

Investigating Stock Differences in Nutritional Metabolites of young Steller Sea Lion pups in Southeast Alaska, Western Alaska and Russia

Lorrie D. Rea, Alaska Department of Fish and Game, lorrie.rea@alaska.gov

Brian Fadely, NMFS / NOAA, brian.fadely@noaa.gov

Vladimir N Burkanov, NMFS, NOAA, vladimir.burkanov@noaa.gov

The decline of the western stock of Steller sea lions (*Eumetopias jubatus*) since the 1970 s prompted seasonal monitoring of health indices to assess nutritional stress using blood metabolites known to change predictably when animals are food deprived. Here comparisons of blood metabolites were used to determine if young Steller sea lion pups (SSLs) (< 2 mo) had blood chemistry profiles indicative of fasting or starvation. Blood samples were collected from pups at rookeries in the west (Aleutian Islands, Gulf of Alaska, Prince William Sound) (W), southeast Alaska (SE) (n=629), and Russia (R) (n=512). Plasma blood urea nitrogen (BUN) and ketone bodies (b-HBA) were measured spectrophotometrically and used to assess whether pups fasted longer than the normal (1 - 2 days) foraging bouts of lactating adult females. BUN plasma concentrations in SE were higher than W and R (SE: $5.55 \text{ mM} \pm 1.82$, n=249, (range: 2.37-11.31 mM); W: $5.1 \text{ mM} \pm 1.99$, n=383, (range: 1.51 - 13.44 mM); R: $5.12 \pm 1.87 \text{ mM}$, n=491, (range: 1.70 - 12.70 mM); p = 0.006). These values are similar to those of same aged SSLs fasted for 2.5 days ($4.8 \text{ mM} \pm 0.5$) during a controlled fasting study (Rea et al., 2000). The majority of sites from all regions had less than 35% of all samples with b-HBA concentrations ([b-HBA]) above 0.3mM, the threshold concentration indicative of fasting in SSLs. Pups with [b-HBA] above fasting threshold had accompanying low [BUN] indicative of adaptive, short-term fasting rather than Phase III fasting or starvation. The proportion of pups that exhibited b-HBA fasting threshold concentrations was higher in SE than in W or the R (p=0.00). Plasma [b-HBA] in SE were higher than W but similar to the R (SE: $0.239 \text{ mM} \pm 0.172$, n=251 (range: 0.040 - 1.088 mM); W: $0.206 \text{ mM} \pm 0.131$, n=382 (range: 0.00 - 0.853 mM); R: $0.219 \pm 0.172 \text{ mM}$, n=498 (range: 0.00 - 1.270 mM); p = 0.041). Higher plasma BUN and b-HBA concentrations in Southeast Alaska may suggest differences in fasting behavior among pups from Southeast Alaska, compared to western Alaska or Russia.

Alaska

Marine Science Symposium

**Showcasing Ocean Research
in the Arctic Ocean, Bering Sea,
and Gulf of Alaska**

January 19–23, 2009

**Hotel Captain Cook
Anchorage, Alaska**

Sponsored by:

Alaska Department of Fish and Game
Alaska Ocean Observing System
Alaska Pacific University
Alaska Sea Grant
Alaska SeaLife Center
Alaska Resources Library and Information Services
Center for Ocean Sciences Education Excellence (COSEE) Alaska
Exxon Valdez Oil Spill Trustee Council
Minerals Management Service
NOAA Alaska Fisheries Science Center
NOAA National Ocean Service
North Pacific Fishery Management Council
North Pacific Research Board
Oil Spill Recovery Institute
Pollock Conservation Cooperative Research Center
Prince William Sound Science Center
University of Alaska Fairbanks
US Arctic Research Commission
US Fish and Wildlife Service
US Geological Survey Alaska Science Center

www.alaskamarinescience.org