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Cross-border Great Lakes Fishery Management: Achieving Transboundary Governance Capacity Through a Non-binding Agreement

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Fishery management authority on the Great Lakes is spread amongst eight states, the Province of Ontario, and Native American tribes. These jurisdictions are inherently in conflict over their fishery management, as they have differing management philosophies, needs, constituent pressures, and political dynamics. To avoid a tragedy of the commons, some degree of transboundary governance must occur. To work within this paradigm, the jurisdictions cooperate through "lake committees," which are action arms of A Joint Strategic Plan for Management of Great Lakes Fisheries, a non-binding, consensus-based agreement. This paper presents the lake committees and the Joint Strategic Plan as a set of institutional arrangements for transboundary governance; it analyzes the plan according to the four indicators presented in the framework paper in this special issue: functional intensity, stability and resilience, legitimacy, and compliance. The plan's transboundary governance capacity ranks high on all four institutional indicators: it fosters deep ongoing interactions, it is robust, it is legitimate in the eyes of a strong "epistemic community" of fishery management professionals, and it contains effective compliance mechanisms. The plan fares less well in terms of coordinating fishery management with other Great Lakes policy goals (such as water quality improvement and habitat protection), though integration is improving.

Keywords: Governance, Transboundary cooperation, Collaboration, Fishery management

If ever a need exists for transboundary governance capacity, it is to help manage the Great Lakes fishery. Eight states, the Province of Ontario, and several US tribes[1] share the fishery, and the fish themselves move about the lakes blissfully unaware of man's borders. Primary authority to manage the fishery—through such actions as licensing, gear restrictions, and stocking—rests with the sub-national governments, though federal agencies are also involved in supporting roles. These jurisdictions are free to manage and appropriate their portion of the shared Great Lakes fishery in the manner they choose and, as such, behave on the Great Lakes like independent nations. Not surprisingly, sub-national jurisdictions are in conflict over their fishery activities, as they have differing management philosophies, needs,

[1] Aboriginal fisheries in Canada are managed on behalf of the First Nations by the province of Ontario and the federal government and, as such, are outside of the scope of this paper.

constituent pressures, and political dynamics. The ability to solve shared water problems is frequently plagued by institutional fragmentation (Teisman, van Buuren, Edelenbos, & Warner, 2013), and Great Lakes fishery management is certainly no exception.

Individual state, provincial, and tribal jurisdictions have the clear authority to manage the fisheries of their waters (Dochoda & Jones, 2002; Gaden, Goddard, & Read, 2012), usually through natural resource departments. Transboundary fishery governance also occurs. Such governance is carried out through "lake committees," which were established in 1965, and through a non-binding, voluntary agreement of 1981 called A Joint Strategic Plan for Management of Great Lakes Fisheries. The plan uses the lake committees as its action arms. Although interactions among people (networks) are constantly humming in the background, the officially sanctioned plan establishes both formal and informal channels for interactions.

This paper will outline the history of Great Lakes fishery governance and will explain how that history led to the current transboundary governance regime. Because cross-border capacity is essential to proper Great Lakes fishery management, and because water governance is improved by understanding how regimes work in practice (Teisman et al., 2013), this paper addresses the following research question: *How does the Joint Strategic Plan perform vis-à-vis the framework paper's four indicators of effective transboundary governance: functional intensity, stability and resilience, legitimacy, and compliance?*

This paper presents the Joint Strategic Plan as comprising a set of formal institutions for collaborative action and explains why a non-binding (or "soft") agreement was selected for shared Great Lakes fishery governance. Overall, the paper concludes that, based on institutional foundations, the plan's transboundary governance capacity ranks high on all four institutional indicators: it fosters successful ongoing interactions (functional intensity); it is robust (stable and resilient); it is reliant on a strong "epistemic community" of fishery management professionals who participate voluntarily and, thus, view the process as legitimate; and it contains meaningful mechanisms to enhance the chances that what is agreed to will be implemented (compliance). However, the plan is less geared toward coordinating fishery management with other Great Lakes policy goals (such as water quality improvement and habitat protection), though integration is improving.

This paper is qualitative, inductive, and based primarily on the results of sixty-two semi-structured interviews conducted by the author between 2004 and 2006 with Canadian and American federal, provincial, state, and tribal Great Lakes fishery officials. Other data include participant observation of the Joint Strategic Plan at work from 1995 to the present and on analysis of historical and current documents, such as 50 years of meeting minutes and reports. To organize the data into emergent themes, the author used computer software ("Nvivo") designed to manage qualitative data. Quotations presented in the narrative are generally illustrative of the types of responses commonly provided and generally are representative of the participants' sentiments.

1. The dire need for transboundary fishery governance

The Great Lakes region has a rich history of native fishing from the time of human inhabitation, and commercial fishing since European arrival. (Recreational fishing, while

present since the late 1700s, grew in the early twentieth century.) As cities like Chicago, Toronto, Detroit, and Milwaukee blossomed, so did the fishing industry (Bogue, 2000; Gough, 2006). Federal, state, provincial, and even local jurisdictions on both sides of the border regulated commercial fishing starting as early as 1801 (Bogue, 2000), but the regulations tended to be inadequate to prevent over-exploitation, inconsistent across political boundaries, and easily overridden by politicians.

By the late nineteenth century, concern over the condition of the fishery was such that high-level scientific assessments took place in both countries to better determine the effectiveness of and the potential need for more drastic steps to save the fish (Gallagher, Huntsman, Taylor, & Van Oosten, 1942). The information from the surveys was sobering. Lake whitefish, a mainstay of commercial fishing, had fallen from about 25 million pounds to 9 million pounds between 1879 and 1899 (Baldwin, Saalfeld, Ross, & Buettner, 1979). The decline of lake sturgeon was equally dramatic, falling from almost 8 million pounds to only two million during the same period (Baldwin et al., 1979). Atlantic salmon, a unique, commercially prized species native to Lake Ontario, had all but collapsed by the late 1800s (Bogue, 2000). As the abundance of some species declined, commercial attention turned to other species (such as lake trout and lake herring), which then also faced considerable pressure.

The diffusion of regulatory power exacerbated the stressors on the fishery. Two nations, eight states, the Province of Ontario, and several tribes border the lakes. Vertical (within country) and horizontal (cross-border) squabbling over fishery management authority was commonplace in the basin. In Canada, for instance, a contradiction in the British North America Act (the precursor to Canada's constitution) caused the federal government and the provinces to fight over fishery responsibilities until the courts settled the matter essentially in favor of the provinces by 1900 (Gaden et al., 2012; Gough, 2006). In the United States, similar tension occurred between federal and state agencies, though the management authority, from the time of state establishment, has largely been a sub-national responsibility (Brown, Ebener, & Gorenflo, 1999; Gaden et al., 2012; Piper, 1967). Overall, sub-national jurisdictions have retained near unlimited authority to manage fisheries in their waters despite the existence of an international border and considerable interstate commerce (Gaden et al., 2012). However, a federal presence in the Great Lakes also exists, with agencies like the US Fish and Wildlife Service and Fisheries and Oceans Canada playing integral roles in fishery restoration, scientific assessment, habitat protection, and invasive species control.

1.1. Transboundary institutions and networks

While attempts to foster consistent policies among the sub-national jurisdictions were voluminous and, at times quite in earnest, the states and the province nevertheless failed time and again to produce coherent regulations or even a regime for regular, cross-border discussions. Indeed, between the 1880s and the 1940s, the sub-national governments rejected or ignored more than twenty-seven proposals to create a formal, overarching agreement or mechanism to facilitate transboundary governance (Gallagher et al., 1942). In 1942, an international board of inquiry, established by Canada and the United

States to consider the condition of the fishery, blamed the fishery decline mostly on a lack of transboundary governance (Gallagher et al., 1942). The only way to solve the problem, the report recommended, was to take major steps at the international level.

Four years after that bi-national inquiry, in 1946, an international treaty was, in fact, proposed (Truman, 1946). The treaty vested strong, binding authority to regulate the fishery in the hands of a bi-national commission, a clear usurpation of state and provincial autonomy. Those wishing to maintain sub-national primacy resisted the treaty vehemently, as illustrated in a testy exchange during a congressional hearing:

> **Mr. Alvin Weichel** (A Congressman from Ohio): The English [i.e., Canadians] do not invite the Americans over there to control their freshwater lakes, but you invite them over here to have something to say about ours.
>
> **Mr. Albert Day** (Director of the Fish and Wildlife Service): You might carry that same philosophy forward in the matter of all treaties . . . .
>
> **Mr. Weichel**: But what you are doing here, you are taking something that belongs to the individual States . . . —and it does not belong to the Federal Government—and trying to take it away from the States. It belongs to the States.
>
> **Mr. Day**: No.
>
> **Mr. Weichel**: That is what it is when you ask for a commission of two English and two Americans, to tell you when you can fish and where, and how, in the waters that belong to the States (U.S. Congress, 1949).

The 1946 treaty failed and was withdrawn because it over-reached (Piper, 1967). About a decade later, in 1954, Canada and the US tried again to create a trans-boundary governance regime, this time, agreeing to the Convention on Great Lakes Fisheries, a bilateral treaty. The convention established the bi-national Great Lakes Fishery Commission, a formal institution composed of commissioners appointed by the Prime Minister and the President. The treaty directed the commission to develop and implement a border-blind program to control the invasive, destructive sea lamprey, and to coordinate fishery research. The sub-national governments accepted the convention—and it was subsequently ratified—because it relieved them of the sea lamprey control burden while expressly prohibiting the commission from assuming the management authority found in the failed 1946 treaty (Fetterolf, 1980).

The convention negotiators remained acutely aware of the need to create some semblance of sub-national, transboundary cooperation, so they also inserted a provision in the treaty directing the commission to establish formal or informal "working arrangements" among the provincial and state fishery agencies. Such transboundary governance was initiated in a modest fashion in 1965 when the commission formed "lake committee" for each Great Lake. Lake committees comprise senior fishery managers—managers responsible for formulating and implementing decisions—from each jurisdiction. Typically, a lake committee member is the jurisdiction's primary manager for the lake. Each lake committee also has at least one technical committee—made up of biologists, scientists, and other experts—to provide data-based information to the lake committees. Thus, lake committee

decisions and actions are designed to be rooted in bottom-up-driven science. The committees would be the ongoing forum under which state and provincial agencies would discuss matters and share information (Great Lakes Fishery Commission, 1964). These committees were the first formal, permanent, multi-jurisdictional institutions for transboundary governance in Great Lakes fishery management.

Between 1965 and the late 1970s, the committees served as places where simple information exchange would take place. Transboundary governance went into high gear starting in 1981 when the agencies signed A Joint Strategic Plan for Management of Great Lakes Fisheries. This agreement retained the lake committee structure and membership, and used them not only as mechanisms for exchanging information, but also for devising and securing promises to implement shared fishery objectives (Great Lakes Fishery Commission, 1997). In other words, although the lake committees existed as the same transboundary governance institutions before and after the Joint Strategic Plan, they changed from being passive, reactionary bodies to active, progressive forums for collaboration.

The Plan creates an elaborate transboundary governance regime with three main functions: First, it creates an expectation that members will work together to collect and share information. Second, it directs members to decide on tasks that need to be done as well as to identify who is to perform the tasks. Finally, it calls upon the members to develop broad policies and specific implementation plans to guide management. As a non-binding agreement, the plan demands that members reach consensus on significant fishery management decisions, especially those where a policy in one jurisdiction could affect policies in another. Managers convene lake committees and technical committees at least once per year (sometimes more often), and conference calls, emails, and outside interactions, pursuant to lake committee actions, are common and on-going. It is a "strategic" plan in that it creates a means for the participants to share science and articulate shared objectives, but it does not determine those specific objectives. Such a plan relies on continuous meetings, strategizing, data collection and sharing, and collaboration. The bi-national Great Lakes Fishery Commission—charged under the convention with maintaining working arrangements—serves as a neutral facilitator to ensure the process is maintained.

1.2. Domestic Legislation and Policies

The Joint Strategic Plan is a non-binding agreement that does not, itself, regulate fisheries. Instead, implementation of anything agreed to under the plan must occur at the individual jurisdictional level. Lake committee members, after agreeing to a course of action or a policy, must rely on their jurisdiction to promulgate a regulation, take an action, or pass a law consistent with the shared policy.

Two Joint Strategic Plan-related examples illustrate how the agreement affects domestic policies and legislation. Uniquely, the Lake Erie Committee uses the Joint Strategic Plan as a way to set annual total allowable catch limits (harvest quotas) for walleye and yellow perch. These species are in high demand both recreationally and commercially, are lake-wide in terms of migration and abundance, and fluctuate annually in abundance.

To determine the annual catch limits, the agencies must work together to conduct biological assessments, must share their data, must come to consensus on what the data indicates, and must agree on an annual harvest level. One defection from this process would result in the others harvesting consistent with constituent pressures, not necessarily the sustainability of the Lake Erie fishery in mind. Even with consensus at the lake committee level, however, the Joint Strategic Plan is non-binding and dependent on implementation by the home jurisdiction. Senior level officials, governors, and the Premier of Ontario are aware of the tough negotiations that take place and have rarely contradicted their fishery managers who sit on the Lake Erie Committee. After all, those managers have consensus on the science and they must face their peers next year to negotiate a quota. Domestic rejection of a manager's recommendation would jeopardize that manager's ability to reach agreement during the next meeting (Gaden, 2007).

Salmon socking in Lake Michigan also illustrates the effect of the Joint Strategic Plan on sub-national domestic policies. Being exotic, salmon are not naturally suited to reproducing in the Great Lakes and, thus, require hatcheries to bolster their numbers. Salmon also require a food source, like alewife. Fishery managers must balance the number of salmon stocked with the amount of prey fish available. If agencies stock too many fish, there will not be enough food to sustain the salmon. If they stock too few fish, they would not take advantage fully of what the lake could offer. Since each agency bordering Lake Michigan maintains hatcheries, has active pro-salmon constituencies, and benefits from salmon-related revenue, maintaining that balance, at a lakewide level, is important. Such management also requires close collaboration among the jurisdictions to ensure appropriate stocking levels and other management activities. In the late 2000s, it became clear to biologists that the alewife population in Lake Michigan was seriously declining (reaching near-low abundances), such that then-current stocking levels would likely result in collapse of the salmon fishery (Dettmers, Goddard, & Smith, 2012). Consequently, managers used the Lake Michigan Committee (and its technical committees) to gain a better understanding of the science, reach consensus on management actions, and agree to implement their decisions back home to ensure consistent policies on Lake Michigan. Unified salmon policy on Lake Michigan is particularly critical given the intense opinions by stakeholders about how salmon should be managed. By approaching the issue scientifically and together, Lake Michigan Committee members were able to use the process to reach out to stakeholders and involve them in the consensus-building process. Such consensus helped ensure that the potentially charged policies were defensible at the domestic level.

2. Transboundary governance capacity

Great Lakes fishery management has always been driven by the existence of a shared resource, diffuse management authority, and a strong interest among the primary, sub-national jurisdictions in maintaining independence. Attempts to create cross-border governance failed time and again because of this desire for independence. Such sentiments

exist to this day and, thus, any transboundary governance regime must take those basic realities into account.

It is under this backdrop that this paper now turns to how cross-border governance occurs. For the purposes of this paper, governance is defined as successful interactions among domains (sub-national fishery agencies) and among networks of actors (fishery managers) who are mutually dependent (Koppenjan & Klijn, 2004; Teisman et al., 2013). The goal of transboundary fishery governance under the Joint Strategic Plan, similar to Jessop's (2003) definition, is to identify fishery goals and objectives that benefit all of the jurisdictions. The fishery institution is a non-binding, "soft" agreement because anything stronger and more binding would be (and had been) rejected. The process depends on networks, personal relationships, trust, good faith interest in identifying shared objectives, and the conviction among members that compliance will occur. Networks, thus, are essential to the operation of the plan. Cooperative results and compliance are arrived at through the process of constant interactions, the strength of science, and the reliance on consensus, the latter being a powerful tool that is difficult to ignore once it is reached.

2.1. Indicators of institutional and network strength

The framework paper in this special issue identifies four indicators for assessing the strength of institutions and networks, which are foundational attributes for transboundary governance capacity (TGC): functional intensity, stability and resilience, the legitimacy of institutional arrangements, and the nature of compliance mechanisms. The following section applies those indicators to the institutional arrangements associated with A Joint Strategic Plan for Management of Great Lakes Fisheries. The plan ranks highly on all measures associated with the indicators, though is limited in its capacity to link fishery management with other management actions such as water quality and habitat improvements.

2.2. Functional intensity

Functional intensity is the extent to which institutions and networks are engaged in deep forms of collaboration, those which require significant engagement and commitment from state and non-state actors. Such intensity ranges from simple information sharing (on the low end) to complete integration of individual jurisdictional policies (on the high end). Over time, as fishery meetings and interactions became commonplace and expected in the Great Lakes basin, members became more and more comfortable working with each other and more confident in intensifying their interactions. Success begat success and members who trusted each other became comfortable working together, heightening functional intensity over time. On the functional intensity spectrum presented in the framework paper, the plan thus moved Great Lakes fishery collaboration from "information sharing" to something approaching "harmonization".

Information exchange provides members with opportunities to learn about the status of the fishery, about what other agencies are doing, and about emerging issues and problems. The pre-plan lake committees, as they existed from 1965 to 1981, operated on the

low end of the functional intensity spectrum, as they were simply places to report information; they inspired little strategic action. A review of meeting agendas and minutes from lake committee meetings during this early period show the committees were not used as a means to develop uniform regulations, to develop shared fishery objectives for management, or to develop and seek consensus about implementation of operational fishery management plans. If anything, the lake committees slipped into rote agency reporting. Said one lake committee member from this era, describing the meetings, "You give your report at the meeting, you sit down, [you think] 'aw Jesus, when is this thing going to end?" (Confidential Interview, 2004d). Said another participant, the early lake committees were so focused on jurisdictional reports that they were "very turf oriented" (Confidential Interview, 2005b).

With the advent of the Joint Strategic Plan in 1981 and a reconstituting of lake committees and technical committees, the transboundary governance regime's functional intensity increased substantially. The use of information and data, which drive fishery management, is a prime example of how functional intensity increased with the plan. Collecting data requires major monetary resources, time, staff, and technical know-how. Data management is difficult because scientists do not always agree on what they need to collect or on how best to collect it. Under the plan, the technical committees help overcome data collection and sharing problems, as members see it as their job to monitor the resource and to conduct the science necessary for the lake committees and the agencies to make informed decisions. The Joint Strategic Plan process, far beyond the early lake committees, is an institution through which jurisdictions do more than share their information; they actively collect, analyze, and use the data together. In terms of support for decision-making, thus, the process is functionally intense.

Another gauge of functional intensity is the degree to which members together decide on tasks that need doing and then identify who is to perform the tasks. This process puts strategic plans into action; it spells out who is expected to do what and commits the members to their shared agenda. The lake committee members use the process to instruct the technical committees. Technical committees devote a significant portion of their meetings to discussing and formulating responses to specific lake committee requests, and technical committee participants, like the technical committee documents themselves, often frame their function in terms of how they respond to lake committee charges. For example, typical in minutes are statements like "the [Lake Superior Technical Committee] was charged by the Lake Superior Committee to investigate what is happening to lake herring stocks on Lake Superior since herring have not reproduced very successfully in the last five years" (Ebener, 1998, p. 3) or "the [Lake Erie Standing Technical Committee] forwards the following recommendations to the [Lake Erie Committee] for their consideration" (Great Lakes Fishery Commission, 1987, p. 77).

A final, important sign of the plan's functional intensity is the development of shared policies, plans, and objectives. Before the plan, lake committee members focused on reporting individual activities to each other. While that remains an important function, managers use today's process to strategize and develop *shared* policies, plans, and objectives.

"If data does not get converted to policy, what's the point?" observed a technical committee member during a lake committee meeting (Gaden, 2003). The lake committees and technical committees are indeed established to turn talk into action, to turn science into policy. The committees motivate members to focus on a shared purpose, to identify their shared goals, and to work together to advance those goals collectively. Under the plan, agencies agree to develop and publish the shared vision for the lake's fishery—the desired species mix, how to attain and sustain the mix, and how to measure successful management (e.g., by the amount of fish it yields). These are called "fish community objectives." The fish community objectives are not specific management plans; rather, they articulate the consensus about what the fishery should look like. The products and plans respect the fact that each jurisdiction will retain management authority, but plans also acknowledge that collective action is necessary to reach the objectives. Fish community objectives are often followed by specific restoration plans, joint assessment activities, and other lake committee and technical committee products that reflect not only a common vision but also a harmonization of policies, at least policies that the jurisdictions recognize as shared. The Joint Strategic Plan establishes a functionally intense process which demands that members work continually to establish and implement their shared fishery objectives.

2.3. Stability and Resiliency

The formation of the Great Lakes Fishery Commission in 1956, and the commission's establishment of permanent lake committees in 1965, ushered in an era of cooperation that has remained highly stable and resilient. Interactions through the lake committees and under the Joint Strategic Plan are ongoing, expected, positive, productive, and sanctioned at high levels within all of the fishery management agencies. In terms of stability, the Joint Strategic Plan is a *strategic* plan, not a specific management or operational plan, and, as such, is an on-going process without a set end. Members benefit from cooperating, creating incentives for further cooperation, thus making the process increasingly robust.

As noted above, until approximately the early-1950s, the nine state and provincial fishery management agencies on the Great Lakes,[2] and the two federal governments, had a dismal record maintaining stable and resilient interactions (Gaden et al., 2012; Gallagher et al., 1942). Most attempts to cooperate were unofficial, and despite sometimes ambitious or progressive calls for cooperation, nothing tangible emerged from the meetings (Bogue, 2000; Gallagher et al., 1942; U.S. Congress, 1937). Indeed, although the interactions among the jurisdictions occurred from time to time, the meetings were *ad hoc* (often an add-on to another meeting, such as an American Fisheries Society convention), the results were negligible, and a dedicated forum for fishery management was non-existent. It is fair to say that before the 1950s, the requirements for stable and resilient transboundary governance institutions were not met.

[2]The tribes had yet to assert their rights.

However, starting in 1965 with the lake committees, and enhanced in 1981 with the Joint Strategic Plan, robust patterns of interactions solidified, which helped improve the chances that the jurisdictions would cooperate. Under the plan, managers agree to meet frequently, to develop shared objectives together, and to implement what they agree to. Unlike the pre-1950s *milieu*, interactions have been ongoing for decades: Lake committees meet over a one- or two-week period every year, technical committees meet several times a year, task groups meet regularly, and data collection and management never stop. Moreover, once tasks are parceled out, members are tagged with fulfilling their tasks and reporting back to the committees on their progress. This means that members are in constant communication with each other to gather and digest information and to write reports. The formal process ensures that members will meet again and that they will be responsible for certain tasks. The lake committees, indeed, require and depend on stable and resilient patterns of interaction; the process helps members care about future relationships.

The Joint Strategic Plan is designed to maximize interactions among peers and, in doing so, to build a close-knit community of fishery managers who want to cooperate. This community not only is the very foundation for resiliency, it is also a major reason why compliance with the plan occurs, as discussed below. The lake committees and technical committees represent what Haas (1992) calls an "epistemic community," a community Great Lakes fishery managers and biologists who are part of a tight professional network, who are recognized experts, and who have authority within their jurisdiction. Many members have been involved in the process for several years—some for decades. These long-term professional and social interactions allow the members to know one another, to predict behavior, to know each person's perspective, and to better understand and foretell individual positions. Lake committee and technical committee members speak of "becoming friends" with colleagues from other jurisdictions. They spend hours a day together in meetings discussing issues and they usually continue their deliberations in social settings after the meetings have ended. Great Lakes fishery managers interviewed for this paper generally express their appreciation for the regular interactions, how they enjoy "renewing acquaintances," and how they see the meetings not as a burden but as a "highlight of the job" (Confidential Interview, 2004m, 2005a). The meetings are a pleasure for many because they provide the chance to interact with respected peers on an international level. They can talk science, commiserate over illogical political decisions, plan major initiatives, and float new ideas with an open-minded, less judgmental group. They grow as a community. Interactions are also rewarding for members because cooperation leads to better management policies that are more defensible with politicians and stakeholders (discussed below under "legitimacy").

Another, perhaps stronger, factor accounting for the plan's resiliency is the peer pressure that comes with being a member of an epistemic community. By relying on strong relationships among members of a close-knit, select group, the plan creates an atmosphere where members are expected to participate in earnest, to adhere to the norms of the community, to not disappoint respected colleagues, and to strategize with those who understand the world of fisheries management. The plan is gently coercive because, under those

conditions, members have an obligation to behave pursuant to the community's rules and norms and follow through on commitments, lest relationships and the managers' professional esteem be jeopardized. Being a member of an epistemic community requires members to work together and adhere to the high principles of their community.

The transboundary governance arrangements, rooted in relationships among members of the epistemic community, have become more stable and resilient over time. Trust and understanding emerge from a community that interacts frequently, creating a positive feedback mechanism: members who meet frequently receive benefits from doing so, making them more interested in meeting again. In epistemic communities, people want to be credible and trusted (particularly with people they respect) and they also want to trust others. Indeed, many observed that lake committee and technical committee meetings engage everyone on a regular basis and allow for—some say force—ongoing dialogue. This creates a positive feedback loop, whereby a solid framework encourages more commitment to collective action, and more collective action has in turn solidified the framework.

However, on one measure associated with the stability and resilience indicator, the Joint Strategic Plan fares less well, namely the ability of related institutions and networks to mesh fishery management issues with critical, related issues, such as environmental management, habitat protection, and water quality. Natural resource management in the Great Lakes and elsewhere has tended to develop in silos, with institutions like the Great Lakes Fishery Commission and departments of natural resources set up to deal with fisheries, and other institutions like the International Joint Commission and environmental protection agencies set up to manage water quantity and quality. In many cases, the explicit disconnect reflects the fact that many management institutions and agencies were set up prior to an acceptance of "ecosystem management," which came of age in the 1960s and 1970s.

On paper, the Joint Strategic Plan would suggest a high potential for horizontal policy coordination, given the plan explicitly acknowledges the need for ecosystem management to occur. The plan envisions that managers consider the Great Lakes as systems of interacting biotic and abiotic variables, which means managers should look beyond fishery management or single species and instead consider and respond to all issues that affect the Great Lakes. Some participants do believe that working together helps them think about the resource in terms of ecosystem management, like preserving the structure and stability of the entire fish community, rather than focusing on single-species management.

Whether the Joint Strategic Plan actually promotes resilience in terms of its ability to facilitate horizontal policy coordination, however, is questionable. The plan calls for fishery managers to develop "environmental objectives" for each lake and then to integrate those objectives with their fishery objectives. Several Joint Strategic Plan members interviewed for this paper acknowledge that such integration has been extremely slow to emerge.

While fishery managers have a long way to go before environmental objectives complement fishery objectives, the new Great Lakes Water Quality Agreement (GLWQA) offers unprecedented opportunities to coordinate fisheries objectives with other elements of Great Lakes policy. The GLWQA, first signed in 1972, is intended to improve the

chemical, biological, and physical integrity of the Great Lakes, though most observers acknowledge that the focus has primarily been on chemical integrity. The most recent version of the agreement (signed in 2012), however, includes 10 annexes that redouble the parties' interest in all three elements of Great Lakes policy. Of particular interest to fishery managers are likely to be Annex 2, focusing attention on lakewide management plans (and how environmental plans can be integrated with other plans, such as fish community objectives); Annex 6, addressing aquatic invasive species; Annex 7, addressing habitat and species rehabilitation; and Annex 10, advancing science. The GLWQA's new governance structure—with a more inclusive executive committee (the Great Lakes Executive Committee) and subcommittees to implement each annex—provides those involved in the Joint Strategic Plan structure exceptional opportunity to fulfill the plan's vision for better ecosystem management through trans-disciplinary synchronization of fishery and other objectives. Should Joint Strategic Plan members become engaged in water quality agreement structures, the stability and resiliency of the plan (in its capacity to engage in deeper ecosystem management) would increase, enhancing its ability to foster transboundary governance capacity.

2.4. Legitimacy

The degree of legitimacy of institutional arrangements is an essential metric for analyzing governance arrangements because it undergirds both resiliency and effectiveness. The Joint Strategic Plan is widely regarded as legitimate, including legal legitimacy (constitutionalization), political legitimacy through accountability, and process legitimacy through transparency and public compliance.

Fishery management on the Great Lakes is a long-standing and recognized sub-national responsibility (Dochoda & Jones, 2002; Gaden et al., 2012; Piper, 1967). Legal legitimacy to manage the fishery comes not from federal authorities; rather, it exists through a mix of Canadian and U.S. constitutional powers, ownership of the resource, treaty rights for tribes, and court cases that have affirmed sub-national primacy (Gaden et al., 2012). At first glance, strong federal powers would appear to preclude non-federal involvement in foreign or cross-border activities. However, in Canada, it is generally agreed that provinces can freely enter into agreements with each other and with foreign governments, so long as the agreement pertains to a provincial authority (Rutan, 1971). In the United States, the absence of Congressional consent, a treaty, or a domestic statute does not preclude states from entering into agreements with each other or with foreign entities, so long as the agreement relates to a state matter and does not encroach upon the federal government's rights and responsibilities (Davis, 1893; Goldsmith, 1997, p. 1620; Killian & Beck, 1987, p. 392; Zimmerman & Wendell, 1951, 1976; Zimmerman, 2002). Thus, the ability for a state, province, or tribe to manage the fisheries in its waters is well-established; the sub-national legitimacy has been tested and today is not in dispute. Moreover, the ability of sub-national governments to cooperate with each other is also

present. In this sense, the Joint Strategic Plan as a mechanism for transboundary governance has a high level of legitimacy.

The Joint Strategic Plan also exhibits process legitimacy in that all fishery management jurisdictions on the Great Lakes, and relevant Canadian and U.S. federal agencies, are signatory. Sub-national acceptance, at senior levels within the state, province, or tribe, indicates to fishery managers and biologists that their home jurisdiction expects them to work with colleagues from other jurisdictions. From the very start, plan-framers decided that senior officials from the management agencies needed to be active in developing the plan and demanding support for it (Great Lakes Fishery Commission, 1978, 1981). Today, fishery managers and biologists from all signatory agencies report that their superiors expect them to participate in the Joint Strategic Plan, thus bringing a high level of legitimacy to the process. This will affect compliance as well, as discussed below.

Another mechanism heightening process legitimacy is the presence of the Great Lakes Fishery Commission as a neutral third party charged with ensuring plan implementation. The call for "working arrangements" is in the commission's treaty, and the commission has been a focal point for cooperation since its founding in 1956. In general, participants expect the commission to push them along, but not so forcefully that the commission upsets agencies' authority to manage their own fisheries. Participants generally agree that the role of the commission is "to facilitate professional, appropriate standards of behavior of individuals participating in the process" (Confidential Interview, 2004c). This means, said a senior state official, that the commission is asked to "create the appropriate level of support where it's easier for [the lake committee members] to do the right thing than it is the wrong thing" (Confidential Interview, 2004c). To create that atmosphere, Joint Strategic Plan participants very much expect the commission to make sure the meetings take place, to help them keep the data flowing, to retain an institutional memory (e.g., prepare minutes), to serve as an honest broker, and to stay neutral. Said one lake committee member, the commission's job is to "provide the prodding to the follow up; [to] gently nudge people along" (Confidential Interview, 2004e).

As for accountability and political legitimacy, lake committee and technical committee members believe that transboundary governance through the Joint Strategic Plan has helped them produce solid policies that are defensible with politicians and stakeholders. Fishery management is a politically charged policy area. The Plan, say participants, has served as a way for fishery managers to counter political pressures with arguments based on careful, cooperative, lake- or basin-wide deliberations. Such arguments blunt parochial tendencies and provide justification for potentially unpopular actions. On the other hand, because "all politics is local," even arguments based on science and multi-jurisdictional consensus are not always enough to stand against considerable political and constituent pressures. Politicians, bureaucrats, and leaders have considerable leeway to influence fishery managers' actions, and stakeholders who want such things as greater access to the resource, lower license fees, higher quotas, or fewer restrictions on behavior, can exert direct pressure on politicians and senior officials.

2.5. Compliance

As the framework paper in this volume notes, "compliance is understood as the degree to which rules are complied with in practice." The Joint Strategic Plan is a non-binding agreement and, as such, measuring compliance is inherently difficult, as adherence to specific "rules" is less clear than with a binding agreement. Non-binding "rules" are often in the form of acceptance of norms and earnest participation in a process. Non-binding agreements like the Joint Strategic Plan are often more flexible than binding agreements in dealing with compliance because they generally rely on consensus and are more ambitious; signatories are more likely to push the envelope if they know they will not be held, legally or otherwise, to the agreement (Raustiala & Victor, 1998, p. 687; Victor, 1997, p. 244). Compliance is heightened when all participants think the process is fair (Franck, 1995; Ostrom, 1990) and when a party's reputation might be at stake (Guzman, 2002; Young, 1989). Non-binding agreements can prompt members to go beyond what is on paper, can lead to more enlightened discussions, and can be flexible enough to adapt to changing needs.

First and foremost, compliance in the context of the Joint Strategic Plan must be considered in the context of the history of Great Lakes fishery management and the jurisdictional realities that preclude any force that would bind an agency to action. During the interviews, time and again, members made note of the fact that each jurisdiction has its own mix of politics and regulations that make each jurisdiction's fisheries management different. "I remember in our dealings we always tried to make sure our colleagues understood that if we had to go back and change the regulations that there was this [internal] process we had to go through" (Confidential Interview, 2004b), said a manager interviewed for this paper, an observation several participants echoed. Added another, "What, really, can another jurisdiction say to you about what you can and cannot do?" (Confidential Interview, 2004i).

With that reality in mind, compliance with the Joint Strategic Plan can be measured empirically in two ways: whether the participating jurisdictions adhere to the plan's rules (called "strategic procedures") and whether the participants themselves (e.g., lake committee and lake technical committee members) believe the plan motivates them and others to comply. A review of fifty years of minutes and attendance records reveals that compliance with the process's most important strategic procedures exists in practice. Moreover, participants, during the semi-structured interviews, expressed a strong belief that the non-binding plan contains structures the motivate members to comply.

The Joint Strategic Plan's most important strategic procedures include the commitment to participate in on-going interactions through the lake committee process and to reach consensus on actions. As noted above in the "resiliency" and "legitimacy" sections, by signing the plan, agencies commit to participate in earnest in lake committee and technical committee meetings. All fishery management authorities on the Great Lakes have signed the plan; no jurisdiction is missing. Meeting minutes and attendance records dating to 1965 list regular and robust participation by all signatory jurisdictions, with no major

lapse in attendance by any authority. Since 1965, all lake committees and technical committees have met at least once per year (some several times per year), and members, during the interviews, reported frequent between-meeting interactions, often in the form of data sharing, collaboration on papers and other reports, and "just staying in touch."

At the jurisdictional level, agencies consider complying with the plan's basic participation requirement to be somewhat mandatory because of the mere existence of an agreed-to framework. On the operational level, most lake committee and technical committee members, when queried during the interviews, also reported that senior-level officials (e.g., the chief of fisheries or the director of the department of natural resources) fully expect them to comply with (participate in) the plan's structures. When participants were asked, for instance, whether their director expects them to cooperate with officials from other jurisdictions through the plan, the most common response was a simple answer like that provided by a lake manager: "definitely" (Confidential Interview, 2004k). Others reported that compliance with the plan is actually mentioned in their position description.

Consensus is another major strategic procedure of the plan, and compliance with that provision is high. Nothing happens without consensus, as no jurisdiction can compel another jurisdiction to take action. As with functional intensity, compliance can be measured in terms of committee output. Each lake committee and technical committee has produced scores of reports, fishery objectives, technical data sets, and fishery restoration plans. The ongoing approval and publication of lake committee products is a clear indication that consensus can be and is reached—these reports could not be published without data sharing (they reflect the data of all participating agencies) and without consensus, as consensus means any agency can "veto" anything if they simply object to it. Thus, compliance with the consensus rule is strong and unwavering.

Beyond measuring compliance based on adherence to the plan's strategic procedures, adherence can also be considered through the second measure of compliance: whether the participants themselves (e.g., lake committee and lake technical committee members) believe all participants are complying. This second measure is, perhaps, more important than the first because, with a consensus-based, non-binding agreement like the plan, perception is essential. If the participants do not believe others are complying with the agreement, they will be less likely to cooperate. If they believe the agreement is robust and positive, they will be more likely to comply. Tiesman et al., (2013) note that a major threat to governance are "mega-events" that cause jurisdictions to hunker back to their sovereign authorities and eschew cooperative, compliant behavior. If Joint Strategic Plan members believe other members are not complying with and implementing their shared goals, they, too, will retreat back to their own jurisdiction and simply will not participate (Gaden, 2007).

The need to believe in others' compliance is especially true with an agreement like the Joint Strategic Plan that relies on the tight-knit epistemic community, described above in "resiliency," for its success. Trust among peers, and personal stature in an epistemic community, are powerful drivers of participation and, hence, compliance, in a transboundary governance regime (Axelrod, 2006; Haas, 1992; Young, 1989). Essential is whether the members have a sense of ownership in the process and whether trust exists (Axelrod,

2006; Gaden, Krueger, Goddard, & Barnhart, 2008; Haas, 1992; Montpetit, 2003; Young, 1989, 1994). As Young (1994, p. 134) states, "those who lack any sense of ownership regarding the arrangements because they have been pressured into pro forma participation . . . can be counted on to drag their feet in fulfilling the requirements of governance systems."

Empirical data from the interviews provide insights into the participants' sentiments about what motivates them to comply with the agreement. While participants believe the plan does not compel unwilling action (such as with enforcement of a binding agreement), they do feel it contains ample strategies to facilitate cooperation, thus allowing the participants to achieve their goals without a more heavy-handed approach that constrains flexibility or creativity. When asked, for instance, whether they believe the Joint Strategic Plan has ever compelled them to comply in a certain way, the responses were nuanced (reflecting differences in how participants define "comply") but consistent in suggesting the plan does change behavior. For instance, participants stated that the plan had affected their thinking beyond the perspective of their own agency. The plan offered them a different viewpoint and a motivation to find common ground. In a few cases, participants could recall instances where one jurisdiction wanted to stock a certain species of fish, but when the issue was discussed through the lake committee and technical committee processes, such stocking became less attractive to the proposing jurisdiction. A broadening of thinking occurs because managers interact with peers, which leads to fresh thinking outside of the particular agency's culture, resulting in refined ideas and improved positions. In this regard, the plan has compelled, in soft, persuasive ways, a change in mindset and behavior. Members note that the plan has prompted them to "take other jurisdictions into account before they take actions that could affect the whole system," it has "forced a lot of people to re-think what they were doing," and it has prompted members "to think about things and to make some changes" (Confidential Interview, 2004a, 2004f, 2004h).

Just as a strong, transboundary epistemic community of fishery managers heightens the plan's resiliency and legitimacy, such a community also strengthens a member's sense of duty to comply with the plan. "When heated debates take place within any epistemic community," says Montpetit (2003, p. 25), "the presence of a common paradigm equips them to construct consensual solutions for the problems they are concerned about." Indeed, this peer pressure, coupled with consensus as a fundamental foundation for the plan, serves to heighten the chances that members will adhere to the norms of the transboundary network (lest they be ostracized) and to their shared decisions (because the decisions are consensus-bases and, thus, of the members).

For lake committee activities to be successful, members must stay committed to what they develop jointly; members rely on forces besides a binding agreement to "compel" them to comply with what they decide. Measures of these compliance forces include following a regular procedure (i.e., lake committees), a feeling of ownership in the plan, and the consensus-based decision process. This transboundary governance regime creates a special feeling of obligation to the decision; as one technical committee member observed tellingly, we feel compelled to stick to the plan "because we have been involved so much in drafting [the policies]" (Confidential Interview, 2004j). Members have a sense

of ownership in the plan, which could lessen the need for a binding agreement. The discussions that take place under the plan, in the words of one technical committee member, are "us versus us" (Confidential Interview, 2004l). A now-retired senior manager added that he preferred the plan to other agreements "because it originates from the parties; it is not imposed" (Confidential Interview, 2004g). The managers understand that no higher force than them compels cooperation; rather, cooperation occurs because the members are vested in the plan's products.

Perhaps most importantly is the not-easy-to-measure sense of camaraderie that the plan ensues, which certainly has an effect on compliance with the letter and spirit of the agreement, as discussed above in the context of strengthening the plan's resiliency. Such camaraderie is more than just a reflection on pleasant interactions with colleagues; it reflects a positive feedback loop that begets further interactions and, thus, heightened compliance.

Another, perhaps stronger, facet of relationships under the plan is the peer pressure that comes with an epistemic community. The Joint Strategic Plan is designed to heighten the number of interactions that occur among specialized community members. By relying on strong relationships among members of an epistemic community, the plan creates an atmosphere where members are expected to comply in earnest, to adhere to the norms of the community, to not disappoint respected colleagues, and to strategize with those who understand the world of fisheries management.

3. Conclusion

The Great Lakes are unique in that the sub-national governments, together, manage an international resource. The Joint Strategic Plan for Management of Great Lakes Fisheries is a formal institution for transboundary governance, comprising formal and informal networks, rules, and norms to allow participants to identify and work toward achieving their shared objectives. Jurisdictions chose a consensus-based, non-binding agreement because they felt it would maximize collaborative action while still respecting their sovereignty. The Joint Strategic Plan is a strategic, not prescriptive, agreement which underpins an ongoing process and set of relationships, rather than serving as a less-ambitious point-in-time agreement backed by formal accountability mechanisms. While a non-binding agreement like the plan entails significant transaction costs, it does ensure that cooperation among the jurisdictions remains on-going, so long as the signatories find the agreement to be useful.

Transboundary governance capacity in Great Lakes fishery management would likely not exist at the level it does absent a disinterested third party like the Great Lakes Fishery Commission. The commission successfully facilitates the Joint Strategic Plan process because it is explicitly prohibited from undertaking management authority reserved to the sub-national governments (the commission is not seen as a threat to sub-national autonomy) and it is directed to maintain working arrangements (thus ending 150 years of chaotic parochialism).When analyzed through the lens of the four indicators (functional

intensity, stability and resilience, legitimacy, and compliance), the Joint Strategic Plan brings considerable transboundary governance capacity in all but its ability to integrate fishery management with other management structures.

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