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Résumé de l'article

La grande majorité des eaux intérieures de l'Ontario a été désignée pour la pêche purement récréative. Les historiens de l'environnement qui étudient les relations entre l'homme et le poisson ont démontré l'influence des pêcheurs à la ligne dans l'établissement de règlements et de politiques de gestion des pêches qui visent à maximiser les ressources en poissons au profit de la pêche sportive et du tourisme l'entourant. Pour atteindre cet objectif, des programmes d'aquaculture ont été conduits partout en Ontario pour élever des poissons et les implanter par la suite dans les lacs. Depuis plus d'un siècle, des années 1860 aux environs des années 1960, l'Ontario s'est appuyé sur l'aquaculture comme une solution globale à tous les problèmes de la pêche. Au cours des cinquante dernières années, la science de la pêche a mis en doute les avantages écologiques des programmes d'empoissonnement. Les efforts de repeuplement dans la province ont considérablement diminué depuis les années 1960, mais ont continué en grande partie grâce à l'initiative d'une base de pêcheurs à la ligne concernés par la question. Lac Ahmic est le siège d'un groupe de chalets faisant partie du village de Magnetawan. Le lac a été rempli d'une variété d'espèces de poissons au cours des cents dernières années. Plusieurs espèces ont été accidentellement introduites dans le lac Ahmic, modifiant son équilibre écologique. Entre 1987 et 2006, une organisation locale de pêche était responsable du lancement et de l'exécution d'un programme de repeuplement du doré jaune dans le lac Ahmic. En 2006, à la grande déception des pêcheurs locaux et de la communauté de Magnetawan, le ministère des Ressources naturelles de l'Ontario a annulé le programme d'empoissonnement. À l'origine de la discorde entre la communauté et le gouvernement se trouve une histoire séculaire marquée de divers éléments, dont les efforts pour concevoir au lac Ahmic une nature 'enviable', les idées changeantes sur la teneur de cette nature 'enviable', et le rôle que la science devait jouer dans sa réalisation. Je soutiens qu'un siècle d'empoissonnement au lac Ahmic a réifié cette pratique dans l'ethos de conservation de la communauté. L'histoire environnementale du lac Ahmic ouvre une fenêtre sur les tensions sociales et politiques qui ont surgi à la suite de l'annulation du programme d'empoissonnement.

Surviving Fisheries Management: Aquaculture, Angling, and Lake Ahmic[1]

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Abstract: The vast majority of inland waters in Ontario have been designated as purely recreational fisheries. Environmental historians who study human-fish relations have demonstrated the influence of anglers in the establishment of fishing regulations and fisheries management policies that sought to maximize fish resources for sport fishing and fishing tourism. To achieve this goal, aquaculture programs were conducted throughout Ontario that artificially reared fish and planted them in lakes. For over a century, from approximately 1860-1960, Ontario relied on aquaculture as a blanket solution to all fishery problems. Over the past fifty years, fisheries science has questioned the ecological benefits of stocking programs. Stocking efforts in the province have been drastically reduced since the 1960s but have continued largely because of grass root initiatives from concerned anglers. Lake Ahmic is home to a small cottage community based out of the village of Magnetawan. The lake has been stocked with a variety of fish species for over a hundred years. In addition to this, several species have been accidentally introduced to Lake Ahmic altering its ecological balance. Between 1987 and 2006, a local angling organization was responsible for initiating and running a walleye-stocking program on Lake Ahmic. In 2006, to the disappointment of the local anglers and greater Magnetawan community, the Ontario Ministry of Natural Resources canceled the stocking program. At the root of the discord between the community and the government is a century long history of efforts to engineer a desirable nature at Lake Ahmic, as well as shifting ideas of what this desirable nature is, and the role that science should play in bringing it about. I argue that a century of stocking fish on Lake Ahmic has reified the practice into the community's conservation ethos. The environmental history of Lake Ahmic adds insight into the social and political tensions that have arisen as a result of the cancelation of the stocking program.

Résumé : La grande majorité des eaux intérieures de l'Ontario a été désignée pour la pêche purement récréative. Les historiens de l'environnement qui étudient les relations entre l'homme et le poisson ont démontré l'influence des pêcheurs à la ligne dans l'établissement de règlements et de politiques de gestion des pêches qui visent à

1. Many thanks go to Dean and the rest of the Nipissing History department for their thoughts and guidance in developing this paper. Other thanks go to the Ontario Graduate Scholar Program, NiCHE: Network in Canadian History and Environment, the NiCHE New Scholars, and Western's history department. This project could not have been made possible without the support and cooperation of the Almaguin Fishing Improvement Association and the community of Magnetwan. Most of all, I would like to thank my parents, Jan and Etts, for their continued support and countless hours of editing.

maximiser les ressources en poissons au profit de la pêche sportive et du tourisme l'entourant. Pour atteindre cet objectif, des programmes d'aquaculture ont été conduits partout en Ontario pour élever des poissons et les implanter par la suite dans les lacs. Depuis plus d'un siècle, des années 1860 aux environs des années 1960, l'Ontario s'est appuyé sur l'aquaculture comme une solution globale à tous les problèmes de la pêche. Au cours des cinquante dernières années, la science de la pêche a mis en doute les avantages écologiques des programmes d'empoissonnement. Les efforts de repeuplement dans la province ont considérablement diminué depuis les années 1960, mais ont continué en grande partie grâce à l'initiative d'une base de pêcheurs à la ligne concernés par la question. Lac Ahmic est le siège d'un groupe de chalets faisant partie du village de Magnetawan. Le lac a été rempli d'une variété d'espèces de poissons au cours des cents dernières années. Plusieurs espèces ont été accidentellement introduites dans le lac Ahmic, modifiant son équilibre écologique. Entre 1987 et 2006, une organisation locale de pêche était responsable du lancement et de l'exécution d'un programme de repeuplement du doré jaune dans le lac Ahmic. En 2006, à la grande déception des pêcheurs locaux et de la communauté de Magnetawan, le ministère des Ressources naturelles de l'Ontario a annulé le programme d'empoissonnement. À l'origine de la discorde entre la communauté et le gouvernement se trouve une histoire séculaire marquée de divers éléments, dont les efforts pour concevoir au lac Ahmic une nature 'enviable', les idées changeantes sur la teneur de cette nature 'enviable', et le rôle que la science devait jouer dans sa réalisation. Je soutiens qu'un siècle d'empoissonnement au lac Ahmic a réifié cette pratique dans l'ethos de conservation de la communauté. L'histoire environnementale du lac Ahmic ouvre une fenêtre sur les tensions sociales et politiques qui ont surgi à la suite de l'annulation du programme d'empoissonnement.

A Place Called Magnetawan

Magnetawan is a small village located in Ontario's cottage country three hundred kilometers north of Toronto. The town is situated on Lake Ahmic, one of the many interconnected lakes that are part of the Magnetawan River watershed. In the early twentieth century, the establishment of a fisheries management policy for the lake coincided with the emergence of a tourism industry based largely on sport fishing (angling). Since then, tourism and sport fishing have driven the management of Lake Ahmic and the economy of Magnetawan. Like many other small bodies of water in Ontario, aquaculture—also known as fish-culture—has been the central conservation strategy for Lake Ahmic for almost a century. The Almaguin Fish Improvement Association (AFIA), established in 1987 under the Ontario Ministry of Natural Resources' (OMNR) Community Fisheries and Wildlife Improvement Program (CFWIP), is a volunteer organization that initiated, funded, and managed the most recent stocking efforts. Supported by the OMNR, the AFIA considered itself to be the

primary steward of Lake Ahmic. Its aquaculture program focused solely on stocking walleye (*Stizostedion vitreum*), Canada's favourite and most lucrative game fish.[2]

In 2006, to the disappointment of both the AFIA and the larger Magnetawan community, the OMNR unilaterally cancelled the stocking program after two decades of operation. Contemporary ecological studies on fish stocking and, more specifically, on walleye stocking, have highlighted uncertainties about the stocking appraisal and the potential risks to aquatic food webs and fish population dynamics that result from stocking efforts.[3] Having been ordered by the OMNR to shut down their hatchery, the AFIA and the Magnetawan community now believe that they have been excluded from the management of their fishery. The citizens of Magnetawan believe that the survival of Lake Ahmic, the AFIA, and the economic and social well-being of the community of Magnetawan are linked to a healthy walleye fishery that depends on annual stocking. Underlying this dispute is over a century of efforts to engineer an ideal nature for Lake Ahmic, as well as evolving beliefs regarding what this ideal is, and the role that science and government should play in bringing it about.

Lake study reports from the OMNR, going back to the 1950s, trace the ecological transformation of Lake Ahmic brought on by government policies, scientific-based management interventions, and local initiatives. Both the planned and accidental introduction of fish changed species composition and trophic levels among Lake Ahmic's fish populations. Millions of undesirable, or "coarse" fish, were also culled (removed) from the lake. The sheer number of introduced, stocked, and culled fish on Lake Ahmic demonstrates the level to which management regimes have attempted to engineer an aquatic nature that catered to the anglers who are so important to the local economy.

Although fish stocking was the foundation of Ontario's fisheries management efforts for over a hundred years, policy and scientific evidence about the practice have changed drastically over the past several decades. The cancellation of the AFIA's aquaculture program in 2006 underscores

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2. Department of Fisheries and Oceans (DFO), *Survey of Recreational Fishing in Canada 2005* (Ottawa: Economic Analysis and Statistics, 2007).

3. Peter E. Ihssen and G. William Martin, *Biochemical Genetic Diversity of Ontario Walleye (Stizostedion vitreum vitreum) Populations: Implications for Stocking* (Maple, Ont.: Percid Community Synthesis, Ontario Ministry of Natural Resources, 1995), 14; Steven J. Kerr et al., *Walleye Stocking as a Management Tool* (Peterborough: Percid Community Synthesis, Ontario Ministry of Natural Resources, 1996), v, 6, 8; Dave Fluri, *Does Planting Walleyes Work in Northeastern Ontario?* (North Bay: Percid Community Synthesis, Ontario Ministry of Natural Resources, 1998); Steven J. Kerr et al., *Strategies for Managing Walleye in Ontario* (Peterborough: Percid Community Synthesis, Ontario Ministry of Natural Resources, 2004), ii, 15.

the tensions that have developed between the scientific understanding of aquaculture and its role in engineering a desirable aquatic nature, and the local beliefs about how humans should interact with fish and their environment. I argue that a century of fish stocking has *reified* an agrarian-based understanding of Lake Ahmic and a relationship of husbandry and stewardship between the AFIA and the walleye living in the lake. For the purposes of this paper, L.B. Slobodkin's definition of reification in relation to the production and dissemination of scientific knowledge proves useful for understanding the role aquaculture plays in the Magnetawan community. He states, "Reification consists of accepting a designation as if it has empirical meaning when, in fact, its existence has either never been tested or it has been found empty."[4] Reification occurs when a scientific theory is adopted because of its appeal or practicality for certain interests despite that fact that is has not been properly assessed or has even been found to be false.[5] Slobodkin also notes that applied sciences, such as ecology and medicine, are particularly susceptible to reifications.[6] The widespread fascination with aquaculture in Ontario developed over the past century and a half and consequently imprinted the angling conservation ethic in the province. Aquaculture was accepted because of its alleged capacity to satisfy social and political goals for aquatic environments without firm scientific evidence of its ability to do so. For the AFIA, Lake Ahmic's walleye became a crop to be sown and harvested. In the language of the OMNR, the lake was a "put-grow-and-take" fishery.[7] The AFIA's reluctance to accept new management policies demonstrates the influence of reified scientific theories when adopted in social settings. The disjuncture between the OMNR and the AFIA reveals a weakness in the OMNR's capability to assess and deal with the social aspect of environmental decisions. The environmental history of Lake Ahmic helps explain the AFIA's anxiety over the OMNR's decision to discontinue stocking efforts. It also explains the power of scientific constructs when they leave the confines of the laboratory, are turned into government policy, and are used to redefine ideas about appropriate relationships between fish and people in the places anglers inhabit.

The Magnetawan story has two sides. First, is an explanation of the reification of aquaculture and the agrarian and economic understanding of the aquatic environments in which it operates. This story is critical of fish stocking practices and the constructed hierarchy of describable fishes that anglers prefer for their sport fishery. The second describes the actions

4. L.B. Slobodkin, "The Good, the Bad and the Reified," *Evolutionary Ecology Research* 3 (2001): 1, 3.
5. Ibid., 3.
6. Ibid., 10.
7. Kerr et al., *Walleye Stocking as a Management Tool*, 6.

of the OMNR as disenfranchising the members of the Magnetawan community and disregarding, or perhaps worse, being completely ignorant to, the social elements and benefits of the AFIA's stocking program. These two narratives help to depict the confusing nature of environmental management and the complicating interaction of science, government, and community in the formation of both official environmental policy and unwritten environmental ethics in Ontario.

Reserved for the Rod: Historiography of Human-Fish Relations in Canada

A "terrestrial bias" has dominated topics in environmental history since its inception in the 1970s.[8] Marc Cioc, editor of *Environmental History*, went so far as to suggest environmental historians are "landlubbers."[9] As the discipline continues to evolve into the twenty-first century, scholars have begun to recognize a void in this historiography. As a result, a distinct subgenre focusing on aquatic environmental history has emerged. Yet environmental histories focused specifically on fish are underrepresented in the literature. In the introduction to *Fishing Places*, *Fishing People*, Dianne Newell and Rosemary E. Ommer argue "[t]he social, cultural, and economic significance of Canadian small-scale, sustainable fisheries…has been grossly underestimated."[10] Their edited collection and related historical research have helped to initiate a more complete understanding of human-fish relations in Canada. When this body of knowledge is compiled, national trends in fisheries management policies emerge around the interconnected themes of marginalization and colonialism. Access to fish resources for First Nation and other subsistence fishers were restricted through the establishment of "legal" fishing practices. Fisheries management regimes developed at different times throughout Canada and responded to different pressures. However, an approximate time frame, from the mid nineteenth century to the early twentieth century, can be designated as the period when sport fishing began to dictate 'proper' and legal relationships between fish and humans in Canada.[11]

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8. J.R. McNeill, "Observations on the Nature and Culture of Environmental History," *History and Theory* 42, 4 (2003): 42.
9. Mark Cioc, "From the Editor," *Environmental History* 11, 3 (2006): 4.
10. Dianne Newell and Rosemary E. Ommer, "Introduction: Traditions and Issues," in *Fishing Places, Fishing People: Traditions and Issues in Canadian Small-Scale Fisheries*, ed. Dianne Newell and Rosemary E. Ommer (Toronto: University of Toronto Press Inc., 1999), 4.
11. Dianne Newell, *Tangled Webs of History: Indians and the Law in Canada's Pacific Coast Fisheries* (Toronto: University of Toronto Press, 1993); Douglas C. Harris, *Fish, Law, and Colonialism: The Legal Capture of Salmon in British Columbia* (Toronto: University of Toronto Press, 2001); Matthew D. Evenden, *Fish Versus Power: An Environmental History of the Fraser River* (Cambridge: Cambridge University Press, 2004), 179-230; Bill

Although they are not among the big three—forestry, mining, and hydro-electric production—in economic importance, commercial fishing and, to a much greater extent, recreational fishing, were important factors in the economic development of Ontario's and Canada's north.[12] As the negative effects of commercial fishing became more obvious, public administrators began to place more value on sport fishing as a commodified natural experience that could be sold in the form of tourism. Canada, and other "wild" tourist destinations across North America were represented as a "sportsman's paradise."[13] H.V. Nelles argues that when

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Parenteau, "A 'Very Determined Opposition to the Law': Conversation, Angling Leases, and Social Conflict in the Canadian Atlantic Salmon Fishery," *Environmental History* 9, 3 (2004): 444-445; Darin Kinsey, "Seeding the Water as the Earth: The Epicenter and Peripheries of a Western Aquacultural Revolution," *Environmental History* 11, 3 (2006): 527-566; William Knight, "Samuel Wilmot, Fish Culture, and Recreational Fisheries in Late 19th Century Ontario," *Scientifica Canadensis* 30, 1 (2007): 75-90; Douglas C. Harris, *Landing Native Fisheries: Indian Reserves and Fishing Rights in British Columbia, 1849-1925* (Vancouver: UBC Press, 2008). American environmental histories on fish address similar themes. See: John F. Reiger, *American Sportsmen and the Origins of Conservation* (Oklahoma: University of Oklahoma Press, 1975); Arthur E. McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980* (Cambridge: Cambridge University Press, 1986); Richard William Judd, *Common Lands Common People: The Origins of Conservation in Northern New England* (Cambridge: Harvard University Press, 1997); Joseph Taylor, *Making Salmon: An Environmental History of the Northwest Fisheries Crisis* (Seattle: University of Washington Press, 1999).

12. H.V. Nelles, *The Politics of Development: Forests, Mines & Hydro-electric Power in Ontario, 1849-1941* (Toronto: Macmillan of Canada, 1974); Liza Piper, *The Industrial Transformation of Subarctic Canada* (Vancouver: UBC Press, 2010). Also see Frank Tough, J. Michael Thoms, and Arthur Ray's contribution to Newell and Ommer's collection *Fishing Places, Fishing People*.

13. William Knight, *Our Sentimental Fisheries: Angling and State Fisheries Administration in 19th Century Ontario* (PhD diss., Trent University, 2008), 50; Neil S. Forkey, "Angler, Fishers, and the St. Croix River: Conflict in Canadian-American Borderland, 1867-1900," *Forest & Conservation History* 37, 4 (1993): 181-182; Bill Parenteau, "'Care, Control and Supervision': Native People in the Canadian Atlantic Salmon Fishery, 1867-1990," *Canadian Historical Review* 79, 1 (1998): 3; Tina Loo, "Making a Modern Wilderness: Conserving Wildlife in Twentieth-Century Canada," *The Canadian Historical Review* 82, 1 (2001): 2-18; Tina Loo, *States of Nature: Conserving Canada's Wildlife in the Twentieth Century* (Vancouver: UBC Press, 2006), 7; Lynda Jessup, "Landscapes of Sport, Landscapes of Exclusion: The 'Sportsman's Paradise' in Late-Nineteenth-Century Canadian Painting," *Journal of Canadian Studies* 40, 1 (2006): 71. The idea of sporting paradises is also common in historiography of the American conservation movement as well. See, Margaret Beattie Bogue, *Fishing the Great Lakes: An Environmental History, 1783-1933* (Madison: University of Wisconsin Press, 2000); Peter A. Coates, "Improving on 'A Paradise of Game': Ecological Impacts, Game Management, and Alaska's Buffalo Transplant," *The Western Historical Quarterly* 28, 2 (1997): 133-159; Kristin M. Szylvian, "Transforming Lake Michigan into the 'World's Greatest Fishing Hole': The Environmental Politics of Michigan's Great Lakes Sport Fishing, 1965-1985," *Environmental History* 9, 1 (2004): 102-127; Aaron Shapiro, "Up North on Vacation: Tourism and Resorts in Wisconsin's North Woods 1900-1945," *The Wisconsin Magazine of History* 89, 4 (2006): 2-13.

Ontario's bureaucrats were developing regulations for managing the province's natural resources, they conducted themselves within a distinct colonial framework; Ontario was viewed as its own little empire, the North its hinterland periphery.[14] Nelles' example of natural resource extraction under the conceptual context of "Empire" provides a way of understanding resource development throughout Canada and serves as a foundation for the exploration of the colonial roots of fisheries management in Ontario and Canada. This form of resource exploitation, as Nelles demonstrates, mimicked British imperial practices. It should come as no surprise, then, that colonial values of nature were also adopted.

Angling as the preferred way to fish has long-standing historic roots that can be traced to seventeenth-century England. Izaak Walton's *The Compleat Angler,* published in 1654, is the most significant piece of angling literature and one of the most widely-printed books in the English language.[15] Scholarly works on angling often refer to Walton's book, commenting on its influence in creating a specific breed of fishermen in North America that was based on social class.[16] The depiction of angling as a gentlemanly art fostered the perception that it was the most advanced and civilized form of catching fish. Of particular importance to the development of fishing regulations, fisheries science, and aquaculture in Canada was Walton's role and influence in establishing the *value* of fish species by categorizing them hierarchically into "game" and "coarse" fish groupings.[17] Game fish were desired for their recreational value, or the degree of fight exerted by the fish during retrieval *and* the quality of their flesh on the table.[18] Coarse fish, although sometimes suitable as food, were not as coveted by anglers and were often viewed as nuisances to be culled. The "cult of Walton," as Darin Kinsey describes it, shaped angling attitudes and institutionalized its fish hierarchy and angling ethic into fisheries management and science.[19] Over time, the Waltonian fish hierarchy has grown to include different species according to geographic circumstances. Ontario, having the most bountiful walleye waters in the

14. Nelles, 51.
15. Richard C. Hoffman, "Fishing for Sport in Medieval Europe: New Evidence," *Speculum* 60, 4 (1985): 902; Jonquil Bevan, *Izaak Walton's The Compleat Angler* (Great Britain: Billing & Sons Ltd, 1988), 68; Mark Browning, *Haunted By Waters: Fly Fishing in North American Literature* (Ohio: Ohio University Press, 1998), 5, 24-25.
16. Knight, "Samuel Wilmot," 76; J. Michael Thoms, "An Ojibwa Community, American Sportsmen, and the Ontario Government in the Early Management of the Nipigon River Fishery," in *Fishing Places, Fishing People*, 178; Kinsey, 531-32.
17. Kinsey, 531; Parenteau, "A 'Very Determined Opposition to the Law'," 437; Anders Halverson, *An Entirely Synthetic Fish: How Rainbow Trout Beguiled American and Overran the World* (New Haven: Yale University Press, 2010).
18. Kinsey, 531-32; Knight, *Our Sentimental Fisheries*, 29; Piper, 272.
19. Kinsey, 550.

world, has placed walleye near the top.[20] A sharp distinction is made in Walton's writing between 'good nature' (game fish) and 'bad nature' (coarse fish). These categories affixing value to fish became an integral part of the aquatic history of Lake Ahmic and are explored in detail below. Influential angling groups not only shaped political decisions, scientific research and the regulatory process, but they also defined and enforced a morality of environmental relationships.

The history of Lake Ahmic falls within the broader narrative of fisheries management established by contemporary Canadian environmental historians. The Ontario Department of Lands and Forests (ODLF), predecessor to the OMNR, conducted a report on the history of the Lake Ahmic's fishery in 1949. It described non-angling fishing practices as damaging to fish stocks and a major reason for the fisheries' noticeable decline. Despite recognizing the importance of Lake Ahmic as a provider of "essential food," especially during the Great Depression, the report emphasized the emergence of a management regime for the purpose of preserving the lake's "recreational value."[21] A clear distinction was made between illegal and unethical methods of subsistence fishing (gill nets, spears) and the "legitimate fishing methods" of the angler (rod and reel).[22] Like the 'game' and 'coarse' values anglers placed on fish species, no scientific evidence existed to suggest angling was a more environmentally-friendly way of harvesting fish that spearing or netting.[23] Yet, fisheries laws were designed to protect sporting interests by marginalizing methods of harvesting fish that did not fall within the colonial discourse of angling. Once it was decided that Lake Ahmic's fish were to be reserved exclusively for the rod, fish stocking was implemented as a management tool to maintain, improve, and even create sport fish populations for the benefit of local anglers and, more importantly, non-resident seasonal tourists from southern Ontario and the United States. By the 1950s, a management regime geared entirely towards recreational fishing was firmly established on Lake Ahmic. By moving beyond the time frame that other fish historians have worked in, roughly 1850-1950, I explore the relationships among anglers, aquaculture and the state as it evolved into the

20. DFO, *Survey of Recreational Fishing*, 2007.
21. F.A Walden, *Management of the Fishery of the Magnetawan River System: Limnology and Fisheries Management of Ahmic Lake, Preliminary Report* (OMNR Fisheries Files Report, Parry Sound District, 1949), 39.
22. Ibid., 39.
23. Recent scholarship has even went as far to say that recreational fishing can be as destructive to aquatic ecosystems as industrial commercial fishing. See: John R. Post et al., "Canada's Recreational Fisheries: The Invisible Collapse?" *Fisheries* 27, 1 (2002): 6; Steven J. Cooke and Ian G. Cowx, "The Role of Recreational Fishing in Global Fish Crisis," *BioScience* 54, 9 (2004): 857.

second half of the twentieth century in Ontario. This more recent history shows clearly how anglers have embraced and popularized the science of aquaculture and subsequently reified the practice into an environmental ethic focused on stewardship and husbandry.

A Brief History of Aquaculture

Although aquaculture is at the crux of the relationship among science, government, and anglers, fish breeding and planting for sport represents only a small and relatively recent portion of the history of aquaculture. The earliest forms of aquaculture were much different from the modern scientific practice of rearing fish and other aquatic organisms. Beginning in China during the fifth century B.C.E., methods of culturing fish that capitalized on natural water fluctuations and fish life- cycle traits continued more or less unchanged in technique for centuries.[24] One of the most common forms of ancient aquaculture was the transport and culture of carp. Naturally-fertilized eggs and full-grown fish were transported between water bodies where they could be fed, protected from predation, and become a fresh source of protein. The common carp was introduced to Europe from Asia in the medieval period using these methods and the practices of aquaculture remained essentially the same for centuries.[25] In the nineteenth century, the combination of a growing body of natural science and the desire of the high-modern state to use scientific knowledge to maximize returns from natural resources stimulated both the technical and ideological aspects of modern aquaculture.[26] Started in nineteenth-century France and then quickly exported to all corners of the globe, scientific aquaculture took on a significantly different form than previous aquaculture practices and began to alter the way people related to fish. Darin Kinsey argues "many places where the aquaculture revolution was exported, anglers became agents as influential as states."[27] Armed with aquaculture science and technology, anglers sponsored an anthropocentric

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24. Herminio R. Rabanal, *History of Aquaculture* (Manila: ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 1988), 1-2; T.V.R. Pillay and M.N. Kutty, *Aquaculture: Principles and Practices* (Iowa: Blackwell Publishing Professional, 2005), 7; David J. Clarke, "Fishing Methods and Technology, To Late 19th Century," in *Seas and Waterways of the World: An Encyclopedia of History, Uses, and Issues*, vol. 1, ed. John Zumerchick and Steven L. Danver (Santa Barbara: ABC-CLIO, 2010), 311, 333.
25. Eugene K. Balon, "Origin and Domestication of the Wild Carp, Cyprinus Carpio: From Roman Gourmets to the Swimming Flowers," *Aquaculture* 129, 1-4 (1995): 8-10; Richard C. Hoffman, "A Brief History of Aquatic Resource Use in Medieval Europe," *Helgoland Marine Research* 59, 1 (2004): 26.
26. James C. Scott, *Seeing Like A State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 1-52.
27. Kinsey, 532.

fisheries management regime and made significant contributions to the changes affecting aquatic environments throughout the world.[28]

In his *History of Aquaculture* commissioned by the United Nation's Food and Agriculture Organization, Herminio R. Rabanal notes that North America had a unique history with fish stocking closely tied to recreational pursuits.[29] The level to which aquaculture was popularized into North American angling ideologies is unprecedented and exists nowhere else in the world. Darin Kinsey dates the emergence of aquaculture science in Europe to approximately the 1840s.[30] John Reiger argues that by the mid-1870s, a fishing stocking "mania" had materialized in North America.[31] He adds, "[o]f all the conservation efforts related to wildlife, probably the most popular for sportsmen and nonsportsmen alike was fish culture."[32] In 1871, the United States had established the United States Fish Commission (USFC) and had begun to use fish stocking as a management tool.[33] In Canada, an official government agency dedicated to aquaculture—the Fish Culture Branch of the Federal Department of Fisheries—was established even earlier when Canada confederated in 1867. The first government-sponsored hatchery-reared fish was stocked in the same year in a tributary of Lake Ontario near Newcastle, Ontario by Samuel Wilmot, the superintendent of the Fish Culture Branch for the Federal Department of Fisheries from 1867-1895.[34] In both countries, aquaculture was regarded as a blanket solution to the depletion of fish resources. Daniel L. Bottom's study of aquaculture in U.S. notes "[f]ish culture transformed the anxiety of resource scarcity into an engineering opportunity of unlimited potential."[35]

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28. Fish, such as rainbow trout (*Oncorhynchus mykiss*), native to the west coast of North America, and brown trout (*Salmo trutta*), native to the British Isles and Western Europe, were imported to waters throughout Canada, the British Empire, and the United States for the purpose of improving, supplementing and creating recreational fisheries. H.R MacCrimmon and T.L. Marshall, "World Distribution of Brown Trout, Salvelinus Fontinalis," *Journal of the Fisheries Research Board Canada* 25, 12 (1968): 2527-2548; H.R. MacCrimmon and J.S. Campbell, "World Distribution of Brook Trout, Salvelinus Fontinalis," *Journal of the Fisheries Research Board Canada* 26, 7 (1969): 1699-1725; H.R. MacCrimmon, "World Distribution of Rainbow Trout (Salmo Gairdneri)," *Journal of the Fisheries Research Board Canada* 28, 5 (1971): 663-704.
29. Rabanal, 7.
30. Kinsey, 533.
31. Reiger, 54.
32. Ibid., 52.
33. Reiger, 53-54.
34. S.J. Kerr, *An Historical Review of Fish Culture, Stocking and Fish Transfers in Ontario, 1865-2004* (Peterborough: Fish and Wildlife Branch, Ontario Ministry of Natural Resources, 2006), 1-2; Knight, "Samuel Wilmot," 78.
35. Daniel L. Bottom, "To Till the Water—A History of Ideas in Fisheries Conservation," in *Pacific Salmon and Their Ecosystems*, ed. D.J. Stouder et al. (New York: Chapman and Hall, 1996), 571.

These sentiments were echoed by the nineteenth-century American angling author Thaddeus Norris. Norris is often heralded as one of the forefathers of the North American fishing tradition. In his 1874 book, *American Fish-Culture: Embracing All the Details of Artificial Breeding and Rearing of Trout, The Culture of Salmon, Shad and Other Fishes*, Norris explained the way in which North American anglers adopted this science, often without the consent of government, and how they intertwined fish stocking with a stewardship ethic that flourishes to this day. He observed,

> The effects of liberal and judicious government patronage have not only been spread over France, but its benefits have reached all parts of enlightened Europe; and our own country is now resorting to this new science to restock its exhausted rivers.[36]

A few pages later, Norris lamented the American government's slow adoption of aquaculture as a management tool, but he was optimistic about the fact that individuals had taken up the practice. "Although the state governments have been tardy in availing themselves of the benefit to be obtained from this new science, individual curiosity and enterprise have not been idle."[37] The idea that fished-out waterways can be restored to their once-bountiful state by stocking artificially-spawned hatchery-raised fish continues to be the main motivation in current stocking programs. Norris also expressed his disappointment with government's inaction and suggested that those who are truly concerned about fish stocks should take matters into their own hands. Norris's book was but one of several angling titles published on the subjects of angling and aquaculture during the second half of the nineteenth century.[38] Collectively, this body of literature educated the average angler on the ideological and practical aspects of fish stocking.

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36. Thaddeus Norris, *American Fish-Culture: Embracing All the Details of Artificial Breeding and Rearing of Trout, The Culture of Salmon, Shad and Other Fishes* (Philadelphia: Porter and Coates, 1874), 20.
37. Ibid., 24.
38. David Foster, *The Scientific Angler, Being a General and Instructive Work on Artistic Angling* (New York: Orange Judd Co., 1883); Theodatus Garlick, *A Treatise on the Artificial Propagation of Certain Kinds of Fish, with the Description and Habits of Such Kinds as Are the Most Suitable for Pisciculture* (Cleveland: T. Brown, 1857); Seth Green, *Home Fishing and Home Water: A Practical Treatise on Fish Culture* (New York: O. Judd Co., 1888); Frederic M. Halford, *The Dry-Fly Man's Handbook: A Complete Manual, Including The Fisherman's Entomology and The Make and Management of a Fishery* (Lanham: The Derrydale Press, 1913 [2000]); John Harrington Keene, "*The Boy's Own Guide to Fishing Tackle-Making and Fish-Breeding: Being a Plain, Precise and Practical Explanation of All that is Necessary to be Known by the Young Angler* (Boston: Lee and Shepard Publishers, 1894); Genio C. Scott, *Fishing in American Waters* (New York: Harper & Brothers Publishers, 1869); Livingston Stone, *Domesticated Trout: How to Breed and Grow Them* (Boston: James R. Osgood and Company, 1872); T. Westwood and T. Satchell, *Bibliotheca Piscatoria: A Catalogue of Books on Angling, The Fisheries and Fish-Culture, with Bibliographical Notes and an Appendix of Citations Touching on Angling and Fishing from old English Authors* (London: W. Satchell, 1883).

Ontario's anglers also embraced the Parisian aquaculture technique quickly, fueling their imaginations of providing infinite fish resources. William Knight quotes a letter published in *The Canadian Farmer* in 1864 that lamented the destruction of Upper Canada's inland fish stocks and wailed, "The subject of fish culture is one which is sadly neglected in Upper Canada."[39] The author's pen name, 'Isaac Walton,' gives up his angling sympathies and reinforces the role of the Waltonian discourse in the creation of angling identities in Ontario.[40] The imperial ideology of aquaculture established in France was captured by the collective desires of anglers and administrators dedicated to the idea of stocking for recreational gain. Present day CFWIP organizations such as the AFIA are adhering to a one hundred and fifty year-old tradition of stewardship that is linked directly to the colonial values of angling.

It did not take long for government policy in both the United States and Canada to reflect Norris's views on aquaculture and fish stocking. In his contribution to *Inland Fisheries Management in North America*, Larry A. Nielsen states,

> The idea that natural resources were crops to be planted, managed, and harvested would later evolve into the founding principle of wildlife management and would dominate the thinking of fisheries scientists for the first half of the twentieth century.[41]

However, in her study of Canadian fisheries science, Jennifer Hubbard argues that by the 1920s "standard Canadian fish-hatchery practices were largely abandoned."[42] Matthew D. Evenden's study of the Fraser River makes a similar argument. He notes that Canadian fisheries scientists moved away from aquaculture as a management tool after a study conducted by Dr. R.E. Foerster in the late 1920s and early 1930s. The study tested the viability of natural versus artificial spawning success in Pacific salmon and concluded that hatchery-raised fish provided no noticeable increase to salmon runs in Cultus Lake, B.C.[43] Evenden extends a central theme in the history of aquaculture in North America that Canadian fisheries scientists pulled away from aquaculture much

39. Isaac Walton, "Fish Culture," *The Canadian Farmer* 1, 16 (1864): 255, quoted in Knight, "Samuel Wilmot," 76.
40. Knight, "Samuel Wilmot," 76.
41. Larry A. Nielson, "History of Inland Fisheries Management in North America," in *Inland Fisheries Management in North America*, 2nd edition, ed. Christopher C. Kohler and Wayne A. Hubert (Maryland: American Fisheries Society, 1999), 15.
42. Jennifer Hubbard, *A Science on the Scales: The Rise of Canadian Atlantics Fisheries Biology, 1898-1939* (Toronto: University of Toronto Press, 2006), 158.
43. Evenden, 109-112.

sooner than their American counterparts. He argues "Whereas after 1935 Canada opted not to use hatcheries as a management tool… in the United States their importance only grew."[44] Joseph Taylor's article on the political economy of fisheries science also notes the importance of the Cultus Lake experiments in the eventual closure of all federal hatcheries in British Columbia, Canada by 1937.[45] The work of Hubbard, Evenden, and Taylor all suggest that Canadian fishery scientists and, subsequently, Canadian fisheries administrators, abandoned aquacultural pursuits by the late 1930s. While this is somewhat true, it is also misleading. These studies do not do a thorough job of contextualizing their findings to their geographical and ecological realities.

Efforts to stock salmon on Canada's coasts certainly ceased in the 1920s and 1930s as these authors claim. However, the stocking of other fish species in inland fresh water lakes and rivers continued, and actually increased, for decades. In Ontario, the federal government transferred the operation of fish hatcheries to the province in 1926.[46] I suggest this transfer had more to do with the jurisdictional battle over fishery regulations between the province and federal government than it did with the federal government's attitude toward stocking fish. Aquacultural endeavors in the provinces continued to be supported and encouraged by the Federal Department of Fisheries well after their withdrawal from the front lines of fish stocking. In 1946, almost two decades after Hubbard, Evenden, and Taylor claim the Canadian federal government had abandoned their aquaculture pursuits, the Department of Fisheries began producing and publishing *The Canadian Fish Culturist*, a publication "to serve as a medium through which information and comment regarding Canadian fish culture and studies bearing upon it may be made more generally available."[47] The first article in the publication outlined the successful introduction of whitefish and walleye to Redberry Lake, Saskatchewan.[48] The article boasted how, after fish were introduced in 1939, it only took five years before commercial and recreational fishermen were harvesting 40,000 to 60,000 pounds of whitefish per season.[49] An article written by J.A. Rodd, the Director of Fish Culture for the Federal Department of Fisheries from 1911-1947 and editor of the

44. Ibid., 112.
45. Joseph E. Taylor III, "The Political Economy of Fishery Science and the Road Not Taken," *Journal of the History of Biology* 31, 1 (1998): 50.
46. Kerr, 2.
47. "Announcement," *The Canadian Fish Culturist* 1, 1 (1946): 3.
48. D.S. Rawson, "Successful Introduction of Fish in a Large Saline Lake," *The Canadian Fish Culturist* 1, 1 (1946): 5.
49. Ibid., 8.

early editions of *The Canadian Fish Culturist*, further explains the complicated situation of aquaculture in Canada in the middle of the twentieth century. He wrote:

> For many years following its inception, the Canadian fish cultural service gave almost its whole attention to the propagation of the more important food fishes such as Atlantic salmon, whitefish, salmon, trout, pickerel, and Pacific salmon, but, with the more general use of the automobile and the construction of highways, waters that were previously remote have come within reach of a greatly increased number of anglers and the toll taken by them on the different species of game fish has increased to such an extent that the propagation of speckled, rainbow, cutthroat, and Kamloops trout has received more and more attention to meet popular demand and the more intensive angling.[50]

In his final sentence, Rodd clarifies that "[w]hile this article refers only to development in the federal service, most of the provinces also administer fish culture services which in some cases have been considerably expanded in recent years."[51] So, while the Canadian government abandoned its efforts to stock salmon in marine environments, it continued to support stocking of inland freshwater lakes into the 1950s and 1960s. At the same time, provinces, such as Ontario, established or expanded their own aquacultural capabilities. Even when fisheries scientists began to stray from the agrarian approach to fisheries management in the latter half of the twentieth century, anglers continued to embrace the ideology and practice of stocking fish for recreational harvest.

Ontario offers the best example of North America's dedication (or perhaps addiction) to aquaculture. The early efforts and achievements of Samuel Wilmot were well known throughout Canada and internationally.[52] His efforts focused mainly on rehabilitating the Great Lakes commercial fish stocks. However, during Wilmot's tenure, tensions over fish stocking materialized between federal interests devoted to increasing commercial stocks and provincial desires to stock game fish for anglers.[53] When the province eventually gained full jurisdiction over inland lakes in Ontario due to a Supreme Court decision in 1896, anglers and like-minded provincial administrators adopted the infrastructure and ideas about aquaculture that Wilmot established to implement fish stocking and transfer programs to suit anglers' interests.[54]

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50. J.A. Rodd, "Notes on Development of Fish Culture in Canada," *The Canadian Fish Culturist* 1, 2 (1947): 3.
51. Ibid., 7.
52. Taylor, 69-72, 250; George Colpits, *Game in the Garden: A Human History of Wildlife in Western Canada to 1940* (Vancouver: UBC Press, 2002), 126.
53. Knight, "Samuel Wilmot," 78-85.
54. Ibid., 75.

Stocking efforts in Ontario of all fish species (measured in number of total fish stocked) peaked in the 1940s with about one billion fish per year.[55] By the 1970s this number had dropped to approximately ten million fish per year, a level at which it has more or less remained to the present.[56] The decline in Ontario's number of total fish stocked in the 1970s reflected a general trend in fisheries science that viewed "maximizing yield of a single species" as leading to "greater instability and depletion of fish stocks."[57] In 1978, the OMNR developed a new ecosystem-based management directive, *Strategic Plan for Ontario Fisheries* (SPOF), which stressed the need to move away from maximum exploitation and for community participation in management efforts.[58] The CFWIP program, to which the AFIA subscribed, was established in 1982 to fulfill the community-oriented component of SPOF. Since 1982, the large majority of stocking efforts and of walleye stocking programs in particular, have been conducted by local initiatives under the CFWIP stewardship.[59] Mass government funded and operated stocking programs may have declined, but they were replaced with small, grass-root initiatives such as the AFIA's.

In his study of ecological politics in twentieth-century Canada, the United States, and Great Britain, Stephen Bocking describes the role of scientific institutions and government-hired scientists in the establishment of scientific-based environmental policy. Bocking argues "institutions of ecological research and their relation to the concerns of society are themselves influenced by the assumptions and priorities that define political discourse and action."[60] The Ontario Fisheries Research Laboratory (OFRL) established by the University of Toronto's biology department in 1920, conducted the vast majority of fisheries research in Ontario during the first half of the twentieth century.[61] Although OFRL scientists emphasized "the need for its independence from immediate practical requirements," provincial policy makers interpreted their research under the context of providing economical management of fish resources.[62] By the 1970s, provincially hired biologists and ecologists began

55. Kerr, *An Historical Review of Fish Culture*, 8.
56. Ibid., 8.
57. Stephen Bocking, "Fishing the Inland Seas: Great Lakes Fisheries Research Management and the Environmental Policy in Ontario," *Environmental History* 2, 1 (1997): 63.
58. Stephen Bocking, *Ecologists and Environmental Politics: A History of Contemporary Ecology* (New Haven: Yale University Press, 1997), 163.
59. Ibid., 148.
60. Bocking, *Ecologists and Environmental Politics*, 6.
61. Ibid., 153.
62. Ibid., 162.

conducting research that addressed specific management objectives.[63] The fact the OMNR encompassed both the scientific and political elements of fisheries policy development made its research more vulnerable to social and political influence and the possibility of reifications.

Until the 1970s, aquaculture practices were carried out in Ontario with little regard to environmental consequences. It was not until the 1940s that the provincial government began to assess the success of stocking programs and "formal" fish stocking guidelines did not emerge until 1982.[64] The idea that aquaculture could be used to engineer a bountiful aquatic nature overshadowed the fact that there was little, if any, evidence that their efforts were successful. Ontario scientists and policy makers were forced to play catch up in their attempt to understand and regulate fish stocking activities. Anglers' beliefs that their sport was scientifically based provided them with a further legitimacy in the environmental politics that they had already come to dominate.

Aquaculture and Lake Ahmic

Aquaculture and fish stocking have had a long-standing tradition on Lake Ahmic as far back as the 1920s.[65] The history of aquaculture on Lake Ahmic reveals the level to which the lake was scientifically controlled for recreational pursuits. It demonstrates, like so many other waterways across Canada, how scientific management attempted to engineer aquatic environments to maximize this recreational quarry. As the history of Lake Ahmic shows, after achieving moral and legal control over fish resources, the use of aquaculture and fish stocking as a management policy gave anglers the technical ability to reshape Ontario's aquatic environments for their own interests.

The Magnetawan River has its headwaters in Algonquin Park and originally flowed, unimpeded, into Georgian Bay. In the late nineteenth century, the river was used to transport logs for the important forest industry.[66] One of the major obstacles along the river was the large set of rapids between Lake Ahmic and Lake Cecebe. In 1886, a dam and locks were built between the two lakes to facilitate the river drives.[67] The dam and locks themselves may not have directly affected the migration of fish populations on Lake Ahmic. Lake Cecebe is approximately ten feet higher than Ahmic, making it unlikely, if not impossible, for Lake Ahmic

63. Bocking, *Ecologists and Environmental Politics*, 163.
64. Kerr, *An Historical Review of Fish Culture*, 8-9.
65. Walden, 41.
66. Ibid., 10.
67. Ibid., 10.

fish to migrate into Cecebe for spawning purposes. However, government biologist F.A. Walden's 1949 report outlined the impact of improper water level management on the lake's fish resources. He noted how "irregularity in the operation has resulted in serious damage to yellow pickerel [walleye] spawn in certain years."[68] Water levels often dropped suddenly during spawning periods and resulted in "a high loss of natural spawn."[69] Although there are other potential spawning grounds on Lake Ahmic, the pool below the locks was, and remains, the most significant.

Low water levels, therefore, had the potential to all but eliminate an entire yearly class of walleye recruits and completely alter the population dynamics of walleye stocks. The long-term consequences of these events on the overall health of Ahmic's walleye population are unknown. Although walleye had the potential to spawn naturally after the locks were created, a successful hatch depended on proper water level management. The importance of the spawning pool was further demonstrated when it was turned into a seasonal walleye spawning sanctuary in 1973.[70] During the 1970s, a habitat rehabilitation project was undertaken, and with the assistance of Ontario Junior Rangers, boulders were placed and arranged in the spawning pool in Magnetawan to improve the habitat for walleye spawning.[71] Further efforts, such as cleaning the rocks in the pool and the establishment of a seasonal fish sanctuary, have been carried out in the hope of improving spawning success.[72] The building of the dam and locks on Lake Ahmic were the first step in converting the *natural lake* into a *fully-managed aquarium*. Subsequent habitat rehabilitation efforts further entrenched this transformation. Stocked and introduced game fish, and culled coarse fish, further contributed to the construction of an "organic machine" oriented to the production of walleye and other game fish for recreational angling.[73]

The ecological balance of Lake Ahmic was altered significantly by a series of intended plantings of both native and non-native fish species. Non-native species included northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), and

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68. Walden, 11.
69. Ibid., 43.
70. M. Anne MacMillan, *The 1983 Summer Creel Census on Ahmic Lake, Neighick and Crawford Lakes* (OMNR Fisheries Files Report, Parry Sound District, 1985), 2.
71. K. Kujala, *Renovation of Magnetawan Village (Ahmic Lake) Pickerel Spawning Areas* (OMNR Fisheries Files Report, Parry Sound District, 1980), 2.
72. R. Mitchell Paus, *1983 Inland Lake Fishery Assessment Program: Tap and Fill Netting Results from Ahmic Lake, June 13—June 30* (OMNR Fisheries Files Report, Parry Sound District, 1980), 2.
73. Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1996).

various kinds of trout.[74] Although these species, with the exception of rainbow trout (*Oncorhynchus mykiss*), are all native to Ontario, they did not occur naturally in Lake Ahmic. The first recorded introduction of a new species took place in 1909 when a shipment of lake trout (*Salvelinus namaycush*) fry was being carried on the Magnetawan River with the intention of being planted in a lake downstream.[75] When the boat arrived at the locks at the village of Magnetawan, no one was there to receive the shipment, so it was dumped into Lake Ahmic.[76] In the years that followed this initial unauthorized planting, there was no indication that trout had taken hold on the lake.[77] However, further planting efforts, authorized by the ODLF, were made with the intention of creating a self-sustaining trout population. Between 1924 and 1930, 70,000 lake trout fry and 30,000 lake trout fingerlings were planted in Lake Ahmic.[78] Despite these efforts, lake trout did not develop a self-sustaining population. Walden concluded that it was "doubtful that they will ever reach a high state of development in the lake."[79]

Nonetheless, efforts continued to introduce trout to Lake Ahmic into the mid-1960s. Between 1959 and 1964, 9,000 rainbow trout yearlings were planted.[80] The effort to introduce trout, a highly-desirable game fish, demonstrated the influence of angling and tourism on the management efforts on the lake and the influence of the Waltonian discourse in management decisions. Furthermore, the repeated attempts to introduce trout, despite reports that there was little evidence to suggest their survival, demonstrates the reification of aquaculture and the level to which evidence could be ignored in order to fulfill the wishes of anglers, even when there was no proof of success. The underlying assumption guiding lake policy seemed to be that humans could produce the nature they desired, and if they failed, it was not because it was impossible, but because the science was not completely understood. The overall result turned lakes into controlled aquaria through the application of scientific aquaculture.

Although the introduction of trout did not have a lasting impact on Lake Ahmic, most likely due to the lack of suitable spawning habitat for trout, three other species foreign to Lake Ahmic were planted successfully. F.A. Walden's 1949 report had predicted the migration of pike from upstream and from connected lakes that had been stocked.[81] There had

74. MacMillan, 1.
75. Walden, 25.
76. Ibid., 25.
77. Ibid., 41.
78. Ibid., 41.
79. Ibid., 42.
80. Paus, 31.
81. Walden, 38.

been reports of pike in Lake Ahmic in the 1970s, but no official evidence of the species existed until the OMNR's 1983 creel survey.[82] More recently, largemouth bass were introduced to Lake Ahmic. In 1982, one hundred adult transplants were placed in Crawford Lake, a direct and unrestricted tributary of Lake Ahmic that is easily accessible by boat. In 2002, the OMNR reported Black Crappie in Lake Ahmic, although it is unclear how the fish was introduced or by whom.[83] Northern Pike, Largemouth Bass, and Black Crappie have all established self-sustaining spawning populations.[84] Their presence has added to the sport fishery on Lake Ahmic and anglers have quite frequently caught trophy specimens.[85] However, the introduction of foreign fish species altered the ecological community of Lake Ahmic and has added significant pressure on indigenous species. Walleye is considered to be the most threatened. The community and the OMNR have gradually accepted northern pike and largemouth bass as a natural part of Lake Ahmic; a sort of "honorary indigenous species."[86] The acceptance of these species demonstrates the "empty" or "plastic" nature of the term invasive.[87] When certain stocked species, those approved by anglers, establish naturally-reproducing populations, they cease to be referred to and thought of as introduced and invasive and are acknowledged as natural members in the lake's ecological community.

While several fish species were introduced to Lake Ahmic with the intention of improving the sport fishery, more substantial efforts were made to improve indigenous fish stocks for anglers. Smallmouth bass (*micropterus dolomieui*), a fish widely recognized for its recreational value, was stocked heavily in Lake Ahmic between 1921 and 1960. During this time, 12,850 smallmouth bass fingerlings and 109,000 fry were planted in Lake Ahmic.[88] Smallmouth bass are a particularly resilient and adaptive fish and it is difficult to determine whether their present-day abundance on Lake Ahmic is a result of the extensive stocking programs, natural reproduction, or both.

The efforts to plant all these other fish species, however, pale in comparison to walleye stocking programs on Lake Ahmic. Historically, the lake is known for its walleye fishery, which helps to explain the focus on walleye for culturing. Two periods of intense walleye stocking occurred on

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82. MacMillan, 1.
83. Kerr, *An Historical Review of Fish Culture*, 170.
84. MacMillan, 19.
85. Luigi J. Miceli, interviewed by Michael Del Vecchio, August 15, 2009.
86. Alders Halverson uses this term to describe the status of Rainbow Trout, and introduced species, in South Africa. Halverson, xvi.
87. Uwe Poerksen, *Plastic Words: The Tyranny of a Modular Language*, trans. Jutta Mason and David Cayley (University Park: Pennsylvania State University Press, 1995); Slobodkin, 1.
88. MacMillan, 1; Walden, 41-42; Paus, 30-31.

Lake Ahmic. The first, between 1921 and 1954, witnessed the planting of at least 8,000,000 walleye fry.[89] The second period of walleye stocking was conducted by AFIA between 1987 and 2006 and used an onsite homemade hatchery located in the basement of the dam in Magnetawan. During that time, over 50,000 walleye fingerlings were stocked, and at least another 2,500,000 fry.[90] At least 50,000 walleye fingerlings and well over 10,000,000 fry have been stocked in Lake Ahmic during the past century. The AFIA, once the officially-sanctioned stewards of Lake Ahmic, and the Ontario government before them, attempted to control walleye populations through the science and the technology of aquaculture in order to ensure a healthy fishery and fishing tourism industry.

Attempts have also been made to cull fish that are deemed undesirable for recreational purposes. Burbot (*Lota lota*), also known as Ling, Eelpout or freshwater Cod, were abundant in Walden's 1949 creel census.[91] The report also noted that efforts were made to reduce this species by netting them during their annual spawn.[92] The reason this species was targeted for culling efforts is not completely clear. Some reports suggested they were a "serious menace to game fish."[93] Ling also have a poor reputation among some anglers for being an 'ugly' fish with limited recreational value. Their potential to grow to a substantial size may explain the perception that they were a threat to game fish. Culling efforts seemed to be quite effective since only one specimen was found in the gill net catch surveys conducted in 1983 and 1987 and no specimens have been documented by the OMNR since.[94] The fate of the ling is representative of the larger management history of Lake Ahmic that has been geared solely towards maximizing the recreational fishery, sometimes at the expense of other, 'coarse' fish. Being considered both a coarse fish and a threat to game fish sealed the fate of ling on Lake Ahmic.

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89. Walden, 41-42; Paus, 31-32.
90. Eric McIntyre, *An Assessment of the Almaguin Fish Improvement Association's (AFIA) Community Fisheries Involvement Project (CFIP) Walleye Egg Collection, Culture, and Stocking of Ahmic Lake (Geographic Township of Croft), 1987-2003* (OMNR Fisheries Files Report, Parry Sound District, 2003), 15; Eric McIntyre, *Index Walleye Spawners and Walleye Culture Report for Ahmic Lake, Cecebe Lake and Poverty Bay on the Magnetawan River, 2005 CFIP Report* (OMNR Fisheries Files Report, Parry Sound District, 2005), 4; Eric McIntyre, *Index Walleye Spawners and Walleye Culture Report for Ahmic Lake, Cecebe Lake and Poverty Bay on the Magnetawan River*, *2006 CFIP Report* (OMNR Fisheries Files Report, Parry Sound District, 2006), 4.
91. Walden, 28.
92. Ibid., 28.
93. Ibid., 28.
94. Paus, 38; Linda Lissa Sober, *Trap Net Survey of the Ahmic Lake Fish Community Conducted June 30–July 2, 1987* (OMNR Fisheries Files Report, Parry Sound District, 1988), 5.

The accidental introduction of rainbow smelt (*Osmerus mordax*) has arguably had the greatest ecological impact on the lake. It is unclear exactly when or how smelt were introduced but the species was first recorded by the OMNR in the spring of 1978.[95] It is most likely that thoughtless and careless anglers introduced them by dumping unused bait into the lake. Smelt are an adaptive species that took hold and quickly flourished in Lake Ahmic. Normally reaching about six to eight inches in length and valued purely as a food source, smelt are commonly harvested by individual or small groups of fishers using hand-held nets. Overgrown smelt, up to a foot long, twice as large as they normally grow, have been reported by a local angler and guide who claims to have caught one using a rod and reel.[96]

Unlike ling, which was culled because it was undesirable, smelt pose serious ecological problems for Lake Ahmic, particularly for the walleye population. Smelt feed on walleye spawn and have a very serious impact on walleye reproduction.[97] In response to this threat, significant culling operations were put into place in 1987 and 1988. Almost 4,000,000 smelt were caught and removed from Lake Ahmic.[98] These attempts to remove smelt from Lake Ahmic reinforce the argument that only fish with a significant recreational value are wanted. Because they are harvested with a net instead of a rod and reel, smelt are not ranked very high on the angler's fish hierarchy and it is doubtful that they will ever achieve the pike's status on Lake Ahmic as an honorary indigenous species. The focus on recreational species of fish created a binary categorization on the lake—natural resource (walleye) or nuisance (smelt). The reification of Walton's values of coarse and game fish into Ontario's fisheries management policy was made quite clear by the fish that were introduced, stocked, and culled from Lake Ahmic.

Changes to Ontario's aquatic environment occurred long before the existence of modern fisheries management, as the building of the dam and locks at the Magnetawan rapids in 1880s illustrated. However, fisheries management programs controlled and manipulated the nature of Lake Ahmic to serve narrow human interests. The unsuccessful attempt of scientific fisheries management to create an angler's aquatic Garden of Eden has irreversibly changed the ecological balance of Lake Ahmic. Lake's Ahmic history could be interpreted, as are many environmental

95. MacMillan, ii.
96. Smelt are usually harvested during spring spawning runs. Catching smelt with a rod and reel is extremely rare. Luigi J. Miceli, interviewed by Michael Del Vecchio, August 15, 2009.
97. Sober, 1.
98. Ibid., 1.

histories, as a study where 'culture' conquered and imposed itself onto 'nature.' While this is useful to a point, it is also necessary to recognize Lake Ahmic as an autonomous agent that played an active role in shaping the current state of the lake's ecological community. The failure of trout stocking and the proliferation of smelt demonstrate that Lake Ahmic has some ability to resist culturally-constructed blueprints for it. Lake Ahmic is no longer completely natural, neither is it completely dominated by culture. Rather, it has evolved into a hybrid of both entities—a "natureculture."[99] The OMNR and the AFIA still have different understandings of the roles humans and science play in the construction of Lake Ahmic's natureculture.

The Reification of Aquaculture

The current fishing quality of many Ontario inland lakes and rivers is a pale reflection of what they once were and Lake Ahmic is but one example. The impact of habitat destruction, invasive species, pollution, and overfishing are usually pointed to as the main culprits in the decline of freshwater fisheries. While all these factors have had an impact on Lake Ahmic, fisheries management also played a significant role in the decline of recreational fishing and the changes in the lake from its natural state. Like Dean Bavington's thesis in his work, *Managed Annihilation: The Unnatural History of the Newfoundland Cod Collapse*, the environmental history of Lake Ahmic demonstrates yet another "example of management creating the very thing that it was designed to prevent."[100]

Yet, it is clear that Lake Ahmic and other Ontario inland lakes are far from dead. While game fish populations have been in steady decline for a century, world-class angling opportunities continue to attract over half a millions anglers annually from across the globe to Ontario.[101] Lake Ahmic is actually full of fish and provides skilled anglers with the unique opportunity to fish for walleye, small and largemouth bass, pike, and panfish within three hundred kilometers of Toronto. Still, as with other lakes, the quality of recreational fishing on Lake Ahmic, in particular the walleye fishing, cannot compare with what it once was. Local and non-resident anglers who want a sensational walleye fishing experience must travel further north in the province; indeed, many do. When interviewed in the summer of 2009, a local angler claimed he had not caught a

99. Donna Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness* (Chicago: Prickly Paradigm Press, 2003).
100. Dean Bavington, *Managed Annihilation: The Unnatural History of the Newfoundland Cod Collapse* (Vancouver: UBC Press, 2010), 2.
101. DFO, *Survey of Recreational Fishing*, 2007.

walleye in six years in the Magnetawan region. He added, "If the fishing was better in our local lakes here, I wouldn't travel all the way up to Lake Temiskaming in June to go fishing."[102]

The AFIA's resistance to the OMNR's decision to cancel its fish stocking activities on Lake Ahmic can be understood in part through the centuries-old Waltonian-based hierarchy of game fish in Ontario. Walleye, for the community of Magnetawan, is at the top of the fish hierarchy. It is the fish that historically built Magnetawan as a fishing tourism town. Fish such as bass, crappie, panfish, and smelt are in abundance on Lake Ahmic. However, they have a lower status and, subsequently, have less value. Full of low to medium value fish species, the current condition of Lake Ahmic is not what the AFIA considers a healthy fishery.[103] The community equates a healthy walleye fishery with angling success measured by fish caught and eaten.[104] Although OMNR netting surveys have (arguably) demonstrated a healthy and natural spawning population, harvestable year classes are in extremely low numbers. According to OMNR biologists, because of the high level of competition on Lake Ahmic, particularly from smelt, it is very difficult for young walleye, and other fish species, to grow to adult spawning age, thereby explaining the small number of fish in harvestable year classes.[105] However, the sheer abundance of smelt on Lake Ahmic also provides a seemingly infinite forage base for mature walleye and adults of other game species. If game fish survive their early years, they quickly rise to the top of the food chain and prosper. The walleye netted by the AFIA year after year during their stocking efforts were absolutely huge by most standards—certainly 'trophy' status. However, an abundance of trophy fish caught in trap nets does not necessarily translate into trophy fish on the end of the angler's line. Complicating the matter even further are the OMNR's legal size restrictions for harvesting walleye on Lake Ahmic and their recommendations for the healthy consumption of Ontario's fish. As of July, 2010, an angler who holds a full (sport) fishing license is allowed a daily limit of four walleye, only one of which may exceed 46 cm (18.1 inches).[106] The Ministry released a guide to eating

102. Ron Winger, interviewed by Michael Del Vecchio, July 20, 2009.
103. Ken Turner, interviewed by Michael Del Vecchio, July 20, 2009; Joe Bernas, interviewed by Michael Del Vecchio, July 28, 2009; George Brooks, interviewed by Michael Del Vecchio, July 28, 2009.
104. Ken Turner, interviewed by Michael Del Vecchio, July 20, 2009; Joe Bernas, interviewed by Michael Del Vecchio, July 28, 2009; George Brooks, interviewed by Michael Del Vecchio, July 28, 2009; Robert Rainy, interviewed by Michael Del Vecchio, August 15, 2009.
105. MacMillan, 8.
106. Ontario Ministry of Natural Resources, *District 15 Fishing Regulations, 2010*, http://www.mnr.gov.on.ca.

fish in Ontario that suggests large fish, of any species, should not be consumed due to mercury accumulation in their adipose tissue.[107] The introduction of smelt have also significantly altered the foraging habits of walleye meaning anglers are no longer able to catch walleye in the same way or in the same place they used to. Because smelt are a deep-schooling fish, downriggers—a set up that allows the angler to target greater depths—has become one of the most effective ways of catching walleye on the lake. This is an angling tactic most often reserved for fishing large, deep bodies of water such as the Great Lakes. So, while skilled and patient anglers with the right equipment may catch trophy walleye, it is much more difficult to catch legally-harvestable fish that are safe to eat using simpler, less expensive fishing technologies. It is this dilemma that has motivated, and continues to motivate, the AFIA in its desire to stock Lake Ahmic with walleye fry. The OMNR's stocking guidelines also state, "Ultimately, the success of any stocking program should be evaluated in terms of its contribution to the angler."[108] Evaluating these benefits has proven to be a challenging and complicated task.

The difficultly in assessing walleye populations on Lake Ahmic has added to the AFIA's frustrations. A 2004 OMNR report, *Strategies for Managing Walleye in Ontario*, states:

> In spite of the large number of water bodies that have been stocked [with walleye] over the years, quantitative assessment of the survival and contribution of stocked fish has been limited. More assessment of stocked walleye is required to determine the most appropriate life stage for stocking under various conditions as well as to *quantify* returns to the angler.[109] (emphasis added)

A 2003 appraisal of the AFIA's activities noted "evaluating the contribution of the AFIA stocking program to the health of this [walleye] spawning population […] is made particularly difficult by virtue of the fact that walleye planted by the AFIA are indistinguishable from those naturally produced."[110] The report argued "natural recruitment and good year–class strength when stocking did not occur were persuasive indicators that this healthy walleye spawning population is maintaining itself on a natural, self-sustaining basis."[111] The difficulty in assessing stocking success on Lake Ahmic reflects a larger difficulty with measuring the success of walleye stocking in Ontario as a whole. The Ministry's decision to cancel

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107. Ontario Ministry of Natural Resource, *Guide to Eating Ontario Sport Fish, 2009-2010*, http://www.ene.gov.on.ca.
108. Ontario Ministry of Natural Resource, *Guidelines for Stocking Fish in Inland Water of Ontario* (Peterborough: Fisheries Section, Fish and Wildlife Branch, Ministry of Natural Resource, 2002), 5.
109. Kerr, *Strategies for Managing Walleye in Ontario*, 14.
110. McIntyre, *An Assessment of the Almaguin Fish Improvement, 1987-2003*, 3.
111. Ibid., 1.

the AFIA's program was not based on firm and irrefutable scientific evidence. It has become the responsibility of the AFIA to assume the burden of proof and demonstrate that their stocking program *is* effective. More importantly, the decision to cancel the stocking program did not take into account any social or economic considerations, despite the fact that the Ministry's *Strategic Plan for Ontario Fisheries II* (SPOFII) repeatedly emphasizes the need for social and cultural elements to be included in fisheries management decisions.[112] Ironically, one of SPOFII's three central objectives is "to improve cultural, social, and economic benefits from Ontario's fisheries resources."[113]

The AFIA has become about much more than walleye and the people who benefit from its former programs are not just anglers. Beyond the obvious benefits that Magnetawan's tourist industry would gain from an improved recreational fishery, the AFIA's stocking adds a unique marketing and sales dynamic.[114] The educational program that coincided with the AFIA's stocking efforts provided unique and culturally significant learning opportunities that fulfill both Ontario's curriculum and the OMNR's educational expectations.[115] Members of the AFIA took fertilized eggs into the local school to let the students watch them grow to the fry state when they were released back into Lake Ahmic by the students. A retired teacher from the Magnetawan Central Public School and the school's principal both commented on the benefits to their students about learning the life cycle of walleye. It was something that related directly to their immediate environment.[116] The educational value was also extended to the general community, thereby increasing awareness and interest in aquatic conservation.[117] It would appear that these factors, impossible to measure quantitatively, were overlooked in the Ministry's decision to shut down the AFIA's hatchery program.

The AFIA's agrarian-based stewardship approach to fisheries management, once supported by the province, now conflicts with the fisheries science and policy produced by the OMNR. Backed by recent scientific

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112. Ontario Ministry of Natural Resources, *Strategic Plan for Ontario Fisheries—SPOF II—An Aquatic Ecosystem Approach to Managing Fisheries* (Toronto: Fisheries Section, Fish and Wildlife Branch, Ministry of Natural Resources, 1992), 6, 11, 15-17.
113. Ibid., 11.
114. Ken Turner, interviewed by Michael Del Vecchio, July 20, 2009; Robert Rainy, interviewed by Michael Del Vecchio, August 15, 2009.
115. Ontario Ministry of Education and Training, *The Ontario Curriculum Grades 1-8: Science and Technology* (Toronto: Ontario Ministry of Education and Training, 1999), 14-30; Ontario Ministry of Education and Training, *The Ontario Curriculum: Social Studies Grades 1 to 6 and History and Geography Grades 7 and 8* (Toronto: Ontario Ministry of Education and Training, 2004), 20-33; Ontario Ministry of Natural Resources, *SPOF II*, 15.
116. Betty Bernas, interviewed by Michael Del Vecchio, August 13, 2009; Don Campbell, interviewed by Michael Del Vecchio, August 13, 2009.
117. Ken Turner, interviewed by Michael Del Vecchio, July 20, 2009.

developments, the OMNR's official policy on fish stocking states "[s]tocking should not be considered to supplement a population where conditions exist for *natural* reproduction capable of maintaining the desired fish population (emphasis added)."[118] Stocking was stopped on Lake Ahmic based on these ministry guidelines. The OMNR's desire to manage for natural processes reflects the emphasis on ecosystem-based management directives in the formation of policy. In his book, *Nature's Experts*, Stephen Bocking explains the dominant role of science and scientists in articulating the natural world based on the ecosystem framework. He argues,

> "Ecosystem" originated as a strictly scientific concept, and it has ever since implied a dominant role for scientists in both understanding nature and determining appropriate conduct […] If only scientists are able to understand how ecosystems work, and only scientists can evaluate whether the goals of the management are being reached, they must have a dominant role in the resource decisions. *Other people may be included in the process, but as objects to be studied, managed, and, occasionally, consulted, not as decisions-makers* (emphasis added).[119]

Science is the ultimate, and in many cases, the only authority within ecosystem-based management regimes. While ecosystem management recognizes environmental complexity, it often achieves this goal by placing restrictions on people, forcing them to redefine their relationships with the natural world. This is exactly what the OMNR is asking the AFIA to do. To date, they have had little success.

Conclusion: Finding a Balance

The conflict between the AFIA and the OMNR illustrates the tensions between social and ecological aspirations in Ontario's fisheries management. The OMNR's policy documents that have been released in the last two decades have all stressed the important and effective role that local communities play in the stewardship of natural resources.[120] According to these documents, the AFIA was an exemplary stewardship group. Its contributions to the community extended far past the shores of Lake Ahmic. The AFIA extended its influence and role into the local

118. Ontario Ministry of Natural Resource, *Guidelines for Stocking Fish…*
119. Stephen Bocking, *Nature's Experts: Science, Politics, and the Environment* (New Jersey: Rutgers University Press, 2004), 98.
120. Eric McIntyre, *2002 Annual C.F.I.P. Report For the Almaguin Fish Improvement Association: Index Walleye Spawners and Egg Culture Program, Magnetawan River (Ahmic Lake, Cecebe Lake, and Poverty Bay)* (Ontario Ministry of Natural Resources, Fisheries Files Report, Parry Sound District, 2002), 6; Ontario Ministry of Natural Resources, *SPOF II*, 6; Ontario Ministry of Natural Resources, *Our Sustainable Future: Strategic Directions* (Ministry of Natural Resources, 2005), 7; Ontario Ministry of Natural Resource, *Meeting the Renewal Challenge* (Field Services Divisions, 2006), 13.

educational community. New scientific developments and views regarding the implementation of fish stocking have trumped these factors. The social benefits of the AFIA and its work have been relegated to a secondary position by a scientifically constructed definition of Lake Ahmic walleye populations. The cancellation of the AFIA's aquaculture program has distressed, disheartened, and disenfranchised members of the Magnetawan community. For almost a century, the scientific and social definitions of Lake Ahmic, as demonstrated by aquaculture, were in alignment. Today, they are not. The OMNR continues to use science as an authority to sanction their decisions about fish in the lake and there is little chance that the AFIA will ever agree with it. The local belief that stocking is the answer to Lake Ahmic's walleye fishing woes has an extended history influenced by reified concepts, specifically, the distinction between coarse and game fish and an agrarian based stewardship mentality. The conflict between the AFIA and the OMNR is rooted in this history.

It is difficult to determine whether the OMNR's new directives are driven solely by science, or also by political, economic and newer ecological pressures. Funding cutbacks and the need to look "green" by presenting less intrusive environmental policy has influenced management directives and, subsequently, the direction and use of science. The fact that some of the government's previous policies may have changed the piscatorial composition of Lake Ahmic seems irrelevant to today's OMNR. The Magnetawan community is fighting a rear-guard action for what it believes has served it well in the past. The widespread adherence to aquaculture in Ontario, developed and practiced for the past century and a half, has been imprinted on the angling and conservation ethic in the province. Aquaculture was accepted and promoted because it satisfied the economic, social and political needs of both the local communities and the broader provincial mandate. Today the provincial outlook has changed and the reluctance of the AFIA to accept the new policies illustrates the power that reified scientific theories have in shaping the lives of both fish and people in Ontario.

So what, if anything, can be done to find solutions to the stocking question in Magnetawan? To start, both sides need to make concessions. The AFIA needs to realize that a healthy walleye population involves more than just dumping a few hundred thousand fry into the lake every year. The AFIA, and their relationship with the OMNR, would benefit from an attempt to diversify the activities of their organization. The OMNR needs to be more able and open in accounting for the social benefits of their environmental programs. Or perhaps better put, the OMNR needs to appreciate the potential harm that comes from making management decisions that disrupt the social realities of people in local communities.

Scientific knowledge, such as annual samples of year-class strength that comes from annual stocking, is also now lost due to the cancelation of the stocking program. This data is useful for monitoring purposes. Operating the hatchery and stocking fry at a reduced level would minimize any possible negative ecological effects of the stocking program and ensure goodwill between the OMNR, the AFIA, and the greater Magnetawan community. It would allow the social programs and benefits conducted by the community to continue to teach and increase awareness about conservation initiatives. The information obtained during the yearly collection of eggs necessary for operating a hatchery, is invaluable for monitoring of the walleye population. Perhaps most importantly, the burden of proof paradigm needs to be abandoned by both parties. Doing so would be a first step towards creating a renewed dialogue between the AFIA and the OMNR. Any renewed dialogue needs to focus on the general ecological health of Lake Ahmic as well as the economic viability of the local community. Unilateral and sweeping policies that stand in direct opposition to previous directives without the input of a formerly involved and active local community is a recipe for failure.