Jason Borwick
Senior Fisheries Biologist
Ministry of Natural Resources and Forestry, Policy Division
Biodiversity Branch
Fisheries Policy Section

18/12/2014

RE: Provincial Bait Policy Review- Angler Use and Movement of Baitfish in Ontario EBR No. 012-2836

Dear Mr. Borwick,

Thank you for the opportunity to provide comments on policy options for managing angler use and movement of baitfish in Ontario. I am submitting comments with input from my colleagues (Drs. Cheryl Chetkiewicz and Justina Ray) in our respective capacities specializing in freshwater and wildlife ecology, conservation biology and landscape ecology in Ontario (Appendix 1). Furthermore, I have participated in the Bait Review Advisory Group (BRAG) managed by Ontario Ministry of Natural Resources and Forestry (MNRF) which has facilitated and improved our understanding of live bait use and harvest in Ontario and its impacts on freshwater fish communities and their habitats in Ontario.

We strongly agree with the need to revise Ontario's live baitfish use policy and regulations. Although we are commenting on the policy options presented here, and in proposal, Bait Use and Commercial Harvest in Provincial Parks and Conservation Reserves (EBR No.012- 012-2835), there is ample evidence to support an outright ban of live bait in Ontario. Most provincial and territorial jurisdictions have banned the use of live bait due to known ecological risks associated with invasive species, diseases, and pathogens with significant economic impacts on recreational and commercial fisheries. The delay in banning live bait may, in part, explain why Ontario has twice the number of invasive freshwater fish than Alberta and one and a half times that of British Columbia (see Ontario Invasive Species Strategic Plan). We recommend MNRF consider a complete ban on live bait in Ontario.

This review and anticipated policy reform is both timely and necessary. We have appreciated our participation as a member of BRAG and the opportunity this has provided to enhance our understanding of this important conservation issue and appreciation for various stakeholder interests. In addition to our comments offered

WCS CANADA
344 BLOOR STREET WEST, SUITE 204
TORONTO, ONTARIO M5S 3A7, CANADA
PHONE: (CAN) 416 850 9038
FAX: 416 850 9040
WWW.WCSCANADA.ORG

throughout the BRAG process to date, we provide the following formal remarks on the proposed policy options in the current proposal regarding **Managing Angler Use and Movement of Bait**. We highlight our preferred options given the information provided and offer scientific support for our choices as per our experience, expertise, and mission of WCS Canada. We take this opportunity to highlight our recommendations to strengthen live bait policy in Ontario.

3.1 Type of Bait used by Anglers in Ontario

We support Option B, which recommends reducing the number of legal baitfish species in Ontario. We recommend a complete ban on live bait in Ontario.

Currently, anglers may use any of 48 species of legal baitfish, alive or dead. However, research has shown that it is often difficult for anglers to distinguish between legal baitfish (e.g., on the white list) and those that are not (e.g., invasive species, species-at-risk). The reduction in the number of species legally harvested and used as live bait in Ontario addresses two scientific findings (Drake and Mandrak 2014):

1. Purchased bait may be contaminated with invasive species and/or species-at-risk.
2. Inadequate knowledge or experience by anglers to identify non-bait fish in their purchase or harvest, particularly the common practice of misidentification of invasive species for native fish.

Reducing the number of species on the white list could address these issues. In addition, Ontario's reintroduced *Invasive Species Act* makes it illegal to possess invasive species, while Ontario's *Endangered Species Act, 2007* makes it illegal to possess species-at-risk such as river redhorse. Reducing the list would reduce management complexity with other legislation and policy processes. Finally, reducing the number of species on the white list would also help commercial harvesters reduce their intake of invasive and at-risk species, thereby supplying "cleaner" live baitfish to the market.

3.2 Managing the Scale of Angler Movement of Bait

We support Option E, which recommends that movement of bait by anglers be restricted to one or more watersheds. We recommend that movement of bait be restricted to the tertiary or quaternary watershed scales, and that FMZ boundaries be realigned to conform with watersheds.

Our selection is based on scientific research showing that not only does unrestricted movement of bait pose numerous ecological risks, but movement across watersheds increases the risks for native fisheries due to invasive species, diseases, and pathogens. In Ontario, for example, the Great Lakes are known as a hot spot for invasive species, but it is simultaneously a significant source of live bait in the province. The unrestricted movement of live bait will spread invasive species into waterbodies across Ontario. Further, unrestricted movement of contaminated live bait will erode genetic diversity in wild populations, leading to homogenization of communities and affecting a species' ability to adapt to stressors such as climate change (Olden et al. 2004).

We take this opportunity to highlight a particular challenge with Ontario's current Fish Management Zones (FMZ) designations in the Far North. They are neither aligned with watershed boundaries, nor are they delineated at appropriate scales for adequate consideration of connectivity and conservation of freshwater resources across the Boreal Shield and Hudson Plains Ecozones. MNRF presentations during BRAG meetings have demonstrated high fishing pressure in FMZs that include more than one primary watershed, e.g. the Southwestern Hudson Bay and Nelson River, the Southwestern Hudson Bay and the Great Lakes. Higher fishing pressure creates a higher probability of invasive species, disease and pathogen introduction, particularly given that anglers visit several lakes in a single fishing trip. We are particularly concerned about the current FMZ boundaries in the Far North. These require special attention, given objectives to maintain biological functions and processes and to designate at least 225,000 sq. km. in protected areas under Ontario's *Far North Act, 2010*. In addition, there is a relative absence of invasive species warranting more proactive planning (Far North Science Advisory Panel Report 2010: 104).

3.3 Angler Storage of Bait

We support Option C, which prohibits anglers from storing bait in Ontario however we recommend a complete ban on live baitfish use in Ontario. We suggest MNRF policy options consider the lowest ecological risk given known social and economic impacts.

Our choice is based on research that angler behaviour with bait buckets is an important pathway for invasive species (e.g., fish, plants, and invertebrates), disease and pathogen introductions (Kerr et al. 2000, Drake and Mandrak 2014). These introductions have significant ecological, social, and economic impacts. For example, the distribution of invasive fish species in Ontario is in high fishing pressure regions and can only be explained by incidental introduction by bait buckets. In one survey, half of the anglers indicated they discarded the contents of their bait buckets at the end of fishing trips into the final waterbody (Litvak and Mandrak 1993). Consequently, dumping bait buckets became illegal (Kerr et al. 2000). However, the current lack of restrictions on live bait movement and the large average distance traveled by anglers with purchased baitfish (~ 319 km) reflects the distances bait buckets may be carried, allowing for significant travel by non-target baitfish, invasive species, diseases, and parasites. Despite the prohibition of bait bucket dumping, the experience over the last decade has been an accelerated spread of invasive species (Vander Zanden and Olden 2008). While restricting anglers' storage of bait would reduce the risks associated with angler use of bait buckets, clearly enforcement is necessary for this regulation to be effective.

3.4 Personal Harvest of Bait

We support Option D, which recommends banning personal harvest of bait by anglers across Ontario.

Our choice is based on research that shows angler's personal bait harvest is associated with several ecological risks, including introduction of invasive species, disease and

pathogen transmission to native fisheries. Drake and Mandrak (2014) showed that anglers are not trained in species identification and cannot identify legal baitfish from invasive species or native fish. For example, 40% of anglers participated in the survey identified Herring (*Coregonus* spp.), a native non-baitfish species, as a baitfish. Furthermore, 35% identified Goldfish (*Carassius auratus)*, an invasive species in Ontario's water, as a legal baitfish. The misidentification of baitfish could result in an angler's possession of invasive species or species-at-risk - both of which are illegal. Drake and Mandrak (2014) demonstrated that misidentification of baitfish species could lead to the spread of invasive species across the province and facilitate the movement of diseases and pathogens. This movement is associated with the spread diseases, such as Viral Hemorrhagic Septicemia (VHS, VHSV Expert Panel and Working Group 2010).

These risks also have social and economic costs, including to anglers and recreational fisheries. Invasive species transferred through angler behaviours can have significant impacts on fish communities through predation and/or competition. For example, invasive rainbow smelt (*Osmerus mordax*), are easily mistaken for a baitfish, but have significant impacts on native fish since they feed on eggs and juveniles of other native species (Evans and Loftus 1987).

Finally, banning personal harvest of bait by anglers would also reduce management complexity (although enforcement efforts will need to continue) and support Ontario's priorities for addressing invasive species and disease spread in Ontario's waters.

3.5. Use of Bait by Anglers in Defined Sensitive Areas

We support Option C, which recommends bait use not be allowed in sensitive areas.

"Sensitive areas" are geographic areas that are either infected with a disease that MNRF is actively managing (e.g., VHS), a known habitat for species-at-risk, and/or an important habitat need for a vulnerable life process (e.g., headwater habitat for brook trout). The use of live bait in these sensitive areas can have different effects on the native aquatic community. In sensitive areas for at-risk species, the use of live bait may introduce invasive species, or more native species than are normally present. In addition, scientific research shows that using live bait produces higher mortality in caught fish than using artificial bait (Beukema 1970). Allowing the harvest and use of live bait in sensitive areas may contribute to additional mortality of species-at-risk if they are accidently caught..

Further, live bait is associated with the introduction of invasive species, the second most important threat to species-at-risk after habitat loss, drives freshwater fish extinction in Ontario (Kerr et al. 2000, Dextrase and Mandrak 2006). This underscores the need to prohibit use of live bait in sensitive species-at-risk habitats to provide protection and facilitate species recovery.

The use of live bait in sensitive areas infested with diseases and/or pathogens increases the risk of spreading the disease across watershed boundaries and the province at large.

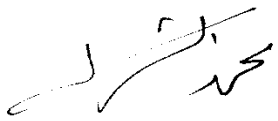
For example, once an angler is fishing, the bait bucket is often kept in the waterbody resulting in an exchange of bait bucket water with the lake or river. Viruses, pathogens, parasites, and microscopic invasive species can all move through this unregulated pathway (Kerr 2000).

Given our active scientific and conservation engagement in Ontario's Far North, we take this opportunity to highlight the imperative to consider proactive planning for this region. At present, there are few invasive species and limited access and industrial disturbance in this globally-significant region (Far North Science Advisory Panel 2010). Ontario's Far North is home to several cold water species, (e.g. lake trout, brook trout); however, fish assemblages are characterized by low species richness and high vulnerability to human disturbance (Browne 2007). The introduction of native non-bait species as well as invasive species via live bait practices such as bait buckets is of high concern. .

In conclusion, live bait use and movement by anglers in Ontario is a key issue associated with the spread of invasive species and pathogens as well as potential impacts on species-at-risk and native fisheries. While the proposed policy options put forward by MNRF recognise the need to address current regulations where they exist on this particular issue, we recommend a complete ban on live bait. A ban would bring Ontario in line with the majority of Canadian jurisdictions that have banned the use of live and dead baitfish due to the ecological (e.g., invasive species, diseases), economic ($1.4 Trillion/year globally, and $7.3 Billion/year to agricultural and forestry industries in Canada), and social costs compared to the current value of the of the bait industry (e.g., $ 22 Million). While we recognize the cultural value of using baitfish, other jurisdictions have also recently introduced this ban after long histories of angling with live bait (e.g., Quebec).

Thank you again for this opportunity to comment. I would be happy to discuss these comments further. You can reach me at malshamlih@wcs.org or via phone at 705 761 9031.

Yours sincerely,



Mohammed Alshamlih, Ph.D.
Postdoctoral Fellow

References:

Beukema J.J. 1970. Acquired hook-avoidance in the pike *Esox Lucius* L. fished with artificial and natural baits. Journal of Fish Biology. 2 155-160

Browne, D.R. 2007. Freshwater fish in Ontario's boreal: Status, conservation and potential impacts of development. Wildlife Conservation Society Canada Conservation Report No. 2. Toronto, Ontario, Canada

Dextrase A.J. and N.E. Mandrak. 2006 Impacts of alien invasive species on freshwater fauna at risk in Canada. Biological Invasions. 8:13-24

Drake A.D. and N.E. Mandrak. 2014. Ecological Risk of Live Bait Fisheries: A New Angle on Selective Fishing. Fisheries. 39(5):201-211.

Evans O.D. and D.H. Loftus. 1987 Colonization of inland lakes in great lakes region by rainbow smelt, Osmerus modax: their freshwater niche and effects on indigenous fishes. Canadian Journal of Fisheries and Aquatic Sciences. 44: 249-266

Kerr S.J., Brousseau C.S. and M. Muschett. 2000 Invasive species in Ontario: A review and analysis of potential pathways for introduction. Fisheries. 30:21-30.

Olden J.D., Poff, N.L., Douglas, M.R. Douglas, M.E., and K.D. Fausch. 2004 Ecological and evolutionary consequences of biotic homogenization. Trends in Ecology and Evolution. 19 (1): 18-24

Litvak, M. K., and N. E. Mandrak. 1993. Ecology of freshwater baitfish use in Canada and the United States. Fisheries. 8(12):6- 13.

Vander Zanden, M.J. and J.D. Olden. 2008 A management framework for preventing the secondary spread of aquatic invasive species. Canadian Journal of Fisheries and Aquatic Sciences. 65 : 1512-1522

VHSV Expert Panel and Working Group. 2010 Viral Hemorrhagic septicemia virus (VHSV IVb) risk factors and association measures derived by expert panel. Preventative Veterinary Medicine 94 :128-139

Appendix 1.

WCS Canada (www.wcscanada.org) was established in May 2004 as a Canadian non-government organization with a mission to conserve wildlife and wildlands by improving our understanding of and seeking solutions to critical problems that threaten key species and large wild ecosystems throughout Canada. WCS Canada generates knowledge through research and tools for conservation of the northern boreal's fish and wildlife species and ecosystems and the services they support. WCS Canada provides this information to Government and First Nations' decision makers to create policies and governance systems that support conservation, sustainable use of biological resources, and best practices for industrial development.

Dr. Mohammed Alshamlih is a Postdoctoral Fellow. His postdoctoral research is investigating smallmouth bass range expansion in Ontario. Using genetic methods, his research considers the vectors of smallmouth bass introduction in northern waters.

Dr. Cheryl Chetkiewicz is an Associate Conservation Scientist and the Lead for Ontario's research and conservation efforts in Ontario's Far North. She is focused on regional scale research and planning in the Far North, specifically wildlife research and monitoring, cumulative effects, and strategic environmental assessment.

Dr. Justina Ray is the President and Senior Scientist and has been engaged in field research in northern Ontario. She is one of the few biologists to spend significant time in this remote region over the last decade, with a specific focus on wolverine and caribou. Dr. Ray serves on MNRF's Provincial Caribou Technical Committee and co-authored Ontario's Wolverine Recovery Strategy. She was a member of MNR's Far North Science Advisory Panel.