

Broad Whitefish (*Coregonus nasus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, August 2011
Revised, September 2014 and January 2018
Web Version, 7/5/2018

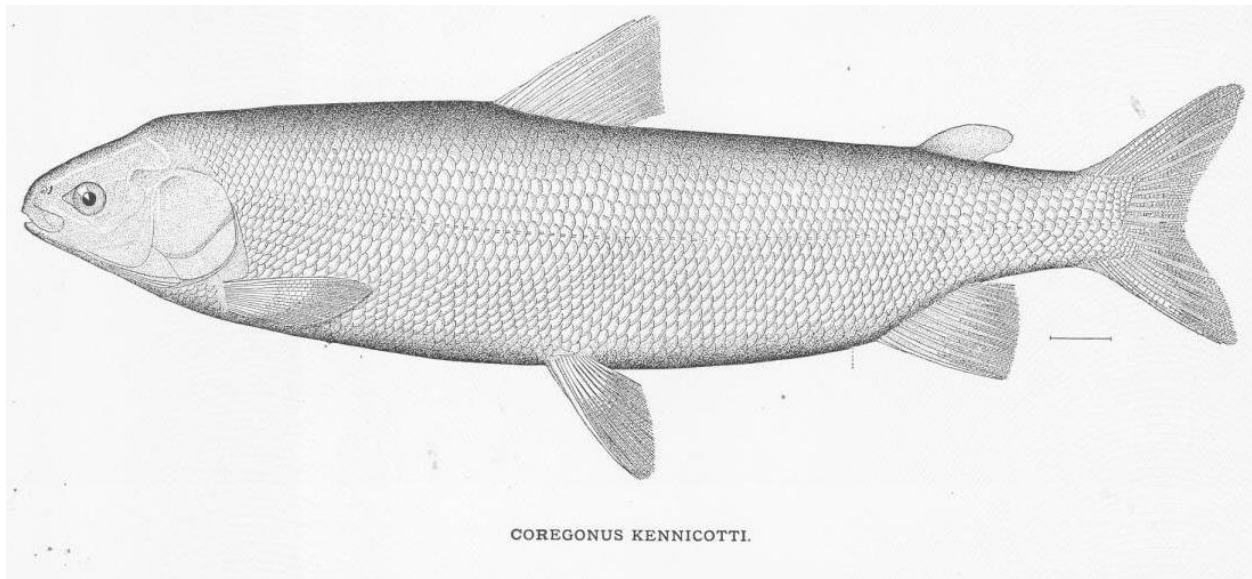


Photo: L. M. Turner. Public domain. Available:
<http://digitalcollections.lib.washington.edu/cdm/singleitem/collection/fishimages/id/46746/rec/2>.
(December 2017).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2017):

“Eurasia and North America: all drainages of Arctic Ocean from Volonga and Pechora to Alaska.”

From NatureServe (2017):

“Range includes Arctic drainages from the Perry River, Northwest Territories, Canada, to the Kuskokwim River (Bering Sea tributary), Alaska; also northern Eurasia (west to the Pechora River, Russia, and south to the Penzhina River, Sea of Okhotsk (Lee et al. 1980, Page and Burr 2011).”

Status in the United States

From Alaska Department of Fish and Game (no date):

“In Alaska, broad whitefish occur throughout the freshwater drainages of the Bering Sea (including the Yukon and Kuskokwim rivers) and drainages of the Chukchi Sea and the Arctic Ocean. Broad whitefish can tolerate some salt water, so they may also be found in the brackish waters of these systems.”

Means of Introductions in the United States

This species has not been reported as introduced or established in the United States outside of its native U.S. range.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2017):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Protacanthopterygii
Order Salmoniformes
Family Salmonidae
Subfamily Coregoninae
Genus *Coregonus*
Species *Coregonus nasus* (Pallas, 1776) – broad whitefish”

From Eschmeyer et al. (2017):

“Current status: Valid as *Coregonus nasus* (Pallas 1776). Salmonidae: Coregoninae.”

From Bailly (2008):

“Synonymised names *Coregonus kennicotti* Milner, 1883 (synonym)
Coregonus nasus kennicotti Milner, 1883
Salmo nasus Pallas, 1776 (synonym)
Salmo nasutus (Pallas, 1776)
Salmo schokur Pallas, 1776 (synonym)”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“Max length : 71.0 cm TL male/unsexed; [Love et al. 2005]; common length : 46.0 cm TL male/unsexed; [Scott and Crossman 1998]; max. published weight: 16.0 kg [Scott and Crossman 1998]; max. reported age: 15 years [Kottelat and Freyhof 2007]”

From Alaska Department of Fish and Game (no date):

“Mature broad whitefish average from two to five kilograms (~4.5 to 11 pounds) In North Slope waters, mature fish are largest in the Colville and Chipp river areas and smallest on the eastern edge of their Alaska distribution. Generally, mature fish on the slope run 500 to 600 mm (~ 9.5 to 23.5 inches).”

“Broad whitefish mature at a late age as compared to other salmonids (members of the salmon family). Most become mature between eight and ten years old. They live a long time; some reaching an age of 20+ years.”

Environment

From Froese and Pauly (2017):

“Freshwater; brackish; pelagic-neritic; anadromous [Riede 2004].”

Climate/Range

From Froese and Pauly (2017):

“Polar; 73°N - 59°N, 46°E - 102°W”

Distribution Outside the United States

Native

From Froese and Pauly (2017):

“Eurasia and North America: all drainages of Arctic Ocean from Volonga and Pechora to Alaska.”

From NatureServe (2017):

“Range includes Arctic drainages from the Perry River, Northwest Territories, Canada, to the Kuskokwim River (Bering Sea tributary), Alaska; also northern Eurasia (west to the Pechora River, Russia, and south to the Penzhina River, Sea of Okhotsk (Lee et al. 1980, Page and Burr 2011).”

Introduced

Olenin et al. (2010) reports *Coregonus nasus* as introduced to the Gulf of Riga, Baltic Sea, but the status of the population is unknown, no other sources corroborate this, and no further information is available.

DAISIE (2018) reports *Coregonus nasus* as Alien/Unknown in Begium – North Sea and the European part of Russia, Alien/Established in Latvia and Lithuania, and in Ukraine with no other information available.

NOBANIS (2018) reports *Coregonus nasus* from Latvia. The status and invasiveness are not known. The species is also reported from Lithuania as extinct, not established, and not invasive.

Means of Introduction Outside the United States

From Olenin et al. (2010):

“Vector of introduction: stocking”

Short Description

From Froese and Pauly (2017):

“Dorsal spines (total): 0; Dorsal soft rays (total): 10-13; Anal spines: 0; Anal soft rays: 11 - 14; Vertebrae: 60 - 65. Distinguished by its short gill rakers, which are less than one-fifth as long as the interorbital width, and the rounded to flat profile of the head [Morrow 1980]. Adipose fin fairly large; axillary process present in the pelvic fins [Morrow 1980]. Olive-brown to nearly black on back; sides silvery, often with a gray cast; belly white to yellowish; fins usually rather gray in adults, pale in young [Morrow 1980].”

From Alaska Department of Fish and Game (no date):

“The broad whitefish has an elongated body covered in silvery scales. Its body from back to belly, however, is very broad (hence the fishes’ name) compared to other whitefish species. From the mouth to the back, just above the gill plate, the broad whitefishes’ body rises at a sharp angle giving it a much more blunt face and meatier head than other whitefishes. The broad whitefish has a very small, slightly down-turned mouth; adapted for feeding off the bottom. As with other whitefishes its caudal (tail) fin is deeply forked. It has an adipose fin (fleshy fin on the back behind the dorsal fin, close to the tail fin) [...]. Fins are dark. The belly is white to faded yellow and cheeks may have brown, frecklish spots.”

Biology

From Froese and Pauly (2018):

“Nerito-pelagic [Coad and Reist 2004]. Lowland river and lakes [Kottelat and Freyhof 2007] but most frequently in streams [Page and Burr 1991]. Lacustrine and estuarine anadromous forms exist [Berg 1962]. Alevins and juveniles feed on zooplankton, adults on benthos, mainly chironomid larvae and molluscs [Scott and Crossman 1973; Kottelat and Freyhof 2007]. Males

reproduce for the first time in 4-8 years, females at 5-9. Adults start upstream migration in late July - August and reach spawning sites by October - November and spawn in stretches with swift current and sand-pebble bottom, often under ice. Spawning lasts 5-7 days and fish leave spawning site soon after, migrating downstream to overwinter in deeper places of lower stretches of rivers together with older juveniles. In spring, alevins drift from spawning sites downstream with flood-water and forage in floodplain lakes and oxbows where they remain until end of summer before moving to river or reaching maturity (if lakes are large enough and do not dry out)."

Human Uses

From Froese and Pauly (2017):

"Widely used for aquaculture in eastern Europe [Kottelat and Freyhof 2007]. Flesh is highly esteemed [Scott and Crossman 1998]. Sold fresh, dried, or smoked [Scott and Crossman 1998]."

"Fisheries: commercial; gamefish: yes"

From Patton et al. (1997):

"The broad whitefish is an abundant amphidromous species that inhabits several of the rivers on the North Slope of the Brooks Range in Alaska, and it is an important component of Native subsistence fisheries."

Diseases

From Hoffman (1999):

"*Coregonus nasus*, broad whitefish

Protozoa:

Patatrichodina sp. (R)

Monogenea:

Tetraonchus grumosus (R)

Nematoda:

Cystidicola farionis

Acanthocephala:

Neoechinorhynchus tumidus"

No OIE-reportable diseases have been documented for this species.

Threat to Humans

From Froese and Pauly (2017):

"Harmless"

3 Impacts of Introductions

From Olenin et al. (2010):

“Ecological impact: predation (Valtonen, Valtonen 1980b), transfer of parasites and diseases (Valtonen, Valtonen 1980a)”

4 Global Distribution

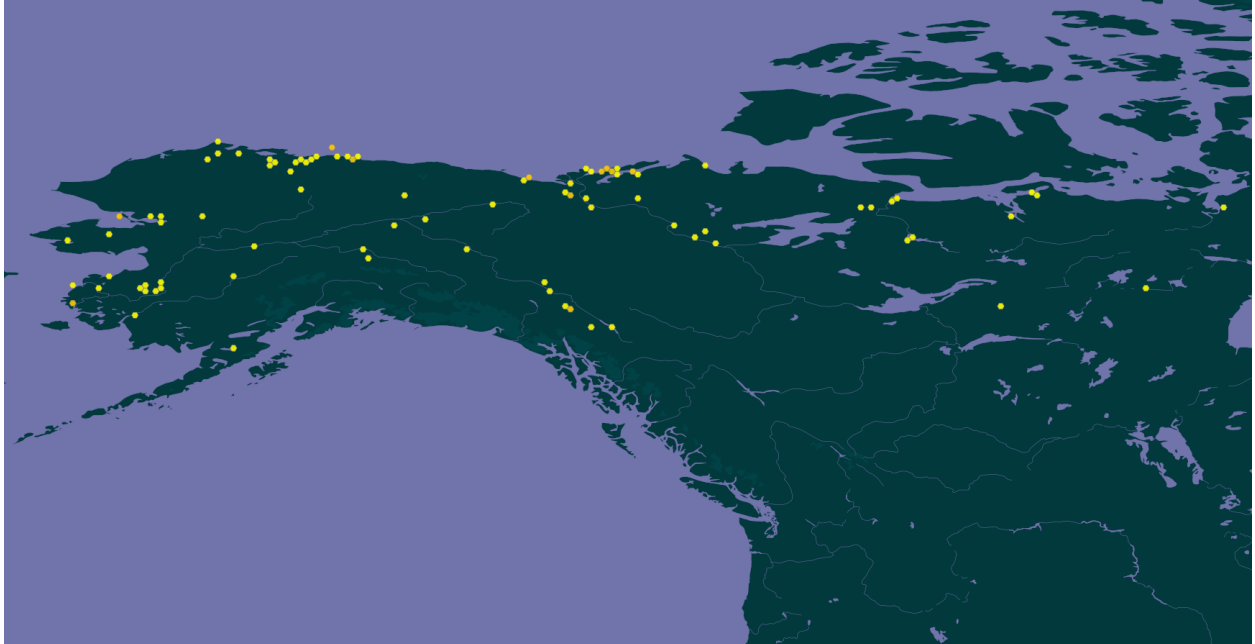


Figure 1. Known global distribution of *Coregonus nasus* in Alaska (United States) and Canada. Map from GBIF Secretariat (2018). Points in Switzerland and Spain were excluded as outliers. No map was available showing the Russian distribution of *Coregonus nasus*.

5 Distribution Within the United States

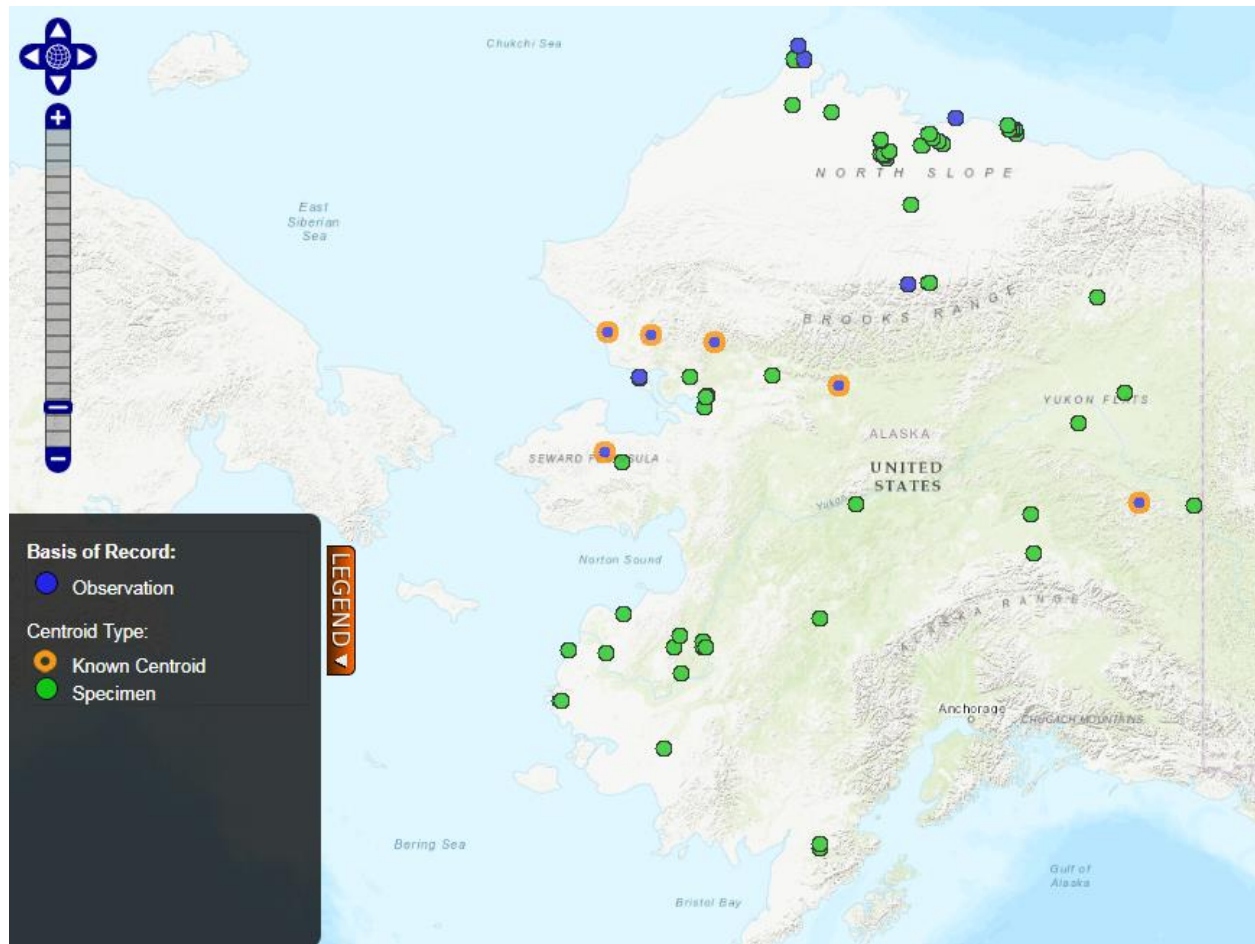


Figure 2. Known distribution of *Coregonus nasus* in the United States. Map from BISON (2018).

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the Continental U.S. was 0.021, which is a medium match. The climate match was high in Colorado, Montana, and Wyoming. The climate match was medium in Idaho, Minnesota, North Dakota, New Mexico, and Utah, and low elsewhere in the contiguous U.S.

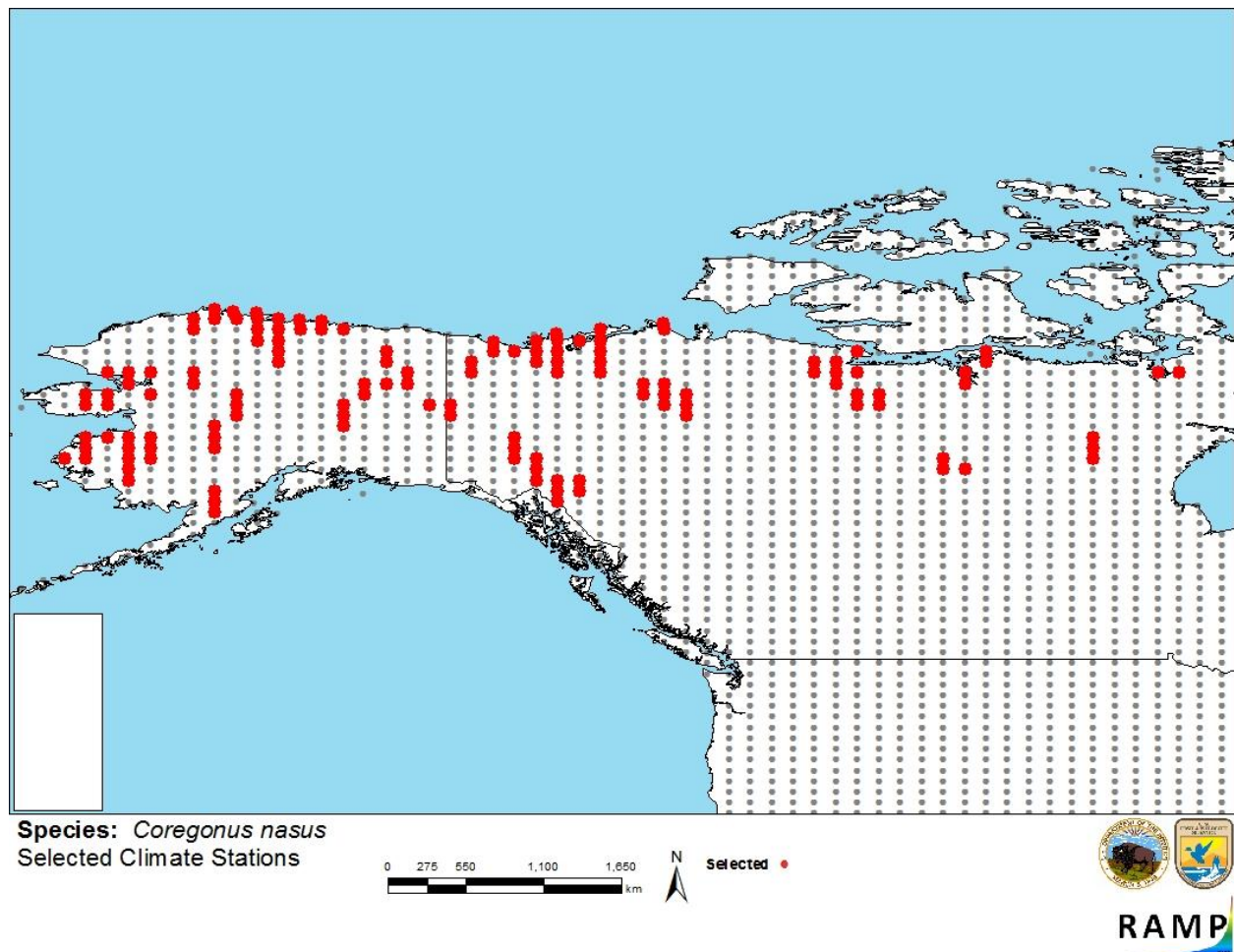


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected in Alaska and Canada as source locations (red) and non-source locations (gray) for *Coregonus nasus* climate matching. Source locations from GBIF Secretariat (2018). Outliers from Switzerland and Spain were not included in the selected climate stations.

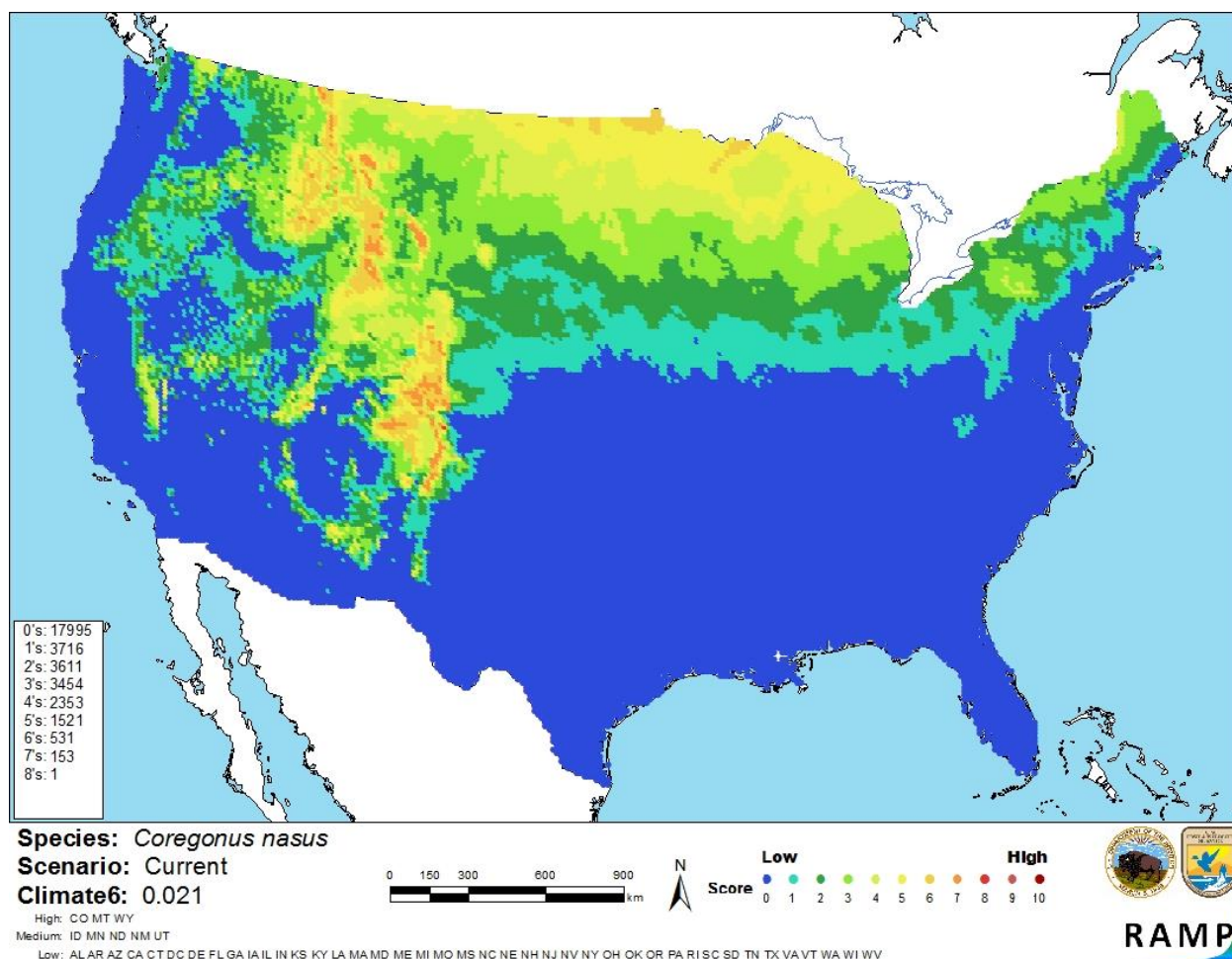


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Coregonus nasus* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

There is adequate information available on the biology, life history, and habitat of *Coregonus nasus*. Its range has been well-documented. Scientifically-credible knowledge of impacts from introductions of the species is not available. More information is needed to evaluate the potential and actual impacts the species may be having in introduced areas before the certainty of assessment can be anything but low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

C. nasus is a fish species native to Eurasia and North America. Its distribution outside of its native range is not certain, and little information is available regarding impacts or potential impacts from introductions of this species. *C. nasus* has a medium climate match with the contiguous United States, with the areas of highest match located in the Northern and Great Plains states. More research is needed to fully understand the impacts, if any, from introductions of this species. Absence of this research makes the certainty of this assessment low. Overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Overall Risk Assessment Category: Uncertain**

9 References

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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10 References Quoted But Not Accessed

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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