Abstract

When project proponents wish to assess a development site for jurisdictional wetland impacts, they are traditionally left with two options: a wetland determination or a delineation. A wetland determination is customarily a desktop assessment of the site including, but not limited to, the following datasets: National Wetland Inventory (NWI), National Hydrography Dataset (NHD), National Resources Conservation Services Soil Survey (NRCS), topographic maps and satellite imagery. A wetland delineation assesses the presence of hydrophytic vegetation, hydric soils and hydrology during field evaluation. The NWI is typically used to determine where existing wetlands are in order to determine if they qualify as jurisdictional wetlands. This allows project proponents to either take the appropriate avoidance measures to reduce impacts to the wetland or determine if a full wetland delineation is required to apply for a Section 404 permit. In some cases, NWI maps have not been updated for up to 30 years, and these mapped wetlands are limited by conditions that were present at the time the aerial imagery was taken.

This thesis shows that by incorporating unmanned aerial systems (UAS) into a wetlands determination, wetland specialists and project planners can capture current conditions of the development site (i.e. topography, disturbance, land cover, etc.) within efficient time frames and assess the potential extent of a wetland(s). This allows project proponents to avoid the cost and time restrictions that come from a full wetland delineation. The UAS imagery was compared to historically mapped wetlands still present; UAS improved placement of wetlands on the landscape and had on average a 76.5% overlap with delineated wetlands. Future research into buffer distances, topography, seasonality and thermal imagery could improve this overlap. With the aerial imagery from current conditions, wetland specialists can assess potential wetland extent, hydrology, highwater marks, and coarsely classify vegetative condition.