

Arc Hydro GeoDataset Exchange Tools – User Manual

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1 Introduction

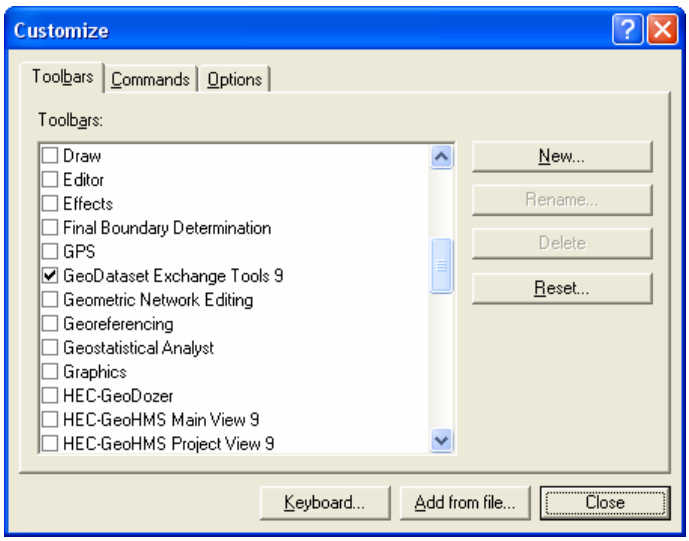
This document serves as the guide to install, configure and use the Arc Hydro GeoDataset Exchange tools.
The GeoDataset Exchange tools allow transferring data between a source and target Arc Hydro geodatabases. The tools allow managing the unique HydroID and related identifiers defined in the Arc Hydro data model. They provides functionalities to maintain unique identifiers and database integrity.

2 Installation

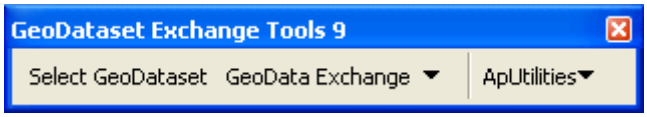
The GeoDataset Exchange tools are installed as part of the Arc Hydro tools. Refer to the document Arc Hydro Tools 1.1 – Tutorial.pdf for instructions on how to install Arc Hydro.

- Once Arc Hydro is installed on your computer, open a new ArcMap document.
- Select Tools>Customize.

The GeoDataset Exchange Tools toolbar should be listed in the Customize window.



- Check the toolbar to make it visible in ArcMap.

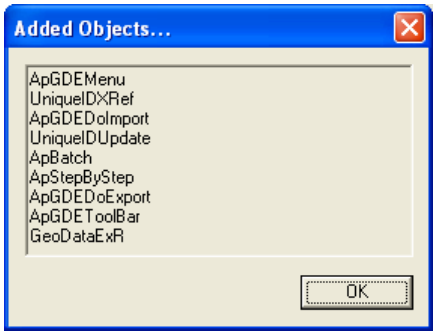


Note: If the Arc Hydro tools are installed but the GeoDataset Exchange Tools is not visible in the list of toolbars, you need to proceed as follows to add the toolbar:

- Open the Customize window.
- Select the tab Toolbars and click Add from file.

- Browse to the bin folder under the Arc Hydro installation directory (defaults to C:\Program Files\ESRI\WaterUtils\ArcHydro9\Bin) and select the file ApGeoDataEx9.dll. Click Open.

The Added Objects window is displayed. Click OK.



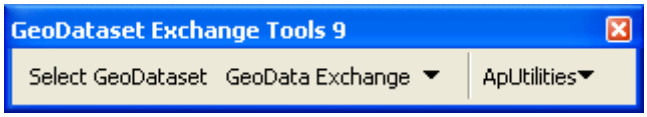
The GeoDataset Exchange Tools toolbar should now be listed under Toolbars.

- Check the toolbar and click Close.

The GeoDataset Exchange Tools toolbar is now visible in ArcMap.

3 Toolbar Description

The GeoDataset Exchange Tools contains one function and two menus:



- *Select GeoDataset function*: Allows selecting the current configuration for the data exchange tools.
- *GeoData Exchange menu*: Contains the tools performing the data exchanges, including unique identifiers management.
- *ApUtilities menu*: Contains utilities functions. Also available in the Arc Hydro Tools toolbar. The function XML Manager allows editing the XML associated to the map document and updating the functions configurations.

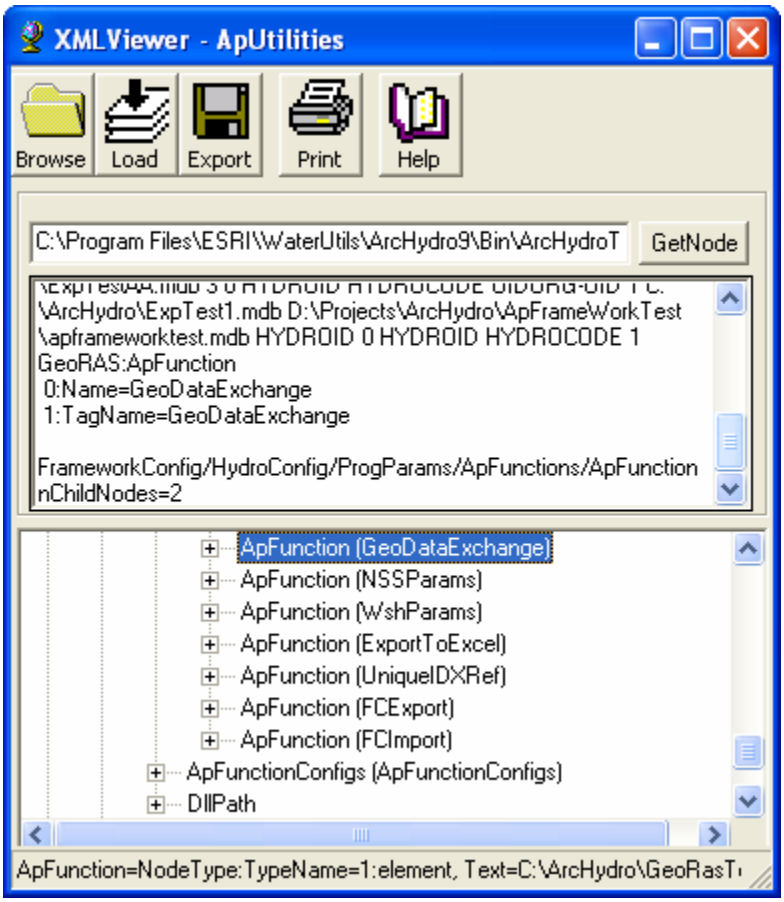
The GeoDataset Exchange Tools are configured using the file ArcHydroTools.xml. The data exchange configurations are stored under the ApFunctions node in this XML file. ArcHydroTools.xml is automatically loaded when an ArcMap document is opened. The XML file can be accessed by using the function ApUtilities>XML Manager, which is a part of both the Arc Hydro Tools and the GeoDataset Exchange Tools toolbar. The XML Manager provides an environment for editing the application configuration. When the ArcMap document is saved, changes to configuration are saved with that ArcMap document. Configuration changes are lost when exiting ArcMap without saving the document, unless the configuration has been previously explicitly exported to an XML file.

Note
To update the configuration for all new map documents, you need to update the ArcHydroTools.xml file located in the Arc Hydro install/bin directory. This is the file that is loaded with the new mxds. Updates performed in a map document only apply to that map document.

The application XMLViewEdit.exe is the executable for the XML Viewer that allows editing the XML file on disk with the same editor as the one accessible with the ApUtilities>XML Manager function. XMLViewEdit.exe is installed in the ArcHydro9\bin directory.

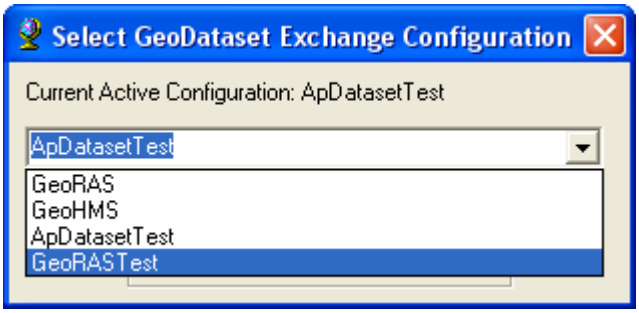
The GeoDataset Exchange Tools rely on the following ApFunction nodes located under the parent node FrameworkConfig/HydroConfig/ProgParams/ApFunctions:

- GeoDataExchange
- FCExport
- FCImport
- UniqueIDXRef



3.1 Select GeoDataset

The Select GeoDataset function allows selecting one of the exchange configuration predefined in the XML associated to the map document.



The function reads the configurations from the node FrameworkConfig/HydroConfig/ProgParamsApFunctions/ApFunction(GeoDataExchange). This node is designed as the repository for configurations of multiple GeoDatasets, represented as ApDataset in the XML. Each ApDataset appearing in this node has three child nodes: FCExport, FCImport, and UniqueIDXRef. These three nodes store the configuration for the functions Import Feature Classes (FCImport), Export Feature Classes (ExportFC), Update UniqueID Reference Table (UniqueIDXRef) and Update UniqueID (UniqueIDXRef) for a specific GeoDataset. .

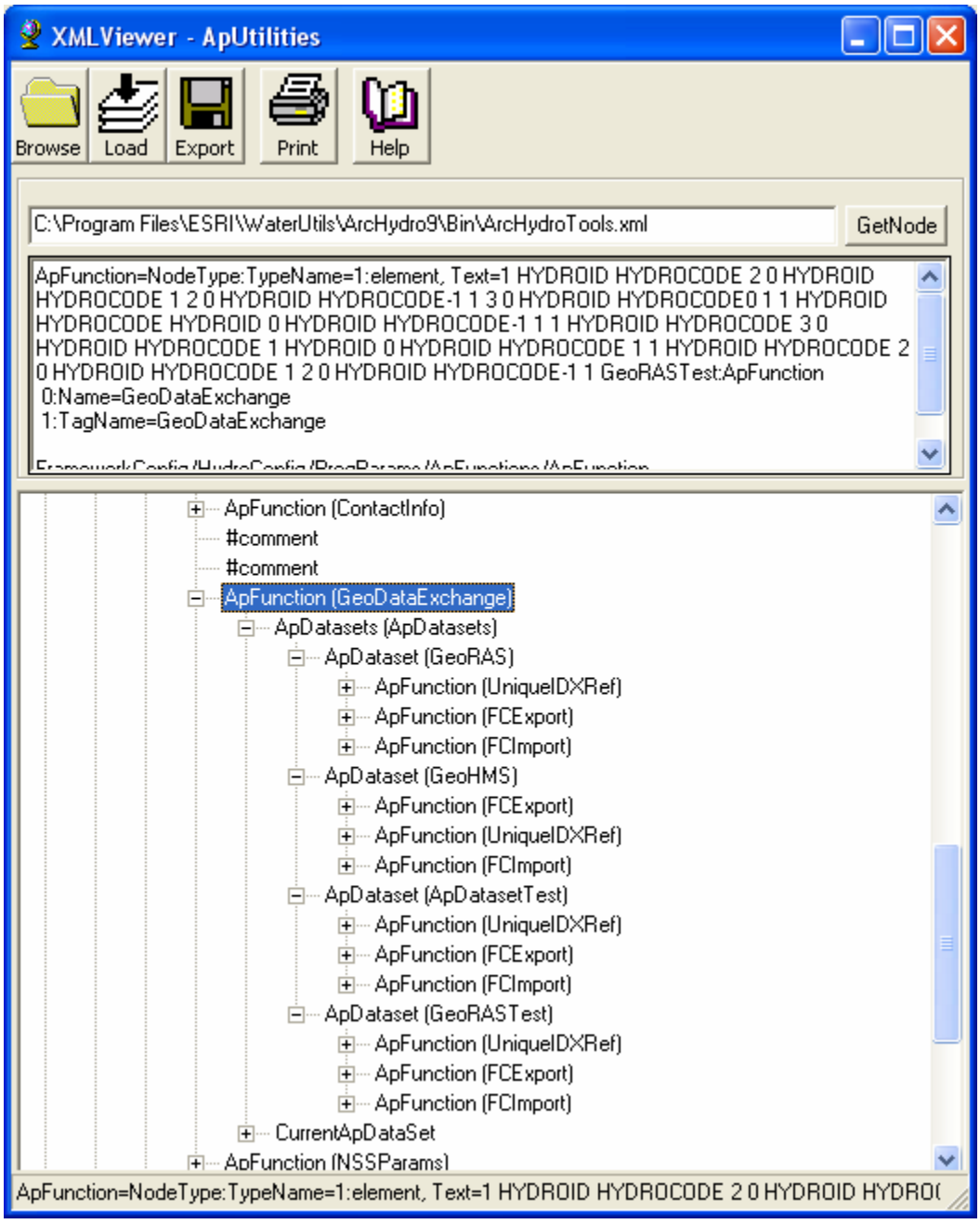
The GeoDataExchange configuration has the following structure and parameters:

- ApDatasets – collection of ApDataset
  - ApDataset – configurations packaged for a specific data exchange operation
    - FCExport – Configuration node for data export function.
    - FCImport – Configuration node for data import function.
    - UniqueIDXRef – Configuration node for UniqueID cross reference table and UniqueID update functions.

The Select GeoDataset function overwrites the three ApFunction nodes (FCExport, FCImport and UniqueIDXRef) located under the node ApFunctions with the three ApFunctions nodes defined for the selected configuration (e.g. GeoRASTest).

Warning
Always configure the nodes under the node ApFunction(GeoDataExchange) to avoid losing modification when switching configuration (and overwriting the ApFunctions/ApFunction node for FCExport, FCImport and UniqueIDXRef).

Note
The node ApFunction(GeoDataExchange)/CurrentApDataSet stores the name of the currently selected configuration.


XMLViewer - ApUtilities
Browse
Load
Export
Print
Help
C:\Program Files\ESRI\WaterUtils\ArcHydro9\Bin\ArcHydroTools.xml
GetNode
ApFunction=NodeType:TypeName=1:element, Text=1 HYDROID HYDROCODE 2 0 HYDROID HYDROCODE 1 2 0 HYDROID HYDROCODE-1 1 3 0 HYDROID HYDROCODE0 1 1 HYDROID HYDROCODE HYDROID 0 HYDROID HYDROCODE-1 1 1 HYDROID HYDROCODE 3 0 HYDROID HYDROCODE 1 HYDROID 0 HYDROID HYDROCODE 1 1 HYDROID HYDROCODE 2 0 HYDROID HYDROCODE 1 2 0 HYDROID HYDROCODE-1 1 GeoRASTest:ApFunction
0:Name=GeoDataExchange
1:TagName=GeoDataExchange
ApFunction (ContactInfo)
#comment
#comment
ApFunction (GeoDataExchange)
ApDatasets (ApDatasets)
ApDataset (GeoRAS)
ApFunction (UniqueIDXRef)
ApFunction (FCExport)
ApFunction (FCImport)
ApDataset (GeoHMS)
ApFunction (FCExport)
ApFunction (UniqueIDXRef)
ApFunction (FCImport)
ApDataset (ApDatasetTest)
ApFunction (UniqueIDXRef)
ApFunction (FCExport)
ApFunction (FCImport)
ApDataset (GeoRASTest)
ApFunction (UniqueIDXRef)
ApFunction (FCExport)
ApFunction (FCImport)
CurrentApDataSet
ApFunction (NSSParams)
ApFunction=NodeType:TypeName=1:element, Text=1 HYDROID HYDROCODE 2 0 HYDROID HYDRO(

3.2 GeoData Exchange

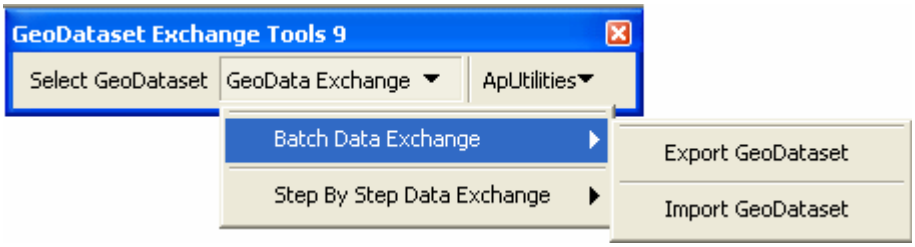
The GeoData Exchange menu contains the functions performing the imports/exports and unique identifiers management. The menu is subdivided into two submenus:

- Batch Data Exchange
- Step By Step Data Exchange

3.2.1 Batch Data Exchange

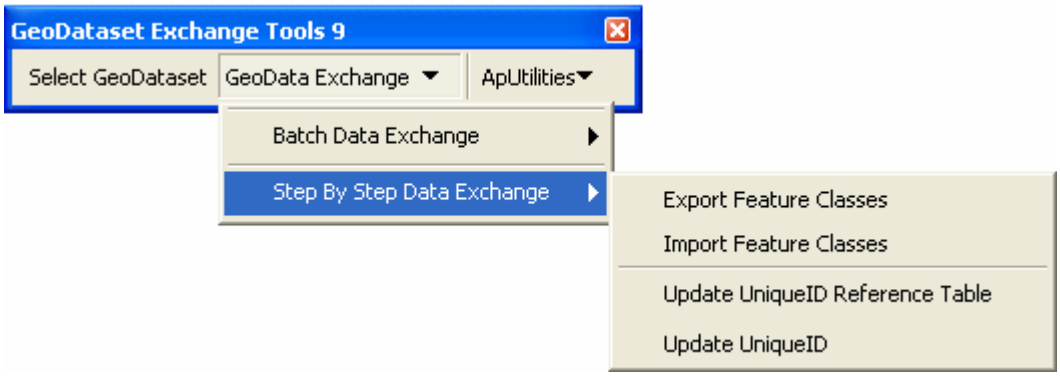
The Export GeoDataset function combines the functions Export Feature Classes, Update UniqueID Reference Table and Update UniqueID.

The Import GeoDataset function combines the functions Import Feature Classes, Update UniqueID Reference Table and Update UniqueID.



3.2.2 Step By Step Data Exchange

The Step By Step Data Exchange menu contains the individual Import/Export and Unique Identifier management functions.



3.2.2.1 Export Feature Classes

The Export Feature Classes function allows exporting layers from a source into a target geodatabase. The function reads the configuration from the node ApFunctions/ApFunction(FCExport). This node allows specifying the default source and target workspaces for the export function and the feature classes to transfer, as well as defining the parameters for the transfer (i.e. Fields to exclude, Key fields, etc.).

The function exports features and records from the source database into the target database based on the current configuration. Unless otherwise specified, all fields from a source table will be copied with the same structure into a target table. The three following fields will be appended to the target table:

- UniqueIDOrg: UniqueID of the record in the source database. The name of this field is constructed by appending the suffice Org to the name of the UniqueID field in the source geodatabase (e.g. HydroID in source triggers the creation of the field HydroIDOrg in the target table).
- OIDOrg: OID of the record in the source database.
- IsDone: Indicates the status of the record. This field is updated with one of the following values after running the Export Feature Classes function:
    - 1: Record created/updated in the target table or existing record not updated having ISDONE=1 in the original record stored in the target table.
    - 2: Existing record not updated/exported having ISDONE not in (1, 4, 8) in the existing record in the target table.
    - 4: Existing record not updated having ISDONE=4 in the existing record in the target table.
    - 8: Existing record not updated having ISDONE=8 in the existing record in the target table.

3.2.2.2 Import Feature Classes

The Import Feature Classes function allows importing data from a source into a target geodatabase. The function reads the configuration from the node ApFunction(FCImport). This node is similar to the FCExport node, and provides parameters that allow specifying the layers/tables that need to be imported.

The function imports features and records from the source database into the target database based on the current configuration. Unless otherwise specified, all fields from a source table will be copied with the same structure into a target table. The three following fields will be appended to the target table:

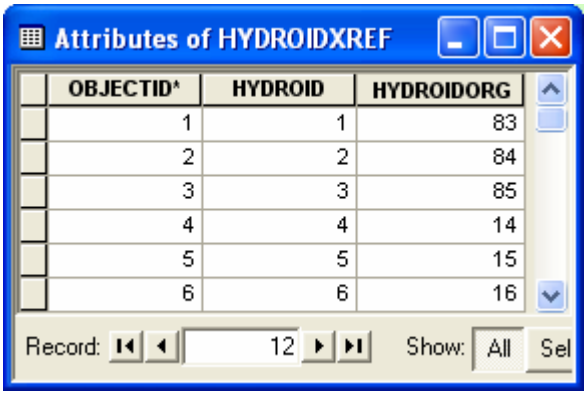
- UniqueIDOrg: UniqueID of the record in the source database. The name of this field is constructed by appending the suffice Org to the name of the UniqueID field in the source geodatabase (e.g. HydroID in source triggers the creation of the field HydroIDOrg in the target table).
- OIDOrg: OID of the record in the source database.
- IsDone: Indicates the status of the record. This field is updated with one of the following values after running the Import Feature Classes function:
    - 4: Existing record not updated having ISDONE=4 in the existing record in the target table.
    - 8: Existing record not updated having ISDONE=8 in the existing record in the target table.
    - 16: Record created/updated in the target table or existing record not updated having ISDONE=1 in the original record stored in the target table.
    - 32: Existing record not updated/exported having ISDONE not in (4, 8,16) in the existing record in the target table.

3.2.2.3 Update UniqueID Reference Table

This function builds a cross-reference table in the target database that stores, for each exported record, the original unique identifier in the source database and the associated new unique identifier in the target geodatabase (e.g. HydroID-HydroIDOrg).

The function processes only the records having ISDONE in (1,4,16).

The ApFunction(UniqueIDXRef) node stores the configuration for both UniqueID cross reference table generation and UniqueID update functions. This node allows selecting the current workspace, and specifying which layers and fields to look into when extracting new and original UniqueID values.



The function Update UniqueID Reference Table updates the field ISDONE with the value 4 in each record that contains the fields HYDROID and HYDROIDORG, whose values are copied to the cross-reference table.

3.2.2.4 Update UniqueID

The function Update UniqueID updates the related identifiers (e.g. DRAINID, JUNCTIONID) with the new UniqueID value associated to the original UniqueID value stored in these fields. The function extracts the new values from the cross-reference table generated using the function Update UniqueID Reference Table. The function updates only the records that:

- Contain the fields HYDROID/HYDROIDORG fields and have ISDONE=4.
- Do not contain the fields HYDROID/HYDROIDORG and have ISDONE=1 or 4 or 16.

The configuration associated to the Update UniqueID function is stored under the node ApFunctions/ApFunction(UniqueIDXRef) in the XML. Note that this node also stores the configuration for the Update UniqueID Reference Table function. The parameters (workspace, UniqueID field, etc.) that are defined under this node are described in section 4.2 – UniqueID Management Configuration.

The Update UniqueID function populates the field ISDONE with the value 8 for each processed record (i.e. each record where a related identifier is updated).

4 XML Configuration

4.1 Export/Import Functions Configuration

The function Export Feature Classes reads its configuration from the node ApFunction(FCExport), whereas the function Import Feature Classes reads it from the node ApFunction(FCImport). Both configurations contain the same parameters that are detailed in the two tables below.

Export/Import Functions Configuration

Parameter Name	Description
FromWorkspace	Default source workspace. Defined as connection string to source data workspace. This workspace can be an ArcSDE geodatabase or a personal geodatabase. Connection string for an ArcSDE workspace is of the form "Connection to server.sde". Note that the Import and Export functions will prompt for this workspace, which will default to the location set in the XML.
ToWorkspace	Default target database. Defined as connection string to target data workspace. This workspace can be an ArcSDE or personal geodatabase. The Export/Import functions will prompt for this workspace, which will default to the location set in the XML.
RemoveRecs	Indicate the behavior of the Export/Import functions when the target layer/table already exists: ▪ 0: Append transferred records to target attributes table. ▪ 1: Delete all records from target table then append transferred records (For export only. Not allowed for import). ▪ 2: Overwrite records that already exist in target table (based on key field) and append records that do not already exist in target table. ▪ 3: Do not overwrite records that already exist in target table (based on key field). Append records that do not already exist in target table. ▪ 4: Delete from target table records that are transferred and are already in target table (based on key field). Option available for Export only.
CopyUniqueID	Indicate whether the values in the source UniqueID (HydroID) field should be copied to the target UniqueID field: ▪ 0: Do not copy (Default setting). ▪ 1: Copy the unique id field values. Notes: 1. If the UniqueID field is set to HydroID, the HydroID field will be automatically populated with new values when CopyUniqueID=0 as the HydroID Manager is enabled by default. The HydroID Manager can be enabled/disabled by using the function ApUtilities>Enable/Disable HydroID Manager. In that case the HydroIDs will be left Null. 2. When selecting CopyUniqueID=1, the function automatically disables the HydroID Manager so that the HydroIDs are copied from the source, and not regenerated. The function reenables the HydroID Manager at the end of the operation.
Where	Where clause used to filter the records to export/import. Defined as a string (e.g. OID<10). The where clause is optional and may be left blank. When defined, it is used to filter each layer that does not have a specific where clause defined at the layer level.
TrnLayers	TrnLayers is the parent node for all TrnLayer child nodes, i.e. the layers, whose data are to be copied into target database. Attributes of TrnLayers are: ▪ TagName: TrnLayers ▪ Name: TrnLayers ▪ Headers: Optional. List of headers used to build the name of source/target layer. Comma-delimited. See node TrnLayers/TrnLayer for additional information on the Headers parameter.

Parameter Name	Description
TrnLayers/TrnLayer	Each TrnLayer node defines one layer or table to copy. TrnLayer has the following attributes: ▪ TagName: Layer tagname. ▪ Name: Layer name. ▪ FromLayer: Layer name in source database. ▪ ToLayer: Layer name in target database. ▪ CopyShape - Indicate whether the shape of a feature should be copied when updating an existing feature in the target database. By default, the shape field will be updated. - 0: Do not update shape. - 1: Update shape. ▪ Where: Where clause defining records to copy specific to layer. Overwrite where clause defined at function level (e.g. OID<10). ▪ OperationType: Indicate the behavior of the Export/Import functions when the target layer/table already exists. If not set, defaults to the RemoveRecs parameter defined at the function level: - 0: Append all transferred records to target attributes table. - 1: Delete all records in target table then append all transferred records. - 2: Overwrite retransferred records in target table and append records transferred for the first time. - 3: Do not overwrite retransferred records in target table. Only append new records not previously transferred. - 4: Remove retransferred record from target table (export only). ▪ HasHeader: Indicates whether the layer names are defined by concatenating a header to the Name specified as attribute. - 0: Does not have header - 1: Has header. ▪ Add2Map: Optional. Indicates whether the input and/or output layers will be added into the Table of Contents of ArcMap. Layers are added turned off by default: - 0: Add neither input nor output layers - 1: Add input layers only. - 2: Add output layers only. - 3: Add both input and output layers. This is the default setting. Notes: A header is a prefix appended to the layer name. For example, there could be a watershed, river, drainage point feature classes defined for each county in a state, with the naming convention: CountyNameRiver for the River feature classes CountyNameWatershed for the Watershed feature classes CountyNameDrainagePoint for the DrainagePoint feature classes

	Instead of having to configure the River, Watershed and DrainagePoint layers for each county, the header parameter allows setting them only once. The possible headers (i.e. list of county names in this example) are defined by using the Attribute Headers of the TrnLayers node as a comma delimited list (e.g. County1, County2, etc). The Header is not defined for the UniqueID functions. Each layer will need to be listed when configuring these functions.
UniqueIDField	Name of the UniqueID field in the source and target geodatabase. This field defaults to HYDROID if not set in the XML. A field named by appending the suffix ORG to the specified UniqueID field (e.g. HYDROIDORG) is created in the target workspace – this field stores the corresponding UniqueID from the source database. Note: This parameter needs to match the name, not the alias, of the field.
ApFields(ExcludedFields)	List of fields created in the target geodatabase but not populated/updated during the export/import (e.g. the values are not copied from the source to the target geodatabase). This list of fields applies to each layer that does not have its specific ExcludedFields parameter defined at the layer level. Each field is defined as an ApField node with the "Name" attribute storing the name (not the alias) of the field to remove.
ApFields(RemovedFields)	List of fields from the source geodatabase that will not be created in the target geodatabase. This list of fields applies to each layer that does not have its specific RemovedFields parameter defined at the layer level. Each field is defined as an ApField node with the Name attribute storing the name (not the alias) of the field to remove.
TrnField(KeyField)	Key field defines the fields used to uniquely identify a feature or record in the source and target geodatabase. It has 4 attributes: ▪ TagName: Must be set to KeyField ▪ Name: For display purpose only. Given as FromField-ToField (e.g. HYDROCODE-HYDROCODE) ▪ FromField: Field storing the global unique identifier in the source geodatabase (e.g. HYDROCODE) ▪ ToField: Field in the target geodatabase storing the global unique identifier from the source geodatabase (e.g. HYDROCODE) Notes 1. Whenever available use the a global unique identifier field as key field, not HydroID or OID. 2. TrnLayer(KeyField) defined at the TrnLayer level overwrites the setting set at the function level. 3. The KeyField.FromField of ExportFC becomes KeyField.ToField of ImportFC function, and vice versa.
Add2Map	Optional. Indicates whether the input and/or output layers will be added into the Table of Contents of ArcMap. All Layers are added turned off by default (Add2Map=3): ▪ 0: Add neither input nor output layers ▪ 1: Add input layers only. ▪ 2: Add output layers only. ▪ 3: Add both input and output layer. This is the default setting.

Configuration of the child nodes of the TrnLayer node

Parameter Name	Description
TrnFields/TrnField	Define transfer fields that do not have the same name in the source and the target feature layer/table. TrnField are optional. By default, all the fields in the source table will be copied with the same field definition. TrnFields contains a list of TrnField, which has the following structure. ▪ TagName: Field tag name. ▪ Name: Field name. ▪ FromField: Name of source field. ▪ ToField: Name of target field.
ApFields (ExcludedFields)	List of fields, whose values will not be copied from source to target. This is an optional attribute. When this attribute is defined, it overwrites the same field on the function level.
ApFields (RemoveFields)	List of fields, whose structure will not be copied from source to target. This is an optional attribute. When this field is defined, it overwrites the same field on the function level.
TrnField (KeyField)	KeyField specific to the layer (e.g. LUCODE-LUCODE). This field is optional. When this field is defined, it overwrites the TrnField(KeyField) defined at the function level.

4.2 UniqueID Management Functions Configuration

The ApFunction(UniqueIDXRef) node stores the configuration for both the Update UniqueID Reference Table and Update UniqueID functions. The cross-reference table is a lookup table between original UniqueIDs (HydroIDs) and current UniqueIDs (HydroIDs). The cross-reference table is named by appending the suffix XREF to the name of the UniqueID field set in the XML (e.g. HydroIDXRef for HydroID). The reference table contains two fields named after the specified UniqueID field. For example, for HydroID, the two fields will be named HydroIDOrg and HydroID, with the HydroID field storing the unique identifiers used in the target database and the HydroIDOrg field the unique identifiers used in the source database. The parameters used to configure the UniqueIDs Management functions are described in the table below.

ApFunction(UniqueIDXRef) Configuration

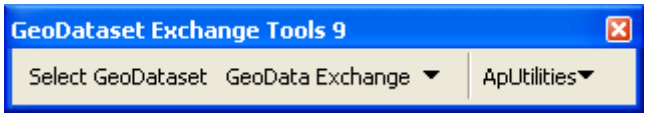
Parameter Name	Description
Workspace	Connection string to the workspace containing the data to process. This workspace will store both the UniqueIDXRef table and the layers that need to have their UniqueIDs updated. Notes: 1. The user will be prompted for the workspace when running the functions Update UniqueID Reference Table and Update UniqueID. The workspace will default to the value set in the XML. 2. After using an import/export function, the workspace is automatically updated in the XML with the target workspace selected for the import/export operation.
RemoveRecs	Indicate the behavior if records exist in the cross-reference table (HydroIDXRef): ▪ 0: Append records to reference table (i.e. may end-up with duplicate HYDROID-HYDROIDORG combination records in the table). ▪ 1: Remove all records from table, then append all records. ▪ 2: Verify record existence first. Append only record having a HYDROID-HYDROIDORG combination that is not already in the reference table.
UniqueIDField	Name of field storing the UniqueID (e.g. HydroID) in the source and target geodatabase. The UniqueID of the source table is saved in the target table in the field named by appending ORG to the name of the UniqueID field. For example, if the UniqueIDField is set to HYDROID, the HYDROID field in the target geodatabase stores the unique identifier in the target geodatabase while the field HYDROIDORG stores the original HYDROID of the record in the source geodatabase.
ApFields	List of fields storing a related UniqueID that need to be updated to match the updated UniqueIDs. For example, in an Arc Hydro geodatabase, the fields NextDownID, DrainID, JunctionID that store the HydroID of the next down feature, related drainage area and related junction feature respectively need to be updated after export/import to match the new HydroID of the exported/imported feature. If this node is not defined, the fields DrainID, NextDownID, JunctionID and FeatureID will be used by default.
ApLayers	List of layers: ▪ From which to retrieve the UniqueID/UniqueIDORG combination to store in the UniqueIDXRef table ▪ Which have related identifier field(s) to update.

5 Example of Data Exchange Tools Configuration

The sample data used in the following sections is a personal geodatabase called GeoRas.mdb. It can be used as is or can be loaded into an ArcSDE geodatabase as needed. The data can be obtained by downloading the file ArcHydro/Data/DataExchangeData.zip from the ESRI Water Utilities ftp site (ftp.esri.com, login:RiverHydraulics, password: river.1114).

5.1 Export Data into Target GeoDatabase

1. Open a new ArcMap document. Make sure the toolbar GeoDataset Exchange Tools is displayed.

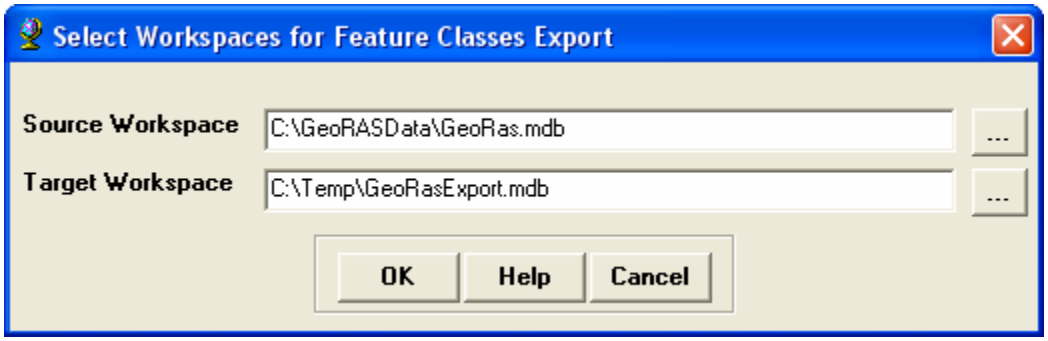


2. In ArcMap, click on Select GeoDataset and choose GeoRASTest as your current configuration. Click Yes when prompted to confirm the selection.

The Select GeoDataset function overwrites the three nodes ApFunction(FCExport), ApFunction(FCImport) and ApFunction(UniqueIDXRef) defined under the node ApFunctions (and used by the import/export and UniqueID management functions) with the same three nodes defined under the node ApFunctions/ApFunction(GeoDataExchange)/ApDatasets/ApDataset(GeoRASTest).

3. Select GeoDataExchange>Step By Step Data Exchange>Export Feature Classes.

The function displays a window showing the default source and target workspaces set in the XML. The workspaces may be modified if necessary.



4. Modify the source/target workspace as needed. The workspace may be either a local or an ArcSDE geodatabase. The source workspace must exist. The target workspace will be created if it does not already exist. Click OK after selecting the workspaces.

The Export Feature Classes function copies the feature classes configured in the FCExport node of the active configuration from the source workspace into the target workspace. The source and target feature classes are automatically added into the table of contents of ArcMap. This is the default setting that may be modified by updating the parameter Add2Map in the XML.

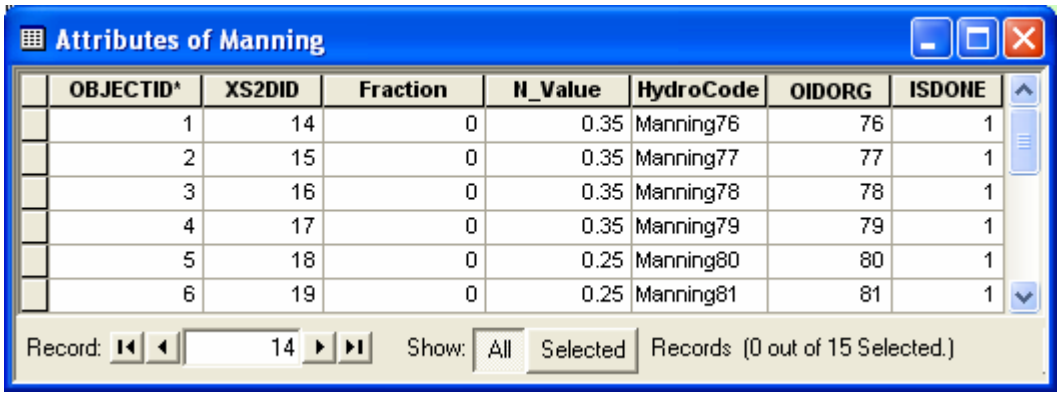
5. In ArcMap, open the Attributes table of the layer XSCutLines3D stored in the target workspace.

Note that the fields OIDORG , HYDROIDORG and ISDONE have been appended to the table. The HYDROIDORG and OIDORG fields store respectively the original HydroID and OID from the source workspace. The field ISDONE stores the status of the record after export. It is set to 1 after exporting a record. The field XS2DID stores the HydroID of the associated XSCutLines feature.

6. Write down the values currently stored in this field (14 to 37 for sample data).

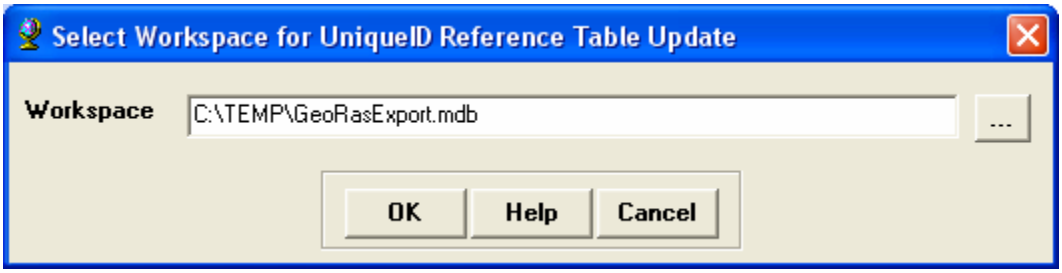
7. Open the Attributes table of Manning.

Note that only two fields have been added to this table, OIDORG and ISDONE. The field HYDROIDORG was not added because there is no HydroID field in the source table. Write down the values of XS2DID (14 to 37 for the sample dataset).
The field ISDONE contains the value 1 that characterizes newly exported features.



8. In ArcMap, click GeoDataExchange>Step By Step Data Exchange > Update UniqueID Reference Table.

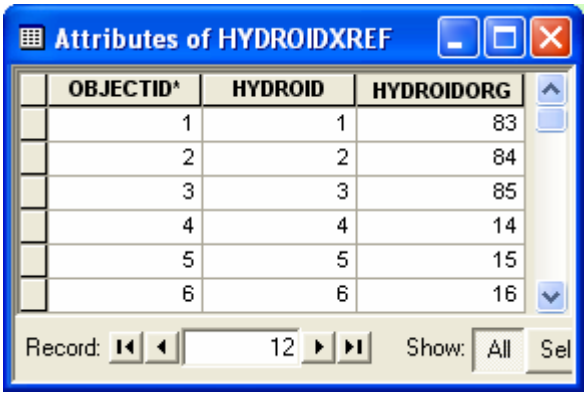
The Select Workspace window is displayed. This workspace is set by default to the target workspace specified when running the function Export Feature Classes.



9. Click OK.

The table HYDROIDXREF is added into the table of contents of ArcMap.

10. Open the table HYDROIDXREF and review its records. This table stores the relationship between newly assigned HydroID and original HydroID (HYDROIDORG).

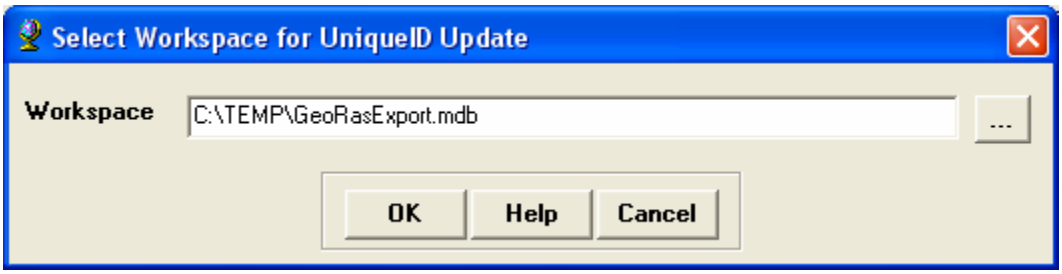


11. Open the Attributes table of Manning and of XSCutLines3D.

The value of the field ISDONE is still 1 in the Attributes table of Manning, but has been updated to 4 in the Attributes table of XSCutLines3D. The value 4 indicates that the record contains the fields HYDROID/HYDROIDORG (when UniqueID is set to HydroID) and that the values from these fields have been stored in the HYDROIDXREF table.

12. In ArcMap, click GeoDataExchange>Step By Step Data Exchange > Update UniqueID.

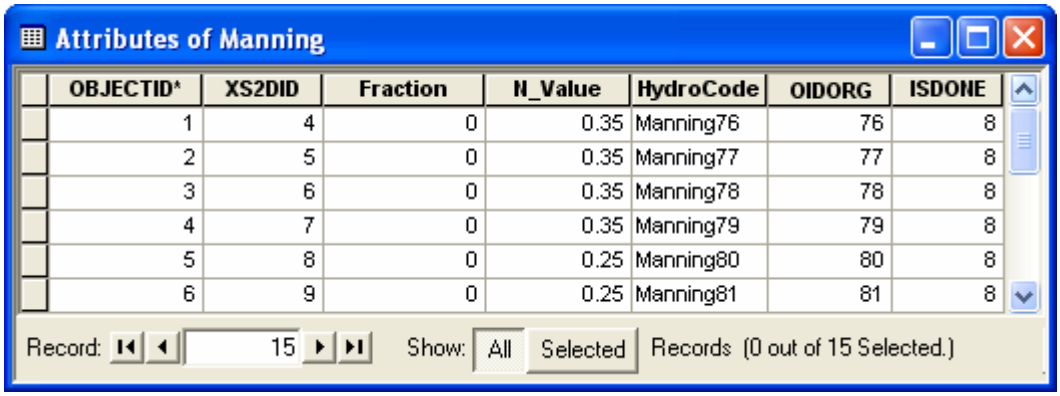
The Select Workspace window is displayed. This workspace is set by default to the workspace selected when running the function Update UniqueID Reference Table.



13. Click OK.

14. Open the attributes table of Manning and XSCutLines3D.

The values in the field XS2DID in both tables have been updated to reflect the newly assigned HydroID in the target database, so that data integrity between Manning/XSCutLines3D and other related feature classes (e.g. XSCutLines) is maintained.
The field ISDONE is updated to 8 in the records that have been processed.



The function GeoDataExchange>Batch Data Exchange>Export GeoDataset could have been used instead of the combination of the 3 functions Export Feature Classes/Update UniqueID Reference Table/Update UniqueID.

5.2 Export Selected Features into an Existing Personal GeoDatabase

The Export Feature Classes function exports only the selected features in the source feature classes having a selection set. If there is no selected set, all features from the feature class will be exported.

1. Add the layer XSCutLines from your source geodatabase to ArcMap if necessary.

2. Click Editor>Start editing and set the layer XSCutlines as target. Create two new XSCutlines line features and save your edits.

3. Select the two newly created features.

4. Select ApUtilities>XML Manager. In the XML Viewer, navigate to the node FrameworkConfig/HydroConfig/ ProgParams/ApFunctions/ ApFunction(GeoDataExchange)/ApDatasets/ ApDataset (GeoRASTest)/ApFunction(FCExport).

5. Select the node RemovesRecs. Right-click the node and select EditText to open the Edit window. Make sure the node has a value of 2 – this means that all existing records in the target database will be overwritten and that new records will be appended.

6. In ArcMap, click on Select GeoDataset and reselect GeoRASTest as your current configuration if you have edited the XML.

The function will copy the modifications to the active configuration node read by the export function.

7. Select GeoDataExchange>Batch Data Exchange>Export GeoDataset.

8. Select the source workspace by browsing to its location or typing the ArcSDE connection string or directory path to the geodatabase containing the source data.

9. Enter a new target workspace different from the workspace created in section 5.1. Click OK.

The function performs consecutively the steps Export Feature Classes, Update UniqueID Reference Table and Update UniqueID. The function indicates that 2 records with a null identifier were not exported. This is because the Key field in the source database (HydroCode) is empty for the two new records.

10. Open the Attributes table of XSCutLines in the target geodatabase.

The table is empty since only two features were selected, and these features were not exported because they have an empty (Null) key field.

11. Click Editor>Start Editing and select the source geodatabase as editing workspace. Populate the HydroCode field for the new features with the concatenation of "XS" and the HydroID. Stop editing and save the edits.

12. Reselect the 2 new features and click GeoData Exchange>Batch Data Exchange>Export GeoDataset. Click OK in the Select Workspaces window.

Only the two newly added cross section features have been copied to the target cross-section feature class.

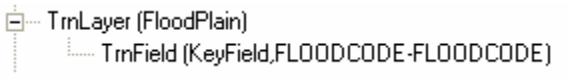
5.3 Import new feature class

1. Start ArcCatalog and create a new polygon feature class named FloodPlain in the target personal geodatabase created in section 5.1 (Note: You need to close ArcMap). Add the attribute FLOODCODE as text field of length 20. This field will be used as the key field that uniquely identifies FloodPlain features.

2. Browse the source workspace for the export and double-check that the FloodPlain feature class does not exist in the source database.

3. Start ArcMap and add the FloodPlain feature class. Create a new polygon feature in the FloodPlain feature class. Populate the field FLOODCODE and save the edits.

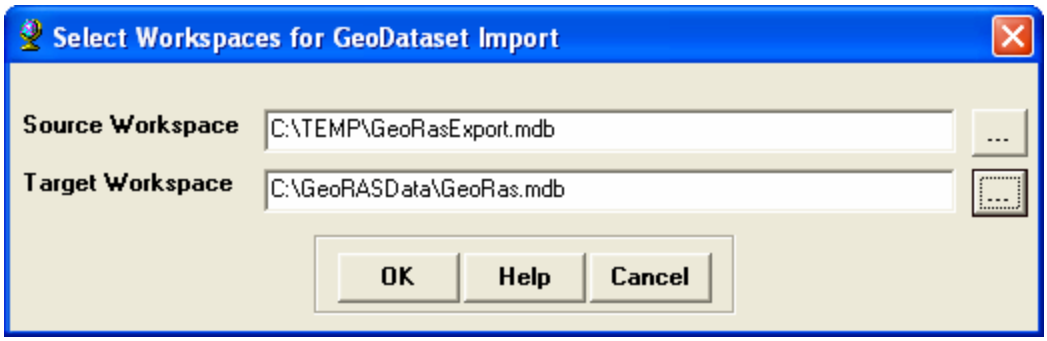
4. Select ApUtilities>XML Manager. Navigate to the node FrameworkConfig/HydroConfig/ ProgParams/ApFunctions/ ApFunction(GeoDataExchange)/ApDatasets/ ApDataset(GeoRASTest)/ApFunction(FCImport). Expand the node Trnlayers and make sure TrnLayer(FloodPlain) is listed.



5. Click on Select GeoDataset and select GeoRASTest as your current configuration if needed.

6. Click GeoDataExchange>Batch Data Exchange>Import GeoDataset.

The Select Workspaces window is displayed.



7. Select as Source Workspace the geodatabase containing the data previously exported, and as target the geodatabase the data was exported from. Click OK.

The feature class FloodPlain is copied into the original personal geodatabase GeoRas.mdb.

5.4 Edit Configuration XML to Manage Data Exchange

5.4.1 Add a new feature class to export.

1. Select ApUtilities>XML Manager to open the XML Viewer. Navigate to FrameworkConfig/HydroConfig/ProgParams/ApFunctions/ApFunction(GeoDataExchange)/ApDatasets/ApDataset(GeoRASTest)/ ApFunction(FCExport)/TrnLayers.

2. Select the node TrnLayer(XSCutLines). Right-click this node and select Copy.

3. Select the node TrnLayers, right-click and select Paste.

4. Select the new copied node TrnLayer(XSCutLines). Right-click this node and select EditAttributes to open the Attribute Editor window. Change all the values from XSCutLines to Levees3D and click OK.

The layer Levees3D contains the HydroID field as well as the field Lev2DID that stores the HydroID of the related Levee feature. This layer needs to be processed with the UniqueID management functions, and hence added to the XML node read by these functions.

5. Navigate to the node FrameworkConfig/HydroConfig/ProgParams/ApFunctions/ApFunction(GeoDataExchange)/ApDatasets/ApDataset(GeoRASTest)/ ApFunction(UniqueIDXRef)/ApLayers.

6. Right-click the node ApLayer(Levees), and select Copy.

7. Right-click the node ApLayers one level above and select Paste.

8. Right-click the new ApLayer(Levees) node and select EditAttributes. Change the name, tag name and alias to Levees3D (Note: only the name is used.).

9. Browse to the node FrameworkConfig/HydroConfig/ProgParams/ApFunctions/ApFunction(GeoDataExchange)/ApDatasets/ApDataset(GeoRASTest)/ ApFunction(UniqueIDXRef)/ApFields that lists the fields storing unique identifiers

that need to be updated with the Update UniqueID function. Check that ApField(Lev2D2D) is defined. Click OK and close the XML Viewer.

10. In ArcMap, click on Select GeoDataset and select GeoRASTest as your current configuration to copy the modifications in the XML.

11. Select GeoDataExchange>Batch Data Exchange>Export GeoDataset.

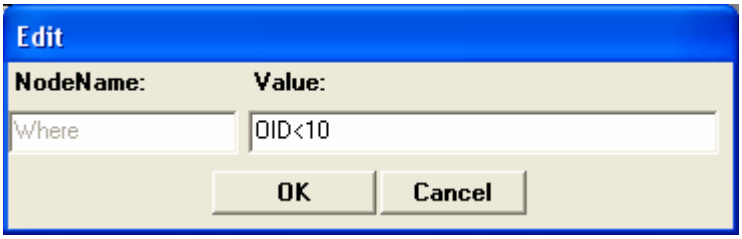
12. Reset the workspaces to the correct source and target geodatabases and click OK.

The layer Levees3D is exported into the target geodatabase and added into the Table of Contents of ArcMap. The Lev2DID field is updated with the new HydroID used in the target database for the related Levee feature.

5.4.2 Add a new export filter

1. Open XML Manager and navigate to FrameworkConfig/HydroConfig/ ProgParams/ApFunctions/ ApFunction(GeoDataExchange)/ApDatasets/ ApDataset (GeoRASTest)/ApFunction(FCExport).

2. Select the node "Where", right-click and select EditText to open the Edit window. Type in the value field "OID<10".



3. In ArcMap, reselect GeoRASTest as the current dataset and perform a data export to a new target geodatabase.

Only features with OID<10 are copied to the target Geodatabase.

Note: The Where clause may also be set at the layer level.

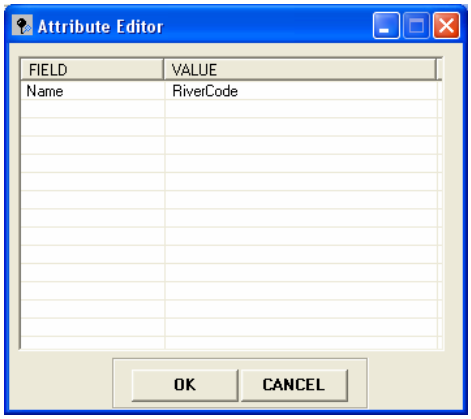
5.4.3 Exclude a field structure from the target database

1. Open XML Manager and Navigate to FrameworkConfig/HydroConfig/ProgParams/ApFunctions/ApFunction(GeoDataExchange)/ApDatasets/ApDataset(GeoRASTest)/ApFunction(FCExport)/ApFields(ExcludedFields). Right-click the child node ApField(HYDROID,HydroID) and select copy.

2. Navigate to the node ApFields(RemoveFields) located at the same level as ApFields(ExcludedFields), right-click and select Paste.

3. Right-click the new ApField node and select EditAttributes. Set the values of Name to "RiverCode". Note that other attributes (e.g. Alias) that may be defined for the ApField are

ignored. Only the Name is used to define the field(s) that will not be created in the target geodatabase. Other attributes may be left as is, updated or deleted.



4. Click OK and close the XML Viewer.

5. Click Select GeoDataset and reselect the GeoRASTest configuration to copy the previous modification.

6. Select GeoDataExchange>Step By Step Data Exchange>Export Feature Class. Set the source and a new target workspace and click OK.

7. Once the export process is complete, open the Attributes tables of River and XSCutLines feature class in the source and target geodatabase. The field “River” is present in the tables in the source but not in the target geodatabase.

Note: “River” is the field alias, whereas “RiverCode” is the field name. The function uses the name to identify the field to remove. The alias is not used.

5.4.4 Set field that should not be populated/updated

The node ApFields(ExcludedFields) is used to define the field that will be created in the target geodatabase, but whose values will not transferred to the target geodatabase. This may be used after a first export to specify the fields that should not be updated.

1. Open XML Manager and navigate to the node FrameworkConfig/HydroConfig/ProgParams/ApFunctions/ApFunction(GeoDataExchange)/ApDatasets/ApDataset(GeoRASTest)/ApFunction(FCExport)/ApFields(ExcludedFields). Note that ApField(HYDROID, HydroID) is listed. This is because the HydroIDs are not copied but are recreated in the target geodatabase.

2. Copy the node ApField(RiverCode) from ApFields(RemoveFields) to ApFields(ExcludedFields).

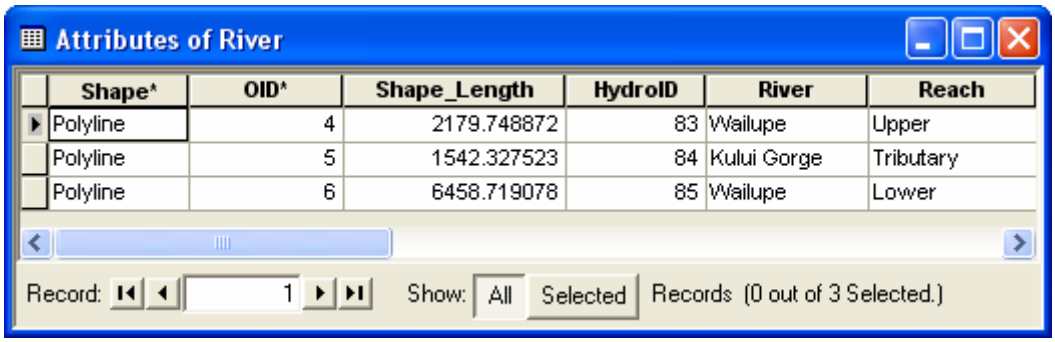
3. Delete the node ApField(RiverCode) under ApFields(RemoveFields) and close the XML Viewer.

4. Click Select GeoDataset and reselect the GeoRASTest configuration.

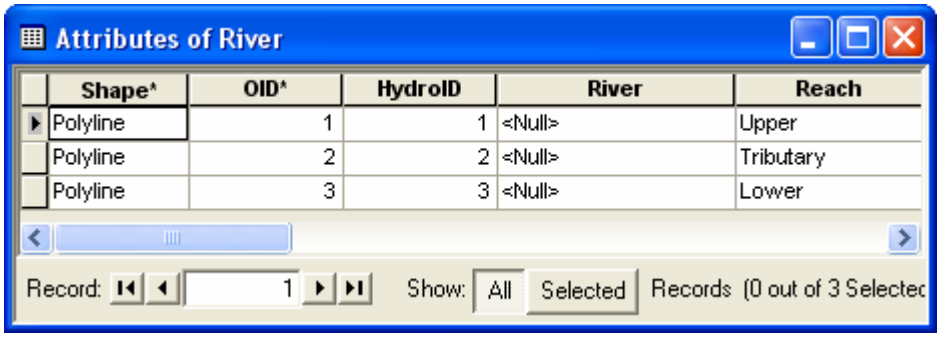
5. Select GeoDataset>Step By Step Data Exchange>Export Feature Class. Select the source workspace and a new target geodatabase. Click OK.

6. Open the Attributes tables of River and XSCutLines in the source and target geodatabase

The values of the HydroID field are different in the source and target geodatabase – the values were not copied but regenerated since the HydroID is the unique identifier in the geodatabase.



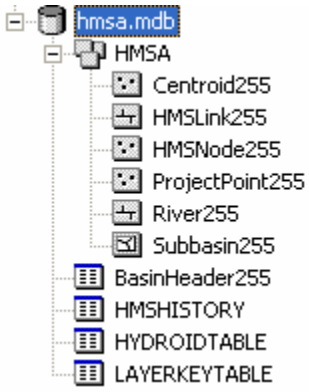
Source table



Target table

5.5 Define a New GeoDataset Configuration Node

The following section describes the procedure to add a new Configuration node to export the data layers stored in a personal geodatabase named HMSA.



1. Start a new ArcMap and save the new document as HMSA.mxd.

2. Select ApUtilities>XML Manager to open the XML Viewer.

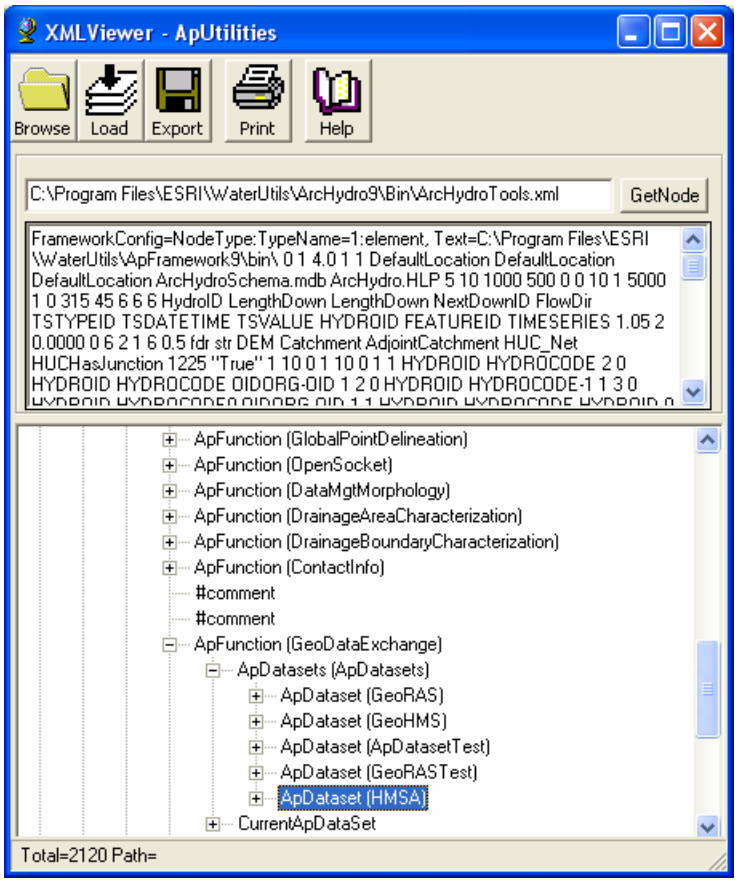
3. Navigate to the node ApFunction(GeoDataExchange) located at FrameworkConfig/HydroConfig/ProgParams/ApFunctions/ApFunction.

You are now going to make a copy of an existing ApDataset configuration and modify this configuration to support the new dataset.

4. Right-click an existing ApDataset node (e.g. GeoRasTest) defined under ApFunction(GeoDataExchange)/ApDatasets and select copy.

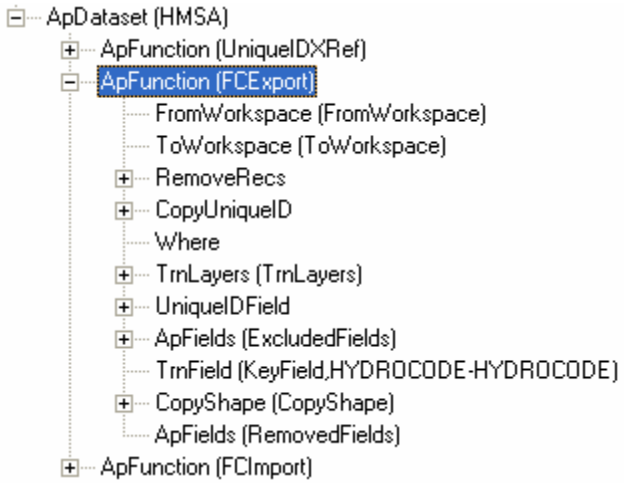
5. Right-click the node ApDatasets and select Paste to paste the node.

6. Right-click the new ApDataset node and select EditAttributes. Double-click on the Name and TagName to change their values to HMSA.



5.5.1 Configure FCExport node for a new GeoDataset

1. Browse to the FCExport node under GeoDataExchange/ApDatasets/ApDataset(HMSA):



2. Set the FromWorkspace to the source workspace, i.e., the full path of HMSA.mdb file (e.g. C:\DataExchange\Data\HMSA.MDB). This value will be used as a default for the source workspace when running the Export function. The workspace may be modified interactively when performing an export.

3. Set the ToWorkspace to your default target workspace, e.g. C:\DataExchange\Data\HMSAOUT.MDB. This workspace may be modified when performing an export.

4. Right-click the node RemoveRecs and select EditText. Set the value to 2, which means that the export will overwrite existing record in the target geodatabase.

5. Right-click the node CopyUniqueID and select EditText. Set the value to 0. This means that the values of the UniqueID field, if not explicitly excluded from the transfer, will not be copied. Note: The values may be automatically populated with the HydroID Manager.

6. Right-click the node Where and select EditText. Make sure the value is left blank, i.e. there is no where clause set to filter the records to export.

The TrnLayers node defines the list of layers to export from the source into the target geodatabase. You will configure the following 6 layers: River255, SubBasin255, ProjectPoint255, Centroid255, HMSNode255, HMSLink255.

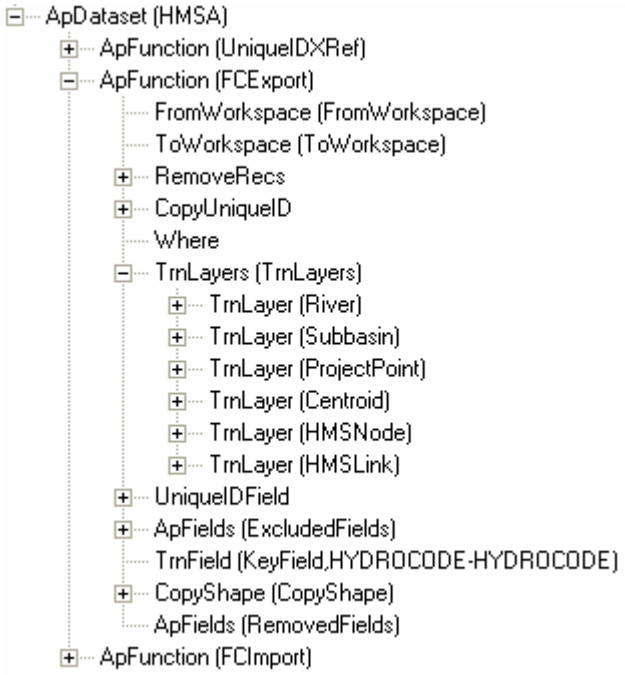
7. Delete all the TrnLayer nodes under TrnLayers node except the first one. Right-click the remaining TrnLayer (e.g. TrnLayer(River)) and select EditAttributes to open the AttributeEditor form. Set the Name and TagName to River and the FromLayer and ToLayer to River255. Click OK to close the Attribute Editor.

8. Right-click the node TrnLayer(River) and select Copy.

9. Right-click the TrnLayers node and select Paste to paste the TrnLayer(River) node under the TrnLayers node.

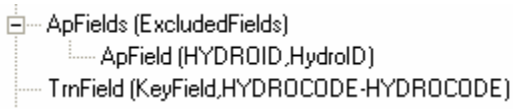
10. Set the Name and TagName to SubBasin. Set the FromLayer, ToLayer values to SubBasin255.

11. Repeat steps 7 and 8 for the remaining layers (ProjectPoint255, Centroid255, HMSNode255, HMSLink255).

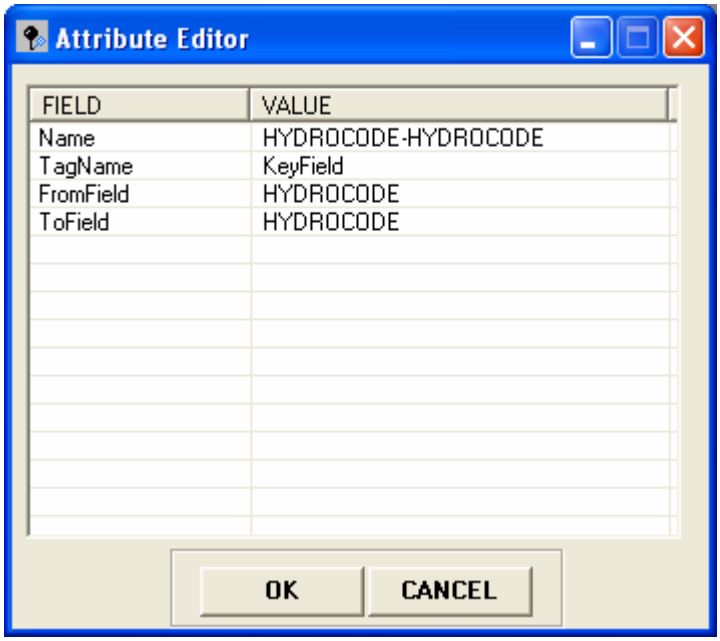


12. Right-click the node UniqueIDField and select EditText. Set the value to HydroID. This is the field storing the unique identifier at the database level, not a global unique identifier. This field may have different values in the source and target geodatabase.

13. Expand the node ApFields(ExcludedFields). This node contains a list of ApField nodes that define the fields, whose values should not be transferred. Check that the ApField(HYDROID) is listed, i.e. the HydroIDs will not be copied from the source to the target (Note: This setting is redundant with the CopyUniqueID parameter set to 0).



14. Right-click the node TrnField(KeyField) and select EditAttributes. Make sure that TagName us set to KeyField, FromField to HYDROCODE and ToField to HYDROCODE. This parameter defines the key fields used in the source and target geodatabase to uniquely identify the records. The key field should store a global unique identifier (i.e. HydroCode, not HydroID which is not unique across databases). Note that the TrnField(KeyField) may also be different for each layer, since this field may not be the same for each layer. HydroCode is used as global identifier and key fields for the 6 layers to export.



15. Right-click the node CopyShape and select EditText. Set the value to 1. This means that the shape field will be updated when overwriting an existing feature in the target geodatabase.

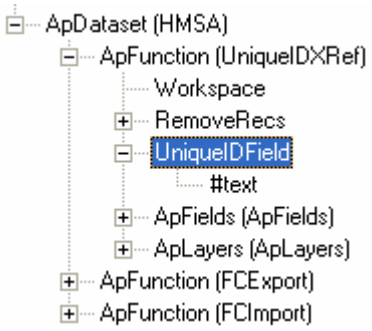
16. Check the node ApFields(RemovedFields). There are no child ApField nodes defined under this node. This means that all fields present in the source layers will also be present in the target layer.

5.5.2 Configure UniqueIDXRef node for a new GeoDataset

The ApFunction(UniqueIDXRef) node allows setting up the configuration of the functions Update UniqueID Reference Table and Update UniqueID. The first function creates and populates the cross-reference table that stores the UniqueID values (e.g. HydroID) from the source geodatabase with the corresponding value in the target geodatabase. The second function replaces related unique identifiers (e.g. DrainID sorting HydroID of related Drainage Area) with the corresponding values used in the target geodatabase.

You first need to define the name of the UniqueIDField. This should be the same as the UniqueIDField set for the Export (i.e. HydroID).

1. Right-click on the UniqueIDField node and select EditText. Make sure the UniqueIDField is set to HYDROID and click OK.



The ApLayers node holds a collection of layers, whose HydroID and HydroIDOrg values need to be added to the HydroIDXRef table and of layers containing at least one field storing a related unique identifier. Since the six layers being exported contain the HydroID field, you need to add one ApLayer definition for each of the 6 data layers exported. Note: only the Name parameter is used by the function. The other parameters (alias, shapetype) are not used.

2. Right-click on an existing ApLayer under the ApLayers node and select the EditAttributes option. Change the TagName, Name, Alias, and Desc values to River255. Note: only the Name parameter will be used by the function. All other parameters, if defined, are ignored.

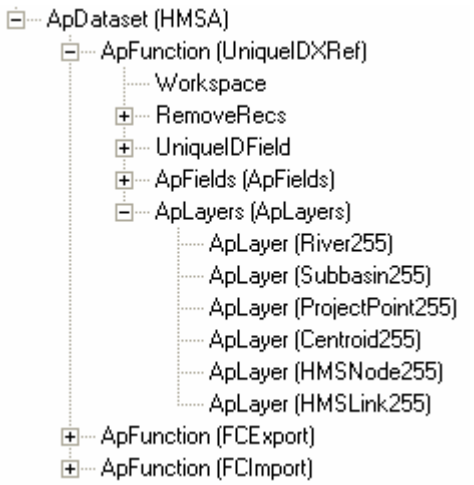
3. Right-click the Aplayer you just modified and select Copy.

4. Right-click on the ApLayers node and select Paste. Repeat the operation 4 more times to paste additional Aplayers.

5. Right-click on the second ApLayer, select the EditAttributes option and change the TagName, Name, Alias, and Desc values to Subbasin255.

6. Repeat step 4 for the remaining 4 layers – ProjectPoint255, HMSNode255, HMSLink255, and Centroid255.

7. Remove any additional ApLayer.



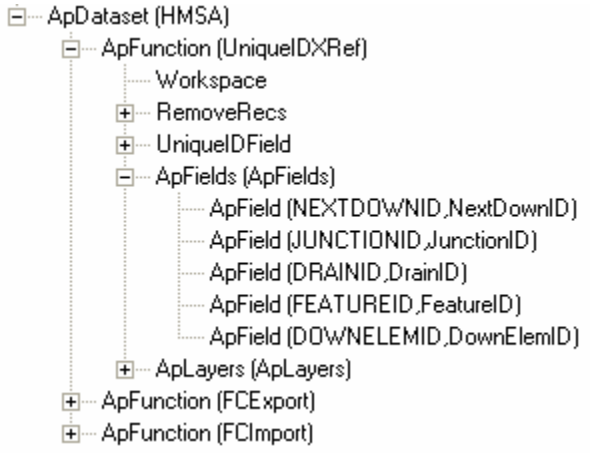
The ApFields parameter defined under the node: FrameworkConfig/HydroConfig/ProgParams/ApFunctions/ApFunction/ApDatasets/ApDataset/ApFunction(UniqueIDXRef)/ApFields specifies the related unique identifier fields (NextDownID, JunctionID, DrainID, FeatureID and DownElemID) that need to be updated to match the new unique identifier value.

8. Expand the ApFields node to view the related unique identifiers fields currently defined. Delete each ApField node except NextDownID, JunctionD, DrainID, FeatureID (if present) by right-clicking each node and selecting Delete.

9. Right-click the node ApField(NextDownID), and select Copy.

10. Right-click the ApFields node and select Paste.

11. Right-click on the just pasted ApField, and change the values of TagName, Name, Alias and Desc to DownElemID

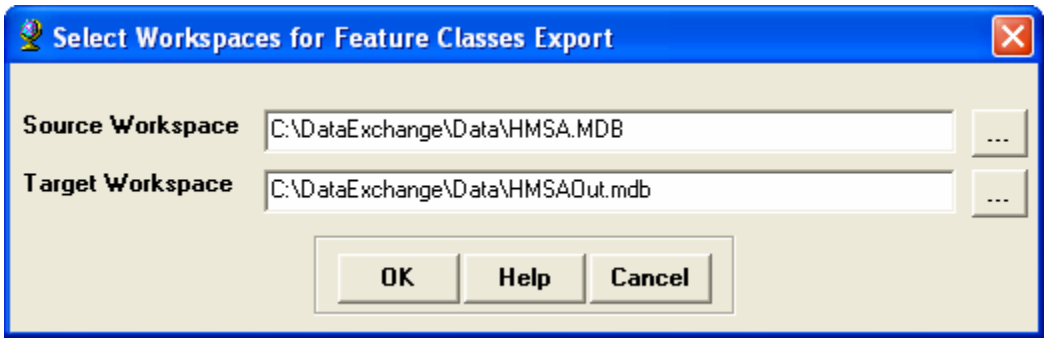


12. Close the XML Viewer. Save the map document to save the XML changes.

5.5.3 Export new GeoDataset

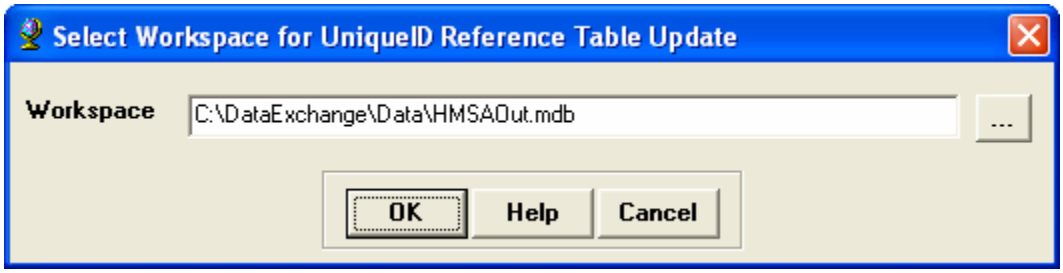
1. Click on Select GeoDataset and select HMSA as the current configuration.

2. Select GeoData Exchange>Step by Step DataExchange>Export FeatureClasses to export the features classes previously configured. Select HMSA.mdb as your source workspace and type the path to a new mdb for the target workspace. Click OK.

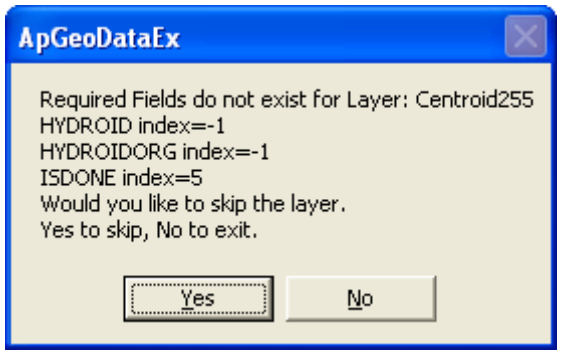


The function exports the 6 layers configured in the XML and all the layers from the source and target geodatabases into the Table of Contents of ArcMap. The field HydroID is populated with new identifiers, and the field HydroIDORG stores the HydroID from the source database. OIDORG stores the OID from the source database. HydroCode is used as key field in the source and target geodatabase.

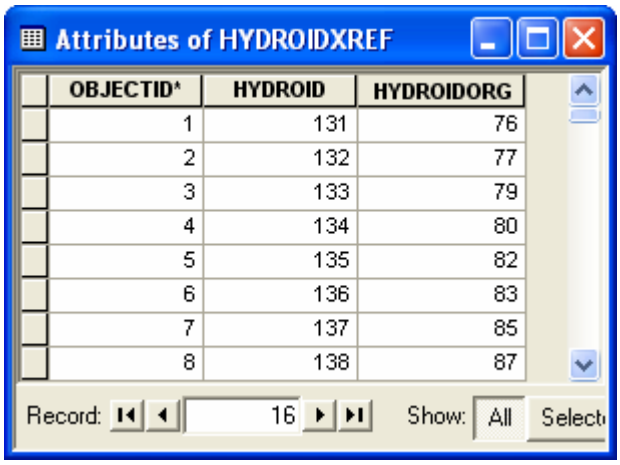
3. Select GeoData Exchange>Step by Step Data Exchange>Update UniqueID Reference Table to update the UniqueID cross-reference table. The workspace defaults to the target workspace previously selected. Click OK.



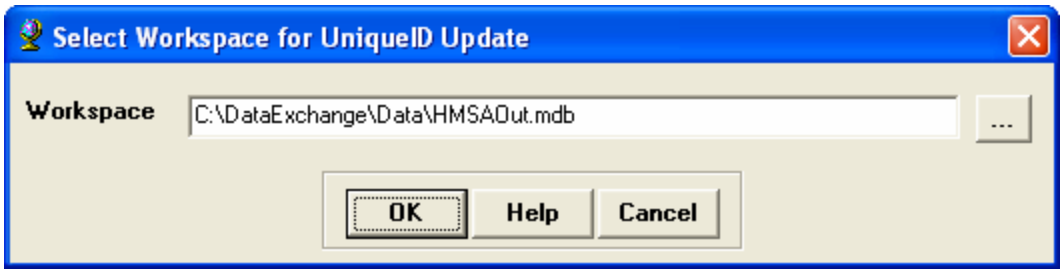
Note: You may see some warning messages saying that the HydroID field was not found etc. You can either select yes to skip the layer or no to abort the operation depending whether the layer should have HydroID field. For example, the layer Centroid255 does not contain the HydroID field, but it has one related identifier field that needs to be updated with the new HydroID of the related feature. In this case, click Yes to skip the layer.



The function creates and populates the unique id cross-reference table HYDROIDXREF and adds it into the Table of Contents of ArcMap.



4. Select GeoData Exchange>Step by Step DataExchange>Update UniqueID to update all the related unique id fields (NextDownID, DrainID, DownElemID, FeatureID etc). The workspace defaults to the target geodatabase previously selected. Click OK.



The function updates the fields DrainID, NextDownID, JunctionID, FeatureID and DownElemID so that they match the new HydroIDs.

Note: The function Batch Data Exchange>Export GeoDataset could have been used instead of running consecutively the functions Export Feature Classes, Update UniqueID Reference Table and Update UniqueID.

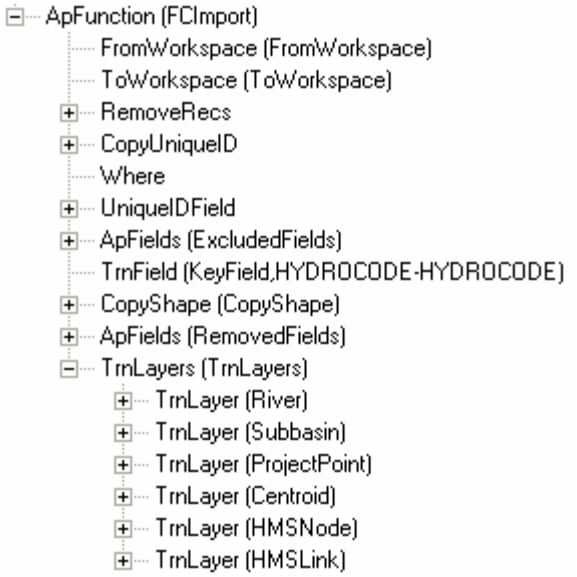
5.5.4 Configure FCImport node for a new GeoDataset

In general, the settings for the Import Feature Classes function are the reverse of those defined for the Export Feature Classes function. For example, if the KeyField in ApFunction(ExportFC) were defined as KeyField(HYDROID-HYDROIDORG), from HYDROID to HYDROIDORG, the KeyField in ApFunction(ImportFC) would be defined as KeyField(HYDROIDORG-HYDROID), from HYDROIDORG to HYDROID. A TrnLayer.FromLayer would become the TrnLayer.ToLayer etc. Also, the FromWorkspace of the ExportFC would become the ToWorkspace of the ImportFC function, and vise versa.

1. Right-click the node TrnLayers for the Import function located at FrameworkConfig/HydroConfig/ProgParamsApFunctions/ApFunction(GeoDataExchange)/ApDatasets/ApDataset(HMSA)/ApFunction(FCImport) and select Delete. Click Yes to confirm the deletion.

2. Right-click the node TrnLayers for the Export function located at FrameworkConfig/HydroConfig/ProgParamsApFunctions/ApFunction(GeoDataExchange)/ApDatasets/ApDataset(HMSA)/ApFunction(FCExport) and select Copy.

3. Right-click the ApFuntion(FCImport) node and click Paste. The node TrnLayers is added under the ApFunction(FCImport) node. This node contains the six layers to import.



4. Check the values of the node RemoveRecs (2), CopyUniqueID (0) and Where (blank).

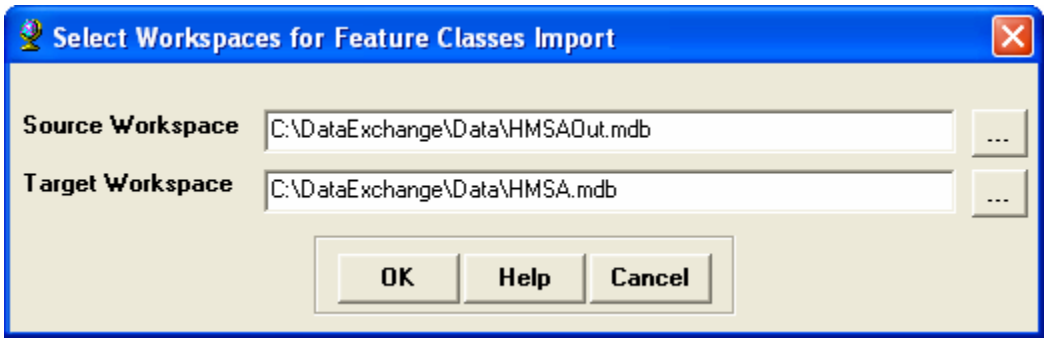
5. Check that UniqueIDField is set to HydroID.

6. Check that TrnField(KeyFielD) has HYDROCODE defined as FromField and ToField.

5.5.5 Import new GeoDataset

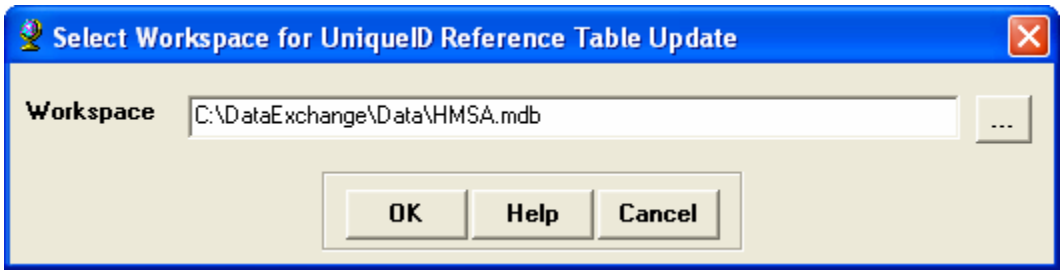
1. Click on Select GeoDataset and select HMSA as the current configuration.

2. Select GeoData Exchange>Step by Step DataExchange>Import FeatureClasses to export the features classes previously configured. Select HMSAout.mdb as your source workspace and HMSA.mdb as your target workspace. Click OK.



The function imports the 6 layers configured in the XML from the source into the target geodatabase. The function adds all the layers from the source and target geodatabases into the Table of Contents of ArcMap. The field HydroID is populated with new identifiers, and the field HydroIDORG stores the HydroID from the source database. OIDORG stores the OID from the source database. HydroCode is used as key field in the source and target geodatabase.

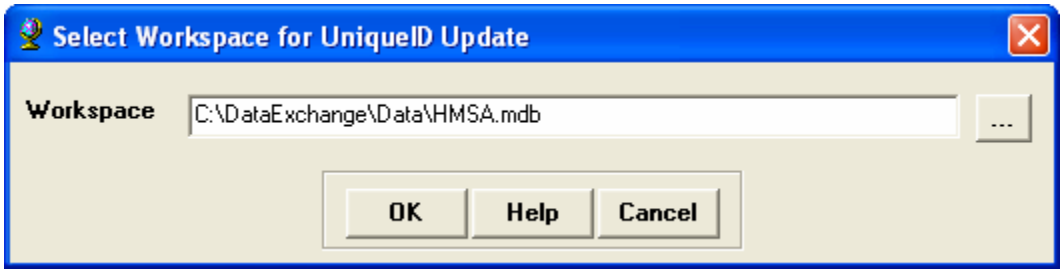
5. Select GeoData Exchange>Step by Step Data Exchange>Update UniqueID Reference Table to update the UniqueID cross-reference table. The workspace defaults to the target workspace previously selected. Click OK.



Note: You may see some warning messages saying that the HydroID field was not found etc. You can either select yes to skip the layer or no to abort the operation depending whether the layer should have HydroID field. For example, the layer Centroid255 does not contain the HydroID field, but it has one related identifier field that needs to be updated with the new HydroID of the related feature. In this case, click Yes to skip the layer.

The function creates and populates the unique id cross-reference table HYDROIDXREF and adds it into the Table of Contents of ArcMap.

6. Select GeoData Exchange>Step by Step DataExchange>Update UniqueID to update all the related unique id fields (NextDownID, DrainID, DownElemID, FeatureID etc). The workspace defaults to the target geodatabase previously selected. Click OK.



The function updates the fields DrainID, NextDownID, JunctionID, FeatureID and DownElemID so that they match the new HydroIDs.

Note: The function Batch Data Exchange>Import GeoDataset could have been used instead of running consecutively the functions Import Feature Classes, Update UniqueID Reference Table and Update UniqueID.