



GISS User Guide: Data Standards and Workflows for Wildland Fire GIS Data

Northern Rockies Geographic Area

2018 Fire Season

Northern Rockies Data Standards Task Group
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Northern Rockies
GISS User Guide: Data Standards and Workflows for Wildland Fire

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Introduction

Following the fire season of 2017, the Northern Rockies Coordinating Group (NRCG) Board, in consultation with the National Wildfire Coordinating Group (NWCG), directed the formation of an interagency, inter-IMT group of specialists known as the Northern Rockies Data Standards Task Group (NR DSTG). The NRCG board tasked this group to develop a set of GIS data standards and workflows for use on incidents in the Northern Rockies Geographic Area (NRGA) that could meet or exceed all NWCG geospatial data standards and be consistently applied by all IMTs operating in the NRGA.

The task group that was formed consists of representatives from state and federal agencies. Initial membership included Billy Phillips (lead, USFS, PSC-2/SITL), Mark Slaten (Montana DNRC, GISS), Greg Dillon (USFS, SITL/GISS), and Lester Maas (BLM, GISS). In the spring of 2018 Lester Maas had to step down and additional members were brought into the group, including Adam Ridley (BLM, GISS), Morganne Lehr (USFS, GISS), and Kevin Kovacs (OGA rep, BLM, GISS). This task group worked to develop the data and workflow standards presented in this document.

The objectives of the task group were two-fold: 1) develop a set of data standards and workflows that will meet all applicable NWCG standards and can be consistently implemented on all wildfire incidents within the NRGA; and 2) build on experiences from NR IMTs that have been using ArcGIS Online and Collector in previous seasons to retain elements that worked well. The goal was to provide the best possible user experience for both field data collectors and GISS tasked with managing the data, while adhering to all national data standards.

The framework outlined here is the result of the task group's efforts to date, and includes information on NRGA-specific data standards and workflows, as well as a specific user guide to aid GISS in implementation. The data standards and workflow are built directly off of the national standards, and should look very familiar to any OGA teams coming into the Northern Rockies. Enhancements specific to the needs of IMTs and host agencies in the NRGA add flexibility to the user interface for field data collectors, and also facilitate the QA/QC and approval of data before it gets synced up to the National Incident Feature Service. The information provided in this document will ensure that all Northern Rockies IMTs, as well as OGA teams, can easily adopt and utilize the standards and workflows.

The intent is to implement these data standards and workflows for the 2018 Northern Rockies fire season. There is a recognized need for training and continuing education for the GISS and SITL community. Draft standards were presented at the 2018 NR Spring IMT meeting. Additional webinars, information, and communication among this user group will be facilitated by a Firenet site that will include a Northern Rockies GISS Forum.

Northern Rockies

Wildland Fire GIS Data Standards

GEODATA STANDARDS

Collection and management of geospatial data on wildfire incidents in the Northern Rockies must meet all applicable NWCG data standards. It must also meet the needs of the NRCG, IMTs and GISS to depict and communicate about incident information in a timely and efficient manner, while adhering to standard ICS feature categories and GIS Standard Operating Procedure ([GSTOP](#)) symbology wherever applicable.

The Northern Rockies data standard consists of three Geographic Area (GA)-wide ArcGIS Online hosted feature services, as well as local geodatabases created through the process of accessing and editing these feature services in ArcGIS. The feature services are outlined here, and the management of data in these feature services and accompanying geodatabases is in the workflow section below.

NR Event Data Feature Service

The Event Data Service is a GA-wide hosted feature service based on the [NWCG standard Event Geodatabase](#) that easily rolls into the [National Incident Feature Service](#) while allowing the GISS and Collector users additional flexibility to control edit and display abilities. Data can only be deleted by a GISS to safeguard against accidental deletion by field users. Consistent with national data standards, this service contains the following three feature layers:

1. **EventPoint_NR** - This feature layer is schema matched to the Event Point feature layer in the National Incident Feature Service. This layer includes all attributes and point feature categories found in the [NWCG Fire Event Point Data Standard](#).
2. **EventLine_NR** - This feature layer is schema matched to the Event Line feature layer in the National Incident Feature Service. This layer includes all attributes and line feature categories found in the [NWCG Fire Event Line Data Standard](#).
3. **EventPolygon_NR** - This feature layer is schema matched to the Event Polygon feature layer in the National Incident Feature Service. This layer includes all attributes and polygon feature categories found in the [NWCG Fire Event Polygon Data Standard](#).

NR Non Event Data Service

The Non Event Data Service is a GA-wide hosted feature service that supplements the NR Event Data Feature Service to store feature categories commonly-used on NR incidents or requested by IMT personnel, but not included in the NWCG point, line, or polygon data standards. Similar to the NR Event Data Feature Service, data can only be deleted by a GISS. This service contains the following 12 feature layers:

1. **NR_NonEvent_GenericPoint** - This layer stores generic point data supplied by Collector users in the View Only map. It can be used for recording any point location not included in the standard list of point feature categories in the EventPoint_NR layer, and provides users without access to the Collector edit map a way to mark locations.
2. **NR_NonEvent_AccountableProperty** - This layer stores the location and attributes for accountable property. It includes a PropertyType field that includes choices of Hose, Pump,

Porta-tank, Pumpkin, and Other. While there are feature category options for Pump and Water Tank in the EventPoint_NR layer, this Accountable Property layer is schema matched to the NIFC Survey – Accountable Property to facilitate easy, consistent, and thorough collection of attribute information such as property owner and serial number.

3. **NR_NonEvent_LogDeck** - This layer stores point information for log decks. This is not a feature category choice in EventPoint_NR, and was a very common point type in the NREGA in 2017.
4. **NR_NonEvent_StructureLocations** - This layer stores structure data. It is schema matched to the Montana NRIS structure feature class to allow easy copy/paste.
5. **NR_NonEvent_ClosureAreaPoints** - This layer stores any closure points established by law enforcement associated with a fire closure area (e.g., closure points on roads or trails).
6. **NR_NonEvent_PACE_Lines** - This layer stores line data depicting the PACE model (Primary, Alternate, Contingency, Emergency).
7. **NR_NonEvent_GenericLines** - This layer stores generic line data supplied by Collector users in the View Only map. It can be used for recording any line location not included in the standard list of line feature categories in the EventLine_NR layer, and provides users without access to the Collector edit map a way to mark locations.
8. **NR_NonEvent_ClosureAreaLine** - This layer stores any closure lines (closed roads or trails, for example). This is not a feature category choice in the EventLine_NR layer.
9. **NR_NonEvent_ValueAtRiskLines** - This layer stores any line data for Values at Risk (National Historic Trails, for example). This is not a feature category choice in the EventLine_NR layer.
10. **NR_NonEvent_FireHistoryPolygons** - This layer stores fire history polygon data. This data is schema matched to the USFS R1 fire history data layer to allow easy copy/paste.
11. **NR_NonEvent_MiscBoundaries** - This layer stores polygons for significant designated areas or jurisdictions that may be important to the management of an incident.
12. **NR_NonEvent_DivBreakLabels** - This layer stores Division and Branch labels for display in Collector.
13. **NR_NonEvent_GenericPolygons** - This layer stores generic polygon data supplied by Collector users in the View map. It can be used for recording any polygon location since the Collector maps do not have editing enabled for the EventPolygon_NR layer.

NR Photo Point Data Service

This Photo Point Data Service is a GA-wide feature service that contains only photo point data. Past experiences have proven that it's best to isolate photos from the rest of the data and store in a separate service to avoid potential sync errors. This is consistent with NWCG direction to create manage photo points in a separate service, using [this template](#). Data in this service can be deleted by Collector users. This service would contain only one feature layer.

1. **NR_NonEvent_PhotoPoints** - This layer stores photos and videos. The intention is to ensure that the Collector maps are restricted to “push” only for photos to enhance performance. Users will have the ability to delete their own photos.

FEATURE LAYER ORGANIZATION

To provide an optimal experience for field data collectors, data in these three feature services are organized into several filtered map layers and “layer views” for display in web maps and the Collector app. The reason for this is to control which features field users can edit and also to enable them to turn particular features on and off independently. Storing the data in three feature services ensures that: 1) all Event data are stored and managed together in one service, making download, edit, QA/QC, and syncing with the National Incident Feature Service as efficient as possible; 2) all data used by GISS for making paper maps are logically and efficiently stored to facilitate download, editing, and syncing of data; 3) GISS can set edit permissions appropriately by logical groups of features; and 4) field users have maximum flexibility to view particular subsets of features and avoid unnecessary clutter in the maps viewed with Collector.

A detailed breakdown of the data organization is in Table 1. The general organization is as follows:

- Editable layers in Collector web maps:
 - Photo Points
 - Generic Points, Lines, and Polygons
 - Accountable Property
 - Log Deck
 - Fire Points (all EventPoint feature categories except: IR Isolated Heat Source, Possible IR Heat Source, Pump, Unknown, Value at Risk, Water Tank)
 - Fire Lines (all EventLine feature categories except: Completed Line, Edge of Imagery, Fire Spread Prediction, Management Action Point, Temporary Flight Restriction, Uncontrolled Fire Edge, Unknown)
 - Structure Locations
- Non-editable layers in Collector web maps (i.e., field users can view but not edit, only GISS can edit):
 - IR Points (IR Isolated Heat Source, Possible IR Heat Source)
 - IR Polygons (Heat Perimeter, IR Intense Heat, IR Scattered Heat)
 - Fire Edge Status (Completed Line, Uncontrolled Fire Edge)
 - P.A.C.E. Lines
 - Management Action Points (lines)
 - Temporary Flight Restriction (lines)
 - Evacuation Areas
 - Fire Perimeter Polygon
 - Values at Risk Points
 - Values at Risk Lines
 - Retardant Avoidance Areas & Values at Risk Polygons
 - Fire History Polygons
 - Misc Boundaries
 - Division and Branch Labels

Table 1. Data organization in ArcGIS Online. Each row represents a separate layer in a web map as viewed from the Collector app. Layers with the word EDIT can be edited by field users with Collector; all others can only be edited by GISS using ArcGIS Desktop or ArcPro software. The Feature Layer column shows which AGOL feature layer or hosted layer view features are in. The Source Feature Service shows which of the three hosted feature services the data are actually stored in. The Feature Categories column shows which categories of actual point, line, or polygon data are in each layer.

Collector Layer Name	Feature Layer	Source Feature Service	Feature Categories
EDIT Photo Points	NR PhotoPoints	NR_PhotoPoints_2018	Photo Point
EDIT Generic Points	NR NonEvent Data – EDITABLE (GenericPoints)	NR_NonEvent_Data_2018	Generic Point
EDIT Generic Lines	NR NonEvent Data – EDITABLE (GenericLines)	NR_NonEvent_Data_2018	Generic Line
EDIT Generic Polygons	NR NonEvent Data – EDITABLE (GenericPolygons)	NR_NonEvent_Data_2018	Generic Polygon
EDIT Accountable Property	NR NonEvent Data – EDITABLE (AccountableProperty)	NR_NonEvent_Data_2018	Hose, Other, Porta-tank, Pump, Pumpkin
EDIT Log Deck	NR NonEvent Data – EDITABLE (LogDeck)	NR_NonEvent_Data_2018	Log Deck
EDIT Fire Points	NR Event Data – EDITABLE (EventPoint_NR)	NR_EVENT_Data_2018	Aerial Hazard, Aerial Ignition, Airstrip or Airport, Branch Break, Camp, Closure Point, Dip Site, Division Break, Drop Point, Fire Location, Fire Origin, Fire Station, First Aid Station, Gate, Helibase, Helispot, Hot Spot, Incident Base, Incident Command Post, Internet Access, Landmark, Lookout, Mobile Weather Unit, Other, Repeater, Restricted Water Source, Retardant/Mud Pit, Safety Zone, Segment Break, Sling Site, Spot Fire, Staging Area, Unimproved Landing Area, Water Source, Wind Speed & Direction, Zone Break
EDIT Fire Lines	NR Event Data – EDITABLE (EventLine_NR)	NR_EVENT_Data_2018	Access or Improved Road, Active Burnout, Aerial Foam Drop, Aerial Hazard, Aerial Ignition, Aerial Retardant Drop, Aerial Water Drop, Air Tanker Foam, Air Tanker Retardant, Completed Burnout, Completed Dozer Line, Completed Hand Line, Completed Plow Line, Escape Route, Explosive Line, Fire Break Planned or Incomplete, Helitanker Foam, Helitanker Water, Highlighted Manmade Feature, Line Break Completed, Other, Planned Fire Line, Planned Secondary Line, Proposed Burnout, Proposed Dozer Line, Ridge/Geographic Feature, Road as Completed Line

Collector Layer Name	Feature Layer	Source Feature Service	Feature Categories
EDIT Structure Locations	NR NonEvent Data – EDITABLE (StructureLocations)	NR_NonEvent_Data_2018	Structure Locations
IR Points	NR Hosted Layer View 1 – Non-Editable (EventPoint_NR)	NR_EVENT_Data_2018	IR Isolated Heat Source, Possible IR Heat Source
Fire Edge Status	NR Hosted Layer View 1 – Non-Editable (EventLine_NR)	NR_EVENT_Data_2018	Completed Line, Uncontrolled Fire Edge
IR Polygons	NR Hosted Layer View 1 – Non-Editable (EventPolygon_NR)	NR_EVENT_Data_2018	Heat Perimeter, IR Intense Heat, IR Scattered Heat
P.A.C.E. Lines	NR NonEvent Data – EDITABLE (PACE_lines)	NR_NonEvent_Data_2018	Primary, Alternate, Contingency, Emergency (editing disabled in web map)
MAPs – Mgt Action Points	NR Hosted Layer View 3 – Non-Editable (EventLine_NR)	NR_EVENT_Data_2018	Management Action Point
Evacuation Areas	NR Hosted Layer View 2 – Non-Editable (EventPolygon_NR)	NR_EVENT_Data_2018	Evacuation Area
Fire Perimeter Polygon	NR Event Data – EDITABLE (EventPolygon_NR)	NR_EVENT_Data_2018	Wildfire Daily Fire Perimeter (editing disabled in web map)
Values At Risk Points	NR Hosted Layer View 2 – Non-Editable (EventPoint_NR)	NR_EVENT_Data_2018	Value at Risk
Values At Risk Lines	NR NonEvent Data – EDITABLE (ValuesAtRiskLines)	NR_NonEvent_Data_2018	Value at Risk
Retardant Avoidance – Values at Risk Polys	NR Hosted Layer View 3 – Non-Editable (EventPolygon_NR)	NR_EVENT_Data_2018	Retardant Avoidance Area, Value at Risk
Div Break Labels	NR NonEvent Data – EDITABLE (DivBreakLabels)	NR_NonEvent_Data_2018	Div A – Div Z, Branch I – Branch IV (editing disabled in web map)
Fire History Polygons	NR NonEvent Data – EDITABLE (DivBreakLabels)	NR_NonEvent_Data_2018	Fire History Polygons (editing disabled in web map)
Misc Boundaries	NR NonEvent Data – EDITABLE (DivBreakLabels)	NR_NonEvent_Data_2018	Other Boundary, Research Natural Area Boundary, Roadless Area, Rural Fire Protection Boundary, Wilderness Area, Wildland Agency Protection (editing disabled in web map)
TFR	NR Hosted Layer View 2 – Non-Editable (EventLine_NR)	NR_EVENT_Data_2018	Temporary Flight Restriction
Repair Status Point	NR Hosted Layer View 4 – Non-Editable (EventPoint_NR)	NR_EVENT_Data_2018	Event Points symbolized by repair status
Repair Status Line	NR Hosted Layer View 4 – Non-Editable (EventLine_NR)	NR_EVENT_Data_2018	Event Lines symbolized by repair status

HOSTING AND REDUNDANCY

All GA-wide feature services are set up as hosted feature services on ESRI's servers through the NIFC ArcGIS Online organization. Setting up GA-wide hosted feature services like this is a different approach to managing incident data than has been used in past seasons. The National Incident Feature Service is a similar concept that is nationwide and accessed (in theory) by all active incidents in the U.S. However, that service is not a "hosted service" on ESRI's servers. It is instead an ArcGIS Server service, hosted on the NIFC Enterprise Geospatial Portal (EGP) servers. In contrast, most incidents in the Northern Rockies in past seasons have created separate hosted services (hosted by ESRI) for each incident. The concept of a set of GA-wide hosted services sits somewhere between these two approaches.

There are several advantages to setting up GA-wide hosted feature services. First, all active incidents in the Northern Rockies will be feeding data into the same service. This will provide complete, consistent, and up-to-date information at the Geographic Area level, providing a single source of information for the NRCC and enabling the Northern Rockies Remote Sit Unit to have direct access to all incident data across the GACC. Second, it will greatly streamline the process of setting up ArcGIS Online and Collector for a new incident. Rather than having to create new feature services at the beginning of an incident, team GISS will simply copy the template web maps that have the GA-wide services pre-loaded (more details below under workflow). This will also make it more possible for Type 3 and Type 4 incidents to use ArcGIS Online and Collector than it has been in the past, particularly with support from the Remote Sit Unit. Lastly, taking advantage of ESRI's servers and the NIFC ArcGIS Online organization saves the Northern Rockies from investing in and maintaining our own server hardware.

As a new approach to online data management, use of GA-wide hosted services may also face some challenges. Although the NR data standards task group has done some functionality testing on the services pre-season, we will not fully know how well they function until we get into fire season and have multiple incidents and users accessing the services at the same time. To protect against failure, the task group has set up backup copies of the feature services. The operational services are identified as the "Primary Version" and there are duplicate backup copies of each service. In the case that the Primary Version starts experiencing problems, we can switch to one of the backup services. If the backup services fail, the last option would be for users to simply follow the [National Incident Workflow](#) for Event data and create incident-level services for Non Event and Photo Point data, using templates in the NIFC ArcGIS Online Organization for a NR Non Event Service and [Photo Point Service](#) (NIFC AGOL login required).

Northern Rockies

Wildland Fire Incident Data Workflows & GISS User Guide

WORKFLOW OVERVIEW

ArcGIS Online Workflows

In 2017, the NWCG Geospatial Subcommittee established a set of workflows for using the National Incident Feature Service. Some improvements were made following the 2017 season, and an updated [National Incident Feature Service Workflows document](#) for the 2018 season was produced by the NIFC ArcGIS Online organization. Additional supporting information and training videos about the Event Geodatabase workflow in general area also available at the [GISS Training website](#). Workflows that we propose for the Northern Rockies are based heavily on these national workflows, and we recommend that all GISS keep a copy of the national workflow document and familiarize themselves with material on the website linked above.

For the Northern Rockies, we propose using the “Approval Workflow” outlined in the NIFC document, with modifications to work with the Northern Rockies GA-wide services instead of national services. The basic structure of this workflow consists of three separate web maps:

1. A Collector EDIT map that shows all features and is used by field users Collecting data. Each new feature defaults to a value of “Proposed” in the *FeatureStatus* field and a value of “Incident” in the *FeatureAccess* field.
2. A Sit Unit APPROVER map that shows all features, and includes displays of points, lines, and polygons symbolized by *FeatureStatus* values to easily identify newly-collected (proposed) features. This map is used by a SITL and/or lead GISS to review new features and set the appropriate values of the *FeatureStatus* (Proposed, In Review, Approved, Archive) and *FeatureAccess* (Public, Cooperators, Incident, Restricted) attributes for each feature.
3. A Collector VIEW map that shows only features with a *FeatureStatus* of “Approved” and *FeatureAccess* not “Restricted”.

The Northern Rockies data standards task group has set up web map templates in the NIFC ArcGIS Online organization for each of these three web maps. They are available in the [NR GISS Development Group](#) (requires NIFC AGOL login). Each web map template is pre-loaded with the appropriate Northern Rockies GA-wide feature services, with the appropriate symbology and editing privileges set. To start using ArcGIS Online and Collector on a new incident, a GISS will only need to open each web map template, Save As a new web map with the incident name, and share the map with the appropriate IMT ArcGIS Online group(s).

The NIFC workflow document also describes a suppression repair workflow that uses a separate web map to symbolize features based on the value of the *RepairStatus* field. Again, the Northern Rockies data standards task group has created a suppression repair web map template (NR Collector REPAIR Map) with the appropriate Northern Rockies feature services and symbology. Use of this suppression repair workflow will be optional.

A critical workflow step in meeting the national standards will be pushing data from the Northern Rockies feature services up to the National Incident Feature Service at regular intervals. Making the NR Event feature service exactly schema matched with the national service will help to facilitate this.

An effort to develop scripts that can automate the process of pulling features from the NR Event Data service and copying them into the National Incident Feature Service is planned. These scripts can be written so that only features marked with a *FeatureStatus* of “Approved” and *FeatureAccess* of “Cooperators” or “Public” will be copied to the national service.

Until the automated scripts are developed, data will be pushed up to the National Incident Feature Service manually by the GISS. Detailed, step-by-step instructions for manually copying data for a particular incident (or group of incidents) to the national service are provided below. A GISS or SITL on an incident will use this manual process to push data to the National Incident Feature Service at least daily.

ArcGIS Desktop Editing Workflow

Aside from the basic process of managing ArcGIS Online data described above, it will be necessary for the GISS on an incident to create local copies for editing. This process will follow the steps described in section 6.1 of the NIFC workflow document linked above, with the important exception that instead of connecting to the EGP server and creating a local copy of the National Incident Feature Service, the user will be connecting to the Northern Rockies feature services and creating local copies of those.

For local copies of the data, the expectation is that data will be managed in accordance with all NIFC and NWCG Geospatial Committee standards outlined in the GIS Standard Operating Procedures ([GSTOP](#)) for wildfire incidents. Local data created from the NR Event Data feature service will adhere to the Event Geodatabase standard, and a zipped copy of each day’s Event Geodatabase backup should be posted to the NIFC FTP site nightly.

Use of Tile Package Basemaps for the Collector App

Tile Packages (or TPKs) are compressed raster basemaps for use in the Collector app on mobile devices. For use on an incident, they are typically created for the vicinity of the fire (a 50 mile x 50 mile area around the fire polygon is common) and made available by the GISS or SITL to incident personnel using Collector. They are loaded directly from a laptop to mobile devices via device-specific USB cables - a process known as “sideloading.” TPKs provide quality basemap coverage to field data collectors, and save them from having to download a basemap over an ICP wi-fi network or cellular network (which can be prohibitively slow in remote settings).

In the Northern Rockies, a set of four standard TPKs is available across the GACC. These TPKs include:

- Aerial photos with road layer
- Montana base map with cadastral layer (Montana only)
- USGS topo quads
- R1-Forest Visitor Maps

When a new incident starts, TPKs specific to that incident can be created for the incident by clipping an appropriate area out of the four TPKs above. Detailed instructions for this are provided below.

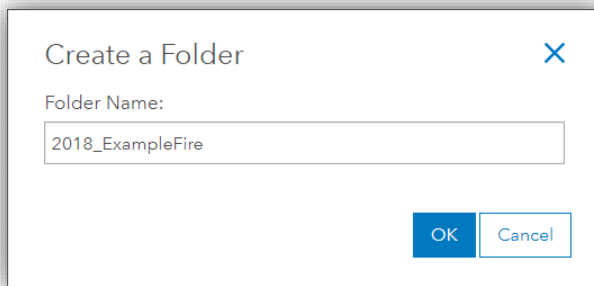
DETAILED WORKFLOWS

All instructions below for managing data in ArcGIS Online will require a login to the NIFC Organization with the GISS user role assigned. The home page for the NIFC ArcGIS Online Organization is: <http://nifc.maps.arcgis.com/home/index.html>.

Create a Folder for All Incident-Related Content in ArcGIS Online

The first thing that needs to be done when setting up a new incident in ArcGIS Online is to create a folder to store all content for that incident.

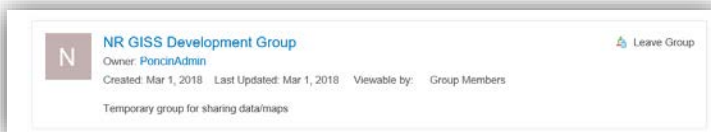
1. From the top menu bar in ArcGIS Online, select “Content”.
2. In the left panel, click the link to create a New folder. The recommended folder name format is “Year_FireName” (e.g., 2018_ExampleFire). Click OK.



Create Web Maps for the Incident

As described in the overview above, three web maps will be used for the ArcGIS Online Approval Workflow. Templates for each of these are available in the NR GISS Development Group. The steps below describe the process for creating the incident web maps from these templates.

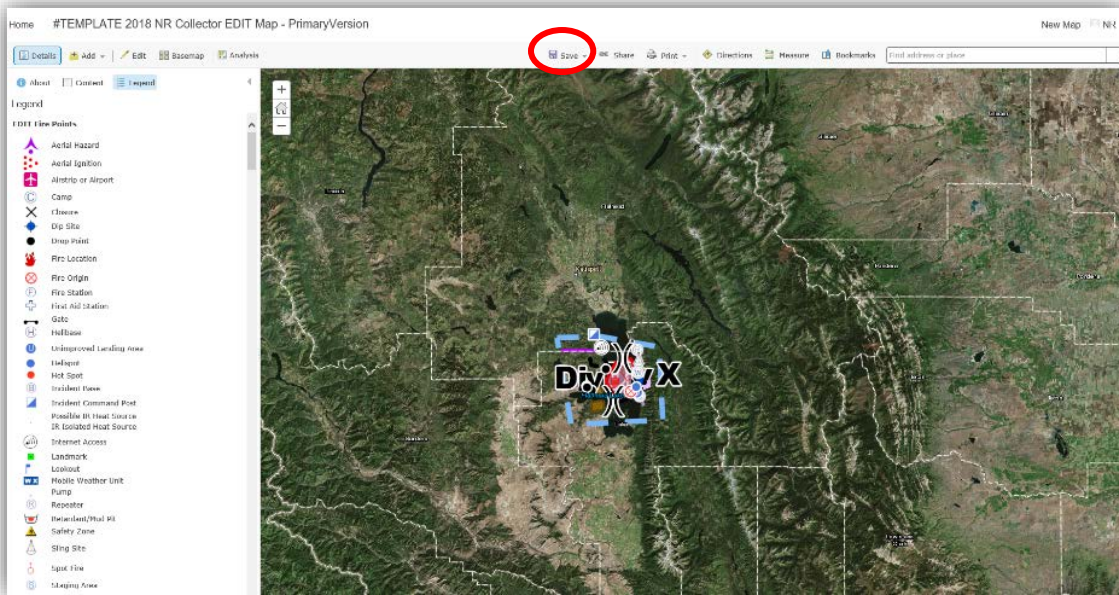
1. From the top menu bar in ArcGIS Online, select “Groups”.
2. Find the group called “NR GISS Development Group”. All active GISS in the Northern Rockies should be members of this group. If you do not see this group in your list, search for it and request to be added. There will also be a link to request group membership on the NR Fire GIS FireNet site.



3. Once in the group, click on the Content tab. Then under Refine Content on the left, click on “Maps”. This will display only the web maps in this group, and you should see the template web maps.
4. Select the map titled “#TEMPLATE 2018 NR Collector EDIT Map – PrimaryVersion” and choose to Open in Map Viewer.



- Zoom to your fire area and select the drop down arrow next to Save. Choose Save As...



- Rename the map to “Year Fire Name EDIT Map” (e.g., “2018 Example Fire EDIT Map”). Under Categories select the appropriate category (in most cases Fire/Wildland). Select any appropriate tags, and fill in a brief summary. Click the Drop Down arrow next to “Save in Folder”, and select the folder you just created for your Fire. Click Save Map.

Save Map ✕

Title:

Categories: ✕
 + Assign Category ▾

Tags:
 Add tag(s)

Summary:

Save in folder: ▾

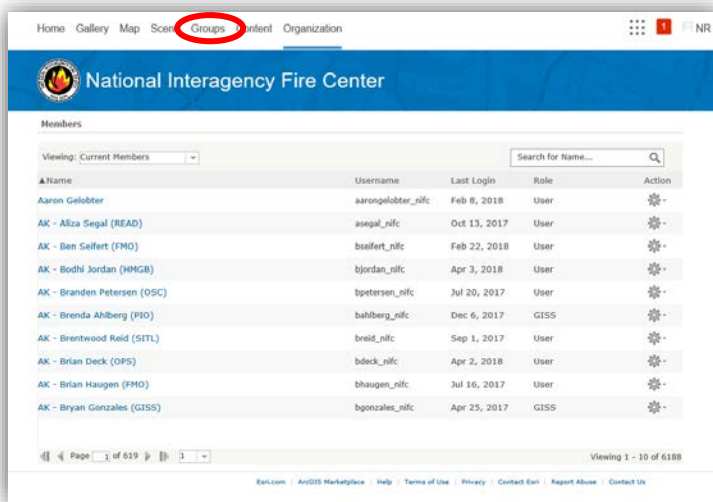
- In the new web map, set bookmarks for your fire area. Zoom to the entire fire area, select Bookmarks from the menu bar, and click Add Bookmark. Type in the fire name and hit Enter. Repeat for specific areas of the fire if desired (it can be convenient to have a bookmark for each Division on a large fire). When finished creating bookmarks, click Save.
- Return to the “NR GISS Development Group” and repeat steps 4 – 7 to save incident-specific web maps from the Sit Unit APPROVER and Collector VIEW map templates. A web map template for suppression repair (#TEMPLATE 2018 NR Collector REPAIR Map) is also available for when the incident gets to that stage.

Note: YouTube videos are available that walk through the steps above for the NIFC national incident workflows. They may be helpful for users new to this process. However, be sure to use the Northern Rockies templates rather than the national templates shown in the videos. Also, the videos include the creation of an incident-specific photo points feature layer that should not be necessary because the Northern Rockies template maps are pre-populated with the Northern Rockies NR_PhotoPoints service. The videos cover the [Event Geodatabase Standard Workflow](#), the [Event Geodatabase Approval Workflow](#), and the [Suppression Repair Workflow](#). They are all included in the context of the [Event GDB Workflow](#) on the GISS Training website.

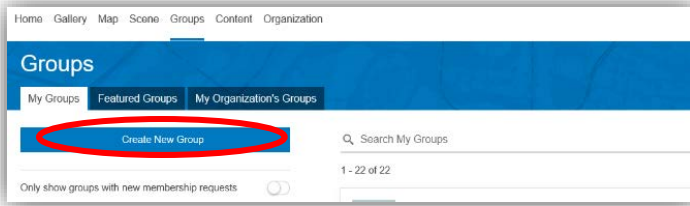
Creating Groups to Share ArcGIS Online Content

If your team already has a Mobile Editing and Viewer Group set up, you may skip this section. If not, then please follow these steps to ensure your groups are set up with the correct permissions.

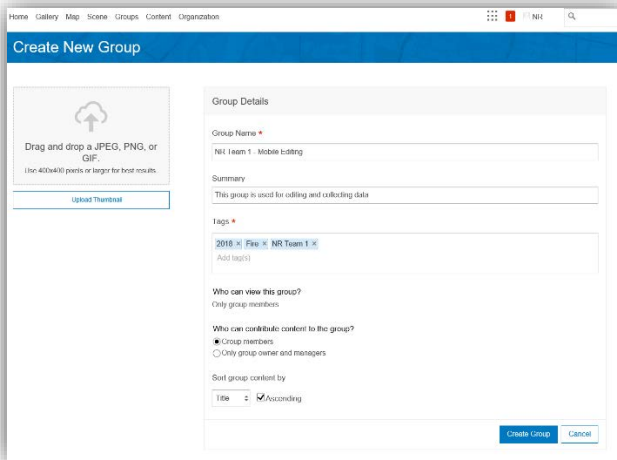
- From the top menu bar in ArcGIS Online, go to “Groups”



- Click on “Create New Group”



3. Create a group name (e.g., “NR Team 1 – Mobile Editing”), add tags and ensure that “Group Members” can contribute content. Click “Create Group”.

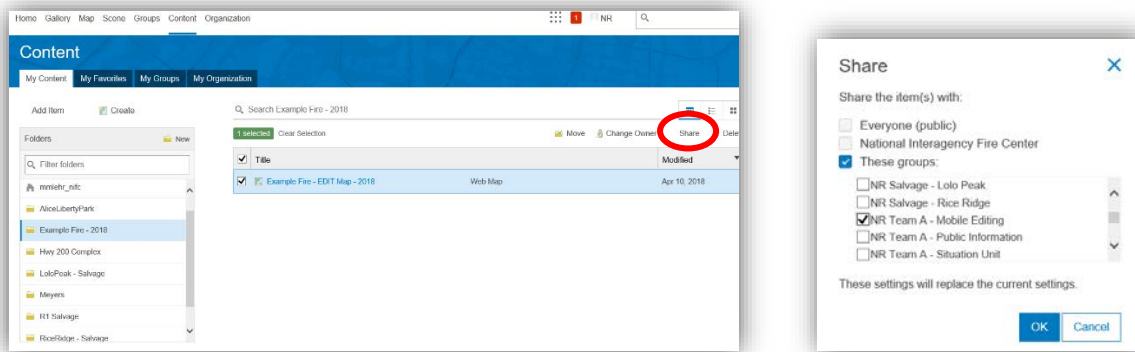


4. Follow the same step to create a group for those who will only need access to the VIEW web map (e.g., “NR Team 1 – Viewer”).

Sharing Web Maps

This section discusses how to share your incident specific web maps to your Mobile Editing and Viewer Groups.

1. From the top menu bar in ArcGIS Online, select “Content”.
2. In the left panel, navigate to the folder for the current incident (e.g., 2018_ExampleFire). Put a check mark in front of the EDIT map you created (e.g., 2018 Example Fire EDIT Map) to select it, then click “Share”. Select your Mobile Editing group. Click OK.



3. Follow the same steps to share the VIEW web map with your Viewer group.

Note: The Northern Rockies feature services will be shared with the entire NIFC ArcGIS Online Organization already, so any users with a NIFC account will be able to see the content in your maps once you share the web maps with them.

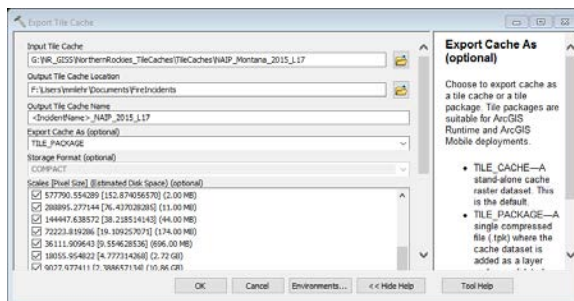
Set Up and Populate Initial Incident Data (if you are the first team to the incident)**

1. Download and save a copy of the [GISS QA QC Map UTM12](#) from AGOL.
2. Change the display projection to the appropriate UTM zone.
3. Begin populating the feature services with data if available, following the process outlined under “Managing the NR Feature Services and Other Incident Data with ArcMap” on pages 12 – 23 below (starting from the QA/QC MXD template essentially shortcuts steps 1 – 6 on pages 21 and 22). Be sure to only bring appropriate features into the Event and Non Event feature services that pertain to the fire and are within the area of interest (e.g., do not put structures for the entire city of Missoula, into the feature service).
4. Data to populate ASAP if available:
 - a. Fire Perimeter
 - b. IR data
 - c. TFR
 - d. PACE lines
 - e. Division breaks
 - f. Retardant Avoidance Areas
 - i. On Northern Rockies GIS data drive under:
NR_GISS\Region1_USFS_Data\Fire2018_USFSBaseData.gdb
 - g. Values at Risk
 - i. Will need to get from the local agency(ies)
 - h. Fire History
 - i. On Northern Rockies GIS data drive under:
NR_GISS\Region1_USFS_Data\Fire2018_USFSBaseData.gdb
 - i. Structures
5. Create a new shapefile and draw a box approximately 50 miles around the fire perimeter. This will be used to clip the TPK’s from the Tile Caches in the next step. Make sure you include access into the fire, and room for the fire to grow.

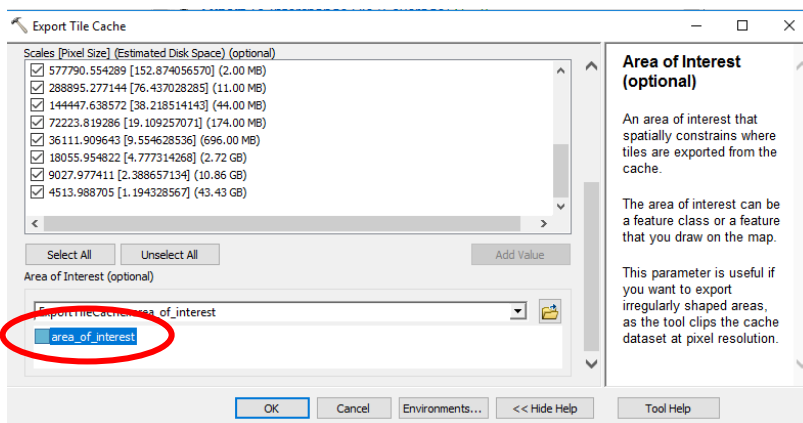
Creating Tile Packages (TPKs)

Once you know your general area of interest around your incident, you will want to create the TPKs from the Tile Caches provided to you on an external hard drive. The extent of the TPK should cover approximately 50 miles around your fire.

1. Open ArcMap, add your fire perimeter and any other data you might need to get oriented.
2. Create a shapefile of your desired extent, or zoom out to display the area of interest for the TPK.
3. Open the “Export Tile Cache” tool and provide the appropriate input/outputs
4. Make sure you change “Export Cache As” to “TILE_PACKAGE”



5. Scroll down and on the drop down button next to “ExportTileCache::area_of_interest” and select the shapefile you want to clip to OR click on “area_of_interest”. This will start an edit session. Move the tool window out of the way, and draw a box around the area you want to export

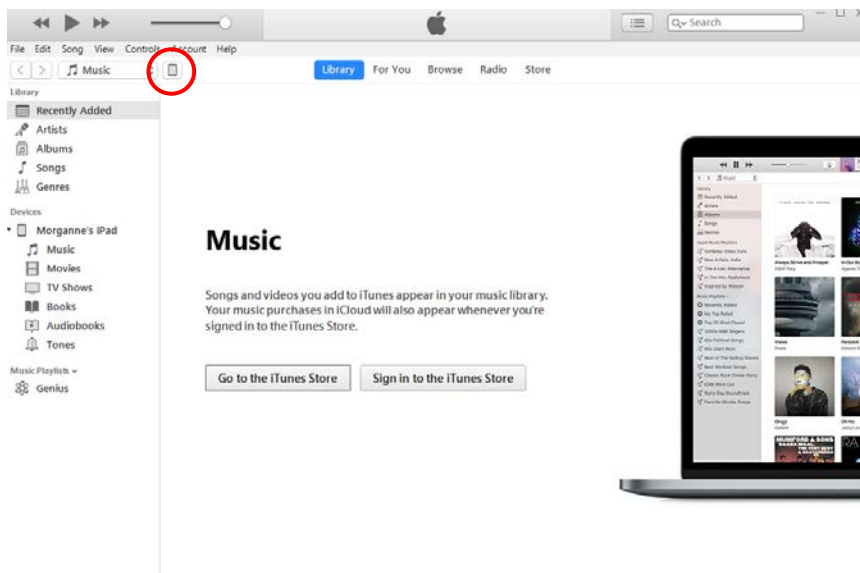


6. Click OK
7. Rerun the Export Tile Cache Tool, so that you have a TPK for each of the tile caches listed below for your incident:
 - o MontanaBaseMap_2018_L15 (Montana fires only)
 - o NAIP_2015_L17
 - o Topo_2018_L15
 - o USFSmap_2018_L15

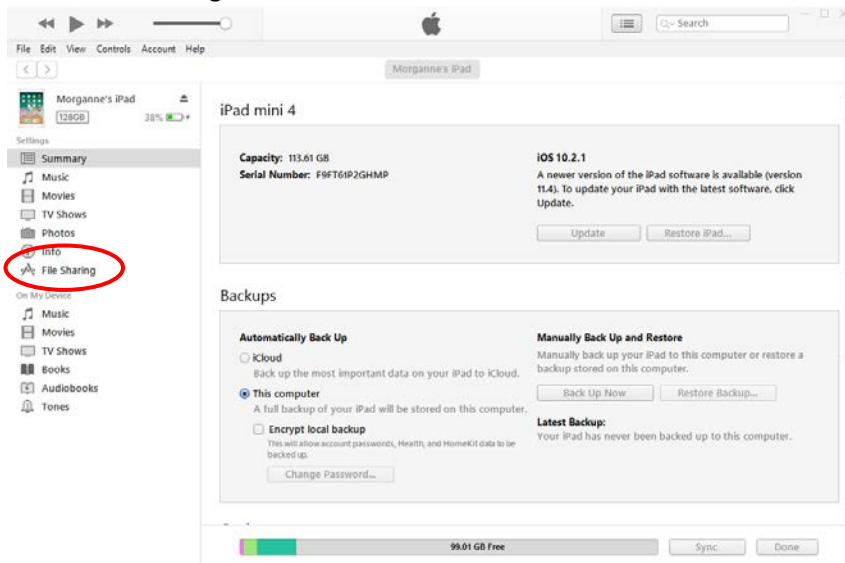
Sideload TPK's onto an iOS Device

Follow this workflow for loading TPKs onto all iOS devices:

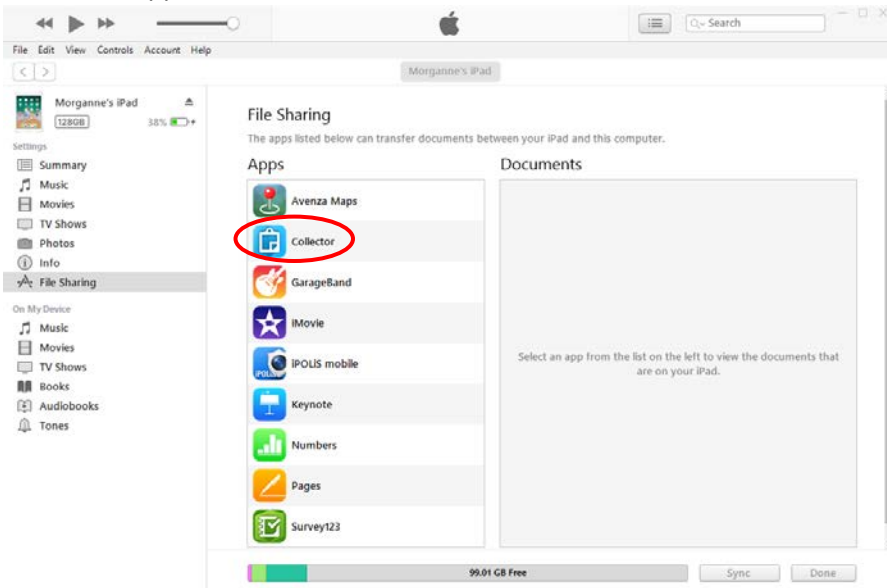
1. Connect your device to your computer. A popup on your device will occur asking if you “Trust This Computer”. Click “Trust”
2. If a Software Update appears in Itune, click Cancel.
3. If you see that the device is syncing with your computer, click the small “X” to stop the sync.
4. Click on the Device Icon.



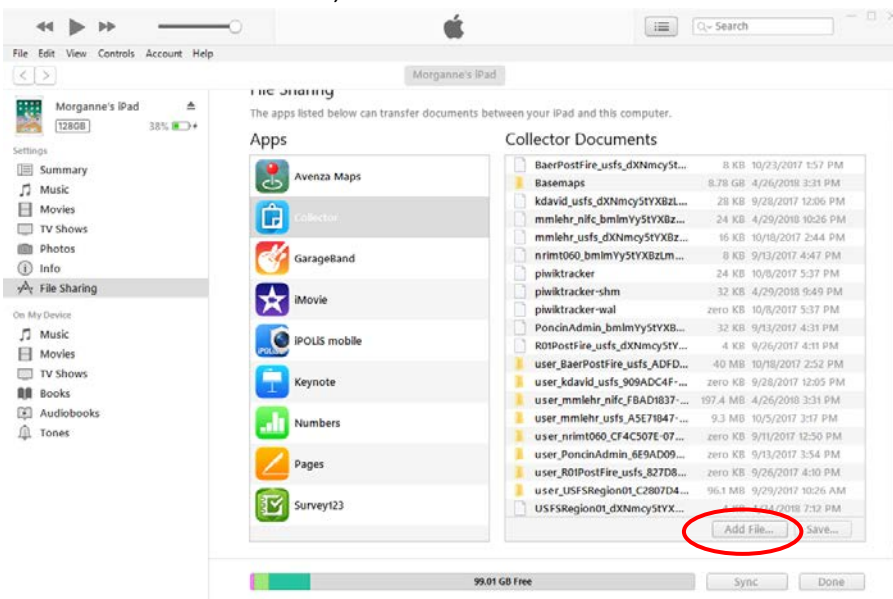
5. Select File Sharing from the menu of the left.



6. Under the Apps Menu, Select Collector



7. Under Collector Documents, select "Add File"

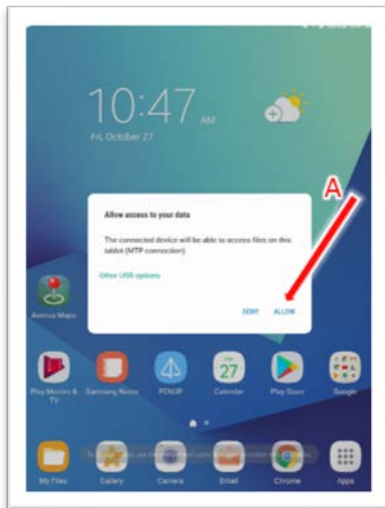


8. Navigate to your workspace to select the four TPKs generated in the previous steps and click "Open"

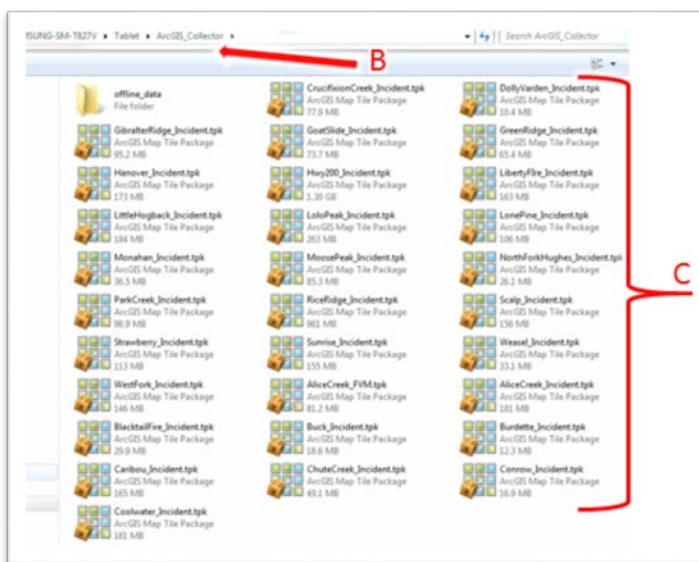
Sideloading TPK's onto an Android Device

Unfortunately, every Android device is slightly different. So these steps may not be exact. However, most issues (differences) occur when trying to connect the device to your PC.

1. To move files from the drive to your tablet, be sure Collector is closed. Plug your tablet into your computer. Be sure to “Allow” the computer access to the tablet (A) from the tablet’s screen. *** If Allow does NOT appear, swipe down from the top of your tablet. If it says “USB Charging”, tap on it and change to “Data Transfer”.

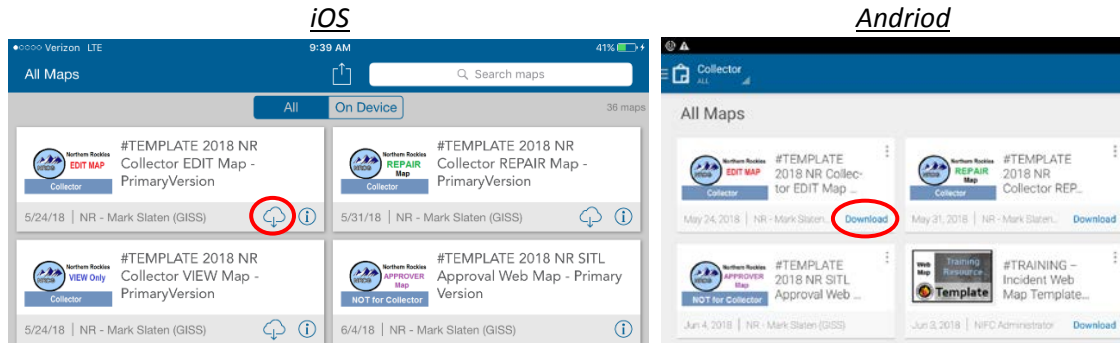


2. Using Windows Explorer, copy the TPK images from your Workspace and paste them directly into the (B) ArcGIS_Collector folder on your tablet (Computer\SAMSUNG-SM-T827V\Tablet\ArcGIS_Collector) (C). **If this folder does not exist, simply open Collector on your tablet, login, and open the web map. This should initiate the creation of the ArcGIS_Collector folder in Window Explorer.

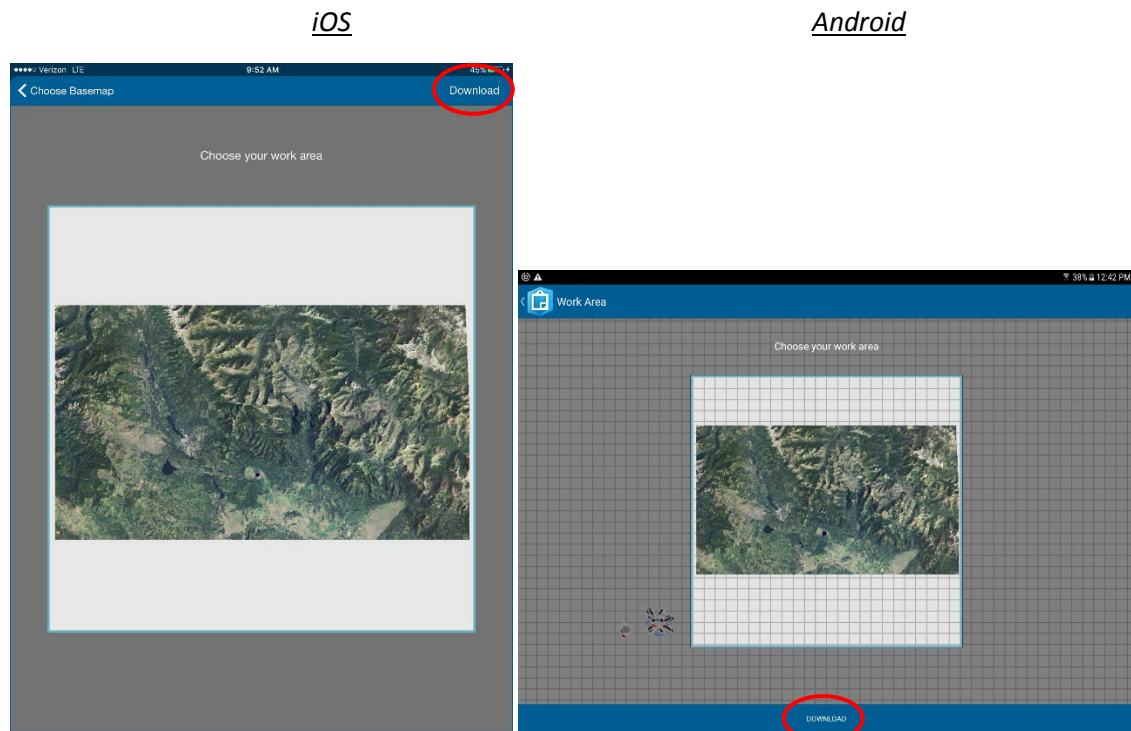


Downloading Web Maps onto an iOS Device and Android

1. Login to Collector using your NIFC account.
2. Once the user has been added to the incident group in AGOL, then they should have access to the web on their tablet. Find the appropriate web map (Editor vs View Only) and click on the download button.



3. Under Choose Basemap, select the NAIP TPK for your incident
4. Using your fingers, “pinch” the image to make it fit inside the blue box. This is considered the Work Area, and will be the only area that users can collect data for. Make sure work area covers the full incident. Click “Download”



Managing the NR Feature Services and Other Incident Data with ArcMap

This section describes how to access the Northern Rockies feature services in ArcMap. This will be necessary for GISS to make local edits to the data and produce the local geodatabases needed for making paper map products. These local geodatabases will also serve as the master incident geodatabase and provide daily backups of the data in the online feature services.

The geodatabases created through this process must be named according to GSTOP file storage and naming conventions. There will be three master geodatabases stored directly under the “incident_data” folder for the incident. These are:

- Event Data
 - File name format is:
[year]_[FireName]_[UnitID&IncidentNumber]_Event_ArcMap_[Version].gdb
 - Example: 2018_Example_MTLNF000123_Event_ArcMap_10_5.gdb
- Non Event Data
 - File name format is:
[year]_[FireName]_[UnitID&IncidentNumber]_NonEvent_ArcMap_[Version].gdb
 - Example: 2018_Example_MTLNF000123_NonEvent_ArcMap_10_5.gdb
- Photo Point Data
 - File name format is:
[year]_[FireName]_[UnitID&IncidentNumber]_PhotoPoint_ArcMap_[Version].gdb
 - Example: 2018_Example_MTLNF000123_PhotoPoint_ArcMap_10_5.gdb

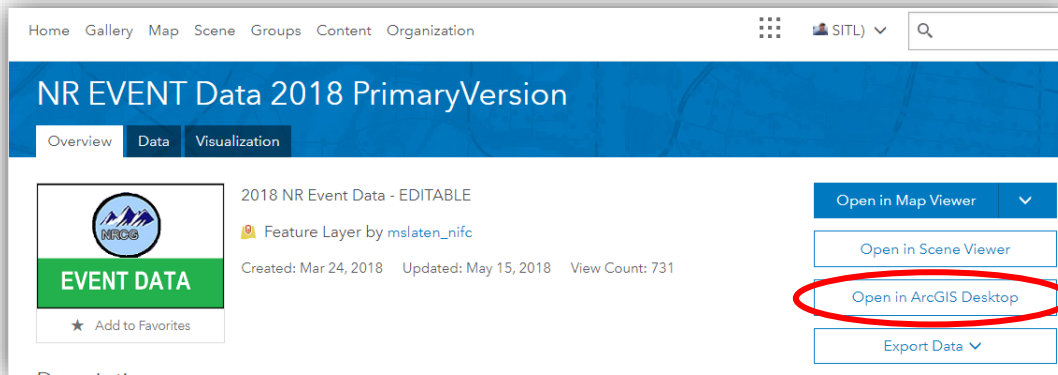
The daily backups of these will be stored in the backups folder under “incident data”. The file names will be the same as above, but instead of just year at the beginning, they will have date and time formatted as YYYYMMDD_HHMM. For example the Event data backup for July 15 at 22:00 would be: 20180715_2200_Example_MTLNF000123_Event_ArcMap_10_5.gdb.

In addition to the three master geodatabases based on the feature services, each incident will likely want to create and maintain a separate file geodatabase for storing annotation and other data needed for map production. This geodatabase is typically called “Other_Incident_Data”, and an example file name would be: 2018_Example_MTLNF000123_Other_Incident_Data_ArcMap_10_5.gdb.

The steps below outline the basic process of bringing the feature service data into ArcMap, making local edits, and syncing those edits back to the services in ArcGIS Online.

1. Open ArcMap. The first time you connect to a service, choose a new blank MXD. You can subsequently save this as an editing MXD that you can use for future editing sessions. In general, it is best practice not to use MXDs for print map products to do your data editing.
2. From the File menu in ArcMap, select Sign in to ArcGIS Online... and enter your NIFC ArcGIS Online credentials.
3. Prepare the MXD for editing by doing two things: 1) zoom to the approximate area of your fire, and 2) set the coordinate system of the Data Frame to the incident’s projected coordinate system.

4. In a web browser, go to the [NR GISS Development Group](#) in the NIFC ArcGIS Online Organization (requires NIFC AGOL login). Under Refine Content on the left side of the page, click on Layers. You should see all the hosted feature layers.
5. Select the “NR EVENT Data 2018 PrimaryVersion” (click on the layer name). This will bring you to the item description page for this feature layer. Click the button to “Open in ArcGIS Desktop”.



6. Open the “item.pitem” file that downloads. This will open the service in your active ArcMap session. You will now see the feature service in ArcMap as a group layer with three layers: Event Point, Event Line, and Event Polygon.
7. Create a local copy of the data.
 - a. To do this, first make sure that you’re zoomed to an extent that includes all the features you may want to edit, but avoids features from other incidents if possible. All features (and only features) in the current display extent will be downloaded into the local copy.
 - b. Next, right click on the group layer name (2018 NR Event Data) and choose Edit Features → Create Local Copy for Editing.
8. Start an edit session and edit the Point, Line, and Polygon data as needed. When edits are complete, Save Edits and Stop Editing.
9. Make note of the local geodatabase name and location. An easy way to do this is to switch the Table of Contents to the List By Source view. The name will be a long GUID and the location will always be a subfolder under C:\Users\[YourUserName]\Documents\ArcGIS\FeatureServiceLocalEdits. It is advisable to create a Folder Connection in Catalog to this location.
10. In Catalog, Copy the database with the GUID name under FeatureServiceLocalEdits.
 - a. Paste the copy into the backups folder under incident_data. Rename the copy according to GSTOP naming conventions listed above.
 - b. Making sure that you and other GISS do not have MXDs open with the local master Event geodatabase in them, delete the master Event geodatabase under incident_data.

Copy the geodatabase you just placed in the backups folder and paste it into incident_data. Rename it with the correct GSTOP file name for the master geodatabase.

11. Synchronize the local edits back to the online feature service.
 - a. To do this, make sure the Table of Contents in ArcMap is in List by Drawing Order view.
 - b. Right click on the group layer name (2018 NR Event Data) and choose Edit Features → Synchronize Local Edits with Server.
12. Repeat steps 5 – 11 for the other two feature services (Non Event and Photo Point). You will also see the various “NR Hosted View Layers” in the NR GISS Development Group content, but those do not need to be downloaded to ArcMap.

Note: There are numerous how-to documents, job aids, and training videos on the [GISS Training](#) website that go into the steps above in greater detail and with illustrations. Materials specifically related to editing feature services are available in [Unit 2C](#) of that site, while [Unit 2A](#) has foundational information about the Event geodatabase, and [Unit 2B](#) has detailed guidance on editing the Event geodatabase in ArcMap.

Important Information about Maintaining Attributes in the Event Data

Pay particular attention to ensuring that attribute information in the Event data are correctly populated during each edit session.

- This includes always calculating *LatWGS84_DDM*, *LongWGS84_DDM* and *PointDateTime* for point features, *LengthFeet* and *LineDateTime* for line features, and *GISAcres* and *PolygonDateTime* for polygon features.
- For entering DateTime values, always type data in the following format: “MM/DD/YYYY HH:MM” (the space between day and time is required; if you enter time in 24-hour time ArcMap will convert it to 12-hour, e.g., 22:30 will become 10:30 PM).
- Other useful attributes include *IsVisible*, *MapMethod*, *RepairStatus*, and *RepairComments* if information is available.

In addition, several attributes in the Event Data attribute tables provide important feature-level metadata and will always have the same value for all features during a team’s tenure on an incident. It is important that GISS populate these attributes when editing the Event data. These attributes include: *Incident Name*, *Map Method*, *ContactName*, *ContactEmail*, *ContactPhone*, *ComplexName*, *ComplexID*, *GACC*, *IMTName*, *UnitID*, *LocalIncidentID*, and *IRWINID*. There are two ways (and maybe more) to efficiently make sure these attributes are always populated consistently:

1. Use feature templates in your ArcMap editing sessions. [This document](#) on how to prepare and configure the Event geodatabase has some particularly useful tips on using feature templates and layer files to accomplish this. While maintaining feature templates becomes trickier when editing a feature service, it is possible. A key point about feature templates is that if you save your Event Data layer group **as a layer file** after setting up feature templates and filling in the default values for the attributes listed above, that information stays in the layer file. In subsequent edit sessions, add the layer file into the MXD first (before adding the actual event data), then repoint the layer file to the local geodatabase for editing, then the feature template

values will be retained during the edit session. For this to work, however, you can't copy and paste features while editing; instead you must use tools like "Replace Sketch" or manually place point features. All of this is illustrated in [Unit 2B](#) and [Unit 2C](#) of the GISS Training website.

2. Keep a simple word document or text document with the values for all fields in the list above. At the end of every edit session, simply select all points, lines, and polygon and make sure these fields are populated. This can easily be done by copying values (particularly for things like IRWINID) from your document into the field calculator in ArcMap. Note: the data standards task group is developing a simple tool to make this step even easier. The tool will be distributed when ready.

Approving New Features in the NR Event Data Feature Service

A critical element of the "Approval Workflow" we are adopting for the Northern Rockies is that new features get approved before they show up on paper maps, in the VIEW map, or in the EGP. This section describes the process of doing QA/QC on new features and setting the *FeatureStatus* to the appropriate value.

1. Using the Sit Unit APPROVER web map, an approver (lead GISS or SITL) can easily see newly-collected features. The display in this web map is set up so that underneath the Event point, line, and polygon layers, there are copies of those layers symbolized by *FeatureStatus* as follows:



The effect of this is to display a large "halo" around each feature that is red, yellow, green, or gray.

2. The approver can then communicate with appropriate people in Operations or other sections who can verify if the information is good and should appear on maps. There may also often be information in the *Comments* field from the person who collected the data that can help with this.
3. When the approver feels confident that the new feature is good, they can change the *FeatureStatus* to Approved, and also set the *FeatureAccess* field to the appropriate value (Public, Cooperators, Incident, Restricted). Editing these attributes can be done either through the web map using ArcGIS Online in a web browser or in an ArcMap editing session. Note that only features with *FeatureStatus* = Approved and *FeatureAccess* = Public or Cooperators will be visible in the EGP after syncing to the national service (below).

Synchronizing the NR Event Data Feature Service with the National Incident Feature Service

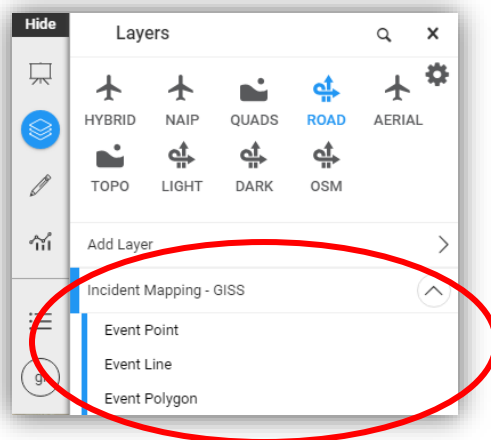
At regular intervals, the data you are managing for your incident in the NR Event Data service will need to be “pushed up”, or synced to the National Incident Feature Service. Ideally this will be done after each round of data editing. At a minimum, it must be done every night at the end of shift.

To do this, you can use the Editing MXD created in the process outlined above for editing feature services in ArcMap. You can also opt to have a separate MXD specifically for syncing to the National Incident Feature Service. Either way, you will need to create a connection in your MXD to the **Event_GISSEdit** feature service on the EGP server. This process is outlined, step-by-step, in [the How to Edit a Feature Service in ArcMap](#) document online. Note that you will need an EGP account with the GISS role assigned to be able to do this. If you’re not sure you have this, [submit a request here](#) to have the GISS role assigned for editing the National Incident Feature Service in ArcMap.

Once you have an MXD with both your current master Event geodatabase and the National Incident Feature Service, you can update the national data as follows:

1. Make sure you only have data from your incident in the display extent of your Data Frame.
2. Create a local copy of the National Incident Feature Service. This is the same process as outlined above and in the “How to Edit a Feature Service in ArcMap” document.
3. Start editing the local copy of the national service. Select all features for your incident (points, lines, and polygons) and delete them.
4. Select all features for your incident from your current master Event geodatabase (points, lines, and polygons separately). Copy and paste them into the appropriate layer in the national service.
5. Save Edits and Stop Editing.
6. Synchronize the local edits to the national service back to the server.

After finishing this process, you can check that it worked by going to the [EGP](#) to view your data. After signing in, launch the Situation Analyst and zoom to your fire area. You should see the data you just synced if you have Incident Mapping turned on in the layer list.



TROUBLESHOOTING, TIPS AND TRICKS

- Problem: Collector User Can't Sync

- First – Force Collector to close by double clicking the home button and swiping the Collector app up. Reopen collector and try to sync again.
- Next, if that doesn't work – Make sure you are getting a strong cellular or Wi-Fi signal. If your signal is weak, try to connect to a hotspot or MyFi.
- If that doesn't work and user HAS EDITS needing to be synced – Collector is likely throwing an error trying to pull new data down onto the device. To ensure that the user's edits make it to the cloud, turn the device to "Push Only".
 1. From the home screen, select the box with the up arrow (aka "magic box"). This is the three dots for Android users.
 2. Select Settings
 3. Under Synchronizations, turn the Push Only button to "On" which should make the button change colors.
 4. Try syncing again.
 5. If the sync was successful (the red dot with number of edits will disappear), return to your settings and turn the Push Only button off.
 6. Follow the steps below to remove the map.
- If that doesn't work, and the user DOES NOT HAVE EDITS to sync – Sync errors can occur for numerous reasons. The easiest way to remove error is to redownload the map.
 1. In collector, go to your Home screen that has the list of available maps. At the top of the screen, click on the "magic box" and choose Manage. Go to the map you want to discard and click remove.
 2. Choose to REMOVE FEATURES ONLY. Don't remove basemaps or you will have to reload the tpks again.
 3. Kill collector (tap the home button twice, and swipe collector up off the screen).
 4. Reopen Collector
 5. Hit the Cloud or download button to download the map again. Choose the Photo and pinch it in to fit inside the box. Once available, hit Download. Let the map download and the sync error should no longer occur.

Visit (and contribute to) the [Northern Rockies Fire GIS Community Forum](#) for more troubleshooting, tips, and tricks.