

Amy R. Knowlton, MMA

Senior Scientist

Anderson Cabot Center for Ocean Life at the New England Aquarium
Central Wharf, Boston, MA 02110
(617) 973-0210

Employment

Oct 2017- present Senior Scientist: New England Aquarium, Boston, MA

1983-2017 Research Assistant to Research Scientist: New England Aquarium

May
1987,1988 Research Assistant: University of Rhode Island, Graduate School
of Oceanography, Narragansett, RI.

June
1984, 1986 Visiting Scientist: Sea Education Association, Woods Hole, MA.

June-July
1985 Co-leader/Scientist: School for Field Studies, Beverly, MA.

Nov., 1983
Dec., 1985 Cartographic Consultant: Ocean Spray Cranberry, Plymouth, MA.

March-July
1984 Research Assistant: Manomet Bird Observatory, Manomet, MA.

Relevant Qualifications

Invited member of Population Evaluation Tool Subgroup of NOAA Fisheries Right Whale Recovery Team: appointed in 2018 to provide information on entanglement impacts for development of a population viability assessment

Invited board member of the Ropeless Consortium: appointed in 2018 to support ropeless fishing gear discussions

Invited member of North Atlantic Right Whale Recovery Plan Southeast U.S. Implementation Team: appointed in 2010 to assist in recovery plan implementation.

Elected board member of the North Atlantic Right Whale Consortium: have served several 3 year terms to provide input on meetings and data access requests

Past chair of the Right Whale Consortium: elected in 2000 to serve as chair for 3 years, 2002-2004. Responsible for overseeing Consortium activities including data access and annual meetings.

Past co-chair of Ship Strike Subcommittee: elected in May 1998 to develop future research and policy initiatives of the Northeast Implementation Team of the Right Whale Recovery Plan.

Licensed Ocean Operator: certified by the U.S. Coast Guard to operate a power vessel up to 100 tons along the eastern seaboard out to 100 miles from shore.

Standards of Training, Certification, and Watchkeeping Basic Safety Training: completed in October 2021

Education

1994-1997 University of Rhode Island, Kingston, R.I.
Masters in Marine Affairs

1978-1982 Boston University, Boston, MA, College of Liberal Arts,
B.A. in Geography (cum laude).

April-July,
1980 Sea Education Association, Woods Hole, MA.
Three month sea semester program

Publications

- Pirotta, E., Schick, R.S., Hamilton, P.K., Harris, C.M., Hewitt, J., **Knowlton, A.R.**, Kraus, S.D., Meyer-Gutbrod, E., Moore, M.J., Pettis, H.M., Photopoulou, T., Rolland, R.M., Tyack, P.L. and Thomas, L. (2023), Estimating the effects of stressors on the health, survival and reproduction of a critically endangered, long-lived species. *Oikos*, 2023: e09801. <https://doi.org/10.1111/oik.09801>
- Knowlton, A. R.**, Clark, J. S., Hamilton, P. K., Kraus, S. D., Pettis, H. M., Rolland, R. M., & Schick, R. S. (2022). Fishing gear entanglement threatens recovery of critically endangered North Atlantic right whales. *Conservation Science and Practice*, 4(8), e12736. <https://doi.org/10.1111/csp2.12736>
- Stewart, J.D., Durban, J.W., Europe,H., Fearnbach, H., Hamilton, P.K., **Knowlton, A.R.**, Lynn, M.S., Miller, C.A., Perryman, W.L., Tao, B.W.H., Moore, M.J. (2022) Larger females have more calves: influence of maternal body length on fecundity in North Atlantic right whales. *Mar Ecol Prog Ser* 689:179-189. <https://doi.org/10.3354/meps14040>
- Stewart, J.D., Durban, J.W., **Knowlton, A.R.**, Lynn, M.S., Fearnbach, H., Barbaro, J., Perryman, W.L., Miller, C.A., & Moore, M.J. (2021) Decreasing body lengths in North Atlantic right whales. *Current Biology*, 31(14), 3174-3179.e3. <https://doi.org/10.1016/j.cub.2021.04.067>.
- Quintana-Rizzo, E., Leiter, S., Cole, T.V.N., Hagbloom, M.N., **Knowlton, A.R.**, Nagelkirk, P., O'Brien, O., Kahn, C.B., Henry, A.G., Duley, P.A., Crowe, L.M., Mayo, C.A., Kraus, S.D. (2021) Residency, demographics, and movement patterns of North Atlantic right whales *Eubalaena glacialis* in an offshore wind energy development area in southern New England, USA. *Endangered Species Research* 45: 251-268. <https://doi.org/10.3354/esr01137>
- Moore, M.J., Rowles, T.K., Fauquier, D.K., Baker, J.T., Biedron, I., Durban, J.W., Hamilton, P.K., Henry, A.G., **Knowlton, A.R.**, McLellan, W.A., Miller, C.A., Pace, R.M. III, Pettis, H.M., Raverty, S., Rolland, R.M., Schick, R.S., Sharp, S.M., Smith, C.R., Thomas, L., van der Hoop, J.M., Ziccardi, M.H. 2021. Assessing North Atlantic right whale health: threats and development of tools critical for conservation of the species. *Diseases of Aquatic Organisms* 143:205-226. <https://doi.org/10.3354/dao03578>
- Pace, R.M., Williams, R., Kraus, S.D., **Knowlton, A.R.**, Pettis, H.M. 2021. Cryptic mortality of North Atlantic right whales. *Conservation Science and Practice* e346. <https://doi.org/10.1111/csp2.346>
- Davies, K.T.A., Brown, M.W., Hamilton, P.K., **Knowlton, A.R.**, Taggart, C.T., Vanderlaan, A.S.M. 2019. Variation in North Atlantic right whales (*Eubalaena glacialis*) occurrence in the Bay of Fundy, Canada, over three decades. *Endang Species Res* 39:159-171. <https://doi.org/10.3354/esr00951>
- Gowan, T.A., Ortega-Ortiz, J.G., Hostetler, J.A., Hamilton, P.K., **Knowlton, A.R.**, Jackson, K.A., George, R.C., Taylor, C.R., Naessig, P.J. 2019. Temporal and demographic variation in partial migration of the North Atlantic right whale. *Scientific Reports* 9:353. DOI:10.1038/s41598-018-36723-3
- Myers, H.J., Moore, M.J., Baumgartner, M.F., Brilliant, S.W., Katona, S.K., **Knowlton, A.R.**, Morissette, L., Pettis, H.M., Shester, G., Werner, T.B. 2019. Ropeless fishing to prevent large whale entanglements: Ropeless Consortium report. *Marine Policy* 107: 103587.
- Lysiak, N.S.J., S.J. Trumble, **A.R. Knowlton**, and M.J. Moore. 2018. Characterizing the Duration and Severity of Fishing Gear Entanglement on a North Atlantic Right Whale (*Eubalaena glacialis*) Using Stable Isotopes, Steroid and Thyroid Hormones in Baleen. *Frontiers in Marine Science*. *Frontiers of Marine Science* 5: 168.
- Krzystan, A.M., T.A. Gowan, W.L Kendall, J. Martin, J.G. Ortega-Ortiz, K. Jackson, **A.R. Knowlton**, P. Naessig, M. Zani, D.W. Schulte, and C.R. Taylor. 2018. Characterizing residence patterns of North Atlantic right whales in the southeastern USA with a multistate open robust design model. *Endangered Species Research* 36:279-295.
- van der Hoop, J.M., Corkeron, P., Henry, A.G., **Knowlton, A.R.**, and Moore, M.J. 2017. Predicting lethal entanglements as a consequence of drag from fishing gear. *Marine Pollution Bulletin* 115: 91-104.
- Pettis, H.M., Rolland, R.M., Hamilton, P.K., **Knowlton, A.R.**, Burgess, E.A., and Kraus, S.D. 2017. Body condition changes from natural factors and fishing gear entanglements in North Atlantic right whales (*Eubalaena glacialis*). *Endangered Species Research*. Vol. 32: 237–249.
- Knowlton, A.R.**, J. Robbins, S. Landry, H. McKenna, S.D. Kraus, and T. B. Werner. 2016. Effects of fishing gear strength on the severity of large whale entanglements. *Conservation Biology* 30: 318-328.
- Schick, R.S., S.D. Kraus, R.M. Rolland, **A.R. Knowlton**, P.K. Hamilton, H.M. Pettis, L. Thomas, J. Harwood, J.S. Clark. 2016. Effects of model formulation on estimates of health in individual right whales (*Eubalaena glacialis*). In: Popper, A.N. and A. Hawkins (eds). *The Effects of Noise on Aquatic Life II*. *Advances in Medicine and Experimental Biology* 875:911-985. Springer Science + Business Media, LLC. NY
- Rolland, R.M., R.S. Schick, H.M. Pettis, **A.R. Knowlton**, P.K. Hamilton, J.S. Clark, S.D. Kraus. 2016. Health in North Atlantic right whales (*Eubalaena glacialis*) over three decades: from individual health to demographic and population health trends. *Marine Ecology Progress Series* 542: 265-282
- Robbins, J., **A.R. Knowlton**, and S. Landry. 2015. Apparent survival of North Atlantic right whales after entanglement in fishing gear. *Biological Conservation* 191: 421-427.
- Laist, D.W., **Knowlton, A.R.**, Pendleton, D. 2014. Effectiveness of mandatory vessel speed limits for protecting North Atlantic right whales. *Endangered Species Research* 23: 133-147.
- Schick, R.S., Kraus, S.D., Rolland, R.M., **Knowlton, A.R.**, Hamilton, P.K., Pettis, H.M., Kenney, R.D., Clark, J.S. 2013.

Using hierarchical bayes to understand movement, health, and survival in the endangered North Atlantic right whale. PLoS ONE 8(6): e64166. 14pp.

- McLellan, W., Berman, M., Cole, T., Costidis, **A. Knowlton**, A., Neilson, J., Pabst, D.A., and Raverty, S. 2013. Case definition: Blunt force trauma induced by vessel collisions with large whales. In Criteria and case definitions for serious injury and death of pinnipeds and cetaceans caused by anthropogenic trauma. Edited by Moore, M.J., van der Hoop, J., Barco, S.G., Costidis, A. M. Gulland, F.M., Jepson, P.D., Moore, K.T., Raverty, S., and McLellan, W.A. Diseases of Aquatic Organisms 103:229-264.
- Knowlton, A.R.**, Hamilton, P.K., Marx, M.K., Pettis, H.M, and Kraus, S.D. 2012. Monitoring North Atlantic right whale *Eubalaena glacialis* entanglement rates: a 30 year retrospective. Marine Ecology Progress Series 466:293-302.
- Lagueux, K.M., Zani, M. A., **Knowlton, A. R.**, and Kraus, S. D. 2011. Response by vessel operators to protection measures for right whales *Eubalaena glacialis* in the southeast US calving ground. Endangered Species Research. 14:69-77.
- Knowlton, A.R.**, Brown, M.W. 2007. Running the Gauntlet: Right Whales and Vessel Strikes. In Kraus, SD and Rolland, RM (eds). The Urban Whale: North Atlantic Right Whales at the Crossroads. Harvard University Press. 514 pp.
- Frasier, T.R., Hamilton, P.K., Brown, M.W., Conger, L.A., **Knowlton, A.R.**, Marx, M.K., Slay, C.K., Kraus, S.D., White, B.N. 2007. Patterns of male reproductive success in a highly promiscuous whale species: the endangered North Atlantic right whale. Molecular Ecology. 16: 5277-5293.
- Hamilton, P.K., **Knowlton, A.R.**, Marx, M.K. 2007. Right Whales Tell Their Own Stories: The Photo-Identification Catalog. In Kraus, SD and Rolland, RM (eds). The Urban Whale: North Atlantic Right Whales at the Crossroads. Harvard University Press. 514 pp.
- Parks, S.E., M.W. Brown, L. A. Conger, P. K. Hamilton, **A. R. Knowlton**, S. D. Kraus, C. K. Slay & P. L. Tyack. 2007. Occurrence, composition and potential functions of North Atlantic right whale (*Eubalaena glacialis*) surface active groups. Marine Mammal Science. 23(4): 868–887.
- Kraus, S.D., Brown, M.W., Caswell, H., Clark, C.W., Fujiwara, M., Hamilton, P.K., Kenney, R.D., **Knowlton, A.R.**, Landry, S., Mayo, C.A., McLellan, W.A., Moore, M.J., Nowacek, D.P., Pabst, D.A., Read, A.J., and Rolland, R.M. 2005. North Atlantic Right Whales in Crisis. Science 309: 561-562.
- Pettis, H.M., Rolland, R.M., Hamilton, P.K., Brault, S., **Knowlton, A.R.**, and Kraus, S.D. 2004. Visual health assessment of North Atlantic right whales (*Eubalaena glacialis*) using photographs. Can. J. Zool. 82(1): 8–19.
- Moore, M.J., Knowlton, A.R., Kraus, S.D., McLellan, W.A., Bonde, R.K. (2004) Morphometry, gross morphology and available histopathology in North Atlantic right whale (*Eubalaena glacialis*) mortalities (1970–2002). J Cetacean Res Manag 6: 199–214
- Knowlton, A.R.**, Kraus, S.D. 2001. Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. J Cetacean Res Manag 2: 193–208
- Brown, M.W., Brault, S., Hamilton, P.K., Kenney, R.D., **Knowlton, A.R.**, Marx, M.K., Mayo, C.A., Slay, C.K., Kraus, S.D. 2001. Sighting heterogeneity of right whales in the western North Atlantic: 1980-1992. J. Cetacean Res. Manage. (Special Issue 2): 245-250.
- Kraus, S.D., Hamilton, P.K., Kenney, R.D., **Knowlton, A.R.**, Slay, C.K. 2001. Reproductive parameters of the North Atlantic right whale. J. Cetacean Res. Manage. (Special Issue 2): 231-236.
- Laist, D.W., **Knowlton, A.R.**, Mead, J.G., Collet, A.S. and Podesta, M. 2001. Collisions between ships and whales. Marine Mammal Science, 17: 35-75.
- Malik, S., Brown, M.W., Kraus, S.D., **Knowlton, A.R.**, Hamilton, P.K., White, B.N. 1999. Assessment of mitochondrial DNA structuring and nursery use in North Atlantic right whales (*Eubalaena glacialis*). C. J. Zool. 77: 1217-1222.
- Hamilton, P.K., **Knowlton, A.R.**, Marx, M.K., Kraus, S.D. 1998. Age structure and longevity in North Atlantic right whales (*Eubalaena glacialis*) and their relation to reproduction. Mar. Ecol. Prog. Ser. 171: 285-292.
- Knowlton, A.R.**, S.D. Kraus, and R.D. Kennney. 1994. Reproduction in North Atlantic right whales (*Eubalaena glacialis*). Canadian Journal of Zoology. Vol. 72:1297-1305.
- Knowlton, A.R.**, J. Sigurjonsson, J.N. Ciano, and S.D. Kraus. 1992. Long-distance movements of North Atlantic right whales, (*Eubalaena glacialis*). Mar. Mamm. Sci. 8(4): 397-405.