(2) *Administrator discretion.* The Administrator retains the discretion to require other electronic means and additional notifications if a manufacturer's chosen means is impractical, does not feasibly reach all affected owners, purchasers, or lessees, or is otherwise deemed inappropriate.

(3) *Electronic recall notification plans.* (i) At least once every five (5) years manufacturers shall submit to NHTSA's Recall Management Division (NEF–107), through the online Manufacturers Recall Portal, a plan for the notification of owners, purchasers, and lessees of recalls by electronic means. This plan must describe the means of electronic notification that the manufacturer anticipates utilizing for its recalls and how the manufacturer will evaluate the selection of the electronic means utilized for a recall, including an explanation of any preferences for the use of certain electronic means.

(ii) A manufacturer's electronic recall notifications issued under this section must be consistent with its electronic recall notification plan unless the manufacturer notifies NHTSA no fewer than ten (10) Federal Government business days before the anticipated issuance of any notification by electronic means that would be inconsistent with its electronic recall notification plan, with an accompanying explanation for the inconsistency.

■ 4. Amend § 577.10 by revising paragraph (g) to read as follows:

§ 577.10 Follow-up notification.

* * * * *

(g) A follow-up notification sent by first-class mail or by electronic means shall be sent in conformance with the requirements of § 577.7 of this part. Notwithstanding any other provision of this part, the Administrator may authorize the use of other means besides first-class mail and electronic means for a follow-up notification.

Issued in Washington, DC, under authority delegated pursuant to 49 CFR 1.95 and 501.8.

Eileen Sullivan,

Associate Administrator for Enforcement.

[FR Doc. 2024–31011 Filed 1–8–25; 8:45 am]

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 16

[Docket No. FWS–HQ–FAC–2024–0060; FXFR13360900000–245–FF09F14000]

RIN 1018–BH15

Injurious Wildlife Species; Listing Two Freshwater Mussel Genera and One Crayfish Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) proposes to add all species of freshwater mussels from two genera, Asian pond mussels (*Sinanodonta* species) and golden mussels (*Limnoperna* species), to the list of injurious mollusks. Additionally, the Service proposes to add marbled crayfish (*Procambarus virginalis*) to the list of injurious crustaceans. Listing these taxa as injurious will prohibit the importation of any live animal, larvae, viable egg, or hybrid of these taxa into the United States, except as specifically authorized. These listings would also prohibit shipment of any live animal, larvae, viable egg, or hybrid of these species between the continental United States, District of Columbia, Hawaii, Commonwealth of Puerto Rico, or any territory or possession of the United States, except as specifically authorized. The action is necessary to protect wildlife and wildlife resources by preventing the introduction and subsequent establishment of these foreign aquatic invertebrates into ecosystems of the United States.

DATES: We will accept comments received or postmarked on or before March 11, 2025.

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal: *https://www.regulations.gov.* In the Search box, enter FWS–HQ–FAC–2024–0060, which is the docket number for this proposed rule. You may submit a comment by clicking on ''Comment.''

(2) *By hard copy:* Submit by U.S. mail to: Public Comments Processing, Attn: FWS–HQ–FAC–2024–0060, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by one of the methods described above. We will post all comments on *https://www.regulations.gov,* meaning that we will generally post any personal information you provide (see Public Comments, below, for more information). This proposed rule and all supporting documentation, including the environmental action statement and references cited in this proposed rule, are available on *https://www.regulations.gov* in Docket No. FWS–HQ–FAC–2024–0060.

FOR FURTHER INFORMATION CONTACT: Kristen Sommers, Injurious Wildlife Listing Coordinator, U.S. Fish and Wildlife Service, Branch of Aquatic Invasive Species; MS: FAC, 5275 Leesburg Pike, Falls Church, VA 22041–3803; by telephone at 571–329–2214. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point of contact in the United States. Please see Docket No. FWS–HQ–FAC–2024–0060 on *https://www.regulations.gov* for a document that summarizes this proposed rule.

SUPPLEMENTARY INFORMATION:

Executive Summary

The U.S. Fish and Wildlife Service (Service) proposes to add the genus of Asian pond mussels (*Sinanodonta*), the genus of golden mussels (*Limnoperna*), and the marbled crayfish (*Procambarus virginalis*) to the list of injurious wildlife in title 50 of the Code of Federal Regulations (CFR) at § 16.13 (50 CFR 16.13). This action would prohibit these genera and species from being imported into the United States and shipped between the continental United States, District of Columbia, Hawaii, Commonwealth of Puerto Rico, or any territory or possession of the United States, except as specifically authorized. The purpose of listing all species from two freshwater mussel genera and one crayfish species is to protect U.S. interests and natural resources by preventing introduction of these injurious aquatic invertebrates into ecosystems of the United States. The final rule may confirm individual, some, or all proposed species for listing as injurious.

Based on current taxonomic classification, there are 26 species in the *Sinanodonta* genus, 1 species in the *Limnoperna* genus, and the marbled crayfish (*Procambarus virginalis*) that we are proposing for listing as injurious under 18 U.S.C. 42(a)(1) (the injurious wildlife listing provision of the Lacey Act). These taxa share various generic

biological traits of invasiveness, including early sexual maturity, high dispersal capability, large reproductive capacity, broad environmental tolerances (even for polluted and contaminated waters), and adaptability to scenarios associated with climate warming or other extreme weather events like drought. Both mussel genera (*Sinanodonta* and *Limnoperna*) are native to Asia. However, marbled crayfish have no native distribution because they originated in captivity in the 1990s, possibly through mutation of sexual reproduction genes. Since these foreign mussels and the crayfish do not presently occur in U.S. ecosystems, except for potentially one species of Asian pond mussel (*S. woodiana*) in New Jersey, the goal is to preemptively list them as injurious before they can establish and harm U.S. interests. The primary pathways by which these species could enter the United States include commercial trade in live animal industries or transoceanic commercial shipping. Further, according to the Service's Law Enforcement Management Information System (LEMIS) records, these taxa are either not traded in the United States or are traded in quantities small enough that market impact of halting importation would be negligible.

The need for this rulemaking action arose from the Service's concern that these foreign aquatic invertebrate species are injurious to the interests of agriculture (including aquaculture), water infrastructure investments (such as hydropower), or wildlife and wildlife resources of the United States. These determinations are based on factors that contribute to injuriousness compared with potential risk mitigation measures that may reduce or eliminate injuriousness. Asian pond mussels, golden mussels, and the marbled crayfish each have proven invasiveness outside their native ranges. Likelihood of establishment inferred from climate suitability modeling is high throughout the contiguous United States for all taxa, so they are likely to spread if introduced. These species all may harm native species, including federally endangered and threatened species, through competition for food and spatial resources. Because available control measures for these species in natural environments would also kill co-occurring native wildlife, control as an option to reduce injuriousness is not considered a practical risk mitigation measure.

Statutory Authority

Under 18 U.S.C. 42(a)(1) (the injurious wildlife listing provision of the Lacey Act), the Secretary of the Department of the Interior may prescribe by regulation wild mammals, wild birds, fishes, mollusks, crustaceans, amphibians, reptiles, and the offspring or eggs therefrom that are injurious to human beings, to the interests of agriculture, horticulture, forestry, or to the wildlife or wildlife resources of the United States. The lists of injurious wildlife are found at 50 CFR 16.11–16.15. Importation into the United States or shipment between the enumerated jurisdictions in 18 U.S.C. 42(a)(1) of listed species is prohibited, except as approved by the Service under permitted terms and conditions for zoological, educational, medical, or scientific purposes found at 50 CFR 16.22 or for Federal agencies for their own use. This rule would not prohibit transport within States. Any regulations pertaining to the possession, transport, or use of these species within a particular State would remain the authority of that State. Further, rulemaking under this statute is governed by the Administrative Procedure Act (5 U.S.C. 551 *et seq.*), which specifies how Federal agencies develop and issue regulations.

Listing and Evaluation Process

The Service must promulgate regulations in accordance with other statutory requirements, in addition to the Lacey Act. The Administrative Procedure Act (5 U.S.C. 551 *et seq.*) governs the process for rulemaking. In keeping with the Administrative Procedure Act, we are publishing a proposed rule for public notice and comment. We also solicit peer review under Office of Management and Budget (OMB) guidelines titled, ''Final Information Quality Bulletin for Peer Review'' (OMB 2004). We also make available to the public an economic analysis (including analysis of potential effects on small businesses), if appropriate.

This proposed rule is based on specific evaluation of taxa (classification-based groupings of life forms) of mollusks and crustaceans reported in the scientific literature as highly invasive and with the potential to be introduced through wildlife trade. We performed an evaluation using the Service's injurious wildlife evaluation criteria (see *Lacey Act Evaluation Criteria,* below); we use these criteria to evaluate if a taxon qualifies as injurious. These criteria include the likelihood and magnitude of release or escape, of survival and establishment upon release or escape, and of spread from the point of origin of release or escape. These criteria also examine the impact on wildlife resources and ecosystems (such as through hybridizing, competition for food or habitat, predation on native species, and pathogen transfer); on endangered and threatened species and their respective habitats; and on human beings, forestry, horticulture, and agriculture. Additionally, the criteria evaluate the likelihood and magnitude of wildlife or habitat damages resulting from measures to control the species proposed as injurious wildlife. The analysis using these criteria serves as a basis for the Service's regulatory decision regarding injurious wildlife species listings.

We also considered the Service's ''Ecological Risk Screening Summaries,'' a rapid screening process that categorizes a species' invasive potential. Executive Order (E.O.) 13751 (Safeguarding the Nation from the Impacts of Invasive Species) defines an invasive species as a nonnative organism, ''whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health.'' Screening reports for representative taxa in this proposed rule are available in a library subcollection on the Service's website: *https://www.fws.gov/library/categories/ecological-risk-screening.*

For the injurious wildlife evaluations, two genera of mollusks were evaluated at the taxonomic level of ''genus,'' so the final determination might confirm one, multiple, or all proposed species within a genus for listing as injurious. The marbled crayfish was evaluated as a single species. For the purposes of this proposed rule, we define hybrids as offspring from parents of different species, including one or more species from the taxa evaluated in the rule. We reasoned that such offspring likely retain similar biological traits as the injurious parents that, through the evaluation process, qualified them for listing. Species do not have to be currently imported, present in the wild, or established in the United States for the Service to list them as injurious. The objective of such listings is to prevent importation and likely establishment of that species in the wild, thereby preventing injurious effects, consistent with 18 U.S.C. 42. Other mollusks and crustaceans may also qualify as injurious under this process and may be considered in subsequent rules.

Public Comments

The Service is soliciting substantive public comments on and data concerning this proposed rule to add the three taxa to the list of injurious wildlife set forth at 50 CFR 16.13. This proposed rule and supporting materials are available on *https://www.regulations.gov* under Docket No. FWS–HQ–FAC–2024–0060.

Comments and materials concerning this rule may be submitted by one of the methods listed in **ADDRESSES**. Comments sent by email or fax or to an address not listed in **ADDRESSES** will not be accepted.

We may post your entire comment—including your personal identifying information—on *https://www.regulations.gov.* If your written comments provide personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that this information will not be made public.

Those comments and materials that we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public review at *https://www.regulations.gov* under Docket No. FWS–HQ–FAC–2024–0060, or by appointment, during normal business hours at U.S. Fish and Wildlife Service Headquarters (see **FOR FURTHER INFORMATION CONTACT**).

Information Requested

The Service specifically seeks public comments and supporting data on (but not limited to) the following topics:

(1) Information on the number and monetary value of Asian pond mussels (*Sinanodonta* species), golden mussels (*Limnoperna* species), or marbled crayfish (*Procambarus virginalis*) (by species) that are imported from out of country into the continental United States, District of Columbia, Hawaii, Commonwealth of Puerto Rico, or any territory or possession of the United States.

(2) Information on the number and monetary value of Asian pond mussels (*Sinanodonta* species), golden mussels (*Limnoperna* species), or marbled crayfish (*Procambarus virginalis*) (by species) that are bred and raised in the United States for wholesale or retail sale and in which U.S. States.

(3) Information on the number of pet shops and dealers involved in the trade of these taxa.

(4) Volume of trade between the continental United States, District of Columbia, Hawaii, Commonwealth of Puerto Rico, or any territory or possession of the United States.

(5) The hybridization potential of Asian pond mussels, golden mussels, or marbled crayfish within the same genus or between species of different genera.

(6) Costs to eradicate individuals or populations of any of the three taxa, or similar species, if found in the United States, and any effective methods available.

(7) Information related to the presence and location of any of the species in the wild in the United States.

(8) Relevant Federal, State, or local rules that may duplicate, overlap, or conflict with this proposed rule.

Sources of Information

We obtained information on species taxonomy, biology, geographic distribution, climate suitability, and invasive potential from a variety of sources, including the U.S. Geological Survey's Nonindigenous Aquatic Species (NAS) database, the Service's Ecological Risk Screening Summaries, and primary literature. We queried the NAS (*https://nas.er.usgs.gov/*) and Global Biodiversity Information Facility (GBIF) (*https://www.gbif.org/*) databases to determine if the three taxa proposed for listing are currently reported as established in U.S. ecosystems. We also adopted GBIF's system as our standard for taxonomic classification, such as number of accepted species in a genus. To determine if there is currently trade of these species in the United States, we analyzed import data for 2015 to 2021 (inclusive) from the Service's LEMIS wildlife trade database.

Species Information

Asian Pond Mussels (Sinanodonta Species)

Taxonomy

Asian pond mussels (*Sinanodonta* species) are a genus of freshwater bivalve mollusk in the Unionidae family. These organisms are characterized by two shells that hinge together, similar to a clam. Based on current taxonomic classification, there are 26 species in the *Sinanodonta* genus (GBIF 2023*a*). Some historical invasive population accounts of this species complex also referred to this species group as *Anodonta woodiana;* our searches of literature and trade data included the name *Anodonta woodiana* for the evaluation. Our searches also included the commonly used name of Chinese pond mussel.

Historically, identification relied solely on shell characteristics of adults, resulting in taxonomic confusion within this genus; therefore, species level identification of Asian pond mussels usually requires molecular genetic analysis (Karaouzas et al. 2022). Recent literature indicates that the invasive populations of *Sinanodonta* that were initially identified as *S. woodiana* are more than one species or lineage (Soroka et al. 2014, Lopes-Lima et al. 2020, Bolotov et al. 2022). For example, two distinct nonnative species of *Sinanodonta* were discovered as well established in the Yenisei River, Russia, that were initially assumed to be one species prior to molecular analysis (Bespalaya et al. 2018). Further, genetic work conducted in Italy also supported that three species, all originally labeled as *Sinanodonta woodiana,* were likely separate species in this genus (Froufe et al. 2017). Other studies have indicated cryptic *Sinanodonta* species with similar invasion histories and harmful ecological effects co-occurring outside their native ranges (Kondakov et al. 2018, 2020*a, b,* Alwanzadegan et al. 2023, Pavluk et al. 2023). While there is some uncertainty about the precise number of existing *Sinanodonta* species (Lopes-Lima et al. 2020), incorporating additional anatomical traits of both adults and larvae, as well as more sensitive molecular tools, continues to improve the ability of scientists to accurately and precisely identify *Sinanodonta* specimens. Given the proximity in native ranges, converging morphology and genetics, and similarly high invasive capability, we consider the whole genus *Sinanodonta* for listing as injurious under an inclusive common name: Asian pond mussels.

Asian pond mussels are characterized by relatively large size, with round or oval shaped shells reaching 26 to 30 centimeters (cm) (10 to 12 inches) in length and up to 12 cm (5 inches) in height (Von Proschwitz 2008, Pou-Rovira et al. 2009) and having fragile shells (Munjiu et al. 2020). In Germany, a 25-cm (10-inch) long specimen weighed 1.6 kilograms (kg) (3.5 pounds) (Dobler et al. 2022). They display considerable variation in shell shape (length to height ratio) attributed to habitat factors, such as hydrology, substrate type, food availability, and parasite prevalence (Guarneri et al. 2014). Transverse ridges and beak (umbo) shape represent other distinguishing features, while shell color ranges from dark brown, to dark green, to yellow green (Von Proschwitz 2008). Diagnostic hinge teeth, which are used to identify other mussel genera, are absent in the *Sinanodonta* genus.

Biology

Asian pond mussels have two sexes (dioecious); however, female-dominated populations in the invaded range of Poland suggest the ability to reproduce

asexually, where a female does not require a mate to produce offspring (parthenogenesis) (Labecka and Domagala 2018). There are also rare instances of individuals with both female and male sex organs (hermaphroditism), enabling self-fertilization (Munjiu et al. 2020). Hybridization of *Sinanodonta* species has been documented and is potentially facilitated by overlapping geographic distributions of species within this genus (Sano et al. 2022).

Generally, fertilization occurs inside the shells of females after they collect sperm released by males. In their native range, Asian pond mussels, such as *S. woodiana,* reach sexual maturity around 9 months and carry young a little over 1 year (Wu et al. 2018). Like other mussels in the Unionidae family, females raise larvae inside a specialized brooding pouch in their gills called a marsupium.

Reproductive traits, such as brooding period, are species-specific but also environment-dependent. In their native ranges, Asian pond mussels may retain and brood larvae for 6 months or more inside their shells, usually during spring and summer (Wu et al. 2018). In the invaded range of central Poland, *S. woodiana* spawn from March to October with their highest reproductive output in March and April (Hliwa et al. 2015); however, reproduction is known to occur in a wide range of water temperatures, indicating a broad tolerance for water bodies (Douda et al. 2012). Also in the European invaded range, they can reproduce 2 to 3 times annually and live up to 15 years (Sárkány-Kiss et al. 2000). In a German population of *S. woodiana,* females carried an average of 100,000 larvae in their brood pouches with over 95 percent viability (Huber and Geist 2019).

After Asian pond mussel larvae are expelled into the water column, they normally only survive outside the female for days to weeks before needing a host fish to carry out the rest of their development. These parasitic larvae, called glochidia, attach with hook-like structures to the fins or gills of freshwater fishes for days to months, depending on water temperature. Research has shown that host species will likely not limit Asian pond mussel expansion, because they have shown little host specificity (Douda et al. 2012).

Adult Asian pond mussels burrow into soft sediment up to 20 cm (8 inches) deep and can ''crawl'' up to 10 meters (m) (33 feet) in a day with aid of their muscular foot (Urbańska et al. 2021). In Poland, they form dense aggregations exceeding 60 individuals per square meter (6 individuals per square foot) in water depths of 1.5 to 2.5 m (5 to 8 feet) (Kraszewski and Zdanowski 2007). Asian pond mussels acquire nutrition through a process called ''filter feeding'' where the animal circulates the surrounding water over its gills, and strains suspended nutrients or smaller organisms to consume as food. They are efficient filter feeders, less hindered by low food availability than native European unionid mussels according to lab experiments (Douda and Čadková 2018).

Native Distribution

Species in the *Sinanodonta* genus are native to Asia including China, Vietnam, Japan, the Korean Peninsula, Indochina, and parts of eastern Russia (Lopes-Lima et al. 2020). They live underwater, inhabiting rivers, ponds, and canals in temperate to tropical waterbodies (Beran 2008). They occupy backwaters and other slow-flowing and standing water systems and are more tolerant of pollution and low oxygen than many other freshwater mussels (Sárkány-Kiss et al. 2000).

Nonnative Distribution

In most cases, Asian pond mussels were not intentionally introduced outside their native range but rather transported with commercially traded fishes serving as hosts to their obligatory parasitic larvae, with first discoveries often occurring at or near fish hatcheries and fish ponds (Watters 1997, Douda et al. 2017, Pavluk et al. 2023). In Germany, early detections of Chinese pond mussels (*S. woodiana*) were limited to waters with grass carp (*Ctenopharyngodon idella*) stocked to graze on and reduce aquatic weeds (Dobler et al. 2022). Chinese pond mussels were first recorded in western Romania around 1979, likely arriving with silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Hypophthalmichthys* nobilis), or grass carp (*Ctenopharyngodon idella*) imports from Asia, (Sárkány-Kiss 1986) and are presently found in at least 17 European countries including Austria (Mienis 2002), Belgium (Packet et al. 2009), Croatia (Lajtner and Crnčan 2011, Beran 2020), Czech Republic (Beran 2008, 2019), France (Adam 2010), Germany (Dobler et al. 2022), Greece (Karaouzas et al. 2022), Hungary (Kiss and Pekli 1988), Italy (Cappelletti et al. 2009), Poland (Kraszewski and Zdanowski 2007, Soroka et al. 2014), Republic of Moldova (Munjiu 2008), Romania (Popa et al. 2007), Serbia (Paunović et al. 2006), Slovakia (Mienis 2001), Spain (Pou-Rovira et al. 2009), Sweden (Von Proschwitz 2008), and Ukraine (Yuryshynets and Krasutska 2009). Asian pond mussels have been recorded outside their native range in Indonesian islands, including Flores and Borneo (Bolotov et al. 2016, Zieritz et al. 2020); north African countries, such as Algeria (Bensaad-Bendjedid et al. 2023) and Morocco (Mabrouki and Taybi 2022); Russia (Kondakov et al. 2020*a*); Dominican Republic (Gomez et al. 1986); and Costa Rica (Baurer et al. 2021). Evidence of their ongoing westward range expansion within Asia exists from Myanmar (Vikhrev et al. 2017, Bolotov et al. 2022) to Iraq (Bogan et al. 2021).

Invasiveness

Asian pond mussels demonstrate many strong traits that support significant risk for invasiveness. As previously described, Asian pond mussels have a broad native range in Asia with an expanded (nonnative) range that includes other regions in Asia as well as across Europe, Africa, and the Americas. These mussels also have demonstrated high adaptability to different aquatic environments and conditions, including several types of water bodies, bottom substrates in those water bodies, poor water quality conditions, and cold water temperatures (Urbańska et al. 2021). Their ability to utilize a variety of fish species as hosts to carry and disperse the larval stage of these mussels is yet another trait that promotes their potential success for invasion (Douda et al. 2012). A high reproductive rate coupled with successful and rapid growth compared to other mussels contributes to a competitive advantage that supports their invasiveness (Huber and Geist 2019). The ability of Asian pond mussels to outperform some other mussels in competition for food and habitat resources has also been demonstrated (Urbańska et al. 2021). Their invasive potential as recognized through the scientific literature has earned them a designation as a ''hyper-successful invader,'' a term used to describe other invasive bivalves such as zebra mussels (*Dreissena polymorpha*), quagga mussels (*Dreissena bugensis*), and Asian clams (*Corbicula fluminea*) that have proven to be problematic as aquatic invasive species in the United States (Sousa et al. 2014). The combination of these characteristics and other factors supports the position that Asian pond mussels have considerable risk for invasiveness within the United States, as has been demonstrated elsewhere around the world.

Golden Mussels (Limnoperna Species)

Taxonomy

Golden mussels (*Limnoperna* species) are a genus of freshwater bivalve mollusk in the Mytilidae family. Like other mussels, golden mussels are characterized by a two-part hinged shell similar to clams. Based on current taxonomic classification, there is one true species in the *Limnoperna* genus (*L. fortunei*) with various synonymized names that other sources may consider unique species (GBIF 2023*b*). Similar to Asian pond mussels, recent genetic studies have indicated a cryptic species (*L. siamensis*) that may be confused with the morphologically identical *L. fortunei* (Sokolova et al. 2021). Given the likelihood of taxonomic diversification and expectation that additional named species in the genus share similar biological traits of injuriousness, we refer to *Limnoperna* species for listing as injurious under an inclusive common name: golden mussels.

Golden mussels are characterized by relatively small size, with D-shaped shells reaching 20 to 30 millimeters (mm) (0.8 to 1.2 inches) in length, and specimens reported up to 50 mm (2 inches) (Nakano et al. 2015). Their shells are brittle and relatively thin compared to other mussels (Morton 2015). They derive their common name from the gold appearance of their exterior shell when wet, while the interior shell has nacre (mother-of-pearl). This nacreous layer distinguishes golden mussels from Mytilidae species in the genus *Dreissena,* such as zebra and quagga mussels. Golden mussels attach to surfaces and the bottom substrate using strong silky fibers with adhesive pads, called byssal threads. These fibers help to keep the mussel attached to solid surfaces in the water, holding them in place to filter feed. Unlike many species of bivalves, golden mussel shells do not have a ''byssal notch,'' a distinct gape in the shell where part of the mollusk foot may protrude or where the byssal threads may extend from. Another distinguishing feature of golden mussels is the absence of hinge teeth, the interlocking parts of the inner surface of the shell valves of a bivalve mollusk.

Biology

Golden mussels are dioecious (having two separate sexes), with rare instances of hermaphroditism (one organism containing both male and female reproductive organs) documented in the invaded range (Darrigran et al. 1998). Hybridization of golden mussels is not well documented.

Fertilization occurs externally in the water column. Their free-swimming larvae, called veligers, live in the water column and undergo several developmental stages before settling on substrates 11 to 20 days after spawning (Cataldo et al. 2005). This extended floating (planktonic) veliger stage facilitates long-distance dispersal.

Water temperature determines golden mussels' reproductive timing and frequency. Data from South America show continuous breeding for 6 to 10 months per year with evidence of punctuated spawning yearlong at some locales; mean planktonic larval densities at invaded sites ranged from 4,000 to 7,000 individuals per cubic meter (100 to 200 individuals per cubic foot) (Boltovskoy et al. 2009).

Golden mussels reach sexual maturity in their first year, and their lifespan ranges from 2 to 5 years with potential for reaching 10 years, depending on geography (Zhang et al. 2022). Age at sexual maturity can be as young as 3 months (as cited in Karatayev et al. 2007).

Golden mussels colonize submerged natural and artificial substrates, aggregating in clumps called druses. They occur at depths of a few centimeters (1 inch) to over 10 m (33 feet) with preference for shaded, angled surfaces (Morton 2015). They reach adult densities of 5,000 to 250,000 individuals per square meter (500 to 23,000 individuals per square foot) on hard surfaces and 90 to 2000 individuals per square meter (8 to 200 individuals per square foot) on soft surfaces (as cited in Frau et al. 2013).

Golden mussels have relatively high filtration rates (Karatayev et al. 2007) with a diet comprising a variety of planktonic food sources from 2 micrometers (μm) (7.8×10^{-5} inches) to over 1 mm (0.04 inches) (Molina et al. 2010). For comparison, despite similar body size, golden mussels can prey on larger plankton than the highly invasive zebra mussels (Molina et al. 2010).

Native Distribution

Species in the *Limnoperna* genus are native to freshwater lakes and rivers of southeast Asia, including China, Thailand, Korea, Laos, Cambodia, Vietnam, and Indonesia (Ricciardi 1998). They live underwater, inhabiting freshwater to estuarine environments in temperate to tropical waterbodies, tolerating brackish water with salinities of 2 to 3 parts per thousand (ppt) and short-term salinity shock up to 12 ppt (Angonesi et al. 2008). Golden mussels also tolerate calcium- and oxygen-poor waters that are inhospitable to highly invasive zebra mussels, but they are comparatively less tolerant of near freezing temperatures (Ricciardi 1998).

Nonnative Distribution

Establishment of invasive golden mussel populations has been recognized in two continents since the late 1980s. They arrived in Japan around 1987, probably with live Asian clams (*Corbicula fluminea*) imported from China for human consumption (Magara et al. 2001). They were introduced to Argentina by 1991, likely in transoceanic ballast water (Darrigran and Pastorino 1995), and within a decade spread to three neighboring countries, Uruguay, Paraguay, and Brazil (Darrigran 2002).

Invasiveness

Golden mussels possess a suite of characteristics pertaining to reproduction, growth, dissemination (dispersal), adaptability, and tolerance of poor environmental conditions that support high potential for invasion. Strong reproductive ability and fast growth have been described for *Limnoperna,* as well as the ability to survive in habitats with widely ranging water temperatures, depth, water flow rates, and dissolved oxygen content (Zhao et al. 2019). The ability to survive for 5 to 7 days out of water also contributes to the potential for dispersal of golden mussels (Darrigran et al. 2004). The high population densities of this mussel in some water bodies in South America also contribute to its potential for invasiveness and dispersal (Ernandes-Silva et al. 2017). The ability of golden mussels to firmly attach to the hulls of ships contributes further to its ability to disseminate along navigable waterways (Boltovskoy and Correa 2015). These factors contributed to invasiveness of golden mussels in their spread beyond their native range in Asia and in South America. Like Asian pond mussels, golden mussels have been identified in scientific literature as a ''hyper-successful invader,'' a term also used to characterize other impactful invasive mussels, including zebra mussels (*Dreissena polymorpha*), quagga mussels (*Dreissena bugensis*), and Asian clams (*C. fluminea*) (Sousa et al. 2014). Based on the combination of these characteristics, golden mussels display a high potential for invasiveness.

Marbled Crayfish (Procambarus virginalis)

Taxonomy

The marbled crayfish (*P. virginalis*) is a 10-legged freshwater crustacean species that resembles a small lobster. It

is also known by the common name Marmorkrebs, a German translation of ''marbled crayfish''(GBIF 2023*c*). Crayfish were imported to Germany from the United States as an aquarium pet in the mid-1990s and generated public intrigue when a German aquarium hobbyist reported an apparently novel all-female (parthenogenic) species reproducing without males; this was the earliest known account of the marbled crayfish as a species (Lyko 2017).

Based on similarities in external morphology and two mitochondrial genes, researchers demonstrated that the marbled crayfish likely descended from slough crayfish (*P. fallax*) in the 1990s (Martin et al. 2010*a*), and Lyko (2017) determined that the marbled crayfish is a newly originated species, not existing before the 1990s. Later, detailed research confirmed the marbled crayfish inherited its genetic material from an Everglades subpopulation of slough crayfish (Gutekunst et al. 2021).

Based on current taxonomic classification, there are 174 species in the *Procambarus* genus, including *P. virginalis* (GBIF 2023*c*). Due to some of the unique characteristics of the marbled crayfish, including a reproductive biology supporting the potential for explosive population growth, we are only considering this one recently emerged species in the *Procambarus* genus for listing as injurious.

The marbled crayfish rarely exceeds 10 cm (4 inches) in length and typically weighs less than 20 grams (g) (0.7 ounces) (Vogt 2021). It shares some physical characteristics with other species in the *Procambarus* genus and most closely resembles the slough crayfish and Everglades crayfish (*P. alleni*) in appearance, but the marbled crayfish uniquely has a bell-shaped female sex organ (annulus ventralis) with S-shaped groove (sinus), antenna length exceeding body length, and complete absence of males (Kawai et al. 2009).

Biology

The marbled crayfish is a freshwater crayfish, and introduced populations are normally found at the bottom of a body of fresh water, such as a lake or stream, but the marbled crayfish is able to walk across land (Chucholl et al. 2012) and retreat into the mud (Deidun et al. 2018) to avoid danger. Gut content analysis from wild specimens in Madagascar revealed the crayfish primarily ate plant material (Kawai et al. 2009). Laboratory feeding trials also from Madagascar revealed a positive relationship between both water temperature up to 27.5 degrees Celsius (°C) (81.5 degrees Fahrenheit (°F)) and crayfish body size with snail consumption rates (Faiad et al. 2023). Throughout their invaded range, the marbled crayfish is considered to have a broad diet, consuming both plants and animals at different levels of the food web.

The marbled crayfish has unique genetic and reproductive features. It is triploid (has three sets of chromosomes) and therefore genetically isolated from closely related crayfish species. Triploid animals are generally unable to reproduce sexually (Lyko 2017). Mutation or loss of sexual reproduction genes is one possible explanation for the origination of this all-female species. This species is the only known clonal, all-female crayfish that reproduces without a mate in the world (Scholtz et al. 2003). Therefore, successful breeding of this species with another crayfish species is plausible, but extremely unlikely (Martin et al. 2016, Lyko 2017). For example, sexual reproduction and hybridization may ensue through experimental manipulation in laboratory or other artificial environments.

The species' reproductive timing and frequency vary by geographic area and likely correlate with water temperature. The number of eggs a marbled crayfish may produce at one time is relatively large, with individuals from Lake Moosweiher (Germany) reported carrying as many as 724 eggs (Chucholl and Pfeiffer 2010). An online marbled crayfish guide for aquarists indicated that the species has the potential to reproduce every 3 months, laying an average of 420 eggs per cycle, or approximately 1,500 offspring annually, under optimal conditions (Aquarium Breeder 2023).

The marbled crayfish reaches sexual maturity at between 5 and 7 months of age and exhibits fast growth (Vogt 2021). Relatively rapid growth, early reproductive maturity, and high frequency of reproduction of this species compared to other crayfishes have been recognized as factors contributing to their success in establishment in the wild (Kouba et al. 2021).

Native Distribution

Recent speciation of marbled crayfish in captivity around 1995 means the crayfish has no native distribution anywhere. Captive marbled crayfish were likely imported to Germany from the United States as aquarium pets or originated as a species in Germany in the mid-1990s (Scholtz et al. 2003, Lyko 2017).

Nonnative Distribution

Establishment of marbled crayfish populations has been recognized in several European countries (Chucholl et al. 2012) and across Madagascar (Kawai et al. 2009, Feria and Faulkes 2011). The introduction and establishment of wild populations in Europe was likely the result of release from private aquaria (Scholtz et al. 2003). Marbled crayfish appear to have entered the North American pet trade around 2004 (Faulkes 2010). While ranked the most popular crayfish in the online pet trade in 2013, accounting for nearly half of crayfish sold through AquaBid (Z. Faulkes 2015), none have been confirmed from the wild in the United States. Studies of established wild populations are published from Belgium (Scheers et al. 2021), Croatia (Maguire et al. 2018), Estonia (Ercoli 2019), France (Grandjean et al. 2021), Germany (Chucholl and Pfeiffer 2010, Martin et al. 2010*b,* Chucholl et al. 2012), Hungary (Bláha et al. 2022), Israel (Carneiro et al. 2023), Italy (Marzano et al. 2009, Mazza et al. 2014), Madagascar (Jones et al. 2009, Kawai et al. 2009), Poland (Maciaszek et al. 2022), Portugal (Mazza et al. 2014), Sardinia (Sanna et al. 2021), Republic of Malta (Deidun et al. 2018), Romania (Pârvulescu et al. 2017), Slovakia (Chucholl et al. 2012), Sweden (Bohman et al. 2013), and Ukraine (Novitsky and Son 2016). Despite occurrence data published to online databases, live marbled crayfish have not become established in the wild in the Netherlands (van Kuijk et al. 2021). There is also some ambiguity surrounding possible marbled crayfish in Ontario, Canada, where morphologically similar, exclusively female specimens were recently collected (U.S. Geological Survey 2023*a*). The marbled crayfish tolerates a range of freshwater habitats from drainage ditches, ponds, urban parks and complexes to nature reserves (Scheers et al. 2021).

Invasiveness

The marbled crayfish displays multiple characteristics that contribute to its overall invasiveness. Many nonnative crayfish species are widely recognized for their invasive potential related to food web alterations through grazing on aquatic plants, predation on aquatic animals, and competition for resources with native aquatic species (Linzmaier et al. 2020). The marbled crayfish has a demonstrated history of establishment throughout many nations over a span of only a few decades since the species originated, and it has been listed among the most invasive species

in the European Union (Hossain et al. 2020). This species is widely available in the global pet trade, including North America (Faulkes 2010), and distribution in the pet trade has been associated with establishment of wild populations elsewhere (Gutekunst et al. 2018). The reproductive biology of this species allows these crayfish to produce many offspring, adding to the threat of successful invasion and establishment through sheer numbers. The combination of up to approximately 1,500 offspring produced per year under ideal conditions (Aquarium Breeder 2023), and the ability of this all-female species to reproduce individually without a mate mean that a population may be established from just a single crayfish (Gutekunst et al. 2018). Rapid growth of the species also is advantageous to survival and establishment of the offspring (Kouba et al. 2021). The marbled crayfish is able to successfully establish in a variety of freshwater habitats and has demonstrated the potential to outcompete other crayfish species for food and habitat resources (Hossain et al. 2020, Kouba et al. 2021). Based on these characteristics, the marbled crayfish displays a high potential for invasiveness related to the capacity to displace native crayfish species and negatively impact the balance of aquatic ecosystems.

Summary of Presence in the United States for All Taxa

Only one of the 28 species considered for listing, Chinese pond mussel (*Sinanodonta woodiana*), has been reported in the wild in the United States (U.S. Geological Survey 2023*b*). In June 2010, a small established population of Chinese pond mussel was detected in Hunterdon County, New Jersey, within an array of former commercial fishponds (Bogan et al. 2011*a, b*). The initial discovery occurred 3 years after the New Jersey Conservation Foundation assumed ownership of a facility that historically imported bighead carp, common carp (*Cyprinus carpio*), and diploid grass carp (H. Desko, Senior Watershed Protection Specialist with New Jersey Water Supply Authority, pers. comm. 2023). Mussel eradication efforts commenced swiftly after detection by lowering water levels and applying rotenone to kill host fishes (Bogan et al. 2011*a, b*). Then copper-based biocides (products that kill organisms) were applied to kill the mussels in 2015 and 2019, which appeared to have eradicated the local infestation. Monitoring by shoreline walks, snorkel, and scuba have not detected live mussels since 2019. However, environmental DNA results indicate that mussels may have persisted as a small remnant population in at least one fishpond and perhaps expanded outside the confines of the retired aquaculture facility toward the Delaware River and into the Raritan River (R. Somes, Senior Zoologist with New Jersey Department of Environmental Protection, pers. comm. 2023). Because these foreign mussels and the crayfish do not presently occur in U.S. ecosystems, except for potentially one species of Asian pond mussel in New Jersey, the goal is to preemptively list them as injurious before they can establish and harm U.S. interests.

Summary of Trade for All Taxa

Of the three taxa, 240 Chinese pond mussel specimens (*Sinanodonta woodiana*) were imported into the United States live between 2015 and 2021. Asian pond mussels are not regulated at the genus or species level in the United States or Canada. They are also not included in the European Parliament's updated list of invasive alien species of Union concern (EU 2022). Most other countries do not have specific regulations about *Sinanodonta* species (Urbańska et al. 2021).

There were no import records of golden mussels in the LEMIS database, which indicates that either there were no imported live animals, the species were misreported, or international import volumes were so minor that designated species codes were not assigned. In Japan, the Invasive Alien Species Act prohibits importation, transportation, and possession of the genus *Limnoperna* (National Institute of Environmental Studies 2023). Under regulatory authority of the European Parliament (EU 2014), golden mussels were added to a third update of the list of invasive alien species of Union concern, taking effect for member countries on August 2, 2022 (EU 2022).

We are only aware of marbled crayfish (*Procambarus virginalis*) in the aquarium trade domestically within the United States. Marbled crayfish commerce is prohibited, however, at the species level in at least 12 States (Arkansas, Georgia, Idaho, Kansas, Maryland, Michigan, Missouri, North Carolina, Ohio, Oklahoma, Tennessee, and Virginia) and at higher taxonomic levels by genus (*Procambarus*), family (Cambaridae), or other designation based on native range or an ''allowed species'' list approach in several more States.

Evaluation Methods

Ecological Risk Screening Summaries

The Service developed Ecological Risk Screening Summary (ERSS) reports more than a decade ago for several purposes. The ERSS process is a method to rapidly evaluate potential risk of invasiveness and establishment of nonnative species, usually by individual species. With the results, species are placed into one of three overall risk categories—high, low, or uncertain risk of invasiveness. The categories are based on climate similarity (quantified) and history of invasiveness (qualified) as predictors of potential risk. The level of certainty of the assessment based on the availability of credible science is also reported (qualified). The ERSS reports were not designed specifically to predict injuriousness, but they have been used to help prioritize species that should be further evaluated for injuriousness. We can create ERSS reports when needed to provide information to use as part of an injurious wildlife listing evaluation. We created ERSS reports for some of the taxa in this rule, and the reports provide the climate matches used here, as well as other information. For more information on how the ERSS reports are produced, please see the standard operating procedures and completed ERSS reports online at: *https://www.fws.gov/story/ecological-risk-screening-summaries.*

We produced ERSS reports for 11 species of *Sinanodonta.* All 11 species were found to be established in climates similar to those found within the United States, increasing the probability of their successful establishment if introduced into the United States. Of those assessed, 10 were assigned an overall risk level as ''uncertain'' based on species identification uncertainty and data deficiency. The Chinese pond mussel (*S. woodiana*) was classified as overall high risk. As discussed above under the taxonomy of this genus, uncertainty of species identification has led to invasions historically attributed to *S. woodiana,* whereas there is recent evidence that invasions of multiple species have occurred undetected. Taxonomic uncertainty and lack of data specific to many of the species in this genus, along with suitable climate and overall risk uncertainty for most of the species evaluated for risk, supported the approach to further assess the genus *Sinandonata* with the evaluation criteria described below under *Lacey Act Evaluation Criteria.*

We also completed ERSS reports for golden mussels and the marbled crayfish. The golden mussel

Limnoperna fortunei was categorized as having a high overall risk, with suitable climate for establishment found across much of the United States. The climate matching analysis for the marbled crayfish also suggests successful establishment if introduced, but its overall risk status was categorized as ''uncertain,'' due at least in part to its very new species identity and the associated paucity of information pertaining to this species in the wild. However, due to other factors, including both the recent history of establishment and spread in the wild elsewhere and its unique reproductive strategy supporting population growth from just a single crayfish, we further evaluated the species. Additionally, another screening tool, the Freshwater Invertebrate Invasiveness Scoring Kit (FI–ISK), has been used to evaluate the invasiveness potential of freshwater invertebrates. In 2010, the FI–ISK was used to assess invasiveness of multiple species of freshwater crayfish, including the marbled crayfish; in this evaluation, the marbled crayfish was rated as a medium to high risk for Italy and likely other parts of Europe with an additional cautionary warning to avoid release to the wild of this species, which was exclusively captive-held at that time (Tricarico et al. 2010).

Lacey Act Evaluation Criteria

Once we determined that the three taxa were priorities for evaluating because of their invasive risk, we used the injurious wildlife listing criteria below to evaluate whether a species qualifies as injurious. These factors were previously developed by the Service, and the analyses using these criteria serve as a general basis for the Service's regulatory decisions regarding all injurious wildlife listings. We evaluated the factors that contribute to and the factors that reduce the likelihood of injuriousness:

1. Factors that contribute to injuriousness:
- The likelihood of release or escape;
- Potential to survive, become established, and spread;
- Impacts on wildlife resources or ecosystems through hybridization and competition for food and habitats, habitat degradation and destruction, predation, and pathogen transfer;
- Impacts to endangered and threatened species and their habitats;
- Impacts to human beings, forestry, horticulture, and agriculture; and
- Wildlife or habitat damages that may occur from control measures.

2. Measures that reduce the likelihood of the species being considered as injurious:
- Ability to prevent escape and establishment;
- Potential to eradicate or manage established populations (for example, making organisms sterile);
- Ability to rehabilitate disturbed ecosystems;
- Ability to prevent or control the spread of pathogens or parasites; and
- Any potential ecological benefits to introduction.

I. Factors That Contribute to Injuriousness

Asian Pond Mussels (Sinanodonta Species)

Potential for Introduction

The primary pathways by which Asian pond mussels (*Sinanodonta* species) could enter the United States involve commercial trade in live animals. Asian pond mussels may hitchhike as parasitic larvae in aquaculture fish shipments or be transported directly as adults by aquaculture, aquarium, live food, or water garden trades. Species from this genus have been advertised on the internet as living filters for water purification of hatcheries, aquaria, and private ponds because they feed by straining water through their digestive system (AquaticArts 2023). In Indonesia, *S. woodiana* has economic value as a protein source for humans and cultivated animals, such as fishes (Bolotov et al. 2016). A recent study from Italy demonstrated potential for *S. woodiana* meal as an alternative to fish meal in aquaculture settings due to the high protein and suitable amino acids composition (Sicuro et al. 2023).

Potential for Spread

Species in the *Sinanodonta* genus favor relatively warm water from 10 to 30 °C (50 to 86 degrees °F) (Kraszewski and Zdanowski 2007) but can also adapt to cold temperatures and waterbodies with yearly ice formation (Konečný et al. 2018, Urbańska et al. 2019). Given the prevalence of potential fish hosts in the United States, such as invasive carps, tilapias, and mosquitofishes, plus an apparent lack of host specificity, once Asian pond mussels are introduced, they have potential to spread broadly. Because Asian pond mussel larvae that are attached to fish hosts take weeks to mature, they can be disseminated over long distances as infested fish hosts swim or are transported (Watters 1997).

Based on climate suitability modeling for *S. woodiana,* the likelihood of establishment for Asian pond mussels is high throughout the contiguous United States. At least 46 States have climates that are suitable for Asian pond mussel establishment (U.S. Fish and Wildlife Service 2021*a*).

Potential Impacts to Native Species

Asian pond mussels could potentially harm vulnerable endemic and other native species due to habitat overlap and direct competition for resources, as well as having superior tolerance for scenarios associated with climate warming or other extreme weather events like drought. The life-history traits of Asian pond mussels, including early sexual maturity (9 months), long distance larval dispersal by host fishes, rapid growth, high reproductive capacity, mobility as adults, long lifespan (10–15 years), high filtration rate, broad environmental tolerance, and adaptability to changing abiotic conditions, all contribute to their invasiveness and disruption of natural ecosystem balance (Douda et al. 2012, Benedict and Geist 2021). As efficient filter feeders, they thrive in high nutrient environments, but can extract similar concentrations of food particles from the water column in enriched versus depleted systems (Douda and Čadková 2018).

Asian pond mussels are also hosts of aquatic pathogens and parasites that may potentially impact other species, and novel parasites introduced with Asian pond mussels may adversely affect the health of native species. The native trematode (flatworm) parasite *Aspidogaster conchicola* was observed from introduced *S. woodiana* specimens across Polish and Ukrainian waterbodies (Yuryshynets and Krasutska 2009). In Poland, a more extensive parasite survey of *S. woodiana* from lakes and fishponds revealed infestations with four parasite groups: bucephalid trematodes, water mites, oligochaetes (worms), and chironomids (non-biting midges) (Cichy et al. 2016). A more recent parasite survey from Poland and Estonia confirmed the presence of the same four groups (Taskinen et al. 2021).

Potential Impacts to Endangered and Threatened Species

At the time of the drafting of this proposed rule, the United States has 95 federally-listed endangered and threatened bivalve mollusks, 11 proposed for listing, and 1 candidate for listing under the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq.*) (U.S. Fish and Wildlife Service 2023*a*). Freshwater bivalves are among the most threatened taxa in the world, with 40 percent of mussel and clam species (45 percent of Unionidae) described as near

threatened, vulnerable, endangered, or extinct according to the International Union for Conservation of Nature (IUCN) Red List conservation status (Lopes-Lima et al. 2018). Asian pond mussels have the potential to compete with native burrowing bivalves (which are already in decline) for host fishes or may diminish native unionid survival through other means of resource competition, such as food and space. For instance, at the larval stage, *S. woodiana* has a higher temperature tolerance than an endangered European mollusk, and thus *S. woodiana* can compete for fish hosts across a wider temperature range (Benedict and Geist 2021).

Potential Impacts to Human Health or Safety

We found no evidence of Asian pond mussels being directly or indirectly harmful to human health or safety. There is a potential associated risk of human health impacts related to ingestion of Asian pond mussel tissues containing high concentrations of toxic metals, as these mussels may effectively concentrate metals from aqueous environments, accumulating them in their tissues (Arumugam et al. 2020). Similarly, freshwater and marine bivalve mollusks are widely recognized for their ability to filter and to concentrate microbial organisms from water and sediment, including pathogens such as bacteria and protozoan parasites. Handling and consumption of Asian pond mussels may thereby represent a human health threat if these mussels are consumed without proper cooking to kill potential pathogens.

Potential Impacts to Agriculture, Horticulture, or Forestry

We found no evidence of Asian pond mussels being directly or indirectly harmful to horticulture or forestry interests. While negative effects of Asian pond mussels on agricultural systems, such as irrigation canals and aquaculture facilities, are likely, we are unaware of any corroborating evidence.

Golden Mussels (Limnoperna species)

Potential for Introduction

The primary pathway by which golden mussels (*Limnoperna* species) could enter the United States involves transoceanic commercial shipping, especially as larvae in ballast water. In the wild, golden mussels have been found attached to aquatic plants, such as elodea and wetland sedges (Karatayev et al. 2007), as well as water hyacinth (Molina et al. 2010). These associations demonstrate the potential for these mussels to be transported as hitchhikers with various aquarium and aquatic horticulture products, similar to other macroinvertebrates (Duggan et al. 2018, Dickey et al. 2023). Live golden mussels have also been found in sand being transported from their nonnative range to replenish other beaches (Moutinho 2021).

Potential for Spread

In South America, golden mussels have invaded temperate and subtropical waterways with average temperatures ranging from 14 to 32.6 °C (57 to 90.7 °F) and salinity means above 3 ppt (Darrigran 2002). However, research from the northern invasion front in China suggests this species has great adaptive capacity, as golden mussels here can endure temperatures below 1 °C (34 °F) for nearly a week and below 5 °C (41 °F) for up to 3.5 months (Xia et al. 2021). For perspective, the magnitude of their spread potential has been likened to the zebra mussel in North America (Karatayev et al. 2007), which was added by Congress to the list of injurious wildlife species during passage of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (Pub. L. 101–646; see 18 U.S.C. 42(a)(1)).

Likelihood of establishment for golden mussels based on climate suitability modeling for *L. fortunei* is high throughout the east, southeast, and central continental United States. At least 26 States have suitable climate for establishment: Alabama, Arkansas, Arizona, Delaware, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Michigan, Missouri, Mississippi, North Carolina, New Jersey, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and West Virginia (U.S. Fish and Wildlife Service 2021*b*). Their adaptability to colder temperatures at the northern edge of the species' population in China (40.26° N, 116.26° E) suggests potential expansion to even higher latitudes (Xia et al. 2021) than are currently documented.

Much like the potential for introduction through shipping, further spread on ships and boats is also possible, as the free-swimming larvae in ballast, bilge, boat well, or other water sources carried from one site to another or as the young and barely visible mussels that attach themselves to the hulls of vessels in the water (Moutinho 2021). Freshwater mollusks are also known to be dispersed in the environment naturally through water currents, winds, and other organisms, including birds and aquatic animals (Coughlan et al. 2017). For instance, fish that consume mollusks may spread invasive mussels by releasing living mussels that pass through their gastrointestinal systems. This method of spread has been demonstrated as a potential means of dispersal for some invasive mollusk species of consequence (Gatlin et al. 2013). While some species of fish are known to consume golden mussels in South America as a significant component of their diet (González-Bergonzini et al. 2020), the role of these fish in the spread of golden mussels is not well documented.

Potential Impacts to Native Species

Golden mussels may harm vulnerable endemic and other native species due to habitat overlap and direct competition for resources. The life-history traits of golden mussels, including early sexual maturity (3 months), long larval residence time, rapid growth, high reproductive capacity, high filtration rate, broad environmental tolerance, and adaptability to changing abiotic conditions, all contribute to their invasiveness and disruption of natural ecosystem balance. As powerful filter feeders, they have one of the highest filtration rates reported for mussels (Sylvester et al. 2005, Pestana et al. 2009). Through feeding, they remove particles suspended in the water column, including phytoplankton, zooplankton, bacteria, and detritus. With superior tolerance for scenarios associated with climate warming, golden mussels may also have a competitive advantage over native species in habitats that are especially susceptible to climate-related change.

Golden mussels also serve as hosts for an intermediate life stage of a trematode parasite, and may carry these parasites with them, spreading them to native aquatic animals. Many types of freshwater fishes may host other life stages of this parasite and could be negatively impacted by its introduction along with golden mussels. Related disease in fish may cause fin damage, internal organ impairment, and even death. In Japan, invasion of golden mussels also introduced two species of these trematodes, which, in turn, negatively impacted the health of many species of fish in the region (Baba et al. 2012, Baba and Urabe 2015). Furthermore, golden mussels are known to host a type of virus known as marseilleviruses. These large viruses have been isolated from water-related environments and from amoeba and other organisms including humans. Among the reported marseilleviruses,

the golden marseillevirus was isolated from golden mussels from a lake in South Brazil (dos Santos et al. 2016). Potential impacts of these viruses upon their various hosts are not well established.

Potential Impacts to Endangered and Threatened Species

At the time of the drafting of this proposed rule, the United States has 95 endangered and threatened bivalve mollusks, 11 proposed for listing, and 1 candidate for listing under the ESA (U.S. Fish and Wildlife Service 2023*a*). Freshwater bivalves are among the most threatened taxa in the word, with 40 percent of mussel and clam species (45 percent of Unionidae) described as near threatened, vulnerable, endangered, or extinct according to the IUCN Red List conservation status (Lopes-Lima et al. 2018). Golden mussels may also directly outcompete endangered and threatened mollusks for food or attach to their shells, effectively smothering them. In South America, golden mussels can colonize the tops of bivalves and crustaceans (Darrigran 2002), which may prevent their host from eating, moving, regulating water (breathing), or reproducing. They would likely settle on and harm comparable native taxa in newly invaded ranges.

Potential Impacts to Human Health or Safety

We have no evidence that golden mussels are directly harmful to human health or safety. In South America, the first marseillevirus isolated from mussels was recovered in golden mussels. These families of viruses infect amoebas and have also been detected in humans, but their potential human health implications still warrant further investigation (Sahmi-Bounsiar et al. 2021).

Potential Impacts to Agriculture, Horticulture, or Forestry

The adverse economic effects of golden mussels to the interest of humans is documented as negative and usually very costly (Boltovskoy et al. 2022). Maintenance expenses would steeply rise for industries processing surface water for power, cooling, irrigation, and drinking. In Brazil, *L. fortunei* is considered the costliest invasive species for aquatic ecosystems (Adelino et al. 2021).

Golden mussels are well known to damage agricultural irrigation systems through biofouling. Their free-swimming larvae with sizes ranging from 85 to 400 µm (0.003 to 0.02 inches) (Cataldo et al. 2005) can evade grates and structural filters to access intake pipelines and, once inside the structure, adhere to plumbing, valves, gates, pumps, impellors, and other equipment, forming 10-cm (4-inch) or thicker clusters (Xu et al. 2015). Shell debris from dead mussels may also clog equipment and cause other maintenance problems. Golden mussels similarly threaten other human-made facilities and infrastructure, such as water transfer, water cooling, wastewater processing, and (hydroelectric, thermal, and nuclear) power plants (Magara et al. 2001, Boltovskoy et al. 2022, Zhang et al. 2022).

We found no evidence of golden mussels being directly or indirectly harmful to horticulture or forestry interests.

Marbled Crayfish (Procambarus Virginalis)

Potential for Introduction

The primary pathway that the marbled crayfish (*Procambarus virginalis*) may enter the United States is the commercial trade in live animals. Marbled crayfish juveniles and adults may be transported by aquaculture, aquarium, or live-food trades. The marbled crayfish reportedly first became commercially available in North America around 2004 (Faulkes 2010). This self-cloning crayfish has grown in popularity with aquarists (Faulkes 2010, Chucholl 2014, Zen Faulkes 2015, Lipták et al. 2023) and for scientific research, such as studying cancerous tumor clonality (Vogt 2010, Gutekunst et al. 2018). In Madagascar, the marbled crayfish has also become valued as a protein source for humans and domestic animals such as birds (Andriantsoa et al. 2019, 2020). In 2023, marbled crayfish were found in the wild in a pond near Burlington in Ontario, Canada, following previous suspected but unconfirmed reports of this species found in the wild in this region since 2021. This occurrence represents the first report of this species in a non-captive status in North America (Marbled crayfish | ontario.ca n.d.).

Potential for Spread

The marbled crayfish can tolerate seasonally low temperatures (ice cover) while optimal growth and reproduction occurs at temperatures between 20 to 25 °C (68 to 77 °F), which is achievable in small or shallow aquatic habitats of otherwise cooler climates (Chucholl and Pfeiffer 2010). Considering that one crayfish can produce up to 1,500 offspring per year under ideal conditions, this species' spread potential is alarming. Further, its asexual reproductive strategy (parthenogenesis) means it can reproduce without a mate and establish a viable population if just one individual escapes.

The likelihood of establishment for the marbled crayfish based on climate suitability modeling is especially high throughout the Great Lakes and Southwest regions of the United States. At least 47 States have high climate compatibility (U.S. Fish and Wildlife Service 2023*b*).

Potential Impacts to Native Species

The marbled crayfish could potentially outcompete native crayfishes, amphibians, fishes, and other freshwater taxa for resources, such as food and shelter. In particular, the southeastern Appalachian Mountains hosts a global crayfish diversity hotspot (Crandall and Buhay 2008). The life-history traits of the marbled crayfish, including early sexual maturity (5 months), high reproductive capacity, broad environmental tolerance, and adaptability to changing abiotic conditions, all contribute to the species' invasiveness and disruption of natural ecosystem balance. For comparison, invasive red swamp crayfish (*Procambarus clarkii*) have displaced native amphibians in Portugal (Cruz et al. 2008). The marbled crayfish was evenly matched or superior in staged contests against the red swamp crayfish, which is well known for its aggression and competitive dominance versus other crayfish species (Jimenez and Faulkes 2011, Hossain et al. 2019). These results suggest a potential for the marbled crayfish to compete with native crayfish similar to the red swamp crayfish, which is often cited as one of the most harmful invaders worldwide (Oficialdegui et al. 2020). The marbled crayfish also dominates the spiny cheek crayfish (*Faxonius limosus*) (Linzmaier et al. 2018) and calico crayfish (*F. immunis*) (Hossain et al. 2019) in analogous laboratory experiments to assess aggression and combative behaviors among crayfish species. This antagonistic behavior often predicts shelter acquisition and the ability to avoid predation in the wild.

The marbled crayfish has demonstrated capacity to carry the crayfish pathogen *Aphanomyces astaci,* the agent of the crayfish plague. *Aphanomyces astaci* is an oomycete (water mold) that is highly pathogenic to some crayfishes, and as an ''Office International des Epizooties (OIE)-notifiable'' pathogen, its occurrence must be reported to the World Organisation for Animal Health. Crayfish plague is of significant concern related to wild crayfish ecology around

the world, yet it is an endemic (constantly present) pathogen in North America, believed to have co-evolved with North American crayfish species. While this pathogen may cause crayfish plague associated with high mortality among many species of crayfishes around the world, native crayfish species in North America do not suffer apparent disease and may be asymptomatic carriers (Martín-Torrijos et al. 2021). Like these North American crayfish species, the marbled crayfish is largely resistant to clinical impacts of crayfish plague but may be infected with *A. astaci* and serve as a carrier with the potential to transmit the pathogen to susceptible crayfish species (Keller et al. 2014, Francesconi et al. 2021). There are multiple strains of *A. astaci* that circulate among infected crayfishes, so it is uncertain whether any crayfish species in North America may be impacted by any strains of *A. astaci* that could potentially be carried and introduced through the marbled crayfish (Francesconi et al. 2021).

Additionally, other procambarid species are recognized as hosts and carriers of another important pathogen, *Batrachochytrium dendrobatidis,* that has demonstrated severe impacts on amphibian populations around the world (Oficialdegui et al. 2019). The potential for the marbled crayfish to carry and transmit this pathogen may have significant consequences for native amphibians, including imperiled amphibian species (Maciaszek et al. 2022).

Potential Impacts to Endangered and Threatened Species

At the time of the drafting of this proposed rule, the United States has eight endangered and threatened crayfish species listed under the ESA (U.S. Fish and Wildlife Service 2023*c*). The threatened Panama City crayfish (*Procambarus econfinae*) belongs to the same genus as the marbled crayfish. In the same family Cambaridae, there are five endangered crayfishes (*Cambarus aculabrum, C. veteranus, C. zophonastes, C. cracens,* and *Faxonius shoupi* (which is listed as *Orconectes shoupi*)) and one threatened crayfish (*C. callainus*). *Pacifastacus fortis,* belonging to the family Astacidae, is also listed as endangered. There were no additional candidates or proposed species of crayfish for listing under the ESA as of the drafting of this proposed rule. The marbled crayfish may directly outcompete these crayfishes given the behavioral experimental evidence of its dominance over other *Procambarus* and *Faxonius* crayfishes (Jimenez and Faulkes 2011, Linzmaier et al. 2018, Hossain et al. 2020). The marbled crayfish may also prey on endangered and threatened fishes, amphibians, and mollusks based on comparable taxa it consumed in European field studies (Deidun et al. 2018). In Poland, dissemination of marbled crayfish to a nature-protected area has been reported, including habitats normally occupied by threatened amphibians and with public and scientific concern for native crayfish and amphibian population impacts (Maciaszek et al. 2022).

Potential Impacts to Human Health or Safety

We have no evidence of this species being directly or indirectly harmful to human health or safety.

Potential Impacts to Agriculture, Horticulture or Forestry

We found no evidence of the marbled crayfish being directly or indirectly harmful to horticulture or forestry interests. However, marbled crayfish dissemination and activity has prompted concern for potentially adverse impacts to rice production and freshwater fisheries elsewhere. Other invasive procambarid crayfish species have been associated with negative impacts for rice farming through consumption of rice seedlings and damage to crop irrigation systems through burrowing activity, and similar impacts for marbled crayfish invasions are plausible (Jones et al. 2009). Potential negative impacts of the marbled crayfish on biodiversity of freshwater organisms, including significant fisheries species, are also anticipated and have been reported in social surveys (Andriantsoa et al. 2020).

II. Factors That Reduce Injuriousness

Asian Pond Mussels (Sinanodonta Species)

Potential Control Options

Mussel populations are difficult to remove manually, and alternative chemical treatments can harm native biota. Available biocides are not selective for genus- or species-level mussel or crayfish treatments, so use of these products may kill native species. Control measures that would harm other wildlife are not recommended to reduce injuriousness, and therefore are not considered a practicable risk mitigation measure. In small closed systems with water draining capacity, such as aquaculture facilities, desiccation could be an effective control method; however, Asian pond mussels may escape drying by burrowing deeper into the sediment. Eradication of any of Asian pond mussels in larger, hydrologically connected, natural systems would be unprecedented and cause collateral damage to native species.

Potential Ecological Benefits

At least one *Sinanodonta* species (*S. woodiana*) has been advertised in Europe as a natural filter to clean turbid or fouled waters in ponds and aquaria due to high tolerance for poor water quality. According to some researchers, potential benefits of their filter feeding to remove suspended particles that could otherwise harm native mussels may be overlooked (Douda and Čadková 2018). In Poland, intentional secondary spread of *S. woodiana* by the ''bucketful'' was attributed to their water filtration effectiveness (Urbańska et al. 2021). They are also marketed in other European countries for water purification and biocontrol purposes (Von Proschwitz 2008). However, we could not find documentation of successful introduction of Asian pond mussels for purposes of water purification or filtration.

There are other potential and documented uses of *Sinanodonta* species. The attractive nacre color on the interior shell may invite their use for culturing freshwater pearls (Arief et al. 2023). Historically, freshwater mussels were used to make buttons in the Mississippi River Basin prior to native mussel declines (Tucker and Theiling 1999). In Europe, they are sold in garden centers that supply pond and water garden products and through online stores for aquarium hobbyists where they can be erroneously labeled as ''European pond mussel'' (Dobler et al. 2022). In Indonesia, the invasive *S. woodiana* has economical value as a local protein source for humans and other cultivated animals like fishes (Bolotov et al. 2016). A recent study from Italy demonstrated the potential for *S. woodiana* meal as a substitute for fish meal in aquaculture for the high protein with adequate amino acid composition (Sicuro et al. 2023). There is currently no overt market in the United States for Asian pond mussels.

Golden Mussels (Limnoperna species)

Potential Control Options

Mussel populations are difficult to remove manually, and alternative chemical treatments can harm native biota. Available biocides are not selective for genus- or species-level mussel treatments, so use of these products may kill native species. Control measures that would harm other wildlife are not recommended to reduce injuriousness, and therefore are not

considered a practicable risk mitigation measure. In small closed systems with water draining capacity, such as aquaculture facilities, desiccation could be an effective control method. In enclosed artificial systems, like municipal water supply pipelines, chlorine treatments have successfully killed golden mussel (*Limnoperna* species) larvae (Shin et al. 2014) and dissolved byssal threads, preventing adhesion of adults (Zhang et al. 2022). However, eradication of golden mussels in larger, hydrologically connected, natural systems would be unprecedented and cause collateral damage to native species.

Potential Ecological Benefits

We are not aware of any documented ecological benefits for the introduction of golden mussels.

Marbled Crayfish (Procambarus Virginalis)

Potential Control Options

Crayfish populations are difficult to remove manually, and alternative chemical treatments can harm native biota. Chemical control options using pyrethrin and pyrethroid pesticides and anthranilic diamide insecticide in fish hatcheries to kill nonnative crayfish have had some success (Allert et al. 2016). Further, biocides may be useful in removal of nonnative crayfish is small isolated waterbodies, although this technique may not be suitable for large water bodies or connected water systems (Ballantyne et al. 2019). Carbon dioxide diffusion has shown some promise as a mechanism for inducing crayfish emergence to facilitate capture for invasive procambarid crayfish control in infested areas, but it may require other mitigation measures for an effective control strategy (Abdelrahman et al. 2021). Nonnative crayfish trapping also showed limited effect on population abundance and is not likely a reliable control option (Aluma et al. 2023). Available biocides are not selective for genus- or species-level crayfish treatments, so use of these products may kill native species. Control measures that would harm other wildlife are not recommended to reduce injuriousness, and therefore are not considered a practicable risk mitigation measure. However, eradication of nonnative crayfish in larger, hydrologically connected, natural systems would be unprecedented and cause collateral damage to native species. In Madagascar, eradication of marbled crayfish was regarded as not possible or prohibitively expensive within a few years of their likely introduction (Jones et al. 2009).

Summary of Potential Ecological Benefits

We are not aware of any documented ecological benefits for the introduction of marbled crayfish.

Summary of Injurious Factors for All Taxa

Using the Service's injurious wildlife listing criteria, we found that all foreign aquatic invertebrate taxa evaluated in this proposed rule are injurious to wildlife and wildlife resources and one taxon is injurious to agriculture. Table 1 shows a summary of the evaluation criteria for all species.

TABLE 1—SUMMARY OF INJURIOUS WILDLIFE LISTING CRITERIA FOR THREE FOREIGN AQUATIC INVERTEBRATE TAXA

Taxa	Factors that contribute to injuriousness					Factors that reduce injuriousness	
	Nonnative occurrences	Potential for introduction and spread	Harm to native species [1]	Harm to human health or safety	Harm to agriculture [2]	Potential control [3]	Ecological benefits of introduction
Asian Pond Mussels	Yes	Yes	Yes	No	Possible	No	Possible.
Golden Mussels	Yes	Yes	Yes	Possible	Yes	No	No.
Marbled Crayfish	Yes	Yes	Yes	No	Possible	No	No.

[1] Includes federally endangered and threatened species.
[2] Includes aquaculture.
[3] Control—"No" if wildlife or habitat damages may occur from control measures proposed as mitigation.

Conclusion

Based on the available evidence, we conclude that the three invertebrate taxa described herein each pose significant risk of harm to interests of the United States if they were to be introduced into the wild. To address these risks, identification of these taxa as injurious wildlife under 18 U.S.C. 42 is within the authority of the Service, and these listings would prevent their legal introduction into the United States through international wildlife trade.

Asian pond mussels (genus *Sinanodonta*) are native in parts of Asia but also found as nonnative throughout other regions in Asia as well as Europe, Africa, Central America, and the Caribbean. Climate suitability within the contiguous United States is high for these mussels. Deemed a hyper-successful invader, these mussels are highly adaptable to varying conditions in freshwater environments and may be likely to outcompete native organisms for food and habitat resources when they are introduced. Further, long-distance dispersal of larval Asian mussels by various suitable fish host species may also make it difficult to contain these mussels once introduced.

Golden mussels (genus *Limnoperna*) are native to southeast Asia but have a nonnative distribution including Japan and parts of South America. Also referenced as a hyper-successful invader in these regions, golden mussels' capacity for high reproduction and fast growth, high adaptability including tolerance of poor environmental conditions, and ease of dispersal in part through their attachment to boats or ships support a high potential for invasion. If introduced into the wild, their high reproductive capacity and efficient feeding behavior would potentially outcompete native aquatic life and disrupt aquatic ecosystem balance. Golden mussels may also carry parasites that could spread to and have negative health consequences for native mollusks and fishes. The tendency of golden mussels to settle and grow within human-made structures make them a serious threat to agriculture and industry related to any infrastructure in or containing water, similar to concerns associated with invasive zebra mussels.

The marbled crayfish (*Procambarus virginalis*) seemingly originated in captivity and has no native range, but it has developed a nonnative distribution throughout Europe and in Madagascar since it was reported as a species in the mid-1990s. Like some other invasive crayfish of concern, the reproduction, growth, and feeding habits of the marbled crayfish support its ability to outcompete native crayfish for habitat

and food. In addition, the highly unique parthenogenetic, clonal reproduction of the marbled crayfish allows it to successfully reproduce in nature with the presence of only one individual animal. Displacement of native aquatic species, including endangered crayfish, and disruption of aquatic ecosystem balance could be consequential impacts if this species were to be introduced into the wild in the United States.

There are currently no risk mitigation measures that appear adequate for eradication of an established population of any of these injurious foreign aquatic invertebrates if they are introduced into natural ecosystems of the United States. Most of these species are in minimal or no live import trade according to LEMIS records, making it timely to list them before a commercial market develops and thereby decreasing risk of new biological invasions through legal trade pathways.

The risks posed to the interests of the United States by these taxa in international wildlife trade are found to be substantive, and we thereby propose to list *Sinanodonta* and *Limnoperna* species of freshwater mussels as well as the marbled crayfish species as injurious under 18 U.S.C. 42. If a determination is made to finalize the listing of one, some, or all proposed species for listing as injurious after evaluating the public comments and peer review, a final rule would be published.

Required Determinations

National Environmental Policy Act (NEPA)

We reviewed this proposed rule in accordance with criteria of NEPA (42 U.S.C. 4321 *et seq.*) and our Departmental Manual at 516 DM 8. This rule does not constitute a major Federal action significantly affecting the quality of the human environment. Under Department of the Interior agency policy and procedures, this rule is covered by a categorical exclusion (516 DM 8.5C(9)) with no extraordinary circumstances associated with the listing action. Preparation of a detailed statement under NEPA is not required because the rule would add species to the list of injurious wildlife in the CFR at title 50, subchapter B, part 16, which prohibits the importation into the United States and transportation between enumerated jurisdictions of wildlife found to be injurious. For further information on this categorial exclusion, made effective October 29, 2015, see 80 FR 66554. We also determined that the rule does not involve any extraordinary circumstances listed at 43 CFR 46.215 that would require further analysis under the NEPA.

Endangered Species Act

Under the ESA (16 U.S.C. 1536(a)(2)), all Federal agencies must ensure the actions they undertake are not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of critical habitat. The listing of the three taxa of invertebrates as injurious wildlife species will not result in general environmental changes on the landscape that meet the two-part causation test (*i.e.,* the ''but/for'' and ''reasonably certain to occur'' standards) for determining ''effects of the action,'' as defined at 50 CFR 402.02. Because there are no general environmental changes that would not occur but for the listing and that are reasonably certain to occur, the listing of the three taxa will not result in any ''effects of the action,'' and a determination of ''no effect'' is appropriate.

Government-to-Government Coordination With Tribes

In accordance with Executive Order (E.O.) 13175 (Consultation and Coordination With Indian Tribal Governments), the Service has collaboratively determined that these injurious listings would not have negative Tribal implications. This proposed rule promotes healthy ecosystems by preventing importation into the United States and transportation between the enumerated jurisdictions of specific freshwater mussels and a crayfish that are not native to the United States. The proposed rule imposes no costs, and we are unaware of trade in these foreign aquatic invertebrate species by Tribes.

Regulatory Planning and Review—Executive Orders 12866, 13563, and 14094

E.O. 14094 (Modernizing Regulatory Review) amends and reaffirms the principles of E.O. 12866 (Regulatory Planning and Review) and E.O. 13563 (Improving Regulation and Regulatory Review). Regulatory analysis should facilitate agency efforts to develop regulations that serve the public interest, advance statutory objectives, and are consistent with E.O. 12866, E.O. 13563, and E.O. 14094. Regulatory analysis, as practicable and appropriate, shall recognize distributive impacts and equity, to the extent permitted by law. E.O. 13563 emphasizes further that regulations must be based on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this proposed rule in a manner consistent with these requirements.

E.O. 12866, as reaffirmed by E.O. 13563 and amended by E.O. 14094, provides that the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB) will review all significant rules. OIRA has determined that this rule is not a significant regulatory action, as defined under section 3(f) of E.O. 12866 (58 FR 51735, October 4, 1993), as amended by E.O. 14094 (88 FR 21879, April 11, 2023).

This proposed rule would add all species of freshwater mussels from two genera, Asian pond mussels (*Sinanodonta* species) and golden mussels (*Limnoperna* species), to the list of injurious mollusks and would add marbled crayfish (*Procambarus virginalis*) to the list of injurious crustaceans. The listings would prohibit these species from being imported live into the United States and shipped between the continental United States, District of Columbia, Hawaii, Commonwealth of Puerto Rico, or any territory or possession of the United States, except as specifically authorized. Any regulations pertaining to the possession, transport, or use of these species within a particular State would remain the responsibility of that State.

To determine the effects of this proposed rule, we assessed the markets for imports and domestic sales. For imports, we used LEMIS for import data on the number of mussels and crayfish to estimate the potential effects of the proposed rule. There were no reported live imports of marbled crayfish or golden mussels from 2015 to 2021. For the same period, there were only three shipments of live Asian pond mussels, which totaled 240 specimens in 2020. Under this proposed rule, we expect negligible import effects would be incurred due to minimal imports of live animals.

For domestic sales, there are no comprehensive data collections or databases for Asian pond mussels, golden mussels, or marbled crayfish. After an internet search, we know of only one U.S. business for live Asian pond mussels and no businesses selling live golden mussels. For marbled crayfish, there are sellers through online aquarium sites and auction sites. Faulkes (2015) stated that marbled crayfish accounted for nearly half of crayfish (476 of 982 total crayfish) sold through the online platform AquaBid in 2013. However, we have no other data regarding domestic sales. Marbled crayfish are regulated as invasive at the species level in at least 12 States

(Arkansas, Georgia, Idaho, Kansas, Maryland, Michigan, Missouri, North Carolina, Ohio, Oklahoma, Tennessee, and Virginia) and at a higher taxonomic level by family or infraorder in several others. Golden mussels are regulated as invasive at the species level in at least 5 States (Illinois, Michigan, Nevada, Ohio, and Wisconsin). We are unaware of any species-specific State regulations for the Asian pond mussel.

Due to limited data availability, we cannot estimate the number of domestically bred mussels and crayfish that are transported between the enumerated jurisdictions that would be prohibited under this proposed rule. While there are domestic marbled crayfish sales, we expect affected sales to be small because the rule does not prohibit interstate transport between the 49 States in the continental United States. Furthermore, pet stores outside the 49 States in the continental United States represent less than 1 percent of all stores and less than 1 percent of total pet store sales (U.S. Census Bureau 2017). We are requesting public comment on the number and value of mussels (by species) and marbled crayfish that are domestically bred and the percentage that are transported between the enumerated jurisdictions (see Public Comments, above).

In the long term, the proposed rule is expected to benefit the economy. Efforts to control or eradicate invasive species and manage the costs they incur to society, once they have become established, are generally recognized as being less effective and more expensive than efforts to prevent potentially invasive species from establishing in the first place (Cuthbert et al. 2022). As a result, sectors of the economy would be expected to benefit from a timely listing process because resources to control or manage injurious wildlife would not need to be expended.

Regulatory Flexibility Act

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA; 5 U.S.C. 801 *et seq.*), whenever a Federal agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (*i.e.,* small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for ''significant impact'' and a threshold for a ''substantial number of small entities.'' See 5 U.S.C. 605(b). SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule would not have a significant economic impact on a substantial number of small entities.

The U.S. Small Business Administration (SBA) defines a small business as one with annual revenue or employment that meets or is below an established size standard for industries described in the 2022 North American Industry Classification System (NAICS) (U.S. Office of Management and Budget 2022). To assess the effects of this proposed rule on small entities, we focus on (1) entities that import live animals of the listed genera and species, and (2) entities with sales of live animals that are transported between the enumerated jurisdictions in 18 U.S.C. 42(a)(1). Entities affected by the proposed rule are represented by data from the NAICS, which are $32.0 million for ''Pet and Pet Supplies Stores'' (NAICS 459910) and $2.75 million for ''All Other Animal Production'' (NAICS 112990).

Under the proposed rule, we expect the number of entities that import *Sinanodonta, Limnoperna,* or *Procambarus virginalis* to be small because, according to LEMIS data, only three shipments of *S. woodiana* were reportedly imported over 6 years from 2015 to 2021. We expect the number of entities that ship or trade these species between the enumerated jurisdictions to be small as well, because the proposed rule would not prohibit interstate transport between the 49 States in the continental United States. Furthermore, pet stores outside the 49 States in the continental United States represent less than 1 percent of all stores and less than 1 percent of total pet store sales (U.S. Census Bureau 2017). Thus, we do not expect the proposed rule would have a significant economic effect on a substantial number of small entities. Therefore, we certify that, if adopted as proposed, this rule would not have a significant economic effect on a substantial number of small entities as defined under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*). An initial regulatory flexibility analysis is not required. Accordingly, a small entity compliance guide is not required.

Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*) does not apply to this proposed rule since it would not impose Federal mandates or have significant or unique effects on State, local, and tribal governments, or the private sector.

Takings

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), this proposed rule would not have significant takings implications. Therefore, a takings implication assessment is not required, as this proposed rule would not impose significant requirements or limitations on private property use.

Federalism

In accordance with E.O. 13132 (Federalism), this proposed rule does not have significant federalism effects. A federalism summary impact statement is not required. This proposed rule would not have substantial direct effects on the States, in the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government.

Civil Justice Reform

In accordance with E.O. 12988 (Civil Justice Reform), the Office of the Solicitor has determined that this proposed rule does not unduly burden the judicial system and meets the requirements of sections 3(a) and 3(b)(2) of this E.O. The rulemaking has been reviewed to eliminate drafting errors and ambiguity, was written to minimize litigation, provides a clear legal standard for affected conduct rather than a general standard, and promotes simplification and burden reduction.

Energy Supply, Distribution, or Use

E.O. 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare statements of energy effects ''to the extent permitted by law'' when undertaking certain actions (66 FR 28355; May 22, 2001). E.O. 13211 defines a ''significant energy action'' as an action that (i) is a significant regulatory action under E.O. 12866 or any successor order (most recently, E.O. 14094 (88 FR 21879; April 11, 2023)); and (ii) is likely to have a significant adverse effect on the supply, distribution, or use of energy. This rule is not a significant regulatory action under E.O. 12866 or 14094. Therefore, this action is not a significant energy action, and there is no requirement to prepare a statement of energy effects for this action.

Paperwork Reduction Act

This proposed rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). We may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. OMB previously approved the information collection requirements associated with the importation of injurious wildlife and assigned OMB Control Number 1018–0078 (expires 01/31/2024, and in accordance with 5 CFR 1320.10, an agency may continue to conduct or sponsor this collection of information while the submission is pending at OMB).

Clarity of Rule

In accordance with E.O. 12866 (Regulatory Planning and Review) and E.O. 12988 (Civil Justice Reform) as well as the Presidential Memorandum of June 1, 1998, all rules must be written in plain language. This means that each published rulemaking must:

(a) Be logically organized;

(b) Use the active voice to address readers directly;

(c) Use clear language rather than jargon;

(d) Be divided into short sections and sentences;

(e) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

Authors

The primary authors of this proposed rule are the staff members of the U.S. Fish and Wildlife Service's Branch of Aquatic Invasive Species (see **FOR FURTHER INFORMATION CONTACT**).

List of Subjects in 50 CFR Part 16

Fish, Imports, Reporting and recordkeeping requirements, Transportation, Wildlife.

Proposed Regulation Promulgation

For the reasons discussed in the preamble, the U.S. Fish and Wildlife Service proposes to amend part 16, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as follows:

PART 16—INJURIOUS WILDLIFE

■ 1. The authority citation for part 16 continues to read as follows:

Authority: 18 U.S.C. 42.

■ 2. Amend § 16.13 by adding paragraphs (a)(2)(xi) through (xiii) to read as follows:

§ 16.13 Importation of live or dead fish, mollusks, and crustaceans, or their eggs.

(a) * * *

(2) * * *

(xi) Any live mollusks, gametes, viable eggs, or hybrids of Asian pond mussels, genus *Sinanodonta.*

(xii) Any live mollusks, gametes, viable eggs, or hybrids of golden mussels, genus *Limnoperna.*

(xiii) Any live crustaceans, gametes, viable eggs, or hybrids of *Procambarus virginalis* (marbled crayfish), family Cambaridae.

* * * * *

Shannon Estenoz,

Assistant Secretary for Fish and Wildlife and Parks.

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