ACTIVE LEARNING THROUGH COURSE-EMBEDDED RESEARCH IN PLANT BIOTECHNOLOGY. Michael H. Renfroe, Department of Biology, James Madison University, Harrisonburg VA 22807. An upper-level elective biology course was revised to use course-embedded research as an instructional approach. Goals were to develop student skills in searching primary literature, experimental design, development of protocols, medium and stock preparation, mastery of laboratory techniques, quantitative skills and technical writing. Additional goals in the metacognitive realm included students working independently, improving decision-making, and taking more responsibility. Students designed experiments, conducted research, made observations, and analyzed and presented the data, including a poster presentation at a research symposium. Assessment indicated that improvements were made in all goals. Student frustrations included a perceived lack of structure because they were not given protocols but had to develop them. However students gained confidence in developing protocols and working more independently. Assessment also indicated that students had mastery of course content without conventional lectures, but from “just-in-time” classroom teaching and reading primary literature. Courses with embedded research have a number of challenges including student initial discomfort, but the rewards for the students include a greater self-reliance and greater confidence of course content and methodology with an increased understanding of the process of science.

ECOLOGICAL INTERACTIONS IN THE FACE OF CLIMATE CHANGE: A HISTORICAL CASE EXAMPLE FROM THE FORESTS OF NORTH AMERICA (MELAMPYRUM LINEARE; OROBANCHACEAE). Maryam Sedaghatpour, Karoline A. Oldham & Andrea Weeks, Department of Biology, George Mason University, Fairfax VA 22030. Melampyrum lineare Desr. is a hemiparasitic annual flowering plant native to the northern latitudes of North America. It obtains water and nutrients by penetrating the roots of its host species, which include maple trees, pine trees, and members of Ericaceae. Due to this dependency, M. lineare is limited to the geographical range of its hosts. Molecular phylogeographic investigation was begun to uncover patterns of this species’ genetic diversity as a complement to our recent morphological revision of its four taxonomic varieties and to test the hypothesis that M. lineare found historical refuge in the southern Appalachian region. Molecular data were collected from 29 eastern US populations ranging from Georgia to Maine and 20 Canadian populations in Alberta and British Columbia. Four nuclear microsatellite markers (MsO66p, MsO70M, MsG2, and MsB58) showed allelic variation and four chloroplast gene regions showed inter- and
intra-population variability (trnS-trnG, psbA-trnH, trnT-trnL, and rps16-trnQ). Analysis of trnS-trnG indicated nine haplotypes are shared among 170 individuals in 49 populations. Two haplotypes are present in Canada, and all nine are present in southeastern US populations. Further analysis of microsatellite and chloroplast gene regions data will refine our ability to test patterns of M. lineare’s historical range expansion and to better describe its biological diversity.

RESPONSE OF ATLANTIC WHITE CEDAR RADIAL GROWTH TO VARYING HYDROLOGIC CONDITIONS IN THE GREAT DISMAL SWAMP. Julie M. Slater, Abigail H. Weaver & Robert B. Atkinson, Department of Organismal and Environmental Biology, Christopher Newport University, Newport News VA 23606. Atlantic white cedar (Chamaecyparis thyoides (L.) B.S.P.) swamps are globally threatened ecosystems that occur in freshwater peatlands in a narrow belt along the Atlantic coast of the United States. Dendrochronological analysis of dead and living Atlantic white cedar (AWC) has the potential to uncover information about historical hydrologic conditions in these swamps and to inform future management and restoration plans. Combining thesis data collected by students in our lab (Merry 2005, and Patterson 2011), this study explores use of basal area increment (BAI) calculations to learn about the age-related growth trend of AWC, the responses of AWC to historic hydrologic changes, and differing growing conditions at Alligator River National Wildlife Refuge and Great Dismal Swamp National Wildlife Refuge (GDSNWR). Our findings suggest that BAI may not be age-dependent after the first 15 years of growth in AWC, making it a potential predictor of environmental conditions. AWC at GDSNWR (the relatively dry site) grew faster and appeared to experience growth release around 1940-1945 and 1955-1965, which may correspond to more aggressive efforts to drain the swamp. BAI is a promising tool for evaluating historic hydrologic conditions at AWC swamps, especially due to its ability to capture growth responses of AWC to past events independent of trees’ age.

EFFECT OF STORAGE ON ANTIOXIDANTS IN CULINARY HERBS. T. Warner Lowry, Peter T. Ko & Michael H. Renfroe, Department of Biology, James Madison University, Harrisonburg VA 22807. Antioxidants are compounds present in foods and beverages that have many beneficial effects to human health. Herbs and spices have long played important roles in food preservation and improvement of food palatability. We investigated the presence of antioxidants in several common culinary herbs: rosemary, organic rosemary, sage, thyme, and basil. We also investigated how concentrations of hydrophilic and lipophilic antioxidants changed over storage times of up to 25 months. We found significant differences in antioxidant
concentrations from batch to batch of fresh herbs. Thyme holds antioxidant content well while rosemary, sage and basil tend to hold steady over the short term, but then drop over long storage. Organic rosemary has a higher initial decline in antioxidant content, but stabilizes between 19 and 25 months. Even at 25 months of storage at room temperature, these herbs can still provide a nutritional source of antioxidants.

CHALLENGES IN PROPAGATING THE PINELANDS NERVERAY, TETRAGONOTHECA HELIANTHOIDES L. Richard Curzon & Philip M. Sheridan. Meadowview Biological Research Station, 8390 Fredericksburg Tnpk., Woodford, VA 22580. Tetragonotheca helianthoides is an extremely rare plant in Virginia with one extant occurrence and ranked S1 by the Virginia Dept. of Conservation and Recreation. Tetragonotheca helianthoides is part of a rare plant reintroduction program at our Joseph Pines Preserve in a longleaf pine ecosystem restoration project. Therefore, the seed ecology of pinelands nerveray needed to be understood for successful propagation and reintroduction of this rare species. Due to the limited number of indigenous seeds available for research, adaptive research was employed to determine an effective way to produce seedlings for restoration purposes. We found that Tetragonotheca seedlings were highly susceptible to fungal pathogens, and the thick seed coat inhibited germination. We devised a seed sterilization and embryo extraction technique that allowed us to get seedlings into the second year of growth, including winter dormancy. Tetragonotheca continues to be a challenging plant to raise, and the many hurdles we face in its cultivation may explain its rarity in the wild.

AN ECOLOGICAL CHARACTERIZATION OF TERRESTRIAL COMMUNITIES AT THE SHENANDOAH UNIVERSITY RIVER CAMPUS AT COOL SPRING BATTLEFIELD, CLARKE COUNTY, VIRGINIA. Sydney J. Vonada1, Woodward S. Bousquet1 & Gary P. Fleming2, 1Environmental Studies Program, Shenandoah University, Winchester, VA 22601, and 2Virginia Natural Heritage Program, Richmond, VA 23219. In April 2013, Shenandoah University acquired its River Campus at Cool Spring Battlefield. The 195-acre site, a former golf course, is situated along the Shenandoah River at the foot of the Blue Ridge Mountains in Clarke County, Virginia. Our study constituted the first documentation of the property’s natural communities. Using the relevé (Braun-Blanquet) method, seven communities were described by their vegetation and physical characteristics. Natural communities belonging to five ecological community types were identified: mountain floodplain forest, acidic oak/hickory forest, rocky bars and shores, central Appalachian low-elevation boulderfield forest, and mountain swamp forest. The plots
examined contained a total of 221 vascular plant species. We documented 11 new county records, including the natives *Rumex verticillatus*, *Tilia americana* var. *heterophylla* and *Quercus shumardii*, and the invasive introduced species *Torillus japonica*. Although the number of introduced species ranged from 15 to 33 percent of the species totals in the communities studied, their dominance was much lower, ranging from only 2 to 22 percent cover. Our research provides a baseline for evaluating the intended protection of natural communities and reduction of invasive species at the River Campus. This project was funded in part through a student fellowship from the Virginia Foundation for Independent Colleges (VFIC).

**DEVELOPING A TREE RING MODEL TO EVALUATE HISTORIC WATER LEVELS IN THE GREAT DISMAL SWAMP.** Abigail H. Weaver, Julie Slater & Robert Atkinson, Department of Organismal and Environmental Biology, Christopher Newport University, Newport News VA 23606. Atlantic white cedar (AWC) stands are an endangered type of wetland ecosystem due to logging and disturbed hydrologic conditions. Alligator River National Wildlife Refuge (AR) and the Great Dismal Swamp National Wildlife Refuge (GDS) are about 100 km apart and contain mature AWC stands but have different historic hydrologic conditions. Historically, AR has had higher water tables than GDS, which has been shown to reduce AWC growth as shown by narrower tree rings. The purpose of the current study was to determine if tree ring widths differ between AR (wet) and GDS (drier) AWC stands using Palmer drought severity index (PDSI) as a surrogate for historic climate conditions including precipitation and temperature. AWC ring widths were positively correlated with PDSI from the associated current year in GDS, suggesting that tree growth increased in wetter, warmer conditions. Ring width was negatively correlated with current year PDSI in AR where tree growth increased with drier, cooler conditions. At both sites, previous year PDSI was negatively correlated with ring widths, possibly resulting from drier, warmer conditions that led to increased tree growth in both sites the following year. (Correlation coefficients ranged from -0.35 to 0.29.) These results suggest that AWC trees respond differently to historic climate conditions based on the site-specific hydrologic conditions, and that there may be water levels that are optimal for AWC growth. These findings may help to inform future restoration plans for these sites and other AWC stands throughout the country.

**ANATOMY AND MORPHOLOGY OF THE ALLOMORPHIC FLOWERS OF ACALYPHA SETOSA (EUPHORBIACEAE).** Sarah Kwon & W. John Hayden, Department of Biology, University of Richmond, Richmond, VA 23173. *Acalypha setosa* is an herbaceous annual widely distributed in the Neotropics. These weedy plants
routinely produce three distinct types of flowers: staminate flowers in short axillary spikes, ordinary pistillate flowers borne in terminal spikes, and allomorphic pistillate flowers that form on distal extremities of pistillate spikes. All three flower types were studied with light and scanning electron microscopy. We interpret allomorphic flowers of *A. setosa* to consist of one enlarged carpel that takes the form of a ridge-like crest flanked by a pair of crown-like concave cylinders plus two rudimentary carpels found at one end of the ridge-like crest; we interpret filiform processes emerging from the junction of the grossly dissimilar carpels to be styles and stigmas. The enlarged allomorphic carpel bears a single ovule with its micropyle oriented towards the style base, and containing readily identifiable integuments and nucellus (megasporangium).

BIG DATA FOR VIRGINIA PLANT TAXONOMY. Andrea Weeks, Department of Biology and Ted R. Bradley Herbarium, George Mason University, Fairfax, VA 22030. All plant taxonomic references that we enjoy today, such as the *Flora of Virginia*, arise out of practices that have remained essentially unchanged from the days of Linnaeus. Herbarium specimens are collected, consulted, compared, measured and annotated in person, in turns, by botanists. However, the plant taxonomic world is flattening in the 21st century due to new technologies and an ethos of highly collaborative, open-access collections-based research. What opportunities does this bring for improving floras? What may be its challenges? How can you become involved and contribute to this brave new world? Activities of the NSF-sponsored collaborative research grant entitled, “The key to the cabinets: building and sustaining a research database for a global biodiversity hotspot,” liberate the power of big data for Virginia botany.

THE FLORA OF VIRGINIA PROJECT: A 2015-2016 PROGRESS UPDATE. Marion B. Lobstein, Northern Virginia Community College. The Foundation of the Flora of Virginia Project continues to make solid progress on development of the *Flora of Virginia* mobile application (app). The *Flora of Virginia* app is at the point in which a prototype will be produced by the developer for field testing during the 2017 growing season. Volunteers have completed parsing (i.e., taken specific information such as flower color from species descriptions) for all 3200 species in the *Flora of Virginia*. Roughly 60% of the species will be included in the prototype. Fundraising efforts, including grant requests, have had positive results with the Mary Morton Parsons Foundation challenge grant awarded for a 1:1 match up to $40,000. Over $20,000 of this grant has been matched to date. This grant is active through the end of 2016. A recent $10,000 grant from Dominion Power has also been awarded. Another $30,000 still needs to be raised to complete the production of the mobile version (for mobile phones and for tablets) of
the app. A future version of this app for computers, both Macintosh and PCs, is being planned.

GENES BEHIND THE FLORAL FLOURISH. April N. Wynn, Department of Biological Sciences, University of Mary Washington, Fredericksburg VA 22407. Flowers are often the most recognizable and colorful reproductive features of angiosperms. The formation and developmental patterning of flowers are determined by several classes of genes, originally termed the ABC Model, and expanded to include class D and E genes. These classes of homeotic genes control the formation of the floral tissues (sepals, petals, stamens, and carpels) and contribute to the diversity of floral phenotypes. Layered on top of the expression of the homeotic genes of the ABC Model is their genetic regulation by transcription factors that control the temporal and spatial expression of the homeotic genes. Perturbations or mutations in either the homeotic genes or transcription factors result in floral variation between species, within species or between plants grown in differing environments. My research examines the genetic regulatory networks comprised of transcription factors that contribute specifically to proper carpel and ovule formation in Arabidopsis thaliana. Two critical transcription factors for carpel and ovule formation are SEUSS and AINTEGUMENTA; however, their direct function and location within the genetic regulatory network controlling carpel formation has yet to be fully characterized. Using previous transcriptomics studies, sets of downstream candidate genes have been identified, including PERIANTHIA and EARLY RESPONSE TO DEHYDRATION 10, and are being functionally characterized for their contribution to carpel and floral development and environmental sensitization of the formation of these tissues.

ANALYSIS OF THE EFFECT OF HYDROLOGIC CONDITIONS ON EARLY GROWTH IN ATLANTIC WHITE CEDAR (CHAMAECYPARIS THYOIDES) IN PEATLANDS IN SOUTHEASTERN VIRGINIA: IMPLICATIONS FOR MANAGEMENT. Christina G. Mirda, Julie Slater & Robert B. Atkinson, Department of Organismal and Environmental Biology, Christopher Newport University, Newport News, VA 23606. Early growth of Atlantic white cedar [AWC, Chamaecyparis thyoides (L.) B.S.P.] is routinely measured during stand reestablishment; however, few summaries that evaluate important site conditions such as hydrology exist. Many of the studies reported that survival is most strongly related to soil inundation and that indicators of soil saturation are better predictors of stem diameter growth and height growth of AWC. The purpose of this research was to review studies and analyze the relationship between hydrology and early growth (height and stem diameter) in order to inform future AWC planting strategies. Existing
research that investigated hydrologic conditions and two measures of
growth (stem diameter and height) of AWC seedlings was compiled
and evaluated. Other parameters affecting growth were also noted. Our
study found that indicators of soil saturation are the most important
factors affecting early growth in AWC, but other influences include
competition, shade, and soil quality. We recommend that future AWC
studies follow a standard method for measuring mean water table depth
to allow for expanded collaboration and data comparison. In order to
help reestablish AWC, additional studies should also focus on
examining growth relationships under the mean water table depth range
of -50 cm to -30 cm, the likely range for optimum AWC seedling
growth.

SELECTION IMPOSED BY POLLINATION MODE MAY
INFLUENCE EVOLUTION OF POLLEN MORPHOLOGY. Rebecca
P. Humphrey & Alison Ossip-Klein, 1 Hollins University, Roanoke,
VA 24020 and 2 Indiana University, Bloomington, IN 47405. Natural
selection has likely exerted significant influence over the evolution of
reproductive structures such as the angiosperm pollen grain, yet the
evolutionary implications of the interactions between pollen grains and
their environment are not fully resolved. Across the flowering plants,
variation in external pollen grain morphology often relates to
pollination mode, suggesting that the conditions of pollen transmission
exert specific selective pressures on features of pollen grains. Within
some species, individuals produce multiple pollen-grain types, each
with a different number of apertures (pollen heteromorphism), and
fertilization success of individual grain type varies with aperture
number and local environment. Through phylogenetic comparative
methods, we examine correlated evolution between pollen morphology
(grain size and aperture number) and pollination mode within the
angiosperm genus Thalictrum (Ranunculaceae). Additionally, we
calculate phylogenetic heritabilities of pollen traits. We find a strong
phylogenetic signal for pollination mode. Pollen grain size shows high
phylogenetic heritability and lower variation within wind-pollinated
species. Insect-pollinated species have a higher calculated optimum
number of pollen-grain apertures, which may relate to pollen
competition.

A MORPHOMETRIC ANALYSIS OF INFRASPECIFIC VARIATION
WITHIN ELEOCHARIS TENUIS (CYPERACEAE). Lane D. Gibbons
& Conley K. McMullen, Department of Biology, James Madison
University, Harrisonburg, VA 22807. North America contains a large
portion of the most problematic and least resolved array of diversity in
the genus Eleocharis (Cyperaceae). Of noteworthy significance are
lasting taxonomic uncertainties involving plants referable to Eleocharis
tenuis (var. tenuis, var. verrucosa, and var. pseudoptera) of the E. tenuis


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species complex (subg. Eleocharis, sect. Eleocharis, ser. Eleocharis, subser. Truncatae Svenson). Morphology of *E. tenuis* is traditionally recognized as being intermediate among taxa along a broad geographic gradient. However, paired cytological and morphometric data indicate that the varieties of *E. tenuis* are well separated by five morphological characters, that these characters do not intergrade between taxonomic entities, and that cytological data are unique to and correlate with currently recognized entities. We propose that the current rank applied to *E. tenuis* var. verrucosa does not appropriately reflect the evolutionary importance of this entity, and we raise it as a species distinct from *E. tenuis* var. tenuis and *E. tenuis* var. pseudoptera.

**CYATHIUM ANATOMY AND MORPHOLOGY IN EUPHORBIA SPATHULATA (EUPHORBIACEAE).** Christian Rabot & W. John Hayden, Department of Biology, University of Richmond, Richmond, VA 23173. *Euphorbia spathulata* is an herbaceous annual widespread throughout North America. We undertook structural and developmental studies of its cyathia in order to investigate a possible mechanism for their self-pollination while still enclosed by subtending cyathophylls. Cyathia studied consist of a gland-bearing involucre enclosing five staminate flowers (each a single stamen), and a central 3-carpellate pistillate flower. In early cyathia still enclosed by cyathophylls, only the pistillate flower is exserted from the involucre and its short styles are erect. Subsequently, while still enclosed by cyathophylls, styles elongate and reorient to a deflexed position, bringing stigmas near or in direct contact with open anthers held at or slightly above the involucre rim; pollen grains were observed on stigmas at this stage. Later, when the cyathophylls have spread apart, exposing the cyathium to the external environment, styles and stigmas are once again ascendant. Our observations suggest that each cyathium of *E. spathulata* combines the potential for early anthesis self-pollination and late anthesis cross-pollination.

**INITIAL STUDIES ON THE REPRODUCTIVE BIOLOGY OF BUCKLEYA DISTICHOPHYLLA (SANTALACEAE).** Conley K. McMullen¹, Ryan Huish² & Melissa Manow³, ¹Department of Biology, James Madison University, Harrisonburg, VA 22807, ²Department of Natural Sciences, The University of Virginia’s College at Wise, Wise, VA 24293, and ³Department of Biology, Hollins University, Roanoke, VA 24019. *Buckleya distichophylla* (Santalaceae), commonly known as piratebush, is a rare dioecious and hemiparasitic shrub endemic to the Appalachian Mountains of Virginia, North Carolina, and Tennessee. Previous studies on piratebush suggest sexual reproductive deficiency as a possible explanation for its rare and scattered distribution. To investigate the reproductive biology of piratebush, we examined sex ratio and flowering phenology in the densest population of piratebush...
known (Poor Mountain, southwest Virginia). Sex ratio data were collected through field surveys along ecological transects. Results show a male-biased sex ratio (61:39) of flowering individuals, with 15% nonflowering. Size data confirm significantly smaller size for nonflowering individuals, suggesting combined characteristics of size and nonflowering as an indicator of juvenility. Floral phenology data were recorded from 23 males and 20 females in varied representative elevation and aspect gradients. Flower abundance was male-dominant by >24:1. Floral phenology showed individual variation, with males beginning and ending approximately 1 week before females, but considerable synchrony for the bulk of flower production for about 2 weeks during the first half of May. The widely male-dominant sex ratio and floral abundance, as well as variation in flower production by females, underscores the importance of ongoing investigations into the reproductive and regenerative health of this rare species.

EVALUATING RELATIONSHIPS BETWEEN WOOLGRASS (SCIRPUS CYPERINUS (L.) KUNTH) TISSUE ELEMENTAL CONCENTRATIONS AND GROWTH OF SAPLINGS PLANTED IN CREATED WETLANDS OF VIRGINIA. Autumn K. Tilghman & Robert B. Atkinson, Department of Organismal and Environmental Biology, Christopher Newport University, Newport News VA 23606. Nutrient (C, N, and P) concentrations in created wetlands can be lower than those in naturally occurring wetlands and may reduce tree biomass in forested wetland mitigation sites. The purpose of this study was to determine the relationship between nutrient concentrations in plant tissue of Scirpus cyperinus (L.) Kunth, the dominant herbaceous species at our study sites, and annual sapling morphometric change (height, basal stem diameter, and canopy) among seven species and three planting types in three created wetlands in Loudoun County, VA. Aboveground vegetation was clipped at ground level in 0.25-m² plots adjacent to each planted sapling. Samples were returned to lab, dried, and analyzed for C and TKN using an elemental analyzer and P using an ashing/acid extraction technique. Tissue nutrient content averaged 43.26±1.40 for %C, 5.07±0.88 for %TKN, and 0.202±0.026 for %P. Nitrogen was positively correlated to sapling height (r=0.32, p=0.02) while there was no correlation of P to height (p>0.05). Both N:P (r=0.31, p=0.02) and C:N (r=-0.29, p=0.04) were significantly correlated with sapling height. These findings indicate that N may be one of the factors limiting tree growth in our study sites. Extensive soil nutrient analyses at these sites failed to detect nutrient limitations, which suggests that S. cyperinus tissue nutrient concentrations may be a more sensitive measure that could guide nutrient amendment decisions to enhance tree establishment in created or restored wetlands.
NITROGEN TISSUE CONTENT IN *JUNCUS EFFUSUS* AS A PREDICTOR OF SAPLING GROWTH IN CREATED WETLANDS OF VIRGINIA. Stephen W. Bendele, Autumn K. Tilghman & Robert B. Atkinson, Department of Organismal and Environmental Biology, Christopher Newport University, Newport News VA 23606. *Juncus effusus* (L.) is an emergent facultative wetland plant species found worldwide in fresh or brackish wetlands. Previous studies of created wetlands found plant tissue nutrient concentration to be more sensitive than soil nutrient concentrations as a predictor of aboveground primary production. The purpose of this study was to evaluate whether the concentration of nitrogen in aboveground vegetative tissue of *J. effusus* could predict sapling morphology. Basal stem diameter, height, canopy cover, and *J. effusus* tissue nitrogen were collected from a three 7-year-old created non-tidal wetlands located in Loudoun County, VA. Tissue nitrogen concentration of *J. effusus* was not related to basal stem diameter ($r=0.19$, $p>0.1$), height ($r=-0.06$, $p>0.1$), or canopy coverage ($r=-0.06$, $p>0.1$). The weak relationship between *J. effusus* tissue nitrogen and tree morphological parameters could be due to the confounding effects of competition, hydrology, and micro- or macro-nutrient limitations.

THE EFFECT OF PHOSPHORUS CONTENT IN *JUNCUS EFFUSUS* ON GROWTH OF SAPLINGS PLANTED IN CREATED WETLANDS OF VIRGINIA. Hannah R. Leich, Autumn K. Tilghman & Robert B. Atkinson, Department of Organismal and Environmental Biology, Christopher Newport University, Newport News VA 23606. The nutrient (C, N, and P) concentrations can be lower in created wetlands than in naturally occurring wetlands, which may reduce the biomass of trees in forested wetland mitigation sites. This work was completed to determine the relationship between the P content in plant tissue of *Juncus effusus*, which was a dominant herbaceous species at our study sites, and the annual sapling morphometric change (basal stem diameter, canopy, and height) among seven species and three planting types in three created wetlands in Loudoun County, VA. Aboveground vegetation was clipped at ground level in 0.25-m$^2$ plots adjacent to each planted sapling. Samples were brought to the lab, dried, ground, and analyzed for P using an ashing/acid extraction technique. There was no correlation found of P to the basal stem diameter, canopy, or height of the saplings. This is likely because P acts along with other nutrients (C and N) and alone is not enough to predict tree growth.

USING *SCIRPUS CYPERINUS* ELEMENTAL ANALYSIS AS A PREDICTOR OF SAPLING GROWTH IN CREATED WETLANDS. Andrew B. Simmons, Autumn K. Tilghman & Robert B. Atkinson, Christopher Newport University, Newport News VA 23606. Created
wetlands have been a focus of study in response to Clean Water Act requirements, but factors affecting sapling growth are poorly understood. The purpose of this study is to determine if tissue nutrient (C, N, P) concentration of surrounding dominant vegetation (*Scirpus cyperinus*) is a predictor of annual sapling morphometric change (height, canopy, and basal stem diameter) and to illustrate nutrient distribution in a created wetland in Loudoun County, Virginia. Aboveground vegetation was collected at the end of the 2015 growing season. Samples were dried and analyzed for C, N, and P by elemental analyzer or ashing/acid extraction technique. Percent N was weakly related to sapling height ($r = 0.32$, $p<0.02$). Comparing the portions of the site having above average sapling growth and nutrients with the site map showed somewhat random distribution, but some clustering in the central low-lying areas of the created wetland was observed. These findings suggest that nitrogen may be one of the factors limiting tree growth in created wetlands, and that visualizing distribution may enhance nutrient amendment decisions in similar created or restored wetlands.