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ESSAY

Can You Fish in a Pandemic? An Overview of Recreational Fishing Management Policies in North America During the COVID-19 Crisis

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Facing challenges of the COVID-19 pandemic, government agencies had to quickly react and provide guidelines for outdoor activities such as recreational fishing. Here we review information provided by provincial and state natural resource management agencies in North America during the March–April 2020 period to collate freshwater fishing regulations implemented during the pandemic. Among the 63 jurisdictions for which information was collected, 92% of jurisdictions kept the recreational fishing season open, asking anglers to practice social distancing at all times. Although recreational fishing was open in most jurisdictions, specific measures for anglers and for the fishing industry (e.g., fishing guides) were enforced to comply with public health rules. Some management agencies altered stocking practices, restricted fishing by non-residents, withdrew permits for competitive angling events, and instituted restrictions on the charter and guide industry. This overview of fishing regulations in North America in the context of a major pandemic provides fisheries managers a portrait of some measures taken by other jurisdictions.

INTRODUCTION

Approximately 10% of the world's population engages regularly in recreational fishing, providing important social and economic benefits to society (Cooke and Cowx 2004; Arlinghaus et al. 2019). Recreational angling is particularly popular in North America. Annually, anglers contribute to local economies for a total of Can$7.9 billion in Canada (DFO 2019) and over US$120 billion in the United States (Hickley and Tompkins 1998; NOAA 2018). Although recreational fishing is foremost a leisure activity, the harvest of fish for personal consumption by recreational anglers can contribute to human nutrition by providing an accessible and affordable food source (Cooke et al. 2017). Beyond nutritional benefits, recreational fisheries provide a range of psychological, social, and educational benefits to anglers (McManus et al. 2011; FAO 2012; Arlinghaus et al. 2019).

In 2020, the COVID-19 outbreak in North America forced governments to rapidly implement public health measures to minimize virus transmission (Bedford et al. 2020; Velavan and Meyer 2020). In many jurisdictions, the implementation of these measures coincided with the spring opening of the 2020 recreational fishing period, when under normal circumstances, angling would be a common activity. In the face of the pandemic, fisheries managers and policymakers had to rapidly evaluate whether their guidelines and practices for recreational fishing activities (e.g. licensing, stocking, events, etc.) had to be adjusted based on guidance from public health officials. Measures taken for the 2020 recreational fishing season may have far reaching consequences, as this activity is important for overall food security and personal nutrition, the economy and the fishing industry, as well as overall wellbeing (Tufts et al. 2015). However, no literature or experiences from recent history existed, and only general guidelines from public health authorities were available to guide stakeholders through their decision process.

The main objective of this study was to review North American policies regarding the opening or the closure of the 2020 recreational fishing season during the March–April period in response to the COVID-19 pandemic. A secondary objective was to present a general overview of other common policies and practices implemented during this period by provincial and state agencies regarding fisheries management. As a result of global travel, growing human population, and increased contact with animals (and thus zoonoses), similar crisis may occur more frequently (Gates 2020). It is hoped that by providing some historical context, this review will assist fisheries managers in addressing future pandemics or even future waves of COVID-19 (Xu and Li 2020).

METHODS

Between March 16 and April 30, 2020, we assembled guidelines regarding the 2020 recreational fishing season for 63 jurisdictions across Canada and the United States with a focus on inland waters. The beginning of the search period corresponds to the rise of the pandemic in North America (https://www.worldometers.info/coronavirus) and to the

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Table 1. Example of measures implemented by jurisdictions in North America to reduce public health risks associated with recreational fishing.

Types of actions	Measures	Example of provinces/states that implemented this measure
Actions taken to maintain or encourage recreational fishing	Temporary waiving of fishing license requirement	Arkansas, Maine, Missouri
	Opening of the fishing season anticipated	Connecticut, Delaware (trout fishing)
	Fishing encouraged with social distancing and precautions	Arkansas, Kentucky, Maine, Michigan, Missouri, Nebraska, New York, Tennessee, Vermont
Actions that adversely impacted recreational fishing	Closure of National parks and Provincial/ State parks	Alberta, British Columbia, New Brunswick, Québec, Illinois, Mississippi
	Opening of the fishing season delayed or temporary closing of the fishing season	New Brunswick, Nova Scotia, Prince Edward Island, Washington
	Prohibition of fishing or temporarily suspension of licenses sales for non-residents	California, Idaho, Oregon, Yukon
	Discouraging long-distance fishing trips and fishing trips with overnight stays	Alaska, Newfoundland and Labrador, Ohio
	Reduction of stocking and/or stocking sites undisclosed	Kentucky, Maryland, Québec, Virginia, West Virginia
	Prohibition of charters and guide	Alaska, Michigan, New Jersey, Pennsylvania
	Cancellation of fishing tournaments	Indiana, Michigan, New Hampshire, Pennsylvania, Vermont, West Virginia, North Carolina
	Minimum distance between boats	Florida, Hawaii
	Closure of certain lakes or rivers	Louisiana, Oregon, South Carolina

beginning of the 2020 recreational fishing seasons for several jurisdictions. Since the end of social confinement in North America started in June 2020, with substantial differences in policy approach among jurisdictions (López and Rodó, 2020), the 6-week search period should have allowed sufficient time for jurisdictions to disseminate information about recreational fisheries management without having entered the stage of full reopening.

Most of the information was retrieved from official websites, and in certain cases, official Facebook pages were also visited for the most up-to-date information. Websites and social media data collection for this review was performed by the same person (S. Bernatchez). To retrieve the information, a Google search was used combining the name of the jurisdiction [state/province/territory] followed by three key words: "angling" "fishing," and "covid-19." Only information sources that came from official governmental websites and fish and wildlife agencies was used, with the exception of four states where information from media coverage was also retrieved (see Supplemental material). When the Google search highlighted a Facebook publication the source of the publication was verified and added if it came from an official authority. Multiple sources were used for most of the jurisdiction to allow a cross validation of the information (see Supplemental material). Information was also provided through personal communications by the Midwest Association of Fish and Wildlife Agencies, who did a regular follow up with other fish and wildlife managers to collate the COVID-19 responses, mainly focusing on the Midwest states regarding fish, wildlife, and parks management policies. Since information was retrieved from fish and wildlife agency websites, specific COVID-19 responses related to the opening or the closure of the recreational fisheries during the search period were generally clearly highlighted in the front page of their respective websites. Responses of the jurisdiction were compiled in an Excel file and dates at which measures regarding recreational fishing activities were published by the authorities on official websites and/or Facebook pages were noted (i.e. notices to anglers were generally dated). Most sources were consulted on multiple dates during the search period. For a given internet source, a search for information was considered completed when information has been seen on official websites and or Facebook pages or if any specific information was retrieved after a 5-minute search period. Responses were then grouped in the category presented in Table 1. Over 65 information sources were used for this review (see supplementary material for sources by jurisdiction). We acknowledge that recreational fishing information and guidelines may have changed since the search period as fisheries management organizations were constantly adjusting to the COVID-19 pandemic. Thus, results of this review should be considered as a snapshot of guidelines for the March–April 2020 period.

Since information provided on websites may have been partial and potentially incomplete regarding restrictions other than fishing closure, we chose not to give any statistics on the proportion of jurisdictions who applied a given restriction, but rather to give examples where such restrictions were applied.

RESULTS AND DISCUSSION

Overall, 92% of jurisdictions did not close or delay the 2020 recreational fishing season (Figure 1) and some chose to encourage recreational fishing during the pandemic (Table 1). In some jurisdictions, like British Columbia and Texas, fishing was even listed as an essential activity, as long as it could be performed while adhering to public health guidelines. States such as Connecticut and Delaware (trout fishing) chose to open the fishing season earlier to diffuse fishing effort. Jurisdictions such as Arkansas, Maine, and Missouri chose to temporarily suspend the requirement to possess a fishing license to provide individuals with access to a "safe" (when conducted alone or when socially distanced) outdoor activity. In almost all jurisdictions where recreational fishing remained

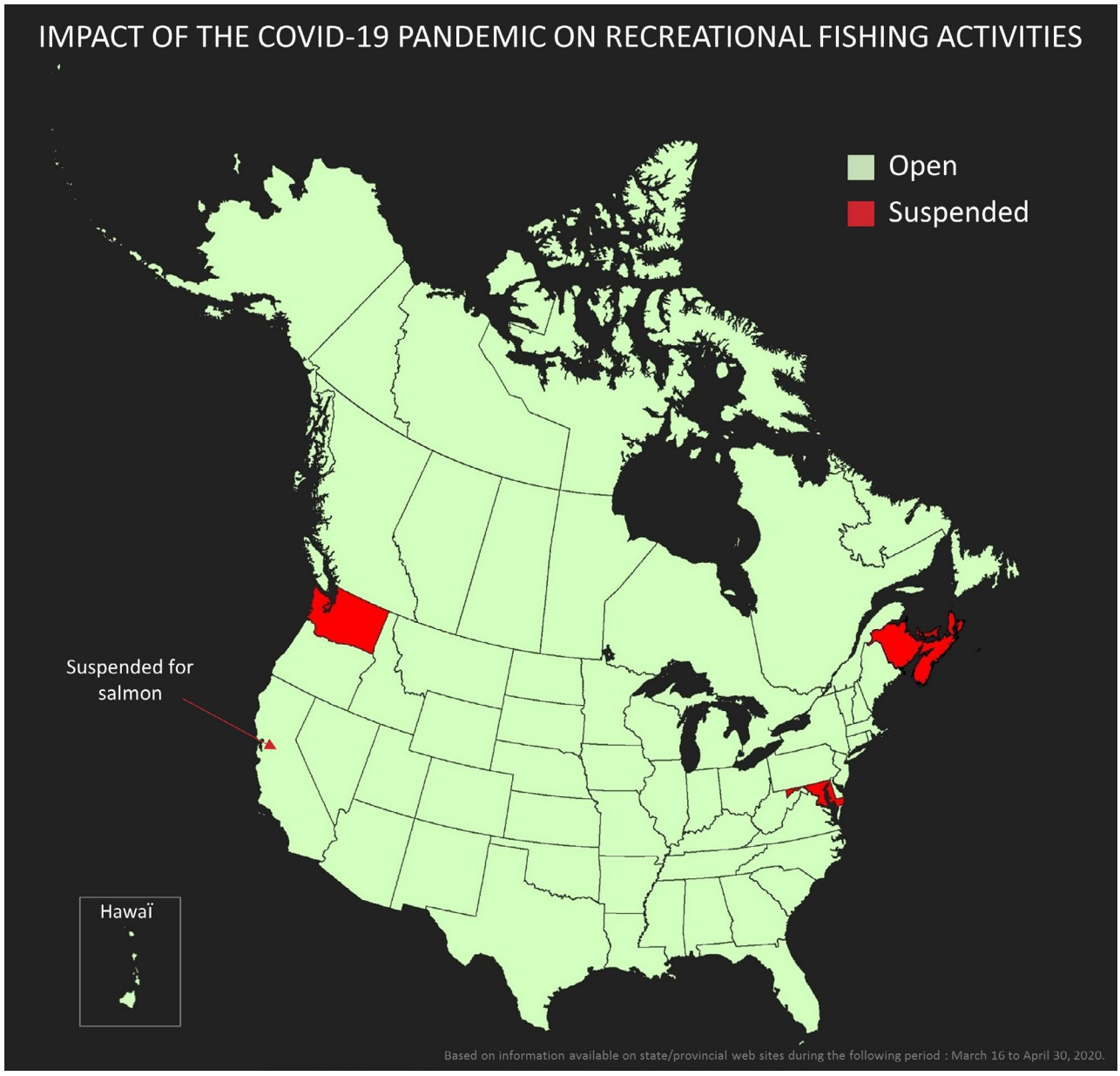

Figure 1. Overview of recreational fishing closures in 63 North American jurisdictions during the March-April 2020 period.

open, safety measures were implemented to prevent anglers from gathering and sanitary measures (e.g., use of gloves and masks, frequent hand washing) were strongly recommended, in order to minimize virus transmission.

Conversely, in some jurisdictions, recreational fishing was adversely impacted by travel restrictions and/or social distancing measures (Table 1). For instance, in addition to fishing in their locality, anglers also cross state/provincial/national lines to go fishing (Ditton et al. 2002). Thus, the closure of the Canada–USA border to non-essential travel on March 21, 2020 (which is still in effect at the time of writing) limited fishing opportunities for tourists. Moreover, to minimize the spread of the coronavirus, certain jurisdictions such as Alaska, Newfoundland and Labrador, and Ohio discouraged long-distance fishing trips and fishing trips with overnight stays. Jurisdictions such as California and Yukon closed fishing to non-resident anglers, and others, such as Delaware, Kentucky, and Vermont required travellers to self-quarantine for 14 days before engaging in non-essential activities such as recreational fishing. In terms of territory access, national and state/provincial parks were closed in some jurisdictions, along with potentially problematic fishing sites (e.g. small lakes, high-traffic areas). Competitive angling events were also cancelled (i.e., permits were revoked by management agencies) in some jurisdictions such as Indiana, Michigan, and New Hampshire, as they inevitably constituted travel and gathering opportunities (Table 1). A measure taken by jurisdictions such as Kentucky, Maryland, and Virginia to discourage gatherings was to reduce fish stocking or to keep stocking sites undisclosed (Table 1). The social distancing mandate of 2 m (6 feet) also restricted the guide and charter industry in states such as Alaska, Michigan, and New Jersey (Table 1).

Despite the fact that restrictions are likely to have major impacts on the recreational fishing industry that depends on tourists, it is also possible that recreational fishing increased

in popularity due to many factors such as state and provincial lock down, unemployment, the need for outdoor activities, etc. It is however too soon to fully evaluate the economic impacts of the pandemic on the different sectors of the recreational fishing industry. Although our review focused on the regulatory response, it is noteworthy that industry associations such as the Canadian Sportfishing Industry Association (via their Keep Canada Fishing program) and the American Sportfishing Association developed and shared resources (https://asafishing.org/covid-19/) including codes of conduct on how to fish responsibly during the pandemic (available: https://bit.ly/2HfC8YM). Industry associations were also active in advocating for the sector and the role of recreational fishing in supporting wellbeing (e.g., https://bit.ly/3kjgtgA).

This review of recreational fisheries policies collates information gathered during the March–April 2020 period, a crucial period in terms of responses to the pandemic and a time window corresponding to the opening of the recreational fishing season in many jurisdictions. Considering the rapid evolution of the pandemic, regulations established in each jurisdiction may have changed since this period. In fact, most of jurisdictions that chose to suspend the opening of the recreational fishing season opened it later. Considering that fisheries managers and stakeholders had to react quickly to the pandemic, management decisions were taken with the best available information with regards to geographical context and regional realities. At times, these decisions led to conflict within the recreational fishing sector. For instance, anglers in Ontario launched a petition urging the provincial government to shut down the recreational fisheries due to inherent risk of gathering and travelling, while others praised the benefits of this activity for mental health (https://bit.ly/2IGiq8W). Conflicts were also observed between anglers and regulators. For example, the angling community organized a protest against the fishing ban in the state of Washington (https://bit.ly/2HgTUel). Indeed, the angling community has been confused at times regarding what is both legal and safe, with uncertainty likely exacerbated by different responses by various levels of government and by temporal changes in responses. Moreover, bottom-up actions within the angling community also presumably played a role in achieving balance between public health and access to recreational fishing. Indeed, it is well known that voluntary behaviors of anglers can achieve the same effect as top-down regulations when it comes to recreational fisheries management (Cooke et al. 2013).

This article does not aim to criticize any management decisions. It rather provides an overview of the various measures taken in the face of a pandemic, and should help and inspire fisheries managers and stakeholders when facing the need to rapidly adjust recreational fishing guidelines in the context of public health crisis. It is important to note that the purpose of this review was not to report the complete list of measures put in place by every jurisdiction. Since the information was gathered mostly from fish and wildlife management agency recreational fishing websites, blanket restrictions that would have applied more broadly, not just to the recreational fishing sector, may have been omitted. It is also noteworthy that although we focused on state/provincial level fisheries management responses, other activities at a more local level (e.g., municipalities closing boat ramps or parking lots) or federal level (e.g., the border closure) also have the potential to influence recreational fishing activities. There is much opportunity for regulators to reflect and share their perceived success and failures to learn from this unanticipated event. However, there is also need for human dimensions research to understand the economic consequences of the COVID-19 crisis for the recreational fishing sector, as well as understanding the effects of different management responses on angler wellbeing. Moreover, COVID-19 may have reduced fishing effort as a result of shelter-in-place restrictions, which may have reduced harvest. However, given that some responses involved encouraging fishing and opening seasons early, those effects will vary among regions and water bodies. We anticipate that research on these topics will emerge in the coming months and years, as the COVID-19 pandemic adds to global emerging considerations regarding the future of recreational fisheries (Bonar 2020; Holder et al. 2020).

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SUPPORTING INFORMATION

Additional supplemental material may be found online in the Supporting Information section at the end of the article.

Supplementary Material AFS

Erratum

Erratum for Fisheries Issue Information, Volume 45, Issue 12, Backpage: Blue Catfish *Ictalurus furcatus*, https://doi.org/10.1002/fsh.10552

The image in this Backpage was incorrectly identified as a Blue Catfish *Ictalurus furcatus*. The species is a darkly colored Channel Catfish *Ictalurus punctatus*. The image has been corrected in the online version.

Erratum for Fisheries Issue Information, Volume 45, Issue 11, Has Steller Sea Lion Predation Impacted Survival of Fraser River Sockeye Salmon?, https://doi.org/10.1002/fsh.10488.

The article's cover image incorrectly lists the National Park Service, Alaska Region as the photo credit. The correct credit goes to Andrew Trites, University of British Columbia.