

# Hawk Mountain Sanctuary Association, Pennsylvania

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*A Hawk Mountain intern holds a Red-tailed Hawk, just banded and ready for release. Photograph/Hawk Mountain Sanctuary Association.*

**H**AWK MOUNTAIN SANCTUARY was established in 1934, to stop the slaughter of migrating hawks as they passed a rocky promontory on the Kittatinny Ridge in Pennsylvania. Some things at Hawk Mountain have changed a great deal since the Sanctuary was created; others, not at all.

In Autumn 1934, after conservation pioneer Rosalie Edge (*e.g.*, Fox 1981) leased the original property of 1393 acres and hired Maurice and Irma Broun to keep gunners off the new sanctuary, about 500 people followed the winding path to the top to watch—not shoot—hawks. Today annual visitation runs about 48,000 people. Since 1955, more than 1.1 million people have climbed the lookout trail. The Brouns were the first staff members at Hawk Mountain, but even they were not there full-time until 1948.

The annual budget that year was under \$14,000. Today there are 10 full-time staff members, a volunteer corps of about 175 people, and an operating budget of about \$500,000.

What has not really changed over the last 55 years is the experience of sitting on the North Lookout with one's friends—a thousand feet above the Little Schuylkill River and a patchwork of farms and forests—watching the passing parade of birds of prey. The effects of shooting, pesticides, and habitat losses notwithstanding, raptors are still passing in numbers, and birdwatching at Hawk Mountain can still be an extraordinary experience. Consider this journal entry from Maurice Broun, dated October 19, 1942:

Crystal clear, cool weather, with brisk northwest winds; 32°-68°. The best hawk flight of the season (preceded by four days of northeast rain and winds) also brought a heavy flight of crows—more than 2,150 passed the Lookout during the day. The sharp-shin flight at its peak, and red-tails staging their first conspicuous movement. Today's count of 907 hawks of ten species included 627 sharp-shins (495 until noon), 44 Cooper's, 210 red-tails, 10 red-shoulders, 4 golden eagles, 2 bald eagles, 3 marsh, 1 osprey, 1 pigeon, 2 sparrow and 3 unidentified hawks.

This passage could just as well have been written last year.

## Mission

The Hawk Mountain of today is both a place to watch and enjoy raptors and nature and an organization

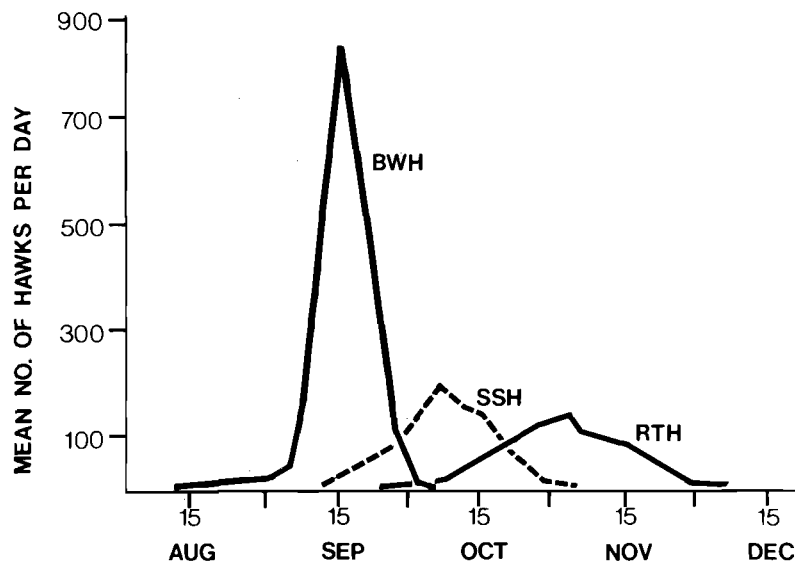


Figure 1. Timing and abundance of migrant Broad-winged Hawks (BWH), Sharp-shinned Hawks (SSH), and Red-tailed Hawks (RTH) observed at Hawk Mountain Sanctuary, Pennsylvania, based on 5-day running averages from 50 years of daily counts.

dedicated to their conservation. Formally stated, the mission of the Hawk Mountain Sanctuary Association "is to foster the conservation of birds of prey and other wildlife and to create better understanding of the environment." This mission is pursued by maintaining the Sanctuary as a high-quality natural area open to the public, and by supporting a program in education, research, and conservation policy.

As the world's first refuge to protect birds of prey and an organization at the forefront of battles to outlaw the shooting of raptors, the Sanctuary quickly achieved an international reputation in wildlife conservation. In a special report on the public benefits of private conservation, the President's Council on Environmental Quality (1984:392) concluded that the history of Hawk Mountain Sanctuary offered "a striking example of the role of private initiative in achieving major accomplishments in wildlife conservation."

### The mountain and the migration

For birdwatchers, Hawk Mountain is first and foremost a place to watch raptors. Because it is the easternmost ridge of the northern Appalachian Mountains, raptors follow it taking advantage of deflected air currents and thermal updrafts as they travel from the northeast to the southwest each autumn. Passage of a low pressure system to the north, an advancing

cold front from the Great Lakes, or two to three consecutive days of northerly winds produce the best hawkwatching. Balmy, windless days in September and October often mean that migrants are very high or cease following the ridge entirely, instead moving south along a broad front.

When conditions are optimal, however, migrant raptors may be seen overhead and at or below eye-level from the North Lookout. The 10-year average for the total number of migrant raptors at Hawk Mountain's North Lookout is 22,708 (Goodrich 1989). Including Black (*Coragyps atratus*) and Turkey (*Cathartes aura*) vultures, 16 species of migrant raptors are routinely recorded at the Sanctuary (Table 1). Broad-winged Hawks (*Buteo platypterus*) and Sharp-shinned Hawks (*Accipiter striatus*) are most numerous; the Rough-legged Hawk (*Buteo lagopus*) and Peregrine Falcon (*Falco peregrinus*) are usually least numerous. Occasional Swainson's Hawks (*Buteo swainsonii*) and Gyrfalcons (*Falco rusticolus*) are seen as well.

The fall raptor migration begins in early-to-mid-August with American Kestrels (*Falco sparverius*) and Bald Eagles (*Haliaeetus leucocephalus*), the latter apparently being southern-breeding birds returning from their nonbreeding season in the north. Broad-winged (Fig. 1), especially, and Ospreys (*Pandion haliaetus*) are abundant in September. By the last week in September, however, Sharp-

shinned begin to outnumber Broad-winged, and during the first half of October one can see the greatest variety of raptors, and the best foliage, at Hawk Mountain. On October 1, 1988, Sanctuary curator Jim Brett saw all 16 species of regularly-seen migrants from the North Lookout in a single day—the first time that phenomenon was ever officially recorded.

Later in October Red-tailed Hawks (*Buteo jamaicensis*) replace accipiters as the most abundant migrants, and Golden Eagles (*Aquila chrysaetos*) begin to appear. November to early December is the time for the northernmost migrants—Red-taileds, Golden Eagles, Rough-leggeds, and Northern Goshawks (*Accipiter gentilis*). Migrant Bald Eagles at this season apparently represent northern breeders en route to southern wintering areas.

In the spring, raptor migration over the Sanctuary proceeds on a much broader front than it does in the fall, and, although many migrants can be seen at Hawk Mountain, large concentrations are rare. Total numbers of spring migrants are in the hundreds or low thousands (Goodrich 1985), and we currently do not keep a formal count.

Birding opportunities at Hawk Mountain are not limited to migrating raptors. The 2200-acre Sanctuary and surrounding state-owned lands encompass habitats typical of the northern Appalachians and have a predict-

Table 1. Ten-year mean of migration counts, by species, at Hawk Mountain Sanctuary, Kempton, PA, 1979-1988.

<i>Cathartidae</i> <sup>1</sup>	
Black Vulture	27
Turkey Vulture	46
<i>Accipitridae</i>	
Osprey	529
Bald Eagle	38
Northern Harrier	325
Sharp-shinned Hawk	7144
Cooper's Hawk	414
Northern Goshawk	88
Red-shouldered Hawk	290
Broad-winged Hawk	8943
Red-tailed Hawk	4109
Rough-legged Hawk	15
Golden Eagle	55
<i>Falconidae</i>	
American Kestrel	502
Merlin	40
Peregrine Falcon	15

<sup>1</sup> mean based only on years 1985-1988 when consistent counting of vultures began.

able mixture of year-round residents (e.g., Pileated Woodpecker [*Dryocopus pileatus*]; Barred Owl [*Strix varia*]), summer breeders (e.g., Wood Thrush [*Hylocichla mustelina*]; Ovenbird [*Seiurus aurocapillus*]), and spring and fall migrants, of which there can be good numbers and variety. Many hawkwatchers, frustrated by fog and rain, through which few raptors migrate, have enjoyed spectacular birding among the warblers and other songbirds feeding and resting in the trees fringing the North Lookout. The ridgetop lookouts also afford fine opportunities for viewing migrating waterfowl, loons, swallows, and species such as Ruby-throated Hummingbird (*Archilochus colubris*, Wilimont *et al.* 1988), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Blue Jay (*Cyanocitta cristata*), Common Raven (*Corvus corax*), American Robin (*Turdus migratorius*), and Scarlet Tanager (*Piranga olivacea*).

Birders spending several days in the vicinity of Hawk Mountain often

check additional sites and habitats. Several impoundments and wetland areas (e.g., Leaser Lake, Green Lane Reservoir, Ontelaunee Reservoir) provide good habitat for migrating waterfowl and shorebirds and wintering raptors, and species such as the Golden-winged Warbler (*Vermivora chrysoptera*), Worm-eating Warbler (*Helmitheros vermivorus*), and Vesper Sparrow (*Poocetes gramineus*) are among local breeders of interest.

#### Access and facilities

Located 11 kilometers west of Kempton, Pennsylvania (8 kilometers north of Interstate 78 on Route 143) on the Berks-Schuylkill counties line, the Sanctuary is open to the public, dawn to dusk, year-round. An admission fee is charged to visitors who are not members of the Association. Published by the Association, *The Mountain and The Migration* (Brett 1986) is an excellent source of information in advance of a visit.

A Visitor Center with exhibits about

birds of prey and Sanctuary history is open from 8:00 a.m. to 5:00 p.m. daily, except Thanksgiving, Christmas, and New Year's days. Other public facilities include: an amphitheater, Common Room Education Center, a small campground and three Adirondack trail shelters, and a newly-developed habitat demonstration area adjacent to the Visitor Center. The habitat area, developed in part with support from Carl Zeiss Optical, Inc., includes small ponds, plantings of native azaleas, other shrubs and wildflowers, bird feeders, and a photography blind. The Sanctuary also maintains a residence where it houses participants in its Internship Program, two staff residences, including Schaumbach's, which is on the National Register of Historic Sites, and a maintenance shed and raptor-care facility.

There are about 13 kilometers of hiking trails on the Sanctuary, and they provide access to Hawk Mountain's major habitats, including the River of Rocks, a large, exposed boulder



Visitors search the skies from the North Lookout for early fall migrants. Photograph/William R. Fink, Jr.



*James C. Bednarz, Director of Higher Education and Research, takes wing measurements from a Red-tailed Hawk trapped on the Kittatinny Ridge. Photograph/Scott Weidensaul.*

der field, and the pristine Kettle Creek. There are opportunities for extended hikes and birdwatching on the Appalachian Trail and thousands of acres of Pennsylvania state forest and game lands abutting the Sanctuary.

### Program

**Education:** In its broadest sense, education is the most important aspect of the Association's program. We seek to provide a memorable experience to all visitors, and we stress the education of teachers and young people training for careers in the natural sciences. The education program is directed by

Hawk Mountain's curator, James J. Brett, and carried out by an education specialist, Trica Oshant.

In addition to interpretive displays in the Visitors Center and elsewhere, visitors can learn about birds of prey and natural history through interpretive talks given in the amphitheater (typically featuring live birds of prey) and along the trails and lookouts. Visitors and members may participate in various scheduled activities, including workshops and courses, which are announced in an annual Calendar of Events. Each fall there is a series of eight Saturday Night Lectures, presented by regional, national, and international guest speakers. The 1989

fall lecture series will be the thirtieth at Hawk Mountain.

Thousands of school children and adults visit the Sanctuary to attend presentations or participate in exercises designed to meet their educational needs. Dozens of teachers and advanced students enroll in natural history-related courses that offer in-service training or college credits, the latter through an affiliation with Cedar Crest College, Allentown, Pennsylvania. A 10-day short course on "The Ecology and Conservation of Birds of Prey" has been especially popular with upper-level college and graduate students. This course will next be offered in January 1990.

Annually about a dozen college students or recent graduates participate in an Internship Program and receive hands-on training in the areas of education, research, and sanctuary management. Since 1976, more than 75 young people, representing 20 of the United States and six foreign countries, have come to the Sanctuary as interns. The interns' energy and special talents are important supplements to the capabilities of our small staff, and, as "alumni," they carry Hawk Mountain's message around the world.

**Research:** Research began at Hawk Mountain before the Sanctuary was established. George M. Sutton, then with the Pennsylvania Game Commission, published two papers in the *Wilson Bulletin* (Sutton 1928, 1931) based on data from raptor carcasses he gathered at Hawk Mountain. These papers attracted the attention of Richard H. Pough, who then visited and photographed the site and initiated the chain of events leading to preservation (Broun 1948).

By 1935, Broun had published the first paper on the raptor migration at Hawk Mountain (Broun 1935). Later he published a 5-year summary of the raptor migration and a pioneering study on the flight speeds of raptors (Broun 1939, Broun and Goodwin 1942). All of these appeared in *The Auk*. Since Broun's early days, and until recently, research at Hawk Mountain was carried out sporadically (e.g., Nagy 1963).

Historically the primary research activity has been the systematic counting of raptors during the fall season. Begun by Broun in 1934, these counts have been continued annually, except



The view from the North Lookout. Migrating raptors come from northeast, along the Kittatinny Ridge, toward this lookout. Photograph/Hawk Mountain Sanctuary Association.

for a 3-year hiatus during World War II. The count techniques have remained virtually unchanged over the years, and a small number of exceptionally qualified observers have recorded most of the data. For a time, count data from more than one lookout were combined in the annual summaries published by Hawk Mountain (*e.g.*, in the 1960s), but, fortunately, we have been able to separate the ancillary data from those recorded at the North Lookout. The result is a clean, remarkably consistent data set spanning 55 years of raptor migration.

There have been several attempts to use migration count data from Hawk Mountain to evaluate trends in raptor populations (*e.g.*, Spofford 1969, Nagy 1977). Most attempts were descriptive and did not attempt to standardize the data for effort. Although a more thorough and technical analysis of the counts, 1934–1986, is now in press (Bednarz *et al.*, ms), we are only beginning to tap the enormous potential of this unique data set.

Since the late 1970s, the Association has made a concerted effort to carry out, sponsor, and otherwise encourage

more research at Hawk Mountain and about raptors. In cooperation with Carl Zeiss Optical, Inc., Hawk Mountain offers an annual award of \$1000–\$2000 for student research on raptors; the award is now in its 13th year. Two study plots have been established at the Sanctuary and, since 1982, have been used for annual Breeding Bird Censuses (*e.g.*, Goodrich 1989). Winter Bird-Population Studies were carried out from 1982 through 1987 and will be carried out at 5-year intervals hereafter.

In 1987, James C. Bednarz joined the staff as our Ph.D.-level Director of Higher Education and Research, and his skills and efforts have supplemented those of staff biologist Laurie J. Goodrich. Current projects include a radiotelemetry study of the pattern and process of raptor migration, an assessment of the effects of forest fragmentation on nesting Ovenbirds, and an on-going study of raptors at a potential nuclear waste storage site in New Mexico. The ecology of migrant raptors on neotropical wintering grounds is an emerging interest in both research and conservation (Sennert and Fuller, *in press*).

To encourage greater uses of the Sanctuary for graduate or faculty research, we now have an efficiency apartment for investigators conducting projects based at Hawk Mountain. The Association has also initiated an annual award of \$1000 for natural science research of any type based at the Sanctuary. Contact the director of higher education and research about use of the apartment or the research awards offered through the Association.

*Conservation Policy:* In 1950 Rosalie Edge wrote that since the membership of the Association was national, “so must its interests be national.” Thus, the Association has always been involved in conservation issues far beyond the Sanctuary boundaries.

From the very start, Rosalie Edge and Maurice Broun were advocates for legislation to end the shooting of raptors across Pennsylvania and in other states, and in 1971 Chandler S. Robbins and James L. Ruos (1971) used Hawk Mountain count data to help make a case for bringing all raptors under the protection of the federal Migratory Bird Treaty Act. In the 1960s and 1970s, Hawk Mountain helped sound the alarm about the indiscriminate shooting of Golden Eagles in the western United States and about the dangers of pesticides for raptor populations. In *Silent Spring*, Rachel Carson (1962) cited Hawk Mountain data on migrant Bald Eagles to help make her case against DDT.

More recently the Association has been an active participant in policy and management decisions in regard to the California Condor (*Gymnogyps californianus*) and, through its Internship Program, supported an interpretive naturalist at a condor lookout in California’s Los Padres National Forest in 1983. Today Hawk Mountain is monitoring the plans and activities of the Idaho National Guard in the Snake River Birds of Prey Area and is working to maintain the integrity of that unique refuge. Through the International Council for Bird Preservation-United States Section, Inc., of which the author serves as Chairman, Hawk Mountain has been a strong advocate for funding for and improvements to the United States Fish and Wildlife Service’s migratory nongame bird program.

At the international level, Hawk Mountain was a co-sponsor of the



World Conference on Birds of Prey III in Eilat, Israel. Through participation in the World Working Group on Birds of Prey, tours for its members, and the Internship Program, the staff has cultivated strong ties to raptor biologists and educators around the world (e.g., the raptor information centers in Israel and South Africa). An emerging interest is to identify sites, worldwide, where large concentrations of raptors may be observed (Senner and Brett, *in press*), and to explore the potential of these sites to serve as bases for raptor and bird education and research programs along the lines of Hawk Mountain Sanctuary. In all of these international activities, our approach is to use the Hawk Mountain experience to encourage conservation awareness and action abroad and, at the same time, educate ourselves and our members about the international dimensions of conservation problems.

#### Organization and support

The Association is a private, independent, nonprofit, educational organization incorporated in 1938. It is supported by nearly 8000 members; annual dues range from \$15 to \$300. About 60 percent of Hawk Mountain members live in Pennsylvania, and 90 percent live in the northeastern United States. In addition to free admission to the Sanctuary, members receive the semi-annual *Hawk Mountain News* and various other benefits.

We do not rely on government funds to support day-to-day operation of the Sanctuary and our program. In fact, the combination of dues, contributions, and admission fees for non-members accounts for nearly 70 percent of our annual operating budget. Additional support comes from bookstore sales, special events, grants, bequests, and investment income from a small endowment. About 75 percent of our operating budget directly supports maintenance of the Sanctuary and our program in education, conservation, and research.

The Association is governed by a board of directors, currently with 18 members coming from seven states and the District of Columbia. Joseph W. Taylor serves as president and has done so since 1967. Among the board members are individuals with backgrounds or active careers in business, journalism, ornithology, banking,

law, and publishing. Our full-time staff of 10 includes seven people with advanced degrees in biology or resource conservation; five of the staff members have direct program responsibilities in education, research, or conservation. The author is the executive director and has held that position since 1982.

#### Conclusion

The original purpose for which the Sanctuary was established (to stop the shooting of migrating hawks at Hawk Mountain) was effectively achieved when the property was leased and posted. The Sanctuary and its founders, however, quickly embraced a larger agenda that included education of the public and action on conservation issues as they affected birds of prey. This is still our program today, albeit with increased recognition of the many contributions that research can make to education and conservation. Although Hawk Mountain's program and support is focused at the Sanctuary, the organization's reach extends far beyond the Sanctuary, consistent with the spirit and visions of its founders.

#### ACKNOWLEDGMENTS

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