

the turtles captured during the study ($n = 833$) in the Ross River. The cause of kyphosis is thought to be a premature asymmetric fusion of the thoracic vertebrae, which results in disproportionate shell growth (Rhodin et al. 1984). Therefore, this allows the vertebral column to dramatically arch, thus permanently deforming the shell (Burke 1994). Although dramatic, kyphosis does not seem to have any affect on either male or female sexual maturity. Both males captured displayed the large tails typical of sexually mature male *E. m. krefftii* (unpubl. data). Unfortunately, sexual maturity could not be determined by palpation of the female because she was captured in April when *E. m. krefftii* are not gravid (unpubl. data). However, other turtles with severely deformed shells have been found to be reproductively viable (Burke 1994; Dietz and Ferri 2003) and healthy in most respects (Odum 1985; McLeod 1994), thus, showing that kyphosis may have minimal effects on the turtles.

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On the Type Locality and Type Specimen of *Testudo geographica* LeSueur 1817

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ABSTRACT. – Charles Alexandre LeSueur discovered the common map turtle *Graptemys geographica* in 1816. He named the species *Testudo geographica* in 1817 and described it with a drawing of a specimen he collected from a Lake Erie marsh, but further details on the collecting locality were not given. I designate the drawn specimen as the lectotype of the species and review historical documents and specimen records that allow restriction of the type locality to the peninsula of Presque Isle and adjacent Presque Isle Bay in Erie County, Pennsylvania.

Charles Alexandre LeSueur (1817a) (sometimes written Le Sueur) described *Testudo geographica*, the species known today as the common map turtle (*Graptemys geographica*), based on a specimen collected in 1816. No type specimens are mentioned in the article nor are any known to have ever been deposited into a natural history collection, but LeSueur's publication includes a drawing showing excellent detail of a typical adult female

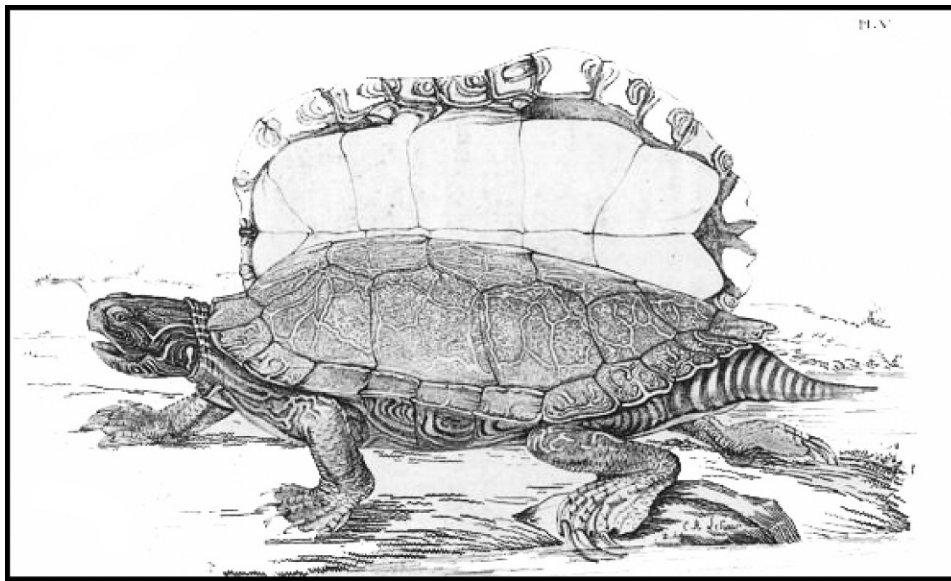


Figure 1. The illustration of *Testudo geographica* that accompanied its description by LeSueur (1817a).

G. geographica, notwithstanding the peculiar bull's-eye striping depicted on the tail (Fig. 1). LeConte (1830) first noted the absence of such striping in specimens, raising the possibility that LeSueur, an outstanding artist, may have worked from a damaged specimen (R. Bour, *pers. comm.*). Additional drawings of *G. geographica* in the LeSueur collections of the Muséum d'Histoire Naturelle in Le Havre, France, are believed to be based on specimens LeSueur took from the Wabash River, after he resettled in New Harmony, Indiana, in 1825, as 4 of LeSueur's 5 stuffed specimens of *G. geographica* in the Museum National d'Histoire Naturelle collections are labeled "Wabash River" (Bonnemains and Bour 1996; R. Bour, *pers. comm.*). To facilitate discussion of the type locality of the species below, the specimen drawn by LeSueur for his publication is herein designated the lectotype, following International Commission on Zoological Nomenclature (ICZN) Article 74.4 and Recommendation 73F; the specimen either was not preserved or has been lost. Following ICZN Article 75.2, no neotype is designated because there is no doubt as to which taxon the name applies and thus no reason to designate a neotype.

LeSueur (1817a:86) did not state the type locality for his new species, other than mentioning that the species was collected "in a marsh, on the borders of Lake Erie." Here I review the travels of LeSueur during the summer of 1816 and argue that the locality where the pictured specimen was captured was likely the peninsula known as Presque Isle or the body of water it forms, Presque Isle Bay, in Erie County, Pennsylvania.

LeSueur was born in Le Havre in 1778. He came to Philadelphia in 1816 after serving as naturalist on geologist William Maclure's expedition to the Lesser Antilles (Vail 1938). In June of 1816, he and Maclure traveled on a collecting expedition in the northeastern

United States. LeSueur's handwritten itinerary, archived in the Muséum d'Histoire Naturelle in Le Havre (Fig. 2), indicates that their travels took them through Pittsburgh, Pennsylvania, to Lake Erie, and on to the Niagara River, Lake Ontario, Saratoga Lake, Lake George, Lake Champlain, and the east coast before they returned to Philadelphia. Apparently on the basis of the itinerary, Bonnemains and Bour (1996) concluded that LeSueur's specimen of *G. geographica* was collected between the towns of Erie, Pennsylvania, and Buffalo, New York. Erie was clearly an important stopover point in the travels of

Croquis de mon Voyage
 Parcours de Paris
 Philadelphia à Pittsburg, Lac Erie
 chute du Niagara, Lac Ontario
 chute du Genesee, Albany, chute
 de Cahoon, Lac Saratoga, bataille
 Lac St George, Lac Champlain,
 Pittsburg Boston Rhode Island
 traverser les montagnes: mine
 de Franklin - Littleton de retour
 à Philadelphia
 année 1816

Figure 2. LeSueur's 1816 itinerary (LeSueur Collection, Muséum d'Histoire Naturelle, Le Havre, France, item 39 023 P).

LeSueur and Maclure, as there are several drawings in the Le Havre collection that were done by LeSueur in Erie (e.g., items 39 043 P recto and 39 042 P) and he mentions being in Erie and collecting on Presque Isle in his publications on fish species (LeSueur 1822, 1824).

Along the Lake Erie shoreline in Erie County, Pennsylvania, the only collection localities noted by Hulse et al. (2001) for *G. geographica* are the lagoons and embayments of Presque Isle and Presque Isle Bay. Presque Isle has long supported an abundant population of the species (e.g., Atkinson 1901; Lindeman 2006; Ryan and Lindeman 2007). Specimens from Presque Isle in natural history collections date back to 1894 (USNM 51192) and 18 specimens were collected in 1900 (CM R3006–R3008, R3040.1–3040.4, R3199.1–3199.11). Either the peninsula or the bay might qualify as the “marsh” where LeSueur caught his specimen. Although the species has been observed in recent years at 2 locations in Erie County, Pennsylvania just east of Presque Isle (East Avenue Boat Launch and North East Marina; M. Lethaby, *pers. comm.*), the Pennsylvania lake shoreline east and west of Presque Isle is wave-tossed, rocky, and adjacent to steep bluffs (Herdendorf 1992) and seems therefore unlikely to have supported a marsh in the early 1800s. Shoreline marshes inhabited by *G. geographica* do occur farther west in Ohio (e.g., Tran et al. 2007). None of the artifacts in the Le Havre collection indicate that LeSueur and Maclure visited sites in Ohio between their stops in Pittsburgh and Erie, however, and Erie’s location due north of Pittsburgh puts it on the most direct line of travel toward Lake Erie.

LeSueur (1817b, 1818a, 1818b) collected fish from Lake Erie near Buffalo and may also have stopped at other localities along the lakeshore between Erie and Buffalo. As in most of Pennsylvania, much of the New York shoreline of the lake is lined with high bluffs where marshes would not likely have occurred historically (Herdendorf 1992); although, there were estuarine marshes historically at the mouths of Cattaraugus Creek and the Buffalo River in New York (K. Roblee and M. Lethaby, *pers. comm.*). However, although range maps for *G. geographica* commonly shade the entire southern shoreline of Lake Erie (e.g., McCoy and Vogt 1990; Collins and Conant 1991; Ernst et al. 1994), no specimens of *G. geographica* are known to have ever been collected or observed along the New York shoreline of the lake (Gibbs et al. 2007). Records for the species in New York sections of the Laurentian Great Lakes and rivers begin in the Niagara River (Gibbs et al. 2007), which has wetlands associated with Grand Island (Herdendorf 1992). The Ontario shoreline of Lake Erie has populations of *G. geographica* associated with marshy habitats on its peninsulas at Point Pelee (Browne and Hecnar 2005), Rondeau Provincial Park (Logier and Toner 1961), and Long Point (Adams and Clark 1958), but these areas were not visited by LeSueur and Maclure. It is therefore highly probable that LeSueur’s specimen came from a disjunct population of *G. geographica* that inhabits the peninsula

of Presque Isle and adjacent Presque Isle Bay in Erie County, Pennsylvania, to which I restrict the type locality.

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Diamondback Terrapin Mortality in Crab Pots in a Georgia Tidal Marsh

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ABSTRACT. – Recreational and commercial crab pots are considered major threats contributing to recent declines in diamondback terrapin populations. In a single Georgia (USA) tidal marsh, 133 diamondback terrapin (*Malaclemys terrapin centrata*) carcasses were observed in abandoned crab pots, consisting of more than double the remaining estimated population. We suggest that the potential for just a few neglected or abandoned crab pots to significantly deplete a terrapin population makes enforcement of explicit soak laws and implementation of a derelict crab-pot removal program a priority for conservation of diamondback terrapins in Georgia.

The accidental capture of diamondback terrapins (*Malaclemys terrapin centrata*) in recreational and commercial crab pots has long been documented among biologists. Davis (1942) first described crab pots as a potential threat to diamondback terrapins, and today crab pots are considered the primary threat to diamondback

terrapin populations throughout their range (Seigel and Gibbons 1995).

Roosenburg et al. (1997) described 2 levels of terrapin mortality in crab pots. The first being a “constant background mortality” for crab pots that are regularly fished over a long period of time, while the second includes crab pots that have been lost or abandoned (“ghost” or derelict crab pots). Regularly fished crab pots have the potential to consistently capture small numbers of terrapins over time, while derelict crab pots tend to capture more terrapins over a shorter time period. Although both levels have the potential to negatively affect terrapin abundance collectively, only baited crab pots have been shown to be detrimental to diamondback terrapin populations throughout their range (Seigel and Gibbons 1995; Roosenburg et al. 1997; Wood 1997; Hoyle and Gibbons 2000; Roosenburg 2004; Dorcas et al. 2007).

Less well-documented are the effects of unbaited derelict pots on terrapin mortality. Guillory et al. (2001) estimated that 250,000 derelict crab pots are added to the Gulf of Mexico and Atlantic coast annually. Bishop (1983) reported a ghost crab pot in South Carolina that contained the carcasses of 29 terrapins. Roosenburg (1991) found a ghost pot in Chesapeake Bay that contained 49 dead terrapins, which he estimated accounted for 1.6%–2.8% of the local population.

Though many derelict pots are added to coastal habitats annually, a small subset may pose the greatest risk to terrapin populations depending on their specific location within a marsh. Bishop (1983) noted that ghost pots are frequently transported through tidal current action to shallow waters, and pots in shallow water have a higher probability of capturing large numbers of terrapins during the spring months (March, April, and May). Additionally, Roosenburg et al. (1999) observed that larger sized terrapins, generally female, utilize the deep, open water more frequently than the smaller sized males and juvenile females. Therefore, expectations are that abandoned crab pots in shallow marsh habitats have great potential to catch and kill large numbers of male and immature female terrapins during spring periods.

On 4 April 2007, while sampling for diamondback terrapins in a tidal marsh at low tide near St. Simons Island, Georgia, USA (Glynn Co), a crab pot was observed just below the water’s surface. The water depth was < 1 m and a mixture of mud, algal and barnacle growth, and turtle carcasses were visible within the trap. The trap was pulled from the water, revealing the carcasses of 94 dead *M. t. centrata* (Fig. 1). On 4 May, we observed 23 dead and 1 live *M. t. centrata* in second trap approximately 100 m from the first trap.

By law, we were prohibited from removing the traps from the water, and during the remainder of our 2-month sampling period, we visited this site 3 additional times. During each visit we observed additional dead terrapins in the derelict crab pots. Over 5 visits between 4 April and 30 June 2008, we documented 133 dead turtles between the 2 derelict crab pots.