

GOLDEN EAGLE ASSESSMENT

Final - January 26, 2000

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TABLE OF CONTENTS

| | Page |
|--|------|
| INTRODUCTION..... | 3 |
| NATURAL HISTORY..... | 4 |
| Description..... | 4 |
| Distribution..... | 6 |
| Taxonomy..... | 7 |
| Habitat and Diet..... | 7 |
| Breeding Ecology..... | 10 |
| Survival, Longevity, and Recruitment..... | 13 |
| Migration and Wintering..... | 14 |
| MANAGEMENT..... | 17 |
| Regulatory Authority..... | 17 |
| Past Goals and Objectives..... | 20 |
| Past and Current Management..... | 21 |
| HABITAT ASSESSMENT..... | 23 |
| Historic Trends..... | 23 |
| Current Assessment..... | 24 |
| Projections..... | 25 |
| POPULATION ASSESSMENT..... | 27 |
| Historic Trends..... | 27 |
| Current Assessment..... | 29 |
| Projections..... | 32 |
| Limiting Factors..... | 33 |
| USE AND DEMAND ASSESSMENT..... | 36 |
| Historic Trends..... | 36 |
| Current Assessment..... | 37 |
| Projections..... | 38 |
| SUMMARY AND CONCLUSIONS..... | 39 |
| LITERATURE CITED..... | 42 |
| APPENDIX I..... | 65 |
| Table 1. Annotated records of golden eagles in Maine..... | 66 |
| Table 2. Annotated records of golden eagle status and residency elsewhere in the eastern United States..... | 79 |
| Table 3. Annotated records of golden eagle status and residency in eastern Canada..... | 95 |
| Table 4. Organochlorine and heavy metal residues in an unhatched golden eagle egg from Maine, 1996..... | 106 |

INTRODUCTION

Since 1968, the Maine Department of Inland Fisheries and Wildlife (MDIFW) has developed and refined wildlife species assessments to formulate management goals, objectives, and strategic plans. Assessments are based upon available information and the judgments of professional wildlife biologists responsible for individual species or groups of species. This document represents the first planning effort undertaken by MDIFW for golden eagles, a species designated as “endangered” in Maine.

Assessments provide the background for species planning initiatives. A “Natural History” section reviews biological characteristics of the species useful to understanding its status. The “Management” section recaps previous actions, strategic plans, relevant rules, and regulatory authority. Historic, current, and projected future conditions for the species are discussed individually for “Habitat,” “Population,” and “Use and Demand” analyses. The major points of an assessment appear in a “Summary and Conclusions.”

Owing to the scarcity of golden eagles in Maine and limited information about them, this assessment draws heavily on studies and insights from other regions. Particular attention is directed to goldens in other eastern states and provinces because of their distinct biology and unique status in eastern North America relative to species’ “norms” elsewhere across their broad range.

I am especially grateful for the remarkable contributions of Dr. Walter Spofford (deceased) and his wife, Dr. Sally Spofford, who devoted decades to investigate rumors of golden eagles in eastern states and provinces. Their diligence over the years provides a foundation for conserving this rare element of Maine’s wildlife heritage. Ralph Palmer and Michael Lucey both shared extensive reviews of Maine records.

NATURAL HISTORY

Description

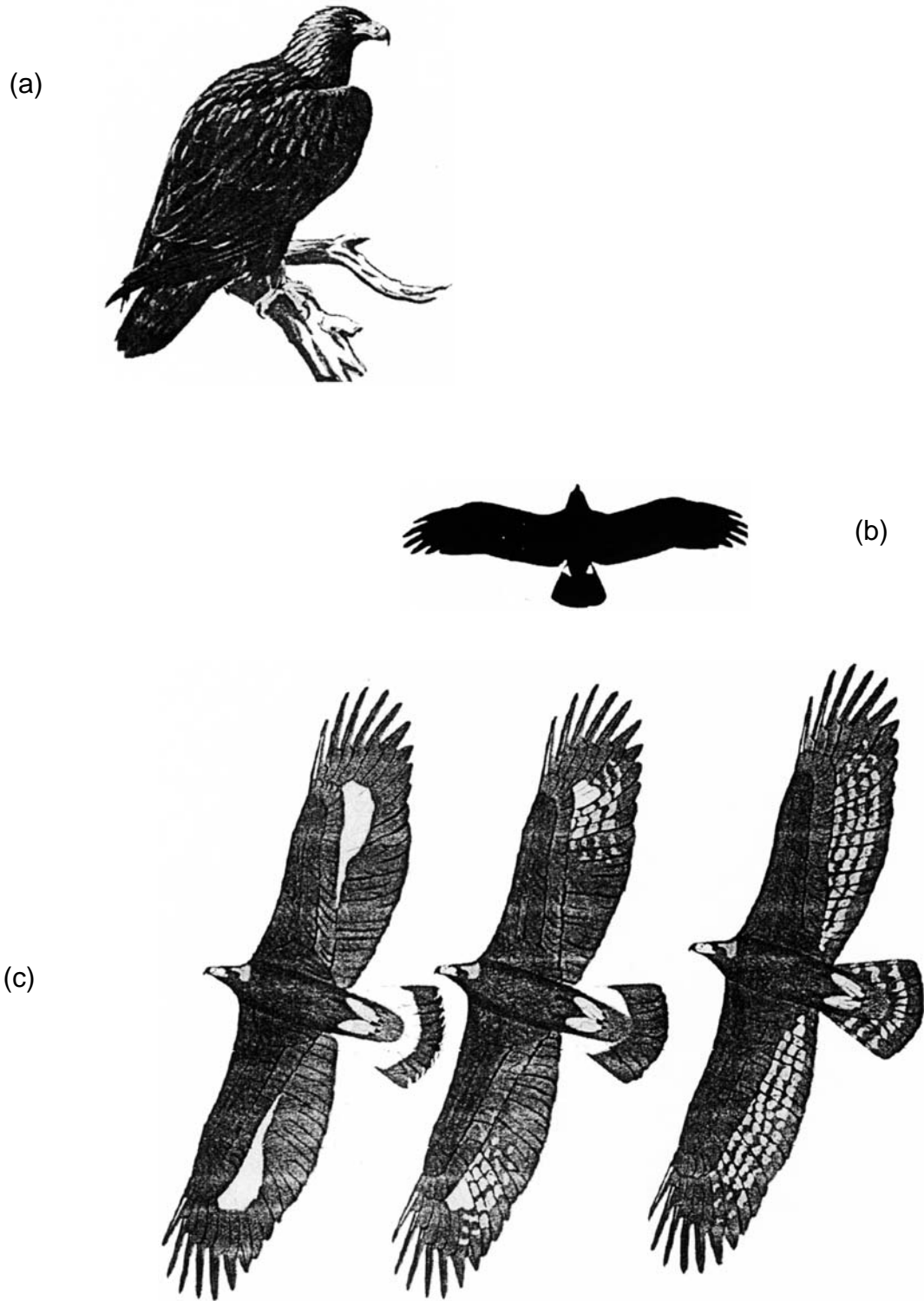
Golden eagles (*Aquila chrysaetos*) rival bald eagles (*Haliaeetus leucocephalus*) as the largest birds of prey in Maine. Eagle wingspans extend up to 2 m. Body weights range from 3.6 to 5.7 kg. Golden eagles are uniformly brown-bodied throughout life. Amber or golden-buff highlights on the head and neck feathers account for its common name (Brown and Amadon 1968, Dunstan 1989).

Females are slightly larger and heavier than males, but the sexes are otherwise similarly feathered and indistinguishable by sight. Individuals can be sexed in the field by 2 combined physical traits (Bortolotti 1984a): lengths of the hallux claw (rear digit talon) and culmen (beak from the cere to its tip). Body weight and length of footpad measurements taken together also separate the sexes (Edwards and Kochert 1986).

Coloration of some feathers changes in golden eagles aged 1-4 years (Jollie 1947, Brown and Amadon 1968). Inner primaries and outer secondaries (mid-wing flight feathers) and retrices (large tail feathers) of a juvenile are white at the base with a broad, black terminal band. Naturalists once referred to young golden eagles as “ring-tailed eagles” based on this latter character. The amount of white at the base of the tail and in the patch at the wrist of the wing lessens with age; it is absent in adults (Figure 1). Annual molts are incomplete and asymmetrical, resulting in 2-3 generations of feathers on a bird at one time (Spofford 1946, Palmer 1988). This precludes a precise correlation between plumage patterns or feather length with age (Bortolotti 1984a).

Golden eagles superficially resemble immature bald eagles from a distance. Several features distinguish them in the field (Clark 1983):

Figure 1. Golden eagles -- (a) portrait of a perched adult; (b) overhead flight silhouette of a juvenile; and (c) plumage patterns of an adult, subadult, and immature.



| <u>Characteristic</u> | <u>Golden Eagle</u> | <u>Bald Eagle</u> |
|---------------------------|--------------------------|-----------------------------|
| Wing profile - soaring: | very slight dihedral | straight horizontal line |
| Wing shape: | narrower, more pointed | broader, more rounded |
| Mid wing coloration | white "epaulette" panels | mottled linings (imm.) |
| Flight silhouette - head: | small head, short beak | large head, long beak |
| Flight silhouette - tail: | relatively long, narrow | shorter, broader |
| Beak length and color: | small, bluish-black | yellow (ad.) / black (imm.) |
| Tarsus appearance: | fine buff feathering | unfeathered, yellow |
| Habitat association: | uplands, mountains | rivers, lakes, coastal bays |

Distribution

Golden eagles are broadly distributed across 3 continents of the northern hemisphere: Europe, Asia, and North America. They also live in northernmost Africa. The species inhabits latitudes from the Arctic through the subtropics and the entire spectrum of elevations from sea level to tall mountains. Golden eagles still breed across the United States from the Pacific to Maine, although their range in the East is greatly reduced and disjunct from the population center in the Rocky Mountain states.

Both the remoteness of eyries and the confidentiality of nests known to naturalists have limited species awareness in the East (Spofford 1971a). Golden eagles are a long-standing resident breeder in Maine, Quebec, and Ontario. In the mid-20th century, their nesting distribution included New Hampshire and New York. Golden eagles also nested in Vermont, Massachusetts, and Pennsylvania >100 years ago. Many accounts suggest that golden eagles nested farther south along the Appalachians in Virginia, West Virginia, Tennessee, Kentucky, North Carolina, and Georgia. However, these are not well-documented and disputed by some (Palmer 1988, Lee and Spofford

1990). Single nesting pairs appeared in Georgia and Tennessee following Georgia's reintroduction efforts during the 1980's (Roberts 1985).

Taxonomy

The golden eagle is the most widespread species of the genus *Aquila*. Five races are recognized in their holarctic distribution, but the variations appear to be only clinal (Brown and Amadon 1968, Dunstan 1989). The subject of this assessment, *Aquila chrysaetos canadensis*, is the subspecies resident to North America. It also lives on the mainland of eastern Asia in Kamchatka, Manchuria, Siberia, and Mongolia.

At least 8 other species of the genus *Aquila*, "booted eagles," are recognized in Asia, Europe, Africa, and Australia (Brown and Amadon 1968). Two races of *Aquila* are imperiled: the Spanish Imperial Eagle, *Aquila heliaca adalberti* (Meyburg 1989) and Japanese golden eagles, *Aquila chrysaetos japonica* (Masuda and Noro 1998). All diurnal birds of prey belong to the avian taxonomic order Falconiformes. Both golden eagles and bald eagles, the only eagle species found in North America, belong to the Family Accipitridae along with more than 200 species of eagles, hawks, and kites.

Habitat and Diet

Golden eagles are traditionally associated with rugged land features in open country. They often nest on cliffs in mountains, foothills, canyons, and open rangelands (Brown and Amadon 1968). In Sweden (where habitats are reasonably similar to those in Maine), most golden nests (76%) are in mountainous terrain and are concentrated in high elevation woodlands <10 km from the treeline (Tjernberg 1985). The alpine zone

above treeline offers higher availability of favored prey. Nesting on cliffs is common in the mountains, but tree nesting prevails in forested regions of Sweden. Nests are typically built in very old pines below well-developed crowns (Tjernberg 1983a).

Golden eagles may search for prey from great soaring heights or lofty perches but usually hunt from flights <100 m above ground interspersed with low (< 8 m) coursing maneuvers (Carnie 1954, Collopy 1983a). A typical strategy is to closely course open slopes, ridgelines, and outcrops in mountainous terrain and nearby grasslands. Thus, foods are often acquired “by ambush” rather than by pursuit (Steenhof and Kochert 1988). Stoops and chases are more frequent in pursuit of birds, and paired adults may hunt in tandem. Regardless of methods, capture success was only 20% in optimal habitats in Idaho (Collopy 1983a). Golden eagles often attack mammals upwind to facilitate searching efforts and lifting captured prey (Palmer 1988).

In the western U. S., golden eagles typically eat mid-sized mammalian prey: ground squirrels, jackrabbits, cottontails, marmots, and prairie dogs (Carnie 1954, McGahan 1967, Boeker and Ray 1971, Mollhagen *et al.* 1972). In a compilation of prey studies throughout North America representing >7000 items, 84% were mammalian (Olendorff 1976). While golden eagles are capable of killing larger prey and are often accused in livestock depredation, they are limited to short distance glides with prey weighing more than 8 kg (Dixon 1937, Walker and Walker 1939, Woodgerd 1952). Comparable food habits generally prevail among golden eagles in Europe, Asia, and Africa (Brown 1976).

Foods of golden eagles in the East often include atypical items such as wading birds, ducks, seabirds, game birds, ravens, and other raptors (Brewster 1925, Spofford 1971b, Singer 1974, Weik 1987, Todd 1989a, Morneau *et al.* 1994, Brodeur *et al.*

1996). Great blue herons comprise more than 90% of prey debris found since 1984 at Maine's only occupied eyrie. Other prey from this site included common merganser, double-crested cormorant, muskrat, and snowshoe hare. Wetlands and waterways are thus focal points for goldens foraging in Maine. They hunt over peatlands and tundra in northern Quebec (Gauthier and Aubry 1996:396). The emphasis on aquatic settings by foraging goldens in the Northeast is remarkable but not unprecedented. Seabirds, wading birds, or fish were found as prey at nests in California (Carnie 1954), Oklahoma (Lish 1973), Idaho (Collopy 1983b), and Scotland (Watson *et al.* 1993).

Golden eagles often exhibit a consistent preference for specific prey, and diversity in the diet generally increases as the abundance of key prey species declines (Steenhof and Kochert 1988). Because the availability of alternate prey is not a strong determinant, this species is a specialist relative to opportunistic bald eagles. Eagle diets are more varied during winter. They may kill or scavenge upland game birds, ducks, seabirds, or big game (Cameron 1905, Sharp 1951, Carnie 1954). Wintering golden eagles are often depicted as "wandering:" a strategy compatible with low prey densities and useful in detecting carrion (Applegate *et al.* 1987).

Excessive food requirements are often depicted for goldens because of (1) their ability to catch and, with favorable updrafts, carry large prey as well as (2) their habit of caching food at nests (Palmer 1988). However, full-grown eagles in captivity consumed between 200 and 390 g of food daily, equivalent to only 5.5 - 6.6% of their body weight (Fevold and Craighead 1958). Studies in Scotland (Brown and Watson 1964, Brown 1969) and Colorado (McGahan 1967) reported a range of 0.5 - 2.2 kg of food eaten

each day. Energetic requirements and food intake peak when adults are feeding fast-growing eaglets aged 4 - 6 weeks (Collopy 1986).

Home range measures vary widely with the quality of foraging and nesting habitats available in a region. Mean home ranges (25 - 145 km²) are immense even in optimal habitats such as in Scotland (Brown and Watson 1964, Brown and Amadon 1968), California (Dixon 1937), Idaho (U. S. Dept. of Interior 1979, Collopy and Edwards 1989, Marzluff *et al.* 1997), and Montana (McGahan 1968).

Breeding Ecology

There are very few data on golden eagles breeding in Maine. Only 8 successful nests were found since monitoring began in the 1950's (Todd 1989a). Age estimates of the 9 eaglets seen (Spofford 1971a, Weik 1987) yield this phenology:

March 6: earliest territorial presence.
 March 26 - April 26: range of egg-laying dates.
 May 6 - June 6: range of hatching dates.
 July 15 - August 8: range of fledging dates.

Birds which breed as solitary pairs space themselves regularly through suitable habitats in proportion to available foods and access to nests (Newton 1979, Tjernberg 1985, Watson and Rothery 1986). Thus, breeding territories of eagles are mutually exclusive, but hunting ranges can overlap (Brown and Watson 1964).

The quality and quantity of foraging habitat are the main influence on carrying capacity (Palmer 1988). Breeding densities range as high as one pair per 40 km² in prime settings: short grass prairies in Wyoming (Phillips *et al.* 1984) and Idaho (U.S. Dept. of Interior 1979), sagebrush flats in Nevada (Seibert *et al.* 1976), and moors in Scotland (Watson 1957). As little as 1.6 km separates active eyries in high quality

habitats in Montana (McGahan 1968) and Idaho (Kochert 1972). In Sweden, nesting density was greater in mountainous regions adjacent to treeline (and more prey) in the alpine zone than in lowlands with conifer forests; separation of adjacent pairs averaged 10.2 km at high elevations and 17.0 km in woodlands (Tjernberg 1985).

Golden eagle nests are large structures built of sticks on a cliff ledge, outcrop, or prominent tree. New nests may be <1 m in diameter and only 0.5 m deep. Additions of sticks in ensuing years enlarge an average nest to 1.4 m high, 1.7 m across, and up to 2.5 m in either dimension. Construction occurs in fall, winter, and spring (Palmer 1988).

Two or more alternate nests may be maintained by a mated pair. Poor condition or the presence of shrubs and herbaceous plants in the nest bowl (Hickman 1972) often indicate inactive nest status, although boughs of evergreens are common adornments to occupied nests (Finley 1906, Bergo 1987). Golden eagle nests are generally similar to bald eagle nests (which are relatively akin to a “mound of sticks”) except goldens typically use shorter, finer, and lighter sticks in nest construction (Grubb and Eakle 1987) yielding a more intricate, woven appearance. Numerous accounts of meticulous nest building support this distinction (Bent 1937, Dixon 1937, Palmer 1988).

Cliff nests are the norm among golden eagles in the western U. S. where such substrates are readily available (McGahan 1968, Boeker and Ray 1971), but tree nesting is common over much of their range: 94% in coastal California (Carnie 1954), 35% in Oregon (Isaacs and Opp 1991), 36% in Montana (McGahan 1966), and 82-96% in southeast Montana / northern Wyoming (Menkens and Anderson 1987, Phillips *et al.* 1990, Phillips and Beske 1990). In Sweden (Tjernberg 1983a), 88% of nests in wooded areas were situated in the tallest tree within a 50 m radius. In open surroundings, they

may use transmission line towers as new or alternative niches for nests (Steenhof *et al.* 1993). While substrates vary, good sites invariably offer nest stability, some shelter, open flight access, and wind updrafts which enhance prey deliveries.

The breeding habits of golden eagles are well chronicled elsewhere (Cameron 1905, 1908; Gordon 1927; Bent 1937; Dixon 1937; Brown and Amadon 1968; Ellis 1979). Courtship displays include spiraling flights interspersed with aerial dives and talon grappling. Copulation may occur at the nest or a nearby perch. Egg-laying and hatching are asynchronous with 1 - 2 day intervals between eggs of a clutch. Eggs are oval or elliptical in shape, cream-colored with brown blotches, and average 7.5 cm long by 5.9 cm diameter. A clutch is typically 1 - 2 eggs, sometimes three or rarely four (Ray 1928, Gordon 1927, Delibes and Calderon 1977, Jenkins and Joseph 1984). A second clutch may replace lost eggs after intervals >21 days (Dennis 1983). Females perform >80% of the incubation duties over a 6-week period (Collopy 1984, Bergo 1987).

Eaglets weigh as little as 105 g at hatching but exceed 4 kg when they fledge at 10 - 12 weeks of age (Walker 1987, 1988). Siblicide among eaglets may occur, particularly when food resources are limited and a female nestling is the oldest in a mixed-sex brood (Edwards and Collopy 1983, Bortolotti 1986). The adult female is generally the nest guardian, and performs most brooding duties. Males spend an average of 74% of their time away from the nest, generally visiting only to deliver prey from their hunting forays (Collopy and Edwards 1989).

These roles broaden as nestlings advance in age (Collopy 1984). When eaglets are sufficiently feathered to thermoregulate, both adults can stray from the nest. One often occupies a "sentry" perch with line-of-sight to the nest (Brown and Amadon 1968).

Awkward first flights sometimes culminate with fledglings on the ground or in a water body (Hickman 1971b). Adults may fly under and boost the flight of inexperienced fledglings (Spofford pers. comm. 1/9/1982, Palmer 1988), which generally fly for short intervals <200 m from the nest during the first 4 weeks on the wing (Walker 1987). Young disperse in the fall, 6 weeks or more after fledging (Snow 1973).

Productivity measures of breeding golden eagles in highly suitable habitats in the western U. S. and Scotland average between 0.6 - 1.0 eaglets fledged per nesting pair (Watson 1957, McGahan 1968, Everett 1971, Kochert 1972, Murphy 1975, U. S. Dept. Interior 1979, Phillips and Beske 1990). Weather and prey abundance during late-winter or early-spring can independently affect or interactively influence breeding activity, timing of reproduction, nesting success, and brood size (Smith and Murphy 1979, Tjernerberg 1983b, Phillips *et al.* 1990, Steenhof *et al.* 1997).

Survival, Longevity, and Recruitment

There are no demographic data for Maine's few golden eagles. Longevity has reached 46 years in captivity (Brown and Amadon 1968). The record lifespan reported in the wild, 11 years (Keran 1981), is likely underestimated. Maturity is achieved at 4 years of age. Adult longevity probably averages 10 years. Among long-lived species such as golden eagles, it is advantageous to remain on an established territory and forego active breeding if prey resources are unfavorable for breeding (Newton 1979).

Immature eagles return to the vicinity of natal nests. In Idaho, 93% of 56 band recoveries of goldens were encountered at ages of 4 months - 4 years within 172 km of their natal nest (Kochert 1972). Studies in Scotland (Brown and Watson 1964) found

that 75% of a cohort died before maturing at an age of 4 years. Subadults can pair and breed (Steenhof *et al.* 1983, Bates 1976, Ellis 1979) but normally form loose pair bonds and explore potential nesting habitats. They typically pair and establish territories at 3-6 years of age (Steenhof *et al.* 1984, Palmer 1988). Adult goldens exhibit strong fidelity to traditional nests and pair for life, although a deceased mate will be replaced from a pool of non-breeders if healthy populations persist (Phillips *et al.* 1991).

Migration and Wintering

Golden eagles may winter in northern latitudes comparable to the range of their breeding limits (Bannon and David 1997). Southerly movements are largely influenced by food supplies (Bent 1937). Immatures migrate before adults (Omland and Hoffman 1996). Most goldens migrating in the East fly south along the Appalachians until they secure adequate foods on open ridges and grassy highlands. Many follow “leading lines” which are favorable topographic and meteorologic features (Haugh 1984) such as at Hawk Mountain, PA. Goldens pass here from late-August to late-November, peaking between September 20 and November 23 (Haugh 1972, Palmer 1988). Movements of eastern raptors often coincide with northwest winds and passing low pressure systems.

There are 5 band recovery records for golden eagles banded as nestlings in the East (Spofford 1964, 1971a; Millsap and Vana 1984). Three from northern Quebec’s Ungava District were encountered in their first fall or winter: two on the St. Lawrence River on the southern border of the province and one in northeastern Pennsylvania. A young golden eagle banded at an eyrie in northwestern Maine on July 10, 1963 was found dead 4 months later in southeastern Pennsylvania. A nestling from western

Ontario was found in a trap in central Kentucky during its first winter. There have been no eastern recoveries of the many golden eagles banded in the West.

A radiotelemetry study of goldens breeding in northern Quebec (Brodeur *et al.* 1996) revealed southward dispersal in late-October, generally associated with northerly winds. Each used different migration routes, but individuals followed similar paths northward the next spring. Fall movements ranged from 26 to 40 days: three flew through central Quebec, passed Lake Ontario to the east, followed the Appalachian corridor from New York, and arrived at final winter destinations in Pennsylvania (early Dec.), West Virginia (early Nov.), and Alabama (mid-Nov.). A fourth adult flew southwest along Hudson Bay through eastern Ontario and arrived on wintering grounds in Michigan (early Dec.). Northerly movements began the following March; 3 adults returned to their nests in Quebec from late-March to mid-May after round trips of at least 3300 - 6000 km.

Most golden eagles in the eastern U. S. winter on the Appalachian plateau and coastal plain of mid-Atlantic states or lowlands along the Mississippi River (Millsap and Vana 1984). More than 80% associate with riverine or wetland systems in contrast to the typical association between breeding goldens and upland habitats. Communal roosting has been reported in western states where goldens are more numerous and winter shelter may be limiting (Craig and Craig 1984).

In Maine, some fall migrants apparently follow the coastline; observations range from as early as August 10 to as late as November 17 (Palmer 1949a). Those in the interior usually appear near mountains. There are few winter records (Appendix 1). In 1981, a young golden frequented 2 carrion sources in coastal Hancock County and was

very aggressive towards many wintering bald eagles there. Maine's single nesting pair was dominant over transient bald eagles attracted to local carrion supplies. Both Lish (1973) and Halley and Gjershaug (1998) note similar interspecific encounters between goldens and other eagles (*Haliaeetus* spp.).

MANAGEMENT

Regulatory Authority

Golden eagles are protected by 2 federal statutes: the Bald Eagle Protection Act (16 USC: 668-668d) and the Migratory Bird Treaty Act (16 USC: 703-712). Both laws prohibit illegal “take” including possession, purchase, sale, barter, trade, offer for any exchange, transport, export, or import eagles, parts thereof, eggs, or nests. The former was revised on April 1, 1963 to address widespread persecution of golden eagles in the West. Permits may be granted for scientific or exhibition purposes, ceremonial use by Native Americans, falconry, or take of golden eagles and their nests in specific depredation incidents (50 CFR 22).

Other federal laws have indirectly served golden eagles. Policies to deal with depredation complaints and aerial hunting of goldens brought order to a major problem in the West (Dunstan 1989). The Pesticides Control Act is credited with significant benefits for many birds of prey, minimally for goldens except in the East where contaminants have been detrimental. Standards to safeguard eagles from electrocution on utility lines were established in the Rural Electrification Act.

Enabling state laws (12 MRSA, Chapter 713) direct MDIFW to "preserve, protect and enhance the inland fisheries and wildlife resources of the state; to encourage the wise use of these resources; to ensure coordinated planning for the future use and preservation of these resources; and to provide for the effective management of these resources" (§7011). They provide considerable protection for wild birds. Except for recognized game species, seasons are perpetually closed on birds such as golden

eagles (§7401). Hunting, possession, and destruction of nests or eggs are prohibited (§7456), unless provided for by one of the following permits:

- “exhibition” = any person intending to keep, purchase, sell, or transport wildlife for either exhibition or attracting trade (§7231);
- “rehabilitation” = temporary care of injured wildlife (§7235-B);
- “importation” = import, receive, or introduce wildlife (§7237);
- “transportation” = any person intending to take or transport wildlife within the state for breeding or advertising purposes (§7241); or
- “scientific collection” = activities related to approved research (§7242).

MDIFW regulations (Chapter 7) govern the housing, care, and health standards for captive animals as well as criteria for determining that wildlife importation does not threaten native wildlife or humans. Such animals may not be displayed in licensed pet shops. State falconry regulations (MDIFW Chapter 4.08) prohibit the use of goldens’.

Primary state protection for goldens stems from their status as “endangered” in Maine (§7753). They have been designated as a state endangered species since Maine’s inaugural listing of vertebrate wildlife in 1986. Prohibitions regarding golden eagles and other endangered or threatened wildlife (§7756) under Maine’s Endangered Species Act (1975) and a 1987 amendment include:

- export from the state;
- hunting, trapping, or possession in the state;
- transport, delivery, carry, ship, sale, offering for sale or processing; and
- deliberate feeding, baiting, or harassment (except for educational or scientific purposes intended to enhance its survival or propagation).

Incidental take is a new provision (§§7756.2-C, D) enacted in 1999 stipulating that lawful activities that do not threaten the recovery of listed species may occur under a plan that minimizes such takings and is approved by the Commissioner.

A 1988 amendment to Maine's Endangered Species Act (§7755) created a mechanism for habitat protection. When implemented, special rules enable oversight of state and municipal functions potentially affecting the listed species in designated areas. These "essential habitats" are locales that currently or historically provide physical or biological features essential to the conservation of the species and which may require special management consideration. Essential habitats must be defined and mapped by rule. Protection guidelines are also promulgated according to state rulemaking procedures. These regulations direct that "a state agency or municipal government shall not permit, license, fund, or carry out projects within an essential habitat without review by MDIFW."

The Natural Resources Protection Act (38 MRSA Article 5-A) is also applicable. Habitats of endangered or threatened wildlife, including golden eagles, may be mapped for designation as "significant wildlife habitats" under this statute. Administered by Maine's Department of Environmental Protection (MDEP), it requires permits for alterations of soils, waters, vegetation, or permanent structures in a protected natural resource (§480-C). This includes other significant wildlife habitats and fragile mountain areas (§480-B) which are defined as settings above 2700 feet elevation, applicable to several golden eagle eyries documented in Maine.

To date, essential habitat and significant wildlife habitat have not been defined for golden eagles. Both designations provide advance notification of threatened or

endangered species issues enabling MDIFW to review permits and consult with property owners or development interests. Case-by-case evaluations are subsequently based on regulatory standards promulgated by state rulemaking procedures.

The Site Location of Development Act (38 MRSA Article 6) is among the few laws pertinent to protecting potential golden eagle habitat. “Developments of state or regional significance that may substantially affect the environment” (*e.g.*, those >20 acres, mineral extraction, most subdivisions >20 acres, transmission lines >100 kV, and several other large-scale projects; §§482, 487-A) require reviews by MDEP or certified municipalities.

Maine's Comprehensive Growth Management Act (30-A MRSA) lists state goals to guide local comprehensive planning and land use management, as required in all municipalities (§§4312, 4321). The overall theme is to promote orderly development. Approved plans must include: “protection of the state’s other critical natural resources, including without limitation, wetlands, wildlife and fisheries habitat ...” The Land Use Regulation Commission (12 MRSA) administers a comprehensive plan with similar purposes (§§685A-C) for “wildlands” in the state's unorganized townships.

Past Goals and Objectives

MDIFW has not previously established specific goals and objectives for golden eagles. Efforts undertaken thus far adhere to the basic theme of Maine’s Endangered Species Act: to maintain the species as part of Maine’s traditional wildlife heritage.

Past and Current Management

A strategic plan and management system have not been previously drafted for golden eagles. Reported nests were previously checked by a few naturalists. Spofford (1971a) periodically monitored 4 golden eyries occupied during the period from 1955 to 1980. In-depth efforts to survey traditional eyries and determine a population baseline began in 1986 (Weik 1987) after designation of the species as “endangered” in Maine. Unfortunately, only one resident breeding pair has been documented since systematic inventories have been underway, and they have exhibited complete reproductive failure since. Insights on local habitat use and food habits accrue slowly under this scenario. Monitoring and management of cliffs for nesting goldens is complimented by similar efforts on behalf of peregrine falcons (*Falco peregrinus*), but tree-nesting possibilities are difficult to evaluate.

Carrion offered as supplemental food during late-winter, 1986 - 1999 has drawn Maine’s resident goldens but not bolstered their productivity. Reproductive performances of some bald eagle pairs in Maine improved when they frequented provisions of winter foods (McCollough 1986).

Voluntary efforts by the landowner employ temporal and spatial buffers generally advocated for the species (Call 1979, Richardson and Miller 1997) to limit disturbance at Maine’s traditionally occupied golden eyrie. Access restrictions and forestry practices have been negotiated at this site. Similar to strategies elsewhere (Camp *et al.* 1997), an extended buffer encompasses viewsheds from the nesting cliff. Maintenance of large foraging areas is pivotal for golden eagle conservation (Olendorff 1984) but has not yet been addressed in Maine since these habitats are poorly understood in the East.

MDIFW has also sought to maintain potential nesting habitat at 4 historic or rumored eyries. Golden eagles apparently returned to one of these locations in 1990. These consultations addressed a variety of issues including electrical transmission line construction and maintenance, proposed wind power facilities, communications towers, timber harvests, new road access, and hiking trails. Although intended primarily to safeguard bald eagles from incidental trapping, risks to golden eagles were minimized by changes in terrestrial trapping seasons, limiting the use of uncovered bait, and restricting the deployment of snares.

Many management issues for golden eagles have arisen from experiences in the western U. S. (Arnold 1954, Snow 1973, Boeker 1974). Their widespread persecution during predator control programs in the 1940's - 1950's led to 1963 legislation that banned aerial hunting and poisoning to control eagles. Frequent electrocutions of eagles gave rise to modified power line designs (Olendorff *et al.* 1981). Fostering (Snow 1973, Olendorff and Stoddard 1974) and nest relocations (Postovit and Grier 1982) have been successful among golden eagles in the West.

Reintroductions of golden eagles, unnecessary in most parts of their range, have been attempted in Georgia (Roberts 1985) and North Carolina (Boynton pers. comm. 10/7/1986) but have yielded few (< 5%) returns. The U.S. Fish and Wildlife Service reviewed the status of golden eagles in the East during the mid-1980's. The limited recovery potential of the species in the eastern U.S. was foremost among findings which would not justify federal listing.

HABITAT ASSESSMENT

Historic Trends

The classic image of golden eagle nesting habitat, a cliff overlooking grasslands (Boeker and Ray 1971), has long been a rarity in Maine and elsewhere in the East.

Open uplands (preferred foraging habitat) have always been in limited supply. Native Americans and European settlers both created a patchwork of forest clearings (Cronon 1983). These may have aided foraging jaunts by goldens across a forested landscape.

Dwindling levels of agriculture, reforestation of fields, wildfire suppression, and land development have clearly diminished potential foraging habitats for golden eagles in Maine and the northeastern U. S. during the 20th century (Spofford 1971a, Singer 1974, Weik 1987, Todd 1989a). Such influences are well documented in Scotland, a species stronghold. Land use changes from farming to forestry (Marquiss *et al.* 1985), especially to conifer plantations (Dennis *et al.* 1984, Watson 1992), diminished habitat suitability for goldens. Nesting success declined with the demise of summer foraging habitats (Watson *et al.* 1989). Less winter carrion for goldens subsequently reduced nesting density (Watson and Langslow 1989). Impacts emerged after understory shrubs were suppressed (intervals >10 years).

Loss of remoteness is a common theme portrayed as cause for abandonment of eagle nests. Vacancies at 3 golden nests in Maine more or less coincided with nearby passage of new roads (Spofford 1971a). An incubating eagle readily leaves its nest in response to nearby intrusions (Bent 1937). However, proximity to roads is not a limiting

factor among >400 pairs of goldens resident in Scotland (Watson and Dennis 1992) and may not be a deterrent to reuse of traditional eyries in Maine.

Current Assessment

All but one (95%) of 22 individual nests known at Maine's 11 historic eyries were on cliff ledges or mountain outcrops. An alternate nest in a tall pine is the only exception. There are only 4 other records of golden eagle nests in trees in the eastern U. S. This near reliance on cliffs by nesting goldens in Maine (if accurate) greatly limits carrying capacity. Recent evaluations of cliffs for peregrine falcons, another endangered species, implied that 35 sites were suitable for that species (MDIFW 1993). Peregrines are more selective of large cliffs than eagles but will use coastal headlands, for which there is no precedent among Maine's goldens. Eagles nest on small cliffs if situated at high elevations (Seibert *et al.* 1976), which is typical of several Maine eyries.

However, few Maine cliffs provide adequate ledges for an eagle's large stick nest, and overhead shelter may be further limiting. Goldens usually opt for cliffs with overhangs (Poole and Bromley 1988) to reduce midsummer heat stress on nestlings (Beecham and Kochert 1975). North- or west-facing cliffs may be avoided due to harsh weather exposure (Mosher and White 1976) or icing.

Cliffs once used by nesting goldens vary considerably in physical characteristics and isolation. While disturbances are a plausible factor in the absence of goldens at 1-2 Maine eyries, most traditional sites appear suitable. Proximity to waterways and wetlands, presumably primary foraging areas for goldens resident in Maine, is also quite variable. There is no demonstrated selectivity for nearby wetland acreage or proximity

to great blue heron nests (Weik 1987), yet the juxtaposition of cliffs to suitable foraging areas clearly limits the quantity of functional nesting habitats. The wetland associations of goldens in the East are atypical for the species and poorly documented. Cliffs lacking this connection are presumably unsuitable for eagle residency. At least 5 traditional golden eyries in Maine still appear suitable from this perspective. More refined measures of functional nesting habitat are not possible without data on nesting options in relation to foraging ranges for goldens in these unusual circumstances.

Projections

Future assessments of golden eagle habitat in Maine are not yet possible given the few insights presently available on the subject. Increasing human access to remote settings and associated recreational pursuits could further reduce the suitability of former golden eyries. Until new insights prove otherwise, these are considered to be the only functional breeding habitats available to the species in Maine. Untimely disturbances can cause breeding failure and, if repetitive, permanent nest abandonment (Boeker and Ray 1971, Murphy 1975).

The quality and adequacy of foraging habitats within a reasonable range of eyries are likely key limiting factors. Food stress is reflected by the 1994 death of a golden eagle in Maine because of complications from ingesting porcupine quills, similar to a Minnesota account (Lano 1922). Use of atypical prey in summer and winter diets raises concerns about functional carrying capacity in the state and nearby regions.

Tree nesting is quite common over much of their range but has been infrequent in eastern states. If goldens in Maine (and the East, in general) nest in trees more often

than is documented, as elsewhere in their range, carrying capacity (based on cliff habitats) may be greater than currently thought. There have been no directed surveys of Maine's extensive woodlands for nesting goldens. Searches have focused on the traditional search image: cliff nests. The single golden nest in a tree known in Maine is quite difficult to detect during aerial surveys, unlike the readily observed bald eagle and osprey nests widely monitored by that technique (Todd 1989b). It is in a dominant pine on low slopes close to a small clearing. Such settings are widely available across the majority of the state.

In Sweden, goldens favor tree nests over cliffs when both were locally available (Tjernberg 1983a) and exhibit great adaptability as long as suitable nest trees exist in the surrounding forest stand. Isolated trees and small stands in the midwestern U. S. support more golden nests than do extensive woodlands (Phillips and Beske 1990).

There are no indications in Maine that any form of timber management enhances woodlands as potential feeding areas. Maine's single breeding pair during 1984-1996 did not shift their diet in response to extensive clearcuts and timber salvages adjacent to their eyrie. Silvicultural treatments involving selection cuts that leave dominant pines in the residual stand could enhance the availability of nest trees. Until goldens in Maine (or a similar habitat in the East) reveal a shift in dietary preferences, future habitat assessments should focus on wetlands, riparian areas, and wading bird populations close to historic eyries.

POPULATION ASSESSMENT

Historic Trends

There is general consensus that golden eagles have always been a rarity in Maine. "Brown" eagles (goldens?) were noted in an initial listing of fauna (Williamson 1832:145). Early accounts (Samuels 1869:50-51, 1875:49; Baird *et al.* 1874:316; Knight 1897, 1908; Forbush 1927:145) simply noted that they occasionally nested in the state. Early settlers cited compelling evidence from Abenaki Indian lore (Eckstorm 1936, Palmer 1988) of 2 eyrie sites in Piscataquis County. They date back to at least 1689 and 1736: among the oldest records of nesting by goldens in North America.

No other definitive records of resident goldens emerged in Maine until the late 19th century. Eyries were documented at 2 Oxford County sites in the 1870's (Brewster 1925). An Indian account (Hubbard 1884:200) hinted of nesting in Penobscot County. Knight (1896) saw territorial goldens at a Somerset County cliff in 1895. Three of these sites were reportedly used for decades, representing 2-3 generations of goldens. The first Franklin County eyrie was reported in the 1920's (Spofford 1971a). Knowledge of goldens accrued slowly in northern Maine's remote terrain and extensive woodlands.

As few as 4 pairs of goldens possibly nested in 2 - 3 counties by the mid-20th century, having once occupied 4 - 5 counties during the previous 100 years (Palmer 1949a). Only 10 nesting territories are documented with certainty over time in Maine, but at least 18 more distinct localities are suspected (Appendix 1). The latter are suggested by eyrie rumors, sightings of goldens, or their names (e.g., Eagle Mountain).

Dr. Walter Spofford was the first to attempt regular surveillance of golden eagles breeding in Maine. He recorded only 6 successful nestings (7 eaglets fledged) while monitoring 22 attempts at 3 Maine eyries during 1955-1967. Golden disappeared from eyries in Oxford, Franklin, and Somerset Counties by the early 1980's. Two adult mortalities were documented in the mid-1908's: the only such encounters during the past 30 years.

Breeding goldens were always sparse elsewhere in the Northeast (Brewer 1875). The last occupied nests to be reported in other eastern states (Eaton 1914:90; Spofford 1971a, 1971b; Singer 1974; Lee and Spofford 1990) were: New York-- 1972, New Hampshire-- 1961, Vermont -- 1900, and Pennsylvania-- 1850's. Absolute documentation was lacking, but historic accounts (Appendix 2) also infer "likely breeding" of goldens in the 19th century in Massachusetts, West Virginia, Virginia (potentially as recent as 1952), Tennessee, Kentucky, North Carolina, South Carolina, and Georgia (Bent 1937, Palmer 1988). Lee and Spofford (1990) question all records south of Pennsylvania.

The traditional status of golden eagles in eastern Canada is poorly documented. Their relative abundance is described as "rare" or "low" in Ontario, southern Quebec, and the Maritime provinces (Fyfe 1976). Population trends are unknown. Nesting goldens date back at least to the 1740's in Quebec and the 1830's in Ontario. There are no definitive breeding records in the Maritimes. The sporadic nature of encounters with goldens in eastern Canada (Appendix 3) is attributable to both low species density and the remoteness of many eyrie settings in the region.

Counts of fall migrants are likely the most reliable trend data for golden eagles in the East. Tallies at Hawk Mountain, PA averaged 42 golden eagles, ranging from 31 to 80 birds per year between 1935 and 1970 (Spofford 1971a). Proportions of immatures dropped by one-half from the 1930's to 1940's (Broun 1949:192). Adult numbers dropped significantly during 1946-72, the era of DDT use. Annual counts at Hawk Mountain during 1965-70 averaged only 29 golden eagles (Bednarz *et al.* 1990). More recently, no change or modest increases of migrant goldens were cited at 5 hawk lookouts in the East where consistent coverage occurred from 1972 to 1987. Hawk Mountain (Berks and Schuylkill Co.), PA and Derby Hill (Oswego Co.), NY tallied the most goldens during fall migrations in this period (Titus and Fuller 1990).

There is widespread consensus that the range of this species has steadily diminished in the East where it possibly nested along the Appalachians as far south as North Carolina or Georgia (Bent 1937, Forbush 1939:115). Knowledgeable ornithologists not only safeguarded the identity of remote nests but also limited their searches to late in the breeding season (Spofford 1971a) to minimize potential disturbances. Thus, there is scant documentation of the species in the region, and the historic range of goldens in the East is often debated.

Current Assessment

Records of golden eagles in Maine are infrequent in all seasons. Reliable observations (Appendix 1) suggest a sparse, regular presence over much of the state. Coastal sightings are limited to migrant and wintering periods. Species rarity, secrecy

of traditional eyries, and remoteness of favored mountainous habitats have each contributed to limited records from interior regions of the state.

Only two of Maine's 11 documented eyries have been inhabited by goldens since 1984. Residency at a Piscataquis County site has spanned most of the 20th century and was implied historically by Abenaki Indians as far back as 1736. Likely already a traditional site at that time, it is considered to be among the oldest golden eagle eyries in North America. Remarkably, it was the only extant golden eagle nest in the northeastern U. S. over the last 15 years until a new nest appeared at a Somerset County eyrie in 1999.

Species normally subordinate to golden eagles (*e.g.*, ravens, peregrines and red-tailed hawks) now inhabit several traditional sites and also attest to the absence of goldens at former eyries in Maine. Similar relationships are cited in the West (Bent 1937, Hickman 1971a). Local residency by goldens during April, 1992 and 1993 in Oxford County, at a site previously unknown as a nesting territory, gave hope for new recruitment to the depleted population but did not materialize into a new eyrie.

Resident goldens fledged only 3 eaglets during 18 nesting attempts at 2 eyries monitored in Maine from 1980 to present (Appendix 1). This level of productivity, 0.17 fledglings per nest attempt, is only one-half of the extremely poor reproductive rate that characterized Maine's bald eagles during several decades of population decline (Sprunt *et al.* 1973, MDIFW 1986).

Goldens in the eastern U. S. are most visible during fall, winter, and spring as transients from eastern Canada. However, residency could evolve analogous to a familiar pattern in bald eagle recovery: sites regularly used by migrants may become

eyries. Adults seen during March, April, or May could be migrant stragglers or potential breeders pioneering in several eastern states: New York, Pennsylvania, West Virginia, Virginia, and North Carolina (Appendix 2). Resident and migrant goldens overlap throughout this time period in Maine. Thus, spring sightings of goldens in southern latitudes hold even more promise as potential residents. If eyries exist in other eastern states and are plagued by frequent nest failures so prevalent in Maine, residency would indeed be difficult to prove. Nesting was verified in both Tennessee and Georgia following prolonged reintroductions in the latter state during the 1980's.

There are no clear trends for goldens breeding in eastern Canada. Breeding Bird Surveys and Christmas Bird Counts both imply slight declines (Kirk and Hyslop 1998), but both indices are considered inappropriate for eagles. Awareness of the species and nesting occurrences have recently risen (Appendix 3). Significant numbers of nesting goldens were found during local waterfowl surveys in both northern Quebec (≥ 10 pairs: Morneau *et al.* 1994) and coastal Labrador (≥ 28 pairs: Kirk and Hyslop 1998) during the last 10 years. At least 3 golden eyries are known on Quebec's Gaspé Peninsula (Baillie 1955, Gauthier and Aubry 1996), which abuts northern Maine. On the state's eastern border, territorial behavior by goldens is a recent development in New Brunswick and Nova Scotia (Tingley 1984; Erskine 1992; Mactavish 1988, 1989, 1996; Maybank 1989). Population estimates are lacking for goldens in all eastern provinces.

Counts of goldens during fall migration peaked at several eastern locations in recent years. This may indicate an increasing population in eastern Canada, or it could reflect greater participation and coverage at migrant hawk watches. Some stations lack

long-term, standardized efforts for trend analyses. Nevertheless, they collectively suggest a regional increase. Recent record counts in the Northeast include:

| <u>Fall hawk watch (county) - year: # goldens</u> |
|---|
| Tadoussac (La Haute Co.), QU - 1995: 64 |
| Holiday Beach (Essex Co.), ON - 1994: 87 |
| Hawk Cliff (Elgin Co.), ON - 1991: 93 |
| Derby Hill (Oswego Co.), NY - 1991: 34 |
| Franklin Mtn. (Delaware Co.), NY - 1993: 139 |
| Hawk Mtn. (Berks Co.), PA - 1998: 144 |
| Bald Eagle Mtn. (Centre Co.), PA - 1997: 122 |
| Stone Mtn. (Huntingdon, Co.), PA - 1996: 76 |
| Tuscarora Summit (Juanita Co.), PA- 1996: 35 |
| Cape May Point (Cape May Co.), NJ - 1995: 38 |
| Town Hill (Allegany Co.), MD - 1996: 53 |

Source

(Aubry and Bannon 1996a)
 (Ridout 1995a)
 (Weir 1992)
 (Boyle *et al.* 1991)
 (Boyle *et al.* 1994)
 (Hawk Mtn. Sanct. 1999)
 (Hall 1998b)
 (Hall 1997)
 (Hall 1997)
 (NJ Audubon 1999)
 (Hall 1997)

Projections

Chronically impaired reproduction, demonstrated low recruitment, and currently peripheral range are all strong limitations to continued residency of golden eagles in Maine. Population models have not been developed for goldens but are adequately simulated by those for bald eagles (Grier 1980), because they share a very similar life history. Models corroborate what realistic managers believe: the recent scenario (a single nesting pair during 1984-97) cannot persist without recruitment from the population in eastern Canada. Only one adult was seen on territory in 1998 and 1999 at Maine's last active eyrie: one step closer to species extirpation from the state.

Because of the small population size and currently peripheral range, short-term extirpations of goldens from Maine are very likely and may have occurred previously. The key to species stability in the region lies to the north (Todd 1989a). The welfare of goldens in adjacent portions of eastern Canada (Appendix 3), especially Quebec, may well determine the final fate of the species in the northeastern U. S. Without active management intervention, the abundance and distribution of goldens in eastern provinces controls potential recruitment to maintain isolated breeding occurrences in the eastern U. S. Record counts of goldens at eastern hawk watch stations during 1991 - 1996 provide some optimism for future regional improvements.

Limiting Factors

The sparsity of suitable habitat is most often cited as the ultimate limitation on golden eagles in the East (Spofford 1971b, Singer 1974, Weik 1987, Todd 1989a). Open terrestrial lands are favored as foraging areas by goldens over most of their broad range. These have always been sparse in the region but were further reduced in the

20th century by landscape changes (see “Habitat Assessment”). Marginal habitat suitability has severely limited carrying capacity throughout the East but has not prevented the long-standing residency of breeding goldens for at least 310 years in Maine. Trends in prey populations (e.g., wading birds and waterfowl) in the range of Maine’s golden eagles are not clear. Numbers of nesting great blue herons have diminished in some localities, but Canada geese populations are increasing.

Other limiting factors, mostly human-related, have contributed to near extirpation of the species. The likely role of environmental contaminants in loss of goldens from many eastern states (Weidensaul 1992) stems from a food quality problem. Regional diet variations, and trophic differences among Scottish goldens resulted in varying degrees of contaminant loading (Furness *et al.* 1989, Newton and Galbraith 1991). In all likelihood, goldens in the Northeast are highly vulnerable due to their unique diet.

There is scant documentation of this issue; residues in a 1996 unhatched egg from Maine’s last remaining active eyrie (Appendix 4) provide the best evidence. Levels of DDE (a persistent metabolite of the insecticide DDT), PCB’s, and mercury are each adequate to impair reproduction (Wiemeyer *et al.* 1984). Other residues infer exposure many years ago to this female of apparently advanced age. Dieldrin, Mirex, and nonachlors were found in the golden egg but had not been detected in bald eagle eggs from Maine since the mid-1970’s (MDIFW 1986). Current dietary exposure to contaminants for goldens eagles in Maine is unknown.

Chronic failures at golden eyries in New York during the 1950’s and 1960’s were thought to be related to contaminants such as DDT (Spofford 1971b). Two of 3 nest failures monitored there during 1971-1972 involved prolonged incubation attempts (Singer 1974), symptomatic of residual DDE (Wiemeyer *et al.* 1984). Young eaglets

were lost in 1969 in the Adirondacks (Spofford 1971b) and at Maine's only eyrie in 1994-1995 (MDIFW unpubl.). PCB contamination can be acutely toxic to developing nestlings (Wiemeyer *et al.* 1984). Dieldrin and DDE caused shell thinning, breakage, and addling of golden eagle eggs in Scotland (Lockie *et al.* 1969, Ratcliffe 1970). An adult golden found dead in Vermont during 1974 had very high residues of PCB's, DDE, dieldrin, and mercury (USFWS unpubl.).

Direct mortality of goldens by toxins has been widely reported from pesticides -- Heptachlor (Henny *et al.* 1984) and dieldrin, as well as by-products such as DDE; industrial pollutants -- PCB's and mercury (Newton and Galbraith 1991); lead ingestion (Craig *et al.* 1990); as well as from predator and rodent controls -- thallium sulfate (Bean and Hudson 1976), cyanide (Reidinger and Crabtree 1974), and strychnine (Cameron 1908, Bortolotti 1984b). Wolf control programs using poisons took a large toll on goldens in eastern Canada (Snyder 1949). Studies during the 1980's in Idaho (Craig *et al.* 1990) and California (Bloom *et al.* 1989) revealed a 44% incidence of exposure to environmental lead among 83 goldens.

Human-caused mortalities of goldens have been widely reported. Three dead goldens were recovered in Maine since 1985. Two died from natural causes, but one succumbed to complications after being trapped. Incidental trapping and poisonings are foremost as human-related losses (Reidinger and Crabtree 1974, Bortolotti 1984b) because of baiting and the prevalence of carrion in the winter diet. Immature eagles are more often shot or electrocuted (Reidinger and Crabtree 1974, Newton 1979).

USE AND DEMAND ASSESSMENT

Historic Trends

Mankind has had a lengthy “love - hate” relationship with golden eagles. Their majestic appearance has been adopted as the emblem of nations dating back at least to the Roman Empire (LeFranc and Clark 1983). Early cultures credited them with mythical powers. Golden eagles symbolize strength and speed. Only nobility could fly them when falconry flourished in Europe and Asia (Bent 1937).

Reverence for golden eagles is also deeply imbedded in many Native American cultures, especially in the West. For instance, an Arapaho tribe (southwest U.S.) might capture 50 -100 eagles in a week, harvest select feathers, and release them (Palmer 1988). Among Plains tribes, a typical war bonnet had at least 60 tail feathers. Despite the rarity of golden eagles, Maine’s Abenaki Indians coined a name for them and named a few settings after their presence (Eckstorm 1936).

Admiration for the species continues in different fashions in modern times. For more than 50 years, hawk watchers have traveled great distances to glimpse a golden eagle fly by Hawk Mountain, PA (Broun 1949). The proliferation of this pastime reflects a broadening constituency of citizens participating in non-consumptive uses of wildlife and concerned with conservation issues.

Negative encounters with man largely relate to the traditional stigma of predators as a threat or a rival to human interests. Golden eagles were often persecuted for impacts (actual or perceived) on livestock, poultry, game species, etc. Only one such incident is documented in Maine: a golden eagle was killed and hung along an Oxford County road in 1879 after it attempted to kill a domestic goose (Brewster 1925).

Complaints of golden eagle depredation and related repercussions are more prevalent in the West (Arnold 1954). For instance, a total of 286 golden eagles were bountied in Carter County, Montana during March, 1948 (Woodgerd 1952). More than 20,000 were killed during aerial depredation programs in Texas and New Mexico ranchlands from 1942 to 1962 (Spofford 1953, 1969). Cases of depredation (primarily during lambing at sheep ranches) can be problematic but invariably are localized incidents (Boeker and Bolen 1972, Snow 1973).

Current Assessment

Extreme rarity of the species and related concern for undue publicity of Maine's single eyrie yield minimal opportunity for direct viewing and appreciation of goldens. The few goldens resident in Maine and eastern Canada are highly sought after by many who participate in fall hawk watches, Christmas Bird Counts, nature photography, etc. An estimated 91% of Maine's adult citizens engaged in some nonconsumptive use of wildlife and expended more than \$50 million in 1988 (Boyle *et al.* 1990).

This intrinsic value of goldens as a rare element of the region's traditional wildlife heritage is the basic theme in the preamble to Maine's Endangered Species Act (1975):

“The Legislature finds that various species of fish or wildlife have been and are in danger of being rendered extinct within the State of Maine, and that these species are of esthetic, ecological, educational, historical, recreational, and scientific value to the people of the State. The Legislature, therefore, declares that it is the policy of the State to conserve, by according such protection as is necessary to maintain and enhance their numbers, all species of fish and wildlife found in the State, as well as the ecosystems upon which they depend.”

Projections

Recent trends will likely continue for the foreseeable future. Public demand will promote conservation of the greatest diversity of species possible at state, national, and global levels (Kellert 1980). These desires reflect increasing public perception of the scientific, utilitarian, and cultural values of biological diversity. Many side with ethical arguments for preserving species that are endangered by the actions of society.

SUMMARY AND CONCLUSIONS

The golden eagle is often credited as being the most successful, adaptable, and widespread eagle of its size in the world (LeFranc and Clark 1983). The species has generally adjusted to man's changes on the landscape (Watson *et al.* 1993). However, local populations have experienced setbacks throughout the northern hemisphere.

Goldens have always been a rarity in eastern North America. The region lacks open expanses of uplands and an accessible supply of marmots and lagomorphs, their favored prey. In recent years, the species is represented by small breeding populations in Quebec, Labrador, and Ontario as well as individual pairs nesting in Maine, Georgia, and Tennessee. The species has always been scarce in eastern Canada (Taverner 1922:129), and insights on its status there remain few. James Bay, one of the few areas inventoried for goldens in northern Quebec faces uncertain threats from mercury contamination and major hydroelectric project development (Rimmer 1992).

It has been extirpated as a breeding bird from the Northeast except for a single pair resident in Maine from 1984 to 1997. Ironically, this Piscataquis County site is one of the oldest golden eagle eyries in North America (Spofford pers. comm., Palmer 1988). Abenaki Indians named the site "Sowangan - adjoo," translated as "Eagle Mountain." Traditional residency of goldens there dates back to at least 1736. Steady occupancy during the last 40 years as other golden eyries were vacated in the northeastern U. S. reveals the remarkable loyalty of the species to this location and presumably the qualities that it offers the golden eagle. Other Maine sites appear

suitable but have exhibited no signs of use until a new nest was found at a traditional Somerset County eyrie in June, 1999.

The demise of goldens in the eastern U. S. is generally linked to attrition of the few settings traditionally offering suitable nesting habitat given that adequate foraging areas appear generally limiting in eastern landscapes. However, it is also clear that environmental contaminants had an ominous impact. For nearly 3 decades this problem hampered birds of prey such as bald eagles and ospreys, greatly reducing their former abundance and distribution. The probable impact on goldens (which were "rare" before the onset of this problem) could easily result in species extirpation.

Awareness of the golden eagle in the East has increased markedly in recent years. Modest efforts are revealing nests in remote areas of northern Quebec (Brodeur *et al.* 1996) and the Atlantic coast of Labrador (Kirk and Hyslop 1998). Local insights sometimes infer a long-standing residency of the species prior to their eventual documentation, as in the nearby Gaspé Peninsula of Quebec (Baillie 1955). The prolonged spring "visits" by goldens in mid-Atlantic regions are viewed by some as potential resident breeders instead of migrants slowly moving northward.

Many value Maine's natural resources and its rarities like golden eagles. There are formidable challenges (practical and philosophical) on developing a policy for its conservation. A lasting solution to the phenomenon of golden eagles vanishing as resident birds in the eastern U. S. must have a regional framework and should dovetail with strategies directed at the regional population center in eastern Canada. Available evidence suggests that Maine cannot achieve a "self sustaining" population of golden eagles within state boundaries independently of a broader approach in the Northeast.

Goldens are recognized as an endangered species in both New Hampshire and New York. They are generally classified as “extirpated” residents, or simply as transient visitors, in other eastern states.

Prudent management should consider the integrity of the few traditional golden eagle habitats in Maine and an assessment of risk from lingering environmental contaminants. Many uncertainties of golden eagle conservation in the eastern U. S. may be clarified by greater attention to the population extant in eastern Canada.

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APPENDIX I: GOLDEN EAGLES IN EASTERN NORTH AMERICA

A summary of all credible golden eagle encounters in Maine appears in Table 1. It should be noted that many citizens have not yet learned to distinguish this species from the relatively abundant, immature bald eagle. Exact locations of vulnerable eyries are not specified. Information from published accounts and reliable, unpublished sources appears chronologically. The phenology of golden eagle residency in Maine is:

Nesting = records of known or suspected residency, documented eyries and potential breeding; generally includes observations during March 16 - August 31, unless otherwise indicated by specifics.

Migration = records of apparent transients during fall (September 1 - November 30) and spring (February 1 - March 15) migrations.

Wintering = records of sightings during December 1 - January 31.

Accounts of status and potential breeding residency elsewhere in the East are reviewed to portray the significance of Maine's population. Regional perspectives are limited because breeding goldens were apparently extirpated from most eastern states (Table 2). Their occurrence in the provinces of eastern Canada (Table 3) has not been a priority for in-depth studies. The tables summarize relevant published records but are not exhaustive compilations. Some data on eastern goldens remain confidential. Past and present insights are pivotal to a regional evaluation of goldens in the East.

Numerous reports of migrant and wintering goldens in eastern North America are not included in Tables 2 or 3. Also, sightings from the Atlantic seaboard of the U. S. are likely transients (even if they overlap Maine's nesting season) and are not cited.

Environmental contaminants in an unhatched golden eagle egg collected in Maine during 1996 are reported in Table 4. This is the only such sample from the East.

Table 1. Annotated records of golden eagles in Maine, by county. Eyrie locations deemed confidential are not specified.

| Year(s) | Remarks | (Source) |
|---------------------------------|---|---|
| <u>Aroostook County</u> | | |
| 1898 | Golden shot, Nov. 6 and mounted by S. L. Crosby. | (Knight 1908) |
| 1957-58 | Oxbow: a golden was killed in a leg hold trap baited for bobcat (<i>fide</i> Barden). | (Palmer pers. comm. 3/16/95) |
| 1995 | Mapleton: golden eagle reported, Oct. 27 (<i>fide</i> Down East Bird Line). | (The Guillemot 25:45) |
| 1996 | T15 R13 WELS: 2 eagles (possibly goldens) at deer carcass on St. John River, May 22. | (MDIFW unpubl.) |
| 1997 | T10 R4 WELS: 2 goldens flying over Squapan Lake, June 28. | (MDIFW unpubl.) |
| <u>Cumberland County</u> | | |
| 1881 | Portland: a golden was collected at Peaks Island, date? | (Brown 1882:22) |
| 1891 | Windham: adult male shot at Duck Pond, Oct. 14. | (Brock 1896) |
| 1898 | Portland: 2 goldens were observed nearby, fall (<i>fide</i> Lord). | (Knight 1908) |
| 1982 | Pownal: subadult golden seen flying overhead, Oct. 2 (<i>fide</i> Nickerson). | (Vickery 1979) |
| 1984 | Gorham: golden flew from the Deering Road with a dead porcupine, May 1. | (Dunton pers. comm. 5/4/84) |
| 1994 | East Sebago: subadult came into a cabin, Nov. 29; bird was emaciated and its feet were severely infected from porcupine quills; euthanized Jan. 12, 1995. | (MDIFW unpubl., Pokras pers. comm. 1/12/95) |
| 1997 | Harpwell: golden on fall hawk watch, Oct. 4: "first in 30 years here" (<i>fide</i> Appell). | (Ellison and Martin 1997) |
| <u>Franklin County</u> | | |
| 1880's | Rare occurrence (<i>fide</i> Richards); 3 goldens have been shot in the county (<i>fide</i> Lord). | (Knight 1897, 1908) |
| 1890 | Rangeley Lake: subadult shot, Sept. 19; specimen in Boston Soc. of Natural History. | (Brewster 1925) |
| 1905 | Avon: a golden was observed locally, June 30. | (Sweet 1906) |

Table 1. (continued: page 2 of 13).

| Year(s) | Remarks | (Source) |
|------------------------------------|--|--|
| Franklin County (continued) | | |
| 1920 | Golden nest "used for years was abandoned after road built nearby" (<i>fide</i> Therrian). | (Spofford 1971a) |
| mid-1950's | Goldens seen at large bog near the eyrie found in 1920 (<i>fide</i> Spofford). | (Lucey pers. comm. 5/10/99) |
| 1954 | Goldens seen near the eyrie found in 1955 (<i>fide</i> Nichols). | (Lucey pers. comm. 5/10/99) |
| 1955-66 | Nesting pair monitored annually at confidential sites; occupancy noted yearly; an adult pair and fledgling reported early fall, 1956 (<i>fide</i> Shaw); nest built in 1955 was first used in 1957, apparent alternate to 3 older nests "used for years" on another cliff (<i>fide</i> Shaw) - 1958 all 3 decorated with pine sprigs; old nest reused 1963-65; successful nestings in 1957, 1960 and 1963 - 3 eaglets fledged and banded; filmed 1960 eaglet and rescued it in pond (after fledging) and returned to nest, Aug. 20; eaglet banded on July 10, 1963 was shot in Quarrysville PA, Nov. 5, 1963 = 1st band recovery of a golden banded as a nestling in eastern U. S.; prey included great blue herons, >20 bitterns, ducks, ruffed grouse, crow, broad-winged hawk, snowshoe hare, muskrat, mink, red fox and a deer fawn. | (Spofford 1964; 1971a, b; pers. comm. 9/24/69, 1/9/82, 12/11/85, 4/3/91) |
| 1976 | Carabasset: 2 (presumed) goldens near Sugarloaf Mtn., Feb. 27 (<i>fide</i> Barker). | (Barker pers. comm. 6/19/85) |
| 1979 | No nest or goldens seen at 1955 eyrie (<i>fide</i> Spofford). | (Lucey pers. comm. 5/10/99) |
| 1983 | No nest or goldens seen at 1955 eyrie (<i>fide</i> Spofford). New Sharon: adult golden among migrating hawks, April 28 (<i>fide</i> Appell). | (Lucey pers. comm. 5/10/99) |
| 1985 | Adult golden seen in flight near 1963 eyrie, July 22; remnant debris of old nest. Mount Abram Township: adult golden flying over Lone Mountain, mid-August. | (Todd unpubl.) (Field pers. comm. 9/8/85) |
| 1990 | Wilton: adult golden seen in a field near Wilson Stream, Dec. 14; Strong: adult golden seen perched along Sandy River, Dec. 15. | (Cross pers. comm. 12/17/90) |
| 1993 | Skinner Twp.: 2 goldens spiraling together over Kibby Mountain, Sept. 10; possibly seen again locally at Spencer Bale Mtn., Sept. 13. | (Fletcher pers. comm. 9/15/93) |

Table 1. (continued: page 3 of 13).

| Year(s) | Remarks | (Source) |
|-------------------------------|--|---|
| <u>Hancock County</u> | | |
| ? | Place names suggestive they were former golden eagle haunts include Eagle Bluff (Dedham, Otis) and Eagle Mountain (T34 MD BPP). | (Eckstorm 1936, Atwood 1946:141) |
| 1897 | Otis: Warren shot a golden at Floods Pond, Oct. 14; seen at S. L. Crosby's. | (Knight 1908) |
| 1952 | Deer Isle: golden observed near Butter Island in Penobscot Bay, Aug. 18. | (Hebard 1960) |
| 1956 | Deer Isle: golden observed near Butter Island in Penobscot Bay, Aug. 22. | (Hebard 1960) |
| 1979 | Winter Harbor: golden well-described at Schoodic Pt., May 27 (<i>fide</i> Heck). | (The Guillemot 8:20) |
| 1982 | Lamoine: pair of goldens soaring locally, late-June (<i>fide</i> Williams) - sighting details were not clearly distinctive from immature bald eagle observation. | (The Guillemot 11:19, M. Lucey pers. comm. 5/10/99) |
| 1985 | Prospect Harbor: subadult golden seen, Jan. 30 (<i>fide</i> Townsend). Lamoine: immature golden at carrion; displaced bald eagles and ravens, Jordan R., Jan. 31; photographed. | (Heil 1985) (Todd unpubl.) |
| 1989 | Bar Harbor: golden seen over Cadillac Mtn., Oct. 9 (<i>fide</i> Dearborn). | (The Guillemot 18:49) |
| <u>Kennebec County</u> | | |
| 1987 | Sydney: golden observed locally, March 30 (<i>fide</i> Maine Audubon Soc.). | (The Guillemot 16:14) |
| <u>Knox County</u> | | |
| 1894 | Isle au Haut: late fall migrant; Staples shot a female golden that was feeding on a deer carcass while in the company of a bald eagle, Nov. 17. | (Black 1894) |
| 1956 | North Haven: migrant golden seen near Saddle Island in Penobscot Bay, Aug. 22. | (Hebard 1960) |
| 1980's | Isle au Haut: "rare winter sightings are the norm;" no specific observations. | (Hundley 1988) |

Table 1. (continued: page 4 of 13).

| <u>Year(s)</u> | <u>Remarks</u> | <u>(Source)</u> |
|---------------------------------------|--|---|
| <u>Knox County (continued)</u> | | |
| 1987 | Camden: golden reported over Camden Hills SP, May 1 (<i>fide</i> Chapman). North Haven: adult golden at Dead Horse Point, Oct. 17 (<i>fide</i> P. Lucey) - sighting details were not clearly distinctive from immature bald eagle observation. | (The Guillemot 16:14) M. Lucey pers. comm. 5/10/99 |
| 1993 | Owl's Head: golden flying over Mussel Ridge Channel, Jan. 23. | (Hammond pers. comm. 1/22/93) |
| 1995 | Isle au Haut: golden seen, Aug. 18; "first seen locally in some time" (<i>fide</i> Nelson); sighting details were not clearly distinctive from imm. bald eagle observation. | (The Guillemot 25:39; Lucey pers. comm. 5/10/99) |
| 1999 | Isle au Haut: immature golden seen March (<i>fide</i> Drury). | (MDIFW unpubl.) |
| <u>Lincoln County</u> | | |
| 1932 | Wiscasset: an early fall migrant golden seen, Aug. 10 (<i>fide</i> Peterson). | (Palmer 1949a) |
| 1986 | Nobleboro: golden regularly seen in the area, February through mid-March. | (Styles pers. comm. 3/18/86) |
| 1989 | Waldoboro: golden seen and well described, Sept. 2 (<i>fide</i> Fiore). | (The Guillemot 18:49) |
| 1993 | Newcastle: subadult flying low with a bald eagle seeking fish discarded on ice-covered Sherman Lake, March 31 and in the area again locally on April 27. | (Reimar pers. comm. 4/28/93) |
| 1997 | Waldoboro: 2 goldens ("not bald eagles") seen at Hardy Island, Nov. | (Clark pers. comm. 12/5/97) |
| <u>Oxford County</u> | | |
| ? | Porter: Eagle Mountain (a.k.a. Rattlesnake Mtn.), a former haunt of golden eagles? | (Atwood 1946:141) |
| 1859 | Grafton: approximate date that someone tried to access golden nest on tall cliff fronting the road in Grafton Notch and saw "remains of ducks, geese, lambs, etc." (<i>fide</i> Ryerson). | (Brewster 1925) |
| 1876 | Unsuccessful attempt to climb into an active nest (<i>fide</i> Bernier); confidential site. | (Brewster 1925) |

Table 1. (continued: page 5 of 13).

| Year(s) | Remarks | (Source) |
|----------------------------------|---|--|
| Oxford County (continued) | | |
| 1879 | Grafton: pair of goldens “continues to breed” at Old Speck Mountain (1859 eyrie). | (Brewster 1925) |
| 1880 | Grafton: dead adult golden was found nailed to a roadside pine, just west of Grafton Notch; killed at a nearby farm after capturing a barnyard goose in Aug., 1879. | (Brewster 1925) |
| 1890 | Grafton: an apparent golden seen eating a crow which it had just killed in a Grafton Notch meadow near the 1859 eyrie (<i>fide</i> Ryerson). | (Brewster 1925) |
| 1896 | Grafton: goldens nesting on Eyebrow Ledge (1859 eyrie), Old Speck Mountain (<i>fide</i> Blanchard, Brooks); Davis tried to reach nest but failed as both adults circled nearby. | (Brewster 1925) |
| 1898 | Andover: farmer captured a fledgling (tufts of natal down on its head) in a field; purchased by Thayer for his Lexington, MA aviary; lived > 10 years and laid 2 eggs (Harvard Museum of Comparative Zoology). | (Brewster 1925) |
| 1900-30 | Goldens nested on cliff "more or less continuously" (<i>fide</i> Morrill); confidential site; alternate nest in Coos County, NH during 1920's (<i>fide</i> Bossworth, Nichols). | (Spofford pers. comm. 6/14/80) |
| 1906 | Nest, 2 adults and 2 young goldens were collected from a confidential site and displayed in the Brooklyn Institute of Arts and Sciences (<i>fide</i> Ericson); exhibit portrayed woodchucks as prey; collection transferred to American Museum of Natural History. | (Palmer 1949a, pers.comm. 11/12/85; Cannell pers. comm. 6/28/85) |
| 1927 | Woodstock: Bald Mtn. was a rumored golden eyrie, but peregrines present. | (Spofford pers. comm. 8/8/75) |
| 1933 | Last activity at traditional golden nest; new road built nearby (1900 eyrie). | (Spofford pers. comm. 6/14/80) |
| 1959-62 | Goldens monitored annually at confidential site; 1 successful nest, 1 fledgling in 1959. | (Spofford 1971a) |
| 1965 | Immature golden seen, June 5 near 1900 eyrie (<i>fide</i> Briggs, Maine Audubon). | (Lucey pers. comm. 5/10/99) |
| 1966 | Lincoln Plt.: 2 goldens seen at Azischohos Lake (<i>fide</i> Barron, Maine Audubon). | (Lucey pers. comm. 5/10/99) |
| 1967 | Lincoln Plt.: adult golden along Magalloway River (<i>fide</i> Briggs, Maine Audubon). | (Lucey pers. comm. 5/10/99) |

Table 1. (continued: page 6 of 13).

| Year(s) | Remarks | (Source) |
|----------------------------------|---|--|
| Oxford County (continued) | | |
| 1973 | Sweden: golden seen, July 14 (<i>fide</i> Richards). | (Lucey pers. comm. 5/10/99) |
| 1974 | Golden eagle soaring over a mountain summit, summer; confidential site. | (Gramlich pers. comm. 7/20/76) |
| 1978 | Golden eagle soaring overhead (1974 sighting location), Aug. 11. | (Bauer pers. comm. 8/15/78) |
| 1980 | Magalloway Pt.: golden at a goat carcass placed on Richardson Lake, April 2. | (Rowe pers. comm. 4/16/80) |
| 1981 | Denmark: possible golden eagle sighting at Hancock Pond, June 27; Denmark: apparent golden perched in lone birch in a field, Dec. 20. | (Dyke pers. comm. 6/27/81) (Cooper pers. comm. 1/21/82) |
| 1983 | Successful nesting; 1 downy eaglet (1959 eyrie), June 20; photographed. Waterford: golden flying over Bear Mountain - Bear Lake, Sept. 10. | (Spofford pers. comm. 11/20/87) (Barnes pers. comm. 1/22/84) |
| 1984 | Nest "mostly gone," no eaglet (the 1959 eyrie). Waterford: subadult seen over Hawk Mtn., Oct. 11 (<i>fide</i> Richards). | (Spofford pers. comm. 11/10/87) (Maine Birdlife 6:67) |
| 1985 | Otisfield: emaciated adult captured near north shore of Thompson Lake, April 15; later died in captivity from respiratory complications, June 22. Remnant nest debris only vestige of a traditional cliff nest (1959 eyrie), July 22. | (Todd unpubl., USFWS unpubl. necropsy report) (Todd unpubl.) |
| 1985 | Adult golden seen at confidential site, July 22; previous eagle rumors in early-1980's. | (Todd unpubl.) |
| 1986 | Golden seen, May 4 and Aug. (local to 7/22/85 sighting). | (Ducette pers. comm. 5/5/85, MDIFW unpubl.) |
| 1987 | Lincoln Plantation: golden(s) seen at beaver carcass on Aziscohos Lake, Mar. Deteriorated golden nest (1959 eyrie); now used by red-tailed hawks, June. | (Adkins pers. comm. 3/23/87) (Spofford pers. comm. 11/20/87) |
| 1988 | Waterford: 2 adults reportedly at close range at Hawk Mtn., Sept. 24 (<i>fide</i> Richards). | (Duncan 1989) |
| 1988-89 | Golden seen during winter in vicinity of 1959 eyrie (<i>fide</i> Adkins, Cross). | (Maine Bird Notes 2:37) |
| 1991 | Woodstock: golden reported flying over field west of Redding village, Aug. | (pers. comm. / /91) |

Table 1. (continued: page 7 of 13).

| <u>Year(s)</u> | <u>Remarks</u> | <u>(Source)</u> |
|---|---|--|
| <u>Oxford County (continued)</u> | | |
| 1992 | Two adults sighted on prey along riverbank, Apr. 16 ; both were later observed flying in 2 nearby localities (one of which same as 1985-86 locale); last seen on May 15. | (MDIFW unpubl.) |
| 1992 | Parkertown Township: golden seen flying over Lincoln Pond Road, ; reportedly also seen in same area approximately 5 - 6 years ago. | (Damon pers. comm. 5/1/92) |
| 1993 | Mason Twp.: golden seen in flight overhead at Albany Notch, early-May. | (Crone pers. comm. 5/18/93) |
| 1994 | Rumford: golden observed for 5 mins. soaring over Glass Face Mountain, April 27. | (MDIFW unpubl.) |
| <u>Penobscot County</u> | | |
| 1880 | Adult male golden (weight = 8 ¾ lbs) shot near Brewer, March 12. | (Hardy 1900) |
| 1880's | Written account of predatory bird (possibly goldens) nesting on cliff; confidential site. | (Hubbard 1884) |
| 1962 | Mt. Chase Twp.: subadult golden flew across Shin Pond Road, early June. | (Chapman pers. comm. 6/20/62) |
| 197? | T5 R8 WELS: golden seen flying near Little Messer Pond, Nov. | (pers. comm. / /7) |
| 1980's | T1 R11 WELS: golden eagle activity rumored at Turtle Ridge, summer. | (MDIFW unpubl.) |
| 1991 | Golden eagle seen flying over Penobscot River "near Bangor," Mar. 27 (<i>fide</i> Lucey). | (Perkins 1991) |
| 1993 | Howland: adult golden soaring near Piscataquis River, April 21. Orrington: unconfirmed sighting on Penobscot River, May 12 (<i>fide</i> Maine Audubon). | (MDIFW unpubl.) (The Guillemot 22:26) |
| <u>Piscataquis County</u> | | |
| ? | East Middlesex Canal Grant: Eagle Mountain, a former haunt of golden eagles? | (Atwood 1946:141) |
| 1689 | Written reference (source?) to golden eagle nest; Abenaki Indian lore suggests it was "probably long used before first reported" as a traditional eyrie; confidential site. | (Palmer 1988) |

Table 1. (continued: page 8 of 13).

| Year(s) | Remarks | (Source) |
|---------------------------------------|--|---|
| Piscataquis County (continued) | | |
| 1736 | Written reference (source?) to another golden eagle nest; Abenaki Indian lore suggests it was "probably long used before first reported" as a traditional eyrie; confidential site. | (Palmer 1988) |
| 1838 | Early survey sketch (<i>fide</i> Jackson) of a site (1689 eyrie) was titled "View of the Eagle's Nest (Sow-on-ga-was);" Abenaki name (distinct from that for bald eagle) is translated as "Eagle Mountain;" infers traditional residence by goldens. | (Eckstorm 1936, Spofford pers. comm. 6/14/80) |
| 1879 | "Sowangan - adjoo:" another Abenaki derivative meaning "Eagle Mountain" (but not for bald eagles) was basis for English corruption to name the site (1736 eyrie) on first map to label the area (<i>fide</i> Hubbard); also indicative of traditional residence by goldens. | (Eckstorm 1936) |
| 1920's | Unsuccessful effort to collect eggs from traditional golden eagle nest (1736 eyrie); a second, alternate nest on same ledge (<i>fide</i> Eckstorm, Harris). | (Palmer 1988, Spofford pers. comm. 2/15/91) |
| 1928 | Mount Katahdin Twp.: golden flying over Pamola Peak, Sept. 10 (<i>fide</i> Harper). | (Palmer and Taber 1946) |
| 1936 | Another written account (source?) of goldens nesting at traditional site (1736 eyrie). | (Palmer 1988) |
| 1940's | Nesting goldens "rediscovered" (1736 eyrie); 2 nests on ledge. Another rumored cliff nest of golden eagles (<i>fide</i> Dupree); confidential site. | (Palmer 1949a, Spofford pers. comm. 1/9/82) (Palmer 1949b) |
| 1945 | Chamberlain Lake: 1 golden seen, March 15; had been a traditional haunt for 2 goldens in previous falls; one was shot and positively identified (<i>fide</i> Clarkson). | (Palmer 1949b) |
| 1954-63 | Annual golden residency (1736 eyrie); nested successfully, 2 eaglets in 1957; used old nest (intact since 1920's) in 1954, new nest on same ledge during 1955-59 and a third nest higher on the cliff in 1961; prey remnants = bitterns and great blue herons. | (Spofford 1964,1971a; pers. comm. 6/14/80, 2/15/91, 4/3/91) |
| 1965 | Unsuccessful nest (1736 eyrie) but evidence of golden occupancy. | (Spofford 1971a) |
| 1969-70 | Pair of golden eagles reported "at ledges" (1940's site) during summer. | (Palmer pers. comm. 3/16/95) |

Table 1. (continued: page 9 of 13).

| Year(s) | Remarks | (Source) |
|---------------------------------------|--|--|
| Piscataquis County (continued) | | |
| 1980 | Downy eagle feather below unsuccessful golden nest (1736 eyrie); remnants of 2 alternate nests on same cliff; remains of 1920's "tripod" attempt to reach nest ledge still present; prey debris = 5 great blue herons found below nest, June 14. | (Spofford unpubl., Weik 1987) |
| 1981 | Empty golden nest (1736 eyrie); 2 adults soaring over cliff, June 28. | (Spofford unpubl., Todd unpubl.) |
| 1983 | Successful nesting, 1 downy eaglet at traditional golden nest (1736 eyrie), June 23; fledgling made short flights on cliff, Aug. 17; "whitewash" seen and prey collected during site visit after dispersal = 3 great blue herons, Sept. 24. | (Spofford pers. comm. 7/11/83, Tingley 1983, Weik 1987) |
| 1984 | Eagle Lake Twp.: golden seen at a deer carcass on ice at Eagle Lake, Jan. | (Dumond pers. comm. 4/13/84) |
| 1984 | Goldens resident at traditional cliff but no successful nesting (1736 eyrie); golden flying over a stream and adjacent marsh, Apr. 11; alternate nest (older structure) found in white pine = 1st tree nest documented in ME, Aug. 25. | (Todd unpubl., Cates pers. comm. 12/31/84) |
| 1985 | Full grown eaglet standing on edge of traditional cliff nest (1736 eyrie), July 22. T11 R8 WELS: subadult female caught in a baited fisher trap on a leaning pole at Round Mtn. Pond, Nov. 20; died from myopathy and hemorrhage. | (Todd unpubl.) (Glidden pers. comm. 11/20/85, USFWS unpubl. necropsy 8/31/92) |
| 1986 | Adult goldens adding to nest on 1st surveillance (1736 eyrie), March 20; courtship flights, Mar. 22; incubation began by Apr. 10, terminated by May 25; no eagles after June 19. | (Weik 1987) |
| 1987 | Adult goldens carrying nest materials to cliff and courting (1736 eyrie), March 7; incubation began by Apr. 10, terminated by May 21; intermittent activity at cliff nest until June 14; pair made additions to alternate nest in pine starting June 19; nest contents: eagle eggshell fragments and prey debris = 9 great blue herons (adults, eggshells), 1 double-crested cormorant, 1 common merganser and 4 cast pellets (avian feathers and bones only), Nov. 9. | (Weik 1987) |
| 1988-95 | Annual residency, feeding on nearby carrion, active nesting attempts and failures noted at traditional cliff nest (1736 eyrie); brooding behavior and feeding motions by adults suggestive of hatches in 1993 and 1994 but soon followed by abandonment. | (MDIFW unpubl.) |

Table 1. (continued: page 10 of 13).

| <u>Year(s)</u> | <u>Remarks</u> | <u>(Source)</u> |
|--|---|--|
| <u>Piscataquis County (continued)</u> | | |
| 1990 | Soper Mtn. Twp.: 2 eagles (likely goldens) in pine on Cliff Ridge, Aug. 10 (<i>fide</i> Matula). | (MDIFW unpubl.) |
| 1991 | Two adults perched in beaver flowage snags (near 1736 eyrie), Aug. 20. | (MDIFW unpubl.) |
| 1992 | Spencer Bay Twp.: golden attacked a great blue heron at Spencer Pond, May; golden(s) were also seen flying over Lobster Mtn. during the same time period. Blanchard: golden seen nearby, Aug. 20 (<i>fide</i> Dorchester). T5 R9 WELS: flushed an eagle (likely a golden) from open ledges, Oct. 17. | (Howe pers. comm. 5/12/92) (The Guillemot 21:39) (Anderson pers. comm. 10/19/92) |
| 1993 | Two goldens flying over a pond, May 27 (<i>fide</i> Remian); confidential site. Golden eagle flew over Spider Lake near inlet. | (McPhee pers. comm. 6/5/93) (McPhee pers. comm. 7/27/93) |
| 1994 | Unconfirmed reports of 2 goldens (near 1940's site) during spring. | (Morrison pers. comm. 9/14/94) |
| 1996 | Golden residency and nest failure (1736 eyrie); 2 unhatched eggs retrieved, June 26. | (MDIFW unpubl.) |
| 1997 | Pair residency but no incubation behavior this year at known nest sites (1736 eyrie). | (MDIFW unpubl.) |
| 1998-99 | Single adult golden on territory (1736 eyrie); no evidence of a pair or active nesting. | (MDIFW unpubl.) |
| 1999 | Frenchtown Twp.: adult golden & 7 bald eagles eating bear bait, Aug. 19. | (Morrison pers. comm. 9/2/99) |
| <u>Sagadahoc County</u> | | |
| 1987 | Woolwich: immature golden seen, Feb. 8 (<i>fide</i> Balodis, Duncan, Vickery). | (Maine Bird Notes 1:22) |
| 1988 | Georgetown: "possible" golden seen, Oct. 10-17 (<i>fide</i> Gamble, Nazor). | (The Guillemot 17:48) |
| 1992 | Bath - Phippsburg: Dorr saw an immature golden on Christmas Bird Count, Dec. 18. | (Heil 1983) |
| 1895 | Golden eagle flying and vocalizing, apparently defending a nearby nest; heard eaglet vocalizations from the direction of a cliff on the mountain, Aug. 19; confidential site. | (Knight 1896) |

Table 1. (continued: page 11 of 13).

| Year(s) | Remarks | (Source) |
|------------------------|---|--|
| Somerset County | | |
| 1899 | Grafton: golden killed after being caught in a trap baited with a dead fox atop "Wyman's Mountain" along the North Branch of the Dead River, Nov. | (Nash 1903) |
| 1920's | Occupied golden eagle nest (1895 eyrie, <i>fide</i> Lampert). | (Spofford pers. comm. 6/14/80) |
| 1960's | King and Bartlett Twp.: golden reported at Kibby Camp, Spectacle Pond. Two goldens seen on ridge outcrop, confidential site (<i>fide</i> Conners, Spofford). | (Spofford pers. comm. 1/9/82) (Lucey pers. comm. 5/10/99) |
| 1970's | "Goldens seen several years; once assisted a fledgling in flight." | (Sherman pers. comm. 12/10/81, 1/15/82) |
| 1972 | Subadult golden soaring over a mountain summit, May 28; confidential site. | (Skaling pers. comm. 5/29/72) |
| 1973 | Golden eagle nest "known by locals for years" (<i>fide</i> Joseph); confidential site. | (Spofford pers. comm. 6/14/80) |
| 1974 | Misery Twp.: possible golden seen 3 times at a high ledge, May - July. | (Gilman pers. comm. 1/23/75) |
| 1982 | Golden flying over a clearcut, then perched on wooded edge, July 20. | (Skaling pers. comm. 8/27/83) |
| 1983 | Old "whitewash" below unoccupied golden nest ledge (1973 eyrie), June 23. | (Spofford pers. comm. 7/11/83) |
| 1984 | Unoccupied golden nest still intact and 3 remnant alternates on another nearby cliff (1973 eyrie); no eagles seen there during 1978-80 monitoring. | (Spofford pers. comm. 7/1/80, 12/23/84) |
| 1986 | Nest in good condition (1973 eyrie); no birds seen, April. | (Weik 1987) |
| 1986 | Comstock Twp.: 2 goldens seen in flight, June (<i>fide</i> Spofford). | (Lee pers. comm. 6/27/86) |
| 1987 | Only trace debris left of former nest (1973 eyrie). | (Weik 1987) |
| 1995 | Distant sighting of eagle (apparently a golden) in flight (near 1973 eyrie), Sept. | (MDIFW unpubl.) |
| 1995 | Flagstaff Twp.: adult golden flew to perch on W side of Flagstaff Lake, Nov. | (Thayer pers. comm. 12/9/95) |
| 1996 | Flagstaff Twp.: immature golden flying over Flagstaff Lake, July 29. | (Haggen pers. comm. 7/29/96) |

Table 1. (continued: page 12 of 13).

| <u>Year(s)</u> | <u>Remarks</u> | <u>(Source)</u> |
|---------------------------------|---|--|
| <u>Waldo County</u> | | |
| 1953 | Islesboro : migrant golden observed over West Penobscot Bay, Aug. 20. | (Hebard 1960) |
| 1954 | Islesboro: 2 migrant goldens observed in West Penobscot Bay, Aug. 18. | (Hebard 1960) |
| 1958 | Lincolnville: 2 migrant (?) goldens observed locally, July 20. | (Nichols 1958) |
| <u>Washington County</u> | | |
| 1800's | Very rare occurrence; "probably resident," a golden was shot during summer. | (Boardman 1862; Knight 1897) |
| 1958 | Calais: golden among 8 eagles at Moosehorn NWR, May (<i>fide</i> Townsend). | (Lucey pers. comm. 5/10/99) |
| 1986 | Steuben: golden reported locally, Aug. 31 (<i>fide</i> Bush). | (The Guillemot 15:33) |
| 1987 | Cooper: 2 goldens ("not bald eagles") at Cathance Lake, July 25. | (Lombardi pers. comm. 7/27/87) |
| 1988 | Machias: golden reported locally, May 28 (<i>fide</i> Bush). Roque Bluffs: golden "with large white patches on shoulders, back and underwings.," June 15 (<i>fide</i> Hunt). Calais: 1 ad. & 1 imm. golden at Moosehorn NWR, July 10 (<i>fide</i> Hastings, Despres) - valid descriptive details but may still have been bald eagle sightings. Roque Bluffs: golden eagle observation, Oct. 1 (<i>fide</i> Preston) - sighting details were not clearly distinctive from immature bald eagle observation. | (The Guillemot 17:25) (Peterson 1988, Lucey pers. comm. 5/10/99) (Duncan 1989, Lucey pers. comm. 5/10/99). |
| 1990 | Steuben: immature golden "carefully observed" at Petit Manan NWR, April 16-17. | (The Guillemot 19:15) |
| <u>York County</u> | | |
| 1977 | Limington: apparent golden sightings near Saco River, Apr. 14 and Apr. 20. | (Haley pers. comm. 4/21/77) |
| 1977 | Newfield : 2 goldens soaring over mountain summit, July 22; confidential site. | (Ramsdell pers. comm. 9/5/87) |
| 1983 | Kennebunk: 2 immature goldens seen for 10-15 mins. at Kennebunk Plains (<i>fide</i> Vickery, Wells). | (Maine Bird Notes 1:22) |

Table 1. (continued: page 13 of 13).

| Year(s) | Remarks | (Source) |
|--------------------------------|--|-------------------------------|
| York County (continued) | | |
| 1987 | York: golden reported locally, Oct. 22 (<i>fide</i> Maine Audubon Soc.). | (The Guillemot 16:43) |
| 1988 | York: golden reported at Mt. Agamenticus, Feb. 28 (<i>fide</i> Maine Audubon Soc.). | (The Guillemot 17:16) |
| 1989 | York: adult golden photographed at Mt. Agamenticus, March 27 (<i>fide</i> Phinney). | (Maine Bird Notes 3:5) |
| 1990 | Newfield : a golden carrying prey flew low over Rt. 110, May 24. | (Haskell pers. comm. 5/24/90) |
| 1992 | York : immature golden seen on Christmas Bird Count, Dec. 20 (<i>fide</i> Ficker, Vickery). | (Heil 1983) |
| 1993 | Kennebunk: golden reported at Kennebunk Plains, Mar. 11 (<i>fide</i> Maine Audubon). | (The Guillemot 22:19) |
| 1994 | Limington: golden observed circling west of Maloy Mountain, June 22 (<i>fide</i> Haskins). | (MDIFW unpubl.) |

Table 2. Annotated accounts of golden eagle status, residency and potential breeding records in the eastern United States (excluding Maine, see Appendix Table 1). Eyrie locations deemed confidential are not specified.

| Year(s) | Locality: Remarks | (Source) |
|---------------------------|---|--|
| <u>Connecticut</u> | | |
| 1890's | Statewide: golden eagles are a "rare visitor in all seasons; they are accidental stragglers in summer and a rare visitant in winter." | (Minot 1895:383; Sage 1913:81, 194, 278; Bigelow 1914:102) |
| 1926 | Hartford Co.: a golden was seen in South Windsor, March 23 (<i>fide</i> Vibert). | (Bagg and Eliot 1937:127) |
| 1980 | Litchfield Co.: golden seen in Litchfield, June 8 (<i>fide</i> Carrier); "unique this summer." | (Vickery 1980) |
| <u>Georgia</u> | | |
| 1800's? | Statewide: casual occurrence "throughout the year;" possibly breeding in northern in previous years. Towns & Union Co.: Brasstown Bald was a rumored nest site. | (Burleigh 1958:189) |
| 1900's | Statewide: rare occurrence "at all seasons;" not clearly documented as breeding. | (Greene et al. 1945:35) |
| 1913 | Butts Co.: male golden collected, April 3; first record documented by a specimen. | (Griffin 1941) |
| 1939 | Lumpkin Co.: a golden was seen along Rt. 19 in northern part of county; it was perched and being harassed by gnatcatchers, July 3. | (Sciple and Griffin 1939) |
| 1939 | Stephens Co.: reported golden eyrie; vultures, no eagles seen on July 9 visit. | (Sciple and Griffin 1939) |
| 1940 | Union Co.: a golden was seen near Woody's Gap, April 26 "suggesting possible breeding locally in Georgia's northern mountains." | (Bell 1940) |
| 1944 | Rabun Co.: subadult golden seen circling a mountain peak above Lake Rabun near Lakemont; vocalized and seen 3 other times, June 8; 1940 sighting was 30 miles west. | (Bell 1944) |
| 1951 | Dougherty Co.: dead golden found on the edge of a cypress pond, April 15. | (Hopkins 1951) |
| 1984 | Co.: a golden was seen at Harvey's Knob, April 13 (<i>fide</i> Moore). | (Hall 1984) |
| 1985 | Rabun Co.: 4 goldens seen at Chattahoochee NF, April 3 (<i>fide</i> DiGioia). | (Hall 1985) |

Table 2. (continued: page 2 of 16)

| Year(s) | Remarks | (Source) |
|-----------------------------------|---|-------------------|
| <u>Georgia (continued)</u> | | |
| 1986 | Rabun Co.: a golden was seen at Chattahoochee NF, March 28 (<i>fide</i> DiGioia). | (Hall 1986b) |
| 1990 | Lumpkin Co.: golden seen, May 29 (<i>fide</i> Freeman); “unusual date and place.” | (Hall 1990) |
| <u>Kentucky</u> | | |
| 1919 | Warren Co.: golden “captured” near Bowling Green, April; bird was displayed locally. | (Wilson 1922) |
| 1935 | Monroe Co.: golden eagle captured near TN line, July 4 (<i>fide</i> Reed). | (Mengel 1985:215) |
| 1946 | Wayne Co.: golden(s) in “all seasons” (<i>fide</i> Spann); area is 18 km N of 1927 TN eyrie. | (Mengel 1965:215) |
| 1950’s | Cumberland Plateau: unproven, consistent rumors of golden nests on local cliffs. | (Mengel 1965:215) |
| 1951 | Wayne Co.: golden(s) seen in “all seasons” in same area as 1946 sighting (<i>fide</i> Spann). | (Mengel 1965:215) |
| 1960’s | Goldens “probably nested in colonial times;” now a very rare winter resident or vagrant; favor rugged parts of the Cumberland Plateau and large water bodies. | (Mengel 1965:214) |
| 1991 | Rowan Co.: an unusual sighting of a golden, April 21 (<i>fide</i> Busroe). | (Hall 1991) |
| 1998 | Whitley Co.: immature golden seen locally, June 17 (<i>fide</i> Denton <i>et al.</i>). | (Hall 1998d) |
| <u>Maryland</u> | | |
| 1993 | Allegany Co.: golden eagle observed, April 18 (<i>fide</i> O’Brien). | (Hall 1993a) |
| <u>Massachusetts</u> | | |
| 1800’s? | “Northern mountains:” occasionally seen in winter “where a few pairs doubtless continue to breed;” golden eagles taken in winter every few years (<i>fide</i> Brewster). | (Minot 1895:383) |
| 1850’s | Essex Co.: golden eagles are a “rare resident.” | (Putnam 1856) |

Table 2. (continued: page 3 of 16)

| Year(s) | Remarks | (Source) |
|---|---|--|
| <u>Massachusetts (continued)</u> | | |
| 1883 | Berkshire Co.: golden soaring over Mt. Greylock, June; locals claimed this was a traditional nest for years; 4 specimens collected locally at Williams Coll. Museum. | (Brewster 1884) |
| 1890's | Western regions: very rare permanent resident; eastern regions: very rare visitor; goldens have been collected in Brighton, Fairhaven, Lanesboro, Lynn, Lexington, Lynnfield, Monson, Paxton, Salem, Weymouth and Williamstown. | (Howe and Allen 1901:64) |
| 1890's | Berkshire Co.: golden flying and perching at the "Serpentine" Cliff overlooking Hoosac Tunnel Railroad Station, Florida (<i>fide</i> Ruberg). | (Bagg and Eliot 1937:127) |
| 1890's | Berkshire Mountains: goldens are "rare permanent residents." | (Faxon and Hoffman 1900) |
| ≤1900 | Berkshire Mountains: resident in earlier years; many specimens shot or trapped previously in the area; now a "rare visitor;" no current breeding. | (Griscom and Snyder 1955:71) (Bigelow 1914:102) |
| 1927 | "Western mountains: former breeding resident but never common; they were extirpated by gun, trap and poison;" currently most seen in autumn and winter. | (Forbush 1927:147) |
| 1991 | Worcester, Franklin & Hampshire Co.: wintering golden lingered into spring at Quabbin Reservoir; Berkshire Co.: an immature golden seen in Great Barrington (<i>fide</i> French). | (Perkins 1991) |
| <u>New Hampshire</u> | | |
| 1830's | White Mountains: young golden eagle "taken from nest, August - it was held in captivity and subsequently trained;" nest location was not specified. | (Nuttall 1832:64, Chamberlain 1891:17) |
| 1849 | Coos Co.: golden collected at Upton (<i>fide</i> Allen); alludes to "very recent capture?" | (Maynard 1877:134) |
| 1855 | Grafton Co.: unsuccessful attempt to reach a nest which had been occupied "for a number of years" on Eagle Cliff at Profile Lake, Franconia Notch. | (Baird et al. 1874:316) |

Table 2. (continued: page 4 of 16)

| Year(s) | Remarks | (Source) |
|---|--|--------------------------------|
| <u>New Hampshire (continued)</u> | | |
| 1860's | Breeds in mountainous regions; low numbers. | (Samuels 1869:51, 1875:51) |
| 1876 | Carrol Co.: nest with 2 eaglets at White Horse Ledge near North Conway, July 6; unsuccessful attempt to reach the nest; site was abandoned in 1877. | (Hawes 1878; Allen 1903:100) |
| 1876-96 | Coos Co.: goldens regularly nested on a cliff during recent years and occasionally during this period but abandoned the area after 1896; confidential site; reportedly prey on geese in Magalloway Settlement; 1 or 2 goldens possibly shot (<i>fide</i> Hart). | (Brewster 1925) |
| 1877 | Grafton Co.: golden was observed flying over summit of Mt. Lafayette (<i>fide</i> Minot).. | (Allen 1903:101) |
| 1880's | Goldens reside on inaccessible cliffs in ME, NH and VT; "nowhere abundant." | (Capen 1886:81) |
| 1890's | Northern mountains: occasionally seen during summer "where a few pairs doubtless continue to breed in remote areas;" one taken in winter every few years. | (Minot 1895:384) |
| 1890's | White Mountains: golden eagles are a "rare visitor and former resident breeder." | (Bigelow 1914:102) |
| 1895 | Grafton Co.: golden observed over the summit of Mt. Lafayette (<i>fide</i> Brewster). | (Allen 1903:101) |
| 1890's | Coos Co.: goldens nested in the Lake Umbagog region; confidential site. | (Brewster 1925) |
| 1890's | White Mountains: a few pairs formerly nested; no recent breeding records. | (Allen 1903:100) |
| 1897 | Coos Co.: adult and immature golden seen at Curtis Meadow, Androscoggin River on Sept. 20; adult seen at Sargent Cove, Lake Umbagog on Oct. 4; both near 1890's eyrie. | (Brewster 1925) |
| 1898 | Coos Co.: 2 goldens seen at Metalluc Pond, Sept. 21 (near 1876-96 eyrie). | (Brewster 1925) |
| 1920's | White Mountains: golden eagle nest (<i>fide</i> Bassworth); alternate site in ME. | (Spofford pers. comm. 6/14/80) |
| 1927 | White Mountains: "former breeding resident but never common; they were extirpated by gun, trap and poison;" currently a rare fall transient. | (Forbush 1927:147) |

Table 2. (continued: page 5 of 16)

| Year(s) | Remarks | (Source) |
|---|--|---|
| <u>New Hampshire (continued)</u> | | |
| 1951-62 | Coos Co.: pair of resident goldens (1876-96 site) at least 10 years during the period; successful nesting in 1954 and 1955, possibly 1952: 6 nestings- fledged 2 eaglets; eaglet apparently lost after hiking disturbances, 1957; nests soon deteriorated although eagles reported locally through 1962; first encountered by woodsmen (<i>fide</i> Proctor). | (Spofford 1971a, pers. comm.7/1/80; Palmer unpubl.) |
| 1966 | White Mountains: golden eagle sightings in June and July. | (Foss 1994:375) |
| 1971 | White Mountains: golden eagle sightings in summer and fall. | (Foss 1994:375) |
| 1981-86 | Statewide: 16 sightings of adults or immatures during atlassing effort, mostly in Connecticut River Valley, White Mountains and northern regions; not seen in winter. | (Foss 1994:375) |
| <u>New York</u> | | |
| 1700's? | "Highlands region, Catskill Mountains and Adirondack Mountains: golden eagles were never common but undoubtedly nested in these areas during early colonial times." | (Eaton 1914:90) |
| 1770's | Hudson Valley: Revolutionary War soldier tried to access golden nest (<i>fide</i> Audubon). | (Ford 1957:109) |
| 1835 | Orange Co.: golden eagles nested at Storm King Mountain (<i>fide</i> Audubon). Hudson River Valley: "saw a few golden nests on bluffs along river (<i>fide</i> Audubon). | (Spofford 1971b) (Ford 1957:109,) |
| 1840's | Hudson Valley: golden nest on a cliff for 8 successive years; a juvenile attacked cattle once, Sept.; a few years later an adult was attracted to carrion, Jan. | (Burroughs 1871:135-136) |
| 1860's | Breeds in mountainous regions; low numbers. | (Samuels 1869:51, 1875:51) |
| 1870's | Hudson River Valley: formerly "not infrequent along riverside cliffs but "driven away by railroads and steamboats;" low numbers breed in mountain regions. | (Baird et al. 1874:316) |
| 1877 | "Highlands region: possibly nesting in secluded areas" (<i>fide</i> Mearns). | (Eaton 1914:90) |

Table 2. (continued: page 6 of 16)

| Year(s) | Remarks | (Source) |
|------------------------------------|--|---------------------------------------|
| <u>New York (continued)</u> | | |
| 1880's | Adirondack's: golden eagles are resident but are a rarity in the area. | (Merriam 1881) |
| 1895 | Hamilton Co.: golden eagles reportedly nested for years in Morehouse on cliffs near the headwaters of West Canada Creek; Ralph found peregrines nesting there but also recovered prey debris with mammal bones at the base of the cliff, May 16. | (Bagg 1897) |
| 1896 | Oneida Co.: golden eagle shot, wounded and captured at Clinton in early May; kept in captivity for "some time;" second local record of the species. | (Bagg 1897) |
| ≤1910 | Adirondack's: golden eggs were collected (<i>fide</i> Ralph); Chumming, Columbia, Fulton, Herkimer, Madison, Monroe, Orange, Putnam, Rensselaer, Schenectady, Steuben, Suffolk, Washington and Westchester Counties: 60 golden observations or specimens to date. | (Eaton 1914:90) |
| 1915-50 | Essex Co.: goldens nested on cliff nest at small pond near Lake Champlain "from at least 1915 -50; no successful nestings; frequent disturbance by fishermen; nest successes reported during 1930's; golden shot at nest in 1950; confidential site. | (Spofford 1971b, pers. comm. 9/24/69) |
| 1926-62 | Franklin Co.: Saunders first reported a golden on June 26, 1926; "nearly a dozen golden eagles shot or killed in the Upper St. Regis Lake area;" a pair was observed nest building on a nearby cliff in March, 1962. | (Spofford 1971b) |
| 1933 | Essex Co.: golden seen near New Russia in Adirondack's, Sept. 12 (<i>fide</i> Rogers). | (Carleton 1951) |
| 1937 | Essex Co.: adult golden observed to assist a fledgling in flight near Lower Ausable Lake in the "High Peaks" region of the Adirondack's, July 11 (<i>fide</i> Reagan). | (Palmer 1988) |
| 1940-60 | Adirondack's: Undisclosed location with 2 old cliff nests: "at least a dozen golden eagles" were shot or trapped locally; site abandoned after April, 1960. | (Spofford 1971b) |
| 1940-70 | Reasonable evidence that goldens "probably have nested in 4-6 counties." | (Spofford 1971b) |

Table 2. (continued: page 7 of 16)

| Year(s) | Remarks | (Source) |
|------------------------------------|--|---|
| <u>New York (continued)</u> | | |
| 1946 | Adirondack's: adult and "a juvenile learning to fly" at undisclosed location (<i>fide</i> Linton), summer. | (Broun 1949:193) |
| 1951 | Monroe Co.: a "late migrant" golden seen near Rochester, May 20. | (Spofford 1959b) |
| 1953 | St. Lawrence Co.: immature golden seen near Degrasse, May 23 (<i>fide</i> Trimm). | (Spofford 1959b) |
| 1954 | Yates Co.: golden seen over Pinnacle Hill in Branchport, May 25. | (Spofford 1959b) |
| 1955 | Seneca Co.: Bauer saw 2 adult goldens circling above ducks in a marsh at Holand's Island north of Montezuma NWR., June 1; goldens also engaged in courtship display and talon grappling; Bauer also saw a juvenile golden locally, date? | (Spofford 1959b) |
| 1956 | L Co.: 2 nests found at cliff 120 m apart; golden eagle trapped locally, Oct. | (Spofford 1964, 1971b) |
| 1957 | L Co.: first golden eagle nestling banded in the East (1915 eyrie), June 10. | (Spofford 1964, 1971b) |
| 1957-60 | H Co.: goldens but no nest found 25 miles from 1915 eyrie; confidential site. | (Spofford 1964, 1971b) |
| 1957-62 | Essex Co.: nest monitored (1915 eyrie); "decorated" in 1959-61; no nesting success. | (Spofford 1964, 1971b) |
| 1966-68 | L Co.: new nest in pine near remote lake (= 1st tree nest in eastern US) "miles away" from cliff alternates (eyrie). | (Spofford 1964, 1971b; pers. comm. 9/24/89) |
| 1 | | |
| 1966-70 | Essex Co.: nest intact (1915 eyrie); occupied during 1966-69; frequent disturbance from hikers but incubation continued into June during 1967. | (Spofford 1964, 1971b; pers. comm.) |
| 1967-69 | H Co.: empty nest in a pine on steep slope by large marsh miles from previous sightings (1957 eyrie); pair was either non-breeding or failures in all nest attempts. | (Spofford 1964, 1971b) |
| 1969 | L Co.: large eaglet in tree nest (eyrie) "watched for several weeks until it disappeared after a violent storm," July 10; site abandoned afterwards. | (Spofford 1964, 1971b) |

Table 2. (continued: page 8 of 16)

| Year(s) | Remarks | (Source) |
|------------------------------------|---|---|
| <u>New York (continued)</u> | | |
| 1970 | H Co.: successful nesting (1957 eyrie); 1 eaglet fledged during 1st week of Aug. | (Spofford 1971b) |
| 1970-72 | Adirondack's: 5 territorial pairs (disputed by Spofford) declined to only two; 5 active nest attempts and 2 successful nestings observed in 3 territories; also 5 sightings of wintering goldens eating carrion on ice of frozen lakes in the area. | (Singer 1974, Spofford pers. comm. 2/15/91) |
| 1980 | Essex Co.: intact tree nest (1915 eyrie), July 3; site abandoned since 1969. | (Spofford pers. comm. 7/14/80) |
| 1981 | Adirondack's: pair of goldens observed, midsummer (<i>fide</i> Lee); "only one in East?" | (Kibbe 1981) |
| 1982 | Dutchess Co.: golden observed on August 12 (<i>fide</i> Waterman Bird Club). | (Paxton et al. 1983) |
| 1985 | Sullivan Co.: "early" golden seen at Cimmaron Pond, Aug. 29 (<i>fide</i> Tramontano). | (Paxton et al. 1986) |
| 1986 | Sullivan Co.: golden was observed at Mongaup Reservoir, late March. | (Boyle et al. 1986) |
| 1987 | Sullivan Co.: golden was observed at Summitville, April 23 (<i>fide</i> Tramontano). | (Boyle et al. 1987) |
| 1988 | Ulster Co.: "immature" golden in the Catskill's, July 17 (<i>fide</i> Kleinbaum). | (Paxton et al. 1988) |
| 1991 | Rockland Co.: golden seen at Hook Mtn., Mar. 25 (<i>fide</i> French). | (Boyle et al. 1991) |
| 1992 | Sullivan Co.: rare spring record of an adult at the Bashakill, May 10; also a golden was observed at Middle Creek, April 15 (<i>fide</i> Hill). | (Boyle et al. 1992) |
| 1995 | Sullivan Co.: prolonged pair residency but no evidence of nesting (<i>fide</i> Loucks); Monroe Co.: immature golden near Greece, July 18 (<i>fide</i> Griffith). | (Paxton et al. 1995) |

Table 2. (continued: page 9 of 16)

| Year(s) | Remarks | (Source) |
|-----------------------|--|--------------------------|
| North Carolina | | |
| ? | Western mountains: place names suggestive they were former golden eagle haunts (Lee and Spofford 1990) include Eaglenest Creek, Eaglenest Mountain, Eaglenest Ridge, Eaglenest Branch, etc. (<i>fide</i> Powell); Swain Co.: Eagle Creek named “from the fact that a nest of eagles was found near its head” near Fontana Lake; possibly confused with historic bald eagle nests. | (Lee and Spofford 1990) |
| 1800’s? | “Goldens formerly nested in both New England and in the southern Appalachian’s.” | (Burleigh 1958:189) |
| 1800’s? | “Once a sparse, resident breeder in mountainous regions;” rare visitor in eastern regions. | (Palmer 1988) |
| 1885 | Western regions: pairs often seen circling in late-May; likely breed on inaccessible ledges of higher mountains; “descend into valleys to prey on lambs, geese, etc.” | (Brewster 1886) |
| 1886 | Buncombe Co.: golden seen perched atop a dead tree on Black Mountain, Sept. 12; occasionally seen on the higher mountains; a “very rare resident. | (Cairns 1887, 1889) |
| 1900’s? | ”Consistent breeding rumors in high mountains; no egg or eaglet records;” Pender Co.: origin of a golden kept for years at Pullen Park, Raleigh (<i>fide</i> Brimley). | (Pearson et al. 1942:98) |
| 1909 | Burke Co.: golden eagle seen flying over Lenoir, August 18. | (Wayne 1910) |
| 1917 | Rutherford Co.: golden shot near Cliffside, Sept. 13; Haynes bought it for mounting. | (Moore 1917) |
| 1919 | Graham Co.: golden eagle identified during May (<i>fide</i> Potter). | (Pearson et al. 1942:98) |
| 1920’s | Western mountains: “possibly still” an extant breeder. | (Forbush 1927:145) |
| 1928 | Watauga Co.: golden observed at Blowing Rock, Aug. 16 (<i>fide</i> Murray). | (Pearson et al. 1942:99) |
| 1930’s | Mountainous regions: “possibly only extant breeding of the species in eastern US.” | (May 1935:79) |
| 1933 | (7 mi Ash’vl Co.: golden seen twice at 3500 foot elevation on Pine Mtn., Sept. 30. | (Clark and Clark 1934) |
| 1940’s | Western mountains: vague reports that goldens are “still” a permanent resident. | (Broun 1949:188) |

Table 2. (continued: page 10 of 16)

| Year(s) | Remarks | (Source) |
|--|--|------------------------------|
| <u>North Carolina (continued)</u> | | |
| 1950's | Southwestern region: reported as southern breeding limit in the Alleghenies. | (Henniger and Jones 1957) |
| 1956 | Brevard: 2 goldens in extended display flights, March 14. | (Palmer 1988) |
| 1983 | Great Smoky Mountains NP: 2 goldens seen, April 23 (<i>fide</i> Stringer). Buncombe Co.: a golden seen on May 5 (<i>fide</i> Ruiz). | (Hall 1983) (Palmer 1988) |
| 1987 | Co.: golden at Black Balsam Knob, "as late as May 4" (<i>fide</i> McNair). | (Hall 1987) |
| <u>Pennsylvania</u> | | |
| 1850's | Co.: Susequehanna River Bluff. | (Lee and Spofford 1990) |
| 1883 | Chester Co.: Doan collected a male golden on western border of county, April 15. | (Ressel 1889) |
| 1894 | Chester Co.: Quigley shot and injured an immature at Berwyn, April 7; it was captured and kept at Sorrel House Tavern for several years. | (Burns 1916:54) |
| 1898-99 | Warren Co.: golden(s) seen at Warren, Nov. - April 1 (<i>fide</i> Simpson). | (Todd 1940:150) |
| 1899-1932 | Clearfield Co.: "probable breeding of golden eagles." | (Todd 1940:150) |
| 1908 | Centre Co.: golden eagle was observed in "Stone Valley," April 16 (<i>fide</i> Musgrave). | (Todd 1940:150) |
| 1917 | Perry Co.: "pair of young bald eagles or goldens" flew across the Susquehanna River at Liverpool, April 25; harassed by a hawk. | (Hofman 1917) |
| ≤1850's | York Co.: golden nest on a cliff on Susquehanna River at the mouth of Peqvea River (<i>fide</i> Raub); goldens considered a "former rare resident" (<i>fide</i> Beck). | (Lee and Spofford 1990) |
| 1926 | Philadelphia Co.: Gilpin banded adult golden near the city in May; recovered in WV. | (Broun 1949:193) |
| 1940 | Butler Co., Cameron Co., Greene Co. and Washington Co.: since 1900, sightings during breeding season; at present, goldens are transients or "winter wanderers." | (Todd 1940:150) |

Table 2. (continued: page 11 of 16)

| Year(s) | Remarks | (Source) |
|--|--|---|
| <u>Pennsylvania (continued)</u> | | |
| 1972 | Monroe Co.: unusual golden sighting at Tocks Island, June 31. | (Street 1975) |
| 1980 | Beaver Co.: golden at Raccoon Creek SP, May 1 (<i>fide</i> Kerlin); Allegheny Co.: golden seen, May 4 (<i>fide</i> Hess); McKean Co.: injured golden recovered, spring (<i>fide</i> Highhouse). | (Hall 1980) |
| 1982 | Co.: a golden was seen at Pittsfield, May 16 (<i>fide</i> Ostrander). | (Hall 1982) |
| 1983 | Erie Co.: "very late" sighting of 2 goldens at Presque Isle SP, May 20 (<i>fide</i> Leberman). | (Hall 1983) |
| 1984 | Lancaster Co.: "very late" golden at Middle Creek WMA, May 12 (<i>fide</i> Santner). | (Boyle et al. 1984) |
| 1985 | Erie Co.: a golden was seen at Waterford, May 8 (<i>fide</i> Stull); Westmoreland Co.: another golden seen at Powdermill Nature Reserve, late spring (<i>fide</i> Schmidt). | (Hall 1985) |
| 1986 | Lancaster Co.: golden was observed at Middle Creek WMA, late March. Schuylkill Co.: golden seen at Tusacrora Summit, April 20 (<i>fide</i> Garner). Centre Co.: "most unusual sighting of a golden eagle, June 11 (<i>fide</i> Bordner). | (Boyle et al. 1986) (Hall 1986b) (Hall 1986c) |
| 1988 | Berks & Schuylkill Cos.: "unusually late" golden observed at Hawk Mtn., May 9 (<i>fide</i> Goodrich). McKean Co.: golden seen at Bradford, Mar. 27 (<i>fide</i> Young) and Co.: golden was observed at Colyer Lake (<i>fide</i> Butler). | (Boyle et al. 1988) (Hall 1988a) |
| 1991 | Warren Co.: golden seen, Mar. 15-16 (<i>fide</i> Highhouse); Centre Co.: golden seen, Mar. 24 (<i>fide</i> Kimmel); Crawford Co.: golden seen at Conneaut Marsh, Mar. 23 (<i>fide</i> Leberman). | (Hall 1991) |
| 1992 | Warren Co.: golden seen in Warren, May 2 (<i>fide</i> Stedman). | (Hall 1992) |
| 1997 | Warren Co.: golden eagle seen at Kinzua Dam, Aug. 13 (<i>fide</i> Grisez). | (Hall 1998a) |
| 1998 | Co.: golden eagle seen at Lake Somerset, Apr. 3 (<i>fide</i> Matko). Hyde Co.: golden seen at Gull Rock Game Land, April 14 (<i>fide</i> Pipehoff). | (Hall 1998c) (Davis 1998) |

Table 2. (continued: page 12 of 16)

| Year(s) | Remarks | (Source) |
|------------------------------|--|------------------------------------|
| <u>South Carolina</u> | | |
| 1926 | Piedmont region: occasional reports, "breeders probably stray down from mountains." | (Pickens 1927, 1928) |
| <u>Tennessee</u> | | |
| 1800's? | Reportedly, goldens were formerly a sparse, resident breeder. | (Palmer 1988) |
| 1902 | Co.: 2 goldens in Bent collections at Museum of Comparative Zoology (#252,795; #252,796) "taken from a nest on Walden's Ridge in Cumberland Mtns.;" reportedly raised in captivity for >1 year but some inconsistency in background documentation. | (Bent 1937, Lee and Spofford 1990) |
| 1920's | Eastern regions: possibly still an extant breeder. | (Forbush 1927:145) |
| 1927 | Fentress Co.: pair goldens near well-maintained (but empty) cliff nest on Cumberland Plateau, May 31; great horned owls preempted nest this year; confidential site. | (Ganier 1937) |
| 1930 | Fentress Co.: 3 goldens (including 1 immature) near 1927 eyrie, May 31. | (Ganier 1937) |
| 1935 | Clay Co.: golden eagle captured near KY line, July 4 (<i>fide</i> Reed). | (Mengel 1985:215) |
| 1986 | Co.: golden at Land-between-the-Lakes, April 5 (<i>fide</i> Blunk). | (Imhof 1986) |
| 1930's | Eastern regions / mountainous: possibly only extant breeding in eastern US | (May 1935:79) |
| 1960's | Co.: golden(s) at Roan Mtn. for "a month during spring lambing and again in fall." | (Dubke 1964) |
| 1986 | Co.: golden at Land-between-the-Lakes, April 5 (<i>fide</i> Blunk). | (Imhof 1986) |
| 1990 | Co.: a "late" golden observed at Johnson City, April 14 (<i>fide</i> Koury). | (Hall 1990) |
| 1991 | Sullivan Co.: golden observed, May 6-14 (<i>fide</i> Cross); golden on the Blue Ridge at Jones Gap SP, Apr. 27 (<i>fide</i> Worthington). | Co.: (Hall 1991, LeGrand 1991) |

Table 2. (continued: page 13 of 16)

| Year(s) | Remarks | (Source) |
|-------------------------------------|--|-------------------------------------|
| <u>Tennessee (continued)</u> | | |
| 1993-97 | Active nesting pair over the Cumberland River near Cookeville; successfully nested 1993, 1994 and 1996; one of the resident adults was found dead locally in March, 1997 = bird originated from a 1985 Georgia reintroduction. | (Walker pers. comm. 4/28/97) |
| <u>Vermont</u> | | |
| 1870's | Golden eagles breed in mountainous regions; low numbers. | (Baird et al. 1874:316) |
| 1880's | Goldens reside on inaccessible cliffs in ME, NH and VT; "nowhere abundant." | (Capen 1886:81) |
| 1890's | Mountainous regions: goldens apparently "resident" in remote areas. Rutland Co.: 2 young golden eaglets taken from a nest at Pond Mtn. (<i>fide</i> Ralph). | (Minot 1895:384) (Eaton 1914:90) |
| 1860's | Breeds in mountainous regions; low numbers. | (Samuels 1869:51, 1875:51) |
| 1900 | Rutland Co.: goldens "possibly still breeding" at Pond Mountain (<i>fide</i> Ralph). | (Eaton 1914:90) |
| 1910's | Mountainous areas: goldens are former residents, now rare visitors." | (Bigelow 1914:302) |
| 1927 | Mountainous areas: "former breeding resident but never common; they were extirpated by gun, trap and poison;" currently a rare fall transient. | (Forbush 1927:147) |
| 1934 | Bennington Co.: juvenile golden captured alive by a farmer while attempting to prey on a domestic goose; 3 others previously collected in the Bennington area. | (Wallace 1937) |
| 1973 | Co.: adult golden seen twice at Victory Bog, Moose River, June; Co.: emaciated juvenile golden was found near Warren, October. | (Spofford pers. comm. 7/14/80) |
| 1991 | Chittenden Co.: immature seen near Williston, April 11 (<i>fide</i> Riley). | (Perkins 1991) |
| 1992 | Addison Co.: golden seen in Addison, Mar. 29 (<i>fide</i> Ellison, Martin <i>et al.</i>). | (Perkins 1992) |

Table 2. (continued: page 14 of 16)

| Year(s) | Remarks | (Source) |
|-----------------|---|--------------------------------------|
| Virginia | | |
| 1890's | Allegheny Mountains: every indication that goldens breed on cliffs although positive evidence is lacking; Giles Co.: often pass Bald Knob headed southward; Co.: 3 goldens seen at Mountain Lake as late as May 19; statewide more common winter than summer; less common in coastal regions. | (Bailey 1912:119) |
| 1891-1906 | Montgomery Co.: irregular fall and winter visitor; one summer record on Aug. 15. | (Smyth 1912) |
| 1900's | Mountainous settings: resident farmers report that goldens nest locally. | (Murray 1933) |
| 1913-14 | Fauquier Co.: golden eagle specimen collected from "The Plains," springtime record. | (Murray 1933) |
| 1926 | Nottoway Co.: Henderson collected one, collection date unknown (<i>fide</i> Handley). | (Murray 1933) |
| 1931 | Highland Co.: 2 goldens seen at Devil's Backbone, a mountain cliff near WV border. | (Brooks 1934) |
| 1935 | Highland Co.: "good reason to believe a pair of goldens nested at Devil's Backbone near Crabbottom (<i>fide</i> Murray). | (Lee and Spofford 1990) |
| ≤1940's | Shenandoah Co.: reportedly goldens "had nested on western face of Massanutten Mountain" (<i>fide</i> Handley). | (Lee and Spofford 1990) |
| 1952 | Giles Co.: reportedly location of "most recently active golden nest in southeastern US;" goldens seen here at Little Stony Creek but rumored nesting not ever substantiated. | (Palmer 1988, Lee and Spofford 1990) |
| 1975 | Giles, Highland, Shennandoah and Washington Counties: no "firm breeding records but goldens have possibly nested" in these localities (<i>fide</i> Larner). | (Lee and Spofford 1990) |
| 1978 | Shennandoah NP: 2 goldens seen, Aug. 17 (<i>fide</i> Britten); "provides further evidence that there may still be a small breeding population in the southern Appalachians." | (Hall 1979a) |
| 1979 | Highland Co.: golden observed, Mar. 20 (<i>fide</i> Rockingham Bird Club); "long been suspected that a pair of goldens is nesting nearby." | (Hall 1979b) |

Table 2. (continued: page 15 of 16)

| Year(s) | Remarks | (Source) |
|------------------------------------|---|------------------------------|
| <u>Virginia (continued)</u> | | |
| 1980 | Highland Co.: golden seen, Mar. 16 (<i>fide</i> Rockingham Bird Club) and Mar. 30 (<i>fide</i> Keelen); Augusta Co.: golden seen, April 2 (<i>fide</i> Rockingham Bird Club). | (Hall 1980) |
| 1981 | Frederick Co.: golden seen, Apr. 29 (<i>fide</i> Simpson); Roanoke Co.: adult and immature goldens at Salem, May 12 (<i>fide</i> Middleton); Augusta Co.: golden seen, May 22 (<i>fide</i> Abbott). | (Hall 1981) |
| 1982 | Co.: a golden was seen at Sharp's Peak, April 10 (<i>fide</i> Russell). | (Hall 1982) |
| 1984 | Co.: a golden was seen at Harvey's Knob, April 13 (<i>fide</i> Moore). | (Hall 1984) |
| 1986 | Highland Co.: 4 goldens, late March and April (<i>fide</i> Teuber); persistent nest rumors. | (Hall 1986b) |
| 1988 | Highland Co.: "≥3 goldens at wintering area, April" (<i>fide</i> Teuber) in Blue Ridge Valley. " Alleghany Co.: golden "plummeted onto prey " in I-64 median, July 31 (<i>fide</i> Handley); Monroe Co.: 2 goldens at Peters Mtn., summer (<i>fide</i> Mcrae). | (Hall 1988a) (Hall 1988b) |
| 1989 | Highland Co.: golden(s) observed, Mar. 11 (<i>fide</i> Rottenborn) and April 19 (<i>fide</i> Teuber). | (Hall 1989) |
| 1990 | Highland Co.: golden seen, March 27 (<i>fide</i> Teuber); Bath Co.: "usual wintering birds." | (Hall 1990) |
| 1991 | Highland Co.: golden eagle was observed, March 19 (<i>fide</i> Anderson). | (Hall 1991) |
| 1993 | Highland Co.: 2 adults and 1 immature, March 2 and an immature, April 17 (<i>fide</i> Irvine). Shennandoah Co.: golden eagle seen at Massanutten Mtn., summer (<i>fide</i> Mellinger). | (Hall 1993a) (Hall 1993b) |
| <u>West Virginia</u> | | |
| 1900's? | Statewide: occur in all seasons throughout mountainous areas; occasional nesting likely in eastern counties but not clearly documented. | (Brooks 1944:18) |
| 1929 | Pendleton Co.: 2 goldens flying 10 miles from Franklin over North Fork Mountain, July 20; 3 goldens seen at North Fork Mountain and Circleville, Aug. 30. | (Brooks 1934) |

Table 2. (continued: page 16 of 16)

| Year(s) | Remarks | (Source) |
|---|---|------------------------|
| <u>West Virginia (continued)</u> | | |
| 1930 | Pendleton Co.: 7 golden sightings at close range near top of North Fork Mtn., May 31; one flew from cliff face; a golden also seen 24 km away at Seneca Rocks, May 31. | (Brooks 1934, 1944:18) |
| 1931 | Pendleton Co.: a golden was seen at North Fork Mountain, Sept. 20. | (Brooks 1934) |
| 1932 | Pendleton Co.: 3 goldens seen at Circleville and one at Seneca Rocks, June 1. | (Brooks 1934) |
| 1933 | Randolph Co.: golden captured alive at Horton, date?; Pendleton Co.: postmaster has a mounted specimen and reports that goldens occur locally every month of the year; many locals claim that goldens are resident breeding - "likely true but still attempting to identify a definitive nest location. | (Brooks 1934) |
| 1983 | Co.: golden seen in Canaan Valley, May 23; "very probable" than an undiscovered nesting site is nearby (<i>fide</i> Stanovick). . | (Hall 1983) |
| 1986 | Co.: 2 goldens at Bear Rocks, date?; "were not following normal migration patterns and may be part of hypothesized (but as yet unlocated) local breeding population. | (Hall 1986a) |
| 1990 | Co.: 3 goldens observed at Barton Knob, March 23 (<i>fide</i> Griffith). | (Hall 1990) |

Table 3. Annotated records of golden eagles in eastern Canada.

| Year(s) | Locality: Remarks | (Source) |
|-----------------------------|--|--|
| <u>Labrador</u> | | |
| 1800's? | Interior region: "very rare permanent resident;" once described as "not uncommon" by residents; sometimes preys on caribou fawns. | (Austin 1932:64) |
| 1834 | Southern regions: golden "sailing over dreary rocks," location? (<i>fide</i> Audubon). | (Ford 1957:109) |
| mid-1800's | Northern regions: goldens reportedly present on northern coast (<i>fide</i> Couper). | (Todd 1963:229) |
| 1860's | Northern regions: "rare in any season, occasionally seen during winter." | (Turner 1885) |
| 1860 | Bradore: a single golden was seen during the summer (<i>fide</i> Bryant). Bradore: goldens not seen but reported by local hearsay (<i>fide</i> Coues). | (Townsend and Allen 1907:367) (Todd 1963:229) |
| 1894 | Upper Hamilton River: goldens observed in several places above Grand Falls; Lake Michikamau: goldens "definitely breeding" at head of lake (<i>fide</i> Low). | (Townsend and Allen 1907:367) |
| 1945 | Indian House Lake: golden observed hunting hares on a barren slope near Barren Point, April 7 (<i>fide</i> Clement); also seen locally at Cliff Peak, July 1. | (Todd 1963:230) |
| 1950's | Northern regions: reported as northern breeding limit in the East. | (Henniger and Jones 1957) |
| 1957 | Interior regions: Clement saw a pair on a rocky hill close to the railroad at Mile 84, May 18 and one on a ridge south of Gerin Mountain, June 25; he also reported a juvenile taken from Mile 176 during the summer was placed in a Quebec zoo. | (Todd 1963:230) |
| 1984-86 | Okak Bay: resident breeding goldens observed annually. | (Bowman pers. comm. 11/17/86) |
| 1990's | Labrador Peninsula: 28 pairs of nesting goldens from other surveys (<i>fide</i> Brazil). | (Kirk and Hyslop 1998) |
| <u>New Brunswick</u> | | |
| 1800's | Only one golden specimen known from the province (<i>fide</i> Chamberlain). "Possible breeder" but nesting never documented; more records in 19th century. | (Macoun and Macoun 1909:265) (Erskine 1992:215) |

Table 3. (continued: page 2 of 11).

| Year(s) | Remarks | (Source) |
|---|--|--|
| <u>New Brunswick (continued)</u> | | |
| 1833 | Charlotte Co.: golden eagle observed at Grand Manan Island, May (<i>fide</i> Audubon). | (Ford 1957:110) |
| 1862 | Charlotte Co.: goldens “probably resident, but locally rare” in Bay of Fundy area. | (Boardman 1862) |
| 1870- 1900 | Charlotte Co.: set of 3 golden eagle eggs in Plummer collection at Dartmouth Coll., NH marked simply “Grand Manan;” Plummer collected during this time period. | (Squires 1952:45) |
| 1905 | Charlotte Co.: female golden shot at Grand Manan I., Oct. 1; specimen in Moses collection at Grand Manan Museum. | (Townsend 1923, Squires 1952:45) |
| 1915 | Charlotte Co.: male golden collected at Grand Manan I., Oct. 1; specimen also in Moses Collection at Grand Manan Museum | (Townsend 1923, Squires 1952:45) |
| 1950 | Six records of golden specimens collected since 1880 plus “a number” of earlier references; no definitive breeding records; collection dates and locations not specified. | (Squires 1952:45) |
| 1970 | “Suspected, but unconfirmed” nesting by goldens “since 1950;” unspecified site. | (Spofford 1971a) |
| 1972 | Charlotte Co.: 2 goldens seen at Castalia, Grand Manan I., Mar. 18 (<i>fide</i> Bagley). | (Christie 1972) |
| 1960's | Goldens are “very rare visitors;” no longer extant in many former breeding sites in East. | (Godfrey 1966:95-96) |
| 1984 | Northumberland Co.: “unverified reports” of nesting pair at Miramachi Lake (<i>fide</i> Christie). | (Tingley 1984) |
| 1985-86 | Charlotte Co.: adult seen at Southern Head, Grand Manan Isl., Dec. 29 (<i>fide</i> Maker); one seen “off and on” through mid-May, often near Deep Cove, Grand Manan Isl. Charlotte Co.: immature at Castalia Marsh on Grand Manan Isl., May 1-3 (<i>fide</i> Dalzell); also an adult at Castalia Marsh, June 1 (<i>fide</i> Lucey). | (Dalzell 1986, Dalzell pers. comm. 4/17/88) (Tingley 1985) (Townsend 1985, Dalzell pers. comm. 4/17/88) |
| 1986-90 | Northumberland and Restigouche Counties: 3 reputable breeding season sightings including one of a pair indicating probable nesting in northern mountains. | (Erskine 1992:215) |

Table 3. (continued: page 3 of 11).

| Year(s) | Remarks | (Source) |
|---|---|---|
| <u>New Brunswick (continued)</u> | | |
| 1987 | Charlotte Co.: golden eagle “summered at Grand Manan Island” (<i>fide</i> Townsend); it was seen by >6 observers at Dark Harbor, Woodward’s Cove, Castalia and White Cove during March 18 - early July (<i>fide</i> Lucey). | (Forster 1988) (Dalzell pers. comm. 4/17/88) |
| 1988 | Charlotte Co.: adult golden “spent summer on Grand Manan Island where there been summer sightings during the previous 3 years (<i>fide</i> Dalzell). | (Mactavish 1988) |
| 1989 | Co.: 1-2 goldens at Nictau - Riley Brook throughout much of the summer (<i>fide</i> Dalzell); “raising the exciting possibility of breeding.” | (Mactavish 1989) |
| 1992 | Co.: a golden eagle was reported at Riley Brook, August 11. | (Mactavish 1992) |
| 1994 | Charlotte Co.: “distressed” adult on Grand Manan Island, April 21 (<i>fide</i> Christie). | (Maybank 1995) |
| 1995 | Co.: “yet another” summer sighting” of goldens: adult at Christmas Mountain, August 19 (<i>fide</i> Myles). | (Mactavish 1996) |
| <u>Newfoundland</u> | | |
| 1951 | St. John’s: specimen in St. John’s museum (without documentation) lost to fire; no further evidence of traditional residency; considered an “accidental.” | (Peters 1951:137) |
| 1951 | “Rare visitant;” occasionally seen among bald eagles wintering near Burgeo fish plant. | (Tuck 1968) |
| 1988 | Hare Bay: adult seen, July 23 “notable for both location and date” (<i>fide</i> Goudie). | (Mactavish 1988) |
| 1994 | St. Pierre et Miquelon: adult on Langdale in May; first local record (<i>fide</i> Etcheberry). | (Mactavish 1994) |
| <u>Nova Scotia</u> | | |
| 1800’s? | Pictou Co.: golden eagle “killed by a woman;” three others taken alive in traps elsewhere represent the 4 specimens to date in the province. | (Gilpin 1873) |

Table 3. (continued: page 4 of 11).

| Year(s) | Remarks | (Source) |
|---------------------------------------|--|------------------------------|
| <u>Nova Scotia (continued)</u> | | |
| 1800's? | "Possible breeder" but nesting by goldens has never documented in the province; more frequent records of goldens were reported in the 19th century. | (Erskine 1992:215) |
| 1800's? | Uncommon but goldens "breed and reside in the province throughout the year" (<i>fide</i> Gilpin); rare occurrence at Wolfville (<i>fide</i> Tufts). | (Macoun and Macoun 1909:265) |
| 1926 | Colchester Co.: pair was trapped many years ago in Stewiacke (<i>fide</i> Downs). | (Tufts 1961:125) |
| 1930 | Shelburne Co.: golden eagle shot; specimen in Nova Scotia Museum of Science. | (Tufts 1961:124) |
| 1950's | Province was reported as part of goldens' breeding distribution in the East. | (Henniger and Jones 1957) |
| 1960's | Goldens are "very rare visitors;" no longer extant in many former breeding sites in East. | (Godfrey 1966:95-96) |
| 1965 | Cape Berton Island: golden seen by reliable observer. | (Tufts 1978:38) |
| 1971-72 | Co.: subadult golden at Brier Isl., Dec. 19 through the winter (<i>fide</i> Finch, Lent). and an adult golden there feeding on drowned sheep, March 6-8 (<i>fide</i> Lent <i>et al.</i>). | (Finch 1972) |
| 1984 | Co.: golden seen "throughout the summer" at Martinique Beach (<i>fide</i> Lavender). | (Tingley 1984) |
| 1986-90 | Inverness Co.: 2 reliable breeding season sightings including one of a pair / likely nesting on Cape Breton Isl.; Guysborough Co.: 1 breeding season sighting in Liscomb. | (Erskine 1992:215) |
| 1989 | Inverness Co.: ≥ 2 golden eagles seen in Cape Breton Highlands, summer (<i>fide</i> McLaren, Lavender, Dalzell); "could they be breeding?" | (Maybank 1989) |
| 1995 | Inverness Co.: adult in mountainous area near Inverness, July 1 (<i>fide</i> Maybank). | (Mactavish 1995) |
| 1996 | Inverness & Victoria Co.: subadult in Cape Breton Highlands NP, mid-July (<i>fide</i> McKenna); such sightings add "further credibility to the rumor that goldens breed there." | (Mactavish 1996) |

Table 3. (continued: page 5 of 11).

| Year(s) | Remarks | (Source) |
|----------------|--|------------------------------|
| Ontario | | |
| 1837 | Hastings Co.: a regularly used golden eagle nest near the York Branch of the Madawaska River was apparently abandoned after 1837. | (Snyder 1949) |
| 1860's | Cochrane Dist.: MacKenzie sent a golden eagle specimen from Moose Factory to US National Museum. | (Todd 1963:230) |
| 1890's | Cochrane Dist.: golden on Missinabi River, Sept. (<i>fide</i> Spreadborough). | (Macoun and Macoun 1909:266) |
| 1890's | Ontario: goldens are "seldom seen" but resident throughout "inaccessible and rugged cliffs of eastern Canada;" transients frequently taken near Hamilton and Toronto. | (McIlwraith 1894:207) |
| 1890's | Frontenac Co.: goldens nested on a cliff at Mazinaw Lake in Barrie Township. | (Snyder 1949) |
| 1891 | Thunder Bay Dist.: golden eagles nesting on Thunder Cape near Port Arthur on Lake Superior this year and previously (<i>fide</i> Raines). | (Snyder 1949) |
| 1896 | Frontenac Co.: goldens nest northeast of Lake Ontario; York Co.: a rare migrant in Toronto- one collected, Oct. 24 where only 1 other local record in previous years. | (Fleming 1907) |
| 1897-98 | Parry Sound Dist.: golden specimens obtained include one at Loring - March, 1897; Lake Scugog - Oct. 20, 1897; Dunchurch - 2 females in March, 1898; and Loring - 2 females and 1 male obtained in 1898. | (Macoun and Macoun 1909:266) |
| 1897-1900 | Parry Sound Dist.: several goldens seen east of Georgian Bay since March, 1897. | (Fleming 1907) |
| 1900's | Cochrane Dist.: golden eagle was collected near Kapuskasing, date? (<i>fide</i> Beare); specimen is now in the Royal Ontario Museum of Zoology. | (Smith 1957) |
| 1905 | Frontenac Co.: golden eagle was shot at Lake Massonga, July 30 (<i>fide</i> Fleming). | (Snyder 1949) |
| 1927 | Rainy River Dist.: goldens at cliff nest at Pipestone Lake, north of Eno (<i>fide</i> Mair). | (Snyder 1949) |
| 1930 | Ottawa Dist.: golden (now in Bourginon collection) electrocuted near Rockland, Aug. 28. | (Lloyd 1949) |

Table 3. (continued: page 6 of 11).

| Year(s) | Remarks | (Source) |
|----------------------------|--|------------------------------|
| Ontario (continued) | | |
| 1936 | Lake Superior: golden seen near Peninsula, June 20 (<i>fide</i> Ballie and Hope). | (Snyder 1949) |
| 1938-39 | Hudson Bay: golden shot on April 10, 1938 "near its nest in a jack pine on a hill, "a few miles inland from Cape Henrietta Maria; its feet were sent to Ontario Museum of Zoology, Toronto; eagles observed again locally in the spring of 1939; no cliffs locally. | (Snyder 1940) |
| 1940's | "Currently (and probably always) rare and irregularly distributed" in the province. | (Snyder 1951:72) |
| 1942 | James Bay: goldens seen at Cockispenny Point near Fort Albany, June 5. | (Snyder 1949) |
| 1966 | Sutton Lake, Cape Henrietta Maria: current breeding sites; probably still breed at Pipestone Lake; known to formerly nest at Thunder Cape, Mazinaw Lake, Schooner Lake and York Branch of Madawaska River. | (Godfrey 1966:96) |
| 1978 | Kenora Dist.: golden eaglet banded in northwestern area of Ontario, Aug. 8. was found in a trap in central Kentucky on January 20, 1973. | (Millsap and Vana 1984) |
| 1979 | Hudson Bay shores: adult golden seen at Winisk, June 26 (<i>fide</i> Bennett) | (Goodwin 1979) |
| 1983 | Hudson Bay lowlands: "several goldens" sighted, June - July. | (Weir 1983) |
| 1984 | Thunder Bay Dist.: adult golden at Pukaskwa NP, May 23 (<i>fide</i> Jones). | (Weir 1984) |
| 1987 | Kenora Dist.: golden was observed at Kenora, March 30 (<i>fide</i> McLeod). Dist.: golden seen at Winisk, June 4-8 (<i>fide</i> Emery, Hagganam). | (Weir 1987a) (Weir 1987b) |
| 1988 | Kenora Dist.: "≥ 1 golden returned to Kenora, April 10 (<i>fide</i> McLeod). | (Weir 1988) |
| 1988 | Frontenac Co.: golden at Frontenac PP, Mar. 19 (<i>fide</i> Schlesinger); golden at Pinery PP, Mar. 24-28 (<i>fide</i> Rider); Sudbury Dist.: golden at Sudbury, Apr. 20 (<i>fide</i> Nicholson); : golden at Amherst Isl., May 20 -31 (<i>fide</i> Ellis <i>et al.</i>). | Co.: (Weir 1989a) |

Table 3. (continued: page 7 of 11).

| Year(s) | Remarks | (Source) |
|------------------------------------|--|----------------------|
| <u>Ontario (continued)</u> | | |
| 1989 | Southern Ontario: active nest; also golden sightings from Grey, Bruce, York, Amherst Island, Leeds and Lanark. | (Weir 1989b) |
| 1990 | : 2 sightings at Lake Shagamu River- adult flying west, June 5 (<i>fide</i> Argo <i>et al.</i>) and immature flying east, July 10 (<i>fide</i> Wormington <i>et al.</i>). | (Weir 1990) |
| 1991 | Goldens seen at Dundas, May 3 (<i>fide</i> Lamond, Wormington); Hangersville, May 4 (<i>fide</i> Smith); Willow Beach, May 4 (<i>fide</i> Blackburn); Manitoulin Isl., May 21 (<i>fide</i> Armstrong). | (Weir 1991) |
| 1992 | Peterborough Co.: adult golden seen at Cold Lake, July 14 (<i>fide</i> Helleiner). | (Ridout 1992) |
| 1994-95 | Central regions: locale for "most of" 15 records of wintering goldens; Rainy River District: first winter record of a golden at Namakan Lake, Feb. 7 (<i>fide</i> Nash). | (Ridout 1995b) |
| 1997 | Atikokan: last golden sighting of the season was far north, Dec. 13 (<i>fide</i> Elder). | (Ridout 1998) |
| <u>Prince Edward Island</u> | | |
| 1892 | New London: a live juvenile golden was caught in a leg hold trap set for fox, June 23 but "after visiting the locality, I am inclined to doubt whether the bird was bred there;" considered rare by residents and possibly strays from Cape Breton Island, NS. | (Dwight 1893) |
| 1960's | Goldens are "very rare visitors;" no longer extant in many former breeding sites in East. | (Godfrey 1966:95-96) |
| 1965 | Cape Berton Island: golden seen by reliable observer. | (Tufts 1978:38) |
| <u>Quebec</u> | | |
| 1743 | Edwards was first to report golden eagles as breeding in the province. | (Snyder 1949) |
| 1800's | Ungava Dist.: rare in any season but occasionally seen during winter. | (Turner 1885) |

Table 3. (continued: page 8 of 11).

| Year(s) | Remarks | (Source) |
|---------------------------|---|--|
| Quebec (continued) | | |
| 1800's | Ungava Dist.: breeds in the northeast portions among the hills and at "The Forks;" specimens have been procured in the region (<i>fide</i> Packard). | (Chamberlain 1887:58, Townsend and Allen 1907:367) |
| 1800's | Sweet Grass Hills: Coues discovered a nesting pair there. | (Chamberlain 1887:58) |
| mid-1800's | Quebec Co.: goldens are resident; one shot in Beauport (<i>fide</i> Dionne). | (Macoun and Macoun 1909:265) |
| 1880's | Manicouagan Co.: Comeau shot 3 goldens near Godbout; "another six were caught in leg hold traps;" golden eagles breed locally and are "not particularly rare" (<i>fide</i> Comeau). | (Merriam 1882) |
| 1884 | Ungava Dist.: natives reported nesting on a bluff 4 miles downriver from "The Forks," juncture of the Larch and Kaniapiskau Rivers near Fort Chimo, 130 km south of Ungava Bay; occasionally seen in summer; very rare in winter; male caught in a fox trap during late-March near George River; another male collected June 23 and is now a specimen (#101130) at Smithsonian Museum, Washington DC; golden seen in October. | (Snyder 1949, Gabrielson and Wright 1951) |
| 1890's | Anticosti Island: feet of a golden eagle from Heath Point (<i>fide</i> Coombs). | (Braund and McCullagh 1940) |
| 1890's | Wright Co.: received a juvenile caught in a trap set for otter or muskrat near High Falls on the Lievre River, 60 km NE of Ottawa; nest reported locally "for years." | (Eifrig 1906, Townsend 1923) |
| 1896 | Ungava Dist.: Spreadborough saw the skin of a golden eagle killed on Kokosak River near Fort Chimo, Aug. and a live golden near "The Forks" in Aug. | (Townsend and Allen 1907:367) |
| 1898 | Hudson Bay: 2 golden eagles seen near Great Whale River, May 2 (<i>fide</i> Low). | (Eifrig 1906) |
| 1900's | Pointe des Monts, Anticosti Island, Baie St. Paul, Mont Notre Dame, Lake Michikamau and Gaspé Peninsula: traditional breeding sites; Back River (near Wolf Rapids), Repulse Bay and inland from Eskimo Point: probable breeding. | (Godfrey 1966:96) |
| 1904 | Anticosti Island: rare permanent resident (<i>fide</i> Schmidt); nest on Jupiter R. | (Braund and McCullagh 1940) |

Table 3. (continued: page 9 of 11).

| Year(s) | Remarks | (Source) |
|---------------------------|---|--------------------------------|
| Quebec (continued) | | |
| 1915-51 | Matane Co.: nesting for at least 25 years on east slope of Mont Notre Dame on Matane Lake, Couq Twp.; young eagles were sometimes caught after fledging; adult(s) seen Mar. 20, Apr. 12 and Sept. 24, 1951; nest was apparently unoccupied when unsuccessful attempt made to reach nest June 17, 1951 (<i>fide</i> Lister, Ouellet). | (Baillie 1955) |
| 1922 | Ottawa Dist.: golden eagle collected near Chelsea in the spring; goldens are now "a casual visitor to the area, probably more regular than the few definite records indicate." | (Lloyd 1923) |
| 1926 | Little Whale River: cliff nest 4 miles north occupied by goldens, July 27. | (Todd 1963:230) |
| 1949 | Ottawa Dist.: dead golden eagle was found on a fence post near Perkins Mills. | (Lloyd 1953) |
| 1951 | Ungava Dist.: golden seen in the Ungava (Chubb) Crater area, late summer. | (Martin 1955) |
| 1952 | Ungava Dist.: stick nest attended by a pair of goldens at Sugluk Inlet, early summer (<i>fide</i> Loomis); currently represents northernmost breeding record east of Hudson Bay. | (Spofford 1959a) |
| 1953 | Finger Lake - Leaf Bay (60 miles east of Fort Chimo): observed occupied nest on cliff overlooking western arm of lake, August 6; also saw a golden nearby, July 29. | (Bateman 1953) |
| 1955 | Ungava Dist.: golden seen in valley at Sugluk Inlet on Hudson Strait, July 28. | (Spofford 1959a) |
| 1950-90 | A total of 24 distinct golden territories in a study near James Bay hydro projects. | (Morneau et al. 1994) |
| 1960 | Granite Co.: golden eyrie reported by foresters at Marble Mountain. | (Spofford pers. comm. 6/14/80) |
| 1967 | Northern Quebec: nestling banded on July 26 near Waskeham Bay in Hudson Strait was recaptured and released in northeastern Pennsylvania on October 23. | (Spofford 1971a) |
| 1969 | Ungava Dist.: nestling banded on July 7 near Labrador was found shot along the St. Lawrence River in October, 1969. | (Millsap and Vana 1984) |
| 1960's | Laurentide's: 3 active golden eagle nests were found and possibly a fourth. | (Mitchell pers. comm. 5/29/85) |

Table 3. (continued: page 10 of 11).

| Year(s) | Remarks | (Source) |
|---------------------------|--|--------------------------------|
| Quebec (continued) | | |
| 1972 | Northern Quebec: nestling banded on August 8 in ? was found in a trap along the St. Lawrence River on January 20, 1973. | (Millsap and Vana 1984) |
| 1979 | Ottawa Dist.: an adult golden seen at Aylmer, July 20 (<i>fide</i> Sirois). | (Gosselin and David 1979) |
| 1981 | Lotbiniere Co.: adult golden seen at Grondines, July 25 (<i>fide</i> Laporte); Gaspé Peninsula: goldens "again nested this summer" (<i>fide</i> Duquette). | (Gosselin and David 1981) |
| 1980's | Bonaventure Island: golden eagles possibly breed there "now." | (Palmer 1988) |
| 1980's | East Charlevoix Co.: old nest reported on Riviere Noire NW of St. Simeon; goldens sighted at Riviere Malbaie N of Claremont and Lac Buteux N of St. Simeon. Saguenay Fjord Co.: golden(s) seen at Lac Eterrite SE of Chicoutimi. Anticosti Isl.: golden eagle nesting rumored locally. | (Mitchell pers. comm. 1986) |
| 1983 | Matane Co.: traditional golden nest in Chic Choc Mountains was intact but unoccupied, June 23. | (Spofford pers. comm. 7/11/83) |
| 1984-89 | Matane Co.: extant nest known for decades at Lac Matane. Chic Choc Mountains: 10 additional probable breeding areas on the Gaspé Peninsula. | (Gauthier and Aubry 1996:396) |
| 1984-89 | Manicouagan Co.: 2 probable breeding areas northeast of Baie Comeau; Saguenay Fjord Co.: probable golden nest south of Chicoutimi. | (Gauthier and Aubry 1996:397) |
| 1985 | Anticosti Island: golden eagle "nesting rumored recently." | (Mitchell pers. comm. 5/29/85) |
| 1989 | Gaspé Co.: golden eagle nest 50 km NW of the town of Gaspé. | (LePage pers. comm. 9/15/93) |
| 1989-91 | Subarctic regions of western Quebec: at least 10 territorial pairs found in a 9850 km ² study area east of Hudson Bay; all were cliff nests; prey in nests included hares, ravens and gulls. | (Morneau et al. 1994) |

Table 3. (continued: page 11 of 11).

| Year(s) | Remarks | (Source) |
|---------------------------|---|---------------------------------|
| Quebec (continued) | | |
| 1989-92 | Matane Co.: golden eagle nest 100 km NE of the town of Rinouski. | (LePage pers. comm. 9/15/93) |
| 1990-92 | Gaspé Peninsula: wintering golden eagles seen in approximately 20 sites. | (LePage pers. comm. 9/15/93) |
| 1991 | Gaspé Co.: partly feathered nestling found near La Grande Rivière. | (Gauthier and Aubry 1996:396) |
| 1991 | Saguenay Fjord Co.: wintering golden(s) near Chicoutimi; Lac St. Jean East Co.: wintering goldens locally at Lake St. John. | (LePage pers. comm. 9/15/93) |
| 1992 | Matane Co.: active golden eagle nest SW of Ste. Anne des Monts, western side of Gaspé NP; occasionally prey on caribou fawns (<i>fide</i> Crete). | (Anderson pers. comm. 10/19/92) |
| 1992 | Beauce Co.: adult golden seen over fields near St. Ludger de Baucé on April 20; immature seen flying over valley near S. Victor de Baucé. | (LePage pers. comm. 9/15/93) |
| 1992-93 | Northern Quebec: telemetry study of 5 adults and an eaglet from 5 nests between Great Whale and Nastapoka Rivers; pair separations averaged 35 km; 4 adults migrated south in October to separate wintering areas in PA, WV, MI and AL. | (Brodeur et al. 1996) |
| 1996 | Pontiac Co.: 2 goldens at Vinton, July 5 (<i>fide</i> Harvey); "seasonally unexpected." | (Aubry and Bannon 1996b) |

Table 4. Organochlorine and heavy metal residues in an unhatched golden eagle egg from Maine, 1996. All concentrations are expressed as ppm, wet weight. ND = not detected. Analyses performed at University of California, Santa Cruz.

| Contaminant | Residue in Egg (ppm wet weight) |
|--|---------------------------------|
| <u>Organochlorines</u> | |
| p, p' - DDE | 11.300 |
| o, p' - DDE | 0.102 |
| p, p' - DDT | ND |
| o, p' - DDT | ND |
| p, p' - DDD | 0.016 |
| o, p' - DDD | ND |
| chloropyrifos | ND |
| p, p' - DDMU | ND |
| heptachlor | ND |
| methoxychlor | ND |
| oxychlordane | 0.167 |
| heptachlor epoxide | 0.076 |
| <i>cis</i> - nonachlor | 0.147 |
| <i>trans</i> - nonachlor | 0.613 |
| <i>cis</i> - chlordane | 0.006 |
| <i>trans</i> - chlordane | ND |
| heptachloro benzene | 0.012 |
| mirex | 0.831 |
| <i>tris</i> - ANE | ND |
| dieldrin | 0.223 |
| dacthal | ND |
| oxadiazon | ND |
| endrin | ND |
| ES - 04 | ND |
| <i>tris</i> - OH | ND |
| <u>Polychlorinated biphenyls (total)</u> | <u>18.088</u> |
| PCB 8 | ND |
| PCB 17 | ND |
| PCB 3 / 30 | ND |
| PCB 15 | ND |
| PCB 18 | ND |
| PCB 27 | ND |
| PCB 28 | 0.041 |
| PCB 29 | ND |
| PCB 31 | 0.004 |

Table 4. (continued: page 2 of 3).

| Contaminant | Residue in Egg (ppm wet weight) |
|---------------|---------------------------------|
| PCB 44 | 0.011 |
| PCB 46 | ND |
| PCB 49 | 0.043 |
| PCB 52 | 0.052 |
| PCB 60 | 0.051 |
| PCB 64 | 0.019 |
| PCB 66 | 0.303 |
| PCB 70 | ND |
| PCB 74 | 0.155 |
| PCB 84 | ND |
| PCB 85 | 0.086 |
| PCB 87 | 0.071 |
| PCB 89 | 0.001 |
| PCB 95 | 0.057 |
| PCB 97 | 0.004 |
| PCB 99 | 0.506 |
| PCB 101 | 0.104 |
| PCB 105 | 0.195 |
| PCB 110 | 0.150 |
| PCB 118 | 0.934 |
| PCB 128 | 0.220 |
| PCB 137 | 0.065 |
| PCB 138 | 1.246 |
| PCB 141 | 0.041 |
| PCB 146 | 0.515 |
| PCB 149 | 0.122 |
| PCB 151 | 0.102 |
| PCB 153 / 132 | 3.616 |
| PCB 156 | 0.369 |
| PCB 157 | 0.036 |
| PCB 158 | 0.274 |
| PCB 167 | 0.284 |
| PCB 170 | 0.766 |
| PCB 174 | 0.055 |
| PCB 177 | 0.243 |
| PCB 178 | 0.194 |
| PCB 180 | 3.665 |
| PCB 183 | 0.550 |
| PCB 187 | 1.247 |

Table 4. (continued: page 3 of 3).

| Contaminant | Residue in Egg (ppm wet weight) |
|---------------------|---------------------------------|
| PCB 189 | 0.051 |
| PCB 194 | 0.774 |
| PCB 195 | 0.073 |
| PCB 196 | 0.375 |
| PCB 198 | 0.010 |
| PCB 200 | 0.095 |
| PCB 203 | 0.174 |
| PCB 206 | 0.104 |
| PCB 209 | 0.036 |
| PCB 103 surrogate | 0.064 |
| PCB 207 surrogate | 0.069 |
| PCNB surrogate | 0.052 |
| <u>Heavy Metals</u> | |
| antimony | < 0.05 |
| arsenic | < 0.05 |
| barium | 0.2 |
| cadmium | < 0.02 |
| chromium | < 0.5 |
| cobalt | < 0.1 |
| copper | 0.8 |
| iron | 17.0 |
| lead | < 0.05 |
| mercury | 0.526 |
| nickel | < 0.1 |
| selenium | < 0.5 |
| silver | < 0.05 |
| thallium | < 1.0 |
| tin | < 0.1 |
| zinc | 9.5 |