

## Inclusion of Blanding’s Turtle *Emydoidea blandingii* in Appendix II

### Proponent: United States of America

**Summary:** Blanding’s Turtle *Emydoidea blandingii* is a medium-sized, semi-aquatic turtle that occurs in southeastern Canada and in the USA in the Upper Midwest and New England. The species uses a range of permanent and temporary wetland habitats and is highly mobile; individuals move extensively between wetlands, and to terrestrial nesting sites which are often well away from their resident wetlands. The range is extensive but has been reduced through habitat loss and fragmentation. An estimated 30–50% of suitable habitat in the Midwestern region of the USA has been lost in recent decades. Reductions in the number of known populations have been recorded in some US states but not in others; many remaining populations are believed to have declined. There is no estimate of the total US population, though the largest known (in Nebraska) is estimated to be over 130 000 individuals (excluding hatchlings and yearlings). The estimated population in Canada is around 10 000 adults. Individuals reach maturity late (12 years for males, 14–20 years in females); once mature, females generally breed every two to three years, producing one clutch of 8-15 eggs, and may remain reproductive for 40–50 years. The species was assessed as Endangered in the IUCN Red List in 2011, based on extensive slow population declines and long generation time.

Wild individuals are collected for the domestic and international pet trade. There may also be some harvest for traditional medicinal use in Canada. Some are caught as by-catch in the harvest of Snapping Turtles *Chelydra serpentina*. Demand in international markets does not appear high, possibly owing to similarity with the widely kept European Pond Tortoise *Emys orbicularis*. Exports from the USA recorded in US Customs data are at a low level, although have increased from an average of under 40 individuals per year in the period 1989–1997 to around 80 per year, 1999–2010. At the same time, the proportion of exports declared as wild-caught has declined from over 80% in the period 1989–1997 to less than 10% in 1999–2010. If these figures are reliable, they equate to an export of fewer than 10 wild animals annually. Canada generally prohibits the commercial export of this species. There are no indications of any non-commercial trade.

**Analysis:** *Emydoidea blandingii* is fairly widespread in the USA and Canada. The global population is believed to exceed 140 000, although is thought to be declining slowly through loss of habitat. The species is reported to be in low demand in international markets. Recorded international trade is at a low level, with fewer than 10 specimens recorded as wild-collected exported from range States in recent years. Even if all exports reported in fact originate from the wild it seems very unlikely that the harvest of specimens from the wild for international trade would reduce the wild population to a level at which its survival might be threatened by continued harvesting or other influences or become eligible for inclusion in Appendix I in the near future.

Supporting Statement (SS)	Additional information
<p>Synonyms: <i>Cistudo blandingii</i>, <i>Emys blandingii</i>, <i>Emys twentei</i>, <i>Testudo flava</i>, <i>Testudo meleagris</i>.</p>	<p><b>Taxonomy</b></p> <p>Synonyms: <i>Cistuda blandingii</i>, <i>Lutremys meleagris</i>, <i>Neoemys blandingii</i> (Congdon et al., 2008).</p> <p><i>The species blandingii has generally been placed in Emydoidea in recent years, but has also been argued to belong in the genus Emys, based on molecular phylogeny results (van Dijk and Rhodin, 2011).</i></p>

Supporting Statement (SS)	Additional information
<p data-bbox="181 276 544 300">Canada, United States of America.</p> <p data-bbox="181 392 763 416">Endangered A2cde+4ce (version 3.1). Assessed 2011.</p>	<p data-bbox="1077 220 1155 244" style="text-align: center;"><u>Range</u></p> <p data-bbox="992 336 1245 360" style="text-align: center;"><u>IUCN Global Category</u></p>
<p data-bbox="181 453 1402 480"><b>Biological and trade criteria for inclusion in Appendix II (Res. Conf. 9.24 (Rev. CoP15) Annex 2 a)</b></p>	
<p data-bbox="309 517 1081 541" style="text-align: center;"><b><u>A) Trade regulation needed to prevent future inclusion in Appendix I</u></b></p>	
<p data-bbox="181 576 1003 655">A crude estimate of the Canadian portion of the Great Lakes/St. Lawrence population is approximately 10 000 adults while the Nova Scotia population is estimated at 350 adults.</p> <p data-bbox="181 687 1077 794">There is no total estimate for the number of <i>Emydoidea blandingii</i> in the United States but populations are often small and localized, with populations of a few dozen or hundred turtles. The largest known population is in Nebraska and is estimated at over 130 000 individuals, excluding hatchlings and yearlings.</p> <p data-bbox="181 826 1070 874">Densities range from 0.02 individuals ha in Maine, to 28 per ha in Wisconsin, 55 per ha in Missouri, and up to 57 per ha in Nebraska.</p> <p data-bbox="181 906 1048 959">Adult nesting females are often easily captured from their nesting sites and so are more vulnerable to collection.</p> <p data-bbox="181 991 1055 1155"><i>Emydoidea blandingii</i> life history traits of delayed sexual maturity, adult longevity, and high juvenile mortality make it particularly vulnerable to collection. Given its population dynamics, even slight increases in the rate of loss of juveniles or reproducing adults from a population can have a significant impact. Maturity is reached at about 12 years in males, and at 14–20 years in females. Longevity can be at least 77 years in the wild, and generation times vary between 36-47 years.</p> <p data-bbox="181 1187 1081 1294">Females produce one or two clutches of 8–15 eggs (range 3– 22, substantial geographic variation) in a reproductive year, but only half the females in a population may reproduce in a given year. An individual female might only breed once every 2-3 years and females may remain reproductive for 40- 50 years.</p>	<p data-bbox="1137 576 2040 708"><i>Along with the Nebraskan population, the other population of note is in south-eastern Minnesota and has over 5000 adults (Pappas et al., 2000 in Congdon et al., 2008). Nebraska contains the largest known population of Emydoidea blandingii. In this State, wetlands have decreased by 35%, from 2 910 000 acres to 1 905 000 acres between 1867 and 2006 (Congdon and Keinath, 2006).</i></p> <p data-bbox="1137 740 2047 959"><i>Congdon et al. (2008) noted that the distances individuals moved varied across the species' range—in some areas, males travelled further than females on average, whilst in other areas the converse was true. Congdon et al. (2011) documented remarkable fidelity to residence wetlands extending over 40 years. In Nebraska, older females (which have a higher reproductive output than their younger counterparts) tended to occupy larger areas and travel greater distances than males (Congdon et al., 2008), which may mean they have a higher chance of encountering humans or predators, thus an increased vulnerability.</i></p> <p data-bbox="1137 1187 2047 1267"><i>Emydoidea blandingii only produces one clutch per year. It is an overstatement to say that females only breed once every two to three years, though it is likely some will skip breeding for a year (Congdon, in litt., 2012).</i></p> <p data-bbox="1137 1299 2047 1378"><i>Nest depredation is high, but so is average juvenile survivorship (Congdon, in litt., 2012). In order to maintain a stable population, annual survivorship between the ages of one year and maturity must be 72% (Congdon et al., 1993).</i></p>

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<p><i>Emydoidea blandingii</i> is present in the Canadian provinces of Nova Scotia, Ontario and Québec, and the American states of Illinois, Indiana, Iowa, Maine, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, Ohio, Pennsylvania, South Dakota, and Wisconsin.</p> <p>This species requires a large home range and its habitat has undergone fragmentation and decline rangewide; often being intersected by roads and rural human habitations. There are no estimates of the amount of suitable <i>Emydoidea blandingii</i> habitat still remaining in Canada or the United States.</p> <p><i>Emydoidea blandingii</i> was listed as Endangered in 2011 because it has experienced a population reduction of more than 50% over three generations, due to habitat decline, overexploitation, increased predation, and the associated mortality caused by these threats.</p> <p>It is estimated that 30–50% of suitable habitat and the populations present have been lost in recent decades, while many remaining populations have declined.</p> <p>Population decline has been noted in Illinois, Iowa, Michigan, Nebraska, Ohio, and Wisconsin and several U.S. States reported that at least portions of extant populations may not be viable. Populations in Illinois and Ohio are considered to be in decline, possibly associated with increased predation by raccoons.</p>	<p>Two moderately sized populations in Michigan and Minnesota demonstrated a female-biased sex ratio amongst adults, whilst another relatively large population in Ontario had a sex ratio that was either equal or slightly male-biased (Congdon et al., 2008). However, re-analysis of the Michigan population that excluded non-resident females resulted in an adult sex ratio close to 1:1 (Congdon, in litt., 2012). A biased sex ratio can reduce the effective size of the population, increasing instability and reducing population persistence (Congdon et al., 2008).</p> <p>The figure of 30–50% given in the SS is for the populations of the Midwestern region of the USA (Nebraska to Ohio) and “recent decades” refers to the past 30–40 years (van Dijk, in litt., 2012).</p> <p>Populations have declined in many of the USA States (Table below). However, of the 100 known sub-populations in Nebraska, 60 are reportedly stable and 20 increasing, with 75% of the sub-populations believed to be viable. In Michigan, 50% of sub-populations are thought to be declining and the status of 30% is unknown, and under 20% of sub-populations are thought to be viable (MWPARC, 2010). Successful recruitment has reportedly occurred in over 90% of the Nebraska population, but only low numbers of juvenile turtles have been observed in the other States (MWPARC, 2010).</p> <p>Change in number of <i>Emydoidea blandingii</i> populations/metapopulations (MWPARC, 2010)</p> <table border="1" data-bbox="1122 1050 2072 1423"> <thead> <tr> <th>State</th> <th>Estimated number of historical populations/metapopulations</th> <th>Number of known extant populations/metapopulations (records &lt;10 years old)</th> </tr> </thead> <tbody> <tr> <td>Illinois</td> <td>134 (27 counties)</td> <td>72 (19 counties)</td> </tr> <tr> <td>Indiana</td> <td>79</td> <td>17</td> </tr> <tr> <td>Iowa</td> <td>45 counties</td> <td>33 counties</td> </tr> <tr> <td>Michigan</td> <td>68 counties</td> <td>68 counties</td> </tr> <tr> <td>Minnesota</td> <td>5 metapopulations</td> <td>5 metapopulations</td> </tr> <tr> <td>Missouri</td> <td>7</td> <td>3</td> </tr> <tr> <td>Nebraska</td> <td>32+ counties</td> <td>50-100+ counties</td> </tr> <tr> <td>Ohio</td> <td>50 localities in 13 counties</td> <td>19 localities in 9 counties</td> </tr> <tr> <td>Wisconsin</td> <td>67 counties</td> <td>29 counties</td> </tr> </tbody> </table>		State	Estimated number of historical populations/metapopulations	Number of known extant populations/metapopulations (records <10 years old)	Illinois	134 (27 counties)	72 (19 counties)	Indiana	79	17	Iowa	45 counties	33 counties	Michigan	68 counties	68 counties	Minnesota	5 metapopulations	5 metapopulations	Missouri	7	3	Nebraska	32+ counties	50-100+ counties	Ohio	50 localities in 13 counties	19 localities in 9 counties	Wisconsin	67 counties	29 counties
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	<i>Brodman et al. (2002) found that in the Jasper-Pulaski Fish and Wildlife Area (Indiana), Emydoidea blandingii had declined from 'very common' in the 1930s to just four individuals in the 1990s.</i>

**B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences**

All of the exports from the USA in Table (below) were reported as commercial trade in the LEMIS database. Overall, only 5% of the exports in the Table (below) were reported as wild, while 93% were reported as captive-bred or farmed. However, because these species are not CITES-listed, it is not possible to determine whether the animals are bred according to *Resolution Conf. 10.16 on Specimens of animal species bred in captivity*, or whether and what level of wild material is being used as parental stock or are being collected from the wild and reared in captivity.

This reportedly high level of captive breeding is an abrupt shift from earlier analyses. Of the 284 individuals exported from the United States during 1996-2000, 64% were wild caught and almost 17% were some form of captive born or bred.

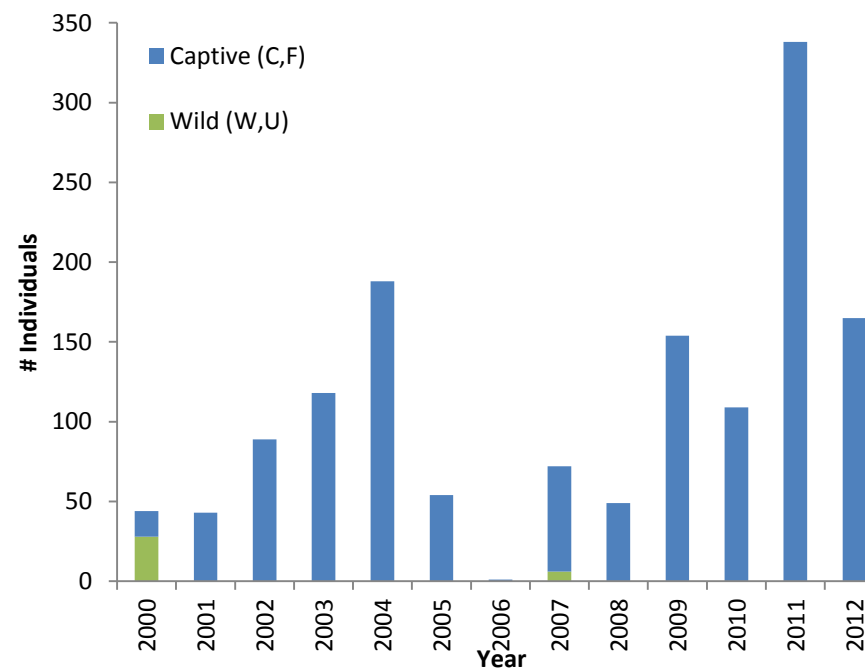
Overall, there appears to be an increasing trend in trade. In another analysis of LEMIS data between 1989 and 1997, total exports equalled 329 individuals, equating to 37 specimens per year for that 9-year period. Between 1996-2000, 284 individuals were exported from the United States averaging 71 individuals per year over a 5-year period. The total exports for the 12-year period in the Table (below) were 976 specimens which averages to 81 specimens per year. Thus, there appears to be an increasing trend in the annual number of U.S. exports.

U.S. Exports of *Emydoidea blandingii*; 1999-2010

Year	# Individuals	# Shipments
1999	50	10
2000	44	10
2001	43	9
2002	89	5
2003	124	18
2004	188	19
2005	54	8
2006	1	1
2007	72	9
2008	49	7
2009	154	19
2010	108	13
Total	976	128

According to export data obtained from the US Fish and Wildlife Service, the number of captive-bred *Emydoidea blandingii* (source code C or F) being exported for all purposes increased from 2000 to 2004, before declining in 2006 (Figure below). Since then, exports showed a general increase, though in 2012 exports once again decreased, but this may partly be explained by incomplete records for November/December. Hong Kong and Japan were by far the most common destinations for individuals being exported from the USA.

U.S. Export Data for *Emydoidea blandingii* 2000–2012 (US Fish and Wildlife Service's LEMIS database). Note that data for 2012 are incomplete as they do not contain full records for November or December.



Supporting Statement (SS)	Additional information
<p>The predominant form of trade is as live pets, though in Ontario, evidence suggests that this species is also harvested for the food industry and traditional medicinal uses.</p> <p>In Canada, collection for the pet trade is perceived as a growing threat. In Nova Scotia, the threat of collection of the species is thought to be of medium concern relative to the other threats facing the species such as habitat loss. This is because the threat from collection is localized and ongoing, but of unknown frequency and based on some uncertain data. The severity of this impact could be high--there is thought to be a correlation between collection of individuals and population viability for the Nova Scotia population.</p> <p>Due to prohibitions under Canada's endangered species legislation which does not distinguish between specimens of captive born, bred in captivity or wild origin, the export of <i>Emydoidea blandingii</i> would only occur for purposes related to conservation.</p> <p>In Ontario, there have been several convictions for the collection, transport, sale, and illegal aquaculture of freshwater turtle species, including <i>Emydoidea blandingii</i>. This leads Environment Canada to believe that there is an established demand for this species in the pet trade, as the species brings a relatively high price on the Canadian market. The value of a juvenile <i>Emydoidea blandingii</i> on the illegal Canadian market is USD150, compared with USD250 for a large female and USD1600 for a breeding pair.</p> <p>Their market value is considerably higher than other turtles because of their ornate markings as well as their rarity and difficulty to acquire legally.</p> <p>The IUCN/SSC Tortoise and Freshwater Turtle Specialist Group identified the elimination of commercial collecting as an immediate conservation need for this species.</p> <p>Collection pressure for trade, whether targeted or as bycatch, magnify the impact of other co-occurring, cumulative, and expanding threats to this species' survival in the wild (i.e., increased predation and increased habitat fragmentation).</p>	<p><i>In Illinois, collecting of this species by hobbyists or visitors is a common concern of land managers. There was no evidence in other States of an impact of over-use, but it may be a threat in Missouri and Ohio (MWPARC, 2010).</i></p> <p><i>Levell (2000) found that the number of US reptile dealers routinely offering Emydoidea blandingii for sale increased from one in 1995 to eight in 1998. The price of a hatchling also increased, from USD30–40 in 1995 to USD100–125 in 1998.</i></p> <p><i>As populations of wood turtles and box turtles decline due to over-exploitation for the pet trade, collectors may focus their attention on Emydoidea blandingii (Congdon and Keinath, 2006).</i></p> <p><i>Harding (1990) stated that Emydoidea had not been as heavily exploited for the pet trade or human food as certain other species and that these species grew too large and were too active to be recommended as aquarium pets.</i></p> <p><i>Juvenile captive-bred Emydoidea blandingii are available online for sale in the USA for USD329.99, though the retailer specifies these cannot be shipped internationally (www.reptilesncritters.com).</i></p> <p><i>Levell (2000) reviewed a number of European, Japanese and Canadian price lists and classified adverts in periodicals and found Emydoidea blandingii was 'conspicuously absent'. He concluded this may be explained by low demand owing to a general similarity in appearance to the widely kept European Pond Turtle Emys orbicularis.</i></p> <p><i>Emydoidea blandingii was found for sale in the pet trade in Hong Kong markets, 2000–2003 (Cheung and Dudgeon, 2006).</i></p>

Supporting Statement (SS)	Additional information
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**Inclusion in Appendix II to improve control of other listed species**

**A) Specimens in trade resemble those of species listed in Appendix II under Res. Conf. 9.24 (Rev. CoP15) Annex 2 a or listed in Appendix I**

*Emydoidea blandingii* is a member of the Emydidae family. Similar species in this family that have overlapping ranges include the bog turtle (*Glyptemys muhlenbergii*) and the spotted turtle (*Clemmys guttata*) both of which are smaller than *Emydoidea blandingii* as adults. *Emydoidea blandingii* also have distinctive yellow marking on their chins.

*Glyptemys muhlenbergii* has been listed in CITES Appendix I since 1992. *Clemmys guttata* is also proposed for inclusion in CITES Appendix II at CoP16.

**Other information**

**Threats**

*Emydoidea blandingii* is impacted by habitat fragmentation and habitat destruction caused by road building and land conversion for human use across its range. Proximity to human habitation exposes these turtles to higher road mortality and facilitates access to the turtles by collectors. This species' propensity for movement over a wide area, being active during the day, and its proximity to human habitation exposes it to higher risk of encountering humans or other predators.

*Emydoidea blandingii* habitat is degraded where human land use surrounding wetlands leads to effluents polluting the waters.

In addition to natural vulnerability to predators, *Emydoidea blandingii* may experience increased predation of eggs, young and possibly adults from subsidized predators (i.e., unnaturally large populations of predators near human population centres).

*Emydoidea blandingii* are also impacted from indirect collection for trapping activities aimed at other species. *Emydoidea blandingii* is the second most common turtle species recorded as bycatch due to commercial trapping of snapping turtles in baited traps. Once captured, a ready market exists to sell *Emydoidea blandingii*, which is an incentive not to release the turtles back to the wild.

Mortality and collection are barriers to gene flow which could jeopardize the species' long-term survival.

A review of the literature by Congdon and Keinath (2006) indicated that habitat degradation and destruction were responsible for the greatest loss of *Emydoidea blandingii* populations throughout their recent range. Habitat destruction can either result in the death of an individual or its emigration, the latter of which puts it at risk and may increase density and competition at remaining habitat fragments.

At Valentine National Wildlife Refuge in Nebraska, where the population is estimated to be more than 135 000 individuals, juveniles were found to suffer from higher road mortality (60%) than adults and during the spring/late summer and at weekends, mortality rates were at their highest. Chronic road kill of adults can have a severe impact on, or extirpate, small populations (Congdon and Keinath, 2006).

*Emydoidea blandingii* habitat is threatened by the invasion of non-native plant species including *Lythrum salicaria* and *Phragmites*. Generally, it is not known what the impact of these non-natives species is having upon *Emydoidea blandingii*, though the introduction of the Asian tree *Elaeagnus umbellata* has resulted in the total abandonment of major nesting areas (Congdon and Keinath, 2006).

Collisions with boats used for water sports have caused the deaths of *Emydoidea blandingii* in Ontario (SARA, 2008).

There is an increased probability of inter-generational in-breeding in this species due to the reproductive lifespan of females being longer than generation times. There is an especially high chance of this occurring in small and isolated populations. Females normally make a nest in a location in proximity to a wetland that is not their resident wetland, but where habitat degradation means this is not possible, an increased probability of in-breeding may occur (Congdon et al., 2008).

Supporting Statement (SS)	Additional information
<u>Conservation, management and legislation</u>	
<p>In Canada <i>Emydoidea blandingii</i> is listed as Endangered (Nova Scotia population) and Threatened (Great Lakes/St. Lawrence population) under Schedule 1 of Canada's Species at Risk Act (SARA). <i>Emydoidea blandingii</i> is listed as Threatened under the Ontario Endangered Species Act. This species is listed as a specially protected reptile under the Fish and Wildlife Conservation Act of 1997. Known localities of turtles are not publicly released due to the threat of poaching. In Quebec, <i>Emydoidea blandingii</i> is protected from disturbance, destruction or alteration by the <i>Loi sur la Conservation et la Mise en Valeur de la Faune</i>. Additionally, the species is listed as threatened (« menacee ») under the <i>Loi sur les especes menacees ou vulnérables</i>. <i>Emydoidea blandingii</i> is listed as Endangered by the Nova Scotia Endangered Species. A conservation action program has been developed in Nova Scotia.</p> <p>In the United States <i>Emydoidea blandingii</i> are protected to varying degrees in all States, commercial harvest is not allowed in some U.S. States or is allowed but restricted in others. The species occurs in a number of protected areas across its range and conservation action programs have been developed in several U.S. States.</p> <p>This species is one of the most northern ranged turtle species in North America. An assessment of the anticipated effects of ongoing climate change on <i>Emydoidea blandingii</i> habitat and survival has not been performed, but this is expected to complicate conservation success, and could potentially allow for turtles to expand their range northward into the Lake Superior drainage.</p>	
<u>Captive breeding/Artificial propagation</u>	
<p>There is a head starting program to reduce egg predation by raccoons at the Shiawassee National Wildlife Refuge. The hatchlings from ninety-three eggs obtained from wild nests are being reared by the Detroit Zoo and Herpetological Resource and Management (Jackson MI). The turtles will be raised until they are about 10 centimetres in size and are scheduled for release in the spring of 2013.</p>	

**Reviewers:** J. Congdon, C. Shepherd.

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