

NAVFAC Atlantic Biological Resource Services

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Northern Long-Eared Bat Survey Report

NSAHR Northwest Annex, Virginia and North Carolina



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1.0 INTRODUCTION

Tetra Tech, Inc., was contracted to collect information on the federally-threatened northern long-eared bat (*Myotis septentrionalis*) (MYSE) at Naval Support Activity Hampton Roads Northwest Annex (NSAHR Northwest Annex or Installation) in Virginia and North Carolina. The survey concentrated on areas of interest as identified by the Navy, including several hundred acres of forest that are proposed for either removal or alteration to obtain vegetation height compliance with existing military mission communications requirements (Figure 1-1). In accordance with the work plan (Tetra Tech 2015) the objective of this project was to determine the presence or absence of MYSE following protocols established by the United States Fish and Wildlife Service (USFWS) and detailed in the *Northern Long-Eared Bat Interim Conference and Planning Guidance* (USFWS 2014a) and the *2014 Range-Wide Indiana Bat Summer Survey Guidelines* (USFWS 2014b). This survey included presence/absence mist-net field capture, radio tracking, delineation of home range or known habitat, and roost emergence surveys.

Mist-netting efforts were concentrated in suitable MYSE habitat within the areas of interest provided by the Navy and nets were strategically placed in flight paths, often near drinking water, to maximize chances of catching MYSE. Mist-netting allows both a snapshot of what species, and in what abundance, are utilizing the areas of interest and provides an opportunity to attach radio transmitters. Species identification through mist-netting is more reliable than acoustic recording alone.

Female MYSE were targeted for radio telemetry to discover if these bats are using maternity roosts on the Installation and to characterize their roost choices. Once the roosts were found, emergence counts were performed to detect the presence of maternity colonies. Maternity colonies are of special interest because they must be protected in White-Nose Syndrome areas under the threatened species 4(d) rule (USFWS 2016). The compilation of capture sites and multiple roost sites enabled a home range, or known habitat, analysis to determine what areas of the Installation were being utilized by MYSE. Information collected on MYSE presence and range can be used by natural resource managers to make informed land-use decisions on the Installation in areas occupied by this vulnerable species.

2.0 SPECIES BACKGROUND

In July 2011, the USFWS was petitioned to list MYSE and the eastern small-footed bat (*Myotis leibii*) on the federal Endangered Species List as Endangered or Threatened, and to designate critical habitat, under the Endangered Species Act (ESA) of 1973 (76 Federal Register [FR] 125). On 02 October 2013 the USFWS concluded that listing for the MYSE was warranted, and the species was proposed for federal listing as endangered (79 FR 191). The USFWS published their final listing of MYSE as a threatened species and issued an interim 4(d) rule in the *Federal Register*

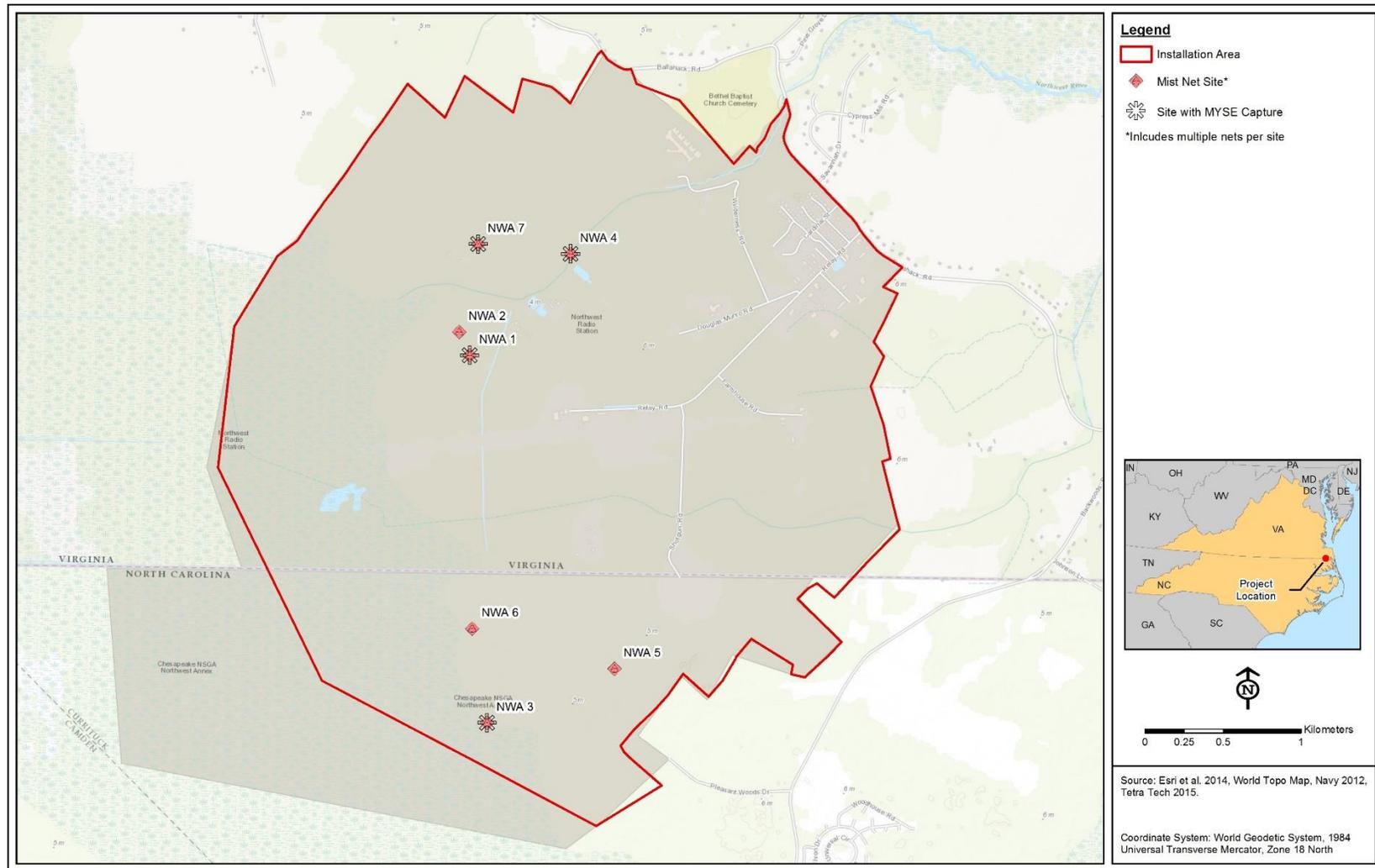


Figure 1-1. Regional Setting and Mist Netting Locations of NSAHR Northwest Annex, Virginia and North Carolina.

on 02 April, 2015 (effective on 04 May 2015) (USFWS 2015). The interim rule was replaced by the final rule on 14 Jan 2016 (USFWS 2016). MYSE occur throughout forested portions of the northeastern United States and in eastern, central, and northern Canada (79 FR 191). Historically, the species was patchily-distributed and less common in the southern and western portions of its range (Barbour and Davis 1969). Population density seems to have been highest in the northern portion of the species' range, which includes much of the eastern United States (Harvey 1992).

MYSE are an obligate forest-dwelling species, adapted to gleaning and hawking for insects in the sub-canopy in deciduous and mixed forests. Foraging occurs entirely within forested areas but is not restricted to mature forests. MYSE forage primarily below the canopy in the understory, or in sub-canopy shrub layers. Foraging is often concentrated in forested upland areas and hillsides but may also occur in forest clearings, above roadways and trails, or near water (79 FR 191). These habitat requirements and behavioral patterns relate directly to the potential for the Installation to support MYSE.

Summer roosts provide MYSE with a thermally stable environment, as well as protection from the elements and predators (Owen *et al.* 2002). Day roost selection by MYSE is dependent upon the presence of suitable live or dead (snag) trees having cavities, crevices, or exfoliating bark for roosting, although man-made structures and caves also may be used for roosting. Throughout their range MYSE roost in a variety of tree species, using specific trees based on their suitability to retain bark or provide cavities or crevices. Isolated trees may also be used as roosts, provided they are within 1,000 feet of another suitable roost tree or forested area (USFWS 2014a). MYSE roost alone or in small maternity colonies and switch roosts often; on average, lactating females switched roosts every two to five days (Menzel *et al.* 2002; Sasse and Perkins 1996).

Two studies conducted in West Virginia identified black locust (*Robinia pseudoacacia*) as a preferred roost tree for both male and female MYSE, although locust roosts accounted for only 34% of potential roosts (Ford *et al.* 2006 and Owen *et al.* 2002). A 2003 study of male MYSE day-roost selection in West Virginia identified 13 roosts in black locust (five snags and eight live trees), one roost in sassafras (*Sassafras albidum*) (snag), and two sugar maple (*Acer saccharum*) (live) (Ford *et al.* 2006). All of the live-tree roosts were medium–large, canopy-dominant trees characterized by substantial amounts of exfoliating bark and numerous broken limbs and cavities. Live-tree roosts tended to be larger than other trees in the vicinity. Roosts located in snags were smaller than the live trees and other snags in the vicinity. It is likely that MYSE exhibit a strong preference for selection of roosts within older forest stands that contain many large trees and snags with exfoliating or plate-like bark or cavities (Ford *et al.* 2006).

Unlike the true long-distance migratory bats (*Lasiurus* spp. and *Lasionycteris* spp.), MYSE do not undertake long-distance migrations between summer and winter ranges, but do make shorter distance movements between summer roosts and winter hibernacula. MYSE arrive at hibernacula in August or September, begin hibernation in October and November, and leave for summer habitats in March or April (79 FR 191). MYSE hibernate in caves and mines, as well as in

man-made structures. The species prefers large hibernacula with large entrances and, although MYSE are often found with other *Myotis* species, they prefer cooler temperatures and higher humidity than little brown bats (*Myotis lucifugus*). Individuals may hibernate in cracks and crevices in hibernacula walls and may be overlooked during winter surveys. The species has also been found in less traditional hibernacula, including dams and dry wells, and may utilize man-made structures more frequently than previously thought, especially in the northeast (USFWS 2013).

Significant decreases in populations of MYSE have occurred over the last five years, primarily as a result of White-Nose Syndrome (WNS), a fungal pathogen responsible for unprecedented mortality of hibernating bats, with an estimated 5.7 million bats killed since the discovery of WNS in the United States. WNS was first discovered in eastern New York in February 2006 and has now been documented in at least 19 states and at least four Canadian provinces. Precipitous declines have been documented for the MYSE and eastern small-footed bats over the last three years with an estimated loss greater than 1 million bats. Other threats to MYSE include loss and fragmentation of forested habitat, alteration to traditional hibernacula, and anthropogenic sources of mortality including wind energy facilities (USFWS 2014a).

3.0 METHODS

3.1 CAPTURE

Per the USFWS Guidelines, mist-net surveys were conducted within the 15 May – 15 August 2015 survey window and were completed over six nights from 01 Jun 2015 to 08 Jun 2015, for a total of 43 net nights. The required federal (TE63633A-3) and state collection permits (VADGIF 051933 and 15-SC00949) were obtained by subcontractor, Biodiversity Research Institute (BRI), for completion of these tasks (Appendix C). During the six-night survey window, bats were captured at seven locations within the areas of interest (Figure 1-1). Coordinates for each mist-net are provided in Appendix E and photos in Appendix F. Mist-net survey sites were typically surrounded by mature trees that potentially provide good roosting habitat and a clear path to foraging areas for bats leaving their roosts. Two two-person teams, each operating two to three nets, conducted the mist-netting survey and one USFWS-approved biologist monitored all survey activities.

A combination of triple-high (three nets stacked upon another, 7.8 meters height), double-high (two nets stacked upon another, 5.2 meters height), and single-high (2.6 meters height) nets were set up each night (Figure 3-1). Depending on the site, nets varied in length from 6 to 12 meters and were positioned to maximize coverage of flight paths, including suitable travel corridors, foraging areas, and/or drinking areas. These areas are of interest since they act as corridors and funnel bats toward the nets. Nets were set at dusk and monitored until at least 00:15 hours, for a minimum of 5 hours. If bats continued to be captured, nets were left up until as late as 01:30 hours.

Bats were live-caught in mist-nets and released unharmed near the point of capture. Nets were checked at an interval of every 10 minutes and processing was completed within 30 minutes from the time the bat was removed from the net. Biological and morphometric data was recorded for each individual captured (e.g., time of capture, capture net, species, sex, age class, reproductive condition, mass, and forearm length) and provided in Appendix E. An adult bat is generally considered over one year and determined through the observation of a long smooth joint demonstrating incomplete epiphyseal ossification (fusion) of the metacarpal-phalangeal joint that are not present in the ossified knobby adult joints. Bats become reproductively active around one year old. Each bat was also banded on the forearm with a unique number for later identification. Representative photographs of various individuals were also taken as per the federal guidelines mandate (2014a) (Figure 3-2) (Appendix G). Time, weather, global positioning system location of each net site and hourly weather conditions also were recorded. Data was recorded in Chiro, an iPad application, for ease of tracking and compiling data to reduce human error. Only captured MYSE were fitted with a radio transmitter.

Caution was taken during mist-net activities to minimize the potential for transmission of WNS by following the most recent decontamination protocols of the USFWS (2008). For example, bats were held in paper bags until processed, and holding bags were disposed of after each use. Bats were evaluated for potential WNS infection following the *Wing-Damage Index Used for Characterizing Wing Condition of Bats Affected by White-nose Syndrome* by Reichard (no date).



Site 3 Net A - MYSE captured
Photo Credit: Biological Diversity Research Institute



Site 3 Net A - MYSE captured
Photo Credit: Biological Diversity Research Institute

Figure 3-1. Representative Photos of Net Sites Where Northern Long-Eared Bat (*Myotis septentrionalis*) were Captured at NSAHR Northwest Annex, Virginia and North Carolina – 2015.



Big brown bat (*Eptesicus fuscus*) caught 05 June
Photo Credit: Biological Diversity Research Institute



Tri-colored bat (*Perimyotis subflavus*) caught 05 June
Photo Credit: Biological Diversity Research Institute



Southeastern bat (*Myotis austroriparius*) 05 June
Photo Credit: Biological Diversity Research Institute



Northern long-eared bat (*Myotis septentrionalis*) 05 June
Photo Credit: Biological Diversity Research Institute

Figure 3-2. Representative Photos of Bat Species Captured at NSAHR Northwest Annex, Virginia and North Carolina – 2015.

3.2 RADIO-TELEMETRY ROOSTS

Female MYSE were fitted with Advanced Telemetry Solutions (ATS) radio transmitters and tracked by crews to facilitate collection of data necessary to determine home range as outlined in the USFWS *Northern Long-Eared Bat Interim Conference and Planning Guidance* (USFWS 2014a). Coordination with Installation tenant commands was required to obtain approval for types of transmitters/receivers and ranges of frequencies that could be utilized on the Installation due to potential conflicts with military communication requirements. The transmitters were the smallest commercially available, weighing only 0.29 grams, representing less than 5% of each bat's body mass. Fur was removed from between the scapulae and the transmitter was attached to the bare skin using Skin Bond surgical cement. The frequency was tested for functionality before release.

Following the night of capture, bat locations were identified using the homing technique specified in White and Garrot (1990). ATS R4000 receivers (Advanced Telemetry Systems, Isanti, MN) and Yagi antennas were used during radio tracking efforts (Appendix D). Radio tracking consisted of driving a vehicle until receivers picked up signals from the transmitters and then hiking to areas within the Installation that are not accessible by vehicle. In addition, fixed wing aircraft was used on 11 June to help track and locate MYSE. The ATS transmitters have about a 300-meter range of detection. MYSE home ranges were estimated using a 3-mile buffer around a capture site if no other information was available for that species (no radio telemetry), per USFWS guidelines. Home ranges for MYSE with known capture and roost site information were created using a buffer of 1.5 miles surrounding the mapped capture and roost site(s).

Female MYSE were targeted for attaching transmitters because they form maternity colonies and occur in live and dead trees during the summer months (Menzel *et al.* 2002). Male MYSE generally roost solitarily and, therefore, were not a priority for the USFWS from a radio-tracking standpoint. MYSE fitted with radio transmitters were tracked for six consecutive days post-capture according to the USFWS protocols for identifying roosting sites. Once a MYSE roost was found through radio-telemetry, emergence counts were conducted using methods outlined in Section 3.3.

3.3 EMERGENCE COUNTS

Roosting sites identified by radio-telemetry were monitored for emergence counts for a period of time following methodologies outlined in the USFWS protocol (USFWS 2014b). A minimum of two evening-emergence counts were conducted at all roosts located via radio-tracking. A biologist would position themselves at the site of the roost tree around dusk each night (about ½ hour before sunset) and count the number of bats emerging from the tree until about one hour after sunset or until it was too dark to see emerging bats. The positioning of the biologist(s) conducting the emergence counts was in a location for observation of emerging bats silhouetted against the sky as they exit the roost. Biologists also positioned themselves close enough to the roost to observe emerging bats, but not so close as to influence emergence. Therefore, biologists did not stand directly beneath the roost. Biologists also minimized noise and use of artificial light sources (i.e. flashlight) when in the vicinity of the roost. Emergence counts were not conducted if during the 30 minutes before and during the observation temperatures were below 50 degrees Fahrenheit, precipitation was occurring for at least 30 minutes or intermittently (including rain or fog), or if wind speeds exceeded 4 meters/second due to reduced activity during these conditions.

4.0 RESULTS

4.1 CAPTURE

A total of 83 bats representing eight species were captured during the 01 June 2015 to 08 June 2015, 43-net-night survey, conducted within the area of interest at Northwest Annex (Table 4-1

and Figure 1-1). Eleven MYSE were captured. The majority of bats trapped (42%) were southeastern bats (*Myotis austroriparius*) followed by big brown bats (*Eptesicus fuscus*) (18%). Also captured were Rafinesque’s big-eared bat (*Corynorhinus rafinesquii*), eastern red bat (*Lasiurus borealis*), little brown bat (*Myotis lucifugus*), tri-colored bat (*Perimyotis subflavus*), and evening bat (*Nycticeius humeralis*). One bat escaped the net before it could be identified and nine bats escaped before metrics were taken.

All bats caught were adults of which 66% were female, 24% were male, and 10% were of unknown sex. Of female bats caught, 33% were lactating, 15% were non-reproductive, and 50% were pregnant. Of male bats caught, 65% had descended testes and 35% were non-reproductive. No bats exhibited any noticeable wing damage (bats were 1 or 0 on Reichard Wing Damage Index).

The nine adult female MYSE and two of unknown sex were captured at mist-net Site 1, 3, 4 and 7 (Table 4-2). Five females were equipped with a radio-transmitter for radio-tracking. Habitat associated with the capture sites included mixed mature hardwoods (red maple [*Acer rubrum*], sweet gum [*Liquidambar styraciflua*], American beech [*Fagus grandifolia*], water oak [*Quercus nigra*], tulip tree [*Liriodendron tulipifera*]), with soft wood species including loblolly pine (*Pinus taeda*). Understory species included greenbrier (*Smilax sp.*), switch grass (*Panicum virgatum*), and spice bush (*Lindera benzoin*).

Table 4-1. Nightly Summary of Bats Captured at NSAHR Northwest Annex VA/NC - 2015.

Species	NWA 1	NWA 2	NWA 3	NWA 4			NWA 5	NWA 6		NWA 7	Species Total
	1-Jun	1-Jun	3-Jun	5-Jun	6-Jun	7-Jun	6-Jun	7-Jun	8-Jun	5-Jun	
Southeastern	3	5	6	8	7			4	2		35
Big brown	1			1	7	4		1	1		15
Northern long-eared	3		2	1	4					1	11
Tri-colored	2	1	1	2	1						7
Eastern red	3	1	1					1		1	7
Little brown	2									2	4
Rafinesque's big-eared				1				1			2
Evening								1			1
Unknown							1				1
Night Total	14	7	10	13	19	4	1	8	3	4	83
Site Total	14	7	10	36			1	11		4	83

Table 4-2. Northern Long-Eared Bat Individuals Captured at NSAHR Northwest Annex VA/NC - 2015.

#	Date	Time	Radio-freq.	Sex	Age	Repro. status	Site	Capture Lat/Long		Habitat
1	1-Jun	21:05	148.913	F	Adult	non-reproductive	1	36.56414	-76.27654	Loblolly Pine, Sweet Gum, Red Maple, Switch Grass, Greenbrier
2	1-Jun	22:40	148.783	F	Adult	Lactating	1	36.56414	-76.27654	
3	1-Jun	22:40	148.733	F	Adult	Pregnant	1	36.56414	-76.27654	
4	3-Jun	23:15	148.844	F	Adult	Lactating	3	36.54175	-76.27239	Sweet Gum, Poison Ivy, Loblolly Pine, Red Maple, Switch Grass, Greenbrier
5	3-Jun	23:55		Unk	Unk	Unknown	3	36.54175	-76.27239	
6	5-Jun	21:50		F	Adult	Pregnant	4	36.56902	-76.26644	American Beech, Water Oak, Sweet Gum, Tulip Tree, Spice Bush
7	5-Jun	21:25	148.902	F	Adult	non-reproductive	4	36.56996	-76.26603	
8	5-Jun	23:15		F	Adult	Pregnant	4	36.56888	-76.26685	
9	5-Jun	0:16		F	Adult	Pregnant	4	36.56996	-76.26603	
10	5-Jun	1:25		F	Adult	Lactating	4	36.56996	-76.26603	Loblolly Pine, Sweet Gum, Red Maple, Switch Grass, Greenbrier
11	7-Jun	1:37		Unk	Unk	Unknown	7	36.56939	-76.27348	

4.2 RADIO-TELEMETRY HOME RANGE AND ROOSTS

During capture, five female MYSE were fitted with an ATS radio transmitter. Following the initial night of capture, the five radio-tagged bats were tracked for six consecutive days. Despite radio tracking efforts within the Installation, only three radio-tagged MYSE were subsequently picked up by the radio telemetry equipment, but not every day (Table 4-3).

Two female MYSE were caught in the same net on the same night and were subsequently found sharing a roost tree on 03 Jun 2015. They both roosted under the bark of a dead red maple around 4m and 5.5m above the ground under 75% canopy cover (Figure 4-1). One was a lactating female (Freq. 148.783) and the other a non-reproductive female (Freq. 148.913) that roosted in an adjacent dead red maple on 06 June.

The home range of MYSE 148.783 was delineated by drawing a 1.5-mile polygon around the roost site and, since the capture site was within 1.5 miles of the polygon, the known home range was defined as all suitable habitat within a 1.5-mile radius of the polygon (Figure 4-2). The farthest

distance between two known locations, however, was actually under 1,080 ft. Approximately 4,520 acres fall within the 1.5-mile radius, 2,712 acres of which is inside the Installation boundary. After extracting unsuitable habitat (non-forested areas) 71% of habitat in this female's home range is within the NSAHR Northwest Annex.

Since multiple roosts were documented via radio-telemetry, the home range of MYSE 148.913 was delineated by first drawing a polygon around the two roosts. Secondly, since the capture site was within 1.5 miles of the multi roost polygon, the known home range was defined as all suitable habitat within a 1.5-mile radius of the multi-roost polygon (Figure 4-3). Approximately, 4,526 acres fall within the 1.5-mile radius; however, 2,473 acres of this is not considered suitable habitat (i.e., non-forested habitat). Again, the majority of suitable habitat within the female's home range (70%) is within the Installation boundary. Although the calculated suitable habitat is large, the farthest distance between two known bat locations was approximately 1,080 ft.

The third lactating female (Freq. 148.844) was tracked for four consecutive nights from 05 June to 08 June. This female showed no tree species preference and used four separate roosts, three in live trees including a loblolly pine, red maple (Figure 4-1), and sweet gum. None of the specific roosts were able to be located, but were in areas with dense forest canopies. Home range was similarly calculated as above for MYSE 148.844 (Figure 4-4). The longest distance between known bat locations was 3,000 ft. Approximately 6,076 acres fall within the 1.5-mile radius; however, only 56% of this is considered suitable habitat (i.e., forested habitat). Much of this suitable habitat (40%) does not fall within the Installation boundary.

Overall, roosts were found as often in dead trees as live trees with no pattern to DBH or height. The roost trees all had more than 70% of the bark remaining and were in areas with relatively high canopy cover (average 75%). All roosts were under bark, in contrast to crevice or cavity roosting, and were 4.0-5.5m high (Table 4-3). Roost trees were predominantly found in hardwood forest including most often red maple followed by sweet gum and loblolly pine.

The remaining two radio-tag signals (148.902 and 148.733) were picked up off of the Installation on 11 June during the fixed wing aircraft survey. The frequency 148.902 emitted from the coordinates 36.61186, -76.27043. The following day the signal frequency was searched on the ground. The site was unable to be validated as a roost site and not a dropped transmitter because landowners would not allow access and the signal was not picked up from the driveway or road near the property. The frequency 148.733 emitted from 36.59585, -76.24871. The signal was tracked from the ground on the following day, but the field crew was unable to get close enough to the transmitter to hear a signal because it was in the middle of a swamp/forest. In the absence of roost site locations, home range was calculated as a 3-mile buffer from capture location based on USFWS guidelines (figure 4-5 and 4-6). The remaining non-tagged MYSE capture locations were plotted and the polygon buffered to create a home range that encompassed the entire Installation (Figure 4-7). Approximately 26,453 acres fall within the 3-mile radius; however, only 10,643 acres of this is considered suitable habitat of which 1,874 acres (18%) is within the Installation boundaries.

Table 4-3. Day Roosts of Northern Long-Eared Bats at NSAHR Northwest Annex VA/NC, July 2015.

Band #	Transmitter	NLEB Sex	Capture Site*	Roost #	Date Used	Roost Coordinates (Lat/Long)		Tree Species	DBH (cm)	Height (m)	Tree State	% Bark Remaining	Significant/Dominant Tree Species in 0.1 ha plot	Roost Type	% Roost Canopy Cover	Roost DBH	Roost Height
DEY 4718	148.783	Female Lactating	NWA 1-Net C	A	3-Jun-15	36.5671	-76.27633	Red Maple	19	12	Dead	80	Red maple swamp; red maple, sweet gum, greenbrier	Bark	75	19	5.5
DEY 4712	148.913	Female Non-reproductive	NWA 1-Net C	A	3-Jun-15	36.5671	-76.27633	Red Maple	19	12	Dead	80	Red maple swamp; red maple, sweet gum, greenbrier	Bark	75	19	4
				B	6-Jun-15	36.56713	-76.27629	Red Maple	30	12	Dead	70	Red maple	Unk	60	Unk	Unk
DEY 4730	148.844	Female Lactating	NWA 3-Net A	A	5-Jun-15	36.546015	-76.263497	Unknown	Unk	Unk	Unk	Unk	Red maple, loblolly pine, switch grass, sweet gum	Unk	Unk	Unk	Unk
				B	6-Jun-15	36.54311	-76.27203	Loblolly Pine	60	21	Live	100	Loblolly pine, sweet gum, maple, shrubs	Unk	64	Unk	Unk
				C	7-Jun-15	36.54721	-76.272359	Red Maple	12	9	Live	100	Red maple, loblolly pine, switch grass, water oak	Unk	90	30	Unk
				D	8-Jun-15	36.54977	-76.27264	Sweet Gum	35	18	Live	100	Loblolly pine, sweet gum, maple	Unk	90	Unk	Unk

* Capture Coordinates (Lat/Long) (NWA 1 36.56414/ -76.27654, NWA 3 36.541759/ -76.27239)



148.844 Roost C Red Maple

Photo Credit: Biological Diversity Research Institute



148.913 and 148.783 Roost A Red Maple

Photo Credit: Biological Diversity Research Institute

Figure 4-1. Examples of Roost Trees Used by Northern Long-Eared Bats (*Myotis septentrionalis*) in NSAHR Northwest Annex VA/NC in July 2015.

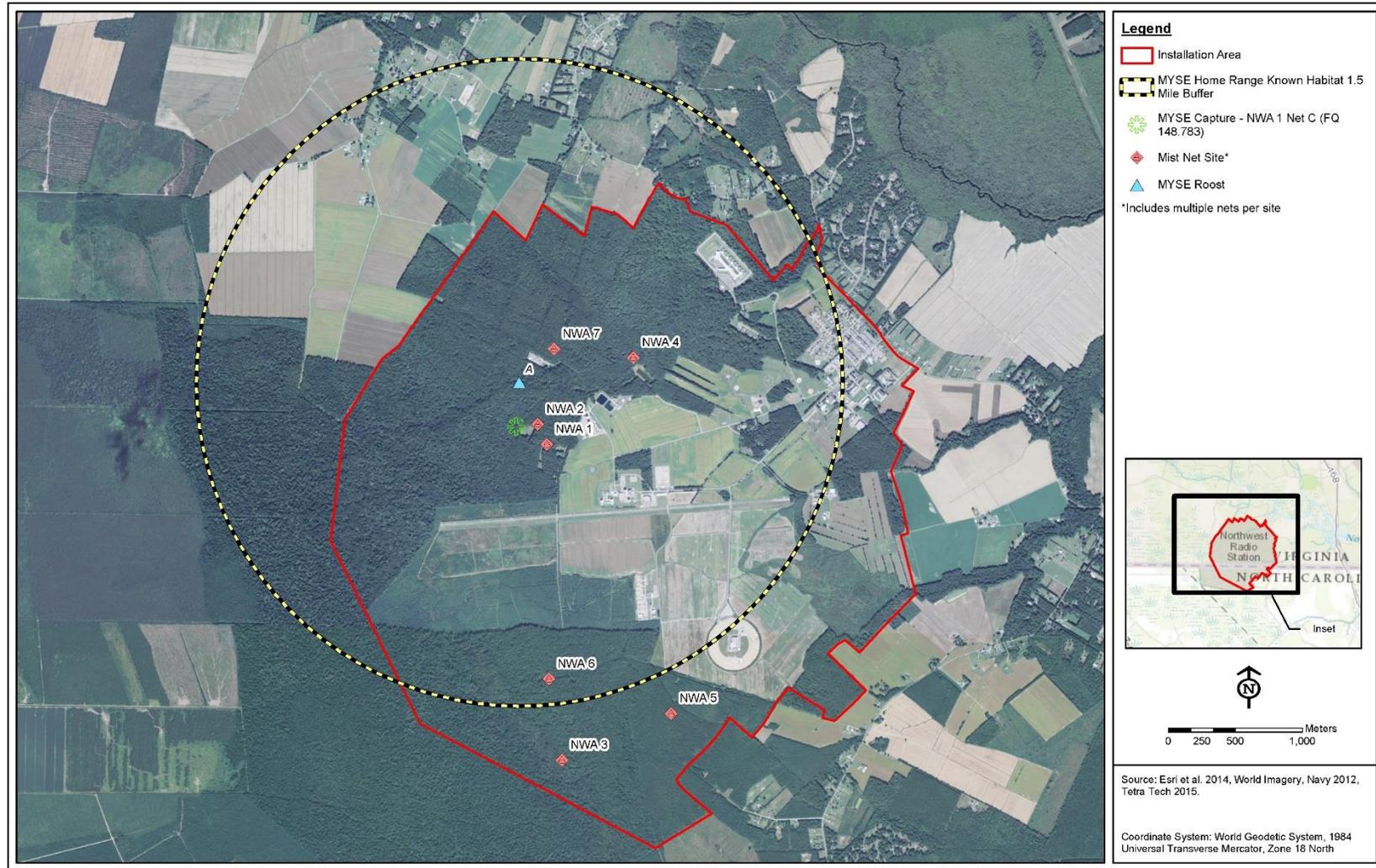


Figure 4-2. Northern Long-Eared Bat Home Range for Frequency 148.783 Including Capture and Roost Sites at NSAHR Northwest Annex VA/NC - 2015.

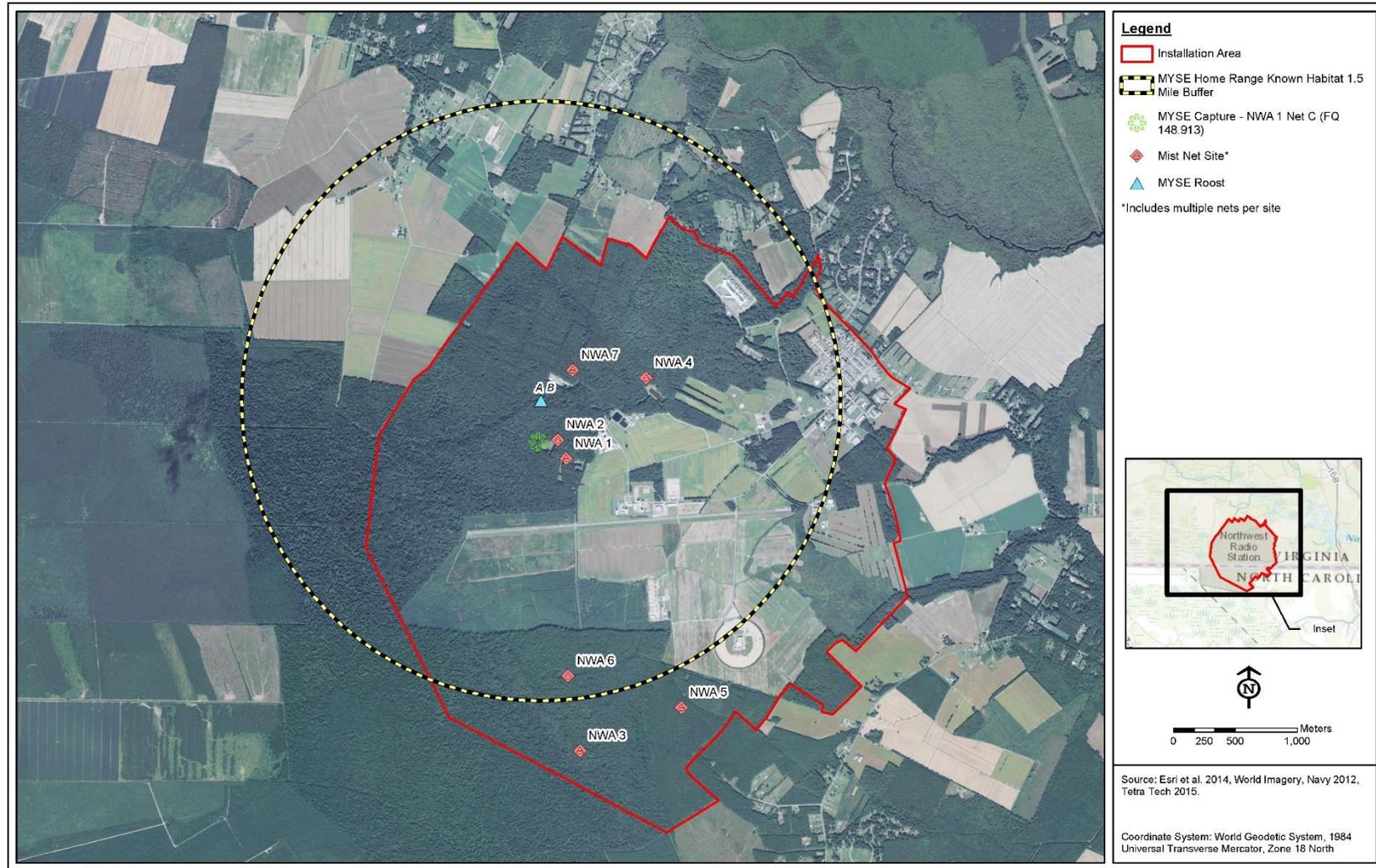


Figure 4-3. Northern Long-Eared Bat Home Range for Frequency 148.913 Including Capture and Roost Sites at NSAHR Northwest Annex VA/NC – 2015.

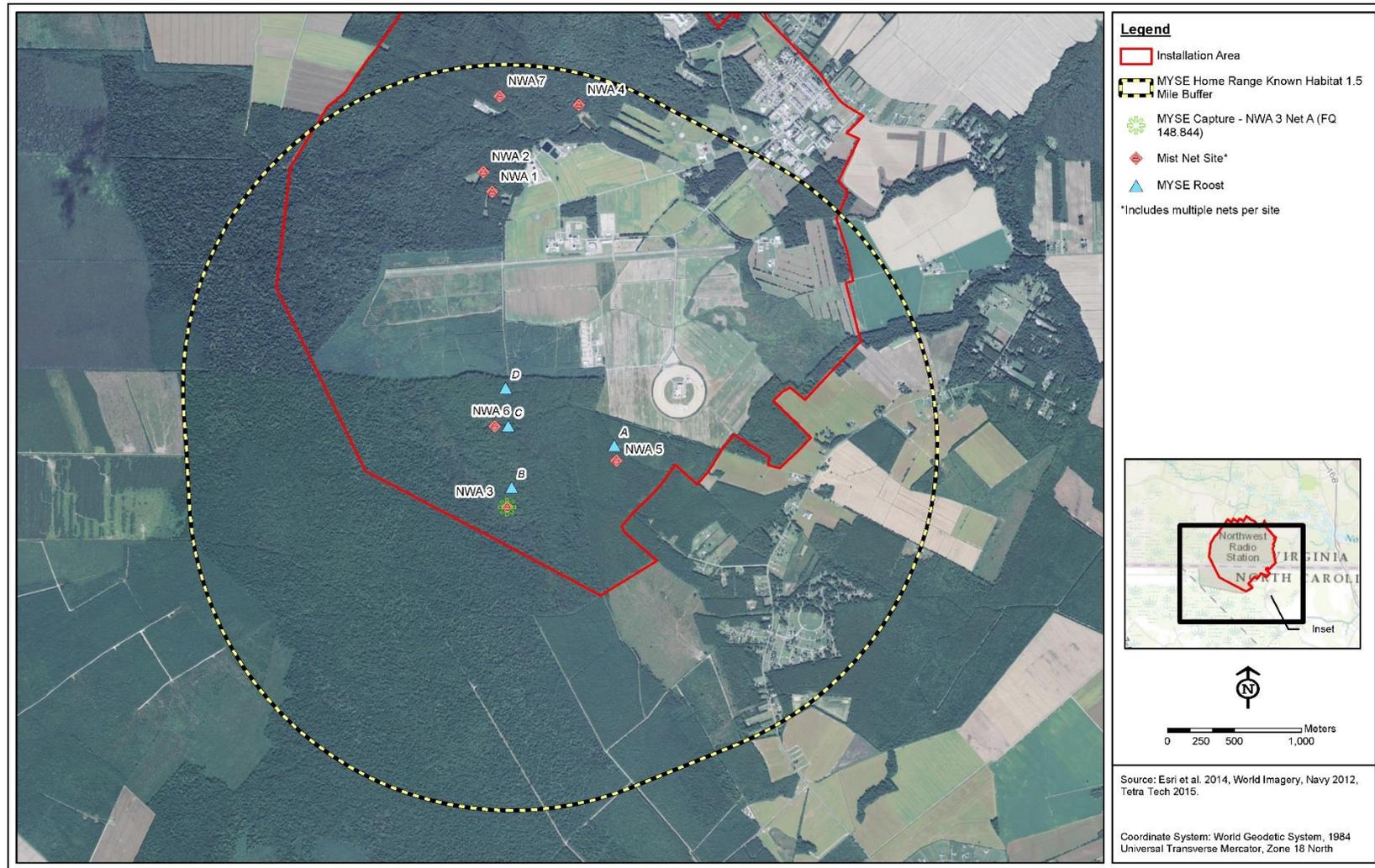


Figure 4-4. Northern Long-Eared Bat Home Range for Frequency 148.844 Including Capture and Roost Sites at NSAHR Northwest Annex VA/NC - 2015.

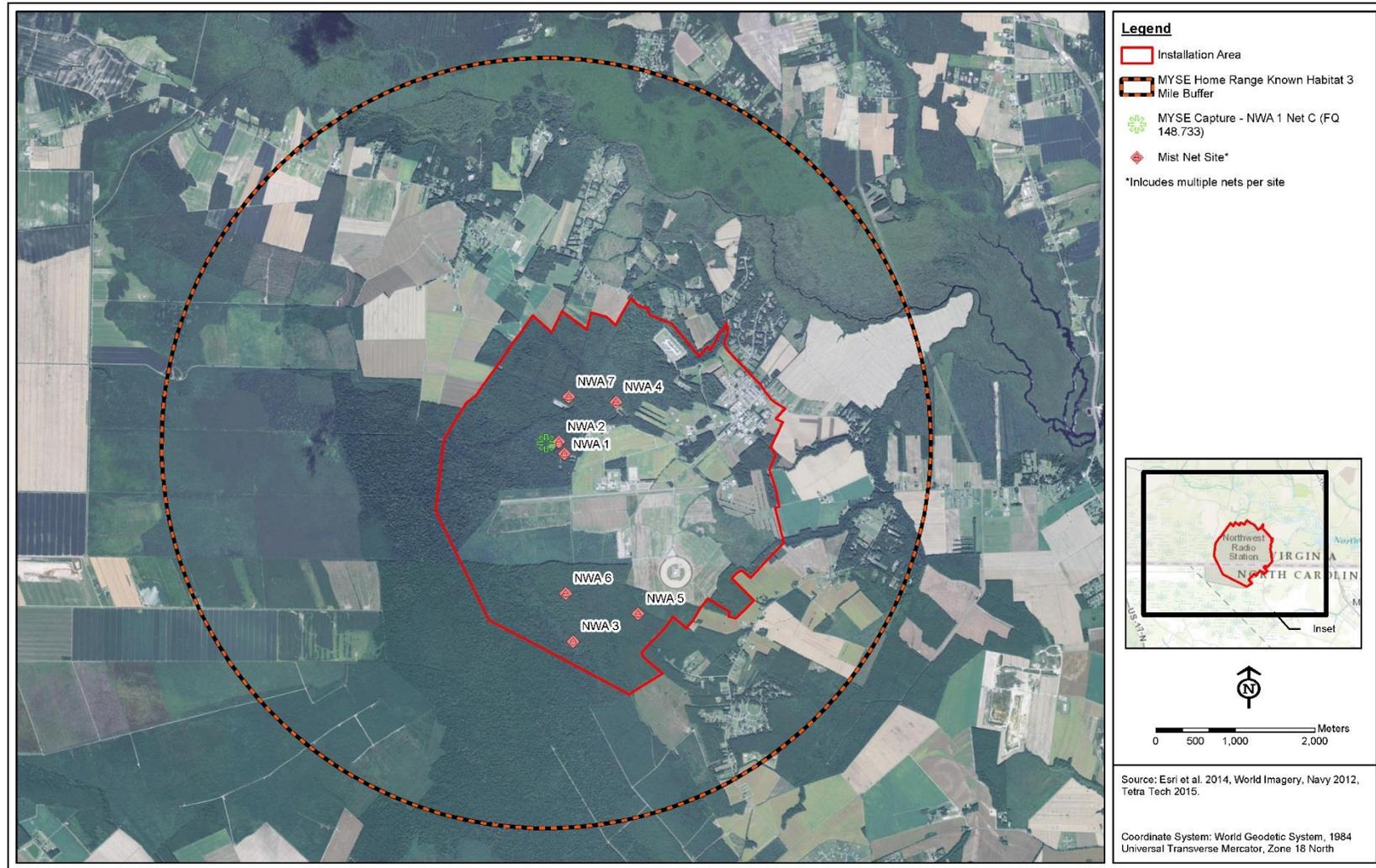


Figure 4-5. Northern Long-Eared Bat Home Range for Frequency 148.733 Including Capture Site at NSAHR Northwest Annex VA/NC – 2015.

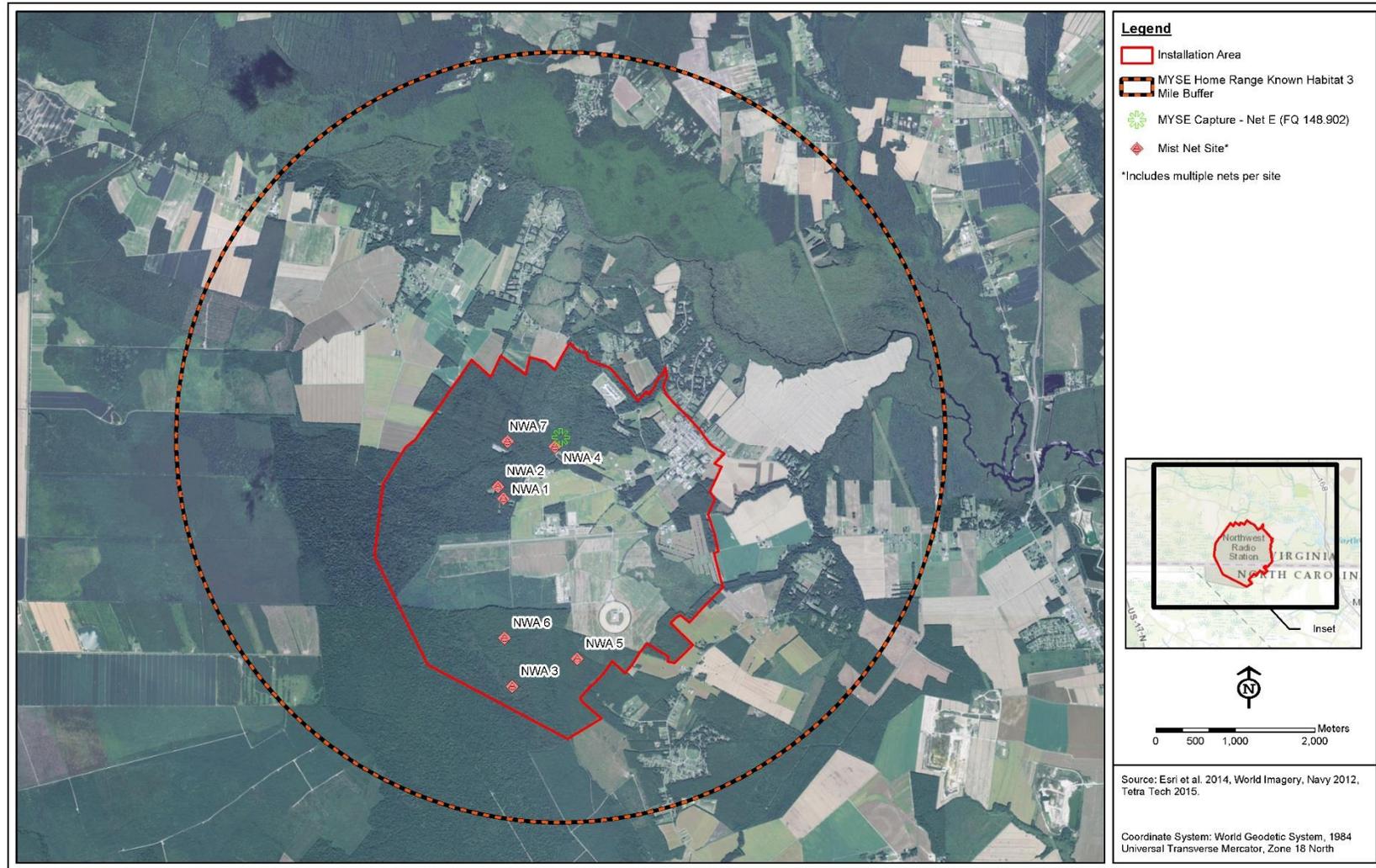


Figure 4-6. Northern Long-Eared Bat Home Range for Frequency 148.902 Including Capture Site at NSAHR Northwest Annex, VA/NC – 2015.

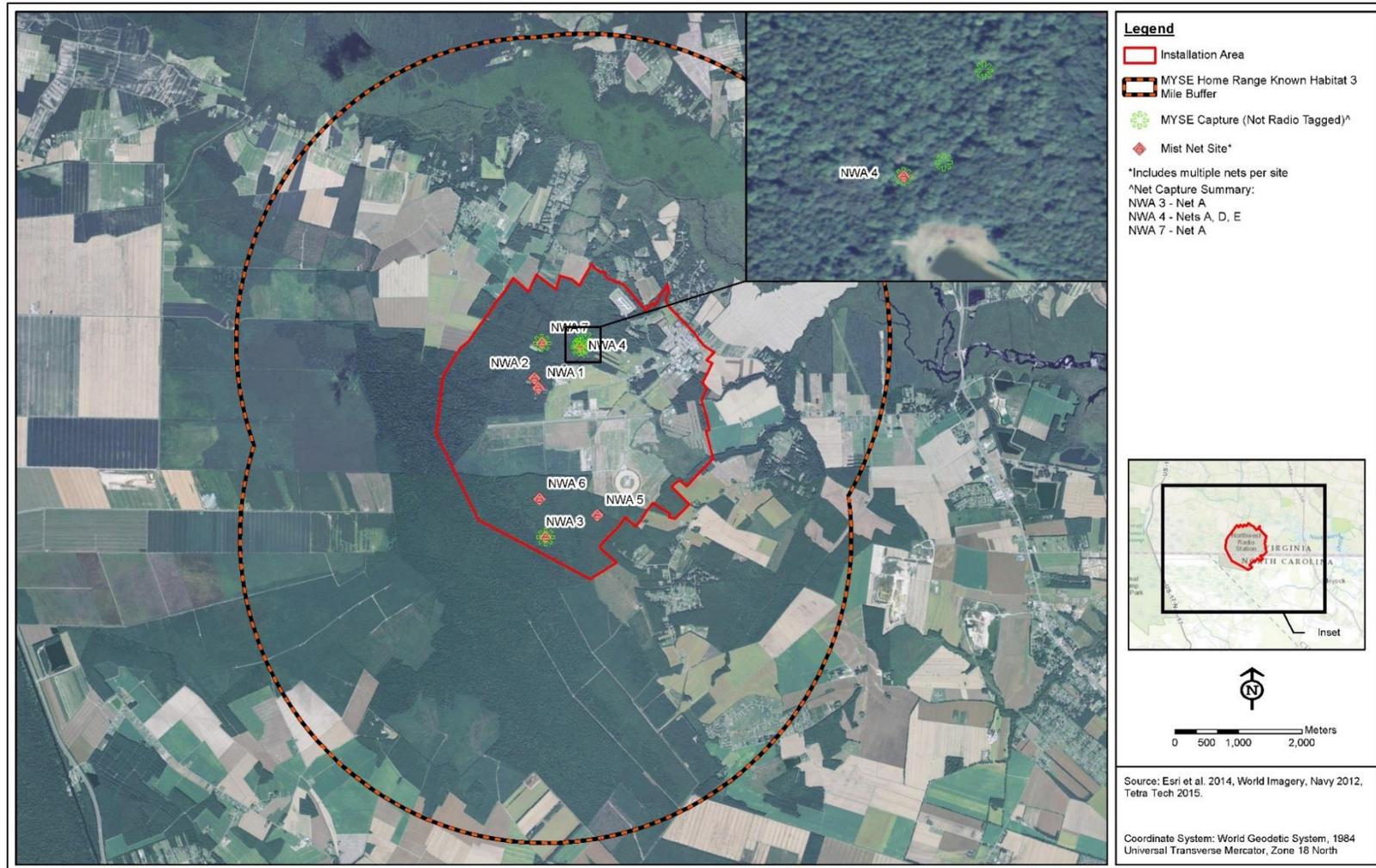


Figure 4-7. Northern Long-Eared Bat Home Range Using Capture Sites from Five NLEBs at NSAHR Northwest Annex, VA/NC – 2015.

4.3 EMERGENCE COUNTS

Emergence counts were conducted at the known MYSE roosts of the three female radio-tagged bats between 03 and 07 June 2015 (Table 4-4). The observed emergence counts were typical of this species with a maximum of 26 bats emerging in one evening. Emergence counts were unable to be performed for the two females that left the Installation due to landowner permission and access issues.

Table 4-4. Summary of Emergence Counts at Northern Long-Eared Bat Roost Tree at NSAHR Northwest Annex, VA/NC – 2015.

Frequency	Date	Roost	Time of transmitted bat	Total # of Bats
148.783 and 148.913	3 Jun 2015	A	20:23	26
Previously 148.783 and 148.913	7 Jun 2015	A	n/a	no bats left roost
148.844	6 Jun 2015	B	20:51	1
	7 Jun 2015	C	20:26	1
	8 Jun 2015	D	20:34	None seen, just transmitted bat heard

5.0 DISCUSSION

This survey documented that MYSE are present at the Installation, likely due to the large contiguous area of mature forest available on the Installation and the surrounding areas. The majority of bats captured in the mist-nets, however, were southeastern bats followed by big brown bats, which is typical for this white-nose affected area. Southeastern bats have been found with the fungus *Pseudogymnoascus destructans*, but have not been confirmed with diagnostic symptoms of White Nose Syndrome that lead to mortality. Big brown bats are less affected than *Myotis* species by WNS possibly because they are larger and thus go into hibernation later and emerge earlier in the season, giving the fungus less time to affect them.

Compared to the NSAHR Northwest Annex 2014 Survey there was a slight increase in MYSE capture, 8 increased to 11 MYSE (Tetra Tech 2014). The MYSE sex ratio was largely skewed toward females in both 2014 and 2015 as well as in surrounding bases such as Naval Auxiliary Landing Field Fentress, suggesting that there are successful maternity colonies in the area. In 2015, four little brown bats were captured, whereas that species was not captured in 2014. Little brown bats have had the highest mortality rates from WNS and are estimated to have a population decrease of 91% in the east (Turner *et al.* 2011). In 2015 there were double the number of southeastern bats, half the numbers of big browns, and less than half the eastern red bats, compared to the year before. The 2014 survey was done in August versus June in 2015, however, which could have an effect on species distributions.

During the radio-tracking period, none of the bats used the same roost twice although two of the transmitted bats shared a roost tree for a night. This is typical for the species and during the lactation period females often switch roosts every two to five days (Foster and Kurta 1999). The single roost type identified was under bark on a dead red maple, which is similar to roost site selection reported from the central Appalachians (Menzel *et al.* 2002, Ford *et al.* 2006). Contrary to the black locust specialization found by Ford *et al.* (2006), however, these females specialized in red maples (66% of the trees used), but also used two other species of trees, including loblolly pine and sweet gum. Although only one roost tree was located in 2014, it was in a red maple, consistent with the 2015 findings. This does align with the findings of Thompson (2006), who documented variability in roost tree preference across MYSE range.

All known roosts were located at or below 5.5 m in height and tended to have 60% or more canopy cover and as high as 90% canopy cover. In 2014 the canopy cover was also high at 75%. This is consistent with many studies in Kentucky and West Virginia, which found canopy covers of 90% or higher (Owen 2002, Silvis 2015, Johnson 2008). All northern long-eared bat roosts were located in or below the dense forest canopy, which suggests that solar exposure may not be as critical for selection of roost trees by maternity colonies of this species as opposed to other species of tree-roosting bat at more northern latitudes in North America (Menzel *et al.* 2002).

Many bats are known to share roost trees, or use the same tree over successive days (Owen *et al.* 2002). MYSE emerge at dusk to forage on insects in upland and lowland woodlands and tree-lined corridors using echolocation or by gleaning from vegetation and water surfaces (USFWS

2014a). Emergence counts conducted over five days at the roost locations identified, at most, 26 bats emerging from a single roost tree on 02 June, including two female tagged bats, one lactating and one non-reproductive. This suggests that there are maternity colonies in the area because females with young roost together, for safety and increased warmth, and male MYSE tend to roost alone (Broders and Forbes 2004). Four nights later, 06 June, no bats were seen leaving that same roost tree. This could suggest that there are multiple suitable roosts in the area that the bats are able to relocate to or the bats didn't emerge due to environmental conditions. A study in New Hampshire had similar results where maternity groups of less than 100 individuals and a colony size mean of 11 bats were found on one day. Several days later, no bats emerged from that same roost (Sasse and Perkins 1996).

The home range, or "known habitat" as calculated using the USFWS protocol, of MYSE is larger than was reported for female MYSE in the central Appalachians using the 95% adaptive kernel method, in which the mean home range was 65 acres (Owen *et al.* 2002). This is likely attributable to the coarse assessment of home range following the USFWS protocol (USFWS 2014a). Two sampling components have a strong relationship on measurement of space use and home range size: number of radio marked animals and number of locations for each animal, which is small for this survey (Kernohan *et al.* 2001). Home range varied from 2,019 to 10,643 acres, using only suitable habitat, and overlapped with the areas of interest provided by the Navy. The Installation's resident population of MYSE are using this suitable habitat for both breeding and foraging.

The several hundred acres of forest that are proposed for either removal or alteration to obtain vegetation height compliance with existing military mission communications requirements may have detrimental effects to MYSE roosts and foraging habitat. Although only the area immediately surrounding roost trees (46 meters) is protected from tree removal during pup season (01 June -31 July) under the 4(d) rule, MYSE appear to be using the forested areas and it may be important to retain (USFWS 2016).

6.0 RECOMMENDATIONS

Depending on the nature and extent of activities within the areas of interest, there is the potential to directly impact MYSE or its summer habitat by removing forested areas or individual roost trees. Below are several recommendations to protect MYSE and their habitat as well as suggestions of ways to gain more information about MYSE utilization of the Installation.

- 1) Avoiding activity such as cutting trees during the pup season (01 June -31 July), can prevent NLEB take and curtail adverse effect. However, tree removal is prohibited under the final 4(d) rule only if it occurs within 46 meters (150 feet) of a known maternity roost tree from 1 June through 31 July (USFWS 2016)

- 2) The tracked female MYSE appear to prefer roosting (60% of known roost trees) in red maples, 12-30 dbh, and over 70% of bark remaining. Consider maintaining and protecting tree stands that contain these roost tree characteristics.
- 3) Make sure snags are left during cutting or if the area is lacking snags, girdle trees to create snags. Snags can create roosting opportunities like peeling bark and cavities for species such as MYSE. Prescribed fire may also increase the number of snags. Fire also increases the canopy gaps and therefore solar radiation reaching roosts, which can increase maximum roosting temperatures (Johnson et al. 2009). Increased roosting temperatures are associated with rapid development of young (Boyles and Aubrey 2006). However, prescribed fire may reduce roosting opportunities for foliage roosting bats such as hoary bats
- 4) Construct or place bat houses around the facility to create roosting habitat
- 5) Each bat species has a preferred habitat for foraging so maintaining multiple habitats on base is important. Many species prefer to feed over open water, thus protecting wetlands and both the forest around them and corridors that connect with other forest patches is vital. The larger species prefer to forage in open meadow areas and along forest edges that tend to collect insects. Finally, many species, such as MYSE, prefer to forage in forested areas that tend to be wetter and breed more insects. Forested corridors that connect the forest patches or run along streams is important to provide a sheltered environment that bats can use to move around the landscape.
- 6) For future radio-tracking efforts, continue to use aircraft to locate bats that have left the immediate area. Using new surgical glue for attaching radio-transmitters may increase success and consider conducting the survey early in the season when temperatures are cool to inhibit glue melt
- 7) Conduct a true home range (95% adaptive kernel method) or core utilization study to determine bats true use of Installation, which requires 30-50 location points
- 8) Conduct acoustic monitoring during an entire season, spanning early spring to late fall, to determine when bats are arriving and when bats are leaving the base. This will pertain both to bats migrating from distant areas and individuals arriving from local hibernacula. If swarms are detected in late fall it may indicate a hibernacula nearby.
- 9) MYSE are most often captured along flyways in closed canopy forests that are unable to be surveyed with acoustic detectors relying on solar panels for power. Consider placing battery powered acoustic detectors in probably MYSE habitat during the maternity period

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APPENDIX A
FIELD SURVEY DATA FORMS – ROOST CHARACTERISTICS

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Northern Long Eared Bat Roost Characteristics

Biologist: M. Ingalls + M. Bailey Date: 6/5/2015

Name of Base/Location: Northwest Annex

Town: Chesapeake State: VA County: _____

Lat/Long (WGS 84): 36.546015^N, -70.263497^W

Frequency: 148, ~~488~~ 844 Sex: F Age: A Date Tagged: 6/3/2015

unable to locate exact roost tree - Transmitter was acting weird.

Roost Tree Data

Tree Species: _____ Live OR Dead

DBH (cm): _____ Tree height (m): _____ Snag Roost Decay Stage (1-4): _____

% Bark Remaining: _____ % Roost Canopy Cover (average 4 directions): _____

Roost Aspect (if known): _____

Surrounding Habitat

Dist. to Water Source (m): 200

Significant/Dominant Tree Species in 0.1 ha plot: Red maple & loblolly pine

switch grass, sweet gum,

of live trees in 0.1 ha plot: 60 # of snags in 0.1 ha plot: 6

Anthropogenic Roost

Roost type: N/A

Roost Aspect: N/A % Roost Canopy Cover: N/A

Decay Stages

	1	2	3	4
Branches	80-100%	few- no branches	Limb stubs to none	none
Bark	80-100%	30-80%	w/ most of ht <30% bark w/ <50% ht: >80% bark	<80%
Height	Full- broken top	Broken top	Broken top to <50% height	<50% height

Northern Long Eared Bat Roost Characteristics

Biologist: CV + KN Date: 6-6-15

Name of Base/Location: NW VA

Town: Chesapeake State: VA County: N/A

Lat/Long (WGS 84): 36.54311, -76.27203

Frequency: 148.844 Sex: F Age: A Date Tagged: 6-3-15

Roost Tree Data

Tree Species: loblolly pine Live OR Dead

DBH (cm): 60 Tree height (m): 70 ft Snag Roost Decay Stage (1-4): E 1

% Bark Remaining: 100% % Roost Canopy Cover (average 4 directions): 64%

Roost Aspect (if known): unknown

Surrounding Habitat

Dist. to Water Source (m): 1/2 km to drainage

Significant/Dominant Tree Species in 0.1 ha plot: loblolly pine,
sweet gum, maple + shrubs

of live trees in 0.1 ha plot: 70 # of snags in 0.1 ha plot: 3

N/A }

Anthropogenic Roost

Roost type: _____

Roost Aspect: _____ % Roost Canopy Cover: _____

Decay Stages

	1	2	3	4
Branches	<u>80-100%</u>	few- no branches	Limb stubs to none	none
Bark	<u>80-100%</u>	30-80%	w/ most of ht <30% bark w/ <50% ht: >80% bark	<80%
Height	Full- broken top	Broken top	Broken top to <50% height	<50% height

Northern Long Eared Bat Roost Characteristics

Biologist: M. Ingalls + K. Nolan Date: 7 June 15

Name of Base/Location: Northwest Annex

Town: Chesapeake State: VA County: N/A

Lat/Long (WGS 84): 36.547210, -76.2725359

Frequency: 148.844 Sex: F Age: A Date Tagged: 3 June 15

Roost Tree Data

Tree Species: Red Maple Live OR Dead

DBH (cm): 12 cm Tree height (m): 9 Snag Roost Decay Stage (1-4): N/A

% Bark Remaining: 100 % Roost Canopy Cover (average 4 directions): 90%

Roost Aspect (if known): unknown

Surrounding Habitat

Dist. to Water Source (m): ? 68m to drainage

Significant/Dominant Tree Species in 0.1 ha plot: _____

red maple, loblolly pine, switch grass, water oak

of live trees in 0.1 ha plot: 30 # of snags in 0.1 ha plot: 1

Anthropogenic Roost

Roost type: N/A

Roost Aspect: N/A % Roost Canopy Cover: N/A

Decay Stages

	1	2	3	4
Branches	80-100%	few- no branches	Limb stubs to none	none
Bark	80-100%	30-80%	w/ most of ht <30% bark w/ <50% ht: >80% bark	<80%
Height	Full- broken top	Broken top	Broken top to <50% height	<50% height

Northern Long Eared Bat Roost Characteristics

Biologist: CV & KN Date: 6-8-15

Name of Base/Location: NW

Town: Chesapeake State: VA County: N/A

Lat/Long (WGS 84): 36.54977, -76.27264

Frequency: 148.844 Sex: F Age: A Date Tagged: 6-3-15

Roost Tree Data

Tree Species: Sweet gum Live OR Dead

DBH (cm): 25 Tree height (m): 60^{15m} Snag Roost Decay Stage (1-4): 1

% Bark Remaining: 100 % Roost Canopy Cover (average 4 directions): 90

Roost Aspect (if known): N/A

Surrounding Habitat

Dist. to Water Source (m): ? 35m to drainage

Significant/Dominant Tree Species in 0.1 ha plot: loblolly pine, maple, Sweet gum

of live trees in 0.1 ha plot: 75 # of snags in 0.1 ha plot: 7

NA { **Anthropogenic Roost**

Roost type: _____

Roost Aspect: _____ % Roost Canopy Cover: _____

Decay Stages

	1	2	3	4
Branches	80-100%	few- no branches	Limb stubs to none	none
Bark	80-100%	30-80%	w/ most of ht <30% bark w/ <50% ht: >80% bark	<80%
Height	Full- broken top	Broken top	Broken top to <50% height	<50% height

Northern Long Eared Bat Roost Characteristics

Biologist: M. Ingalls, M. Bailey Date: 3 June 2015

Name of Base/Location: Northwest Annex

Town: Chesapeake State: VA County: N/A

Lat/Long (WGS 84): 36.56710, -76.27633

Frequency: 148.913 Sex: F Age: A Date Tagged: 1 June 2015
148.783

Roost Tree Data

Tree Species: Red Maple Snag Live OR Dead

DBH (cm): 19 Tree height (m): 12 Snag Roost Decay Stage (1-4): 2

% Bark Remaining: 80% % Roost Canopy Cover (average 4 directions): 75%

Roost Aspect (if known): unknown

Surrounding Habitat

Dist. to Water Source (m): 0.5 km to drainage, 0.6 km to pond.

Significant/Dominant Tree Species in 0.1 ha plot: red maple swamp: red maple,
sweet gum, green birch,

of live trees in 0.1 ha plot: 30 # of snags in 0.1 ha plot: 9

Anthropogenic Roost

Roost type: N/A

Roost Aspect: N/A % Roost Canopy Cover: N/A

Decay Stages

	1	2	3	4
Branches	80-100%	few- no branches	Limb stubs to none	none
Bark	80-100%	30-80%	w/ most of ht <30% bark w/ <50% ht: >80% bark	<80%
Height	Full- broken top	Broken top	Broken top to <50% height	<50% height

APPENDIX B
FIELD SURVEY DATA FORMS – EMERGENCE COUNTS

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Emergence CountBiologist: Baxter Seguin Date: 5 June 2015 Frequency: 148,783 and 148,913Start time: 20:10 End time: 20:35**Location**Name of Base: Northwest AnnexDescription: to the west of the red rangeLat/Long: 36.56710, -76.27633**Roost Details**Roost Type: Bark OR Crevice/cavity % Roost Canopy Cover: 75%Roost Aspect (deg): UNK Roost DBH (cm): 19 Roost Height (m): 5.5m**Bats**Time of first bat: 20:15 Time of last bat: 20:24Time of transmitted bat: 20:23 Total # of bats: 26**Weather**Temperature: 65° % Clouds: 100 Wind: 0

Force	What it looks like	What it's called	Wind Speed (mph)
0	Smoke rises straight up	Calm	0
1	Smoke drifts, indicating wind direction	Light air	1-3
2	Leaves rustle	Light breeze	4-7
3	Leaves and twigs move	Gentle breeze	8-12
4	Branches move; flags flap	Moderate breeze	13-18
5	Small trees sway; whitecaps on water	Fresh breeze	19-24
6	Large branches move; flags beat	Strong breeze	25-31
7	Whole trees move; flags extend	Near gale	32-38
8	Twigs break; walking is hard	Fresh gale	39-46
9	Signs blow down; slate blows off roofs	Strong gale	47-54
10	Trees uproot	Whole gale	55-63
11	Much general damage	Storm	64-72
12	Widespread destruction	Hurricane	72+

Emergence Count

Biologist: Ratie Nolan Date: 6-6-15 Frequency: 148 844

Start time: 20:32 End time: 20:51

Location

Name of Base: Northwest Annex, UA

Description: NC/UA Southern end

Lat/Long: 36.54311, -76.27203

Roost Details

Roost Type: Bark OR Crevice/cavity % Roost Canopy Cover:

Roost Aspect (deg): Roost DBH (cm): Roost Height (m): } unknown

Bats

Time of first bat: 20:45 Time of last bat: 20:51

Time of transmitted bat: 20:51 Total # of bats: 1

Weather

Temperature: 71°F % Clouds: 30% Wind: 0

Force	What it looks like	What it's called	Wind Speed (mph)
0	Smoke rises straight up	Calm	0
1	Smoke drifts, indicating wind direction	Light air	1-3
2	Leaves rustle	Light breeze	4-7
3	Leave and twigs move	Gentle breeze	8-12
4	Branches move; flags flap	Moderate breeze	13-18
5	Small trees sway; whitecaps on water	Fresh breeze	19-24
6	Large branches move; flags beat	Strong breeze	25-31
7	Whole trees move; flags extend	Near gale	32-38
8	Twigs break; walking is hard	Fresh gale	39-46
9	Signs blow down; slate blows off roofs	Strong gale	47-54
10	Trees uproot	Whole gale	55-63
11	Much general damage	Storm	64-72
12	Widespread destruction	Hurricane	72+

Emergence Count

(Previously 9134783)

Biologist: Baxter Seguin Date: 6/7/2015 Frequency: None (Previously 9134783)

Start time: 20:14 End time: 20:50

Location

Name of Base: Northwest Annex

Description: To the west of the red range

Lat/Long: 4 36.56710, -76.27633

Roost Details

Roost Type: Bark OR Crevice/cavity % Roost Canopy Cover: 75%

Roost Aspect (deg): Unknown Roost DBH (cm): 19 Roost Height (m): 4

Bats

Time of first bat: N/A Time of last bat: N/A

Time of transmitted bat: N/A Total # of bats: 0

Weather

Temperature: 74° ~~68°~~ % Clouds: 0 Wind: 0

Force	What it looks like	What it's called	Wind Speed (mph)
0	Smoke rises straight up	Calm	0
1	Smoke drifts, indicating wind direction	Light air	1-3
2	Leaves rustle	Light breeze	4-7
3	Leaves and twigs move	Gentle breeze	8-12
4	Branches move; flags flap	Moderate breeze	13-18
5	Small trees sway; whitecaps on water	Fresh breeze	19-24
6	Large branches move; flags beat	Strong breeze	25-31
7	Whole trees move; flags extend	Near gale	32-38
8	Twigs break; walking is hard	Fresh gale	39-46
9	Signs blow down; slate blows off roofs	Strong gale	47-54
10	Trees uproot	Whole gale	55-63
11	Much general damage	Storm	64-72
12	Widespread destruction	Hurricane	72+

Emergence CountBiologist: CV Date: 6-7-15 Frequency: 148.844Start time: 8 20:20 End time: 20:30**Location**Name of Base: North WestDescription: S end of NW AnnexLat/Long: 36.547210, -76.272359**Roost Details**Roost Type: Bark OR Crevise/cavity ^{u/k} % Roost Canopy Cover: 90%Roost Aspect (deg): N/A Roost DBH (cm): u/k Roost Height (m): u/k**Bats**Time of first bat: 20:26 Time of last bat: 20:26Time of transmitted bat: 20:26 Total # of bats: ~~0~~ 1**Weather**Temperature: 72° % Clouds: 0 Wind: 0

Force	What it looks like	What it's called	Wind Speed (mph)
0	Smoke rises straight up	Calm	0
1	Smoke drifts, indicating wind direction	Light air	1-3
2	Leaves rustle	Light breeze	4-7
3	Leave and twigs move	Gentle breeze	8-12
4	Branches move; flags flap	Moderate breeze	13-18
5	Small trees sway; whitecaps on water	Fresh breeze	19-24
6	Large branches move; flags beat	Strong breeze	25-31
7	Whole trees move; flags extend	Near gale	32-38
8	Twigs break; walking is hard	Fresh gale	39-46
9	Signs blow down; slate blows off roofs	Strong gale	47-54
10	Trees uproot	Whole gale	55-63
11	Much general damage	Storm	64-72
12	Widespread destruction	Hurricane	72+

Emergence Count

Biologist: Baxter Segura Date: 6/8/2015 Frequency: 148.844

Start time: 20:20 End time: 20:38

Location

Name of Base: Northwest Annex

Description: West of Carolina Rd., Within danger zone of IAMS, North of gate

Lat/Long: N 36.54977° W -76.27264

Roost Details

Roost Type: Bark OR Crevice/cavity % Roost Canopy Cover: 75

Roost Aspect (deg): N/A Roost DBH (cm): 30 Roost Height (m): N/A

Bats

Time of first bat: N/A Time of last bat: N/A

Time of transmitted bat: 20:34 Total # of bats: 0

Weather

Temperature: 78°F % Clouds: 0 Wind: 4

Force	What it looks like	What it's called	Wind Speed (mph)
0	Smoke rises straight up	Calm	0
1	Smoke drifts, indicating wind direction	Light air	1-3
2	Leaves rustle	Light breeze	4-7
3	Leave and twigs move	Gentle breeze	8-12
4	Branches move; flags flap	Moderate breeze	13-18
5	Small trees sway; whitecaps on water	Fresh breeze	19-24
6	Large branches move; flags beat	Strong breeze	25-31
7	Whole trees move; flags extend	Near gale	32-38
8	Twigs break; walking is hard	Fresh gale	39-46
9	Signs blow down; slate blows off roofs	Strong gale	47-54
10	Trees uproot	Whole gale	55-63
11	Much general damage	Storm	64-72
12	Widespread destruction	Hurricane	72+

APPENDIX C
RESUMES AND PERMITS FOR FIELD CREWS

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RECEIVED
APR 16 2015
By _____



DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
Endangered Species Permit Office
1875 Century Boulevard, Suite 200
Atlanta, GA 30345
permitsR4ES@fws.gov

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

BIODIVERSITY RESEARCH INSTITUTE
652 MAIN STREET
GORHAM, ME 04038
U.S.A.

2. AUTHORITY-STATUTES
16 USC 1539(a)

REGULATIONS
50 CFR 17.22

50 CFR 13

3. NUMBER
TE63633A-3 AMENDMENT

4. RENEWABLE
 YES
 NO

5. MAY COPY
 YES
 NO

6. EFFECTIVE
04/09/2015

7. EXPIRES
04/09/2018

8. NAME AND TITLE OF PRINCIPAL OFFICER (If #1 is a business)
DAVID C EVERS
EXECUTIVE DIRECTOR

9. TYPE OF PERMIT
NATIVE ENDANGERED SP. RECOVERY - E WILDLIFE

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
Alabama, Georgia, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Minnesota, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia

11. CONDITIONS AND AUTHORIZATIONS:

- A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.
- B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL, TRIBAL, OR OTHER FEDERAL LAW.
- C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

C. 1. Continued: the following individuals are authorized to conduct activities as authorized by this permit: Carl Anderson, Timothy Divoll, Shaylyn Hatch, Dustin Meattley, David Yates, and for Indiana bats only: Jonathan Fiely.

Trained assistants not named on this permit may work on permitted bat activities under the direct and on-site supervision of the individuals named above. However, trained assistants may not work independently at a site. Trained assistants are individuals who are considered qualified by the permitted biologist(s) to select sampling sites, deploy sampling equipment and nets, and handle bats in the field.

D. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE UNDERSTANDS AND AGREES TO ABIDE BY THE TERMS OF THIS PERMIT AND ALL SECTIONS OF TITLE 50 CODE OF FEDERAL REGULATIONS, PARTS 13 AND 17, PERTINENT TO ISSUED PERMITS. SECTION 11 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED, PROVIDES FOR CIVIL AND CRIMINAL PENALTIES FOR FAILURE TO COMPLY WITH PERMIT CONDITIONS.

ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS

Annual reports are due by January 31 following each year this permit is in effect

ISSUED BY

TITLE
CHIEF, DIVISION OF ENVIRONMENTAL REVIEW

DATE
04/09/2015

Roxanna Hinzman

Chief, Division of Environmental Review

E. PERMITTEE IS AUTHORIZED TO TAKE (ENTER HIBERNACULA OR MATERNITY ROOST CAVES, SALVAGE DEAD BATS, CAPTURE WITH MIST NETS OR HARP TRAPS, HANDLE, IDENTIFY, COLLECT HAIR SAMPLES, BAND, RADIO TAG, LIGHT-TAG, AND WING-PUNCH) INDIANA BATS (Myotis sodalis), GRAY BATS (Myotis grisescens), AND NORTHERN LONG-EARED BATS (Myotis septentrionalis), FOR SCIENTIFIC RESEARCH AIMED AT RECOVERY OF THE SPECIES, SUCH AS: PRESENCE/ABSENCE SURVEYS, STUDIES TO DOCUMENT HABITAT USE, POPULATION MONITORING, AND TO EVALUATE POTENTIAL IMPACTS OF WHITE-NOSE SYNDROME OR OTHER THREATS AS CONDITIONED BELOW.

F. Activities at the following locations require written site-specific approval from the USFWS Field Supervisor in the State(s) where the project will occur (as outlined in Condition G):

F.1. Locations within Region 3 of the USFWS: Illinois, Indiana, Missouri, Minnesota, and Ohio

F.2. Locations within Region 4 of the USFWS: Alabama, Georgia, Kentucky, Mississippi, North Carolina, Louisiana, South Carolina, and Tennessee

F.3. Locations within Region 5 of the USFWS: Massachusetts, New Jersey, New York, Pennsylvania, Virginia and West Virginia

G. Permittee shall notify the USFWS Field Supervisor for the State in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is in Condition P., below. Your request for this site-specific approval must be in writing and must indicate:

G.1. The purpose and a description of the activities proposed (e.g., surveys, radio telemetry studies, etc.).

G.2. Location of proposed activities, including project site (legal description and lat/long), county, and state.

G.3. Dates when the project is proposed to take place.

G.4. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*

H. Permittee shall adhere to the following conditions involving capture and handling of bats:

H.1. Federally listed bats may be captured (e.g., mist-nets and harp traps) following the protocol(s) provided by the USFWS, when available. Permittees must contact the USFWS FO in the State(s) in which activities are proposed to ensure correct protocol(s) are used. For example, the current Range-wide Indiana Bat Summer Survey Guidelines are available at:

<http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html>. The monitoring interval for mist nets is once every 10 minutes. Harp traps must be continually monitored.

H.2. Captured bats may be held for a maximum of 30 minutes, unless injured. If an exception is required to this prohibition, permittee must receive prior written approval from the USFWS Field Supervisor for the State in which the activities are proposed to occur.

H.3. Permittees shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data form provided by the USFWS (e.g., INDIANA BAT SURVEY AND BANDING DATA form). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful

recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally listed species captured are encouraged. The permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.4. If bands are applied, these must be lipped metal bands having a unique identifier. Bands should be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.5. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least five days, or until the transmitter falls off, whichever occurs first.

H.6. No capture activities shall occur within 20 meters of a known or potential summer or winter roost site, either natural or artificial, of a federally listed bat. If an exception is required to this prohibition, permittee must receive prior written approval from the USFWS Field Supervisor for the State in which the activities are proposed to occur.

H.7. Permittee may collect dorsal hair samples, wing biopsy tissue samples, fungal lift tape and swab samples from captured bats for scientific study. Hair samples shall be obtained via clipping fur from between scapula from females and juvenile males. The clipped area is the same area frequently clipped for radio transmitter attachment. Wing tissue samples may be taken using a new, sterile biopsy punch (2mm) for each endangered bat sampled. No more than two samples, one from each wing, may be obtained per individual. All boards and equipment used to obtain samples must be disinfected according to the protocol cited in Condition H.9.

H.8. Cyalume light tags may be affixed to the back of unmarked bats during summer roosting period via non-toxic skin bond adhesive to aid in identification of individuals for echolocation recordings. Light tags shall not be affixed to bats carrying radio transmitters. Light tag cannot exceed 2 cm in length or 0.15 g in weight. The light tag must be resistant to tooth puncture and sealed to prevent bats from ingesting cyalume compound. Any light tag that has the potential to expose bats to the cyalume compound is prohibited; the compound is known to be toxic to bats.

H.9. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: <http://whitenosesyndrome.org/>

H.10. Caves, mines, or other suitable hibernation sites may be quietly searched in a manner that minimizes disturbance by utilizing the minimum number of people and time required to complete the survey. Surveys of known hibernacula conducted during the winter hibernation season shall follow the guidelines established in the recovery plans for each federally listed bat species with regards to how often a site may be visited and other species-specific requirements related to entering hibernaculum (for example, for Indiana bats, winter surveys should not be repeated more often than once every other year in any given hibernaculum; for gray bats, winter surveys should not be repeated more often than once every three years in any given hibernaculum), unless authorized by the appropriate Service Recovery Lead identified in Condition O (below).

Under no circumstances should multiple trips to the hibernation area occur within the same year without written approval of the USFWS Field Supervisor for the state in which activities are proposed.

Bats may be handled during winter surveys in order to collect band information and confirm the identification of

listed species. When possible, bands should be read without touching the bat. Banded bats should only be handled if easily accessible and removal of the bat does not disturb a large number of additional bats and is unlikely to result in injury to the bat. Detailed photographs should be taken to document the presence of listed species in previously undocumented hibernaculum. Where hibernacula area and safety conditions allow, individuals entering hibernacula are recommended to utilize night vision goggles or red-filtered light and to remain in the site no more than 90 minutes to complete the work.

H.11. Surveys of gray bat maternity roosts and their other known summer roost sites shall be conducted by observing the bats with night vision equipment and/or infrared light sources (e.g., thermal infrared) as they emerge from their roosts to avoid any possible disturbance to these bats. At previously undocumented sites for these species, the accepted method to determine if they are present is to carefully and slowly enter the potential roost site to check for evidence of presence/use, such as visual observation of bats, significant quantities or a strong smell of guano, or the audible sounds produced by bats roosting at the site. As soon as any evidence is obtained that the roost site is being used by a federally-listed bat species, survey team members shall immediately exit the roost site and make further observations from outside the entrance to the roost. All further observations shall be made from the entrance during the evening emergence.

I. Upon determination that endangered bats are present, permittee shall notify the following offices immediately (not to exceed 1 business day): the appropriate USFWS Regional Office (Condition N.), and the USFWS Field Office within the geographic location of study areas (Condition P.).

J. Permittee must carry a copy of this permit at all times when conducting the authorized activities. Shipments of collected biological materials should also be accompanied by a copy of this permit. NOTE: This permit is limited to the above activities and identified species.

K. Issuance of this permit does not constitute permission to conduct these activities on National Wildlife Refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

L. Accidental mortality may not exceed one specimen. In the event that an accidental mortality occurs, cease all activities until consulting with the USFWS. Any bat mortality or serious injury must be reported immediately (not to exceed 1 business day) to the applicable office listed in condition N. and to the appropriate Field Office identified in Condition P. The USFWS will work with you to determine the cause of injury or mortality and whether such could be avoided should activities be allowed to proceed. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS for potential necropsy and/or for scientific or educational purposes.

Upon locating a dead, injured, or sick bat, or any other threatened or endangered species, under circumstances not addressed in this authorization, initial notification must be made immediately (not to exceed 1 business day) to the appropriate USFWS Office identified in condition N., below, including a description of the circumstances, location information, and photo documentation. Notification should also be made at the same time to the appropriate USFWS Field Office identified in condition P., below. Care should be taken in handling sick, injured, or dead specimens to ensure effective treatment or to preserve biological materials for later analysis. In conjunction with the care of sick or injured threatened or endangered species, and the preservation of biological materials from a dead animal, the permittee should take responsible steps to ensure that the site is not unnecessarily disturbed. Prior to collecting the specimen(s), you must photograph the specimen(s) to document the conditions in which they were found. You may preserve the specimen(s) by freezing them or other suitable method to allow scientific study. Disposition of collected specimen(s) shall be determined by the USFWS Field Office.

M. Reports are due on January 31 following each year this permit is in effect. At a minimum, your report shall include:

M.1. The date, time, geographic locations (including datum and projection information).

M.2. All locations surveyed (regardless of whether federally listed bats were captured/observed).

M.3. Band numbers of all bats banded and all bats recovered/observed.

M.4. Information on any injuries and/or mortalities and disposition of specimens.

M.5. Location and characteristics of roost trees and bat colonies.

M.6. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

M.7. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data form provided by the USFWS (e.g., INDIANA BAT SURVEY AND BANDING DATA forms, the data collection forms found in the current Rangewide Indiana Bat Summer Survey Guidelines cited in Condition H.1., or other species specific forms). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

M.8. Copies of all site specific authorization letters required under Condition G.

If no activities occurred over the course of the year, indication of such shall be submitted as an annual report.

N. Copies of your reports shall be sent to the offices listed below. When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office.

N.1

Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

N.2.

Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southeast Region (Region 4)
1875 Century Boulevard, Suite 200
Atlanta, Georgia 30345-3301
(404/679-7101; fax 404/679-7081)
permitsR4ES@fws.gov

N.3.

Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division

300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(703/358-2402; fax 413/253-8482)
permitsR5ES@fws.gov

O. Additionally, based on species, reports and publications shall be submitted to the following:

O.1. For Studies involving Indiana Bats:

Lori Pruitt
U.S. Fish and Wildlife Service
Indiana Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

O.2. For Studies involving Gray Bats:

Shauna Marquardt
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park De Ville Drive, Suite A
Columbia, Missouri 65203
(573/234-2132 x174; fax 573/234-2181)

O.3. For Studies involving Northern Long-eared Bats:

Jill Utrup
U.S. Fish and Wildlife Service
Twin Cities Ecological Services Field Office
4104 American Blvd. E
Bloomington, Minnesota 55425
(612/725-3548 x207; fax 612/725-3609)

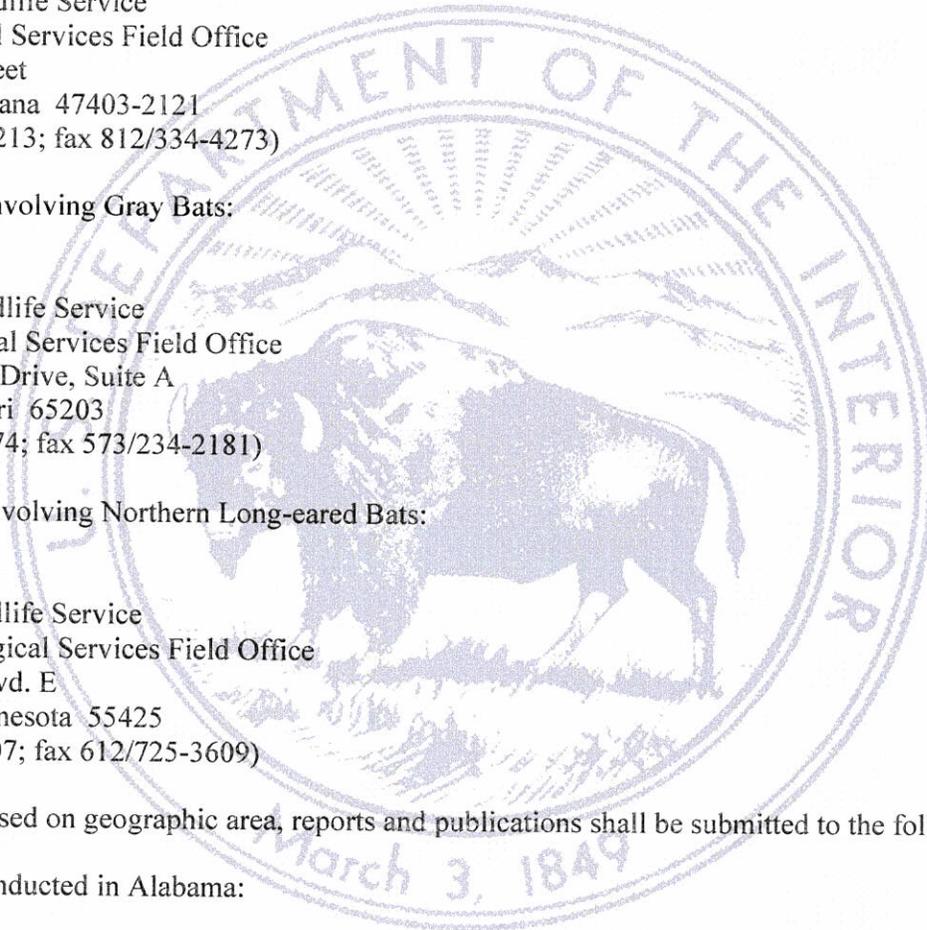
P. Additionally, based on geographic area, reports and publications shall be submitted to the following:

P.1. For studies conducted in Alabama:

Field Supervisor
Alabama Ecological Services Field Office
1208-B Main Street
Daphne, Alabama 36526-4419
(251) 441-5181

P.2. For studies conducted in Georgia:

Field Supervisor
Georgia Ecological Services Field Office
105 Westpark Drive, Suite D
Athens, GA 30606-3175
(706) 613-9493; fax 706/613-6059



P.3. For studies conducted in Illinois:

P.3.a.

Kristen Lundh
Endangered Species Coordinator for Illinois/Iowa
U.S. Fish and Wildlife Service
Ecological Services Field Office
1511 47th Ave.
Moline, Illinois 61265
(309/757-5800, x215; fax 309/757-5807)

P.3.b.

Joe Kath
Endangered Species Coordinator
Illinois Department of Natural Resources
Division of Natural Heritage
One Natural Resource Way
Springfield, Illinois 62702-1271
(217/785-8764; fax 217/785-2438)

P.4. For studies conducted in Indiana:

P.4.a.

Lori Pruitt
Endangered Species Coordinator for Indiana
Indiana Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

P.4.b.

Scott Johnson
Indiana Department of Natural Resources
5596 East State Road 46
Bloomington, IN 47401
(812/334-1137, ext. 3400)

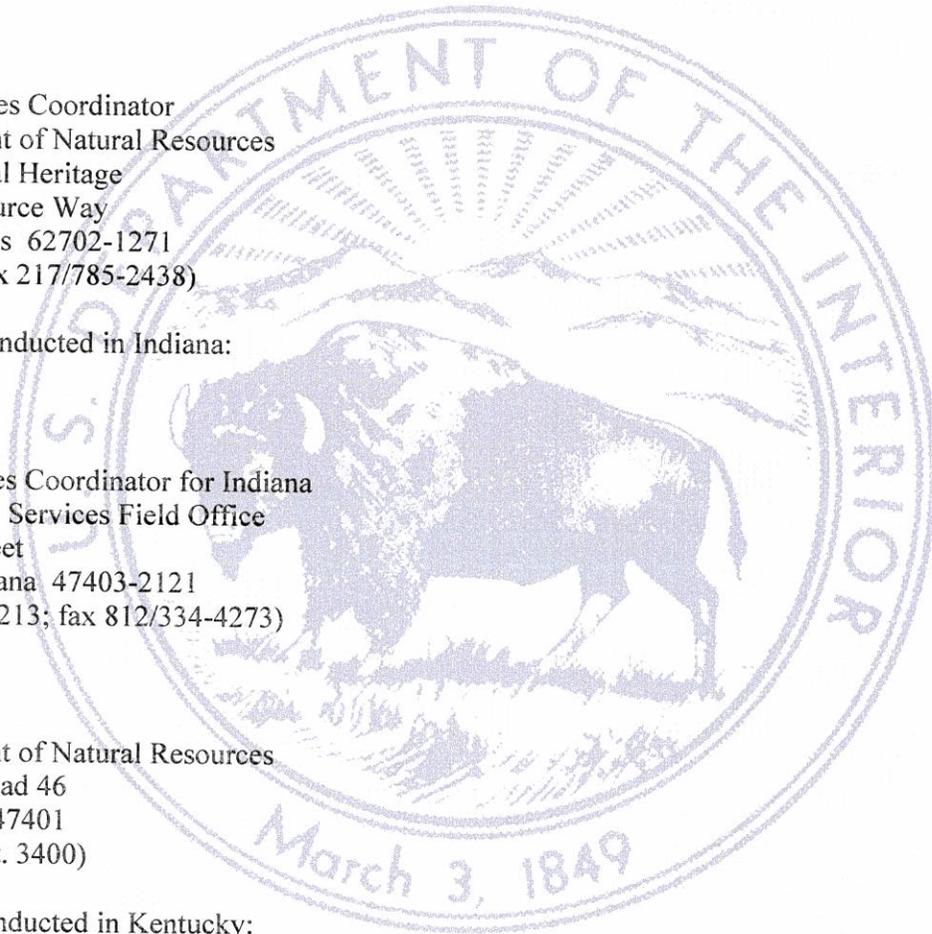
P.5. For studies conducted in Kentucky:

Field Supervisor
Frankfort Ecological Services Field Office
J C Watts Federal Bldg., Rm 265
330 West Broadway
Frankfort, KY 40601-8670
(502) 695-0468

P.6. For studies conducted in Louisiana

Field Supervisor

Louisiana Ecological Service Field Office



646 Cajundome Boulevard, Suite 400

Lafayette, LA 70506

(337) 291-3100

P.7. For studies conducted in Massachusetts:

Field Supervisor
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541

P.8. For studies conducted in Minnesota and Wisconsin:

P.8.a.
Phil Delphey
Endangered Species Coordinator for Minnesota and Wisconsin
U.S. Fish and Wildlife Service
Ecological Services Field Office
4101 American Blvd E.
Bloomington, Minnesota 55425
(612/725-3548 x2206; fax 612/725-3609)

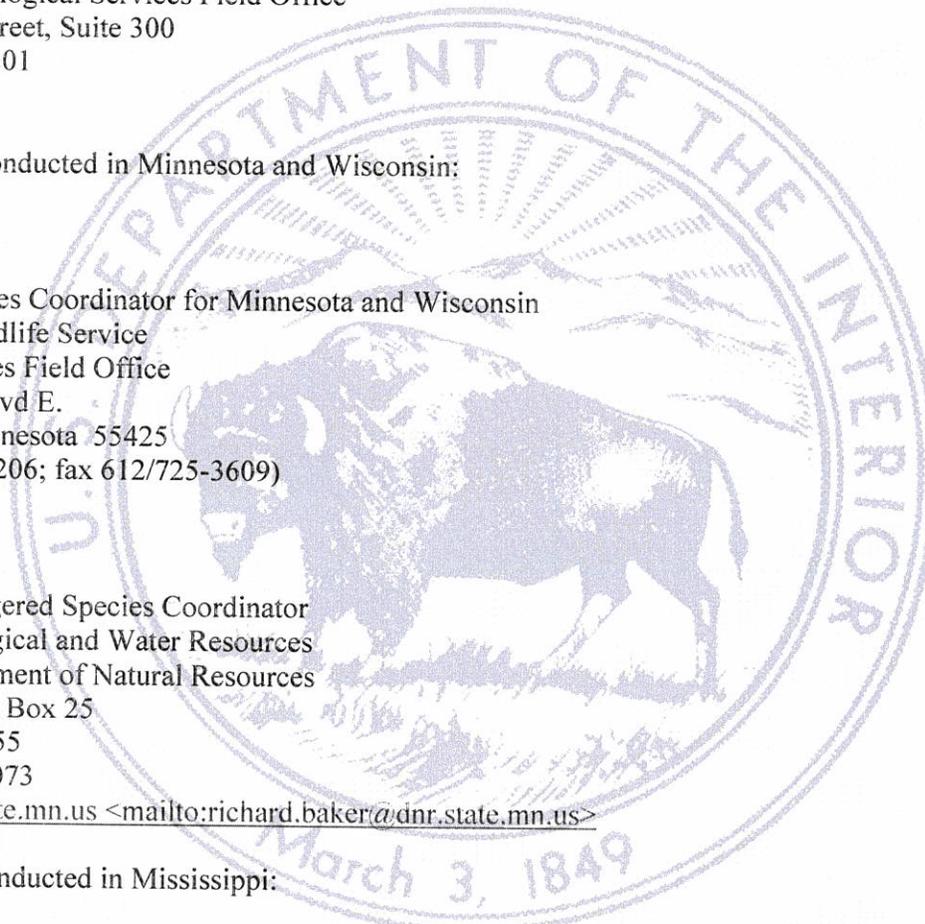
P.8.b.
Richard Baker
Minnesota Endangered Species Coordinator
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Rd., Box 25
St. Paul, MN 55155
Phone: 651/259-5073
richard.baker@state.mn.us <<mailto:richard.baker@dnr.state.mn.us>>

P.9. For studies conducted in Mississippi:

Field Supervisor
Mississippi Ecological Services Field Office
6578 Dogwood View Pkwy, Ste A
Jackson, MS 39213-7856
(601) 321-1122

P.10. For studies conducted in Missouri:

P.10.a.
Field Supervisor
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-2132



(573/234-2132; fax 573/234-2181)

P.10.b.

Tara Jennings
Scientific Collecting Permit Coordinator
Missouri Department of Conservation
Endangered Species and Natural History Division
2901 W. Truman Blvd., P.O. Box 180
Jefferson City, Missouri 65102-0180
(573/522-4115 ext. 3322; fax 573/751-4864)

P.11. For studies conducted in New Jersey:

Field Supervisor
New Jersey Ecological Services Field Office
927 N. Main Street, Building D
Pleasantville, NJ 08232-1454
(609) 646-9310

P.12. For studies conducted in New York:

Field Supervisor
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045
(607) 753-9334

P.13. For studies conducted in North Carolina:

Field Supervisor
Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
(828) 258-3939

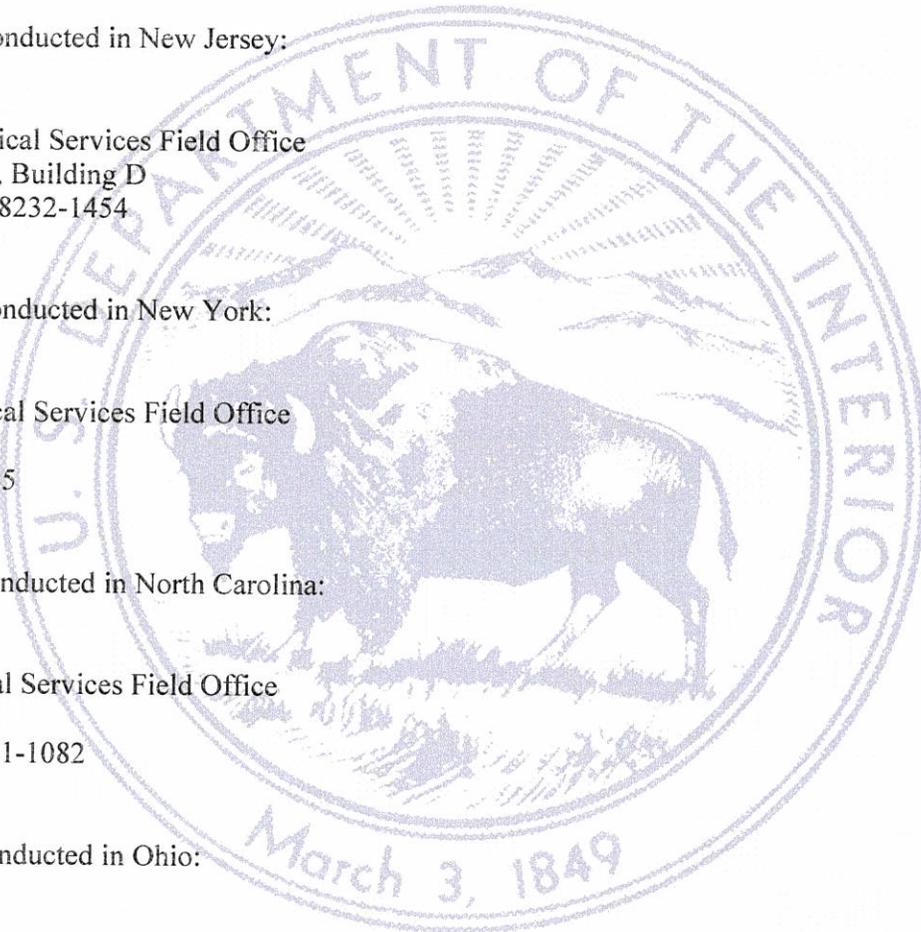
P.14. For studies conducted in Ohio:

P.14.a.

Angela Boyer
Endangered Species Coordinator for Ohio
U.S. Fish and Wildlife Service
Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614/416-8993, x22; fax 614/416-8994)

P.14.b.

Endangered Species Coordinator
Ohio Department of Natural Resources
Division of Wildlife
2045 Morse Road, Building G
Columbus, Ohio 43229-6693



(614-265-6329; fax 614/262-1143)

P.15. For studies conducted in Pennsylvania:

Field Supervisor
Pennsylvania Ecological Services Field Office
315 So. Allen Street, Suite 322
State College, PA 16801-4850
(814) 234-4090

P.16. For studies conducted in South Carolina:

P. 16.a.
Field Supervisor
South Carolina Ecological Services Field Office
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
(843) 727-4707 x227

P. 16.b.
Mary Bunch
Biologist/Preserve Manager
South Carolina Department of Natural Resources
311 Natural Resources Drive
Clemson, SC 29631
(864) 654-6738 x15
Fax: (864) 654-9168
bunchm@dnr.sc.gov

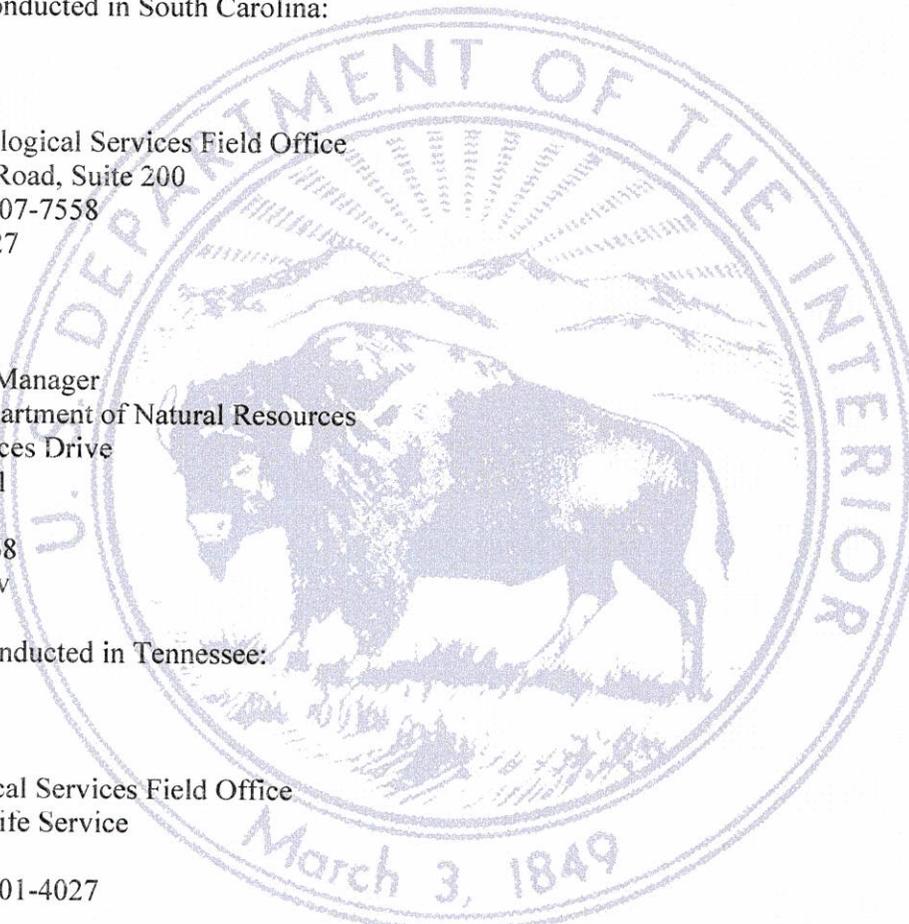
P.17. For studies conducted in Tennessee:

P. 17. a.
Field Supervisor
Cookeville Ecological Services Field Office
U.S. Fish and Wildlife Service
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

P. 17.b.
Brian Flock
Bat Coordinator
Tennessee Wildlife Resources Agency
P.O. Box 40747
Nashville, TN 37204
(615) 781-6569

P.18. For studies conducted in Virginia:

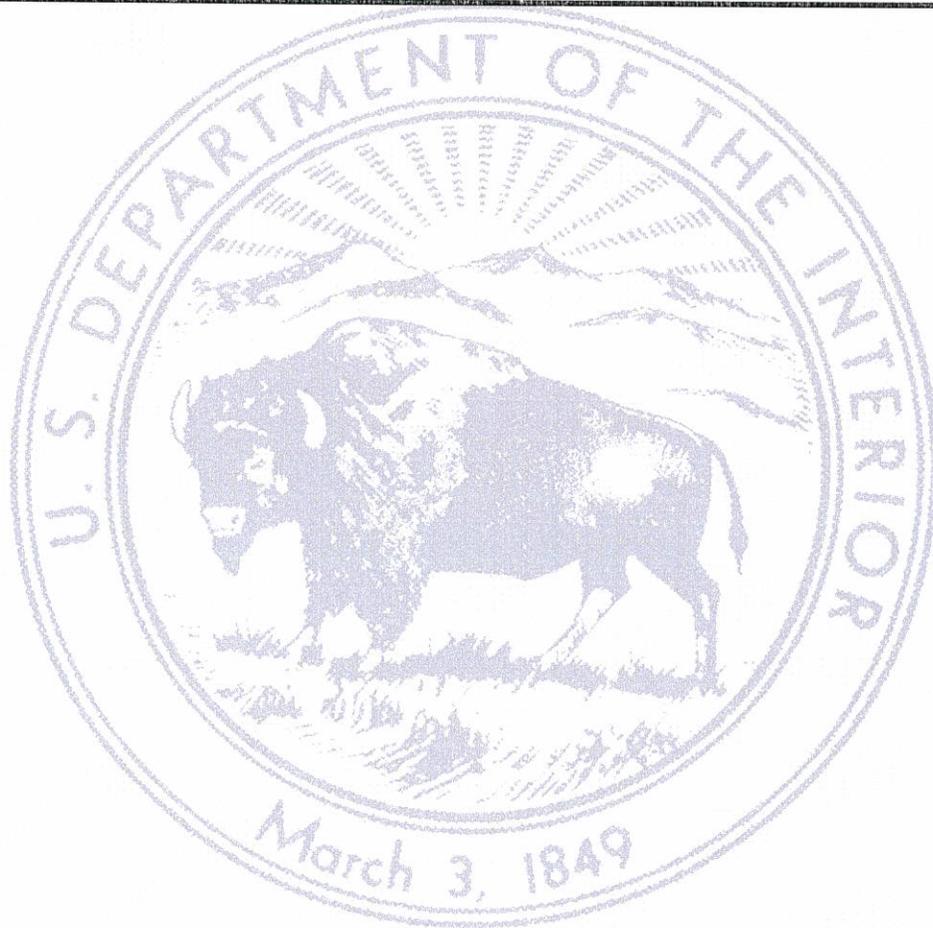
Field Supervisor
Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061



(804) 693-6694

P.19. For studies conducted in West Virginia:

Field Supervisor
West Virginia Ecological Services Field Office
694 Beverly Pike
Elkins, WV 26241
(304) 636-6586





Virginia Department of Game and Inland Fisheries

4010 West Broad Street, P.O. Box 11104, Richmond, VA 23230-1104

(804) 367-1000 (V/TDD)

Under Authority of § 29.1-412, § 29.1-417, & § 29.1-418 of the Code of Virginia



Scientific Collection Permit

Permit Type: **New** Fee Paid: **\$40.00** VADGIF Permit No. **051933**

Permittee: **Dave Yates**
Address: **Biodiversity Research Institute**
19 Flaggy Meadow Road
Gorham, ME 04038

Office: **(207) 839-7600**
City/County: **Out of State**

Contract Species Surveys

Authorized Collection Methods: **Harp Traps for Bats/Terrestrial Mist Nets (Bats/Birds)**
Authorized Waterbodies: **N/A**
Authorized Marking Techniques: **N/A**

Authorized Counties / Cities:
York
Norfolk

PERMIT AMENDMENT 5/18/2015: **This amendment adds the following:**
Authorized Subpermittees: **Amanda Bailey/Morgan Ingalls/Caroliine Byrnes/Chelsea Vosburgh**
Authorized Locations: **Naval Properties:**
Yorktown/Northwest/Norfolk/Oceana/Fentress/Fort Story/Dam Neck/Fort Eustis/Langley

Permittee **MUST** notify VDGIF a minimum of 7 days prior to each sampling event. Notification must be made via email to: collectionpermits@dgif.virginia.gov

Report Due: **31 January 2015, 31 January 2016**

ALL PERMIT REPORTS MUST CONTAIN COORDINATES; PERMITTEE CAN USE THE VIRGINIA FISH AND WILDLIFE INFORMATION SERVICE (VAFWIS) TO OBTAIN COORDINATES BY VISITING: [HTTPS://FWISWEB1.DGIF.VIRGINIA.GOV/FWIS/INDEX.HTML](https://fwisweb1.dgif.virginia.gov/fwis/index.html)

STANDARD CONDITIONS ATTACHED APPLY TO THIS PERMIT.

Authorized Species:

<u>Description</u>	<u>ID Number</u>	<u>Scientific Name</u>
Bats		

Annual Report Due End of Each Year

Authorized Sub-Permittees:
See Attached Sheet

Approved by:

Title: **James E. Husband - Permits Manager**

Applicants may appeal permit decisions within 60 days of issuance. The appeal must be in writing to the Director, Department of Game and Inland Fisheries.

Date: **5/18/2015**



Wildlife Collection License

FEB 23 2015

North Carolina Wildlife Resources Commission
Division of Wildlife Management
MSC 1722
Raleigh, NC 27699-1722

Phone: (919) 707-0060
Fax: (919) 707-0067

AUTHORITY
STATUTES
GS 113-261 & GS 113-272.4
RULES
15A NCAC 10B .0119

PERMITTEE/LICENSEE

DAVID YATES
19 FLAGGY MEADOW RD
GORHAM, ME 04038

PERMIT NUMBER

15-SC00949

EFFECTIVE

02/10/2015

EXPIRES

12/31/2015

COUNTY

DISTRICT

This license authorizes the collection of the following species:

Print Date: **02/11/2015**

-Bats

CONDITIONS AND AUTHORIZATIONS

This license authorizes the capture and temporary possession of the listed species.

Methods Authorized: Mist Netting

All species captured must be immediately released unharmed at the site of capture upon completion of data collection.

Must follow all current USFWS white-nose syndrome decontamination protocols and advisories and adhere to the North Carolina White-Nose Syndrome Surveillance and Response Plan.

Must coordinate with the appropriate Wildlife Diversity Biologist at least 48 hours prior to collecting activity commencing.

The licensee must maintain a copy of this license in their possession at all times during authorized collection activities.

Issuance of this license does not constitute permission to conduct collection activities on any public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning authorized collection activities.

This license neither directly nor by implication grants right of trespass.

A complete report is due at the time of renewal to be eligible for renewal. The report must be submitted through the online reporting system (<https://ncpaws.org/paws/>). Failure to submit the report may result in the license not being renewed.

Collection Location Authorized: STATEWIDE

This permit/license is non-transferable and expires at midnight on the above specified expiration date.

ISSUED BY:

TITLE:

Permits Supervisor

DAVID YATES

719 Moosehead Lake Rd
Greenville, ME 04441
(207) 491-4707

EDUCATION:

Bachelor of Science, Wildlife Biology and Management
Unity College, Unity, ME
Graduated May 1999

M.Sc., Conservation Biology
Antioch University New England
Graduated May 2006

SKILLS:

- Proficient in animal tagging and release methods
- Ability to identify bats of N. and C. America in and QIBS by USFWS and PA State
- HERO training
- Collected and prepared blood samples for contaminant analyses.
- Current DEA drug license
- Analyzed water quality of ponds, rivers and streams
- Experience using tranquilizers/sedatives
- B3 and HUET certificates for low level flights
- HAZWOPR training
- Trained in CPR and First Aid

EXPERIENCE:

- Biodiversity Research Institute – Research Biologist/Mammal Director, Gorham, ME* January 1998 -present
- Certified Indiana Bat Identifier for the state of PA and USFWS
 - Project Manager for Acadia National Park bat survey and tracking study
 - Project manager and conducted bat surveys for US Navy in VA and NJ
 - Lead Biologist Indiana bat surveys for Gas fracking and pipelines in PA
 - Project Manager/Lead Biologist for Maine IF&W Eco-region Surveys for bats for 5 years
 - Project Manager/Lead Biologists for bat mercury studies at superfund sites from VA to Maine involving U.S.F.&W.S.
 - Project Manager/Lead Biologist at 4 U.S. Fish and Wildlife NRDAR sites for bats and furbearers
 - Project Manager bat surveys at multiple National Wildlife Refuges in the northeast
 - Telemetry Coordinator Gulf Oil Spill Project for USFWS NRDAR bird injury assessment
 - Developed Scope of Work for USFWS NRDAR Gulf Oil Spill bird injury assessment
 - Coordinated aerial and ground tracking of more than 400 birds using multiple airplanes and satellite technology
 - Project Manager/Lead Biologist for FPL Maine Hydro. Beaver, muskrat, otter, and mink telemetry study
 - Project Manager/Lead Biologist for live trapping mink and otter study in Maine for state DEP (Master's thesis)
 - Project Manager/Lead Biologist for live trapping mink and otter study in Massachusetts for EPA and other superfund studies
 - Project Manager for Maine IF&W Ecoregion for three areas in Maine, birds and small mammals
 - Project Manager for common loon monitoring in northern and western Maine
 - Project Manager/Lead Biologist for National Park Service survey of small and large mammals of Appalachian Trail in Maine
 - Winter large carnivore tracking surveys for NPS and private landowner
 - Administered schedule III drugs for mink and otter study (Ketamine & Metomidine)
 - DEA Schedule II-III license
 - Researched recent trends of mercury and lead contaminants in the North American piscivorous bird's mammals.
 - Captured, banded and gathered mercury and lead level data in piscivorous birds.
 - Entered banding data into database for Biodiversity Research Institute data analysis.
 - Compiled banding data into official banding schedules for U.S. Fish & Wildlife Services.
 - Supervised banding of Common Loons, Eagles, Kingfishers and various other species.
 - Surveyed reservoirs and lakes for Common Loons, Kingfishers and other piscivorous birds.
 - Presented Mammal, Bat and Common Loon slide show to various organizations for educational purposes
 - Wrote reports for Loon productivity on Reservoirs for state and private agencies.
 - Proposed, designed and organized a mink and otter study for Maine Department of Environmental Protection.

Publications and Reports:

- Yates, David E., Evan M. Adams, Sofia E. Angelo, David C. Evers, John Schmerfeld, Marianne S. Moore, Thomas H. Kunz et al. Mercury in bats from the northeastern United States. *Ecotoxicology* 23, no. 1 (2014): 45-55.
- Nam, D.-H., Yates, D., Ardapple, P., Evers, D. C., Schmerfeld, J., & Basu, N. 2012. Elevated mercury exposure and neurochemical alterations in little brown bats (*Myotis lucifugus*) from a site with historical mercury contamination. *Ecotoxicology*, 12(4), 1094–1101
- Yates, D., K. Taylor, and C. Niven. 2008. Effects of Water Levels on Muskrat (*Ondatra zibethicus*) Populations within the West Grand Lake Project, Maine. Report BRI 2008-25 submitted to BIA and OA System Corporation, Amarillo, Texas. BioDiversity Research Institute, Gorham, Maine.
- Wada, H., D. Yates, D. Evers, R. Taylor, W. Hopkins. 2010. Tissue mercury concentrations and adrenocortical responses of female big brown bats (*Eptesicus fuscus*) near a contaminated river. *Ecotox.* 19:7 1277-84.
- Yates, D., S. Angelo, T. Divoll and D.C. Evers, 2009. Assessment of mercury exposure to bats at Onondaga Lake, New York. Report BRI 2010-11 submitted to U.S. Fish and Wildlife Service, Cortland, NY. BioDiversity Research Institute, Gorham, Maine, 44 pp.
- T. Divoll, D. Yates, D.C. Evers, 2008. Pilot assessment of mercury exposure to bats at Onondaga Lake, New York. Report BRI 2009-10 submitted to U.S. Fish and Wildlife Service, Cortland, NY. BioDiversity Research Institute, Gorham, Maine, 44 pp.
- Yates, D., S.E. Angelo, M.W. Goodale and D.C. Evers. 2011. Bat Mercury Study Examining Footprint Area and Downstream: South River, Virginia - 2009. Report BRI 2009-10 submitted to DuPont Corporate Remediation Group, Newark, Delaware and the U.S. Fish Wildl. Serv., Gloucester, Virginia. BioDiversity Research Institute, Gorham, ME. 57pp.
- Yates, D., M. Moore, T. Kunz, and D.C. Evers 2008. Pilot assessment of methylmercury availability to bats on the South River, Virginia - 2008. Report BRI 2009-16 submitted to DuPont Corporate Remediation Group, Newark, Delaware and the U.S. Fish Wildl. Serv., Gloucester, Virginia. BioDiversity Research Institute, Gorham, ME. 47pp.
- Yates, D., D.C. Evers, and D. Meattay. 2008. Pilot assessment of methylmercury availability to muskrat and shrews on the South Fork River, Virginia - 2008. Report BRI 2009-21 submitted to the U.S. Fish Wildl. Serv., Gloucester, Virginia. BioDiversity Research Institute, Gorham, ME.
- Yates, D., W. Goodale, M. Holden, and D. Evers. 2008. Home ranges size in relation to water level fluctuations in river otter, muskrat, mink and beaver on Brassua Lake and surrounding waterbodies. Report BRI 2008-18 submitted to FPL Energy Maine Hydro. BioDiversity Research Institute, Gorham, Maine.
- Yates, D. and D.C. Evers. 2007-6. Small Mammals and Bat Inventory of the Appalachian Trail in Maine-2006. Report BRI 2007-6 submitted to the Maine Natural Areas Program and NPS. BioDiversity Research Institute, Gorham, ME.
- Yates, D., H. Wada, M. Moore, B. Hopkins, T. Kunz, and D.C. Evers 2007. Pilot assessment of methylmercury availability to bats on the South River, Virginia - 2007. Report BRI 2008-08 submitted to DuPont Corporate Remediation Group, Newark, Delaware and the U.S. Fish Wildl. Serv., Gloucester, Virginia. BioDiversity Research Institute, Gorham, ME. 42pp.
- Yates, D., D.C. Evers, and L. Savoy. 2004. Developing a mercury exposure profile for mink and river otter in Maine. Report BRI 2004-09 submitted to Maine Department of Environmental Protection and Maine Inland Fisheries and Wildlife. BioDiversity Research Institute, Gorham, Maine.
- Yates, D. E., D.T. Mayack, K. Munney, D.C. Evers, A. Major, T. Kaur, and R.J. Taylor. 2005. Mercury levels in mink (*Mustela vison*) and river otter (*Lontra canadensis*) from northeastern North America. *Ecotoxicology* 14:263-274.
- Yates and D.C. Evers. 2007. Pilot assessment of methylmercury availability to furbearers on the North Fork of the Holston River, Virginia - 2005. Report BRI 2007-10 submitted to the U.S. Fish Wildl. Serv., Gloucester, Virginia. BioDiversity Research Institute, Gorham, ME.
- Yates, D., and D.C. Evers. 2006. Assessment of bats for mercury contamination on the North Fork of the Holston River, VA- 2005. Report BRI 2006-9. BioDiversity Research Institute, Gorham, ME.
- Yates, D.E. and D. Evers. 2005. An overall assessment of the loon population at Lake Umbagog National Wildlife Refuge: Investigations into individual-specific demographics and assessment of individual and population health. Report BRI 2004-13 BioDiversity Research Institute, Gorham, Maine. 17pp.
- Yates, D., D.C. Evers, and W. Goodale. 2006. Monitoring of breeding Common Loons: West Branch of the Penobscot River area - 2005. Report BRI 2006-05. BioDiversity Research Institute, Gorham, ME. pp.30
- Yates, D., D.C. Evers, W. Goodale, and W. MacCabe. 2005. Monitoring of breeding Common Loons: West Branch of the Penobscot River area - 2004. Report BRI 2005-10. BioDiversity Research Institute, Gorham, ME. 27 pp.
- Yates, D., L. Savoy, D. Evers, C. DeSorbo, W. Goodale, L. Attix, A. Paul, C. Niven, E. Saxson, and M. Nelson. 2005. Documentation of the reproductive success of the Common Loon on selected lakes in the Rangeley Lakes and Eagle Lake Regions in 2004. Report BRI 2005-06 submitted to the New England Forestry Foundation. BioDiversity Research Institute, Gorham, ME. 60p.

Morgan K. Ingalls

367 Rice Farm Road
Dummerston, VT. 05301
(802) 254-2988
morgan.ingalls@briloon.org

Education:

Antioch University New England

Keene, NH

Master of Science in Environmental Studies/Conservation Biology, 2014

Thesis Title: *Estimating Little Brown Bat Winter Mortality Rates from White-Nose Syndrome at Aeolus Cave in Dorset, Vermont using PIT Tag Technology*

Marlboro College

Marlboro, VT

Bachelor of Science in Biochemistry, 2010

Thesis Title: *Mysterious Mortalities: A study of White-Nose Syndrome and *G. destructans* from a molecular biology perspective*

Skill Sets:

- **Supervisory Skills:** Teaching and overseeing others in both laboratory and field settings
 - **Animal Handling Skills:** Removal of bats from net; Species identification and biometrics; Attachment of bands; Collection of blood samples, wing punches, hair samples, etc.
 - **Radio Telemetry Skills:** Attachment of radio transmitters to animals; Programming of receivers; Interpretation of radio telemetry signals in difficult terrain
 - **Data Management and Analysis Skills:** Appropriate use of statistical tests; Large data set management; Geographical Information Systems; Laboratory analysis of molecular products
 - **Project Design Skills:** Co-designed study investigating RNA regulation in cells exposed to *Pseudogymnoascus destructans*; Co-designed study to assess over-winter survivorship of Little Brown bats at Vermont's largest hibernaculum
 - **Leadership Skills:** Group management and logistics; Collaborative planning; Communication
 - **Caving and Outdoor Skills:** National Cave Rescue Commission Level 1 Certification; Six years of caving experience; Familiarity with single rope technique
 - **Computer Skills:** Familiarity with Microsoft Office, ArcGIS, JMP, and Sonobat
-
-

Relevant Work Experience:

Wildlife Biologist

Biodiversity Research Institute

Portland, ME

- Oversee field staff
- Supervise and participate in live capture of bats
- Supervise and participate in radio tracking of bats
- Analyze data and write/contribute to reports

May 2015 - Present

Bat Technician

Biodiversity Research Institute

Portland, ME

- Set up and broke down mist-nets, removed bats from nets
- Species ID and biometrics, attachment of radio transmitters to animals
- Used radio telemetry to determine day roosts and foraging areas for target species
- Managed the data that was gathered from the project

July 2014 – October 2014

Intern

Summer 2012 – Summer 2013

Biodiversity Research Institute

Portland, ME

- Participated in several bat banding projects at Great Bay NWR, Parker River NWR, and Acadia National Park
- Identified bats by species, determined sex, age, and reproductive status, and measured hind foot, ear, tragus, and forearm
- Used radio telemetry to determine day roosts of *Myotis leibii* and *Myotis septentrionalis*
- Analysis and writing of report

Volunteer

Winter 2010, 2011, & 2014

New York Department of Environmental Conservation

Albany, NY

- Helped conduct bat counts in Merlin's Cave, Dragon Bones Cave, Surprise Cave, and Haile's Cave

Volunteer

Winter 2009, 2010, 2011, & 2014

Massachusetts Division of Fisheries and Wildlife

Dalton, MA

- Helped conduct bat counts in Bat's Den, Crystal Pool, and Red Bat Caves

Freshman Orientation Program Trip Leader

Fall 2008, 2009, & 2010

Marlboro College

Marlboro, VT

- Designed and co-led six to nine day wilderness trips for six to eight incoming students
- Took part in extensive leadership and logistics training prior to running trips
- Led or co-led day long caving trips for students during the school year

Laboratory Assistant

Fall 2008 – Summer 2010

Marlboro College

Marlboro, VT

- Helped with chemical inventory and organization of MSDS
- Assisted with general laboratory organization and upkeep
- Assisted with preparation and running of General Biology Laboratory and General Chemistry Laboratory
- Helped to implement changes to laboratory safety procedures

Research Assistant to Prof. Todd Smith, PhD.

Summer 2008 & Summer 2010

Marlboro College

Marlboro, VT

- Research on anti-freeze glycoproteins in Atlantic Cod
- Analyzed cod serum samples using SDS-PAGE
- Quantified samples using a BSA protein assay

Office Manager and Production Coordinator

2007 – 2008

Yellow Barn Music School & Festival

Putney, VT

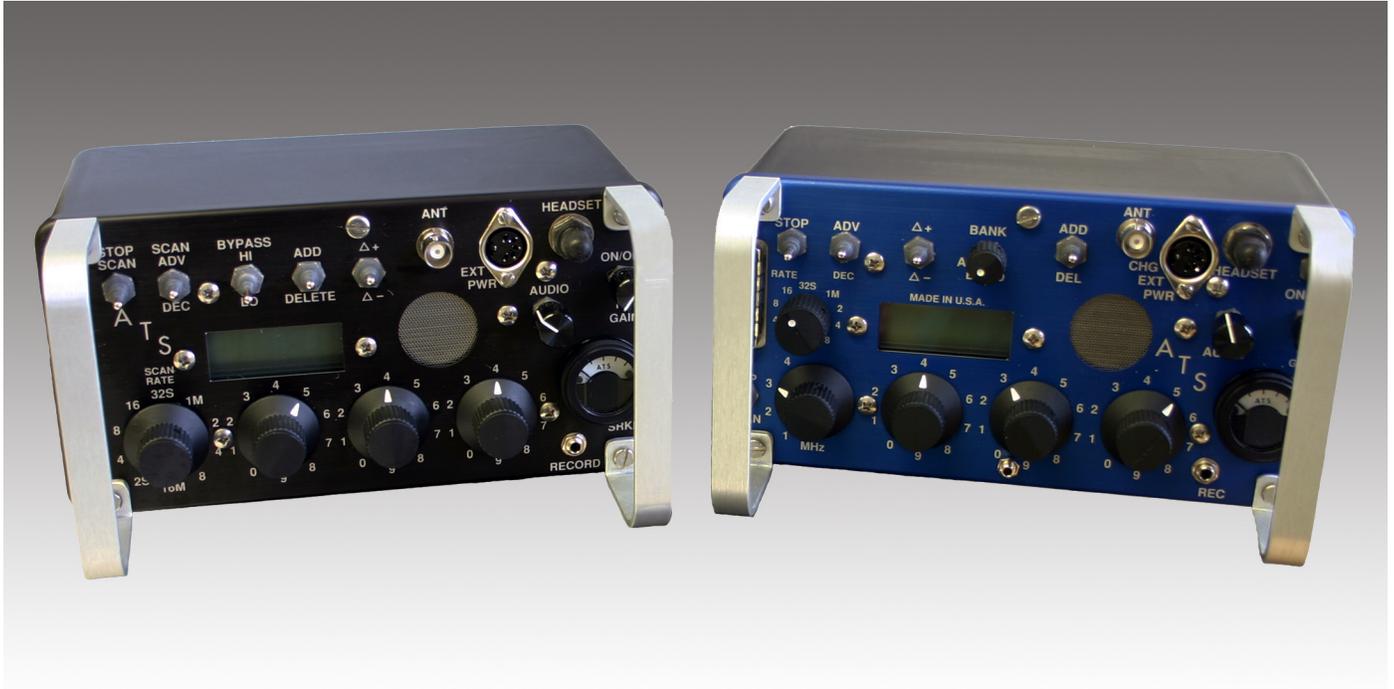
- Processed and organized student applications
 - Organized and implemented mailings
 - Organized audio archives
-
-

APPENDIX D
RECEIVER AND TRANSMITTER SPECIFICATIONS

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ATS R2000 / R4000 Scientific Receivers

Finding Solutions. Delivering Results.



With performance features and proven reliability, these receivers are an exceptional value.

ATS models R2000 and R4000 are excellent receivers for most aerial, terrestrial and aquatic studies. They offer leading edge technology and outstanding performance.

Both models feature programmable, automatic or manual scanning over a 2 MHz or 4 MHz frequency range. Their 1 kHz channel spacing tracks up to 200 or 400 targets. The user-friendly front panel gives the operator full control over all functions including scan rate, add/delete frequencies, RF gain, audio level, tone decoder threshold, and more. Both units feature state-of-the-art circuitry for exceptional sensitivity, frequency stability, and low noise.

Both receivers are designed for easy field operation. Their large 1/2" LCD display is backlit for night use. A padded Nylon case, battery charger, power cord and detailed operation manual are included with each receiver.

The R2000 and R4000 are lightweight, compact and ruggedly built to withstand heavy field use and extreme environmental conditions. Each can be powered by an external 12 volt DC battery or its own built-in NiCad battery pack for up to 8 hours of use.

ATS R2000 and R4000 receivers offer high performance with high value.

- 2 or 4 MHz Frequency Range
- 1 kHz Channel Spacing
- Improved RF Gain Control For More Precise Direction Finding
- Excellent Frequency Stability
- High Sensitivity/Low Noise
- Sensitive Signal Meter
- Ruggedly Built For Field Use
- Easy Operation
- 4 Distinct Memory Banks (R4000)
- Built-in Computer Interface (R4000)
- Delta Tune Drift Compensation
- Rechargeable NiCad Batteries
- Separate RF Gain And Audio Level Controls
- Battery-Backed Memory
- Auto-Shut Off On Low Battery For Longer Battery Life

TRANSMITTERS
RECEIVERS
GPS SYSTEMS


ADVANCED TELEMETRY SYSTEMS

ANTENNA SYSTEMS
CODED ID SYSTEMS
CONSULTING

Finding Solutions.
Delivering Results.



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CONSULTING



ADVANCED TELEMETRY SYSTEMS

470 FIRST AVE N • BOX 398 • ISANTI, MN 55040

763-444-9267 • 763-444-9384 fax

email:sales@atstrack.com • www.atstrack.com

ATS R2000 / R4000 Scientific Receivers

GENERAL

- Frequency range: R2000 Any Specified 2 MHz range from 30 to 220 MHz
R4000 Any Specified 4 MHz range from 140 to 220 MHz
- Channel spacing: 1 kHz
- Input impedance: 50 ohms
- Minimum discernible signal (MDS): -150 dBm (0.007 uv into 50 ohms)
- Noise figure: 3 dB maximum
- Speaker: 8 ohms
- Tone decoder detection range: ± 2 kHz (Model R4000)
- Tone decoder detection level: -120 dBm minimum (Model R4000)
- Frequency stability: ± 1 kHz -20°C to +50°C
- Delta tune: +4 kHz; -4 kHz
- IF frequency: 10.7 MHz
- IF bandwidth: 6 dB ± 2 kHz; 80 dB ± 7 kHz
- Image rejection: >150 dB
- RF gain control range: >130 dB
- Operating voltage range: 9 to 18 volts DC
- Dwell time (scan rate): Selectable, 2 sec. to 16 min. (10 positions)

CONTROLS

- Frequency selectors (4)
- Audio level
- Delta tune
- RF gain
- Increment frequency up/down
- Tone decoder threshold (R4000)
- Memory bank select (R4000)
- Auto scan/memory bypass
- Receiver on/off
- Dwell time (scan rate)
- Add-delete to memory
- Stop scan

MEMORY

- All frequencies programmable in each bank
- Four distinct banks (R4000)
- Sequentially scanned
- Battery backed
- Delete all frequencies in each bank
- Delete frequencies individually with single switch while scanning or on standby

DISPLAYS

- Selected frequency: LCD (0.5" digits) with backlight for night use
- Memory status: Colon in display indicates frequency stored in memory
- Battery status: "Lo Bat" indicator flashes when battery voltage is low
- Signal detection: "+" present in display indicates detection by tone decoder (R4000)
- Signal level: 0-1 mA meter

CONNECTIONS

- Antenna: BNC - female
- Headset: Receptacle for 0.25" phone plug
- Signal level: 0.125" phone receptacle for external 0.1 mA current meter
- External power/recharge receptacle: 5-pin DIN
- Computer interface (R4000): 25-pin D-sub filtered connection (socket)

POWER

- 12 volts DC nominal: 130 mA drain nominal
- Internal: 1.2 amp-hour NiCad battery pack; 8-hour nominal operating time
- External: 9 to 18 volts, negative ground; switches automatically to external power

COMPUTER INTERFACE (R4000)

- 4 digits BCD (active high)
- Computer control select
- 5 volt DC regulated (5 mA max.)
- 12 volt DC unregulated
- Tone decoder output (active low)
- Signal strength

PHYSICAL

- Size: 11 cm wide x 21 cm long x 18 cm high (4.3" x 8.3" x 7")
- Weight: 2.3 kg (5 lbs)
- Accessories (included): External power cord, battery charger, padded nylon case, instruction manual
- Accessories (optional): David Clark aviation-grade headset, DC-DC charger, external battery pack

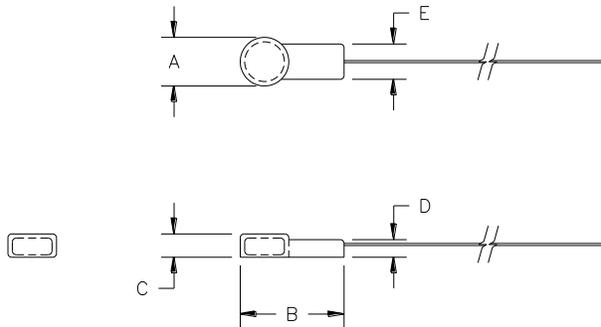
ENVIRONMENTAL

- Operating temperature: -20°C to +50°C
- Storage temperature: -70°C to +60°C
- Humidity: 95% non-condensing

WARRANTY

- One year parts and labor on materials and workmanship

2011 ATS, all rights reserved. Features and specifications subject to change without notice.



Technical Specifications

Transmitter type:	Crystal controlled 2-stage
Calibration tolerance:	±2.5kHz
Frequency stability:	±2.5kHz, -20°C to 40°C
Pulse rate and width:	Typical on time 15ms, off time 1.5-4.0sec (controlled by astable circuit)
Pulse rate variation:	5%/volt, ± 20% for temperatures -20°C to +40°C
Battery:	Silver Oxide
Activation:	By removing magnet
Encapsulation:	Electrical resin, water-proof, specific gravity: 1.12

MODEL	BATTERY	BATTERY CAPACITY (days)				DIMENSIONS (mm)					WEIGHT (grams)	PRICE GROUP
		15 ppm	24 ppm	30 ppm	40 ppm	A	B	C	D	E		
	1.5V											
A2412	410	22	15	12	9	5	12	1.5	2.5	4	0.20	F
A2414	337	45	30	24	18	5	12	3	2.5	4	0.30	C
A2415	337	45	30	24	18	5	13	3	4	5	0.50	A
A2426	317	68	45	36	28	6	14	3	4	5	0.65	A
A2435	319	90	60	48	37	6	14	4	4	5	0.75	A
A2445	377	135	89	72	55	7	15	4	4	5	0.90	A
A2455	392	216	143	116	88	8	16	5	4	5	1.20	A

Above models available only in 48.00-50.66MHz, 144.06-151.98MHz, and 164.00-167.99MHz ranges.

Warranty life is 50% of battery capacity.

470 First Ave. No., Box 398 • Isanti, MN 55040
763.444.9267 • fax:763.444.9384 • sales@atstrack.com • www.atstrack.com

Model A2405 Compliance to FCC Part 15 Regulations

This note certifies that Advanced Telemetry Systems, Inc. series A2405 transmitters in frequency range 048.00 – 167.999 comply with regulations under FCC Part 15.231 for periodic operation. Periodic operation describes the pulsing mode these units use. The attached antenna may not be altered or the unit may no longer be in compliance.

Regulations under Part 15.5 also apply making them exempt from FCC licensing requirements. These in general state that these devices are secondary users and as such must accept possible interference from other authorized users of the frequency.

Regarding the power output for these transmitters: the power output is less than one milliwatt. (-0.5dBm) when operational with the magnet removed.

Larry B. Kuechle

Engineer
Advanced Telemetry Systems, Inc.
470 1st Avenue North
Isanti, MN 55040

APPENDIX E
MIST-NET COORDINATES AND CAPTURE DATA

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Site Name	NWA 1	NWA 2	NWA 3	NWA 4	NWA 5	NWA 6	NWA 7
State	VA	VA	NC	VA	NC	NC	VA
County	Chesapeake	Chesapeake	Currituck	Chesapeake	Currituck	Currituck	Chesapeake
Town	Chesapeake	Chesapeake	Moyock	Chesapeake	Moyock	Moyock	Chesapeake
Datum	WGS84	WGS84	WGS84	WGS84	WGS84	WGS84	WGS84
Net A Lat	36.56296	36.5643	36.541759	36.568776	36.544979	36.547188	36.56939
Net A Long	-76.27398	-76.27476	-76.272390	-76.266806	-76.263325	-76.27354	-76.27348
Net B lat	36.563	36.56467	36.541551	36.568930	36.545487	36.543961	36.57015
Net B Long	-76.27454	-76.27447	-76.271227	-76.266633	-76.262445	-76.27354	-76.27317
Net C Lat	36.56414	36.5674	36.541472	36.569340	36.545348	36.54717	36.57124
Net C Long	-76.27654	-76.27433	-76.270846	-76.266608	-76.262308	-76.274366	-76.27277
Net D Lat			36.541429	36.569026	36.546163	36.54717	
Net D Long			-76.270307	-76.266441	-76.262782	-76.274366	
Net E Lat				36.569396	36.54631	36.54766	
Net E Long				-76.266275	-76.263538	-76.274568	
Capture Technique	2, 9m triple highs; 1 6m triple high	1, 12m triple high; 1, 9m triple high; 1, 6m triple high	2, 6m triple highs; 1, 9m triple high; 1, 6m single high	1, 12m triple high; 1, 9m triple high; 1 6m triple high; 2, 6m single highs	2, 6m triple highs; 1, 9m triple high; 2, 6m single highs	2, 6m triple highs; 1, 9m triple high; 2 6m single highs	3, 6m triple highs
Net nights	3	3	4	5	5	5	3
Habitat	Loblolly Pine, Sweet Gum, Red Maple, Switch Grass, Greenbrier	Loblolly Pine, Sweet Gum, Red Maple, Switch Grass, Greenbrier	Sweet Gum, Poison Ivy, Loblolly Pine, Red Maple, Switch Grass, Greenbrier	American Beech, Water Oak, Sweet Gum, Tulip Tree, Spice Bush	Switch grass, Sweet Gum, Loblolly Pine, Red Maple, Greenbrier	Loblolly Pine, Sweet Gum, Red Maple, Switch Grass, Greenbrier	Loblolly Pine, Sweet Gum, Red Maple, Switch Grass, Greenbrier

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Site Name	Net name	Date	Start Time	Start Temp	End Time	End Temp	% Clouds	Wind	Precip	% Moon	Time	Species	Age	Sex	Reproductive Status	RFA (mm)	Mass (g)	Ear (mm)	Samples	RS	Band	Notes
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	1:00	PESU	A	F	Pregnant	33.5	10.2	11		0	DEY 4721	
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	1:29	MYLU	A	F	Pregnant	35.9	8.4	10.1		0	DEY4722	
NWA 1		6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	1:30	LABO	Unk	Unk	Unk	Unk	Unk	Unk		Unk		Flew the net
NWA 1		6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	1:30	LABO	Unk	Unk	Unk	Unk	Unk	Unk		Unk		Flew the net
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:02	EPFU	A	M	non-reproductive	5.5	15.5			0	dey1065	
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:02	PESU	A	F	Pregnant	34.1	7.8			0	DEY4709	
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:05	MYSE	A	F	non-reproductive	34.1	6.5	14		0	DEY4712	transmitter frequency 148.913
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:20	MYAU	A		Pregnant	36	7.5			0	DEY4710	
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:20	MYLU	A	M	Testes descended	37.1	7.1	12		1	DEY4711	
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:43	MYAU	A	F	non-reproductive	36.6	8.4	9.5		0	DEY4713	
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	22:08	MYAU	A	F	non-reproductive	36.1	7.8	10.1		1	DEY 4715	
NWA 1	B	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	22:23	LABO	A	F	Pregnant	41.9	20.1	8		0	DEY1067	
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	22:40	MYSE	A	F	Lactating	36.7	6.7	16		0	DEY4718	transmitter frequency 148.783
NWA 1	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	22:40	MYSE	A	F	Pregnant	34.8	7.3	16		0	DEY4719	transmitter frequency 148.733
NWA 2	A	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	1:30	MYAU	A	M	non-reproductive	39.7	9.6	9		0	DEY4723	
NWA 2	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	1:30	MYAU	A	F	Lactating	48.7	10.1	10		0	DEY4724	
NWA 2	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:52	MYAU	A	F	non-reproductive	39.7	9.7	8		0	DEY4716	
NWA 2	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:58	LABO	A	F	non-reproductive	40.7	20.2	6		0	DEY1066	
NWA 2	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	21:58	PESU	A	F	Pregnant	32.8	8.3	10		1	DEY4714	
NWA 2	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	22:33	MYAU	A	F	Pregnant	37.8	9.3	11		0	DEY4717	
NWA 2	C	6/1/2015	20:30	85	1:30	82	30	0 mph	none	100	23:40	MYAU	A	M	non-reproductive	34.6	7.1	10		0	DEY4720	
NWA 3	A	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	21:15	LABO	A	F	Pregnant	41.15	20.8	10		0	DEY1068	
NWA 3	A	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	21:15	MYAU	A	F	Lactating	37.7	9.6	10		0	DEY4725	

NWA 3	A	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	21:45	MYAU	A	F	Pregnant	36.5	8.1	10		0	DEY4726	
NWA 3	A	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	21:45	MYAU	A	F	Lactating	####	10.3	8		0	DEY4727	
NWA 3	A	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	21:45	MYAU	Unk	Unk	Unk	Unk	Unk	Unk		Unk		Flew the net
NWA 3	A	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	22:15	MYAU	Unk	F	Unk	Unk	Unk	Unk		Unk		Let go due to injured wing joint.
NWA 3	B	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	22:40	MYAU	A	F	Lactating	38.9	10	11		0	DEY4728	
NWA 3	D	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	22:40	PESU	A	M	Non-reproductive	33.3	8.8	14		0	DEY4730	
NWA 3	A	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	23:15	MYSE	A	F	Lactating	33.7	7.4	15	hair	0	DEY4730	freq: 148.844
NWA 3	A	06/03/2015	20:30	66	00:00 (rained out)	64	100	1-3 mph	Drizzle	99	23:55	MYSE	Unk	Unk	Unk	Unk	Unk	Unk		Unk		Flew the net
NWA 4	E	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	0:16	MYSE	A	F	Pregnant	36.2	8.7	12.5		0	DEY4888	
NWA 4	B	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	01:22	MYAU	A	F	Pregnant	38.1	8.6	10		0	DEY4877	
NWA 4	E	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	1:25	MYSE	A	F	Lactating	38.9	7.8	16		0	DEY4889	
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	20:34	EPFU	A	F	Lactating	48	17.1	9.6		0	DEY1406	Swollen, bloody genitals. See pic
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	20:35	EPFU	A	F	Lactating	45.4	14.5	11		0	DEY1407	
NWA 4	D	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	20:55	EPFU	A	F	Lactating	48.1	19.8	15.5		0	DEY1408	Swollen and bloody genitals...See pic
NWA 4	C	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	21:06	CORA	A	M	Testes Descended	41.1	8.3	27.5		0	DEY4867	
NWA 4	A	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	21:08	MYAU	Unk	Unk	Unk	Unk	Unk	Unk		Unk		flew the net
NWA 4	D	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:20	EPFU	A	F	Pregnant	37.1	26.6	13.4		0	Dey1409	
NWA 4	B	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	21:25	MYAU	A	M	Testes Descended	37.5	7.7	12		0	DEY4869	
NWA 4	E	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:25	MYSE	A	F	non-reproductive	34.6	6.6	18		0	DEY4883	freq 148.902
NWA 4	E	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:25	MYAU	A	F	Lactating	38.5	7.6	9		0	DEY4882	

NWA 4	D	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:27	MYAU	A	M	non-reproductive	35.6	7.2	9		0	DEY4880	
NWA 4	E	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	21:28	MYAU	A	F	Lactating	37.6	7.3	11		0	DEY4868	
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:30	EPFU	A	F	Lactating	46.6	20.7	13.9		0	DEY1411	
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:30	EPFU	A	F	Pregnant	47	19.8	14		0	DEY1412	
NWA 4	B	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:30	EPFU	A	M	non-reproductive	44.5	17	14		1	DEY1410	
NWA 4	E	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:35	MYAU	A	F	Pregnant	38.5	8.4	12		0	DEY4979	
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	21:40	MYAU	A	F	Pregnant	36.8	8.8	9		0	DEY4881	Recaptured at 00:15 in net E--- hole in wing from band. Band removed
NWA 4	4(a)	6/7/2015	20:30	72	1:30	61	0	0 mph	none	67	21:42	EPFU	A	F	Pregnant						DEY1409	recapture from last night
NWA 4	4(a)	6/7/2015	20:30	72	1:30	61	0	0 mph	none	67	21:42	EPFU	A	M	Testes descended	41.7	14.7	12		0	DEY1413	
NWA 4	D	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	21:50	MYSE	A	F	Pregnant	35.6	7.2	15		0	DEY4871	boil-like lumps on ears
NWA 4	E	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	21:50	MYAU	A	M	Testes Descended	37.4	6.9	12		0	DEY4870	
NWA 4	E	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	22:00	MYAU	A	F	Pregnant	38.5	9.4	7.7		0	DEY4886	
NWA 4	4(a)	6/7/2015	20:30	72	1:30	61	0	0 mph	none	67	22:10	EPFU	A	F	Pregnant	46.7	20.4	14		0	DEY1414	
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	22:10	MYAU	A	F	Pregnant	38	9.9	9		0	DEY4884	
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	22:10	MYAU	A	F	Pregnant	37.8	8.9	6		0	DEY4885	
NWA 4	B	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	22:10	MYAU	A	F	Lactating	36.2	9.7	11.5		0	DEY4872	
NWA 4	B	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	22:10	PESU	A	M	Testes Descended	33.1	6.4	10		1	DEY4873	
NWA 4	4(a)	6/7/2015	20:30	72	1:30	61	0	0 mph	none	67	22:20	EPFU	A	F	Pregnant	45	15	14		0	DEY1415	
NWA 4	B	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	22:37	PESU	A	F	Pregnant	35.2	8.4	10.5		0	DEY4874	
NWA 4	B	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	22:50	EPFU	A	F	Pregnant	47.6	21.8	13		0	DEY1405	
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	22:58	PESU	A	M	Testes descended	34.4	6.1	8		0	DEY4878	
NWA 4	B	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	23:11	MYAU	A	M	Testes Descended	36.7	7	9.5		0	DEY4875	
NWA 4	A	6/6/2015	20:30	70	1:30	65	10	1-3 mph	none	78	23:15	MYSE	A	F	Pregnant	34	8.8	17		0	DEY4887	

NWA 4	E	06/05/2015	20:30	68	1:30	66	100	1-3 mph	none	91	23:22	MYAU	A	F	Pregnant	36.3	9.3	10.5		0	DEY4876		
NWA 5	-	06/06/2015	20:30	70	1:30	65	10	1-3 mph	none	78	NO BATS	-	-	-	-	-	-	-	-	-	-	-	-
NWA 6	B	06/07/2015	20:30	72	1:30	61	0	0 mph	none	67	00:15	CORA	A	M	Testes Descended	40	5.8	30		0	DEY4750		
NWA 6	B	06/07/2015	20:30	72	1:30	61	0	0 mph	none	67	21:15	LABO	A	M	Non-reproductive	36.5	Unk	8.6		0		Funky looking wing-let go.	
NWA 6	B	06/07/2015	20:30	72	1:30	61	0	0 mph	none	67	21:15	EPFU	A	M	Testes Descended	44.9	10.4	12		1	DEY1072		
NWA 6	B	06/07/2015	20:30	72	1:30	61	0	0 mph	none	67	22:20	MYAU	A	F	Lactating	46.2	5.4	10		0	DEY4733		
NWA 6	B	06/07/2015	20:30	72	1:30	61	0	0 mph	none	67	22:20	NYHU	A	M	Testes Descended	34	6.3	11		0	DEY4734		
NWA 6	E	06/08/2015	20:30	79	1:30	74	25	1-3 mph	none	63	22:30	MYAU	A	F	Pregnant	37.4	5.9	12		0	DEY4738		
NWA 6	B	06/08/2015	20:30	79	1:30	74	25	1-3 mph	none	63	22:45	MYAU	A	F	Lactating	36.8	5.5	11		0	DEY4737		
NWA 6	B	06/08/2015	20:30	79	1:30	74	25	1-3 mph	none	63	22:51	LABO	Unk	Unk	Unk	Unk	Unk	Unk		Unk		Flew the net	
NWA 6	B	06/07/2015	20:30	72	1:30	61	0	0 mph	none	67	23:00	MYAU	A	F	Lactating	36.5	5.1	11		0	DEY4726	recap. Removed band due to damage.	
NWA 6	B	06/07/2015	20:30	72	1:30	61	0	0 mph	none	67	23:32	MYAU	A	M	Testes Descended	34.5	4.8	11		0	DEY4735		
NWA 6	E	06/07/2015	20:30	72	1:30	61	0	0 mph	none	67	23:45	MYAU	A	M	Testes Descended	36.7	4.8	13		0	DEY4736		
NWA 7	A	6/8/2015	20:30	80	1:30	75	0	4-7 mph	none	57.3	1:32	LABO	A	F	non-reproductive	39.5	12.3	13		1			
NWA 7	A	6/8/2015	20:30	80	1:30	75	0	4-7 mph	none	57.3	1:37	MYSE	Unk	Unk	Unk	Unk	Unk	Unk		Unk		Escaped	
NWA 7	C	6/8/2015	20:30	80	1:30	75	0	4-7 mph	none	57.3	21:00	MYLU	A	F	non-reproductive	35.8	8.3	10		0	DEY4899		
NWA 7	A	6/8/2015	20:30	80	1:30	75	0	4-7 mph	none	57.3	21:55	MYLU	A	F	Lactating	37.9	8.3	7.8		0	DEY4890		

APPENDIX F
MIST-NET PHOTO LOG

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Base: Northwest Annex	Site # 1	Net # A	Lat: 36.56296	Long: -76.27398
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Base: Northwest Annex	Site # 1	Net # B	Lat: 36.563	Long: -76.27454
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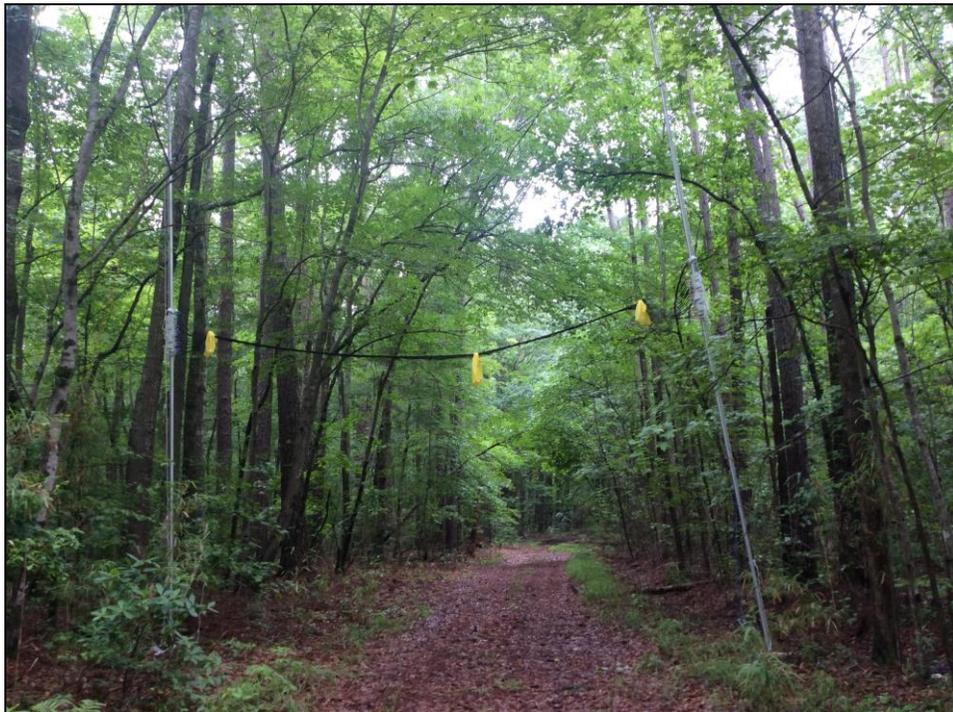
Base: Northwest Annex	Site # 1	Net # C	Lat: 36.56414	Long: -76.27654
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Base: Northwest Annex	Site # 2	Net # A	Lat: 36.5643	Long: -76.27476
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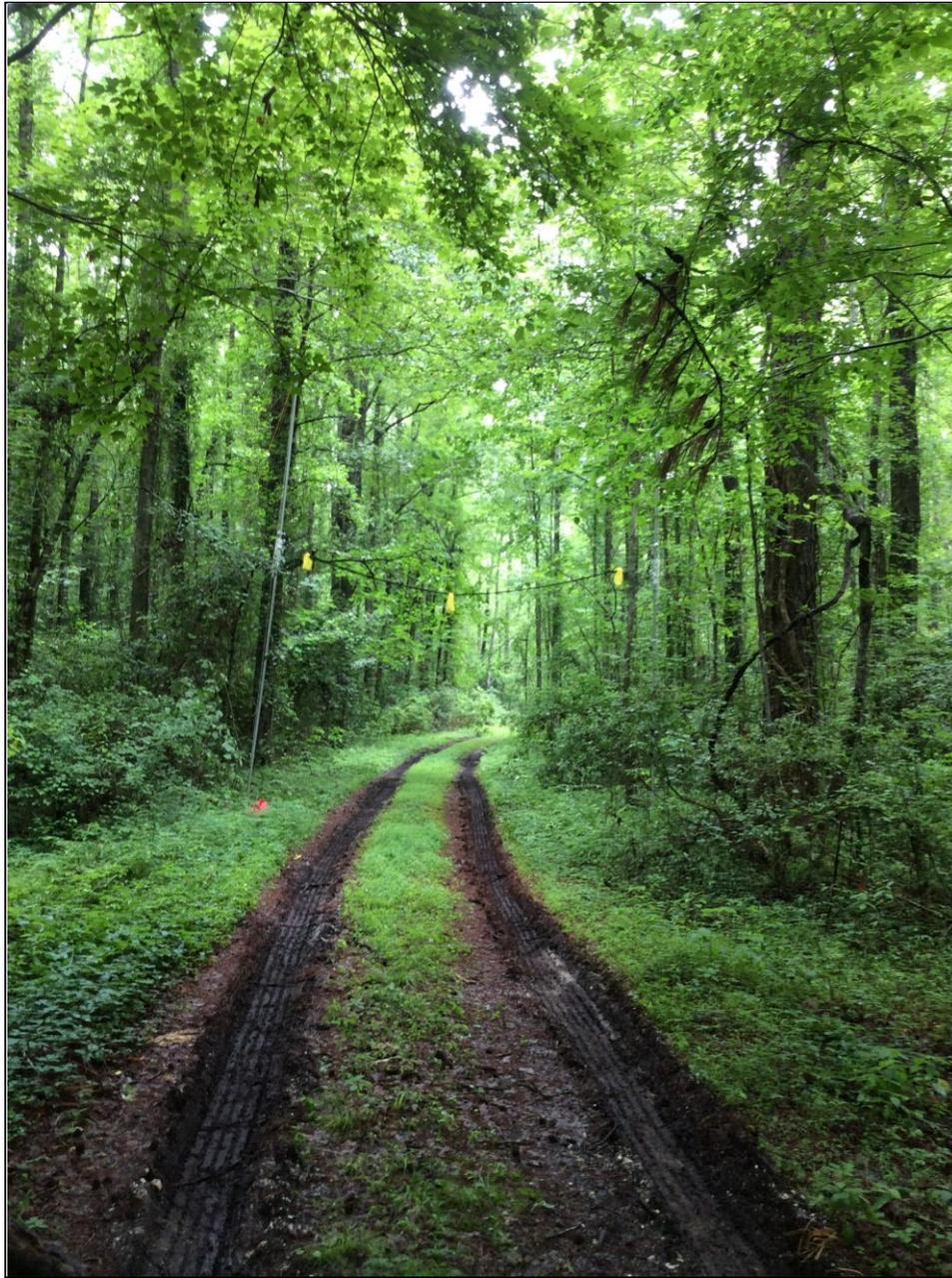
Base: Northwest Annex	Site # 2	Net # B	Lat: 36.56467	Long: -76.27447
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Base: Northwest Annex	Site # 2	Net # C	Lat: 36.5674	Long: -76.27433
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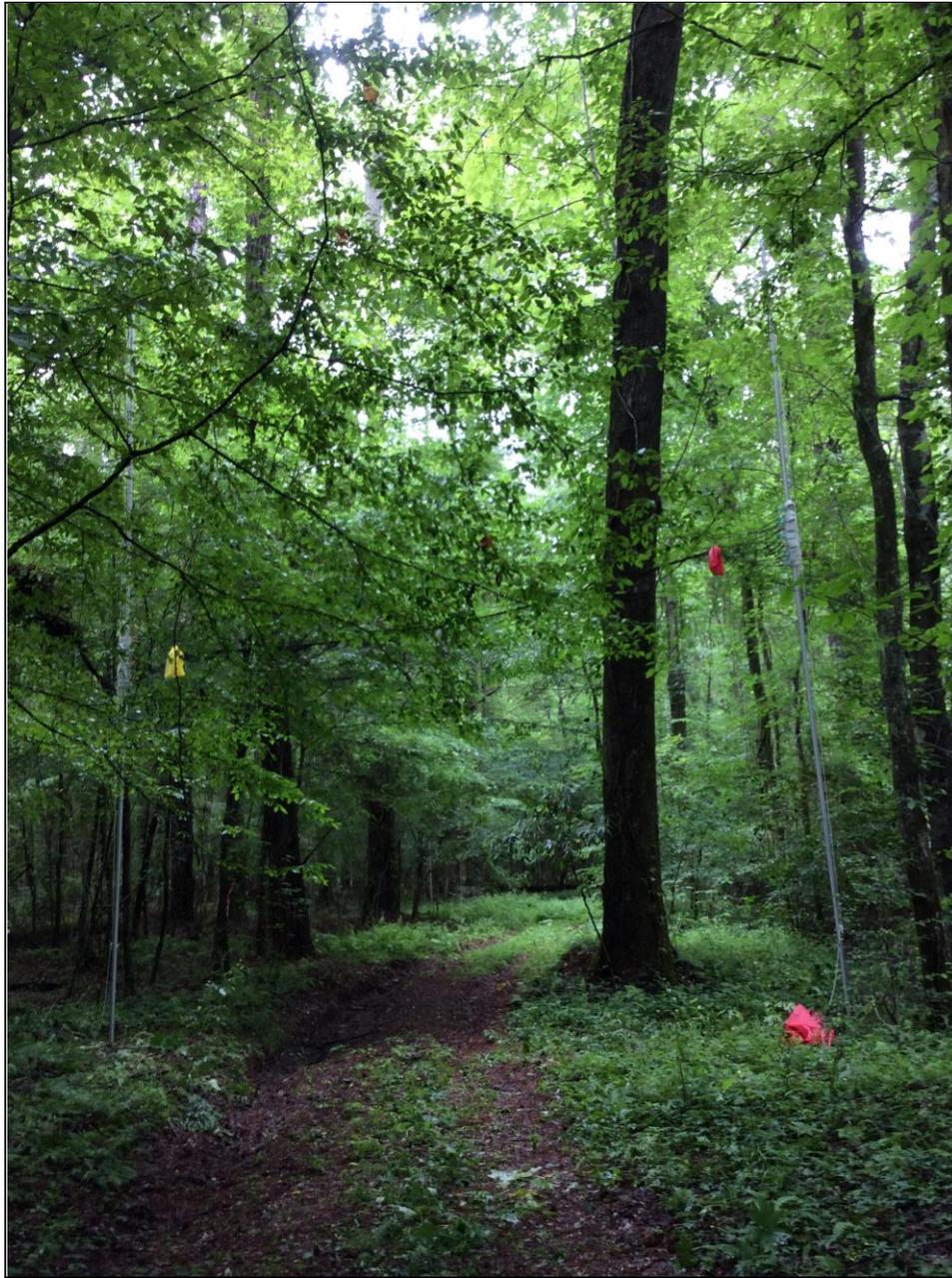
Base: Northwest Annex	Site # 3	Net # A	Lat: 36.541759	Long: -76.27239
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Base: Northwest Annex	Site # 3	Net # A	Lat: 36.541759	Long: -76.27239
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Base: Northwest Annex	Site # 3	Net # B	Lat: 36.541551	Long: -76.271227
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Base: Northwest Annex	Site # 3	Net # B	Lat: 36.541551	Long: -76.271227
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Base: Northwest Annex	Site # 3	Net # C	Lat: 36.541472	Long: -76.270846
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Base: Northwest Annex	Site # 3	Net # C	Lat: 36.541472	Long: -76.270846
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Base: Northwest Annex	Site # 3	Net # D	Lat: 36.541429	Long: -76.270307
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Base: Northwest Annex	Site # 4	Net # A	Lat: 36.568776	Long: -76.266806
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Base: Northwest Annex	Site # 4	Net # A	Lat: 36.568776	Long: -76.266806
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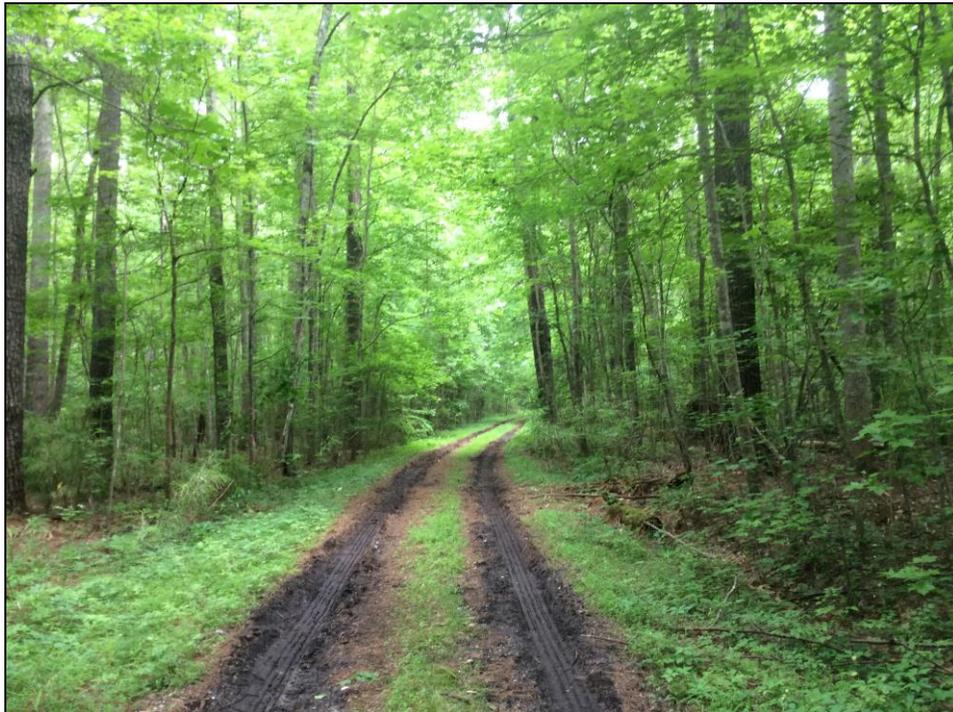
Base: Northwest Annex	Site # 4	Net # A	Lat: 36.547188	Long: -76.27354
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Base: Northwest Annex	Site # 4	Net # B	Lat: 36.56893	Long: -76.266633
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Base: Northwest Annex	Site # 4	Net # B	Lat: 36.56893	Long: -76.266633
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Base: Northwest Annex	Site # 4	Net # B	Lat: 36.543961	Long: -76.27354
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Base: Northwest Annex	Site # 4	Net # C	Lat: 36.56934	Long: -76.266608
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Base: Northwest Annex	Site # 4	Net # C	Lat: 36.56934	Long: -76.266608
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Base: Northwest Annex	Site # 4	Net # C	Lat: 36.54717	Long: -76.274366
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Base: Northwest Annex	Site # 4	Net # D	Lat: 36.569026	Long: -76.266441
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Base: Northwest Annex	Site # 4	Net # D	Lat: 36.569026	Long: -76.266441
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Base: Northwest Annex	Site # 4	Net # D	Lat: 36.54717	Long: -76.274366
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Base: Northwest Annex	Site # 4	Net # E	Lat: 36.569396	Long: -76.266275
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Base: Northwest Annex	Site # 4	Net # E	Lat: 36.569396	Long: -76.266275
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Base: Northwest Annex	Site # 4	Net # E	Lat: 36.54766	Long: -76.274568
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Base: Northwest Annex	Site # 5	Net # A	Lat: 36.544979	Long: -76.263325
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Base: Northwest Annex	Site # 5	Net # B	Lat: 36.545487	Long: -76.262445
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Base: Northwest Annex	Site # 5	Net # C	Lat: 36.545348	Long: -76.262308
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Base: Northwest Annex	Site # 5	Net # D	Lat: 36.546163	Long: -76.262782
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Base: Northwest Annex	Site # 5	Net # E	Lat: 36.54631	Long: -76.263538
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Base: Northwest Annex	Site # 7	Net # A	Lat: 36.56939	Long: -76.27348
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Base: Northwest Annex	Site # 7	Net # B	Lat: 36.57015	Long: -76.27317
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Base: Northwest Annex	Site # 7	Net # C	Lat: 36.57124	Long: -76.27277
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APPENDIX G
BATS CAPTURED PHOTO LOG

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Big brown bat <i>Eptesicus fuscus</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.56893
		Band # DEY1405	Net # B	Long: -76.266633



Big brown bat <i>Eptesicus fuscus</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.56893
		Band # DEY1405	Net # B	Long: -76.266633



Southeastern myotis <i>Myotis austroriparius</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.56893
		Band # DEY4869	Net # B	Long: -76.266633



Tri-colored bat <i>Perimyotis subflavus</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.56893
		Band # DEY4874	Net # B	Long: -76.266633



Southeastern myotis <i>Myotis austroriparius</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.56893
		Band # DEY4875	Net # B	Long: -76.266633



Southeastern myotis <i>Myotis austroriparius</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.56893
		Band # DEY4875	Net # B	Long: -76.266633



Northern Long-eared bat <i>Myotis septentrionalis</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.569026
		Band # DEY4871	Net # D	Long: -76.266441



Northern Long-eared bat <i>Myotis septentrionalis</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.569026
		Band # DEY4871	Net # D	Long: -76.266441



Southeastern myotis <i>Myotis austroriparius</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.569396
		Band # DEY4870	Net # E	Long: -76.266275



Southeastern myotis <i>Myotis austroriparius</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.569396
		Band # DEY4870	Net # E	Long: -76.266275



Southeastern myotis <i>Myotis austroriparius</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.569396
		Band # DEY4876	Net # E	Long: -76.266275



Southeastern myotis <i>Myotis austroriparius</i>	Date Photo Taken: 6/5/2015	Base: Northwest Annex	Site # 4	Lat: 36.569396
		Band # DEY4876	Net # E	Long: -76.266275

APPENDIX H
SAFETY PLANS

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INCIDENT PREVENTION PLAN

1. GENERAL INFORMATION

Client Name:	U.S. Department of the Navy		
Project Location:	Various Navy installations located in New Jersey, Virginia, and North Carolina	Project Number:	194-8480
Project Manager:	Derek Hengstenberg	Estimate Dates for Field Work	Spring and fall of 2015, 2016, and 2017

*All incidents including near misses involving Tt personnel or Tt subcontractors under Tt's immediate direction **must be reported** to the Project Manager within 24 hours. Incidents may include any injury, illness, potential exposure to hazardous chemicals or biological agents, property damage, theft or motor vehicle damage/accident.*

2. Work Scope

Tetra Tech CES biologists will conduct field work at several U.S. Department of the Navy (Navy) NAVFAC Mid-Atlantic installations located in New Jersey, Virginia, and North Carolina, including Naval Weapons Station (NWS) Earle (Colts Neck, New Jersey); NWS Yorktown (including Cheatham Annex), Naval Station Norfolk, Naval Air Station Oceana Dam Neck Annex, Joint Expeditionary Base Fort Story, Naval Air Station Oceana, and Naval Auxiliary Landing Field Fentress located in Virginia; and Naval Support Activity Hampton Roads, Northwest Annex located in Virginia and North Carolina. Field surveys include bat acoustic surveys to be conducted between 15 March and 15 November 2015, and mist netting surveys to be conducted during the summer of 2015. These presence/absence surveys will be conducted in accordance with federal protocols established for northern long-eared bat (NLEB) (*Myotis septentrionalis*). Tetra Tech has teamed with Biodiversity Research Institute to complete the field work and data analysis for this work. Deployment, retrieval and period downloading of acoustic monitoring equipment will occur during normal, daylight hours. Mist-netting surveys will be conducted during nighttime hours. This IPP will be revised prior to Mist-netting activities in order to more fully outline the control measures to be implemented to mitigate the risks of this activity.

All field survey personnel will be provided with project-specific training, maps and GPS data, indicating the locations and survey limits of their respective survey areas, and restricted access locations prior to mobilization. Due to the presence of explosive ordnance at NWS Earle and NWS Yorktown, lead staff conducting field work at these locations are required to take the Navy's Hazards of Electromagnetic Radiation to Ordnance (HERO) training. The project manager for this project, Derek Hengstenberg, received this required training from the Navy in 2014. Coordination to obtain security access approval to all the installations for all field staff involved will be required in advance of conducting the field efforts, and the project manager will notify each installation Natural Resources Manager (NRM) of the proposed field survey schedule ahead of the field effort. Daily check in/out with the project manager Derek Hengstenberg (cell: 908.616.0436 or office: 207.358.2401) will be conducted by field staff via phone call or text message, to let him known times and locations of where the field work at the start and end of each field effort.

3. PROJECT TASKS, POTENTIAL HAZARDS, AND CONTROL MEASURES (Or Attach Relevant AHA)

3a. TASK(S)	3b. POTENTIAL SAFETY AND HEALTH HAZARD(S)	3c. CONTROL MEASURE(S) (Medical or Training Qualifications, Work Practices, PPE*, etc.)
All field tasks (acoustic monitoring and mist-net surveys)	Slip/Trip/Fall Hazards	<ul style="list-style-type: none"> Be careful and alert when walking and driving around the installation for overhead wires and objects protruding from the ground (i.e., stumps, anchors, wires)
	Poisonous Plants	<ul style="list-style-type: none"> The most common poisonous plants that will be encountered are poison ivy (<i>Toxicodendron radicans</i>), poison sumac (<i>T. vernix</i>), and poison oak (<i>T. diversilobum</i>). The best way to avoid the effects caused by urushiol oil produced by these plants is to avoid coming into contact with any part of the

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3a. TASK(S)	3b. POTENTIAL SAFETY AND HEALTH HAZARD(S)	3c. CONTROL MEASURE(S) (Medical or Training Qualifications, Work Practices, PPE*, etc.)
		<p>plant. These plants are easily identifiable, and all field staff should become familiar with their identification and any known locations on the installations being surveyed. If contact is made, immediately wash contact area with water and soap or use soaps or washes designed for these plants available in drug stores (e.g., Technu). Avoid touching the face and eyes areas and be careful when handling materials and/or equipment that may have come into contact with the plants. Calamine or Caladryl lotion may be effective in relieving the irritation.</p>
	Ticks/Biting Insects	<ul style="list-style-type: none"> ▪ Applying good bug spray and sealing the bottom of your pants (by tucking into boots or socks) will reduce exposure. It is also extremely important to <i>thoroughly</i> check yourself for ticks at the end of each field day. The deer tick is (<i>Ixodes scapularis</i>) prevalent on East Coast and transmits Lyme disease. Chiggers or mites from the family Trombiculidae live in forests and grasslands and are also found in the vegetation of low, damp areas such as woodlands, berry bushes, orchards, along lakes and streams, and even in drier places where vegetation is low, such as lawns, golf courses, and parks. They are most numerous in early summer when grass, weeds and other vegetation are heaviest. In their larval stage, they attach to various animals, including humans, and feed on skin, often causing itching. These relatives of ticks are nearly microscopic, measuring 0.4 mm and have a chrome-orange hue. Field workers should be able to identify the deer tick and chiggers.
	Inclement Weather	<ul style="list-style-type: none"> ▪ Prepare clothing and field gear by checking weather forecasts often. Develop work plans that account for the weather (drastic storms forecasted = work in non-remote areas). Anticipate and prepare for drastic weather noted for the season and region. Seek shelter as necessary. ▪ Do not work during lightning storms.
	Heat and Cold Stress	<ul style="list-style-type: none"> ▪ It is important to be aware of climate conditions and related health effects, such as heat stress and heat stroke, or cold-related conditions such as hypothermia and frostbite. Heat stress can result in serious injury or death. Become familiar with the following heat-related warning signs and symptoms: <ul style="list-style-type: none"> ▪ Heat Fatigue—Impaired performance on skilled sensory-motor, mental, or vigilance work. ▪ Heat Cramps—Cramping of the muscles because of loss of salt through sweat

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3a. TASK(S)	3b. POTENTIAL SAFETY AND HEALTH HAZARD(S)	3c. CONTROL MEASURE(S) (Medical or Training Qualifications, Work Practices, PPE*, etc.)
		<ul style="list-style-type: none"> ▪ Heat Exhaustion—Skin is pale, cool, and moist; heavy sweating; dizziness; fainting; headache; nausea; weakness. It is important to cool a person down quickly should they experience these symptoms ▪ Heat Stroke—Red, hot, dry skin with a lack of perspiration. (Note: Use of PPE can prevent the evaporation of sweat and cause high body temperature, rapid pulse, dizziness, confusion, delirium, coma, or death). Heat stroke is characterized by a cessation of sweating and is considered a medical emergency. 911 should be contacted if someone exhibits the symptoms of heat stroke ▪ Pre-Existing Conditions may impair your ability to tolerate heat. Acclimate yourself to working in hot environments over an approximate 6-day period. (Fit workers may acclimate more quickly.) ▪ Heat stress preventive measures include the following: <ul style="list-style-type: none"> ○ Drinking plenty of replacement fluids. You can lose 2-3 gallons (8-12 liters) of water per shift when the weather is hot. Water works just as well as non-carbonated flavored drinks. ○ Follow the appropriate work/rest regimen whenever working in a high temperature and humidity environment. ○ Take breaks out of direct sunlight and in areas cooler than where you've been working. ○ If you feel ill, notify the field team lead or the project manager. ○ Do not work alone in extreme heat stress conditions; always use the Buddy System. ○ Field personnel will be trained about signs and symptoms of heat stress and hypothermia. ○ Proper clothing shall be worn.
	Hunting Seasons	<ul style="list-style-type: none"> ▪ Check with Navy Technical Representative, installation NRM, project manager, and/or field escorts regarding hunting seasons, area restrictions, and safety requirements. Wear hunter orange vests and hats during applicable hunting seasons.
	Interaction with Public/Strangers	<ul style="list-style-type: none"> ▪ Encounters with the public or strange and/or threatening individuals may occur at any time; however, since work will occur on military installations, the chance of these encounters are

3. PROJECT TASKS, POTENTIAL HAZARDS, AND CONTROL MEASURES (Or Attach Relevant AHA)		
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		low. If they do occur, the majority of the time it is friendly and curious individuals. Questions and comments from the public should be directed to the project manager Derek Hengstenberg (cell: 908.616.0436 or office: 207.358.2401) and the installation NRM.
	Water Quality/Water Safety Hazards	<ul style="list-style-type: none"> ▪ Personnel shall refrain from drinking directly from rivers, streams, lakes, and ponds. A minimum of one quart of potable fresh water shall be carried by each person for a field day. Water purification tablets shall be carried for emergency use. If absolutely necessary for drinking, water from rivers, streams, lakes, and ponds should be boiled for at least 5 minutes and then cooled prior to use. In-water surveys should be conducted when water levels are low to prevent injuries or accidents. If current is too swift to safely survey, personnel should not conduct the survey. ▪ Standard Safety Equipment: <ul style="list-style-type: none"> (1) Waders – All crew members must wear chest or hip waders when conducting in-water survey work. Suitable waders are generally constructed of neoprene, PVC, silicon, and should be breathable for work conducted during high temperatures. (2) Footwear - All footwear must have non-slip soles. ▪ Terrain - Common hazards encountered during sampling activities in streams, rivers, and other waterbodies include slippery surfaces, unstable footing, and strong currents. Use caution to avoid falls, cuts, and injuries.
	Vehicle travel, including parking along public/private roadways and getting stuck.	<ul style="list-style-type: none"> ▪ Wear seat belts at all times. ▪ Park only where there is enough room to pull completely off roadway, pull completely off roadway to park. ▪ Wear High Visibility Clothing. ▪ Do not leave vehicle unattended with the engine running. ▪ Check parking area for soft or unstable surfaces. ▪ Plan ahead to leave the installation before dark (not applicable to mist-netting surveys, which will occur during nighttime hours) as required by security requirements.
	Scratches/cuts/other injuries from vegetation.	<ul style="list-style-type: none"> ▪ Always wear long pants and long-sleeved shirts; carry a first aid kit.

3. PROJECT TASKS, POTENTIAL HAZARDS, AND CONTROL MEASURES (Or Attach Relevant AHA)		
3a. TASK(S)	3b. POTENTIAL SAFETY AND HEALTH HAZARD(S)	3c. CONTROL MEASURE(S) (Medical or Training Qualifications, Work Practices, PPE*, etc.)
	General site requirements	<ul style="list-style-type: none"> ▪ Wear hard hats and safety vest when working in active construction areas, or on/near roadways. ▪ Where applicable, do not enter restricted areas, ordnance storage areas, or active range areas (typically a flag is raised and flown when the range is active).
Mist-netting surveys	Contact with live or dead animals that have the potential to carry rabies.	<ul style="list-style-type: none"> ▪ The rabies virus is present in the saliva and neural tissue of infected mammals and the most widely known route of exposure occurs from the bite of a rabid animal. However, exposure to rabies may also occur when the virus, from the saliva or other potentially infectious material (neural tissue) is introduced into the handler. Direct exposure routes consist of: <ul style="list-style-type: none"> ○ Bites – even those that do not cause bleeding ○ Existing open cuts in the handler’s skin ○ Mucus membranes of the handler (i.e., rubbing one’s eyes, mouth or nose after handling) ▪ Bats (and other small mammals) should never be handled by untrained and unvaccinated field staff. Field staff who handle bats will have received pre-exposure vaccinations and a current antibody check (titer level). ▪ Use appropriately sized PPE, including face shields/masks, eye protection, gloves, gowns, and laboratory coats when handling small mammals (bats) to prevent blood or other potentially infectious materials to pass through to or reach clothes, skin, eyes, mouth, or mucous membranes under normal conditions for the full duration of use. If necessary, provide training to field staff on proper use of PPE. ▪ All reusable equipment must be kept clean and repaired/replaced, and/or disposed of when necessary to maintain its intended protective use. ▪ Properly dispose of used PPE. ▪ When handling live bats, field staff will wear Kevlar lined deer skin gloves, or similar deer skin gloves for protection. ▪ Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives should be made available for field staff that are allergic to standard gloves. ▪ Wash hands or use sanitizer gel or wipes after handling bats. ▪ Properly dispose of any dead animal carcasses.

3. PROJECT TASKS, POTENTIAL HAZARDS, AND CONTROL MEASURES (Or Attach Relevant AHA)		
3a. TASK(S)	3b. POTENTIAL SAFETY AND HEALTH HAZARD(S)	3c. CONTROL MEASURE(S) (Medical or Training Qualifications, Work Practices, PPE*, etc.)
		<ul style="list-style-type: none"> If suspected exposure to rabies or other infectious diseases occur, the mammal should be retained for testing, the bitten/scratched area should be thoroughly cleansed, and the individual should seek medical counsel and possible vaccination regardless of their previous vaccination history. If the animal is a listed species, the local USFWS Game Warden office will be contacted to take control of the animal[RL1]. Refer to the CDC website http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5902a1.htm
Safety meetings	General site risks and hazards, and emergency protocols	<ul style="list-style-type: none"> Conduct tail-gate safety meetings at the beginning of each field effort for a new site/location to discuss safety related topics, including site-specific health and safety risks, hazards, and procedures and medical emergency locations in the event of an accident or emergency. If new staff join the field effort after the site-specific, tail-gate safety meeting was conducted, they will be provided the information prior to conducting the field effort (by the field team lead). Any near misses or injuries that have occurred specific to the nature of work or location, and to prevent future incidents should also be discussed at these safety meetings. Documentation of the name and date personnel receive the training, and a summary of topics discussed should be retained by the field team lead and project manager. Any near misses or injuries/emergencies need to be reported to the Tetra Tech Health and Safety Officer as soon as possible after the incident, but no more than 24 hours after the incident.

* PPE identified in this Plan was selected in accordance with 29 CFR 1910.132 and additional TtCES requirements.



Project Name: NAVFAC Mid-Atlantic
NLEB Surveys
IPP Revision Date: 08 May 2015

4. EMERGENCY INFORMATION (Or attach Client—or other—plans that meet requirements)

4a. Procedure to account for field staff:

Field team lead will call or text project manager (or designee) before the beginning of the day's/night's field work. Once field work is completed for the day/night, field team lead will call or text project manager (or designee) to let them know that all field staff are safe and off the project site.

4b. First aid/CPR trained individual's name and first aid kit location:

Derek Hengstenberg will ensure all field teams contain at least one person that is CPR/First Aid certified, and that a stocked first aid kit is available for use during all field survey work.

4c. Location of urgent care facilities: Locations and contact information for medical facilities located both on and off the installations covered by this plan are provided below. Most of the installations where the work will take place will have a medical clinic; however, these may not be equipped to handle life-threatening emergencies. For life-threatening emergencies, proceed to the nearest emergency facility noted in this section.

NWS Earle, Colts Neck New JerseyOn-Installation

Branch Health Clinic NWS Earle
201 Highway 34 South, Bldg. C-3,
Colts Neck, NJ 07722
732-866-2300 or 732-866-7493

The NWS Earle Branch Medical Clinic provides outpatient ambulatory care by appointment only, between the hours of 0730 – 1600 Monday – Thursday, and 0730 – 1100 on Friday, excluding holidays.

Off-Installation

Monmouth Medical Center
300 2nd Avenue
Long Branch, New Jersey 07740
(732) 222-5200

NWS Yorktown (including Cheatham Annex)On-Installation

Branch Health Clinic NWS Yorktown
160 Main Road, Bldg. 1806
Yorktown, VA 23691
(757) 953-8454

The NWS Yorktown Branch Health Clinic is open Monday – Friday, 0730 – 1530; close weekends and federal holidays. Clinic is located at the intersection of Longfellow Rd and Jefferson Ave, in Newport News, VA. From Base Gate #1, take the first Right at Fullinwinder Lane. At the end of this road, make another Right. Thereafter, the road will come to a "Y"-section. Take the Left fork of the "Y". The clinic is the second building on the Right.

Off-Installation

Riverside Doctors' Hospital
1500 Commonwealth Avenue
Williamsburg, VA 23185
(757) 585-2200

Naval Station NorfolkOn-Installation

Branch Health Clinic NAVSTA Norfolk
1721 Admiral Taussig Blvd.
Norfolk, VA 23511-2899
(757) 953-9000

The NAVSTA Norfolk Branch Health Clinic is open Monday – Friday 0700-1600

Off-Installation

Bon Secours DePaul Medical Center
150 Kingsley Lane
Norfolk, VA 23505
(757) 889-5000

Naval Air Station Oceana Dam Neck AnnexOff-Installation

Sentara Virginia Beach General Hospital
1060 First Colonial Rd
Virginia Beach, VA 23454
(757) 395-8000 or (757) 395-8890 (emergency department)

Joint Expeditionary Base Fort StoryOn-Installation

Medical Clinic
Bldg. 649 New Guinea Road, Fort Story, VA 23451
(757) 422-7851

Hours: 0630-1500 Mon-Fri

Off-Installation

Sentara Virginia Beach General Hospital
1060 First Colonial Rd
Virginia Beach, VA 23454
(757) 395-8000 or (757) 395-8890 (emergency department)

Naval Air Station OceanaOn-Installation

Oceana Branch Medical Clinic
1550 Tomcat Blvd. Suite 150
Virginia Beach, VA 23460
(757) 953-3933

Off-Installation

Sentara Virginia Beach General Hospital
1060 First Colonial Rd
Virginia Beach, VA 23454
(757) 395-8000 or (757) 395-8890 (emergency department)

Naval Auxiliary Landing Field FentressOff-Installation

Chesapeake Regional Medical Center
736 North Battlefield Boulevard
Chesapeake, Virginia 23320

(757) 312-8121

Naval Support Activity Hampton Roads, Northwest AnnexOff-Installation

Chesapeake Regional Medical Center
736 North Battlefield Boulevard
Chesapeake, Virginia 23320

(757) 312-8121

4d. Evacuation routes and rally point(s):

Return to parked vehicle at start of field work. Consult attached medical facility information. Drive to nearest hospital identified for the installation, if necessary.

4e. Emergency contact information



WorkCare Phone: 800-455-6155 (24 hour)

Project Manager: Derek Hengstenberg
(908) 616-0436 (cell)
(207) 358-2401 (office)

Safety Manager: Tami Froelich
(509) 372-5827 (office)
(509) 392-9080 (cell)

Local Tt Personnel: Emily Cowperthwaite
(207) 358-2397 (office)
(207) 329-7381 (cell)

Local Client Reps: Michael Wright – Natural Resources Manager for NSAHR NWA, NASO DNA, NAS Oceana, and NALF
Fentress; (757) 433-3461 (work) or (757) 373-8531 (cell)

JOHN PULVER ~~Melanie Friesch~~ – Natural Resources Manager for NWS Yorktown; (757) 462-5351 (work) or (757) 544-4796 (cell) ^{887-4952 Jennifer Podbesek 322-4782}

Patricia Chizmadia – Natural Resources Manager for NWS Earle; (732) 866-2254 (work)

Emmett Carawan ~~Melanie Friesch~~ –for Naval Station Norfolk; (757) 462-5351 (work) or (757) 544-4796 (cell) ^{(757) 341-0495}

Roger White ~~Michael Wright~~ – Natural Resources Manager for JEB Fort Story; (757) 433-3461 (work) or (757) 373-8531 (cell) ^{462-5361 Sharon Waligora 462-5350}

On-site emergencies should call 911

What do I do in an emergency situation?

1. Call 911 or your local emergency responder for initial employee evaluation and transport to the hospital.
2. Administer first aid to minimize the injury effects.
3. Call WorkCare at 800-455-6155 for a triage call/discussion with an occupational health nurse or physician. Please mention as soon as possible that the call is regarding an emergency injury. At this point, the nurse or physician will assist the field staff to determine the best treatment plan.
4. Call your Project Manager: (See 4e).
5. Call your Safety Manager, Tami Froelich (See 4e).

What do I do in a non-emergency situation?

1. Administer first aid as soon as possible to minimize the injury effects
2. Follow steps 3 thru 5 above.
3. Call the local clinic identified above to notify them that you are bringing an injured worker in for evaluation.
 - You may transport the injured employee to the local clinic in a privately owned vehicle. A designated Tetra Tech employee must accompany the injured worker to the local clinic. Encourage the clinic, with WorkCare support, to consider first aid measures first.

5. INCIDENT PREVENTION PLAN SIGNOFFS

Prepared By:	Linda Rivard <i>Linda Rivard</i>	Phone No.:	207.358.2393	Date:	²⁶ 09 May 2015
Project Manager Approval:	Derek Hengstenberg <i>Derek</i>	Phone No.:	207.358.2401	Date:	26 May 2015
PESM Approval:	Tami Froelich <i>Tami Froelich</i>	Phone No.:	509.392.9080	Date:	5/20/15
Incident Prevention Plan expiration				Date:	5/20/2016

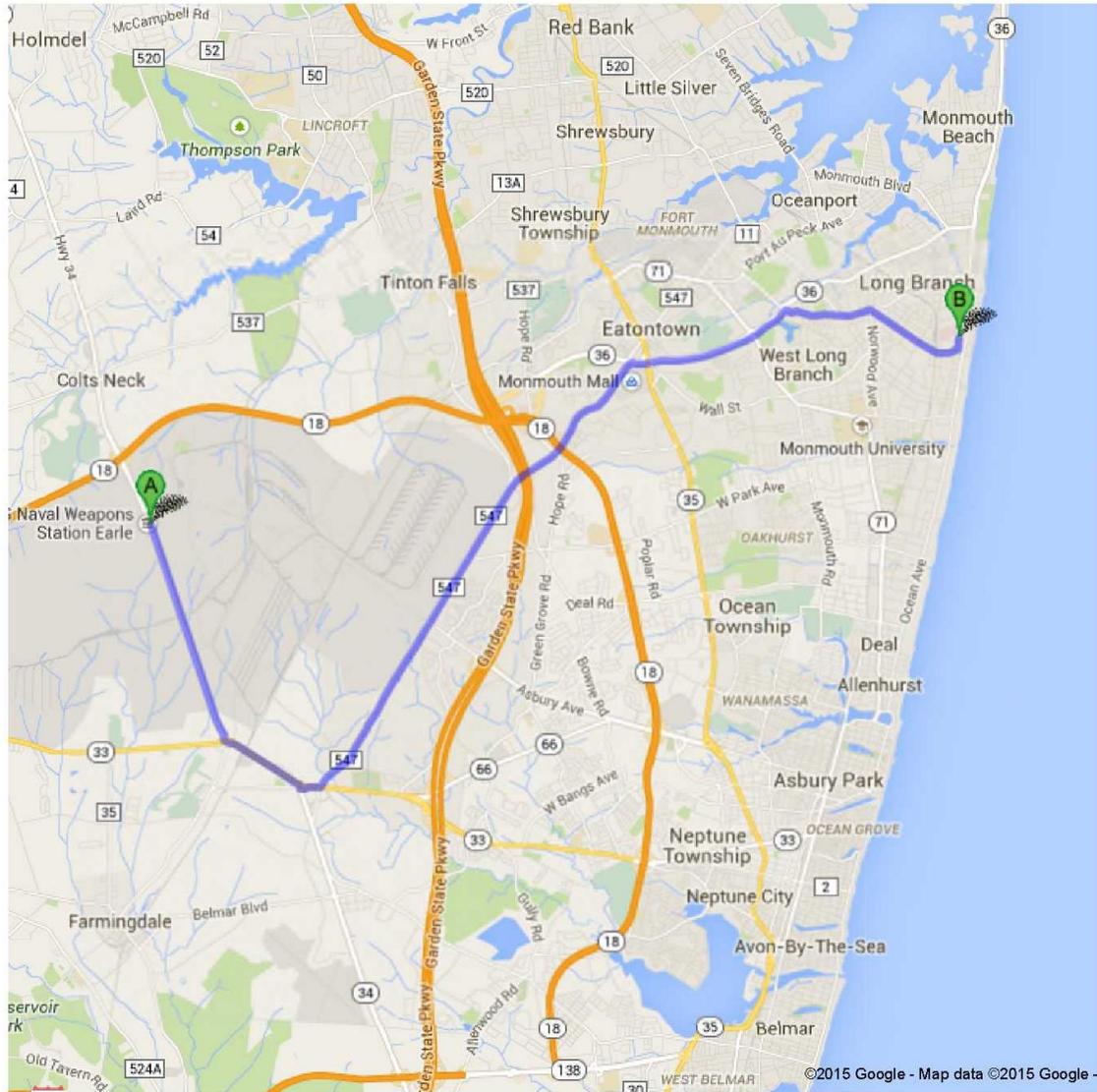
ATTACHMENT A – PERSONAL PROTECTIVE EQUIPMENT

The Personal Protective Equipment (PPE) specified for this project is based on the hazard analysis. Because no chemical hazards are anticipated, the initial PPE will be Level D. Level D PPE includes the following:

- Hard hats – Required in active construction areas (if applicable)
- Safety boots –Sturdy boots are required but steel toe or composite toed boots are not necessary, but are recommended if working in active construction zones
- Footwear - All footwear must have non-slip soles
- Puncture-resistant gloves and face masks- Wear face masks and Kevlar lined deer skin gloves, or similar deer skin gloves are required for protection when handling live bats
- High visibility vest – Required when working around traffic and in/near construction zones
- Safety glasses – Not required but recommended for work in dense vegetation
- Long pants – Required
- Leather gloves –Recommended if working in dense and thorny vegetation
- Sunscreen – Not required, but is recommended
- Insect repellent – Not required, but is recommended for ticks and biting insects. DEET is an effective repellent that typically must be applied every 5 hours. Perform tick self-inspections after exiting wooded areas and tall grasses. Inspect areas for insects and spiders before entering or before placing hands near the ground
- Water or other hydrating fluids – Not required, but should be consumed throughout the day to stay hydrated
- Hip or chest waders – waders should be worn when conducting in-water survey work. Suitable waders are generally constructed of neoprene, PVC, silicon, and should be breathable for working high temperatures
- A first aid kit containing medical supplies (bandages, dressing, antibiotic ointment, first aid manual, etc.), Technu, Caladryl or similar lotion, sunscreen, insect repellent, and emergency water purification tablets shall be available during all aspects of field survey work

NWS Earle, Colts Neck New Jersey
Off-Installation
 Monmouth Medical Center
 300 2nd Avenue
 Long Branch, New Jersey 07740
 (732) 222-5200

	US Naval Weapons Station Earle 201 New Jersey 34, Colts Neck, NJ 07722 - (732) 866-2171	
	1. Head south on NJ-34 S About 3 mins	go 2.7 mi total 2.7 mi
	2. Slight left onto NJ-33 E/NJ-34 S Continue to follow NJ-34 S About 1 min	go 1.0 mi total 3.7 mi
	3. At the traffic circle, take the 3rd exit onto NJ-33 E	go 0.3 mi total 4.0 mi
	4. Turn left onto Shafto Rd About 7 mins	go 4.8 mi total 8.8 mi
	5. Continue onto Wyckoff Rd About 2 mins	go 1.4 mi total 10.2 mi
	6. Turn right onto NJ-36 E About 3 mins	go 2.0 mi total 12.2 mi
	7. Turn right onto Broadway About 2 mins	go 1.0 mi total 13.2 mi
	8. Turn right onto N Bath Ave About 3 mins	go 1.2 mi total 14.3 mi
	9. Turn left onto 2nd Ave Destination will be on the left	go 0.1 mi total 14.5 mi
	Monmouth Medical Center 300 2nd Avenue, Long Branch, NJ 07740 - (732) 222-5200	

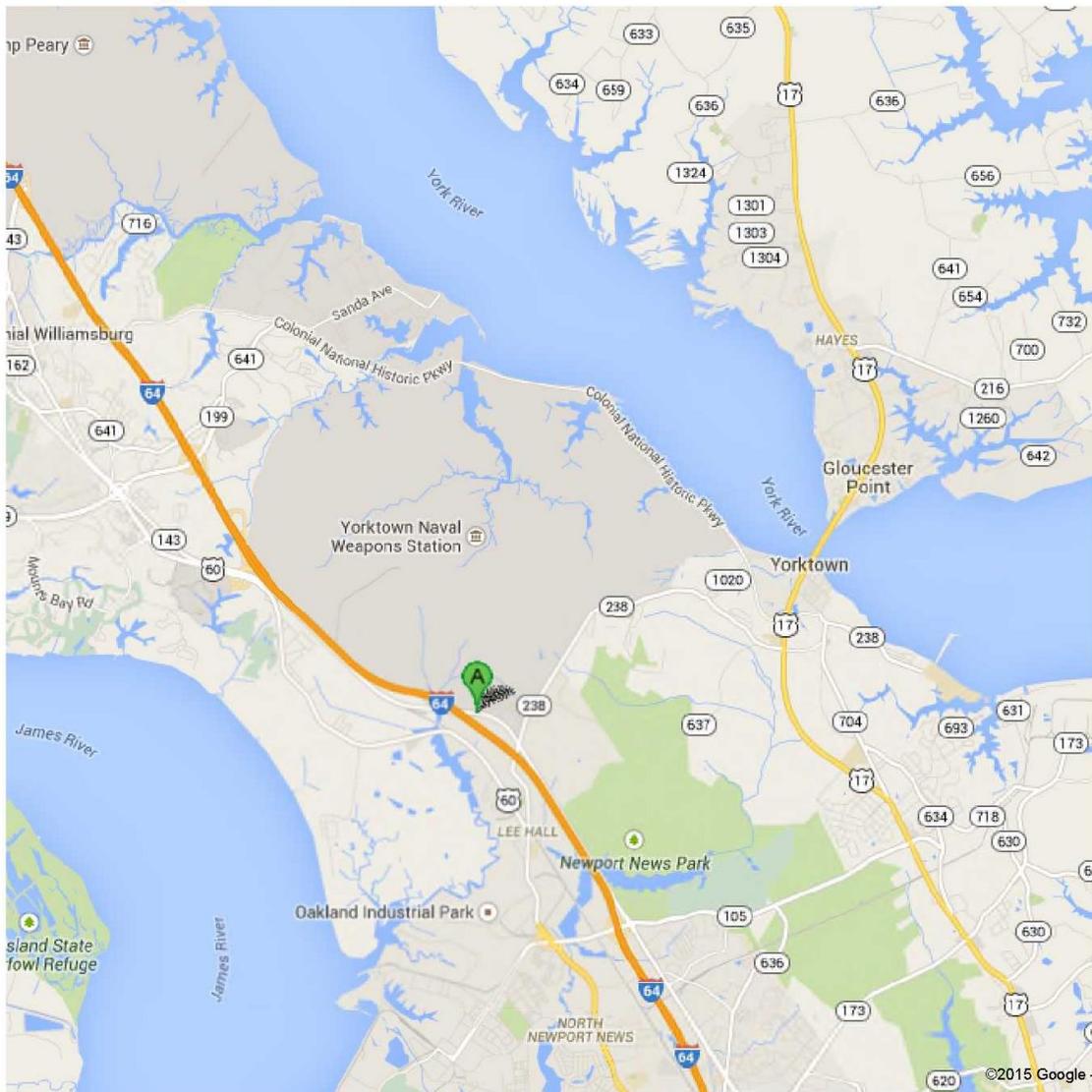


NWS Yorktown (including Cheatham Annex)**On-Installation**

Branch Health Clinic NWS Yorktown
160 Main Road, Bldg. 1806
Yorktown, VA 23691
(757) 953-8454

The NWS Yorktown Branch Health Clinic is open Monday – Friday, 0730 – 1530; close weekends and federal holidays

Clinic is located at the intersection of Longfellow Rd and Jefferson Ave, in Newport News, VA. From Base Gate #1, take the first Right at Fullinwinder Lane. At the end of this road, make another Right. Thereafter, the road will come to a "Y"-section. Take the Left fork of the "Y". The clinic is the second building on the Right.



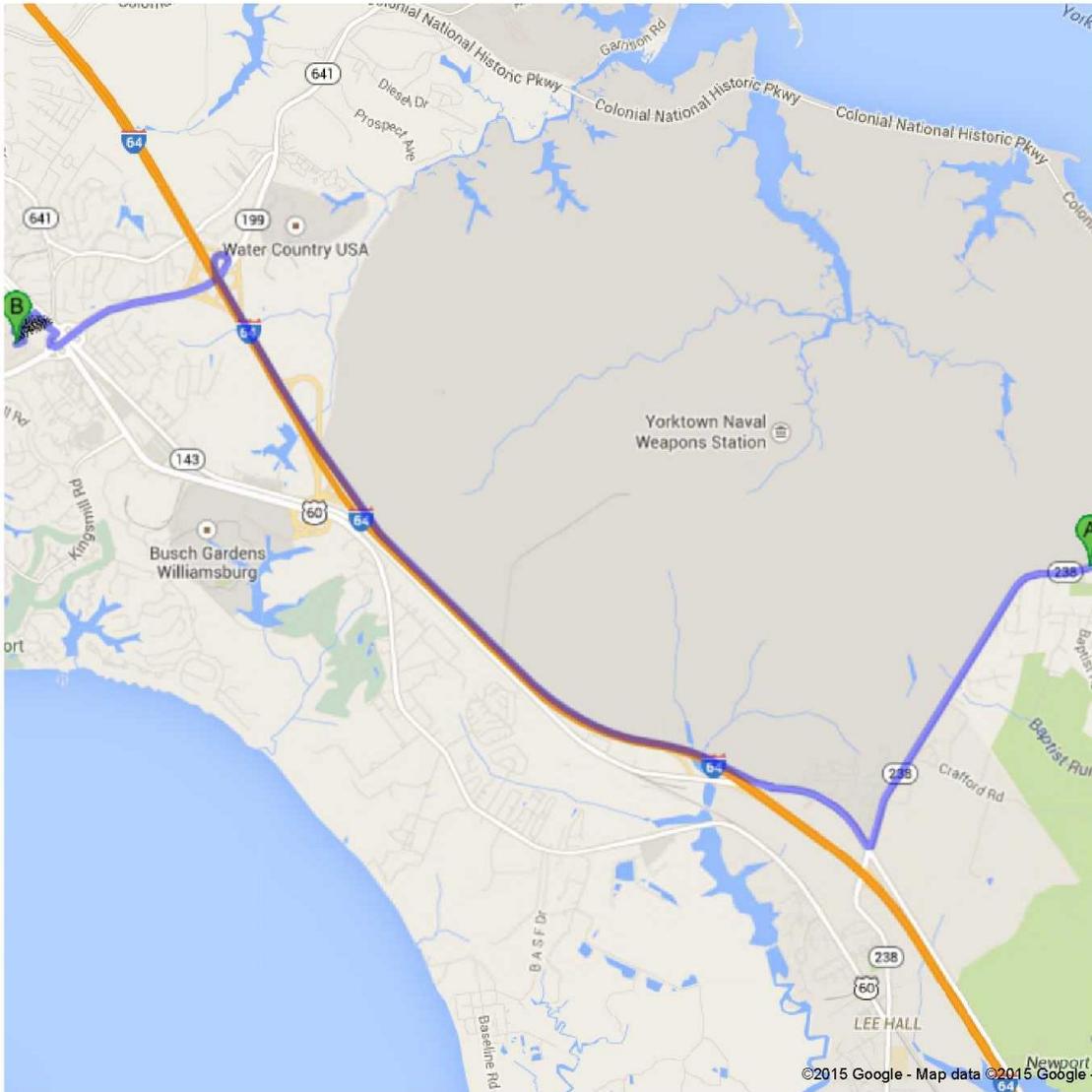
NWS Yorktown (including Cheatham Annex)
Off-Installation

Riverside Doctors' Hospital
 1500 Commonwealth Avenue
 Williamsburg, VA 23185
 (757) 585-2200

	Naval Weapons Station Yorktown, Yorktown, VA	
	1. Head west on VA-238 W toward Red Oak Ln About 3 mins	go 2.3 mi total 2.3 mi
	2. Turn right onto Jefferson Ave About 1 min	go 0.8 mi total 3.1 mi
	3. Take the ramp onto I-64 W About 4 mins	go 4.7 mi total 7.8 mi
	4. Take exit 242A to merge onto VA-199 W toward Williamsburg/Jamestown About 2 mins	go 1.4 mi total 9.2 mi
	5. Take the US 60 ramp to Williamsburg/Busch Gardens	go 0.1 mi total 9.3 mi
	6. Turn left onto US-60 W	go 0.2 mi total 9.5 mi
	7. Turn left onto Battery Blvd	go 0.1 mi total 9.6 mi
	8. At the traffic circle, take the 3rd exit onto Commonwealth Ave	go 0.1 mi total 9.7 mi
	9. Turn right	go 285 ft total 9.8 mi
	10. Turn left Destination will be on the right	go 16 ft total 9.8 mi
	Riverside Doctors' Hospital Williamsburg 1500 Commonwealth Avenue, Williamsburg, VA 23185 - (757) 585-2200	



**Directions to Riverside Doctors' Hospital
Williamsburg**
1500 Commonwealth Avenue, Williamsburg, VA
23185 - (757) 585-2200
9.8 mi – about 13 mins



Naval Station Norfolk
Off-Installation
 Bon Secours DePaul Medical Center
 150 Kingsley Lane
 Norfolk, VA 23505
 (757) 889-5000



Naval Station Norfolk

- | | | | |
|----|---|--|---------------------------|
| 1. | Head east toward Hampton Blvd | | go 217 ft
total 217 ft |
| 2. |  Turn right onto Hampton Blvd
About 3 mins | | go 1.0 mi
total 1.1 mi |
| 3. |  Turn left onto Terminal Blvd
About 3 mins | | go 1.6 mi
total 2.7 mi |
| 4. | Take the US-460/Granby St ramp
About 59 secs | | go 0.7 mi
total 3.3 mi |
| 5. |  Turn right onto US-460 W/Granby St
About 3 mins | | go 1.5 mi
total 4.8 mi |
| 6. |  Turn right onto Kingsley Ln
Destination will be on the right
About 48 secs | | go 0.1 mi
total 4.9 mi |



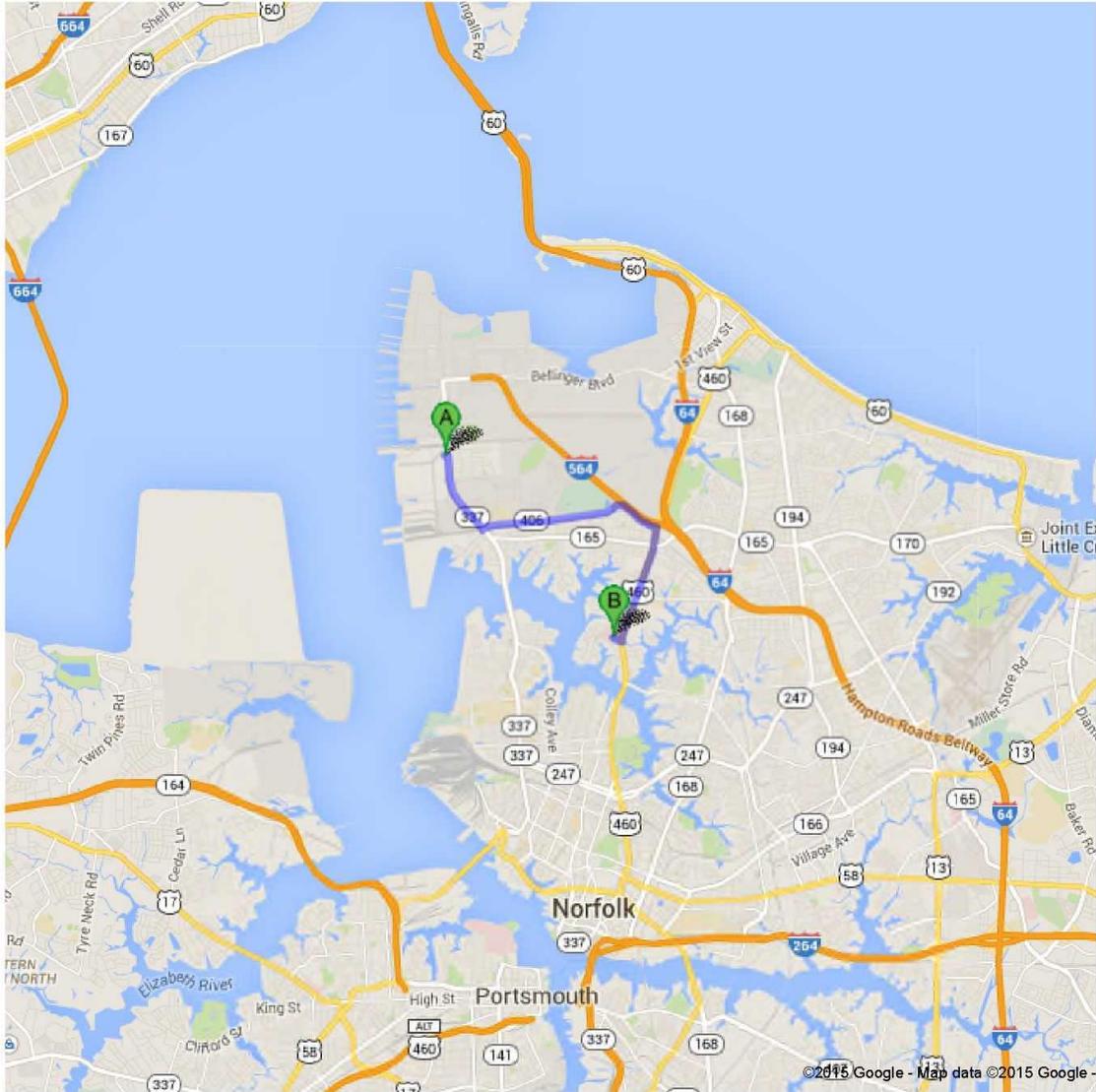
Bon Secours DePaul Medical Center
 100 Kingsley Lane, Norfolk, VA 23505 - (757) 889-5000



Directions to Bon Secours DePaul Medical Center

100 Kingsley Lane, Norfolk, VA 23505 - (757) 889-5000

4.9 mi – about 10 mins



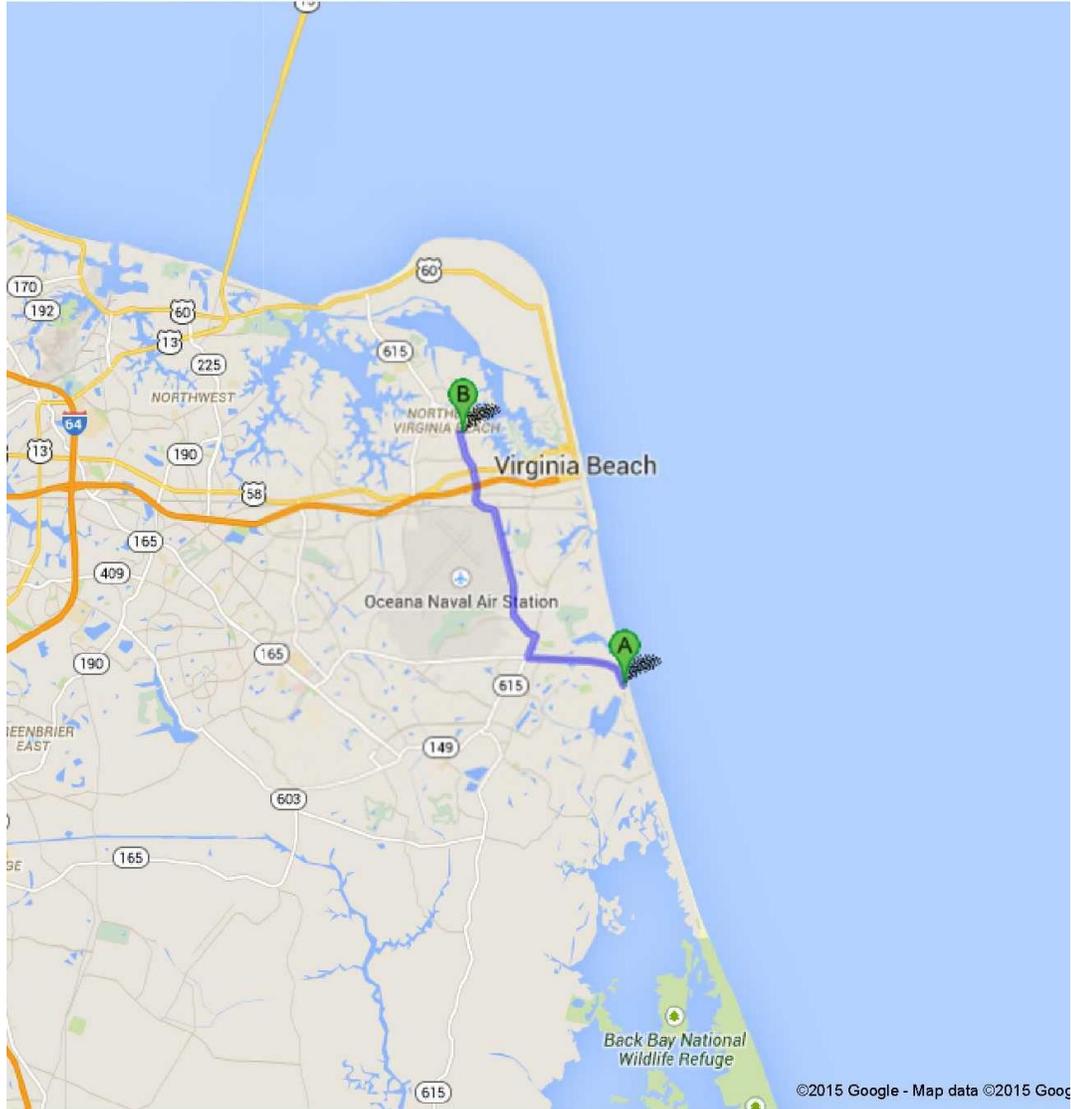
**Naval Air Station Oceana, Dam Neck Annex
Off-Installation**

Sentara Virginia Beach General Hospital
1060 First Colonial Rd
Virginia Beach, VA 23454
(757) 395-8000 or (757) 395-8890 (emergency department)

	naval air station oceana dam neck annex	
	1. Head north on Regulus Ave toward Talos St <i>Restricted usage road</i>	go 0.4 mi total 0.4 mi
	2. Turn left onto Vanguard St <i>Restricted usage road</i> About 1 min	go 0.3 mi total 0.7 mi
	3. Continue onto Dam Neck Rd About 3 mins	go 1.9 mi total 2.6 mi
	4. Slight right toward General Booth Blvd	go 200 ft total 2.6 mi
	5. Turn right onto General Booth Blvd About 51 secs	go 0.5 mi total 3.2 mi
	6. Turn left onto Oceana Blvd About 5 mins	go 3.8 mi total 7.0 mi
	7. Continue onto First Colonial Road	go 1.7 mi total 8.7 mi
	8. Turn right at 1st General Pkwy	go 308 ft total 8.8 mi
	Sentara Virginia Beach General Hospital, 1060 First Colonial Rd, Virginia Beach, VA 23454	



Directions to Sentara Virginia Beach General Hospital, 1060 First Colonial Rd, Virginia Beach, VA 23454
8.8 mi – about 15 mins



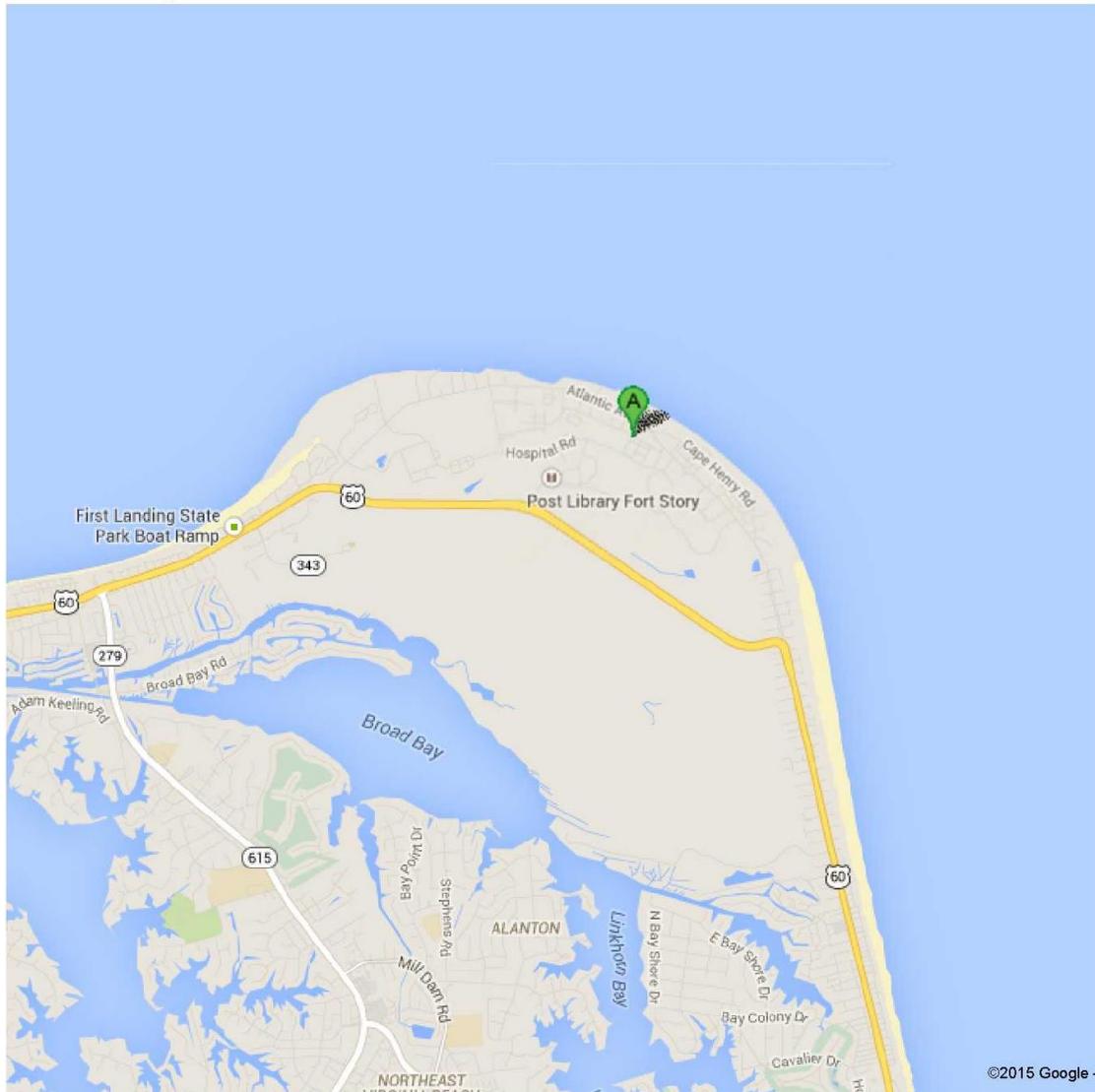
Joint Expeditionary Base Fort Story**On-Installation**

Medical Clinic

Bldg. 649 New Guinea Road, Fort Story, VA 23451

(757) 422-7851

Hours: 0630-1500 Mon-Fri



Joint Expeditionary Base Fort Story Off-Installation

Sentara Virginia Beach General Hospital

1060 First Colonial Rd

Virginia Beach, VA 23454

(757) 395-8000 or (757) 395-8890 (emergency department)

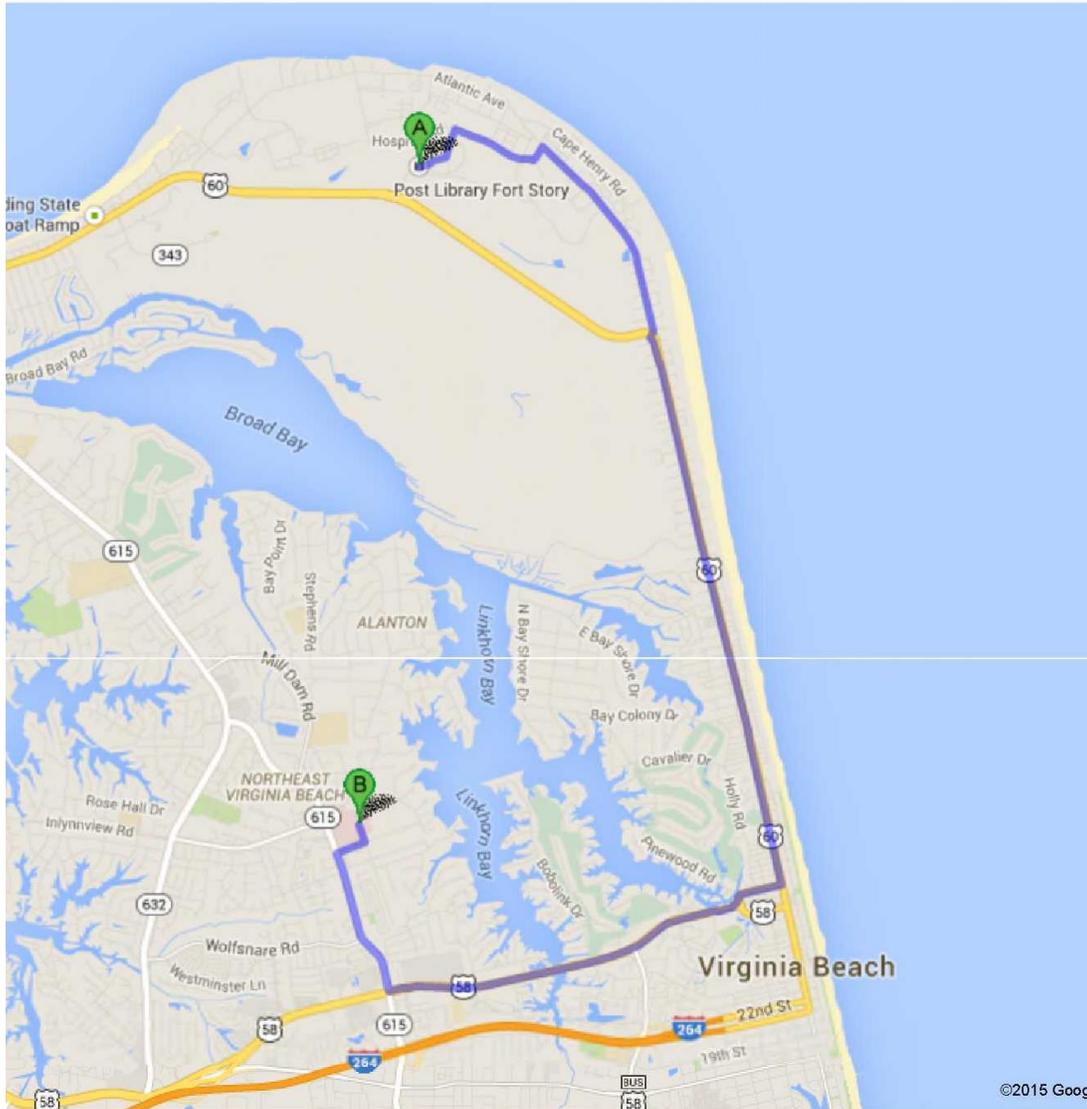
 Fort Story, Virginia Beach, VA

	1. Head east on Desert Rd	go 0.2 mi total 0.2 mi
	2. Turn left to stay on Desert Rd	go 0.2 mi total 0.4 mi
	3. Turn right onto Hospital Rd About 1 min	go 0.5 mi total 0.9 mi
	4. Turn left onto 1st Landing Rd	go 0.1 mi total 1.0 mi
	5. Turn right onto Atlantic Ave About 3 mins	go 1.4 mi total 2.3 mi
	6. Turn left to stay on Atlantic Ave About 5 mins	go 2.7 mi total 5.1 mi
	7. Continue onto Pacific Ave About 1 min	go 0.7 mi total 5.7 mi
	8. Turn right onto 32nd St	go 0.2 mi total 5.9 mi
	9. Continue onto Pinewood Rd	go 292 ft total 6.0 mi
	10. Continue onto 32nd St	go 79 ft total 6.0 mi
	11. Keep right to continue toward Laskin Rd	go 344 ft total 6.1 mi
	12. Slight right onto Laskin Rd About 3 mins	go 2.0 mi total 8.1 mi
	13. Slight right toward First Colonial Road	go 0.1 mi total 8.2 mi
	14. Turn right onto First Colonial Road About 2 mins	go 0.9 mi total 9.1 mi
	15. Turn right onto Will O Wisp Dr	go 0.2 mi total 9.3 mi
	16. Turn left onto Facilities Ln Destination will be on the left	go 0.1 mi total 9.4 mi

 1060 First Colonial Rd, Virginia Beach, VA 23454

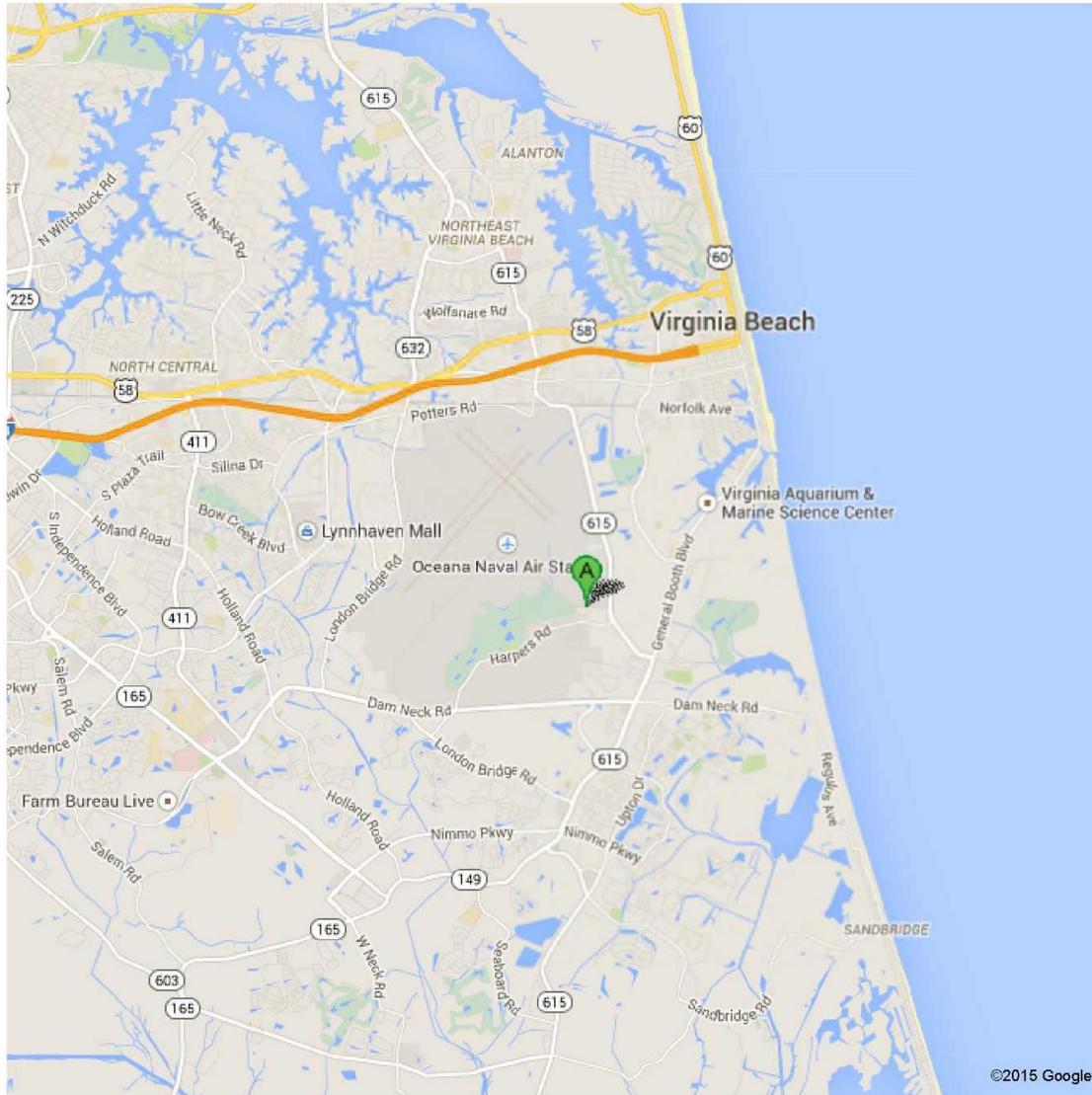


Directions to 1060 First Colonial Rd, Virginia Beach, VA 23454
9.4 mi – about 20 mins



**Naval Air Station Oceana
On-Installation**

Oceana Branch Medical Clinic
1550 Tomcat Blvd. Suite 150
Virginia Beach, VA 23460
(757) 953-3933





**Naval Air Station Oceana
Off-Installation**

Sentara Virginia Beach General Hospital
1060 First Colonial Rd
Virginia Beach, VA 23454
(757) 395-8000 or (757) 395-8890 (emergency department)



naval station oceana

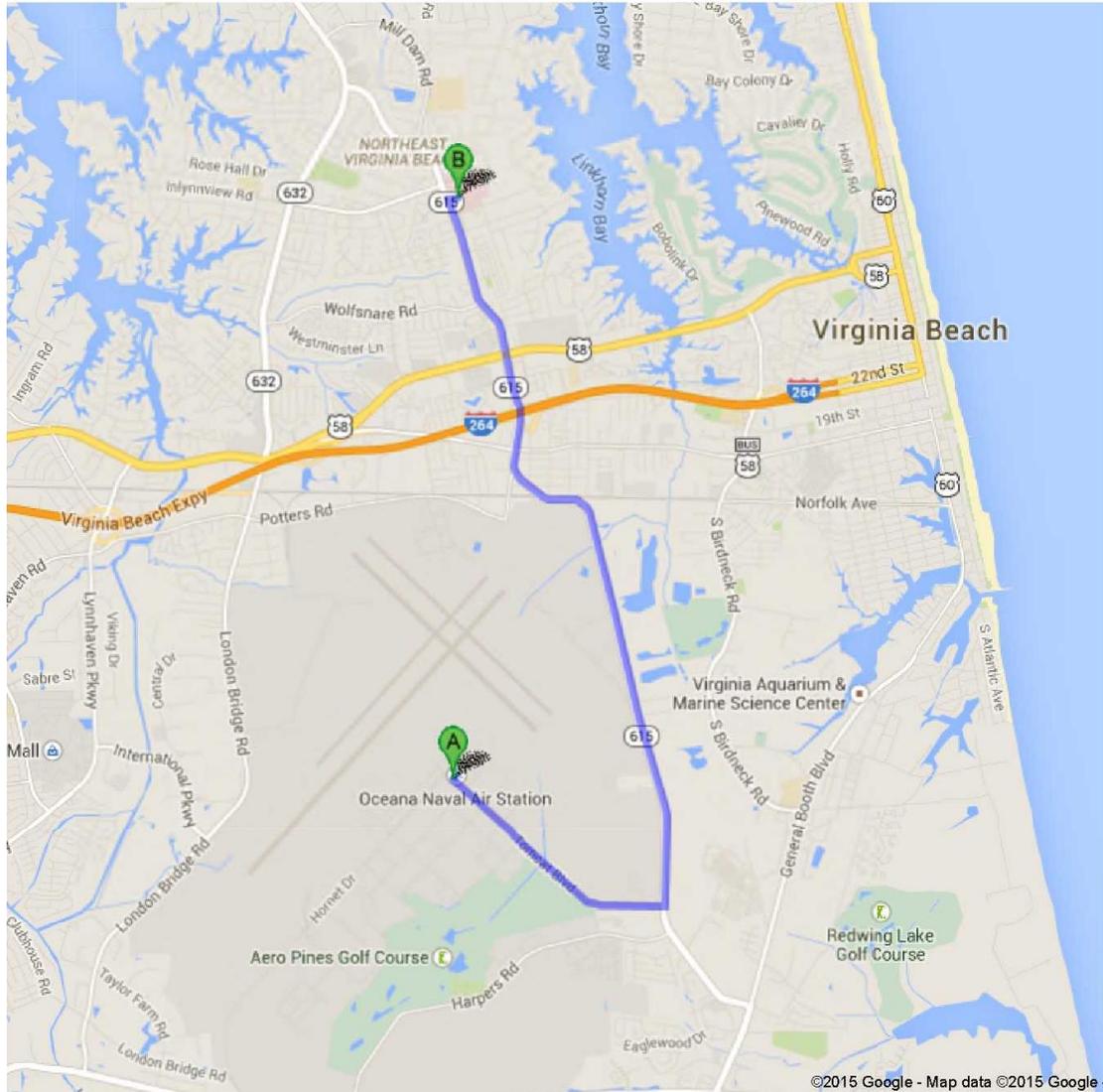
-
- | | |
|--|---------------------------|
| 1. Head southeast on Tomcat Blvd toward D Avenue
About 4 mins | go 1.6 mi
total 1.6 mi |
|  2. Turn left onto Oceana Blvd
About 4 mins | go 3.0 mi
total 4.5 mi |
| 3. Continue onto First Colonial Road
About 4 mins | go 1.7 mi
total 6.3 mi |
|  4. Turn right at 1st General Pkwy | go 308 ft
total 6.3 mi |



sentara virginia beach general hospital



Directions to sentara virginia beach general hospital
6.3 mi – about 12 mins



**Naval Auxiliary Landing Field Fentress
Off-Installation**

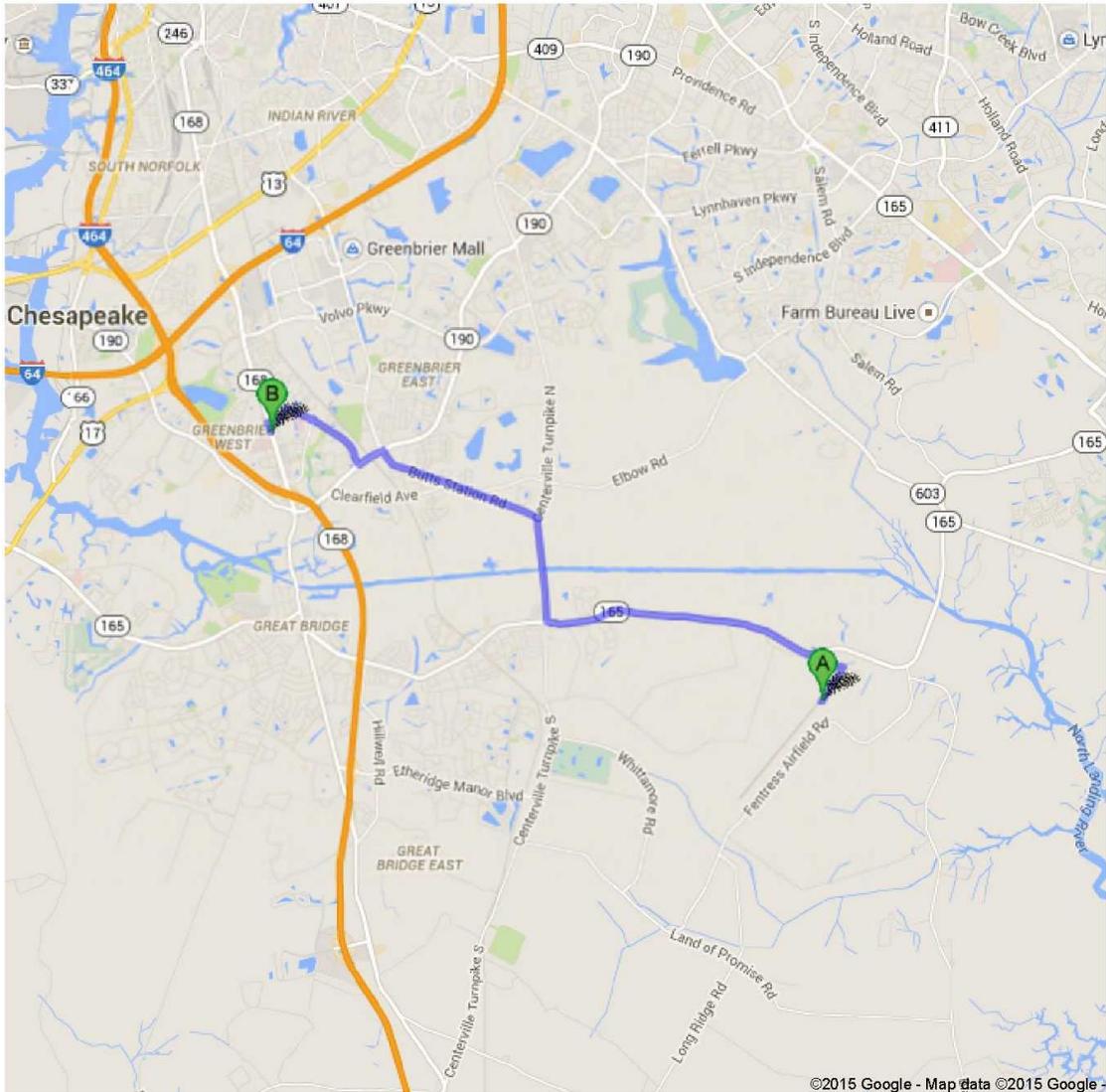
Chesapeake Regional Medical Center
736 North Battlefield Boulevard
Chesapeake, Virginia 23320

(757) 312-8121

	Fentress Naval Air Landing Field Chesapeake, VA 23322 - (757) 953-6246	
	1. Head northeast toward Bellpage Ave About 1 min	go 0.5 mi total 0.5 mi
	2. Turn left onto Bellpage Ave About 54 secs	go 0.3 mi total 0.8 mi
	3. Turn right onto Doolittle Ave	go 0.1 mi total 0.9 mi
	4. Turn left onto Mt Pleasant Rd About 5 mins	go 3.5 mi total 4.4 mi
	5. Turn right onto Centerville Turnpike S About 2 mins	go 1.3 mi total 5.6 mi
	6. Turn left onto Butts Station Rd About 3 mins	go 2.1 mi total 7.7 mi
	7. Turn left onto Kempsville Rd About 47 secs	go 0.3 mi total 8.0 mi
	8. Turn right onto Green Tree Rd About 1 min	go 0.8 mi total 8.8 mi
	9. At the traffic circle, take the 1st exit onto Old Oak Grove Rd	go 0.4 mi total 9.2 mi
	10. Turn left onto Knell's Ridge Blvd About 55 secs	go 0.3 mi total 9.5 mi
	11. Turn left onto N Battlefield Blvd Destination will be on the right	go 0.1 mi total 9.6 mi
	736 N Battlefield Blvd, Chesapeake, VA 23320	



Directions to 736 N Battlefield Blvd,
Chesapeake, VA 23320
9.6 mi – about 17 mins



**Naval Support Activity Hampton Roads, Northwest Annex
Off-Installation**

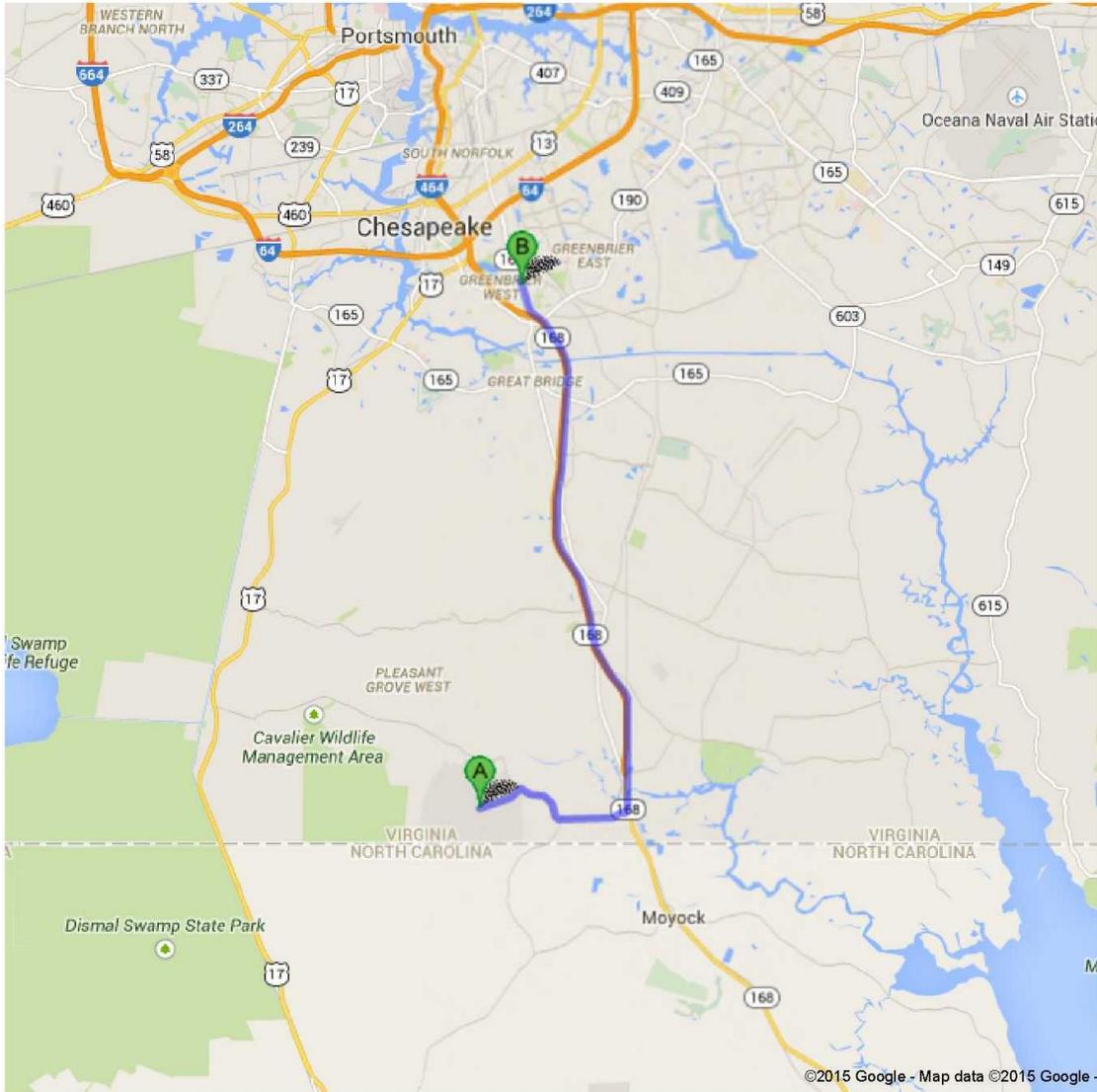
Chesapeake Regional Medical Center
736 North Battlefield Boulevard
Chesapeake, Virginia 23320

(757) 312-8121

	navy northwest security group	
	1. Head east on Milepost Rd About 2 mins	go 0.8 mi total 0.8 mi
	2. Slight left onto Relay Rd About 2 mins	go 0.3 mi total 1.1 mi
	3. Turn right onto Ballahack Rd About 4 mins	go 3.0 mi total 4.1 mi
	4. Turn left onto Old Battlefield Blvd	go 0.2 mi total 4.3 mi
	5. Turn left at the 1st cross street onto VA-168 N/Battlefield Blvd S/Chesapeake Expy Continue to follow VA-168 N <i>Partial toll road</i> About 13 mins	go 12.6 mi total 16.8 mi
	6. Take exit 13A for Battlefield Blvd N toward VA-168 BUS	go 0.3 mi total 17.1 mi
	7. Merge onto VA-168 BUS N/N Battlefield Blvd About 1 min	go 0.8 mi total 17.9 mi
	8. Make a U-turn at Knell's Ridge Blvd Destination will be on the right	go 0.1 mi total 18.0 mi
	736 N Battlefield Blvd, Chesapeake, VA 23320	



**Directions to 736 N Battlefield Blvd,
Chesapeake, VA 23320**
18.0 mi – about 24 mins





ATTACHMENT C – MEDICAL DATA SHEET

Tetra Tech CES, Inc.

Medical Data Sheet

(Form to be completed by all field personnel)

This brief medical data sheet shall be completed by all on-site personnel and will be kept on-site by the Project Manager or ESS as a project record during site operations. It accompanies any personnel when medical assistance is needed or if transport to a hospital is required.

Name: _____

Home Phone: _____ Spouse's Name: (if applicable) _____

Age: _____ Height: _____ Weight: _____ Blood Type: _____

Number of Dependents: _____

Name and Phone Number of Emergency Contact:

Drug or Other Allergies: _____

Do You Wear Contacts? _____

Provide List of Major Previous Illnesses or On-going Medical Conditions:

What Medications are you Presently Using?

Do you have any Medical Restrictions?

Name, Address, and Phone Number of Personal Physician:



Safety and Accident Prevention Plan

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1.0 INTRODUCTION

Biodiversity Research Institute (BRI) places a high value on its employees, and is committed to providing a safe and healthy workplace. BRI believes that its employees have a right to know about health hazards associated with work environment, and it's every ones responsibility to become familiar with, have knowledge of, and take responsibility for potential safety risks.

The Safety and Accident Prevention Program seeks to prevent injury before it happens by involving all staff in identifying and eliminating hazards that before they develop, and minimize the impact if an injury should occur. BRI will always have to prepare for, respond to, and recover from disasters resulting from natural, human-based, or technology-based events. The key to success is in adopting a standardized approach that provides common program elements, techniques, and processes. This plan applies to all BRI employees and provides customizable forms to incorporate into field projects.

This plan hinges on employees adopting three essential values:

- 1) No task is so important that employees must risk their safety in order to get the job done.

BRI employees often work in challenging environments that require quick thinking and innovative problem solving. However, despite timeline pressures, inclement weather, or the desire to “get the job done”, BRI expects its employees to always put safety first while doing their job.

- 2) Accidents expose all BRI Employees to risk.

Recall the old saying “haste makes waste” and consider the impact when decision to shortcut safety results in a serious injury that takes a key researcher out of commission. This incident affects more than the injured employee. Not only will the research be compromised as the team scrambles to find a replacement, but BRI may be faced with increased insurance premiums and/or penalty fines. Additional costs eventually are passed on to all employees. Loss of revenue for the company could result in layoffs. A good safety record may make the difference between BRI being selected by a funding agency over an equal competitor.

- 3) Accidents happen to good people.

Whether tethered to a desk, skimming on the water, or flying in the clouds, every BRI employee is exposed to safety-related issues every day. For those who live by “it can never happen to me” – think again. The laws of probability are working against this tenet since accidents will occur without warning despite preventative measures.

ABOUT THIS PLAN

This plan is divided alphabetically into several sections with accompanying appendices for field staff to use on a project-by-project basis. Please familiarize with the information

contained within this plan, ask questions, and consider how various aspects are applicable to your specific work.

It is the intention of BRI to comply with all applicable Occupational Safety and Health Administration (OSHA) regulations. This plan describes the processes and procedures used to manage occupational safety and health issues at BRI, and identify the most critical regulatory requirements.

AUTHORITIES

In the development of this plan, several authorities were consulted.

- U.S. Fish and Wildlife Service (USFWS)
- U.S. Coast Guard (USCG)
- American Canoe Association (ACA)
- Occupational Safety and Health Administration (OSHA)
- National Institute for Occupational Safety and Health (NIOSH)
- Centers for Disease Control and Prevention (CDC)
- National Fire Protection Association (NFPA)

2.0 RESPONSIBILITIES

BRI's Leadership Team holds the authority and responsibility for the over-all implementation of this program, and is assisted by Program Directors, the HR Manager, and the Risk and Compliance Advisor in its implementation. This section identifies who is responsible for implementing each element of BRI's Safety and Accident Prevention Program. The actual performance of activities described in this section may be delegated to other, but ultimate responsibility for ensuring that each program element is implemented correctly remains with the individuals identified below.

PERFORM FORMAL SAFETY WORKPLACE INSPECTIONS

Conduct Safety Inspections using the "Walk-Through Inspection Checklist" (see Appendix 1). The inspections must be performed quarterly. File the completed checklists in the Safety Inspections folder.

BRI Leadership Team and appointed staff

TRACK CORRECTIVE ACTIONS TO BE COMPLETED

A need for action to correct workplace safety or health deficiencies may be identified and reported through formal workplace inspections, suggestions by management or employees, and accident investigations. BRI will ensure that the person responsible for completing each corrective action is clearly documented and reports to the Leadership Team any required corrective actions that are not completed in a timely manner.

BRI Leadership Team and appointed staff

INJURY REPORTING AND RECORDING

Injuries and illnesses are recorded in accordance to OSHA requirements. If a work related injury or illness occurs, the Program Director should immediately inform the HR Director and complete the Report of Injury or Illness form (Appendix 1) within 24 hours of the incident. Sharps related injuries are noted so they can be separated out if necessary. The OSHA Form 300-A form from February 1 – April 30 is posted in common work areas as required by law. Note: if the work-related injury or illness involves a fatality or hospitalization of an employee, BRI may be required to notify OSHA within 8 hours.

Program Directors, HR Department

ACCIDENT INVESTIGATIONS

Accident investigations for work related injuries, illnesses, and near miss accidents are conducted as soon as possible following the event. These investigations are required by this program and must be completed within 24 hours of the incident. See Appendix 1 for the Accident/Injury and Near Miss Incident Review form. To ensure proper documentation, completed investigations are filed in the Accident Investigations folder of the Safety Program files. Additional guidance on how to perform accident investigations is provided in Appendix 8.

Program Directors, HR Department

CONDUCT SAFETY MEETINGS

Safety meetings to discuss safety related topics are conducted quarterly, at the beginning of each project and/or field season, or with the addition of new staff. An initial safety meeting that covers all potential hazards and expected response is required for new employees. Subsequent meetings should include discussion of injuries and near misses that have occurred since the last meeting, and how to prevent future incidents.

Meetings need to have a written agenda, date, names of employees who attend, and notes of any decisions. To ensure that any safety issues that were brought up during the meeting are forwarded to the correct person for resolution, file documentation of all safety meetings in the Safety Meeting folder for review by the Leadership Team.

Program Directors, Field Team Leaders, Leadership Team and appointed staff

EMPTY SAFETY SUGGESTION BOX

BRI has provided a Safety Suggestion Box at each facility (in the lunch area) and it will be checked at least weekly. An online version of the Safety Suggestion Box is located on BRI's intranet website. The Leadership Team reviews and determines the appropriate action on all suggestions received. All suggestions, and subsequent actions, will be filed in the Safety Suggestions folder.

Leadership Team and appointed staff

SUPERVISOR and MANAGER SAFETY TRAINING

All supervisors and managers must be aware of their responsibilities under the Safety Program, and all supervisors and managers must be aware of the hazards to which their employees may be exposed and the controls necessary for their employees to work safely.

Leadership Team and appointed staff

SUPERVISOR HEAT STRESS TRAINING

All supervisors with employees working in hot environments must receive training on the hazards of heat stress and, understand the procedures they are to follow if one of their employees develops a heat related illness. This training will be documented in the Safety Training folder.

Leadership Team and appointed staff

NEW EMPLOYEE TRAINING

All new employees are supplied with a copy of the Code of Safety Practices (Appendix 2) and any additional training specific to their work assignment(s). All BRI employees also receive additional training when they are given new job assignments with additional hazards, when new substances, processes, procedures or equipment are introduced into the work area, and when new workplace hazards are recognized. The employee must date and sign a copy of the safety training certification, which is placed the completed form in the employee's personnel file.

Program Directors and their appointed staff

PROJECT SPECIFIC TRAINING

Each Program Director is responsible for ensuring the safety of his/her crew. Each employee shall receive a safety orientation by his/her immediate supervisor when:

- First hired
- First drafted to work and a specific project

Each safety orientation shall cover the following points:

- A description of potential hazards associated with the project and related prevention strategies;
- How and when to report injuries;
- Where first aid supplies are located;
- How to report unsafe conditions and/or practices;
- What to do in an emergency;
- Identification of hazardous animals, plants or chemicals;
- Use and care of required personal protection equipment (PPE).

It is advisable that Program Directors take time to develop project job assessment plans (JSAs). This may be a requirement of the funding agency, and template is presented in Appendix 1, which may be modified for a specific project. See Appendix 6 for additional directions on how to complete a JSA.

Project Directors

START-UP SAFETY TRAINING

Ensure that all employees receive initial safety training when this Safety and Accident Program is first established.

Leadership Team

PROVIDE PERSONAL PROTECTIVE EQUIPMENT

BRI is committed to providing adequate supplies of the personal protective equipment listed in the Code of Safe Practices (Appendix 6) and making sure they are readily available for use by employees.

BRI is required to protect employees from exposure to potentially infectious material, and provide PPE in the appropriate sizes at no cost to employees. The equipment provided should not permit blood or other potentially infectious materials to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions for the full duration of use. The types of equipment which may be provided include, but are not limited to gloves, gowns, laboratory coats, face shields, masks, eye protection, mouthpieces, resuscitation bags, pocket masks, or other ventilation devices. The equipment must be kept clean and be repaired, replaced, and/or disposed of when necessary at no cost to the employee. Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives are available for employees who are allergic to the standard gloves.

Project Directors

SHARPS CONTAINER DISPOSAL

Ensure that sharps containers are replaced and properly disposed of as necessary.

Program Directors, Lab Manager

HAZARD, CONTROL, and PERSONAL PROTECTIVE EQUIPMENT CHANGES

This Safety Program shall be updated to reflect any changes in the hazards to which employees are exposed, the engineering controls used to protect them from those hazards, or personal protective equipment they use.

Leadership Team and their appointed staff

PERFORM ANNUAL REVIEW

Review the effectiveness of this program every year by completing the "Safety Program Review Checklist" (Appendix 1). Results are presented to the Leadership Team, and placed the completed checklist in the Safety Program Reviews file.

Leadership Team's appointed staff

MAINTAIN SAFETY PROGRAM FILES

Ensure that all the documentation generated by this program is properly filed.

In addition, BRI's Leadership Team has the responsibility of:

- Approving this Safety and Accident Prevention Plan.
- Providing adequate resources.

- Setting a good example.
- Assign staff to monitor safety conditions.
- Follow-up on unsafe condition reports.
- Report all work-related injuries and illnesses.
- Enforce Code of Safe Practices

DISCIPLINE

Discipline for employees who do not comply with the Code of Safety Practices (Appendix 2) or behave unsafely includes:

- Verbal warning and retraining for first offense
- Written warning for second offense (copy placed in employees' personnel file)
- Suspension without pay or termination for subsequent offenses.

3.0 SAFETY COMMUNICATION

BRI uses the following methods to communicate with employees regarding safety related issues. Safety communication will be in a form that is understandable to every employee.

- Safety Meeting
 - Presented quarterly during regular staff meetings
 - All staff are required to attend
- Safety Suggestion Box
 - Located in the lunch room at each building and online
 - Staff are encouraged to submit suggestions
 - Suggestions may be made anomalously if desired
- Safety Training
 - All employees will receive safety training prior to starting work
- Safety Inspection
 - All supervisors must continuously (daily) observe their work area for unsafe actions and/or conditions and correct any deficiencies.
 - Formal safety inspections using checklists provided in Appendix 1 are conducted quarterly.

4.0 PERSONAL PROTECTIVE EQUIPMENT

Employees must be trained on the proper use of all personal protective equipment (PPE) they use when they are first given an assignment that requires PPE. If they are observed using the equipment incorrectly, it is the responsibility of ALL BRI employees to instruct them on the correct usage. While most PPE is specific to programs and managed by the Program Director, some PPE is communal and viewed as a shared resource.

5.0 ANNUAL REVIEW

BRI will review the effectiveness of this Safety Program at least annually and correct any deficiencies noted during the review.

6.0 RECORDS RETENTION

Records documenting the administration of this Safety Program will be retained for at least three (3) years.

The following will be retained for at least five (5) years:

- Training documentation
- Accident investigation records
- Safety inspection
- OSHA 300 log, summary and incident reports

Vaccination and post-exposure follow up records will be retained for the duration of employment plus 30 years. All records containing employee medical information will be kept strictly confidential.

7.0 LIST OF APPENDICES

Appendix 1 FORMS

Employee Training Form
 Float Plan
 Field Check-Out/Check-In Procedures
 Report of Injury or Illness
 Accident/Injury and Near Miss Incident Review
 General Hazard Identification and Risk Assessment

Appendix 2 CODE OF SAFETY PRACTICES

Code of Safety Practices
 Basic Safety
 Personal Protective Equipment
 Office and Shop Safety
 Field Safety

Appendix 3 CHEMICAL HYGINE PLAN

Overview
 Hazard Determination
 MSDS
 Labels and Warnings
 Training
 Written Hazard Communication Plan
 Trade Secrets

Appendix 4 EMERGENCY ACTION PLAN

Emergencies
 Incident Command System
 Fire Emergency
 Medical Emergency

Appendix 5	Weather Related Emergency TRAVEL SAFETY Field Itinerary Communications Multiple Forms of Communication Check-in Policy Rental Vehicles
Appendix 6	PERSONAL PROTECTION EQUIPMENT Authorities Job Hazard Assessments Common Hazards PPE Training Record Keeping PPE for Standardized BRI Activities - Boating
Appendix 7	SPOT TRACKER When to use a SPOT SPOT Operating Directions SPOT Buttons Viewing Track Progress Online
Appendix 8	ACCIDENT and NEAR MISS INVESTIGATIONS Accidents and Near Misses Definitions Accident Causation Step-by-Step Investigation Reporting Subcontractors
Appendix 9	CONTACT INFORMATION Local Medical Facilities Local Law Enforcement and Fire BRI Staff Office and Cellular Contact Information
Appendix 10	BATS AND RABIES Overview Exposure Routes Vaccinations Exposure Management Rabies Specimen Submission Literature Cited

APPENDIX 1

FORMS

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GENERAL HAZARD IDENTIFICATION AND RISK ASSESSMENT.....	9

EMPLOYEE TRAINING FORM

Employee Training Requirements, Biodiversity Research Institute

Employee Name:	
Primary Trainer:	
Item	Date Completed
Code of Safe Practices – Provide the employee with a copy of the Code of Safe Practices (Appendix 2). Explain every item in the Code of Safe Practices to the employee and answer any questions they have. Remind them that their signature below is affirmation that they read the Code of Safe Practices.	
First Aid – Show employee the location of the first aid kit, and explain the procedure for calling outside help in the event of an emergency.	
Evacuation Plan – Show employee how to leave their work area in an emergency. Explain the system used to notify employees of an emergency. Show the employee where to assemble in the event of a building evacuation. Review the emergency action plan (Appendix 4) with the employee.	
Assignment Specific Hazards and Safety Procedures – Train employee on any additional hazards and safety procedures required for their specific work assignment.	

I certify that I have received all of the training indicated above:

Signature

Printed Name

Date

Note to employee: Cross out and initial any items you have not yet been trained on.

FLOAT PLAN

BRI FLOAT PLAN			
1	Name and cell phone number of person filing the plan.		
2	Boat Description		
	Registration #	Hull Type	
	Manufacturer	Hull Color	
	Length	Trim Color	
3	Engine(s)		
	Type	H.P.	
	# Engines	Fuel Capacity	
4	Survival Equipment		
	<input type="checkbox"/> PFD's	<input type="checkbox"/> Flares	<input type="checkbox"/> Mustang Suit
	<input type="checkbox"/> Paddles	<input type="checkbox"/> Anchor	<input type="checkbox"/> Mustang Jacket
		<input type="checkbox"/> Spot Tracker	Spot # _____
5	Radio?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Type	Frequency	
6	Persons on board		
	Name	Age	Phone

7	Do any of the persons onboard have a medical problem?		
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	If Yes, Explain _____		
8	Trip Details		
	Leaving at:	_____	am/pm
	Going to:	_____	
	Expected back:	_____	am/pm
9	Other pertinent information: _____		

FIELD CHECK-OUT/CHECK-IN PROCEDURES

All biologists involved in this project are required to adhere to this check-out/check-in procedure each and every time they embark on field work. Please read and understand the following directions, and ask questions of your supervisor on points that you find unclear. The Check-OUT/Check-In list should be posted in a common area and made visible to all staff.

- Date:** Please use mm/dd/yy format.
- Name(s):** List the full name(s) of all biologists in your party, use multiple lines if necessary.
- Departure:** This is the time you'll depart; use 2400 hr time format.
- Destination:** Briefly describe your destination. This could be a transect number, trail name, etc. BRI in Gorham Maine should have a copy on file (with details) of such destinations, and a copy should be posted onsite for reference by other team members.
- Transport:** List the vessel/vehicle you'll be using for the day.
- Communications:** List the forms of communication you'll be carrying (cell phone numbers, SPOT number, etc.).
- Return:** This is the time you expect to return; use 24 hour time format.
- Checked In:** Place a check in this column once you've returned.

Date	Name(s)	Departure	Destination	Transport	Communications	Return	Checked In
5/15/12	Jonny on the Spot	0800	Sebago Lake – south end	Boat #3	205.752.3366 (cell)	1400	

REPORT OF INJURY OR ILLNESS

Employee Name (Last, First, MI)			Incident Number	
Mailing Address		City	State	Zip Code
Phone		E-mail	DOB	
Job Title		Current Supervisor	Hire Date	
Incident Location	Incident Date	Time of Incident	State Incident Occurred In	
<p>Description of Incident <i>(describe sequence of events, object or exposure that directly caused injury or illness)</i></p>				
Form Completed By			Date	
<p>Release of Medical Information: I certify that the above information is true to the best of my knowledge and I authorize the release to my employer and workers' compensation company all records relevant to my disability and my claim for disability or workers' compensation benefits, including but not limited to medical diagnosis, prognosis, treatment, and periods of hospitalization. It is understood that the company will use the information to verify my disability and determine my eligibility of appropriate benefits. This authorization applies to physicians and other health care providers, hospitals, clinics, insurance companies, workers' compensation carriers, and organizations administering benefit programs. This authorization will remain in effect throughout my claim for workers' compensation benefits. I understand that I have the right to revoke this authorization in writing. A photocopy of this authorization will be as valid as the original.</p>				
Employee Signature			Date	

Incident Details					
Date of Incident	Time of Incident <input type="checkbox"/> AM <input type="checkbox"/> PM	Date Reported	Reported To		
Incident Location (area)		On Employer Premise	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Witness(es)					
Employee lost time to injury	<input type="checkbox"/> Yes	<input type="checkbox"/> No	First Aid Given	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Date Worker Left Work	Time Worker Left Work		Date Worker Returned		
Medical Facility			Doctor		
Follow Up Appointment Scheduled				<input type="checkbox"/> Yes	<input type="checkbox"/> No
Time Off Authorized by Physician	<input type="checkbox"/> Yes	<input type="checkbox"/> No	If Yes, How Many Days		
Treatment Given	<input type="checkbox"/> Prescription	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Sutures	<input type="checkbox"/> Tetanus Shot	
<input type="checkbox"/> Ace Bandage	<input type="checkbox"/> Brace	<input type="checkbox"/> Cast	<input type="checkbox"/> Remove Foreign	<input type="checkbox"/> None	
<input type="checkbox"/> Other:					

Part of Body Injured (mark all that apply)									
<input type="checkbox"/> Head		<input type="checkbox"/> Arm	R L	<input type="checkbox"/> Trunk	R L	<input type="checkbox"/> Hip	R L	<input type="checkbox"/> Foot	R L
<input type="checkbox"/> Face		<input type="checkbox"/> Elbow	R L	<input type="checkbox"/> Shoulder	R L	<input type="checkbox"/> Thigh	R L	<input type="checkbox"/> Toe	R L
<input type="checkbox"/> Eye	R L	<input type="checkbox"/> Forearm	R L	<input type="checkbox"/> Chest	R L	<input type="checkbox"/> Knee	R L	<input type="checkbox"/> Ribs	R L
<input type="checkbox"/> Nose		<input type="checkbox"/> Hand	R L	<input type="checkbox"/> Back	R L	<input type="checkbox"/> Leg	R L	<input type="checkbox"/> Skin	R L
<input type="checkbox"/> Neck		<input type="checkbox"/> Finger	R L	<input type="checkbox"/> Abdomen	R L	<input type="checkbox"/> Ankle	R L	<input type="checkbox"/> Other	R L
Other:									

Nature of Injury (mark all that apply)				
<input type="checkbox"/> Abrasion	<input type="checkbox"/> Puncture	<input type="checkbox"/> Chemical	<input type="checkbox"/> Inhalation	<input type="checkbox"/> Burn
<input type="checkbox"/> Bruise-Crushed	<input type="checkbox"/> Fracture	<input type="checkbox"/> Hearing	<input type="checkbox"/> Fatality	<input type="checkbox"/> Other
<input type="checkbox"/> Laceration	<input type="checkbox"/> Poisoning	<input type="checkbox"/> Sprain	<input type="checkbox"/> Heat/Cold	<input type="checkbox"/>
<input type="checkbox"/> Amputation	<input type="checkbox"/> Dermatitis	<input type="checkbox"/> Strain	<input type="checkbox"/> Foreign Object	<input type="checkbox"/>
Other:				

Cause of Injury (mark all that apply)				
<input type="checkbox"/> Body Motions	<input type="checkbox"/> Hot/Cold	<input type="checkbox"/> Flame/Smoke	<input type="checkbox"/> Ladders	<input type="checkbox"/> Slip/Trip/Fall
<input type="checkbox"/> Bldg/Structure	<input type="checkbox"/> Conveyors	<input type="checkbox"/> Furniture	<input type="checkbox"/> Machines	<input type="checkbox"/> Flying Object
<input type="checkbox"/> Chemicals	<input type="checkbox"/> Electrical –HV	<input type="checkbox"/> Hand Tool	<input type="checkbox"/> Notices	<input type="checkbox"/> Flash
<input type="checkbox"/> Vehicles	<input type="checkbox"/> Electrical - LV	<input type="checkbox"/> Hoisting	<input type="checkbox"/> Particles	<input type="checkbox"/> Other
<input type="checkbox"/> Falling Objects				
Other:				

Cause of Incident (mark all that apply)				
<input type="checkbox"/> Equipment	<input type="checkbox"/> Material Handling	<input type="checkbox"/> Excessive Speed	<input type="checkbox"/> Poor Housekeeping	<input type="checkbox"/> Horseplay
<input type="checkbox"/> Lack of Attention	<input type="checkbox"/> Slippery Surface	<input type="checkbox"/> Procedure Failure	<input type="checkbox"/> Fatigue	<input type="checkbox"/> Other
Other:				

Supervisor Signature:	Date:

Return completed form to: Catherine S. Flegel, Science Operations Director
Biodiversity Research Institute
652 Main Street, Gorham, ME 04038
Phone: 207.839.7600 x212
catherine.flegel@briloon.org

ACCIDENT/INJURY and NEAR MISS INCIDENT REVIEW

Incident Summary		
Incident Number	Location	Date and Time
Investigator's Name		
Employees and Managers involved		
Description of incident; Controls and Personal Protection Equipment in Use/Not in Use		

Incident Type		
<input type="checkbox"/> Vehicle	<input type="checkbox"/> Equipment	<input type="checkbox"/> Injury / Medical
<input type="checkbox"/> Boat	<input type="checkbox"/> Near Miss	<input type="checkbox"/> Injury / Non-Medical

Contributing Factors		
<input type="checkbox"/> Weather related	<input type="checkbox"/> Retraining needed	<input type="checkbox"/> PPE damaged
<input type="checkbox"/> Outside Influence	<input type="checkbox"/> Did not follow Policy, Procedure, Rules	<input type="checkbox"/> Equipment failure
<input type="checkbox"/> Poor Judgment	<input type="checkbox"/> No Policy, Procedure, Rule in place	<input type="checkbox"/> Equipment misused
<input type="checkbox"/> Inattention to Detail	<input type="checkbox"/> Circumstances beyond control	<input type="checkbox"/> Tool available, not use
<input type="checkbox"/> Improper training	<input type="checkbox"/> PPE not available	<input type="checkbox"/> Tool not available
<input type="checkbox"/> No training	<input type="checkbox"/> PPE not used properly	<input type="checkbox"/> Broken tool

Summary	
Primary Cause	
Corrective Action	
<i>I agree with the above incident description</i>	
Investigator's Signature	Date

Return completed form to:

Catherine S. Flegel, Science Operations Director
Biodiversity Research Institute
652 Main Street, Gorham, ME 04038
Phone: 207.839.7600 x212
catherine.flegel@briloon.org

GENERAL HAZARD IDENTIFICATION AND RISK ASSESSMENT

Workplace :		Contract Code:	
Risk Assessor (s):		Assessment Date:	
Specific Task Related to Hazard :			
Section 1.	Hazards: Potential Damaging Energies		
Work Environment		Radiation	
Adequate access	<input type="checkbox"/>	Ionizing radiation	<input type="checkbox"/>
Air-conditioning	<input type="checkbox"/>	Non-ionizing radiation	<input type="checkbox"/>
Confined spaces	<input type="checkbox"/>		
Lighting	<input type="checkbox"/>	Kinetic Energy	
Mental stress	<input type="checkbox"/>	The body hitting objects	<input type="checkbox"/>
Ergonomics	<input type="checkbox"/>	Hit by moving objects	<input type="checkbox"/>
		Explosion	<input type="checkbox"/>
Temperature / Weather Effects		Penetrating objects	<input type="checkbox"/>
Heat	<input type="checkbox"/>	Vibration	<input type="checkbox"/>
Cold	<input type="checkbox"/>	Acoustic / Noise	<input type="checkbox"/>
Rain / Flood	<input type="checkbox"/>		
Wind	<input type="checkbox"/>	Energy	
Pressure (Diving / Altitude)	<input type="checkbox"/>	Electrical	<input type="checkbox"/>
Lightning	<input type="checkbox"/>	Gravity	<input type="checkbox"/>
Smoke	<input type="checkbox"/>	Falls / Trips / Slips	<input type="checkbox"/>
		Falling objects	<input type="checkbox"/>
Health and Security	<input type="checkbox"/>		
Food	<input type="checkbox"/>	Mechanical	
Poisoning or Contamination	<input type="checkbox"/>	Vehicles	<input type="checkbox"/>
Intoxication	<input type="checkbox"/>	Mobile and Fixed plant	<input type="checkbox"/>
Dehydration	<input type="checkbox"/>	Powered Equipment	<input type="checkbox"/>
Violence	<input type="checkbox"/>	Non-Powered Equipment	<input type="checkbox"/>
Working alone	<input type="checkbox"/>		
Bites / Stings	<input type="checkbox"/>		
		Biological	
		Microbiological	<input type="checkbox"/>
		Animal tissue / Fluids	<input type="checkbox"/>
		Human tissue / Fluids	<input type="checkbox"/>
		Allergenic	<input type="checkbox"/>
		Other Biological	<input type="checkbox"/>
		Chemical / Hazardous Substance	
		Liquids	<input type="checkbox"/>
		Fumes	<input type="checkbox"/>
		Gases	<input type="checkbox"/>
		Vapors / Mists	<input type="checkbox"/>
		Solids	<input type="checkbox"/>
		Manual Handling	
		Lifting / Carrying	<input type="checkbox"/>
		Pushing / Pulling	<input type="checkbox"/>
		Posture	<input type="checkbox"/>
		Reaching/ Overstretching	<input type="checkbox"/>
		Repetitive movement	<input type="checkbox"/>
		Bending	<input type="checkbox"/>
		Miscellaneous	
		Working at heights	<input type="checkbox"/>
		Working alone	<input type="checkbox"/>

Section 2. - Summary of Identified Hazards			
1.		9.	
2.		10.	
3.		11.	
4.		12.	
5.		13.	
6.		14.	
7.		15.	
8.		16.	
Any specific circumstances (describe):			
Persons at Risk: (list)			
Is the risk (Tick one)	<input type="checkbox"/> Minimal risk exposure		
	<input type="checkbox"/> Adequately controlled. No further action required		
	<input type="checkbox"/> Inadequately controlled. Further Action/Investigation Required. Proceed with Risk Assessment (Section 3)		
	<input type="checkbox"/> Covered by Regulation/Standard/Code Specify:		

Section 3. – Risk Assessment (List identified hazards and detail measures taken to address the hazards) This form is to be expanded electronically or additional information attached where required

Controls to be considered from the following hierarchy of control

- | | |
|-------------------------------------|---|
| 1. Elimination (is it necessary?) | 5. Administration (training, SOP's,) |
| 2. Substitution | 6. Personal Protective Equipment (PPE) e.g.
(gloves, leather apron, coveralls, respirator) |
| 3. Isolation (restrict access) | etc |
| 4. Engineering (guarding, redesign) | |

Identified Hazards Exposure	Risk assessment		Risk Rating	Required Controls	Controls Implemented	
	Consequences	Likelihood			Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>
					Yes <input type="checkbox"/>	No <input type="checkbox"/>

Section 4 – Implementation Plan			
Control Option	Resources	Person(s) Responsible	Proposed Implementation date

Section 5 – Consultation			
Have relevant staff been consulted in relation to this risk assessment? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, indicate who was consulted.			
Name:	Date:	Name:	Date:

Section 6 – Comments and Endorsements		
Name:	Signature:	Date:
Assessment Approval:		
I am satisfied that the risks are not significant and/or adequately controlled and that resources required will be provided.		
Name:	Signature:	Date:
Position Title:		

Risk Assessment Matrix

PRIORITISING HAZARDS AND RISKS (SEE EXAMPLE ON PAGE 13)

Probability	Consequence			
	Negligible	Marginal	Critical	Catastrophic
Certain	High	High	Extreme	Extreme
Likely	Moderate	High	High	Extreme
Possible	Low	Moderate	High	Extreme
Unlikely	Low	Low	Moderate	Extreme
Rare	Low	Low	Moderate	High

HAZARD CONSEQUENCE RATING TABLE

Catastrophic	Multiple deaths
Critical	One death or multiple minor injuries
Marginal	One severe injury or multiple minor injuries.
Negligible	One minor injury

PROBABILITY RATING TABLE

Certain	Exposure to hazard likely to occur frequently (91-100%)
Likely	Exposure to hazard likely to occur but not frequently (90-76%)
Possible	Exposure to hazard may occur, but probably is low (75-24%)
Unlikely	Exposure to hazard unlikely to occur (25-2%)
Rare	Exposure to hazard so unlikely that it can be assumed that it will not happen (<1%)

RISK PRIORITY TABLE

Risk Priority	Definitions Of Priority	Suggested Time Frame
High	Situation critical, stop work immediately or consider cessation of work process. Must be fixed today, consider short term and/or long term actions.	Now
Medium	Is very important, must be fixed this week, consider short term and/or long term actions.	This Week
Low	Is still important but can be dealt with through scheduled maintenance or similar type programming. However, if solution is quick and easy then fix it today. Review and/or manage by routine procedures.	1 - 3 Months

Risk Assessment Matrix Example

Risk is the amount of harm that can be expected to occurring during a given time period due to specific harm event, such as an accident. The level of risk can be statistically calculated by multiplying the probability that harm could occur, by the severity of the harm. A risk matrix (as seen on page 11) defines the various levels of risk as the product of harm probably categories and harm severity categories. Project managers should tailor each risk matrix to their own project and ensure the job assessment is signed. An example for a BRI bird mist netting project would be:

Probability	Consequence			
	Negligible	Marginal	Critical	Catastrophic
Certain	Stub toe on trail			
Likely		Cut hand setting up nets, Twist ankle on trails,		
Possible		Minor car accident on way to site		
Unlikely			Major car accident on way to site	
Rare				Tornado hits site while working

APPENDIX 2

CODE OF SAFE PRACTICES

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CODE OF SAFETY PRACTICES

BASIC SAFETY

Follow all Safety Rules – All employees must work safely and follow all safety rules.

Safety Program – BRI’s Safety and Accident Prevention Program describes the policies and procedures BRI uses to provide you with a safe workplace.

Report Unsafe Conditions or Actions – All employees must immediately report unsafe conditions or near misses to Program Managers, Field Coordinators, the Executive Director, Deputy Director, or the Science Operations Director. A near miss is an incident where someone could have been hurt but wasn’t this time. It is important to correct unsafe conditions or procedures before someone is hurt.

Report all Injuries – Employees must report all injuries (no matter how minor) to their supervisor so that arrangements can be made for medical or first aid treatment. This includes illness or aches and pains that employees think may be work related and that don’t go away normally. Needle sticks or contact of your broken skin or mucous membranes with potentially infectious materials counts as “injuries” which must be reported.

Do not disturb or clean-up the scene of a serious accident (except to aid injured people or make the area safe) until an accident investigation has been completed.

Don’t Work When Impaired – Employees shall not work when impaired by fatigue, illness, medication, or intoxicating substances such as alcohol. The use of illegal drugs is strictly prohibited.

Housekeeping – Keep your work area tidy and free from unnecessary clutter and trip hazards. Clean up spills as soon as possible. Keep solvent waste, oily rags, and flammable liquids in labeled fire resistant covered containers until removed from the work-site.

No Horseplay – Horseplay is forbidden.

Threats and Violence are Prohibited – Violence, threats of violence, and physical intimidation are prohibited.

Employees who feel that a BRI employee or client is potentially violent should immediately report their concerns to any manager or supervisor. Employees who experience violence on the job, or are threatened or experience physical or verbal intimidation should report this to their supervisor immediately.

PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment (PPE) used in your work area is listed below. Do not perform any tasks which require the use of PPE until you've been shown how to use it correctly. During your initial safety training you will be told which work tasks require the use of PPE and how to obtain the equipment you need.

- U.S. Coast Guard (USCG) approved flotation vests – employees are expected to wear USCG approved life vests when in a boat for work-related activities.
- USCG approved survival suits – supervisors will determine if conditions require USCG approved survival suits when boating in colder weather or on the ocean.
- Safety glasses with side protection (ANSI Z87.1)
- Safety goggles (ANZI Z87.1) – wear as required.
- Ultra-violet safety glasses (ANSI Z87.1) – are required with using UV fluorescence torches
- Latex disposable gloves – when handling, or expecting to handle, potentially infectious materials.
- Nitrile disposable gloves – when handling, or expecting to handle, potentially infectious materials; an alternative when employees are allergic to latex.

Eyesight is Precious – Always wear your eye protection when required. There are many types of eye protection available, tell your supervisor if your eye protection distorts your vision or gives you headaches.

Chemical Protective Gloves – Each kind of glove only provides protection against certain chemicals; always make sure that the chemicals you are using can't go through the kind of gloves you are wearing. No glove provides a perfect chemical barrier; always try to minimize the amount of chemicals that gets on your gloves. Avoid touching your skin or clothes with contaminated gloves. Never touch or allow others to touch objects with bare hands after handling them with contaminated gloves. Decontaminate objects which you have handled with contaminated gloves as soon as possible.

Latex Allergy – Some people may become allergic to latex rubber. Alternative gloves are available, and the allergy usually gets worse if you continue using latex gloves. For these reasons, inform your supervisor immediately and switch to another type of glove if you have any reaction to latex gloves.

Disposable Gloves – Do not re-use disposable gloves. Use the following technique to remove gloves without contaminating your hands.

1. Pinch one of the gloves at the cuff of the glove near the wrist.
2. Peel the glove off by pulling it off our hand turning it inside out.
3. Place the glove you just removed in the hand that still has a glove on, taking care to touch only the clean inner side of the just removed glove.
4. Slide your index finger under the remaining glove, and use your finger to turn the glove inside out over the previously removed glove. Take care to touch only the clean inner side of the glove with your bare hand.
5. Dispose of the gloves and wash your hands with soap and warm water.

BRI employees may be exposed to blood or other potentially infectious materials. Exposure with human blood and/or pathogens may occur through:

- Accidental needle sticks while drawing blood from wildlife.
- Tactile exposure with body fluids through an open wound of a coworker while providing first aid.

All body fluids should be considered potentially infectious materials and to avoid/minimize exposure, BRI staff must take the following precautions:

1. Always wash your hands immediately or as soon as possible after removing gloves or other PPE. Always wash your hands or any other skin with soap and water, or flush mucous membranes (e.g., eyes, mouth, and nose) with water immediately or as soon as possible following contact with a potentially infectious material. If you can't wash or flush immediately, use antiseptic hand cleaners or towelettes and wash as soon as possible.
 - a. Antiseptic soap is provided in the restrooms of every BRI facility.
 - b. Antiseptic hand cleansers or towelettes are provided in each field first-aid kit, and hands should be washed with soap and running water as soon as feasible.
2. Do not bend, recap or remove needles or sharps. Always place used sharps in an appropriate sharps container immediately or as soon as possible after use. Never reach into a sharps container for any reason. Securely close sharps containers before moving them. Report or replace sharps containers which are nearly full as instructed by your supervisor.
3. Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where you may be exposed to potentially infectious materials and while providing first aid. Never place food or drink in or on refrigerators, freezers, shelves, cabinets, or counter-tops where potentially infectious materials are stored or handles.
4. Always minimize splashing, spraying, spattering, and generation of droplets when performing procedures involving potentially infectious materials. Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

5. Always place specimens of potentially infectious materials in closable, puncture resistant, labeled or color-coded containers. If the outside of the primary container becomes contaminated or the specimen may puncture the primary container, place the primary container in a second, labeled or color-coded container.
6. Always decontaminate equipment you have used with potentially infectious materials before giving it to another employee or releasing it for servicing. If it is not possible to decontaminate the equipment, put an easily visible label that describes what parts remain contaminated on the equipment.
7. Always wear PPE when required. All PPE will be provided to you at no cost.
8. Gloves must be worn when it can be reasonably anticipated that you may have hand contact with potentially infectious materials, mucous membranes, or non-intact skin, are drawing blood, if you will be handling or touching contaminated items or surfaces, or if you are handling potentially contaminated laundry or waste.
9. Masks in combination with eye protection devices are required whenever you may be exposed to splashes, sprays, spatter, or droplets of potentially infectious materials and eye, nose, or mouth contamination can be reasonably anticipated.
10. Appropriate protective clothing (e.g. gowns, aprons, lab coats) may be required depending on the task and degree of exposure anticipated. Always immediately remove garments soiled by potentially infectious materials as soon as possible and place them in the designated container.
11. Change disposable glove immediately or as soon as possible if they are contaminated with potentially infectious materials, are torn or punctured, or lose the ability to function as an effective barrier. Remove all PPE before leaving the work area. Place PPE in the designated area or container for storage, washing, decontamination, or disposal. Never wash or reuse disposable gloves or any disposable equipment.
12. Clean equipment or surfaces which are overtly contaminated with potentially infectious materials immediately or as soon as possible.
13. Never clean up broken glassware by hand; use a brush and dust pan, tongs, forceps or other mechanical means.
14. Inform your supervisor immediately if potentially infectious material contacts your eyes, gets in your nose or mouth, or gets on your skin where there is a cut, rash, or any other skin problem. Inform your supervisor immediately if you are stuck or cut with a sharp that is contaminated with potentially infectious materials. The incident must be

documented, investigated, and you are entitled to receive confidential medical follow-up at no cost.

Sharps Safety – Always use all available safety covers built into sharps. Dispose of used sharps promptly in appropriate sharps disposal containers. Do not re-cap used needles. Report all needle sticks and other sharps-related injuries promptly to your supervisor.

Vaccinations and Boosters – If conditions prevail, BRI employees are eligible for vaccinations and/or boosters (i.e., Hepatitis B, rabies) at no cost to the employee.

Ticks and Lyme disease – Field biologists, especially those working in the northeast, should take precautions against being bitten by deer ticks. Black-legged and western black-legged ticks transmit Lyme Disease, an infection caused by *Borrelia burgdorferi*, a type of bacterium called a spirochete. When bitten, the bacterium travels through the bloodstream, establishes itself in various body tissues, and can cause a number of symptoms. Report tick bites and seek medical attention if the following occur:

- An expanding rash radiates from the site of a tick bite.
- A bull's-eye rash appears around the site of the tick bite.
- Swelling of the lymph glands occurs near the tick bite.
- Headaches occur.

If in doubt, always have a tick bite investigated by a medical professional. BRI's Workers Compensation plan covers the expenses if the tick bite occurred while working for BRI.

Plan Updates – BRI's Potentially Infectious Materials Exposure Control Plan will be reviewed and updated annually. Each employee will subsequently receive an updated copy electronically.

Records – Medical records relating to blood borne pathogens and/or potentially infectious materials (and any other medical issue) will be kept in BRI's medical files (locked) for 30 years. Medical records are kept under lock and key separate from other personnel files.

Training – BRI provides training on potentially infectious materials when:

- Employee is first hired, with retraining within a year.
- Employee is assigned to a project where exposure is likely.

Training is documented via BRI's Employee Training Documentation Form, and this form will reside in the employees personnel file for three years.

OFFICE and SHOP SAFETY

Computer Ergonomics – Employees should take the time to set up their computer comfortably. The keyboard and monitor should be directly in front of them so that they can work without twisting. The keyboard should be just below elbow height when sitting with their shoulders and

arms relaxed at their sides. The top of the monitor should not be above eye level. If necessary, employees should raise their seats and use a foot rest if their feet don't rest flat on the ground.

Employees should request a split keyboard or alternative mouse if their existing equipment generates wrist or arm discomfort.

Employees should arrange their work space so that there is not excessive glare on their monitor screen from lights and windows.

Food – Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where potentially hazardous or biological samples are stored or handled. Food and drink is not kept in refrigerators, freezers, shelves, cabinets, or on countertops or bench tops where biological materials are stored or handled.

Safe Lifting – Use mechanical devices, such as carts, to lift and carry heavy objects whenever possible. If necessary, have another person help lift a heavy item. Bend your legs (instead of your back) and avoid twisting your neck and back while lifting. Store heavy objects at waist level, not on the floor or overhead.

Keep Hand Tools in Good Condition – Replace chisels, punches and other impact tools with mushroomed shafts. Replace hammers with loose heads and any tool with loose handles. Keep tools reasonably clean to prevent your hands from slipping while using them. Do not use wrenches when the jaws are worn to the point that slippage occurs. Wooden handles should be free of splinters and cracks. Keep cutting tools sharp.

Guarding – never use any machine or portable power-operated tool unless all guards are in place and fully operational.

Electrical Safety

While most BRI staff will not encounter electrical issues during the course of their work, electricity can be a serious work place hazard, capable of causing both employees injury (shocks, electrocution, fires, and explosions) as well as serious property damage. By providing awareness training, BRI hopes to minimize the risk for such incidents.

BRI employees must be trained and authorized to perform electrical work. Evidence of their training must reside in their personnel file. All other BRI employees (most) who have not been trained to perform electrical work are not authorized.

Safe electrical work safety practices include:

- Make sure all electrical distribution panels, breakers, disconnects, switches, and junction boxes are completely enclosed. Shut the breaker panel door when finished.
- Always assume a circuit and/or piece of equipment is energized (whether it is or not).

- Move work and tools away from such circuits/equipment, which may be energized, thereby reducing the risk of shock or injury. For example, work benches should be located away from the breaker panel.
- Minimum approach distance, for qualified employees only, are:
 - 300 V and less – avoid contact
 - Over 300V, but not over 750V – 1'-0"
 - Over 750V, but not over 2kV – 1'-6"
 - Over 2kV, but not over 15kV – 2'-0"
 - Over 15kv, but not over 37kV – 3'-0"
 - Over 37kV, but not over 87.5kV – 3'-6"
 - Over 87.5kV, but no over 121kV – 4'-0"
 - Over 121kV, but not over 140kV – 4'-6"
- When working in an enclosed area, BRI will provide the necessary insulating materials or barriers to ensure employees are not exposed to potential electrical hazards.
- Always assume parts of electrical equipment are energized and treat them as live, unless otherwise noted.
- If a part is locked out or tagged by an electrician, do not touch it.
- If a repair or alteration is needed and no qualified and authorized employee is available, contact a qualified electrician using BRI's normal procurement procedures.
- Be aware of overhead lines – especially when working in the field. This includes vehicles, boats, mist nets, and all other equipment.
 - Keep a minimum distance of 10 feet for 50kV lines, and an additional 4" for every additional 10kV.
 - Scout bat sites in the daylight prior to selecting sites for mist nets and avoid areas with overhead lines and/or electrical equipment.
 - Always illuminate the area when setting up nets.
 - Always illuminate dark areas before touching, operating, or assessing electrical equipment or devices.
- Do not wear jewelry or other apparel that is capable of conducting electricity when working near energized equipment. Always wear non-conductive apparel, or render conductive apparel non-conductive by wrapping or insulating it (i.e., gloves of fingers with rings).
- Inspect Power Cords – Never use electrical equipment unless the power cord and ground plug (if present) are in good order. Never use equipment that shocks you, even the small shock from a minor short will get worse with time. Never use the electrical cord to

hoist, carry, or pull electrical equipment. Report all problems with electrical equipment to your supervisor.

Ladders

The following rules apply when using step and portable extension ladders while conducting BRI business.

Ladder Condition and Design

- Step ladders (self-supporting) and extension portable ladders (not self-supporting) – must be capable of supporting at least four times the maximum intended load.
- The rungs, cleats and steps on all ladders must be parallel, level, and uniformly spaced when the ladder is in use.
- Steps should be spaced not less than 10 inches apart, and no more than 14 inches apart.
- Ladders should be inspected regularly and maintained free of oil, grease, and other slipping hazards. They should also be free of defects that may snag clothing of the person climbing the ladder. Any ladder that is defective should be tagged and placed out of service.
- All portable ladders will have non-conductive side rails.

Ladder Use

- Do not use a ladder for any other purpose other than the one for which it was designed, and make sure it is securely placed on level ground away from hazards.
 - Do not use it in a horizontal position (scaffolding)
 - Do not place it on top of barrels or other unstable platforms
 - Keep ladders well away from electrical service and other energized parts.
 - Do not place ladders on slippery or slanted surfaces.
- Ladders should not be loaded beyond the maximum intended load for which they were built, or beyond the manufacturer's rated capacity.
- Do not stand on the top two rungs of a ladder. If the ladder is too short to accommodate the job, get a different ladder. The top of the ladder should extend three feet above the upper landing surface.
- Always face the ladder when ascending and descending.
- Use at least one hand to grasp the ladder when progressing up and/or down the ladder.
- Do not carry any object or load that could cause you to lose balance and fall.
- Place extension ladders such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder.

FIELD SAFETY

Check-out/Check-In Procedures

All field activities should develop and adhere to a check-out/check-in procedure each and every time they embark into the field. While this form can be customized (see Appendix 1 for an

example), they must be written and readily available to all staff. A Check-out/Check-in form should include:

- Date (mm/dd/yy)
- Name(s) of staff
- Departure time (2400 time)
- Destination (route #, coordinates, local name)
- Transport (boat #, canoe #, kayak #, truck #, aircraft tail #, or on-foot)
- Communications (cell phone #, radio, SPOT #)
- Expected return time (2400 time)
- Actual return time (2400 time)

Working Alone

For any employee working alone, a job hazard assessment (Appendix 1) must be conducted to evaluate the risk of working alone and measures in place to assure additional safety. This plan must address check measures, such as those listed above, to be in place before work begins.

Communications

BRI field staff should carry at least one form of communication with them while in the field. Type and associated contact information (phone number, device number) must be entered onto the “Check-out/Check-in” form. Various forms of communication devices include:

- Personal cell phone –many staff use their personal cell phones and must submit a request for monthly reimbursement to the Deputy Director before reimbursement can be issued via your paycheck.
- SPOT Tracker – BRI maintains three (3) SPOT Trackers, a GPS-based device equipped with a SOS feature that when triggered, notifies GEOS, a 24/7 monitoring company. SPOTS are also programmed by project to send predetermined messages (e.g. “Scoter crew is on the water” and “Scoter crew is done for the day”) that are sent to specific staff. SPOTS are used by field teams in remote locations where cell service is non-existent, in a marine environment where the boat is not equipped with alternative tracking equipment, and while conducting field work outside of the U.S. See the Risk & Compliance Advisor to reserve your SPOT.

Project Directors and their field crew leader(s) should develop a communication plan specific to their project that covers:

- Frequency of check-ins
- Contingency plan(s) if field crew fails to return by the prearranged time

Boating

BRI owns several Class A (less than 16 feet) and Class 1 (16’ to less than 26’) vessels; some are equipped with outboard motors. Much of BRI’s field work involves operating a boat, canoe or kayak, and it’s important that the operator be familiar with how to operate, maintain, and

repair their vessel well in advance of launching it into the water on the first day of their field season.

Training

BRI biologists, even seasoned professionals, working on Maine waters should thoroughly review Maine Boater's Guide, an online publication published by the Maine Department of Inland Fisheries and Wildlife.

Visit: <http://www.boat-ed.com/maine/handbook/book.html>

While there are no required mandatory boating or water safety course educational requirements for the State of Maine, other states may have requirements.

Visit: http://www.americasboatingcourse.com/abc_website/state_boating_law.htm#me

Complete any necessary boating and/or water safety courses (most are online) well in advance of deploying into the field.

Float Plan

BRI advises crews operating boats, canoes, and/or kayaks to file a float plan. This simple act may be the one determining factor between others finding and assisting crews in the field when an emergency occurs. Do not underestimate the importance of leaving a float plan with a responsible person who remains on shore. An example of a float plan is presented in Appendix 1. If field work is routine, BRI should have a basic float plan on file, and the field staff should maintain an onsite check-out/check-in procedure. Carrying and using a functional SPOT Tracker may act as a substitute for filing a float plan.

PPE

When working on the water, in a boat, canoe, or kayak, BRI employees are expected to wear a USGC approved life vest. USCG approved survival suits are available when working in colder weather or on the ocean. Your supervisor will determine if conditions require that they be worn.

Boat Supplies

All BRI boats are equipped with first aid and emergency kits including flares and air horns. These items are housed in water tight boxes. Each boat should also have a suitable anchor, spare prop, basic tool kit, and two paddles. It is the operator's responsibility to make sure these items are present and in good order. Leaving shore without any of these safety items in good working order is the responsibility of the operator.

Operation and Maintenance

These vessels and their associated equipment (trailers, radios, batteries, PFD's, etc.) are an investment that can generate costly repairs if not operated and maintained correctly. Since

these vessels are a resource shared by all BRI programs, Project Directors are ultimately responsible for the care and maintenance of them and the associated equipment while in their possession. It is advisable that Program Directors adopt the approach that every crew member is responsible, properly trained, and take an active role in the care of each vessel. At a minimum, the following should be reviewed by all members of the crew before deploying into the field.

- Pre-departure check
 - Steering and throttle controls – are they working properly?
 - Bilge water – drain if present, making sure plug is replaced securely
 - Fuel – are tanks full?
 - Lights – are they working properly?
 - Oil/Fuel leaks – any present? If so, fix immediately.
 - Hose connections/clamps – check for leaks/cracks and replace/tighten if needed
 - Fire extinguishers – are they fully charged?
 - Radio/GPS – are they operating correctly?
 - Batteries – are they fully charged?
 - First Aid Kit – is it restocked and onboard?
 - PFD's – are there enough and are they in good condition?
 - Emergency Kit – is it restocked and onboard?
 - Float Plan – FILL ONE OUT AND LEAVE WITH A RESPONSIBLE PERSON

- Towing
 - Check seating of trailer hitch on the ball
 - Make sure the ball and trailer hitch is within the limits recommended by the trailer/boat/and vehicle manufacturer.
 - Make sure the trailer hitch is locked onto the ball
 - Use a padlock or tailoring pin
 - Check lights – are they operating correctly?
 - Check for a license plate on the trailer
 - Check wheel bearings – are they full of grease or oil?
 - Secure load
 - Check bow strap, stern straps and transom cover
 - Make sure nothing will fly out of the boat while in transit
 - Check paddles, boat bumpers and ropes
 - Arrange cooler so lid opening faces back of boat
 - Adjust mirrors as needed

Working Over Water

If a project requires BRI employees to work over water, at a minimum, the following safety precautions must be taken:

- Include the hazards of working over water as part of the project safety meeting.

- Be sure each employee has read and signed a description of the tasks to be performed while working over water. This documentation will be kept for 3 years.
- Have available, ring buoys with at least 90 feet of line, placed no more farther than 200' apart
- Provide U.S. Coast Guard-approved life jacket or buoyant work vest.
- Have a small boat available onshore in case an employee falls into the water and a water rescue is needed.
- Working over water, or near water alone where the possibility of drowning exists is prohibited.

Weather Conditions

Consult the weather forecast BEFORE leaving shore. Do not operate a boat in foggy conditions were you lose sight of the shoreline unless you have the appropriate navigation equipment that allows you to see your location and oncoming traffic. If hazardous wind and waves develop, if possible, boat close to the shoreline least exposed to the wind. If conditions deteriorate, immediately put to shore and wait for the wind to subside. Boating early in the morning and toward evening is the best practice when trying to avoid choppy conditions. Monitor thunder closely as lightening can strike 10-20 miles from the center of a storm cell. When you hear thunder, proceed immediately to shore and seek shelter (away from trees if possible). Delay your boating trip when a storm or front is predicted to move through your area. In all cases where your trip is interrupted by foul weather and you are forced to “wait it out” notify your base camp of your status, especially if you will fail to make your check-in time. Be aware, do not key hand-held 2-way communications during a thunderstorm.

Fuel

When departing, check that there is adequate fuel for your planned travel time and distance, including a generous reserve in case it's needed.

Vehicles

Drivers Safety Policy

The safety and well-being of our employees are of critical importance to the organization; therefore, we each have a responsibility not only to protect ourselves when on the road but also to do our part to protect those around us. Employees who are required to drive on company business at any time will be expected to consistently follow all the procedures noted in this policy.

1. Employees are expected to wear seat belts at all times while in a moving vehicle being used for company business, whether they are the driver or passenger.
2. Employees are prohibited from driving while under the influence of alcohol, drugs, or other substances that in anyway impair driving ability.

3. Employees are expected to follow all driving laws and safety rules, such as adherence to posted speed limits and directional signs, use of turn signals, and avoidance of confrontational or offensive behavior while driving. The allowable use of cell phones while driving varies by state.
4. Employees who drive commercial vehicles or who are otherwise subject to separate rules and regulations such as those dictated by state or federal laws are expected to adhere to all policies and regulations associated with the appropriate law or regulation that applies.
5. Employees must promptly report any accidents in accordance with established procedures. Employees must also appraise their supervisors of any damages to BRI vehicles.
6. Employees must inspect their vehicle prior to use. Report any malfunction to your supervisor. If the malfunction involves the clutch, braking system, lighting, or control system, the vehicle may be locked-out/tagged out until repaired. For vehicles equipped with backup warning signal alarm, make sure it is working properly before taking the vehicle. All BRI vehicles must be maintained and safe to operate.

Vehicle Usage

The purpose of this policy is to ensure the safety of those individuals who drive company vehicles and to provide guidance on the proper use of company vehicles. The term “*vehicle*,” as used in this policy, includes, but is not limited to, cars, trucks, snowmobiles, and boats. This policy also applies to rental vehicles, which may have additional requirements. BRI expects each driver to drive in a safe and courteous manner pursuant to the Driver and Boating safety rules, as well as follow any applicable rental agreement. Employees who need a vehicle for an extended field assignment may be assigned a company vehicle for their use. All other employees needing transportation for company business may use vehicles from the pool.

BRI and rental vehicles should only be operated in the manner in which they were designed and intended for, and loads should not exceed the manufacturer’s recommendations or local load limits. All loads will be secured safely before the vehicle is underway.

When fueling, the engine should be shut off. Make sure the filler nozzle is in contact with the tank to reduce to the possibility of a spark. Never smoke or have an open flame nearby when fueling a vehicle. To avoid the chance of ignition from smoking by others do not have other individuals in the back of the truck or, if hauling, the boat or trailer while fueling. Use of cell phones may increase the chance of sparks, so keep cell phones out of operation while fueling.

BRI vehicles are intended solely for company use. With the exception of extended field assignments, where a BRI vehicle is your only source of transportation, BRI vehicles are not for personal use.

Employees are required to wear eye protection when operating snowmobiles.

Driver Criteria & Administration

Employees must have a valid and current driver's license to operate a company vehicle. Employees holding jobs requiring regular driving for business as an essential job function must, as a condition of employment, be able to meet the driver approval standards of this policy at all times. For all other jobs, driving is considered only an incidental function of the position. Employees are expected to drive in a safe and responsible manner and to maintain a good driving record. Criteria that may indicate an unacceptable record includes, but is not limited to:

- Three or more moving violations in a three-year period.
- Recurring chargeable accidents. Chargeable means that the driver is determined to be the primary cause of the accident through speeding, inattention, etc.
- Any combination of accidents and/or moving violations.

Driver Guidelines and Reporting Requirements

1. Company vehicles are to be driven by authorized employees only, or in case of repair testing, by a mechanic. Spouses, other family members, or other non-employees, including independent contractors, are *not* authorized to drive company vehicles. In no case should subcontractors or their employees drive BRI vehicles. Volunteers may drive BRI vehicles in cases of special exceptions dictated by BRI business needs.
2. Passengers are generally limited to those individuals who need to ride in the vehicle to conduct employer business, such as other employees, independent contractors, volunteers, collaborators, etc. In the event of an emergency, non-employee family members may be passengers. If this occurs, please understand the following: Employees who use the vehicle to transport non-employees (for example, to pick up a child from day care) must understand that they are liable for any damages, payments, or costs that exceed the limits of employer insurance coverage, and such use indicates acceptance of any liability not covered by company insurance. **NOTE: Children age 12 and under should never ride in a front passenger seat.** If an employee's child, age 12 or under, is transported in a company vehicle, the child should ride buckled up in the rear seat. They should use child safety seats, booster seats, or safety belts appropriate to their age and size. Passengers should ride only in seats equipped to accommodate passengers.
3. Any employee who has a driver's license revoked or suspended shall immediately notify his or her supervisor and Human Resources, and immediately discontinue operation of any company vehicle, if applicable.
4. Accident Procedures:
 - a. Accidents are to be reported as soon as possible, in all cases, without fail. All accidents in company vehicles, regardless of severity, must be reported to supervisor, Executive Director, Deputy Director, and the Science Operations Director.

- b. Accidents involving other vehicles, people or property must also be reported to the police by the employee.
 - c. Accidents involving personal injury to an employee must be reported to Human Resources for Worker's Compensation purposes.
 - d. To help staff in a stressful situation, we are providing a vehicle accident form for your benefit. It will guide you in obtaining all the critical information BRI and its insurance companies need in the event of an accident. In the event of an accident, complete the form located in the glove compartment.
 - e. Do not discuss the accident with anyone at the scene except the police. Do not accept any responsibility for the accident. Don't argue with anyone.
 - f. Provide the other party with your name, address, driver's license number and insurance information.
 - g. Accidents in personal vehicles while on company business* **must** follow these same accident procedures
5. Drivers must report all ticket violations received during the operation of a company vehicle, or while driving a personal vehicle on company business* to their supervisor and Human Resources as soon as possible. Employees are responsible for any driving infractions or fines as a result of their driving.
 6. Motor Vehicle Records will be obtained on all drivers upon hire. A driving record that fails to meet the criteria stated in this policy, or is considered to be in violation of the intent of this policy by the Leadership Team, will result in a loss of the privilege of driving a company vehicle.

** Company business is defined as driving at the direction, or for the benefit, of employer. It does not include normal commuting to and from work.*

General Rules and Regulations for the Use of Company and Rental Vehicles

1. It is the responsibility of the assigned driver to inform the Office Administrator of any vehicle maintenance needs or safety problems.
2. Employees will be held accountable for maintaining proper fluid levels and tire air pressure. If you have checked out the vehicle for a longer period of time, present the vehicle for repair, service, or adjustment whenever such is needed, and preventative maintenance when time is due.

3. Employees will be held accountable for consulting the manufacturer specifications, securing loads within legal limits, and making sure vehicles are of the correct size and design for the intended use.
4. An updated copy of the employee's driver's license must be kept on file at all times with Human Resources.
5. Copies of the Vehicle Registration, a Copy of the Insurance Card, and a Vehicle Accident Report Form must be kept in the vehicle at all times.
6. Pool vehicles are to be left with no less than a half a tank of fuel when returned. If there is less than half a tank when returning, please fill the vehicle.
7. Vehicles are to be kept reasonably clean. It is the responsibility of the driver to clean out the vehicle upon return and run it through the car wash if needed. Any costs for cleaning the interior/exterior of a vehicle are reimbursable.
8. Smoking is not allowed in BRI vehicles.

Extreme Environmental Condition Safety

Heat

Heat illness prevention applies to field crews working out-of-doors, and requires Project Managers to consider the following regarding their projects:

- Training for themselves and their employees
- Providing potable water on the worksite
- Providing access to shade
- Having local procedures in place to handle a heat-related illness

Prior to the field season, Project Managers should undergo heat-related illness training and:

- Assess weather conditions at their intended field sites
- Take note of high humidity
- Try to schedule outdoor work during the cooler part of the day
- For strenuous tasks, rotate staff.

Prior to working in warm weather, Project Managers, field supervisors and field employees will review the following heat illness prevention procedures:

- Review the environmental and personal risk factors for heat illness;
- Discuss the importance of consuming water throughout the work day;
- The importance of acclimatization to conditions at the worksite;
- Discuss common signs/symptoms of heat illness;

- Discuss the importance of reporting signs/symptoms of heat illness to the field supervisor;
- Emergency response procedures specific to their worksite.

Risk Factors include:

- Environmental
 - Weather conditions
 - Temperature
 - Humidity
 - Air movement
 - Radiant heat (sunshine)
 - Conductive heat (ground)
 - High intensity and/or duration of physical activity
 - PPE/clothing
- Personal
 - Poor physical conditions
 - Age
 - Degree of acclimatization
 - Water consumption
 - Some medications
 - Alcohol/drugs

Water Consumption - Drink plenty of water when working in hot environments. It's best to drink small amounts frequently (up to four (4) cups/hour). Take it easy when you first start working in a hot environment. It takes your body at least a week to get used to working in elevated temperatures. BRI provides potable water in coolers for field staff.

Acclimatization – It takes 4-14 days for people to adapt to outdoor conditions. BRI employees, when working in environmental conditions that are not standard should do the following:

- Start slowly – do not overexert yourself until you've adjusted.
 - Supervisors should adjust work schedules and intensities during the first two weeks of each new or returning employee begin work date.
- As needed, take frequent breaks in the shade (or in shade that's provided), especially when ambient temperatures rise above 85⁰F
- Drink plenty of water

Common Signs –

- Heat Exhaustion – caused by excessive loss of water and salt through sweat
 - Headaches, dizziness, lightheadedness or fainting
 - Weakness and moist skin
 - Muscle cramps

- Mood changes such as irritability or confusion
- Upset stomach or vomiting
- Heat Stroke – caused by a total breakdown of the body’s cooling system
 - Sweating stops – skin is hot, red, and dry
 - Mental confusion, losing consciousness
 - Fainting
 - Seizures or convulsions
 - This is a medical emergency – can be life threatening

Reporting signs/symptoms - All BRI field supervisors are trained on how to recognize and prevent heat exposure as part of their first aid training, and will be monitoring the condition of field employees. Tell your supervisor if you or a co-worker experiences extreme weakness or fatigue, giddiness, nausea, or headache or if your face becomes pale or flushed. These are symptoms of **heat exhaustion** and anyone with these symptoms should rest in a shady or cool area. If shade is not available, ask your supervisor and they will provide shade. You will not be punished in any way if you experience heat stress and must rest. Watch out for your coworkers; sometimes a person with heat stress does not realize it themselves.

If you or a co-worker stops sweating and experiences mental confusion, delirium, loss of consciousness, convulsion, or coma this may be heat stroke. Immediately soak the person in cool water and fan them. The person must go to the hospital or medical clinic as soon as possible. A person with **heat stroke** may die without medical attention.

Local Emergency Response - Field supervisors, as part of their morning tail-gate review of the workday, will remind employees of what to do when a heat-related illness occurs. At a minimum, the following should be reviewed:

- Identify employees carrying cell phones (for calling 911)
- The location of the nearest hospital or clinic
- While waiting for help:
 - Move the affected individual to a cooler area.
 - Give them a small cup of water (if conscious and not nauseous).
 - Loosen and/or remove clothing.
 - Fan and mist the individual with water.
 - Apply a water-soaked towel (or ice-pack wrapped in towel) to head and ice pack to arm pits.
- Call the field supervisor immediately.
- Do not let anyone with any of these symptoms return home or to the field camp unattended without a medical evaluation.
- Supervisors must report each incident on BRI’s Report of Injury or Illness form (see Appendix 1)

Cold

If you or a co-worker experiences uncontrollable shivering and the sensation of coldness, a slower heartbeat and weak pulse, slurred speech, memory lapses, or extreme sleepiness, you may be suffering from hypothermia (low body temperature). Anyone suffering from hypothermia should rest in a warm environment right away.

When working in cold environments for extended periods of time, watch for the symptoms of frostbite in your hands, feet and face. These include burning, numbness, tingling, itching, or cold sensations. Skin with superficial frostbite may appear white and frozen, but it retains some resistance when pressed. Skin with deep frostbite is hard.

Ice

In cold environments, be sure to watch for ice on walkways and floors. Do not walk on slippery ice. Remove ice build-up from floors and walkways if necessary.

Sun

Protect your skin and eyes from the sun by using hats, sunglasses, sunscreens, and covering you skin with clothing. Ultraviolet light in sunlight causes skin cancer.

Project Specific Safety

Additional Information

Your supervisor will provide additional information regarding hazards or working procedures specific to your work area.

Never start working on a task until you have been fully trained on the safety requirements and your supervisor has cleared you to begin.

Fit for Duty

For each BRI position, the physical requirements necessary to complete the tasks related to the position are clearly stated in each employee's hiring documents. Should the employee's position title change, or the demands of his/her current position change, BRI will review the position's written description and the new physical requirements with the employee and provide training if necessary.

Drug-Free Workplace Policy

In compliance with the federal Drug-Free Workplace Act of 1988, BRI employees, including those working on a Federal Grant, must abide by the following statement. The unlawful manufacture, distribution, dispensation, possession or use of controlled substances is prohibited in the workplace, in the field, or at any BRI activity.

Employees are prohibited from working while under the influence of drugs, and are expected to report to the workplace with no alcohol or illegal substances in their body. In addition, any drug or alcohol activity that adversely affects job performance or job safety, or that discredits BRI is prohibited.

Use of legally prescribed drugs on the job is allowable only if they do not impair the employee's ability to perform the essential functions of their job effectively and safely without endangering themselves or others. BRI may request to do an evaluation of safety for the effects of some prescribed drugs.

Note: Some funding agencies may require drug and alcohol screening as part of their contractual agreement with BRI. In such cases, BRI employees may be required to undergo pre-project, post-accident, or random testing as required by the funding agency.

Any violation of the above provisions will result in the employee being subject to disciplinary action, up to and including termination for misconduct. BRI also reserves the right to request that any employee undertake either drug counseling or a full rehabilitation program if a violation of the above provision occurs. Any employee exhibiting observed behaviors suggesting a violation of this policy may also be reassigned or sent home.

In addition there are conditions that must be met if the employee is convicted of, or pleads "No contest" to a drug related criminal charge. The employee must, within five days, notify BRI of this. BRI will then take appropriate action, up to and including termination, or require the employee to participate in a recognized drug rehabilitation program.

If questions arise about this policy or issues related to drug or alcohol use at work, employees are encouraged to speak with the Executive Director or Deputy Director without fear of reprisal.

SAFETY AND ACCIDENT PREVENTION

APPENDIX 3

CHEMICAL HYGIENE PLAN

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OVERVIEW

While BRI's Mercury Laboratory may be the first location that comes to mind when referencing chemicals, there are other areas, such as the garage and museum, where chemicals are present. In order to comply with OSHA's 29 CFR 1910.1450, or what is also known as the Laboratory Standard, the following guidelines should be followed. The laboratory standard applies to labs that:

- Use hazardous chemicals
- Serve as a workplace where relatively small amounts of hazardous chemicals are used on a nonproduction basis
- Hazardous chemicals are manipulated on a laboratory scale
- Use of multiple chemical procedures or chemicals
- Have procedures that are not part of a production process
- Use protective practices and equipment to minimize the potential exposure to hazardous chemicals

OSHA's Hazard Communication Standard (29 CFR 1910.1200), also known as the Right-to-Know Law ensures that chemical hazards in the workplace are identified and evaluated, and that information concerning these hazards are shared with employers and employees. This is accomplished through a hazard communication program that includes:

- Determination of hazards
- Container labeling and other forms of warning
- Material Safety Data Sheets (MSDS)
- Training
- Written hazard communication plan
- Trade secrets

HAZARD DETERMINATION

The hazard determination requires employers to identify and evaluate all chemicals used in the workplace. All Project Managers need to conduct this hazard determination for their work area and/or project. This evaluation falls into two categories:

- Listed hazards – those included in one of the following references: OSHA 29 CFR 1910.1000 tables, American Conference of Governmental Industrial Hygienists Threshold Limit Values (TLV), The National Toxicology Program, or the International Agency for Research on Cancer (see Appendix B).
- Defined hazards – physical or health hazards, such as combustible liquids, oxidizers, corrosives, and reproductive toxins and non-toxins.

MSDS

Once all the chemicals have been evaluated and identified, document them in an inventory list and obtain an MSDS for each of them. MSDS are available from the chemical supplier or manufacturer. They contain specific chemical hazard information, such as health hazard, routes of entry, exposure limits, safe handling precautions, spill clean-up, personal protective equipment, emergency and first-aid procedures, and the name, address and telephone number of the chemical manufacture. All information must be in English, collected alphabetically in a binder, and displayed in highly visible place accessible to all employees. If this collection of MSDS sheets is moved, all BRI employees should be informed of its new location via an email.

The inventory list of hazardous chemicals will be posted at each work area where it occurs, with directions of where the MSDS binder is currently located.

LABELS AND WARNINGS

Hazardous chemicals in the workplace need to be clearly labeled. The label should contain the identity of the material, appropriate hazard warnings, and the name and address of the manufacturer. Again, all labels should be in English.

If a container is unlabeled, automatically assume it contains a hazardous material and contact the local transfer station on guidance on how to dispose of it. Hazardous chemicals are sometimes present in unlabeled areas, such as hoses (antifreeze). If unsure, please consult your Project Manager or a certified mechanic.

When working on a site where other subcontractors are working, inquire if they have hazardous materials onsite and ask for a copy of their written chemical hygiene plan. Inform them that the work BRI performs does not include the use of hazardous chemicals.

TRAINING

BRI is obligated, by law, to provide employees with the necessary information and train them in the use and handling of hazardous chemicals in their work area at the time of their initial assignment or whenever a new physical or health hazard is introduced. Training includes:

- Methods and observations used to detect the presence or release of the chemical
- Associated physical and health hazards
- Protective measures
- Labeling
- MSDS information

BRI will achieve this training through the quarterly staff meetings and project-specific meetings.

WRITTEN HAZARD COMMUNICATION PLAN

The written hazard communication plan must fully documents the actions BRI has taken to comply with OSHA regulations pertaining to chemical hazards. It should list the responsible person(s) for each area of the program, and a copy made available to all staff. The written plan will be updated annually, or when a significant change has occurred. Updated plans will be shared with staff electronically. If a new hazard is identified, the plan will be updated, staff notified electronically, the MSDS binder will be updated, and the inventory list updated. Non-routine activities that may subject employees to hazardous chemicals will be reviewed with the affected employees prior to implementation, and added to the written chemical hygiene plan for future reference.

TRADE SECRETS

This final category involves manufacturer Trade Secrets. A chemical manufacturer may withhold the chemical identity, including the chemical name or other specific information, from the MSDS. However, under special conditions, this secret information may be obtained by health care professionals. BRI needs to be aware of the possibility of trade secrets.

APPENDIX 4

EMERGENCY ACTION PLAN

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EMERGENCIES

Emergencies vary from urgent situations to disaster and tragedy. While the latter is unlikely, there is a high probability that BRI staff will encounter and need to respond to less critical emergencies. Emergencies are just as likely to occur in the office as they do in the field, and this section contains strategies for both. Being prepared is the best defense, and knowing in advance the details on where to gather, who to call, and what to do will help mitigate the negative consequences of an emergency.

INCIDENT COMMAND SYSTEM

The Incident Command System (ICS) is a standardized, on scene, all-hazard incident management concept adopted by the United States in the 1970s in response to massive wildfires in California. Due to its flexibility, the ICS is used at any scale (local to federal) to provide a common framework for a standard response and operation procedures to reduce problems and the potential for miscommunications during incidents.

First on the Scene

The ICS is based on a “first-on-scene” concept where the first responder on the scene is in until the incident is resolved, or the initial responder transitions incident command to an arriving, more qualified individual.

So what does this mean? When a BRI employee is the first on the scene of an emergency, he/she is essentially the Incident Commander until someone more qualified or an agency, such as the fire department, emergency medical transport (EMT), U.S. Coast Guard, or law enforcement, arrives and takes over making the decisions. If multiple BRI staff members are present, the one with the most experience and/or training (not necessarily the supervisor or field crew leader) assumes the role of incident commander.

FIRE EMERGENCY

Fires are generally categorized as:

- Structural – fire that involves a building
- Wildfire – vegetation catches on fire through several sources of ignition, including lightning strikes, arson, accidental (discarded cigarette), or intentional (prescribed fire out of control).
- Vehicular – a piece of machinery, usually a car or truck, is on fire.

Sometimes the only indication of fire is heat or smoke. Do not ignore these early warning signs of a potentially deadly situation. In structures, explosions sometimes start or can accompany

fires. Explosions are a rapid and powerful combustion that feature a loud bang, blast waves, and flying debris.

Structural Fires

When a fire occurs within a building or structure, the plan is to evacuate occupants in a safe, controlled, and efficient manner. Prior planning is the key to avoiding irrational behavior during a structural fire.

Alarms – In the event of a fire emergency, employees will be alerted by:

- Verbal announcement (shouting)
- In case of fire, shout: “Fire, fire, everyone out” as you make your way to the nearest exit.

Facilities

- 19 Flagg Meadow Road, Gorham, ME 04038
- 652 Main Street, Gorham, ME 04038
- Other rented facilities (field housing)

Evacuation – In the event of fire or other emergency, ALL employees shall evacuate immediately by means of the nearest available marked exit.

- Always keep exits clear
- Move to the “Designated Area of Assembly” (see below)

Small Fires

- Portable fire extinguishers are provided in the workplace for employee use.
- Small fires are those that can be quickly controlled with little risk to staff. An example of a small fire is one occurring in a wastebasket.
- A small fire becomes a substantial fire that requires evacuation when ONE fire extinguisher is not enough to put the fire out.
- In the event of a small fire, any employee may use the extinguishers to extinguish the fire before evacuating.

Fully Involved Fires

- Fully involved fires are those that cannot be controlled by ONE fire extinguisher.
- Evacuate the building immediately while shouting a verbal announcement to other staff.
 - Stay low to the floor if smoke and flames are present.
 - Hot air can scorch lungs.
 - Smoke may contain toxic fumes.

- Take short breaths.
- Cover face with damp cloth.
- Breathe through your nose.
- Check doors before opening.
 - Place your hand on the door face or handle.
 - If hot, DO NOT OPEN.
 - If cool, open door slowly, keeping your head to one side to avoid any blast of hot air.

Critical Operations/Equipment – Critical operations shutdown procedures are NOT required, and no employees are authorized to delay evacuation for this purpose or to delay evacuation for the purpose of gathering up equipment.

Designated Area of Assembly - After an emergency evacuation, employees are to gather in the following locations:

- BRI West – gather in the side yard (off of Flaggy Meadow Road) to await further instructions and roll call.
- BRI East – gather in the front yard to await further instructions and roll call.

Vehicles - You may move your vehicle to a location away from the building.

- Park it such that it will NOT interfere with emergency response vehicles.
- DO NOT DRIVE AWAY.
- Report to your designated area of assembly to await further instructions and roll call.

Roll Call - will be conducted at the staging area.

- The fire monitor (see list below) will conduct roll call.
- The location of staff not present will be verified via cell phone.
- A list of names and possible location within the building of all unaccounted-for staff will be given to the responding fire department.

Fire Monitors - For further assistance with emergency evacuation procedures, the following individuals may be contacted:

- BRI West – TBD
- BRI East – Cathy Flegel (727.267.1854), Lynn Marchilli (207.450.6287)

Wildfires

Fire is a natural component in many ecosystems. However, these unplanned fires can pose a threat to life and property. When a wildfire occurs close to a BRI field site, the primary directive is to evacuate and/or cease field work until the area has been deemed safe by the Incident Commander. Wildfires display unusual behaviors that hard for even seasoned veterans to anticipate. BRI field staff DO NOT carry the appropriate safety gear to work in and around a wildfire.

If, while working in the field, you notice large amounts of smoke or see uncontained flames:

- Evacuate the area immediately.
- Call authorities (911) when you are in a safe place.

Vehicle Fires

Most vehicle fires begin through a mechanical or electrical failure, and usually the risk of death is low. Fires can also start during vehicular collisions or rollovers. The risk of death is higher since additional injuries and/or obstructed means of egress often accompany these types of accidents. Arson is the third way vehicles can catch on fire.

Although automobile manufacturers have engineered safety features into cars and trucks, the risk of an explosion still exists. Also, if a burning vehicle is parked off pavement, the surrounding vegetation could catch on fire, resulting in a wildfire.

Please follow these guidelines:

- Never leave a vehicle parked with the engine running over dry vegetation.
- Try to park on a mineral soil surface.

Boat Fires

All BRI boats are equipped outboard engines and BRI employee using the boats are responsible for making sure the onboard BRI-supplied Marine-grade fire extinguishers are operational and charged.

Fire Extinguishers

BRI provides portable fire extinguishers in the offices, in vehicles, and on boats. These extinguishers are visually inspected monthly, maintained annually, and are replaced as needed. At a minimum, BRI provides an annual training program for staff to familiarize them with:

1. The location of fire extinguishers
2. General usage of fire extinguishers

This topic will also be covered in Project specific training for field staff, conducted by the Project Manager at the beginning of each field season.

In general, follow these guidelines when using a fire extinguisher:

1. Do not use a fire extinguisher to fight a fire unless you are very confident the extinguisher will safely put the fire out. Instead, evacuate the building notifying others as you leave and summon the fire department if necessary.
2. When using a fire extinguisher, remember PASS

- a. **Pull the pin** – this will allow you to discharge the extinguisher.
- b. **Aim at the base of the fire** – if you aim at the flames, the extinguishing agent will fly right through and do no good. You will want to hit the fuel base, which is located at the bottom of the flame.
- c. **Squeeze the handle** – depress the button that releases the pressurized extinguishing agent in the extinguisher.
- d. **Sweep from side to side** – until the fire is completely out. Start using the fire extinguisher from a safe distance away, then move forward. Once the fire is out, keep an eye on the area in case it re-ignites.

Do not use a fire extinguisher to fight a fire unless you are very confident the extinguisher will safely put the fire out. Instead, evacuate the building notifying others as you leave and summon the fire department if necessary.

MEDICAL EMERGENCY

A medical emergency is an unforeseen event that requires a prompt response. A victim's health and/or life may be at risk in the event of an injury or medical emergency. Your ability to respond promptly, make quick decisions, and attend to the victim until medical personnel arrive may make the difference between life and death. When you recognize an emergency, you must be prepared to take action, preferable with an overall plan in mind. The following guidelines are designed to help you "plan in advance" of an actual emergency.

If you experience a medical emergency and someone is injured, contact your supervisor once help has arrived and the victim is well attended by an emergency responder.

At the beginning of each field season, BRI requires Project Managers to identify remote field sites where access by 911 emergency responders or access to a clinic, hospital or physician is limited. For these projects, at least one BRI employee with valid first-aid training will be part of the field team, and will be available to provide basic first aid. Training, equivalent to training provided by the American Red Cross, will be provided to BRI employees at no cost.

Life-threatening Medical Emergencies

CALL 911 IMMEDIATELY

Life-threatening signs include when a victim:

- Is or was unconscious
- Has chest pains or pressure
- Is bleeding severely
- Has difficulty breathing
- Has pain or pressure in the abdomen
- Is passing blood or vomiting

- Has slurred speech, severe headache or seizures
- Has a head, neck or back injury
- Has a possible broken bone(s)
- Has been poisoned

Assess, Alert, Attend

When someone is hurt, the natural tendency is to rush in and assist. However, the first step is to **assess** the scene to determine if it is safe for you to help. Just a few things to look for include:

- Downed wires that may be a source of electricity
- Presence of a venomous snake and or rabid animal
- Unsafe substrate that could give way under your weight

Once you've assess that the area is safe, **attend** to the victim by gathering the following information:

If unconscious:

- Is the victim breathing?
- Does the victim have a pulse
- Is the victim severely bleeding?

If conscious - same questions as above plus:

- What happened?
- Where do they hurt?
- Do they know their name?
- What is their age?
- Do they have any medical conditions?

NOTE:

- **NEVER** administer CPR or First-Aid unless you are **CERTIFIED**.
- **NEVER** administer First Aid unless you obtain the **PERMISSION** of the victim.

Alert 911 if you determine the extent of their injuries warrants immediate help, and stay with the victim until medical help arrives.

First Aid Kits

All BRI field crews will have in their possession a first aid kit supplied with items relevant to the work they are performing. Prior to each field season, the Project Managers will appoint an

employee to review each kit and replace missing and/or outdated items. All first-aid kits will be watertight and clearly labeled.

Portable Eye-wash Station

If a project involves a risk of BRI employees being exposed to corrosive materials, then BRI will provide a portable eye-wash station at no cost to the employees.

WEATHER RELATED EMERGENCY

Lightening

While thunder and lightning storms occur year round, they are most common during the summer months. Since lightning often strikes well in advance of heavy rain, sometimes as far as 10-20 miles from the center of the storm, it's important to take action when you....

...first hear thunder:

- Look for shelter inside a home, large building, or hard-topped vehicle.
- If on the open water, go to land and seek shelter immediately.
- DO NOT seek shelter under tall trees.
- DO NOT key portable radios.
- Wait at least 30 minutes after the last thunder before leaving your shelter.

...feel your hair stand on end:

- Lightning is about to strike.
- Squat low to the ground on the balls of your feet.
- Place your hands over your ears and your head between your legs.
- DO NOT lie flat on the ground.
- This is a last resort when a building or hard-topped vehicle is not available.

...are with someone who is struck by lightning:

- Call 911
- Attend to victim (who carries no electrical charge)
- Check their breathing, heartbeat, and pulse.
- CPR may be needed.

Tornado

The National Weather Service issues two tornado messages:

- Tornado Watch – issued when conditions are favorable for a tornado

- Tornado Warning – issued when a tornado has been sighted and reported. The warning provides the last known location of the tornado, its speed, and its direction of movement.

During a tornado watch or warning:

- Monitor outside conditions.
- Cease outside activities if the wind picks up or the sky darkens.

If a tornado is seen or heard:

- If indoors:
 - Move away from windows.
 - Assemble in the most secure part of the building, generally an interior room with no windows.
 - Try to get under heavy pieces of furniture.
 - A corner of the room (even if it has a window) provides more protection than the middle span of a wall.
- If outside:
 - Do not stay in your vehicle.
 - Seek shelter inside a building.
 - Do not try to outrun the tornado.
 - Falling limbs/trees and downed power lines often occur before a tornado strikes.
 - Seek refuge in a ditch or culvert as a last resort.
 - Cover your head with your arms.

Communicating and Updating this Plan

This written plan will be updated annually, and updates shared with employees electronically. A copy of the plan will reside at each office, on BRI's server under PROGAMS, and on ADP, BRI's online payroll system. A review of plan will occur during at least one of BRI's quarterly staff meetings annually, and this plan is part of the new employee orientation.

APPENDIX 5

TRAVEL SAFETY

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FIELD ITINERARY

While each field project is unique, they all contain certain basic elements such as start and end dates, big ticket equipment, safety gear and a communication plan. Before entering the field, the Project Managers should share field itinerary details including, but not limited to:

- Project funding code
- Dates the field team will be deployed
- Names of all BRI field crew members
- A list of equipment (trucks, boats, trailers) that will be used
- Forms of communication (Spot Trackers, marine radio, personal cell phones)
- Additional safety equipment (i.e., Mustang suits, first aid kits, flares)
- A description of the field work
- Check-in/Check-out policy

Send this information to the Finance Administrator and the Science Operations Director. Finance will keep a copy of the information with all the financial records associated with the project as verification of participating staff and the correct contract code. The Science Operations Director will review and may request additional insurance, particularly for international field-oriented work, and request the field team use a SPOT Tracker and/or the information that is linked the MMSI number programmed into the boat radios.

Finally, the Executive Director or Deputy Director will use this information if BRI is contacted by an outside agency on your behalf, such as the U.S. Coast Guard or local law enforcement, while the BRI team is deployed in the field, or if the BRI field staff fails to check-in as agreed.

COMMUNICATIONS

While phone calls and emails help administrative staff in Gorham with logistics and billing, some projects require the field staff to remain connected to Gorham during the course of their travel via prearranged check-ins. The projects most likely to require this extra step include:

- International travel – where field work is required
- Travel into remote areas where cell phone service is spotty or nonexistent
- Solo field work
- Field work is of a dangerous nature

MULTIPLE FORMS OF COMMUNICATIONS

BRI staff in the field should not rely on just one form of communication. Cell phones, SPOT Trackers, and other communication devices should be housed in watertight containers while in the field. Communicating with your supervisor can be done in a variety of ways:

- Phone call – be sure to leave a message if your supervisor fails to answer
- Text message – use to notify a group of people
- Email – use to notify a group of people
- SPOT Tracker – can prearrange notifications by text and/or emails
- Rented satellite phone – use 2-stage calling; include contact numbers on field itinerary

BRI maintains a cell phone reimbursement policy for biologists who use their personal phones.

CHECK-IN POLICY

A daily check-in, usually at the end of the day, is preferred, but negotiable between the field staff and their supervisor. It is the supervisor's responsibility to have a check-in protocol established, preferably in writing, with their field staff BEFORE they enter the field.

Failure to check-in will trigger a series of responses from your supervisor, the Executive Director and the Deputy Director.

- 1) 12 hours after a failed check-in the supervisor must make multiple attempts to contact the employee/team.
 - a. Given the emergency contact information obtained at the beginning of the project, the supervisor begins contacting BRI staff or other researchers working in the last known area where the missing employee/team were working.
 - b. Direct them to look for, make contact with, and call back on the status of the missing employee/team.
- 2) 24 hours after a failed check-in, the supervisor must notify the Executive Director and Deputy Director.
 - a. If no additional BRI staff or other researchers are working in the area, the Executive Director and Deputy Director will contact the nearest law enforcement and/or U.S. Coast Guard station and request assistance.
 - b. If the missing employee/team is traveling internationally, the appropriate U.S. Embassy will be contacted. Family members will be notified.
- 3) After 48 hours, the Executive Director, Deputy Director, or their appointee will make arrangements to travel to the last known location of the missing employee/team. Family members will be kept informed.
 - a. Searching will continue until the authorities discontinue search and rescue operations.

Note: in addition to the emotional toll, steps 4-6 will likely result in a financial cost to BRI. Search and rescue operations expenses are often passed on to the employer and/or family. Therefore, field biologists who disregard the check-in policy established between them and their supervisor for their field work may face disciplinary action.

RENTAL VEHICLES

BRI employees renting vehicles are covered under BRI's automobile insurance policy. There is no need to purchase additional insurance through the rental agency. A copy of a rental insurance card is available upon request from the Science Operations Director.

APPENDIX 6

PERSONAL PROTECTIVE EQUIPMENT

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AUTHORITIES

Personal protective equipment (PPE) is governed by the following authorities:

- 29 CFR 1910.132-133 and 135-138, Occupational Safety and Health Administration
- American National Standards Institute (ANSI) standards incorporated in the Occupational Safety and Health Act (29 CFR 1910).
- National Institute for Occupational Safety and Health (NIOSH) Personal Protective Equipment Guidance

JOB HAZARD ASSESSMENTS

Program Managers are responsible for conducting a thorough assessment to make sure all job hazards on their projects are identified, and take action to eliminate or reduce them. A job hazard assessment is a process of identifying real or potential safety and occupational health risks for specific jobs within the workplace that might require the use of PPE to protect employees. If the scope of work changes, the job hazard assessment must be revisited, re-evaluated, and employees retrained if necessary. These requirements also extend to subcontractors. Hazards must be ranked on basis of severity (see example in Appendix 1).

Program Managers should use the General Hazard and Risk Assessment form (see Appendix 1) when preparing a job hazard assessment. A copy of this form completed form will reside with the contract documents in BRI's Finance Office. If the project includes subcontractors, they will receive a copy of the job hazard assessment. BRI will provide training for Project Managers and others involved in preparing job hazard assessments.

Purchase of necessary PPE should be a budgetary consideration for both Program Managers (when developing a proposal and/or annual budget) and the Executive Team (when approving the annual budget). It is the Program Manager's responsibility to make sure their employees have proper PPE to protect them from workplace hazards, and are trained on how to select, use, maintain and clean the PPE.

Types of PPE that may be required are:

- **Electrical protective equipment** – e.g. insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber when exposed to electrical hazards.
- **Eye and Face Protection** – All persons must wear ANSI Z87.1 approved protective eyewear when there is a hazard from flying objects. ANSI Z87.1 approved UV protective eyewear is necessary when using a Ultra-violet light.
- **Foot Protection** – All persons must wear safety shoes or boots with impact protection when the work involves carrying or handling materials such as packages, objects, parts

or heavy tools which could be dropped, and for other activities where objects might fall onto the feet and cause injury.

- **Hand Protection** – Hand protection (gloves) are required whenever working with equipment or materials likely to be hazardous to the hands, such as:
 - Skin absorption of harmful substances
 - Severe cuts or scrapes
 - Punctures
 - Chemical or thermal burns
 - Harmful temperature extremes

- **Head Protection** – Head protection that resists penetration and absorbs the shock of a blow are required when working in an environment where there is a danger of head injuries from falling objects or other hazards.

- **Leg Protection** – When working where injury to legs is possible, special equipment is required to prevent injury. For example:
 - Working with chain saws – wear leg chaps
 - Working in areas where you may encounter venomous snakes – wear leg guards

- **Other Special Types of Protection** – includes protective aprons, waders, U.S. Coast Guard approved life vests, Mustang jackets.

COMMON HAZARDS

- Employees may work around vehicle traffic.
- Employees may work in the rain.
- Employees may work in wet conditions.
- Employees may work on ice or snow.
- Employees may work while kneeling.
- Employees may work over or near water (risk of drowning)
- Employees may work at elevated heights (climbing gear required)

PPE TRAINING

Project Managers must train employees, who in turn must comply with all PPE requirements including:

- Wearing PPE as required
- Completing PPE training
- Cleaning and maintenance to keep PPE in serviceable condition
- Notifying supervisors when PPE needs to be repaired or replaced

Training should include:

- When PPE is necessary.
- What PPE is necessary for which job task(s).
- How to properly put on, remove, adjust and wear PPE.
- The limitation of the PPE, and its proper care/maintenance/disposal.

Project Managers will provide retraining when either the type of PPE or workplace changes making earlier training obsolete or an employee illustrates a lack of knowledge concerning how to use the PPE or is observed using it incorrectly.

RECORD KEEPING

Project Managers should keep written records of PPE training for all employees. At a minimum, training records should include:

- Name of the person trained.
- Date of the training.
- Type of training provided.

PPE for STANDARDIZED BRI ACTIVITIES

Boating

- Required PPE
 - Employees are expected to wear a U.S. Coast Guard approved life vest when in a boat for work-related activities.
 - BRI will provide lightweight, self-inflatable personal flotation devices for this purpose.
 - When boating in cold weather or on the ocean, when the water temperature could cause hypothermia, BRI will provide USGC approved survival suits.
 - These suits are required to be in the boat.
 - The onsite Project Manager will determine if conditions require that they be worn.
- Other recommended PPE
 - Water-activated personal strobe light
 - Whistle

APPENDIX 7

SPOT TRACKER

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WHEN TO USE A SPOT

BRI has purchased three (3) SPOT Trackers for staff to use in the field. It is just one device that helps keeps field staff and BRI Maine in contact with each other and is viewed as an additional safety measure. It comes equipped with a SOS feature that, when triggered, notifies a 24/7 monitoring operation (GEOS) who will arrange emergency response(s) regardless of where you are at. The SPOT works globally, and BRI expects the following teams to carry (and use) a SPOT who are:

1. Working in remote locations where cell phone coverage is very sparse or nonexistent
2. Working in a marine environment in a boat that is not equipped with alternative tracking equipment
3. Conducting field work outside of the U.S.

While exceptions may apply, if your field work falls into one of the above categories, verify with your Director on the need to carry a SPOT.

If you are asked to carry a SPOT, information from the TRAVEL ITINERARY will be used to update the information GEOS will need in case of an emergency.

SPOT OPERATING DIRECTIONS



POWER

To turn SPOT on simply press and hold the ON/OFF button until the button blinks green.

- SPOT performs a self-diagnostic test.
- When power is ON, the button will blink green every 3 seconds.
 - This is helpful for making SPOT more visible in the dark.
- To turn SPOT off, press and hold the ON/OFF button until the light stops blinking.

AUTOMATIC SELF TEST

SPOT performs a self-test when you initially turn on your SPOT. If all visible lights flash red, the SPOT self-test has found a failure, and SPOT will not send a message. If the On/Off light, GPS light and Message Sending light all blink red, SPOT has a GPS failure, but SPOT may still be able to transmit an SOS or Help/SPOT Assist message without your GPS location

INITIAL TEST BEFORE GOING INTO THE FIELD:

Perform an initial system test to evaluate your entire messaging system, from the operational condition of the SPOT to the readiness of those you've chosen to receive your messages.

- 1) Go outside to where SPOT has a **clear view of the sky** in all directions.
- 2) Press and hold the **ON/OFF** button until the function light blinks green.
- 3) Press and hold the **Check-In/OK** button until the function light blinks green.
- 4) Leave SPOT outdoors. The GPS indicator light blinks green as SPOT acquires a GPS fix.
 - a. Once SPOT acquires your GPS location, the Message Sending light and GPS light will blink green in unison for ~15 seconds to notify you that your message is being transmitted with GPS location.
 - b. The Message Sending light will continue to blink green over the remainder of the 20 minute message cycle and for one (1) hour after the end of the message cycle (this is to provide you with additional time to check if your most recent message was transmitted).
 - c. The Check-In/OK function light will turn off once the message cycle is complete.
- 5) Verify that the message was received in the email or SMS account(s) that you set up during activation in your Check-In/OK contact list.
- 6) You can also view your messages in your account at findmeSPOT.com

- 7) If the GPS light blinks red, SPOT does not have a clear view of the GPS satellites and you must move to an area with a clearer view of the sky for proper operation. Then repeat steps 2 through 5.
- 8) You can update the names and contact information anytime via your account on the SPOT website.

SPOT BUTTONS

SOS

SOS: Use this function in the event of a life threatening or other critical emergency to notify emergency services of your GPS location and that you need assistance.

- The GEOS International Emergency Response Center alerts the appropriate agencies worldwide – for example contacting 9-1-1 responders in North America and 1-1-2 responders in Europe.
- SPOT will again look for a GPS signal prior to sending the next scheduled message to GEOS Rescue Coordination Center (~4-5 minutes after the first message)
- SOS will repeat the entire message cycle until cancelled (or batteries are depleted) with updated location.
- SOS messages will be sent even if GPS location cannot be determined.
- SOS overrides Check-In/Ok, Custom Message, and Track Progress.



Help: In the event of a non-life threatening emergency, you can use this function to notify your personal contacts that you need assistance.

- Messages scheduled every 5 minutes for one hour with updated location to your friends or coworkers.
- SPOT sends Help/SPOT Assist messages even without a GPS location.
- SPOT will again look for a GPS signal prior to sending the next scheduled message (~4-5 minutes), and repeat the entire message cycle.
- Overrides Check-In/OK, Custom Message, and Track Progress.



Check-in/OK: This feature allows you to let your friends and family know that all is OK with a pre-programmed message along with your GPS location.

- **BRI biologists** – use this feature at the **BEGINNING** of your field day to notify BRI Gorham that your activities are underway.
- With a push of a button a message is sent via email or SMS to up to 10 pre-determined contacts and your waypoint is stored in your SPOT account for later reference.
- Messages scheduled 3 times over 20 minutes to contacts on your contact list.
- SPOT must get a GPS signal before sending your Check-In/OK or Custom Message.
- If no GPS signal is found, the GPS light blinks red and SPOT deactivates the function without sending any messages.
- Suspends Track Progress until message is sent, then Track Progress resumes automatically.



Custom Message: This feature allows you to let your friends and family now receive a custom message along with your GPS location with a push of a button.

- **BRI Biologists** – use this feature at the **END** of your field day to notify BRI Gorham that all is ok and your field day is done.
- SPOT must get a GPS signal before sending your Check-In/OK or Custom Message.
- If no GPS signal is found, the GPS light blinks red and SPOT deactivates the function without sending any messages.



Track Progress: Start/stop tracking at any time using your SPOT device.

- You can also mark a Reference Point or send Check-in/OK messages from specific locations while in Track Progress mode.
- SPOT will schedule an update to a transmission to your account every 10 minutes for 24 hours.
- Message not sent if GPS location cannot be determined.
- SPOT must get a GPS signal before sending your waypoint.
- SPOT will stay in the Track Progress function, and again look for a GPS signal at the next scheduled message interval.

Light indicators

SPOT uses lights to tell you what it's doing. Take a moment to become familiar with these lights. Function lights Each button has a backlight that blinks when that button is active. To activate (or if applicable, cancel) any function, you must press and hold the button until the function light starts blinking (approximately 3 seconds).



GPS Light

The GPS light notifies you whether SPOT is able to see the GPS satellites and obtain your GPS location.

- Green – The GPS light blinks green while SPOT sees the GPS satellites and is looking for a GPS location. Once the GPS location is obtained, the GPS light and Message Sending light blink green approximately 15 seconds to notify you that your message was sent with your GPS location.
- Red – The GPS light blinks red if SPOT doesn't see the GPS satellites and /or can't find your GPS location. You should move to a location with a clearer view of the sky.



Message Sending Light

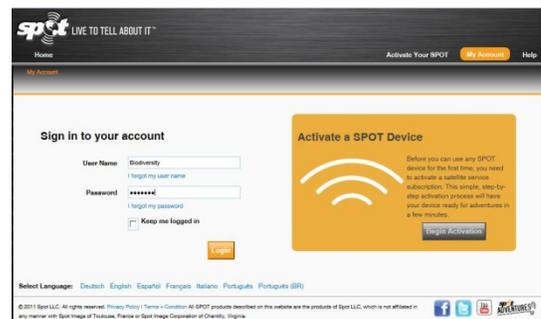
The Message Sending light notifies you whether or not your most recent message was transmitted.

- Green – The Message Sending light blinks green after SPOT transmits the most recent message.
 - Red – The Message Sending light blinks red if SPOT didn't send the most recent message.
- The Message Sending Light will continue to blink as appropriate for each function – until the next scheduled message (Track Progress, Help/SPOT Assist, SOS) and/or until one (1) hour after the message cycle is complete (Check-In/OK, Custom Message, Track Progress, Help/SPOT Assist).

VIEWING TRACK PROGRESS ONLINE

When the TRACK PROGRESS option button is pressed, the SPOT will locate your position every 10 minutes. To view your progress (or a history of it):

- Log onto <http://www.findmespot.com>
- Select **My Account** in the upper right-hand menu bar
- User Name = **Biodiversity**
- Password = **gavia19**



- Under the **My GPS Locations** tab
- Use **Set Filter** to your SPOT number (see back of carrying case), **Apply**
- Click each message – your page should look like this:

<input type="checkbox"/>	Time (US/Eastern)	SPOT Device	Type	Sent To	Latitude	Longitude	Status
<input checked="" type="checkbox"/>	05/03/2012 05:51:39 AM	BRI 2	Custom	DOE-BOEM 2 (Custom)	43.79609	-76.17532	
<input checked="" type="checkbox"/>	05/03/2012 05:44:20 AM	BRI 2	Track		43.79461	-76.18957	
<input checked="" type="checkbox"/>	05/03/2012 05:34:12 AM	BRI 2	Track		43.78891	-76.13776	
<input checked="" type="checkbox"/>	05/03/2012 05:24:40 AM	BRI 2	Track		43.77317	-76.11588	
<input checked="" type="checkbox"/>	05/03/2012 05:14:17 AM	BRI 2	Track		43.77304	-76.11536	
<input checked="" type="checkbox"/>	05/03/2012 05:04:20 AM	BRI 2	Track		43.77312	-76.11536	
<input checked="" type="checkbox"/>	05/03/2012 07:54:15 AM	BRI 2	Track		43.77266	-76.10834	
<input checked="" type="checkbox"/>	05/03/2012 07:46:42 AM	BRI 2	Track		43.77265	-76.11581	
<input checked="" type="checkbox"/>	05/03/2012 07:36:42 AM	BRI 2	Track		43.76842	-76.11452	
<input checked="" type="checkbox"/>	05/03/2012 07:24:28 AM	BRI 2	Track		43.7744	-76.11447	
<input checked="" type="checkbox"/>	05/03/2012 07:14:26 AM	BRI 2	Track		43.76175	-76.10863	
<input checked="" type="checkbox"/>	05/03/2012 07:04:20 AM	BRI 2	Track		43.76559	-76.11139	
<input checked="" type="checkbox"/>	05/03/2012 06:55:59 AM	BRI 2	Track		43.77145	-76.117	
<input checked="" type="checkbox"/>	05/03/2012 06:44:27 AM	BRI 2	Track		43.77529	-76.11224	
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<input checked="" type="checkbox"/>	05/03/2012 04:54:24 AM	BRI 2	Track		43.78559	-76.1261	
<input checked="" type="checkbox"/>	05/03/2012 04:44:31 AM	BRI 2	Track		43.78964	-76.14029	
<input checked="" type="checkbox"/>	05/03/2012 04:34:28 AM	BRI 2	Track		43.78348	-76.14732	
<input checked="" type="checkbox"/>	05/03/2012 04:24:32 AM	BRI 2	Track		43.78891	-76.16156	
<input checked="" type="checkbox"/>	05/03/2012 04:15:29 AM	BRI 2	Track		43.79584	-76.17267	
<input checked="" type="checkbox"/>	05/03/2012 03:23:40 AM	BRI 2	Check-in/OC	DOE-BOEM 2 (Check-in/OC)	43.66609	-76.38894	

- Select **Show on Map** icon
- Map view appears



- Click the **Satellite** button in the upper right-hand corner of the map to see the map in satellite view



APPENDIX 8

ACCIDENT and NEAR MISS INVESTIGATIONS

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ACCIDENTS and NEAR MISSES

Accident and near miss incident investigation is a critical part of every Safety Program. The purpose of these investigations is to determine why the incident occurred and then prevent similar incidents in the future.

DEFINITIONS

Accident	An unintended injury, illness, death or property damage.
Near Miss Incident	An event which could have resulted in an accident but didn't (e.g. "that was a close one....")

ACCIDENT CAUSATION

It's important to report and investigate every accident and incident especially minor accidents and near misses incidents. Often, many minor incidents occur before a major accident; investigating and preventing minor incidents can also be prevent major accidents. For example, many people may slip on an oil puddle before someone falls and is injured. By finding and fixing the oil lead after someone slips (the "near miss incident") we also prevent someone from falling (the "accident").

Most accidents have more than one cause; the accident occurs because of a combination of factors which by themselves might not have caused the accident. Usually, the most underlying causes of an accident are in fact symptoms of underlying problems.

When conducting an accident or near miss investigation it is important to understand all of the causal factors in order to identify the most effective corrective actions.

STEP-BY-STEP INVESTIGATION

The following steps should be used as a guideline when investigating and evaluating an accident or near miss incident.

- Make the area safe
- Care for the injured
- Cordon off the accident area
- Assemble others to help assess (if necessary)
- Gather necessary investigative tools
 - Pen and paper for documentation
 - Digital camera
 - Tape measure

- Marking tools (flagging)
- Investigate
 - Examine and describe the area
 - Take photographs
 - Review personal protective equipment
 - Interview others
 - Document finding in writing
- Analyze and identify the underlying problems
- Devise corrective actions
 - Present suggestions to the Executive Team
- Follow-up
 - Executive Team implements solution
 - Original accident investigator should also follow up on corrective actions

REPORTING

Project Managers should appoint an employee responsible for reporting and conducting an investigation on their project before an incident occurs. The Science Operations Director will review the investigation/reporting process with the identified employee prior to them embarking on their field season. The Science Operations Director is responsible for reporting and investigating incidents that occur at BRI's main offices in Gorham, ME. A form is provided in Appendix 1 to assist with this process.

Near miss and accidents must be reported in a timely manner.

- For incidents that involve an injury, notify the Executive Director, Deputy Director or Science Operations Manager within 8 hours. Upon notification, BRI will contract Chartis Insurance, BRI's Workers Compensation carrier, to establish a case file. Depending on the severity of the injury, other regulatory agencies (i.e., OSHA) will be notified. If working on a funded project, BRI is also obligated to inform the funding agency of the incident within 24 hours.
- For near miss incidents, the incident needs to be reported to the above BRI employees within 24 hours.

SUBCONTRACTORS

Each subcontractor working on BRI projects is obligated to comply with all Federal, State and Local safety requirements as well as project-specific requirements of the funding client. These combined safety requirements constitute a minimum level of performance expected from each subcontractor and his/her employees, or their agents, throughout the project's period of performance.

As part of the contracting agreement, subcontractors will supply BRI with a copy of their safety plan, and agree to be solely responsible for implementing their safety plan. They will also have their insurance carrier provide BRI with a copy of their Experience Modification Rate (EMR) for the past three years. The EMR is a metric that gauges both the past cost of injuries and the future chances of risk.

Before work begins, the subcontractor will be required to attend BRI's project orientation meeting where safety is discussed. Their attendance will be documented by the Project Manager, and this documentation will reside in the Finance Department's contract folder. Attendance is also required at subsequent job meetings where safety, hazard assessments, and inspections are discussed. It's highly advisable to include the subcontractor in the development of the job hazard assessment, however the level of their involvement may vary by project.

If an accident or near miss incident occurs, subcontractors must inform the BRI Project Manager within eight hours, who will then inform the appropriate agencies and/or clients within 24 hours.

Subcontractors should also be part of post-job performance reviews and include a safety review.

SAFETY AND ACCIDENT PREVENTION

APPENDIX 9

CONTACTS

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LOCAL MEDICAL FACILITIES	
<p>Mercy Hospital 144 State Street Portland, ME 04101 Telephone: 207.879.3000 Toll Free: 800.293.6583 24/7 hours Major medical emergencies</p>	<p>Animal Emergency Clinic 739 Warren Avenue Portland, Maine 04103 Telephone: 207.878.3121 24/7 hours Emergency animal care</p>
<p>Maine Medical Center - Brighton First Care 335 Brighton Avenue Portland, ME Telephone: 207.662.0111 Hours: 9:00 am – 8:00 pm, daily Minor medical emergencies and walk-in medical care</p>	<p>Maine Veterinary Referral Center 1500 Technology Way, Enterprise Park Scarborough, ME 04074 Telephone: 207.885.1290 27/7 hours Emergency and specialty animal hospital</p>
<p>Concentra Urgent Care 1600 Congress Street Portland, ME 04102 Telephone: 207.774.7751 Fax: 207.828.5410 Hours: M-F, 7:30 am – 5:00 pm Minor medical emergencies and walk-in medical care</p>	
LOCAL LAW ENFORCEMENT and FIRE	
For ALL Emergencies Dial 911	
<p>Gorham Police Department 270 Main Street Gorham, ME 04038 Telephone: 207.839.5581 Fax: 207.839.7717</p>	<p>Gorham Fire & Rescue 270 Main Street Gorham, ME 04038 Telephone: 207.839.6762</p>

BRI STAFF OFFICE and CELLULAR CONTACT INFORMATION

BRI – East 207-887-7160, Fax 207-887-7194

BRI – West 207-839-5818, Fax 207-839-7655

Name	Extension	Location	Cell
Apartment Office	122	West	
Amy Sauer	-	Offsite	1-315-200-0534
Andrew Gilbert	205	East	1-207-329-7525
Bruce Rinker	217	East	1-207-894-4399
Carl Anderson	126	West	1-802-324-5219
Carry Gray	247	East	1-207-272-8370
Cathy Flegel	212	East	1-727-267-1854
Chris DeSorbo	115	East	1-207-212-0794
Chris Perisco	122	West	1-207-478-1619
Conference Room	111	West	
Conference Room	216	East	
Dave Buck	245	East	1-603-953-7320
Dave Evers	221	East	1-207-518-9022
Dave Yates	114	East	1-207-491-4707
Deborah McKew	222	East	1-603-724-3609
Dustin Meattley	112	East	1-603-491-3940
Emily Connelly	203	East	1-518-424-7005
Evan Adams	204	East	1-207-217-4717
Jonathan Fiely	124	East	1-406-640-3212
Kevin Regan	107	West	1-860-917-2045
Iain Stenhouse	210	East	1-207-312-9401
Jennifer Goyette	208	East	1-414-526-0808
Jim Paruk	249	East	1-608-280-1758
Joan Plevich	-	Offsite	1-717-350-1295
Kate Taylor	218	East	1-207-450-4701
Kate Williams	108	East	1-207-318-2658
Kristin Hanegan	214	East	1-207-807-5752
Lee Attix	103	West	1-207-838-0359
Lynn Marchilli	201	East	1-207-450-6287
Lucas Savoy	104	East	1-207-232-3441
Madeline Turnquist	248	East	1-763-238-3867
Mark DiGirolamo	-	Offsite	1-207-542-3631
Matt O'Neal	-	Offsite	1-207-462-4467
Melissa Duron	251	East	1-207-409-0940
Mike Chickering	123	West	1-207-894-4378
Nina Schoch	-	Offsite	1-518-891-6965
Patrick Keenan	242	East	1-508-397-6476
Oksana Lane	106	East	1-207-939-3076
Rick Gray	125	East	1-207-322-1744
Robby Lambert	252	East	1-207-249-8310
Shay Hatch	209	East	1-908-358-8976
Tim Divoll	244	East	1-508-662-2274
Wing Goodale	219	East	1-207-807-8750

Rangeley House 207-864-5970
BRI East Landlord – Ken Lefebvre 207-210-1111

APPENDIX 10

BATS AND RABIES

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OVERVIEW

Rabies is a fatal viral zoonotic disease of public health significance (CDC 2011). It is a viral disease caused by RNA viruses in the family *Rhabdoviridae*, genus *Lyssavirus* (Lyles and Rupprecht 2007) that affect the brain and spinal cord. In humans, it generally takes many weeks and in rare cases even a few years before symptoms appear. Most often people show signs of the disease within one to three months after exposure to the virus. Unfortunately, once people show signs of the disease it is nearly always fatal. Even though tens of thousands of people are successfully vaccinated each year after being bitten by a mammal that may have rabies, a few die each year because they do not recognize the risk of rabies from the bite of a wild mammal or they do not seek medical advice once bitten (CDC, 2001). Rabid animals (wild and un-vaccinated pets and farm animals) have been recorded in every county in Maine (ME CDC, 2010).

Early signs of rabies in humans may include:

- Fever
- Headache
- Unclear thinking
- Sleepiness
- Excessive worry
- Numbness or tingling around the wound

Mammals with rabies may (or may not) show the following:

- Act strangely once the virus reaches their brains
- Seem shy or fearful
- Seem overly friendly or aggressive
- May stumble as drunk
- May appear lame

Rabies in Bats

Bats, like all mammals, are susceptible to contracting rabies. The literature cites that some bat species seem more susceptible to contracting rabies and the disease in bat populations is not thought to be increasing (Brass 1993). The occurrence of the disease in bats in North America has been estimated to be less than ½ of 1 percent (Constantine 1988), and the traditional view that bats are asymptomatic carriers of rabies, immune to its progression, has been debunked (Brass 1994).

The U.S. Department of Health and Human Services' Center for Disease Control and Prevention (CDC), and most State CDC offices maintain rabies is more common among certain mammals, including:

- Bats
- Raccoons
- Skunks
- Foxes, coyotes

They also report that rabies is very rare among small rodents, mice and chipmunks. While all of this is encouraging, given the lethality of the virus and the inability to confirm diagnosis except through testing saliva or neural tissue, rabies remains a threat that must be approached with much caution.

The need for caution is further justified because the recent human rabies cases in the United States have been caused by the rabies virus from bats (CDC 2001), and the most common rabies virus variants responsible for human rabies in the United States are bat-related (CDC 2008). During 1990-2007, 34 naturally acquired bat-associated human cases of rabies were reported in the United States. Actual bites were reported in 18% of the case while contact with a probable bite represented 6%. The majority (44%) reported contact with a bat but no suspected bite, while 32% reported no bat interaction at all (CDC 2008). Laboratory data supports the hypothesis that the bat rabies virus variant associated with the silver-haired bat (*Lasiurus noctivagans*) and the eastern tricolored bat (*Perimyotis subflavus*) have biological characteristics that might allow for a higher likelihood of infection (Morimoto et al. 1996).

The CDC (2008) recommends bats should never be handled by untrained and unvaccinated individuals (CDC 2008). If an exposure does occur, the mammal should either be tested or the bitten individual should seek medical counsel and possible vaccination regardless of their previous vaccination history. No studies exist on the effectiveness of rabies pre-exposure prophylaxis in preventing rabies deaths in humans (CDC 2008). While some studies on animals receiving pre-exposure vaccinations report complete protection from the street rabies virus isolates (Brookes, et al. 2005), when challenged with five (5) other lyssavirus variants survival rates ranged from 44% to 89% (Halon et al. 2005). These study results support the usefulness of the pre-exposure vaccinations, but also emphasize the variation in effectiveness between the vaccine and its phylogenetic relatedness with the particular lyssavirus isolate. Approximately 94% of bats submitted for testing are not rabid (CDC 2011). The Advisory Committee on Immunization Practices (ACIP) (CDC 1999) and the World Health Organization (WHO) (WHO 1992) also recommend that prophylaxis for the prevention of rabies in humans exposed to the rabies virus should include thorough wound cleansing followed by vaccination

BRI recognizes that CDC data may be biased toward the infrequent interactions between the general public and bats. However, given the inability to look at an animal and definitively diagnose if it is infected with the rabies virus or not, the probability of a lethal outcome if exposures go untreated, the knowledge that 6% of all tested bats are rabid, and the high likelihood of exposure due to the nature of our work, BRI has adopted a cautious and conservative approach for BRI biologists who work with bats as part of their job. While BRI recognizes that some bat species are more likely to carry the virus, BRI maintains that all species of bats are a suspect rabid animal - an animal that is susceptible to rabies but in which the disease cannot be ruled out – and rabies is ruled out by testing which is performed via necropsy of a euthanized or dead animal. To that end, BRI has adopted the Standard Operating Procedures (SOPs) outlined throughout this document that staff must follow when handling bats.

EXPOSURE ROUTES

Exposure

The rabies virus is present in the saliva and neural tissue of infected mammals and the most widely known route of exposure occurs from the bite of a rabid animal. However, exposure to rabies might also occur when the virus, from the saliva or other potentially infectious material (neural tissue) is introduced into the handler. Direct exposure routes consist of (CDC 2011):

- Bites – even those that do not cause bleeding
- Existing open cuts in the handler’s skin
- Mucus membranes of the handler – i.e., rubbing one’s eyes, mouth or nose after handling

Bite Exposures

Any bite, regardless of body site or severity, constitutes an exposure to the rabies virus (CDC 2008). Although the risk for transmission varies with the anatomical location of the bite and the severity of the wound (98), rabies transmission can occur from bites that inflict minor injury (e.g., bats) resulting in lesions that are difficult to detect under certain circumstances (CDC 2005, Messenger et al. 2002).

Nonbite Exposures

While nonbite exposures from mammals rarely cause rabies, there is evidence that suggests such exposures require assessment to determine if there are sufficient reasons to consider post-exposure prophylaxis (Afshar 1979). The contamination of open cuts/abrasions or mucous membranes of the handler with the saliva or other infectious material (e.g., neural tissue) of a rabid animal is the nonbite exposure route BRI staff are most likely to encounter.

Indirect Contact

Indirect contact and activities do not constitute exposure. The rabies virus is inactivated by desiccation, ultraviolet irradiation and other factors and it does not persist in the environment (CDC 2008). However BRI strongly recommends using precautions with these indirect routes, which include (CDC 2011):

- Petting or handling an animal (without getting bitten)
- Contact with blood
- Contact with urine
- Contact with feces
- Contact of wet saliva with intact skin
- Touching dried saliva

There is a possibility that another animal may have saliva and/or neural tissue from rabies infected prey item present on its teeth, beak or talons. Given the lack of published research on this topic, BRI biologists need to be aware of this potential risk and take precautions when handling other animals. BRI supports consultation with medical experts and recommended rabies treatment for any staff who suspects they were exposed to the rabies virus.

VACCINATIONS

Pre-Exposure Management

The CDC recommends all individuals in high risk occupations, such as veterinarians, veterinary assistants, and wildlife handlers receive a series of pre-exposure vaccinations to boost the antibody level in the event of an exposure (CDC 2011). The pre-exposure vaccinations do not provide immunity to contracting

rabies; they are designed only to boost antibody titer and to improve the response to treatment that is still required following all possible exposures (CDC 2011).

BRI employees who handle bats must complete the pre-exposure prophylaxis vaccinations BEFORE they can handle bats. Pre-exposure management includes (CDC 2008):

- 1) Pre-exposure vaccines followed by serology and vaccine boosters
- 2) Promptly reporting and treating ALL potential exposures to the virus
- 3) Wearing protective gloves when handling mammals

Pre-exposure Vaccinations

BRI will arrange with a local medical care provider for the pre-exposure vaccinations. Pre-exposure vaccinations from human diploid cell vaccine (HDCV) or purified chick embryo cell vaccine (PCECV) are administered in a series of three (3) intra-muscular (IM) injections. The series starts at day 0, and continue with boosters at day 7 and day 21. The timing of the injections cannot be deviated from, so BRI biologist seeking pre-exposure should adjust their availability to accommodate the vaccination schedule.

- Only BRI biologists who have pre-exposure vaccinations and a current antibody check (titer level) shall handle bats.
 - A record of your vaccination schedule and subsequent titer test(s) must be in your medical file at BRI in Gorham, ME.
- Annual titer level tests are mandatory.
 - How long the antibodies remain active varies by individual.
 - The titer level test assesses the level of antibodies in your system.
 - Depending on test results, a booster shot may be required.
 - If you continue to be in a high risk category for exposure to rabies, you should plan on having your levels tested annually.
- No BRI biologist will be allowed on a bat project without proof of an annual titer test.
 - Test results can take weeks to obtain.
- As the field season approaches, plan ahead.
 - BRI covers the cost for any employee needing the pre-exposure vaccinations and titer test due to their work at BRI.
 - Contact the Science Operations Director with your request

EXPOSURE MANAGEMENT

Exposure management begins before BRI biologists are deployed into the field. It's important to think through the steps, research and obtain important local contact information, and review protocols with others – all before handling the first bat.

Handling Bats

As a conservation-research organization, BRI fully appreciates current threats faced by populations' wild species and to that end none of us wish to contribute to the loss of a wild animal. However, BRI has a responsibility to their employees to provide them with the safest environment within which to work,

and endorse policies that have the health and welfare of the staff as a priority. To help insure no bat must be euthanized for rabies testing, please exercise the following handling guidelines.

- Wear gloves at all times (see Appendix A)
 - High Risk Biters (generally the larger species with bigger teeth) require leather gloves on both hands at all time.
 - Low Risk Biters require latex gloves at all times, and it is recommended that handlers wear one leather glove and one latex glove.
- Do not allow ungloved or unvaccinated staff to “help” you remove the animal from the mist/harp net
 - Assign them tasks that keep them out of contact with the bats.
 - Volunteers must sign a pre-waiver form and this form must be in the possession of BRI ME before the volunteer may join BRI staff in the field.
 - Not handling a possibly infected bat will reduce the risk of contracting rabies to nearly zero.

Isolate the Animal

The unfortunate happens – you get bitten by a bat. But you are mentally prepared because you know that rabies prevention should be forefront in all handlers’ minds, even before they begin handling a bat.

- Come prepared with a clearly marked container to humanely house an animal that bites.
 - If bit, put the bat in the container immediately, do not continue handling it.
 - Make sure others at the site are aware of the container and its contents.
- Try to identify the species of bat before you handling it.
 - Flinging off a biting animal is often an automatic response.
 - Identifying an animal to species level before handling it will help in determining the final treatment if this automatic response results in the bat escaping.
- If it’s a listed species...
 - Contact the nearest USFWS Game Warden.
 - Allow him/her to take over the fate of the live animal.

Wound Treatment

Regardless of the risk of rabies, when bitten by a mammal, the optimal medical treatment includes recognition of the wound and prompt treatment. For most types of bites, immediate irrigation with water or a dilute water povidone-iodine solution markedly reduces the risk for bacterial infection (Callahan 1978). When treating a wound, take care to not add further damage to the skin or tissues (CDC 2008). Studies with animals (not human studies) have shown that wound cleansing is especially important in rabies prevention because through wound cleansing alone, without other post-exposure prophylaxis, there is a marked reduction in the likelihood of rabies (Dean et al. 1963, Kaplan et al. 1962).

- Keep the first aid kit stocked with fresh water, soap and povidone iodine
- Always have the first aid kit onsite
- Supervisors need to remind staff daily of its presence and importance of wound care

Testing

In the event of a possible rabies exposure, BRI biologists are encouraged to have the animal tested for rabies even though testing is fatal to the animal.

- DO NOT euthanize a listed species.
 - Call the nearest USFWS Game Warden.
 - Allow him/her to take possession of the live bat.
- Euthanize non-listed species via cervical dislocation
 - Only staff skilled in this procedure should perform it.
 - Contact your supervisor if you need help.
- Keep carcass cool – do not freeze it.
 - Freezing will interfere with subsequent testing.
 - Never place biological samples in the same refrigerator with food consumed by humans.
- Contact the local health department and arrange for shipping.
 - Follow shipping instructions listed in the Rabies Specimen Submission section (below).

Reporting Exposures

BRI biologists must report a bat exposure to their supervisor(s) and BRI in Gorham, ME within 24 hours of the event. There are strict state laws regarding timelines in which BRI and its insurance carrier must report injuries to the state workers' compensation board. Any delay subject BRI to potential fines by the state.

- REPORT ALL EXPOSURES IMMEDIATELY
 - Failure to report a bat bite or other exposure puts both the affected individual and BRI at great risk
 - Peer-pressure to NOT report an exposure will not be tolerated
- Employee (and/or their supervisor) is responsible for:
 - Completing BRI's Report of Injury Form
 - Answering basic questions for Workers' Compensation insurance/OSHA reporting
- Cost of the follow-up and testing will be covered by Worker's Compensation insurance.
 - Hospitals, Public Health Departments, and local pharmacies will need Worker's Compensation policy numbers.
 - Policy Number
 - You will be supplied with this number in advance.
 - Keep it with you at all times.
 - If you lose this number, you may still seek treatment – it can be provided later.
 - Claim Number
 - Available about 24 hours after the incident is reported to the insurance carrier.

Post-Exposure Treatment

BRI biologists should mentally prepare themselves for the steps involved with treatment following exposure to the rabies virus. Given the nature of BRI's bat work, there always remains a high probability that staff will encounter an exposure to the rabies virus. Bats tend to defend themselves (attempt to bite) during removal after being ensnared in mist and harp nets. Since the epidemiology and pathogenesis of rabies is complex, recommendations regarding post-exposure prophylaxis are dependent on associated risks which must be assessed by the attending medical professional (CDC 2008). These risks include:

- 1) Type of exposure
- 2) Epidemiology of animal rabies in the area where the contact occurred
- 3) Species of animal involved
- 4) Circumstances of the exposure incident

Clinicians should seek assistance from local or state public health officials for evaluating post-exposure management in situations that are not routine. State and local officials have access to CDC rabies experts for difficult decisions (CDV 2008). As the affected individual, this dialogue may seem confusing and unsettling. Remain calm and keep in mind that when an unvaccinated person is exposed the administration of the rabies post-exposure prophylaxis is a medical urgency, not a medical emergency (CDC 2011).

BRI has adopted the following protocols if a staff member experiences an exposure to the rabies virus. Please keep in mind that the actual decision to administer the post-exposure prophylaxis may differ between cases and is dependent on the affected individual's vaccination status (Table 1).

- Supervisors should provide staff, in advance of going into the field, with the contact information for:
 - Local hospital(s)
 - Local and State Public Health Facilities
- Consult with the local medical health care provider and the local/state public health officials
 - Keep notes on their recommendations
 - Ask questions
 - Use Table 1 as a guide to post-exposure treatment
 - Rabies vaccines are not always readily available, so the Emergency Room is the typical place to seek treatment.
 - In Portland, ME, Concentra may be a treatment option
- If the animal is available for testing
 - You most likely will be instructed to wait for the results before receiving the post-exposure prophylaxis
 - Employees are encouraged to seek medical treatment/advice if they feel they are at risk in waiting
- Keep BRI Gorham ME apprised of your progress.

Unfortunately, not many health care providers are accustomed to dealing with rabies exposures in individuals who have the pre-exposure vaccination. We recommend you bring the following table with you if you need to seek treatment.

Table 1. Rabies post-exposure prophylaxis schedule – United States, 2008 (CDC 2008, 2010)

Vaccination Status	Treatment	Regime*
Not previously vaccinated	Wound cleansing	All post-exposure prophylaxis should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as povidine-iodine solution should be used to irrigate the wounds.
	Rabies immune globulin (RIG)	Administer 20 IU/kg body weight. If anatomically feasible, the full dose should be infiltrated around the wound(s) and any remaining volume should be administered intramuscularly (IM) at an anatomical site distant from the vaccine administration. Also, RIG should not be administered in the same syringe as the vaccine. Because RIG might partially suppress active production of antibody, no more than the recommended does should be given.
	Vaccine	Human diploid cell vaccine (HDCV) or purified chick embryo cell vaccine (PCECV) 1.0 mL, IM (deltoid area [§]), on each day of days 0 [¶] , 3, 7, 14, and 29.
Previously vaccinated **	Wound cleansing	All post-exposure prophylaxis should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as providine-iodine solution should be used to irrigate the wounds.
	RIG	RIG should not be administered.
	Vaccine	HDCV or PCECV 1.0 mL, IM (deltoid area [§]), one each on days 0 [¶] and 3.

* These regimes are applicable for all age groups, including children.

** Any person with a history of a complete pre-exposure or post-exposure vaccination regime w/HDCV, PCECV, or rabies vaccine adsorbed, or previously vaccination with any other type of rabies vaccine and a documented history of antibody response to the prior vaccination.

§ The deltoid area is the only acceptable site of vaccination for adults and older children. For younger children, the outer aspect of the thigh can be used. Vaccine should never be administered in the gluteal area.

¶ Day 0 is the day the first dose of the vaccine is administered.

RABIES SPECIMEN SUBMISSION

General Information

The purpose of this appendix is to provide BRI field staff with a guideline of how to prepare and ship a suspected rabies specimen to a local laboratory for testing. Each laboratory and/or state is likely to have specific protocols, which can be addressed by asking the following questions.

- Normal business hours
- Telephone number
- Do they use a specific courier

It is extremely unlikely that a live animal will be accepted by the laboratory.

Necropsy

- The animal should be humanely euthanized without damage to the head.
 - Exception: if the suspected animal is a listed species.
 - Call the nearest U.S. Fish and Wildlife Service office.
 - Turn the LIVE animal over to them for handling.
 - Only BRI employees experienced with this procedure should perform euthanasia.
 - Contact your supervisor if you need help.
- The head must be removed from the body and submitted intact for necropsy.
 - Exception: entire body of small mammals, such as bats, mice, and squirrels may be submitted as whole carcasses for testing.

Packaging and Shipping

- A laboratory submission form may be required – ask.
 - Fill it out completely.
 - Make a copy or scan the form for BRI's records.
- All materials collected for rabies diagnosis are considered to be infectious.
 - Appropriate handling and shipping precautions should be taken in order to ensure the safety of the collector/submitter, transportation carriers, laboratory staff and the public at large in accordance with 49 CFR Department of Transportation Regulations.
- Submit specimens to the laboratory promptly and cold to reduce decomposition of the animal.
 - Use frozen cold packs only.
 - Do not use “wet” ice as it may leak through the container; leaking containers are often rejected.
 - DO NOT FREEZE the specimen as this will delay the testing and possibly alter the results.
- All specimens should be sprayed or dusted for fleas and ticks with a pesticide before packaging.
- Wear disposable gloves while packaging a rabies sample.
- Clearly label the sample with:
 - Health Department or Animal Control internal tracking number (if provided)
 - Animal Species
- Triple package the specimen:
 - Primary Container
 - Ziploc bag or heavy-duty garbage bag appropriately sized for the specimen with an absorbent material (absorbent pads, paper towels, etc.) placed in the bag to prevent blood and body fluid from leaking.

- If sharp objects protrude from the specimen, such as a shattered bone, wrap the specimen in several layers of newspaper.
- Always tightly seal or fasten the primary container to contain the specimen.
- Label this container.
- Secondary Container
 - Use a metal can, heavy plastic pail with a lid or a heavy-duty plastic garbage bag as the secondary container.
 - Seal secondary container to help prevent leakage of blood or body fluid.
 - Label this container.
- Rigid Outer Shipping Container
 - Use a cooler or thick-walled Styrofoam container with or without an exterior fiber board liner.
 - “Rabies” should be clearly labeled with permanent marker.
 - Place the secondary container inside the shipping container with sufficient frozen cool packs and cushion materials to prevent damage to the specimen during transport.
 - Clean the outside of the Outer Shipping Container with a disinfectant
 - 10% bleach (9 parts water, 2 parts household bleach)
 - Secure the lid of the container (tape) for transport
 - Place the address on the container

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