

ADMS Training 2025

Imagery processing~Local/Consultants & Image Tools (VR)

At the end of this training session, attendees should be able to extract multiple data inputs (layers), including imagery, in preparation for creating management zones. Along the way we will cover tips and tricks identifying quality imagery for using in our final zones.

During class, we will be covering concepts that are relevant to ADMS users who use *Local Data* versus users with the *Consultants* package, who have access to the online GK Imagery Library. Attendees of GK Training Classes gain access to a trial code, granting temporary access to the many features of ADMS software, including the Online Imagery Library included with the *Consultants* package. If you would like access to the Online Imagery Library after your trial period, let us know! We can get you connected with the *Consultants* package. ADMS users can also choose to utilize local imagery and data layers to create management zones. We will cover how to utilize both local and online data inputs during this class.

If you do not have a local library built and do not plan to purchase the *Consultants* package, please consult the training video that covers “GK Data Links & Downloading data.”

<https://gktechinc.com/login/> then “Help Videos”



We will be working solely out of the Map Window for the entirety of this class.

Grower: GKT-Data Inputs

Farm: Image Data

Fields: BM 28-22-EH-Local-WMS

and BM-28-22-EH Consultants

Extracting Imagery

What is an image? In the context of ADMS, an image is a raster that has more than one band value associated with every pixel. Each band represents a segment of the electromagnetic spectrum collected by a sensor (Red, Green, Blue, Infrared).

What is a raster? A matrix of cells ordered into rows and columns where each cell contains one value. (See PPT). A single-band raster is a *surface*. In the context of ADMS, raster = surface.

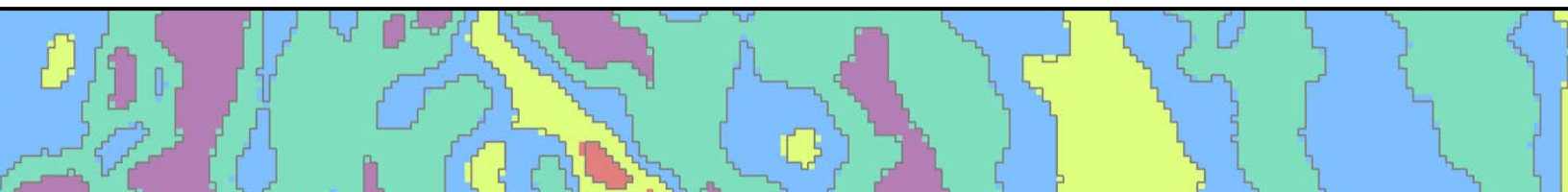
- <https://www.buzzsprout.com/2297340/episodes/15509080> - Tiny Bytes Episode 5: Raster Monster
- **Draw a Boundary (pg. 89)**
- **Where are we? Extracting from Web Layers & WMS (pg. 95-102)**
 - o We are extracting RGB Images from Web Layers & WMS
 - o County Data>Web Maps>Bing Hybrid Map>Zoom Into Bull Moose
 - o Field Data>Create New Layer from Template>Boundary>Draw New Object>Complete Square
 - o Want to use WMS (Web Map Service)? Have to have internet.
 - o Extract a web map service image
 - Have a web map open
 - Right click on web map title in “Images in Map”>Export>RGBGeoTiff
 - Set WMS Map as your active layer on “Images in Map”, Select “Extract NIR and Invert” button and select “Extract Image”
 - o Want to add your own WMS? See pg. 100 of manual.



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- **Extracting NAIP Imagery (pg. 94)**
 - We are extracting RGB, CIR, and RGBN Images from NAIP (3, 3, and 4 band images, respectively)
 - FSA's National Ag Imagery Program (NAIP) supplies high resolution .sid & .jp2 images, 1 and 2 meter resolution.
 - NAIP images are *georeferenced* meaning you can use these to draw field boundaries that line up with the actual field on planet earth.
 - *Local Data*
 - Click "County Data" and choose which NAIP image you would like to use to draw your boundary.
 - Right click selected NAIP image and click "Extract Current View"
 - *Consultants*
 - Select on the boundary that is larger than the field>"Extract from County Images">"Set Selection Parameters">Click inside of field boundary>"Set Selected Boundary">Click inside of field boundary>"Use Online Data">NAIP tab>State – ND>ND-UTM 14>Wells
 - Select "Wells NAIP 2022 RGB.sid"
- **Drawing "Guide Lines" (pg. 103)**
 - Important for non-georeferenced images (Landsat and to a much lesser extent, especially with newer years of data Sentinel)
 - Make sure both the field boundary and the guide lines are both selected on before going into Imagery to extract surfaces.
- **Importing Lidar Data (2m or 3m) (pg. 253-255)**
 - We are importing point cloud data of elevation and importing it so that we have a SURFACE where each pixel represents 1 elevation point.
 - *Local Data*
 - Select "Project Area Boundary" (the larger boundary that encompasses the field boundary
 - County Data>ND-Wells>Wells Catalog Lidar 2020.shp
 - Zoom out so you can see what the lidar tile names are
 - Import Topo>LIDAR LAS Import>Keep Output Resolution at 1m>Select LAS Source Folder>Navigate to folder with lidar data files (Wells)
 - Fill Filters to fill in holes
 - Want to view in 3D? Turn Lidar layer on, right click, "Open in 3D Window"
 - *Consultants*
 - Very similar to extracting NAIP imagery – using GK Imagery Library
 - Turn on field boundary>Extract from County Images>Set Selection Parameters>Set Selected Boundary>Use Online Data>LIDAR>State>County>Output Resolution>Search and Extract



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- **Visual Indexing & Manual Image Extraction (pg. 106-107)**
 - In ADMS, we are going from IMAGES that have multiple bands and extracting single bands from these images, essentially turning them into SURFACES that we can use across multiple layers. If you want to use an RGB image in ADMS, you have to extract a single layer from the RGB data.
 - 4-Band Images (Red, Green, Blue, Infrared)
 - Bands can be extracted out individually or a vegetative index (Red, Green, Blue, NIR, Red NDVI, Green NDVI) can be used.
 - 3-Band Images (Red, Green, Blue)
 - Bands can be extracted out individually or the RGB vegetative index (RGB VI) can be used. RGB VI will enhance vegetation in the field.
 - **NIR – Best for bare soils or no vegetation**
 - **Red or Green NDVI – Best for moderate to heavy vegetation**
 - **NDVI Values – higher than “35” shows full ground cover**
 - **In doubt? Extract and use Red NDVI.**
- **NAIP Image Extraction to GRD (pg. 94)**
 - *Local Data*
 - Browse to county data
 - NAIP images after 2018 will have 4-bands; if there's a CIR image and you want to use it (i.e. there is enough vegetation that tells the story you're looking to tell) turn the NAIP image on, navigate to bottom toolbar, select “Extract an Image” and “Extract NDVI.” For RGB NAIPs, “Extract Visible Vegetation Index.”
 - Go back to data tree, click “Refresh” and find NAIP extractions in data tree under “NAIP”
 - *Consultants*
 - Turn on field boundary>Extract from County Images>NAIP>Select which NAIP images you want to extract surfaces from.
- **Landsat & Sentinel Data Processing (pg. 109)**
 - *Local Data*
 - Turn field boundary on, plus any guidelines you would like to use that you've drawn>Extract from Image to Zone>Click Set Selection Parameters>Click in Field Boundary>Click Set Selected Boundary>Click in Field Boundary>Click “Browse” and navigate to your local Sentinel or Landsat imagery folder.
 - Click through the imagery, select which bands you want to extract (Red NDVI is a great go-to), align the image (if needed), make sure desired number of zones is set to 255 (use the drop down menu) and press “Finish.”
 - Extracted surfaces will appear in Data Tree under “Images”
 - *Consultants*
 - Turn field boundary on>Extract from County Images>Set Selection Parameters>Set Selected Boundary>Use Online Data>Sentinel or Landsat
 - *Image selection for both:*
 - See Tiny Byte Episode about “Selecting Imagery”
 - <https://www.buzzsprout.com/2297340/episodes/16135793>

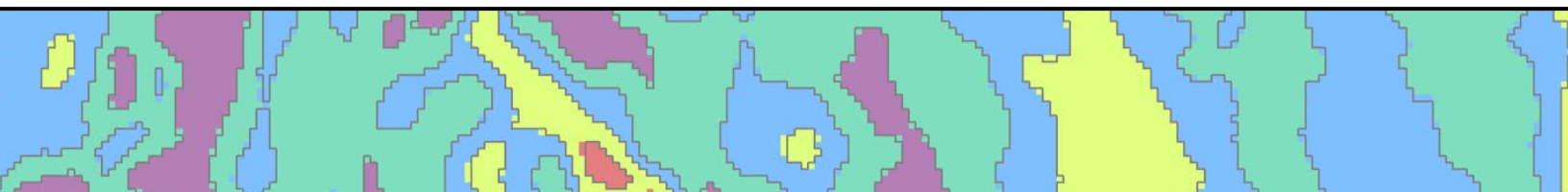
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- You want to select imagery that has vegetation in it (wheat in ND: probably looking at May thru July for imagery dates; corn and soybeans will have later season dates you'll extract imagery from – probably late July through September)
 - You want vegetation to be there and covering the ground but you don't want the field to be so lush that there are no longer differences in the vegetation (what variability do you pick up then?)
 - Good idea to look through multiple years of NAIP images and understand what patterns you want to pull out when you're looking through satellite imagery.
 - Avoid pulling imagery with clouds, missing parts (can happen when at the edge of a Sentinel/Landsat tile), fog, or smoke. You want to avoid using *false* data.
 - You can always extract images and delete or move them out of the way later.
- **Create Topo Features (pg. 111)**
 - Will need an elevation layer that's larger than the field boundaries, preferably lidar (if NED, see page 111 of manual)
 - Turn this elevation layer on>Right Click Layer Name>Utilities>Create Topo Features>set to 100 (this is 1m lidar data; set to 100; see pg. 111 for using lidar of different resolutions)
 - Need to cut this: Turn on field boundary>Select inside of field boundary>Select "Topography Features" layer>Select "Crop Raster to Selected Polygon">Just This Layer>Rest Colors by Clicking "Quick Zone">K-Means>5
 - Depressions = Red, Hill tops = Green, Mid-Slopes = Yellow
 - Another layer you can use in making zones.

Refining Data Layers Prior to Merging

- **Moving poor images to "XtraData" folder (pg. 131)**
 - In images folder in data tree, select "Create New Folder" and name "XtraData"
 - Images that you do not plan to use can be dragged and dropped into the XtraData folder, clearing up your data tree.
- **Inverting Data (pg. 112)**
 - Sometimes you may want to invert values of a layer in order to make it easier to merge with other data layers; "bad" areas should be red, "good" areas should be green.
 - Turn on layer you want to invert>Click "Invert" on bottom toolbar
- **Reduce Border Effect (pg. 113)**
 - Important for Sentinel- and Landsat-extracted surfaces; the purpose is to reduce amount of "false" data – sometimes field edges will come out looking "poor" when in reality they aren't actually that bad producing
 - Turn on field boundary>Click inside boundary to select field boundary>Click check box next to field boundary layer to remove green hashing>Select layer you want to reduce border effect on>Click "Reduce Boundary Effect" Start small and go bigger; once you go big you can't go back.
- **Trimming End Values & Smoothing Filter (pg. 113-114)**
 - Sometimes there are weird artifacts in extracted surfaces.
 - In general, there shouldn't be long tails in surface value histograms.
 - Trim these end values to remove these outlier data values.
 - Turn on surface you want to trim end values on>Decide what value you want to set as your threshold>Click "Trim End Values"





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- The purpose of trimming end values is to highlight the variability in the parts of the field that we care about; we don't care about the variability in the parts of the field that don't produce anything.
 - Smoothing filter can also help to smooth out a rough histogram, or help mask man made lines, especially in higher resolution images such as NAIP images which are more likely to contain these types of lines.
 - To use, turn on image you want to smooth>select smoothing filter from bottom toolbar
- **Adjust Geo-Reference (pg. 106)**
 - Sometimes you don't realize until after you've downloaded a bunch of imagery that images aren't lined up how you want them to be. You can use "Adjust Geo-Reference" to adjust these images after you've already extracted them.
 - Select the raster you want to adjust>Select "Surface Properties">Use arrow buttons to move the surface around
 - Tip: start with a NAIP-derived surface (we know the georeferencing on these extracts are very good) and then adjust other non-NAIP surfaces in relation to it. Lining up images will help draw out variability in smaller areas.

Questions?

