In this review:
A. Recent articles – no abstract
B. Recent articles with abstracts

O/A denotes an open access article or journal

A. Recent articles – no abstract


B. Recent articles with abstracts


Notes: Mangroves on Pacific high islands offer a number of important ecosystem services to both natural ecological communities and human societies. High islands are subjected to constant erosion over geologic time, which establishes an important source of terrigeneous sediment for nearby marine communities. Many of these sediments are deposited in mangrove forests and offer mangroves a potentially important means for adjusting surface elevation with rising sea level. In this study, we investigated sedimentation and elevation dynamics of mangrove forests in three hydrogeomorphic settings on the islands of Kosrae and Pohnpei, Federated States of Micronesia (FSM). Surface accretion rates ranged from 2.9 to 20.8 mm y⁻¹, and are high for naturally occurring mangroves. Although mangrove forests in Micronesian high islands appear to have a strong capacity to offset elevation losses by way of sedimentation, elevation change over 6 years ranged from -3.2 to 4.1 mm y⁻¹, depending on the location. Mangrove surface elevation change also varied by hydrogeomorphic setting and river, and suggested differential, and not uniformly bleak, susceptibilities among Pacific high island mangroves to sea-level rise. Fringe, riverine, and interior settings registered elevation changes of -1.30, 0.46, and 1.56 mm y⁻¹, respectively, with the greatest elevation deficit (-3.2 mm y⁻¹) from a fringe zone on Pohnpei and the highest rate of elevation gain (4.1 mm y⁻¹) from an interior zone on Kosrae. Relative to sea-level rise estimates for FSM (0.8-1.8 mm y⁻¹) and assuming a consistent linear trend in these estimates, soil elevations in mangroves on Kosrae and Pohnpei are experiencing between an annual deficit of 4.95 mm and an annual surplus of 3.28 mm. Although natural disturbances are important in mediating elevation gain in some situations, constant allochthonous sediment deposition probably matters most on these Pacific high islands, and is especially helpful in certain hydrogeomorphic zones. Fringe mangrove forests are most susceptible to sea-level rise, such that protection of these outer zones from anthropogenic disturbances (for example, harvesting) may slow the rate at which these zones convert to open water.
Notes: Aquatic ecosystems are almost invariably connected to other ecosystems because the dominant force of water movement facilitates physical, chemical, and biological exchanges among ecosystems. In this sense, we define an ecosystem linkage as any persistent or recurring process or attribute that connects different ecosystems in some manner. We argue that such linkages are integral, even defining, components of aquatic ecosystem structure and function, and therefore, should be evaluated in the course of ecological studies. J-NABS has made significant contributions to our understanding of such linkages. The percentage of all publications in J-NABS addressing some ecological linkage has approached 10% in recent years. Historically, emphasis was placed on upstream-downstream linkages in flowing waters, and theory (e.g., river continuum, nutrient spiraling) has evolved largely around this phenomenon. However, other linkages among ecosystems have received increased attention in the past 20 y. These linkages include surface-subsurface, lake-stream, river-floodplain, and, more recently, marine-freshwater. We contend that many ecological processes, including primary production, nutrient cycling, organic matter processing, and secondary production, are driven by such exchanges because of the donor-controlled nature of many aquatic ecosystems. Exchanges of materials from aquatic ecosystems to terrestrial systems, caused by flooding, nutrient translocation, or insect emergence, can be substantial. Movement of energy and nutrients from the ocean to freshwaters, such as in the migrations of anadromous fishes, also can be dramatic. Despite increasing evidence of the importance of such linkages, considerable impediments to research, such as journal specialization, lack of interdisciplinary study teams, and limited funding of sufficient duration for such research, exist. Such obstacles are surmountable if investigators continue to emphasize that aquatic ecology will be advanced by the study of such linkages, and that environmental problems are better understood and solved in the context of that knowledge.


Notes: Early comparisons between rates of vertical accretion and sea level rise across marshes in different tidal ranges inspired a paradigm that marshes in high tidal range environments are more resilient to sea level rise than marshes in low tidal range environments. We use field-based observations to propose a relationship between vegetation growth and tidal range and to adapt two numerical models of marsh evolution to explicitly consider the effect of tidal range on the response of the marsh platform channel network system to accelerating rates of sea level rise. We find that the stability of both the channel network and vegetated platform increases with increasing tidal range. Our results support earlier hypotheses that suggest enhanced stability can be directly attributable to a vegetation growth range that expands with tidal range. Accretion rates equilibrate to the rate of sea level rise in all experiments regardless of tidal range, suggesting that comparisons between accretion rate and tidal range will not likely produce a significant relationship. Therefore, our model results offer an explanation to widely inconsistent field-based attempts to quantify this relationship while still supporting the long-held paradigm that high tidal range marshes are indeed more stable.


Notes: Seagrass research in China is still in its infancy. Even though there has been progress recently, there is still a great deal of research needed to gain a better understanding of seagrass. In this article we review and discuss the advances in seagrass research in China from two aspects: (1) seagrass species and their distribution; (2) seagrass research in China, including studies on their taxonomy, ecology, photosynthesis, applications in aquaculture, salt-tolerance mechanisms and other research topics. A total of 18 seagrass species belonging to 8 genera are distributed in nine provinces and regions in China (including Hong Kong and Taiwan), as well as the Xisha and Nansha Archipelagos. They can be divided into two groups: a North China Group and a South China Group. Based on the seagrass distribution, the Chinese mainland coast can be divided into three sections: North China Seagrass Coast, Middle China Seagrass Coast, and South China Seagrass Coast. Ecological studies include research on seagrass communities, nutrient cycling in seagrass ecosystems, genetic diversity, pollution ecology and research in the key regions of Shandong, Guangdong, Guangxi, and Hainan. Seagrass species and their locations, community structure, ecological evaluation, epiphytes, ecological functions and threats in the key regions are also summarized. Other studies have focused on remote sensing of seagrass, threatened seagrass species of China, and pollen morphology of Halophila ovalis.

**Notes:** Predicting regime shifts – drastic changes in dynamic behaviour – is a key challenge in ecology and other fields. Here we show that the class of ecological systems that will exhibit leading indicators of regime shifts is limited, and that there is a set of ecological models and, therefore, also likely to be a class of natural systems for which there will be no forewarning of a regime change. We first describe how nonlinearities in combination with environmental variability lead to model descriptions that will not have smooth potentials, concluding that many ecological systems are described by systems without smooth potentials and thus will not show typical leading indicators of regime shifts. We then illustrate the impact of these general arguments by numerically examining the dynamics of several model ecological systems under slowly changing conditions. Our results offer a cautionary note about the generality of forecasting sudden changes in ecosystems.

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Brin, L.D., Valiela, I., Goehringer, D., and Howes, B. **Nitrogen interception and export by experimental salt marsh plots exposed to chronic nutrient addition.** *Marine Ecology Progress Series* 400: 3-17, 2010. O/A

**Notes:** Mass balance studies conducted in the 1970s in Great Sippewissett Salt Marsh, New England, showed that fertilized plots intercepted 60 to 80% of the nitrogen (N) applied at several treatment levels every year from April to October, where interception mechanisms include plant uptake, denitrification and burial. These results pointed out that salt marshes are able to intercept land-derived N that could otherwise cause eutrophication in coastal waters. To determine the long-term N interception capacity of salt marshes and to assess the effect of different levels of N input, we measured nitrogenous materials in tidal water entering and leaving Great Sippewissett experimental plots in the 2007 growing season. Our results, from sampling over both full tidal cycles and more intensively sampled ebb tides, indicate high interception of externally added N. Tidal export of dissolved inorganic N (DIN) was small, although it increased with tide height and at high N input rates. NH$_4^+$ export was generally 2 to 3 times NO$_3^-$ export, except at the highest N addition, where DIN export was evenly partitioned between NO$_3^-$ and NH$_4^+$. Exports of dissolved organic N were not enhanced by N addition. Overall, export of added N was very small, <7 % for all treatments, which is less than earlier estimates. Apparent enhanced tidal export of N from N-amended plots ceased when N additions ended in the fall. Nitrogen cycling within the vegetated marsh appears to limit N export, such that interception of added N remains high even after over 3 decades of external N inputs.

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**Notes:** The present study shows how marine commercial fish food webs dramatically changed in the north-western Black Sea on both pelagic and benthic environments. Fisheries landings, diversity and equitability strongly decreased between 1965-1970 and 2001-2005. Fishes adapted their feeding behaviour to the increasingly low species diversity of the Black Sea communities. Their food web became poor and simplified following the loss of many top predator species and their trophic links. Linkage density, connectivity and Lyapunov stability proxy strongly decreased. The north-western Black Sea system switched from a complex top-down and bottom-up functioning pattern to a dominantly bottom-up functioning pattern. This study contributes to a better understanding of these transformations within the Danube-Black Sea system in the last decades. An attempt is made to relate these changes with river inputs, fisheries and coastal pollution.

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**Notes:** Hadal trenches account for the deepest 45% of the oceanic depth range and host active and diverse biological communities. Advances in our understanding of hadal community structure and function have, until recently, relied on technologies that were unable to document ecological information. Renewed international interest in exploring the deepest marine environment on Earth provides impetus to re-evaluate hadal community ecology. We review the abiotic and biotic...
characteristics of trenches and offer a contemporary perspective of trench ecology. The application of existing, rather than the generation of novel, ecological theory offers the best prospect of understanding deep ocean ecology.


**Notes:** The loss and degradation of wetlands worldwide has adversely affected waterbirds, which depend on wetland habitats. Many studies have indicated that effectively managed wetlands can provide alternative or complementary habitats for waterbirds and mitigate the adverse effects of wetland loss and degradation. We review the studies on the habitat variables affecting use of wetlands by waterbirds, and we suggest how wetlands can be managed to provide waterbird habitat. These habitat variables include water depth, water level fluctuation, vegetation, salinity, topography, food type, food accessibility, wetland size, and wetland connectivity. Overall, the practice of wetland management requires integrated knowledge related to the entire wetland ecosystem, and ecosystem-based approach is needed to improve the habitat quality of managed wetlands with considering multiple spatial scales, temporal variability, and trade-off among diverse habitat requirements of different waterbirds. Several priorities for future research and management are also suggested in this paper.


**Notes:** The predictions for coastal change under the scenario of global sea-level rise offer impending disaster for the variety of coastal morphologies, their associated habitats, and the accompanying infrastructure. However, the predictions tend to ignore the role of sediment budget in the maintenance of coastal morphology and the dynamics of sediment transfers in the beach-dune sand-sharing system. Accepting that shoreline displacement may be an outcome of sea-level rise and a negative sediment budget, conditions are presented that could lead to a positive or equilibrium sediment budget in the coastal foredune and the retention of the foredune system even as it is being displaced. Accommodation space is a key requirement for the continued functioning of the foredune morphologies during periods of sea-level rise.


**Notes:** Determining the relative importance of local and regional processes for the distribution of population abundance is a fundamental but contentious issue in ecology. In marine systems, classical theory holds that the influence of demographic processes and dispersal is confined to local populations whereas the environment controls regional patterns of abundance. Here, we use spatial synchrony to compare the distribution of population abundance of the dominant mussel *Mytilus californianus* observed along the West Coast of the United States to that predicted by dynamical models undergoing different dispersal and environmental treatments to infer the relative influence of local and regional processes. We reveal synchronized fluctuations in the abundance of mussel populations across a whole continent despite limited larval dispersal and strong environmental forcing. We show that dispersal among neighboring populations interacts with local demographic processes to generate characteristic patterns of spatial synchrony that can govern the dynamic distribution of mussel abundance over 1,800 km of coastline. Our study emphasizes the importance of dispersal and local dynamics for the distribution of abundance at the continental scale. It further highlights potential limits to the use of "climate envelope" models for predicting the response of large-scale ecosystems to global climate change.


**Notes:** The identification of biodiversity hotspots and their management for conservation have been hypothesized as effective ways to protect many species. There has been a significant effort to identify and map these areas at a global scale, but the
coarse resolution of most datasets masks the small-scale patterns associated with coastal habitats or seamounts. Here we used tuna longline observer data to investigate the role of seamounts in aggregating large pelagic biodiversity and to identify which pelagic species are associated with seamounts. Our analysis indicates that seamounts are hotspots of pelagic biodiversity. Higher species richness was detected in association with seamounts than with coastal or oceanic areas. Seamounts were found to have higher species diversity within 30-40 km of the summit, whereas for sets close to coastal habitat the diversity was lower and fairly constant with distance. Higher probability of capture and higher number of fish caught were detected for some shark, billfish, tuna, and other by-catch species. The study supports hypotheses that seamounts may be areas of special interest for management for marine pelagic predators.

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**Notes:** Many nearshore restoration projects are currently underway at coastal locations where human influence and development have disrupted natural habitat and coastal ecological systems. The objectives of these projects in general are to restore the lost estuarine functions to the tidal marshland. Often these projects are conducted with little understanding of the potential effects of other nearby projects within the ecosystem, and similarly, it is easy to neglect the effect of the local project on the larger estuarine scale. In this paper, a modeling study is presented to evaluate the hydrodynamic responses of multiple restoration projects and their cumulative effect in the Snohomish River estuary in Washington, USA. The concept of absolute mean tidal transport is introduced and used to measure the cumulative effect of the proposed restoration projects on the estuarine hydrodynamics. The results show that the hydrodynamic responses due to multiple restoration projects are additive in the estuary, and the effect is nonlinear. The hydrodynamic response under restoration conditions depends on the size of the restoration area and the geometric configuration of the existing river channels. Within a complex braided estuary such as the Snohomish, the influence of a specific restoration project is not only experienced locally, but also found to significantly affect tidal transport in all distributary branches within the system.

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**Notes:** The Ligurian Sea is a deep basin in the northernmost sector of the western Mediterranean which shows peculiar hydrodynamic and meteo-oceanographic features. The coasts of the Ligurian Sea are among the most urbanised and industrialised along the Italian coastline: the main causes of disturbance being littoral urban development and harbour activities, the building of littoral rail- and highways, and the presence of several polluted discharges. This review, by evaluating the huge scientific output published in the last three decades, describes and discusses the most important geological, hydrological and biological characteristics of the Ligurian Sea. We show that this regional sea has largely been investigated in terms of its geological and structural evolution, as well as in terms of the sedimentation dynamics of the littoral and deep bottoms, with particular attention to the sedimentation balance of the beaches and their erosive processes. We report that the prevalent hydrodynamic and meteo-oceanographic conditions favour a continuous exchange of coastal water masses, and that the seasonal and interannual dynamics of water masses can effects the local climate, with direct and indirect consequences on fish and benthic communities documented in the last decade. We stress that although recent studies offer good knowledge of the distribution of coastal benthic communities, only scant information is available for the whole continental shelf, the submarine canyons and the rocky bathyal bottoms. Our meta-analysis reveals that significant fishing activities are monitored, but also that certain sectors of the biological resource are suffering, and suggests the set up of appropriate management measures. The Ligurian Sea hosts a number of Marine Protected Areas (MPAs) of high relevance, while the institution of the Whale Sanctuary completes the protection policy of the Regione Liguria. Our meta-analysis points out the need for long-term studies, based primarily on the analysis of those areas of the Ligurian Sea that have been little investigated to date. Finally, only properly addressed studies, using experimental approaches and along appropriate spatial and temporal scales, might allow us to understand the functioning of the Ligurian marine ecosystems, evaluate their health conditions and the dynamics of the main variables that affect the distribution of the single species (including species of high economic value) and benthic communities.

**Notes:** Seamounts are active or extinct undersea volcanoes with heights exceeding ~100 m. They represent a small but significant fraction of the volcanic extrusive budget for oceanic seafloor and their distribution gives information about spatial and temporal variations in intraplate volcanic activity. In addition, they sustain important ecological communities, determine habitats for fish, and act as obstacles to currents, thus enhancing tidal energy dissipation and ocean mixing. Mapping the complete global distribution will help constrain models of seamount formation as well as aid in understanding marine habitats and deep ocean circulation. Two approaches have been used to map the global seamount distribution. Depth soundings from single- and multibeam echosounders can provide the most detailed maps with up to 200-m horizontal resolution. However, soundings from the >5000 publicly available cruises sample only a small fraction of the ocean floor. Satellite altimetry can detect seamounts taller than ~1.5 km, and studies using altimetry have produced seamount catalogues holding almost 13,000 seamounts. Based on the size-frequency relationship for larger seamounts, we predict over 100,000 seamounts >1 km in height remain uncharted, and speculatively 25 million >100 m in height. Future altimetry missions could improve on resolution and significantly decrease noise levels, allowing for an even larger number of intermediate (1 - 1.5-km height) seamounts to be detected. Recent retracking of the radar altimeter waveforms to improve the accuracy of the gravity field has resulted in a twofold increase in resolution. Thus, improved analyses of existing altimetry with better calibration from multibeam bathymetry could also increase census estimates.


**Notes:** Seamount systems that are geographically, hydrographically, topographically, and/or genetically "isolated" are likely to have developed highly endemic taxa and ecosystems. Although current estimates of endemism are challenged by inconsistencies in sampling approaches, the physical, biological, and geological processes intrinsic to seamount systems can undeniably serve to connect or isolate populations, stimulate genetic divergence, drive the formation of new species, and structure diversity and endemism. In fact, the large variety of interconnected mechanisms that promote or impede the genetic connectivity of seamount communities via dispersal (and the long-term maintenance of species or the subsequent divergence of populations leading to speciation) are key unknowns to understanding the fundamental evolutionary processes that structure both the diversity and biogeography of deep-sea fauna. Fortunately, the net results of these ecological interactions at seamounts are represented in the patterns of genetic connectivity of the constituent species. The conclusions of the relatively few genetic connectivity studies across seamount fish, coral, and invertebrates are largely inconsistent, reflecting the ecological and evolutionary complexities of seamount systems. Yet, identifying the "connectivity" of seamount populations and their diverse ecosystems, which are increasingly vulnerable to threats from destructive fisheries and mining practices, is vital for developing and evaluating conservation and management strategies for seamount resources. Integrated, multidisciplinary studies of the physical, chemical, geological, an ecological dynamics of seamounts will continue to reveal the value of seamounts as natural laboratories in which to gain insights into the factors that elucidate the role these systems play in the dispersal, evolution, and biodiversity of deep-sea fauna. These studies will also direct the management of seamount biological diversity, which is increasingly susceptible to anthropogenic disturbance.

Pitcher, T.J., Clark, M.R., Morato, T., and Watson, R. **Seamount fisheries: Do they have a future?** *Oceanography* 23(1): 134-144, 2010.  O/A

**Notes:** Today, seamount fish populations are in trouble following a 30-year history of overexploitation, depletion, and collapse, with untold consequences for global biodiversity and the complex, delicate, but poorly understood, open-ocean food webs. Seamount fishes are especially vulnerable to fishing because their "boom-and-bust" life history characteristics can be exploited by heavy, high-technology fisheries. We estimate present global seamount catches to be about 3 million tonnes per annum and increasing – vastly in excess of estimated sustainable levels. Unfortunately, most seamount fisheries are unmanaged. In a few developed countries, precautionary management regimes have recently been introduced, including protection from bottom trawling. Small-scale artisanal fisheries using less-harmful fishing gear, spatial closures, and low catch levels provide an attractive model for improved seamount fishery management that could foster the reconstruction of previously damaged seamount ecosystems. Such restored systems might one day support a substantial global sustainable fishery, although, like many other fisheries, the prognosis is poor.

Notes: The near exponential growth in Earth’s population and the global economy puts increasing constraints on our planets finite supply of natural metal resources, and, consequently, there is an increasing need for new sources to supply high-tech industries. To date, effectively all of our raw-metal resources are produced at land-based sites. Except for nearshore placer deposits, the marine environment has been largely excluded from metal mining due to technological difficulties, even though it covers more than 70% of the planet. The case can be made that deep-water seabed mining is inevitable in the future, owing to the critical and strategic metal needs for human society. In this paper, we evaluate the case that seamounts offer significant potential for mining.


Notes: Extractive processes such as fishing and mining are degrading seamount ecosystems considerably, raising serious concerns about the impacts of these practices on global ocean biodiversity and key fluxes. Despite the data collected to date, we remain ignorant of the quantitative details of many of these issues. To address this limitation, we call for the closure of selected seamounts for research purposes. These research seamounts will act as baselines for recovery, and should be earmarked for monitoring and fundamental research. We describe an innovative bio-observatory at Condor Seamount in the Azores as one possible model.


Notes: Future estuarine geomorphic change, in response to climate change, sea-level rise, and watershed sediment supply, may govern ecological function, navigation, and water quality. We estimated geomorphic changes in Suisun Bay, CA, under four scenarios using a tidal-timescale hydrodynamic/sediment transport model. Computational expense and data needs were reduced using the morphological hydrograph concept and the morphological acceleration factor. The four scenarios included (1) present-day conditions; (2) sea-level rise and freshwater flow changes of 2030; (3) sea-level rise and decreased watershed sediment supply of 2030; and (4) sea-level rise, freshwater flow changes, and decreased watershed sediment supply of 2030. Sea-level rise increased water levels thereby reducing wave-induced bottom shear stress and sediment redistribution during the wind-wave season. Decreased watershed sediment supply reduced net deposition within the estuary, while minor changes in freshwater flow timing and magnitude induced the smallest overall effect. In all future scenarios, net deposition in the entire estuary and in the shallowest areas did not keep pace with sea-level rise, suggesting that intertidal and wetland areas may struggle to maintain elevation. Tidal-timescale simulations using future conditions were also used to infer changes in optical depth: though sea-level rise acts to decrease mean light irradiance, decreased suspended-sediment concentrations increase irradiance, yielding small changes in optical depth. The modeling results also assisted with the development of a dimensionless estuarine geomorphic number representing the ratio of potential sediment import forces to sediment export forces; we found the number to be linearly related to relative geomorphic change in Suisun Bay. The methods implemented here are widely applicable to evaluating future scenarios of estuarine change over decadal timescales.


Notes: We investigated the role of beach grooming in the loss of coastal strand ecosystems. On groomed beaches, unvegetated dry sand zones were four times wider, macrophyte wrack cover was >9 times lower, and native plant abundance and richness were 15 and >3 times lower, respectively, compared to ungroomed beaches. Experimental comparisons of native plant performance were consistent with our survey results: although initial germination was similar, seed bank, survival, and reproduction were significantly lower in groomed compared to ungroomed plots. Rates of aeolian sand transport were
significantly higher in groomed plots, while native plants or wrack placed in that zone reduced sand transport. Our results suggest beach grooming has contributed to widespread conversion of coastal strand ecosystems to unvegetated sand. Increased conservation of these threatened coastal ecosystems could help retain sediment, promote the formation of dunes, and maintain biodiversity, wildlife, and human use in the face of rising sea levels.


**Notes:** We examined the rhizosphere structure of 14 seagrass meadows (seven mixed, three *Enhalus acoroides*, two *Zostera japonica*, one *Thalassia hemprichii*, and one *Halophila ovalis*) in the Philippines and Vietnam and tested their effect on sediment redox potential by comparing the redox potential in vegetated vs unvegetated sediments. The effect of seagrass photosynthesis on sediment redox potential was tested in an *E. acoroides* meadow during a short-term (2-day) clipping experiment. In all the meadows, the centroidal depth (i.e., depth comprising 50%) of seagrass belowground biomass was within the top 15 cm sediment layer. Redox potentials in vegetated sediments tended to be higher than those in adjacent unvegetated ones; sediment redox potential anomaly ranged from -61 to 133 mV across the meadows. The centroidal depths of positive redox potential anomaly and seagrass root biomass were significantly correlated across the meadows investigated (type II regression analysis, slope = 0.90, lower confidence limit [CL] = 0.42 upper CL = 1.82, $R^2 = 0.59$, $p < 0.01$). Experimental removal of *E. acoroides* leaves resulted in a decrease in rhizosphere redox potential by 20 mV, further confirming the positive effect of seagrass roots and rhizomes on sediment redox potential and, thus, the general conditions for microbial processes in the coastal zone.

Orth, R.J., Marion, S.R., Moore, K.A., and Wilcox, D.J. **Eelgrass (Zostera marina L.) in the Chesapeake Bay region of Mid-Atlantic coast of the USA: Challenges in conservation and restoration.** *Estuaries and Coasts* 33(1): 139-150, 2010. O/A

**Notes:** Decreases in seagrass abundance reported from numerous locations around the world suggest that seagrass are facing a global crisis. Declining water quality has been identified as the leading cause for most losses. Increased public awareness is leading to expanded efforts for conservation and restoration. Here, we report on abundance patterns and environmental issues facing eelgrass (*Zostera marina*), the dominant seagrass species in the Chesapeake Bay region in the mid-Atlantic coast of the USA, and describe efforts to promote its protection and restoration. Eelgrass beds in Chesapeake Bay and Chincoteague Bay, which had started to recover from earlier diebacks, have shown a downward trend in the last 5-10 years, while eelgrass beds in the Virginia coastal bays have substantially increased in abundance during this same time period. Declining water quality appears to be the primary reason for the decreased abundance, but a recent baywide dieback in 2005 was associated with higher than usual summer water temperatures along with poor water clarity. The success of eelgrass in the Virginia coastal bays has been attributed, in part, to slightly cooler water due to their proximity to the Atlantic Ocean. A number of policies and regulations have been adopted in this region since 1983 aimed at protecting and restoring both habitat and water quality. Eelgrass abundance is now one of the criteria for assessing attainment of water clarity goals in this region. Numerous transplant projects have been aimed at restoring eelgrass but most have not succeeded beyond 1 to 2 years. A notable exception is the large-scale restoration effort in the Virginia coastal bays, where seeds distributed beginning in 2001 has initiated an expanding recovery process. Our research on eelgrass abundance patterns in the Chesapeake Bay region and the processes contributing to these patterns have provided a scientific background for management strategies for the protection and restoration of eelgrass and insights into the causes of success and failure of restoration efforts that may have applications to other seagrass systems.


**Notes:** We assess the status of channel networks and pools of two tidal salt marshes recovering from more than a century of agricultural reclamation on the Bay of Fundy, Canada. A process of largely unmanaged restoration occurred at these sites since abandonment of agricultural activities during the first half of the twentieth century. Each recovering marsh was compared to a reference marsh that was never drained or ditched. We field mapped channel networks at all marshes and used aerial
photographs to map the pre-abandonment channel network at one of the sites. The recovering marshes have hybrid channel networks that feature highly variable channel morphologies, loss of original channels, and incorporation of drainage ditches. Although channel networks in recovering marshes integrate agricultural ditches, the recovering marsh networks may not be substantially increased in length or density. Our aerial photograph analysis shows that channel density at one of the recovering marshes is comparable to the pre-abandonment density, but with reduced sinuosity. Field mapping of permanent tidal pools on the lower Bay marshes revealed that pools cover 13% of the recovering marsh, compared to ~5% of the reference marsh. This study demonstrates that these essential marsh features can be regained through restoration or simple abandonment of drainage infrastructure.

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**Notes:** We examined patterns of habitat function (plant species richness), productivity (plant aboveground biomass and total C), and nutrient stocks (N and P in aboveground plant biomass and soil) in tidal marshes of the Satilla, Altamaha, and Ogeechee Estuaries in Georgia, USA. We worked at two sites within each salinity zone (fresh, brackish, and saline) in each estuary, sampling a transect from the creekbank to the marsh platform. In total, 110 plant species were found. Site-scale and plot-scale species richness decreased from fresh to saline sites. Standing crop biomass and total carbon stocks were greatest at brackish sites, followed by freshwater then saline sites. Nitrogen stocks in plants and soil decreased across sites as salinity increased, while phosphorus stocks did not differ between fresh and brackish sites but were lowest at salty sites. These results generally support past speculation about ecosystem change across the estuarine gradient, emphasizing that ecosystem function in tidal wetlands changes sharply across the relatively short horizontal distance of the estuary. Changes in plant distribution patterns driven by global changes such as sea level rise, changing climates, or fresh water withdrawal are likely to have strong impacts on a variety of wetland functions and services.

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**Notes:** The Helgoland Roads time series is one of the richest temporal marine data sets available. Running since 1962, it documents changes for phytoplankton, salinity, Secchi disc depths and macronutrients. Uniquely, the data have been carefully quality controlled and linked to relevant meta-data, and the pelagic time series is further augmented by zooplankton, intertidal macroalgae, macro-zoobenthos and bacterioplankton data. Data analyses have shown changes in hydrography and biota around Helgoland. In the late 1970s, water inflows from the south-west to the German Bight increased with a corresponding increase in flushing rates. Salinity and annual mean temperature have also increased since 1962 and the latter by an average of 1.67 °C. This has influenced seasonal phytoplankton growth causing significant shifts in diatom densities and the numbers of large diatoms (e.g. *Coscinodiscus wailesii*). Changes in zooplankton diversity have included the appearance of the ctenophore *Mnemiopsis leidyi*. The macroalgal community also showed an increase in green algal and a decrease in brown algal species after 1959. Over 30 benthic macrofaunal species have been newly recorded at Helgoland over the last 20 years, with a distinct shift towards southern species. These detailed data provide the basis for long-term analyses of changes on many trophic levels at Helgoland Roads.


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