

Peer Review Summary Document

(12/18/2015)

Peer Review Plan

http://www.usgs.gov/peer_review/docs/grass_carp_risk_assessment_great_lakes_basin.pdf
[37 KB PDF]

Title and Authorship of Information Product Disseminated

Risk Assessment of Grass Carp (*Ctenopharyngodon idella*) in the Great Lakes Basin, By Becky Cudmore, Nicholas E. Mandrak, Lisa A. Jones, John M. Dettmers, Greg Conover, Duane C. Chapman, and Cynthia S. Kolar.

Peer Reviewers Expertise and Credentials

Reviewer #1: Assistant Professor at the University of Nevada, Reno. The reviewer holds an undergraduate and master's degree from Montana State University and a doctoral degree from the University of Alberta in ecology and environmental science. The reviewer has been a Research Assistant Professor at the University of Notre Dame where research projects included developing and testing molecular methods for detection of Asian carp in the Great Lakes. The reviewer has over 50 publications in the peer-reviewed literature, many in the areas of invasive species biology and detection and risk assessment, many of which focused on Asian carp.

Reviewer #2: Research Assistant Professor at the University of Nevada, Reno. The reviewer holds an undergraduate degree from the University of California, Berkeley, and a doctoral degree from the University of California, Santa Barbara. The reviewer has over 20 peer-reviewed publications on topics such as invasive species biology, detection, and control; aquatic species population modeling; and expert elicitation and other methods of risk assessment, particularly regarding Asian carp.

Reviewer #3: Aquatic Habitat Enhancement Program Director for the Texas Parks and Wildlife Department in Austin, Texas. The reviewer holds a master's degree from Bowling Green University and a doctoral degree from Ohio State University in aquatic ecology and fisheries. The reviewer is currently a member of the National Invasive Species Advisory Committee and vice-chair of the Texas Invasive Species Coordinating. Additionally, the reviewer is a member of the Gulf and South Atlantic States Regional, the Mississippi River Basin Regional, and the Western Regional Panels of the Aquatic Nuisance Species Task Force.

Reviewer #4: Research scientist with Fisheries and Oceans Canada and Adjunct faculty in the Cooperative Resource Management Institute, School of Resource and Environmental Management, Simon Fraser University. The reviewer holds undergraduate and master's degrees from Simon Fraser University and a doctoral degree from McGill University. The reviewer is a quantitative ecologist who works on conservation, fish population biology, and fish habitat issues, including effects of hydroelectric power projects and placer mining. The reviewer also has experience with the Canadian Science Advice for Government

Effectiveness (SAGE) process and in conducting risk assessments on invasive species and conservation issues and has authored over 100 peer-reviewed publications.

Reviewer #5: Post-doctoral Fellow at the Department of Biological Sciences, University of Toronto Scarborough. The reviewer holds an undergraduate degree from the University of Waterloo and a doctoral degree from the University of Toronto in ecology and evolutionary biology. The reviewer's background includes studying aquatic ecology, risk and uncertainty, fish harvest dynamics, species invasions, simulation modeling, and estimating threat of baitfish introduction in Canada. The reviewer has authored over a dozen publications in peer-reviewed journals.

Reviewer #6: Chief of the USGS, Great Lake Science Center's Coastal Ecosystems Branch. Reviewer holds undergraduate and master's degrees from Bucknell University and a doctoral degree from the University of Michigan School of Natural Resources and Environment. The reviewer previously served as the Fisheries Research Program Manager for the State of Michigan and maintains an adjunct professorship with the University of Michigan. The reviewer's research topics include ecology of migratory salmonids, riverine ecosystems and their fish communities, environmental flow policy, landscape ecology applied to aquatic systems, environmental management philosophy, with a specialty in Great Lakes fisheries management. The reviewer has authored over 40 peer-reviewed publications.

Reviewer #7: Research scientist with Fisheries and Oceans Canada and professor at several universities (including the University of Waterloo, University of Guelph, University of Toronto, and McMaster University). The reviewer holds undergraduate and master's degrees from Concordia University and a doctoral degree from the University of Manitoba. The reviewer is a quantitative ecologist, whose research focuses on freshwater ecology and the building blocks of ecosystem dynamics, ranging from the life history of fishes to factors affecting population dynamics to the interactions of organisms in a food web and the ecosystem impacts of human activities. The reviewer has extensive expertise with the SAGE process and has authored over 90 peer-reviewed publications.

Reviewer #8: Regional aquatic invasive species coordinator, fish biologist and fish passage coordinator with the U.S. Fish and Wildlife Service. The reviewer holds an undergraduate degree from University of Wisconsin, Stevens Point and a master's in biology from Tennessee Technological University. The reviewer has over 40 years of experience on invasive species issues, played a lead role in drafting Aquatic Invasive Species Action Plans for the Great Lakes Regional Collaboration and for the Mississippi Interstate Cooperative Resource Association, and is leading efforts to use risk assessment products for regulatory and non-regulatory decision-making. The reviewer has authored over 30 peer-reviewed publications.

Charge Submitted to Peer Reviewers

The reviewers were asked to conduct an impartial and objective scientific review of the risk assessment document, with particular emphasis on the interpretation and discussion of results. They were notified that the subject matter could receive attention on a nationwide scale and be scrutinized at a high level of detail.

Summary of Peer Reviewers Comments

Peer review was conducted by a panel that included eight peer reviewers. Each panel member presented comments to the entire panel group and a group consensus rather than

separate individual reviewer comments were submitted. Overall the panel agreed that the document was well-constructed, thorough, and accurate. During the 2-day panel review, a variety of comments were provided to authors.

The review panel recommended minor edits changes throughout the manuscript to improve clarity of particular points (e.g., providing definitions, replacing a phrase with more specific wording, improving table headings, or more explicitly expressing assumptions). The review panel recommended a number of areas that required additional information, generally relating to inserting a phrase or sentence, though several recommendations were a more substantial. The review panel suggested including data or information regarding eDNA results that were unknown to the authors during initial manuscript writing. The review panel also suggested adding a section of text on abiotic factors that could affect ecological consequences of Grass Carp establishment, such as bank erosion, changes to water quality, and alteration of nutrient cycling. Additionally, the review panel indicated several areas in the manuscript they thought needed further interpretation of model results or literature cited to improve clarity and strengthen the manuscript. Lastly, review panel suggested adding information to the knowledge gap section, such as current status of Grass Carp in the Great Lakes, the possibility of lentic spawning, reproductive behavior and the finding of mates, and potential effects of density dependence on population models.

A summary of the review panel's more substantial comments/questions/recommendations were as follows:

- Given uncertainty in the potential for ballast water from lakers to spread Grass Carp from Great Lake-to-Great Lake, would the model cited in the manuscript (Drake et al. 2015a) have different results if run for additional years?
- Run additional simulations and make changes to the text based on results of these additional simulations.
- Revisit ratings given to certainty throughout the manuscript.
- Concern was expressed that additional factors entered into rankings other than data quality and quantity.
- Suggestion that authors invest additional effort in explaining that the potential impact of Grass Carp in a Great Lakes ecosystem would be affected by lake area, area of submerged aquatic vegetation, as well as initial population size through time.
- Suggestion that authors reconsider the consequence rankings and certainty ratings under the ecological consequences section using Grass Carp population densities as thresholds between levels of ecological consequence ratings.
- Concern that given the equation provided to calculate overall risk and the definition of 'establishment', the overall risk of triploid Grass Carp could only be assessed as "negligible"; and two potential solutions were offered: removing establishment from the equation or redefining establishment for triploid to include immigration from stocking.

Summary of USGS Response to Peer Reviewers Comments

The authors agreed with all minor editorial suggestions posed by the review panel and made appropriate changes throughout the manuscript. New sentences or phrases were incorporated as suggested by the review panel to provide additional information or interpretation. A subsection of text entitled 'Abiotic Factors' with text and an associated table was added to the section on Ecological Consequences in response to the review panel's recommendations. All suggested changes to the knowledge gap section provided by the review panel were added.

The authors requested that additional simulations from the laker ballast model (presented in Drake et al. 2015a) using several more time steps after time of introduction be run as recommended by the review panel; and the additional simulations found that model results did not change. Appropriate additional text was added to the Arrival and Spread sections as suggested. The authors agreed with the review panel that other factors (particularly how certain authors were of the likelihood rankings) influenced initial assigning of certainty codes and made revisions to the manuscript to reflect this. All certainty codes were reassessed throughout the manuscript using only the criteria already identified in the manuscript (quantity and quality of data used to assess likelihood). Additional information was incorporated to discuss the potential ecological consequences of Grass Carp relative to the amount of submerged aquatic vegetation and different seed population sizes of Grass Carp on a lake-by-lake basis as suggested. The authors also agreed with the review panel that criteria should be provided for rating ecological risk of Grass Carp and to facilitate this discussion and delineation of ecological consequence ratings, and a new table (Table 16) and associated text was added. These newly delineated rating levels were used to separately assess ecological consequences of triploid and diploid Grass Carp on a lake-by-lake basis. In response to the review panel's comment that it was problematic that triploid Grass Carp could only be assessed negligible overall risk given the definition of establishment and the equation used to determine introduction, the authors removed establishment from the probability of introduction equation for triploid Grass Carp and assessed the overall risk likelihood for each lake.

The Dissemination

The product will be published by the Department of Fisheries and Oceans Canada as a Scientific Advisory Report and will be available at <http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm>.