A Summary of 23 Years of Raptor Banding at Kiptopeke State Park Virginia: 1991-2013

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ABSTRACT

Here we present 23 consecutive years (1991-2013) of fall raptor trapping and banding totals in Kiptopeke State Park, Virginia. A total of 16,373 raptors representing 13 diurnal species were captured at Kiptopeke: 10,986 accipiters, 3,757 falcons; 1,240 buteos, 386 harriers and 4 eagles. Except for the raptors which were already banded (at least 71 were foreign recaptures) and a peregrine sent for rehabilitation, the migrating raptors captured at Kiptopeke were measured, aged, sexed and banded with USGS bands.

INTRODUCTION

Consistent effort raptor trapping and banding allows for long-term data collection and affords many insights into raptor biology: migratory timing of various species, morphometric data, age/sex ratios of migrants, health assessments, collection of samples of blood, feather, tissue or ectoparasites from free-living raptors, and the potential to learn about the longevity and movements of raptors that are subsequently recaptured (Clark et al. 2000). There are relatively few places where migrating raptors can be captured and banded in sufficiently large numbers to provide statistically relevant data (Clark 1995). Capture and banding of migrating raptors where the topography is favorable allow researchers to access a large sample of birds coming from an extensive geographic area.

Kiptopeke State Park is located on the Chesapeake Bay near the southern tip of the Delmarva peninsula where the topography concentrates the flow of birds migrating along the eastern coast of North America (Goodrich and Smith 2008). Because of the high concentration of migrating birds at Kiptopeke, a songbird banding program was established in 1963 and continued for 50 consecutive years (Brennan and Reilly 2012). The raptor banding station was established in Kiptopeke in 1991 and remained in operation for 23 years each fall migration until the program was discontinued after the 2013 season. The aim of presenting the numbers of different species of raptors captured at Kiptopeke herein is to: 1) preserve and disseminate the data, 2) acknowledge the efforts of many people over many years, and 3) to encourage others to further analyze the extensive data collected by this program.

METHODS

Raptor trapping and banding

The main station in Kiptopeke State Park (Latitude 37.1680, Longitude -75.9838, elevation a.s.l. 10 m) initially operated daily, weather permitting, from 1 Sep to 30 Nov. However, trapping was shifted to 1 week later (8 Sep to 7 Dec) during 2010-2013 to maximize the number of raptors captured. This shift in trapping period was officially adopted after a trial of trapping in December 2009. Raptors trapped at an adjunct trapping station in a local soybean field were included in totals from 1994 but the "beanfield blind" eventually ceased operations. In addition, road trapping with bal-chatris was occasionally performed during periods of low raptor migration. The numbers of road-trapped raptors were negligible when compared to numbers of raptors trapped at the main station.

Migrating raptors were captured using mist nests, dho ghazas, bownets and bal-chatris. Lures included: House Sparrow (*Passer domesticus*), European Starling (*Sturnus vulgaris*), captive-raised non-native dove (*Columba* sp.), Rock Dove (*Columba livia*), and domestic mice (*Mus musculus*). Each raptor was removed from the trap and taken to the blind for processing inside an appropriate size can (if necessary). Data collected includes species, how captured, type of lure, age, sex (when determination was possible), natural

wing chord, weight, fat and muscle scores, date and time of capture. If time permitted, length of culmen, tail, and hallux were measured. During some seasons, raptors' crop condition, fault barring of tail and ectoparasite load were also recorded. Local weather conditions including wind speed and direction, percent cloud cover, and air temperature were recorded three times per day: when the station opened, at noon, and when the station closed. Raptors were banded with USGS bands and released. The main trapping station was open to the public and some raptors were taken to the nearby Kiptopeke hawk watch tower or on-site birding events for education and photography prior to release.

Collection of results

Data summarized herein was gleaned from various annual reports (listed below). Several annual reports were provided by Brian Taber of the Coastal Virginia Wildlife Observatory (CVWO). Data for years for which annual reports were not available was obtained from tables within other years' annual reports comparing current to prior seasons. For example, number of raptors captured in 1991-1994 were included in the 1995 report; 1996-1998 results were covered in the 2002 report; years 2003-2004 were covered in the 2005 report, and 2006 was covered in the 2007 report. Below is the list of annual reports from which this summary is derived:

- 1995: Cape Charles Raptor Research Station
  Annual Report 1995
- 1999: The 1999 Hawk Banding Season
  by Jamie Cameron
- 2000: Coastal Virginia Wildlife Observatory Raptor Banding Project Fall 2000
  Final Report by Brian L. Sullivan
- 2001: Coastal Virginia Wildlife Observatory Raptor Banding Project Fall 2001
  Final Report by Deniz Aygen
- 2002: Coastal Virginia Wildlife Observatory Raptor Banding Project, Fall 2002
  Kiptopeke State Park by Deniz Aygen
- 2005: CVWO Raptor Banding Project
  by Zach Smith
- 2007: Untitled report
  by Joe Medley
- 2008: Untitled report
  by Neal Johannson
- 2009: Untitled report
  by Robert Chapman
- 2010: Fall 2010 Kiptopeke Raptor Banding Report
  by Robert Chapman, Head Bander
- 2011: Untitled report
  by Robert Chapman
- 2012: Untitled report
  by Jackie Catino
- 2013: Kiptopeke Hawk Banding Report 2013 Coastal Virginia Wildlife Observator
  by Bob Chapman Master Bander

RESULTS

Table 1 summarizes the results of raptor banding at Kiptopeke from 1991-2013. During this 23-year period, 13 species of diurnal raptors were captured at Kiptopeke: three species of accipiters, three species of falcons, four of buteos, 1 harrier species and two species of eagles. Numbers of raptors trapped annually varied, widely ranging from 168 (in 1991) to 1561 (in 1997). Annual trapping effort (expressed as number days trapped), ranged from 25 (in 1991 and 1993) to 102 (in 2009 including 21 days trapping in December for the first time). Number of trapping days each year did not correlate with number of raptors trapped per day which varied widely ranging from 6.0 (in 2001) to 20.3 (in 1997) with a mean of 11.0 raptors trapped per day (excluding the 3 years for which the number days trapped was not available: 2003, 2004 and 2006). Total number raptors trapped includes recaptures which may or may not have been specifically enumerated in the various annual reports; see right column of Table 1 for foreign recaptures that were reported.

DISCUSSION

Raptor banding at Kiptopeke began in 1991 and continued for 23 years to a considerable effort with the potential to contribute much to raptor biology. This report summarizes the numbers and species of raptors trapped at Kiptopeke from 1991-2013 but represents only the tip of an iceberg of data collected by the program.

The quintessence of bird banding is what is learned by where and when banded birds are recaptured (Clark et al. 2000). Raptor band recoveries gives researchers information about migration pathways and distances, breeding and nonbreeding areas, longevity, and (potentially) causes of mortality. In order to get a large number of recoveries of banded raptors, one must capture and band a large number of migrants, as recovery rates for raptors is low; averaging from 1.6% for raptors banded at Cape May Point, NJ (Clark et al. 2000) to a recovery rate of 3% worldwide (Goodrich and Smith 2008). We have not attempted to compile any recaptures of the thousands of raptors banded at Kiptopeke over this 23-year period. However, this data can easily be analyzed by requesting Kiptopeke raptor band and re-encounter records from the Bird Banding Laboratory.

There are multiple uses for data from long-term banding projects, but caveats and numerous variables must be taken into consideration when drawing conclusions. There were varying degrees of effort (expressed as # days trapped) at Kiptopeke from year to year. Also, the number of trapping stations operating, road trapping effort, shifting the trapping period to a later week introduced more variables. The layout and number of traps and nets at the main station was in a constant state of flux, with each bander striving for maximum efficiency. Some years had adequate numbers of trappers, assistants, traps and lures. However, other years saw shortages of one or more of these critical components.

Annual reports from the Kiptopeke raptor banding program had no consistent format for data presentation. For example, many annual reports do not mention the number of days trapped, the number of recaptures or the number of foreign recaptures. Most annual reports had little or no emphasis on recoveries of banded raptors, either foreign recaptures of birds banded elsewhere, or recaptures of birds banded at Kiptopeke either in the current season or in previous years. Specific band information about the foreign recaptures was likely not available for inclusion in annual reports. Two trapping seasons, 2006 and 2012, were partial efforts with no information on the number of trapping days or in which months the 329 raptors were trapped during 2006. Cape May Point bander C. Schultz mentions the importance of accounting for trapping effort when evaluating yearly fluctuations in raptor banding totals (Schultz 1996).

Several of the annual reports suggest the number of raptors captured each year correlates to the migratory hawk counts that take place simultaneously at the Kiptopeke hawk watch tower located 120 m from the main raptor trapping station. Although this type of analysis is beyond the scope of this paper, a positive correlation

between migrating raptors and capture rates has been documented at Cape May Point NJ (Clark et al. 2000).

There are many inherent variables when trapping raptors: their state of hunger, previous experiences with traps creating a "trap shy" raptor, the experience and skill of the hawk trapper, activity and visibility of lures, and any activity that prevents raptors from approaching lures (e.g., people walking around, moving vehicles, or other raptors perched or soaring over the trapping station). A common observation in the annual Kiptopeke reports was that weather conditions made raptor migration highly variable. Many describe yet another variable influencing trapping success at the main trapping station; the ongoing problem of growing vegetation blocking raptors' view of the lures. Specifically, trappers were concerned with the row of fast-growing loblolly pines to the north and trees blocking the view from the beach along which falcons migrate and hunt. Due to the inconsistencies and inherent variabilities, it is not valid to compare numbers of raptors captured at Kiptopeke from year to year as a measure of raptor populations, nesting productivity or of raptor migration. Nevertheless, Kiptopeke raptor banding records contain a wealth of information that should be analyzed: morphometric measurements, health of raptors (keel assessment, feather fault bars and ectoparasite loads), timing of migration as it relates to each specie, age and sex of raptors migrating along the east coast. Education of the public with raptors in the hand was a priority of the Kiptopeke raptor banding program and has immeasurable value to promote appreciation for birds of prey, migratory bird banding and raptor conservation.

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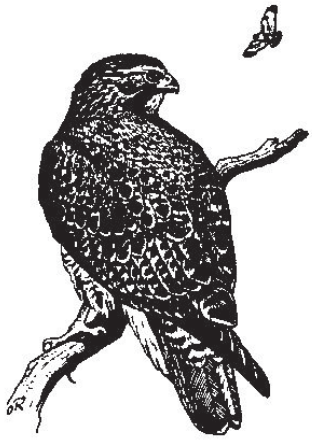

Table 1. Fall raptor banding results by year at Kiptopeke Virginia: 1991-2013. Species codes are standard USGS banding codes: SSHA (Sharp-shinned Hawk *Accipiter striatus*), COHA (Cooper's Hawk *Accipiter cooperii*), NOGO (Northern Goshawk *Accipiter gentilis*), AMKE (American Kestrel *Falco sparverius*), MERL (Merlin *Falco columbarius*), PEFA (Peregrine Falcon *Falco peregrinus*), RTHA (Red-tailed Hawk *Buteo jamaicensis*), RSHA (Red-shouldered Hawk *Buteo lineatus*), BWHA (Broad-winged Hawk *Buteo platypterus*), SWHA (Swainson's Hawk *Buteo swainsoni*), NOHA (Northern Harrier *Circus hudsonius*), BAEA (Bald Eagle *Haliaeetus leucocephalus*) and GOEA (Golden Eagle *Aquila chrysaetos*). # Raptors trapped includes foreign recaptures.

Year	Bander in Charge	SSHA	COHA	NOGO	AMKE	MERL	PEFA	RTHA	RSHA	SWHA	BWHA	NOHA	BAEA	GOEA	# Raptors Trapped	# Days Trapped	# Trapped Per Day	# Foreign Recaptures
1991	Earl Hodnett	110	31		5	9	4	9							168	25	6.7	
1992	Earl Hodnett	165	80		1	4	4	16	1			2			273	33	8.3	
1993	Earl Hodnett	248	90	3	15	32	12	25	4			5			434	25	17.4	
1994	Earl Hodnett	372	114		10	47	14	47	1		2	15			622	52	12.0	
1995	Earl Hodnett	350	241	2	19	134	15	75	1			31			868	49	17.7	12
1996	Earl Hodnett	436	165	2	47	134	43	89	1			16			933	50	18.7	
1997	Earl Hodnett	528	313	4	58	422	51	137	6		2	39		1	1561	77	20.3	
1998	Earl Hodnett	353	232		17	285	38	66	1	1	3	28			1024	83	12.3	
1999	Earl Hodnett	528	341	5	27	237	53	137	6		3	76			1413	92	15.4	
2000	Earl Hodnett	262	145	2	28	126	15	28			1	16			623	77	8.1	
2001	Earl Hodnett	317	89		13	50	1	8	2			7			487	81	6.0	
2002	Earl Hodnett	292	100		2	68	9	29	3		1	12			516	76	6.8	
2003	Earl Hodnett	227	155		14	105	11	92				35			639			
2004	Steve Cardano	115	139	1	6	121	19	59	1			5			466			
2005	Steve Cardano	251	157	2	54	156	22	34	1			17			694	76	9.1	6
2006*	Joe Medley	114	90		5	93	12	10				4	1		329			
2007	Joe Medley	318	163	3	11	145	26	49	2		1	7			725	85	8.5	5
2008		123	195	1	3	89	27	32	1			3	1		475	74	6.4	
2009	Robert Chapman	296	271		32	103	24	68	1			10			805	102	7.9	10
2010	Robert Chapman	340	416	5	24	159	30	42	3			18			1037	87	11.9	23
2011	Robert Chapman	661	341		60	173	21	52	1			19	1		1329	93	14.3	9
2012*	Jaclyn Catino	186	89	6	5	11	2	29	4			6			338	36	9.4	6
2013	Robert Chapman	208	192	1	21	98	26	50	1	1	1	15			614	83	7.4	

* Partial trapping season

Totals for fall raptor banding at Kiptopeke Virginia: 1991-2013.

Years	# Years	SSHA	COHA	NOGO	AMKE	MERL	PEFA	RTHA	RSHA	SWHA	BWHA	NOHA	BAEA	GOEA	# Raptors Trapped	# Days Trapped**	# Trapped Per Day**	# Foreign Recaptures
1991 - 2013	23	6800	4149	37	477	2801	479	1183	41	2	14	386	3	1	16373	1356	11.0	71

** # Days trapped and # trapped per day excludes years 2003, 2004 & 2006 due to lack of records of # days trapped for those 3 years.