# Appendix: TSTool Installation and Configuration for CDSS

CDSS Version, 07.01.00, 2007-03-03, Acrobat Distiller

## 1. Overview

This appendix describes how to install TSTool in the CDSS (Colorado's Decision Support Systems) environment. The State of Colorado's CDSS consists of the HydroBase database, modeling, and data viewing/editing software. TSTool can be used within this system to process time series from the HydroBase database, CDSS model files, and other databases and files.

## 2. File Locations

Locations of TSTool software files within the CDSS main folder are as shown below. The *_XXX* notation indicates the JRE [Java Runtime Environment] version number (e.g., *_142*), which may change as upgrades to the system occur.

| | |
|---|---|
| *\CDSS* | Top-level CDSS install directory. |
| *bin* | Directory for *TSTool.exe*, *TSTool.bat* file and Java JAR files. |
| *Blowfish_XXX.jar* | Used for encryption/security. |
| *HydroBaseDMI_XXX.jar* | State of Colorado HydroBase database interface package. |
| *msbase.jar, mssqlserver.jar, msutil.jar* | Microsoft SQL Server packages (see special installation instructions below). |
| *NWSRFS_DMI_XXX.jar* | National Weather Service River Forecast System (NWSRFS) package. |
| *RiversideDB_DMI_XXX.jar* | Riverside Technology, inc., RiversideDB database package to support RiverTrak® systems. |
| *RTi_Common_XXX.jar* | Riverside Technology, inc. supporting packages. |
| *SatmonSysDMI_XXX.jar* | State of Colorado's Satellite Monitoring System package. |
| *shellcon.exe* | Executable program used to read from the Windows registry (e.g., to determine the default web browser and list available ODBC data source names). |
| *StateCU_XXX.jar* | State of Colorado's StateCU model package. |
| *StateMod_XXX.jar* | State of Colorado's StateMod model package. |
| *TSTool.bat* | Batch file to run TSTool using the JRE software. You may need to edit this if the installation is not standard. |
| *TSTool_XXX.jar* | TSTool main application package. |
| *\CDSS\doc\TSTool\UserManual* | Main documentation directory for TSTool. |
| *TSTool.pdf* | TSTool documentation as PDF. |
| *\CDSS\JRE_XXX* | Java Runtime Environment. |
| *\CDSS\logs* | Directory for TSTool log files (should be writeable). |
| *\CDSS\system* | Directory for system files. |
| *CDSS.cfg* | Optional configuration file for CDSS, impacting the HydroBase login defaults (see below). |
| *DATAUNIT* | Data units file (see below). |
| *TSTool.cfg* | Configuration file to modify TSTool defaults (see below). |

# 3. Installing TSTool

TSTool can be installed either as part of the HydroBase Tools CD/DVD installation, or as a separate installation. In both cases, is recommended that the CDSS file structure be used.

### 3.1 Installing TSTool from the "HydroBase data set Analysis Query Tools CD/DVD"

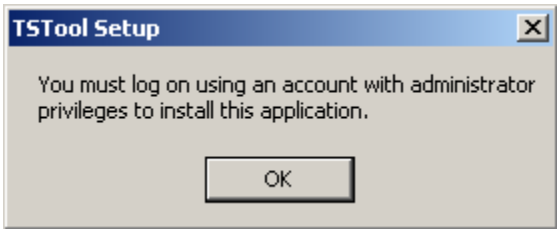
If you have purchased a HydroBase CD/DVD, TSTool will be installed during the CD install process. Refer to the installation instructions for that distribution.

### 3.2 Installing TSTool from the TSTool Setup File

Use the following instructions to install TSTool using the *TSTool_Setup.exe* installer program, for example if TSTool software was downloaded from the CDSS web site (*http://cdss.state.co.us*):

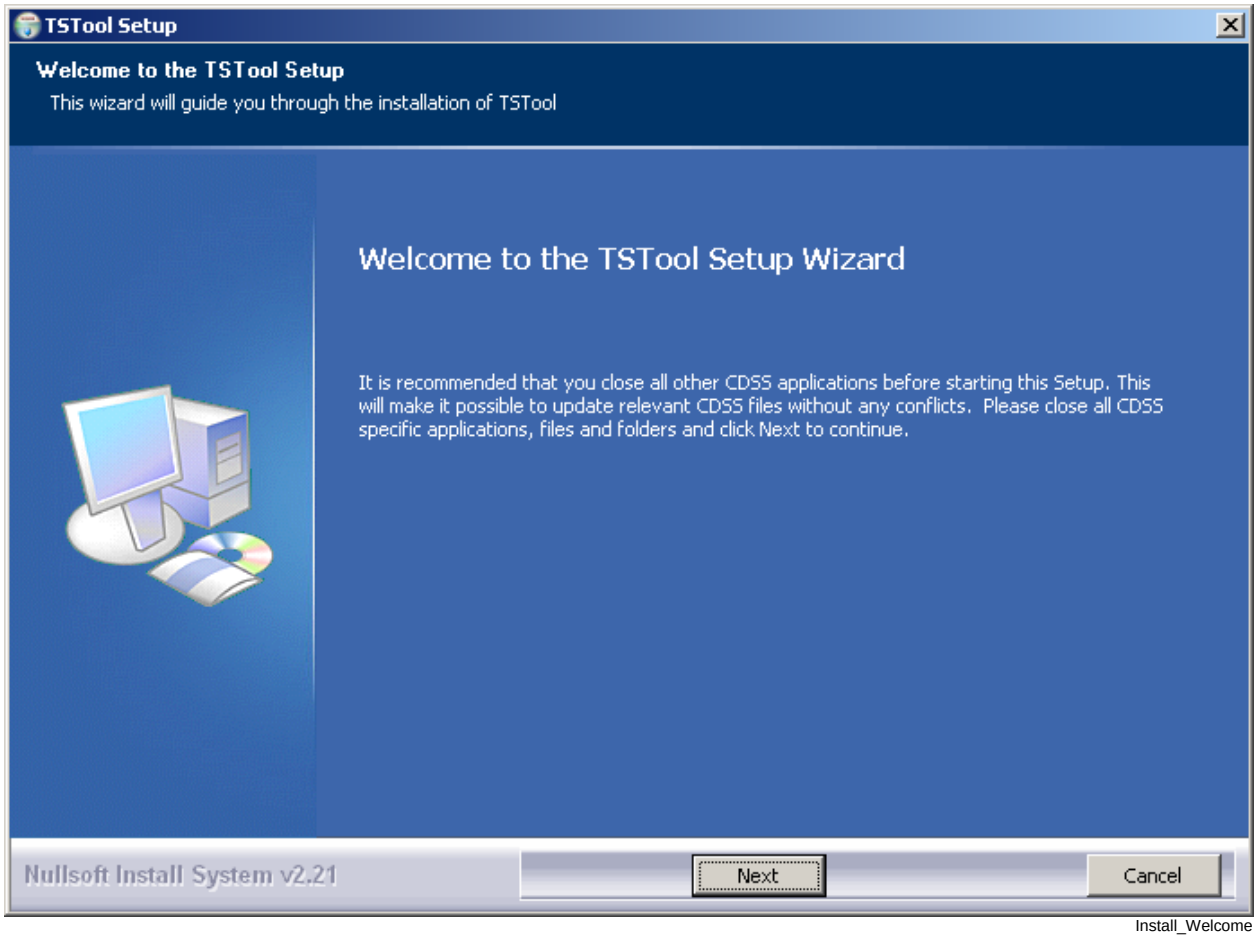
1. Run the *TSTool_Setup.exe* file by selecting from Windows Explorer, the ***Start… Run… menu***, or from a command shell. The setup filename will include a version number (e.g., *TSTool_7.00.00_Setup.exe*).

   You must be logged into the computer using an account with administrator privileges. Otherwise, the following warning will be displayed:



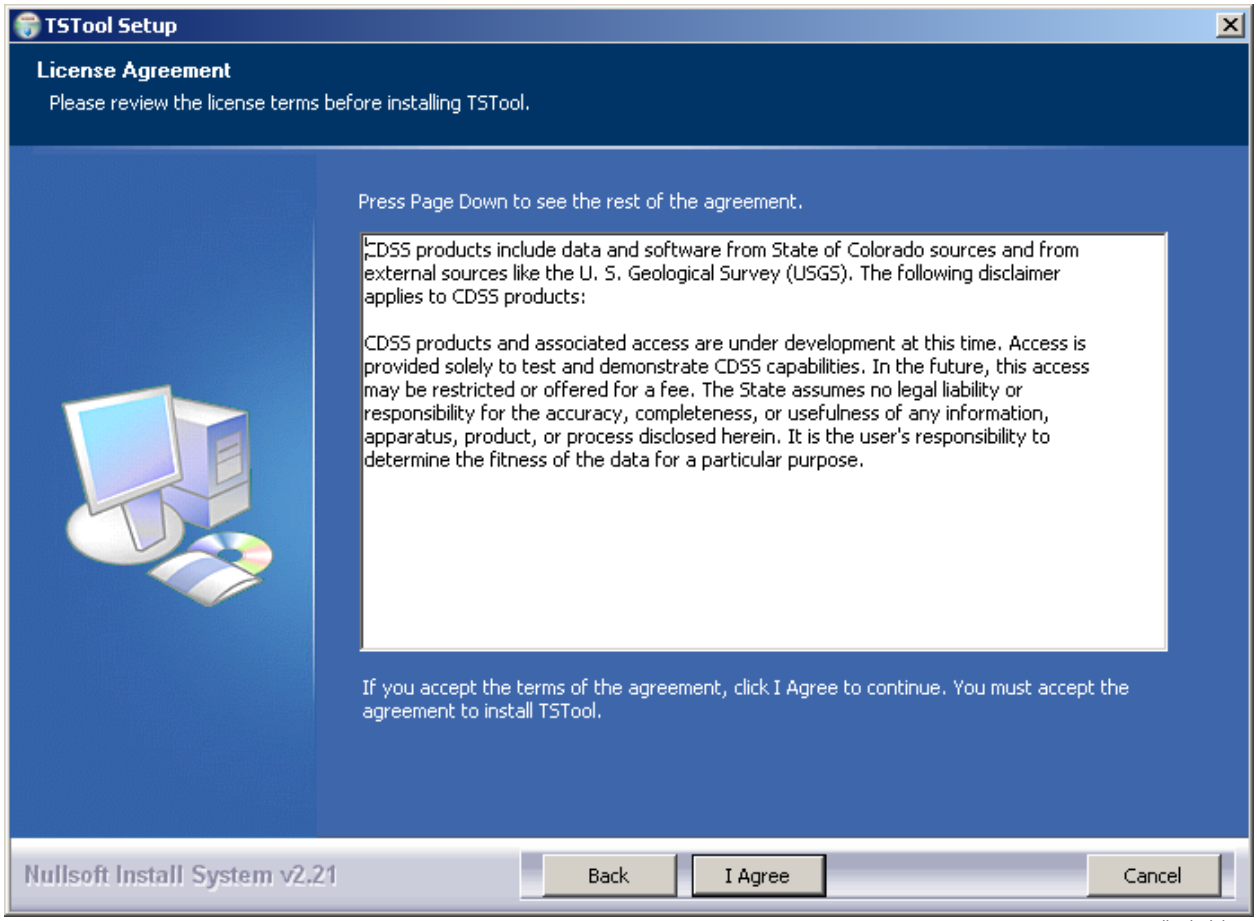

Install_AdministratorWarning

If you have administrative privileges, the following welcome will be displayed, and the installation can continue:




Install_Welcome

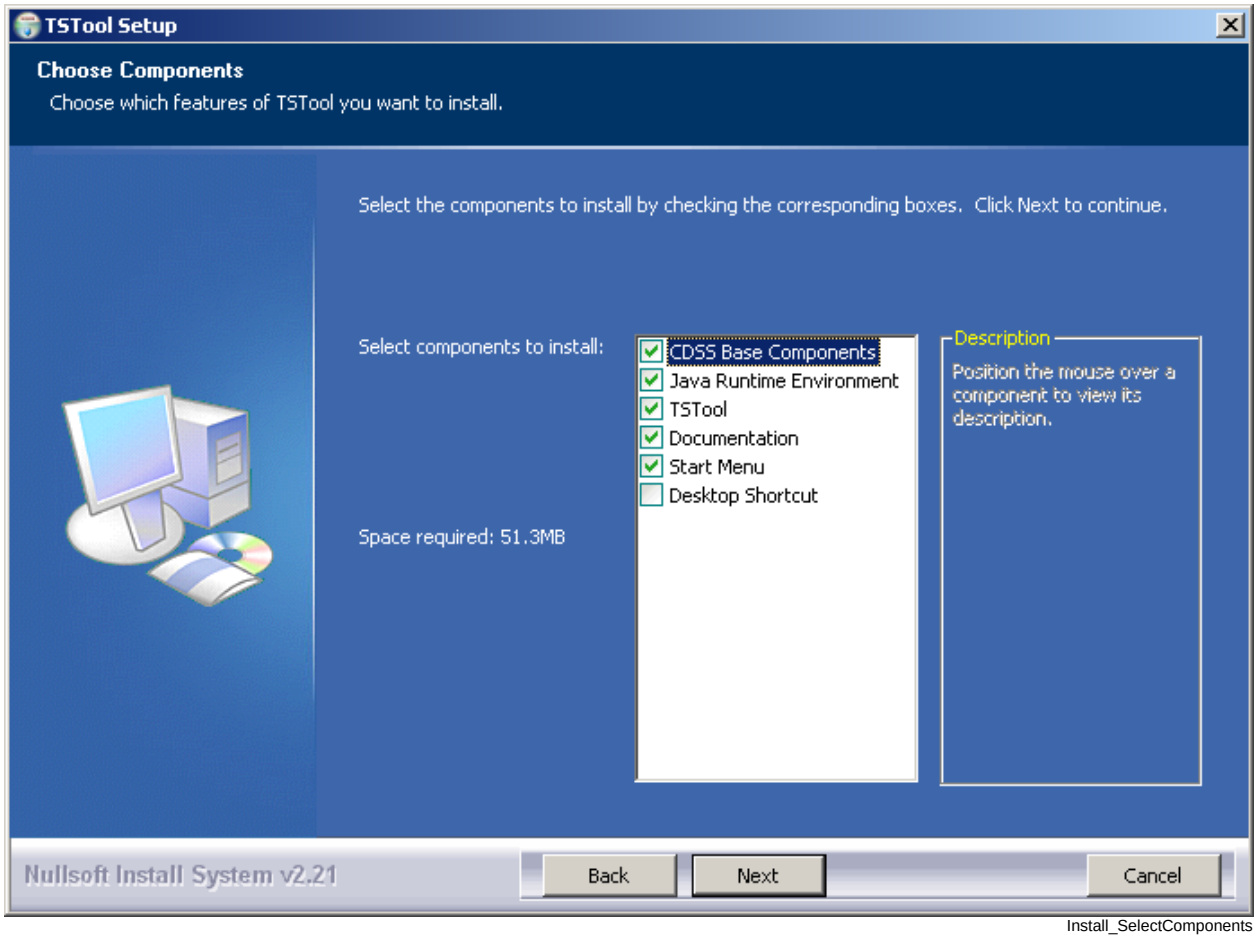
Press ***Next*** to continue with the installation.



Install_Disclaimer

TSTool is distributed with CDSS with no license restrictions. However the disclaimer must be acknowledged. Press ***I Agree*** to continue with the installation.

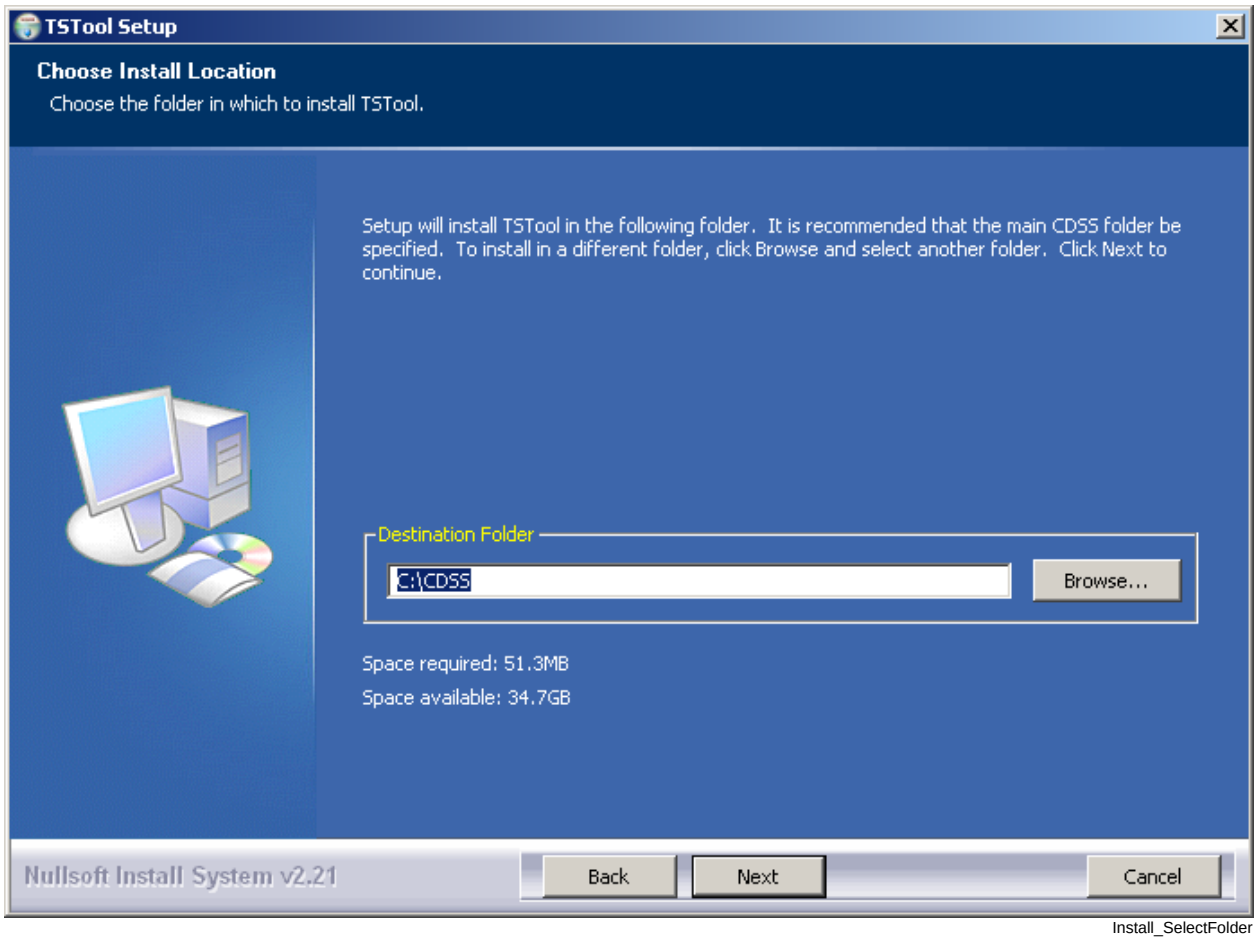
2. Several components can be selected for the install as shown in the following dialog. Position the mouse over a component to see its description.




Install_SelectComponents

Select the components to install and press ***Next***.

3. The following dialog is then shown and is used to select the installation location for TSTool. To be consistent with other CDSS components, select the main CDSS folder. The following dialog will display the CDSS install location if the CDSS Base component has been previously installed:

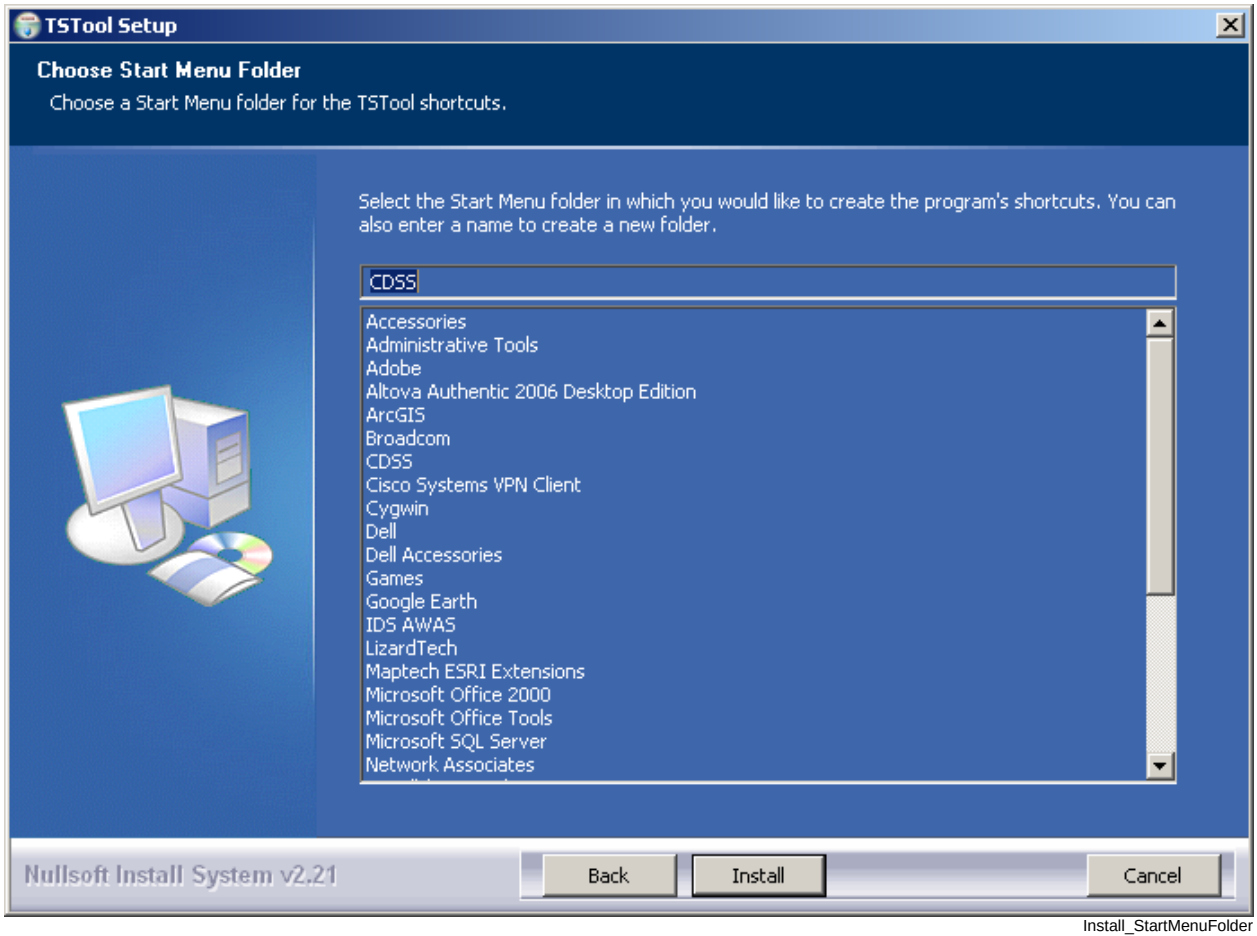



Install_SelectFolder

After selecting the install location, press ***Next***.

Note that this location will be saved as a Windows registry setting (*HKEY_LOCAL_MACHINE\Software\State of Colorado\TSTool\Path*) to allow future updates to check for and default to the same install location, and to allow the standard software uninstall procedure to work correctly.

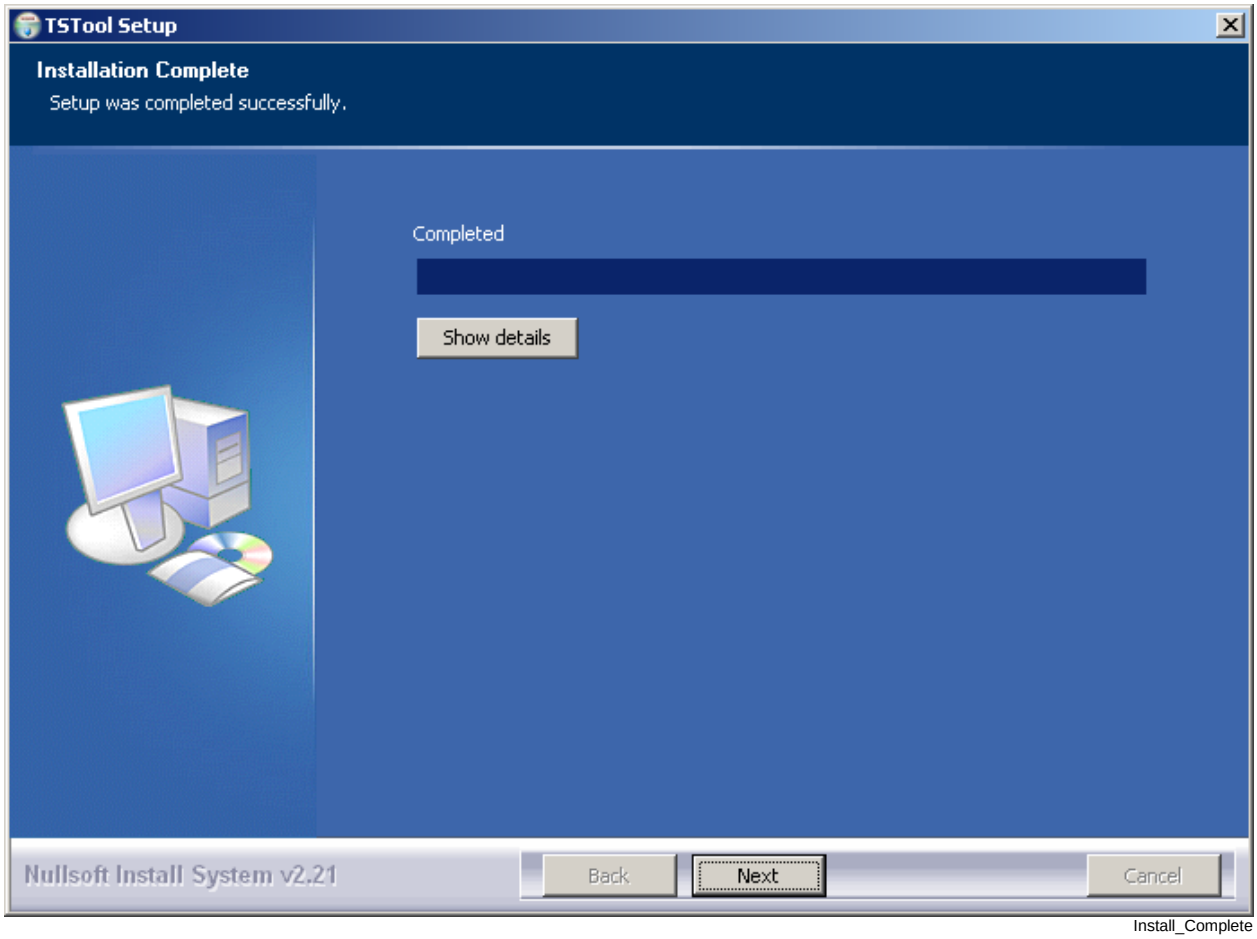
4. The following dialog will be shown to select the menu for the software:




Install_StartMenuFolder

After selecting the folder, press ***Install***.

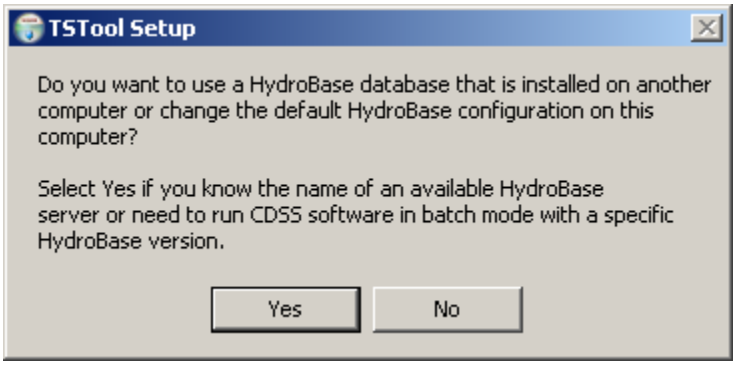
5. The following dialog will show the progress of the installation:




Install_Complete

Press Show details to see the files that were installed or press ***Next*** to continue.

6. If the CDSS Base Components were selected for install, the following dialog will be displayed:

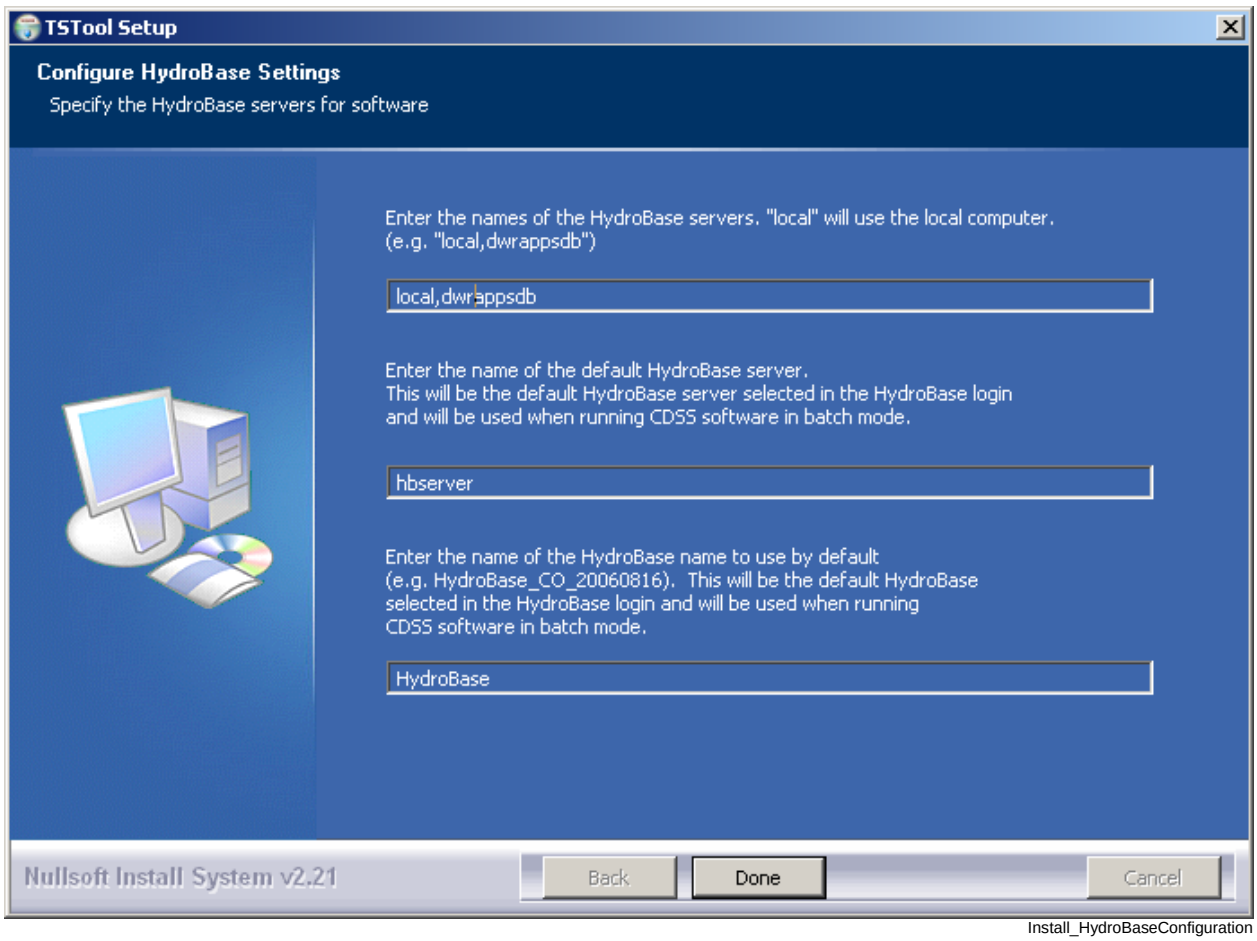



Install_HydroBaseQuestion

TSTool and other CDSS software can utilize HydroBase running on the local computer as well as other computers. Press ***Yes*** if HydroBase has been installed on another computer in the network environment and may be used by the software (then continue to the next step). Also press ***Yes*** if

TSTool will be run in batch mode because the specific HydroBase name must be specified in configuration files. Otherwise, press ***No*** (skip to step 8).

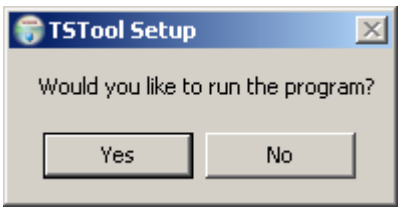
7. The following dialog allows additional HydroBase servers to be specified for use by CDSS software (the example below configures CDSS software to list the dwrappsdb HydroBase server in choices and defaults to HydroBase on the local computer). The dialog will initially show previous settings from the *\CDSS\system\CDSS.cfg* file and settings typically only need to be changed after installing a new HydroBase version.




Install_HydroBaseConfiguration

After entering the name of a HydroBase server and the default server to use, press ***Done***.

8. The following dialog will then be shown asking whether the TSTool software should be run:




Install_RunTSToolQuestion

Press ***Yes*** to run the software or ***No*** to exit the installation procedure.

9. A reboot is not required to use the software from the ***Start*** menu. However, a reboot may be required on some computers to run TSTool from the command line.

### 3.3 Installing TSTool on a File Server

TSTool can be installed on a file server, which allows software updates to be made in one location, thereby eliminating the need to install software on individual machines. For this type of installation, all computers that access the software must have similar configuration, including network configuration. The standard installer described in this documentation focuses on individual installs on user computers. To make TSTool software installed on a server available to other computers, perform the following (this is typically performed by system administrators):

1. Run the *TSTool_Setup.exe* installer as described above. During installation specify the CDSS home using a drive letter and path for the server or specify a Universal Naming Convention (UNC) path (e.g., *\\CDSSServer\CDSS*). All computers that will use the software will need to have access to the server in a consistent way because the TSTool software will expect the CDSS installation home at runtime to be that specified during the installation.
2. The menus and shortcuts will only be configured for the computer from which the installation was run. Therefore, menus and shortcuts for other computers will need to be manually configured.
3. If appropriate, edit the *CDSSInstallHome\system\CDSS.cfg* file to include additional information (e.g., Satellite Monitoring System database configuration – see **Section 6** below). The installer described in this documentation focuses on general users who in most cases will not have access to advanced features available only within the State of Colorado's server environment.

If TSTool has been installed on a local computer and it is also available on the network, the network version can be run by running the software in the *NetworkCDSSInstallHome\bin* folder. The software will expect that file locations use the same drives as when the software was installed.

### 3.4 Special Installation Instructions for Microsoft SQL Server Support

CDSS software uses the free SQL Server driver from Microsoft. The CDSS software requires only the *msbase.jar*, *mssqlserver.jar*, and *msutil.jar* files from the Microsoft installation. However, Microsoft requires that you do a full installation of its driver in order to acknowledge the End User License Agreement (EULA). Because only three files listed previously are needed for CDSS Java software, it is recommended that the Microsoft install be completed once within an organization (to complete the EULA recognition), but then use the three files distributed with CDSS software as is (ignore the files from the full Microsoft installation). If installing the HydroBase CD, the Microsoft files will be installed automatically and this EULA will be displayed.

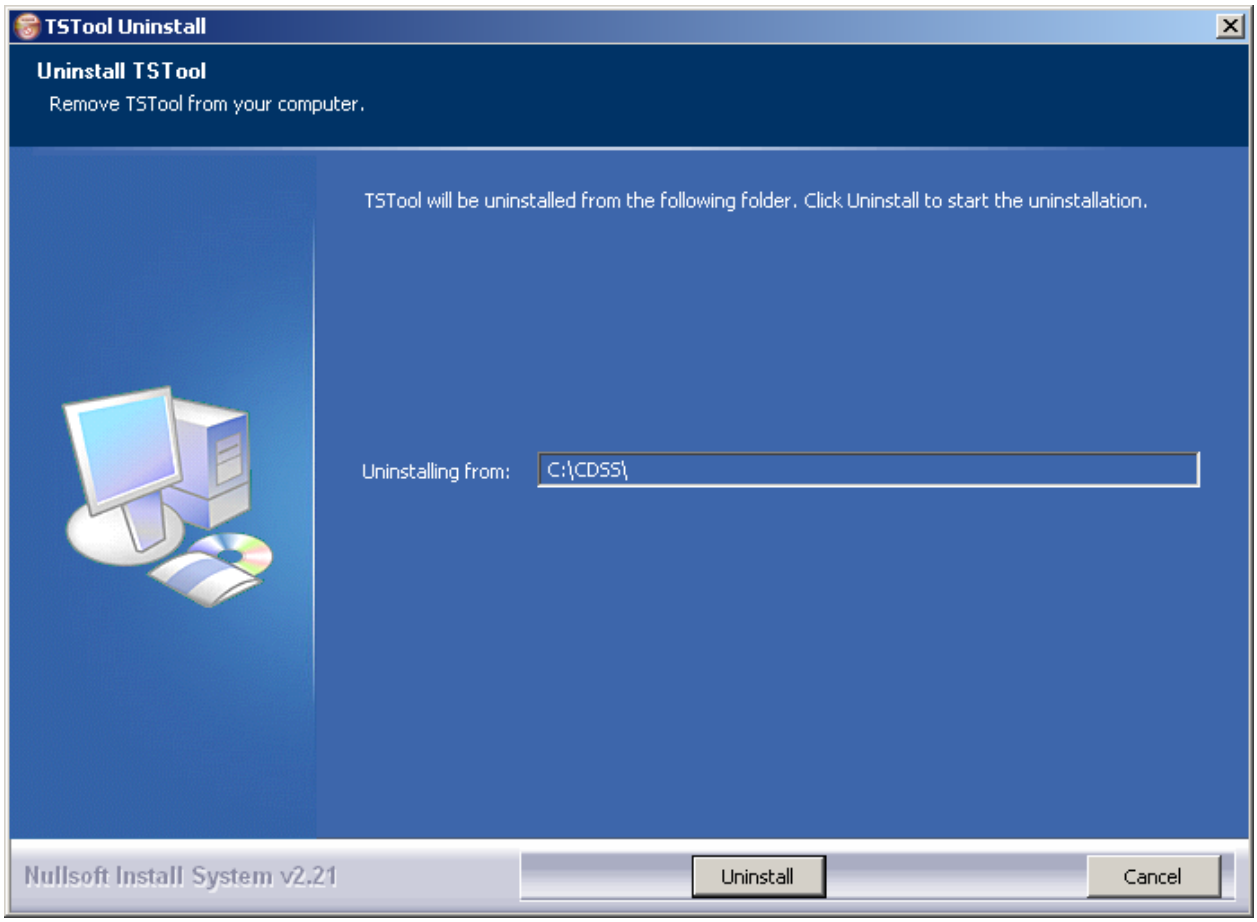
To manually perform the Microsoft installation, do one of the following:

1. Contact the supplier of the CDSS software (e.g., the State of Colorado IT staff) to provide the Microsoft driver. For software installations at the State, this step needs be done only once by the State of Colorado IT staff. All other CDSS users at the State can then use the software using the three software files described above.

2. Download and install the Microsoft JDBC driver from *http://www.microsoft.com/sql/downloads* and install according to its instructions. Do this if you have purchased SQL Server and will install the State's HydroBase using SQL Server at your organization.

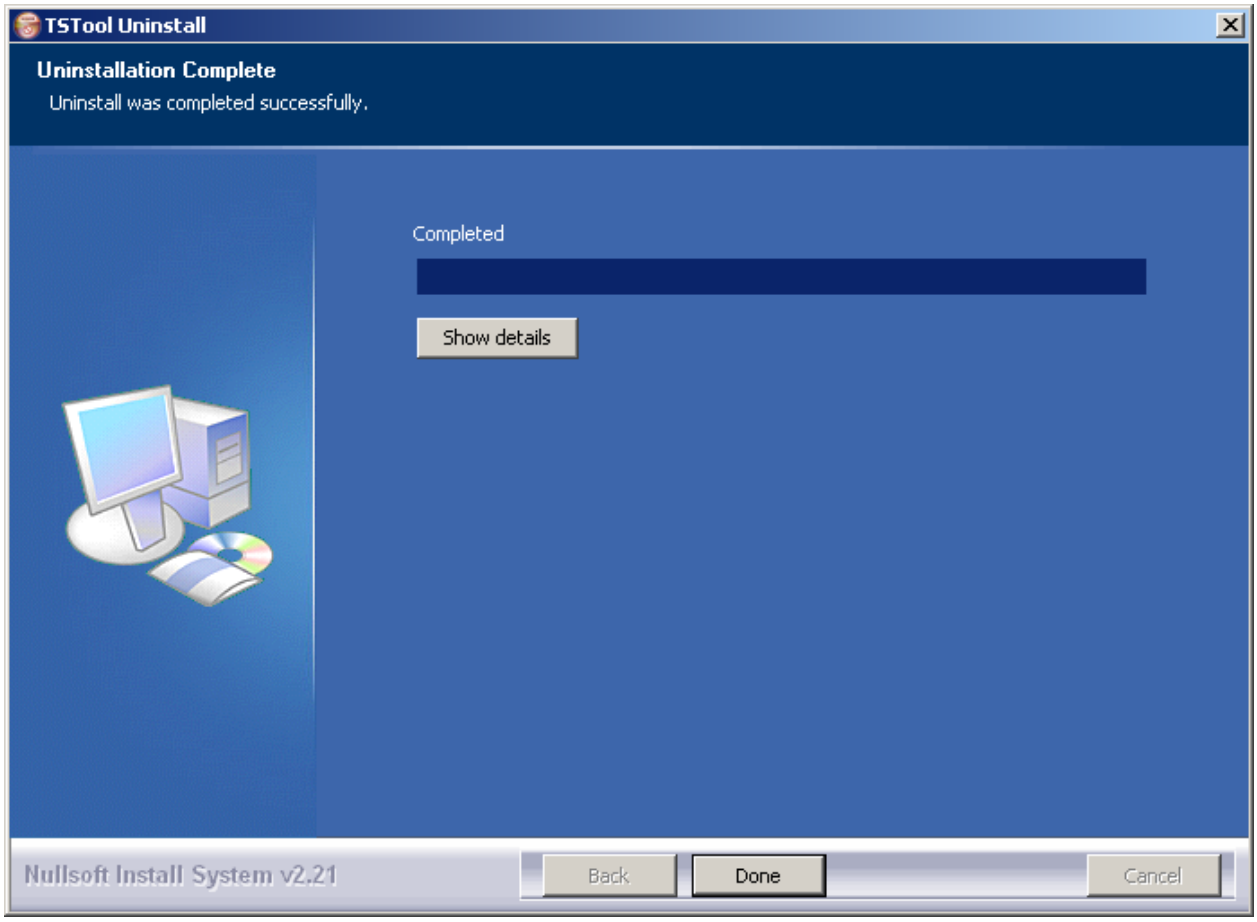
## 4. Uninstalling TSTool Software

To uninstall TSTool software, select the ***CDSS…Uninstall…TSTool*** from the ***Start*** menu and confirm the uninstall. CDSS components that are used by other software (e.g., CDSS Base component software) as well as user data will remain installed.




Press ***Uninstall*** to uninstall the software.

If TSTool is the last CDSS application to be uninstalled, you will also be prompted to confirm uninstalling CDSS system files.




Press ***Show details*** to see the list of files that were removed. Press ***Done*** to exit the uninstall.

## 5. Running TSTool

TSTool can be started in several ways as described below.

### 5.1 CDSS Menu

The ***Start…All Programs…TSTool*** (or ***Start… Programs… TSTool***) menu can be used to start the software. This runs the *CDSSInstallHome\bin\TSTool.exe* software.

### 5.2 Command Line Executable

The installation process adds the *CDSSInstallHome\bin* folder to the path, allowing the TSTool software to be started anywhere by running TSTool. Running TSTool from any drive will result in the software being run in the installation location. Specifying a commands file on the command line or interactively will reset the working directory to that of the commands file.

### 5.3 TSTool Batch File

TSTool was previously started with and can still be run with the *CDSSInstallHome\bin\TSTool.bat* file, for example to support troubleshooting. In this case, the file name tstool.bat must be fully specified because running tstool will result in the executable program being run (see previous section).

# 6. TSTool Configuration

TSTool requires minimal configuration after installation. This section describes TSTool configuration files that can be customized for a system. Configuration is specified for each TSTool installation. Installations on a server use one configuration for all users.

## 6.1 TSTool Configuration File

The *CDSSInstallHome\system\TSTool.cfg* file under the main installation directory contains top-level configuration information for TSTool. The format of the file is as follows:

```
#
# Configuration file for TSTool

[TSTool]

ColoradoSMSEnabled = true
DateValueEnabled = true
HydroBaseEnabled = true
RiverWareEnabled = true
StateCUEnabled = true
StateModEnabled = true

MapLayerLookupFile = "\cdss\gis\co\TimeSeriesMapLookup.csv"

LicenseOwner = "CDSS"
LicenseType = CDSS
LicenseCount = NoLimit
LicenseExpires = Never
LicenseKey = 00-77960bdfb1dde707-1dd052fe0327a332-a07266ee645e8845-7560192d374235c5-
1dd052fe0327a332
```

**Example TSTool Configuration File**

The example illustrates the format of the file. The `*Enabled` properties can be used to enable/disable input types. Common formats are enabled by default and more specialized formats are disabled by default, if not specified in the file. For example, use `HydroBaseEnabled = false` to disable the automatic HydroBase login that occurs with the HydroBase input type (e.g., if HydroBase is unavailable for some reason). The license properties are assigned by RTi and should not normally be changed by TSTool users. Each input type can have additional properties, although only a few currently do, as described below.

The optional `MapLayerLookupFile` property indicates the name of the time series to map layer lookup file. See the **Map Configuration** section below.

### 6.2 HydroBase Configuration

The following properties can be defined in the *TSTool.cfg* file in a [HydroBase] section to control how TSTool interacts with HydroBase. See also the **CDSS Configuration File** section below.

**TSTool HydroBase Configuration Properties**

| Property | Description | Default |
|---|---|---|
| `WDIDLength` | Indicates the length of water district identifiers (WDIDs) constructed from separate WD and ID data, when creating time series identifiers. Because time series identifier strings are compared literally, it is important that the WDIDs are consistent within a commands file. | `7` |

### 6.2 Data Units File

The *CDSSInstallHome\system\DATAUNIT* file under the main installation directory contains data unit information that defines conversions and output precision. In most cases the default file can be used but additional units may need to be added for a user's needs (in this case please notify the developers so the units can be added to the default file distributed with installations). Currently, the *DATAUNIT* file is the only source for units information – in the future units may be determined from the various input sources.

### 6.3 CDSS Configuration File

By default, TSTool will automatically look for HydroBase databases on the current (local) machine and the State servers. State server databases are typically only accessible to State of Colorado computers. If SQL Server or MSDE HydroBase versions have been installed on a different machine, the *CDSSInstallHome\system\CDSS.cfg* file can be used to indicate the database servers. An example of the configuration file is as follows:

```
[HydroBase]

ServerNames="ServerName,local"
DefaultServerName="ServerName"
DefaultDatabaseName="HydroBase_CO_East_20050730"

[ColoradoSMS]

ServerNames="ServerName,local"
DefaultServerName="ServerName"
DefaultDatabaseName="RealtimeStreamflow"
UserLogin="UserLogin"
```

The ColoradoSMS input type is being used to support annotation of real-time data graphs with alert information. These features are under development and should be configured only on State of Colorado computers.

Properties can be specified on the TSTool command line using the notation "`Property=Value`" and will in some cases override the values in the configuration file. These features are under development as necessary.

The CDSS configuration properties are described in the following tables:

**CDSS HydroBase Database Configuration Properties**

| Property | Description | Default |
|---|---|---|
| ServerNames | A comma-separated list of server names to list in the HydroBase login dialog. | The state server is listed. |
| Default ServerName | The default HydroBase server name to use. This allows the HydroBase login dialog to preselect a default that applies to most users in the system. If TSTool is run in batch mode and the HydroBase input type is enabled, use this property to make a default connection to HydroBase, for use with other commands in the batch run. | greenmtn. state.co.us |
| Default DatabaseName | The default HydroBase database name to use. This allows the HydroBase login dialog to preselect a default that applies to most users in the system. If TSTool is run in batch mode and the HydroBase input type is enabled, use this property to make a default connection to HydroBase, for use with other commands in the batch run. | |
| Database Engine | Reserved for internal use. | |
| DatabaseName | The database name to use for the initial connection. This overrides the default server. | |
| Database Server | The server name to use for the initial connection. This overrides the default server. | |
| SystemLogin | Reserved for internal use. | |
| SystemPassword | Reserved for internal use. | |
| UserLogin | Reserved for internal use. | |

**CDSS Satellite Monitoring System (ColoradoSMS) Database Configuration Properties**

| Property | Description | Default |
|---|---|---|
| `ServerNames` | A comma-separated list of server names to list in the SMS login dialog. | The state server is listed. |
| `Default ServerName` | The default SMS database server name to use. This allows the SMS login dialog to preselect a default that applies to most users in the system. If TSTool is run in batch mode and the ColoradoSMS input type is enabled, use this property to make a default connection to the SMS database, for use with other commands in the batch run. | `greenmtn. state.co.us` |
| `Default DatabaseName` | The default SMS database name to use. This allows the SMS login dialog to preselect a default that applies to most users in the system. If TSTool is run in batch mode and the ColoradoSMS input type is enabled, use this property to make a default connection to the SMS database, for use with other commands in the batch run. | |
| `Database Engine` | Reserved for internal use. | |
| `DatabaseName` | The database name to use for the initial connection. This overrides the default server. | |
| `Database Server` | The server name to use for the initial connection. This overrides the default server. | |
| `SystemLogin` | Reserved for internal use. | |
| `SystemPassword` | Reserved for internal use. | |
| `UserLogin` | The user login, for use with TSTool batch runs. The `ColoradoSMS.UserLogin` parameter can be specified on the command line and will be used when making the initial SMS database connection. | |

The SMS database cannot currently be opened with a login dialog. Therefore, correct information must be specified in the CDSS configuration file and the TSTool command line.

### 6.4 Map Configuration

TSTool can display maps configured as GeoView project files. See the **GeoView Mapping Tools Appendix** for more information about these files. To allow a link between time series and map layers, use the `TimeSeriesMapLayerLook` property in the *TSTool.cfg* file to specify a time series to map layer lookup file (see the **TSTool Configuration File** section above). The following example file illustrates the contents of the lookup file:

```
# This file allows time series in TSTool to be linked to stations in spatial
# data layers.  The columns are used as appropriate, depending on the direction
# of the select (from time series list or from the map).
#
# This file has been tested with the \CDSS\GIS\CO\co_TSTool.gvp file.  Not all
# possible combinations of time series and map layers have been defined - only
# enough to illustrate the configuration.
# Additional attributes need to be added to the point files to allow more
# extensive functionality.  For example, if attributes for data interval (time
# step) and data source are added to the attributes, then a definition query
# can be defined on the layer for displays to use the same data file.  The
# configuration below can then use the different names to configure the link
# to time series.
#
# TS_InputType - the time series input type, as used in TSTool
# TS_DataType - the data type shown in TSTool, specific to an input type
#              For example, TSTool uses "Streamflow" for HydroBase, whereas
#              for other input types a different data type string may be used.
# TS_Interval - time series interval of interest (e.g.,"Month", "Day", "1Hour"
#              "Irregular")
# Layer_Name - the layer name used in the map layer list
# Layer_Location - the attribute that is used to identify a location, to be
#              matched against the time series data location
# Layer_DataType - the attribute that is used to indicate the data type for a
#              station's time series (CURRENTLY NOT USED - UNDER EVALUATION)
# Layer_Interval - the attribute that is used to indicate the interval for a
#              station's time series
# Layer_DataSource - the attribute that is used to indicate the data source for
#              a station's time series.
#
# When matching time series in the TSTool time series query list with features
# on the map, the TS_* values are matched with the time series identifier
# values and the Layer_* attributes are matched against specific time series.
#
# Data layers are listed from largest interval to smallest.
"TS_InputType","TS_DataType","TS_Interval","Layer_Name","Layer_Location","Layer_DataSource"
HydroBase,DivTotal,Day,"Diversions",id_label_7,""
HydroBase,DivTotal,Month,"Diversions",id_label_7,""
HydroBase,EvapPan,Day,"Evaporation Stations",station_id,""
HydroBase,EvapPan,Month,"Evaporation Stations",station_id,""
HydroBase,Precip,Irregular,"Precipitation Stations",station_id,""
HydroBase,Precip,Day,"Precipitation Stations",station_id,""
HydroBase,Precip,Month,"Precipitation Stations",station_id,""
HydroBase,RelTotal,Day,"Reservoirs",id_label_7,""
HydroBase,RelTotal,Month,"Reservoirs",id_label_7,""
HydroBase,Streamflow-DISCHRG,Irregular,"Streamflow Gages - Real-time",station_id,""
HydroBase,Streamflow,Day,"Streamflow Gages - Historical",station_id,""
HydroBase,Streamflow,Month,"Streamflow Gages - Historical",station_id,""
```

**Example Time Series Map Layer Lookup File**

The columns in the lookup file indicate how information in the time series input/query list can be matched against time series in map layers. In particular, the `TS*` columns define values that are seen in the TSTool interface and the `Layer*` columns define the layer and attribute names for map layers. The `Layer_Interval` and `Layer_DataSource` are optional but if specified result in more specific links between time series and map layers.

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