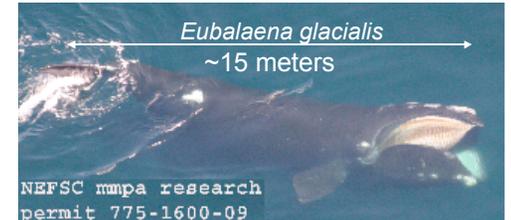
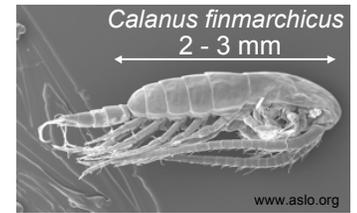


Mean copepod concentration indicates relative abundance of North Atlantic right whales on seasonal and interannual timescales: options for operational forecasts of right whale occurrence

DE Pendleton^{1,2,3}, AJ Pershing^{2,3}, PJ Sullivan¹, MW Brown^{4,5}, CA Mayo⁵, RD Kenney⁶, NR Record^{1,2}, TVN Cole⁷

¹Cornell University, Ithaca NY
²University of Maine, Orono ME
³Gulf of Maine Research Institute, Portland ME
⁴New England Aquarium, Boston MA

⁵Provincetown Center for Coastal Studies, Provincetown MA
⁶University of Rhode Island, Narragansett RI
⁷National Marine Fisheries Service, Woods Hole MA



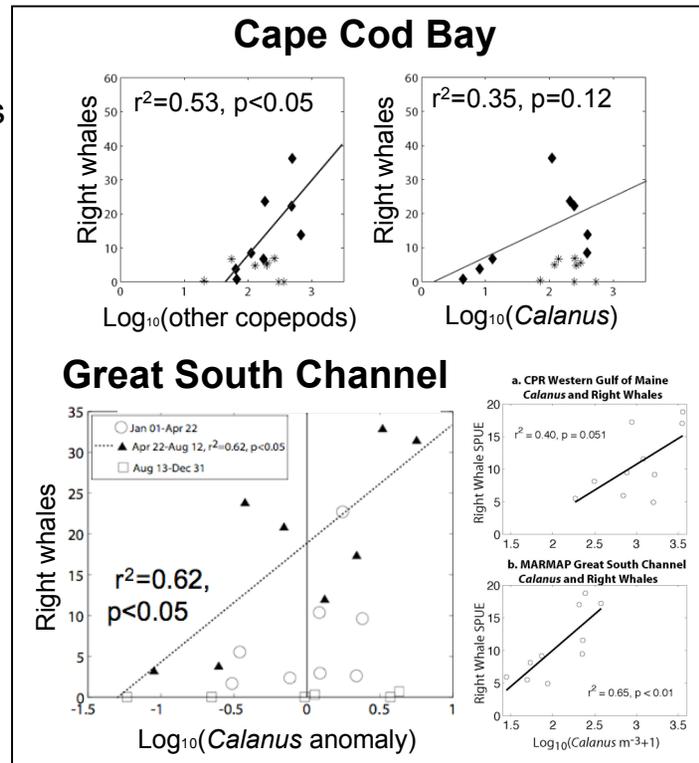
Motivation

- ~350 North Atlantic right whales remain
- Right whale deaths are caused by collisions with ships and entanglements in fishing gear
- Efforts to reduce human caused right whale death depend on knowing when and where whales occur

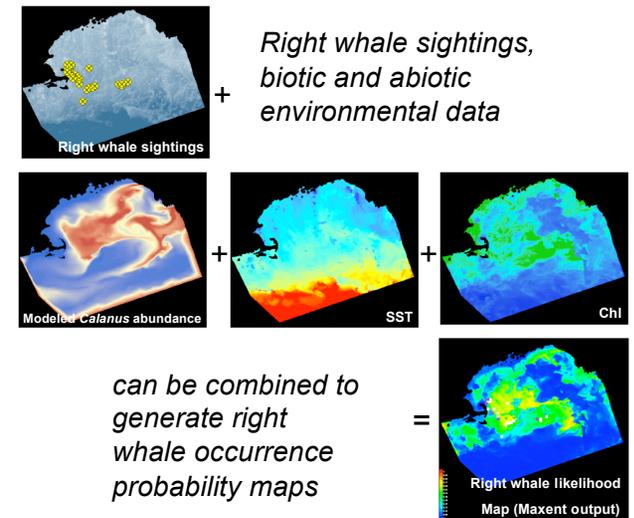
Facts

- Right whales feed on ultra dense patches of copepods
- Dense copepod patches are not detected by standard sampling programs

Hypothesis: Right whale abundance is a function of regional-scale mean copepod concentration



Moving from a “nowcast” to a forecast with species distribution models (SDMs)



SDM challenges

- Coupling SDMs to biological-physical models of Calanus distributions
- Running SDMs on an operational time scale to make near-term predictions of right whale distributions



Mean copepod concentration is a good indicator of right whale abundance