

ATTACHMENT SS2

REGION 2 SENSITIVE SPECIES EVALUATION FORM

Species: <i>Hygrotus diversipes</i> , narrowfoot hygrotus diving beetle			
Criteria	Rank	Rationale	Literature Citations
<p>1 Distribution within R2</p>	A	<p>Only known from WY. After 1993, the species was known from about 6 individual sites and perhaps 140 specimens collected within about 18 miles, all from Natrona County and all from the type locality or nearby.</p> <p>NatureServe Status Global Status: G1G2 Global Status Last Reviewed: 23Feb2004 Global Status Last Changed: 23Feb2004 Rounded Global Status: G1 - Critically Imperiled Reasons: Only three known repositories and a single known site. Nation: United States National Status: N1N2 (23Feb2004) WY: S1S2</p> <p>It has been petitioned for emergency listing under ESA by Wild Earth Guardians.</p> <p>Confidence in Rank High</p>	<ul style="list-style-type: none"> • Miller 2002 • NatureServe 2009 • Leech 1966
<p>2 Distribution outside R2</p>	A	<p>No distribution outside R2, only known from WY. However, currently known locations are outside of NFS lands of R2.</p> <p>NatureServe Global Range Comments: Natrona County, Wyoming. After inquiring at 10 major museum collections (Harvard Museum of Comparative Zoology, United States National Museum, Academy of Natural Sciences of Philadelphia, Cornell University, California Academy of Sciences, Montana State, University of Nebraska Museum, Colorado State University, University of Colorado Museum, University of Wyoming, Brigham Young University), only known specimens are at the California Academy of Sciences, Cornell University, and the Casper, Wyoming, Bureau of Land Management (Jerry Freilich, Wyoming Outdoor Council, personal communication, June 2002).</p> <p>Confidence in Rank Medium</p>	<ul style="list-style-type: none"> • Miller 2002 • NatureServe 2009 • Leech 1966

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3 Dispersal Capability	A	<p>The known habitat of the type specimen is a creek which in mid summer becomes a series of disconnected pools in a clay and gravel bed. Other occurrences are in small, highly mineralized pools in gulches where there is often white crusts of salts along the margins of the water.</p> <p><i>H. diversipes</i> probably doesn't disperse during times when pools are disconnected.</p> <p>Other <i>Hygrotus</i> spp. have this lifecycle: Four developmental stages: egg, larva, pupa, adult (complex, or complete, metamorphosis); adult females attach eggs to underwater plants; upon hatching, larvae are free-swimming, are fully aquatic, and molt (shed their body covering) several times before leaving the water to pupate underground near the water; adults emerge in warm months, and are the overwintering stage for most species. Both larvae and adults are predaceous.</p> <p>Confidence in Rank Medium</p>	<ul style="list-style-type: none"> • Miller 2002 • NatureServe 2009 • Leech 1966 • Vernal Pools http://vernalpools.rpi.org/account/745 [01/23/09].
4 Abundance in R2	A	<p>Two of the 11 known locations of this species are outside of, but near the TBNG. The TBNG has similar habitat to that described for this beetle. There are no documented occurrences on NFS lands in R2 at this time. There has been no effort to search for this beetle on NFS lands.</p> <p>Confidence in Rank Low</p>	<ul style="list-style-type: none"> • Miller 2002 • NatureServe 2009 • Leech 1966
5 Population Trend in R2	A/B	<p>There is no population data available. Miller (2002) found <i>H. diversipes</i> at 6 sites (including the type locality) increasing the total number of known individual sites for this beetles to about 11. None of the known sites is on NFS lands of the TBNG. Populations fluctuate with water levels and time of year.</p> <p>Confidence in Rank Medium</p>	<ul style="list-style-type: none"> • Miller 2002 • NatureServe 2009 • Leech 1966
6 Habitat Trend in R2	A	<p>Water is a scarce commodity in this part of Wyoming and changing natural water regimes has been on-going for hundreds of years. Most streams are dammed or diverted for stock ponds or other uses. Natural pool habitat that this beetle needs is in decline over all but is more abundant in wet years than in dry years.</p> <p>Confidence in Rank High</p>	<ul style="list-style-type: none"> • Miller 2002 • NatureServe 2009 • Leech 1966

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Criteria	Rank	Rationale	Literature Citations
7 Habitat Vulnerability or Modification	A	Water is a scarce commodity in this part of Wyoming and changing natural water regimes has been on-going for hundreds of years. Most streams are dammed or diverted for stock ponds or other uses. Natural pool habitat that this beetle needs is in decline over all but is more abundant in wet years than in dry years. Type locality has been affected by CO2 pipeline and methane development. Confidence in Rank Medium	<ul style="list-style-type: none"> • Miller 2002 • NatureServe 2009 • Leech 1966
8 Life History and Demographics	A/B	Intermittent pools require several weeks to develop a fauna after thunderstorms. There is some dormancy involved but it is currently unknown which life stage provides dormancy during inhospitable conditions. Confidence in Rank LOW	<ul style="list-style-type: none"> • Miller 2002 • NatureServe 2009 • Leech 1966
Evaluator(s): Kathy Roche, Ecologist MBRTB			Date: 01/23/09

Hygrotus diversipes Leech is a rarely-collected beetle of the family Dytiscidae. It is a member of a speciose Holarctic genus with species that are often very abundant and commonly collected in a variety of habitats (Miller 2002). The Narrow Foot Hygrotus diving beetle (*Hygrotus diversipes*) is considered globally and within the state of WY to be critically imperiled (G1G2 and S1S2) (At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors).

Miller (2002) indicates that the historical rareness of *H. diversipes* could be genuine when compared with other Nearctic diving beetles. However, eastern Wyoming represents a prominent geographic gap in the knowledge of diving beetles. *Hygrotus diversipes* was described from nineteen specimens collected by H.B. Leech (Leech, 1966). Until 1985, Leech was the only person known to have collected the species. However, later attempts were made to specifically assess the status of the beetle (see Appendix 3). In 1985 a survey to assess the species was conducted by G. Dahlem and others from the Bureau of Land Management (BLM). Seventy-one specimens of the species were collected by the BLM team at three localities, the type locality at Dugout Creek (18 specimens) and two nearby locations (36 and 17 specimens). Specimens were identified by R. Anderson (Southern Utah State College, Cedar City, Utah), who revised the genus (Anderson, 1983). Subsequently in 1988, another attempt to collect the species was made by W. Fitzgerald and others, also of the BLM. They collected at the type locality and various other localities but did not collect any *H. diversipes* (Anderson also identified their material). In 1992, two surveys were conducted. The first, by L.C. Keenan and T. Howard of Professional Entomological Services Technology, Inc. (PEST), found specimens at the type locality and a single additional location nearby (3 specimens total, identified by R.E. Roughley, University of Manitoba, Winnipeg, Manitoba). The BLM conducted an additional survey in 1992 (led by R.A. Nelson), as well, and found

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the species in another location nearby (10 specimens total). Finally, PEST conducted another survey in 1993, and found specimens in the same sites as in their 1992 survey. The efforts by both the BLM and PEST were made for the U.S. Fish and Wildlife Service to determine whether to propose listing the species as endangered or threatened.

Miller (2002) indicates that the known habitat of the type specimen is a creek which in mid summer becomes a series of disconnected pools in a clay and gravel bed. Other occurrences are in small, highly mineralized pools in gulches where there is often white crusts of salts along the margins of the water. Substrates in these sites are generally clay with some larger gravel. There is often a species of sedge in some pools and sometimes considerable plant debris. *Hygrotus diversipes* was not found at sites without plant debris nor in adjacent areas with only mineral substrates at sites where the species was collected. Collected from June 18 - September 30.

It has been petitioned for emergency listing under ESA by Wild Earth Guardians.

It is only known from WY. Two of the known locations of this species are outside of, but nearby the TBNG. The TBNG has habitat similar to that described for this diving beetle.

Literature Cited:

Leech, H. B. 1966. The pedalis group of *Hygrotus*, with descriptions of two new species and a key to the species (Coleoptera: Dytiscidae). Proceedings of the California Academy of Sciences. XXXIII (15): 481-498. As cited in NatureServe 2009.

Miller, K. 2002. Report on the Diving Beetle *Hygrotus diversipes* Leech (Coleoptera: Dytiscidae). Unpublished report. Department of Entomology, Comstock Hall, Cornell University, Ithaca, NY. On file at Medicine Bow – Routt National Forests and Thunder Basin National Grassland Forest Supervisor's Office, Laramie, WY.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.6. NatureServe, Arlington, VA. Available <http://www.natureserve.org/explorer> [01/14/09].

Vernal Pools. 2009. <http://vernalpools.rtpi.org/account/745> [01/23/09].

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National Forests in the Rocky Mountain Region where species is KNOWN (K) or LIKELY (L)¹ to occur:

Species Name: <i>Hygrotus diversipes</i> , narrowfoot hygrotus diving beetle														
<u>Colorado NF/NG</u>		<u>Kansas NF/NG</u>		<u>Nebraska NF/NG</u>		<u>South Dakota NF/NG</u>		<u>Wyoming NF/NG</u>						
Known	Likely	Known	Likely	Known	Likely	Known	Likely	Known	Likely	Known	Likely			
		Cimarron NG				Samuel R. McKelvie NF				Black Hills NF		Shoshone NF		
						Halsey NF				Buffalo Gap NG		Bighorn NF		
						Nebraska NF				Ft. Pierre NG		Black Hills NF		
						Ogalala NG						Medicine Bow NF		
												Thunder Basin NG		x

¹ Likely is defined as more likely to occur than not occur on the National Forest or Grassland. This generally can be thought of as having a 50% chance or greater of appearing on NFS lands.