York River Research Symposium – April 2011 – abstracts:

Coastal Virginia Ecological Value Assessment (VEVA): A conservation planning tool for Virginia's Coastal Zone.

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Habitat loss and fragmentation pose threats to long term conservation of wildlife species and natural communities. Conservation planning at the local level offers a proactive approach to managing current and future stressors. However, tools available to local governments in support of this process are limited. The Coastal Virginia Ecological Value Assessment (VEVA) synthesizes best available resource information into one geospatial product to provide guidance to localities engaged in conservation and land use planning. VEVA is a multi-agency collaborative effort funded by Virginia's Coastal Zone Management Program.

In 2009, Virginia's Departments of Game and Inland Fisheries, Conservation and Recreation- Division of Natural Heritage, and Virginia Commonwealth University's Center of Environmental Studies (VCU) combined conservation databases to create Virginia's Priority Conservation Areas (PCA) dataset. In 2010, the Virginia Institute of Marine Sciences' Center for Coastal Resources Management engaged in a similar activity; focused on estuarine and coastal bay areas. In 2011, the two initiatives were integrated to create Coastal VEVA.

Coastal VEVA takes an integrated approach to blue-green infrastructure as a regional and local level planning tool. VEVA combines scientific data and best professional judgment to rank terrestrial and aquatic areas for ecological value. A qualitative ecological value is assigned to an area based on habitat and resources present. A 5-tier classification scheme ranks areas from "general" to "outstanding". These data can be applied to conservation planning efforts to maximize conservation objectives while also meeting local development needs.

The presentation will discuss project details, highlighting examples from the York River Watershed.

Sea level change in the York River: The context of regional variability and global trends.

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Long-term sea level change in the York River is relevant to communities, ecosystems, commerce, and military facilities. However, the trends that could be critical over periods of decades to centuries are masked by variations on shorter time scales associated with: tides, weather systems, seasonal cycles, and remote influence from open ocean processes. Water level data from stations in the York River, along with other locations in the Chesapeake Bay, have been analyzed with techniques designed to isolate the long-term trend in relative sea level over the length of available record. Since relative sea level change is due both to absolute sea level change and to land subsidence, additional data were incorporated into the analysis, including satellite altimetry and CORS-GPS measurements. The results indicate that land subsidence is a significant component of relative sea level rise in the York River, and that subsidence is responsible for significant spatial variability in relative sea level over the regional scale of the Chesapeake Bay. On a larger spatial scale, rates of absolute sea-level change vary significantly over the world ocean. Consequently, scenarios for a particular coastal region differ, depending on whether a local value versus a global average for absolute sea-level change is applied.

In situ characterization of estuarine suspended sediment in the presence of muddy flocs and pellets.

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Observations are presented from a benthic observatory in the middle reaches of the York River estuary, VA, USA, that show evidence for both muddy flocs and pellets in the lower 1 m of the water column. This study combines in situ time series estimates of (i) volume concentration and particle size distribution from a Laser In Situ Scattering Transmisometer (LISST) (for 2.5-500 μm) and a high-definition particle camera (for 20 μm to 20 mm), and (ii) water velocity, turbulent stress, mass concentration and settling velocity derived from an Acoustic Doppler Velocimeter (ADV). Mass concentration, mass settling velocity and the abundant 88 μm size class are in phase with velocity and stress, consistent with suspension of relatively dense, rapidly settling and resilient ~90 μm pellets. Volume concentration of the abundant 280 mm class peaks well after stress and velocity begin to decrease, consistent with the formation of lower density, slowly settling and fragile ~300 μm flocs.

Utilizing volunteer monitoring programs to meet local community education and data needs.

Chris French

Alliance for the Chesapeake Bay

Volunteer water monitoring has become a popular and effective activity for engaging community members in local river and Chesapeake Bay restoration efforts. Once shunned by the scientific community, data collected by volunteers is now accepted by various government entities and other partners. In addition to state agency use of data, new partnerships are developing between volunteer organizations and local governments in order to address local needs. Volunteer monitoring can not only generate high quality data and promote environmental stewardship in communities, it can also be utilize to address local concerns such as TMDLs and be used as a strategy for meeting MS4 stormwater permit requirements in urban communities. This presentation will explore existing volunteer partnerships with state and local governments and highlight examples of successful partnerships in Virginia that can be replicated in the York River basin.

Improved observation, analysis, and modeling of fine sediment dynamics in turbid, biologically active coastal environments: A new NSF-funded study taking place in the York River estuary.

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A better understanding of the physics of fine sediment suspension, transport and settling is key to advancing the fields of benthic ecology, biogeochemistry and geology. Recent findings suggest that within turbid, biologically active coastal environments, the interactions of flow with the two dominant types of muddy particle packaging are notably distinct. Although they are formed from nearly identical mud grains and are often simultaneously present, loosely bound flocs and biologically compacted pellets erode, settle and respond to circulation very differently. At present, the distinct physical responses to flow of these two common types of particle packages are not adequately documented by observations, have not been sufficiently analyzed, and are not satisfactorily represented within state-of- the art models, especially for cases when they occur together.

A three-year study of the York River estuary, funded by the National Science Foundation, is scheduled to begin in spring of 2011 to investigate questions associated with dynamics of flocs versus pellets using a three-pronged approach of observations, analysis, and modeling. Novel observations of turbulence and sediment concentration, in concert with erosion microcosms and a particle camera, will enable continual estimation of both particle settling velocity and bed erodibility. Analysis of sediment dynamics will incorporate formal data assimilation techniques, allowing continual objective inference of such key variables as the erosion rate parameter and the size distribution of suspended particles. While accounting for the presence of both pellets and flocs, three-dimensional modeling will be used to extend localized observations and analysis to encompass the entire estuary.

York River Estuary: Shoreline management-bulkheads to breakwaters

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The York River estuary is located in the tidal waters of the coastal plain of Virginia. There are approximately 400 miles of shoreline in the York River estuary and for the purposes of this talk we will restrict our discussion to those coasts from West Point and extending downriver to the mouth of the York River. West Point is where the Mattaponi and Pamunkey rivers meet to become the York. It is also the point at which shoreline processes transition from tidal current dominated to wind/wave dominated. The York River has three basic wind/wave energy regimes, creeks, river and bay with average fetch exposures of generally <1 mile, 1- 5 miles and > 5miles, respectively. Shoreline erosion generally increases with increased fetch. Three basic shore types occur along the York, either marsh or upland. Tidal marsh fringes, if wide enough, can attenuate storm waves and protect adjacent uplands from erosion. The marsh fringes themselves erode over time and, when gone or diminished, upland bank erosion ensues, a natural evolution of the transgressing coastal system.

Over the years as waterfront properties are developed, landowners often react to shoreline erosion by installing shore protection devices. Wood bulkheads were the traditional standard for many years after WWII to the 1980s and are still used today. Wood sheet piles are driven or jetted along an eroding upland bank. Usually the upland banks are graded behind the bulkhead and stabilized with vegetation, usually grass. Bulkheads were generally a cheap solution but with a limited life span, 20 years or so, and would cause waves to reflect off the vertical face causing scour and loss of the fronting beach or marsh.

Stone revetments or rip rap became more common place in the late 1970s and 1980s and are used extensively today. Revetments are sloped, stone defensive structures used in the same manner as the wood bulkhead, for shoreline defense. Rock size is a function of the design wave that is determined for the project site. However, many contractors install what they are familiar with rather than perform engineering calculations. This has, during extreme storm events like Isabel, led to structural damage and failure.

In 1985, the first headland breakwater system for private property was installed on the James River at Drummond Field. It was designed, in part, by the author and was based on a combination of geomorphic setting and empirical formulae developed by Yasso 1965, Silvester 1976 and others. Since that time, numerous systems have been installed, many along the shorelines of the York River Estuary. Empirical relationships have been developed by the author for key parameters like breakwater length (Lb), gap (Gb) and minimum beach width (Bm). Breakwater systems provide for stable pocket beaches to be built not only for the purpose of shore protection but to create sandy beach and dune habitat, missing from the bulkhead and revetments.

Notable breakwater installations along the York River include the systems along the Town of Yorktown, Allmondsville, Holley Rod and most recently, at VIMS. The breakwater system at Yorktown has been in since 1994 and been through numerous storms including Hurricane Isabel with only minor beach loss. The Yorktown beaches also are the anchor for a very much revitalized waterfront that has brought the area back from the brink of economic decay.

Aerial survey and mapping of common reed (*Phragmites australis*) in Virginia's estuarine rivers and bays.

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Since 2004, DCR-DNH has mapped over 12,000 acres of Phragmites australis in Virginia using low-altitude helicopter surveys and GPS. Areas mapped include seaside and bayside of the Eastern Shore, Back Bay, western Bay shorelines and tributaries--including the tidal portion of the Rappahannock River--from Smith Point to New Point Comfort. In the summer of 2011, DCR-DNH will survey the York River using the same methods. This data allows land managers to accurately assess their Phragmites infestations and develop effective strategies for control. Project data will be made available at www.iMapInvasives.org.

Sediment Budget for the York River estuary

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Understanding the distribution of suspended sediments in Chesapeake Bay tributaries is an important contribution to quantifying the Bay sediment budget, as well as an aid to management strategies. The overall purpose of the project was to identify estuarine sediment transport processes, and estimate sediment loads and sediment budgets for major tributaries of the Bay. The York River estuary was part of Phase I.

A sediment budget quantifies sources of erosion and sinks of deposition and helps identify data gaps. Components for an average annual sediment budget included sediment loads at the head and mouth of the estuary, a sediment load from shoreline erosion, and a sediment load for accumulation in the estuary. Loads were reported in metric tons/yr. Numerous existing datasets and geographic information systems were used to calculate the components.

The results support previous studies showing the York River as highly energetic, moving large amounts of sediment within the estuary. The average sediment load for the river as a whole shows the York importing sediment, with three of the four stations in the York River having estuarine loads that are directed upstream. The mass balance for the budget shows a sediment loss that is unaccounted for, i.e. more sediment is needed from sources, or sinks are too large. Additional data are needed from shoreline erosion, bathymetry, and suspended sediment concentrations during storms to improve the budget.

Anthropogenic nitrogen sources stimulate growth of harmful algae in the York River, Virginia.

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Anthropogenic nitrogen (N) sources were used to assess their role in exacerbation of a harmful algal bloom (HAB) in the York River, Virginia. Urban storm water run-off from a parking lot (+ Urban), exposed soil from a construction site (+ Soil), and industrial run-off from a local paper mill (+ Industrial) were added to a natural bloom assemblage as nutrient sources during a 7 day bioassay experiment. Nutrient analyses indicate the three anthropogenic source waters had distinct compositions of dissolved inorganic and organic N. The + Urban and + Soil treatments stimulated growth of the harmful dinoflagellate *Cochlodinium polykrikoides* and co-occurring phytoplankton. In these treatments there was a doubling of chlorophyll *a* and concomitant nutrient drawdown of both organic and inorganic N sources after 1 day. The response in the + Industrial treatment did not significantly differ from the Control until days 5 to 7 when chlorophyll *a* concentrations doubled due to increased diatom biomass. Overall, anthropogenic N inputs likely have important consequences in the York River, leading to enhanced HAB growth as well as altered phytoplankton community composition within blooms.

The assessment of sediment bed properties within the York River Estuary as a function of spring and neap tidal cycles.

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Resuspension of fine-grained sediments is a critical factor affecting the physical, chemical, and biological health of estuarine environments. As a part of the National Science Foundation MUDBED (Multi-disciplinary Benthic Exchange Dynamics) Project, a sedimentalogical study was conducted over a course of 5 weeks during the spring of 2010. The research was executed to assess the relationship between seabed properties and resulting bed erodibility in the York River Estuary, over spring and neap tidal cycles. Multiple GOMEX box cores were collected at Clay Bank, located 30 km upriver from the mouth of the estuary, and precautions were taken during core retrieval in order to preserve the sediment-water interface. Samples were then analyzed for erodibility using a Gust Microcosm; sub-sampled further for grain size, ^{7}Be presence, and water content; and were defined as physically or biologically influenced using x-radiography. Initial findings showed a considerable difference between water content of surficial sediments between spring and neap tide samples. Water content sub-sampled at 0-1 cm during neap tides averaged 81.8% (±1.18 standard deviation), whereas spring tide samples averaged 74.5% (±4.86 standard deviation). These results agree with companion MUDBED studies, where it was suggested that increased erodibility is mainly due to recent ephemeral deposition associated with a transient local secondary turbidity maximum, whereas lower erodibility was associated with eroded or biologically reworked conditions.

Evaluating the current status of American shad (*Alosa sapidissima*) stocks in Virginia.

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Directed commercial fisheries for American shad (*Alosa sapidissima*) in the Virginia tributaries of Chesapeake Bay have been under moratorium since 1994. Monitoring of adult American shad within Virginia's rivers has been ongoing since 1998 through a cooperative program involving commercial fishers. The monitoring program is designed to mimic commercial fishing practices so that stock status can be inferred by comparing contemporary catch-per-unit-effort levels to those derived from historic logbooks. Here, we present a synthetic analysis of the available monitoring and historic catch rate data along with updated stock status information for American shad in the James, York, and Rappahannock Rivers. Annual indices of relative abundance derived using two different methods showed very similar patterns within each river system. Virginia stocks of American shad continue to persist at historically low levels of abundance despite drastic reductions in fishing mortality. Current moratoria and restoration strategies which include hatchery releases of fry, removal of obstructions blocking spawning and nursery habitat, and reductions in bycatch from other fisheries should continue into the foreseeable future.

Translating York River science into VIMS education programs for multiple audiences.

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Education and translation about the York River are targeted towards a broad spectrum of audiences through several programs located at the Virginia Institute of Marine Science. The York River serves as an important field site for water quality, shallow water investigations, and ecology studies for both K-12 students and in professional

development activities for science teachers. The "Chesapeake Studies" project through CBNERRVA uses the local environment as an example for 7th grade standards of learning both in the classroom and in the field. The "CBIBS Inside and Out" project, through the VA Sea Grant/VIMS Marine Advisory Program, tapped the educational potential of the Chesapeake Bay Interpretive Buoy System (CBIBS) as a benchmark for data collected by teachers. Another audience that uses translated data on the York River includes local governments, state and federal regulatory agencies, Master Naturalists, and the general public. The Center for Coastal Resources Management sponsors continuing education and training programs that include York River shorelines, wetlands and shallow water resources, while the Coastal Training Program at CBNERRVA offers seminars, hands-on skill training, participatory workshops, and technology demonstrations. Reserve-identified topic areas are: wetlands and riparian buffers, shoreline management, and water quality and water management. Through education programs offered by the Virginia Institute of Marine Science, we can demonstrate how science, education, and coastal-resource stewardship can solve coastal-management problems and improve the awareness and understanding of the York River.

The interactive effects of turbidity and temperature conditions on eelgrass (*Zostera marina*) bed persistence in the York River, Virginia.

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The long-term historical trend for eelgrass populations in the Chesapeake Bay including the York River has been one of reduced abundances over the past 80 years or more. This decline has been related to a variety of stressors including disease, turbidity and unusually high summer temperatures. Because eelgrass in the Chesapeake Bay is located in a region near the southern limits of its range along the western Atlantic, it might be expected to be more susceptible to stressors including those associated with climate change and watershed development. Our studies in the York River demonstrate that Interactions of temperature and turbidity have had dramatic effects on eelgrass persistence by reducing light availability below the eelgrass community compensation point. In upriver, formerly vegetated areas high turbidities limit eelgrass re-colonization and restoration. In downriver areas, short-term, unusually high summertime water temperatures such as those in 2005 and 20010 cause massive mortalities. Since eelgrass typically requires two years for new seedlings to flower and produce seed, and there is no long term sediment seed bank, consecutive years of high environmental stress can cause extirpation from regions that are so affected. Given this combination of factors, the projected long-term increases here in water temperature and turbidity due to climate change and watershed development, pose serious threats for eelgrass persistence in this system.

Vulnerability Assessment of emergent wetlands to sea level rise: a focus on the York River Estuary.

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Fish larvae in the York river: the ongoing saga of the Ingress Project.

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Estuaries are important nursery areas for many marine fishes that arrive as larvae or eggs. The sources of fish larvae into the York River are dependent on spawning location of the adults that either reproduce within the Chesapeake Bay estuary, on the continental shelf or in the Sargasso Sea (e.g., Eel species). Commercially important species such as Atlantic menhaden, Atlantic croaker, summer flounder, and American eel spawn outside estuaries but use estuaries as nursery grounds to complete their life-cycles. These species rely on physical mechanisms and larval fish behavior to be transported into estuaries like the Chesapeake Bay. These four species are advected into the York river as larvae and early juveniles from fall to spring through species-specific differences in spawning (timing, location) and transport characteristics (swimming ability, body shape). In this presentation, we compare the differences in the timing and duration of ingress, density, and size distribution of these four species between fall 2007 and spring 2011. Larvae were collected during weekly, night-time flood tides at shore-based stations on the York River (Gloucester Point, VA). All four species exhibited large inter-annual variability in timing, density, and sizes. Recruitment patterns of croaker, menhaden, and summer flounder show differences in ingress strength and mean size between years. The inter-annual variation on larval fish abundances seems to be related to the subsequent inter-annual juvenile recruitment variability, suggesting that these results could be used for recruitment monitoring of some fishes.

Simulated Changes in Salinity in the York River Estuary from Projected Sea-Level Rise in the Chesapeake Bay.

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We used a numerical model and sea-level rise scenarios to evaluate the effects of potential sea-level rise on salinity of the York River. The U.S. Climate Change Science Program developed three future sea-level rise scenarios for the mid-Atlantic region by the year 2100: (1) 30-40 cm; (2) up to 50 cm; and (3) up to 100 cm. We refer to these scenarios as the 30-, 50-, and 100-cm rise, respectively.

Simulations were made with the Three-Dimensional Hydrodynamic-Eutrophication Model (HEM-3D), which was used to simulate tide, current, and salinity for the Chesapeake Bay. The high-resolution nested-grid model for the York River was linked to the existing HEM-3D Chesapeake Bay model.

We present results relative to a typical, wet, and dry year. We recorded the number of days from June 1 through December 31 (214 days) that salinity would exceed 0.1 parts per thousand (ppt). At 51 km upstream of the river mouth, the no-rise simulation indicated that salinity would exceed 0.1 ppt for a typical (214 days), dry (214 days), and wet (183 days) year. For all three sea-level rise scenarios, during both typical and dry years, salinity would exceed 0.1 ppt on each of the 214 days. During a wet year, 0.1 ppt would be reached a fewer number of days for the 30- (201 days) and 50-cm (211 days) rise scenarios. For a wet year with a 100-cm rise, however, salinity would exceed 0.1 ppt for all 214 days, indicating the dominance of sea-level rise over increased stream flow.

Changing marsh plant communities along the York River, Virginia: comparing current communities with those from 30 years ago.

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Tidal marsh communities vary along a continuum based on the salinity of the water and the level of inundation that the area receives. Over long time periods, rising water levels are likely to impact the distribution of tidal marsh

communities along an estuarine gradient. In this study, we surveyed the plant communities in all tidal marshes along the York River from the Goodwin Islands to the beginning of the tidal freshwater swamps. Results from the survey were compared to the plant communities identified in the Tidal Marsh Inventory (varies 1976-1981) for counties in the York River watershed. Results show that in large portions of the river there has been little change in the tidal marsh communities. However, some areas show shifts in the community, notably from diverse, high marsh communities to less diverse, low marsh communities. In addition, *Phragmites australis* has become prevalent along the length of the river to the extent where some marshes are now dominated by *P. australis*. This represents a change from the original Tidal Marsh Inventories.

Importance of shallow-water coves for benthic infauna and as nursery habitats in the York River.

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Shallow-water, unvegetated habitats are becoming recognized as important nursery grounds for juvenile blue crabs. Previous gut-content studies have examined crabs > 30 mm CW, suggesting that there is an ontogenetic shift in diet. We examined the availability of prey and feeding habits of juvenile crabs (< 40 mm carapace width [CW]). We examine prey availability in six shallow-water experimental coves in the York River, a gut content study to examine the diet of the smallest juvenile crabs (< 40 mm CW), and a laboratory prey-preference experiment. In spring, a majority of benthic abundance was comprised of amphipods, with some contribution from polychaetes and bivalves. However, bivalves comprised 84-94% of the biomass, with 1-6% amphipods and isopods. In September, abundance was evenly distributed among bivalves and polychaetes, though biomass was 86-97% bivalves. Bivalve density in all experimental coves remained above the low-density threshold, suggesting that carrying capacity of the system was not exceeded with our enhancement efforts. In the gut content study, small juveniles (< 20 mm CW) fed on a majority of small crustaceans (amphipods and isopods), with the remaining contribution from detritus, polychaetes, and some bivalves. Larger juveniles (20-40 mm CW) also fed on a majority of small crustaceans, with a larger contribution from bivalves. In feeding preference experiments, small juveniles ate mostly polychaetes, with some bivalves and prey crabs, whereas larger juveniles ate more conspecifics than bivalves or polychaetes. These results suggest that small juvenile crabs feed on a diverse assemblage of prey items, with an ontogenetic shift from small crustaceans and polychaetes to more bivalves and conspecifics by 20-40 mm in size.

Response of Tidal Wetland Plants to Increases in Salinity

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Tidal freshwater marshes (TFM) are highly productive systems occupying a small but critical position at the upper reaches of estuaries. The vegetative profile of a TFM is driven by competition, inundation and salinity. Vegetation at a TFM known to be in transition to a more brackish system (Sweet Hall Marsh on the Pamunkey River—a tributary of the York River), has shifted to include the halophyte, *Spartina alterniflora*. To address the role of salinity on vegetative stress, a mesocosm study subjecting three of Sweet Hall's dominant perennials (*Peltandra virginica, Leersia oryzoides* and *S. alterniflora*) to different sub-lethal levels of salinity (0, 2, 4 and 6 ppt) was conducted. Net photosynthesis, as a function of CO_2 flux, was measured with a portable infrared gas analyzer. Biomass was collected and dried for comparison across species and treatments as well as nutrient content analyses. With added salt, each species rate of CO_2 uptake responded slightly differently – *S. alterniflora* slowly declined, *P. virginica* dropped at a threshold between 2 and 4 ppt, and *L. oryzoides* did not change – and only *S. alterniflora* increased its above ground biomass. On average, the total biomass of *S. alterniflora* increased 1%; whereas, TFM vegetation biomass decreased by 81%. Suboptimal performance of TFM plants could be the result of plants leaking C, sloughing tissue, increasing photorespiration or other detrimental mechanisms caused by

salinity stress. Nutrient content and ratios in the TFM vegetation shifted toward higher nitrogen and phosphorus retention, a typical plant strategy in response to stress.

Potential changes in fish relative abundance and community structure in the York River associated with the expansion of blue catfish populations.

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The York River is used by more than 94 fish species and a provides nursery habitat for juvenile stages of anadromous fishes such as striped bass and American shad, as well as summer flounder and other economically important species. In the 1980s, blue catfish, a large, non-native, omnivorous species, were stocked in the York River to promote development of a fishery. Previous stocking events in the Chesapeake Bay watershed occurred in the James and Rappahannock rivers in the 1970s. Since the mid-1990s, fisheries surveys conducted by VIMS in the James, York, and Rappahannock rivers have demonstrated the spatial expansion of blue catfish populations within these rivers. Survey results also indicate an increase in abundance of blue catfish in the James and Rappahannock rivers coincident with decreases in abundance of other fishes. Such a change has not been observed in the York River, implying that fish community changes in the James and Rappahannock rivers are not a regional effect, but rather, reflect river-specific alterations. Recently, increases in the relative abundance of blue catfish in the York River have been observed, raising concerns about potential effects on native species in this tributary. As blue catfish populations expand to new river systems throughout Chesapeake Bay, scientists and resource management agencies from Virginia and Maryland have joined together to compile the latest information and develop a comprehensive understanding of the biology and ecology of this introduced species. Although significant questions remain about blue catfish population dynamics, resource managers are actively engaged in forming a management plan for blue catfish to restore the natural balance in the York River and the greater Chesapeake Bay ecosystem.

Foraging of northern diamondback terrapins (Malaclemys terrapin terrapin) in eelgrass (*Zostera marina*) beds of the York River subestuary, Chesapeake Bay.

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Diamondback terrapins (*Malaclemys terrapin*) are important predators in salt marsh systems, but foraging habits in seagrass beds are relatively unknown. We analyzed fecal samples of terrapins collected in 2009 and 2010 from eelgrass (*Zostera marina*) beds adjacent to salt marshes near the mouth of the York River. Terrapins fed primarily on eelgrass epibionts (e.g., barnacles *Balanus* spp. and isopod *Erichsonella attenuata*), but also consumed *Zostera* seeds, which may have been ingested coincidentally. Seeds were in fecal samples of 52% and 40% (May 2009 and 2010, respectively) of terrapins collected from seagrass beds. Captive terrapins were fed mature eelgrass seeds to determine effect on seed germination. Germination rate of egested seeds was 23% compared with *in situ* seed germination rate of 10%. Saurochory, dispersal of plants by reptiles, has not been extensively investigated especially in aquatic reptiles. Given (i) the ability of terrapins to traverse entire beds, (ii) reasonable passage time of seeds through the digestive track, and (iii) their home range and site fidelity, terrapins may be an important dispersal vector for *Zostera* seeds within and between seagrass meadows. These findings represent the first report of terrapins foraging in eelgrass beds and ingesting eelgrass seeds, thereby expanding the modes of biological seed dispersal for *Zostera*.
