Giant Ramshorn Snail (*Marisa cornuarietis*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2022
Revised, April 2022
Web Version, 8/12/2022

Organism Type: Snail
Overall Risk Assessment Category: High

Photo: Katrin-die-Räuberbraut. Public Domain. Available: https://commons.wikimedia.org/wiki/File:Paradiesschnecke.jpg (February 2022).

1 Native Range and Status in the United States

Native Range

From Benson et al. (2022):

"*Marisa cornuarietis* is native to northern South America and several of the southern islands of the Caribbean (Robins 1971) including Bolivia, Brazil, Colombia, Costa Rica, Cuba, French Guiana, Guyana, Panama, Suriname, Trinidad and Tobago and Venezuela (OGATT 2018)."

From CABI (2019):

"The native range of *M. cornuarietis* extends from Central America (Panama, Costa Rica) to southern Brazil. […] Nguma et al. (1982) considered *M. cornuarietis* as autochthonous to habitats in the Magdalena and Orinoco river systems in Colombia and Venezuela. Generally, Venezuela, Colombia, Trinidad and Tobago and the Amazon Basin regions of Brazil, Bolivia and Peru are considered to be the native range […] Additionally, *M. cornuarietis* has been reported from southern regions of South America. […] Quintana (1982) document specimen records from the Alto Paraguay region (as *M. chiquitensis*) and Simone (2006) records the species from Paraguay, Argentina and Uruguay."

Status in the United States

From Benson et al. (2022):

"The first recorded occurrence of *Marisa cornuarietis* in the conterminous U.S. was in Coral Gables, Florida (Hunt 1958). The first Texas occurrence was in June 1983 in the San Marcos River, Hays County (Neck 1984). The snail is also established in some warm springs in Idaho, as well as many areas of Puerto Rico."

"California Department of Fish and Game (2003) included this species on a list of macroinvertebrates documented in the state but did not present details related to this record (Howells et al. 2006)."

According to Benson et al. (2022), nonindigenous occurrences of *Marisa cornuarietis* have been reported in the following States (years of reports and hydrologic unit codes given after State name):

- Florida (1957-2022; Big Cypress Swamp; Caloosahatchee; Everglades; Florida Southeast Coast)
- Idaho (1991-2016; Upper Snake-Rock)
- Puerto Rico (2007-2017; Cibuco-Guajataca; Eastern Puerto Rico; Southern Puerto Rico)
- Texas (1983-2018; Middle Guadalupe; San Marcos; Upper San Antonio)

"*Marisa cornuarietis* has been in the aquarium trade as early as the 1930s but fell out of favor in the 1950s (Hunt 1958). Currently, the *Marisa cornuarietis* is available for purchase at numerous pet stores and online."

According to Benson et al. (2022), *Marisa cornuarietis* is established in southern Florida, Texas, Puerto Rico, and warm springs of Idaho.

From CABI (2019):

"The United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS), implemented regulations in 2006 to require importers and inter-state sellers of marine and freshwater aquatic snails to obtain a three-year permit; prohibit the importation or

interstate movement of all members of the Family Ampullariidae (excluding *Pomacea bridgesi*, *P. diffusa* and *Asolene spixi*) and require routine inspection of shipments of aquatic plants and aquarium supplies that may contain aquatic snails. Additional regulations apply in some US states. For example, in Texas, *M. cornuarietis* was added to the Texas Parks and Wildlife Department (TPWD) list of harmful or potentially harmful aquatic species in 1990. This legally prohibits possession, culture, sale and transport of this species."

Idaho Office of the Administrative Rules Coordinator (2019) lists *Marisa cornuarietis* under their invasive species area that requires decontamination.

Means of Introductions in the United States

From Benson et al. (2022):

"The first introductions into the U.S. were probably as a result of releases by aquarium hobbyists (Neck 1984, Horne et al. 1992)"

"*Marisa cornuarietis* are also used in ecotoxicological studies, suggesting specimens could have escaped or been released from a laboratory. Florida and Puerto Rico have stocked this snail for biocontrol of weeds and pulmonate snails (Radke et al. 1961, Demian and Lufty 1965). Secondary dispersal has occurred downstream on floating macrophytes (Robins 1971)."

From CABI (2019):

"A further pathway for spread is the aquatic plants trade to pond gardening, with snails and their eggs accidentally distributed along with their host plants."

Remarks

According to Benson et al. (2022), common names for this species include the giant rams-horn, striped ram's horn snail, Goldenhorned Marissa, and Colombian ramshorn applesnail.

From CABI (2019):

"Nonetheless, within this range there has been some variance among authors as to what constitutes native and introduced. […] the species' status in French Guyana, Guyana and Surinam and in countries of the southern Caribbean, is ambiguous. The lack of invasiveness in these latter countries may indicate its native status there."

Additionally, *M. cornuarietis* has been reported from southern regions of South America. Cowie and Thiengo (2003) argued that specimens from south of the Amazon Basin were wrongly identified as *M. cornuarietis* by Ihering (1919) and these records had been perpetuated in the subsequent literature. Therefore, Cowie and Thiengo (2003) considered Paraguay, Uruguay and Argentina as being not part of this species' native distribution."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From MolluscaBase (2022):

"Status accepted"

From ITIS (2022):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Protostomia
Superphylum Lophozoa
Phylum Mollusca
Class Gastropoda
Subclass Prosobranchia
Order Architaenioglossa
Family Ampullariidae
Genus *Marisa*
Species *Marisa cornuarietis* (Linnaeus, 1758)

Size, Weight, and Age Range

From CABI (2019):

"Shell in adults 18-22 mm in height, 48-56 mm in diameter, more-or-less glossy but with growth lines (transverse striate) that are most prominent near the aperture […] Adult mass about 500-650 mg."

"Estimates of the longevity of *M. cornuarietis* indicate three years (Cowie, 2002). Nonetheless, the proportion surviving after 1 year was 0.03 in Sudan (Haridi et al., 1985) and 0.10 in Puerto Rico (Jobin, 1970). It is unclear from the current literature if individuals contribute to more than one generation in the field."

Environment

From Benson et al. (2022):

"This species is found in freshwater habitats with a preference for still or slow-moving water with live aquatic vegetation (Robins 1971, OGATT 2018). Hunt (1961) demonstrated that *Marisa cornuarietis* tolerates salinities of up to 25 percent seawater. This snail is limited to warm water and spring-fed systems with high calcium concentrations for shell-building (OGATT 2018). Robins (1971) showed that exposure to low temperatures for any significant time (8 °C for 8 hours) is fatal."

Climate

From CABI (2019):

"*M. cornuarietis* poses the greatest potential for establishment in tropical regions due to its thermal requirements. In subtropical and temperature regions the extent of suitable warm-water habitat is restricted to tectonically-heated springs, streams and lakes and artificially thermal waters arising from industrial and thermal-electric facilities."

Distribution Outside the United States

Native

From Benson et al. (2022):

"*Marisa cornuarietis* is native to northern South America and several of the southern islands of the Caribbean (Robins 1971) including Bolivia, Brazil, Colombia, Costa Rica, Cuba, French Guiana, Guyana, Panama, Suriname, Trinidad and Tobago and Venezuela (OGATT 2018)."

From CABI (2019):

"The native range of *M. cornuarietis* extends from Central America (Panama, Costa Rica) to southern Brazil. […] Nguma et al. (1982) considered *M. cornuarietis* as autochthonous to habitats in the Magdalena and Orinoco river systems in Colombia and Venezuela. Generally, Venezuela, Colombia, Trinidad and Tobago and the Amazon Basin regions of Brazil, Bolivia and Peru are considered to be the native range […].

Additionally*, M. cornuarietis* has been reported from southern regions of South America. […] Quintana (1982) document specimen records from the Alto Paraguay region (as *M. chiquitensis*) and Simone (2006) records the species from Paraguay, Argentina and Uruguay."

Introduced

According to GBIF Secretariat (2022), *Marisa cornuarietis* is recorded as introduced in Israel and Cuba.

From Barker (2022)

"*M. cornuarietis* has been introduced into Egypt, Puerto Rico, South Africa, Sudan, Tanzania […]. This species was also introduced into New Zealand and evaluated as a potential biocontrol agent for aquatic weeds, however, it was not released (Chapman et al., 1974; NIWA, 2002; Horgan et al., 2014)."

From Arias et al. (2014):

"*Marisa cornuarietis* have been introduced, and have established populations, in […] some Caribbean islands (Cuba, Guadeloupe, Martinique, […]: Pointier & Jourdane, 2000; Vázquez & Perera, 2010) and Africa (Egypt, Sudan, Tanzania: Brown, 1994). In Asia introduced populations

have been detected, but later disappeared and are now considered extinct (i.e. Israel: Roll et al., 2009)."

"Specimens of *M. cornuarietis* have been found in the Nora River [Spain] several times in the last two years. Adult snails located in 2012 and May 2013, and juveniles found in October 2013 revealed that the giant ramshorn snail has a reproductively active population in this locality."

Means of Introduction Outside the United States

From CABI (2019):

"[…] but subsequently became widely distributed in the Caribbean and thence in Africa (Egypt, Sudan, Tanzania) as a result of biological control programs directed at pulmonate snail intermediate hosts of Schistosoma parasites and/or aquatic weeds."

From Arias et al. (2014):

"Wild populations of the giant ramshorn snail in Europe were hitherto unknown. Their introduction pathway/s may be associated with pet/ domestic aquarium trade or aquatic plants trade to pond gardening and subsequent wild release/escape of specimens, similar way to introduction in USA (Howells et al., 2006; Rawlings et al., 2007)."

Short Description

From Benson et al. (2022):

"*Marisa cornuarietis* is a relatively large snail with a flat, circular-shaped shell. The shell is smooth with defined striations and about 3-4 whorls and 3-6 spiral brown bands (OGATT 2018). Their coloring varies greatly from dark yellow to dark brick-red tints with black spiral stripes. There are color variates with no stripes and a completely yellow shell. The body color can be white with a pattern of yellowish, gray, and black, with pigment spots (Texas Invasive Species Institute 2014)."

From CABI (2019):

"Shell: dextrally coiled. Juveniles globose. During post-hatching ontogeny shell growth is of planispiral coiling, producing 3.5 to 4 flat whorls in which the juvenile spire is not elevated above the adult whorls and the umbilicus is very widely open. Shell in adults 18-22 mm in height, 48-56 mm in diameter, more-or-less glossy but with growth lines (transverse striate) that are most prominent near the aperture. Aperture plane makes a slight angle with the shell axis (10°); peristome (aperture margin) generally continuous, but interrupted by prominent callus on parietal wall in immature snails; peristome simple, sharp, but late in ontogeny becoming reflected and thickened. Yellow to brownish ground colour with 3-6 dark red-brown to black spiral bands over periphery and umbilicus; banding pattern can be absent. Adult mass about 500-650 mg. With a weak sexual dimorphism, shell of males tending smaller, thicker and with more rounded aperture. The planispiral shell is orientated vertically."

"Operculum: yellowish to brownish corneous, concentric."

"Adults: head region with prominent snout, dorsally bearing two long slender cephalic tentacles, each with a black-pigmented eye borne on short peduncles at their base and at its anterior fringe bearing two slender inferior (labial) tentacles and a small mouth ventrally. Tail region moderately long, dorsally carrying an operculum. Snout, tentacles and dorsal aspects of foot and tail mottled grey to black. Foot sole broadly-rounded anteriorly, bluntly-pointed posteriorly; uniformly pale. […]"

"Radula: taenioglossate (formula 2.1.c.1.2), i.e. seven teeth in each transverse row are arranged such that the central tooth is flanked on each side by a lateral tooth and two marginal teeth. […]"

Biology

From Benson et al. (2022):

"This species is in the Ampullariidae family of snails and has both gills and a lung (Demian 1965). *Marisa cornuarietis* is omnivorous and feeds on live or decaying plants, fish, eggs, and juvenile snails (Robins 1971, OGATT 2018)."

"The life cycle of the snail is dependent on the availability of food and the water temperature. At high temperatures and high abundance of food, the life cycle is short (less than three months) and reproduction occurs throughout the year (OGATT 2018). In less than conducive conditions, the life span can be around two years, and reproduction will only occur in the spring and early summer (Robins 1971, OGATT 2018).

Marisa cornuarietis reproduce sexually, with females being able to store sperm for months (OGATT 2018). Eggs are laid in large, clear gelatinous masses-containing 20-80 eggs that are 2-3 mm in size. The eggs are laid on the surface of objects under the water (Robins 1971, OGATT 2018). The eggs swell up to 4 mm after ten days and become transparent enough to see the snail moving. After hatching, the emergent snail resembles an adult snail, and will continue to grow in size with time and calcium availability in the water (OGATT 2018)."

From CABI (2019):

"*M. cornuarietis* feeds on subsurface vegetation, typically severing stems and consuming these cuttings."

"*M. cornuarietis* is a dioecious (separate sexes), outcrossing species. Breeding tends to occur in spawning groups with a clutch size of 50-210 (Cowie, 2002). Keller et al. (2007) indicated the fecundity of *M. cornuarietis* to be in the order of 1700 eggs per female a year. Females are able to store sperm in the genital tract for months after copulation, enabling spawning to be delayed if necessary to coincide with return of favourable environmental conditions."

"Within its introduced range, *M. cornuarietis* can achieve densities in the order of 50-175 per m2 (Haridi et al., 1985; Vargas et al., 1991). In North America, population densities were found to fluctuate greatly between years (Howells et al., 2006)."

"*M. cornuarietis* is a diurnally active species. It exhibits a degree of amphibiousness and is able to aestivate in muddy residues during periods of low water levels provided temperatures do not reach lethal levels. After hatching, young *M. cornuarietis* feed on the remains of the egg-mass for the first few days. Later they disperse locally to forage."

"*M. cornuarietis* has gills as well as a lung, to ensure efficient underwater respiration even in condition of low levels of dissolved oxygen. Nonetheless, *M. cornuarietis* is anoxia intolerant, surviving only brief periods without adequate oxygen supply (von Brand et al., 1950). *M. cornuarietis* exhibits some amphibiousity and is able to respirate exposed to air for a period, although oxygen uptake is slower than those during submerged aquatic respiration (Freiberg and Hazelwood, 1977)."

"Natural spread of *M. cornuarietis* in lotic systems has been reported by rafting downstream on floating macrophytes (Robins, 1971). In addition, *M. cornuarietis* can migrate upstream against a moderate current (Ferguson and Palmer, 1958)."

Human Uses

From Benson et al. (2022):

"*Marisa cornuarietis* has been in the aquarium trade as early as the 1930s but fell out of favor in the 1950s (Hunt 1958). Currently, the *Marisa cornuarietis* is available for purchase at numerous pet stores and online."

"*Marisa cornuarietis* are known as a competitive feeder and an incidental predator on egg masses and newly hatched pulmonate snails (Demian and Lufty 1965). This snail's competitive ability has been utilized in biocontrol in Puerto Rico and Guadeloupe for *Biomphalaria glabrata*, an intermediate snail host for the trematode *Schistosoma mansoni* (Oliver-Gonzalez et al. 1956, Radke et al. 1961, Ruiz-Tiben et al. 1969, Pointer and David 2004). This trematode is one of the main schistosomes that infect humans."

"This snail has been tested as a biocontrol agent for several important aquatic weeds and has been shown to control nuisance weeds in both Puerto Rico and South Florida canals as early as the 1960's and as recently as the early 2000's (Pointer and David 2004, Seaman and Porterfield 1964; some of the targeted weeds include Illinois pondweed (*Potamogeton illinoensis*), southern naiad (*Najas guadalupensis*), coontail (*Ceratophyllum demersum*) salvinia (*Salvinia rotundifolia*), waterhyacinth (*Eichhornia crassipes*), and waterlettuce (*Pistia stratiotes*), alligatorweed (*Alternanthera philoxeroides*)."

From CABI (2019):

"*M. cornuarietis* is sold in the aquarium trade and therefore has an economic impact but the value of this is unknown."

"*M. cornuarietis* is popular in aquariums and sold internationally in aquarium shops servicing the pet/domestic aquarium trade and scientific laboratories. *M. cornuarietis* has been intentionally introduced to several countries as a competitor and facultative predator of pest aquatic snails,

especially those involved in transmission of schistosome trematodes. It was also introduced to several countries as a biological control agent for aquatic macrophyte weeds."

"*M. cornuarietis* offered economic benefits in irrigation canals, drainage canals and in inland waterways important for freight movement and a reduction in the need for active weed management (Horne et al., 1992). However, the use of *M. cornuarietis* in biological control programmes is no longer considered an environmentally acceptable."

"Herbivory by *M. cornuarietis* in recreational and amenity waterbodies may reduce the need for active aquatic weed control. Such an effect of *M. cornuarietis* has been observed in Lake Landa in Texas, USA (Horne et al., 1992) […]."

From Ortiz-Torres E (1962):

"The fresh-water snail (*Marisa cornuarietis*) has been found to effectively reduce populations of another snail (*Australorbis glabratus* Say) in Puerto Rico1. The latter is the alternate host of the human blood fluke (*Schistosoma mansoni* Sambon), the cause of the debilitating tropical disease "Bilharzia".2 A large population of Australorbis began to disappear soon after *Marisa* was introduced into the pools and streams on the grounds of this Station. Marisa also fed on waterlilies (*Nymphae* sp.) and other vegetation growing in the ponds. As a result, the question was asked, aside from controlling the intermediate host for the "Bilharzia" organism, could the snail also be used to eliminate undesirable water plants?"

From Fofonoff et al. (2022):

"It has been intentionally introduced in areas of Africa as biocontrol of snail species which host trematode parasites causing schistosomiasis in humans."

Diseases

No records of OIE-reportable diseases (OIE 2021) were found for *Marisa cornuarietis*.

From CABI (2019):

"There is clear evidence that apple snails, including *M. cornuarietis*, are involved as intermediate hosts of trematode parasites and may therefore spread the parasite onto native species (Nasir et al., 1968; Nasir et al., 1969; Mattos et al., 2013; Pinto et al., 2015)."

According to Poelen et al. (2014), *Marisa cornuarietis* has the endoparasite rat lungworm (*Angiostrongylus cantonensis*).

Threat to Humans

No information on a threat to humans was found for *Marisa cornuarietis*.

3 Impacts of Introductions

From Benson et al. (2022):

"*Marisa cornuarietis* is known as a voracious herbivore and may devour large numbers of aquatic macrophytes (Pointer and David 2004), potentially altering plant communities (Neck 1984, Horne et al. 1992). The snail could also be an aquaculture pest in cultivated rice, water-cress, water lilies, or dasheen (Seaman and Porterfield, 1964). The herbivory impact can also extend to federal and state-listed plant species. Neck (1984) suggested that the introductions in the San Marcos River, TX could have an impact on the endemic wild rice (*Zizania texana*) populations. Laboratory studies have shown a feeding preference for other Texas natives like *Ludwigia repens* and American eelgrass (*Vallisneria americana*; Grantham et al. 1993)."

"A study looking at the feeding rate of snails on the eggs of the endangered fountain darter (*Etheostoma fonticola*) found that *Marisa cornuarietis* not only fed on the eggs, but a more significant portion of the eggs than other nonnative and native snails (Phillips et al. 2010). Neck (1984) suggested that the San Marcos River introduction of *Marisa cornuarietis* may compete with *Balcones elimia*, (*Elimia comalensis*) populations."

From Horne et al. (1992):

"Plants in many areas of Landa Lake [Texas] have been denuded of leaves or even grazed to the bottom. […] Mowing of the plants in Landa Lake by park employees to allow swimming and recreational use of the lake has stopped since the snails have so effectively grazed the macrophyte communities."

From Arias et al. (2014):

"Alien *M. cornuarietis* populations in the USA have shown densities highly fluctuating annually (Howells et al., 2006), with impacts on macrophytes when population density becomes high (Horne et al., 1992) and without damage detections when population densities are low (Howells et al., 2006). High decrement of macrophyte communities, including elimination of some species, was detected in Caribbean ponds with introduced Marisa (e.g. Pointier & David, 2004). In ponds of central part of Asturias [Spain], in the basin of the Nora River and sometimes nourished by river floods or its tributaries, there are populations of the bladderwort Utricularia australis R. Br. (Ocharan et al., 2007), included in the Regional Catalogue of Threatened Species as Vulnerable. Due to Marisa preference for this genus of macrophytes, U. australis could be affected if *M. cornuarietis* achieves to invade these ponds."

4 History of Invasiveness

Marisa cornuarietis is reported as introduced outside its native range, including in the United States. Introductions in the United State have resulted in established populations in Idaho, Texas, and Florida. *M. cornuarietis* has had an impact on aquatic macrophytes potentially altering plant communities. It has also been proposed that *M. cornuarietis* could be an aquaculture pest in cultivated rice, water-cress, water lilies, or dasheen. *M. cornarietis* has also been reported as a predator of pulmonate snails and their egg masses. A study looking at the feeding rate of snails

on the eggs of the endangered fountain darter (*Etheostoma fonticola*) found that *M. cornuarietis* not only fed on the eggs, but a more significant portion of the eggs than other nonnative and native snails in Texas. *M. cornuarietis* is also present in trade outside its native range. There is limited information about its volume in trade, therefor it cannot meet the threshold of substantial trade. Due to *M. cornuarietis* being present in trade, and scientifically defensible evidence of its negative impact of introduction, the History of Invasiveness is categorized as High.

5 Global Distribution

Figure 1. Known global distribution of *Marisa cornuarietis*. Map from GBIF Secretariat (2022). Observations are recorded in North America, Central America, the Caribbean, South America and Central Europe. Source points from the Northeastern United States, Chile, and Central Europe were not used in the climate match as no proof of establishment could be found for these areas.

6 Distribution Within the United States

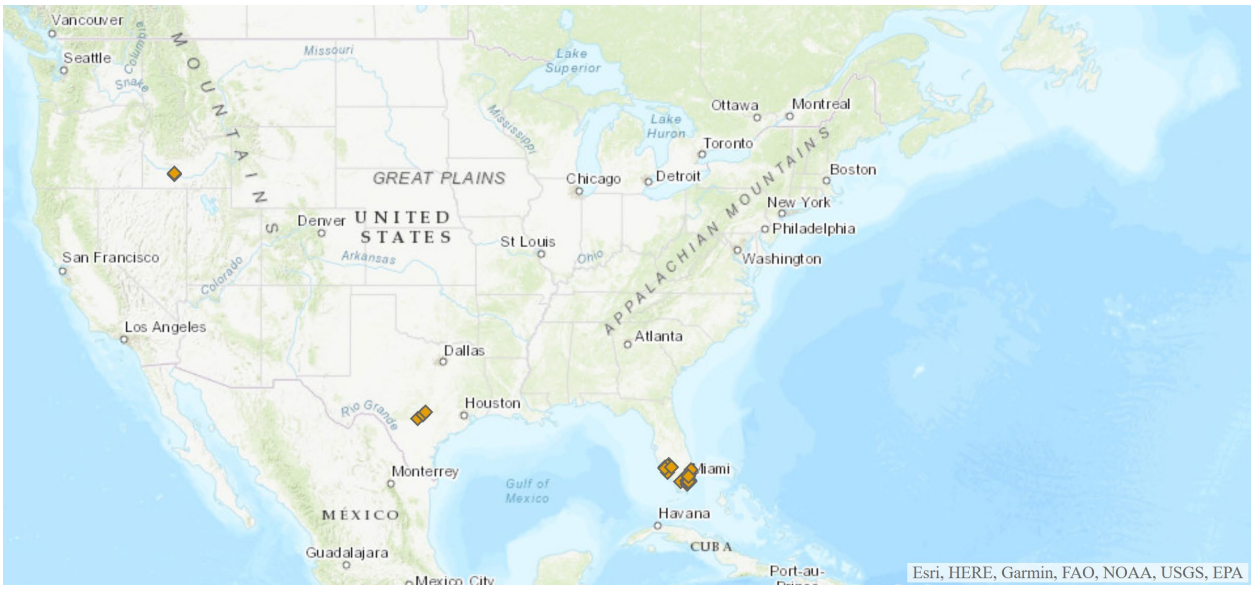

Figure 2. Known distribution of *Marisa cornuarietis* in the United States. Shaded orange areas represent the observations of the species in established populations. Map from Benson et al. (2022). Locations in Florida, Texas, and Idaho were used to select source point in the climate match; the points represent currently established wild populations.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Marisa cornuarietis* was generally high for the contiguous United States with small areas of medium and low climate match. Peninsular Florida, inland southeast of the Atlantic Coast, and inland of the eastern Gulf Coast had high climate match. Other areas of high match were found in central Texas ranging to the Midwest and the inland Pacific Northwest. Areas of low match were found in the acute area of the Cascade Mountain and Sierra Nevada Mountain Ranges. Sporadic areas of low match were found in the New England area as well as northwestern portion of the Midwest ranging into Minnesota and North and South Dakota. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) was 0.547, High (scores of 0.103 and greater are classified as high). The States with medium individual climate 6 scores were Connecticut, Iowa, Nebraska, New York, and Wisconsin. States with low individual climate 6 scores were Massachusetts, Maine, Minnesota, North Dakota, New Hampshire, Rhode Island, South Dakota, and Vermont. All other States had a high individual climate 6 scores.

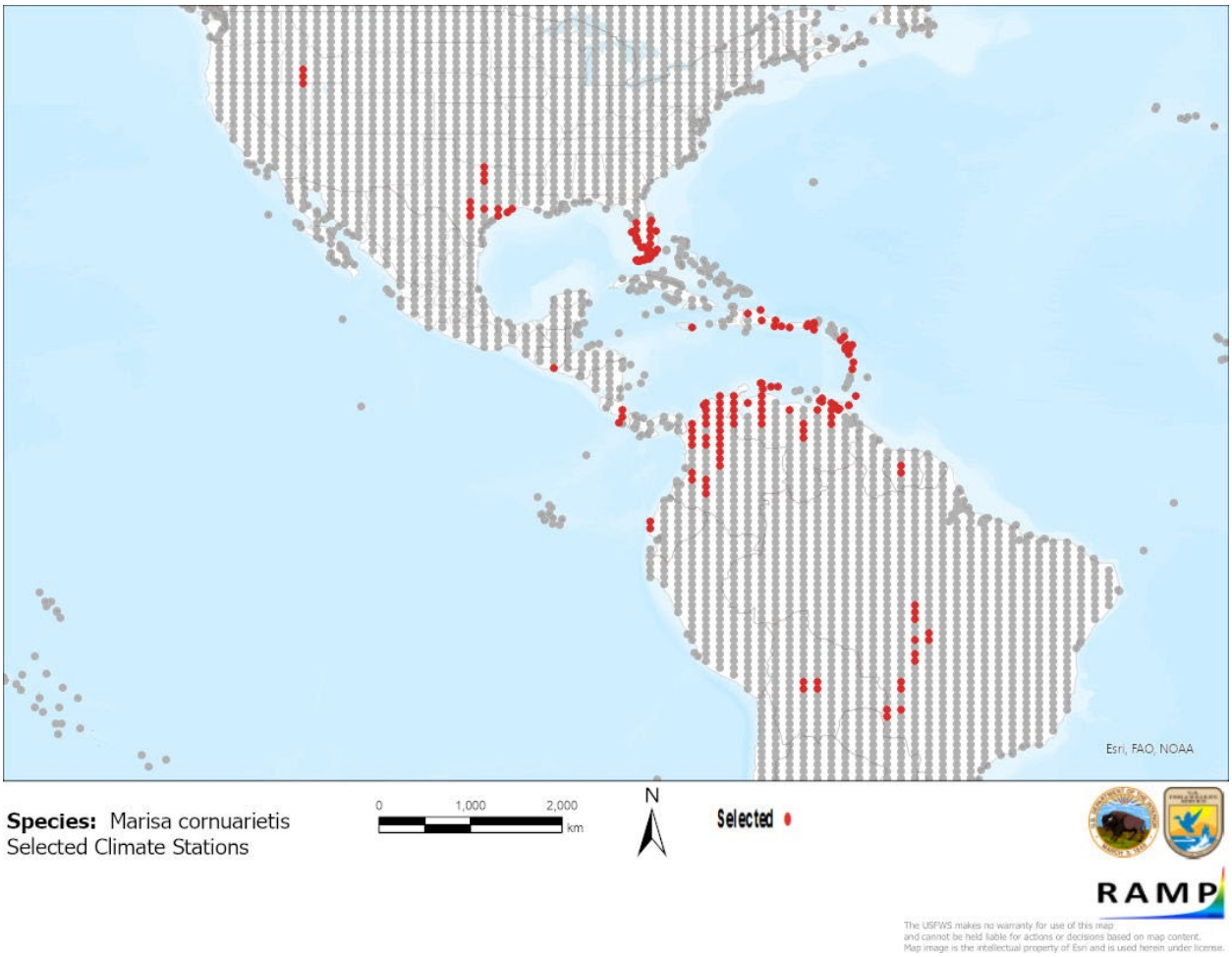

Figure 3. RAMP (Sanders et al. 2021) source map showing weather stations in North America and South America selected as source locations (red; North America, South America, Central America and the Caribbean) and non-source locations (gray) *for Marisa cornuarietis* climate matching. Source locations from GBIF Secretariat (2022). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

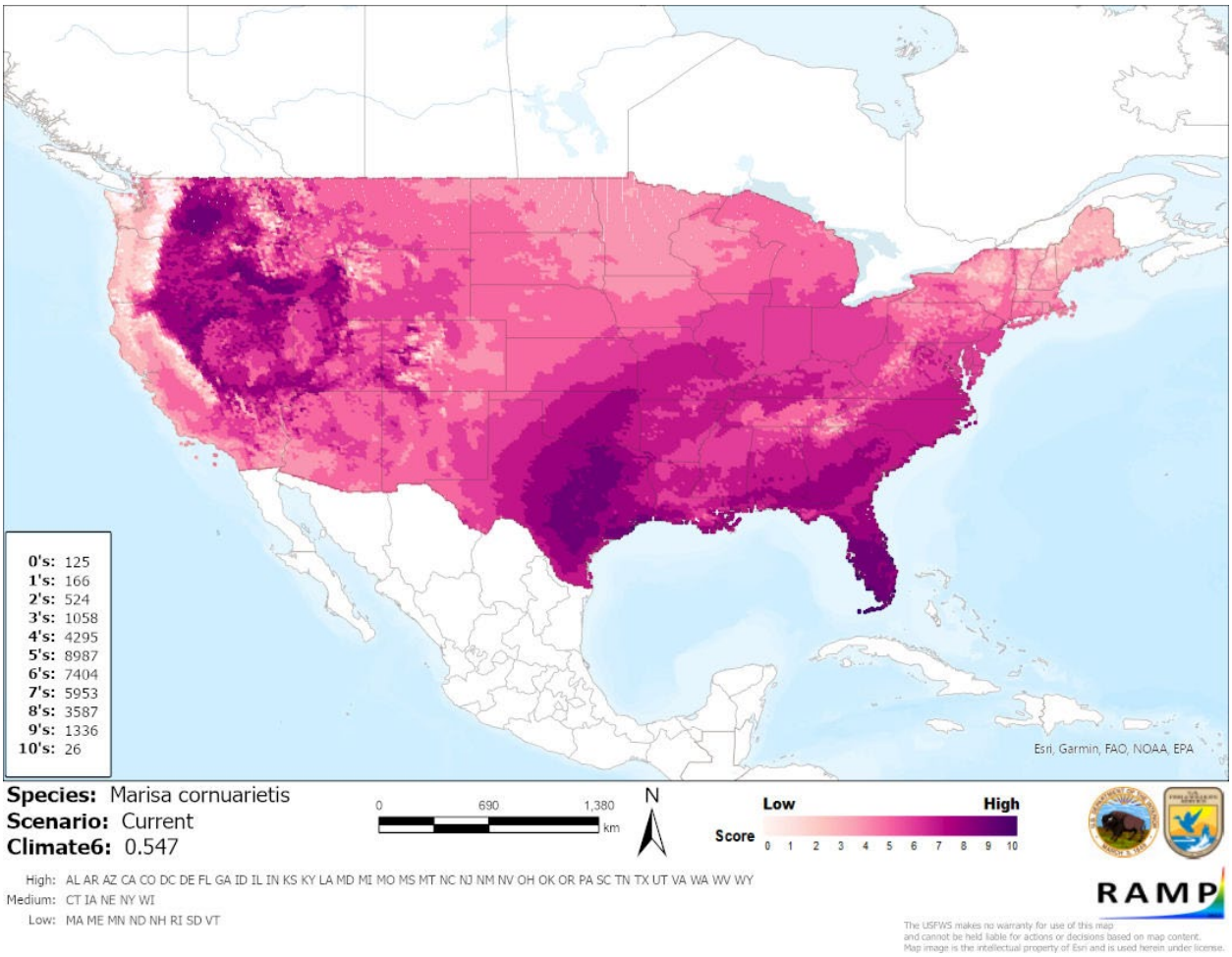

Figure 4. Map of RAMP (Sanders et al. 2021) climate matches for *Marisa cornuarietis* in the contiguous United States based on source locations reported by GBIF Secretariat (2022). Counts of climate match scores are tabulated on the left. 0/Light Pink = Lowest match, 10/Dark Purple = Highest match.

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

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

The certainty of assessment is High. There is quality information available about the biology and ecology of *Marisa cornuarietis*. Records of introduction were found. Information was available regarding impacts of introductions. Information on impacts was from scientifically credible sources. All sources proposed that *Marisa cornuarietis* could have an impact in areas that it is

introduced and does have an impact on a native darter species where it is introduced. The certainty is elevated from medium to high for that reason. There was some conflicting information regarding the native range of the species. However, the differences in what may be considered the native range are not large enough to affect the screening results and does not lower the certainty in those results.

9 Risk Assessment

Summary of Risk to the Contiguous United States

The Giant Ramshorn Snail (*Marisa cornuarietis*) is a freshwater snail that is native to northern South America and several of the southern islands of the Caribbean. It is used in the aquarium trade throughout the world as well as within the United States. The USDA and a few States regulated the trade of *M. cornuarietis*. The history of invasiveness is High. It has been introduced in Egypt, Puerto Rico, South Africa, Sudan, Tanzania, Cuba, Israel, Europe, and the United States. Information on impacts of introduction were found. The overall climate match for the contiguous United States was 0.547, High. The certainty of assessment is High. All sources proposed that *M. cornuarietis* could have an impact in areas that it is introduced and does have an impact on native species where it is currently established. The overall risk assessment category is High.

Assessment Elements

- **History of Invasiveness (Sec. 4): High**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): High**
- **Remarks, Important additional information:** No additional remarks.
- **Overall Risk Assessment Category: High**

10 Literature Cited

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

Arias A, Torralba-Burrial A. 2014. First European record of the giant ramshorn snail *Marisa cornuarietis* (Linnaeus, 1758) (Gastropoda: Ampullariidae) from northern Spain. Limnetica 33:65–72.

Benson AJ, Daniel WM, Morningstar CR. 2022. *Marisa cornuarietis* (Linnaeus, 1758). Gainesville, Florida: U.S. Geological Survey, Nonindigenous Aquatic Species Database. Available: https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=981 (February 2022).

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