

**An Intensive Survey of the Aquatic Insects in the Lusk Creek System  
Wildlife Preservation Small Project Grant (#04-030W)  
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## INTRODUCTION

Lusk Creek ranks as one of the state's highest quality streams (see below). It lies within a relatively undisturbed watershed of high natural quality. The significance of Lusk Creek and its watershed has been recognized by many state jurisdictions, and some Lusk Creek insect investigations have been conducted in the past. However, a system-wide survey of the aquatic insects found in the Lusk Creek and its tributaries has never been undertaken.

In 1970, Lusk Creek Canyon Nature Preserve was dedicated. Nature Preserve status is given to areas that contain outstanding natural features (IDNR 2003).

Fourteen areas in Lusk Creek and its watershed were included in the State of Illinois Natural Areas Inventory (INAI). These areas are the Chimaphila site (INAI No.334), Copperous Branch (INAI No.1028), the East Fork *Oxalis grandis* site (INAI No. 807), Flick Hill (INAI No. 335), Frieze Cave (INAI No. 819), Martha's Woods (INAI No.791), Manson Ford (INAI No. 1196), Pleasant Valley Hill Prairie (INAI No. 803), Quarrel Creek Area (INAI No. 1197), Reddick Hollow (INAI No.336), Werner Tract (INAI No. 337), Lusk Creek North (INAI No.816), Lusk Creek Canyon (INAI No.1057), and Lusk Creek (INAI No.495) (SNF 1992, J. Shimp, personal comm. 2004).

In 1992, scientists at Illinois Natural History Survey (INHS) identified Lusk Creek, from Flick Creek to Little Lusk Creek, and its tributary Copperous Branch as "biologically significant streams (BSS)." This designation was given to Illinois streams considered to be "most biologically worthy of protection" (Page *et al.* 1992).

The Illinois Environmental Protection Agency characterized five miles (river mile 16.5 to 21.5) of Lusk Creek as a "unique aquatic resource" and the remaining 27 miles as (river mile 0 to 16.5 and 21.5 to 32) as a "highly valued aquatic resource." Streams that are a "unique aquatic resource" (Class A) have "local, ecological significant stream conditions" and are the "highest quality streams Illinois." Those that are a "highly valued aquatic resource" (Class B) are "significant aquatic resources" and serve as buffers for Class A streams (IEPA, 1996).

As part of the Critical Trends Assessment Project, INHS scientists prepared a report entitled "Inventory of Resource Rich Areas." Illinois watersheds were ranked based on percentage of forest, percentage of wetlands, total acreage of INAI areas, and

total length of BBS streams. Resource Rich Areas (RRA) were delineated to include all of watersheds that received a ranking in the top 12%. One the RRA's identified in the report was the Shawnee Hills, which includes Lusk Creek and its watershed (IDNR 1996).

In 1986 and 1987, the IEPA investigated the streams on the Shawnee National Forest, which included Lusk Creek. Sampling activities included macroinvertebrates. Their sampling was limited to Lusk Creek and conducted in August and September (IEPA 1990).

INHS scientists have collected on Lusk Creek. Sampling was conducted most recently for the Critical Trend Assessment Program. Historically, sampling has focused on Ephemeroptera, Plecoptera, and Trichoptera. INHS results revealed that the plecopteran faunal diversity of Lusk Creek is exceptional. INHS scientists have documented 26 species of Plecoptera in Lusk Creek (INHS 2003). This high diversity is further evidence of the outstanding biological character of the stream. However, an intensive survey of the aquatic insects inhabiting Lusk Creek and its tributaries has never been conducted. The purpose of this study is to conduct such a survey.

## MATERIALS AND METHODS

### Site Selection Process

The Lusk Creek system includes a wide range of stream sizes and a diversity of habitats. Twelve sites were chosen to represent a variety of relatively undisturbed forested stream habitats: Dog Hollow (DH), Lusk Creek at Dog Hollow (L@DH), Little Bear Branch (LBB), Bear Branch (BB), Ramsey Branch (RB), Lusk Creek upstream of Ramsey Branch (LuRB), Copperous Branch (CB), Quarrel Creek (QC), Lusk Creek at the Eddyville Road (L@ER), East Fork of Little Lusk Creek (EF), Little Lusk at East Fork (LL@EF), and Little Lusk Creek downstream of Martha's Woods (LLdMW).

To begin, a list of potential sites was compiled, using land-cover maps. Streams without sufficient adjacent forest cover were excluded. The sites, which were located throughout the Lusk Creek watershed, then were inspected on the ground to determine the ones that would be used.

Sites were selected based on relative lack of disturbance and results of riffle benthic sampling. Disturbance was considered to be lack of forest cover, high percentage of bank instability, and excessive siltation on the streambed. Riffle benthic sampling results were evaluated using the absence of sensitive taxa or level of taxa richness. Eight sites were selected using this process.

After initial screening, four sites were added, one because it was relatively undisturbed, two because more sites were needed with a large drainage basin, and one because of past collection activities associated with it.

### Sampling

Benthic sampling was conducted at all twelve sites during June 2003 and March 2004. Sampling at each site involved two habitat types, riffles and banks, but varied depending upon the relative percentage of each habitat present. If the riffle habitat comprised more than 90% of the combined total of habitat, then all sampling activities were conducted in the riffle habitat. If the riffle habitat was 90% or less of the combined habitat, then both riffle and bank habitats were sampled in proportion to the amount of each habitat present.

Ten samples were taken at each site. For 11 of the 12 sites, riffle habitat comprised over 90% of the combined area of riffle and bank habitat. For these sites, all 10 samples were taken from the riffles. For the twelfth site, in which riffle habitats comprised less than 90% of the combined habitats, one bank and nine riffles were sampled.

Benthic riffle habitats, representing a range of velocities, were included to increase the possible diversity of the insects collected. Samples were collected at intervals of about 10 feet over a hundred-foot reach.

Benthic riffle habitats were sampled using a Surber sampler with a 363 micron-mesh. Prior to disturbing the smaller components of the substrate, large rocks within the sampling area were lightly rubbed in rushing water in front of the sampler to remove animals clinging to the rock surface. After the rocks were washed, they were inspected to collect any remaining animals. Once all large rocks were removed, the substrate was disturbed thoroughly and sampled. The sample then was washed in water or 95% ethanol

and preserved in 95% ethanol. All riffle samples from a site were combined into one sample.

Benthic bank habitats were sampled using a D-frame dip net with a 500 micron-mesh. An area of the bank comparable to the area sampled with the Surber sampler was selected. Dislodged material was collected with the net and preserved in 95% ethanol.

#### Light Trapping

Light trapping was conducted at the 12 sites during June and July 2003. Light traps were operated for about an hour from 21:00 to 22:00.

The light source was a white light and an ultraviolet light powered by a Coleman lantern that was suspended over the stream from a clothesline and was attached to two trees. The lantern was placed at a 45 degree angle by elevating its base with a bucket. A sheet was suspended from the line. Two white trays, filled with 80% ethanol, were placed on rocks beneath the edge of sheet. Specimens were preserved in 80% ethanol.

#### Sample Processing

Benthic riffle and bank samples currently are being processed. Processing of riffle samples involves subsampling. The insects are or will be identified to the lowest possible taxonomic level, usually the generic level.

Light trap samples also are being processed. Processing involves sorting and identifying the insects to the lowest possible taxonomic level. Species-level identification will be possible for several specimens because they are adults. Specimens being identified below ordinal level belong to Ephemeroptera, Plecoptera, Trichoptera, Megaloptera, and Odonata, which are exclusively aquatic.

## RESULTS

All twelve benthic samples from 2003 have been subsampled and identified to the family level. However, the identifications have not been verified. They will be reported when the determinations are confirmed. However, two genera have been confirmed: *Dicranota* and *Neophylax*. *Dicranota* belongs to the family Tipulidae and was collected

at DH, BB, CB, RB, EF, LLdMW, L@DH, LuRB, and LL@EF. *Neophylax* belongs to the family Ueonidae and was collected at Lusk@DH.

Some results can be reported from light traps. The Trichoptera and Plecoptera from LL@EF and LLdMW have been identified (Tables 1 and 2):

Table 1. Trichoptera and Plecoptera collected at a Light Trap on 5 July 2003 at Little Lusk Creek downstream of Martha's Wood.

Order	Family	Species
Trichoptera	Hydropsychidae	<i>Cheumatopsyche burksi</i>
Trichoptera	Hydropsychidae	<i>Cheumatopsyche pettiti</i>
Trichoptera	Hydroptilidae	<i>Hydroptila amoena</i>
Trichoptera	Hydroptilidae	<i>Hydroptila angusta</i>
Trichoptera	Hydroptilidae	<i>Hydroptila hamata</i>
Trichoptera	Hydroptilidae	<i>Hydroptila vala</i>
Trichoptera	Hydroptilidae	<i>Hydroptila waubesiana</i>
Trichoptera	Hydroptilidae	<i>Neotrichia collata</i>
Trichoptera	Hydroptilidae	<i>Neotrichia okopa</i>
Trichoptera	Hydroptilidae	<i>Neotrichia riegeli</i>
Trichoptera	Hydroptilidae	<i>Ochrotrichias shawnee</i>
Trichoptera	Hydroptilidae	<i>Orthotrichia aegerfasciella</i>
Trichoptera	Hydroptilidae	<i>Orthotrichia crista</i>
Trichoptera	Hydroptilidae	<i>Oxyethira pallida</i>
Trichoptera	Leptoceridae	<i>Ceraclea ancylus</i>
Trichoptera	Leptoceridae	<i>Ceraclea transversa</i>
Trichoptera	Leptoceridae	<i>Oecetis ditissa</i>
Trichoptera	Leptoceridae	<i>Oecetis inconspicua</i>
Trichoptera	Leptoceridae	<i>Oecetis persimilis</i>
Trichoptera	Leptoceridae	<i>Trianenodes cumberlandensis</i>
Trichoptera	Philopotamidae	<i>Chimarra feria</i>
Trichoptera	Philopotamidae	<i>Chimarra obscura</i>
Trichoptera	Philopotamidae	<i>Wormaldia shawnee</i>
Trichoptera	Phryganeidae	<i>Ptilostomis ocellifera</i>
Trichoptera	Polycentropodidae	<i>Nyctiophylax affinis</i>
Trichoptera	Polycentropodidae	<i>Polycentropus centialis</i>
Plecoptera	Perlidae	<i>Acroneuria felicis</i>
Plecoptera	Perlidae	<i>Acroneuria frisoni</i>
Plecoptera	Perlidae	<i>Perlesta lagoi</i>
Plecoptera	Perlidae	<i>Perlest nelsoni</i>

Table 2. Trichoptera and Plecoptera collected at a Light Trap on 10 July 2003 at Little Lusk Creek at East Fork.

Order	Family	Species
Trichoptera	Glossosomatidae	Agapetus illini
Trichoptera	Hydropsychidae	Cheumatopsyche oxa
Trichoptera	Hydropsychidae	Cheumatopsyche pettiti
Trichoptera	Hydropsychidae	Diplectrona modesto
Trichoptera	Hydroptilidae	Hydroptila amoena
Trichoptera	Hydroptilidae	Hydroptila angusta
Trichoptera	Hydroptilidae	Hydroptila consimilis
Trichoptera	Hydroptilidae	Hydroptila hamata
Trichoptera	Hydroptilidae	Hydroptila nr. metoeca
Trichoptera	Hydroptilidae	Hydroptila vala
Trichoptera	Hydroptilidae	Neotrichia okopa
Trichoptera	Hydroptilidae	Neotrichia riegeli
Trichoptera	Hydroptilidae	Orthotrichia aegerfasciella
Trichoptera	Hydroptilidae	Oxyethira pallida
Trichoptera	Leptoceridae	Ceraclea flava
Trichoptera	Leptoceridae	Ceraclea resurgens
Trichoptera	Leptoceridae	Oecetis inconspicua
Trichoptera	Leptoceridae	Oecetis nocturna
Trichoptera	Leptoceridae	Oeceti persimilisu
Trichoptera	Leptoceridae	Triaenodes cumberlandensis
Trichoptera	Philopotamidae	Chimarra feria
Trichoptera	Philopotamidae	Chimarra obscura
Trichoptera	Polycentropodidae	Nyctiophylax affinis
Trichoptera	Polycentropodidae	Polycentropus centralis
Plecoptera	Perlidae	Acroneuria frisoni
Plecoptera	Perlidae	Perlesta lagoi
Plecoptera	Perlidae	Perlesta nelsoni

#### Other Results

During benthic sampling in 2003, Asiatic clam shells were observed at the L@ER site and the LuRB site, both of which are on Lusk Creek.

On 10 August 2003, I found a specimen of the state-endangered orchid, *Spiranthes vernalis*, along FR 1762, T. 12 S, R. 6 E, section 1, NW quarter. The orchid was in bloom and approximately 2 feet high.

During benthic sampling in 2004, I captured and released a possible least brook lamprey at L@ER. This possible state-threatened fish was in a riffle.

## DISCUSSION

In 1986, IEPA collected benthic macroinvertebrates from four sites along Lusk Creek during last summer/early fall. They did not report collecting *Dicranota* or *Neophylax*. In the present study, benthic sampling was conducted in late spring/early summer and late winter/early spring on Lusk Creek and its tributaries. Therefore, other genera not collected by IEPA also may be found.

Partial light trapping results demonstrate that the Little Lusk Creek trichopteran diversity is impressive. For example, twelve species of hydroptilids were collected in a single night at LLdMW (Table 1). Dewalt and others (1999) working on the lower Illinois River system, ran light traps at eight sites for one night in June, July, and August. They documented at most six species hydroptilids at any one site combining the results of three nights.

The observed distribution of the Asiatic clam from this study was limited to two of three sites on Lusk Creek. The third site was L@DH, which is the furthest upstream.

## CONCLUSION

Lusk Creek is state-recognized high quality stream system. Past insect studies have provided some insight into the quality of one of the state's premier stream systems. However a system-wide insect survey has not been conducted to date. This study represents the first comprehensive insect survey of Lusk Creek and its tributaries. The partial results reported here indicate that the insect diversity documented in earlier studies was underestimated. The results of this study will substantially supplement the knowledge of the insect fauna found in the Lusk Creek system.



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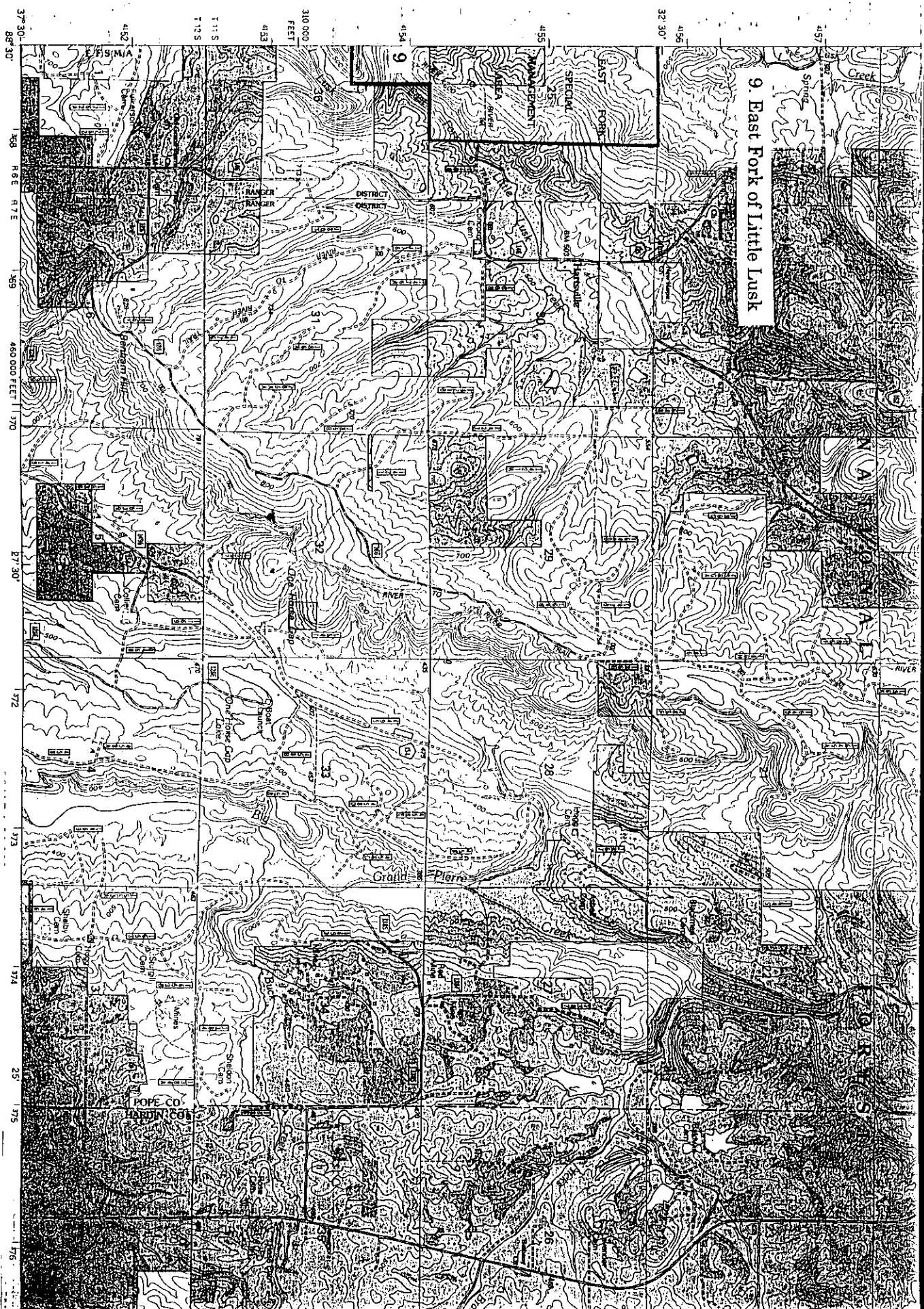
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9, East Fork of Little Lusk



37° 30' 88° 30' 189 N 6 E 17 E 189 460 000 FEET 170 27 30 172 173 174 25 175 176

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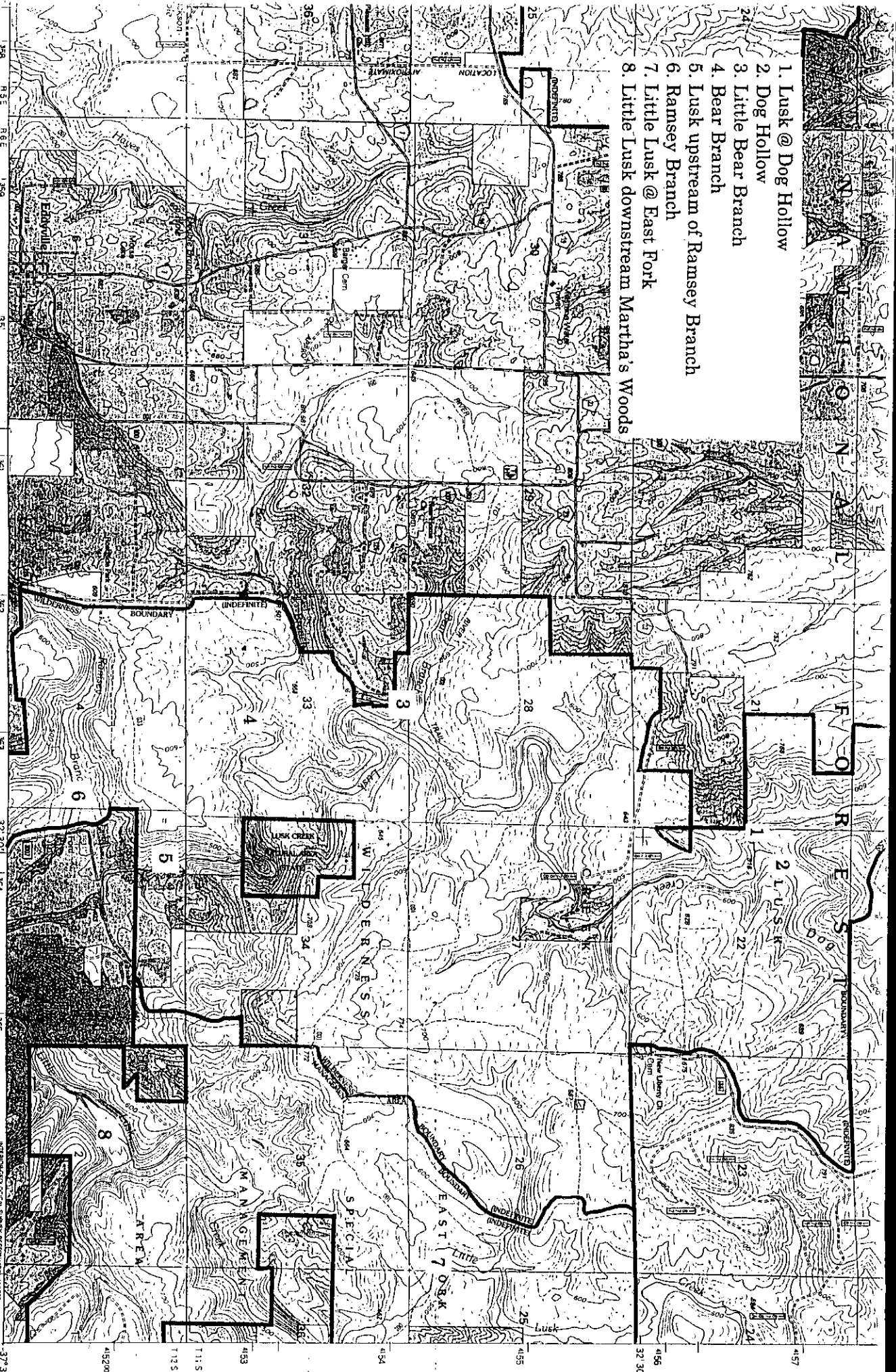
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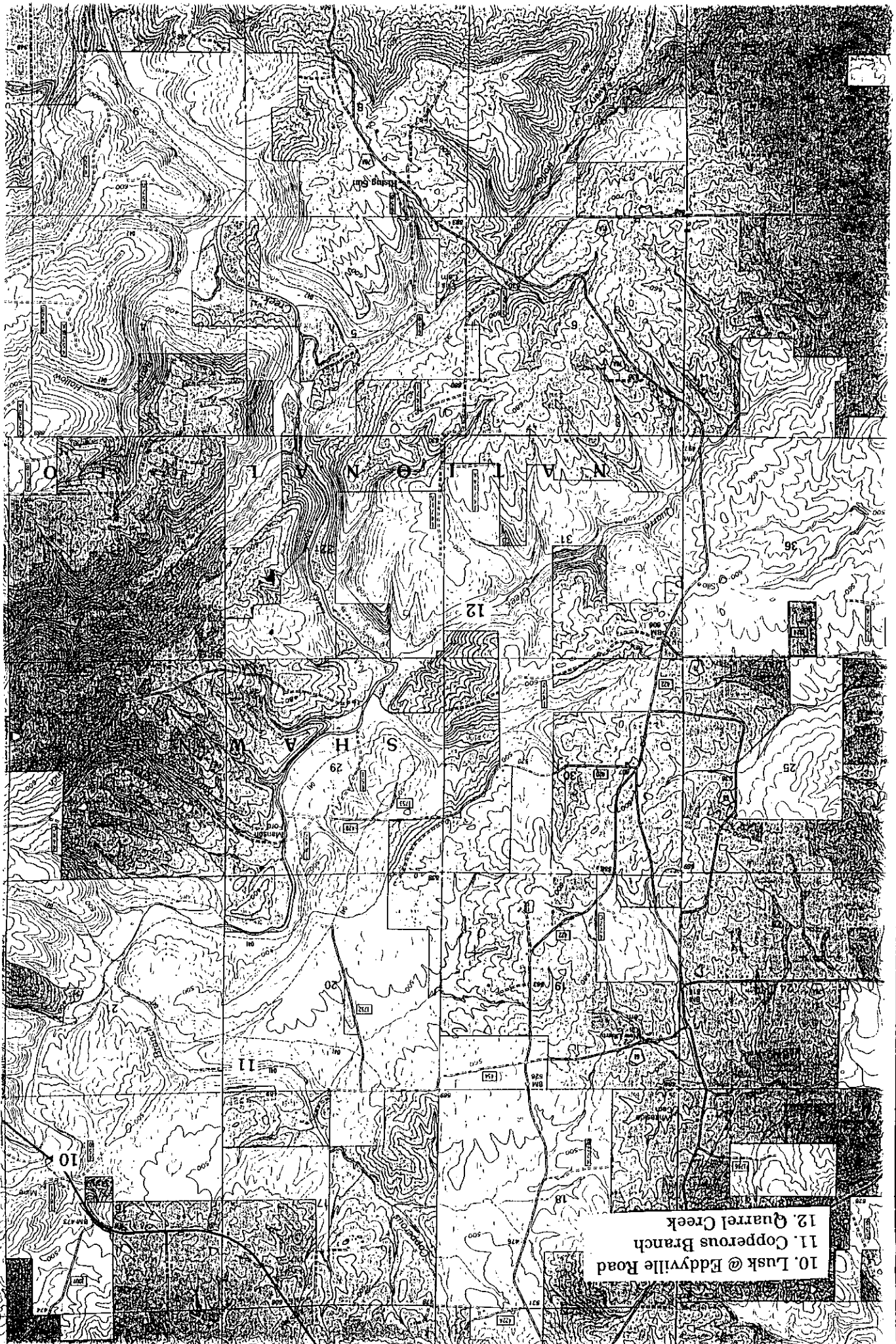
1. Lusk @ Dog Hollow
2. Dog Hollow
3. Little Bear Branch
4. Bear Branch
5. Lusk upstream of Ramsey Branch
6. Ramsey Branch
7. Little Lusk @ East Fork
8. Little Lusk downstream Martha's Woods



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10. Lusk @ Eddyville Road  
11. Copperous Branch  
12. Quarrel Creek