



Invasive Crayfish Collaborative

Great Lakes

Invasive Crayfish Collaborative May Meeting – Summary Notes

May 15, 2019

12:30pm – 3:30pm

Great Lakes Science Center

601 Erieside Ave

Cleveland, Ohio

Facilitated by Pat Charlebois, Greg Hitzroth, and Amanda Huegelmann, Illinois-Indiana Sea Grant

12:30 Grab a Lunch and Find a Seat

1:00 Welcome and Introductions

Charlebois welcomed all members, introduced herself, gave a brief overview of the ICC, then outlined the meeting agenda. She then asked members and other facilitators to introduce themselves to the meeting attendees.

1:15 ICC Project Updates – Status and Deliverables

Charlebois presented on the status of several ICC projects, sharing the following updates:

1. The ICC website is now public. Charlebois went through the main pages and features of the website and encouraged attendees to send any feedback they have either to Greg Hitzroth or the ICC Gmail.
2. ICC Webinars: Three webinars have been delivered so far and are archived on the ICC website. Reuben Keller will give the next webinar on June 20th. Charlebois then asked attendees for any other webinar suggestions. The following ideas were proposed:
 - Looking at the role of crayfish in human food. This could include exploring how to establish better control mechanisms of invasive crayfishes as food, and learning about Illinois' enforcement history on the topic.
 - Emphasizing that organisms in trade can have several pathways to introduction, such as for human food consumption or in the pet industry, for example.

1:25 Michigan/USGS/Auburn Red Swamp Working Group Update

Seth Herbst, Michigan Department of Natural Resources, presented on the status of red swamp crayfish in Michigan. Main points from this presentation are as follows:

- The issue of red swamp crayfish (RSC) presented in 2013 in southwestern Michigan when anglers were using live RSC as bait. Michigan began looking at RSC in trade (live food markets, bait shops), and conducted trapping, but did not detect any RSC at the



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time. From 2014-2016, Michigan conducted survey work and pathway risk evaluations, and in 2015 the live possession of RSC was prohibited.

- In 2017 there were reported RSC sightings which were then confirmed as infestations. A response/management plan was developed. It is noted that in 2017 and 2018 all documented infestations except one occurred on private property.
- Michigan's goals in the RSC response plan include early detection and monitoring, determining source and distributional extent of infestations, collecting physical and biological information, and implementing/evaluating control methods.
 - Michigan is exploring using sound to increase capture rates, evaluating predator control, as well as implementing and evaluating chemical control (carbon dioxide and others). They are developing management and research goals of each treatment method.
- The focus for 2019 includes strategic and intensive control and removal of crayfish where infestations are confirmed and incorporating new trap designs.

Herbst then opened the meeting to questions from attendees. The following questions and answers were discussed:

Question 1:

Q: How do you take crayfish burrowing lifestyles into consideration?

A: Burrow excavation is done to remove gravid/rearing females. Knowledge about burrowing is used to inform when to implement different control strategies.

Question 2:

Q: Are you finding native crayfish in the same ponds as RSC?

A: A few ponds do have native virile crayfish. However, most sites with RSC infestations are small retention ponds or private ponds that do not have native ecosystem assemblages.

Q: Do you distinguish among species or are you effectively controlling all crayfish?

A: No species-specific strategy yet except live trapping and sorting.

Question 3:

Q: How do you prevent the re-introduction of invasives after control efforts?

A: Prevention efforts aren't 100%, but trying to prevent reintroduction through outreach, regulation, and continued monitoring.

Follow-up answer: RSC were only banned recently. Michigan is hoping to do more outreach to increase awareness and reduce reintroduction risk, especially for teachers/in classrooms.

Question 4:

Q: Do you have EPA approval for chemical treatments?

A: Wisconsin has approval, but Michigan does not yet have a permit for chemical treatment yet.



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Q: Are you aware of non-target impacts of chemical treatments?

A: Only a few studies have used this chemical in the environment, but with targeted application, there seems to be few to no concerns. The chemical in consideration is highly toxic to aquatic organisms, but not terrestrial mammals and birds. The permit applications require applicants to outline the risk to other organisms that may be in the area.

Question 5:

Q: How effective is eDNA in detecting crayfish?

A: They have seen some issues with eDNA and must weigh the pros and cons of trapping vs eDNA. Ideally, you would use eDNA markers that have been shared in published literature, but one lab found that a marker available in European studies was not species-specific for the native crayfish in Michigan. Michigan is mostly trapping with some additional eDNA sites at the fringe of buffer zone.

Question 6:

Q: Are you tracking the composition of substrates along and above the shoreline where you are finding RSC?

A: Ideally, it would be information gained based on what habitat references were used, but Michigan is seeing consistent habitat (mucky substrate ponds) where RSC crayfish are found.

1:55 IISG Outreach Updates

1. Outreach Tool – Survey Results and Discussion

Elizabeth (Bizzy) Berg presented the results of an online survey she had previously distributed to ICC members to collect their suggestions for a future outreach tool. The responses to the survey questions and follow-up are summarized as follows:

1. Audience: Respondents are currently reaching bait stores and anglers, so the outreach tool should target these two audiences.
2. Informational focus: It is important to respondents that the outreach tool includes information on current crayfish regulations.
3. Format: The outreach tool can be distributed as stickers, magnets, etc. containing some information and a link to website with more on regulations, crayfish identification, etc.

Berg then opened the meeting for discussion on the above survey responses. ICC meeting attendees had some mixed suggestions about the outreach tool. Main ideas and feedback shared is as follows:

- Some attendees agreed that targeting anglers and bait shop owners is sufficient, but others suggested expanding the audience past these two groups.



- One attendee suggested that we should consider various species of concern and their particular pathways in order to prioritize messaging and audience. For instance, perhaps this is not a bait/angler issue at all, but rather a live food problem.
- Some attendees suggested that various audiences should get a different message or outreach product accordingly, while others thought the messaging might not have to be so specific for different audiences. Either way, messaging should be clear enough to prevent misinterpretation.
- It can be difficult to get people to go to a website; some attendees would rather see the behaviors we want on an outreach tool, rather than a website.

2. Teacher Workshop/Community Science Program

Greg Hitzroth presented a summary of the one-day pilot workshop he and Bizzy Berg facilitated to provide teachers with a program manual and materials for trapping, identifying, and reporting local crayfish with their students. This program encourages teachers to utilize iNaturalist to report their catches by uploading photos and other data, such as date and location, for others to help successfully identify crayfish.

Hitzroth opened the discussion to the group to collect feedback on specific points, such as what type of data to collect, for future teacher workshops. Main ideas from this discussion are as follows:

- What data should we encourage/ask educators to collect?
 - Break down catch-per-unit information into easier to answer questions
 - How many crayfish did you catch, how did you catch them, and how long did it take? Then we convert this information to catch per unit effort so educators don't have to worry about this.
 - Latitude and longitude location data
 - If educators do not know latitude/longitude, iNaturalist lets you put a pin down and adjust your area of certainty.
- Longevity of the program influences what data educators should collect. Are we designing the program to be consistent, year after year sampling or just a one-time thing?
 - If it's a one-time thing, presence and location data is fine
 - If year after year, then other data types would be more useful to collect
- A secondary benefit of this workshop/program is educating teachers on their involvement as a vector for AIS spread.

Charlebois wrapped up this agenda point and reminded meeting attendees that information on this teacher workshop will be sent through the Google Group to allow members to provide more feedback.



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2:25 Break

2:35 BMP Framework – First Steps and Brainstorm

Following the break, Hitzroth introduced another potential goal of the ICC which is to facilitate the creation of a “best management practice” (BMP) framework to disseminate best practices for managing crayfish. A BMP framework could be used to assess management and control methods (i.e. availability, effectiveness, cost) and/or to assess invasive species prevention (i.e. regulation, enforcement, outreach). Some introductory questions for thinking about creating a BMP framework include:

1. How can outreach contribute to a BMP framework?
2. What might the scale of a BMP framework be? Can a framework be adapted for specific regions?
3. Can we capitalize on a BMP outline/framework that already exists?

Hitzroth then opened the meeting for brainstorming an ICC best management practice framework. Discussion prompts for attendees included: How have you used BMPs? Do you have BMPs for other species? What would dissuade you from or help you in using/applying a BMP framework? How should we consider scale and time? Input and questions from the group discussion included:

- Is the ICC interested in a BMP framework for any invasive crayfish species, or do we want to focus on red swamp crayfish? Crayfish research is still in the relatively early stages. For example, there seems to be a lack of knowledge on best control and outreach methods. There are also multiple rebukes of existing control methods. As such, we might need to identify knowledge gaps before we can pick a framework. Michigan’s approach started with a broad conversation with many partners.
 - There is crayfish expertise across the nation with a good grasp on types of methodology that could be used for certain management goals, but we might be missing a more holistic document that identifies knowledge gaps in these management goals.
 - One suggestion is to look at BMPs for invasive plants, e.g. phragmites control, and then adapt those for crayfish.
- What type of BMP are we interested in creating? Population management? Outreach? Maybe there should be separate BMPs for prevention, early detection, and eradication/control. A BMP framework helps to serve as a reminder of “things to consider along the way.”
 - A BMP framework on prevention could be helpful because invasive crayfish control methods are usually species and site specific, but prevention is more universal.
 - Every management action is a learning opportunity, so we should identify potential management methods that contain actions that would ensure learning even if their success was uncertain.



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- A BMP framework should respect context and a place-based species perspective. BMP methods should be implemented with an understanding of a species' life history. It is also important to voucher native species as well as the invasive specimens.

3:05 Member Updates

- Roger Thoma, Midwest Biodiversity Institute:
 - Finishing a 5-year project in Ohio to do a conservation assessment of all the crayfish in the state.
 - Documented spread of *Procambarus clarkii* (red swamp crayfish) throughout Sandusky Basin and Portage River – this species is problematic and has eliminated other species in areas where it's established.
 - Also looked at small populations around the state, noticed sediment might play a role in population survival.
 - Followed up a previous study of rusty crayfish to see if they had expanded range and forced northern clearwater crayfish out of Lake Erie. Found no change in distribution between 20 years and a few years ago.
 - Checked on waterbodies where rusty crayfish had been introduced. Expected rusty crayfish to have taken over certain waterbodies, but found this was not true. Instead, rusty crayfish were cohabitating with native populations of *Faxonius* except in one case in a small stream where *F. rusticus* had completely eliminated *F. obscurus*. This might have to do with the limestone content of the waterbody – *F. rusticus* might be associated with waters that have high limestone content.
 - Areas of new invasions tend to produce larger, more fecund organisms.
- Seth Herbst, Michigan DNR:
 - Updated attendees on genomics analysis done on voucher specimens to figure out source of relatedness among infestations in Michigan. This helped determine that certain infestations were the result of numerous unique introduction events; not a single introduction event spread.
- Doug Jensen, Minnesota Sea Grant:
 - Updated attendees about several upcoming crawfish boils being held to spread awareness about invasive crayfish.
- Laura Martin Torrijos, USDA Forest Service:
 - Conducting studies in southeastern North America to trace back the origins of pathogens that have been introduced in Europe. Studying the origin of pathogens can help determine where crayfish populations originate as well.
 - Also working to identify the diversity and virulence of pathogens that crayfish can carry, particularly *Procambarus clarkii* which is known to transport several pathogens.
 - Wondering if native species can be affected by strains that are more virulent. In Europe, native crayfish have been susceptible to crayfish plague - is it the same in the US?



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- Lindsay Chadderton, The Nature Conservancy:
 - Working with Michigan DNR and Central Michigan University on spawning reefs in Grand Traverse Bay and Little Traverse Bay in Lake Michigan. Conducted a combination of intensive trapping and barriers to get rid of rusty crayfish to try to protect native crayfish spawning reefs to increase native survivorship.
 - Also has a PhD student at Central Michigan University working on life history of rusty crayfish in the Great Lakes.
- Brian Roth, Michigan State University:
 - Will conduct methodological evaluations in infested ponds to compare various trapping techniques for red swamp crayfish. Two types of habitat traps are supposed to be less biased towards large male crayfish. They will be testing juvenile trapping methods as well.
- Reuben Keller, Loyola University Chicago:
 - Working on a population of red swamp crayfish in the North Shore channel of the Chicago area water systems. Were trapping intensively at a few sites last summer and tracked population declines. Population change is measured by catch per unit effort relative to control sites. They will see if population declines have been sustained over the winter and will work to push population levels even lower.
 - Also testing different bait types and experimenting with how long traps can be left out in order to maximize number of crayfish caught per number of traps that must be emptied.
 - Hot dogs seem to catch twice as many red swamp crayfish compared to other bait, such as dry dog food. Mael Glon also recommends Fancy Feast for trapping.

3:25 Next Steps

Charlebois told attendees that they should be hearing from the ICC about the outreach tool and BMP framework. She also explained that IISG is seeking funding to continue facilitation and practices (meetings, webinars) of the ICC. If funding is secured, an advisory committee will be created to guide ICC activities and continue moving this group forward.

Finally, Charlebois reminded attendees about the ICC website and recommended them to visit it and provide feedback to IISG in order to guide revisions. She also promoted the Google Group as a means to stay in contact with one another and continue to share information.

3:30 Adjourn



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Attendance

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