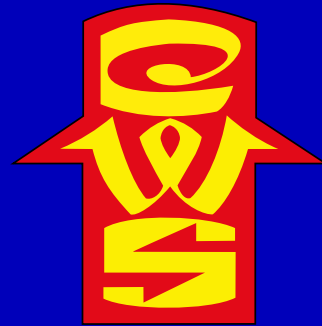


*Status of Waterfowl Breeding in  
Newfoundland and Labrador:  
Black Duck Joint Venture Surveys*

*Scott G. Gilliland*



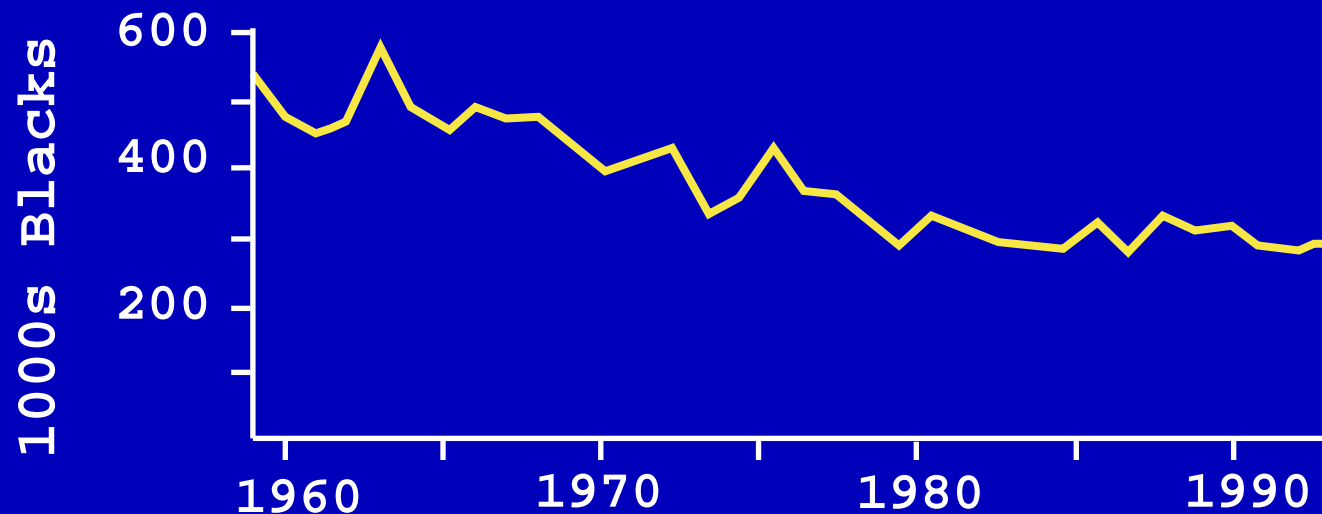
*Canadian Wildlife Service  
Atlantic Region*

## *Outline*

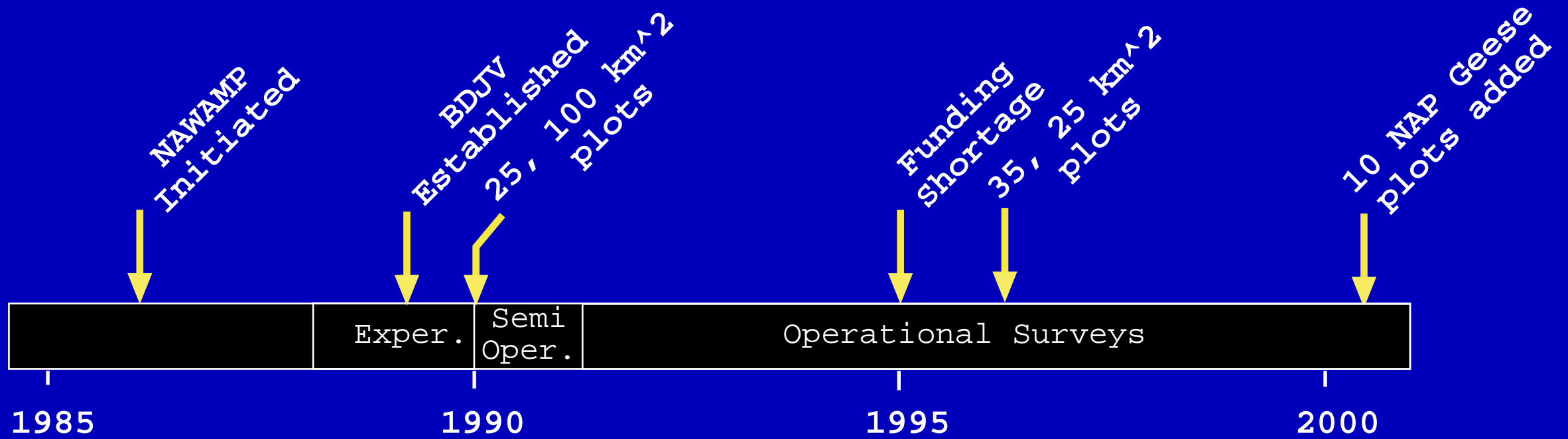
- Historical background of the BDJV surveys.
- BDJV survey objectives.
- Description of the survey methods.
- Geographical coverage of the BDJV survey.
- Description of analyses.
- Summary of the results of the survey.

## *The Issue*

- Only survey that monitored waterfowl in eastern North America was the Mid-winter Inventory of east coast USA.
- By 1980s, the number of Black Ducks had declined to 1/2 1960s levels.



# History of BDJV Surveys

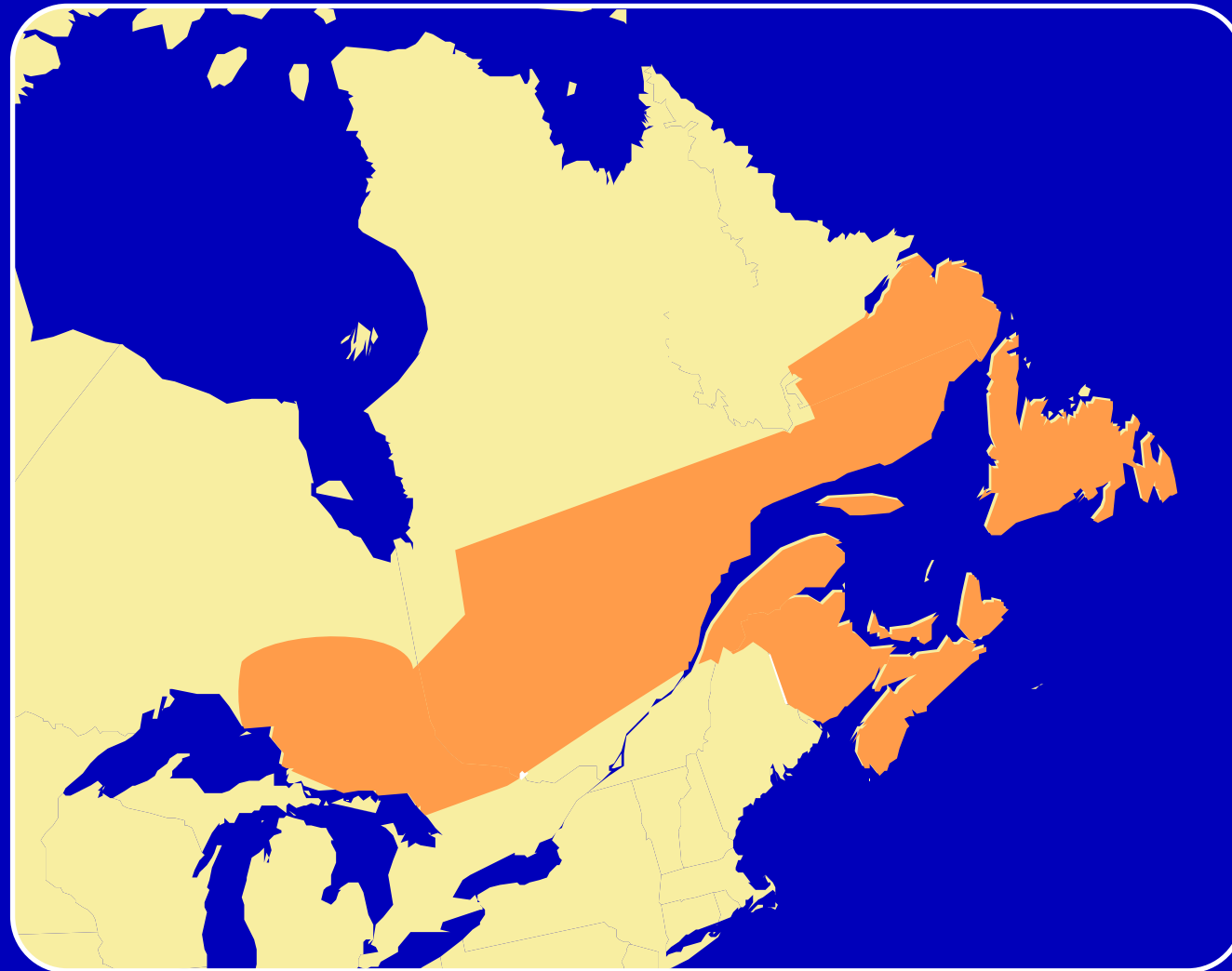


Time Line

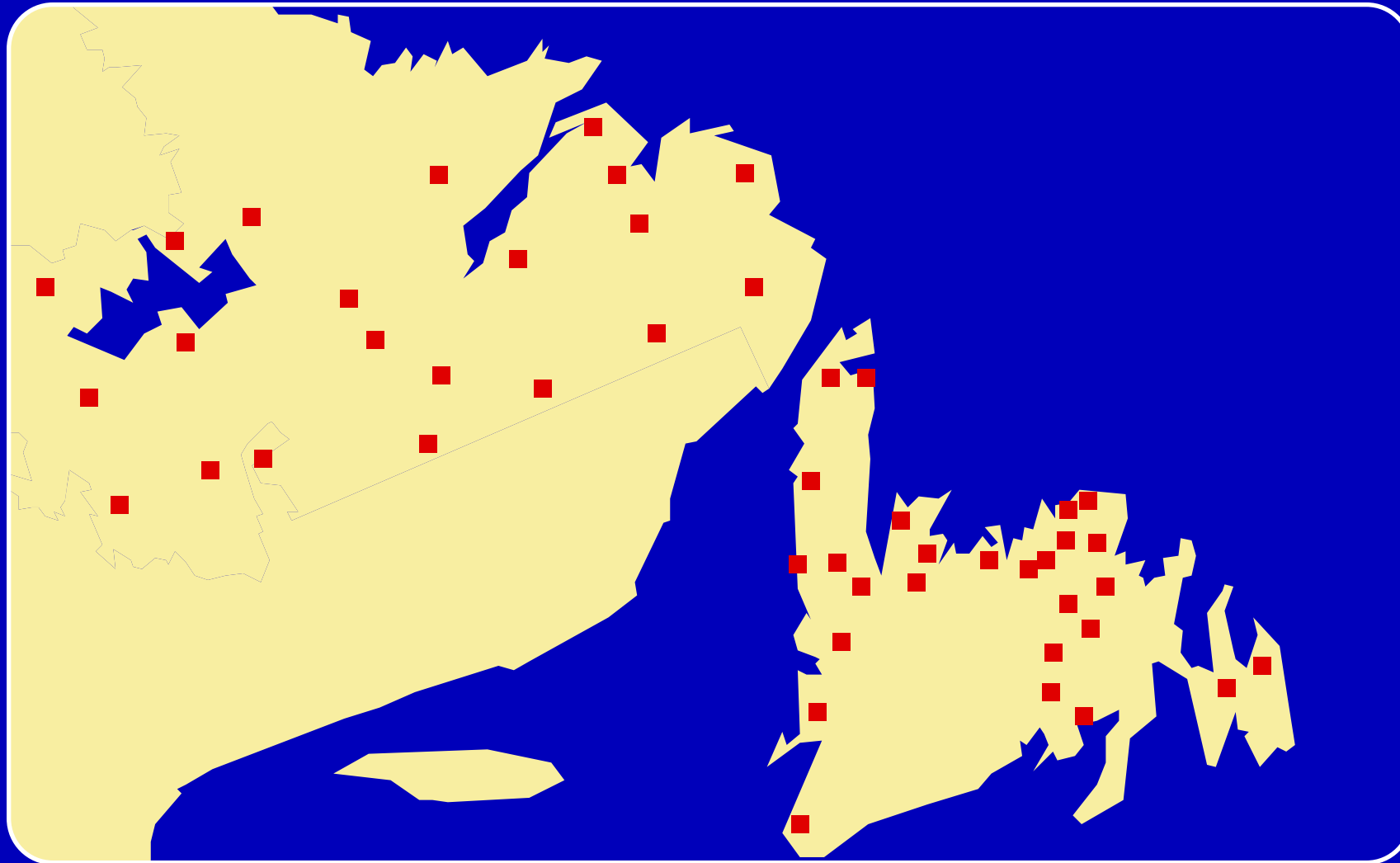
## *Black Duck Joint Venture Survey Objectives*

- Provide statistically reliable trends for breeding Black Ducks eastern Canada.
  - detect range-wide change of 10% over 5 years.
  - detect regional change of 10% over 10 years.
- Provide trend information for other breeding waterfowl within the survey area.

*Geographic coverage of the  
BDJV Survey*



*Location of Survey Plots Throughout  
Newfoundland & Labrador*



## *Survey Methods*

- 304, 25 km<sup>2</sup> plots established within boreal forest areas of eastern Canada.
  - 39 plots in Newfoundland & Labrador.
- Plots covered in a 3-year rotational sampling scheme.

## *Survey Methods*

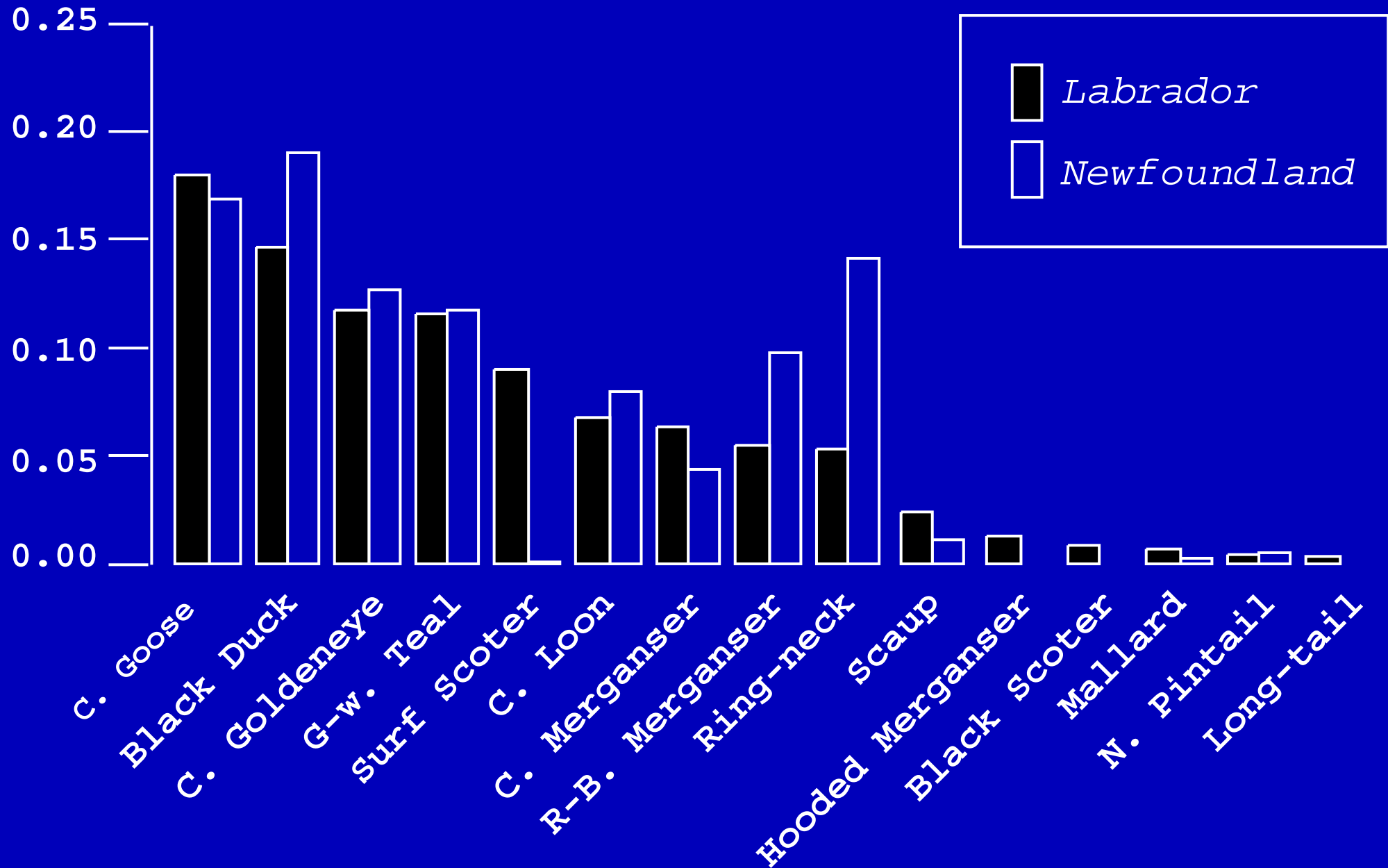
- All surveys conducted from Bell 206L helicopter.
- Coverage includes all waterbodies (lakes, streams, wetlands, etc.) within the plots.
- All observations of wildlife within the plots recorded.



## *Data Analyses*

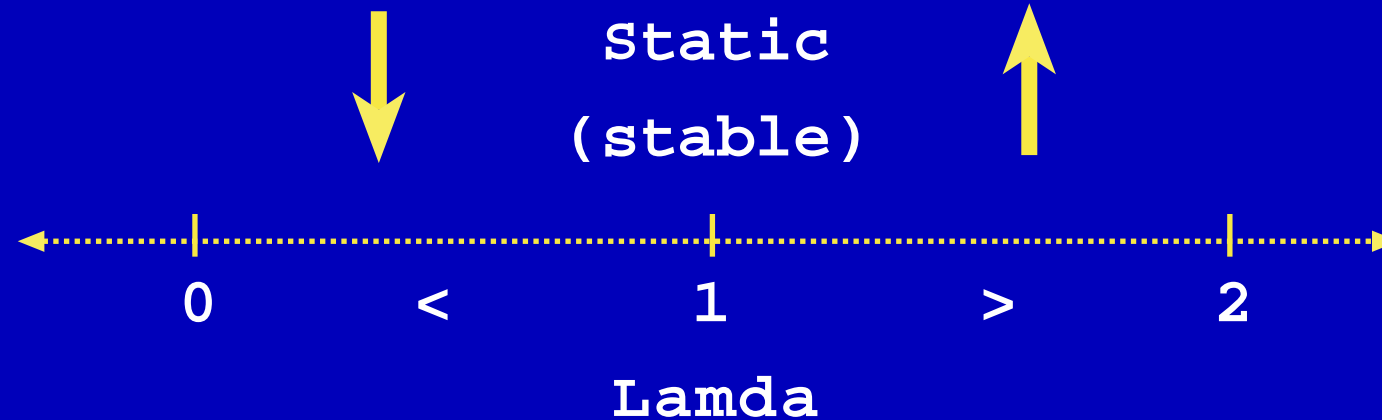
- A data file containing all wildlife observations from 1990 to 2002 was compiled.  
-(n~6,000 records of 11,700 birds & mammals)
- Plot totals by species and year were calculated for pairs and total waterfowl.
- Trends (Lamda's) were estimated for each species with a regression model using a negative binomial distribution.
- The critical p-value was corrected using Dunn-Šidák method to an experiment-wide error level of  $p=0.004$ .

## Species Composition



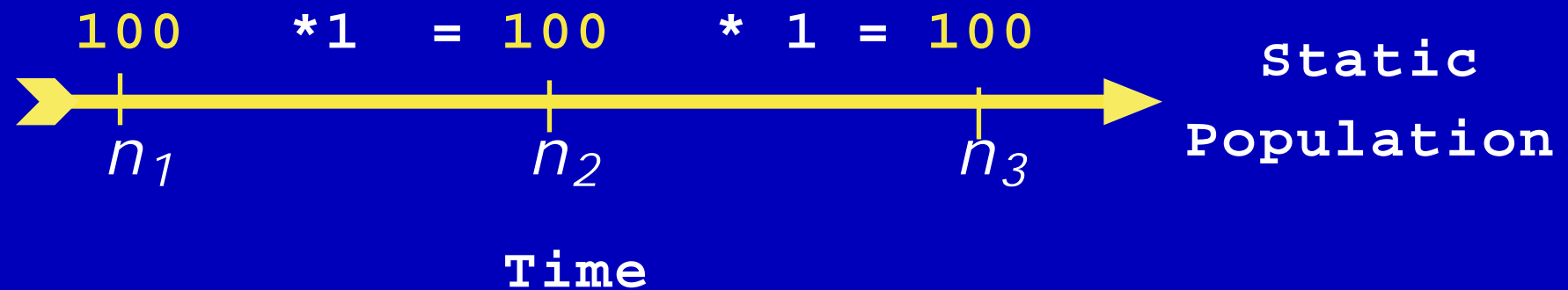
## *Measures of Population Growth*

- Lamda ( $\lambda$ ) is the finite rate of population increase.



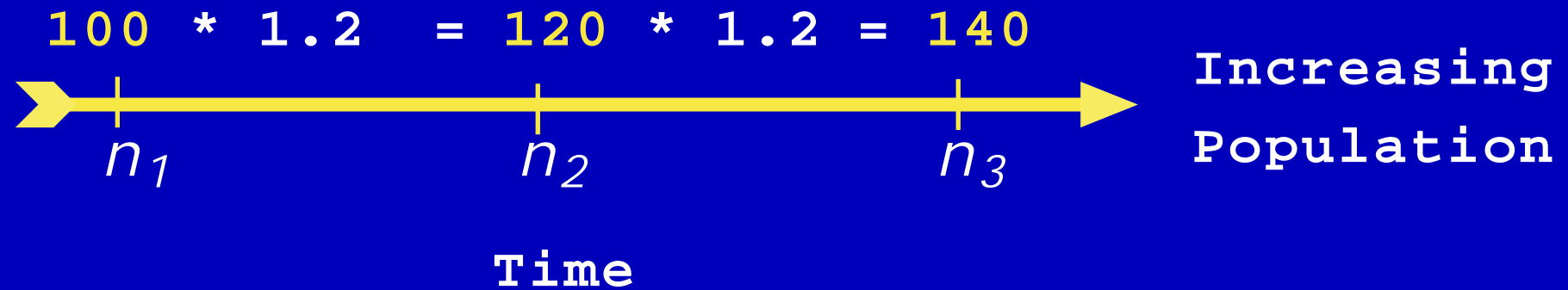
## Measures of Population Growth

Example: starting population = 100 and  $\lambda = 1$



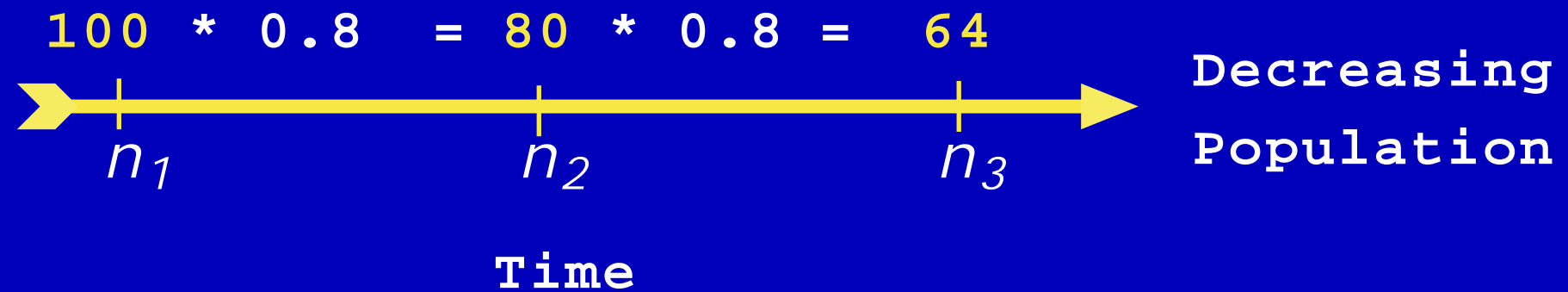
## Measures of Population Growth

Example: starting population = 100 and  $\lambda = 1.2$

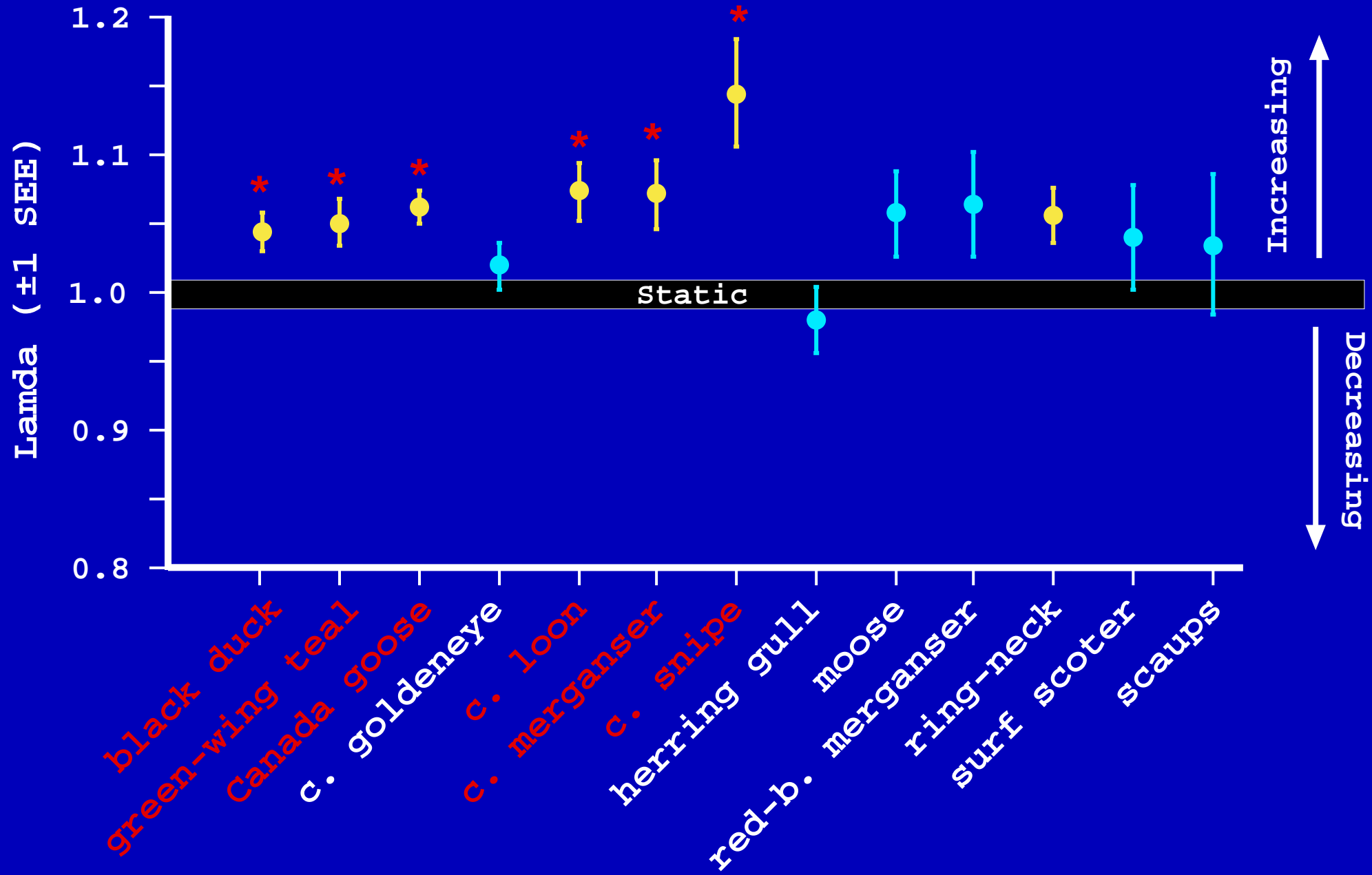


## Measures of Population Growth

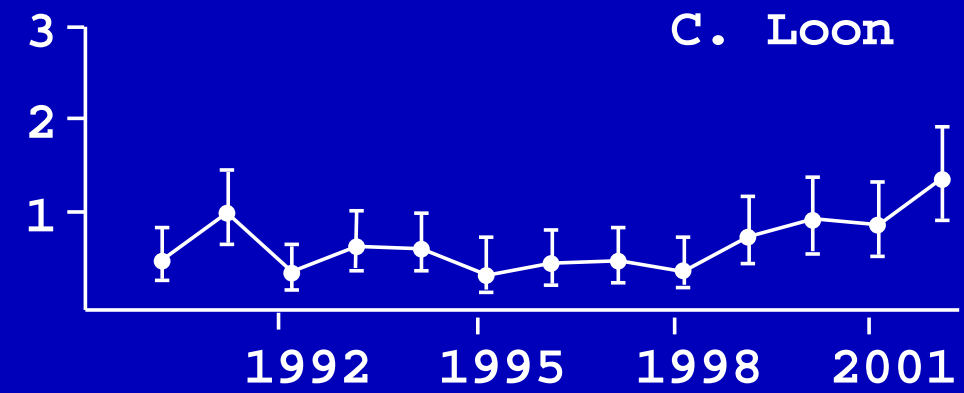
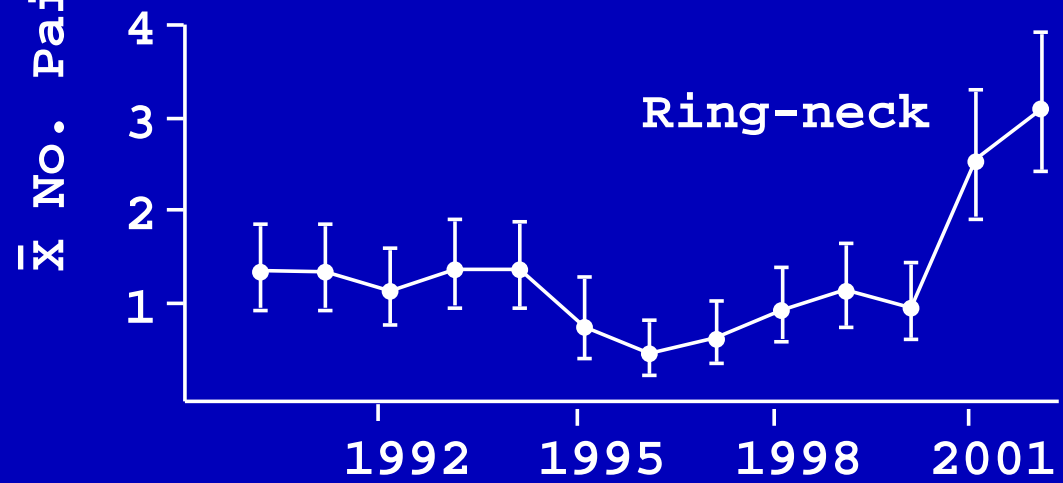
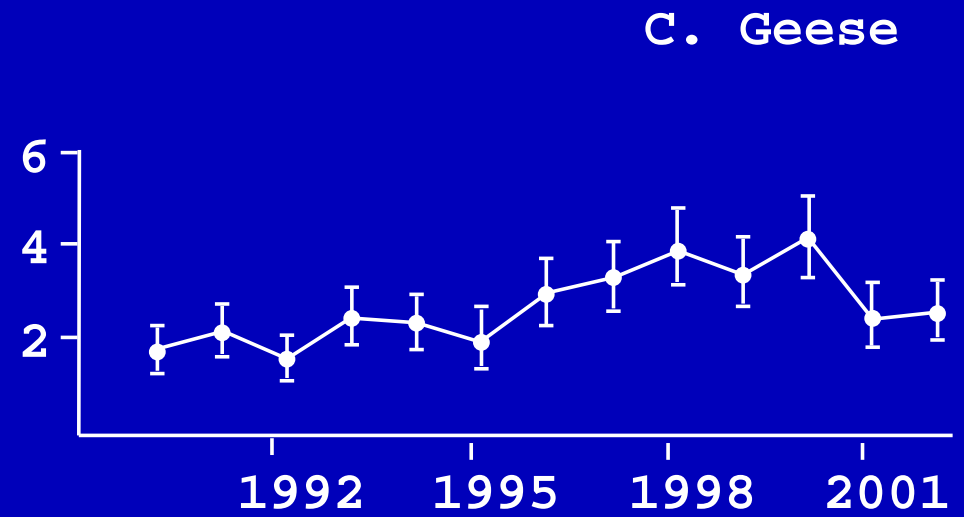
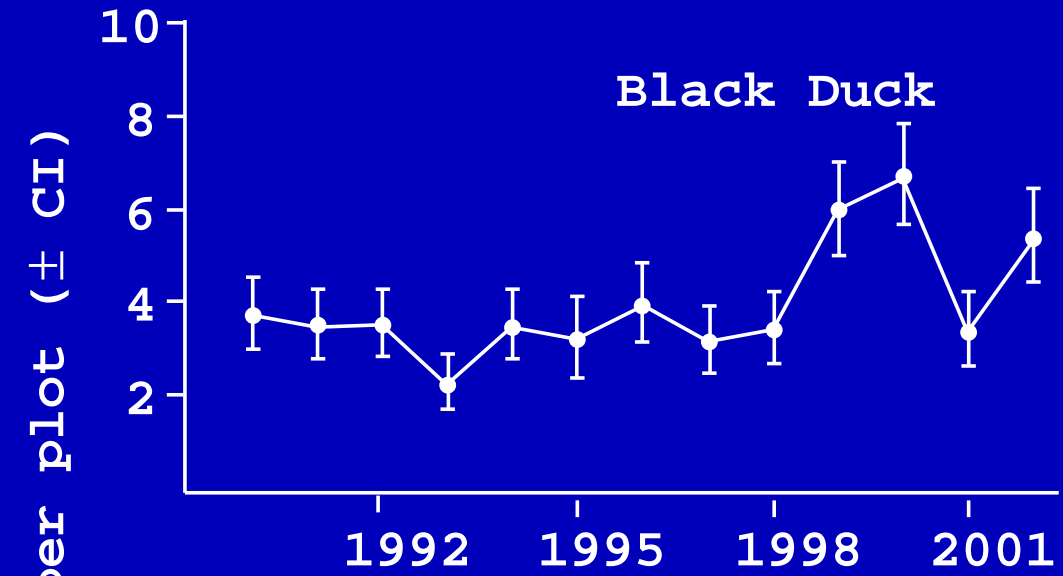
Example: starting population = 100 and  $\lambda=0.8$



# Population Growth Rates



\* Sign @ experiment-wide  $p < 0.004$



## *Summary*

- Most waterfowl that breed across the forested regions of Newfoundland and Labrador are stable or increasing.
- Many species had a higher rate of increase in the late 1990s than in the early 1990s.
- The delayed spring, following the severe winter of 2000, appears to have affected a number species, and their numbers are slowly recovering.

## *Acknowledgements*

**Survey Coordinators:** Mytle Bateman and Ian Goudie

**Pilots:** Geoff Goodyear, Dave Bursey,  
Jimmy Myra and Paul Wyatt

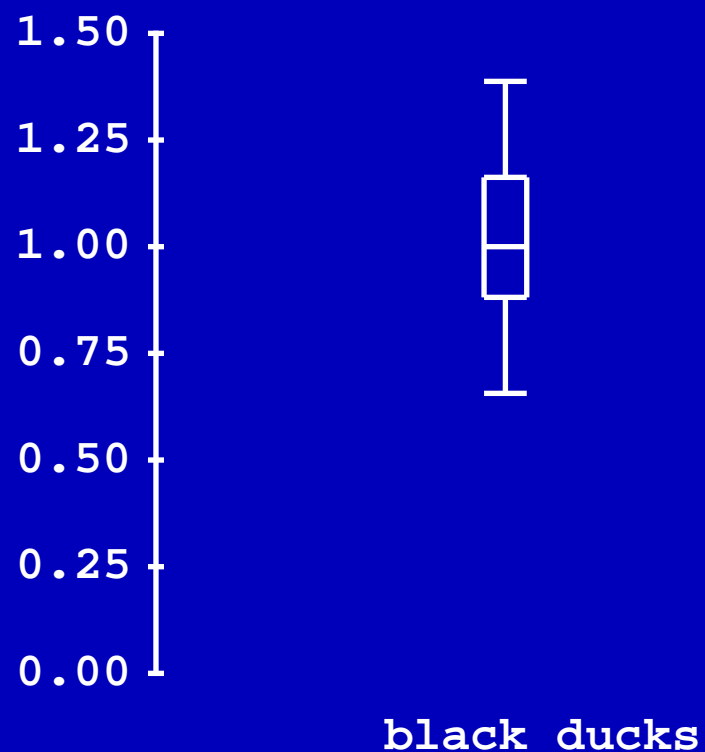
**Observers:** Randy Hicks, Chris Baldwin, Wayne  
Lidster, Wayne Barney, Glen  
Parsons, Pierre Ryan, Wally Skinner,  
Bruce Turner, Norm North and Andrew  
Hicks

**Stats:** Brian Collins and Neil Burgess

**Dept. Inland Fish & Wildlife Division**

**Ducks Unlimited Canada**

Phenology Index  
(No. Singles/No. Pairs)



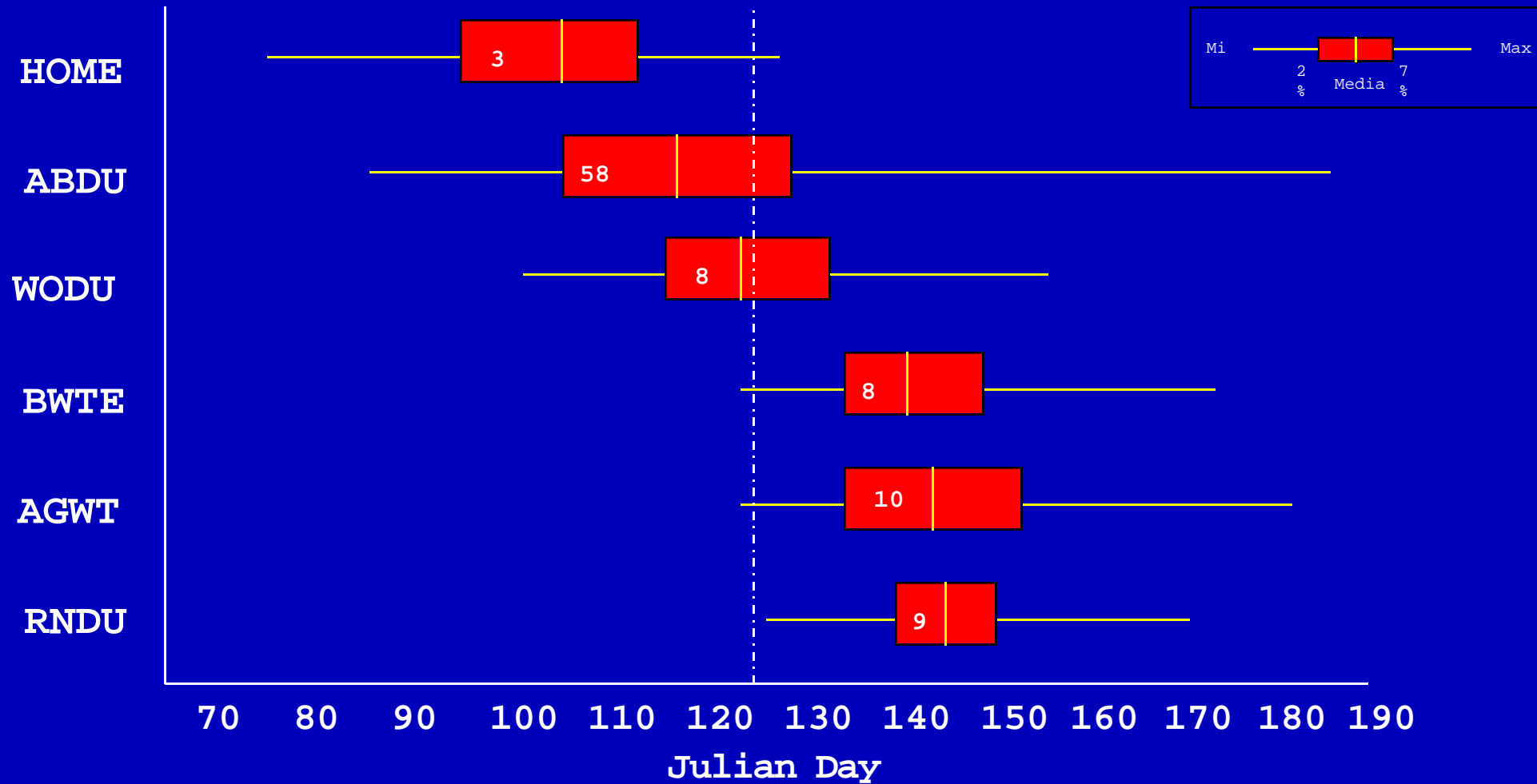
Summary of PhenIndx\$  
cases selected according to Selected phenindx.txt  
321 total cases of which 308 are missing

Percentile 10

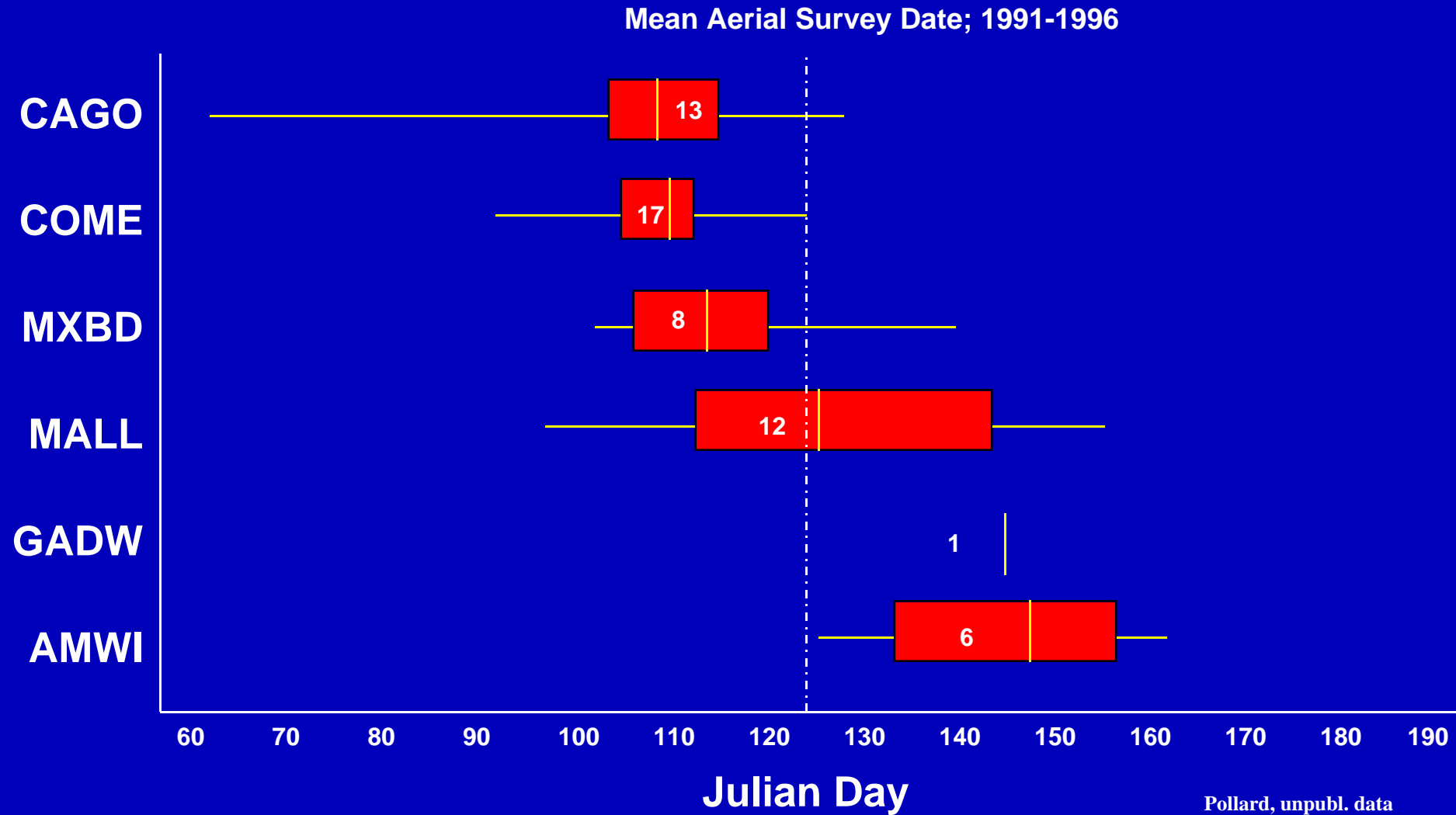
Sum	12.6615
Mean	0.973962
Median	1
StdErr	0.085191
Lower ith %tile	0.575040
Upper ith %tile	1.33770

# Waterfowl Nest Initiation Dates: Belleville, NS

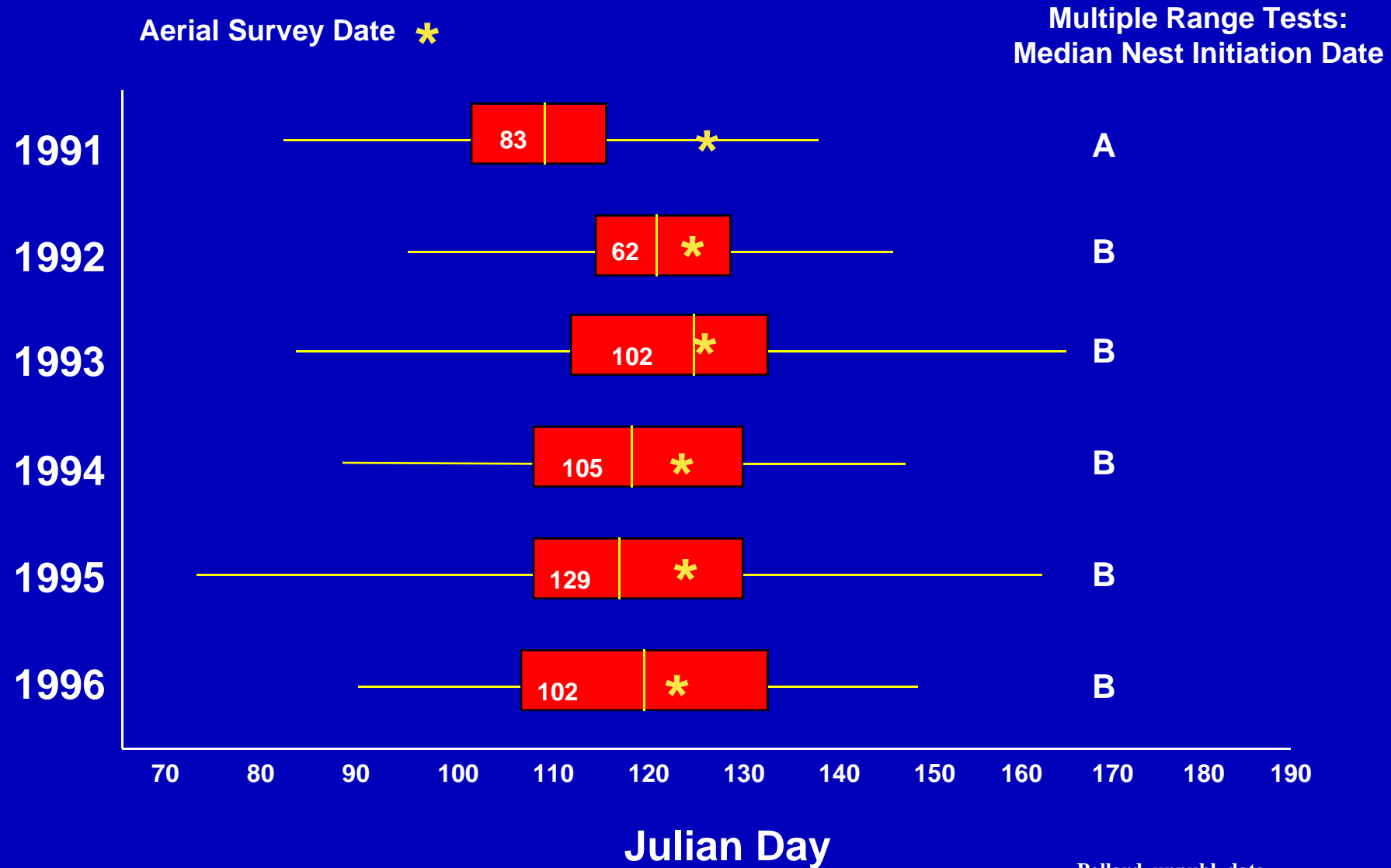
Mean Aerial Survey Date;  
1991-1996



# Waterfowl Nest Initiation Dates: Belleisle, NS



# Black Duck Nest Initiation Dates: Belleisle, NS



Pollard, unpubl. data