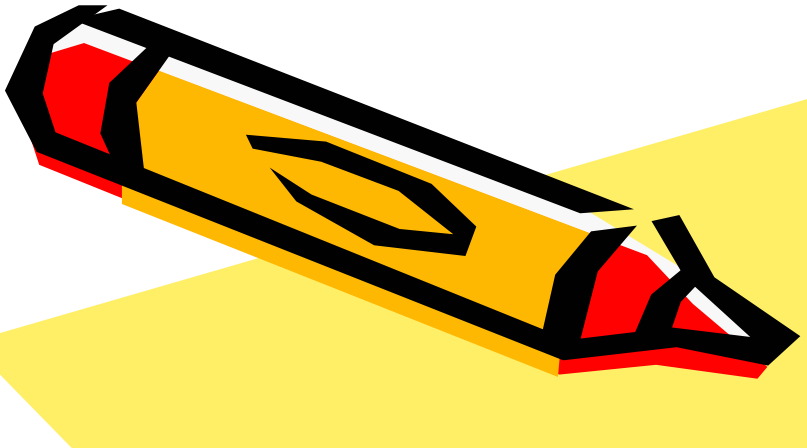


Harbor Porpoise Background Information

Dr. Debi Palka
Northeast Fisheries Science Center
Protected Species Branch

Overview

- Biology
  1) Physical characteristics
  2) Distribution
  3) Stock structure
  4) Abundance
  5) Feeding ecology
  6) Life history parameters
- Management
  1) Stock Assessment Reports
  2) PBR and ZMRG

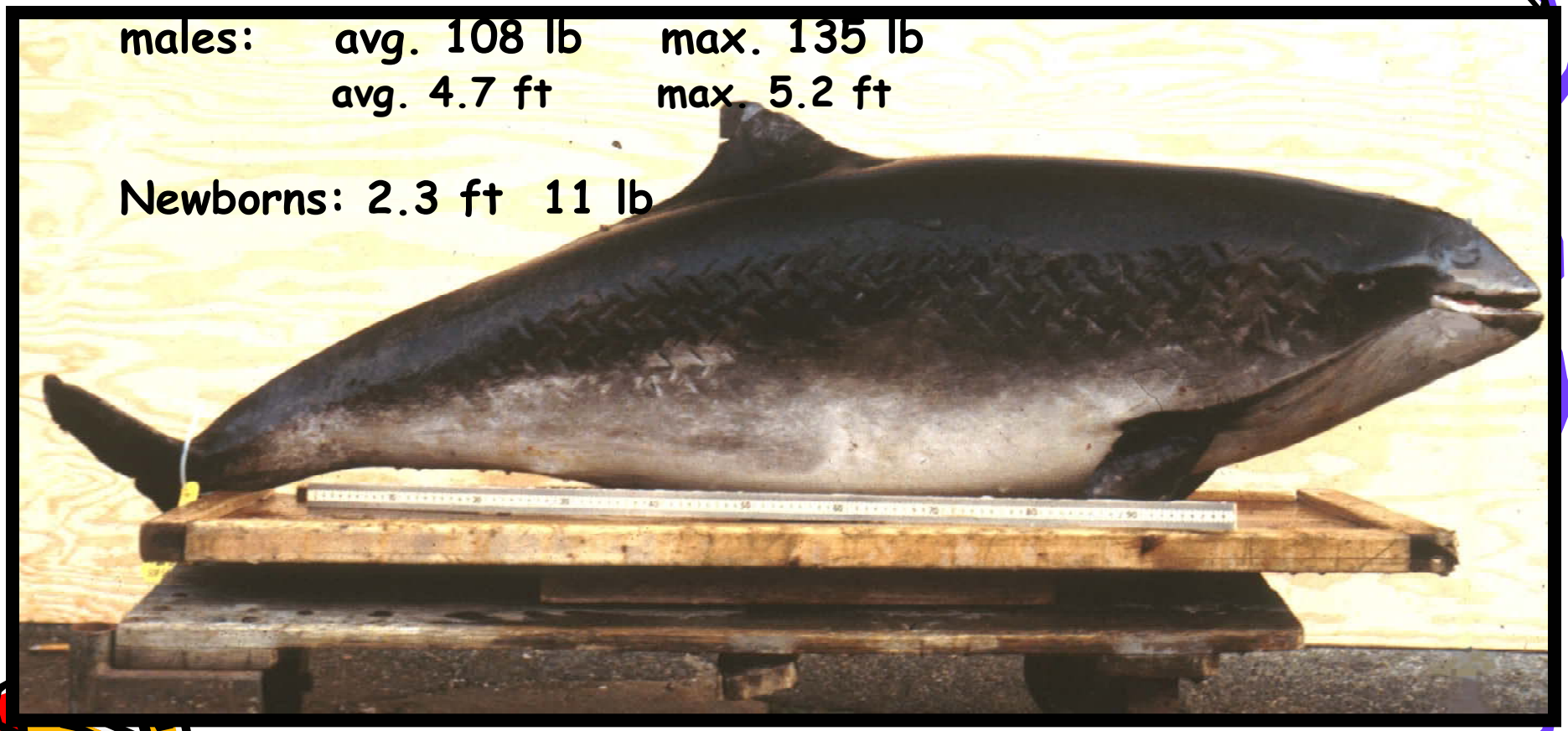
1) Physical characteristics

ONE OF SMALLEST CETACEANS

females: avg. 137 lb max. 168 lb
avg. 5 ft max. 5.5 ft

males: avg. 108 lb max. 135 lb
avg. 4.7 ft max. 5.2 ft

Newborns: 2.3 ft 11 lb



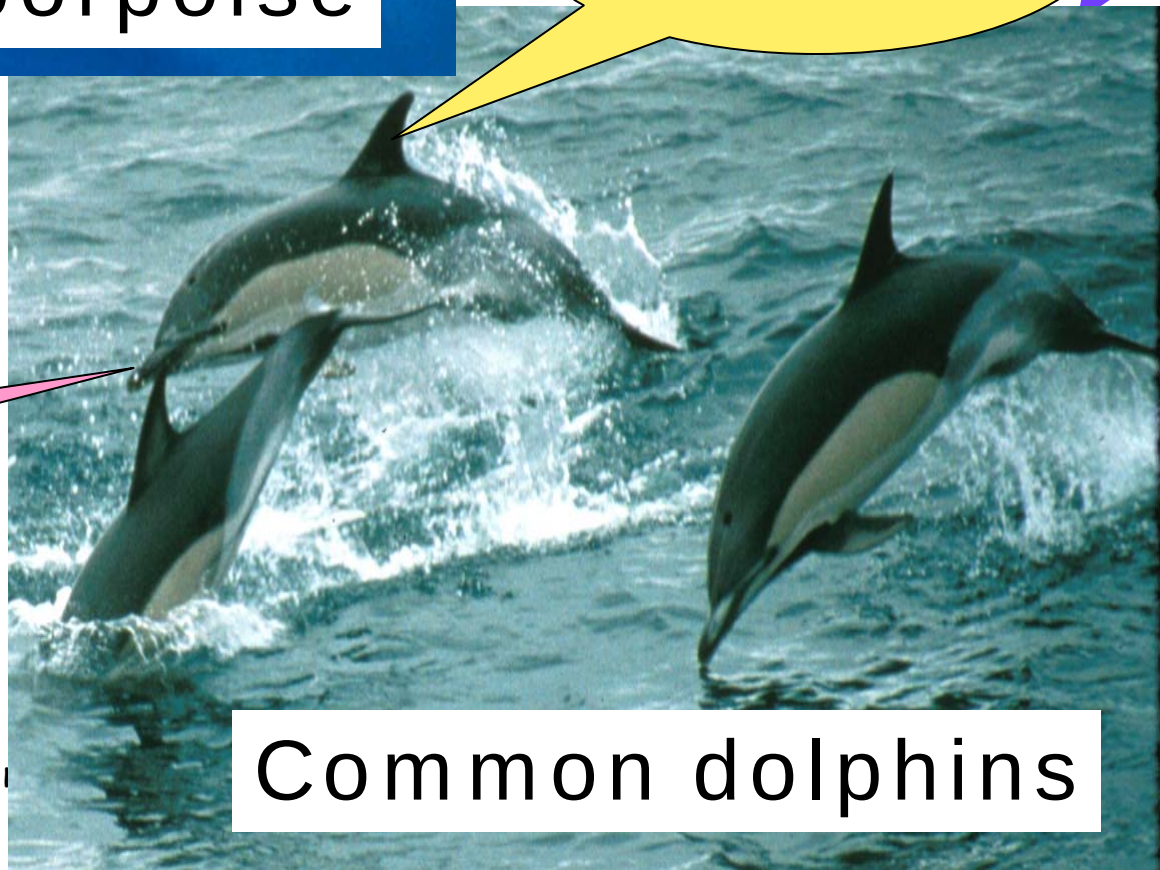
Typical view while in the water

Harbor porpoise in the Bay of Fundy, Canada. Photo courtesy of John Y. Wang, Porpoise Rescue Program.

Harbor porpoise

Small, triangular dorsal fin

No beak

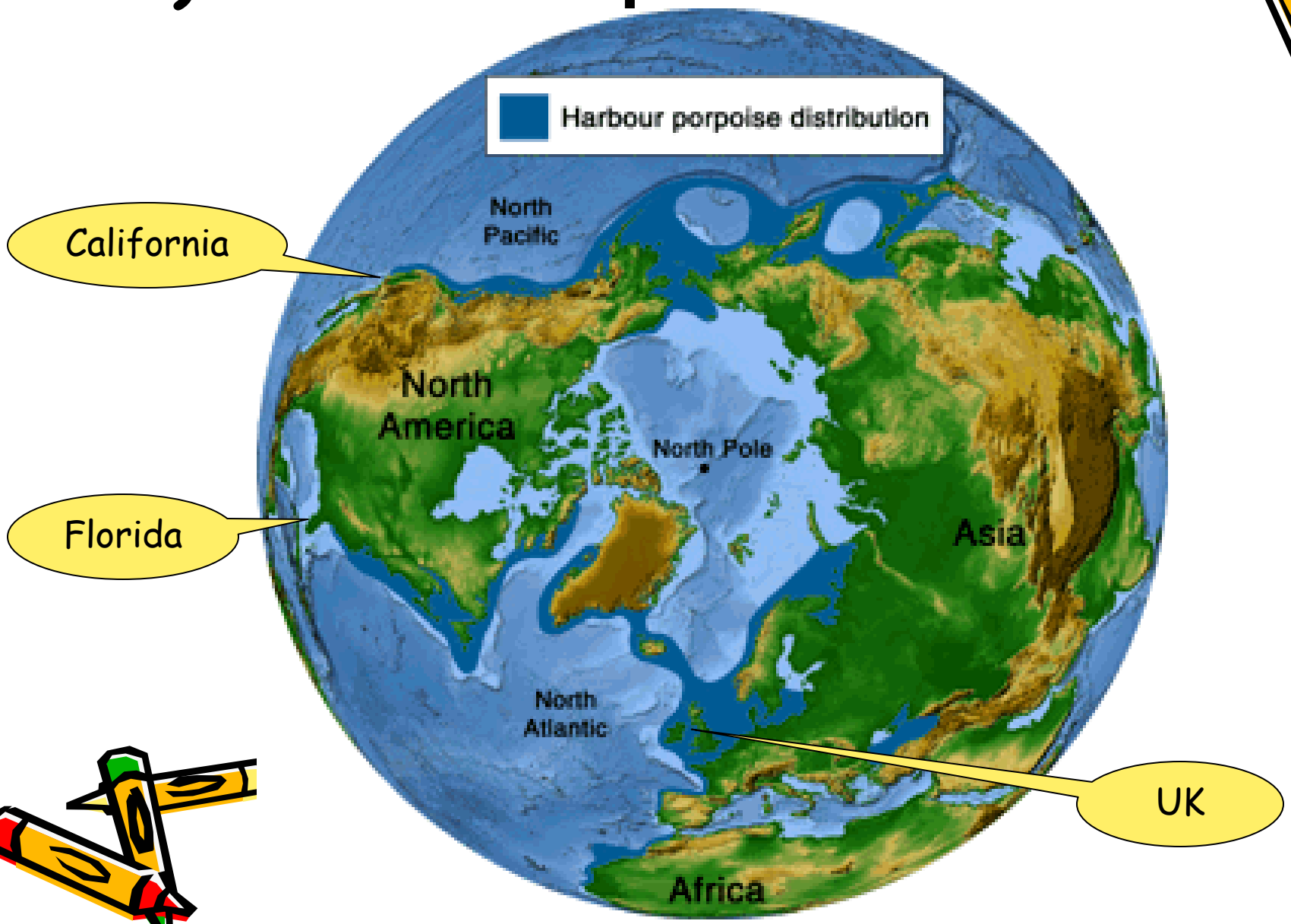


Tall, pointed dorsal fin

Long beak

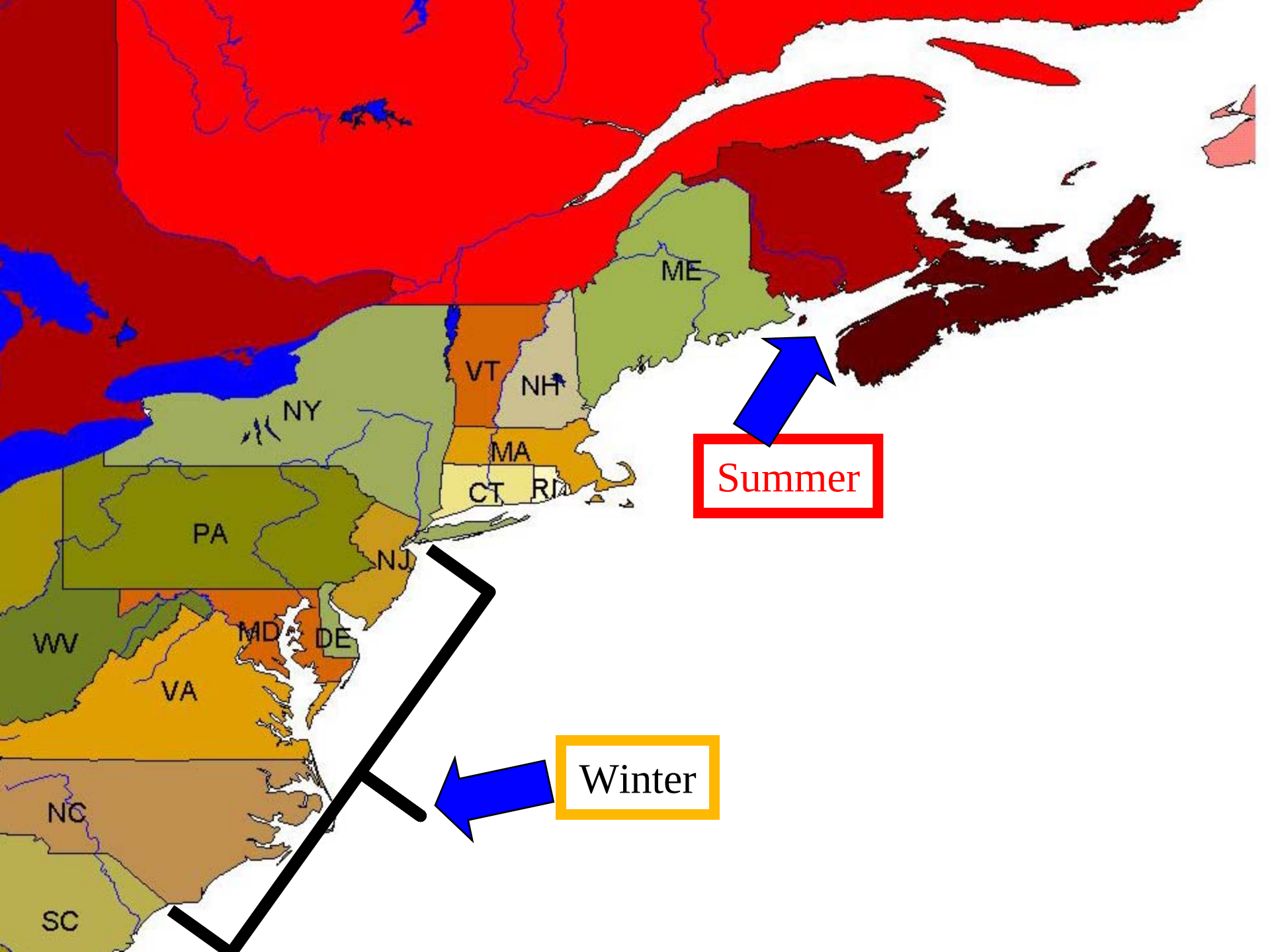
Common dolphins

2) Harbor Porpoise Distribution

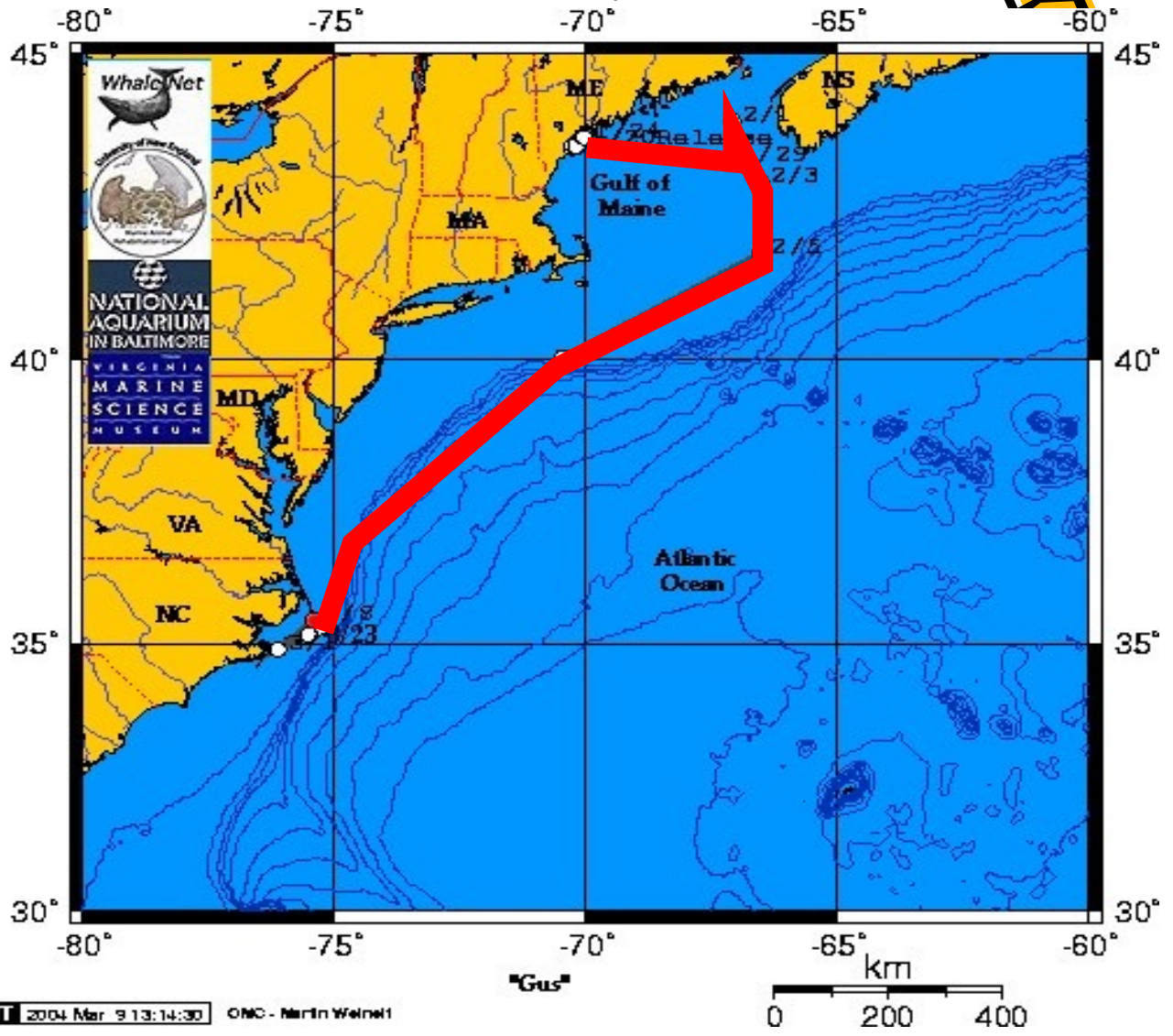


Distribution in western N. Atlantic

- Stocks are:
  - Gulf of Maine/Bay of Fundy
  - Gulf of St. Lawrence
  - Newfoundland
  - Greenland
- in US Mid-Atlantic waters in winter:
  - Mixed stocks

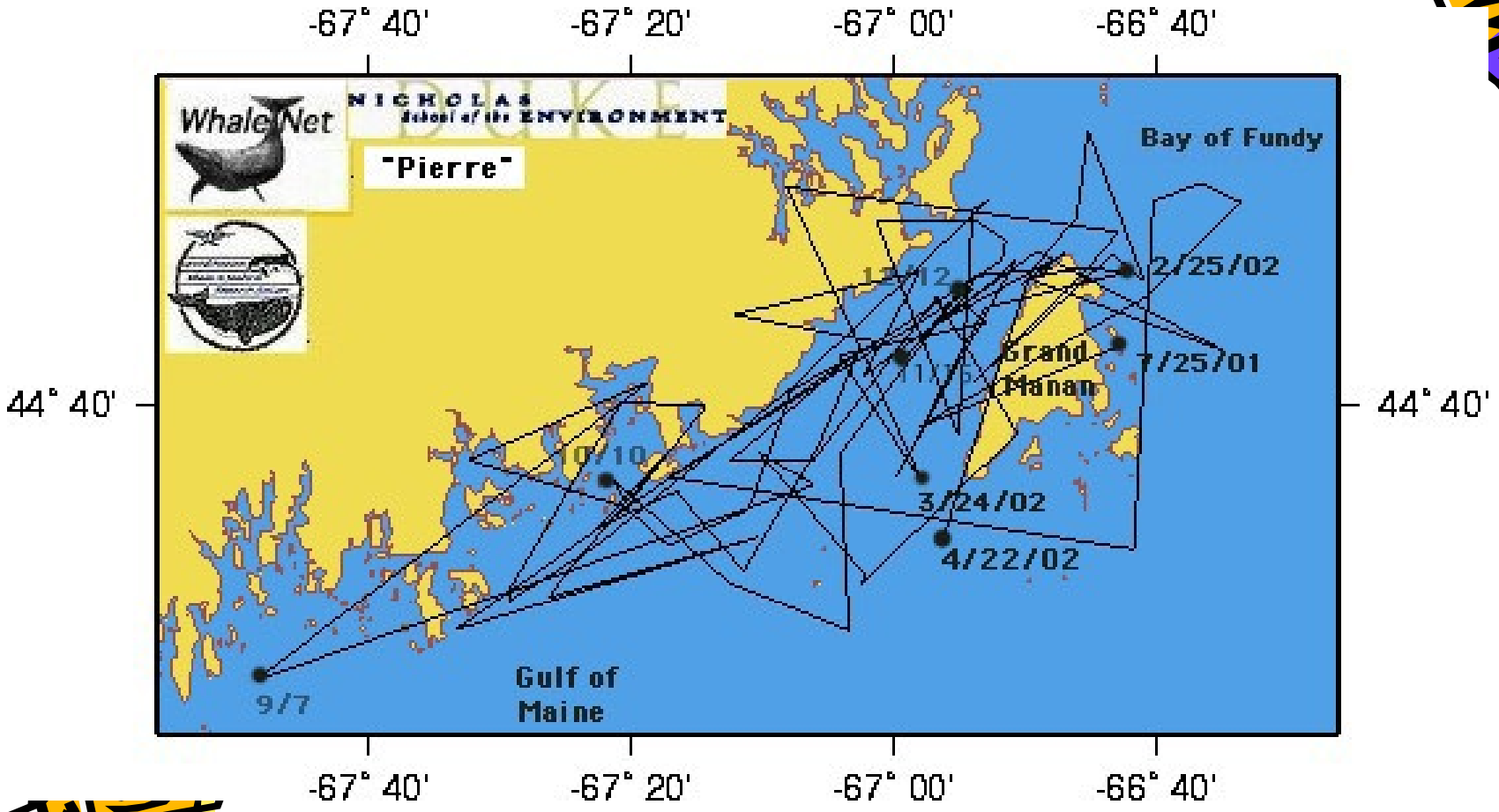

ME
VT
NH
NY
MA
CT
RI
PA
NJ
WV
MD
DE
VA
NC
SC
Summer
Winter

Satellite tagged harbor porpoise Jan 20, 2004 – March 23, 2004

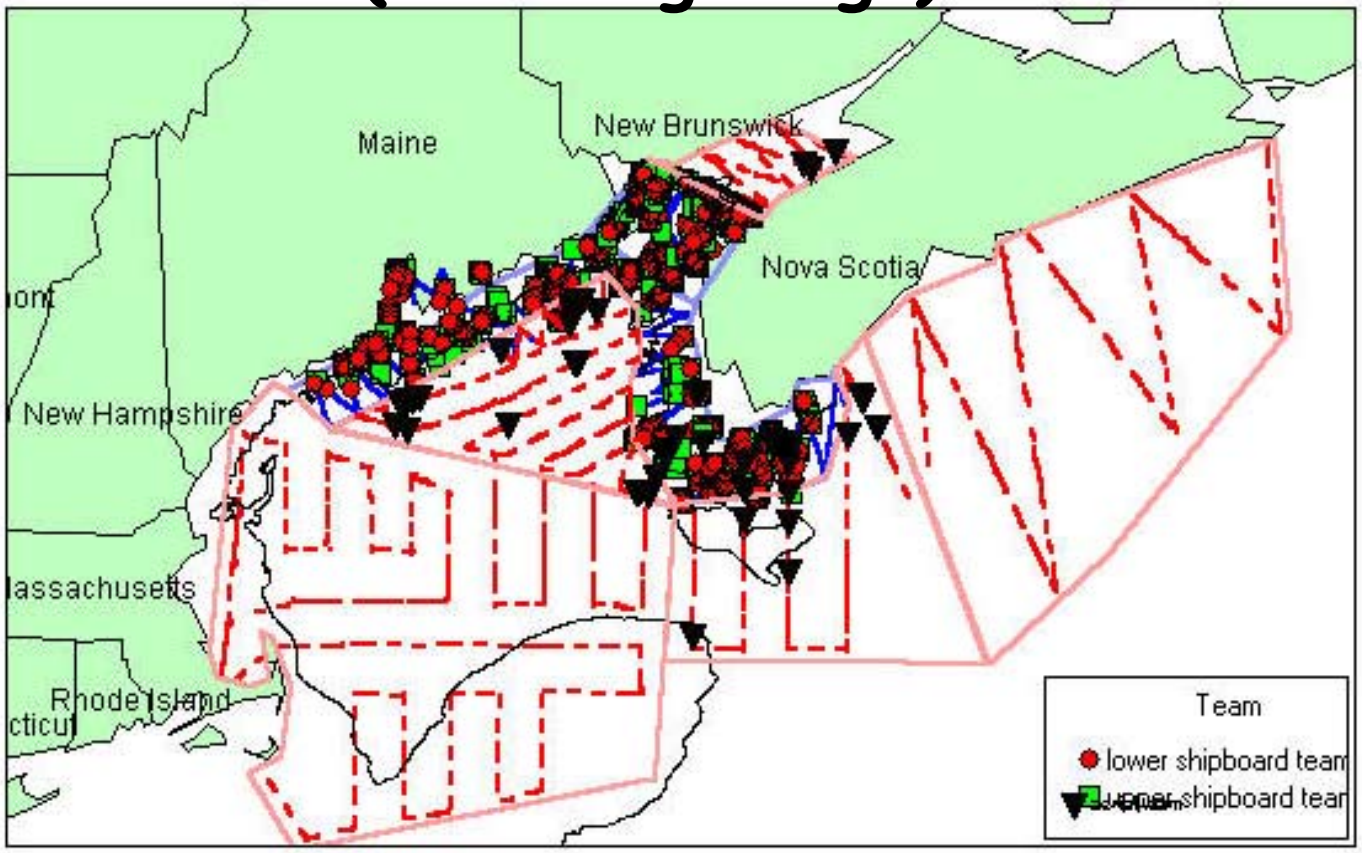


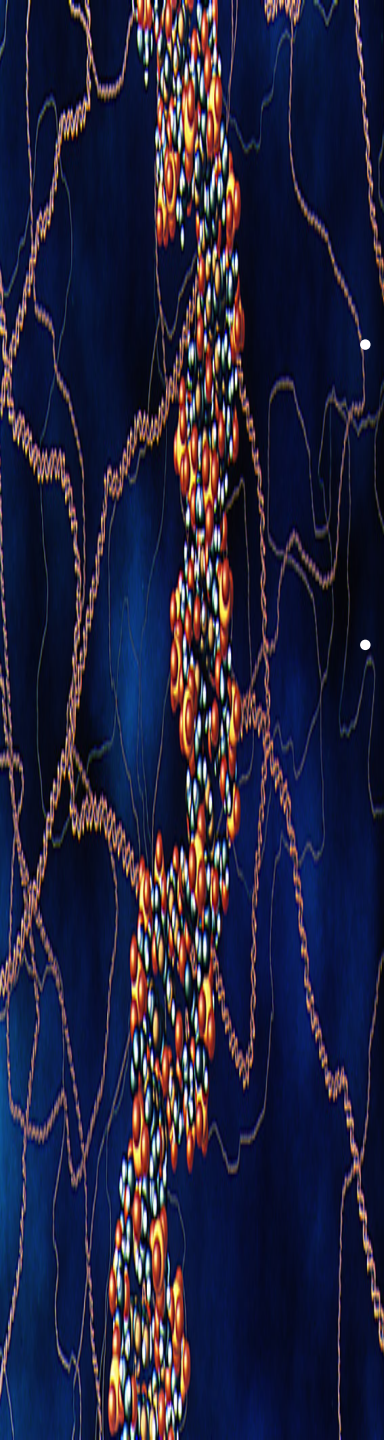
Orientat

July 25,2001 to April 30, 2002 (280 days)



Typical August distribution
(1999 sightings)



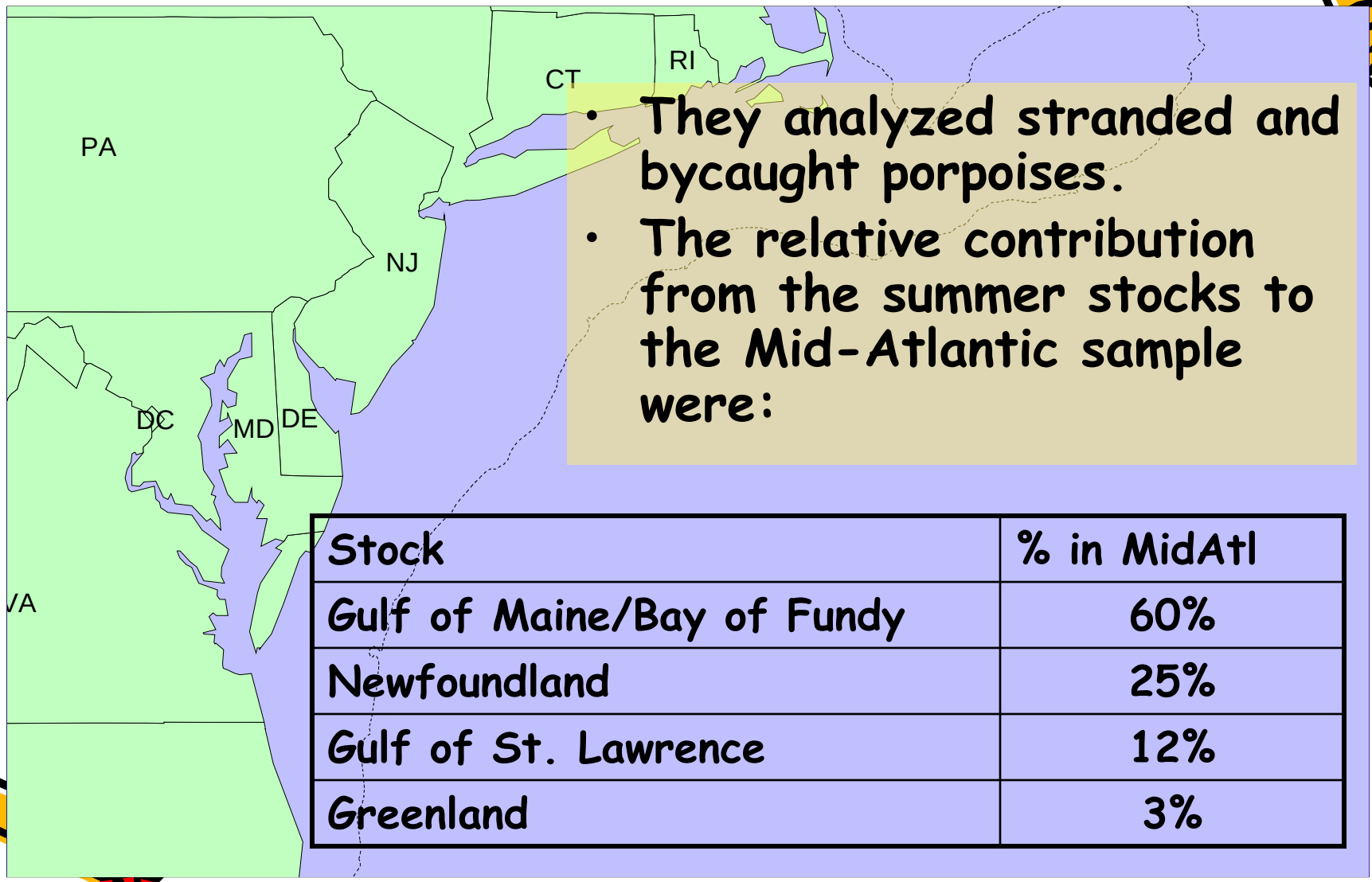


3) Genetic Stock Structure Findings from NW Atlantic

- Wang et al. (1996) suggested the presence of a weak cline in mtDNA genotype frequencies from Newfoundland to the Bay of Fundy, and some degree of female philopatry.
- Rosel et al. (1999) included W. Greenland and Newfoundland:
  - further support of male-mediated gene flow that maintained homogeneity among nuclear loci
  - female philopatry sufficient to produce a significantly difference in maternal mtDNA
  - Gulf of St. Lawrence and West Greenland were not statistically different from each other.
  - Limited migration between NE and NW Atlantic

Findings from winter Mid-Atlantic

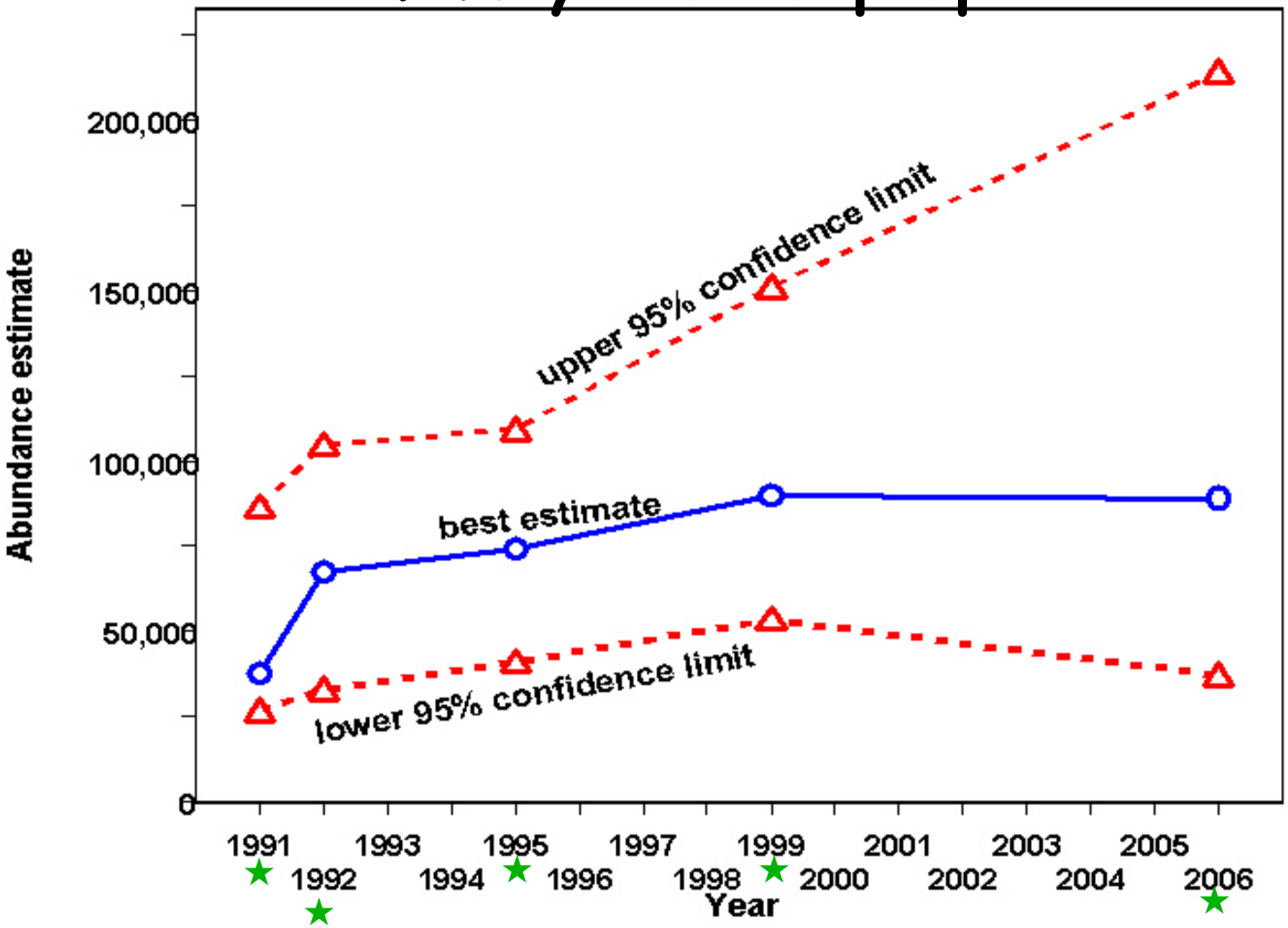
(Rosel et al. 1999; Hiltunen 2006; Hiltunen and Rosel in prep)



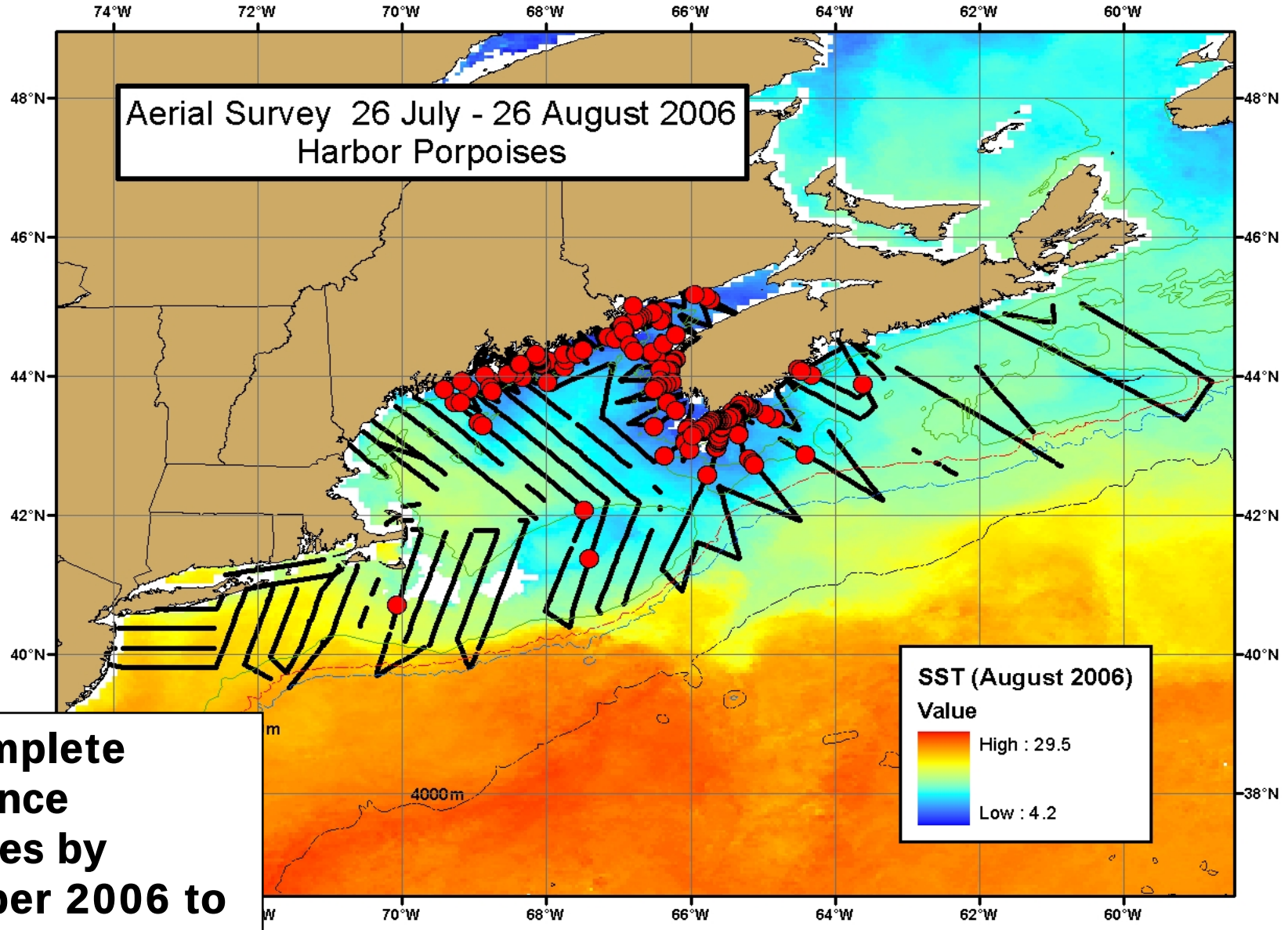
- They analyzed stranded and bycaught porpoises.
- The relative contribution from the summer stocks to the Mid-Atlantic sample were:

Stock	% in MidAtl
Gulf of Maine/Bay of Fundy	60%
Newfoundland	25%
Gulf of St. Lawrence	12%
Greenland	3%

4) Abundance estimates of Gulf of Maine/Bay of Fundy harbor porpoise

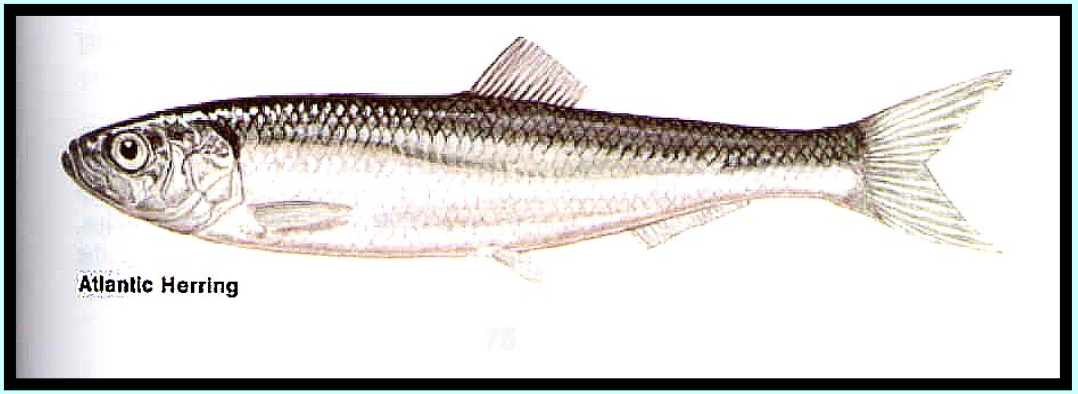


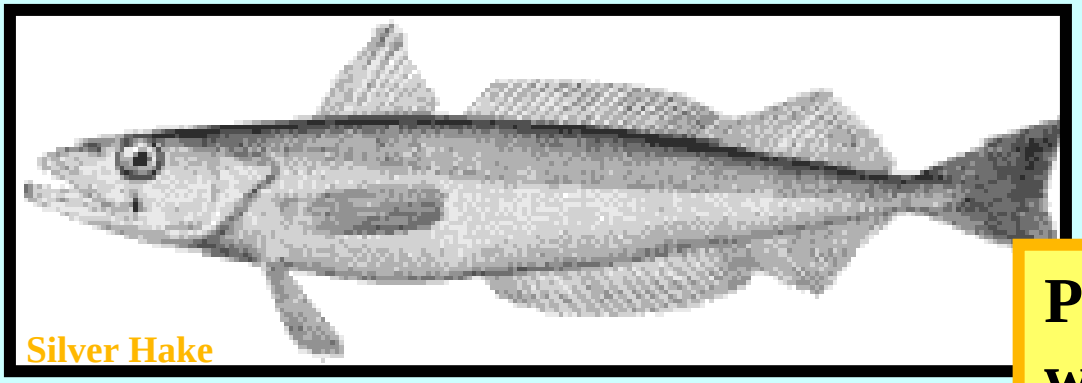
NOAA Twin Otter

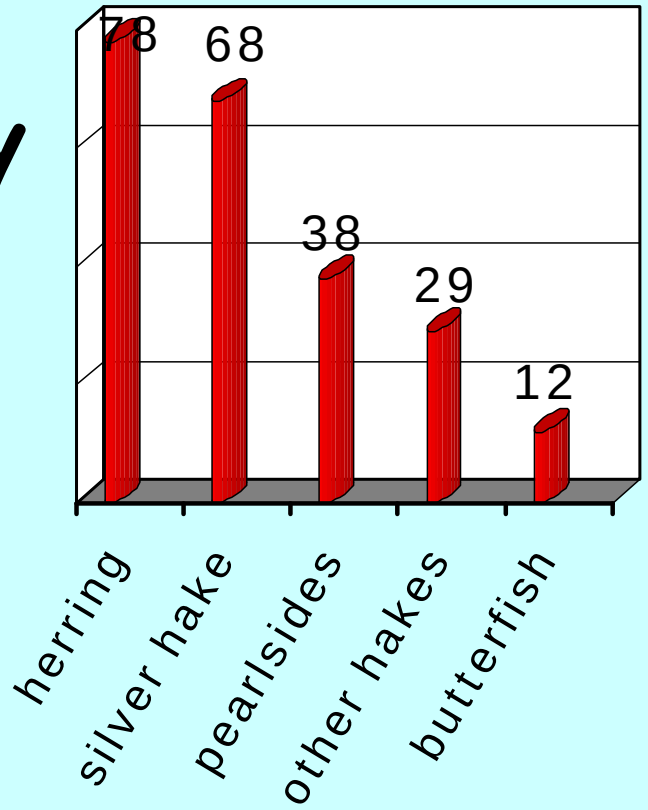


Will complete abundance estimates by December 2006 to be reviewed by Atlantic Scientific evaluation Group

5. Feeding Ecology

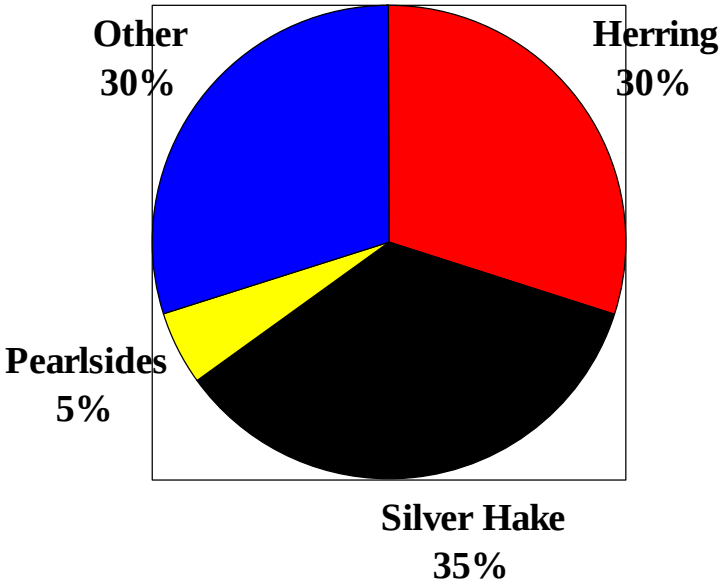




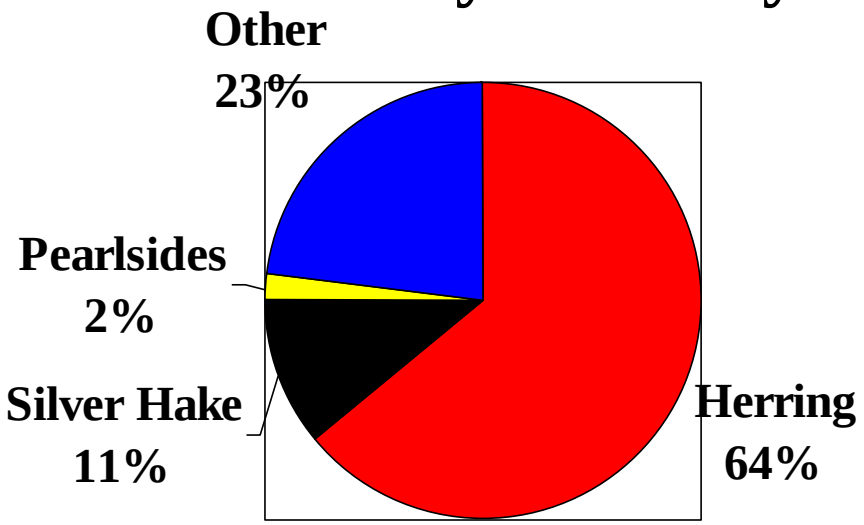


Percent of porpoises (n=95) with fish species in stomachs during fall

Harbor Porpoise Diet in Gulf of Maine/Bay of Fundy

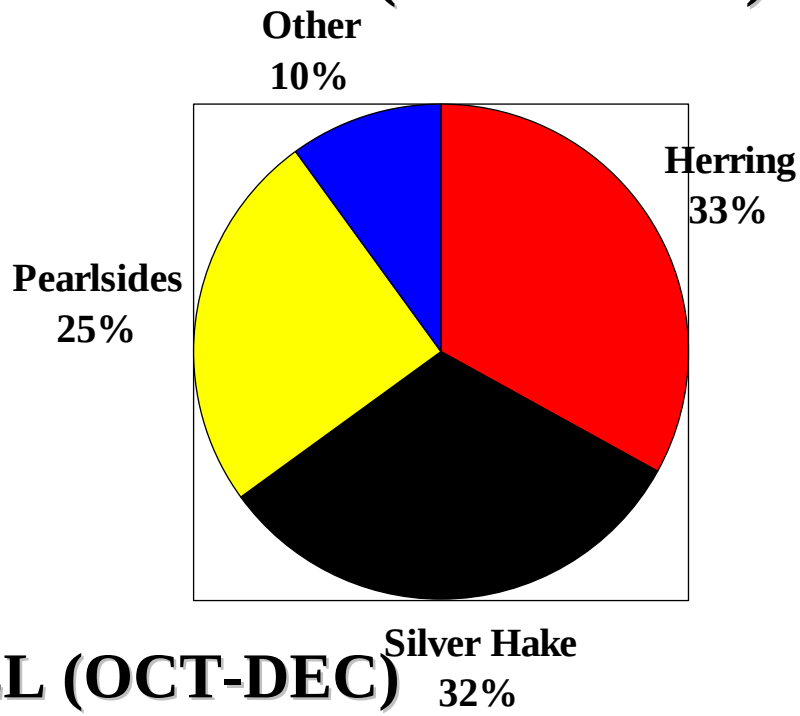


WINTER (JAN-MAY)



SUMMER (JUNE-SEPT)

Numeric Proportion= Number of items of a prey species divided by total number of prey items in each stomach



FALL (OCT-DEC)

6) Life history

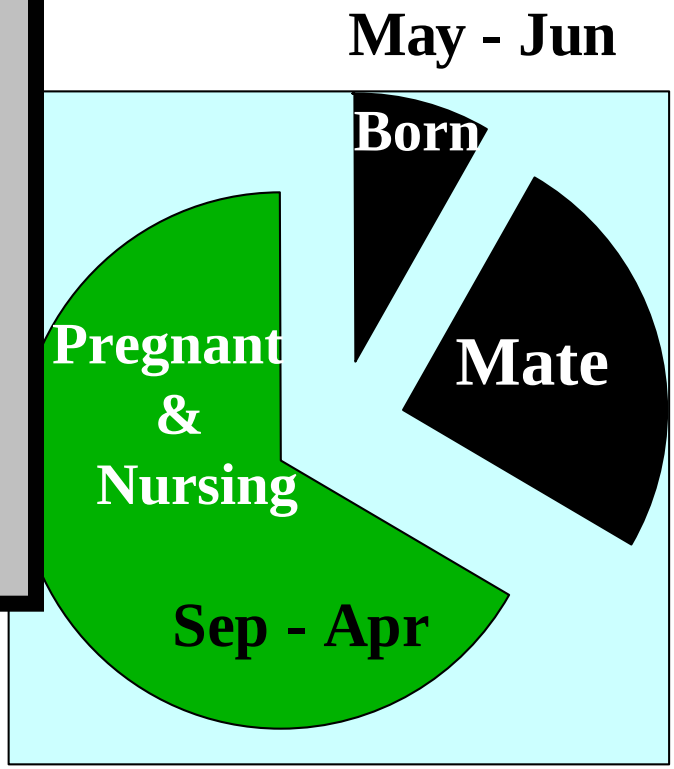
Reproductive cycle

Mean age females start to mate is 3.4 years old

Males start at 3-5 years old

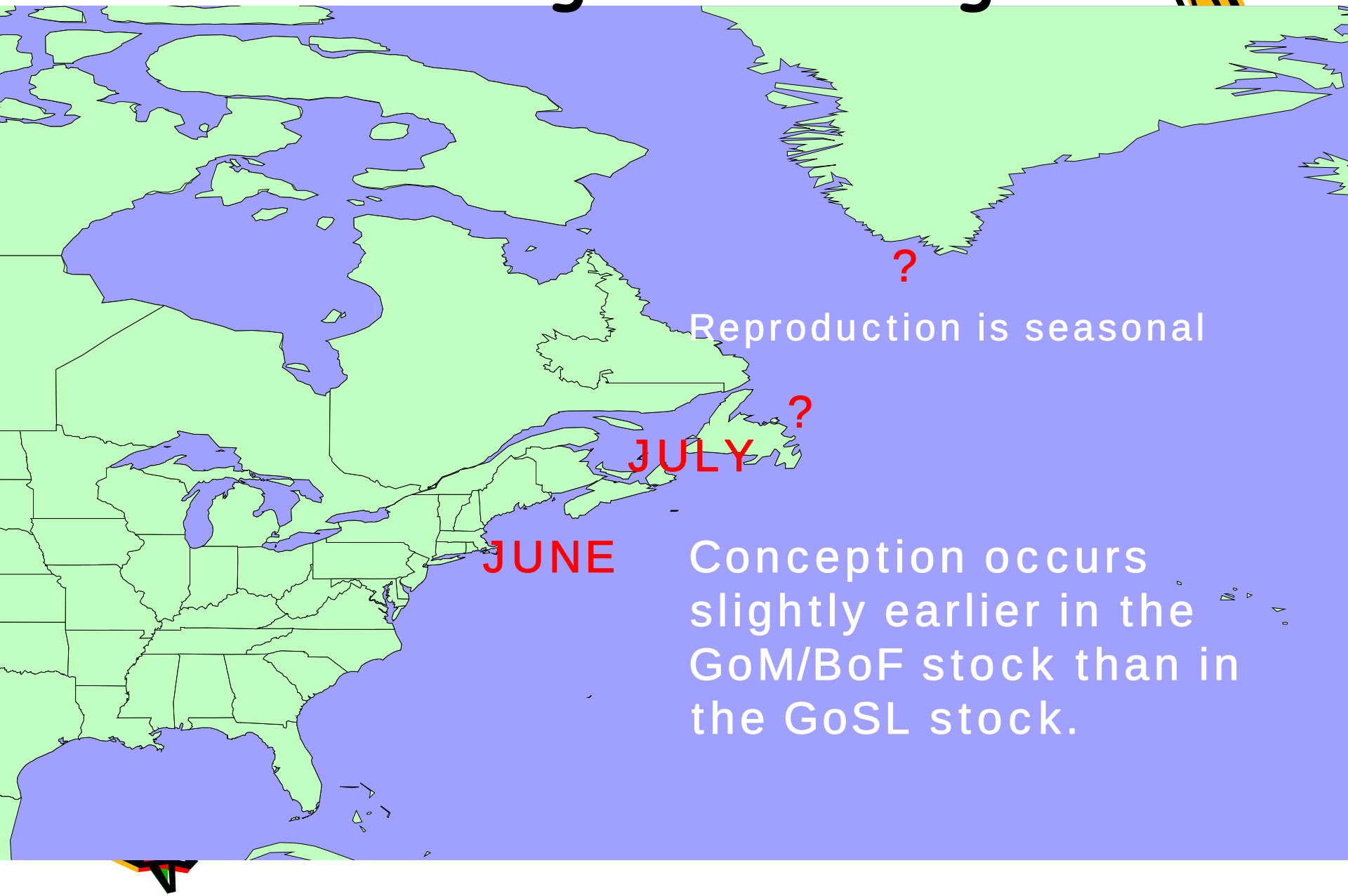
Gestation = 10.6 months

1 young/year



Female usually are nursing a calf & pregnant at the same time

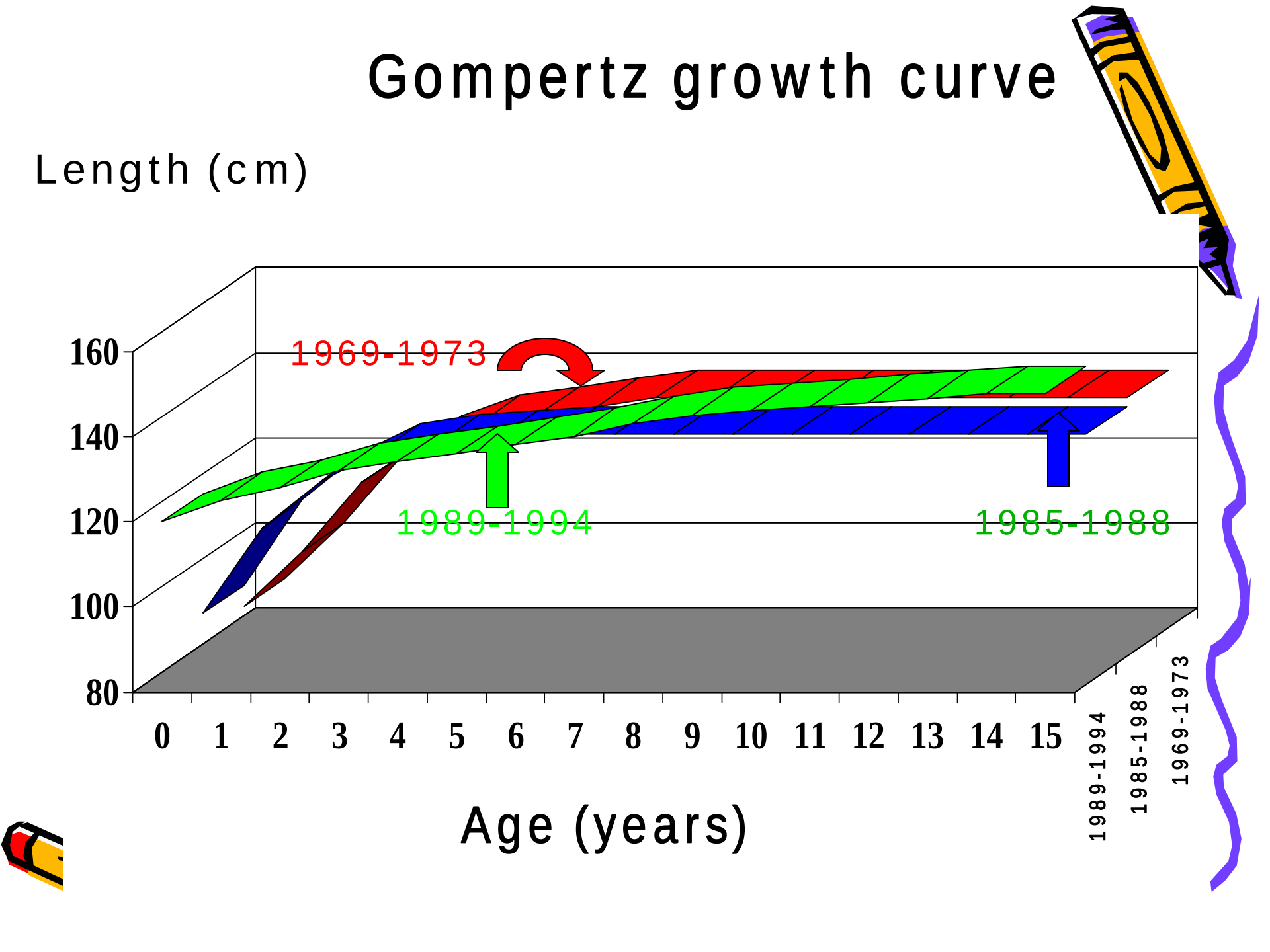
Timing of Breeding



Reproduction is seasonal

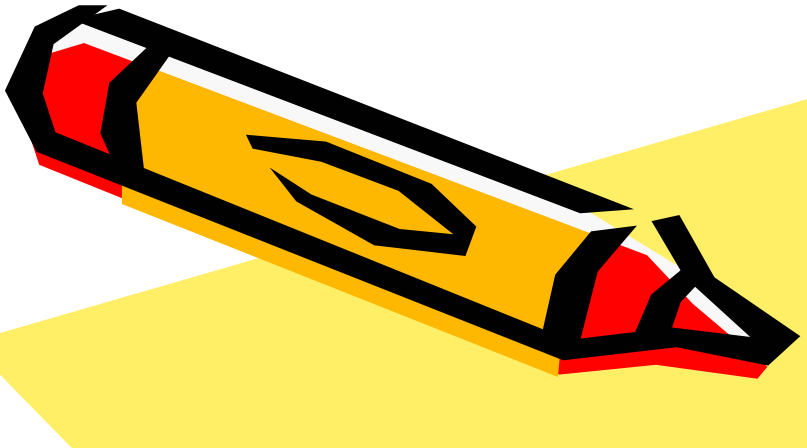
Conception occurs slightly earlier in the GoM/BoF stock than in the GoSL stock.

Gompertz growth curve



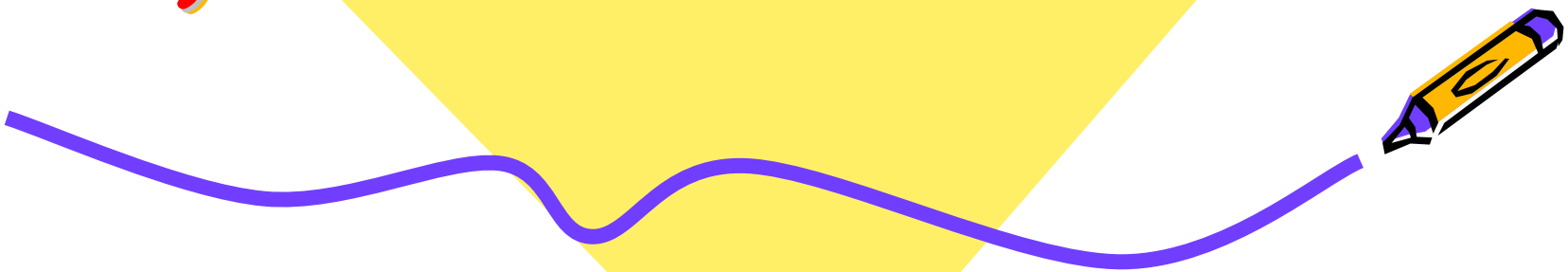
Rate of increase?

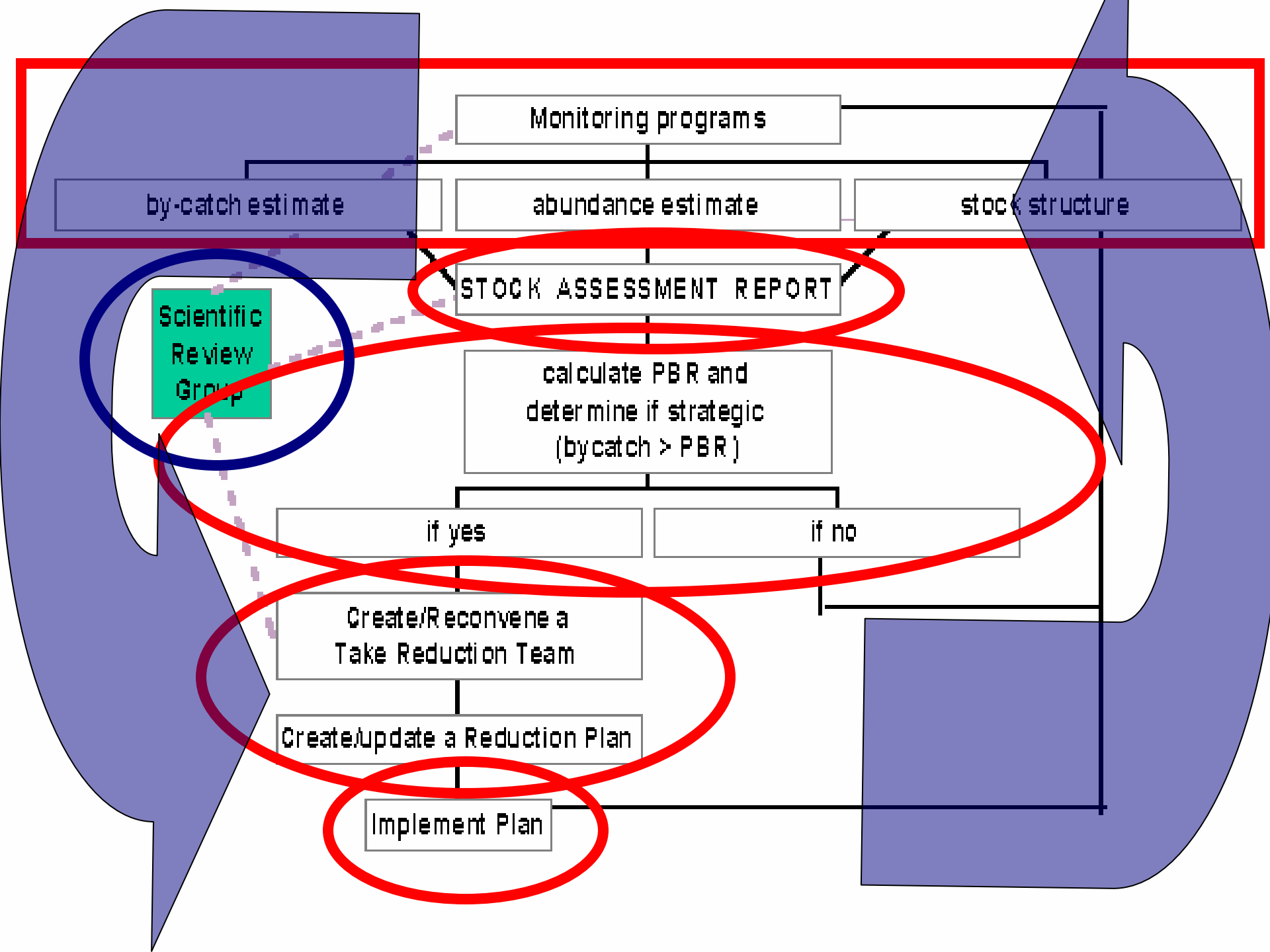
- No data exist to empirically estimate
- Using model populations, estimated the *potential* rate of increase
  - 9.4% Barlow and Boveng (1991)
  - 4% Woodley and Read (1991)
  - 10% Caswell *et al.* (1998)
    - 90% confidence interval: 3-15%



MANAGEMENT ISSUES

1) Stock Assessment Process
2) PBR & ZMRG




Monitoring programs
by-catch estimate
abundance estimate
stock structure
STOCK ASSESSMENT REPORT
Scientific Review Group
calculate PBR and determine if strategic (bycatch > PBR)
if yes
if no
Create/Reconvene a Take Reduction Team
Create/update a Reduction Plan
Implement Plan

PBR = Potential Biological Removal level

PBR is defined as the maximum number of animals, not including natural mortalities, that may annually be removed from a stock while allowing that stock to reach and maintain its OSP level

$$PBR = N_{min} * 1/2\ R_{max} * F_R$$

Zero Mortality Rate Goal (ZMRG)

- In 1994, MMPA amended to establish a requirement that the level of incidental mortality and serious injury of marine mammals be reduced to insignificant levels approaching a zero rate by April 30, 2001.
- NMFS defined "insignificant level" as 10% of the Potential Biological Removal (PBR) level for a stock of marine mammals

Harbor Porpoise

$PBR = N_{min} * 1/2\ R_{max} * F_R$

$ZMRG = 0.10 * PBR$

Year	N_{best}	$CV(N_{best})$	N_{min}	PBR	ZMRG
1991	37,500	0.29	--	--	--
1992	67,500	0.23	40,297*	403	40.3
1995	74,000	0.20	48,289**	483	48.3
1999	89,700	0.22	74,695	747	74.7
2006	89,054	0.47	60,970	610	61.0

* Average of 1991 and 1992

** Average of 1991, 1992, and 1995