

New York's Forgotten Freshwater Taxon: Investigating the Crayfish Diversity of Cortland and Onondaga Counties

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Figure 2: Invasive *Faxonius rusticus* (rusty crayfish) at Upper Little York Lake, Cortland County New York. Note the distinguishing rust-colored spot on the carapace.

Introduction

New York's crayfish populations have received little attention since survey work by Crocker (1957), despite their complex role in aquatic food webs (Charlebois and Lamberti 1996; Kreps et al. 2016) and great conservation need (Taylor et al. 2007). In the decades following Crocker's (1957) work the invasive *Faxonius rusticus* (rusty crayfish) was introduced to New York through bait bucket discharge. *F. rusticus* has been implicated in the widespread decline of native crayfish in Otsego County (Kuhlman and Hazelton 2007), but the status of crayfish populations in nearby Cortland and Onondaga counties was unknown.

Objective: Gather missing baseline data on Cortland and Onondaga County's current crayfish diversity

Hypothesis: The publicly fished lake systems of Skaneateles, Onondaga, and Little York will already contain *F. rusticus*; a private isolated kettle lake like Song Lake will contain only natives or no crayfish

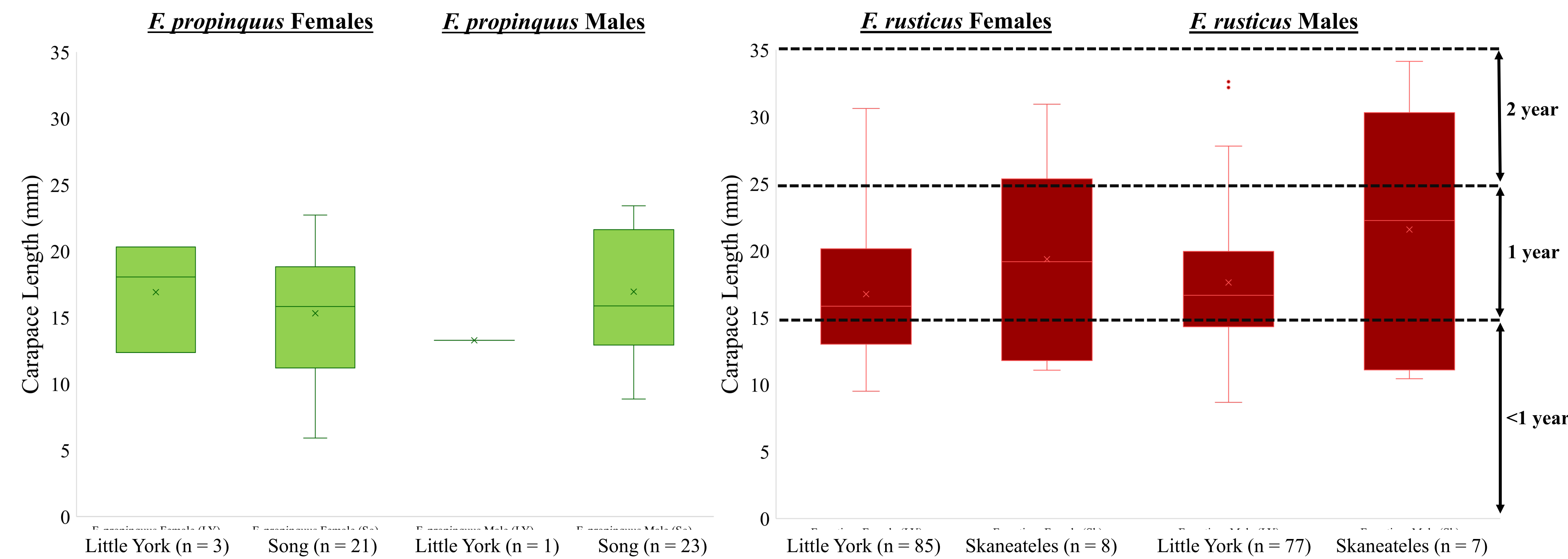


Figure 4: Box plots of size (carapace length) and where applicable age class (after Hein et al. (2006) of captured crayfish by species, sex, and lake system.

Table 1: Summary of catch per unit effort (CPUE) and male to female ratios among sites.

Lake System	Site	CPUE (hr)	Species	Male : Female Ratio	
Song	1	22.000	<i>F. propinquus</i>	1.095	
	1	52.271	<i>F. rusticus</i>	1.033	
	2	32.222	<i>F. rusticus</i>	0.933	
	Little York	3	50.400	<i>F. rusticus</i>	0.750
		4	13.000	<i>F. rusticus</i> , <i>F. propinquus</i>	1.250 0.333
		$\bar{x} = 38.453$			
Skaneateles	1	1.364	<i>C. bartonii</i>	N/A	
	2	0	-	-	
	3	0	-	-	
	4	0	-	-	
	5	12.853	<i>F. rusticus</i>	0.875	
		$\bar{x} = 4.507$			
Onondaga	1	0	-	-	
	2	0	-	-	

Methods

Four lake systems were surveyed (Fig. 1) via timed kicknetting with a D-frame net. Crayfish were identified to species, sexed, and measured for carapace length with digital calipers. Catch per unit effort (total number of crayfish caught divided by search time) among sites was calculated to compare abundance.



Figure 3: *Faxonius propinquus* (northern clearwater crayfish) in Song Lake, Cortland County New York. At right is the typical color morph; at left, an unusually vibrant male.

Results

- Three species were recorded (Table), with the invasive *F. rusticus* (Fig. 2) as the predominant crayfish (78.3% of total captures); it was found in the publicly fished Skaneateles and Little York Lake systems (Fig. 1)
- Native *F. propinquus* (Fig. 3) was the only species captured in a private and hydrologically isolated kettle lake (Song) (Fig. 1)
- No crayfish were found in Onondaga Lake
- Age classes (size) of *F. rusticus* (Fig. 4) ranged from <1 year (up to 15 mm) to 2nd year individuals (25-35 mm) after Hein et al. (2006)
- Abundance via catch per unit effort (CPUE) was highest in the *F. rusticus*-dominated Little York drainage ($\bar{x} = 38.453$ crayfish per hour searching) (Table 1)
- Site sex ratios indicate sampling was not consistently biased toward males or females (Table 1)

Discussion

The variety of size / age classes (Fig. 4) and pervasiveness of *F. rusticus* (Fig. 1) suggest it is not a new introduction in the drainages where captured. Additional surveys are needed to determine the full extent of this invasion, as *F. rusticus* can cause trophic cascades that negatively affect other aquatic taxa besides native crayfishes (Kuhlman and Hazelton 2007; Kreps et al. 2016; Charlebois and Lamberti 1996). The presence of relatively abundant (mean CPUE = 22.0; Table 1) native *F. propinquus* in a small, closed kettle lake (Song) raises questions about colonization of such waterbodies and genetic isolation. Failure to find any crayfish in publicly fished Onondaga Lake could reflect poor habitat (pers. obs.), the lake's long history of pollution (Effler and Hennigan 1996), and/or seasonal migration (e.g. Flint 1977). Resampling during spring and summer would easily test the latter explanation.

Acknowledgments

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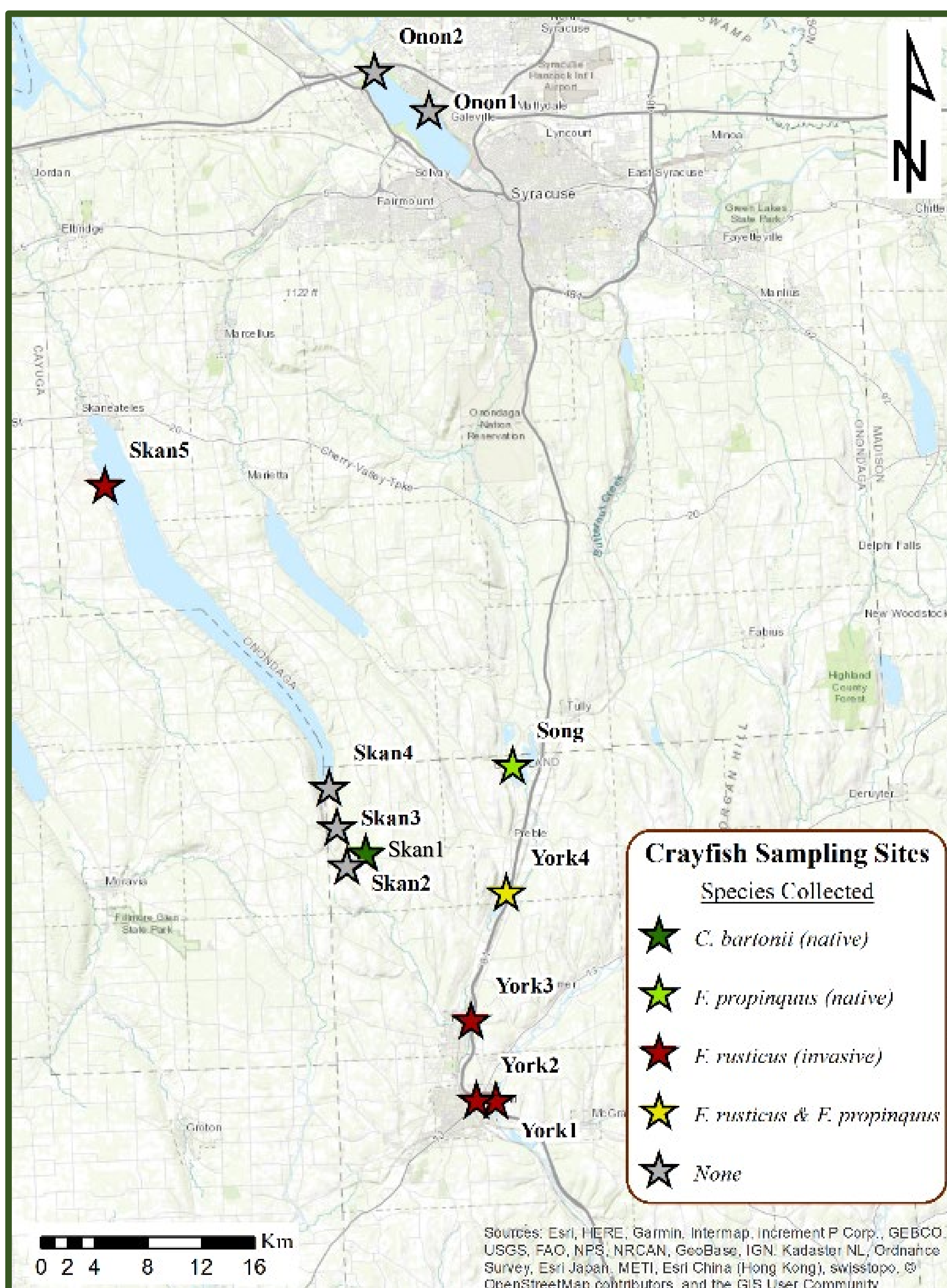


Figure 1: Map of crayfish sampling locations and species captured in Cortland and Onondaga counties, New York.