

FINAL REPORT  
IOWA PLEISTOCENE SNAIL PROJECT  
1987

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## INTRODUCTION

Research in the Paleozoic Plateau in certain counties in northeastern Iowa, southeastern Minnesota, southwestern Wisconsin, and northwestern Illinois has resulted in the discovery of a number of sites for glacial relict flora and fauna. Some dozen plant and animal taxa are either federally Endangered or Threatened or are current or potential candidates for such status. Two major habitat types, algific talus slopes and moderate cliffs, have been defined in previous reports (Frest, 1982-1986).

Systematic searches using a set of rather narrowly defined geologic and botanical criteria have added a sizeable number of sites in each of the preceding five years. Field methods have been discussed at length previously. The same methodology was used for a final sweep of the full area for six weeks in June and July, 1987. This sweep was expected to visit all remaining areas with any high probability for additional sites. Counties targeted were Winneshiek, Mitchell, Howard, Allamakee, Fayette, Delaware, Clayton, Jackson, Dubuque, and Jones in Iowa, Fillmore in Minnesota, Grant in Wisconsin, and Jo Daviess in Illinois.

## RESULTS

Essentially all first, second, and third-ranked sites have now been visited at least once. Coverage of the Blanding, Hopkinton, and Dunleith-Wise Lake potential areas in all states is for all practical purposes complete. Coverage of the Prairie du Chien is less complete, but all high probability areas were visited. It is probably not cost efficient to cover all Prairie du Chien sites, and it is unlikely that doing so would yield more than a few significant additional sites. The total number of algific sites now stands at 300; a listing by number (geared to my previous reports), size, stratigraphy,

location, and degree of disturbance is included as Appendix 1. Some fifteen new algific sites were added in this field season, as well as seven moderate cliffs, bringing the latter total to 28 (Appendix 1).

New localities are described in Appendix 2; floral and faunal lists for significant elements constitute Appendix 3. Site maps are included as Appendix 4.

No new sites for Discus macclinlocki were discovered. Two new sites for Aconitum noveboracense were located, as well as two additional for Chrysosplenium ioense (Table 1). St. Bridget 2 (343) is nearly the largest known site, roughly tied in population size with Blue Spring West (198). Because of the candidate status of C. ioense, it was thought useful to include a summary of the known Paleozoic Plateau sites (47) by population size (Table 3). While I did not take a precise census, the ranking may be of value as I am the only person thus far to have visited all, generally at roughly the same time in the growing season. As regards land snails, major increases in the number of sites for probable candidates Catinella gelida (Baker) and Succinea n. sp. morphs 1 and 2 resulted from 1987 fieldwork (Table 2). All new sites were in Iowa and Minnesota. The most spectacular sites in terms of overall diversity are 343 and 336.

The algific portion of St. Budget 2 (343) is quite large and pristine, and a small moderate cliff with Succinea n. sp. is present also. Aside from the huge C. ioense population the site has the largest known Plateau populations of Viola canadensis and Hybanthus concolor, as well as large populations of a number of other uncommon plants. The moderate portion of Pine Creek 3 has significant populations of both Succinea morphs. Blue Springs East 3 (337) is also a spectacular and diverse algific plant site with, among many others, the largest Iowa population of Linnaea borealis. Occurring as it does above

a major moderate cliff with large succineid populations (85-264), it offers a unique combination of elements in a comparatively small tract. A couple of other non-algific sites were also noted. In particular, the sand hill prairies located east of Hesper, IA (325) and near Newhouse, MN (327) had note-worthy floras (see Appendix 3).

With this report the field phase of research on algific talus slopes and moderate cliffs is regarded as complete. It is to be hoped that this and previous reports stimulate both serious study of the unique glacial relict biota of the Plateau and successful efforts to preserve and protect it.

Table 1. Significant plant records, 1987 survey

<u>Site</u>	<u>Taxon</u>	<u>Population</u>
(338) Little Paint Creek 3	Aconitum noveboracense	300
(321) Lytle Creek 16	Aconitum noveboracense	750
(343) St. Bridget 2	Chrysosplenium ioense	very large
(335) Kendalville North	Chrysosplenium ioense	very small

Table 2. Significant snail records, 1987 survey

<u>Site</u>	<u>Taxon</u>	<u>Population</u>
(338) Little Paint Creek 3	Vertigo hubrichti	small
(322) Kingdom Hall 1	Catinella gelida	small
	Vertigo hubrichti	small
	Vallonia cyclophorella	very small
(323) Kingdom Hall 2	Vertigo hubrichti	large
	V. n. sp.	very small
(329) Silver Creek 1	Catinella gelida	small
	Vallonia cyclophorella	very large
(330) Silver Creek 2	Catinella gelida	small
	Vallonia cyclophorella	small
(331) Silver Creek 3	Catinella gelida	very small
(336) Pine Creek 3	Succinea n. sp. morph 1	large
	Succinea n. sp. morph 2	small
	Vallonia cyclophorella	large
	Vertigo hubrichti	large
(335) Kendalville North 2	Succinea n. sp. morph 2	very small
	Vertigo hubrichti	very small
(343) St. Bridget 2	Succinea n. sp. morph 1	medium
	Succinea n. sp. morph 2	very small
	Vertigo hubrichti	very small
(324) Pine Creek 1	Catinella gelida	small
	Vallonia cyclophorella	large
	Vertigo hubrichti	medium

Table 3. Known Paleozoic Plateau sites for C. ioense, in approximate rank by population size.

A. Very Large (8)		E. Very Small (9)		
(198)	Blue Spring West	1	(MN4) Spring Valley Creek 4	39
(343)	St. Bridget 2	2	(239) 37 North	40
(180)	Kendalville North	3	(277) Bear Creek 1	41
(135)	Buck Creek - main creek 2	4	(202) West Bluffton 2	42
(MN28)	Root River 4	5	(278) Bear Creek 2	43
(169)	Kline Hunt Hollow 4	6	(280) Bear Creek 4	44
(240)	Steeles Branch 2	7	(36) Canoe Creek	45
(185)	St. Bridget	8	(335) Kendalville North 2	46
			Brainard Ice Cave	47
B. Large (9)				
(178)	Bluffton Airport 1	9		
(181)	Larkin Bridge 1	10		
(269)	Suttle Creek	11		
(170)	Klein Hunt Hollow 3	12		
(190)	Ten-Mile Creek 5	13		
(206)	Bankston East	14		
(82)	WP 56	15		
(182)	Larkin Bridge 2	16		
(207)	Bankston West	17		
C. Medium (11)				
(33)	WP 2	18		
(38)	Kendalville	19		
(62)	Bixby West	20		
(6)	Old Stone House	21		
(MN3)	Spring Valley Creek 3	22		
(85)	WP 58	23		
(83)	WP 55	24		
(197)	Blue Spring East	25		
(279)	Beak Creek 3	26		
(238)	WPH NW 4	27		
(242)	Steeles Branch 4	28		
D. Small (10)				
(291)	Brush Creek East	29		
(298)	Lytle Creek 7	30		
(184)	Kendalville East	31		
(MN17)	Root River 2	32		
(MN2)	Spring Valley Creek 2	33		
(MN18)	Root River 3	34		
(237)	WPH NW 7	35		
(250)	Bluebell Hollow 2	36		
(61)	Bixby East 1	37		
(161)	Kline Hunt Hollow 1	38		

APPENDIX 1.  
KNOWN ALGIFIC AND MADERATE SITES

A. SUMMARY OF KNOWN ALGIFIC SITES

1. Locality names. Numbers refer to report designations (Frest 1983-1987).

PRAIRIE DU CHIEN GRP-23

A. LARGE

1. Undisturbed

Minnesota:

MN27 Whitewater R.

Wisconsin:

WI22 Essofea

WI26 Big Green R.

WI28 Walnut Eddy

2. Disturbed

Iowa:

257 Waterloo Creek 2

256 Waterloo Creek 1

B. MEDIUM

1. Undisturbed

Iowa:

254 Village Creek IA

338 Little Paint Creek 3 YRF

Minnesota:

MN26 Whitewater R.S.

Wisconsin:

WI23 Steuben

WI24 Boydtown

WI30 Mill Creek

2. Disturbed

Iowa:

33 Waterville

255 Trout Run

Wisconsin:

WI19 Pine Knob

C. SMALL

1. Undisturbed

Iowa:

77 Little Paint Creek 1 YRF

78 Little Paint Creek 2 YRF

2. Disturbed

Iowa:

80 Luster Heights

81 Cota Creek

154 Bear Creek West

158 Camp Tahiqgwa

Minnesota:

MN20 Beaver Creek Valley

MN22 Sheldon West

DUNLEITH/WISE LAKE - 182

## A. LARGE

## 1. Undisturbed

Iowa:

6 Old Stone House 1  
 130 Buck Creek 5  
 134 Buck Creek - Main Creek 1  
 138 Dry Mill NE (Thein)  
 144 Buck Creek - Trib. 3  
 169 Kline Hunt Hollow 4  
 179 Decorah N.  
 181 Larkin Bridge 1  
 185 St. Bridget  
 190 Ten-Mile Creek 5  
 198 Blue Spring W.  
 343 St. Bridget 2

Minnesota:

MN2 Spring Valley 2  
 MN3 Spring Valley 3  
 MN9 Forestville 4  
 MN10 Canfield Creek 1  
 MN12 Canfield Creek 3  
 MN16 Root River 1  
 MN28 Root River 4  
 MN37 Table Rock South  
 MN39 Mahood's Creek

Wisconsin:

WI5 Chase Creek 2

Illinois:

IL5 Grant Hill Cemetary

## 2. Disturbed

Iowa:

35 Buck Creek - Main 2  
 131 A34  
 147 Coldwater Creek S.  
 207 Williams Creek 2  
 182 Lakrin Bridge 2  
 178 Bluffton E.  
 184 Kendallville E.  
 260 Elkader NW 6

Minnesota:

MN18 Root River 3

Wisconsin:

WI3 Glenhaven 3  
 WI14 Muddy Creek S

## B. MEDIUM

## 1. Undisturbed

Iowa:

64 Old Stone House 3  
 25 Andy Hollow 1  
 60 Andy Hollow 2  
 29 Dry Mill Creek N  
 38 Kendallville  
 35 Bluffton  
 37 Bluffton NW 1  
 45 Malanaphy Springs 1  
 75 Dry Mill North 2  
 76 Dry Mill North 3  
 98 Buck Creek 1

99 Buck Creek 2  
 100 Louse Hollow 1  
 103 Buck Creek 3  
 119 Buck Creek 7  
 121 Buck Creek 6  
 123 Miners Creek 1  
 132 Miners Creek 2  
 136 Buck Creek 8  
 164 Hickory Creek 2  
 165 Hickory Creek 3  
 160 Miners Creek 5



DUNLEITH/WISE LAKE (Continued)

## B. Medium

## 1. Undisturbed

Iowa:

170 Kline Hunt Hollow 3  
 166 Elkader S2  
 174 Andy Hollow 5  
 180 Kendallville N  
 195 Decorah Drive-In  
 197 Blue Spring E.  
 201 W. Bluffton 1  
 202 W. Bluffton 2  
 246 Howard Creek 2  
 249 Louse Hollow 5  
 259 Elkader NW 5  
 239 37 N.  
 309 Williams Creek 3  
 311 Williams Creek 5  
 322 Kingdom Hall 1  
 324 Pine Creek 1  
 326 Pine Creek 2  
 329 Silver Creek 1  
 337 Blue Spring East 3

Minnesota:

MN 1 Spring Valley 1  
 MN 6 Forestville 1  
 MN14 Canfield Creek 5  
 MN15 Canfield Creek 6  
 MN30 Forestville West  
 MN31 Etna East

Wisconsin:

WI 4 Chase Creek 1  
 WI27 Wyalusing

Illinois:

IL 6 Sinsinnewa R1

## 2. Disturbed

Iowa:

67 Malanaphy Springs 2  
 71 Elkader NW 1  
 72 Elkader NW 2  
 90 Osterdock E.  
 137 Dry Mill East (Olson Farm)  
 145 Buck Creek - Main Creek 3  
 127 Decorah S.  
 205 Hickory Creek 5  
 208 Williams Creek 1  
 161 Kline Hunt Hollow 1  
 171 Eldader S. 3  
 173 Andy Hollow 4  
 183 Larkin Bridge 3  
 155 Phelps Park  
 188 Ten-Mile Creek 3  
 189 Ten-Mile Creek 4

191 Ten-Mile Creek 5  
 192 Ten-Mile Creek 5  
 193 Ten-Mile Creek 8  
 199 Martha Creek E.  
 269 Suttle Creek  
 224 Little Turkey R2  
 244 Osterdock 3  
 245 Howard Creek 1  
 247 Howard Creek 3  
 262 Roberts Creek

Wisconsin:

WI17 McCartney Branch  
 WI18 Burton  
 WI21 British Hollow

Minnesota:

MN29 Larkin Bridge 3  
 333 Jordan Creek East

## C. SMALL

## 1. Undisturbed

Iowa:

30 Dry Mill Crest S.  
 39 Blue Spring  
 91 Peck Creek  
 93 Pine Creek 2  
 104 Buck Creek 4  
 122 Joles Creek  
 124 Buck Creek Trib. 1  
 128 Twin Springs 1  
 129 Twin Springs 2  
 147 Coldwater Creek N.  
 148 Bluffton Hill Prairie  
 152 Postville N. 1  
 153 Postville N. 2  
 163 Hickory Creek 1  
 245 Dry Mill W  
 290 Andy Hollow 5  
 310 Williams Creek 4  
 323 Kingdom Hall 2  
 330 Silver Creek 2  
 335 Kendalville North 2  
 336 Pine Creek 3  
 344 St. Bridget 3  
 345 St. Bridget 4

Minnesota:

MN 4 Spring Valley 4  
 MN 7 Forestville 2  
 MN 8 Forestville 3  
 MN 32 Deer Creek 2  
 MN 36 Deer Creek 3

Illinois:

IL 7 Apple River Canyon 1  
 IL 9 Apple River Canyon 3

Wisconsin:

WI 1 Glenhaven 1  
 WI 2 Glenhaven 2  
 WI 7 Chase Creek 4  
 WI 8 Chase Creek 5

## 2. Disturbed

Iowa:

28 Elkader S.  
 59 S. Cedar Creek  
 44 Bluffton West  
 73 Elkader N.  
 74 Roberts Creek  
 101 Louse Hollow 2  
 102 Louse Hollow 3  
 125 Buck Creek Trib. 2  
 133 Louse Hollow 4  
 139 Motor  
 140 Dry Mills S. 2  
 162 Kline Hunt Hollow 2  
 168 Hickory Creek 4  
 172 Elkader S. 4  
 176 Twin Springs N.  
 177 Bluffton W.  
 186 Ten-Mile Creek 1  
 187 Ten-Mile Creek 2

194 Ten-Mile Creek 9  
 217 Postville N. 3  
 261 Elkader NW4  
 270 Buck Creek 9  
 271 Freeport E.  
 272 Merlin Moe W.  
 273 Merlin Moe E.

Minnesota:

MN 5 Spring Valley 5  
 MN11 Canfield Creek 2  
 MN19 Deer Creek  
 334 Jordan Creek West

Wisconsin:

WI 6 Chase Creek 3  
 WI20 Chase Creek 6  
 WI30 Benton

BLANDING - 68

## A. LARGE

## 1. Undisturbed

Iowa:

82 WPH 56 - IA  
 95 Pine Creek 4  
 240 Steeles Branch 2  
 250 Bluebell Hollow 2  
 241 Steeles Branch 3

## 2. Disturbed

Iowa:

142 Kleinlein Hollow 2  
 143 Hewett Hollow 1  
 234 Little Turkey R. 1

## B. MEDIUM

## 1. Undisturbed

Iowa:

33 WPH2  
 51 Brush Creek Canyon 1  
 62 Bixby West  
 83 WPH 55  
 167 Hewett Creek 1.  
 206 Bankston E.  
 207 Bankston W.  
 210 WPH 48  
 229 Cow Branch W  
 268 Steeles Branch 6  
 226 Elk Creek E  
 242 Steeles Branch 4  
 238 WPH NW4  
 279 Bear Creek 3  
 281 Bear Creek 5  
 291 Bear Creek E

Illinois:

IL1 Yonkers Bluff 1  
 IL2 Yonkers Bluff 2  
 IL3 Yonkers Bluff 3

## 2. Undisturbed

Iowa:

32 Steeles Branch 1  
 61 Bixby East  
 228 Cow Branch E  
 225 Elk Creek W  
 251 Little Turkey R3

Illinois:

IL4 Chestnut Ridge

BLANDING (Continued)

## C. SMALL

## 1. Undisturbed

Iowa:

27 Bixby Preserve 3  
 31 Mossy Glen  
 56 Bixby Preserve 1  
 57 Bixby Preserve 2  
 53 Brush Creek Canyon 3  
 54 Brush Creek Canyon 4  
 96 Pine Creek 5  
 97 Bluebell Hollow 1  
 114 Bixby Preserve 4  
 115 Bixby E. 2  
 211 WPH 46  
 212 WPH 27  
 227 WPH NW3  
 235 WPH NW6  
 236 WPH NE7  
 253 Brush Creek Canyon 4  
 280 Bear Creek 4  
 332 Fayette E

## 2. Disturbed

Iowa:

43 Glover Creek  
 47 Backbone 2  
 48 Backbone 3  
 85 WPH 58  
 88 Camp Klaus  
 116 Fountain Springs 1  
 117 Fountain Springs 2  
 118 Fountain Springs 3  
 150 Miners Creek 3  
 151 Miners Creek 4  
 156 Buck Creek - Main 4  
 243 Steeles Branch 5  
 252 Little Turkey R4  
 277 Bear Creek 1  
 278 Bear Creek 2

HOPKINTON-27

## A. LARGE

## 1. Undisturbed

Iowa:

307 Lytle Creek 12  
 312 Lytle Creek 13  
 295 Lytle Creek 4  
 297 Lytle Creek 6  
 304 North Maquoketa 1  
 316 North Maquoketa 2

## 2. Disturbed

Iowa:

301 Lytle Creek 10  
 306 Lytle Creek 11

## B. MEDIUM

## 1. Undisturbed

Iowa:

232 Pine Creek 2  
 302 Elk River 1  
 296 Lytle Creek 5  
 299 Lytle Creek 8  
 292 Lytle Creek 1

293 Lytle Creek 2  
 315 Farm Creek  
 305 Farm Creek  
 140 Maquoketa West  
 308 Indian Bluff

## 2. Disturbed

Iowa:

233 Pine Creek 1  
 313 Lytle Creek 14  
 314 Lytle Creek 15  
 294 Lytle Creek 3

## C. SMALL

## 1. Undisturbed

Iowa:

300 Lytle Creek 9  
 298 Lytle Creek 7  
 321 Lytle Creek 16

## 2. Disturbed

Iowa:

113 Green Island S.  
 111 Maquoketa Caves State Park

## 2. Summary breakdown.

## A. PRAIRIE DU CHIEN GRP-23

Iowa -12  
 Minnesota - 4  
 Wisconsin - 7

1. SMALL
  - a) UNDISTURBED - 2  
Iowa - 2
  - b) DISTURBED - 6  
Iowa - 4, Wisconsin - 2
2. MEDIUM
  - a) UNDISTURBED - 6  
Iowa - 2, Minnesota - 1, Wisconsin - 3
  - b) DISTURBED - 3  
Iowa - 2, Wisconsin - 1
3. LARGE
  - a) UNDISTURBED - 4  
Minnesota - 1, Wisconsin - 3
  - b) DISTURBED - 2  
Iowa - 2

## B. DUNLEITH/WISE LAKE - 182

Iowa - 136  
 Minnesota - 27  
 Wisconsin - 15  
 Illinois - 4

1. SMALL
  - a) UNDISTURBED - 33  
Iowa - 22, Minnesota - 5, Wisconsin - 4, Illinois - 2
  - b) DISTURBED - 34  
Iowa - 27, Minnesota - 4, Wisconsin - 3, Illinois - 1
2. MEDIUM
  - a) UNDISTURBED - 50  
Iowa - 41, Minnesota - 6, Wisconsin - 3
  - b) DISTURBED - 31  
Iowa - 26, Minnesota - 2, Wisconsin - 3
3. LARGE
  - a) UNDISTURBED - 23  
Iowa - 12, Minnesota - 9, Wisconsin - 1, Illinois - 1
  - b) DISTURBED - 11  
Iowa - 8, Minnesota - 1, Wisconsin - 2

## C. BLANDING - 68

Iowa -64  
 Illinois - 4

1. SMALL
  - a) UNDISTURBED - 18  
Iowa - 18
  - b) DISTURBED - 17  
Iowa - 17
2. MEDIUM
  - a) UNDISTURBED - 19  
Iowa - 16, Illinois - 3
  - b) DISTURBED - 6  
Iowa - 5, Illinois - 1
3. LARGE
  - a) UNDISTURBED - 5  
Iowa - 5
  - b) DISTURBED - 3  
Iowa - 3

## D. HOPKINTON - 27

Iowa -27

1. SMALL
  - a) UNDISTURBED - 3
  - b) DISTURBED - 2
2. MEDIUM
  - a) UNDISTURBED - 10
  - b) DISTURBED - 4
3. LARGE
  - a) UNDISTURBED - 6
  - b) DISTURBED - 2

TOTAL CONFIRMED SITES - 300

IOWA - 240 (80%)  
 MINNESOTA - 30 (10%)  
 WISCONSIN - 22 ( 7%)  
 ILLINOIS - 8 ( 3%)

B. SUMMARY OF KNOWN MADERATE SITES

1. Locality names. Numbers refer to report designations (Frest 1983-1987).

DUNLEITH/WISE LAKE

## A. LARGE

## 1. Undisturbed

Iowa:

219 Bluffton Fir Stand  
326 Pine Creek 2  
336 Pine Creek 3

Minnesota:

MN41 Root River 4  
MN33 Simpson  
MN40 Canfield Creek 10  
MN38 Bear Creek

## B. MEDIUM

## 1. Undisturbed

Iowa:

220 Bluffton Airport  
264 Blue Springs 4  
324 Pine Creek 1

Minnesota

MN19 Deer Creek 1  
MN36 Deer Creek 3  
MN32 Deer Creek 2  
MN35 Maple Valley Golf Course

## 2. Disturbed

Iowa:

221 Plymouth Rock South  
265 Phelps Park 2

## C. SMALL

## 1. Undisturbed

Iowa:

222 Malanaphy Springs 2  
223 A34-2  
248 Bluffton North  
258 Osage Springs Park  
263 Chattahoochie Park 2  
329 Silver Creek 1  
330 Silver Creek 2  
331 Silver Creek 3  
343 St. Bridget 2

Minnesota:

MN34 Simpson East

## 2. Disturbed

Iowa:

127 Route 9  
266 Will Baker Park



## 2. Summary breakdown.

## A. Dunleith/Wise Lake - 28

Iowa 19

Minnesota 9

1. SMALL
  - a) UNDISTURBED - 10  
Iowa - 9, Minnesota - 1
  - b) DISTURBED - 2  
Iowa - 2
2. MEDIUM
  - a) UNDISTURBED - 7  
Iowa - 3, Minnesota - 4
  - b) DISTURBED - 2  
Iowa - 2
3. LARGE
  - a) UNDISTURBED - 7  
Iowa - 3, Minnesota - 4
  - b) DISTURBED - none

TOTAL CONFIRMED SITES - 28

IOWA - 19 (68%)

MINNESOTA - 9 (32%)

## APPENDIX 2. LOCALITIES

Asterisks denote algific slopes, crosses moderate cliffs

## ALLAMAKEE COUNTY, IA

- \*(338) Little Paint Creek 3. Medium undisturbed perched Prairie du Chien algific slope, 18' x 650', above Little Paint Creek, NW facing, SW 1/4 NE 1/4 SW 1/4 sec. 19, T 97 N R 3 W, Taylor Twp., Harpers Ferry 7 1/2' quadrangle. Originally found by Mark Leoschke. Within Yellow River State Forest.

## FAYETTE COUNTY, IA

- \*(332) Fayette E. Long, complex N facing Blanding site, mostly not algific, consisting of 80' x 1500' talus: on W end, 60' x 200' prairie; just to E of this and high on site 12' x 20' algific talus. NE 1/4 SE 1/4 SE 1/4 sec. 22 and N 1/2 SW 1/4 SW 1/4 sec. 23, T 93N R 8 W, Westfield Twp., Fayette 7 1/2' quadrangle.

## FILLMORE COUNTY, MN

- \*(333) Jordan Creek E. NE facing Sinsinnewa talus, extensive and weak, ca. 60' x 700', badly pastured except at W end. NW 1/4 SE 1/4 SE 1/4 sec. 28, T 104 N R 12 W, Jordan Twp., Washington 7 1/2' quadrangle.
- \*(334) Jordan Creek W. Very weak NW facing algific talus, badly pastured, Sinsinnewa. SE 1/4 NW 1/4 SE 1/4 sec. 28, T 104 N R 12 W, Jordan Twp., Washington 7 1/2' quadrangle.

## HOUSTON COUNTY, MN

- (327) Newhouse W. Ten acre pastured prairie on N side of sandstone bluff, SE 1/4 NW 1/4 sec. 30, T 101 N R 9 W, Spring Grove Twp., Spring Grove 7 1/2' quadrangle. Best plants on low rounded ss outcrops.

## JACKSON COUNTY, IA

- \*(321) Lytle Creek 16. Small undisturbed Farmers Creek algific site, ca. 20-25' x 150', NE 1/4 SW 1/4 NW 1/4 sec. 17, T 86 N R 2 E, Otter Creek twp., Bernard 7 1/2' quadrangle. Rather low, N-facing, single level, one patch.

## WINNESHIEK COUNTY, IA

- \* (322) Kingdom Hall 1. Medium high single-level Sinsinnewa site in two patches in small drainage to Upper Iowa River, NE 1/4 SE 1/4 SE 1/4 sec. 13, T. 99 N. R 9 W, Bluffton Twp., Burr Oak 7 1/2' quadrangle. W patch 13' x 75', N to NE facing, weak: E patch 80' x 100', relatively intense, N-facing. Both undisturbed.
- \* (323) Kingdom Hall 2. Intensely cold high perched NW facing Sinsinnewa site. Undisturbed, small, dimensions, ca. 20' x 100', on small drainage into Upper Iowa River to E of spring. SW 1/4 NE 1/4 SE 1/4 sec. 13, T 99 N R 9 W, Bluffton Twp., Burr Oak 7 1/2' quadrangle.
- +,\* (324) Pine Creek 1. Medium, somewhat weak N-facing single-level Sinsinnewa site on Pine Creek, NW 1/4 SW 1/4 SE 1/4 sec. 4, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle. Rather cliffy moderate site to 100' high, 400' long, algific portion on E end ca. 100' long.
- (325) Hesper E. Not algific. NW-facing channel ss. (?Cretaceous) in Dunleith on low ridge near Minnesota border, ca. 40' x 1,200', S 1/2 NE 1/4 and N 1/2 SE 1/4 NW 1/4 sec. 8, T 100 N R 7 W, Hesper Twp., Highlandville 7 1/2' quadrangle. Mostly pastured: best plants on low projecting ss. outcrops.
- +,\* (326) Pine Creek 2. Long N to NE-facing Dunleith-Wise Lake moderate cliff with algific sites on W and E ends. Cliff to 120', 2000' long. Algific portion single leveled combined Dunleith-Wise Lake talus, ca. 80' x 200' each. NE 1/4 NW 1/4 SE 1/4 and N 1/2 NE 1/4 SE 1/4 sec. 33, T 100 N R 9 W, Burr Oak Twp., Bluffton 7 1/2' quadrangle. Sites somewhat weak, undisturbed.
- (328) Bluffton airport N. Small NE-facing Wise Lake cliff in small drainage to Upper Iowa River. Not an algific site. SW 1/4 SW 1/4 NW 1/4 sec. 11, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle.
- +,\* (329) Silver Creek 1. Medium cliffy, Dunleith-Wise Lake site with extensive talus, weakly algific, N-facing, undisturbed, single leveled but with some nearly separate Sinsinnewa patches near top. S 1/2 NE 1/4 SE 1/4 sec. 3, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle. Parts poorly distinguished moderate cliff.
- +,\* (330) Silver Creek 2. NW-facing high site, small (80' 120' x 300'), partly algific (weak single-level talus) but with short moderate cliff above. Dunleith-Wise Lake site, undisturbed. SW 1/4 NW 1/4 SW 1/4 sec. 2, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle.
- + (331) Silver Creek 3. Small (80' x 300') SW-facing cliff, barely moderate, upper Dunleith-Wise Lake, undisturbed. SE 1/4 SE 1/4 NE 1/4 sec. 3, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle.

- \*(335) Kendallville North 2. Short, cliffy (ca. 50'), NE-facing site with small algific talus (20' x 100') on W end. Site is in Dunleith-Wise Lake, on Upper Iowa River. ca. 1.2 mi. N of Kendallville, SE 1/4 SE 1/4 SE 1/4 sec. 21, T 100 N R 10 W, Fremont Twp., Winneshiek Co., Cresco NE quadrangle.
- +,\*(336) Pine Creek, 3. Extensive undisturbed N-facing Dunleith-Wise Lake moderate cliff with minor algific sections, especially near center, perched single level, high on cliff. Small basal talus (non-algific) throughout. N 1/2 SW 1/4 NE 1/4 sec. 4, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle.
- \*(337) Blue Springs East 3. Extensive very steep and dry NW-facing perched Sinsinna algific site above moderate cliff (85-264). Undisturbed site ca. 39' x 800', NW 1/4 SE 1/4 NW 1/4 sec. 8, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle.
- +,\*(343) St. Bridget 2. Large (100' x 1,000'), pristine Dunleith-Wise Lake complex cliffy bilevel-trilevel site, NE-facing, on Upper Iowa River. Center NE 1/4 NW 1/4 sec. 23, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle. Small portions in center (ca. 300' length) also moderate cliff.
- \*(344) St. Bridget 3. Small, NE-facing undisturbed but weak algific talus, ca. 15' x 100', Dunleith, on Upper Iowa River., NW 1/4 SW 1/4 SW 1/4 sec. 14, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle. Single level.
- \*(345) St. Bridget 4. Small, nearly E-facing single level Dunleith site in two patches, ca. 20' x 400', above Upper Iowa River, SE 1/4 SW 1/4 SW 1/4 sec. 14, T 99 N R 9 W, Bluffton Twp., Bluffton 7 1/2' quadrangle. Undisturbed but weak except for SE end.

APPENDIX 3. FAUNAL AND FLORAL LISTS  
 Asterisks indicate algific sites, crosses moderate cliffs

ALLAMAKEE COUNTY, IA

- \*(338) Little Paint Creek 3.  
 Aconitum noveboracense  
 Gynnocarpium robertianum  
 Maianthemum canadense  
 Betula lutea  
 Salix bebbiana  
 Saxifraga forbesii
- Hendersonia occulta  
 Triodopsis alleni  
 Mesodon thyroidus  
 Anquispira alternata  
 Nesovitrea electrina  
 Cochlicopa lubrica  
 Columella simplex  
 Euconulus polygyratus  
 Strobilops labyrinthica  
 Stenotrema barbatum  
 Vertigo gouldi  
 V. hubrichti  
 V. tridentata  
 Hawaiiia minuscula  
 Carychium exile canadense  
 Punctum vitreum

FAYETTE COUNTY, IA

- \*(332) Fayette E.  
 (hill prairie)  
 Taxus canadensis  
 Lycopodium dendroideum
- (algific slope)  
 Taxus canadensis  
 Sambucus pubens  
 Rosa acicularis
- Hendersonia occulta

FILLMORE COUNTY, MN

- \*(333) Jordan Creek E.  
 Adoxa moschatellina  
 Circaea intermedia
- \*(334) Betula papyrifera  
 Sambucus pubens  
 Maianthemum canadense

## HOUSTON COUNTY, MN

- (327) Newhouse W.  
 Juniperus communis  
 Prunus pumilus<sup>a</sup>  
 Amelanchier humilis  
 Anemone patens  
 Selaginella rupestris

## JACKSON COUNTY, IA

- \*(321) Lytle Creek 16.  
 Aconitum noveboracense      Hendersonia occulta  
 Equisetum pratense  
 Streptopus roseus  
 Taxus canadensis  
 Cerastium arvense  
 Saxifraga forbesii  
 Maianthemum canadense  
 Schizachne purpurescens

## WINNESHIEK CO., IA

- \*(322) Kingdom Hall 1.
- |                          |                                |
|--------------------------|--------------------------------|
| Pinus strobus            | Catinella gelida               |
| Betula papyrifera        | Hendersonia occulta            |
| Salix bebbiana           | Allogona profunda              |
| Sambucus pubens          | Triodopsis alleni              |
| Rubus pubescens          | Stenotrema fraternum fraternum |
| Mertensia paniculata     | Anguispira alternata           |
| Rosa acicularis          | Vallonia perspectiva           |
| Gymnocarpium robertianum | V. cyclophorella               |
| Cystopteris laurentiana  | Punctum vitreum                |
| Poa wolfii (?)           | Vertigo gouldi                 |
| Solidago sciaphila       | V. hubuchti                    |
| Saxifraga forbesii       | Columella simplex              |
|                          | Nesovitreia electrina          |
|                          | Strobilops labyrinthica        |
|                          | Deroceras laeve                |
|                          | Euconulus polygyratus          |
|                          | Carychium exile canadense      |
|                          | Gastrocopta armifera           |
|                          | G. contracta                   |
|                          | G. pentodon                    |
|                          | G. corticaria                  |
|                          | G. holzingeri                  |
- \*(323) Kingdom Hall 2.
- |                            |                           |
|----------------------------|---------------------------|
| Pinus strobus              | Hendersonia occulta       |
| Gymnocarpium robertianum   | Triodopsis alleni         |
| Betula papyrifera          | Allogona profunda         |
| Taxus canadensis           | Mesodon clausus           |
| Viburnum opulus americanum | Punctum vitreum           |
| Rosa acicularis            | Carychium exile canadense |
| Cornus stolonifera         | Gastrocopta contracta     |
| Maianthemum canadensis     | Vertigo gouldi            |
| Cystopteris laurentiana    | V. hubrichti              |
| Solidago sciaphila         | V. n. sp.                 |
| Equisetum pratense         |                           |
| Saxifraga forbesii         |                           |
- +,\*(324) Pine Creek 1.
- |                            |                           |
|----------------------------|---------------------------|
| Pinus strobus              | Hendersonia occulta       |
| Viburnum opulus americanum | Anguispira alternata      |
| Betula papyrifera          | Mesodon clausus clausus   |
| Salix bebbiana             | Triodopsis alleni         |
| Taxus canadense            | Allogona profunda         |
| Mertensia paniculata       | Deroceras laeve           |
| Circaea alpina             | Catinella gelida          |
| Rhamnus alnifolia          | Euconulus polygyratus     |
| Sambucus pubens            | Strobilops labyrinthica   |
| Solidago sciaphila         | Hawaiiia minuscula        |
| Equisetum pratense         | Carychium exile canadense |
|                            | Punctum vitreum           |
|                            | Vallonia perspectiva      |
|                            | V. cyclophorella          |



- Columella simplex  
 Striatura nilium  
 Nesovitrea electrina  
 Vertigo gouldi  
 V. hubrichti  
 V. tridentata  
 Gastrocopta contracta  
 G. holzingeri  
 G. pentodon
- (325) Hesper E.  
 Potentilla tridentata  
 Anemone patens  
 Viola pedata  
 Agrium trifolium  
 Muelenbergia asperifolia  
 Amelanchier humilis  
 Juniperus communis
- +,\*(326) Pine Creek 2.  
 Betula papyrifera  
 Viburnum opulus americanum  
 Salix bebbiana  
 Rhamnus alnifolia  
 Cypridium reginae  
 Rosa acicularis  
 Sambucus pubens  
 Saxifraga forbesii  
 Adoxa moschatellina  
 Cerastium arvense  
 Circaea alpina
- Hendersonia occulta  
 Allogona profunda  
 Anguispira alternata  
 Triodopsis multilineata  
 Mesodon clausus clausus  
 Stenotrema barbatum  
 Hawaiiia minuscula  
 Columella simplex  
 Carychium exile canadense  
 Euconulus polygyratus  
 Vertigo gouldi  
 Gastrocopta contracta  
 G. holzingeri  
 Strobilops labyrinthica  
 Nesovitrea electrina  
 Punctum vitreum
- (328) Bluffton Airport N.  
 Discus catskillensis  
 Hendersonia occulta  
 Allogona profunda  
 Triodopsis alleni  
 Anguispira alternata  
 Stenotrema fraternum fraternum  
 Glyphyalinia indentata  
 Euconulus polygyratus  
 Carychium exile canadense
- +,\*(329) Silver Creek 1.  
 Pinus strobus  
 Betula papyrifera  
 Rhamnus alnifolia  
 Sambucus pubens
- Hendersonia occulta  
 Vallonia cyclophorella  
 V. perspectiva  
 Catinella gelida

*Taxus canadensis*  
*Solidago sciaphila*  
*Maianthemum canadense*  
*Rubus pubescens*  
*Circaea alpina*  
*Cypripedium calceolus*

*Anguispira alternata*  
*Discus catskillensis*  
*Stenotrema fraternum fraternum*  
*Allogona profunda*  
*Helicodiscus parallelus*  
*Zonitoides arboreus*  
*Nesovitrea electrina*  
*Glyphyalinia indentata*  
*Euconulus polygyratus*  
*Gastrocopta armifera*  
*G. contracta*  
*G. holzingeri*  
*Hawaila minuscula*

+,\*(330) Silver Creek 2.  
*Betula papyrifera*  
*Sambucus pubens*  
*Rosa acicularia*  
*Cerastium arvense*  
*Maianthemum canadense*  
*Adoxa moschatellina*  
*Solidago sciaphila*

*Hendersonia occulta*  
*Vallonia cyclophorella*  
*Catinella gelida*  
*Allogona profunda*  
*Anguispira alternata*  
*Mesodon clausus clausus*  
*Stenotrema fraternum fraternum*  
*Helicodiscus parallelus*  
*Euconulus polygyratus*  
*Carychium exile canadense*  
*Hawaila minuscula*  
*Nesovitrea electrina*  
*Zonitoides arboreus*  
*Glyphyalinia indentata*  
*Punctum vitreum*  
*Gastrocopta armifera*  
*G. contracta*  
*G. holzingeri*

+ (331) Silver Creek 3.  
*Betula papyrifera*

*Catinella gelida*  
*Hendersonia occulta*  
*Anguispira alternata*  
*Allogona profunda*  
*Helicodiscus parallelus*  
*Zonitoides arboreus*  
*Strobilops labyrinthica*  
*Euconulus polygyratus*  
*Gastrocopta contracta*  
*Carychium exile canadense*  
*Punctum vitreum*  
*Hawaila minuscula*  
*Vertigo gouldi*

## \*335. Kendalville North 2.

Cerastium arvense  
 Cypridium calceolus  
 Saxifraga forbesii  
 Abies balsamea  
 Chrysosplenium ioense  
 Rhamnus alnifolia  
 Rosa acicularis  
 Circaea alpina

Hendersonia occulta  
 Allogona profunda  
 Succinea n. sp. morph 2  
 Gastrocopta contracta  
 G. holzingeri  
 V. gouldi  
 V. hubrichti  
 Punctum vitreum  
 Discus catskillensis  
 Vallonia perspectiva  
 Euconulus polygyratus

+,\*(336) Pine Creek 3.  
(algific)

Pinus strobus  
 Betula papyrifera  
 Cerastium arvense  
 Streptopus roseus  
 Rhamnus alnifolia  
 Maianthemum canadense  
 Sambucus pubens

Allogona profunda  
 Anguispira alternata  
 Discus catskillensis  
 Zonitoides arboreus  
 Glyphyalinia indentata  
 Nesovitrea electrina  
 Guppya sterkii  
 Euconulus polygyratus  
 Punctum vitreum  
 Hawaiiia minuscula  
 Cochlicopa lubrica  
 Deroceras laeve  
 Succinea n. sp. morph 1  
 Succinea n. sp. morph 2  
 Vallonia cyclophorella  
 V. perspectiva  
 Hendersonia occulta  
 Gastrocopta armifera  
 G. corticaria  
 G. holzingeri  
 G. pentodon  
 Stenotrema fraternum fraternum  
 S. barbatum  
 Vertigo gouldi  
 V. hubrichti  
 Carychium exile canadense

## \*(337) Blue Springs East 3.

Pinus strobus  
 Abies balsamea  
 Taxus canadensis  
 Rhamnus alnifolia  
 Betula papyrifera  
 Gymnocarpium robertianum  
 Linnaea borealis  
 Pyrola secunda  
 Viburnum opulus americana  
 Cordylus cornuta

*Sambucus pubens*  
*Cerastium arvense*  
*Maianthemum canadense*  
*Solidago sciaphila*  
*Saxifraga forbesii*  
*Allium cernuum*  
*Juniperus communis*  
*Rubus pubescens*  
*Latrium auriculata*

+, \*(343) St. Bridget 2

*Taxus canadensis*  
*Abies balsamea*  
*Pinus strobus*  
*Cypripedium calceolus*  
*C. reginae*  
*Maianthemum canadense*  
*Adoxa moschatellina*  
*Chrysosplenium ioense*  
*Hybanthus concolor*  
*Rubus pubescens*  
*Gymnocarpium robertianum*  
*Viola canadensis*  
*Salix bebbiana*  
*Viburnum opulus americana*  
*Sambucus pubens*  
*Rhamnus alnifolia*  
*Betula papyrifera*  
*Circaea alpina*  
*Schizacne purpurescens*  
*Cerastium arvense*  
*Solidago sciaphila*  
*Cornus cornuta*  
*Saxifraga forbesii*  
*Equisetum pratense*

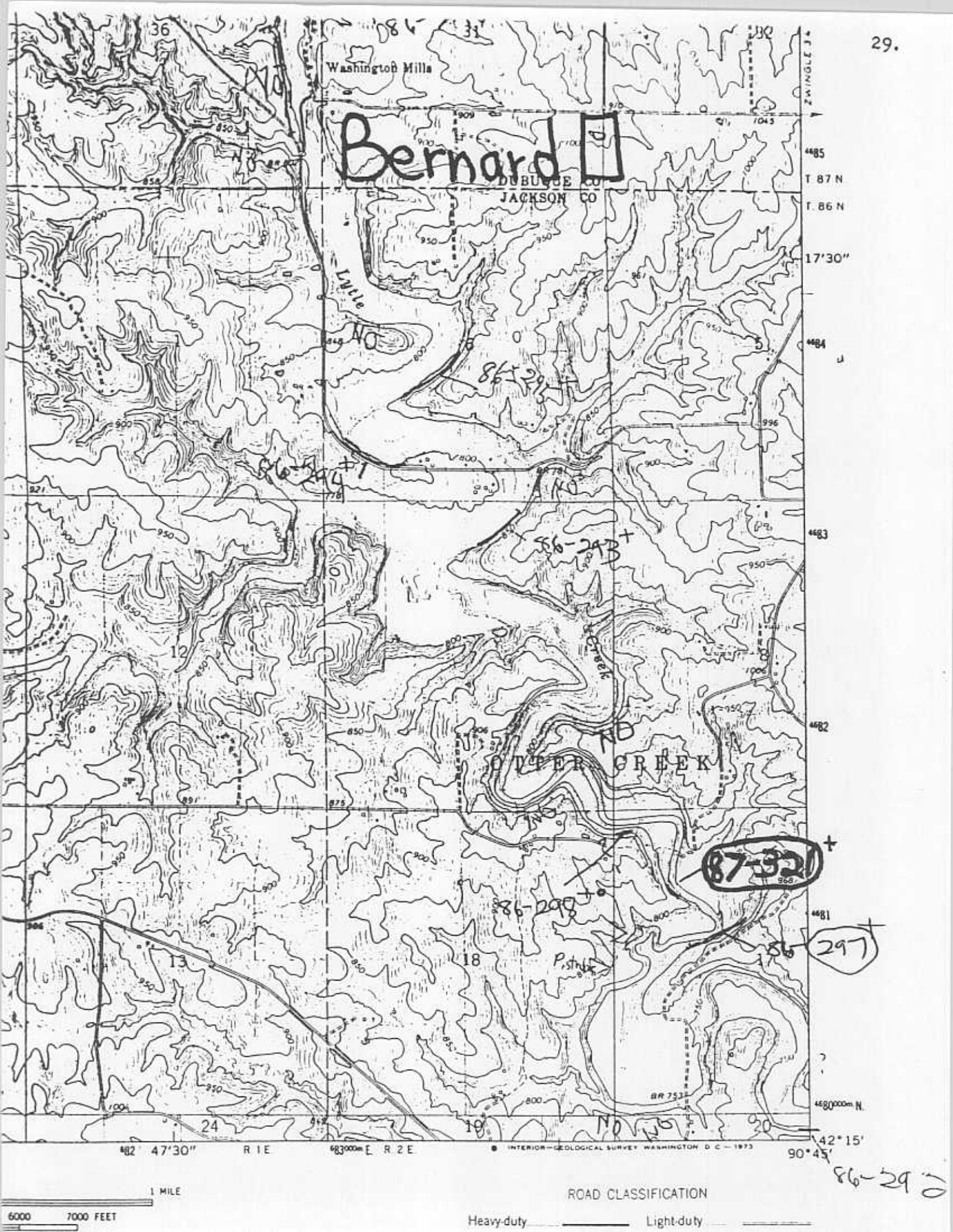
*Hendersonia occulta*  
*Allogona profunda*  
*Gastrocopta contracta*  
*G. pentodon*  
*G. corticaria*  
*G. holzingeri*  
*Vertigo gouldi*  
*V. hubrichti*  
*Punctum vitreum*  
*Discus catskillensis*  
*Vallonia perspectiva*  
*Euconulus polygyratus*  
*Succinea n. sp. morph 1*  
*Succinea n. sp. morph 2*  
*Triodopsis alleni*  
*Anguispira alternata*  
*Stenotrema fraternum fraternum*  
*Helicodiscus parallelus*  
*Hawaiiia minuscula*  
*Strobilops labyrinthica*  
*Columella simplex*  
*Zonitoides arboreus*  
*Nesovitrea electrina*  
*Carychium exile canadense*

\*(344) St. Bridget 3.  
*Cerastium arvense*

\*(345) St. Bridget 4.  
*Sambucus pubens*  
*Mertensia paniculata*  
*Saxifraga forbesii*  
*Rhamnus alnifolia*  
*Circaea alpina*

## APPENDIX 4. SITE MAPS

All maps use U.S.G.S. 7.5' topographic quadrangles as bases: names as indicated.



Washington Mills

# Bernard

DUBUQUE CO  
JACKSON CO

Little  
Creek

Older  
Creek

OLDER CREEK

**87-321**

86-297

482 47'30" R 1 E

683000m E R 2 E

INTERIOR GEOLOGICAL SURVEY WASHINGTON D C - 1973

42° 15'  
90° 45'

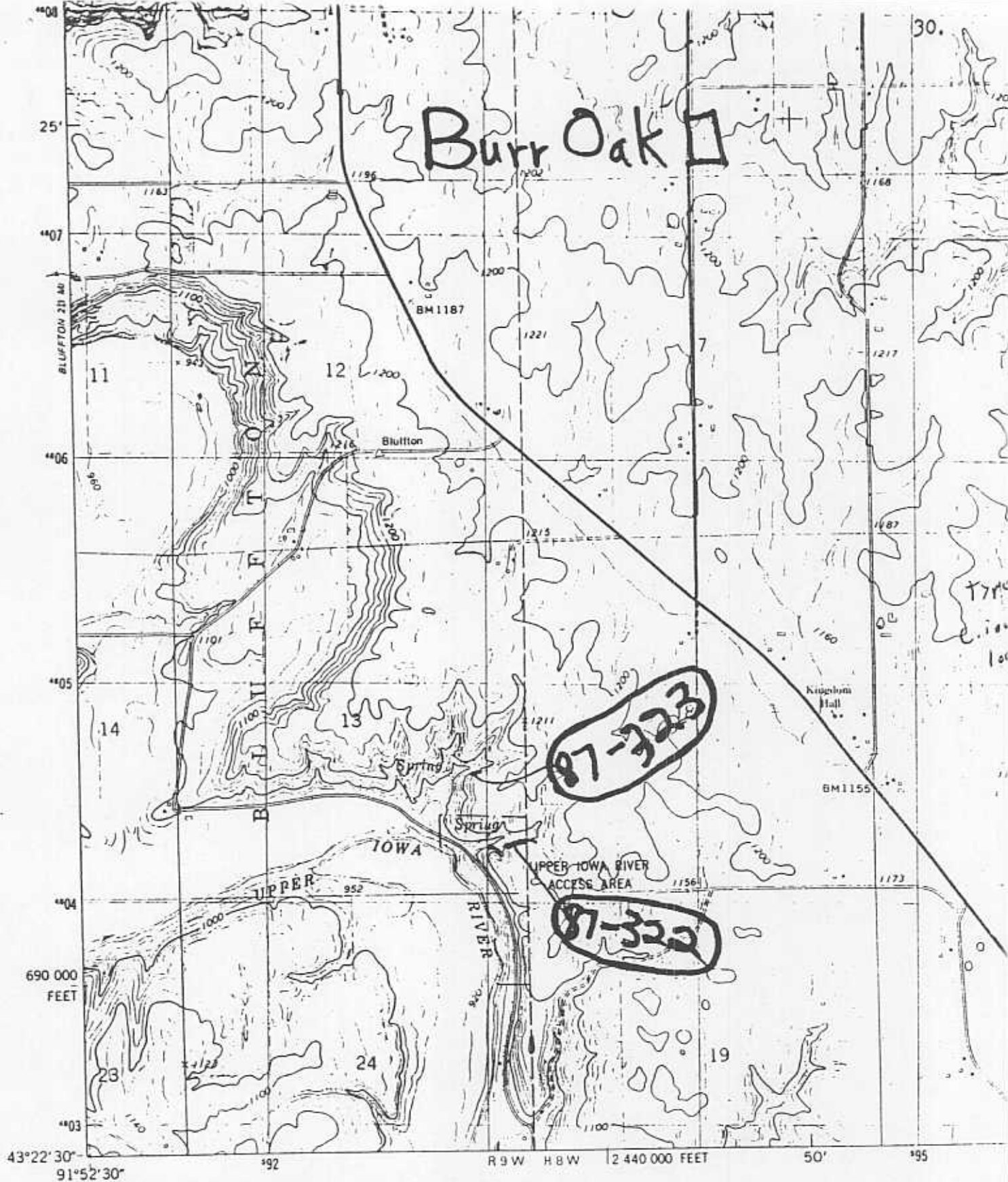
1 MILE

6000 7000 FEET

ROAD CLASSIFICATION

Heavy-duty Light-duty

86-290



(ROCKWAY)  
7420 IV SW

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

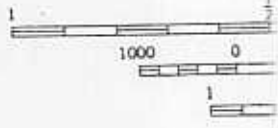
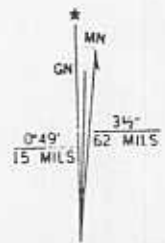
Topography by photogrammetric methods from aerial photographs taken 1975. Field checked 1977. Map edited 1981

Projection and 10,000-foot grid ticks: Iowa coordinate system, north zone (Lambert conformal conic)

1000-meter Universal Transverse Mercator grid, zone 15

1927 North American Datum

To place on the predicted North American Datum 1983 move the projection lines 6 meters north and 14 meters east as shown by dashed corner ticks



UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

THIS MAP FOR SALE BY U. S. GEOL

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

97-325







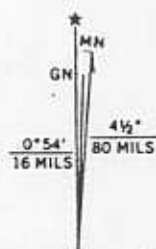
Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

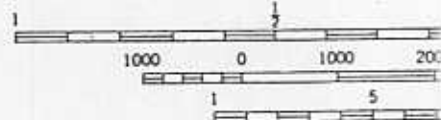
Topography by photogrammetric methods from aerial photographs taken 1963-64. Field checked 1965

Polyconic projection. 1927 North American datum  
 10,000-foot grid based on Minnesota coordinate system, south zone  
 1000-meter Universal Transverse Mercator grid ticks, zone 15, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs  
 This information is unchecked



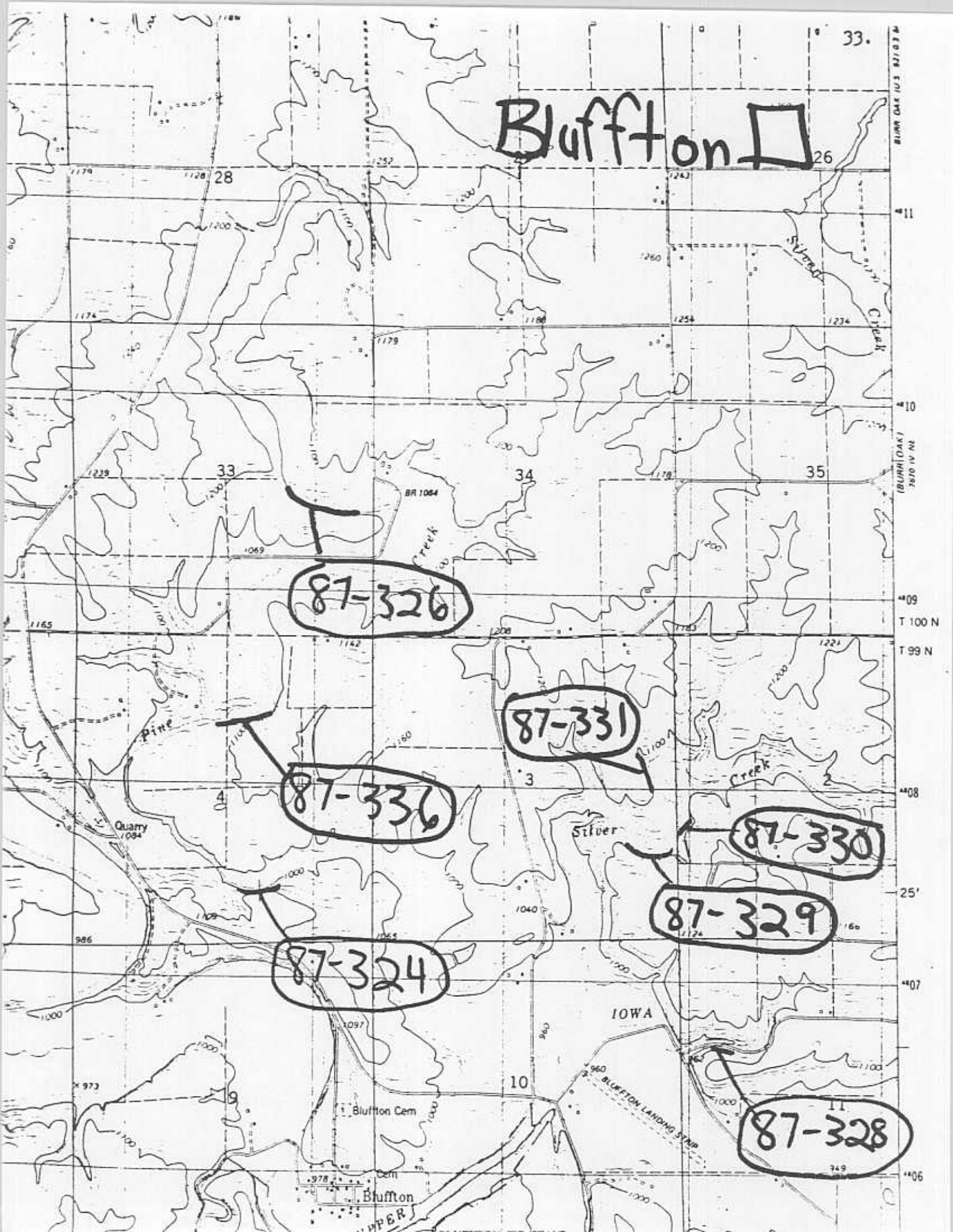
UTM GRID AND 1965 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



CONT  
 DAT

THIS MAP COMPLIES WITH  
 FOR SALE BY U.S. GEOLOGICAL SURVEY,  
 AND BY THE IOWA GEOLOGICAL SURVEY  
 A FOLDER DESCRIBING TOPOGRAPHY

# Bluffton



# Fayette

VOLGA RIVER

STATE RECREATION AREA



87-332

46

500 FEET

45

44

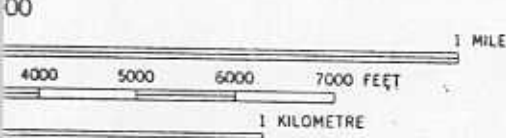
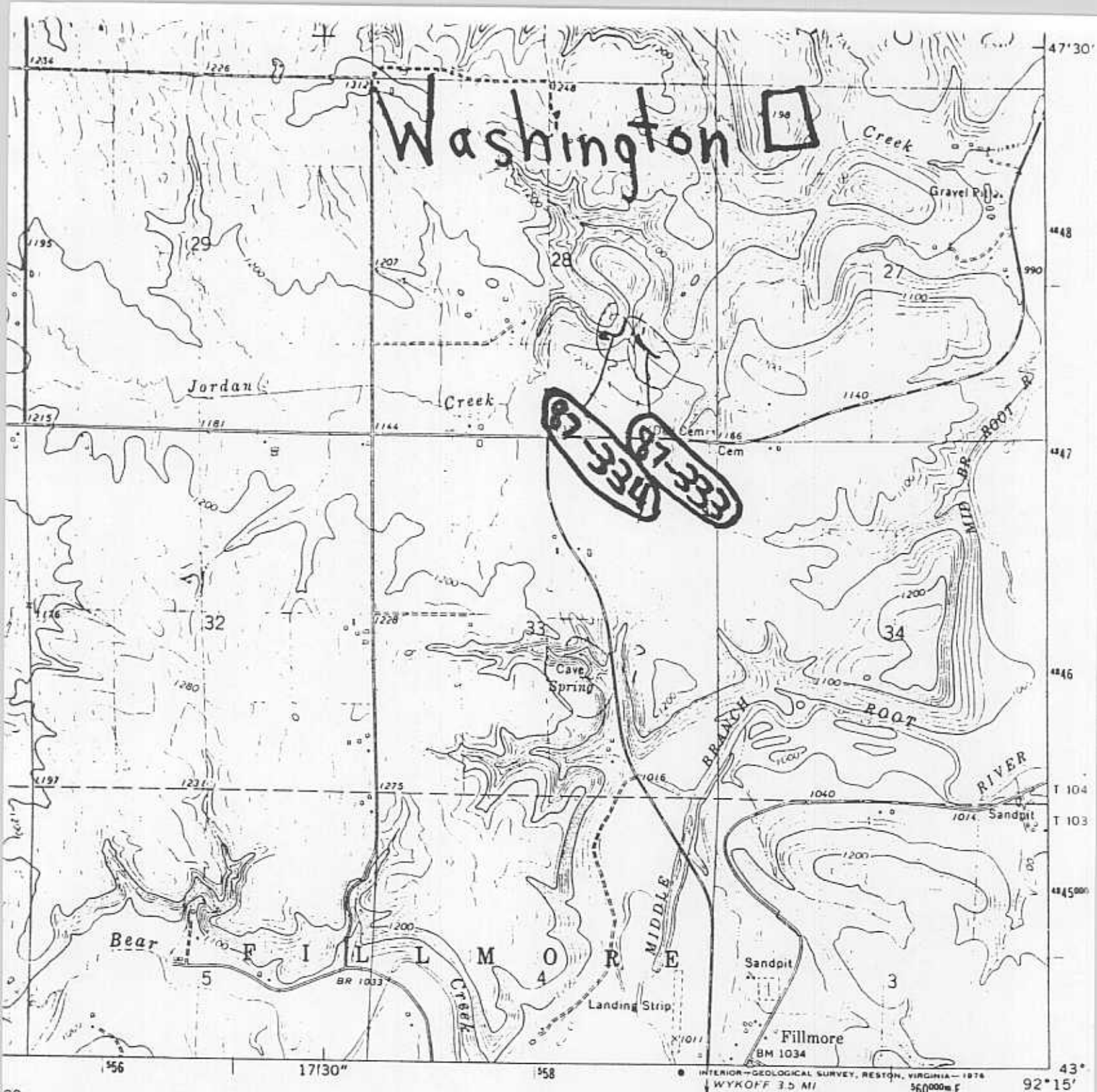
43

42

41

40

39



ROAD CLASSIFICATION

Primary highway, hard surface	Light-duty road, hard or improved surface
Secondary highway, hard surface	Unimproved road
( ) Interstate Route	( ) U. S. Route ( ) State Route

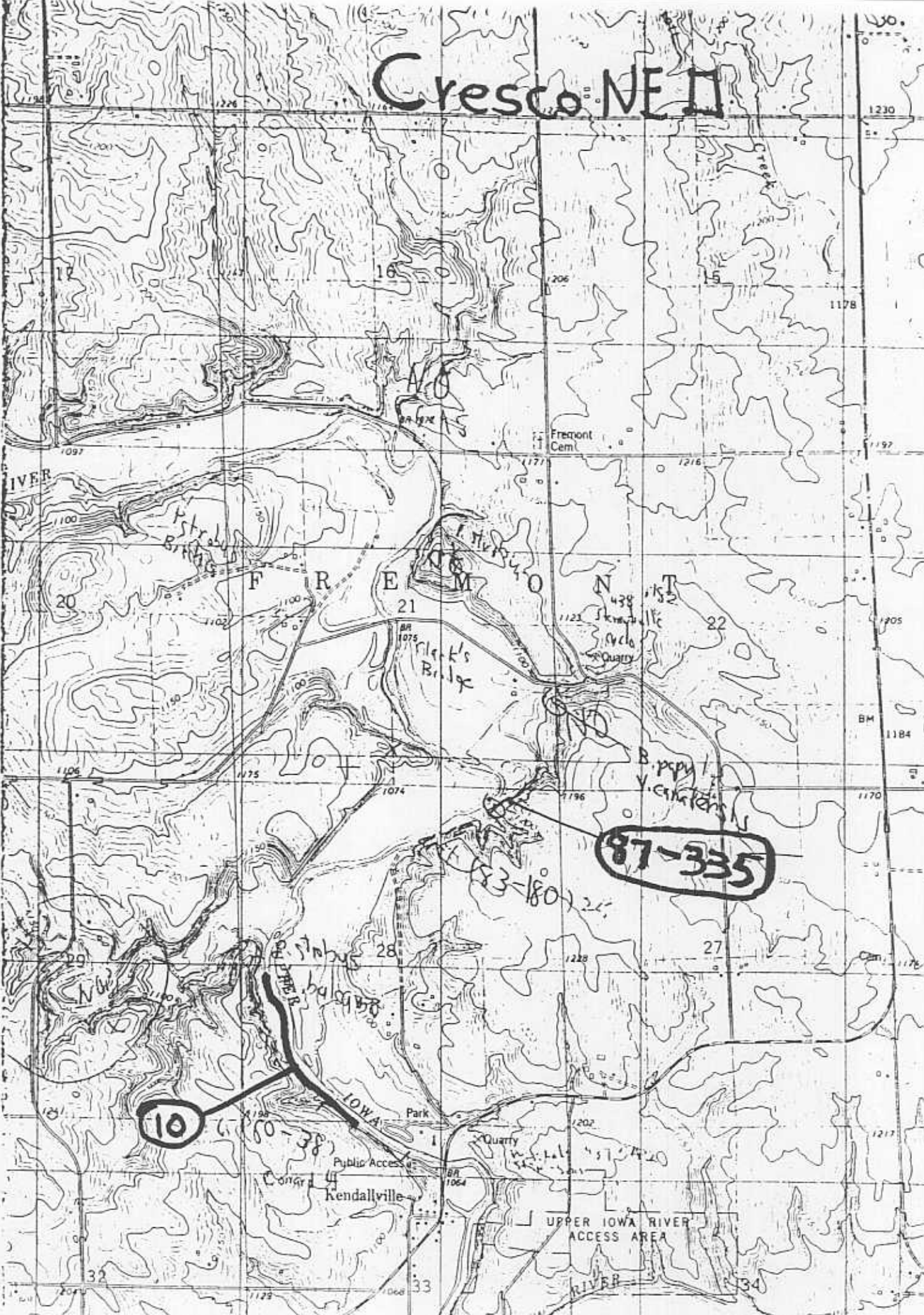
MAP ACCURACY STANDARDS  
Y, RESTON, VIRGINIA 22092  
SYMBOLS IS AVAILABLE ON REQUEST

WASHINGTON, MINN.  
SE/4 STEWARTVILLE 15' QUADRANGLE  
N4345-W9215/7.5

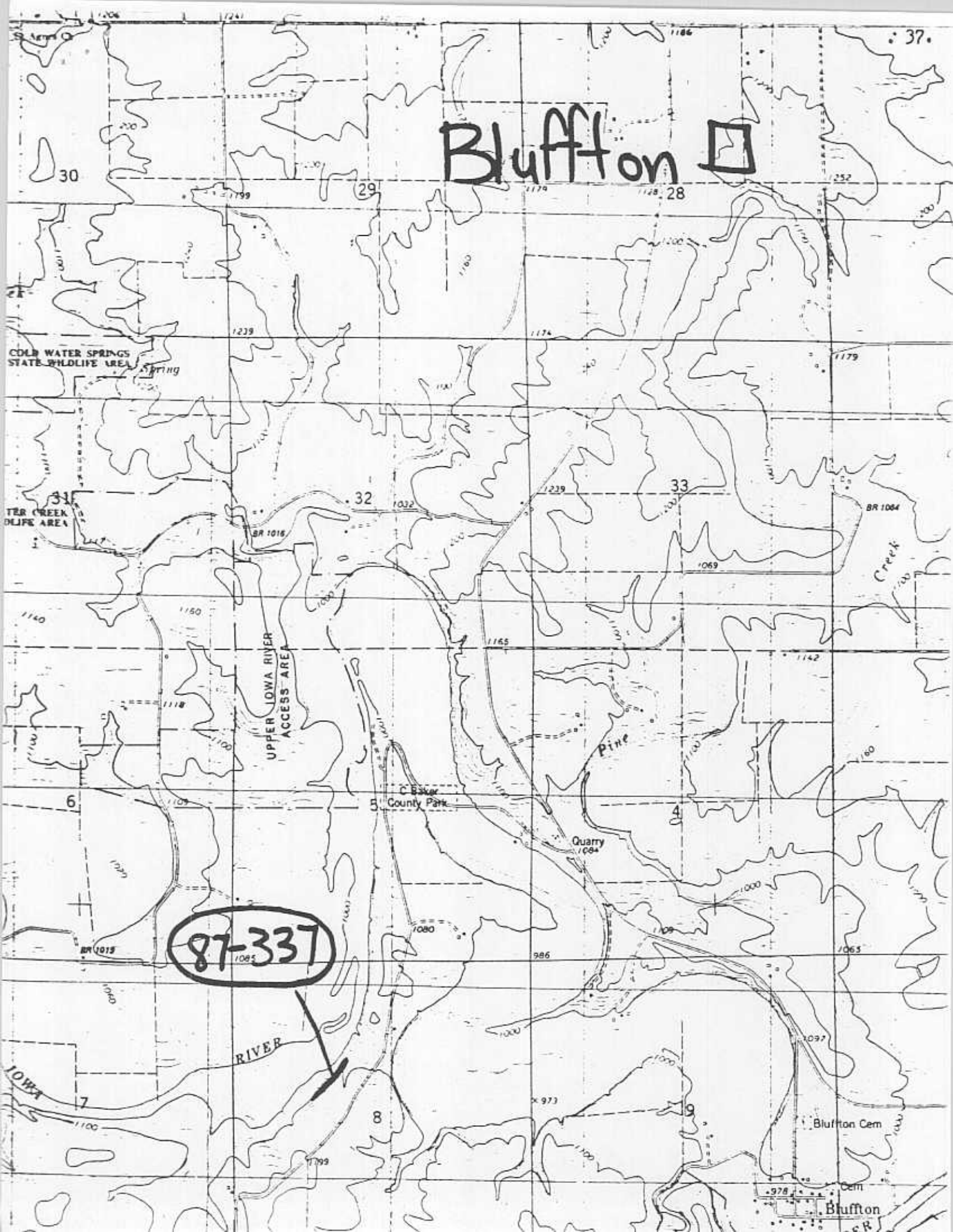
1974

AMS 7571 IV SE-SERIES V872

# Cresco NE II



# Bluffton □



87-337

UPPER IOWA RIVER

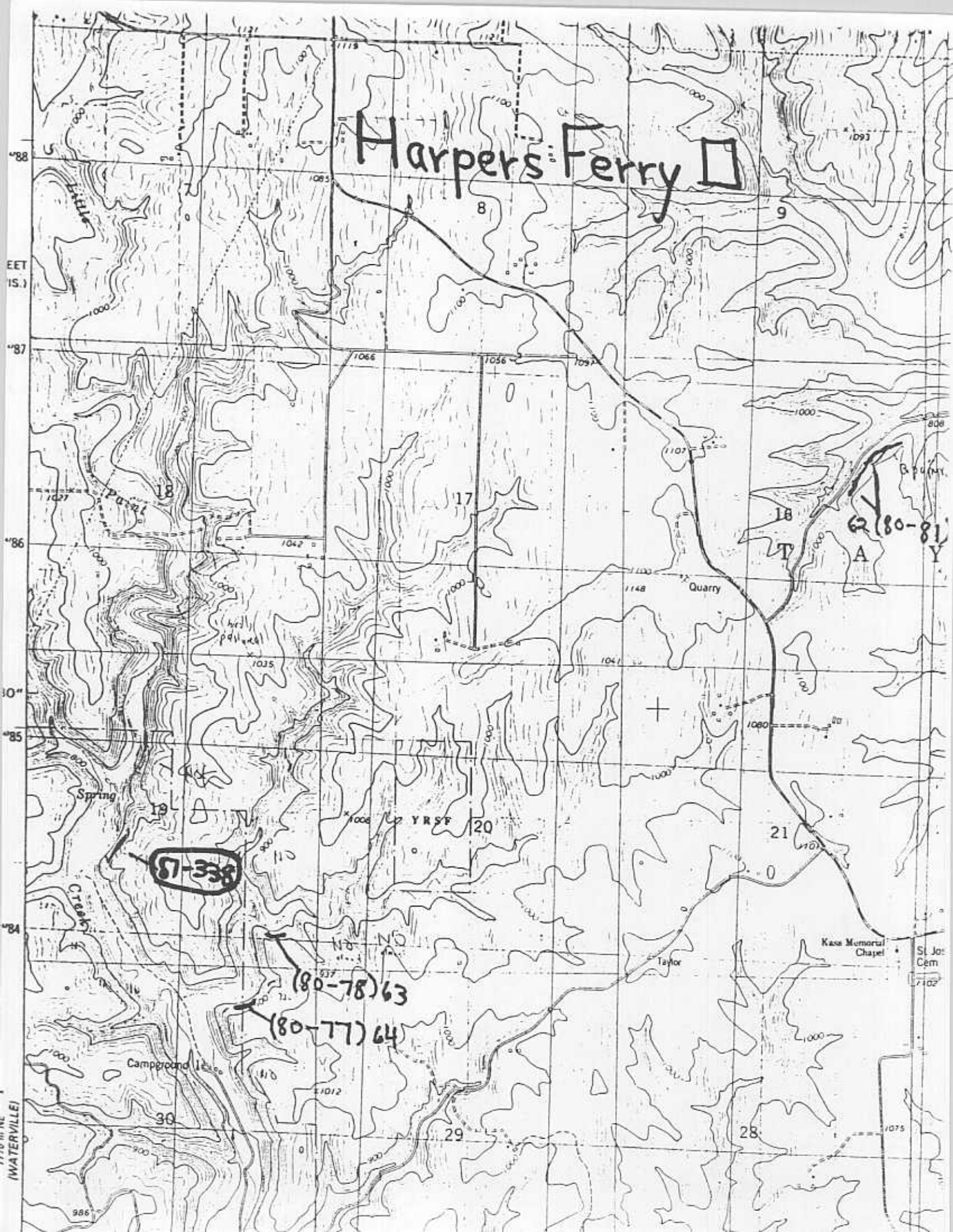
Pine

Creek

Bluffton Cem

Bluffton

# Harpers Ferry



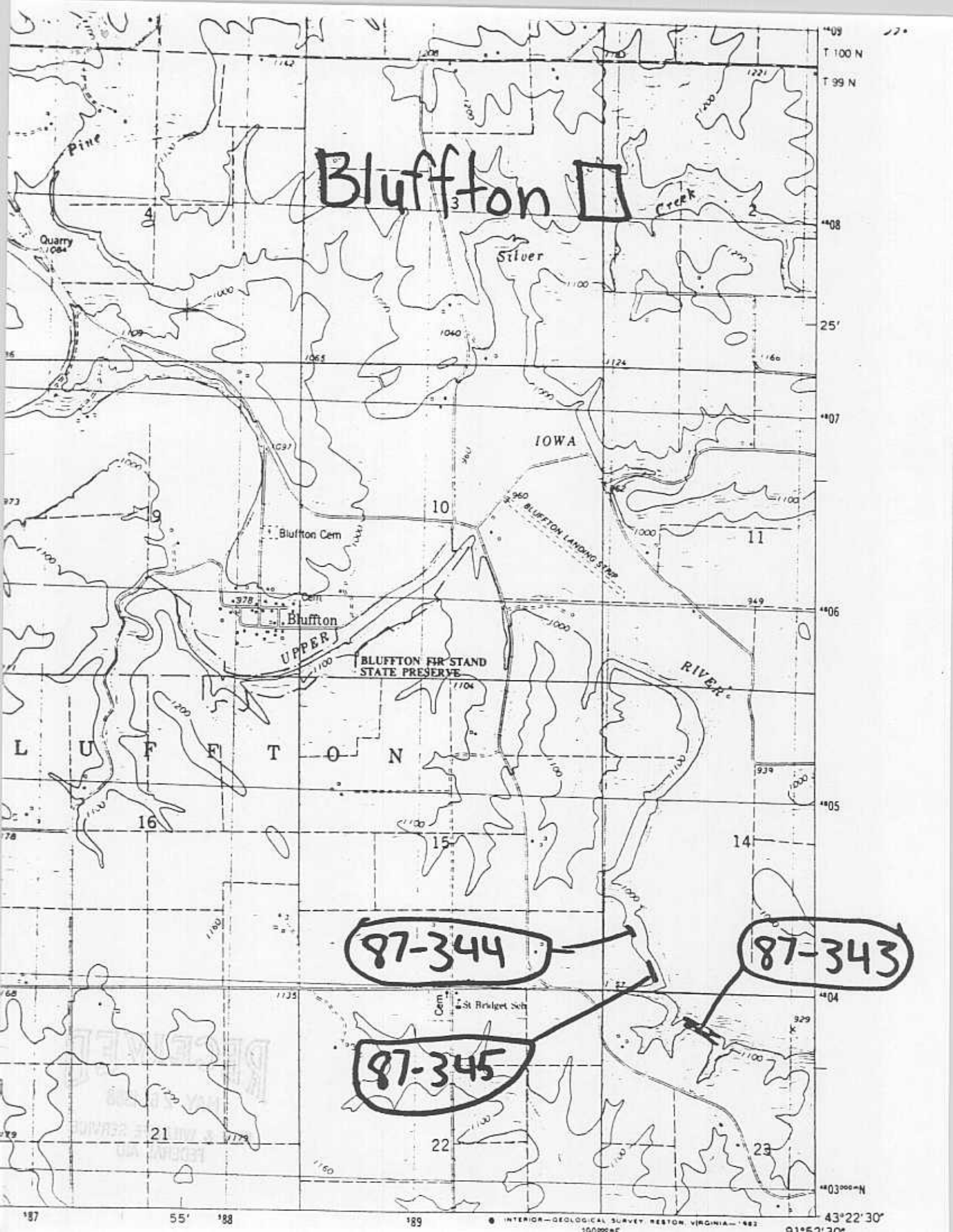
87-338

82(80-81) A Y

(80-78) 63

(80-77) 64

(WATERVILLE)



Bluffton

87-344

87-343

87-345

T 100 N  
T 99 N  
4408  
25'  
4407  
4406  
4405  
4404  
4403  
43°22'30"