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HIGHLIGHTED ARTICLES

[Disentangling the effects of climate, abundance, and size on the distribution of marine fish: an example based on four stocks from the Northeast US shelf](#)

Journal of Marine Systems (2.476)

[An examination of wind decay, sustained wind speed forecasts, and gust factors for recent tropical cyclones in the Mid-Atlantic Region of the United States](#)

Weather and Forecasting (1.860)

[Using citizen-science data to identify local hotspots of species occurrence](#)

PeerJ (Impact Factor not yet assigned)

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[Polycyclic aromatic hydrocarbons and flatfish health in the marine ecosystem in Kitimat, British Columbia](#)

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[Fine-scale planktonic habitat partitioning at a shelf-slope front revealed by a high-resolution imaging system](#)

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[Estimating natural mortality rates of juvenile white shrimp *Litopenaeus setiferus*](#)

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[Trophic interactions of common elasmobranchs in deep-sea communities of the Gulf of Mexico revealed through stable isotope and stomach content analysis](#)

Deep Sea Research II (2.763)

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[Precipitation forecasting with gamma distribution models for gridded precipitation events in eastern Oklahoma and northwest Arkansas](#)

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Progress in Oceanography (3.986)

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[Comparative analysis of modeled nitrogen removal by shellfish farms](#)

Marine Pollution Bulletin (2.793)

OTHER REPORTS, BOOK CHAPTERS, AND INTERNAL PUBLICATIONS

[Characterization of deep-coral and sponge communities in the Gulf of the Farallones National Marine Sanctuary: Rittenburg Bank, Cochrane Bank and the Farallon Escarpment](#)

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[Introduction to NOAA's National Database of Deep-Sea Corals and Sponges](#)

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HIGHLIGHTED ARTICLES

Disentangling the effects of climate, abundance, and size on the distribution of marine fish: an example based on four stocks from the Northeast US shelf

Journal of Marine Systems (2.476)

R. Bell, D. E. Richardson, J. A. Hare, P. D. Lynch, and P. S. Fratantoni (NMFS/NEFSC)

- When fish stock distribution moves poleward with increasing temperature, this movement cannot be assumed to result from climate change.
- Range shifts are also influenced by biological conditions in the stock resulting from fishing mortality
- The exact mechanism of a shift is not always apparent and can be different for different species.

Climate change and fishing can have major impacts on the distribution of natural marine resources. Climate change alters the distribution of suitable habitat, forcing organisms to shift their range or attempt to survive under suboptimal conditions. Fishing reduces the abundance of marine populations and truncates their age structure leading to range contractions or shifts. Along the east coast of the United States, there have been major changes in fish populations due to the impacts of fishing and subsequent regulations, as well as changes in the climate. Black sea bass, scup, summer flounder, and winter flounder are important commercial and recreational species, which utilize inshore and offshore waters on the northeast shelf. We examined the distributions of the four species with the Northeast Fisheries Science Center trawl surveys to determine if the along-shelf centres of biomass had changed over time and if the changes were attributed to changes in temperature or fishing pressure through changes in abundance and length structure. Black sea bass, scup, and summer flounder exhibited significant poleward shifts in distributions in at least one season while the Southern New England/Mid-Atlantic Bight stock of winter flounder did not shift. Generalized additive modeling indicated that the





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changes in the centres of biomass for black sea bass and scup in spring were related to climate, while the change in the distribution of summer flounder was largely attributed to a decrease in fishing pressure and an expansion of the length–age structure. While the changes in ocean temperatures will have major impacts on the distribution of marine taxa, the effects of fishing can be of equivalent magnitude and on a more immediate time scale. It is important for management to take all factors into consideration when developing regulations for natural marine resources.

Published: 11 December 2014

<http://icesjms.oxfordjournals.org/content/early/2014/12/11/icesjms.fsu217.full.pdf+html>

An examination of wind decay, sustained wind speed forecasts, and gust factors for recent tropical cyclones in the mid-Atlantic Region of the United States

Weather and Forecasting (1.860)

B. Tyner, A. Aiyyer, **J. Blaes** (NWS/Raleigh, NC), and **D. R. Hawkins** (NWS/Wilmington, NC)

- Recent NWS forecasts for tropical cyclones impacting the mid-Atlantic have slightly over predicted sustained wind speeds for land areas.
- The study suggests some possible improvements for forecasts of wind speed and gusts for land falling tropical cyclones.
- Use of these suggestions may help the NWS better meet its mission of saving lives and property.

In this study, several analyses were conducted that were aimed at improving sustained wind speed and gust forecasts for tropical cyclones (TCs) affecting coastal regions. An objective wind speed forecast analysis of recent TCs affecting the mid-Atlantic region was first conducted to set a benchmark for improvement. Forecasts from the National Digital Forecast Database were compared to observations and surface wind analyses in the region. The analysis suggests a general over prediction of sustained wind speeds, especially for areas affected by the strongest winds. Currently, National Weather Service Forecast Offices use a software tool known as the TCMWindTool to develop their wind forecast grids. The tool assumes linear decay in the





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sustained wind speeds when interpolating the National Hurricane Center 12-24 hourly TCM product to hourly grids. An analysis of post landfall wind decay for recent TCs was conducted to evaluate this assumption. Results indicate that large errors in the forecasted wind speeds can emerge, especially for stronger storms. Finally, an analysis of gust factors for recent TCs affecting the region was conducted. Gust factors associated with weak sustained wind speeds are shown to be highly variable but average around 1.5. The gust factors decrease to values around 1.2 for wind speeds above 40 kts and are in general insensitive to the wind direction, suggesting local rather than upstream surface roughness largely dictates the gust factor at a given location. Forecasters are encouraged to increase land reduction factors used in the TCMWindTool and to modify gust factors to account for factors including the sustained wind speed and local surface roughness.

Early online: <http://journals.ametsoc.org/doi/pdf/10.1175/WAF-D-13-00125.1>

Using citizen-science data to identify local hotspots of species occurrence

PeerJ (Impact Factor not yet assigned)

E. J. Ward, K. N. Marshall, T. Hass, S. F. Pearson, G. Joyce, N. J. Hamel, A. Sedgley, T. Ross, P. J. Hodum, R. Faucett (NMFS/NWFSC)

- This was a collaboration with scientists from the state and NGOs to develop a larger effort to monitor seabird trends in the region.
- The authors developed an extensive network of citizen scientists volunteers to conduct monthly winter surveys of seabirds in Puget Sound for the last 7 years.
- Results from this survey are largely in agreement with other seabird indices, and the survey is now the only land-based winter survey of seabirds in the region, providing a baseline for future trends, or impacts (e.g. oil spills).

Seabirds have been identified and used as indicators of ecosystem processes such as climate change and human activity in nearshore ecosystems around the globe. Temporal and spatial trends have been documented at large spatial scales, but few studies have examined more localized patterns of spatiotemporal variation, by species or functional group. In this paper, we apply spatial occupancy models to assess the spatial patchiness and interannual trends of 18





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seabird species in the Puget Sound region (Washington State, USA). Our dataset, the Puget Sound Seabird Survey of the Seattle Audubon Society, is unique in that it represents a seven-year study, collected with a focus on winter months (October – April). Despite historic declines of seabirds in the region over the last 50 years, results from our study are optimistic, suggesting increases in probabilities of occurrence for 14 of the 18 species included. We found support for declines in occurrence for white-winged scoters, brants, and 2 species of grebes. The decline of Western grebes in particular is troubling, but in agreement with other recent studies that have shown support for a range shift south in recent years, to the southern end of California Current. Expected publication date: December 2014

<https://peerj.com/preprints/557v1/>

ADDITIONAL ARTICLES

NMFS Publications

Polycyclic aromatic hydrocarbons and flatfish health in the marine ecosystem in Kitimat, British Columbia

Science of the Total Environment (3.163)

L. L. Johnson, G. M. Ylitalo, B. F. Anulacion, J. Buzitis, and T. K. Collier
(NMFS/NWFSC)

- This study evaluated the impacts of aluminum smelter-derived polycyclic aromatic hydrocarbons (PAHs) on the health of English sole in the marine waters of Kitimat, British Columbia, Canada.
- PAH exposure and PAH-associated liver disease were elevated in fish nearest the smelter, but compared to urban sites contaminated with PAHs from other sources, effects were relatively low.
- These findings suggest reduced bioavailability of smelter-associated PAHs.

Marine and estuarine sediments in the area around Kitimat have been severely contaminated with a mixture of smelter-associated PAHs in the range of 10,000–100,000 ng/g dry wt. These concentrations are above those shown to cause adverse effects in fish exposed to PAHs in urban estuaries. To evaluate the impacts of smelter-derived PAHs on fish in these waters, we collected





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adult English sole (*Parophrys vetulus*) and sediment samples at corresponding capture sites biennially from 2000-2004. We used tissue (e.g. liver, kidney, gonad, stomach contents) and bile samples from the fish to determine levels of exposure, biological effects, and compare the uptake and toxicity of smelter-derived PAHs with urban mixtures of PAHs. There were significant inter-site differences in concentrations of PAHs. Sole collected at sites nearest the smelter showed increased PAH exposure and significantly higher prevalence of PAH-associated liver disease compared to sites within Kitimat Arm that were farther from the smelter. PAH uptake, exposure, and biological effects in Kitimat English sole were relatively lower compared to English sole collected from urban sites contaminated with PAH mixtures from other sources. These findings indicate that while smelter-associated PAHs in Kitimat Arm appear to cause some injury to marine resources, they likely have reduced bioavailability, and thus reduced biological toxicity, compared to other environmental PAH mixtures.

Expected publication date: Winter 2015

Fine-scale planktonic habitat partitioning at a shelf-slope front revealed by a high-resolution imaging system

Journal of Marine Systems (2.476)

A. Greer, R. Cowen, C. Guigand, and **J. Hare (NMFS/NEFSC)**

- Optical technologies can be used to collect data on ichthyoplankton and gelatinous zooplankton.
- Fine-scale habitat partitioning exists in pelagic systems.

Ocean fronts represent productive regions of the ocean, but predator-prey interactions within these features are poorly understood partially due to the coarse-scale and biases of net-based sampling methods. The authors used the In Situ Ichthyoplankton Imaging System (ISIIS) to sample across a front near the Georges Bank shelf edge on two separate sampling days in August 2010, capturing ~800,000 images with fine-scale environmental data (temperature, depth, salinity, chlorophyll-*a* fluorescence). Salinity characterized the transition from shelf to slope water, with isopycnals sloping vertically, seaward, and shoaling at the thermocline. A frontal feature defined by the convergence of isopycnals and a surface temperature gradient was





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sampled several km inshore of the surface of the shelf-slope front. Zooplankton and larval fishes were abundant on the shelf side of the front and displayed taxon-dependent depth distributions, but were much less common in the slope waters. Supervised automated particle counting showed small particles with high solidity, verified to be zooplankton (copepods and appendicularians), aggregating near surface above the front, potentially in the vicinity of the frontal jet. Salps were most abundant in zones of intermediate chlorophyll-*a* fluorescence in shelf waters, distinctly separate from high abundances of other grazers, and were found almost exclusively in colonial form (97.5%). Distributions of gelatinous zooplankton differed among taxa but tended to follow isopycnals. Such fine-scale sampling reveals distinct habitat partitioning of various planktonic taxa, which results from a balance of physical and biological drivers in relation to the front.

Accepted: 23 October 2014

Estimating natural mortality rates of juvenile white shrimp *Litopenaeus setiferus*
Estuaries and Coasts (2.245)

M. M. Mace III and **L. P. Rozas** (NMFS/SEFSC)

- The natural mortality rates of white shrimp documented using the different methods in this study were comparable and similar to values published in the literature.
- In the mark-recapture study, natural mortality rates seemed to be related to predator abundance in the experimental ponds and flooding patterns of the adjacent marsh.
- Natural mortality rates obtained from this study, together with rates from the literature, provide a range of estimates that can be used to improve stock assessment and other population models for white shrimp.

Comparisons of natural mortality rates can be used to identify essential habitat and nursery areas for fishery species. The authors estimated and compared natural mortality rates of juvenile white shrimp *Litopenaeus setiferus* using length-frequency and mark-recapture data and attempted to identify factors that may affect these mortality rates. Daily instantaneous natural mortality rates (95 % confidence interval (CI)) obtained from length-frequency data by following individual cohorts were 0.043 (0.031–0.054) and 0.014 (0.0–0.039). Combining all





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length-frequency data, converting to age-frequency data, and using two types of catch-curve analyses yielded estimates of 0.069 (0.042–0.095) and 0.060 (0.046–0.073). Mark-recapture estimates obtained in a separate study from two ponds were 0.129 (0.054–0.203) and 0.014 (–0.048–0.076). These estimates are comparable to previously reported values for this species, but this is the first study to report a measure of precision with these estimates. In the mark-recapture study, mortality rates appeared to be related to predator abundance in ponds and flooding patterns of the surrounding marsh. The only mortality rate significantly different from any of the other estimates was the lower of the two length-frequency estimates, but this result should be interpreted with caution because of the uncertainty in that estimate, relative imprecision of the estimates, and confounding factors between the methods used to estimate mortality. Despite this caveat, the results from this study can be used to improve population models for *L. setiferus* and our understanding of the role of marsh habitats as nursery areas.

Published online: 28 October 2014

<http://link.springer.com/article/10.1007/s12237-014-9901-7>

Jellyfish, forage fish, and the world's major fisheries

Oceanography (2.986)

K. L. Robinson, J. J. Ruzicka, M. B. Decker, **R. D. Brodeur** (NMFS/NWFSC), F. L. Hernandez, and E. M. Acha

- Jellyfish are important components of many marine ecosystems.
- High abundances of jellyfish can impact forage fishes through competition or predation.
- Jellyfish may divert energy away from important commercial fisheries.

A majority of the world's largest net-based fisheries target planktivorous forage fish that serve as a critical trophic link between the plankton and upper-level consumers such as large predatory fishes, sea birds, and marine mammals. Because the plankton production that drives forage fish also drive jellyfish production, these taxa often overlap in space, time, and diet in coastal ecosystems. This overlap likely also leads to predatory and competitive interactions as jellyfish are effective predators of fish early life stages and zooplankton. The trophic interplay between these groups is made more complex by the harvest of forage fish, which presumably





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releases jellyfish from competition and is hypothesized to lead to an increase in their production. To understand the role forage fish and jellyfish play as alternate energy transfer pathways in coastal ecosystems, the authors explored how functional group productivity is altered in three oceanographically distinct ecosystems when jellyfish are abundant and when fish harvest rates are reduced using ecosystem modeling. The authors proposed that ecosystem-based fishery management approaches to forage fish stocks include the use of jellyfish as an independent, empirical ecosystem health indicator.

Accepted: 4 November 2014

Trophic interactions of common elasmobranchs in deep-sea communities of the Gulf of Mexico revealed through stable isotope and stomach content analysis

Deep Sea Research II (2.763)

D. A. Churchill, M. R. Heithaus, J. J. Vaudo, R. D. Grubbs, K. Gastrich, and **J. I. Castro** (NMFS/SEFSC)

- Sharks likely are important components of deep-sea communities and their trophic interactions may serve as system-wide indicators of overall community health.
- Stomach content analysis suggests relatively similar diets at the level of broad taxonomic categories of prey among the taxa with sufficient sample sizes.
- This study provides the first characterization of the trophic interactions of deep-sea sharks in the Gulf of Mexico and establishes system baselines for future investigations.

Deep-water sharks are abundant and widely distributed in the northern and eastern Gulf of Mexico. As mid- and upper-level consumers that can range widely, sharks likely are important components of deep-sea communities and their trophic interactions may serve as system-wide baselines that could be used to monitor the overall health of these communities. We investigated the trophic interactions of deep-sea sharks using a combination of stable isotope ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) and stomach content analyses. Two hundred thirty-two muscle samples were collected from elasmobranchs captured off the bottom at depths between 200 and 1100 m along the northern slope (NGS) and the west Florida slope (WFS) of the Gulf of Mexico during 2011 and 2012. Although we detected some spatial, temporal, and interspecific variation in apparent





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trophic positions based on stable isotopes, there was considerable isotopic overlap among species, between locations, and through time. Overall $\delta^{15}\text{N}$ values in the NGS region were higher than in the WFS. The $\delta^{15}\text{N}$ values of *Squalus cf. mitsukurii* also increased between April 2011 and 2012 in the NGS, but not the WFS. We found that stable isotope values of *S. cf. mitsukurii*, the most commonly captured elasmobranch, varied between sample regions, through time, and also with sex and size. Stomach content analysis ($n=105$) suggested relatively similar diets at the level of broad taxonomic categories of prey among the taxa with sufficient sample sizes. We did not detect a relationship between body size and relative trophic levels inferred from $\delta^{15}\text{N}$, but patterns within several species suggest increasing trophic levels with increasing size. Both $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values suggest a substantial degree of overlap among most deep-water shark species. This study provides the first characterization of the trophic interactions of deep-sea sharks in the Gulf of Mexico and establishes system baselines for future investigations.

Expected publication date: February 2015

<http://dx.doi.org/10.1016/j.dsr2.2014.10.011>

Impact of light on catch rate of four demersal fish species during the 2009 - 2010 U.S. west coast groundfish bottom trawl survey

Fisheries Research (1.843)

M. J. Bradburn, and A. A. Keller (NMFS/NWFSC)

- Light can influence catch rates in bottom trawl surveys by influencing the density and distribution of groundfish species.
- The authors examined the relationship between near-bottom light levels, catch rates, and catch probability for four abundant groundfish species well represented in annual bottom trawl surveys.
- Significant linear relationships were observed between catch per unit effort and near-bottom light, with catch probability varying inversely with light for all species at depths less than 150 m.





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The authors examined the relationship between near-bottom light levels, catch rates, and catch probability for four abundant groundfish species well represented in annual bottom trawl surveys: arrowtooth flounder (*Atheresthes stomias*), greenstriped rockfish (*Sebastes elongatus*), longnose skate (*Raja rhina*), and Pacific hake (*Merluccius productus*). Relative downward irradiance was measured with net-mounted archival tags during annual trawl surveys along the U.S. west coast in 2009 and 2010. Near-bottom light levels were recorded for 818 hauls at depths less than 400 m. Significant linear relationships were observed between catch per unit effort (CPUE, kg ha⁻¹) and near-bottom light ($P < 0.05$). CPUE of arrowtooth flounder, longnose skate, and Pacific hake was negatively related to near-bottom light. For these species, CPUE decreased 16 - 22% per unit increase in log₁₀ photon flux ($\mu\text{E m}^{-2} \text{s}^{-1}$). CPUE of greenstriped rockfish increased 39% per unit increase in log₁₀ photon flux. Light, depth, and latitude explained 15 - 47% of the variance in CPUE for the four species. Catch probability was significantly related to light, depth, latitude, and relative time of day ($P < 0.05$). For all species, catch probability varied inversely with light when depth was less than 150 m. At depths greater than 150 m, catch probability increased with light for arrowtooth flounder and greenstriped rockfish. Catch probability for longnose skate was relatively unaffected by light at depths greater than 150 m. We used these relationships to explain the variability in catch rates for individual species within bottom trawl surveys. By influencing the density and distribution of these groundfish species, light can alter catch rates. Furthermore, we found possible herding of greenstriped rockfish, and trawl avoidance by arrowtooth flounder, Pacific hake, and longnose skate.

Expected publication date: Winter 2015

Soil bioretention protects juvenile salmon and their prey from the toxic impacts of urban stormwater runoff

Chemosphere (3.499)

J. K. McIntyre, J. W. Davis, R. C. Edmunds, J. P. Incardona, N. L. Scholz, and J. Stark (NMFS/NWFSC)





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- Relatively simple stormwater treatment technologies can significantly improve water quality and protect salmon and their prey species from the acutely lethal effects of urban runoff.

Green stormwater infrastructure (GSI), or low impact development, encompasses a diverse and expanding portfolio of strategies to reduce the impacts of stormwater runoff on natural systems. Benchmarks for GSI success are usually framed in terms of hydrology and water chemistry, with reduced flow and loadings of toxic chemical contaminants as primary metrics. Despite the central goal of protecting aquatic species abundance and diversity, the effectiveness of GSI treatments in maintaining diverse assemblages of sensitive aquatic taxa has not been widely evaluated. In the present study we characterized the baseline toxicity of untreated urban runoff from a highway in Seattle, WA, across six storm events. For all storms, first flush runoff was toxic to the daphnid *Ceriodaphnia dubia*, causing up to 100% mortality or impairing reproduction among survivors. We then evaluated whether soil bioretention, a conventional GSI method, could reduce or eliminate toxicity to juvenile coho salmon (*Oncorhynchus kisutch*) as well as their macroinvertebrate prey, including cultured *C. dubia* and wild-collected mayfly nymphs (*Baetis* spp.). Untreated highway runoff was generally lethal to salmon and invertebrates, and this acute mortality was eliminated when the runoff was filtered through soil bioretention columns. Soil treatment also protected against sublethal reproductive toxicity in *C. dubia*). Thus, a relatively inexpensive GSI technology can be highly effective at reversing the acutely lethal and sublethal effects of urban runoff on multiple aquatic species.

Expected publication date: Winter 2015

NWS Publications

Precipitation forecasting with gamma distribution models for gridded precipitation events in eastern Oklahoma and northwest Arkansas

Weather and Forecasting (1.860)

S. A. Amburn (NWS/Tulsa, OK), A. S. I. D Lang, and M. Buonaiuto





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- The research demonstrates that rainfall probability of exceedance forecasts can be produced from current NWS forecasts of expected mean quantitative precipitation forecasts (QPF) and the probability of rain.
- The method provides a way to communicate forecasts of the probability of rainfall amounts, especially excessive amounts, to decision makers.

An elegant and easy to implement probabilistic quantitative precipitation forecasting model that can be used to estimate the probability of exceedance (POE) is presented. The model was built using precipitation data collected across eastern Oklahoma and northwest Arkansas from late 2005 through early 2013. The data set includes precipitation analyses at 4578 contiguous, 4 km x 4 km grids for 1800 12-hour precipitation events. The data set is unique in that the meteorological conditions for each 12-hour event were relatively homogeneous when contrasted with single point data obtained over months or years where the meteorological conditions for each rain event could have varied widely. Grids were counted and stratified by precipitation amount in increments of 0.05 inches (1.27 mm) up to 10 inches (254 mm), yielding histograms for each event. POEs were computed from the observed precipitation distributions and compared to POEs computed from two gamma probability density functions ($\alpha = 1$ and $\beta = 3$). The errors between the observed POEs and gamma computed POEs ranged between 2% and 10%, depending on the threshold POE selected for the comparison. This accuracy suggests the gamma models could be used to make reasonably accurate estimates of POE, given the percent areal coverage and the mean precipitation over the area. Finally, it is suggested that the areal distribution for each event is representative of the distribution at any point in the area over a large number of similar events. It then follows that the gamma models can be used to make forecasts for the probability of exceedance at a point, given the probability of rain and the expected mean rainfall at that same point.

Acceptance date: 6 December 2014

NESDIS Publications

A new collective view of oceanography of the Arctic and North Atlantic basins

Progress in Oceanography (3.986)





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I. Yashayaev, **D. Seidov (NESDIS/NODC)**, and E. Demirov

- This preface provides a review and establishes the background of the research of long-term ocean climate variability presented in the articles included in the Special Issue.
- It serves to provide the history and state of affairs in North Atlantic and adjacent seas observation, monitoring and modeling.

This is an introductory paper by the guest editors serving as a Preface to the *Special Issue of Progress in Oceanography "The subpolar North Atlantic, Nordic and Barents Seas, Arctic Ocean and Mediterranean Sea."* We review some aspects of history and development of ocean climate monitoring, major observational programs in the North Atlantic Ocean and adjacent regions, and modern views on the climate change from the oceanic perspective. The review touches the important issues of ocean climate variability on time scales from years to decades and how these changes correlate with major climate indexes, such as the North Atlantic Oscillation and Atlantic Multidecadal Oscillation. Some elements of existing collective view of subpolar North Atlantic and adjacent seas variability are discussed, especially in connection with recent technological breakthroughs, notably the advent of Argo floats. A section with highlights of all papers included in the Special Issue concludes the Preface.

Expected publication date: Early 2015

Joint Line Office Publications

Comparative analysis of modeled nitrogen removal by shellfish farms

Marine Pollution Bulletin (2.793)

J. Rose (NMFS/NEFSC), S. Bricker (NOS/NCCOS), J. Ferreira

- Model estimates of nitrogen removal by shellfish farms compare favorably to agricultural best management practices and storm water control measures.
- Removal estimates are site-specific, not transferable to other locations.

The use of shellfish aquaculture for nutrient removal and reduction of coastal eutrophication has been proposed. Published literature has indicated that nitrogen contained in harvested shellfish can be accurately estimated from shell length:nitrogen content ratios. The range of nitrogen that could be removed by a typical farm in a specific estuarine or coastal setting is also of interest to





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regulators and planners. Farm Aquaculture Resource Management (FARM) model outputs of nitrogen removal at the shellfish farm scale have been summarized here, from 14 locations in 9 countries across 4 continents. Modeled nitrogen removal ranged from 105 lbs acre⁻¹ year⁻¹ (12 g m⁻² year⁻¹) to 1356 lbs acre⁻¹ year⁻¹ (152 g m⁻² year⁻¹). Mean nitrogen removal was 520 lbs acre⁻¹ year⁻¹ (58 g m⁻² year⁻¹). These model results are site-specific in nature, but compare favorably to reported nitrogen removal effectiveness of agricultural best management practices and stormwater control measures.

Acceptance: 3 December 2014

OTHER REPORTS, BOOK CHAPTERS, AND INTERNAL PUBLICATIONS

Characterization of deep-coral and sponge communities in the Gulf of the Farallones National Marine Sanctuary: Rittenburg Bank, Cochrane Bank and the Farallon Escarpment

NOAA Technical Memorandum

P. J. Etnoyer, G. Cochrane, E. Salgado, K. Graiff, J. Roletto, G. Williams, K. Reyna, J. Hyland (NOS/NCCOS)

- This study found that rockfish and sponges were diverse and abundant on the continental shelf banks off San Francisco, and there was a relatively high degree of association between coral and sponges and some overfished and commercially fished rockfish species.
- This work led to the discovery of a new genus and species of octocoral (*Chromoplexaura markii*), and a range extension for *Antipathes dendrochristos*, a large, presumably very old black coral discovered on Cochrane Bank.
- The study determined that Rittenburg Bank and Cochrane Bank warrant protection as 'Essential Fish Habitat' because corals and sponges are present, there is a demonstrable degree of association between corals/sponges and some commercially fished species, and there was evidence of bottom fishing at these sites in the form of discarded nets and traps.

The purpose of the surveys was to groundtruth mapping data collected in 2011, and to characterize the seafloor biota, particularly corals and sponges, in order to support Essential Fish Habitat designations under Magnuson-Stevens Act and other conservation and





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management goals under the National Marine Sanctuaries Act. Benthic surveys were conducted in the Gulf of Farallones National Marine Sanctuary aboard R/V Fulmar, October 3-11, 2012 using the large observation-class remotely operated vehicle (ROV) Beagle. A total area of 25,416 sq. meters of sea floor was surveyed during 34 ROV transects. The overall research priorities were: (1) to locate and characterize deep-sea coral (DSC) and sponge habitats in priority areas; (2) to collect information to help understand the value of DSCs and sponges as reservoirs of biodiversity, or habitat for associated species, including commercially important fishes and invertebrates; (3) to assess the condition of DSC/sponge assemblages in relation to potential anthropogenic or environmental disturbances; and (4) to make this information available to support fisheries and sanctuary management needs under Magnuson-Stevens Act and National Marine Sanctuaries Act requirements.

Publication date: November 2014

<http://www2.coastalscience.noaa.gov/publications/detail.aspx?resource=5zy3qIWZ22tZM7wpcwF1ynGoSLypy/xF9QO4coSEshs=>

Introduction to NOAA's National Database of Deep-Sea Corals and Sponges

NOAA Technical Memorandum

T. F. Hourigan, P. J. Etnoyer, R. P. McGuinn, C. Whitmire, D. Dorfman, M. Dornback, S. Cross, and D. Sallis (NOS/NCCOS)

- There is a need for a comprehensive, national scale database of deep-sea corals in US waters under the Magnuson-Stevens Fishery Conservation and Management Act.
- The database will aggregate records from museums, research institutions, and scientific literature, with observations from *in situ* surveys conducted by NOAA and others.
- A standardized data schema is necessary to accommodate the many various resources available to this database. The minimal data requirements for point observations, transects, and trawls are outlined in this document.

NOAA's Deep Sea Coral Research and Technology Program (DSCRTP) is compiling a national database of the locations of deep-sea corals and sponges, beginning in U.S. waters. The DSCRTP will make this information accessible to resource managers, the scientific community,





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and the public over the World Wide Web. The database fulfills NOAA's requirements under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to identify and map locations of deep-sea corals and to submit this information for use by regional fishery management councils. At present, there is no comprehensive, national-scale data portal for deep-sea corals and sponges. Given the authorities outlined in the MSA, NOAA's DSCRTP will serve as a central data aggregator and distributor. The DSCRTP will aggregate and make accessible historical records from samples archived in museums, research institutions, and reported in the scientific literature augmented by observations collected during deep-water *in situ* surveys conducted by NOAA and other research institutions. The database schema accommodates both linear (trawls, transects) and point data (samples, observations). The schema captures information in 93 fields in seven main categories: survey data, event data, observation data, metadata, environment, biomass, and record-keeping. All fields do not need to be filled in for submission to the database. The minimal data requirements for point observations, transects, and trawls are outlined in this document. The database represents a new standard to catalyze progress in deep-sea coral and sponge resource management and habitat suitability modeling. Records will be compiled continuously by NOAA, and distributed online in a map atlas format beginning in 2015.

Publication date: December 2014

