

**HOME RANGE, DISPERSAL TIMING AND MIGRATION ROUTES OF  
PEREGRINE FALCONS IN NEW HAMPSHIRE: PROGRESS REPORT FOR 2017  
FIELD SEASON.**

**(BRI report # 2018-13)**



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## **Progress Report: 2017 Season Findings**

### **INTRODUCTION**

Despite extensive research on the species, many basic aspects of the movement ecology of Peregrine Falcons (peregrines hereafter) remain unknown in many breeding populations. New Hampshire's resident peregrine population has steadily increased since the early 1980s. While band encounters provide some insights on nestling dispersal patterns and adult movements, the year-round movement patterns of New Hampshire's resident peregrines remains poorly understood. While rapidly developing tracking technologies have enabled researchers to answer numerous questions about migration and habitat use patterns of numerous species, efforts to study breeding peregrine populations to date using these technologies have been limited.

This progress report summarizes information from the fourth year (2017) of a four-year (2014-2017) collaborative study among BRI, Stantec Consulting Inc. and New Hampshire Audubon to improve our understanding of the breeding, wintering and migratory ecology of Peregrine Falcons that breed in northcentral and southeastern New Hampshire. Information on home range, dispersal timing and migration routes as reported here helps inform a wide variety of conservation and management needs that are relevant to peregrines throughout their range.

In past summaries, we summarized information on the breeding home range (i.e., space use), wintering home range, and migration routes for New Hampshire peregrines fitted with satellite transmitters in 2014-2016. In 2016, BRI received a research grant from Stantec Consulting Inc. to expand this work to two additional sites in 2017 (Fall Mountain and Portsmouth). Here, we: (1) summarize the breeding home range for females associated with those two sites, along with the females associated with the two sites studied previously (Bear Mountain and Rattlesnake Mountain), and (2) document the migration routes used by these four individuals during the fall 2017 migration. Methods used to capture these individuals and fit them with satellite transmitters are outlined extensively in previous reports of this work.

### **2017 PROGRESS REPORT UPDATE**

In 2017, we successfully captured adult breeding female peregrines associated with peregrine nest sites in Portsmouth (Portsmouth nest hereafter) and Walpole (Fall Mountain hereafter), New Hampshire. Both females were instrumented with 9 g solar powered satellite transmitters manufactured by GeoTrak Inc. Details on PTT IDs, Animal IDs, capture dates, and current status of these two transmitters as well as those deployed in 2014 and 2016 on this project, are listed in Table 1.

**Table 1. Animal IDs, PTT IDs, capture dates, and status of transmitters deployed on Peregrine Falcons at four nest sites in New Hampshire.**

Site	Year	Animal ID	PTT ID	Capture Date	Status
Rattlesnake Mountain	2014	ADF01	129175	13-May	Last transmission on 15-Nov near nest site
Bear Mountain	2014	ADF02	129176	12-May	Still transmitting as of March 2018
Rattlesnake Mountain	2016	ADF03	149264	28-Apr	Still transmitting as of March 2018
Portsmouth	2017	ADF04	129177	8-May	Still transmitting as of March 2018
Fall Mountain	2017	ADF05	149262	9-May	Still transmitting as of March 2018

### Space Use Estimation – Breeding Areas

We generated Utilization Distributions (space use estimates) for peregrines in breeding areas during 2017 between their estimated hatch dates and the day in which young were 70 days of age. This time period encompasses the pre-fledge nesting stage (approx. 0 – 42 d) and a portion of the period between fledging and adult dispersal from the nesting territory. Dates associated with these timelines for instrumented peregrines are listed in Table 2. We filtered telemetry data to screen for erroneous locations using the Hybrid Douglas Argos Filter (DAF) and generated Kernel Density Estimates using a subset of daily data selected by the ‘Best Daily’ setting in the DAF.

**Table 2. Animal IDs, PTT IDs, capture dates, and status of transmitters deployed on Peregrine Falcons at four nest sites in New Hampshire.**

Site	Year	Animal ID	Incubation Initiated <sup>a</sup>	Estimated Hatch <sup>b</sup>	70 days
Bear Mountain	2017	ADF02	17-Apr	22-May	31-Jul
Rattlesnake Mountain	2017	ADF03	12-Apr	17-May	26-Jul
Portsmouth	2017	ADF04	12-Apr	17-May	26-Jul
Fall Mountain	2017	ADF05	28-Mar	2-May	11-Jul

a. Median date incubation initiated based upon field monitoring visits

b. Median hatch date based upon field monitoring visits

Overall, 95% isopleth UD of peregrines at the four sites studied in 2017 ranged in area from 729 – 5,872 km<sup>2</sup> (Table 3). Peregrines at Bear Mountain and Rattlesnake Mountain exhibited UD (95% isopleth) of 3,325 km<sup>2</sup> and 5,897 km<sup>2</sup>, respectively. Spatial patterns for females at these two sites were generally similar in 2017 as those observed in previous years (Figure 1). The peregrine at Fall Mountain (ADF05) exhibited a similar home range size and pattern similar to individuals instrumented at Bear Mountain and Rattlesnake Mountain sites. The UD of the peregrine at the Portsmouth nest site (ADF04) was notably smaller than individuals instrumented at the other three sites in 2017. The smaller area used by the female at the Portsmouth site may suggest that food resources are more plentiful in the vicinity of this nest site compared to others studied.

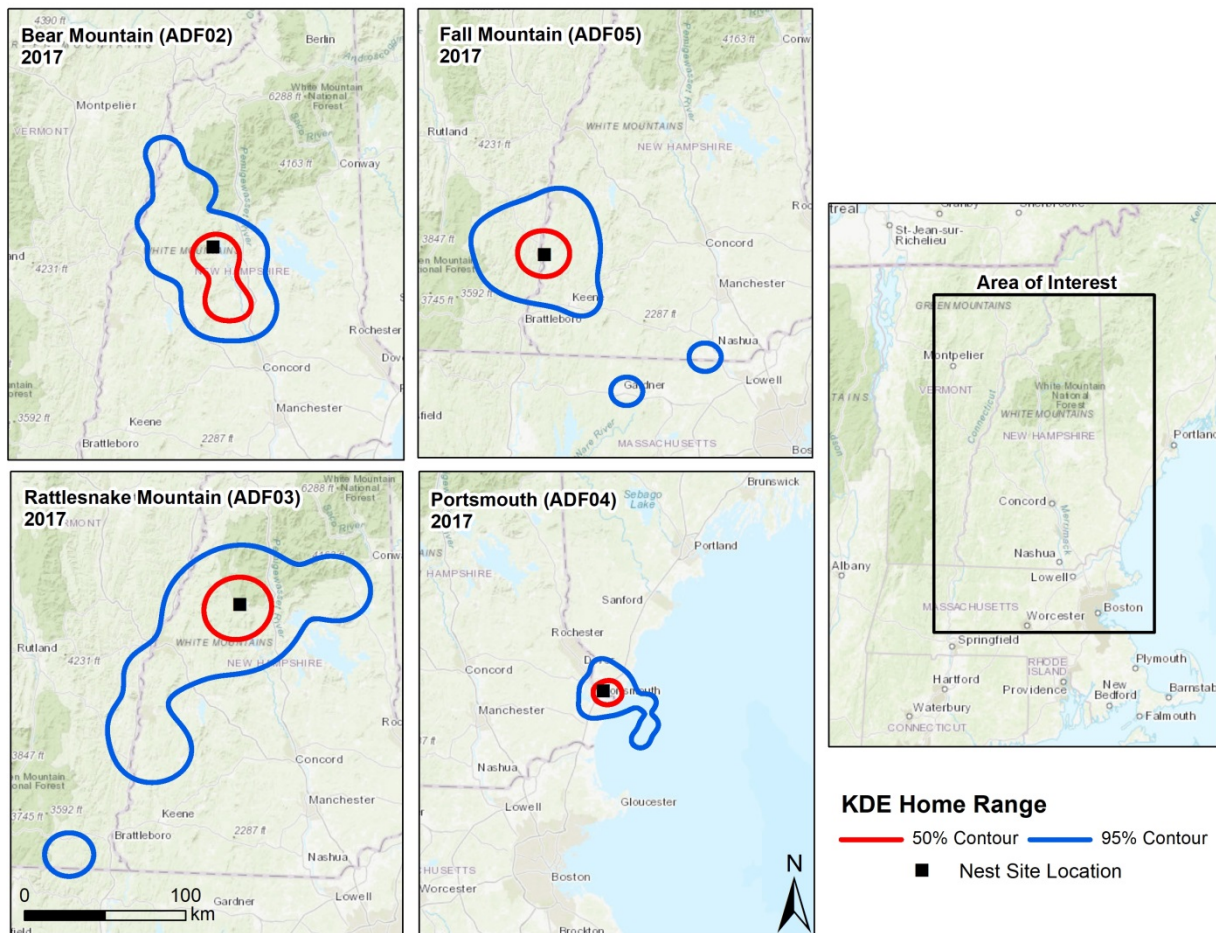
**Table 3. Home range areas (in km<sup>2</sup>) of four breeding adult female Peregrine Falcons in New Hampshire during days 0 – 70 of the nestling development period. (UDs generated using Kernel Density Estimates.)**

Site	Year	Animal ID	50%	95%
Bear Mountain	2017	ADF02	656	3,325
Rattlesnake Mountain	2017	ADF03	664	5,872
Portsmouth	2017	ADF04	112	729
Fall Mountain	2017	ADF05	387	2,862

### Dispersal Timing

Of the three peregrines that dispersed from their breeding areas, departure days ranged from 25 July to 30 October (median: 10 Oct; Table 4). Peregrines arrived in their non-breeding/wintering areas 5-6 days following their departure from the breeding area, arriving in non-breeding areas between 30 July and 4 November (median 16 Oct).

Site	Animal ID	Year	Breeding	Non-breeding
			Departure	Arrival
Bear Mountain	ADF02	2017	30-Oct	4-Nov
Rattlesnake Mountain	ADF03	2017	25-Jul	30-Jul
Fall Mountain	ADF05	2017	10-Oct	16-Oct



**Figure 1. 2017 breeding season Kernel Density Estimates (KDE) for four adult breeding female Peregrine Falcons instrumented with satellite transmitters in New Hampshire.**

### **Migration Routes – 2017 Season.**

Three of the four peregrines studied in 2017 migrated in the fall. The Rattlesnake Mountain female (ADF03) and the Bear Mountain female (ADF02) followed very similar migration routes to those used in previous seasons (see 2014 – 2016 season report). The Fall Mountain female (ADF05) followed a different migration route compared to previously instrumented peregrines from New Hampshire; ADF05 migrated southeast through Massachusetts to coastal Connecticut (New London). The female at the Portsmouth site (ADF04) did not migrate. This non-migratory behavior was suspected based upon reports of regular observations of urban-based peregrines at numerous nest sites in New England on a year-round basis. This observation is the first opportunity, however, to more formally document the year-round residency of New Hampshire peregrines and characterize their space use habits.





**Figure 2. Fall migration routes of adult female breeding Peregrine Falcons instrumented with satellite transmitters at nest sites in New Hampshire.**

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