

# CRANE CREEK

## 2012 Summary



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## INTRODUCTION

Crane Creek, located in extreme southwest Lawrence County and northwest Stone County, flows approximately 25 miles before its confluence with the James River. Its headwaters are largely spring fed, which supplies cold water year-round. Wire Road Conservation Area (WRCA) encompasses 818 acres in the upper watershed and straddles the town of Crane ([Figure 1](#)). Since the 1880s, Crane Creek has boasted a wild rainbow trout population derived from early stockings from the McCloud River, California stock. This population has thrived over the years with very few additional stockings, making it valuable to anglers and hatcheries due to its relative genetic purity. The last known stocking of rainbow trout in Crane Creek was in 1967. Because of its importance, Crane Creek was designated as one of Missouri Department of Conservation's (MDC) priority watersheds in 2011.

Historically, the population of rainbow trout in Crane Creek has remained strong possibly due to private ownership, low harvest rates, and adequate habitat. A 1994 visual survey estimated 606 trout/mile in the upper portion of WRCA (upstream of 13-90A Rd., [Figure 1](#)). However, this population experienced a marked decline with only 95 trout/mile estimated in 1999 and 2005 surveys. Contributing factors were most likely related to extended periods of lower than normal precipitation and reduced stream flow. Additionally, these conditions increased the likelihood of trout predation by piscivores such as river otters and great blue herons. The population had improved in 2009 with 271 trout/mile observed on upper WRCA, likely due to increased stream flows and the reduction in the number of otters. Downstream push-boat electrofishing surveys were initiated in 2005. An abundant population, representing numerous year classes, was observed on the lower WRCA in 2005, 2009, and 2012.

Missouri experienced its worst drought in 30 years with all 114 counties declared primary natural disaster areas by the Secretary of Agriculture on July 17. Numerous portions of the state experienced severe to extreme drought resulting low water conditions in many lakes and streams, including Crane Creek. Overall, the trout population fared well and appeared to be healthy despite the harsh conditions in 2012.

Otter scat has been observed in various locations along Crane Creek in previous years. To minimize potential impacts on this fragile fishery, several otters have been trapped in previous years. This has been a coordinated effort between Fisheries, Wildlife, and Protection divisions in addition to a local trapper. Otter scat was observed along Crane Creek in several places on lower WRCA and private land during the 2012 surveys. The local trapper plans to trap otters during the 2012-2013 trapping season.

Crane Creek is currently managed as a Blue Ribbon Trout Area in the upper 8 miles to maximize and sustain the fishery. While harvest is assumed minimal, one fish per day at least 18" long is allowed under these regulations. Only flies and artificial lures are permitted in this zone. Public access is available on MDC property (WRCA) as well as in the city park at Crane.

## 2012 MANAGEMENT OBJECTIVES

1. Collect visual density estimates for the upper and lower tracts of WRCA and compare to historic data.
2. Collect visual density estimates for the private land between lower WRCA and the City of Crane to compare trout abundance on public versus private land.
3. Obtain catch per unit of effort (CPUE) data for the lower WRCA and compare to historic data.
4. Monitor trout habitat in Crane Creek and Spring Creek using water temperature loggers at numerous sites.
5. Use Resource Assessment and Monitoring (RAM) sampling in the Crane Creek watershed as a means to update trout distribution information outside of the Blue Ribbon Trout Area.

## METHODS AND RESULTS

### Objective 1 – Collect Trout Density Estimates on WRCA

Fifteen individual pool/riffle (P/R) sites were identified and marked along the upper WRCA ([Figures 1-2](#)). As a result of drought conditions in 2012, this stretch only represents about half of the length of stream on which earlier surveys were conducted in 1994, 1999, 2005, 2007, and 2009. The numbers of rainbow trout observed were recorded for each P/R site in the following size ranges: < 8 inches, 8-12 inches, and > 12 inches. Each member of a two person dive team worked from the lower end of each riffle upstream through the pool immediately above each riffle. A mean number of trout observed at each P/R site was calculated using the number of trout observed in each of the two independent counts.

Direct counts were conducted on upper WRCA on October 2, 2012. The total stream length on upper WRCA from the lower parking lot to the upper parking lot is 1.23 miles. However, much of this reach was dry in 2012, allowing for only a 0.6 mile reach of stream to be snorkeled. A total of 204 rainbow trout were counted in a 0.6 mile reach of stream. In order to make a valid comparison with previous years' data, this number was divided by the entire stream reach of 1.23 miles, which extrapolates to 166 trout/mile ([Tables 1-2](#), [Figure 3](#)). Although this represents a decrease from the 2009 estimate, it also indicates that the rainbow trout population in this reach can remain strong during extended periods of low water in the areas of quality habitat to which they concentrate. Population estimates were based on random P/R site selection in the 1994-2007 samples, and several of the P/R sites were impounded by beaver dams at that time. Therefore, estimates from those samples may not be directly comparable to the 2009 and 2012 samples wherein the total number of rainbow trout observed in all of the P/R sites was recorded.

Eight individual P/R sites were identified and marked along the lower WRCA ([Figures 1, 4](#)). This stretch has historically been sampled using push boat electrofishing; however the water level was too low in 2012 to electrofish the entire stretch of Crane Creek on

lower WRCA. Therefore, snorkel estimates were used. Using snorkel estimates also enabled us to compare numbers of rainbow trout on lower WRCA with those on private land just upstream and the upper WRCA.

Direct counts were conducted on lower WRCA on October 4, 2012. A total of 139 rainbow trout were counted in a 0.3 mile reach of stream which extrapolates to 421 trout/mile ([Table 2](#), [Figure 3](#)). This is higher than the number of trout observed on upper WRCA. We observed nearly three times as many rainbow trout < 8" on lower WRCA than upper WRCA. Additionally, we observed more fish in the 8"-18" range on upper WRCA than on lower WRCA, which suggests that the population of adult trout is stable within this reach, but may not have reproduced well in 2011-2012 due to reduced stream flows and lack of suitable spawning habitat. A few fish greater than 18" were observed in each of the samples, indicating that the opportunity to catch a legal trophy fish exists throughout WRCA.

### Objective 2 - Collect Trout Density Estimates on Private Land

Thirteen individual P/R sites were identified and marked along a section of private land upstream of lower WRCA and downstream of the City of Crane ([Figures 1, 5](#)). This particular section of private land has been the site of recent NRCS and MDC cost share based riparian plantings and streambank stabilization. The landowner has been a great cooperater with MDC and was more than willing to allow us to snorkel the section of Crane Creek that runs through his land.

Direct counts were conducted on October 3, 2012. A total of 423 rainbow trout were counted in a 0.6 mile reach of stream which extrapolates to 705 trout/mile ([Table 2](#), [Figure 3](#)). This section of Crane Creek had higher densities of rainbow trout in all size ranges, and we observed five times as many rainbow trout greater than 18" than on either section of WRCA. This is likely due to better trout habitat in this reach and decreased fishing pressure. Siepker (2008) documented that better quality riffle habitat existed within the private land section versus the lower WRCA. Using a classification system of 1, 2, and 3 with 1 being the best quality habitat, 78 percent of riffle habitat on the private land was classified as a 2, with only 42 percent classified as 2 on lower WRCA. In addition, the landowner allows very little fishing and only fishes with dry flies with barbless hooks in this reach. The highest number of rainbow trout < 8" was observed in P/R J06, which corresponds with the section of stream recently reconstructed as part of a streambank stabilization project ([Figures 5-6](#)). This area was once a series of slow moving pools and is now characterized as a long, shallow riffle with a rip-rap bank. Furthermore, the landowner observed several nest sites in this section of creek in January of 2013 ([Figure 7](#)).

### Objective 3 – Collect CPUE Data on Lower WRCA

Trout were sampled using electrofishing on lower WRCA on October 10, 2012 ([Figures 1, 4](#)). The push boat was used and equipped with a Smithroot Type VI-A electrofishing box using direct current and running 6 amps and 530 volts. A three person crew was

utilized. In shallow pools and riffles, the boat was pushed by one person from behind with two netters by the boat anodes, one on each side of the boat. In deeper pools, two people were in the boat (driver, dipper) both dipping fish as needed. Only two electrofishing runs were able to be completed using the push boat in 2012 due to low water conditions in the upper portions of lower WRCA. Therefore, analysis in this report only reflects those fish captured in the same locations in 2009 and 2012.

A total of 92 rainbow trout, ranging in length from 3.0 to 13.5 inches, were collected in 0.6 hours of electrofishing. This CPUE of 152 trout/hour represents an increase in total number of trout from the 2009 catch rates of 83 trout/hour for the same runs ([Figure 8](#)). This higher catch rate could be a result of trout congregating in these deeper portions of the stream during the drought in 2012. The overall catch rate in the entire reach of lower WRCA was 121 trout/hour in 2009, during which time the trout could have been dispersed throughout the entire reach of stream lower WRCA, thereby decreasing the catch rates in electrofishing runs one and two. Similar to snorkel surveys in lower WRCA, age-1 fish (3" - 6") dominated the catch indicating recent favorable spawning conditions in this reach. Although present as observed in snorkel surveys, no trout of legal harvest size (18" or larger) were collected in this area via electrofishing.

A small section of private land was also sampled directly downstream of lower WRCA ([Figure 4](#)). Only six rainbow trout ranging from 8" to 14" were captured in 0.3 hours of electrofishing for a CPUE of 18 trout/hour. Due to this small sample size, a valid comparison with the population of trout on lower WRCA could not be made. A significant change in stream depth and gradient prohibited sampling further downstream using the push boat.

#### Objective 4 – Monitor Trout Habitat

Five water temperature data loggers were deployed in the Crane Creek watershed in 2012 to monitor suitable habitat during summer months. Four of the loggers were placed at sites on Crane Creek and one was on Spring Creek ([Figures 9-10](#)). Site 1 is located just below the main spring on Crane Creek and Site 8 is located just below Brown's Spring on Spring Creek. Site 4 represents the downstream boundary of the Blue Ribbon Trout Area. Despite extreme temperatures and drought conditions during the summer months, water temperatures remained favorable for trout in the sections of Crane Creek and Spring Creeks that were monitored in 2012.

As expected, water generally warmed in a downstream gradient in Crane Creek ([Figures 10-11](#)). Rainbow trout cannot tolerate water temperatures in excess of 70°F for an extended period of time. A stress day can be defined as a period of 24 hours or more in which the water is 70°F or higher. With the exception of Site 6, which is located in a backwater slough on private land, stress days are limited to the furthest downstream sites. Stress days at Site 4 are highly variable among years. Trout habitat at this site and further downstream may be limited during the summer months due to sub-optimal thermal conditions. However, reports from fishermen suggest that trout may inhabit portions of Crane Creek all the way downstream to the confluence of the James River during the

winter months when water temperatures are cooler. Results listed in Figure 11 were limited to sites with two or more years of data.

### Objective 5 – Identify Trout Distribution in Watershed

Eight sites were sampled within the Crane Creek watershed during the summer field season of 2012 in an effort to establish baseline aquatic community data, determine Index of Biotic Integrity and Stream Condition Index scores, increase the known locations for Species of Conservation Concern and collect baseline habitat data (Figure 12). Sampling sites were selected at random, but had to be narrowed down as many of the random sites selected in the watershed were dry in 2012. The fish communities and physical habitats were sampled according to RAM protocol, crayfish were collected from all fish seine hauls, and macroinvertebrate surveys were conducted to calculate Stream Condition Index scores for all stream reaches sampled. Another important objective of the RAM sampling that took place in 2012 was to delineate rainbow trout range within the Crane Creek watershed and quantify trout abundance outside the Blue Ribbon Trout Area. For the purposes of this report, rainbow trout were the only species included in this analysis. More extensive results and summary of these sampling efforts will be forthcoming in a separate report in the near future.

Rainbow trout were found to be present in five of the eight sites sampled in 2012 (Figure 13). All sites were sampled in a 150 meter reach using both backpack electrofishing and seine hauls, except for CRC01 which was only seined. Because of the differences in sampling methods among sites, only total fish captured are included in these analyses. As expected, the locations in which rainbow trout were most abundant were directly correlated with sites in which the water temperature did not rise above 70°F (Figures 9-13). Water temperatures and trout abundance should continue to be monitored at these sites in future years as time and resources are available. Sites CRC01 and CRC06 both fall within the Blue Ribbon Trout Area on Crane Creek. The abundance and size distribution of rainbow trout observed at site CRC03 in Spring Creek confirms the presence of a reproducing population outside of Crane Creek and the Blue Ribbon Trout Area. This reach of Spring Creek has the potential to be a future Blue Ribbon Trout Area and should be carefully considered for future land acquisition by MDC to protect this valuable resource.

### **RECOMMENDATIONS**

1. Collect visual density estimates on WRCA and private land, and electrofishing catch rate data in the lower WRCA during 2015.
2. Continue to monitor for otter activity and coordinate any corrective measures with Protection and Wildlife divisions.
3. Monitor habitat conditions annually using temperature loggers at designated locations from July through October.
4. Provide technical assistance to landowners who seek streambank and riparian improvements.

5. Continue to implement watershed prioritization activities in the Crane Creek watershed.

## **REFERENCES**

Sieper, M. 2008. A survey of Missouri's trout habitat quality. Missouri Department of Conservation Final Report.



Table 1. Rainbow trout population estimates for the upper WRCA using visual estimation methods, 1994-2012. [back to text](#)

<b><u>Year</u></b>	<b><u>Total number of trout</u></b>	<b><u>Estimated number of trout/mile</u></b>
1994	788	606
1999	124	95
2005	117	95
2007	33	75
2009	333	271
2012	204	166

Table 2. Size distribution of rainbow trout observed during snorkel surveys, 2009 and 2012. [back to text](#)

<u>2012</u>				<u>2009</u>			
Upper WRCA	Number of fish	Miles	Rainbow trout/mile	Upper WRCA	Number of fish	Miles	Rainbow trout/mile
<8"	58	1.23	47	<8"	190	1.23	154
8"-12"	92	1.23	75	8"-12"	70	1.23	57
12"-18"	49	1.23	40	12"-18"	61	1.23	50
>18"	5	1.23	4	>18"	12	1.23	10
Total	204	1.23	166	Total	333	1.23	271
Lower WRCA							
<8"	89	0.33	270				
8"-12"	32	0.33	97				
12"-18"	14	0.33	42				
>18"	4	0.33	12				
Total	139	0.33	421				
Private							
<8"	205	0.60	342				
8"-12"	112	0.60	187				
12"-18"	80	0.60	133				
>18"	26	0.60	43				
Total	423	0.60	705				

# WIRE ROAD CONSERVATION AREA

STONE COUNTY  
818 ACRES

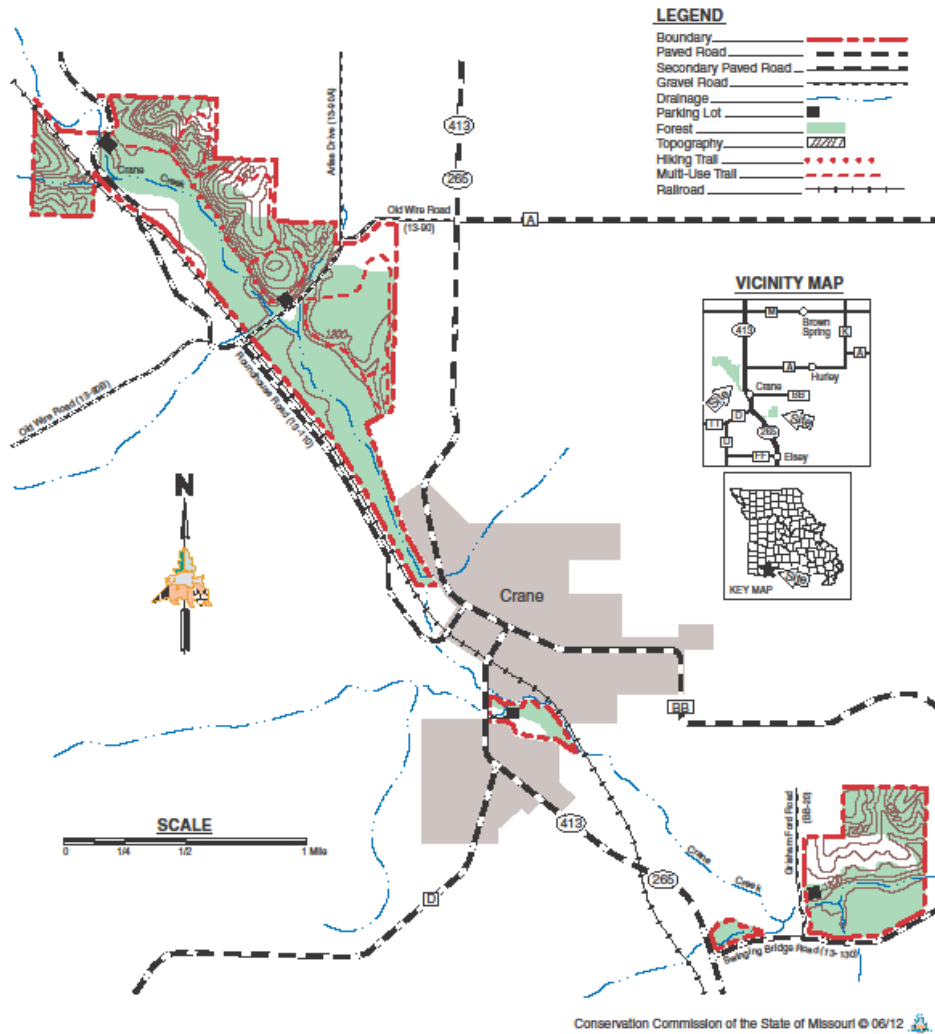


Figure 1. Wire Road Conservation Area map. [back to text](#)



Figure 2. Upper Wire Road Conservation Area snorkel sites, 2012. [back to text](#)

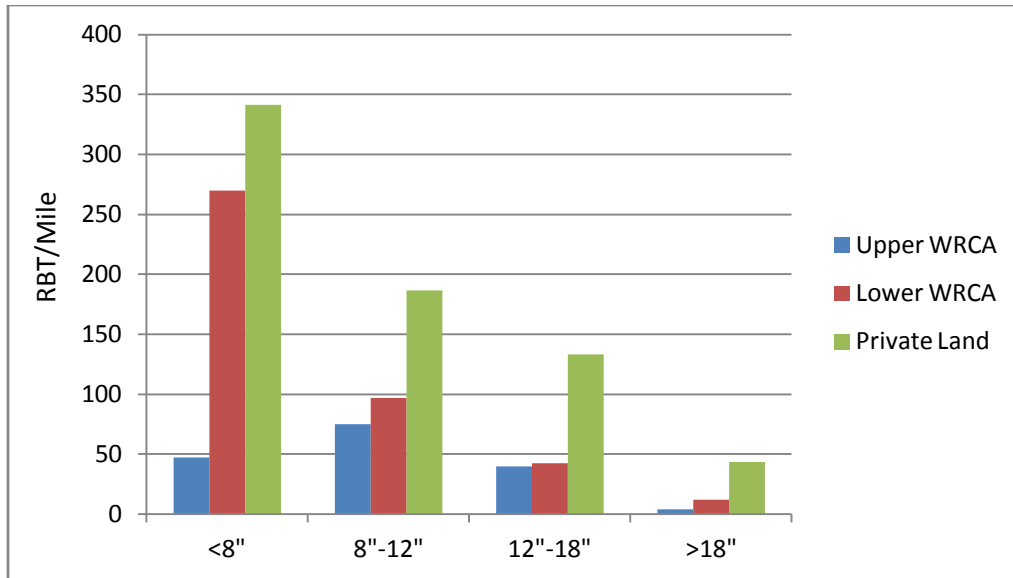


Figure 3. Total number of rainbow trout observed per mile in Crane Creek, 2012.  
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Figure 4. Lower Wire Road Conservation Area snorkel and electrofishing sites, 2012.

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Figure 5. Private land snorkel sites, 2012. [back to text](#)



Figure 6. New channel configuration in P/R J06 completed 5/1/12. [back to text](#)





Figure 7. Redds observed in P/R J06 on 1/14/13. [back to text](#)

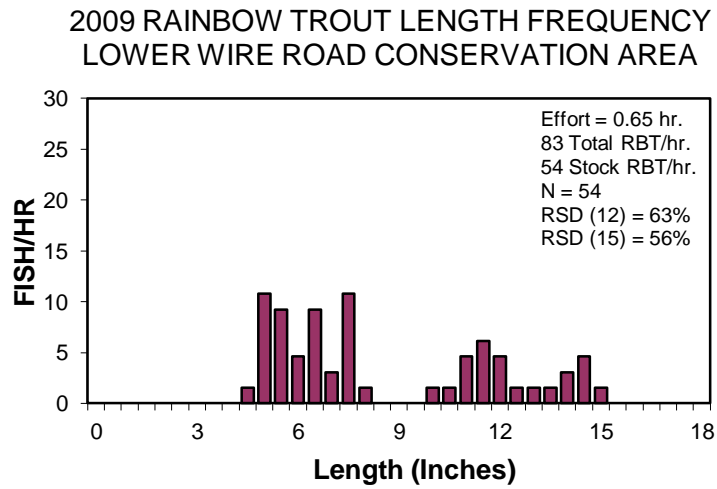
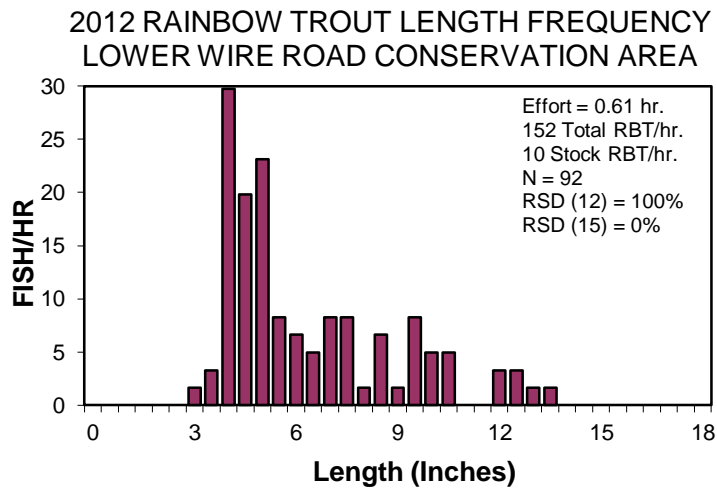


Figure 8. Rainbow trout length frequencies: Lower Wire Road Conservation Area, 2009 and 2012. [back to text](#)

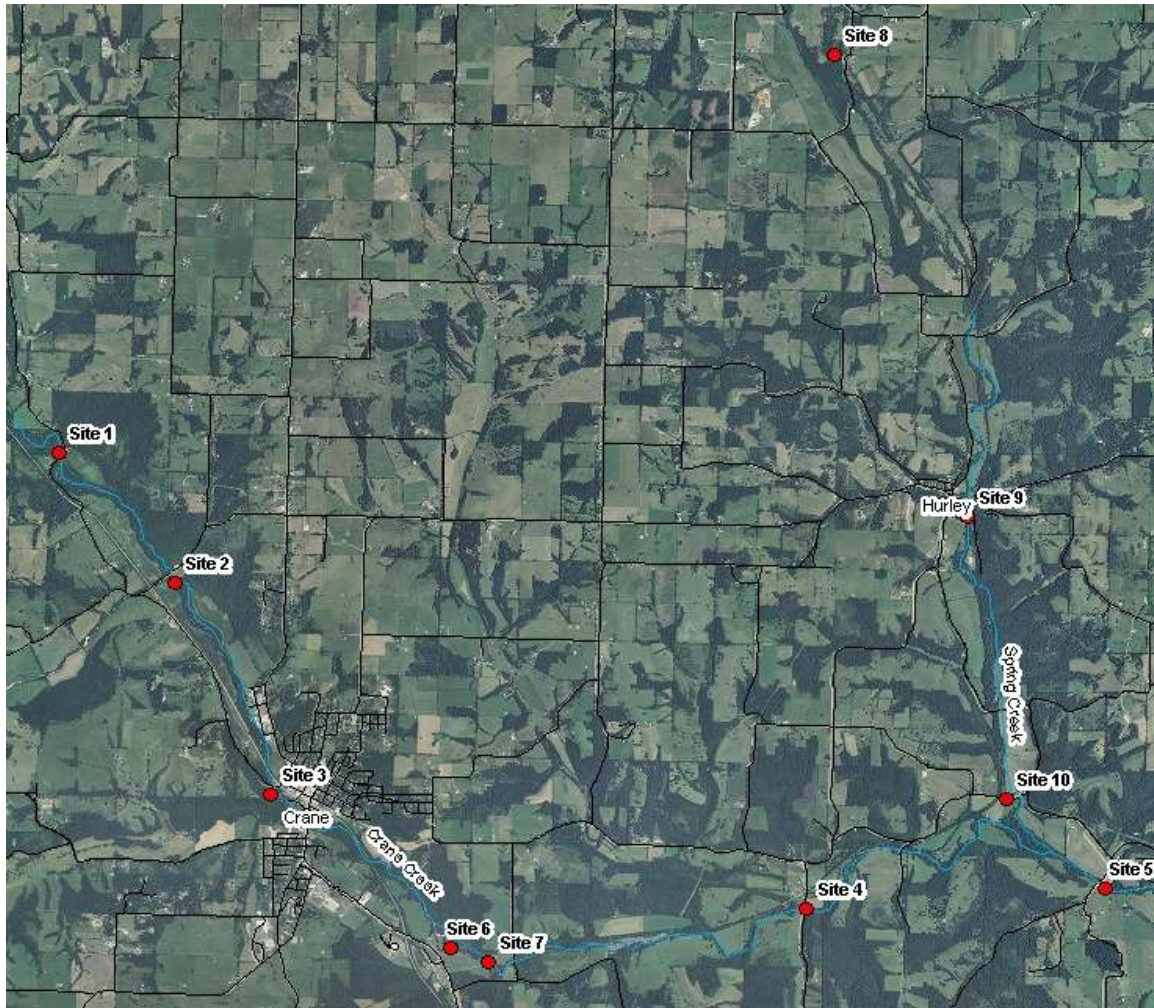


Figure 9. Locations of temperature loggers in the Crane Creek watershed, 2002-2012.  
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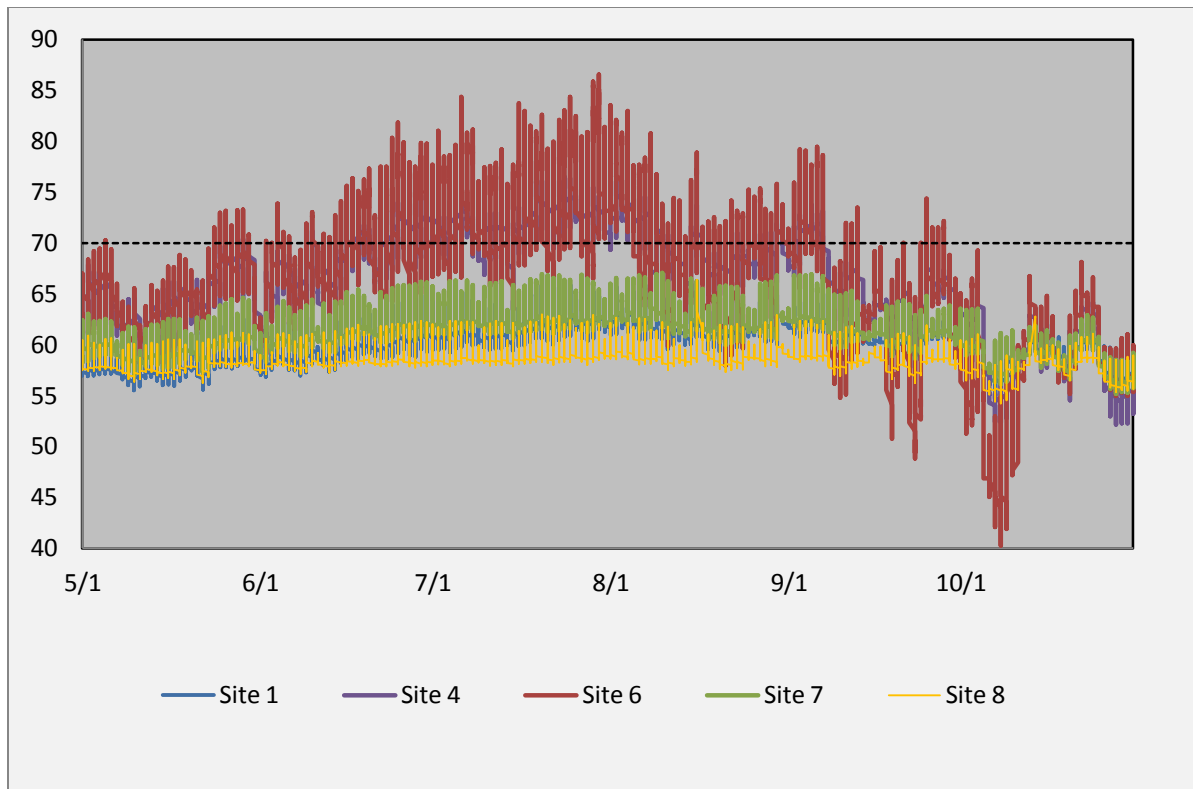


Figure 10. Daily water temperatures at temperature logger sites in the Crane Creek watershed in 2012. [back to text](#)

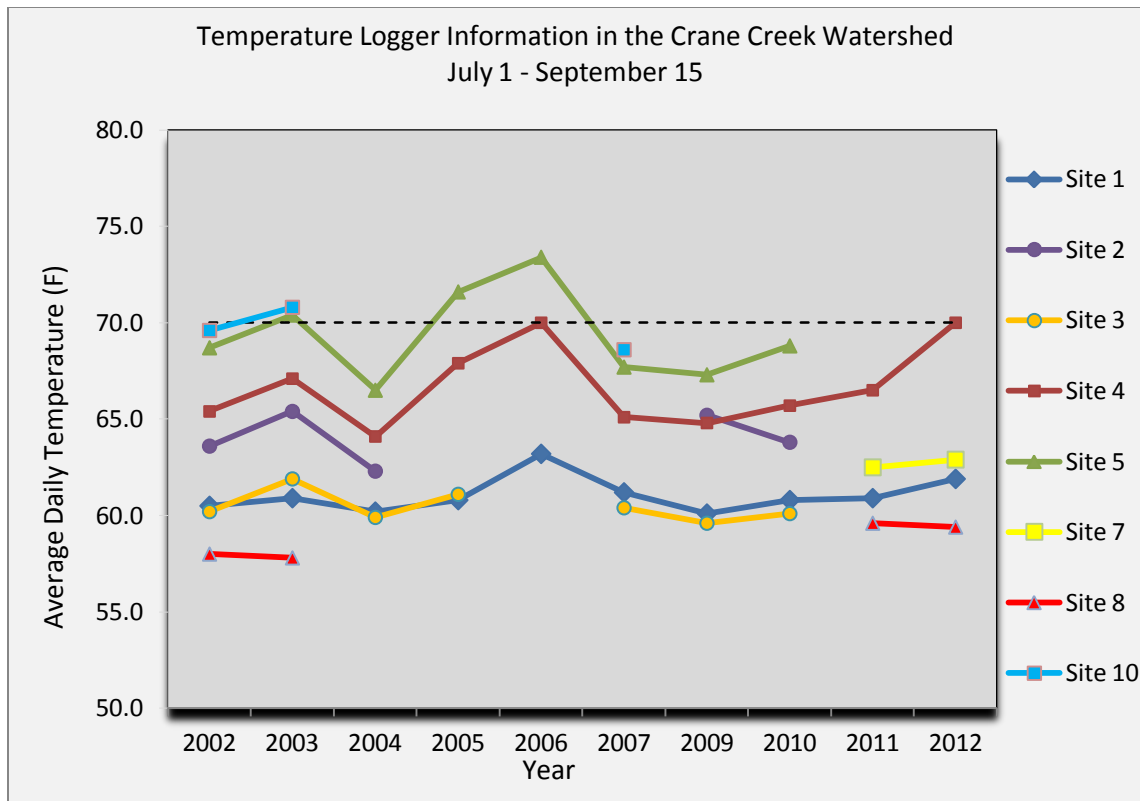


Figure 11. Average daily temperatures at logger sites in the Crane Creek watershed, 2002-2012. [back to text](#)

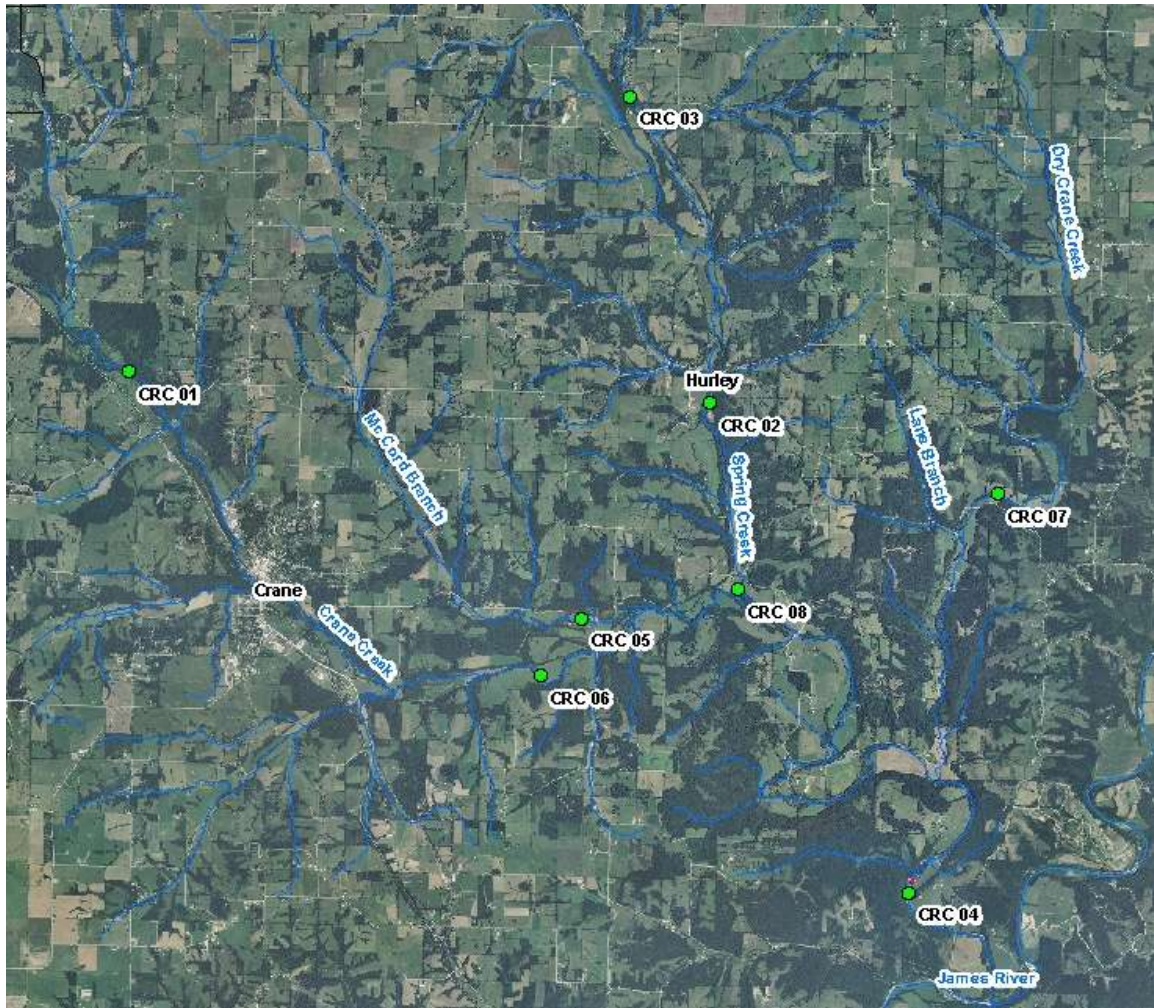


Figure 12. 2012 Crane Creek watershed RAM sampling sites. [back to text](#)

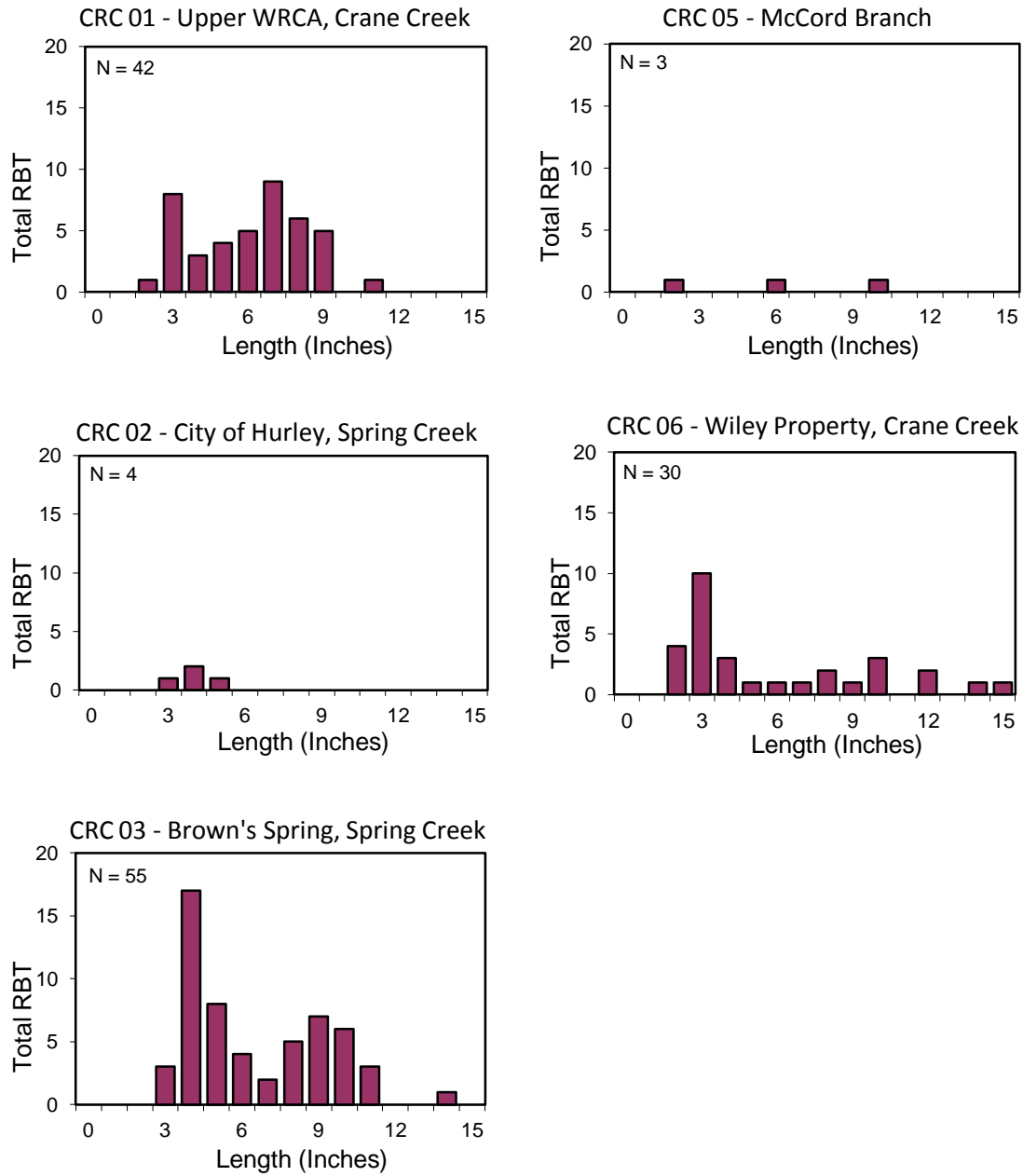


Figure 13. Length frequency of rainbow trout at five sites in the Crane Creek watershed, 2012. [back to text](#)