

Golden Grey Mullet (*Chelon auratus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2011

Revised, July 2018

Web Version, 8/20/2018



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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018a):

“Eastern Atlantic: Scotland to Cape Verde; in the Mediterranean and Black Sea. Also in coastal waters from southern Norway to Morocco, rare off Mauritania [Thomson 1986]. Records from the lagoon of Accra are probably misidentifications.”

From Eschmeyer et al. (2018):

“Distribution: Western Baltic Sea, North Sea, Mediterranean Sea, Black Sea, Sea of Azov, eastern Atlantic: Scotland to Senegal including Azores, Madeira, Canary Islands and Cape Verde Islands [...]”

Status in the United States

This species has not been reported as introduced or established in the United States. There is no indication that this species is in trade in the United States.

Means of Introductions in the United States

This species has not been reported as introduced or established in the United States.

Remarks

Eschmeyer et al. (2018) list the following synonyms for this species: *Liza aurata*, *Mugil auratus*, *Mugil breviceps*, *Mugil cryptocheilos*, *Mugil maderensis*, *Planiliza aurata*. These synonyms were used, along with the accepted scientific name, to search for information for this report.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Froese and Pauly (2018b):

“Biota > Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > Pisces (Superclass) > Actinopterygii (Class) > Perciformes (Order) > Mugiloidei (Suborder) > Mugilidae (Family) > *Chelon* (Genus) > *Chelon auratus* (Species)”

“Status
accepted”

Size, Weight, and Age Range

From Froese and Pauly (2018a):

“Maturity: L_m 34.0 range ? - ? cm
Max length : 59.0 cm TL male/unsexed; [Berg 1965]; common length : 30.0 cm SL
male/unsexed; [Thomson 1990]”

Environment

From Froese and Pauly (2018a):

“Marine; freshwater; brackish; pelagic-neritic; catadromous [Riede 2004]; depth range 10 - ? m [Thomson 1990].”

Climate/Range

From Froese and Pauly (2018a):

“Temperate; 64°N - 20°N, 26°W - 42°E”

Distribution Outside the United States

Native

From Froese and Pauly (2018a):

“Eastern Atlantic: Scotland to Cape Verde; in the Mediterranean and Black Sea. Also in coastal waters from southern Norway to Morocco, rare off Mauritania [Thomson 1986]. Records from the lagoon of Accra are probably misidentifications.”

From Eschmeyer et al. (2018):

“Distribution: Western Baltic Sea, North Sea, Mediterranean Sea, Black Sea, Sea of Azov, eastern Atlantic: Scotland to Senegal including Azores, Madeira, Canary Islands and Cape Verde Islands [...]”

Introduced

Froese and Pauly (2018a) state that *C. auratus* was introduced into Iran, Lake Kinneret (Israel), and the Jordan River (unknown country) from unknown sources. *C. auratus* is probably established in Iran and is not established in Lake Kinneret and Jordan River.

Froese and Pauly (2018a) also state that *C. auratus* was introduced from the Black Sea to the Caspian Sea in Azerbaijan, Kazakhstan and Turkmenistan. It is established in all three countries.

Means of Introduction Outside the United States

From Froese and Pauly (2018a):

“unknown [for introductions to Azerbaijan, Kazakhstan, Turkmenistan, Iran and Jordan River]”

“accidental [...] was accidentally stocked [in Lake Kinneret, Israel] with other gray mullets.”

From Shiganova et al. (2005):

“[...] intentionally introduced into the Caspian Sea and became commercial in it.”

Short Description

From Froese and Pauly (2018a):

“Dorsal spines (total): 5; Dorsal soft rays (total): 7-9; Anal spines: 3. Longer pectoral fins, lack of black spot at the pectoral fin base. Golden spot present in gill cover [Muus and Nielsen 1999].”

Biology

From Froese and Pauly (2018a):

“Adults are neritic usually in schools, entering lagoons and lower estuaries [Thomson 1990]; rarely entering freshwater [Thomson 1986, Kottelat and Freyhof 2007]. Juveniles move to coastal lagoons and estuaries in winter and especially in spring [Kottelat and Freyhof 2007]. They feed on small benthic organisms, detritus, and occasionally on insects and plankton [Ben-Tuvia 1986]. Juveniles feed only on zooplankton [Kottelat and Freyhof 2007]. Reproduction takes place in the sea, from July to November. Oviparous, eggs are pelagic and non-adhesive [Breder and Rosen 1966].”

“Juveniles move to coastal lagoons and estuaries in winter and especially in spring [Kottelat and Freyhof 2007].”

Human Uses

From Froese and Pauly (2018a):

“Fisheries: commercial; aquaculture: commercial”

Diseases

From Froese and Pauly (2018a):

“Epitheliocystis, Bacterial diseases”

From Özer and Kirca (2013):

“Parasite fauna of the golden grey mullet *Liza aurata* (Risso, 1810) collected from Lower Kızılırmak Delta in Samsun, Turkey were investigated in the present study. [...] A total of 10 parasite species were identified and they are; *Trichodina puytoraci*, *Trichodina lepsii*, *Ligophorus mediterraneus*, *Ligophorus cephalis*, *Microcotyle mugilis*, *Ascocotyle (Phagicola) longa*, *Haplosporidium pachysomus*, *Tylodelphys clavata*, *Neoechinorhynchus agilis* and *Ergasilus lizae*. Overall infection prevalence was 100 % [...]”

From Innal et al. (2007):

“Specimens of *Anilocra frontalis* Milne-Edwards, 1840 and *Anilocra physodes* (Linnaeus, 1758) (Cymothoidae - Isopoda) were observed on [...] *Liza aurata* (Risso, 1810) [...] on the coast of Antalya, Eastern Mediterranean Sea.”

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

Threat to Humans

From Froese and Pauly (2018a):

“Harmless”

3 Impacts of Introductions

From Froese and Paul (2018a):

“Significant socio-economic effects: some – beneficial [...] Established and now constitute as a commercially important species.”

From Fazli et al. (2008):

“[...] one of the major commercial and forage species in the Caspian Sea [...]”

4 Global Distribution



Figure 1. Known global distribution of *Chelone auratus* throughout the Eastern Atlantic from Norway to Cape Verde and into the Mediterranean Sea. Map from GBIF Secretariat (2017). The two points within sub-Saharan Africa do not represent established populations and were removed from the climate matching analysis. No georeferenced occurrences were available for established populations in Azerbaijan, Kazakhstan, or Turkmenistan.

Because the climate matching analysis is not valid for marine waters, no marine occurrences were used in the climate matching analysis. Brackish water occurrences were included, such as in the Caspian and Black Seas and in estuaries.

5 Distribution Within the United States

No known occurrences.

6 Climate Matching

Summary of Climate Matching Analysis

This climate match only applies to the brackish and fresh water portions of the species range. It does not apply to marine environments where *Chelon auratus* reproduces.

The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for *Chelon auratus* for the contiguous United States was 0.253, which is a high score. The range for a high climate match is 0.103 and above. Most of the contiguous United States recorded a medium match, with areas of high match throughout the west, around the Great Lakes, and in southeastern New England. The northern Great Plains, the Northern Pacific coast, and much of the Gulf Coast and Florida had a low match. More states recorded a high score than a low or medium score.

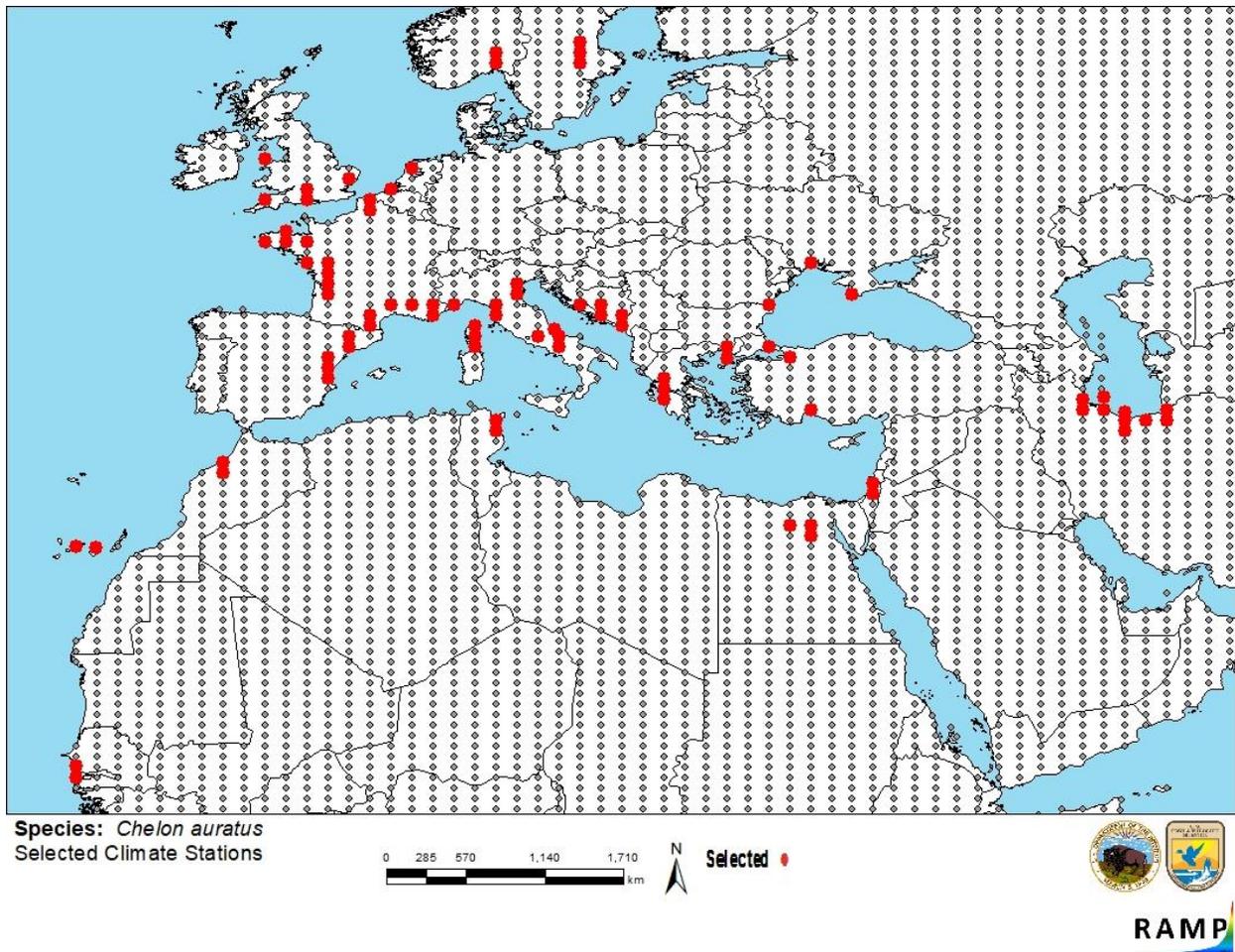


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; coastal areas of Eastern Atlantic from Scandinavia to Cape Verde, Mediterranean Sea, Black Sea, and southern Caspian Sea) and non-source locations (gray) for *Chelon auratus* climate matching. Source locations from GBIF Secretariat (2017).

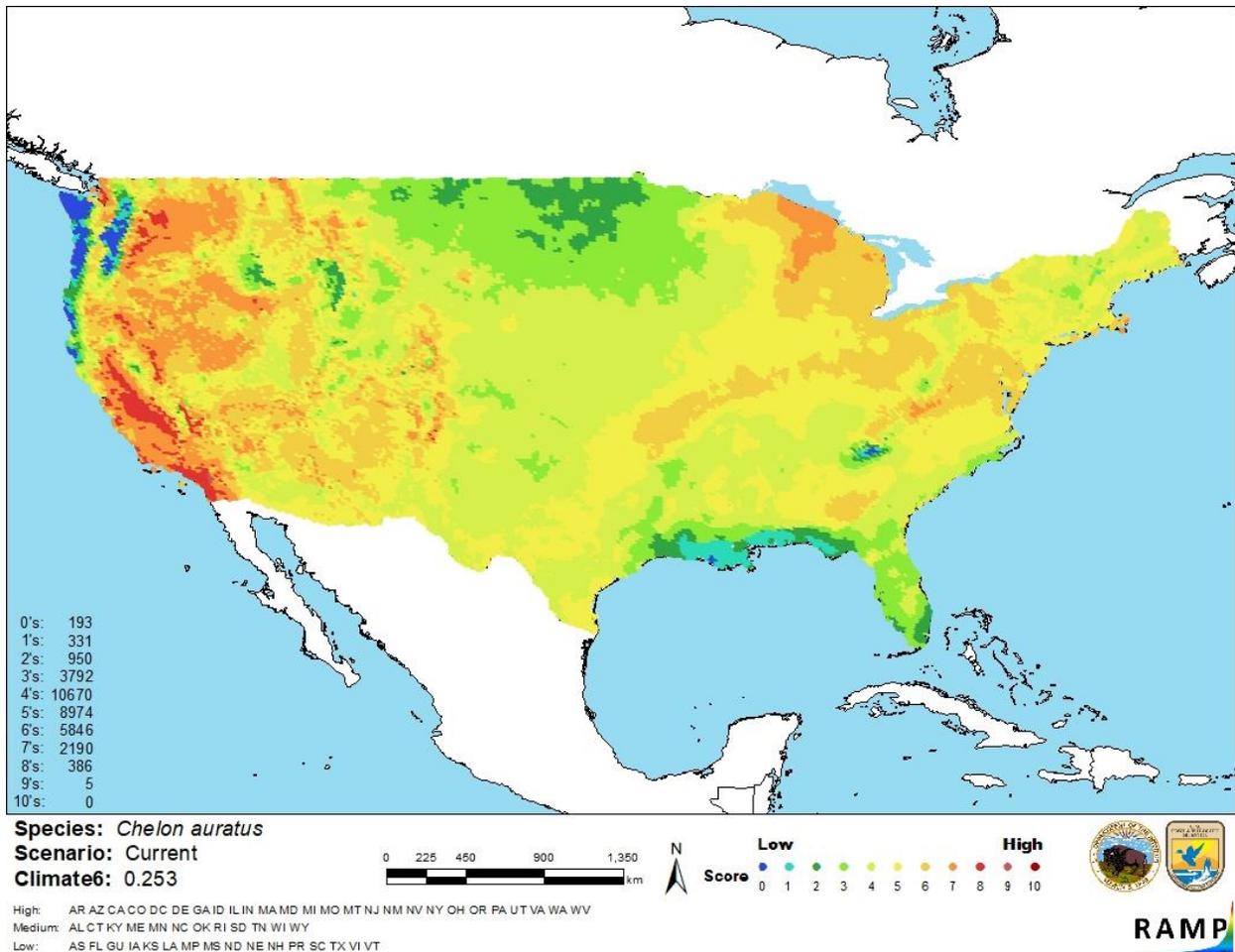


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Chelon auratus* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

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

7 Certainty of Assessment

Information is known about the biology and ecology of *Chelon auratus*. This species is native to the Eastern Atlantic area from Norway to Cape Verde and throughout the Mediterranean. It lives in marine, brackish and freshwater environments. This fish has been reported as introduced and established into the Caspian Sea. It has also been introduced in the Jordan River and Lake Kinneret but is not established. No adverse impacts have been recorded from these introductions. Another source of uncertainty in this assessment is the ability of the species to reproduce,

because the climate matching analysis does not cover the marine habitats where *C. auratus* typically breeds. Due to lack of information on impacts to the ecosystem and climate matching uncertainty, the certainty of assessment is low. More information is needed to increase the certainty of the assessment.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Golden grey mullet (*Chelon auratus*) is a fish native throughout the Eastern Atlantic and into the Mediterranean Sea. It is used for human consumption with commercial fishing and aquaculture. *C. auratus* lives in marine, brackish and freshwater environments, but reproduces only in ocean environments. It has been introduced into the Caspian Sea where it has established populations but no negative impacts have been reported from this introduction, and there have been economic benefits from the fishery. It has also been introduced in the Jordan River and Lake Kinneret but is not established. The climate match with freshwater and brackish water in the contiguous United States is high overall. There are areas of high climate match throughout the west, around the Great Lakes, and in southeastern New England, as well as other scattered locations. More states recorded a high score than a low or medium score. Due to lack of information about negative impacts of introduction, and not being able to prepare a climate match for the marine portion of *C. auratus*' life cycle, the overall risk for this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **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.

- Eschmeyer, W. N., R. Fricke, and R. van der Laan, editors. 2018. Catalog of fishes: genera, species, references. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatget.asp?spid=16939>. (July 2018).
- Fazli, H., D. Ghaninejad, A. A. Janbaz, and R. Daryanabard. 2008. Population ecology parameters and biomass of golden grey mullet (*Liza aurata*) in Iranian waters of the Caspian Sea. Fisheries Research 93:222-228.
- Froese, R., and D. Pauly, editors. 2018a. *Chelon auratus* (Risso, 1810). FishBase. Available: <https://www.fishbase.de/summary/Chelon-auratus.html>. (July 2018).

- Froese, R., and D. Pauly, editors. 2018b. *Chelon auratus* (Risso, 1810). FishBase. In World Register of Marine Species. Available: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=1044127>. (July 2018)
- GBIF Secretariat. 2017. GBIF backbone taxonomy: *Chelon auratus* (Risso, 1810). Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/9466310>. (July 2018).
- Innal, D., F. Kirkim, and F. Erk'akan. 2007. The parasitic isopods, *Anilocra frontalis* and *Anilocra physodes* (Crustacea; Isopoda) on some marine fish in Antalya Gulf, Turkey. *Bulletin of the European Association of Fish Pathologists* 27(6):239-241.
- Özer, A., and D. Y. Kirca. 2013. Parasite fauna of golden grey mullet *Liza aurata* (Risso, 1810) collected from Lower Kızılırmak Delta in Samsun, Turkey. *Helminthologia* 50(4):269-280.
- Sanders, S., C. Castiglione, and M. H. Hoff. 2018. Risk Assessment Mapping Program: RAMP, version 3.1. U.S. Fish and Wildlife Service.
- Shiganova, T. A., E. I. Musaeva, L. A. Pautova, and Yu. V. Bulgakova. 2005. The problem of invaders in the Caspian Sea in the context of the findings of new zoo- and phytoplankton species from the Black Sea. *Biology Bulletin* 32(1):65-74.

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.

- Ben-Tuvia, A. 1986. Mugilidae. Pages 1197-1204 in P. J. P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen and E. Tortonese, editors. *Fishes of the North-eastern Atlantic and Mediterranean*, volume 3. UNESCO, Paris.
- Berg, L. S. 1965. *Freshwater fishes of the U.S.S.R. and adjacent countries*, volume 3, 4th edition. Israel Program for Scientific Translations Ltd, Jerusalem. (Russian version published 1949).
- Billard, R. 1997. *Les poissons d'eau douce des rivières de France. Identification, inventaire et répartition des 83 espèces*. Delachaux & Niestlé, Lausanne, Switzerland.
- Breder, C. M., and D. E. Rosen. 1966. *Modes of reproduction in fishes*. T. F. H. Publications, Neptune City, New Jersey.
- Kottelat, M., and J. Freyhof. 2007. *Handbook of European freshwater fishes*. Publications Kottelat, Cornol and Freyhof, Berlin.

- Muus, B. J., and J. G. Nielsen. 1999. Sea fish. Scandinavian Fishing Year Book, Hedehusene, Denmark.
- Riede, K. 2004. Global register of migratory species - from global to regional scales. Final report of the R&D-Projekt 808 05 081. Federal Agency for Nature Conservation, Bonn, Germany.
- Thomson, J. M. 1986. Mugilidae. Pages 344-349 *in* J. Daget, J.-P. Gosse, and D. F. E. Thys van den Audenaerde, editors. Check-list of the freshwater fishes of Africa (CLOFFA), volume 2. ISNB, Brussels, MRAC, Tervuren, Belgium, and ORSTOM, Paris.
- Thomson, J. M. 1990. Mugilidae. Pages 855-859 *in* J. C. Quero, J. C. Hureau, C. Karrer, A. Post and L. Saldanha, editors. Check-list of the fishes of the eastern tropical Atlantic (CLOFETA), volume 2. JNICT, Lisbon, SEI, Paris, and UNESCO, Paris.