Skipjack Herring (*Alosa chrysochloris*)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, Web Version – 9/13/2017

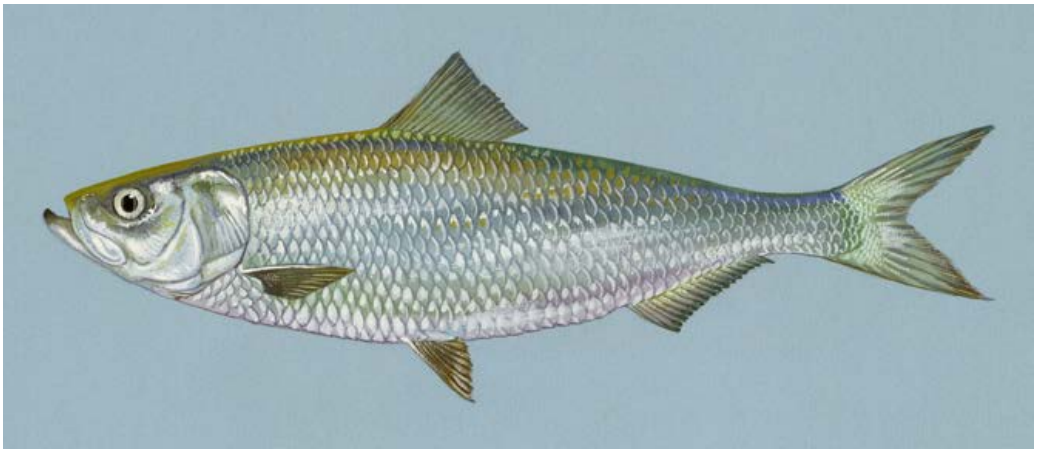

Photo: Duane Raver. Public domain. Available: http://www.eol.org/data_objects/27291676.

1 Native Range and Status in the United States

Native Range

From Collette et al. (2015):

"This species is distributed in the Gulf of Mexico from Tampa, Florida west to Corpus Christi, Texas and also in rivers between those areas."

From Fuller (2016):

"Red River drainage (Hudson Bay basin) and Mississippi River basin from central Minnesota south to the Gulf of Mexico, and from southwestern Pennsylvania west to eastern South Dakota, Nebraska, Kansas, Oklahoma, and Texas; Gulf Slope drainages from the Apalachicola River, Florida, to the Colorado River, Texas (Page and Burr 1991)."

Status in the United States

Alosa chrysochloris is native to the United States as indicated in the Native Range section above. The remainder of this section is devoted to introduced populations within the United States.

From Fuller (2016):

“Skipjack herring were collected above the falls of the Kanawha drainage in West Virginia prior to 1993 (Stauffer et al. 1995).

Skipjack herring were recently collected in Lake Michigan in Wisconsin (Fago 1993). The first collection was a single fish taken in Green Bay north of Dyckeysville, Kewaunee County on 2 August 1989. A second fish was caught in Lake Michigan just east of Kenosha, Kenosha County in January of 1991. A third was caught east of Bailey's Harbor near the outlet of Moonlight Bay in Door County (Fago 1993).”

“The report of skipjack herring from Lake Erie was rejected by Trautman (1981).”

From Lemke and Pegg (2001):

“Clupeids collected in hoop nets were primarily gizzard shad (*Dorosoma cepedianum*), however, threadfin shad (*D. petenense*) and skipjack herring (*Alosa chrysochloris*) were also collected [from Lake Chautauqua, Illinois] (Fig. 4, App. A [in source material]).”

Means of Introductions in the United States

From Fuller (2016):

“The herring likely gained access to Lake Michigan via the Chicago Shipping Canal (Fago 1993). Unknown in West Virginia.”

Remarks

From Chandler (2014):

“Skipjack herring are the sole host for the larval stages of two endangered mussel species in Minnesota, ebony shells and elephant-ears. These fish permit these two mussel species to complete their life cycle. The reestablishment of skipjack herring would allow ebony shell and elephant ear mussels to return to Minnesota. Lock and dam structures limit the spring migration of skipjack herring. To reestablish these fish in Minnesota, fish passage features such as ladders or lifts will be needed at several lock and dam sites between Iowa and central Minnesota. (MN DNR, 2013)”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Eschmeyer et al. (2016):

“***chrysochloris, Pomolobus*** Rafinesque [C. S.] 1820:171 [Western Revue and Miscellaneous Magazine: a monthly publ., devoted to literature and science, Lexington, KY v. 2 (no. 3)] Ohio River, U.S.A. No types known. Also in Rafinesque 1820:39. •Valid as *Alosa chrysochloris*

(Rafinesque 1820) -- (Lee et al. 1980:63, Whitehead 1985:198, Robins & Ray 1986:68, Robison & Buchanan 1988:109, Tomelleri & Eberle 1990:38, Page & Burr 1991:34, Boschung 1992:40, Etnier & Starnes 1993:123, Warren et al. 1994:132, Knight & Hastings 1994:149, Stauffer et al. 1995:46, Cross & Collins 1995:43, Mettee et al. 1996:117, McEachran & Fechhelm 1998:332], Fuller et al. 1999:43, Lyons et al. 2000:22, Ross et al. 2001:105, Scharpf 2003:13, Munroe & Nizinski 2003:812, Nelson et al. 2004:67, Bailey et al. 2004:68, Miller & Robison 2004:68, Boschung & Mayden 2004:137, Scharpf 2005:9, Page & Burr 2011:149, Page et al. 2013:67). **Current status:** Valid as *Alosa chrysochloris* (Rafinesque 1820). Clupeidae."

From ITIS (2016):

"Taxonomic Status: Current Standing: valid"

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Clupeomorpha
Order Clupeiformes
Suborder Clupeoidei
Family Clupeidae
Subfamily Alosinae
Genus *Alosa*
Species *Alosa chrysochloris* (Rafinesque, 1820)"

Size, Weight, and Age Range

From Collette et al. (2015):

"Its maximum length is 50 cm SL, but common to 37.5 cm SL. Its maximum published weight is 1.7 kg and its maximum reported age is 4 years (Whitehead 1985)."

From Fuller (2016):

"Size: 53 cm."

Environment

From Collette et al. (2015):

"This pelagic-neritic and anadromous (maybe not strictly) species enters brackish and freshwater. It is strongly migratory within rivers, mostly in fast-flowing water where it is

renowned for leaping (Munroe and Nizinski 2002)."

From Froese and Pauly (2016):

"Marine; freshwater; brackish; pelagic-neritic; anadromous [Riede 2004]."

From NatureServe (2015):

"Habitat includes clear to moderately turbid medium to large rivers and large reservoirs; usually in current over sand and gravel; occasionally occurs in coastal brackish or marine waters (Robins and Ray 1986, Page and Burr 2011)."

Climate/Range

From Froese and Pauly (2016):

"Subtropical; 45°N - 23°N, 100°W - 82°W [Whitehead 1985]"

Distribution Outside the United States

Native

Alosa chrysochloris is native to the United States. See Native Range in Section 1.

Introduced

No records of *Alosa chrysochloris* introductions outside the United States were found.

Means of Introduction Outside the United States

No records of *Alosa chrysochloris* introductions outside the United States were found.

Short Description

From Froese and Pauly (2016):

"Dorsal spines (total): 0; Anal spines: 0. Belly with a distinct keel of scutes. Lower jaw not rising steeply within mouth; teeth prominent at front of lower jaw. Lower gill rakers slender. Back bluish green, abruptly changing to silver on flank; no dark spot at shoulder. Closely resembles *A. mediocris* of Atlantic coasts, which has no upper and weak lower jaw teeth, a dark shoulder spot and the body deeper than head length [Whitehead 1985]."

From Chandler (2014):

"These fish have a large mouth and pointed snout with a protruding lower jaw, which is distinctive from other similar species. Skipjack herring have teeth in both jaws as well as two to four rows on their tongue. They are gray dorsally and silver or white laterally and ventrally. At times, skipjack herring can appear to have a blue reflection coming from their sides. These fish also have yellow eyes with protective eye lid covers. Skipjack herring have modified scales on their slender body. These scales are referred to as "scutes" and form a saw-tooth margin around

the belly, which distinguishes skipjack herring from other similar species. ("Skipjack Herring", 2012; MN DNR, 2013)”

Biology

From Collette et al. (2015):

“Adults feed on small fishes; juveniles on insects. Its spawning location and season are not well understood. Adults serve as hosts to the larvae (glochidia) of the economically valuable pearly mussel (*Fusconaia ebena*) of the Mississippi basin.”

From NatureServe (2015):

“Spawns from early March to late April in Florida, early May to early July in upper Mississippi drainage.”

“A schooling species.”

“Spawning occurs probably in deep water of main channels over bars of coarse sand or gravel (Lee et al. 1980).”

From Chandler (2014):

“Skipjack herring complete their entire life cycle in fresh water. Information regarding their spawning patterns is very limited; however, skipjack herring are thought to spawn in the deepest channels over coarse gravel or underwater sandbars. Juveniles feed on zooplankton, insect larvae, and small fishes, fish consumption increases proportionately with size. Juvenile skipjack herring reach lengths of 75 to 150 mm during their first year of life. Sexual maturity occurs at about 300 mm. Immediately after hatching, skipjack herring are on their own and many are eaten by predatory fish. Juveniles that survive the first few months of life have greatly increased chances of survival. Skipjack herring typically stop growing after reaching 21 inches in length, which means they do not have indeterminate growth. ("Herring Family: Clupeidae", 2008; Hassan, 2013)”

“Very little information is available regarding the spawning patterns of skipjack herring. These fish are unique in family Clupeidae, as not all skipjack herring make an anadromous journey. In general, members of family Clupeidae spawn in the spring, once water temperatures have warmed to between 11 and 27° Celsius. Before spawning, skipjack herring typically travel a long distance. Due to the water temperature requirements, spawning typically occurs earlier at lower latitudes and later at higher latitudes. Female clupeids typically reach the spawning grounds before males, where the oldest females spawn first. Since clupeids travel in schools, they do not have a problem finding or attracting mates. These fish typically form mating pairs, or groups of three. Females drop their eggs in moderately deep, to very deep areas over gravel, while males simultaneously fertilize them with sperm. ("Herring Family: Clupeidae", 2008)”

“Female skipjack herring reach sexual maturity in approximately three years, while males are thought to mature in two years. Females are thought to lay between 100,000 and 300,000 eggs

every spring after their migration. Mature skipjack herring immediately leave the spawning site once the spawn is complete. Larvae hatch in 58 hours at 17.2° Celsius. The average larval length after hatching is roughly 3.4 to 3.6 mm. After the spawn concludes, larval skipjack herring are immediately on their own. (Ross, 2001)

Skipjack herring give no parental care after the young hatch; they immediately leave the spawning grounds and begin the journey back to their original habitat location. Larval skipjack herring spend the summer in the shallows and in the fall, they move to large groups in the main channel for protection. ("Skipjack Herring", 2012)”

Human Uses

From Collette et al. (2015):

“This species is of minor commercial importance and is a gamefish in some regions.”

From Chandler (2014):

“Skipjack herring can be eaten by people, but they are generally considered a 'rough fish' because they are difficult to debone. These fish are caught by commercial fisherman to sell and use for bait to catch preferred game fish. Although skipjack herring do not have a very large economic purpose, they provide a quality food source for many desired game fish. Game fishing is a very large industry and attracts people from all over the country. (Morrison, 2009)”

Diseases

From Bailly (2008):

“Host of *Ergasilus arthrosis* Roberts, 1969 (parasitic: ectoparasitic)
Ergasilus clupeidarum Johnson S.K. & Rogers, 1972 (parasitic: ectoparasitic)”

No records of OIE reportable diseases were found.

Threat to Humans

From Froese and Pauly (2016):

“Harmless”

3 Impacts of Introductions

No records of impacts of introductions of *Alosa chrysochloris* were found.

4 Global Distribution

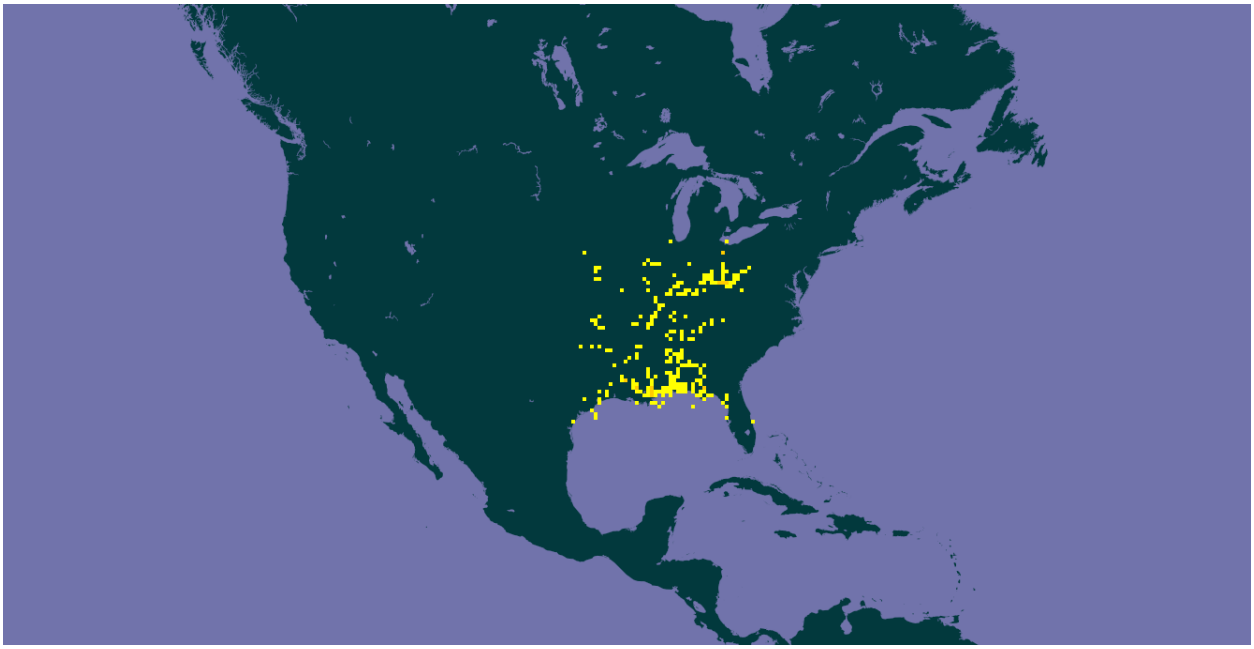

Figure 1. Known global distribution of *Alosa chrysochloris*. Map from GBIF (2013).

The observation in Lake Erie was discredited in 1981 (Fuller 2016) and was not used as a source point for the climate match. The observation on the east coast of Florida is the result of a single specimen collected in 1977 (GBIF 2013) and cannot be corroborated by another source and was not used as a source point for the climate match.

5 Distribution Within the United States

Figure 2. Known distribution of *Alosa chrysochloris* in the United States. The brown area indicates the native range of the species. Map from Fuller (2016).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match was high for much of the eastern half of the country fading to medium and low the further west with a very low match on the West Coast. Much of the area with a high match contains the native range of *Alosa chrysochloris*. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the Continental U.S. was 0.567, high, and high in Alabama, Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Mississippi, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Virginia, Vermont, West Virginia, Wisconsin, and Wyoming.

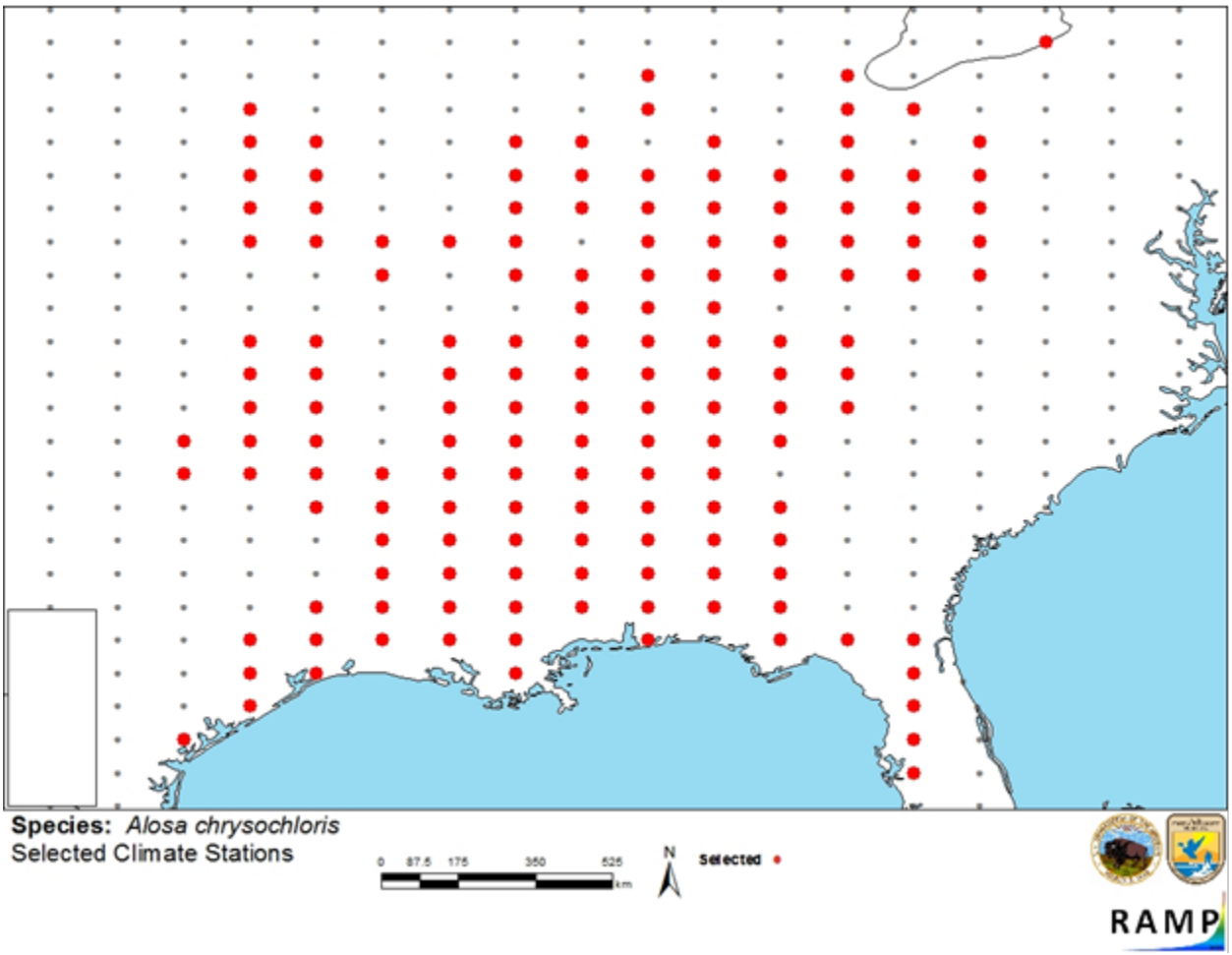

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Alosa chrysochloris* climate matching. Source locations from Lemke and Pegg (2001), GBIF (2013), and Fuller (2016).

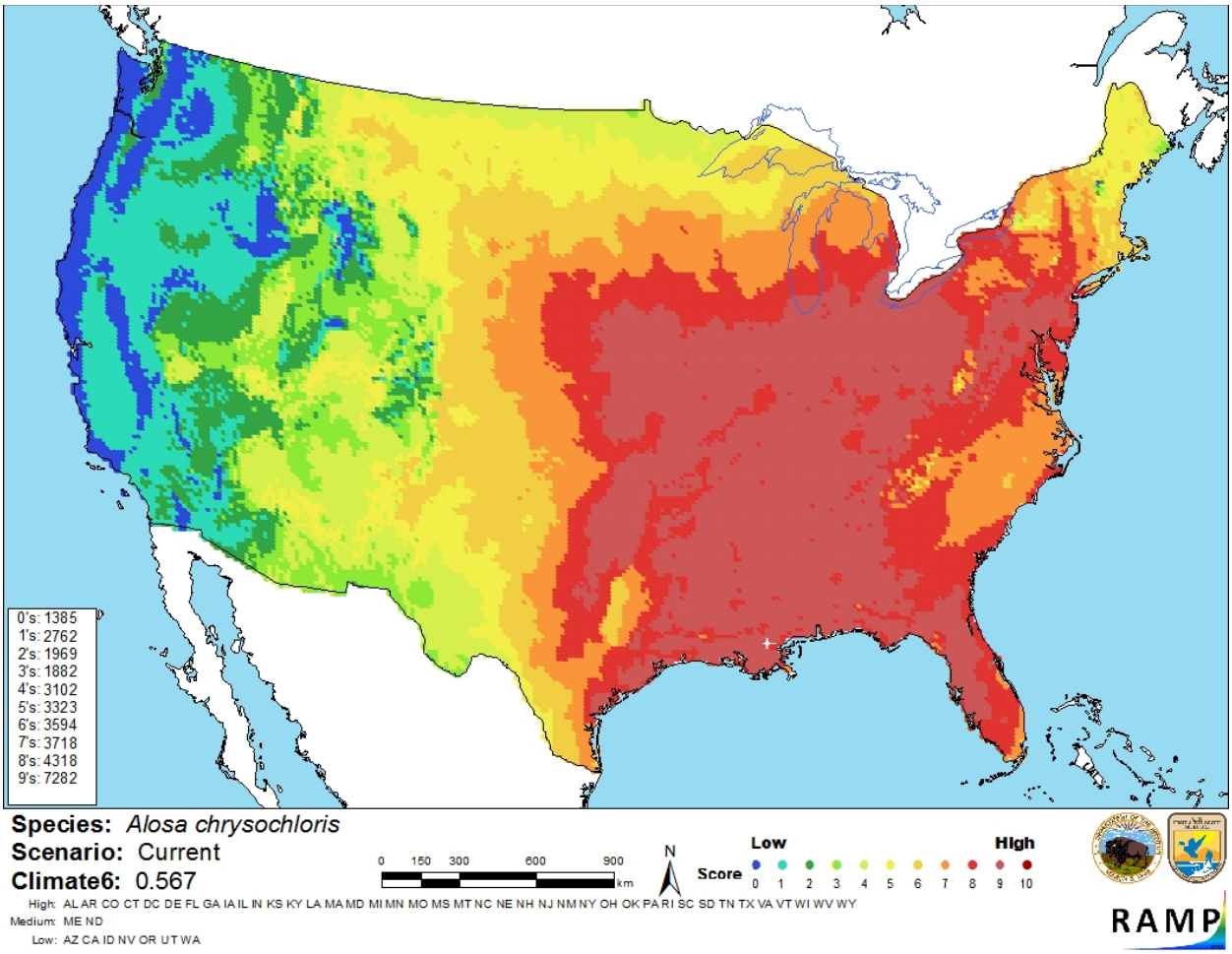

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Alosa chrysochloris* in the contiguous United States based on source locations reported by Lemke and Pegg (2001), GBIF (2013), and Fuller (2016). 0= Lowest match, 10=Highest match."

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

The certainty of assessment for *Alosa chrysochloris* is medium. Adequate ecological and biological information was available. Records of introductions were found but no records of impacts of those introductions were available.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The history of invasiveness for *Alosa chrysochloris* is not documented. There are records of this species introduced outside its native range. Some introductions seem to have resulted in reproducing populations but there were no records found of any impacts of these introductions. The climate match is high. The majority of the areas with a high match are within the native range of *Alosa chrysochloris*; however there are areas with high match outside of the native range, particularly the Great Lakes basin and the East Coast. The certainty of assessment is medium. The overall risk assessment category is uncertain. This species is native to a very large portion of the United States which makes interpretation of the climate match results difficult.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Medium**
- **Remarks/Important additional information No additional remarks.**
- **Overall Risk Assessment Category: Uncertain**

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Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

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Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

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