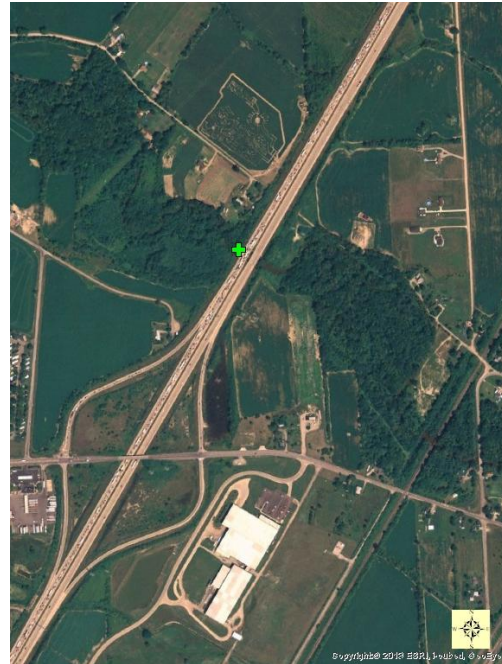
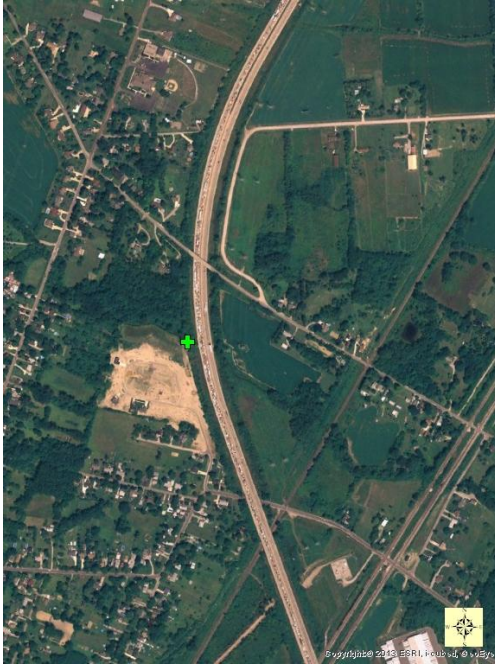


An Assessment of the Presence or Likely Absence of the Indiana Bat (*Myotis sodalis*) and the Northern Long-eared Bat (*Myotis septentrionalis*) in Portions of the I-75 Corridor, Monroe County, Michigan



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Background

The Indiana bat (*Myotis sodalis*) is a Federally-listed endangered species. The species is known to occur in Michigan and is most prevalent in southern Michigan (MNFI Natural Heritage Database 2014). While the Northern long-eared bat (*Myotis septentrionalis*) is not currently on either the state or Federal list of threatened or endangered species, it is currently proposed by the US Fish and Wildlife Service to be listed; a decision in this regard is expected sometime in 2015. Under the Endangered Species Act and the National Environmental Policy Act, projects with a Federal nexus are required to consider the potential for “take” with respect to listed species and if take is possible, to consult with the US Fish and Wildlife Service to minimize such potential.

Consequently, the Michigan Department of Transportation (MDOT) requested the Michigan Natural Features Inventory (MNFI) to conduct an assessment of presence or likely absence of these two species for a project corridor along I-75, south of the I-75/I-275 interchange south to Telb Road in Monroe County, Michigan. Neither species has been recorded in the immediate project area, but both the Indiana bat and Northern long-eared bat have been recorded in Southeastern Michigan (Kurta 2014, Klatt and Gehring 2011, respectively). MDOT concerns focused on two stream crossings within the project corridor that appeared to represent the most suitable habitat in the corridor (Figure 1).

Methodology

MNFI analyzed acoustic data that we collected from both stream crossing sites (Figures 2 and 3 and Table 1). These data were collected under the following considerations and procedures.

Habitat. Potential habitat within the right-of-way, as well as in the larger surrounding area is marginal for bat species, consisting mostly of agricultural lands, urban areas, and fragmented forest patches (though these woodlots may serve as habitat for both species and the agricultural fields can provide foraging areas). From an MDOT supplied map, MNFI determined that there is 231 acres of wooded habitat within the project area, spread out in a number of patches. Two wooded patches are accessible from the MDOT ROW. Both patches are associated with streams and the streams cross under I-75 at bridges. The northernmost stream is named Stoney Creek and the southern stream is named Sandy Creek. Forest cover in the Stoney Creek corridor is more intact than in the Sandy Creek corridor (Figure 1) and includes species typical of riparian habitats in southern Michigan.

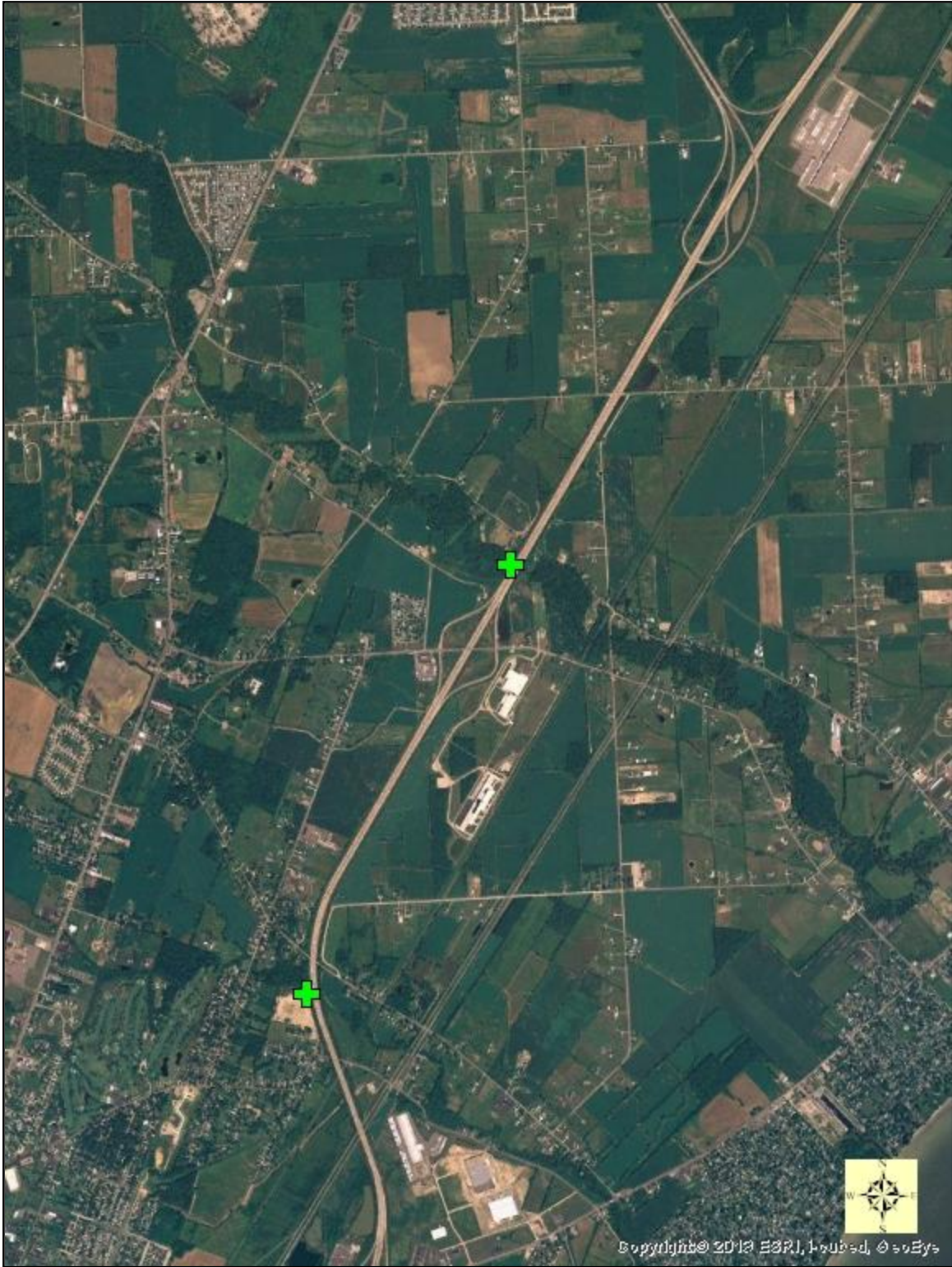


Figure 1: Project Area



Figure 2: Northern Site (Stoney Creek)

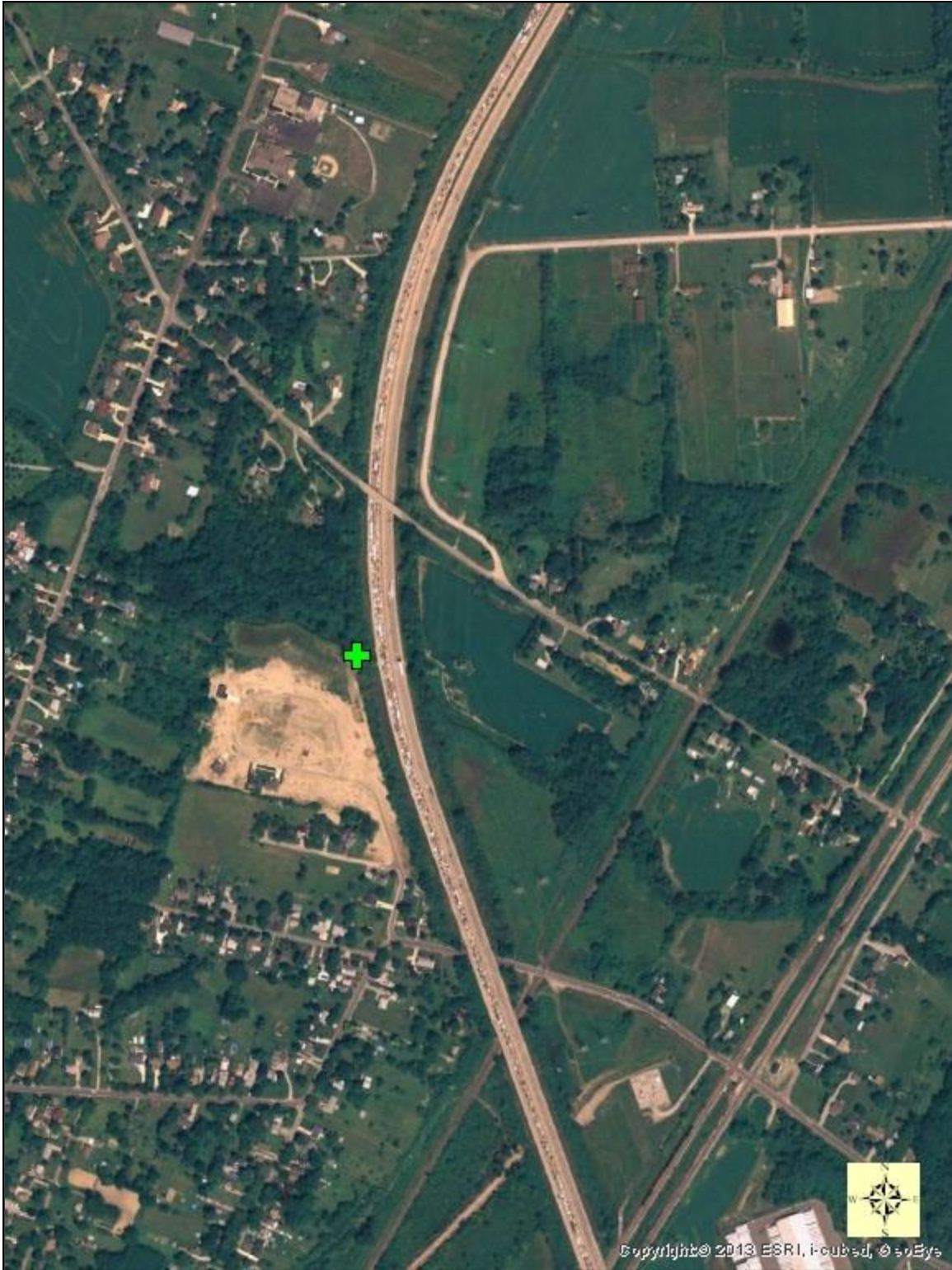


Figure 3: Southern Site (Sandy Creek)

Sampling Intensity and Timing. The USFWS *2014 Range-wide Indiana Bat Summer Survey Guidelines* (USFWS 2014) suggest four monitor nights for every 123 acres of potential bat habitat, which equates to eight nights of acoustic monitoring within the project area. The analyzed data were collected over 16 detector nights of acoustic monitoring. Monitoring took place between July 8 and July 15, 2014, i.e. during the summer season when females of both *Myotis* species form maternity colonies. Each site had an acoustic detector in place for eight nights and each site had a backup detector in the event that post monitoring calibration indicated a malfunction of the primary detector.

Monitoring Sites. Based on the distribution of habitats within the area and the fact that no MDOT activities will take place outside of the I-75 ROW, two sampling locations were selected. Both were located within the I-75 ROW and were associated with small streams and included associated riparian forest. Previous habitat associations of Indiana bats and Northern long-eared bats in Southern Michigan indicate that these species are associated with water courses with associated riparian galleries; thus the selected monitoring sites provided the best available habitat conditions in the project area for detecting these two species.

Table 1. Monitoring Location Coordinates.			
Site	Latitude	Longitude	Habitat
Stoney Creek	41.9692	-83.3468	Riparian forest edge
Sandy Creek	41.9446	-83.3636	Riparian forest edge

Acoustic Detectors and Functioning Checks. The acoustic data were collected with Wildlife Acoustics SM2Bat+ ultrasonic monitors in conjunction with SMX – US ultrasonic microphones. This model of acoustic detector records in full-spectrum mode and in a compressed format (.WAC), storing the data on standard SDHC cards. The microphones were tethered to the monitors with cable and elevated approximately 4 feet above the ground. No weatherproofing was used on the microphones. The monitors were programmed to record on a 15-minute on, 15-minute off duty cycle, from one half hour before sunset until one half hour after sunrise.

To verify proper functioning of the detectors, and appropriate sensitivity of the microphones, the microphones and detectors were tested using Wildlife Acoustics' Ultrasonic Calibrator (UC). The UC generates a calibrated 40kHz tone allowing comparison to the Song Meters' expected values to verify the systems' performance. This testing was performed at both the beginning and end of field deployment to insure that the monitor and microphone had functioned appropriately throughout the monitoring period.

Data Analyses. As noted above, the field recordings are stored in a compressed format. Thus, the first step in data analysis was to convert the compressed .WAC files to

standard audio (.WAV) format, using Wildlife Acoustics’s Kaleidoscope software. MNFI then batch-analyzed the acoustic files using both Sonobat and Kaleidoscope software, both of which are USFWS-approved bat call identification programs (<http://www.fws.gov/midwest/Endangered/mammals/inba/surveys/inbaAcousticSoftware.html>).

Staff. The following MNFI staff members were involved with the project.

Dr. Brian Klatt – Served as Co-principal Investigator, directed pre-field activities; and performed both primary data analysis and quality control of other team member’s data analysis. Dr. Klatt has completed Acoustic Monitoring Training with Bat Conservation International (see resume, Appendix A).

Edward H. Schools – Served as Co-PI, conducted GIS data collection and analyses, designed field sampling approach, programmed monitors pre-deployment, deployed monitors, conducted field calibration, conducted call classification analyses, and prepared the draft report.

Daria A. Hyde – Assisted with field deployment of monitors; QC’ed report.

Helen D. Enander - Conducted complete independent analysis of data using Kaleidoscope software.

Results

Batch Analyses. A total of 12,049 acoustic files were analyzed for the Stoney Creek site and a total of 11,543 files were batch-analyzed for the Sandy Creek stream site. Neither program identified any suspected *M. sodalis* or *M. septentrionalis* calls.

Kaleidoscope classified one Eastern red bat (*Lasiurus borealis*) pass on July 15 at the Sandy Creek site and one Eastern red bat pass at the Stoney Creek site on July 8. Sonobat identified two Eastern red bat calls at the Sandy Creek site, one each on July 12 and 13. Sonobat also identified a single silver-haired bat (*Lasiurus noctivagans*) call at the Sandy Creek site on July 13. Tables 2 and 3 present the detailed results of the batch analyses at Stoney Creek and Sandy Creek, respectively.

Sampling Period	Stoney Creek	
	Sonobat	Kaleidoscope
7/8 09:11 – 7/9 06:25	No bat passes I.D.ed	1 – L. borealis
7/9 20:41 – 7/10 06:23	No bat passes I.D.ed	No bat passes I.D.ed
7/10 20:40 – 7/11 06:23	No bat passes I.D.ed	No bat passes I.D.ed
7/11 20:40 – 7/12 06:24	No bat passes I.D.ed	No bat passes I.D.ed
7/12 20:39 – 7/13 06:39	No bat passes I.D.ed	No bat passes I.D.ed
7/13 20:39 – 7/14 06:39	No bat passes I.D.ed	No bat passes I.D.ed
7/14 20:38 – 7/15 06:38	No bat passes I.D.ed	No bat passes I.D.ed

Sampling Period	Sandy Creek	
	Sonobat	Kaleidoscope
7/8 09:53 – 7/9 06:25	No bat passes I.D.ed	No bat passes I.D.ed
7/9 20:41 – 7/10 06:25	No bat passes I.D.ed	No bat passes I.D.ed
7/10 20:40 – 7/11 06:24	No bat passes I.D.ed	No bat passes I.D.ed
7/11 20:40 – 7/12 06:24	No bat passes I.D.ed	No bat passes I.D.ed
7/12 20:39 – 7/13 06:39	1 – <i>L. borealis</i> ; 1 – <i>L. noctivagans</i>	No bat passes I.D.ed
7/13 20:39 – 7/14 06:40	1 – <i>L. borealis</i>	No bat passes I.D.ed
7/14 20:38 – 7/15 06:41	No bat passes I.D.ed	1 – <i>L. borealis</i>

Qualitative Analyses. In the event that neither bat call classification program identifies suspected Indiana bat calls, USFWS guidelines do not require qualitative analyses of any recorded calls.

Discussion

These results support the conclusion that *M. sodalis* and *M. septentrionalis* are likely absent in the project area. The overall project area is highly disturbed from a roosting perspective and the removal of trees associated with the I-75 project is unlikely to affect foraging resources for these species. In addition, the area is very noisy, with noise levels reducing but still high throughout the night, potentially interfering with echolocation used by bats. These high noise levels may explain the exceptionally low level of bat activity found in the area.

It is interesting to note that batch analyses identified primarily Eastern red bats in the project area. This species has been found to range widely with respect to foraging areas and will forage in both riparian galleries and out over agricultural fields (Klatt and Gehring 2013). Indeed, this species has been detected in the center of Lake Michigan throughout the summer, suggesting that individuals of this species will fly distances of more than 30 miles to feed (Klatt, et al. 2014). Other researchers have detected a variety of bat species by utilizing acoustic monitoring within similar landscape conditions in Southeastern Michigan (Klatt and Gehring 2011). These studies, however, were not immediately associated with an interstate highway. Thus, it can be concluded from the current study that both of the *Myotis* species of interest are absent from the project area.

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Klatt, B. J., J. Gehring. 2011. Mist-net and Supplemental Acoustic Assessment of Indiana Bat (*Myotis sodalis*) and Evening Bat (*Nycticeius humeralis*) Presence/Absence in the Vicinity of the Proposed Blissfield Wind Energy Site: Summer 2011. MNFI report 2011-05.

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U.S. Fish and Wildlife Service. 2014. Range-wide Indiana Bat Summer Survey Guidelines – 2014. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.

Appendix A
Resume of Brian Klatt

BRIAN J. KLATT

EDUCATION

- Ph.D. 1986. Biology (Ecology Program), University of Illinois, Urbana-Champaign, Illinois
- M.S. 1979. Biology, Northern Illinois University, Dekalb, Illinois
- B.S. 1975. Zoology, University of Michigan, Ann Arbor, Michigan

SUMMARY OF RELEVANT QUALIFICATIONS

Over 25 years of executive, managerial, and research experience in conducting studies in biodiversity and rare species conservation and management, leading program and organizational development, teaching, and curriculum development. Dr. Klatt has been conducting research with respect to mammals and has been a member of the American Society of Mammalogists for 38 years. Dr. Klatt completed the Bat Conservation International course in acoustic monitoring in 2012; instructors for the workshop included Joe Szewczak (developer of Sonobat), Chris Corben (inventor of Anabat), and Janet Tyburec (head instructor for BCI).

WORK EXPERIENCE

2009- Present. Director, Michigan Natural Features Inventory, Michigan State University Extension, Michigan State University, East Lansing, MI. I serve as the chief financial and administrative officer, as well as a Principal Investigator for the Michigan Natural Features Inventory (MNFI). MNFI is the Natural Heritage Program for the State of Michigan and is a part of the Michigan State University Extension system. As such, its mission is to generate high quality information on the distribution and condition of the biodiversity resources of the state, especially threatened and endangered species, and share this information through the NatureServe Biotics database with the other 50 state natural heritage programs. MNFI also conducts applied research relevant to the conservation of the biodiversity of the state, working closely with a variety of partners, including Federal and state agencies (e.g. US Forest Service; US Fish and Wildlife Service; the Michigan Departments of Natural Resources, Environmental Quality, and Transportation), non-governmental organizations (NatureServe, The Nature Conservancy) as well as the commercial sector (e.g. Plum Creek Timber, Exelon Wind Resources).

1997-2009. Senior Scientist and Owner, Klatt Environmental Associates LLC, Brighton, MI. Management of all aspects of a small business, including: marketing, website management, invoicing, accounting, client identification and cultivation. Providing consulting services in a wide range of environmental issues, including: ecological

characterization, biodiversity management, wetland delineation and mitigation design, threatened and endangered species, and environmental regulatory compliance.

2007-2009. Instructor, Lansing Community College, Lansing, MI. Instructor for Biology 120 – Environmental Science. Teach traditional and non-traditional students basic principles of environmental science and explore current environmental issues. Lecture and lab.

1995-2005. Associate Director, Interim Director, Associate Professor, University of Michigan Matthaei Botanical Gardens and the Program in the Environment, University of Michigan, Ann Arbor, MI. Served as chief financial and administrative officer for Matthaei Botanical Gardens and faculty member in the Program in the Environment. Responsibilities included: 1) day-to-day operations and human resource management of unit having: 30 staff, 450 volunteers, 600 acres, 90,000 square feet of facility space, extensive earned-income from business operations, support mission to over 20 university classes and faculty and student researchers, host to 30 mission-related groups (e.g. Audubon Society, Orchid Society, Fiber Arts Guild); 2) strategic and operational planning; 3) complete range of financial analysis and management; 4) liaison with Dean's Office, department chairs, institute and program directors; as well as local, state and national media; advisory boards, and community groups (e.g. Chamber of Commerce); 5) grant preparation, oversight of earned income activities, donor cultivation and liaison, chairing major fundraising events, conducting annual fund appeals and targeted campaigns; 6) faculty duties in Program in the Environment, Undergraduate Research Opportunity Program, School of Natural Resources' Honor's Program, Museum Studies Program, and Curriculum Task Force of the Provost Office's Public Goods Council.

1989-1995. Department Manager, Senior Scientist, Acting Vice President, RUST Environment and Infrastructure Inc., Sheboygan, WI. As Department Manager of the Environmental Science Department, responsible for appropriate staffing levels, departmental profit/loss, personnel management of department of up to 30 staff members, and managing \$4 million annual budget. As Acting Vice President of Environmental Division, responsible for developing an operational plan for \$10 million annual budget; assigned by divisional vice president as day-to-day coordinator for work assignments/billability of 70-person division located in three offices (Sheboygan and Milwaukee, WI and Chicago, IL). As Senior Scientist, responsible for projects and proposals related to: 1) assessing the environmental impacts of proposed projects and preparing documentation, such as environmental impact statements, in accordance with National Environmental Policy Act; 2) biodiversity assessments and management planning for commercial facilities; 3) threatened and endangered species assessments; 4) wetland determinations, delineations, functional assessments, dredge and fill permits, mitigation design, and mitigation banking; 5) regulatory compliance audits and permitting under RCRA, CWA, CAA, TSCA, FIFRA, and SPCC plans; 6) hazardous waste

site investigations under CERCLA (Superfund) and state equivalents; 7) ecological risk assessments; and 8) public hearing and expert witness testimony.

1989. Senior Scientist, Meredith/Boli & Associates, Hinsdale, IL. Lead scientist and manager for projects relating to: 1) groundwater statistical analysis; 2) asbestos assessment and abatement; and 3) hazardous waste management, regulatory compliance, and permitting.

1988-1989. Environmental Protection Specialist, US Environmental Protection Agency, Chicago, IL. Responsible for 1) initiation of hazardous waste management enforcement actions under the Resource Conservation and Recovery Act; 2) conducting audits of state RCRA programs; and 3) conducting field inspections of RCRA-permitted facilities.

1985-1988. Environmental Protection Specialist and Certified Environmental Instructor, US Army Field Artillery School and Fort Sill, Fort Sill, OK. Environmental manager for major US Army installation, responsible for: 1) developing analyses and environmental documentation under the National Environmental Policy Act for construction projects and major training exercises; 2) coordinating NEPA activities with wildlife management staff, post engineer, and post archeologist, especially as affecting National Historic District and a variety of locations of tribal importance (e.g. Medicine Bluff); 3) regulatory compliance of installation addressing: CWA, CAA, RCRA, TSCA, FIFRA; 4) asbestos-management program for 2000+ buildings on post and over 20 Army Reserve Centers throughout Oklahoma, Arkansas, and Texas; served as chief spokesperson to the media for asbestos issues; 5) conducted water quality monitoring for NPDES permit; and 6) Certified Instructor for the Army Logistics Management Center, teaching environmental management principles and hazardous materials handling procedures to military personnel.

PROFESSIONAL AFFILIATIONS

- American Society of Mammalogists
- US Section Council, member – NatureServe
- Certified Senior Ecologist (#470) and member, Ecological Society of America
- Threatened and Endangered Species Permit, Michigan Department of Natural Resources
- Society of Wetland Scientists
- Michigan Wetland Association
- Sigma Xi – The Research Society of America
- Phi Kappa Phi – Academic Honor Society

SELECTED RELEVANT PUBLICATIONS AND REPORTS

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