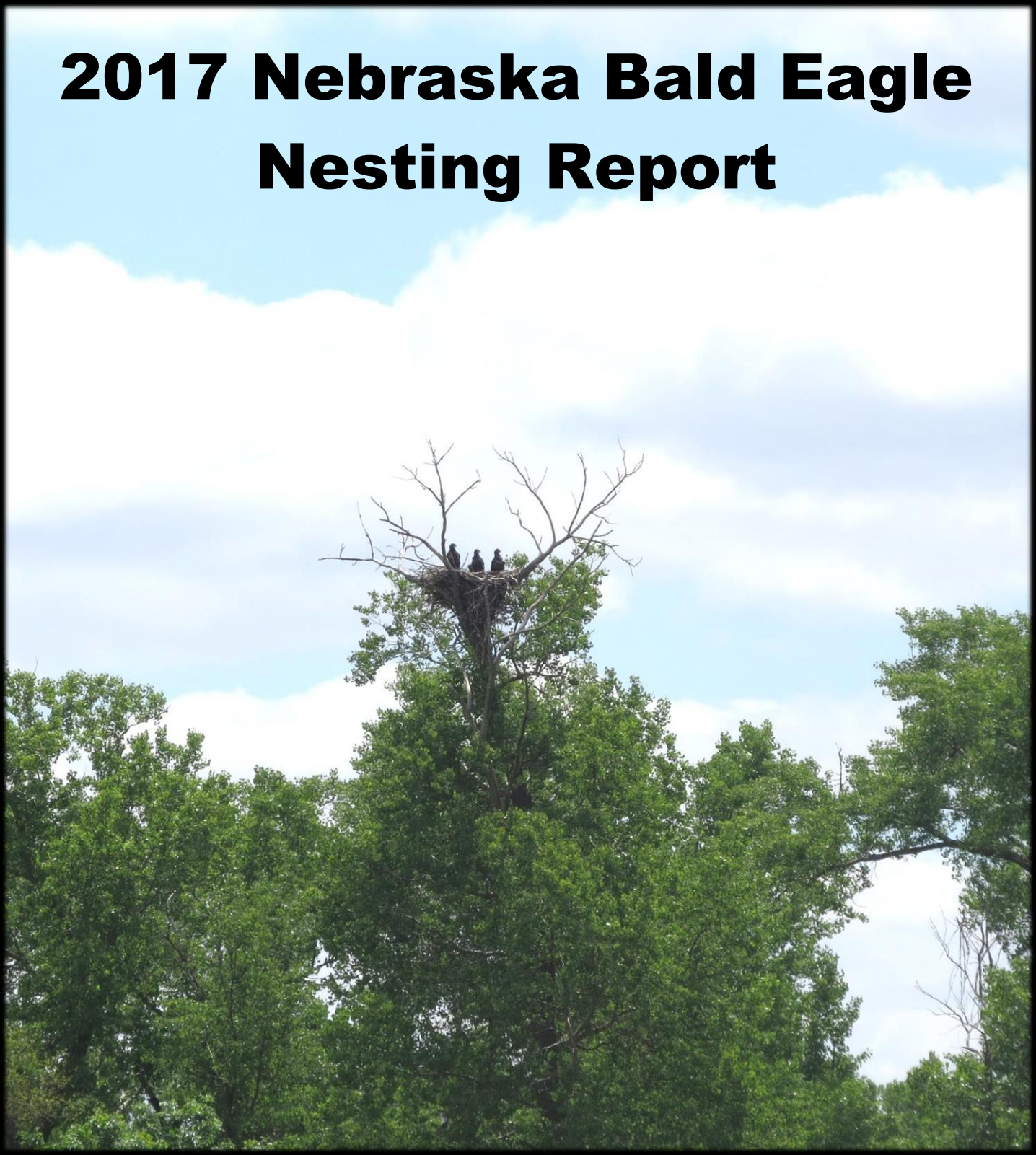
2017 Nebraska Bald Eagle Nesting Report



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Nebraska Game and Parks Commission

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The Bald Eagle (Haliaeetus leucocephalus), a species once threatened with extinction, has increased throughout North America since the mid- to late 20th Century. In Nebraska, Bald Eagles bred historically, but were absent as a breeding species for most of the 20th Century. The first active successful modern Bald Eagle nest in Nebraska was recorded in 1991 (Farrar 1991). Since 1991, increases in the number of Bald Eagle breeding pairs in Nebraska have been remarkable. Within the last 27 years the Bald Eagle has gone from a nonexistent breeding species in Nebraska to one that is relatively numerous. Nebraska originally had a federal recovery goal of ten active breeding pairs (USFWS 1983). This goal was met in 1996 and has been surpassed every year since (Jorgensen and Dinan 2017). In 2007, the year the Bald Eagle was removed from the federal list of threatened and endangered species, the number of active Bald Eagle nests in Nebraska had grown to 54 active nests. Less than a decade later in 2016, the number of known active nests nearly tripled to 161.

Since 1991, the Nongame Bird Program of the Nebraska Game and Parks Commission (NGPC-NBP) has conducted annual Bald Eagle nest monitoring statewide. The approach used by the NGPC-NBP is outlined by Jorgensen and Dinan (2012, 2013, 2014, 2016, 2017), but generally has involved NGPC-NBP and partners surveying all known nests in the state to determine whether individual nests are active or not active. The NGPC-NBP has surveyed a majority of the nests in the state. Other formal surveys have been conducted regularly by the National Park Service (Missouri and Niobrara Rivers) and the Platte River Recovery Implementation Program (central Platte River; Platte River Recovery Implementation Program 2017). Nest activity for other nests located on conservation properties (e.g., National Wildlife Refuges, Wildlife Management Areas) are typically reported by personnel from respective management agencies. Finally, additional information about other nests, including new ones discovered each year, are received opportunistically from various sources including wildlife professionals, birders, landowners and the public.

This traditional approach of annual statewide Bald Eagle nest monitoring, employed since 2012, has become challenging to implement and is no longer efficient due to increases in the number of Bald Eagle nests. Furthermore, as Bald Eagle numbers continue to increase there is less need to perpetually monitor breeding populations. At this point in time, we remain interested in monitoring Bald Eagle nest numbers in the state, but recognize a need to improve the efficiency of our monitoring program. In 2017, we developed a new nest monitoring methodology. Our principal objectives for the new monitoring methodology are to: 1) annually produce an estimate of the minimum number of active Bald Eagle nests in the state, 2) maintain a database of current active Bald Eagle nests, and, 3) reduce resource commitment used to conduct traditional Bald Eagle nesting surveys.

METHODS

This year was the first year we used the new survey methodology developed prior to the 2017 nest monitoring season. The new approach replaces methods used from 1991-2016 (see Jorgensen and Dinan 2015, 2016, 2017). The basic premise of our new methodology was surveying only a proportion of previously-known nests and using data from all previous years of nest monitoring to estimate a probability that previously-known nests, not surveyed in 2017, were active during the survey year. Additional information was also considered in our calculations and we provide details of this approach below.

We divided the state into 11 monitoring units with the intention of surveying one third of known nests during any one survey year (Figure 1, Table 1). We defined a known nest as one present and observed prior to 2017. Monitoring units were developed based on survey opportunities and constraints and were loosely based on Nebraska's watersheds, which are areas where Bald Eagle nests are disproportionately distributed. We selected the monitoring units to be formally surveyed each year of the first three year survey cycle using the proportion of active nest in each monitoring unit during the previous (2016) nesting season. This approach was used so that survey effort was distributed as evenly as possible throughout the three-year survey cycle (Table 1).

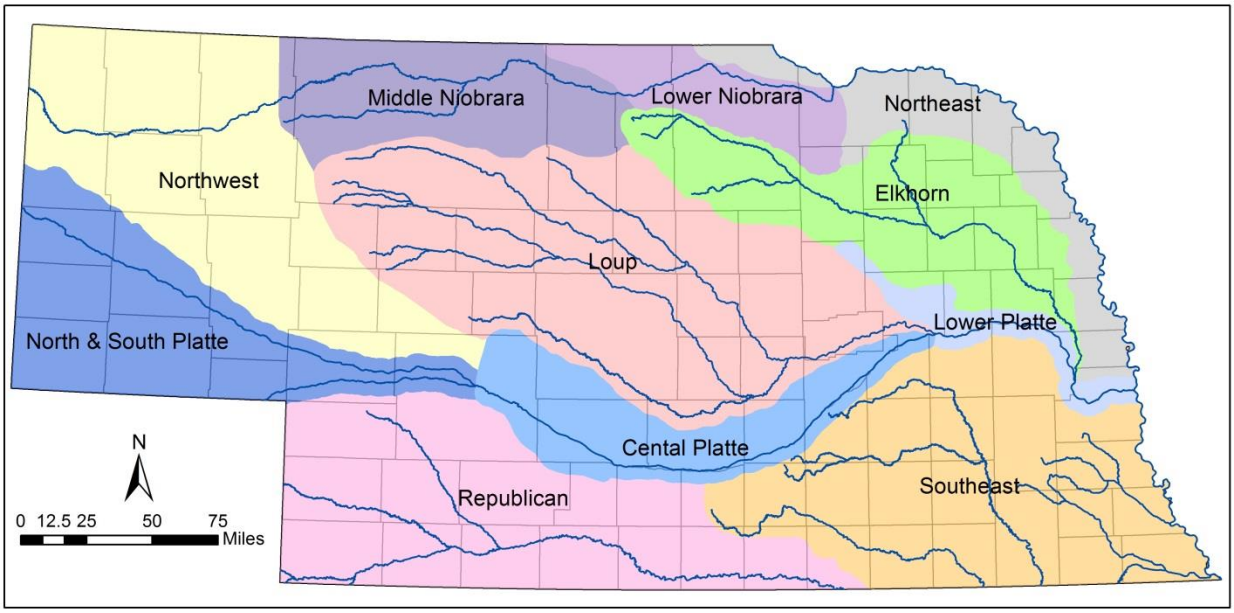

Figure 1. Bald Eagle monitoring units.

Table 1. Schedule of monitoring units selected to be formally surveyed in 2017, 2018 and 2019.

Year	Selected Management Unites	Proportion of nests selected to be surveyed
2017	Loup and Middle Niobrara	35%
2018	Elkhorn, Northeast, Central Platte, North and South Platte, and Northwest	33%
2019	Lower Platte, Republican, Southeast, and Lower Niobrara	33%

Formal surveys (previously referred to as targeted surveys in past annual reports) were conducted following the same basic methods used since 2012 (Jorgensen and Dinan 2012, 2013, 2014, 2016, 2017). Along with formal surveys we also collected information on a number of nests outside of the selected monitoring units that were surveyed opportunistically by us or by others. The principal goal of nest monitoring in 2017, including formal and opportunistic surveys, was to determine nest locations and nest status of all known and new nests found during these surveys. Nest status was categorized as either active or inactive. We defined an active nest as a nest in which a pair of adult Bald Eagles was engaged in breeding activity (e.g., incubating eggs, tending to young). We did not monitor active nests throughout the nesting season to determine nest productivity but chick and fledgling numbers were recorded opportunistically if and when observed.

Using these data from the formal and opportunistic surveys, we developed the following equation to calculate an estimate of the number of active nests in Nebraska in 2017. This equation consisted of five metrics or categories which are described below.

Number of active nests = $NON_{surveyed} + NON_{opportunistic} + NON_{new} + NON_{re\text{-}established} + NON_{unsurveyed}$

1. **$NON_{surveyed}$ (formal surveys of known nests active the previous year)**

   In 2017, we conducted formal surveys in the Loup and Middle Niobrara monitoring units (Figure 1). Formal surveys of known nests that were active in 2016 were conducted by the NGPC-NBP. These formal surveys provide a count of the total number of nests that were previously known and active in 2016 and which were determined to be active in the selected monitoring units in 2017.

2. **$NON_{opportunistic}$ (opportunistic surveys of known nests active the previous year)**

   In 2017, several known nests outside of the selected monitoring units that were active in 2016 were surveyed opportunistically by the NGPC-NBP, National Park Service, Platte River Recovery Implementation Program, U.S. Fish and Wildlife Service, and others, including members of the public. These nests were surveyed due to being highly visible, easily observed while conducting other activities, or reported by members of the public. These surveys provided a count of the number of nests outside of the selected monitoring units that were previously known and active in 2016 and which were opportunistically surveyed and determined to be active in 2017.

3. **NON_{new} (formal and opportunistic surveys of new nests found in 2017)**

   Throughout 2017, we recorded nest activity information on a number of new nests that were documented for the first time in 2017. These new nests were either found during formal or opportunistic surveys or were reported to us by others. At the end of the year we possessed a count of new nests determined to be active in 2017.

4. **$NON_{re\text{-}established}$ (formal and opportunistic surveys of re-established nests checked in 2017)**

   Throughout 2017, we recorded nest activity information on a number of known nests that were recorded as inactive the previous year but were determined to be active in 2017. These re-established nests were found during both formal and opportunistic surveys or

reported to us by others. At the end of the year we possessed a count of all re-established nests determined to be active in 2017.

5. **$NON_{unsurveyed}$ (estimating nest activity of unsurveyed nests based on existing information)**

   We used Program MARK (White and Burnham 1999) and Bald Eagle nesting data collected from 1991 – 2016 to estimate the probability that a nest active one year will be active the following year. The estimate we produced is tantamount to a survival estimate (for an animal of interest) that is commonly produced in mark-recapture analyses (White and Burnham 1999). The top model in our analysis estimated the probability that a nest active one year will be active again the following year to be 0.884 (SE = 0.010, 95% CI = 0.862-0.903). We multiplied the number of nests that were active in 2016 and not surveyed in 2017 by this probability estimate to generate a prediction of the number of the unsurveyed nests that were active in 2017 ($NON_{unsurveyed}$ = number of nests unsurveyed * 0.884).

To calculate an estimate of the total number of active Bald Eagle nests in Nebraska we summed the individual metrics defined above.

Number of active nests = $NON_{surveyed}$ + $NON_{opportunistic}$ + NON_{new} + $NON_{re\text{-}established}$ + $NON_{unsurveyed}$

Any one nest could only be included in only one of the five categories. For example, a nest in the $NON_{unsurveyed}$ category that was opportunistically surveyed was moved to the $NON_{opportunistic}$ category. We also removed $NON_{opportunistic}$ from the equation and included those nests in the $NON_{unsurveyed}$ category as a secondary way of calculating total number of active nests. We then compared the results to see if they were markedly different. We used results from the original equation that included $NON_{opportunistic}$ since the results from this equation were based on the actual surveys that were conducted.

RESULTS

We estimated at total of 209 active Bald Eagle nests in Nebraska in 2017 (Figure 2). Overall 170 nests were surveyed and 144 of these nests were confirmed active in 2017 (Figure 3). We formally surveyed 54 nests that were active in 2016 and in the selected monitoring units; 49 of these nests were found to be active in 2017 ($NON_{surveyed}$ = 49). A total of 38 nests that were active in 2016 but outside of the selected monitoring units were opportunistically surveyed in 2017; 35 of these nests were active ($NON_{opportunistic}$ = 35). In 2017, a total of 47 new nests were located and 43 of these nests were active in 2017 (NON_{new} = 43). A total of 31 nests not active in 2016 were surveyed in 2017 and 17 of these nests were re-established and active ($NON_{re\text{-}established}$ = 17). Out of the 165 nests that were active in 2016, 73 were not surveyed in 2017. We predicted 65 of these unsurveyed nests were active in 2017 based on our calculation ($NON_{unsurveyed}$ = 73 * 0.884 = 65).

49 ($NON_{surveyed}$) + **35** ($NON_{opportunistic}$) + **43** (NON_{new}) + **17** ($NON_{re\text{-}established}$) + **65** ($NON_{unsurveyed}$)
=
209 (active Bald Eagle nests in Nebraska in 2017)

We also calculated an estimate for the number of active nests in Nebraska in 2017 excluding $NON_{opportunistic}$. In this calculation, 111 nests were unsurveyed. We predicted 98 of the 111 unsurveyed nests were active in 2017. Using this equation we estimated 207 active Bald Eagle nests in Nebraska in 2017.

49 ($NON_{surveyed}$) + **43** (NON_{new}) + **17** ($NON_{re\text{-}established}$) + **98** ($NON_{unsurveyed}$)
=
207 (active Bald Eagle nests in Nebraska in 2017)

Nests have not been monitored for reproductive success for several years, but chick and fledgling numbers were recorded opportunistically if and when they were observed. We recorded 72 fledgling Bald Eagles during our surveys in 2017. From 1991 to 2017, a minimum of 1092 fledgling Bald Eagles have been produced in Nebraska.

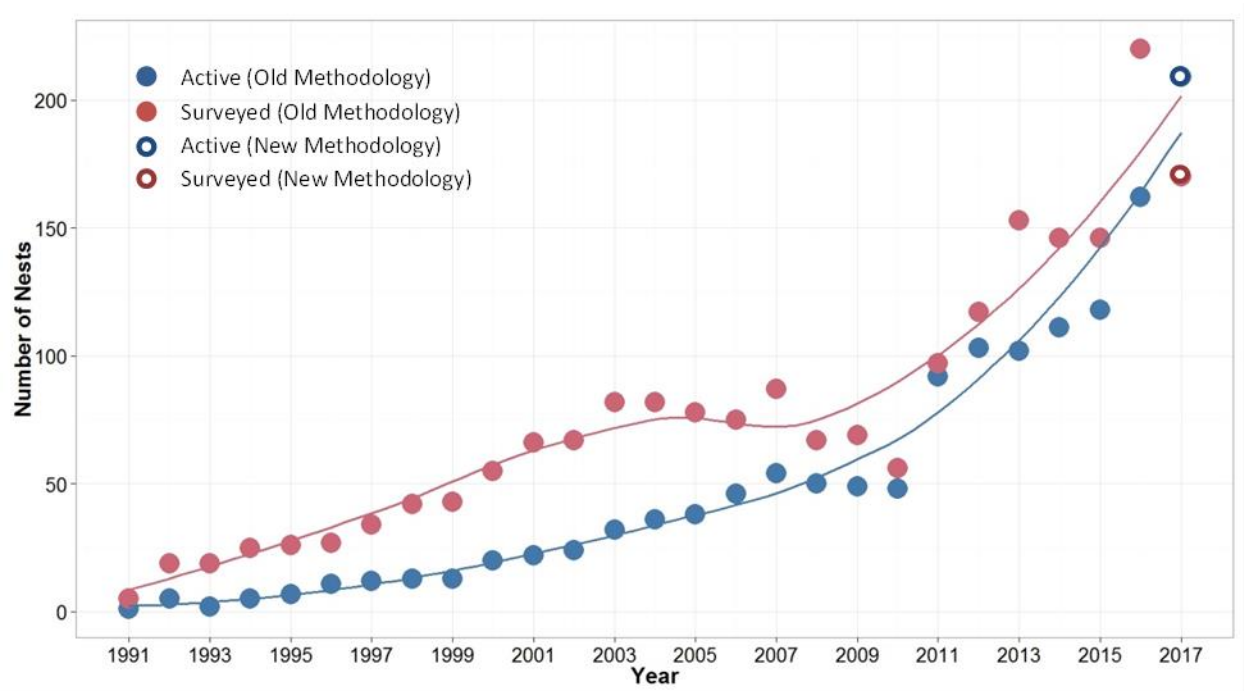

Figure 2. Number of Bald Eagle nests surveyed (red points) and number of active nests (blue points) in Nebraska from 1991 - 2017. The solid dots represent survey results using the old methodology (Jorgensen and Dinan 2017) and the hollow dots represent survey results using the new methodology outlined in this report. The trend lines were created using locally weighted scatterplot smoothing (LOESS) in Program R (R Development Core Team 2014).

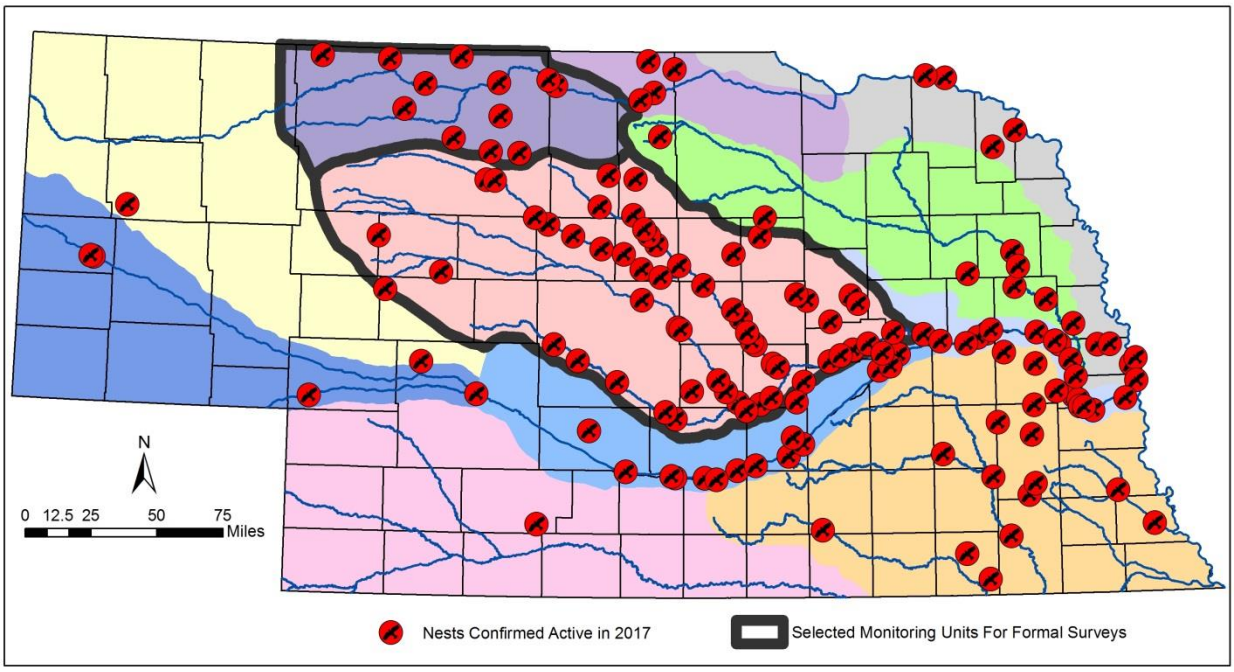

Figure 3. Spatial distribution of nests confirmed active in 2017 during Bald Eagle nests surveys.

DISCUSSION

The overall estimated total of 209 active Bald Eagle nests in Nebraska in 2017 represents a 29% increase over the 162 nests recorded as active in 2016. This is the first year the number of active nests counted or estimated in Nebraska has exceeded 200. It is also the fourth year in a row in which the number of active Bald Eagle nests surpassed the previous year's reported total.

Our change in survey methodology is an important factor to consider when interpreting our results. However, even with the changes in methodology and not surveying all nests, we still confirmed 144 active nests in Nebraska in 2017. This total is only 28 less than the total recorded in 2016 when survey effort was far greater. Our estimate of total number of active Bald Eagle nests in 2017 should be viewed as a minimum estimate since we believe it is extremely likely there were a number of active nests in 2017 that remained unknown to us. It is also notable that when we removed $NON_{opportunistic}$ from the equation and included those nests in the $NON_{unsurveyed}$ category, as a secondary way of calculating total number of active nests, our estimate only decreased by 2 active nests.

Our new survey approach was successful in allowing us to achieve our objectives of 1) producing an estimate of the minimum number of active Bald Eagle in the state, 2) maintaining our database of current active Bald nests, and, 3) reducing resource commitment used to conduct Bald Eagle nesting surveys. Furthermore, over time, this approach may allow us to "wind down" Bald Eagle nest monitoring altogether as the species continues to increase and becomes even more numerous. Although our survey methods limit our ability to make certain inferences, results from 2017, and the last several years of surveys, show the general long-term pattern of increase in the number of nesting Bald Eagles in Nebraska is continuing and there are no indications the trend is leveling off.

LITERATURE CITED

Farrar, J. 1991. Return of the Bald Eagle. NEBRASKAland, August-September, pages 8-11.

Jorgensen, J.G., and L.R. Dinan. 2012. 2012 Nebraska Bald Eagle Nest Report. Nongame Bird Program of the Nebraska Game and Parks Commission, Lincoln, NE.

Jorgensen, J.G., and L.R. Dinan. 2013. 2013 Nebraska Bald Eagle Nest Report. Nongame Bird Program of the Nebraska Game and Parks Commission, Lincoln, NE.

Jorgensen, J.G., and L.R. Dinan. 2014. 2014 Nebraska Bald Eagle Nest Report. Nongame Bird Program of the Nebraska Game and Parks Commission, Lincoln, NE.

Jorgensen, J.G., and L.R. Dinan. 2016. 2015 Nebraska Bald Eagle Nest Report. Nongame Bird Program of the Nebraska Game and Parks Commission, Lincoln, NE.

Jorgensen, J.G., and L.R. Dinan. 2017. 2016 Nebraska Bald Eagle Nest Report. Nongame Bird Program of the Nebraska Game and Parks Commission, Lincoln, NE.

Jorgensen, J.G., S.K. Wilson, J.J. Dinan, S.E. Rehme, S.E. Steckler, and M.J. Panella. 2010. A Review of Modern Bald Eagle (*Haliaeetus leucocephalus*) Nesting Records and Breeding Status in Nebraska. Nebraska Bird Review 78: 121-126.

Platte River Recovery Implementation Program. 2017. Platte River Recovery Implementation Program 2017 Central Platte River Eagle Nest Summary. Kearney, NE.

R Development Core Team. 2014. R: A language and environment for statistical computing, v. 3.1.1. R Foundation for Statistical Computing, Vienna, Austria. http://www.R-project.org/, Accessed April 15, 2015.

United States Fish and Wildlife Service. 1983. Northern States Bald Eagle Recovery Plan. US Fish and Wildlife Service. Twin Cities, MN.

White, G.C. and K.P. Burnham. 1999. Program MARK: survival estimates from populations of marked animals. Bird Study 46: S120–S139.