Thermal and Metabolic Constraints Affecting Pacific Walrus (Odobenus rosmarus divergens): A Modeling Exercise Incorporating Stable Isotopes and Thermal Biology

S.D. Farley (Alaska Department of Fish and Game, Anchorage, AK 99518; 907-267-2203; e-mail: sfarley@fishgame.state.ak.us)
C. Jay (BRD/USGS, Anchorage, AK 99503; 907-786-3856; e-mail: chad_jay@usgs.gov)

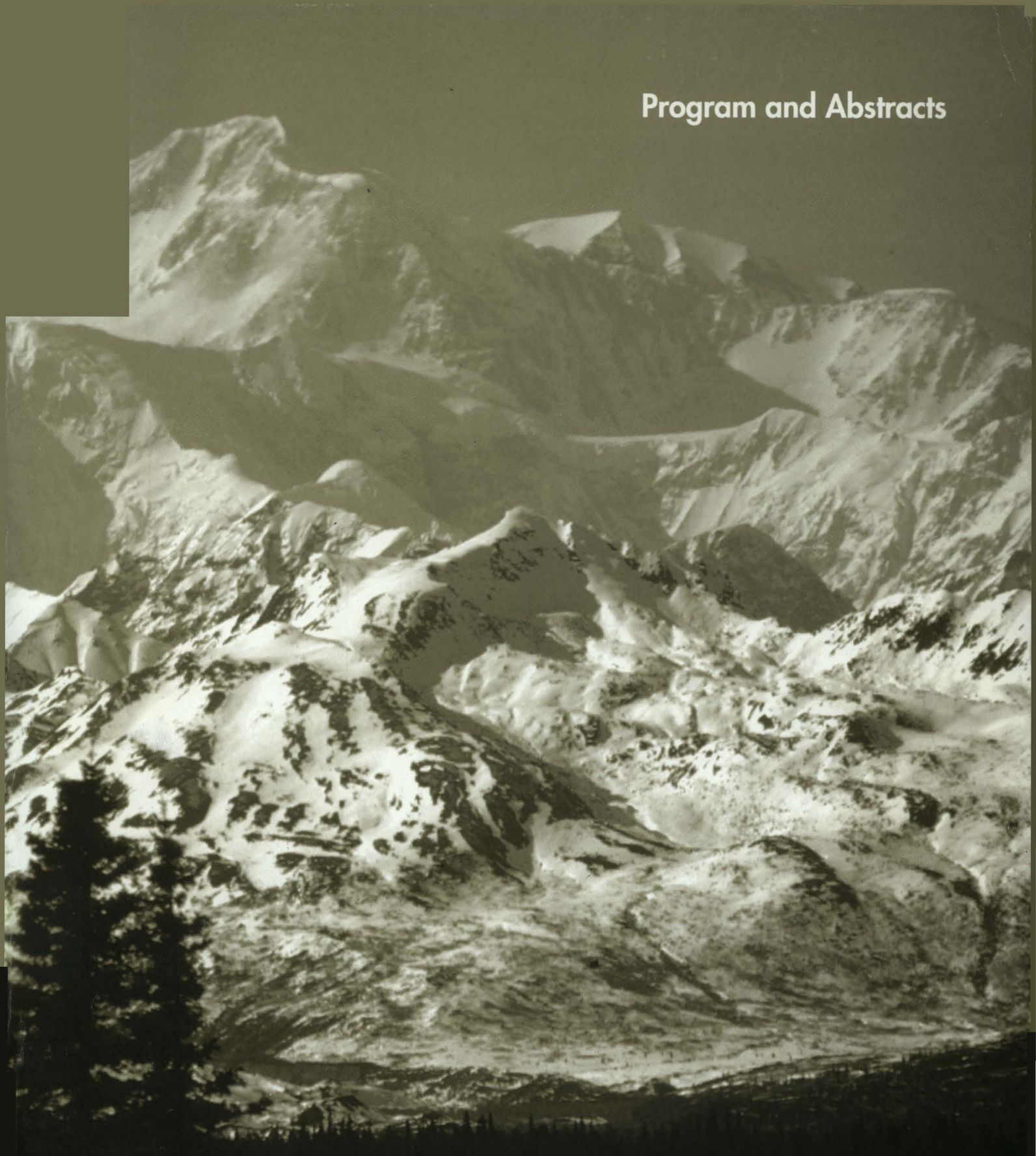
Pacific Walrus (*Odobenus rosmarus divergens*) are the largest members of the Odobenidae and range from the northern end of the Aleutian chain into the Arctic Ocean. Seasonal movements generally follow the ice edge, progressing northward in the summer and south in the fall, though many adult males remain in the Bristol Bay region throughout the summer. This species exhibit a behavior characterized by mass aggregations of individuals on land or sea-ice, often in dense clumps numbering into the thousands. Individuals will spend several days out of the water, then return to the ocean for extended (6–10 day) foraging periods.

Most male walrus on shore in Bristol Bay are post-absorptive. Upon first arrival at shore's edge individuals are often strikingly light colored from peripheral vasoconstriction. Their progress onto land generally follows a thermoregulatory pattern of movement into the center mass of individuals, followed by subsequent travel to the periphery of the herd. Body color ashore will range from light to dark red, and often individuals can be seen elevating flippers in an (assumed) attempt to dump excess body heat.

Stomachs of harvested animals have contained a wide array of prey items (Mollusca to Chordata), however, stable isotope analysis of blood and vibrissae indicate a strongly monophagic diet of bivalves, relative to assimilated carbon and nitrogen.

We present results of a simple energy balance model designed to test the assumption that it is cost-effective for walrus to bask onshore, rather than relying entirely upon metabolic heat production. We also discuss the metabolic constraints faced by a mammal that weighs upwards of two tons and eats primarily clams.

Program and Abstracts



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