

NOAA Scientific Publications Report



MAY 11, 2013

HIGHLIGHTED ARTICLE

Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales

Geographic patterns of genetic differentiation among killer whales in the northern North Pacific

Longitudinal and seasonal structure of the ionospheric equatorial electric field

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A thin soup: extraction and amplification of DNA from DMSO and ethanol used as preservative for cetacean tissue samples

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Geophysical data stewardship in the 21st Century at the National Geophysical Data Center (NGDC)

Coastal zone management: using no-build areas to protect the shorefront

AUTHORS

P. B. Conn (NMFS/NMML) and G. K. Silber (NMFS/OPR)

PUBLICATION DATE

Published: April 2013

TITLE

Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales

JOURNAL

Ecosphere

SIGNIFICANCE

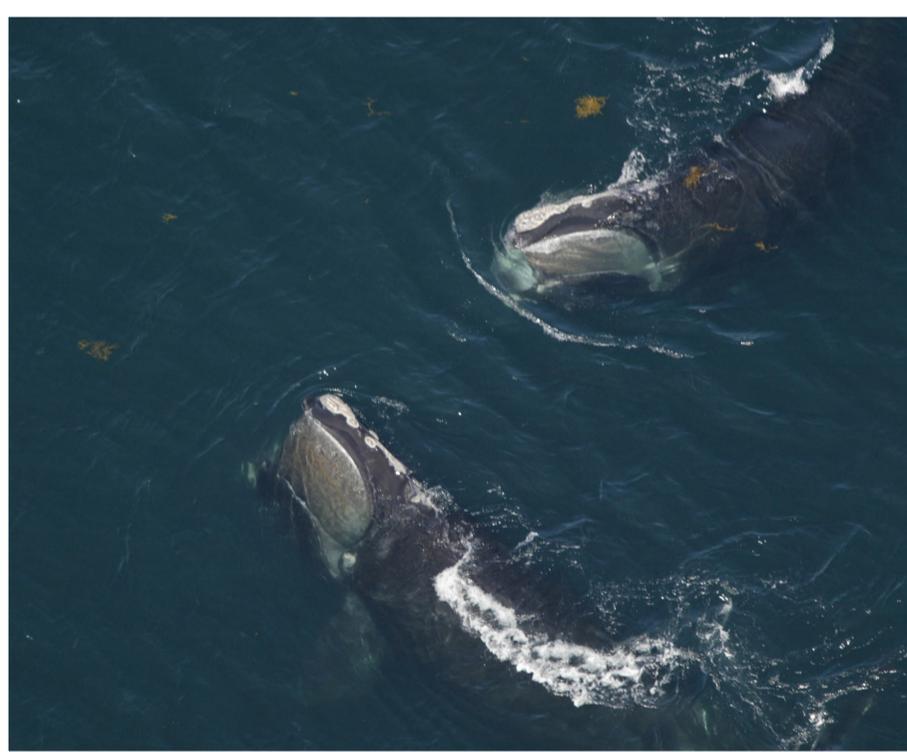
- Collisions with vessels are a serious threat to a number of endangered large whale species, particularly the North Atlantic right whale.
- The authors estimated that vessel speed restrictions put in place by NOAA in 2008 reduced total ship strike mortality risk levels for North Atlantic right whales by 80–90%.
- These findings indicate that vessel speed limits are a powerful tool for reducing anthropogenic mortality risk for North Atlantic right whales.

SUMMARY

In late 2008, NOAA issued mandatory time-area vessel speed restrictions along the U.S. eastern seaboard in an effort to mediate collision-related mortality of right whales (*Eubalaena glacialis*). All vessels 65 feet and greater in length are restricted to speeds of 10 knots or less during seasonally implemented regulatory periods. The authors modeled mortality risk of North Atlantic right whale when the vessel restrictions were and were not in effect, including estimation of the probability of lethal injury given a ship strike as a function of vessel speed, estimation of the effect of transit speed on the instantaneous rate of ship strikes, and a consideration of total risk reduction. Logistic regression and Bayesian probit analyses indicated a significant positive relationship between ship speed and the probability of a lethal injury. The authors found that speeds of vessels that struck whales were consistently greater than typical vessel speeds for each vessel type and regulatory period studied. A use-availability model fit to these data provided strong evidence for a linear effect of transit speed on strike rates. Overall, authors estimated that vessel speed restrictions reduced total ship strike mortality risk levels by 80–90%, with levels that were closer to 90% in the latter two of the four active vessel speed restriction periods studied. This is the most comprehensive assessment to date of the utility of vessel speed restrictions in reducing the threat of vessel collisions to large whales, and the authors' findings indicate that vessel speed limits are a powerful tool for reducing anthropogenic mortality risk for North Atlantic right whales.

LINK TO PAPER

<http://www.esajournals.org/doi/pdf/10.1890/ES13-00004.1>



North American Right Whales



AUTHORS

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PUBLICATION DATE

Expected By end of 2013

TITLE

Geographic patterns of genetic differentiation among killer whales in the northern North Pacific

JOURNAL

Journal of Heredity

SIGNIFICANCE

- This paper provides further evidence of divergence between killer whale types in the North Pacific
- The results support a revision of stocks of killer whales in Alaska

SUMMARY

Detecting population boundaries is difficult and has constrained the conservation and management of highly mobile, wide-ranging marine species, such as killer whales (*Orcinus orca*). In this study, DNA testing was conducted to test population subdivisions from a decade of killer whale surveys across the northern North Pacific. A total of 462 skin biopsies were collected from wild killer whales primarily between 2001 and 2010 from the northern Gulf of Alaska to the Sea of Okhotsk. Whales representing both the fish eating 'resident' and the mammal-eating 'transient' (or Bigg's) killer whales were sampled. Divergence of the two ecotypes was supported by DNA testing; both mtDNA and microsatellites. Geographic patterns of genetic differentiation were supported by significant regions of genetic discontinuity providing evidence of population structuring within both ecotypes, and corroborating direct observations of restricted movements of individual whales. In the Aleutian Islands (Alaska) subpopulations were largely delimited by major oceanographic boundaries for resident killer whales. While Amchitka Pass represented a major subdivision for transient killer whales between the central and western Aleutian Islands, several smaller subpopulations were evident throughout the Eastern Aleutians and Bering Sea. Support for seasonally sympatric transient subpopulations around Unimak Island suggests isolating mechanisms other than geographic distance within this highly mobile top predator.



Killer Whales (*Orcinus orca*)



AUTHORS

P. Alken, A. Chulliat, and S. Maus (NOAA/NGDC/CIRES)

PUBLICATION DATE

Expected March 28, 2013

TITLE

Longitudinal and seasonal structure of the ionospheric equatorial electric field

JOURNAL

Journal of Geophysical Research: Space Physics

SIGNIFICANCE

- Electric fields in the ionosphere play a crucial role in the dynamics of ionospheric phenomena and our ability to predict space weather.
- Direct measurements of these fields have historically proven difficult and have been restricted to sparse ground radars and a very few satellite missions.
- This paper demonstrates a method of reliably estimating the ionospheric electric field from geomagnetic field measurements from satellites and ground observatories.
- This will allow the building of much larger databases of these important measurements, and will allow the study of ionospheric electric fields to a degree not possible previously.

SUMMARY

The daytime eastward equatorial electric field (EEF) in the upper atmosphere (ionospheric E region) plays an important role in equatorial upper atmospheric dynamics (It is responsible for driving the equatorial electrojet (EEJ) current system, equatorial vertical ion drifts, and the equatorial ionization anomaly). Due to its importance, it is important to accurately measure and model the EEF. In this work we propose a method of estimating the EEF using CHAMP satellite data. Station pairs in both Africa and South America were used for this study. The current profiles were inverted for estimates of the EEF by solving the governing electrostatic equations. We compare our results with other satellite data (the Ion Velocity Meter (IVM) instrument on board the Communication/Navigation Outage Forecasting System) and find high correlations of about 80%, however, we also find a constant offset of about 0.3 mV/m between the two data sets in Africa. Further investigation is needed to determine its cause. We compare the EEF structure in Africa and South America and find differences which can be attributed to the effect of atmospheric nonmigrating tides. This technique can be extended to any pair of ground magnetometer stations which can capture the daytoday strength of the EEJ.



AUTHORS

R. S. McBride (NMFS/NEFSC) S. Somarakis, G. R. Fitzhugh (NMFS/SEFSC), A. Albert, N. A. Yaragina, M. J. Wuenschel (NMFS/NEFSC), A. Alonso-Fernández, and G. Basilone

PUBLICATION DATE

Expected Summer 2013

TITLE

Energy acquisition and allocation to egg production in relation to fish reproductive strategies

JOURNAL

Fish and Fisheries

SIGNIFICANCE

- This paper recognizes established ideas that some fishes are 'capital breeders,' (use stored resources from previous feeding to grow eggs), and other fishes are 'income breeders,' (immediately convert consumed energy into eggs), but explores how many other fishes mix both breeding strategies, which has largely been under-appreciated in the literature.
- These breeding strategies are aligned with certain environmental conditions or certain spatial and temporal scales, confirming that annual fish egg production -- and possibly fish recruitment -- can respond predictably to environmental productivity.
- Whether more eggs produced mean more fish to harvest will require additional study to confirm, and if so, additional time to make it practical in terms of providing management advice

SUMMARY

Oogenesis in fishes follows a universal plan yet, due to differences in the synchrony and rate of egg development, spawning frequency varies from daily to once in a lifetime. Some species spawn and feed in separate areas, during different seasons, by storing energy and drawing on it later for reproduction (i.e., capital breeding). Other species spawn using energy acquired locally, throughout a prolonged spawning season, allocating energy directly to reproduction (i.e., income breeding). Capital breeders tend to ovulate all at once, and are more likely to be distributed at boreal latitudes. Income breeding allows small fish to overcome allometric constraints on egg production. Income breeders can recover more quickly when good feeding conditions are reestablished, which is a benefit to adults regarding bet-hedging spawning strategies. Many species exhibit mixed capital and income breeding patterns. An individual's position along this capital-income continuum may shift with ontogeny or in relation to environmental conditions, so breeding patterns are a conditional reproductive strategy. Poor-feeding environments can lead to delayed maturation, skipped spawning, fewer spawning events per season, or fewer eggs produced per event. In a few cases, variations in feeding environments appear to affect recruitment variability. These flexible processes of energy acquisition and allocation allow females to prioritize their own condition over their propagules' condition at any given spawning opportunity, thereby investing energy cautiously to maximize lifetime reproductive value. These findings have implications for temporal and spatial sampling designs, for measurement and interpretation of fecundity, and for interpreting fishery and ecosystem assessments.



AUTHORS

A. K. Hilting, C. A. Currin, R. K. Kosaki (NOS/NCCOS and ONMS)

PUBLICATION DATE

Expected April 2013

TITLE

Evidence for benthic primary production support of an apex predator–dominated coral reef food web

JOURNAL

Marine Biology

SIGNIFICANCE

- The authors looked at the stable isotopes of 599 primary producers and consumers and their results have immediate implications for management of healthy coral reef resources and the restoration of unhealthy reefs.
- “Anything affecting native algal species, such as sedimentation, dredging, or the spread of non-native invasive algae, will ultimately impact the abundance of prized food fish such as snapper or jacks,” said Randall Kosaki, NOAA Deputy Superintendent of Papahānaumokuākea, and a co- author on the study. “Taking care of the reef itself will help to ensure healthy fish populations.”
- Because the PMNM ecosystem was found to be heavily dependent on algae growing on the sea floor, any impacts to the reef and its algae - for example: damage from bottom trawling, coral bleaching or other threats - could influence the organisms higher on the food web.

SUMMARY

Five hundred and ninety-nine primary producers and consumers in the Papahānaumokuākea Marine National Monument (PMNM) were sampled for carbon and nitrogen stable isotope composition to elucidate trophic relationships in a relatively unimpacted, apex predator–dominated coral reef ecosystem. A one-isotope ($\delta^{13}\text{C}$), two-source (phytoplankton and benthic primary production) mixing model provided evidence for an average minimum benthic primary production contribution of 65 % to consumer production. Primary producer $\delta^{15}\text{N}$ values ranged from -1.6 to 8.0 ‰ with an average value (2.1 ‰) consistent with a prevalence of N_2 fixation. Consumer group $\delta^{15}\text{N}$ means ranged from 6.6 ‰ (herbivore) to 12.1 ‰ (*Galeocerdo cuvier*), and differences between consumer group $\delta^{15}\text{N}$ values suggest an average trophic enrichment factor of 1.8 ‰ $\delta^{15}\text{N}$. Based on relative $\delta^{15}\text{N}$ values, the larger *G. cuvier* may feed at a trophic position above other apex predators.



AUTHORS

Zador S., G. Hunt, T. TenBrink, K. Aydin (NMFS/AKFSC)

PUBLICATION DATE

Expected June 12, 2014

TITLE

Combined seabird indices show lagged relationships between environmental conditions and breeding activity

JOURNAL

Marine Ecology Progress Series

SIGNIFICANCE

- Some environmental conditions observed in the eastern Bering Sea could be related to lower seabird productivity.
- Oceanographic and prey variables may serve as leading indicators of seabird breeding activity in the eastern Bering Sea.

SUMMARY

Ecosystem managers and policy-makers need ecological indicators that have a sound scientific basis and can be used to inform them of the ecological state of the marine environment. In this study, we integrate existing data on seabird reproductive performance into two simplified measures of seabird trends in the eastern Bering Sea. We then relate these indices to climate, oceanography, and food supply. These indices thus provide a means of assessing the status and trends of marine birds and enable testing of hypotheses concerning the effects of environmental factors on this suite of predators. We used principal components analysis to integrate 17 data sets on the reproductive effort of common murre *Uria aalge*, thick-billed murre *U. lomvia*, black-legged kittiwake *Rissa tridactyla*, red-legged kittiwake *R. brevirostris*, and red-faced cormorant *Phalacrocorax urile*. Two strong patterns were evident in the leading principal components (PC). In general, PC1 represented the hatch timing and reproductive success of diving foragers; PC2 represented kittiwake reproductive success trends. Together, PC1 and PC2 accounted for 65.2% of the variability in the seabird reproductive performance data. Time series analysis of these indices against selected environmental variables showed significant, but in most cases, lagged relationships. Warmer bottom and surface temperatures, greater wind mixing and higher stratification correlated with delayed and lower productivity for most seabirds up to 2 years later. Later ice retreat was correlated with lower kittiwake productivity 2 years later, whereas higher local abundances of age-1 walleye pollock *Theragra chalcogramma* were linked to higher kittiwake productivity the following year. Because the observable impacts of environmental forcing on seabirds may be delayed, oceanographic and prey variables may serve as leading indicators of seabird breeding activity in the eastern Bering Sea.



AUTHORS

E. Galimany, J. M. Rose, M. S. Dixon, and G. H. Wikfors
(NMFS/NEFSC)

PUBLICATION DATE

Accepted April 13, 2013

TITLE

*Quantifying feeding behavior of ribbed mussels (*Geukensia demissa*) in two urban sites (Long Island Sound, USA) with different seston characteristics*

JOURNAL
Estuaries and Coasts

SIGNIFICANCE

- The ribbed mussel, a non-commercial species, can be cultured and used for nutrient bioextraction in coastal waters where bacteriological water-quality criteria prohibit human consumption of shellfish found there
- This paper presents filtration and feeding data needed to project the uptake, processing, and assimilation of seston components by ribbed mussels
- The Hunts Point (New York City) site used as one of the study locations was found to not be eutrophic and nitrogen limited, as expected, which suggests that assumptions about environmental conditions leading to hypoxia in western Long Island Sound need to be reconsidered.

SUMMARY

The Atlantic ribbed mussel, *Geukensia demissa*, is found in salt marshes along the North American Atlantic Coast. As a first step to study the possibility of future cultivation and harvest of ribbed mussels for nutrient removal from eutrophic urban environments, the feeding behavior of ribbed mussels in situ was studied from July to October 2011. Two locations approximately 80 km apart were used as study sites: Milford Harbor, Connecticut and Hunts Point, New York. Total particulate matter was higher at Hunts Point than at Milford Harbor, but the organic content was higher at Milford than at Hunts Point. The relatively low quantity of organic content in Hunts Point seston (minute material moving in water and including both living organisms and nonliving matter) resulted in a much higher production of pseudofeces by mussels. Mussel clearance and absorption rates were higher at Milford Harbor than at Hunts Point. Nevertheless, mussels at both sites had the same absorption efficiency, suggesting that mussels are able to adapt to conditions at both locations. Ribbed mussels decreased clearance rate when the seston quantity was high at both sites. At Hunts Point, ribbed mussels increased the gut transit time of ingested particles when the amount of inorganic particulates in the water increased. This study does not quantify nutrient removal capacity of *G. demissa*; however, the environmental tolerance demonstrated here, and current lack of commercial harvest, suggest that this species may be a good candidate for nutrient bioextraction in highly-impacted urban environments.



AUTHORS

K. M. Robertson, J. Minich, A. J. Bowman, and P. A. Morin (NMFS/SWFSC)

PUBLICATION DATE

Accepted April 22, 2013

TITLE

A thin soup: extraction and amplification of DNA from DMSO and ethanol used as preservative for cetacean tissue samples

JOURNAL

Conservation Genetics Resources

SIGNIFICANCE

- Method paper describing improved DNA extraction techniques that increase the amount of obtainable DNA from preserved samples
- The ability to obtain more usable DNA from smaller preserved samples (2-18 years old) has the potential to increase the number of samples that can be analyzed for conservation genetic projects

SUMMARY

Two popular tissue preservatives, 100% ethanol and 20% salt saturated dimethyl sulfoxide (DMSO) solution, were tested for the existence of amplifiable, free-floating DNA after 2 to 18 yrs of tissue storage. The authors found that short mitochondrial DNA were consistently amplified and of high enough quality to allow for genetic sequencing from DMSO preservative, while nuclear DNA amplification was limited and inconsistent. Amplification of both mitochondrial DNA and nuclear DNA failed most of the time for the ethanol samples, most likely due to DNA degradation over time.



AUTHORS

E. A. Araujo-Pradere, D. Buresova, D. J. Fuller-Rowell (NESDIS/NGDC), and T. J. Fuller-Rowell

PUBLICATION DATE

Publication Date: February 2013

TITLE

Initial results of the evaluation of IRI $h_m F_2$ performance for minima 22-23 and 23-24

JOURNAL

Advances in Space Research

SIGNIFICANCE

- This paper seeks to improve the empirical IRI ionospheric model by including measurements from the last solar minimum, a period of extreme solar quiet conditions.
- IRI is, as its name states, an international reference model for the ionosphere. Incremental improvements to IRI are handled within a spiral developmental framework.

SUMMARY

The performance of the International Reference Ionosphere (IRI) in predicting the height of the maximum of electron density ($h_m F_2$) has been evaluated for similar geomagnetic latitudes stations in the northern hemisphere (NH) and southern hemisphere (SH), and for the last two minima. As truth-sites, the digisonde stations of Millstone Hill (42.6° N, 288.5° E), USA, and Grahamstown (33.3° S, 26.5° E), South Africa, were considered. A monthly averaged diurnal variation was obtained from all the observations and model output in the months studied, and the corresponding difference was also calculated. For this initial study, data from summer and winter in the NH and SH were selected for the solstice comparison and October data for both stations were used to represent equinox conditions. The choice of these periods depended on data availability and quality. The results show that for the earlier minimum in 1996, in general IRI $h_m F_2$ values are in reasonable agreement with the observations. The exceptions are October and December in the SH, where IRI $h_m F_2$ tends to high, particularly on the dayside, and also July for which the daytime measured values tend to be larger than the IRI ones. For the recent minimum in 2008, IRI tends to over-estimate the $h_m F_2$ in most of the observations. The results support the general assertion that thermospheric temperatures were cooler during the last solar minimum as a consequence of an unusually low, and extended, minimum in solar extreme-ultraviolet flux, and in response to continually increasing long-term trend in anthropogenic carbon dioxide. The cooler temperatures not only decrease density at a fixed height, but also make the corresponding contraction of the atmosphere lower the height of the F-region peak.

LINK TO PAPER

<http://www.sciencedirect.com/science/article/pii/S0273117712001093>



AUTHORS

F. Whitney, S. Bograd (NMFS/SWFSC), and T. Ono

PUBLICATION DATE

Expected May 15, 2013

TITLE

Nutrient enrichment of the subarctic Pacific Ocean pycnocline

JOURNAL

Geophysical Research Letters

SIGNIFICANCE

- Nutrients are accumulating in the pycnocline waters of the subarctic Pacific Ocean.
- Pycnocline enrichment maintains winter nutrient levels in the surface layer.
- Shallower remineralization is possible due to habitat compression or reduced sinking rates.

SUMMARY

At the end of the global thermohaline circulation, the subarctic Pacific is the richest nutrient repository in the world oceans. Trends towards lower oxygen and higher nutrients in waters below the surface layer (the pycnocline) have been observed in recent decades. We assess these trends using data from four programs and suggest the enrichment of pycnocline nitrate (200 Gmol y^{-1}) is essential in keeping supply to the surface ocean constant, despite increasing upper ocean stratification. A nitrate budget helps identify possible vertical processes that could account for nutrient redistribution. We hypothesize that warming and oxygen loss in the deeper pycnocline, arising from ice loss in the Okhotsk Sea, have initiated a largely vertical redistribution of nutrients due to compression of vertical migrator habitat and/or changes in dissolution of sinking particulates. Coupled climate-ecosystem models will need to incorporate these processes to more fully understand projected changes in the subarctic Pacific.



AUTHORS

D. M. Frechette, A. L. Collins, J. T. Harvey, S. A. Hayes, D. D. Huff, A. W. Jones, A. E. Langford, J. W. Moore, A. K. Osterback, N. A. Retford, W.H. Satterthwaite, and S. A. Shaffer (NMFS/SWFSC)

PUBLICATION DATE

Expected November 2013

TITLE

*A bioenergetics approach to assessing potential impacts of avian predation on juvenile steelhead (*Oncorhynchus mykiss*) during freshwater rearing*

JOURNAL

North American Journal of Fisheries Management

SIGNIFICANCE

- Our results suggest that predation by avian species, particularly mergansers, may be an important source of mortality for threatened steelhead populations in central California and should be addressed further in future research and recovery planning.

SUMMARY

Avian predation of juvenile salmonids is an important source of mortality in freshwater and estuarine habitats when birds and salmonids overlap in space and time. Here we assessed the potential impact of avian predation upon juvenile steelhead (*Oncorhynchus mykiss*) in a coastal watershed in central California. We conducted stream surveys between 2008 and 2010 to determine the composition, distribution, and density of piscivorous birds in areas that provide rearing habitat for juvenile steelhead. The most commonly sighted species were common mergansers (*Mergus merganser*) and belted kingfishers (*Megacyrle alcyon*). Density of avian predators varied spatially and temporally but were greatest in the estuary regardless of season and decreased with increasing distance from the estuary. We then we applied a bioenergetics model to estimate potential predation on juvenile steelhead in the Scott Creek estuary by the two most commonly observed predators, mergansers and kingfishers, in the absence of local predator diet data. We used bird count data from stream surveys and fish abundance and the length frequency distribution of steelhead in the estuary to predict the extent of predation for different values of steelhead in bird diet. With the contribution of steelhead to the diet ranging from 20% to 100%, the population of kingfishers foraging in the Scott Creek estuary had the potential to remove 3 to 17% of annual production, whereas mergansers had the potential to remove 5 to 54% of annual steelhead production. Our results suggest that predation by avian species, particularly mergansers, may be an important source of mortality for threatened steelhead populations in central California and should be addressed further in future research and recovery planning.



AUTHORS

R. A. Heintz, E. Siddon, E. F. Farley Jr. and J. M. Napp
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PUBLICATION DATE

Accepted February 28, 2013

TITLE

*Correlation between recruitment and fall condition of age-0 pollock (*Theragra chalcogramma*) from the eastern Bering Sea under varying climate conditions*

JOURNAL
Deep Sea Research II

SIGNIFICANCE

- Recruitment of age-1 in walleye pollock can be predicted from the total energy content of young of the year prior to winter.
- Climate influences the condition of juvenile pollock in fall via changes in the quality and quantity of the prey field.
- Recruitment of pollock to age-1 in the southeastern Bering Sea is improved when environmental conditions produce large, energy dense young of the year pollock in the fall.

SUMMARY

Fishery managers require an understanding of how climate influences recruitment if they are to separate the effects of fishing and climate on production. The south-eastern Bering Sea offers opportunities to understand climate effects on recruitment because inter-annual oscillations in ice coverage set up warm or cold conditions for juvenile fish production. Depth-averaged temperature anomalies in the Bering Sea indicate the last nine years have included 3 warm (2003–2005), an average (2006), and 5 cold (2007–2011) years. We examined how these climatic states influenced the diet quality and condition (size, energy density and total energy) of young-of-the-year (YOY) pollock (*Theragra chalcogramma*) in fall. The implications of fall condition were further examined by relating condition prior to winter to the number of age-1 recruits-per-spawner the following summer (R/S). The percentage of lipid in pollock diets was three-fold higher in cold years compared with warm years, but stomach fullness did not vary. Consequently, fish energy densities were 33% higher in cold years ($P < 0.001$) than in warm years. In contrast, neither fish size ($P = 0.666$), nor total energy ($P = 0.197$) varied with climatic condition. However, total energy was significantly ($P = 0.007$) and positively correlated with R/S ($R^2 = 0.736$). We conclude that recruitment to age-1 in the southeastern Bering Sea is improved under environmental conditions that produce large, energy dense YOY pollock in fall.



AUTHORS

A. Andrews (NMFS/PIFSC), R. Leaf, L. Rogers-Bennett,
M. Neuman (NMFS/SWRO), H. Hawk, and G. Cailliet

PUBLICATION DATE

Expected June or July 2013

TITLE

*Bomb radiocarbon dating of the endangered white abalone (*Haliotis sorenseni*): investigations of age, growth and lifespan*

JOURNAL

Marine & Freshwater Research

SIGNIFICANCE

- Bomb radiocarbon dating indicated was variable among individuals with a maximum estimated age of 27 years; abalone lifespan was estimated at ~42 years.
- Lifespan estimates for abalone sampled in this study are consistent with earlier research, providing greater confidence in proposed measures in the ESA white abalone recovery plan (NMFS, 2008).
- Results support the urgency of actions to restore the white abalone resource in keeping with the recovery plan.

SUMMARY

Understanding basic life history characteristics of white abalone (*Haliotis sorenseni*), such as estimated life span, is critical to making informed decisions regarding the recovery of this endangered species. All predictive modeling tools used to forecast the status and health of populations following restoration activities depend upon a validated estimate of adult lifespan. Of the seven *Haliotis* species in California, white abalone is considered to have the highest extinction risk and was the first marine invertebrate listed as an endangered species under the Federal Endangered Species Act (ESA). Lifespan was previously estimated from observations of early growth, but no study has generated ages for the largest white abalone. To address questions of age and growth, bomb radiocarbon ($\Delta^{14}\text{C}$) dating was used on shells from large white abalone. Measured bomb $\Delta^{14}\text{C}$ levels were compared to regional $\Delta^{14}\text{C}$ reference records to provide estimates of age, growth and lifespan. Bomb radiocarbon dating indicated growth and was variable among individuals with a maximum estimated age of 27 years. The findings presented here provide support for previous age and growth estimates and an estimated lifespan near 42 years. These age data support the perception of a critical need for restoring the remnant aging and potentially senescent population.



AUTHORS

E.A. Kihn and Christopher G. Fox (NOAA/NGDC)

PUBLICATION DATE

Accepted March 12, 2013

TITLE

Geophysical data stewardship in the 21st Century at the National Geophysical Data Center (NGDC)

JOURNAL

Data Science Journal

SIGNIFICANCE

- Because of increasing data volumes and diversity, data mining techniques need to be developed or we will be overwhelmed by “big Data”.
- This paper details probable course and needs for scientific data management. They controversy would lie around relative priorities.

SUMMARY

The World Data Center for Geophysics in Boulder, Colorado is hosted by the National Geophysical Data Center (NGDC). NGDC’s vision is to be the world’s leading provider of geophysical and environmental data, information, and products. NGDC’s mission is to provide long-term scientific data stewardship for geophysical data, ensuring quality, integrity, and accessibility. Faced with ever expanding data volumes and types of data, NGDC is developing more innovative techniques for science data stewardship based in part on data mining and fuzzy logic. Use of these techniques will allow NGDC to more effectively provide data stewardship for its own scientific data archives and perhaps the broader World Data System.



AUTHORS

Christa Rabenold (NOS/OCRM/CPD)

PUBLICATION DATE

Expected March 18, 2013

TITLE

Coastal zone management: using no-build areas to protect the shorefront

JOURNAL

Coastal Management Journal

SIGNIFICANCE

- In the face of continued population growth and increasing economic activity along our nation's coasts, more devastating storm events, and sea level rise, states must balance shorefront development with protection of the natural resources that attract it and life and property.
- This article, which is based on an OCRM report from 2012, is meant to be a resource for states that are considering revising their current laws and regulations as well as for other states that may be interested in adopting similar safeguards.

SUMMARY

The U.S. coast is susceptible to a number of natural processes that can threaten lives, property, the natural environment, and, ultimately, economies. The hazards posed by these processes are likely to be exacerbated as development and redevelopment continue along the coasts and as coastal populations rise. Risk is best reduced by limiting exposure to coastal hazards. While most land use decisions are made at the local level, states can play a role in directing development away from hazard-prone places along ocean and Great Lake shorefronts through their coastal management programs. This article reports on where coastal states and territories have established no-build areas along ocean and Great Lake shorefronts to prevent unsustainable development and protect public interests. Findings suggest that roughly 75% of states with federally approved coastal management programs employ shorefront no-build areas, but that the associated laws and regulations vary considerably due largely to differences in geographic and geologic situations, regulatory frameworks, shorefront property ownership, level of existing development, and dominant uses. Laws and regulations change over time to improve effectiveness and reflect better information and new challenges. Climate change is one of the challenges that already has states reevaluating how best to protect their shorefronts.

