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# Raptor-migration Watchsite Descriptions

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ABSTRACT.—This chapter contains descriptions of 22 raptor-migration watchsites on which trend analyses described in this work were based. The descriptions are grouped geographically. Fifteen of the sites are within protected areas. Eleven of the sites are on mountain ridges, two are on canyon rims, five are in coastal plains, two are in river valleys, one is along a lake, and one is on a small island. Volunteers conducted the counts at many sites, particularly in the East. My objective here is to provide information on site location, operations, and species monitored, and to provide summaries of counts for each watchsite for the past 10 years.

## INTRODUCTION

More than 380 raptor-migration watchsites have been used to monitor raptor populations worldwide (Zalles and Bildstein 2000). Europe and North America have the highest densities of watchsites, and the overwhelming majority of watchsites are in North America. Most are operated by volunteers and are found along *leading lines* or *diversion lines* that form traditional migration corridors for raptors (Bildstein 2006). Most watchsites count migrants during autumn rather than in spring, but some operate during both migration periods, and some operate only in spring (Zalles and Bildstein 2000). Here, I provide a general overview of the geographic distribution, seasonal coverage, site operations, and species monitored at each of 22 watchsites on which analyses in this book are based (Table 1). My goal is to give details about the watchsites so that readers of chapters 5–7 will understand the local and regional geography

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Table 1. Raptor-migration watchsites used in trend analyses presented in chapters 5–7.

Watchsite name	State or province	Watchsite type
<b>Eastern</b>		
Audubon's Hawk Watch at Waggoner's Gap	Pennsylvania	Mountaintop
Cape May Bird Observatory	New Jersey	Coastal-plain
Hawk Mountain Sanctuary	Pennsylvania	Mountaintop
Hawk Ridge Bird Observatory	Minnesota	Mountaintop
Holiday Beach Migration Observatory	Ontario	Lakeside
Lighthouse Point Hawk Watch	Connecticut	Coastal-plain
Montclair Hawk Lookout	New Jersey	Mountaintop
Observatoire d'oiseaux de Tadoussac	Québec	River-valley
<b>Western</b>		
Boise Ridge	Idaho	Mountaintop
Bonney Butte Raptor Migration Project	Oregon	Mountaintop
Bridger Mountains Raptor Migration Project	Montana	Mountaintop
Chelan Ridge Raptor Migration Project	Washington	Mountaintop
Goshute Mountains Raptor Migration Project	Nevada	Mountaintop
Grand Canyon Raptor Migration Project– Lipan Point	Arizona	Canyon-rim
Grand Canyon Raptor Migration Project– Yaki Point	Arizona	Canyon-rim
Manzano Mountains Raptor Migration Project	New Mexico	Mountaintop
Mount Lorette	Alberta	River-valley
Wellsville Mountains Raptor Migration Project	Utah	Mountaintop
<b>Gulf Coast</b>		
Corpus Christi Raptor Migration Project	Texas	Coastal-plain
Florida Keys Raptor Migration Project	Florida	Small island
Smith Point Raptor Migration Project	Texas	Coastal-plain
Veracruz River of Raptors	Veracruz	Coastal-plain

of each site, who collected the data, and what species and how many individuals of each are seen at each of the watchsites. Contact information for each site also is provided.

#### GEOGRAPHIC DISTRIBUTION

I have grouped the watchsites into three major regions: Eastern, including the Northeast and Great Lakes ( $n = 8$  sites), Western ( $n = 10$ ), and Gulf Coast ( $n = 4$ ). Eighteen watchsites are in the United States, three are in Canada, and one is in México. Most of the sites are along mountain ridges ( $n = 11$ ), two are on canyon rims, five are along coasts, two in river valleys, one on a small island, and one along a lake.

To be chosen for analysis, watchsites had to have been active for at least 7 years, and in each year each site had to have counted raptors

for at least 150 hours. Analyses included 10–30 years for eastern sites (1974–2004, Chapter 5), 8–22 years for western sites (1983/1998–2005, Chapter 6), and 7–10 years for Gulf Coast sites (1995/1999–2005, Chapter 7).

#### OPERATION OF WATCHSITES

Raptor-migration watchsites have been established in places with a array of owners, institutional affiliations, and financial arrangements for the collection and management of data. Many are owned or operated by non-governmental organizations (NGOs). Many NGOs are supported by membership programs, and a few have affiliations with academic institutions (Bildstein 1998). Fifteen of the 22 watchsites described below are within protected areas.

Sites are staffed by either professional or volunteer hawkwatchers, or by a combination of the two. Eastern sites rely more heavily on volunteers, although many hire principal counters and site coordinators to oversee the counts. Most watchsites use a standard data collection protocol (HMANA 2008). In some sites, this protocol has been modified and expanded to make it site-specific (Pronatura Veracruz 1999, Barber et al. 2001, Vekasy and Smith 2002). Counts at western and Gulf Coast watchsites usually are made by paid counters. The rotation of volunteer and professional observers is a common practice among watchsites.

Local, regional, and national governments sometimes provide access to and financial support for watchsites. Migrating hawks are more frequently counted in autumn than in spring. This is because of the greater volume of migration in autumn and the more spectacular concentrations of migrants that occur then. Spring routes followed by hawks often differ from those followed in autumn, so watchsites active in the autumn may not be suitable during spring. Only four of the 22 sites—Hawk Mountain Sanctuary, Hawk Ridge Bird Observatory, Montclair Hawk Lookout, and Mount Lorette—are active during both autumn and spring.

The average duration of the field season is 84 days (range: 45–153). Nineteen of the 22 watchsites currently submit daily or hourly counts to HawkCount.org (Chapter 10).

#### WATCHSITE DESCRIPTIONS

*Audubon's Hawk Watch at Waggoner's Gap.*—Waggoner's Gap is a mountaintop watchsite with a 270° view along the Kittatinny Ridge, the southeastern-most ridge in the east-northeast–west-southwest-oriented Central Appalachian Mountains of eastern Pennsylvania.

Mixed deciduous forest dominates the site, which is surrounded by lowland farms. Counts are made from an exposed boulder field. Trees on

Table 2. Raptors observed at Audubon's Hawk Watch at Waggoner's Gap, 1995–2004 (16 species, mean = 18,392 individuals). The site, which is operated by Audubon Pennsylvania, is 40 km west of Harrisburg, Pennsylvania (40°16'37"N, 77°16'33"W; elevation 460 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture			
<i>Coragyps atratus</i>	84	50 (1995)	122 (2003)
Turkey Vulture			
<i>Cathartes aura</i>	961	274 (1995)	1,492 (2003)
Osprey			
<i>Pandion haliaetus</i>	423	302 (1995)	522 (2003)
Bald Eagle			
<i>Haliaeetus leucocephalus</i>	126	57 (1995, 1996)	190 (2002)
Northern Harrier			
<i>Circus cyaneus</i>	278	121 (1996)	457 (2003)
Sharp-shinned Hawk			
<i>Accipiter striatus</i>	5,353	4,335 (2002)	6,536 (1998)
Cooper's Hawk			
<i>A. cooperii</i>	727	460 (1997)	933 (1998)
Northern Goshawk			
<i>A. gentilis</i>	101	48 (1998)	218 (1999)
Red-shouldered Hawk			
<i>Buteo lineatus</i>	338	260 (2004)	441 (1996)
Broad-winged Hawk			
<i>B. platypterus</i>	4,891	2,015 (1996)	9,559 (2002)
Red-tailed Hawk			
<i>B. jamaicensis</i>	4,469	3,672 (2000)	5,731 (1999)
Rough-legged Hawk			
<i>B. lagopus</i>	11	3 (2002)	30 (1995)
Golden Eagle			
<i>Aquila chrysaetos</i>	196	146 (1995)	234 (2003)
American Kestrel			
<i>Falco sparverius</i>	320	192 (1995)	474 (1999)
Merlin			
<i>F. columbarius</i>	65	40 (1996)	98 (2002)
Peregrine Falcon			
<i>F. peregrinus</i>	49	30 (1996)	62 (2003)

the ridge limit visibility of low-flying birds, and prevent detection of low-flying birds coming down the ridge until they are close to the observation point. Counts are made by one official volunteer observer. Migration is most pronounced on northwest and, secondarily, south winds (Table 2).

The site contact is Dave Grove, Compiler, Audubon Pennsylvania, 1865 Alexander Spring Road, Carlisle, Pennsylvania 17013; URL: <http://user.pa.net/~waggap/>; E-mail: [waggap@pa.net](mailto:waggap@pa.net); Phone: (717) 258-5253.

*Boise Ridge.*—Boise Ridge (a.k.a. Lucky Peak) is a mountaintop watchsite on the southwestern-most peak of northwest–southeast-oriented Boise Ridge, overlooking the Boise River Valley, and Snake River Plain to the southwest. The site is accessible on foot and via four-wheel-drive vehicles.

Mixed conifer forest on northern and eastern slopes, and sagebrush steppe on the southern and western slopes dominate the site. Riparian areas are dominated by willow and birch (*Salix* and *Betula* spp.) scrub. Banding and counts are conducted by two field biologists. Migration is more pronounced during high-pressure conditions and light northwest winds (Table 3).

The site contact is Gregory S. Kaltenecker, Project Director, Idaho Bird Observatory, Department of Biology, Boise State University, 1910 University Drive, Boise, Idaho 83725; URL: [www.boisestate.edu/biology/ibo](http://www.boisestate.edu/biology/ibo); E-mail: [gregorykaltenecker@boisestate.edu](mailto:gregorykaltenecker@boisestate.edu); Phone: (208) 426-4354.

*Bonney Butte Raptor Migration Project.*—Bonney Butte is a mountaintop watchsite at the southern end of Surveyor's Ridge. The site, which has a 360° view, is southeast of Mount Hood, east of the White River, and west of Boulder Creek.

Table 3. Raptors observed at Boise Ridge, 1996–2005 (17 species, mean = 5,946 individuals). The Boise Ridge watchsite is on Lucky Peak, Boise River Wildlife Management Area, 12 km east of Boise, Idaho (43°37'N, 116°03'W; elevation 1,845 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	1,077	320 (1996)	1,811 (2003)
Osprey	62	33 (1999)	91 (1998)
Bald Eagle	6	1 (1998)	13 (2002)
Northern Harrier	241	132 (2004)	442 (2005)
Sharp-shinned Hawk	1,238	961 (2004)	1,902 (1992)
Cooper's Hawk	845	612 (2001)	1,519 (2005)
Northern Goshawk	43	15 (2001)	79 (2000)
Broad-winged Hawk	19	7 (1996)	33 (1998)
Swainson's Hawk			
<i>Buteo swainsoni</i>	69	18 (2000)	141 (1998)
Red-tailed Hawk	1,061	541 (1996)	1,495 (2005)
Ferruginous Hawk			
<i>B. regalis</i>	6	0 (2000)	9 (2002)
Rough-legged Hawk	5	2 (1998, 2005)	11 (1997)
Golden Eagle	51	29 (1996)	65 (2005)
American Kestrel	1,180	781 (2004)	1,402 (1998)
Merlin	33	19 (2001)	70 (2005)
Peregrine Falcon	7	2 (2001)	21 (2004)
Prairie Falcon			
<i>Falco mexicanus</i>	9	2 (1996)	14 (2004)

Coniferous forest and forest openings dominate the site. Shrub-steppe lies to the east. Surveyor's Ridge originates near Hood River, Oregon, and extends southward 50 km, ending southeast of Mount Hood, which overlooks the site. Counts are made from the highest point on the butte. Banding occurs 500 m north of the count site. Counts are made by two full-time, trained volunteers, assisted by others. Migration is slightly more pronounced on northeast winds (Table 4).

The site contact is Jeff P. Smith, Conservation Science Director, HawkWatch International, 2240 S. 900 East, Salt Lake City, Utah 84106; URL: [www.hawkwatch.org](http://www.hawkwatch.org); E-mail: [jsmith@hawkwatch.org](mailto:jsmith@hawkwatch.org); Phone: (801) 484-6808 ext. 109.

*Bridger Mountains Raptor Migration Project.*—Bridger Mountains is a mountaintop watchsite with a near 360° view in the Bridger Mountains along the eastern front range of the Rocky Mountains atop the Bridger Bowl Ski Area.

Coniferous forest dominates the site. The Bridger Mountains are a relatively small primarily north-south range that runs from 2,950-m Sacagawea Peak south 40 km to the Gallatin Valley 5 km northeast of Bozeman, Montana. Access involves at a 2-km walk up 780 m in elevation. Counts are made from a helicopter-landing pad at the Bridger Bowl Ski

Table 4. Raptors observed at Bonney Butte Raptor Migration Project, 1996–2005 (17 species, mean = 2,860 individuals). Bonney Butte is in Mount Hood National Forest, 10 km east-southeast of Government Camp, and 80 km east-southeast of Portland, Oregon (45°15'46"N, 121°35'31"W; elevation 1,754 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	318	133 (1997)	553 (2000)
Osprey	71	50 (2002)	106 (2000)
Bald Eagle	49	33 (1997)	66 (2003)
Northern Harrier	31	7 (2001)	56 (1998)
Sharp-shinned Hawk	1,170	600 (2002)	1,789 (2004)
Cooper's Hawk	349	233 (2002)	485 (2004)
Northern Goshawk	27	8 (2002)	39 (1996)
Broad-winged Hawk	9	0 (3 years)	75 (1999)
Swainson's Hawk	<1	0 (5 years)	2 (1997, 1998)
Red-tailed Hawk	624	410 (1998)	931 (1999)
Ferruginous Hawk	<1	0 (5 years)	1 (5 years)
Rough-legged Hawk	13	3 (2005)	29 (2000)
Golden Eagle	96	56 (2002)	176 (1999)
American Kestrel	21	9 (2005)	35 (1997)
Merlin	71	33 (2001)	105 (2004)
Peregrine Falcon	7	0 (1996)	14 (2004, 2005)
Prairie Falcon	4	0 (1996)	10 (1998)

Table 5. Raptors observed at Bridger Mountains Raptor Migration Project, 1996–2005 (17 species, mean = 2,442 individuals). The Bridger Mountains site is in Gallatin National Forest, 20 km north of Bozeman, and 190 km west of Billings, Montana (45°50'N, 110°57'W; elevation 2,610 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	1	0 (6 years)	6 (1997)
Osprey	7	1 (2004)	14 (1996)
Bald Eagle	83	55 (2002)	128 (2000)
Northern Harrier	56	12 (2002)	230 (1998)
Sharp-shinned Hawk	356	190 (2000)	612 (1998)
Cooper's Hawk	179	102 (2002)	343 (1997)
Northern Goshawk	33	2 (2002)	61 (1999)
Broad-winged Hawk	10	3 (2002)	38 (2001)
Swainson's Hawk	1	0 (4 years)	6 (1997)
Red-tailed Hawk	118	45 (2000)	276 (1998)
Ferruginous Hawk	3	0 (2002)	7 (1998)
Rough-legged Hawk	35	11 (2002)	75 (1999)
Golden Eagle	1,451	1,057 (2005)	1,859 (1996)
American Kestrel	78	16 (2002)	145 (1997)
Merlin	9	2 (2002)	24 (1997)
Peregrine Falcon	9	1 (2000, 2002)	18 (1999)
Prairie Falcon	13	6 (2002)	20 (2005)

Area. Two full-time, trained volunteers, assisted by other local volunteers, conduct the count. Migration is most pronounced on southwest and westerly winds (Table 5).

The site contact is Jeff P. Smith (see Bonney Butte above).

*Cape May Bird Observatory.*—Cape May is a coastal-plain watchsite at the southern tip of New Jersey and the eastern lip of Delaware Bay.

Dune scrub, salt marsh, tidal creeks, and coastal scrub dominate the site. Southbound migrants following the Atlantic seaboard concentrate at the tip of the peninsula before making the 18-km water-crossing to Delaware. Some migrants double back along the bay shore to make a shorter water-crossing farther north. Counts are made from a platform by one paid counter assisted by volunteers. Highest counts are during north-westerly winds (Table 6). Cape May is renowned as a concentration point for migrating passerines.

The site contact is David Mizrahi, Vice President for Research, New Jersey Audubon Society, 600 Route 47 North, Cape May Court House, New Jersey 08210; URL: [www.njaudubon.org/Sites/HwCMBO.html](http://www.njaudubon.org/Sites/HwCMBO.html); E-mail: [david.mizrahi@njaudubon.org](mailto:david.mizrahi@njaudubon.org); Phone: (609) 861-0700.

*Chelan Ridge Raptor Migration Project.*—Chelan Ridge is a mountaintop watchsite in the eastern Cascade Mountains of Washington, with a 360° view.

Table 6. Raptors observed at Cape May Bird Observatory, 1995–2004 (18 species, mean = 49,728 individuals). The site is at Cape May Point, New Jersey (38°55'57"N, 74°57'28"W; elevation 1 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture	186	104 (2001)	369 (1997)
Turkey Vulture	2,680	776 (2000)	6,420 (1996)
Osprey	3,176	1,643 (2001)	6,734 (1996)
Mississippi Kite			
<i>Ictinia mississippiensis</i>	<1	0 (9 years)	2 (1998)
Bald Eagle	187	131 (2000)	284 (1996)
Northern Harrier	1,721	743 (2000)	2,458 (2003)
Sharp-shinned Hawk	23,388	12,927 (2001)	48,992 (1997)
Cooper's Hawk	3,861	1,874 (2001)	5,046 (2004)
Northern Goshawk	39	8 (2003)	89 (1997)
Red-shouldered Hawk	480	232 (2000)	723 (2003)
Broad-winged Hawk	1,468	452 (2002)	2,844 (1996)
Swainson's Hawk	2	1 (4 years)	10 (1998)
Red-tailed Hawk	2,507	921 (2002)	5,135 (1996)
Rough-legged Hawk	3	0 (3 years)	13 (1999)
Golden Eagle	16	9 (1998)	38 (1996)
American Kestrel	7,074	2,672 (2004)	11,768 (1999)
Merlin	1,857	1,085 (2000)	2,694 (1999)
Peregrine Falcon	1,083	588 (2001)	1,793 (1997)

Snags and post-fire regenerating vegetation, mainly Scouler willow (*Salix scouleri*), big sagebrush (*Artemisia tridentata*), and lodgepole pine (*Pinus contorta*), lie southeast of the site. Elsewhere, conifer forest featuring lodgepole and Ponderosa pine (*P. ponderosa*) dominates. A banding station operates at the site. Counts are made by two full-time, trained volunteers, assisted by other crew members and local volunteers. Migration, which is northwest to southeast at the site, is most pronounced during moderate southwesterly winds (Table 7).

The site contact is Jeff P. Smith (see Bonney Butte above).

*Corpus Christi Raptor Migration Project.*—Corpus Christi is a coastal-plain watchsite with a 105° view from the northeast to the west on the southern bank of the Nueces River in Texas. The site is about 8 km from the Gulf of Mexico along an extensive, forested river corridor and situated atop the highest point in the region.

A transitional riparian forest, the Nueces River bottomlands, dominates the immediate surroundings. Open farmland dominates to the north and south, open ranchland to the west. Corpus Christi Bay lies to the East. Counts are made by three full-time, trained volunteers assisted by additional local volunteers. Migration is northeast to southwest at the site and is most pronounced during northwest winds, which concentrate migrants along the coast (Table 8).



Table 7. Raptors observed at Chelan Ridge Raptor Migration Project, 1998–2005 (18 species, mean = 1,814 individuals). The site is in the Okanogan and Wenatchee National Forests, 21 km north-northwest of Chelan, Washington (48°01'13"N, 120°05'39"W; elevation 1,729 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	31	14 (2001)	58 (2005)
Osprey	42	24 (1998)	71 (2000)
White-tailed Kite			
<i>Elanus leucurus</i>	<1	0 (7 years)	1 (2003)
Bald Eagle	5	1 (2003)	15 (2000)
Northern Harrier	113	59 (2004)	167 (1999)
Sharp-shinned Hawk	796	420 (2003)	1,050 (2000)
Cooper's Hawk	212	136 (2003)	247 (1998)
Northern Goshawk	28	13 (2005)	50 (1999)
Broad-winged Hawk	5	2 (2004)	9 (2002)
Swainson's Hawk	7	2 (2000)	17 (1999)
Red-tailed Hawk	302	182 (1998)	450 (1999)
Ferruginous Hawk	<1	0 (7 years)	1 (2000)
Rough-legged Hawk	28	13 (2001)	53 (2000)
Golden Eagle	127	55 (1998)	174 (2000)
American Kestrel	66	33 (2003)	107 (1998)
Merlin	38	21 (2003)	55 (1998)
Peregrine Falcon	6	1 (2000)	14 (2003)
Prairie Falcon	8	4 (2005)	19 (2003)

The site contact is Jeff P. Smith (see Bonney Butte above).

*Florida Keys Raptor Migration Project.*—Florida Keys is a small-island watchsite on Little Crawl Key, south of peninsular Florida.

Native grasses and mixed small and native tree species, primarily red mangrove (*Rhizophora mangle*) and buttonwood (*Conocarpus erectus*), dominate the site. The site is famous for its falcon migrations. Counts are made by two full-time observers and volunteers. Migration is most pronounced on light winds of any direction and on northerly winds of >28 km h<sup>-1</sup> (Table 9).

The site contact is Casey A. Lott, Project Director, HawkWatch International, 111 Hillwood Drive, Huntington Station, New York 11746; URL: [www.hawkwatch.org](http://www.hawkwatch.org); E-mail: [clott@abcbirds.org](mailto:clott@abcbirds.org); Phone: (631) 470-5776.

*Goshute Mountains Raptor Migration Project.*—Goshute Mountains is a mountaintop watchsite at the southern end of the north-to-south Goshute Mountains, a 100-km-long ridge west of the Great Salt Lake Desert in northeastern Nevada.

Coniferous forest, dominated by limber pine (*P. flexilis*) and white fir (*Abies concolor*) in upper elevations and by singleleaf pinyon (*P. monophylla*)

Table 8. Raptors observed at Corpus Christi Raptor Migration Project, 1997–2005 (27 species, mean = 714,873 individuals). The site is in Hazel Bazemore County Park, outside of Corpus Christi and 240 km southeast of San Antonio, Texas (27°52'03"N, 97°38'30"W; elevation 28 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture	539	138 (1998)	1,398 (1999)
Turkey Vulture	21,123	4,870 (2001)	42,536 (2002)
Osprey	160	81 (1997)	241 (2005)
Hook-billed Kite			
<i>Chondrohierax uncinatus</i>	<1	0 (9 years)	1 (2003)
Swallow-tailed Kite			
<i>Elanoides forficatus</i>	35	0 (2000)	57 (2002)
White-tailed Kite	4	1 (2003)	9 (2005)
Mississippi Kite	6,599	2,974 (1997)	10,155 (2001)
Bald Eagle	2	1 (2002)	4 (2005)
Northern Harrier	154	92 (1997)	331 (1999)
Sharp-shinned Hawk	1,106	698 (2001)	1,869 (2002)
Cooper's Hawk	647	260 (1998)	1,092 (1999)
Northern Goshawk	<1	0 (8 years)	1 (2002)
Harris's Hawk			
<i>Parabuteo unicinctus</i>	14	5 (1998)	28 (1999)
Red-shouldered Hawk	55	24 (2004)	92 (2002)
Broad-winged Hawk	677,518	263,101 (2005)	989,957 (2004)
Swainson's Hawk	6,036	300 (1997)	14,751 (2004)
White-tailed Hawk			
<i>Buteo albicaudatus</i>	9	4 (1997)	25 (2005)
Zone-tailed Hawk			
<i>B. albonotatus</i>	3	1 (2001)	10 (2005)
Red-tailed Hawk	167	96 (2001)	282 (1999)
Ferruginous Hawk	3	1 (2001)	14 (1999)
Rough-legged Hawk	1	1 (1997)	4 (1999)
Golden Eagle	1	1 (2004)	4 (1999)
Crested Caracara			
<i>Caracara cheriway</i>	11	1 (1998)	21 (2001)
American Kestrel	492	189 (1997)	860 (2003)
Merlin	32	18 (2002)	57 (2003)
Peregrine Falcon	153	65 (2000)	241 (1999)
Prairie Falcon	9	2 (2004)	33 (1999)

Table 9. Raptors observed at the Florida Keys Raptor Migration Project, 1999–2005 (18 species, mean = 16,174 individuals). The site is in Curry Hammock State Park, northeast of Marathon on Little Crawl Key, Florida (24°44'50"N, 80°59'00"W; elevation 2 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture	<1	0 (3 years)	2 (2000)
Turkey Vulture	7,366	2,800 (1999)	11,932 (2000) <sup>a</sup>
Osprey	1,165	925 (2004)	1,657 (2002)
Swallow-tailed Kite	10	1 (2005)	21 (2003)
Mississippi Kite	19	6 (2005)	57 (2001)
Bald Eagle	15	11 (1999, 2005)	21 (2002)
Northern Harrier	534	332 (2005)	786 (1999)
Sharp-shinned Hawk	2,972	1,001 (2005)	4,741 (1999)
Cooper's Hawk	536	289 (2002)	1,036 (2004)
Red-shouldered Hawk	14	1 (2002)	35 (2000)
Broad-winged Hawk	3,737	2,803 (2005)	5,237 (2003)
Short-tailed Hawk			
<i>Buteo brachyurus</i>	25	6 (2005)	38 (2004)
Swainson's Hawk	81	31 (1999)	146 (2000)
Zone-tailed Hawk	<1	0 (6 years)	1 (2005)
Red-tailed Hawk	2	0 (2000, 2005)	5 (2001)
American Kestrel	2,606	1,437 (2005)	4,338 (2001)
Merlin	525	317 (2004)	834 (1999)
Peregrine Falcon	1,828	1,344 (2005)	2,858 (2003)

<sup>a</sup>Turkey Vulture counts were discontinued after 2000.

and Utah juniper (*Juniperus osteosperma*) in lower elevations, dominates the site. The site hosts one of the largest known concentrations of migratory raptors in the western United States. Counts are made by two full-time, trained, volunteer observers, assisted by short-term volunteers. Migration is most pronounced on light to moderate southwesterly winds and moderate to strong westerly winds (Table 10).

The site contact is Jeff P. Smith (see Bonney Butte above).

*Grand Canyon Raptor Migration Project—Lipan Point.*—Lipan Point is a canyon-rim watchsite on the south side of the Grand Canyon, due south of the Kaibab Plateau, with a 360° view overlooking the Grand Canyon to the north, east, and west.

Big sagebrush, cliffrose (*Cowania mexicana*), Utah juniper, two-needle pinyon (*P. edulis*), and, away from the canyon rim, Ponderosa pine dominate the site. Southbound migrants flow across the Kaibab Plateau in a broad front, most likely avoiding the Painted Desert to the east, and cross the canyon at Lipan and Yaki points (see below) where the canyon is relatively narrow. Lipan Point and Yaki Point together constitute a 20-km east–west transect. Counts are made by two trained volunteers organized in rotating teams with those at Yaki Point, and assisted by site educators,

Table 10. Raptors observed at the Goshute Mountains Raptor Migration Project, 1996–2005 (18 species, mean = 17,031 individuals). The site is in the Goshute Wilderness Study Area, 42 km southwest of Wendover and 190 km west of Salt Lake City, Utah (40°25'27"N, 114°16'16"W; elevation 2,745 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	432	243 (2002)	732 (1998)
Osprey	125	83 (2005)	187 (1997)
Bald Eagle	11	6 (3 years)	31 (1999)
Northern Harrier	205	96 (2004)	356 (1999)
Sharp-shinned Hawk	5,429	2,973 (2005)	9,598 (1998)
Cooper's Hawk	3,712	2,260 (2005)	6,736 (1998)
Northern Goshawk	86	11 (2002)	241 (1996)
Red-shouldered Hawk	<1	0 (8 years)	2 (1996)
Broad-winged Hawk	72	27 (1996)	160 (1998)
Swainson's Hawk	372	91 (2002)	904 (2003)
Red-tailed Hawk	3,692	2,922 (1997)	5,137 (1999)
Ferruginous Hawk	16	8 (2004)	25 (1999)
Rough-legged Hawk	15	1 (2003)	50 (1999)
Golden Eagle	265	130 (2005)	344 (1996)
American Kestrel	2,501	1,468 (2005)	3,393 (1997)
Merlin	53	22 (2004)	91 (1998)
Peregrine Falcon	18	9 (2003)	29 (2001)
Prairie Falcon	27	9 (2005)	50 (1998)

additional local volunteers, and park staff. Migration is most pronounced on light westerly winds (Table 11).

The site contact is Jeff P. Smith (see Bonney Butte above).

*Grand Canyon Raptor Migration Project—Yaki Point.*—Yaki Point is a canyon-rim watchsite on the south side of the Grand Canyon, due south of the Kaibab Plateau. The site has nearly a 360° view overlooking the Grand Canyon to the north, east, and west.

Yaki Point and Lipan Point (see above) make up a 20-km east–west transect. Counts are made by two trained volunteers organized in rotating teams with those at Yaki Point, and assisted by others. Migration is most pronounced with light westerly winds (Table 12).

The site contact is Jeff P. Smith (see Bonney Butte above).

*Hawk Mountain Sanctuary.*—Hawk Mountain is a mountaintop watchsite on the Kittatinny Ridge, a 300-km long, northeast-to-southwest ridge in the Central Appalachian Mountains of eastern Pennsylvania. The 1,100-ha sanctuary includes more than a dozen ridgetop outcrops overlooking the Kempton Valley to the southeast, and the Ridge-and-Valley physiographic province to the north. The latter is a belt of Appalachian mountains characterized by long, even-topped ridges interspersed by long, continuous valleys.

Second-growth mixed deciduous forest, including oak–maple (*Quercus* and *Acer* spp.) associations and eastern hemlock (*Tsuga canadensis*)

Table 11. Raptors observed at the Grand Canyon Raptor Migration Project–Lipan Point, 1996–2005 (17 species, mean = 5,096 individuals). The site is in Grand Canyon National Park, 110 km north of Flagstaff and 310 km north of Phoenix, Arizona (36°02'N, 111°51'W; elevation 2,125 m).

Species	Mean count	Minimum (year)	Maximum (year)
Osprey	80	52 (2002)	125 (1997)
Bald Eagle	16	9 (2001)	25 (1997)
Northern Harrier	73	39 (2001)	130 (1999)
Sharp-shinned Hawk	1,342	880 (2005)	1,650 (1996)
Cooper's Hawk	996	316 (2004)	1,696 (1998)
Northern Goshawk	4	0 (2003, 2004)	12 (2000)
Broad-winged Hawk	12	0 (2004)	35 (1998)
Swainson's Hawk	50	21 (2000)	103 (2003)
Zone-tailed Hawk	1	1 (1997)	2 (2003)
Red-tailed Hawk	1,426	594 (2005)	2,236 (1996)
Ferruginous Hawk	4	1 (2004, 2005)	7 (1997, 1999)
Rough-legged Hawk	<1	0 (9 years)	1 (2002)
Golden Eagle	19	3 (2001)	47 (1996)
American Kestrel	1,049	615 (2005)	1,565 (1996)
Merlin	11	4 (2002)	24 (1997)
Peregrine Falcon	8	6 (2000, 2001)	14 (2002)
Prairie Falcon	5	1 (2002)	9 (2000)

Table 12. Raptors observed at the Grand Canyon Raptor Migration Project–Yaki Point, 1997–2005 (17 species, mean = 4,605 individuals). Yaki Point is in Grand Canyon National Park, 110 km north of Flagstaff, 310 km north of Phoenix, Arizona (36°03'31"N, 112°05'02"W; elevation 2,025 m).

Species	Mean count	Minimum (year)	Maximum (year)
Osprey	40	27 (1999)	51 (2002)
Bald Eagle	18	9 (2004)	45 (2002)
Northern Harrier	39	27 (2004)	53 (1999)
Sharp-shinned Hawk	1,627	981 (2005)	2,247 (2003)
Cooper's Hawk	1,054	510 (2005)	1,649 (2003)
Northern Goshawk	5	1 (2005)	10 (2001)
Broad-winged Hawk	11	2 (2005)	19 (2004)
Swainson's Hawk	40	8 (2000)	145 (2003)
Zone-tailed Hawk	<1	0 (6 years)	1 (3 years)
Red-tailed Hawk	991	754 (2005)	1,248 (2003)
Ferruginous Hawk	6	1 (2004)	11 (1999)
Golden Eagle	10	2 (1999)	24 (1997)
American Kestrel	742	384 (1998)	920 (1997)
Merlin	10	5 (2000)	20 (2001)
Peregrine Falcon	7	1 (2000)	18 (1998)
Prairie Falcon	5	2 (2005)	9 (1997)

on the ridgetops and mountain slopes; rolling, partly wooded farmland, and Christmas-tree plantations in the valleys, dominate the surrounding landscape. "The Sanctuary" straddles the Kittatinny Ridge and abuts the Appalachian Trail to the east. Facilities include a visitor center and a biological field station. The principal observation point, the North Lookout, is a rocky outcrop 1.5 km from the visitor-center parking lot, with a 240° view to the southeast and northwest. Counts are made by professional biologists or educators during the week and trained volunteers on weekends. Migration is most pronounced on northwest winds, especially during the first three days following the passage of a cold front (Table 13).

The site contact is Laurie J. Goodrich, Senior Monitoring Biologist, Hawk Mountain Sanctuary, Acopian Center for Conservation Learning, 410 Summer Valley Road, Orwigsburg, Pennsylvania 17961; URL: [www.hawkmountain.org](http://www.hawkmountain.org); E-mail: [goodrich@hawkmtn.org](mailto:goodrich@hawkmtn.org); Phone: (570) 943-3411, ext. 106.

*Hawk Ridge Bird Observatory*.—Hawk Ridge is a mountaintop watch-site near the eastern tip of Lake Superior in suburban Duluth, Minnesota. The site is at the southern end of the northeast–southwest-oriented Sawtooth Mountains.

White birch (*Betula papyrifera*) and aspen (*Populus* spp.) forests dominate the ridges surrounding the site. Counts are made from the ridgetop at

Table 13. Raptors observed at Hawk Mountain Sanctuary, 1995–2004 (autumn only; 17 species, mean = 18,230 individuals). The site is 40 km west-northwest of Allentown, Pennsylvania, and 40 km north of Reading, Pennsylvania (40°38'29"N, 75°59'29"W; elevation 465 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture	46	9 (2000)	80 (1999)
Turkey Vulture	242	169 (2000)	367 (1999)
Osprey	610	468 (1995)	705 (2002)
Bald Eagle	155	96 (1996)	211 (2003)
Northern Harrier	223	127 (1996)	314 (1999)
Sharp-shinned Hawk	4,427	2,967 (2004)	6,217 (1995)
Cooper's Hawk	740	534 (2004)	1,118 (1998)
Northern Goshawk	72	31 (2004)	170 (1999)
Red-shouldered Hawk	286	195 (2000)	399 (1995)
Broad-winged Hawk	7,056	1,774 (1996)	11,854 (2002)
Swainson's Hawk	<1	0 (9 years)	1 (2004)
Red-tailed Hawk	3,528	2,360 (1997)	4,953 (1999)
Rough-legged Hawk	6	2 (2000)	14 (1999)
Golden Eagle	109	85 (2001)	159 (2003)
American Kestrel	545	352 (1996)	784 (1998)
Merlin	137	97 (2003)	176 (2001)
Peregrine Falcon	47	28 (1995)	62 (2002)

Main Overlook on the Skyline Parkway, 3.3 km from Lake Superior, and from a banding station 0.5 km down ridge from the Main Overlook. The Main Overlook is accessible by car; the research station requires a short walk. Counts are made by two full-time counters assisted by volunteers. Migration is most pronounced on west and northwest winds (Table 14).

The site contact is Janelle Wesley, Executive Director, Hawk Ridge Bird Observatory, P.O. Box 3006, Duluth, Minnesota 55803-3006; URL: [www.hawkridge.org](http://www.hawkridge.org); E-mail: [mail@hawkridge.org](mailto:mail@hawkridge.org); Phone: (218) 428-6209.

*Holiday Beach Migration Observatory.*—Holiday Beach is a lakeside watchsite on the Niagara Peninsula, along the north shore of Lake Erie in southwestern Ontario, in the Holiday Beach Conservation Area.

The site is surrounded by farmland. Freshwater marsh, open deciduous woodland (*Acer* and *Populus* spp.), agricultural fields, and pine and cedar stands to the north dominate the landscape. The Niagara Peninsula funnels migrants in the region. Southbound migrants soaring on thermals over flat farmland are diverted to the east by the shoreline of Lake Erie. Counts are made by two volunteers. Migration is most pronounced on north and northwest winds (Table 15).

Table 14. Raptors observed at Hawk Ridge Bird Observatory, 1995–2004 (autumn only; 19 species, mean = 89,661 individuals). The site is in the Hawk Ridge Nature Reserve, Duluth, 200 km north-northeast of Minneapolis, Minnesota (46°45'N, 92°02'W; elevation 350 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture	56	0 (8 years)	562 (2001)
Turkey Vulture	1,417	768 (2001)	1,952 (1996)
Osprey	419	293 (2003)	568 (1997)
Mississippi Kite	<1	0 (8 years)	3 (2004)
Bald Eagle	2,900	1,812 (1995)	3,754 (2002)
Northern Harrier	526	214 (2000)	1,100 (1999)
Sharp-shinned Hawk	17,167	11,790 (2001)	21,352 (1997)
Cooper's Hawk	169	103 (1995)	259 (1999)
Northern Goshawk	904	206 (1998)	3,408 (1995)
Red-shouldered Hawk	3	0 (2004)	6 (2002)
Broad-winged Hawk	54,220	8,558 (1998)	160,703 (2003)
Swainson's Hawk	7	0 (2004)	17 (1999)
Red-tailed Hawk	8,815	4,842 (2000)	12,663 (2003)
Rough-legged Hawk	518	287 (2001)	812 (1999)
Golden Eagle	122	69 (1995)	172 (2002)
American Kestrel	2,141	1,248 (2003)	3,637 (2002)
Merlin	213	101 (2003)	362 (1997)
Cyrfalcon			
<i>Falco rusticolus</i>	<1	0 (8 years)	1 (1996, 2001)
Peregrine Falcon	64	34 (2003)	100 (1997)

Table 15. Raptors observed at Holiday Beach Migration Observatory, 1995–2004 (autumn only; 16 species, mean = 79,405 individuals). The site is in the Holiday Beach Conservation Area, 40 km south of Windsor, Ontario (42°01'59"N, 83°02'43"W; elevation 90 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	20,000	14,752 (2004)	32,186 (2001)
Osprey	109	68 (2000)	173 (1995)
Bald Eagle	58	27 (1996)	83 (2003)
Northern Harrier	821	272 (2004)	1,276 (1999)
Sharp-shinned Hawk	11,447	5,506 (2004)	15,344 (1995)
Cooper's Hawk	468	355 (1997, 1998)	755 (1995)
Northern Goshawk	36	16 (2000)	59 (1995)
Red-shouldered Hawk	633	403 (2004)	1,042 (1997)
Broad-winged Hawk	37,386	4,887 (2002)	107,877 (1996)
Swainson's Hawk	<1	0 (5 years)	2 (2003)
Red-tailed Hawk	5,745	2,771 (2004)	10,987 (1995)
Rough-legged Hawk	75	26 (2003)	170 (1995)
Golden Eagle	69	28 (1998)	134 (1999)
American Kestrel	2,432	1,369 (2004)	4,884 (1995)
Merlin	77	47 (1996)	120 (1995)
Peregrine Falcon	49	15 (2004)	82 (1995)

The site contact is Bob Hall-Brooks, Chair, Holiday Beach Migration Observatory, 1215 Huntwick Place, La Salle, Ontario N9H 2B4, Canada; URL: [www.hbmo.org](http://www.hbmo.org); E-mail: [bhall-brooks@cogeco.ca](mailto:bhall-brooks@cogeco.ca); Phone: (519) 972-5736.

*Lighthouse Point Hawk Watch.*—Lighthouse Point is a coastal-plain watchsite in Lighthouse Point Park, New Haven, on Long Island Sound, and has a 360° view.

Open lawns, parking lots, picnic areas, swimming-beach facilities, fragments of upland oak forest, and an area of old dredging spoils in various stages of secondary succession dominate the site. Large numbers of diurnal-migrating passerines also are seen at the site. Counts are made by a group of volunteers, with each volunteer counting on the same day of the week in subsequent years. Counters are assisted by additional experienced observers. Migration is most pronounced on north and northwest winds (Table 16).

The site contact is Ronald G. Bell, Lighthouse Point Count Coordinator, New Haven Bird Club, 89 Peck Hill Road, Woodbridge, Connecticut 06525; URL: [www.battaly.com/nehw](http://www.battaly.com/nehw); E-mail: [ronald.g.bell@snet.net](mailto:ronald.g.bell@snet.net); Phone: (203) 387-3815.

*Manzano Mountains Raptor Migration Project.*—Manzano Mountains is a mountaintop watchsite atop the central north-south-oriented Manzano Mountains, a southern extension of the Sangre de Cristo Mountains in the front range of the Rocky Mountains. The observation point is on a



Table 16. Raptors observed at Lighthouse Point Hawk Watch, 1995–2004 (17 species, mean = 13,358 individuals). The site is in Lighthouse Point Park, a city park in southeastern suburban New Haven, Connecticut (41°14'59"N, 72°54'05"W; elevation 15 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture	1	0 (8 years)	9 (2002)
Turkey Vulture	299	178 (2001)	586 (2004)
Osprey	1,282	853 (2001)	1,796 (1997)
Bald Eagle	46	23 (2001)	84 (2004)
Northern Harrier	495	259 (1996)	795 (1998)
Sharp-shinned Hawk	6,496	4,605 (2000)	8,213 (1997)
Cooper's Hawk	776	537 (1996)	1,146 (2003)
Northern Goshawk	15	3 (2001)	34 (2003)
Red-shouldered Hawk	79	25 (1998)	157 (2004)
Broad-winged Hawk	1,095	307 (2001)	3,690 (2004)
Swainson's Hawk	1	0 (7 years)	6 (2003)
Red-tailed Hawk	569	207 (1997)	968 (1999)
Rough-legged Hawk	2	0 (1997)	6 (1998)
Golden Eagle	3	0 (1995)	10 (2002)
American Kestrel	1,836	1,426 (2004)	2,602 (1998)
Merlin	305	205 (1996)	402 (1999)
Peregrine Falcon	58	33 (2000)	84 (2001)

northwest–southeast-oriented outcrop along a limestone ridge, with good views except to the southeast.

Gambell oak (*Quercus gambelli*), Rocky Mountain Douglas-fir (*Pseudotsuga menziesii*), white fir, Ponderosa pine, pinyon pine, New Mexico locust (*Robinia neomexicana*), and bigtooth maple (*Acer grandidentatum*) dominate the site. Banding occurs at the site. Counts are made by two full-time, trained volunteers, assisted by other crew members and volunteers. Migration is most pronounced with light to moderate southwest winds. Relatively uncommon light east and northeast winds also produce flights (Table 17).

The site contact is Jeff P. Smith (see Bonney Butte above).

*Montclair Hawk Lookout.*—Montclair is a mountaintop watchsite with a 240° view to the northeast, on First Watchung Mountain, the first ridge west of the Hudson River near New York City.

The site, which is a New Jersey Audubon Sanctuary, is an exposed cliff top next to Mills Reservation (a forested county park) and Cedar Grove Reservoir. In some years, exceptional numbers of Broad-winged Hawks (*Buteo platypterus*) are seen at the site.

Mixed secondary forest and suburbia dominate the surrounding landscape. Access is by a 102-step, 200-m-long staircase. Counts are made from a stone-filled platform. The view from the platform to the south and

Table 17. Raptors observed at Manzano Mountains Raptor Migration Project, 1996–2005 (18 species, mean = 5,535 individuals). This site is in Manzano Mountains Wilderness Area in Cibola National Forest, 55 km south-southeast of Albuquerque and 125 km southwest of Santa Fe, New Mexico (34°42'01"N, 106°24'00"W; elevation 2,805 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	471	164 (2001)	1,116 (1998)
Osprey	36	14 (1999)	86 (2003)
Bald Eagle	2	0 (1996)	8 (2003)
Northern Harrier	56	27 (2004)	133 (1998)
Sharp-shinned Hawk	1,705	1,032 (2001)	2,585 (1998)
Cooper's Hawk	1,256	913 (2001)	2,025 (1998)
Northern Goshawk	16	9 (1996, 1997)	42 (2000)
Broad-winged Hawk	8	3 (2000)	16 (2003)
Swainson's Hawk	368	19 (2000)	867 (1996)
Zone-tailed Hawk	<1	0 (4 years)	3 (2000)
Red-tailed Hawk	783	591 (2000)	1,151 (1998)
Ferruginous Hawk	9	3 (2000)	14 (2002)
Rough-legged Hawk	<1	0 (7 years)	1 (3 years)
Golden Eagle	125	71 (2005)	159 (1999)
American Kestrel	562	362 (2004)	905 (1996)
Merlin	32	14 (1999)	56 (1998)
Peregrine Falcon	79	49 (2000)	127 (2002)
Prairie Falcon	27	16 (2005)	58 (1998)

east includes the Verrazano Narrows Bridge and the New York City skyline, including the Statue of Liberty, all the way northeast to the Palisades along the Hudson River. Counts are made by one paid counter assisted by volunteers. Migration is most pronounced on northwest winds (Table 18).

The site contact is Else M. Greenstone, Hawkwatch Coordinator, New Jersey Audubon Society, 10 Moss Lane, Cranford, New Jersey 07016; URL: [www.njaudubon.org/sites/hwmont.html](http://www.njaudubon.org/sites/hwmont.html); E-mail: [wglaw2@cs.com](mailto:wglaw2@cs.com); Phone: (908) 276-4605.

*Mount Lorette.*—Mount Lorette is a river-valley watchsite with a 360° view of the Front Range of the Rocky Mountains along a major Golden Eagle migration corridor in both spring and autumn.

Mountain meadows surrounded by coniferous forests (*Pinus* and *Picea* spp.) and aspen (*Populus* spp.), interspersed with grass-shrub openings, dominate the site. Counts are made by two volunteers. Migration is most pronounced on southwest and westerly winds (Table 19).

The site contact is Peter F. Sherrington, Research Director, Rocky Mountain Eagle Research Foundation, P.O. Box 63154, 2604 Kensington Road N.W., Calgary, Alberta T2N 4S5, Canada; URL: [www.eaglewatch.ca](http://www.eaglewatch.ca); E-mail: [psherrin@telusplanet.net](mailto:psherrin@telusplanet.net); Phone: (403) 932-5183.

Table 18. Raptors observed at Montclair Hawk Lookout, 1994–2005 (autumn only; 17 species, mean = 14,254 individuals). The site is a New Jersey Audubon Sanctuary 10 km north of Newark, New Jersey (40°50'47"N, 74°12'46"W; elevation 155 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture	28	0 (1995)	120 (2001)
Turkey Vulture	970	495 (1995)	1,458 (2001)
Osprey	498	301 (1996)	737 (1999)
Bald Eagle	74	39 (2002)	123 (1999)
Northern Harrier	124	45 (1996)	201 (2003)
Sharp-shinned Hawk	2,540	1,907 (1996)	3,937 (1999)
Cooper's Hawk	253	108 (1996)	474 (2004)
Northern Goshawk	5	2 (1998)	12 (1999)
Red-shouldered Hawk	216	106 (2002)	385 (1999)
Broad-winged Hawk	8,069	2,225 (2003)	15,814 (2000)
Swainson's Hawk	1	0 (8 years)	16 (2000)
Red-tailed Hawk	770	440 (2000)	1,568 (1999)
Rough-legged Hawk	1	0 (4 years)	4 (1999)
Golden Eagle	2	1 (3 years)	4 (1999)
American Kestrel	601	422 (2003)	964 (1999)
Merlin	71	38 (1995)	131 (1999)
Peregrine Falcon	31	11 (1995)	48 (1999)

Table 19. Raptors observed at Mount Lorette, 1996–2005 (autumn only; 18 species, mean = 4,761 individuals). The site is in a Provincial Park 40 km east of Banff and 75 km west-southwest of Calgary, Alberta (50°56'08"N, 115°07'54"W; elevation 1,440 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	<1	0 (8 years)	1 (1998)
Osprey	10	5 (1998)	18 (2004)
Bald Eagle	374	276 (2003)	628 (2000)
Northern Harrier	23	15 (2001)	35 (1999)
Sharp-shinned Hawk	212	152 (1998)	291 (2001)
Cooper's Hawk	43	37 (2001)	50 (2004)
Northern Goshawk	63	9 (1996)	146 (2000)
Broad-winged Hawk	12	5 (2001)	27 (1999)
Swainson's Hawk	1	0 (1996)	4 (1999)
Red-tailed Hawk	77	41 (2004)	131 (1998)
Ferruginous Hawk	<1	0 (7 years)	2 (1998)
Rough-legged Hawk	67	34 (2003)	89 (1998)
Golden Eagle	3,842	3,395 (1998)	4,753 (2000)
American Kestrel	11	5 (2000)	18 (1996)
Merlin	14	8 (1998)	22 (2001)
Gyrfalcon	3	0 (1996)	9 (2004)
Peregrine Falcon	7	5 (2005)	14 (2004)
Prairie Falcon	2	1 (3 years)	4 (3 years)

*Observatoire d'oiseaux de Tadoussac.*—Tadoussac is a river-valley watch-site overlooking the Saint Lawrence River estuary in southeastern Québec.

A sand terrace covered with birch, tamarack (*Larix laricina*), and mixed coniferous–deciduous forest, surrounded by forested hills, dominates the site. Counts are made by two full-time counters from Explos-Nature, a non-profit organization devoted to education and research. Migration is more pronounced on northwest winds (Table 20). In addition to raptors, the site also counts boreal songbirds, woodpeckers, and waterbirds.

Site contact is Émilie Berthiaume, Coordinator, Observatoire d'oiseaux de Tadoussac, Corporation Explos-Nature, 302 rue de la Rivière, Les Bergeronnes, Québec G0T 1G0, Canada; URL: [www.explos-nature.qc.ca/ooot](http://www.explos-nature.qc.ca/ooot); E-mail: [oot@explos-nature.qc.ca](mailto:oot@explos-nature.qc.ca); Phone: (418) 232-6249.

*Smith Point Raptor Migration Project.*—Smith Point is a coastal-plain watchsite on the Gulf of Mexico, at the southern tip of a peninsula in Galveston Bay.

Coastal marshes interspersed with weedy, fallow fields and earthen mounds covered by oak (*Quercus* spp.) dominate the site. Counts are made from a 7-m tower at the southwestern tip of the peninsula. Much of the flight follows the mainland toward Smith Point. On days with favorable north winds, many migrants proceed directly from Smith Point across the bay to Eagle Point 12 km to the west, or head southwest across the bay toward the tip of Bolivar Peninsula. During unfavorable winds, many

Table 20. Raptors observed at Observatoire d'oiseaux de Tadoussac, 1995–2004 (15 species, mean = 16,286 individuals). The site is in Parc du Saguenay National Park, 4 km northeast of Tadoussac, on the north shore of the St. Lawrence River estuary, ~220 km northeast of Québec City, Québec (48°09'00"N, 69°40'00"W; elevation 50 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	8	0 (3 years)	22 (2003)
Osprey	668	272 (1996)	1,227 (1998)
Bald Eagle	109	47 (1996)	178 (2003)
Northern Harrier	302	62 (1996)	432 (1995)
Sharp-shinned Hawk	5,310	2,626 (1996)	7,914 (1999)
Northern Goshawk	260	154 (1998)	381 (2000)
Broad-winged Hawk	1,437	474 (1996)	2,443 (2002)
Swainson's Hawk	<1	0 (9 years)	1 (2004)
Red-tailed Hawk	5,780	2,271 (1996)	10,232 (1999)
Rough-legged Hawk	481	179 (1997)	958 (1999)
Golden Eagle	56	26 (2004)	105 (1999)
American Kestrel	1,598	461 (1996)	2,361 (2000)
Merlin	203	89 (1996)	334 (1999)
Gyrfalcon	<1	0 (5 years)	2 (1995)
Peregrine Falcon	74	44 (1997)	129 (2003)

migrants turn back to the east or northeast along the peninsula, with some returning later to try the crossing under more favorable conditions. Counts are made by two full-time, trained volunteers, assisted by other volunteers (Table 21).

The site contact is Jeff P. Smith (see Bonney Butte above).

*Veracruz River of Raptors.*—A two-site (Cardel and Chichicaxtle) coastal-plain transect, 7 to 17 km from the Gulf of Mexico in southern Veracruz, México.

Cattle pasture and sugar cane, together with isolated patches of tropical deciduous forest, second-growth vegetation, and mid-elevation oak forest (*Q. oleoides*) dominate the site. Counts at Chichicaxtle, the more inland count site, are made from a 6-m tower at the edge of town. Counts at Cardel are made from the top of a six-story hotel in the center of town. The transect monitors movements of the largest concentration of migrating raptors in the world. Teams of three observers count at each site.

Table 21. Raptors observed at Smith Point Raptor Migration Project, 1997–2005 (24 species, mean = 51,217 individuals). The site is in the Candy Abshier State Wildlife Management Area, near the town of Smith Point, 25 km north of Galveston and 65 km southeast of Houston, Texas (29°31'34"N, 94°45'57"W; elevation 1 m).

Species	Mean count	Minimum (year)	Maximum (year)
Black Vulture	177	4 (2000)	379 (2001)
Turkey Vulture	1,529	581 (1998)	3,091 (2004)
Osprey	65	48 (2002)	87 (2004)
Hook-billed Kite	<1	0 (8 years)	1 (2003)
Swallow-tailed Kite	82	34 (1998)	150 (2002)
White-tailed Kite	17	7 (2002)	26 (2001)
Mississippi Kite	4,324	2,124 (1997)	7,952 (2005)
Bald Eagle	3	1 (2004)	7 (2000)
Northern Harrier	331	144 (2002)	537 (1999)
Sharp-shinned Hawk	2,917	1,484 (2000)	4,780 (1997)
Cooper's Hawk	1,126	738 (2003)	1,281 (2001)
Harris's Hawk	1	2 (2001)	3 (2005)
Red-shouldered Hawk	47	23 (2002)	88 (2004)
Broad-winged Hawk	38,646	16,137 (1998)	103,612 (2001)
Swainson's Hawk	299	56 (1998)	1,036 (2004)
White-tailed Hawk	11	1 (1998)	24 (2005)
Red-tailed Hawk	141	35 (1998)	331 (1997)
Ferruginous Hawk	1	1 (2004)	2 (2003)
Rough-legged Hawk	1	2 (1999)	3 (2001)
Golden Eagle	1	1 (1999)	3 (1997)
Crested Caracara	10	3 (1998)	26 (2004)
American Kestrel	1,341	816 (2003)	1,949 (2002)
Merlin	58	26 (1998)	88 (1997)
Peregrine Falcon	89	65 (1997)	129 (2004)

Migration is most pronounced on north and northeast winds, as affected by periodic fronts (Table 22).

The site contact is Ernesto Ruelas Inzunza, VRR Data Curator and Project Associate, Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850; URL: [www.pronaturaveracruz.org](http://www.pronaturaveracruz.org); E-mail: [er99@cornell.edu](mailto:er99@cornell.edu); Phone: (607) 254-2464.

*Wellsville Mountains Raptor Migration Project.*—The Wellsville is a mountaintop watchsite with a 360° view, at the north end of the Wellsville Mountains, southeast of the Snake River plains and 31 km north-northeast of the Great Salt Lake in northern Utah. Subalpine fir (*Abies lasiocarpa*),

Table 22. Raptors observed at Veracruz River of Raptors, 1996 and 1998–2005 (27 species, mean = 4,986,761 individuals). This is a two-site transect (Cardel and Chichicaxtle; 19°22'00"N, 96°22'00"W; elevation 29 m; and 19°21'N, 96°28'W; elevation 120 m, respectively) 30 km north of Veracruz City, México.

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	2,001,537	1,474,797 (1999)	2,677,355 (2002)
Osprey	3,219	2,232 (2004)	5,072 (1998)
Hook-billed Kite	178	84 (1996)	300 (2000)
Swallow-tailed Kite	176	95 (1996)	286 (2001)
White-tailed Kite	<1	0 (6 years)	2 (3 years)
Mississippi Kite	171,852	32,568 (1996)	306,274 (2002)
Plumbeous Kite			
<i>Ictinia plumbea</i>	2	0 (5 years)	11 (2001)
Bald Eagle	<1	0 (8 years)	1 (1999)
Northern Harrier	443	106 (2004)	850 (2000)
Sharp-shinned Hawk	4,284	2,199 (2005)	10,462 (1998)
Cooper's Hawk	2,581	1,667 (1996)	4,019 (2001)
Northern Goshawk	<1	0 (8 years)	1 (2002)
Gray Hawk			
<i>Buteo nitidus</i>	322	0 (4 years)	1,271 (2005)
Common Black Hawk	2	0 (6 years)	10 (2001)
Harris's Hawk	7	0 (1999)	12 (2003)
Red-shouldered Hawk	11	1 (2002)	27 (1996)
Broad-winged Hawk	1,941,335	1,534,556 (2000)	2,389,232 (2002)
Swainson's Hawk	851,977	388,916 (1998)	1,201,484 (2005)
White-tailed Hawk	<1	0 (8 years)	2 (2003)
Zone-tailed Hawk	140	52 (1996)	238 (2005)
Red-tailed Hawk	199	115 (2005)	352 (1996)
Ferruginous Hawk	<1	0 (6 years)	2 (2002)
Golden Eagle	1	0 (6 years)	3 (2002, 2003)
Crested Caracara	1	1 (9 years)	2 (2003)
American Kestrel	7,541	3,092 (1996)	21,642 (1998)
Merlin	175	94 (1996)	383 (1998)
Peregrine Falcon	777	461 (2005)	1,469 (1998)

Table 23. Raptors observed in the Wellsville Mountains Raptor Migration Project, 1995–2001, 2003–2004 (17 species, mean = 3,634 individuals). This site is in Wellsville Wilderness Area of Wasatch-Cache National Forest, immediately west of Mendon, 16 km west of Logan, and 100 km north of Salt Lake City, Utah (41°41'18"N, 112°02'54"W; elevation 2,617 m).

Species	Mean count	Minimum (year)	Maximum (year)
Turkey Vulture	30	17 (1998)	47 (1997)
Osprey	29	14 (2003)	40 (1995)
Bald Eagle	2	0 (1998, 2001)	10 (2004)
Northern Harrier	314	171 (1997)	487 (1999)
Sharp-shinned Hawk	893	650 (1997)	1,216 (1995)
Cooper's Hawk	537	241 (2004)	873 (1995)
Northern Goshawk	20	14 (1998)	33 (2003)
Broad-winged Hawk	4	1 (4 years)	13 (1995)
Swainson's Hawk	189	29 (2000)	466 (1995)
Red-tailed Hawk	690	357 (2001)	1,087 (1999)
Ferruginous Hawk	10	2 (2000)	18 (1995)
Rough-legged Hawk	2	0 (1995–2003)	6 (1997)
Golden Eagle	156	104 (2004)	245 (1999)
American Kestrel	713	515 (2003)	1,324 (1995)
Merlin	12	6 (2004)	20 (2000)
Peregrine Falcon	14	8 (1996)	24 (1999)
Prairie Falcon	19	12 (1998)	28 (1999)

quaking aspen (*Populus tremuloides*), Douglas-fir, bigtooth maple, Rocky Mountain maple (*Acer glabrum*), and Sitka mountain-ash (*Sorbus sitchensis*) dominate the slopes; grasses and big sagebrush dominate the ridgetop; and agriculture dominates the surrounding valleys. The site is in the Wellsville Wilderness Area of Wasatch-Cache National Forest. Counts are made by two full-time, trained volunteers. Migration is most pronounced on light south-west or moderate to strong west–northwest winds (Table 23).

The site contact is Jeff P. Smith (see Bonney Butte above).

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