



FORESTRY
FUTURES
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ONTARIO



 **FORSITE**
Forest Management Specialists

 **SUMAC**

Presentation for KTTD 1A-2021

Enhancements for eFRI Next Generation Handhelds

Craig Robinson, RPF

Overview

- A bit of a history of Ground Data Collection Apps
- The other current technologies for mobile data collection
- Where we started in 2019
- What we did up to 2022
- eVSN in 2023
- Next steps



What are we targeting?



Vegetation Sampling Network Protocol:

Technical specifications for field plots

Technical Manual

Science and Research Branch

Ministry of Natural Resources and Forestry

Unpublished draft operational version 2.2, March 2023

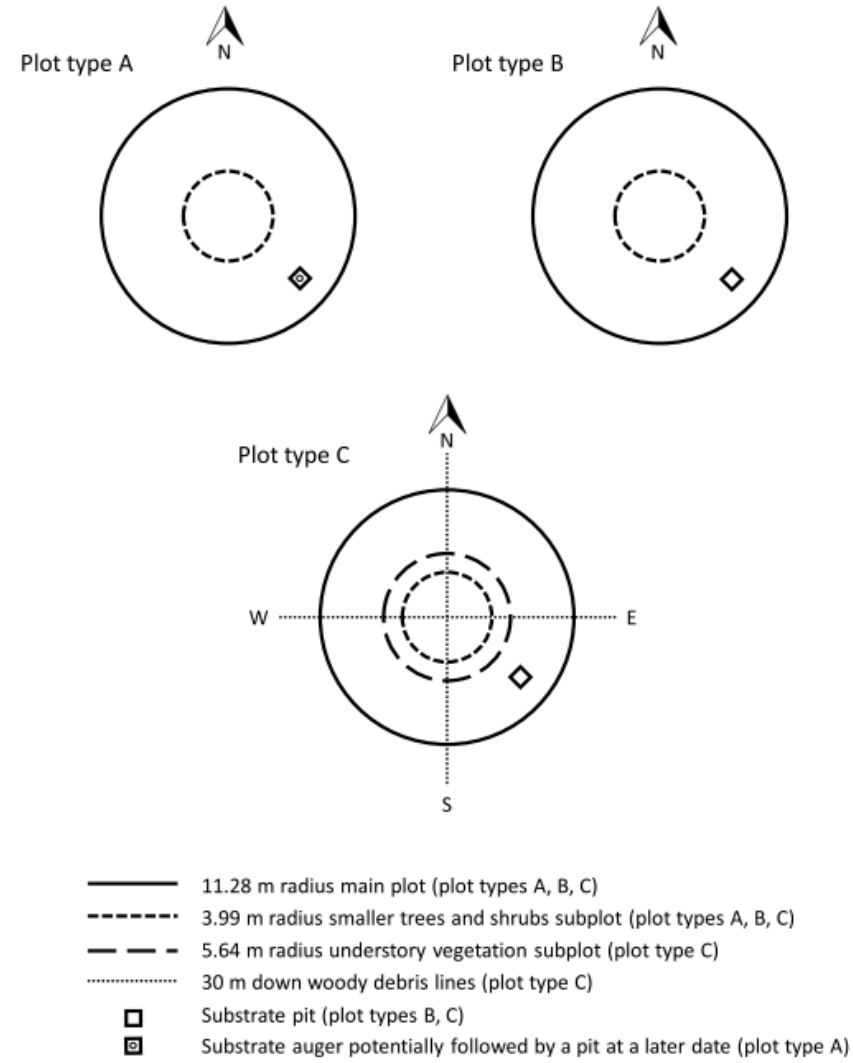


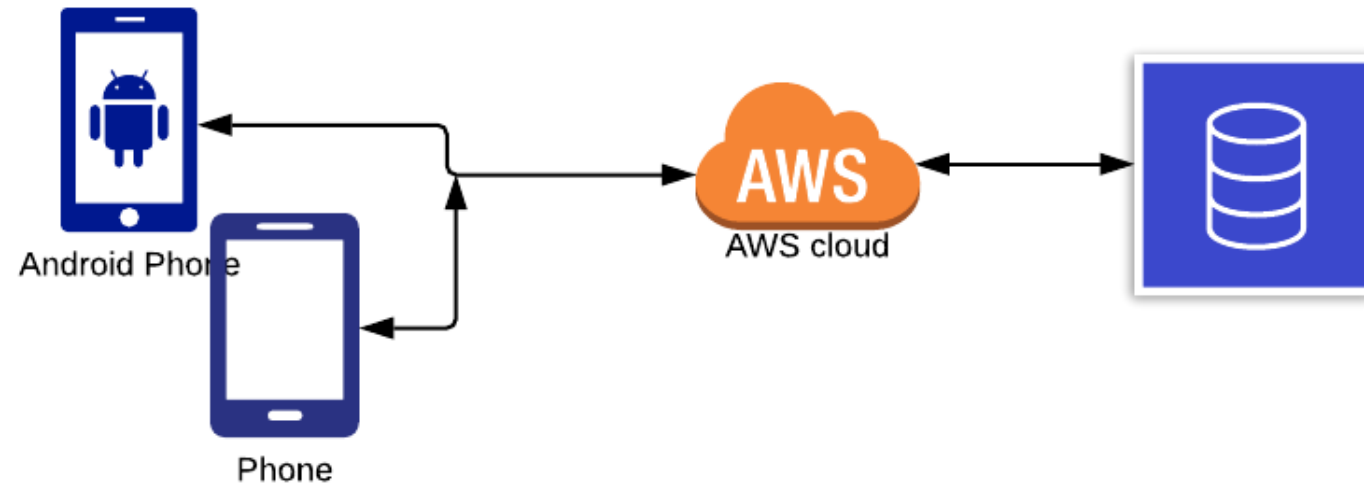
Figure 3. Elements and layout of the three plot types used in the Vegetation Sampling Network.



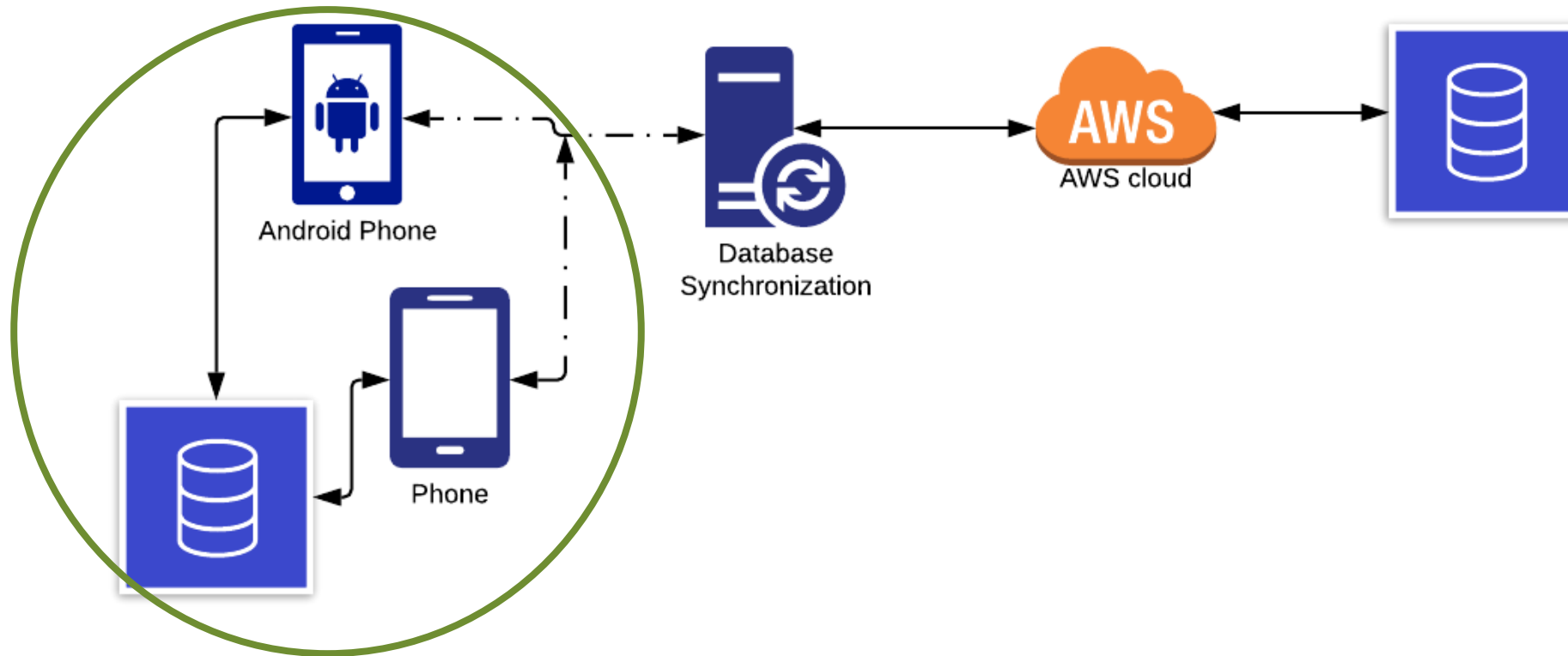
Thanks to Todd Domney for the photos

But first....

Connected Apps



Disconnected Apps



A bit of history

Windows Mobile

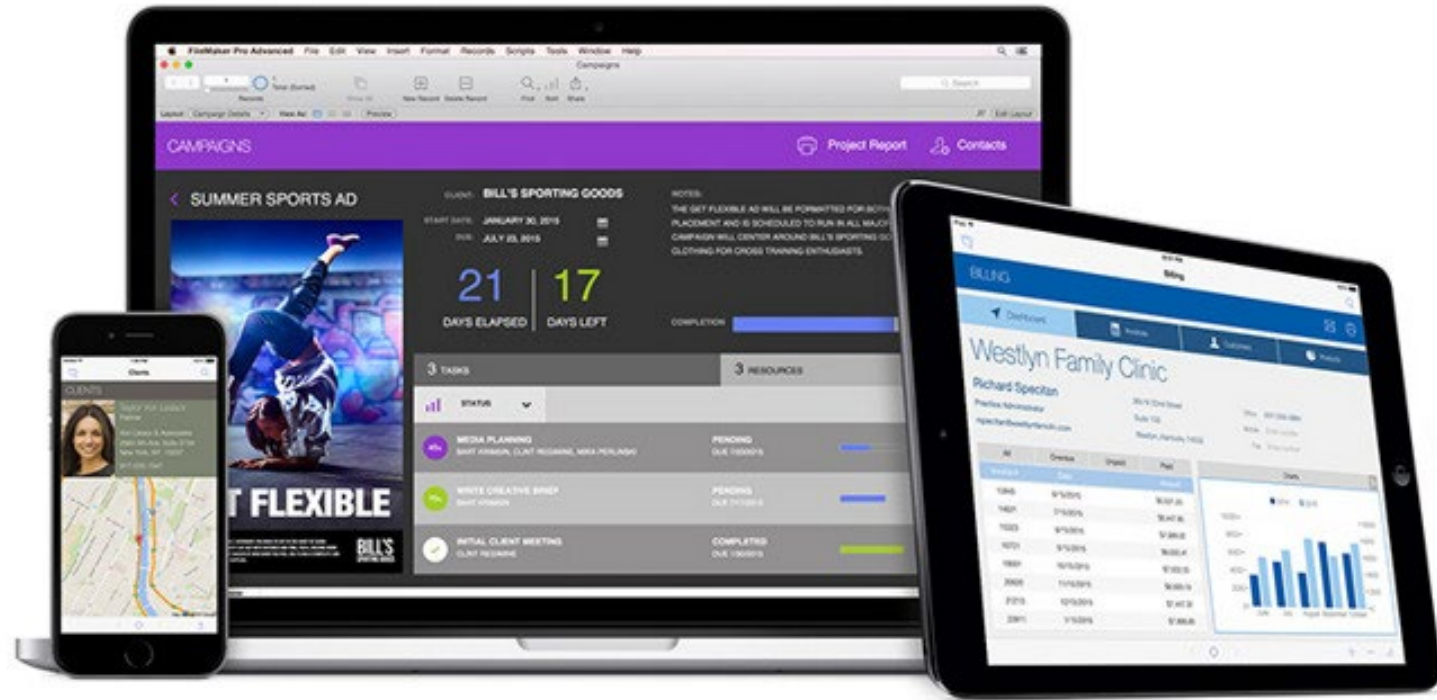
OLD!

- Very rugged
- Not really connected devices
- Windows Mobile support ended a long time ago
- Morphed into other products – like Windows Phone – that never took off
- Build apps in .NET Compact Framework



FileMaker Pro / Go

- Easyish development
- Deploy to iOS devices
- Works disconnected
- Challenging scripting language
- Takes some effort to retrieve data



More Modern Solutions

Survey 123 (from Esri)

- Very configurable
- Works disconnected
- Integrated with GIS
- Deploys to iOS, Android
- TOO Simple!



Xamarin Forms



- Cross-Platform
- Develop in C# and XAML
- One set of code
- Deploy to iOS, Android, UWP devices
- Ability to have the app be whatever you want



What did we do initially?

eVSN

- Built in Xamarin.Forms, C#, SQLite and Azure SQL
- Deployable to iOS 13+ or Android 9+
- Works fully disconnected
- Collects data for Plot Types A, B, C
- Multi-device/multi-user



Common App Patterns

- Lists
- Details
- Add Buttons

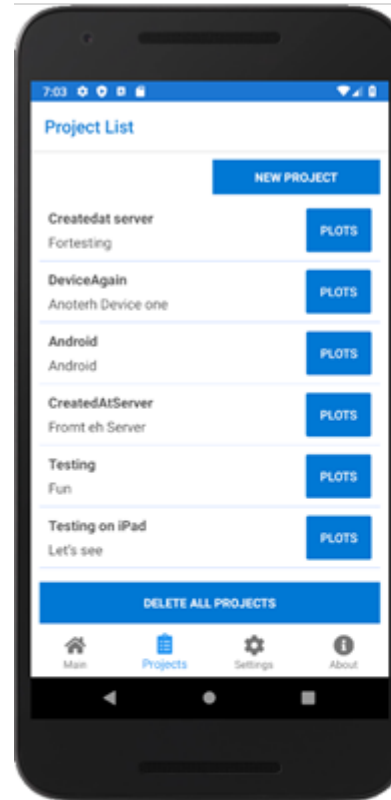


Figure 1 Project Screen. A list of plot projects will appear here. If no project already exists, then a user can Add a New Project. THIS IS THE UPDATED STYLING IN THIS SCREEN SHOT. IT IS CONSISTENT BETWEEN ANDROID AND iOS

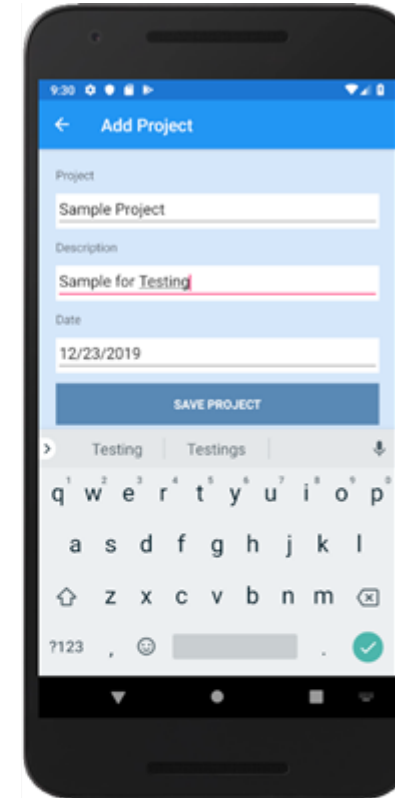


Figure 2 Project Details screen. For entering project attributes. At least one project must exist to add plot data to.

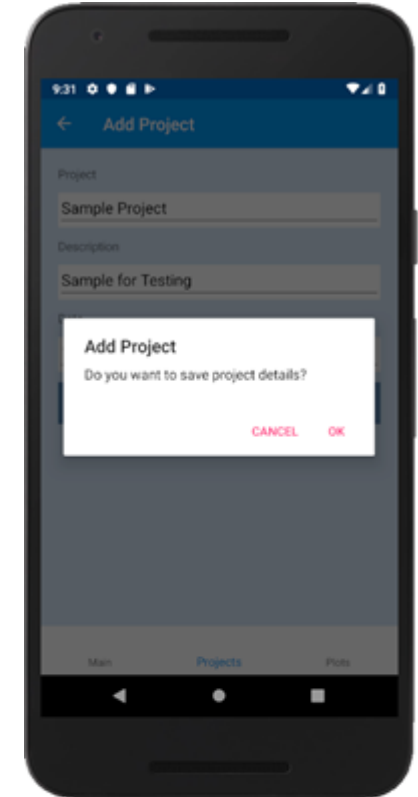
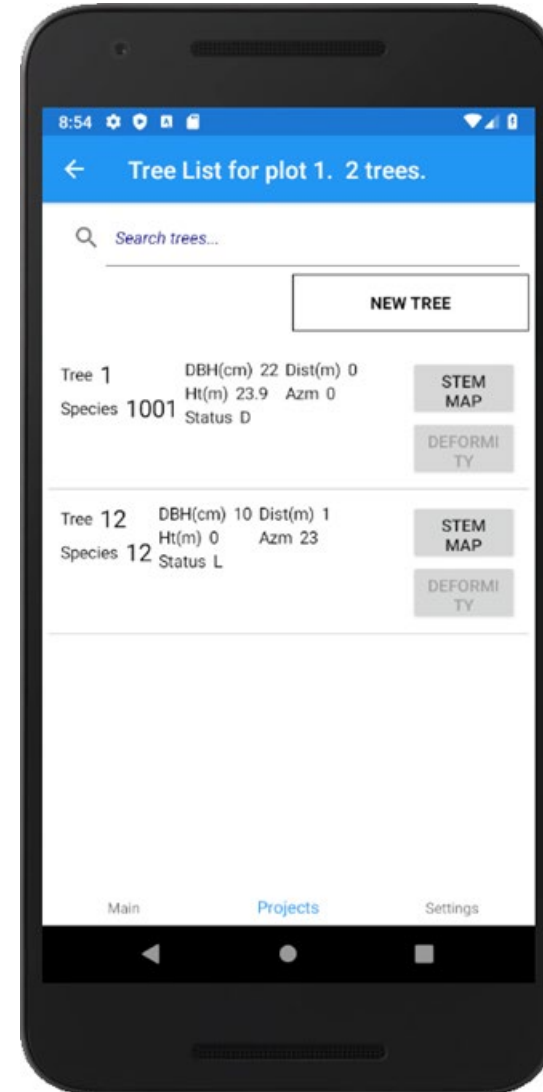


Figure 1 All screens feature a 'Save' utility to save changes to the SQLite database on the device. The device and database always operates disconnected. Data is pushed to the cloud when the user requests it. The data stored on device on SQLite will sync up to an Azure SQL version of the same database when the user has connectivity.

Understands Plot Types

- Only let you enter the screens associated with the plot type



Helpers

Complex Types

➤ Soil Horizons

➤ Ecosites

9:08

← Add Soil Layer

Soil Attributes Layer Number	Soil Attributes Continued Pore Pattern	Soil Attributes Continued Percent Gravel
10	Pore Pattern 0	0
From (cm) 0	Structure	Percent COBBLE
To (cm) 13	COLOUR 0	Percent Stone
Horizon	Mottle Colour	
HORIZON	MOTTLE COLOUR	
von Post		
von Post		
Mineral Texture		
Mineral Textur		

SAVE SOIL

Main Projects Settings

9:09

← Soil Horizon

Choose from the codes to construct a soil horizon.

START OVER

C-Unweathered Parent Material

g-Presence of Prominent mottles or gley

j-Immature development of the suffix it modifies

Soil Horizon Suffix 3

Soil Horizon Suffix 4

SOIL HORIZON

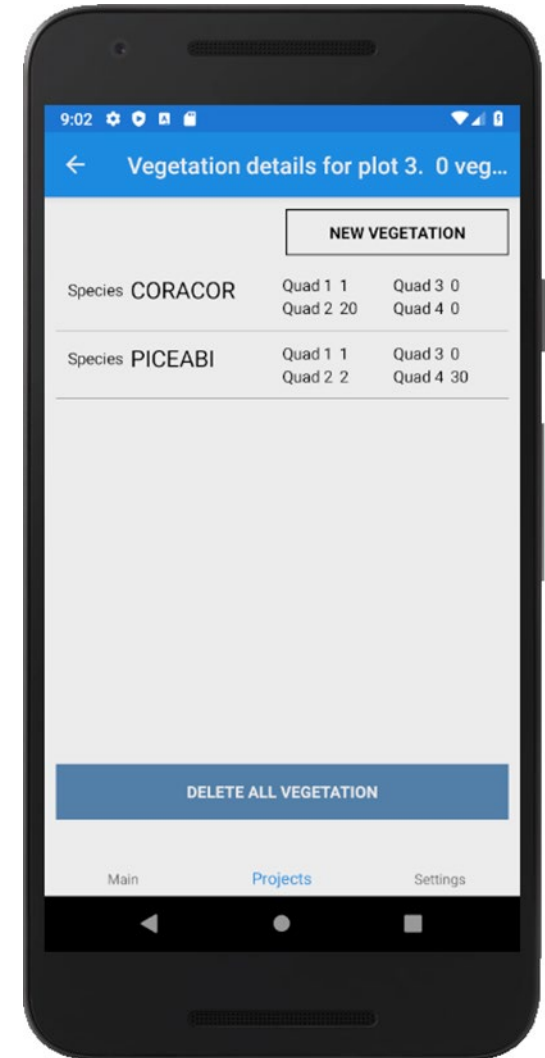
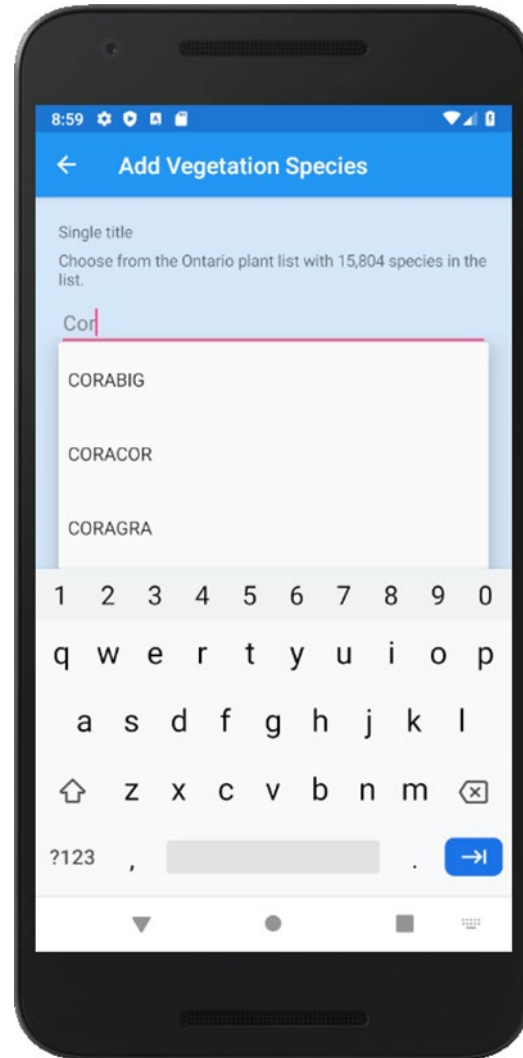
Cgj

Main Projects Settings

Helpers

Really Big Lists

- Over 15,000 understory species in the understory vegetation plot



Github

➤ Open Source!!!

The screenshot shows a web browser displaying the GitHub repository page for 'csrobins / eFRI_LiDAR_Handheld'. The page includes a navigation bar with links for 'Why GitHub?', 'Enterprise', 'Explore', 'Marketplace', and 'Pricing', along with a search bar and 'Sign in'/'Sign up' buttons. The repository name is 'csrobins / eFRI_LiDAR_Handheld', with 0 watches, 0 stars, and 0 forks. Below the repository name, there are tabs for 'Code', 'Issues', 'Pull requests', 'Projects', 'Security', and 'Insights'. The main content area features a description: 'Xamarin project for an Ontario eFRI LiDAR plot for field data collection'. It also displays statistics: 7 commits, 1 branch, 0 packages, 0 releases, 1 contributor, and GPL-3.0 license. A 'Branch: master' dropdown and a 'New pull request' button are visible. A 'Find file' button and a 'Clone or download' button are also present. The file list includes folders for 'db', 'eLiDAR.Android', 'eLiDAR.iOS', 'eLiDAR', and 'extras', and files for '.gitignore', 'LICENSE', 'README.md', 'eLiDAR.sln', and 'readme.md'. The 'README.md' file is selected, showing its content.

File/Folder	Version	Commit Date
db	Version 0.1	2 months ago
eLiDAR.Android	Version 0.1	2 months ago
eLiDAR.iOS	Alpha	6 months ago
eLiDAR	Version 0.1	2 months ago
extras	Version 0.1	2 months ago
.gitignore	Initial commit	6 months ago
LICENSE	Initial commit	6 months ago
README.md	Initial commit	6 months ago
eLiDAR.sln	Alpha	6 months ago
readme.md	Alpha	6 months ago

For the 2021 and 2022 Field Seasons

Enhanced Error Checking

Real Time

➤ Error checking more comprehensive and in real time for user

Android Emulator - tablet_m-dpi_7in_-_api_33:5554

11:00

Plot Details for plot TST000001

Non Standard Condition	500000
Access Condition	Datum
Existing Plot Name	Datum
Existing Plot Type	
Growth Plot Number	

UTM Zone must be between 15 and 18.
Northing should be between 4620000 and 7000000 m
You must have at least one crew member (Crew Member 1) in the Plot screen
Stand Information date should > 01-01-2022.
You must have a Crew Lead in the Stand Info screen
Canopy Structure 1 should be filled out in the Stand Info Screen
Canopy Origin 1 should be filled out in the Stand Info Screen
Maturity Class Code 1 should be filled out in the Stand Info Screen
You must have an Age Person in the Plot Crew Screen
You must have a valid Age Date in the Plot Crew screen (> 01-01-2022)

STAND INFO

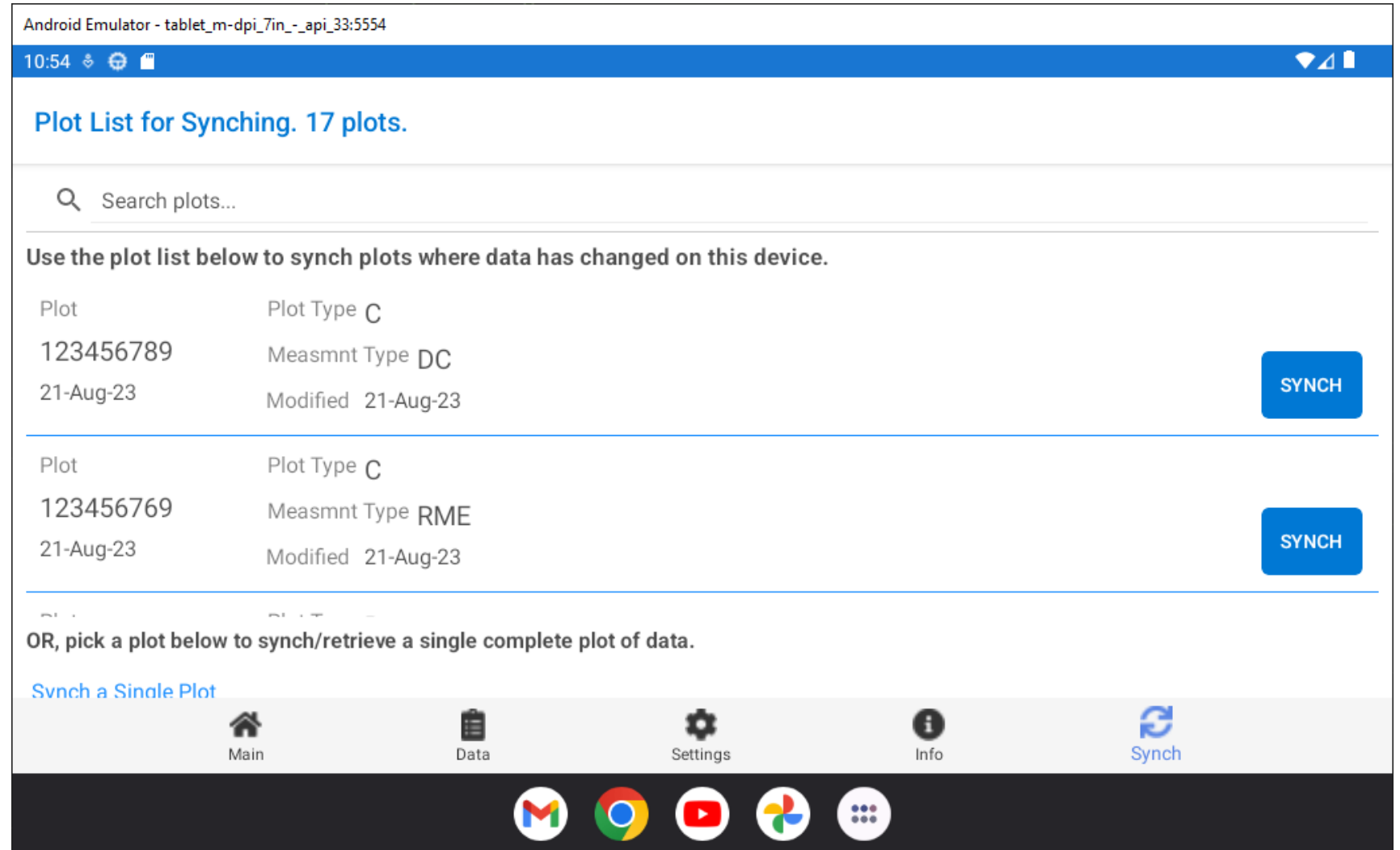
FOREST HEALTH

Main Data Settings Info Synch

Enhanced Syncing

Targeted

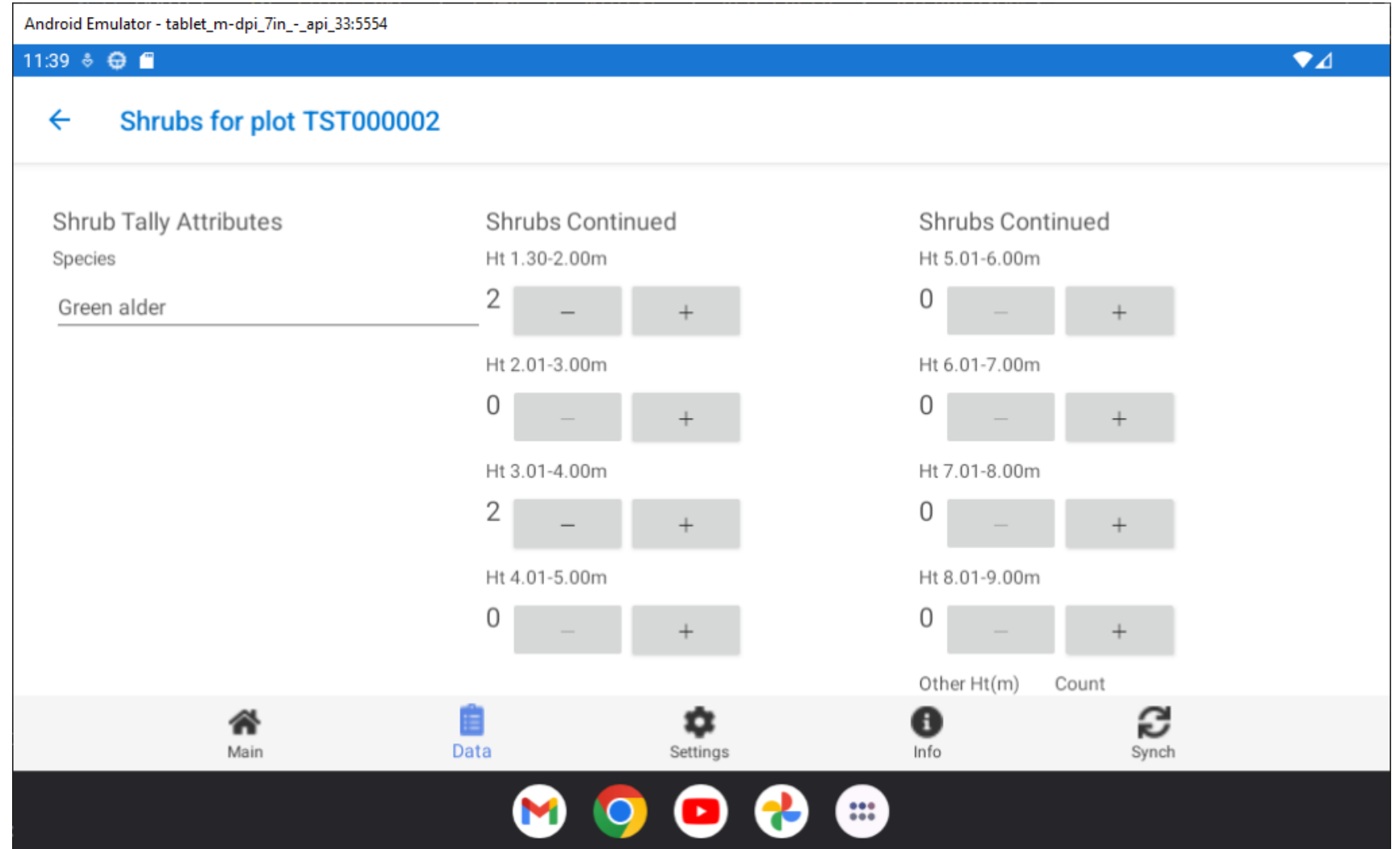
- More efficient syncing of plot data



Keeping up with Procedural Changes

Shrubs

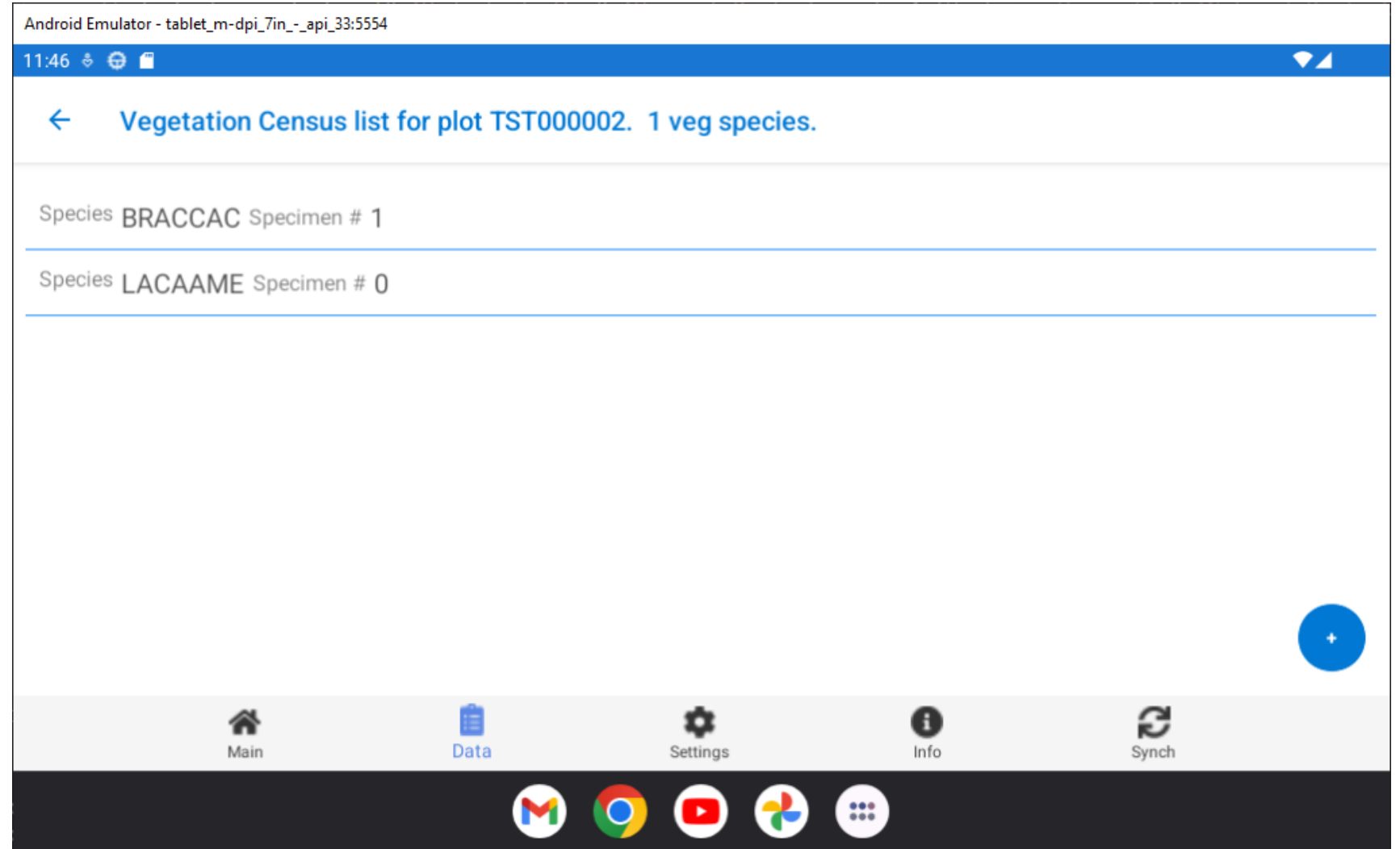
- New screens for new data types were added



Keeping up with Procedural Changes

Census

- New screens for new data types were added



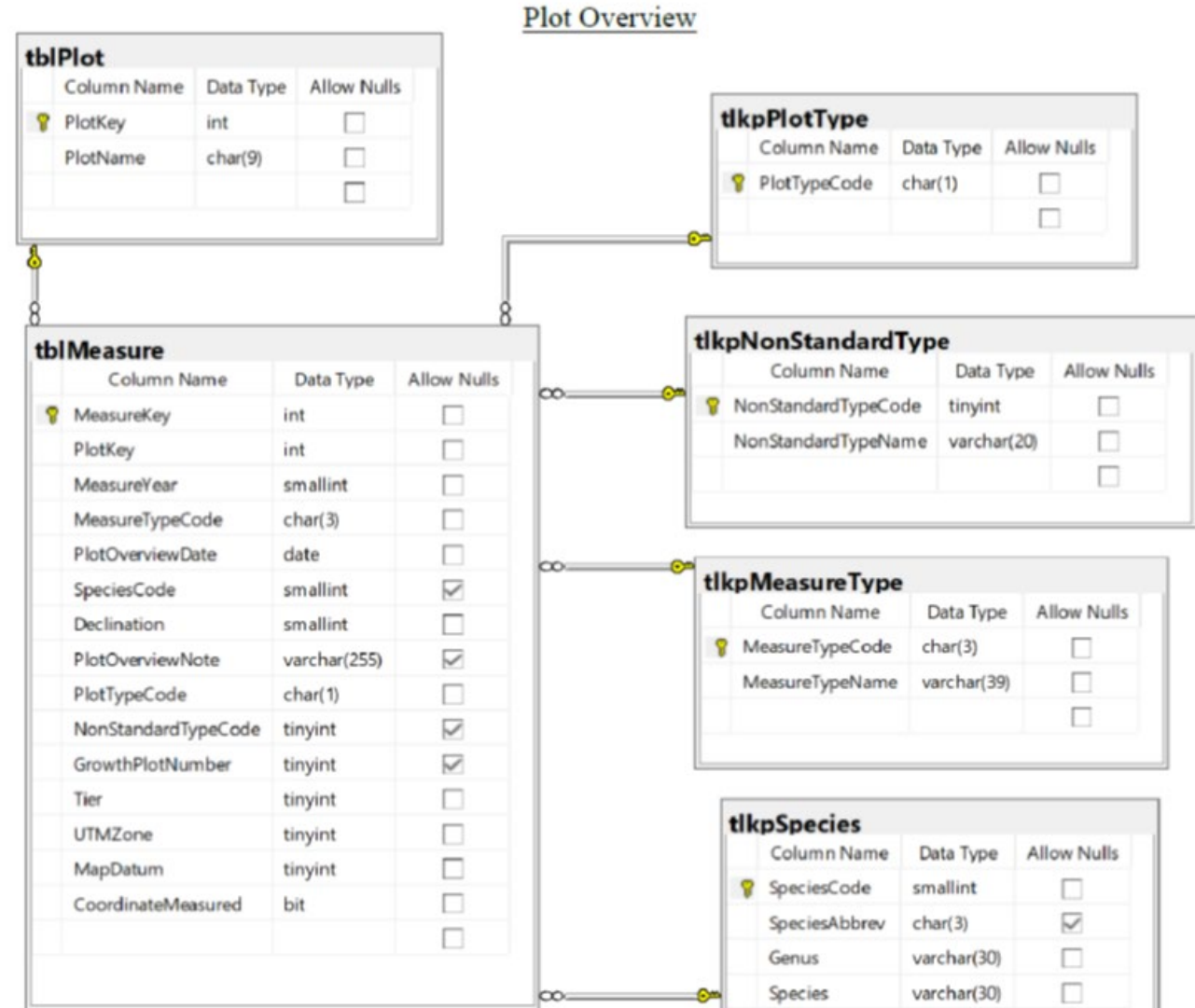
Delivering Data

VSN Contractor

- Worked with the existing VSN Contractor format to deliver data to the OMNRF
- Was challenging and complex

vsnContractorVer 2.01

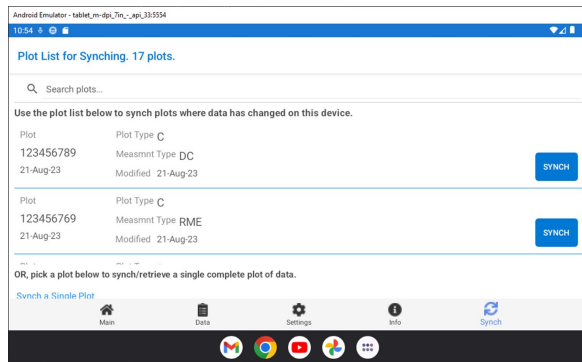
June 25, 2020



Delivering Data

Using an API

➤ By 2022 – the delivery of data simplified



API



For 2023 Field Season

It went Enterprise!

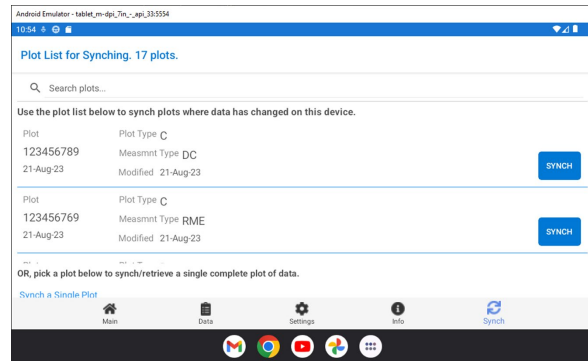
- ① LRC took the app inside the Ontario government
- ② Made many improvements to the backend
- ③ Enhanced security
- ④ Simplified deployment

For 2023 Field Season

It went Enterprise



Azure Cosmos DB



API



Welcome to the Forest Resources Inventory Partner Portal

This portal provides services to industry, vendors and research partners.

Sign in to the Portal

The Forest Resources Inventory Partner Portal uses the Government of Ontario's Public Secure login service to sign in this site. Use your existing Public Secure account or register for a new Public Secure account.



For 2023 Field Season

It went Enterprise



Many Parties Involved

It went Enterprise



Next Steps

Ongoing Maintenance

- ① 1400 VSN plots to be completed next year
- ① Continue to evolve to keep pace with procedure changes
- ① Find ways to make it more efficient, so crews can work efficiently



Questions?



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