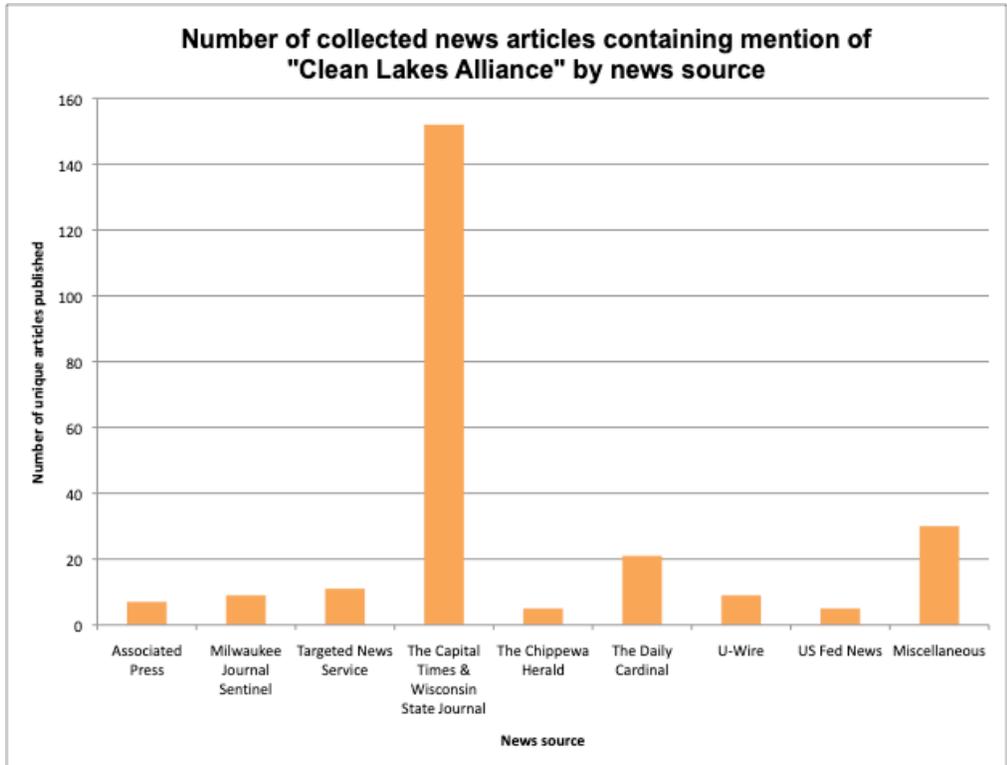
Top concept codes used in relation to mentions of LSPA in news publications



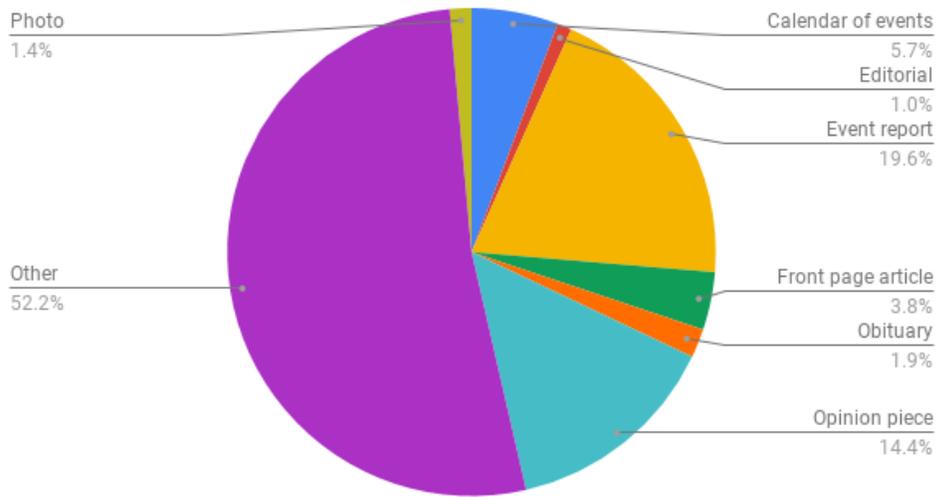
Top subject matters mentioned in relation to LSPA in news articles



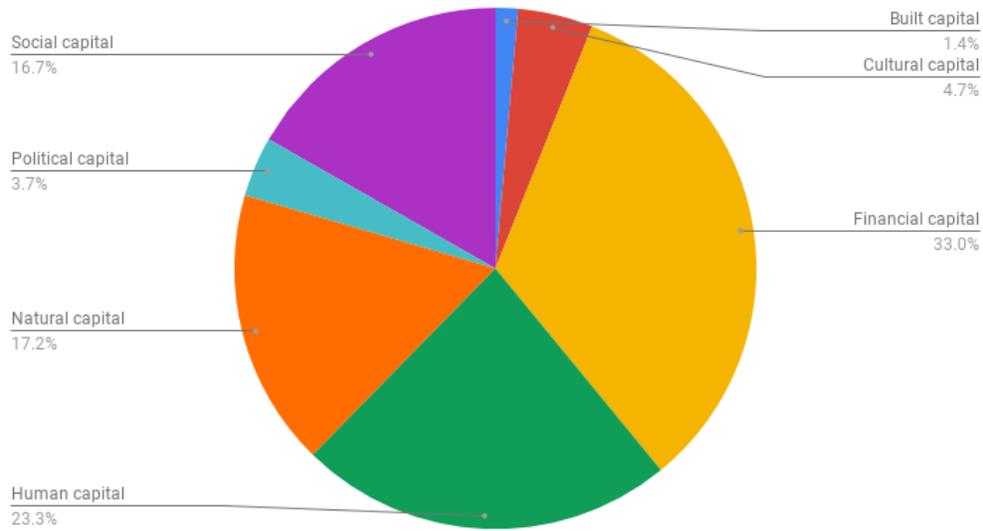
7.10 Appendix J: CLA News Publications Data



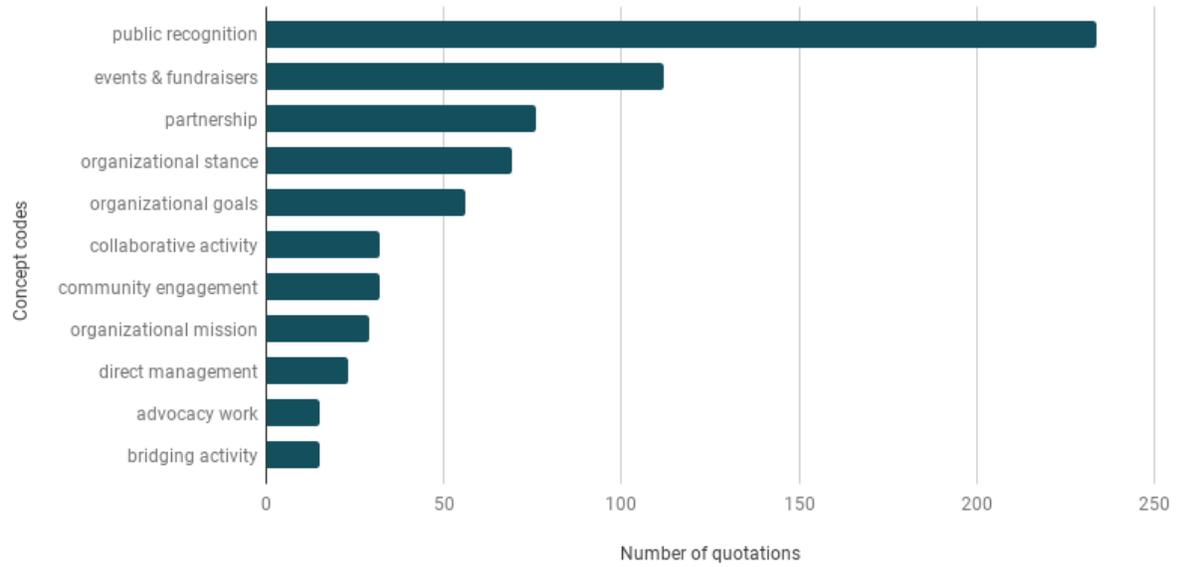
Types of news articles mentioning CLA



Mentions of CLA's capital assets in news articles



Top concept codes used in relation to mentions of CLA in news publications



Top subject matters mentioned in relation to CLA in news articles

