

PETITION TO LIST THE Narrow-foot Hygrotus Diving Beetle (*Hygrotus diversipes*) UNDER
THE ENDANGERED SPECIES ACT



Photo of Diving Beetle by Dr. Kelly B. Miller.

**Petition Submitted to the U.S. Secretary of Interior
Acting through the U.S. Fish and Wildlife Service**

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I. INTRODUCTION

WildEarth Guardians requests that the Secretary of Interior, acting through the U.S. Fish and Wildlife Service (“FWS”), list the Narrow-foot Hygrotus Diving Beetle (*Hygrotus diversipes*) as threatened or endangered under the Endangered Species Act (“ESA”). 16 U.S.C. §§ 1531-44. Petitioner also requests that FWS designate critical habitat for this species.

The Narrow-foot Hygrotus Diving Beetle (“Diving Beetle”) is threatened by at least four principal factors. First, the species’ habitat is adversely affected by a range of threats, including livestock grazing, overuse of water resources, and energy development. Second, no regulatory mechanisms exist to protect the Diving Beetle. Third, the Diving Beetle’s extraordinary rarity, which is reflected in the limited number of individuals found and the few populations discovered, itself imperils its population viability. And fourth, the threat of climate change represents an additional risk to the Diving Beetle’s continued existence.

Listing the Diving Beetle under the ESA would provide needed protection for this species by limiting or restricting activities that harm the Diving Beetle’s habitat. In addition, ESA listing would provide vital protection for critical habitat important for Diving Beetle recovery.

II. PETITIONER

WildEarth Guardians is a nonprofit environmental advocacy organization that works to protect wildlife, wild places, and wild waters. The organization has more than 14,000 members and supporters and maintains offices in New Mexico, Colorado, and Arizona. WildEarth Guardians has an active endangered species program that works to protect imperiled species and their habitat throughout the United States and beyond.

III. MATTER HISTORY¹

In July 2007, WildEarth Guardians petitioned FWS to list the Diving Beetle as threatened or endangered under the ESA, along with 205 other species categorized as imperiled or critically imperiled by the organization NatureServe.² By June 2008, FWS had not issued a 90-day finding

¹ The resources cited in this petition are provided on an accompanying compact disc. If FWS is unable to access a referenced source, please do not hesitate to request it by contacting either the Natural Resources and Environmental Law Clinic or Petitioner directly.

² NatureServe is a non-profit organization whose mission is to provide a scientific basis for effective conservation action. It compiles the work of nearly 1,000 scientists and has an annual budget of approximately \$45 million. NatureServe maintains an online encyclopedia, called NatureServe Explorer. NatureServe Explorer maintains the best available scientific information on approximately 50,000 plants, animals, and ecological communities in the United States and Canada. NatureServe ranks species by their degree of imperilment. The highest possible rank, indicating the highest degree of imperilment, is G1. A G1 ranking indicates a full species is critically imperiled and is at very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep population declines, or other factors. A G2 ranking indicates that a species is imperiled and is at a high risk of extinction due to very restricted range, very few populations, steep declines, or other factors. Some taxa are classified as G1G2 because there is uncertainty about their status. A G1G2 rank would indicate that the species may be either G1 or G2, and other ranks would be far less accurate. The 206 species included in this petition were ranked as G1 or G1G2 by NatureServe.

on these species. WildEarth Guardians then filed a second, emergency petition, for 32 species, including the Diving Beetle.³ The 32 species included in this emergency listing petition were those most in danger of immediate extinction. In July 2008, FWS denied Guardians' emergency listing petition. Subsequently, in February 2009, FWS denied Guardians' original July 2007 petition for 165 species of the 206 species, including the Diving Beetle. 74 Fed. Reg. 6122 (Feb. 5, 2009). With respect to the Diving Beetle and 89 other species included in the original listing petition, the 90-day finding stated that Guardians presented

only minimal information about each species, and in some cases no more information than the name of the species. . . . Occasionally, generic information was presented in the NatureServe species files for a larger group of species, such as for the class or family the species belongs to, but not specific information on the individual species. The references were taxonomic in nature or simply checklists of keys (which provide anatomical characteristics for identification of species) and did not address threats to the species.

74 Fed. Reg. at 6124.

On January 5, 2010, Guardians challenged FWS's 90-day finding for the Diving Beetle in federal court, claiming that FWS's "decision [wa]s arbitrary, capricious, and contrary to law in violation of the Endangered Species Act." *WildEarth Guardians v. Salazar*, 834 F. Supp. 2d 1220, 1222 (D. Colo. 2011). This lawsuit was subsequently dismissed for lack of standing. *Id.* at 1228.

This petition discusses new, important research on the state of the Diving Beetle, and, provides specific information on the Diving Beetle that compels a listing as threatened or endangered.

IV. ENDANGERED SPECIES ACT AND IMPLEMENTING REGULATIONS

The Endangered Species Act of 1973 protects plants and animals that are listed by the federal government as "endangered" or "threatened." 16 U.S.C. §§ 1531-44. Any interested person may file a petition with FWS to list a species under the ESA. *Id.* § 1533(b)(3)(A); 50 C.F.R. § 424.14(b). An "endangered species" is "any species that is in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. § 1532(6). A "threatened species" is defined as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." *Id.* § 1532(20). The ESA definition of "species" includes subspecies. *Id.* § 1532(16).

³ These 32 species were drawn from WildEarth Guardians' *A Petition to List 206 Critically Imperiled or Imperiled Species in the Mountain-Prairie Region of the United States as Threatened or Endangered Under the Endangered Species Act*, (July 24, 2007), available at http://www.wildearthguardians.org/site/DocServer/petition_protection-206-species-r6_7-24-07.pdf?docID=1522&AddInterest=1103 and *A Petition to List All Critically Imperiled or Imperiled Species in the Southwest United States as Threatened or Endangered Under the Endangered Species Act* (June 18, 2007), available at http://www.wildearthguardians.org/site/DocServer/petition_protection-475-species_6-21-07.pdf?docID=1442&AddInterest=1103.

The ESA sets forth five listing factors under which a species can qualify for protection:

- A. The present or threatened destruction, modification, or curtailment of habitat or range;
- B. Overutilization for commercial, recreational, scientific, or educational purposes;
- C. Disease or predation;
- D. The inadequacy of existing regulatory mechanisms; or
- E. Other natural or manmade factors affecting its continued existence.

Id. § 1533(a)(1).

A species need only meet one of the listing criteria outlined in the ESA to qualify for federal listing. *Id.* § 1533(a)(1).

If the Secretary of the Interior determines that a species warrants listing as “endangered” or “threatened” under the ESA, the Secretary must designate critical habitat for that species based on the best scientific data available. *Id.* § 1533(b)(2).

V. CLASSIFICATION AND NOMENCLATURE

A. Common Name

Hygrotus diversipes is known by the common name “Narrow-foot Hygrotus Diving Beetle.” This petition refers to the species as the “Diving Beetle” or “Beetle.”

B. Taxonomy

The petitioned species is *Hygrotus diversipes*. Leech 1966; *see also* U.S. Fish and Wildlife Species Profile, Narrow-Foot Hygrotus diving beetle (*Hygrotus diversipes*), available at <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=I06K>. The species’ taxonomic classification is shown in Table 1.

Table 1. Taxonomy of *Hygrotus diversipes*.

Kingdom	Animalia
Phylum	Mandibulata
Class	Insecta
Order	Coleoptera
Family	Dytiscidae
Genus	Hygrotus
Species	Diversipes

VI. SPECIES DESCRIPTION

The Narrow-foot Hygrotus Diving Beetle, *Hygrotus diversipes*, is about 4.5mm in length, oval in shape, with a pale yellowish color on its back and black on its abdomen. Miller 2002 at 1. The Diving Beetle has some unusual characteristics, which are probably synapomorphies (traits common to two or more taxa, and their common ancestor, but not common to the ancestor's ancestor). *Id.* In males, the median lobe of the aedeagus is exceptionally narrow apically in the lateral aspect. *Id.* at 1. Additionally, the profemora, mesofemora, and mesotibiae are modified with various emarginations and lobes. *Id.* at 1.

A. Life Cycle

Generally, little is known about the Diving Beetle's life cycle. Tronstad 2011 at 12. What is known is that the Diving Beetle has three life stages: larvae, pupae, and adult. The larvae hatch from eggs in an aquatic environment and are predaceous. *Id.* The predaceous diving beetles pupate on land. *Id.* "The adults return to water and breathe atmospheric air. Larvae are typically restricted to the habitat in which eggs were laid, but the adults can disperse among water bodies because they have wings." *Id.* Researchers would like to learn more about the Diving Beetle's larval stage, its overwintering strategies, and its drought refuges. *Id.*⁴

B. The Diving Beetle's Habitat and Range

The Diving Beetle seems to exist "almost exclusively in small, highly mineralized pools in gulches." Miller 2002 at 3; Tronstad 2011 at 12. The bottoms of the gulches are generally clay with some larger gravel, and often there exists a species of sedge or considerable plant debris in the pools. Miller 2002 at 3. Water flows in these gulches intermittently; often the gulches flood entirely. *Id.* Thus, the Diving Beetle's habitat is subject to unpredictable flooding and drying regimes. *Id.* The Diving Beetle is likely "capable of moving to a new habitat as a stream dries" because the adult beetles are "probably good fliers." Tronstad 2011 at 11.

However, although Diving Beetles are generally well-suited for exploiting small, temporary bodies of water, in 2002 Dr. Miller concluded that the Diving Beetle was "genuinely rare." Miller 2002 at 3. The species range is restricted to Eastern Wyoming and suitable habitat is "extremely patchy." *Id.* at 4. A regional drought represents a serious threat to the species by creating large areas that are entirely unsuitable within its limited range. Miller 2002 at 2; Tronstad 2011 at 11.

⁴ The lack of information regarding the Diving Beetle's life cycle does not undermine this listing petition and should not delay a decision. Under the ESA, listing determinations are required to be based solely on the best scientific and commercial data available. 16 U.S.C. § 1533(b)(1)(a). The U.S. Fish and Wildlife Species Profile for the Diving Beetle recognizes that the NatureServe database, NatureServe Explorer, is an authoritative source for conservation information on the species. U.S. Fish and Wildlife Species Profile, Narrow-Foot Hygrotus diving beetle (*Hygrotus diversipes*) available at <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=I06K>. NatureServe Explorer currently classifies the Diving Beetle as G1G2 in recognition of its high risk of extinction due to extreme rarity, very steep declines, or other factors. In addition, the Wyoming Natural Diversity Database, a member of the Natural Heritage Network program dedicated to gathering and developing biological information on species of conservation concern, classifies the Diving Beetle as S1S2. See Wyoming Natural Diversity Database, Insect Species of Concern available at <http://www.uwyo.edu/wyndd/species-of-concern/invertebrate-animals/insects.html>. An S1S2 rank is assigned by WYNDD biologists for species that are critically imperiled or imperiled in Wyoming.

The Diving Beetle has been collected from few locations and in few numbers. A decade ago, the range of the Diving Beetle was known to extend to only 11 sites in Natrona, Johnson, and Fremont counties in Wyoming, including areas in the Powder River basin (South and Middle Forks, Salt Creek and the main Powder River drainage farther north) and the Wind River basin (Muskrat Creek and Poison Creek drainages); the greatest distance between these localities was about 126 miles. Miller 2002 at 3. Dr. Leech collected the first known specimen of the Diving Beetle from Dugout Creek, 8.5 miles northwest of Midwest, Wyoming. Leech 1966.

Moreover, the range and habitat of the Diving Beetle appears to be in decline. In 2009 the Forest Service noted that the natural pool habitat the Diving Beetle requires is in an overall decline. U.S. Forest Service, Region 2 Sensitive Species Evaluation Form 2 for the *Hygrotus diversipes* (January 23, 2009), available at <http://www.fs.fed.us/r2/projects/scp/evalrationale/evaluations/insects/narrowfootdivingbeetle.pdf>. And a University of Wyoming statewide survey team conducted 211 site visits between 2010 and 2011 in search of the Diving Beetle, including four of the 11 sites identified by Dr. Miller. See Tronstad 2011 at 18-21. The Diving Beetle was found at only three locations, including only two of the previously known locations. Tronstad 2011 at 9. Notably, although Dr. Leech found the Diving Beetle at Dugout Creek in the 1960s, and Dr. Miller found the Diving Beetle there in 2002, searches of Dugout Creek in 2010 and 2011 failed to find the Diving Beetle. *Id.* Dugout Creek once had a “moderately large” population of Diving Beetles. Miller 2002 at 3.

The researchers for the University of Wyoming study documented the decline of Diving Beetle habitat and the contraction of its range. These researchers conducted 37 site visits in 2010, and located the Diving Beetle at only 2 sites (Dead Horse Creek and Cloud Creek at Wild Horse Road), collecting only 24 specimens. Tronstad 2011 at 9. In 2011, these researchers visited 174 sites in Wyoming, and found the Diving Beetle at only one (Dead Horse Creek), collecting only two specimens. *Id.*

VII. IDENTIFIED THREATS TO THE PETITIONED SPECIES: CRITERIA FOR LISTING

The Diving Beetle population meets three of the criteria for listing identified in ESA § 4 (16 U.S.C. §1533(a)(1)) (in bold):

- A. The present or threatened destruction, modification, or curtailment of its habitat or range;**
- B. Overutilization for commercial, recreational, scientific, or educational purposes;
- C. Disease or predation;
- D. The inadequacy of existing regulatory mechanisms; or**
- E. Other natural or manmade factors affecting its continued existence.**

Grazing, stream diversions, and energy development represent significant threats to the Diving Beetle habitat. Currently there are no regulatory measures in place to protect the Diving Beetle or its habitat from these activities. These dangers, combined with the Diving Beetle’s extreme

rarity (both in terms of number of populations and individuals) and the threats posed by climate change, mean that this species is endangered.

A. The Diving Beetle's Existence Is Imperiled By The Present And Threatened Destruction Of Its Habitat.

1. Livestock Grazing

The effects of livestock grazing on riparian zones, wetlands, seeps, and springs in the West are well known. Grazing removes native vegetation, reducing cover, biomass, and productivity of herbaceous and woody species; trampling by livestock destroys vegetation, increases runoff, compacts soil, and accelerates erosion; grazing also facilitates the spread of nonnative plants. Belsky et al. 1999; Fleischner 1994; Sada et al. 2001. Diversions from streams and springs to water livestock also eliminate important aquatic habitats. Sada et al. 2001. This damage combines to reduce the suitability and availability of the specialized habitat Diving Beetles require.

In fact, livestock grazing is directly responsible for the destruction of Diving Beetle habitat. Dr. Miller, in his 2002 survey of the Diving Beetle in Wyoming, reported that the Diving Beetle was previously found in locations that are now "exceptionally disturbed by . . . cattle grazing." Miller 2002 at 4. Dr. Miller noted that Diving Beetles were found only at sites with vegetation; sites adjacent to areas where the Diving Beetle was found but lacking vegetation did not contain beetles. *Id.* at 3. And by trampling and grazing, livestock destroy vegetation, thereby destroying Diving Beetle habitat. When this habitat destruction is considered in light of the Diving Beetle's extreme rarity, any destruction of the Beetle's habitat is a significant detriment to the species' continued existence.

Below are photos documenting damage done by livestock to Diving Beetle habitat. Livestock damage the riparian areas used by Diving Beetles directly by destroying the habitat quality and indirectly by causing erosion through overgrazing. The streams and pools in which Diving Beetles have been located contain organic matter, fine substrates, and sedges along the water's edge. Miller 2002 at 3; Tronstad 2011 at 11. But as these photos show, livestock grazing destroys vegetation, increases runoff, and subjects these specialized riparian areas to severe erosion and channelization, destroying the Diving Beetle's limited habitat.



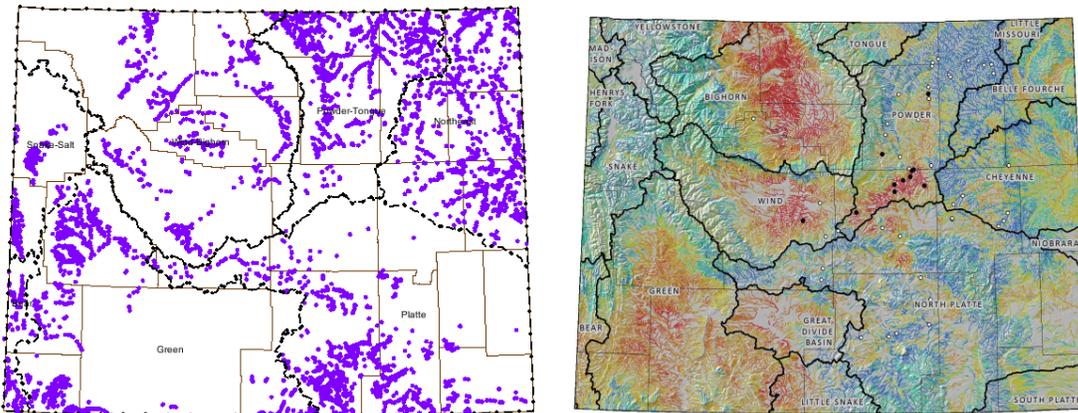
Photos taken by Jay Tutchton of WildEarth Guardians⁵

⁵ These four photos are of Dugout Creek, the creek in which the Diving Beetle was first discovered in 1966. The upper left photo was taken at Natrona County Road on March 22, 2011. This photo shows the effects of grazing and the channelization of the creek. The upper right photo, taken at the same location on the same date, is a close-up detailing the destruction of vegetation by trampling at the creek's edge. The lower left photo was also taken at the same location and on the same date, and details more of the damaging effects of grazing. Lastly, the lower right photo was taken of Dugout Creek from the Old Highway 87 Bridge on December 20, 2010. The Diving Beetle was first discovered in Dugout Creek under the highway bridge in 1966 by Dr. Leach. This photo shows the presence of cattle in this fragile

2. Stream Diversions

Stream diversions adversely affect Diving Beetle habitat because they affect the quantity and content of water downstream from those diversions. *See* Baker et al. 2011. Given the Diving Beetle’s need for small, highly mineralized pools with vegetation, any change in the quality or content of the water flowing into its habitat has the potential to destroy that habitat. *See* Miller 2002 at 3. Additionally, one of the Diving Beetle’s main evolutionary advantages is the ability to “respond quickly to local conditions,” including flooding. Tronstad 2011 at 12. Such stream diversions decrease or eliminate the natural flooding that may occur. And without occasional flooding, the specialized habitat of Diving Beetles – intermittent streams and naturally forming disconnect pools – may be destroyed, thereby imperiling the continued existence of the Beetle. *Id.*

Indeed, water diversions do adversely affect the Diving Beetle’s aquatic habitat. The Forest Service has noted that most streams within the range of the Diving Beetle are dammed or diverted for stock ponds or other uses. U.S. Forest Service, Region 2 Sensitive Species Evaluation Form for the *Hygrotus diversipes* (January 23, 2009), *available at* <http://www.fs.fed.us/r2/projects/scp/evalrationale/evaluations/insects/narrowfootdivingbeetle.pdf>. Below are two maps.⁶ The map on the left shows each point in Wyoming where water is diverted from a lake, river, or stream. The map on the right shows each location where Dr. Miller located the Diving Beetle in 2002 (indicated by a black dot). The water diversion map shows that water is diverted away from rivers and stream upstream from Diving Beetle habitat in the Powder River basin.



The impact of the diversions affects the water quality and quantity in Diving Beetle habitat, thereby threatening the Beetle’s continued existence. In 2009, the Forest Service noted that “water diversions . . . have impacted the location where [the Diving Beetle] was first described.”

habitat. Despite being first discovered there, and having a notable population in 2002, no Diving Beetles currently inhabit the area.

⁶ Wyoming Water Development Commission, <http://ims2.wrds.uwyo.edu/Website/Statewide/viewer.htm>; Tronstad 2011 at 7.

U.S. Forest Service, Region 2 Individual Species Recommendations Form for the *Hygrotus diversipes* (March 3, 2009), *available at* <http://www.fs.fed.us/r2/projects/scp/evalrationale/rationales/insects/narrowfootdivingbeetle.pdf>. Despite a search in 2010 and multiple searches in 2011, the Diving Beetle could no longer be found at this location. Tronstad 2011 at 9.

3. Energy Development

Energy development, including the installation of pipelines and methane development, has directly destroyed Diving Beetle habitat. Miller 2002 at 2; 4. The Diving Beetle was first discovered by Dr. Leech in Dugout Creek in the 1960s. Leech 1966. And the Diving Beetle was still observed there by Dr. Miller as late as 2002. Miller 2002 at 4. But a CO₂ pipeline and methane development have subsequently disturbed this location. U.S. Forest Service, Region 2 Sensitive Species Evaluation Form for the *Hygrotus diversipes* (January 23, 2009); *see also* U.S. Forest Service, Region 2 Individual Species Recommendations Form for the *Hygrotus diversipes* (March 3, 2009); Miller 2002 at 4. Recent searches of Dugout Creek in 2010 and 2011 failed to find Diving Beetles remaining in the area. Tronstad 2011 at 9.

Additionally, Diving Beetle habitat occurs near mineral exploration and extraction activities that has the potential to disrupt or destroy this habitat. Miller 2002 at 4.

D. The inadequacy of existing regulatory mechanisms

No regulatory mechanisms currently exist to protect the Diving Beetle. The Diving Beetle was previously considered a category 2 candidate species by the FWS in 1989, 1991, and 1994. 54 Fed. Reg. 554 (Jan. 6, 1989); 56 Fed. Reg. 58804 (November 21, 1991); 59 Fed. Reg., 58982 (Nov. 15, 1994); *see also* U.S. Fish and Wildlife Service, Species Profile: Narrow-Foot Hygrotus diving beetle, *available at* <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?sPCODE=I06K>; Tronstad 2011 at 2. But the Diving Beetle was removed as a candidate in 1996 and remains unlisted under the ESA. *See* U.S. Fish and Wildlife Service, Species Profile: Narrow-Foot Hygrotus diving beetle; Tronstad 2011 at 2.

The Diving Beetle is not protected by other federal or state agencies. The Diving Beetle is not on the Bureau of Land Management's Sensitive Species List. BLM Wyoming Sensitive Species Policy and List (March 31, 2010), *available at* <http://www.blm.gov/pgdata/etc/medialib/blm/wy/resources/efoia/IMs/2010.Par.41285.File.dat/wy2010-027atch2.pdf>. Nor is the Diving Beetle on the Forest Service's Sensitive Species List. U.S. Forest Service, Region 2 Regional Forester's Sensitive Species, *available at* <http://www.fs.fed.us/r2/projects/scp/sensitivespecies/>. Although the Diving Beetle is listed as an insect "Species of Concern" on the Wyoming Natural Diversity Database, this listing has no regulatory effect. University of Wyoming, Wyoming Natural Diversity Database: Species of Concern, *available at* <http://www.uwyo.edu/wyndd/species-of-concern/>. The Wyoming state agency with jurisdiction over protecting wildlife, the Wyoming Game and Fish Department, claims it lacks jurisdiction to protect insects. Wyoming Game and Fish Department, Wyoming Species of Greatest Conservation Need at 1 (2010), *available at*

http://wgfd.wyo.gov/web2011/Departments/Wildlife/pdfs/SWAP_SPECIESCONSERVATIONINTRO0002949.pdf. Therefore the Diving Beetle is not listed as a “Species of Greatest Conservation Need” by the state of Wyoming. *See id.*

Given that no formal regulatory mechanisms currently protect the Diving Beetle at either the federal or state level, existing regulatory mechanisms are wholly inadequate and the Diving Beetle remains at constant risk of extinction.

E. Other natural or manmade factors affecting continued existence

1. Rarity

The Diving Beetle’s extreme rarity threatens its existence. In 2002 Dr. Miller, after conducting an extensive study, determined that the Diving Beetle existed in only 11 locations. Miller 2002 at 3. He concluded that the Diving Beetle was “genuinely rare.” *Id.* A statewide study by the University of Wyoming conducted from 2010 to 2011 found the Diving Beetle in only three locations, despite the researchers visiting 211 locations believed to potentially harbor the Diving Beetle. Tronstad 2011 at 9. The University of Wyoming researchers visited four of the previously known locations identified by Dr. Miller, finding Diving Beetles at only two of them. *Id.* Despite multiple site visits to Dugout Creek where the Diving Beetle was first discovered by Dr. Leech in 1966 and where Dr. Miller collected specimens in 2002, the University of Wyoming researchers were unable to find any Diving Beetles. *Id.* The researchers found Diving Beetles in only three locations, and they were only able to collect 26 specimens total – 24 in 2010 and two in 2011. *Id.* The results of this survey suggest that the Diving Beetle’s range is contracting and its population is in sharp decline.

With such a small population, the Diving Beetle is particularly vulnerable to stochastic events (an impossible to accurately predict event such as flooding, severe drought, chemical spill, or intense cattle grazing) that could cause local extirpation and destroy the beetle’s essential habitat. In addition to being subject to flooding and drought regimes, Dr. Miller noted that mineral exploration and extraction, gas pipelines, cattle grazing, and a major highway all occur within the species’ limited habitat. Miller 2002 at 4.

Additionally, “[s]mall populations can persist in the wild for some time, but the reproductive fitness of these, and especially the ability to adapt to change (evolutionary potential) is compromised and extirpation is likely.” Traill et al. 2010 at 30. The Diving Beetle’s extreme rarity, and its likelihood of extirpation, are therefore a sufficient basis for listing under the ESA.

FWS has recognized that rarity itself is a threat to a species’ continued existence.⁷ For the Langford’s tree snail (*Partula langfordi*), FWS stated:

Even if the threats responsible for the decline of this species were controlled, the persistence of existing populations is hampered by the limited number of known

⁷ See, e.g., FWS candidate assessment forms for *Doryopteris takeuchii*, *Huperzia stemmermanniae*, *Melicope hiiakae*, *Ostodes strigatus*, *Partula langfordi*, *Peperomia subpetiolata*, *Phyllostegia bracteata*, and *Tryonia circumstriata*, available at <http://www.fws.gov/endangered>.

individuals of this species. This circumstance makes the species more vulnerable to extinction due to a variety of natural processes. Small populations are particularly vulnerable to reduced reproductive vigor caused by inbreeding depression, and they may suffer a loss of genetic variability over time due to random genetic drift, resulting in decreased evolutionary potential and ability to cope with environmental change.

U.S. Fish and Wildlife Service, Listing Form for *Partula langfordi* at 5 (2010), available at http://ecos.fws.gov/docs/candforms_pdf/r1/G0AI_I01.pdf.

Similarly, for the Sisi snail (*Ostodes strigatus*) FWS noted that “[e]ven if the threats responsible for the decline of this species were controlled, the persistence of existing populations is hampered by the small number of extant populations and the small geographic range of the known populations.” U.S. Fish and Wildlife Service, Listing Form for *Ostodes strigatus* at 4 (2012), available at http://ecos.fws.gov/docs/candidate/assessments/2013/r1/G0A5_I01.pdf. And in finding that the Ozark Hellbender (*Cryptobranchus alleganiensis bishopi*) warranted listing as endangered, FWS concluded that “[a]lthough changes in the environment may cause populations to fluctuate naturally, small and low-density populations are more likely to fluctuate below a minimum viable population (the minimum or threshold number of individuals needed in a population to persist in a viable state for a given interval).” 76 Fed. Reg. 61972 (Oct. 6, 2011) (listing the Ozark Hellbender as endangered), available at <http://www.gpo.gov/fdsys/pkg/FR-2011-10-06/html/2011-25690.htm>.

Here, the Diving Beetle suffers from these same threats and pressures afflicting other species that have small populations and a limited number of populations, greatly increasing its risk of extinction. The Diving Beetle’s rarity subjects it to reduced reproductive vigor through inbreeding depression, a loss of genetic variability, diminished evolutionary potential, and inability to cope with new stressors such as climate change. See Traill et al. 2010 at 30. These threats, coupled with the danger of natural fluctuations causing the Diving Beetle’s population to fall below a minimum viable population, warrant a finding that the Diving Beetle is “threatened” or “endangered” due to its extreme rarity.

Additionally, in light of continuing fragmentation and destruction of the Diving Beetle’s habitat (detailed above) and the stress caused by climate change (explained further below), the Diving Beetle is constantly at risk of local extirpation at its known locations and, ultimately, complete extinction. Therefore, due to the lack of short- and long-term viability of the Diving Beetle’s existing population, FWS should find this species at risk of extinction.

2. Climate Change

Climate change poses a fundamental challenge for species survival in coming years and decades. Climate change is already causing a rise in temperatures across the United States and an increase in extreme weather events, such as droughts and increased rainfall. See, e.g., Parmesan et al. 2000; NSC 2003; CCSP 2008; Karl et al. 2009; Staudinger et al. 2012. Temperatures during the latter period of warming have increased at a rate comparable to the rates of warming that conservative projections predict will occur during the next century with continued increases of greenhouse gases. As climate change progresses, maximum high and minimum low

temperatures are expected to increase, as are the magnitude and duration of regional droughts. IPCC 2001.

For the Diving Beetle's habitat, climate change is expected to cause more extreme and frequent weather events that include droughts, heavy rainfall, and heat waves. Karl et al. 2009. Temperatures are expected to increase significantly. The species may not be able to adapt to these changes. Karl et al. described the predicted effects of climate change impacts:

Climate-driven changes are likely to combine with other human-induced stresses to further increase the vulnerability of natural ecosystems to pests, invasive species, and loss of native species. Changes in temperature and precipitation affect the composition and diversity of native animals and plants through altering their breeding patterns, water and food supply, and habitat availability.

Id. at 126. Given these changes, the Diving Beetle's unique and limited riparian habitat will likely be reduced. The Diving Beetle needs small, highly mineralized pools with vegetation to exist and any change to the vegetation or quality and content of the water available has the potential to destroy its habitat. *See* Miller 2002 at 3. As a result, climate change will likely adversely affect the Diving Beetle's ability to survive and may already be negatively affecting its limited habitat.

VIII. CONCLUSION AND REQUESTED DESIGNATION

For the reasons explained above, WildEarth Guardians petitions FWS to list the Narrow-foot Hygrotus Diving Beetle (*Hygrotus diversipes*) as an "endangered" or "threatened" species under the ESA. This listing action is warranted, given that the Diving Beetle is threatened by three of the five statutory listing factors: present and threatened destruction, modification and curtailment of habitat and range; the inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence. Specifically, the Diving's Beetle habitat is in decline because of grazing, over-use of water resources, and energy development. No regulatory regime currently exists that protects the Diving Beetle. Additionally, the Diving Beetle's extreme rarity and the impacts of climate change threaten the Diving Beetle's continued existence.

Since threats to Diving Beetle's habitat are a significant cause of imperilment for the Diving Beetle, WildEarth Guardians also requests that critical habitat be designated for this species in its U.S. range concurrent with final ESA listing. We further request that critical habitat is designated for the Diving Beetle in order to ensure its recovery. In order to avoid extinction and to achieve recovery, critical habitat should be designated within the Powder River basin, including the drainages of Dugout Creek, Dead Horse Creek, and Cloud Creek where the Diving Beetle has been historically found, and any other suitable habitat necessary for its conservation.

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