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NSWC CRANE
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DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

IN REPLY REFER TO:
5090
Ser 095/7121

01 JUL 1997

Fish and Wildlife Service
Bloomington Field Office
ATTN: Scott Pruitt
620 South Walker Street
Bloomington, IN 47403-2121

Dear Mr. Pruitt:

Provided as enclosure (1) is the proposed sampling approach for the insects at the Ammunition Burning Grounds. The proposal lays out locations, times, analytical parameters, etc. Please review and provide feedback as soon as possible. I have completed two nights of collection for June with light traps. Tentatively, I plan on sampling three nights in July, probably the week of the 14th. Let me know if you would be interested in coming on site to view the setup.

I could use some recommendations on detection limits for the metals and explosives. I have held some discussions with the U.S. EPA ecologist, but I'm still somewhat in the dark as to what levels will be acceptable to Fish and Wildlife.

NAVSURFWARCENDIV Crane point of contact is Mr. Thomas J. Brent, Code 09510, telephone 812-854-6160.

Sincerely,

James M. Humsicker

JAMES M. HUMSICKER
Director, Environmental Protection Department
By direction of
the Commander

Encl:
(1) Insect Collection Proposal

Copy to:
USEPA (DRP-8J)
USAE-WES (ERD-A)
ADMINISTRATIVE RECORD

PROPOSAL FOR INSECT COLLECTION AT THE AMMUNITION BURNING GROUNDS CRANE DIVISION, NAVAL SURFACE WARFARE CENTER

BACKGROUND

Crane Division, Naval Surface Warfare Center (NSWC Crane) is conducting an ecological risk assessment for Resource Conservation Recovery Act (RCRA) corrective action activities and to support a RCRA Subpart X (open burning-open detonation) permit. A bat survey along the streams near the areas of concern was included as part of the ecological risk assessment. On June 25, 1996, a single male Indiana bat (*Myotis sodalis*) was caught. The capture occurred south of the Ammunition Burning Grounds (ABG) on Little Sulphur Creek approximately in the SE corner of Section 28, T5N, R3W, as shown on figure (1).

On June 28, 1996, Thomas J. Brent from NSWC Crane and Carol Witt-Smith of the U.S. EPA met with representatives from the U.S. Fish and Wildlife Service (USFWS) to discuss follow-up actions. NSWC Crane is in the process of determining if operations at the ABG are impacting *M. Sodalis*. Thus, NSWC Crane proposed to conduct a survey, such as a blacklight survey, of the available prey in the area the bat was captured, in order to determine if contaminants are mobilizing through the bat's food chain.

FIELD COLLECTION

NSWC Crane has contacted the U.S. Army Corps of Engineers, Waterways Experiment Station (WES) to assist in the project. Dr. Al Cofrancesco is a research entomologist who will be providing support in field collection and identification. Dr. Steve Larson will lead the analytical work.

Two types of traps will be used for field collection. The first collecting apparatus will be a large light trap that utilizes both black lights and a mercury vapor lamp. This trap attracts flying insect from a long distance. The different light sources give a wide spectrum of light stimulus that attracts the insects. The trap contains three large drawers. The bottom drawer contains a metal pan. Inside the pan, sheets of cotton are placed and then approximately 800 ml of ethyl acetate is poured over the cotton. The chemical evaporates up through the two upper drawers and funnel area where the insects land. After breathing the chemical they fall through the collecting funnel and into the top drawer. This drawer is composed of large mesh screen and the smaller insects drop through to the second drawer. Two of these light traps will be situated on the Jeep Trail below the ABG, one each at Bridges 3089 and 3090, shown in figure (1). Due to the remote location, the lights receive power from a gas-powered generator. The generator is fitted with an external gas supply to provide continuous fuel through the night. The generator is placed on gravel to ensure that hot exhausts will not create a fire hazard for dry vegetation. Typically, the traps are setup at dusk and taken down and

emptied around 8:00 a.m. However, if conditions exist such that the generators pose an unacceptable fire risk, the light traps are manned until 1:00 a.m. and then shut off. Insect activity tends to decrease after 1:00 a.m., and this of course, coincides with the bat's evening feeding behavior.

Since light traps bias collection for light-attracted insects, a Malaise trap will also be used. This type of trap consists of insect netting designed in a configuration that will funnel flying insects into the collecting container. The Malaise trap will be set up at dusk so as to not collect insects that fly only during daylight hours. The collecting container can be operated dry or with a fluid such as alcohol, soapy water or other fluid.

All three traps will be operated for three nights in each of the months of June, July, and August. The exceptions are the Malaise trap, which may not arrive on site until early July, and only two nights of trapping in June for the light traps (late start and technical difficulties). Therefore, 22 trap nights are anticipated. This sampling strategy should allow for collecting insects with differing emergences, and provide for optimum sample volume. Following collection, all insects from one trap will be placed into a container and frozen. For example, three nights of collection in July will produce 9 containers -- six from the two light traps and three from the Malaise trap. After sample numbers have been applied and chain-of custodies completed, the samples will be sent to Dr. Cofrancesco at WES for sorting and identification. Sorting will determine the differences between the collection devices, particularly the Malaise versus the light traps. No difference is anticipated between the light traps. However, since they tend to collect a larger volume of insects, samples from each light trap will be containerized separately.

ANALYTICAL

Determining the capture differences between the two trap types is mostly academic. The bat essentially does not care whether or not the insects are light attracted and captured, as long as both trap types collect insects representative of the bat's diet. As such, NSWC Crane proposes to combine collections from all three traps from each night from each month for a total of three samples sent for analysis (i.e., a sample for each month). Reduction of sample numbers is especially important since the project has a very limited budget. Furthermore, collection combination is necessary to ensure adequate sample volumes in order to achieve sufficiently low detection limits.

During the sorting process, insect orders not typically associated with the diet of *M. sodalis* will be noted and discarded. Only those insects representative of the bat's diet will be submitted for analysis. The intent of the project is to be as representative as reasonably possible in order to determine whether or not site contaminants are impacting this endangered species. It is possible, albeit highly unlikely, that there may be an order of insects which is particularly good at mobilizing and concentrating metals or explosives. Although, this would be note worthy, it is not the subject of this study. Submitting all insects regardless of dietary preferences might unfavorably bias the outcome.

Virgil Brack, with regard to the food habit of *M. sodalis,* states that:

> Most prey were moths (Lepidoptera) and beetles (Coleoptera), both of which are predominately found in a terrestrial environment. These data are compatible with observations that the bat forages high in the woodland canopy. Although some insects dependant upon an aquatic environment, such as flies (Diptera), caddisflies (Trichoptera), and stoneflies (Plecoptera), are consumed, they do not appear to be selected for. More aquatic-based insects are eaten when riparian woodlands comprised the predominant available habitat (1990).

The NSWC Crane site is riparian woodlands, and therefore we assume the bat would consume a significant number of aquatic-based insects. The Habitat Suitability Index Model for *M. sodalis* presents Lepidoptera, Diptera, Trichoptera, and Coleoptera as the most important food sources, with Plecoptera included in riparian woodlands habitat (1995). Ya-Fu Lee found Lepidoptera, Trichoptera, Coleoptera, Diptera, and Homoptera to account for the largest portion of diet (1993).

Based on the literature cited and the habitat type, NSWC Crane proposes to submit the following insect orders for analyses: Lepidoptera, Coleoptera, Trichoptera, Diptera, Plecoptera, Homoptera, and Hymenoptera.

On February 18, 1997, Mr. Brent spoke with Cindy Chaffee of the Fish and Wildlife Service as to what constituents to analyze for during the study. Ms. Chaffee requested we analyze for metals and explosives. Inorganic and explosive contaminants have been identified at the ABG during various RCRA Facility Investigation (RFI) sampling efforts. NSWC Crane therefore, proposes to analyze for the 14 explosives found under SW846 Method 8330. For metals, NSWC Crane proposes to analyze for antimony, cadmium, chromium, copper, lead, mercury, silver, magnesium, and barium. These are the principal inorganic contaminants of concern identified during the RFI Phase III soil sampling at the ABG. Nickel, zinc, manganese, sodium, tin, aluminum, cobalt, and phosphorus were also identified as contaminants, but we do not believe these elements to be of primary concern from a toxicological perspective.

Brack, V. and K. Tyrell. 1990. A model of the habitat used by the Indiana bat (*Myotis sodalis*) during the summer in Indiana: 1990 field studies. Report to Indiana Department of Natural Resources, Endangered Species Program, Project E-1-4, Study No. 8

Lee, F. 1993. Feeding Ecology of the Indiana Bat, *Myotis Sodalis*, and Resource Partitioning with *Myotis Keenii* and *Myotis Lucifugus* (Master of Science Thesis, University of Tennessee, Knoxville).

Rommé, R.C., et al. 1995. Literature Summary and Habitat Suitability Index Model: Components of Summer Habitat for the Indiana Bat, *Myotis Sodalis*. Report to Indiana Department of Natural Resources, Federal Aid Project E-1-7, Study No. 8

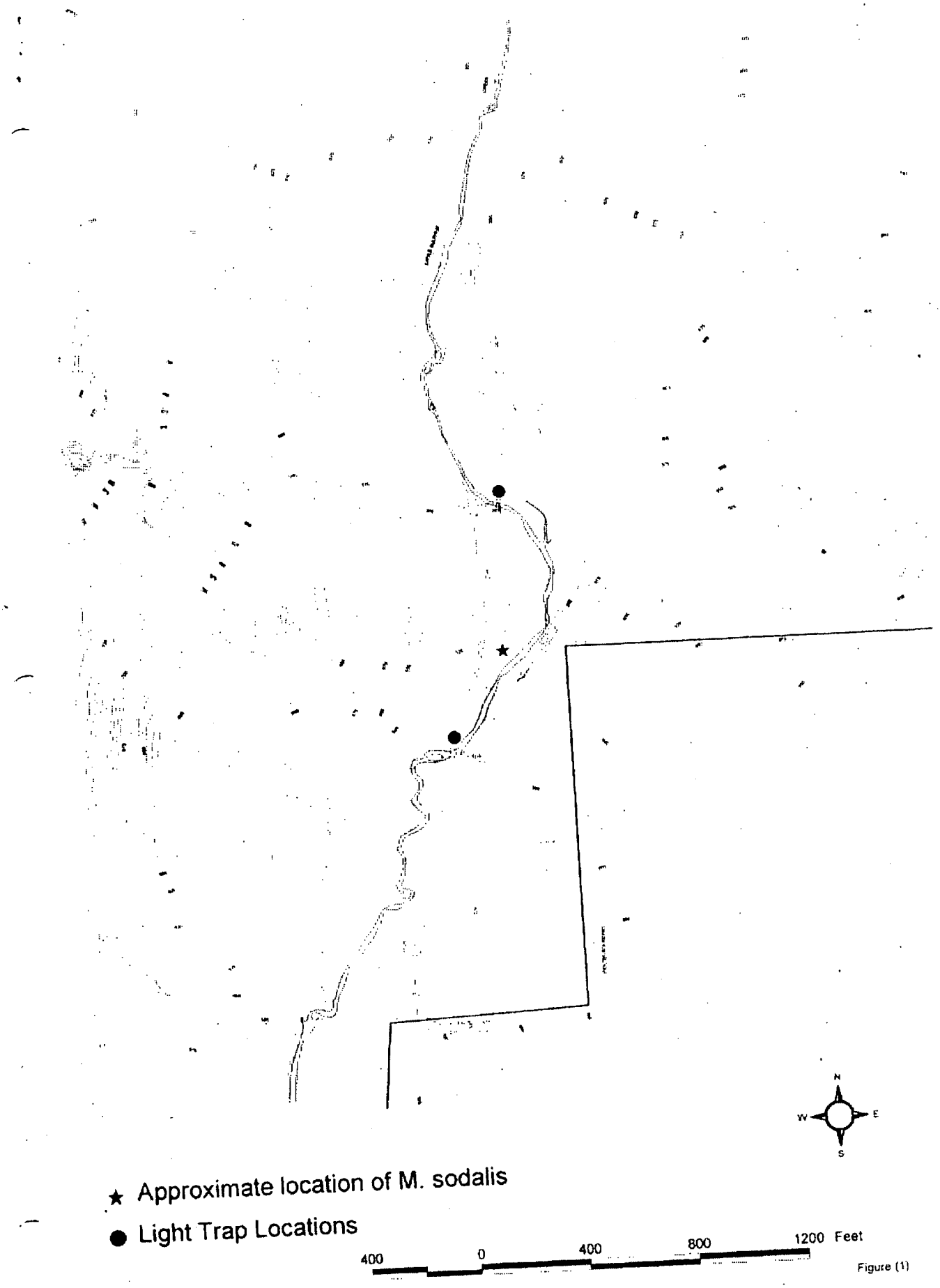
N
W
E
S
★ Approximate location of M. sodalis
● Light Trap Locations
400
0
400
800
1200 Feet

Figure (1)