

# Animal Disease Spread Model

## ADSM Administration



# Table of Contents

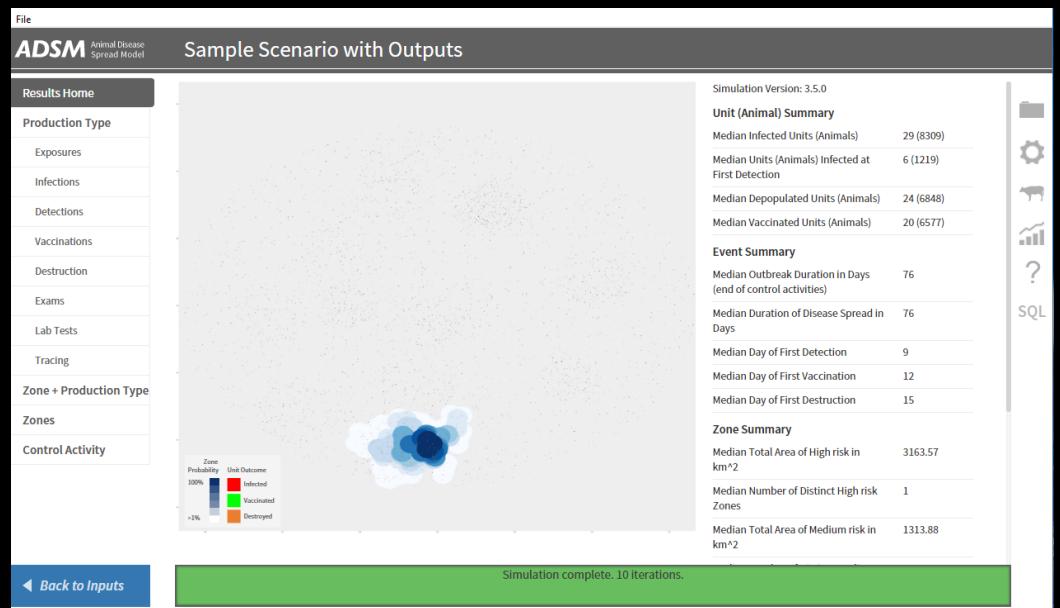
ADSM Administration

ADSM Workspace

Administrative Panel

Importing from NAADSM

What's Next?



# Document Conventions

The following conventions are used throughout the training modules:

Other **TRAINING MODULES** in this series will be referred to using all capital letters, bold face, italics, and underline.

*Rhetorical questions* and *extra notes* will be in orange italics.

Conventions applying to the ADSM application are:

Navigation tabs on right and Admin panels on left are designated with an underline. Examples are Project Panel or Population tab.

Items with an action on click, such as [Apply] Button or [Save As] icon are enclosed in square brackets.

*Parameter fields* (inputs) are in blue italics and *Variables* (outputs) are in green italics.

Navigation Tabs > *Parameter field* indicates to go to the given navigation tab to find the given field.

Hyperlinks appear in bright green type with underline <http://navadmc.github.io/ADSM/>

# ADSM Administration



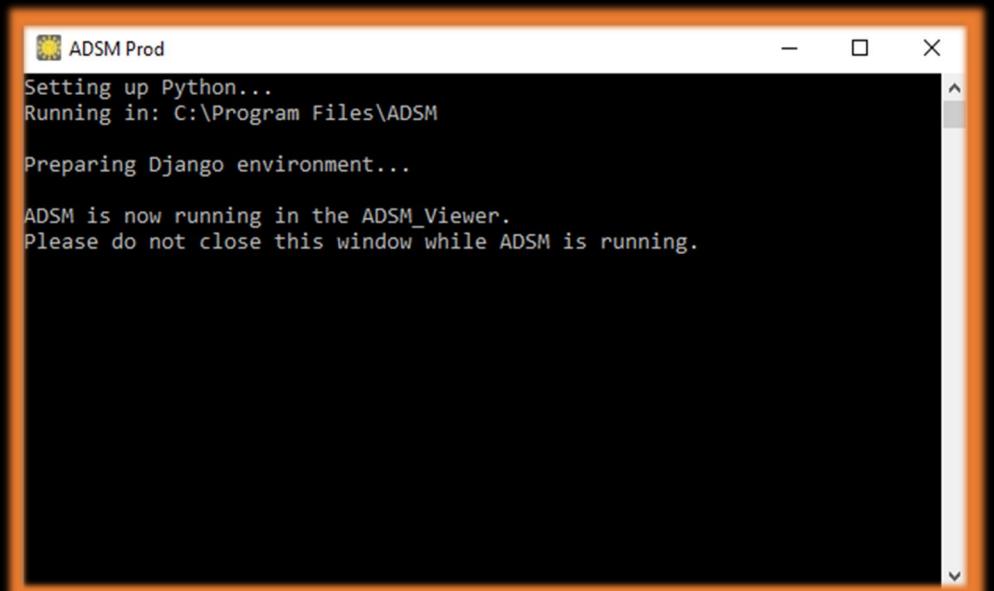
There are several administrative actions that can modify the ADSM application. Some of this functionality is visible in the application. Other features are behind the scenes in supporting ADSM processes.

These actions can be useful as you become more familiar with ADSM.



A command window will be opened in a separate tab when ADSM is open.

The command window gives a real-time update of the system status. Don't close the window while ADSM is running, as it will close the scenario. Minimize the command window if needed.

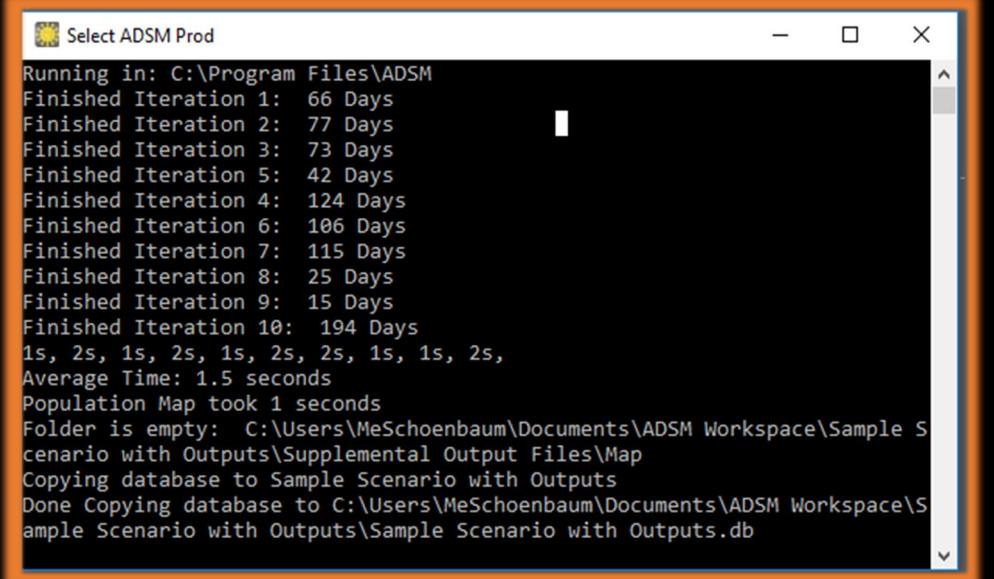


ADSM Prod

```
Setting up Python...
Running in: C:\Program Files\ADSM

Preparing Django environment...

ADSM is now running in the ADSM_Viewer.
Please do not close this window while ADSM is running.
```



Select ADSM Prod

```
Running in: C:\Program Files\ADSM
Finished Iteration 1: 66 Days
Finished Iteration 2: 77 Days
Finished Iteration 3: 73 Days
Finished Iteration 5: 42 Days
Finished Iteration 4: 124 Days
Finished Iteration 6: 106 Days
Finished Iteration 7: 115 Days
Finished Iteration 8: 25 Days
Finished Iteration 9: 15 Days
Finished Iteration 10: 194 Days
1s, 2s, 1s, 2s, 1s, 2s, 1s, 1s, 2s,
Average Time: 1.5 seconds
Population Map took 1 seconds
Folder is empty: C:\Users\MeSchoenbaum\Documents\ADSM Workspace\Sample Scenario with Outputs\Supplemental Output Files\Map
Copying database to Sample Scenario with Outputs
Done Copying database to C:\Users\MeSchoenbaum\Documents\ADSM Workspace\Sample Scenario with Outputs\Sample Scenario with Outputs.db
```

Scenario Description
Population
Disease
Disease Progression
Assign Progression
<b>Disease Spread</b>
Review Disease Spread
Controls <span style="background-color: #90EE90; border: 1px solid #90EE90; padding: 2px;">on</span>
Control Protocol
Vaccination Triggers
Vaccination Rings
Vaccination Global
Destruction Global
Assign Protocols
Zones
<b>Validate Scenario ►</b>

### Create Disease Spreads

**Direct Spread**

- Cattle > Cattle + X
- Swine > Swine + X
- + New Direct Spread

**Indirect Spread**

- Cattle > Cattle + X
- Cattle > Swine + X
- Swine > Cattle + X
- Swine > Swine + X
- + New Indirect Spread

**Airborne Spread**

- Cattle source + X
- Swine source + X
- + New Airborne Spread

**Name\***  
Cattle > Cattle

Subclinical units can infect others  
Indicates if Subclinical units of the source type can spread disease.

Use fixed contact rate  
Use a fixed contact rate or model contact rate as a mean distribution.

**Contact rate\***  
0.3

Mean baseline contact rate (in outgoing contacts/unit/day)

**Infection probability\***  
0.05

example: 0.37 = 37%

The probability that a contact will result in disease transmission.

**Distance distribution\***  
Indirect contact distance

Defines the shipment distances for direct or indirect contact models.

**Movement control\***  
Unrestricted movement

To manage the possibility of closing without saving, ADSM requires an [Apply] at the end of every Navigation tab when changes have been made. Apply is on the bottom of every form.

On some screens, the slider becomes red to indicate that a save is needed, especially when the [Apply] button requires a scroll down to see.

A message also appears in the top right of the application as a reminder to save.



## Scenario Description

Population

Disease

Disease Progression

Assign Progression

Disease Spread

Review Disease Spread

Controls on

Control Protocol

Vaccination Triggers

Vaccination Rings

Vaccination Global

Destruction Global

Assign Protocols

Zones

Zone Effects

Assign Effects

Output Settings

view the population

The name of the current scenario

Close this overlay

Edit the different

The ADSM overlay gives a quick glance at the administrative sections to help get you started. The overlay, shown here in blue, will be on the first time you open ADSM. Use the stacked files in the upper right to toggle off this feature.

change the program settings,  
view the population types,  
create and edit functions, and  
find more helpful resources

The overlay can only be turned on while in the Scenario Description tab.

Check and make sure everything is entered correctly and run the simulation



Scenario Description

Population

Disease

Disease Progression

Assign Progression

Disease Spread

Review Disease Spread

Controls on

Control Protocol

Vaccination Triggers

Vaccination Rings

Vaccination Global

Destruction Global

Assign Protocols

Zones

Zone Effects

Assign Effects

Output Settings

Validate Scenario ▶

The parameterization of a scenario happens in the navigation tabs. A scenario breaks down into 3 main components for input into the simulation:

- ⚙️ Population
- ⚙️ Disease Parameters
- ⚙️ Control Parameters

The user inputs parameters into the Disease and Control components to simulate disease spread and control within the Population.

Specific trainings cover each portion of the navigation tabs in greater detail. In this training, we will focus on administrative settings.

Scenario Description

Population

Disease

Disease Progression

Assign Progression

Disease Spread

Review Disease Spread

Controls

on

Control Protocol

Vaccination Triggers

Vaccination Rings

Vaccination Global

Destruction Global

Assign Protocols

Zones

Zone Effects

Assign Effects

Output Settings

Validate Scenario ➤

Depending on the type of question you are trying to answer, you can modify these main components and do comparisons:

⚙ For example, changing the Population and keeping all the other parameters would let you evaluate if the disease and control strategy behaves differently in other geographical areas that might have varying animal densities.

⚙ Another method could be keeping the Population and Disease parameters the same and changing Control parameters to see the effect of a different control strategy on an outbreak.

Working through the parameters that feed into a model provides a useful exercise in understanding all the complexities to consider when preparing an emergency outbreak response plan.

A photograph of two Watusi cattle standing in a grassy field. One cow is dark brown with white spots, and the other is white with brown spots. They are facing each other, with their heads close together. The background is a blurred green landscape.

Error checking and validation are used throughout the application.

Mariposa Ranch Watusi

# ADSM Workspace

---



The ADSM Workspace is the file location that will contain both the scenarios and the results. The user can select this file location. A portable drive (USB flash drive) can be used for the ADSM Workspace file location.

The ADSM Workspace is different than the location of the programming code that runs the application. This file location is selected by the user.

Name	Date modified	Type	Size
Sample_population	8/26/2020 9:37 AM	XML Document	1,959 KB
Population_Grid	8/26/2020 9:37 AM	XML Document	5 KB
TX_FeedlotStart	8/26/2020 9:38 AM	File folder	
Test1	8/26/2020 1:32 PM	File folder	
temp	8/25/2020 2:49 PM	File folder	
settings	8/26/2020 1:33 PM	File folder	
Sample Scenario with Outputs	8/26/2020 1:31 PM	File folder	
Sample Scenario	8/26/2020 1:31 PM	File folder	
Exports	10/23/2020 9:38 AM	File folder	
Example R Code	8/25/2020 9:39 AM	File folder	
Example Database Queries	8/25/2020 9:39 AM	File folder	
Batch5	8/26/2020 1:30 PM	File folder	
Batch4	8/26/2020 1:30 PM	File folder	
Batch3	8/26/2020 1:29 PM	File folder	
Batch2	8/26/2020 1:29 PM	File folder	
Batch1	8/26/2020 1:28 PM	File folder	

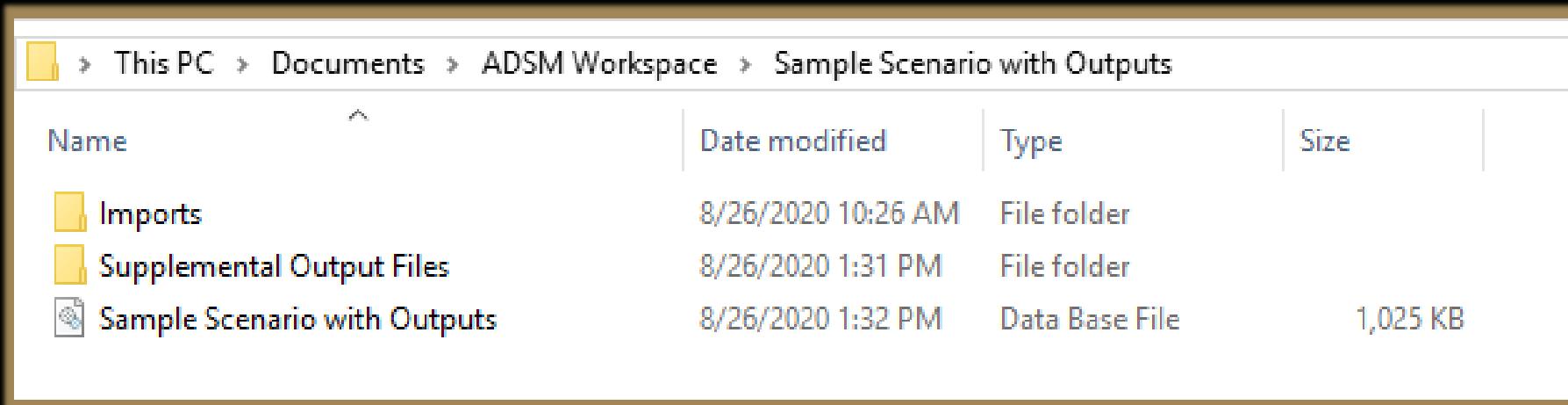
The ADSM Workspace has these folders:

- ⚙️ Individual Scenarios
- ⚙️ Example Database Queries
- ⚙️ Example R code
- ⚙️ Exports
- ⚙️ Settings



Each Scenario folder will contain:

- ⚙ The actual database file for the scenario, as a .db file
- ⚙ Supplemental Output Files
- ⚙ Imports



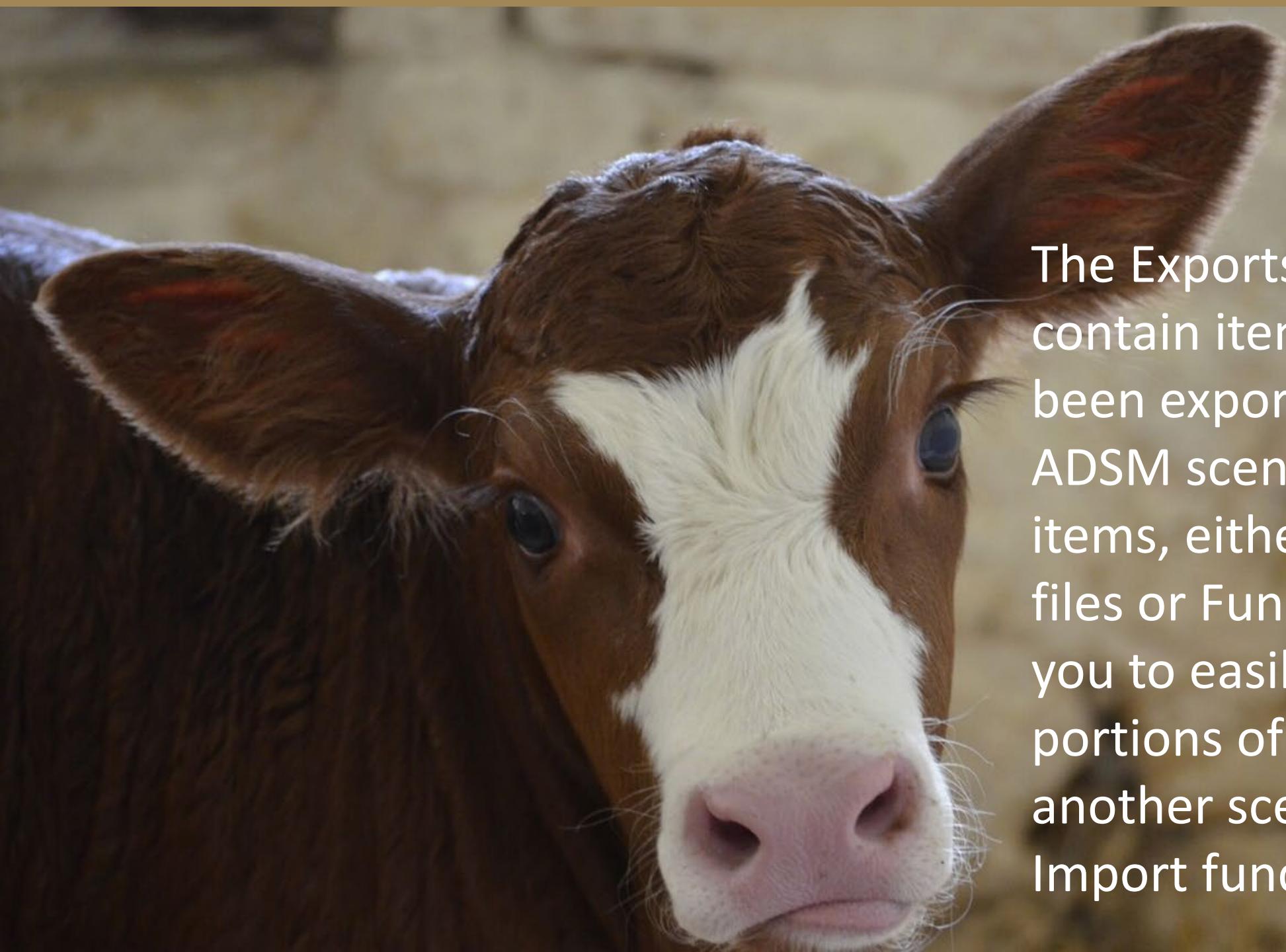
The screenshot shows a Windows File Explorer window with the following details:

Path: This PC > Documents > ADSM Workspace > Sample Scenario with Outputs

Name	Date modified	Type	Size
Imports	8/26/2020 10:26 AM	File folder	
Supplemental Output Files	8/26/2020 1:31 PM	File folder	
Sample Scenario with Outputs	8/26/2020 1:32 PM	Data Base File	1,025 KB

The Example folders have code snippets that can be used to manipulate ADSM outputs. Each folder has a READ\_ME.txt file with additional details. Don't save your code into the Example files, as they are updated when the application updates.





The Exports folder will contain items that have been exported from an ADSM scenario. These items, either Population files or Function files, allow you to easily transfer portions of one scenario to another scenario using Import functionality.

Population files can be exported from the Population panel in either .xml format or .csv format.

Population files can be imported as part of a new scenario, or by using the Replace Population functionality on the Population Navigation tab.

Population Production Type	
Swine	(460 units)
Cattle	(3497 units)

[+ define new production type](#)

Production Type Groups

[+ define new group](#)

[Export Population as XML](#)

[Export Population as CSV](#)

The exported population will be saved in a folder titled "Exports" in your workspace folder.



Function files can be exported from the Functions panel. These files are exported as a .csv format, which a user can edit and are in the Exports folder at the root of the ADSM Workspace.

Function files can be imported from the Functions panel. It will be necessary to copy the desired set of functions from the main Exports folder and move them into the destination scenario's Import folder. This allows you to customize the functions that you wish to transfer into the destination scenario.

If you choose to open and edit either type of export, pay close attention to leave them in the same format as they started in. For example, do not delete a line and leave a blank space. Don't save the file into an Excel format.

Relational	Probability
Latent period - cattle	
Subclinical period - Cattle	
Clinical period - cattle	
Immune Period	
Latent period - swine	
Subclinical period - swine	
Infectious period - swine	
0 day delay	
Direct contact distance	
Indirect contact distance	
No tracing delay [NAADSM update default]	
Tracing delay	
Immune period vaccination	
+ New Probability Density Function	

Exported functions will be saved in a folder titled "Exports" in your workspace folder with either "REL\_" or "PDF\_" prepended to their names.

[Export Relational Functions](#)

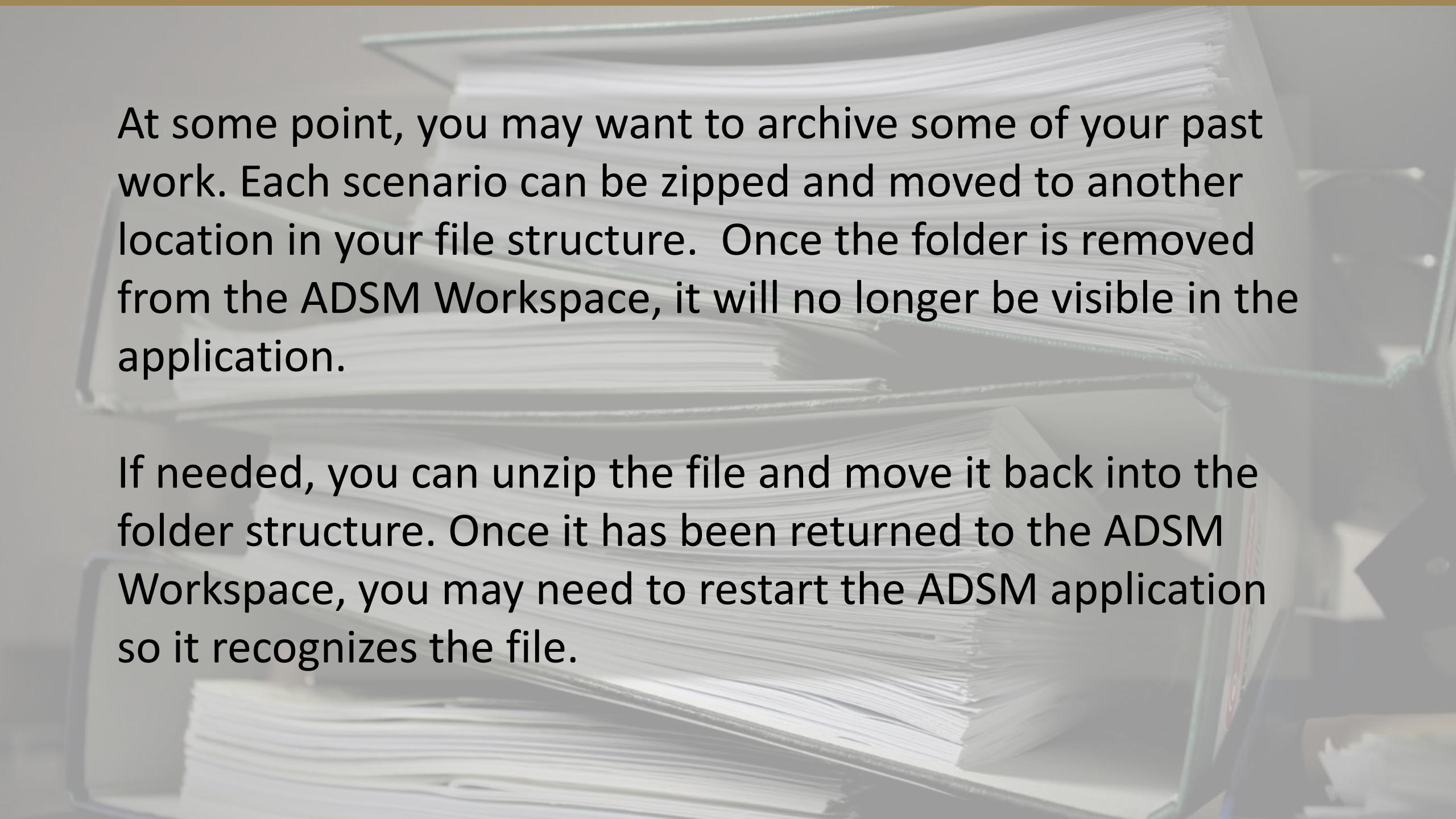
[Export Probability Density Functions](#)

Imported functions are read from csv files in the current scenario's workspace "Imports" folder that have either "REL\_" or "PDF\_" prepended to their names.

If the "Imports" folder does not exist save the current scenario to create it.

[Import Relational Functions](#)

[Import Probability Density Functions](#)

A large, slightly blurred stack of white papers or files is visible in the background, creating a professional and organized feel.

At some point, you may want to archive some of your past work. Each scenario can be zipped and moved to another location in your file structure. Once the folder is removed from the ADSM Workspace, it will no longer be visible in the application.

If needed, you can unzip the file and move it back into the folder structure. Once it has been returned to the ADSM Workspace, you may need to restart the ADSM application so it recognizes the file.

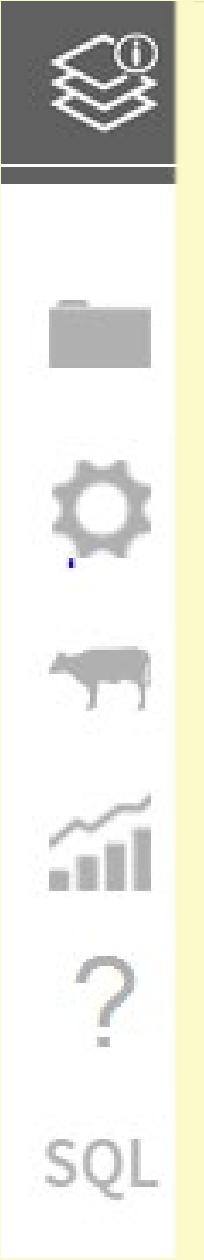
# Administrative Panel

---



The Administrative Panel contains:

- ⚙ Project Panel
- ⚙ Settings Panel
- ⚙ Production Type Panel
- ⚙ Functions Panel
- ⚙ Documentation Panel
- ⚙ SQL Panel



# The Project Panel:

- ⚙️ Opens a different scenario
- ⚙️Duplicates (Save As) a current scenario
- ⚙️Creates a new, empty scenario
- ⚙️Imports a NAADSM 3.2.XX scenario
- ⚙️Deletes a scenario
- ⚙️Allows user to discard all changes
- ⚙️Shows ADSM Workspace location
- ⚙️Allows change of ADSM Workspace location

*The scenario files stored in the ADSM Workspace show up on the list in the Project Panel.*

The screenshot shows the Project Panel with the following sections:

- Currently Open:** Shows the current workspace path: `C:/Users/MeSchoenbaum/Documents/ADSM`. There is also a link to "Test Workspace (change)".
- Sample Scenario:** A list item with a delete icon.
- Available Scenarios:** A list of scenarios:
  - `Examplefortraining.db` with a delete icon.
  - `Sample Scenario with Outputs.db` with a delete icon.
- Action Buttons:**
  - Discard Changes** (red button)
  - Create New** (green button)
  - Import NAADSM Legacy Scenario** (blue button)

# The Settings Panel:

- ⚙️ Shows current application version
- ⚙️ Toggles on/off help text
- ⚙️ Allows access to Advanced Panel

*The Advanced Panel allows setting of the random seed, which is not recommended unless there is a need to reduce the stochasticity of the model. Instructions to change the random seed are in the wiki.*

<https://github.com/NAVADMC/ADSM/wiki/Changing-the-Random-Seed>

## Application Settings

You are running...

3.5.10.6

No updates are available.

Show inline help text and hints

## Please Cite

ADSM Development Team 2019. Animal Disease Spread Model 3.5.10.6

[Advanced Panel](#)

# The Production Type Panel:

- ✿ Provides overview of parameterization using Status Lights
- ✿ Creates a new production type
- ✿ Creates a new production group
- ✿ Exports the population file (.xml or .csv)

The screenshot shows the 'Population Production Type' panel. At the top, there are two entries: 'Swine (460 units)' with three green status lights and one yellow status light, and 'Cattle (3497 units)' with four green status lights. Below these are links to define new production type and group. A large blue button at the bottom says 'Export Population as XML'. Below it is another blue button for 'Export Population as CSV'. A note states: 'The exported population will be saved in a folder titled "Exports" in your workspace folder.'

Population Production Type

Swine (460 units) Cattle (3497 units)

+ define new production type

Production Type Groups

+ define new group

*Export Population as XML*

*Export Population as CSV*

The exported population will be saved in a folder titled "Exports" in your workspace folder.



Feedlot – small  
Feedlot – large  
Cow-Calf  
Dairy – small  
Dairy - large

Cattle



Production type groups are a new concept in ADSM and are used as a vaccination trigger. This group allows the user to trigger vaccination to start when disease spreads into more than one industry.

Farrow to finish  
Nursery pigs  
Farrow to wean  
Pigs – small operations  
Pigs - backyard

Swine



Goats – dairy  
Goats – meat  
Sheep

Small Ruminants

# The Functions Panel:

- Provides a list of relational functions
- Provides a list of probability density functions
- Allows addition and deletion of functions
- Allows export of functions by type
- Allows import of functions by type

The screenshot shows a software interface for managing functions. At the top, there are tabs for "Assign", "Relational", and "Probability". Below the tabs, a header bar includes "Moderate risk movement", a back arrow, and a "New Relational Function" button. On the right side, there are icons for file operations (New, Open, Save, Delete, Copy, Paste) and other tools (Settings, Help, SQL).

**Relational Functions:**

- Latent period - cattle
- Subclinical period - Cattle
- Clinical period - cattle
- Immune Period
- Latent period - swine
- Subclinical period - swine
- Infectious period - swine
- 0 day delay
- Direct contact distance
- Indirect contact distance
- No tracing delay [NAADSM update default]
- Tracing delay
- Immune period vaccination

**Probability Density Functions:**

- + New Probability Density Function

Export Relational Functions

Export Probability Density Functions

Import Relational Functions

Import Probability Density Functions

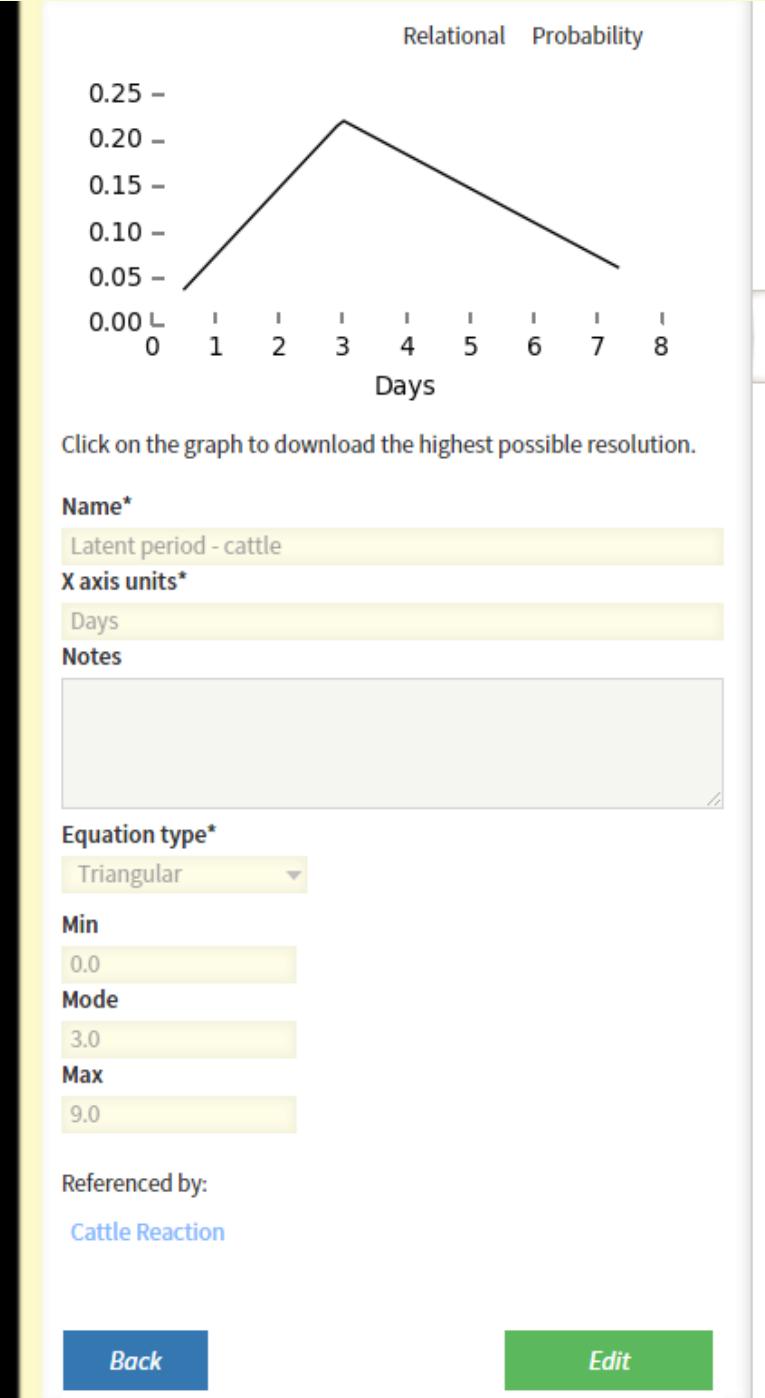
Exported functions will be saved in the current scenario's workspace folder with either "REL\_" or "PDF\_" prepended to their names.

Imported functions are read from csv files in the current scenario's workspace folder that have either "REL\_" or "PDF\_" prepended to their names and do not contain the current scenario's name.

# Individual Functions:

- ⚙️ Show a visualization of the input
- ⚙️ Allows export of visualized image
- ⚙️ Holds the function parameters
- ⚙️ Allows duplication (Edit, Variant)
- ⚙️ Allows update (Edit, Overwrite)
- ⚙️ Shows where function is assigned in scenario
- ⚙️ Allows deletion of function if not assigned to a parameter (Edit, Overwrite, Delete)

*It is important that you don't delete a function that the simulation is using; therefore, the application will not allow it to happen (Edit, Overwrite, Delete Disabled).*



# The Documentation Panel:

- ⚙️ Provides links to help documentation
- ⚙️ Provides links to ADSM wiki

The screenshot shows a GitHub Wiki page for the repository "NAVADMC / ADSM". The page title is "Home". At the top, there are navigation links for Code, Issues (121), Pull requests (0), ZenHub, Projects (0), Wiki (which is highlighted in orange), Security, Insights, and Settings. Below the title, it says "Missy Schoenbaum edited this page on Nov 15, 2018 · 52 revisions". The main content area has a heading "Welcome to the Animal Disease Spread Model wiki." and a section "Links to the most important top level pages are here:". Under this section, there is a heading "How to Get Started" with a bulleted list of links: "How to Install ADSM", "Updating ADSM", "A Quick Start Guide: Running the Sample Scenario", "Lexicon of Disease Spread Modelling terms", "Known Issues in ADSM", "Population File Requirements", "Types of Input Parameters", "Probability Density Functions", "Relational Functions", "Logging/Troubleshooting", and "Changing the Random Seed". There is also a heading "How to Access Results". On the right side of the page, there is a sidebar titled "Pages 36" with a search bar "Find a Page..." and a list of pages: Home, A Quick Start Guide: Running the sample scenario, Access the full results dataset using SQL Explorer panel, Access the full results dataset using SQLite Studio, Accessing ADSM Data with R, Basic SQL Overview, Basics of Stochastic Modeling, Benchmarking and Profiling, Changing the Random Seed, Code Archaeology, and Concepts of Herd level.

ADSM Documentation

Helpful links...

Quick Start Guide

Model Specifications

Basics of Stochastic Modeling

Lexicon of Disease Spread Modelling Terms

PDF Overview

PDF White Paper

Results Overview

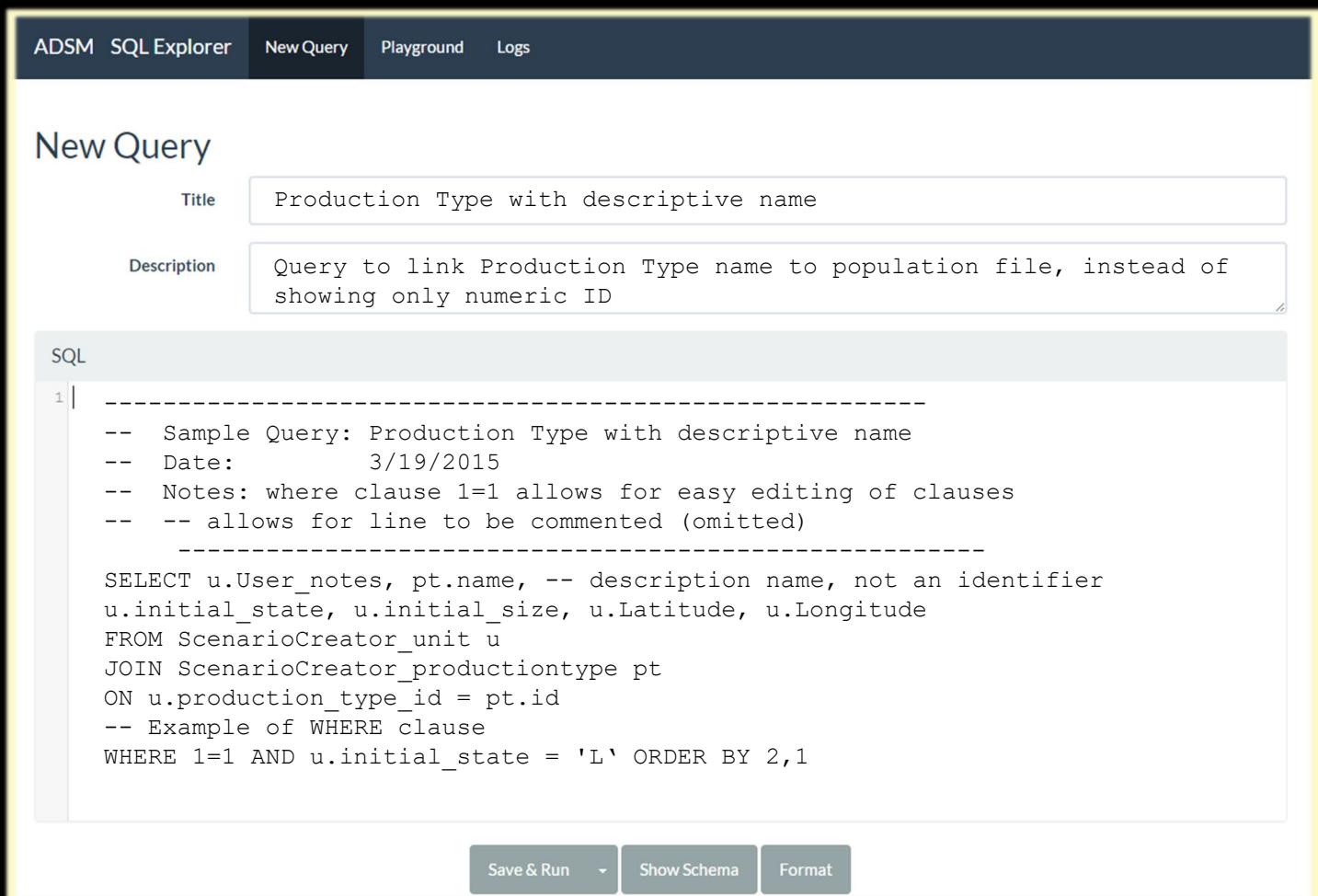
Data Dictionary

Refer to the [wiki](#) for additional information

# The SQL Panel:

## Opens SQL Editor

Here's an example query to try on the SQL window. Cut and paste the text into the SQL window, then click Save & Run.



The screenshot shows the ADSM SQL Panel interface. At the top, there is a navigation bar with tabs: ADSM, SQL Explorer, New Query (which is selected), Playground, and Logs. Below the navigation bar, the title "New Query" is displayed. There are two input fields: "Title" containing "Production Type with descriptive name" and "Description" containing "Query to link Production Type name to population file, instead of showing only numeric ID". The main area is titled "SQL" and contains the following code:

```
1 | -----
-- Sample Query: Production Type with descriptive name
-- Date: 3/19/2015
-- Notes: where clause l=1 allows for easy editing of clauses
-- -- allows for line to be commented (omitted)
-----
SELECT u.User_notes, pt.name, -- description name, not an identifier
u.initial_state, u.initial_size, u.Latitude, u.Longitude
FROM ScenarioCreator_unit u
JOIN ScenarioCreator_productiontype pt
ON u.production_type_id = pt.id
-- Example of WHERE clause
WHERE l=1 AND u.initial_state = 'L' ORDER BY 2,1
```

At the bottom of the SQL window, there are three buttons: "Save & Run", "Show Schema", and "Format".

*Recall that example queries are packaged in the ADSM Workspace, Example Database Queries folder.*

# Importing from NAADSM

---



# NAADSM Focus

NAADSM and therefore ADSM were originally designed for North America, to simulate the highly contagious diseases that are of interest to users based in Canada, the United States, and Mexico.

If you have scenarios created in NAADSM, you may be able to import your past work. You can import scenarios that were created in version 3.2.XX of NAADSM into ADSM. You cannot import scenarios that were created in NAADSM version 4 into ADSM. ADSM does not contain some of the functionality that was implemented in 4.X.XX. The ADSM Development Team does not manage NAADSM.

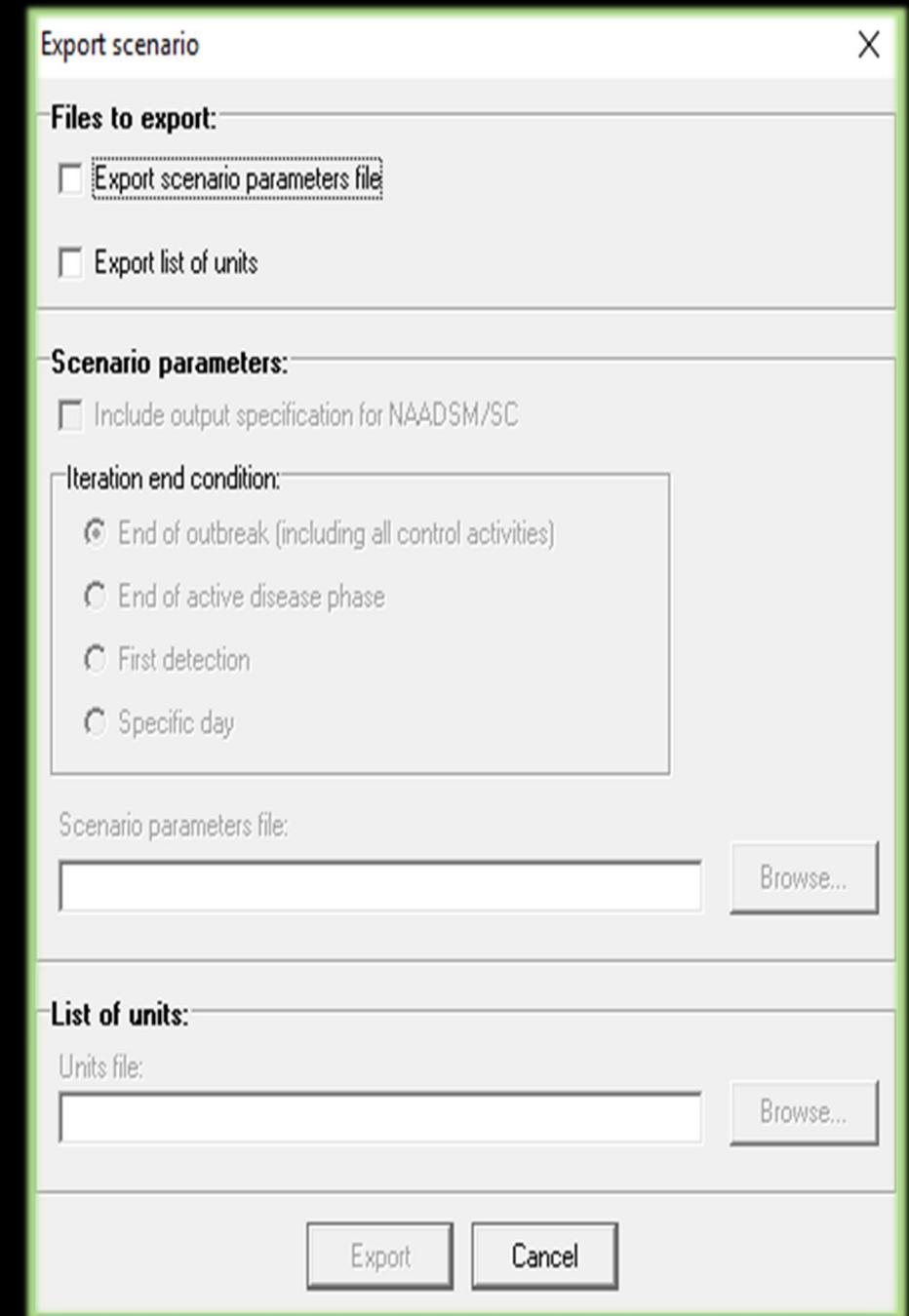
If you are new to modeling, starting in ADSM may be an easier option to learn. ADSM features newer technology and an updated user interface.

# NAADSM Import

Importing from NAADSM into ADSM requires two files that can be exported from NAADSM.

- ➊ Open the NAADSM scenario
- ➋ From the File menu, choose Export Scenario
- ➌ The Export Scenario window will open
- ➍ Check both the
  - Export scenario parameters file
  - Export list of units
- ➎ At the bottom of the page, browse to find the location to export the files. Hit [Export].

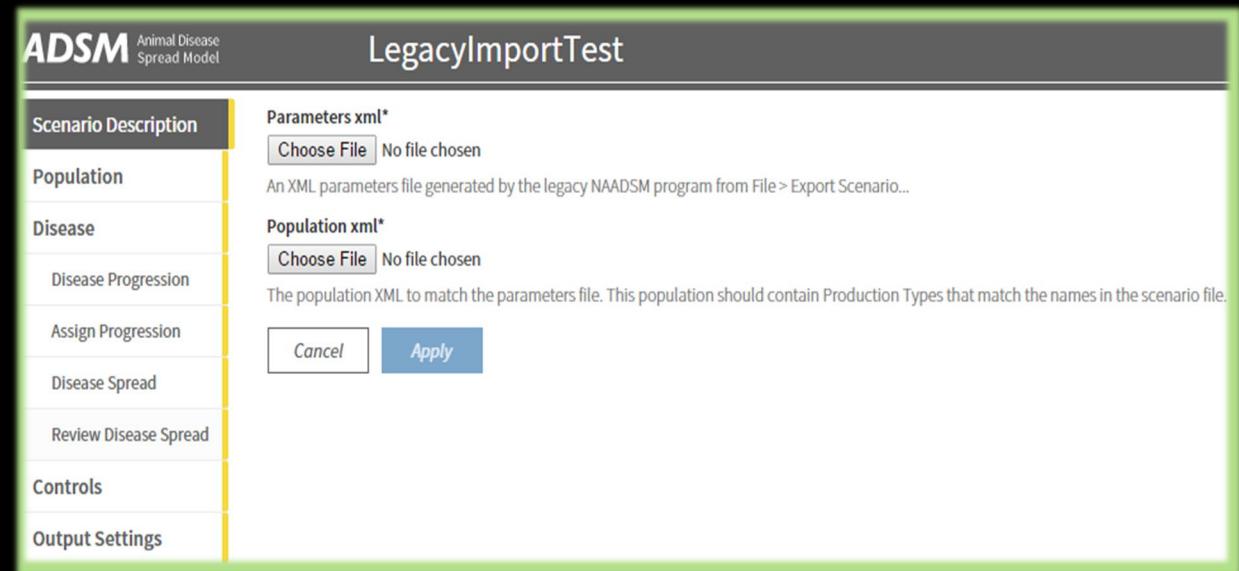
*Name the files for clarity, such as My\_pop.xml and My\_para.xml.*



Use the Project Panel to import the NAADSM Legacy Scenario.

*Import NAADSM Legacy Scenario*

- ⚙ A prompt will ask for a new file name
- ⚙ Select the parameter file using 
- ⚙ Select the population using 
- ⚙ Use [Apply] to start import process



*The import is unable to estimate how long the process may take. The ADSM Development Team tests with a 400,000-unit population take about 20 minutes.*

## *What if I want a new population instead of the old project population?*

For the import process, ADSM needs to match up with the previous production types. If you need to change population:

- ⚙ Import following the previous instructions
- ⚙ Use the [Replace population]
- ⚙ Production Types are not required to match on a replace action



# What's Next?

---





**Join the flock!**

**Learn more about ADSM or try an example**

**ADSM is currently available at <https://github.com/NAVADMC/ADSM/releases/latest>**

Try the sample scenario

<https://github.com/NAVADMC/ADSM/wiki/A-Quick-Start-Guide:-Running-the-sample-scenario>

Read the wiki pages link

<https://github.com/NAVADMC/ADSM/wiki>

**Additional training materials will be posted at**

<http://navadmc.github.io/ADSM/>

Training includes:

Overview

Populations and Production Types

Getting Started

Disease Parameters

Control Parameters

Output Settings and Run

Results

Detailed Evaluation of Results - Verification and Validation

Vaccination Strategy

Administration



*The outcome of an ADSM simulation (as with any computer simulation model) depends heavily on the quality of the scenario input parameters, the assumptions of the modeler who created the scenario, and the capabilities and limitations of the model framework itself. The utility of disease models like those created with ADSM critically depends on input and interpretation of experts familiar with the behavior of disease within populations, and with the limitations, assumptions, and output of the model. While ADSM is available as a service to animal health communities, the ADSM team does not necessarily endorse results obtained with the ADSM application or any conclusions drawn from such results. Note that the parameters provided in the Sample Scenario are simple examples to clarify concepts in the application. These parameters do not represent any real population or disease event.*



This work was funded in whole through Cooperative Agreement AP18VSCEAH00C005 with the University of Tennessee Department of Animal Science by the Animal and Plant Health Inspection Service, an agency of the United States Department of Agriculture.

### Photo credits

Canva.com

Mariposa Ranch Watusi

Joy Way Farm

Pinecroft Farms, Woodstock CT, Mariah Chapman

Dr. Melissa Ackerman

