

2017

Delineation of bald eagle nesting habitat, bald eagle nest surveys, and communal roost delineation at NAS Oceana, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress, and fledgling eagle tracking

B. J. Paxton

The Center for Conservation Biology

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Delineation of Bald Eagle Nesting Habitat, Bald Eagle Nest Surveys, and Communal Roost Delineation at NAS Oceana, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress, and Fledgling Eagle Tracking

November 2017

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Identifying Potential Bald Eagle Nesting Habitat

Objectives-To delineate potential breeding and roosting habitat within and near (within 2,640ft buffer around boundary) NAS Oceana, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress. Bald eagle use similar habitat for both roosting and nesting. From previous work throughout the Chesapeake Bay (*Production and implementation of a habitat suitability model for breeding Bald Eagles in the lower Chesapeake Bay (Phase II: Model Construction through Habitat Mapping)* Watts et al 1994), we have determined that 3 habitat dimensions including forest stand age, proximity to water and human infrastructure are dominant determinants of habitat suitability for breeding bald eagles. Stand age is most related to substrate suitability for nesting and roosting and should be used for survey planning. In recent years, some pairs of Bald Eagles have become more tolerant to human disturbance in urban and suburban areas of coastal Virginia. Each year a greater number of Bald Eagle nests occur within close proximity to human habitation (Watts, unpublished). While this delineation of the most favorable nesting habitat use characteristic that conform to most Bald Eagle nests, nests may occur in suboptimal nesting habitat if suitable nesting structure is present.

Methods- GIS Layers for base resources including; installation boundary layers, vegetation classification data, waterways, and human infrastructure were acquired for all bases from DOD biologists. The installation boundary layer was used to establish a 2,640ft buffer around NAS Oceana, NAS Oceana NEXCOM Headquarters, NAS Oceana Midway Manor Housing, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress. For classification within the buffer zone, National Landcover Database 2011 was used (Homer et. al. 2015). Within base boundaries, Navy GIS layers of Roads, buildings, structures, and airfields section layers were used to create an impervious surface layer used to represent human habitation, recent aerial imagery (VGIN, 2013) and vegetation layers were used to identify forested habitat suitable for Bald Eagle nesting, early successional habitats within base boundaries were included in the forest habitat layer, as mature trees suitable for nesting were often present within this vegetation classification. All forested habitat within 25m of the impervious surface layer was considered unsuitable nesting habitat and removed from the forested habitat layer. A 250m buffer was generated around all water bodies/features and unioned with the forested habitat layer. Within the buffer zone, the NLCD classification of low intensity, medium intensity and high intensity developed was used to identify human habitation. Open water classification was used to identify water features. Visual inspection of recent aerial imagery (VGIN, 2013) and NLCD vegetation layers were used to manually delineate forest blocks that could support breeding bald eagles. The resulting layers were used to delineate Bald Eagle nesting habitats on the bases at 3 levels (Suitable, Preferred, and Most Preferred). Suitable nesting habitat included all forested habitat at least 25m from impervious surfaces, and not associated with water or forested habitat with a major pine component. Preferred nesting habitat included all forested habitat at least 25m from impervious surfaces, and associated with either water or forested habitat with a major pine component. Most preferred nesting habitat included all forested habitat at least 25m from impervious surfaces, and associated with both water and forested habitat with a major pine component. In addition to the 3 levels of nesting habitat suitability delineated from GIS data, an additional level was included based on direct observation of the landscape during the nest survey flights. This fourth level of habitat suitability (Most Preferred from observation) includes forested nesting habitat that, through direct observation, seemed to be the most likely nesting

habitat based on proximity to water, distance to human habitation, and most importantly, the presence of old mature pine and cypress trees most favored for nesting substrate.

Results – A GIS polygon layer was created delineating nesting and roosting habitat at 4 levels (Suitable, Preferred, and Most Preferred and most preferred by observation) (Figure 1) (See appendix I for detailed base specific maps). This layer was uploaded via <https://safe.amrdec.army.mil> in accordance with the current NAVFAC MIDLANT EV GIS Data Deliverable Specifications.

Bald Eagle Nest Survey and Status Classification

Objectives – To locate and map Bald Eagle nests within installation study areas and spatial buffers, and determine occupancy status of bald eagle territories, condition of nest structures and productivity of active nests.

Methods- Nest surveys of NAS Oceana, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress and habitat within a 2,640ft buffer of installation boundaries was conducted using a standard Bald Eagle nest survey approach. Nest survey flights typically occur from late February through early April to coincide with the peak of incubation. We used a Cessna 172 aircraft to systematically overfly the land surface to detect eagles and nests. The aircraft was maneuvered over all potential nesting habitat at an altitude of approximately 300-500 feet. All bald eagle nests detected were manually digitized using a GPS-enabled laptop (see appendix II for equipment details) loaded with recent aerial imagery and were assigned a unique, 3-part code (County-Year-Nest Number) that conforms to the historic national naming conventions. Aerial surveys were conducted in compliance with all FAA regulations regarding the operation of aircraft in areas around human habitation (FAA Guide to Low Flying Aircraft 91.199). Our pilot has a low altitude waiver for wildlife research. Flights were scheduled in advance with flight operations officers and the aircraft was in contact with appropriate air traffic control towers while conducting flights.

When a nest was located, the plane was maneuvered to approximately 100 feet over the nest allowing observers to examine nest contents, observe incubation/brooding posture, record the number of eggs, and record the number and age of eaglets, if present. Age of eaglets was estimated based on the extent of plumage development (Bortolotti, 1984). Each Bald Eagle nest was examined to determine its condition and status of use. Nests were classified according to national nomenclature (<https://www.fws.gov/midwest/midwestbird/eaglepermits/index.html>). We consider a breeding territory to be occupied if we observed a pair of birds in association with the nest, and there was evidence of recent nest maintenance (e.g., well-formed cup, fresh lining, structural maintenance). We consider nests to be active if we observed a bird in an incubating posture or if we detected eggs or young in the nest.

Results – Bald Eagle nests surveys were conducted on 3 April 2016 and 5 March 2017. Typically, we utilize a 2 flight approach, which includes a productivity flight later in the nesting season to determine nest success and productivity; however, since the chicks of the only active

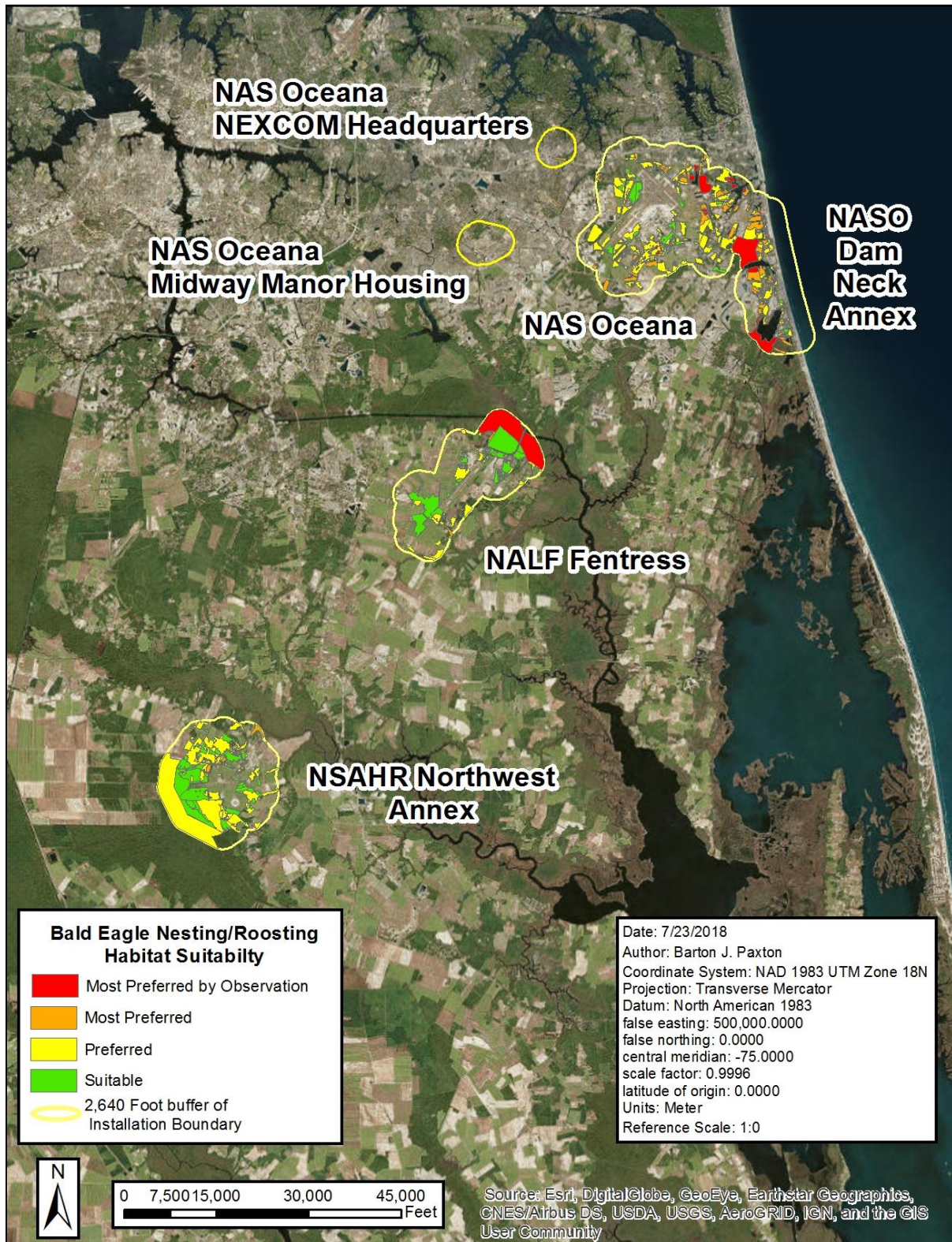


Figure 1. Overview of Bald Eagle nesting and roosting habitat suitability, delineated on NAS Oceana, NAS Oceana NEXCOM Headquarters, NAS Oceana Midway Manor Housing, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress.

nest on base properties in 2016 were banded as part of the larger study, a productivity flight was not warranted and funds were used to perform an additional nest survey flight in 2017.

The nest survey flight in 2016 resulted in 2 Bald Eagle nests detected on base properties and buffers (Table 1, Figure 2). Nest VB0601, on Redwing Golf Course within the buffer of NASO Dam Neck Annex and VB1501 on NAS Oceana’s Owl Creek property. No nests were located on the base properties or buffers of NALF Fentress or NSAHR Northwest Annex. The nearest known nests to these bases are VB1103 approximately 3,800 feet north of the NALF Fentress boundary, and CP1501 approximately 13,000 feet east northeast of the NSAHR Northwest Annex boundary (<http://www.ccbirds.org/what-we-do/research/species-of-concern/virginia-eagles/nest-locator/>).

Table 1. Results of 2016 Bald Eagle nest survey flight for NAS Oceana, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress.

Nest Code	X WGS 84	Y WGS 84	Tree	Landmark	Occupied Territory	Active Nest	Observation	Productivity
VB0601	-75.979924	36.793889	Loblolly	Redwing Golf Course	Y	N	2 Adults Present	N/A
VB1501	-75.984630	36.823300	Loblolly	Owl Creek	Y	Y	Incubating	2 Chicks

The nest survey flight in 2017 resulted in 3 Bald Eagle nests detected on base properties and buffers (Table 2, Figure 3). VB0601 on Redwing Golf Course within the buffer of NASO Dam Neck Annex, VB1501 on NAS Oceana’s Owl Creek property and VB1702 on Back Bay National Wildlife Refuge property within the southwest buffer of NASO Dam Neck Annex. No nests were located on the base properties or buffers of NALF Fentress or NSAHR Northwest Annex. The nearest known nests to these bases are VB1103 approximately 3,800 feet north of the NALF Fentress boundary, and CP1501 approximately 13,000 feet east northeast of the NSAHR Northwest Annex boundary (<http://www.ccbirds.org/what-we-do/research/species-of-concern/virginia-eagles/nest-locator/>).

Table 2. Results of 2017 Bald Eagle nest survey flight for NAS Oceana, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress.

Nest Code	X WGS 84	Y WGS 84	Tree	Landmark	Occupied Territory	Active Nest	Observation	Productivity
VB0601	-75.979924	36.793889	Loblolly	Redwing Golf Course	N	N	empty	N/A
VB1501	-75.984630	36.823300	Loblolly	Owl Creek	Y	Y	Incubating	Unknown
VB1702	-75.964337	36.756490	Loblolly	Dam Neck Buffer SW	Y	Y	Incubating	Unknown

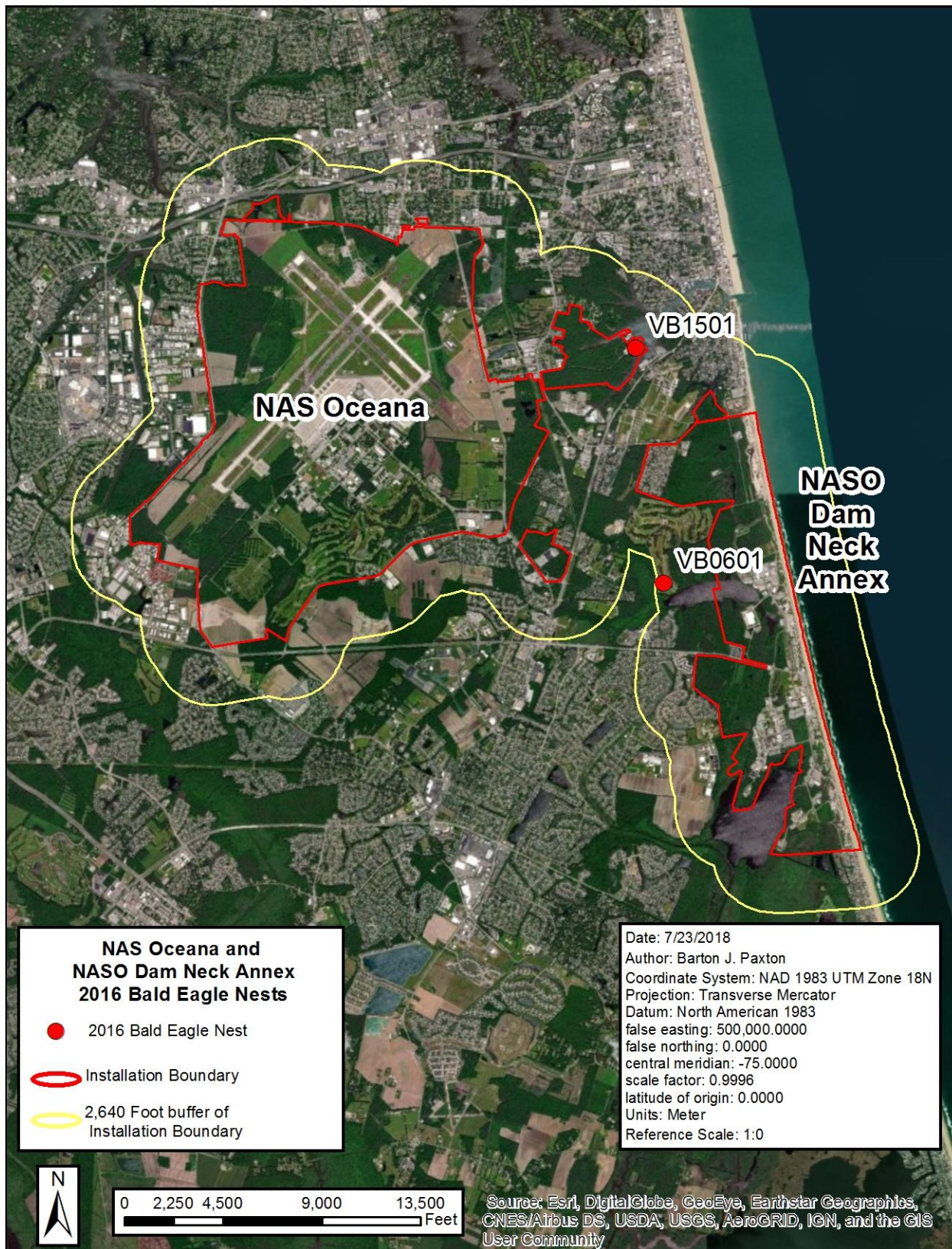


Figure 2. Map of Bald Eagle nest locations detected during the 2016 nest survey flight of NAS Oceana, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress.

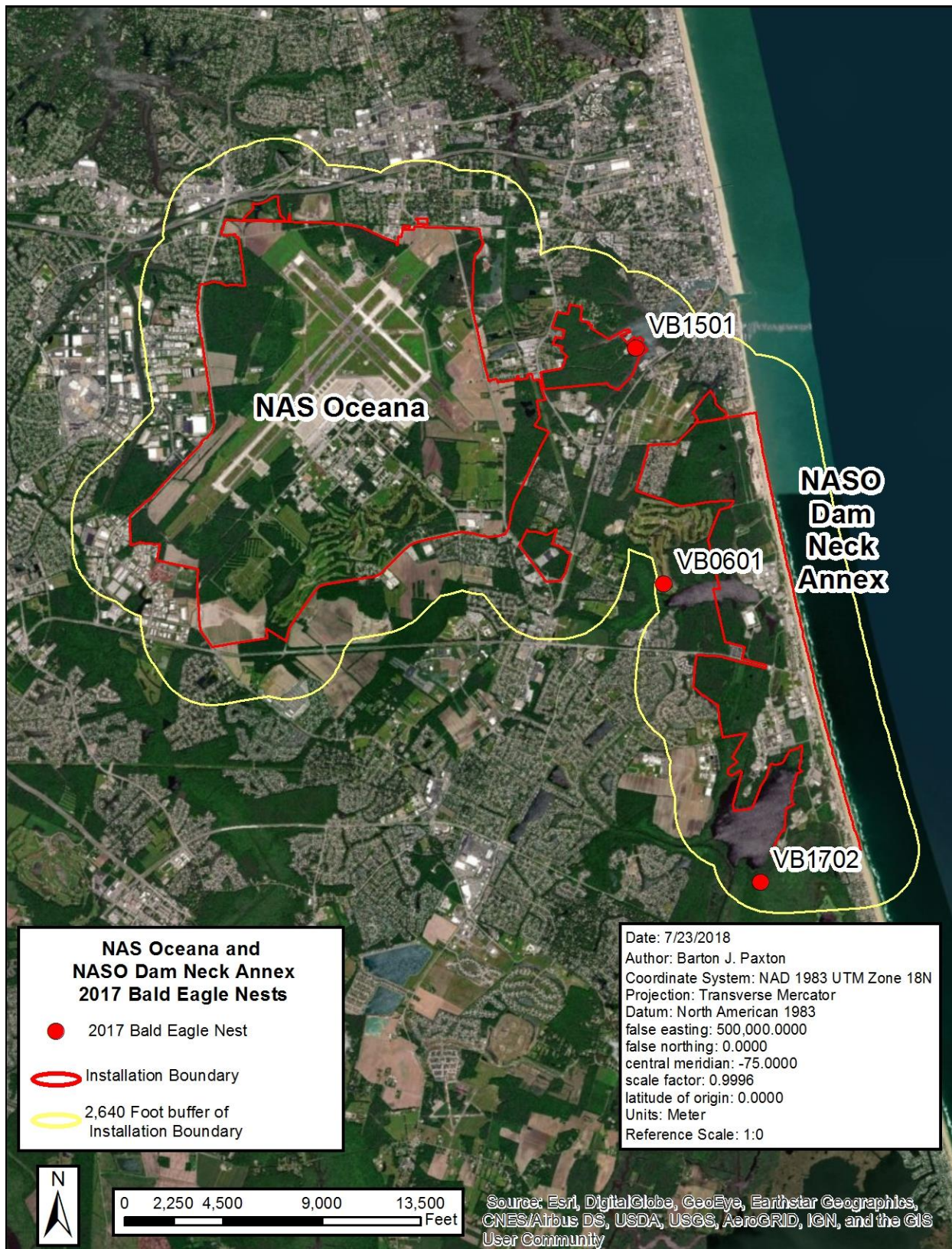


Figure 3. Map of Bald Eagle nest locations detected during the 2017 nest survey flight of NAS Oceana, NSAHR Northwest Annex, NASO Dam Neck Annex, and NALF Fentress.

Eagle Tracking

Objectives-Attachment of GPS transmitters to young eagles, to collect post fledging movement data from eagles produced from nests near installations. Data collected will help expand our knowledge of eagle movements around southeast Virginia and may be used to explore issues involving eagle and human conflict.

Methods – Suitable nests were located during nest survey flights of the greater Virginia Beach area. Landowner permissions (Appendix III) were secured and a banding schedule, based on chick age, was produced. Nests were entered using standard arborists equipment when broods are 50-55 days old (pre-fledging age) young were lowered to the ground for processing. Processing included; banding, measurements, and tissue collection. The following morphometric measurements were taken on all chicks: weight, wing length, tail length, culmen length, culmen depth and hallux length. Wing and tail length were measured with a ruler (± 1 mm) and culmen length, culmen depth and hallux length were measured with dial calipers (± 0.1 mm). Eagles were weighed on a digital scale (± 1 g). Nestlings were marked with numeric federal bands (USGS Bird Banding Lab, Laurel, MD) on the right tarsus and purple alpha-numeric color bands (ACRAFT, Edmonton, Alberta) on the left tarsus. Field readable alpha-numeric bands are placed on bird to facilitate resighting by researchers and the general public. While standard federal bands are typically only readable while the bird is in hand, colored alpha numeric bands with large type can be typically be read with binoculars or spotting scopes and from images of banded individuals. Both, federal and field readable alpha-numeric bands can be reported at “Report a banded bird” <https://www.pwrc.usgs.gov/BBL/bblretrv/>. Blood samples from one chick at nest VB1501 were collected from the brachial vein in the wing using 23 gauge butterfly needles and 4cc heparinized Vacutainers©. The blood sample collected was subdivided into 2 Vacutainers© including one designated for heavy metal analysis (green top), and one designated for lead isotope analysis (tan top). Samples from the green top vial were analyzed by Noel V. Stanton, Chemical Response Coordinator, State Laboratory of Hygiene, 2601 Agriculture Dr, Madison WI 53718. The results of contaminant testing can be found in appendix IV. Results are part of a larger collaboration with the National Park Service. Samples are continuing to be collected and broad analyses of results have not yet begun. Blood samples from the tan top vial were sent to Vincent Slabe, PhD Candidate, West Virginia University, School of Natural Resources, 355 Oakland St. / 322 Percival Hall, Morgantown, WV 26506-6125 USA vaslabe@mix.wvu.edu. A maximum of 6cc of blood was collected from the chick. Blood samples were immediately packed on ice and frozen within 4 hours of collection. All samples were labeled with the eagle’s band number and unique nest code. Breast feathers, for future genetic analysis, were collected and placed in envelopes labeled with the eagle’s band number and unique nest code.

Twelve chicks were fitted with Microwave Telemetry GSM70 (appendix II) transmitters using a backpack-style harness constructed of 0.64-cm Teflon® ribbon and returned to the nest. All birds fitted with transmitters were from nests off of installation properties, due to potential safety concerns associated with transmission signals. The Naval Ordnance Safety and Security Activity (NOSSA) would not clear the equipment for use on installation. Data from transmitters was/is monitored weekly, from deployment to present time, to check operational status of transmitters and mortality status of the eagle.. Data is stored online in a free but secure cloud service

provided by Movebank.org. The Center for Conservation Biology has an account with Movebank to receive and store all our data from birds with GPS transmitters. CCB will continue to collect and manage data from these transmitters as long as the units are functional. Data collected after the period of performance of this contract can be made available to the Navy upon request for future analyses on eagle home range, migration, and movement around installations, airfields, electrical lines and other hazards.

Eagle capture and handling methods were conducted in compliance with both federal IACUC (IACUC-2016-03-24-11117-bjpaxt) and IBC (IBC-2016-04-07-11159-bjpaxt) protocols at the College of William and Mary. Eagle banding and transmitter deployment were conducted under federal banding license 21567 issued to Bryan Watts and Virginia Threatened and Endangered Species Permit 054255 issued by the Virginia Department of Game & Inland Fisheries. See appendix V for permit and compliance documents.

Results – 7 bald eagle nests were accessed and 15 chicks were banded (Appendix VI). All banded birds were considered to be in excellent health. Twelve of the 15 banded chicks were fitted with GSM transmitters. All chicks that received transmitters were from nests off installations due to potential safety concerns associated with transmission signals. The Naval Ordnance Safety and Security Activity (NOSSA) would not clear the equipment for use on installation (Figure 4). Of the 12 chicks that received transmitters 11 successfully fledged. The one chick that did not successfully fledge was one of two chicks that received transmitters from nest VB1201. Approximately 3 weeks after banding and transmitter deployment, nest VB1201 was damaged in a storm and the eagle chick with band number 0629-12162, transmitter number 798, was ejected from the nest. The bird was captured and released near the nest site on 11 June 2016. Transmitter 798 stopped on 15 July 2016 and the bird was reported to have been found dead on 25 July 2016. Details are not clear and it is believed that this bird was buried with the transmitter still attached.

The bald eagle from nest VB1501 (Owl Creek) which was banded with BBL band 0629-12154 and alpha-numeric RK, was presumed to have been struck by a plane and subsequently euthanized. On 10 April 2017, an injured eagle was reported on the runway of Norfolk International Airport by a pilot. The bird was retrieved and found to have a severed wing. It was transported to Midway Veterinary Hospital in Chesapeake, Virginia by USDA wildlife specialist Carl Knauer. The eagle was then transferred to the Virginia Beach SPCA who received permission from the United States Fish and Wildlife Service to euthanize the eagle.

Approximately one year after transmitter deployment, data from 913,020 GPS position fixes were uploaded via <https://safe.amrdec.army.mil> in accordance with the current NAVFAC MIDLANT EV GIS Data Deliverable Specifications. Updates of positions from active transmitter were also uploaded to via <https://safe.amrdec.army.mil> on 8 January 2018 and 29 July 2018.

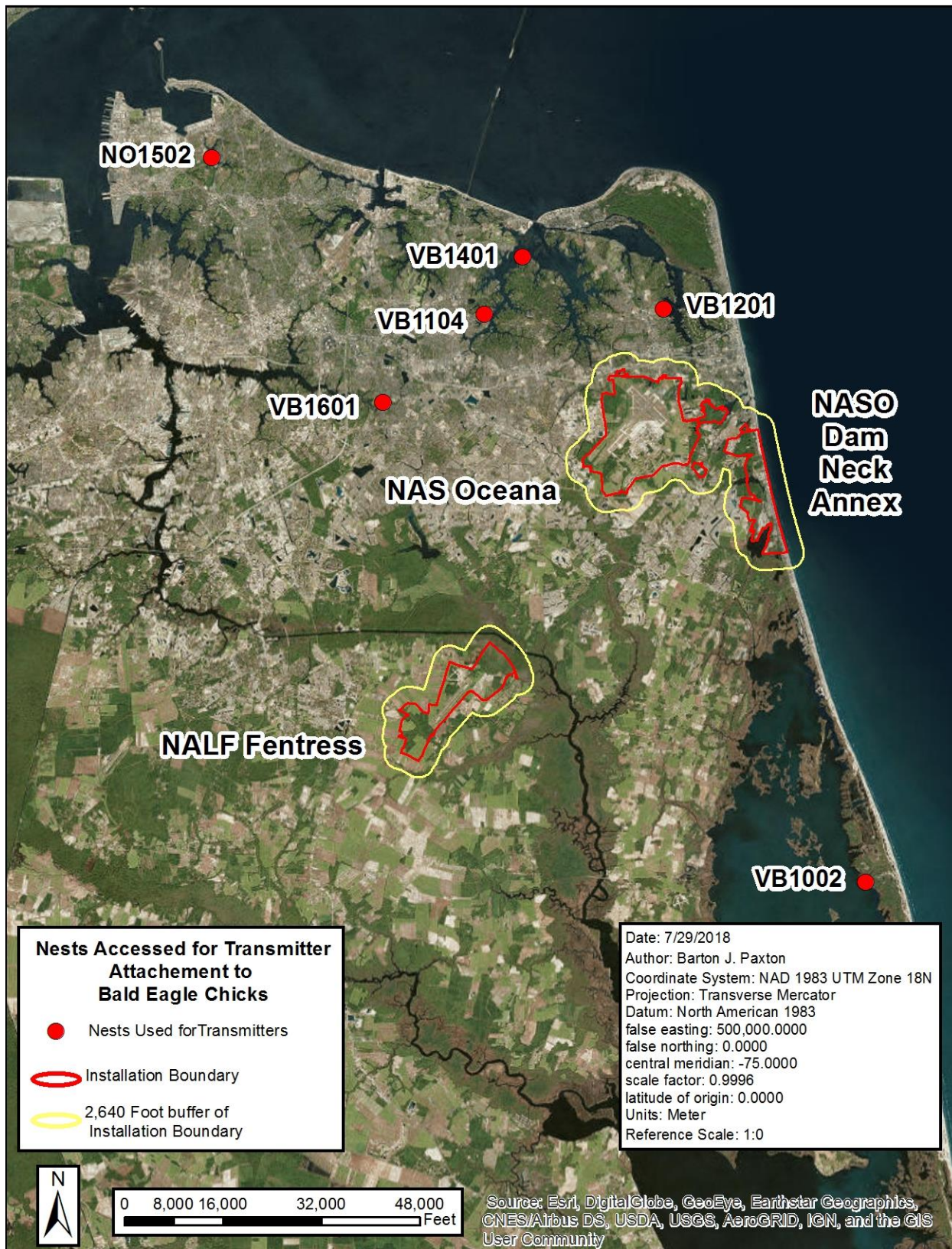


Figure 4. Map of, off installation, Bald Eagle nest locations accessed for banding and transmitter attachment.

Communal Roosts

Objectives-To utilize collected transmitter tracking data to delineate potential communal roosts within installation study areas and spatial buffers. Satellite tracking data from recently fledged eagles are particularly suited for roost delineation because these birds explore the landscape effectively “traplining” and revealing roost networks.

Methods – Due to the daily timing of occupation, daytime aerial surveys are not an effective tool in locating communal roosts. Project personnel have developed an approach to delineating communal roosts using tracking data (Watts and Mojica 2012). The approach uses night-time fixes in conjunction with clustering software to identify potential communal roosts. Satellite tracking data from recently fledged eagles are particularly suited for roost delineation because these birds explore the landscape effectively “traplining” and revealing roost networks.

Satellite telemetry data were compiled for the 11 transmittered Bald Eagle chicks that successfully fledged. Data from transmitter deployment to mid- September 2017 was used to isolate fixes occurring from 2400h to 0400h. Since no transmitters were deployed on birds from within base boundaries or buffers, fixes from natal areas were not removed. Data were arranged so that duplicate fixes from individual birds on the same date were removed, resulting in a single night time fix for each eagle. Cluster parameters were set to search a fixed distance of 200 m for a minimum of five night locations (Watts and Mojica 2012). Minimum convex polygons of roosts were generated around individual clusters of points.

Results – A total of 367 roost night positions were identified for 10 different eagles within base boundaries and buffers (Figure 5). One eagle did not roost within base boundaries or buffers. Cluster analysis revealed 8 distinct communal roosts within base boundaries and buffers (Table 3 and Figure 6). The number of roost nights ranged from 9 to 106, and the number of transmittered eagles using individual roosts ranged from 1 to 9. The very small roost identified on Redwing golf course (Redwing Golf Course 2) that consists of single bird for 9 roost nights would be considered a suspected roost. However these roost night positions are in very close proximity to other larger roost identified in this study and by Mojica and Watts 2014. The cluster of roost positions within the buffer of NALF Fentress did not meet the parameters to consider it a roost. However, with additional data it is likely that this cluster would be classified as a roost. A single roost night position was located within the buffer of NSAHR Northwest Annex. Even with additional data, it is not likely that this area would be classified as a roost.

Discussion

While inclement weather and selection of workable nests with suitably aged chicks made completing transmitter attachment less than ideal, these small inconveniences did not negatively impact the overall project.

While we knew that fledged eagles are particularly suited for roost delineation because these birds explore the landscape effectively “traplining” and revealing roost networks. We were very surprised at the level to which these young birds were using roosts within base boundaries and buffers. Ten of the 11 eagle that fledged with transmitters attach utilized roosts within base

boundaries and buffers. Additional analysis data, collected after this roost analysis was performed, could reveal additional roosts and/or refine current roost boundaries within base boundaries and buffers. Regular aerial surveys of nesting bald eagle is always recommended to ensure compliance to recommendations of the Bald and Golden Eagle Protection Act (<https://www.fws.gov/midwest/eagle/protect/laws.html>)

Table 3. Communal roosts identified on or near NAS Oceana and NASO Dam Neck Annex.

Roost	RstNights	NumInd	Perimeter	Area
Lake Tecumseh East	71	9	989.90156622000	46193.89031420000
Lake Tecumseh South	10	5	425.88197078400	10100.00228090000
Lake Tecumseh West	70	9	846.05397636300	43191.86062790000
Owl Creek	12	6	1433.61912613000	131197.19494600000
Redwing Golf Course	106	5	1110.54133948000	64351.79536340000
Redwing Golf Course 2	9	1	60.95006204480	224.18119091000
Redwing Lake North	20	6	810.65419796700	31976.10294680000
Redwing Lake South	33	5	1158.70894482000	66977.74512830000

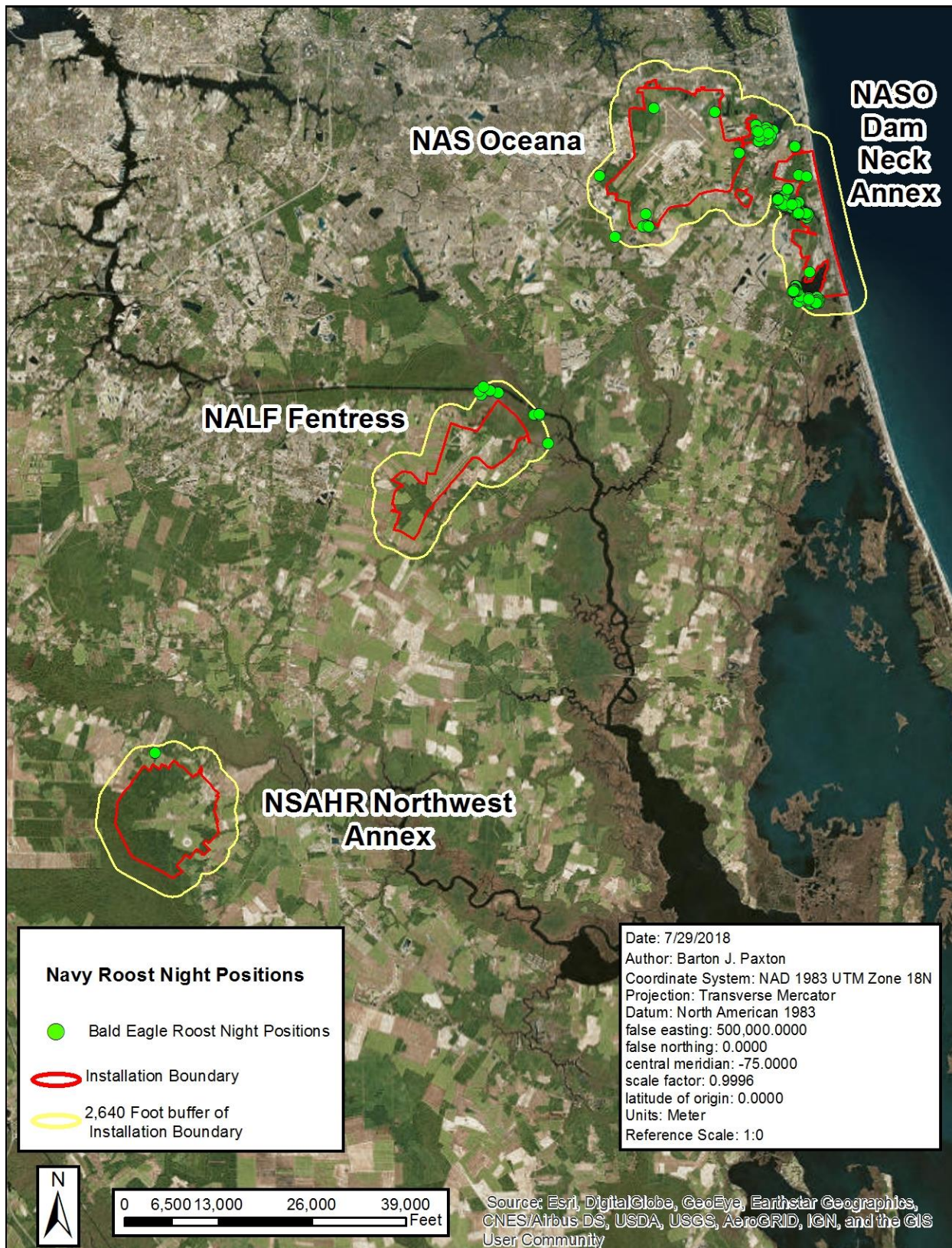


Figure 5. Map of Bald Eagle roost night positions used to delineate communal roosts on NAS Oceana and NASO Dam Neck Annex.

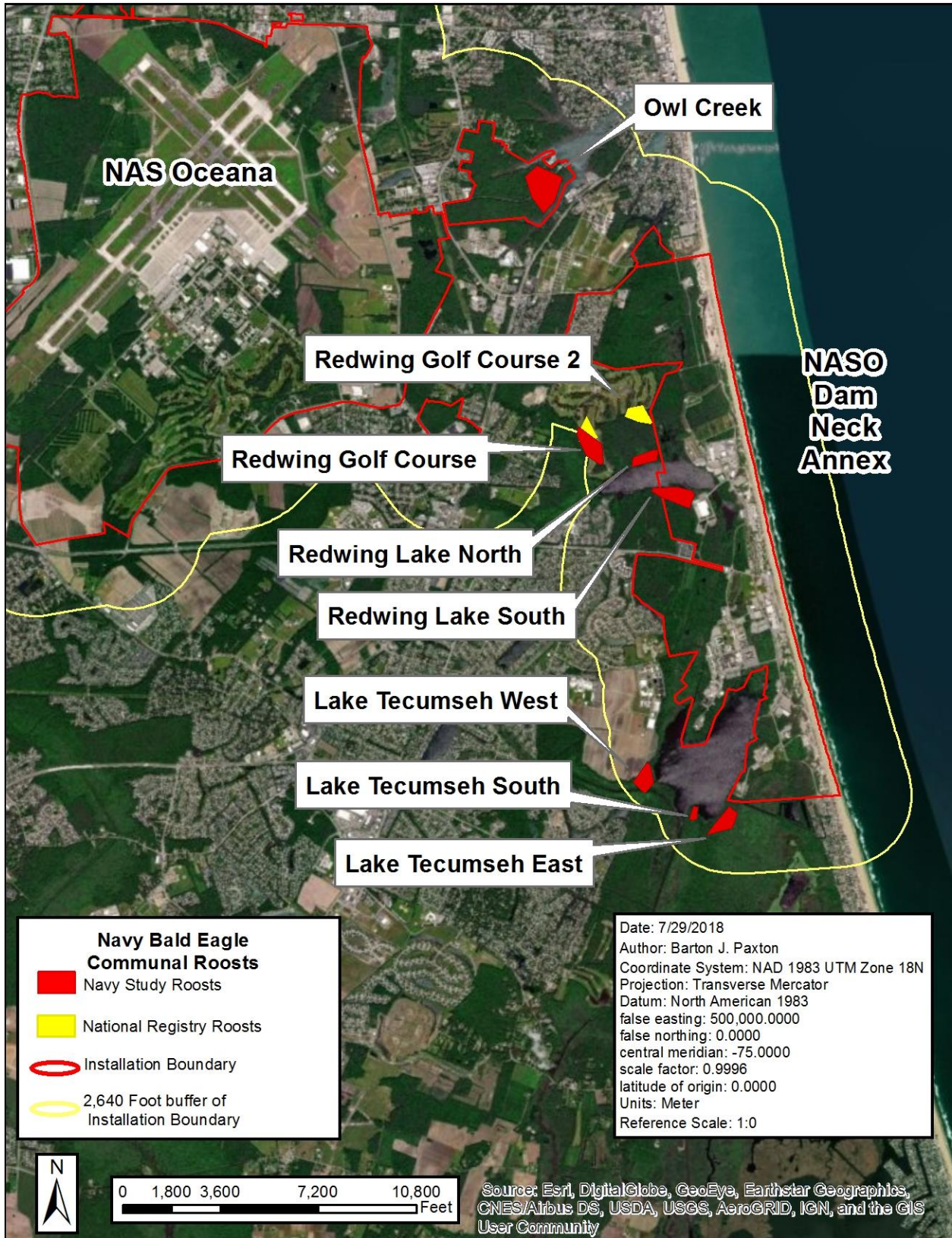
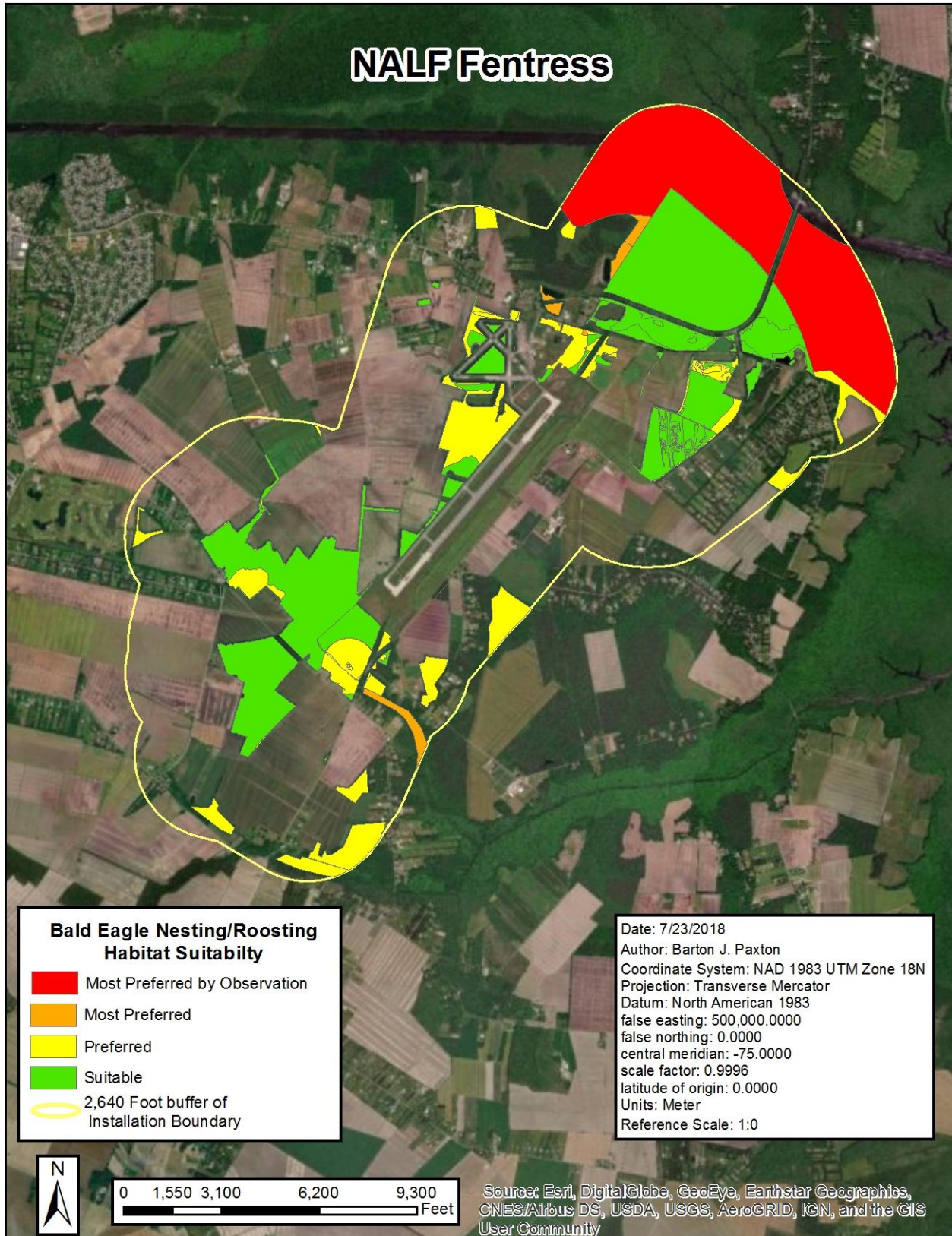


Figure 6. Map of Bald Eagle communal roost delineated on/near NAS Oceana and NASO Dam Neck Annex.

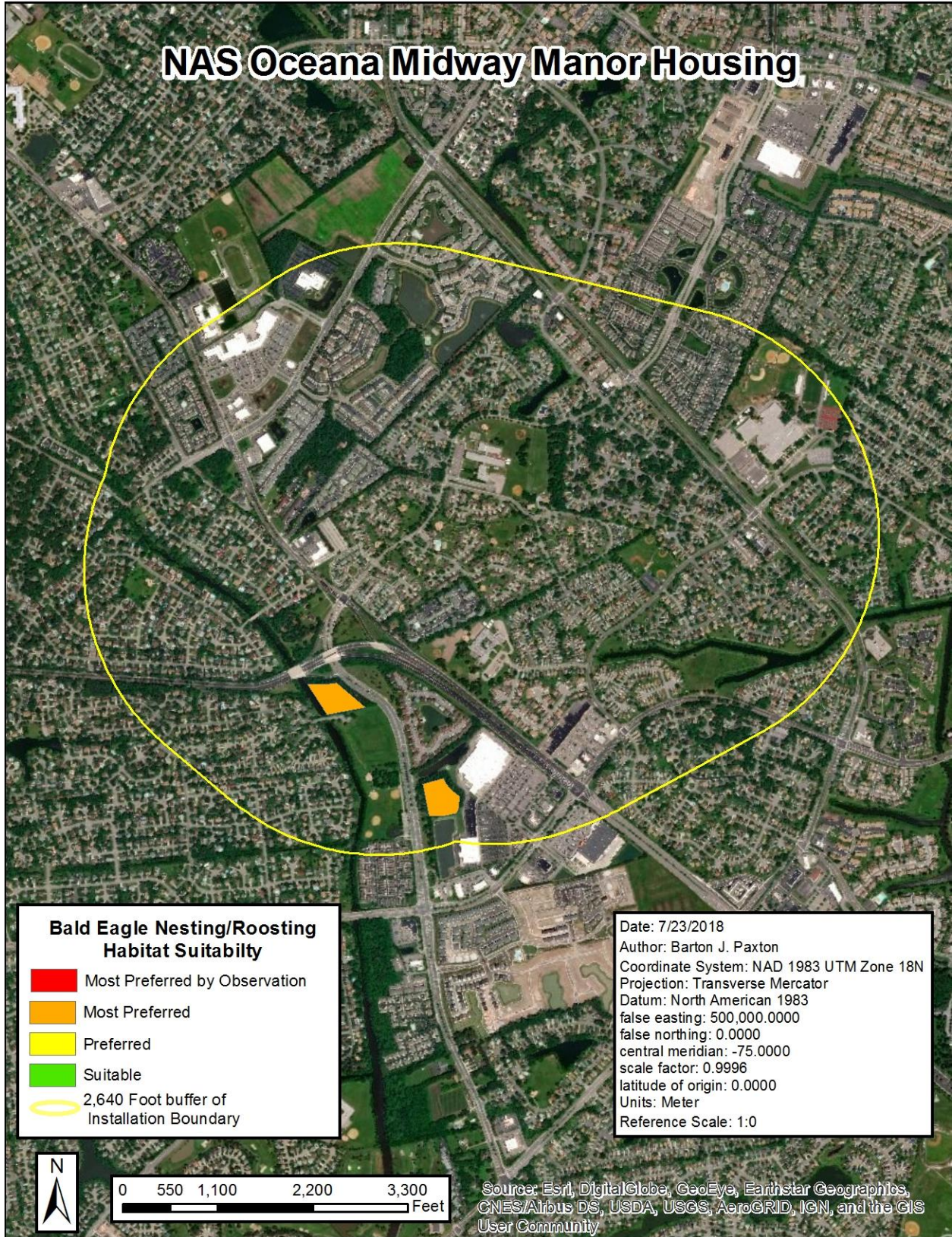
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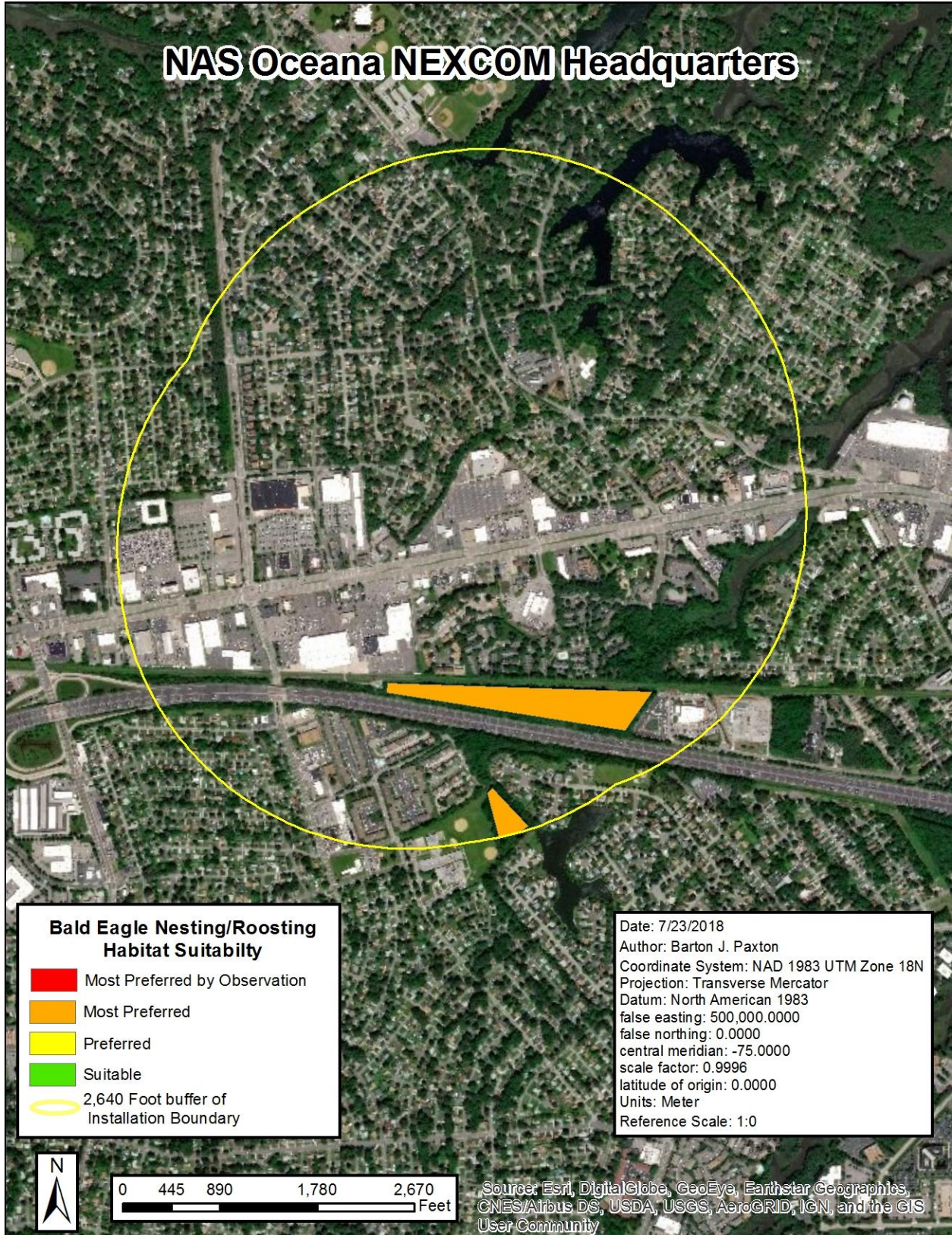
Appendix I. Base specific maps of potential Bald Eagle nesting habitat.



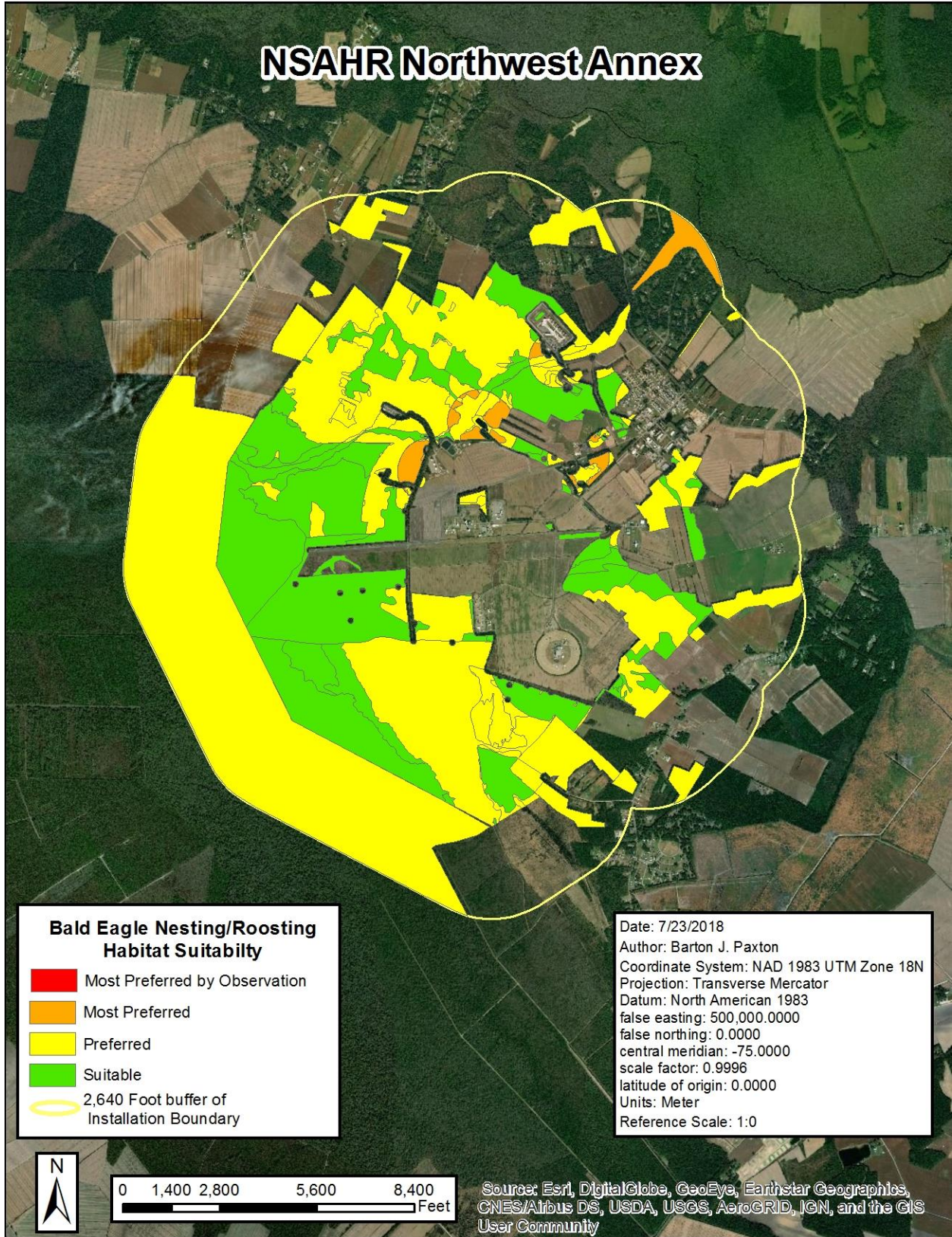
NAS Oceana Midway Manor Housing



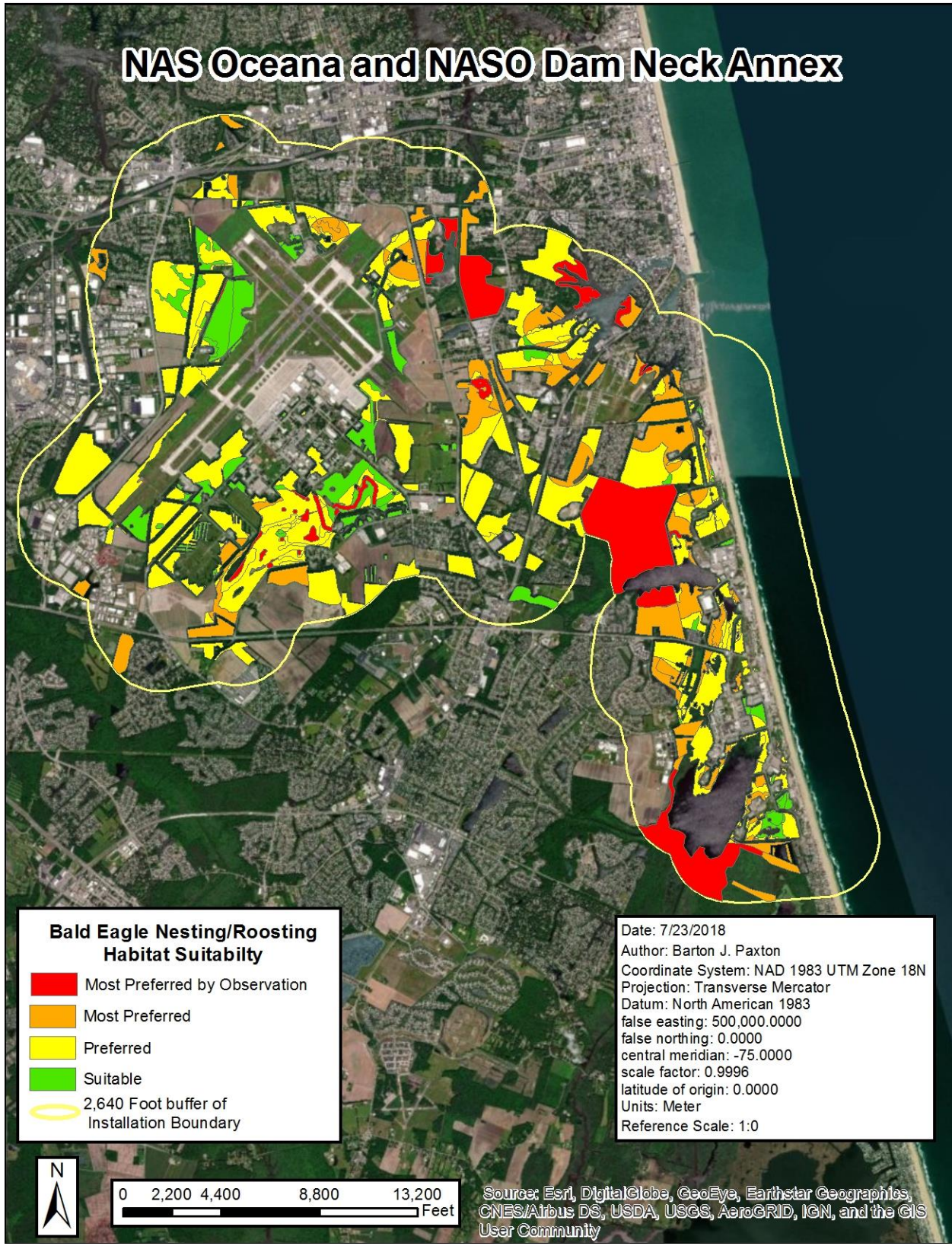
NAS Oceana NEXCOM Headquarters



NSAHR Northwest Annex



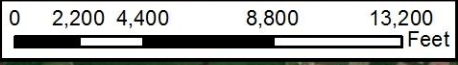
NAS Oceana and NASO Dam Neck Annex



**Bald Eagle Nesting/Roosting
Habitat Suitability**

- Most Preferred by Observation
- Most Preferred
- Preferred
- Suitable
- 2,640 Foot buffer of Installation Boundary

Date: 7/23/2018
Author: Barton J. Paxton
Coordinate System: NAD 1983 UTM Zone 18N
Projection: Transverse Mercator
Datum: North American 1983
false easting: 500,000.0000
false northing: 0.0000
central meridian: -75.0000
scale factor: 0.9996
latitude of origin: 0.0000
Units: Meter
Reference Scale: 1:0



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix II. List of Equipment and Software Specifications

1. Getac V200 convertible tablet/laptop

General

- Packaged Quantity

1

- Operating System

Microsoft Windows 7

- Manufacturer

Getac Inc

Processor / Chipset

- CPU

Intel Core i7 620LM / 2 GHz

- Max Turbo Speed

2.8 GHz

- Number of Cores

Dual-Core

- Cache

L3 – 4 MB

- 64-bit Computing

Yes

- Features

Intel Advanced Smart Cache, Intel Turbo Boost Technology

Cache Memory

- Type
L3 cache
- Installed Size
4 MB

RAM

- Technology
DDR3 SDRAM
- Installed Size
2 GB

Storage

- Interface
Serial ATA-300

Memory

- Max Supported Size
8 GB
- Technology
DDR3 SDRAM

Environmental Parameters

- Humidity Range Operating
5 – 95% (non-condensing)

Display

- LCD Backlight Technology
LED backlight

- Resolution
1280 x 800 (WXGA)
- Widescreen Display
Yes
- Monitor Features
180° screen rotation, QuadraClear, sunlight readable
- Type
LED
- Touchscreen
yes (multi-touch)
- Diagonal Size (metric)
30.7 cm
- Display Resolution Abbreviation
WXGA

Audio & Video

- Memory Allocation Technology
shared video memory (UMA)
- Max Allocated RAM Size
1024 MB
- Integrated Webcam
Yes
- Sound
Microphone

Hard Drive

- Type
HDD
- Capacity
320 GB

Input

- Type
glove controller, keyboard, touchpad, touchscreen
- Features
waterproof

Communications

- Wireless Protocol
802.11 a/b/g/n, Bluetooth 2.1 EDR
- Bluetooth Class
Class 2

Processor

- CPU Type
Core i7
- Processor Number
i7-620LM
- Manufacturer
Intel
- Clock Speed

2 GHz

Optical Storage

- Drive Type
no optical drive
- Type
none

Battery

- Capacity
7800 mAh
- Technology
lithium ion

Card Reader

- Type
card reader
- Supported Flash Memory
SD Memory Card

AC Adapter

- Input
AC 120/230 V (50/60 Hz)

Connections & Expansion

- Slots
1 x ExpressCard
1 x Smart Card
- Interfaces

2 x USB 2.0
USB 2.0/eSATA
Dock
Serial
LAN
Modem
VGA

- Memory Card Reader

Yes (SD Card)

Header

- Brand

Getac

- Product Line

Getac

- Model

V200

- Packaged Quantity

1

- Compatibility

PC

Networking

- Max Transfer Rate

56 Kbps

- Data Link Protocol

Bluetooth 2.1 EDR, Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, IEEE 802.11n

- Wireless LAN Supported

Yes

Monitor

- Diagonal Size

12.1 in

Miscellaneous

- Security

SmartCard reader

- Features

Trusted Platform Module (TPM) 1.2, security lock slot (cable lock sold separately)

- Compliant Standards

IP65, MIL-STD 810G

- Included Accessories

power adapter

System

- Notebook Type

Tablet PC

- Platform

Windows

- Hard Drive Capacity

320 GB

- Rugged Design

Yes

- Dockable

Yes

- Security Devices

SmartCard reader

Dimensions & Weight

- Width

12.4 in

- Depth

8.7 in

- Height

1.9 in

Manufacturer Warranty

- Type

5 years warranty

Physical Characteristics

- Weight

5.95 lbs

Power

- Min Operating Temperature

-4 °F

- Max Operating Temperature

140 °F

Operating System / Software

- OS Provided: Type

Microsoft Windows 7

Video Memory

- Memory Allocation Technology
shared video memory (UMA)
- Max Allocated RAM Size
1024 MB

Notebook Camera

- Integrated Webcam
Yes

Service & Support

- Type
5 years warranty

Service & Support Details

- Type
limited warranty
- Full Contract Period
5 years

General

- Manufacturer
Getac Inc

2. Trimble ProXT GPS receiver

www.trimble.com

NORTH & SOUTH
AMERICA

Trimble Navigation Limited
7401 Church Ranch Blvd
Westminster, CO 80021
USA

+1-720-887-4374 Phone

+1-720-887-8019 Fax

YOUR LOCAL TRIMBLE OFFICE OR REPRESENTATIVE

GPS Pathfinder ProXT receiver

EUROPE, AFRICA &
MIDDLE EAST

Trimble GmbH
Am Prime Parc 11
65479 Raunheim

GERMANY

+49-6142-2100-0 Phone

+49-6142-2100-550 Fax

ASIA-PACIFIC

Trimble Navigation Australia
PTY Limited

Level 1/120 Wickham Street
Fortitude Valley, QLD 4006

AUSTRALIA

+61-7-3216-0044 Phone

+61-7-3216-0088 Fax

STANDARD FEATURES

GPS

- Integrated GPS/SBAS 1 receiver and antenna
- Submeter accuracy in real-time
- EVEREST multipath rejection technology
- RTCM input
- NMEA and TSIP protocol support System
- Integrated GPS receiver, antenna and battery
- Integrated Bluetooth wireless technology
- User replaceable all-day battery
- Wearable GPS receiver with ergonomic belt clip
- Rugged waterproof housing Software
- GPS Controller software for mission planning and GPS configuration
- Bluetooth deactivation utility Accessories
- Power supply with international adapter kit
- Ergonomic belt clip
- Screwthread adaptor for range pole, backpack, or vehicle mounting

- Null modem cable
- User Guide

OPTIONAL FEATURES

Software

- TerraSync software
- Trimble GPSCorrect extension for ESRI ArcPad software
- Custom applications built with the GPS Pathfinder Tools Software Development Kit (SDK)
- GPS Pathfinder Office software
- Trimble GPS Analyst extension for ESRI ArcGIS software Field computers
- Field computer running Microsoft®Windows® CE operating system or Microsoft Windows Mobile™

2003 software for Pocket PCs, such as:

- GIS TSCe field device
- Trimble Recon handheld
- Field computer running Microsoft Windows desktop operating system
- GeoBeacon receiver
- Backpack
- 1 foot pole (for backpack mounting) • 2 meter range pole
- Range pole bracket
- Hurricane antenna kit
- External patch antenna
- Baseball cap with patch
- Hard carry case antenna pocket
- Magnetic vehicle mount
- Serial port splitter cable

TECHNICAL SPECIFICATIONS

Physical Integrated GPS receiver, antenna, and battery

Size.

10.6 cm × 4.0 cm × 14.6 cm (4.2 in × 1.6 in × 5.75 in)

Weight.

0.53 kg (1.16 lb)

Power Low (GPS only).

0.8 Watts

Normal (GPS and Bluetooth).

1.0 Watt

Battery.

User replaceable lithium-ion, chargeable in unit

12.6 Watt hours

Environmental

Temperature

Operating.

−20 °C to +60 °C (−4 °F to +140 °F)

Storage.

−30 °C to +85 °C (−22 °F to +185 °F)

Humidity

100% fully sealed Sand and dust . . .

IP67, MIL-STD-810F, Method 510.4, Procedures I and II
 Water.
 IP67, MIL-STD-810F, Method 512.4, Procedure I
 Drop.
 1.22 m (4 ft), MIL-STD-810F, Method 516.5, Procedure IV
 Vibration.
 Vibration resistant, MIL-STD-810F, Method 514.5, Procedure I
 Shock
 Shock resistant, MIL-STD-810F, Method 516.5, Procedure I
 Input/output
 Serial
 Dual port in single DE9

 Bluetooth 2.
 2 NMEA/TSIP Serial Port (SPP) services
 Interface.
 Power button, 3 status LEDs
 GPSChannels
 12 (L1 code and carrier)
 Integrated real-time.
 SBAS 1 Update rate.
 1 Hz
 Time to first fix
 30 seconds (typical)
 Protocols
 TSIP, NMEA (GGA, VTG, GLL, GSA, ZDA, GSV, RMC)
 Accuracy (HRMS) 3 after differential correctionCode postprocessed

 Submeter
 Carrier postprocessed 4 With 5 minutes tracking satellites.
 30 cm
 With 10 minutes tracking satellites.
 20 cm
 With 20 minutes tracking satellites.
 10 cm
 With 45 minutes tracking satellites.
 1 cm
 Real-time (SBAS1or external RTCM source)
 Submeter
 1 SBAS (Satellite Based Augmentation System). Includes WAAS (Wide Area Augmentation System) available in North America only. And EGNOS (European Geostationary Navigation Overlay System) available in Europe only.
 2 Bluetooth type approvals are country specific. The GPS Pathfinder ProXT receiver has Bluetooth approval in the U.S. and EU. For other countries please consult your local Distributor.
 3 Horizontal Root Mean Squared accuracy. Requires data to be collected with minimum

of 4 satellites, maximum PDOP of 6, minimum SNR of 39 dBHz, minimum elevation of 15 degrees, and reasonable multipath conditions. Ionospheric conditions, multipath signals or obstruction of the sky by buildings or heavy tree canopy may degrade precision by interfering with signal reception. Accuracy varies with proximity to base station by +1 ppm for postprocessing and real-time.
4 Accuracy varies with proximity to base station by +5 ppm.

3. Microwave Telemetry 70 gram solar GSM GPS transmitter

Physical Specifications:

Dimensions:

[70 gram solar model](#): L 3.82" (97) x W 1.51" (38.4) x H 1.0" (25.4) (mm)

Antenna and mounting tubes/loops not included in these dimensions

Antenna: Hard nylon coated flexible stranded marine grade stainless steel, 3.35" long, protruding from the back edge of the transmitter 45 degrees to the bottom face (except 25 gram and 50 gram Patagial units)

Construction:

The housing is constructed from an epoxy glass reinforced lightweight composite material, plated on the inside with a contiguous metal coating. The final seal is a metal to metal solder. The unit is therefore hermetically sealed and remains so during changes in temperature and humidity.

Sensors:

The GSM20-70 comes complete with sensors to measure temperature, its own battery voltage and animal activity, as well as a GPS receiver that calculates position, altitude, speed and heading.

General Electrical Specifications:

Maximum power output: 2W
Quad band at 850/900/1800/1900 MHz
Operating Temperature range: -15 to 45 Deg C

Certified by:

FCC

Industry Canada

PTCRB



Features:

- Internal micro-power GPS receiver
- GPS horizontal accuracy $\pm 18\text{m}$ on average - [Graphs](#)
- GPS vertical accuracy $\pm 22\text{m}$ on average - [Graphs](#)

- GPS resolution 0.00001 degree (approximately 1 meter at equator)
- Solar powered
- Microprocessor controlled battery charge management to allow the transmitter to charge during the day and collect data and transmit at night
- Dynamically adjusting GPS fix rate; rate of fix acquisition increases with higher battery voltage, decreases with lower battery voltage. Daytime fix acquisition rate ranges from 1 minute to 2 hours, depending on the battery voltage. At night, the transmitter goes into a more conservative data collection mode in which the data collection interval expands from half an hour to 4 hours.
- Dataset transmitted once a day. If the unit is not in a location with GSM service, data are stored until transmission is possible.
- GPS location data include altitude, lat/long coordinates, HDOP, VDOP and number of satellites used to obtain the fix.
- Transmitter archives up to 258,000 locations.
- Temperature, battery voltage and activity sensors
- 3.35 inch (85 mm) external antenna produces a stronger radiated signal than a concealed internal antenna; better signal-to-noise ratio for better reception in low coverage areas
- Configured for backpack attachment (except 50 gram Patagial unit)
- Up to three years operating lifetime
- One year warranty against electronic failure

4. ArcPad 10.0 R4 (Build 4)

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This application uses Visual Basic® Scripting Edition and JScript® from Microsoft® Corporation.

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This software is based in part on the work of the Independent JPEG Group

This product was developed using Kakadu™ software under licence from Unisearch Limited, Australia. Copyright © 2001 Unisearch Limited. All rights reserved.

Appendix III. Non-Navy land owner who allowed us to access nests on their property.

Nest Code	Location	Land Owner	X coordinate (WGS 84)	Y coordinate (WGS 84)	Address
NO1502	Culfor Crescent	Dr. Bruce Sandow	-76.27115	36.93395	8530 Culfor Crescent, 23503
VB1002	False Cape	Virginia Department of Conservation and Recreation	-75.90376	36.61389	False Cape State Park, 23456
VB1104	Saw Pen Pt	Mark Garcea	-76.11835	36.86552	4024 Wheelgate Lane, 23455
VB1201	Linkhorn	Sally Kitchin	-76.01889	36.86893	1500 Old Bay Court, 23455
VB1401	Little Neck	H. Thakkar	-76.09778	36.89136	3829 Little Neck Point, 23452
VB1601	Carolanne Farm	Nicole Desmond	-76.17437	36.82561	5365 Challedon Drive, 23462




Appendix IV. Results of blood analyses of eagle 629-12153, from VB1501 (Owl Creek).

Eagle Blood (ng g ⁻¹ , wet weight)	USGS Band VIMS IDs	Lab Blk 17EBB01	629-12153 17EB01
2,2',4,4'-tetrabromodiphenyl ether (BDE-47)		nd	nd
2,2',3,4,4'-pentabromodiphenyl ether (BDE-85)		nd	nd
2,2',4,4',6-pentabromodiphenyl ether (BDE-100)		5.40	34.9
2,2',4,4',5-pentabromodiphenyl ether (BDE-99)		2.63	15.6
2,2',4,4',5,6'-hexabromodiphenyl ether (BDE-154)		nd	nd
2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153)		nd	nd
2,2',3,4,4',5',6-heptabromodiphenyl ether (BDE-183)		nd	nd
2,2',3,3',4,4',5,5',6-nonabromodiphenyl ether (BDE-206)		nd	nd
decabromodiphenyl ether (BDE-209)		nd	nd
2-ethylhexyl 2, 3, 4, 5-tetrabromobenzoate (TBB)		12.0	nd
2-ethylhexyl 2, 3, 4, 5-tetrabromophthalate (TBPH)		2.56	nd
1, 2-bis (2, 4, 6-tribromophenoxy) ethane (BTBPE)		nd	nd
decabromodiphenyl ethane (DBDPE)		nd	nd
α-hexabromocyclododecane (α-HBCD)		nd	nd
β-hexabromocyclododecane (β-HBCD)		nd	nd
γ-hexabromocyclododecane (γ-HBCD)		nd	nd
2,3, 4,4', 5,6-hexabromodiphenyl ether (BDE-166) % recovery		84	64
tris (2-chloroethyl) phosphate (TCEP)		nd	nd
tris (1-chloro-2-propyl) phosphate (TCPP)		nd	nd
tris (1,3-dichloro-2-propyl) phosphate (TDCPP)		nd	nd
tetrabromobisphenol A (TBBP-A)		nd	nd
deuterated tris (1,3-dichloro-2-propyl) phosphate (dTDCPP) % recovery		70	65
triethyl phosphate (TEP)		nd	nd
tripropyl phosphate (TPrP)		nd	nd
tricresyl phosphate (TCP)		nd	nd
tributyl phosphate (TBP)		nd	nd
triphenyl phosphate (TPP)		nd	nd
tris (2-isopropylphenyl) phosphate (TiPP)		nd	nd
deuterated triphenyl phosphate (d15-TPP) % recovery		70	71
<i>* Results are not surrogate recovery corrected.</i>			

NPS Eagle Blood Lead Results-VA

Specimen ID	Identifier	Collection		Sample Location	Result	Value	Units
		Date					
16TX002962	629-12153	5/11/2016		Owl Creek	Cadmium	<0.21	µg/L
16TX002962	629-12153	5/11/2016		Owl Creek	Lead	0.41	µg/dL
16TX002962	629-12153	5/11/2016		Owl Creek	Mercury	72.6	µg/L

Appendix V. State and federal permits, and university compliance utilized.

	Virginia Department of Game and Inland Fisheries 7870 Villa Park Drive, P.O. Box 90778, Henrico, VA 23228-0778 (804) 367-1000 (V/TDD)	
Bird Banding		
Permit Type: Renewal	Fee Paid: \$40.00	VADGIF Permit No. 056694
<p>Permittee: Dr. Bryan D Watts Address: Center for Conservation Biology, College of William and Mary P O Box 8795 Williamsburg, VA 23187-8795 Email:</p>		
Agency Species Management/Biomonitoring/Research/Banding		
THIS PERMIT IS ISSUED IN ACCORDANCE WITH FEDERAL BANDING PERMIT #21567		Authorized Counties / Cities: Statewide
Authorized Marking Techniques: USGS Bird Banding Lab Authorized Numbered Bands		
Authorized Water Bodies: James River/York River/Rappahannock River/Potomac River/Chesapeake Bay/Atlantic Ocean		
See attached for permittee/subpermittee(s) list and authorizations.		
The permittee is required report to the USGS Bird Banding Lab using the Bandit database. No direct report to DGIF is required other than for threatened & endangered species incidental take.		
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		
STANDARD CONDITIONS ATTACHED APPLY TO THIS PERMIT.		
Approved by: 	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.	
Title: James E. Husband - Permits Manager	Date: 4/1/2016	



Virginia Department of Game and Inland Fisheries

7870 Villa Park Drive, P.O. Box 90778, Henrico, VA 23228-0778
(804) 367-1000 (V/TDD)



Bird Banding

Permit Type: **Renewal** Fee Paid: \$40.00 VADGIF Permit No. 056694

20 Permit Effective 3/29/2016 through 12/31/2017 **17**



Virginia Department of Game and Inland Fisheries
 4010 West Broad Street, P.O. Box 11104, Richmond, VA 23230-1104
 (804) 367-1000 (V/TDD) FAX (804) 367-9147

Under Authority of § 29.1-41.2, § 29.1-41.7, & § 29.1-568 of the Code of Virginia and Policy E-1-90



Permittee/Subpermittee Authorizations for Banding Permit #56694

Principal Permittee is Authorized to Band:

All Species Except Waterfowl and Eagles

*Threatened and Endangered species are not included in groups unless specified

- Bald Eagle
- Golden Eagle
- Red-Cockaded Woodpecker

With Special Authorization to:

Use USGS Bands on Above Listed North American Migrants in "Panama" Upon Host Country Approval Band

Take, possess and transport blood samples-not to exceed 1% body mass

Take, possess and transport feather samples

Hand Capture

Handle at Nest Boxes

Use Bal-chatris

Use Bow Nets

Use Cannon Nets

Use Drop Nets

Use Hand Nets

Use Mist Nets

Use Noose carpets and Snares

Use Rocket Nets

Use Whoosh Nets

Trap

SUBPERMITTEES:

Mike Wilson

Authorized to Band:

All Species Except Waterfowl and Eagles

*Threatened and Endangered species are not included in groups unless specified

With Special Authorization to:

Band

Use Mist Nets

Trap

Bart J Paxton

Authorized to Band:

All Species Except Waterfowl and Eagles

*Threatened and Endangered species are not included in groups unless specified

Bald Eagle

Golden Eagle

With Special Authorization to:

Use USGS Bands on Above Listed North American Migrants in "Panama" Upon Host Country Approval
Band

Auxiliary Mark

Use Cannon Nets

Use Mist Nets

Use Rocket Nets

Trap

Shawn Padgett

Authorized to Band:

Peregrine Falcon

With Special Authorization to:

Band

Auxiliary Mark

Trap

Fletcher Smith

Authorized to Band:

All Species Except Waterfowl and Eagles

*Threatened and Endangered species are not included in groups unless specified

Bald Eagle

Golden Eagle

With Special Authorization to:

Use USGS Bands on Above Listed North American Migrants in "Panama" Upon Host Country Approval
Band

Auxiliary Mark

Take, possess and transport blood samples-not to exceed 1% body mass

Use Cannon Nets

Use Mist Nets

Use Rocket Nets

Trap

Alexandra Wilke

Authorized to Band:

American Oystercatcher

With Special Authorization to:

Band

Auxiliary Mark

Trap

Elizabeth K Mojica

Authorized to Band:

All Species Except Waterfowl and Eagles

*Threatened and Endangered species are not included in groups unless specified

Bald Eagle

With Special Authorization to:

Band

Auxiliary Mark

Take, possess and transport blood samples-not to exceed 1% body mass

Take, possess and transport feather samples

Use Rocket Nets

Trap

Daniel Zachary Poulton

Authorized to Band:

American Oystercatcher

With Special Authorization to:

Band

Auxiliary Mark

Use Drop Nets

Use Hand Nets

Use Noose Carpets and Snares

Use Whoosh Nets

Reese F Lukei

Authorized to Band:

All Species Except Waterfowl and Eagles

*Threatened and Endangered species are not included in groups unless specified

Bald Eagle

With Special Authorization to:

Band

Auxiliary Mark

Take, possess and transport feather samples

Hand Capture

Use Bal-chattris
Use Bow Nets
Use Noose Carpets and Snares

Sergio Harding

Authorized to Band:

Peregrine Falcon

With Special Authorization to:

Band
Auxiliary Mark
Take, possess and transport blood samples-not to exceed 1% body mass
Take, possess and transport feather samples
Hand Capture
Use Hand Nets

Stephen Living

Authorized to Band:

Peregrine Falcon

With Special Authorization to:

Band
Auxiliary Mark
Hand Capture
Use Hand Nets

Rob Bierregaard

Authorized to Band:

Osprey

With Special Authorization to:

Band
Auxiliary Mark
Hand Capture
Use Hand Nets

Crystal Matthews

Authorized to Band:

Osprey

With Special Authorization to:

Band
Auxiliary Mark

Hand Capture
Use Hand Nets

Lauren Billodeaux

Authorized to Band:
Osprey

With Special Authorization to:
Band
Take, possess and transport feather samples
Hand Capture
Use Bal-Chatris
Use Hand Nets
Comments: Trap at Nest



United States Department of the Interior
 U.S. GEOLOGICAL SURVEY
 PATUXENT WILDLIFE RESEARCH CENTER
 BIRD BANDING LABORATORY
 12100 BEECH FOREST ROAD STE-4037
 LAUREL, MD 20708-4037
 301-497-5790

FEDERAL BIRD BANDING PERMIT

Permittee: Personal DR BRYAN D WATTS	Permit Number: 21567	Action: Revise	Action Date: 02/29/16	Issue Date: 06/29/82	Valid Until: 11/30/18
CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795		Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoh</i>			
		Signature of Permittee			

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

Permittee is Authorized To Band:

All Species Except Waterfowl and Eagles
 * Threatened and Endangered species are not included in groups unless specified.

- Bald Eagle
- Golden Eagle
- Red-cockaded Woodpecker

In the States of:

AL * FL * GA * KY * LA * MD * MS * NC * PA * SC * VI * VA * WV *

With Special Authorization to:

- Use USGS Bands On Above Listed North American Migrants in * Panama * Upon Host Country Approval
- Band
- Take, possess and transport blood samples-not to exceed 1% body mass
- Take, possess and transport feather samples
- Hand capture
- Use Bal-chatris
- Use Bow nets
- Use Cannon nets
- Use Drop nets
- Use Hand nets
- Use Mist nets
- Use Noose Carpets and Snares
- Use Rocket nets
- Use Whoosh nets
- Trap

And Additionally Authorized to Use The Following Auxiliary Marking Authorization/s:

Marker Type	Species	Colors of marker	Locations	Seg #
Plastic Color Leg Band (01A)	Yellow-crowned Night-Heron	Blue, Green, Red, White, Yellow	VA	2
Plastic Color Leg Band (01A)	American Kestrel	Black, Blue, Green, Red, White, Yellow	VA	3

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number:	Action:	Action Date:	Issue Date:	Valid Until:
	21567	Revise	02/29/16	06/29/82	11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoe</i>				
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

Marker Type	Species	Colors of marker	Locations	Seg #
Plastic Color Leg Band (01A)	Black-bellied Plover Whimbrel	Yellow	VA	7
Comments Yellow leg bands used in combination with light green coded flags				
Leg Flag (69)	Black-bellied Plover Whimbrel	Green	VA	8
Comments Light green flags with 3-character codes in combination with yellow leg band.				
Transmitter (obsolete) (89)	Eastern Whip-poor-will		NC	9
Comments NOT TO EXCEED 3% TOTAL BODY WT; 151 MHZ; NECKLOOP ATTACHMENT				
Anodized Color Leg Band (01B)	Peregrine Falcon	Miscellaneous	VA WV	10
Comments BICOLORED BLACK AND GREEN ACRAFT BANDS PER PEREGRINE PROTOCOL ALSO ANODIZING FEDERAL BAND GREEN				
Transmitter (obsolete) (89)	Peregrine Falcon		VA WV	11
Comments NTE 3% TOTAL BODY WT; SATELLITE TRANSMITTERS; BACKPACK ATTACHMENT				
Plastic Color Leg Band (01A)	American Oystercatcher	Miscellaneous	VA	12

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number: 21567	Action: Revise	Action Date: 02/29/16	Issue Date: 06/29/82	Valid Until: 11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoe</i>				
	Signature of Permittee				

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

Marker Type	Species	Colors of marker	Locations	Seg #
Comments COLOR BANDS IN COORDINATION W/OTHER RESEARCHERS; RED UPPER LEFT FOR VIRGINIA; MISC. COLORS AT RESEARCHERS DISCRETION; SOME BANDS CODED				
Plastic Color Leg Band (01A)	American Oystercatcher	Black, Red	VA	13
Comments CODED BANDS, BLACK WITH TWO WHITE CODES, ALL COMBINATIONS OF NUMBERS AND LETTERS, IN COORDINATION W/OTHER AMOY BANDERS				
Transmitter (obsolete) (89)	Whimbrel		GA Saint Croix, VI VA	14
Comments 9 or 12g Satellite transmitters				
Plastic Color Leg Band (01A)	Nelson's Sparrow Saltmarsh Sparrow	Blue, Orange, Pink, Red, White, Yellow	VA	15
Plastic Color Leg Band (01A)	Yellow-crowned Night-Heron	Red	VA	16
Comments white alpha-numeric-numeric codes				
Transmitter (obsolete) (89)	Yellow-crowned Night-Heron		VA	17
Comments 17-g solar transmitter				
Plastic Color Leg Band (01A)	Red-cockaded Woodpecker	Black, Dark Blue, Dark Green, Light Blue, Light Green, Mauve, Miscellaneous, Orange,	Suffolk, VA Sussex, VA	18

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number:	Action:	Action Date:	Issue Date:	Valid Until:
	21567	Revise	02/29/16	06/29/82	11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoe</i>				
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

Marker Type	Species	Colors of marker	Locations	Seg #
		Pink, Purple, Red, White, Yellow		18
Comments Misc color = stripes				
Anodized Color Leg Band (01B)	Bald Eagle Golden Eagle	Purple	MD VA	19
Comments Acraft bands Alpha-numeric & alpha-alpha				
Satellite/ Cell/ GPS Transmitter (back pack) (80B)	Bald Eagle Golden Eagle		KY MD PA VA	20
Comments Satellite/GPS transmitters NTE 3% total body weight. Backpack harness using teflon ribbon				
Wing/Head/Back Tag (obsolete) (39)	Black Vulture	Orange	VA	21
Comments Orange wing tags with black 3-digit numbers.				
Tape over alum. Color Leg Band (01D)	Peregrine Falcon	Blue, Green, Miscellaneous, Pink, Purple, Red, Turquoise, White, Yellow	VA WV	22
Comments Misc color = various bi-colored tapes.				
Anodized Color Leg Band (01B)	Osprey	Purple	MD VA	24
Code description(s) a) 3 char. (70 combos) 1st place: 0123456;				

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number: 21567	Action: Revise	Action Date: 02/29/16	Issue Date: 06/29/82	Valid Until: 11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoe</i>				
	Signature of Permittee				

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

Marker Type	Species	Colors of marker	Locations	Seg #
All bands, auxiliary markers and attachment materials not to exceed 3% total body weight.				
Satellite/ Cell/ GPS Transmitter (leg attachment) (80C)	Greater Yellowlegs		VA	30
Comments All bands, auxiliary markers and attachment materials not to exceed 2% total body weight.				
Satellite/ Cell/ GPS Transmitter (back pack) (80B)	Osprey		MD VA	31
Comments All bands, auxiliary markers and attachment materials not to exceed 3% total body weight.				
Leg Flag (69)	Semipalmated Plover	Gray	Panama	32
Code description(s) a) 3 char. (450 combos) 1st place: LX; 2nd place: ACEHJKLMNPTUVXY; 3rd place: ACEHJKLMNPTUVXY; b) 3 char. (45 combos) 1st place: H; 2nd place: ACEHJKLMNPTUVXY; 3rd place: ACE; c) 3 char. (5 combos) 1st place: H; 2nd place: ACEHJ; 3rd place: H; Comments Gray flags with 3-character black codes as follows (XL + ACEHJKLMNPTUVXY + ACEHJKLMNPTUVXY) or (H + ACEHJKLMNPTUVXY + ACE) or (H + ACEHJ + H).				
Leg Flag (69)	Semipalmated Sandpiper Western Sandpiper	Gray	Panama	33
Code description(s) a) 3 char. (900 combos) 1st place: HJLX; 2nd place: ACEHJKLMNPTUVXY; 3rd place: ACEHJKLMNPTUVXY;				

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number: 21567	Action: Revise	Action Date: 02/29/16	Issue Date: 06/29/82	Valid Until: 11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoe</i>				
	Signature of Permittee				

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

Marker Type	Species	Colors of marker	Locations	Seg #
b) 3 char. (90 combos) 1st place: K; 2nd place: ACEHJKLMNPTUVXY; 3rd place: ACEHJK; c) 3 char. (10 combos) 1st place: K; 2nd place: ACEHJKLMNP; 3rd place: L; Comments Gray flags with 3-character black codes as follows (HJLX + ACEHJKLMNPTUVXY + ACEHJKLMNPTUVXY) or (K + ACEHJKLMNPTUVXY + ACEHJK) or (K + ACEHJKLMNP + L) .				
Plastic Color Leg Band (01A)	Semipalmated Plover Semipalmated Sandpiper Western Sandpiper	Yellow	Panama	34

The following Subpermittee/s are authorized to band under the direction of the above permittee, in accordance with the same general conditions, and the subpermittee specific authorizations listed below:

21567 - A MR MIKE WILSON CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WILLIAM AND MARY WILLIAMSBURG, VA 23185

Is Authorized To Band:

All Species Except Waterfowl and Eagles
 * Threatened and Endangered species are not included in groups unless specified.

In the States Of:

FL * GA * MD * SC * VA *

With Special Authorization to:

Band
 Use Mist nets
 Trap

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number:	Action:	Action Date:	Issue Date:	Valid Until:
	21567	Revise	02/29/16	06/29/82	11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoe</i>				
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

21567 - C MR BART J PAXTON COLLEGE OF WILLIAM AND MARY P O BOX 8795
WILLIAMSBURG, VA 23187 8795

Is Authorized To Band:
All Species Except Waterfowl and Eagles
* Threatened and Endangered species are not included in groups unless specified.

Bald Eagle
Golden Eagle

In the States Of:
FL * GA * MD * NC * SC * VA *

With Special Authorization to:
Use USGS Bands On Above Listed North American Migrants in * Panama * Upon Host Country
Approval
Band
Auxiliary mark
Use Cannon nets
Use Mist nets
Use Rocket nets
Trap

21567 - D MR SHAWN PADGETT 314 SUBURBAN PARKWAY NORFOLK, VA 23505

Is Authorized To Band:
Peregrine Falcon

In the States Of:
VA *

With Special Authorization to:
Band
Auxiliary mark
Trap

21567 - E MR FLETCHER SMITH CENTER FOR CONSERVATION BIOLOGY COLLEGE OF
WILLIAM AND MARY WILLIAMSBURG, VA 23187 8795

Is Authorized To Band:
All Species Except Waterfowl and Eagles
* Threatened and Endangered species are not included in groups unless specified.

Bald Eagle
Golden Eagle

In the States Of:
FL * GA * MD * SC * VA *

With Special Authorization to:
Use USGS Bands On Above Listed North American Migrants in * Panama * Upon Host Country
Approval
Band
Auxiliary mark
Take, possess and transport blood samples-not to exceed 1% body mass
Use Cannon nets
Use Mist nets
Use Rocket nets
Trap

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number:	Action:	Action Date:	Issue Date:	Valid Until:
	21567	Revise	02/29/16	06/29/82	11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoh</i>				
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

21567 - G MS ALEXANDRA WILKE THE NATURE CONSERVANCY PO BOX 158 11332
BROWNSVILLE ROAD NASSAWADOX, VA 23413

Is Authorized To Band:

American Oystercatcher

In the States Of:

VA *

With Special Authorization to:

Band
Auxiliary mark
Trap

21567 - H MS ELIZABETH K MOJICA CENTER FOR CONSERVATION BIOLOGY COLLEGE OF
WILLIAM & MARY WILLIAMSBURG, VA 23187 8795

Is Authorized To Band:

All Raptors Except Eagles

* Threatened and Endangered species are not included in groups unless specified.

Bald Eagle

In the States Of:

MD * VA *

With Special Authorization to:

Band
Auxiliary mark
Take, possess and transport blood samples-not to exceed 1% body mass
Take, possess and transport feather samples
Use Rocket nets
Trap

21567 - K MR REESE F LUKEI 1046 AZELA CT VIRGINIA BEACH, VA 23452

Is Authorized To Band:

All Raptors Except Eagles

* Threatened and Endangered species are not included in groups unless specified.

Bald Eagle

In the States Of:

NC * VA *

With Special Authorization to:

Band
Auxiliary mark
Take, possess and transport feather samples
Hand capture
Use Bal-chatris
Use Bow nets
Use Noose Carpets and Snares

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number:	Action:	Action Date:	Issue Date:	Valid Until:
	21567	Revise	02/29/16	06/29/82	11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoe</i>				
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

21567 - M MR SERGIO HARDING VA DEPT OF GAME & INLAND FISHERIES 4010 WEST BROAD STREET RICHMOND, VA 23230

Is Authorized To Band:

Peregrine Falcon

In the States Of:

VA *

With Special Authorization to:

Band

Auxiliary mark

Take, possess and transport blood samples-not to exceed 1% body mass

Take, possess and transport feather samples

Hand capture

Use Hand nets

21567 - N MR STEPHEN LIVING VA DEPT OF GAME & INLAND FISHERIES 3909 AIRLINE BLVD CHESAPEAKE, VA 23321

Is Authorized To Band:

Peregrine Falcon

In the States Of:

VA *

With Special Authorization to:

Band

Auxiliary mark

Hand capture

Use Hand nets

21567 - O ROB BIERREGAARD UNIV OF NC CHARLOTTE 421 COTSWOLD LN WYNNEWOOD, PA 19096

Is Authorized To Band:

Osprey

In the States Of:

VA *

With Special Authorization to:

Band

Auxiliary mark

Hand capture

Use Hand nets

Permittee: Personal DR BRYAN D WATTS CENTER FOR CONSERVATION BIOLOGY COLLEGE OF WM & MARY -PO BOX 8795 WILLIAMSBURG, VA 23187 8795	Permit Number:	Action:	Action Date:	Issue Date:	Valid Until:
	21567	Revise	02/29/16	06/29/82	11/30/18
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Bruce Peterjoh</i>				
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

21567 - P CRYSTAL MATTHEWS 2457 ENTRADA DRIVE VIRGINIA BEACH, VA 23456

Is Authorized To Band:

Osprey

In the States Of:

VA *

With Special Authorization to:

Band
Auxiliary mark
Hand capture
Use Hand nets

21567 - Q LAUREN BILLODEAUX USFWS - EASTERN VA RIV NWRC PO BOX 1030 336
WILNA RD WARSAW, VA 22572

Is Authorized To Band:

Osprey

In the States Of:

VA *

With Special Authorization to:

Band
Take, possess and transport feather samples
Hand capture
Use Bal-chatris
Use Hand nets

Comments:

TRAP AT NEST

21567 - R DANIEL "ZAK" POULTON NATURE CONS VA COAST RESERVE 11332
BROWNSVILLE ROAD NASSAWADOX, VA 23413

Is Authorized To Band:

American Oystercatcher

In the States Of:

VA *

With Special Authorization to:

Band
Auxiliary mark
Hand capture
Use Drop nets
Use Hand nets
Use Noose Carpets and Snares
Use Whoosh nets

FEDERAL BIRD BANDING PERMIT

Under the provisions of Regulations issued under the Migratory Bird Treaty Act of July 3, 1918 (40 Stat. 755) as amended, or the Bald Eagle Act of June 8, 1940 (54 Stat. 250) as amended, the person named hereon is authorized to capture, for scientific banding or marking purposes, those migratory birds described hereon and to salvage birds accidentally killed during normal banding activities.

This permit is subject to the terms, exceptions and restrictions expressed herein or on the reverse side hereof and is further subject to any applicable Territorial, State, Tribal or Federal Regulations.

This permit is invalid unless accompanied by any required State permits or licenses.

GENERAL CONDITIONS

1. The Permittee is not authorized to capture or possess migratory birds for any reason other than banding, marking or salvage of banding mortalities for scientific purposes. **NOR IS THE PERMITTEE ALLOWED TO HOLD MIGRATORY BIRDS FOR A PERIOD OF MORE THAN 24 HOURS.** Live birds shall be released as soon as practical after capture.
2. You may donate dead migratory birds or any parts thereof (except bald eagles and golden eagles, and species listed as threatened and endangered) without additional authorization from the migratory bird permit issuing office to public institutions (as specified in 50 CFR 10.12) or individuals or entities authorized by permit to acquire and possess migratory bird specimens for educational purposes. All dead specimens that you do not transfer to another authorized party must be disposed of by such means as are necessary to ensure that they are not exposed to animals in the wild.
3. You may not salvage and must immediately report to the USFWS Office of Law Enforcement any dead or injured migratory birds that you encounter that appear to have been poisoned, shot, electrocuted, have collided with industrial power generation equipment, or were otherwise killed or injured as the result of potential criminal activity. Please contact BBL for more information.
4. All eagle feathers and/or whole eagle carcasses must be shipped to the National Eagle Repository. Contact: U.S. Fish and Wildlife Service, National Eagle and Wildlife Repository, 5650 Havana St., RMA, Building 128, Commerce City, Colorado 80022, (303) 287-2110.
5. The Permittee shall keep RECORDS accounting for the use of all bands received. Periodic RECORDS COVERING THE USE OF THESE BANDS shall be submitted to the Bird Banding Laboratory in accordance with the instructions received there from. Failure to provide data in accordance with the instructions received from the Bird Banding Laboratory is sufficient justification for the revocation of this permit. The Permittee shall keep records of disposition of salvaged banding mortalities for a period of five years and shall be reported to the Bird Banding Laboratory upon request.
6. The holder of this permit shall not sell, exchange, or transfer bands to unauthorized banders or to the general public. All transfers to authorized banders must be communicated to the Bird Banding Laboratory prior to the transfer of bands. Any unused bands remaining when this permit is voluntarily returned, revoked, or expired must be returned to the Bird Banding Laboratory.
7. The Permittee shall, at all reasonable hours, allow any authorized representative of the U. S. Geological Survey or the U.S. Fish and Wildlife Service to ENTER and INSPECT the premises where operations authorized by this permit are being conducted and shall allow such representative to inspect the records relating to such operations.
8. This permit may be SUSPENDED or REVOKED by the Director of the U.S. Geological Survey or authorized representative, if the Permittee violates any of the provisions in the regulations under which this permit is issued or if the Permittee fails to render promptly any reports required. This permit is, at all times, subject to suspension or revocation at the discretion of the Director or representative.
9. This permit is not transferable and must be in possession of the Permittee when exercising the authorizations granted herein.
10. All traps, nets or other capture devices shall bear a TAG or LABEL showing the name, address and permit number of the Permittee; alternatively the trapping area shall be adequately marked with POSTERS provided by the Bird Banding Laboratory. The Permittee's name, address and permit number shall be legibly displayed on such posters.
11. This permit DOES NOT authorize the capture of any birds on any property, public or private without the CONSENT OF THE OWNER OR CUSTODIAN THEREOF.
12. All Banding under this permit is in accordance with the principles, spirit, and intent of the Animal Welfare Act of 1970 and the most recent revision of The Ornithological Council's Guidelines in the Use of Wild Birds in Research.
13. Unless specifically noted on the reverse, the following ARE NOT AUTHORIZED:
 - a. The taking of blood or feather sampling from any bird.
 - b. The use of ANY BAND, clip, paint, dye, signal-sending device or any marking device other than the official numbered leg bands issued by the Bird Banding Laboratory.
 - c. The use of MIST NETS or other nets for the capturing of birds.
 - d. The use of TRANQUILIZING DRUGS OR OTHER CHEMICALS for the purpose of capturing birds.
 - e. Trapping or disturbing the nests or nestlings, for the purpose of banding or marking, of species designated by the Secretary of Interior as "ENDANGERED" or "THREATENED."
 - f. The handling of any PREVIOUSLY BANDED BIRD in any manner which may bias data on file in the Bird Banding Laboratory which pertain to that bird or which may alter that bird's survival potential, behavior or other normal characteristics. This specifically includes adding markers to or removing markers from previously banded birds.

Form 9-475
(April 2011)

Basic Info

Protocol ID: IBC-2016-04-07-11159-bjpaxt

Protocol Title: Center for Conservation Biology - Projects in Conservation Biology

Overall Status: active

Protocol Timeline: Year 1 of 1

Committee(s): IBC

Campus: Main

CC Email Addresses: bdwatt@wm.edu

Comments

Actions

Status Info

Submitted: 2016-04-07 12:27:01 by bjpaxt

Overall Status: active since 2016-06-28 12:05:54

IBC Status: approved since 2016-06-28 12:05:54

Date Info

Submitted: 2016-04-07 12:27:01 by bjpaxt

Protocol Current Year Duration 2016-06-28 through 2017-06-28

Project Entire Duration 2016-06-28 through 2017-06-28

PI Info (bdwatt)

Protocol Details https://compliance.wm.edu/printer_friendly.html

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Name: Watts, Bryan

Acceptance: accept since 2016-04-07 12:33:26

Role Faculty

Department Center for Conservation Biology

Day/Work Phone +1 757 221 2247

Day/Work Ext.

Home/Evening/Emergency Phone

PI Info (bjpaxt)

Name: Paxton, Barton

Acceptance: accept since 2016-04-07 12:27:01

Role Faculty

Department Center for Conservation Biology

Day/Work Phone +1 757 221 1639

Day/Work Ext.

Home/Evening/Emergency Phone

Emails

From compli@wm.edu (WM Compliance)

2016-04-07 12:27:01

Your response needed for protocol IBC-2016-04-07-11159-bjpaxt set to contingent

From compli@wm.edu (WM Compliance)

2016-04-07 12:33:26

Original submission for protocol IBC-2016-04-07-11159-bjpaxt

From compli@wm.edu (WM Compliance)

2016-06-28 12:05:54

Status of protocol IBC-2016-04-07-11159-bjpaxt set to active

Admin-Additional Information

Protocol Details https://compliance.wm.edu/printer_friendly.html

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Upload additional files - browse for a file then choose any save option below to upload it.

SpeciesList.doc

IBC-General Registration Information

Provide your department Chair name and email address.

Be sure to enter this on the "Basic Info" page under the CC email address.*

Bryan Watts

Indicate whether this protocol is for teaching or research activities. Teaching protocols are active for a one year term only. For subsequent years, a new protocol must be submitted prior to the protocol expiration date to avoid discontinuation of work.*

Research

Course number/Research Project Number * Research

Indicate the building and room number(s) where research/instruction is to be conducted:

Minson Galt House/Dillard Complex

This protocol is a(n) (select one):* Modification of existing Protocol

If this is a current year modification or an annual renewal of an existing protocol, please provide the number of the protocol being modified or renewed. Teaching protocols are valid for one year only. These submissions are considered "new" not annual renewals.

IBC-2013-10-09-9012-mdwils

If you selected "Modification of an Existing Protocol" or "Annual Renewal" describe the modifications from the previous version of this protocol.

Please note: This will not reset the date for the annual renewal.

Removal of mdwils as PI and added bjpaxt as PI. Minor revisions as recommended.

My protocol involves the use of Recombinant DNA* No

My protocol involves the use of Infectious Agents.* No

My protocol involves the use of Infectious Agents from Zoonotic sources.*

Yes

My protocol involves the use of Human Blood, Fluid, or Tissue*

No

IBC-Description of Activities (Recombinant DNA)

Protocol Details https://compliance.wm.edu/printer_friendly.html

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Date: 2016-04-07

IBC-Description of Activities (Infectious Agents from Zoonotic Sources)

Project or Course Summary

Present a summary of your project or course (1 or 2 paragraphs). Please define any acronyms and abbreviations:

Institutional Profile: The Center for Conservation Biology (CCB) conducts research with applications to the management of land and species of conservation concern primarily within the

mid-Atlantic region but extending throughout eastern North America. The Center serves as one

of the principal advisors to governmental and non-governmental agencies responsible for the management and recovery of avian species at risk. CCB maintains decades-long relationships

with most agencies and organizations involved with avian species and land management within

the mid-Atlantic region. On an annual basis, CCB conducts 30-40 field based projects focused on

a wide variety of species, habitats, and ecosystems of conservation concern. CCB projects are

considered national models and include many government, corporate, and NGO partners and

. CCB manages more than 200 historic databases dealing with birds of conservation concern within the region. CCB also houses one of the most extensive collections of specialized field equipment in the region for investigating ecological relationships for bird species.

Animals or Animal Tissues Used

Indicate species, strain, or other appropriate description of animals or animal tissues used.

Multiple avian species-see attached species list.

Procedures, Storage, Transportation of Animals/Tissues

Describe the basic procedures employed with respect to animal and animal tissues handling, the methods of animal quarantine, and procedures to be employed to prevent zoonotic disease transmission. If the animals/materials will be transported, describe the safety measures that will be employed.

Handling Birds - The handling of wild birds in the United States is regulated by the U.S. Geological Survey and managed by a permitting process. CCB personnel handle many different species of birds. The overwhelming majority of birds handled by CCB personnel are captured and handled for the purpose of banding. Handling techniques vary with species. Eagles, hawks and falcons require experience in handling to avoid injury to either the bird or the handler. CCB personnel use approved techniques with appropriate safety equipment to handle predatory birds (Bloom. 1987, Capture and handling raptors In Pendleton, Millsap, Cline and Bird, editors. Raptor Management Techniques Manual. National Wildlife Federation,

Washington, D.C.).

Songbirds and other species are handled using standard techniques that have been developed over decades to insure safety of the birds. Bird handling skills are learned by conducting field work and refined under direct supervision of experienced handlers (see Gaunt, Oring, Able, Anderson, Baptista, Barlow, and Wingfield. 1999. Guidelines to the Use of Wild Birds in Research. The Ornithological Council. Washington D.C.).

Currently, CCB holds and transports a very small number of birds for reintroduction programs. Birds are transported in pet carriers that are composed of clean cardboard and Protocol Details https://compliance.wm.edu/printer_friendly.html

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lined with highly absorbent materials to prevent bird feces from leaking. The pet carriers have air circulations holes along the top of the carrier and are transported inside of a vehicle to maintain cool temperatures so the individual birds are not stressed. Limiting stress is important when transporting such birds because their successful reintroduction is dependent upon moving healthy birds.

There are some situations when CCB personnel do not use personal protective gear such as latex or nitrile gloves and eye or face protection because such equipment hinders their mobility and/or tactile senses and thus hinders the safety of the person. CCB personnel are instructed to use latex or nitrile gloves whenever handling birds except only in limited situations where their personal safety or the safety of the bird is jeopardized. For example, when climbing nest trees to band birds, rubber gloves and eye protection can hinder the climbing abilities of a person, which can jeopardize personal safety during the climb. Another example is when small birds are removed from mist-nets that are used to capture them during flight. Gloves may severely hinder the tactile senses of field personnel when untangling birds from the fine netting and lead to extended time birds remain in nets and increased potential of injuring birds. In such cases, latex or nitrile gloves will be worn whenever possible when handling birds. If birds are handled without such gloves, hands will be disinfected frequently and immediately before gloves are donned. After handling birds, CCB personnel are instructed to wash their hands thoroughly with an alcohol-based disinfectant to inactivate pathogens that might be carried by birds or with soap and water. During and after handling birds, CCB personnel are also instructed to avoid rubbing eyes, eating, or drinking until hands have been adequately disinfected.

Blood Collections - Latex or nitrile gloves are used when collecting blood and when handling birds that are bloody to avoid direct contact with blood and to protect the bird from possible infection. Safety glasses are used to prevent blood droplets from entering the eyes. It is not practical to sterilize needles, gloves and other supplies in the field. Sharps and other small blood contaminated supplies are collected in a portable sharps container in the field. When the sharps container is full, we contact the Environment, Health and Safety Office at the College of William and Mary, for pick-up of the sharps container and other biohazard bags. The Environment, Health and Safety Office at William and Mary, manages the waste storage and disposal in accordance with the procedures outlined in the W&M Regulated Medical Waste Management document. Other blood contaminated equipment is immediately cleaned with a 10% solution of bleach, alcohol or a commercial disinfectant. With these precautions, we feel that risk of transmission of avian-borne diseases to researchers is minimal.

Blood Processing – On occasion, personnel at CCB process blood following blood collection to limit degradation of samples for specific analyses. This processing includes using a mobile

centrifuge that can be operated from an automobile (12 V receptacle) to separate blood serum from whole blood cells. When handling blood in these situations, latex or nitrile gloves and eye protection are used to prevent exposure to blood or blood droplets. When blood is processed in the field, processing occurs outside to prevent contamination of the vehicle and in open air situations that are very well ventilated to prevent exposure to aerosols. Any blood spills are immediately cleaned with a 10% solution of bleach, alcohol, or commercial disinfectant. Needles and disposable gloves that are contaminated by blood during processing are stored in a sharps container following protocol described above.

Blood Sample Transport and Storage – Blood samples collected in the field are transported to the College of William and Mary in sealed plastic vacutainer or centrifuge tubes that are held in plastic tube holders or sealed ziplock-type bags to contain leaks or spills. These samples are then stored in a refrigerator or freezer until they are packaged and shipped to a

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lab for analysis. When shipped, the vacutainers or centrifuge tubes are bagged to contain leaks or spills and packaged into Styrofoam coolers with ice, dry ice, or artificial ice to maintain appropriate temperatures. The Styrofoam cooler is then packaged in a cardboard box for final shipping. Currently, CCB sends all blood products to other commercial or academic labs for analysis.

Uropygeal Gland Samples – Samples of oils excreted from the uropygeal gland of birds are occasionally collected for analysis. The uropygeal gland can be a source of concentrated lipids that are used in certain laboratory analyses. We are not aware of any hazards or pathogens that exposure to such oils pose. Collection of such oils will be completed following the protocol described above when handling birds. Uropygeal gland samples are collected on filter paper, the paper is then enclosed in foil, sealed in re-closeable plastic bags, and shipped directly to a lab for analysis.

Pellets, regurgitated food items, and prey remains – CCB personnel participate in diet studies of birds by analyzing pellets and food items that are regurgitated by birds and analyzing prey remains discarded by birds. These samples are collected at and below nests of birds. Analysis of these samples are completed following the same safety procedures for handling live birds. Latex or nitrile gloves are worn to prevent exposure to potential pathogens passed from birds to the diet samples. Care is also taken to avoid rubbing eyes, eating, or drinking until hands have been adequately disinfected by soap and water or alcohol based disinfectant.

Other Dead Wild Birds – On occasion, CCB personnel encounter and handle dead wild birds. In the vast majority of these situations, the cause of death is readily apparent as trauma (collisions with windows or automobiles) because there are outward signs of trauma to the bird and the bird is found adjacent to a window or road. In these situations, handling of the dead bird is the same as for handling of a live bird because the bird was apparently healthy immediately before the trauma occurred. Whenever blood is exposed on such a dead bird, we follow procedures described above for blood collections. As with handling any animals, care is recommended to avoid rubbing eyes, eating, or drinking until hands have been adequately disinfected with soap and water or alcohol based disinfectant. If such a bird is collected for analysis, we will follow procedures to bag and ship the carcass to a lab as described in the previous paragraph. If the bird is not collected for analysis, the carcass will be replaced where found and treated as if never handled.

Currently, CCB is not currently engaged in any research sampling for avian diseases. IACUC and IBC protocols will be amended in the future in the event that disease sampling is necessary. In some situations, dead birds are encountered and collected so that the cause of death can be determined or birds are brought to CCB that are clearly sick. Dead, sick, or moribund birds are handled with extreme care to prevent exposure to blood, bodily fluids, or aerosolized particles because the cause of death is unknown and the risk of exposure to potential pathogens may be greater than for apparently healthy wild birds. When available, personal protective gear including rubber boots, protective clothing, latex or nitrile gloves, and eye protection, are worn as recommended by the National Wildlife Health Center and CDC. These precautions are recommended for situations where a mortality event, or multiple carcasses are present and are more rigorous than recommendations for handling single dead birds. If such protective gear is not available, carcasses or birds are handled such that the person remains upwind of the carcass. For dead birds, latex or nitrile gloves or plastic bags are used to prevent direct exposure to the carcass, and the carcass is carefully enclosed in a plastic bag and sealed to prevent exposure to fluids, following recommendations for handling single dead birds (Department of Interior, Occupational Protocol Details https://compliance.wm.edu/printer_friendly.html

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Health and Safety Guidance. Employee Health and Safety for Avian Influenza Surveillance and Control Activities in Wild Bird Populations <http://www.doi.gov/issues/appendixOHSguidanceforAvian%20Influenza12-18.pdf>). Carcasses are then stored in coolers with ice, blue ice (or other artificial ice sources), or dry ice and immediately shipped to an appropriate facility for analysis and diagnosis. Moribund or sick birds are isolated in closed boxes and transported to an appropriate veterinary or wildlife rehabilitation facility. In these cases, the animals are transported to facilities in open beds of pickup trucks but not in enclosed portions of vehicles. Additionally, any leaking of bodily fluids or feces from the box is cleaned with a 10% bleach solution, or other appropriate disinfectant to prevent spread or transfer of potential infectious agents. Because our work is conducted outside and in the field, our working environment is well ventilated and exposure to aerosols is therefore very limited.

Other animal carcasses – Personnel at CCB also handle other animal carcasses as part of our studies of birds. Deer, fish, and bird carcasses are used to bait eagles and vultures to trap locations. When deer or bird carcasses are used, we only handle and transport deer that were shot by legally authorized personnel from other government agencies for the purpose of using as bait, population control, or that are road killed (deer). Road killed deer are identified through obvious trauma and their immediate location adjacent to a road way. Fish that we use are supplied by local watermen. By limiting ourselves to these sources of deer and fish, we use only apparently healthy animals that have a low likelihood of harboring disease pathogens. When handling deer carcasses, we are always outside where it is well ventilated and we wear personal protective gear including gloves, eye protection, and N95 mask to limit exposure to blood and other bodily fluids. Any blood residues on equipment are cleaned with a 10% bleach solution, alcohol, or commercial disinfectant to deactivate any potential pathogens. When processing fish or birds to make lures, we follow the same procedures as for live wild birds, which include using latex or nitrile gloves and eye protection to prevent exposure to bodily fluids or aerosols. The process of creating a lure includes replacing the internal organs of the lure animal with Styrofoam so that it floats.

Metal is also sewn into the body cavity of the lure animal so that monofilament nooses can be attached to the lure. When the lure is deployed in the field, the noose tightens around the talons of a bird that attempts to eat the lure, thus capturing the bird. Whenever a lure animal is used in the field, precautions are taken to limit exposure to tissues of the animal. Because these animals have been processed, bodily fluids are eliminated; therefore, exposure to potential pathogens has been severely reduced. Care is recommended to avoid rubbing eyes, eating, or drinking until hands have been adequately disinfected with soap and water or alcohol based disinfectant. Additionally, whenever possible, lures are handled with latex or nitrile gloves. Animals that are used as lures are left in the field and allowed to decompose naturally when used in remote locations where other dead animals can be found. In situations where leaving lures in the field is not appropriate, we will bag them in plastic, transport them to the main campus where they will be turned over to an animal care technician in the Biology Department for disposal. The animal care technician currently manages disposal of dead lab animals by placing them in red biohazard waste bags, freezing them, and storing them for bi-weekly pickup arranged by the College of William and Mary Environment, Health, and Safety Office.

Animal Biosafety Level

Which Animal Biosafety Level (ASBL) applies to this proposal? Describe the rationale for selecting the animal biosafety level chosen:

Biosafety Level Description and Rationale: Biosafety Level (BSL) 1 but we will maintain BSL 2 precautions when possible- We undertake several precautions to minimize the risk of infection by avian borne diseases (no worker here at CCB has ever contracted any avian-borne disease). Biologists at the CCB constantly monitor the status of known avian Protocol Details https://compliance.wm.edu/printer_friendly.html

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borne diseases in North America through various state and federal agency media and alert systems. All biologists that work for the Center are trained in techniques for proper handling based on recommendations from the Center for Disease Control, the National Wildlife Health Center, and others. When working outdoors with birds there is a minimal risk of contracting a disease. Contact with bird saliva, feces, or blood could conceivably bring researchers in contact with Lyme disease, West Nile virus, Avian Influenza, Newcastle Disease, Chlamydiosis, Histoplasmosis or Salmonella that affect humans. As of now, no highly pathogenic avian influenza (HPAI) has been detected in wild migratory bird populations in North America; therefore, we are not in a situation where there is even a slight probability of coming in contact with this pathogen. Lyme disease and West Nile virus are vector borne, but theoretically could be transmitted through direct blood-to-blood contact. However, such infections are rare or undocumented and when they do occur where most likely due to tick or mosquito bites. Other diseases could be contracted through inhalation of aerosolized bird feces in areas that are protected from the weather where feces can accumulate and dry to dust. We will limit exposure to these diseases by using eye protection and face shields when working with birds in such areas. The dominant hazards for most of these projects involve the fieldwork itself (i.e. insect borne diseases, climbing to cliffs, climbing to nest trees, working on the water). We have safety measures in place to minimize these hazards. Repellents such as DEET and Permethrin are used to minimize risk of contracting insect-borne diseases. Safety equipment is used when needed for particular activities (e.g.

climbing harnesses).

Blood, OP, and CL collection - Risk of infection from blood products is small - there are few or no cases ever reported of this sort of transmission - but it is a theoretical possibility.

There is no or exceedingly low risk of infection to a second person from an infected person.

Biosafety level 1 was chosen to reflect the low risk of the activity, especially because all contact occurs outside in fresh air so airborne transmission is particularly unlikely. Personal protection and hygiene and disposal of sharps are sufficient to reduce risk to almost zero.

However, because of the unknown and evolving risk of H5N1 avian influenza virus and the known risk of contracting West Nile virus in North America, we will maintain BSL-2 safety levels when possible when collecting blood so that we are prepared if the threat level rises.

There is no known case where HPAI H5N1 has been transmitted from wild birds to humans.

However, even apparently healthy wild birds can be infected with microorganisms other than HPAI, some of which are currently of more concern to human health in North America than HPAI H5N1.

As a precaution, all CCB personnel will receive an influenza immunization as an annually unless medically contradicted. Moreover, CCB personnel will not handle birds if they

have been recently infected with any flu-like illness until a period of 24 hours after becoming afebrile. Similarly, to reduce the potential of transmission of influenza from human

researchers to birds, no CCB personnel will handle birds if infected with any flu-like illness

until a period of 24 hours after becoming afebrile. Thoroughly washing hands with soap and

water (or with alcohol-based hand products if hands are not visibly soiled) is a very effective

method for inactivating influenza viruses, including HPAI and other pathogens. These viruses

are also inactivated with many common disinfectants such as detergents, 10% household

bleach, alcohol other commercial disinfectants. Washing hands after handling of birds and

preventing exposure of mucosal membranes to fluids, dust and dander from birds represents

the current federal recommendations to avoid Avian Influenza in areas where it has not been

detected. If H5N1 is detected within North America, we will immediately stop work that

involves handling birds, revise this protocol following recommendations set forth by the CDC

and NWHC for handling of each taxonomic group of wild birds that the Center studies, and

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resume work after such protocols are approved.

Senior Personnel Qualifications and Experience

List all senior personnel (including the PI) who will be

involved in the project. Describe their role in the

project and their qualifications and experience.

“Senior personnel” are defined as any individuals who

will supervise or train others.

Researchers at CCB have combined work experience with birds of more than 200 years.

Many specialized field techniques used widely with birds have been developed by researchers

at CCB. CCB serves as an advisor to numerous agencies and other groups on the use of field

techniques with birds. Most of the hands on work with birds is currently being conducted

under a federal permit held by Bryan Watts. Watts has held a master bird banding permit for

more than 25 years. He also has unique authority to handle and utilize field techniques with

several species in the state. Biologists and technicians working for CCB are evaluated before

they are allowed to work independently. Ability to handle and work with birds varies

dramatically between individuals. While some people may become adept at necessary

techniques in a short period of time, others should never be allowed to work independently. Each person is evaluated to determine when they have achieved a sufficient level of competency for each technique required.

The following individuals are directly involved with avian work.

Bryan Watts – Observation, capture, banding, transmitter attachment, bleeding. : Dr. Watts has held a Master federal bird banding permit since 1982 and banded ~ 50,000 birds. He has decades of experience banding passerines, raptors, shorebirds, and many other bird species. He managed the Wise Point and Kiptopeke bird trapping and banding stations on the Eastern Shore of Virginia. He has received special training and certification to band juvenile Red-cockaded woodpeckers. His federal banding permit authorizes mist net, cannon net, and rocket net capture of birds. He has special federal authorization to band peregrine falcons, bald eagles, golden eagles, and red-cockaded woodpeckers. Federal Banding Permit 21567.

Bart Paxton - Observation, capture, and banding. : Bart has over 10 years of bird banding experience. He's handled and banded tens of thousands of birds (passerines, raptors, and shorebirds). Bart has experience capturing, processing, and banding raptors (including eagles and falcons) of all ages from nestlings to adults. He's banded and auxiliary marked adult Red-cockaded Woodpeckers. Certified to use canon and rocket nets. Authorized by the federal bird banding lab to band all species (waterfowl excluded) including bald and golden eagles. Authorized by the bird banding lab to trap, use mist nets, band, auxiliary mark, and use rocket and canon nets. Federal Bird Banding permit #21567C

Other Personnel

Briefly describe any other personnel who will be involved in the project or course. There is no need to list the names of these individuals, only a general description of their role in the project.

Mitchell Byrd – Observation, assist with capture and banding. Mitchell Byrd has over 50 year of experience with all species of birds. He held a federal master banding permit for many years until recently when he voluntarily decided not to renew it based on the fact that all of the Center's research was now covered under Bryan Watt's permit.

Marian Watts - Observation, assist with capture and banding. Marian has worked under the direct observation of Bryan Watts on multiple projects dealing with multiple species for over 25 years.

Shawn Padgett – Observation, capture, and banding of Peregrine Falcons. Shawn was our primary volunteer falcon bander until the population became too large to be monitored on a volunteer basis. He has 30 plus year of experience safely capturing and banding Falcons of all ages. He still volunteers with us as needed. Federal Bird Banding permit #21567D

Fletcher Smith - Observation, capture, banding, transmitter attachment, bleeding. Fletcher has 10 plus years of experience capturing and banding birds of multiple species. He is considered as one of most successful and experienced people for attachment of transmitters to large shorebirds in the western hemisphere. Trained and experienced it capillary tube blood collection. Federal Bird Banding permit #21567E

Alexandra Wilke - Observation, capture, and banding of American Oystercatchers. Alex, and Protocol Details https://compliance.wm.edu/printer_friendly.html

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employee of the TNC, has been working with American Oystercatchers and beach-nesting colonial birds since 2003. She has extensive experience trapping and banding oystercatchers

and other shorebirds, as well as, other waterbirds. Federal Bird Banding permit #21567G
Reese Lukei - Observation, capture, and banding of raptors. Reese has been trapping and banding raptors since the early 1970s and has extensive experience with many different capture techniques. He ran the Wise Point raptor station for 20 years catching thousands of migrating raptors. He has banded osprey in tidewater for decades. Federal Bird Banding permit #21567K

Sergio Harding - Observation, capture, and banding of Peregrine Falcons. Sergio is an employee of the VA DGIF. His work with the DGIF involves capturing and banding/tagging of Black Vultures, Bald Eagles, and Peregrine Falcons. Federal Bird Banding permit #21567M

Steven Living - Observation, capture, and banding of Peregrine Falcons. Stephen is an employee of the VA DGIF. He has completed bird banding training taught by a NABC certified trainer. His work with the DGIF involves capturing and banding Mourning Doves, Canada Geese, Prothonotary Wablers, and Peregrine Falcons. Federal Bird Banding permit #21567N

Rob Bierregaard - Observation, capture, and banding of Ospreys. Rob has banded raptors since 1971, when he got his master banding permit from the Bird Banding Lab (permit #20096). He has banded over 700 individual raptors. Since 2000 he has satellite tagged 23 adult and 37 juvenile Ospreys, making Rob the second most experienced Osprey tagger in North America. Federal Bird Banding permit #21567O

Crystal Matthews - Observation, capture, and banding of Ospreys. The Curator of Birds & Quarantine Supervisor at the Virginia Aquarium & Marine Science Center, Virginia Beach, VA. Crystal has worked as an associate of the Center banding osprey in the Virginia Beach area since 2013. Federal Bird Banding permit #21567P

Lauren Billodeaux - Lauren is an employee of the USFWS. She has been trained in safe capture, handling, and banding techniques by the USFWS and by Bryan Watts for Ospreys specifically. Federal Bird Banding permit #21567Q

Daniel Poulton - Observation, capture, and banding of American Oystercatchers. Daniel, and employee of the TNC, has been working with birds for 10 plus years. He is very experienced in extraction of birds from mist nets, and was our primary Northern Saw-whet Owl bander for multiple years. His current position at TNC involves the monitoring and banding of American Oystercatchers. Federal Bird Banding permit #21567R

Safety Precautions and Personal Protection

Describe safety precautions such as dress code and protective dress/equipment for work performed under this protocol. Please avoid phrases such as “when appropriate” when describing protective labwear; rather, describe the situations when gloves, goggles, etc. will be used.

Described above

Storage and Security of Materials

Describe how the BL1 and/or BL2 materials will be stored and how security measures will be implemented. If the materials will be used or transported outside the rooms indicated above, describe the safety measures that will be used to transport the materials.

While not a biological agent. We occasionally use Cannon/Rocket nets to capture birds:

These nets are employed to capture groups of birds such as waterfowl, shorebirds, turkey, pigeons, etc. These nets are large and are attached to charges or other devices capable of throwing them over specified locations. Birds are concentrated over bait in the appropriate location and captured when the net is released. Since large numbers of birds may be captured at once, the technique requires a large enough field crew to handle and secure the birds once captured. This technique rarely results in any injury to target birds. Birds captured with this technique almost certainly experience increased stress depending on the species.

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The stress is of short duration. Birds fly off at release and resume normal activity within seconds. Nontarget birds captured with this technique are released unharmed. Storage and transport of rocket net charges adhere to all federal and state regulations:

REFERENCES

Title 27, Code of Federal Regulations, Part 555, Commerce in Explosives. Federal Explosives Law and Regulations, ATF P 5400.7.

Title 29, Code of Federal Regulations, Part 1910.109, Explosives and Blasting Agents.

Title 29, Code of Federal Regulations, Part 1910, Subpart I, Personal Protective Equipment.

Title 49, Code of Federal Regulations, Part 173, Shippers-General Requirements for Shipments and Packaging.

Title 49, Code of Federal Regulations, Part 177, Carriage by Public Highway.

APHIS Safety and Health Manual (Revised 6/30/04).

WS Directive 2.615, Firearms Use and Safety (01/06/06).

WS Directive 2.435, Explosives Use and Safety (01/06/06).

WS Standard Operating Procedures for Rocket and Cannon Net Use.

WS Explosives Safety Manual.

Institute of Makers of Explosives Safety Library Publication No. 22.

Disinfection/Disposal of Materials

Provide a detailed description of the procedures that will be used for the disinfection/disposal of contaminated materials generated under BL1 and/or BL conditions. Describe procedures for storage/disposal of animal tissues or carcasses.

Described above

Full name of Principal Investigator: Barton J. Paxton

Name of project/course: Research

Date: 2016-04-07

View Details for IACUC-2016-03-24-11117-bjpaxt

Basic Info

Protocol ID: IACUC-2016-03-24-11117-bjpaxt

Protocol Title: Center for Conservation Biology - Projects in Conservation Biology

Overall Status: active

Protocol Timeline: Year 1 of 3

Committee(s): IACUC

Campus: Main

CC Email Addresses: bdwatt@wm.edu

Comments

Comment by dacris

(Daniel Cristol)

2016-04-05 14:37:16

Bart - Some minor revisions needed and then we can get this approved:

1) Remove the words “Blanket Protocol” from the title of the protocol replace with something like “Projects in Conservation Biology”.

Under Species One designation replace “Multiple species of birds” with “Multiple species of birds – see attached species list”.

Clarify the role (and experience when relevant) of multiple personnel listed

Avian Influenza virus / Salmonella: Protocol reviewed by EH&S? 2008 too long ago - please recontact and update

Clarify explicitly that workers are advised of possible contact with virus?

Update refinement database searches to 2016 with new search.

Actions

Status Info

Submitted: 2016-04-07 11:10:34 by bjpaxt

Protocol Details https://compliance.wm.edu/printer_friendly.html

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Overall Status: active since 2016-04-08 13:56:57

IACUC Status: approved-multi since 2016-04-08 13:56:57

Date Info

Submitted: 2016-04-07 11:10:34 by bjpaxt

Protocol Current Year Duration 2016-04-24 through 2017-04-24

Project Entire Duration 2016-04-24 through 2019-04-24

PI Info (bdwatt)

Name: Watts, Bryan

Acceptance: accept since 2016-04-07 11:11:28

Role Faculty

Department Center for Conservation Biology

Day/Work Phone +1 757 221 2247

Day/Work Ext.

Home/Evening/Emergency Phone

PI Info (bjpaxt)

Name: Paxton, Barton

Acceptance: accept since 2016-04-07 11:10:34

Role Faculty

Department Center for Conservation Biology

Day/Work Phone +1 757 221 1639

Day/Work Ext.

Home/Evening/Emergency Phone

Emails

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From compli@wm.edu (WM Compliance)

2016-03-24 16:45:44

Your response needed for protocol IACUC-2016-03-24-11117-bjpaxt set to contingent

From compli@wm.edu (WM Compliance)

2016-03-25 10:55:40

Original submission for protocol IACUC-2016-03-24-11117-bjpaxt

From compli@wm.edu (WM Compliance)

2016-04-05 14:37:31

Status of protocol IACUC-2016-03-24-11117-bjpaxt set to revise

From compli@wm.edu (WM Compliance)

2016-04-07 11:10:34

Your response needed for protocol IACUC-2016-03-24-11117-bjpaxt set to contingent

From compli@wm.edu (WM Compliance)

2016-04-07 11:11:28

Revised submission for protocol IACUC-2016-03-24-11117-bjpaxt

From compli@wm.edu (WM Compliance)

2016-04-08 13:56:57

Status of protocol IACUC-2016-03-24-11117-bjpaxt set to active

Admin-Additional Information

If Funded, Agency Name(s) and internal W&M grant number:

Various

Upload additional files - browse for a file then choose any save option below to upload it.

SpeciesList.doc

IACUC-Preliminary Information

Indicate if this protocol is for teaching or research activities.*

Research

Course Number to which this protocol relates. If this protocol is linked to an academic class, the appropriate department chair must be added in the cc email line when creating the protocol.*

n/a

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ANNUAL RENEWAL OF PROTOCOL: If this is an annual renewal of a previously approved protocol, please summarize any differences between the currently approved protocol and this annual renewal.

No Changes

IACUC-Description of Animal Subjects

Species One (please use Latin genus, species name, and common name):*

Multiple species of birds-see attached species list.

Strain(s) - separate with commas:* n/a

Sex (M,F, or B (Both)):* Both

Age/Weight:* varies

Number 1st year:* <20,000

Total for 3 years:* <60,000

Where will animals be housed (building/room)? If the location planned for animal housing is not indicated below, please contact Cindy Corbett at 1-3966 or cacorb@wm.edu.*

Field work

Will the animals be held more than 12 hours outside the usual animal room?*

No

IACUC-Housing Requirements

In order to use animal holding rooms specified in this protocol, you must first contact department representatives (typically the animal care supervisor) to ensure the room(s) and intended dates of use are accessible for your project.

Please indicate you have contacted the appropriate animal care supervisor to discuss housing needs including: (a) anticipated animal order date (as applicable), (b) intended room of use, (c) duration of housing. This must be accomplished prior to submitting this protocol. This protocol will not be approved until housing has been verified.

Note: If/once the protocol is approved, it is your

responsibility to contact the animal care supervisor

Yes

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one week prior to animal order [as applicable] to ensure intended housing is ready for receipt of animals.*

IACUC-Pain Categories

Pain Category C number for 1st Year :* <20,000

Pain Category C total for 3 Years :* <60,000

Pain Category D number for 1st Year :* 0

Pain Category D total for 3 Years :* 0

Pain Category E number for 1st Year :* 0

Pain Category E total for 3 Years :* 0

IACUC-Species One Euthanasia Description

Describe method(s) of animal euthanasia. Include dose (mg/kg) and route of administration when using a drug. If the drug is a restricted material, provide license number of the responsible person who will acquire and use the agent.*

Procedures that we employ should not or vary rarely require euthanasia. If a unique situation arose in which a bird appeared moribund, we would transfer the subject to a vet who would make a decision as to how to proceed. In even rarer cases, when we determine that a subject has no chance of surviving, we would euthanize it through cervical dislocation to limit the bird's suffering to the maximum extent possible. We have not encountered such situations in the past. We work primarily with endangered species and species of conservation concern; therefore, we make all efforts not to injure or euthanize subjects. A bird that has experienced a life-threatening injury or an injury where pain and suffering cannot be relieved will be euthanized swiftly. We use cervical dislocation as the primary means of euthanasia. Birds that receive non-life threatening life injuries may be sent to the Wildlife Center of Virginia for treatment if believed this transport can be completed in a relatively short amount of time.

Appendix VI. Bald eagle banding details.

USGS Band	Alphanumeric Color	Alphanumeric Code	Trasmtitter Number	Nest Code	Location	Latitude	Longitude	Date_	Gender	Age days
0629-47649	Purple	R/B	791	NO1502	Culfor Crescent	36.933949	-76.271147	5/10/2016	F	56
0629-47650	Purple	R/C	792	NO1502	Culfor Crescent	36.933949	-76.271147	5/10/2016	F	56
0629-12155	Purple	R/M	794	VB1002	False Cape	36.613889	-75.903762	5/11/2016	F	56
0629-12156	Purple	R/N	797	VB1002	False Cape	36.613889	-75.903762	5/11/2016	F	56
0629-12157	Purple	R/P	N/A	VB1002	False Cape	36.613889	-75.903762	5/11/2016	F	56
0629-12158	Purple	R/R	789	VB1104	Saw Pen Pt	36.865519	-76.118348	5/17/2016	M	63
0629-12159	Purple	R/S	790	VB1104	Saw Pen Pt	36.865519	-76.118348	5/17/2016	M	63
0629-12162	Purple	R/W	798	VB1201	Linkhorn	36.868925	-76.018886	5/18/2016	F	60
0629-12163	Purple	R/X	799	VB1201	Linkhorn	36.868925	-76.018886	5/18/2016	F	60
0629-12160	Purple	R/U	793	VB1401	Little Neck	36.891355	-76.097778	5/18/2016	F	52
0629-12161	Purple	R/V	795	VB1401	Little Neck	36.891355	-76.097778	5/18/2016	M	52
0629-12151	Purple	R/D	800	VB1601	Carolanne Farm	36.825611	-76.174370	5/10/2016	F	56
0629-12152	Purple	R/E	796	VB1601	Carolanne Farm	36.825611	-76.174370	5/10/2016	F	56
629-12153	Purple	R/H	N/A	VB1501	Owl Creek	36.823300	-75.984630	5/11/2016	M	42
629-12154	Purple	R/K	N/A	VB1501	Owl Creek	36.823300	-75.984630	5/11/2016	M	42

USGS Band	Mass grams	Culmen With Cere mm	Culmen Without Cere mm	Culmen Depth mm	Wing Chord mm	Tail mm	Halux mm	Breast Feathers	Nabuto Strip	Tan Vial	Green Vial
0629-47649	4902	63.2	49.7	33.4	410	228	38.0	4	Yes		
0629-47650	3730	59.1	45.7	31.7	441	208	34.4	4	Yes		
0629-12151	4480	62.5	50.0	33.5	430	208	36.1	4	Yes		
0629-12152	4602	64.6	51.4	33.8	433	215	36.7	4	Yes		
0629-12153	2892	52.3	42.1	27.9	336	148	34.5	4	Yes	Yes	Partial
0629-12154	3368	54.5	42.8	29.9	293	124	33.8	4	Yes		
0629-12155	4270	62.6	50.4	34.5	420	200	38.2	4	Yes		
0629-12156	3998	62.3	50.2	32.8	440	202	37.7	4	Yes		
0629-12157	4326	60.2	48.4	33.4	437	217	38.2	4	Yes		
0629-12158	3314	55.8	44.5	30.2	422	230	34.5	4	Yes		
0629-12159	3474	57.8	45.5	31.5	415	217	36.8	4	Yes		
0629-12160	4250	61.0	48.6	33.7	405	158	37.2	4	Yes		
0629-12161	3092	54.6	41.9	30.0	335	145	33.0	4	Yes		
0629-12162	4620	61.1	49.0	34.9	461	207	39.0	4	Yes		
0629-12163	4622	61.7	49.4	34.3	462	242	37.4	4	Yes		

Appendix VII. Photographs and Photograph Log.

Photo Name/Number	Photographer	Date	X coordinate (WGS 84)	Y coordinate (WGS 84)	Description	Bird ID	People Pictured
Linkhorn2016 001	Holly Smith	18 May 2016	-76.01889	36.86893	Climber in nest with chick.	Bald Eagle	Shane Lawler
Linkhorn2016 002	Holly Smith	18 May 2016	-76.01889	36.86893	Attaching hood to chick.	Bald Eagle	Reese Lukei, Bryan Watts
Linkhorn2016 003	Holly Smith	18 May 2016	-76.01889	36.86893	Attaching hood to chick.	Bald Eagle	Reese Lukei, Bryan Watts
Linkhorn2016 004	Holly Smith	18 May 2016	-76.01889	36.86893	Alphanumeric band on chick	Bald Eagle	
Linkhorn2016 005	Holly Smith	18 May 2016	-76.01889	36.86893	Weighing chick	Bald Eagle	Reese Lukei, Bryan Watts
Linkhorn2016 006	Holly Smith	18 May 2016	-76.01889	36.86893	Fitting Transmitter	Bald Eagle	Bryan Watts
Linkhorn2016 007	Holly Smith	18 May 2016	-76.01889	36.86893	Fitting transmitter	Bald Eagle	Bryan Watts, Bart Paxton, Sally Kitchen
Linkhorn2016 008	Holly Smith	18 May 2016	-76.01889	36.86893	Hooded chick	Bald Eagle	Bryan Watts
Linkhorn2016 009	Holly Smith	18 May 2016	-76.01889	36.86893	Banding chick	Bald Eagle	Bryan Watts, Bart Paxton
Linkhorn2016 010	Holly Smith	18 May 2016	-76.01889	36.86893	Banding chick	Bald Eagle	Bryan Watts, Bart Paxton, Reese Lukei
Linkhorn2016 011	Holly Smith	18 May 2016	-76.01889	36.86893	Banded, hooded chick	Bald Eagle	Bart Paxton
Linkhorn2016	Holly Smith	18	-76.01889	36.86893	Measuring	Bald	Bryan

012		May 2016			chick wing	Eagle	Watts, Bart Paxton
Linkhorn2016 013	Holly Smith	18 May 2016	-76.01889	36.86893	Fitting transmitter	Bald Eagle	Bryan Watts
Linkhorn2016 014	Holly Smith	18 May 2016	-76.01889	36.86893	Fitting transmitter	Bald Eagle	Bryan Watts
Linkhorn2016 015	Holly Smith	18 May 2016	-76.01889	36.86893	Chick in transport bag	Bald Eagle	Reese Lukei, Bryan Watts
OwlCreek2016 001	Reese Lukei	11 May 2016	-75.98463	36.82330	Owl Creek chicks	Bald Eagle	
OwlCreek2016 002	Reese Lukei	11 May 2016	-75.98463	36.82330	Processing chick	Bald Eagle	Bryan Watts, Bart Paxton
OwlCreek2016 003	Reese Lukei	11 May 2016	-75.98463	36.82330	Banding chick	Bald Eagle	Bryan Watts
OwlCreek2016 004	Reese Lukei	11 May 2016	-75.98463	36.82330	Banded chick	Bald Eagle	Bryan Watts, Bart Paxton
OwlCreek2016 005	Reese Lukei	11 May 2016	-75.98463	36.82330	Collecting blood sample from chick	Bald Eagle	Bryan Watts, Bart Paxton. Mike Wright
OwlCreek2016 006	Reese Lukei	11 May 2016	-75.98463	36.82330	Weighing chick	Bald Eagle	Bryan Watts, Bart Paxton

Linkhorn2016 001







Linkhorn2016 004





Linkhorn2016 006





Linkhorn2016 008



Linkhorn2016 009













Linkhorn2016 015



OwlCreek2016 001



OwlCreek2016 002









OwlCreek2016 006



Appendix VIII. Non-Navy project staff directly involved with this project.

Bryan D. Watts
Director of the Center for Conservation Biology

Dr. Bryan Watts is the Mitchell A. Byrd Professor of Conservation Biology and the Director of the Center for Conservation Biology a research unit shared between The College of William and Mary and the Virginia Commonwealth University. Dr. Watts has worked with bald eagles within the Chesapeake Bay region for more than 30 years and has produced more than 100 publications specifically focused on bald eagle ecology, policy and management. In addition to these academic publications, Dr. Watts is the author of the Virginia Bald Eagle Conservation Plan and the bald eagle biological assessment for Aberdeen Proving Ground. He has conducted the Virginia annual bald eagle breeding survey for 24 years including more than 3,000 hours of aerial surveys including more than 50 survey flights over the study area. He has climbed bald eagle nest trees throughout the Chesapeake Bay and has banded hundreds of bald eagles. He serves on 2 national panels charged with setting research priorities for bald eagles. He has held a master personal banding permit since 1980 with special authorization for handling, trapping, banding, transmitter attachment, blood collection, and collecting feathers for bald eagles.

Barton J. Paxton

Biologist at the Center for Conservation Biology

Barton J. Paxton has been employed by the Center for Conservation Biology, a research unit shared between The College of William and Mary and the Virginia Commonwealth University, for 15 years. During his time at the Center for Conservation Biology, Mr. Paxton has worked on numerous projects involving Bald Eagles. He is the primary observer for yearly eagle surveys of Naval Support Facility Indian Head, Naval Surface Warfare Center Dahlgren, Naval Air Station Patuxent River Complex, Blossom Point Research Facility, Northern Potomac Refuges, and Alcoa-Yadkin power generating properties in North Carolina. Observer for eagle and osprey surveys in response to the Gulf oil spill in 2010. Regular observer for the annual Virginia bald eagle breeding survey. He has extensive experience handling and processing young eagles.

Reese Lukei

Research Associate at the Center for Conservation Biology

Reese started volunteering for CCB in the mid 1990s as lead hawk trapper at the Wise Point trapping station on the Eastern Shore of Virginia. Reese currently monitors eagle and osprey populations in the lower tidewater area of Virginia including the pair of eagles at the Norfolk Botanical Gardens. Reese writes two blogs on the Norfolk eagles: Eagle nest and EagleTrak.

Captain Caton “Fuzzzo” Shermer

Owner/Pilot

Hanover Aviation Co

9347 Brentwood Dr
Mechanicsville, VA 23116

Captain Fuzzzo Shermer is a retired Air Force captain who has flown fixed-wing aircraft for more than 50 years. He is a retired commercial pilot with certification on a wide variety of airplanes and a certified flight instructor. Captain Shermer was an airport operator for many years. He has flown eagle surveys within Virginia since 1992 and is permitted by the FAA for low-altitude surveys. He has flown eagle surveys over all federal lands in coastal Virginia.

Shane Lawler
Certified Arborist
ARBORSCAPES, LLC
1710 Douthit Court
Powhatan, VA 23139

Shane is a certified arborist with experience handling eagle chicks. He has completed the Collaborative Institutional Training Initiative courses for Introduction to Biosafety, Animal Biosafety, and Wildlife Research