

Nebraska Aquatic Invasive Species List; Assessment Scores:

Nebraska Invasive Species Advisory Council
August 25, 2011

To better manage invasions, the Nebraska Invasive Species Council developed an assessment process to provide a transparent, repeatable, and credible basis for the council and partner agencies to prioritize management actions for invasive species

The list of Aquatic Invasive Species in Nebraska includes species that have been known to be invasive in at least one habitat type. Some species may not show invasive tendencies in other habitats. These lists are advisory in nature; they are provided as an educational tool and are not intended, alone, to dictate management actions or for regulatory action.

Species Evaluation

In order to categorize invasive species, the Nebraska Invasive Species Advisory Council developed an evaluation worksheet that is completed for each species. This evaluation worksheet was developed by incorporating components from other assessment models (e.g., Criteria for Ranking Invasive Plants of Nebraska (Rolfmeier 2007), I-Rank Invasive Species Assessment Protocol (Nature Serve), and Invasive Species Impact and Prevention/Early Action Assessment Tool (Washington Invasive Species Council), in which species are ranked by a series of questions in 5 broad sections: Ecological Impact, Current/Potential Distribution and Abundance, Economic Impact, Human Health Impact, and Management Difficulty/Current Management.

The list of Invasive Plants in Nebraska was produced by the Nebraska Invasive Species Council, and include species that have been known to be invasive in at least one habitat type. Some species may not show invasive tendencies in other habitats. These lists are advisory in nature; they are provided as an educational tool and are not intended, alone, to dictate management actions or for regulatory action.

Note: this ranking system is designed to give focus towards being *pro-active* rather than *re-active*; preventing the introduction of new invasive species and the spread of those that are in Nebraska but can still be eradicated; scores are assigned as such.

The Scores

The assessment provides two scores for each species:

- An **impact score** that relates to a species' environmental, economic, and human health threat
- A **prevention score** that relates to an agency's ability to take preventative or early action for that species.

For example, the higher the impact score, the greater the threat is to Nebraska's environment, economy, human health, or a combination of them. The higher the prevention score, the greater the opportunity for an agency to prevent establishment of the species or the greater the agency's ability to respond quickly to new infestations.

Both of these scores are plotted on a management grid to inform the council on future actions to take and to track the effectiveness of those actions. The actual scores are less important than the relative difference among species and the change in score over time. The scores also will serve as a baseline against which to measure how effective the actions of the council and other

agencies are in reducing a species' impact and improving the ability of state agencies to prevent new species from establishing, and to conduct a rapid response. The movement of a species on the graph will be important to enable the council to be adaptive in implementing its actions.

The supporting data:

The lists are primarily intended for use in categorizing and listing invasive species that are most threatening to Nebraska's resources. Lists for regions or localities within each state will differ from each other due primarily to differences in the degree of local ecological impacts. The following paragraphs outline the approach used by the Nebraska Invasive Species Advisory Council to create state lists of invasive species.

A list of the non-native aquatic species in Nebraska was compiled based on the previously developed *Aquatic Invasive Species of Nebraska Pocket Guide* (Decker et al. 2010), which includes information pertaining to species specific characteristics and current known location. Species represented were those recommended by experts in the field, although additional species recommendations would be welcomed.

The occurrence of a species in a county indicates that it has been collected and identified in that county. Although not all species have been fully accounted for in every county, the data here represent a fair distribution of where non-native species have occurred and likely still do.

For the compilation of a statewide list, a committee comprised of people with experience in invasive species biology, plant ecology and taxonomy, and land

management was formed. This "list committee" considered for evaluation any non-native species that was brought to its attention, but for the sake of efficiency the committee also focused on those species already widely acknowledged as invasive (based on existing records and data, such as previously published lists of invasive species or recommendations from observers, managers, scientists, and others). In addition, the committee solicited further information from all available sources, primarily those people with expertise and experience regarding the species to be evaluated.

Information sought was in several formats, including the following: published research and review papers; official reports, book chapters, planning documents, and biological assessments; unpublished data, including sampling or monitoring statistics, photographs, or detailed written descriptions; and personal observations or anecdotes (useful when published information is unavailable). As an integral part of this process, the committee solicited and welcomed contributions from as wide a diversity of potential sources of information as possible, but based its conclusions primarily on sources of information that possess the highest degree of reliability.

Once a categorical list is generated from an individual evaluation of each species, the committee will make the list and individual species evaluations public. The information will be published in two formats: a simple list and a list accompanied by the more extensive background information, including supporting documentation.

The evaluation and categorizing is an ongoing, iterative process. The list committee will continue to welcome new

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information that supplements knowledge about the ecology or distribution of any non-native species. When substantiated new information becomes available, the committee can re-evaluate, especially if the new data would potentially influence the ranking outcome.

The committee is willing to address comments about the composition of the list to the extent possible. The evaluation and ranking process is intended to provide public access to the decision-making process, as well as to serve as an educational resource on the factors that render invasive species a threat to Nebraska's resources.

All lists and supporting documents will be available online at the Nebraska Invasive Species Project website (<http://snr.unl.edu/invasives>)

Creating the List

Based on the scores, invasive species were placed into the pre-determined categories. Previous establishment of categories separate these lists:

Category 1: Future Potential Invasives

Category 2: Priority Invasives

Category 3: Established Invasives

How the List will be used

The species are plotted on a grid which will provide recommendations for action, such as looking at the current ability to prevent new infestations, making policy recommendations, and identifying where more management or education is needed.

The list is intended to:

- Provide a uniform methodology for categorizing invasive species.
- Provide a clear explanation of the process used to evaluate and categorize species.
- Provide flexibility so the criteria can be

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adapted to the needs of different regions or organizations.

- Identify where more information may be needed.
- Educate about the impacts of invasive species and the ability to prevent them.

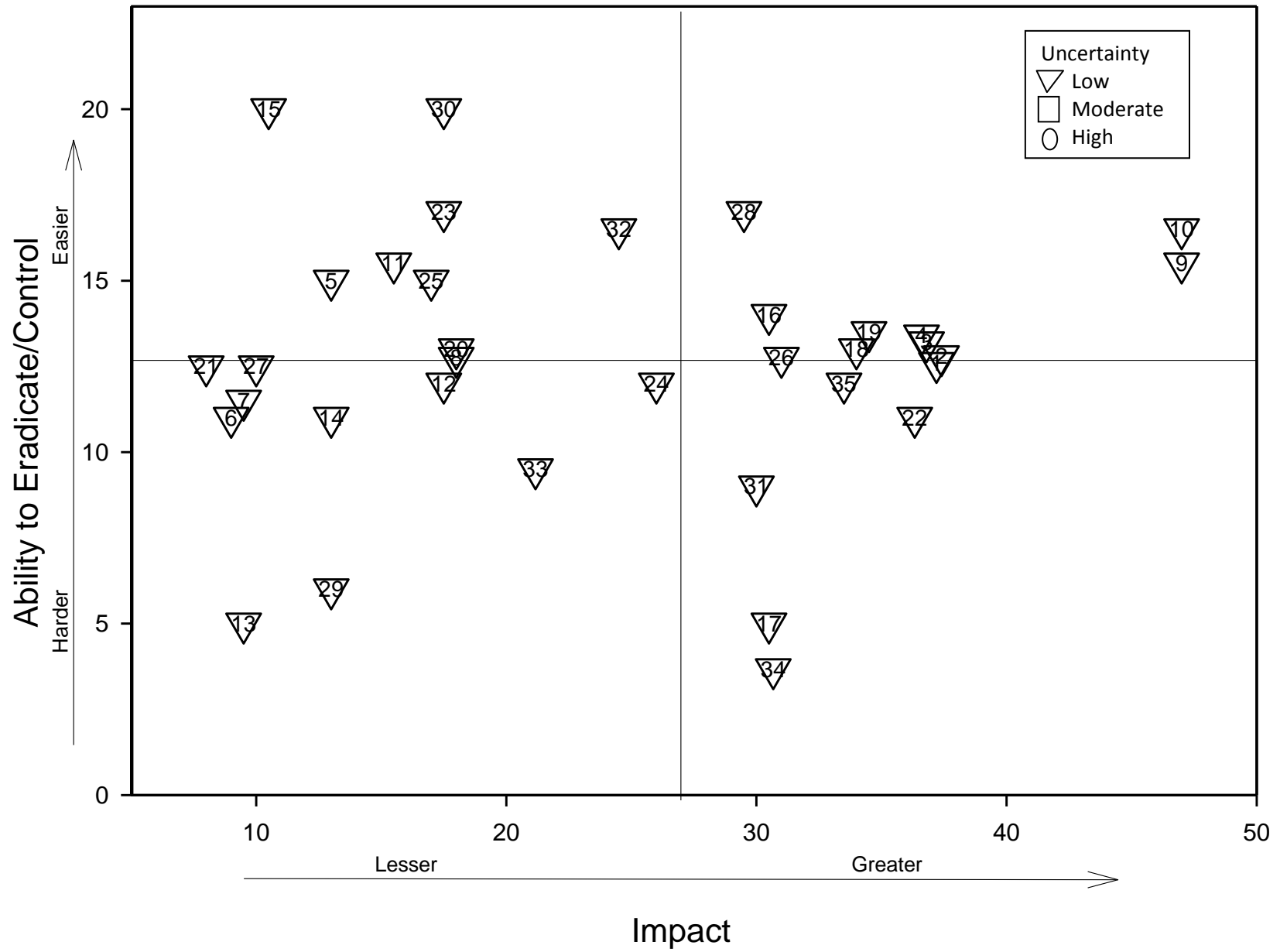
These lists are not intended to:

- Represent a scientifically based risk assessment (this is an assessment based on best professional judgment).
- Produce a list that itself has regulatory force, though regulatory agencies may use the information to modify existing lists.
- Provide lists for any region as the invasiveness of species will differ from one region to another depending on geography, climate, ecosystems present, and other factors.

How to Read the Grid

The grid is divided into four sections based on high and low impact scores and high and low prevention scores. Management actions presented in the quadrants then pertain to the group of species falling there. A level of uncertainty is assigned to each species based on the ability to answer each assessment question given current information. Additional information should be examined to help reduce uncertainty.

More information may be found at <http://snr.unl.edu/invasives>



1	Largemouth bass virus*		19	bighead carp	Hypophthalmichthys nobilis
2	Heterosporosis*		20	white perch	Morone americana
3	Whirling Disease*		21	rudd	Scardinius erythrophthalmus
4	Viral Hemorrhagic Septicemia (VHS)*		22	giant reed*	Arundo donax
5	Chytrid fungus	Batrachochytrium dendrobatidis	23	flowering rush	Butomus umbellatus
6	Chinese mystery snail	Cipangopaludina chinensis	24	Brazilian waterweed, elodea*	Egeria densa
7	Japanese mystery snail	Cipangopaludina japonica	25	water hyacinth*	Eichhornia sp.
8	Asian clam	Corbicula fluminea	26	hydrilla*	Hydrilla verticillata
9	zebra mussel	Dreissena polymorpha	27	parrot feather*	Myriophyllum aquaticum
10	quagga mussel*	Dreissena rostriformis bugensis	28	Eurasian watermilfoil	Myriophyllum spicatum
11	rusty crayfish	Orconectes rusticus	29	common watercress	Nasturtium officinale
12	New Zealand mudsnail*	Potamopyrgus antipodarum	30	yellow floating heart	Nymphoides peltata
13	North American bullfrog	Rana catesbeiana	31	reed canary grass	Phalaris arundinacea
14	round goby*	Apollonia melanostoma	32	curly leaf pondweed	Potamogeton crispus
15	snakehead*	Chana sp.	33	giant salvia*	Salvinia molesta
16	grass carp	Ctenopharyngodon idella	34	narrow-leaf cattail	Typha angustifolia and hybrids
17	common carp	Cyprinus carpio	35	Didymo, rock snot*	Didymosphenia geminata
18	silver carp	Hypophthalmichthys molitrix			

***Potential Future Invasives (not in Nebraska)**

Nebraska Invasive Species Assessment Scores

Nebraska Invasive Species Advisory Council

July 22, 2011

INVASIVE SPECIES SCORING WORKSHEET

The Invasive Species Threat to Nebraska

In response to this increasing threat of invasive species, the Nebraska Invasive Species Council has developed a ranking system to evaluate the impacts of current and potential invasive species. This ranking system has been designed to be a robust and transparent procedure to aid natural resource managers in 1) identifying the most problematic invasive species in or near the state and 2) prioritizing invasive species with a focus on preventing the introduction of new species and the spread of those that are here but can still be eradicated. This ranking worksheet was developed by incorporating components from other assessment models (e.g., Criteria for Ranking Invasive Plants of Nebraska (Rolfmeier 2007), I-Rank Invasive Species Assessment Protocol (Nature Serve), and Invasive Species Impact and Prevention/Early Action Assessment Tool (Washington Invasive Species Council), in which species are ranked by a series of questions in 5 broad sections: Ecological Impact, Current/Potential Distribution and Abundance, Economic Impact, Human Health Impact, and Management Difficulty/Current Management.

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Instructions:

For most questions, scores range from 0 to 10 points. Reviewers may select a single score per question, or a range of scores may also be applied (i.e., selecting both A and B when there is uncertainty). Selecting more than one answer will result in a range of scores for that question and should be added up as such for a final score range. Any score of 'unknown' is given a numeric score of 1 and incorporated into the overall score. The number of unknown responses is recorded and also used to determine the level of certainty in the assessment (i.e., high, medium, low).

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Species Name:

Summary of Scores

	<u>Potential Max</u>	<u>Score</u>
1). Ecological Impact	20	
2). Current/Potential Distribution & Abundance	20	
3). Economic Impact	20	
4). Human Health Impact	20	
5). Management Difficulty	20	
Total Score (100)		
Number of 'Unknown' Scores Recorded:		
Level of Certainty in Assessment:		High Medium Low

For most questions, scores range from 0 to 10 points. A range of scores may also be applied (i.e., selecting both A and B). Any score of 'unknown' is given a numeric score of 1 and incorporated into the overall score. The number of unknown responses is recorded and used to determine the level of certainty in the assessment (i.e., high, medium, low).

1. ECOLOGICAL IMPACT

Impact on ecosystem processes

- | | |
|---|----|
| A. No impact on ecosystem processes. | 0 |
| B. Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability). | 3 |
| C. Causes significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coasts, reduces areas of open water important to waterfowl, alters water chemistry, alters rate of water retention, reduces ecosystem productivity). | 7 |
| D. Causes major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., alters geomorphology, hydrology, or fire frequency; fixes substantial levels of nitrogen in the soil which favors non-native species). | 10 |
| U. Unknown | |

Comments:

Impact on community composition, structure, and interactions

- | | |
|---|----|
| A. No impact on community composition, structure, and interactions. | 0 |
| B. Influences community composition, structure, and interactions (e.g., reduces the number of individuals in one or more native species). | 3 |
| C. Causes significant alteration of community composition, structure, and interactions (e.g., produces a significant reduction in the population size of one or more native species). | 7 |
| D. Causes major alteration in community composition, structure, and interactions (e.g., forms a complete monotype, results in the extirpation of one or more native species reducing biodiversity or changing composition towards exotic species). | 10 |
| U. Unknown | |

Comments:

2. CURRENT/POTENTIAL DISTRIBUTION AND ABUNDANCE

Current distribution in Nebraska

- A. Widely distributed throughout state. 0
- B. Regionally distributed. 3
- C. Not present 5
- D. More than one infestation known spread within one or multiple watersheds. 7
- E. Isolated infestation, 1-3 known locations encompassing fewer than 50 acres. 10
- U. Unknown

Comments:

Ability to spread and disperse

- A. Does not occur – species does not spread within suitable habitat. 0
- B. Actual or potential slow rate of spread within suitable habitat, infrequent or inefficient dispersal. 5
- C. Actual or potential moderate rate of spread within suitable habitat, efficient dispersal occurs but population remains within a natural boundary (such as a water body or natural area surrounded by human development). 7
- D. Actual or potential rapid rate of spread (doubling in < 10 years) within suitable habitat, numerous opportunities for dispersal (species has ability to move across natural barriers or has adaptations such as wings or hooked fruit-coats that facilitate dispersal). 10
- U. Unknown

Comments:

3. ECONOMIC IMPACT

Impact on agricultural/aquaculture/forest products industry or physical infrastructure

- A. No impact on agriculture/aquaculture, forest products, or physical infrastructure. 0
- B. Causes minor impact on industries/infrastructure (e.g., reduced livestock forage, small increase in fire susceptibility, minor damage to dams, roads, flood control ditches). 5
- C. Causes significant impact on industries/infrastructure (e.g., loss of livestock, major damage to dams, roads, damage to water diversion system). 7
- D. Potential to shut-down portions of the industry, potential to render parts of physical infrastructure unusable, extreme replacement costs. 10
- U. Unknown

Comments:

Impact on recreational sector

- A. No impact on recreational opportunities. 0
- B. Causes minor impact on recreational opportunities (e.g., short-term closure). 5
- C. Causes detrimental impact on recreational opportunities (e.g., long-term closure, significant loss of opportunities for camping, hiking, boating, fishing/hunting). 7
- D. Causes long-term elimination of one or more recreational opportunities. 10
- U. Unknown

Comments:

4. HUMAN HEALTH IMPACT

- A. No impact on human health. 0
- B. Minor risk of impacting human health. 7
- C. Causes physical injury (e.g., thorns, shells of zebra mussel) or provides habitat for a disease vector or organism. 14
- D. Is a human disease vector or is a disease organism. May also cause individual mortality (e.g., accidental ingestion of poison hemlock, West Nile Virus). 20
- U. Unknown

Comments:

5. ABILITY TO MANAGE OR CONTROL

Difficulty of Control

- A. Management is not required (e.g., species does not persist). 0
- B. Management requires a major, long-term investment of human and financial resources. 5
- C. Management requires a major short-term investment of human and financial resources, or a moderate long-term investment. 7
- D. Management is relatively easy and inexpensive; requires a minor investment in human and financial resources. 10
- U. Unknown

Comments:

Degree to which control is regulated

- A. No regulatory barriers, voluntary control may or may not be encouraged, no or minor regulatory restrictions on organisms/host and no surveillance. 0
- B. Mandatory control at local level, regulatory oversight on organisms/host with restricted trade. 5
- C. Mandatory containment of species where regionally established and mandatory control of species where not yet established, trade and/or transport of organisms/hosts illegal. 7
- D. Mandatory eradication of species, strict prohibition on organisms/host and some infrastructure for interception. 10
- U. Unknown

Comments:

Total Score