

First Record of Pond Sliders (*Trachemys scripta scripta* and *T. s. elegans*) at Fredericksburg, Virginia with Observations on Population Size, Age and Growth

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ABSTRACT

We conducted a turtle mark-recapture program within a 160 m stretch of the Fredericksburg Canal with standard, baited hoop nets from May to July 2012 to determine if a population of the introduced Red-eared Slider (*Trachemys scripta elegans*) and Yellow-bellied Slider (*Trachemys s. scripta*) are established in this area. We captured and marked nine Red-eared Sliders (1 male, 8 females) and estimated a population size of 23 individuals. Most were reproductively mature. The established population in the canal may be a source of introduction into the Rappahannock River.

Key Words: Red-eared slider, *Trachemys scripta elegans*, distribution, age, introduced

INTRODUCTION

Pond sliders (*Trachemys scripta*) are found throughout the southeastern and middle United States, ranging from the southeastern coastal plain west to Kansas, Oklahoma, and New Mexico (Ernst and Lovich 2009). However, they are not native to areas outside of southeastern and southwestern Virginia (Buhlman et al. 2008). Three subspecies are recognized; the Yellow-bellied Slider (*T. s. scripta*), the Red-eared Slider (*T. s. elegans*), and the Cumberland Slider (*T. s. troosti*). As a result of their popularity in the pet trade pond sliders have been introduced in all 48 states and Hawaii and breeding colonies are established on all continents except Antarctica (Ernst and Lovich 2009). The Red-eared Slider is not native to Virginia (Mitchell 1994; Ernst and Lovich 2009). Both Yellow-bellied Slider and Red-eared Slider have been introduced in Maryland and Northern Virginia, where subspecific intergradation readily occurs (Iverson 1992; Ernst et al. 1997). Specifically, populations of both subspecies are established in Mason Neck Wildlife Refuge of Fairfax County (Mitchell 1994). Mitchell (1994) has recorded Red-eared Sliders in Hanover County and other southeastern counties and municipalities where they sometimes intergrade with native Yellow-bellied Sliders. Another population of red-eared sliders occurs in Henry County, south-central Virginia (Mitchell, 1994).

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Yellow-bellied Sliders are native to southeastern Virginia and their range extends throughout the Coastal Plain of the Carolinas, Georgia, northern Florida and the eastern portion of Alabama (Mount 1975; Stevenson 1976; Ashton and Ashton 1991; Gibbons and Semlitsch 1991; Mitchell 1994; Palmer and Braswell 1995; Conant and Collins 1998; Bartlett and Bartlett 2006; Beane et al. 2010). The Red-eared Slider's native range extends from the midwestern states as far east as West Virginia, west into eastern New Mexico, and south into northeastern Mexico (Green and Pauley 1987; Conant and Collins 1998; Bartlett and Bartlett 2006; Phillips et al. 1999; Dixon 2000). The two subspecies naturally intergrade throughout much of Alabama resulting in an admixture of parental forms and intermediate patterns (Mount 1975).

In April 2011 a specimen of the Yellow-bellied Slider was captured in the canal in the City of Fredericksburg by a student and brought to the senior author for identification. The individual appeared to be an immature female about 130 mm plastron length. The specimen was taken by dip net about 300 m from the canal's downstream confluence with the Rappahannock River. The canal is about 3.2 km in length. This is the only reported occurrence of this subspecies in the vicinity of Fredericksburg, Virginia and the Rappahannock River drainage. This individual was returned to the canal after being photographed. The northernmost native occurrence of Yellow-bellied Sliders is in Hanover County in the headwaters of the Chickahominy River (Kleopfer and Niccoli 2010). Given these observations we sampled turtles in the Fredericksburg Canal to determine if a population of Yellow-bellied Sliders is established.

METHODS

From May 30 until July 19, 2012 we collected turtles in the Fredericksburg Canal with commercial, single throat hoop nets (3 ft. diameter, 1 in. mesh) available from Memphis Net & Twine Co., Inc. Each was baited with sardines and set for 24 h period. Combinations of four and eight nets were set and checked the following morning. All were set in an area covering about 160 m of the canal in the vicinity where the original Yellow-bellied Slider was captured. Upon capture turtles were weighed (± 10 g) with Pesola® scales, plastron length measured (± 1 mm), and given an identifying code by filing a combination of notches into the marginal scutes (Figure 1) (Mitchell 1988). Some individuals were aged by counting annuli on the plastron (Buhlmann et al. 2008). We used a Jolly-Seber model (POPAN formulation) available as a submodule of the program MARK (White and Burnham 1999) to estimate population size (available from USGS Patuxent Wildlife Research Center Software Archive).

RESULTS

We captured five species during 152 trap nights: Snapping turtle (*Chelydra serpentina*), Eastern Painted Turtle (*Chrysemys picta picta*), Northern Red-bellied Cooter (*Pseudemys rubriventris*), Eastern Musk Turtle (*Sternotherus odoratus*), and Red-eared Slider. No Yellow-bellied Sliders were captured.

Nine Red-eared Sliders (1 male; 8 female) were captured; three females were each captured twice. Time between first and second captured ranged from 3 to 27 days. Females ranged in size from 117-235 mm (Table 1). The single male measured at 115 mm. Both male and female turtles are considered reproductively mature based on the smallest known size at maturity as reported for populations of pond sliders in Georgia

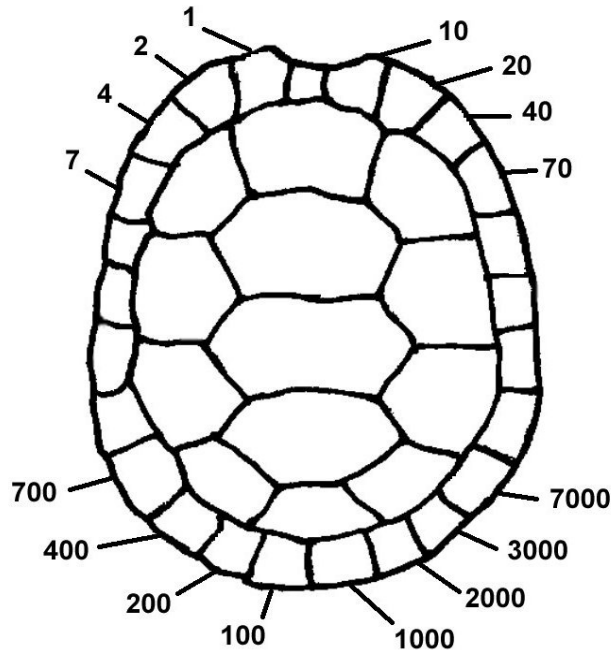


FIGURE 1. Number system for marking the carapace of turtles after Mitchell (1988). This system allows for identification of 9999 individuals.

by Gibbons and Greene (1990) and in Virginia by Mitchell and Pague (1990). Slider ages ranged between 3-6 years for females; the male was 4 years old. The oldest female (200 mm) we were able to age was not the largest. Due to a lack of annuli or numerous abrasions we were unable to age four of the females.

Program MARK estimated that 23 Red-eared Sliders occur within the sampling area (95% CI 10-114) which consisted of about 160 m of canal extending upstream from the lower end. Based on information from Schubauer et al. (1990) for mean length of home range we estimate a total population of 100 to 500 individuals within the entire length of the canal. Given the range of values, this population size estimate may not be reliable.

DISCUSSION

The absence of Yellow-bellied Slider suggests that there is no established population in the Fredericksburg Canal. The turtle captured in April 2011 is likely the only individual present. Based on photographs it appeared to be about 130 mm and likely a female.

TABLE 1. Age, as determined by counting annuli on the plastron, and size of Red-eared Slider (*Trachemys scripta elegans*) from the Fredericksburg Canal at Fredericksburg, Virginia, May - July 2012.

Age	Sex	Plastron length (mm)	Weight (g)
4	M	115	270
?	F	117	1100
3	F	160	730*
4	F	190	1325
5	F	221	1425
6	F	200	1350
?	F	225	1550
?	F	225	2250
?	F	235	2100

* - immature individual based on size.

The occurrence of the Red-eared Slider is a new record for the Rappahannock River drainage (Figure 2). Due to the wide extent of introductions of this species its presence is not unexpected. However, because both male (albeit only one) and female individuals were captured there appears to be an established population. Presumably due, in part, to its extensive introduction throughout the world the International Union for Conservation of Nature has placed the Red-eared Slider on its list of the World's Worst Invasive Species (ICUN 2012).

Age determination for all individuals proved problematic due to abrasions or the lack of annuli. This was especially true for the larger individuals. The size of the largest individuals captured indicate that these were mature females (Table 1) because plastron lengths and weight correspond with that reported by Mitchell and Pague (1990) for female pond sliders from southeastern Virginia. However, there is a discrepancy in age as reported here. Slider females have been reported to reach maturity at eight years of age (Gibbons and Green, 1990; Mitchell and Pague, 1990) yet our oldest mature individual was 6 years. Wilson et al. (2003) noted that many of the studies they reviewed found this method of aging to be reliable for young adults only (*i.e.*, prior to reaching sexual maturity). This is consistent with our observations. Mitchell and Pague (1990) reported the a minimum plastron length of 204 mm at maturity for pond sliders in the Great Dismal Swamp National Wildlife Refuge, Suffolk, Virginia. Ages relative to size reported in this study differed from those expected based on reports for Yellow-

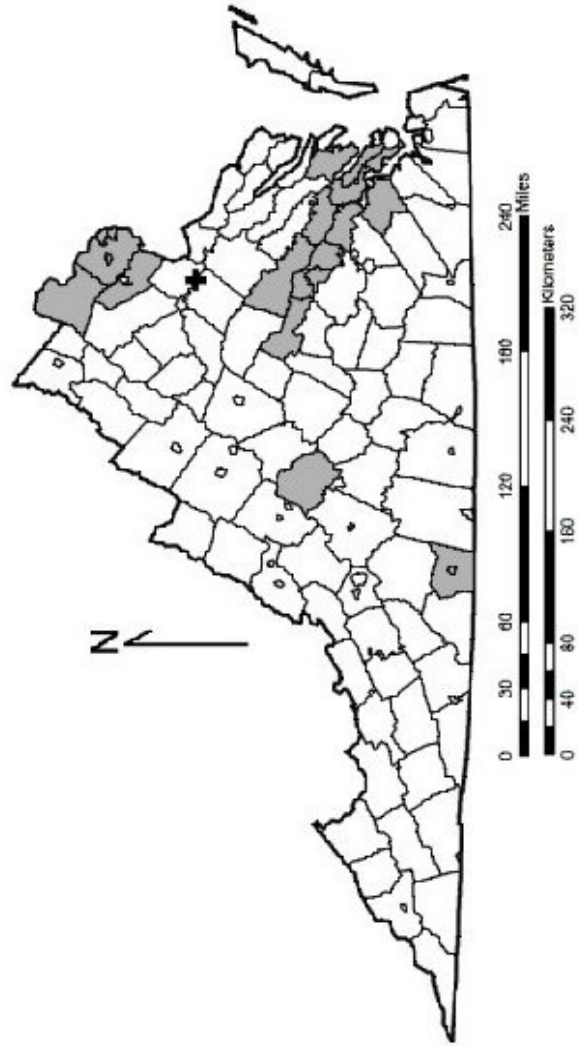


FIGURE 2. Shaded areas indicate known occurrences of the non-native Red-eared Slider (*Trachemys scripta elegans*) in Virginia as reported on the Virginia Department of Game & Inland Fisheries website (February 2012) (<http://www.dgif.virginia.gov/wildlife/information/?s=030077>). First report of population discovered in the Fredericksburg Canal (+), Rappahannock River drainage basin (May-July 2012).

bellied Sliders in Virginia (Mitchell and Pague 1990). However, the inaccuracy or inability to age large individuals is consistent with what is reported by Wilson et al. (2003).

Our results show that a Red-eared Slider population is established in the Fredericksburg Canal at Fredericksburg, Virginia. Given the ease with which this turtle adapts to areas where it where it this population may soon spread to the Rappahannock River and its adjoining bodies of water, if it has not already done so.

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