SpraySync Software Guide

December 2024

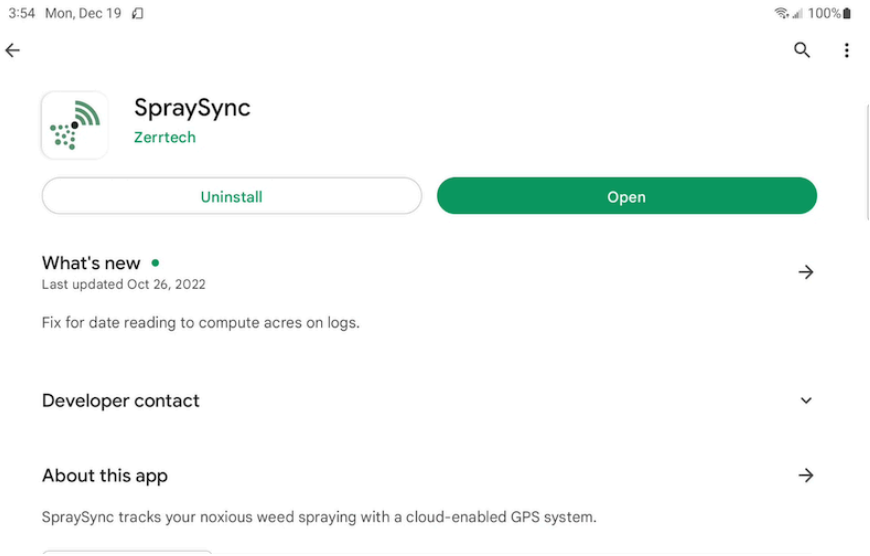
Table of Contents

1. Introduction

The SpraySync system consists of:

- Android mobile app designed to run on a tablet (suggested tablets are rugged Samsung tablets specifically Samsung Galaxy Tab Active5 or Active4 Pro)
- A single SpraySync monitor box, currently two models. Both monitor boxes are a hardware device that interfaces with the sprayer to monitor status of nozzles/switches or hoses through electrical switches or flow switches. This device plugs in via USB to the tablet running the Android mobile app. Power for the device is from the tablet via USB, and USB also handles data flow from the monitor box to the mobile app.
    - WT1 box - for trucks, ATV/UTVs with multiple nozzles, tracks up to 15 total inputs - up to 11 voltage signals and up to 4 flow switch or electrical non-voltage toggle on/off switches
    - BP1 box - for only backpacks, tracks a single flow switch or electrical non-voltage toggle on/off switch input
- Android tablet - Samsung Galaxy Tab Active5 128GB with unlocked LTE Verizon cellular data capability (optional upgrade to a larger tablet the Active4 Pro)
- Tablet mount - custom fit to the Samsung Galaxy Tab Active5 to provide constant power using a cigarette adapter or direct battery connection (or mount for the Active4 Pro if tablet is upgraded)
- Web application that is used for reporting and administration of the system
- Cloud servers that store all of the data tracked by each tablet and provide data synchronization of all the different tablets

The mobile app is available only for Android in the Google Play Store:
https://play.google.com/store/apps/details?id=com.zerrtech.spraysync&hl=en_US&gl=US



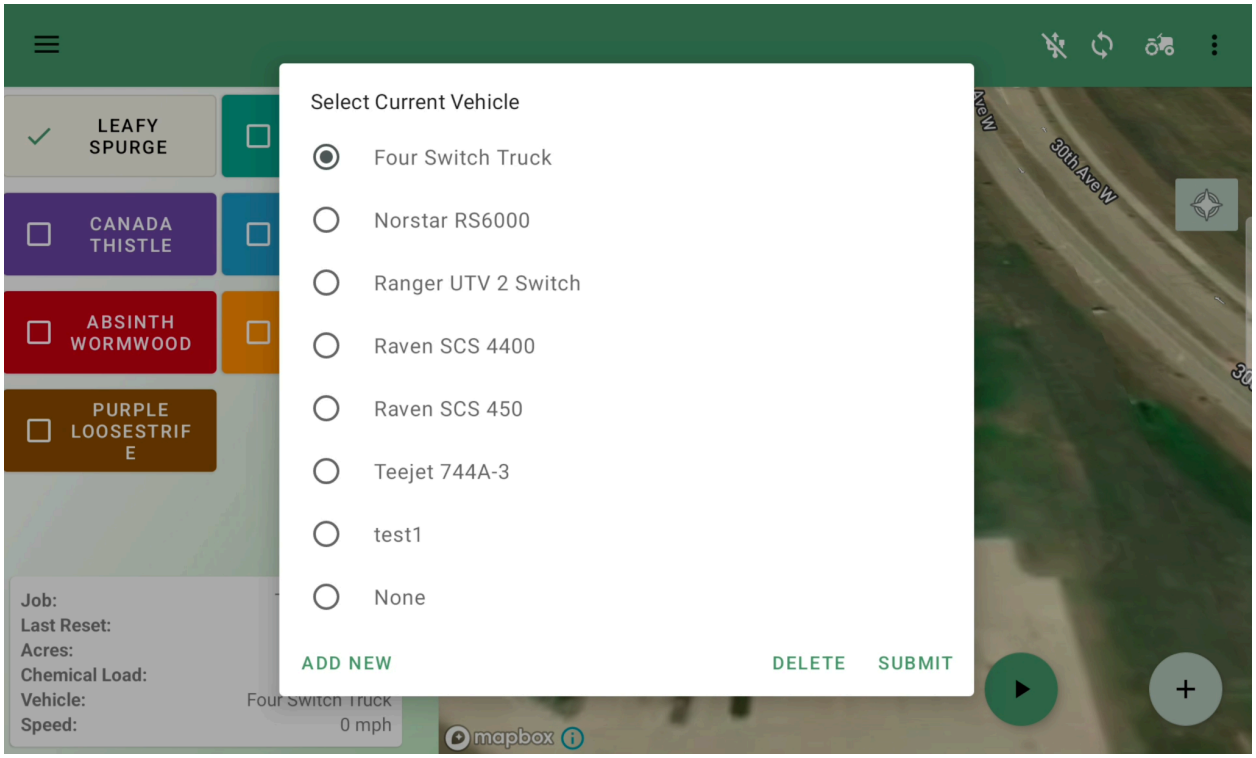
The web site to use for reporting and administration is available at: https://app.spraysync.com

Our marketing web site is a valuable resource for training and many other resources: https://spraysync.com

2. App Map Page

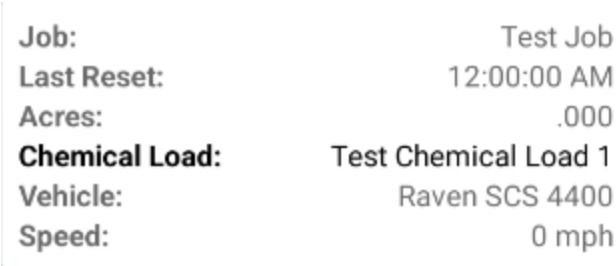
After logging into the Android app, you land at the first page which is to select your Job. I already have several jobs in the system I am using for demonstration.

I will select “Test Job” and that brings me to the “Select Current Vehicle” screen:

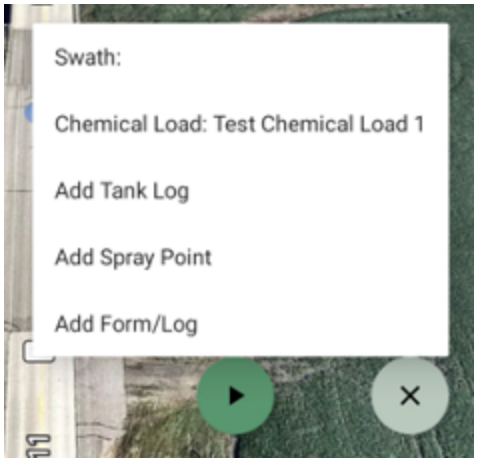


You will also notice I have several different vehicles set up here. Each of these vehicles represents a different configuration of nozzles with their respective swath distance they cover on the ground. These can all be set up ahead of time so that your sprayers don't need to know the exact information about the sprayer, because your sprayer only rarely changes so we allow you to set this up ahead of time. We will cover the specifics of vehicle configuration in an upcoming section.

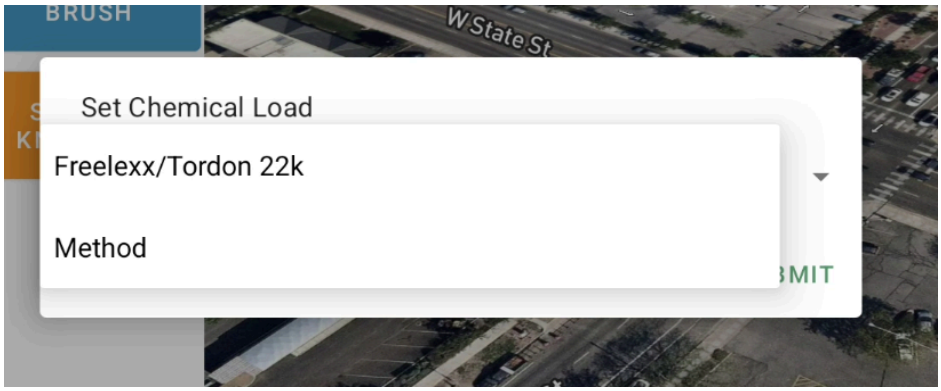
Once you hit the "Submit" button, you see your selections in the bottom left corner of the map page.



Notice there is a chemical load selected. The Job has a default chemical load, so we initially set that one. If you want to change it, you go to the bottom right corner of the map page and click the circle plus button:



When you click “Chemical Load: Method” it brings up the “Set Chemical Load” popup.



You can click on the chemical load name to get a dropdown that lists all of the Chemical Loads you have set up.

All of your weeds are listed on the left of the map page. There is always at least one selected. In this case it’s “Leafy Spurge” at the very top. It has a green checkmark by it and it’s in a slightly different shade than the rest where the button background is lightened up a bit.

To begin spraying, there are a few things that we showed as being set up ahead of time. Let's go and set up these things:

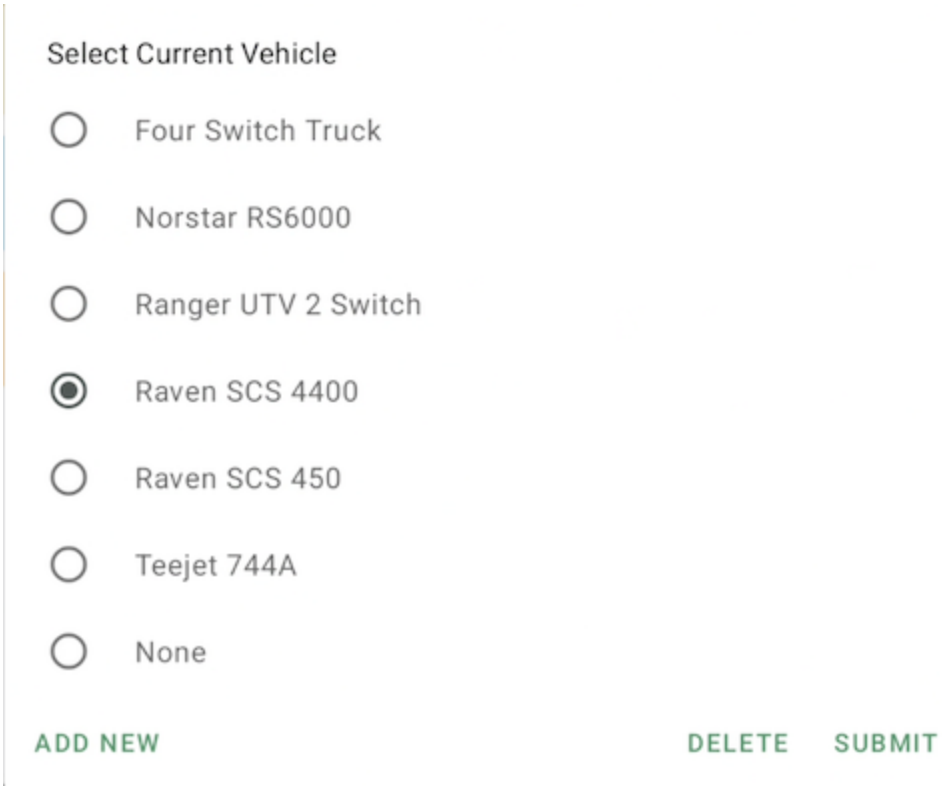
- Vehicle
- Job
- Chemical Load

First, let's look at the Vehicle

3. Vehicle

You can pick your Vehicle using the tractor icon on the top right of the screen.

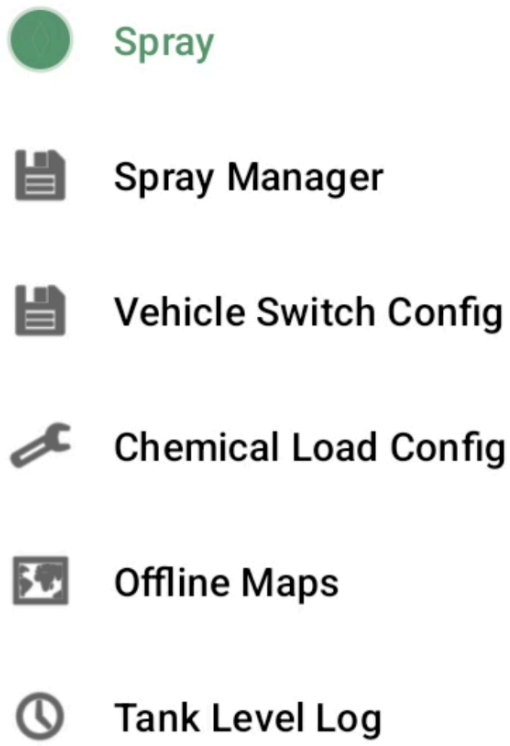
This brings up the vehicle selector.



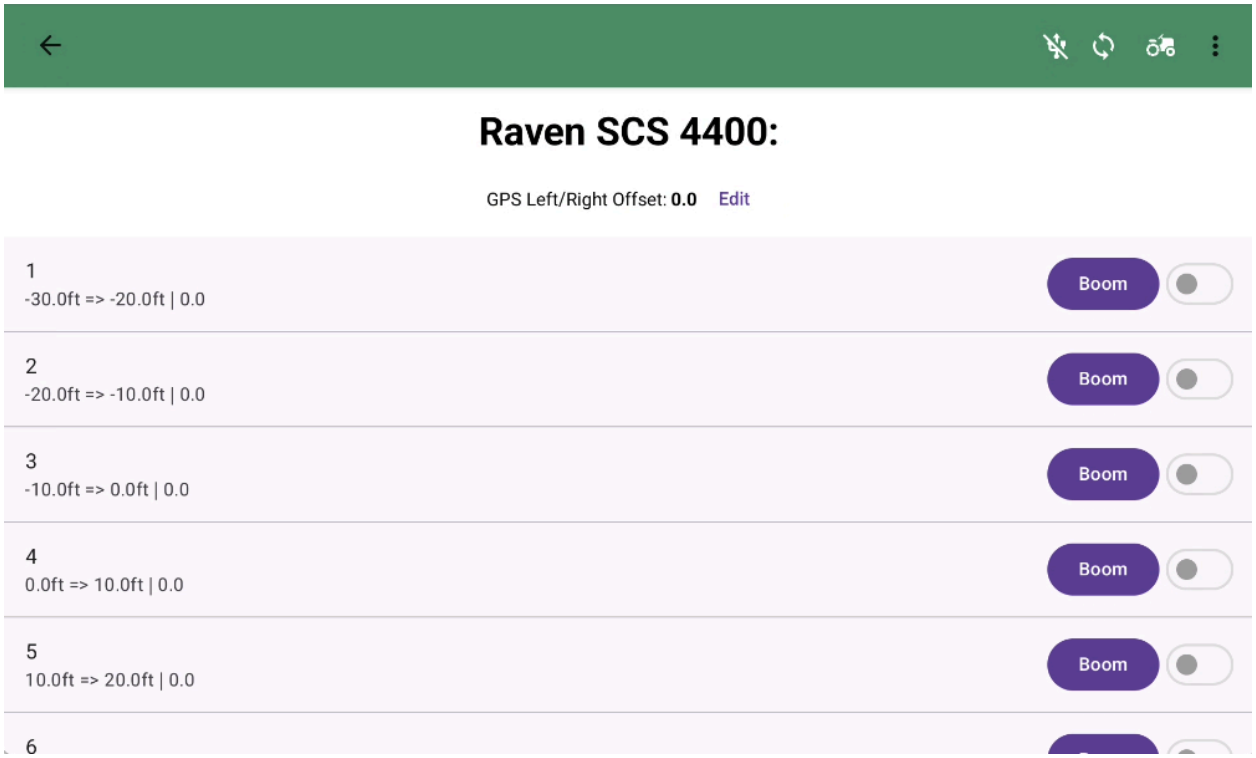
Let's keep the same vehicle. You can hit "Submit" to confirm the selected vehicle.

Let's look into what the setup is for this vehicle by going to the "Vehicle Switch Config" option. Tap the hamburger menu in the top left corner of the app.

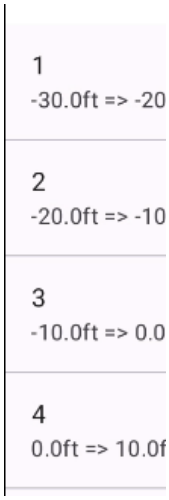
And pick “Vehicle Switch Config” from the resulting menu.



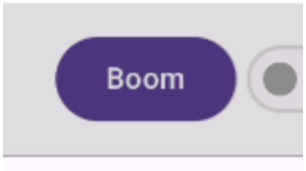
This will list the switch config for the vehicle we currently have chosen.



The numbers of the switches as labeled on the SpraySync box will show up on the left side. See 1, 2, 3, 4 shown here:

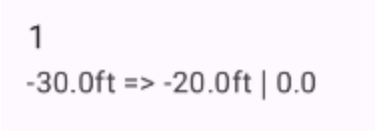


On the right side you see a button that displays the Switch Type that the switch represents. Here it represents “Boom” spraying:



There are other Switch Types that we will discuss in a later section. Let's continue with talking about the Boom switch type.

We use negative numbers for left, positive numbers for right, and 0 represents the middle of your vehicle that is where the Android Tablet is (where the GPS is). Let's use this as an example:

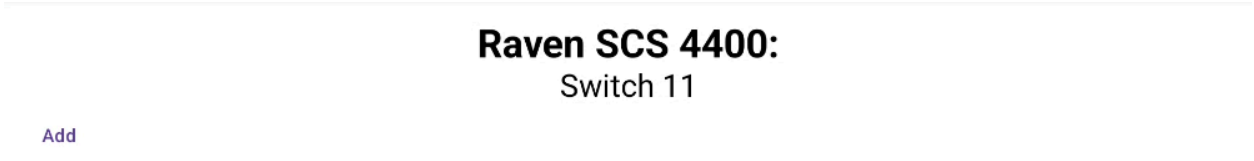


The -30.0ft => -20.0ft means that the spray pattern starts from 30 feet to the LEFT of the GPS and ends 20 feet to the LEFT of the GPS. Another way to describe this setup is that there is a 10 foot swath that is out to the LEFT of the GPS and starts at 20 feet, ends at 30 feet.

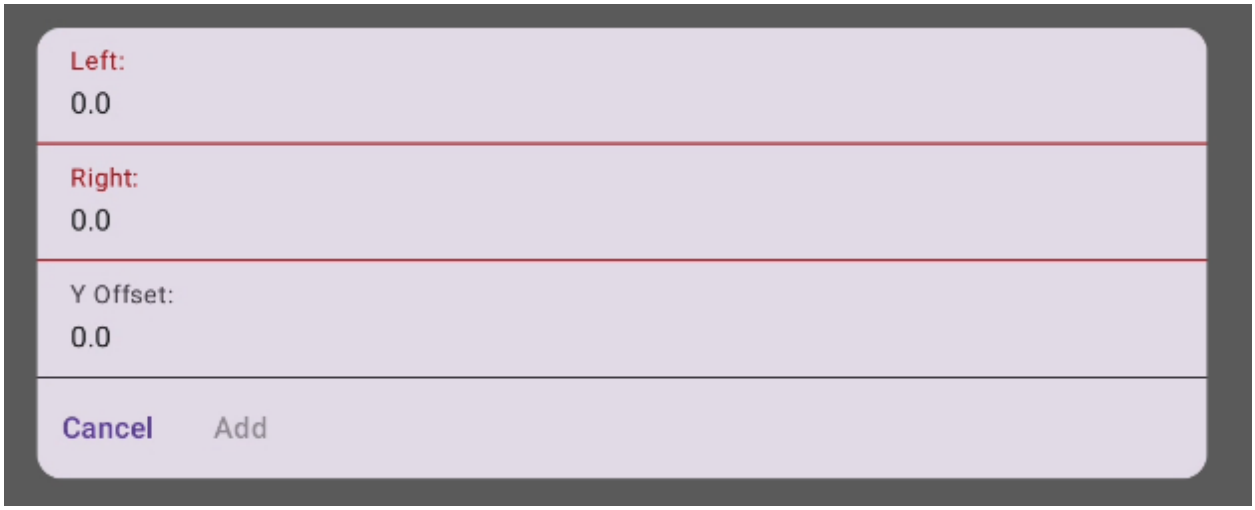
If you have any left/right offset from GPS, you can factor that in here. Let's say you are spraying off to the right side of your truck, your Android tablet is in the center of your truck, but your sprayer hangs off the right side, 4 feet from where your tablet is in the center. Let's say the nozzle sprays 15 feet. You can put the config at +4 feet => 19 feet

The "| 0.0" that is on the end in the screenshot above represents the Y offset, or the forward/rear offset in relation to the GPS. Being configured as 0.0 means that the boom is right next to GPS. If the nozzles are on the back of your spray vehicle, you could configure that to be -10.0 which means your spray pattern starts 10 feet BEHIND the GPS. If you have nozzles off of the front of your vehicle, you may configure that to be 10.0 which means your spray pattern starts 10 feet IN FRONT of the GPS. Remember, the GPS is in the tablet.

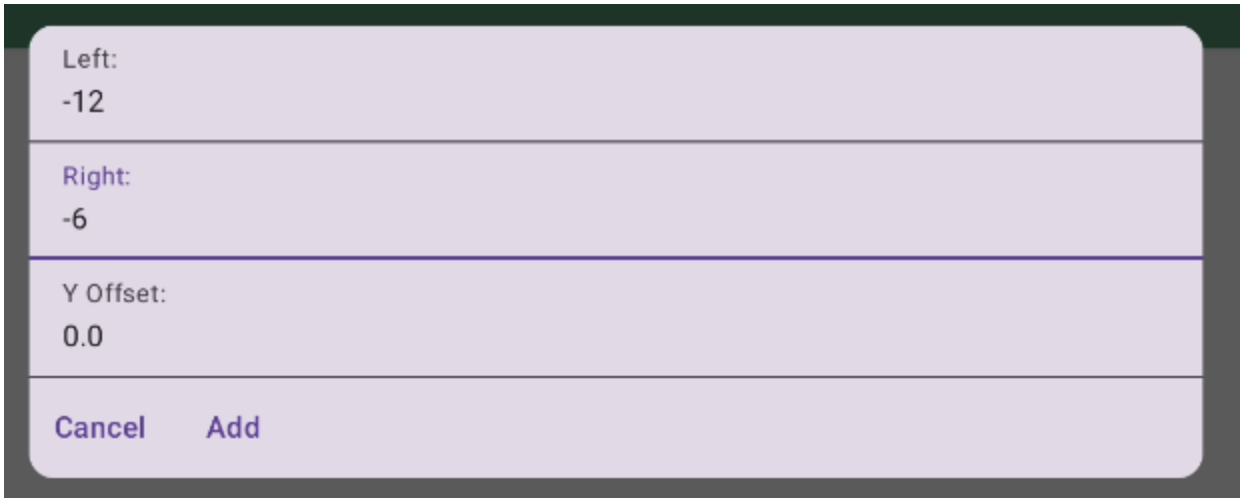
Let's go through an example of defining a switch. When you tap on a switch that has not been defined yet, you will see:



Then if you click the “Add” button:

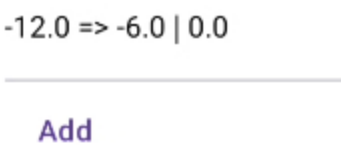


We enter the swath start and end in feet. The order doesn’t matter here.



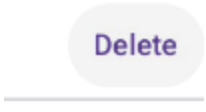
Recall, -12 to -6 would mean we are spraying from 12 feet to the left of our GPS center up to 6 feet to the left of our GPS center. If you want a "-" you may have to tap the ".-" button twice, it's a little tricky. Just double check the numbers added in.

After you enter the numbers, hit the Add button



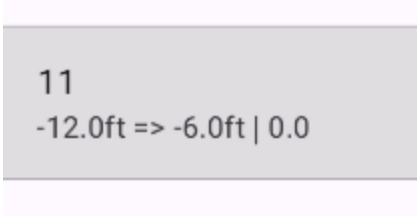
When it shows up at the top, you know it is added.

If you want to delete what you just did, the area at the top of the dialog where it shows up as added, tap the "Delete" button.



Also, here you can add multiple segments. Let's say you have a switch that turns on spraying out far on both the right and left side. You could add another switch config here that says 15 feet => 30 feet and when you flip that switch on, we track both.

Continuing on, if you hit the back arrow, you go back to the main Switch Config screen and see the setup



Now that the Switch Config is defined, we still have the Job and Chemical Load to define.

4. Job

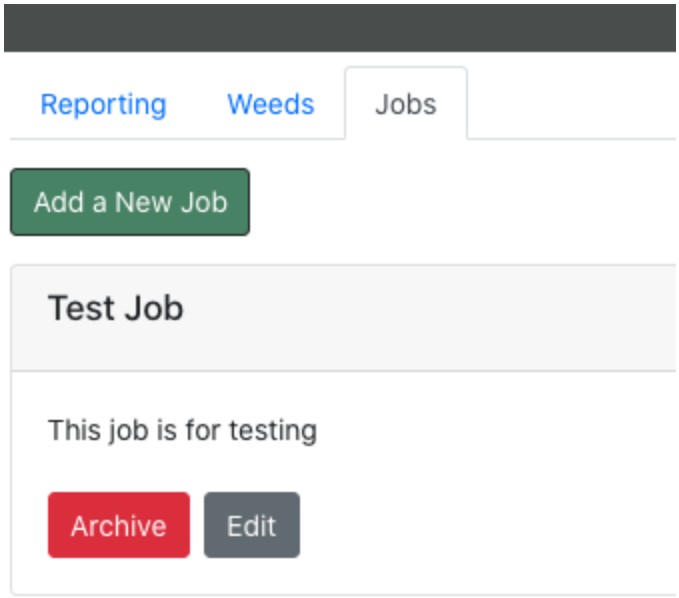
A job is a way to group data together, commonly for purposes of tracking, sharing, or reporting. Commonly this is used to group data for a contract if the sprayer is working on a contract basis. Another purpose for using a Job is tracking private landowner requests and being able to report and record exactly what was done. It can be used to fit whatever situation you need to group for reporting, maybe you want to track each township in a county individually. Maybe you just want to have your entire county tracked for the year so you create a job like “Cass County 2025”.

We allow an unlimited number of users per job. We also allow an unlimited amount of spraying tracked per job. Any number of users can be spraying and tracking on a single job at any given time. For billing, we allow unlimited users and no extra cost per user.

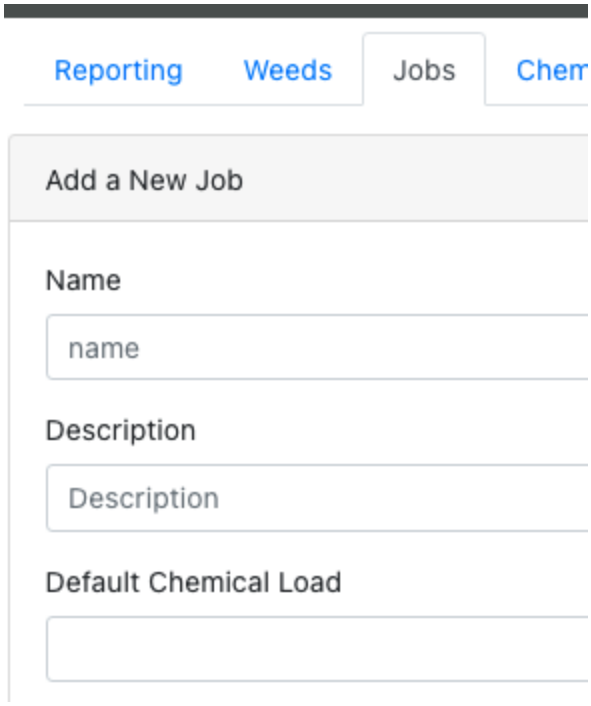
Users can be added with different roles, Administrator, Sprayer, or Reporter. Reporters can be granted access on a job by job basis.

The Jobs you have can be created both on the web site and in the mobile app. We will show an example of creating and updating Jobs within the web site.

On the Jobs tab, you can add a new Job:



Give a name, description, along with selecting the default chemical load and click the Submit button.



The Description field is a great place to put the name and address of a landowner if this Job is used to track spraying for them.

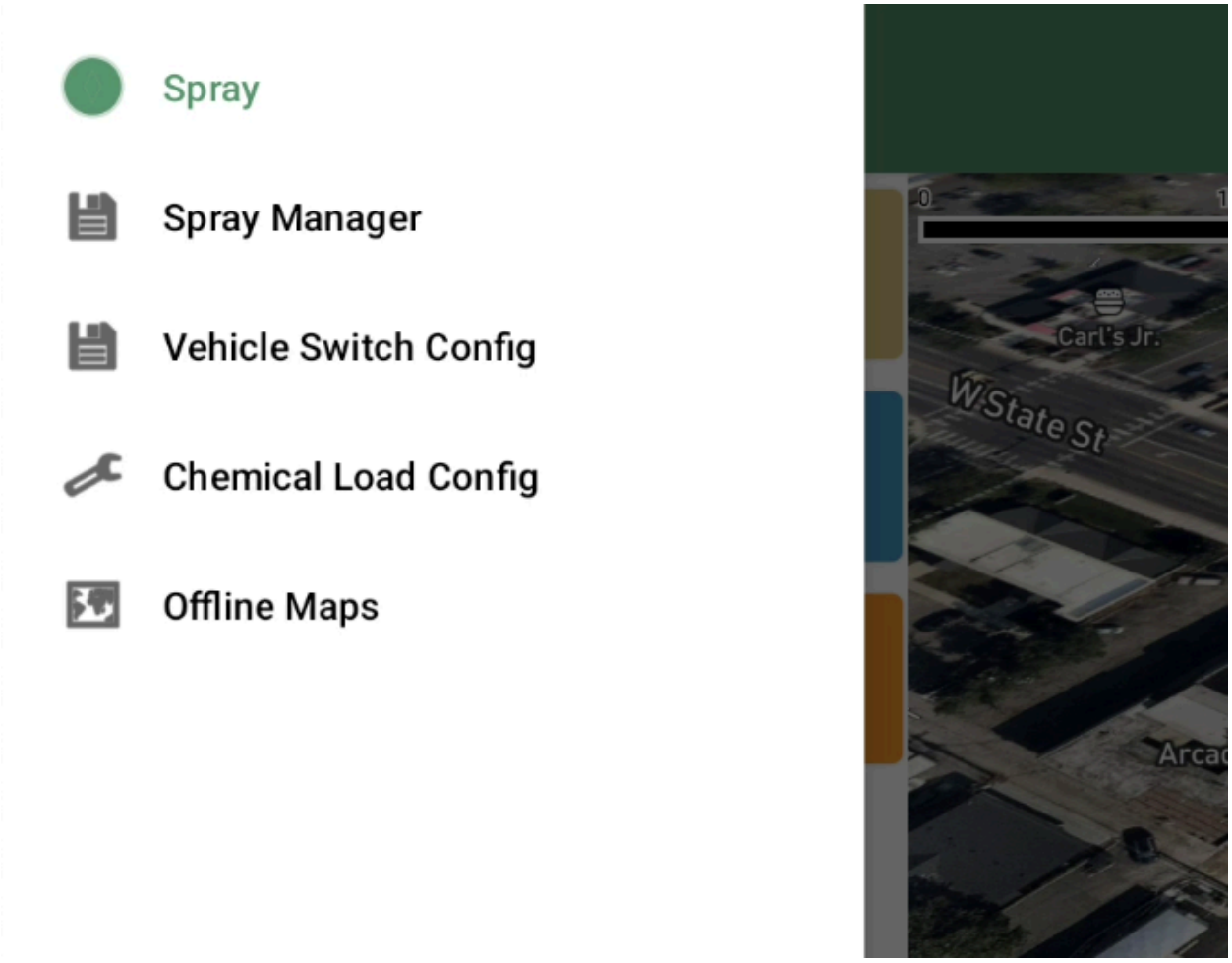
The Default Chemical Load is for convenience to save time. Most of the time if you have a particular landowner, or a particular stretch of road/highway, there is a prescribed chemical load that you use most of the time. So we allow you to pick a default chemical load, but you can always override the default to a different chemical load.

We added a Job onto the web site, but we need it in the app. There are a lot of situations that force an automatic sync, like if you spray anything, or come in or out of wifi range. But now to make this easy, let's force a sync in the app. This is a good thing to know for lots of reasons.

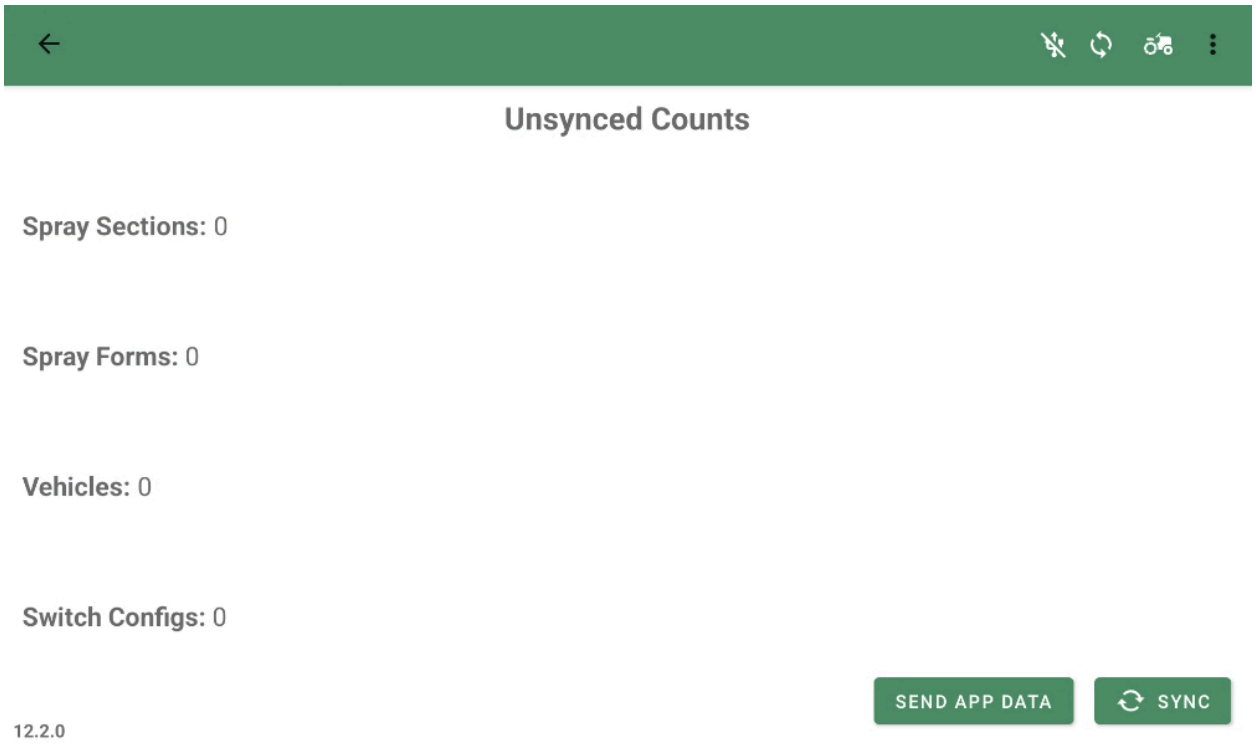
One way to force a sync is using the "refresh"-like icon in the top right corner of most screens within the map, as an example from the main map screen.

When you tap that “refresh” icon, the 2nd icon from the left, you will notice a progress line racing across the screen, in a lighter green color, right underneath the top green menu bar, as it connects to the internet and does a sync:

You can also go to the left navigation menu and visit the “Spray Manager” page.



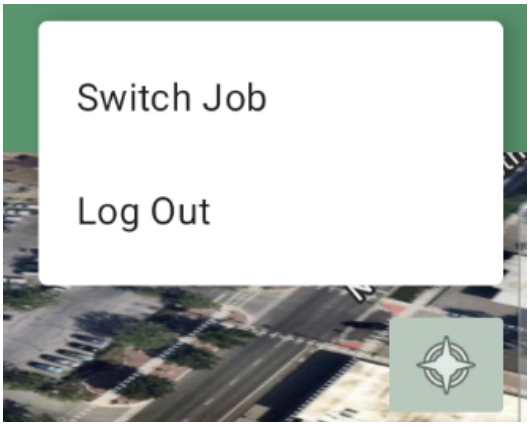
The “Spray Manager” page will look something like this



If you tap the “Sync” button in the bottom right, it will fetch in that new Job from the server. It will grey out for a bit after you tap it. That means the sync is running, just let it run to completion where it will turn back green. Then hit the back button on the top left and go back to the map page.

If you click the 3 black dots in the top right corner:

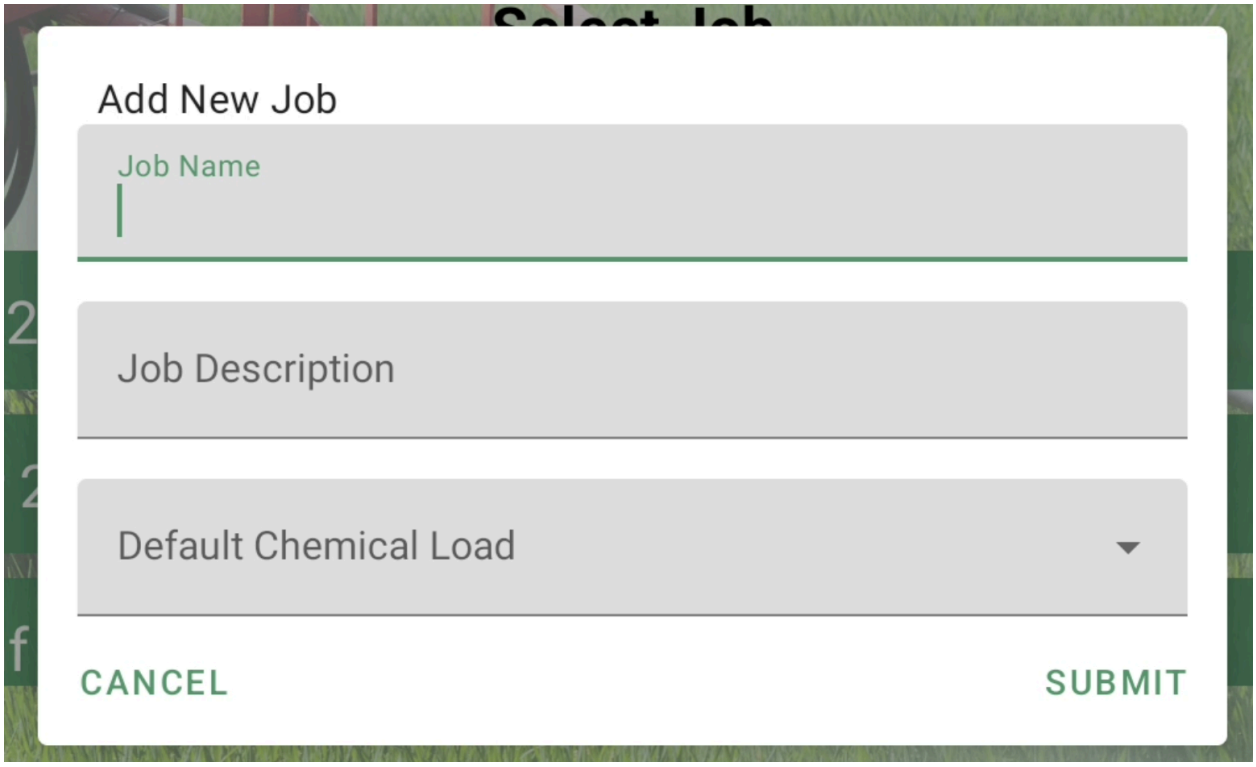
you’ll see an entry to “Switch Job”:



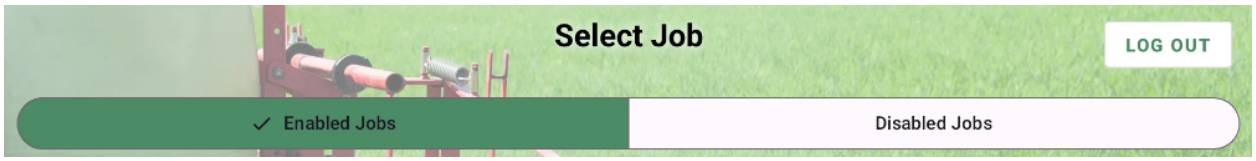
Tap that and you'll see a place to pick the job. We default to picking a job if you have at least one, so it's likely this is filled in with something already.

Pick the job you want and then you are done.

You can also add a job in the app using the circular plus button you see in the bottom right of the App "Select Job" screen.



You can also view any Disabled Jobs by using the “Disabled Jobs” tab at the top of the Select Job page.



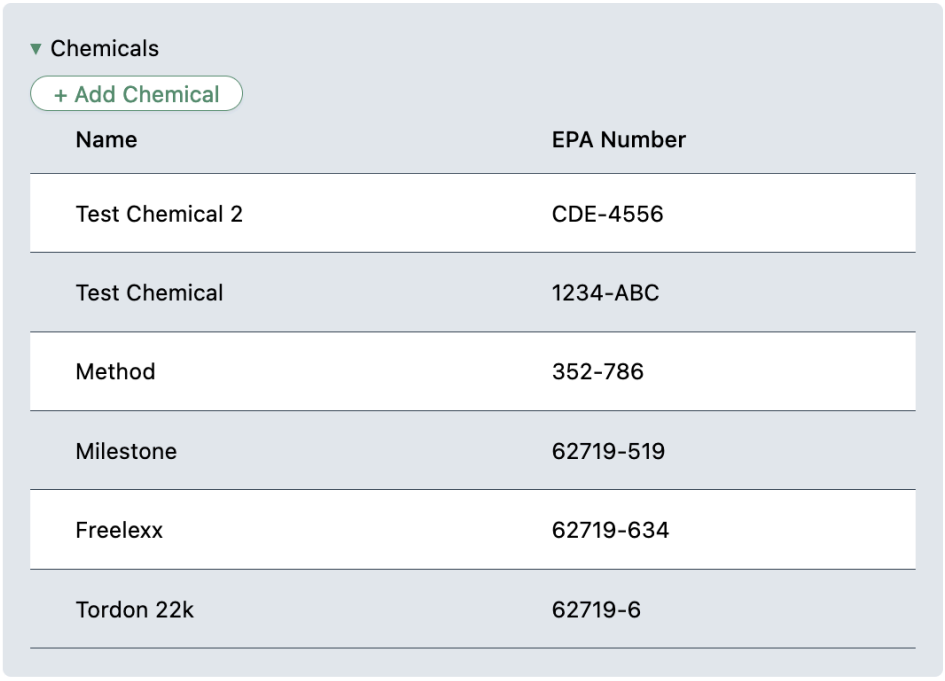
Disabling a job is a way to hide a job from showing up on your default Enabled Jobs selection screen. Disabling a job still allows you to run reports on the Job but still move it out of the way to allow you keep your main Job list as small as you can to save operator time and less chance of mistakenly picking the wrong Job.

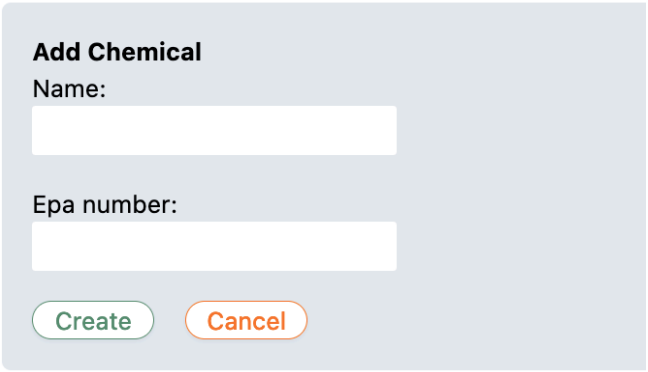
Now let’s go onto the Chemical Load.

5. Chemical Load

Chemicals

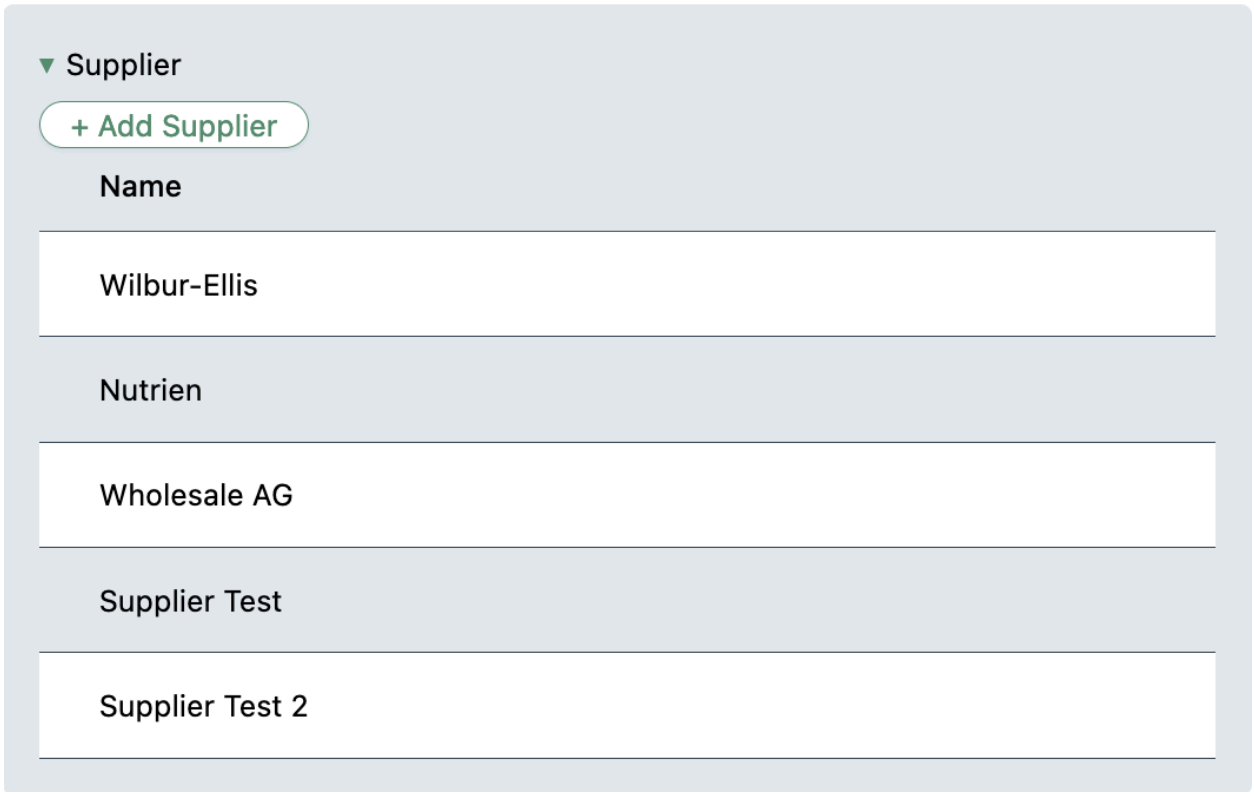
Chemicals consist of trade names and EPA numbers. These can be viewed and created from the **Chemicals** tab in the web application.

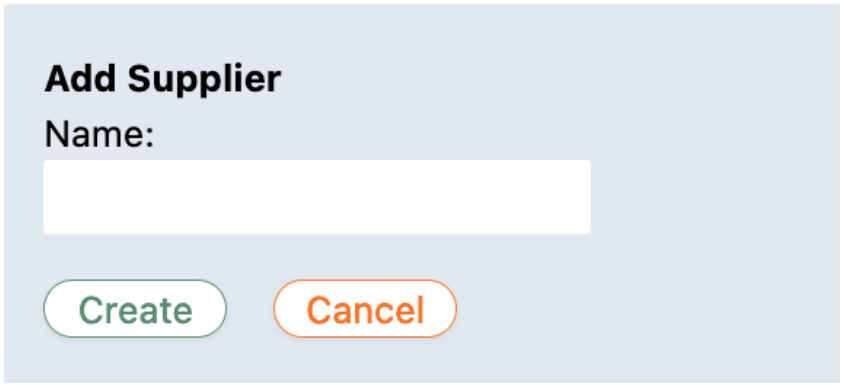




Suppliers

Suppliers can be viewed and edited from the **Chemicals** tab in the web application.

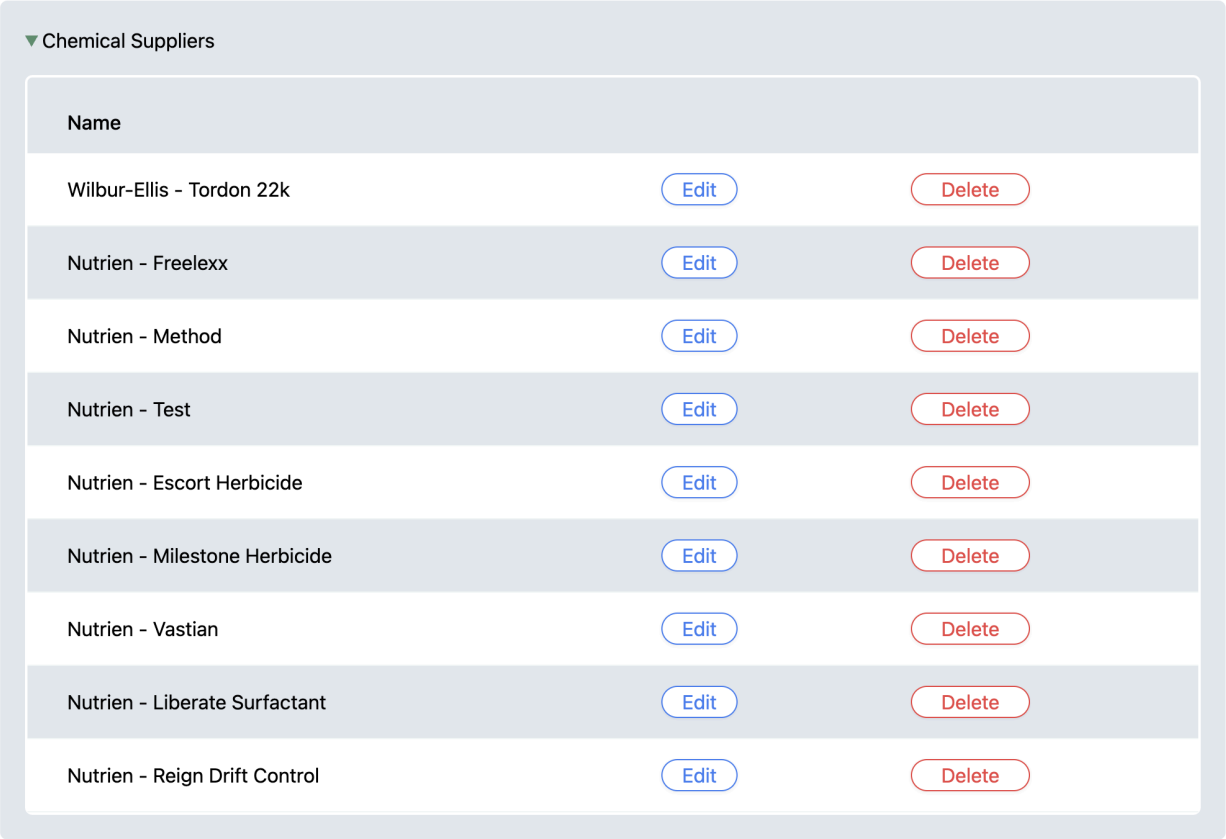




Chemical Suppliers

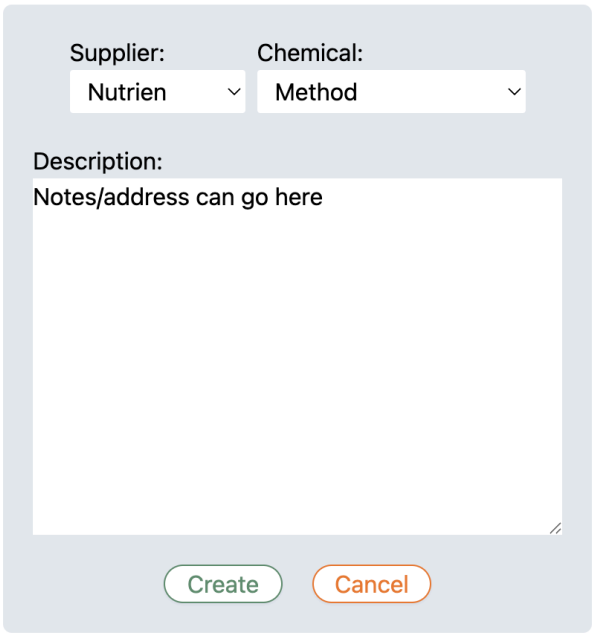
Under the **Chemicals** tab you can view, create, and edit Chemical+Supplier combinations. In order to create a Chemical Load, you need to first add a Chemical + Supplier combination.

They are listed under the “Chemical Suppliers” section:



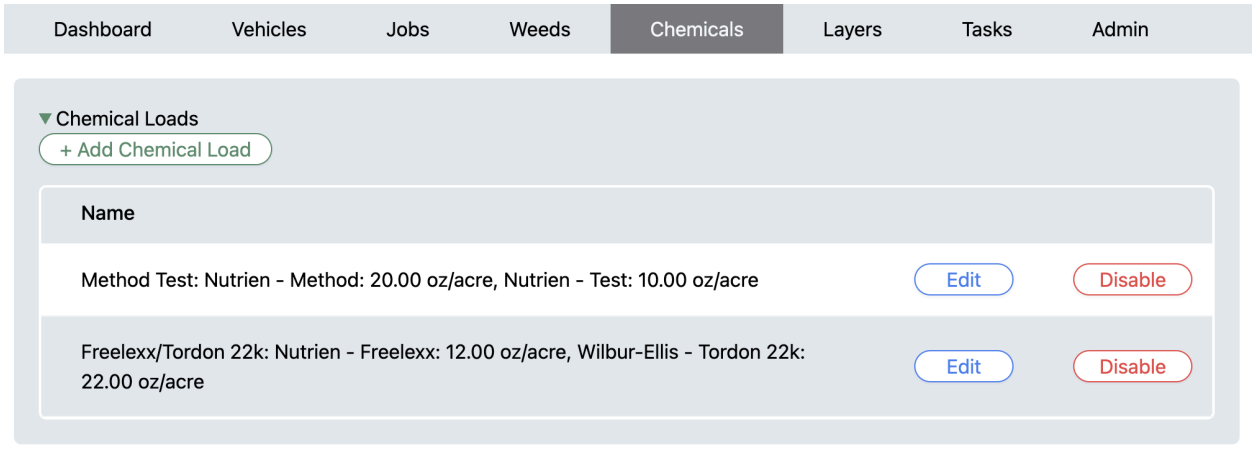
Press the button that looks like a merge/combination icon:

There is a description field to add contact information or any other notes that sometimes we can end up exposing in one of our reports. It is an optional section.

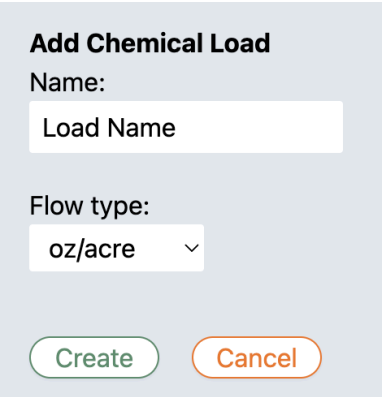


Chemical Load

Chemical Loads consist of a name, total flow rate, and multiple Chemical+Supplier combinations that are mixed, or injected, together. Once you have created Chemical+Supplier combinations, you can begin to add Chemical Loads. Under the **Chemicals** tab you can create, view, and edit Chemical Loads.



To add a new Chemical Load click the “+ Add Chemical Load” button:



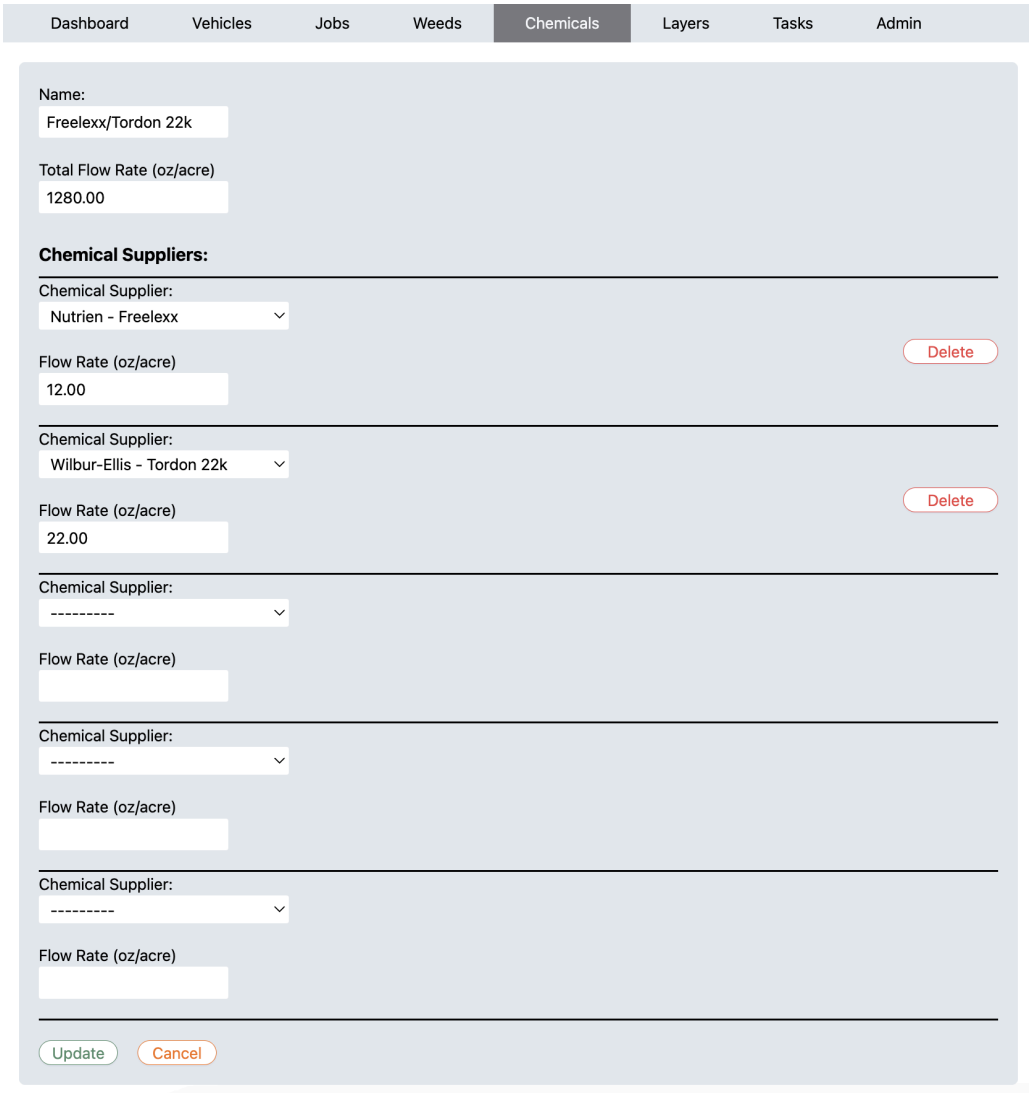
Here you give a name to the Chemical Load and you also have the option to pick the Flow Type where the options are:

- oz/acre
- oz/minute

For liquid droplet spraying, you will typically use oz/acre. Examples would include roadside spraying, hand wand spraying.

For fogging you will typically use oz/minute. Examples are mosquito fogging.

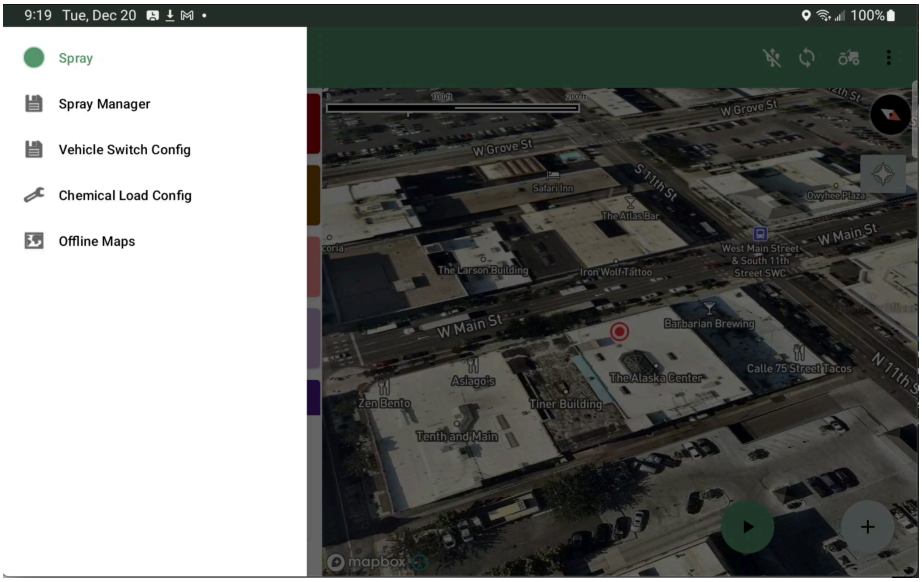
Once you hit “Create” you will be brought to the main screen where the flow type is fixed. If you decide to change the “flow type” after you create a Chemical Load, you can’t, you would need to create a new one.



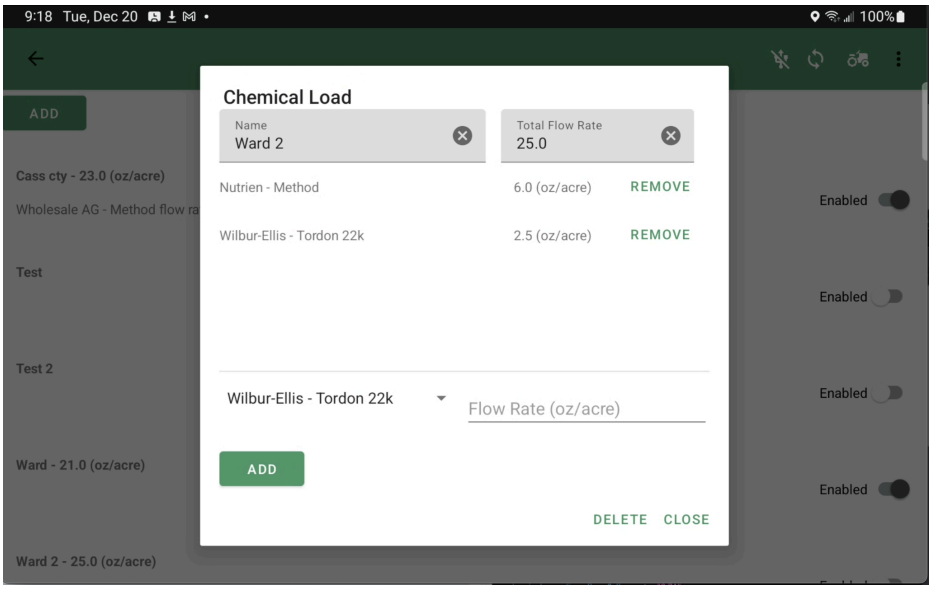
You can put the “Total flow rate” at the top. Which would be your total tank mix if you are mixing chemicals with water. Or in a case of injection, the total diluted application rate.

Select Chemical+Supplier combination from the drop down and add a corresponding flow rate.

You can add as many chemical + supplier combinations as you actually have in your load. Even if you have more than the five slots you see above, just add what you can and when you click “Update” it will add a few extra spare spots.

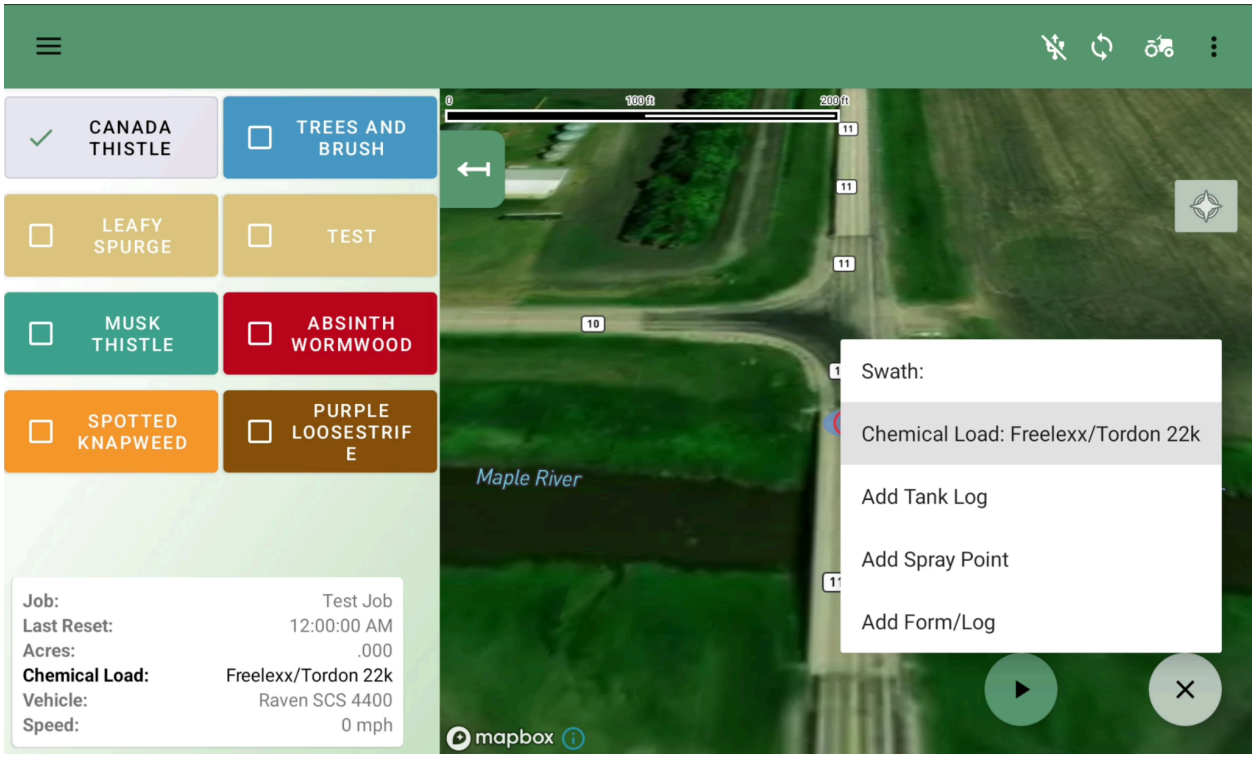


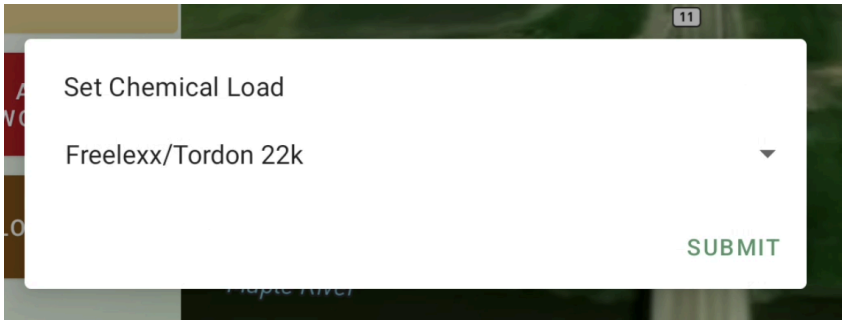
In the SpraySync mobile app, the Chemical Load information can be accessed from the **Chemical Load Config** option in the sidebar.

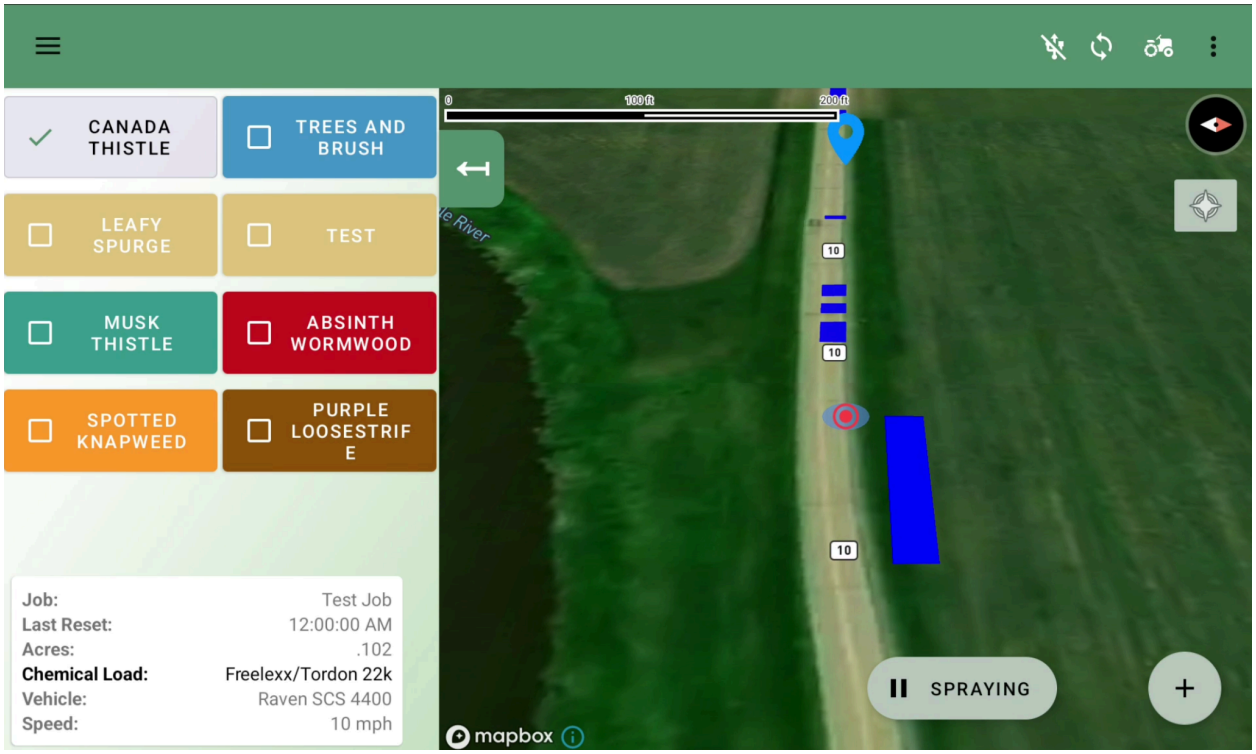


Here you can view and edit Chemical Load configuration.

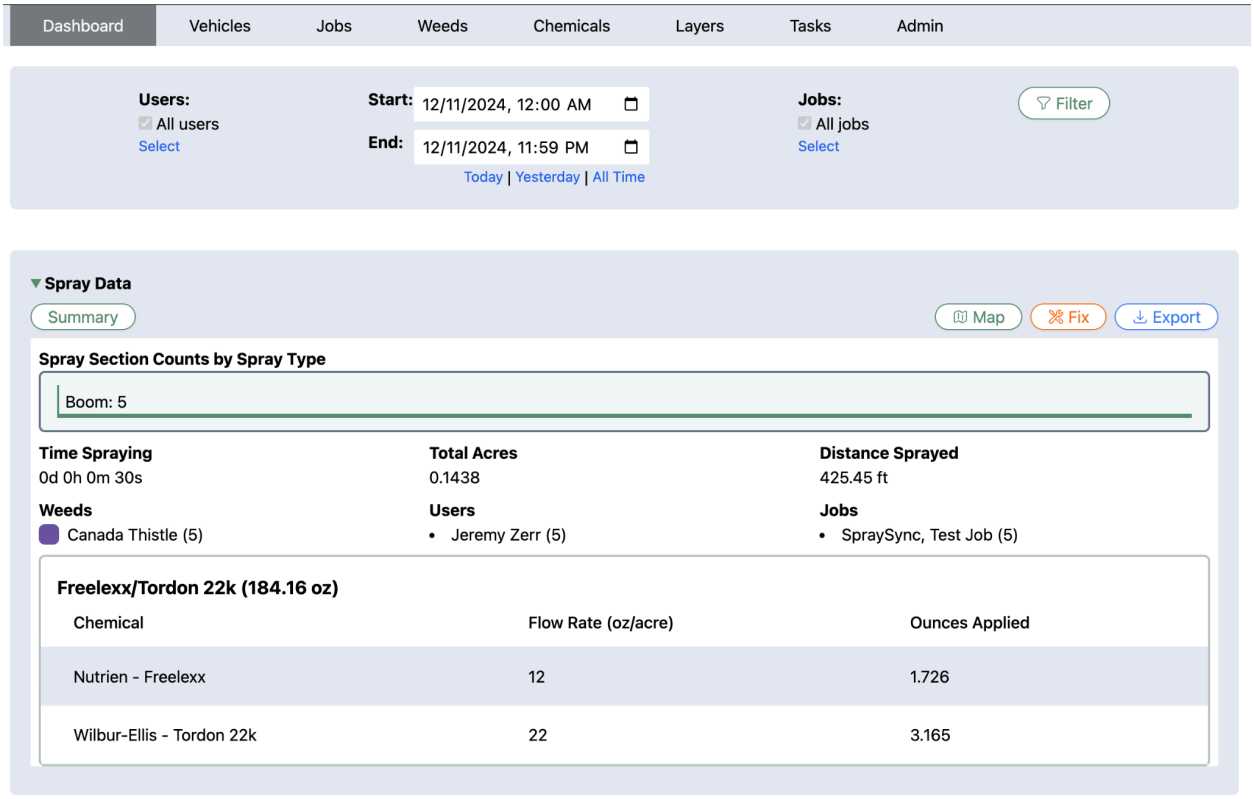
To activate a Chemical Load, you can select the **Chemical Load** option from the "**+**" floating action button on the bottom right of the home map view. Note: a default Chemical Load may be selected initially based on the job. If there is no default, you will be asked to select one once the map screen loads.



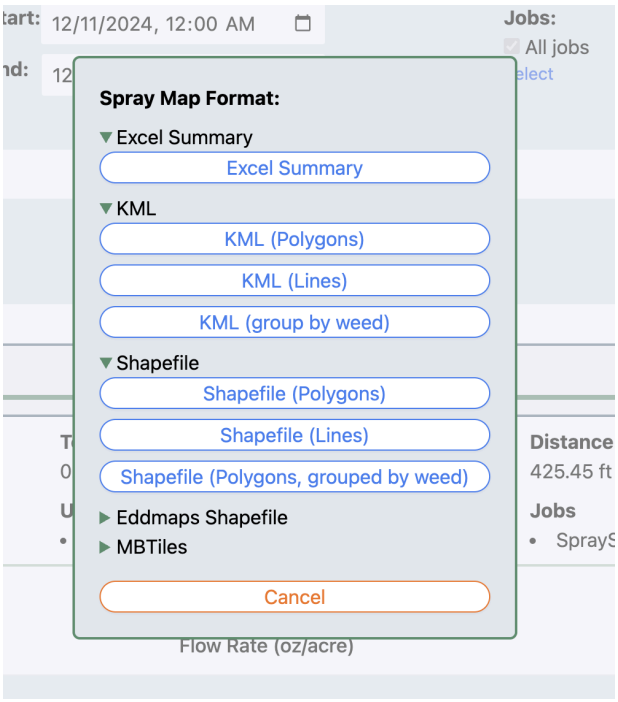




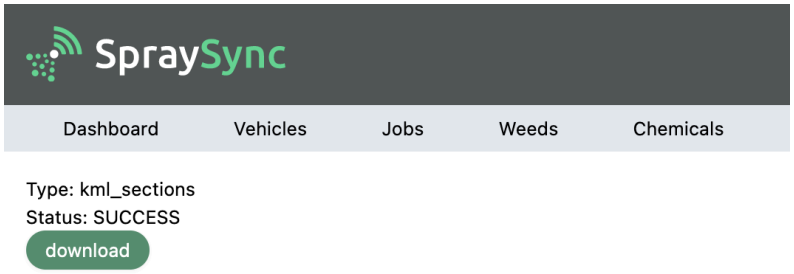
Track some data. Note that the "**Acres**" tracker increases.



To create a KML spray section report, click on "Export" and then the "KML (Polygons)" option in the modal.

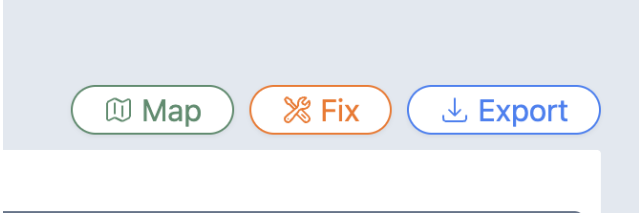


This will take you to the task page which will display a "Download" button once the file is ready to download (this may take a few minutes for a large report). This file download can also be found on the "Tasks" tab.

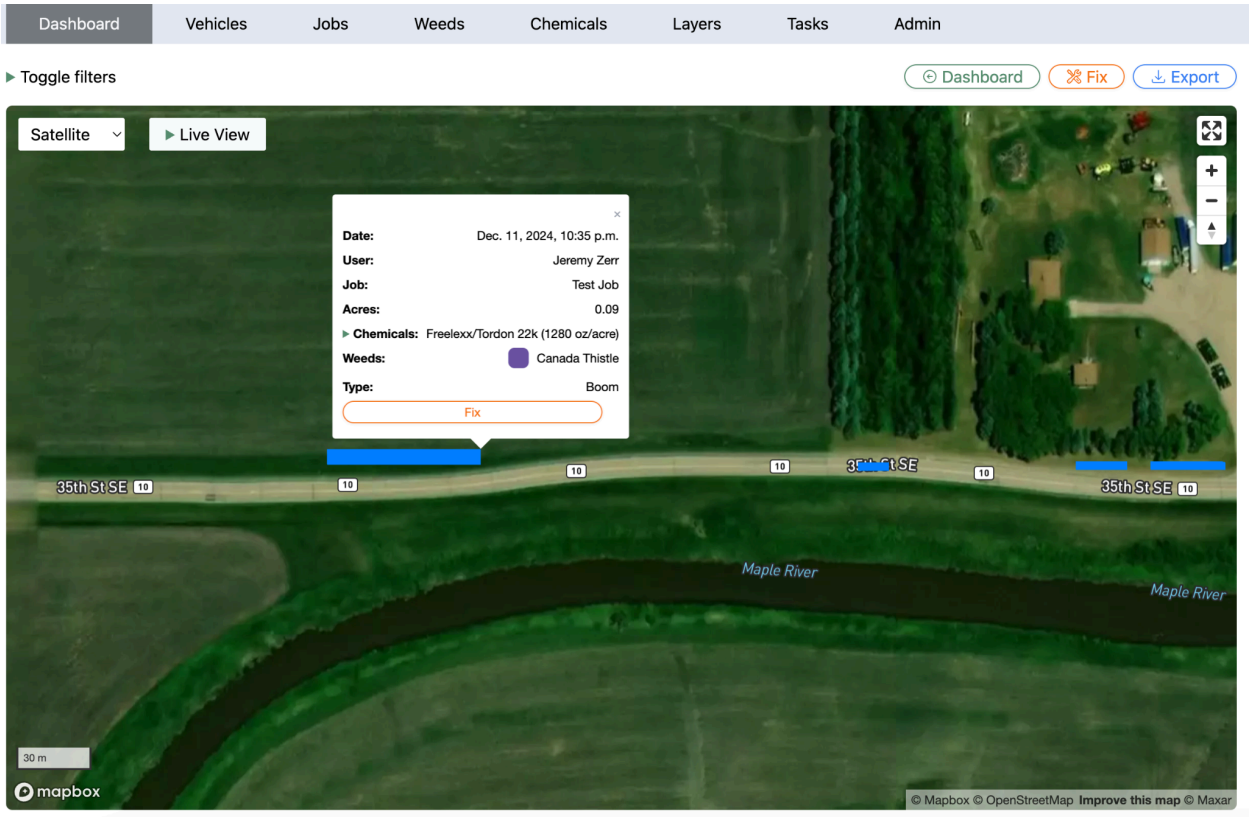


Open up the file in Google Earth (or some other KML viewer). If you click on a spray section you can see the tracked Chemical Load data.

From the dashboard you can also click the “Map” button and view it in a map without having to download a KML file and open up a different application.



The map page within SpraySync works in almost exactly the same way that Google Earth works. Our map page uses the same map images you see on the tablet.



6. Forms

The Android app allows you to add forms to collect other information while spraying, one of the main uses is for temperature and wind collection. Our forms are flexible to allow you to collect whatever information you might need for your reporting purposes. Then we pair that with a lot of automatically calculated information.

Some of types of data we have helped customers collect:

- Temperature
- Wind velocity
- Wind direction
- Official names for Weed Management Areas
- Notes section (freeform text area)

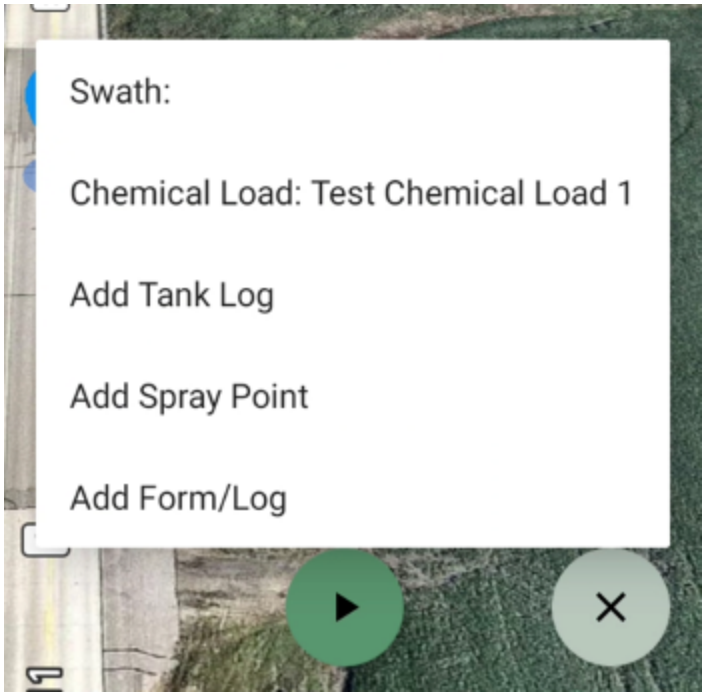
Some of the automatically calculated information:

- GPS location
- Form submission time
- User who submitted the form (the user who is logged in)
- Group user was working under (most users just have 1 group, but a user can belong to multiple groups/organizations within SpraySync)
- Weeds controlled since the previous form entry
- Acres applied since the previous form entry
- Chemicals applied and their quantities and suppliers

We can support adding lots of generic fields to your forms:

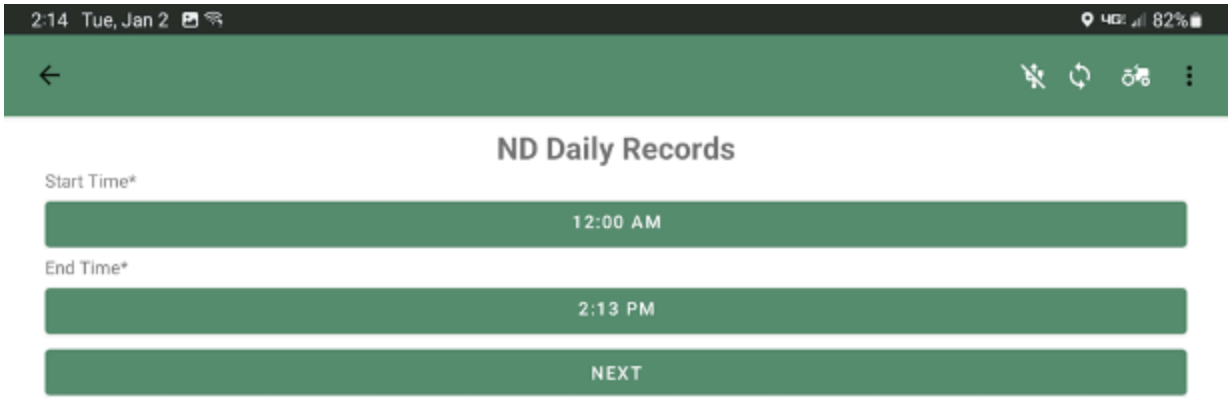
- Text field - single line
- Number field
- Dropdown Field
- Text area - multiple line free-form text field

First you tap the circular plus button at the bottom right of the map screen and pick the “Add Form/Log”

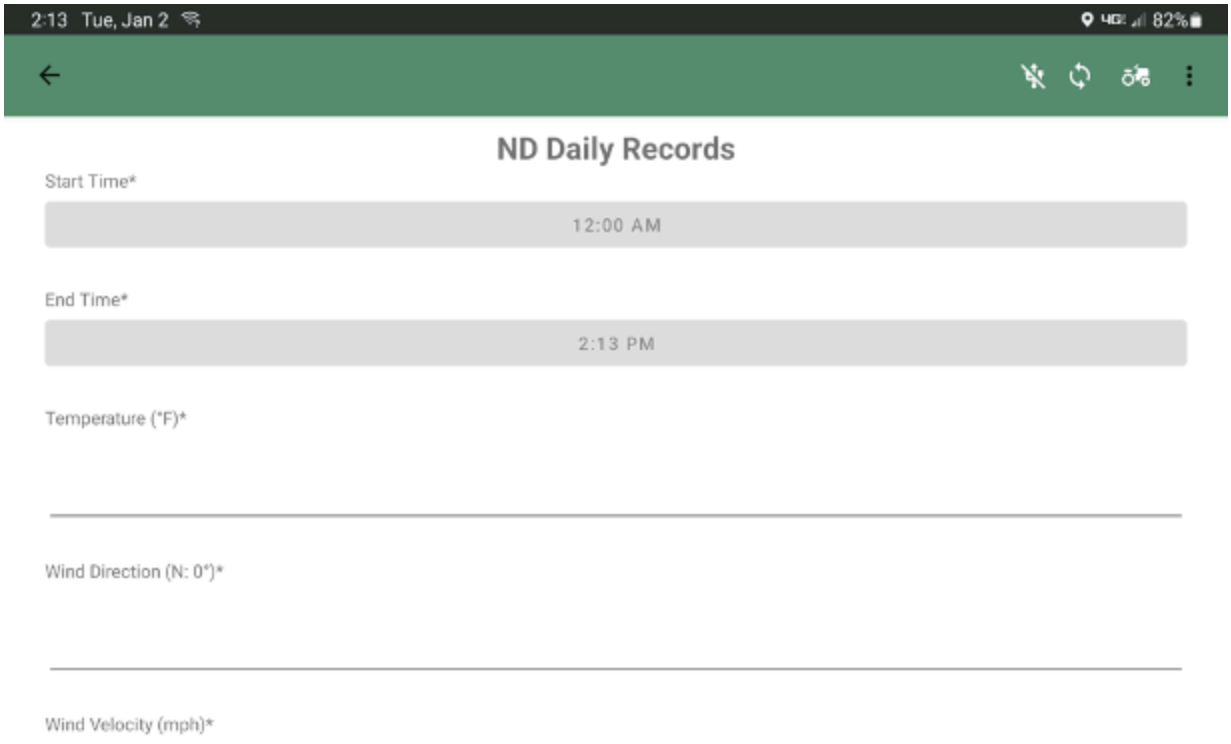


This will list your forms, you likely will only have one button to pick as we include one default temp/wind form. On the screen that results, pick the form you want to select. We have two main types of form, what we call a “snapshot” form which is a form taken at a single time, and a “time range” form that has a start and end date.

Depending on the form, if it is configured to need a time range, it will show this screen, otherwise it will be skipped:



If you are using a form that is asking for this time range, the Start Time is defaulted based on the last time you added a form entry of this type (or midnight if this is your first form of the day). The End Time defaults to the current time. This allows the form to be incremental in nature and automatically pull in your spraying statistics during that time range.



When each log is entered, we also prompt for a signature where the user can use a stylus or their finger to draw their signature.

For North Dakota customers we have a special form that we've developed to be similar to the official North Dakota Right of Way Daily Records report SFN50020

Weather logging (spray log) reporting capabilities:

- User - name, email, certification number
- Group
- GPS location
- Start time
- End time
- Temperature
- Wind direction
- Wind velocity
- Acres applied
- Tank mix applied
- Chemical load used - chemicals, suppliers, flow rate, and ounces applied for the logging period
- Weeds controlled since previous log
- Edge of Road (N, S, E, W)
- Image of the applicator's signature captured on the mobile app

For other customers, we include an initial default temp/wind snapshot-style form that includes:

- User - name, email, certification number
- Group
- GPS location
- Form submission time
- Temperature
- Wind direction
- Wind velocity
- Image of the applicator's signature captured on the mobile app

When this default temp/wind form is combined with our default temp/wind form Excel export over a time range and job selection, it brings in all of the other spray mapping pieces in, including:

- Acres applied
- Chemical applied - flow rates + acres applied = ounces applied for each individual chemical and total mix
- Miles/distance sprayed
- Time spent spraying
- Weeds controlled
- Users who sprayed
- Map image of what was sprayed

Our initial forms we create upon initial account creation work for most chemical application tracking, but other types of data reporting needs exist. We created our Custom forms features to allow customers to meet their specific reporting needs. You can track the usual temperature, wind velocity, wind direction, GPS location, weeds controlled since the previous log, acres

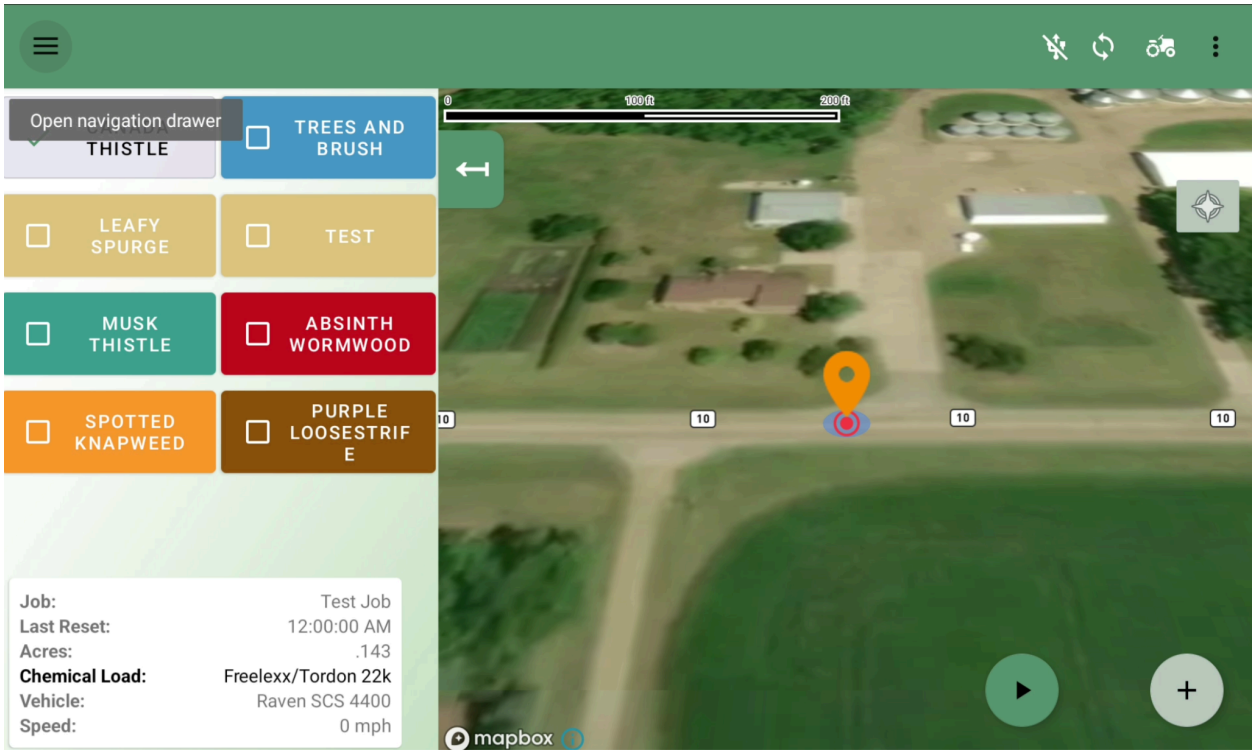
applied since the previous log, chemicals applied and their quantities and suppliers. In addition to our previous features with Weather Logging, you can also track any other fields. Some examples from customers include tracking township or land owner from a fixed list, changing the wind speed input from a number to a dropdown that includes different ranges. The custom forms have all the capabilities of our original weather logging but with much more.

We can add just about anything else you need. For now we are providing custom forms as a free service. Send us your reporting forms and we'll create you a custom form and reporting solution.

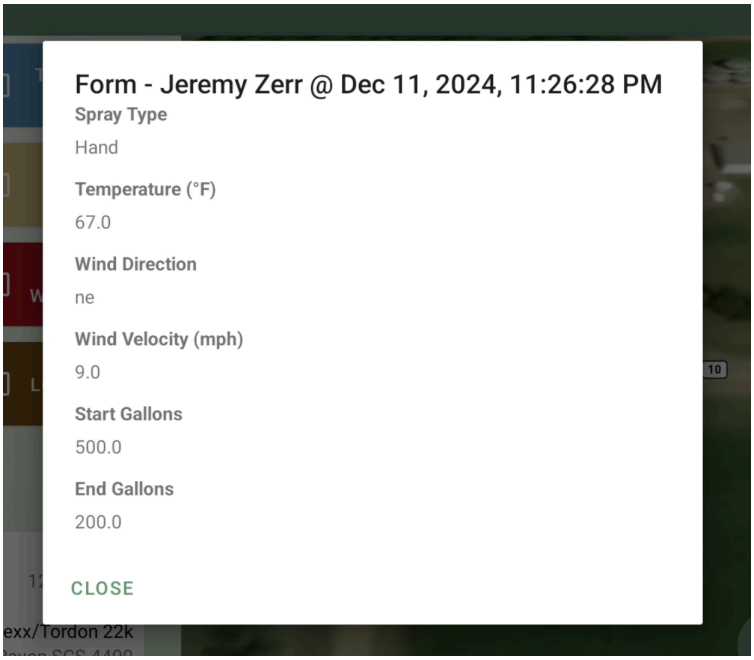
Custom form field:

- Number fields
- Text fields (single line and text area)
- Dropdown lists

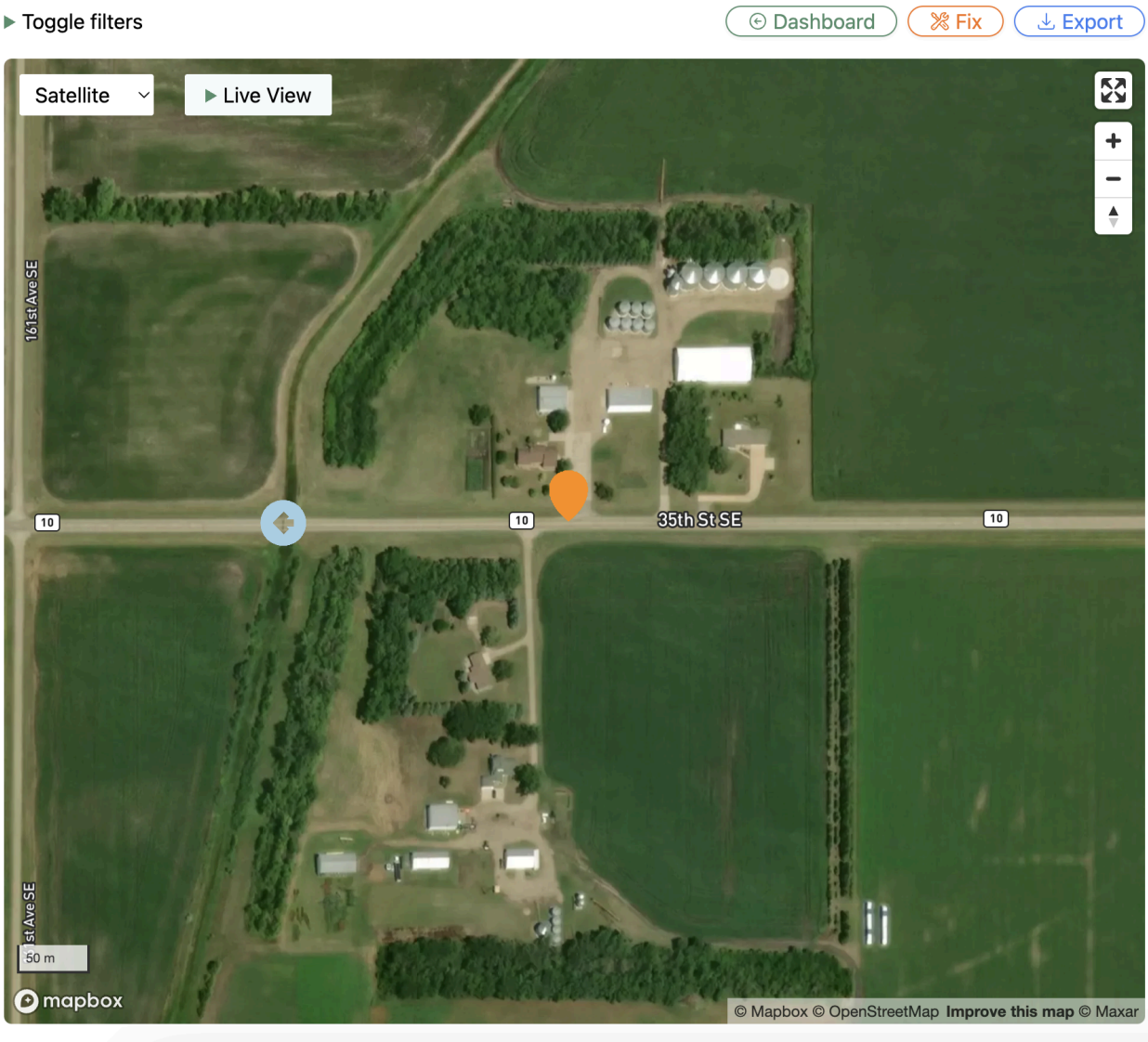
After you add a form it will show up as an orange marker on the map.



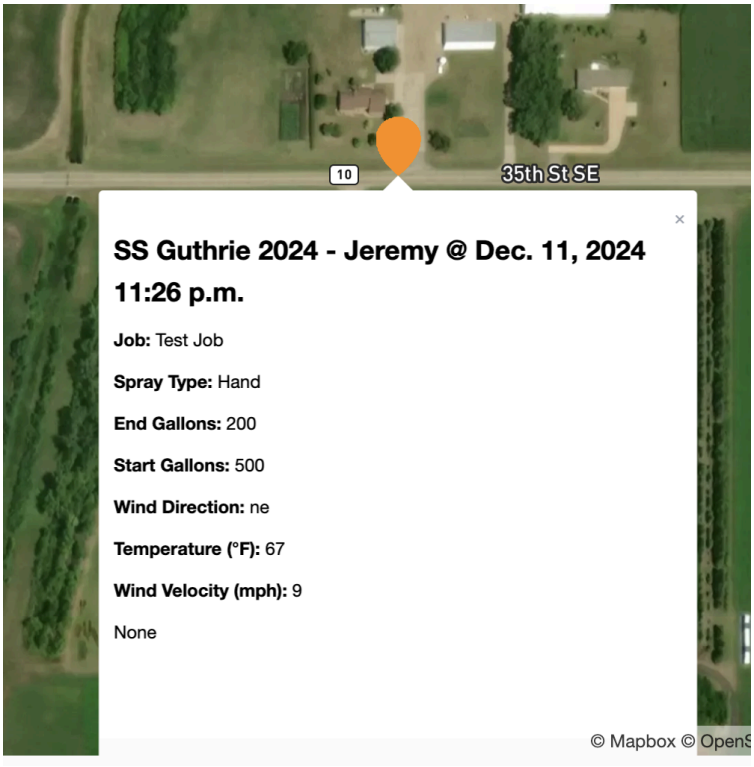
If you tap on the orange icon, you can see any information that was added in the form:



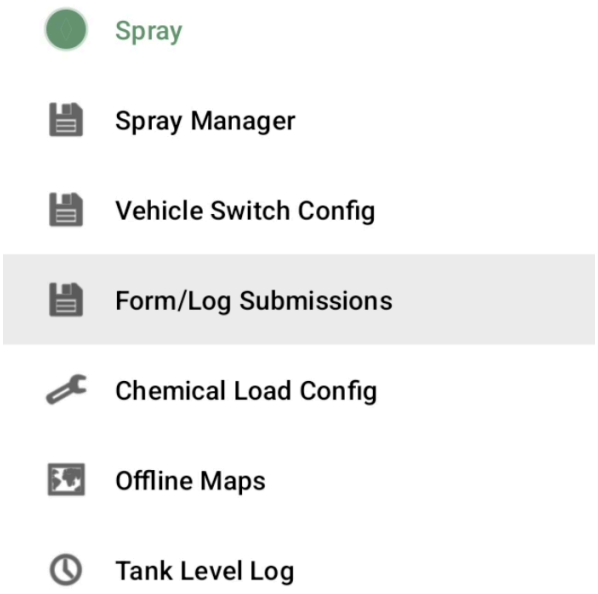
You can view the forms on the Map page within the web dashboard, too. They will also show up as an orange marker on the web site:



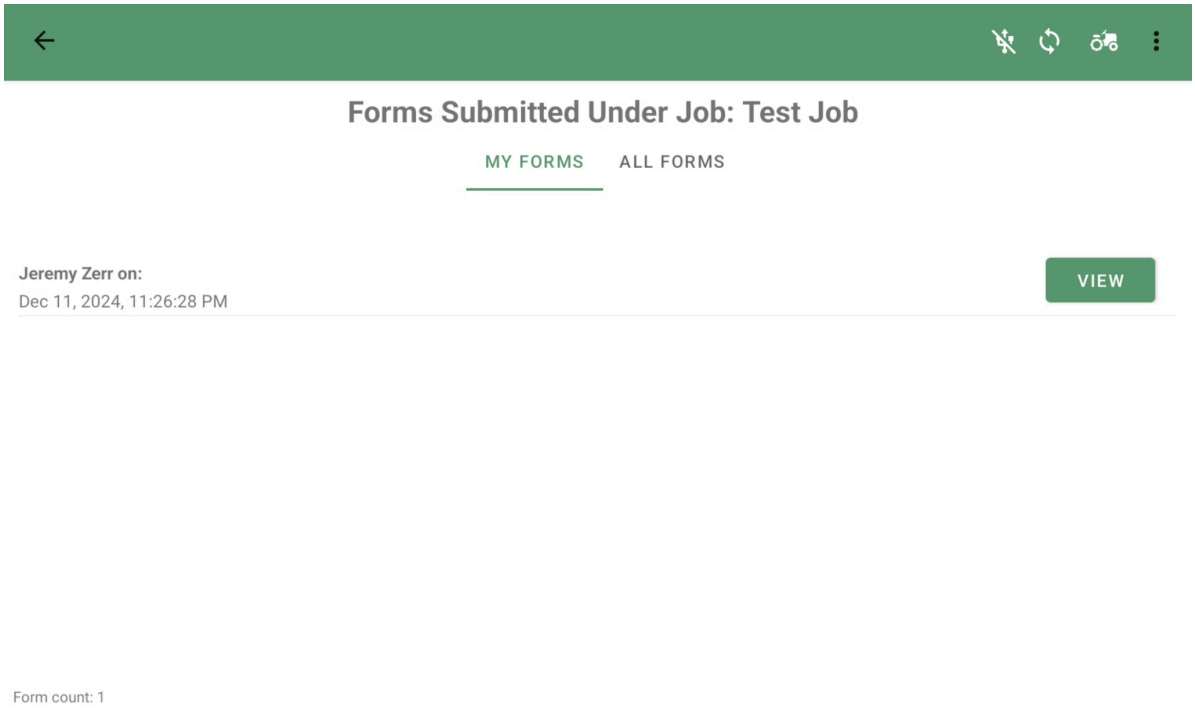
Click on the orange marker and you get a similar view as within the app:



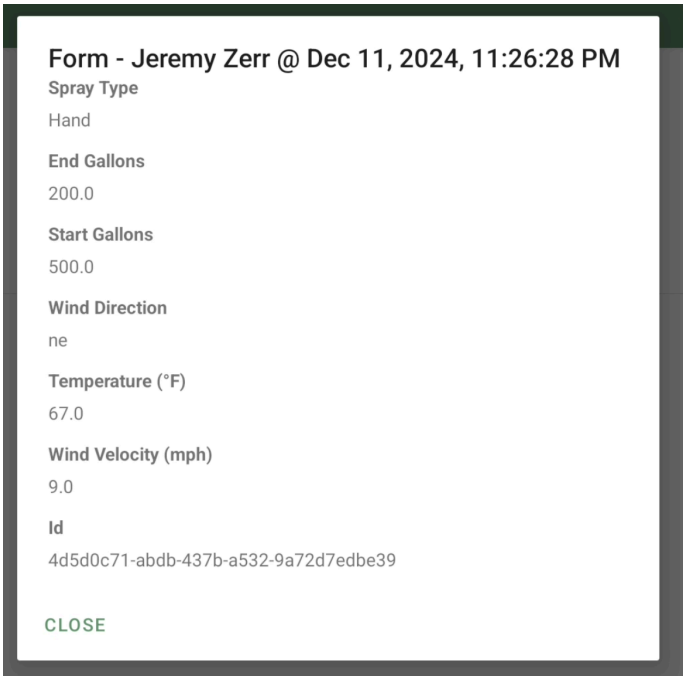
You can view any forms submitted within the App on the left menu there is a “Form/Log Submissions” option.



The Form/Log Submissions page will show your forms, when you submitted them, and you can view the details.



If you click the “View” button you see the form details.



7. Spray Types

Within each Vehicle Switch Config, you have the chance to select from one of several Spray Types.

- Boom
- Hose Reel Line
- Backpack
- Hose Reel Point - Weed Popup
- Hose Reel Point
- Fogger

Boom

This will map spraying like a polygon. This is common for a boom nozzle, or boomless nozzle. Anything that sprays over a swath and you are driving while you are spraying.

Hose Reel Line

This tracks your spraying with a line. This spray type is commonly used when you are using a hose reel and driving while you are using the hose reel. We allow you to specify if the line is off of the right side or left side of the vehicle. A line has no area, so there are no acres applied. Our built in chemical calculations are all based on acres applied, then using the flow rate in ounces per acre, to calculate the chemical ounces applied, so with this spray type, the chemical calculation cannot be done.

Backpack

This tracks your spraying with a line. This spray type is commonly used when you are using a backpack and have the tablet with you. This is the same as Hose Reel Line, so the same details apply. The only difference is that the line tracks the GPS, and is not out to the left or the right.

Hose Reel Point - Weed Popup

This tracks your spraying with a point. Designed for when you park your sprayer, the tablet with GPS stays on the sprayer, you get out and use the hose reel a few times. Usually there is a flow switch involved that triggers when fluid goes through your hose reel. The first time you trigger spraying, it will mark the location and bring a popup on the tablet to select the weeds. You continue spraying, additional trigger presses will not drop additional points (GPS isn't moving so no purpose). Then when you come back you select the weeds you control and they are embedded within a single point.

Hose Reel Point

This tracks your spraying with a point. Designed for when someone is driving the sprayer and someone is walking alongside the sprayer with a hose reel. Usually there is a flow switch involved that triggers when fluid goes through your hose reel. This drops a point every time you trigger spraying, that is how it differs from "Hose Reel Point - Weed Popup". The weed buttons you have selected are embedded within every single point.

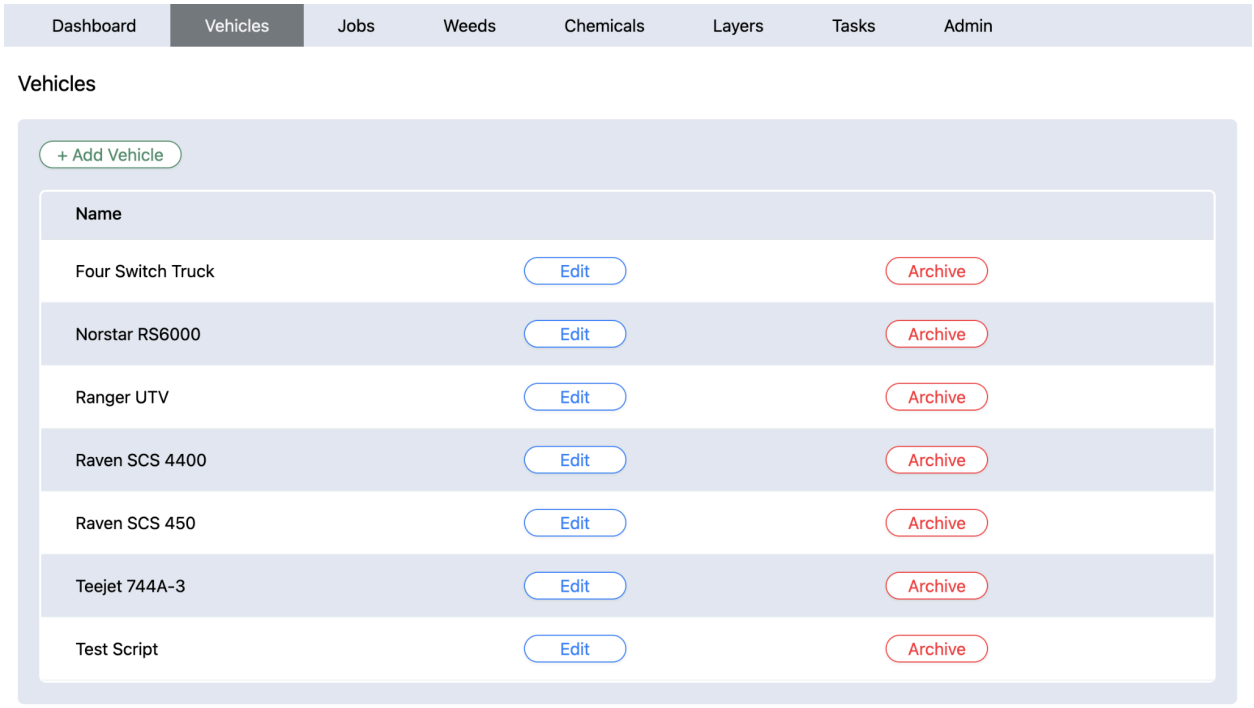
Fogger

This spray type is treated exactly like a boom, where you have a swatch and the sprayer is driving, but we do not track acres applied because it's not typically of interest in the mosquito fogger application process.

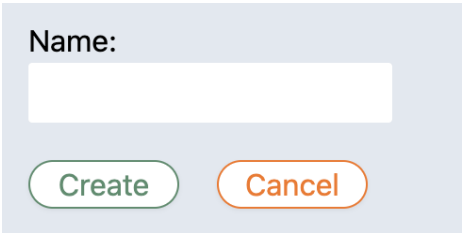
8. Vehicle Switch Config

We will build off of our explanation of the spray types in the previous section to go through the Vehicle Switch Config page. We've touched on the page that is in the tablet app previously, but we will go deeper into the web side and also the tablet side again.

Within the web application we have our "Vehicles" tab where the sprayer configuration lives.



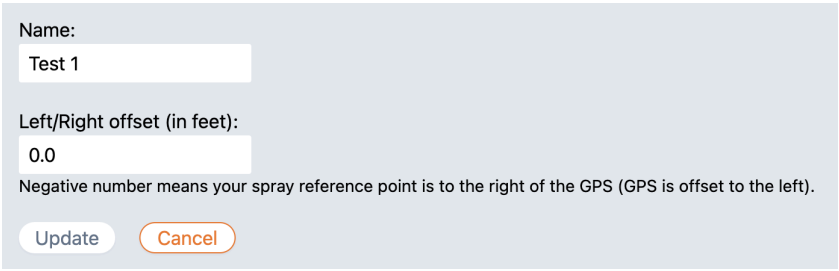
If we click the “+ Add Vehicle” button it gives us initially a small form:



Give it a name and click Create.

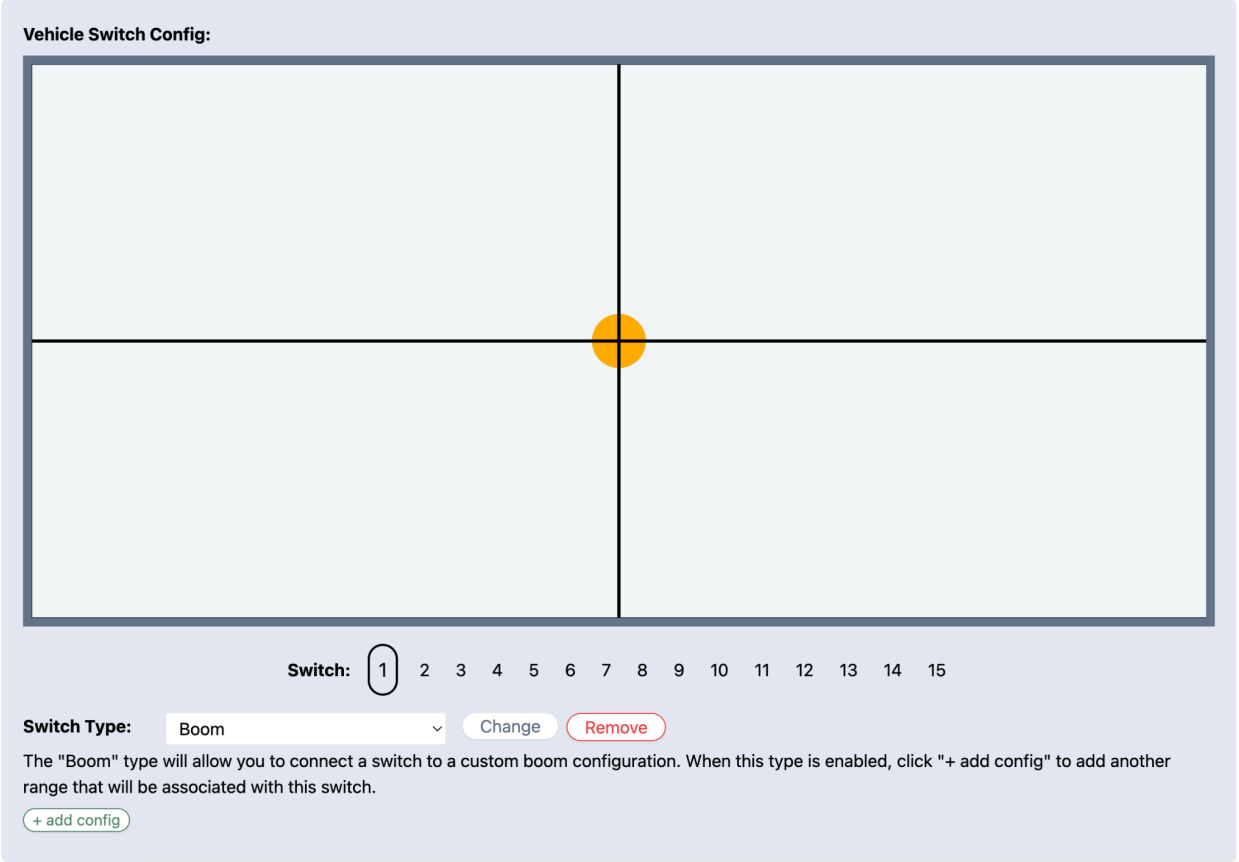
That new vehicle name will show up below, then click on the “Edit” button next to it to get to the vehicle switch configuration.

At the top, you have the name and Left/Right offset.



We'll discuss the Left/Right offset later.

Down in the bottom we have the Vehicle Switch Config:

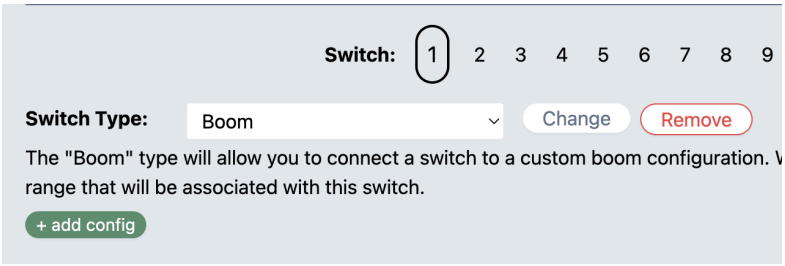


The individual switches are listed 1-15 and you can click on each one to highlight its configuration.

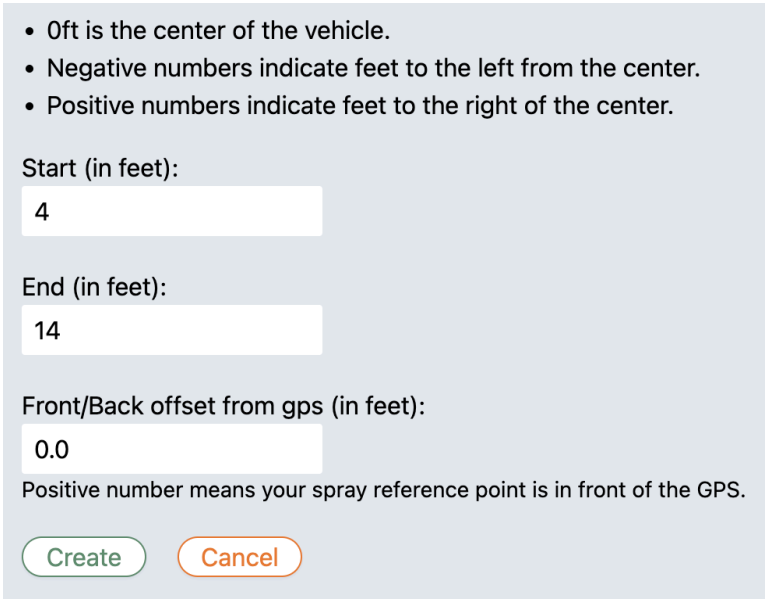
Let's lay out our sprayer which has two nozzles on a boom. The first one is a 10 foot swath that starts spraying right at the tire line. The second one has no overlap, starts at 10 foot and is another 10 foot swath, so it ends at 20 feet.

If the GPS is in the center of my vehicle, it's about 4 feet from there out to the tire line where my first swath starts. So I need to configure my first switch to start at 4 feet (positive 4 because positive numbers start out to the right) and it will end at 14 feet (I have a 10 foot swath).

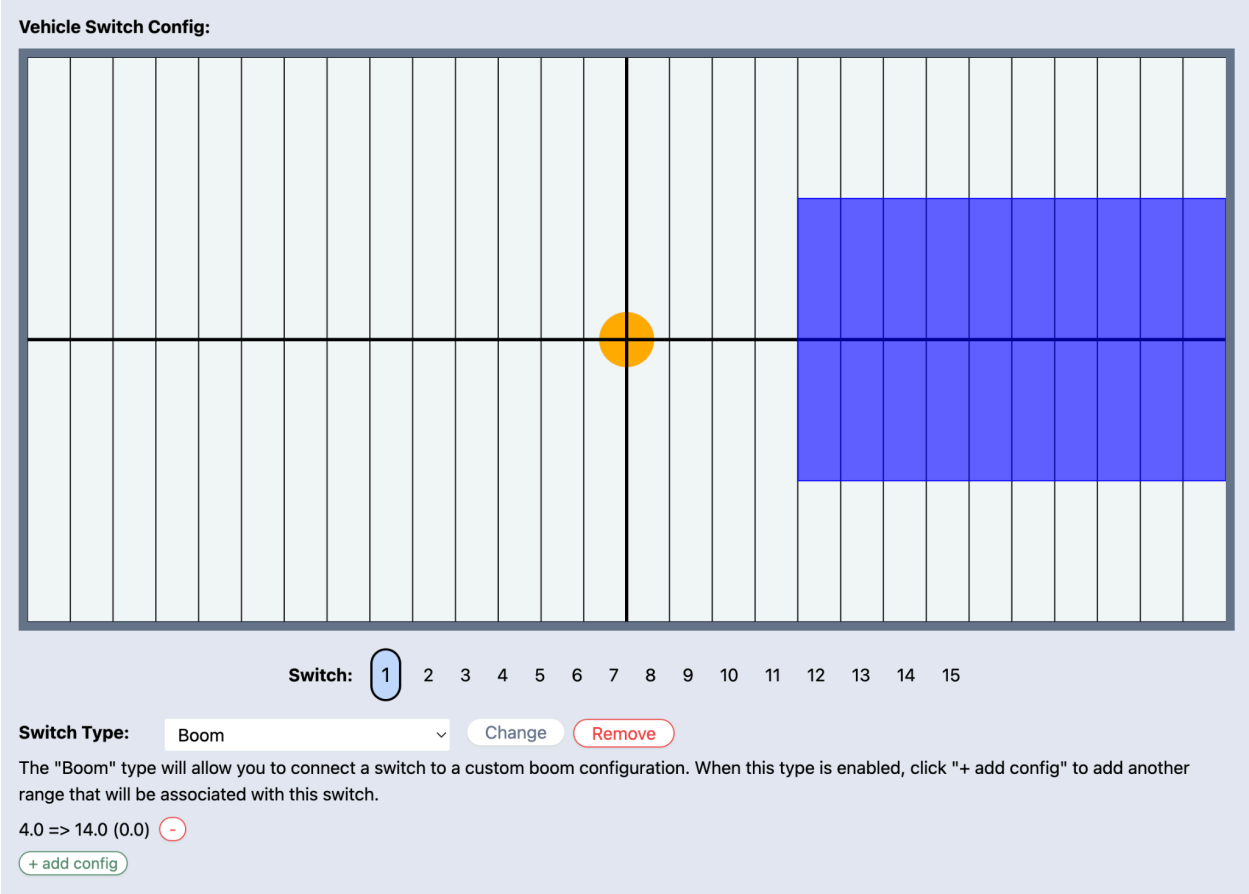
So I am already by default I have the Boom switch type selected. I am going to click "+ add config".



And I'll add in those items that we calculated from above.

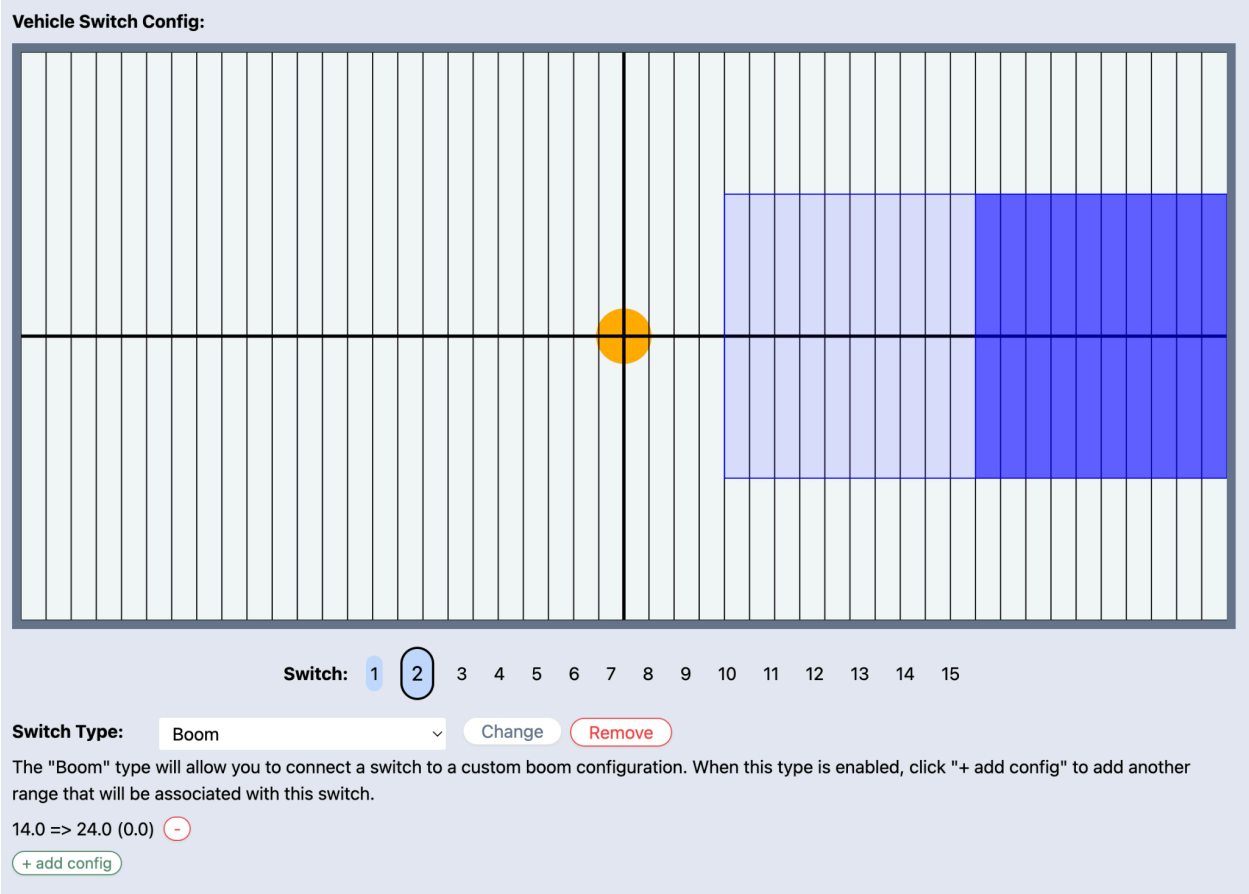


The map above looks like:

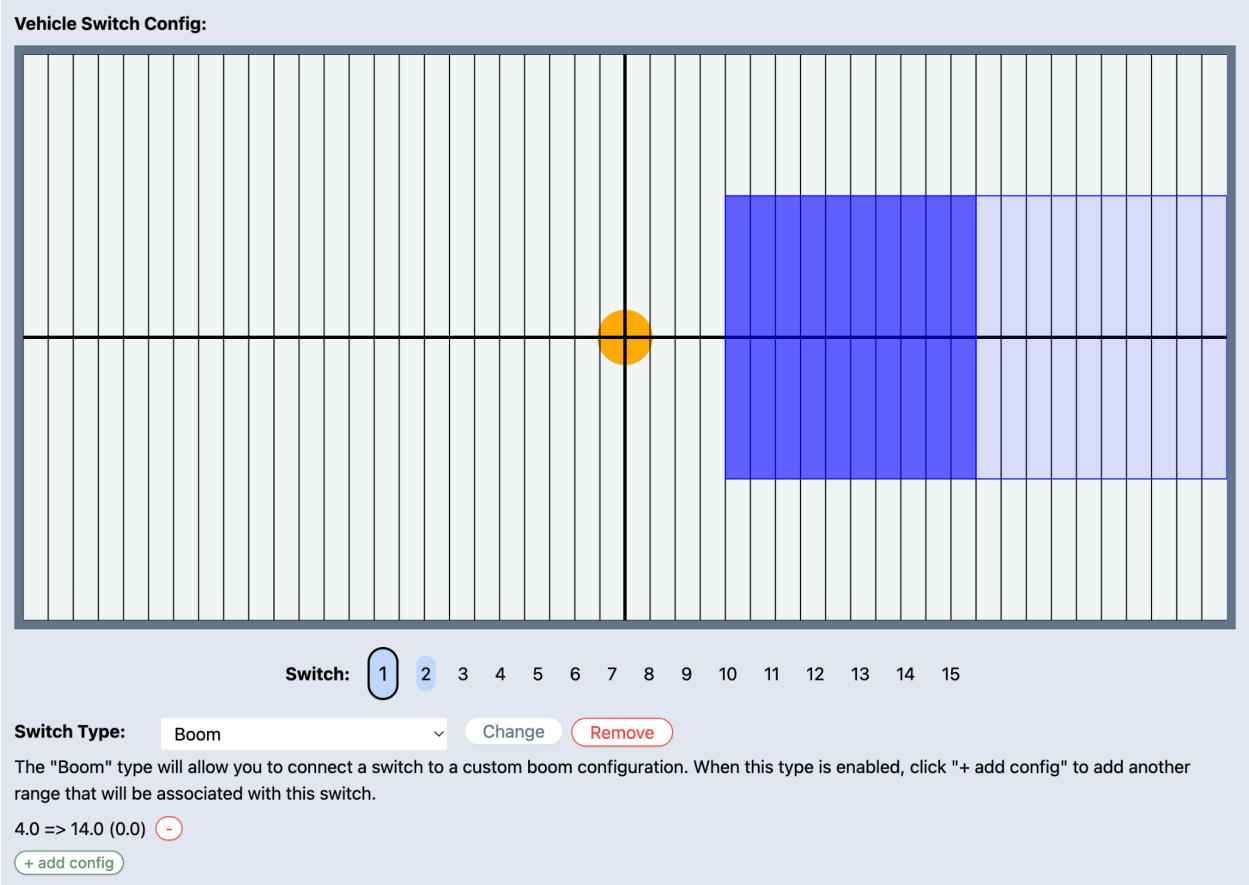


The orange spot in the middle represents the location of the GPS. This is a lot like we are looking from the sky down on the sprayer, a top down view, to help us visualize our spray pattern.

Let's put our 2nd switch in. This starts where the first one left off, at 14 feet, and has a 10 foot swath so it ends at 24 feet. So I'll click over on switch 2 and set that up. Now here is our updated spray pattern map.

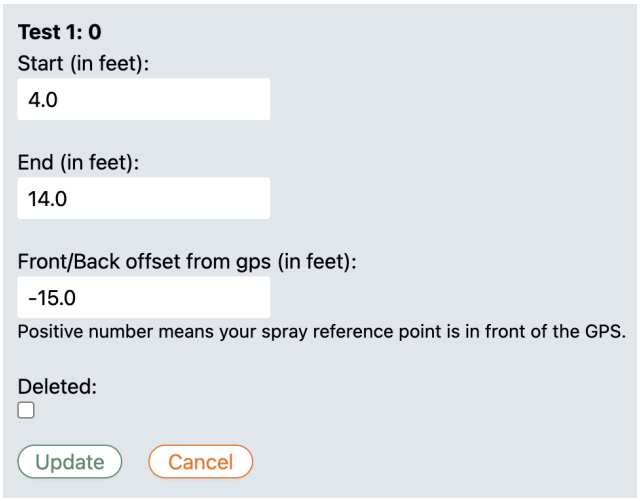


I have the switch 2 selected, so it's spray pattern is highlighted in a darker blue. If I click on switch 1, here is what it changes to:

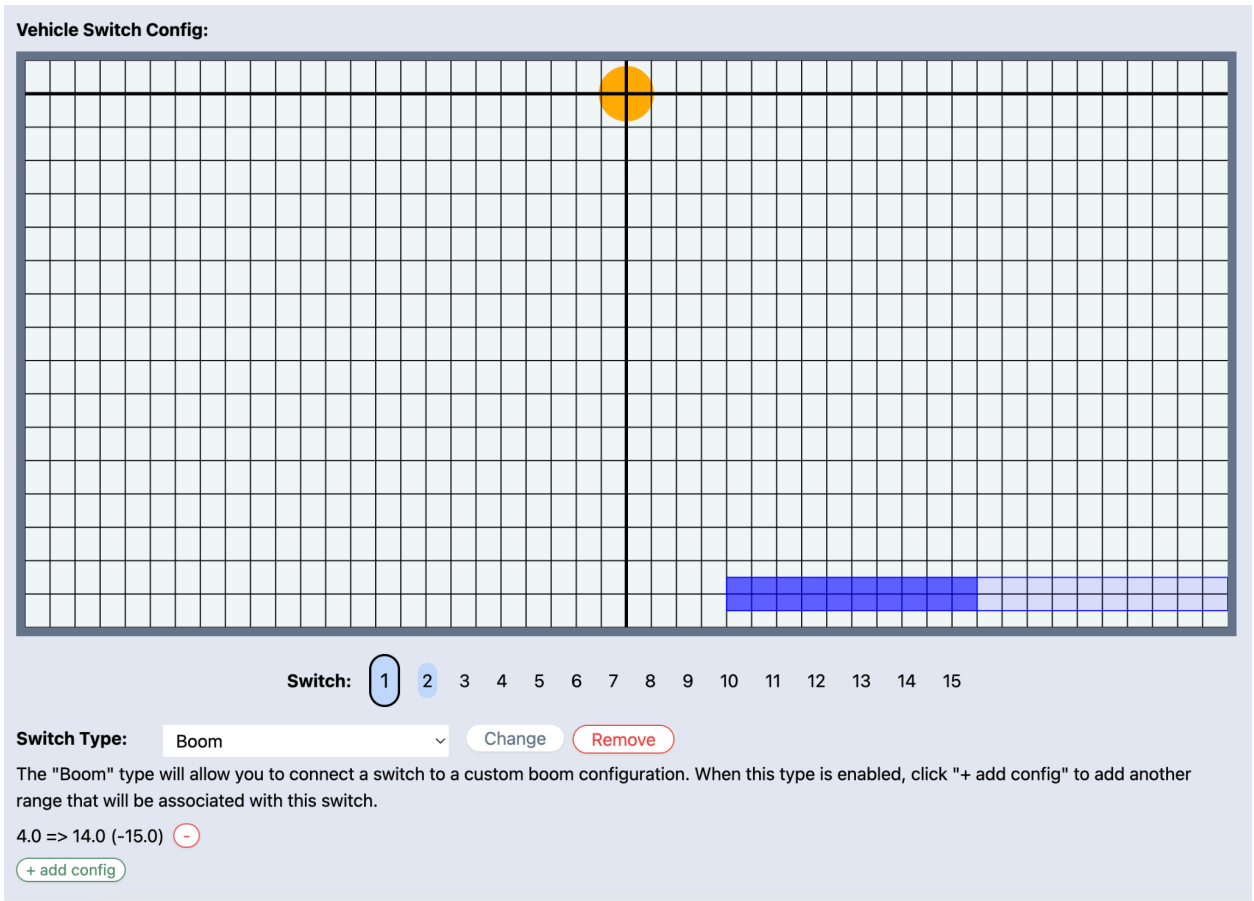


So now let's adjust our setup so that we reflect the fact that our nozzles are actually at the rear of our sprayer. They are about 15 feet back at the rear of the sprayer from the location of the GPS which is in the tablet.

I can edit switch 1 by clicking on the "4.0 => 14.0 (0.0)", it will take me to a page where I can edit this.



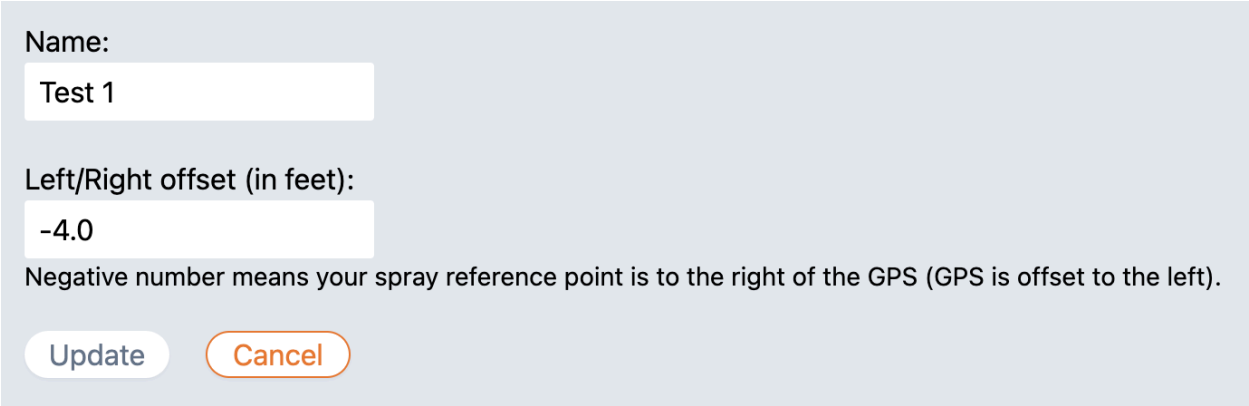
I will make the number negative to represent something out at the rear of the sprayer. I'll make this change and click "Update". I'll repeat the same thing with switch 2. Here is the updated spray pattern map.



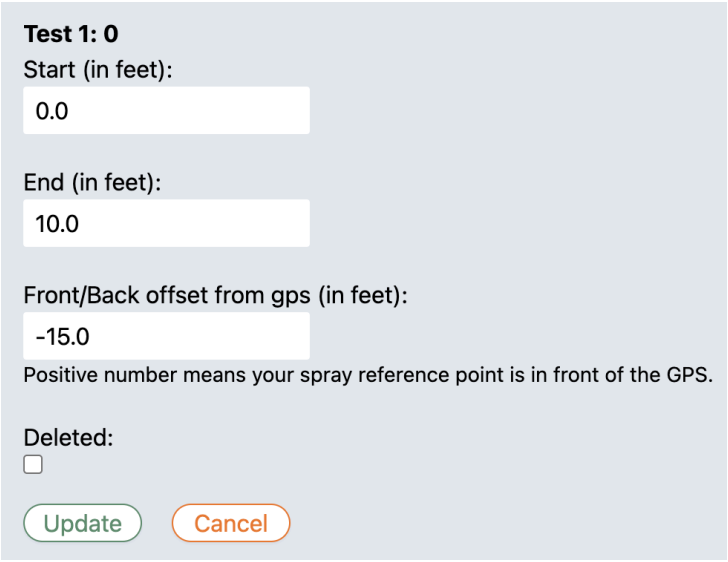
You can see the visualization shows the orange GPS dot out in front and our switch 1 and 2 patterns are out behind it. Remember we are viewing it from the top down, and facing forward.

Now back to the Left/Right offset that I ignored from earlier. I said our sprayer was set up where we start spraying out at the tire line off the right side. That required us to offset our spray pattern by 4 feet. So we had 4ft to 14ft for switch 1, 14ft to 24ft for switch 2. A more efficient way to do this is with the left/right offset at the vehicle level. I don't want us to have to add the 4ft offset into each.

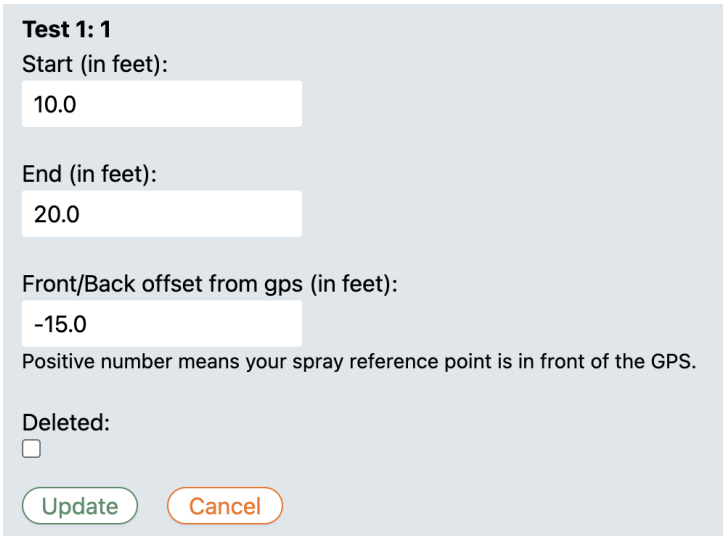
I can change the top vehicle offset to -4.0:



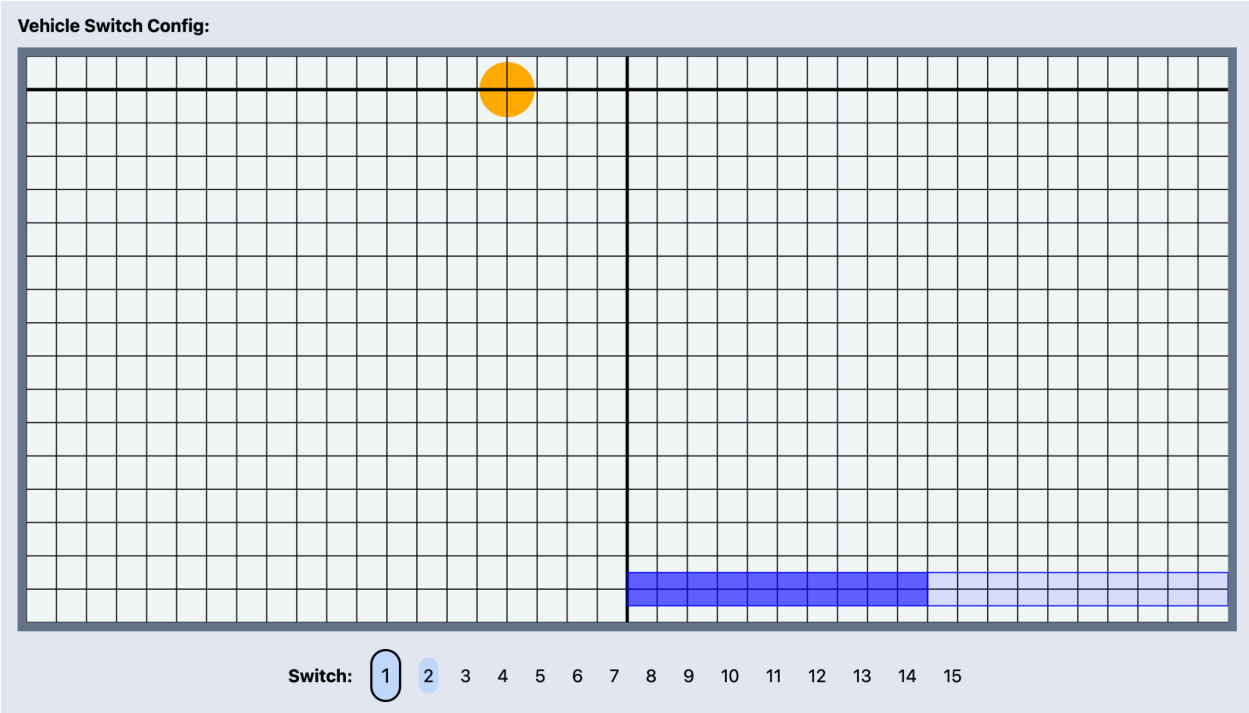
And then move switch 1 to:



And move switch 2 to:

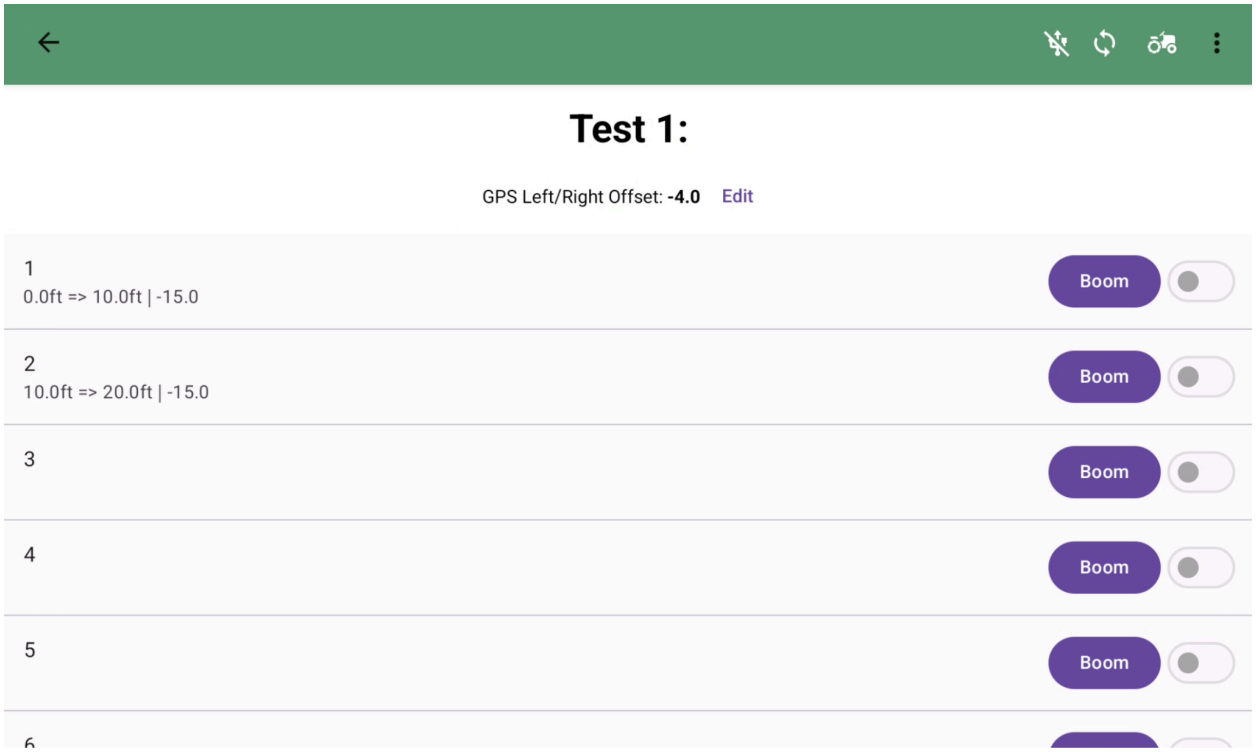


So now the overall spray pattern map looks almost the same.



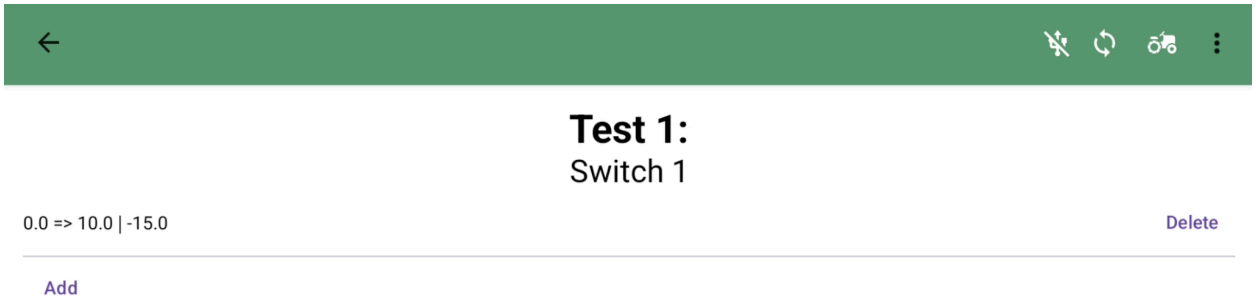
So what is the point? Well if you ever decide to move your entire boom or change the position of the tablet, you only have one spot to change. This gets even more important if you are running a lot of nozzles. Instead of changing many individual switches, you can just change one number.

Over in the tablet app you will see all of the same configuration.



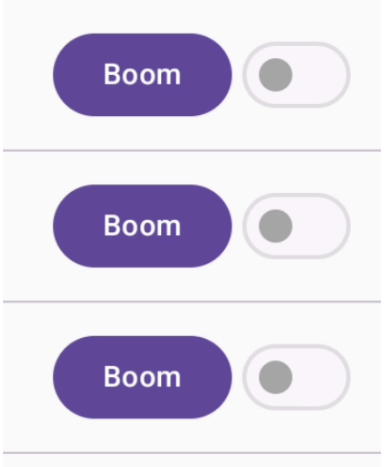
The global Left/Right offset is up at the top, you can click the Edit button to change it:

Let's view the switch 1 config:



And we can always change it on the tablet but not as nicely on the web, we have to Delete it and then Add a new one.

One part of the tablet app Switch Config page we haven't discussed yet is the toggle switch:



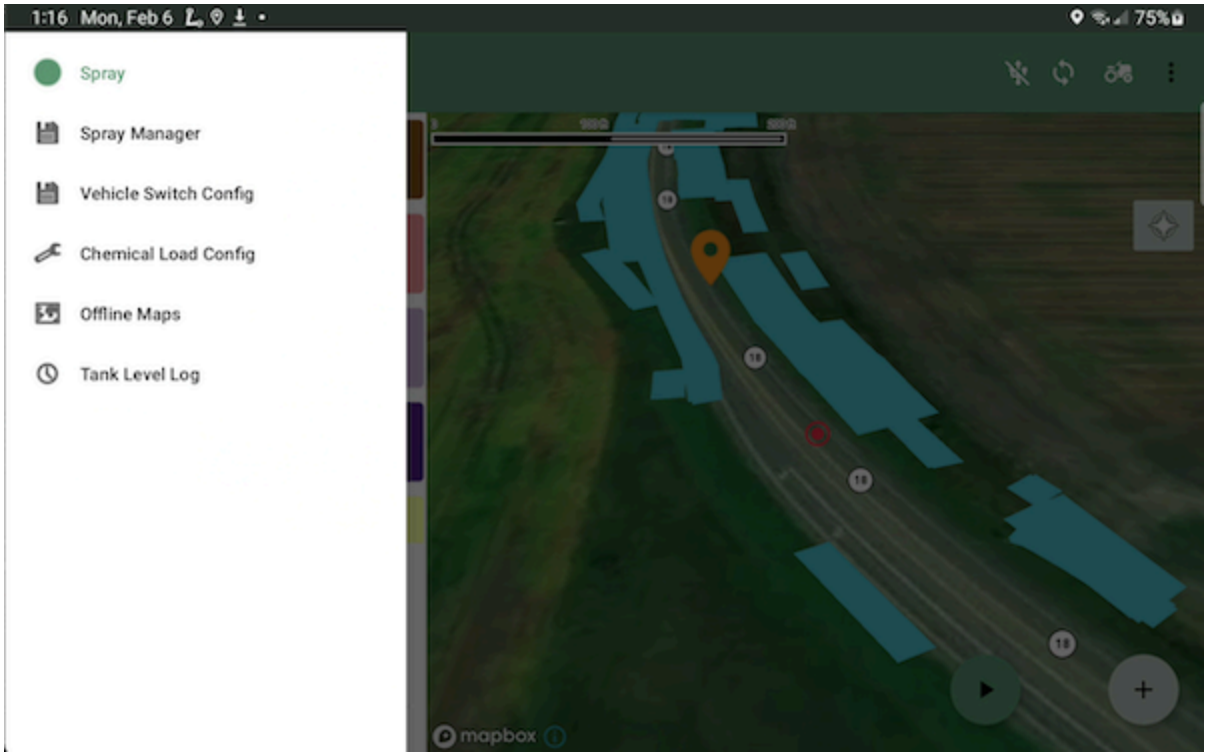
The toggle switch out to the right is not something that you can toggle yourself. This is the most direct view of the status of your boom switches as read by the SpraySync monitor box hardware integration with your sprayer. When doing hardware testing, go straight here and skip the map. If you turn your switch on your sprayer controller or whatever electronics you might have, you will be able to see this toggle switch also toggling over to the right when your switch is on and back to the left when it is off.

9. Tank Level Log

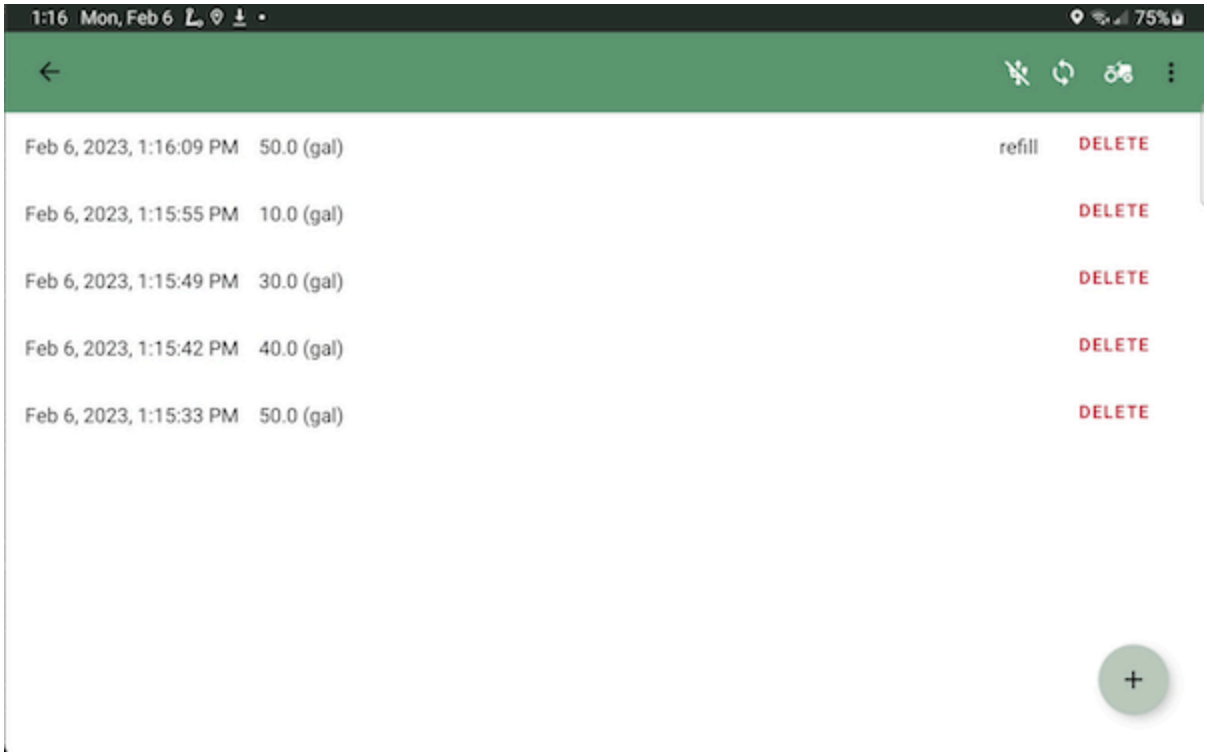
We provide automatic chemical application tracking as a part of the SpraySync system based on acres applied and a flow rate defined as ounces per acre defined within your Chemical Load. There are some sprayer configurations and integrations that may be challenging to track using our automated methods. Examples of this would be when you are using a flow switch when you are using a backpack or spot spraying with a hose.

Another option we have for tracking the chemical amount used in cases mentioned above is manual tank level logging.

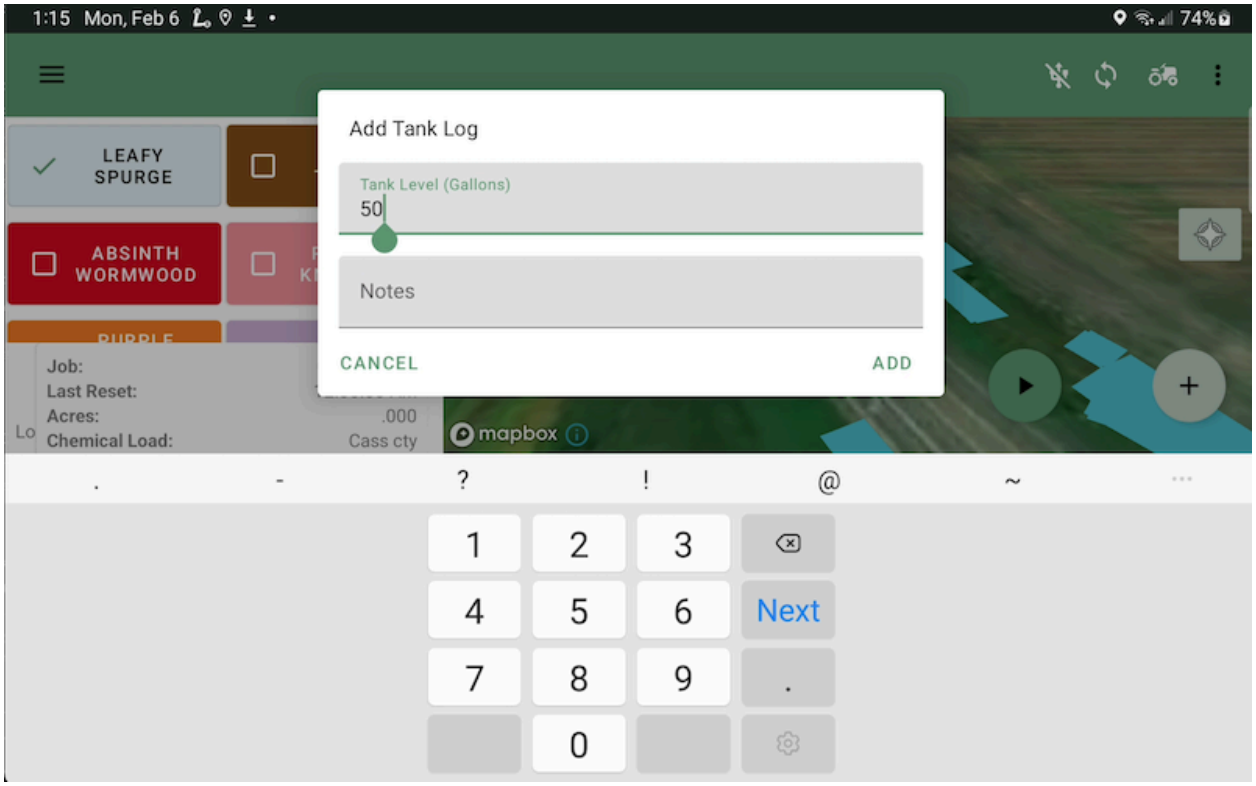
You can launch the Tank Level log list from the left hand menu and tapping on the "Tank Level Log" menu item:



This will list the tank level readings that you have taken as shown in the screen below:



You can add a Tank Log by using the circular plus button in the bottom right of the app. The Tank Level Log asks for a tank level reading and a notes field.



When you are filling in a Form entry, you have the ability to override any of the automatic chemical usage calculations with your own measurements. By using the Tank Level Log, you can have a historical view of your tank usage and refills throughout the day to help you remember your usage.

This is just a way to take down information within the app. It is not part of the sync process. It's not automatically integrated into forms or reporting. It's just there to use alongside other digital forms, or to help you take information you use for completing paper-based forms.

10. Real-time Mapping Feedback

While spraying, the map shows exactly the dimensions of your sprayer nozzle spray pattern so you can confirm both location and spray swath that you are covering as you are spraying. Allows you to ensure that all of your monitoring is working and gives you confidence that you are meeting your reporting requirements. It also allows you to see where one of your other sprayers have sprayed in the past. Or where you last sprayed weeks ago.

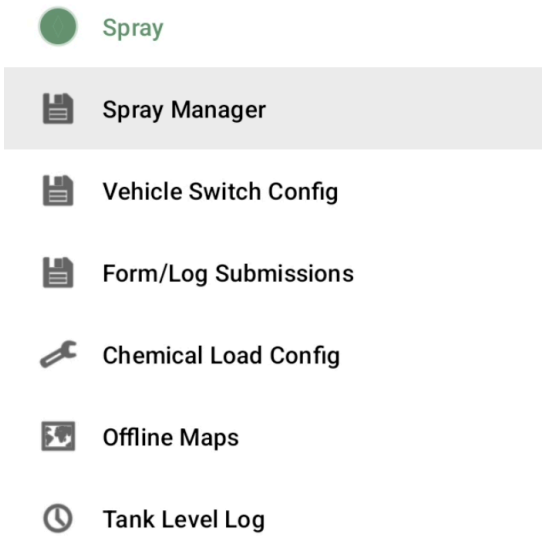
You also see your acres accumulating as you spray and speed on the main map page to help monitor your progress.

On the map you will see any spraying that has been done on the Job that you currently are on.

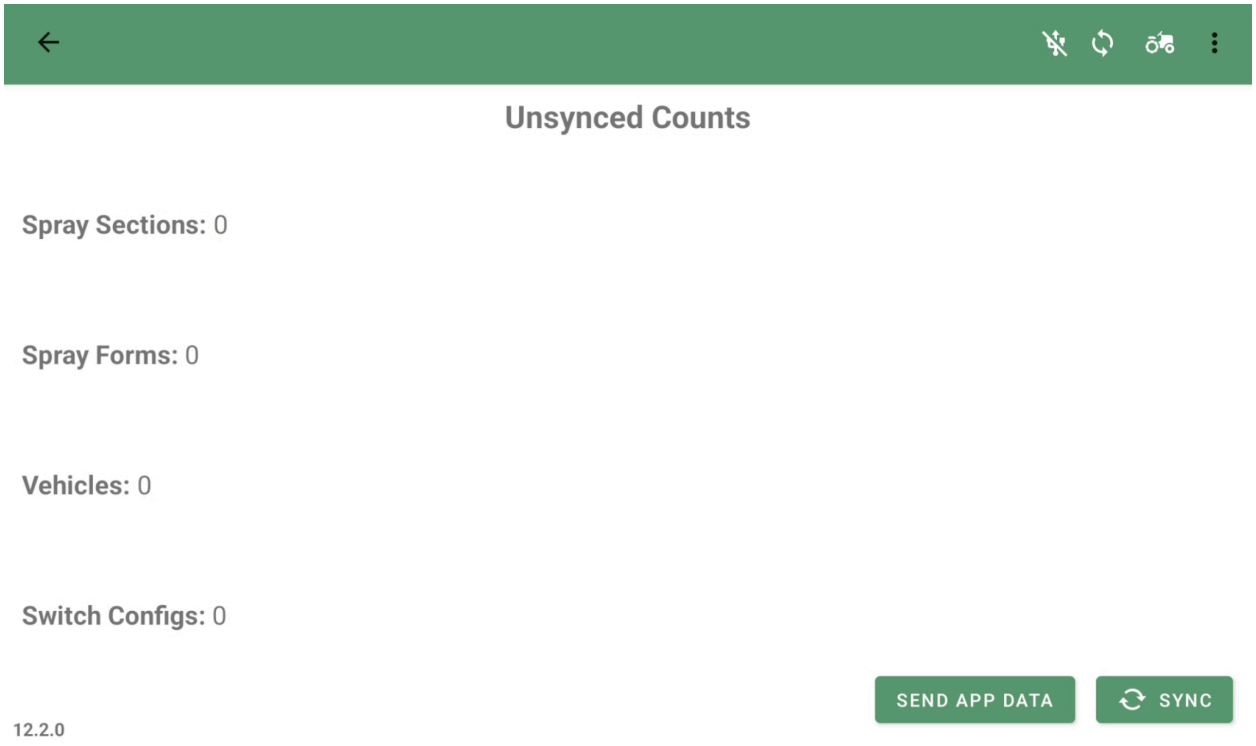
11. Data Sync

Whether you have a cell service plan in your tablet, or you are wifi only, once you have internet access all of your data is automatically synchronized with the cloud servers. That sync process is bi-directional, any changes made by an admin on a web site, by someone spraying on a tablet, it all goes up to the cloud server and then communicated back to all of the users and tablets on your account.

To see the status of the sync process, you can view the “Spray Manager” page which you can access in the top left menu of the app.



The “Spray Manager” page will show you the status of the main items in the sync process.



If the sync has been completed, and everything is on the server, the numbers will all be 0.

You can manually press the “Sync” button if you have something that is not synced yet and you have the tablet connected to the internet.

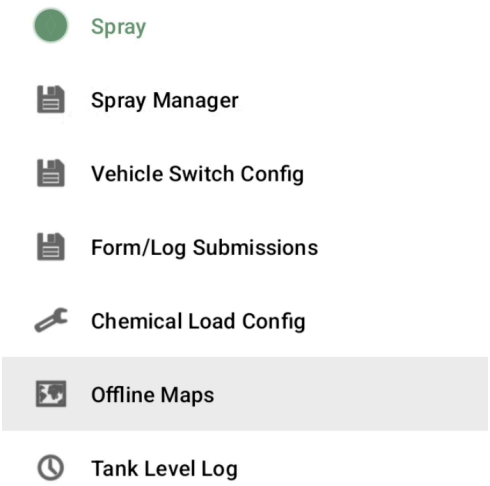
This centralized server is the place where it allows us to do reporting for your entire group, all in one place. Reporting can be done on the central server, in one place, without plugging anything into a computer to download data off of the tablet or box. Once everybody's individual tablets are completely synchronized, you can click a couple buttons and generate your preferred reporting format and send out to your customers, or just grant your customer direct online access to the data via the web application.

12. Offline-first Design

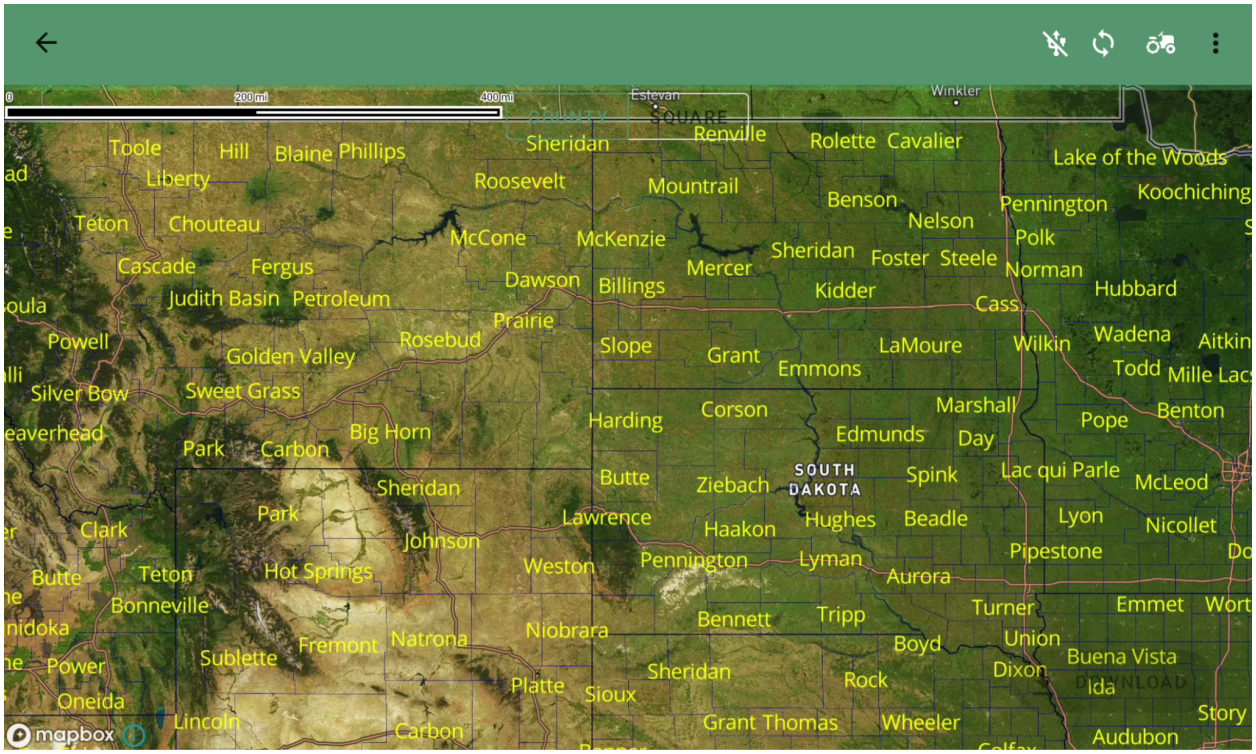
The app is designed to work online or offline, or somewhere in between in areas of spotty internet connectivity. All spraying activities are stored locally to the tablet first, then optionally the sync will run to send the data up to the cloud. Once internet access is available the sync will save everything to the cloud server. You can optionally choose to have a cell service plan for your tablet to be doing sync from the field as you go, or you can use it without a cell service plan and have it sync data when you get back in the shop or office and your tablet auto connects to wifi with access to the internet.

You can download satellite maps for offline access. This allows you to still see roads and visual landmarks from satellite images when you have areas of spotty cellular coverage.

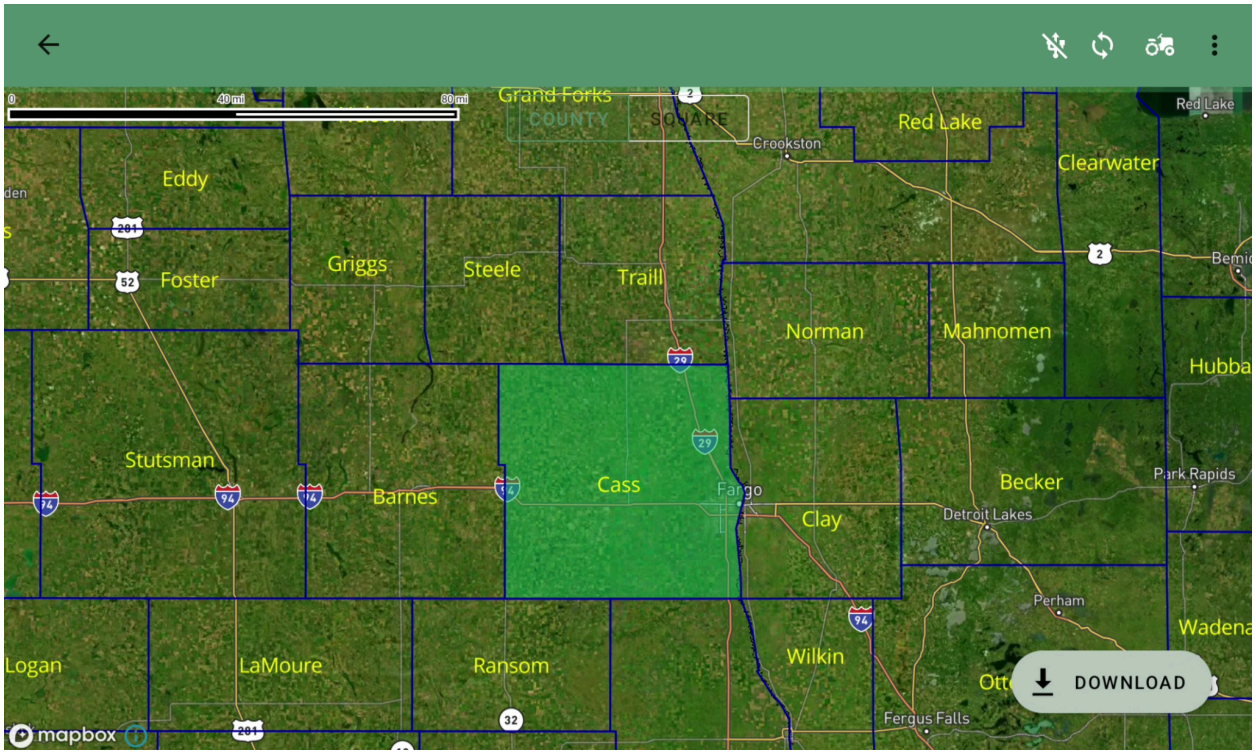
Within the app, in the top left menu, there is an item for "Offline Maps".



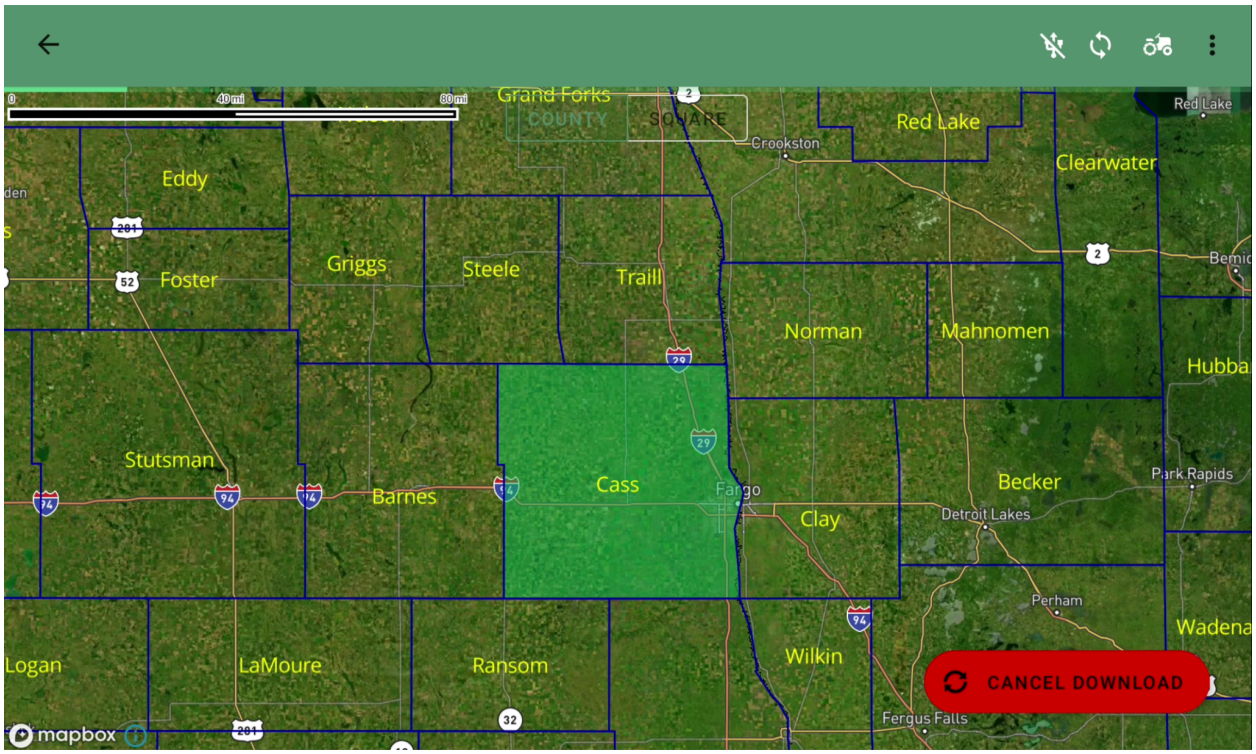
The default selection mode is by "County".



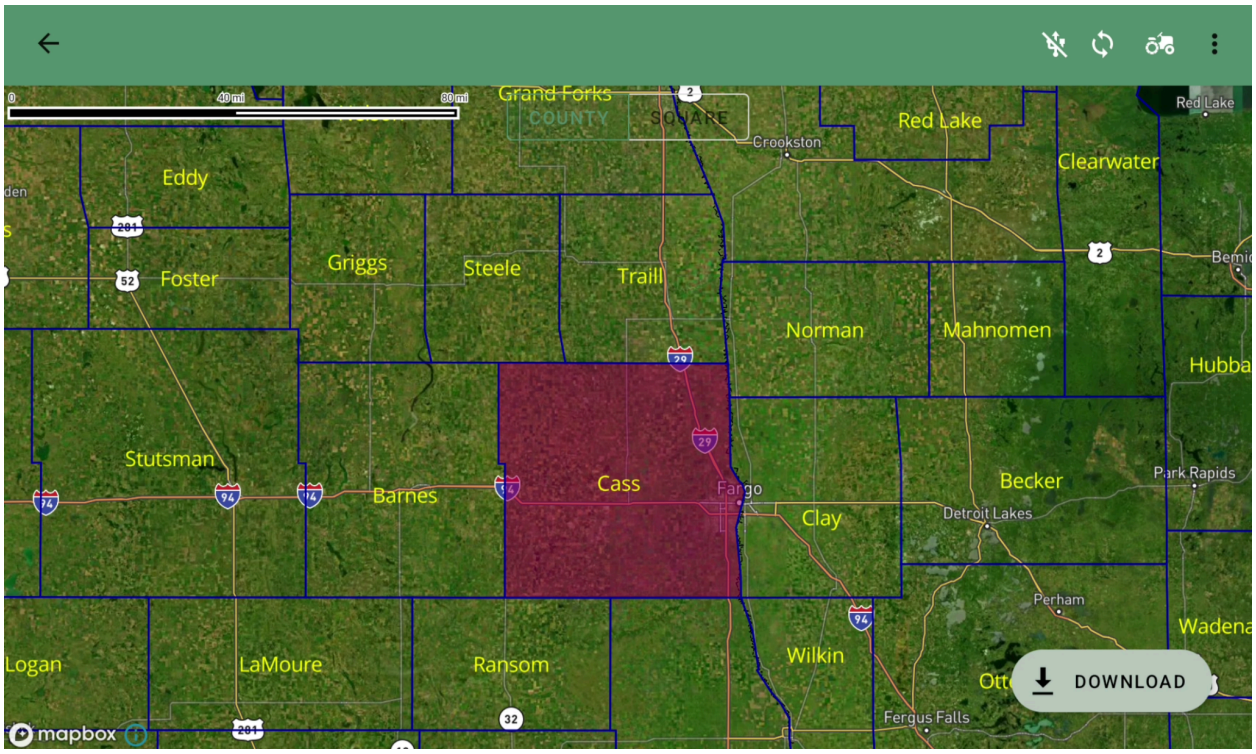
If you zoom in you will see county borders, you can tap a county to highlight it in green.



The “Download” button shows up. When you click it there will be a thin, green progress bar across the top underneath the top bar and the button turns to a “Cancel Download” button.

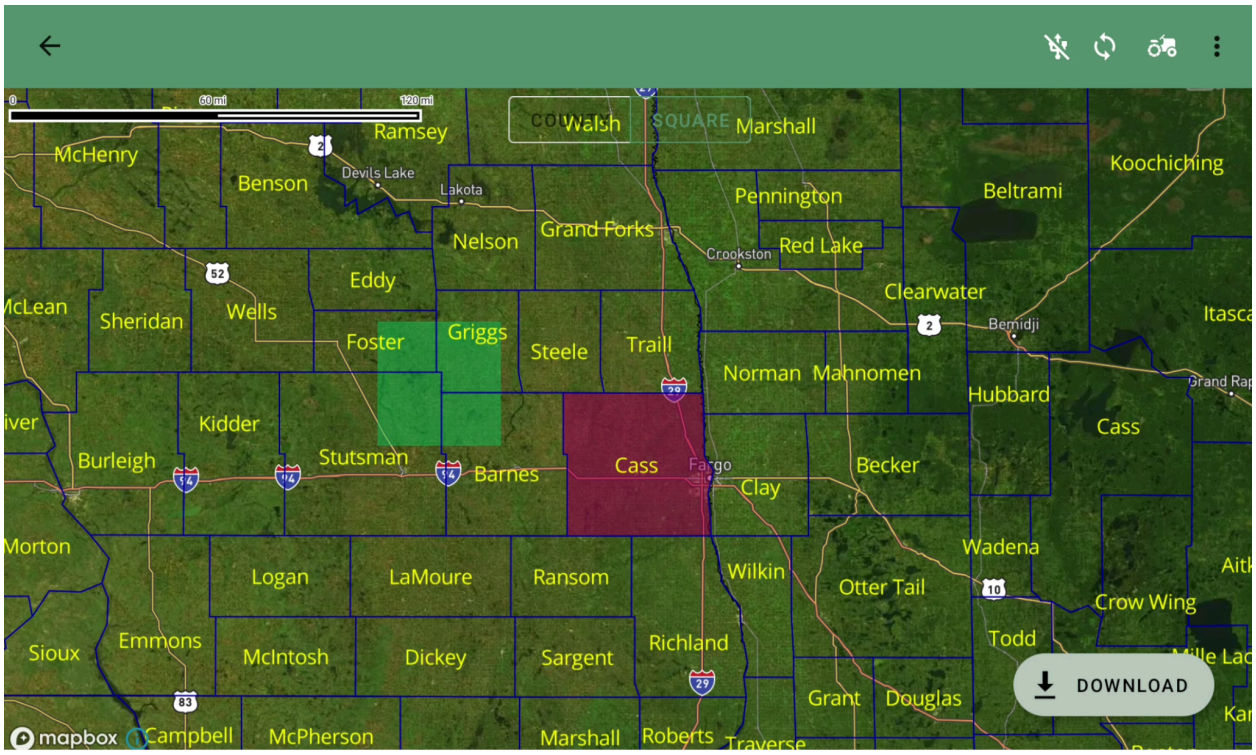


When the download is complete, the county will show up in purple instead of green.



If you want a new county, just click on a different county and tap Download. Only one county can be downloaded at a time in this mode.

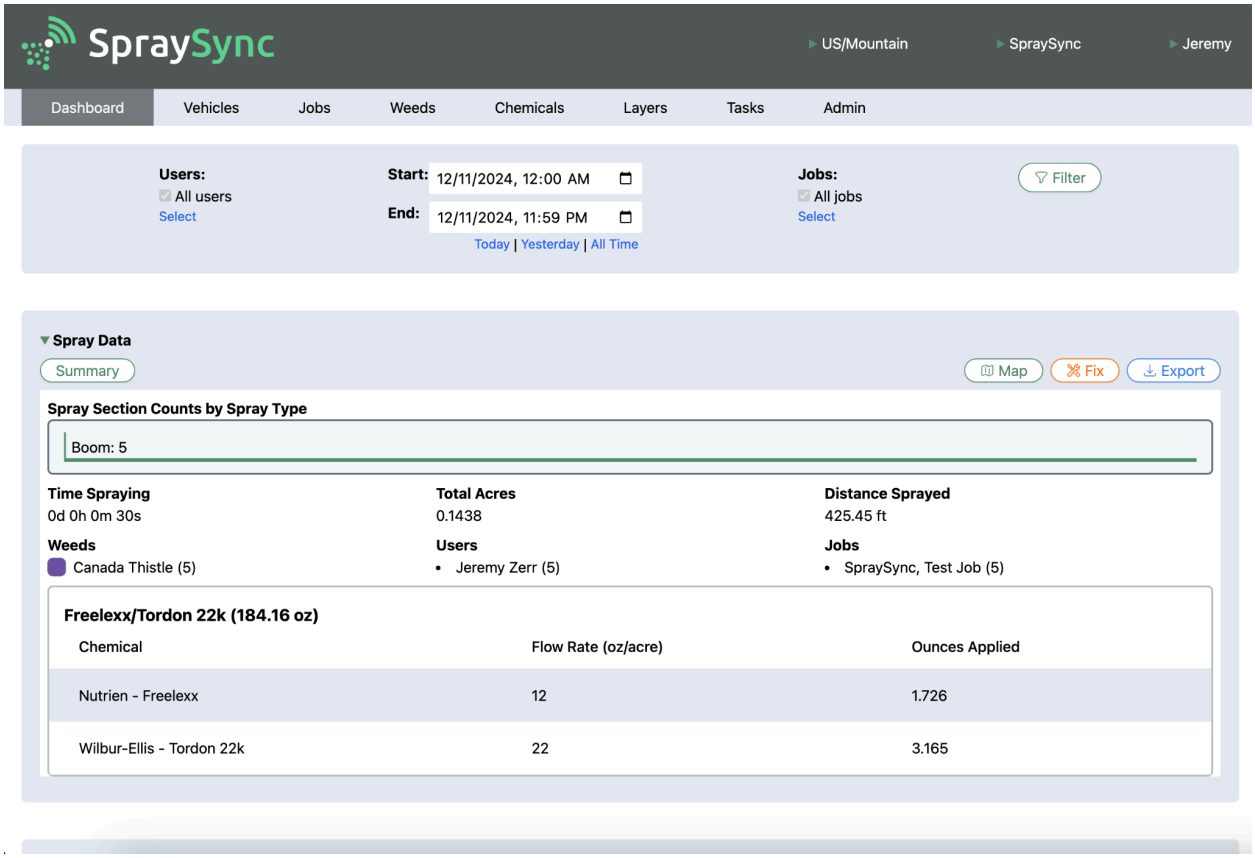
There is a button at the top to change the selection to a Square as an alternative. A square will show up in green as you tap around.



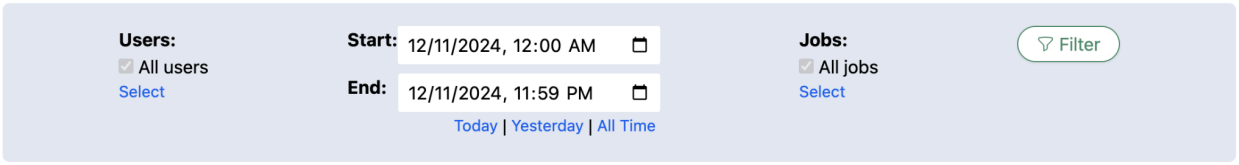
Another feature related to offline maps for the satellite images, is that we also have offline maps of your spray maps available. Prior to going out for a day of spraying without internet access, while you are on wifi, your tablet will automatically download an offline spray map of you and your teammates. This will allow you to still gain the advantage of knowing where you and your team members sprayed in the past, even if you don't have a cellular data plan on your tablets out in the field.

13. Reporting Dashboard

SpraySync is a cloud connected system. Once your chemical spraying has been tracked and your tablet has an internet connection, your data will be synced to our web application in the cloud. You can view all of your data on the Dashboard tab within the web application.

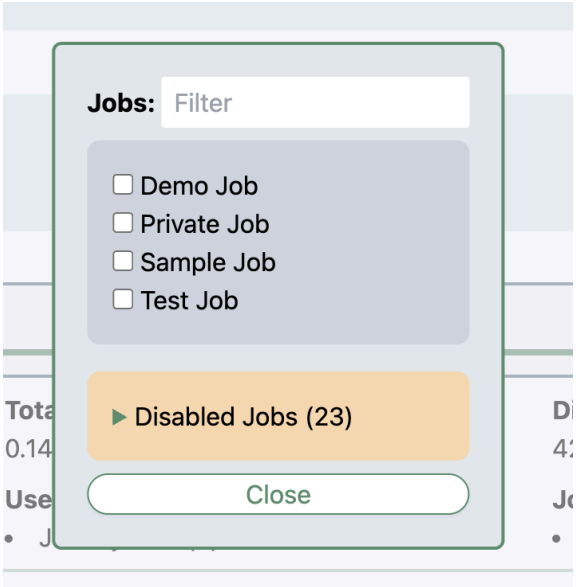


You have filters at the top:



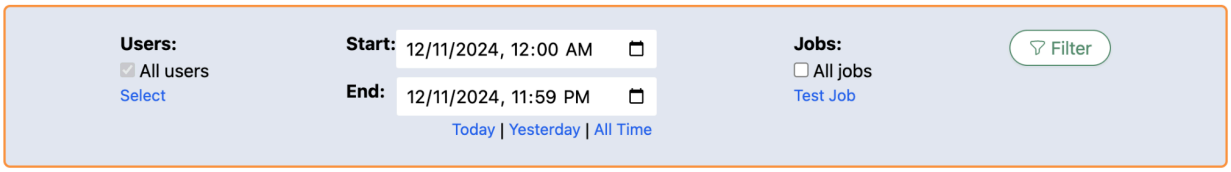
Defaults are All Users, All Jobs, and Today for a time range.

To pick a single job or user, click the “Select” link. That will bring up a popup:

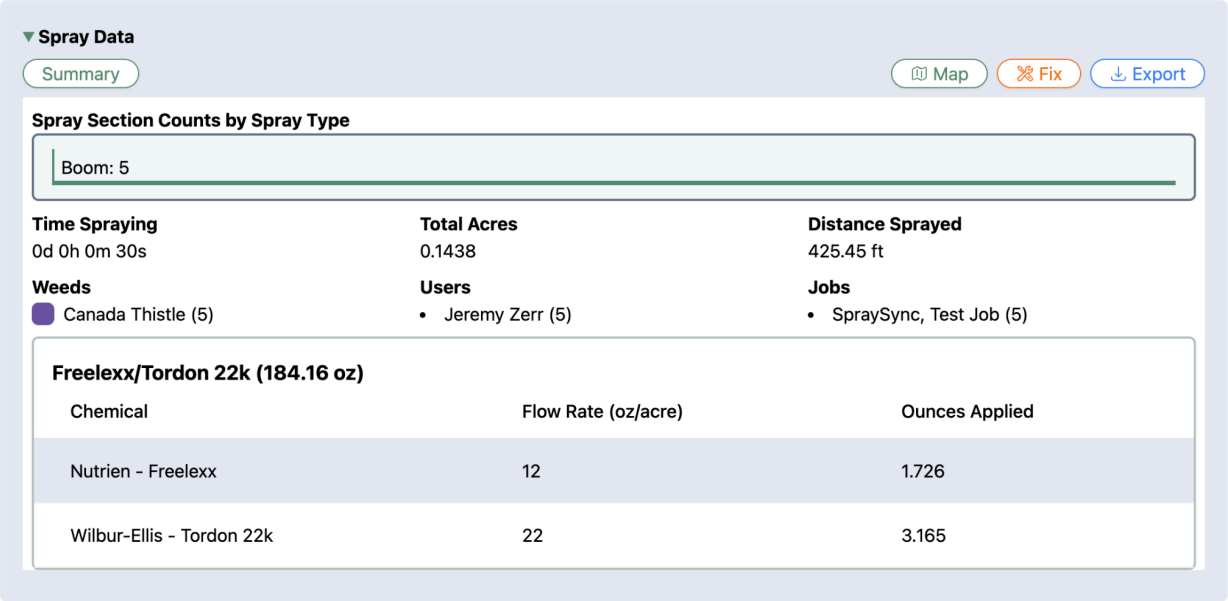


Pick the Job or multiple Jobs you want to filter on and click “Close”.

When you get back to the Filters section, the data hasn’t updated yet, you will see a Red outline around the filters section indicating that you need to click the “Filter” button to apply your filters.



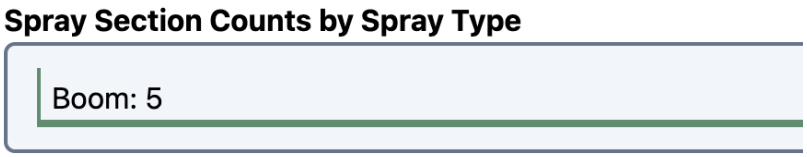
Down below in the Summary section:



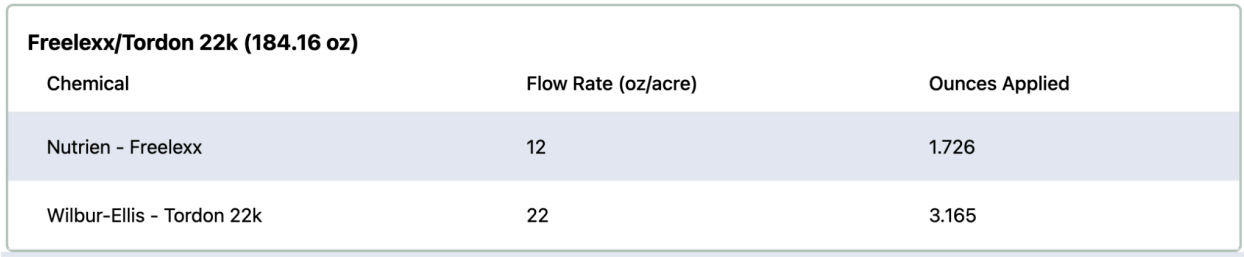
This shows:

- Total time spent spraying
- Total acres applied
- Distance covered while spraying
- Weeds controlled while spraying (using the Weed buttons on the left in the app)
- Users who sprayed during that period
- Jobs that were tracked

The very top part of the Summary section will break down by spray type:



The bottom part of the Summary section will show your chemical usage based on the Chemical Loads that you had selected while spraying.

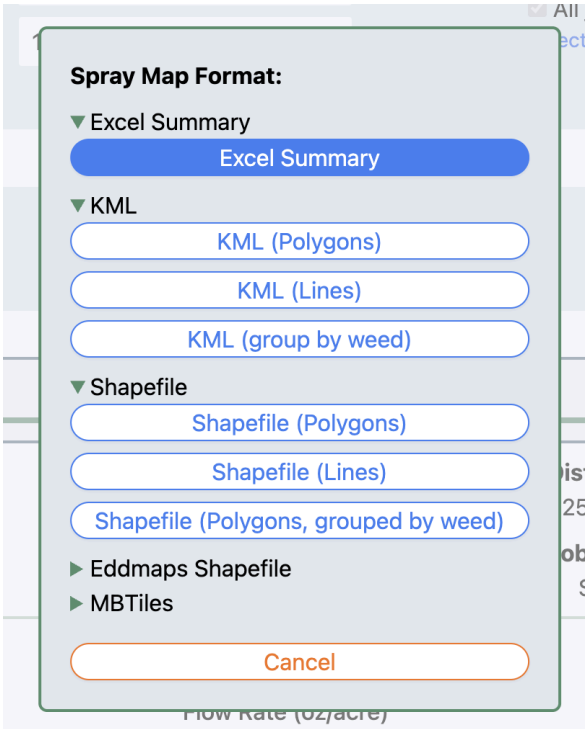


This includes the total mix applied (the 184.16 oz in screenshot) which is what came from configuring the “Total Flow Rate” on the Chemical Load.

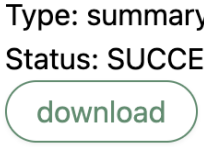
Sometimes there is too much spraying to display this top section, it would take too long to compute. In that case, we’ll give you a message indicating too many spray sections and how you can get the data is by kicking off an Export.

Click the Export button:

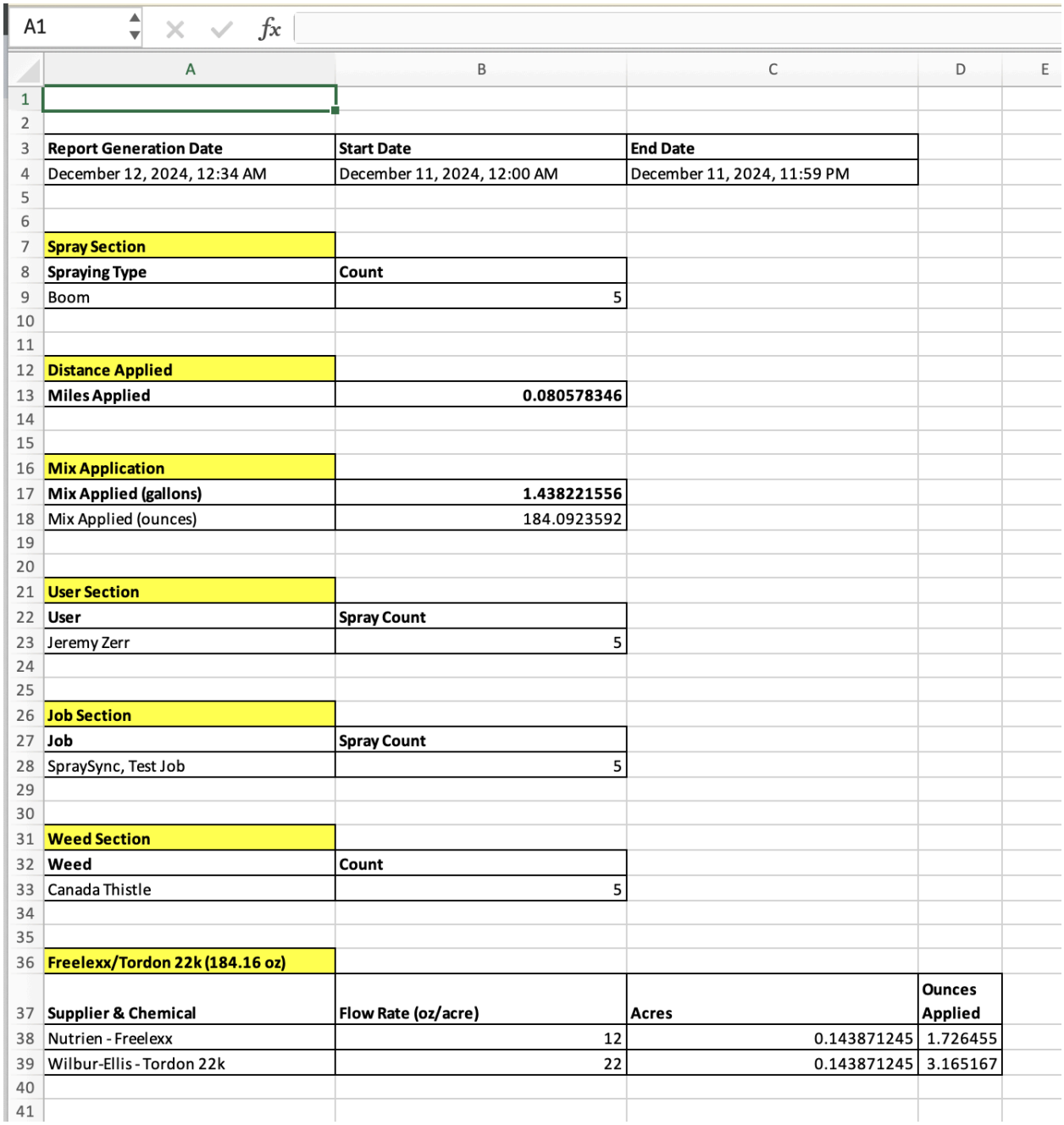
And choose the “Excel Summary” option:



This will kick off an export, the page will automatically refresh until the export is done.



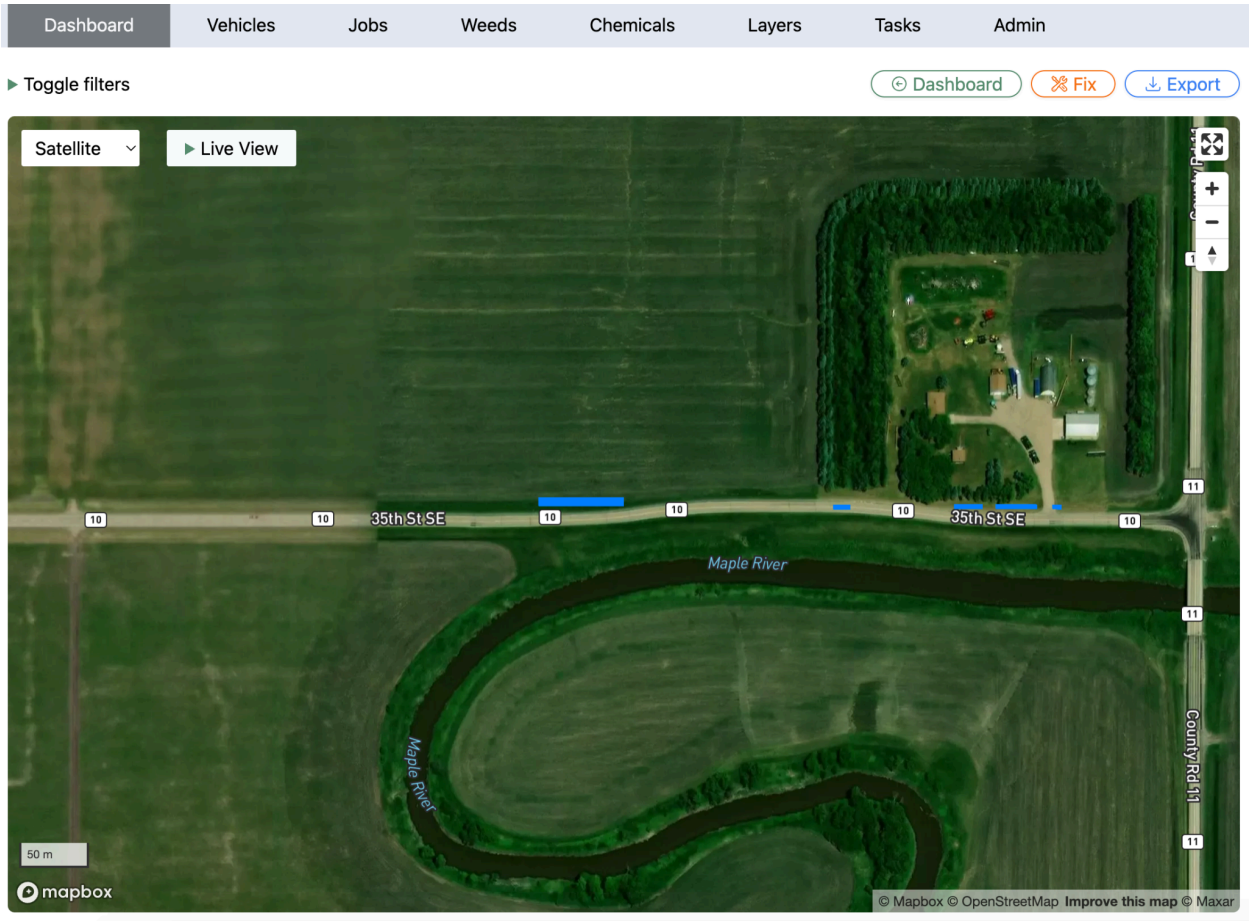
You can then click the “Download” button and you’ll get an Excel file with the same contents as the Summary section.



	A	B	C	D	E
1					
2					
3	**Report Generation Date**	**Start Date**	**End Date**		
4	December 12, 2024, 12:34 AM	December 11, 2024, 12:00 AM	December 11, 2024, 11:59 PM		
5					
6					
7	**Spray Section**				
8	**Spraying Type**	**Count**			
9	Boom	5			
10					
11					
12	**Distance Applied**				
13	**Miles Applied**	**0.080578346**			
14					
15					
16	**Mix Application**				
17	**Mix Applied (gallons)**	**1.438221556**			
18	Mix Applied (ounces)	184.0923592			
19					
20					
21	**User Section**				
22	**User**	**Spray Count**			
23	Jeremy Zerr	5			
24					
25					
26	**Job Section**				
27	**Job**	**Spray Count**			
28	SpraySync, Test Job	5			
29					
30					
31	**Weed Section**				
32	**Weed**	**Count**			
33	Canada Thistle	5			
34					
35					
36	**Freelexx/Tordon 22k (184.16 oz)**				
37	**Supplier & Chemical**	**Flow Rate (oz/acre)**	**Acres**	**Ounces Applied**	
38	Nutrien - Freelexx	12	0.143871245	1.726455	
39	Wilbur-Ellis - Tordon 22k	22	0.143871245	3.165167	
40					
41					

You can view the data on a map by clicking the “Map” button on the Dashboard.

It uses the same map images that are used on the mobile app.



It will zoom into the most recent section sprayed during the time period you picked in the filters. You can revisit those filters by clicking on the “Toggle filters” section at the top.

You can change the map background with the button in the top left corner:

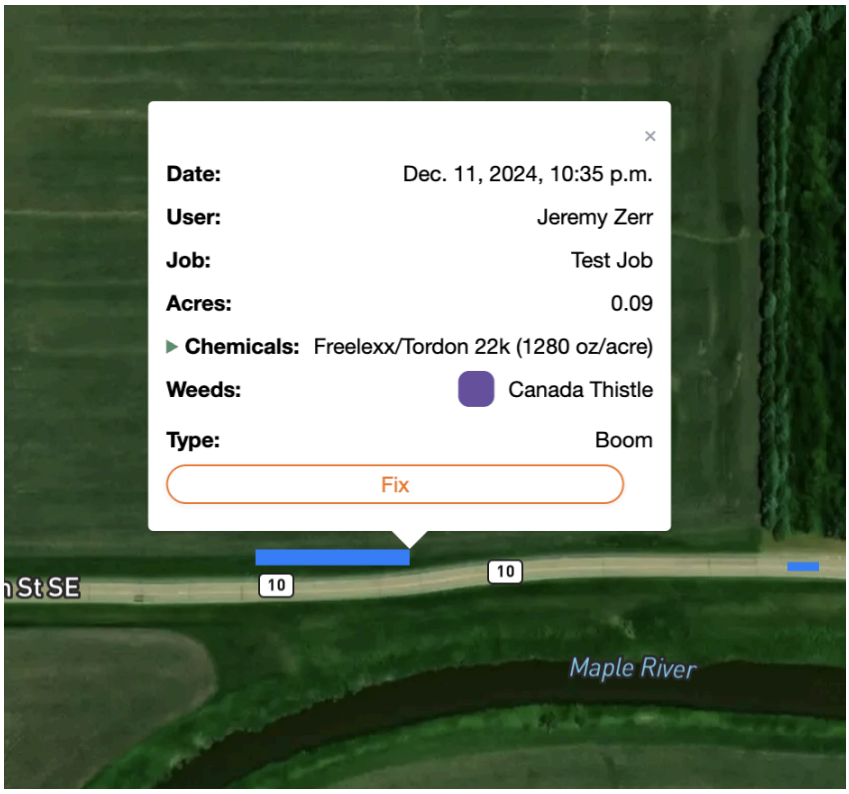
You can choose:

- Outdoors
- Satellite (default)
- Light
- Dark

You can make the map take up the full screen using the button in the top right corner.

Like most maps you can also pinch to zoom in and out. Along with using the + and - buttons in the top left corner.

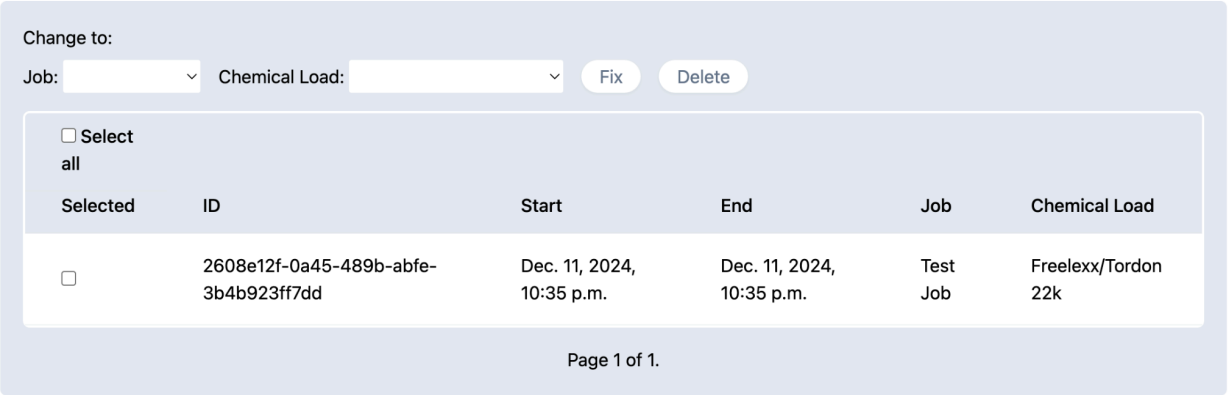
You can click on a map section to see information about it.



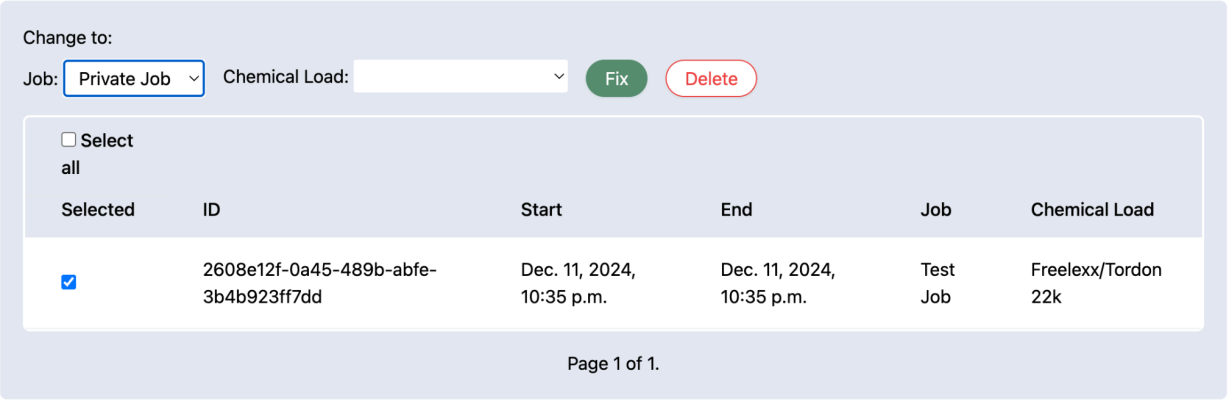
Notice the “Fix” button that you see here and in a few other spots.

Your group administrators are empowered to be able to correct some mistakes made by sprayers. If the wrong job or chemical load is picked and not noticed until after spraying has been done, an administrator is able to bulk correct these mistakes using tools within the reporting interface. No adjustments after spraying can be made to the GPS coordinates and path taken while spraying or the switch configuration that determines the area sprayed.

If we click the “Fix” button we get a page with only that spray section and changes we can make.

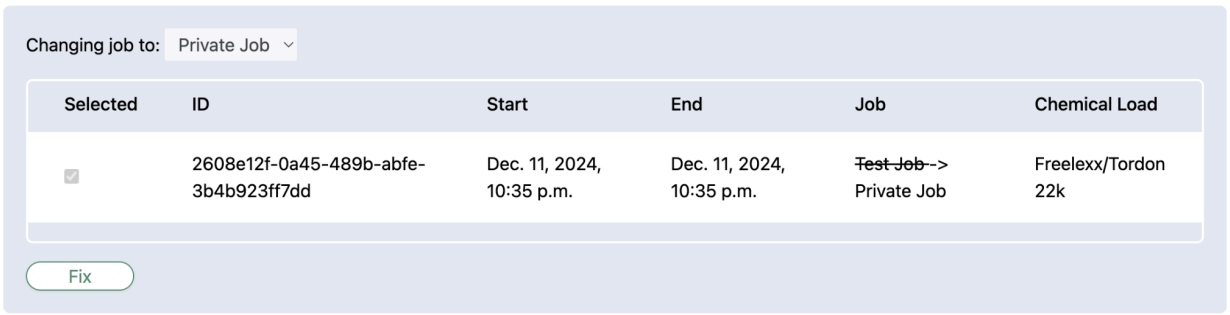


Click the checkbox next to the item, along with the changes to make. In this case, I’ll change the Job by selecting a different job and then click the Fix button.



You’ll go to a Confirmation page where it shows the change that you are making. The changes have not been made yet.

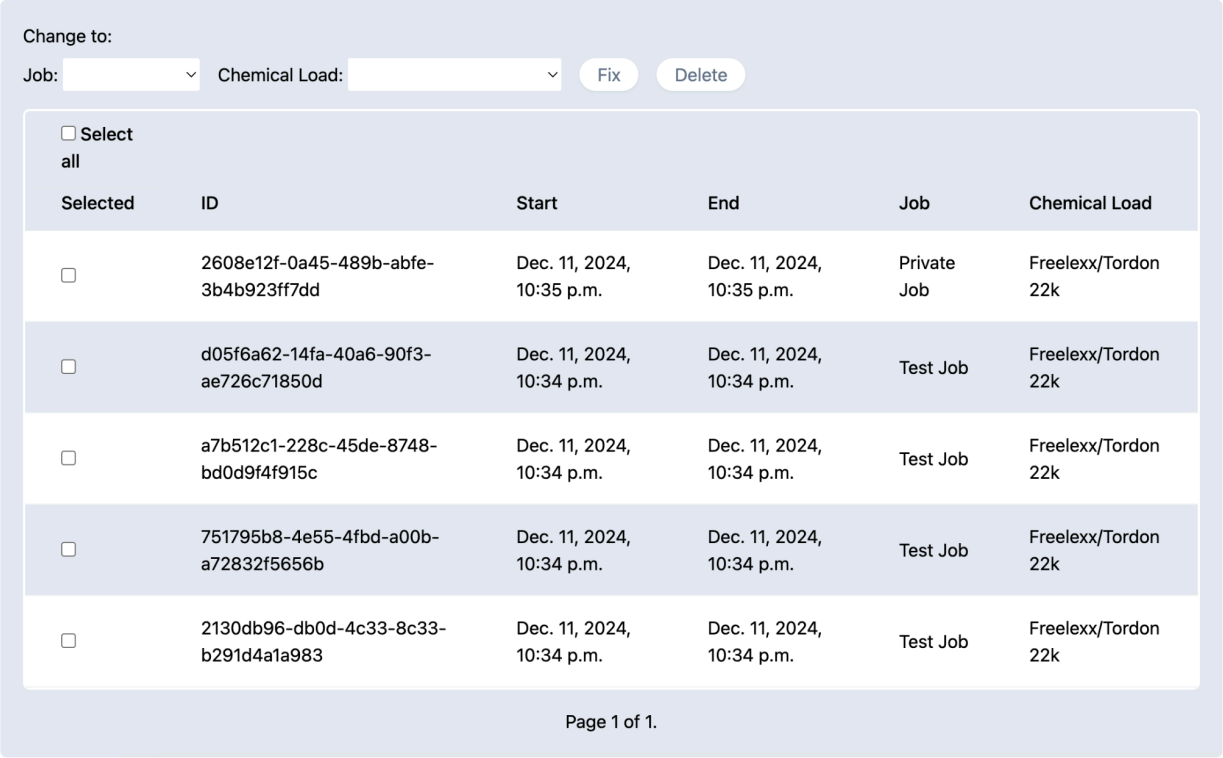
Fix Confirm



Click the “Fix” button and the changes are applied.

You’ll get a similar interface if you click the “Fix” button from the main Dashboard page.

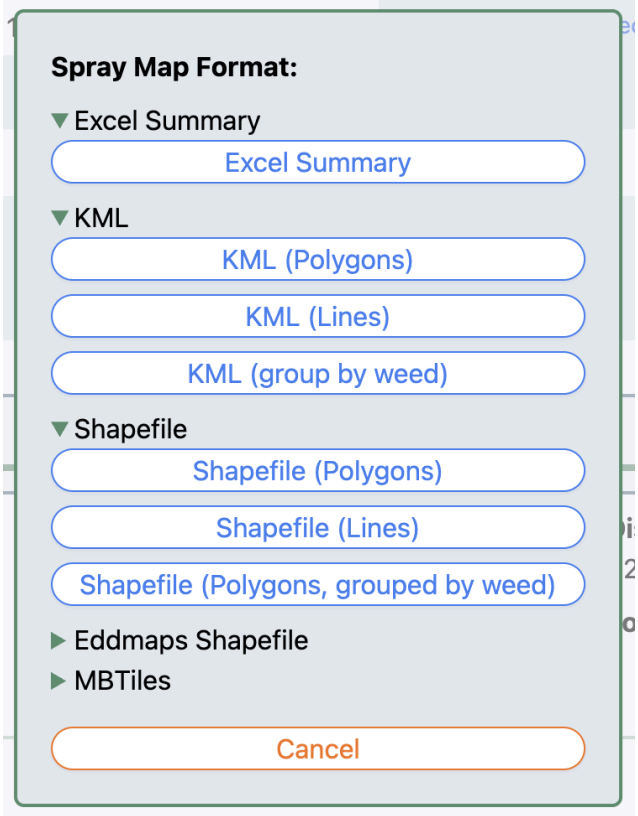
But with this Fix you get an interface to select multiple spray sections.



Here you can select some or all and fix them in bulk.

Let’s go through the Spray Export options by clicking the “Export” button.

The Export popup has a lot of options.



We've talked about the "Excel Summary" export option already. You can see a KML section and a Shapefile section. Those are both the most popular GIS data formats.

"KML (Polygons)" will export your spraying as it exists, without any modification of the shapes. Your boom spraying will be polygons, your line spraying will be lines, your point spraying will be points.

"KML (Lines)" will convert all of your Polygons to Lines. This is useful in situations where maybe you just want to see coverage, where you were driving while spraying, not caring about specifically which boom sections you had on.

"KML (group by weed)" is the same as "KML (polygons)" but every weed will be a separate layer. Let's say you were boom spraying, and you had multiple Weed buttons pressed, Canada Thistle and Leafy Spurge. In this map, the same area you sprayed would show up in two separate layers. This is a great export option when analyzing where weeds are present for planning your weed control strategy.

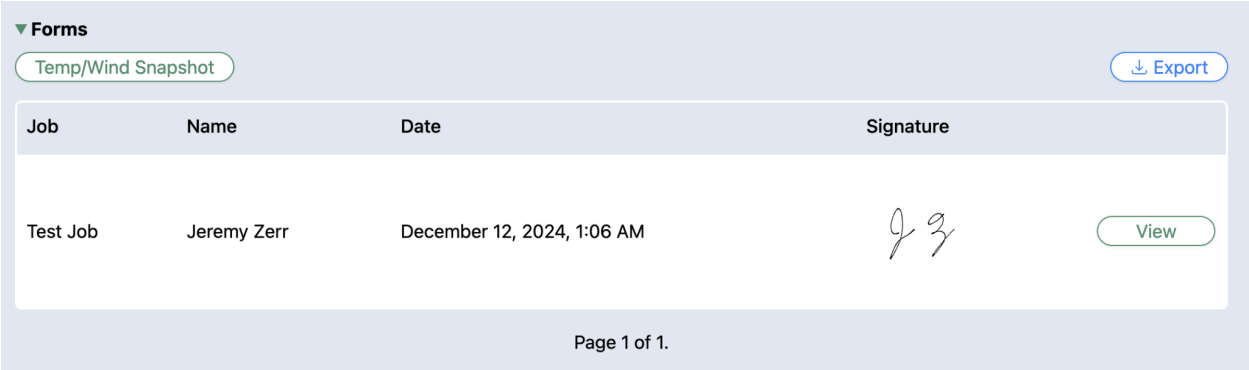
KML is a great format because you can use a free program, Google Earth, to view them.

Shapefile has the same three options that KML has, just is a different file format that might be preferred depending on what tools you have available. Shapefile can be viewed in one of the

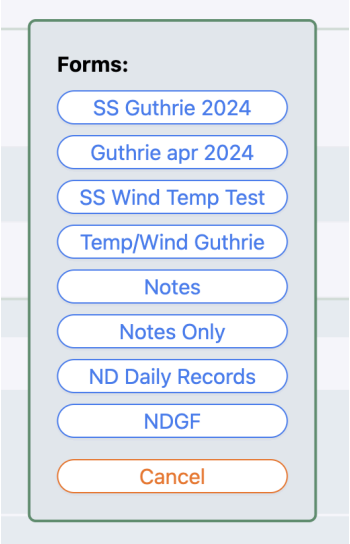
most popular GIS tools, ArcGIS, but also can be viewed by a tool QGIS that is free. Those tools are a lot harder to use because they are also more powerful. A KML file with Google Earth is a quicker way to see your spraying in a system outside of SpraySync, and could be a good archival format.

The other two options are Eddmaps Shapefile and MBTiles. Those are options not commonly used. If you have a format you would like to use, typically a KML or Shapefile can be converted to other formats using freely available tools.

The bottom section of the Dashboard page show your forms.

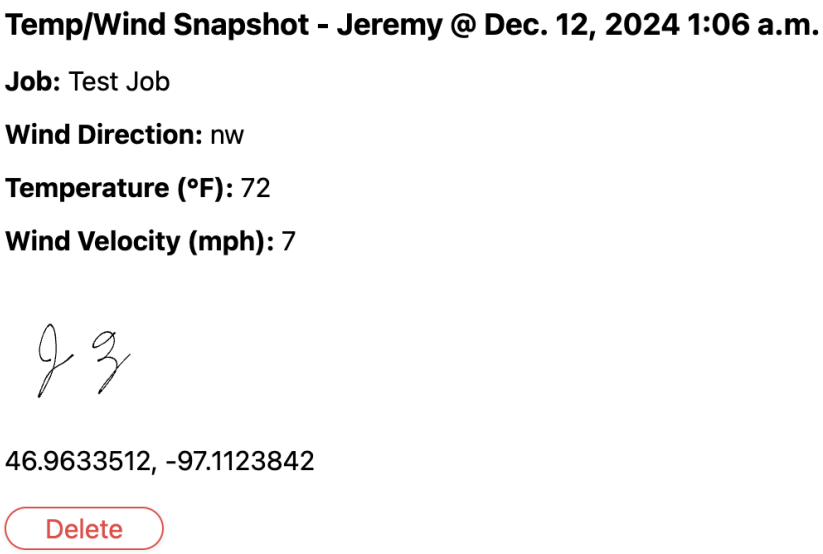


If you have multiple forms configured, you can switch between them using the button right underneath the “Forms” section label. If you click that, you will get a popup. The forms list you can only see one form type at a time.



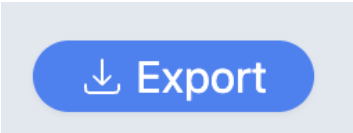
If you click the “View” button you see the form details.

The form details consist of whatever form fields you have configured:

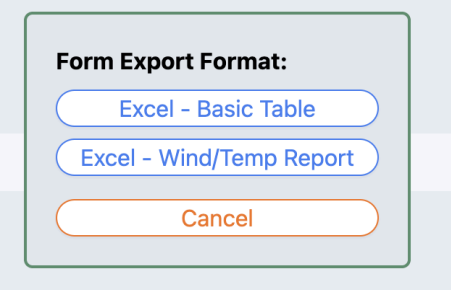


You can click on the latitude and longitude coordinates and that will open a Google Map pin at that location.

Back in the Forms section you can click “Export”:



You will get a popup:



There is an Excel - Basic Table that is a raw dump of the columns. That output will look like:

	A	B	C	D	E	F	G	H	I	J
1	User	License Num	Job	Latitude/Longitude	Submitted Time	mperature (F	ind Direction	Velocity (r	Notes	Confirmation Signature
2	Jeremy Zerr	123456-78	Test Job	46.9633512, -97.1123842	December 12, 2024, 1:06 AM	72	nw	7	N/A	
3										

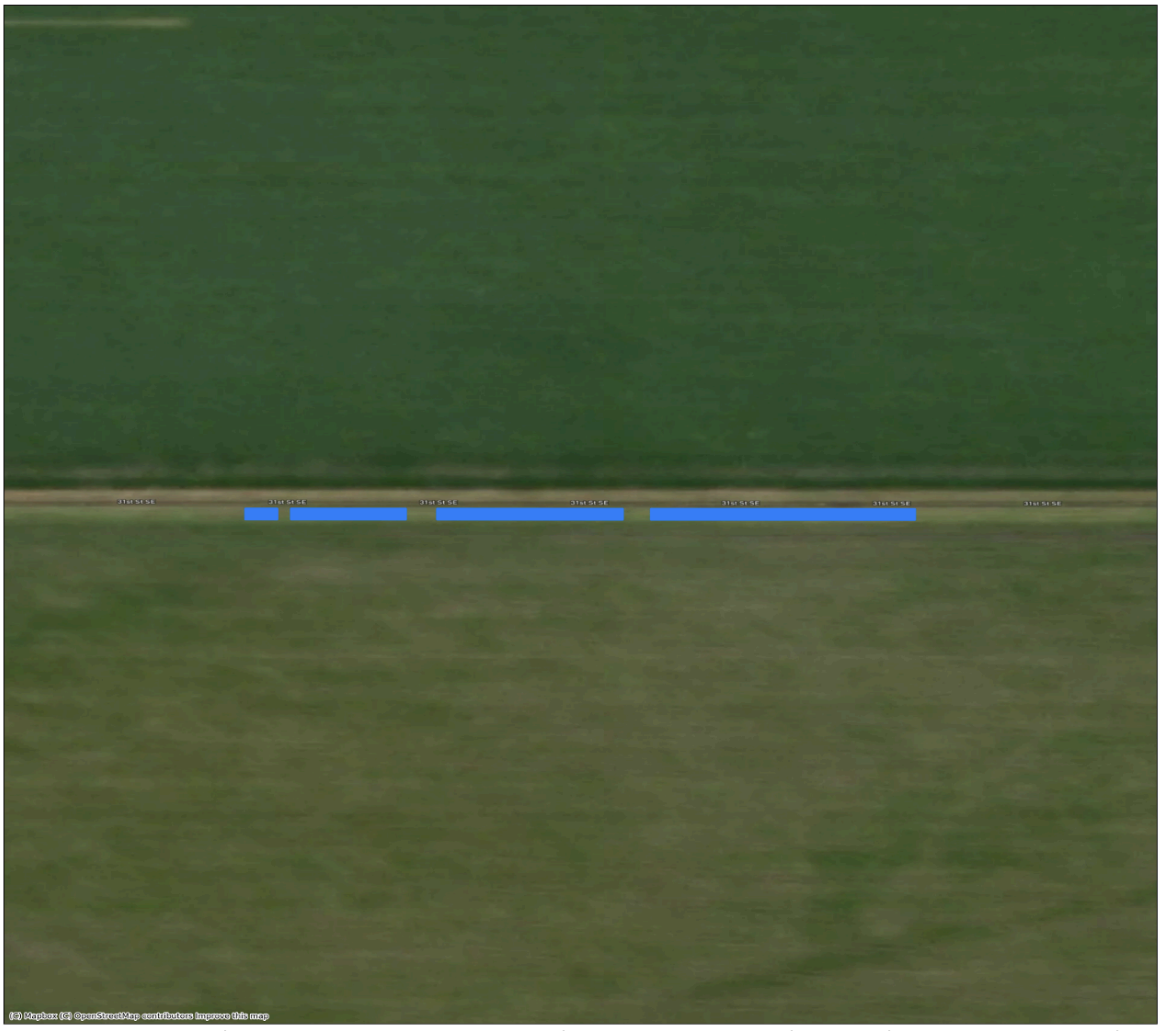
The “Excel - Wind/Temp Report” is a more formatted report designed to replace a typical daily report.

	A	B	C	D	E	F	G
1	**Date Range:**	December 12, 2024, 12:00 AM - December 12, 2024, 11:59 PM					
2							
3	**Applicator Information:**						
4	**User**	**License Number**					
5	Jeremy Zerr	123456-78					
6							
7							
8	**Group Information:**						
9	**Name**	**Address**	**City**	**State**	**Zip**		
10	SpraySync	1116 S Vista Ave #103	Boise	ID	83705		
11							
12	**Job Information:**						
13	**Job Name**	**Job Description**					
14	Test Job	Just a test					
15							
16	**Record Reporting:**						
17	**Log Time**	**Temperature (°F)**	**Wind Direction**	**Wind Velocity (mph)**	**Latitude/Longitude**	**Notes**	**Confirmation Signature**
18	December 12, 2024, 1:06 AM	72	nw	7	46.9633512, -97.1123842	N/A	
19							
20	**Vehicles Used:**						
21	**Vehicle Name**						
22	Raven SCS 4400						
23							
24							
25	**Applied Chemical Information:**						
26	**Chemical**	**Supplier**	**EPA Number**	**Chemical Applied (oz)**	**Acres Applied**		
27	Freelexx	Nutrien	123789	3.65	0.30		
28	Tordon 22k	Wilbur-Ellis	456789	6.68	0.30		

30				
31	**Chemical Loads:**			
32	**Chemical Load Name**	**Total Mix Flow Rate (oz/acre)**	**Total Acres Applied**	**Total Mix Applied (gal)**
33	Freelexx/Tordon 22k	1280.0	0.30	3.038
34	**Chemical**	**Supplier**	**EPA Number**	**Flow Rate (oz/acre)**
35	Freelexx	Nutrien	123789	12
36	Tordon 22k	Wilbur-Ellis	456789	22
37				

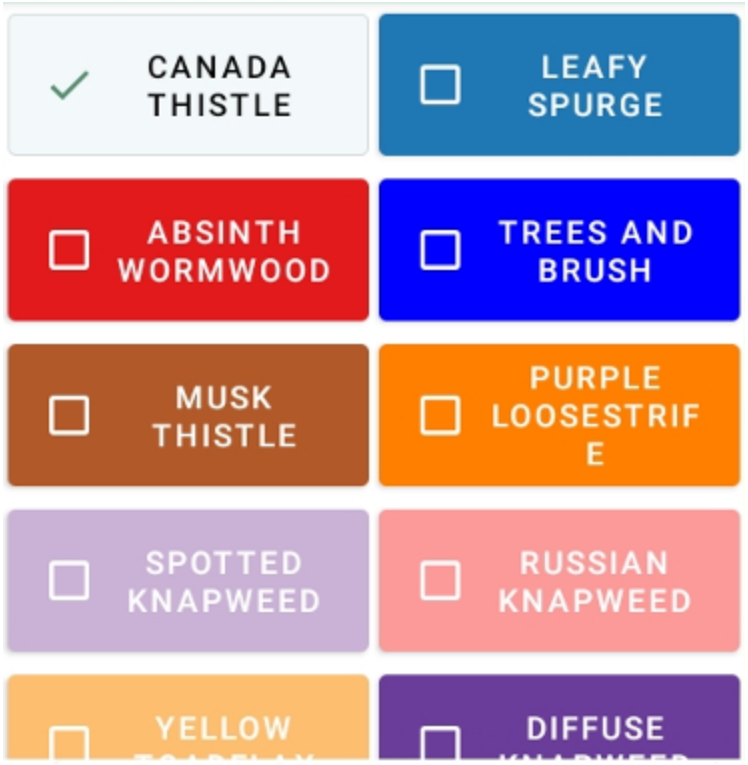
It will also include a map image embedded in the Excel sheet.

39 **Spray Report Map:**



14. Noxious Weed Tracking

You have the option of adding in different weeds and using a single tap of a button to track what weeds you are spraying. This minimizes distractions and keeps your eyes up for driving.

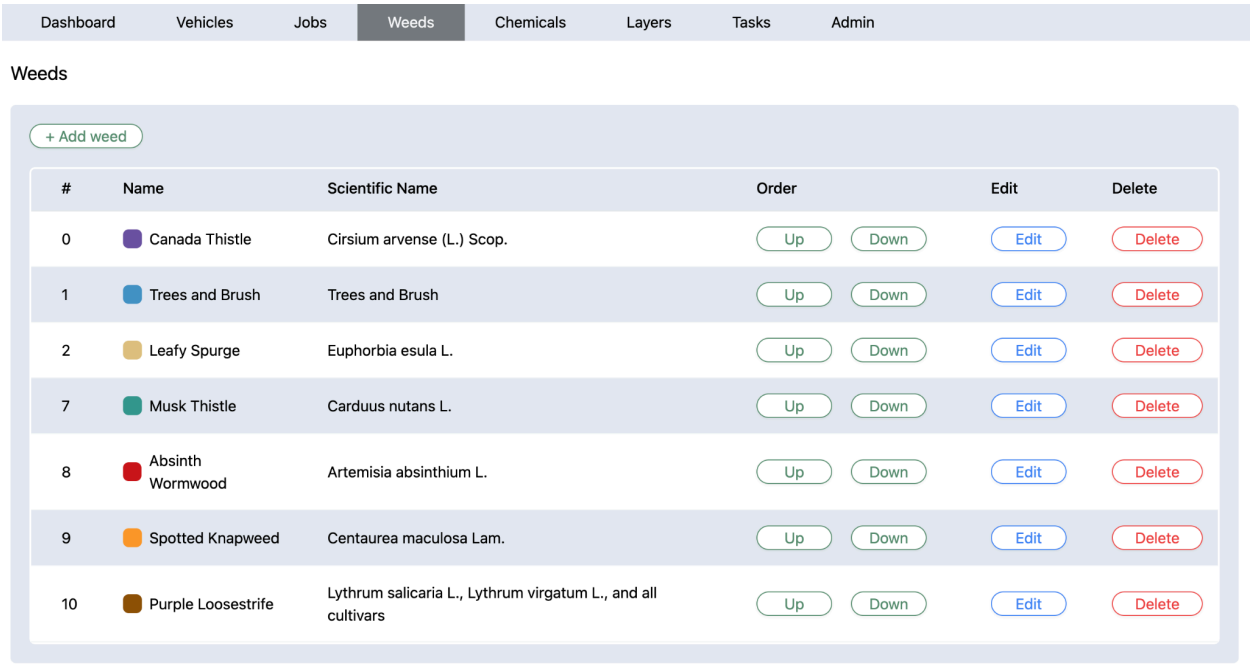


The weeds tracking is optional. The system defaults to always having one selected, but you can make those weeds labels for anything you want. You can choose the color and the order of how they display, and those are all part of the data that is synchronized with your group, so everybody, no matter what tablet or vehicle they jump into, will have a consistent view of the buttons, names and colors, which helps with training, reduces errors, and simplifies the job a sprayer has to do.

You can also track multiple weeds at one time, for example in an area where you see multiple types of weeds, you can just push down a second weed button and they both stay active and stored alongside your spraying.

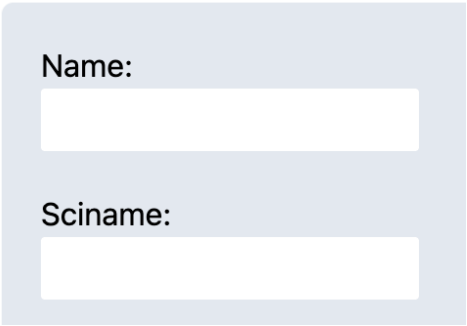
The weeds tracked show up in your downloads, whether it is your KML/Shapefile that represents your spray sections, or the Excel download that is for your spray logs.

The Weeds are defined within the web application to have a name and their scientific name. Here is the Weeds tab in the web application.

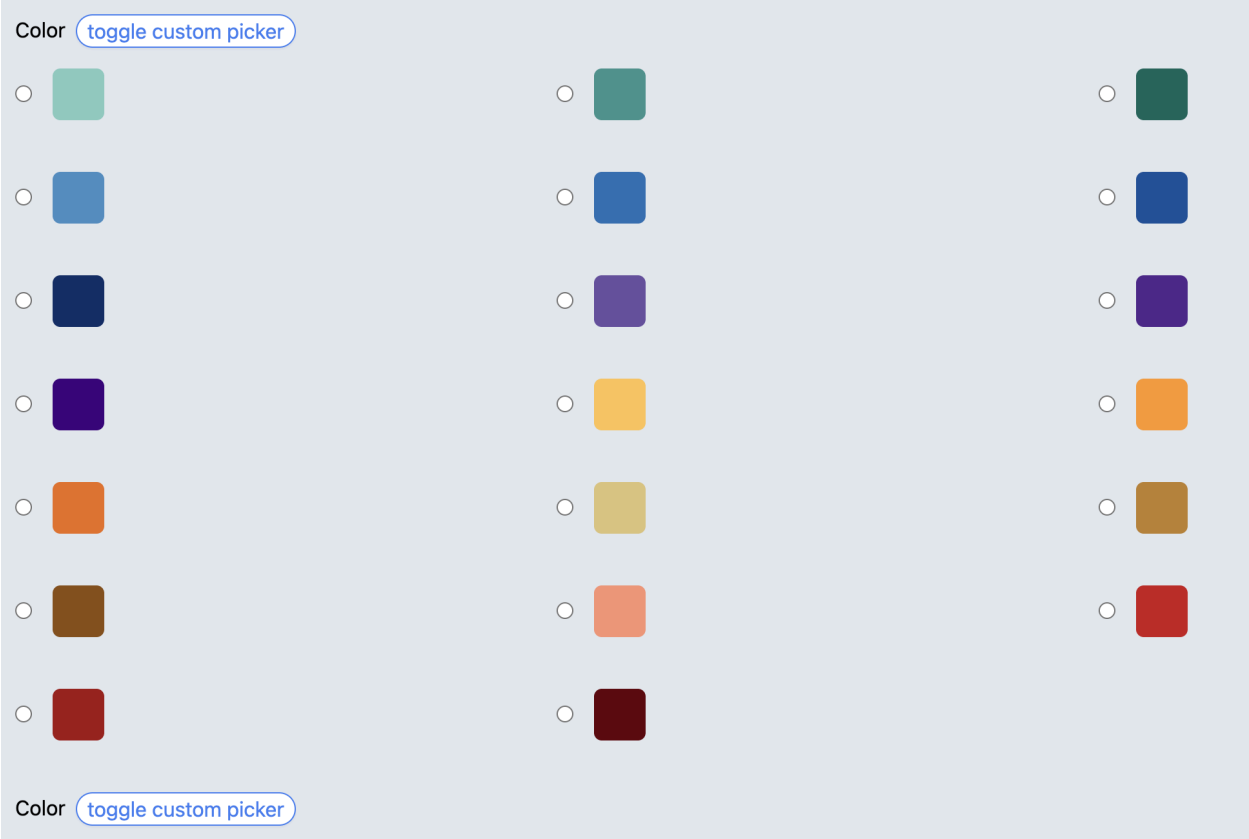


You can add a new weed with “+ Add Weed”.

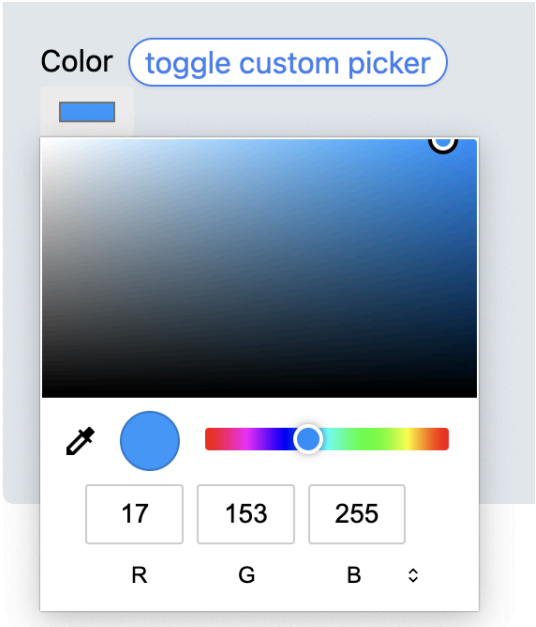
You add a name and scientific name. Scientific name is required, because some reporting requirements needed the scientific name, but if you don’t need it just put N/A or something similar. The “Name” field is what shows up within the app for the button names.



Pick the Color using a few prepared options:



Or click the “Toggle custom picker” to pick a different color. That will collapse down, then you can click on the color swatch and get a popup:



Order is a number that defines what order the buttons show up in the app. This allows everybody on your team, no matter what tablet, to have the same color and same order of display of the buttons. Consistency is important to make it as easy as possible for applicators.

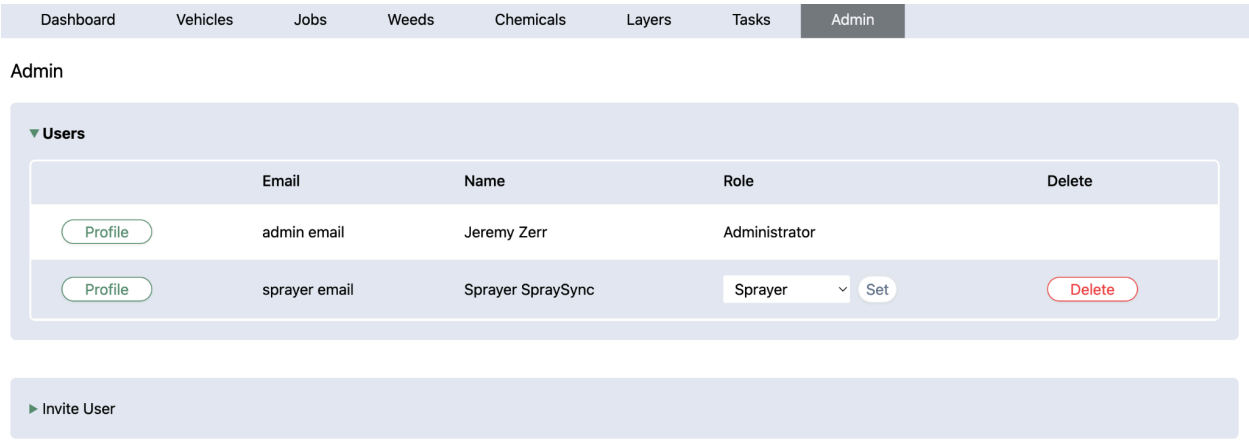
After clicking the “Create” button, you’ll find it’s easier to order the buttons on that screen using the Up and Down arrow buttons.

You can also Edit or Delete the weed using the provided Edit and Delete buttons. You can always edit color or name, the next time the tablet does a sync it will get the new colors.

If you Delete, the button will no longer show in the app, but it doesn’t remove any data. Any spraying done associated with that Weed will still remain. We are very careful to never allow something to get Deleted that was already used in a record. So the “Delete” is not a hard delete, it’s more of an “Archive” or a soft delete.

15. User Roles

You can invite other users to your SpraySync Group/account. You can see all of the users that are in your Group, and their roles, on the Admin tab within the web application.



I've replaced the emails with placeholders for privacy reasons.

Next to the "Sprayer SpraySync" user, you can see the role is Sprayer. The SpraySync roles:

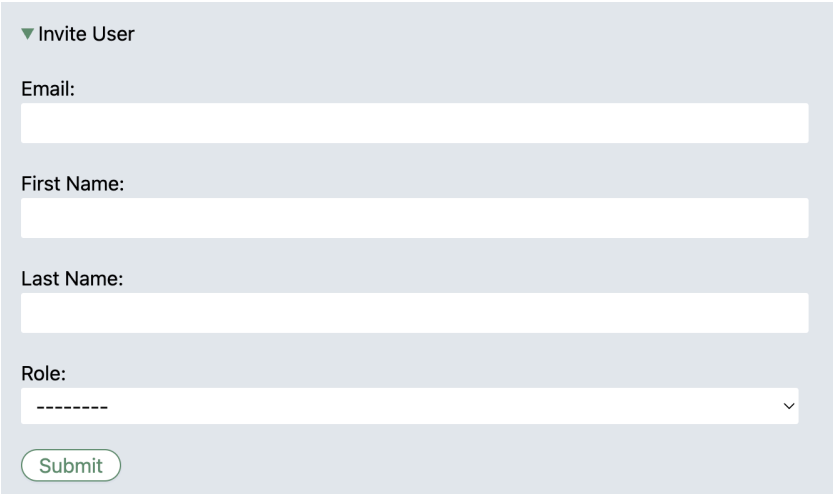
- Administrator
- Sprayer
- Reporter

An Administrator can do everything.

A Sprayer can do everything an Administrator can do except they cannot invite other users. They have access to all Jobs.

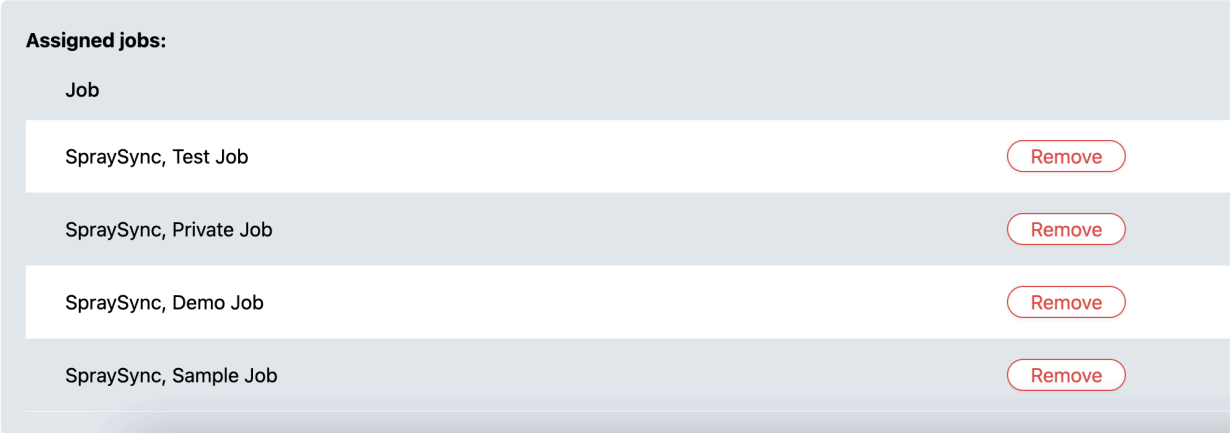
A Reporter can only login and see the "Dashboard" tab and run reports and export them. Basically anything that can be done on the Dashboard tab, a Reporter can do. A Reporter cannot Fix a spray section though. Reports also don't get default access to all Jobs. You grant them access to a Job on a Job by Job basis.

To invite a user you click the "Invite User" section:



After you click "Submit" that user will get an email that includes a link to set a password so they can then log in and access the website.

When you invite a Reporter, you can select the Jobs then. For a reporter, you can see the Jobs they have access to at any time by clicking on the "Profile" button next to their name. At the bottom there is an "Assigned jobs:" section:



You can remove Job access there.

If you want to give someone with a Sprayer role access to a Job, go to the Jobs page and click the Edit button for the Job. At the bottom of the page there is a “Reporters not assigned to job:” section.

After you click the “Add to job” button the user will show up in the section on the page that says “Job Users:”:

You have an unlimited number of users that you can add to your Group account.

16. Multiple Group Access

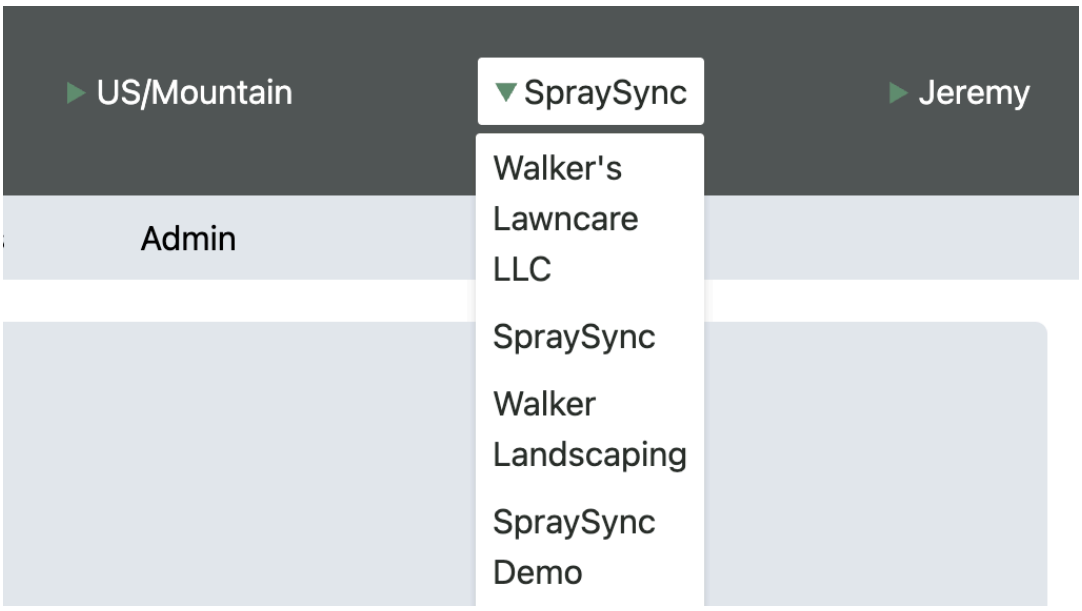
We have the concept of a Group, something you would give a name to your Organization, or your company name, or government entity.

As an example, a contractor who has 3 employees would have a group that represents their company, and the owner and each employee would have a user account underneath that group.

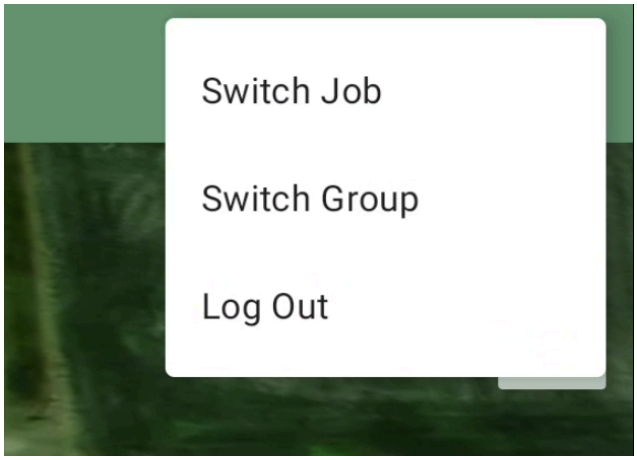
One of the main reasons for the Group system is to be able to grant access to your data to other people like customers or state/county reporting or data analysts. For example, a county contracts out some spraying, but also does some of their own spraying. They would have their own group to represent their county and any employees of the county, but then they could also be invited to access the data on a particular Job by their contractors in their contractors group. The groups are separate, but the user account can access data from both groups if desired.

An individual user can belong to multiple groups. That user can also have different roles within each of the groups. In the example above of the county who contracts but also sprays themselves, they would have an administrator role in the county's group, but have a reporter role in the contractor's group for the one particular job.

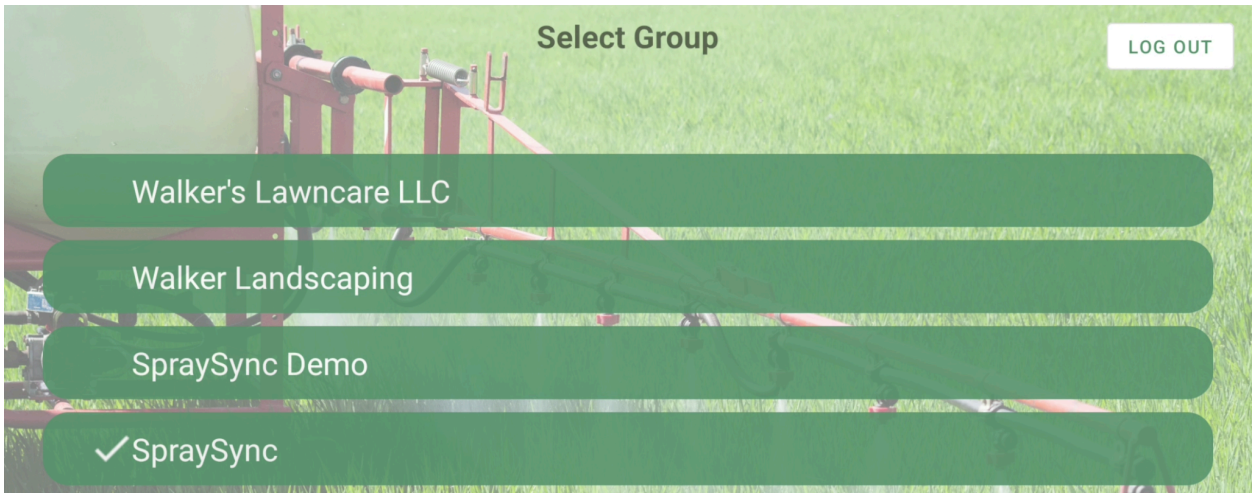
Multiple groups can be managed from the top right hand corner of the web dashboard. If you have multiple groups, that will show up and it will expand:



If you have multiple groups, within the tablet app you will have a new option when you click the three dots in the upper right corner and it's called "Switch Group".



The Group Selection page shows up:

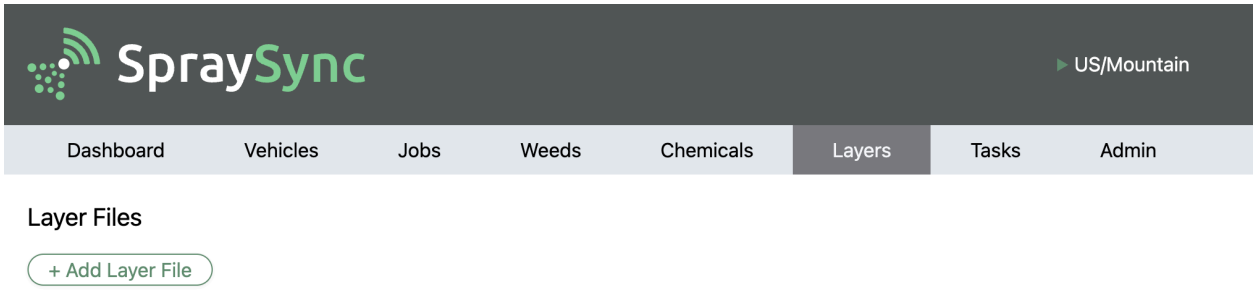


And when you select a Group, the next screen is the Job Selection screen, only for Jobs that are within that group.

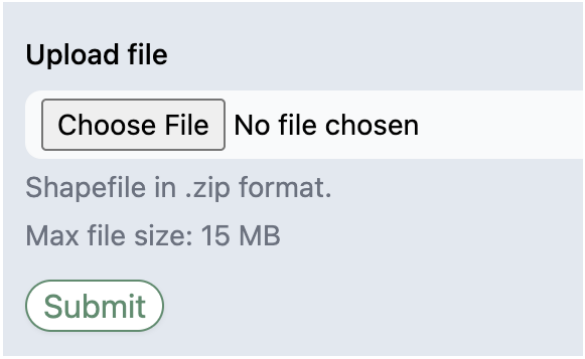
17. Layers - Bring Your Own Data

An optional feature within SpraySync is the ability to upload your own maps and have them display while spraying.

Within the web dashboard, if the feature is enabled, you will see a Layers tab.

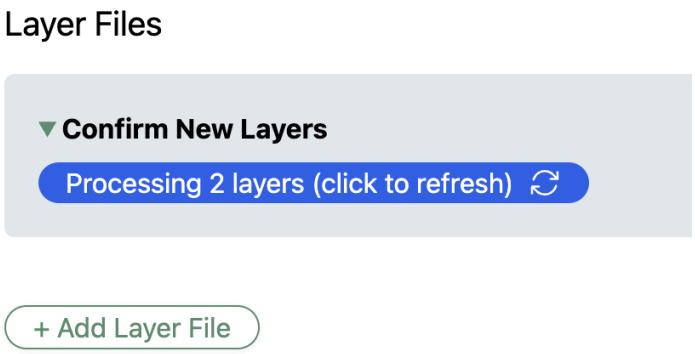


You can click the button to “+ Add Layer File”. This will prompt you to upload a Shapefile file that can contain polygons, lines, or points.



If your file is too big and exceeds limits or results in errors, we can work to get it uploaded.

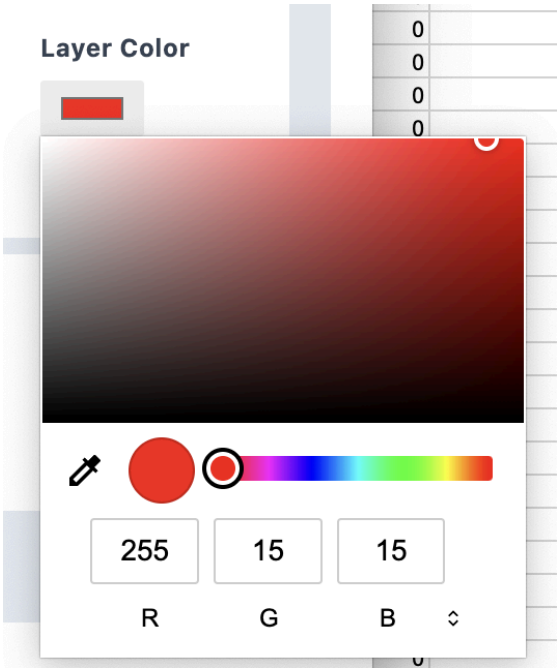
After you choose a file and click “Submit”, it may take a while to process. Here is the screen you may need to wait at for a while.



If you click the button to refresh, or just refresh the entire web browser, eventually it will be done. In the example file I uploaded, there are two separate data layers and those will both show up separately.

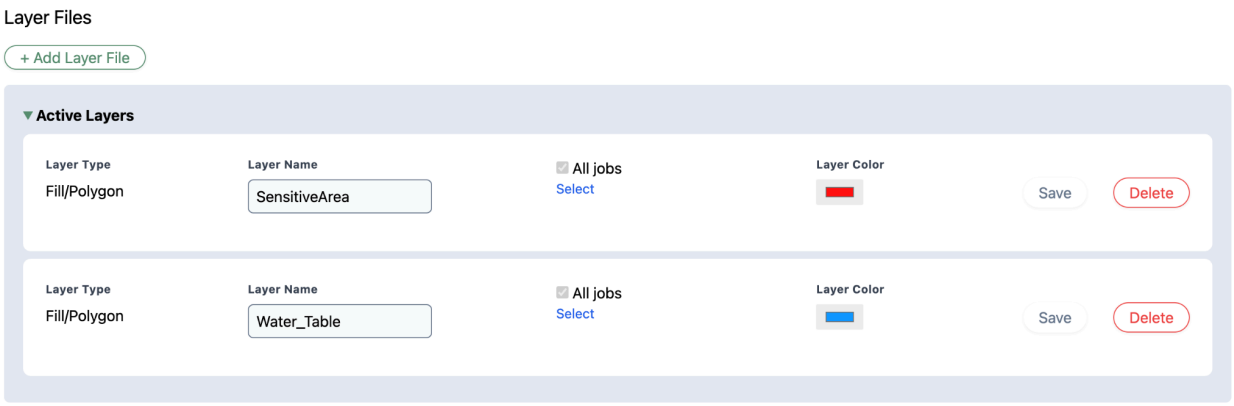
You can choose to include or exclude specific layers. You can rename them. You can choose which Jobs they should be displayed on. You can choose their color.

In this example, the “SensitiveArea” layer is a No Spray Map, so let’s color it red. I can click the color swatch underneath the “Layer Color” column.

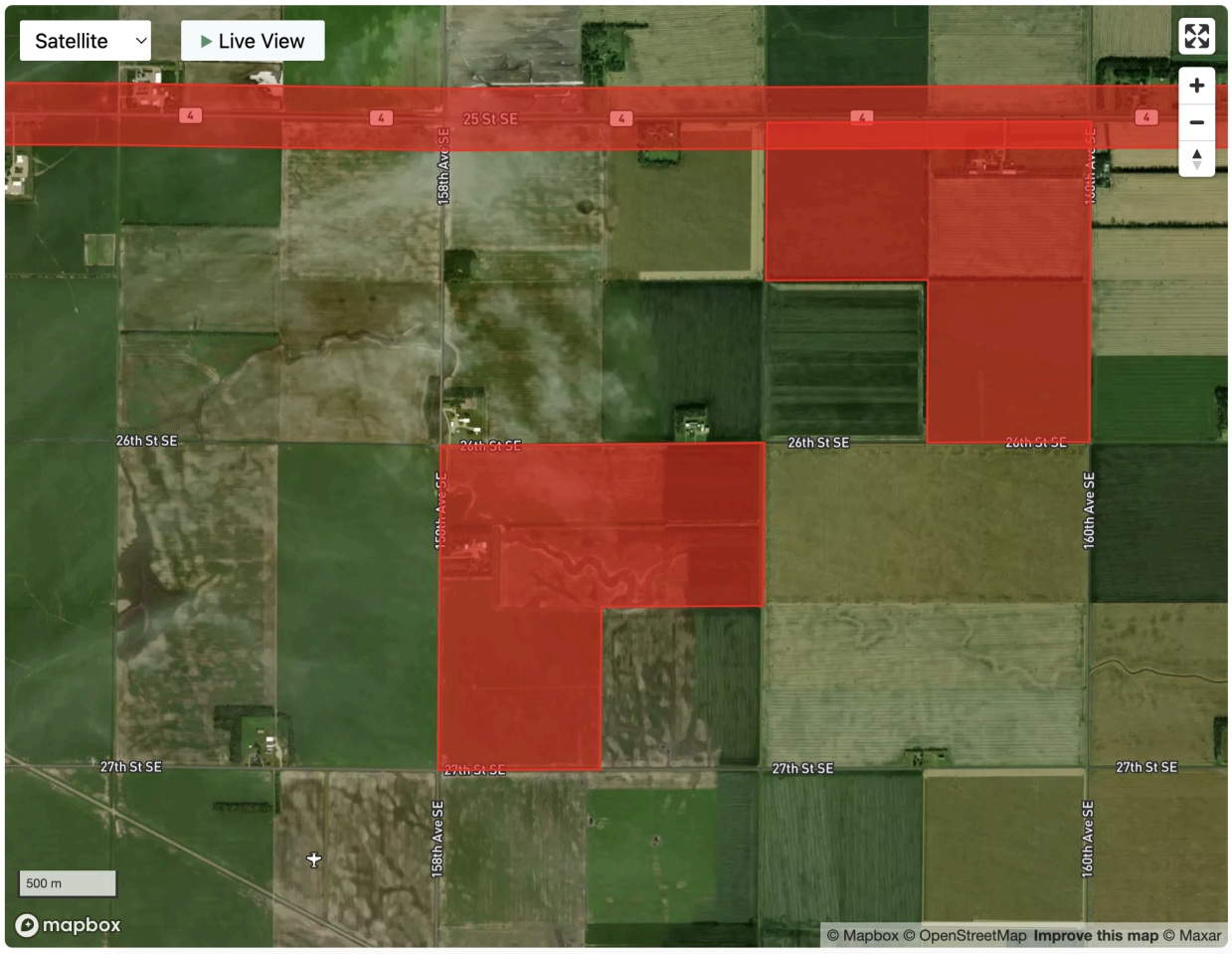


Then I’ll go ahead and click “Confirm”.

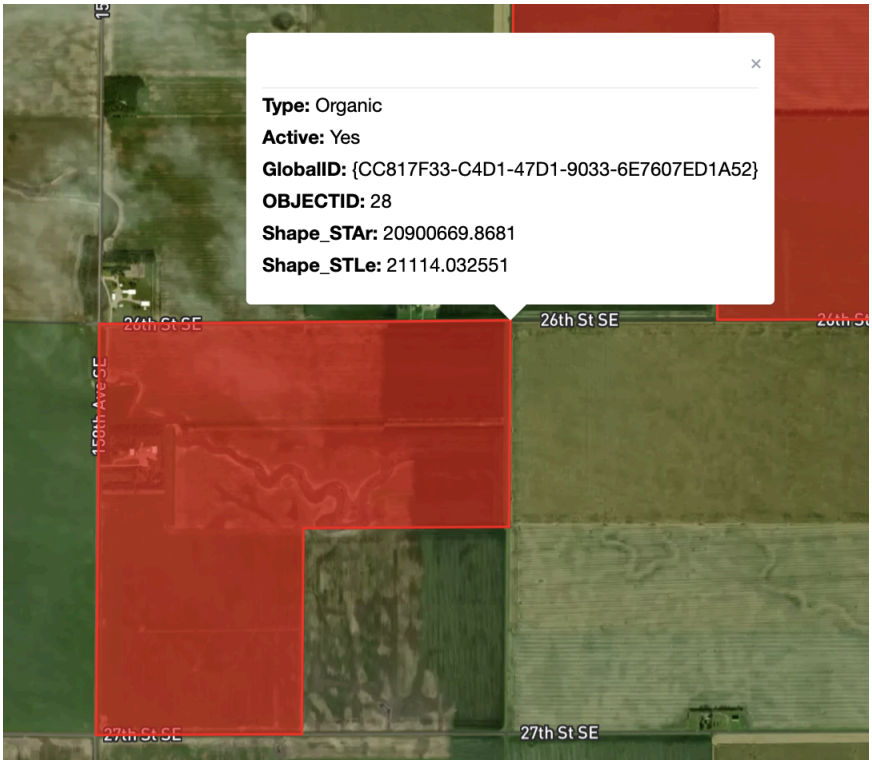
Both layers now go into an “Active Layers” section.



Now I can go on the web application and view the “Map” and I can see these layers in red.

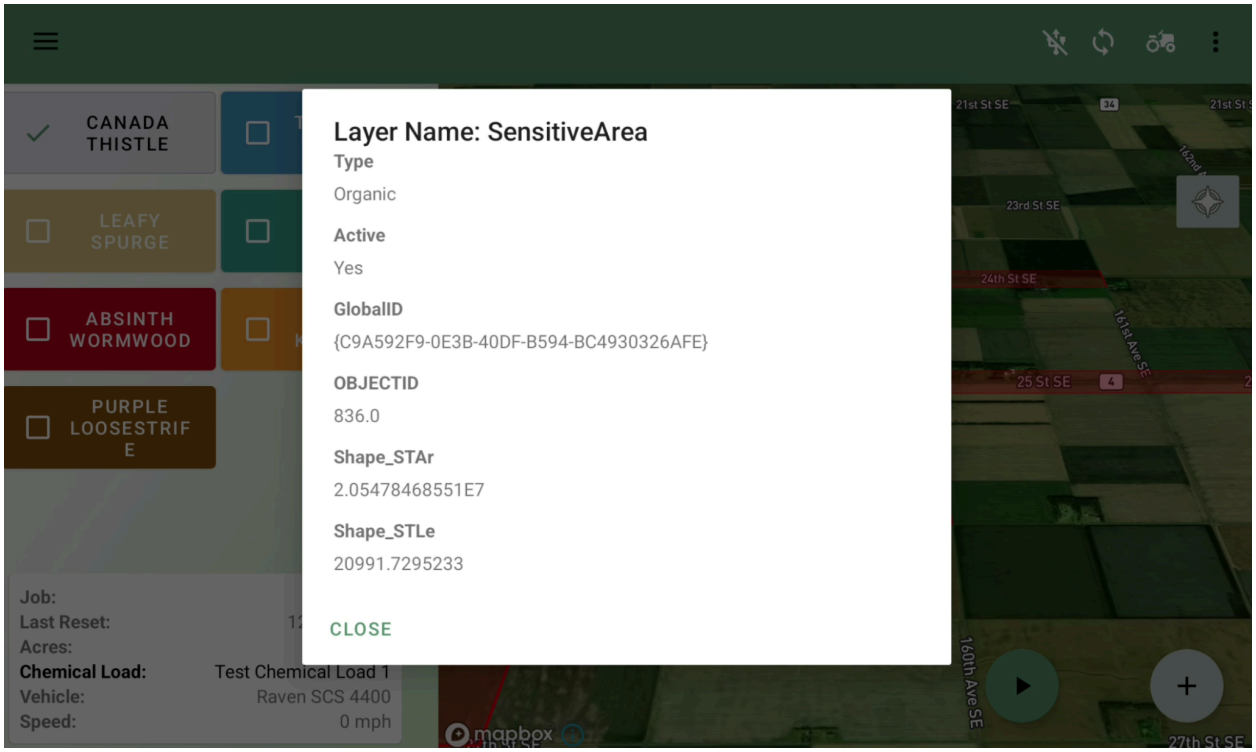


If you click on the layer, you can see the data that was embedded within the Shapefile for that particular polygon.



The same thing will be available on the tablet app.

You can also tap on those polygons and see the data.



If you want to remove these Layers so they don't show up any more, you can Delete them. They will be permanently deleted. There's no replace option, so if you have a new version of a layer, you will delete the old one and add the new one.

18. Data Management

Data stored in the cloud in databases is encrypted at rest and in transit. All access to the cloud services and web applications are through the https protocol, encrypted in transit. All data stored in the tablet for the mobile app to track offline is only accessible to the application itself by design and Android OS restrictions.

The reporting download feature allows backups of spraying and logs to be taken by the user. Your spray data and records are kept indefinitely without expiration.

19. Versioning

[1.0] - Initial User Guide

[2.0] - Updating features and supported sprayer units
[3.0] - Updating for 2022 latest screenshots
[4.0] - Hardware updates and details, wiring diagrams, and new tank level log feature
[August 2023] - Updated some screenshots.
[April 2024] - Updated some screenshots.
[December 2024] - Added features including Job enable/disable, Vehicle GPS offsets, Layers, updated misc screenshots.