

# APPENDIX F: GIS STEP-BY-STEP PROCEDURES

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## INTRODUCTION

The following instructions are intended as step-by-step tutorials for performing the GIS tasks necessary to successfully collect and process field data for BDCP EIR/EIS environmental surveys. These steps do not include the coordination efforts described in the workflows, as discussed in the main document, but are limited to technical GIS tasks only. The tutorials are organized in the same order as the steps outlined in the main document under “Environmental Field Surveys Workflows, Methods, and Protocols” and

“Multiuser Geodatabase Workflows, Methods, and Protocols”. The software used for these processes is provided by ESRI®. For further help on using ESRI software, please refer to the following website: <http://webhelp.esri.com/arcgisdesktop/9.3/index.cfm?TopicName=welcome>

## ENVIRONMENTAL FIELD SURVEYS DATA MANAGEMENT PROCESSES

### Geodatabase Schema Creation/Adjustment

**STEP 1:** Open ArcCatalog.

**STEP 2:** Create a geodatabase. Browse to the folder intended for storage of the new geodatabase and right-click. Select “New” from the dropdown menu that appears and select “Personal Geodatabase”. In order to use the GPS Analyst tool, which is needed for Post-Differential Correction, a personal geodatabase must be created. Refer to the section called “GPS Enable a Personal Geodatabase” for further instruction. If post differential correction is not required, “File Geodatabase” could be selected instead of “Personal Geodatabase”. Creation of an SDE geodatabase requires a more complex process and will not be discussed in this document.

**NOTE:** Steps 3 and 4 are applicable to any geodatabase, including an SDE geodatabase.

**STEP 3:** *Add/Import/Remove Geodatabase Objects.* To create a new object, right-click on the geodatabase and select “New”. From the new menu, select the type of geodatabase object that is to be created (e.g., feature class, table, and relationship class).

Alternatively, objects can be imported from other sources, like a shapefile or an object located in another geodatabase. In order to import an object, right-click the geodatabase and select “Import”. From the import menu that appears, select “Feature Class” for a feature class import or “Table” for a table import.

To remove an object from the geodatabase, right-click on the object and select “Delete”.

**STEP 4:** *Add/Remove Fields.* Click on the object to select it. The right window in ArcCatalog will present three tabs of information for the selected object. Select the “Preview” tab. At the bottom of the same window select “Table” from the dropdown “Preview” menu. At the bottom right of the table that appears, click on the “Options” button. Within the Options Menu, select “Add field”.

To remove a field while viewing the table in “Preview”, right-click on a Field Name along the top of the table and select “Delete Field”.

**NOTE:** Access to field level drop down menus, requires geodatabase domains to have already been created. Read ESRI help regarding the creation of domains and assigning a domain to a field.

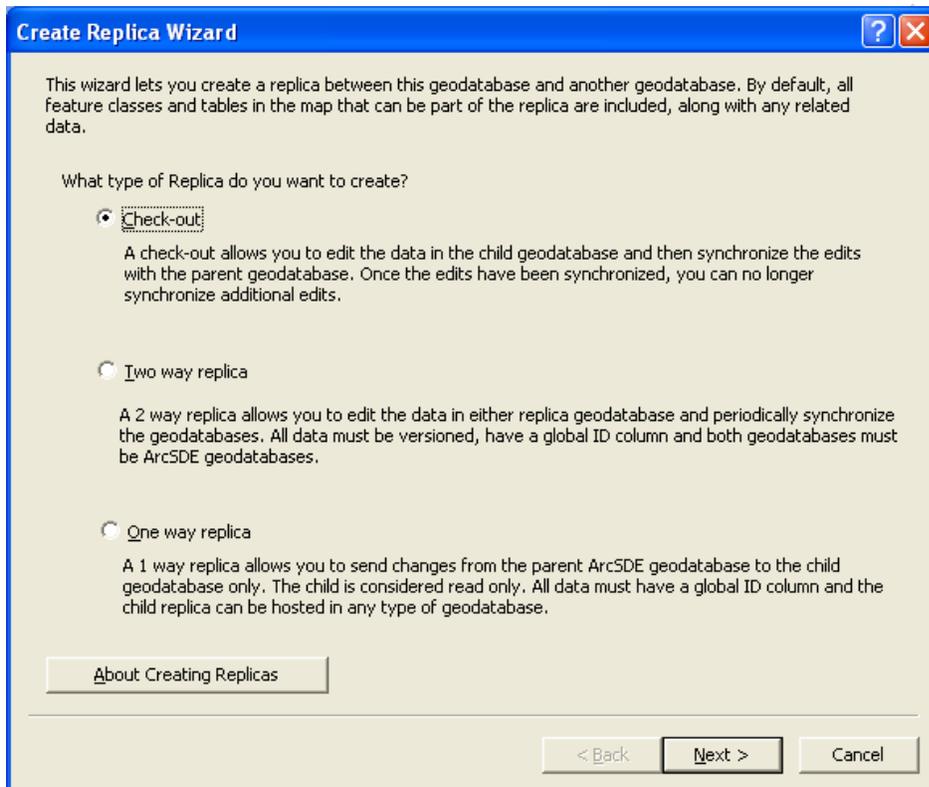
### Creating a “Check Out” Geodatabase Replica from a Multiuser Geodatabase

Replica creation is the process of copying the multiuser geodatabase with the ability to edit that copy and then sync those edits back to the multiuser geodatabase. For this project, this applies to intermediary geodatabase replicas that AXF files are checked out from and back into, for disconnected editing (editing of the data offsite) and the transfer of edits from the geodatabase in the production environment to the geodatabase in the publish environment. There are multiple types of replicas, the kind used for intermediary geodatabases for checking out and in AXF files is called a check out replica. The replica used for the publish environment is a “One Way” replica.

**STEP 1:** Open ArcMap. Use the “Add Data” button to add layers from the multiuser geodatabase to ArcMap that are to be checked out to a replica geodatabase.

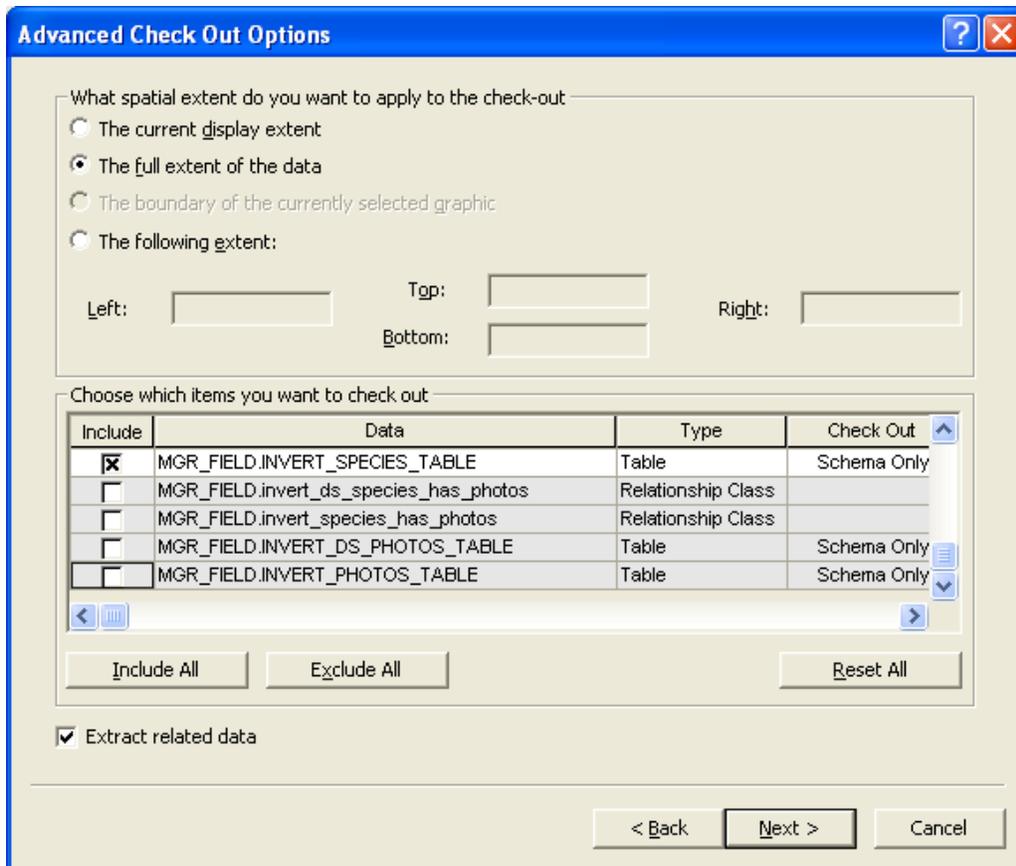
**STEP 2:** Select what gets checked out. If you only want to check out a subset of records within a layer, select those records that are to be included by selecting them in the attribute table, by using the select by attribute tool, by using the select by location tool, or by using the selection tool to click on a feature or features to select them in the map. Alternatively, a definition query can be used. Either the selection or the definition query will be recognized by the “Create Replica” tool, but both cannot be used for the same replication process.

**STEP 3:** Use the create replica tool. Make sure the “Distributed Geodatabase” toolbar is active. Select the “Create Replica” button  on the toolbar. The following screen will appear:

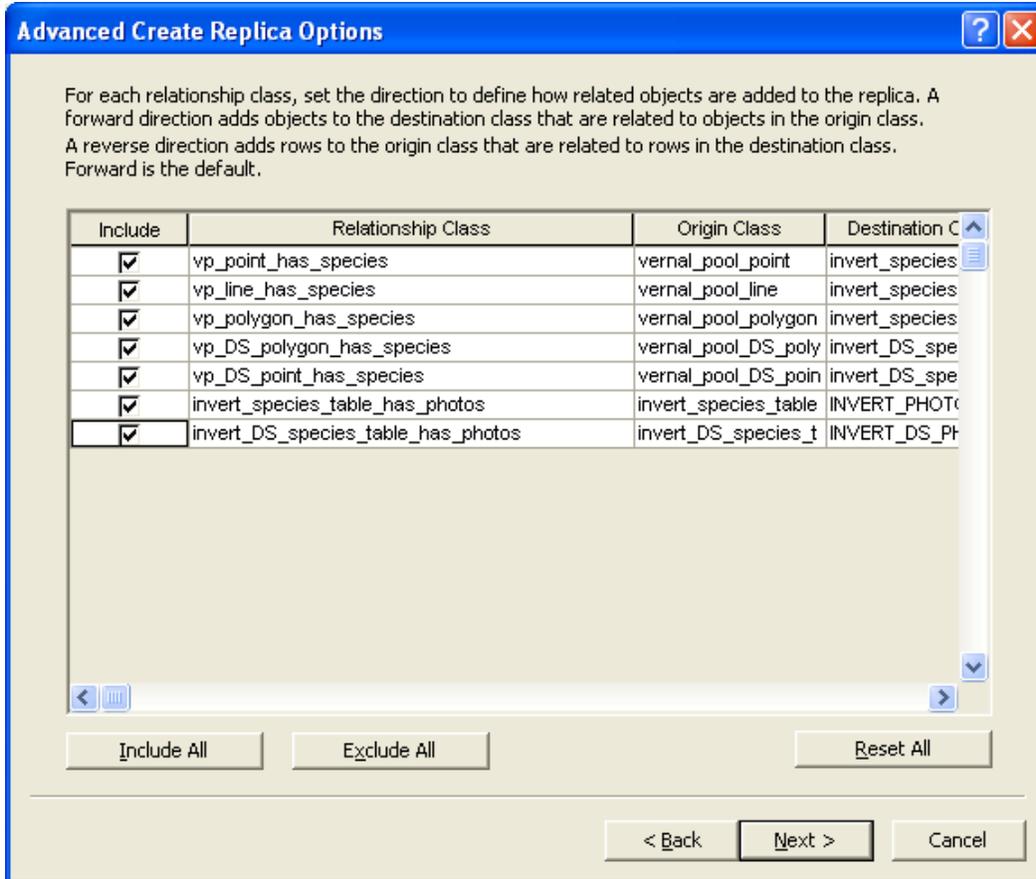


**STEP 4:** Choose Check-out and click on next. The following screen will appear:

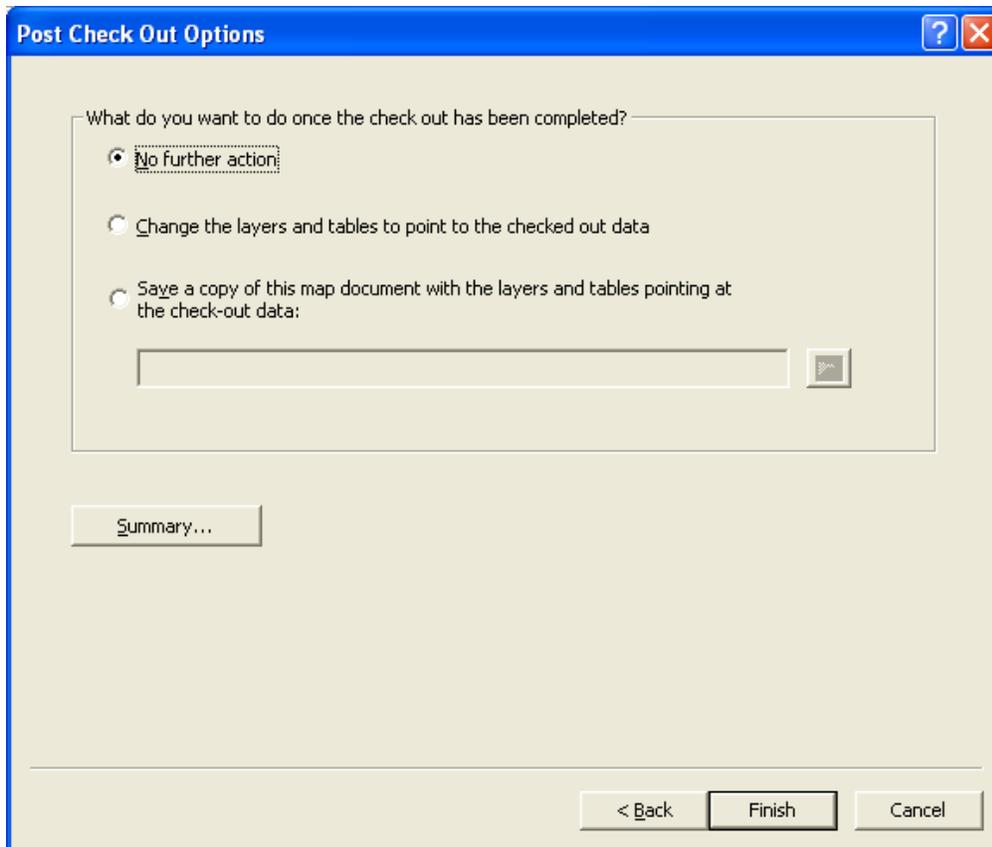
**STEP 5:** *Choose replica save location.* Under “Which geodatabase do you want to check out to?”, use either the browse to button on the right to locate a geodatabase that has already been created, or type in a path and name for a new geodatabase that is to be created. If creating a new geodatabase, make sure to include either a .mdb or .gdb extension at the end of the name depending on the type to be created (.mdb = personal or Access geodatabase, .gdb = file geodatabase). The naming convention for replica geodatabases that will be used to create future AXF files is as follows: BDCP\_<Resource\_Type>\_Field\_Data\_<mm\_dd\_yy>. Under “What do you want to call this check-out?” enter a name for this new replica version. Check the box next to where the form states “Show advanced options for overriding check-out defaults when I click Next”. In most cases the other options on this screen can be left as defaulted. Click Next. The following screen will appear:



**STEP 6:** *Choose extent and geodatabase objects to be checked out.* In most cases, choose the option “The full extent of the data” under where it is stated “What spatial extent do you want to apply to the check-out”. In the section that states “Choose which items you want to check out” each layer in the open map and its related tables will be listed and automatically checked for inclusion. If the features that have been added to the map are stored within a feature dataset in the geodatabase, and some other layers in the same feature dataset weren’t added to the current map, those layers will also be listed and selected in this list. Please note that most layers and tables are related to a photo table and this photo table will be included in this list of data sources and selected by default unless they are unselected by the user here. Checking out a photo table will add to processing time and may also take up a large amount of disk space; therefore is not recommended unless the photos are intended to be included in the replica geodatabase. If the purpose of the replica is to create an AXF file, uncheck the box next to each photo table that is listed, as well as the relationship class that binds them to the other geodatabase objects. Select Next. The following screen will appear:



**STEP 7:** Leave everything as defaulted and select Next. The following screen will appear:



**STEP 8:** *Determine what to do with the current Map Document.* This screen provides options that can tell the layers in the existing map to point to the new replica geodatabase or will create a new map document that will point to the replica geodatabase upon completion of the check-out. In most cases, leave as the default and select Finish.

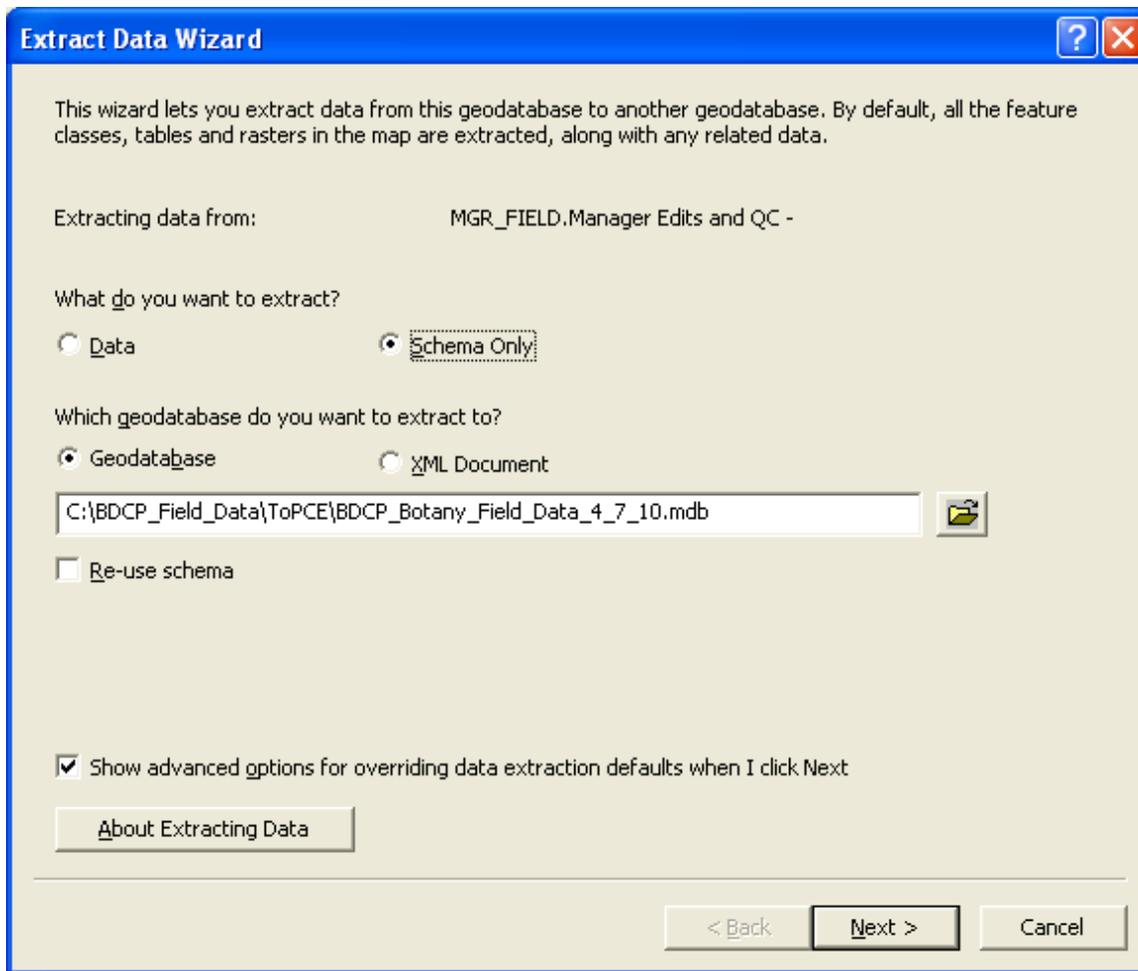
## Exporting Data or Schema from a Multiuser Geodatabase to a Personal Geodatabase

**NOTE:** In order to use the tools associated with GPS Analyst a personal geodatabase must be used. GPS Analyst does not work with file or SDE geodatabases.

**STEP 1:** *Open ArcMap.* Add data from the multiuser geodatabase to be exported.

**STEP 2:** *Select what gets checked out.* If you only want to check out a subset of records within a layer, select those records that are to be included by selecting them in the attribute table, by using the select by attribute tool, by using the select by location tool, or by using the selection tool to click on a feature or features to select them in the map. Alternatively, a definition query can be used. Either will be recognized by the “Extract Data” tool but not both at the same time.

**STEP 3:** Use the create extract data tool. Make sure the “Distributed Geodatabase” toolbar is active. Press the “Extract Data” button  on the toolbar. The following screen will appear:



**STEP 4:** *Specify geodatabase to hold data.* On the first page of the “Extract Data Wizard” specify where it says “What do you want to extract?” whether it is an empty schema that is to be created in the target geodatabase or if it is to hold data. Where it says “Which geodatabase do you want to extract to?” select Geodatabase and type the path and geodatabase name to hold the data. For the geodatabase name make sure to include the extension (either .mdb or .gdb). Alternatively, if the geodatabase already exists click the browse to button to the right and select existing database. Check the box next to “Show advanced...” and then press “Next”.

**Advanced Extract Data Options**

What spatial extent do you want to extract data for?

The current display extent  
 The full extent of the data  
 The boundary of the currently selected graphic  
 The following extent:

Left:       Top:       Right:   
 Bottom:

Choose which items you want to extract

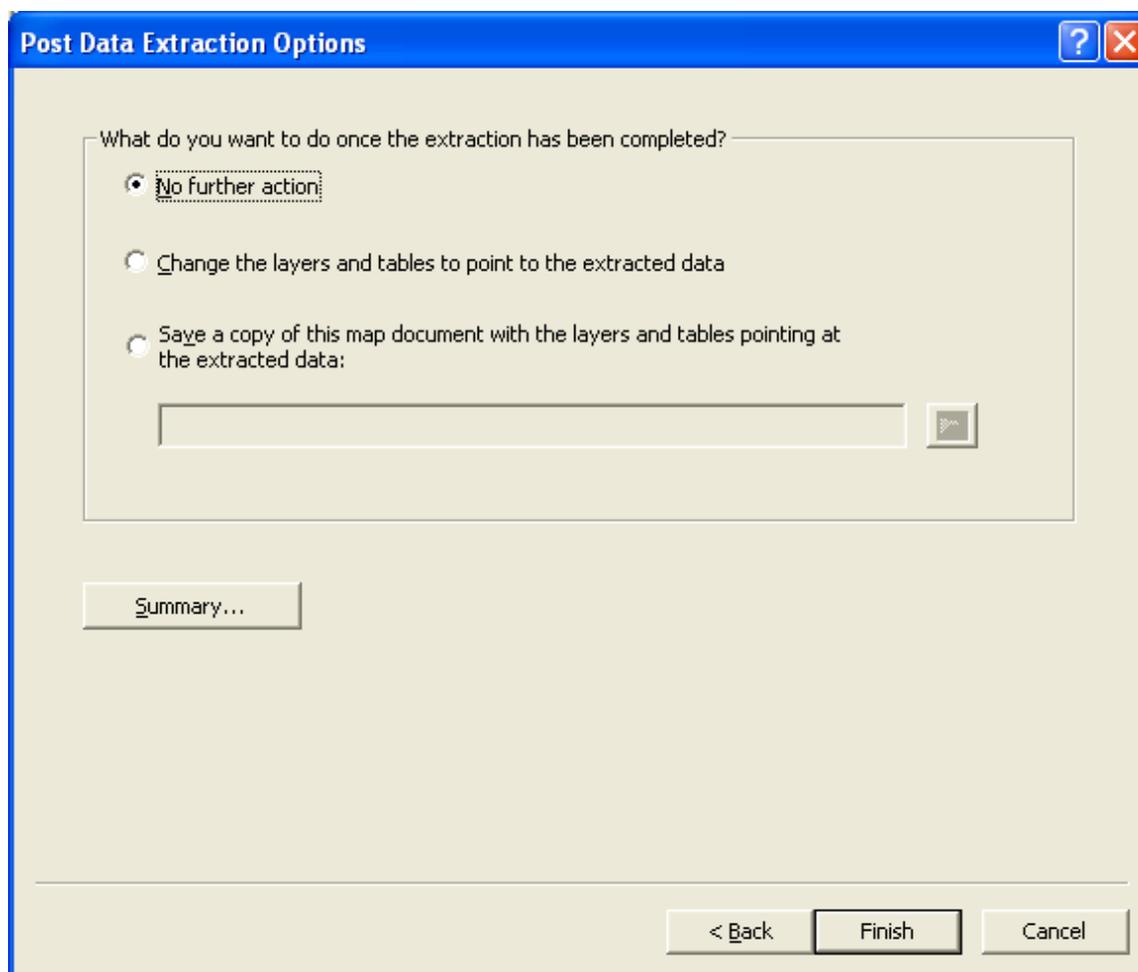
Include	Data	Type	Check
<input type="checkbox"/>	MGR_FIELD.botany_line_has_photos	Relationship Cla	
<input type="checkbox"/>	MGR_FIELD.botany_point_has_photos	Relationship Cla	
<input type="checkbox"/>	MGR_FIELD.botany_polygon_has_photos	Relationship Cla	
<input type="checkbox"/>	MGR_FIELD.BOTANY_PHOTOS_TABLE	Table	Schema

Extract related data

**STEP 5:** *Select details of what's extracted.* If "Schema Only" was chosen on the first page most of the options on the next page will be grayed out. Most likely the photos will not be needed so uncheck all relationship classes and photo tables. The photo tables require a lot of storage space and considerably draws out the time it takes the computer to run the extraction process. When done with this screen press "Next".



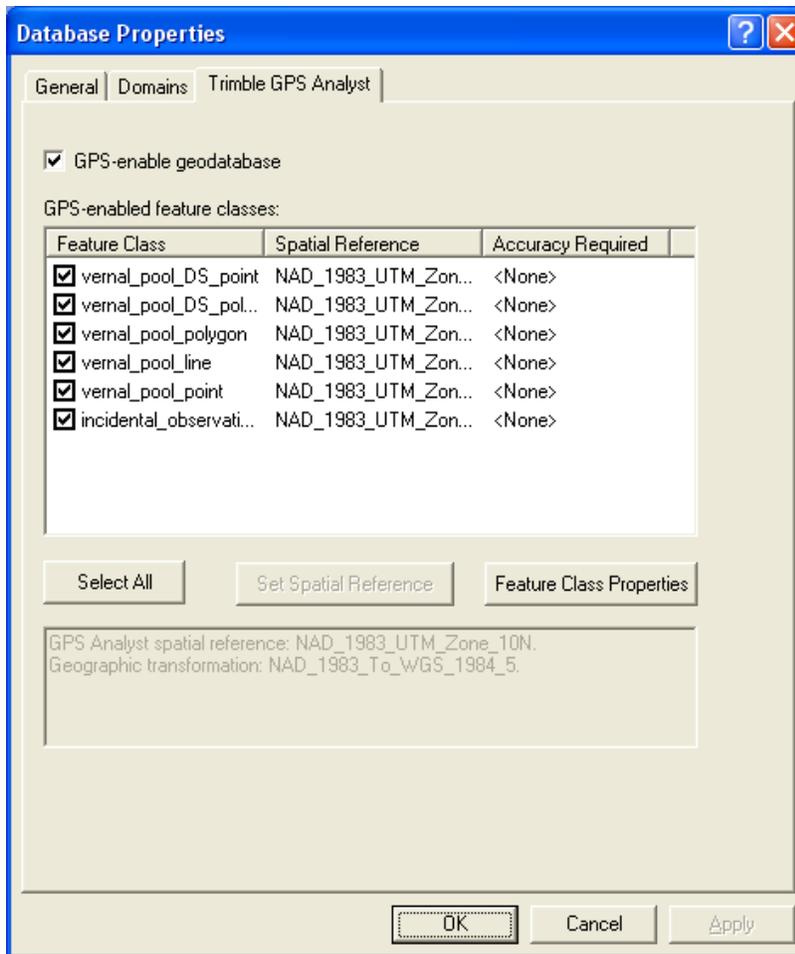
**STEP 6:** *Finish.* On the final page make a choice among the options given and press “Finish”.

### GPS Enabling a Personal Geodatabase

**NOTE:** This function relates specifically to using a geodatabase in conjunction with GPS Analyst. GPS Analyst provides post-differential correction and other tools. In order to use the tools associated with GPS Analyst, the temporary geodatabase being used to store the period’s field data must be a personal geodatabase and GPS enabled.

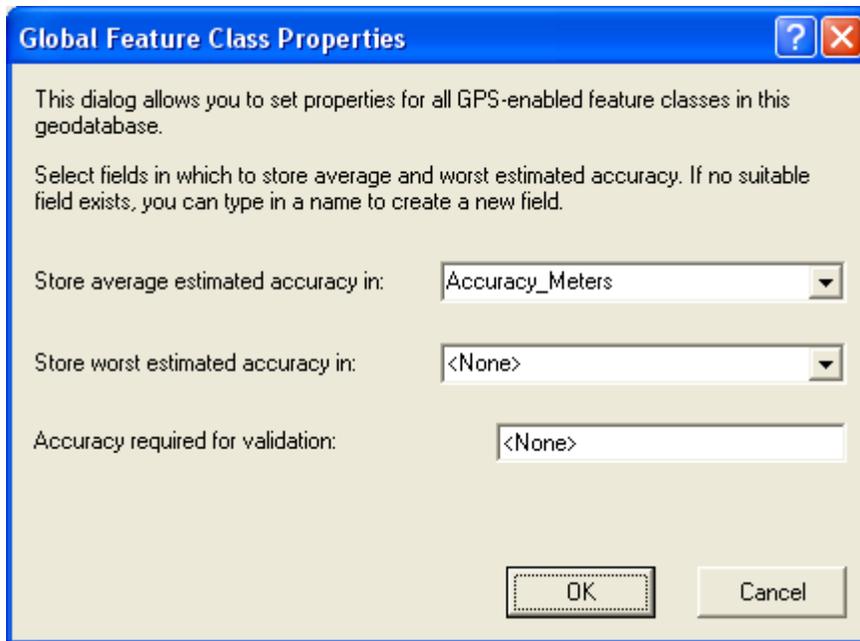
**STEP 1:** Open ArcCatalog. Navigate to the personal geodatabase that is to be GPS enabled.

**STEP 2:** Right click on the geodatabase. Choose properties from the provided menu. The following screen will appear:



**STEP 3: Select Feature Classes.** In the Database Properties screen, select the Trimble GPS Analyst tab. Check the box next to “GPS-enable geodatabase”, press the “Apply” button at the bottom and then check all boxes under “GPS-enabled feature classes” for those features that will be used during field data collection with a GPS. When the screen appears asking for the geographic transformation, choose “NAD\_1983\_To\_WGS\_1984\_5”.

**STEP 4: Set GPS accuracy field.** Click the “Feature Class Properties” button. The dialog box that will appear is shown below. Each feature class has a field named “Accuracy\_Meters”. Select that field from the drop down menu next to where it states: “Store average estimated accuracy in”. Leave other items to their defaulted values. Select OK when finished. Press OK once more to complete the GPS enabling.



## Creating an AXF File from a Geodatabase

**NOTE:** When creating an AXF there are a number of situations that can cause a problem. Those problems will cause recorded errors. To see the errors, open the XML file that is created at the same time the AXF is created and saved at the same location. Without viewing the file, the errors may go unnoticed until the AXF file is used in ArcPad. The following are known situations that will cause an error (items 1-3 only apply to situations with a relationship):

1. The primary key field has a value that has been used more than once. A primary key field must have unique values.
2. The foreign key field in the related table has a null value. In ArcPad the related table will be inaccessible.
3. The primary key field has a null value. This will cause random removal of records from the feature class which will cause some foreign key values in the related table to become null and will in turn cause the problem described in item 2 above.
4. Feature class has non-spatial records. This will show up as an error in the XML file and those records will not be included in the AXF file.

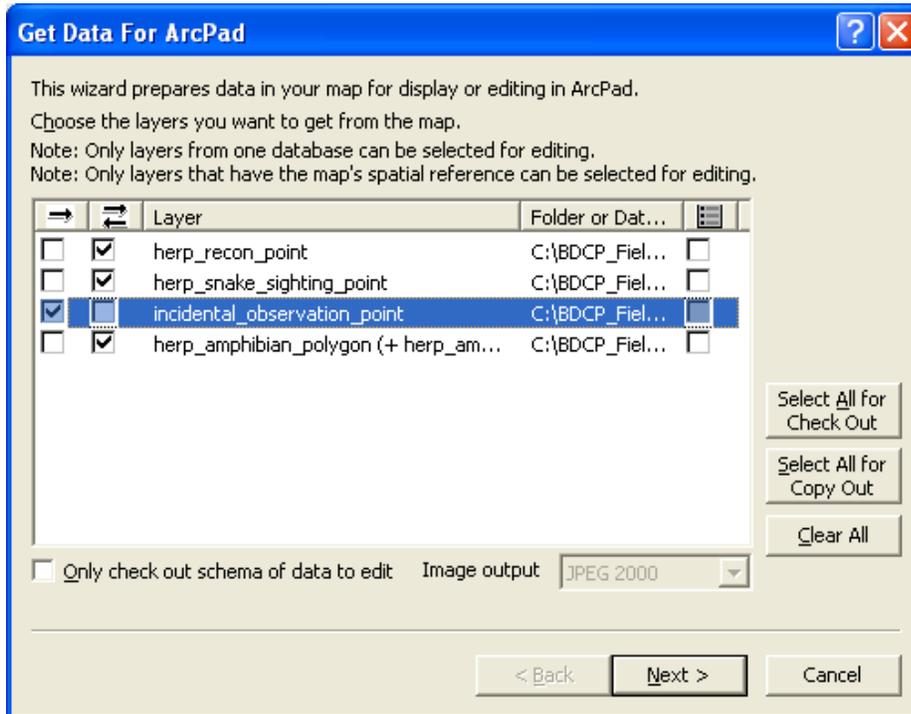
If the data in the AXF is to be post-differentially corrected, refer to Section 1 below; otherwise, use the instructions in Section 2.

### Section 1

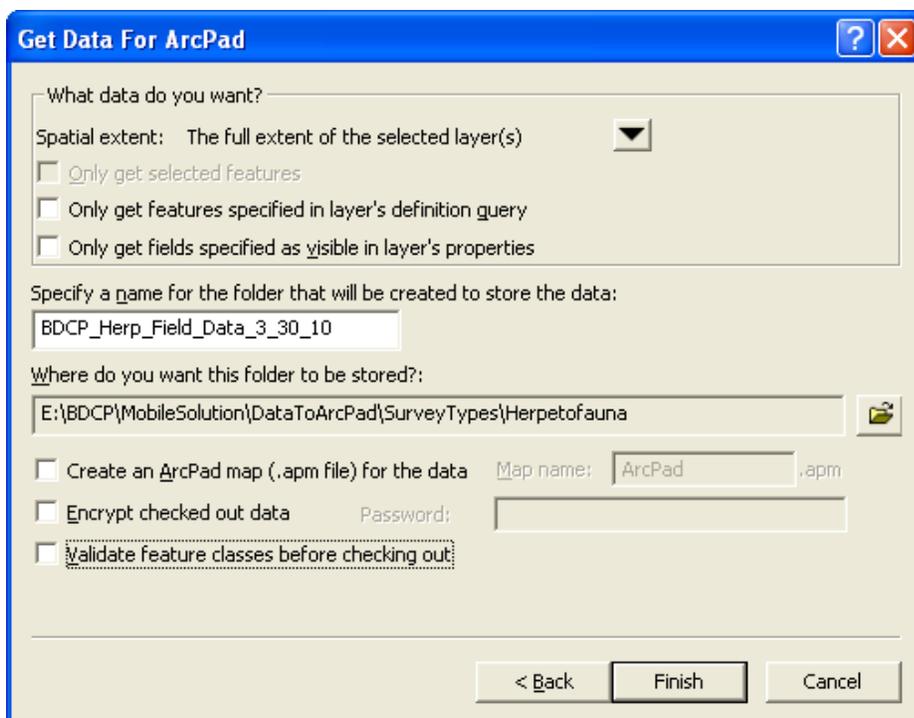
**STEP 1:** Use the “Add Data” button in ArcMap to *add data layers from a geodatabase that subsequently will be checked out to an AXF file.*

**STEP 2:** Use the “Get Data for ArcPad” tool. Confirm that both ArcPad and GPS Analyst have previously been installed on the computer. Make sure that both ArcPad Data Manager and GPS Analyst extensions have been turned on (Tools > Extensions), and that the GPS Analyst toolbar has been turned on (Tools > Customize). Also confirm that the AXF “check in” and “check out” buttons have been added to the Toolbar. Refer to GPS Analyst documentation if those buttons are not present on the Toolbar. The

corresponding icons are as follows: “Get Data for ArcPad” and “Check in ArcPad AXF file and GPSCorrect SSF”. On the GPS Analyst toolbar, select the “Get Data for ArcPad” button. The following screen will appear:



**STEP 3: Check out layers for editing.** Selections in the first two columns determine whether the layers will be checked out for editing or not. The first column has a single right-facing arrow, while the second has two opposite facing arrows. Check the box in the first column for layers that are not to be edited (they will be output as shapefiles). Check the box in the second column for layers that are are to be edited (they will be output as feature classes in the AXF file). Moving to the right side of the screen there are more checkboxes. This column allows you to assign data entry forms that were used with other AXF files or shapefiles to each of the listed layers. Choose whether or not to include the actual data or just the schema of the data by selecting the box at the bottom. When all selections have been made, click Next. The following screen will appear:

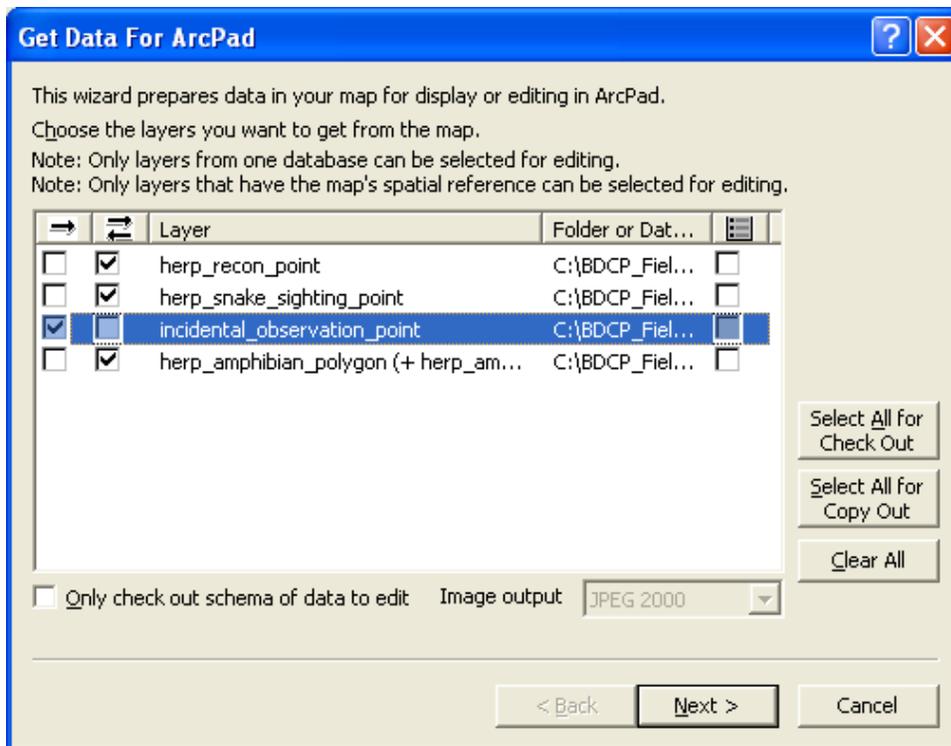


**STEP 4:** Complete final page. Under the section “What data do you want?”, specify the subset of data to be used (if any). Assign a name to the output folder (format: BDCP\_<resource type>\_Field\_Data\_<mm\_dd\_yy>), browse to the location in which to save the folder, and select “Finish”.

## Section 2

**STEP 1:** Add data layers that are to be checked out to an AXF file from an existing geodatabase to an open ArcMap window.

**STEP 2:** Use the “Get Data For ArcPad” tool. Make sure that ArcPad has already been installed on the computer and that the ArcPad Data Manager extension (Tools > Extensions) and the ArcPad Data Manager toolbar have both been turned on (Tools > Customize). On the ArcPad Data Manager Toolbar select the “Get Data For ArcPad” button . The following screen will appear:



**STEP 3: Check out layers for editing.** Selections in the first two columns determine whether the layers will be checked out for editing or not. The first column has a single right-facing arrow, while the second has two opposite facing arrows. Check the box in the first column for layers that are not to be edited (they will be output as shapefiles). Check the box in the second column for layers that are to be edited (they will be output as feature classes in the AXF file). The right side of the screen includes more checkboxes that will allow you to assign data entry forms that were used with other AXF or shapefiles to each of the listed layers. Choose whether or not to include the actual data or just the schema of the data by selecting the box at the bottom. When all selections have been made, click Next. The following screen will appear:

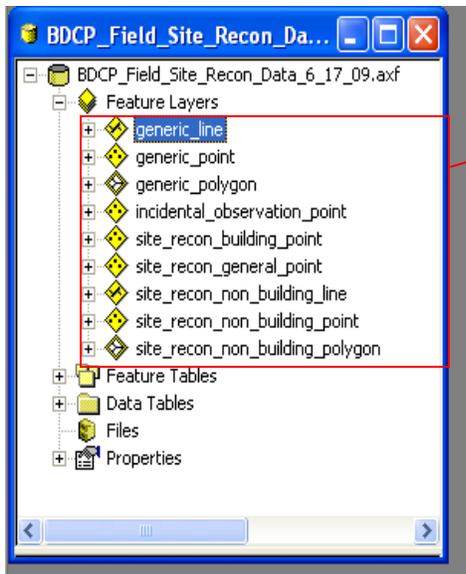
**STEP 4:** *Complete final page.* Under the section “What data do you want?” specify the subset of data to be used (if any). Assign a name to the output folder (format: BDCP\_<resource type>\_Field\_Data\_<mm\_dd\_yy>), browse to the location in which to save the folder, and select “Finish”.

## Creating Data Entry Forms

**STEP 1:** Start the ArcPad Application Builder program.

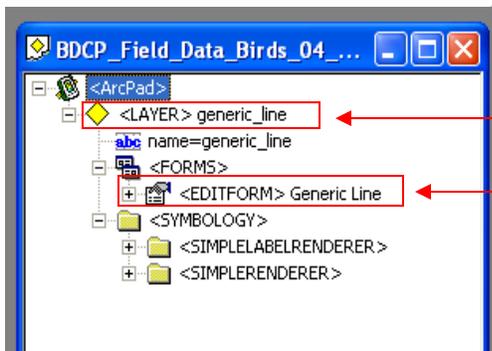
**STEP 2:** Open an AXF file or ArcPad layer file (.apl if using a shapefile) in ArcPad Application Builder.

**STEP 3:** Select the Layer from which to create the form. An AXF can have multiple layers contained within it. Refer to the image below to see where to find the layers:



Select one and double-click

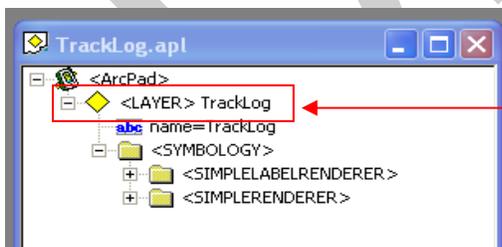
If a data form has already been created, the window will include:



Select "<LAYER> generic line"..

If the layer contains <EDITFORM> as shown here, it means that a data form has already been created. . To use this form, double-click "<EDITFORM>..." to open the form. ..Editor" and jump to STEP 5

If a data form has not already been created, the window will be similar to:

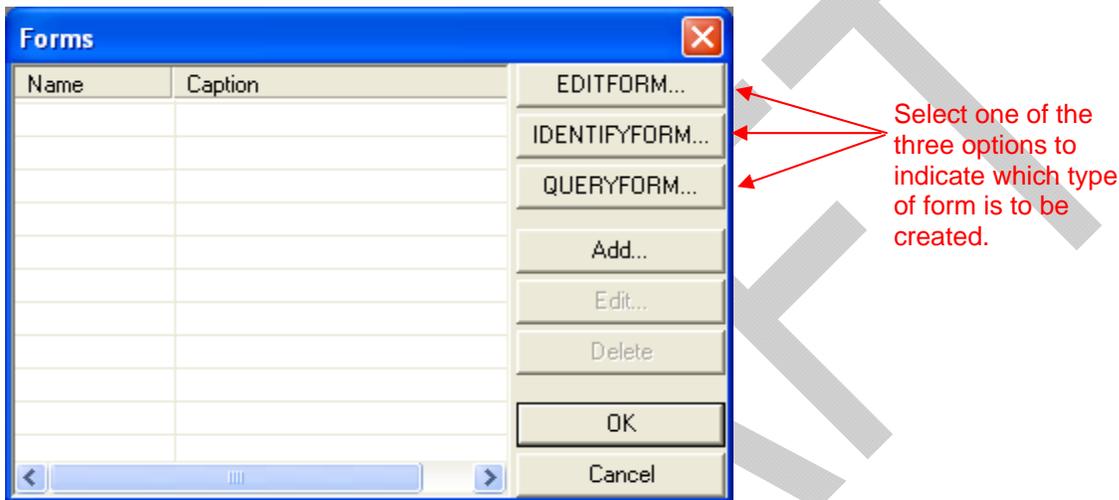


Select this layer and move to Step 4.

**STEP 4:** Select the “Create Form” button. The “Forms” button is located on the top toolbar as shown below:

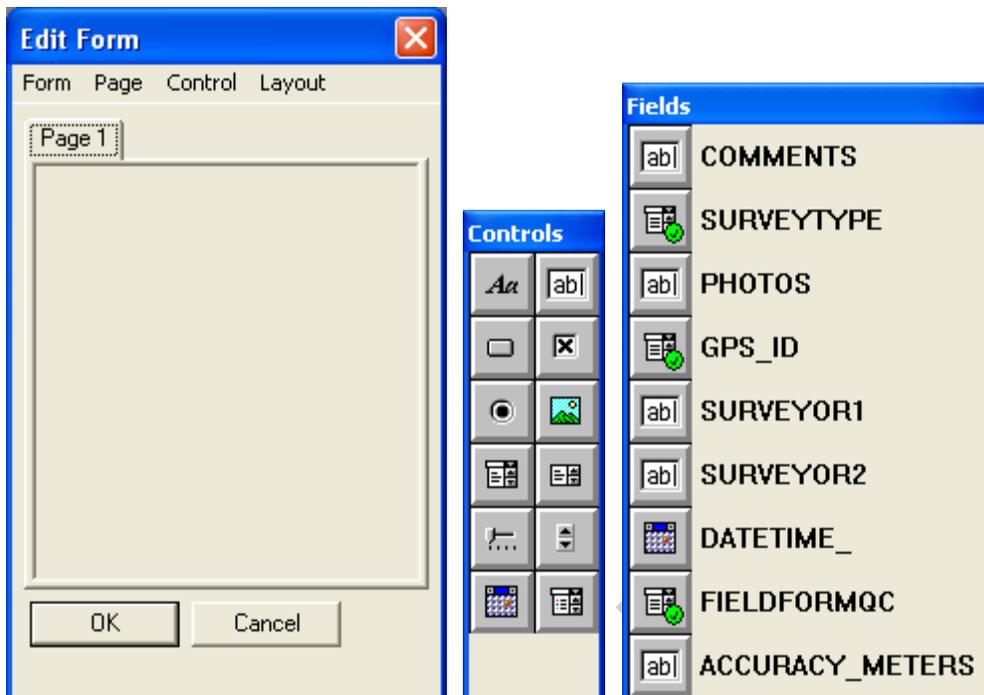


The following screen will appear:



The “Edit Form” option creates a form that is used in ArcPad for data editing. A read only “Edit Form” will also display when the “Identify Tool” is used unless a different “Identify Form” is created. Alternatively though, an “Identify Form” cannot be used in ArcPad for data editing. The “Query Form” option is used to create a form specifically for querying the data. For this program, only the “Edit Form” option is being used. Select “EDITFORM”.

**STEP 5:** Design the Form. When “EDITFORM” is selected, the following windows will appear:

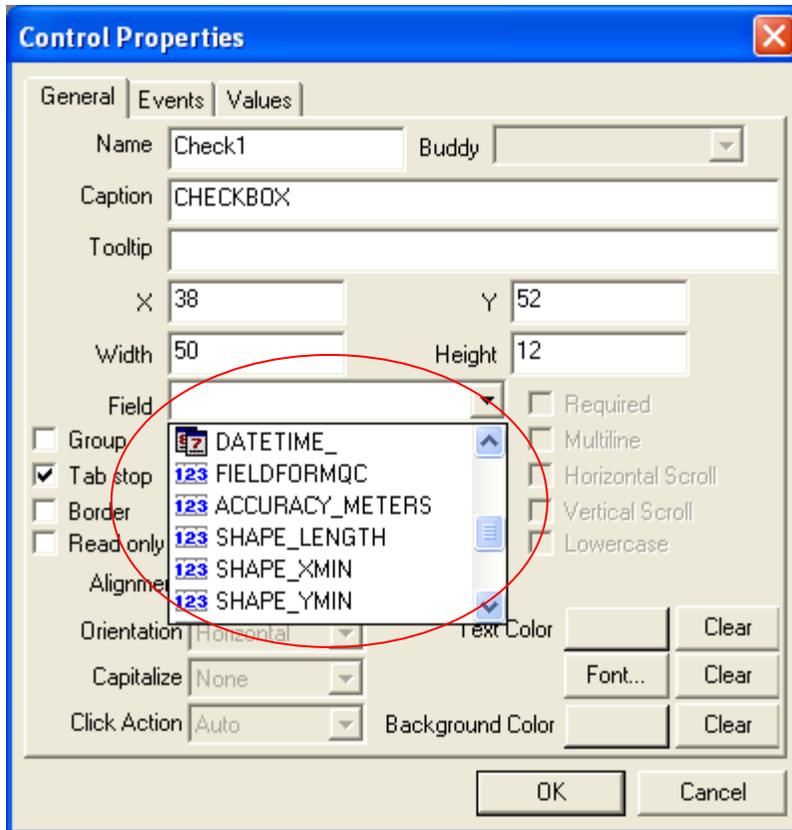


A form contains a series of controls. Text is considered a “Control”. The “Control” window contains the suite of controls that can be included in a form. To add a Control to the form, select and drag one of the “Control” icons from the “Controls” window to the “Edit Form” window (shown on left). The “Properties” window will appear when the control is placed in the “Edit Form” window. For updating already existing controls, the “Control Properties” window can be accessed by double-clicking an existing control on a form. The “Control Properties” window allows for the adjustment of the control’s position on the form, the field that the control is tied to, and other functions.

The “Fields” window (shown above to the right) contains all current fields included in the layer; the icon to the left of each field shows the *type* of control most likely to be used for that Field. Click on and drag a Field over to the Edit Form and the control previously added to the Edit Form will be linked to that field. This is the ideal way to create the controls.

There are some fields that will need to be created with a different control link than the default suggested. The “FIELDFORMQC” field in the “Field” window above is an example. The default field control shown for “FIELDFORMQC” is a combo box. In this case, although the combo box also provides a “yes/no” field, for this project, a checkbox field is preferred (checked = yes, unchecked = no).

To change the control link for a field: 1) Click and drag the checkbox control  from the controls window over to the “Edit Form” screen; 2) A window (as shown below) will appear. Select the field “FIELDFORMQC” from the dropdown menu for the “Field” property.



**STEP 6:** Click OK to complete this task. Within the ArcPad studio main window, save. If all controls have been created, close the program to end this session.

## ArcPad Common Tasks Guide

### Task 1: Starting ArcPad on the GPS

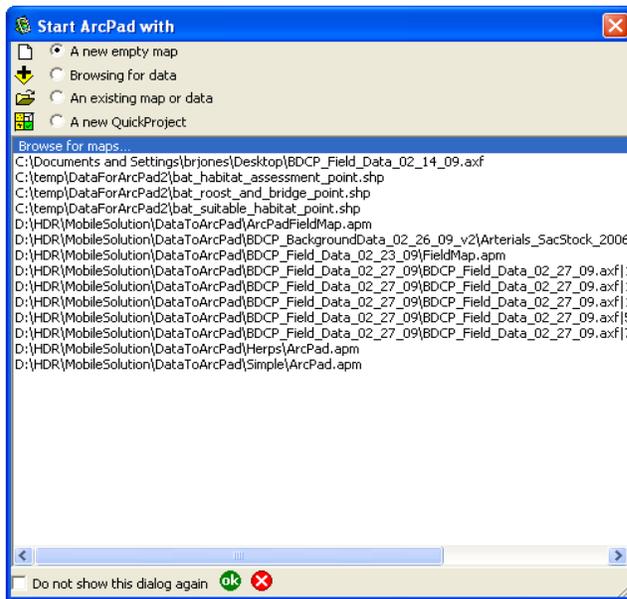
**STEP 1:** To power on the Trimble GPS, push the green button located at the bottom right of the handheld. The Windows Mobile desktop will open. This may take a few minutes as the Trimble GPS boots up. When the Windows Mobile desktop appears, using the attached stylus, touch START at the top left hand corner of the screen. A drop down menu will appear. Select "Programs" from the bottom of the menu. A new window will appear; find the icon shown below:



Touch the icon shown above and ArcPad will start.

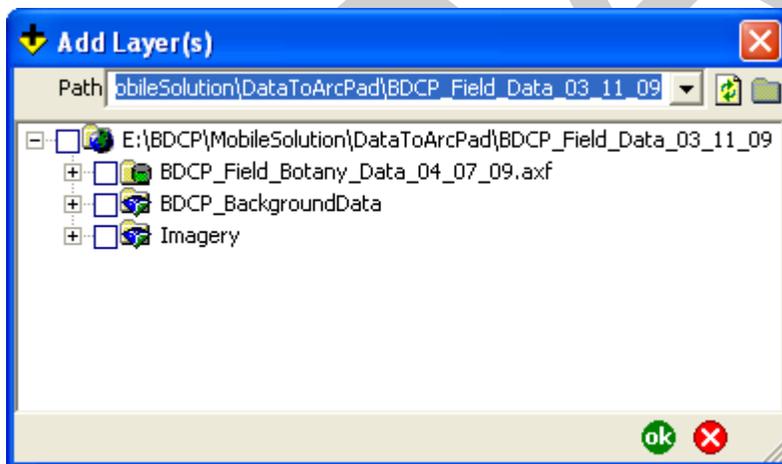
*Tip:* When using the stylus, it is a common mistake to hold the stylus on the screen too long. Quickly touch the screen and let up on the stylus for best response.

**STEP 2:** After starting ArcPad (it will take a minute or two to start up) a window similar to the one shown below will appear:

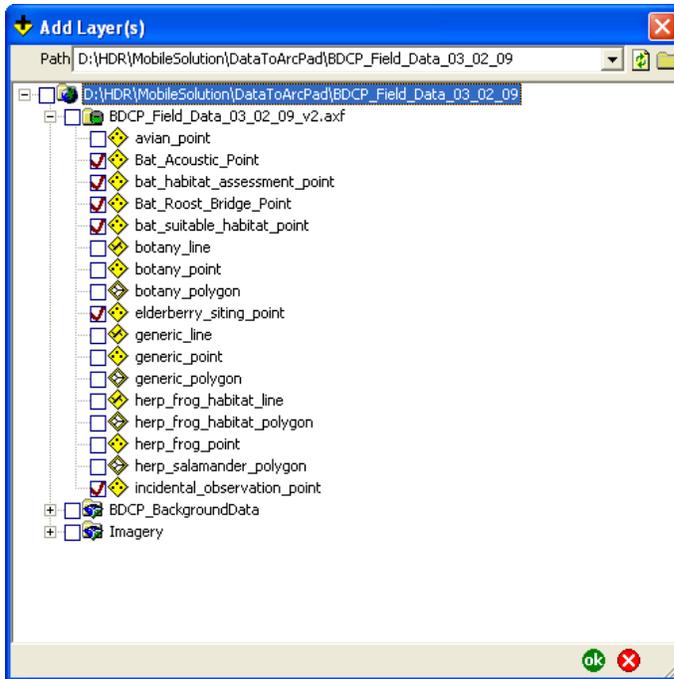


The window shows all files that have been accessed on this handheld using ArcPad. Select “Browsing for data” among the four options at the top (*this is to be performed for initial use only*). Alternatively, if a map has already been saved with pre-selected layers and symbology, confirm the name of the .apm file shown in the window is the map to be accessed, and select “An existing map or data” from the four options. Touch the green OK icon at the bottom of the window to move to the next step.

**STEP 3a:** If the “Browsing for data” option was selected in Step 2, the screen below will appear:



The file shown above “BDCP\_Field\_Botany\_Data\_04\_07\_09.axf” is an ArcPad geodatabase. An AXF for each of the resource types has been created. Each resource’s AXF file contains the form that has been developed for that specific resource. Check the box next to the AXF file itself and the plus sign next to “BDCP\_BackgroundData” to see a list of layers that can be used as background information. Imagery is also available; also select the plus sign next to “Imagery” to navigate to the location of the imagery. It is suggested to only select layers that are required for the field effort. The Trimble GPS will run out of RAM memory and cease to work if too many layers get added. Be careful when imagery is added. If imagery is to be used, it is suggested to use only the AXF file and one background file in addition to the imagery. After selecting the layers (see screen below), touch the green OK icon at the bottom of the window.



**STEP 3b:** If the “An existing map or data” option was selected in Step 2, a window will appear listing all the .apm files available on the Trimble GPS. Select the preferred map and touch OK.

**Task 2: Recording a New Point Feature**

**STEP 1:** *Turn on GPS function.* To add a point feature to a GIS layer based on GPS coordinates (versus just tapping on the screen with the stylus in a location on the shown map), first activate the GPS. To do this, on the main ArcPad screen, touch the icon shown below:



The window below will appear:

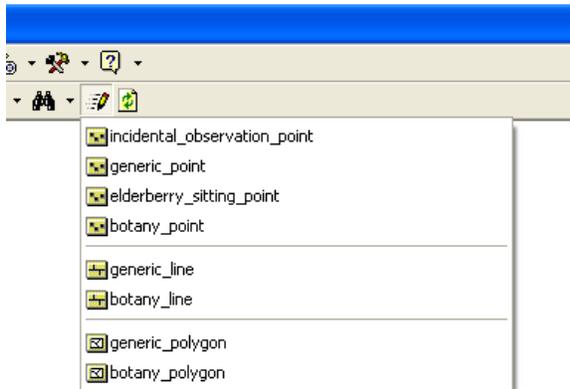


Initially, “NOFIX” will appear in the window. This will change to “2D” once the device has locked on to enough satellites. At this point, the window should be showing the Latitude and Longitude of your current position, and will indicate whether or not the device is ready for data collection. Once GPS is activated, it will not be necessary to repeat this step for the remainder of the current ArcPad session. Select the red “X” box to close the “Position” window.

**STEP 2:** *Begin recording a new point.* First identify on ArcPad which point layer to edit. To do this, touch the “Edit Layer” icon shown below:



A list of the available layers will appear similar to the list shown below:



The layers are divided into geometry groups: all of the point layers are grouped together, all of the line layers are grouped together, and all of the polygon layers are grouped together. Choose the point layer to edit.

Once a layer is selected for editing, the Editing Toolbar will automatically appear below the two default toolbars as shown below:



**STEP 3:** Touch the “edit point” icon as shown below:



Once this icon is selected, touch a location on the map displayed on the screen to manually add the point, or add the point by GPS unit location as follows (the below icon will be available on the screen):



Touch the above icon; a point will be recorded based on the unit’s current position. Once the icon is selected, it will take about 10 seconds for the Trimble to process the position information and bring up a data entry form. The form will look similar to the image below:

The image shows a software window titled "Botany Point". At the top, there are two tabs: "Initial Info" and "Species". Below the tabs, there is a date field showing "3/ 3/2009". Underneath the date field are two text input fields labeled "Surveyor1" and "Surveyor2". Below these is a dropdown menu for "GPS ID" with the value "<Null>" selected. At the bottom of the form is a text input field for "Photo #s". In the bottom left corner of the window, there are two buttons: a green "ok" button and a red "cancel" button.

**STEP 4:** In the image shown above, the tabs are located at the top of the window, while on the GPS unit they will be positioned at the bottom. For information that requires typed entry you must use the "keyboard". The "keyboard" icon is located at the bottom right of the screen and can be difficult to see because it is white. In the event the activated "keyboard" hides a field that requires data entry: 1) touch the field with the stylus; 2) touch the "keyboard" icon. This will not prevent the keyboard from hiding the field but will ensure that you are typing in the correct field. To view the field during the typing process, touch the "keyboard" icon to temporarily hide the keyboard and review entered text, then touch the icon again to reactivate and resume typing.

**STEP 5:** Some layers are associated with tables that enable the user to record more than one species per point. If the layer is associated with a table, the "Related Table" tab will be shown on the field form. Please refer to the image below:

“Attributes”  
table icon  
and tab

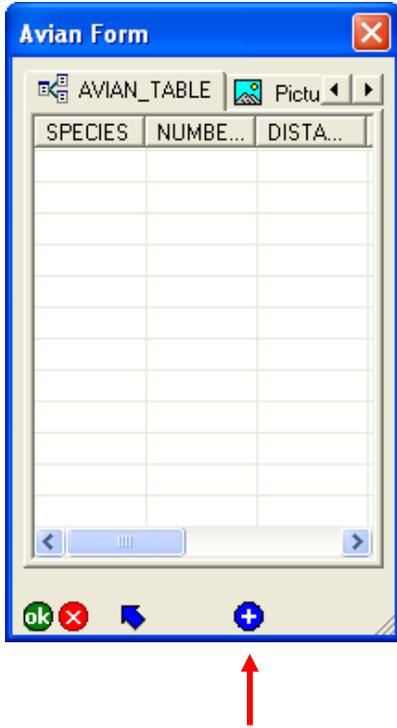
Icon and tab  
for related  
table.

The screenshot shows a window titled "Avian Form" with a close button in the top right corner. Below the title bar, there are two tabs: "Attributes" (selected) and "AVIAN\_TA". The main area contains a table with two columns: "Property" and "Value". The table has the following rows:

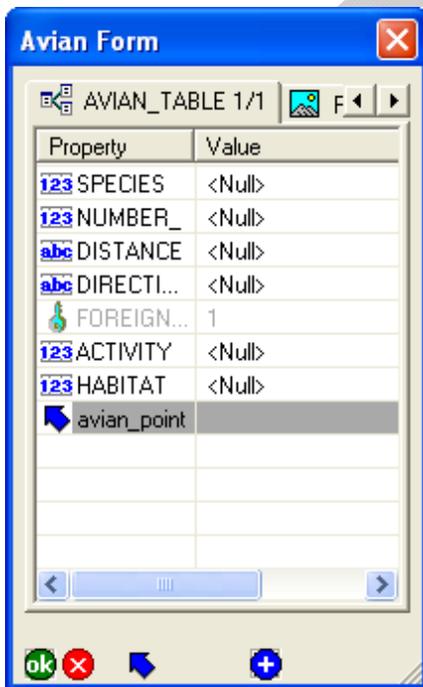
Property	Value
abc SURVEY...	
abc SURVEY...	
7 DATETIM...	<Null>
123 GPS_ID	<Null>
abc PARCELA...	
123 WEATHER	<Null>
abc TEMPER...	
abc COMMEN...	
abc PHOTOS	
123 FIELDFO...	No
AVIAN_T...	None

At the bottom of the window, there are three buttons: "ok", a red "X" button, and a blue arrow button.

Scroll through the form tabs to find the “Attributes” table tab. Following the “Attributes” table tab, the related table tab will be found. When the related table tab is selected, it will resemble the image below:

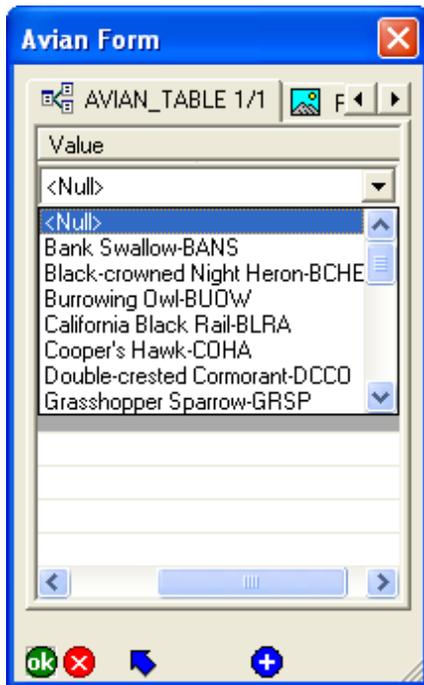


To add an “occurrence” to be associated with the new point, in this example it’s a “Species of Bird”; click on the blue plus sign located at the bottom of the window. The following image will appear:



The information that will be associated with each attribute as defined for this form will be visible. Click in the cell below “Value” next to an attribute to insert information for that attribute. Below is an example of

selecting the species property. The drop down menu appears after the user clicks on the cell in the “Value” column corresponding to the field “SPECIES”.



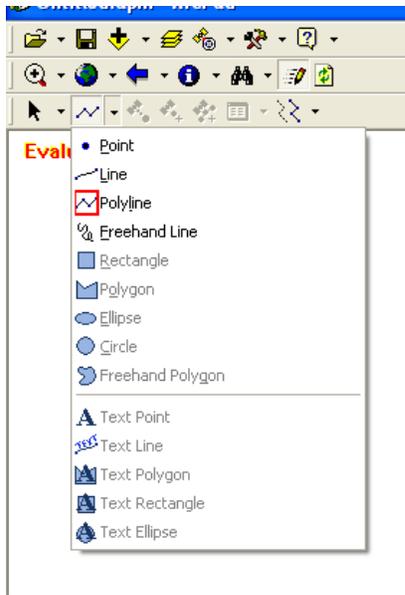
To add another occurrence, which in this example would be another bird species and its associated information, click on the plus sign at the bottom. Continue performing this procedure until all the occurrences have been recorded. Click on the green OK icon at the bottom of the window when finished.

### Task 3: Recording a New Line Feature

**STEP 1:** Steps associated with this task are similar to those of Task 2. Refer to Step 1 in Task 2 (above) for information regarding activating the GPS function. For this activity, Step 2 would change to selection of a line layer for editing (instead of a point layer); a “polyline” should be specified as the type of geometry to be collected. Please refer to the image below:



If a line layer is the only item selected for editing, then the “polyline” symbol is automatically chosen as the Geometry type. If both a point and line layer is selected for editing, the geometry type for editing will need to be specified. To do this, click on the down arrow key to the right of the “Geometry” icon and select “Polyline”. An example of the dropdown menu is below:



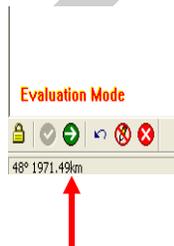
**STEP 2:** After the polyline geometry is selected, the polyline can be edited on the screen manually or can be collected by current GPS position. There are two options for collecting a line by GPS unit position. The first option allows the collection of one vertex (i.e.; segment point) at a time. To use this option, select the button located on the toolbar as shown below at each vertex along the line:



The second option allows the GPS to collect the vertices automatically. To use this option, click the streaming icon (shown below) to initiate:



With the streaming icon selected, walk the line. Upon completion, click on the green right arrow at the bottom of the screen:



Clicking on the green right arrow initiates the Data Collection form. Please refer to Task 2, Steps 4 and 5 for the remaining steps in the activity.

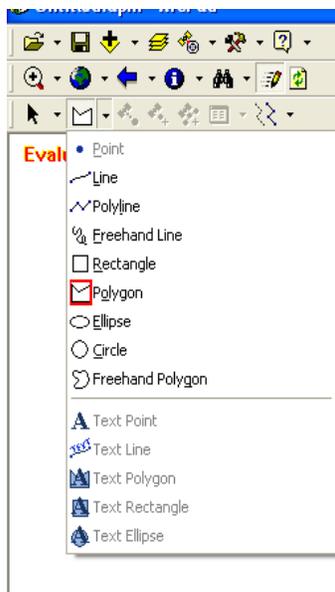
#### Task 4: Recording a New Polygon Feature

**STEP 1:** Steps associated with this task are similar to those of Task 2. Refer to Step 1 in Task 2 (above) for information regarding activating the GPS function. For this activity, Step 2 would change to selection of a polygon layer for editing (instead of a point layer); the steps associated with this task are similar to

Task 2. Refer to Step 1 in Task 2 for information regarding activating the GPS. After completing Steps 1 and 2 in Task 2, assuming a polygon layer to edit was selected in Step 1, a polygon must be specified as the type of Geometry to be collected. Please refer to the image below:



If a polygon layer is the only item selected for editing, then the “polygon” symbol is automatically chosen as the Geometry type. If both a point layer and a polygon layer are selected for editing, it will be necessary to specify which geometry type is to be edited. To accomplish this, click on the drop down arrow to the right of the “Geometry” icon (see figure above) and select “Polygon” from the dropdown menu that appears:



**STEP 2:** Once the polygon geometry is selected, edits can be performed manually on the screen or collection by GPS position can be performed. There are two options for collecting a polygon by GPS position. The first option allows the collection of one vertex at a time. To use this option click on the button located on the toolbar (shown below) at each vertex along the line:



The second option allows the GPS to collect the vertices automatically. To use this option, click the streaming icon (shown below) to initiate:



With the streaming icon selected, walk the perimeter of the polygon. Upon completion, click on the green right arrow at the bottom of the screen:



Clicking on the green right arrow initiates the Data Collection form. Please refer to Task 2, Steps 4 and 5 for the remaining steps in the activity.

## Data Management by the EFS

For information regarding the steps to be taken for an EFS to obtain an AXF file to use for field data entry, as well as steps for end-of-day file and photograph uploads, please refer to Appendix A.

## Checking in AXF Files

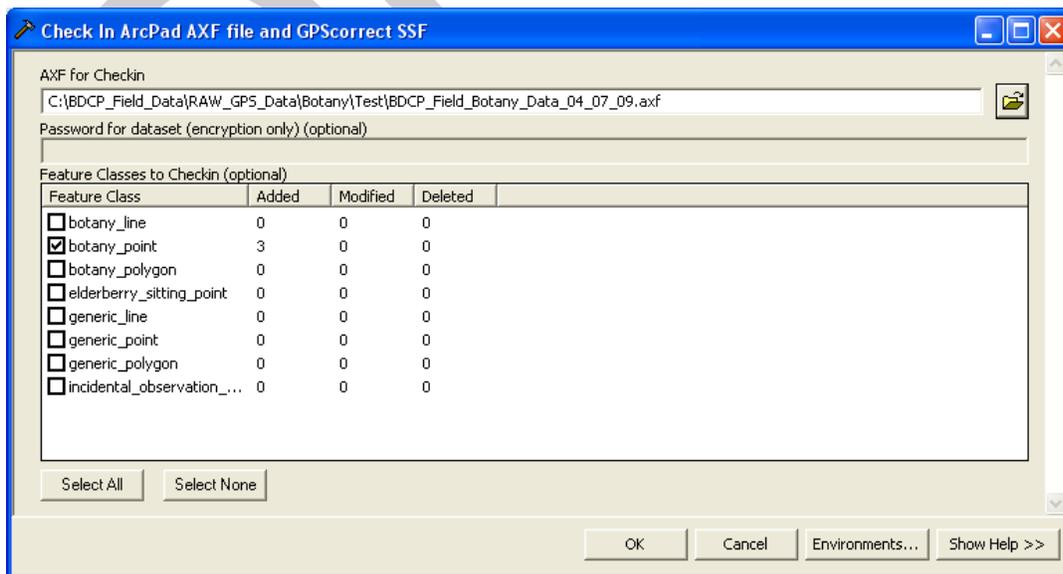
If the data in the AXF is to be post-differentially corrected (increases feature accuracy by 1-2 meters) begin with Section 1 below, otherwise skip to Section 2.

### Section 1

**STEP 1:** Open ArcMap.

**STEP 2:** Use the “Check in ArcPad AXF file and GPSCorrect SSF” tool. Confirm that both ArcPad and GPS Analyst software has been installed on the computer. In addition, confirm that ArcPad Data Manager and GPS Analyst extensions have been initiated (Tools > Extensions), and that the GPS Analyst toolbar has been turned on (Tools > Customize). Finally, confirm that the AXF “check in” and “check out” buttons have been added to the toolbar. Refer to GPS Analyst documentation for instructions as necessary. The icons include: “Get Data for ArcPad” and “Check in ArcPad AXF file and GPSCorrect SSF”.

On the GPS Analyst toolbar click on the “Check in ArcPad AXF file and GPSCorrect SSF” button. The following screen will appear:



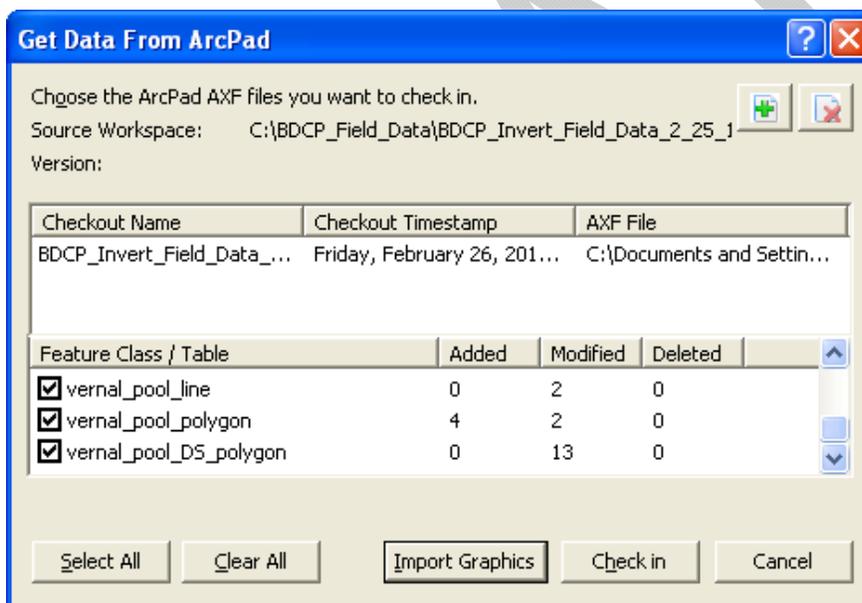
**STEP 3: Add AXF.** Click the folder button at the right of the tool to browse to the location of the AXF and SSF files (both files need to be located together in the same folder). Select the appropriate AXF file for editing. Once the AXF has been added to the tool, the column “Feature Class” will reflect all feature classes contained in the selected AXF. Select all feature classes that have a number greater than zero in any of the columns to the right of each name. When completed, select OK. This will initiate the tool run. Occasionally, when the tool has completed its run or experiences an error during processing, the above screen will reappear with some of the feature classes showing all columns changed to zero. Uncheck those feature classes that have been changed and select OK.

*NOTE: It is suggested to record the numbers associated with each feature class and table under the “Added”, “Modified”, and “Deleted” columns. Sometimes all changes do not make it over to the geodatabase. A comparison between the recorded numbers and what quantities are contained in the feature classes and tables after the check in is complete is recommended.*

## Section 2

**STEP 1:** Open ArcMap.

**STEP 2:** Use the “Get Data for ArcPad” tool. Confirm that ArcPad has been installed on the computer and the ArcPad Data Manager extension has been turned on (Tools > Extensions). Also make sure the ArcPad Data Manager toolbar has been turned on (Tools > Customize). On the ArcPad Data Manager toolbar, select the “Get Data from ArcPad” button . The following screen will appear:



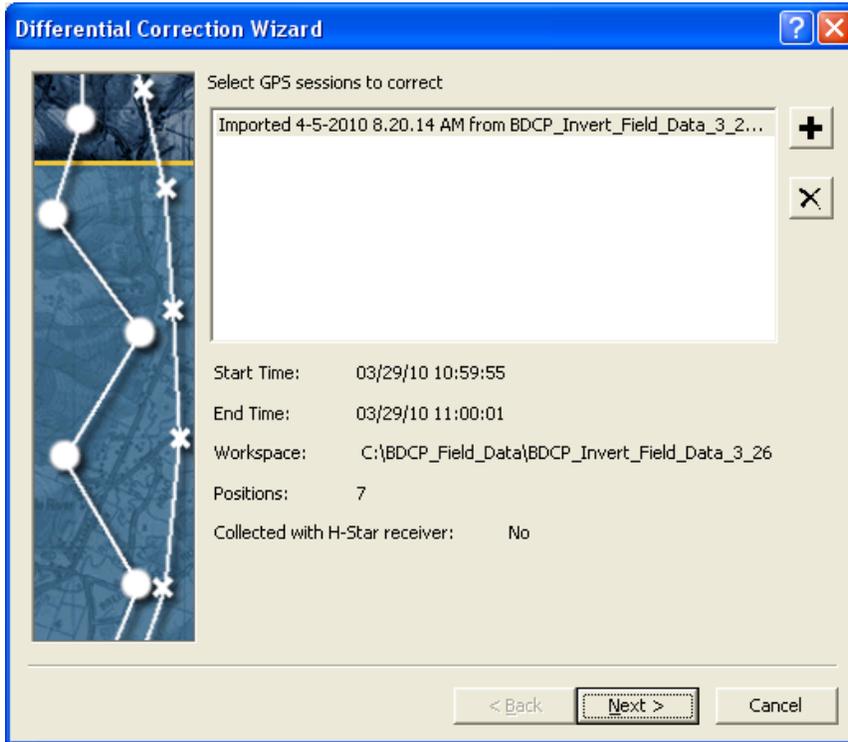
**STEP 3: Add AXF.** Click the green plus sign at the top right corner of the window and a “browse to AXF file” dialog screen will appear. After completing the “add AXF” function, the feature classes contained in the AXF will be displayed under the “Feature Class/Table” column. The remaining columns indicate how many records were added, deleted, or modified in each feature class. Select “Check in”. The following screen will appear describing the results of the check in:

*NOTE: It is suggested to record the numbers associated with each feature class and table under the “Added”, “Modified”, and “Deleted” columns. Sometimes all changes do not make it over to the geodatabase. A comparison between the recorded numbers and what quantities are contained in the feature classes and tables after the check in is complete is recommended.*

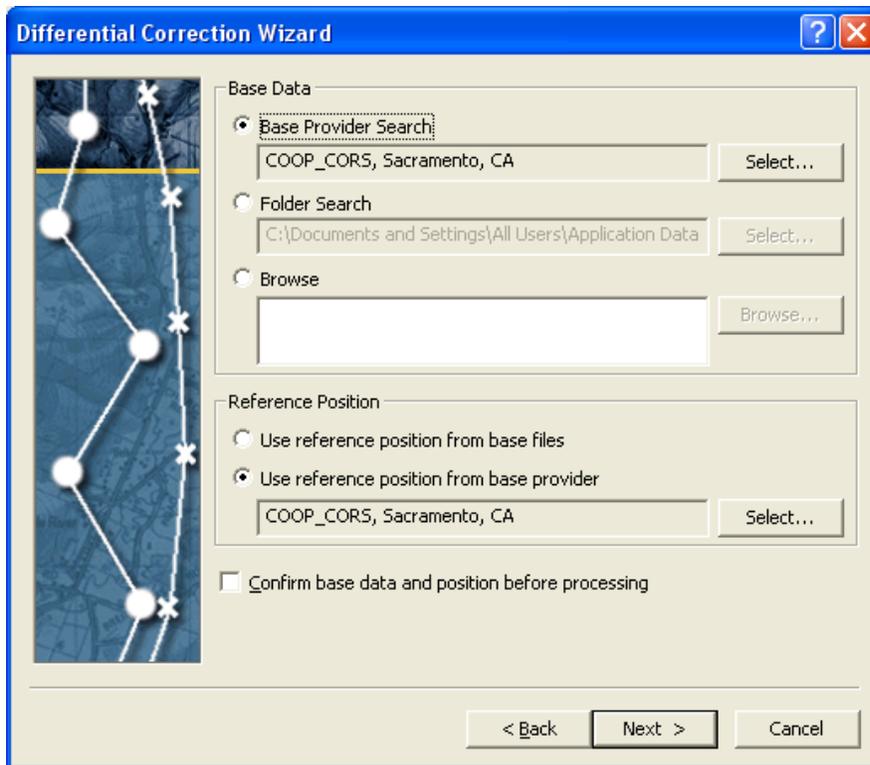
## Post Differential Correction

**STEP 1:** Open ArcCatalog. Browse to the GPS Enabled geodatabase to be edited.

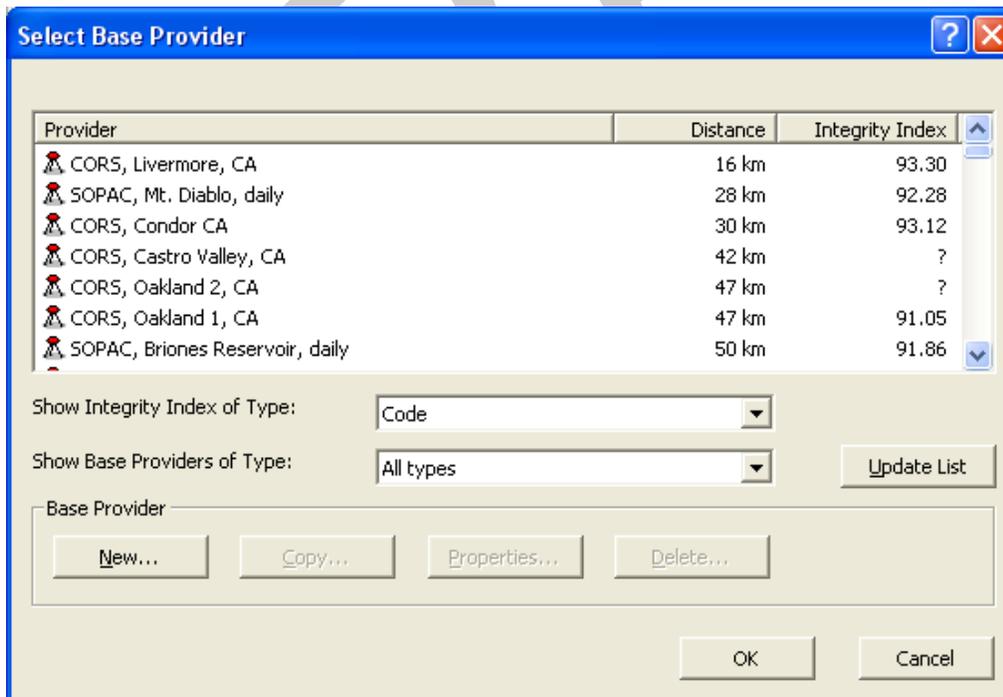
**STEP 2:** Select undifferentially corrected SSF files. Within the geodatabase, open the folder called “GPS Sessions”. All of the SSFs that have been imported into the geodatabase will be listed. For any files that have previously been differentially corrected, a listing with a bullseye symbol will be displayed; the listing will note the name of the SSF file that has been corrected and when the correction was performed.



**STEP 3:** *Run post differential correction.* Right click on an SSF file that has not been post differentially corrected. Select the “Differential Correction” button. The “Differential Correction Wizard” will open. The first field will include the name of the SSF file that was selected for differential correction. The bottom half of the screen will provide information about the SSF file. Click “Next” three times to page through screens that should be left to defaulted values.



**STEP 4:** *Select base provider.* At the top of the 4<sup>th</sup> screen (shown above) confirm that the radio button next to “Base Provider Search” is selected and then click the “Select” button to the right of the field. The following screen will appear:



The base provider stations will be shown sorted from closest to furthest from the location at which the SSF file was recorded. For best results, select the closest location with the highest “Integrity Index”. Select the “Update List” button to refresh the list from the internet in case new base stations have become operational since the last update. For the next three screens, select “OK”, “Next”, and finally, “Start”.

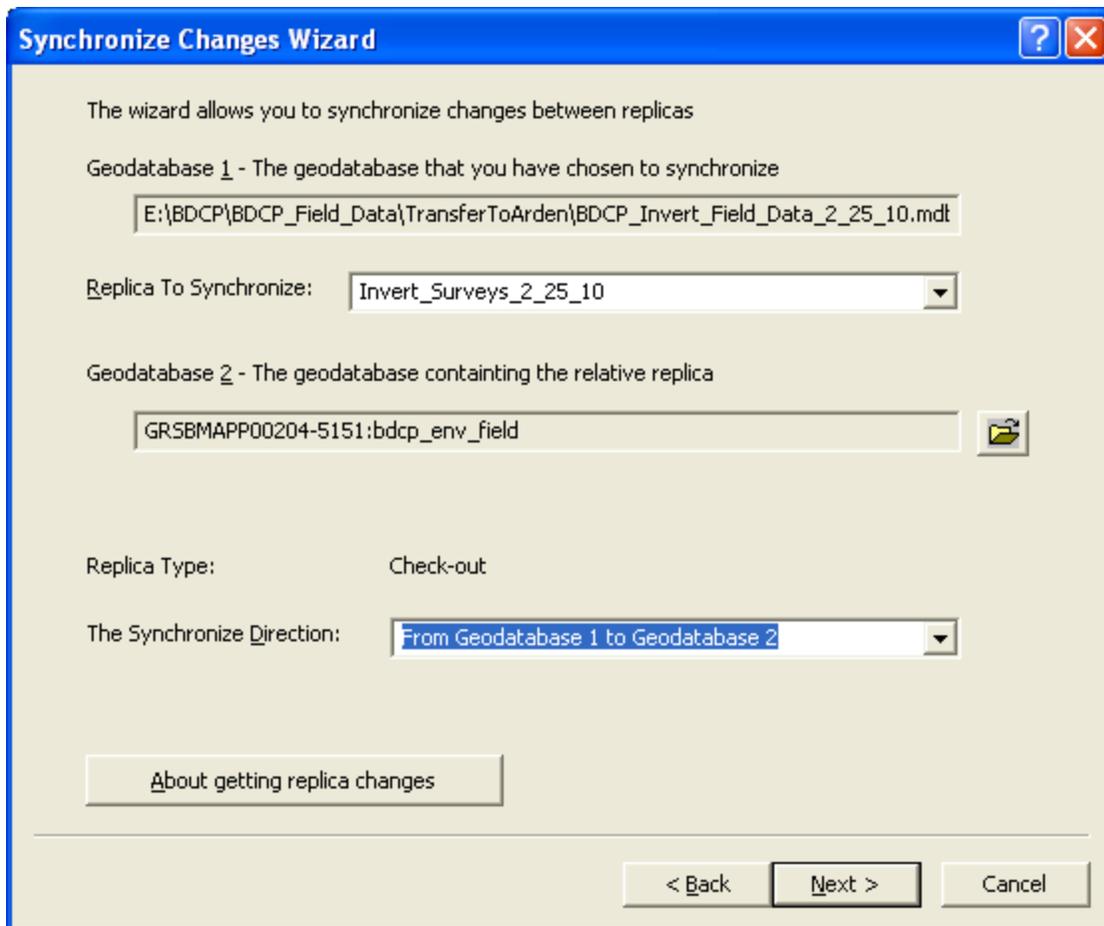
**STEP 5: Review Report.** As the different steps in the process are being performed, a report will be displayed on the screen. Occasionally, the wizard will be unable to find, download, or open base data from the base provider station that was selected. If this happens, select the “Back” button at the bottom until the “Base Provider Search” screen is shown. Select a different base station and try again. Click the “Next” button twice and restart the correction by selecting “Start” on the final screen. Review the final report to assure the quality and effectiveness of the process. The best results will be indicated by the following items within the report. The section of the report labeled “Coverage Details” should show 100% coverage. In the section where it says “Differential Correction Summary” it should say 100% of the selected positions were code corrected... and within that same section it should have 100% of the positions falling between 0-15cm and 2-5m for estimated accuracies.

### “Check Out” Replica Geodatabase Synchronization

Replica synchronization is the process of transferring edits from one geodatabase to another. One of the geodatabases needs to be the parent geodatabase and the other the child replica geodatabase of this parent. For this project, this applies to intermediary geodatabase replicas from which AXF files are checked out and back into, for disconnected editing (i.e.; editing of the data offsite). In addition, it will be used for transfer of edits from the geodatabase in the production environment to the geodatabase in the publish environment. There are multiple types of replicas; for intermediary geodatabases used to check out and in the AXF files, they are referred to as a “check out” replica. The replica used for the publish environment is a “one way” replica.

**STEP 1: Open ArcCatalog.** Browse to the geodatabase replica that was created from the original SDE multiuser geodatabase.

**STEP 2: Use the synchronize changes tool.** Right click on the geodatabase name and hover the mouse pointer over “Distributed Geodatabase” from the menu that opens. A secondary menu will appear; click “Synchronize Changes” from the menu list. The following screen will appear:



**STEP 3:** *Press next.* Since the synchronize was initiated from a locally saved replica and not from the multiuser geodatabase parent which likely has multiple replicas created from it, all options have been defaulted correctly; select the "Next" button to move to the next step.



**STEP 4:** *Reconcile and post with the parent version.* The parent version of the replica is the version that the replica was created from. By checking the box to “Reconcile and post with the parent version” this step can also be completed and the replica version will not have to be managed separately. Choose “By Attribute” and “Conflicts will be resolved manually at a later time” (to increase control of the data edits). If there are conflicts found, the reconcile and post process will be aborted and conflicts can be viewed and resolved. The reconcile and post process will need to be repeated once the conflicts are resolved. If conflicts were found and the reconcile and post process was aborted, it does not mean that the synchronization was unsuccessful. It means that the edits were transferred from the replica geodatabase to the multiuser geodatabase, but they remain a child version under the parent version instead of the edits being incorporated into the parent version itself. If this happens, review and resolve the conflicts and then post and reconcile with the parent the child version that now contains the replica information and has had its conflicts reviewed and resolved. Select “Finish” to end the process.

## Photo Management Processes

**STEP 1:** Download pictures from PCE.

**STEP 2:** Organize photos. Open the GPSID folder that matches the ID of the handheld unit that was being used when the zipped set of photos were taken. The GPSID folders are located within each of the survey type folders. Within this open folder, create individual “day” folders for all days included in the photo period. Unzip the photographs and separate them into their related “day” folders. Please refer to the introduction to the Data Management and Maintenance section for more information on the overall field survey data folder structure.

**STEP 3:** Start ArcMap. Add the feature class or table that has the photo numbers stored. For this example the feature class is titled “botany\_point”.

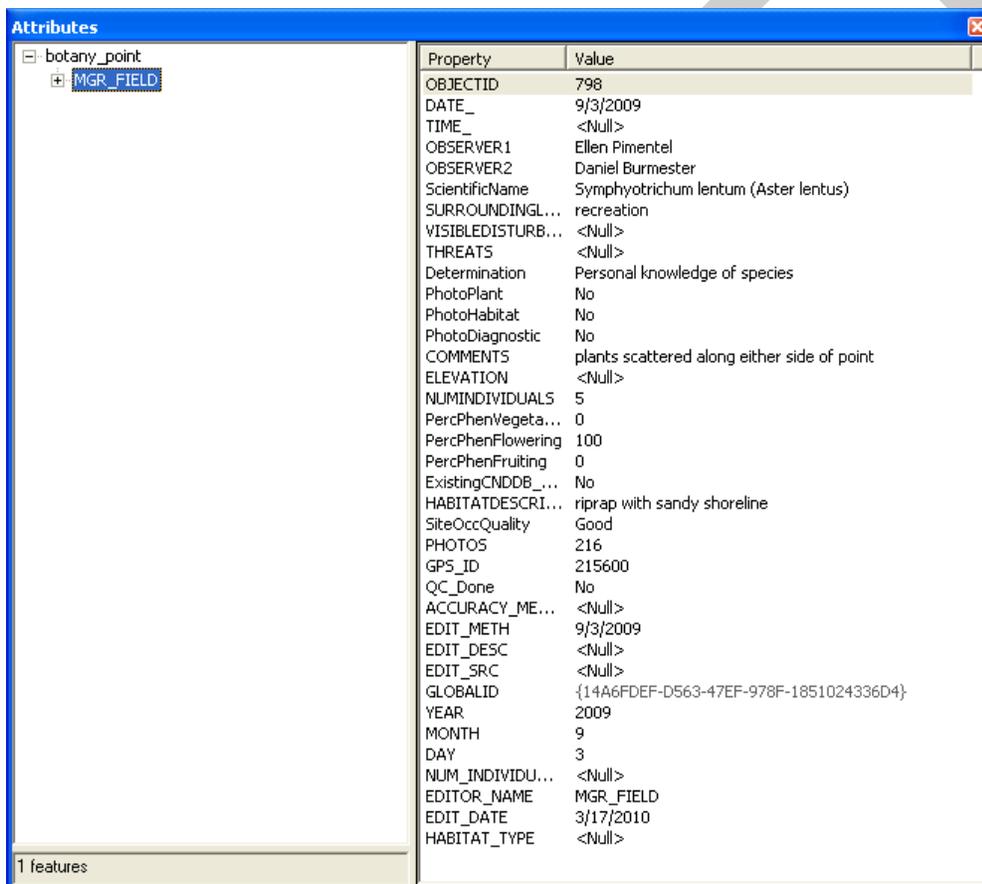
**NOTE:** This tutorial is split into two sections. For most situations refer to section 1. Alternatively, in situations where the photo number is being stored in a species table, which is then related to a photos table, refer to section 2.

### Section 1

**STEP 4:** Start Edit session and select a feature. After selecting a feature class, click the attributes button on the editor toolbar (as shown below).

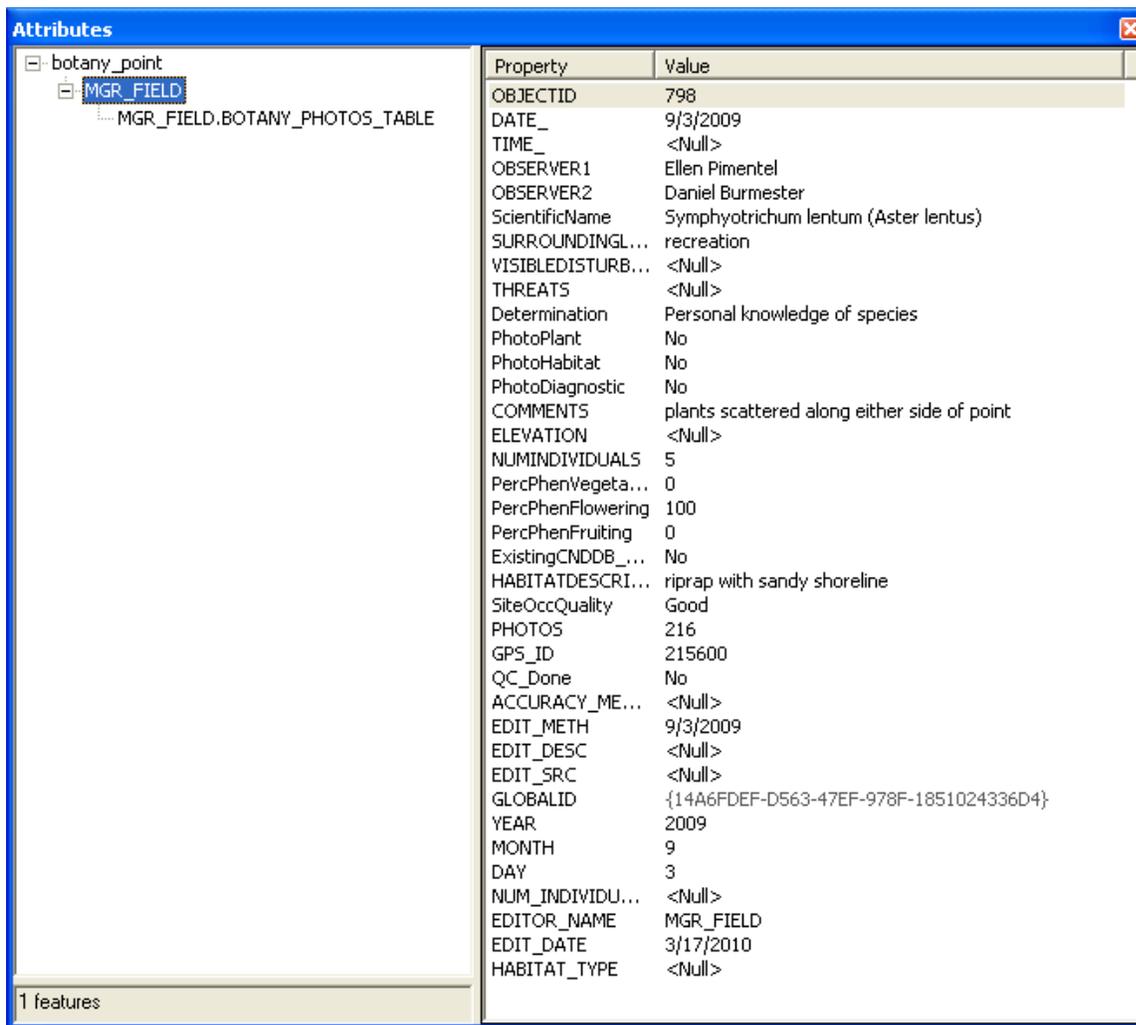


The following window will appear:

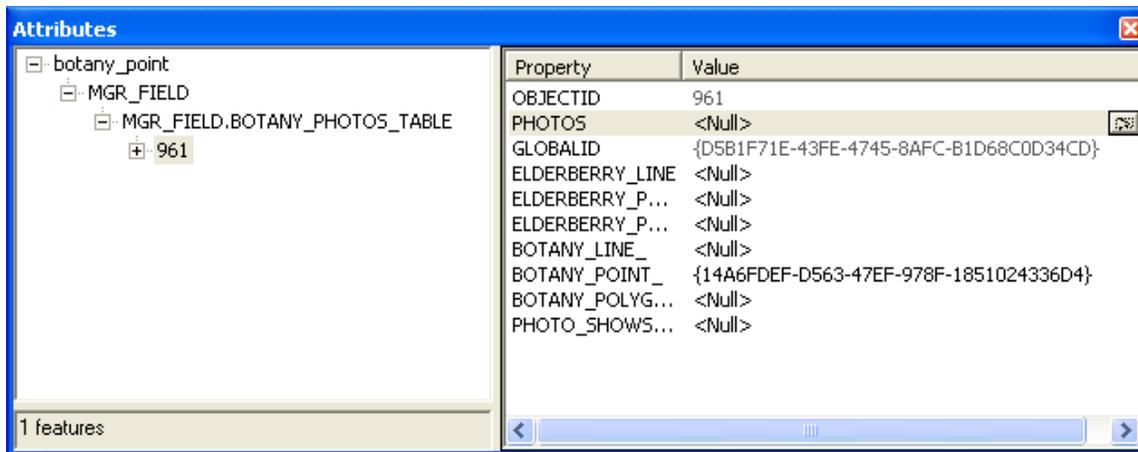


**STEP 5:** Click plus sign corresponding to feature class to expand table of contents. Once expanded, the left pane will display the value for the primary display field for the selected feature class (in this case, “MGR\_FIELD”). The primary display field can be changed by right-clicking on the layer (layers in a map document point to feature classes) in the table of contents, and selecting “Properties”. Within the “Properties” menu, select the “Fields” tab; from the resulting drop down menu, select from the list of available fields in the feature class. Returning to the “Attributes” window, when the value for the primary display field is selected (field is highlighted in blue when selected), the fields for the feature class are shown in the right pane. Note the date, GPSID and photo fields displayed in the right pane; these will be

used to find the corresponding photo to upload for this record. Shown in the left pane, there will be a plus sign next to the value shown for the primary display field. Click the plus sign to the left of the field name to show related feature classes and/or tables—in this case, the example includes one table (MGR\_FIELD.BOTANY\_PHOTOS\_TABLE).

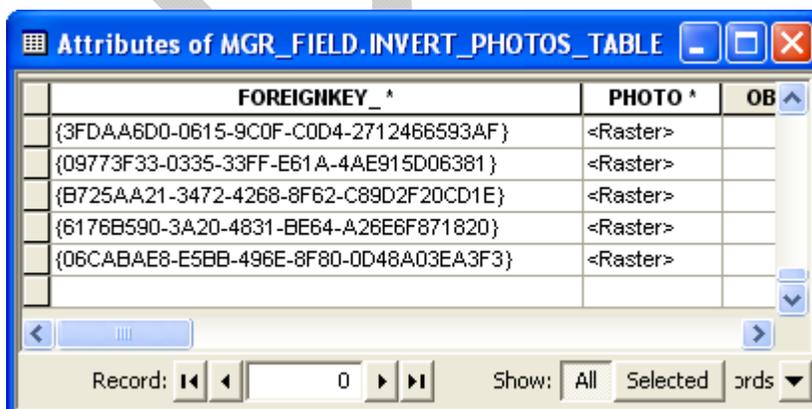
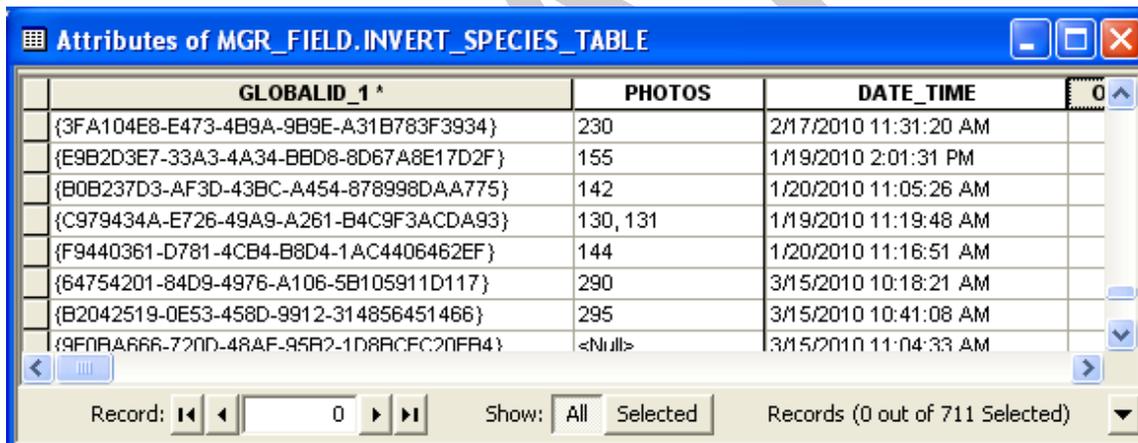


**STEP 6: Load Photo.** Right click on the related photo table (“MGR\_FIELD.BOTANY\_PHOTOS\_TABLE”). Select “Add new” from the menu that opens. A value will appear for the primary display field of the photo table (in this example, “961” is displayed). Click on the new value. In the right pane all fields contained within the related table will be shown. Locate the field that is named PHOTOS or PHOTO. It is a raster field for loading and viewing rasters, which in this case are photographs. Click in the area to the right of “PHOTOS” and a little picture icon will appear at the far right. Click on the icon; a small window will appear with instructions telling user to right-click on the window. As instructed, right-click on the small window and a menu will appear; select “Load” from the options. From the “Load” window that appears, choose “JPEG” for the compression type (leave compression ratio as 75) and click the browse button to navigate to the photo referenced in the photo field from the feature class (the feature class and its related photo table both have a field called photo(s)). Select “OK”.

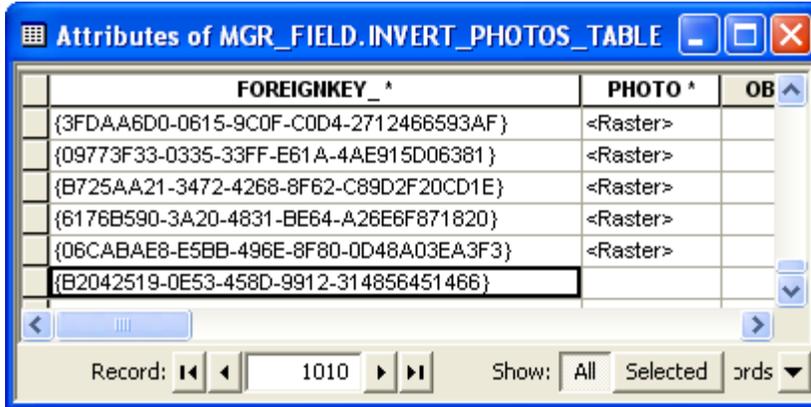


## Section 2

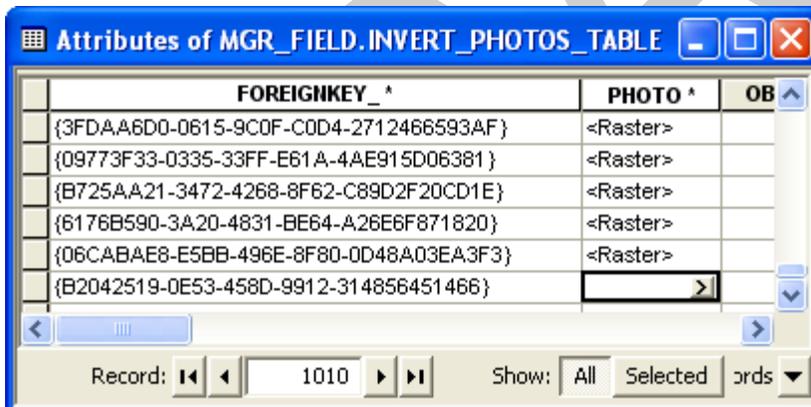
**STEP 4:** *Start Edit session and open attribute tables.* Open the attribute table of both the species and photo tables. In this example, the invert\_species\_table and the invert\_photos\_table will be used. Once open, order the species table so that the primary key field, in this case named GLOBALID\_1, is to the far left, followed by the PHOTOS field and DATE\_TIME field and sort by OBJECTID. Order the fields in the photos table so the field holding the foreign key is to the far left, in this case named FOREIGNKEY, followed by the PHOTO field.



**STEP 5:** Copy primary key value to foreign key cell for a new photo record. Locate the first record in the species table for which to associate a photo or photos. Copy the value in the GLOBALID\_1 (primary key) field. Scroll to the bottom of the photo table and paste the value in the first empty cell within the foreign key field.



**STEP 6:** Load photo. Click in the corresponding empty cell in the PHOTO field and a right-pointing arrow will appear. Left click on the arrow and a window will appear stating to right click on the window to load. Right click on the window and a menu will appear—select “Load”. From the new window choose JPEG for the compression type (leave compression ratio as 75) and click the “browse to” button to navigate to the corresponding photo that is referenced in the features photo field. Press OK.



### Process for Offsetting Avian Data

For the avian surveys, to avoid disturbing birds during surveys, the GPS location of the surveyors is recorded at a distance away from the bird. The distance and direction of the bird or bird nest is then estimated from the surveyors’ location and recorded in the attribute table. This tutorial describes the step-by-step procedures used to offset the surveyor’s GPS position for the distance and direction recorded.

**STEP 1:** Open ArcMap. Add avian\_point\_ver2 and avian\_point\_offset from the multiuser geodatabase.

**STEP 2:** Start an edit session.

**STEP 3:** Calculate X and Y fields. Open the attribute table for avian\_point\_ver2, right click on the field called X, and choose “Calculate Geometry”. In the window that appears choose “X Coordinate of Point” from the drop down menu at the top, leave coordinate system as it is, make sure for the drop down menu at the bottom it says “Meters (m)”, uncheck the box next to “Calculate selected records only”, and press OK. Do the same for the field called Y except choose “Y Coordinate of Point” from the drop down menu at the top of the “Calculate Geometry” window.

**NOTE:** Steps 4-6 are contained in a model. To use the model first add the toolbox containing the model in ArcMap by first opening ArcToolBox in ArcMap and then right clicking on ArcToolBox located at the top of the ArcToolBox window and then selecting “Add Toolbox” from the menu and finally browsing to the Multiuser Geodatabase where the toolbox called MGR\_FIELD.SurveySupportModels is located. Once added to ArcToolBox in ArcMap, go to SurveySupportModels > AvianOffset2010 within the ArcToolBox window and right click on the model contained there. Choose “Edit”. In Edit mode click “File” and choose “Validate Entire Model”. Make sure steps 1 through 3 have been performed above and still in edit view of model builder press the play button on the far right of the toolbar to run the model. Once the model has completed please skip to step 7.

**STEP 4:** Calculate Quadrant. Part of calculating the offset requires knowing what quadrant within the XY grid the point will reside in. If the direction of the offset is between 0 and 90 degrees then the point will be in quadrant 1, if the direction will be between 90 and 180 degrees then the point will reside in quadrant 2, if between 180 and 270 then quadrant 3, and finally if between 270 and 360 then quadrant 4. To apply this logic to avian\_point\_ver2, open its attribute table. Right click on the field called “Quadrant” and choose “Field Calculator”. Check the box next to “Advanced”. Copy into the box that says “Pre-Logic VBA Script Code” the following:

**Dim Output As Integer**

```
If [DIRECTION_TEXT] >= 0 AND [DIRECTION_TEXT] < 91 Then
    Output = 1
Elseif [DIRECTION_TEXT] > 90 AND [DIRECTION_TEXT] < 181 Then
    Output = 2
Elseif [DIRECTION_TEXT] > 180 AND [DIRECTION_TEXT] < 271 Then
    Output = 3
Elseif [DIRECTION_TEXT] > 270 AND [DIRECTION_TEXT] < 361 Then
    Output = 4
End If
```

In the box under where it says “QUADRANT =” type: Output. Then press OK.

**STEP 5:** Calculate Offset X and Y. Open the attribute table for avian\_point\_ver2. Right click on the X field and choose “Field Calculator”. Check the box next to “Advanced”. Copy into the box that says “Pre-Logic VBA Script Code” the following:

**Dim Output As Double**

```
Select Case [QUADRANT]
    Case 1
        Output = [X] + ( [DISTANCE_TEXT] * Cos (((90 - [DIRECTION_TEXT]) * 0.0174532925)))
```

Case 2

Output = [X] + ( [DISTANCE\_TEXT] \* Cos ((( [DIRECTION\_TEXT] - 90) \* 0.0174532925)))

Case 3

Output = [X] - ( [DISTANCE\_TEXT] \* Cos (((270 - [DIRECTION\_TEXT] ) \* 0.0174532925)))

Case 4

Output = [X] - ( [DISTANCE\_TEXT] \* Cos ((( [DIRECTION\_TEXT] - 270) \* 0.0174532925)))

Case Else

Output = [X]

End Select

In the box where it says “X =” type: Output. Then press OK.

The trigonometric function used for the Y coordinate value offset is this: “offset distance = the Sin of the direction”. The function only works with right triangles so the direction must be between 0 and 90, which is the purpose for the quadrants. Also, ArcMap only recognizes direction in radians (not degrees), hence the conversion factor of 0.0174532925. Complete the same steps for the “Y” field, except copy the following text in the field calculator field “Pre-Logic VBA Script Code”:

### Dim Output as Double

Select Case [QUADRANT]

Case 1

Output = [Y] + ( [DISTANCE\_TEXT] \* Sin (((90 - [DIRECTION\_TEXT] ) \* 0.0174532925)))

Case 2

Output = [Y] - ( [DISTANCE\_TEXT] \* Sin ((( [DIRECTION\_TEXT] - 90) \* 0.0174532925)))

Case 3

Output = [Y] - ( [DISTANCE\_TEXT] \* Sin (((270 - [DIRECTION\_TEXT] ) \* 0.0174532925)))

Case 4

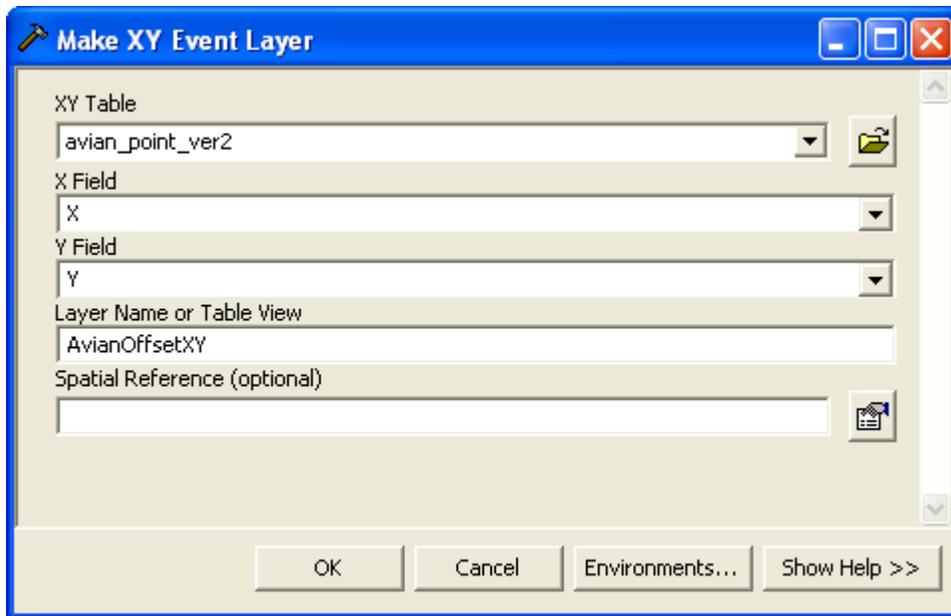
Output = [Y] + ( [DISTANCE\_TEXT] \* Sin ((( [DIRECTION\_TEXT] - 270) \* 0.0174532925)))

Case Else

Output = [Y]

End Select

**STEP 6: Make XY Event Layer.** Within ArcToolBox, browse to Data Management Tools > Layers and Table Views > Make XY Event Layer and open the tool “Make XY Event Layer. Where it states “XY Table” choose avian\_point\_ver2 from the drop down. Where it states “X Field” choose X and at “Y Field” choose Y. Where it states “Layer Name or Table View” type AvianOffsetXY. Select OK. (Refer to image below)



**STEP 7: Select New Records.** The feature class `avian_point_offset` is regularly updated, so most of the records contained in the new `AvianOffsetXY` layer that was just created have previously been copied into `avian_point_offset`. Open the attribute table for the new layer “`AvianOffsetXY`” and sort records by the `OBJECTID` field. Review the most recent records in `AvianOffsetXY` and compare them to the most recent records in the attribute table for `avian_point_offset` feature class. Once you have identified those records that are contained within `AvianOffsetXY` but not yet copied to `avian_point_offset`, select only these new records.

**STEP 8: Copy and Paste.** Click the copy button  on the standard toolbar. Make sure the target on the editor toolbar is the “`avian_point_offset`” feature class and select the paste button . Save all edits when completed.

## Metadata Creation Instructions

**STEP 1: Open ArcCatalog.** In the catalog tree, browse to and select the feature class or table for which metadata is to be updated.

**STEP 2: Open Metadata Editor.** In the right-hand pane, click on the Metadata tab. Make sure the metadata toolbar has been activated. Select “customize” from the “Tools” dropdown menu and click on the “Edit Metadata” button .

**STEP 3: Fill Out Information.** While adhering to DWR metadata standards, enter the new metadata. The DHCCP metadata standards are specified in the DWR document “Spatial Data Standards for the California Department of Water Resources”, which can be located by contacting the DHCCP GIS coordinator.

## Viewing Photos Stored in the Multiuser Geodatabase

Field photographs are accessed through the following tables:

- AVIAN\_PHOTOS\_TABLE
- BAT\_PHOTOS\_TABLE

- BOTANY\_PHOTOS\_TABLE
- HERP\_PHOTOS\_TABLE
- INVERT\_PHOTOS\_TABLE

The photographs are accessed in ArcMap using the “identify” tool or by using the attribute table as described in the previous section “Working With Related Tables in ArcMap”.

To use the “identify” tool to access photographs:

**STEP 1:** *Activate the identify tool.* Select the “i” button next to the binoculars on the tools toolbar.

**STEP 2:** *Click on a feature.* Select a feature (e.g.; point, line) that is likely to have associated photos.

**STEP 3:** *Click plus signs.* In the left pane of the “identify” window, click on plus signs to expand the table of contents until the photos table is located. If there are photographs associated with the selected feature, a plus sign will be shown next to the photos table.

**STEP 4:** *Click plus sign next to photo table.* Each photo record associated with the feature record will display below the photo table after clicking the corresponding plus sign. Click on one of the listed photograph records; the fields and their values for the selected record will appear to the right. Search for the “Photos” field containing a small picture icon.

**STEP 5:** *Click on the picture icon.* Selecting the picture icon will display the photograph in a viewer window. The viewer can be resized to whatever is preferred and multiple viewers can be open at the same time.

To use the attribute table to access photographs:

**STEP 1:** *Select a record from the attribute table of a specific feature.*

**STEP 2:** *Press the “options” button at the bottom of the attribute table.* When the options menu appears, hover the mouse pointer over “related tables” and then click on the name of photo table when it appears. This will open the photograph table with associated photo records selected.

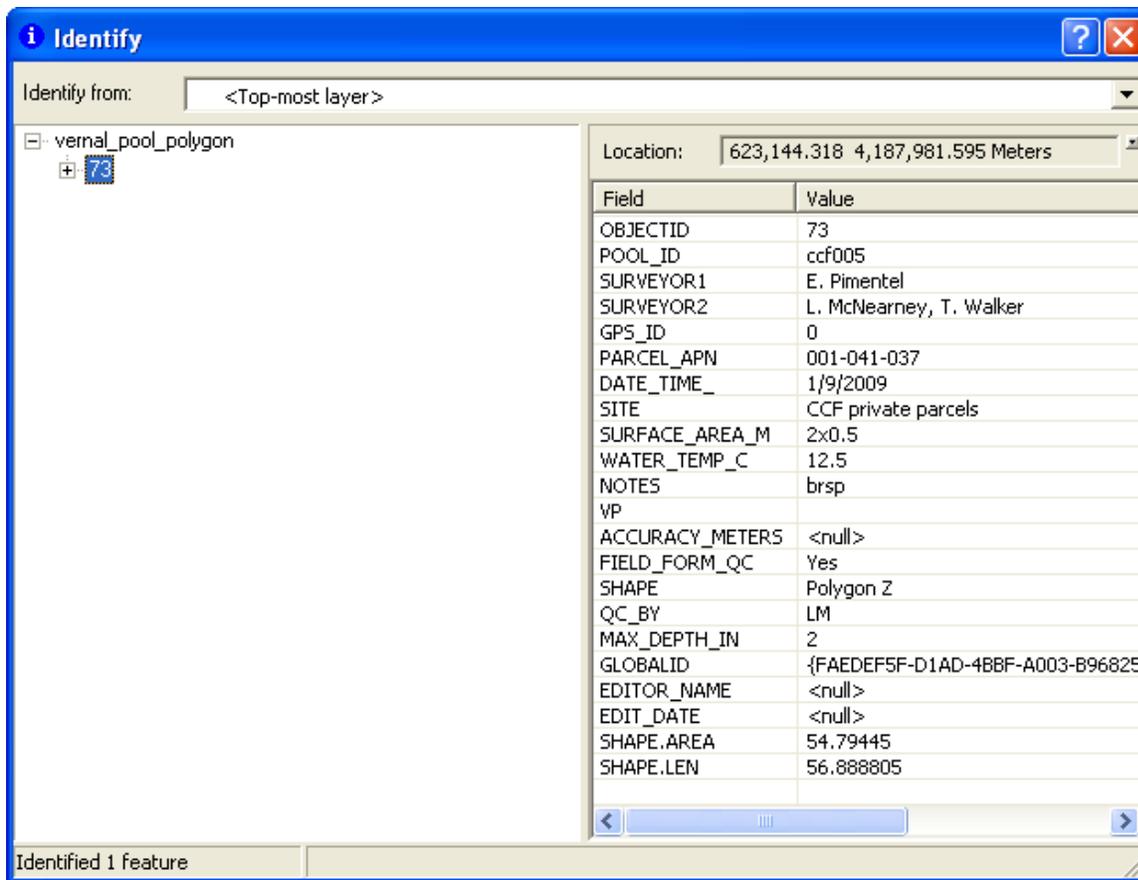
**STEP 3:** *Click the “Selected” button.* If the “Selected” button at the bottom of the photos table is selected, the table will show only those photograph records that are related to the selected feature.

**STEP 4:** *Scroll to the field titled “Photo”.* Click in the cell that states “<Raster>”. A small arrow will appear; click the arrow, which will produce a thumbnail of the photograph. Click the thumbnail to open a new viewer with the photograph.

## Working with Related Tables in ArcMap

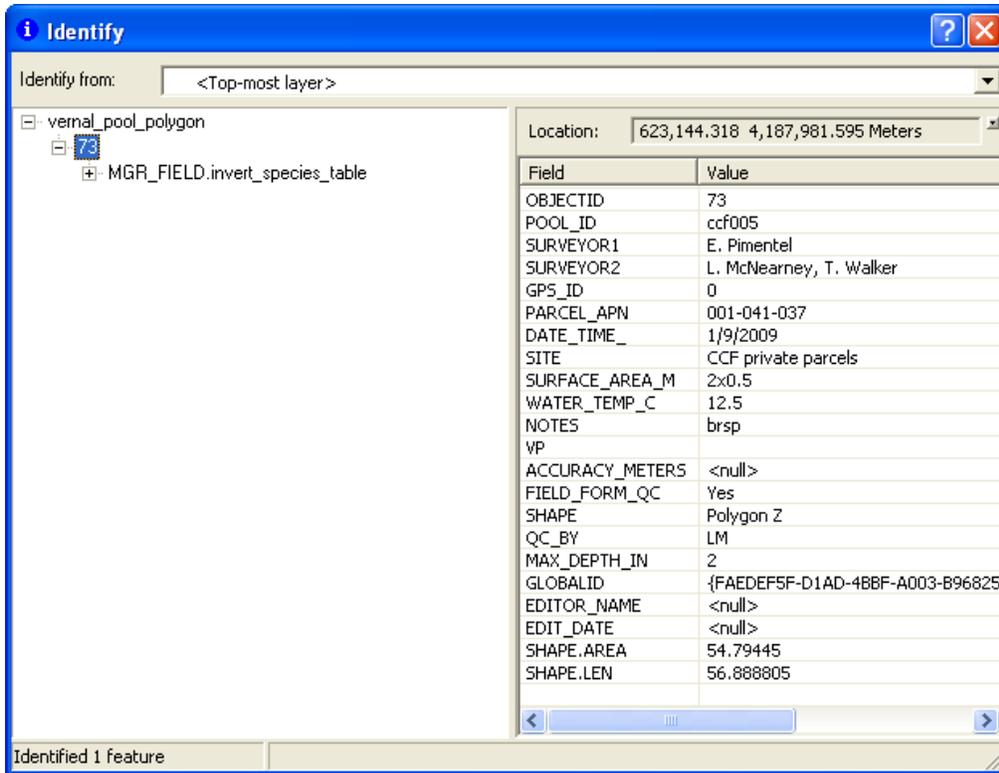
There are several feature classes that have been built to include relationships with data tables. For the purpose of this section data tables are different than photograph tables as their purpose is to store data other than photographs. Our feature classes that are related to data tables include: herp\_amphibian\_polygon, herp\_frog\_survey\_point, vernal\_pool\_line, vernal\_pool\_point, vernal\_pool\_polygon, riparian\_mammal\_trap\_line, and riparian\_mammal\_trap\_point. Each feature class has a relationship with a photograph table except for the riparian mammals feature class. This section will provide instructions on working with relationships in ArcMap.

**STEP 1:** Using the identify tool:  click on a feature in the display screen for which there is a related table. The window below will appear:

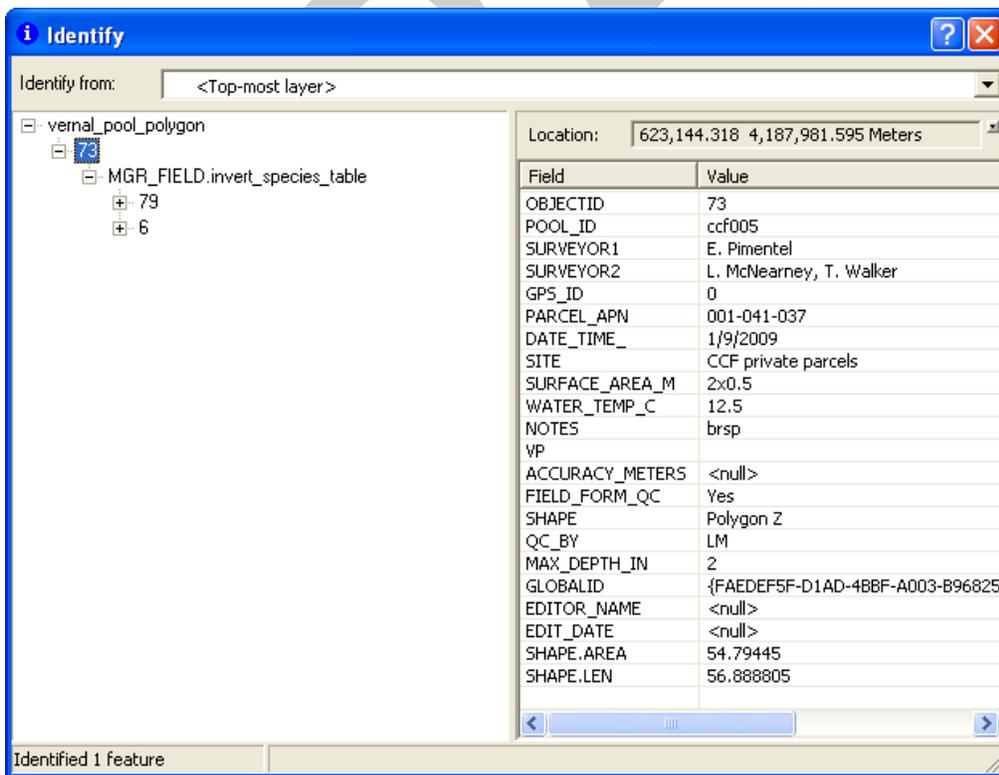


Notice in the left pane that the name of the layer and the value of the primary display field (often the OBJECTID) for the feature you selected are shown. If the value under the layer name is selected, all attributes for that selected record (feature) will be displayed in the pane to the right and the record value will be highlighted in blue.

**STEP 2:** Click the plus sign next to the value in the left pane to reveal a related table(s) as shown below:



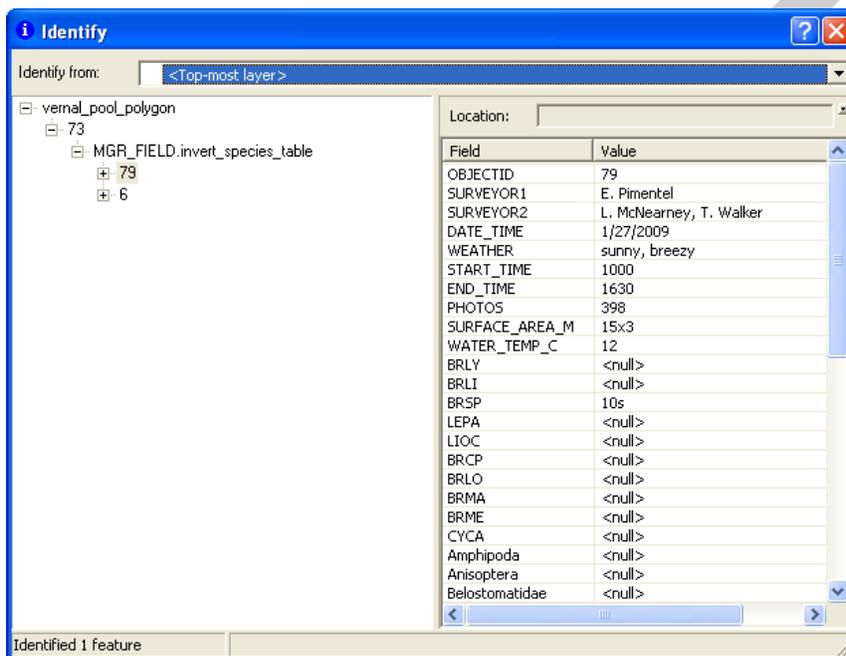
**STEP 3:** Click the plus sign next to the name of the related table to display the records related to the feature class as shown below:



Notice in the example above that in the right pane the attributes for the vernal\_pool\_polygon record (73) are still being displayed in the right pane. This is because, although other records have been displayed by clicking on corresponding plus signs, the record selection has not changed (indicated by blue highlight).

**STEP 4:** To see the attributes for one of the related records in the related table click on one of the values (if the primary display field has no values or are the same values for multiple records you may just see multiple nulls or repeats of the same value—rest assured they are separate records within the related table) under MGR\_FIELD.invert\_species\_table.

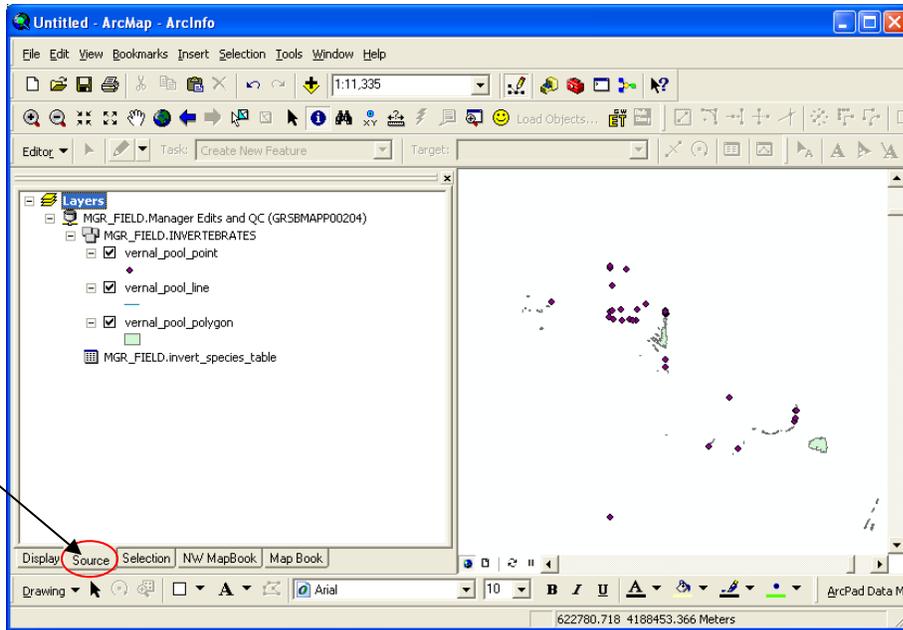
**NOTE:** If the primary display field has not been assigned a value for a related feature or the same value has been repeated for multiple related records, multiple nulls or repeats of the same value may be displayed. Individual records for each of these features shown under the related table do still exist.



### Selecting Rows in One Table Based on Rows Selected in Another

To select features from a feature layer based on a selection in the related table or vice versa, follow the instructions shown below.

**STEP 1:** Open the attribute table of an object from which you want to start the selection. In this example, we have opened the “MGR\_FIELD.invert\_species\_table” attribute table which is also related to vernal\_pool\_point, vernal\_pool\_line, and vernal\_pool\_polygon. Click the “source” tab (circled in red in example below):



Locate MGR\_FIELD.invert\_species\_table, right click the name and select “Open”. The following will be displayed:

Attributes of MGR\_FIELD.invert\_species\_table

OBJECTID *	SURVEYOR1	SURVEYOR2	DATE_TIME	WEATHER	STAR
306	mjw	mab	10/26/2009	sunny warm	1120
450	E. Pimentel	T. Walker	2/19/2009	Sunny, breezy to calm	0930
136	E. Pimentel	L. McNearney, T. Walker	2/9/2009	sunny, breezy, cool	1100
2068	lm	dt	12/22/2009 11:14:07 AM	very cold windy sunny	9:25
86	E. Pimentel	L. McNearney, T. Walker	1/27/2009	sunny, breezy	1000
2073	lm	ep	1/4/2010 10:49:23 AM	cold, overcast and cool	<Null>
41	E. Pimentel	L. McNearney, T. Walker	1/26/2009	Sunny, breezy	1030
251	E. Pimentel	L. McNearney, M. Wacker	2/24/2009	sunny, calm, warm	1000
184	E. Pimentel	T. Walker	2/19/2009	Sunny, breezy to calm	0930
2050	DET	KAW	1/4/2010 1:15:03 PM	OVERCAST	1100
28	E. Pimentel	L. McNearney	1/13/2009	Sunny, cool to warm	1000
172	E. Pimentel	T. Walker	2/19/2009	Sunny, breezy to calm	0930

Record: 1 | Show: All Selected | Records (0 out of 554 Selected) | Options

**STEP 2:** Select rows. Click on the rows to be included while holding down the “Ctrl” key on the keyboard.

**STEP 3:** Select records in the vernal\_pool\_polygon layer that are related to the rows selected in the MGR\_FIELD.invert\_species\_table. Click the “Options” button located at the bottom of the attribute table screen (circled in red below):

OBJECTID *	SURVEYOR1	SURVEYOR2	DATE_TIME	WEATHER
306	mjw	mab	10/26/2009	sunny warm
450	E. Pimentel	T. Walker	2/19/2009	Sunny, breezy to calm
136	E. Pimentel	L. McNearney, T. Walker	2/9/2009	sunny, breezy, cool
2068	lm	dt	12/22/2009 11:14:07 AM	very cold windy sunny
86	E. Pimentel	L. McNearney, T. Walker	1/27/2009	sunny, breezy
2073	lm	ep	1/4/2010 10:49:23 AM	cold, overcast and cool
41	E. Pimentel	L. McNearney, T. Walker	1/26/2009	Sunny, breezy
251	E. Pimentel	L. McNearney, M. Wacker	2/24/2009	sunny, calm, warm
184	E. Pimentel	T. Walker	2/19/2009	Sunny, breezy to calm
2050	DET	KAW	1/4/2010 1:15:03 PM	OVERCAST
28	E. Pimentel	L. McNearney	1/13/2009	Sunny, cool to warm
172	E. Pimentel	T. Walker	2/19/2009	Sunny, breezy to calm

A list of options will appear, choose “Related Tables”. To the side of the list of options will appear a list of related tables. For example, for MGR\_FIELD.invert\_species\_table the following will appear:

MGR\_FIELD.invert\_species\_table\_has\_photos: INVERT\_PHOTOS\_TABLE

MGR\_FIELD.vp\_point\_has\_species: vernal\_pool\_point

MGR\_FIELD.vp\_line\_has\_species: vernal\_pool\_line

MGR\_FIELD.vp\_polygon\_has\_species: vernal\_pool\_polygon

For this example, the last option was selected by clicking it in the list of related tables. The attribute table for “vernal\_pool\_polygon” automatically opens with the related record(s) highlighted. By clicking the “Selected” button at the bottom of this new screen, the view will be limited to the selected record(s). On the map, the polygon itself will also be highlighted; clicking on the polygon feature will also zoom the user to the selected record.

OBJECTID *	POOL_ID *	SURVEYOR1	SURVEYOR2	GPS_ID	PARCEL_API
64	ccf060	E. Pimentel	L. McNearney, T. Walker	0	001-081-028
202	ccfs1003	lem	mab	216286	001-041-055
246	wb1002a	etp	tw	215599	011-070-007

The function can also work the opposite way by beginning with the map feature itself. Following are instructions for doing so:

**STEP 1:** Select a feature on the map screen.

**STEP 2:** Right-click on the corresponding layer name in the table of contents and choose “Open Attribute Table” to access the feature’s attribute table.

**STEP 3:** Click on “Options”, then “Related Tables”, and finally, select the related table within which to view related record(s).

### Using the Query Table Tool to Combine a Feature Class and its Related Table into a Single Feature Class

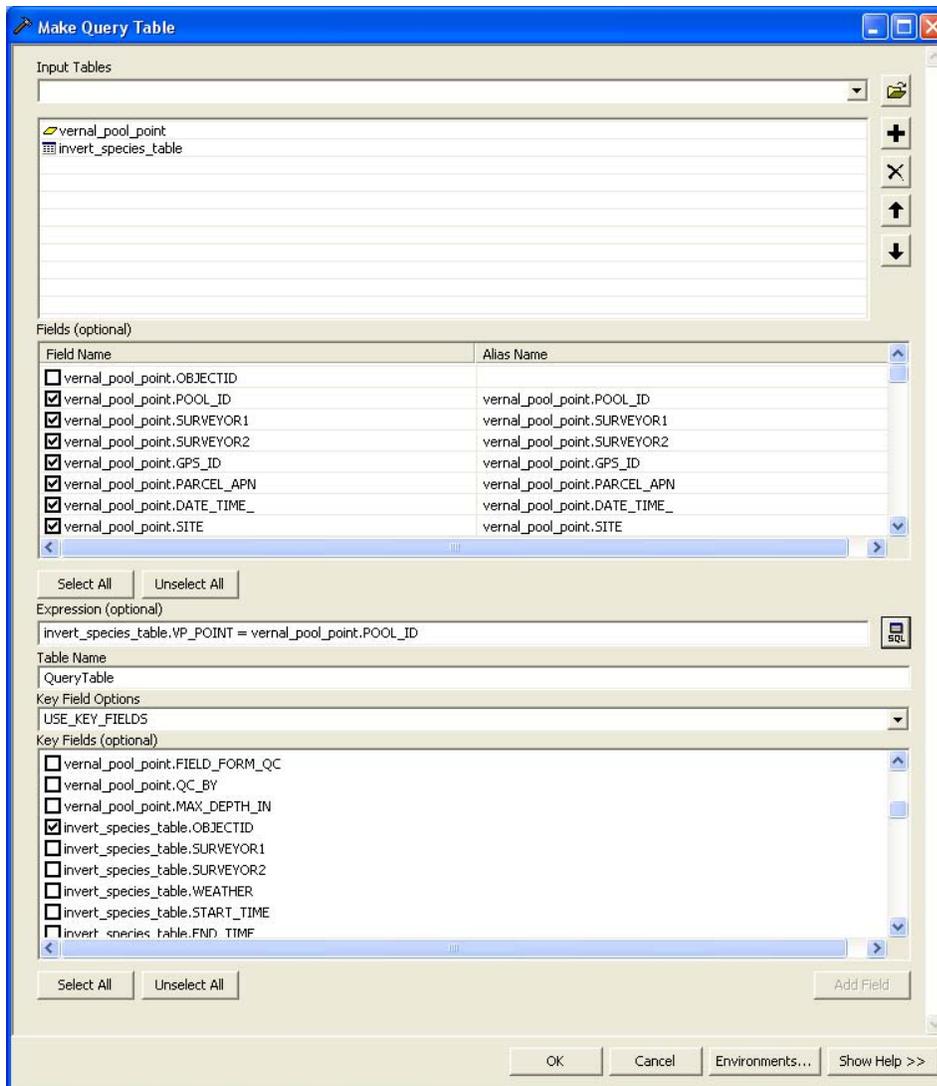
When working with tables in ArcMap that have a one-to-many or many-to-cardinality setup, it is not possible to symbolize, label, or write a definition based on information in the related table. In order to perform such functions types of related tables, the feature class and related table must first be combined into a single feature class. If the relationship is one-to-one, an “Join” can suffice. The “Make Query Table” tool, explained below, is used working with one-to-many relationships.

**STEP 1:** Access the “Make Query Table” tool through ArcToolBox at Data Management Tools→Layers and Table Views→Make Query Table. Please the screen shot below as each step is described.



many query for these ArcMap when refer to

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**STEP 2:** At the field “Input Tables”, browse to and add the feature class and related table.

**STEP 3:** Under “Fields (optional)”, check the box next to each field that should be included in the output feature class. In order to create a feature class (versus the creation of a table), be sure to select the shape field (called “Shape”) in the list. Also make sure the related table’s OBJECTID field is checked. (e.g.; invert\_species\_table.OBJECTID).

**STEP 4:** Look at where it says “Expression”. This is where the primary key field in the feature class that holds the unique feature ID is linked with the foreign key field in the related table that references the unique feature ID from the feature class. In some cases the primary key is a custom unique set of values like in this example with vernal pool point. In this example POOL\_ID is the primary key field and the values are not auto-generated by the computer but by surveyors out in the field who assign each pool they survey with a unique pool ID. The foreign key field in the related table references the values from the POOL\_ID field. When a custom unique ID field is not used, the GLOBALID field is used as the primary key. The foreign key for the related invert\_species\_table is the VP\_Point field. In the example above, if the SQL button is pressed on the right a SQL editor tool will appear to help properly construct the statement. The basic formula for the Make Query Table Tool expression is: <Foreign Key>=<Primary Key>.

**STEP 5:** In the field “Table Name”, assign the new layer a name.

**STEP 6:** Leave the field “Key Field Options” as defaulted (USE\_KEY\_FIELDS).

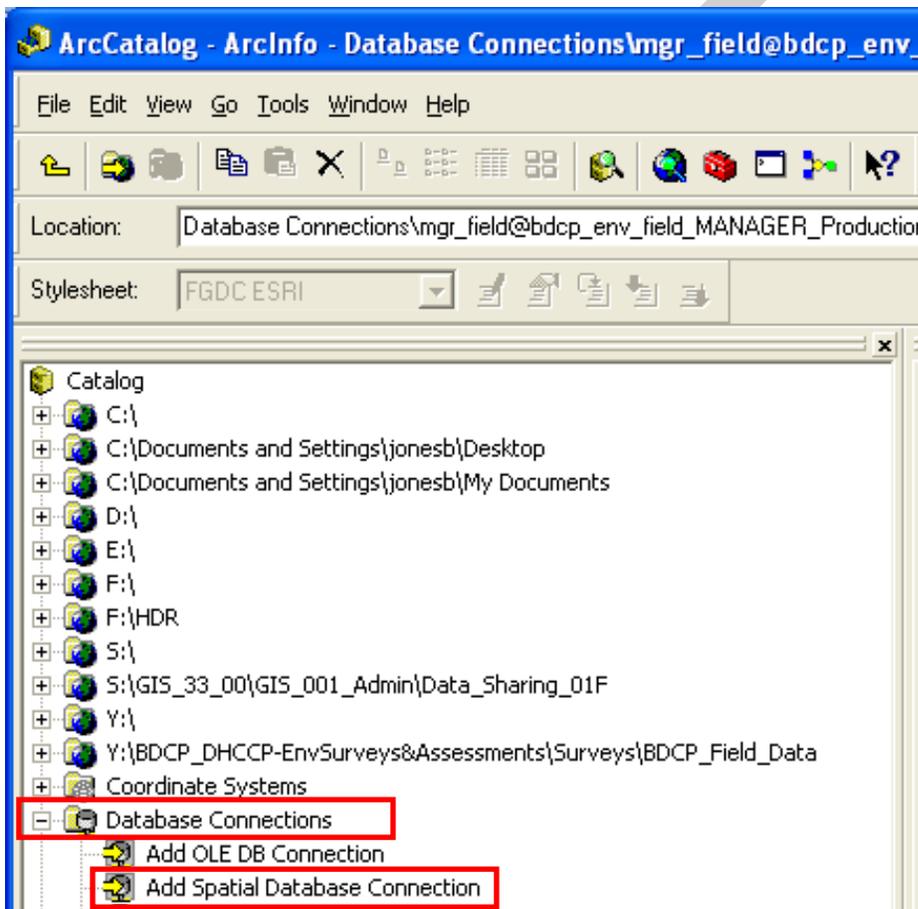
**STEP 7:** In the field “Key Fields (optional)”, select the OBJECTID field from the related table fields list (invert\_species\_table in this example).

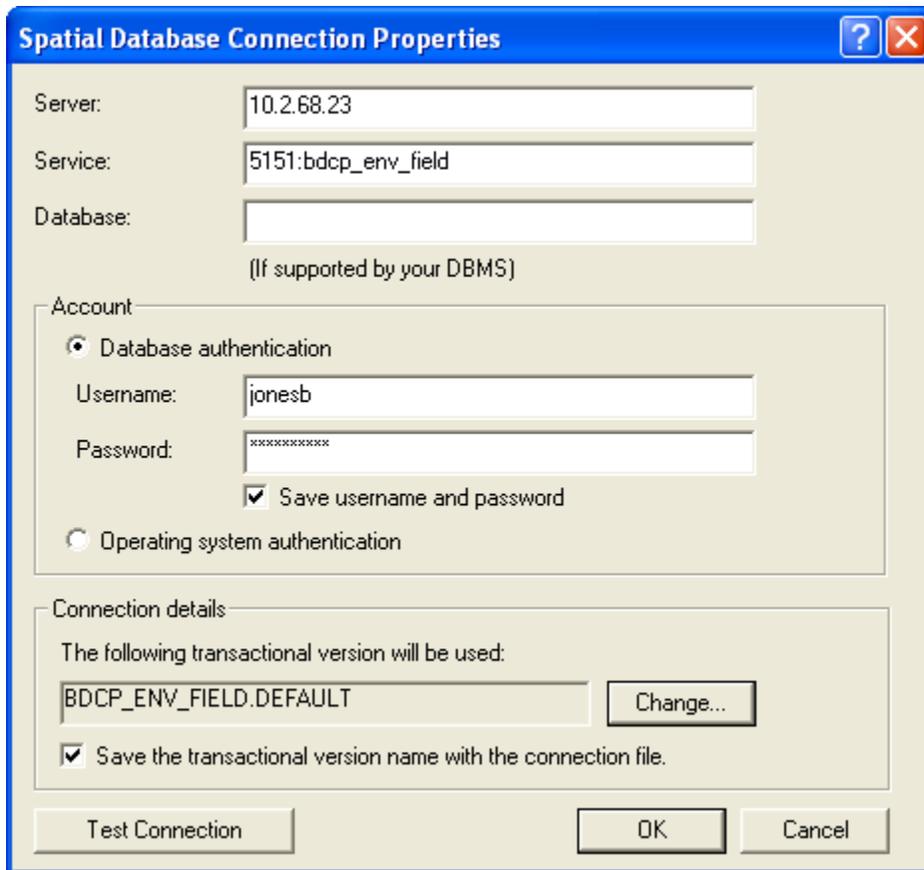
**STEP 8:** Select “OK” to create the new map layer.

## MULTIUSER GEODATABASE PROCESSES

### Connecting to “BDCP\_ENV\_FIELD” Multituser Geodatabase

**STEP 1:** *Open ArcCatalog.* Locate “Database Connections” and click the plus sign to expand the folder. Double-click on “Add Spatial Database Connection”.

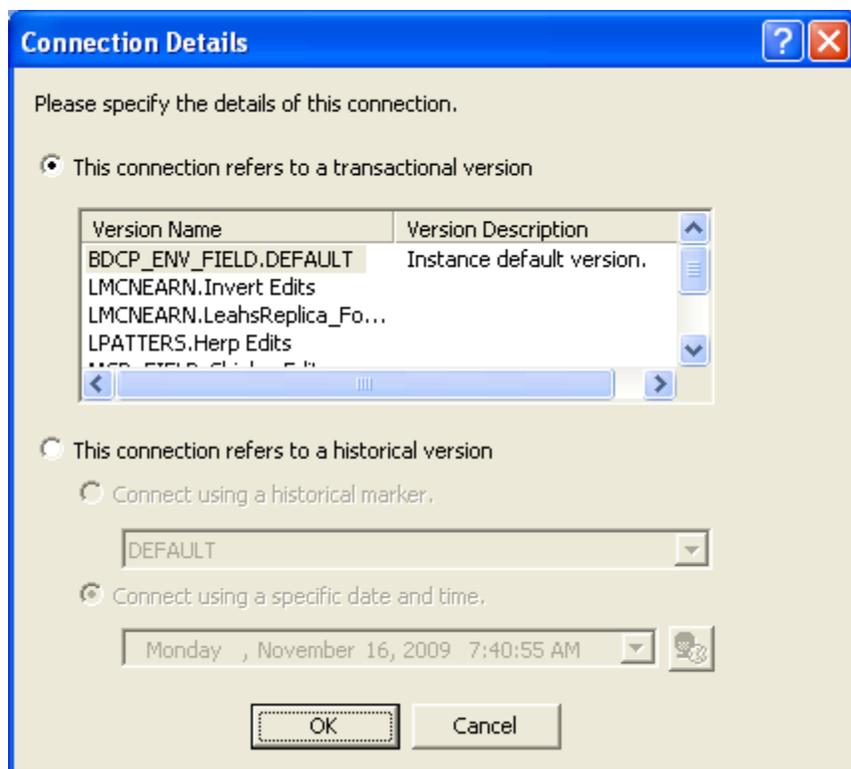




**STEP 2:** After double-clicking on “Add Spatial Database Connection” a “Spatial Database Connection” window will open. In the field next to “Server”, type “**10.2.68.23**”. Directly below, in the “Service” field, type “**5151:bdcp\_env\_field**” (5151 is the port on the server through which you are connecting; bdcp\_env\_field is the name of the geodatabase to which you are connecting). Leave the “Database” field blank.

**STEP 3:** In the “Account” section of the screen, select the “Database authentication” option. The DHCCP GIS Coordinator or the database DBA will need to be contacted in order to obtain a username and password. In most cases, the username will be your DWR computer login username, although the manager of the geodatabase is an exception to this rule. For the manager, the generic username is “mgr\_field”. The SDEA also has been assigned the generic username “bdcp\_env\_field”. After completing the Username and Password fields, select the “Save username and password” option.

**STEP 4:** The geodatabase version connection is specified at the bottom of the window under “Connection details”. The field “The following transactional version will be used” will be defaulted to “<sde name>.DEFAULT”, although connection to that version will not be available. Select the “Change” button; a “Connection Details” window will open, an example of which is shown below. Within the version list provided, find the correct one beneath the column titled “Version Name”. There will be at least one version which is named “BDCP\_ENV\_FIELD.DEFAULT” so select any one of them as all versions will ultimately get checked back into the primary default version. Once the version is selected, click “OK”. The selected version will now be displayed in the field. After returning to the “Spatial Database Connection” window, click on “OK” to create the connection.



**STEP 5:** Once the connection has been created, click to highlight the new connection file (will be displayed as “Connection to 10.2.68.23”) which will be found in the “Database Connections” folder (the same folder mapped to in Step 1 above). Right-click the connection file and select “Rename”. Following this naming convention: **<username>@bdcp\_env\_field\_<VERSION>**, rename the file. For the Geodatabase Manager (with the defaulted username “mgr\_field”) and connected to the DEFAULT version, the connection name should read as follows: **“mgr\_field@bdcp\_env\_field\_DEFAULT”**.

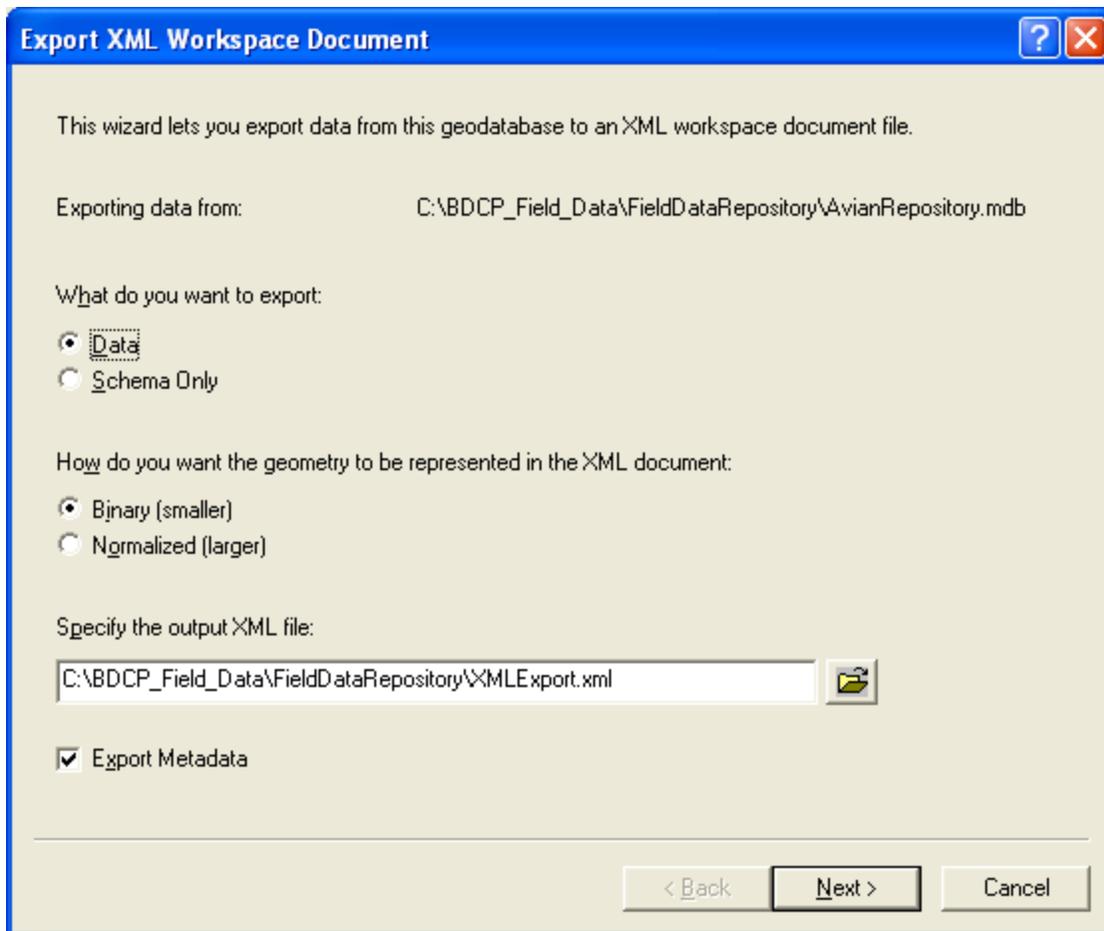
**STEP 6:** If a need should arise to change connection properties, right-click on the connection and select “Connection Properties”. This will allow for modification(s) of the connected version.

**STEP 7:** In ArcMap, click the “Add Data” button. Click to access the drop down list on the window that opens and scroll to the bottom to select “Database Connections”. A database connections window will open; the list will include the connection created in the above steps. Double-click on the new connection and the contents of the geodatabase will be displayed. Select the data that is to be added to the new map.

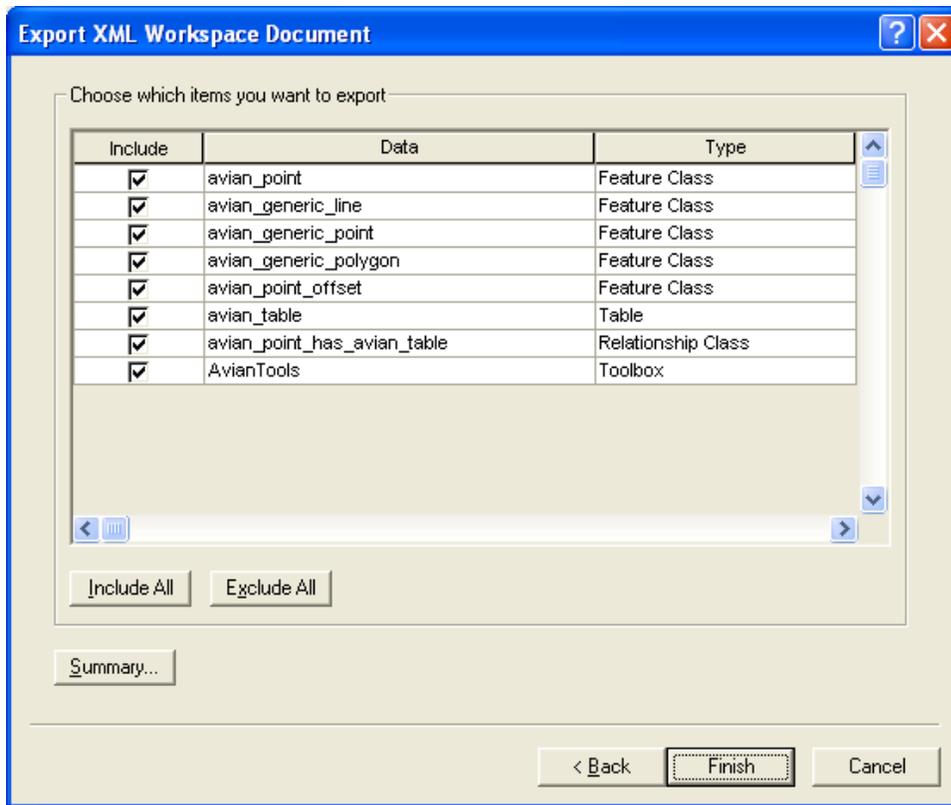
## Transferring Schema and Data from One Geodatabase to Another

To maintain complex behavior, like relationship classes, the Database Schema must be transferred from one geodatabase to another using the “Export XML Workspace Document” tool (can also include data, if necessary).

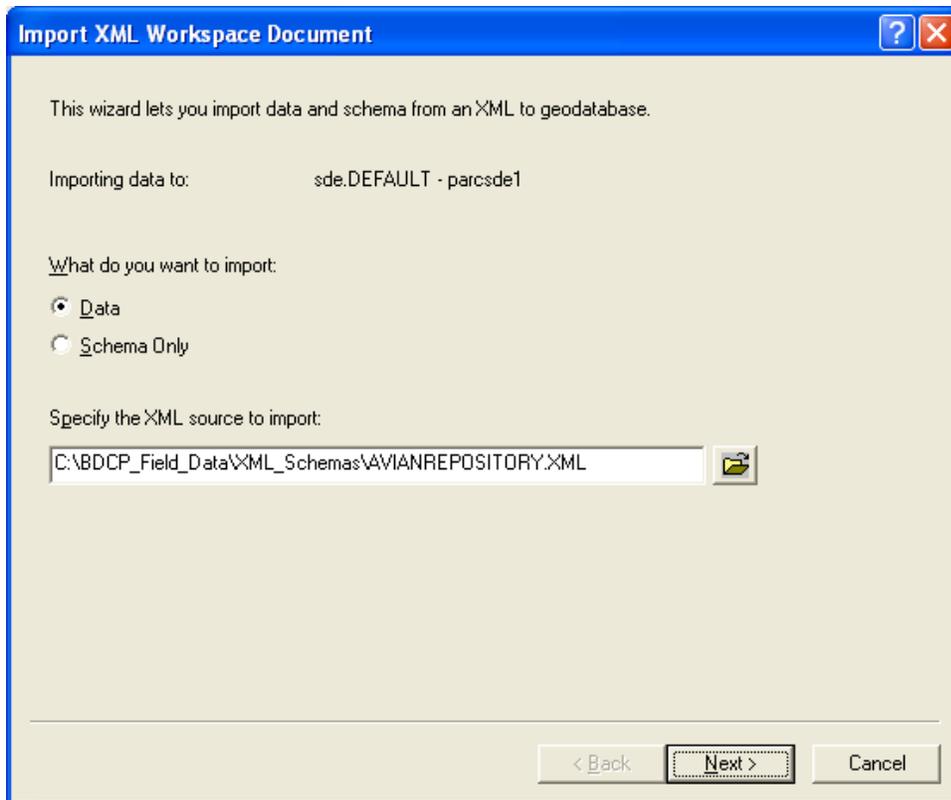
**STEP 1:** *Export Schema from Source Geodatabase or Feature Dataset.* In ArcCatalog, right-click on either the Source Geodatabase or Source Feature Dataset and select “Export”. From the list that appears, select “XML Workspace Document...” The following window will be opened:



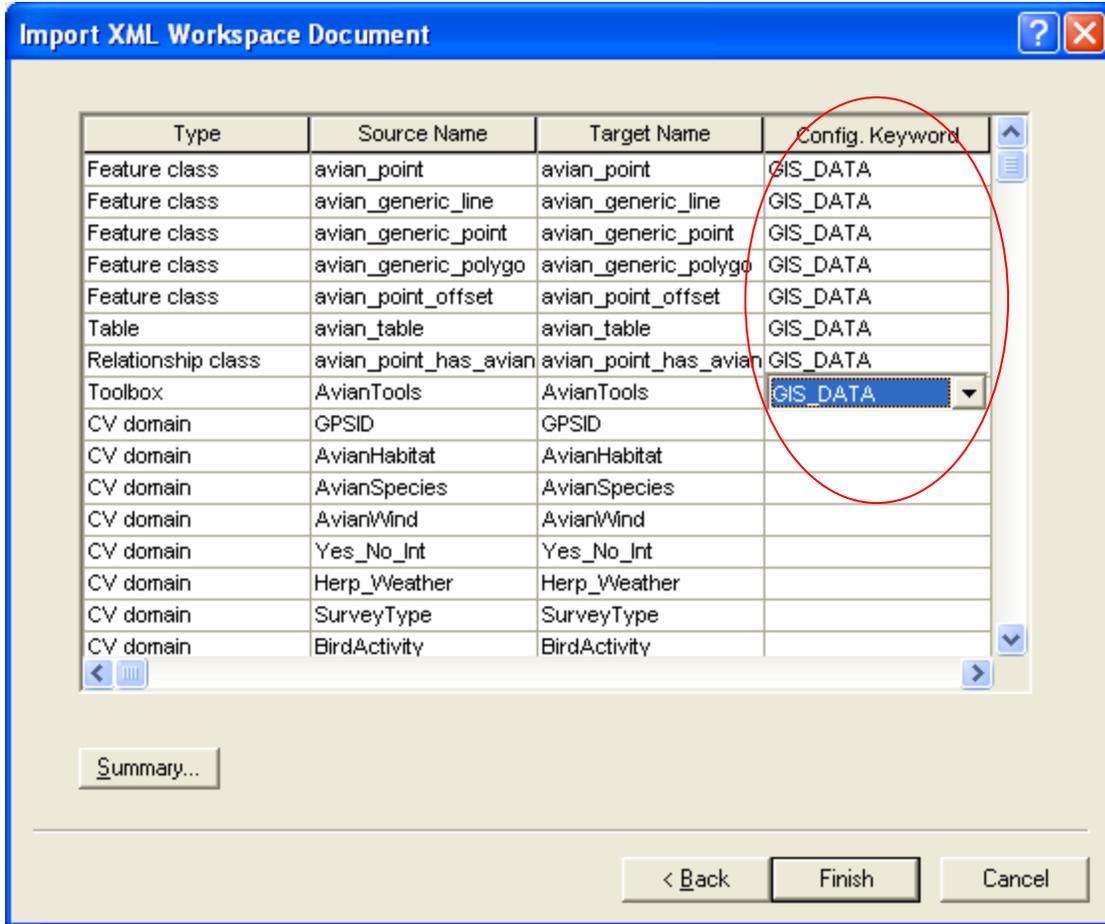
**STEP 2:** In the first page of the “Export XML Workspace Document” tool, the option to export the Schema, with or without data, can be specified. The geometry coordinates can be stored in the XML in binary or normalized formats (normalized will be more legible to read, but this will not matter if only importing the XML into another geodatabase). Specification of location to save the XML file and whether or not to export the metadata is also included in this screen. After all selections have been made, click “Next”.



**STEP 3:** On the second page, identify which objects to include in the export. After making the selection(s), click “Finish”. The XML file will be created at the location specified and will be available for import into another geodatabase.



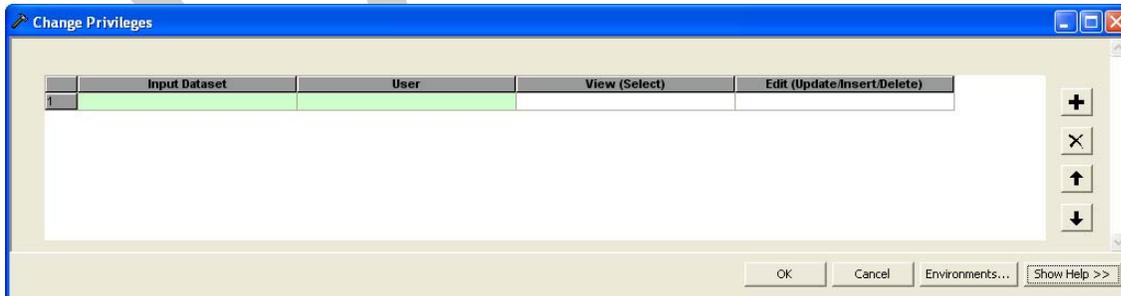
**STEP 4:** Import created XML file to new geodatabase. In ArcCatalog, navigate to the target geodatabase to import the Schema (and Data, if selected). Right-click the Geodatabase, select “import”, and “XML Workspace Document”. The “Import XML Workspace Document” tool will open. On the first page, select from the two options under “What do you want to import”. The first page also provides a field to specify where the XML file with the Schema (and Data) is saved. After both selections have been made, click “Next”.



**STEP 4:** On the next page, in the “Config. Keyword” column change the keyword for each object to “GIS\_DATA”. After completing this step, click “Finish”.

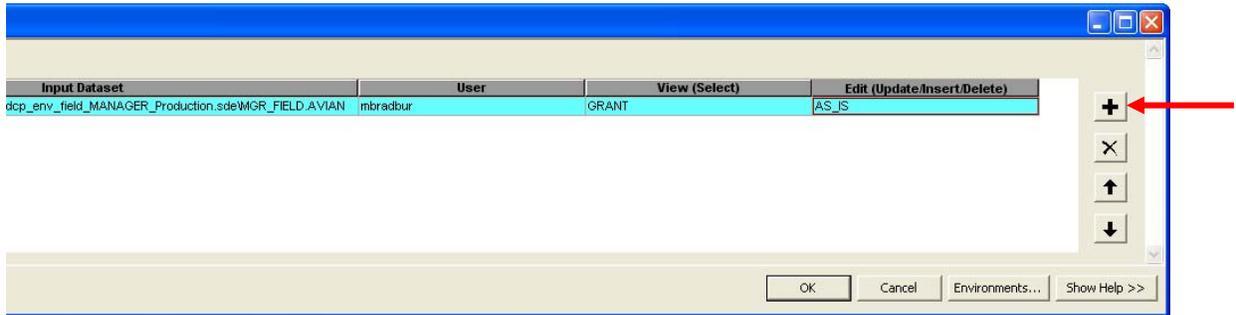
### Granting/Revoking SDE Privileges

**STEP 1:** In ArcCatalog, start ArcToolBox and browse to **Data Management Tools > Table > Change Privileges**. Right-click “Change Privileges” and select “Batch...” The following screen will appear:



**STEP 2:** While viewing the contents of the SDE geodatabase on the left hand side of ArcCatalog, select an “Object” or “Feature Dataset” and drag it into the cell under “Input Dataset”. In the cell located below “User”, type in the user name or role for which to assign privileges. In the cell below “View (Select)”,

select “Grant”, “As Is” or “Revoke”. In the cell under “Edit (Update/Insert/Delete)” select “Grant”, “As is”, or “Revoke” depending on whether it is or isn’t preferred for the user/role to have editing capability for the Object/Feature Dataset.



**STEP 3:** To grant additional privileges, select the entire row that was just completed. Next, press the plus sign located on the right hand side of the screen (see red arrow above). This will copy information from the first row into a second row. This allows the user to duplicate specific settings for additional Objects and/or Datasets. Additionally, further modifications can be made too the previously defined Object that was copied from the first row. To change to an alternate geodatabase Object or Feature Dataset, drag a different Object or Dataset name from the left side of the screen over into the new row’s cell under “Input Dataset”.



**STEP 4:** When finished, click “OK”.

## Creating and Managing Versions for a Multiuser Geodatabase

**STEP 1:** In ArcCatalog, on the left side within “Database Connections”, double-click on the connection for which you want to create a version. This will activate the connection. Right-click on the connection and select “Versions...”

**STEP 2:** A window will open displaying all versions created of the geodatabase, the owner(s), assigned access levels, and date each version was last modified. All versions must have been created from an “existing” version and there will always be a “DEFAULT” version included in the list. To create a version as a Child of another version, right-click on the version from which you want to create the Child and select “New...”

Name	Owner	Access	Last Modified
Invert Edits	LMCNEARN	Public	11/12/2009 ...
Lauras_Replica_11_11_09	MGR_FIELD	Public	11/11/2009 ...
Manager Edits and QC	MGR_FIELD	Protected	11/13/2009 ...
DEFAULT	BDCP_ENV_F...	Public	11/9/2009 6:...
LeahsReplica_ForEditing_11_12_09	LMCNEARN	Public	11/12/2009 ...
Chieko_Edits	MGR_FIELD	Private	11/13/2009 ...
Herp Edits	LPATTERS	Public	11/11/2009 ...

**STEP 3:** A window named “New Version” will open as in the example below. Type in a “Name” to identify the new version in the provided field and the version’s “Description” in the second field. Finally, select the preferred access permissions to set for the “New Version”. For Permissions, “Private” indicates that only the creator of the version can view and edit the version, “Public” allows anyone with appropriate object level privileges to view or edit the version, and “Protected” allows anyone with the appropriate object level permissions to view, but not edit the version.

**New Version**

Name

Description

Permission

Private

Public

Protected

OK Cancel

**STEP 4:** The new version can be used to make edits or upload data while isolating the new file from other user’s view and possible interference.

**STEP 5:** When version updates are complete and all edits made in the new version have been posted to the corresponding Parent Version, the new version is no longer necessary and should be deleted. To delete, in the “Version Manager” window (shown with STEP 2 above) right-click on the version and select “Delete”.

### Editing in a Multiuser Geodatabase

**STEP 1:** Register the Feature Class for editing (if this has not yet been completed). Open ArcCatalog and connect to the SDE Multiuser Geodatabase. Right-click on a geodatabase object (i.e.; Feature

Dataset, Feature Class, or Table). Select “Register as Versioned...” A window will appear providing the option to “move all edits to base automatically”. Do not select the checkbox for this option and click OK.

**STEP 2: Make edits.** Ensure the SDE account being used has editing privileges. Contact the DS acting as the Geodatabase Manager to find out and request privileges if necessary. Start Arcmap and add the data to be edited. Start an edit session and perform edits in the same manner as previously described in the “editing a data layer” process.

**STEP 3: Save edits and end editing session.**

*NOTE: If multiple people open the same map for editing at the same time, the user that saves edits first will prevent other users from saving their corresponding edits. As a result, a message will appear to the other users stating that the edits cannot be saved, and the edits of the first user have been merged into the active map for review. At this point, the other users can attempt to identify the updates that were made by the first user. When satisfied with the merged edits, the users can attempt the save again. As long as no one has saved since the last attempt to save, the process will be successful.*

### Copying a Subset of Data from one Geodatabase to Another

**NOTE:** For data that needs to be “post-differentially corrected”, the AXF files must be checked into a Personal Geodatabase that has been GPS-enabled. When data is downloaded, the process includes being placed in the Personal Geodatabase, then post-differential corrections are made, and finally, the new data must be selected and copied into the SDE Multiuser Geodatabase following the instructions in this section.

**STEP 1:** Start ArcMap. Add the objects (Feature Classes and Related Tables) that are to be copied to ArcMap from the source Geodatabase as well as the corresponding objects from the target Geodatabase.

**NOTE:** If there are no related records that use the OBJECTID field as the Primary Field, then proceed to STEP 3.

**STEP 2:** If the primary key for the relationship is the “OBJECTID”, the “OBJECTID” values in the Personal Geodatabase Feature Class should be copied to another field within the same Feature Class prior to copying the records to the target Geodatabase. This is because the “OBJECTID” will be reassigned when the records are copied, thus breaking the current relationship. If a field named: “OLD\_OBJECTID” does not already exist, create in both the source Geodatabase Feature Class and its corresponding target Geodatabase Feature Class. Using the field calculator on the “OLD\_OBJECTID” field, set the field to equal the “OBJECTID” field.

### SOURCE GEODATABASE FEATURE CLASS ATTRIBUTE TABLE - example

OBJECTID	SHAPE*	GPS_ID	Observer1	Observer2	Northing	UTM_Easting	DateTime	Site	Trap_Burn	StartDate	EndDate	Habitat	Habitat_Mud	Dominant_App_Veg	Dominant_Veg_Per_Ce
3603	Point Z						9/15/2009 11:22:14 AM		274						
3610	Point Z						9/15/2009 11:23:03 AM		271						
3611	Point Z						9/15/2009 11:23:43 AM		268						
3612	Point Z		Whow	Jay			7/13/2009 10:48:48 AM		16						
3613	Point Z						7/13/2009 10:51:26 AM		1						
3614	Point Z						7/13/2009 10:52:48 AM		3						
3615	Point Z						7/13/2009 10:53:58 AM		45						
3616	Point Z						7/13/2009 10:54:56 AM		49						
3617	Point Z						7/13/2009 10:56:11 AM		44						
3618	Point Z						7/13/2009 10:57:17 AM		39						
3619	Point Z						7/13/2009 10:58:14 AM		41						

## TARGET GEODATABASE FEATURE CLASS ATTRIBUTE TABLE – example

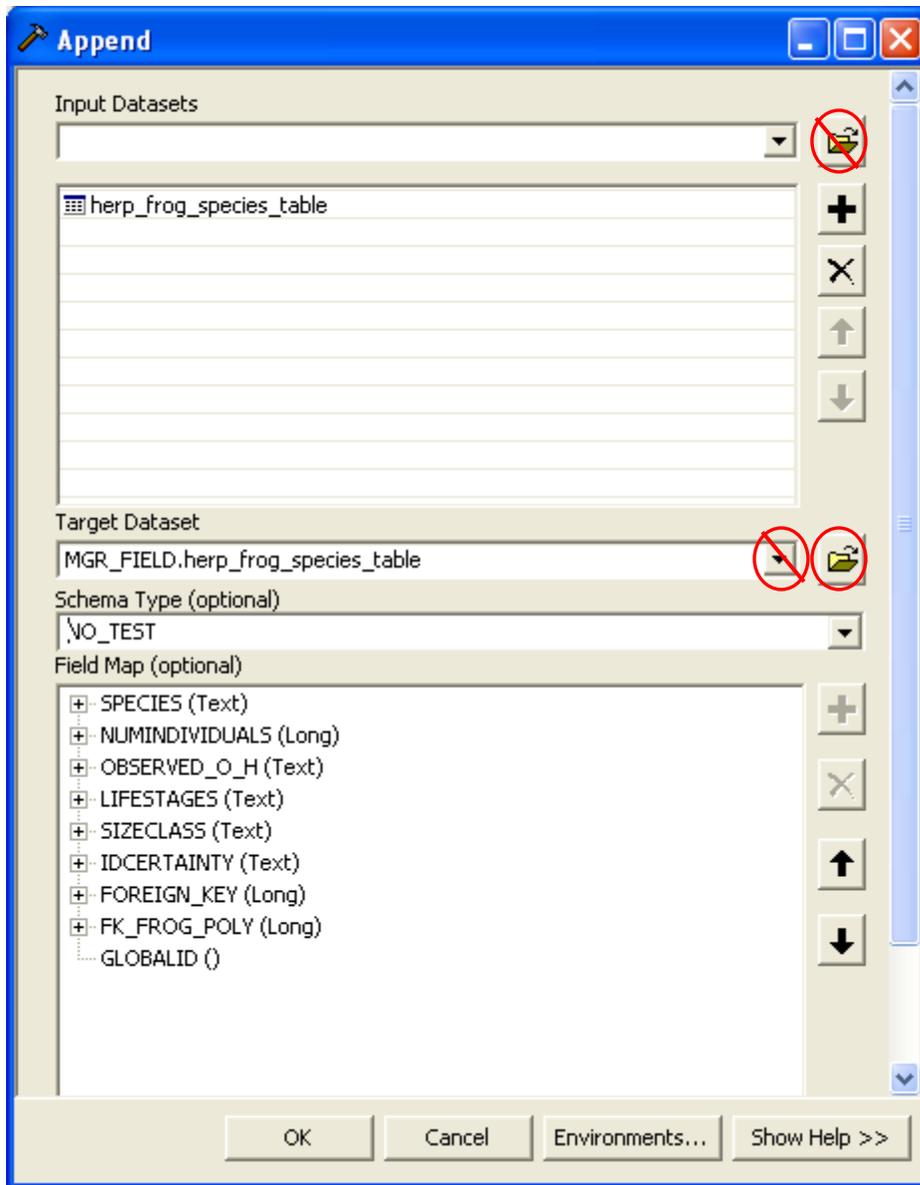
OBJECTID	GPS_ID	OBSERVER	OBSERVER2	Northing	UTM EASTING	DATETIME	SITE	TRAP_JOB#	STARTDATE	ENDDATE	Habitat	Habitat_Misc	DOMINANT_AQU_VEG	DOM_AQU_VEG_PER_COV	DOMINANT
3617	215598	jl, mv	vw, eg	4205005.0547	630405.9726	3/15/2009 11:15:26 AM	+hab	263	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3618	215598	jl, mv	vw, eg	4205094.0411	630405.7626	3/15/2009 11:16:31 AM	+hab	269	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3619	215598	jl, mv	vw, eg	4205096.8391	630405.9612	3/15/2009 11:17:20 AM	+hab	265	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3620	215598	jl, mv	vw, eg	4205075.0083	630407.7152	3/15/2009 11:18:12 AM	+hab	270	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3621	215598	jl, mv	vw, eg	4205064.3325	630402.9471	3/15/2009 11:18:54 AM	+hab	262	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3622	215598	jl, mv	vw, eg	4205055.3789	630479.3075	3/15/2009 11:19:37 AM	+hab	261	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3623	215598	jl, mv	vw, eg	4205045.2187	630479.1116	3/15/2009 11:20:27 AM	+hab	269	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3624	215598	jl, mv	vw, eg	4205037.8956	630478.3969	3/15/2009 11:21:26 AM	+hab	266	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3625	215598	jl, mv	vw, eg	4205025.1619	630471.1571	3/15/2009 11:22:14 AM	+hab	274	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3626	215598	jl, mv	vw, eg	4205014.6834	630471.2652	3/15/2009 11:23:03 AM	+hab	271	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab
3627	215598	jl, mv	vw, eg	4205005.9605	630471.3853	3/15/2009 11:23:43 AM	+hab	256	3/15/2009	+hab	+hab	+hab	+hab	+hab	+hab

**STEP 3:** Starting with the first object to be copied (feature class or table), open the “Attribute” tables of both the source Geodatabase object and the corresponding target Geodatabase object. Select all of the records in the source Geodatabase that do not already exist in the target Geodatabase. Start an edit session. Click on the “Copy” icon. After moving the cursor over the target geodatabase, click on the “Paste” icon. Verify that the records were successfully copied into the target Geodatabase.

*NOTE:* If there is not a related relationship class between the object just copied and another object, copying is complete and you can skip Steps 4-6 below.

**STEP 4:** If there is corresponding data stored in a related table, once the data from the Feature Class has been copied over, the append tool will be used to append related table records from the source Geodatabase to the target Geodatabase. With the features that were previously selected in Step 3 still selected (or reselected), go to the Options menu of the Feature Class’ Attribute table and select “Related Tables”. A list of related tables will appear. Select the related table from which to copy data. The related table’s Attribute table will open displaying the data to be appended. In ArcToolBox, browse to Data Management Tools > General > Append. Double-click to select the Append tool and fill in the information as follows:

- The input dataset should have the related table from the target Geodatabase entered. Use the drop down arrow to select the table (not the “browse to” (folder icon) button).
- The target dataset (2<sup>nd</sup> field) will be populated with the target Geodatabase version of the same table. In this case, it is recommended to use the “browse to” button (folder icon) to add the dataset instead of the down arrow.
- For Schema Type, select “NO\_TEST”.

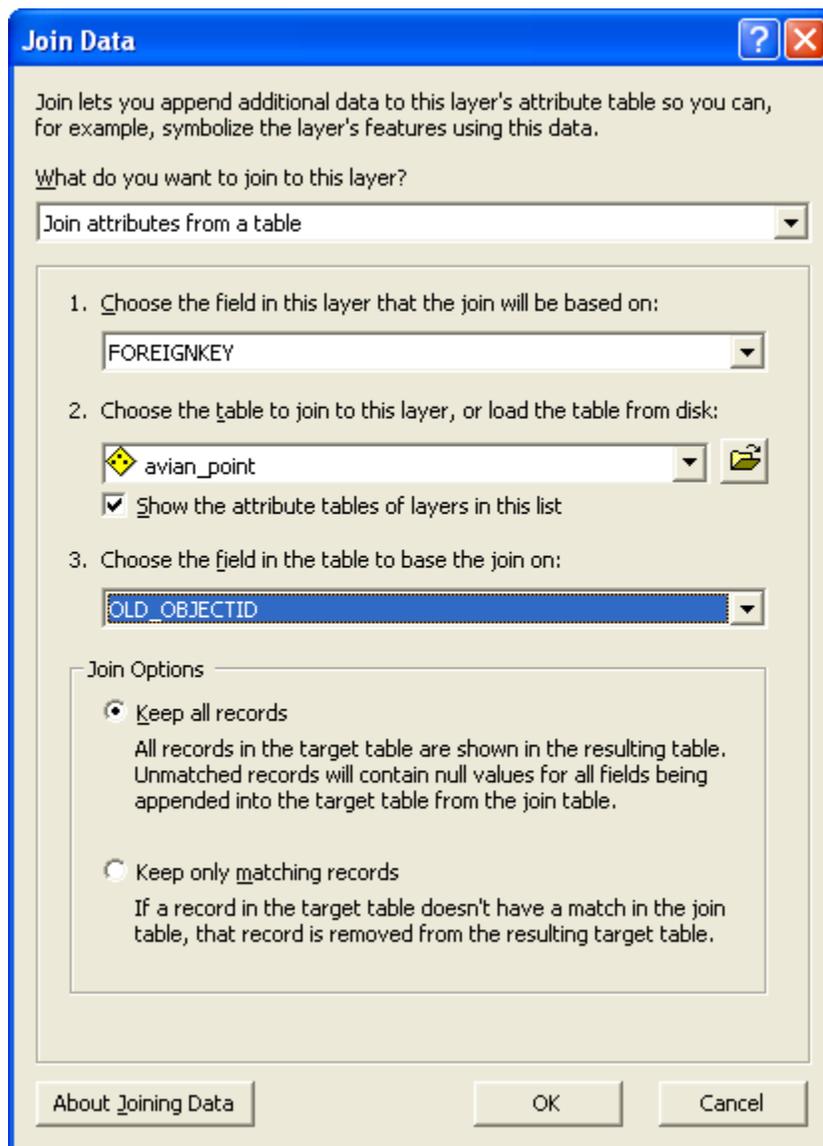


**NOTE:** If the OBJECTID field was not used as the primary key in the original dataset, copying is complete and you can skip Steps 5-6 below.

**STEP 5:** For datasets with relationships that use the “OBJECTID” as the Primary Key, the new “OBJECTIDS” must be copied into the Foreign Key field of the related table. In order to do so, you will create a “Join” between the targets Geodatabase’s table and the Feature Class related to that table. To begin, open the Table of Contents in ArcMap and click on the “Source” tab. On the Source tab, right-click on the target Geodatabase’ related table of interest and select “Joins and Relates”, then select “Join...” Fill in the options with the following information:

- For the first option within the “Join” tool select “Join attributes from a table”.
- For number 1. select “FOREIGNKEY”
- For number 2. select the related feature class from the SDE multiuser geodatabase
- For number 3. select “OLD\_OBJECTID”

- For the “Join Options” select “Keep all records”
- Click on OK

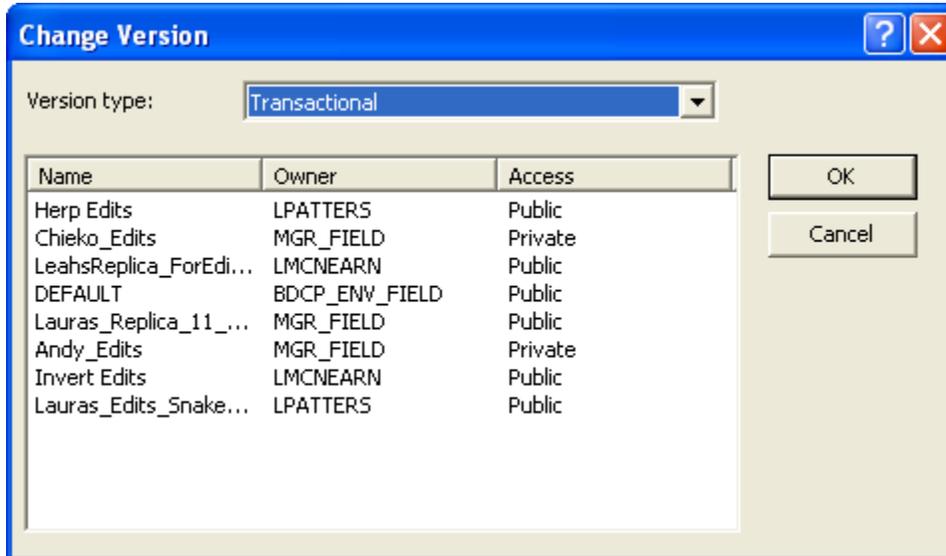


**STEP 6:** Open the Attribute Table of the related table that has just been joined. Using the field calculator for the “FOREIGNKEY” field, set the field equal to the Feature Class’ “OBJECTID” field. The related table’s “OBJECTID” will be listed first. Do not set the “FOREIGNKEY” equal to the related table’s “OBJECTID”. Follow down the list until the name of the Feature Class followed by “OBJECTID” is found. After completing the calculation function, verify that the new rows of Feature Classes and related records in the related table that were copied and joined through the previous steps reflect the same relationships as were seen in the original datasets.

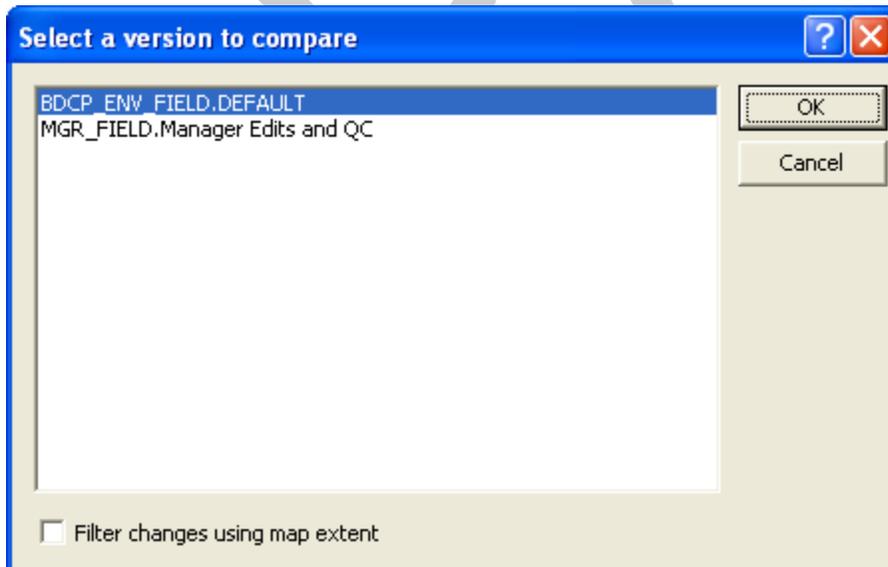
## Reviewing Edits Made in Child Versions

**STEP 1:** Open ArcMap. In ArcMap add the data that has been changed and for which it is desired to review the changes by comparing to a parent version.

**STEP 2:** In order to view edits made in each of the Child versions, the first step is to change the displayed version to the Child. To do this, select the “source” tab at the bottom of the Table of Contents in ArcMap. Right-click on the name of the geodatabase version which should be displayed just below “Layers” in the table of contents. After right-clicking on the geodatabase, select “Change Version...” The “Change Version” window will appear. Select the Child Version for which you want to review edits and click on OK (the “version type” field should read “Transactional”).

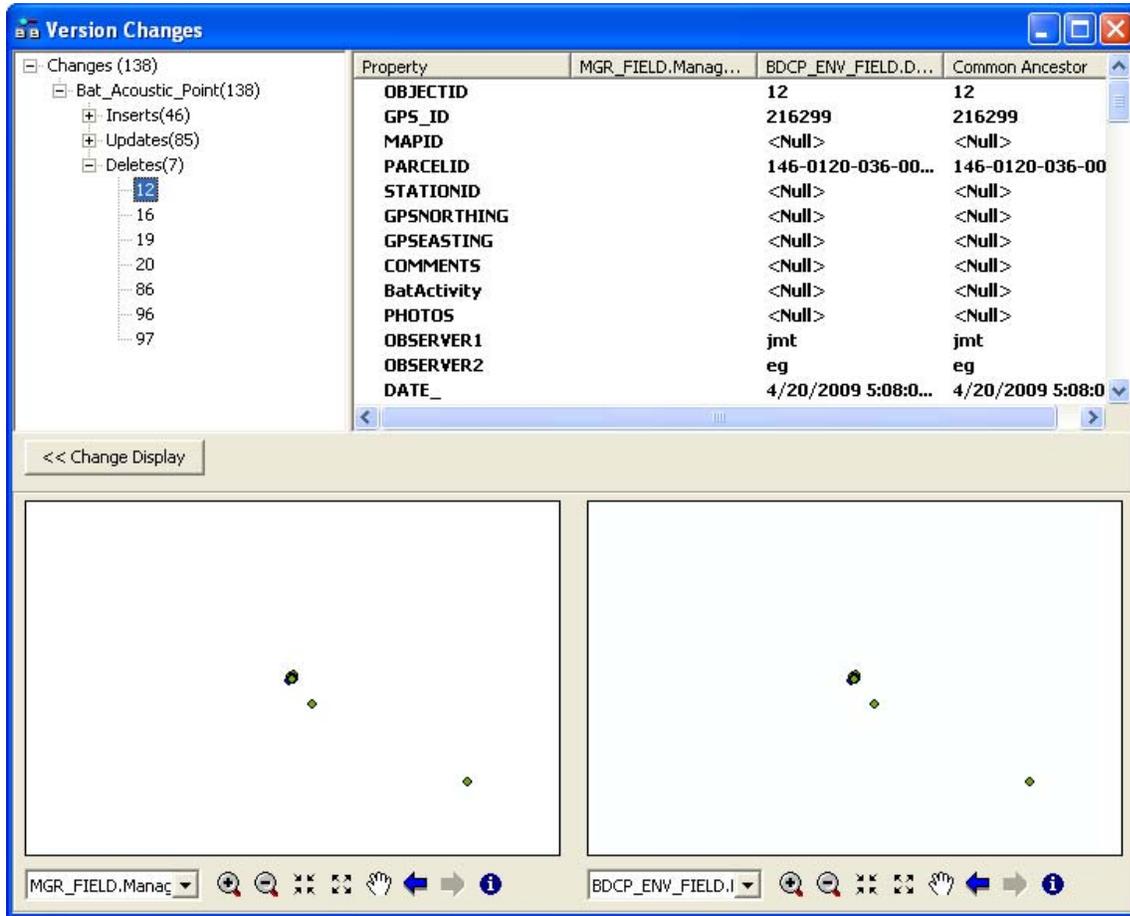


**STEP 3:** Confirm that the “Versioning” toolbar has been turned on in the map. Select the geodatabase in the Table of Contents. When the geodatabase is selected, the “View Changes” button on the “Versioning” toolbar will become active. The “Select a version to compare” window will also appear. Select the preferred Parent or Grandparent Version for which to compare the current version and click on OK.



**STEP 4:** At this point, a “Version Changes” window will appear. The top left hand side shows a table of contents of those layers with changes, and groups the changes by type (inserts, updates, or deletes). Under each type of change, the changed records are referenced by their OBJECTID. When an

OBJECTID is selected in the listing, the screen to the right displays the record's fields and their corresponding values. The right screen also displays both what the Parent field contained and what the Child currently has for values. Fields that were changed are displayed in bold. The bottom screens display an optional comparative geographic view of the data.

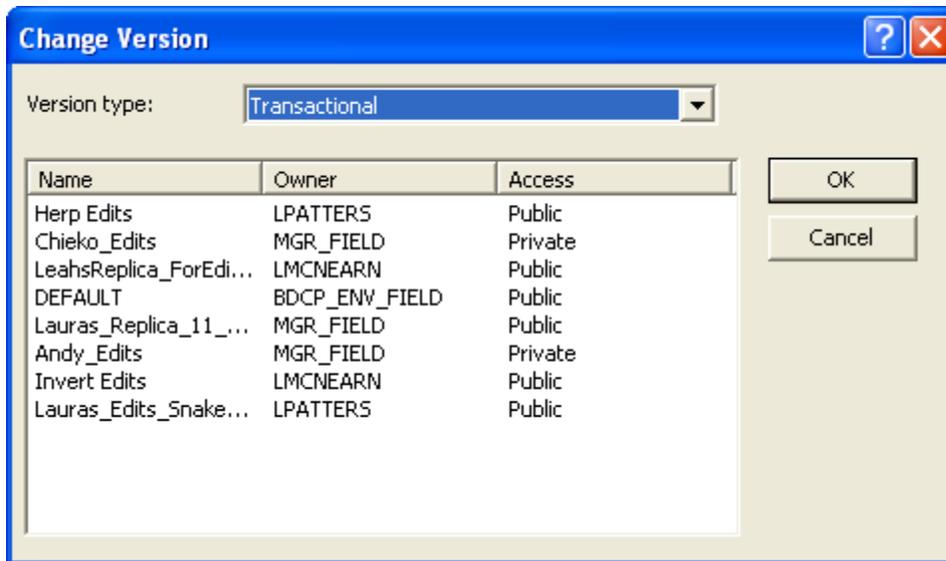


## Reconciling and Posting Edits between Versions

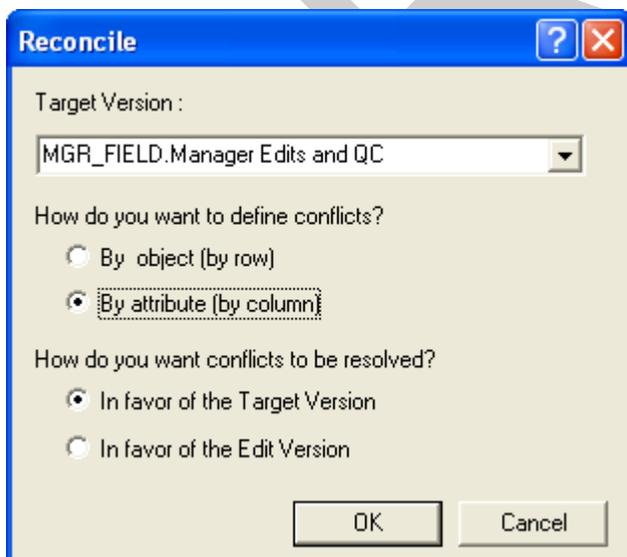
Reconciling brings any Parent version edits into the Child version and identifies editing conflicts if any exist. The posting function takes the Child edits after all conflicts have been resolved and posts them to the Parent version. The “Post” button will not be active until a “reconcile” has taken place.

**STEP 1:** *Open ArcMap.* Add data from the edited Child version of the SDE Multiuser Geodatabase that is to be reconciled and posted. In order to perform a “reconcile”, the user logged into the geodatabase must have editing privileges for the data layers, and either be the owner of the Child Version or the Child Version itself must have a public access setting. To post the Child’s changes to the Parent, the user must again have editing privileges for the data layers and either be the Owner of the Parent Version or the Parent Version itself must have public access.

**STEP 2:** To reconcile and post edits, the first step is to change the version of the data to the Child dataset. To do this, click the “source” tab at the bottom of the table of contents in ArcMap. Right-click on the geodatabase name in the table of contents (should be located just below where it states “Layers”) and select “Change Version...”. A “Change Version” window will appear. From the list, select the Child version to reconcile and click OK (the Version type field should read “Transactional”).

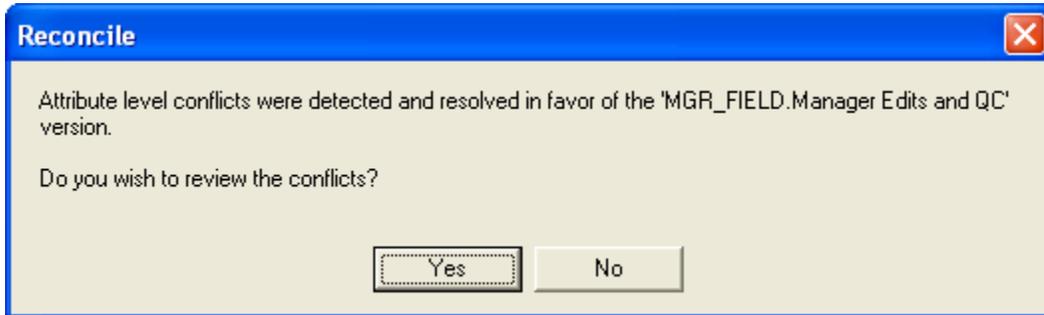


**STEP 3:** Make sure the “Versioning” toolbar has been turned on in the map. Start an Edit Session. The “Reconcile” button  will become active on the “Versioning” toolbar. Click on the “Reconcile” button; a “Reconcile” window will open. The “Target Version” field on the window that appears will automatically be directed to the current versions’ Parent. In most cases, this should be left to the default. The remaining fields in the window relate to editing conflicts. Conflicts can happen when a record in the Parent Version has been edited since the Child Version was created, and the Child Version also includes an edit for the same record. The first question about defining conflicts gives you the option to have the program either display conflicts between any records that have been edited in both versions (by object), regardless if the edits were in the same fields or not, or limit the conflicts displayed to cases where the same fields within the two versions were edited (by attribute). For most situations, it is better to choose “By attribute” to reduce the number of conflicts identified. In the event conflicts should arise, the second question asks the user if the Edit version (the Child) is to be changed to match the edit(s) of the Target version (the Parent) or vice versa. This option is dependent on each individual situation, so there is no preferred setting.

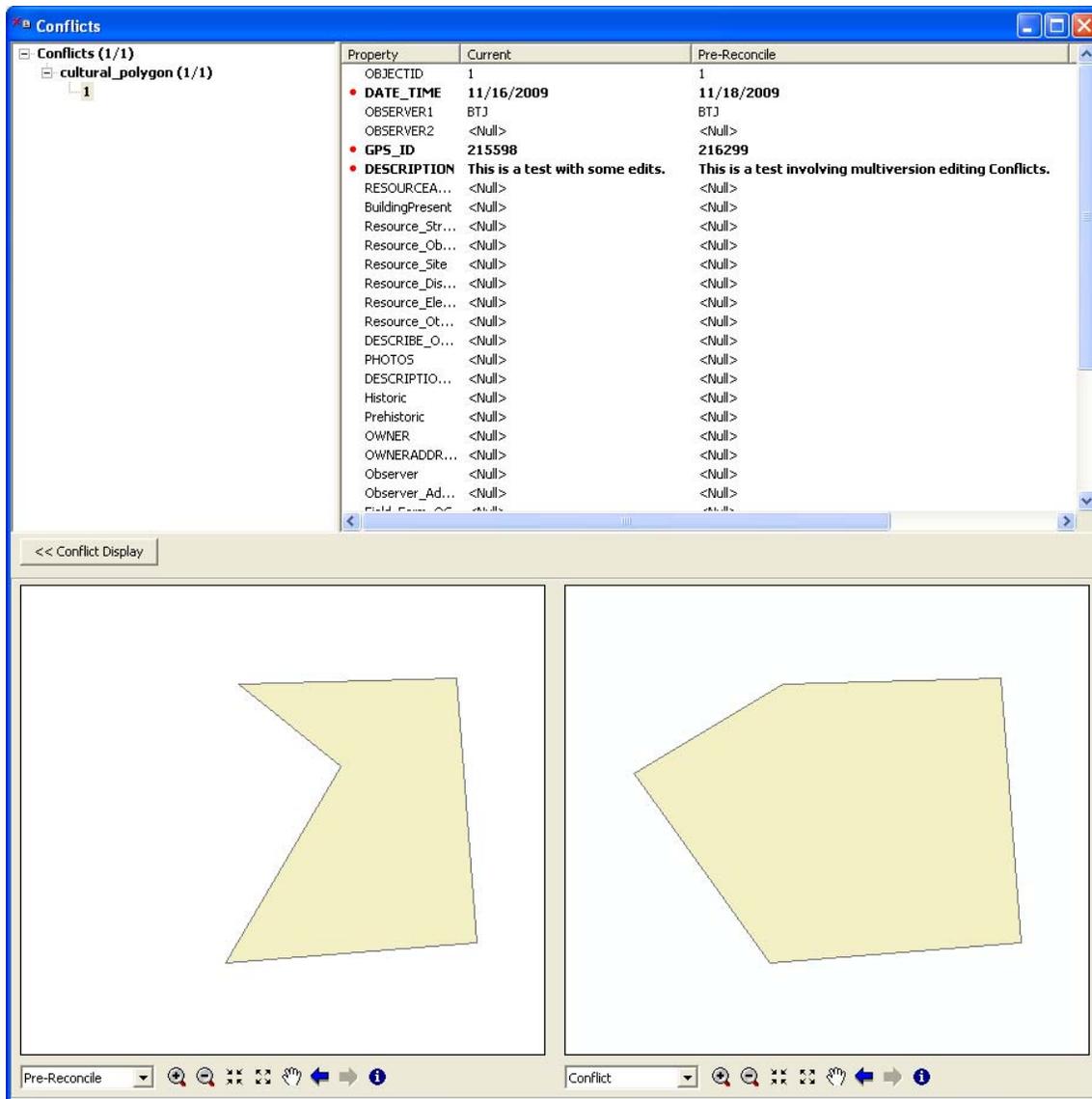


**STEP 4:** If there are conflicts, a message will appear with information as shown below. If you select “Yes”, the “Conflicts” window will appear; if you select “No”, the “Conflicts” window can be accessed by

clicking the “Conflicts” button  on the “Versioning” toolbar. If you decide not to review the conflicts and you post the Child version to the Parent version, the ability to review those conflicts will be gone and the conflicts will have been resolved either in favor of the Parent or the Child depending on your answer to Step 3 above.



**STEP 5:** The “Conflicts” window is very similar to the “Version Changes” window. Refer to the previous section called “Viewing Edits Made in Child Versions”, Step 4 to get an overview of the display. The main difference in the “Conflicts” window is the added functionality of being able to switch the resolution rule set in Step 3 above for that individual field. To do this, right-click on a record listed in the table of contents (left top window) to change the record reference to an alternate version. To change the conflict resolution rule for only a specific field, right-click on the field in the top right screen and select the alternate version (of the two: Child or Parent).



**STEP 6:** After reconciliation has been completed, click on the “post” button  on the “Versioning Toolbar” to post the Child Version edits to the Parent.

### Archiving DEFAULT Version

**NOTE:** Archiving cannot be activated for an entire geodatabase, but can only be enabled at the individual geodatabase object level (feature dataset, feature class, or table).

**STEP 1:** Open ArcCatalog. Create a connection to the SDE multiuser geodatabase for which you want to enable archiving. To enable archiving, right-click on an object (feature dataset, feature class, or table) and select “Archiving”. Then select “Enable Archiving”.

**Note:** Archiving prevents the compression tool from doing all that it is designed to do. For example, any data participating in archiving cannot be moved to base during compression.

## Compression of the SDE Multiuser Geodatabase

**NOTE:** The connection to the SDE Multiuser Geodatabase that is used for the compress must have been made using the SDEA user account. In this case, it would be the user identified as “bdcp\_env\_field”.

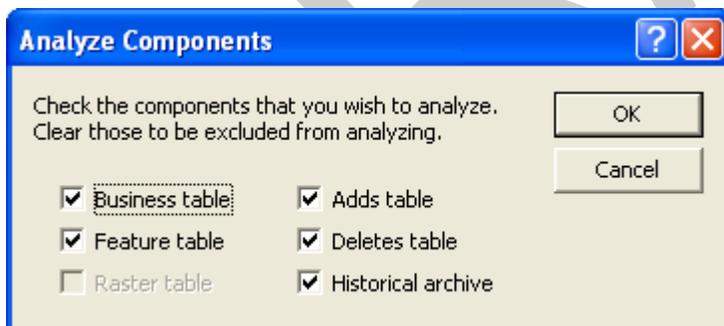
**STEP 1:** Open ArcCatalog. Open ArcToolBox and browse to Data Management Tools > Database > Compress. Double-click on “Compress”.



**STEP 2:** From the navigation pane on the left hand side of ArcCatalog, click and drag the SDE multiuser geodatabase into the “Input Workspace” box in the window. Alternatively, another option is to click on the “browse to” button (folder icon) and locate the geodatabase for selection. Click on OK button.

## Compute Statistics

Open ArcCatalog and connect to the target SDE multiuser geodatabase. It is not possible to compute statistics for the entire geodatabase simultaneously; each geodatabase object (feature dataset, feature class, or table) must have statistics generated for them individually. To generate statistics, right-click on an object and select “Analyze”. Check all option boxes in the “Analyze Components” window and click on OK.



## Initial Creation of a “One Way” Replica Geodatabase from Production Environment to the Publish Environment

**NOTE:** There are two servers running Oracle with SDE. The server for initial production/creation of the data is referred to as the production environment while the server for serving the data out to end users (i.e.; users who are not involved in editing or QC of the data, just consumption) is referred to as the publish environment. For more detailed information about the environments contact the DHCCP GIS coordinator to get access to the DHCCP GIS Data Management Plan. Once the data in the production environment has made it through QC and has been checked into the DEFAULT version it is ready to reside in the publish environment. To do this the DEFAULT version is copied to a geodatabase in the

publish environment. For the initial creation of the replica, the geodatabase in the publish environment must be empty. The SDE Administrator can use the replication wizard to complete the replication. The steps are as follows:

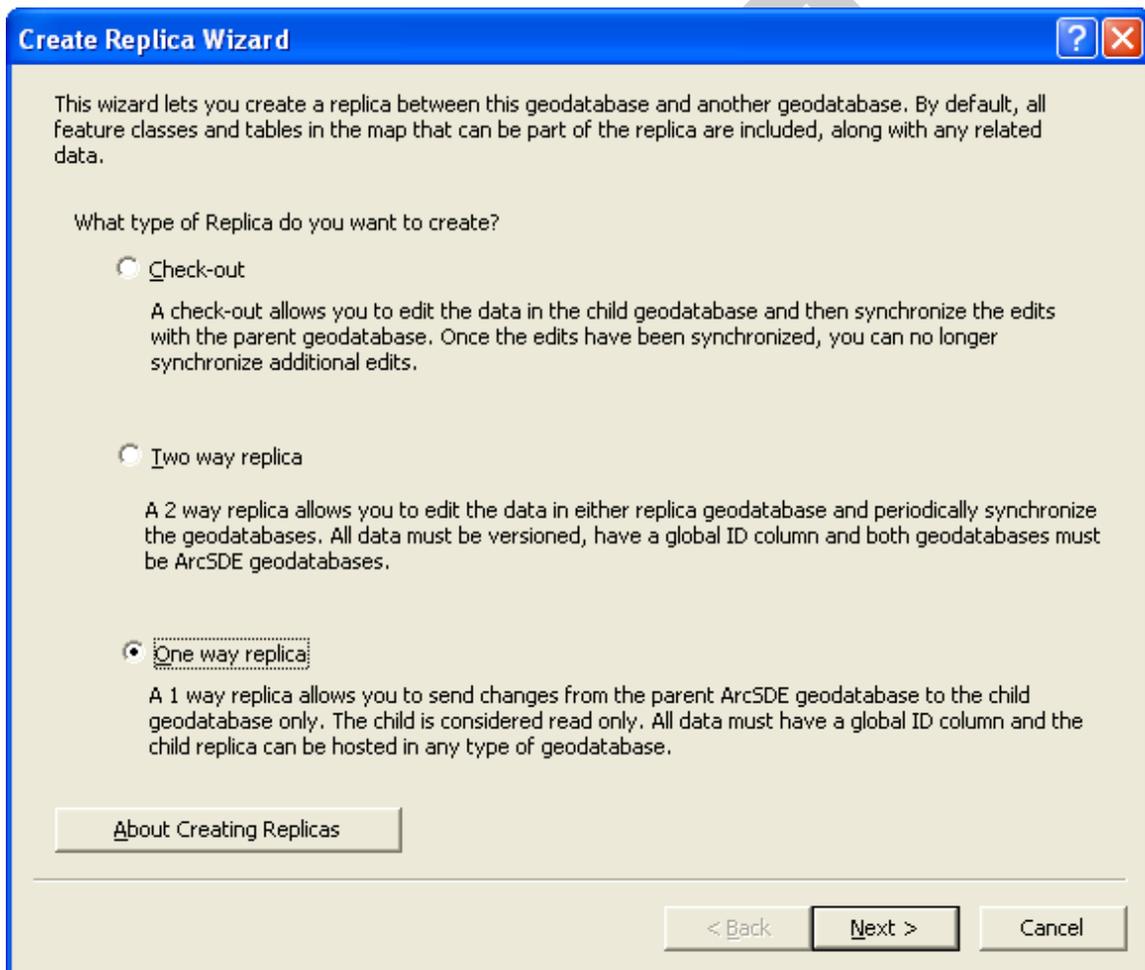
**STEP 1:** Open ArcMap.

**STEP 2:** Add the “Distributed Geodatabase” toolbar.

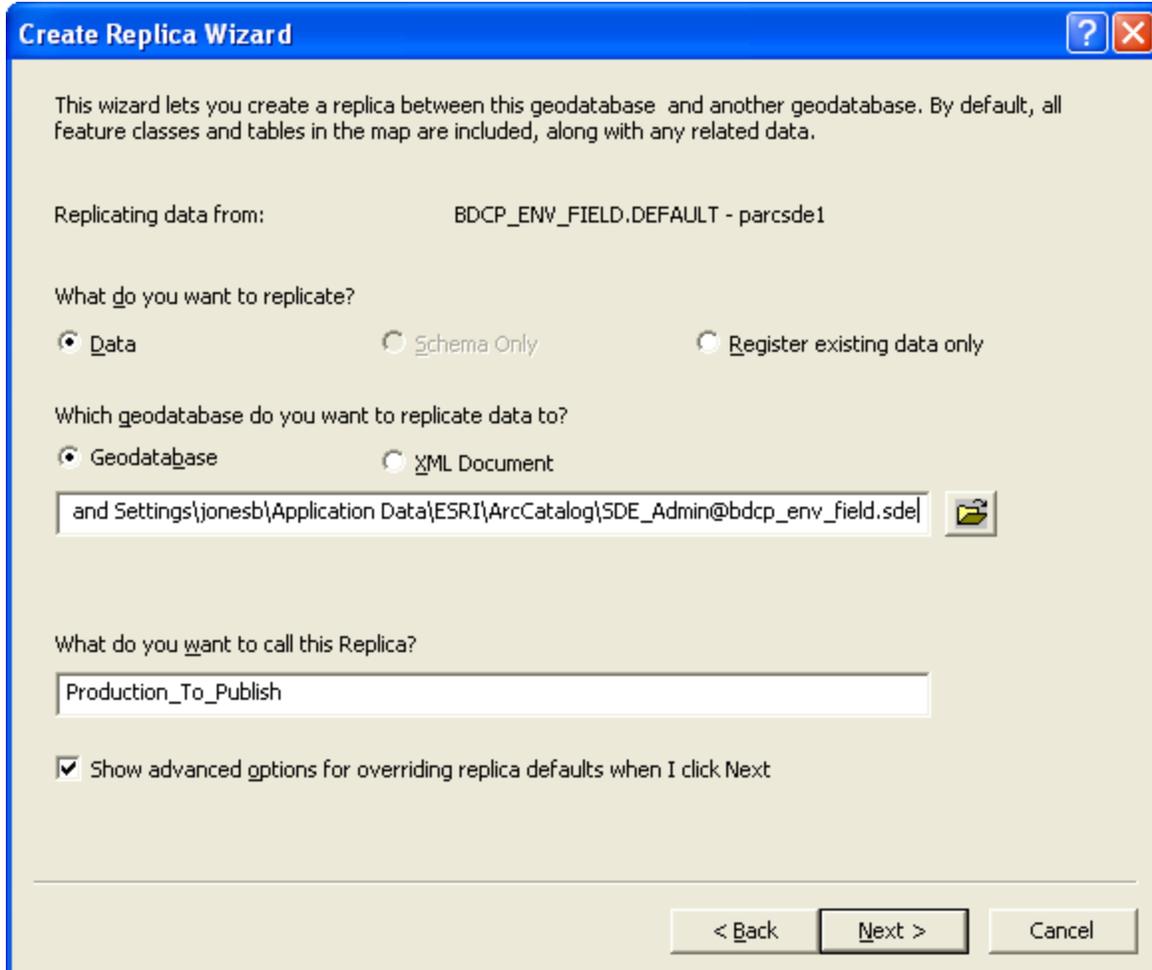
**STEP 3:** Add all DEFAULT version’s feature classes to the map from the production geodatabase.

**STEP 4:** Press the “create replica” button: 

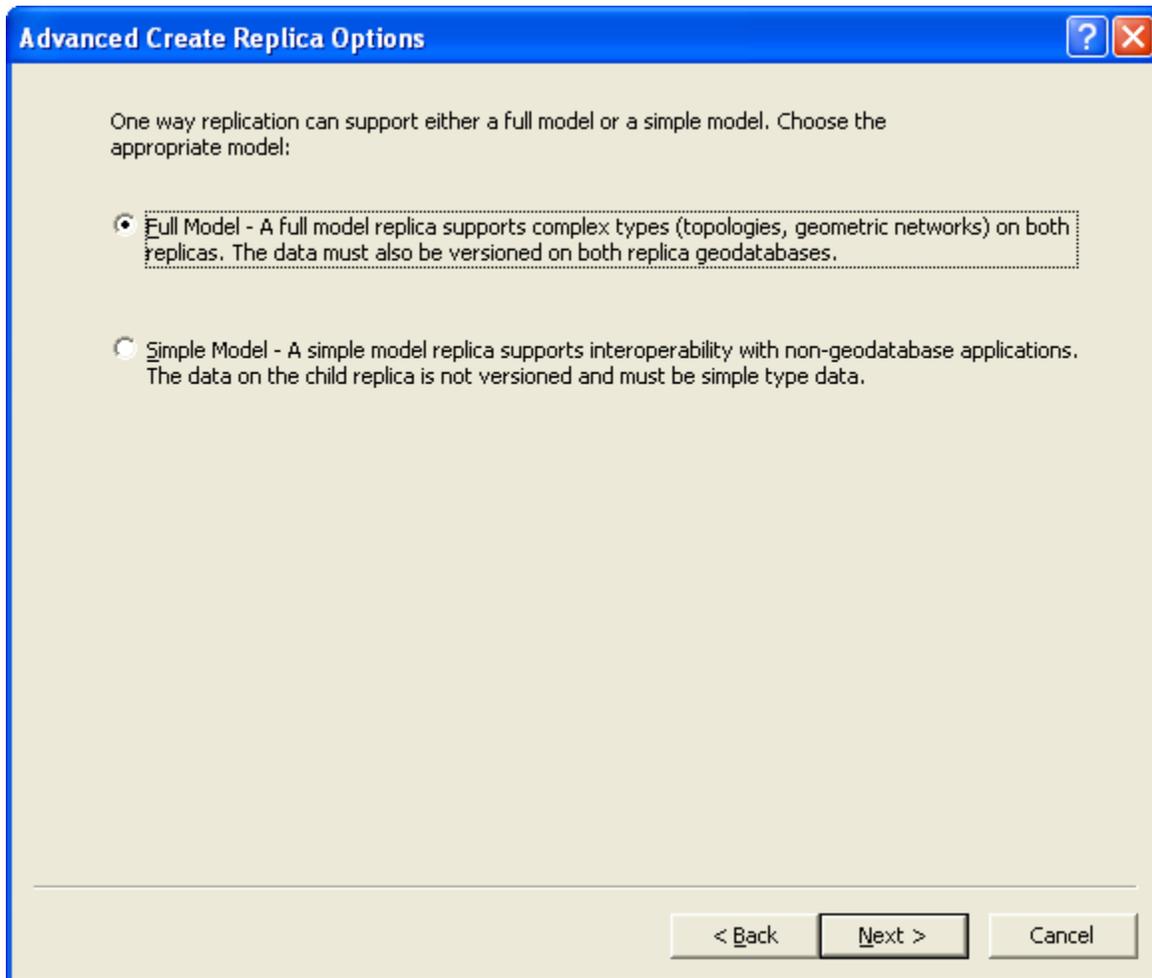
**STEP 5:** Choose “One way replica” and press “Next”.



**STEP 6:** On the next screen confirm that the “Replicating data from:” field is populated with “BDCP\_ENV\_FIELD.DEFAULT - <production server name>”. At “What do you want to replicate?” select “Data”. For “Which geodatabase do you want to replicate data to?” select “Geodatabase” and then browse to your BDCP\_ENV\_FIELD connection on the publish server. In the field “What do you want to call this Replica?” enter “Production\_To\_Publish”. Finally, check the checkbox for “Show advanced options for overriding replica defaults when I click next”. Click the “Next” button.



**STEP 7:** On the next screen select “Full Model” and click “Next”.



**STEP 8:** On the next screen select “The full extent of the data” option and leave all the displayed geodatabase objects checked as “Included”. Confirm “Replicate related data” is checked and click “Next”.

**Advanced Create Replica Options**

What spatial extent do you want to apply to the replica

- The current display extent
- The full extent of the data
- The boundary of the currently selected graphic
- The following extent:

Left:  Top:  Right:   
 Bottom:

Choose which items you want to check out

Include	Data	Type	Check Out	Use Spatial Extent
<input checked="" type="checkbox"/>	MGR_FIELD.avian_point	Feature Class	All Features	<input type="checkbox"/>
<input checked="" type="checkbox"/>	MGR_FIELD.avian_generic_li	Feature Class	All Features	<input type="checkbox"/>
<input checked="" type="checkbox"/>	MGR_FIELD.avian_generic_p	Feature Class	All Features	<input type="checkbox"/>
<input checked="" type="checkbox"/>	MGR_FIELD.avian_generic_p	Feature Class	All Features	<input type="checkbox"/>
<input checked="" type="checkbox"/>	MGR_FIELD.avian_point_offs	Feature Class	All Features	<input type="checkbox"/>
<input type="checkbox"/>	MGR_FIELD...	Relationship Class		

Replicate related data

**STEP 9:** On the next screen leave everything as defaulted and click “Next”.

**Advanced Create Replica Options**

For each relationship class, set the direction to define how related objects are added to the replica. A forward direction adds objects to the destination class that are related to objects in the origin class. A reverse direction adds rows to the origin class that are related to rows in the destination class. Forward is the default.

Include	Relationship Class	Origin Class	Destination Class	Direction
<input checked="" type="checkbox"/>	sit_rec_no_build_lin_	sit_rec_non_building	sit_rec_haz_mat_tabl	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_pol	sit_rec_non_building	sit_rec_haz_mat_tabl	Forward
<input checked="" type="checkbox"/>	sit_rec_build_poi_inte	sit_rec_building_point	sit_rec_interactions_t	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_poi	sit_rec_non_building	sit_rec_interactions_t	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_lin_i	sit_rec_non_building	sit_rec_interactions_t	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_pol	sit_rec_non_building	sit_rec_interactions_t	Forward
<input checked="" type="checkbox"/>	sit_rec_build_poi_tan	sit_rec_building_point	sit_rec_storage_tank	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_poi	sit_rec_non_building	sit_rec_storage_tank	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_lin_t	sit_rec_non_building	sit_rec_storage_tank	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_pol	sit_rec_non_building	sit_rec_storage_tank	Forward
<input checked="" type="checkbox"/>	sit_rec_build_poi_uni	sit_rec_building_point	sit_rec_unidentified_t	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_poi	sit_rec_non_building	sit_rec_unidentified_t	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_lin_	sit_rec_non_building	sit_rec_unidentified_t	Forward
<input checked="" type="checkbox"/>	sit_rec_no_build_pol	sit_rec_non_building	sit_rec_unidentified_t	Forward
<input checked="" type="checkbox"/>	avian_point_has_avi	avian_point	avian_table	Forward

**STEP 10:** On the next screen change everything in the “Config. Keyword” column to “GIS\_DATA” by choosing it from the drop down menu options. Click “Next”.

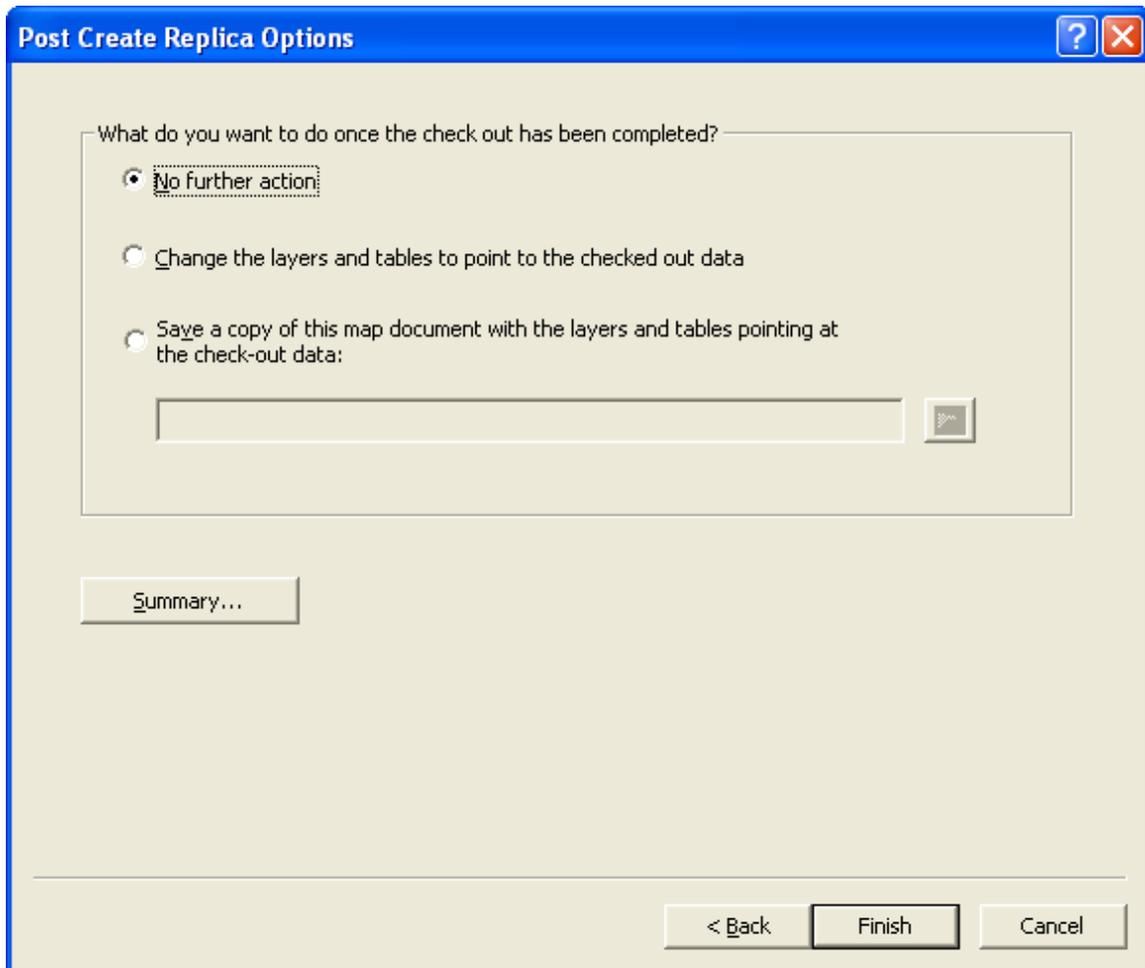
**Create Replica Wizard**

Specify creation keywords for the replica

Type	Source Name	Config. Keyword
Relationship Class	MGR_FIELD.sit_rec_no_build_pol	
Feature Dataset	MGR_FIELD.AVIAN	
Relationship Class	MGR_FIELD.avian_point_has_avi	
Feature Class	MGR_FIELD.avian_point	GIS_DATA
Feature Class	MGR_FIELD.avian_generic_line	GIS_DATA
Feature Class	MGR_FIELD.avian_generic_point	GIS_DATA
Feature Class	MGR_FIELD.avian_generic_polyg	GIS_DATA
Feature Class	MGR_FIELD.avian_point_offset	GIS_DATA
Table	MGR_FIELD.herp_frog_species_t	GIS_DATA
Table	MGR_FIELD.riparian_mammal_ca	GIS_DATA
Table	MGR_FIELD.sit_rec_drums_table	GIS_DATA
Table	MGR_FIELD.sit_rec_haz_mat_tab	GIS_DATA
Table	MGR_FIELD.sit_rec_interactions_	GIS_DATA
Table	MGR_FIELD.sit_rec_storage_tank	GIS_DATA
Table	MGR_FIELD.sit_rec_unidentified_	GIS_DATA
Table	MGR_FIELD.avian_table	GIS_DATA

< Back   **Next >**   Cancel

**STEP 11:** On the next screen leave the default selection to “No further action” and click “Finish”.



### Transfer Data Edits from Production to the Published Environment

Refer to the section in this appendix under “Environmental Field Surveys Data Management Processes” named “Replica Synchronization”.

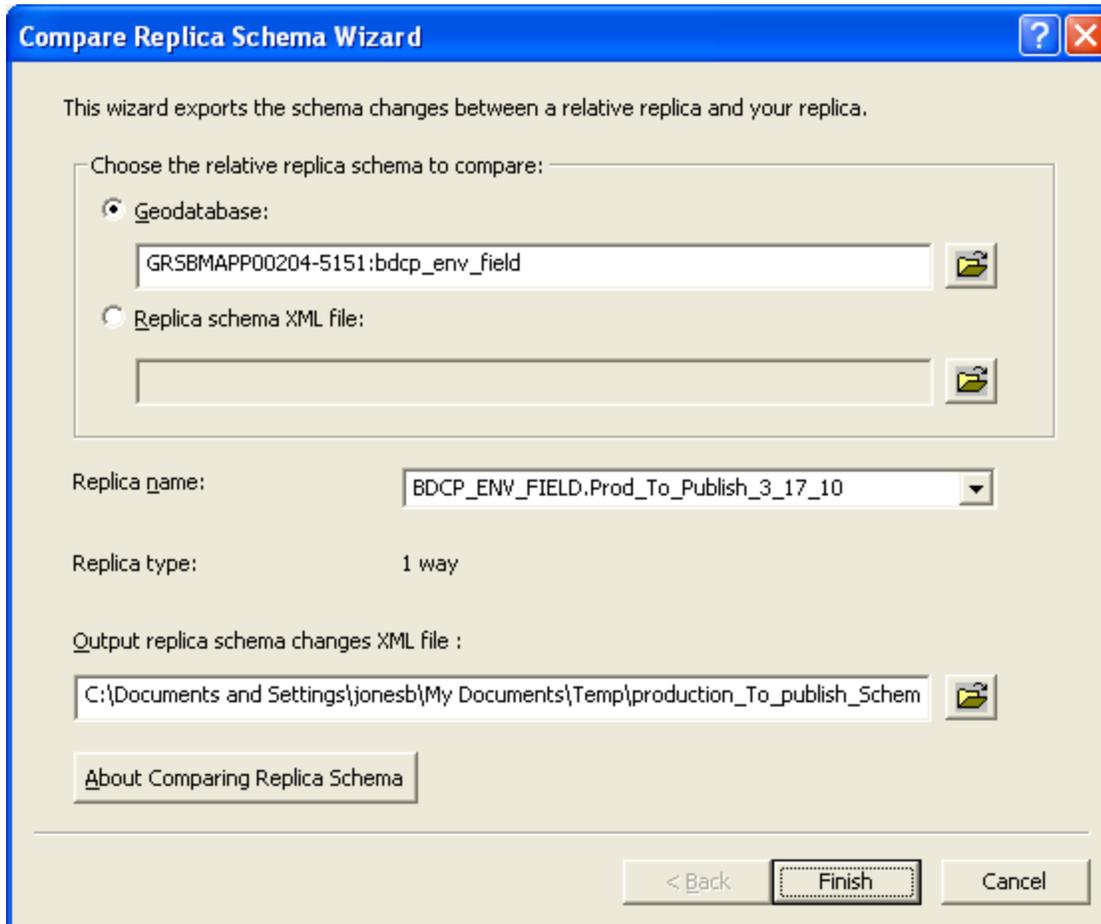
### Transfer Schema Changes between Original Geodatabase and Replica Geodatabase

*NOTE:* If the following situations apply do not proceed with this tutorial but rather delete and recreate the replica:

- A geodatabase object is deleted and re-added with the same name. This typically happens when the fields need to be re-ordered in an object.
- A relationship class is added or removed. Instead of deleting the replica, the relationship classes may be manually removed or added. The recommendation is to delete and recreate the replica to ensure the success of synchronization.

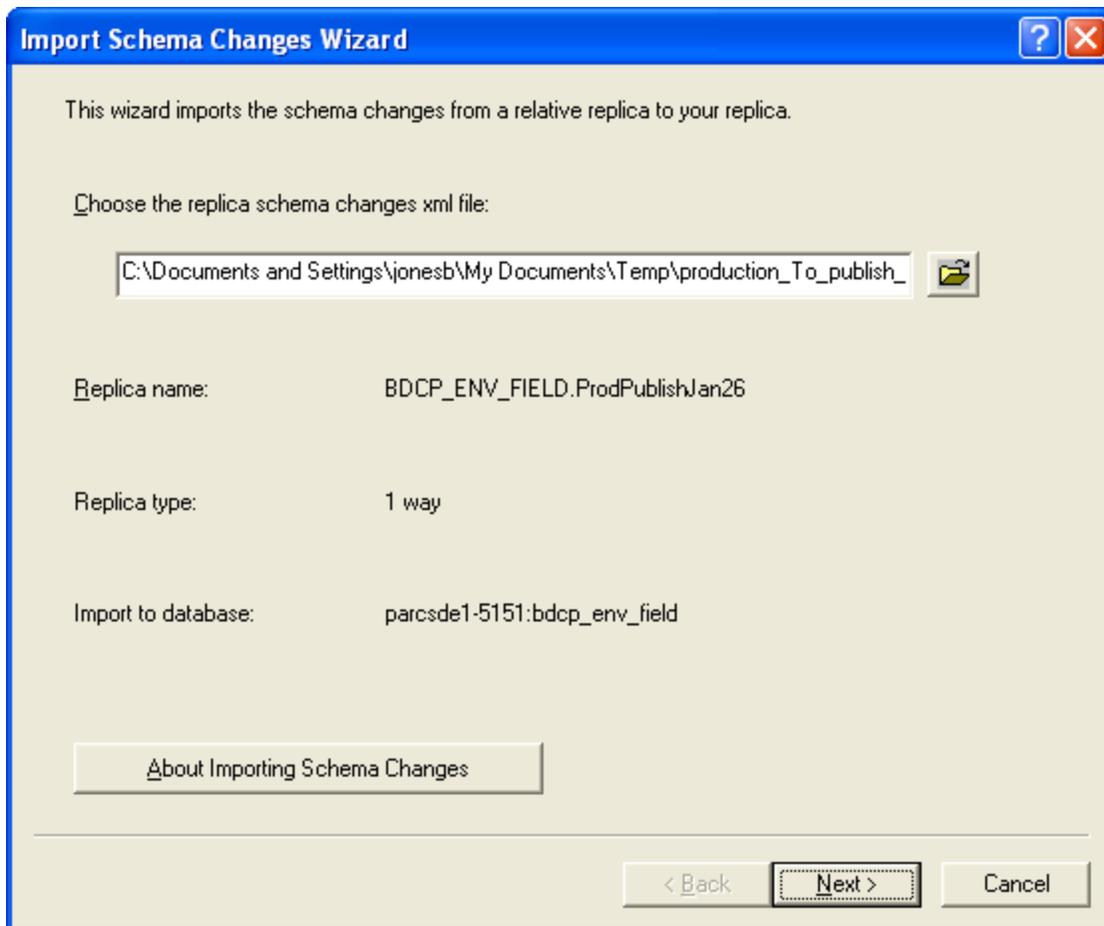
**STEP 1:** *Open ArcCatalog.* Navigate to the original geodatabase.

**STEP 2:** *Compare replica schema.* Right click on the original geodatabase and choose “Distributed Geodatabase”. From the menu that appears choose “Compare replica schema”. Refer to the image below:

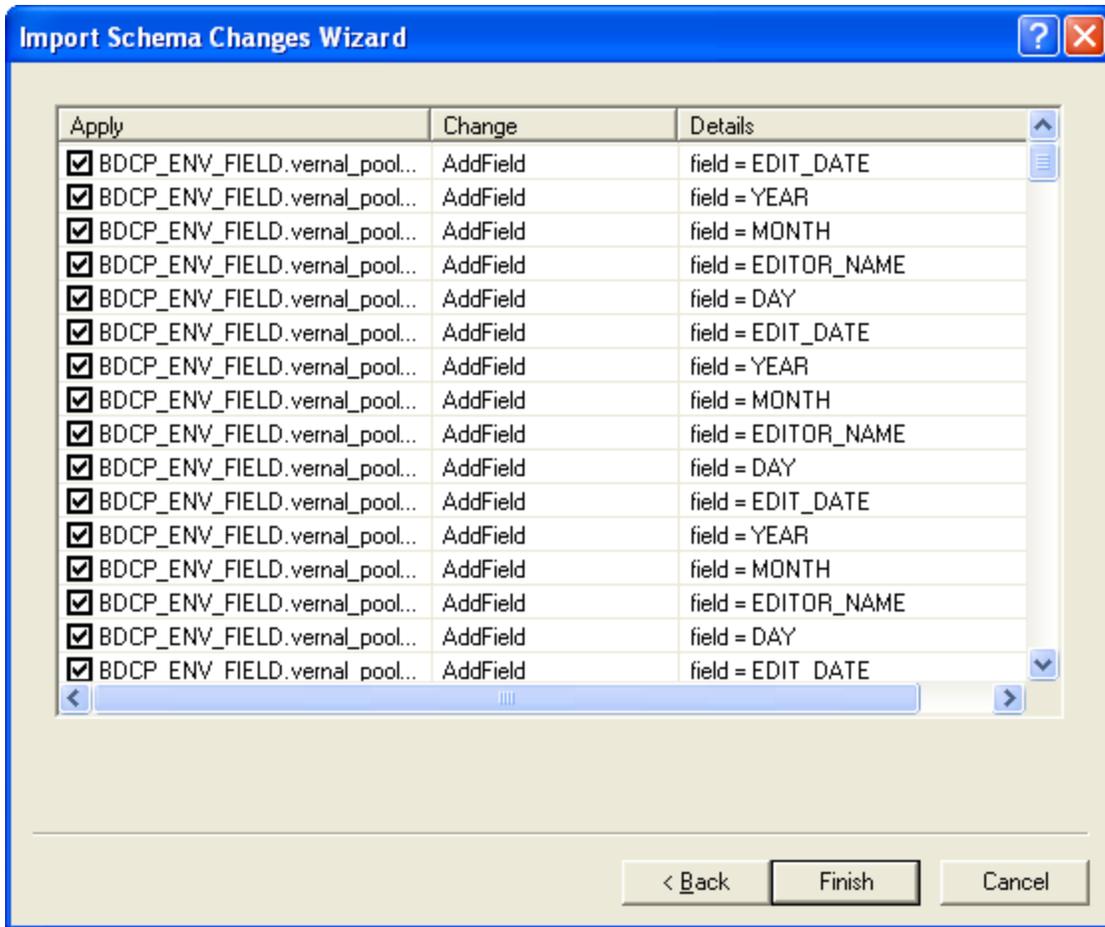


For the geodatabase, navigate to the replica geodatabase that needs the schema change. The replica name should auto-populate. Where it states “Output replica schema changes XML file:” navigate to a location to store the XML file that will subsequently be used in another tool to import the schema changes. Press “Finish”.

**STEP 3:** *Import schema changes.* Navigate to the replica geodatabase that is to receive the schema changes. Right click on it and hover the mouse pointer over “Distributed Geodatabase”. From the menu that appears choose “Import Schema Changes”. Refer to the image below:



On the first page of the “Import Schema Changes Wizard” where it says “Choose the replica schema changes xml file” navigate to the location of the XML file created by the “Compare Schema Changes” tool. Select “Next”.



By default, the properties and objects to be deleted (as shown in the second page of the wizard) are all unchecked. Unless it is desired to leave those objects and properties in the replica, check all boxes. Select "Finish".