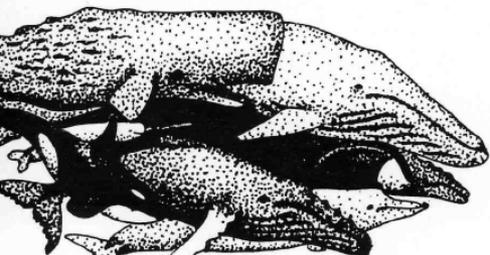


# Size and Body Condition of Southern Residents



*John.Durban@noaa.gov*



# Center for Whale Research: long-term photo-id

1976



Orcinus orca

### ORCA SURVEY

**THE ORCA SURVEY** is an intensive study of **KILLER WHALES** in the Pacific Northwest waters. Biologists aboard the "Ballena Pacifica" in conjunction with the National Marine Fisheries Service are photographing Orcas and following the movements of recognizable individuals and/or groups.

The study is purely scientific. Detailed examination of photographs will enable researchers to identify distinctive individuals. Information gathered will give a clearer understanding of the natural biology, social behavior, and population dynamics of these animals.

**PUBLIC COOPERATION** is vital to the success of the study. Researchers aboard the study vessel are prepared to respond instantly to sighting calls anywhere in Washington waters.

**HAVE YOU SEEN ANY KILLER WHALES? IF YOU SEE KILLER WHALES PLEASE CALL IN YOUR SIGHTING IMMEDIATELY.**

National Marine Fisheries Service **442-4737**  
collect or direct 24 hrs.

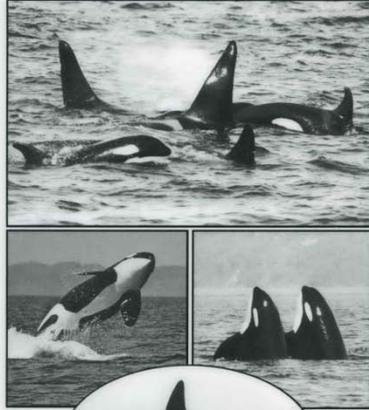
If you live on the water and wish to participate in the "Whale Spotter Information Network" please contact

Orca Survey Coordination Center  
445 Wood Ave. SW  
Bainbridge Island Wa. 98110  
842-7558

Thank you for your cooperation. We will acknowledge your help.

Moclips Cetological Society 6/76

2011



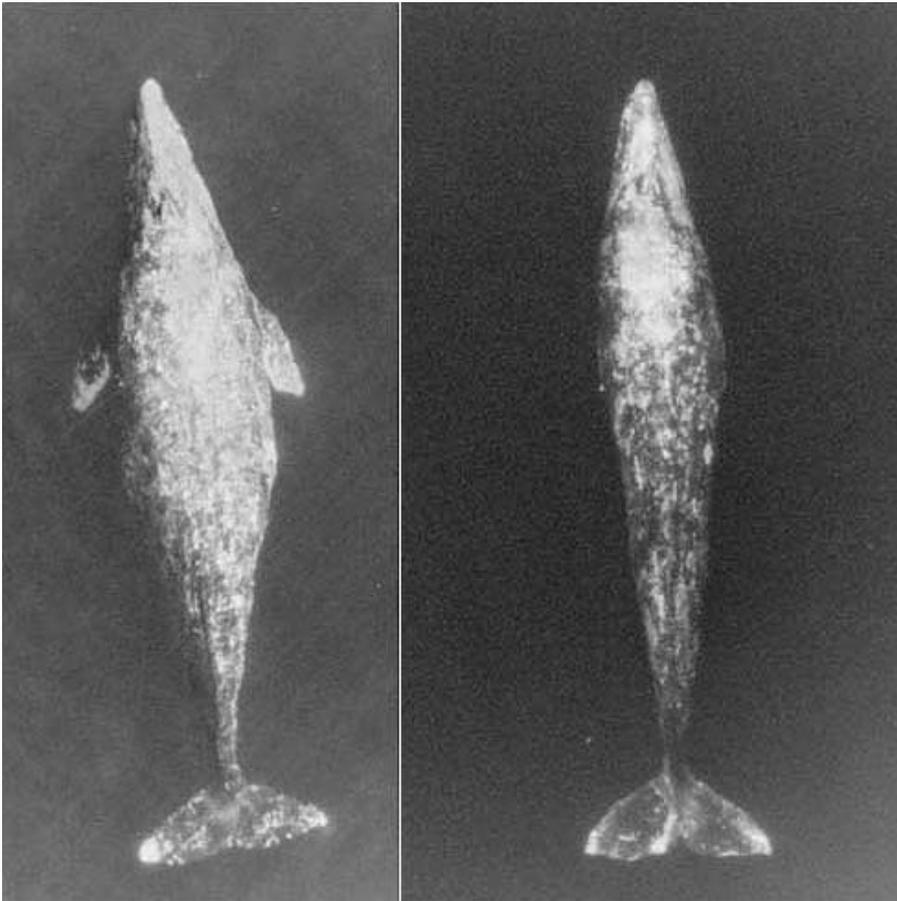
*Official*  
**Orca Survey**  
*Naturalist's Family Tree Guide to  
Orca Whales of the Southern Resident Community  
2011 Summer Edition*  
*August 16, 2011*

Produced by the Center for Whale Research, Friday Harbor, WA 98250  
David Ellifrit, Erin Heydenreich and Kenneth C. Balcomb III

# *35 years of life-history data*



# ***NOAA SWFSC: Photogrammetry expertise***



## ***Food limitation in Southern Residents***





Grow your small business with search engine marke

## LOCAL

Last updated October 24, 2008 11:39 p.m. PT

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Nancy Black / Monterey Bay Whale Watch

Orcas from L pod, usually seen in state waters, surface near Cypress Point, Calif. Scientists suggest the pod may be driven to swim hundreds of miles just to meet minimum nutritional requirements.

### Are the orcas starving?

As salmon runs decline, killer whale numbers take hardest hit since 1990s

By ROBERT McCLURE  
P-I REPORTER

Chemical signs of starvation as salmon runs followed the pod down the

# ***Two photogrammetry approaches:***

## **Aerial photogrammetry**

Helicopter platform; 2008

Size and condition

## **Laser photogrammetry**

Boat based; 2004- 2009

Individual growth

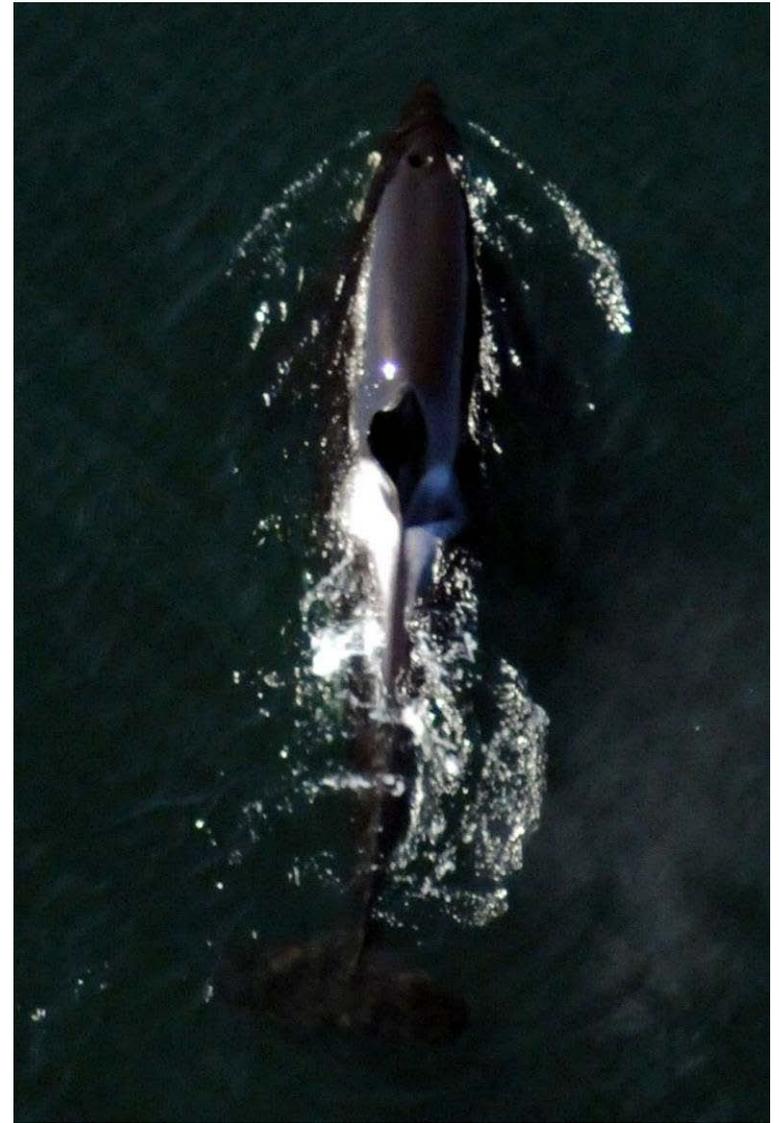
# *Aerial photogrammetry*



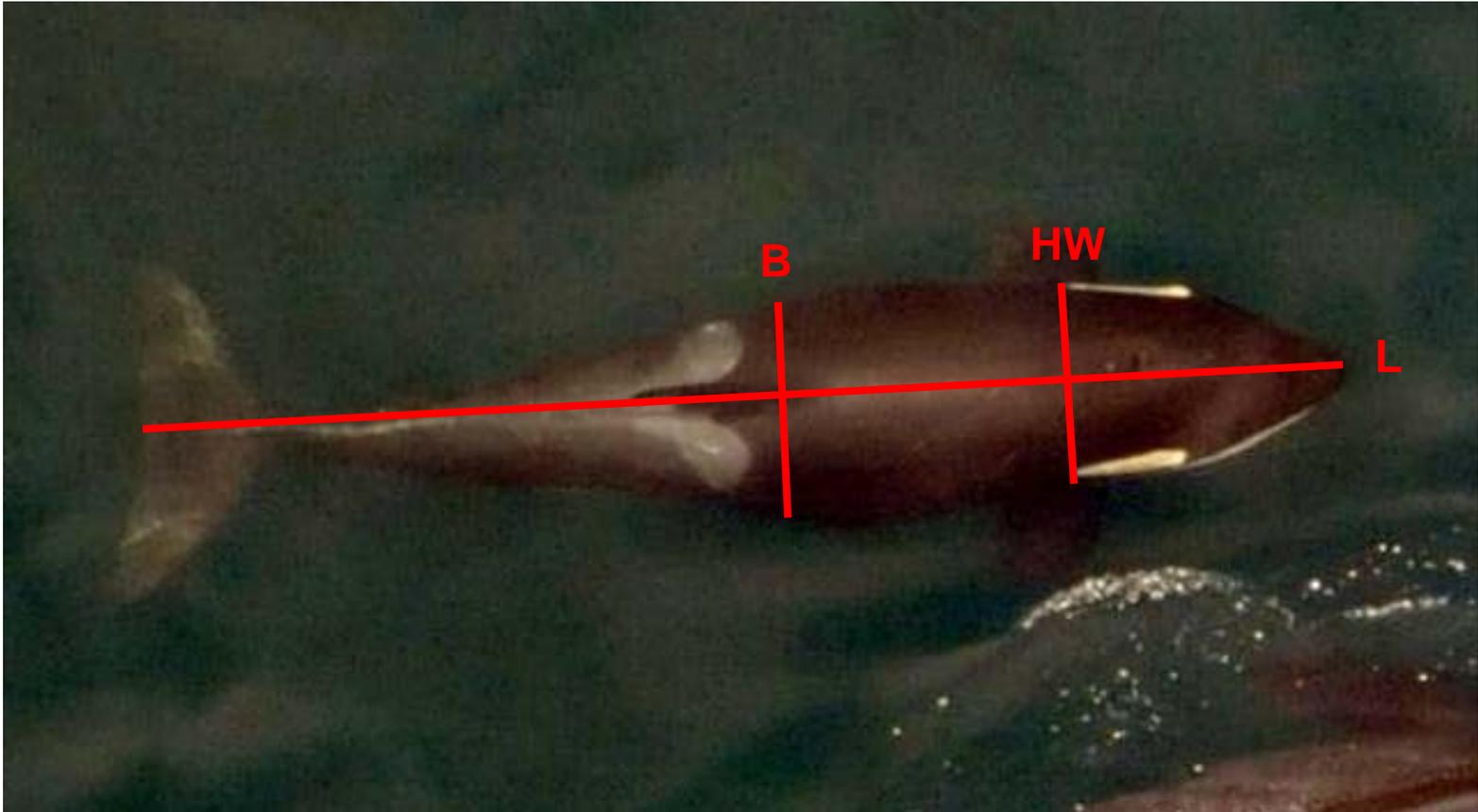
Fearnbach, Durban, Ellifrit and Balcomb. 2011. **Size and long-term growth trends of endangered fish-eating killer whales.** *Endangered Species Research* 13, 173-180.



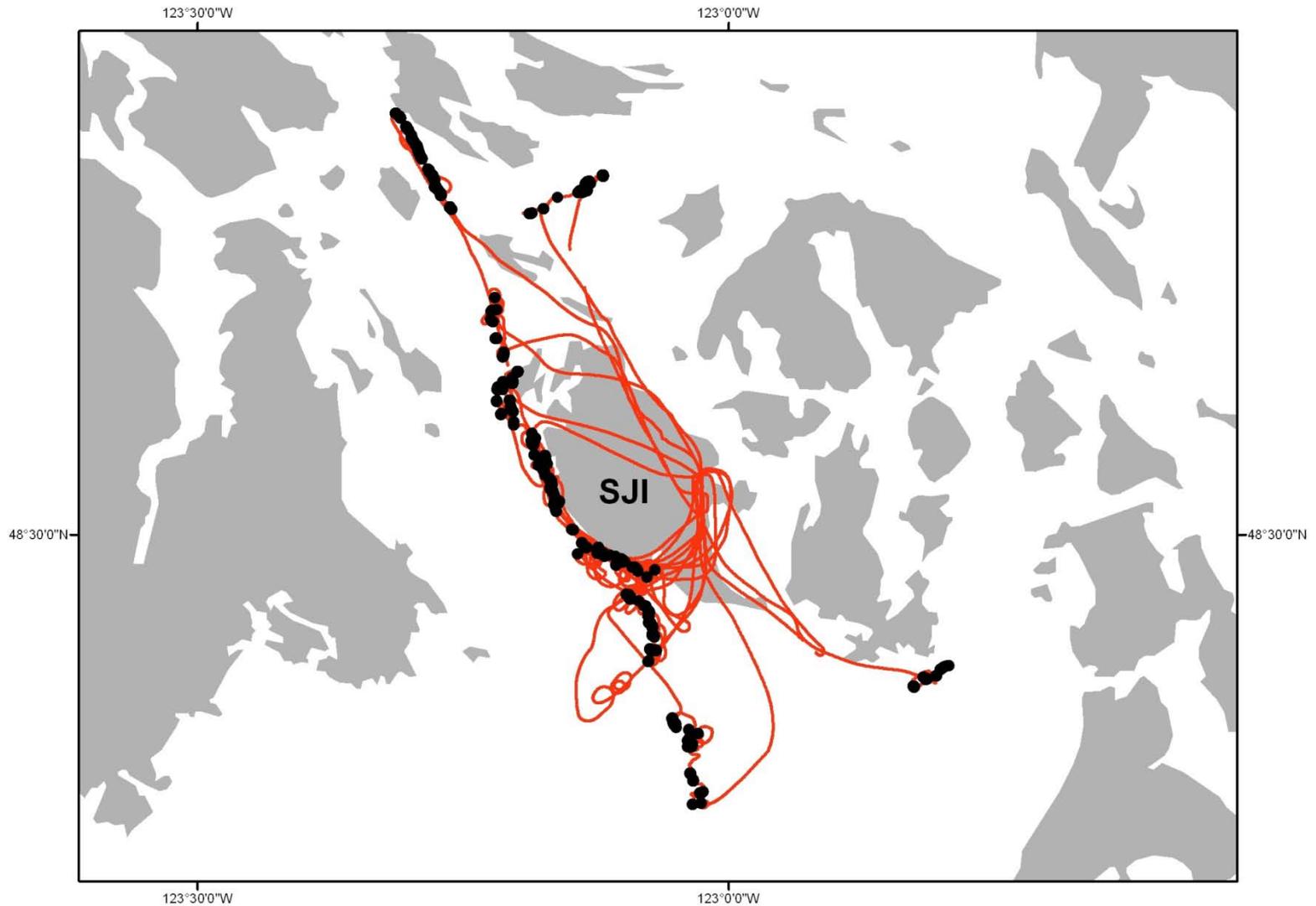
***Monitoring individuals (L78, male, born 1989 )***



***Scale = altitude / focal length***



# 10 flights, September 2008



# *Testing with known-size boats*

*R/V Orca*

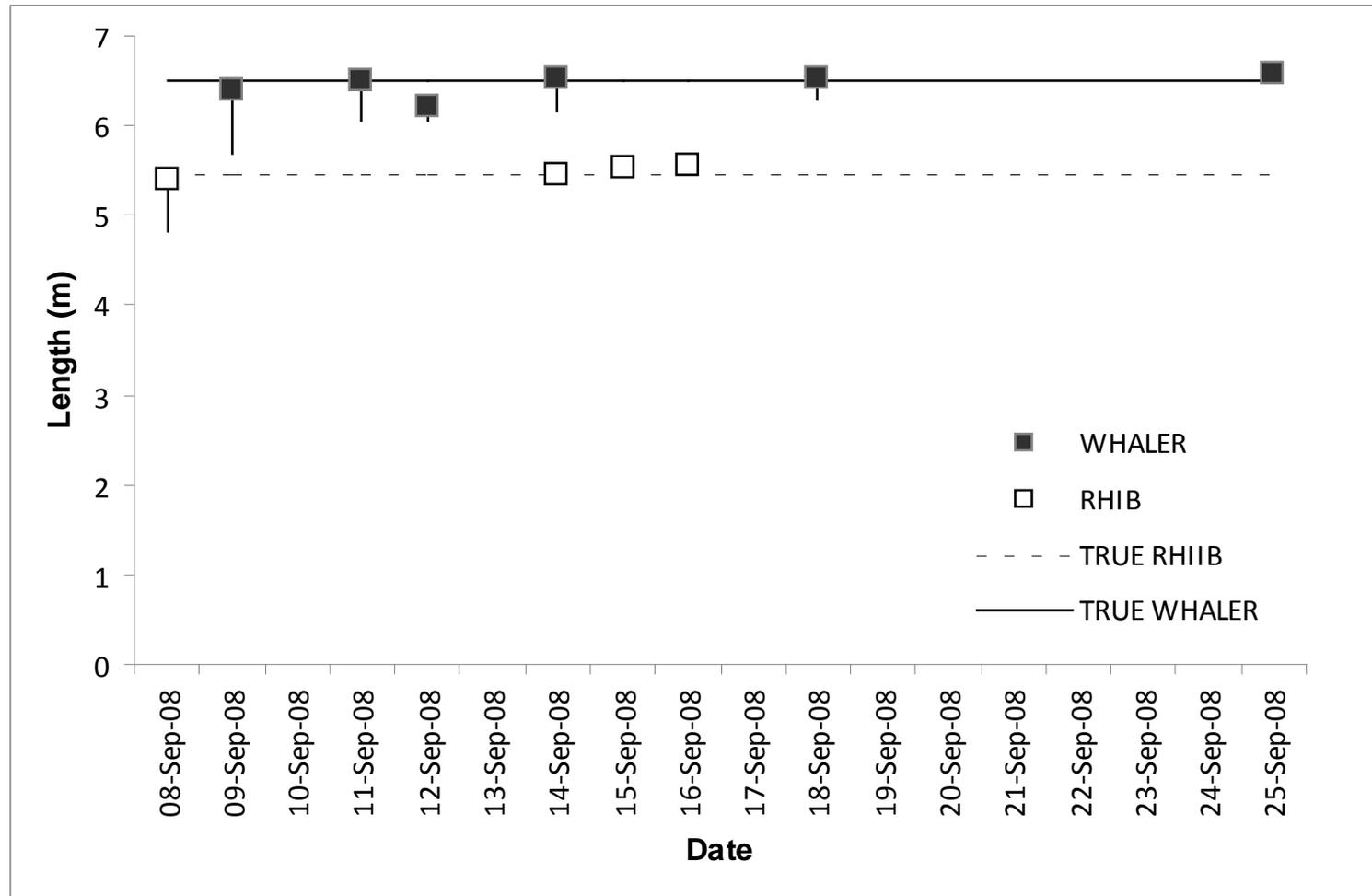


*R/V Starlett*



*It worked!*

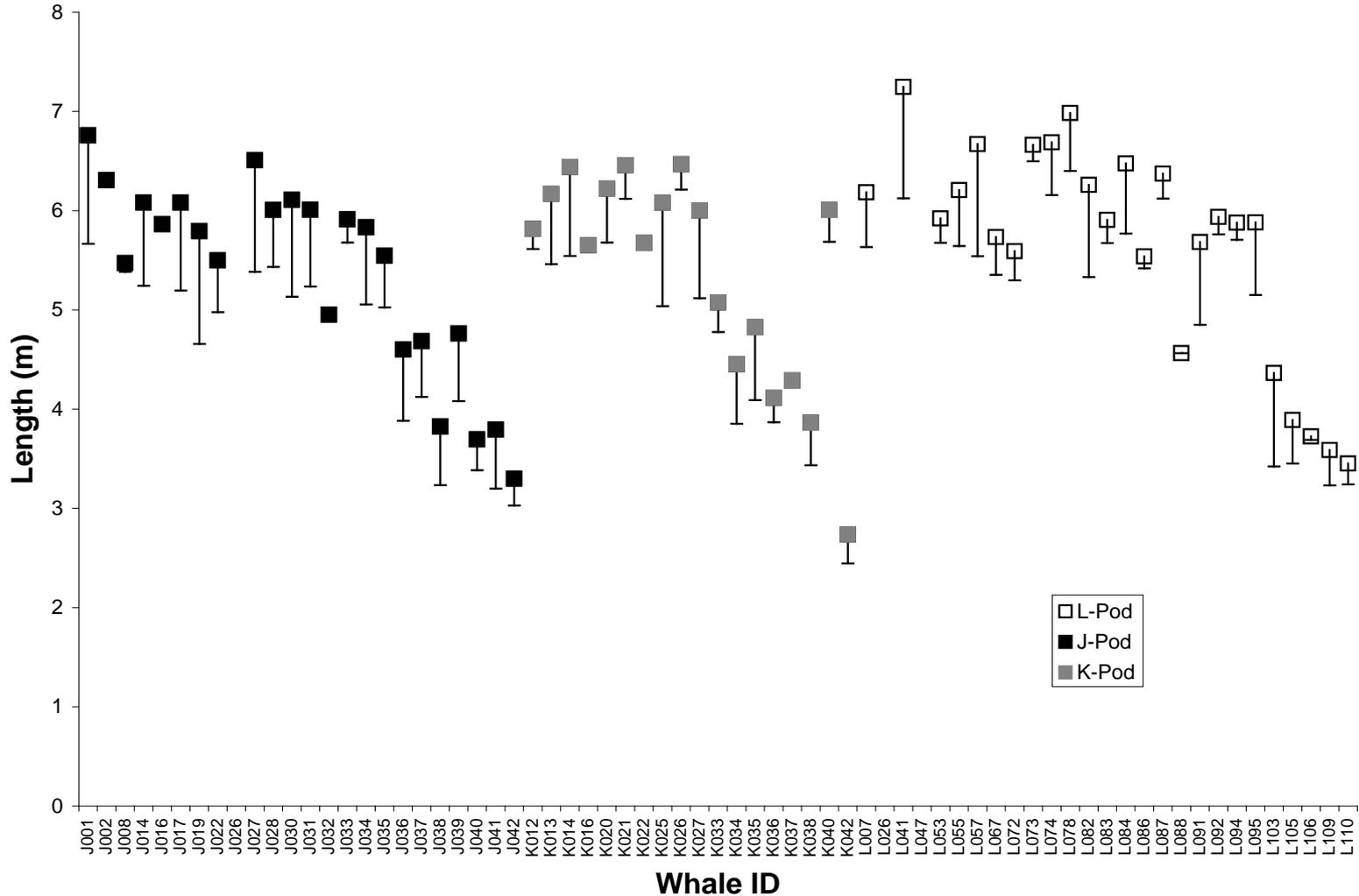
*Bias ~ 7cm*



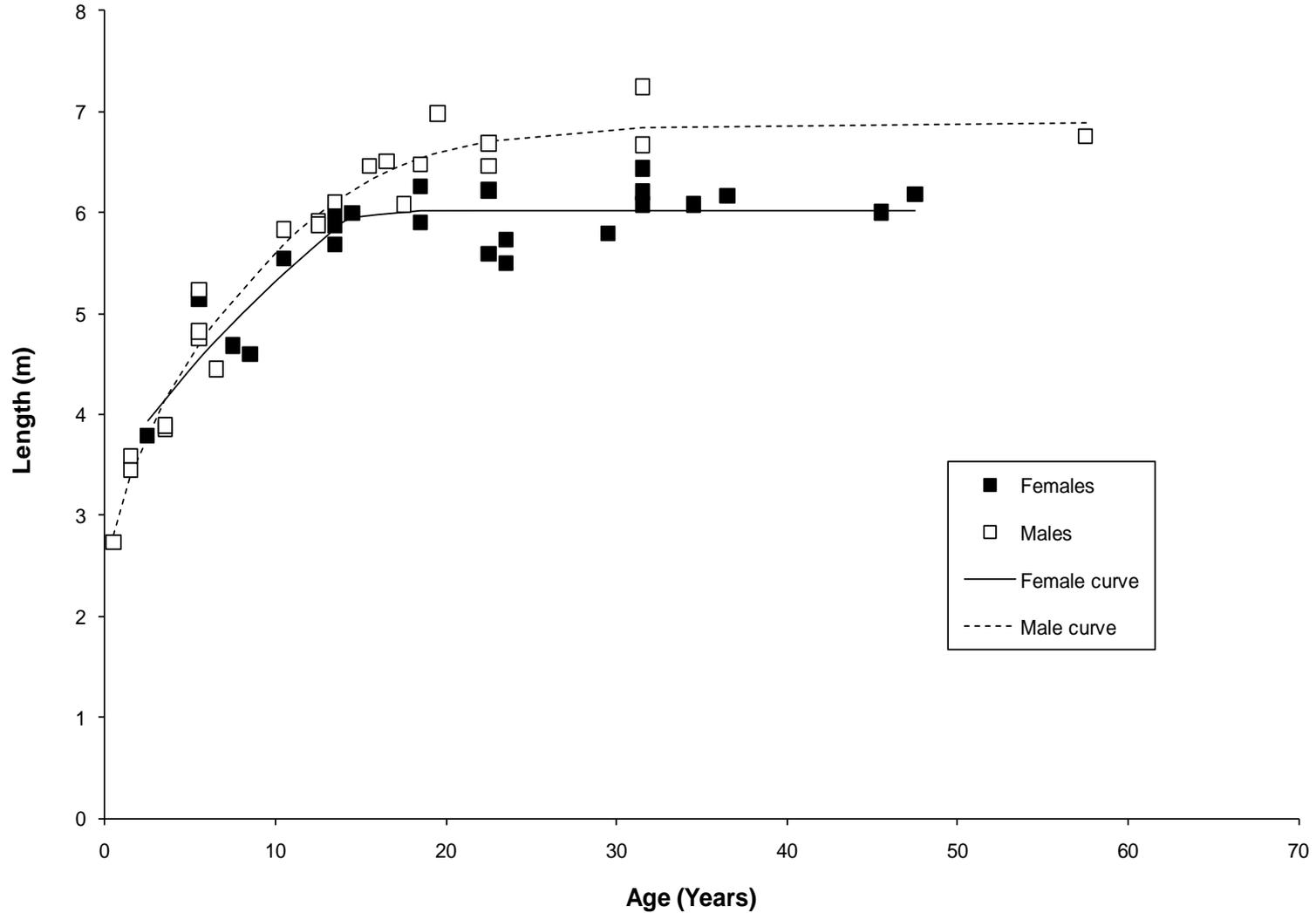
# *What about the whales?*



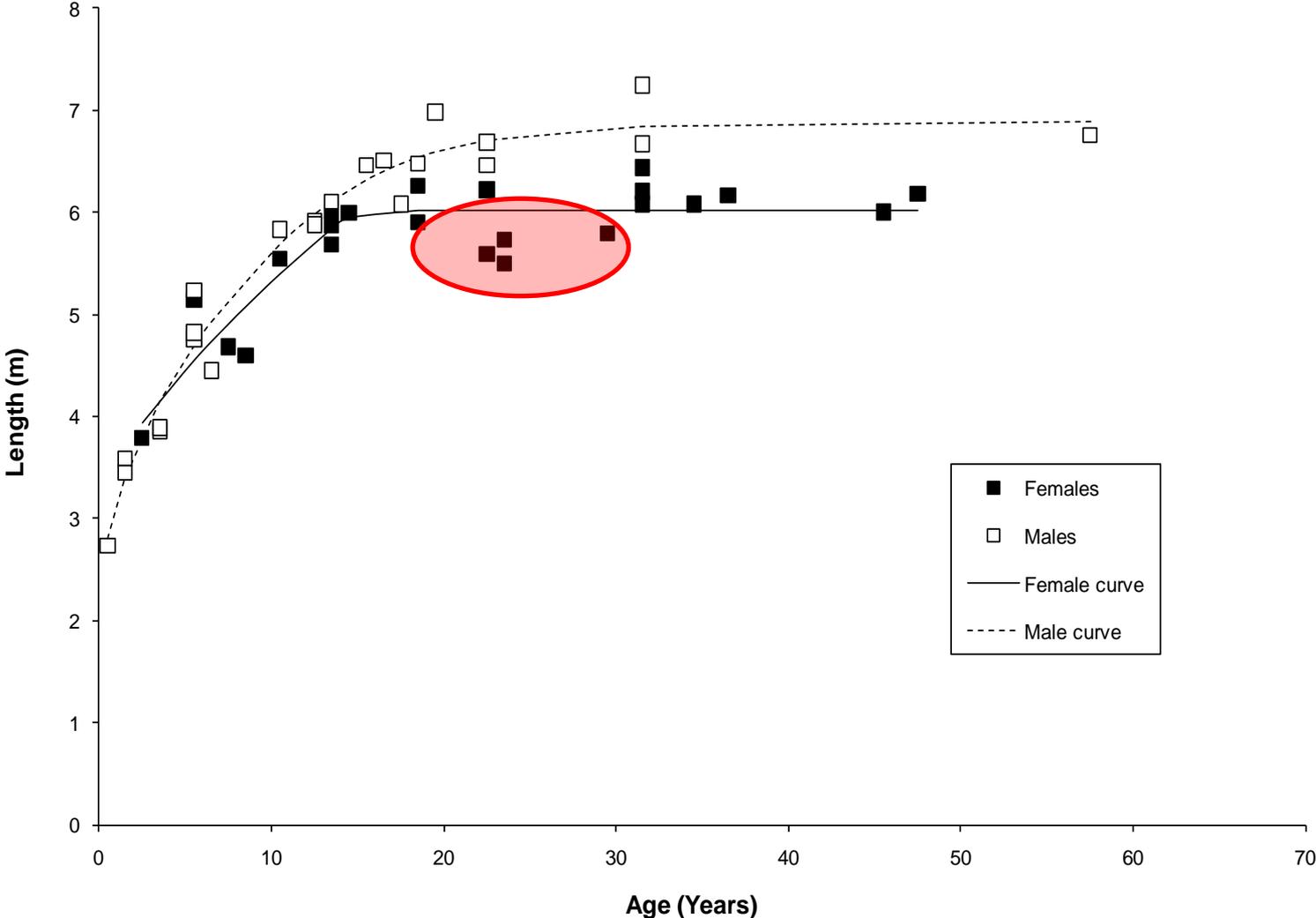
# Measurements from 69 whales



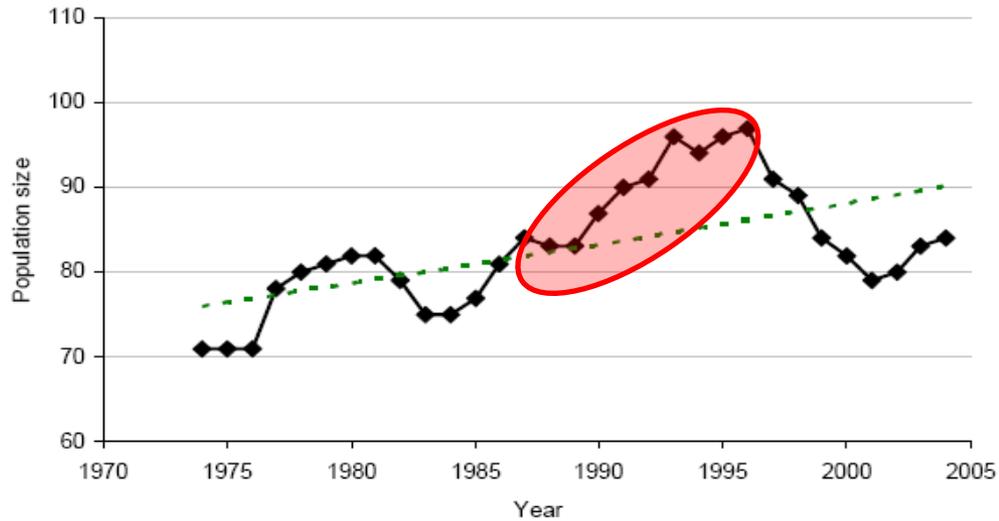
# Asymptotic length at age curves



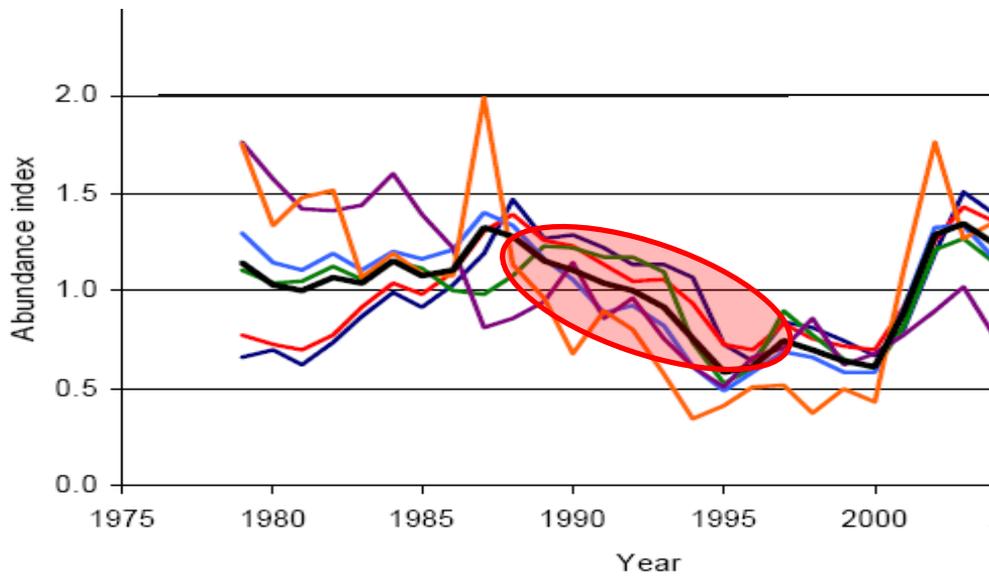
# *A hint at growth trends*



# A hint at growth trends

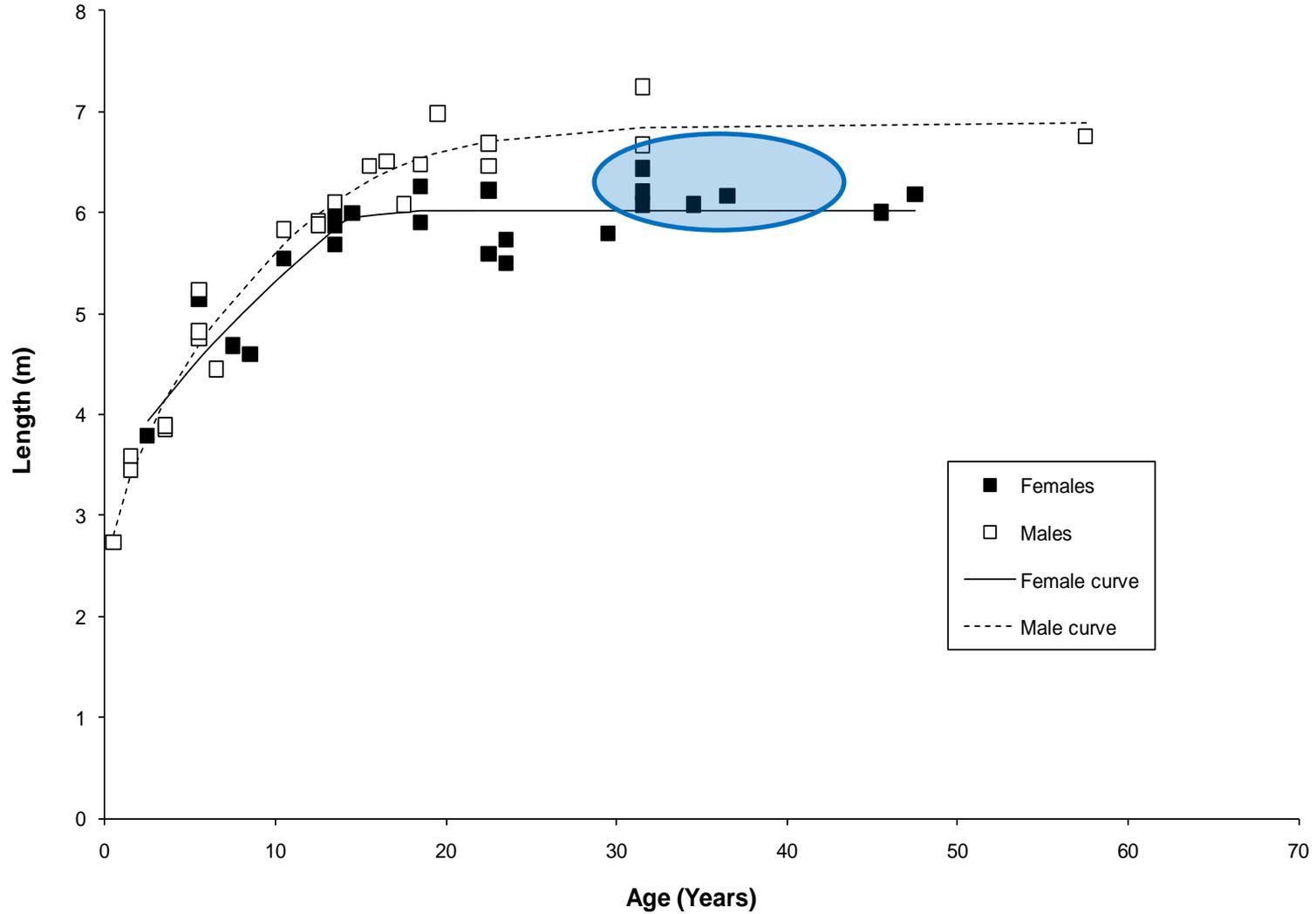


**Whales**

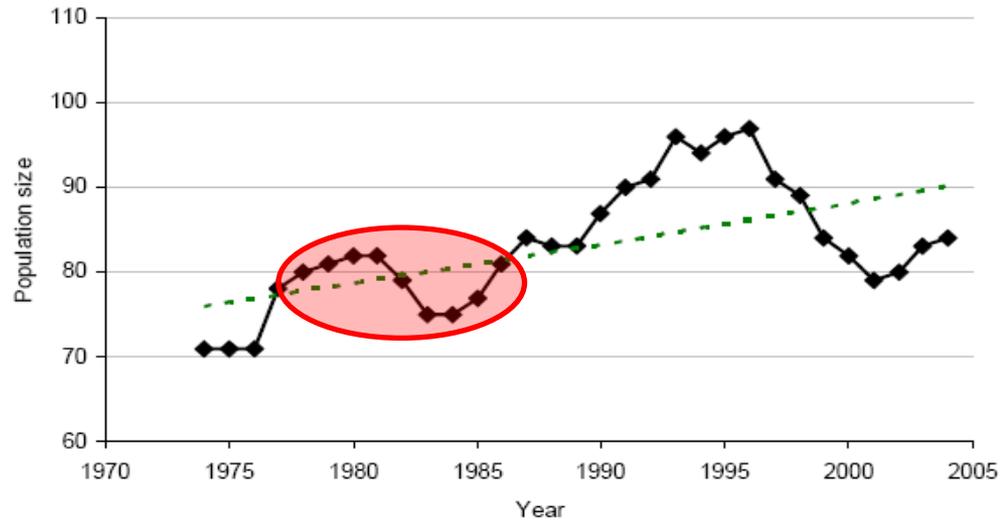


**Chinook**

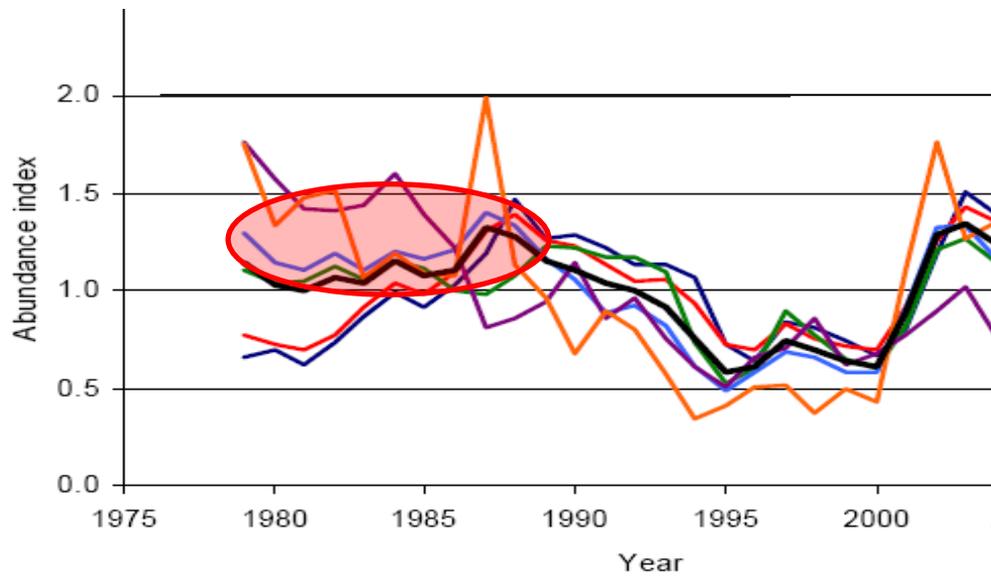
# *A hint at growth trends*



# A hint at growth trends



**Whales**

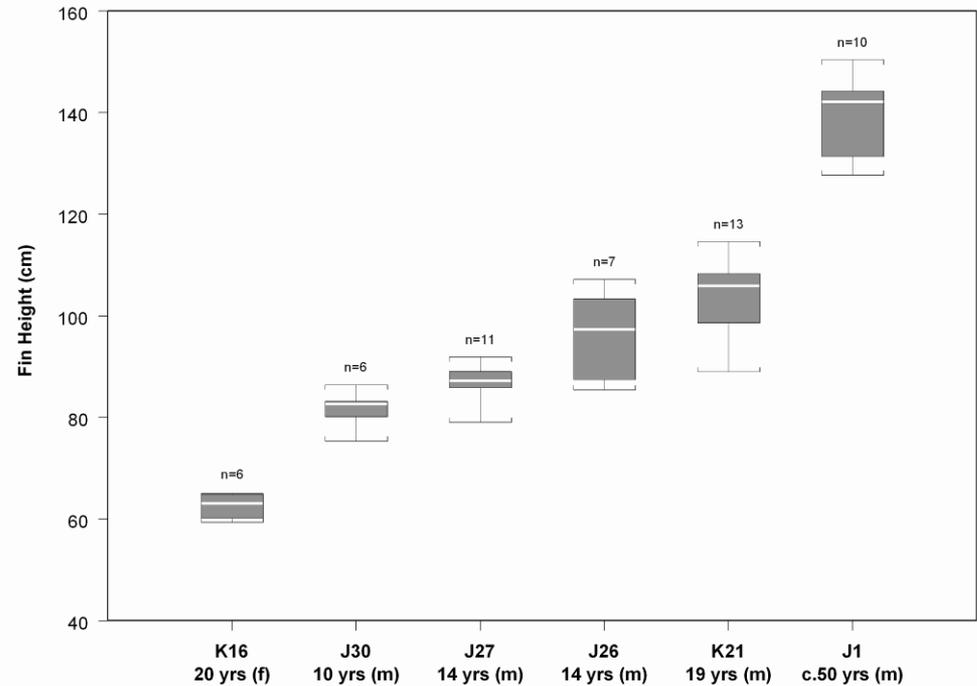


**Chinook**

# *Direct monitoring of individual growth*



# Monitoring individual growth, since 2004



Durban & Parsons. 2006. *Marine Mammal Science* 22, 735-743.

# *Extrapolating to length*

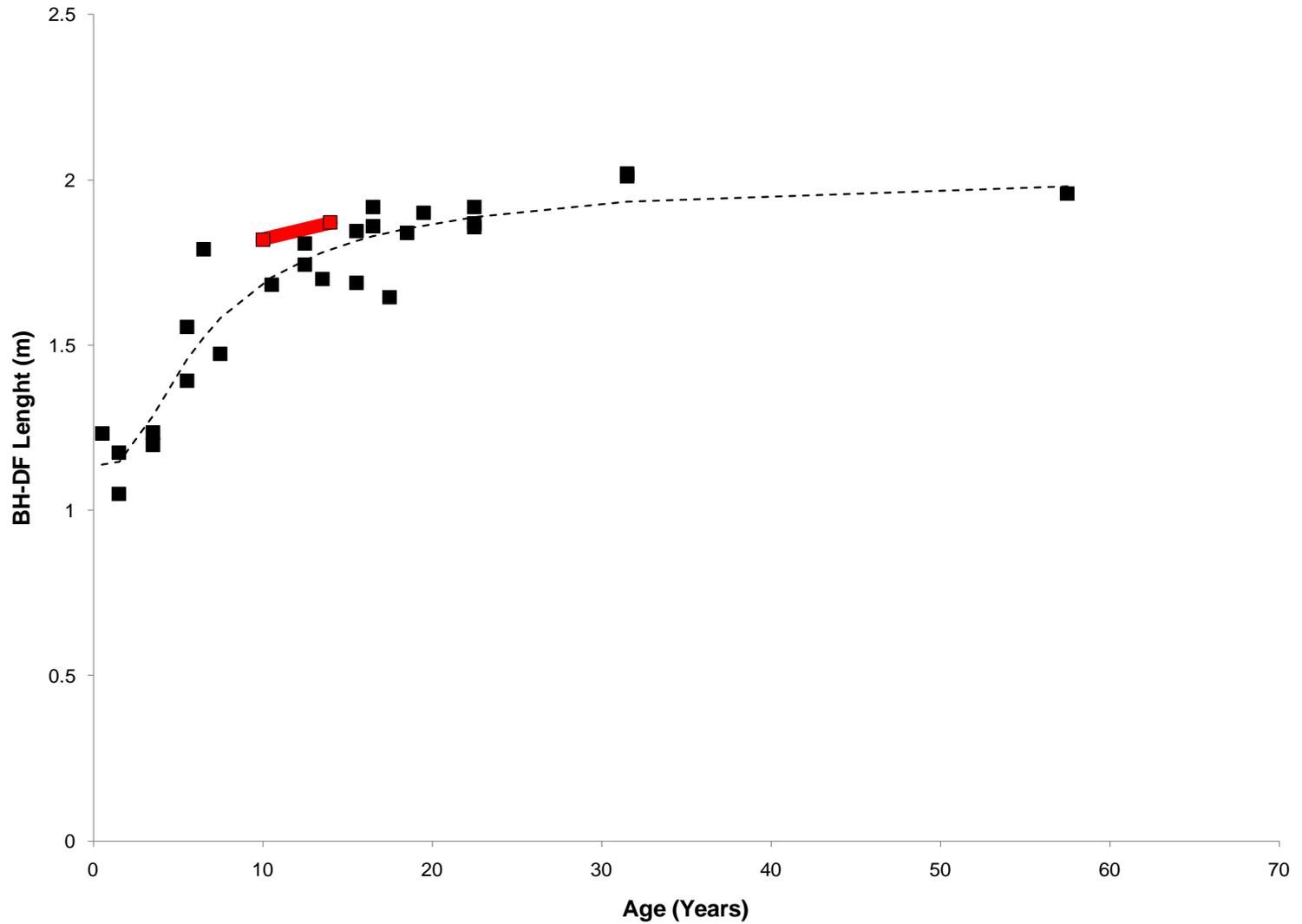
**J30 in 2004, Age = 10, fin = 88cm**



**J30 in 2008, Age = 14, fin height = 128 cm**



# ***Lasers: Monitoring individual growth***



# ***Body condition***

**Robust**

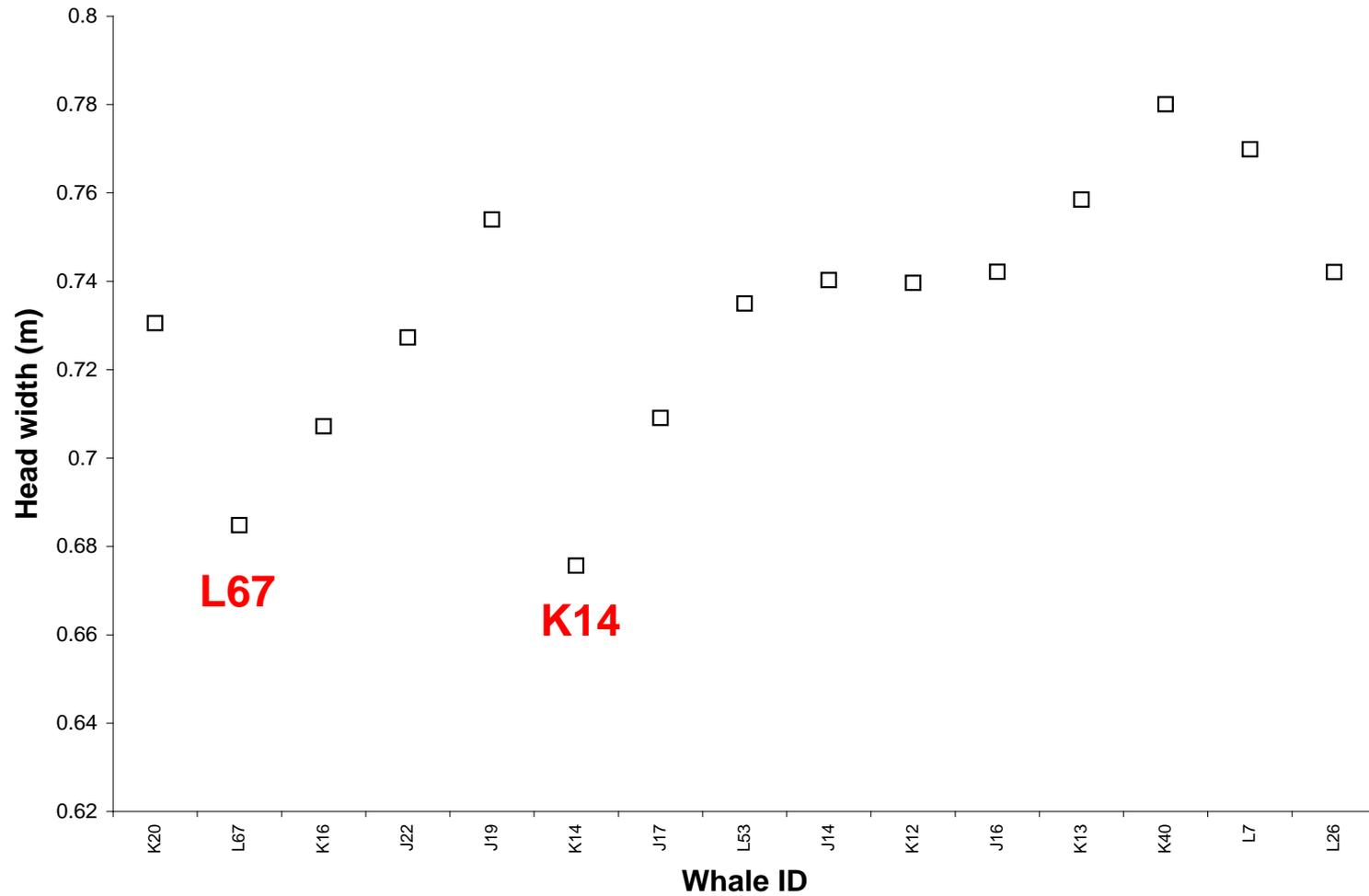


**Thin**

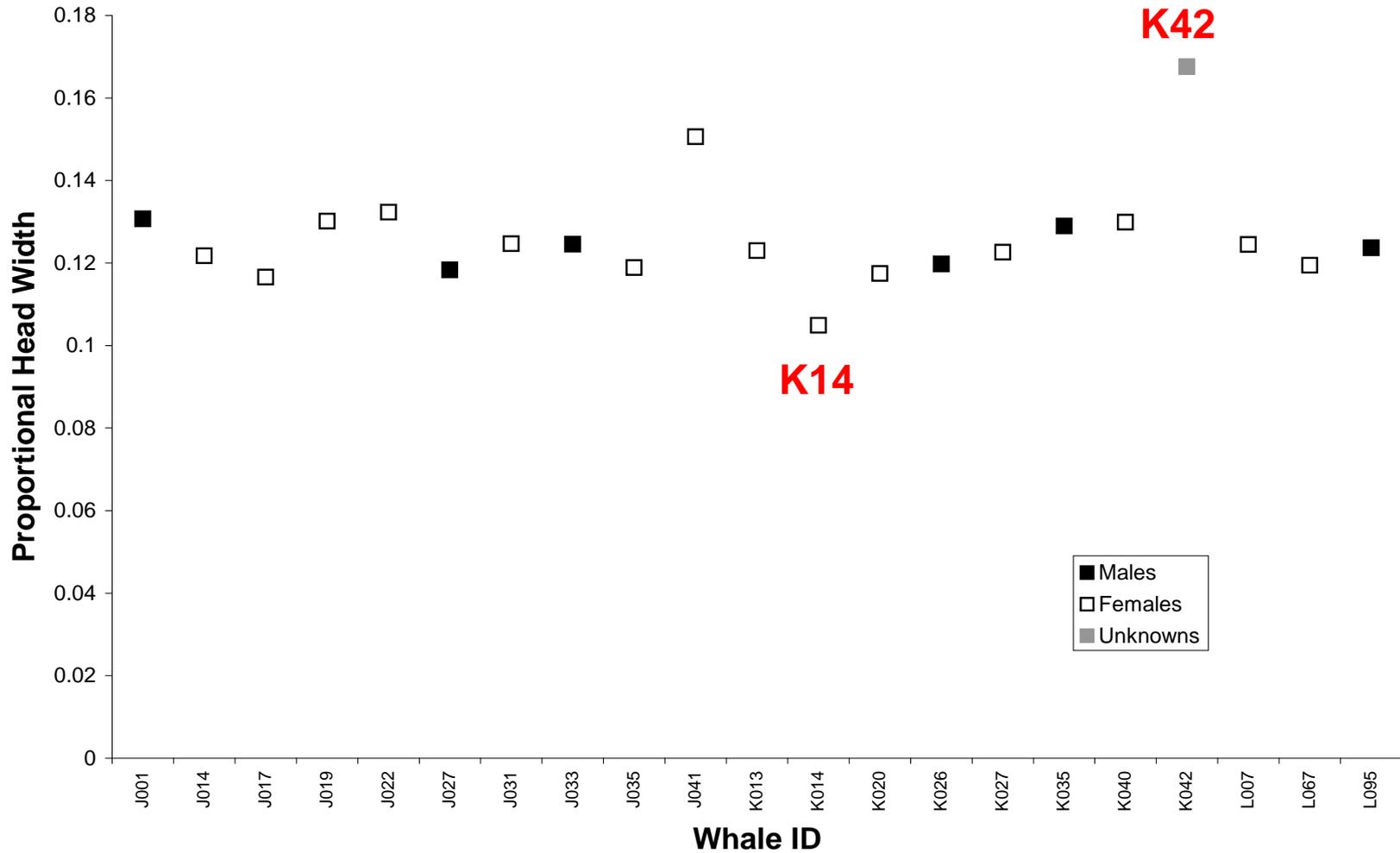


Durban, J., Fearnbach, H., Ellifrit, D. and Balcomb, K. 2009. Size and body condition of southern resident killer whales. Contract report to the NMFS Northwest Regional Office.

# *Head widths of adult females*



# Head widths as proportion of body length



# ***Energetic demands of lactation***



# ***Key future tasks***

## **Aerial photogrammetry**

Develop sensitive indicators of condition from past data

Changes in condition, size from new data

Seasonal, inter-annual changes

## **Laser photogrammetry**

Baseline of individual growth from 2004-2009 data

Extend time series with new data collection

