

# IRVM & GIS Data Collection & Management

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Scott County, GIS



# What is GIS?

Stands for “Geographic Information Systems”

Maps (not just Google)

Data

Analysis

Applications



# GIS & IRVM

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## Manage Data

- **Herbicide Application Records**
- **Weed Locations**
- **Treatment Locations**
- **Planting Prep Locations**
- **Planting Locations**
- **Roadside Inventory**



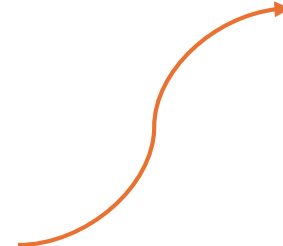
- **GIS Applications**
  - **ArcGIS Pro**
  - **ArcGIS Online**
  - **ArcGIS Field Maps**
  - **Survey123**



# Herbicide Applications Records

- **ArcGIS Survey123**
  - **Easy to build forms**
  - **App available in app stores**
  - **Submit data in a connected environment**
  - **Submit data in an offline environment**

Basically, take this and make it digital!



**Pesticide Application Record**

Certified Applicator \_\_\_\_\_ Certification # \_\_\_\_\_ Phone \_\_\_\_\_

Customer \_\_\_\_\_ Address \_\_\_\_\_ Phone \_\_\_\_\_

Crop or other area treated \_\_\_\_\_

Number of acres or other units treated \_\_\_\_\_

Pest(s) controlled and developmental state \_\_\_\_\_

Severity of infestation, infection, etc. \_\_\_\_\_

Stage of crop growth (if applicable) \_\_\_\_\_

Date and time pesticide was applied \_\_\_\_\_

Soil condition (if applicable) \_\_\_\_\_  
(wet, dry, cloudy)

Temperature \_\_\_\_\_ Humidity \_\_\_\_\_ Cloud Cover \_\_\_\_\_ Wind direction and speed \_\_\_\_\_

Pesticide used \_\_\_\_\_  
(name of product and formulation)

How pesticide mixed (if applicable) \_\_\_\_\_  
(active ingredient per gallon, etc.)

Total amount of pesticide applied \_\_\_\_\_  
(gallons/lbs. per acre or other unit treated)

Specific location of application (if applicable): Township \_\_\_\_\_ Section \_\_\_\_\_ Quarter \_\_\_\_\_  
Section \_\_\_\_\_

Map of treated area (if applicable):



# Herbicide Applications Records (Continued)

- ArcGIS Survey123
  - Create record on a mobile device
  - Submit records in real time
  - Save and submit records later when offline
  - Location data is recorded and shown on maps

Scott County IRVM “Pesticide Application Record” created in Survey123

Crop or other area treated \_\_\_\_\_

Number of acres or other units treated \_\_\_\_\_

Pest(s) controlled and development/infestation \_\_\_\_\_

Severity of infestation, infection, etc. \_\_\_\_\_

Stage of crop growth (if applicable) \_\_\_\_\_

Date and time pesticide was applied \_\_\_\_\_

Soil condition (if applicable) \_\_\_\_\_  
(wet, dry, cloudy)

Temperature \_\_\_\_\_ Humidity \_\_\_\_\_ Cloud Cover \_\_\_\_\_ Wind direction and speed \_\_\_\_\_

Pesticide used: \_\_\_\_\_  
(name of product and formulation)

How pesticide mixed (if applicable) \_\_\_\_\_  
(active ingredient per volume, etc.)

**Records: 211**

IRVM Pesticide Application Record  
by Scott\_County\_IA\_GIS



# Herbicide Applications Records (Continued)

11:27

My Survey123

Search

IRVM Pesticide Application Rec...

11:27

IRVM Pesticide Application Record

Owner: Scott\_County\_IA\_GIS  
Created: 12/30/21 3:13 PM  
Modified: 3/14/24 11:14 AM

This template includes all XLSForm features supported in ArcGIS Survey123.

+ Collect

11:28

IRVM Pesticide Application Record

Spray Location Start:  
41.524°N 90.579°W ± 35.0 m

Certified Applicator:  
(Select one)  
Brian Burkholder

Certification Number:  
(Select one)  
40295

Customer:  
Secondary Roads

Address:  
950 E Blackhawk Trail

Crop or other area treated:  
Roadside

11:28

IRVM Pesticide Application Record

Number of gallons used:  
(Enter number of gallons used)

Pest(s) controlled:  
(Select one)

Start Date and Time:  
Thursday, March 14, 2024  
11:27 AM

Finish Date and Time:  
Date  
Time

Location Comment:

Temperature:

Humidity:

11:28

IRVM Pesticide Application Record

Humidity:

Cloud Cover:  
(Select one)

Wind Direction:  
(Select one)

Wind Speed:

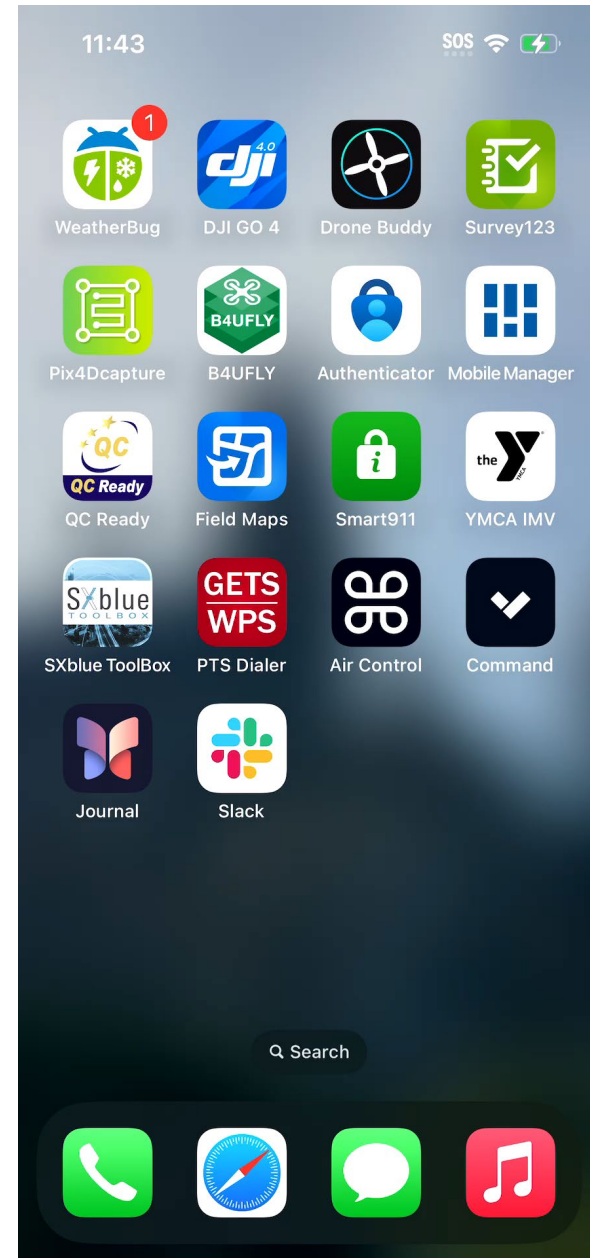
Pesticide used:  
(Select one)

Pesticide mixed:  
Secondary Roads

Total amount of pesticide applied:  
 oz  
 gal

# Herbicide Applications Records (Continued)

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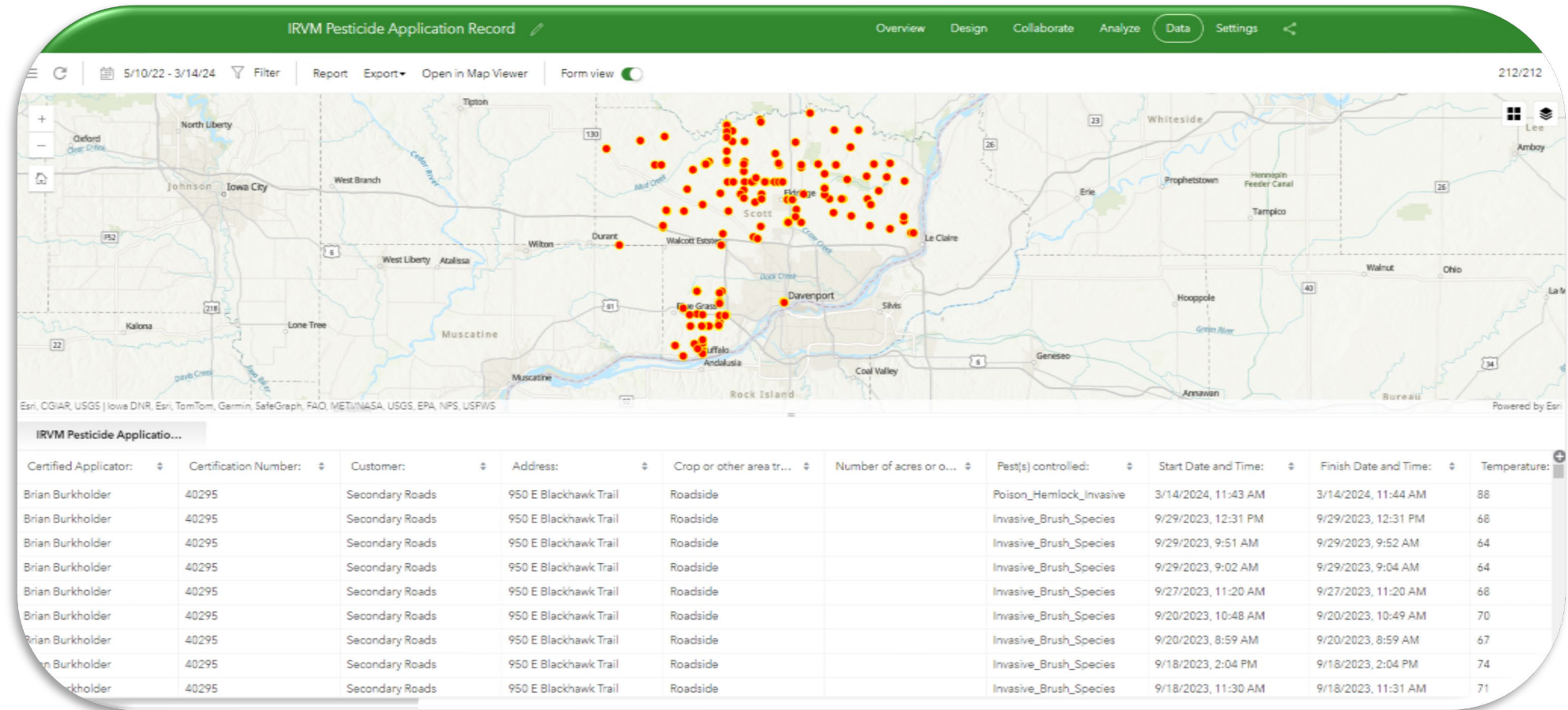




# Herbicide Applications Records (Continued)

- **ArcGIS Survey123**

- Application records are stored on Survey123
- Records can be exported in various GIS formats
- PDF reports of records can be generated







# Weed Locations

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- **ArcGIS Field Maps**
  - **Collect data locations on a map**
  - **Use device location for accuracy**
  - **Can be paired with Trimble R1 or SxBlue GPS**
  - **App available in app stores**
  - **Submit data in a connected environment**
  - **Submit data in an offline environment**





# Weed Locations (continued)

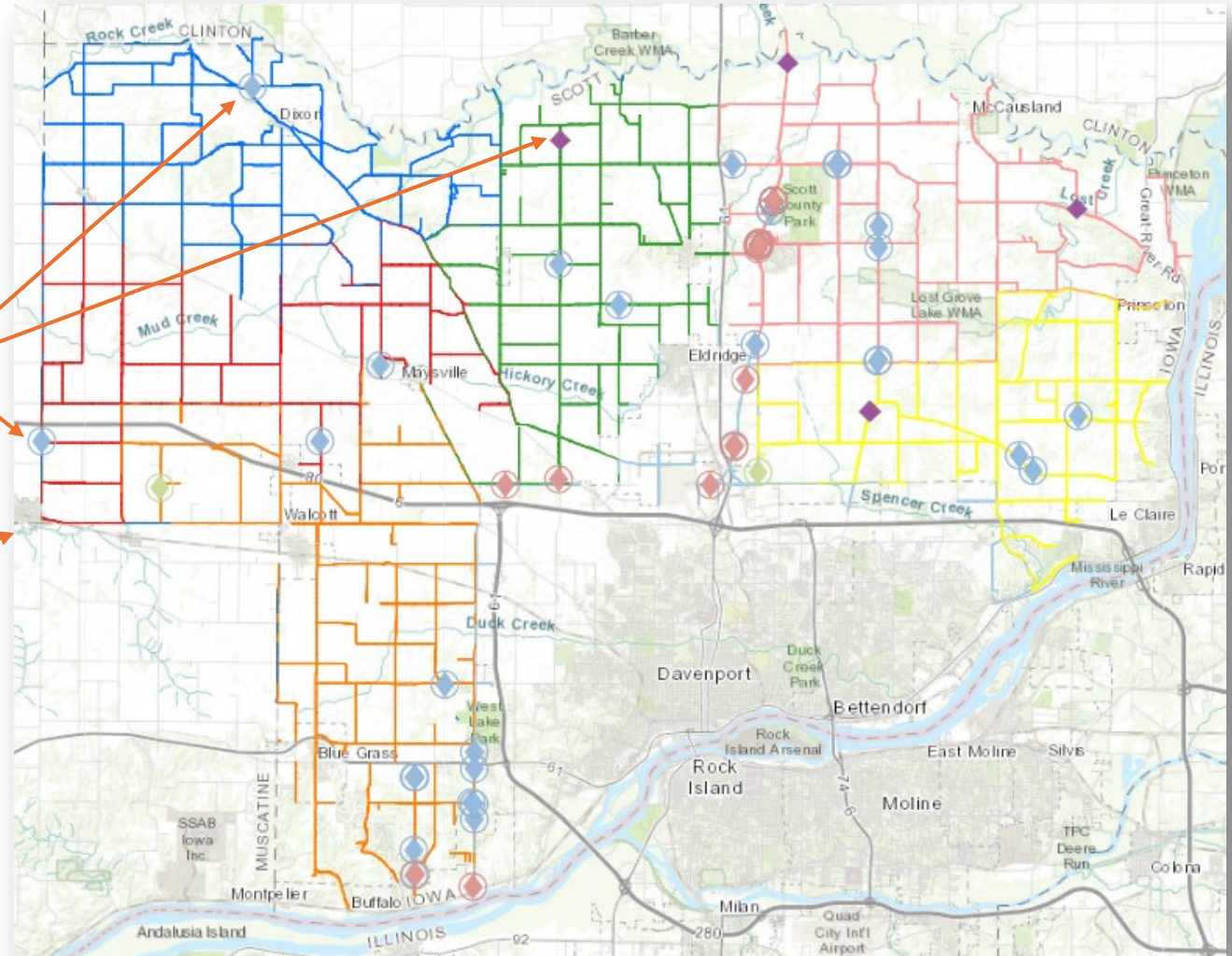
- **ArcGIS Field Maps**
  - **Organized on ArcGIS Online**
  - **Managed on ArcGIS Online**

→ Invasive Species  Feature Layer (hosted)

This “Feature Layer” was created and appears in the “Web Map”

→ IRVM Herbicide Application  Web Map

The “Web Map” appears in “Field Maps” for editing and data collection





# Weed Locations (Continued)

- Organize on ArcGIS Online
  - Examine Fields
  - Create “List of Value” (Domian)
  - These are dropdowns that appear in “Field Maps”

The screenshot shows the ArcGIS Online interface for a feature layer named "Invasive Species". The "Fields" table lists several fields, with "Species" circled in orange. An arrow points from the "Species" field to the "List of Values (Domain)" window. This window displays a list of species names: Phragmites, Teasel, Poison Hemlock, Japanese Knotweed, Chinese Silvergrass, Canada Thistle, Bull Thistle, and Musk Thistle. An orange arrow points from the list to a text box.

<input type="checkbox"/> Display Name	Field Name	Type
<input type="checkbox"/> OBJECTID	OBJECTID	ObjectID
<input type="checkbox"/> Species	Species	String
<input type="checkbox"/> Treatment Date	TreatDate	Date
<input type="checkbox"/> Comments	Comments	String
<input type="checkbox"/> GlobalID	GlobalID	GlobalID

List of Values (Domain)

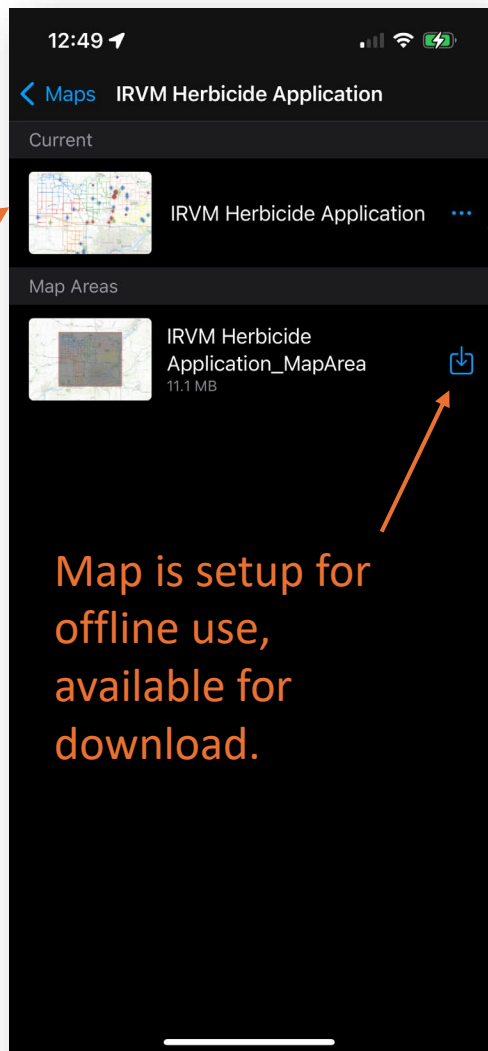
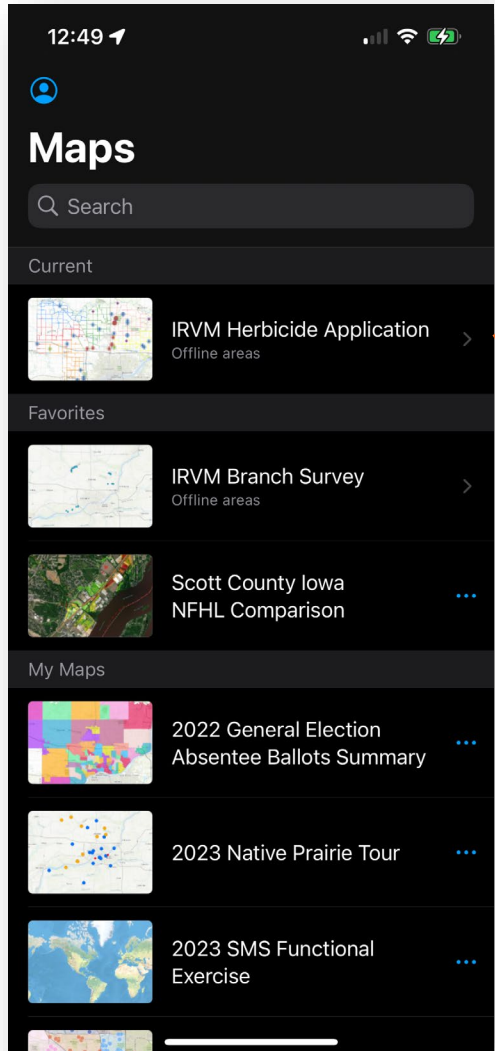
Phragmites
Teasel
Poison Hemlock
Japanese Knotweed
Chinese Silvergrass
Canada Thistle
Bull Thistle
Musk Thistle

List of Species that will appear in the dropdown as options in “Field Maps”

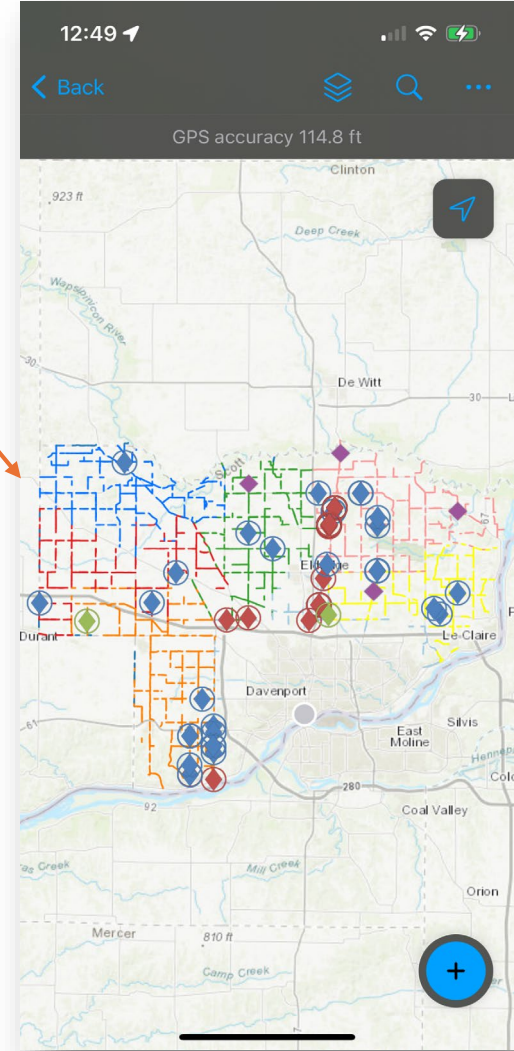




# Weed Locations (Continued)



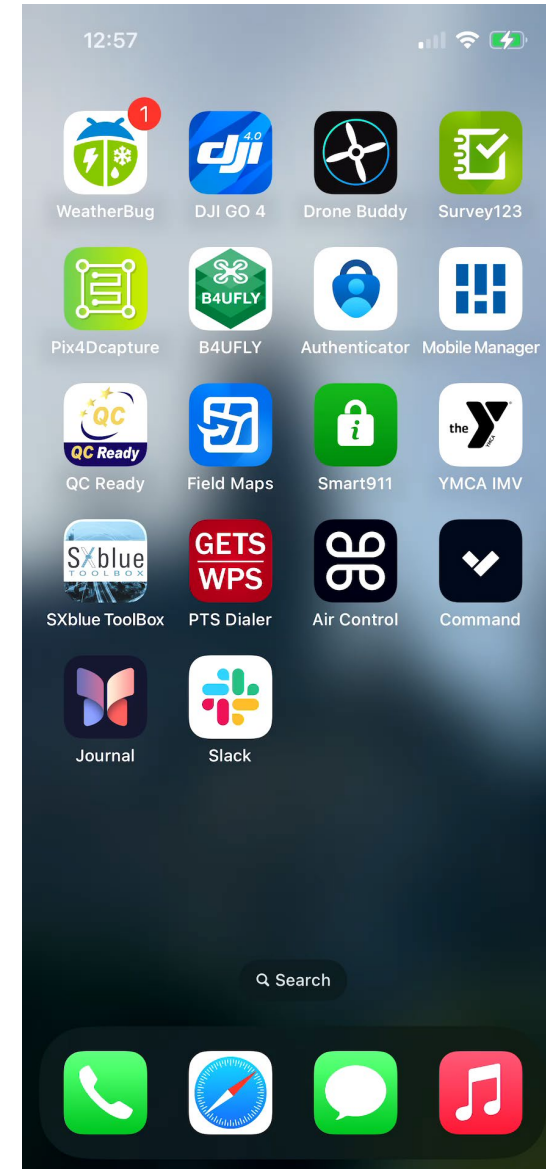
Map is setup for offline use, available for download.



# Weed Locations (Continued)

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- ArcGIS Field Maps
  - Let's put it to work!



# Treatment Locations

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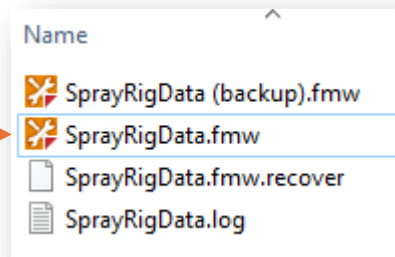
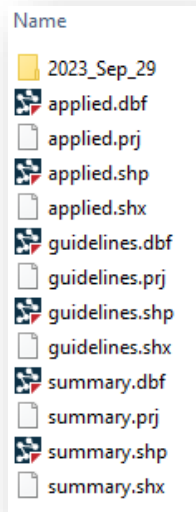
- **ArcGIS Pro & FME**
  - **Spray Rig data logger files**
  - **Automate process using FME**
  - **Publish to ArcGIS Online using ArcGIS Pro**
  - **Visualize data in ArcGIS Dashboard**
  - **Entire operation is almost daily and takes around 5 minutes**





# Treatment Locations (Continued)

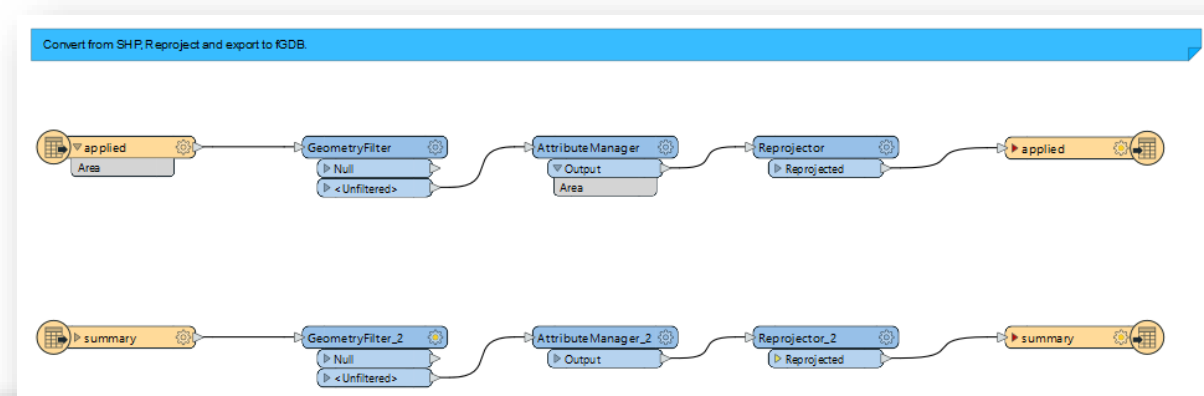
- **ArcGIS Pro & FME**
  - **Organize data from the field**
  - **Execute FME operation**
  - **Publish to ArcGIS Online**



**FME reads the location of shapefiles generated from the spray rig data logger, converts the data to a GIS feature layer. This operation is executed daily, and the output is different each day.**

# Treatment Locations (Continued)

- FME
  - Execute daily



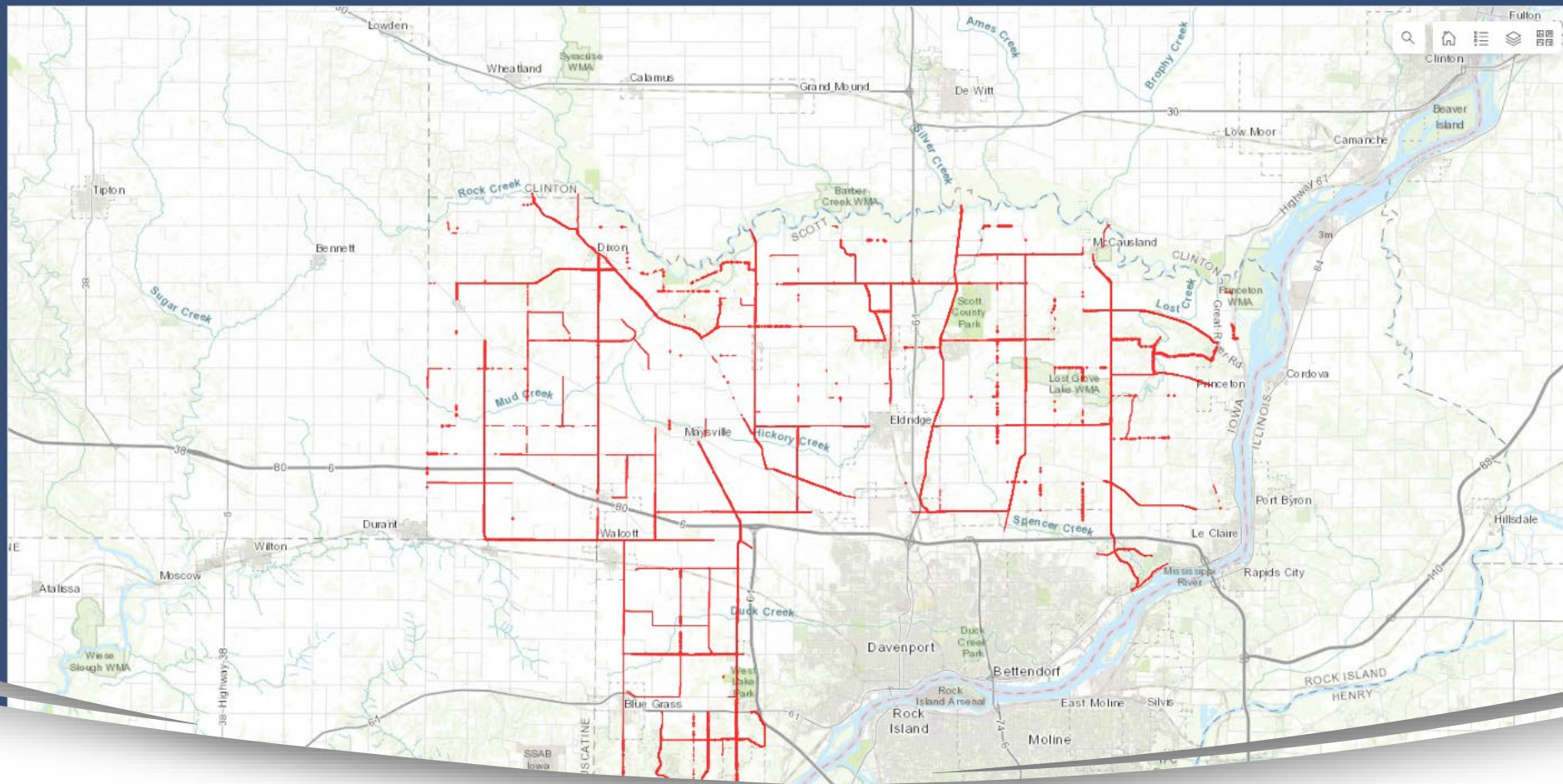
A screenshot of the FME Quick Translator software interface. The window title is "FME Quick Translator". The menu bar includes "File", "Log", "Tools", and "Help". The toolbar contains icons for "Translate", "Run", "Re-Run", "Stop", "Generate", "Save Log Text", "Copy", "Find", "Find Next", and "Word Wrap". The main area is divided into "Get Started" and "Resources" sections. The "Get Started" section has "Translate" and "Run" buttons. The "Resources" section features a video thumbnail for "FME Academy" and text about integrating data with a platform. A "Translation Parameter Values" dialog box is open in the foreground, showing the following fields: "File Geodatabase:" with the value "projects\Ongoing\IRVM\Data\Spray Rig\SprayRig.gdb", "Source Esri Shapefile(s):" with the value "I:\Spray Rig Shapefiles\2021\DataTransfer\applied.shp", "Source Esri Shapefile(s):" with the value "Spray Rig Shapefiles\2021\DataTransfer\summary.shp", and "File Geodatabase:" with the value "projects\Ongoing\IRVM\Data\Spray Rig\SprayRig.gdb". There are "OK" and "Cancel" buttons at the bottom of the dialog box. Below the dialog box, a list of workspace files is visible, including "SprayRigData.fmw", "AI\_Dailyfgdb\_TO\_AI\_DailyAGO.fmw", "DailycsvTOAI\_Dailyfgdb.fmw", "AFNEEDS\_Step1.fmw", and "AI\_Messages\_TO\_AI\_MessagesAGO.fmw".

Count of 2021 Areas Applied:

2,122

2021 2022 2023

Sum of 2021 Areas (acres):



Application Records Date

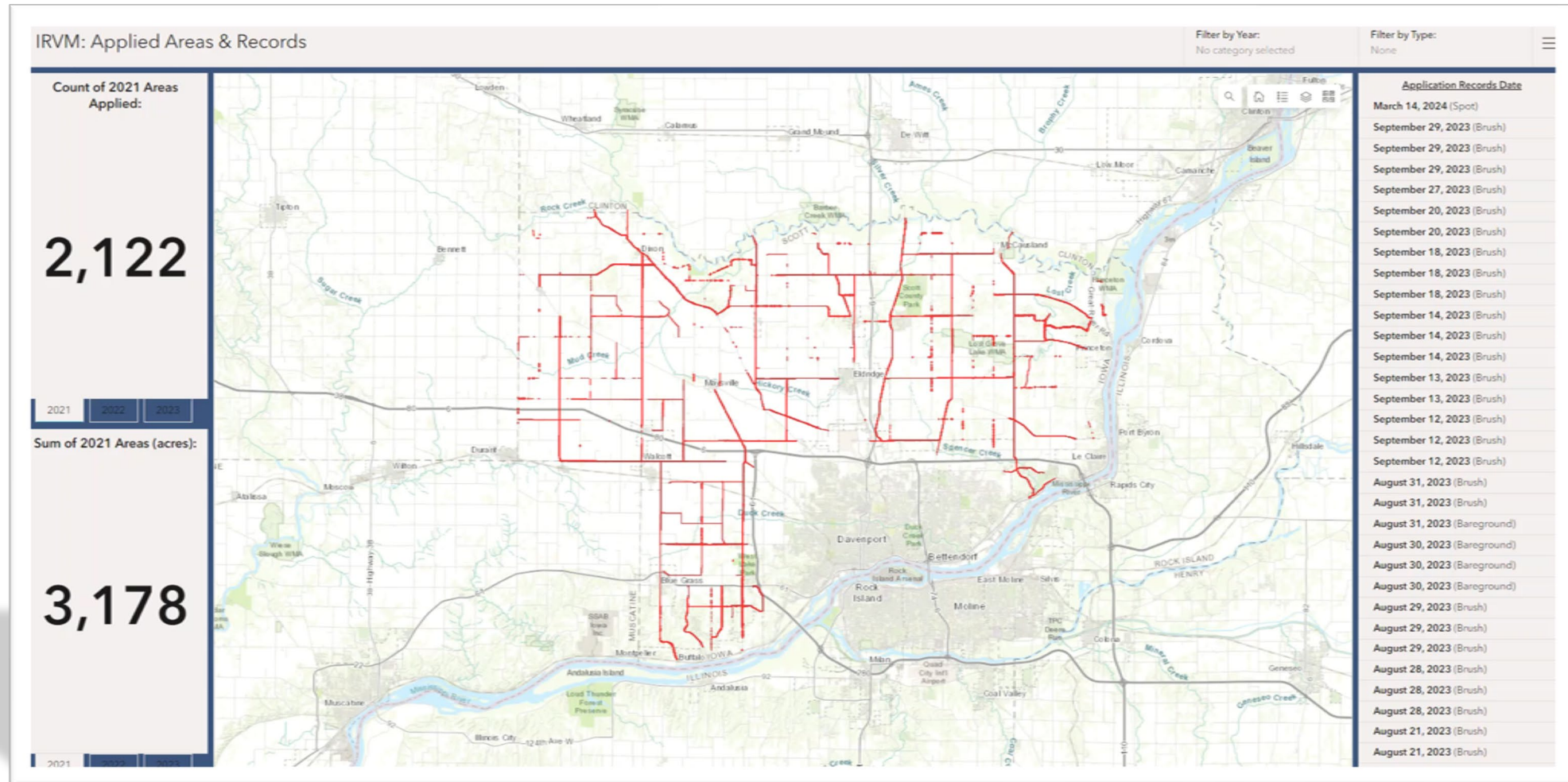
March 14, 2024 (Spot)
September 29, 2023 (Brush)
September 29, 2023 (Brush)
September 29, 2023 (Brush)
September 27, 2023 (Brush)
September 20, 2023 (Brush)
September 20, 2023 (Brush)
September 18, 2023 (Brush)
September 18, 2023 (Brush)
September 18, 2023 (Brush)
September 14, 2023 (Brush)
September 14, 2023 (Brush)
September 14, 2023 (Brush)
September 13, 2023 (Brush)
September 13, 2023 (Brush)
September 12, 2023 (Brush)
September 12, 2023 (Brush)
September 12, 2023 (Brush)
September 12, 2023 (Brush)
August 31, 2023 (Brush)
August 31, 2023 (Brush)
August 31, 2023 (Bareground)
August 30, 2023 (Bareground)
August 30, 2023 (Bareground)

## Treatment Locations (Continued)

- ArcGIS Online Dashboard
- Visualize & Explore the data



# Treatment Locations (Continued)



# Treatment Locations (Continued)

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- **ArcGIS Pro & FME**
  - **Organize data from the field**
  - **Execute FME operation**
  - **Publish to ArcGIS Online**

# Planting & Prep Locations

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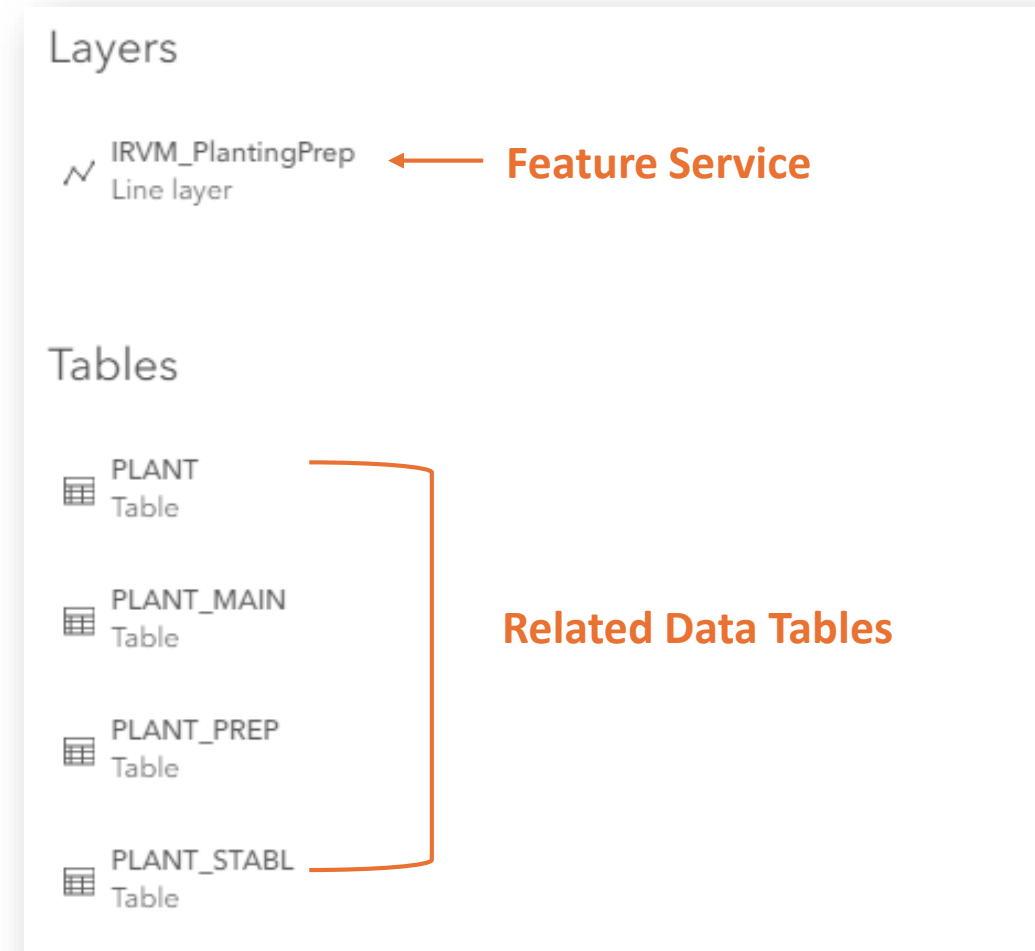
- **ArcGIS Online & Field Maps**
  - Data managed on ArcGIS Online
  - Multiple related tables established to record planting and preparation data related to one roadside segment
  - Data is recorded in ArcGIS Field Maps
  - Relationship data can be viewed in ArcGIS Pro or ArcGIS Online



# Planting & Prep Locations (Continued)

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- ArcGIS Online
  - Roadside “Feature Layer” and related tables are managed
  - Domains are created for the related tables

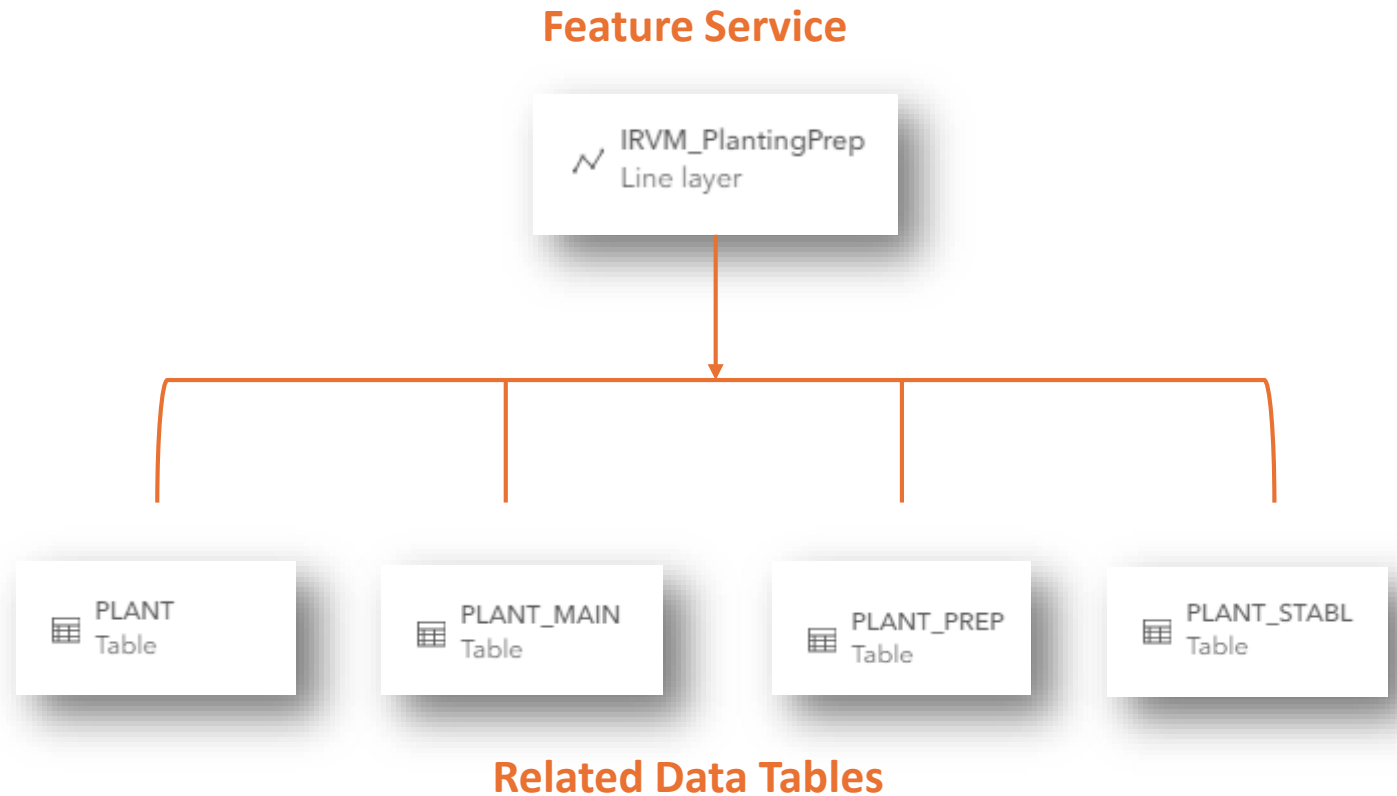




# Planting & Prep Locations (Continued)

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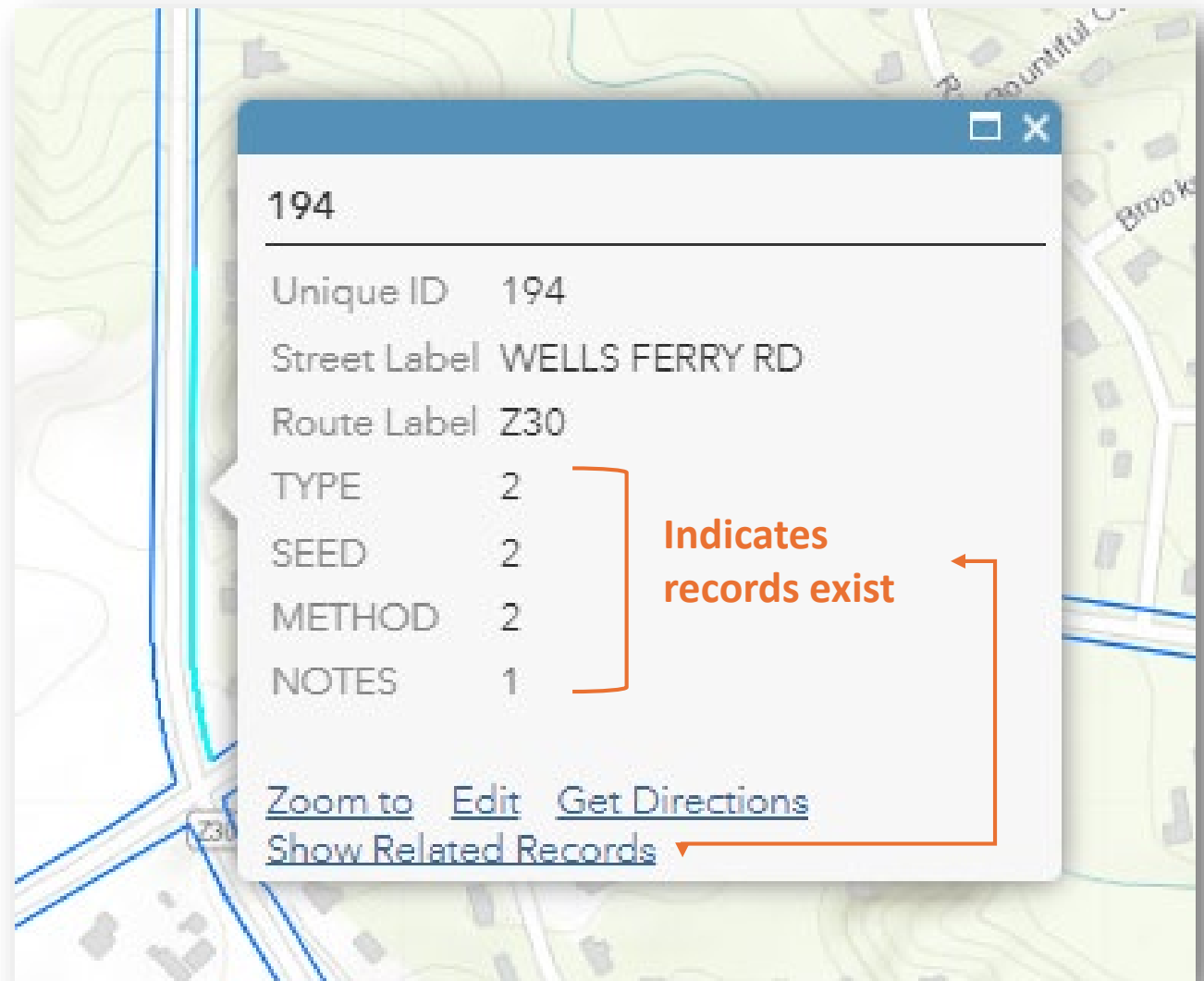
- ArcGIS Online
  - One roadside segment can have multiple records in individual tables



# Planting & Prep Locations (Continued)

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- ArcGIS Online
  - View records in Web Map



# Planting & Prep Locations (Continued)

Planting (Features: 2, Selected: 0)										
DITCHUID	PLANTUID	TYPE	SEED	METHOD	Date	NOTES	PLANT STABILIZATION TABLE	PLANT MAINTENANCE TABLE	PLANT PREP TABLE	IRVM Planting Prep Lines
194	194	Secondary Roads Maintenance	turf	Hydroseed	5/26/2022		(2) Show	(0)	(0)	(1) Show
194	194	Secondary Roads Maintenance	Turf	Hydroseed	6/20/2022	pipe replacement	(2) Show	(0)	(0)	(1) Show

PLANT STABILIZATION TABLE	PLANT MAINTENANCE TABLE	PLANT PREP TABLE	IRVM Planting Prep Lines
(2) Show	(0)	(0)	(1) Show
(2) Show	(0)	(0)	(1) Show

Number of records in the table for the roadside segment

PLANT\_STABL Table

PLANT\_MAIN Table

PLANT\_PREP Table

PLANT Table

# Planting & Prep Locations (Continued)

Planting (Features: 2, Selected: 0)										
DITCHUID	PLANTUID	TYPE	SEED	METHOD	Date	NOTES	PLANT STABILIZATION TABLE	PLANT MAINTENANCE TABLE	PLANT PREP TABLE	IRVM Planting Prep Lines
194	194	Secondary Roads Maintenance	turf	Hydroseed	5/26/2022		(2) Show	(0)	(0)	(1) Show
194	194	Secondary Roads Maintenance	Turf	Hydroseed	6/20/2022	← pipe replacement	(2) Show	(0)	(0)	(1) Show

PLANT_STABL (Features: 2, Selected: 0)						
OBJECTID	PLANTUID	STABILTYPE	Date	NOTES	GlobalID	
118	194	Silt Fence	6/20/2022, 1:54 PM		ee1db051-91c0-4df3-84f9-0b5e7d7dda52	
119	194	Waddles	6/20/2022, 1:55 PM		8a0657a5-f5d8-4ec1-8c46-6bae07cbc62f	

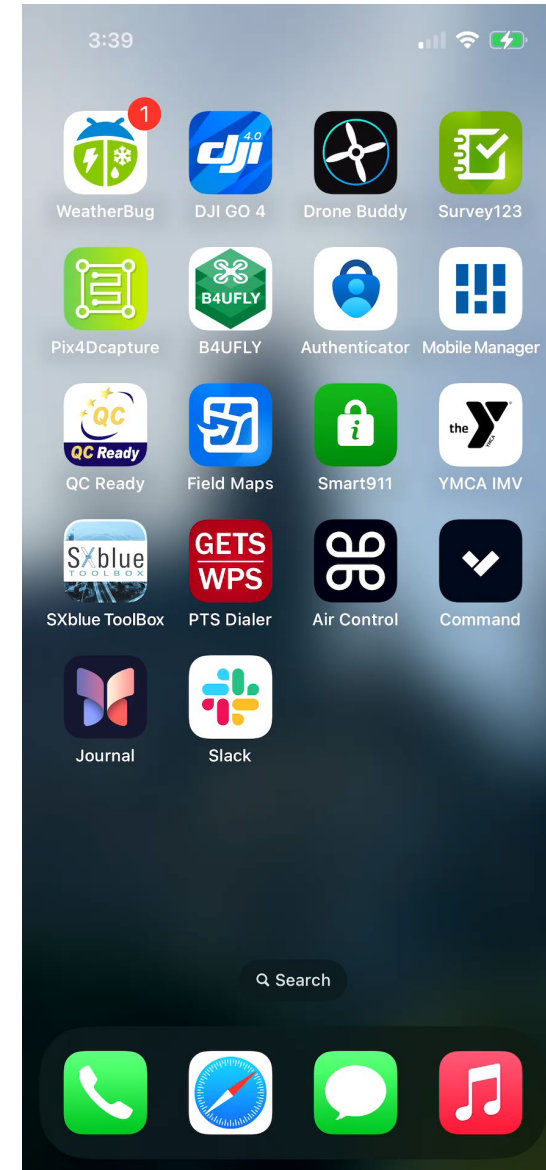


# Planting & Prep Locations (Continued)

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- **ArcGIS Field Maps**
  - **Let's put it to work!**

Let's enter Maintenance and  
Planting records!



# Planting & Prep Locations (Continued)

258

Unique ID 258  
Street Label BRADY ST  
Route Label  
District Number 0  
TYPE 1  
SEED 1  
METHOD 1  
NOTES 1

[Zoom to](#) [Edit](#) [Get Directions](#)  
[Show Related Records](#)

DITCHUID	PLANTUID	TYPE	SEED	METHOD	Date	NOTES	PLANT STABILIZATION TABLE	PLANT MAINTENANCE TABLE	PLANT PREP TABLE	LRVM Planting Prep Lines
					3/14/2024	Test	(0)	(1) Show	(0)	(1) Show

# Planting & Prep Locations (Continued)

Planting (Features: 1, Selected: 0)

DITCHUID	PLANTUID	TYPE	SEED	METHOD	Date	NOTES	PLANT STABLIZATION TABLE	PLANT MAINTENANCE TABLE	PLANT PREP TABLE	IRVM Planting Prep Lines
258	258	Secondary Roads Maintenance	2019	Drill	3/14/2024	Test	(0)	(1) Show	(0)	(1) Show

Selected: 0)

DITCHUID	PLANTUID	MAINTENANCE	DATE	NOTES
258	258	Burn	3/14/2024, 3:40 PM	Test

PLANT (Features: 1, Selected: 0)

PLANTUID	TYPE	SEED	METHOD	Date	NOTES	PLANT STABLIZATION TABLE	PLANT MAINTENANCE TABLE
258	Secondary Roads Maintenance	2019	Drill	3/14/2024, 3:40 PM	Test	(0)	(1) Show