

BALLOON IMAGERY VERIFICATION OF REMOTELY SENSED *PHRAGMITES AUSTRALIS* EXPANSION IN WETLANDS OF THE HACKENSACK MEADOWLANDS

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The invasion of exotic *Phragmites australis* is increasingly displacing local native species from northeastern coastal estuaries. This study evaluates a remote sensing technique to accurately map the distribution of common reed, monitor the rate of invasion and determine areas of natural resistance to invasion. The current invasion footprint of *Phragmites* in the Hackensack Meadowlands District in Northern New Jersey was determined using high spectral and spatial resolution hyperspectral imagery. A balloon-based imaging device with limited coverage area was used to verify the accuracy of the hyperspectral imagery classification. The accuracy assessment based on true color balloon images revealed that the hyperspectral classification technique from images covering hundreds of acres was 90% accurate in separating the dominant common reed-invaded areas from the native vegetation. Furthermore, linear spectral un-mixing techniques for sub-pixel classification revealed that for mixed areas where *Phragmites* covered 75% or more of a pixel, the classification was correct 96% of the time. The accuracy dropped to 52% for pixels that contained 25% or less of *Phragmites* cover, and dropped dramatically (4%) for pixels with equal amounts of invasive and native species cover.