



Migrant Raptor Research at the Naval and  
Telecommunications Area Master Station  
Atlantic Detachment Cutler, Cutler Maine:  
Fall 2020

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**The mission** of Biodiversity Research Institute is to assess emerging threats to wildlife and ecosystems through collaborative research, and to use scientific findings to advance environmental awareness and inform decision makers.

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**Front Photo Caption:** View of Naval and Telecommunications Area Master Station Atlantic Detachment Cutler, Cutler Maine.

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## 1.0 EXECUTIVE SUMMARY

In the fall of 2020, Biodiversity Research Institute (BRI) established a raptor research station at the Naval Computer Telecommunications and Area Master Station Atlantic Detachment in Cutler, Maine, to further assess the site for its value in studying migrating raptors. We additionally fit four Peregrine Falcons (*Falco peregrinus*) with satellite transmitters to collect information on their movements at three spatial scales: (1) local use of the Installation, (2) regional use of the Gulf of Maine, and (3) continental-scale use of the Atlantic migration flyway. Further research based out of the Cutler Raptor Research Station would enable significant contributions to a variety of timely conservation and management questions important to U.S. Department of Defense, wildlife agencies, the energy industry and conservation entities.

## 2.0 INTRODUCTION

The Naval Computer Telecommunications and Area Master Station Atlantic Detachment Cutler (“Cutler Installation” hereafter), located in Cutler, Maine is a globally strategic communication facility owned and operated by the U.S. Navy. Within the 12.2 km<sup>2</sup> property lies a communication compound comprised of two antenna arrays, 13 supporting towers, and an extensive system of guy wires covering approximately 3.1 km<sup>2</sup> in area. Extensive natural resource studies have been conducted throughout the communication facility itself as well as within the large tracts of forestland, open space and shoreline associated with the property (Regan and Meattley 2017, DeSorbo et al. 2018a, Tetra Tech 2018, Biodiversity Research Institute 2019). Such studies are important for assessing potential direct impacts of the facility, such as collision risks, but the strategic location of the facility along the North Atlantic U.S. coast also make it particularly unique for studying migrating wildlife.

The Atlantic flyway is one of the most significant bird migration routes in the western hemisphere. Over the coming decades, birds migrating along the Atlantic coast will have an increasingly higher likelihood of encountering large scale commercial offshore wind energy

facilities in either state or federal waters. Post-construction reflections over such facilities built in Europe have demonstrated the importance of collecting pre-construction data on wildlife movements to inform siting decisions.

One of the bird groups that comprises a significant portion of individuals using the Atlantic migration flyway is the raptors. Many diurnal raptors travel thousands of miles between the arctic and tropical locales twice annually using the Atlantic migration flyway. While many raptor species use inland or coastal habitats during migration, some, particularly Peregrine Falcons (*Falco peregrinus*) and Merlins (*Falco columbarius*), commonly travel large distances from shore and therefore may be at some risk of interacting with offshore wind turbines. (DeSorbo et al. 2012, 2015).

At just 32 km (20 mi.) from the U.S.-Canada border, the Cutler Installation is located at nearly the northernmost extent of the U.S. Atlantic coast. This location offers a unique opportunity to study wildlife migrating through not only the Gulf of Maine, but along the entire U.S. portion of the Atlantic migration flyway. Fall raptor surveys conducted by the U.S. Navy and Tetra Tech at the Cutler Installation previously established that migrant raptors commonly pass through the region during fall migration (Tetra Tech 2018). Subsequent surveys also established local flight paths of migrant raptors relative to the Cutler Installation. Using this information, Biodiversity Research Institute (BRI) conducted a short pilot effort in the late fall of 2018 to assess the feasibility of establishing a successful migrant raptor research station at the Cutler Installation (DeSorbo et al. 2018b). That effort resulted in the siting and establishment of a raptor research station at the Cutler Installation, observations of raptor flight paths relative to the station, the successful capture of several raptors, and the fitting of one individual (a Merlin) with a tracking device. That pilot effort led to the determination that a migrant raptor research station could be successfully established at the Cutler Installation, and that the operation of such a station during the period more closely associated with peak raptor migration would enable numerous opportunities to study raptors migrating along the Atlantic flyway and crossing through the Gulf of Maine. The present study summarizes an additional effort conducted in fall 2020 to deploy four more

transmitters on raptors migrating through the Cutler Installation, and to further assess the utility of this station for studying migrant raptors.

### 3.0 OBJECTIVES

The objectives of this study are to:

1. Build on the 2018 pilot study to further evaluate the feasibility and suitability of the Cutler Raptor Research Station for its use in studying raptors using the Atlantic migration flyway.
2. Contribute to broader datasets documenting the local, regional, and continental scale movement patterns of migrant raptors along the Atlantic coast through banding (all raptors) and satellite telemetry (Peregrine Falcons and Merlins).
3. Collect biological samples to assess mercury exposure in migrant raptors travelling along the Atlantic migration flyway.

### 4.0 METHODS

#### 4.1 Station Location and Operation

The Cutler Raptor Research Station was sited on the southwest corner of the U.S. Navy property in Cutler, Maine (44.627662, -67.257948) (Figure 1). The station was approximately 1,100 m (0.69 mi) from the perimeter road that surrounds the communication facility. The station, which is comprised of a series of nets and traps, lies clearly within the typical flight path of many passing migrant raptors. Full descriptions of the typical station design generally adopted for the Cutler Installation can be found elsewhere (DeSorbo et al. 2012, 2019).

The station was set up on 21 September and it was operated daily whenever weather permitted between 22 September - 6 October. Trapping typically began at approximately 0800 EDT and ended at approximately 1800 EDT. A thick fog that engulfed the region from 26 September thru 1 October, and several notably hot and relatively windless days probably reduced captures



during our 2020 trapping operations. Trapping did not occur on 30 September due to heavy rain. In total, we operated the station on one partial, and 18 full days (186 trapping hours).



Figure 1. Location of the Cutler Raptor Research Station in Cutler, Maine.



Figure 2. A view looking down upon the Cutler Raptor Research Station.

## 4.2 Banding and Sampling

Captured raptors were banded using U.S. Geological Survey leg bands. We collected morphometric data (natural wing cord, tarsus width, body mass, tail length, culmen) on all individuals and documented the age and sex of captured individuals using standardized protocols (Pyle 2008, Liguori et al. 2020). Each bird was given a rudimentary health evaluation which included classifying both the crop and body index condition (BIC) into four qualitative classes (0–3). Three-to-four feathers were collected from the breast, back and/or rump of all individuals handled. Feathers will be analyzed for mercury and will be further considered for analyses of other metals, stable isotopes, genetics and archival as funding allows. Blood samples were collected from a subset of individuals using standard protocols (Fair et al. 2010). Further explanation of Hg investigations and sample collection methods can be found elsewhere (DeSorbo et al. 2019, Keyel et al. 2020). Most captured birds were photo-documented.



Figure 3. Hatching Year Peregrine Falcon captured at the Cutler Raptor Research Station.

#### 4.3 Transmitters, Programming and Filtering and Analysis

We attached 12 gram solar powered GPS satellite transmitters to four male Peregrine Falcons in fall 2020. Transmitters (manufactured by GeoTrak, Inc., Apex, North Carolina) were fitted to individuals with backpack-style harnesses made of 0.25 in (6.35 mm; peregrines) Spectra® sewn with Spiderwire Dyneema® thread (Steenhof et al. 2006, Walls and Kenward 2007, Fair et al. 2010). All satellite transmitters fixed locations acquired by both Doppler-shift (a.k.a. ‘Argos’ locations) and GPS. Up to seven GPS locations were fixed daily on the following schedule: 04:00, 12:00, 14:00, 16:00, 18:00, 20:00, and 22:00 EDT. GPS locations exhibit notably higher accuracy compared to Argos locations (Douglas et al. 2012). The location error for GPS locations typically ranges from 5 to 15m. Argos locations are classified into seven different location classes by CLS America according to their associated error (Douglas et al. 2012, CLS 2016). We removed implausible Argos locations using the “Hybrid” Douglas Argos Filter (DAF) prior to mapping (Douglas et al. 2012). For the purposes of this report, we mapped all location estimates from deployment to the last transmission of each unit and roughly evaluated movements within local

(vicinity of the Cutler Installation), regional (Gulf of Maine) and continental (Atlantic flyway) scales.

## 5.0 RESULTS AND DISCUSSION

### 5.1 Raptor Captures and Transmitter Deployments

We trapped ten individual raptors during the fall 2020 trapping period: eight peregrines (all males), one female Merlin, and one female Sharp-shinned Hawk (*Accipiter striatus*). All captured individuals were of the hatching year (young of the year) age class. Four of the eight Peregrine Falcons captured were fitted with GPS satellite transmitters (Table 1). We suspect that poor weather conditions likely had a significant negative effect on our overall capture success during the fall 2020 trapping season (see Methods).

Table 1. Animal ID, unit ID, deployment date and last transmission date of transmitters deployed on four Peregrine Falcons (PG) and one Merlin (ML).

Animal ID	Unit ID	Deployment Date	Last Transmission Date <sup>1</sup>
ML_ADF03	176295	10/10/2018	4/21/2019
PG_HYM22	205153	9/27/2020	10/8/2020
PG_HYM23	205154	9/28/2020	11/18/2020
PG_HYM24	205155	10/1/2020	11/19/2020
PG_HYM25	205156	10/1/2020	10/10/2020

### 5.2 Local, Regional and Continental Scale Movement Patterns

When combined with the Merlin instrumented in 2018, these are the only migrating raptors tracked from the Cutler Installation, and a very limited number of individuals documenting movements along the northerly portion of the U.S. Atlantic migration flyway.

<sup>1</sup> As of time of report writing.

### 5.2.1 Local Movement Patterns (Relative to the Installation)

While further details of the Merlin tracked from the Cutler Installation in 2018 are outlined elsewhere (DeSorbo et al. 2018*b*), we include some information on the movements of this individual in this report. The adult Merlin instrumented with a transmitter in 2018 spent approximately 10 days in the general vicinity of Cutler and eastern Maine before continuing its southward migration (Figure 4). In contrast, all four instrumented Peregrine Falcons tracked in fall 2020 appeared to leave the vicinity of the Cutler Installation relatively quickly after release. Two Peregrine Falcons (HYM22 and HYM23) fixed GPS locations approximately 5 – 15 km north of the Cutler Installation within one hour of transmitter deployments. Within 48 hours, both of these individuals were 30-130 km southwest of the Installation. Two other instrumented Peregrine Falcons (HYM24 and HYM25) fixed GPS locations on Cross Island (approximately 2 km southwest of the Installation) within 6 hours of release and within 48 hours were located respectively 71 km and 380 km southwest of the Installation (Figure 4).

### 5.2.2 Regional Movement Patterns (Gulf of Maine)

Collectively, the two Peregrine Falcons BRI tracked from Monhegan Island in 2010 (DeSorbo et al. 2012), the Merlin tracked from the Cutler Installation in 2018, and the four Peregrine Falcons tracked from the Cutler Installation in this study provide some of the only available data to our knowledge documenting raptor movement patterns through the Gulf of Maine (Figure 4).

Of the four Peregrine Falcons fitted with satellite transmitters at the Installation, only one (PG\_HYM23) followed a coastal route along the perimeter of the Gulf of Maine (Figure 4). This route was similar to that taken by the Merlin tagged in 2018 (DeSorbo et al. 2018*b*). One individual, HYM25, travelled through the Gulf of Maine predominantly over open water. After release, this individual travelled southwest to Cross Island (approximately 2 km south of the Installation) and then to Black Island (approximately 6 km south of Mount Desert Island), before

making an open water crossing of approximately 290 km directly to Cape Cod, Massachusetts. Two individuals travelled southwest from the Installation along the Maine coast to Monhegan Island (16 km offshore south of Friendship, Maine) before shifting their migration directions to the south and heading out over open water into the Gulf of Maine. Monhegan Island is a well-known stopover location for Peregrine Falcons and other birds (DeSorbo et al. 2012). Of the three Peregrine Falcons that cut across the Gulf of Maine, two (HYM22 and HYM25) made their next landfall on Cape Cod, Massachusetts, while the third likely made landfall approximately 57 km further to the northwest in the vicinity of Pembroke, Massachusetts (Figure 4). The migration tracks of all four Peregrine Falcons fitted with transmitters at the Cutler Installation converged on Cape Cod. This study confirms previously undocumented information about Peregrine Falcon travel routes through the Gulf of Maine. Previous studies have documented similar patterns of extensive use of offshore habitats by Peregrine Falcons along the Atlantic coast (DeSorbo et al. 2012, 2015).

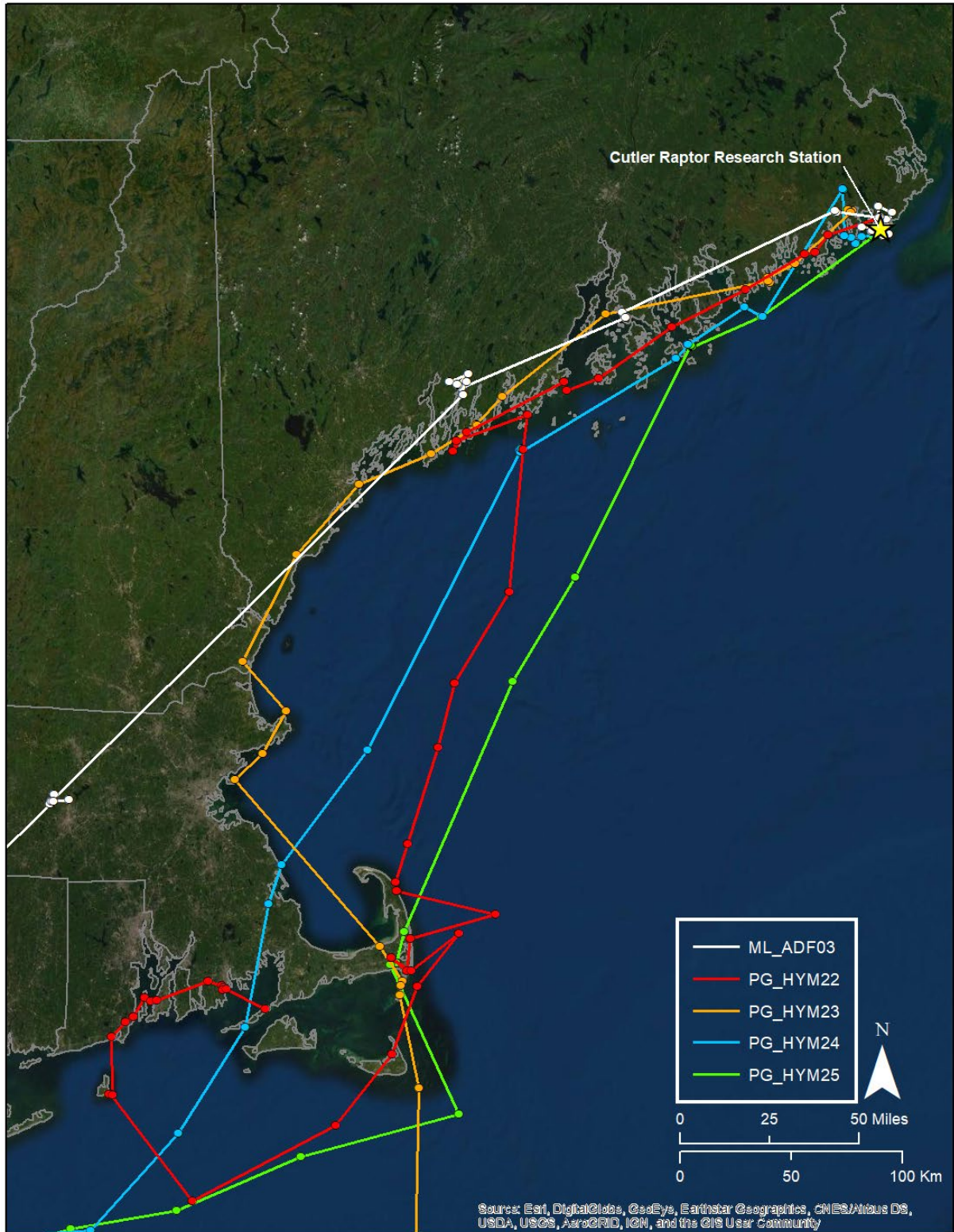


Figure 4. Southward travel routes of four Peregrine Falcons and one Merlin travelling through the Gulf of Maine. Location estimates (points) derived from satellite transmitters fitted to individuals at the Cutler Raptor Research Station, Cutler, Maine (see methods). Lines between points are interpolated.

### 5.2.3 Continental Scale Movement Patterns

Travel routes of Peregrine Falcons tracked during this study are among the most comprehensive depictions of migration routes recorded for the species along the Atlantic flyway. In addition to first-time documentations of travel across the Gulf of Maine, this subset of individuals also shows clear use of offshore habitats along large portions of the Atlantic coast (Figure 5). Extensive use of offshore habitats by Peregrine Falcons along the Atlantic coast has been previously noted (DeSorbo et al. 2012, 2015, 2019). Offshore habitat use by this species in particular has relevance to siting decisions relating to offshore wind energy facilities in varying stages of development along the Atlantic coast (BOEM 2021). Overall, migration routes, stopover destinations and suggested overwintering areas suggested by these four Peregrine Falcons were relatively consistent with those indicated previously (Fuller et al. 1998, DeSorbo et al. 2019).



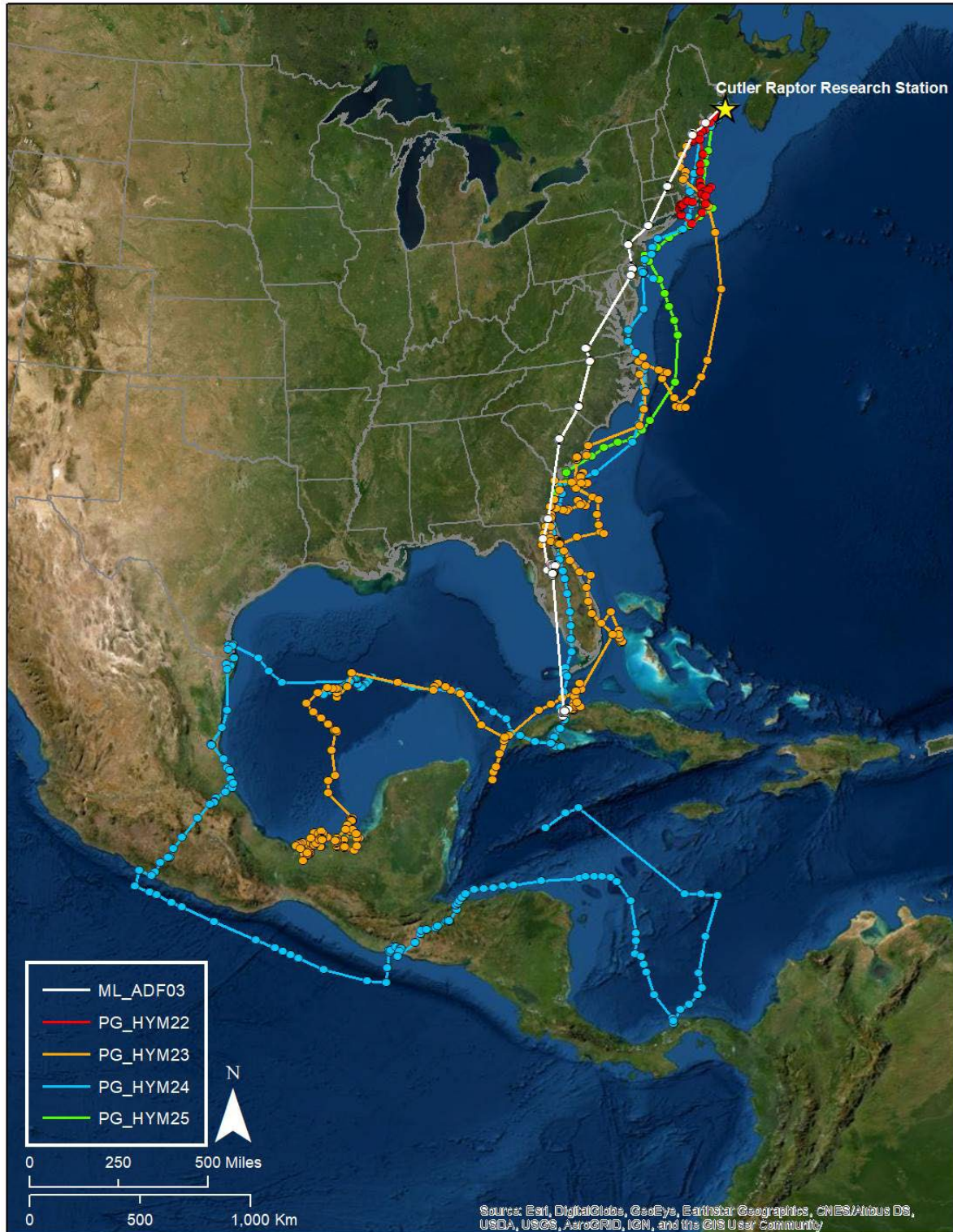


Figure 5. Southward travel routes of four Peregrine Falcons (PG) and one Merlin (ML) travelling along the Atlantic flyway. Location estimates (points) are derived from satellite transmitters fitted to individuals at the Cutler Raptor Research Station, Cutler, Maine (see methods). Lines between points are interpolated.

## 6.0 PROJECT SUMMARY

The 2020 field effort further confirmed previous indications that establishment of a migrant raptor research station at the Cutler Installation is highly feasible. The establishment and operation of a research station at the Cutler Installation provides a unique opportunity to study the movements of migrating raptors at local (i.e., evaluating risks relative to the communication facility), regional (i.e., evaluating movements through the Gulf of Maine) and continental (i.e., the Atlantic migration flyway) scales. The Cutler Raptor Research Station provides especially unique opportunities to study raptor stopover duration and habitat use of numerous areas of ecological significance to raptors such as Monhegan Island, Maine, Block Island, Rhode Island and Assateague Island, Maryland/Virginia. Offshore areas associated with these sites are also in varying stages of development for offshore wind energy facilities in state or federal waters, and understanding offshore movements of raptors in relation to these areas is timely. Further efforts to study the movements of both fall and spring migrating raptors from the Cutler Raptor Research Station would offer significant contributions to our understanding of raptor ecology that are pertinent to a variety of conservation and management questions important to U.S. Department of Defense, wildlife agencies, the energy industry and conservation entities.

## 7.0 ACKNOWLEDGEMENTS

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## 8.0 LITERATURE CITED

- Biodiversity Research Institute. 2019. 2019 Monitoring Avian Productivity and Survivorship ( MAPS ) Surveys at Naval Support Activity Cutler , ME FINAL December 2019.
- BOEM. Bureau of Ocean Energy Management. 2021. State Activities. <<http://www.boem.gov/Renewable-Energy-State-Activities/>>. Accessed 5 Feb 2021.
- CLS. 2016. Argos User's Manual 2007-16. <<http://www.argos-system.org/manual/>>. Last updated 15 June 2016.>. Accessed 17 Feb 2017.
- DeSorbo, C. R., A. T. Gilbert, C. P. Persico, and W. Hanson. 2018a. Pilot GPS telemetry study: Evaluating bald eagle movements relative to the Naval and Telecommunications Area Master Station Atlantic Detachment Cutler, Cutler, Maine. BRI Report # 2017-22 Submitted to NAVFAC PWD-ME, Portsmouth, NH and Tetra Tech, Portland, Maine. Biodiversity Research Institute, Portland, Maine. 21 pp.
- DeSorbo, C. R., L. Gilpatrick, C. Persico, and W. Hanson. 2018b. Pilot Study: Establishing a migrant raptor research station at the Naval and Telecommunications Area Master Station Atlantic Detachment Cutler, Cutler Maine. Submitted to: Naval Facilities Air Force Command (NAFAC) PWD-ME, Portsmouth, New Hampshire. Portland, Maine.
- DeSorbo, C. R., R. B. Gray, J. Tash, C. E. Gray, K. A. Williams, and D. Riordan. 2015. Offshore Migration of Peregrine Falcons (*Falco peregrinus*) Along the Atlantic Flyway. In *Wildlife Densities and Habitat Use Across Temporal and Spatial Scales on the Mid-Atlantic Outer Continental Shelf: Final Report to the Department of Energy EER*. Kathryn A. Williams, E. E. Connelly, S. M. Johnson, and I. J. Stenhouse, editors. Award Number: DE-EE0005362. Report BRI 2015-11, Biodiversity Research Institute, Portland, Maine. 28 pp.
- DeSorbo, C. R., C. P. Persico, L. Gilpatrick, A. Gilbert, A. Dalton, and M. Burton. 2019. Studying migrant raptors using the Atlantic Flyway: Block Island Raptor Research Station, Block Island, RI: 2018 season. BRI Report # 2019-10 submitted to The Nature Conservancy, Block Island, Rhode Island, and The Bailey Wildlife Foundation, Cambridge, Massachusetts. Biodiversity Research Institute, Portland, Maine. 33 pp plus appendices.
- DeSorbo, C. R., K. G. Wright, and R. Gray. 2012. Bird migration stopover sites: ecology of nocturnal and diurnal raptors at Monhegan Island. Report BRI 2012-09 submitted to the Maine Outdoor Heritage Fund, Pittston, Maine, and the Davis Conservation Foundation, Yarmouth, Maine. Biodiversity

- Research Institute, Gorham, Maine. 43 pp.
- Douglas, D. C., R. Weinzierl, S. C. Davidson, R. Kays, M. Wikelski, and G. Bohrer. 2012. Moderating Argos location errors in animal tracking data. *Methods in Ecology and Evolution* 3:999–1007.
- Fair, J. M., E. Paul, and J. Jones. 2010. Guidelines to the use of wild birds in research. The Ornithological Council, Washington D.C., USA. 215 pp.
- Fuller, M. R., W. S. Seegar, L. S. Schueck, and L. S. Fuller, M. R., Seegar, W. S., Schueck. 1998. Routes and travel rates of migrating Peregrine Falcons *Falco peregrinus* and Swainson's Hawks *Buteo swainsoni* in the Western Hemisphere. *Journal of Avian Biology* 29:433–440.
- Keyel, E. R., M. A. Etterson, G. J. Niemi, D. C. Evers, C. R. DeSorbo, J. C. Hoffman, J. W. Nichols, Y. Li, and F. Nicoletti. 2020. Feather mercury increases with feeding at higher trophic levels in two species of migrant raptors, Merlin (*Falco columbarius*) and Sharp-shinned Hawk (*Accipiter striatus*). *The Condor* 122:1–17.
- Liguori, J., J. L. Watson, F. Nicoletti, and D. Oleyar. 2020. In-hand guide to diurnal North American Raptors. HawkWatch International, Inc., Salt Lake City, Utah: 210 pp.
- Pyle, P. 2008. Identification guide to North American birds, Part 2. Slate Creek Press, Point Reyes Station, California.
- Regan, K., and D. Meattley. 2017. Report of Piping Plover and Roseate Tern Surveys at the Naval and Telecommunications Area Master Station, Atlantic Detachment Cutler, Cutler Maine. BRI Report # 2018-10. Submitted to Ian Trefry, Natural Resource Manager, NAVFAC PWD-ME, Portsmouth Naval Shipyard, Portsmouth, NH 03804. Biodiversity Research Institute, Portland, Maine. 16 pp.
- Steenhof, K., K. K. Bates, M. R. Fuller, M. N. Kochert, J. O. McKinley, and P. M. Lukacs. 2006. Effects of radiomarking on Prairie Falcons: attachment failures provide insights about survival. *Wildlife Society Bulletin* 34:116–126.
- Tetra Tech. 2018. Bird and bat conservation strategy: Naval Computer and Telecommunication Area Master Station Atlantic Cutler. Cutler, Maine. Tetra Tech, Portland, ME. 33pp.
- Walls, S. S., and R. E. Kenward. 2007. Spatial Tracking. Pages 237–255 in D. M. Bird and K. L. Bildstein, editors. *Raptor Research and Management Techniques*. Hancock House, Blaine, WA, USA.