We sit, perched on the mountain peak as the sun rises, gazing over the extensive Santa Cruz Island landscape below. My field crew listens intently to my elaborate plan, eager to begin the point-intercept transects, feeling prepared to identify floral species. Our collective team attitude is positive as we pour over the mountainside, sweeping back and forth between our predetermined GPS coordinates. My training in Wilderness First Aid/CPR and careful planning of every logistical detail ensures adequate preparation for all possible road bumps, and I am confident that I have set our team up for success by setting achievable daily goals. After our return to the field station from sampling, we are keen to assign meaning to the data, so we discuss the Before-After Control-Impact study design. I explain why a Multidimensional Scaling plot and PERMANOVA are the most pertinent analytical methods to ascertain how the vegetation community has changed after feral grazers were eradicated from the landscape. As the lead investigator on this study of the long-term effects of herbivores on an island ecosystem, I secured $1000 in funding and established cross-institution collaborations with researchers from UC Davis, UC Santa Cruz, and The Nature Conservancy. I knew that examining the recovery of ecosystems from severe disturbances was crucial for determining whether active interventions are necessary to achieve desired restorations. I organized the volunteer field crew and travelled to Santa Cruz Island with the goal of quantifying changes in vegetation composition at the site since a pre-eradication study in 1979/80. Our data reflected an unmistakable recovery from predominantly non-native grassland to native coastal scrubland through 23 years of post-eradication passive restoration. I presented our work at the 2013 Conservation Biology Symposium, and have submitted a manuscript for peer-reviewed publication[1].

The Santa Cruz Island work was a prime example of how fortunate I am to participate in a subject that brings me so much enjoyment - I took great pride in seeing the research go from planning stages to publishable results. Ever since I can remember, the mysteries of nature have enticed me to explore and discover, and throughout time, I have found myself consistently and unequivocally passionate about scientific inquiry. Unraveling these mysteries began as a passion and manifested into a lifestyle as I dove headfirst into an assortment of research laboratories during my undergraduate tenure at the University of California, Santa Cruz (UCSC), where researchers and faculty members expressed sincere interest in my personal growth and professional development. I actively pursued a rigorous academic schedule, sought out networking opportunities, and took advantage of every possible learning opportunity by being pro-active, enthusiastic, and engaged. I participated in research and education at various taxonomic levels — from using a scanning electron microscope to photograph 30-micron hydrothermal vent larvae, to training captive sea lions, to taking groups of young students inside the skeleton of an 87-foot blue whale. I quickly realized the importance of designing interdisciplinary research with precise conservation implications and education outcomes in mind.

I discovered my interest in marine animals when I began working with a captive pinniped cognition laboratory under the direction of Dr. Colleen Reichmuth. For two years, I trained six resident pinniped species and supported the research program by engaging in facilities maintenance, sustaining animal and facilities records, completing annual written reports, and

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[1] **Beltran, R.,** N. Kreidler, D. Van Vuren, S. Morrison, E. Zavaleta, K. Newton, B. Tershy and D. Croll. (2013). *Passive recovery of vegetation from herbivore eradication on Santa Cruz Island, California*. Restoration Ecology. Submitted.

subsequently providing mentorship to newer members of the lab. I helped graduate students and associated researchers complete multiple phases of data collection and analysis in their aim to strengthen legislation on the anthropogenic noise pollution that adversely affects marine mammals. Through this work, I attained a deep appreciation for the scientific process and gained an understanding of the significant amount of time, effort and financial support needed to carry out high quality research. Perhaps most importantly, I learned to establish research questions based on initial observations, to examine theories for possible explanations, to choose methods that adequately address my question, and to utilize analytical methods and reasoning to draw conclusions and tie in big-picture implications. The scientific methods that I learned provided me with a quantitative approach for indulging my curiosity and determination.

I continued to work with pinnipeds in my role as the field and database technician in Dr. Dan Costa's functional ecology and physiology laboratory, where I assisted with weekly elephant seal sedation procedures through satellite tag attachment, blood collection, body composition measurements, and blubber/muscle biopsies. I supplemented this research by collecting daily rookery census data, deploying flipper tags, collecting and analyzing photogrammetric data, scoring behavioral interactions, entering data into the longitudinal demographic study database, and assisting with detail-oriented laboratory work. My involvement in the elephant seal field research team culminated in primary responsibility over a study aimed to determine the influences of male elephant seal body mass on social dominance during two breeding seasons.

During my senior year, I developed an independent thesis project, where I used an innovative combination of photogrammetry and stable isotope analysis to calibrate pinniped whisker growth models. I used 80 weekly photogrammetric estimates of whisker length from a captive elephant seal to generate high-resolution models of whisker growth dynamics. Supported by $1500 in student research grants, I analyzed stable carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotope ratios in blood and whisker samples from the seal. Whisker growth could be consistently described using an asymptotic growth function. $\delta^{13}C$ and $\delta^{15}N$ values fluctuated along each analyzed vibrissae, but exhibited similar values when assigned to appropriate time scales based on the derived growth parameters. My senior thesis was awarded honors distinction by the UCSC department of Ecology and Evolutionary Biology, and I will give an oral presentation of my research to an international group of researchers at the 2013 Society of Marine Mammalogy Biennial Conference on the Biology of Marine Mammals in New Zealand. Through this study, I showed that stable isotope analysis data obtained from whiskers could be placed within appropriate time frames to obtain accurate conclusions regarding prey selection and location. To validate the efficacy of photogrammetric methods in whisker length estimation, I worked with collaborators at UCSC and The Marine Mammal Center to correlate direct and photogrammetric estimates of whisker length in nine additional deceased pinniped subjects. We presented these results at the 2013 Monterey Bay National Marine Sanctuary Symposium, where we were awarded second place in the student poster competition[2].

With every research task, I have found ways to make meaningful contributions that connect science to education. I have found that my passion for scientific inquiry is renewed when I am

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[2] **Beltran, R.,** M Connolly and C Reichmuth. *A picture is worth a thousand measurements: A calibration procedure for pinniped vibrissal length estimation using photogrammetry.* Monterey Bay National Marine Sanctuary Symposium. 27 April 2013. Monterey, CA. Poster presentation.

translating science and conservation activities into educational opportunities for students at every level. I strive to inspire passion and action in those around me by expressing sincere interest, sharing experiences, encouraging discoveries, and conveying knowledge. I have learned to communicate with others efficiently and informatively as a shift manager at the Seymour Center public aquarium, where I created specialized training presentations for the volunteer docents, and used my fluency in Spanish to develop a Spanish-speaking tour. I also shared my undergraduate experiences with freshmen during my two-year tenure as an orientation leader at UCSC.

I have discovered that SCUBA diving is an effective way to bridge the gap between science and public interest. I often use my underwater photos and experiences as examples of how critical thinking and problem solving can be used to investigate questions. I have realized that those who dabble with the underwater world present the interest and pose all the right questions – why fishes seem to group together in the middle of the water column, or why gastropods are always found near kelp, or why sometimes in the dark, a swift movement of the hand will activate small, bright stars in the water. Once the questions are there, the answers begin to emerge. It takes only a few brief minutes to explain adaptive predator avoidance strategies, or species distribution patterns, or the mechanisms behind bioluminescence. After obtaining my American Academy of Underwater Sciences scientific diving certification and participating in an extensive Motorboat Operator Training Course, I completed an international research project pertaining to the effects of light exposure on benthic community composition during a field quarter in the Mediterranean Sea. Studying in challenging conditions and isolated locations has always been a great interest of mine. My ambitions of SCUBA diving in Antarctica came closer to reality when Diving Unlimited International awarded me with a drysuit through an advanced dive training grant from the Women Divers Hall of Fame society and a KeyPerson sponsorship.

Upon my graduation from UCSC, I was awarded a $3000 Thimann Scholarship, which is presented annually to a graduating senior who “shows the most promise as a future scientist in one of the scientific disciplines”. I am currently enrolled in the University of Alaska Anchorage graduate studies program, where I work with Drs. Jennifer Burns and Ward Testa to model the demographic consequences of environmental change and fishing pressure on Antarctic Weddell seals by examining the interaction between timing of life history events (i.e. molt and reproduction), animal condition (i.e. body composition) and the environment. Studying the population dynamics of organisms is exceptionally rewarding because I am challenged to consider problems from a more complex, hierarchical perspective. The NSF funding that has been awarded to the project will provide an essential support framework for my proposed research. After the completion of my graduate and post-graduate research, I hope to continue conducting research in marine ecology while simultaneously sharing my enthusiasm and knowledge with students who are beginning their careers. I believe that my passionate commitment to scientific discovery coupled with my skill set will greatly facilitate my goal of addressing time-sensitive, conservation focused research questions. Becoming an NSF Graduate Research Fellow would be an extraordinary opportunity for me to continue producing high-impact research with a far-reaching community of collaborators.