

A Crayfish Survey on Clear Creek

Morgan County Tennessee

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Tennessee Wildlife Resources Agency

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Introduction

Clear Creek originates approximately 8.0 miles south of Monterey in Cumberland County and flows generally ESE before emptying into the Obed River (Emory River system) just west of Wartburg. On 16 May 2003, The Tennessee Wildlife Resources Agency (TWRA) and National Park Service (NPS) surveyed three sites on Clear Creek in Morgan County within the Obed Wild and Scenic Area to evaluate the epigeal (inhabitant of surface water) crayfish population in response to an oil spill into Clear and White creeks in 2002. No attempt to collect burrowing crayfish species was made. Also a series of crayfish specimens was collected for tissue contamination analysis. Crayfish were collected under NPS Scientific Research and Collecting Permit number OBRI-2003-SCI-003.

Although we could find no comprehensive crayfish surveys on Clear Creek to compare our surveys with, we were able to locate data on catalogued specimens at the Smithsonian National Museum of Natural History. This data documents the occurrence of the Hairylegged Crayfish (*Cambarus crinipes*) from several sites, including our three sample sites, dating back from the 1940's to the late 1960's. In addition, the TWRA Collection of Crayfishes contains catalogued specimens of the Hairylegged Crayfish from the upper Clear Creek system in Cumberland County collected in July 1994. The Wedge Crayfish (*Cambarus sphenoides*), a less common inhabitant of the Clear Creek system, has been documented as well. To our knowledge, no other epigeal crayfish species are known to occur in this portion of Clear Creek.

Site 1, located at Jett Bridge, is several miles downstream of the point of where the oil entered the stream (Figure 1). Site 2 is located at the mouth of White Creek and is just downstream of the point of entry. Site 3 (the control site) is located approx. 1.4 mi. upstream of the confluence with White Creek and was sampled first to avoid cross contamination of oil toxicants (for tissue analysis purposes) from the lower two sites.

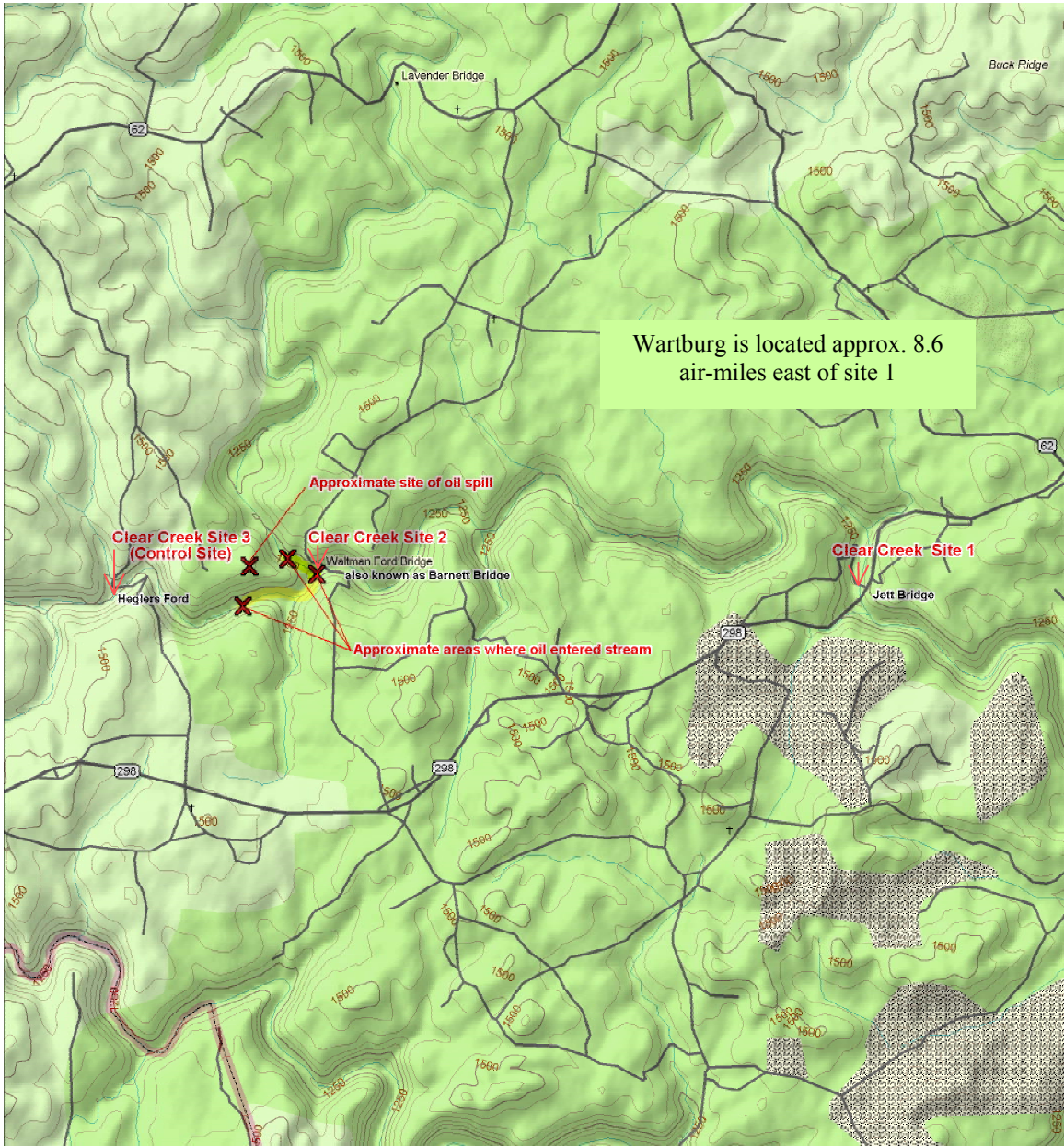


Figure 1. Map depicting the three sample sites on Clear Creek.

Sample Methods

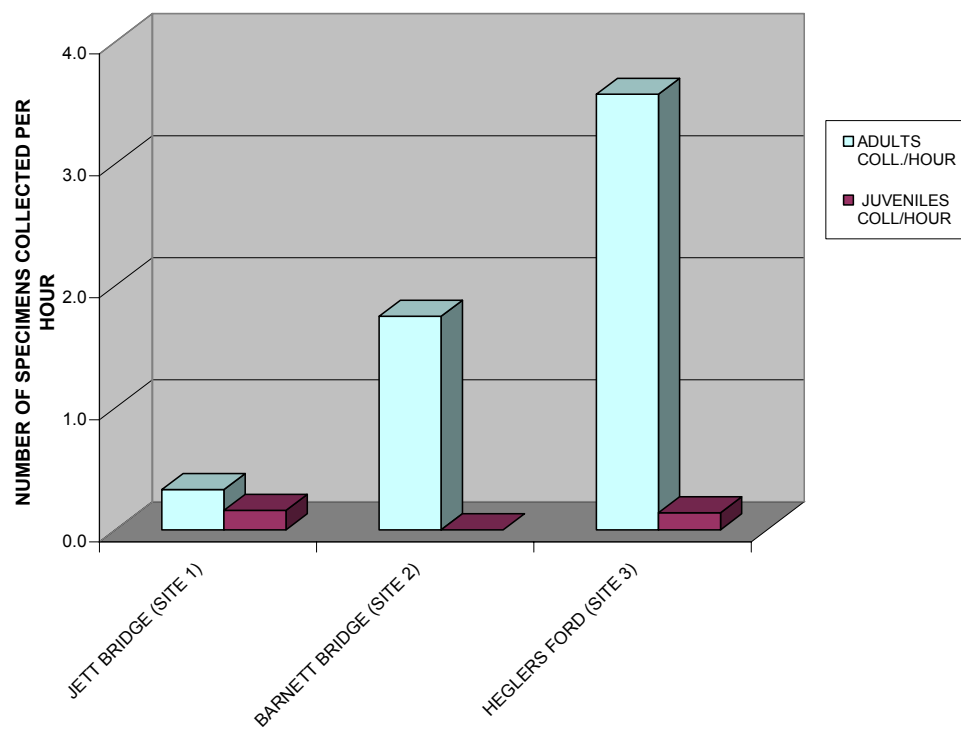
Tennessee Wildlife Resources Agency and NPS personnel collected crayfish from all habitat types except deep pools at each site employing the collecting technique utilized by Williams et al. (2002). This included carefully turning large rocks by hand while holding a net just downstream in fast current, often followed with a boot sweeping action. Quickly grabbing specimens in slow current was also an effective method where visibility permitted. In addition, snorkeling proved to be a very effective means of collecting specimens within the deep and swift habitat inaccessible to the wading collectors. The duration of each sample was recorded and the collecting technique was standardized at each site. Finally, specimens from each site were retained following NPS protocol for preserving specimens for tissue analysis, and stored at an approved location pending transport to the Louisiana State University for lab work.

Results and Discussion

Due to an ample amount of rainfall this spring, Clear Creek flows were high, making collecting conditions difficult. We noted during our sampling effort that much of the habitat currently favorable for aquatic life was likely dewatered during the drought conditions of 2002 as well as previous years. While the high flow conditions inhibited our ability to collect crayfish, resulting in decreased catch rates, the standardized collecting technique we employed should provide comparable data. Although our surveys produced crayfish specimens at all three sites, site 3 at Heglers Ford (the control site), was clearly the most productive with 3.7 specimens per/hour (Figure 2). Sites 1 (Jett Bridge) and 2 (Barnett Bridge) produced substantially fewer specimens per/hour, 0.5 and 1.8, respectively.

The presence of oil residue was noted at site 2 only. This was observed in the form of an “oily sheen” rising to the surface from beneath rocks when over-turned.

Figure 2. CPUE values for crayfish collected at three sampling stations on Clear Creek.



Field Collection Crew

TWRA Personnel: Bivens, R.D., McKinney, A.B., Miles, R.K., Williams, C.E.

NPS Personnel: Bakaletz, S., Hudson, M., Williams, K.

Stream Survey Accounts:

Stream: Clear Creek Site 1

Date: 16 May 2003

Field Number: CEW-03-04

Quadrangle: Lancing

Coordinates: 360717.7N – 844445.6W

Elevation: 1,110 ft.

Locality: The site was at Jett Bridge, 8.6 air miles west of Wartburg near Clear Creek mile 4.0. Morgan Co., TN

Comments: Due to high flow conditions, collectors wearing chest waders were most effective in the shallow run and riffle areas, while the snorkelers were able to collect within a greater variety of habitat.

Effort: 4 hours of rock turning, and 2 hours of snorkeling.

Specimens Collected: *Cambarus crinipes* – 1-2nd ♂, and 1 juvenile ♀
C. sphenoides– 1-2nd ♂

Stream: Clear Creek Site 2

Date: 16 May 2003

Field Numbers: CEW-03-03

Quadrangle: Hebbertsburg

Coordinates: 360721.9N-844742.0W

Elevation: 1,170 ft.

Locality: This site was at Barnett Bridge (Waltman Ford Bridge on TOPO), 11.1 air mi. west of Wartburg at Clear Creek mile 8.7. Morgan Co., TN

Comments: Due to high flow conditions, collectors wearing chest waders were most effective in the shallow runs and riffle areas, while the snorkelers were able to collect a greater variety of habitat. Some oil residue observed beneath over-turned rocks at this site.

Effort: 5.5 hours of rock turning, and 1.5 hours of snorkeling

Specimens Collected: *Cambarus crinipes* – 1-1st ♂, 1-2nd ♂, and 2-♀

Stream: Clear Creek Site 3

Date: 16 May 2003

Field Numbers: CEW-03-02

Quadrangle: Hebbertsburg

Coordinates: 360717.2N – 844847.3W

Elevation: 1,210 ft.

Locality: The site was at Heglers Ford, 12.1 air miles west of Wartburg, at Clear Creek mile 10.1. Morgan Co., TN

Comments: Collectors wearing chest waders worked the shallow runs and riffles, while the snorkelers were able to collect a greater variety of habitat.

Effort: 6.0 hours of rock turning, and 1.0 hours of snorkeling.

Specimens collected: *Cambarus crinipes* – 3-1st ♂, 13-2nd ♂, 8-♀, and 1 juvenile ♀
C. sphenoides – 1-♀

Literature Source:

Williams, C.E., R.D. Bivens, and B.D. Carter. 2002. A Survey of The Big South Fork Crayfish (*Cambarus bouchardi*). Tennessee Wildlife Resources Agency, Nashville, TN.