

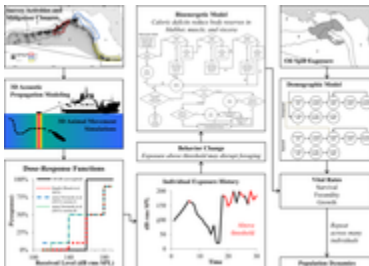


April 2019

## 2019 Issue #1

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### Population consequences of disturbance by offshore oil and gas activity for endangered sperm whales, *Farmer et al.*



The impacts of exposure to Deepwater Horizon oil and chronic anthropogenic noise caused by geological and geophysical (G&G) surveys was estimated

for Northern Gulf of Mexico sperm whales (*Physeter macrocephalus*) using a Population Consequences of Disturbance (PCoD) theoretical framework. This framework evaluated how impacts to individual fitness by oil exposure and/or behavioral disturbance resulted in population-level effects. PCoD models compared three

### Recent Publications

**NEW:** An interim science report by the National Academy of Sciences on coral interventionist research.

[\*\*A Research Review of Interventions to Increase the Persistence and Resilience of Coral Reefs\*\*](#)

### Environment, Climate, & Ecosystem Effects

**Hoffman et al.**

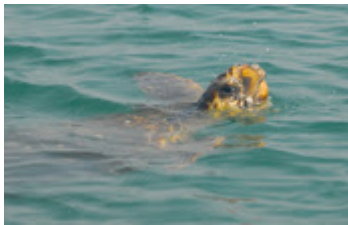
A global cline in a colour polymorphism suggests a

regimes (baseline, spill, and spill and disturbance) under six resilience scenarios. PCoD models incorporated (1) survey activities and mitigation closures, (2) three-dimensional propagation of sound and simulations of animal movement, (3) dose-response functions, (4) bioenergetics transfer functions, (5) oil exposure models, and (6) demographic models to assess vital rates and stock population dynamics. All model simulations suggested significant reductions in the relative fitness of reproductive females. Oil exposure was projected to reduce survival and reproductive success, and cause the stock to decline by 26% by 2025. Precautionary simulations predicted that 4.4% of the stock may reach terminal starvation due to behavioral disturbance associated with future G&G surveys, resulting in a 25% greater stock decline than that predicted from oil spill exposure alone.

[Journal article](#) |

*Photo courtesy of Nick Farmer*

## Characterizing sex ratios of sea turtle populations, *Shertzer et al.*



Determining adult sea turtle operational sex ratios typically requires expensive laparoscopic examination of the gonads and endocrinological analysis of

circulatory plasma testosterone concentrations. To improve estimation, the authors employed a Bayesian mixture model to classify the sex of juvenile loggerhead sea turtles from a dataset containing the following variables: juvenile testosterone concentration levels (based on 1401 samples), carapace length, and water temperature data collected from 1997-2010 on foraging grounds in Core and Pamlico Sounds, North Carolina, USA. Of these, 170 samples included laparoscopically-confirmed sexes and were used as model training data. The authors considered multiple model configurations, and the one with best performance fit the natural log of testosterone concentration as a function of sex to water temperature with a normally distributed error. Juvenile sea turtle sex ratio was 81% female with 94% classification accuracy. Model performance analysis suggested that only 100-140 turtle laparoscopies would be required to

limited contribution of gene flow towards the recovery of a heavily exploited marine mammal. 2018. *Royal Society Open Science*. [Read More](#)

## Population Studies

### C.J. Michel

Decoupling outmigration from marine survival indicates outsized influence of streamflow on cohort success for California's Chinook salmon populations. 2018. *Canadian Journal of Fisheries and Aquatic Sciences*. [Read More](#)

### Stoffel et al.

Recent demographic histories and genetic diversity across pinnipeds are shaped by anthropogenic interactions and mediated by ecology and life-history. 2018. *Nature Communications*. [Read More](#)

### Shamblin et al.

Mixed stock analyses indicate population-scale connectivity effects of active dispersal by surface-pelagic green turtles. 2018. *Marine Ecology Progress Series*. [Read More](#)

## Conservation

### Stacy et al.

Chronic debilitation in stranded loggerhead sea turtles (*Caretta caretta*) in the southeastern United States: morphometrics and clinicopathological findings. 2018. *Plos One*. [Read More](#)

### Amaya et al.

Large-scale sea turtle mortality events in El Salvador attributed to paralytic shellfish toxin-

sufficiently establish testosterone reference training data for the model. This new method minimizes invasive sampling, provides guidance for future studies estimating sex ratios of sea turtle demography, and enhances conservation and management efforts.

[Journal article](#) |

*Photo courtesy of K. Shertzer. NMFS ESA permit #16733*

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## Environmental conditions and herbivore biomass determine coral reef benthic community composition: implications for quantitative baselines, *Robinson et al.*



This study explores the relative importance of biotic and abiotic factors

on benthic coral reef communities. The authors used underwater images, visual census, and remote sensing data from 1,566 sites across 34 islands and atolls spanning the central Pacific Ocean. Boosted regression tree models assessed the relative importance of four abiotic variables (sea surface temperature, aragonite saturation state, productivity, and wave energy), three biotic variables (all related to herbivore grazing), and a proxy for anthropogenic effects (based on whether an island was inhabited or not), on a 'reef-builder index' (based on the relative abundances of calcifiers, i.e., hard coral, crustose coralline algae as opposed to turf and fleshy macroalgae). Several important conclusions emerged. In general, at the site level, abiotic factors outweigh or match grazing pressure as predictors of coral community composition. Reefs tend to be dominated by calcifiers in warmer, more productive, aragonite saturated, low wave-energy waters and when scraping, excavating, and/or cropping herbivores are abundant. More specifically, as long as a minimum amount of grazing fish biomass (10-20 kg ha<sup>-1</sup>) exists, abiotic factors predict the coral community composition. As opposed to other single-island-scale studies, which have found that the abiotic versus biotic factors decouple based on human disturbance, this was not seen at a regional scale. The quantitative threshold along with the preferred type of grazing fish biomass is particularly useful for coral reef and reef fisheries management.

producing algae blooms. 2018. *Frontiers in Marine Science*. [Read More](#)

### Wildermann et al.

Informing research priorities for immature sea turtles through expert elicitation. 2018. *Endangered Species Research*. [Read More](#)

## Methods

### Fiedler et al.

Prediction of Large Whale Distributions: A Comparison of Presence–Absence and Presence-Only Modeling Techniques. 2018. *Frontiers in Marine Science*: [Read More](#)

## Foraging

### Avens and Dell'Amico

Evaluating viability of sea turtle foraging populations at high latitudes: age and growth of juveniles along the French Atlantic coast. 2018. *Endangered Species Research*. [Read More](#)

## Habitat

### Witherington et al.

Characterizing a sea turtle developmental habitat using Landsat observations of surface-pelagic drift communities in the eastern Gulf of Mexico. 2018. *IEEE Journal*. [Read More](#)

### Henderson et al.

Estimating spatial-temporal differences in Chinook salmon outmigration survival with habitat and predation related covariates. 2018. *Canadian*

[Journal article](#) |

Photo courtesy of I. Williams

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## Novel anelloviruses identified in buccal swabs of Antarctic fur seals, *Crane et al.*



Viral diversity characterization is essential for protecting marine megafauna for whom infectious diseases are a leading cause of mass mortality. A viral metagenomics

approach was applied to identify circular DNA viruses in buccal swab samples from 37 Antarctic fur seals (*Arctocephalus gazella*) breeding on Livingston Island, Antarctica during the 2016/2017 austral summer. The authors compared the found genomes with 940 anellovirus genomes from GenBank to find five full, new, anellovirus genomes. Of these, the authors determined that there were two new putative species lineages, torque teno *Arctocephalus gazella* virus (TTAgV) -1 and -2. These lineages are most closely related to and cluster with a previously identified anellovirus associated with California sea lions (*Zalophus californianus*). The ORF1 protein of TTAgVs share 26–41% amino acid similarity to the ORF1 protein of other previously identified pinniped-associated anelloviruses. This study presents the first report of anelloviruses associated with Antarctic fur seals, expanding the number of pinniped species known to be infected with anelloviruses to four (Antarctic fur seals, California sea lions, harbor seals, and Weddell seals).

[Journal article](#) |

Photo courtesy of NOAA

The **Protected Species Science Branch (PSSB)** within the NOAA Fisheries Office of Science and Technology mission is to advocate for protected species science within and outside NOAA Fisheries by investing in research and development efforts and to communicate and coordinate agency science in support of species conservation and recovery. We do this by coordinating closely with the six Fisheries Science Centers, the Office of Protected Resources, and other NOAA Headquarters Offices and internal and external partners.

This newsletter is intended to summarize the latest research on protected species from scientific publications that include one or more NOAA Fisheries authors. It will be distributed

quarterly with alternate issues highlighting research from the East and West Coasts centers and offices.

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