UPDATE ON USFWS RISK ASSESSMENT ACTIVITIES

Kate Wyman-Grothem
U.S. Fish and Wildlife Service, Midwest Region
Ecological Risk Screening Summary (ERSS)
Freshwater Fish Injurious Species Risk Assessment Model (FISRAM)
Crayfish Invasiveness Risk Assessment Model (CIRAM)
## Components of USFWS Risk Assessment Activities*

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<th>Ecological Risk Screening Summary (ERSS)</th>
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<tbody>
<tr>
<td>Type of assessment</td>
<td>Semi-quantitative rapid screen</td>
<td>Bayesian network model</td>
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</tr>
<tr>
<td>Sources of evidence</td>
<td>Published information</td>
<td>Published information and expert opinion</td>
<td>Published information and expert opinion</td>
</tr>
<tr>
<td>Taxonomic scope</td>
<td>All</td>
<td>Freshwater fish</td>
<td>Crayfish</td>
</tr>
<tr>
<td>Geographic scope</td>
<td>Contiguous United States (supplement available for non-contiguous states and territories)</td>
<td>Flexible</td>
<td>Flexible</td>
</tr>
<tr>
<td>Time to complete</td>
<td>approx. 3 days</td>
<td>1-2 months minimum</td>
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</tr>
<tr>
<td>Number of completed assessments</td>
<td>&gt;1,000</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
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*excluding participation in species-specific comprehensive risk assessment efforts
# Components of USFWS Risk Assessment Activities*

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<tr>
<td>Arrival considered?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survival considered?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Establishment considered?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Spread considered?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Ecological impacts considered?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Socioeconomic impacts considered?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Manageability considered?</td>
<td>No</td>
<td>No</td>
<td>No</td>
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</table>

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NEWLY AVAILABLE & UPDATED ERSS OF RELEVANCE TO THE GREAT LAKES
High Risk Crustaceans

- Killer Shrimp (*Dikerogammarus villosus*)
- Danube Crayfish (*Pontastacus leptodactylus*)
- Fishhook Waterflea (*Cercopagis pengoi*)
- Demon Shrimp (*Dikerogammarus haemobaphes*)
- Amphipod (*Pontogammarus robustoides*)
- Water Flea (*Daphnia lumholtzi*)
- Estuarine Mudcrab (*Rhithropanopeus harrisii*)

Photo credit: NOAA GLERL
High Risk Fish

- Maraena Whitefish (*Coregonus maraena*)
- Threespine Stickleback (*Gasterosteus aculeatus*)
- European Smelt (*Osmerus eperlanus*)
- Eastern Mosquitofish (*Gambusia holbrooki*)
- Northern Snakehead (*Channa argus*)
- Redear Sunfish (*Lepomis microlophus*)
- Topmouth Culter (*Culter alburnus*)
- Inland Silverside (*Menidia beryllina*)
- Barbel (*Barbus barbus*)
- Sailfin Molly (*Poecilia latipinna*)
- Japanese Eel (*Anguilla japonica*)
- Gudgeon (*Gobio gobio*)
- Bighead Carp (*Hypophthalmichthys nobilis*)
- Siberian Sturgeon (*Acipenser baerii*)
High Risk Mollusks

- Red-rim Melania (*Melanoides tuberculata*)
- Channeled Applesnail (*Pomacea canaliculata*)
- Chinese Mystery Snail (*Cipangopaludina chinensis*)
- Dark Falsemussel (*Mytilopsis leucophaeata*)
High Risk
Other
Vertebrates

• Nutria (*Myocastor coypus*)
• Egyptian Goose (*Alopochen aegyptiaca*)
• American Bullfrog (*Lithobates catesbeianus*)
High Risk Plants

- Giant Reed (Arundo donax)
- Hydrilla (Hydrilla verticillata)
- Pacific Mosquitofern (Azolla filiculoides)
- Parrotfeather (Myriophyllum aquaticum)
- Water Lettuce (Pistia stratiotes)
- Reed Canarygrass (Phalaris arundinacea)
- Eurasian Watermilfoil (Myriophyllum spicatum)
- Alligator Weed (Alternanthera philoxeroides)
- Flowering Rush (Butomus umbellatus)
- Carolina Fanwort (Cabomba caroliniana)
- Purple Nutsedge (Cyperus rotundus)
- African Elodea (Lagarosiphon major)
- Curly Leaved Pondweed (Potamogeton crispus)
- Large-flower Primrose-willow (Ludwigia grandiflora)
- Brittle Waternymph (Najas minor)
- Water Chestnut (Trapa natans)
Low Risk Fish

- Cockatoo Cichlid (*Apistogramma cacatuoides*)
- Zebra Loach (*Botia striata*)
- Tricolor Sharkminnow (*Balantiocheilos melanopterus*)
- Redtail Sharkminnow (*Epalzeorhynchos bicolor*)
Updated High Risk ERSS

- Redclaw (*Cherax quadricarinatus*)
- Tench (*Tinca tinca*)
- Grass Carp (*Ctenopharyngodon idella*)
- Nile Perch (*Lates niloticus*)
- Blue Tilapia (*Oreochromis aureus*)
- Mozambique Tilapia (*Oreochromis mossambicus*)
- Nile Tilapia (*Oreochromis niloticus*)
- Jaguar Guapote (*Parachromis managuensis*)
- Guppy (*Poecilia reticulata*)
- Orinoco Sailfin Catfish (*Pterygoplichthys multiradiatus*)
- Amazon Sailfin Catfish (*Pterygoplichthys pardalis*)
Updated Uncertain Risk ERSS

- Marbled Crayfish (*Procambarus virginalis*)
- Mrigal Carp (*Cirrhinus cirrhosus*)
- Black Acara (*Cichlasoma bimaculatum*)
- Crucian Carp (*Carassius carassius*)
Expanded Climate Matching Capabilities (RAMP 3.1)

- Addition of U.S. commonwealths and territories as target regions
- Ability to conduct a climate matching analysis for a single State or territory
- Improved handling of extremely high and extremely low volumes of species occurrence data
- RAMP SOP now available online
Recent Applications of USFWS Risk Assessment in the Great Lakes Region

- **ERSS:**
  - Supporting USEPA in nonnative zooplankton findings
  - Supporting the State of New York in decision-making following eDNA reports of northern snakehead
  - Identifying targets for invertebrate early detection through the USFWS Early Detection and Monitoring (EDM) program in the U.S. Great Lakes

- **FISRAM:** Evaluating risk of African longfin eel aquaculture in Michigan
All lakes: Demon Shrimp, Killer Shrimp, Marbled Crayfish

Red Swamp Crayfish
Amphipod *Pontogammarus robustoides*

Golden Mussel
Chinese Mitten Crab

Red Swamp Crayfish
Chinese Mitten Crab

Japanese Mysterysnail

Golden Mussel
Channeled Applesnail
Future Directions

• Continue to update finalized ERSS reports, incorporating the latest research and climate matching results
• Continue to respond to partner requests to produce ERSS reports that are not currently in our database
• Implement a standardized horizon scanning protocol to identify future suites of species for risk screening based on priority pathways and climate matching
• Increase attention to uncertain risk ERSS, prioritizing species for more in-depth assessment
Resources

• USFWS website: https://www.fws.gov/fisheries/ans/prevention.html
  – All completed ERSS reports, organized by risk category and taxon
  – Standard Operating Procedures for ERSS and RAMP
  – Peer review summaries for ERSS and FISRAM

• Example use of FISRAM:

• Email katherine_wyman-grothem@fws.gov to request an ERSS report not on the website or a copy of RAMP for your own use.