



Disaster Damage Assessment

Using Collector and ArcGIS Online for the Woolsey Fire Damage Assessment

Steven Gutierrez and Manuel Regalado

Overview

- Pre-Woolsey Fire preparations
- The Woolsey Fire
- Damage assessment with Collector
- Lessons learned and preparations for the next event

Pre-Woolsey Fire

- Mapping of existing assets from our current asset management system to GIS
 - Department of Public Works maintained roads, guardrail, drains, and partial tree GIS inventory created prior to fire
 - Implementation of Collector based apps into daily workflow for field staff.



Woolsey Fire Disaster Damage Assessment

In November 2018, the Woolsey Fire Struck and brought devastation to the Santa Monica Mountains of Los Angeles County. Following the fire, the Los Angeles County Department of Public Works was tasked with quickly performing damage assessment to quantify needs and restore public access to areas effected. Department of Public Works utilized ESRI tools, specifically the Collector app to assess damaged assets within the Road Right of Way to inventory and summarize needs for recovery efforts.

The Woolsey Fire

- Began November 8, 2018
- Driven by 70 mph gusts of wind
- 14 miles wide, 150 square miles
- 280,000 people evacuated
- 70,000 homes, businesses, and structures effected
- 1,400 structures destroyed
- 100% contained reached November 22, 2018





Thousand Oaks

Oak Park

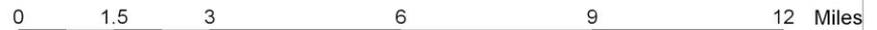
Agoura Hills

Calabasas

Malibu



Woolsey Fire Extent



The Woolsey Fire



Public Works Initial Response Needs

- Immediately following the event, an initial damage assessment was needed of all assets within the public right of way with the following goals
 - Determine extent and severity of damage
 - Document and quantify the amount of damage to build a rough initial damage estimate
 - Assess safety of areas affected by fire for recovery teams as well as safety of areas to public access can be quickly restored

The Solution

- **ArcGIS Pro**
 - Creation of initial feature layer with domains to ensure high quality data is produced
- **ArcGIS Online**
 - WebMaps for use in ArcGIS Collector and OpsDashboards
 - OpsDashboards quickly summarize data
 - WebApps for QAQC
- **Collector**
 - Mobile-app with offline capabilities and compatible with both i-OS and Android systems.
 - Easy ability to add attachments
 - Data easily accessible by office staff once it has been synced with ArcGIS Online

Process

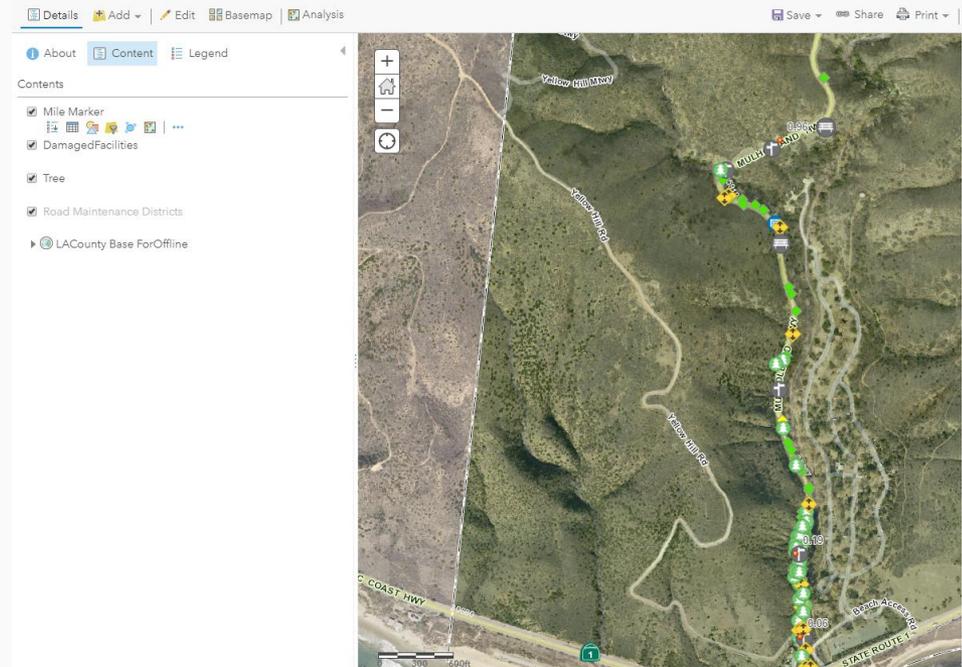


ArcGIS Pro

- Damage Assessment Feature Class created as a point layer
- Fields included Asset Type, Severity, Location Description, Quantity, and a Recommendation field as well as others.
- Domains used for fields for quality control of data and also simple use by field users in app.
- Attachments enabled
- Data uploaded to ArcGIS Online as a hosted feature layer

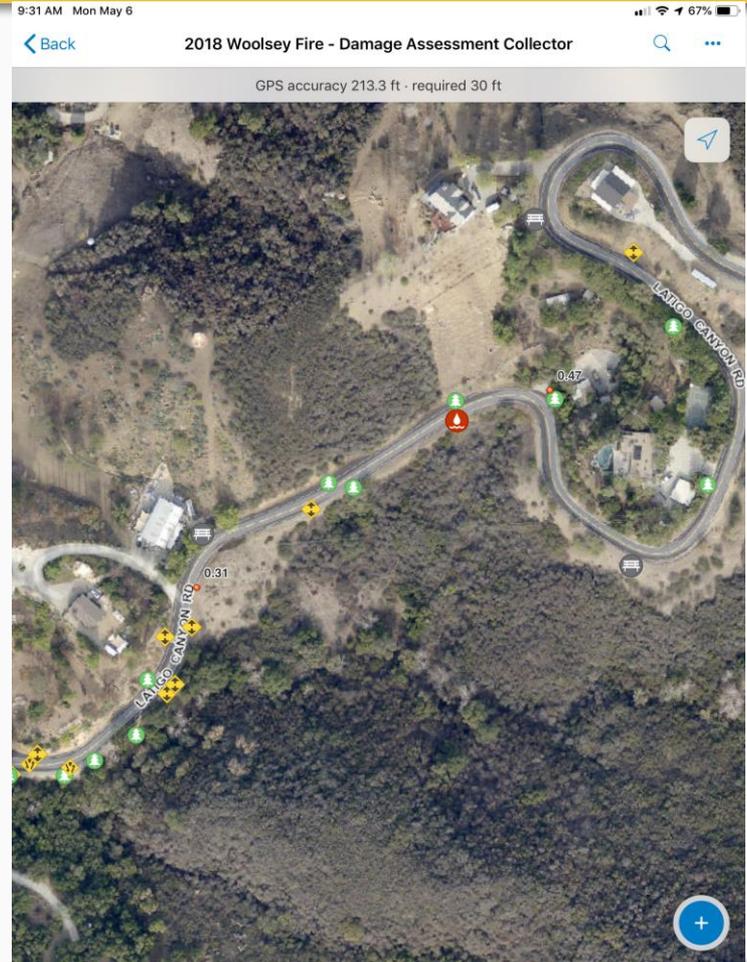
ArcGIS Online WebMap

- WebMap composed of a minimal amount of content for simplicity
 - Mile Markers Layer
 - Damage Assessment Layer
 - Tree Layer
 - Jurisdiction Layer
 - Offline compatible Aerial imagery
- Only pertinent fields made visible. Fields such as the “Street Name” field were hidden so they can be filled in by geoprocessing post collection



Damage Assessment with Collector

- ESRI Collector App
- Simple User Interface and user experience allows most users to learn it relatively quickly
- Use of hosted feature layer means this is the exact same data that office staff will see once a sync has occurred.



Damage Assessment Teams

- Five teams of two sent out for damage assessment
- Each team responsible for an assigned subarea and inspected all RMD maintained assets in road right of way
- Teams were then reassigned as areas more heavily damaged by the fire were identified



Sample - Guardrail

- Field count kept to a minimum within the app to simplify collection for the teams.
- Teams were encouraged to photograph the assets as much as possible so damage could be thoroughly documented.

9:32 AM Mon May 6

Cancel Collect Submit

DamagedFacilities: Guardrail
34.114900°N 118.804192°W

Take Photo Attach

FACILITY_TYPE *
Guardrail >

SEVERITY
Damaged >

QUANTITY_TYPE
LENGTH_LF >

QUANTITY
520.00

COMMENTS
80 timber blocks need replacement

LOC_DESC
Sb MM6.05

ASSETNUM
5779477

COST_EST

Work_Type >

WORK ORDER

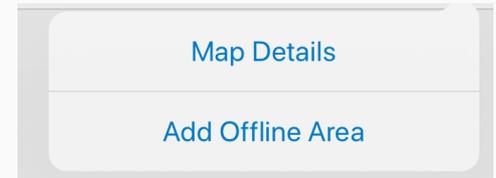
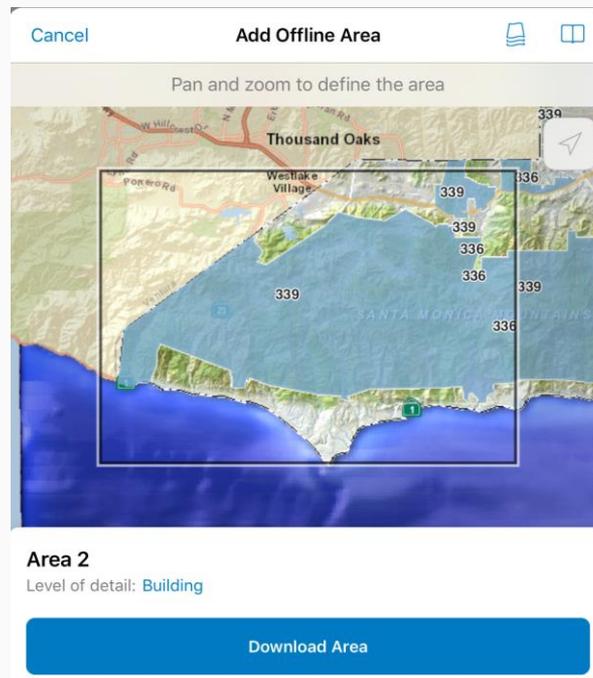
Status >

Photos Collected



Offline Mode

- Offline mode in Collector made this damage assessment possible due to zero cell service in fire affected areas
- Relatively simple download process and multiple areas can be downloaded to the device



Dashboard

ASSETS ASSESSED

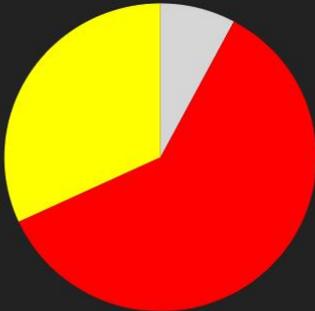
2,180

Last update: a few seconds ago

OPERATING TREES WITHIN ROAD DISTRICTS AFFECTED BY FIRE

21,552

SEVERITY



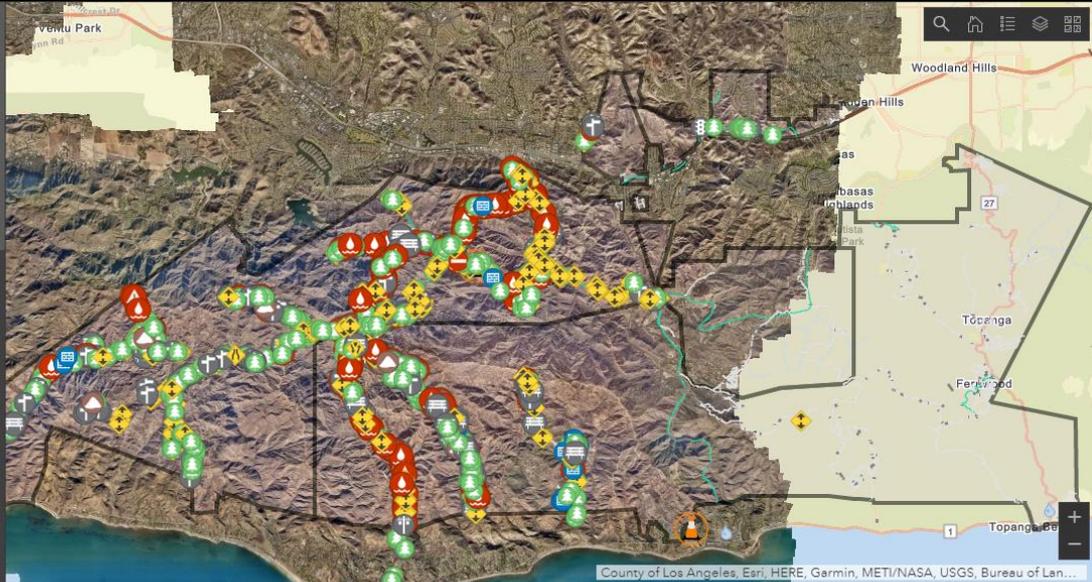
Null 170
Destroyed 1.3k
Damaged 695

Last update: a few seconds ago

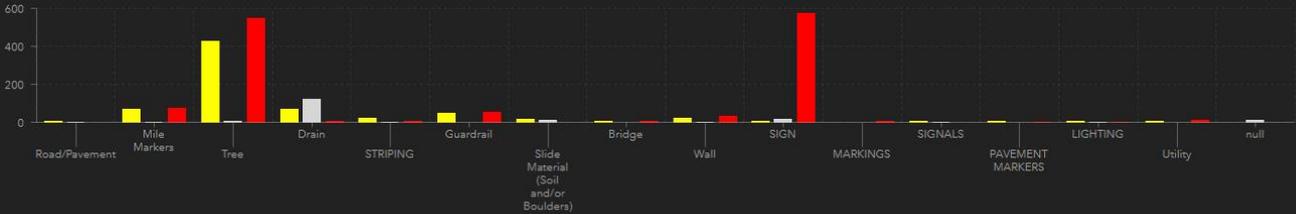
DamagedFacilities

- Bridge
- Drain
- Guardrail
- Road Yard
- Road/Pavement
- Slide Material (Soil and/or Boulders)
- Tree
- Wall
- SIGN
- Utility
- PAVEMENT MARKERS
- MARKINGS
- SIGNALS
- STRIPING
- Mile Markers

Operational Services



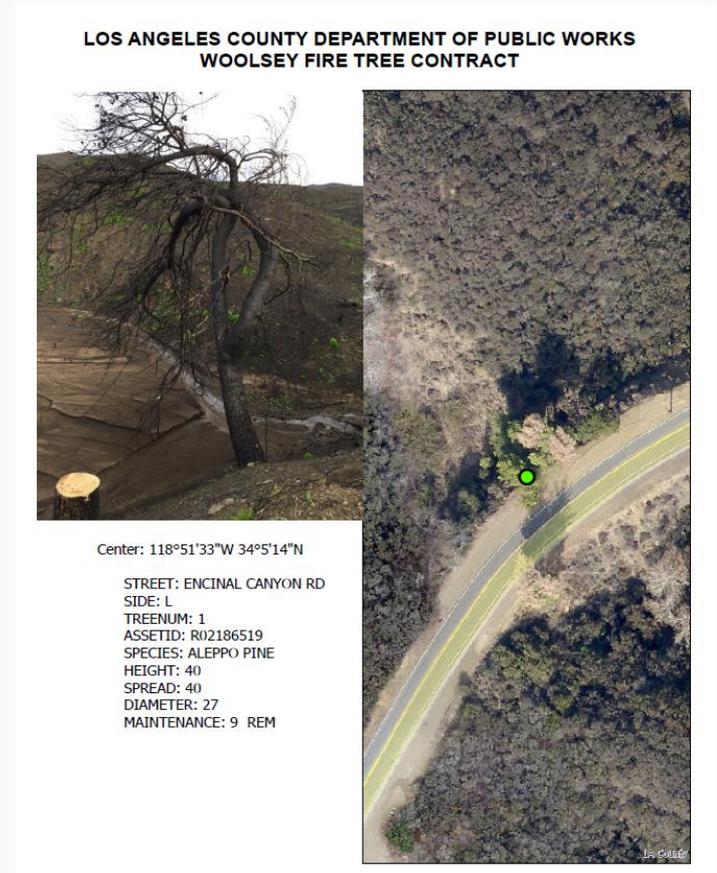
STATUS BY ASSET



Last update: a few seconds ago

Reports / Data Use

- Map Series and KML files created to assist contractors with Tree Removals
- This will assist with tree maintenance in remote areas where the existing tree inventory was severely affected
- Less room for error in removing wrong trees or performing wrong maintenance



Lessons Learned

- Keep it simple but also make sure appropriate data is collected for each asset type
- Domains are your friend
- Make fields required to be filled out before submitting a new point
- Be prepared before hand, have necessary IT equipment as well as accounts set up for collection

New Damage Assessment Prep

- Feature classes created for each asset type instead of just one feature class which was used for this damage assessment
 - Enables collection of unique fields for each asset type as well as assists with keeping data organized
- On-going efforts to inventory and map all assets
 - This will reduce the amount of guess-work required following a major event. The extent of the event could be used to determine assets affected and teams could be deployed more effectively
- Implementation of Collector and other GIS apps into daily workflows to promote familiarity and expertise to the users.

Using Collector and ArcGIS Online for the Woolsey Fire Damage Assessment

Manuel Regalado, PE
Civil Engineer

mregalado@pw.lacounty.gov

(626) 458-4195

Steven Gutierrez
Civil Engineering Assistant

sgutierrez@pw.lacounty.gov

(626) 300-3233

