

Daniel E. Crocker
Professor, Department of Biology

Report for sabbatical leave, Spring, 2020

My sabbatical plans were strongly impacted by the COVID19 shelter orders which ended both of my proposed projects off campus.

I was able to complete planned field sampling and instrument deployments as part of my grant obligations to two projects:

Q0028 - NSF – Integrative Organismal Systems - Collaborative Research: Role of endogenous carbon monoxide (CO) in hypoxia tolerant species.

QC385 – ONR - On-board calculation and telemetry of the body condition of individual marine mammals.

I performed field experiments for a project with colleagues from UC Berkeley and was allowed by the EOC to finish the field sampling in early March. Unfortunately my plans to work in the UCB lab were canceled by the shelter order.

My Antarctic NSF-Polar Programs trip to study leopard seals at Cape Sheriff, Antarctica was also canceled due to travel restrictions. The trip was postponed to Spring, 2021.

Instead I had to focus on objectives I could complete while sheltering:

1. I worked with 2 of my graduate students (Rzucidlo & Sperou) to complete their thesis projects and papers that are the primary 2 research products on: QC421- ONR - Developing metrics of animal condition and their linkage to vital rates: Further development of the PCOD model. These manuscripts are now being submitted for publication.
2. I revised and obtained funding on a new collaborative research proposal: SERDP – Assessment of the Cumulative Effects of Multiple Stressors on Marine Mammals– Elephant Seals as a Model System. \$489,644 to SSU (PI, 8/1/20-3/31/24).
3. I wrote an invited book chapter: ‘Physiology’ in: Ethology and Behavioral Ecology of Phocids. Springer Press. D.P. Costa and E. McHuron, eds.
4. I participated in writing, revision and submission of 14 manuscripts for publication:

DeRango, E.J., J.F.L. Schwarz, F. Zenth, P. Piedrahita, D. Páez-Rosas, **D.E. Crocker**, O. Krüger. Developmental conditions promote individual differentiation of endocrine axes and behavior in a tropical pinniped. *Hormones and Behavior* (submitted).

Beltran, R.S., J.M. Kendall-Bar, E. Pirodda, T. Adachi, Y. Naito, A. Takahashi, J. Cremers, P.W. Robinson, **D.E. Crocker**, D.P. Costa. Lightscares of fear: how mesopredators balance starvation and predation in the open ocean. *Science Advances* (submitted).

Rachel R. Holser, R.R., **D.E. Crocker**, P.W. Robinson, R. Condit, D.P. Costa, Density-dependent effects on reproductive success in a capital breeding carnivore, the northern elephant seal (*Mirounga angustirostris*). *Proceedings of The Royal Society B* (submitted).

Conners, M.G., P.D. Agamoue, P.W. Atkinson, A.M.M. Baylis, S.R. Benson, B. Block, S.J. Bograd, P. Bordino¹, W. D. Bowen, P. Brickle, I.M. Bruno, V. González Carman, C.D. Champagne, **D.E. Crocker**, D.P. Costa, T.M. Dawson, T. Deguchi, H. Dewar, P.D. Doherty, T. Eguchi, A. Formia, B.J. Godley, R.T. Graham, C. Gredzens, K.M. Hart, L.A. Hawkes, S. Henderson, W. Henry, L.A. Hückstädt, L. Irvine, S. Kienle, C.E. Kuhn, D. Lidgard, S.A. Loreda, B. Mate, K. Metcalfe, J. Nzegoue, C.K. Kouerey Oliwina, R.A. Orben, K. Ozaki, R. Parnell, E.P. Pike, P. Robinson, H. Rosenbaum, F. Sato²¹, S.A. Shaffer, D.J. Shaver, S.E. Simmons, N.B. Sisson, B.J. Smith, G. Sounguet, R. Suryan, D.R. Thompson, M. Tierney, D. Tilley, H.S. Young, V. Warwick-Evans, M. J. Weise, R.S. Wells, B.P. Wilkinson, M.J. Witt, J.A. Estes, S.M. Maxwell. Mismatches in Scale Between Marine Protected Areas and Mobile Marine Megafauna. *Proceedings of The National Academy of Science* (in revision).

Debiec, C., L. Pirard, M. Verhaegen, C. Ruzicidlo, G. Tinant, Y. Larondelle, D. Smith, J. Rees, **D.E. Crocker**. In vitro lipolysis and leptin production of elephant seal blubber using a new model of precision-cut adipose tissue slices. *Scientific Reports* (in revision).

Kienle, S.S., A. Friedlaender, **D.E. Crocker**, R.S. Mehta, D.P. Costa. Risk reward trade-offs drive sex-specific foraging strategies in a sexually dimorphic predator. *Proceedings of The National Academy of Science* (in revision).

Kroeger, C.E., **D.E. Crocker**, R.A. Orben, D.R. Thompson, L.G. Torres, P.M. Sagar, L.A. Sztukowski, T. Andriese, D.P. Costa, S.A. Shaffer. Similar foraging energetics of two sympatric albatrosses despite contrasting life histories and foraging strategies in the wind. *Journal of Experimental Biology* (in revision).

Pujade Busqueta, L., **D.E. Crocker**, C.D. Champagne, M.C. McCormley, J.S. Deyarmin, D.S. Houser, J.I. Khudyakov. A blubber gene expression index for evaluating stress in marine mammals. *Conservation Physiology* (in press).

Delehanty, B., G.D. Bossart, C.D. Champagne, **D.E. Crocker**, K.H. Elliott, D.S. Houser, A.E.M. Newman, P.A. Fair, R. Boonstra. 2020. Measurement of free glucocorticoids: Quantifying

corticosteroid binding capacity and its variation within and among mammal and bird species. Conservation Physiology. doi: 10.1093/conphys/coaa05

Hückstädt, L.A., A. Piñones, D.M. Palacios, B.I. McDonald, M.S. Dinniman, E.E. Hofmann, J.M. Burns, **D.E. Crocker** and D.P. Costa. 2020. Projected shifts in the foraging habitat of crabeater seals along the Antarctic Peninsula. Nature Climate Change. 10:472-477.

Strahan, M.G., D.S. Houser, J.J. Finneran, J. Mulsow, **D.E. Crocker**. 2020. Behaviorally measured tactile sensitivity in the common bottlenose dolphin, *Tursiops truncatus*. Marine Mammal Science. 36:802-812.

Deyarmin, J.S., R. Hekman, C.D. Champagne, M.C. McCormley, A. Stephan, **D.E. Crocker**, D.S. Houser, J.I. Khudyakov. 2020. Blubber proteome response to repeated ACTH administration in a wild marine mammal. Journal of Comparative Biochemistry and Physiology D. 33:100644: 1-9.

Del Aguila-Vargasa, A.C., J.P. Vázquez-Medina, **D.E. Crocker**, L.C. Méndez-Rodríguez, R. Gaxiola-Robles, J.A. de Anda-Montañeza, L. Javier Ramirez-Jirano, O. Lugo-Lugo, T. Zenteno-Savín. 2020. Antioxidant response to cadmium exposure in primary skeletal muscle cells isolated from humans and elephant seals. Journal of Comparative Biochemistry and Physiology C. 227:108641:1-9.

Houser, D.S., S. Martin, **D.E. Crocker**, and J.J. Finneran. 2020. Endocrine response to simulated U.S. Navy mid-frequency sonar exposures in the bottlenose dolphin (*Tursiops truncatus*). The Journal of the Acoustical Society of America. 147: 1681-1687.