Thinlip Grey Mullet (*Chelon ramada*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2011
Revised, July 2018
Web Version, 8/21/2018

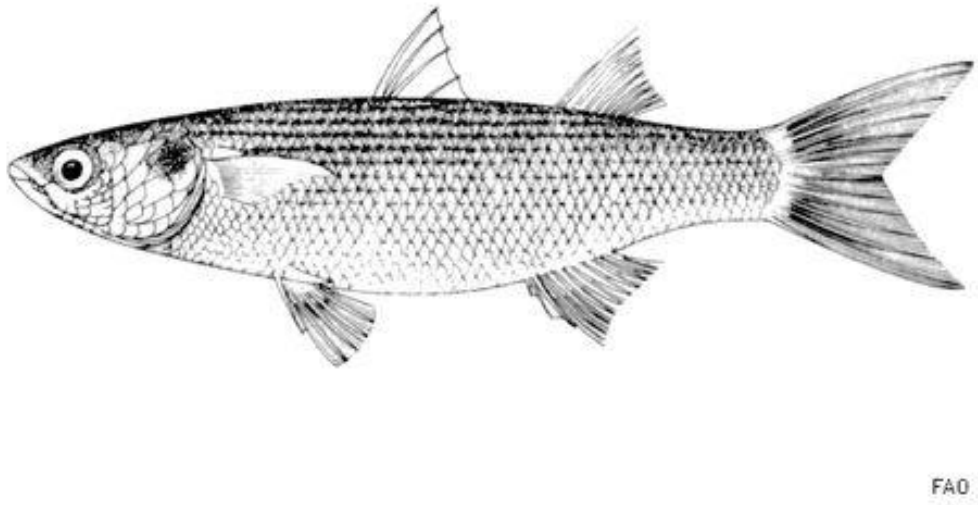

Photo: FAO. Licensed under CC BY-NC 3.0. Available: http://eol.org/pages/356521/overview. (July 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018a):

"Eastern Atlantic: from the coasts of southern Norway to Cape Verde, including the Mediterranean and the Black Sea [Ben-Tuvia 1986, Rochard and Elie 1994, Lloris et al. 1991]. Records of its occurrence in tropical waters are based on misidentifications [Thomson 1986]."

From Eschmeyer et al. (2018):

"Distribution: Western Baltic Sea, Mediterranean Sea, Black Sea, eastern Atlantic: southern Norway to Senegal including Azores, Madeira, Canary Islands and Cape Verde Islands."

Status in the United States

From Froese and Pauly (2018a):

"Introduced from Ashdod, Israel to Baltimore, Maryland. Unknown if established."

No evidence was found to suggest that this species is in trade in the United States.

Means of Introductions in the United States

From Froese and Pauly (2018a):

"Reason: accidental with ships […]
Recorded from ballast water in commercial vessels [Wonham et al. 2000]."

Remarks

Eschmeyer et al. (2018) list the following synonyms for *C. ramada*: *Liza alosoides*, *Liza ramada*, *Liza ramado*, *Mugil capito*, *Mugil dubahra*, *Myxus maroccensis*, *Mugil octoradiatus*, *Mugil petherici*, and *Mugil ramada*. All synonyms were used in addition to the currently accepted scientific name to search for information on this species.

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 ramada* (Species)"

"Status
accepted"

Size, Weight, and Age Range

From Froese and Pauly (2018a):

"Maturity: L_m 25.9, range 25 - 32 cm
Max length : 70.0 cm TL male/unsexed; [Muus and Dahlström 1978]; common length : 35.0 cm TL male/unsexed; [Thomson 1981]; max. published weight: 2.9 kg [Keith and Allardi 2001]; max. reported age: 10 years [Keith and Allardi 2001]"

Environment

From Froese and Pauly (2018a):

"Marine; freshwater; brackish; pelagic-neritic; catadromous [Kottelat and Freyhof 2007]; depth range 10 - 20 m [Billard 1997]."

From Cardona (2006):

"Comparing habitat availability and habitat use showed that the distribution of all grey mullet species in the estuaries of Minorca was strongly affected by salinity. *M*[*ugil*] *cephalus* and *L. ramado* are good osmoregulators, as they maintain a stable internal osmolality in a wide range of external salinity levels, including fresh water (Lasserre and Gallis, 1975; Nordlie and Lefler, 1975; Nordlie et al.,, [*sic*] 1982; Thomas, 1984; Kulikova et al.,, [*sic*] 1989). In these two species, the cost of osmotic regulation is the lowest within the oligomesohaline range (Nordlie and Lefler, 1975; Cardona, 1994, 2000) and therefore growth is expected to be highest within that range, although experimental evidence is available only for *M. cephalus* (Cardona, 2000). Thus, it is not surprising to find that these two species showed a strong preference for sites with a salinity level under 15, although adults may prefer more saline areas (Cardona, 2000; Chang et al., 2004). However, Chang et al., (2004) have revealed the existence of individual differences in the habitat preference of *M. cephalus* in Taiwan, as most specimens avoid freshwater sites throughout their life whereas others spend long periods there. Such variability may also be true for *L. ramado*, which is a species found over a wide range of salinity levels (Lafaille et al., 2002; Almeida, 2003)."

Climate/Range

From Froese and Pauly (2018a):

"Temperate; 60°N - 15°N, 32°W - 42°E"

Distribution Outside the United States

Native

From Froese and Pauly (2018a):

"Eastern Atlantic: from the coasts of southern Norway to Cape Verde, including the Mediterranean and the Black Sea [Ben-Tuvia 1986, Rochard and Elie 1994, Lloris et al. 1991]. Records of its occurrence in tropical waters are based on misidentifications [Thomson 1986]."

From Eschmeyer et al. (2018):

"Distribution: Western Baltic Sea, Mediterranean Sea, Black Sea, eastern Atlantic: southern Norway to Senegal including Azores, Madeira, Canary Islands and Cape Verde Islands."

Introduced

Froese and Pauly (2018a) report that *C. ramada* was introduced to Israel from an unknown location and is now established. *C. ramada* was introduced to the Jordan River (unknown country) from an unknown location and to Oman from Greece; neither introduction resulted in establishment.

Means of Introduction Outside the United States

From Froese and Pauly (2018a):

"aquaculture [in Israel and Oman]"

"unknown [in Jordan River]"

Short Description

From Froese and Pauly (2018a):

"Dorsal spines (total): 4 - 5; Dorsal soft rays (total): 7-10; Anal spines: 3; Anal soft rays: 8 - 9. Fusiform body [Rochard and Elie 1994]. Massive head, flattened above the eyes [Rochard and Elie 1994]. Small mouth [Rochard and Elie 1994]. Snout short and blunt [Rochard and Elie 1994]. Two dorsal fins well-separated, the first with 4 to 5 spines [Keith and Allardi 2001, Rochard and Elie 1994]. Pectoral fins are placed high on the flanks [Rochard and Elie 1994]. Large scales [Rochard and Elie 1994]. Dorsal sides and flanks gray-colored, ventral side white [Rochard and Elie 1994]."

Biology

From Froese and Pauly (2018a):

"Adults are pelagic occurring near shore, entering lagoons and lower reaches of rivers in schools; often in polluted waters [Rochard and Elie 1994, Kottelat and Freyhof 2007] between temperatures 8-24°C. Juveniles colonize the littoral zone and estuaries [Rochard and Elie 1994]. Adults feed on epiphytic algae, detritus and small benthic or planktonic organisms, pelagic eggs and larvae while juveniles feed on zooplankton until about 3.0 cm SL, then on benthic animals and plants [Kottelat and Freyhof 2007]. Spawning takes place at sea near the coast between September and February [Billard 1997, Rochard and Elie 1994]. Oviparous, eggs are pelagic and non-adhesive [Breder and Rosen 1966]. Adults undergo migrations [Rochard and Elie 1994]."

"Spawning takes place at sea near the coast by gathering in groups between September and February [Rochard and Elie 1994]. The eggs develop at sea [Rochard and Elie 1994]. The juveniles then colonize the littoral zone and the estuaries [Rochard and Elie 1994]. Adults enter the lower parts of the rivers and treturn [*sic*] to the sea to spawn [Rochard and Elie 1994]."

Human Uses

From Froese and Pauly (2018a):

"Fisheries: commercial; aquaculture: commercial; gamefish: yes"

Diseases

From Froese and Pauly (2018a):

"Heterophyes Infection, Parasitic infestations (protozoa, worms, etc.)
Epitheliocystis, Bacterial diseases"

Oguz and Öktener (2007) report *C. ramada* (as *Liza ramada*) as a host for the parasitic crustaceans *Caligus pageti* Russel, 1925, *Pseudocaligus apodus* Brian, 1924, and *Ergasilus nanus* van Beneden, 1870.

From Yurakhno et al. (2007):

"A new multivalvulid myxozoan parasite, *Kudoa unicapsula* n. sp., is described from the intestinal mesentery, intestine and pyloric caeca of the thin-lipped grey mullet *Liza ramada* (Risso 1826) […]"

Blasco-Costa et al. (2008) report *C. ramada* (as *Liza ramado*) as a host for two digenean stomach parasites specific to mullets: *Saturnius papernai* Overstreet, 1977 and *Saturnius dimitrovi* Blasco-Costa, Pankov, Gibson, Balbuena, Raga, Sarabeev & Kostadinova, 2006.

From Oguz and Bray (2008):

"*Microcotyle mugilis* (Vogt, 1878)
Host: *Liza ramada*
Infection site: Gill […]
Remarks: This species is a common parasite of *L. ramada* in the Mediterranean (Euzet et al. 1993, Radujkovic & Euzet, 1989) and has recently been reported in the Black Sea in this host (Dmitrieva & Gaevskaya 2001)."

Blasco-Costa et al. (2009) report *C. ramada* (as *Liza ramado*) as a host for the digenean parasites *Dicrogaster perpusilla* Looss, 1902, *Dicrogaster contracta* Looss, 1902, *Dicrogaster maryutensis* Al-Bassel, 1990, and *Forticulcita glabra* Overstreet, 1982.

Strona et al. (2010) report *C. ramada* (as *Liza ramado*) as a host for the following monogenoidean parasites: *Benedenia monticellii* (Parona & Perugia, 1895), *Ergenstrema mugilis* Paperna, 1964, *Ligophorus confusus* Euzet & Suriano, 1977, *Ligophorus imitans* Euzet & Suriano, 1977, and *Ligophorus parvicirrus* Euzet & Sanfilippo, 1983.

Atopkin et al. (2015) report *C. ramada* (as *Liza ramado*) as a host for the following trematode parasites: *Saccocoelium obesum*, *Saccocoelium tensum*, *Dicrogaster perpusilla*, and *Haploporus benedeni*.

The above is not a complete list of diseases and parasites documented in *C. ramada*. However, no OIE-reportable diseases have been documented for this species.

Threat to Humans

From Froese and Pauly (2018a):

"Harmless"

3 Impacts of Introductions

According to Froese and Pauly (2018a) there are no known impacts of this species in its introduced areas. The introduction to Oman states that there are "probably none" when it comes to significant ecological impacts.

4 Global Distribution

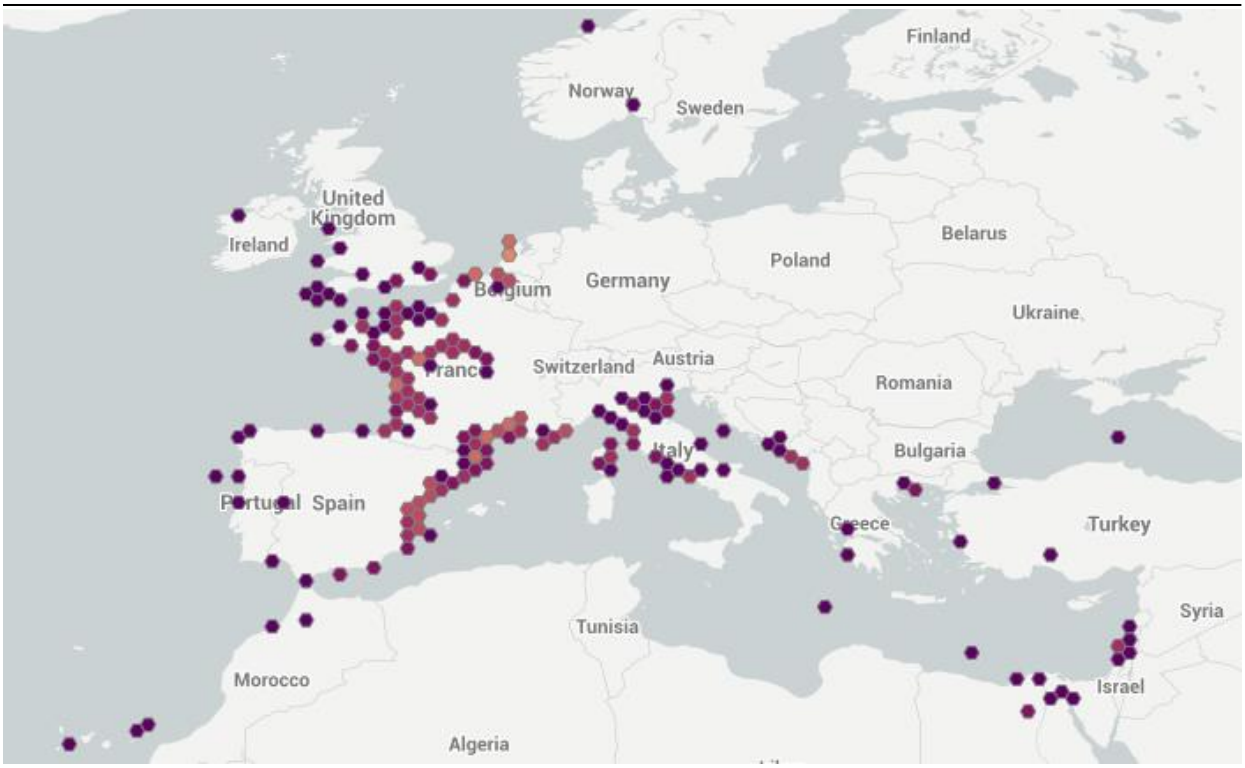

Figure 1. Known global distribution of *Chelon ramada*. Map from GBIF Secretariat (2017). Locations reported in sub-Saharan Africa and Central America were excluded from this map and the climate matching analysis because they do not represent established populations of *C. ramada*.

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, including the Black Sea and estuaries.

5 Distribution Within the United States

No map is available. *Chelon ramada* was accidentally introduced to Baltimore, Maryland but it is unknown if it is established (Froese and Pauly 2018a). A search was conducted on USGS NAS website and no results were found.

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 ramada* reproduces.

The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for *Chelon ramada* for the contiguous United States is 0.247, 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 pockets of high match throughout the western United States especially in coastal states, and in the Midwest and Mid-Atlantic regions. The Plains states, the Olympic Peninsula of Washington, and much of the Gulf Coast and Florida had a low match.

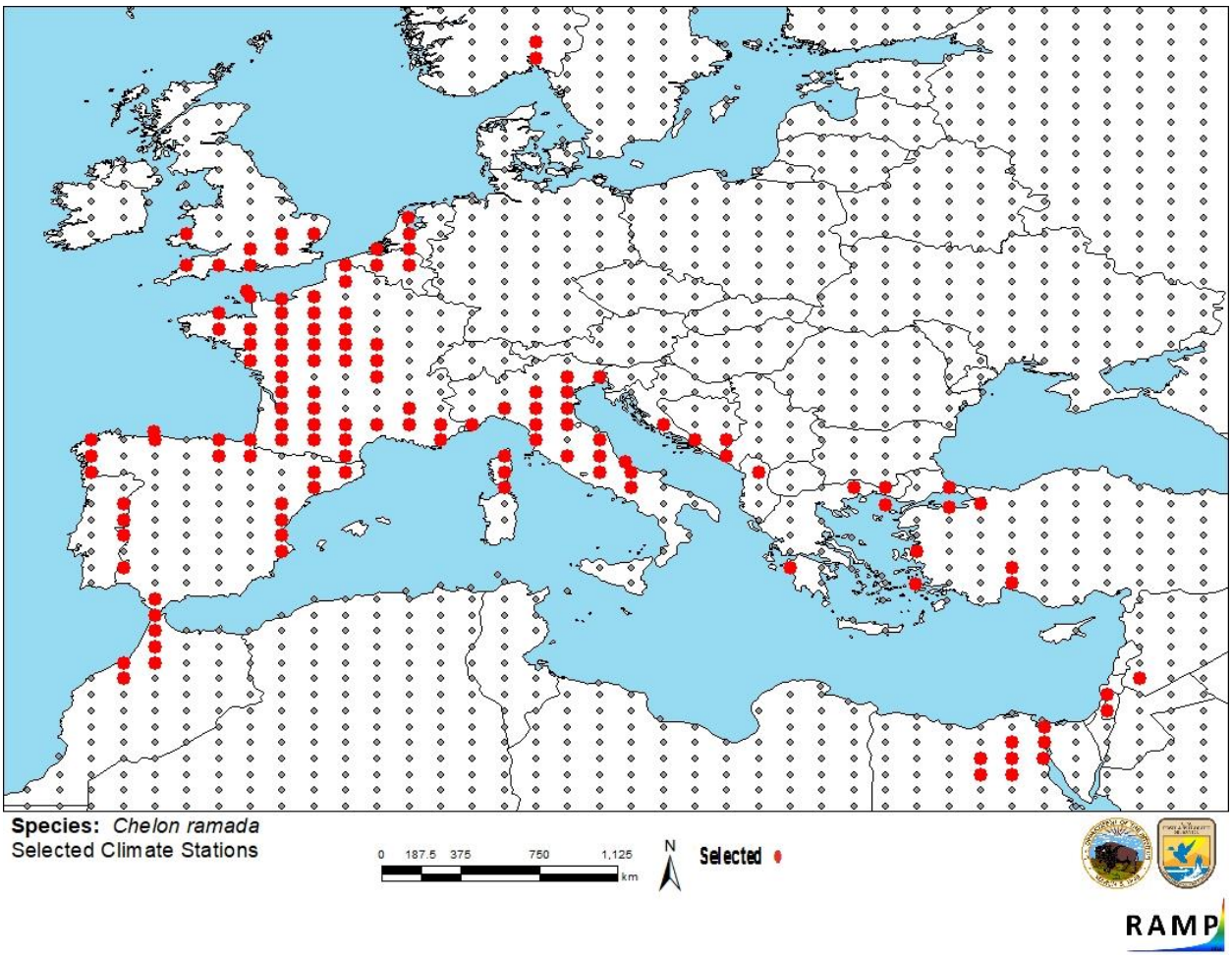

Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; southern Norway to Morocco and east into the Mediterranean and Black Seas) and non-source locations (gray) for *Chelon ramada* climate matching. Source locations from GBIF Secretariat (2017).

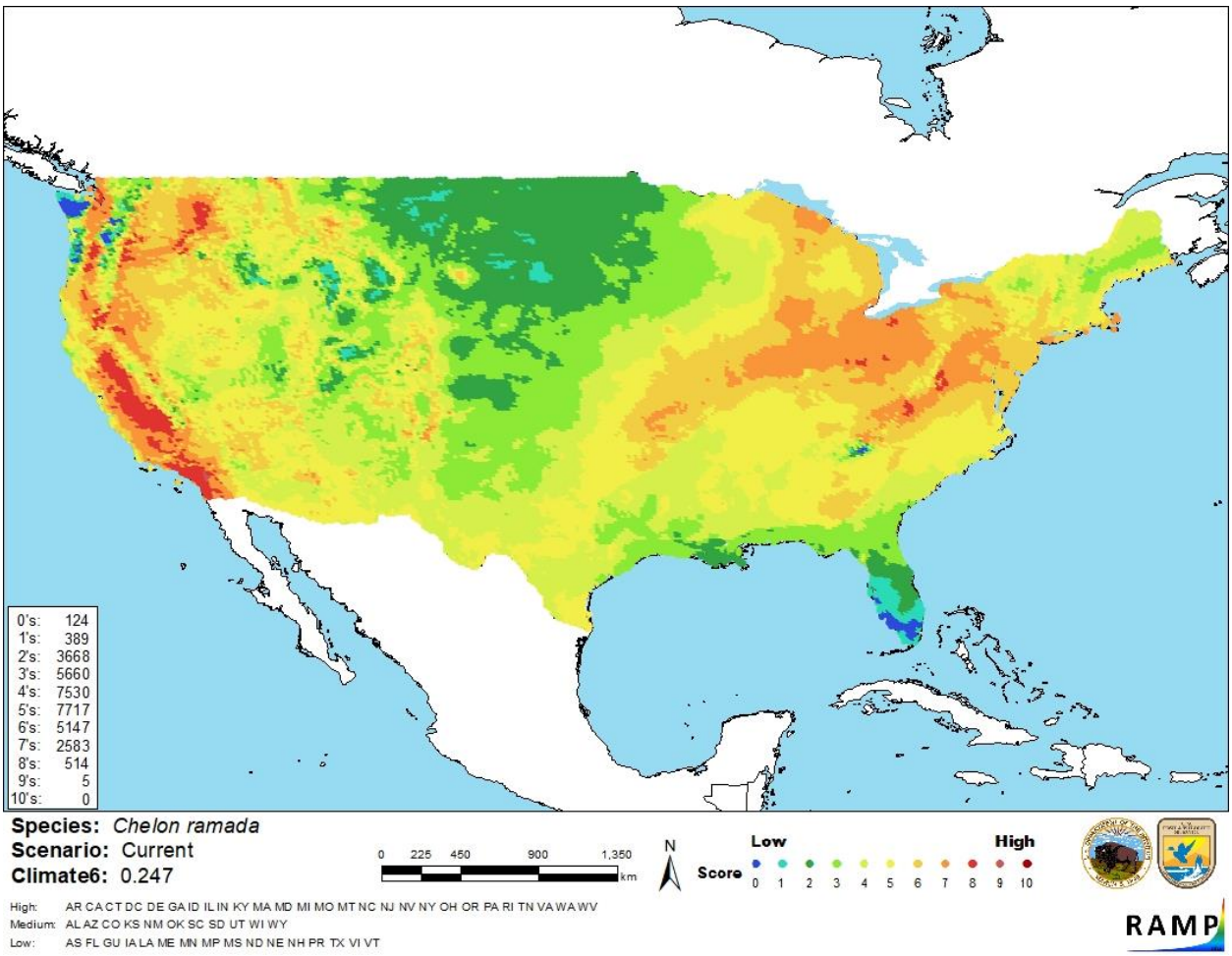

Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Chelon ramada* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

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≤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 ramada*. *C. ramada* has been reported as introduced and established in Israel. It has also been introduced in the Jordan River (country unknown) and Oman but not established. *Chelon ramada* was also accidentally introduced to Baltimore, Maryland, but it is unknown if it became 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. ramada* typically breeds. Due to lack of information on impacts and climate matching uncertainty, the certainty of this assessment is low. More information is needed to increase the assessment certainty.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Thinlip grey mullet (*Chelon ramada*) is a fish native throughout the Eastern Atlantic from Norway to Cape Verde and into the Mediterranean and Black Seas. *C. ramada* is used for human consumption as a gamefish, in commercial fisheries, and in aquaculture. It has been introduced into Israel for aquaculture, where it has become established, but no negative impacts have been reported. There have been other introductions, including to Baltimore, Maryland, but establishment has not been confirmed other than in Israel. The introduction to Maryland occurred through ballast water. *C. ramada* does not appear to be in trade in the United States. This species is a host to numerous diseases and parasites. The climate match with the contiguous United States for the freshwater and brackish portions of its lifecycle is high overall. There were areas of high match throughout the west especially in coastal states, as well as in the Midwest and Mid-Atlantic regions. More states recorded a high match than a low or medium match. Due to lack of information about impacts from introductions, and not being able to prepare a climate match for the marine portion of *C. ramada*'s 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**

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