Topeka Shiner Monitoring in Minnesota: 2012-2013

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ABSTRACT

In response to a range-wide decline in abundance and distribution, the Topeka shiner (*Notropis topeka)* was designated as a federally endangered species in 1999. In 2004, the Minnesota Department of Natural Resources began a presence/absence survey effort to monitor Minnesota populations of Topeka Shiners at randomly selected sites within the federally designated critical habitat for the species. Averaged over the seven years of monitoring from 2004-2010, Topeka shiners were present at 76.4% of randomly selected reaches of streams. Results are presented for Topeka shiner monitoring surveys conducted in 2012 and 2013. Topeka shiners were present at 40% of randomly selected segments in 2012, and 30% in 2013. Results from this and previous sampling efforts indicate a decline in Minnesota populations of Topeka shiners. Expanded monitoring and survey efforts are recommended.

INTRODUCTION

The Topeka shiner (*Notropis topeka)* was historically widespread and abundant in low order streams throughout the central plains region of the United States. Over the last several decades, it has exhibited widespread decline across much of its range and is estimated to occur in only 10 percent of its historic geographic distribution (Tabor 2002). Although no single factor has been identified as the causative agent in the rapid decline of this species, habitat loss resulting from the nearly wholesale conversion of the landscape for agricultural purposes has been implicated by several researchers (Pflieger 1997; Eddy and Underhill 1974; Gelwicks and Bruenderman 1996; Berg et al. 2004). The combined effects of ecosystem alteration have led to a decrease in base flows, elevated sedimentation, increased turbidity, higher water temperatures, and loss of aquatic vegetation; all of these factors contribute to the degradation and loss of the Topeka shiner's preferred habitat (Tabor 1993). In response to the rapid and dramatic decline in abundance and distribution, the U.S. Fish and Wildlife Service designated the species as endangered under the Endangered Species Act of 1973 (Tabor 1998).

Surveys conducted during the late 1990s indicated that Minnesota harbored viable populations of Topeka shiners throughout its distribution in the state, and that compared with previous survey efforts in the 1970s and 80s, these populations appeared to be stable (Dahle 2001; Hatch 2001). These findings were in sharp contrast to survey efforts in other portions of the Topeka shiner's historic range, where they were sampled at only 17% of historic localities in Kansas (Tabor 1998) and 15% of historic localities in Missouri (Gelwicks and Brunderman 1996). This discrepancy between presence/absence at historic sites in Minnesota versus other

regions within the species' range led Dahle (2001) to conclude that "Minnesota populations may represent the largest and most stable population remaining in the species' range."

In 2004, the Minnesota Department of Natural Resources began a program to monitor populations of Topeka shiners within the state. A protocol was established (Ceas and Anderson 2004) to conduct a presence/absence survey of Topeka shiners at twenty randomly selected reaches of stream from within the federally-designated critical habitat in the Big Sioux and Rock River drainages in southwestern MN. Surveys were conducted annually from 2004 to 2010 and Topeka shiners were found at an average of 76.4% of sites over the seven year period (Ceas and Anderson 2004; Ceas and Monstad 2005, 2006; Ceas and Plain 2007; Ceas and Larson 2008, 2009, 2010). These values ranged from Topeka shiners present at 90% of the 20 randomly-selected reaches of streams in 2006, to 60% of sites in 2010. Although the annual percentage of sites where Topeka shiners were present was relatively stable for the first six years of monitoring (Figure 1), surveyors began to note a marked decline in relative abundance of the species as well as a decline in the number of sites where the species was present (Ceas and Larson 2009, 2010). Results from monitoring surveys conducted in 2012 and 2013 are detailed in this report and are consistent with a decline in the prevalence of Topeka shiners in Minnesota.

METHODS

Methods for 2012 and 2013 Topeka shiner monitoring follow Ceas and Anderson (2004) and are reproduced below with updated information.

Selection of Stream Segments

For each year of Topeka shiner monitoring, 20 one-mile reaches of stream were selected at random from the federally designated Topeka shiner critical habitat within Minnesota, employing an ArcView extension program developed by MN DNR (Appendix A, Map 1).

Landowner Contact

When possible, stream segments were accessed at public rights-of-way at bridge crossings. However, given that many of the randomly-selected stream segments occur on privately-owned lands, permission was obtained from landowners to access those reaches of stream. Contact information for landowners was provided to the DNR by the County Auditor's offices of Pipestone, Lincoln, Murray, and Nobles counties. Landowner contact information for Rock County was accessed online at Rock County Assessor's office. Landowners received a notice in the mail requesting access to the property to conduct aquatic surveys, and when possible were also contacted by telephone.

Selection and Reconnaissance of Sampling Sites

Based on habitat preferences characterized in the literature (Minckley and Cross 1959; Bailey and Allum 1962; Pflieger 1997; Berg et al. 2004; Eddy and Underhill 1974; Dahle 2001; Hatch 2001), sample sites were identified within each randomly-selected reach of stream using

aerial photography viewed in ArcGIS ver 10.0. At each sample segment, a brief reconnaissance was conducted to prioritize sampling at potential Topeka shiner habitat.

Basic habitat descriptions and locality information for each of the twenty stream segments sampled in 2012 and 2013 are presented in Tables 1 and 2 of Appendix B. Lists of fish species captured along each of the sample segments are presented in Tables 3 and 4.

Fish Sampling

Presence/absence surveys were conducted for Topeka shiners using 15' x 5' x 1/8" pole seines. Sampling efforts were focused on low-flow areas along the main channel boundary (MCB), backwaters, and off-channel ponds and oxbows. Seines were dragged along unobstructed reaches of substrate, and set-kicks were performed in vegetation or undercut banks. Due to substantial habitat and stream character heterogeneity across randomly selected sample segments, sampling efforts were not standardized between segments. Stream segments were sampled until either Topeka shiners were captured, or all suitable Topeka shiner habitat within the segment had been sampled. In the absence of Topeka shiners or suitable habitat, a minimum of ten sites were sampled within each segment.

The monitoring effort focuses on presence/absence of Topeka shiners and no methodologies were employed to quantify population size or numbers of individuals within the sample reaches. However, within segments where Topeka shiners were sampled, a qualitative assessment of relative abundance was made based on the professional judgment of the surveyor (Ceas and Larson 2010). While these assessments are inherently subjective by nature, they are intended to provide a coarse characterization of Topeka shiner relative abundance at sites where they are present. Sites where Topeka shiners were sampled were categorized as either 'abundant' (Topeka shiner is most numerous species present, or >10 individuals collected in the

initial seine haul at capture site), 'common'(Topeka shiner individuals appear in low numbers relative to other species, or 5-10 individuals captured in the initial seine haul), or 'present'(<5 individuals captured after substantial sampling effort).

RESULTS

2012 Monitoring Surveys

Topeka shiners were collected at eight of the 20 one-mile stream segments: 141, 145, 148, 149, 150, 151, 156, and 159 (Appendix A, Map 2). See Figure 1 for yearly totals of segments with Topeka shiners from 2004-2013. In all instances, Topeka shiners were captured in areas of low flow, pool, or backwater habitat; no individuals were captured in free-flowing reaches of stream. Segments 151 and 156 were the only reaches of stream where Topeka shiners were captured at the first sample site. Habitat and voucher photographs for 2012 stream segments are presented in Appendix C.

Very few Topeka shiners were captured during the 2012 surveys. Of the sites where Topeka shiners were captured, only two yielded shiners in high numbers. At the remaining six capture sites, fewer than five individuals were captured after substantial seining effort.

Three sample segments contained off-channel pond habitat (segments 144, 153, and 156), but Topeka shiners were not found in any of them. The off-channel ponds along segment 144 were dominated by fathead minnow (*Pimephales promelas*) and black bullhead (*Ameiurus melas*), and no Topeka shiners were captured. The off-channel ponds along segment 153 were nearly dry and contained thick mats of filamentous algae and duckweed; no fish were captured.

The pond near the north end of segment 156 was not sampled, as large numbers of Topeka shiners were captured/ observed in a pool elsewhere in the segment.

A total of 35 fish species were collected during the 2012 surveys. Plains topminnow, a Threatened species in MN, was collected in three segments (sites: 154-11, Map 16; 156-1, Map 18; 158-4, Map 20). A complete list of fish species collected in each segment is presented in Table 3.

2013 Monitoring Surveys

Topeka shiners were collected at six of the 20 one-mile stream segments: 161, 168, 169, 174, 175, and 180 (Appendix A, Map 2). As with the 2012 surveys, Topeka shiners were captured in areas of low flow, pool, or backwater habitat, in all instances; no individuals were captured in free-flowing reaches of stream. Segments 168 and 180 were the only reaches of stream where Topeka shiners were captured at the first sample site. Habitat and voucher photographs for 2013 stream segments are presented in Appendix C.

Very few Topeka shiners were captured during the 2013 surveys. Of the sites where Topeka shiners were captured, only two yielded shiners in high numbers. At the remaining four capture sites, fewer than ten individuals were captured after substantial seining effort.

Four of the sample segments had adjacent, off-channel ponds: 172, 175, 177, and 180. Of these, the artificially constructed live stock pond just south of Champepadan Creek (segment 175) was the only pond where Topeka shiners were captured. A single individual was captured in this pond, along with thousands of fathead minnows (*Pimephales promelas)* in spawning condition and several black bullheads (*Ameiurus melas).* Segment 172's pond was an excavated livestock pond that did not contain Topeka shiners. The off-channel ponds to the west of segment

177 (Rock River) appeared to be remnants of large holding ponds and contained thick filamentous algae and some submerged macrophytes; no fish were captured. Segment 180 had a small off-channel pond on the north side of the stream, but the pond did not contain Topeka shiners despite the large numbers sampled in the pool at the bridge crossing and along the stream.

A total of 27 fish species were collected during the 2013 surveys. Plains topminnow were collected at three sites along segment 178 (178-5, 178-9, and 178-11, Map 40). A complete list of fish species collected in each segment is presented in Table 4.

DISCUSSION

Monitoring surveys conducted in 2012 and 2013 found Topeka shiners at 40% and 30% respectively, the lowest percentages of randomly-selected sites since the monitoring began in 2004 (Figure 1). While absence at some sites may be attributable to distributional and geomorphic factors associated with randomly selected sites falling outside of preferred habitats, the near absence of Topeka shiners in areas with historically strong populations (e.g. Kanaranzi Creek) is of particular concern.

2012 Absence localities

As mentioned above, the randomized segment selection process may result in some segments falling on reaches of stream that are less likely to contain Topeka shiners. The following section describes segments of streams that did not contain Topeka shiners, but exhibited suitable habitat and/or contained historic records of the species from previous MN DNR monitoring surveys (2004-2010). Refer to Table 1 for basic habitat descriptions and

coordinates of sample sites within each segment. Refer to Appendix C for habitat photographs of the segments described below.

Segment 144 (North Branch Pipestone Creek) exhibited suitable Topeka shiner habitat in that it is a very low gradient reach of stream with adjacent off-channel pond habitat.

Throughout the previous monitoring effort from 2004-2010, Topeka shiners were collected at 15/15 sites in the Pipestone Creek watershed.

Segment 146 (Split Rock Creek) contained suitable habitat; a large shallow pooled area with sandy substrate was present at the bridge crossing with County Road 53, as well as off-channel ponds along the segment. Monitoring efforts during 2004-2010 documented Topeka shiners at 9/9 sample segments in the Split Rock Creek watershed.

Segment 154 (Rock River) exhibited the least signs of human disturbance of any of the 2012 segments and had an intact riparian corridor of willow and cottonwood trees. Ample side channels and backwater habitats were located behind gravel bars along the main channel boundary. Previous monitoring surveys during 2004-2010 found Topeka shiners at 10/11 sites sampled on the main stem of the Rock River, and the species was common at a locality just upstream of this segment in 2006

Segment 158 (Kanaranzi Creek) was located in the middle reaches of the watershed, below the confluence with the east branch of the creek just upstream of Adrian. Although some evidence of bank alteration and rip rapping was present along reaches of this segment, ample suitable backwater habitats and side channels were sampled behind gravel bars along the main channel boundary. Of the 10 segments of Kanaranzi Creek sampled below Adrian in 2004-2010 surveys, only one (segment 79 in 2007) did not contain Topeka shiners.

The remaining segments of stream that did not contain Topeka shiners either occurred in regions that have not historically exhibited large populations and/or the natural character of the stream did not offer suitable habitat (Segments 142, 143, 147, 153, 155), or the segment exhibited signs of substantial alterations to the stream in the form of drainage tiles, channelization, or bank modifications (Segments 152, 157, 160).

2013 Absence localities

As above, the following section describes segments of streams that did not contain Topeka shiners, but exhibited suitable habitat and/or contained records of the species from previous MN DNR monitoring surveys (2004-2010). Refer to Table 2 for basic habitat descriptions and sample site coordinates. Refer to Appendix C for habitat photographs of the segments described below.

Segment 165 (North Branch Pipestone Creek) contained suitable habitat in a pooled area at a bridge crossing and an oxbow backwater. The Pipestone Creek watershed has historically high numbers of sites with Topeka shiners (see above).

Segment 171 (Rock River) was sampled at a period of high water after recent rains, but backwater and side channel areas were present along a wide, shallow reach in the northern portion of the segment. Previous monitoring surveys during 2004-2010 found Topeka shiners at 10/11 sites sampled on the main stem of the Rock River.

Segment 176 (Kanaranzi Creek) exhibited some backwaters along the main channel boundary, and a pooled area at the County Road 15 bridge. A small backwater upstream of the bridge yielded Topeka shiners on the first seine haul during the 2005 monitoring surveys (site

37-1). This backwater was thoroughly sampled and no Topeka shiners were captured there or elsewhere along the segment.

Segment 177 (Rock River) was a wide, free flowing stream with some braiding and backwater habitats behind sand/gravel bars along the main channel. The segment contained a historic Topeka shiner locality from an oxbow along the channel, but the oxbow was nearly dry (despite recent rains) and was devoid of fish at the time of sampling. Previous monitoring surveys collected Topeka shiners at numerous segments along this reach of the Rock River (see above).

Segment 178 (Kanaranzi Creek) exhibited suitable Topeka shiner habitat in backwaters separated from the main channel by sand bars. Backwater areas along the main channel were filled with deep silt deposits from a recent period of high flow; sampling was difficult. Previous monitoring surveys in this region of the Kanaranzi Creek watershed collected Topeka shiners (see above).

Segment 179 (East Branch Kanaranzi Creek) exhibited suitable habitat in a pooled backwater area at the upstream end of the segment. This pool was thoroughly sampled and no Topeka shiners were captured here or elsewhere along the segment. A monitoring survey in 2008 found Topeka shiners in abundance in this pool.

The remaining segments of stream that did not contain Topeka shiners either occurred in regions that have not historically exhibited large populations and/or the natural character of the stream did not offer suitable habitat (Segments 162, 164, 167), or the segment exhibited little or no suitable habitat due to substantial alterations to the stream in the form of drainage tiles, channelization, or bank modifications (Segments 163, 166, 170, 172, 173).

Plains Topminnow

Plains topminnow (*Fundulus sciadicus*) is a Threatened Species in Minnesota. Although survey efforts specifically targeted Topeka shiners, survey efforts were focused on backwaters, low-flow areas, and pool habitats, which is also the preferred habitat of the plains topminnow (Pflieger 1997). Despite intense survey effort in suitable plains topminnow habitat, the species was documented at only 3/20 segments in 2012 and at 1/20 segments in 2013. The low number of segments where the species was documented and scarcity of individuals suggest that this taxon is in need of additional protection and management.

Conclusions

The protocol employed in Minnesota's Topeka shiner monitoring effort was designed to detect changes in the species' presence within the state (Ceas and Anderson 2004). Data collected over the past nine years of monitoring provide detailed documentation of a shift in the prevalence of Topeka shiners in Minnesota. In the five year period from the onset of monitoring in 2004 to 2008, Topeka shiners were present at an average of 80% of sites. The next four cycles of monitoring reported an annual drop in the number of sites were the species was present, falling steadily from 80% of sites in 2008, to 30% of sites in 2013 (Ceas and Larson 2008, 2009, 2010) (Figure 1). Not only have the last four monitoring periods demonstrated a decrease in the number of sites where the species are present, but have also shown a distinct decline in the qualitative assessments of relative abundance. Ceas and Larson (2008) ranked 11 of the sites where shiners were present as 'common' or 'abundant', and this value fell to two sites by 2010 (Figure 2). The downward trend in distribution and abundance of Topeka shiners noted by Ceas and Larson (2010) is reinforced by recent survey efforts presented here; surveys conducted in

2012 and 2013 exhibit still lower numbers of sites where Topeka shiners were present, with the percentage of sites falling to 40% and 30% respectively. These findings are further bolstered by a recent study in Iowa that demonstrates a similar pattern; surveys conducted in Iowa during 2010-2011 only collected Topeka shiners 43% of sites where the species was present in 1997-2000 (Bakevich 2013).

Although sampling effort is not standardized among sample segments, a general trend of increased sample effort is observed throughout the monitoring effort. Averaged over the period from 2004 to 2009, Topeka shiners were collected at the first sample site at over ten of the segments. This value dropped to six segments in 2010 and to two segments in 2012 and 2013. This trend of greater sampling effort yielding fewer and fewer individuals is further indication of a decline in Minnesota populations of Topeka shiners.

Having detected what appears to be a significant decline in Minnesota populations of Topeka shiners, it is recommended that a larger survey effort be implemented to evaluate shiner populations at historic localities from this monitoring program and other studies, as well as continuing to monitor sites at randomly-selected localities. It is critical to determine if sites that historically harbored large, viable populations are in decline as well as the observed trend in the randomly-selected monitoring sites.

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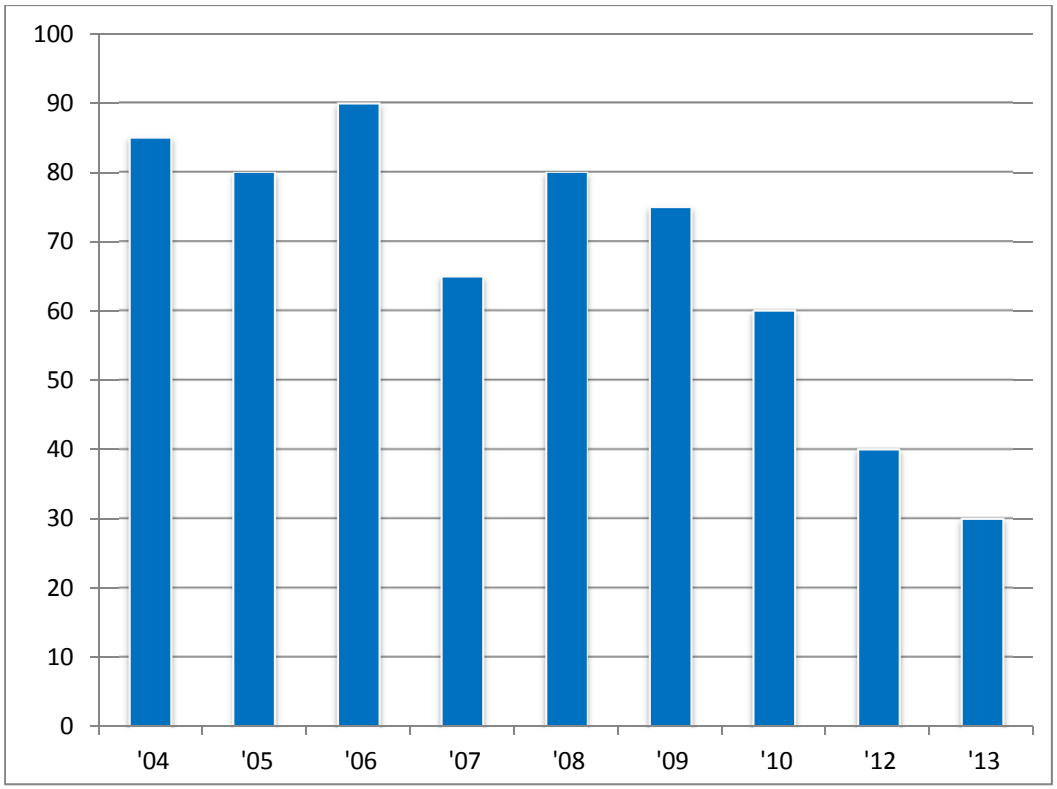


Figure 1: Percentage of randomly selected stream segments where Topeka shiners were captured, 2004-2013.

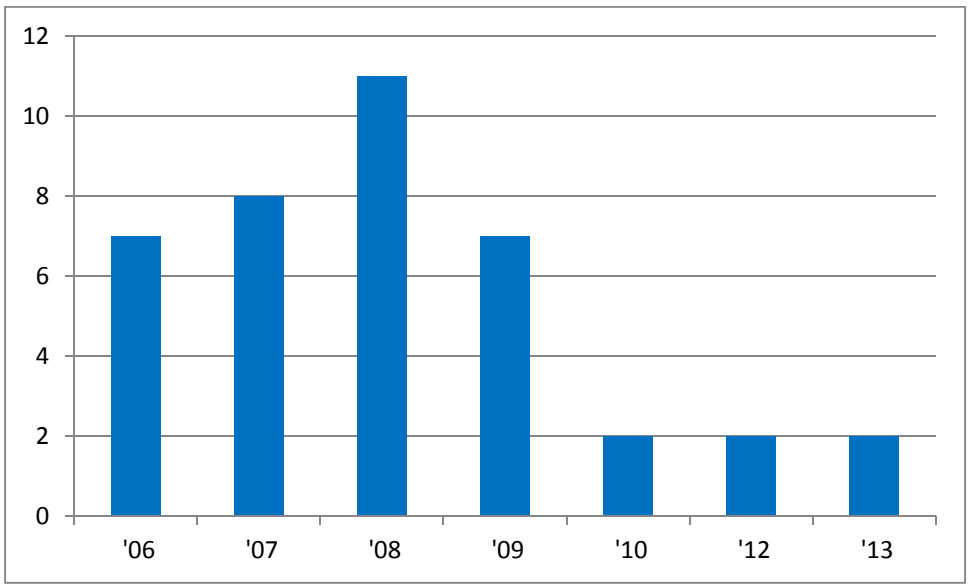


Figure 2: Number of sites where Topeka shiners were considered ‘common’ or ‘abundant’: 2006-2013.

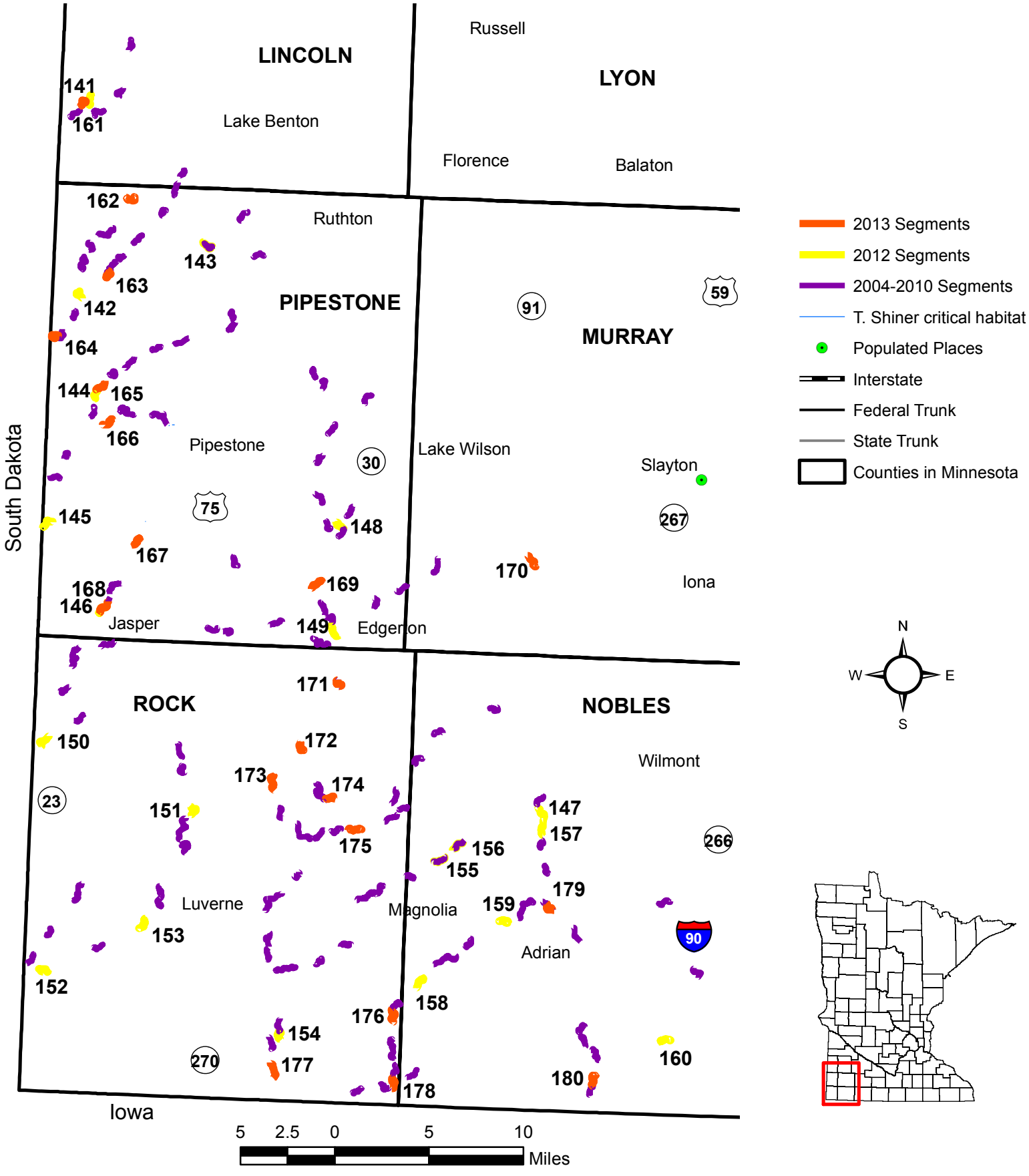
Appendix A- Maps of Stream Segments

Map 1. Overview of 180 one-mile stream segments sampled during 2004-2013.

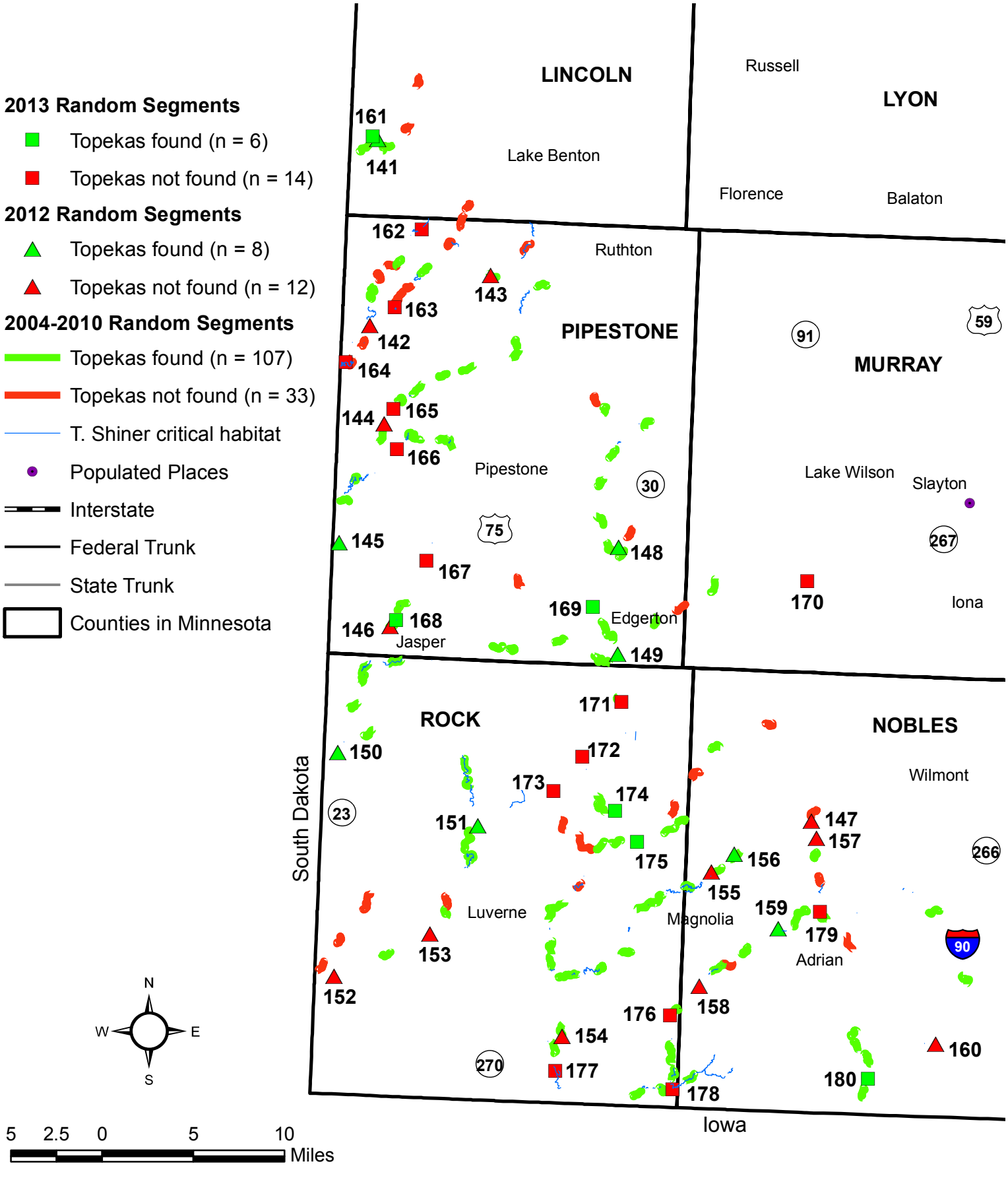
Map 2. Presence/absence of Topeka shiners at segments sampled during 2004-2013.

Maps 3-42. Aerial views of the 40 sample segments that were sampled in 2012 and 2013.

Map 1: Overview of Random Segments 2004-2013

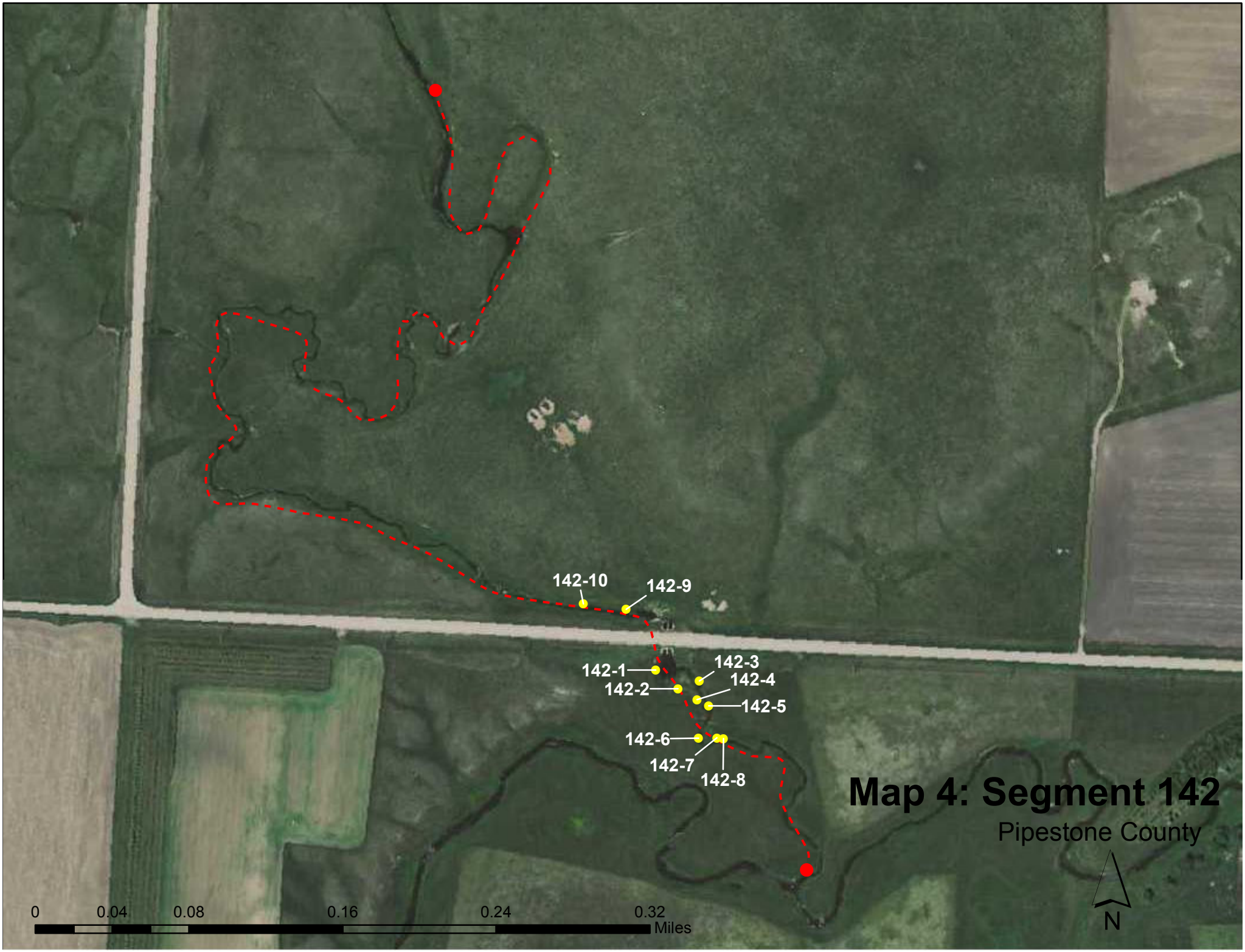


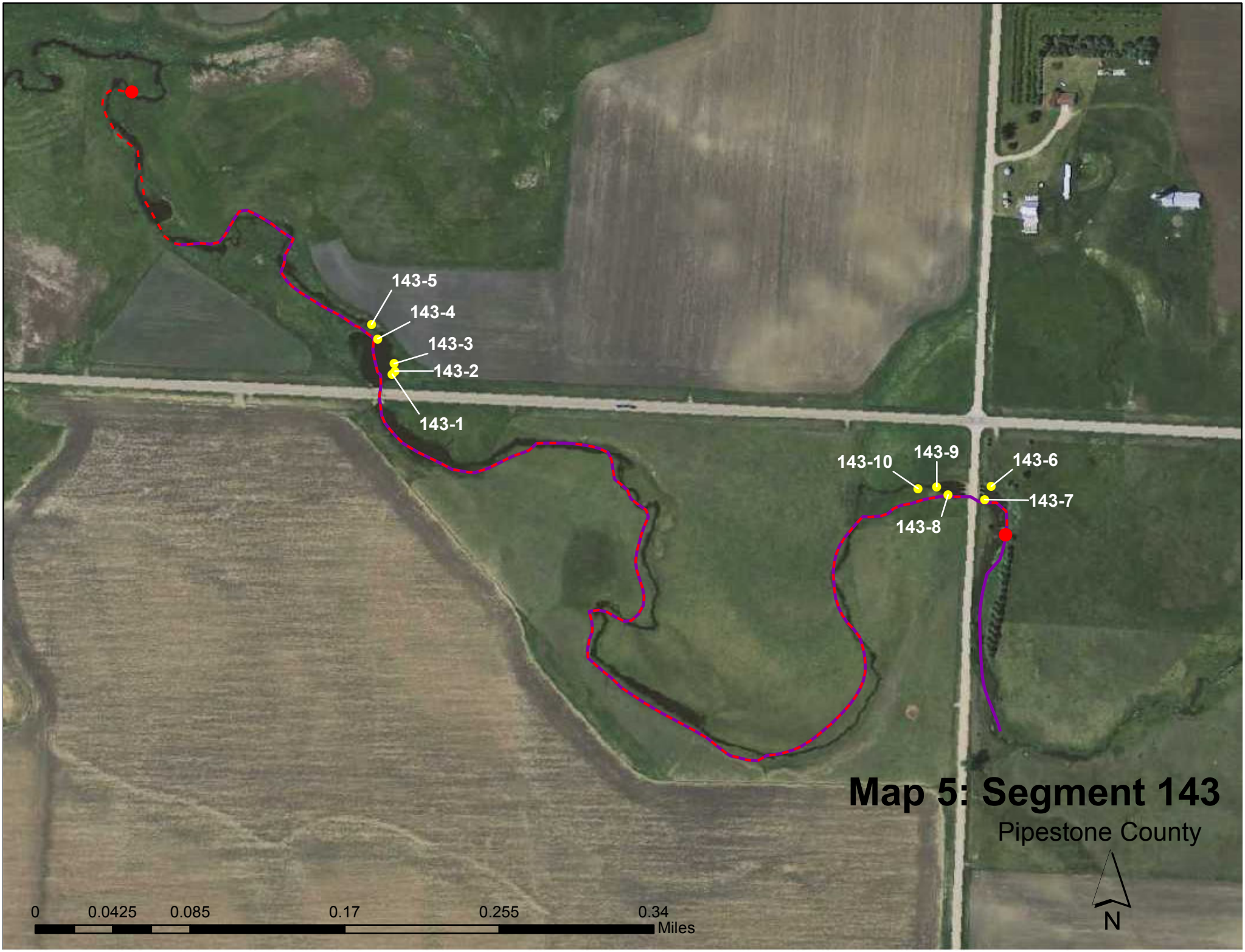
Map 2: Overview of segments where Topeka Shiners were found 2004-2013



Map 3: Segment 141

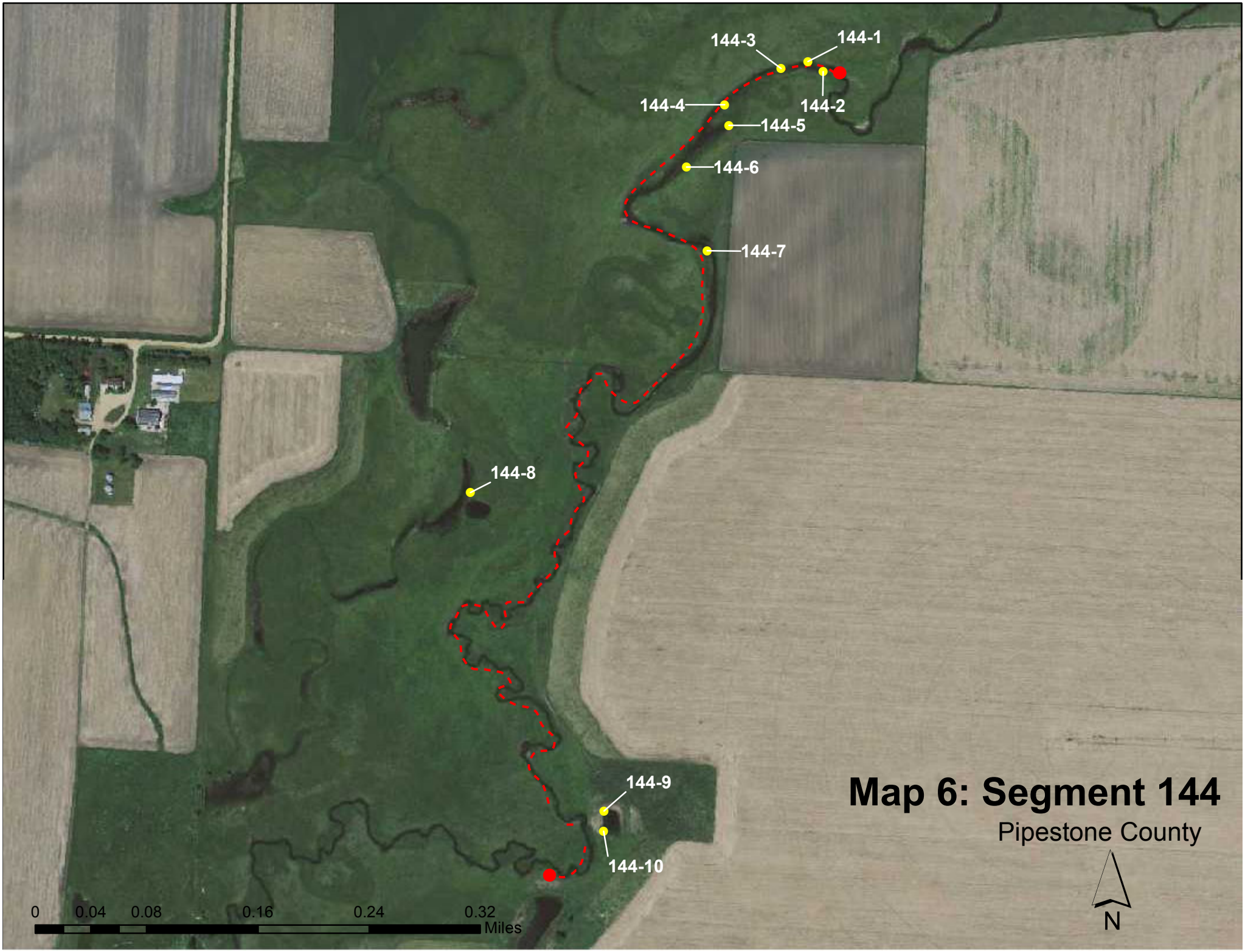
Lincoln County


142-10
142-9
142-1
142-2
142-3
142-4
142-5
142-6
142-7
142-8
Map 4: Segment 142
Pipestone County
0
0.04
0.08
0.16
0.24
0.32
Miles
N



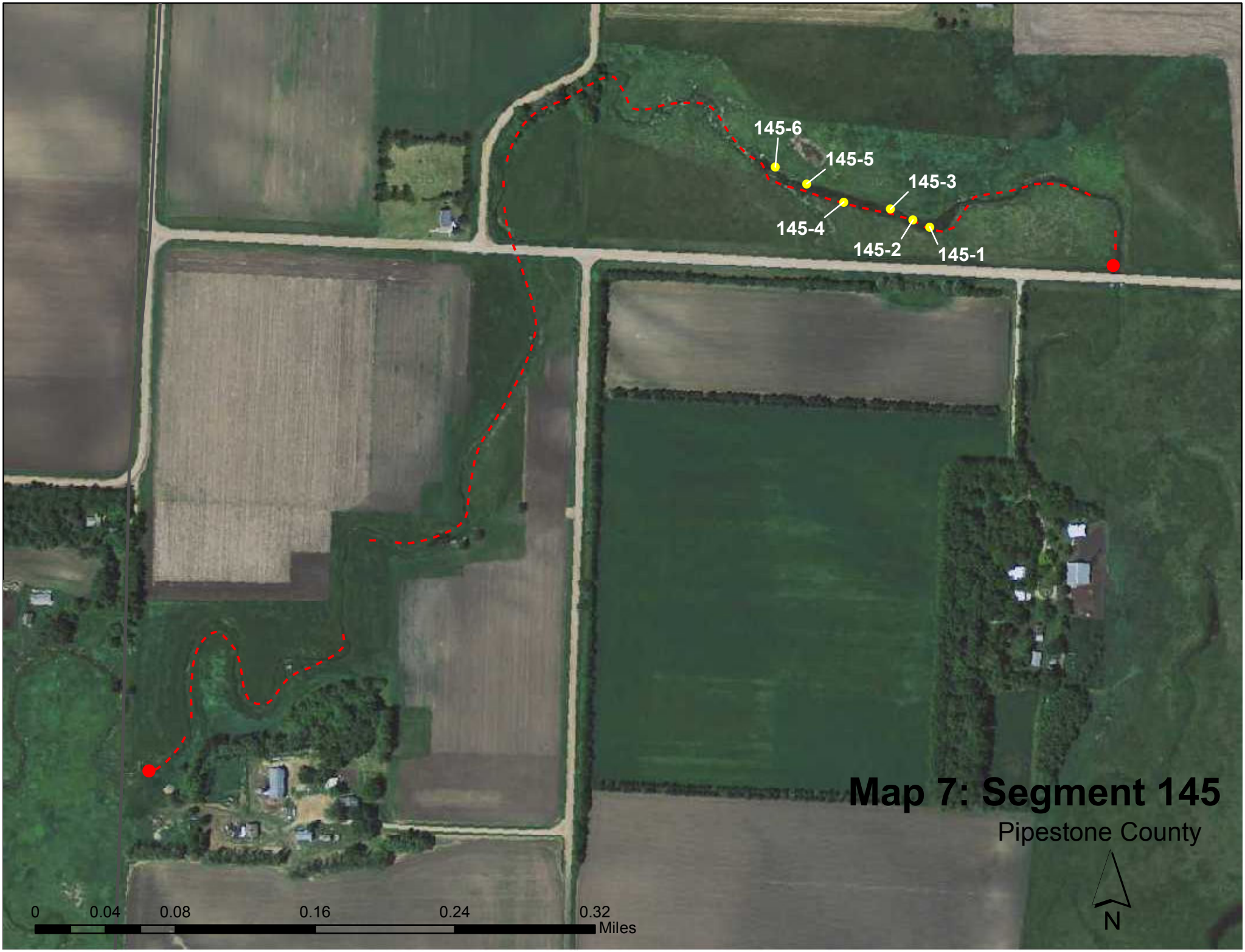
Map 5: Segment 143

Pipestone County



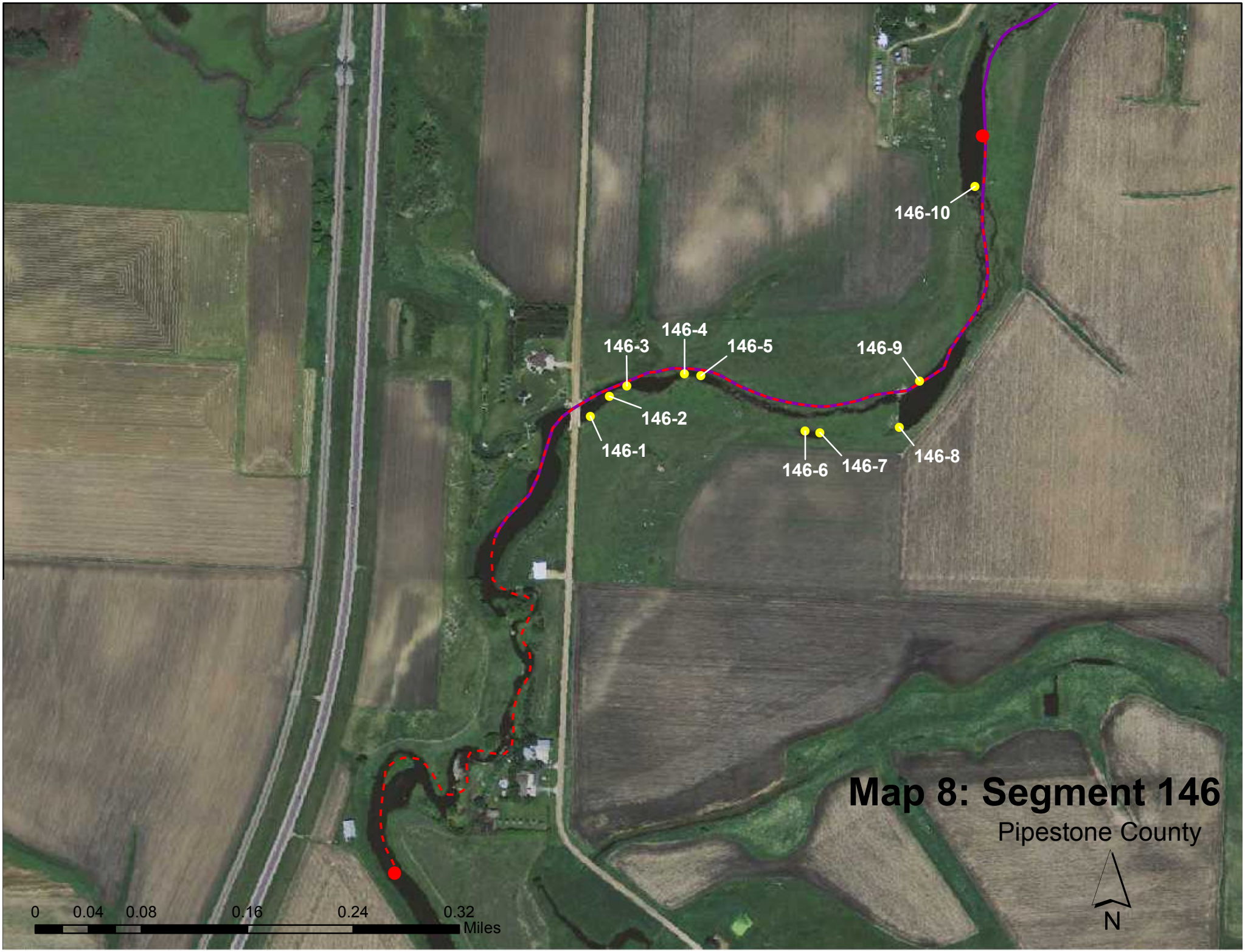
Map 6: Segment 144

Pipestone County



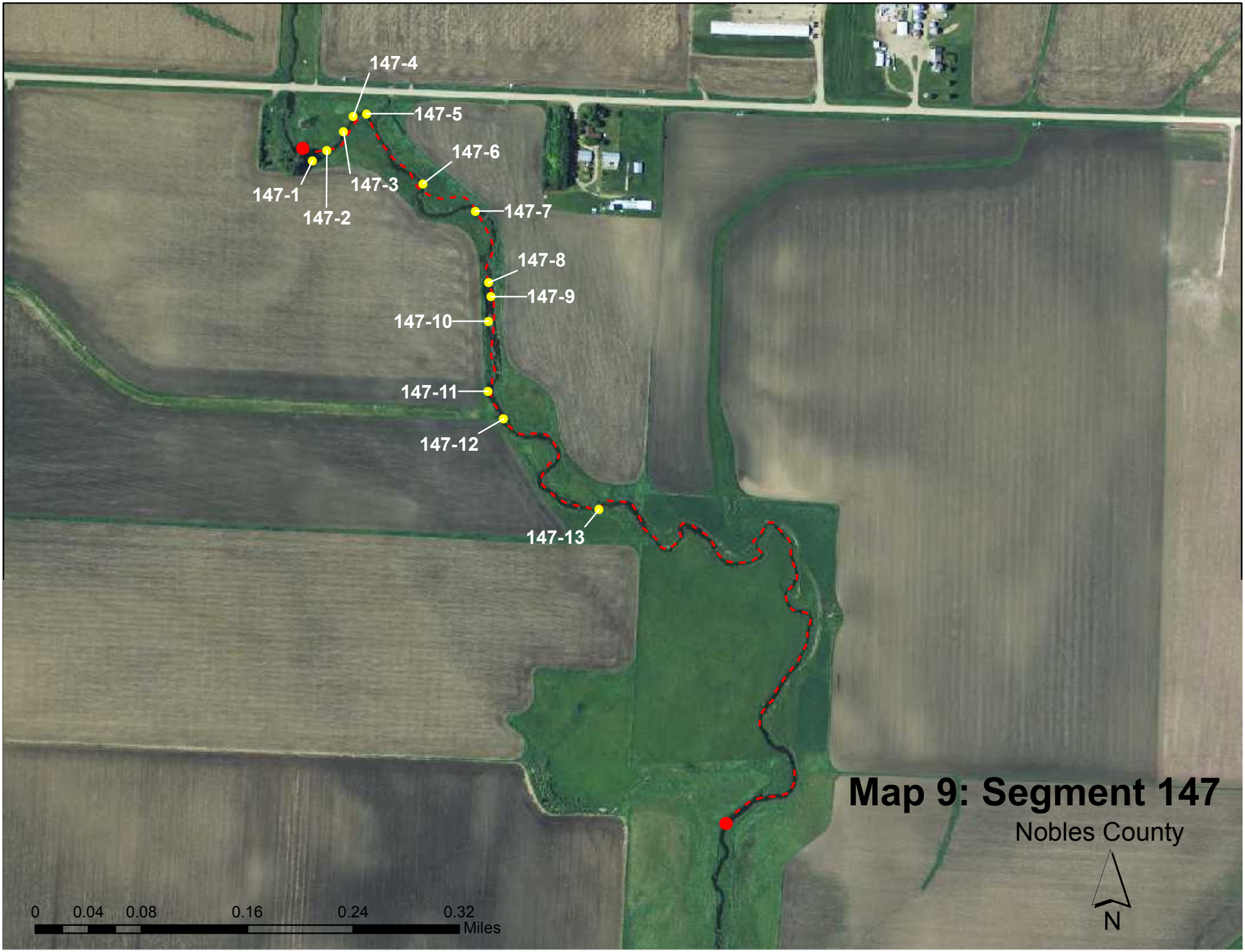
Map 7: Segment 145

Pipestone County



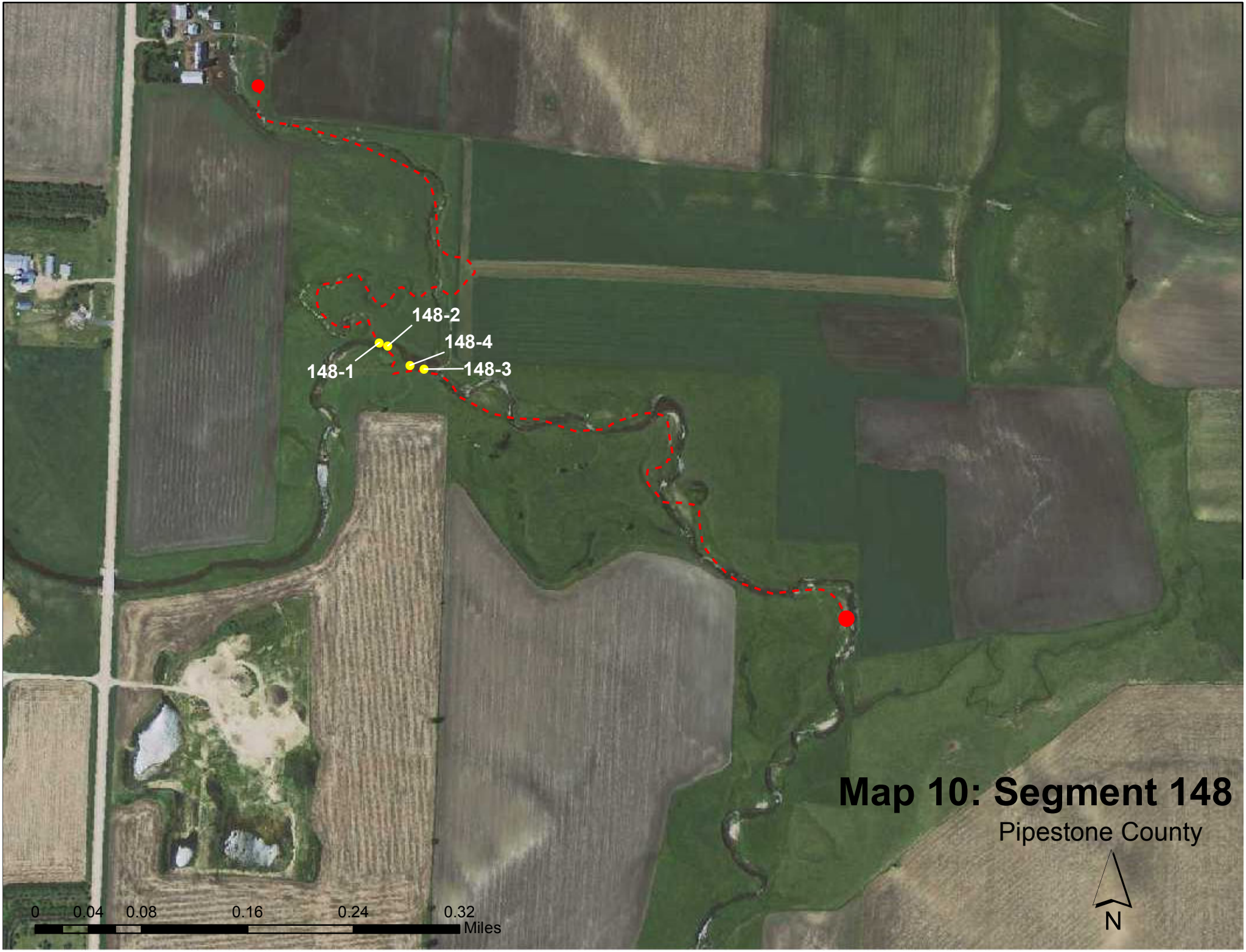
Map 8: Segment 146

Pipestone County



Map 9: Segment 147

Nobles County



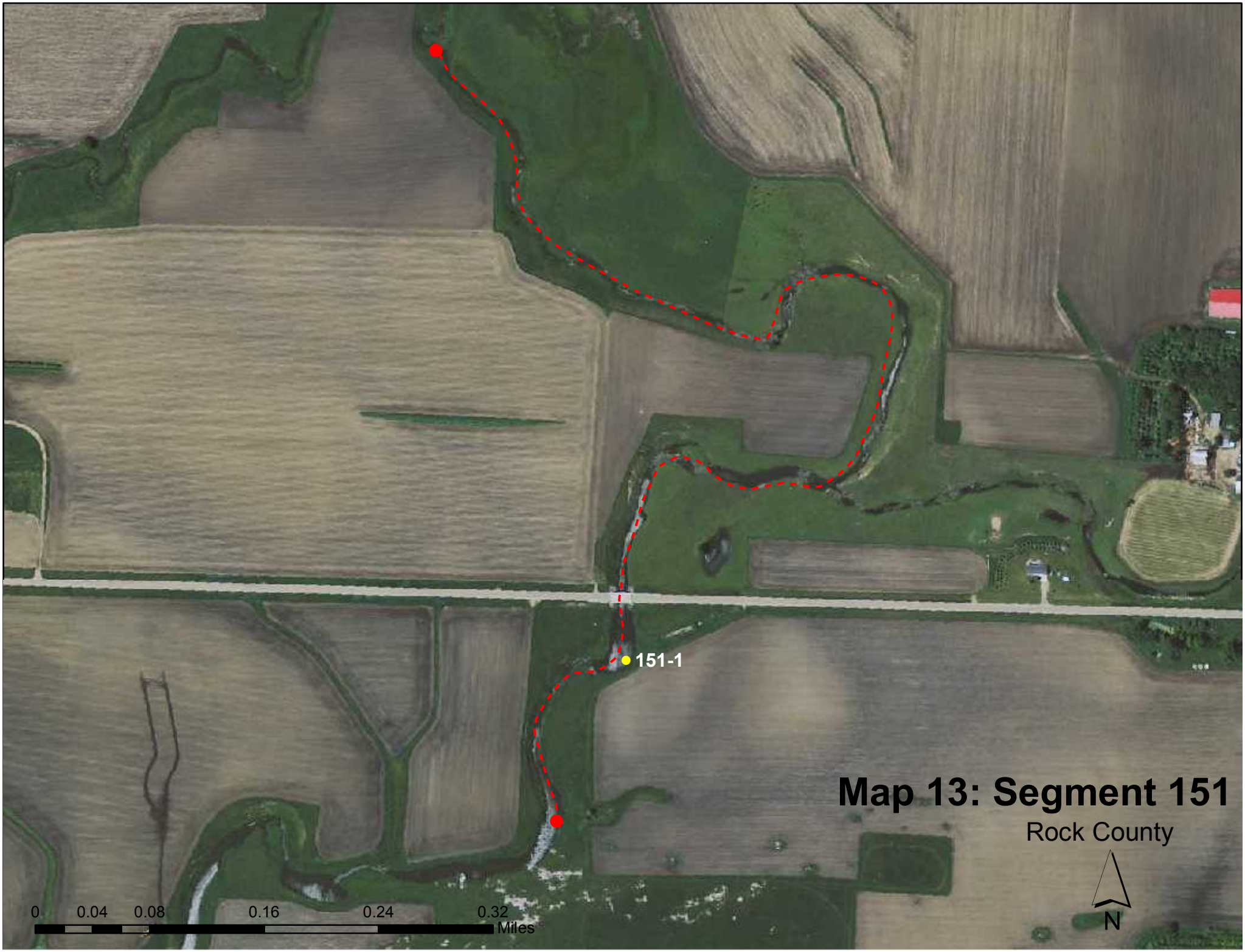
Map 10: Segment 148

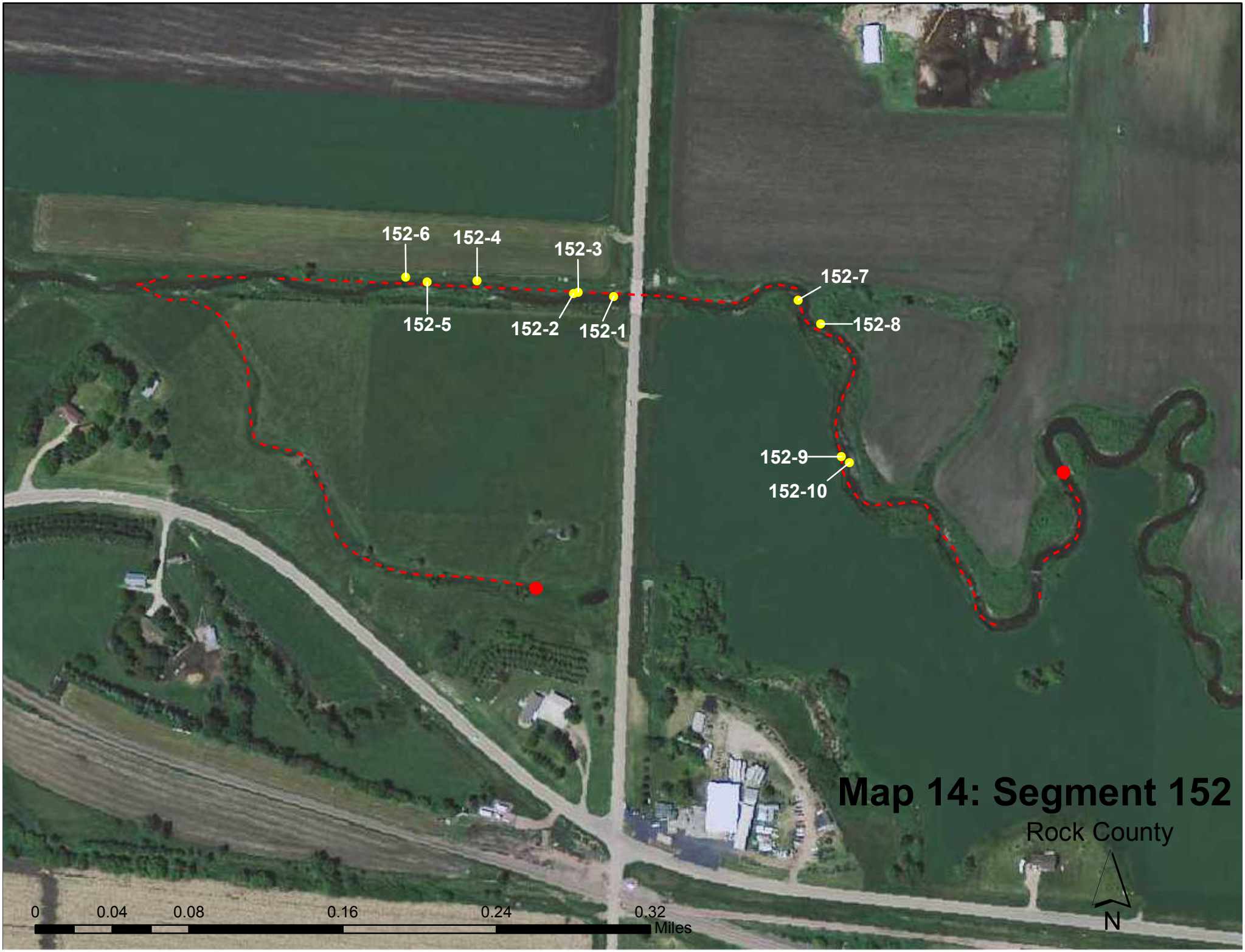
Pipestone County

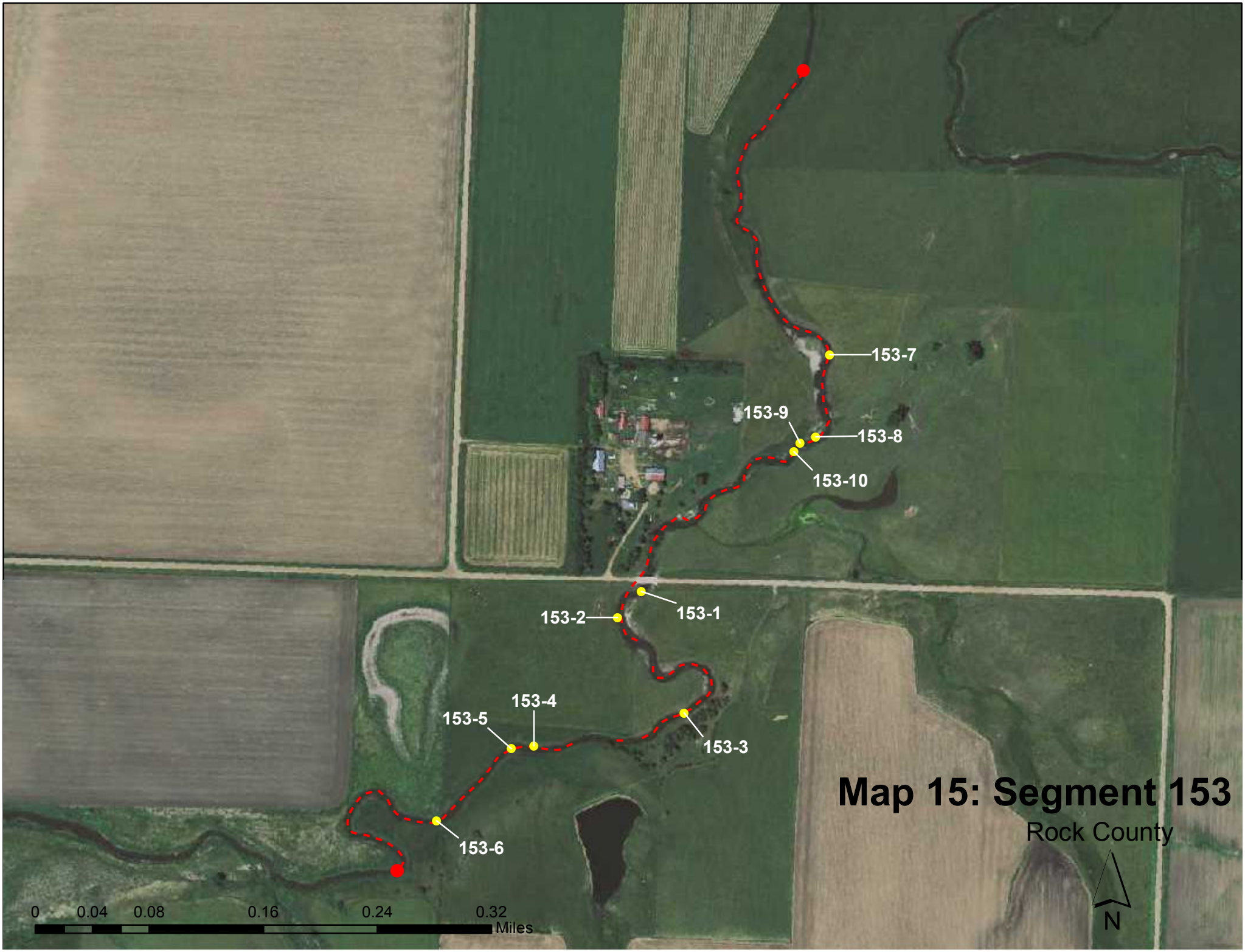

Map 11: Segment 149
Pipestone County
149-1
149-2
149-3
149-4
0
0.04
0.08
0.16
0.24
0.32
Miles
N

Map 12: Segment 150

Rock County

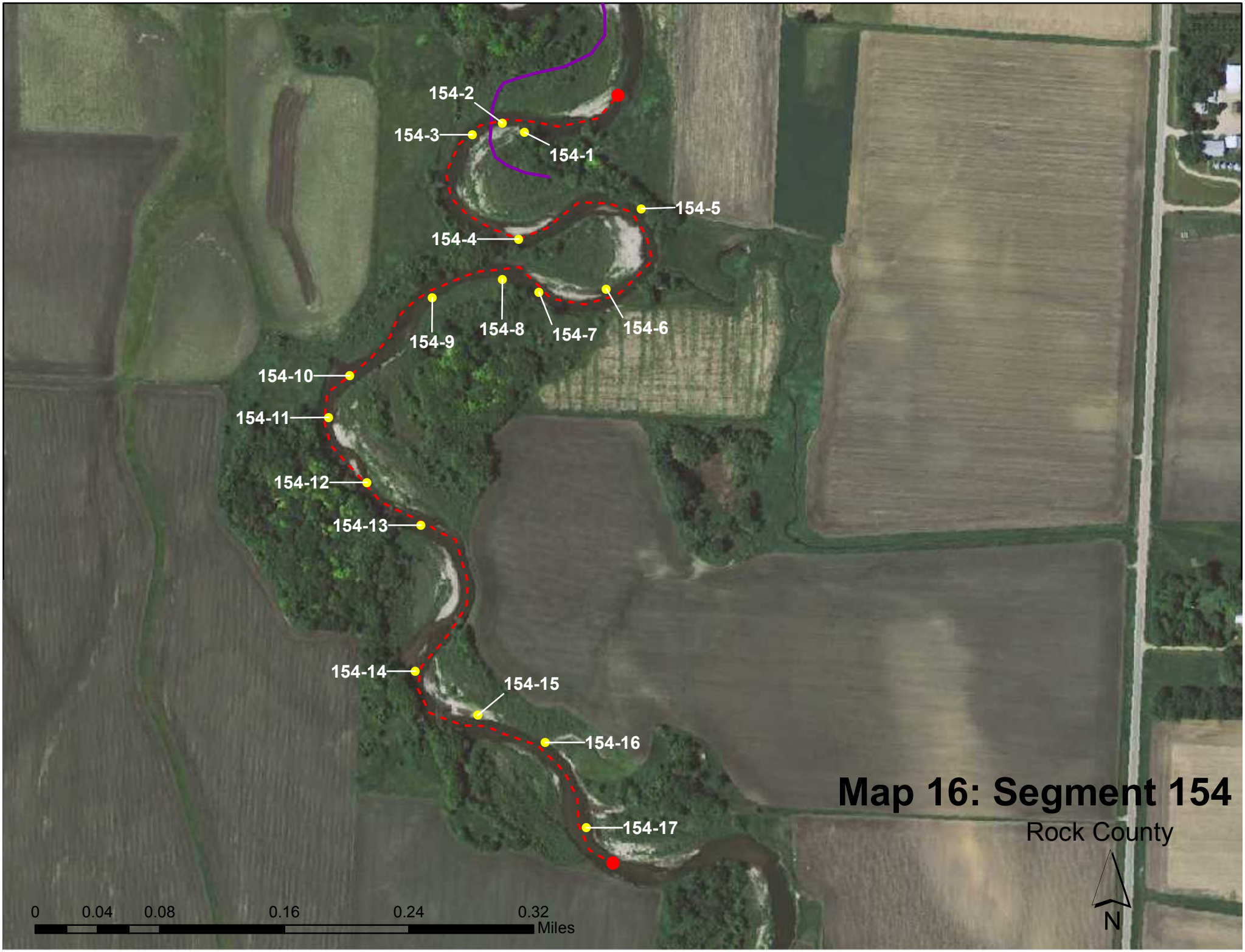

151-1
Map 13: Segment 151
Rock County
0
0.04
0.08
0.16
0.24
0.32
Miles
N

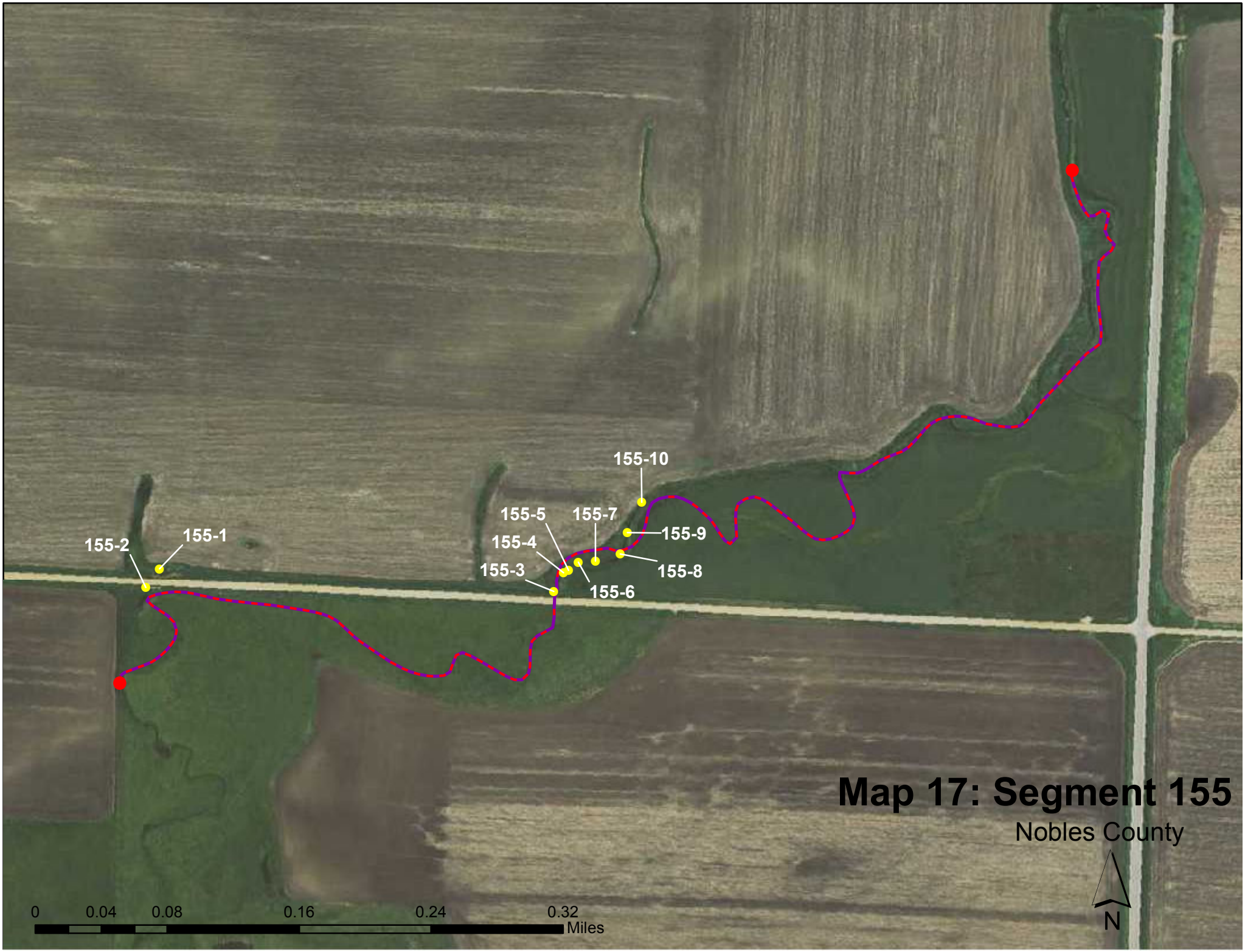

152-6
152-4
152-3
152-7
152-5
152-2
152-1
152-8
152-9
152-10
Map 14: Segment 152
Rock County
0
0.04
0.08
0.16
0.24
0.32
Miles
N

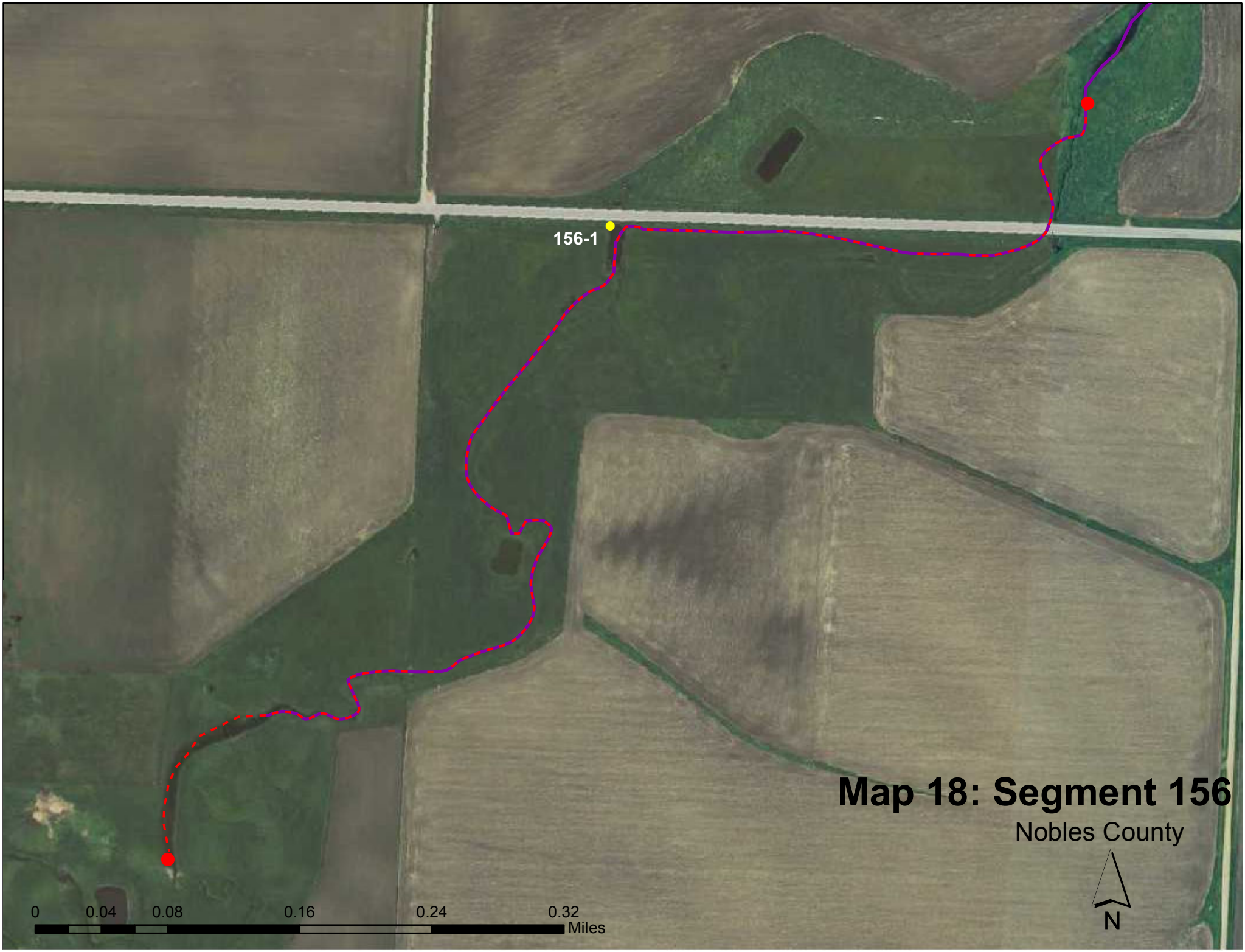


Map 15: Segment 153

Rock County

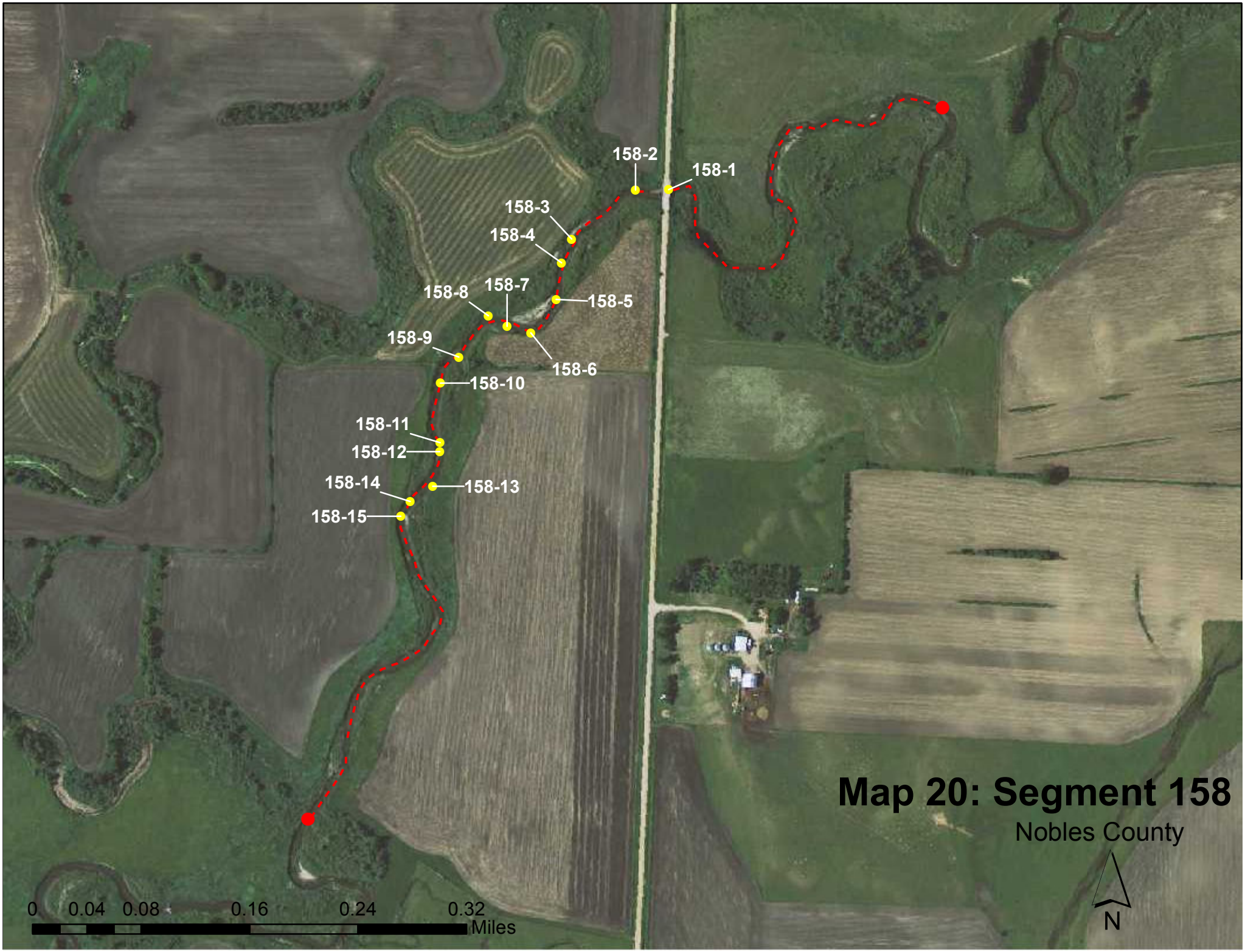

154-2
154-3
154-1
154-5
154-4
154-9
154-8
154-7
154-6
154-10
154-11
154-12
154-13
154-14
154-15
154-16
154-17
Map 16: Segment 154
Rock County
N
0
0.04
0.08
0.16
0.24
0.32
Miles


155-10
155-5
155-7
155-9
155-4
155-2
155-1
155-3
155-8
155-6
Map 17: Segment 155
Nobles County
0
0.04
0.08
0.16
0.24
0.32
Miles
N


156-1
Map 18: Segment 156
Nobles County
0
0.04
0.08
0.16
0.24
0.32
Miles
N

Map 19: Segment 157

Nobles County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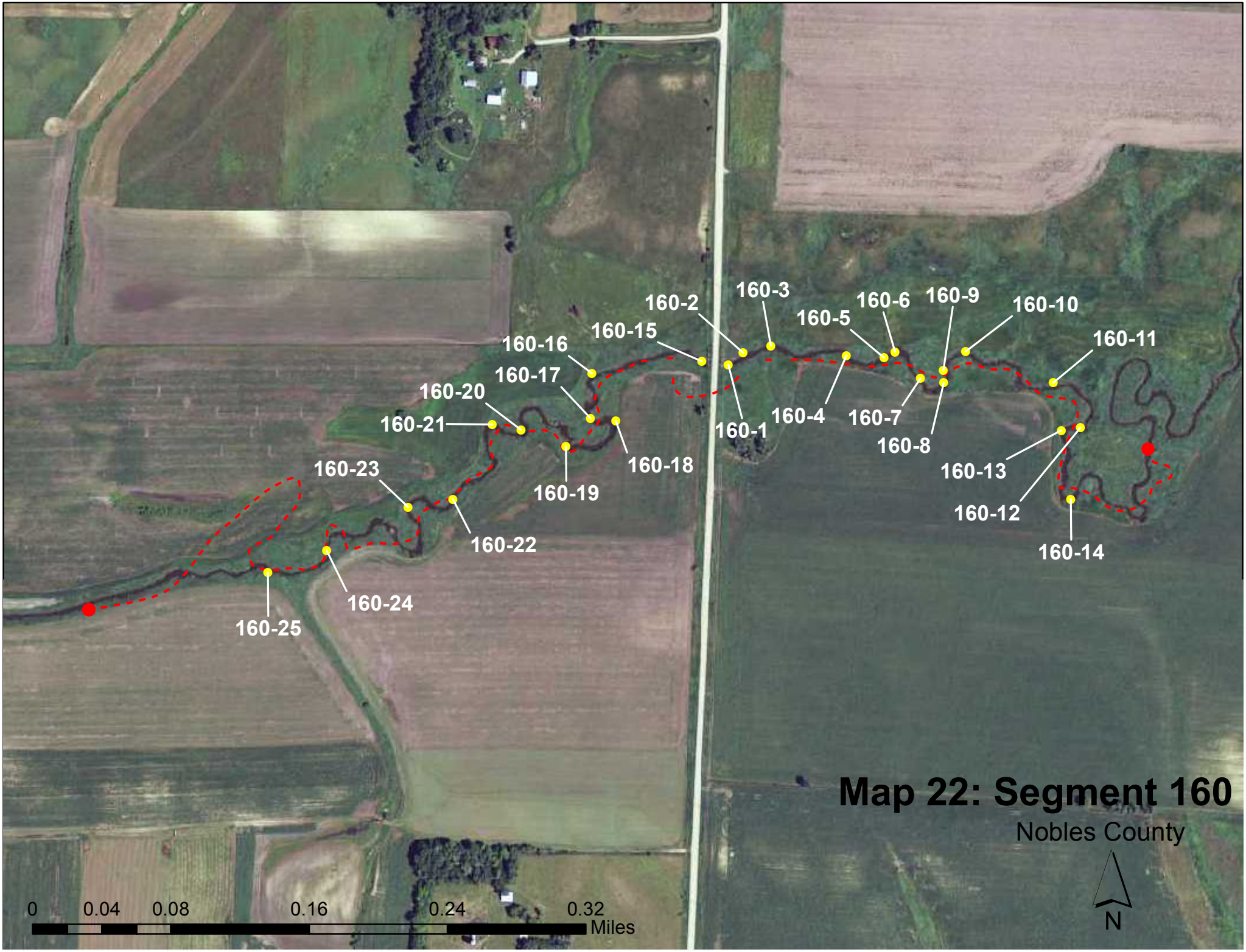
158-7
158-8
158-9
158-10
158-11
158-12
158-13
158-14
158-15
Map 20: Segment 158
Nobles County
0 0.04 0.08 0.16 0.24 0.32
Miles
N


159-3
159-4
159-2
159-10
159-12
159-6
159-11
159-1
159-5
159-7
159-8
159-9
Map 21: Segment 159
Nobles County
0 0.02750.055 0.11 0.165 0.22
Miles
N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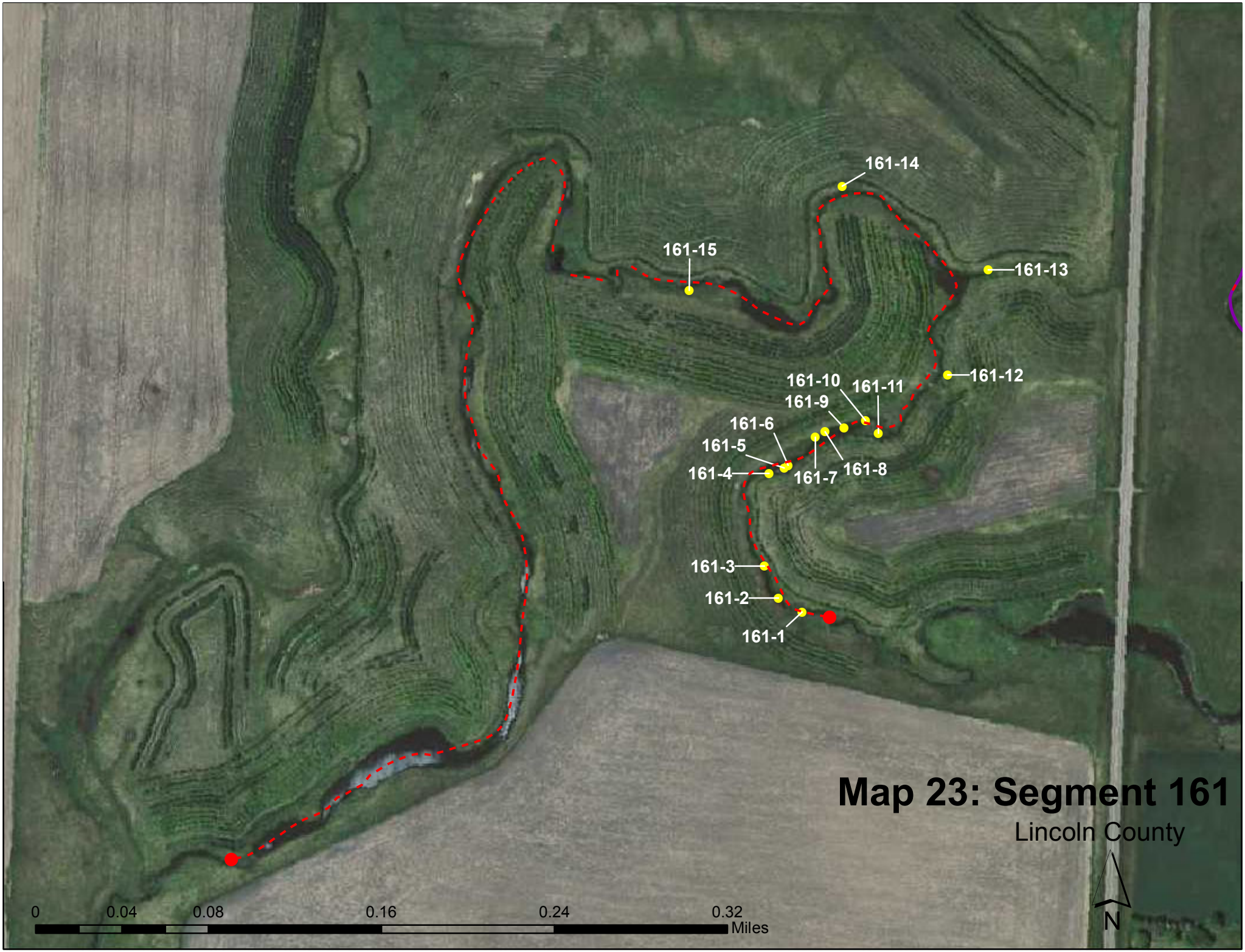
160-14
160-15
160-16
160-17
160-18
160-19
160-20
160-21
160-22
160-23
160-24
160-25
Map 22: Segment 160
Nobles County
N
0
0.04
0.08
0.16
0.24
0.32
Miles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161-13
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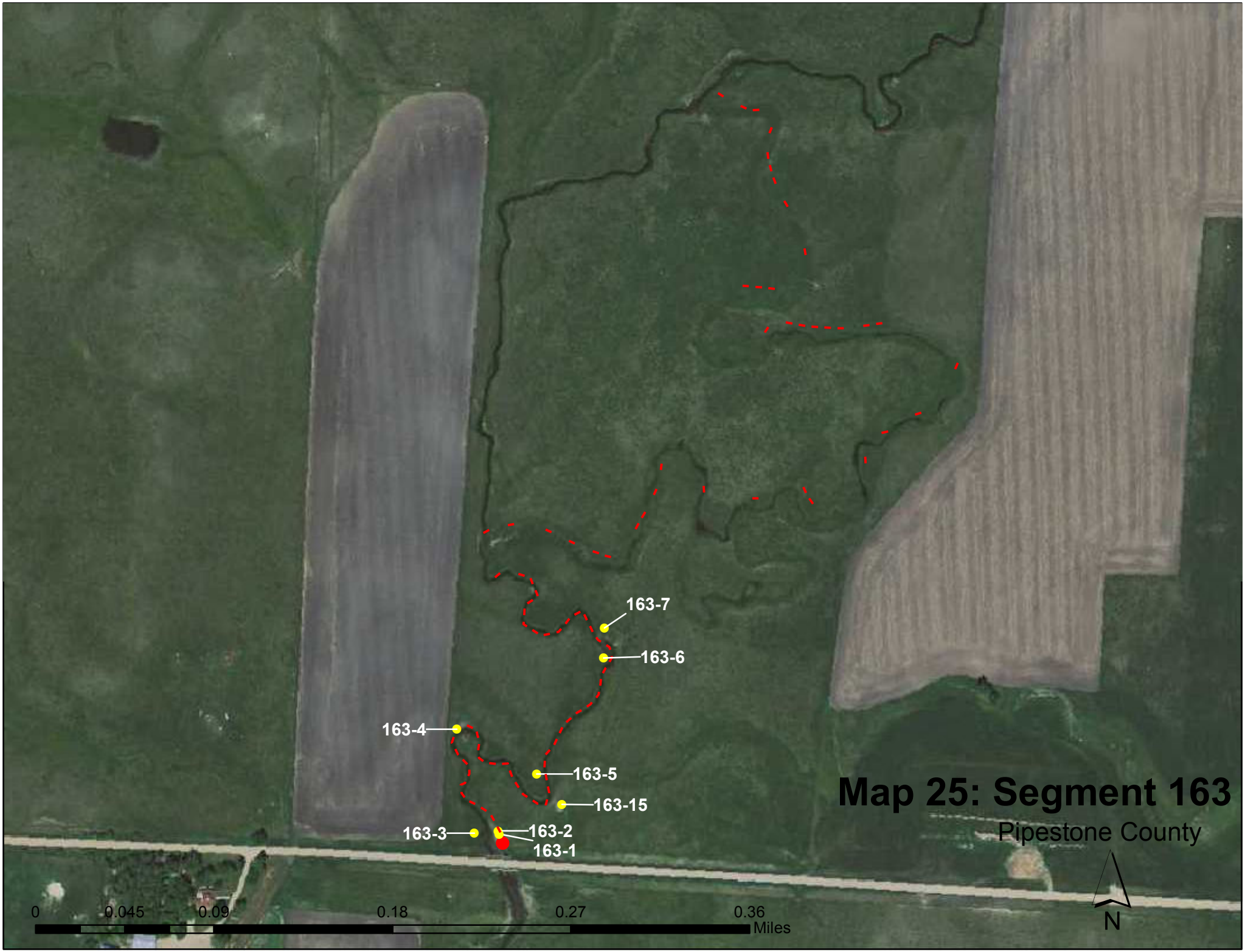
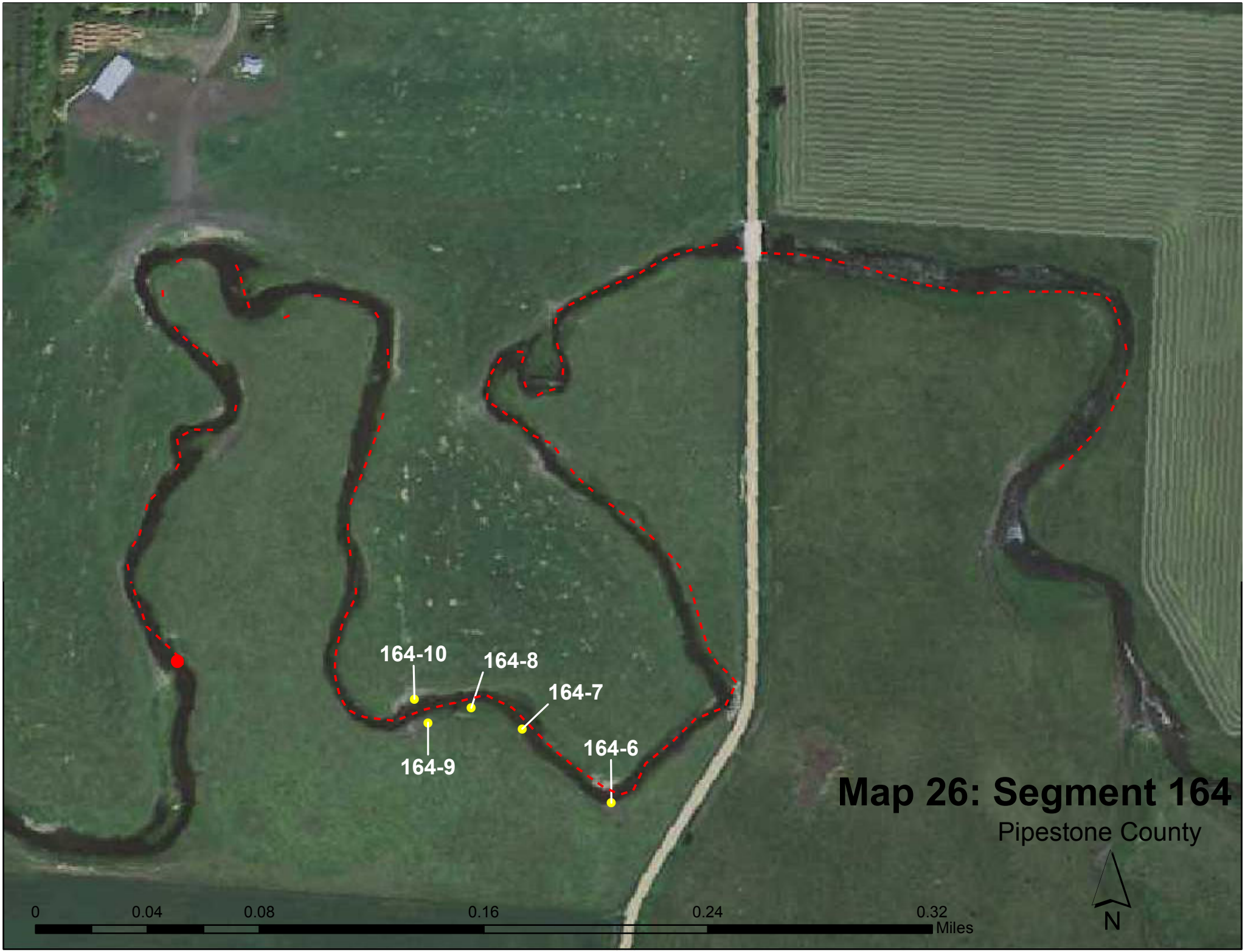
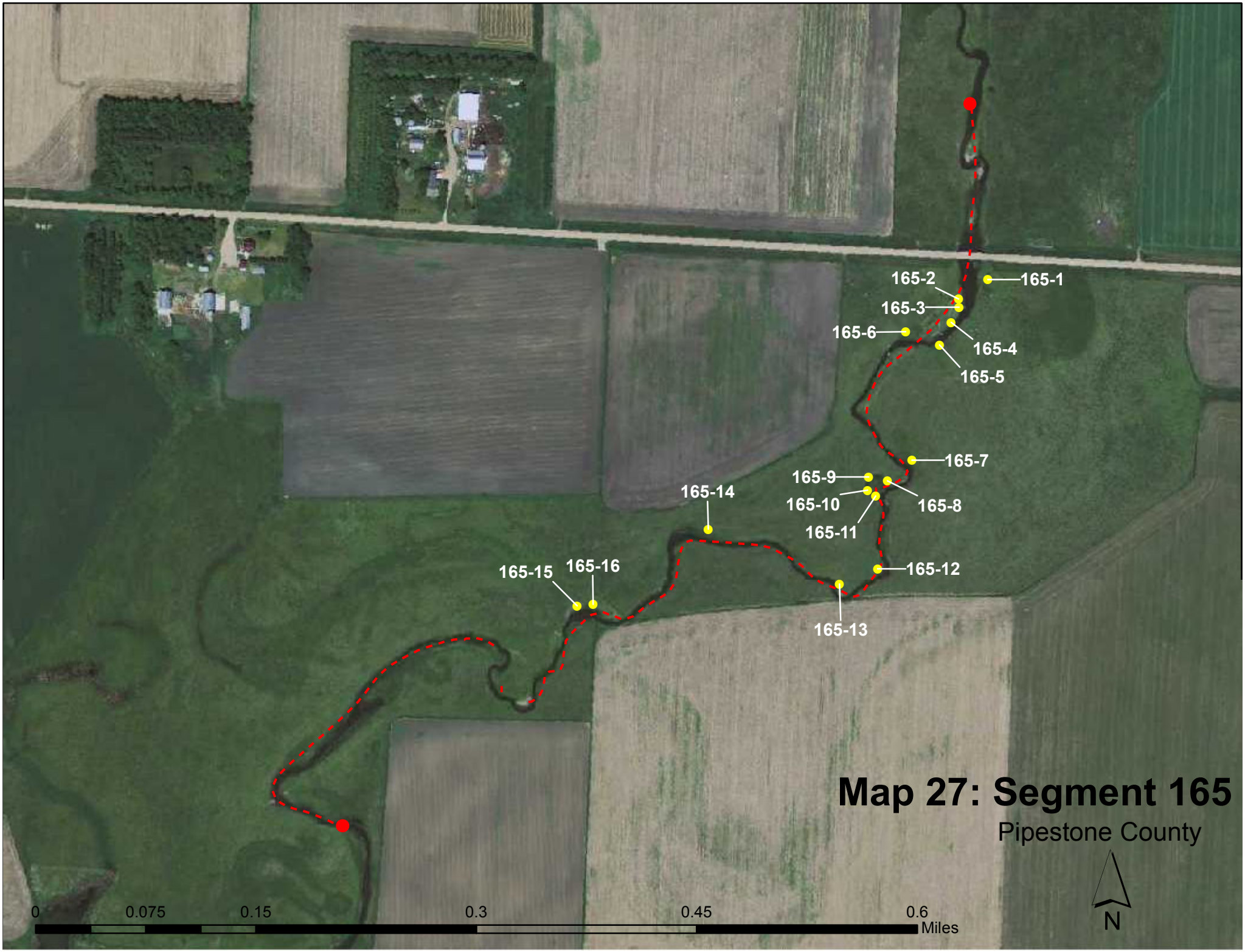
161-11
161-9
161-6
161-5
161-4
161-7
161-8
161-3
161-2
161-1
Map 23: Segment 161
Lincoln County
0
0.04
0.08
0.16
0.24
0.32
Miles
N


162-10
162-6
162-5
162-4
162-3
Map 24: Segment 162
Pipestone County
0
0.04
0.08
0.16
0.24
0.32
Miles
N


163-7
163-6
163-4
163-5
163-15
163-3
163-2
163-1
Map 25: Segment 163
Pipestone County
0
0.045
0.09
0.18
0.27
0.36
Miles
N


164-10
164-8
164-7
164-9
164-6
Map 26: Segment 164
Pipestone County
0
0.04
0.08
0.16
0.24
0.32
Miles
N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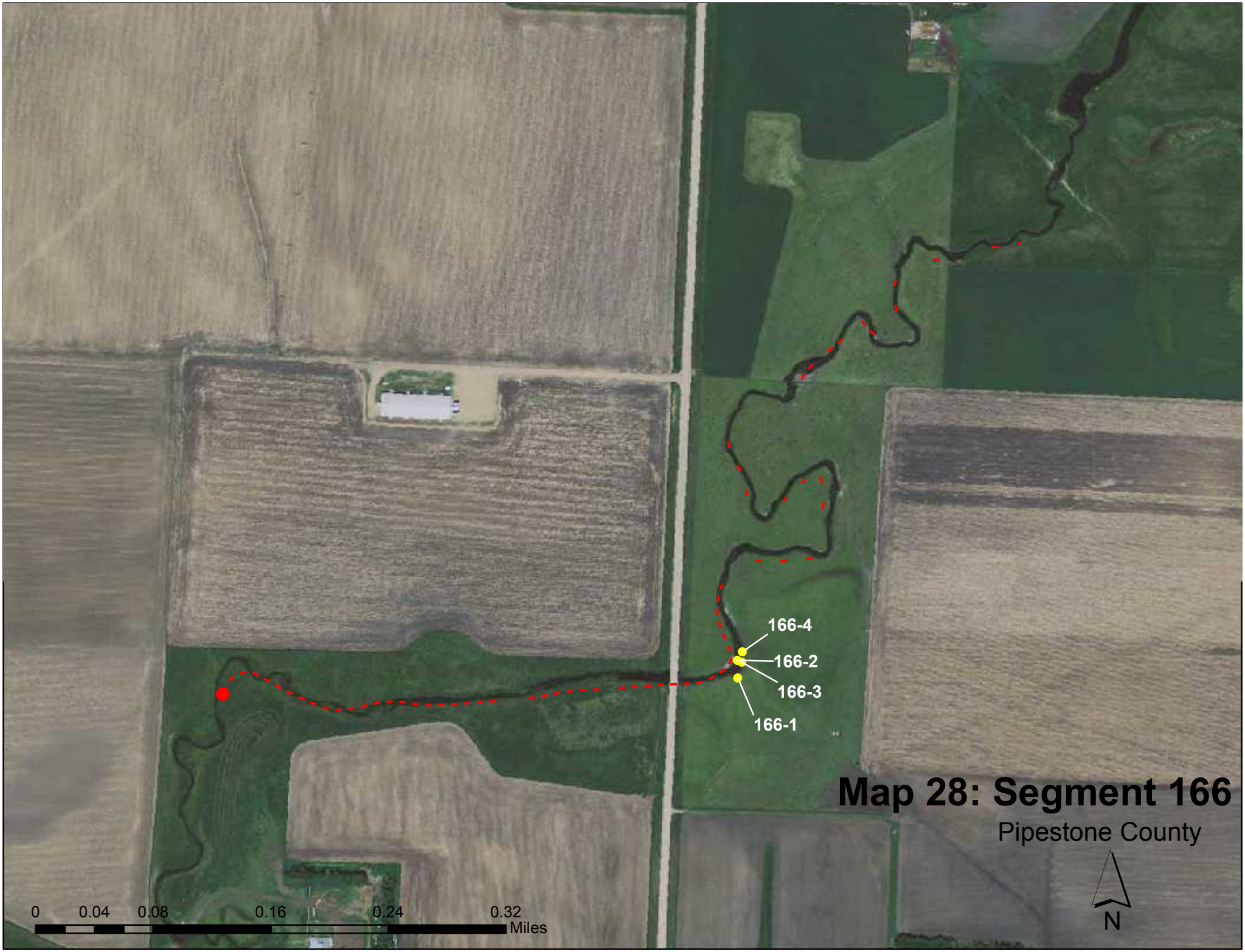
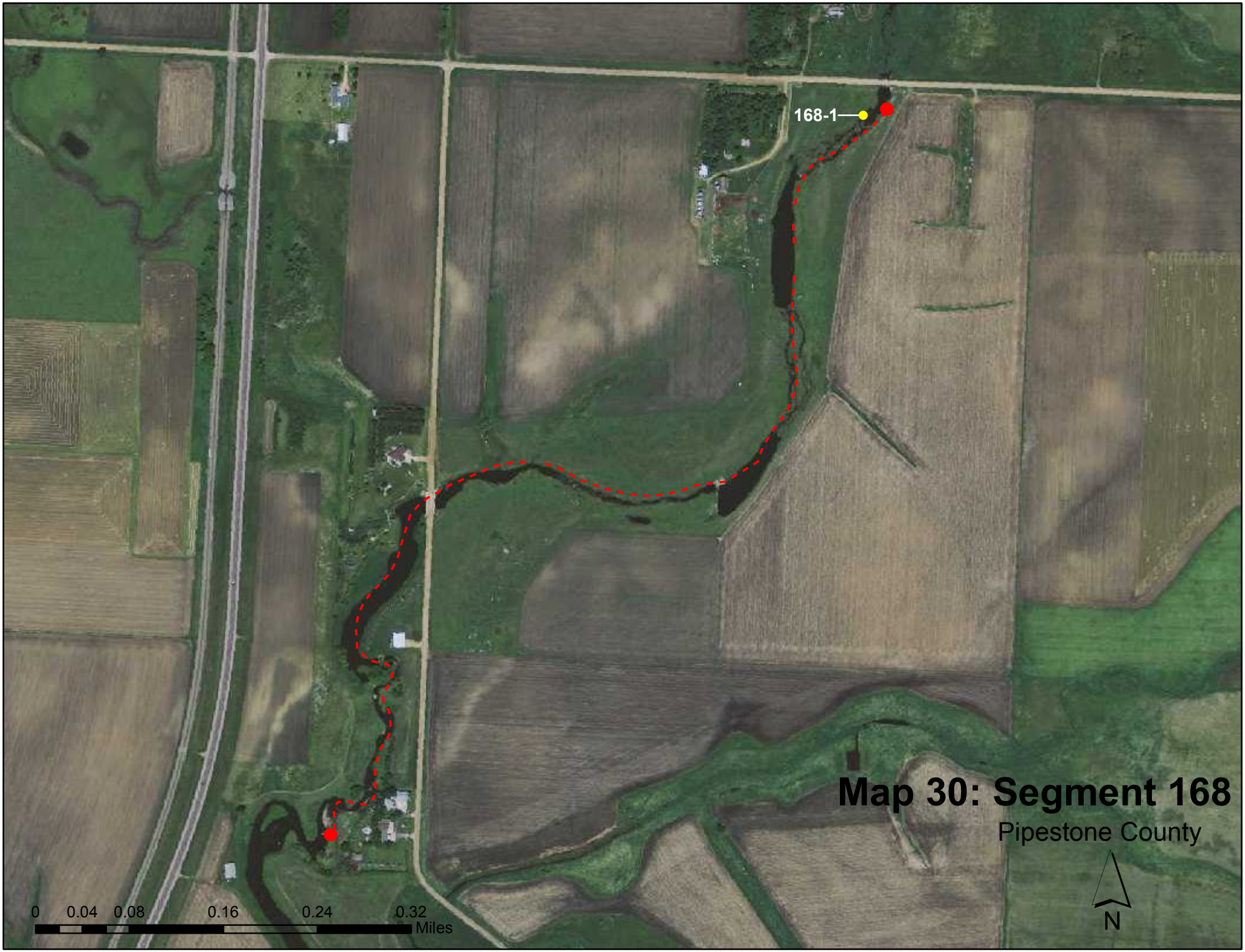
165-8
165-9
165-10
165-11
165-12
165-13
165-14
165-15
165-16
Map 27: Segment 165
Pipestone County
0
0.075
0.15
0.3
0.45
0.6
Miles
N

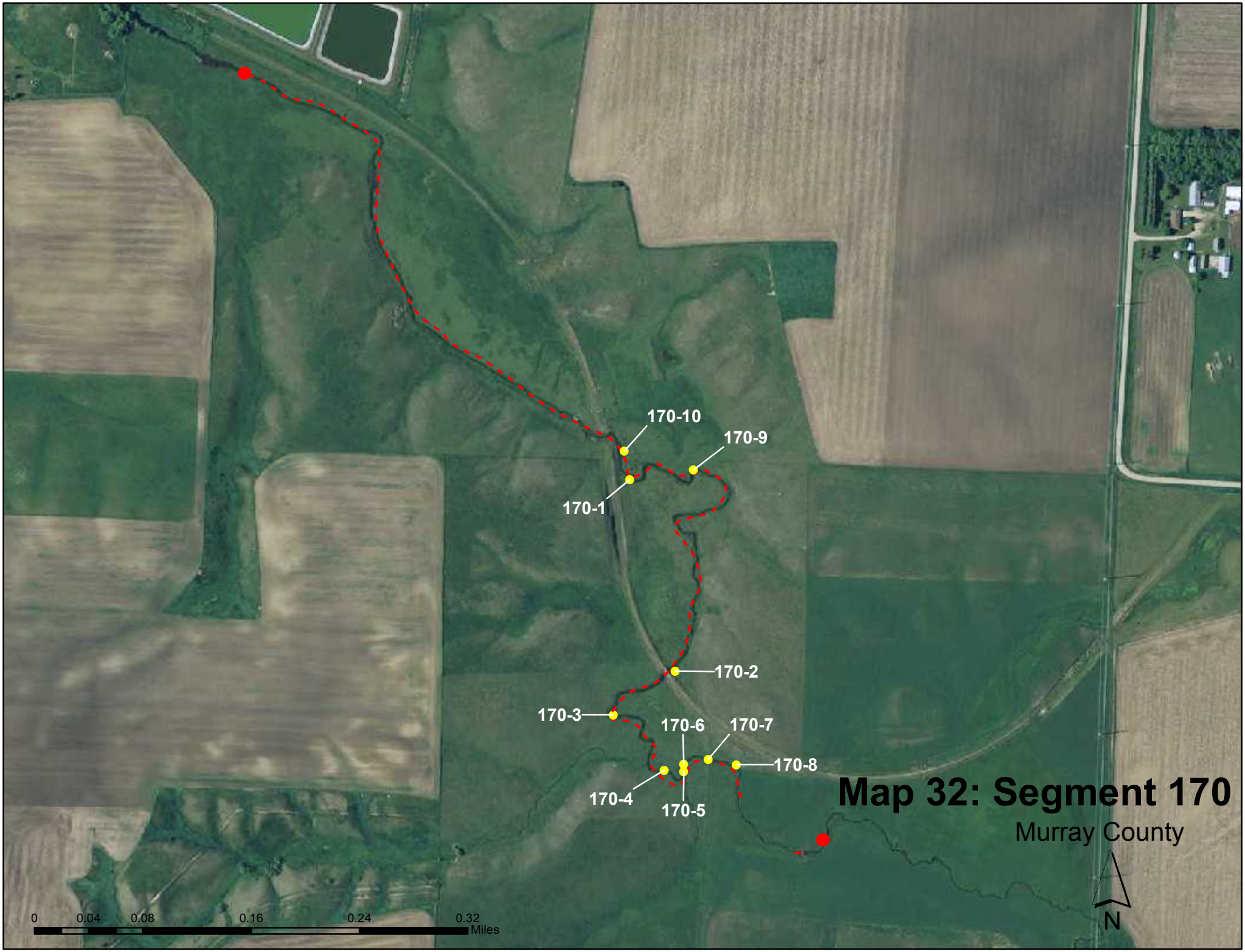

166-4
166-2
166-3
166-1
Map 28: Segment 166
Pipestone County
N
0
0.04
0.08
0.16
0.24
0.32
Miles

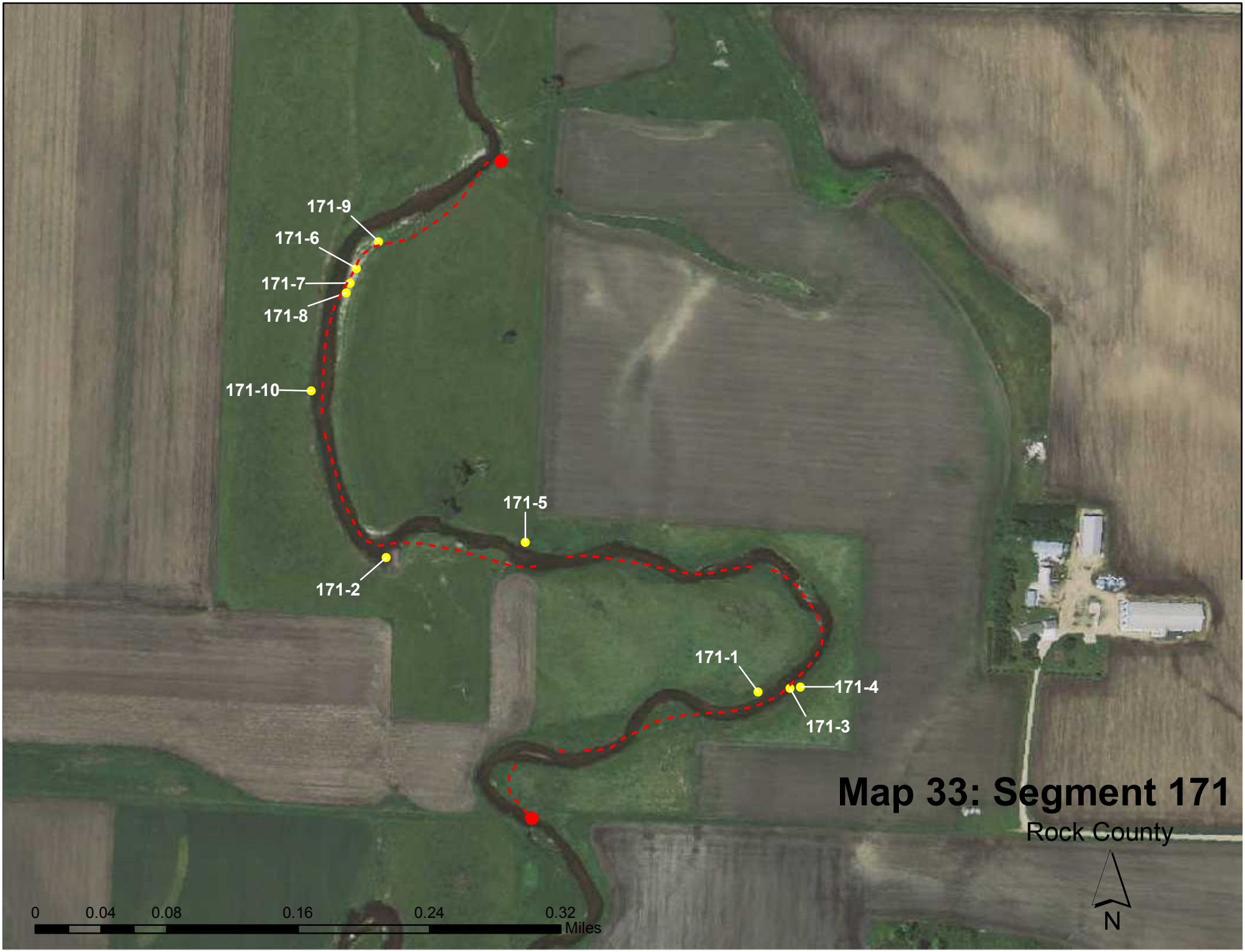

Map 29: Segment 167
Pipestone County
0
0.04
0.08
0.16
0.24
0.32
Miles
N

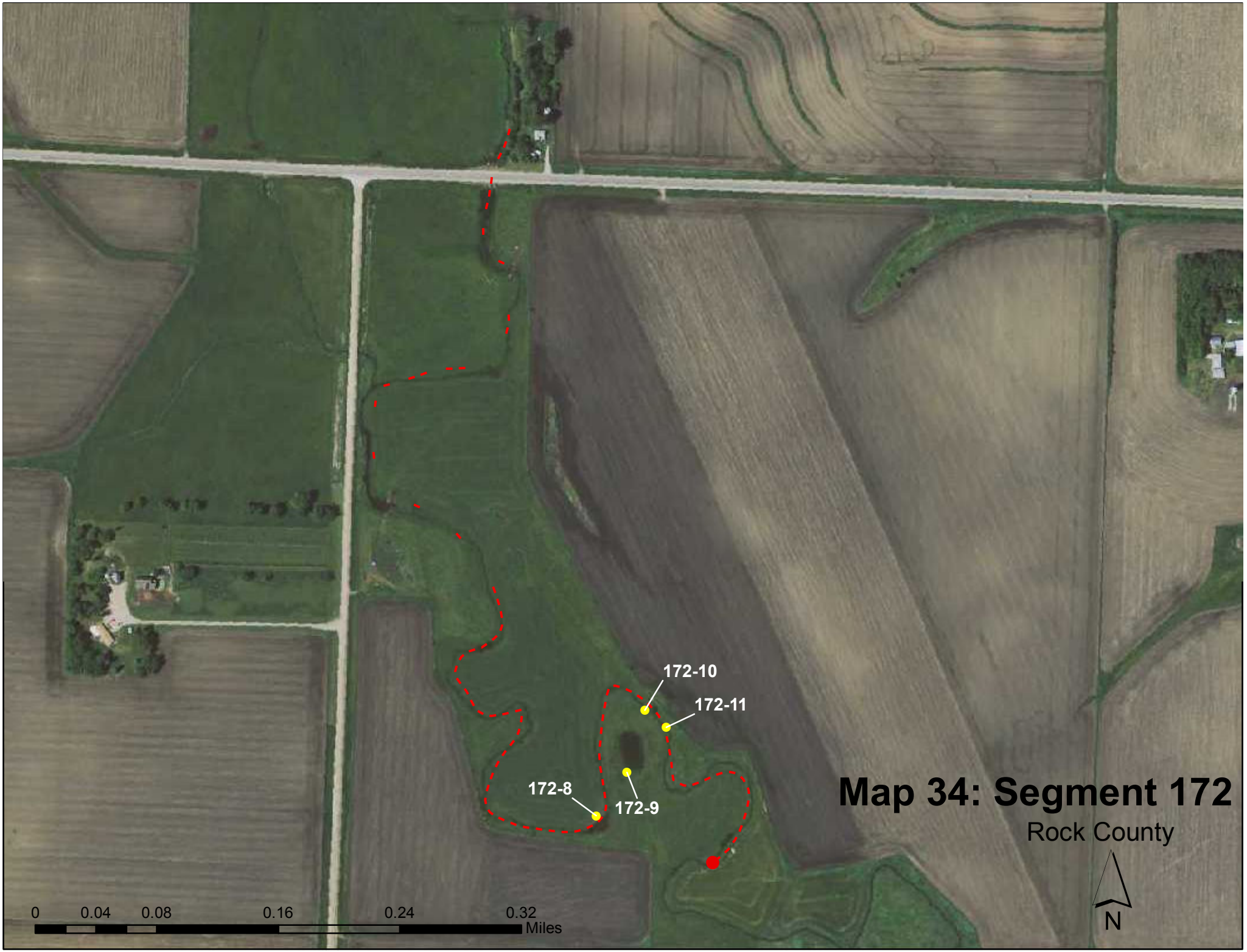

168-1
Map 30: Segment 168
Pipestone County
0 0.04 0.08 0.16 0.24 0.32
Miles
N

Map 31: Segment 169

Pipestone County

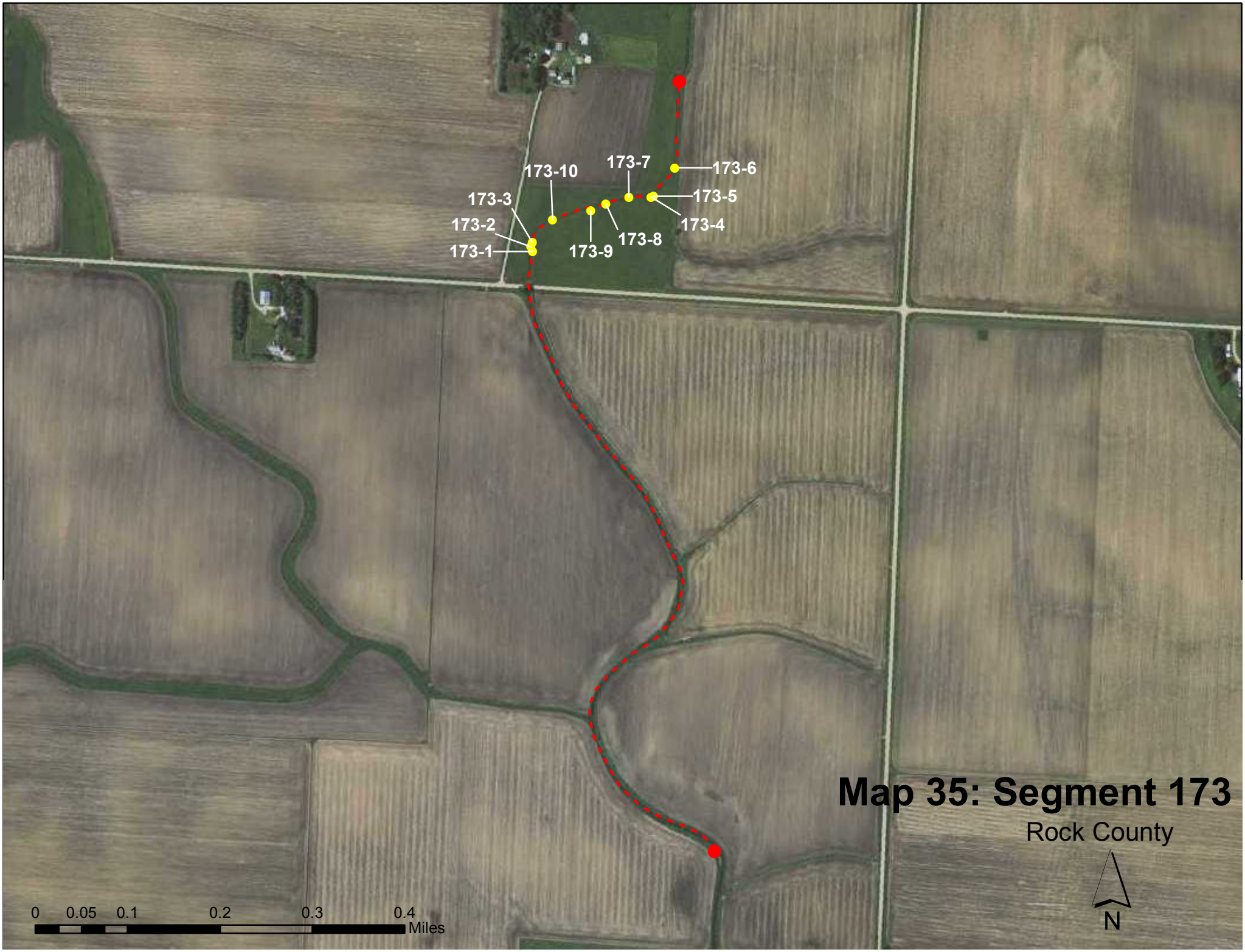

170-10
170-9
170-1
170-2
170-3
170-6
170-7
170-8
170-4
170-5
Map 32: Segment 170
Murray County
0
0.04
0.08
0.16
0.24
0.32
Miles
N


171-9
171-6
171-7
171-8
171-10
171-5
171-2
171-1
171-4
171-3
Map 33: Segment 171
Rock County
0
0.04
0.08
0.16
0.24
0.32
Miles
N



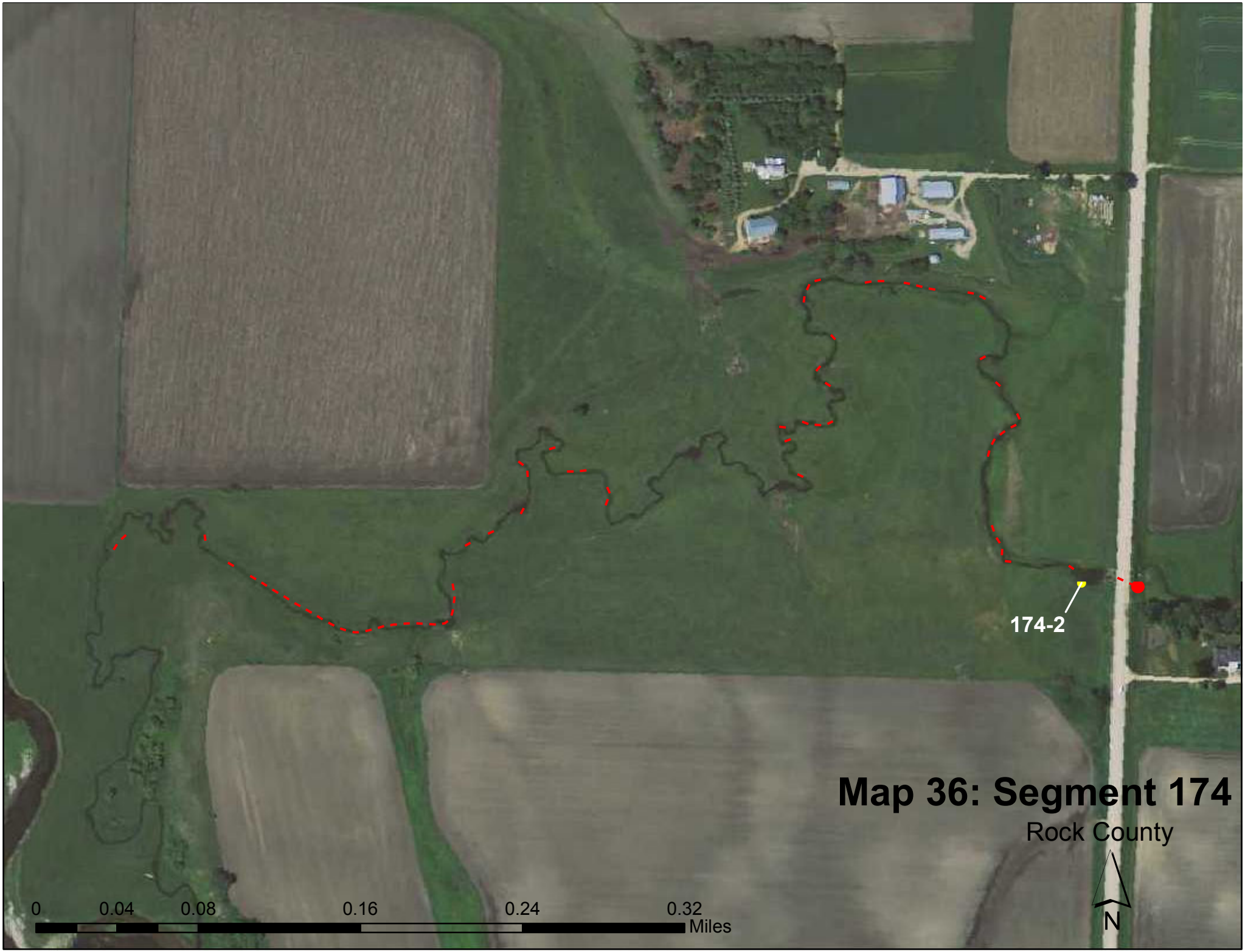
Map 34: Segment 172

Rock County



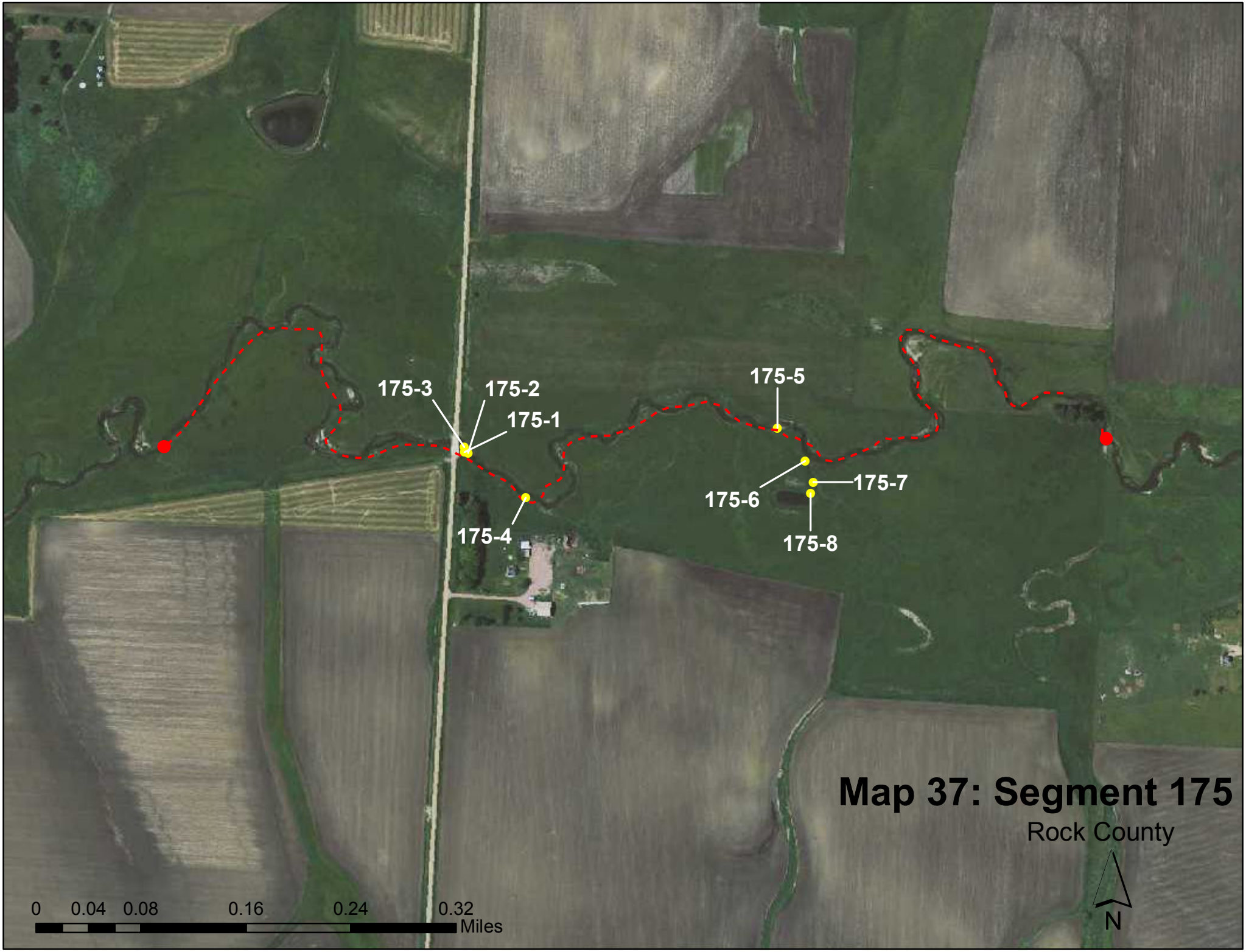
Map 35: Segment 173

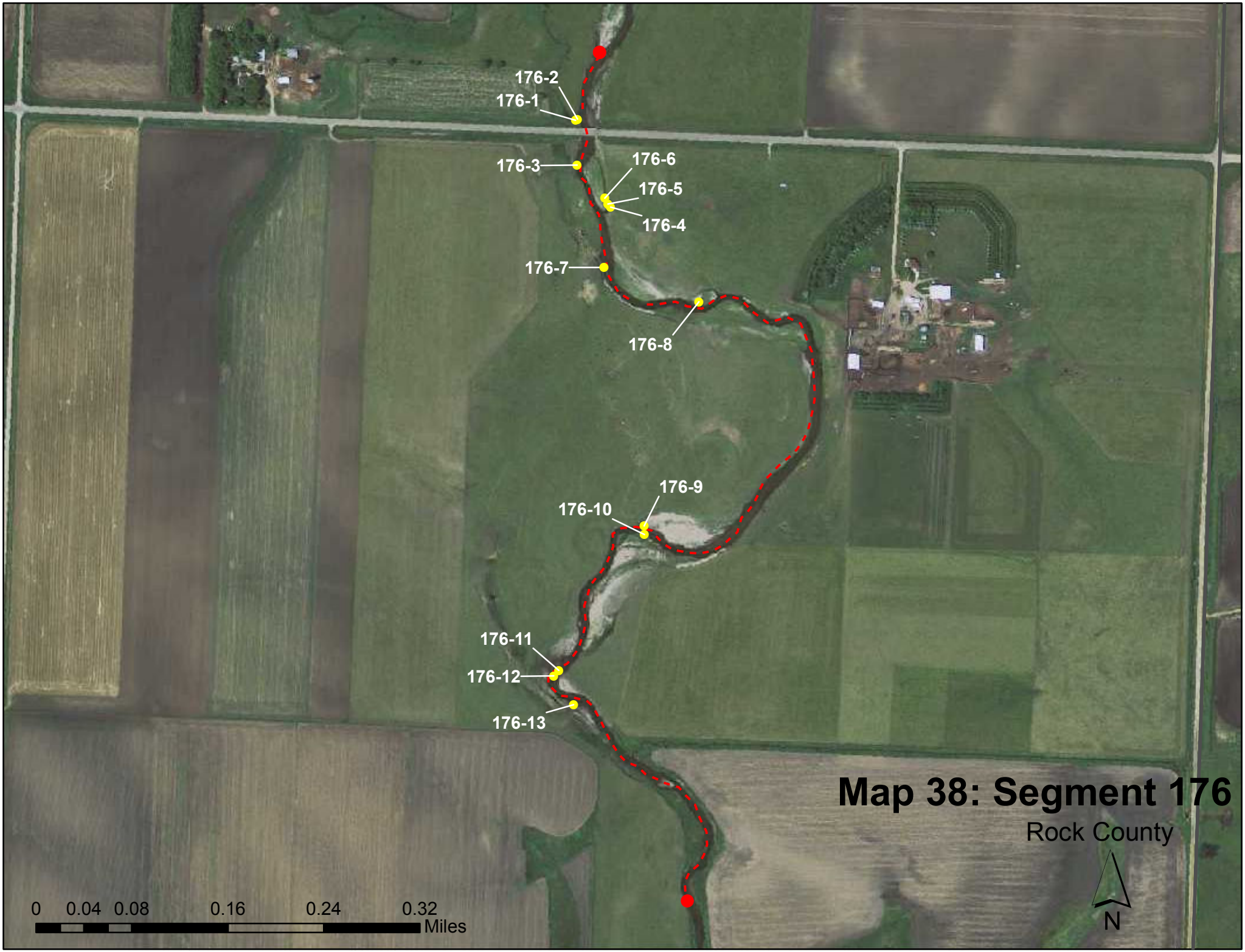
Rock County



Map 36: Segment 174

Rock County


175-3
175-2
175-1
175-4
175-5
175-6
175-7
175-8
Map 37: Segment 175
Rock County
0 0.04 0.08 0.16 0.24 0.32
Miles
N


176-2
176-1
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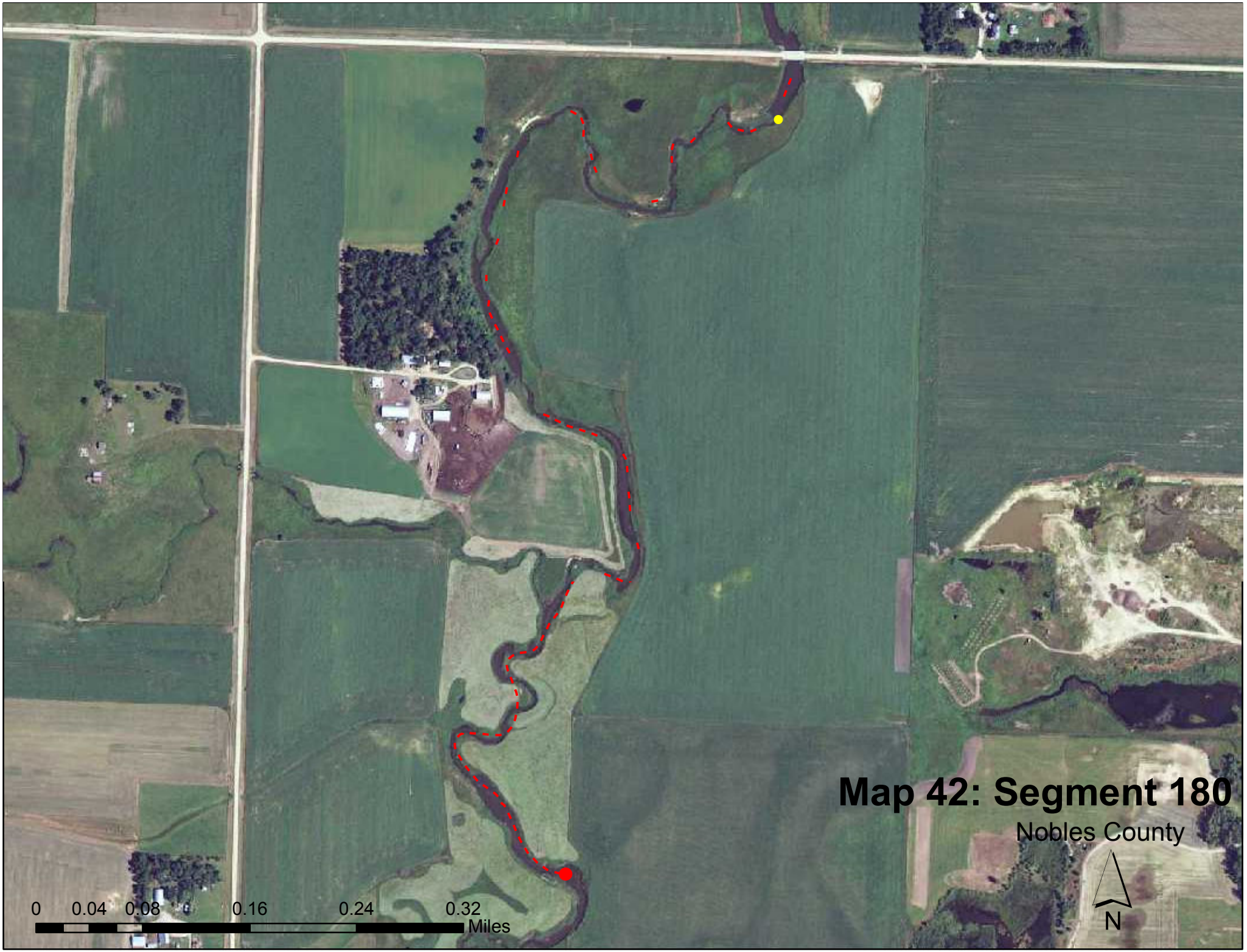
176-6
176-5
176-4
176-7
176-8
176-9
176-10
176-11
176-12
176-13
Map 38: Segment 176
Rock County
0 0.04 0.08 0.16 0.24 0.32
Miles
N

Map 39: Segment 177

Rock County


178-11
178-12
178-9
178-10
178-8
178-1
178-2
178-3
178-7
178-5
178-4
178-6
Map 40: Segment 178
Rock County
0 0.04 0.08 0.16 0.24 0.32
Miles
N


179-8
179-11
179-9
179-10
Map 41: Segment 179
Nobles County
0
0.04
0.08
0.16
0.24
0.32
Miles
N


Map 42: Segment 180
Nobles County
0 0.04 0.08 0.16 0.24 0.32
Miles
N

Appendix B- Tables 1- 4.

Table 1. 2012 Segments, Samples Sites, and Topeka Shiner Presence/Absence.

Table 2. 2013 Segments, Samples Sites, and Topeka Shiner Presence/Absence.

Table 3. List of Fish Species Collected at Segments 141-160, 2012.

Table 4. List of Fish Species Collected at Segments 161-180, 2013.

Table 1. Locations of the twenty stream Segments (sites 141-160) sampled in 2012, corresponding sampling sites within each segment, and a brief habitat description for each site from which Topeka shiners were collected. Included are a "Common Location" descriptor (approximate mileage & direction to nearest town/highways), the Township/Range for the 20 Segments, and UTM coordinates for each sampling site. Habitat type is an aproximate characterization of the specific sample site within the sample reach: pooled areas along the stream channel ('pool'); low-flow reaches of stream and backwater habitats along the main channel boundary ('in-channel/MCB'); ponds adjacent to the sample reach that are not connected to the main channel of the stream ('pool, off-channel').

Segment	Stream Name & Common Location								
	County	**T**	**R**	**Section(s)**	**Township Name**	**Site Number**	**Habitat Type**	**Latitude**	**Longitude**
141	**Medary Creek**	7 mi W Lake Benson							
	Lincoln	109	46	8	Verdi	141-1	in-channel/MCB	44.25815	-96.42240
						141-2	pool	44.25819	-96.42236
	Habitat Description: narrow (2-4m) headwater stream; little to no flow.								
	Topeka shiner: present: single Topeka shiner collected among submerged macrophytes in pool at bend in stream								
	Substrate = sand/silt mixture.								

(Table 1 continued on next page)

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
142	**Willow Creek** at Co Rd 8, 1 mi N, 12 mi W Holland									
		Pipestone	108	46	31	Altona	142-1	pool	44.11068	-96.42268
			107	46	6		142-2	pool	44.11055	-96.42243
							142-3	in-channel/MCB	44.11061	-96.42221
							142-4	in-channel/MCB	44.11047	-96.42223
							142-5	in-channel/MCB	44.11043	-96.42211
							142-6	in-channel/MCB	44.11018	-96.42220
							142-7	in-channel/MCB	44.11019	-96.42201
							142-8	in-channel/MCB	44.11019	-96.42194
							142-9	in-channel/MCB	44.11113	-96.42301
							142-10	in-channel/MCB	44.11116	-96.42346
	Habitat Description: narrow (2-m) headwater stream; little or no OCH present. Sampled pool at CR 8 bridge. Current very slow. Pooled areas separated by very narrow, flowing channel with hard substrate. No Topeka shiners captured. Substrate = silt, sand, gravel									
143	**E Branch Flandreau Creek** 4 mi N, 5 mi W Holland									
		Pipestone	108	45	18-20	Fountain Prairie	143-1	pool	44.15401	-96.29187
							143-2	pool	44.15404	-96.29184
							143-3	pool	44.15410	-96.29186
							143-4	pool	44.15429	-96.29205
							143-5	in-channel/MCB	44.15441	-96.29212
							143-6	pool	44.15331	-96.28520
							143-7	pool	44.15321	-96.28527
							143-8	pool	44.15323	-96.28568
							143-9	in-channel/MCB	44.15329	-96.28580
							143-10	in-channel/MCB	44.15327	-96.28601
	Habitat Description: low water. very narrow (1m) gently-flowing stream in channel with little/no OCH between pooled areas at bridges, sampled pools at bridges at CR 10 bride, and N/S gravel cross road. No Topeka shiners captured. Substrate = firm sand, gravel in-channel, deep silt in pools.									

Table 1. Continued.

Segment	Stream Name & Common Location								
	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
144	**N Branch Pipestone Creek** 4 mi W, 2.5 mi N Pipestone								
	Pipestone	107	46	29, 32	Troy	144-1	in-channel/MCB	44.04130	-96.39968
						144-2	in-channel/MCB	44.04120	-96.39945
						144-3	in-channel/MCB	44.04122	-96.40006
						144-4	in-channel/MCB	44.04082	-96.40085
						144-5	pool, off-channel	44.04061	-96.40078
						144-6	in-channel/MCB	44.04015	-96.40137
						144-7	in-channel/MCB	44.03929	-96.40102
						144-8	pool, off-channel	44.03667	-96.40429
						144-9	pool, off-channel	44.03342	-96.40218
						144-10	pool, off-channel	44.03321	-96.40217

Habitat Description: slowly flowing water through majority of segment, very little OCH along stream channel, sampled slackwater at bends and OC pools in adjacent pastures.
No Topeka shiners captured.
Substrate = silt, gravel, sand

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
145	**Pipestone Creek** 4 mi W, 2 mi N Ihlen									
		Pipestone	106	47	35, 36	Sweet	145-1	pool	43.93698	-96.44445
			105	47	2		145-2	pool	43.93703	-96.44465
							145-3	pool	43.93711	-96.44491
							145-4	pool	43.93716	-96.44545
							145-5	pool	43.93729	-96.44589
							145-6	pool	43.93742	-96.44625
	Habitat Description: low water. Very narrow headwater stream (0.5 m) that is nearly dry between pools, sampled in stagnant, pooled area upstream of a small boulder dam. Floating mats of filamentous algae, some submerged macrophytes.									
	Topeka shiner: present; three captured at down stream end of pooled area.									
	Substrate = silt, clay, some boulders/ sand									
146	**Split Rock Creek** 1.5 mi N, 0.5 mi E Jasper									
		Pipestone	105	46	28, 29	Eden	146-1	pool	43.87271	-96.38712
							146-2	pool	43.87293	-96.38684
							146-3	pool	43.87306	-96.38659
							146-4	pool	43.87321	-96.38572
							146-5	in-channel/MCB	43.87320	-96.38548
							146-6	pool, off-channel	43.87264	-96.38386
							146-7	pool, off-channel	43.87263	-96.38364
							146-8	pool	43.87273	-96.38244
							146-9	pool	43.87324	-96.38217
							146-10	pool	43.87539	-96.38146
	Habitat Description: very low water, shallow, sandy pool at CR 53 bridge, narow (2-3 m) channel between pooled areas									
	No Topeka shiners captured.									
	Substrate = boulder, gravel, sand. Deep silt along margins of pools.									

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
147	**Kanaranzi Creek** 1.5 mi W, 1 mi N Lismore									
		Nobles	103	42	17, 18	Altona	147-1	in-channel/MCB	43.73149	-95.91764
							147-2	in-channel/MCB	43.73161	-95.91743
							147-3	in-channel/MCB	43.73182	-95.91719
							147-4	in-channel/MCB	43.73199	-95.91705
							147-5	in-channel/MCB	43.73202	-95.91686
							147-6	in-channel/MCB	43.73128	-95.91596
							147-7	in-channel/MCB	43.73100	-95.91516
							147-8	in-channel/MCB	43.73022	-95.91492
							147-9	in-channel/MCB	43.73007	-95.91488
							147-10	in-channel/MCB	43.72980	-95.91491
							147-11	in-channel/MCB	43.72904	-95.91487
							147-12	in-channel/MCB	43.72874	-95.91463
							147-13	in-channel/MCB	43.72779	-95.91314
	Habitat Description: very low water. narrow (2-3 m) channel, high steep banks, little/no OCH. S end of segment ditched. No Topeka shiners captured. Substrate = gravel, silt, muck									
148	**Rock River** 2.5 mi E, 1 mi S Hatfield									
		Pipestone	106	44	33	Burke	148-1	in-channel/MCB	43.94307	-96.14039
							148-2	in-channel/MCB	43.94304	-96.14026
							148-3	in-channel/MCB	43.94280	-96.13970
							148-4	pool	43.94283	-96.13991
	Habitat Description: low water. 3m wide flowing stream, N end of segment nearly dry, some backwater OCH present Topeka shiner: present; two individuals captured in 20m x 3m backwater pool adjacent to the main channel Substrate = sand, gravel, muck									

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
149	**Rock River** 1 mi SW of Edgerton									
		Pipestone	105	44	33	Osborne	149-1	pool	43.85836	-96.13494
							149-2	pool	43.85839	-96.13508
							149-3	in-channel/MCB	43.85830	-96.13528
							149-4	in-channel/MCB	43.85809	-96.13627
	Habitat Description: low water. 13m wide flowing stream, small backwaters along MCB and pools at bridge									
	Topeka shiner: present; one individual captured in small backwater along MCB									
	Substrate = Gravel, sand, cobble. Deep silt in off-channel areas/pools									
150	**Split Rock Creek** 6 mi S, 2 mi W Jasper									
		Rock	104	47	35	Rose Dell	150-1	in-channel/MCB	43.77128	-96.43910
							150-2	in-channel/MCB	43.77116	-96.43912
							150-3	in-channel/MCB	43.77114	-96.43931
							150-4	in-channel/MCB	43.77149	-96.43814
	Habitat Description: 15m wide, slowly flowing stream with high, steep, eroded banks. Low water.									
	Topeka shiner: present; two individuals captured in 1.5m x 2.5m shallow, silted puddle along MCB									
	Substrate = gravel, sand, silt									

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
151	**Beaver Creek** E 4.5 mi N, 3.5 W Luverne along CSAH 20									
		Rock	103	45	18, 19	Mound	151-1	pool	43.71768	-96.28182
	Habitat Description: 80m x 40m pool downstream of bridge, no flow, deep (1m) silt over clay Topeka shiner: abundant; 18 individuals captured in single seine haul in pool. Substrate = deep (1m) silt over clay									
152	**Beaver Creek** 3.5 mi W, 1.5 mi S Beaver Creek along CSAH 7									
		Rock	102	47	35, 36	Beaver Creek	152-1	in-channel/MCB	43.59418	-96.43251
							152-2	in-channel/MCB	43.59419	-96.43293
							152-3	in-channel/MCB	43.59420	-96.43288
							152-4	in-channel/MCB	43.59426	-96.43393
							152-5	in-channel/MCB	43.59423	-96.43445
							152-6	in-channel/MCB	43.59427	-96.43467
							152-7	in-channel/MCB	43.59421	-96.43060
							152-8	in-channel/MCB	43.59404	-96.43035
							152-9	in-channel/MCB	43.59305	-96.43008
							152-10	in-channel/MCB	43.59301	-96.42999
	Habitat Description: 4m wide slowly flowing stream with high, steep banks. No OCH present. Sampled slow water areas along MCB No Topeka shiners captured. Substrate = Silt, sand, gravel									

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
153	**Beaver Creek** 1 mi N, 1.75 mi E Beaver Creek									
		Rock	102	46	14, 23	Beaver Creek	153-1	in-channel/MCB	43.63076	-96.32975
							153-2	in-channel/MCB	43.63049	-96.33007
							153-3	in-channel/MCB	43.62954	-96.32909
							153-4	in-channel/MCB	43.62915	-96.33117
							153-5	in-channel/MCB	43.62911	-96.33148
							153-6	in-channel/MCB	43.62835	-96.33249
							153-7	in-channel/MCB	43.63324	-96.32725
							153-8	in-channel/MCB	43.63240	-96.32740
							153-9	in-channel/MCB	43.63233	-96.32762
							153-10	in-channel/MCB	43.63224	-96.32770

Habitat Description: 3m wide slowly flowing stream.High, steep banks. Lots of bank erosion and very little OCH. Off channel ponds along northern 1/3 of segment were dry. Water very low. Cattle in stream. Sampled slack water along MCB. No Topeka shiners captured.

Substrate = firm sand/silt in backwater; sand/gravel in main channel.

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
154	**Rock River** 4mi S, 2.5 mi W Steen									
		Rock	101	45	13	Clinton	154-1	pool	43.55354	-96.18125
							154-2	in-channel/MCB	43.55362	-96.18154
							154-3	in-channel/MCB	43.55350	-96.18191
							154-4	in-channel/MCB	43.55254	-96.18127
							154-5	pool	43.55287	-96.17972
							154-6	in-channel/MCB	43.55211	-96.18013
							154-7	in-channel/MCB	43.55206	-96.18099
							154-8	in-channel/MCB	43.55216	-96.18146
							154-9	in-channel/MCB	43.55197	-96.18235
							154-10	in-channel/MCB	43.55121	-96.18336
							154-11	in-channel/MCB	43.55081	-96.18361
							154-12	in-channel/MCB	43.55022	-96.18309
							154-13	in-channel/MCB	43.54985	-96.18238
							154-14	riffle	43.54849	-96.18238
							154-15	in-channel/MCB	43.54810	-96.18156
							154-16	in-channel/MCB	43.54787	-96.18069
							154-17	in-channel/MCB	43.54709	-96.18012

Habitat Description: Wide (10m) flowing stream with ample OCH. Channel is braided along meanders, with backwater habitat along sand/gravel bars. Wooded riparian corridor.
No Topeka shiners captured.
Substrate = gravel, sand, silt

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
155	**Elk Creek** 3 mi N, 3 mi E Magnolia, along CSAH 19									
		Nobles	103	43	29, 32	Lismore	155-1	pool	43.68849	-96.02497
							155-2	pool	43.68832	-96.02512
							155-3	pool	43.68842	-96.02019
							155-4	in-channel/MCB	43.68859	-96.02008
							155-5	in-channel/MCB	43.68861	-96.02002
							155-6	in-channel/MCB	43.68868	-96.01990
							155-7	in-channel/MCB	43.68870	-96.01969
							155-8	in-channel/MCB	43.68877	-96.01940
							155-9	in-channel/MCB	43.68896	-96.01932
							155-10	in-channel/MCB	43.68923	-96.01916
	Habitat Description: Water very low. Narrow (2m) intermittent stream. Stream bed is dry in places between isolated pools. No flow. Sampled at pooled areas at culverts at CH 19. No Topeka shiners captured. Substrate = silt, muck, gravel									
156	**Elk Creek** 4 mi N, 4 mi E Magnolia along CSAH 14									
		Nobles	103	43	21, 28	Lismore	156-1	pool	43.70276	-96.00072
	Habitat Description: very small headwater stream (1m) that is nearly dry between pools. Sampled on margin of 20m x 50m pool at bridge. Pool depth > 2m. Thick mats of floating, filamentous algae, pool depth, and submerged macrophytes made seining difficult. Topeka shiner: abundant; 5 individuals captured in single kick set on margin of pool. Numerous male Topeka shiners were observed defending cleared patches of gravel along the margin of the pool. Substrate = silt over gravel.									

Table 1. Continued.

Segment	Stream Name & Common Location								
	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
157	**Kanaranzi Creek** 1.5 mi E, 2 mi S Lismore								
	Nobles	103	42	17, 19, 20	Larkin	157-1	pool	43.71762	-95.91115
						157-2	pool	43.71757	-95.91102
						157-3	pool	43.71753	-95.91108
						157-4	pool	43.71755	-95.91112
						157-5	pool	43.71785	-95.91112
						157-6	pool	43.71786	-95.91115
						157-7	pool	43.71793	-95.91111
						157-8	in-channel/MCB	43.71818	-95.91105
						157-9	in-channel/MCB	43.71820	-95.91097
						157-10	in-channel/MCB	43.71829	-95.91093
						157-11	in-channel/MCB	43.71835	-95.91097
						157-12	in-channel/MCB	43.71785	-95.91100

Habitat Description: Stream has been ditched/channelized. High banks and no OCH is present except for a pooled area upstream of a beaver dam that is S of the bridge.
No Topeka shiners captured.
Substrate = silt, muck, sand

Table 1. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
158	**Kanaranzi Creek** 2 mi E, 3.5 mi S Magnolia	Nobles	102	43	31, 32	Westside	158-1	pool	43.59742	-96.03359
							158-2	pool	43.59741	-96.03408
							158-3	in-channel/MCB	43.59686	-96.03499
							158-4	in-channel/MCB	43.59660	-96.03513
							158-5	in-channel/MCB	43.59620	-96.03518
							158-6	pool	43.59584	-96.03554
							158-7	in-channel/MCB	43.59590	-96.03589
							158-8	in-channel/MCB	43.59600	-96.03617
							158-9	in-channel/MCB	43.59555	-96.03658
							158-10	in-channel/MCB	43.59527	-96.03683
							158-11	in-channel/MCB	43.59463	-96.03681
							158-12	in-channel/MCB	43.59454	-96.03681
							158-13	in-channel/MCB	43.59416	-96.03690
							158-14	in-channel/MCB	43.59399	-96.03722
							158-15	in-channel/MCB	43.59383	-96.03735

Habitat Description: 4m wide slowly flowing stream. Sampled backwater and off-channel habitats along MCB and side channels. Hard gravel/sand substrate in channel. Ample low-flow habitat along sand/gravel bars.

No Topeka shiners captured.

Substrate = sand, gravel, silt

Table 1. Continued.

Segment	Stream Name & Common Location								
	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
159	**Kanaranzi Creek** 1 mi NW Adrian along CSAH 35								
	Nobles	102	43	13	Westside	159-1	pool	43.64453	-95.95165
						159-2	pool	43.64481	-95.95166
						159-3	pool	43.64479	-95.95182
						159-4	pool	43.64461	-95.95195
						159-5	in-channel/MCB	43.64438	-95.95194
						159-6	in-channel/MCB	43.64427	-95.95224
						159-7	in-channel/MCB	43.64406	-95.95307
						159-8	in-channel/MCB	43.64407	-95.95333
						159-9	in-channel/MCB	43.64401	-95.95360
						159-10	pool	43.64448	-95.95347
						159-11	in-channel/MCB	43.64467	-95.95077
						159-12	in-channel/MCB	43.64500	-95.94982

Habitat Description: Flowing 7m wide stream. Abundant backwaters, pools and OCH along MCB.
Topeka shiner: present; a single individual captured in a side channel over gravel/sand mix after much effort
Substrate = gravel, sand, silt

Table 1. Contined

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
160	**Little Rock River** 1 mi E, 4 mi S Rushmore	Nobles	101	41	16, 17	Ransom	160-1	in-channel/MCB	43.55809	-95.77372
							160-2	in-channel/MCB	43.55819	-95.77356
							160-3	in-channel/MCB	43.55826	-95.77324
							160-4	in-channel/MCB	43.55820	-95.77237
							160-5	in-channel/MCB	43.55819	-95.77193
							160-6	in-channel/MCB	43.55824	-95.77181
							160-7	in-channel/MCB	43.55803	-95.77151
							160-8	in-channel/MCB	43.55800	-95.77123
							160-9	in-channel/MCB	43.55810	-95.77124
							160-10	in-channel/MCB	43.55827	-95.77099
							160-11	in-channel/MCB	43.55803	-95.76997
							160-12	in-channel/MCB	43.55766	-95.76964
							160-13	in-channel/MCB	43.55763	-95.76986
							160-14	in-channel/MCB	43.55706	-95.76972
							160-15	in-channel/MCB	43.55811	-95.77403
							160-16	in-channel/MCB	43.55798	-95.77529
							160-17	in-channel/MCB	43.55760	-95.77529
							160-18	in-channel/MCB	43.55759	-95.77500
							160-19	in-channel/MCB	43.55736	-95.77556

Table 1. Site 160 Continued, Table 1 Concluded.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
160	**Little Rock River** 1 mi E, 4 mi S Rushmore									
							160-20	in-channel/MCB	43.55748	-95.77608
							160-21	in-channel/MCB	43.55752	-95.77642
							160-22	in-channel/MCB	43.55689	-95.77684
							160-23	in-channel/MCB	43.55681	-95.77736
							160-24	in-channel/MCB	43.55642	-95.77828
							160-25	in-channel/MCB	43.55622	-95.77895
	Habitat Description: Slowly flowing 3m wide stream with high, steep banks. Little or no OCH. Portions of this stream appear to have been ditched and rip-rapped.									
	No Topeka shiners captured.									
	Substrate = gravel, sand, muck									

Table 2. Locations of the twenty stream Segments (sites 161-180) sampled in 2013, corresponding sampling sites within each segment, and a brief habitat description for each site from which Topeka shiners were collected. Included are a "Common Location" descriptor (approximate mileage & direction to nearest town/highways), the Township/Range for the 20 Segments, and UTM coordinates for each sampling site. Habitat type is an aproximate characterization of the specific sample site within the sample reach: 'pooled areas along the stream channel ('pool'); low-flow reaches of stream and backwater habitats along the main channel boundary ('in-channel/MCB'); ponds adjacent to the sample reach that are not connected to the main channel of the stream ('pool, off-channel').

Segment	Stream Name & Common Location								
	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
161	**Medary Creek**	7 mi W Lake Benson							
	Lincoln	109	46	7	Verdi	161-1	in-channel/MCB	44.25807000	-96.42702300
						161-2	in-channel/MCB	44.25815900	-96.42724800
						161-3	in-channel/MCB	44.25836800	-96.42739100
						161-4	in-channel/MCB	44.25898800	-96.42738400
						161-5	in-channel/MCB	44.25902800	-96.42724500
						161-6	in-channel/MCB	44.25904800	-96.42721000
						161-7	in-channel/MCB	44.25924400	-96.42696700
						161-8	in-channel/MCB	44.25928300	-96.42687800
						161-9	in-channel/MCB	44.25931400	-96.42670400
						161-10	in-channel/MCB	44.25936800	-96.42650600
						161-11	in-channel/MCB	44.25928700	-96.42638400
						161-12	in-channel/MCB	44.25969600	-96.42576100
						161-13	pool	44.26041100	-96.42542500
						161-14	in-channel/MCB	44.26093000	-96.42681600
						161-15	in-channel/MCB	44.26018800	-96.42819900

Habitat Description: narrow (2m), flowing headwater stream; beaver dams along sample reach
Topeka shiner: present; nine Topeka shiners captured in a flowing pool downstream of a beaver dam. Thousands of fish downstream of dam, and almost none in the upstream sites 1-14.
Substrate = cobble, gravel, silt

Table 2. Continued.

Segment	Stream Name & Common Location								
	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
162	**Willow Creek** 13 mi W Ruthton								
	Pipestone	108	46	4, 29	Altona	162-1	in-channel/MCB	44.18795200	-96.36967900
						162-2	in-channel/MCB	44.18776900	-96.36978700
						162-3	in-channel/MCB	44.18554500	-96.37231900
						162-4	pool	44.18587700	-96.37323700
						162-5	pool	44.18588600	-96.37353100
						162-6	pool	44.18597900	-96.37352800
						162-7	pool	44.18617800	-96.37343500
						162-8	pool	44.18608500	-96.37352600
						162-9	pool	44.18659800	-96.37532400
						162-10	pool	44.18647400	-96.37460200

Habitat Description: very narrow (1m) headwater stream; slow flow; large pool (sites 4-8) appears to be an excavated pond metal debris and fencing material made seining difficult. Seined pooled areas in cattail beds.
No Topeka shiners captured.
Substrate = sand, gravel, silt

Table 2. Continued.

Segment	Stream Name & Common Location								
	County	**T**	**R**	**Section(s)**	**Township Name**	**Site Number**	**Habitat Type**	**Latitude**	**Longitude**
163	**Flandreau Creek** 4 mi N, 5 mi W Holland								
	Pipestone	108	46	29	Altona	163-1	pool	44.12550100	-96.39615400
						163-2	pool	44.12552400	-96.39616700
						163-3	pool	44.12550000	-96.39640600
						163-4	in-channel/MCB	44.12625200	-96.39662400
						163-5	in-channel/MCB	44.12595100	-96.39579900
						163-6	in-channel/MCB	44.12681700	-96.39517200
						163-7	pool	44.12703400	-96.39517600
						163-8	pool	44.12761900	-96.39631000
						163-9	pool	44.12764600	-96.39631600
						163-10	pool	44.12782600	-96.39590000
						163-11	pool	44.12754600	-96.39531600
						163-12	pool	44.12762600	-96.39632100
						163-13	in-channel/MCB	44.13017900	-96.39591600
						163-14	in-channel/MCB	44.13084800	-96.39438100
						163-15	pool	44.12573500	-96.39553100

Habitat Description: 3m wide flowing stream. Channel appears to have been ditched, most of plotted reach is dry. Seined in heavily vegetated, stagnant pools.
No Topeka shiners captured.
Substrate = firm sand, gravel in-channel, deep silt along MCB.

Table 2. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
164	**Flandreau Creek** 6.5 mi W, 5.5 mi N Pipestone									
		Pipestone	107	47	13, 14	Troy	164-1	pool	44.08042400	-96.44734000
							164-2	pool	44.08043100	-96.44720500
							164-3	pool	44.08042200	-96.44708000
							164-4	pool	44.07996200	-96.44910500
							164-5	in-channel/MCB	44.07938200	-96.44906400
							164-6	in-channel/MCB	44.07760400	-96.44847500
							164-7	in-channel/MCB	44.07796600	-96.44913300
							164-8	in-channel/MCB	44.07806300	-96.44950500
							164-9	in-channel/MCB	44.07797700	-96.44981100
							164-10	in-channel/MCB	44.07809800	-96.44991500
							164-11	pool	44.08029200	-96.45104800

Habitat Description: flowing 3-5m wide stream, with firm, gravel substrate in thalweg. Sampled pooled area at bridge some off-channel habitat at sites 4 and 11. Banks are steep along most of the reach with little slackwater habitat along MCB. No Topeka shiners captured.
Substrate = gravel, sand, cobble in-channel. Deep silt in low-flow areas.

Table 2. Continued.

Segment	Stream Name & Common Location								
	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
165	**North Branch Pipestone Creek** 4 mi W, 3 mi N Pipestone								
	Pipestone	107	46	29	Troy	165-1	pool	44.04501300	-96.39278100
						165-2	pool	44.04481000	-96.39316800
						165-3	pool	44.04472800	-96.39315500
						165-4	in-channel/MCB	44.04457500	-96.39325200
						165-5	in-channel/MCB	44.04434800	-96.39340300
						165-6	in-channel/MCB	44.04446400	-96.39386900
						165-7	in-channel/MCB	44.04320300	-96.39371300
						165-8	pool	44.04299200	-96.39403700
						165-9	pool	44.04302200	-96.39429200
						165-10	pool	44.04289200	-96.39430300
						165-11	pool	44.04283700	-96.39418700
						165-12	in-channel/MCB	44.04212300	-96.39411800
						165-13	in-channel/MCB	44.04195800	-96.39463400
						165-14	in-channel/MCB	44.04244400	-96.39645200
						165-15	in-channel/MCB	44.04163700	-96.39819800
						165-16	in-channel/MCB	44.04165900	-96.39797900

Habitat Description: moderately flowing 3-5m wide stream. Recent increase in stream level; some submerged terrestrial grasses along MCB. Sites 8-11 in oxbow. Submerged terrestrial grasses in oxbow.
No Topeka shiners captured.
Substrate = sand, gravel, silt

Table 2. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
166	**Pipestone Creek** 3.5 mi W, 1 mi N Pipestone									
		Pipestone	106	46	4, 5	Sweet	166-1	in-channel/MCB	44.01330100	-96.38708400
							166-2	in-channel/MCB	44.01347000	-96.38709700
							166-3	in-channel/MCB	44.01345500	-96.38703700
							166-4	in-channel/MCB	44.01355800	-96.38703000
							166-5	in-channel/MCB	44.01541200	-96.38596400
							166-6	in-channel/MCB	44.01618700	-96.38658000
							166-7	in-channel/MCB	44.01623400	-96.38660800
							166-8	in-channel/MCB	44.01625200	-96.38646200
							166-9	in-channel/MCB	44.01633300	-96.38635600
							166-10	in-channel/MCB	44.01740500	-96.38517300

Habitat Description: 10m wide slowly flowing stream. Sampled along MCB in slack water. West end of segment appears to have been ditched. Little/no OCH. Drainage tiles along E reach of segment.
No Topeka shiners captured.
Substrate = cobble, gravel, sand. Deep silt along margins of pools.

Table 2. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
167	**Split Rock Creek** 1.5 mi N, 1 mi E Ihlen									
		Pipestone	105	46	3	Eden	167-1	pool	43.92585400	-96.34993300
							167-2	in-channel/MCB	43.92638100	-96.35031600
							167-3	pool	43.92643100	-96.35103600
							167-4	pool	43.92638200	-96.35101900
							167-5	pool	43.92633000	-96.35108800
							167-6	pool	43.92633200	-96.35116400
							167-7	pool	43.92635700	-96.35131600
							167-8	pool	43.92636400	-96.35139100
							167-9	pool	43.92635900	-96.35156000
							167-10	in-channel/MCB	43.92470900	-96.35255600
							167-11	in-channel/MCB	43.92465600	-96.35242800
							167-12	in-channel/MCB	43.92447500	-96.35240300
	Habitat Description: very small headwater stream (~1m), water low, isolated series of pools along streambed/ No Topeka shiners captured. Substrate = sand, gravel, silt									
168	**Split Rock Creek** 1.5 mi N, 0.5 mi E Jasper									
		Pipestone	105	46	28, 29	Eden	168-1	in-channel/MCB	43.87771400	-96.38026400
	Habitat Description: high water, 4m wide flowing stream, submerged terrestrial grasses on margins. Topeka shiner: common; 6 individuals captured on first seine haul in pooled area at MCB just downstream of culvert. Substrate = boulder, cobble, sand									

Table 2. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
169	**Rock River** 1 mi SW of Edgerton	Pipestone	105	44	17, 18	Osborne	169-1	pool	43.89371700	-96.16564700
							169-2	in-channel/MCB	43.89439900	-96.16531800
	Habitat Description: Swiftly flowing 10m wide stream at high water. Sampled pooled area at outside bend of stream over deep silt.									
	Topeka shiner: present; four individuals captured in four seine hauls in a 1m wide drainage channel that joins a retention pond to the Rock River.									
	Substrate = Silt, gravel. Deep silt in off-channel areas/pools									
170	**Chanarambie Creek** 0.5 mi S, 0.5 mi E Chandler	Murray	104	47	35	Fenton	170-1	in-channel/MCB	43.92093400	-95.93156600
							170-2	in-channel/MCB	43.91890200	-95.93079300
							170-3	in-channel/MCB	43.91841400	-95.93168100
							170-4	in-channel/MCB	43.91784300	-95.93090300
							170-5	in-channel/MCB	43.91783100	-95.93060700
							170-6	in-channel/MCB	43.91790600	-95.93061100
							170-7	in-channel/MCB	43.91796700	-95.93025000
							170-8	in-channel/MCB	43.91792000	-95.92982800
							170-9	in-channel/MCB	43.92105300	-95.93062100
							170-10	in-channel/MCB	43.92122900	-95.93165100
	Habitat Description: narrow (1-2m) headwater stream. Stream is flowing swiftly and little or no OCH is present. most of the segment appears to have been channelized.									
	No Topeka shiners captured.									
	Substrate = silt, sand									

Table 2. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
171	**Rock River** 4 mi S Edgerton									
		Rock	104	44	8, 9	Battle Plain	171-1	in-channel/MCB	43.82021200	-96.13013100
							171-2	pool	43.82126400	-96.13470300
							171-3	in-channel/MCB	43.82025300	-96.12974300
							171-4	in-channel/MCB	43.82027100	-96.12961600
							171-5	in-channel/MCB	43.82145400	-96.13302800
							171-6	in-channel/MCB	43.82380700	-96.13520900
							171-7	in-channel/MCB	43.82367500	-96.13527700
							171-8	in-channel/MCB	43.82359000	-96.13532400
							171-9	in-channel/MCB	43.82405300	-96.13495400
							171-10	in-channel/MCB	43.82271200	-96.13570400

Habitat Description: High water. 8-12m wide swiftly flowing stream. Stream is full to high banks. Much of slackwater areas along MCB likely inudndated. Sampled in backwaters sites 6-9.

No Topeka shiners captured.

Substrate = Sand, gravel, silt

Table 2. Continued.

Segment	Stream Name & Common Location								
	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
172	**Rock River tributary**			1 mi E Hardwick					
	Rock	104	44	30, 31	Battle Plain	172-1	pool	43.77538900	-96.17075500
						172-2	pool	43.77529200	-96.17075600
						172-3	pool	43.77514700	-96.17079800
						172-4	in-channel/MCB	43.77386200	-96.17079600
						172-5	in-channel/MCB	43.77247100	-96.17207900
						172-6	in-channel/MCB	43.77241900	-96.17224500
						172-7	in-channel/MCB	43.77245200	-96.17219500
						172-8	in-channel/MCB	43.76956400	-96.16914600
						172-9	pool, off-channel	43.76998700	-96.16876000
						172-10	in-channel/MCB	43.77058800	-96.16855700
						172-11	in-channel/MCB	43.77043200	-96.16826600

Habitat Description: 3m wide slowly flowing pasture stream with high trampled banks. Much of reach appears to have been channelized; no OCH present along MCB.Sampled in stock pond at site 9. Some submerged macrophytes. No Topeka shiners captured.
Substrate = sand, silt, muck

Table 2. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
173	**Mound Creek** 1 mi N, 1.75 mi E Beaver Creek									
		Rock	103	45	2, 11	Mound	173-1	in-channel/MCB	43.74749900	-96.20089200
							173-2	in-channel/MCB	43.74756900	-96.20094400
							173-3	in-channel/MCB	43.74763700	-96.20090700
							173-4	in-channel/MCB	43.74842800	-96.19838100
							173-5	in-channel/MCB	43.74844000	-96.19833200
							173-6	in-channel/MCB	43.74889800	-96.19789300
							173-7	in-channel/MCB	43.74839600	-96.19885800
							173-8	in-channel/MCB	43.74827900	-96.19934500
							173-9	in-channel/MCB	43.74817000	-96.19966400
							173-10	in-channel/MCB	43.74799700	-96.20048400

Habitat Description: Entire reach of sement has been channelized. Stream is 1-2m wide and constantly flowing. High banks. No OCH.
No Topeka shiners captured.
Substrate = gravel, sand, silt

Table 2. Continued.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
174	**Rock River tributary** 5.5 mi N, 4 mi E Luverne									
		Rock	103	44	8, 9	Vienna	174-1	pool	43.73333900	-96.13250300
							174-2	pool	43.73322100	-96.13262700

Habitat Description: Narrow (2-3m) wide flowing headwater stream. Sampled in deep, silted pool at bridge.
Topeka shiner: present; two individuals captured over gravel in pooled area at bridge. Much of the pool is filled with deep (>0.5m) silt. No Topeka shiners collected in silted portion of pool.
Substrate = gravel, sand, silt

Table 2. Continued.

Segment	Stream Name & Common Location								
	County	**T**	**R**	**Section(s)**	**Township Name**	**Site Number**	**Habitat Type**	**Latitude**	**Longitude**
175	**Champepadan Creek**	4mi N, 5 mi E Luverne							
	Rock	103	44	21, 22	Vienna	175-1	pool	43.71002900	-96.11238300
						175-2	pool	43.71001900	-96.11232600
						175-3	pool	43.71008300	-96.11238900
						175-4	in-channel/MCB	43.70955000	-96.11142300
						175-5	in-channel/MCB	43.71042200	-96.10763900
						175-6	in-channel/MCB	43.71007000	-96.10720000
						175-7	in-channel/MCB	43.70984100	-96.10706400
						175-8	pool/off-channel	43.70971600	-96.10709700

Habitat Description: 3m wide stream with moderate flow. Native prairie has been planted along both banks for the entire reach. No flow. Sampled at pooled areas at culverts at CH 19.

Topeka shiner: present; one individual captured in deep livestock pond S of stream. Depth (>2m) made seining in pond difficult

Substrate = sand, silt, gravel

Table 2. Continued.

Segment	Stream Name & Common Location								
	County	**T**	**R**	**Section(s)**	**Township Name**	**Site Number**	**Habitat Type**	**Latitude**	**Longitude**
176	**Kanaranzi Creek** **2** mi W, 3.5 mi N Ellworth								
	Rock	101	44	12	Kanaranzi	176-1	pool	43.57304000	-96.06413600
						176-2	pool	43.57305400	-96.06410500
						176-3	pool	43.57249700	-96.06408600
						176-4	in-channel/MCB	43.57200500	-96.06350300
						176-5	in-channel/MCB	43.57204500	-96.06354600
						176-6	in-channel/MCB	43.57211400	-96.06360400
						176-7	in-channel/MCB	43.57127700	-96.06357500
						176-8	in-channel/MCB	43.57090500	-96.06197900
						176-9	in-channel/MCB	43.56817400	-96.06275000
						176-10	in-channel/MCB	43.56807000	-96.06273900
						176-11	in-channel/MCB	43.56639200	-96.06408000
						176-12	in-channel/MCB	43.56632100	-96.06416000
						176-13	in-channel/MCB	43.56598300	-96.06381200

Habitat Description: 10m wide flowing stream. Very little OCH. Very deep silt along MCB. Sampled pooled area at bridge. High, eroded banks.

No Topeka shiners captured.

Substrate = silt over gravel.

Table 2. Continued.

Segment	Stream Name & Common Location								
	County	**T**	**R**	**Section(s)**	**Township Name**	**Site Number**	**Habitat Type**	**Latitude**	**Longitude**
177	**Rock River** **0.5** mi N, 4 mi E Steen								
	Rock	101	45	25	Clinton	177-1	pool	43.52588900	-96.18721100
						177-2	pool	43.52592700	-96.18726600
						177-3	in-channel/MCB	43.52519900	-96.18594900
						177-4	in-channel/MCB	43.52297500	-96.18558400
						177-5	in-channel/MCB	43.52147800	-96.18456000
						177-6	in-channel/MCB	43.52143300	-96.18458200
						177-7	in-channel/MCB	43.52125000	-96.18453100
						177-8	in-channel/MCB	43.52121500	-96.18442200
						177-9	in-channel/MCB	43.52106600	-96.18444000
						177-10	in-channel/MCB	43.52727900	-96.18684800
						177-11	pool	43.52783000	-96.18770800
						177-12	pool/off-channel	43.52663200	-96.19046500

Habitat Description: 11m wide flowing stream, with wide channel, sand bars and some braiding. Firm gravel in thalweg
Oxbow in middle of reach is nearly dry (<25 cm). No fish observed, culicid fly larvae abundant.
No Topeka shiners captured.
Substrate = sand, gravel, silt

Table 2. Continued.

Segment	Stream Name & Common Location								
	County	**T**	**R**	**Section(s)**	**Township Name**	**Site Number**	**Habitat Type**	**Latitude**	**Longitude**
178	**Kanaranzi Creek** 2 mi W Ellsworth								
	Rock	101	44	25, 36	Kanaranzi	178-1	pool	43.51441400	-96.05867000
						178-2	in-channel/MCB	43.51404500	-96.05846000
						178-3	in-channel/MCB	43.51378800	-96.05844300
						178-4	pool	43.51349700	-96.05841200
						178-5	pool	43.51358400	-96.05829800
						178-6	pool	43.51351800	-96.05816800
						178-7	in-channel/MCB	43.51355800	-96.05866900
						178-8	in-channel/MCB	43.51549000	-96.05823700
						178-9	in-channel/MCB	43.51891800	-96.05895600
						178-10	in-channel/MCB	43.51866200	-96.05881400
						178-11	pool	43.52078500	-96.06070000
						178-12	pool	43.52046000	-96.06082200

Habitat Description: 7-9m wide flowing stream. Sampled backwater and off-channel habitats along MCB and side channels. Recent high flow has filled in off-channel areas with deep silt. Seining difficult.

No Topeka shiners captured.

Substrate = sand, silt, gravel

Table 2. Concluded.

Segment	Stream Name & Common Location	County	T	R	Section(s)	Township Name	Site Number	Habitat Type	Latitude	Longitude
179	**East Branch Kanaranzi Creek** 1.5 mi N, 1.5 mi E Adrian									
		Nobles	102	42	8	Olney	179-1	pool	43.65932900	-95.90462700
							179-2	pool	43.65928900	-95.90449500
							179-3	pool	43.65930600	-95.90463300
							179-4	pool	43.65908000	-95.90420300
							179-5	in-channel/MCB	43.65679800	-95.90378600
							179-6	in-channel/MCB	43.65661000	-95.90387800
							179-7	in-channel/MCB	43.65604000	-95.90417100
							179-8	in-channel/MCB	43.65508100	-95.90385200
							179-9	in-channel/MCB	43.65460100	-95.90342200
							179-10	pool	43.65434900	-95.90020100
							179-11	in-channel/MCB	43.65507700	-95.90154900
							179-12	in-channel/MCB	43.65588000	-95.89900200
	Habitat Description: Flowing 9m wide stream. Stream is full to high banks; very little slackwater habitat present at this site. No Topeka shiners captured. Substrate = sand, silt, gravel									
180	**Little Rock River** 8 mi E Ellsworth									
		Nobles	101	42	26	Little Rock	180-1	in-channel/MCB	43.52838500	-95.84615900
	Habitat Description: Sampled large pooled area at bridge, no discernible flow, silt over gravel substrate. Channel downstream of pool is a 2-3 m wide, flowing stream with a firm sand/gravel substrate. Topeka shiner: abundant ; fourteen individuals captured in first seine haul in pool, fifteen individuals captured in second seine haul near outlet of the pool. Substrate = gravel, sand, silt									

Table 3. Complete List of Fish Species Captured at Segments 141-160, 2012.

Species	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
Campostoma anomalum		X	X	X			X	X		X		X	X	X	X		X	X	X	X
Chrosomus erythrogaster							X										X			
Cyprinella lutrensis		X		X		X			X	X	X		X	X				X		
Cyprinus carpio	X			X	X	X				X										
Hybognathus hankinsoni	X	X					X							X				X	X	X
Luxilus cornutus	X	X	X	X				X				X	X	X	X		X	X	X	X
Notropis dorsalis		X					X	X		X			X	X	X		X	X	X	X
Notropis stramineus		X		X		X	X	X	X	X	X	X	X	X			X	X	X	X
Notropis topeka	X				X			X	X	X	X					X			X	
Pimephales notatus		X	X	X		X	X	X	X	X				X				X	X	X
Pimephales promelas	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X
Rhinichthys atratulus			X				X								X		X	X	X	
Semotilus atromaculatus	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X
Carpiodes cyprinus										X										
Carpiodes sp. (YOY)				X				X						X						
Catostomus commersoni		X	X		X	X	X	X	X	X	X	X	X	X	X			X		X
Moxostoma macrolepidotum		X																		X
Ameiurus melas	X	X	X	X	X	X		X			X			X			X	X	X	X
Ameiurus natalis	X																			
Ictalurus punctatus									X	X		X		X						
Noturus flavus				X													X	X		X
Noturus gyrinus			X	X		X		X	X											
Esox lucius			X																	X
Percopsis omiscomaycus														X						
Fundulus sciadicus														X		X		X		
Culaea inconstans							X	X						X	X				X	
Lepomis cyanellus						X		X	X							X	X	X	X	
Lepomis humilis				X	X	X		X	X		X	X		X		X			X	X
Lepomis macrochirus		X			X	X												X	X	
Micropterus dolomieui													X							
Micropterus salmoides								X									X			
Pomoxis nigromaculatus				X		X														
Etheostoma exile				X			X								X	X				X
Etheostoma nigrum	X	X	X	X		X	X	X	X		X	X		X	X	X	X	X	X	X
Perca flavescens																	X		X	
Percina maculata						X			X					X						X

Table 4. Complete List of Fish Species Captured at Segments 161-180, 2013.

Species	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
Campostoma anomalum	X			X	X					X	X	X	X	X	X	X	X	X	X	X
Cyprinella lutrensis				X	X	X			X		X			X		X	X	X		X
Cyprinus carpio		X		X	X															
Hybognathus hankinsoni	X	X		X												X		X		
Luxilus cornutus	X		X	X		X					X	X		X	X	X	X	X	X	X
Notropis dorsalis			X	X	X	X	X				X	X	X	X	X	X	X	X	X	
Notropis stramineus			X		X	X	X	X	X		X			X	X	X	X	X	X	X
Notropis topeka	X							X	X					X	X					X
Pimephales notatus	X			X	X	X		X			X			X	X	X	X		X	X
Pimephales promelas	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Rhinichthys atratulus	X		X	X	X							X	X	X	X	X	X	X		
Semotilus atromaculatus	X		X	X	X	X		X			X	X	X	X	X	X	X	X	X	X
Carpiodes cyprinus					X											X				
Catostomus commersoni	X		X	X	X	X					X	X	X	X			X	X	X	X
Moxostoma erythrurum			X	X	X															
Moxostoma macrolepidotum															X					X
Ameiurus melas	X			X	X	X	X	X			X			X	X	X				
Noturus flavus			X											X			X			
Esox lucius		X										X								
Percopsis omiscomaycus																	X			
Fundulus sciadicus																		X		
Culaea inconstans		X	X	X								X								
Lepomis cyanellus				X		X	X	X			X				X					
Lepomis humilis	X			X	X		X	X			X			X			X			X
Etheostoma exile	X				X															
Etheostoma nigrum	X		X							X	X		X	X	X	X	X	X		
Percina maculata																	X			X

Appendix C- Habitat and Voucher Photographs

Habitat photographs for segments in which no Topeka shiners were captured are representative of the habitat along the one-mile reach of stream. Habitat photographs from segments where Topeka shiners were present represent the specific site where they were collected. Voucher photographs are presented for each of the sites were Topeka shiners were collected.

Site 141-2 Medary Creek: voucher and habitat photos.

Segment 142, Willow Creek: no Topeka shiners captured.

Segment 143, East Branch Flandrau Creek: no Topeka shiners captured.

Segment 144, North Branch Pipestone Creek: no Topeka shiners captured.

Site 145-6, Pipestone Creek: voucher photo.

Site 145-6, Pipestone Creek: habitat photo

Segment 146, Split Rock Creek: no Topeka shiners captured. No habitat photo.

Segment 147, Kanaranzi Creek: no Topeka shiners captured.

Site 148-4, Rock River: voucher and habitat photos.

Site 149-4, Rock River: voucher and habitat photos.

Site 150-4, Split Rock Creek: voucher and habitat photos.

Site 151-1, Beaver Creek: voucher and habitat photos.

Segment 152, Beaver Creek: no Topeka shiners captured.

Segment 153, Beaver Creek: no Topeka shiners captured.

Segment 154, Rock River: no Topeka shiners captured.

Segment 155, Elk Creek: no Topeka shiners captured.

Site 156-1, Elk Creek: voucher and habitat photos.

Segment 157, Kanaranzi Creek: no Topeka shiners captured.

Segment 158, Kanaranzi Creek: no Topeka shiners captured.

Site 159-1, Kanaranzi Creek: voucher and habitat photos.

Segment 160, Little Rock River: no Topeka shiners captured.

Site 161-15, Medary Creek: voucher photo.

Site 161-15, Medary Creek: habitat photo.

Segment 162, Willow Creek: no Topeka shiners captured. No habitat photo.

Segment 163, Flandrau Creek: no Topeka shiners captured.

Segment 164, Flandrau Creek: no Topeka shiners captured.

Segment 165, North Branch Pipestone Creek: no Topeka Shiners captured.

Segment 166, Pipestone Creek: no Topeka Shiners captured.

Segment 167, Tributary to Split Rock Creek: no Topeka Shiners captured. No habitat photo.

Site 168-1, Split Rock Creek: voucher photo.

Site 168-1, Split Rock Creek: habitat photo.

Site 169-2, Rock River: voucher photo.

Site 169-2, Rock River: habitat photo.

Segment 170, Chanarambie Creek: no Topeka shiners captured.

Segment 171, Rock River: no Topeka shiners captured.

Segment 172, Tributary to Rock River: no Topeka shiners captured.

Segment 173, Blue Mound Creek: no Topeka shiners.

Site 174-2, Tributary to Rock River: voucher photo.

Site 174-2, Tributary to Rock River: habitat photo.

Site 175-8, Champepadan Creek: voucher photo.

Site 175-8, Champepadan Creek: habitat photo.

Segment 176, Kanaranzi Creek: no Topekas captured.

Segment 177, Rock River: no Topeka shiners captured.

Segment 178, Kanaranzi Creek: no Topeka shiners captured.

Segment 179, East Branch Kanaranzi Creek: no Topeka shiners captured

Site 180-1, West Branch Little Rock River: voucher photo.

Site 180-1, West Branch Little Rock River: habitat photo.