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Commentary

A tale of two Great Lakes conferences: Urging global collaboration on our largest freshwater resources

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ABSTRACT

Scientific meetings and conferences are a part of the scientific process, and can facilitate collaboration, idea-sharing, and harmonization of research and management. The success of a conference can be measured using many criteria, including consistency and reoccurrence of the meetings, credibility by participation of reputable professionals, and attendance by a diverse community. In the interest of increasing the success of large-lake, freshwater science, policy, and management, this comment focuses on two recent conferences attended by the authors: the 60th annual meeting of the International Association for Great Lakes Research, in Detroit, U.S.A., and the African Great Lakes Conference, in Entebbe, Uganda. By our measures of success, we suggest that to make a larger impact on research, policy, and management of global, large, freshwater lakes that each conference can improve, either through greater diversity of experts from the global freshwater research community, or by consistently reoccurring on a regular basis.

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1. Introduction

Most large lakes of the world are multi-jurisdictional in nature, often crossing national boundaries. Thus, successful management or large-scale research requires an inter-jurisdictional approach. Transboundary cooperation (i.e., the engagement and transfer of knowledge and ideas among international communities of researchers, managers, and policy-makers) is critical for efficient management and research moving forward. This has been demonstrated by the successful cooperative management on the Laurentian Great Lakes in North America with collaboration facilitated by the Great Lakes Fishery Commission, International Joint Commission, and others. Similarly, on Lake Victoria, East Africa, cooperation between its three riparian countries is coordinated through the Lake Victoria Fisheries Organization. Large lakes should not be studied within singular bubbles, as it is unlikely that experts from a single system or lake have the necessary resources to address large-scale challenges alone. Indeed, global collaborations on freshwater resources have already occurred and momentum for continued collaborations is increasing. During the last decade multiple successful, large-scale collaborations have been developed, including the Transboundary Lake Basin Management Initiative during 2008–2009 (Adeel et al., 2012); the Great Lakes to Great Lakes Initiative started in

2015 by Office of Special Envoy to the Great Lakes, U.S. Senator Russell Feingold, which brought together experts from the Laurentian Great Lakes and Lakes Victoria and Tanganyika to demonstrate the “positive benefits of strengthened cooperation between the countries of the African Great Lakes region, as well as a rare opportunity to learn from each other about our respective approaches to key environmental issues.” (GL2GL, 2015); and the 2016 global conference Freshwater, Fish and the Future, which aimed to address contemporary challenges facing global freshwater resources (Taylor et al., 2016). In addition, various stand-alone and recurring meetings attempt to address global freshwater resource science, management, and policy. Examples include the Great Lakes of the World (GLOW) symposia facilitated by Aquatic Ecosystem Health and Management Society (AEHMS), the International Association for Great Lakes Research (IAGLR) annual conference, the European Large Lakes Symposium (ELLS), the annual lake committee meetings for the Laurentian Great Lakes, and the 2017 African Great Lakes conference (AGLC). Such conferences allow the global research and management community to address trans-boundary common pool resources. They serve as a venue for scientists to present work and receive feedback, disseminate findings, and exchange ideas, methods, and approaches. Such interactions lead to structure and harmonized processes that allow the community as a whole to evolve; conferences build momentum of like-minded researchers, creating collaborations that can in turn amass the resources and knowledge to conduct research that results in useful, harmonized data and ideas to influence positive change (Eggers and Capri, 2011).

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Successful conferences can be measured by multiple criteria. Here we focus on three of particular interest to the research and management of large, international lakes: regular occurrence, thus allowing consistent, up-to-date exchanges of knowledge while maintaining progress on issues of wide interest; participation by reputable professionals; and attendance by a diverse, global community, thus allowing a broader view of approaches with the ability and resources to conduct research on large lakes globally. Successful conferences allow international experts to share challenges and successes, develop professional connections, and broaden views and approaches of members of the freshwater scientific community. It is clear that international collaboration is desired and valued within the research, policy, and management communities of large freshwater lakes. Though these efforts aim to address challenges and share successes of freshwater science, management, and policy, we have observed three key aspects that restrict their global impact: (1) there is generally a strong regional or lake-specific focus (either formal or informal), (2) the conference is often too small to achieve a truly global scope, or (3) the conference occurs too infrequently to be effective.

With this comment, we call for stronger transboundary, international cooperation by focusing on two recent research and resource management conferences focusing on the largest sets of freshwater lakes globally. Both conferences were held in May 2017: The 60th annual meeting of IAGLR, in Detroit, U.S.A., and the African Great Lakes Conference (AGLC), in Entebbe, Uganda, each attracting over 300 international attendees. The authors attended both conferences and observed strong similarities in the goals of each conference and the potential for a synthesis between the conferences.

1.1. The conferences

With approximately 700 members, IAGLR is a mid-sized scientific society that runs an annual conference and publishes the multidisciplinary Journal of Great Lakes Research (JGLR), which covers a variety of topics dealing with large lakes of the world. Membership encompasses a wide range of expertise, including biology, limnology, natural resources management, engineering, and social science (McNaught, 1993). Notably, IAGLR highly values student participation in its annual meeting as well as within the membership and direction of the association. Multiple student scholarships are available to support travel to the conference and to reward excellence in presentation and research. Students are given discounted membership rates, and must fill two positions on the board of directors. Historically, while aspiring to address all global great lakes in its mission, IAGLR has focused primarily on the Laurentian Great Lakes of North America. The 2017 IAGLR conference

was the 60th annual meeting of IAGLR; and the Detroit, Michigan, venue was centrally located in the Laurentian Great Lakes basin. As such, the 2017 meeting was larger than the average IAGLR conference. However, the meeting occurred during a time when the U.S. was dealing with potential travel bans for travelers from certain nations, and this may have impacted attendance by international attendees.

The AGLC was developed as a one-time conference initiated by The Nature Conservancy (TNC) and the Lake Tanganyika Authority through the TNC's African Great Lakes initiative. The conference addressed the African Great Lakes, identified as Lakes Albert, Edward, Kivu, Malawi/Nyasa, Tanganyika, Turkana, and Victoria, and was motivated by stakeholders throughout the region. Funding was provided by the MacArthur Foundation, the Critical Ecosystem Partnership Fund, and the United Nations Environment Program among others (TNC, 2017a). The AGLC was intended to advance cross-basin sustainable development solutions and long-term thinking on a range of topics including human and environmental health, biodiversity conservation, sustainable fisheries and aquaculture, climate change, and governance. Two key outcomes of the AGLC were: the Resolution of the African Great Lakes Conference: Conservation and Development in a Changing Climate, a guiding document intended to serve as a resource for granting through the newly formed African Great Lakes Conservation Fund (TNC, 2017a), established by the John D. and Catherine T. MacArthur Foundation, to support projects that will address the priorities identified in the AGLC resolution (TNC, 2017b).

Attending two conferences of similar scope in such a short window of time gave us unique insight into the similarities and differences among the research and management communities represented by the respective attendees. Here, our goal was to use this insight to develop recommendations for improving the reach of each conference within global freshwater science and management. To do so, we qualitatively compared attendee demographics of the AGLC and the 2017 IAGLR conference, obtained from the conference program books and conference coordinators, with particular focus on the proportion of student attendance and degree of international participation observed (Table 1). We expected that, based on the geography of the African and Laurentian Great Lakes, more countries will have been represented at the AGLC as compared to IAGLR. Based on resources available to students in each research community we also expected that the proportion of student attendees will be higher at IAGLR compared to the AGLC.

2. Discussion

Although the scope of these two meetings was similar, focusing on scientific research and natural resource management within large

Table 1
Summary of attendee demographics for the African Great Lakes Conference and the 60th annual conference of the International Association for Great Lakes Research.

Variable	African Great Lakes Conference	International Association of Great Lakes Research conference
Date	May 2–5, 2017	May 15–19, 2017
Location	Entebbe, Uganda	Detroit, USA
Total attendees	314	1049
Total student attendees (percentage)	45 (14%)	353 (34%)
Number of oral presentations	68	664
Number of poster presentations	57	166
Number of student-led presentations (oral or poster) ^a	Not available	212 (26%)
Number of countries represented	35	11
Countries represented (number of representatives)	Belgium (1), Burkina Faso (3), Burundi (7), Canada (5), Chad (3), Cote D'Ivoire (1), Democratic Republic of the Congo (8), Ethiopia (2), France (8), Germany (1), Ghana (1), India (1), Ireland (1), Japan (2), Kenya (35), Malawi (8), Mozambique (3), Netherlands (4), Niger (2), Nigeria (2), Norway (2), Poland (1), Rwanda (10), Sierra Leone (1), South Africa (6), Spain (1), Switzerland (2), Tanzania (30), Tunisia (1), Turkey (1), Uganda (93), United Kingdom (13), United States of America (47), Zambia (4), Zimbabwe (1), undeclared (3)	Australia (1), Canada (191), China (8), England (1), Finland (2), France (3), Germany (1), Hungary (1), Japan (2), Switzerland (1), United States of America (838)

^a The number of student-led presentations was conservatively estimated using the number of presenters who signed up to be judged as part of IAGLR's student presentation competition. Comparable data were not available for the AGLC.

freshwater systems, they differed in geographic focus, attendance, and consistent reoccurrence. Each conference primarily addressed the large-lake systems of the host continent (the African Great Lakes and the Laurentian Great Lakes for the AGLC and IAGLR, respectively), though we concede that this regional focus was the intention of the AGLC. Attendance of the IAGLR conference comprised primarily North American freshwater experts, with a small number of attendees from other continents, whereas Africa, Europe, and North America were all well represented at the AGLC (Table 1). The AGLC had 314 attendees. At approximately three times the size of the AGLC, the 2017 IAGLR conference was the largest IAGLR conference to date (1049 attendees), likely due to its convenient location and the fact that it was the 60th anniversary. Past IAGLR meetings have tended to attract approximately 650–750 attendees. Although the location and anniversary may have influenced the volume of attendance, we feel that the demographic makeup of the conference was unlikely to be heavily influenced. The AGLC was the first largescale meeting of its kind to occur in the African Great Lakes region in 20 years (but see discussion of the GLOW conference below) and has no ongoing formal membership or association, while IAGLR celebrated its 60th annual meeting and has an active board of directors and journal that keep the association visible throughout the year. Thus, attendees are able to plan travel and budgets around the regular occurrence of the annual conference.

The lower proportion of student attendees at the AGLC compared to IAGLR is likely due to a combination of factors. With 60 annual conferences complete, IAGLR has an established annual presence in the research community around the Laurentian Great Lakes. Meeting locations and dates are announced well in advance, and students or their supervisors can incorporate the conference into travel plans and budgets well before the meeting date. Many students attending IAGLR led oral or poster presentations (Table 1), which may allow supervisors more justification for providing travel funds. IAGLR has made a strong push for student participation, beginning in the late 1980s when the first student fellowship was offered and the student membership category was created (McNaught, 1993). Multiple student scholarships are currently available, including the international travel scholarship and the IAGLR-Ontario Ministry of Natural Resources and Forestry Student Travel award, the latter of which is awarded to all eligible student attendees of the conference. The paucity of freshwater-oriented students (and young, under-35 professionals) was notable at the AGLC, and a key factor in this was lack of resources for student travel (Modesta Medard, TNC, personal communication, May 15, 2017). The benefits to students of attending a professional or academic conference include growing a professional network, building a broad knowledge base of ongoing research, and developing formal and informal presentation skills. As a result, we urge that, though understandably difficult with limited funds, focus should be placed on student attendance at future conferences to strengthen capacity in the early-career research community.

As expected, the degree of international participation was notably higher at the AGLC than IAGLR. Even with attendance more than triple that of the AGLC, less than one third of the number of countries represented at the AGLC were represented at IAGLR. The lack of representation by African scientists at IAGLR may be largely a factor of the financial expense of travel to North America, where IAGLR has historically been held. The number of countries that surround the African Great Lakes, and the resources provided by TNC and its partners, allowed broader international attendance at the AGLC. In addition to all nine countries that geographically surround the African Great Lakes, attendees represented neighboring African countries, Europe, North America, and Asia (Table 1). Although IAGLR's mission nominally includes all global large lakes, the association is effectively binational, particularly in the board of directors. Bylaws specify the number of Canadian and U.S. board members that must serve (though note the new international board member position mentioned below), and the presidency is required to alternate between representatives of the two countries (IAGLR, 2007). The annual conference site alternates between

Canada and the U.S. and the majority of presentations focus on Laurentian Great Lake issues. At the 2017 IAGLR conference, 54 of 664 presentations (8%) explicitly stated within their abstract that the presented work had been done on sites outside of the Laurentian Great Lakes basin, while 543 abstracts (82%) focused on some aspect of the Laurentian Great Lakes. However, recently IAGLR has been actively attempting to increase its global reach. The issue of increased international reach has been regularly discussed at IAGLR board meetings beginning in 2010 (IAGLR, 2010a, 2010b). In 2011, a new membership category for members from developing countries was added in an attempt to increase international membership. After five years, this membership category had 14 members (five regular and nine student members) (IAGLR, 2016). In 2013, an international travel award was created to facilitate increased conference attendance by students outside Canada and the U.S. (IAGLR, 2007). Since 2015, IAGLR has collaborated with the ELLS to co-host a joint IAGLR-ELLS conference in Evian, France, in September 2018 entitled “Big Lakes, Small World”, with the intention of having a broad, global focus on large lakes around the world. Most recently, the first candidates for a new international board member category, which must be filled by a non-Canadian and non-U.S. representative, will stand for election in 2018. In addition, the editors of JGLR attended the AGLC with the intention of soliciting submissions to a special journal section dedicated to the African Great Lakes, of which this comment is part.

Although IAGLR and the AGLC are the focus of this comment due to their similar timing in 2017, and the authors' attendance at both, other notable conferences focusing on large lakes are held on a regular basis. For example, the series of GLOW symposia was established by AEHMS in 1996, and the first GLOW symposium was held at Victoria Falls, Zimbabwe. Its purpose is to establish a global platform where ecosystem-based studies of structure, function, and performance of large lake ecosystems are promoted, organized, and synthesized. Since then, a series of GLOW symposia have taken place, and several have been held in Africa to allow greater participation of African experts. Though this symposium is a good model for inclusion of African, European, and North American Great Lakes experts, with approximately 70–100 attendees (Martin van der Knaap, Food and Agriculture Organization of the United Nations, personal communication, August 15, 2017), the small size of the GLOW symposia restricts their impact on the larger research and management community. The ELLS symposia, held every three years, gather scientists, management planners, and policy makers to present research and discuss ideas for improved management of large lakes. The ELLS symposia largely focus on large-lake systems in Europe though each symposium has two or three presentations on non-European large-lake systems. While the ELLS symposia thus have a degree of constancy and expected reoccurrence, each iteration of ELLS is run by a host organization, similar to the model of AGLC, and thus there may be some difficulty with continuity that association-run meetings such as IAGLR, do not experience. Similarly to IAGLR, ELLS is attempting to increase its global reach (Kankaala et al., 2016) by co-hosting the aforementioned September 2018 “Big Lakes, Small World” conference with IAGLR.

3. Conclusion

Both the 2017 IAGLR conference and the AGLC were well attended and successful in bringing together a diverse group of experts in the study of large lakes. The AGLC's success was in part due to TNC's efforts to include a wide range of participants from North America, Europe, and Africa. The model, though Africa-oriented, was a successful model for other international meetings seeking perspectives from the global community. We suggest that, for continued success in the African Great Lakes region, it is necessary that meetings be regularly scheduled (e.g., annually or biennial) and, located in, and largely focused on, the African Great Lakes. As with IAGLR in the Laurentian Great Lakes region, consistent and recurring meetings among managers and researchers

working on African Great Lakes issues would likely lead to strengthened collaborations, both interdisciplinary and international, and provide research groups a forum for regular research updates, discussion, and new approaches to scientific inquiry, management, and policy making. Future sponsors of the AGLC could consider affiliating with AEHMS and the GLOW conference to pool resources and develop a larger, more inclusive conference. So too must IAGLR expand and become more inclusive, particularly with regard to large lake systems other than the Laurentian Great Lakes. The annual IAGLR conference has numerous mechanisms for collaboration and scientific transfer, and the fact that IAGLR is actively working to increase its presence beyond the borders of Canada and the U.S. is promising.

In our attendance at the 2017 IAGLR conference and the AGLC, and our comparison of attendee demographics from both meetings, we conclude that while the intent of these conferences is to foster collaborative, global freshwater research and management, each meeting can improve in some aspects. Our observations lead us to four recommendations for these similar, yet distinct, research communities: (1) IAGLR should continue to seek increased international reach, especially focusing on African students, researchers, and managers; (2) momentum arising from the 2017 AGLC should be used to ensure that systematic and consistent international meetings, on a similar scale, be held in the region; (3) both conferences should focus on processes to harmonize and prioritize research on the African Great Lakes to cultivate more robust, holistic, and efficient research efforts; and (4) IAGLR and experts in the Africa Great Lakes region should continue strong inclusion of students. Training of the next generation of freshwater experts will increase the capacity of the research and management communities to address current and future issues, especially those issues of the African Great Lakes and their basins as well as global challenges such as climate change. Enhanced participation by North American, European, and African freshwater students and experts at each of these conferences will lead to a free exchange of social and natural science information, improving experts' mutual understanding of the natural processes of large freshwater ecosystems and the social and cultural aspects of each other's basins. Increased international participation will also increase collaboration, interest, knowledge, and the ability to address challenges globally. Collaborations will increase research resources for many and facilitate transnational work. Increasing collaboration at IAGLR and AGLC will increase research resources for many and facilitate transnational work, creating more opportunities for freshwater scientists to produce better science and better inform management and policies that will positively affect millions of people who rely on our global freshwater resources.

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