

NOTES ON THE NATURAL HISTORY OF THE NORTHERN GOSHAWK

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During most of the twentieth century, only a few sporadic studies of Northern Goshawk natural history were accomplished. Most of these were qualitative piecemeal accounts and descriptions of prey items, nests, and behavioral notes. However, the mid 1970's to late 1980's witnessed a virtual renaissance during which numerous investigations were completed by field workers and scientists alike. Most of these studies were conducted in the western United States. The driving force behind them was widespread concern over loss of nesting habitat as old-growth forests shrank dramatically before armies of loggers and bulldozers. Along the New York-New Jersey border region, urbanization rather than clearcutting, has been the major problem. Habitat loss continues at a frightening pace, spurred by a land and economic boom. Yet a meager population of Northern Goshawk continues to persist there, and in some areas, may be expanding into new territory. Goshawks have nested here for almost three decades but research has been hampered by their very low nesting density, the large amounts of land in private ownership, and the lack of sufficient project interest and support by government agencies. Studies of nest site habitat and selection (Speiser and Bosakowski 1987), nest tree parameters and selection (Speiser and Bosakowski 1989), and nesting phenology and behavior (Speiser and Bosakowski 1991) have been reported. Much more remains to be elucidated. A worthwhile project would be to document quality of nest site habitats and prey levels with productivity, especially in regards to yearly climate extremes. We also need more data on Northern Goshawk interactions with other raptors, especially Cooper's Hawk, which may be displaced from some areas by its larger congener. In this paper, I report on productivity and provide miscellaneous observations of note.

Behavior

The late Walter Lehnes pointed out to me the presence of "gentle" Northern Goshawk in our woodlands. Indeed, one occasionally can meet individual hens that are somewhat more curious than fierce regarding human interlopers near nest sites. They seem to require provocation to

swoop or attack, and are more at ease in just protesting and setting off on circling flights about the treetops. However, Northern Goshawk normally do not adapt to human disturbances near nests or to the proximity of human habitations. It should be emphasized here that the most aggressive responses and assaults I have encountered have been at nests which were unfortunately located along well-used hiking trails. Clearly, the nesting pairs at these localities were extremely agitated by excessive disturbances and responded by increased, almost fanatical aggression. The only times (twice) I have been actually struck by a Northern Goshawk occurred at these nests. Male Northern Goshawk rarely joined in nest site defense against human intruders. Only twice have males swooped me so vigorously that I was forced to flee or defend myself with a stick.

Northern Goshawk are adept at measuring a human opponent and become bolder with each swoop. I once visited a nest with chicks present and the hen swooped at me, passing perhaps one meter over my head. On the next pass, she came within half a meter, and on the next maybe a quarter of a meter. On her fourth pass, she came so close to my cheek I could feel the wind rushing past the hawk's body. I quickly got the message that on her next sortie I would be struck in the face, so I promptly retreated. Goshawks are keenly aware of their nest site environment and it is almost impossible to sneak up on a nest undetected. However, I once walked quietly below a nest unobserved while an adult was busy feeding and attending young. I watched for several minutes before I was detected.

As noted by other field workers, aggression by the adults drops considerably by the time the chicks are four weeks of age.

Productivity

Table 1 summarizes data gleaned from numerous years of field work on the New York-New Jersey border and represents a good percentage of the entire population there. As in other studies, I have considered a nest active if eggs were laid or one of the adults was observed in incubating posture. This would also equal a "nest attempt". Some nests, which were known to be active but which could not be rechecked for data on numbers of young, have been included in a separate column. A nebulous four, perhaps five, year breeding cycle is exhibited by the data. In other words, there seems to be a peak in nesting activity every fourth year. The cause of this periodicity in the study area is unknown. However, the year of maximum breeding

Table 1. Goshawk productivity in NY-NJ border region, 1976-90.

Year	Total Nests	Active Nests no data	Active Nests data	#Nests Fledging Young	% Nest Success	# Young Fledged	Fledged Per Nest Attempt
76*	2	1	1	0	0	0	0.0
77	5	1	4	4	100	8	2.0
78	3	0	3	2	66	4	1.3
79	0	0	0	0	0	0	—
80	1	0	1	0	0	0	0.0
81	3	2	1	1	100	2	2.0
82	4	2	2	2	100	4	2.0
83	1	0	1	1	100	1	1.0
84	0	0	0	0	0	0	—
85	4	1	3	3	100	4	—
86	4	1	3	1	33	3	1.0
87	2	0	2	2	100	3	1.5
88	2	0	2	2	100	3	1.5
89	3	1	2	2	100	3	1.5
90*	2	2	0				
Totals	36	11	25	20	80	35	1.4

* denotes year with only partial field data.

activity (1977) coincided with the highest abundance in numbers of sciurids, notably Eastern Chipmunk and Gray Squirrel. Perhaps cycles in beech and oak mast production are also a factor, effecting prey levels. Nagy (1977) and Angelstam *et al.* (1985) reported four-year goshawk cycles also.

These nests produced 1.4 young fledged per nesting attempt (N=25), which is considerably lower than most published findings. Repeated visits to nests made during the nestling stage negated the need for tree climbing in all but extreme cases. The first Northern Goshawk nest in the study area was observed for eight consecutive breeding seasons (1964-71), and nest produced three young only once (P. Both, pers. comm.).

The low productivity seen in Table 1 is the result of many causes. Two nests failed during incubation as a direct result of human disturbances by campers near the nests. Another nest suffered the loss of a complete brood (two young) by a falconer; this loss was not included in the final productivity figures.

Table 2. Northern Goshawk Productivity.

Locality	Nests	Productivity	Years	Source
Alaska	33	2.0	3	McGowan 1975
Connecticut	65	1.9	6	Root and DeSimone 1980
Minnesota	9	2.2	?	Gullion 1981
Nevada	88	2.2	6	Herron <i>et al.</i> 1985
NJ/NY	36	1.4	13+	this study
Oregon 1978	48	1.7	6	Reynolds and Wight
Finland	28	1.5	4	Hakila <i>in</i> Jones 1979
Great Britain	50	2.6-3.3	22	Newton 1982
Sweden	6	2.7	15	Widen 1985
Switzerland	73	2.5	7	Buhler <i>et al.</i> 1987

Productivity = young fledged per nest

It is obvious that Northern Goshawk nesting on the New York-New Jersey border area are having difficulty maintaining a viable population. This is not surprising considering the species is at the southeast margin of its North American nesting range here. Immigrants from surrounding regions such as northwest Connecticut and eastern Pennsylvania probably play an important role in maintaining the breeding populations.

Results are most similar to those of Hakila (1969, *in* Jones 1979) in Finland (Table 2). Additionally, Northern Goshawk in Michigan produced 1.6-1.9 downy young per occupied nest, in a three year study by Serg Postupalsky (*pers. comm.*). Productivity of new nests was similar to that of "traditional" older nests, and if nesting activity began, a good (80%) success rate followed. "Late" nesters, those birds beginning egg-laying and incubation in late April or even the first week of May, appeared to have poorer productivity than goshawks which began nesting in early to mid April. These late birds at least "salvaged" something out of the breeding year.

These results argue for strict protection of nesting Northern Goshawk in southeastern New York and northern New Jersey. Appropriation of chicks for use in falconry is an unnecessary burden on an already stressed population.

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