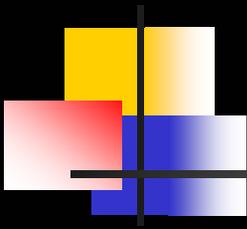


Some Lessons Learned from Agency Responses to Ruffe Invasion of the U.S.

Michael Hoff
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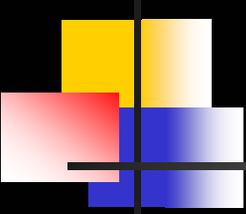
Ruffe





Overview of Presentation

- Native range, biology, and ecology of ruffe
- Lessons learned from those responses

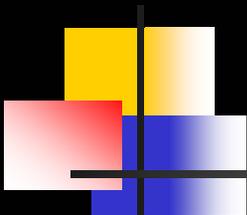


Ruffe and Rough

- For those of you who have not heard the common name ruffe, which sounds like “rough,”
 - rough could be used to describe how people in Great Lakes agencies worked together on this species during the first few years after verification that the species was established in the Great Lakes.

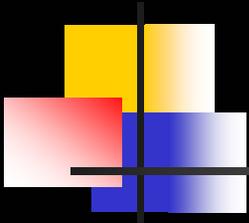
Ruffe





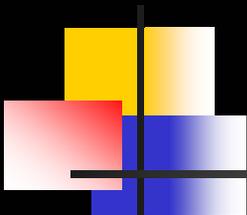
To Act or Not To Act...

- Since the presence of ruffe in North America was announced in 1988, a series of formal and informal groups have considered options for action, and decided whether to act or not to act.



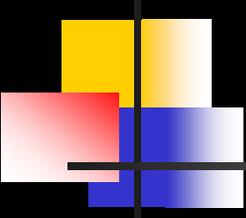
Decision Record

- I will review what I believe to be the most important decisions in light of what was known at the time the decisions were made.



Results of Decisions

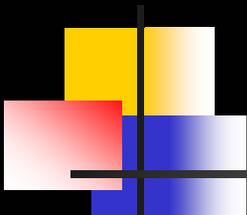
- Actions that were taken in response to the invasion of ruffe have resulted in limited success.
- Could we have been more effective at containing, controlling, and possibly even eradicating ruffe?
- What lessons have we learned?



Ruffe Native Range

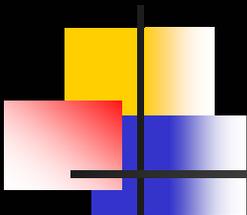
- Member of the perch family, native to Europe and western Asian





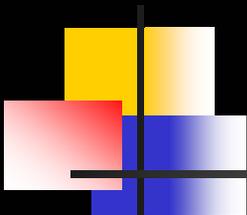
Ruffe Biology

- Ruffe are typically less than 20 cm, rarely attain a size greater than 25 cm
 - Sizes are too small to
 - Support any recreational fishery, or
 - Be used for human food



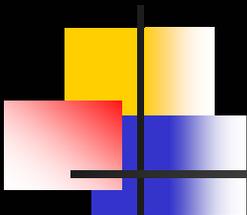
Ruffe Biology

- Tolerates a wide range of habitats, but are mostly associated with slow-moving water with a soft bottom that is devoid of vegetation.



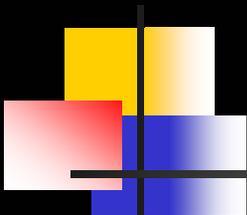
Ruffe Biology

- Optimal temperature for growth ruffe was at 21°C, with a fundamental thermal niche of 18-22°C
 - The fundamental thermal niche for ruffe corresponds closely to that of walleye, sauger, and yellow perch.



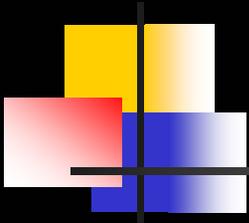
Ruffe Biology

- Thus, using a relationship developed for walleye, study results estimated that
 - 58% of Lake Erie
 - 21% of Lake Huron
 - 12% of Lake Michigan
 - 7% of Lake Ontario
 - and 2% of Lake Superior was optimal growth habitat for ruffe.



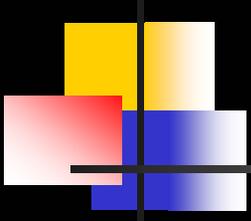
Ruffe Ecology

- In Europe and Asia,
 - Ruffe are assumed to compete for food resources with other fishes
 - Ruffe are preyed on by only a few predators.
 - The primary predators are pikeperch and northern pike
 - The rate of predation on ruffe is thought to be affected by the abundance of ruffe and the availability of alternative prey.

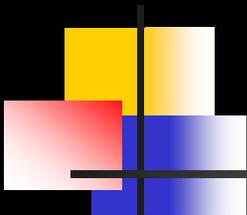


Ruffe Population Dynamics

- In the St. Louis River, Lake Superior
 - Ruffe population size is most driven by recruitment
 - Recruitment is most driven by adult population size, water clarity during the time ruffe eggs hatch, and yellow perch and channel catfish abundance.

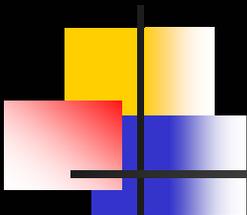


Lessons Learned



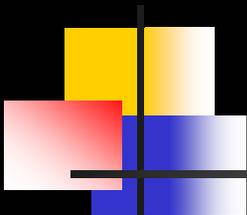
Lessons Learned

- Issue:
 - Ruffe were probably in the Great Lakes at least 3 years before they were documented there
- Lesson:
 - Early Detection Program needed in the Great Lakes
 - Specifically, we need to develop and implement scientifically based monitoring programs to detect species invasions in Great Lakes invasion hotspots



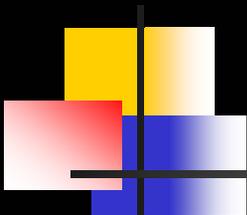
Lessons Learned

- Issue:
 - Fisheries Management Agencies had diverse and/or conflicting opinions about whether and how to control ruffe
 - Some believed that managers should deploy physical, chemical, and biological methods to contain ruffe and reduce existing populations.



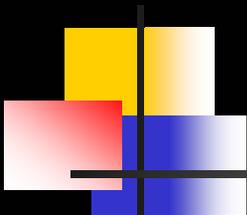
Lessons Learned

- Issue (continued):
 - Others maintained that ruffe are established in North America, and will spread regardless of control efforts.
 - This argument was exacerbated by the lack of species-specific and low-cost control technologies.



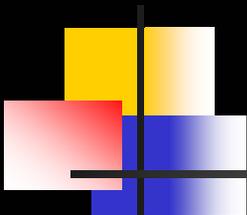
Lessons Learned

- Lessons:
 - The aquatic pest manager's toolbox remains nearly empty, and integrated pest management is poorly developed for aquatic pests in open systems.
 - We cannot wait until a need exists to place effective, efficient, and environmentally sound approaches into the toolbox



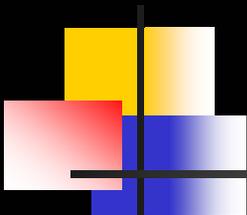
Lessons Learned

- Lessons:
 - Research is needed to develop effective and ecologically sound approaches to eradicating and controlling
 - established AIS, and
 - those that are documented as high risk to be introduced into the Great Lakes
 - This research will require significant investment (public funding)



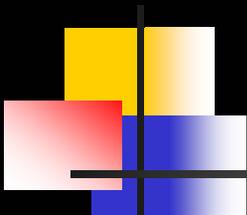
Lessons Learned

- Issue:
 - Many public comments on the Draft Ruffe Control Plan from the part of the Great Lakes with established ruffe populations wanted no chemical treatment
 - Many public comments from the parts of the Great Lakes where ruffe was not established wanted “rapid, aggressive action to control ruffe.”



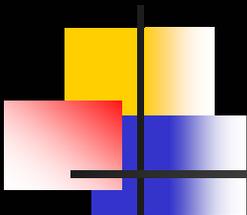
Lessons Learned

- Lesson:
 - Chemical use may not be supported by locals, when there are nontarget effects
 - Chemical use may be supported by those outside the treated area



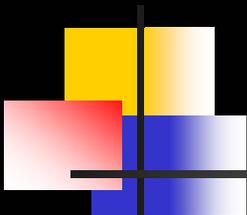
Lessons Learned

- Issue:
 - Impacts of ruffe in ground zero – Lake Superior ecosystem different that elsewhere
 - So control activities, notably available chemical treatment approaches, could impact fisheries and ecosystems of Lake Superior (and its estuaries and tributaries)



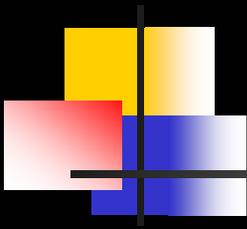
Lessons Learned

- Issue (continued):
 - However, control of ruffe would mostly benefit the cool-water fisheries of the lower Great Lakes, the Mississippi Basin and Canadian Shield



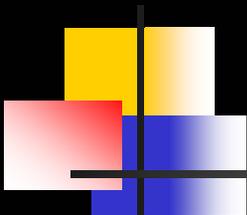
Lessons Learned

- Lesson:
 - Although the ground-zero invasion site is the location to attempt extirpation in the U.S., predicted impacts there may result in a decision to not pay the costs of extirpation
 - i.e., local cost-benefits predictions could be different than national or international cost-benefits to attempt extirpation at ground zero



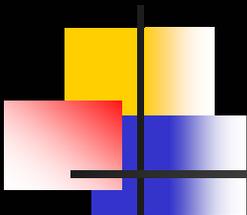
Lessons Learned

- Issue:
 - Agency opinions differed on economic and ecologic projections of impact



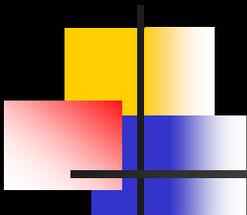
Lessons Learned

- Lessons:
 - Models and/or expert panels are needed to estimate economic and ecologic damage (and uncertainties), so that decision makers can use that information when deciding action or no action
 - Particularly important for species at high risk to invade



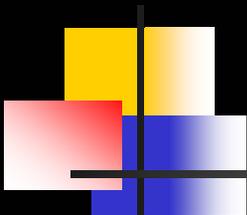
Lessons Learned

- Lessons:
 - We are not proactive—we are not preparing ourselves for species that are known to be high risk to invade the Great Lakes



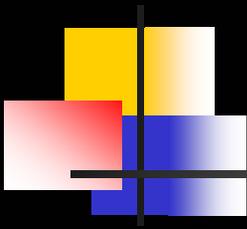
Lessons Learned

- Lesson:
 - If we are to implement rapid response:
 - Need a contingency fund to support actions
 - If Federal funds are used, then Federal environmental compliance, permitting, and other procedures must be prepared in advance.



Lessons Learned

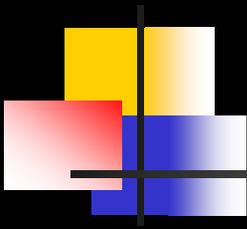
- Issue:
 - Structure of the groups responding to ruffe invasion was blend of other structures
 - No clear Incident Commander and Command System



Lessons Learned

- Lesson:

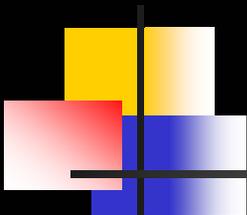
- If we are to be truly effective at responding to AIS RAPIDLY, then we need to install and implement a system like the Incident Command System
 - Clearly defines:
 - Incident Command
 - Structure
 - Roles and Responsibilities
 - Goals
 - Decision framework (decision tree)



Lessons Learned

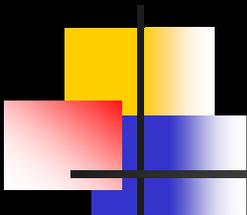
- Lesson:

- Again, we need to be proactive --- to prepare ourselves for species that are high risk to invade the Great Lakes



Lessons Learned

- Before Rapid Response (a reminder)
 - Protect and Restore Ecological Diversity and Integrity
 - Seminal works in ecology recommend healthy ecosystems to either
 - minimize risk of species invasions, or
 - minimize impacts of invaders, which become established, on native species and their habitats



Lessons Learned

- Lesson Reminder:
 - To reduce the need for rapid response
 - Interdiction (i.e., prevention) is needed for all pathways in which invasive species can be introduced into a water body
 - In the Great Lakes, much better management of ballast water (ruffe was introduced via ballast) and other pathways is to prevent species invasion