



Species Action Plan:

Northern Red-bellied Cooter (*Pseudemys rubriventris*)

Purpose: This plan provides an initial five-year blueprint for the actions needed to attain near-term and, ultimately, long-term goals for the conservation and recovery of the Northern Red-bellied Cooter in Pennsylvania. Given the complexity of managing and recovering this species, this plan will be continually updated to reflect progress toward the identified goals, and to incorporate new information. This Species Action Plan (SAP) also includes a description of the species natural history, its distribution and threats that have led to its rarity or imperilment, and conservation actions that could recover the species.

Goals: The goal of this plan is to provide guidance for the maintenance and protection of extant populations of Northern Red-bellied Cooter in the Commonwealth to ensure sufficient distribution and threat management to adequately secure the species and allow its removal from the Pennsylvania list of threatened species (58 Pa. Code §75.2).

Natural History

Taxonomy: Class Reptilia, Order Testudines (turtles), Family Emydidae (water turtles), Northern Red-bellied Cooter (*Pseudemys rubriventris* Le Conte, 1830).

Description: The Red-bellied Cooter is a large aquatic turtle distinguished by a deep notch at the tip of the upper jaw with a prominent cusp on either side. Coloration



Figure 1. Northern Red-bellied Cooters (*Pseudemys rubriventris*). Photo by Stephen Staedtler

varies, but the carapace is predominantly brown to black with red bars running vertically through the costal and marginal scutes. The plastron is generally reddish orange; juveniles exhibit a black mottled pattern along the seams of the plastron that fades with age. Markings of both carapace and plastron darken or fade with age, and melanism is common in older individuals, particularly males (Graham 1991). The head and legs are dark brown to black with yellow stripes. Sexual dimorphism has been documented, with females exhibiting slightly larger and a more domed carapace than males as well as having a smaller and thinner tail. Graham (1971) also reported that males from Massachusetts had a pale pink plastron with dark vermicular mottling; in females the plastron was coral red with gray borders along the seams. The maximum size (carapace length [CL]) reported is 40 cm (Conant and Collins 1998). Swarth (2003) reported hatchling lengths ranging in size from 25.0-35.7 mm (mean = 31.7 mm, n = 136) in Maryland. These sizes are com-



parable to those of hatchlings from Virginia (Mitchell 1974, 2003).

Habitat: Northern Red-bellied Cooters in Pennsylvania rely on relatively deep water-bodies such as moderate gradient rivers, reservoirs, ponds, and marshes, though transient turtles occur in faster-moving streams, shallow ponds or impoundments, and ditches (Hulse et al. 2001). During the active season Northern Red-bellied Cooters require abundant basking habitat and aquatic vegetation for feeding; winter habitat must have a soft bottom and sufficient depth for brumation. Red-bellies seek out sandy or loamy sun-exposed soil for digging nests, usually within close proximity (up to 250 m; Mitchell 1974) of the water. Swarth has documented nest sites up to 1000 m from foraging habitat (personal communication).

Life History: Northern Red-bellied Cooters are thought to be primarily herbivorous, based on the difficulty of luring adults into baited traps (Ernst et al. 1994). Recent research in Maryland has confirmed that adult Red-bellies feed almost exclusively on submerged aquatic vegetation and other wetland plants, while hatchlings and juveniles rely primarily on aquatic invertebrates for food (M. Fogel, J. Sage, and C. Swarth, Jug Bay Wetlands Sanctuary, unpublished data). The Red-bellied Cooter is diurnal, emerging from hibernation in early-to-mid-April and becoming inactive again in mid-to-late-October. Red-bellied Cooters spend a considerable amount of time basking in the sun. They are quite shy and one of the first turtles to drop into the water upon any alarm. Brumating (hibernating) turtles burrow in soft mud or rest on the substrate in deep water. Conant (1951) reported observations through the ice of several *Pseudemys rubriventris* resting on the bottom of a lake in Bucks County in December. Graham and

Guimond (1995) observed and tracked Cooters in the winter in a pond in Massachusetts; the individuals were in a depth of 1-3 m and lying exposed on the bottom.

Predation on Red-bellied Cooters is not well documented. As with other turtle species, a variety of predators prey upon the Cooter, especially the eggs and hatchlings. Documented nest predators include raccoons, fox, and skunk (Avery 2018).

There have been no descriptions of courtship or mating, or the maturation age of females (Hulse et al. 2001). Females leave the water to lay eggs in June and July. Nests usually contain 10-12 elliptical white eggs, 24-37 mm long. Swarth (2003) recorded a maximum of 22 eggs in a nest and had evidence of double clutching. Young either hatch in late summer or fall or overwinter in the nest and emerge in the spring. Both hatch periods have been documented in Pennsylvania populations (M. Corn pers. comm.). A study of emergence patterns in Maryland found that some nests exhibited mixed emergence of both fall and spring (E. Friebele and C. Swarth, Jug Bay Wetlands Sanctuary, unpublished data).

Distribution and Status

National Distribution: *P. rubriventris* occurs in coastal states from central New Jersey south to northeastern North Carolina and westward in parts of the Piedmont to West Virginia (Figure 1). Populations in Plymouth County, Massachusetts are disjunct from the heart of the range by more than 300 km.

Pennsylvania Distribution: In Pennsylvania, *P. rubriventris* are well distributed in the Delaware and Schuylkill River drainages of Berks, Bucks, Chester, Delaware, Montgomery, and Philadelphia counties. Isolated populations occur in lakes and smaller impoundments within the Susquehanna and Potomac watersheds.

Pennsylvania Legal Status: Threatened

Federal Status: Populations in Plymouth County, Massachusetts are disjunct from the heart of the range by more than 300 km and are protected by the U.S. Endangered Species Act (ESA) since 1980. The range-wide occurrence of the species is scheduled for review under the ESA in 2023.

State Rank: S2S3 – Imperiled-Vulnerable (last reviewed 2015)

Global Status: G5 –Secure (last reviewed 2005)

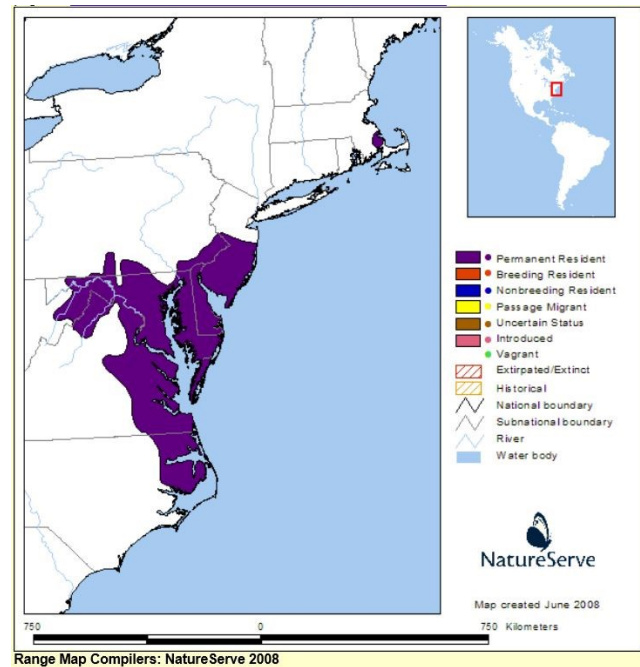


Figure 2. Distribution of the Northern Red-bellied Cooter in North America, based on data from 2008 (NatureServe 2018).

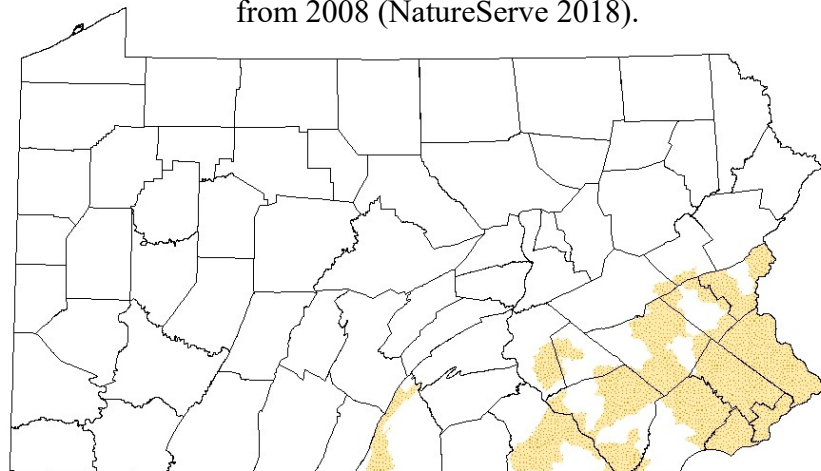


Figure 3. *Pseudemys rubriventris* occupied HUC-10 watersheds in Pennsylvania as of 2023.



Management Status

Conant (1951) postulated that the organic and chemical pollutants in the Delaware River caused the elimination of this habitat for *P. rubriventris*, in addition to the industrial and residential build-out of the Philadelphia region. Much of the lower Delaware and Schuylkill Rivers was bulkheaded in the 20th century for shipping and industrial uses, thus eliminating this shoreline habitat for turtles. The subsequent abandonment and redevelopment of many of these industrial areas has renewed additions of bulkheads and large rip-rap to river shorelines.

Historically, due to their large adult size, Red-bellied Cooters were targeted by collectors when the turtle soup industry was thriving (McCoy 1982). Hatchling turtles, likely due to their colorful, attractive appearance have been targeted by poachers. PFBC has documented poaching and illegal captive propagation in recent years (PFBC internal data).

Population trends: As of 2023, 88 extant element occurrence records, consisting of over 490 unique locations, are databased for *P. rubriventris* in Pennsylvania, indicating a significant range expansion since the reports of McCoy (1982) and Conant (1951) in the previous century (PNHP Biotics). Records have been documented during surveys for permit reviews, incidentally, and through observations from the Pennsylvania Amphibian and Reptile Survey (PARS). It is important to note that many of these sites have likely been inhabited by the Red-bellied Cooter for an unknown period of time, in all likelihood decades or more, and may not constitute an active expansion of the range of this species but rather an expansion of the knowledge of the distribution.

No range-wide population assessments have been done for *P. rubriventris* in Pennsylvania; however, numerous small-scale studies provide insights into relative abundance, population size, and recruitment in various waterbodies across the range. Sites where intensive mark-recapture efforts occurred generally show a distribution of size classes that suggest the populations may be successfully recruiting new individuals (Avery et al. 2010). These studies have revealed reproducing populations at five lakes or impounded habitat assemblages in Philadelphia, Chester, and Bucks Counties. Additional visual surveys at sites across the range indicate successful recruitment and permanent occupancy of the sites. Other waterbodies appear to be recently colonized, often by nesting females discovering potential nest sites adjacent to new habitats (PFBC unpublished data). Combined, these case studies illustrate the return of the Cooter to parts of its range where it was thought to be extirpated as well as the establishment of several sustaining populations within this range.

Threats

- 1) Habitat loss by anthropogenic alteration or destruction
 - a. Historical and ongoing residential, commercial and industrial development, road construction, and agricultural practices
 - b. Maintenance draining and dredging of occupied waterbodies
 - c. Road mortality threat to nesting females from developed areas adjacent to occupied waters
 - d. Pollution events
 - e. Reduction in available nesting habitat from dense cover of invasive plant species, woody plant succes-



- sion, and bulkheading/rip-rap of river banks
- 2) Predation (especially of nests): Predominant predators of nests and juveniles are meso-mammals (i.e., raccoon, opossum, mink, fox).
 - 3) Roads – the core population in Pennsylvania occurs in the highly urbanized Philadelphia and its surrounding suburbs. Road-kills are mostly due to gravid females searching for nesting habitat and other dispersing turtles.
 - 4) Competition with non-native turtle species e.g. established populations of Red-eared Sliders, Yellow-bellied Cooters and River Cooters.
 - 5) Poaching/collection – In recent years, hatchling turtles, likely due to their colorful, attractive appearance have been targeted by poachers.
- 2) Monitor occupied *P. rubriventris* sites.
 - a. Establish a long-term monitoring plan for representative sites across the range to detect population trends over time.
 - i. Visual surveys of basking sites
 - ii. Volunteer or camera surveys of nesting sites
 - b. Develop monitoring program at sites undergoing habitat management to measure population response.
 - 3) Continue and expand ongoing protection measures for the *P. rubriventris* populations.
 - a. Review and comment on permit applications that involve proposed temporary and/or permanent disturbances to known *Pseudemys rubriventris* habitat.
 - b. Incorporate seasonal restrictions in drawdown permits within the range of *P. rubriventris* to prevent winter drawdowns.
 - c. Continue to enforce “no take” collection prohibitions. Target poachers collecting mature females for brood stock, and conducting captive propagation for black market sales.
 - 4) Continue to survey for undocumented populations of *P. rubriventris* within Pennsylvania.
 - a. Conduct range determination and status assessment
 - b. Conduct targeted surveys in likely habitats
 - c. Continue PARS Focal Team surveys
 - d. Collect ad-hoc PARS reports

Conservation and Recovery

Conservation Actions:

- 1) Identify occupied *Pseudemys rubriventris* sites on publicly owned lands (and interested private land-owners) and develop management plans based upon priority of current needs.
 - a. Obtain population demographic data.
 - b. Identify or establish preferred nesting areas
 - c. Control vegetation at priority nesting areas
 - d. Control predators and/or protect nests, depending on the availability of staff or volunteers
 - e. Remove non-native turtle species
 - f. Establish or enhance basking habitat



- 5) Work with transportation agencies to identify important turtle crossing sites that can be managed with wildlife crossings
 - a. Use PARS data to target sites where multiple SGCN species would benefit.

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