

**Assessment of Olive-sided Flycatcher (*Contopus cooperi*)  
Status and Distribution in New Hampshire**



A Report to the Nuttall Ornithological Club and Davis Conservation Foundation  
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## Introduction

The Olive-sided Flycatcher (*Contopus cooperi*, hereafter OSFL) is a large flycatcher found in coniferous forests across the boreal zone of North America, and south in appropriate habitat in the Pacific coastal ranges, Rocky Mountains, and Appalachians (Altman and Sallabanks 2012). Across this broad range, the species has been in consistent decline since at least the mid-1960s, with an average loss of 3.5% per year (-2.3% since 2001) according to the Breeding Bird Survey (BBS, Sauer et al. 2014). These declines are also seen in Breeding Bird Atlases, where projects repeated in the early 2000s have consistently shown range retractions when compared with original Atlases from the 1970s and 1980s. Atlases in New York, Vermont, and Massachusetts found OSFLs in roughly a third fewer blocks than 20-30 years previously (McGowan and Corwin 2008, Renfrew 2013, Mass Audubon data). Near the southernmost range edge, it largely disappeared from New York's Catskill Mountains between Atlases, and was not confirmed as breeding during the second Massachusetts Atlas from 2007-2011. The species was apparently more widespread in southern New England during the 1800s, when it bred throughout Massachusetts (Veit and Petersen 1993) and occasionally in southeastern New Hampshire (Keith and Fox 2013). It does not appear to have been more widespread in New York during this same period (Bull 1974). Olive-sided Flycatchers disappeared as a breeding species from eastern Massachusetts and southern New Hampshire by the early 1900s.

Based largely on the recent declines, the OSFL was listed as Threatened in Canada in 2007 (COSEWIC 2007) and is currently considered a "Special Concern" species in Vermont and New Hampshire. Causes for the decline are unknown, but may include habitat loss or alteration on the breeding and/or wintering grounds. Breeding habitat is characterized as open forest or forest edge with isolated tall trees or snags that serve as singing and foraging perches (Altman and Sallabanks 2012). Specific examples include burns, harvested areas, and – particularly in New England – bogs or beaver meadows. Because such habitats have not declined significantly over much of the species' range during the last several decades (but see Robertson and Hutto 2007), speculation on the decline has often focused on changes to winter habitat in the highland forests of Central and South America, although there are currently no data with which to evaluate a winter threat hypothesis. In addition, the effects of pesticides on flycatchers and/or their prey have been proposed as threats to this and other aerial insectivores.

In light of regional declines, and the species' conservation status in New Hampshire, it is desirable to obtain more up-to-date information on OSFL distribution in the state. The first New Hampshire Breeding Bird Atlas was conducted during the 1980s (Foss 1994), and documented the species in 82 priority blocks, with probable or confirmed breeding in 43 of these. The species was fairly widespread in the northern half of the state (63 blocks), with most remaining records in the western highlands (14 blocks). A very similar pattern was seen in Vermont in their first Atlas (late 1970s): most records in the north and a handful in southern highland areas. Between Atlases, however, the number of occupied blocks in southern regions declined more than that in the north (Renfrew 2013), another indication of retraction from the species' southern range edge. Given similarities between New Hampshire and Vermont, it would not be surprising to find a similar loss of range, but there are limited data with which to evaluate this hypothesis.

## Methods

Using funds from the Nuttall Ornithological Club and Davis Conservation Foundation, New Hampshire Audubon conducted a targeted survey for Olive-sided Flycatchers in 2014-16. We started by dividing the state into 7.5' USGS topographic quads (hereafter "quads"), which were the baseline unit of survey effort in the original Breeding Bird Atlas (priority blocks in the Atlas were randomly selected sixths of these quads). For the OSFL surveys, we excluded quads that were 1) not surveyed during the original Atlas, 2) largely outside the state, or 3) outside the expected range of OSFL in New Hampshire (here roughly defined as Bird Conservation Region 14). This preliminary reduction of survey area yielded 147 quads as the sample frame for surveys in this project.

We next obtained recent OSFL data (2000-2013) from several sources: *New Hampshire Bird Records*, eBird, USGS Breeding Bird Survey, White Mountain National Forest, and independent researchers. Whenever possible, these records were assigned latitude and longitude, which allowed them to be assigned to one of the survey quads. Over 300 records were obtained and assigned to quads, and the latter then placed into one of four priority categories as follows:

- 1) Priority 1 = OSFL in quad during Atlas but NOT in 2000-2013
- 2) Priority 2 = OSFL not present during Atlas OR 2000-2013
- 3) Priority 3 = OSFL present 2000-2009, either present or absent during Atlas
- 4) Priority 4 = OSFL present 2010-2013, either present or absent during Atlas

This prioritization scheme was designed to focus effort on sites that had the species during the early 1980s, since these would be the areas where range retraction would be easiest to document. Priority 2 quads were ranked highly in an effort to ensure thorough coverage of potential range. Priority 3 and 4 reflect different degrees of confidence in continued presence of OSFL, with the latter considered occupied and not in need of surveys during the new project. Quads were roughly evenly distributed among the four categories (Table 1). Figure 1 shows the distribution of quads and priorities across the state. Quads were also assigned to one of four regions that correspond roughly to counties, as follows: North (Coos County, 38 quads), West Central (Grafton, 35), East Central (Belknap and Carroll, 34), and Southwest (Cheshire, Hillsborough, Merrimack, and Sullivan; 40) (see also Table 1).

New Hampshire Audubon then created maps for all quads that showed general topography, major roads, and potential OSFL habitat (peatlands and wetlands). We then recruited birders through New Hampshire Audubon publications and the NH.Birds email list, and assigned them – when possible – Priority 1 quads for surveys (some Priority 2 and 3 quads were also surveyed). Volunteers were encouraged to visit all areas of suitable habitat in their assigned quads at least three times in June and July, and record the presence or absence of OSFL. If birds were detected, they also recorded the number of individuals and any noteworthy behaviors. Observers were also asked to note the general habitat at each site in a quad, whether it had OSFL or not. After surveys were completed each summer, quads were re-assigned priorities to reflect recent data. Data submitted to eBird during 2014-16 were also assigned to quads and used to update their status.

## Results and Discussion

A total of 25 observers participated in the project, and collected data in 82 quads (Table 2). Each quad was assigned a code corresponding to the amount of effort expended in surveys (Table 3). Most of the quads with effort code 3 were not officially surveyed, and are included on the basis of incidental observations reported to eBird. There are numerous ways to break down these data on the basis of priority, survey effort, and region, and Tables 1-3 are an attempt to provide multiple perspectives on the same large data set.

Although the number of quads was similar among the four regions (Table 1), Priority 1 quads were disproportionately in the south and east. This is likely the result of more regular birding activity in Coos and Grafton counties, which in turn yielded more incidental OSFL detections that allowed quads to be categorized as Priority 3 or 4 at the start of the survey. As a result, volunteer effort was especially encouraged in the Southwest, which was also the area where OSFL range retraction would be most likely.

Despite the greater survey effort in the south, OSFL detections declined markedly from north to south (Table 1), and only a single bird was detected in a Priority 1 quad in the entire Southwest region. This was a singing male in Lempster on June 14, and unfortunately the site did not receive additional visits later in the season to determine if the bird persisted. The other three OSFL detections in the southwest (Figure 3) were also single incidental sightings that may not represent regularly-occupied sites. Most unusual of these was a bird near the Massachusetts border on June 21, 2016. Based on these data, OSFL have apparently largely disappeared from the southwestern part of New Hampshire since the Breeding Bird Atlas (Figures 2 and 3).

By most measures (e.g., Table 1, Figure 3), OSFL have not declined as significantly in the central portion of the state. The survey started with more occupied quads in the West Central and East Central regions, suggesting that birds persisted in the higher or more northerly portions (e.g., Figure 1). However, when Priority 1 quads were targeted in these two regions, only a third of them were found to contain OSFL. This ratio persisted when Priority 2 quads were included (Table 1). Figure 3 also shows indicates that there have been more losses in the southern third of this region than farther north. In addition, 16 Priority 3 quads were surveyed in the two central regions, but OSFL were only detected in two of them, suggesting a more recent decline since 2000-09 in parts of New Hampshire. This possible recent decline is also indicated by hash-marks over pale blue quads in Figure 2.

The status of OSFL is most secure in northern New Hampshire, where the overall range does not appear to have changed significantly since the Breeding Bird Atlas (Figure 3). Even so, the species went undetected in 20-30% of Priority 1-3 quads in this region. At the regional scale, these losses were likely countered by the discovery (often incidentally) of OSFL in quads where they were not reported during the Atlas.

To summarize, current data suggest that the distribution of OSFL in New Hampshire is gradually retracting to the north. The species is all but absent from areas it formerly occupied in the southwestern portion of the state, and even where it was detected it may not occur regularly. In central New Hampshire, declines in southern areas are more obvious than

in the north, but there are signs of losses even in formerly-occupied areas in the southern White Mountains. Localized losses are also possible in the northern third of the state, although in general the range here has not changed significantly.

This pattern of larger losses to the south matches range retractions documented in New York, Vermont, and Massachusetts during recent Breeding Bird Atlases. It also corroborates population declines derived from the Breeding Bird Survey for the state and region. At this point, however, there are still limited data with which to evaluate potential factors behind the decline. One goal of the present project was to use data collected from volunteer surveys to better define habitat relationships of OSFL in New Hampshire, but this is not feasible given the data received. There were less than 15 specific sites with OSFL in surveyed quads, and this is probably not a large enough sample size to allow more detailed habitat modelling. The addition of incidental sightings made during the survey period would help with sample size concerns, but many of these records lack the necessary geographic precision to identify habitats. In addition, there is not an easily-definable set of sites that lack the species that would be needed to create a robust habitat model. That said, these data are still useful for identifying important sites for this declining species in New Hampshire, and may still serve to focus further research, including on habitat relationships.

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Table 1. Overview of Olive-sided Flycatcher survey quads and results by region. P1-4 indicate Priority categories as designated at the start of the project in 2014.

Region	Number of Quads					P1-2 Quads only		
	Total	P1	P2	P3	P4	E3-2 <sup>1</sup>	OSFL <sup>2</sup>	%w/OSFL <sup>3</sup>
North	38	9	6	5	18	5	4	0.80
West Central	35	7	6	13	9	8	3	0.38
East Central	34	10	13	5	6	11	3	0.27
Southwest	40	14	23	1	2	17	0	0.00
<b>Total</b>	<b>147</b>	<b>40</b>	<b>48</b>	<b>24</b>	<b>35</b>	<b>41</b>	<b>10</b>	<b>0.24</b>

<sup>1</sup> Number of priority 1 or 2 quads which received at least two survey visits during 2014-16 (effort codes 2 and 3).

<sup>2</sup> Number of the above quads where Olive-sided Flycatchers were detected.

<sup>3</sup> Percentage of well-surveyed quads where Olive-sided Flycatchers were detected.

Table 2. Survey effort in Priority 1-3 quads during 2014-16. Quads with less effort (<2 visits) include those where incidental data were obtained from eBird or other sources.

Priority	# quads	# with data	# with at least two visits (%)
1	40	34	27 (68)
2	48	27	14 (29)
3	24	21	13 (54)
Sum P1-3	112	82	54 (48)

Table 3. Distribution of survey effort among quads in 2014-16. P1-P3 indicate a quad's original priority category at the start of the project in 2014.

Survey Effort	Description	Total #Quads	P1	P2	P3
3	three visits to suitable habitat 2014-16	44	26	10	8
2	two visits to suitable habitat 2014-16	10	1	4	5
1	one visit to suitable habitat 2014-16 and/or incidental surveys	33	7	13	8
0	not visited at all	30	6	21	3
x	not targeted for surveys (Priority 4 and "out of range")	64	0	0	0

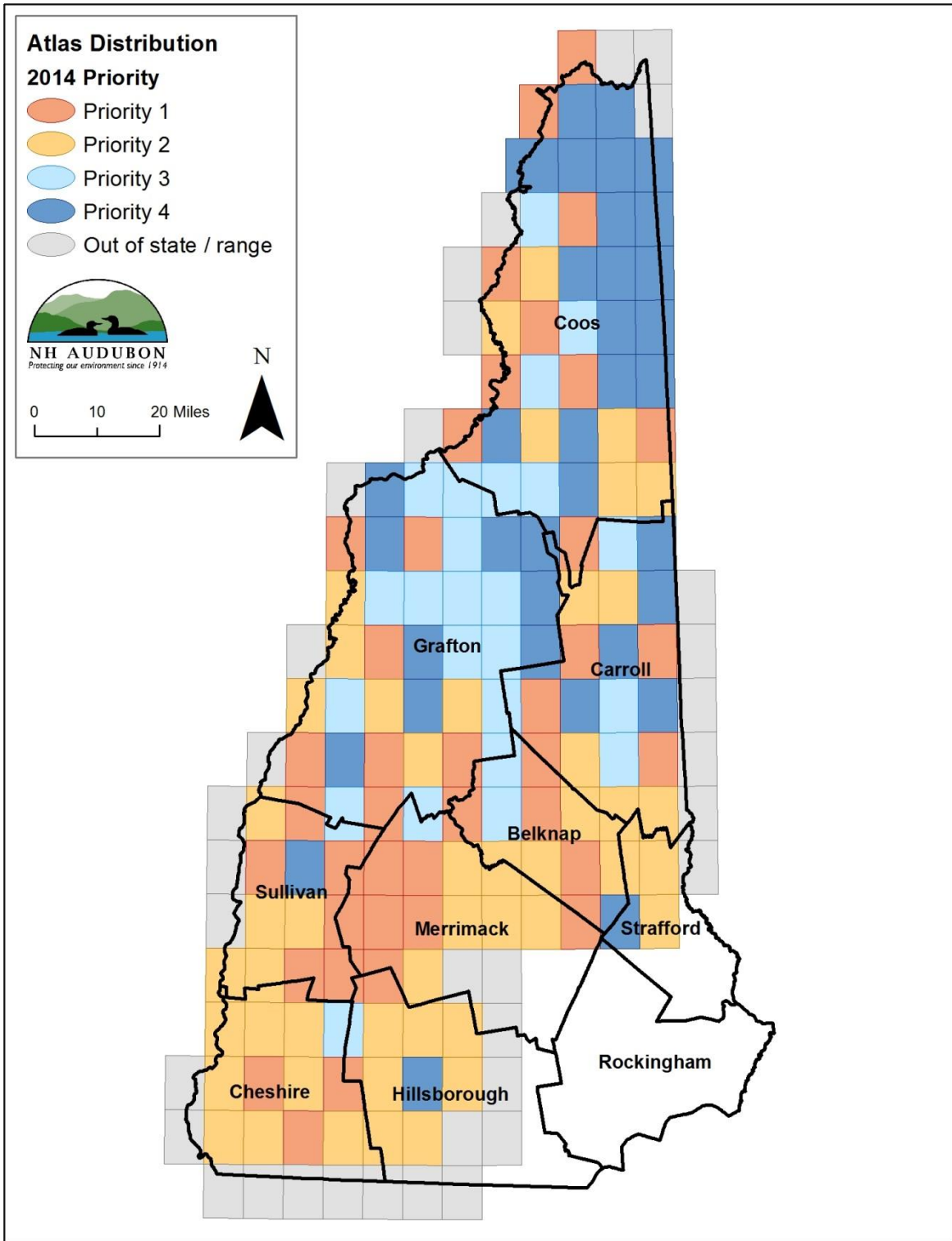


Figure 1. Map of Olive-sided Flycatcher survey quads in the BCR 14 portion of New Hampshire. Color coding indicates the survey priority of each quad at the start of the 2014 field season. See text for priority category definitions. Similar maps were made for 2015 and 2016, but updated using the results from the preceding year.



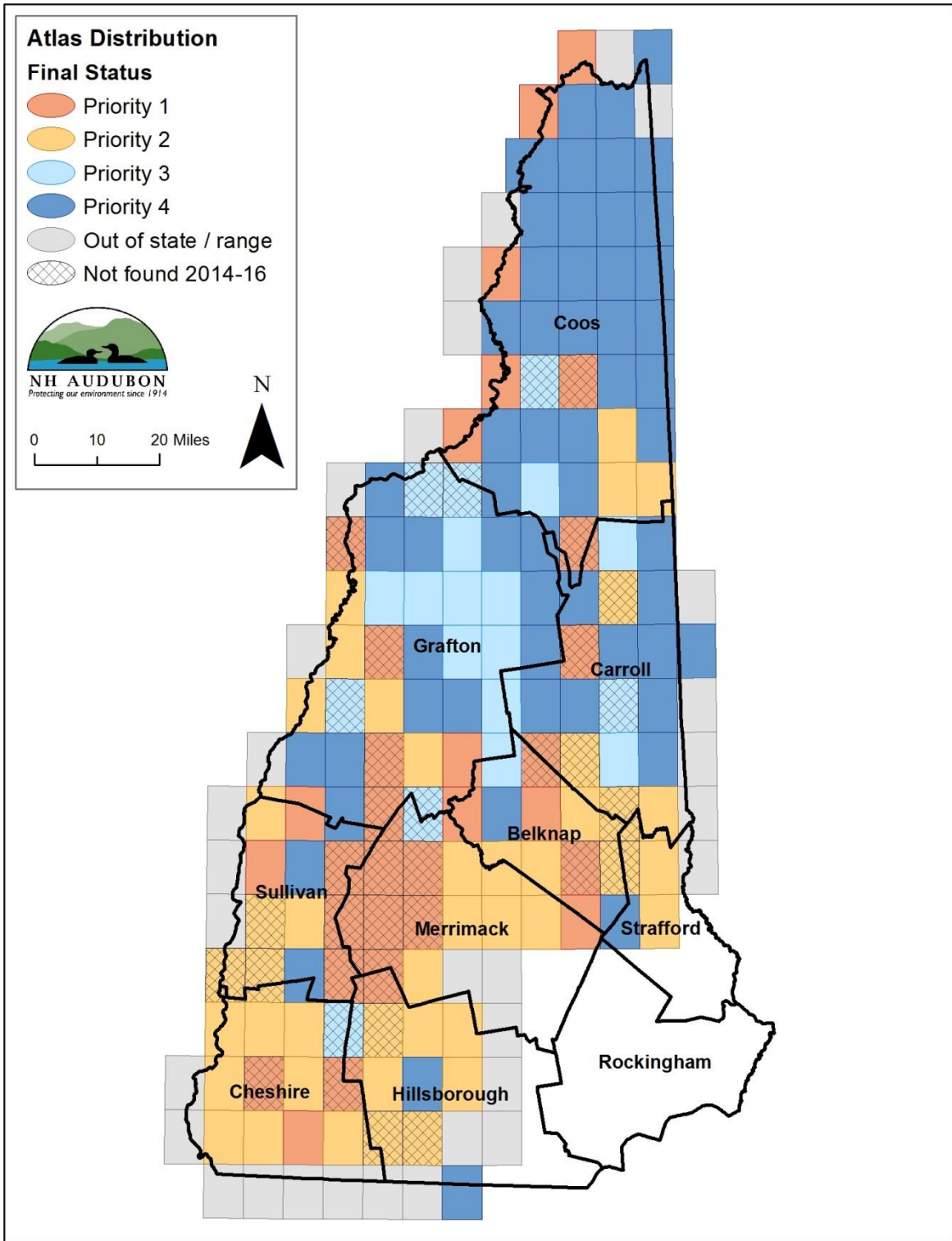


Figure 2. Final status of survey quads at end of 2016 field season. Cross-hatching indicates that quads where Olive-sided Flycatchers were not detected during 2014-16 despite receiving sufficient survey effort. Note the prevalence of cross-hatched Priority 1 quads in southwestern New Hampshire, which is reflected in the range retraction shown in Figure 3.

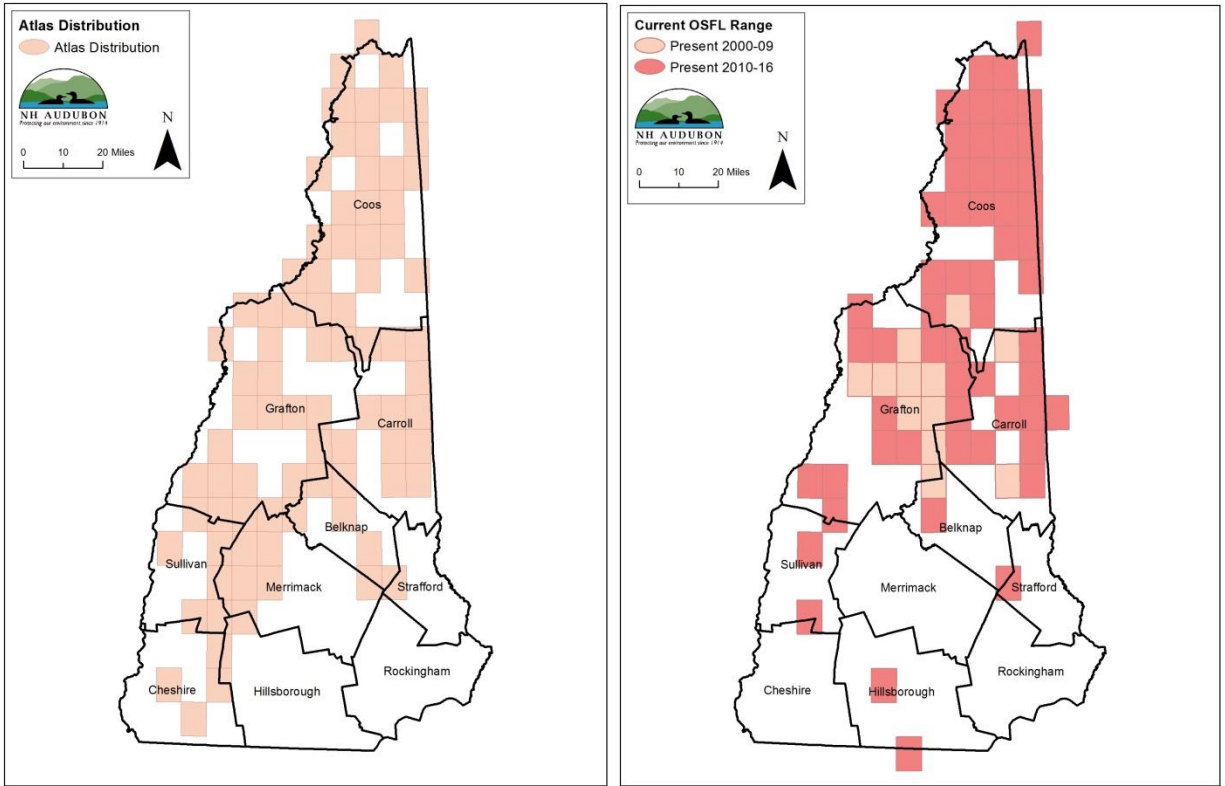


Figure 3. Comparison of Olive-sided Flycatcher range (by 7.5' survey quads) in New Hampshire during the Breeding Bird Atlas (left, data from 1981-86) and since 2000. Data collected in 2014-16 informed the current range map.