Asian Clam (*Corbicula fluminea*)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Reviewed, September 2014 and July 2015

Photo: © Noel M. Burkhead, USGS

1 Native Range, and Status in the United States

Native Range

From GISD (2005):

"*C. fluminea* is native to southeastern China, Korea, southeastern Russia, and the Ussuri Basin (Aguirre and Poss 1999)."

Status in the United States

From Foster et al. (2015):

"*Corbicula fluminea* has established in L. Michigan, Superior, Erie (USEPA 2008)."

“Since the introduction of Corbicula fluminea to the United States in 1938, it has spread into many of the major waterways. The following location information briefly outlines where it is presently found. The [date: author publication date] format associated with each state identifies the first collection or record of C. fluminea in that state. The Asian clam has become established in the following states: Alabama [1962: Hubricht 1963] widespread (Counts 1991); Arizona [1958: Dundee and Dundee 1958] in the Aqua Fria, Colorado, Gila, Salt, and Verde rivers; Lake Martinez; and in several irrigation systems in Maricopa County (Counts 1991); Arkansas [1970: Fox 1970] widespread (Counts 1991) White River National Wildlife Refuge (USFWS 2005); California [1945: Hanna 1966] in the Sacramento and San Joaquin drainages; Santa Barbara County south to San Diego County and west to the Salton Sea (Counts 1991) in San Francisco Bay (Ruiz et al. 2000); Colorado [1995: Livo 1996] in a northwestern reservoir; Connecticut [1990: Morgan, pers. comm.] in the Connecticut River; Delaware [1986: Counts 1986] in the Delaware River in New Castle County; the Nanticoke River in Sussex County; and the Nanticoke Wildlife Refuge (Counts 1991); District of Columbia [1979: Dressler and Cory 1980] in the Potomac River; Florida [1964: Heard 1964] widespread (Counts 1991, J. D. Williams pers. comm. 1996); Georgia [1971: Sickel 1973] widespread (Counts 1991); Hawai`i [1982: Devick 1991] on the islands of O`ahu, Kaua`i, Maui, and Hawai`i; Idaho [1959: Ingram 1959] in the Snake River on the Idaho-Washington state line; Illinois [1962: Fetchner 1962] in the Illinois River south to the state line (Counts 1991) and Illinois River National Wildlife and Fish Refuges (USFWS 2005); Indiana [1962: Fox 1969] in the White, lower Wabash, and Blue River drainages; Big Indian and Indian Creeks; and the Ohio River in Clark and Posey Counties (Counts 1991); Iowa [1974: Eckblad 1975] in the Mississippi River near Lansing; and the Cedar River in Linn County (Counts 1991); Kansas [1983: Mackie and Huggins 1983] in Perry Reservoir on the Delaware River; the Kansas River drainage; the North Fork of the Ninnescah River; Wilson Reservoir on the Saline River; and Cedar Bluff Reservoir on the Smoky Hill River (Counts 1991); Kentucky [1957: Sinclair and Isom 1961] widespread (Counts 1991); Louisiana [1961: Stein 1962] in the Pearl, Atchafalaya, Mississippi, and upper Red drainages (Counts 1991); Maryland [1975: Stotts et al. 1977] in the Choptank River near Goldsboro; Nassawango Creek near Snow Hill; the Susquehanna River below Conowingo Dam; the Wicomico River at Salisbury; the Potomac River in Charles, Prince Georges, and Montgomery Counties; Chesapeake Bay at Havre-de-Grace, and near the mouth of the Susquehanna River (Counts 1991) throughout Chesapeake Bay (Ruiz et al. 2000); Michigan [1981: Clarke 1981] in Lake Michigan at the J. H. Campbell Power Plant; and Lake Erie at Detroit Beach, Sterling State Park and Bolles Harbor (Counts 1991); Minnesota [1975: Cummings and Jones 1978] in the Minnesota River near Burnsville and St. Croix River (Karns [et al.] 2004); Mississippi [1963: Heard 1966] widespread (Counts 1991); Missouri [1969: Fox 1969] in the lower Missouri River drainage south to the state line; Nebraska [1991: Peyton and Maher 1995] in the Platte River in Lincoln and Dawson Counties; Nevada [1959: Ingram 1959] in Lake Meade (Counts 1991); New Jersey [1973: Fuller and Powell 1973] in the Raritan River in Middlesex and Somerset Counties; and the Delaware River near Newbold Island, Wright Point, and Trenton (Counts 1991); New Mexico [1966: Metcalf 1966] in Nemexas-West Drain in Dona Ana Co.; the Pecos River impoundment at Riverside Drive in Carlsbad; and the Rio Grande River from Caballo and Elephant Butte reservoirs, south to Percha Dam (Counts 1991); New York [1983: Raeihle 1983] in Massapequa Lake on Long Island; North Carolina [1970: Fox 1971] in the Cape Fear, Catawba, Chowan, Eden, Little, Meherrin, Neuse, Roanoke, Rocky, Tar, Uhwarrie, and Waccamaw rivers; and Richardsons Creek (Counts 1991); Ohio [1962: Pojeta 1964] in the

Muskingum, upper Scioto, and upper Great Miami drainages; and the lower Hocking River (Counts 1991); **Oklahoma** [1969: Clench 1971] in the Arkansas River from Cherokee to Wagoner Counties; the Little River near Goodwater; Lake Texoma on the Red River; Lake Overholser; Lake Thunderbird; and Caddo Creek in Carter County (Counts 1991) and Sequoyah National Wildlife Refuge (USFWS 2005); **Oregon** [1948: Ingram 1948] in the Columbia drainage; the John Day River; the Smith River near Scottsburg; and at the mouth of the Siuslaw and Willamette rivers (Counts 1991) and Coos Bay (Ruiz et al. 2000); **Pennsylvania** [1973: Fuller and Powell 1973] in the Ohio and Delaware rivers; the Beaver River in Beaver County; the Monongahela River at Lock and Dam Number 8; and the Schuykill River at the Limerick Power Station and Fairmount Dam (Counts 1991); **Rhode Island** [1999: E. Herron, personal communication] in Tiogue Lake, Just SW of West Warwick; Pawtuxet River at Tiogue Lake drainage in 2005; Worden Pond in Kingston in 2007; and Pocasset Pond in Johnston in 2010 (R. Hartenstine 2010, personal communicaton); **South Carolina** [1972: Fuller and Powell 1973] in the Savannah, Cooper, Santee, Pee Dee, Little Pee Dee, Edisto, Waccamaw, and Salkahatchie rivers; the intracoastal waterway; and several industrial facilities in Aiken and Pickens counties (Counts 1991); **Tennessee** [1959: Sinclair and Isom 1961] in the Tennessee drainage (Counts 1991) in Tennessee National Wildlife Refuge (USFWS 2005); **Texas** [1964: Metcalf 1966] in the Angelina, Colorado, Rio Grande, Guadalupe, San Antonio, San Jacinto, Sabine, Red, White, and Brazos drainages; the Clear and West Forks of the Trinity River (Counts 1991); **Utah** [1975: Counts 1985] in Sevier Reservoir; **Virginia** [1968: Diaz 1974] in the Appomattox, Clinch, Potomac, James, and New rivers; Lake Anna; the Chowan River at the mouths of the the Blackwater and Nottoway rivers; and the Chickahominy River at Lanexa; (Counts 1991); **Washington** [1938: Burch 1944] in the Columbia, Snake, Chehalis, and Willapa rivers; Hood Canal in Jefferson County; and Aberdeen Lake in Grays Harbor Lake County (Counts 1986, 1991); **West Virginia** [1964: Thomas and MacKenthum 1964] in the Elk and Kanawha drainages (Counts 1991) and Ohio River Island National Wildlife Refuge (USFWS 2005); **Wisconsin** [1977: Cummings and Jones 1978] in the Mississippi River near Prairie du Chien and La Crosse; and the St. Croix River near Hudson (Counts 1991, Karns [et al.] 2004). In 2011, dead specimens were found at several locations along the Laramie River in southeastern **Wyoming** (2011: B. Bear, personal communication)."

Means of Introductions in the United States

From Foster et al. (2015):

"The first collection of *C. fluminea* in the United States occurred in 1938 along the banks of the Columbia River near Knappton, Washington (Counts 1986). Since this first introduction, it is now found in 38 states and the District of Columbia. *Corbicula fluminea* was thought to enter the United States as a food item used by Chinese immigrants. Alternatively, it may have come in with the importation of the Giant Pacific oyster also from the Asia. The mechanism for dispersal within North America is unknown. It is known mostly as a biofouler of many electrical and nuclear power plants across the country. As water is drawn from rivers, streams, and reservoirs for cooling purposes so are *Corbicula* larvae. Once inside the plant, this mussel can clog condenser tubes, raw service water pipes, and firefighting equipment. Economic problems can result from the decreased efficiency of energy generation. Warm water effluents at these power plants make a hospitable environment for stabilizing populations. With man demonstrated to be the primary agent of dispersal, no large-scale geographic features function as dispersal barriers

(Counts 1986, Isom 1986). Current methods of introduction include bait bucket introductions (Counts 1986), accidental introductions associated with imported aquaculture species (Counts 1986), and intentional introductions by people who buy them as a food item in markets (Devick 1991). The only other significant dispersal agent is thought to be passive movement via water currents (Isom 1986); fish and birds are not considered to be significant distribution vectors (Counts 1986, Isom 1986)."

Remarks

From Foster et al. (2015):

"Factors that may affect population density and distribution of Asian clams include excessively high or low temperatures, salinity, drying, low pH, silt, hypoxia, pollution, bacterial, viral and parasitic infections, inter- and intraspecific competition, predators, and genetic changes (Evans et al. 1979, Sickel 1986). This clam has been found in the stomachs of black buffalo - *Ictiobus niger* (Minckley 1973); carp - *Cyprinus carpio*, channel catfish - *Ictalurus punctatus*, yellow bullhead - *Ameiurus natalis*, redear sunfish - *Lepomis microlophus,* largemouth bass - *Micropterus salmoides*, Mozambique tilapia - *Tilapia mossambica* (Minckley 1982); blue catfish - *Ictalurus furcatus* (M. Moser pers. comm. 1996); and spotted catfish - *Ameiurus serracanthus* (A. Foster pers. comm. 1996). Other predators of *Corbicula* include birds, raccoons, crayfish, and flatworms (Sickel 1986). Densities of *C. fluminea* have also been documented to occur by the thousands per square meter, often dominating the benthic community (Sickel 1986)."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2014):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Protostomia
Superphylum Lophozoa
Phylum Mollusca
Class Bivalvia
Subclass Heterodonta
Order Veneroida
Superfamily Corbiculoidea
Family Corbiculidae
Genus Corbicula
Species *Corbicula fluminea*"

"Taxonomic Status: valid"

Size, Weight, and Age Range

From GISD (2005):

"They are usually less than 25mm but can grow up to 50 to 65mm in length (Aguirre and Poss 1999)."

"Larvae spawned late in spring and early summer can reach sexual maturity by the next fall (Aguirre and Poss 1999). *C. fluminea* maximum lifespan is 7 years, but it varies according to habitat (Aguirre and Poss 1999), with an average lifespan of 2 to 4 years (PNNL 2003)."

Environment

From GISD (2005):

"*Corbicula fluminea* is found in lakes and streams of all sizes with silt, mud, sand, and gravel substrate (INHS 1996). … It prefers fine, clean sand, clay, and coarse sand substrates (Aguirre and Poss 1999). It is usually found in moving water because it requires high levels of dissolved oxygen. *C. fluminea* is generally intolerant of pollution."

Climate/Range

From GISD (2005):

"They can tolerate salinities of up to 13 ppt for short periods (Aguirre and Poss 1999) and temperatures between 2 and 30 degrees Celsius, or 86 degrees Fahrenheit, (Balcom 1994)."

Distribution Outside the United States

Native

From GISD (2005):

"*C. fluminea* is native to southeastern China, Korea, southeastern Russia, and the Ussuri Basin (Aguirre and Poss 1999)."

Introduced

From CABI (2015):

"*C. fluminea* has also been introduced into Europe, with reports of its presence in Portugal (Mouthon, 1981), France (Mouthon, 1981), the Netherlands (bij de Vaate and Greijdanus-Klaas, 1990), Germany (bij de Vaate, 1991), Spain (Araujo et al., 1993) and Britain (Aldridge and Muller, 2001). It was reported in the River Garonne in France in 1980-1981, in Germany's River Weser in 1983, and the River Rhine in 1987. By 1991, it was common throughout the lower and middle Rhine system (Den Hartog et al., 1992). Aldridge and Muller (2001) give an account of the distribution and abundance of *C. fluminea* in Britain. The presence of *C. fluminea* in South America has also been documented (Ituarte, 1981; 1994)."

Means of Introduction Outside the United States

From CABI (2015):

"In rivers, colonization in the downstream direction is easily achieved for the juveniles since they will be transported by the current flow or by byssal attachment to floating vegetation (Prezant and Chalermwat, 1984). However, upstream movement is thought to be via secondary transportations by animals or man (Britton and Murphy, 1977; Rodgers et al., 1977; McMahon 1983)."

"Some reports seem to support dispersion via fish; however, this must be treated with caution, because it is questionable if *Corbicula* could survive the conditions inside fish guts (McMahon, 1982). Even so, in Brazil (Upper Paraná River) in the fish *Pterodora granulosus* a considerable amount of closed *C. fluminea* were found at the end of its intestine (Cantanhêde et al., 2007)."

"At a global level the common means of transportation applied to most aquatic species, are the ballast ship waters, which is the probable cause of *C. fluminea* introduction to the Rhine River (Gittenberger and Janssen, 1998; Bij de Vaate and Greijdanus-Klaas, 1990; Bij de Vaate, 1991; Karatayev et al., 2007)."

"In Europe (France), there are reports confirming the capture of C. fluminea to use as a decorative species in freshwater aquariums (Brancotte and Vincent, 2002). Tourist activities could be another potential vector of dispersal (McMahon, 1982)."

Short description

From Foster et al. (2015):

"A small light-colored bivalve with shell ornamented by distinct, concentric sulcations, anterior and posterior lateral teeth with many fine serrations. Dark shell morphs exist but are limited to the southwestern United States. The light-colored shell morph has a yellow-green to light brown periostracum and white to light blue or light purple nacre while the darker shell morph has a dark olive green to black periostracum and deep royal blue nacre (McMahon 1991). Qiu et al. (2001) reported yellow and brown shell color morphs among specimens collected from Sichuan Province in China. The shells of the yellow morphs were straw yellow on the outside and white on the inside; those of brown morphs were dark brown and purple, respectively. Further analyses revealed that the yellow and brown morphs are triploid and tetraploid, respectively."

Biology

From Foster et al. (2015):

"The Asian clam is a filter feeder that removes particles from the water column. It can be found at the sediment surface or slightly buried. Its ability to reproduce rapidly, coupled with low tolerance of cold temperatures (2-30°C), can produce wild swings in population sizes from year to year in northern water bodies. Both yellow and brown morphs are simultaneous hermaphrodites and brood their larvae in the inner demibranchs (Qiu et al. 2001). Furthermore, *C. fluminea* is able to reproduce by self-fertilization at different ploidy levels."

From GISD (2005):

"*Corbicula fluminea* is a hermaphrodite (both sexes are found on one organism) and is capable of self-fertilisation. Sperm is released into the water, caught by another clam, and brooded in the gills. The larvae are released through the excurrent siphon and sent out into the water column. Spawning can continue year around in water temperatures higher than 16 degrees Celsius. The water temperature must be above 16 degrees Celsius for the clams to release their larvae. In North America, spawning occurs from spring to fall (Aguirre and Poss 1999). Maximum densities of *C. fluminea* can range from 10,000 to 20,000 per square metre, and a single clam can release an average of 400 of juveniles a day (PNNL 2003) and up to 70,000 per year. Reproductive rates are highest in fall (Aguirre and Poss 1999)."

Human uses

From GISD (2005):

"In *Corbicula fluminea*'s native range, it is marketed for human consumption and as feed for domestic fowl (Aguirre and Poss 1999). In the United States, it is sold as fish bait (Aguirre and Poss 1999), and it is sold through the aquarium trade where they are known as "pygmy" or "gold" clams."

From CABI (2015):

"The aquaculture potential of *C. fluminea* in invaded places was analyzed by Phelps ([1994]). This clam has never been marketed for food in the US, except canned or smoked, with the canned form mostly commercialized to the Oriental market. Even so, Asians were found harvesting for the Asiatic clam in the Potomac River, above Washington, DC and selling it in large quantities in New York, because they prefer to consume this item fresh (Phelps, [1994])."

"*C. fluminea* has importance in polyculture; it may promote superior water quality in catfish-rearing ponds (Buttner, 1981). Corbicula is not affected by the presence of catfish (*Ictalurus punctatus*) and is of importance as a biofilter if water temperature does not exceed 30ºC (Buttner, 1986)."

Diseases

From CABI (2015):

"There exists a wide variety of parasites in the Corbiculidae and their success as disease vectors is enhanced by *Corbicula* sp. abundance and distribution (Darrigran, 2002; Sousa et al., [2008])."

"*Echinostoma* sp. is the most referenced parasite within *Corbicula* sp. detected for the first time by Bonne (1941) in *Corbicula rivalis* 'Busch' Philiphi, 1850. Echinostomiasis is spread over South-East Asia and the Far East (mainland China, Taiwan, India, Korea, Malaysia, Philippines, and Indonesia) (Huffman and Fried, 1990). *Corbicula* is one of the hosts and some parasite forms cause severe diseases in man, and are still a public health problem in endemic areas. Pathway transmission is by eating clams raw or barely cooked (Carney et al., 1980)."

From Graczyk et al. (1998):

"May play an epidemiological and epizootiological role in food-borne cryptosporidiosis."

From Saitoh et al. (2013):

"The freshwater bivalve *C. fluminea* is a reservoir for NoVs [noroviruses], similar to seawater bivalves such as oysters."

Threat to humans

From CABI (2015):

"In the USA, *C. fluminea* has caused millions of dollars worth of damage to intake pipes used in the power and water industries. Large numbers, both dead or alive, clog water intake pipes and the cost of removing them is estimated at about a billion US dollars each year (Anon., 2005). Juvenile *C. fluminea* get carried by water currents into condensers of electrical generating facilities where they attach themselves to the walls via byssus threads, growing and ultimately obstructing the flow of water. Several nuclear reactors have had to be closed down temporarily in the USA for the removal of *Corbicula* from the cooling systems (Isom, 1986). In Ohio and Tennessee where river beds are dredged for sand and gravel for use as aggregation material in cement, the high densities of *C. fluminea* have incorporated themselves in the cement, burrowing to the surface as the cement starts to set, weakening the structure (Sinclair and Isom, 1961). Isom (1986) has reviewed the invasion of *C. fluminea* of the Americas and the biofouling of its waters and industries."

"In the United States *Corbicula* sp. is consider a pest species (Counts, 1981; Isom, 1986). In power plant facilities they can clog condenser tubes (Potter and Liden, 1986). In the United States alone, cost damages in a nuclear station by C. fluminea were estimated at US $2.2 billion annually in the early 1980s (OTA, 1993). In the Delta-Mendota Canal, with a deficient design, the accumulation of sediment and *Corbicula* clams reduced the canal capacity (Arthur and Cederquist, 1976). In South America fouling problems were only recorded in power plants in Brazil in 2000 (Zampatti and Darrigan, 2001). In Russia there are reports of biofouling problems in reservoirs by *Corbicula* sp. in numerous locations: southern Primorye, Sakhalin and Khabarovsk (Ya[v]nov and Rakov, 2002). Control methods in the power plant industry are reviewed by Post et al. (2006)."

3 Impacts of Introductions

From Foster et al. (2015):

"Environmental: The most prominent effect of the introduction of the Asian clam into the United States has been biofouling, especially of complex power plant and industrial water systems (Isom et al. 1986; Williams and McMahon 1986). It has also been documented to cause problems in irrigation canals and pipes (Prokopovich and Hebert 1965; Devick 1991) and drinking water supplies (Smith et al. 1979). It also alters benthic substrates (Sickel 1986), and competes with native species for limited resources (Devick 1991).**"**

“Ecological: *C. fluminea* is consumed mainly by fish and crayfish. An account of the different species which prey on *C. fluminea* in the USA is given by McMahon (1983). Garcia and Protogino (2005) describe the diet of some native fishes from Argentina (Rio de la Plata) previously not known to feed on *C. fluminea*. Their results indicate that several local fish species have modified their diet to feed on invasive molluscan species such as *C. fluminea*.”

From GISD (2005):

“Ecologically, *C. fluminea* can outcompete many native clam species for food and space (PNNL 2003). The introduction of *C. fluminea* into the United States has resulted in the clogging of water intake pipes, affecting power, water, and other industries. Nuclear service water systems (for fire protection) are very vulnerable, jeopardising fire protection. In 1980, the costs of correcting this problem were estimated at 1 billion dollars annually. *C. fluminea* causes these problems because juveniles are weak-swimmers, and consequently they are pushed to the bottom of the water column where intake pipes are usually placed. They are pulled inside the intakes, where they attach, breed, and die. The intake pipe become clogged with live clams, empty shells, and dead body tissues. Buoyant, dead clams can also clog intake screens.”

“The indigenous *C. leana* has disappeared in the Yodo River in the Lake Biwa-Yodo river system. The authors suggest that the invasion of exotic *C. fluminea* may result in the extinction of the indigenous *C. leana*.”

From CABI (2015):

“*C. fluminea* is known to alter benthic substrata and competes with native species of bivalves for food and space. It is also able to tolerate polluted environments better than native species of bivalves. Several studies have shown that the filter feeding of *C. fluminea* had resulted in a significant removal of suspended matter from the water column; Cohen et al. (1984) reported a large decrease in phytoplankton in the Potomac River which was attributed to *Corbicula*. A decrease in seston in streams with high populations of *Corbicula* has also been reported (Leff et al., 1990). These declines in particulate matter have important repercussions for the rest of the biota. *Corbicula* is also known to increase the rate of sedimentation which would require more frequent dredging to maintain water flow; this would not only be expensive and but also have serious effects on the river ecosystem. Although there is as yet no evidence that *C. fluminea* is directly responsible for declines in populations of threatened native species in the USA and Britain there is some concern that they could lead to such declines by outcompeting them for space and food (Aldridge and Muller, 2001).”

4 Global Distribution

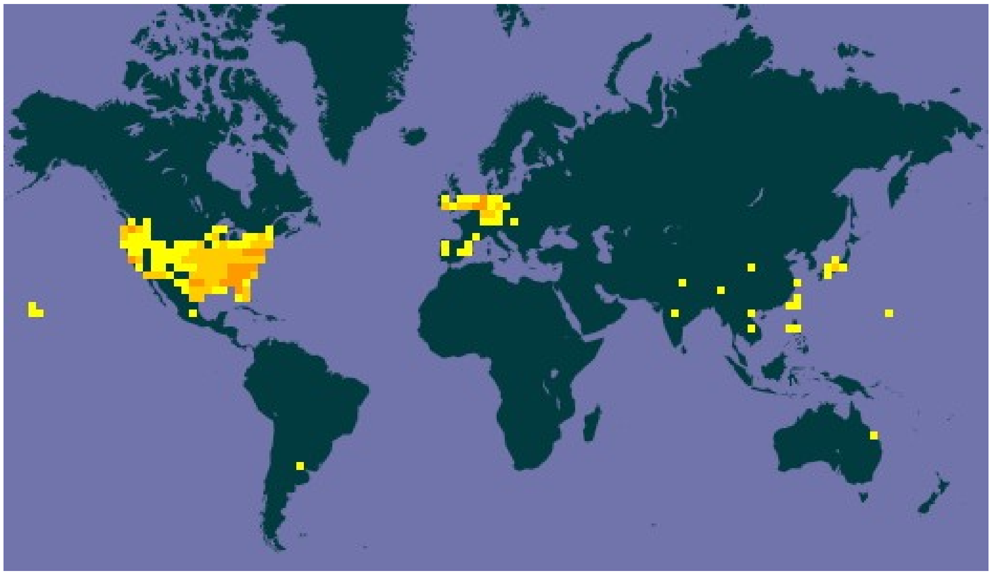

Figure 1. Map of known global distribution of *Corbicula fluminea*. Map from GBIF (2015). Point in Nepal was not included in climate matching (Sec. 6) because it was incorrectly located.

5 Distribution within the United States

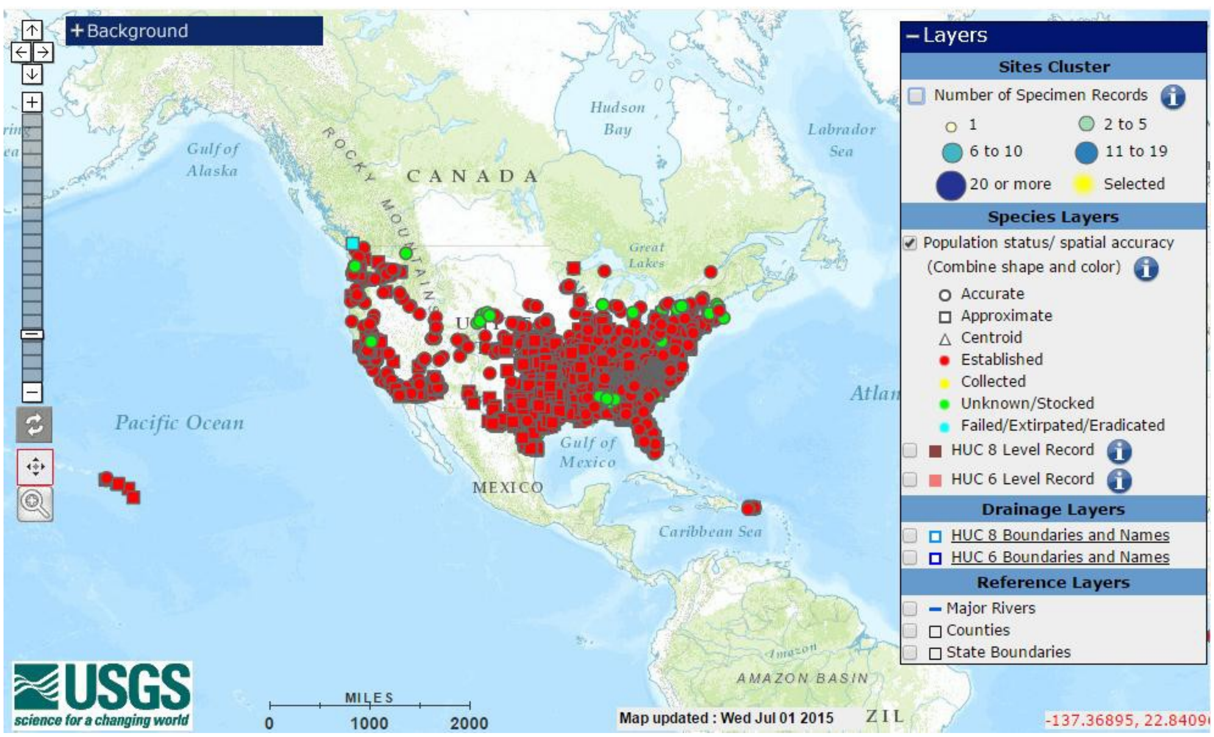

Figure 2. Distribution of *Corbicula fluminea* in the United States. Map from Foster et al. (2015).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was high throughout the United States, except for small parts of the Pacific Northwest and the northern Interior West. Climate 6 score indicated that the contiguous U.S. is a very high climate match overall for *C. fluminea*. The range for a high climate match is 0.103 and greater; Climate 6 score of *Corbicula fluminea* is 0.993.

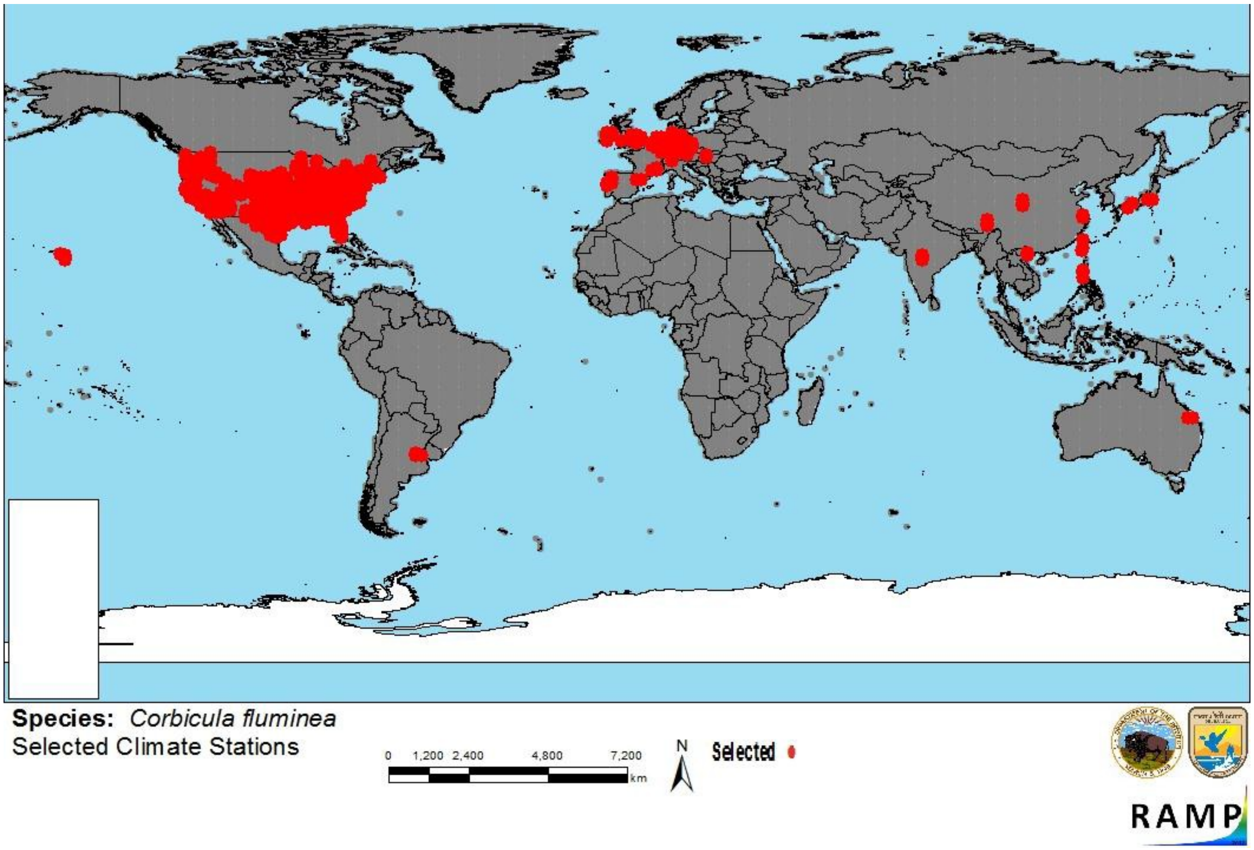

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Corbicula fluminea* climate matching. Source locations from GBIF (2015).

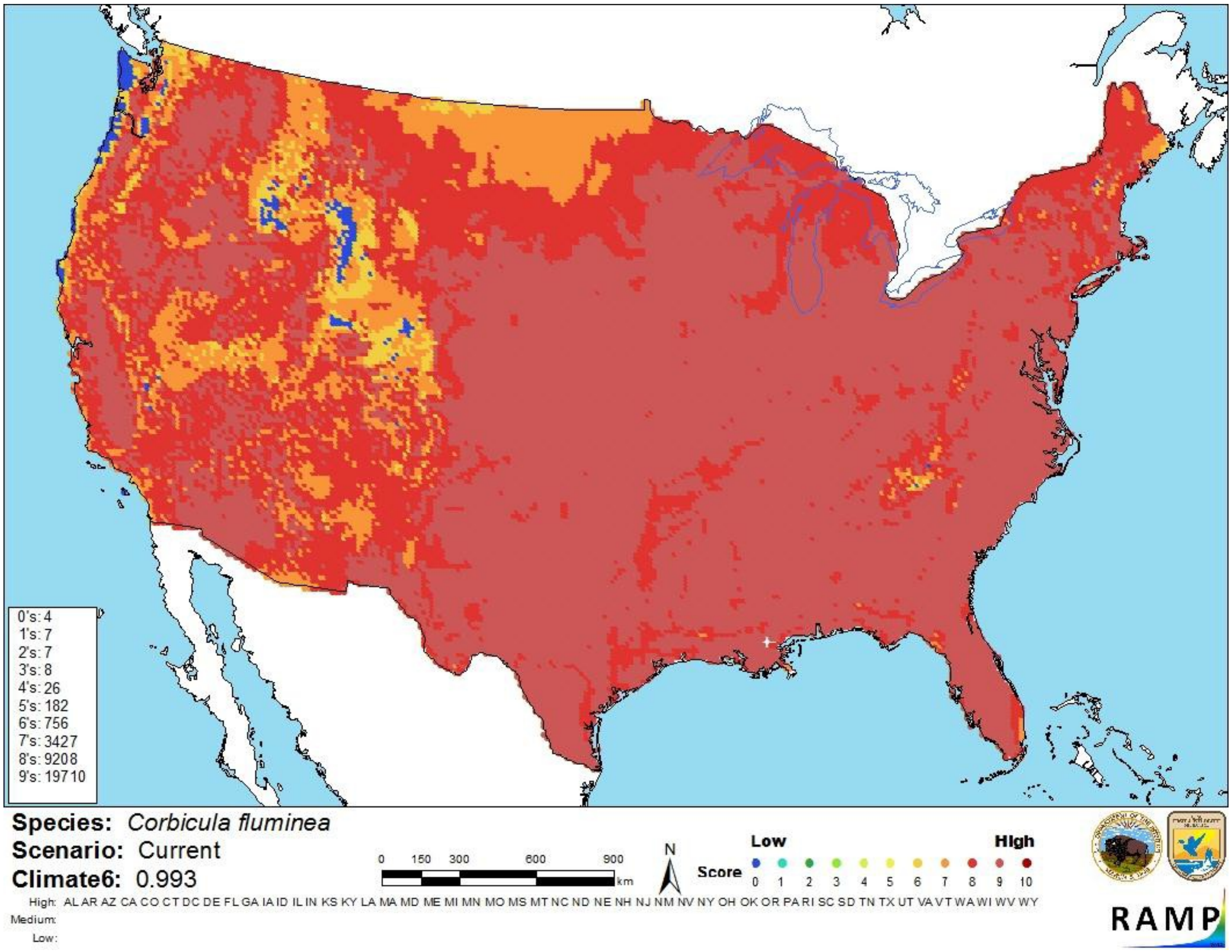

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Corbicula fluminea* in the continental United States based on source locations reported by GBIF (2015). 0= Lowest match, 10=Highest match. Counts of climate match scores are tabulated at left.

7 Certainty of Assessment

The biology and ecology of *C. fluminea* are well-known. Negative impacts from introductions of this species are adequately documented in the scientific literature. No further information is needed to evaluate the negative impacts the species is having where introduced. Certainty of this assessment is high.

8 Risk Assessment

Summary of Risk to the Continental United States

C. fluminea has become an established invasive species in many parts of the United States. With a very high climate match, the species has the potential to establish across the country. The ease of spread, large numbers of offspring produced sexually or asexually, wide habitat tolerances, ability to outcompete native species, and potential to cause negative economic impacts make this a very high risk species.

Assessment Elements

- ☐ **History of Invasiveness (Sec. 3):** High
- ☐ **Climate Match (Sec.6):** High
- ☐ **Certainty of Assessment (Sec. 7):** High
- ☐ **Remarks/Important additional information** Asexual reproduction and considered a pest species
- ☐ **Overall Risk Assessment Category: High**

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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