GUS v. 1.0
Grazinglands Utilization System

Analysis and report created by GUS (Grazinglands Utilization System) a collaboration between Wyoming NRCS and WYGISC.

NRCS

USDA NRCS Wyoming
GUS Report
SRMS Test 1(Version: 2)

Date:
Wed Apr 15 2020 09:24:29 GMT-0600 (Mountain Daylight Time)

NRCS Planner Name:
John Hartung

Project Description:
Livestock Water Planning

Planner Notes:
Current

Vicinity Map:

	Fenced:	Response Area:
Total Ac:	10428.79	6619.22
Elevation Range:	4842.33-5333.01 ft	4842.33-5283.70 ft
Precip Range:	12.40-13.30 in	12.40-13.30 in
Total Grazeable Ac:	6619.22	6619.22

USER GUIDE

For GUS questions or to report issues, please contact:
* John Hartung (State Range Specialist) john.hartung2@usda.gov or 307-233-6773
* Brandon Elkins (Range Specialist) brandon.elkins@usda.gov or 307-696-4456
* Randy Wiggins (GIS) Randall.wiggins@usda.gov or 307-233-6778
* Sage Sheldon (State GIS Specialist) sage.sheldon@usda.gov or 307-233-6754

GUS User Guide

Version 1.0 April 2020

The Grazing Utilization System (GUS) is a GIS application designed and developed by Wyoming NRCS and the Wyoming Geographic Information Science Center (WYGISC) to assist NRCS conservation planning efforts in Wyoming. GUS is designed to help planners in determining livestock distribution and effective utilization of pastures in relation to slope and distance from available water source(s).
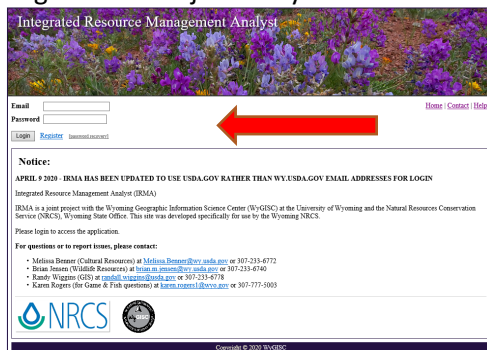
GUS uses 10-meter digital elevation models (DEM's) to assign an energy expenditure value to each pixel with the corresponding slope and distance from the water source to determine overall available acres around identified water sources. The application uses the maximum distance of two (2) miles and maximum slope of 80% to determine the response area of the most effective utilization. The user must keep in mind in using this tool and working with livestock producers that livestock will use areas outside of these parameters but at a reduced and less efficient rate and manner.

GUS is intended to be used as a planning tool and help in discussions with producers. GUS may not be entirely accurate and will need to be ground-truthed and adjusted for real world scenarios.

GUS is located along with the Integrated Resources Management Analyst (IRMA) https://irma-wy.wygisc.org/ and can be found by clicking on the highlighted IRMA link.

GUS has been found to work the best with Microsoft Edge.

Login to GUS is just like you would for IRMA (Same username and password):

Once logged in there will be two choices; IRMA Application or GUS Application – Click on the GUS Application:

The main project list will be in the left-hand frame and a map of Wyoming will be in the right-hand frame when you first open the GUS Application:
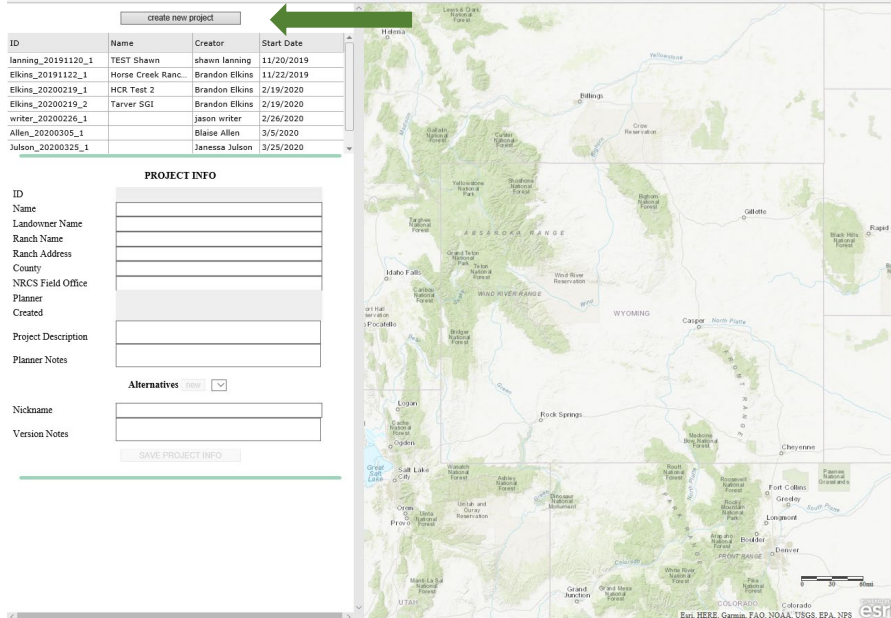
First you will need to Create a new project

Click on create new project (top of page) (Green Arrow Above):

This will be the next screen with some auto-populated Project Info (Red Arrows).
User enters Information into the yellow highlighted boxes (below).
Click on Save Project Info after entering project info (Blue Arrow).
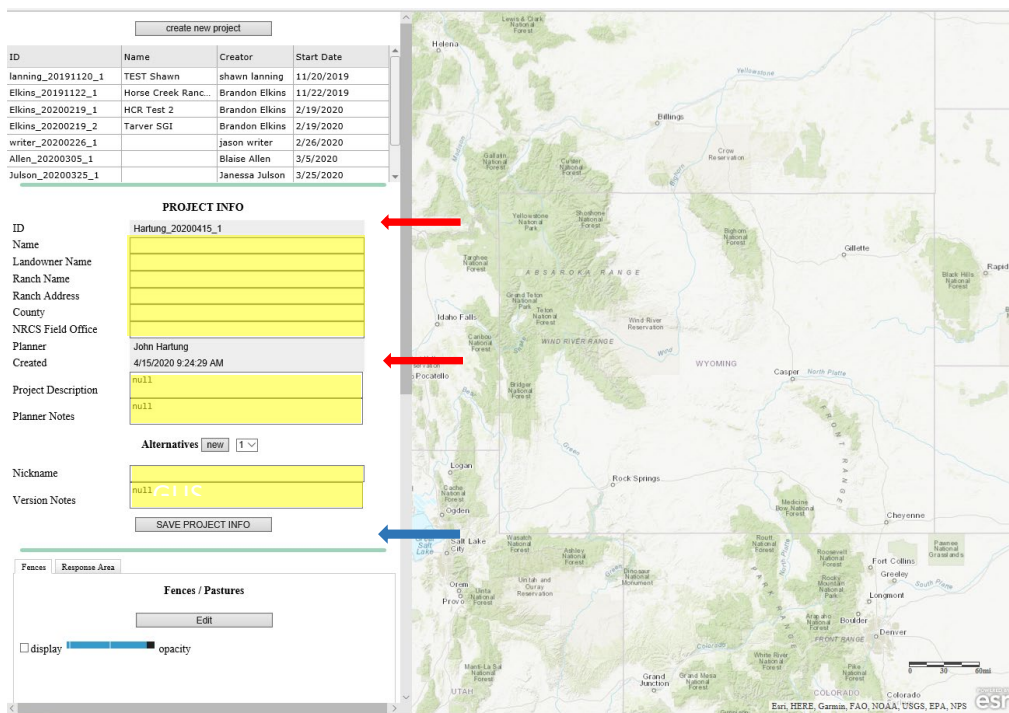
PROJECT INFO section "flashes" green when saved process is complete

FENCES/PASTURES:

With the completion of entering in the Project Info in GUS now user can start to put pastures/fences on the map.

Bottom left – there are two tabs: Fences – Response Area.

Click or make sure to be on the Fences tab – (Red arrow below).

Then click the Edit button below Fences / Pastures [Edit] (Green Arrow below):

After clicking on the Edit button, the Fence Editor will come up:

There are two options for putting in Fences/Pastures – Drawing in the Fences manually (Red Arrow above) or uploading an existing shape file (blue arrow above).

1) Manual Drawing – The main options under "draw" are freehand polygon, polygon, and rectangle.
- Edit - allows moving, adding and deleting vertices
- Split - allows polygons to be split
- Merge – allows selected polygons to be combined. Click on the `merge` button – left click one time on the first shape to merged – double left click on the seco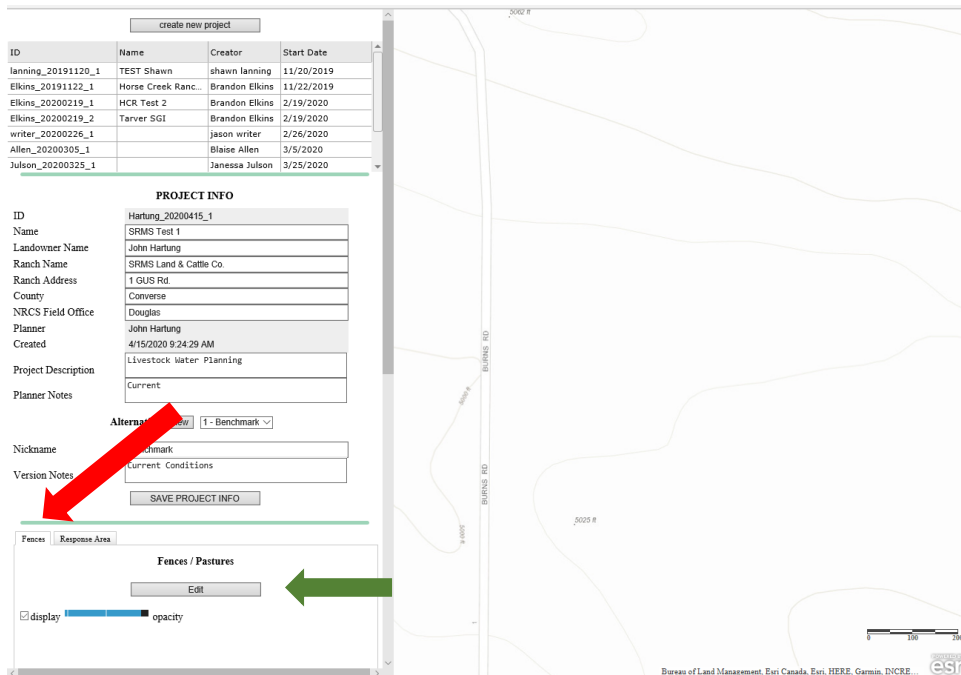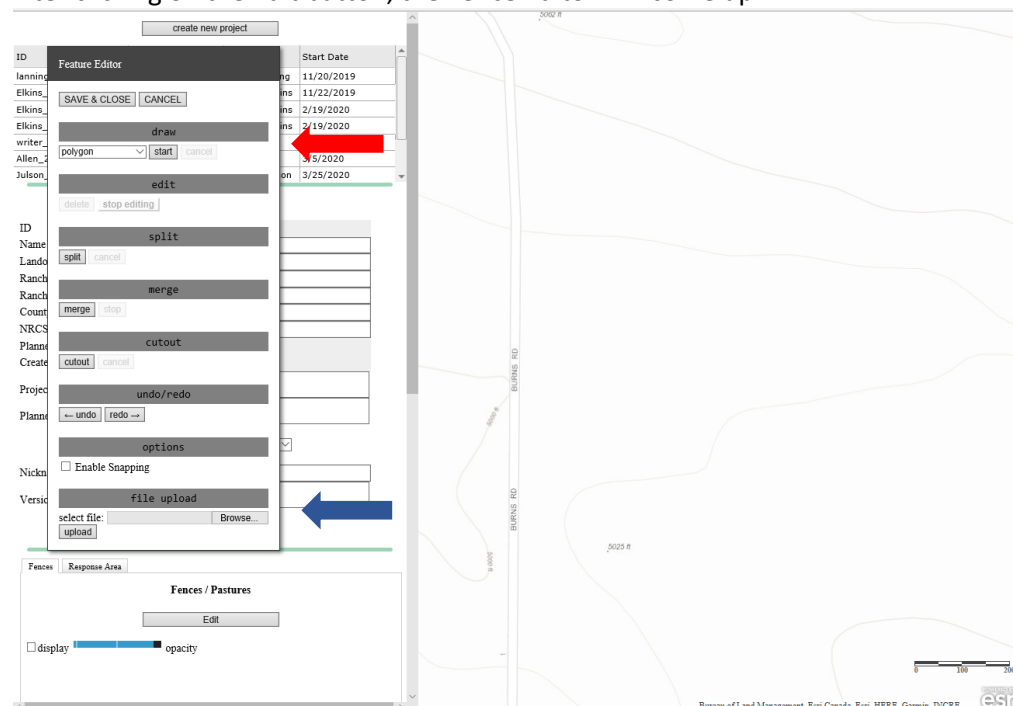nd shape to merged – this will merge the two selected shapes. Undo `← undo` in the feature editor will return to two shapes if needed.
- cutout – allows removal of portions contained inside of a polygon, AKA, the "donut-hole"
- undo-redo – If needed
- options – Enable Snapping

2) File upload (uploading an existing shapefile)
- When you have a shapefile(s) made and saved in GIS. This is the same for points and polygons. Navigate to where the shapefile is saved using Windows Explorer.
Look for the name of the file you saved. There will be multiple files with that same name.
You will need to zip six specific files into a zipped file for it to work and read correctly in GUS. The files will end with the follow extensions
.dbf
.prj
.sbn
.sbx
.shp
.shx
Highlight these files using the Control+click option.
*Note: Caution against using Shift+click option because you might get an extra file you don't want
Once they are highlighted right-click on one of the files and use the WinZip>Add/Move to Zip file…
When the WinZip dialogue box comes up change the file name to Name.zip and choose a file destination.
When you are done click add. The zipped file should where you saved it and ready for upload into GUS.

When all fences/pastures are completed click SAVE & CLOSE:

View of fences/pastures:

LIVESTOCK WATER:

Adding Surface Water (Ephemeral & Intermittent Streams, Perennial Streams, All other flow/linear features, and Water Bodies from NHD) and livestock water developments (livestock tanks)

Click on Response Area tab (Red Arrow) –

Click on Edit under Surface Water [Edit] (Blue Arrow) –

Feature Editor comes up again:
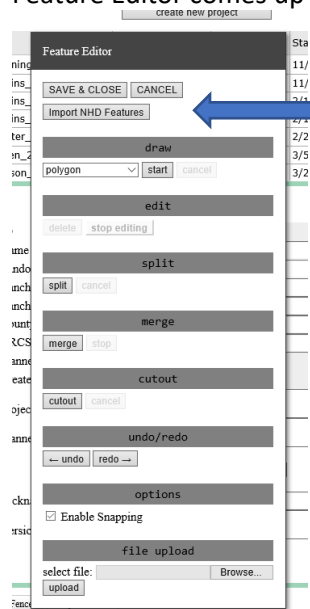
If the user wants to import natural water features from the National Hydrologic Database click Import NHD Features `Import NHD Features` (blue arrow above).

User can select (if desired) which natural water feature(s) to be included in the response area.

Inputting Existing or planned Water Tanks/Livestock Drinkers into the application:
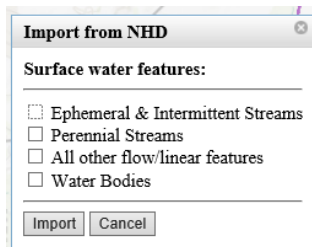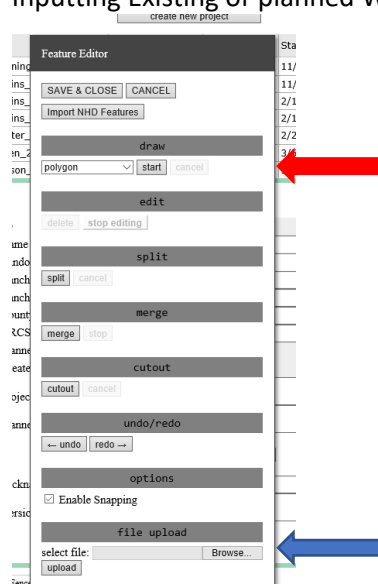
Again, there are two options for putting in water tanks – Drawing in the water manually (Red Arrow) or uploading a shape file (blue arrow).

- Manual Drawing – The main options under "draw" are freehand polygon, freehand polyline, point, polygon, polyline and rectangle.
If using draw option to add water features, select one of the draw options then user must click start

<mark>Example – for every one-point user must select point from the drop down then click start each time.</mark>
- Edit - allows moving, adding and deleting points and vertices
- Split - allows polygons to be split
- Merge – allows polygons to be merged
- cutout – allows removal of portions contained inside of a polygon
- undo-redo – if needed
- options – Enable Snapping

- File upload (uploading an existing shapefile)
- When you have a shapefile(s) made and saved in GIS. This is the same for points and polygons.
Navigate to where the shapefile is saved using Windows Explorer.
Look for the name of the file you saved. There will be multiple files with that same name.
You will need to zip six specific files into a zipped file for it to work and read correctly in GUS.
The files will end with the follow extensions
.dbf
.prj
.sbn
.sbx
.shp
.shx
Highlight these files using the Control+click option.
*Note: Caution against using Shit+click option because you might get an extra file you don't want
Once they are highlighted right-click on one of the files and use the WinZip>Add/Move to Zip file…
When the WinZip dialogue box comes up change the file name to Name.zip and choose a file destination.
When you are done click add. The zipped file should where you saved it and ready for upload into GUS.

After all water features are identified for this Alternative on the map – Click SAVE & CLOSE
Added point water tanks will turn from open circles to color filled points.

To Run Response Area of identified water click on [Create Response Area] in the Response Area Section (Red Arrow below).
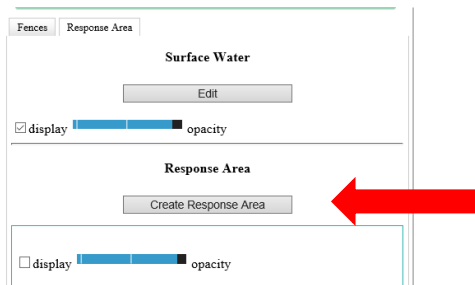
The process to run the Response Area takes time (on average around 3 minutes) to complete – Be patient! Green bar will appear with running time and circling white arrows to show processing the Response Area - It is not locked up! (Red Arrow below).
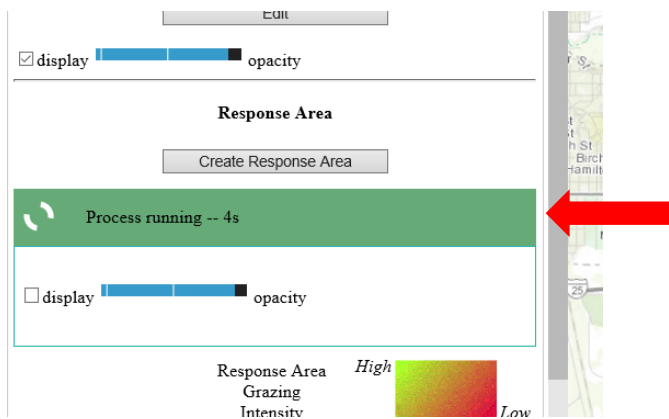
After the Process Run time is complete the message below will appear click OK:
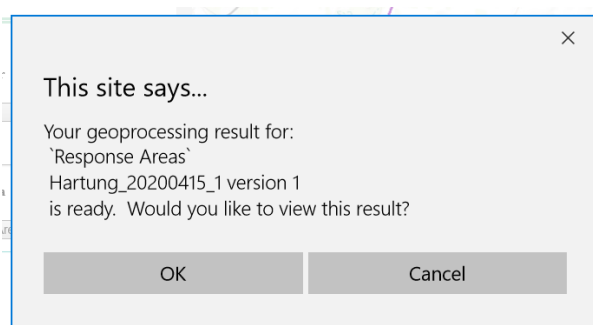
The colored Response Area will appear on the map:
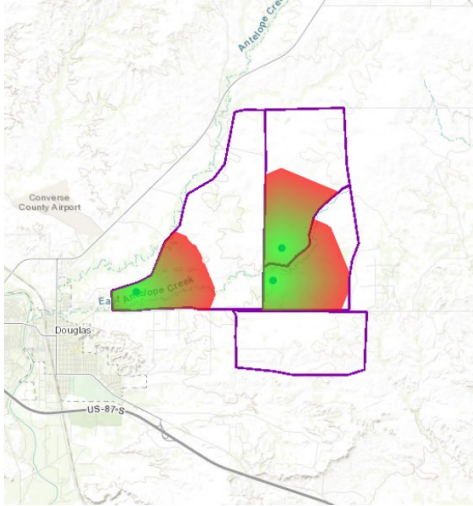
Click on Generate PDF (Red Arrow below):
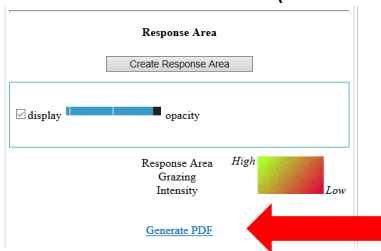
This picture with a cow swaying her head will appear to let user know that the report is loading and once again the program is not locked up. User will also be able to see that things are happening in the background. Once again be patient! This process will again take several minutes.
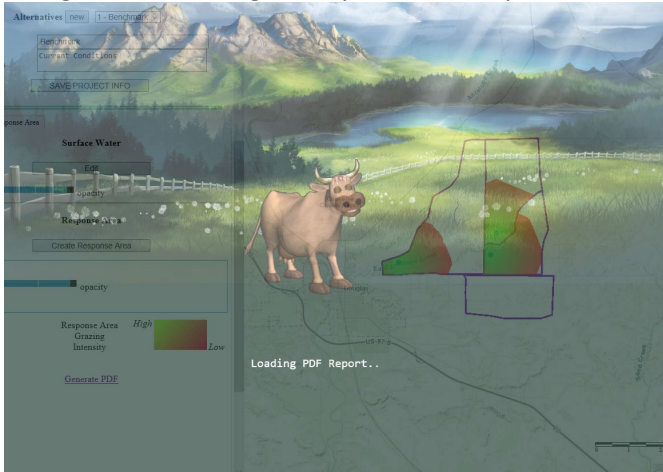
Once the process has completed and the report has loaded, the below message will appear, and user will have the option to Open or Save.
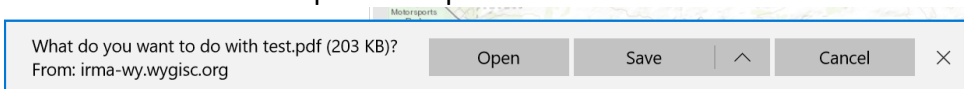
After opening the report, it should look like the example below:

Analysis and report created by GUS (Grazinglands Utilization System) a collaboration between Wyoming NRCS and WYGISC.

NRCS

USDA NRCS Wyoming
GUS Report
SRMS Test 1(Version: 1)
Date:
Wed Apr 15 2020 09:24:29 GMT-0600 (Mountain Daylight Time)
NRCS Planner Name:
John Hartung
Project Description:
Livestock Water Planning

Planner Notes:
Current

Vicinity Map:

	Fenced:	Response Area:
Total Ac:	10428.79	3692.89
Elevation Range:	4842.33-5333.01 ft	4842.33-5185.84 ft
Precip Range:	12.40-13.30 In	12.50-13.30 In
Total Grazeable Ac:	3692.89	3692.89

Fenced Area	Pasture ID	Acres	Acre w/ water .5mi	Acres w/ water .75mi	Acre w/ water 1mi
	1	2019.10	0.00	54.68	278.73
	2	4048.96	491.07	967.76	1535.14
	3	2577.15	369.26	541.46	711.90
	4	1783.58	361.60	655.90	974.25

Response Area	Pasture ID	Acres	Acre w/ water .5mi	Acres w/ water .75mi	Acre w/ water 1mi

Legend:
- WaterFeature_Points
- WaterFeatureLines
- WaterFeaturePolygon
- ProjectPolygons
- ResponseAreaPolygons

Response Area

NRCS

N   0   8,000   16,000   1:88,388
Feet   Date: 4/22/2020

END OF "BENCHMARK" ALTERNATIVE EXAMPLE

Creating Additional Alternatives

This first example, Alternative 1 (above) was the "Benchmark" or existing livestock water.
Alternative 2 (below) will be the "Planned" or future livestock water.
The user has the ability to build and compare several alternatives in GUS.

Using the Same Project Info (Same Project as above) …

Next to Alternatives Click new **Alternatives** [new] (Red Arrow below):

Create New Version window will pop-up:

Select the Fences and Water boxes to copy these features from previous alternative (red arrows).

Click on [Create] (green arrow above) – (May take a few seconds as it copies that information over into the new alternative).

** GUS version 1.0 shows "ESD" and "AUM" in the Create New Version pop-up currently in version 1.0 these selections are not functional

In the Alternatives Section in the dropdown selection there will be a 2 now (Red Arrow below).

PROJECT INFO

ID	Hartung_20200415_1
Name	SRMS Test 1
Landowner Name	John Hartung
Ranch Name	SRMS Land & Cattle Co.
Ranch Address	1 GUS Rd.
County	Converse
NRCS Field Office	Douglas
Planner	John Hartung
Created	4/15/2020 9:24:29 AM
Project Description	Livestock Water Planning
Planner Notes	Current

Alternatives [new] [2 ⌄] ⬅ (Red Arrow)

Nickname: [Planned] ⬅ (Blue Arrow)

Version Notes: [Planned Livestock Water] ⬅ (Green Arrow)

[SAVE PROJECT INFO] ⬅ (Orange Arrow)

User fill in the new Nickname (This example – "Planned") (Blue Arrow above) -
User fill in the new Version Notes (This example – "Planned Livestock Water") (Green Arrow above) -
Click the [SAVE PROJECT INFO] button to save new project (Orange Arrow above) -

Screen will again "FLASH" green here and "Planned" will appear along with the 2 in the dropdown next to Alternatives (Red Arrow below) –

Planner	John Hartung
Created	4/15/2020 9:24:29 AM
Project Description	Livestock Water Planning
Planner Notes	Current

Alternatives [new] [2 - Planned ⌄] ⬅ (Red Arrow)

Nickname: [Planned]

Version Notes: [Planned Livestock Water]

[SAVE PROJECT INFO]

At this point if the plan is to add cross fences refer to Alternative 1 – Benchmark **Fence/Pasture** section to add new fences or add cross fencing with the "split" editing tool.

Adding planned water tanks refer to Alternative 1 – Benchmark **Livestock Water** section to add new planned water developments.

Follow the steps in the first example to create a new Response Area and Report. See Alternative 2 – "Planned" Example Report below:

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NRCS

USDA NRCS Wyoming
GUS Report
SRMS Test 1(Version: 2)
Date:
Wed Apr 15 2020 09:24:29 GMT-0600 (Mountain Daylight Time)
NRCS Planner Name:
John Hartung
Project Description:
Livestock Water Planning

Vicinity Map:

Planner Notes:
Current

	Fenced:	Response Area:
Total Ac:	10428.79	6619.22
Elevation Range:	4842.33-5333.01 ft	4842.33-5283.70 ft
Precip Range:	12.40-13.30 in	12.40-13.30 in
Total Grazeable Ac:	6619.22	6619.22

Fenced Area	Pasture ID	Acres	Acre w/ water .5mi	Acre w/ water .75mi	Acre w/ water 1mi
	1	2019.10	0.00	54.68	278.73
	2	4048.96	880.29	1669.15	2512.72
	3	2577.15	764.50	1329.55	1938.46
	4	1783.58	361.60	655.90	974.25

Response Area	Pasture ID	Acres	Acres w/ water .5mi	Acres w/ water .75mi	Acres w/ water 1mi

Legend:
- • WaterFeature_Points
- — WaterFeatureLines
- ■ WaterFeaturePolygon
- ▢ ProjectPolygons
- ▨ ResponseAreaPolygons

NRCS   Response Area

0	8,000	16,000	1:88,388
	Feet		Date: 4/22/2020