

Mobile GIS Technology for Efficient Field Data Collection

BRIAN GRASS – MASON, BRUCE & GIRARD

Outline

An overview of hardware options

Case Study: Sensitive Species and Noxious Weeds Mapping

Our Strategy: Hybrid approach using Trimble and Android

MobileMap: MB&G's mobile GIS solution

Managing your field data: Spatial CMS ties it all together

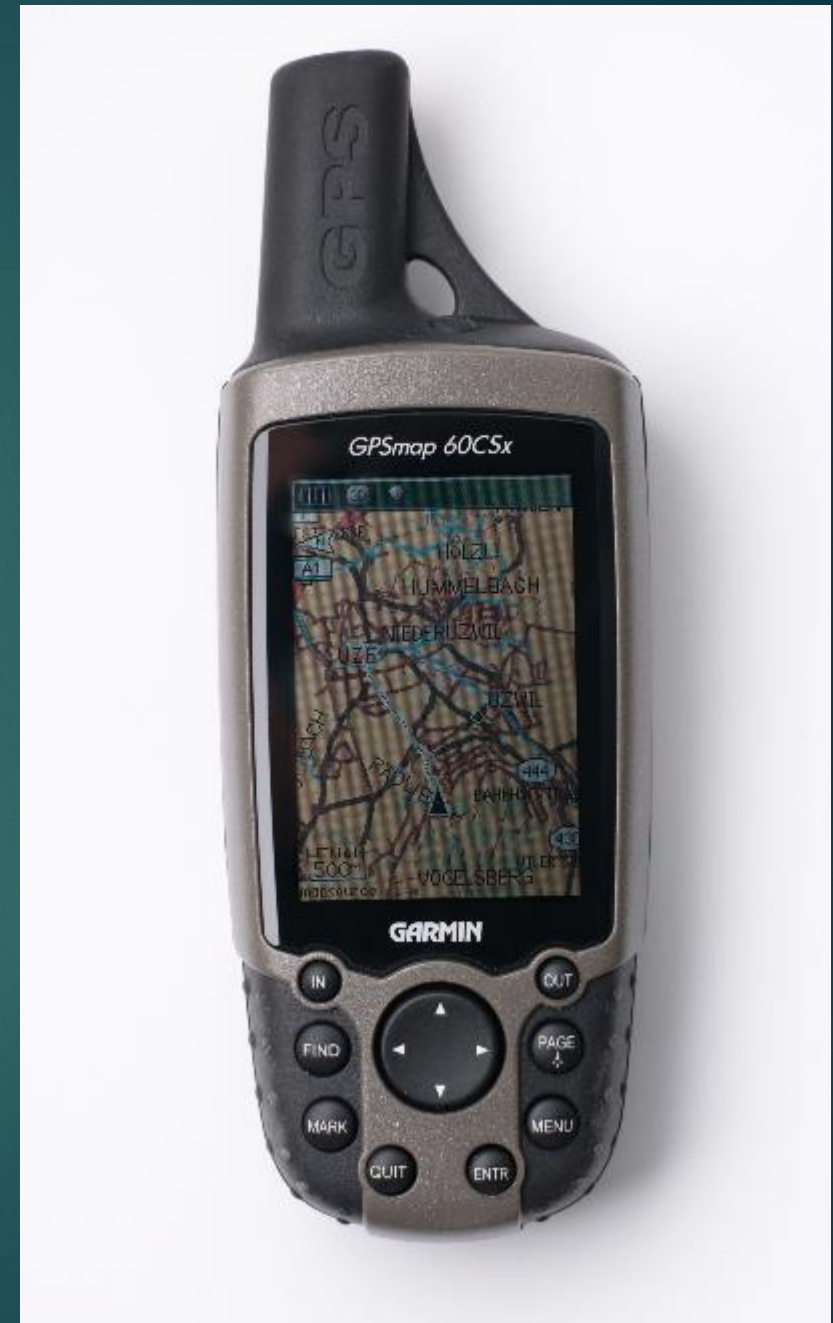
Garmin – Recreational-Grade GPS

Pros:

- Inexpensive
- Portable and rugged
- Facilitates navigation to predetermined sample plots or waypoints

Cons:

- Small, low-resolution screen
- Limited data collection capabilities
- Requires data conversion for use with GIS



Trimble GeoExplorer – Resource-Grade GPS

Pros:

- Capable of sub-meter accuracy under good conditions with post-correction
- Rugged, well built device
- Customizable data collection forms with ArcPad or TerraSync

Cons:

- Expensive
- Slow to acquire positions
- Limited memory -> struggles with complex forms
- Very limited imagery capacity



iPad and iPhone – Consumer Tablet and Phone

Pros:

- Elegant hardware and slick interface
- Multiple GPS/field data solutions available from App Store
- Excellent display

Cons:

- Hardware GPS only available on more-expensive 4G models
- No SD card option
- Dependence on iTunes for data transfer





Android– Consumer Tablets and Phones

Pros:

- Inexpensive (good choices start under \$200)
- Many hardware options – from phones to oversized tablets
- Multiple GPS/field data solutions available from Play Store
- Excellent display on many models
- Supports MB&G's MobileMap mobile GIS application

Cons:

- Inexpensive devices may lack durability in tough conditions





Android- Ruggedized Tablets

Specialized hardware, familiar operating system

- Extends the selection of Android devices to include professional-grade hardware
- Waterproof, submersible, dustproof, shock-resistant - choose the device that meets your specialized needs



Case Study:

I-5: Elkhead Rd. – Anlauf Paving Project Botanical Clearance survey

Project Area:

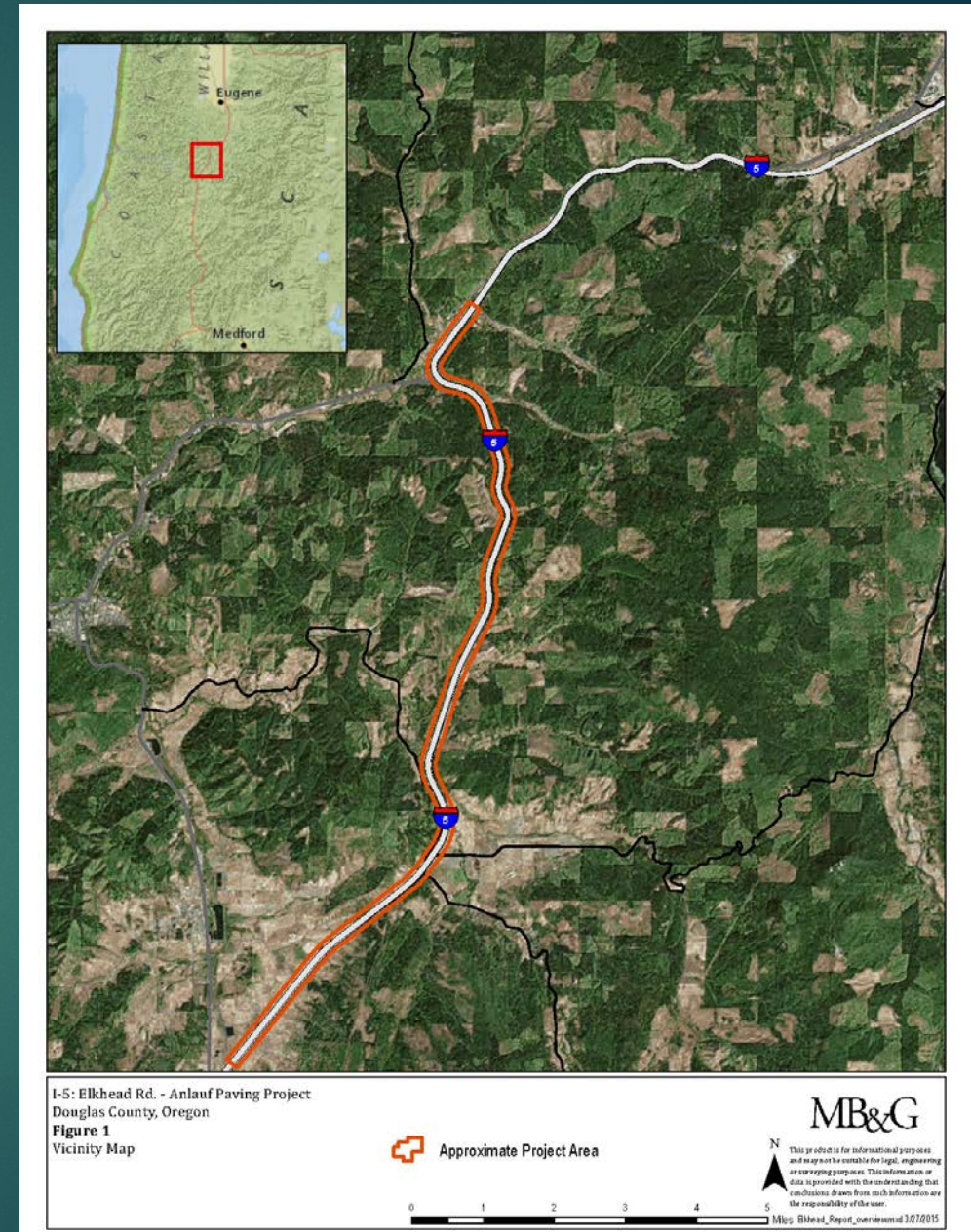
11.7 miles of I-5 right-of-way in northern Douglas County
Elkhead Rd. to Anlauf, OR

Survey Effort:

Map sensitive plant species and noxious weeds

Both shoulders and median – 26 linear miles surveyed

Completed by 2-person crew over 2 week period



Case Study:

I-5: Elkhead Rd. – Anlauf Paving Project

Sensitive Plant Species –

Cusick's checkerbloom (*Sidalcea cusickii*)
Rough popcorn-flower (*Plagiobothrys hirtus*)
California wayside-aster (*Eucephalus vialis*)
among others

Noxious Weeds –

ODA Class A and T noxious weeds



Case Study:

I-5: Elkhead Rd. – Anlauf Paving Project

Selecting a data collection approach

Project Requirements:

- Cover lots of ground
- Collect lots of spatial data
- Use resource-grade GPS where feasible; sketching occurrences on aerial photos acceptable in the interest of safety

Tailoring approach to data use cases:

- Sensitive species occurrences are rare and relatively small – maximum precision needed to allow site to be revisited and protected
- Noxious weed occurrences are numerous and extensive in ROW – efficient workflow need to effectively map weeds



Case Study:

I-5: Elkhead Rd. – Anlauf Paving Project

Our Solution: A hybrid approach using Trimble and Android devices

Trimble GeoExplorer for precision mapping of sensitive species occurrences

- Spatial accuracy is top priority
- Relatively few occurrences to map so slower data collection not a factor



Case Study:

I-5: Elkhead Rd. – Anlauf Paving Project

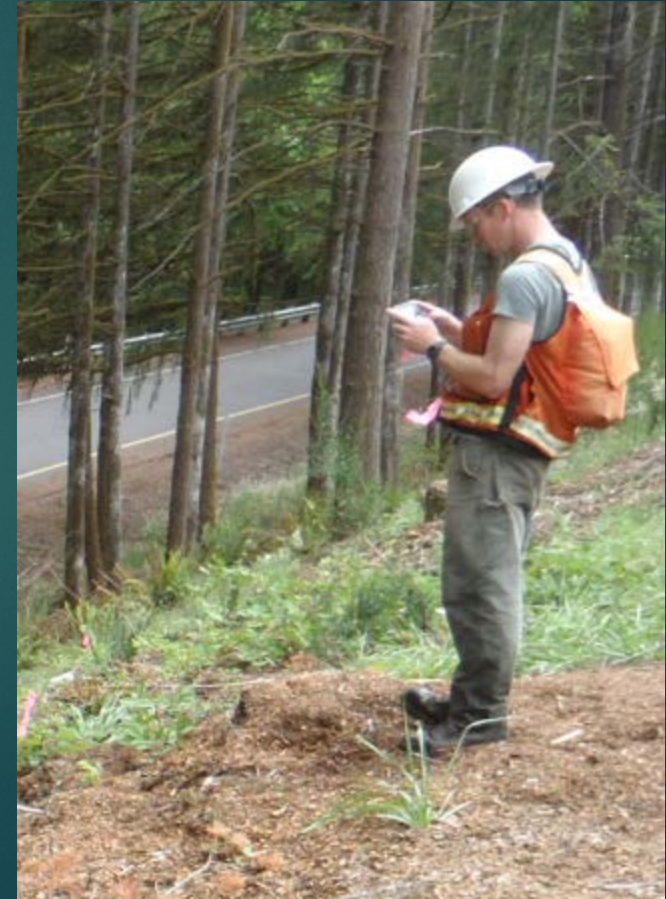
Our Solution: A hybrid approach using Trimble and Android devices

Trimble GeoExplorer for high-precision mapping of sensitive species occurrences

- Spatial accuracy is top priority
- Relatively few occurrences to map so slower data collection not a factor

Android tablet with MobileMap for noxious weeds mapping

- Much faster data collection and post-processing
- High-resolution imagery and reference datasets at your fingertips
- Enhanced safety by allowing field staff to sketch weed patches in high-risk areas

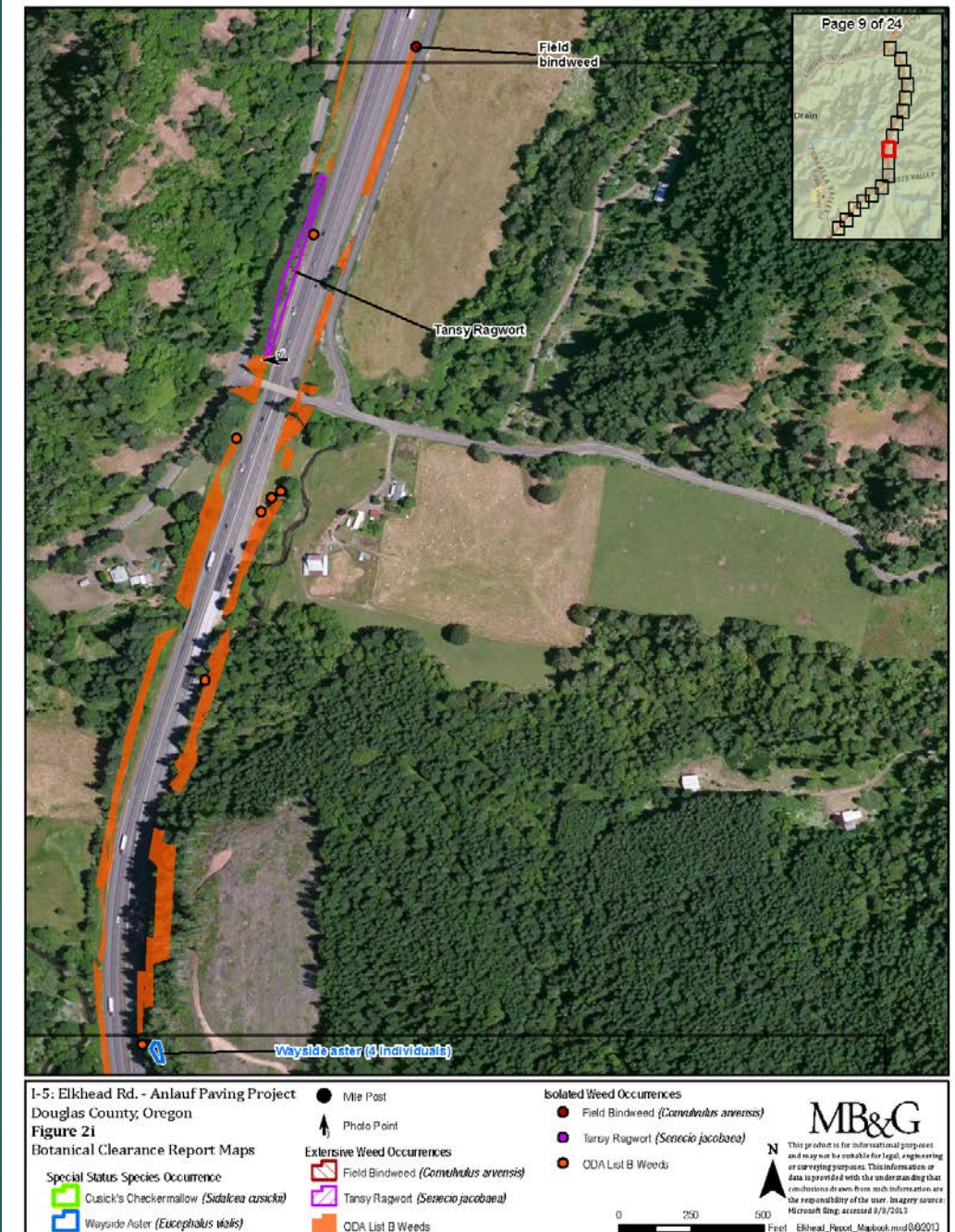


Case Study:

I-5: Elkhead Rd. – Anlauf Paving Project

Results:


- Survey completed on-time and under budget
- 7 sensitive species occurrences documented and mapped with Trimble
- Nearly 500 noxious weed occurrences mapped with MobileMap



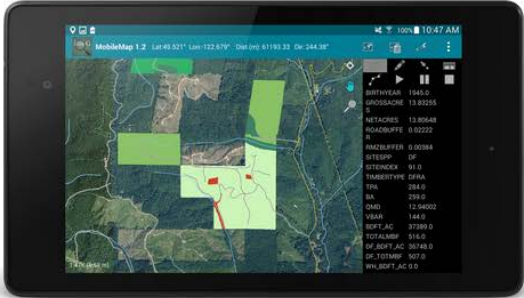
MB&G MobileMap

Mobile GIS and Field Data Collection Software

ABOUT FORESTRY ENVIRONMENTAL GEOSPATIAL TECHNOLOGY NEWS & EVENTS CAREERS



Made for our office.



Mobile Field Data Collection: Offline GIS Capabilities

MobileMap provides real GIS functionality, not just basic maps, to users in the field. This allows field staff to perform complex data visualization, discovery and collection activities. While other mapping applications offer basic offline functionality, none rival MobileMap when it comes to flexibility, capability, and performance.

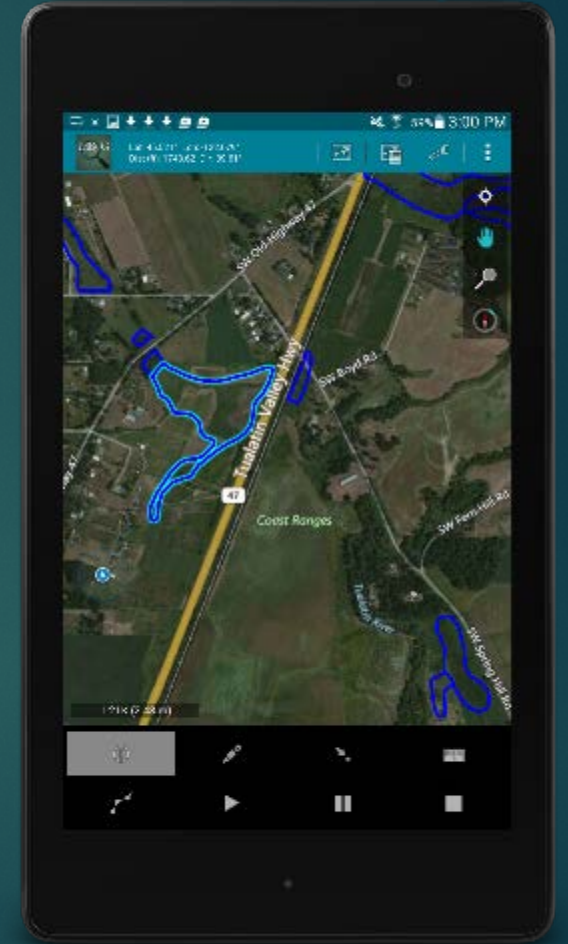
A closer look . . .

MB&G MobileMap

For Android phones, tablets and ruggedized devices

Key Features:

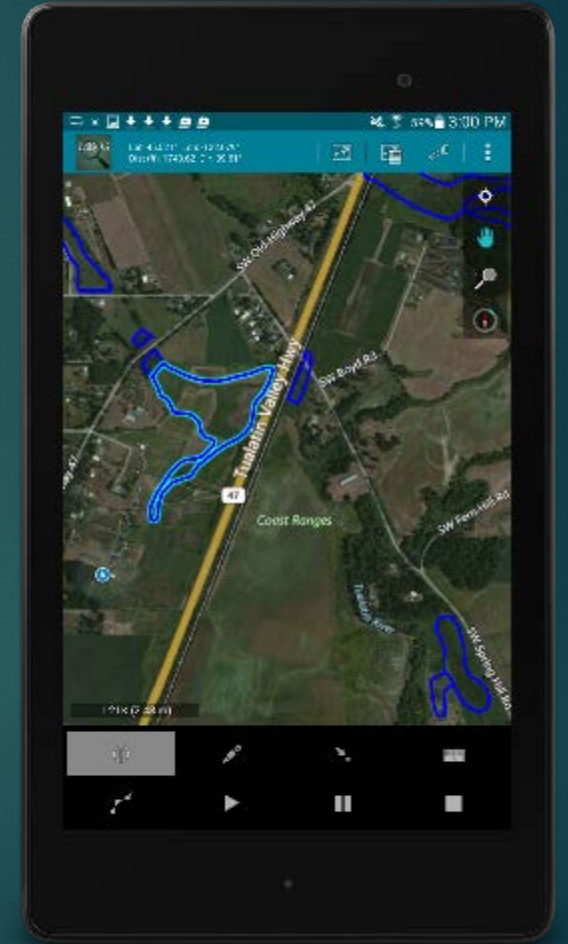
- Supports disconnected editing to allow data collection anywhere
- Field data synced with cloud (ArcGIS Online) or ArcGIS Server via Wi-Fi; facilitates multi-user data collection and collaboration
- Built using ESRI technology to integrate seamlessly with other GIS processes
- Flexible custom forms streamline data collection and reduce errors
- Respects ESRI data types (domains, non-nullable, character limits etc)
- Supports very large imagery datasets allowing real-time access to high-res imagery in the field



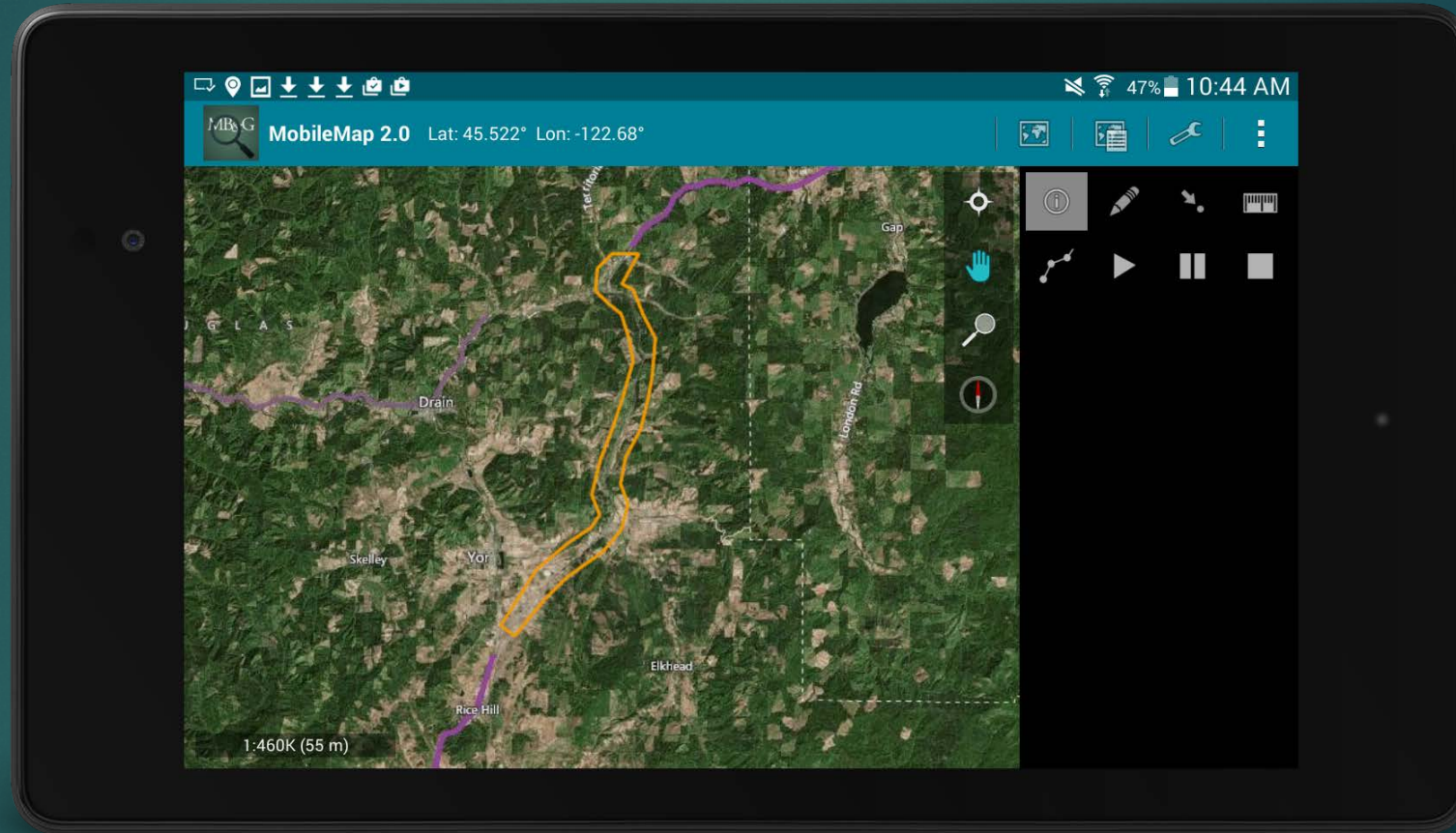
MB&G MobileMap

Additional Features:

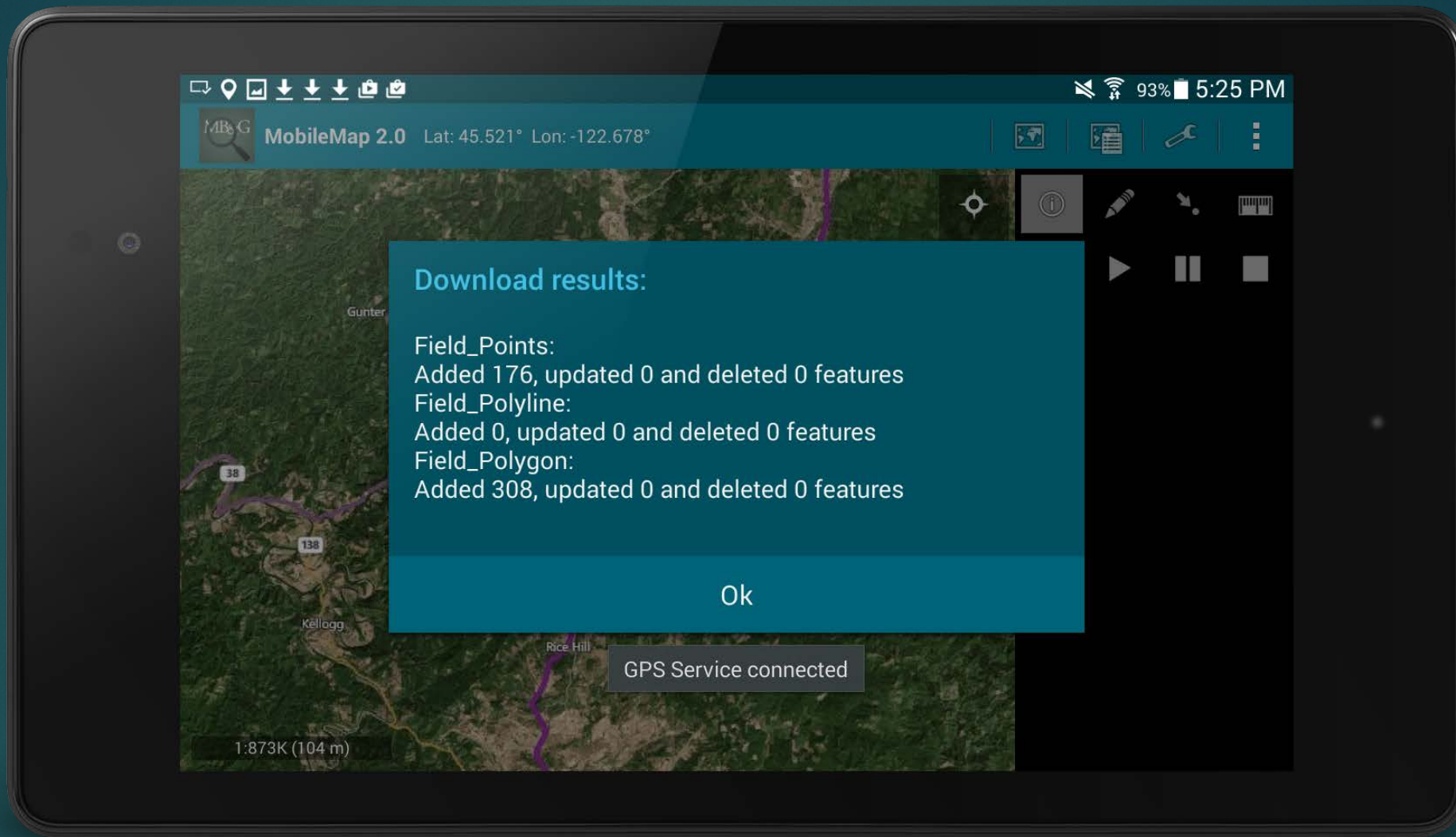
- Supports multiple base maps and any number of overlay layers
- Layers can be toggled on and off
- Supports shapefiles and CSV tabular data with search capabilities
- Navigates to selected features
- Allows on-screen measurement of features
- Tracking function can collect route travelled
- Highly configurable for all kinds of data collection or reference needs



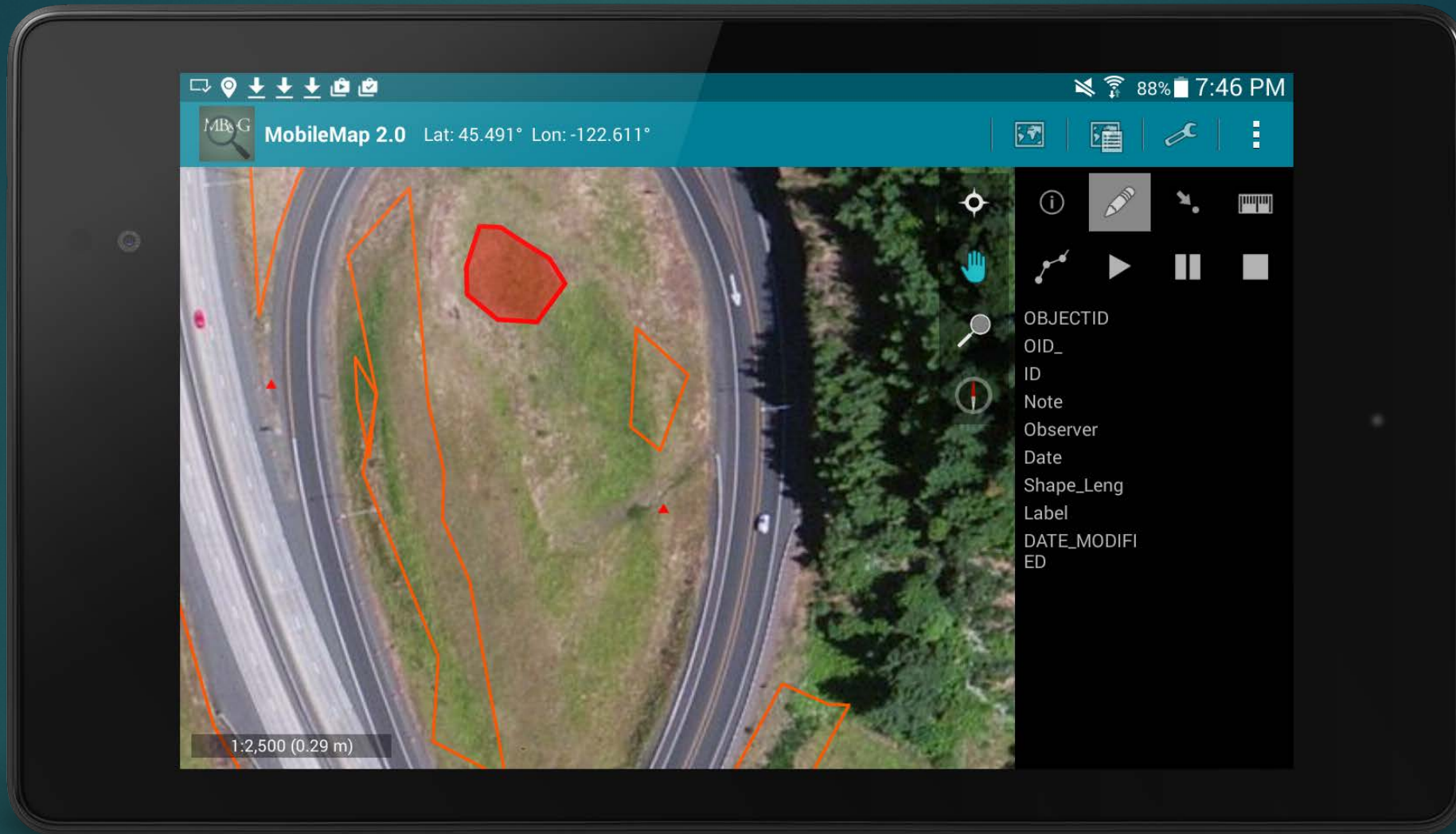
MB&G MobileMap



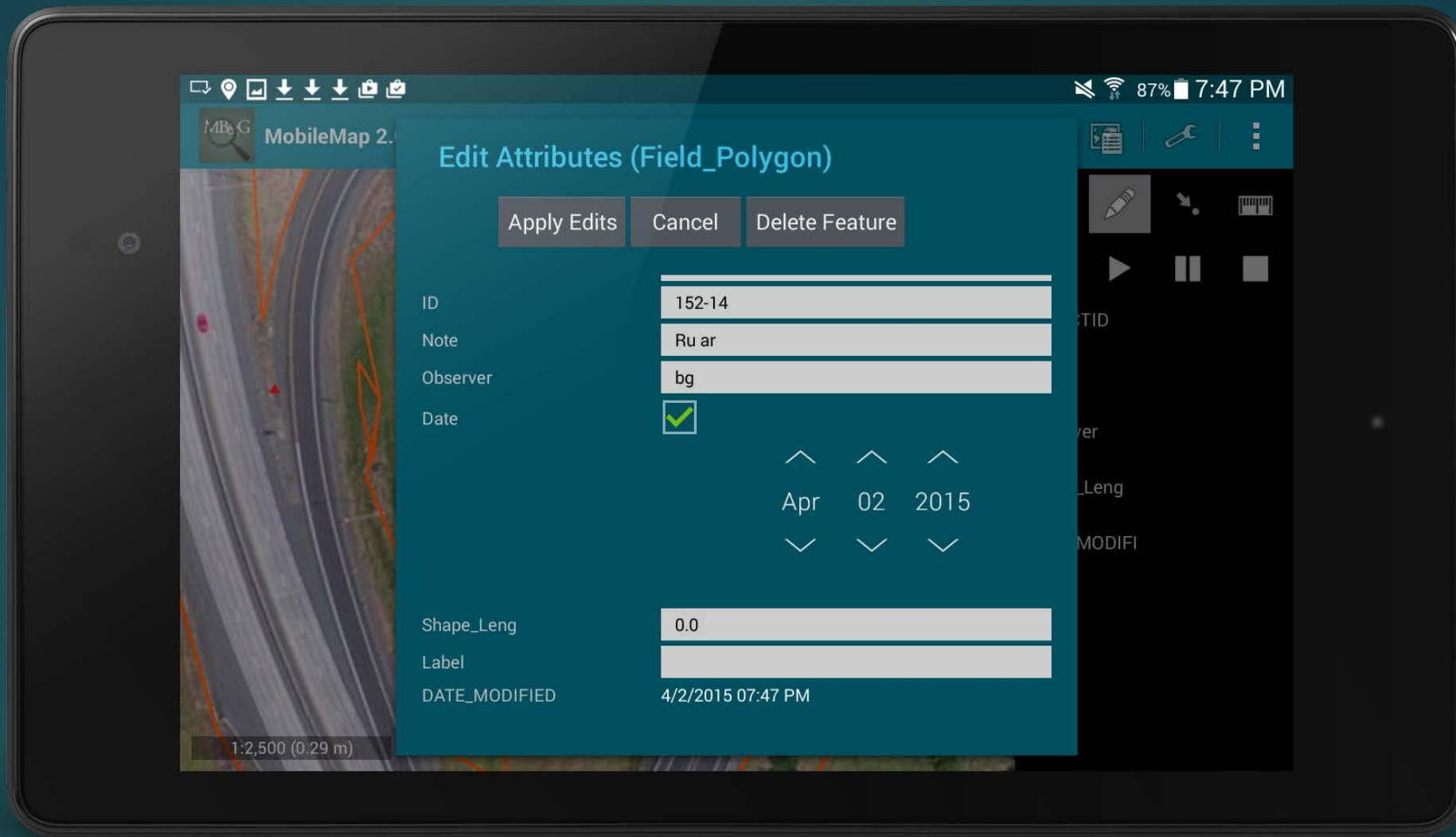
A closer look . . .



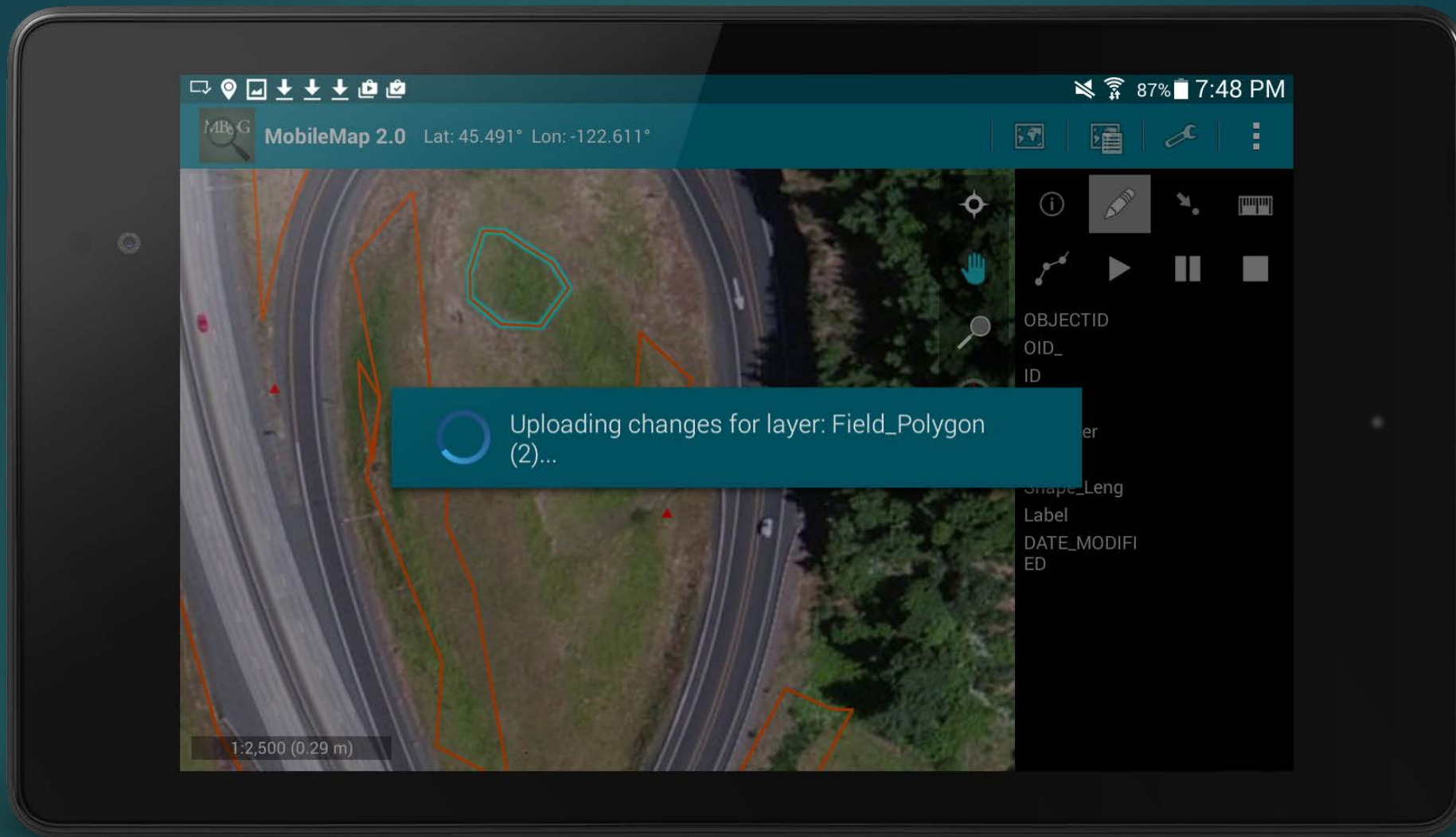
Downloading existing features from cloud



Digitizing a new polygon



A basic attribute editor form



Uploading new field data – true sync capability eliminates duplicates

HOME ▾ Elkhead_toAnlauf_NoxiousWeeds NEW MAP Brian ▾

[Details](#) [Add](#) ▾ | [Edit](#) [Basemap](#) | [Save](#) ▾ [Share](#) [Print](#) | [Directions](#) [Measure](#) [Bookmarks](#)

[About](#) [Content](#) [Legend](#) ▾

Contents

- Elkhead toAnlauf NoxiousWeeds - Field Points
- Elkhead toAnlauf NoxiousWeeds - Field Polyline
- Elkhead toAnlauf NoxiousWeeds - Field Polygon
- Topographic

Field_Polygon: 152-14

OID_	0
ID	152-14
Note	Ru ar
Observer	bg
Date	April 2, 2015
Label	
DATE_MODIFIED	April 2, 2015

[Zoom to](#) [Get Directions](#) [Edit](#)

0 100 200ft

MRLC, State of Oregon, State of Oregon DOT, State of Oregon GEO, Esri, HERE, DeLorm...

Now it's securely accessible on the Web

Leverage your data on the Web

The screenshot displays the Oregon Department of Transportation Mitigation and Monitoring Reporting System (MMRS) web application. The browser address bar shows the URL `geo.masonbruce.com/mMrs/?q=mapper`. The page header includes the Oregon Department of Transportation logo and the title "Mitigation and Monitoring Reporting System (MMRS)". Navigation tabs include "Map", "Sites", "Photos", "Docs", "Program Docs", "Add Site", and "Add Program Document".

The main interface features a "Select Project:" dropdown menu and a "Select County:" dropdown menu set to "Douglas". A sidebar on the left contains a "Legend" tab and three sections of links:

- Reports:**
 - [2011 Monitoring Report](#)
 - [2010 Monitoring Report](#)
 - [2012 Monitoring Report](#)
- Permits:**
 - [USACE authorization letter](#)
 - [DSL Authorization](#)
- Maintenance Reports:**
 - [2012 Maintenance Contract](#)
 - [2013 Hill Creek Maintenance Contract](#)

The central map area shows an aerial view of a road with several overlays: a pink rectangular boundary, a blue irregular boundary, and several red camera icons. The map includes labels for "7603", "66", and "OR-66". The bottom right corner of the map area features the text "POWERED BY esri" and "DigitalGlobe, Microsoft | Copyright: © 2014 Esri, DeLorme, ...".

Spatial Content Management - manage spatial data and related documents & photos and share across your organization