



# Size frequency variation of an emerging fisheries species across its biogeographical range

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## Introduction

Kellet's whelk (*Kelletia kelletii*) is a large subtidal gastropod and the basis for an emerging bycatch fishery in California. Historically ranging from southern California to Baja California, Kellet's whelk populations have recently undergone a northward range expansion into the Central Coast of California [1]. The commercial fishery for kellet's whelk increased dramatically from 1993 to 2003 when statewide landings quadrupled and more than doubled over the subsequent five years [2]. Despite Kellet's whelk's ecological and emerging economic importance, there is little biological information available to inform its management [3,4]. **Hypothesis:** Size frequency distributions will vary spatially across the Kellet's whelk range.

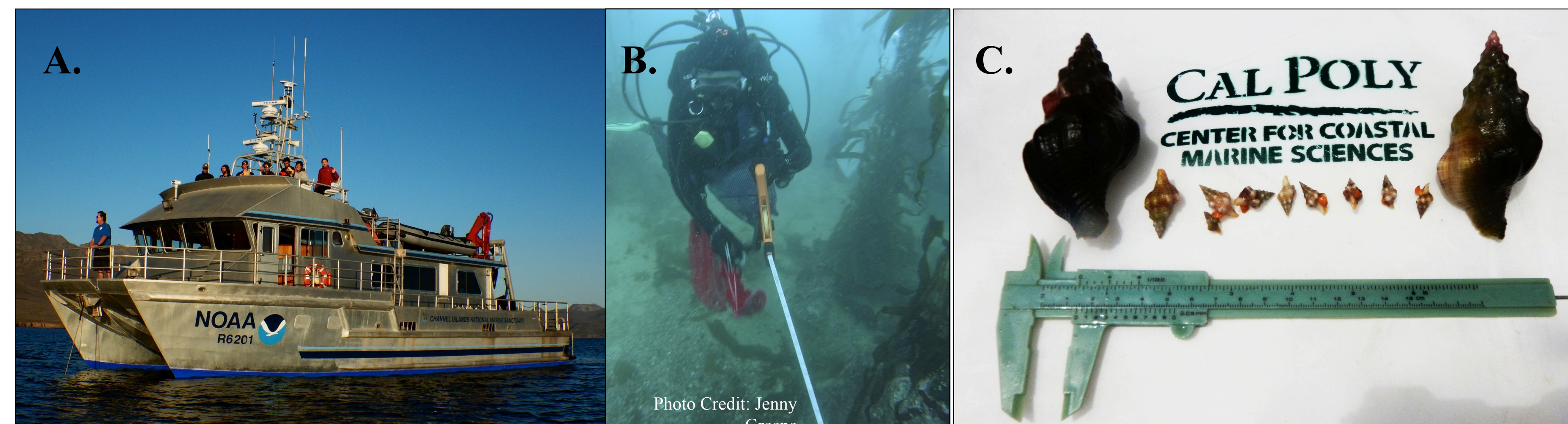


Figure 1: A) NOAA's 62' Research Vessel (R/V) Shearwater at a survey site off of Santa Rosa Island. B) A diver performing a fixed-width transect survey on SCUBA in Monterey, California. C) Size variation in adult and juvenile Kellet's whelk aboard Cal Poly's R/V T.L. Richards.

## Results

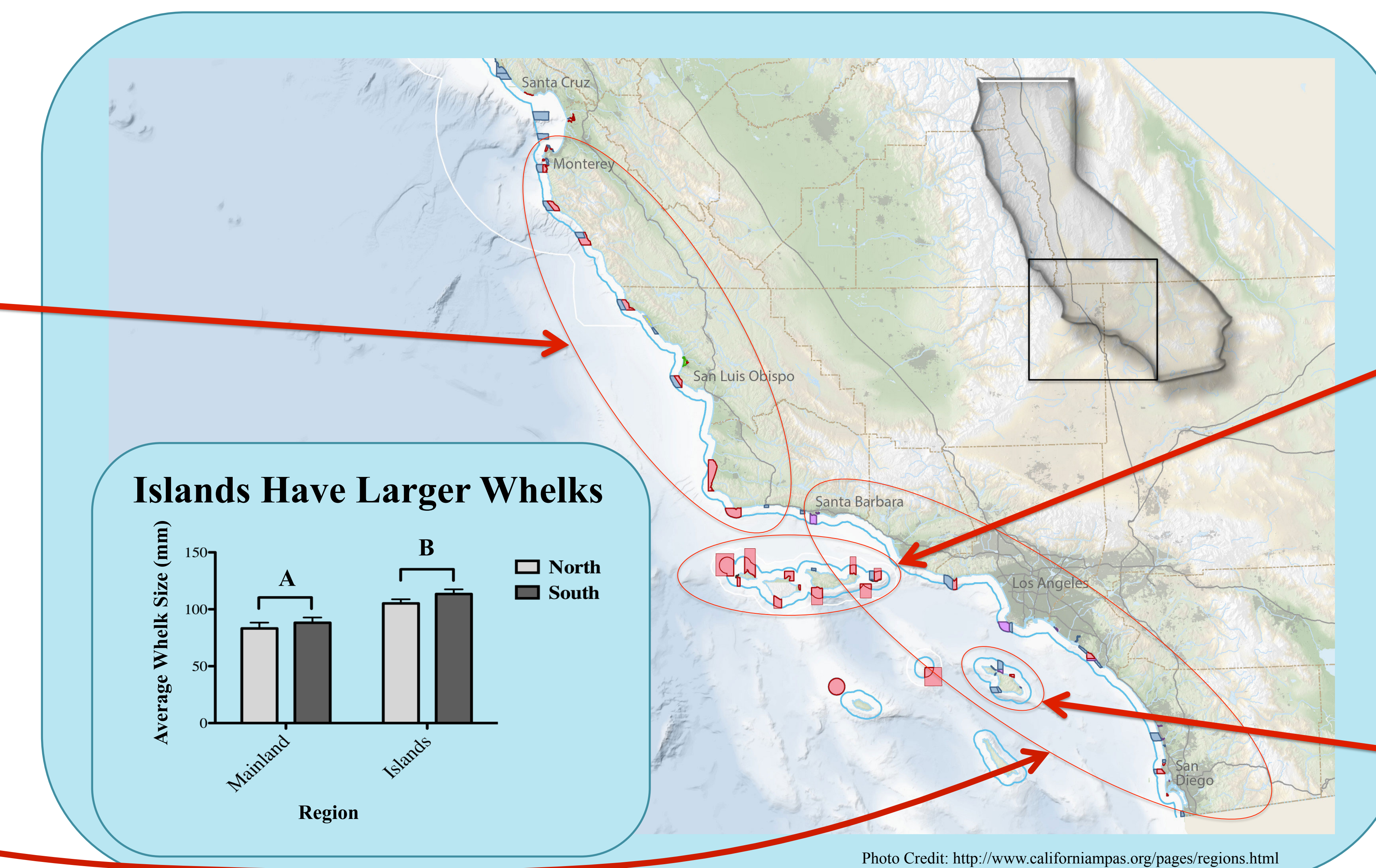
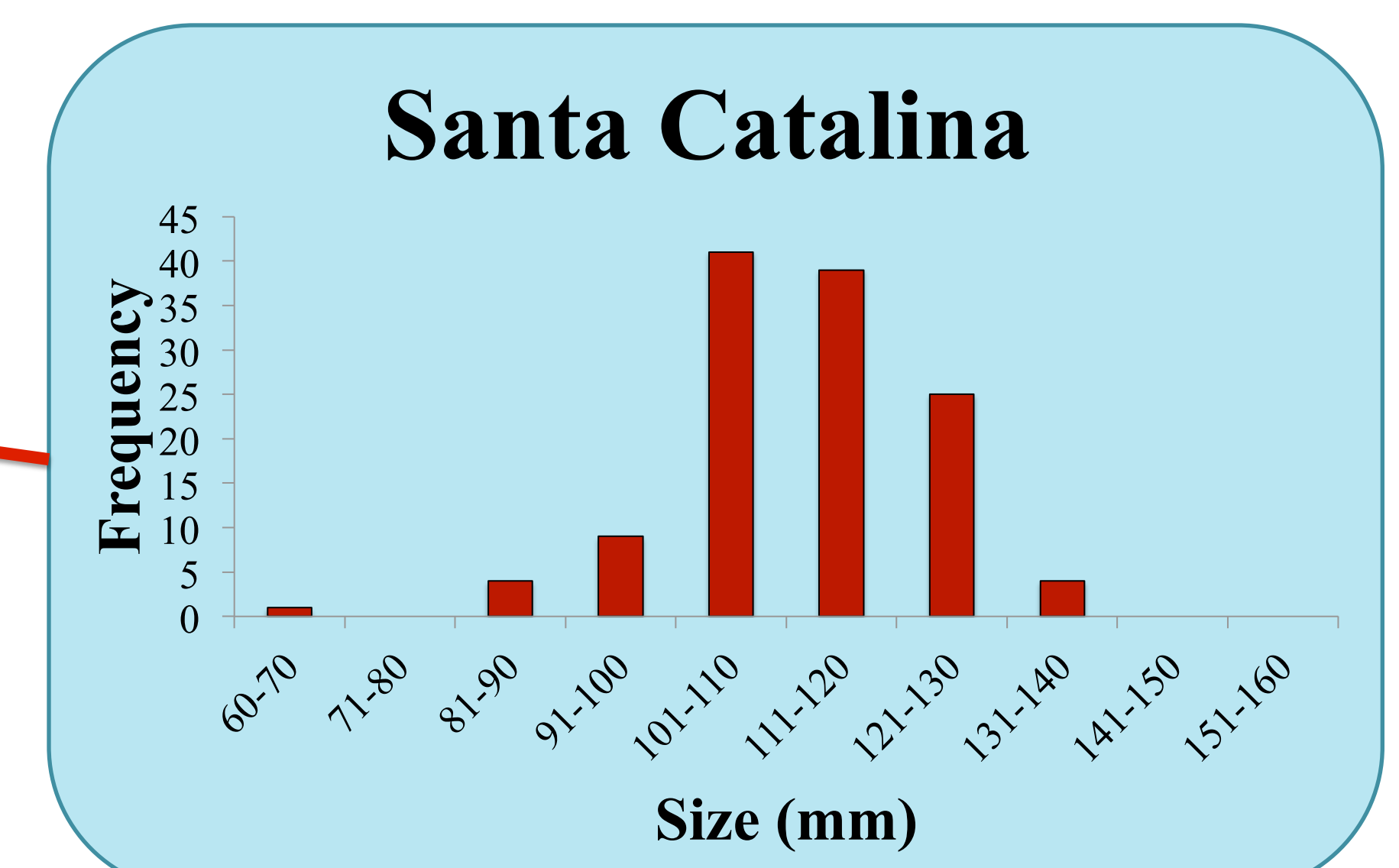
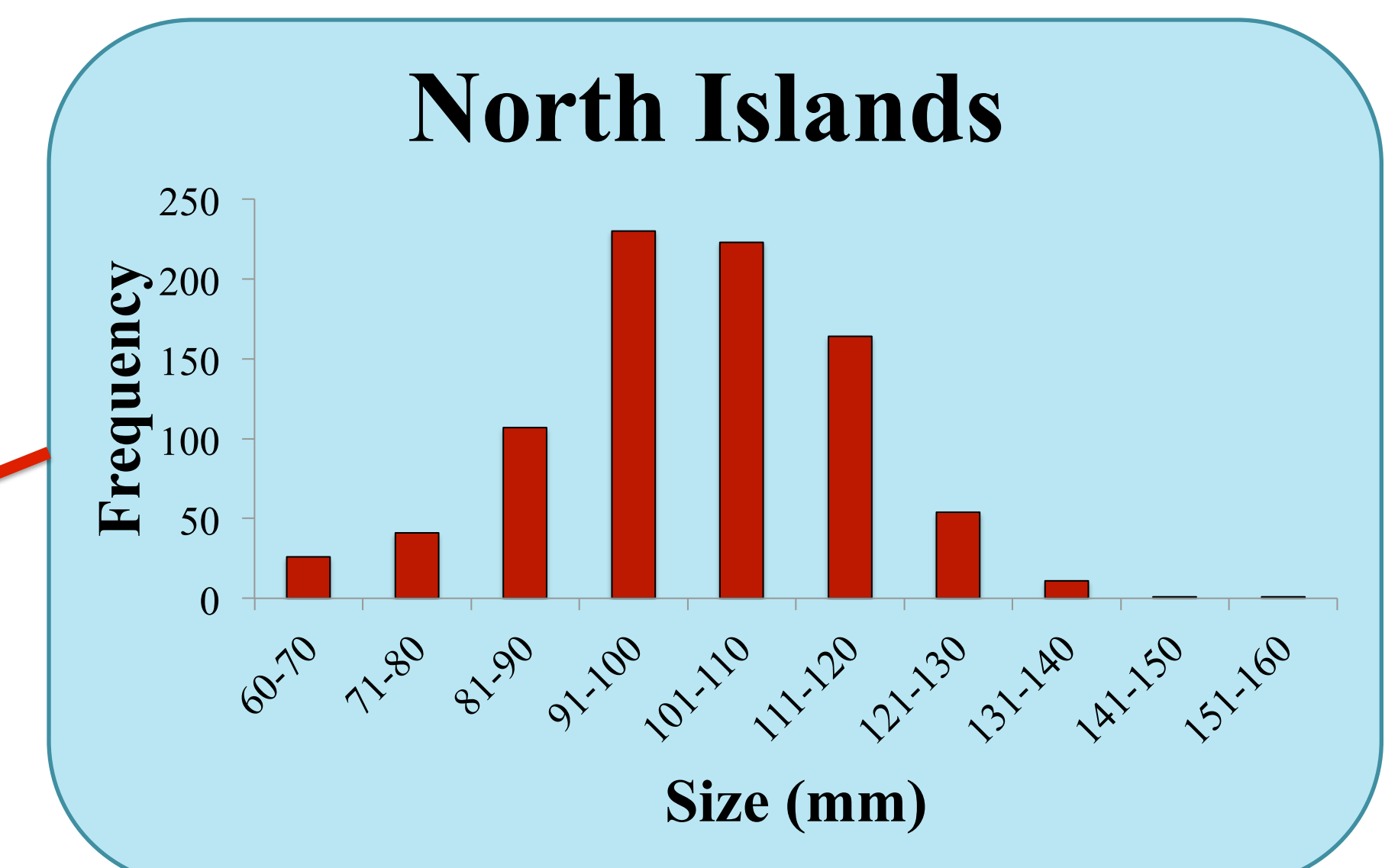
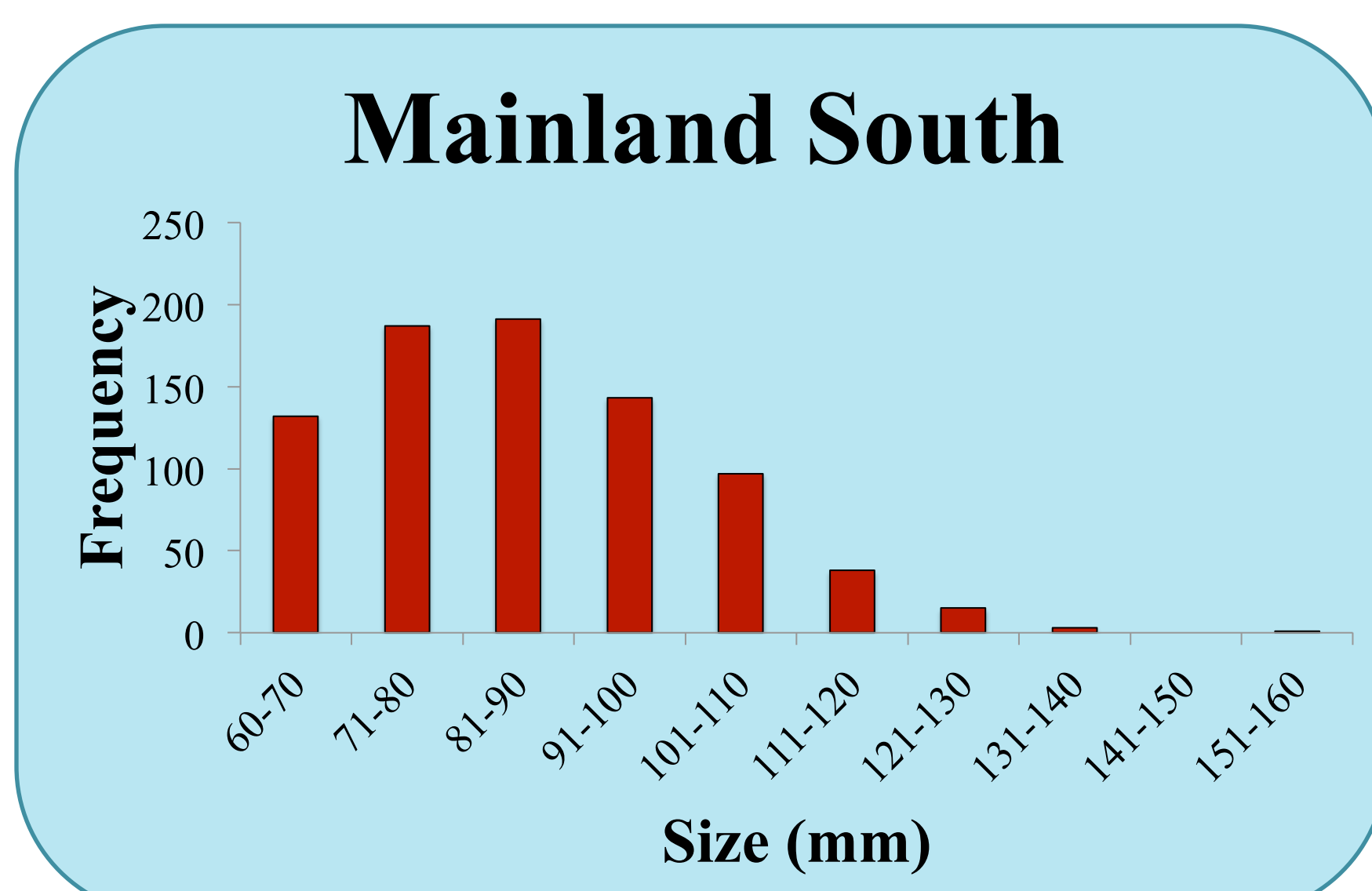
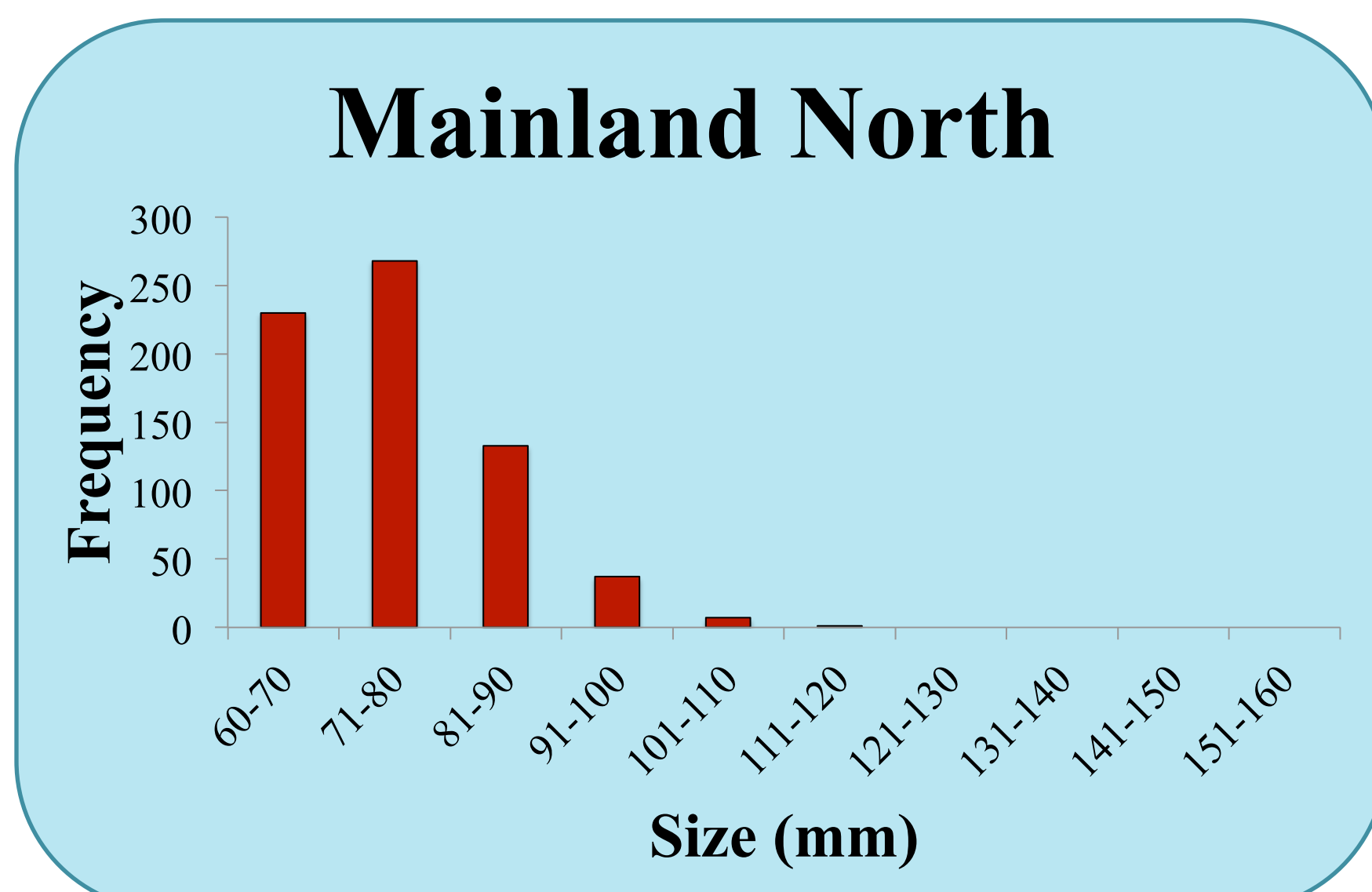


Figure 2: Map showing the California portion of the biogeographical range of Kellet's whelk. Mean size of whelks from island sites (107.685 mm, SEM=3.0772, N=13) is significantly larger ( $p < .0001$ ) than the mean size of whelks from mainland sites (85.902 mm, SEM=3.3055, N=15). Levels not connected by a letter are significantly different. Size frequency histograms of adult whelks (>59mm) [6] show size variation across sites from all northern mainland sites (Point Conception to Monterey), southern mainland sites (San Diego to Point Conception), northern channel island sites, and Santa Catalina Island sites.

## Discussion

Currently there are seasonal restrictions for commercial and recreational fishing for Kellet's whelk in California with annual total allowable catch at 100,000 pounds. There is no size limit; however, one option suggested for a size limit includes a minimum harvestable size of 76 mm (3 inches) [5]. Results here indicate that one size limit is likely inappropriate for sustainable management. There appears to be large natural variation in sizes across the range, specifically between the mainland and island populations. Designing harvesting strategies that would maintain these natural size frequency distributions -- e.g., a larger size limit at the islands and a smaller size limit at the mainland populations -- may generate more sustainable and productive economic and ecological outcomes.

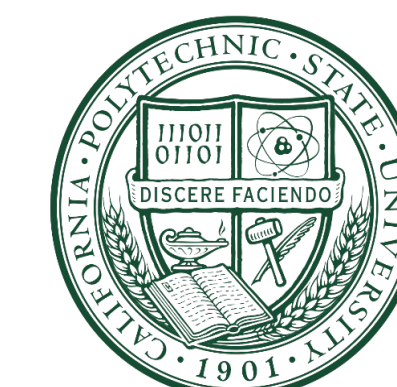


## Methods

Using SCUBA we conducted six 30mX2m fixed-width transect surveys at 28 subtidal rocky reefs across the Kellet's whelk geographic range to quantify its population density and size-frequency distribution, and to assess spatial differences in demography.

### Acknowledgments

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