INTRODUCTION: Juvenile foraging ability is limited due to physiological and morphological constraints (e.g. lower oxygen stores, more drag per unit mass[1], etc). Younger, smaller animals do not have the diving ability of larger animals[1], lack foraging experience and hence are more sensitive to changes in prey distribution[2]. Inadequate foraging skills can result in reduced juvenile survival[3,4], which can lead to population decline[3,5,6]. The endemic New Zealand sea lion (*Phocarctos hookeri*) is one of the rarest and most highly localized sea lions in the world[7]. Lactating NZ sea lions are one of the deepest, longest diving otariids and operate close to their physiological maximum in a marginal foraging environment[7]. Given this, examining how juveniles forage is vital for management as a species operating close to its physiological limits is more vulnerable to human and environmental changes resulting in decreased prey availability[8].

Size and experience matter:
foraging behaviour of juvenile New Zealand sea lions

elaineswleung@gmail.com

Elaine S. Leung[1], B. Louise Chilvers[2], Shinichi Nakagawa[1] & Bruce Robertson[1]

[1]Department of Zoology, University of Otago, PO Box 56, Dunedin 9054, NZ.
[2]Department of Conservation, Aquatic & Threats Unit. PO Box 10-420, Wellington, NZ.

Objectives

- Quantify foraging behaviour of various age-sex classes of juvenile NZ sea lions
- Assess sex, age and mass-related differences in foraging behaviour

Fig.1 Enderby Is., Auckland Is., NZ

Methods

Time-depth recorders (TDR; Mk9 or SPLASH) were deployed on 2-5 year-old NZ sea lions from Jan.-Feb., 2008-10 at Enderby Island in the subantarctic Auckland Islands, NZ (50°30'S, 166°17'E; Fig.1). A total of 18 TDRs were recovered (Table 1).

Results

Sex Differences

- Females: larger proportion of time at sea diving (Fig.2) and greater dive rate (Fig.3) than males
- Males: deeper maximum depths (Fig.4) and longer maximum dive durations than females
- On average, females dove to deeper depths (Fig.4) for longer durations than 3-4 year males

Age and Mass Differences

- Younger, smaller animals had higher dive rates (Fig.3)
- Maximum dive depth (Fig.4), and duration increased with age and mass

AGE	2	3	4	5	TOTAL
n FEMALE	3	9			12
kg	58±7	72±6			
n MALE		2	1	3	6
kg		83±6	83	118±22	

Table 1. Sample sizes and mean mass per age-sex class.

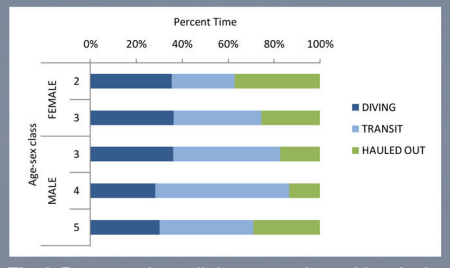

Fig.2 Percent time diving, transit and hauled out during foraging trips of juvenile NZ sea lions.

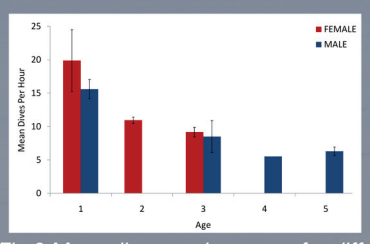

Fig.3 Mean dives per hour ± se for different age-sex classes of juvenile NZ sea lions.

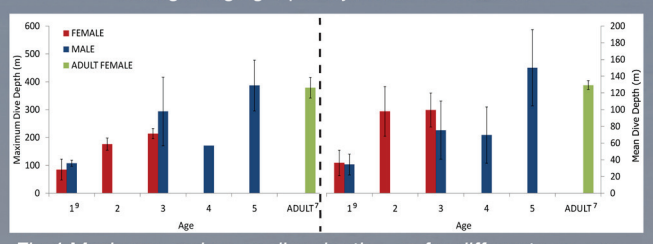

Fig.4 Maximum and mean dive depth ± se for different age-sex classes of juvenile and adult female NZ sea lions.

Conclusions

- Older, larger juveniles have greater foraging ability
- Males can dive to deeper depths for longer durations than females
- On average, females expended more foraging effort than males
- Juveniles (except for 5 year males) did not dive to adult female dive depths and durations, possibly limiting their available foraging habitat
- Smaller, younger animals do not have the foraging ability of larger, older animals as they have lower aerobic dive capacity and less foraging experience

Given these additional constraints, juvenile NZ sea lions, especially the females, appear particularly vulnerable to human and environmental impacts and this needs to be considered in the management of this species.

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