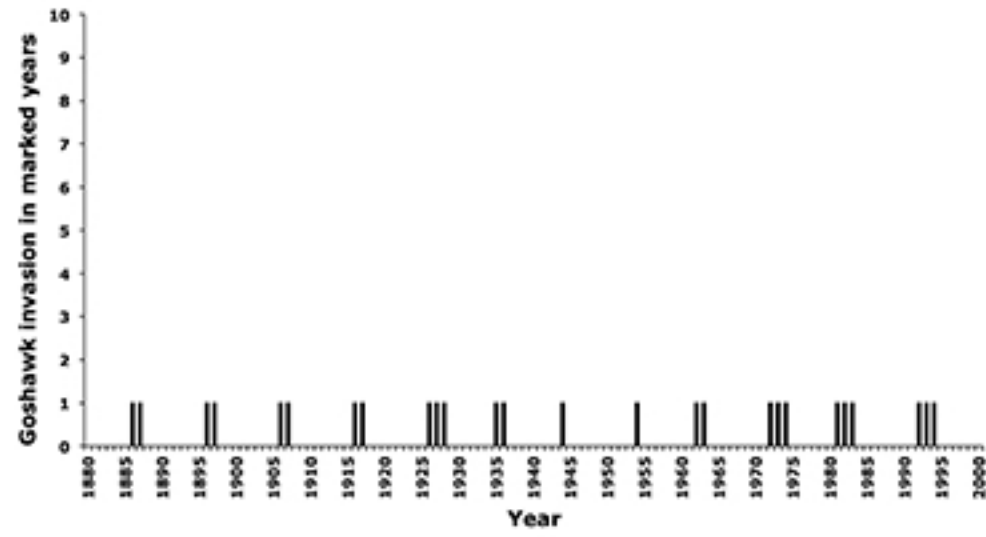


# PERIODIC INVASIONS OF NORTHERN GOSHAWKS

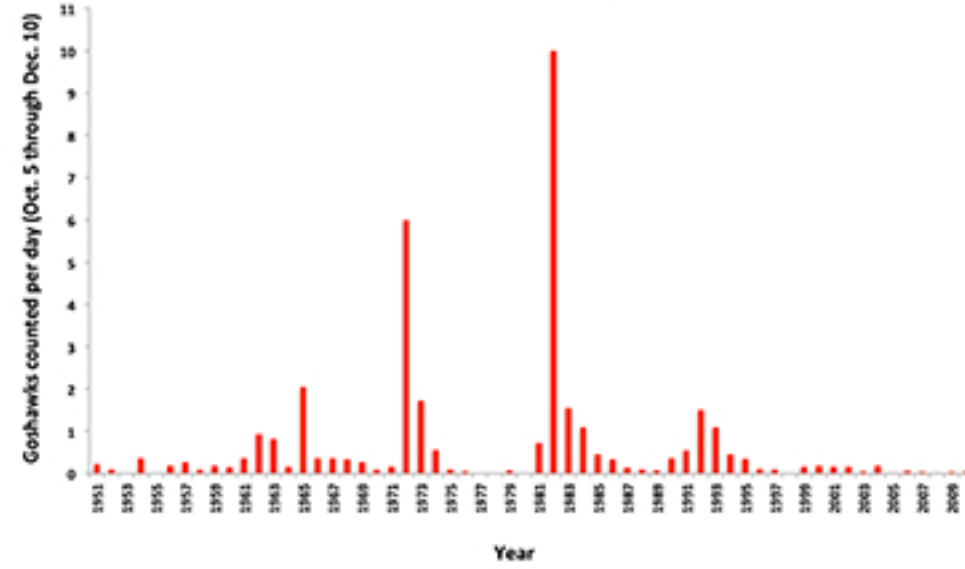
Richard F. Green, David L. Evans, Mary J. Evans\*, Frank J. Nicoletti, Karl J. Bardon, Janet C. Green  
 Hawk Ridge Bird Observatory Duluth, MN  
 \* Deceased

## Counts at Hawk Mountain, Cedar Grove, and Hawk Ridge

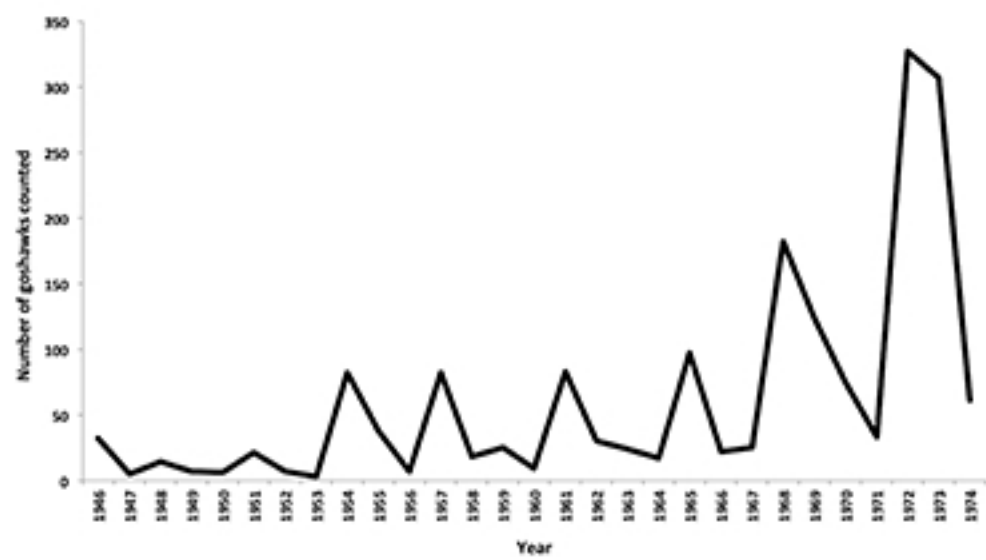
YEARS IN WHICH GOSHAWK INVASIONS OCCURRED (from Newton 2002)



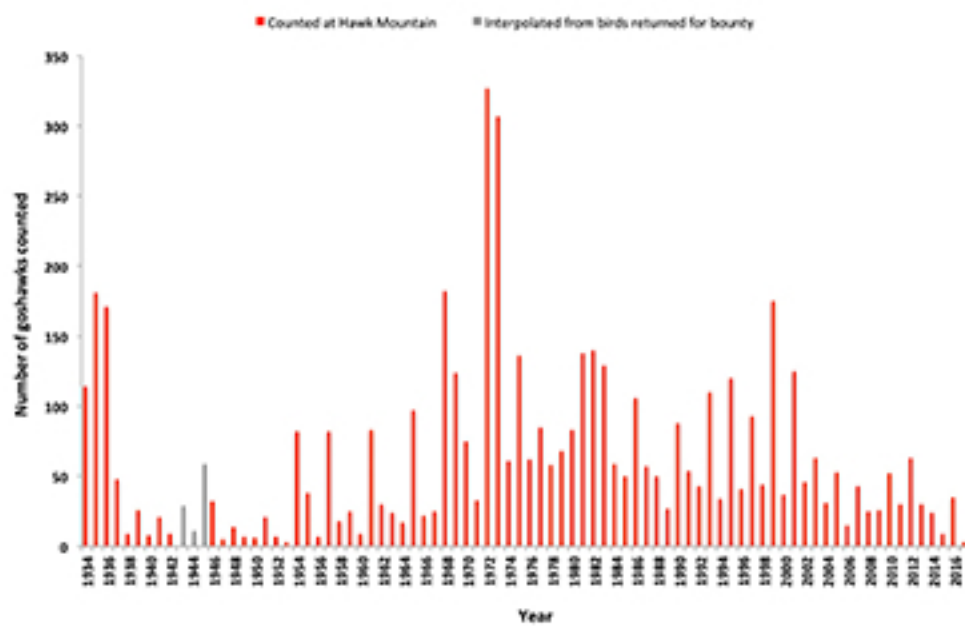
GOSHAWKS COUNTED AT CEDAR GROVE FROM 1951 TO 2004 (Mueller et al. 2008)



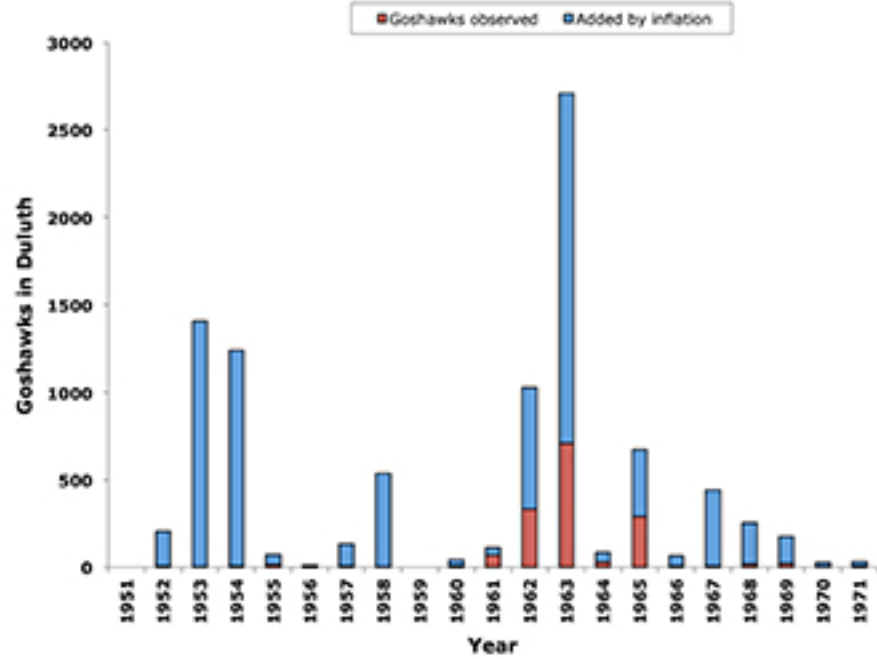
GOSHAWKS COUNTED AT HAWK MOUNTAIN



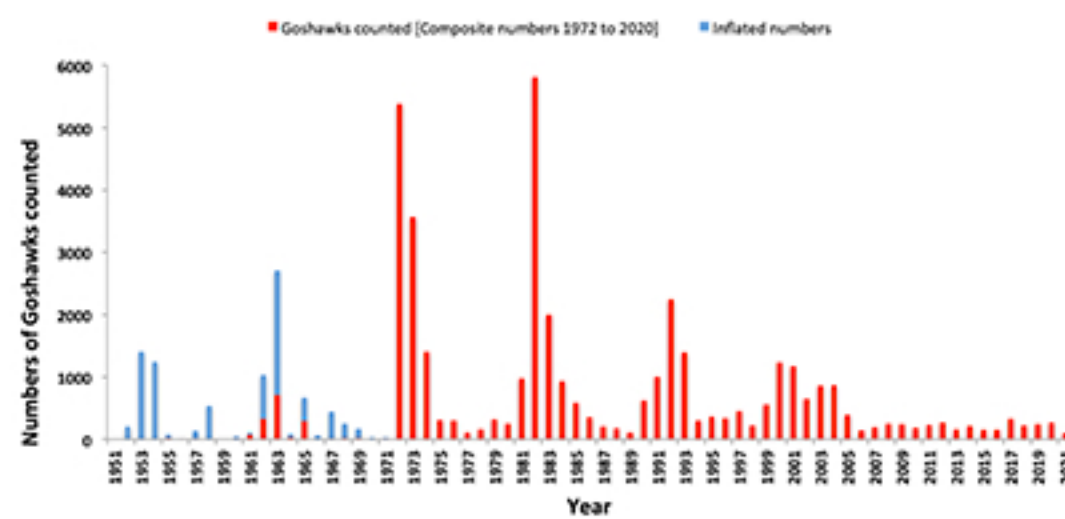
GOSHAWKS COUNTED AT HAWK MOUNTAIN



Original and inflated values

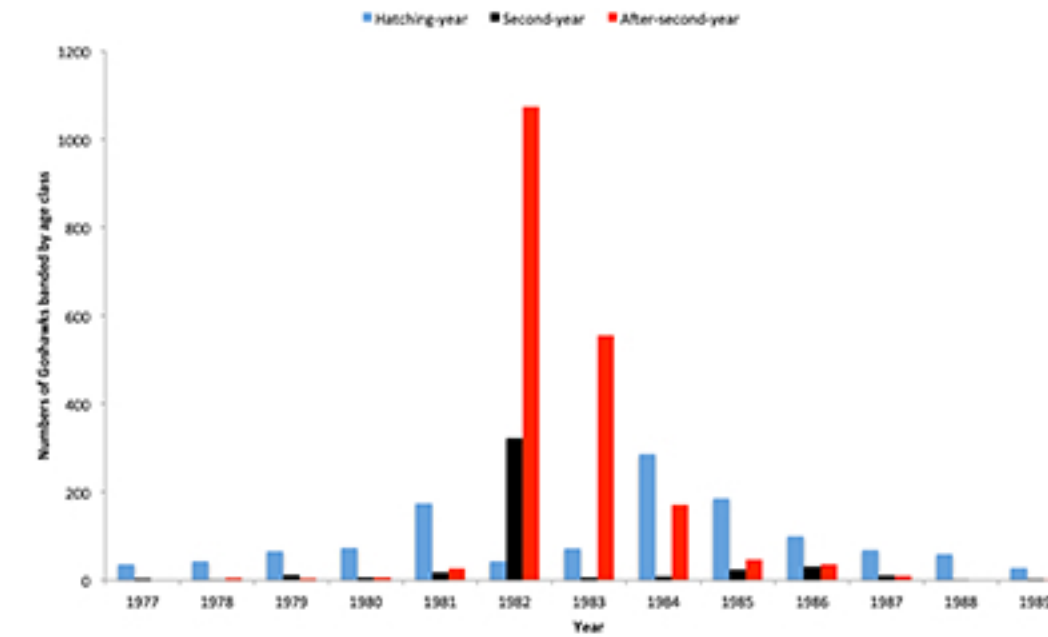


GOSHAWKS SEEN AT HAWK RIDGE FROM 1951 TO 2021

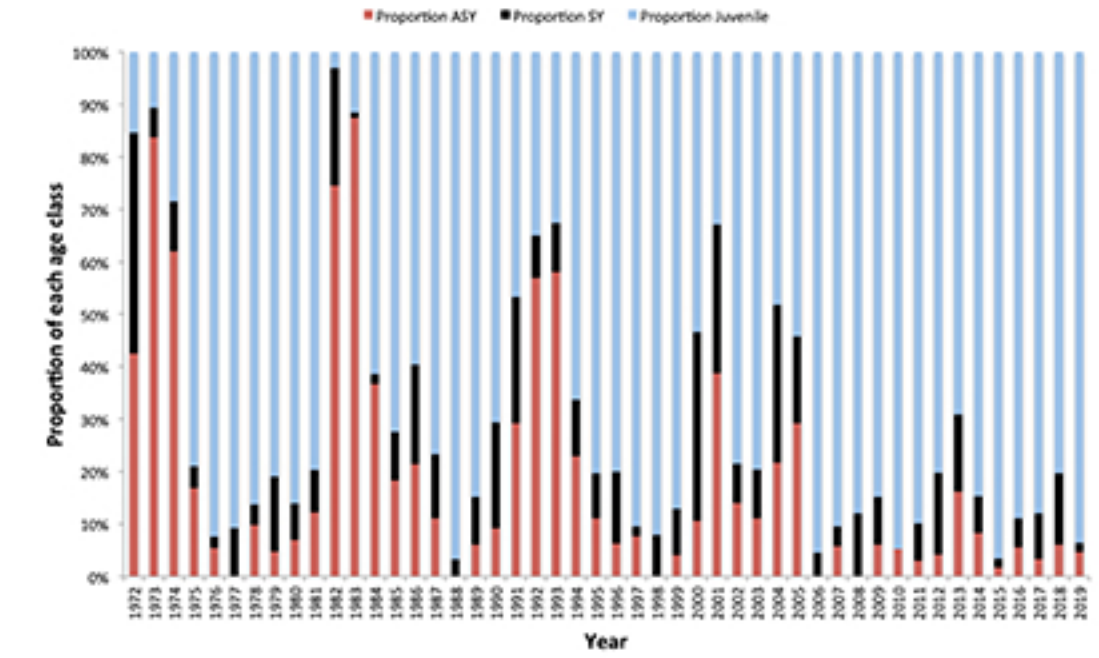


## Age and Sex Distributions

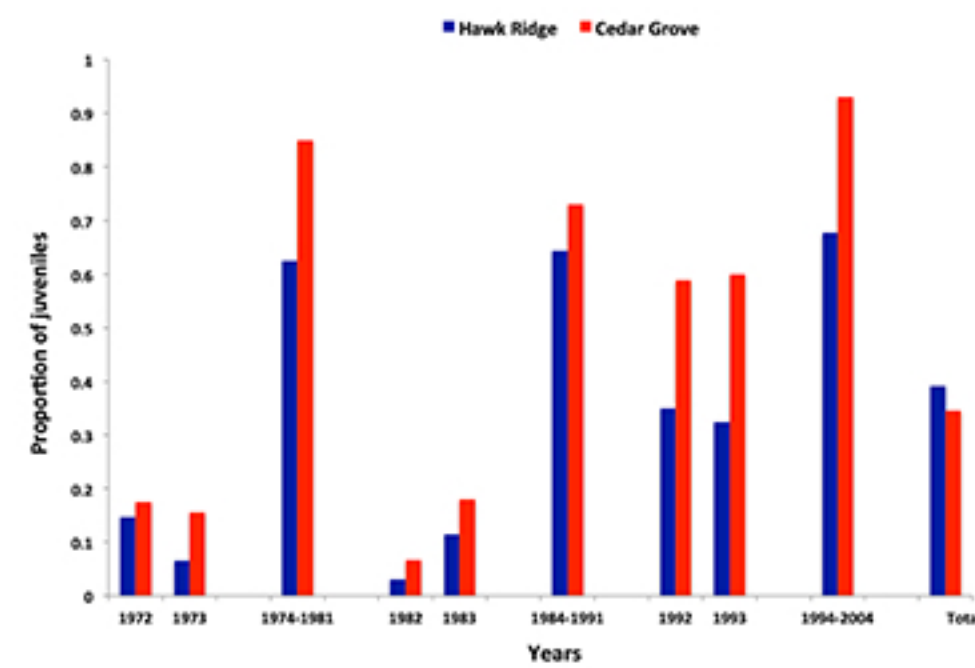
AGE DISTRIBUTION AROUND 1980s INVASION



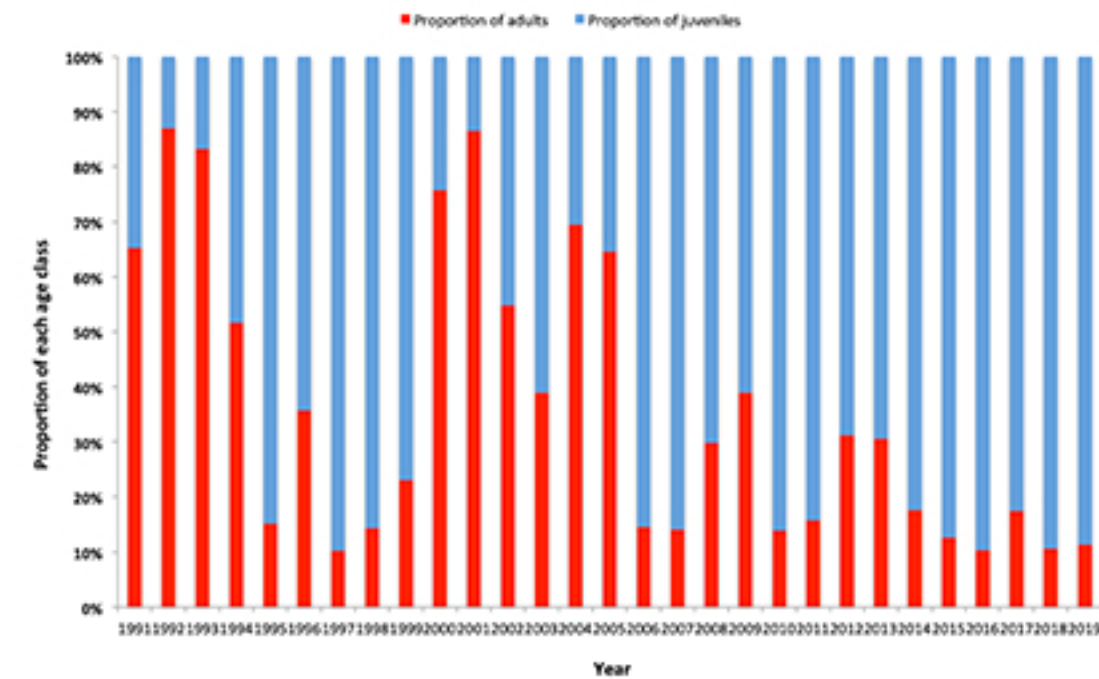
AGE DISTRIBUTION OF GOSHAWKS BANDED AT HAWK RIDGE



PROPORTION OF JUVENILES AT HAWK RIDGE AND CEDAR GROVE



AGE PROPORTIONS OF GOSHAWKS OBSERVED AT HAWK RIDGE



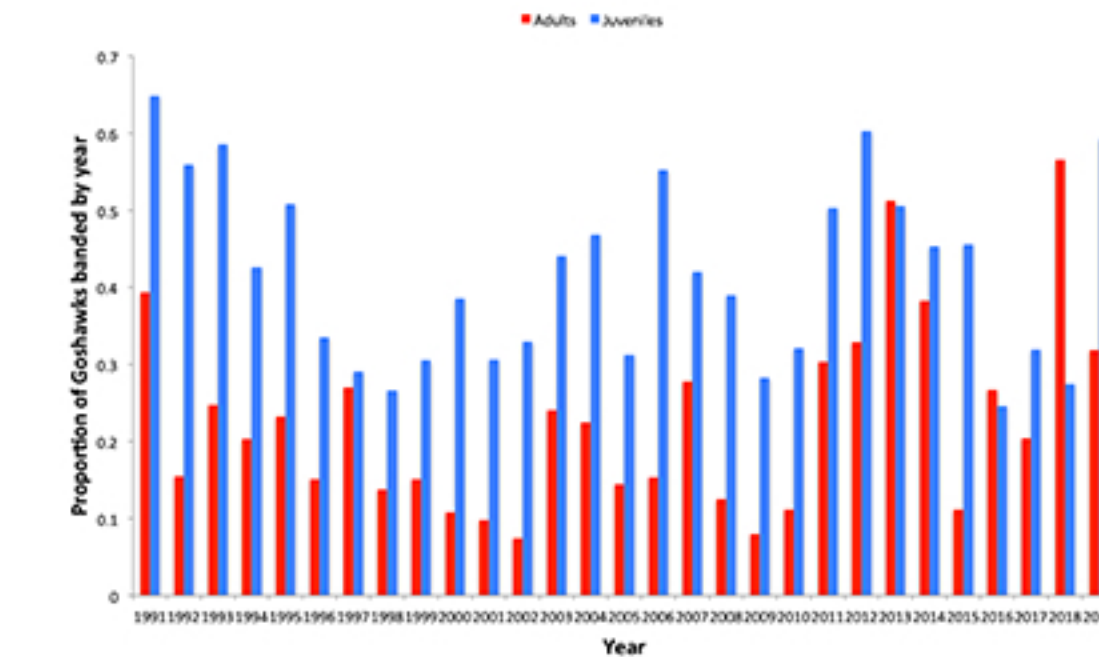
### SEX RATIOS FOR ALL YEARS (Male:Female)

Bird age:	HY	SY	ASY
Cedar Grove	292:146	100:100	225:209
Ratio	2:1	1:1	1.08:1
Hawk Ridge	2916:1034	679:524	1563:2179
Ratio	2.82:1	1.30:1	0.72:1
			= 1:1.39

### SEX RATIO CHANGES DURING INVASIONS

ASY at HR	Male:Female	Ratio
1972	83:83	1:1
1973	212:334	0.63:1
1982	608:465	1.31:1
1983	194:362	0.54:1
1992	70:161	0.43:1
1993	60:156	0.48:1
2000	11:9	1.22:1
2001	25:28	0.89:1

GOSHAWK BANDABILITY: EVANS, NICOLETTI AND BARDON



## Population Cycles in Lynx and Hares

