

PFRP **black-footed albatross** **modelling workshop**

<http://www.soest.hawaii.edu/PFRP/wiki/tiki-index.php?page=Albatross+Modeling+Workshop>

PFRP Pelagic Fisheries Research Program
Joint Institute for Marine and Atmospheric Research • School of Ocean and Earth Science and Technology



Background

- Black-footed albatross *Phoebastria nigripes*
- Breed on north-western Hawaiian islands
 - Genetically distinct population on Torishima island
- About 60000 breeding pairs in Hawaiian population
- Conservation status
 - Endangered (IUCN)
 - Status review (US ESA)

2001 PFRP Protected Species Modeling Workshop

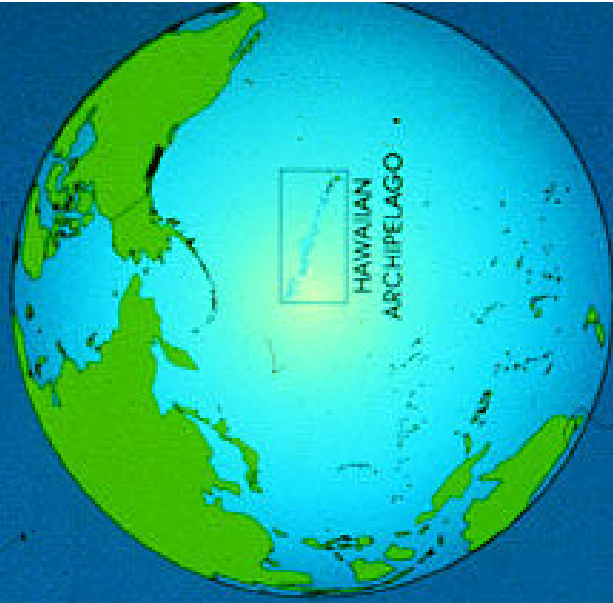
- “Development of integrated statistical models for Hawaiian albatross populations is feasible and could be started at any time”
- Priority research area for 2002 RFP
- Two projects funded

Purpose of modelling workshop

- Review results of the PFRP-funded projects,
- Compare these results to other population assessments,
- Identify problems in model development and application, and
- Suggest future directions for model development.

177°

Tropic of Cancer — 23°



KURE
MIDWAY
ATOLL

PEARL AND HERMES REEF

LAYSAN ISLAND

MARO REEF

GARDNER PINNACLES

TEAR ISLAND

FRENCH FRIGATE
SHOALS

NECKER ISLAND

NIHOA ISLAND

KAUAI

OAHU

MOLOKAI

LANAI

MAUI

KAHOOLAWE

HAWAII

PACIFIC OCEAN



HAWAIIAN ARCHIPELAGO

166

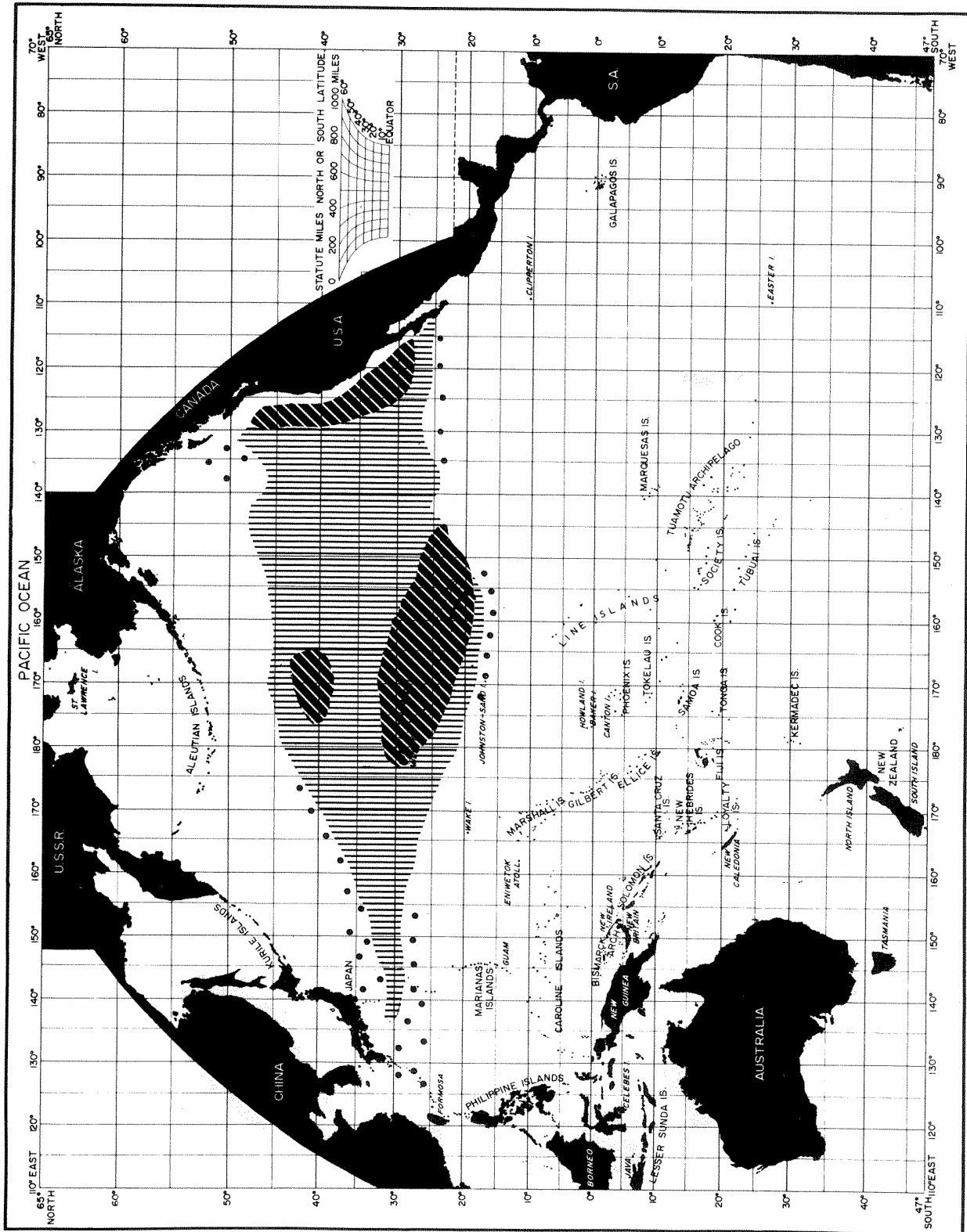
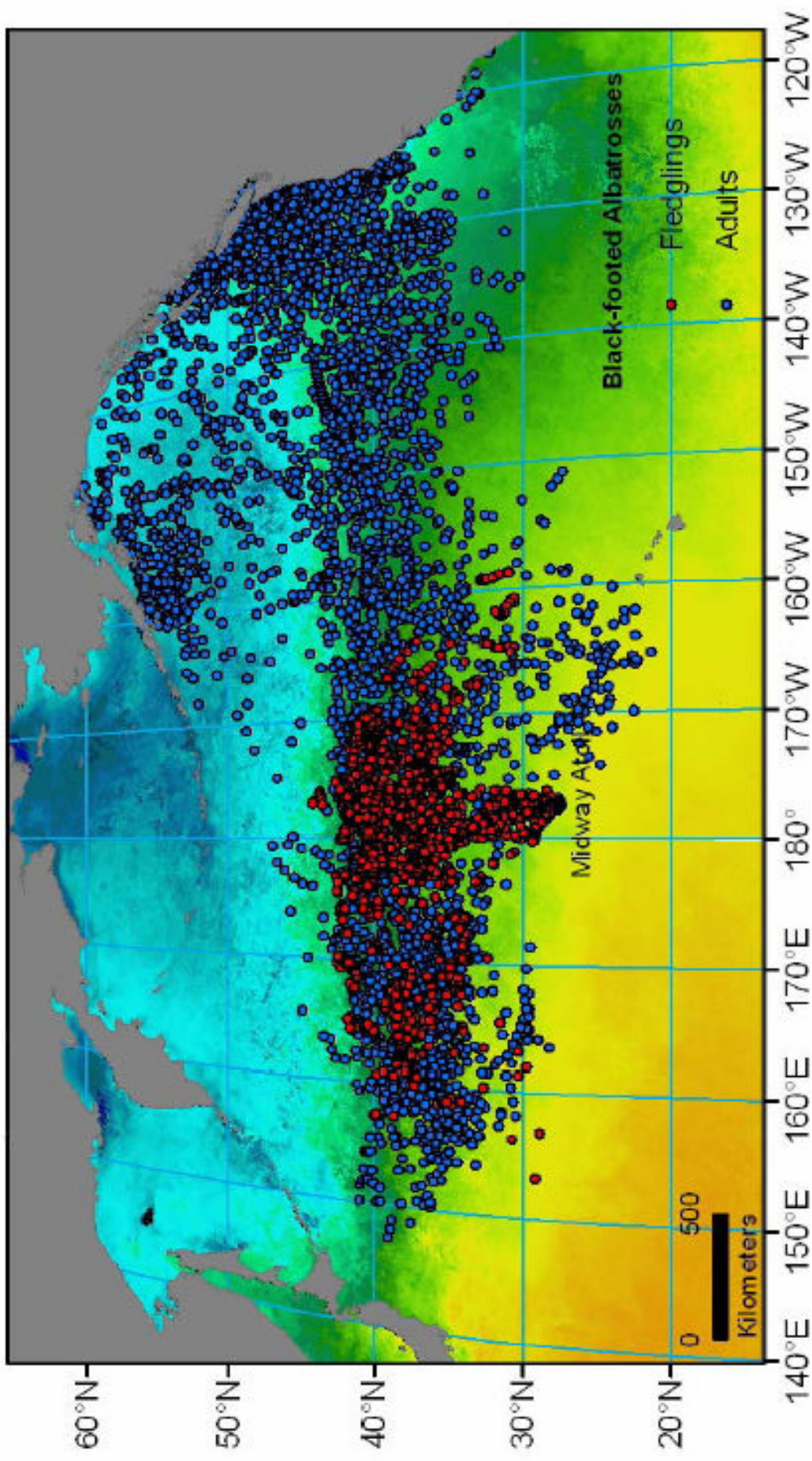


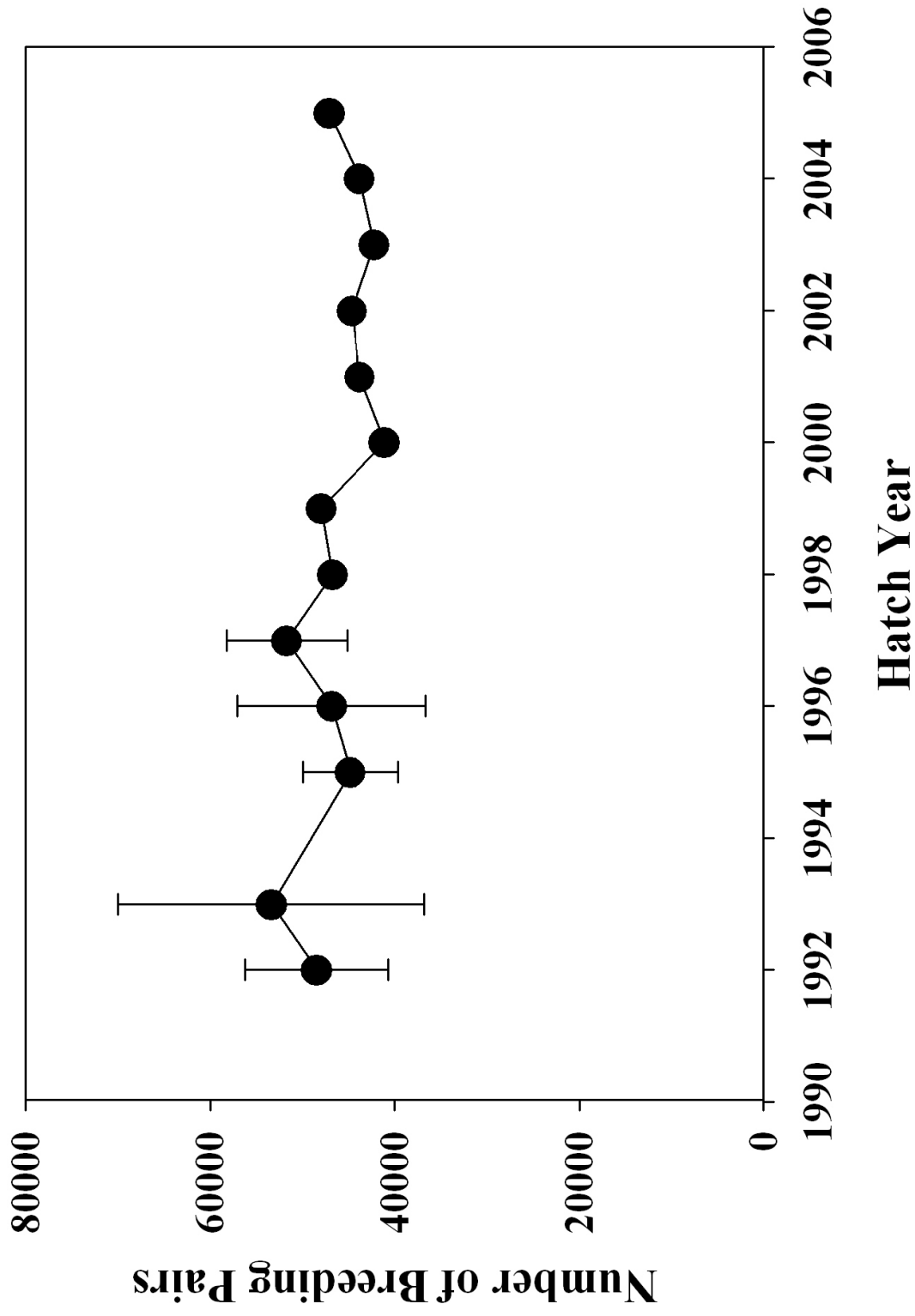
FIGURE 152.—Winter distribution of Black-footed Albatrosses, after Shuntov, 1968. (Symbols as in Figure 149.)

Black-footed Albatross

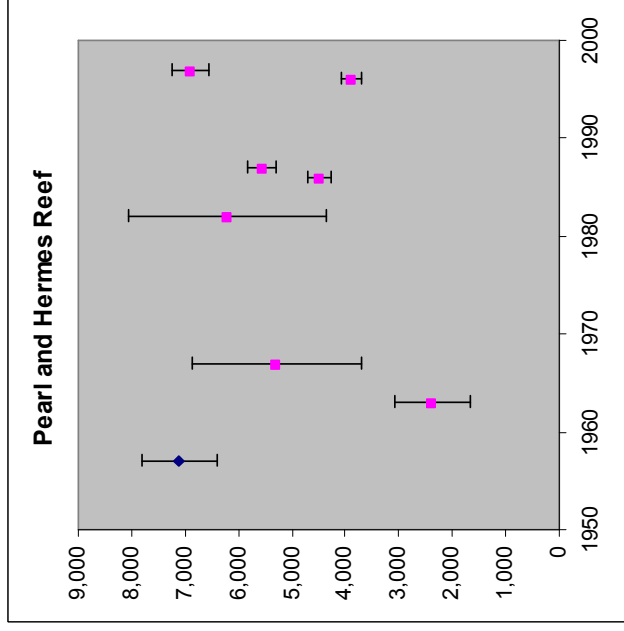
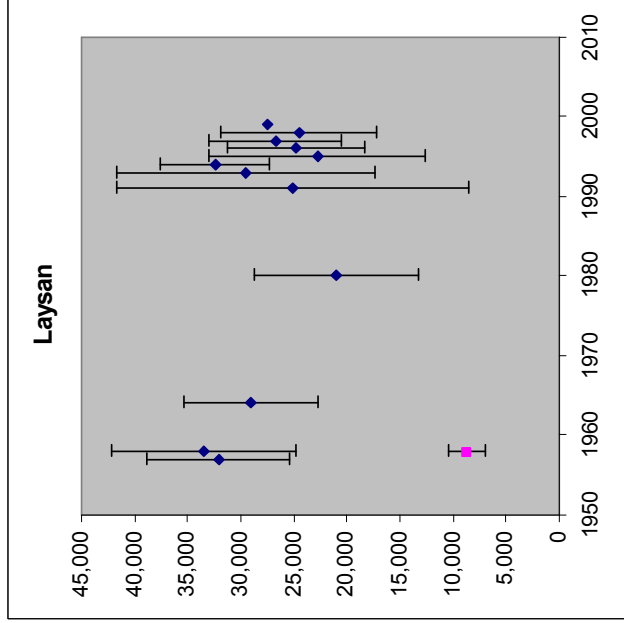
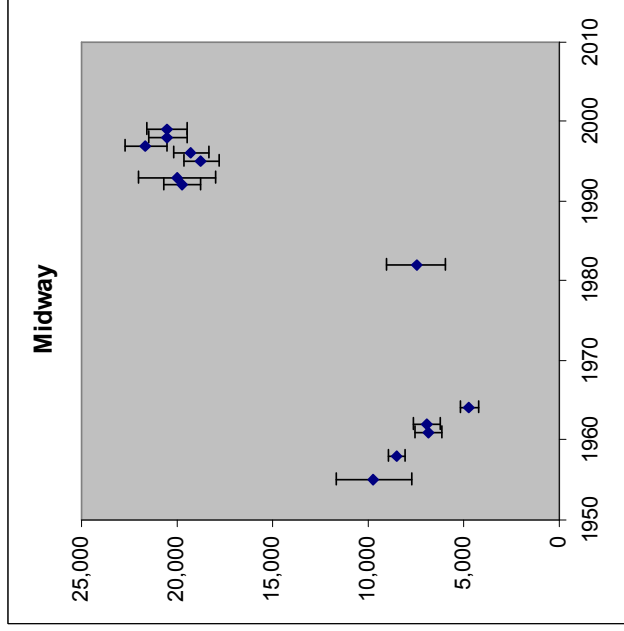
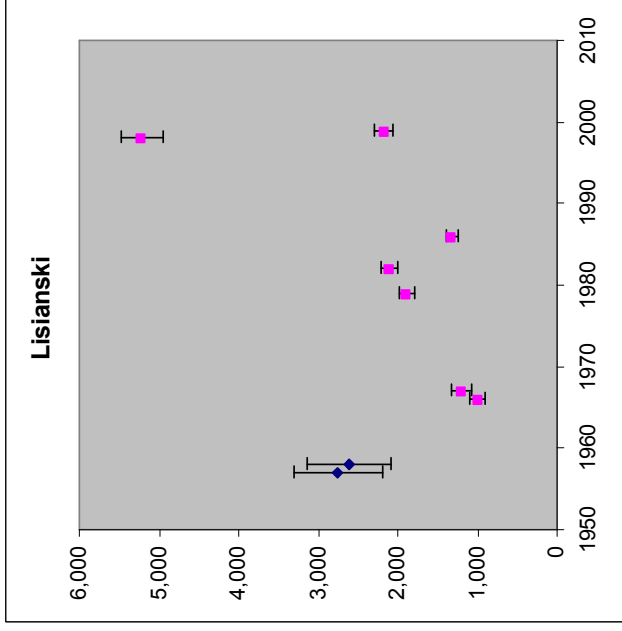
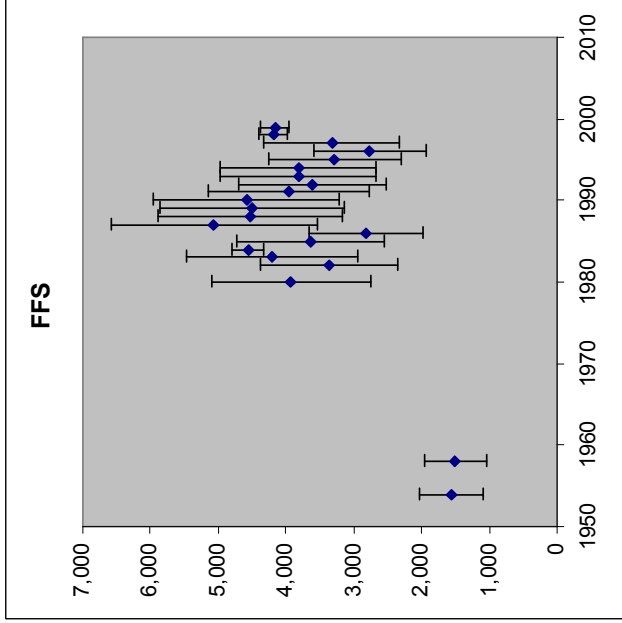
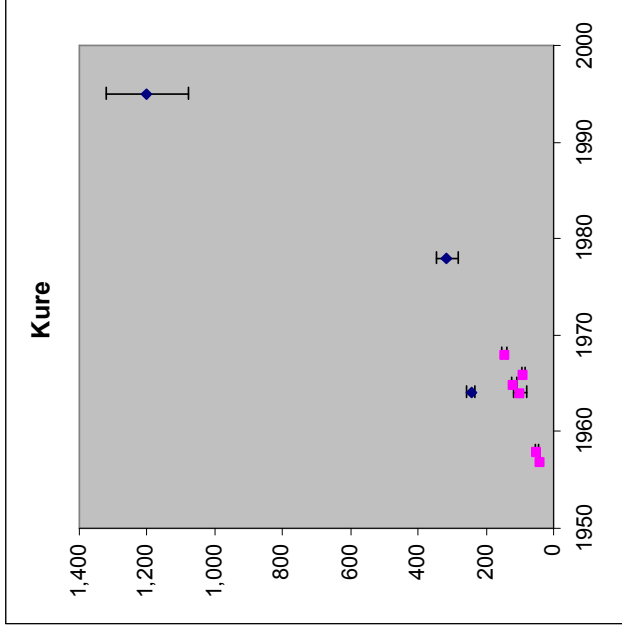
Satellite tracking data – limited # birds and time period
Fledgling albatrosses (red dots) tracked from Midway Atoll



**Black-footed Albatross
Midway-Laysan-FFS (76 % World population)
+/- 95% CI**



Trajectories vary among islands



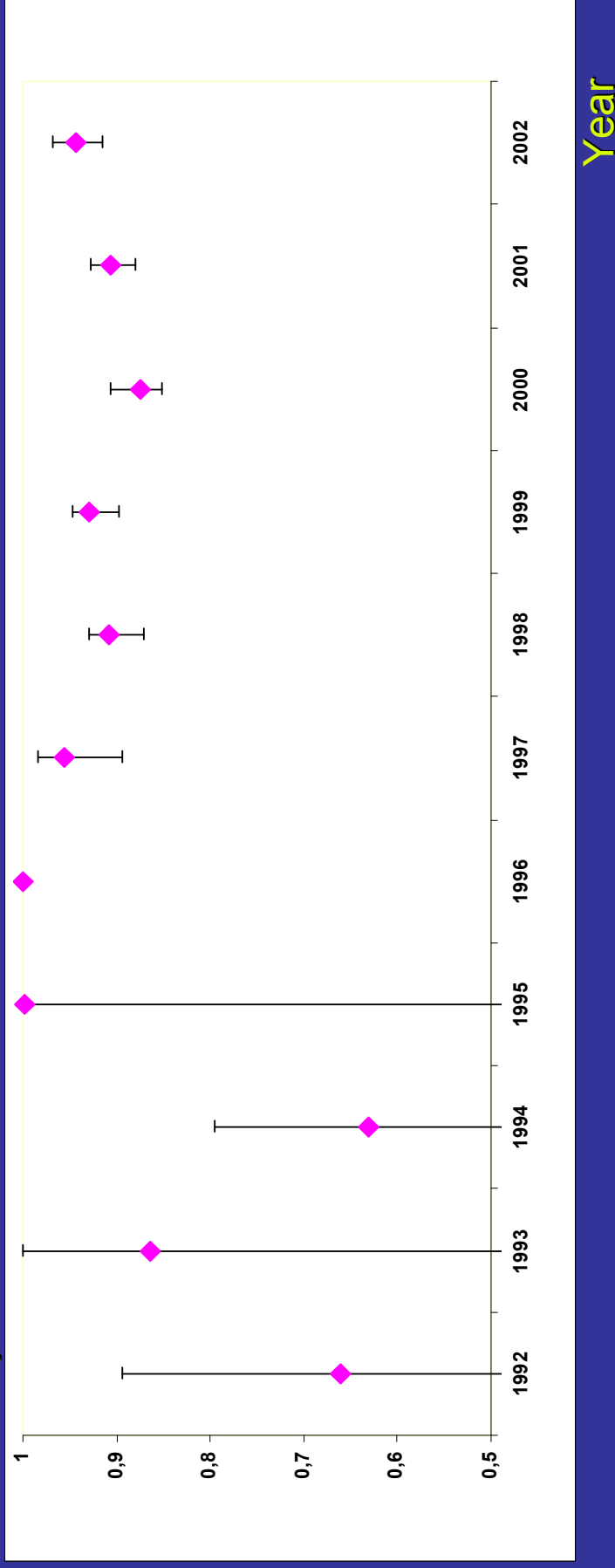
Current threats

- **At sea effects**
 - Longline fishing
 - Pollutants
 - Plastic ingestion
 - Lost and discarded fishing gear
- **Breeding colony effects**
 - Invasive species
 - predators, plants, invertebrates, diseases
 - Pollutants
 - Climate change

Modelling

Survival analysis

Adult Survival
Probability

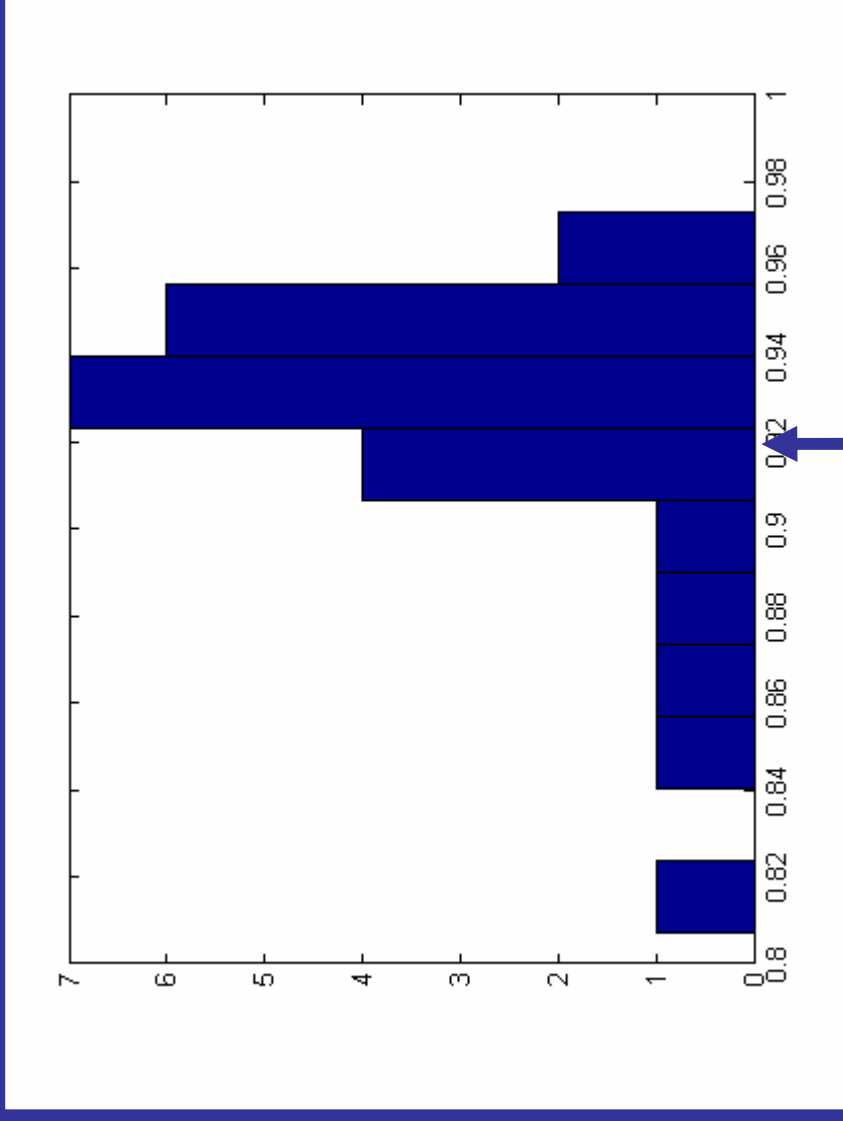


Veran et al. 2007

Significantly correlated with fishing effort variable

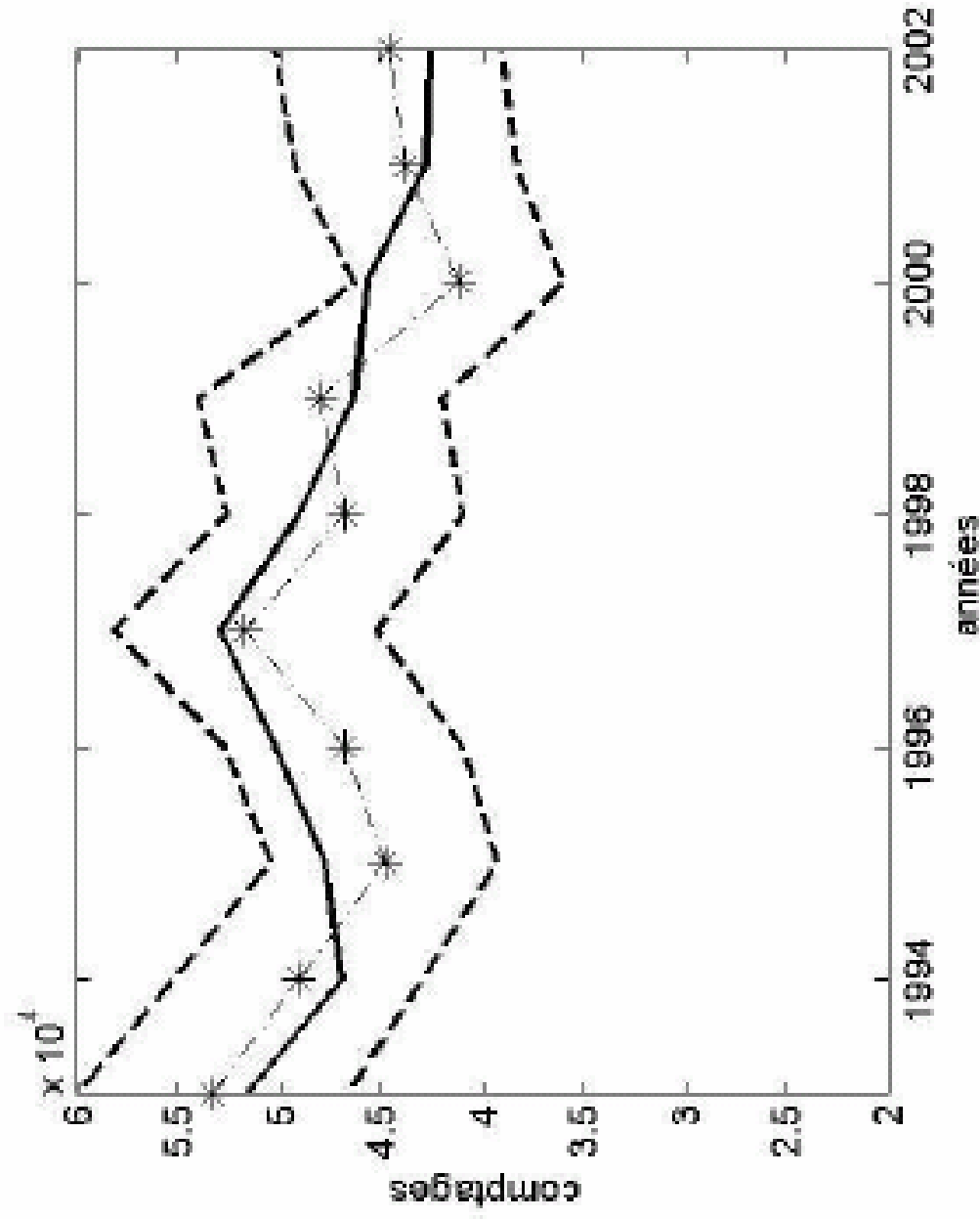
- 2nd PC of PCA (mostly north Pacific swordfish catch)
- effectively only 5-6 data points through 2002

Compare survival rate with other species



- Veran & Lebreton in prep
- **Low estimate compared with other Albatross species (estimates possibly affected by heterogeneity... and by-catch)**
- Wide confidence interval (price to pay for heterogeneity)

Integrated analysis (Veran)



Integrated analysis 2

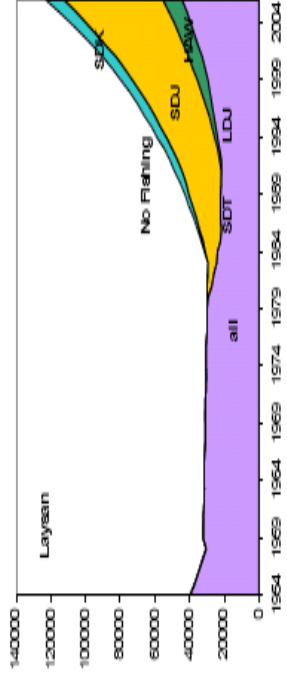
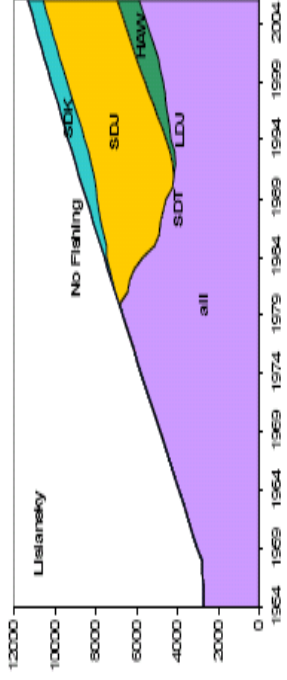
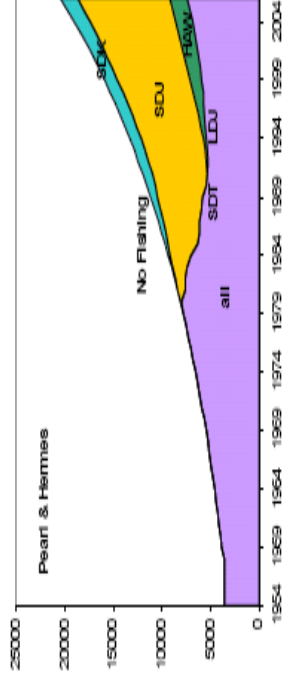
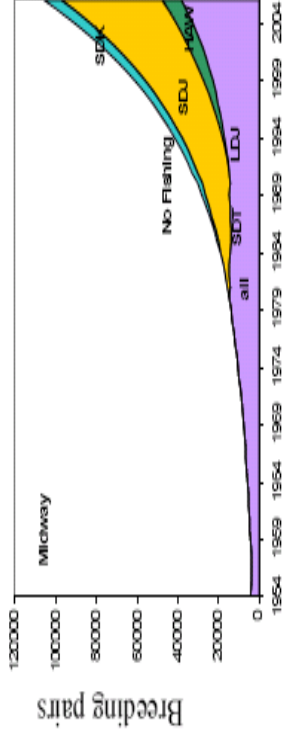
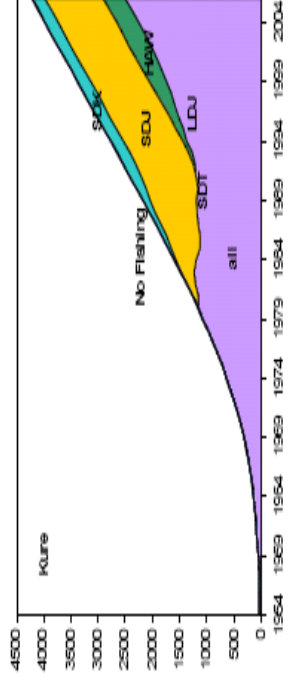
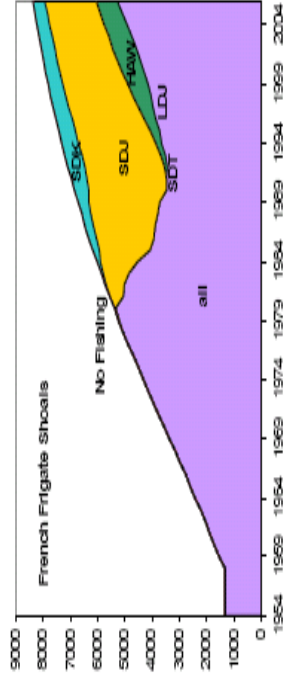
- **Maunder, Hoyle, Alvarez-Flores**
 - 2 separate models
- **Fitting to all available data**
 - Counts of adults and fledglings
 - Survival rate estimates
 - Breeding success estimates
 - Bycatch estimates
- **Preliminary results so far**

Only preliminary results so far

- Fit only to drift gillnet and Hawaiian longline data (other longline data not yet included)
- Bird count, albatross distribution estimates, model structure and parameter values being revised
- No estimates of uncertainty
- Final results likely to be very different

Integrated analysis

preliminary results – not realistic



Data availability

- Finding: Data availability and legal constraints impede research and model development.
- Recommendation: Legal constraints need to be resolved within agencies and between governments. Metadata inventory could be hosted on the NPAWG website

Data interpretation and analysis

- Finding: Spatial and temporal overlap between fishing effort and bird distribution is critical to estimate bycatch and understand fishery impacts.
- Recommendation: Develop uniform means to characterize longline fishing depth by identifying usable proxies. Attempt to access bird tracking results from TOPP and other sources.

Data storage and dissemination

- Finding: The existing institutions do not provide a stable means to store and update albatross band resighting data.
- Recommendation: Continue to develop the USGS/BBL database. Consolidate existing ad hoc research data collections.

Information needs for FWS

Listing

- Finding: Change in population size is a critical piece of information on which the decision to list may rest.
- Recommendation: More information on “walkers”, changes in age of first reproduction, changes in survival by age, will improve estimates of population size.

Data collection on-colony

- Finding: It may be possible to collect additional data without compromising current protocols.
- Recommendations:
 - Clarifying which parameter(s) of interest are needed to monitor population change would facilitate the design of data collection protocols. Additional statistical consultation may help to optimize banding efforts among islands and age classes.
 - PIT tag pilot study, collect and archive feathers/egg shells, collect and analyze mating pair data on known-age plots.

