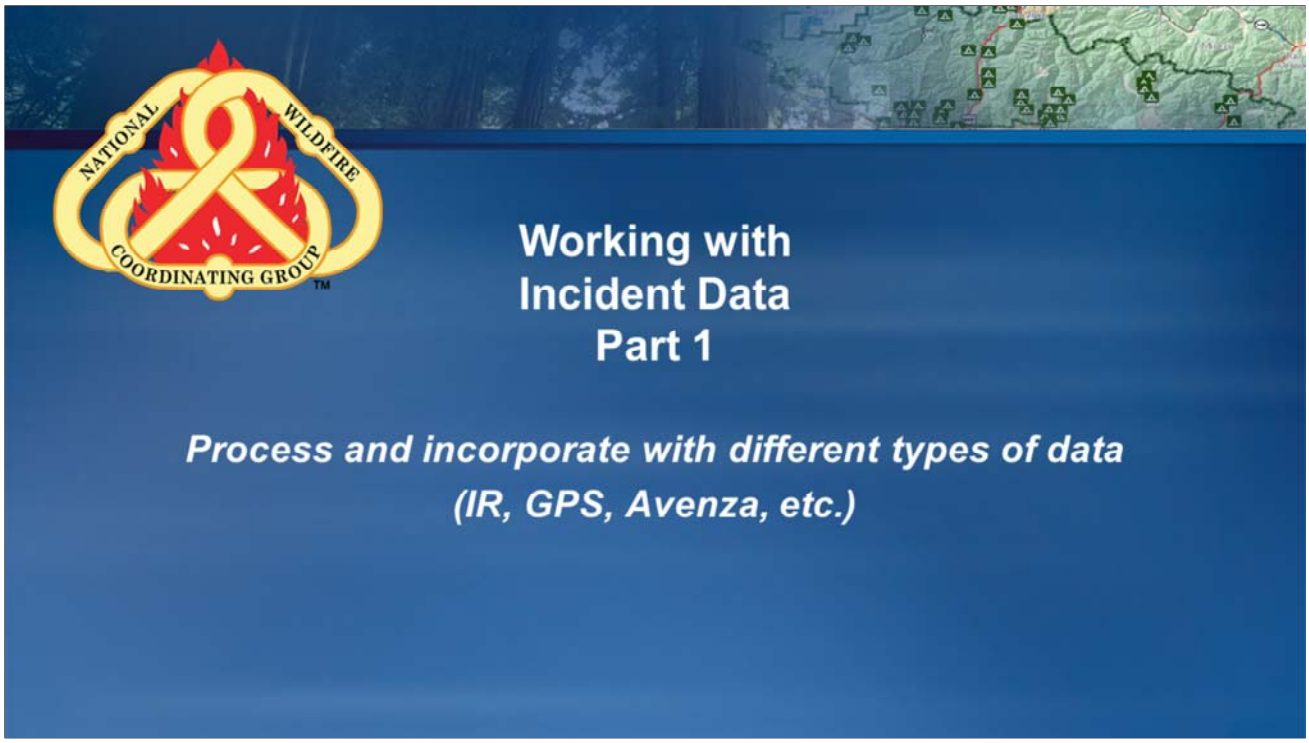
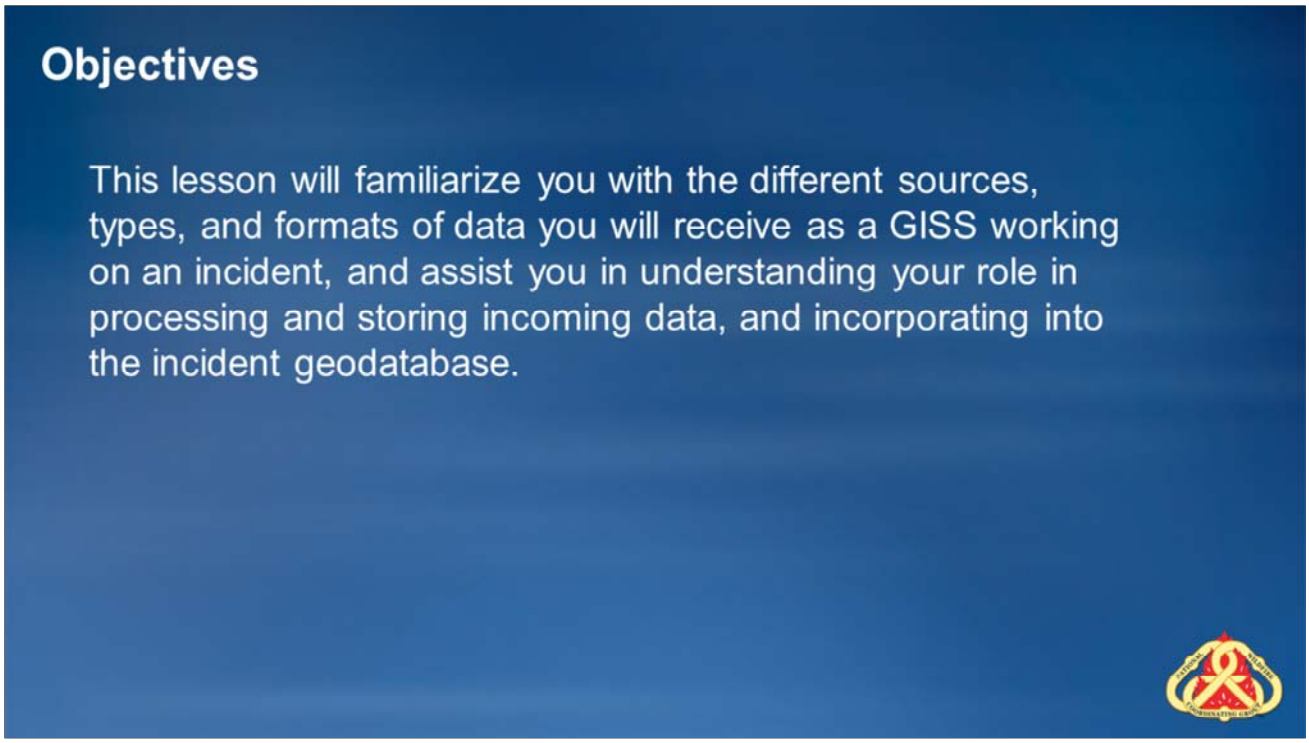
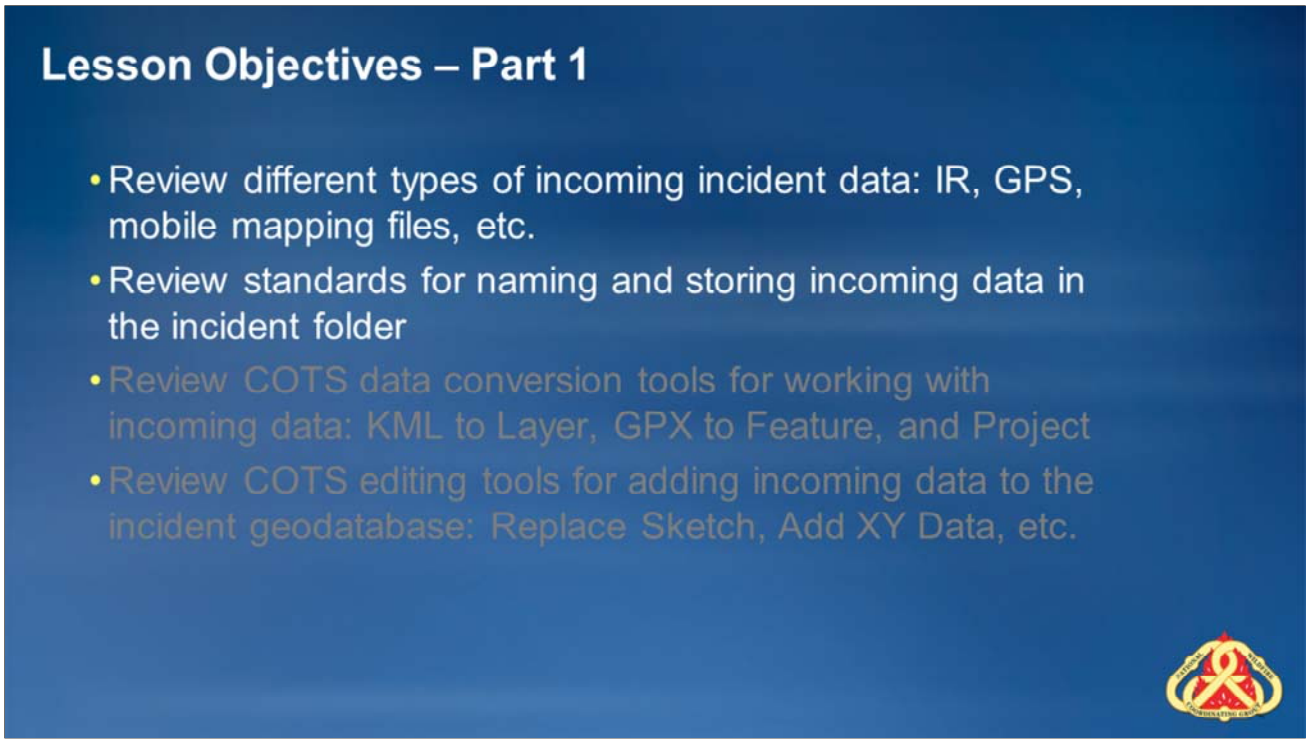


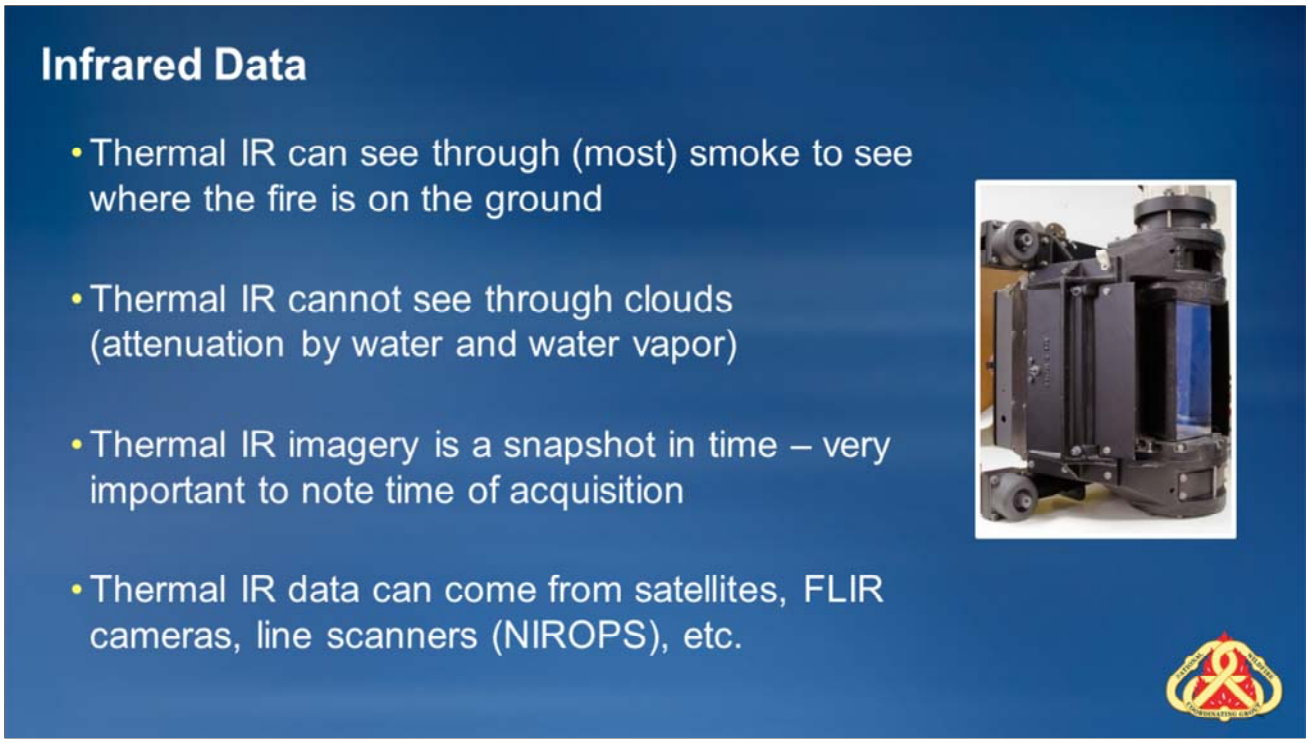
This presentation is part 1 of a 2 part lesson on working with incident data.



This lesson will familiarize you with the different sources, types, and formats of data you will receive working as a GISS on an incident. It will assist you in understanding your role in processing and storing incoming data, and incorporating that data into the incident geodatabase.



In Part 1 of this lesson students will learn about some of the different types of incident data they will receive and process during the course of an incident and review the standards associated with naming and storing incoming incident data.



The infrared imagery interpretations provided by the **National Infrared Operations Unit,** or NIROPS, are one of the most important sources of incident data for the situation unit.

Although the thermal infrared sensors used by NIROPS are unable to see through cloud cover, they can see through most smoke to capture a reasonably accurate image of where the fire is on the ground.

The imagery captured by NIROPS and interpreted by infrared interpreters represents a snapshot in time of fire activity, it is therefore important to note time of imagery acquisition on map products showing infrared data or fire perimeters that were updated with infrared imagery.

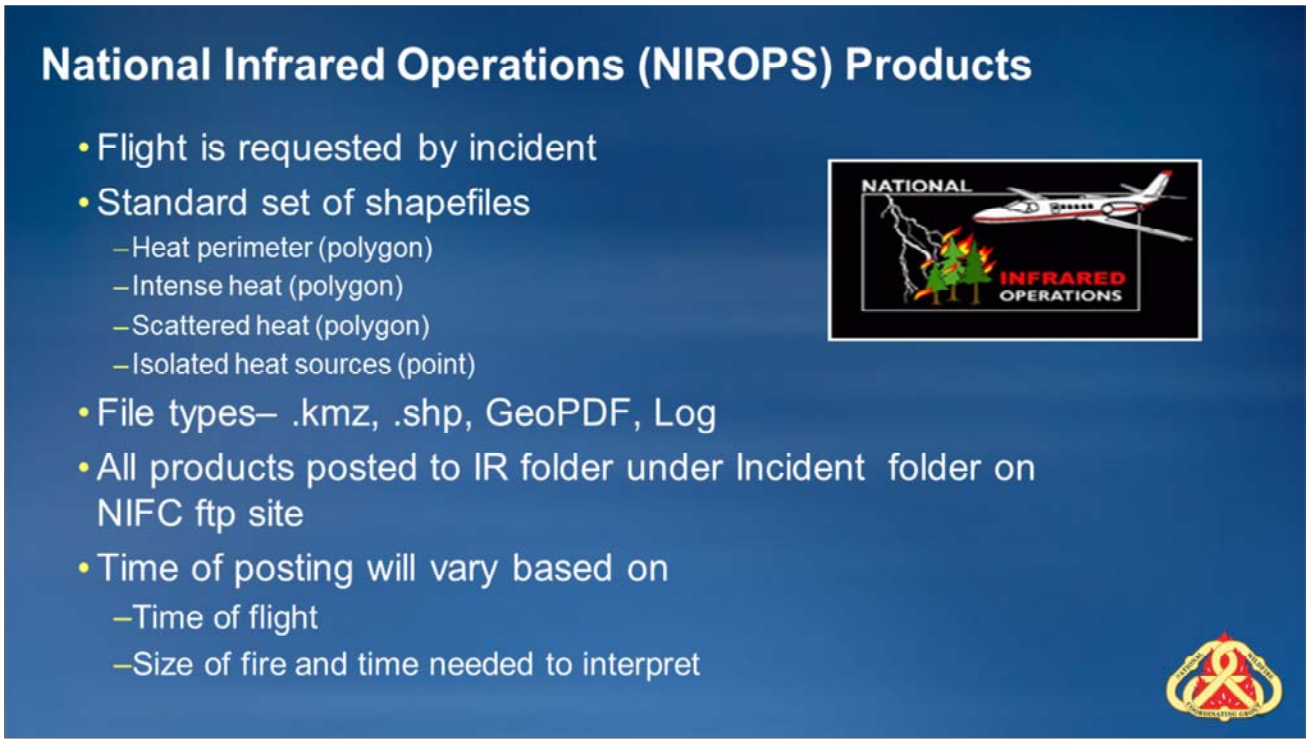
While thermal infrared data can come from a variety of sources including forward looking cameras and a number of satellite platforms, the vast majority of infrared data incorporated into the incident geodatabase comes from NIROPS interpreters.

Slide from IRIN, Tom Mellin

- The latest system from the **National Infrared Operations Unit** (NIROPS) is a Phoenix System Windows-based computer with a Dual Channel Data Acquisition Card. The output of this system is a geo-referenced ".tiff" file. On an image, **Red areas** come from high readings on the A Channel sensor (high temperatures) and indicate fire. **Green areas** show readings from the B Channel sensor (lower temperatures), with **lighter shades** correlating with warming temperatures. **Yellow areas** represent regions hot enough to register on the A Channel, but too low to trigger the fire detection algorithm.
- When thermal IR is unavailable due to weather, availability, or any other reason, the satellite **IR data** from **MODIS, VIIRS,** and **LANDSAT** available and the **Active Fire Mapping website** can be useful. It must be interpreted with caution, but there's a lot you can do with it.

Resources

- IR data from MODIS, VIIRS, and LANDSAT: https://fsapps.nwcg.gov/afm/gisdata.php



NIROPS flights are requested by the incident. Requesting a flight and communicating with the infrared interpreter (or IRIN) are often duties of the SITL, though the morning shift GISS may sometimes be primary point of contact for the IRIN.

The IRIN will post a set of files to the NIFC FTP site after they have completed their interpretation. This includes Google Earth KMZ files, shapefiles, PDF maps of the new interpretation and a log file, typically a word document.

Included in the post is a standard set of shapefiles showing the heat perimeter, intense heat, scattered heat, and isolated heat sources of the fire. It is typically the duty of the morning shift GISS to incorporate the newly updated heat perimeter into the incident data, and update certain map products with the new data prior to morning briefing.

The time the NIROPS data is posted will depend upon the time of the flight and the time needed to interpret the fire imagery. A GISS typically can setup up a line of communication with an IRIN to be notified when the data is posted.

Slide and note from IRIN, Tom Mellin

- All applicable shapefiles are delivered, e.g. no intense heat shapefile if fire is in mop-up stage

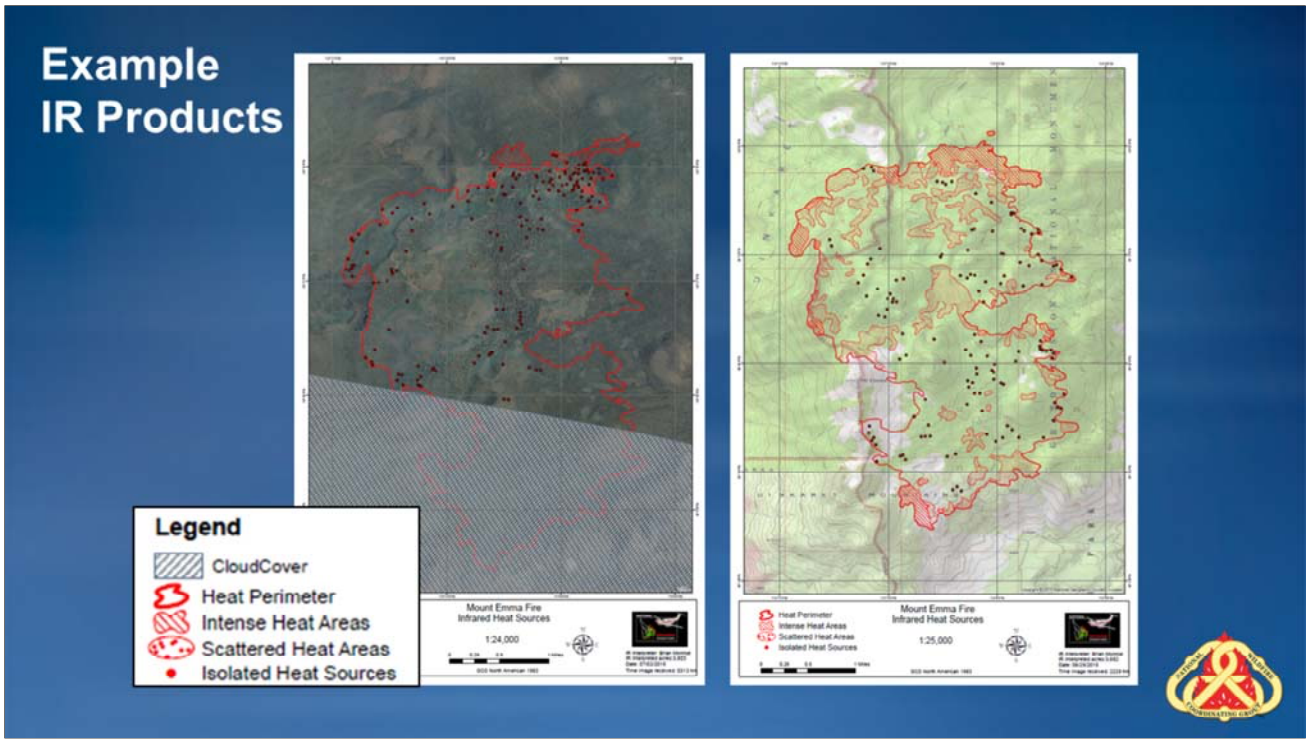
More notes

- Good communication between the SIT Unit on an incident and the IRIN is very important. This often happens between the SITL and IRIN, but sometimes the early morning GISS is the one in contact with the IRIN.
- IRINs will often be willing to send a text message when the imagery has been acquired and/or when it has been posted to FTP.
- NIROPS also maintains an active Twitter feed for each ship, which allows you to follow their flight progress each night.

Resources

- NIROPS: https://fsapps.nwcg.gov/nirops/
- NIFC, NIICD Infrared Branch: https://www.nifc.gov/NIICD/infrared/infrared.html

- Great 2013 article from Earthzine about NIROPS: https://earthzine.org/2013/09/17/the-fire-mappers/



Here are a few examples of the PDF maps delivered by NIROPS containing the standard set of heat perimeter, intense heat, scattered heat, and isolated heat shapefiles. As you can see cloud cover can obscure a portion of the fire area, in these instances, an interpretation may only cover a portion of the incident.

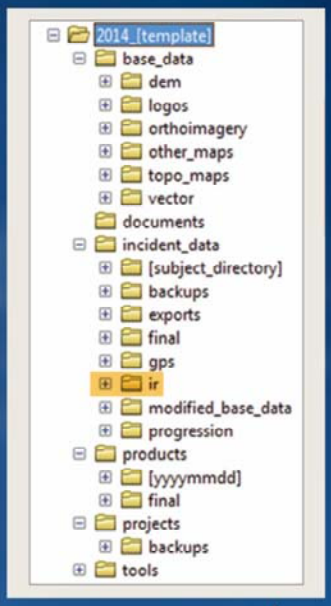
IR Products

- These map products were pulled from the NIFC FTP.
    - *20150629_Mount_Emma_IRIN_11X17Topo*
    - *20150702_Mount_Emma_IRIN_11X17NAIP*

- IR data is posted to the NIFC FTP site under each incident's GIS folder.
- GIS file types are usually .shp and .kmz

Storing IR Data

- Store NIROPS IR data downloaded from the NIFC FTP site in the **incident_data\ir** directory
- Dated sub-folders (e.g. 20170925) within the **ir** folder can assist in organizing and documenting data.
- **Always** note the **acquisition date and time** of the IR imagery on map products containing those data



- Within the incident directory, store downloaded NIROPS data in the incident_data\ir folder.
- Storing downloaded data within a dated sub-folder within the ir directory can help better organize and document incoming incident data.
- Remember to always note the date & time of imagery acquisition on map products containing IR data, or perimeters based on IR interpretations.

GPS Units

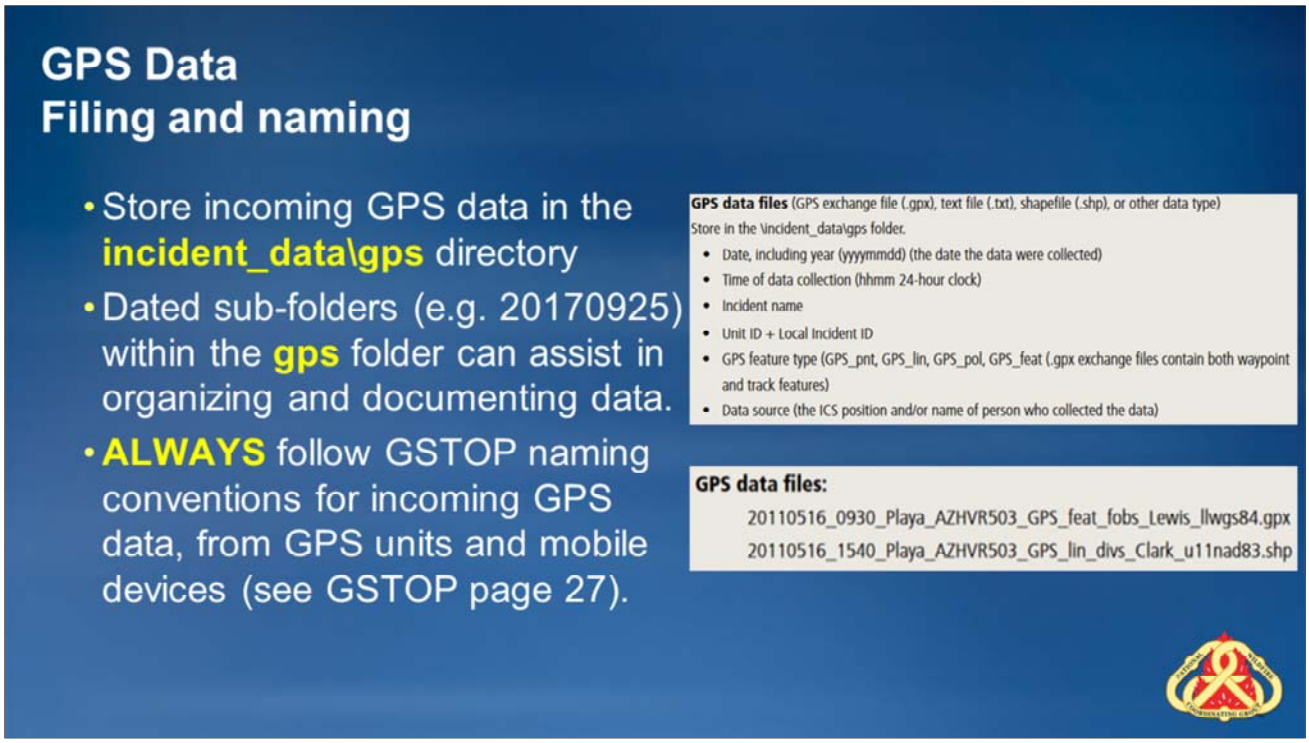
- As a GISS you may be asked to download incident data from a recreational GPS unit, often a Garmin brand GPS unit.
- Most newer GPS units produce a .gpx file that can be copy/pasted from the device into the incident data folder.
- It's best to bring a few varieties of download cables with you to an incident, including at least 1 mini-USB cable in case you need to download data.
- Older GPS units may require third party software for data download
- DNR GPS is a freely available application that will connect with most Garmin GPS units, including older units.
- Purpose built GPS units are becoming less common on incidents as more data is collected with mobile devices, such as smartphones and tablets.

Resources

- DNR GPS: http://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html

Mobile Devices

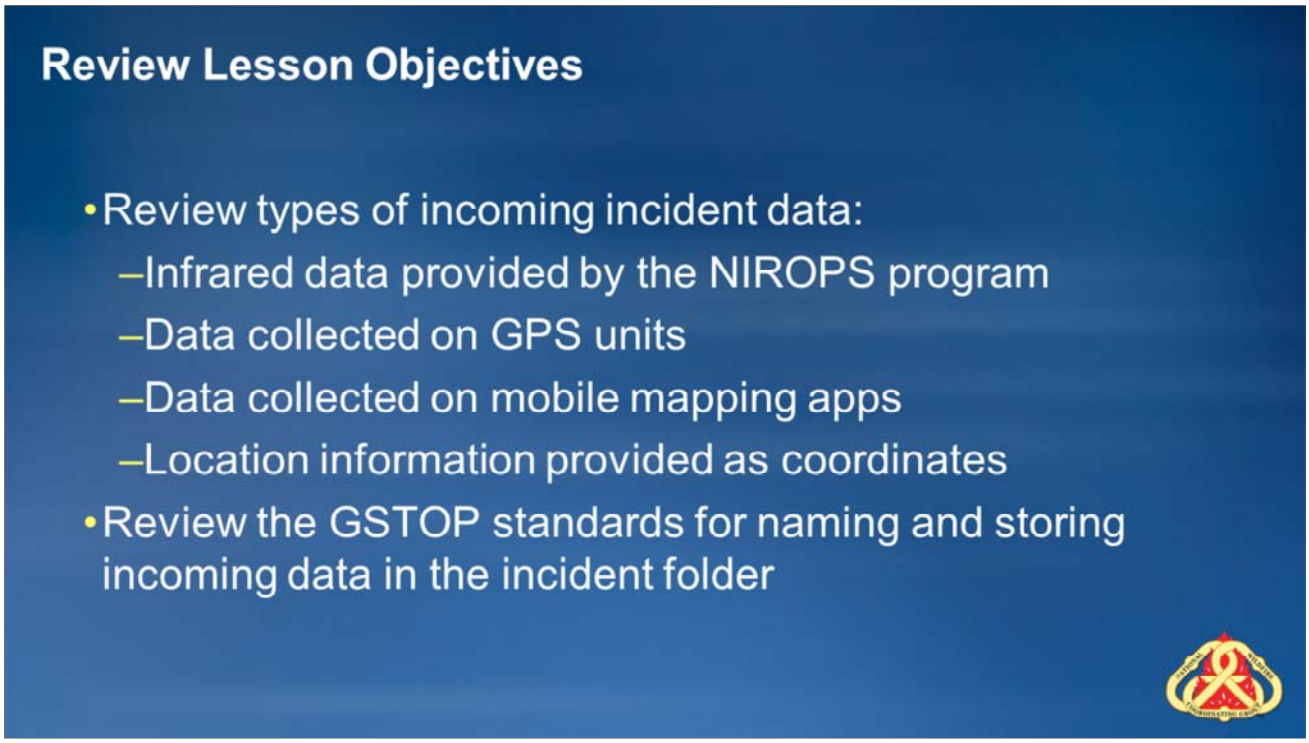
- In addition to the Esri Collector app, there are currently a number of geospatial apps that can be used to collect and export geospatial information on incidents.
- Avenza Maps is one of the more commonly used mobile mapping apps on wildfire incidents, and GISS frequently produce maps specifically for use in Avenza Maps.
- Data collected in Avenza maps can be exported in a number of different formats including kml, gpx, shp, and csv.
- The USFS, DOI and some other agencies have access to an Avenza Maps Pro License. The free version of the app only allows the user to download and save three maps at a time.



- Within the incident directory, store incoming GPSdata in the incident_data\gps folder.
- As with IR data, storing downloaded data within a dated sub-folder in the GPS directory can help the incident better organize and document incoming incident data.
- Always follow the GPS data file naming conventions outlined in GTSOP for data downloaded from GPS units or mobile devices.
- In the case of GPS files, GSTOP file names serve as a valuable source of metadata for the original file.

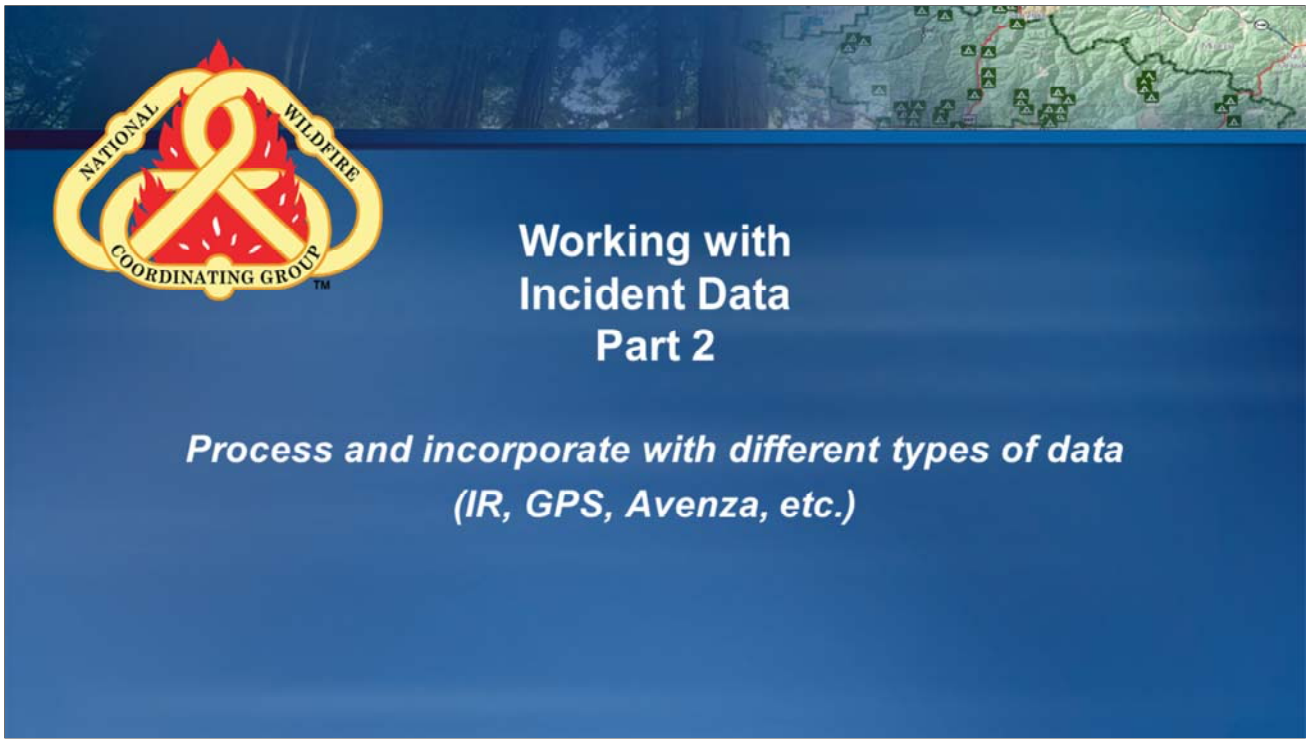
Coordinates

- Coordinates, particularly latitude longitude coordinates are a common way of communicating location information on an incident.
- The preferred format for coordinates on wildfires is **Degrees Decimal Minutes** sometimes referred to as (DDM coordinates)
- Aviation uses DDM to communicate locations with aircraft.
- While DDM is the preferred coordinate format, coordinates will come to you in all different formats through a variety of different media.
- Coordinates may come to you written on a general message form, or on a sticky note, or in an e-mail. The coordinates may be in degrees minutes seconds and be formatted perfectly, or in degrees decimal minutes or decimal degrees and lacking any formatting or character notation.
- Follow up with those who give you location information through coordinates to ensure the coordinates plot in the correct location on a map.
- When entering numeric longitude values, don't forget to include the negative values for locations in the western hemisphere.

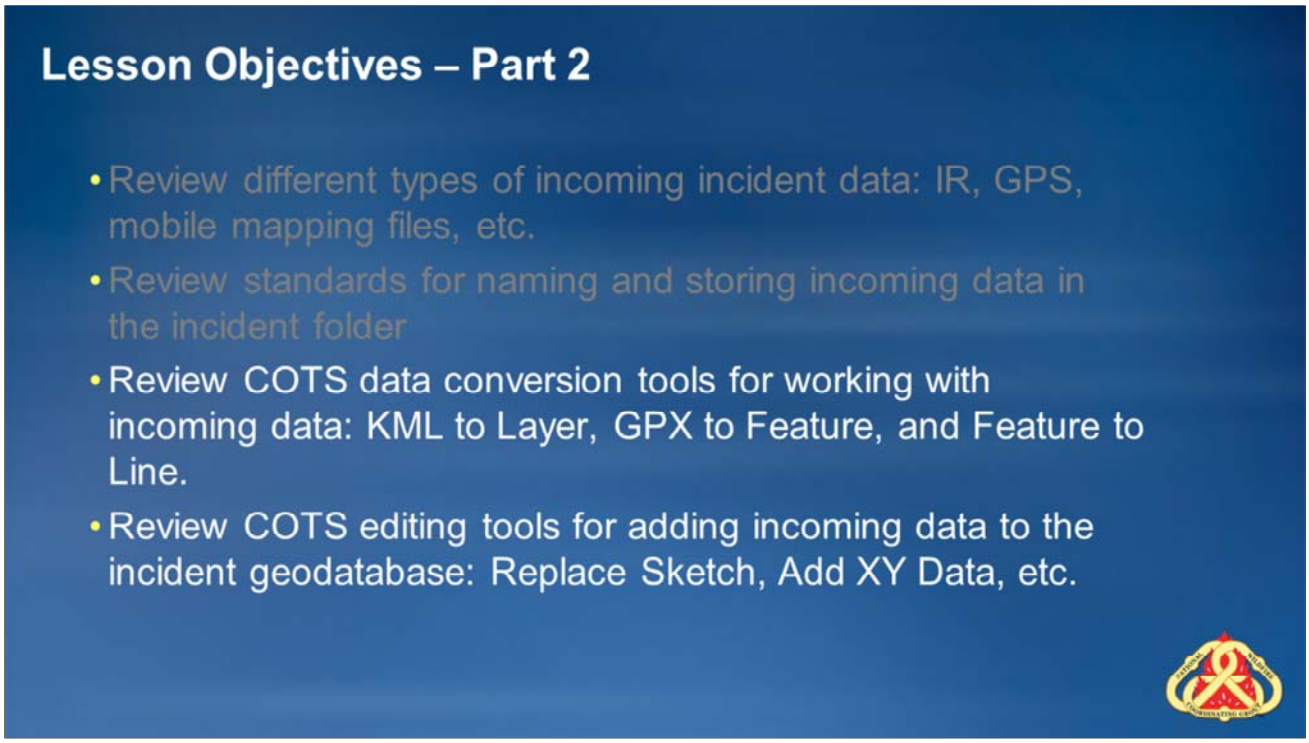


In this part of the lesson, we reviewed various sources and types of incoming data you may process to add to the incident geodatabase as a GISS. These include:

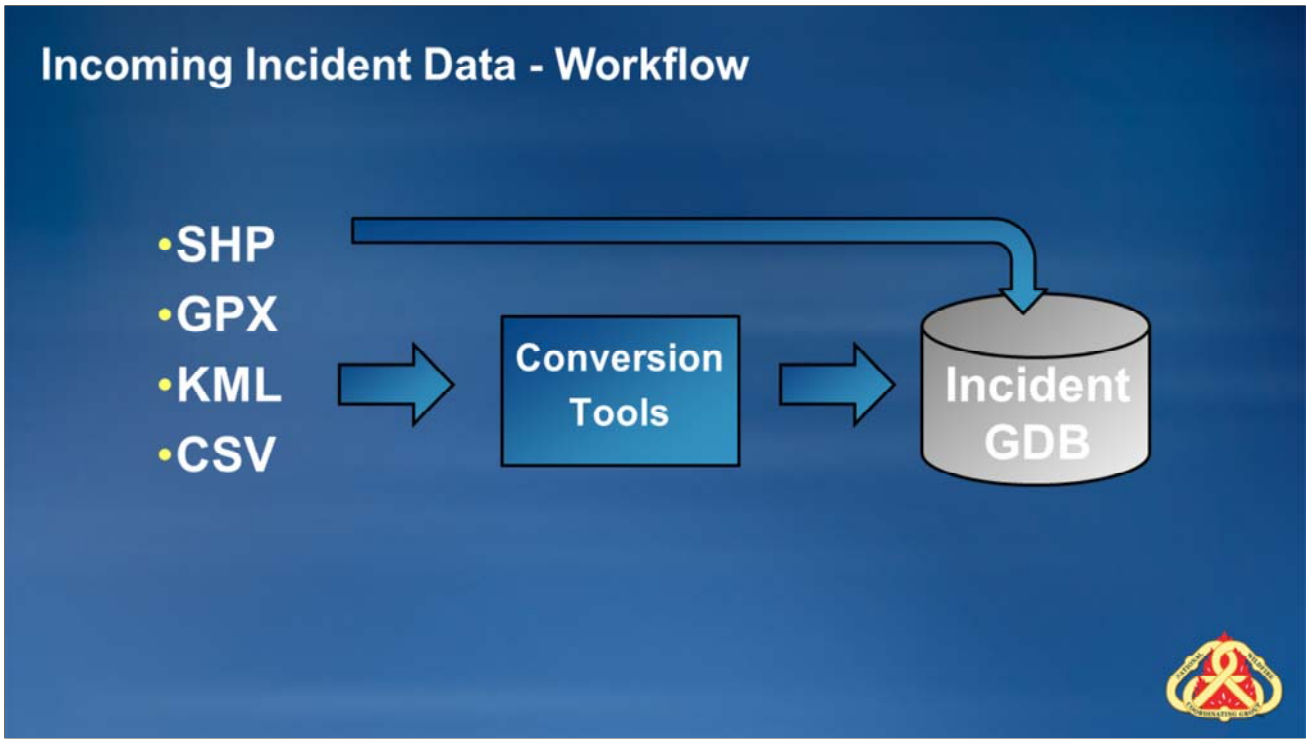
- Infrared data provided by the NIROPS program
- Data collected via recreational GPS units
- Data collected via mobile mapping apps
- And, locations provided as coordinates.
- We also did a quick review of the GSTOP standards associated with naming and filing some of this data.



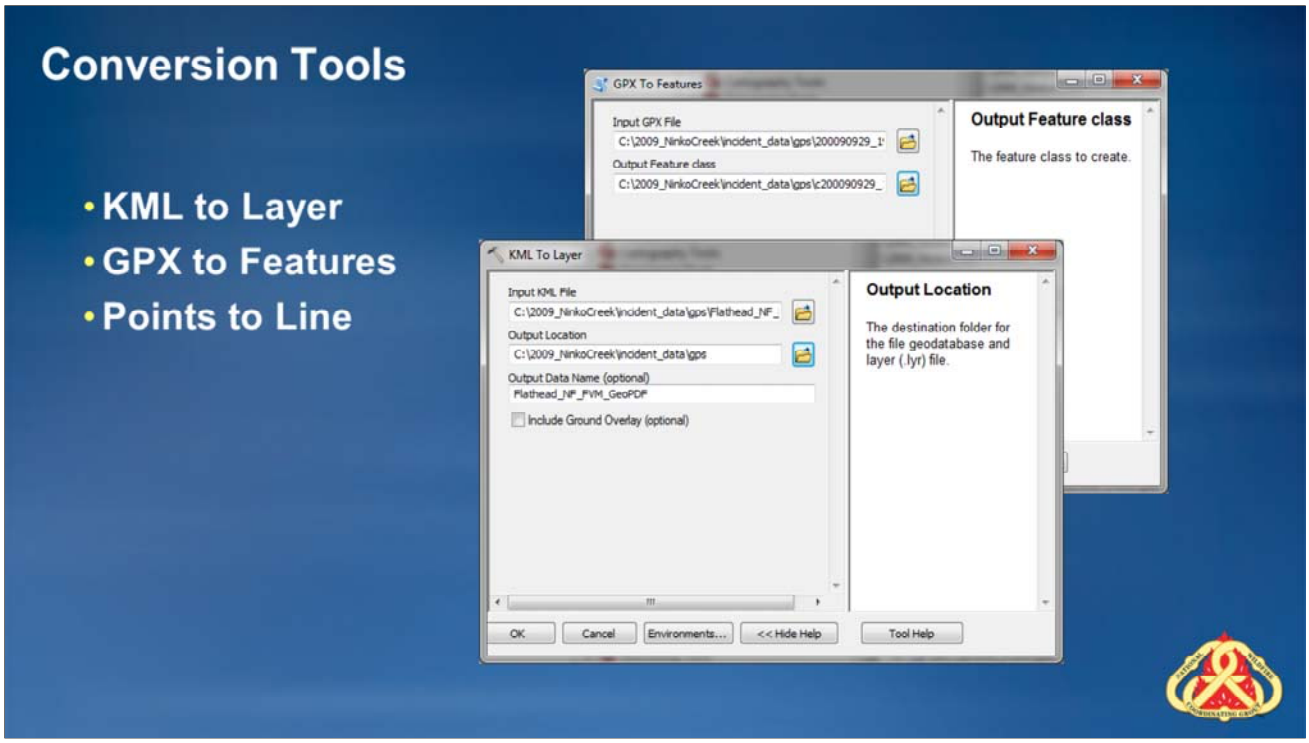
This presentation is part 2 of a 2 part lesson on working with incident data.



In Part 2 of this lesson students will learn about some of the COTS tools available to convert incoming incident data into formats suitable for incorporation into the incident geodatabase. Students will also learn some of the editing processes that streamline the incorporation of incoming incident data into the incident geodatabase.



With the exception of shapefiles which can be directly copied into the incident geodatabase, most other incoming incident data will have to be converted using a COTS GIS tool into a format that can be directly entered into the incident geodatabase, such as a shapefile or file geodatabase feature class.



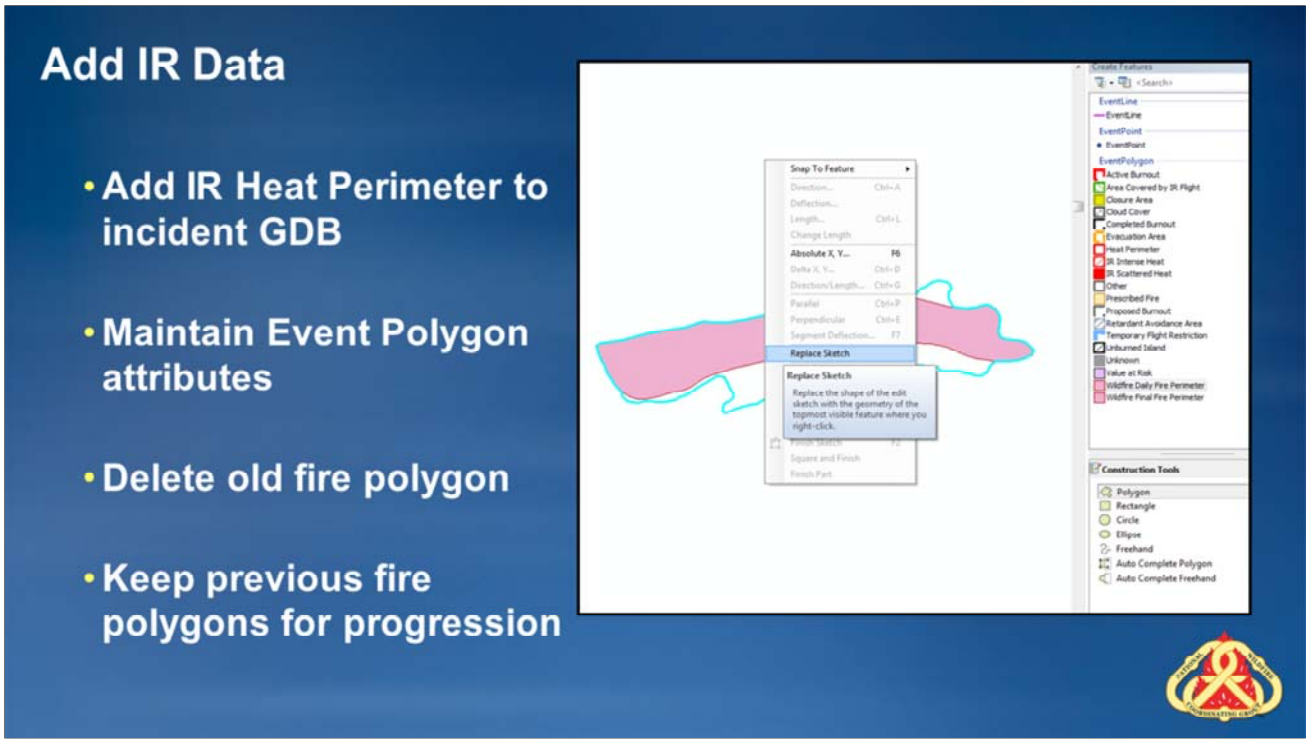
Conversion Tools

- The **KML to Layer** ArcGIS Dekstop tool converts a Google Earth KML file to a feature class housed inside a geodatabase.
- The **GPX to Features** tool converts a GPS file into a feature class or shapefile. Note that this tool only creates output points. The **Points to Line** tool can then be used to create lines features from output points in the GPS data in the GPX file captured incident line data.

Working with Incident Data – Offline workflow demonstration

- Demonstrations:
  - –Add IR Data
  - –Add GPS Data
  - –Adding KML files
  - –Coordinates provided (points)
  - –CSV file provided (points)

The remaining portions of the presentation will demonstrate an offline editing workflow in the event geodatabase. Demonstrations will cover adding IR and GPS data to the Event geodatabase and entering and adding coordinate data into the Event geodatabase. All editing within the demonstration will take place in an ArcMap session in which the Event feature classes have been symbolized appropriately, and configured with feature templates containing incident specific identification, contact, GACC and IMT information.



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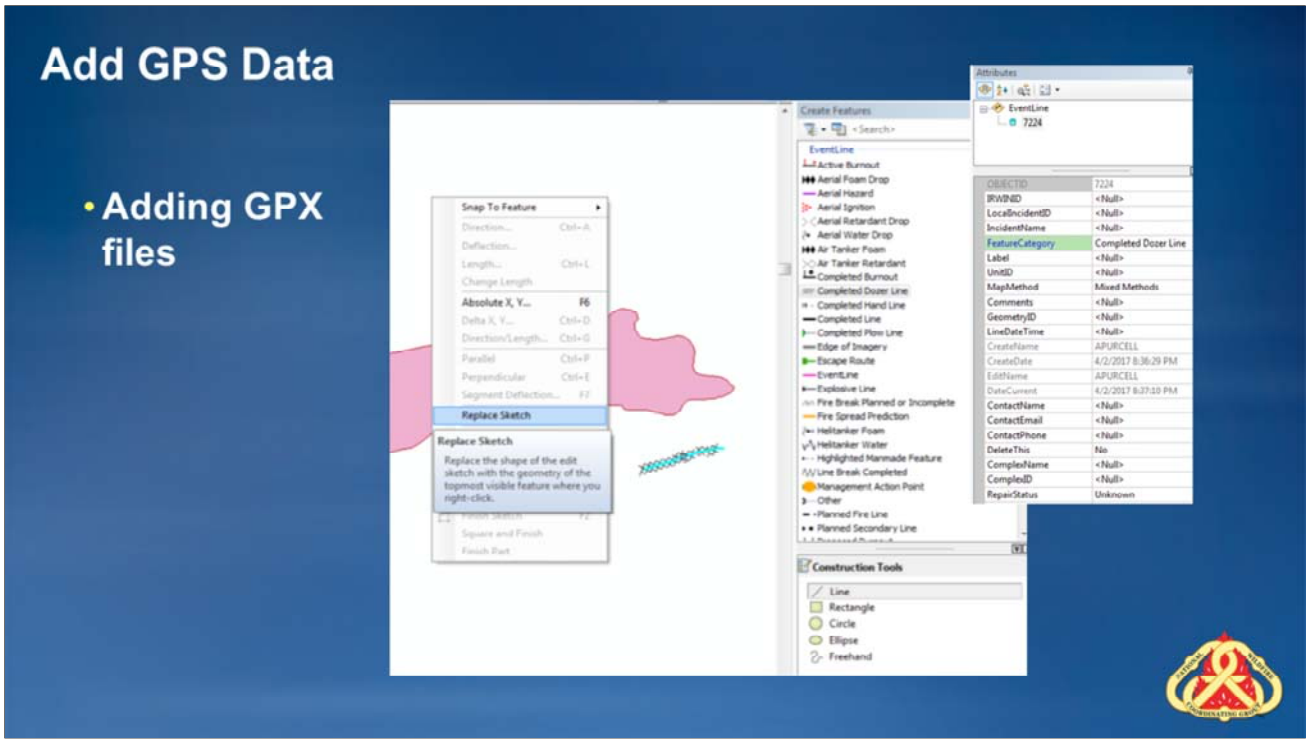
Add IR Data (SHP, Polygon)

1. Add the IR Heat Perimeter polygon from the 20090929_NinkoCreek_Shapefiles.
2. Start an edit session. Right click on the Event Polygon, go to **Edit Features** > **Start Editing**.
3. Make sure the Editor Toolbar is displayed.
4. Using the **Edit Tool** select the IR Heat Perimeter polygon.
5. Within the Editor Pane, click **Create Features** at the bottom. Select the **Polygon** Construction Tool, right-click on the selected polygon, and choose **Replace Sketch**.
6. Using the Replace Sketch tool preserves the default values you have pre-loaded in the editing template.
7. Right-click on the selected polygon a second time, and select **Finish Sketch** or use **F2**.
8. Within the Editor Pane, click **Attributes** at the bottom. Select **Feature Category**, and use the drop-down menu to select the point or line type.



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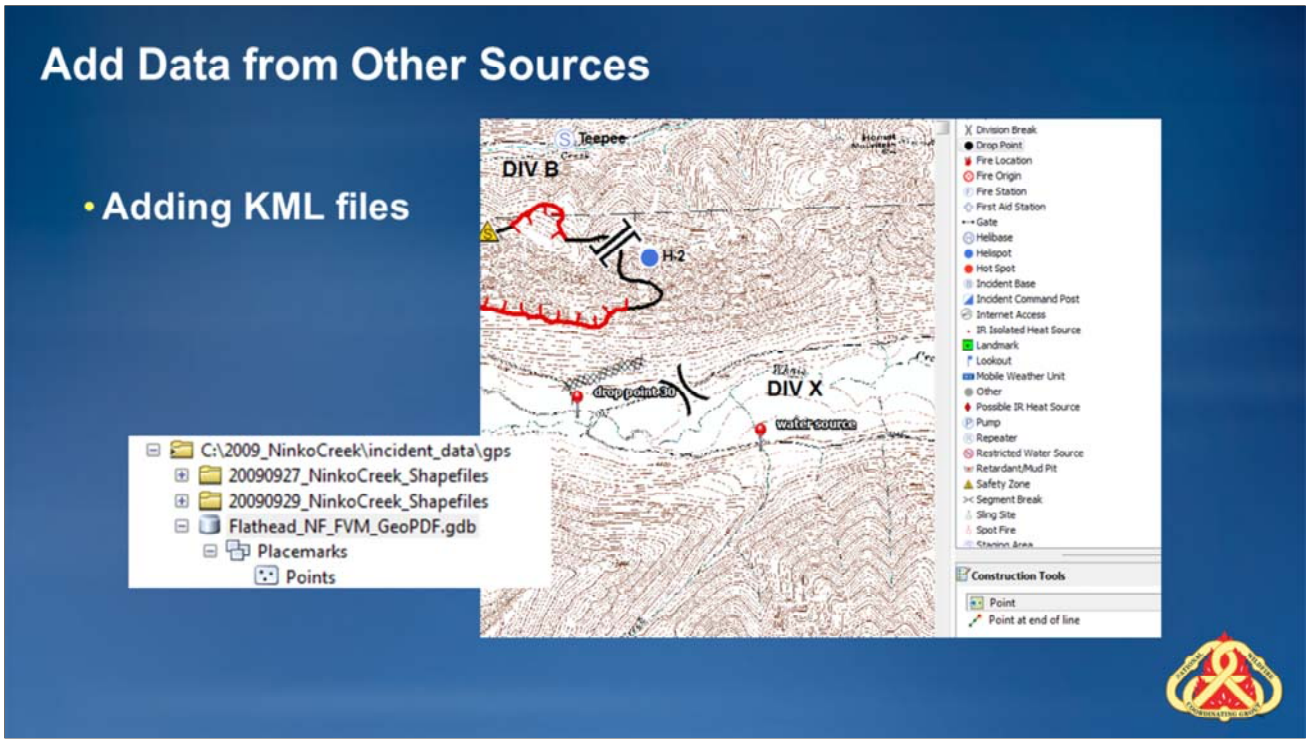
Add GPS Data (GPX, Track Points)

1. Download GPS data by copying .gpx file from the GPS unit to incident_data > gps folders on your computer.
2. Use conversion tool **GPX to Layer**. For lines, also use the data management tool for **Points to Line**. Both tools create shapefiles.
3. Add new SHP for GPS data to ArcMap.
4. Right-click Event Point or Event Line and go to **Edit Features > Start Editing**.
5. Using the **Edit Tool** select points or lines to be added to GDB.
6. Within the Editor Pane, click **Create Features** at the bottom. Select **Point** or **Line** under **Construction Tools**.
7. Right-click on the selected points or lines, and select **Replace Sketch**.
8. Right-click on the selected points or lines a second time, and select **Finish Sketch** or **F2**.
9. Within the Editor Pane, click **Attributes** at the bottom. Select **Feature Category**, and use the drop-down menu to select the point or line type.



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Adding a KML File

1. Use the Conversion tool in ArcToolbox, KML to Layer. This tool creates a geodatabase and adds the feature to the map.
2. Start an edit session. Right click on the Event Feature Class, go to **Edit Features** > **Start Editing**.
3. Select features to be added to the incident geodatabase.
4. Use the Replace Sketch Tool or Copy/Paste buttons on the main toolbar to copy features to the Event Feature Classes.
5. Points will come over with a FeatureCategory of **Unknown** because you cannot use the Replace Sketch Tool for points.
6. Show how the **Feature Template** default values were not passed to the new features.
7. Use the **Attributes** window to populate values for all 5 features at once.

Fill in the following values:

IRWINID: {E22B2AB3-D88F-4876-8972-3179C24712BF}

Local Incident ID: 000050

Incident Name: Ninko Creek

Unit ID: MT-FNF

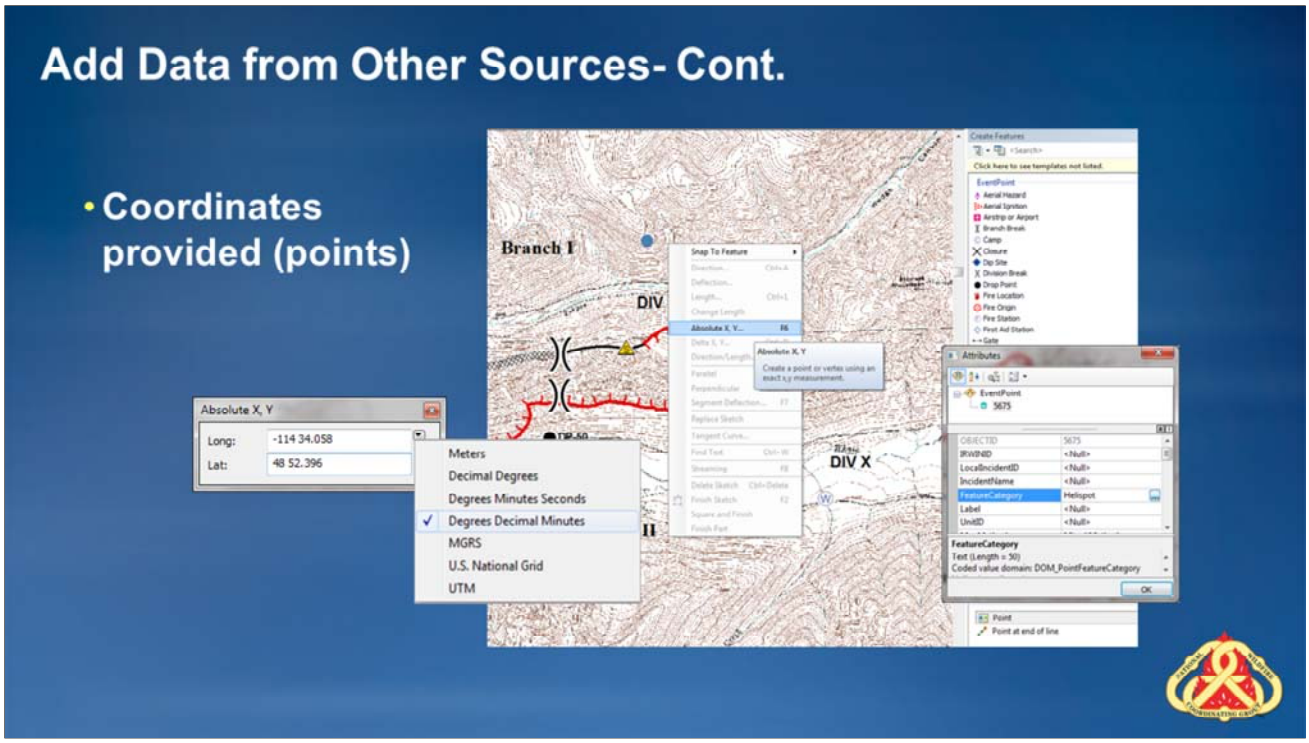
Contact Info: Yours

GACC: NRCC

IMTName: NRIMT

7. Change the Display Field by right clicking on **EventPoint** in the table of contents and selecting **Properties**. Then go to the **Display** tab and select Label as the display field.

8. Show how the various Drop Point labels can be added by clicking on the individual ObjectID. Once the **Label** field is updated it will display in the Attributes window.



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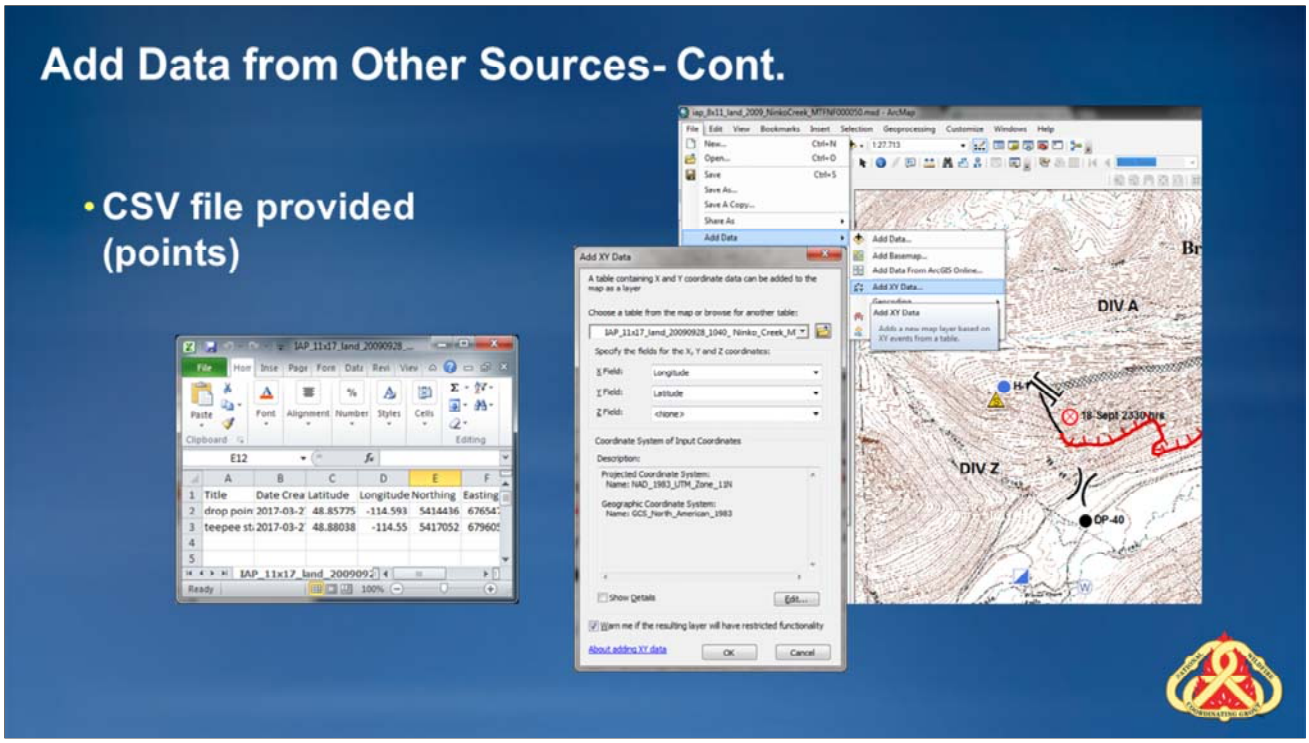
Add Data from Other Sources (Add Absolute XY)

1. Click on the Create New Feature tool in the Editor toolbar.
2. Hover over the map in Data view.
3. Right-click and select Absolute XY.
4. Enter the coordinates provided. You can select the format from a drop down menu that appears on the right side of the Abosolute XY the dialogue box.



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Add Data from Other Sources (Points, Individual Coordinates and CSV)

1. Go to File > Add Data > Add XY data
2. Choose a **table from the map or browser for another table** using the browse button in the Add XY Data dialogue box. Make the fields for coordinates and coordinate system are set correctly and click **OK**. The points will be added to the map as an event layer. If the table on which the XY event layer is based does not have an ObjectID field, you won't be able to perform certain tasks on the layer.
3. You can export the XY event layer to a feature class by using the **Export Data** tool. Right-click on the event layer in the table of contents and select Export Data. Set the output coordinate system and location and click **OK**.

Tips

- Tables must contain two fields: one for the x-coordinate and one for the y-coordinate. Values in the fields may represent any coordinate system and units such as latitude and longitude or meters.
- Fields must be numeric. If the fields are not numeric, such as when the coordinate value is stored in degrees, minutes, and seconds (for example, -120 13 58), the coordinates will be converted and displayed as decimal degrees.

Review Objectives

- Review conversion tools: KML to Layer, GPX to Feature, and Project
- Review Editor tools for adding new incident data to the incident geodatabase: Replace Sketch, Add XY Data, etc.

In this part of the lesson we reviewed some of the conversion workflows a GISS can follow to incorporate incoming incident data into the incident geodatabase, we also reviewed some of the COTS editing tools that can help streamline the process of entering incoming incident data into incident geodatabase.