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Introduction

In order to take advantage of this program, the user should be familiar with data in FLIPS that corresponds to data in the GIS. The steps in this guide outline the procedures necessary to link data from a GIS to FLIPS or FLIPS to a GIS. It is assumed that the polygon shapefile being used for the linkage was created by following the steps in this guide. This is important to ensure accuracy in the acreage values that will be imported into FLIPS from the shapefile through the linkage process.

It is highly recommended that you back up both the GIS and FLIPS files before starting this process. While it is relatively easy to undo changes made in a GIS, once data in FLIPS has been altered, the only way to go back to the original data is through a backup.

Reasons for linking to FLIPS

Any of these processes can be run singularly or in combination.

- Import acres from GIS to FLIPS through user selected common attribute matches.
- Automatically create stream and road buffer stand masters in FLIPS from a shapefile.
- Automatically create a forest inventory data table for joining to a GIS shapefile.
- Automatically create new stand masters in FLIPS from shapefile attributes.

Organizing Shapefiles

Four base layer shapefiles that correspond with the FLIPS inventory data are used to create the final shapefile to utilize all of the GIS Linkage tool functions. At a minimum, a Stand and PLS layer should be used for creating the final shapefile. Additional layers can be included for special buffer situations.

1. Stand or Type polygon layer (delineating timber types on a timberland ownership).
2. PLS (public land survey) polygon layer.
3. Roads layer (Utilized for buffering).
4. Hydro layer (Utilized for buffering).

These buffer layers will be overlaid with the stand and pls layers to create the final shapefile for linking to FLIPS.

Before processing can begin, the stand and pls layer attribute tables need to have the following attribute fields in their attribute tables.

Linking FLIPS™ to a GIS Shapefile

Stand layer table attributes: All the fields require a value with the exception of the FIFVkey which is left empty. The value for this field will be automatically created by the GIS Link tool and used as the key field for the linkage process.

Field Name	Field Type	Field Length
Tract	Text	12
Type, Stand or Strata*	Text	4
Acre	Double	12,2
FIFVkey	Text	6

*Depending on the type of inventory data.

Stand layer attribute table example

FID	Shape *	AREA	PERIMETER	ACRE	STAND	TRACT	FIFVkey
0	Polygon	1804026.458	14507.4	41.41	1248	LINK	
1	Polygon	2962815.26953	8903.48	68.02	6056	LINK	
2	Polygon	1195766.96972	8606.229	27.45	1138	LINK	
3	Polygon	1547452.29785	8588.243	35.52	0985	LINK	
4	Polygon	4839895.23925	16509.72	111.11	6054	LINK	
5	Polygon	3187176.01464	13069.99	73.17	7029	LINK	
6	Polygon	2422101.87207	10413.21	55.6	1148	LINK	
7	Polygon	300743.169922	2121.944	6.9	1149	LINK	

PLS layer table attributes: All the fields require a value.

Field Name*	Field Type	Field Length
Township	Text	3
Range	Text	3
Section	Text	2

*Field names can be abbreviated (e.g. TWN for Township).

PLS layer attribute table example

FID	Shape *	AREA	PERIMETER	OBJECTID	TWN	RGE	SEC
0	Polygon	23838200	19627.47	64266	99N	99W	15
1	Polygon	24045510	19713.79	64246	99N	99W	14
2	Polygon	20112030	18077.36	64305	99N	99W	18
3	Polygon	24163600	19715.11	64231	99N	99W	13
4	Polygon	26602120	20660.62	64295	99N	99W	17
5	Polygon	27632930	21036.29	64279	99N	99W	16
6	Polygon	26099590	21204.25	64054	99N	99W	22
7	Polygon	28235690	21257.6	64044	99N	99W	23

If you are not going to create buffer shapefiles you can skip ahead to the **Processing** section of this guide.

Buffer layer table attributes: If you have created buffer shapefile layers, you need to add an attribute field to each buffer layer table to identify the table records as a buffer for the linkage tool to recognize. The field must have a unique name for each buffer shapefile being used for linking to FLIPS. The field must be a TEXT field with a length of 2. The field must contain a “^Y” value.

Buffer layer attribute table examples

Road Buffer

FID	Shape *	Id	RDBUF
0	Polygon	0	^Y
1	Polygon	0	^Y
2	Polygon	0	^Y
3	Polygon	0	^Y
4	Polygon	0	^Y

Hydro Buffer

FID	Shape *	Id	HYBUF
0	Polygon	0	^Y
1	Polygon	0	^Y
2	Polygon	0	^Y
3	Polygon	0	^Y
4	Polygon	0	^Y

Processing

Now that you have all your base layer shapefile in the proper format it is time to process the shapefiles to create the final linkage shapefile to be used with the ACI Linking tool.


1. Convert all the shapefiles to coverages.
2. Next overlay process all the coverages using the Identity tool with the Stand layer being the input coverage.
3. Convert the final overlay coverage to a shapefile.
4. Calculate acres using the field calculator.
5. The shapefile should now contain all the necessary attributes to run the GIS Link tool.

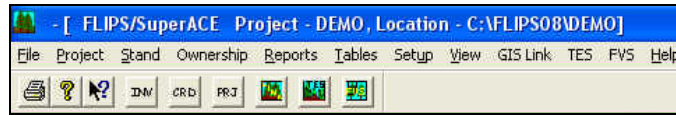
Example of the final shapefile table fields

AREA	PERIMETER	OVER3	OVER3_ID	STAND	TRACT	TWN	RGE	SEC	RDBUF	HYBUF	Acre	FIFVkey
1804475.00875	14507.9500022	2	1	1248	LINK	99N	99W	14			41.43	
2895381.8989	16197.7528821	3	2	6056	LINK	99N	99W	14			66.47	
515058.746377	6218.1502722	4	3	1138	LINK	99N	99W	14			11.82	
1505611.03351	8258.67439689	5	4	0985	LINK	99N	99W	18			34.56	
1667034.73963	7613.55354357	6	5	6054	LINK	99N	99W	14			38.27	
367825.808281	4353.08193231	7	6	7029	LINK	99N	99W	18			8.44	
2117356.53605	9469.26323064	8	7	6054	LINK	99N	99W	13			48.61	
27712.1370351	2404.58562096	9	8	7029	LINK	99N	99W	18	^Y		0.64	
1038191.80134	5230.25563062	10	9	7029	LINK	99N	99W	18			23.83	
67226.6784492	7345.76126719	11	10	6056	LINK	99N	99W	14	^Y		1.54	
1163152.02621	7133.18089041	12	11	7029	LINK	99N	99W	17			26.7	
410385.737216	2838.40562104	13	12	1148	LINK	99N	99W	13			9.42	
579429.773891	5596.97264201	14	13	7029	LINK	99N	99W	17		^Y	13.3	
298723.999608	2116.27155071	15	14	1149	LINK	99N	99W	13			6.86	
98735.4136238	8294.82320155	16	15	1138	LINK	99N	99W	14	^Y		2.27	

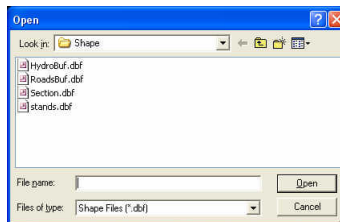
In this case, there are RDBUF and HYBUF fields because a road and hydro layer was overlaid so that road and hydro buffer stand masters could be created automatically in FLIPS through the linkage routine. If you didn't create a road or hydro buffer layer these attributes will not be in the table and buffer stand masters will not be created in FLIPS.

Initiating the Link to Flips

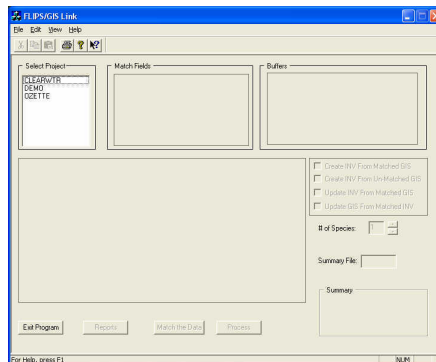
1. Open SuperACE/FLIPS.
2. Click either on the  button on the toolbar or the **GIS Link** on the menu bar.



3. The following dialog appears:



4. Select the Shapefile DBF file to be linked to a FLIPS project. Remember that this should be a GIS shapefile that has tabular fields that match the tabular fields in a FLIPS project. These fields will not necessarily have the same name, but they must represent the same data.
5. Click Open. The Linking interface screen appears.

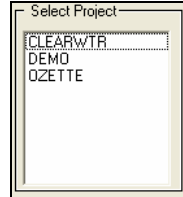


Note: You can only select one shapefile to link at a time; however, you can open a new session to link additional GIS files as many times as you wish.

You can click on the Exit Program button at any time to exit the program.

Selecting the FLIPS Project

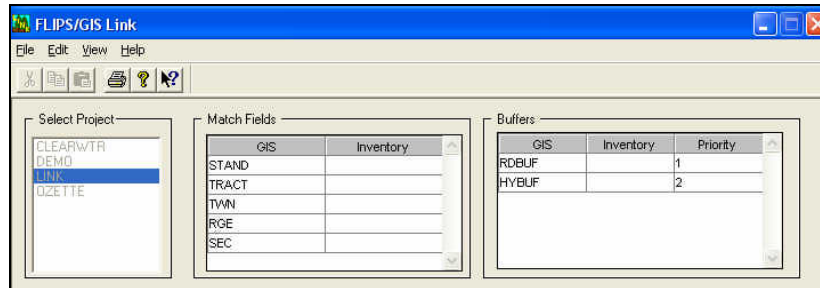
1. In the Select Project area of the interface screen, select the FLIPS project to which the GIS data is to be linked. A question appears asking if you wish to start processing.



2. Answer yes to the question that appears.



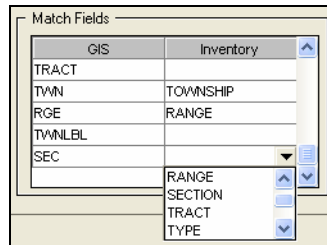
3. Note that after the processing is finished, the Match Fields of the interface screen are populated with data. If the shapefile contains "AY" buffer attributes then the buffer attribute data will be listed in the Buffers area of the interface screen.



Filling in the Match Fields Area

Now the user must choose which fields of the GIS shapefile to match with fields in FLIPS. Depending on your project needs, you can match on any combination of the match fields.

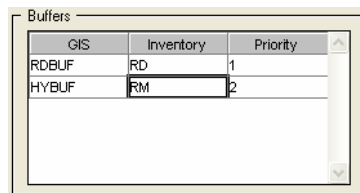
1. In the Match Fields area of the interface screen, identify a field to use for searching for matches with FLIPS. Note that a matching field may have a different name in GIS compared to the corresponding field in FLIPS.
2. Click in the cell in the Inventory column adjacent to the GIS field to select a field to match. A dropdown list box appears from which you may choose a corresponding match field from FLIPS.



Filling in the Buffers Area

When the shapefile was initially selected, the linkage routine automatically identified any records that contained a “^Y” attribute. If any “^Y” attributes occur in the data they will be listed in the Buffers area of the interface screen. In this portion of the screen, the user may name the buffer fields with an alphanumeric name up to four characters long (basically giving these areas a type designation). Also, the Priority column is filled in. Priority assignments tell the software which field name is assigned to an area that two or more fields share in common. For instance, perhaps a light duty road crosses over a secondary highway. Rather than have two records for the area contained in the intersection of their buffers, the higher priority field contains the record.

1. Click the cursor in a cell of the Inventory field next to the first GIS cell entry.



2. Enter a name up to 4 alphanumeric characters long to identify the GIS buffer.
3. Set the priority for each buffer area by clicking in the cell and edit the desired priority assignment.

Matching the Data

Once the fields have been picked to match on and the buffer names and priorities have been assigned, if buffers exist in the shapefile, it is time to let FLIPS and GIS search for data matches.

1. Click on the Match Data button at the bottom of the interface screen. Click Yes or No to the window that pops up. This window appears if the user did not enter any names for the Buffers area Inventory fields.



2. After processing is finished, three tabs appear on the lower left portion of the screen.

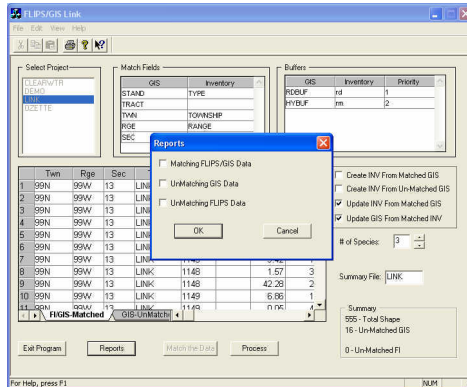
	TwN	Rge	Sec	Tract	Type	Buffer	Acres	FiFv	Ke
1	99N	99W	13	LINK	0533	RD	0.13	3	
2	99N	99W	13	LINK	0533		8.06	1	
3	99N	99W	13	LINK	0533		23.10	3	
4	99N	99W	13	LINK	0533		0.76	2	
5	99N	99W	13	LINK	0985		0.96	2	
6	99N	99W	13	LINK	1133		0.09	14	
7	99N	99W	13	LINK	1148		9.42	1	
8	99N	99W	13	LINK	1148	RD	1.57	3	
9	99N	99W	13	LINK	1148		42.28	2	
10	99N	99W	13	LINK	1149		6.86	1	
11	99N	99W	13	LINK	1149	RD	0.05	4	

3. Resize the tab area in order to see all three tabs. These are the FI/GIS-Matched, GIS-UnMatched and FI-Unmatched tabs.
4. Click on these tabs from left to right in order to view the data matches and non-matches that occurred between FLIPS and the GIS, those records that did not match from the GIS data, and those that did not match from the FLIPS data.

The GIS-UnMatched and FI-Unmatched tabs are useful in determining if you need to enter or remove a stand master in FLIPS or edit the GIS shapefile. If you need to do an edit before continuing, just click on the Exit Program button to end the linkage routine. Once you have completed your edits simply restart the linkage routine again and repeat the previous steps to see if your edits were successful.

Linking FLIPS™ to a GIS Shapefile

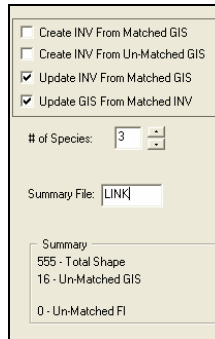
If you click on the Reports button you can choose to generate and print reports for each of the three tab screens.



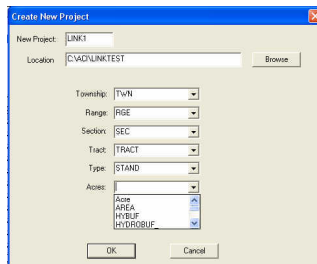
Making Choices for the FI/GIS-Matched Area

Now it is necessary to choose whether or not to create an inventory from the GIS data, update the FLIPS data with the GIS data, or update the GIS data with the inventory data.

Check any or all of the four checkboxes to choose how you want to use the matched and un-matched data. The two Update options are the most commonly used linkage options. Each option is explained below.



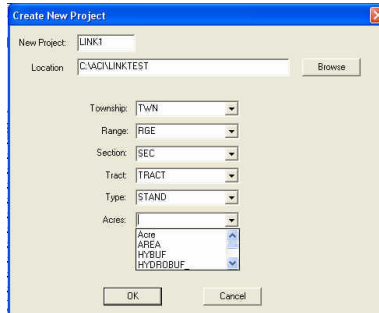
Create INV From Matched GIS: This function will automatically create stand masters in a new FLIPS project. When you check this box and click the Process button the following window comes up.



Linking FLIPS™ to a GIS Shapefile

Fill in the New Project name, Location and use the dropdown window in each of the cells to select which shapefile attributes are to be used to create the stand masters. This is useful if your shapefile contains other attributes that you want to use to create a new FLIPS project.

Create INV From Un-Matched GIS: This function is useful in automatically creating stand masters in FLIPS for stands that occur in the GIS but not in FLIPS. When you check this box and click Process the same window as above opens.



Fill in the New Project name, Location and use the dropdown window in each of the cells to select which shapefile attributes are to be used to create the stand masters. This process forces the user to create the stand masters in a new FLIPS project in order to safeguard the existing FLIPS data. You can then use Stand Maintenance in FLIPS to copy the new masters from one FLIPS project to another.

Update INV From Matched GIS: This selection is the most used process of the linkage program. It will use the matched data between the GIS and FLIPS to automatically load acres from the GIS into FLIPS and, if the shapefile contains buffer attributes, will create buffer stand masters in FLIPS. This is the most time saving feature of the linkage program.

Update GIS From Matched INV: This function will create a data base file (dbf) in a directory named Fldata. The data base will contain one record of stand inventory data for every matched shapefile record. This table can be used in a GIS to link, using the FIFVkey field, to the shapefile for querying and symbolizing inventory data in the GIS. For this option it is best to use a shapefile that does not contain road or hydro buffer attributes.

Linking FLIPS™ to a GIS Shapefile

The screenshot shows a dialog box with the following elements:

- Four checkboxes: Create INV From Matched GIS, Create INV From Un-Matched GIS, Update INV From Matched GIS, and Update GIS From Matched INV.
- A "# of Species:" label followed by a numeric input field containing "3" and a spinner control.
- A "Summary File:" label followed by a text input field containing "LINK".
- A "Summary" section with a list:
 - 555 - Total Shape
 - 16 - Un-Matched GIS
 - 0 - Un-Matched FI

1. Fill in the number of species to be used in the project. Up to seven species can be included. If there are more species available than the number entered into this box, the main species will be chosen. For example, if the user has 4 species in a timber type and chooses 2 as the # of Species, the information associated with the main two species will be used.
2. Either enter a new name in the Summary File box, or accept the default name of the original shapefile name.
3. Click the Process button.

Back to FLIPS

Once the processing is complete, you will be returned to the FLIPS project you were in when you initiated the GIS Link routine. The FLIPS project that you linked to the GIS shapefile is now updated, if you choose either of the Create Inv selections or the Update Inv selection.