StateDMI Training

Getting Started

Version: 3.09.03, 2010-04-22

Duration: Approximately 60 minutes

Level: Introduction

This Presentation

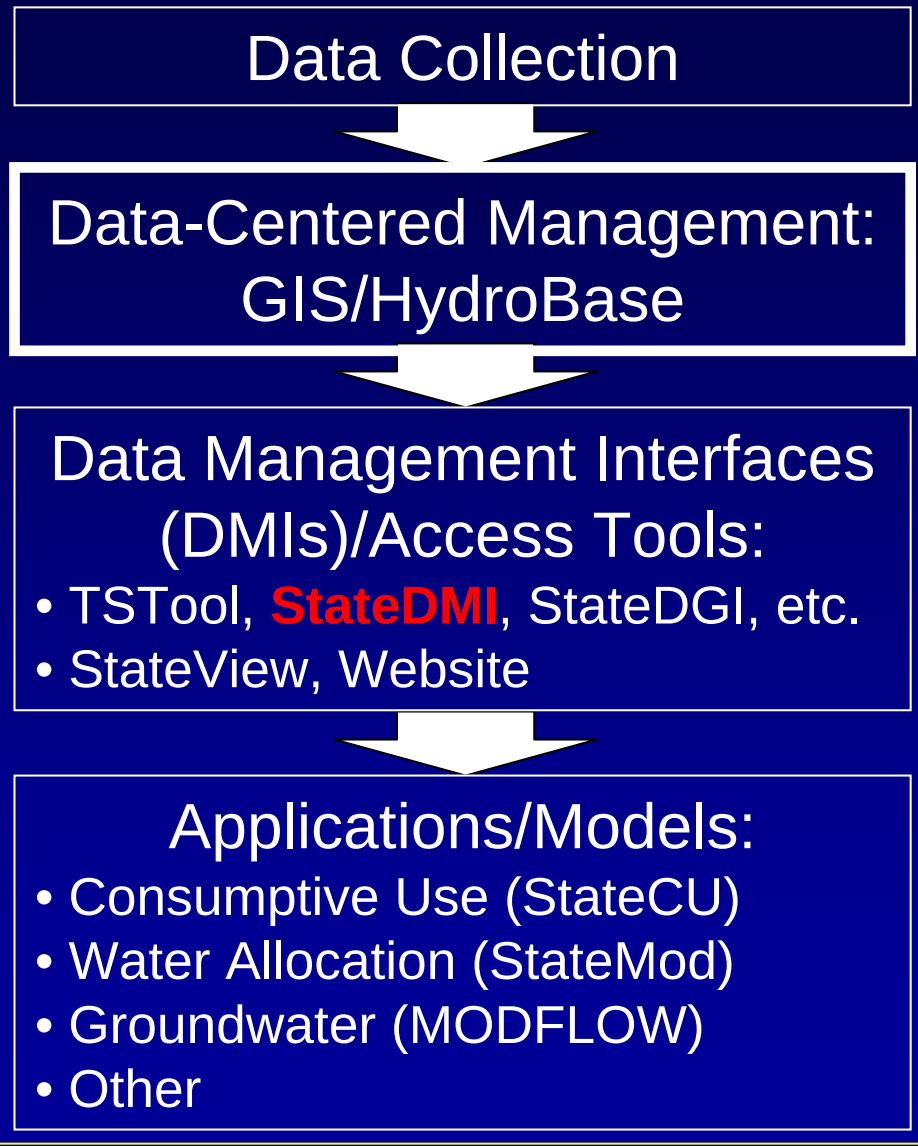
- Provides an introduction to StateDMI for new users
- Is designed for self-paced training
- Is accompanied by examples, each of which reside in a folder distributed with this presentation
  - See the doc/Training folder under the software installation
  - Full use of StateDMI requires that the HydroBase database is accessible

StateDMI

- Developed for Colorado's Decision Support Systems (CDSS)
- Reads data from HydroBase and files and creates input files for StateCU and StateMod
- Complements TSTool software
  - TSTool processes time series
  - StateDMI processes some time series but focuses on other data files
- Automates processing and quality control

Data-Centered Approach

- Open access to data
- Share data for multiple uses
- Applications focus on analysis and generating results/products



Starting StateDMI

If not already installed, download and install the software from http://cdss.state.co.us (see the Products…DMI Utilities link).

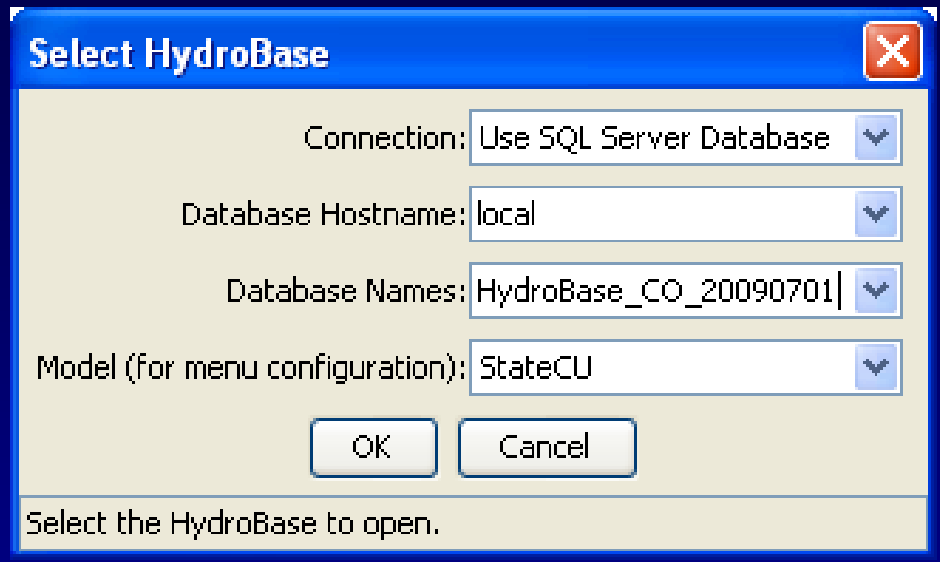
To run, for example:

Start…All Programs…CDSS…StateDMI-03.09.03

Multiple versions can be installed and will be listed in the CDSS menu.

Select HydroBase and Model

- Select HydroBase version to use
- Select model for which files are being created (can change later using File…Switch to StateCU/StateMod menu items)

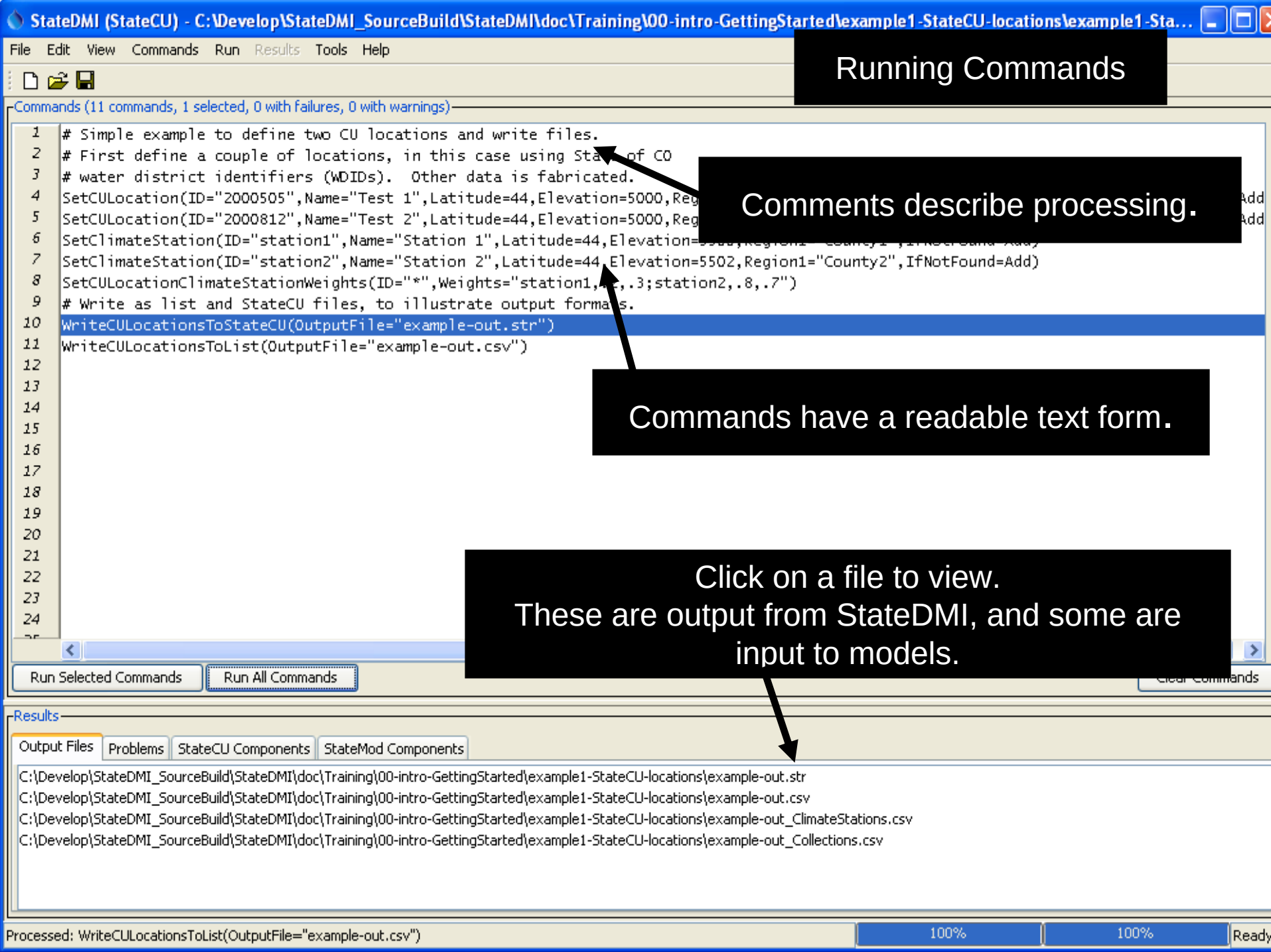


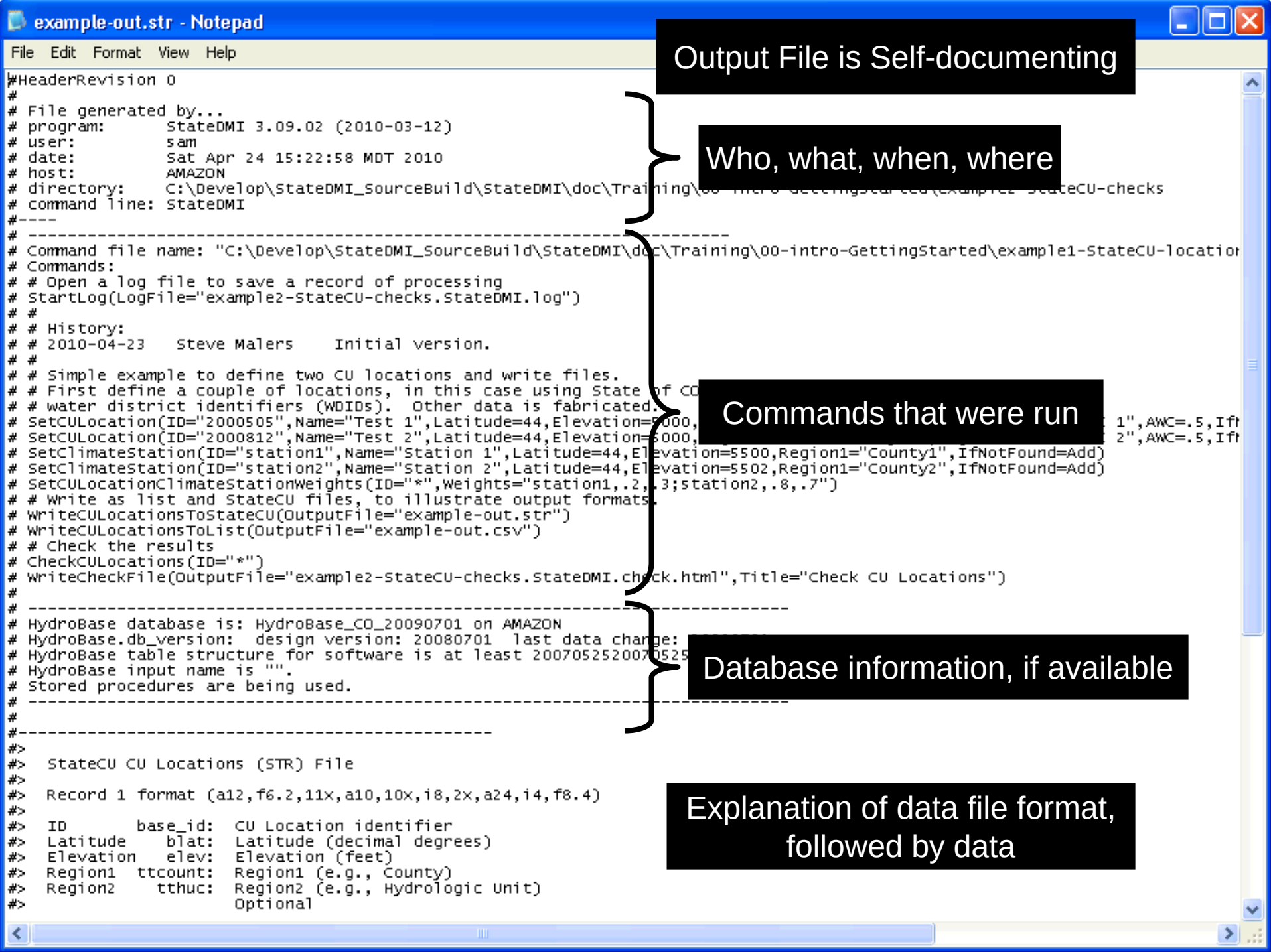
Functionality will be limited to reading from files if HydroBase is not available.

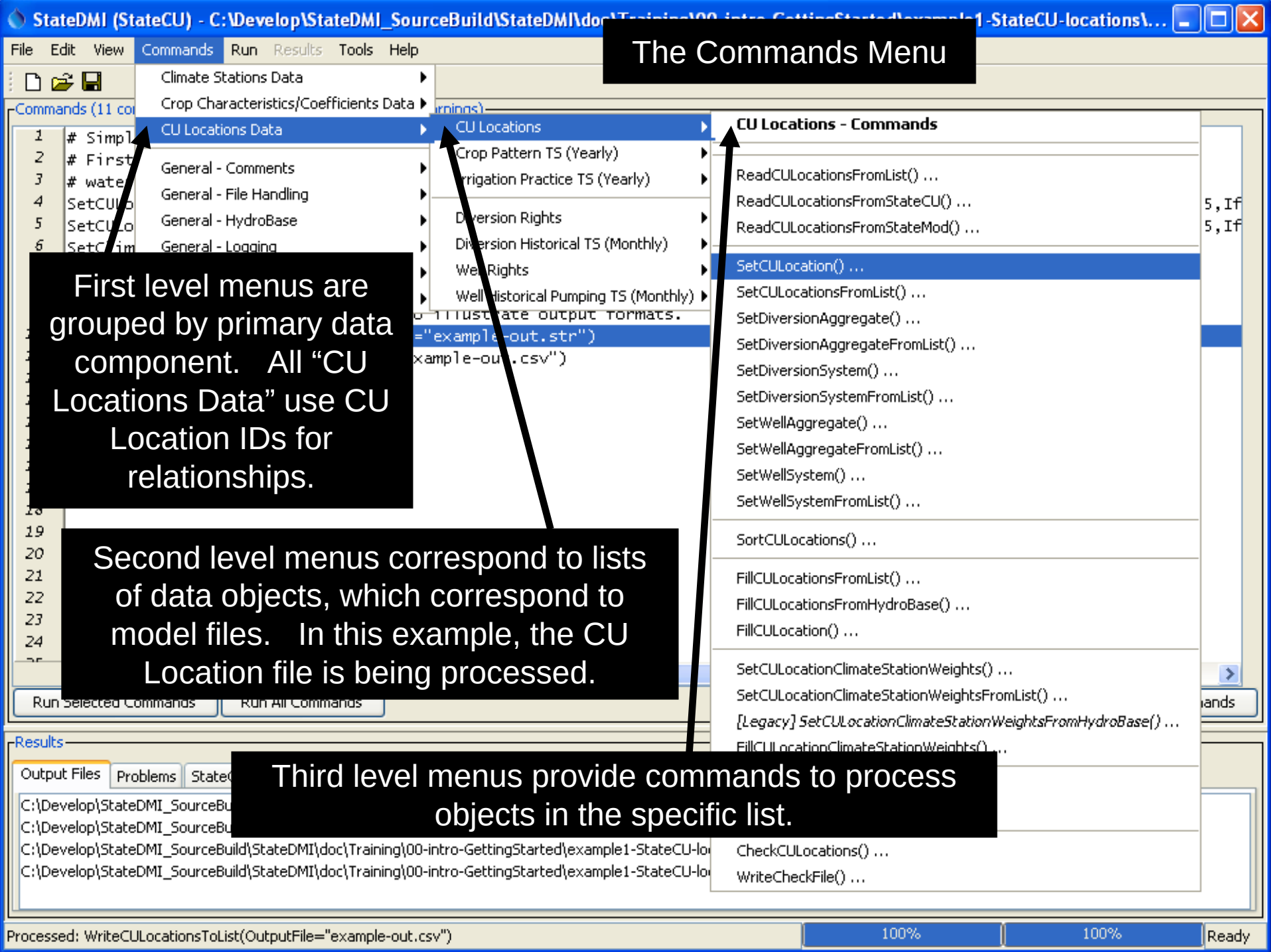

StateDMI (StateCU) - no commands saved
File Edit View Commands Run Results Tools Help
After starting the software
Commands (0 commands, 0 selected, 0 with failures, 0 with warnings)
1. Use the Commands menu to insert commands in the Commands list
2. Run highlighted or all commands
Run Selected Commands
Run All Commands
Clear Commands
Results
Output Files
Problems
StateCU Components
StateMod Components
3. View the results
Open a command file or add new commands.
0%
0%
Ready

Opening and Running an Existing Command File

- File…Open…Command File
- Select a *.StateDMI file (in this case choose example1-StateCU-locations.StateDMI)
- Press the Run All Commands button under the command list
- View the output files


StateDMI (StateCU) - C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example1-StateCU-locations\example1-Sta...
File Edit View Commands Run Results Tools Help
Running Commands
Commands (11 commands, 1 selected, 0 with failures, 0 with warnings)
1 # Simple example to define two CU locations and write files.
2 # First define a couple of locations, in this case using Sta of CO
3 # water district identifiers (WDIDs). Other data is fabricated.
4 SetCULocation(ID="2000505",Name="Test 1",Latitude=44,Elevation=5000,Reg
5 SetCULocation(ID="2000812",Name="Test 2",Latitude=44,Elevation=5000,Reg
6 SetClimateStation(ID="station1",Name="Station 1",Latitude=44,Elevation=
7 SetClimateStation(ID="station2",Name="Station 2",Latitude=44,Elevation=5502,Region1="County2",IfNotFound=Add)
8 SetCULocationClimateStationWeights(ID="*",Weights="station1,
9 # Write as list and StateCU files, to illustrate output formats.
10 WriteCULocationsToStateCU(OutputFile="example-out.str")
11 WriteCULocationsToList(OutputFile="example-out.csv")
Comments describe processing.
Commands have a readable text form.
Run Selected Commands
Run All Commands
Click on a file to view.
These are output from StateDMI, and some are input to models.
Results
Output Files
Problems
StateCU Components
StateMod Components
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example1-StateCU-locations\example-out.str
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example1-StateCU-locations\example-out.csv
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example1-StateCU-locations\example-out_ClimateStations.csv
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example1-StateCU-locations\example-out_Collections.csv
Processed: WriteCULocationsToList(OutputFile="example-out.csv")
100%
100%
Ready


example-out.str - Notepad
File Edit Format View Help
#HeaderRevision 0
#
File generated by...
program: StateDMI 3.09.02 (2010-03-12)
user: sam
date: Sat Apr 24 15:22:58 MDT 2010
host: AMAZON
directory: C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-Intro-GettingStarted\example2-StateCU-checks
command line: StateDMI
#----
--
Command file name: "C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example1-StateCU-location
Commands:
Open a log file to save a record of processing
StartLog(LogFile="example2-StateCU-checks.StateDMI.log")
# #
History:
2010-04-23 Steve Malers Initial version.
# #
Simple example to define two CU locations and write files.
First define a couple of locations, in this case using State of CO
water district identifiers (WDIDs). Other data is fabricated.
SetCULocation(ID="2000505",Name="Test 1",Latitude=44,Elevation=5000,
SetCULocation(ID="2000812",Name="Test 2",Latitude=44,Elevation=5000,
SetClimateStation(ID="station1",Name="Station 1",Latitude=44,Elevation=5500,Region1="County1",IfNotFound=Add)
SetClimateStation(ID="station2",Name="Station 2",Latitude=44,Elevation=5502,Region1="County2",IfNotFound=Add)
SetCULocationClimateStationWeights(ID="*",Weights="station1,.2,.3;station2,.8,.7")
Write as list and StateCU files, to illustrate output formats.
WriteCULocationsToStateCU(OutputFile="example-out.str")
WriteCULocationsToList(OutputFile="example-out.csv")
Check the results
CheckCULocations(ID="*")
WriteCheckFile(OutputFile="example2-StateCU-checks.StateDMI.check.html",Title="Check CU Locations")
#
--
HydroBase database is: HydroBase_CO_20090701 on AMAZON
HydroBase.db_version: design version: 20080701 last data change:
HydroBase table structure for software is at least 20070525200705
HydroBase input name is "".
Stored procedures are being used.
--
#
#---
#>
#> StateCU CU Locations (STR) File
#>
#> Record 1 format (a12,f6.2,11x,a10,10x,i8,2x,a24,i4,f8.4)
#>
#> ID base_id: CU Location identifier
#> Latitude blat: Latitude (decimal degrees)
#> Elevation elev: Elevation (feet)
#> Region1 ttcount: Region1 (e.g., County)
#> Region2 tthuc: Region2 (e.g., Hydrologic Unit)
#> Optional
Output File is Self-documenting
Who, what, when, where
Commands that were run
Database information, if available
Explanation of data file format, followed by data

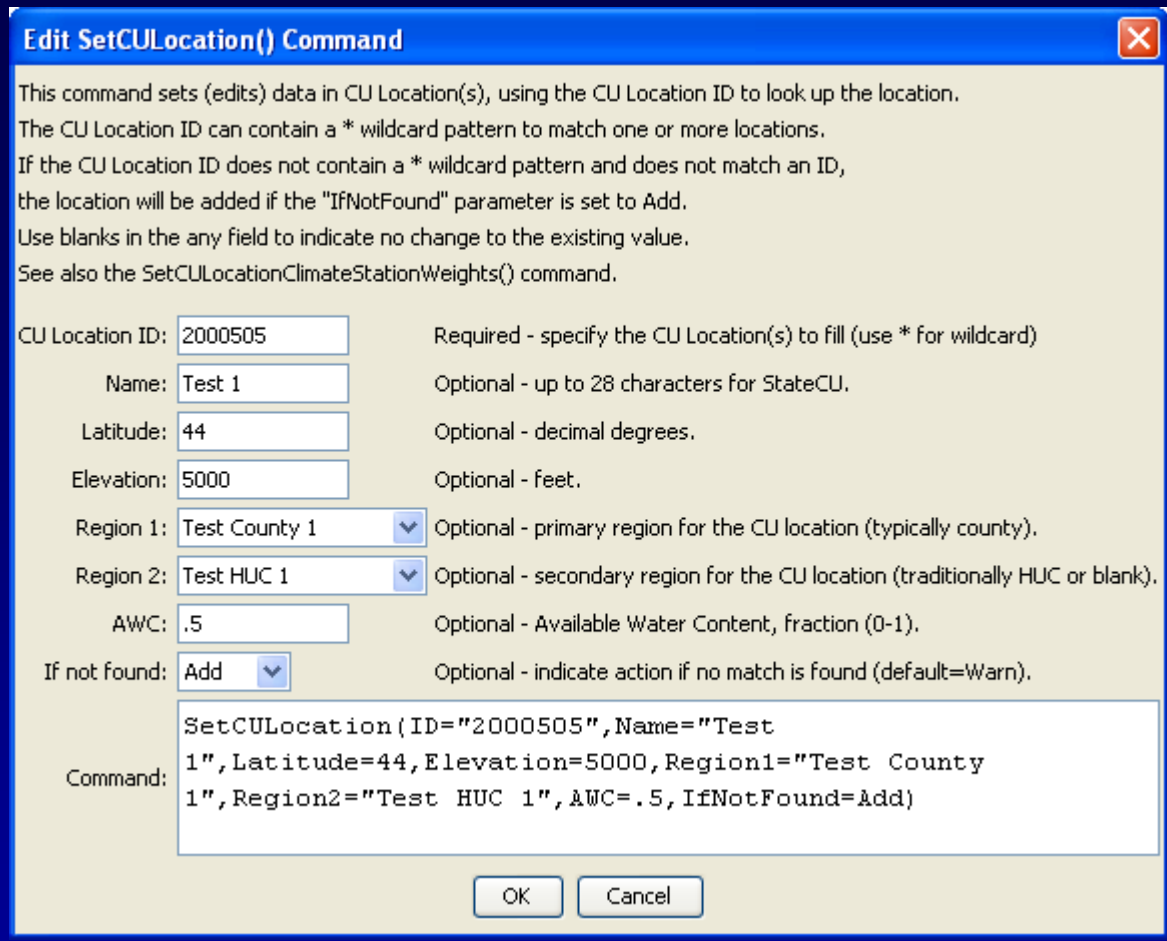

The Commands Menu
First level menus are grouped by primary data component. All "CU Locations Data" use CU Location IDs for relationships.
Second level menus correspond to lists of data objects, which correspond to model files. In this example, the CU Location file is being processed.
Third level menus provide commands to process objects in the specific list.
StateDMI (StateCU) - C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example1-StateCU-locations\...
File Edit View Commands Run Results Tools Help
Climate Stations Data
Crop Characteristics/Coefficients Data
CU Locations Data
General - Comments
General - File Handling
General - HydroBase
General - Logging
CU Locations
Crop Pattern TS (Yearly)
Irrigation Practice TS (Yearly)
Diversion Rights
Diversion Historical TS (Monthly)
Well Rights
Well Historical Pumping TS (Monthly)
CU Locations - Commands
ReadCULocationsFromList() ...
ReadCULocationsFromStateCU() ...
ReadCULocationsFromStateMod() ...
SetCULocation() ...
SetCULocationsFromList() ...
SetDiversionAggregate() ...
SetDiversionAggregateFromList() ...
SetDiversionSystem() ...
SetDiversionSystemFromList() ...
SetWellAggregate() ...
SetWellAggregateFromList() ...
SetWellSystem() ...
SetWellSystemFromList() ...
SortCULocations() ...
FillCULocationsFromList() ...
FillCULocationsFromHydroBase() ...
FillCULocation() ...
SetCULocationClimateStationWeights() ...
SetCULocationClimateStationWeightsFromList() ...
[Legacy] SetCULocationClimateStationWeightsFromHydroBase() ...
CheckCULocations() ...
WriteCheckFile() ...
Commands (11 co
Run Selected Commands
Run All Commands
Results
Output Files
Problems
Processed: WriteCULocationsToList(OutputFile="example-out.csv")
100%
100%
Ready

The Commands Menu is a Guide to the Processing Sequence

- Top level menus are generally listed in the order of file dependency
- Commands within a menu are generally listed in order of processing order (read, set, fill, write, check)
- Processing is simple for some files, and complex for others
- See also the StateDMI documentation (Help…View Documentation) and model data set documentation (on cdss.state.co.us website) for guidance

Inserting/Editing Commands

- Use the Commands menu to insert a command
- Double-click, or right-click (and Edit) on existing command to edit
- Command editors provide choices and check input

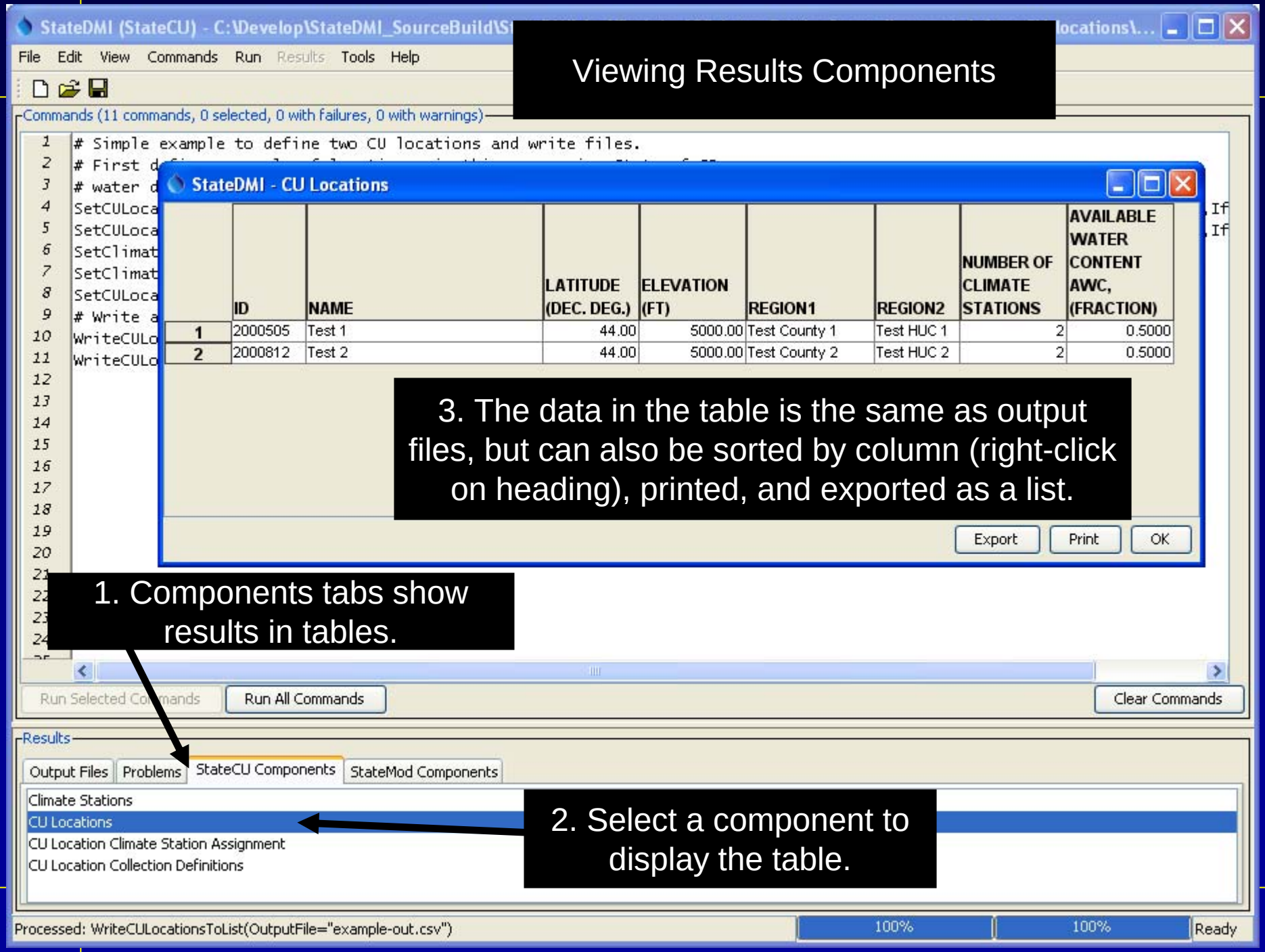


See also the Command Reference in the StateDMI documentation.

Command Editing Hints

- Insert/copy/paste/delete depend on what is selected – right click on commands and use Deselect All to allow adding a command at the end.
- To save time duplicating commands, highlight commands, use copy/paste, and then edit to change.
- Experienced users can edit command files with a text editor (commands will be checked at load and can be corrected).

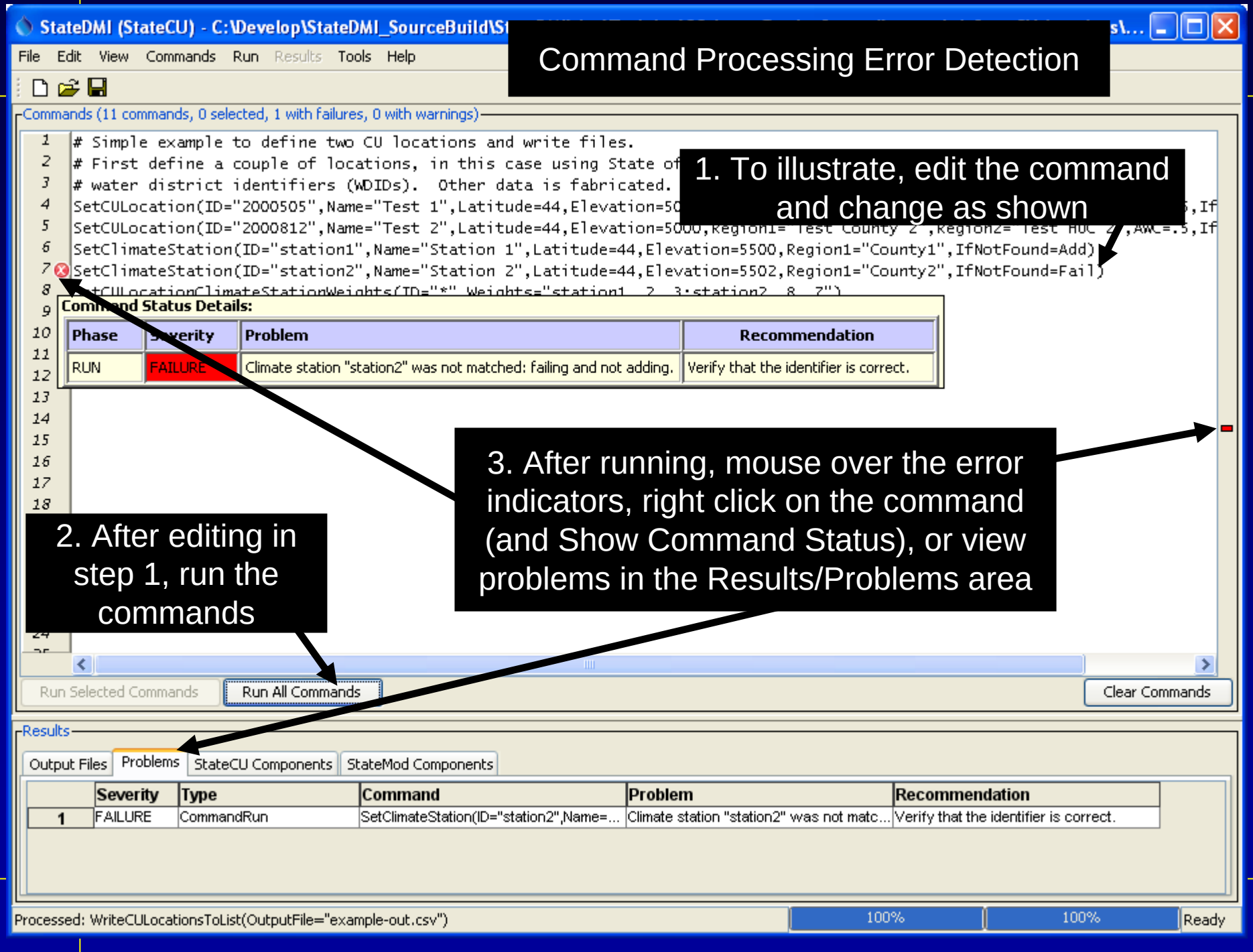
Viewing Results Components



3. The data in the table is the same as output files, but can also be sorted by column (right-click on heading), printed, and exported as a list.

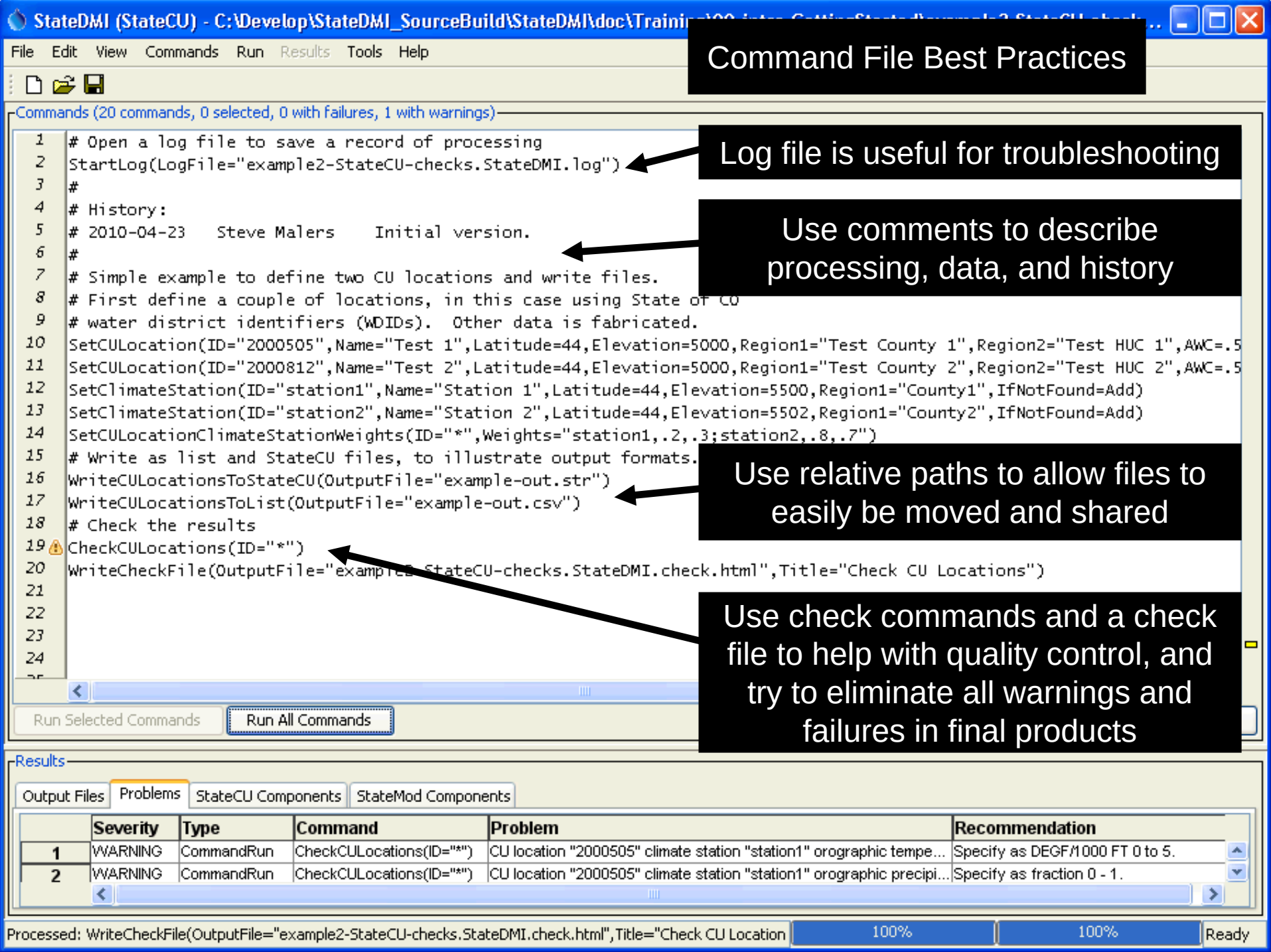
1. Components tabs show results in tables.

2. Select a component to display the table.


Command Processing Error Detection
1. To illustrate, edit the command and change as shown
2. After editing in step 1, run the commands
3. After running, mouse over the error indicators, right click on the command (and Show Command Status), or view problems in the Results/Problems area
StateDMI (StateCU) - C:\Develop\StateDMI_SourceBuild\St
File Edit View Commands Run Results Tools Help
Commands (11 commands, 0 selected, 1 with failures, 0 with warnings)
Simple example to define two CU locations and write files.
First define a couple of locations, in this case using State of
water district identifiers (WDIDs). Other data is fabricated.
SetCULocation(ID="2000505",Name="Test 1",Latitude=44,Elevation=50
SetCULocation(ID="2000812",Name="Test 2",Latitude=44,Elevation=5000,Region1="Test County 2",Region2="Test HUC 2",AWC=.5,If
SetClimateStation(ID="station1",Name="Station 1",Latitude=44,Elevation=5500,Region1="County1",IfNotFound=Add)
SetClimateStation(ID="station2",Name="Station 2",Latitude=44,Elevation=5502,Region1="County2",IfNotFound=Fail)
Command Status Details:
Phase
Severity
Problem
Recommendation
RUN
FAILURE
Climate station "station2" was not matched: failing and not adding.
Verify that the identifier is correct.
Run Selected Commands
Run All Commands
Clear Commands
Results
Output Files
Problems
StateCU Components
StateMod Components
Severity
Type
Command
Problem
Recommendation
1
FAILURE
CommandRun
SetClimateStation(ID="station2",Name=...
Climate station "station2" was not matc...
Verify that the identifier is correct.
Processed: WriteCULocationsToList(OutputFile="example-out.csv")
100%
100%
Ready

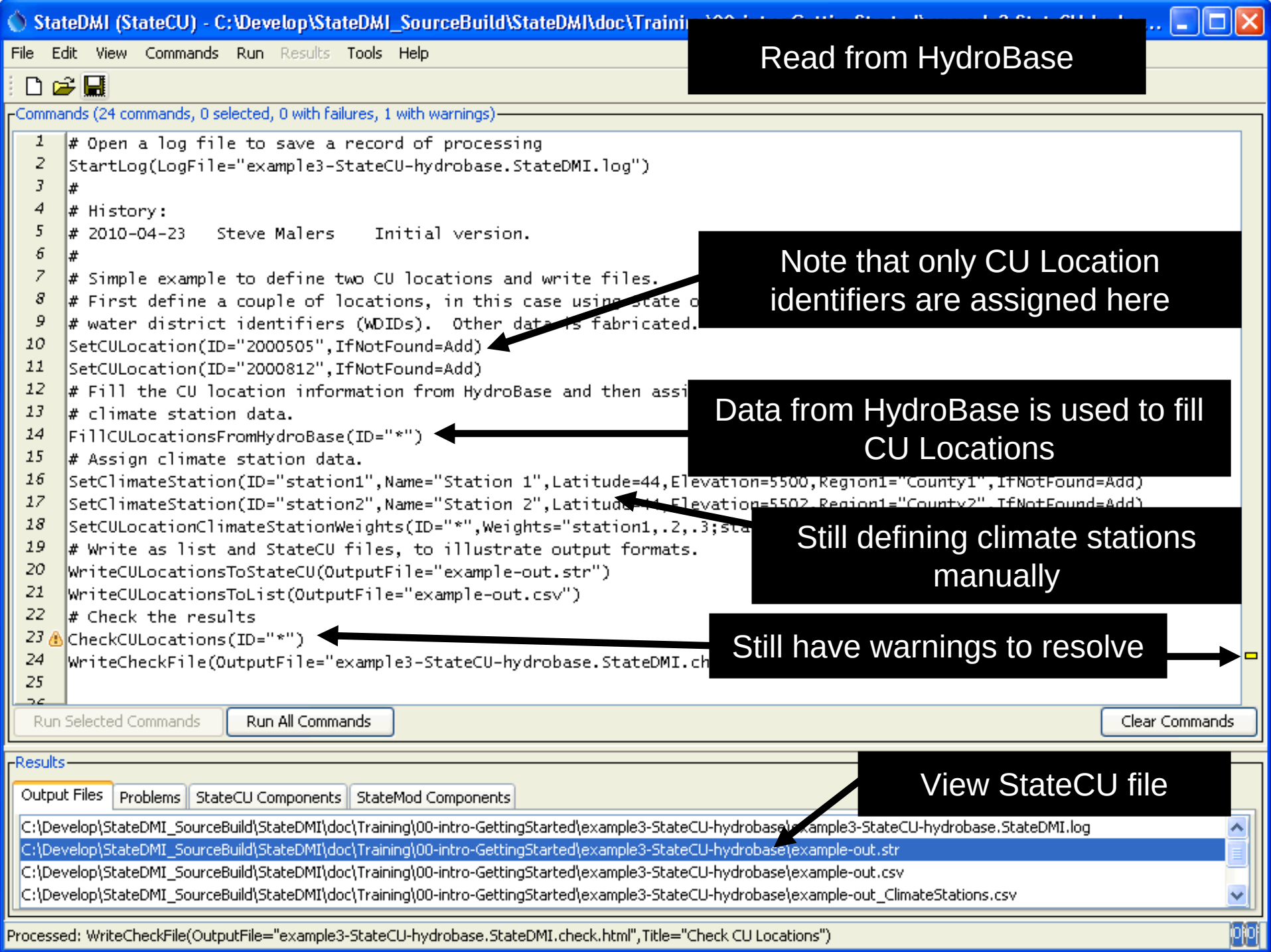
Command Editing Hints

- Insert/copy/paste/delete depend on what is selected – right click on commands and use Deselect All to allow adding a command at the end.
- To save time duplicating commands, highlight commands, use copy/paste, and then edit to change.
- Experienced users can edit command files with a text editor (commands will be checked at load and can be corrected).


StateDMI (StateCU) - C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Trainin
File Edit View Commands Run Results Tools Help
Command File Best Practices
Commands (20 commands, 0 selected, 0 with failures, 1 with warnings)
1 # Open a log file to save a record of processing
2 StartLog(LogFile="example2-StateCU-checks.StateDMI.log")
3 #
4 # History:
5 # 2010-04-23 Steve Malers Initial version.
6 #
7 # Simple example to define two CU locations and write files.
8 # First define a couple of locations, in this case using State of CO
9 # water district identifiers (WDIDs). Other data is fabricated.
10 SetCULocation(ID="2000505",Name="Test 1",Latitude=44,Elevation=5000,Region1="Test County 1",Region2="Test HUC 1",AWC=.5
11 SetCULocation(ID="2000812",Name="Test 2",Latitude=44,Elevation=5000,Region1="Test County 2",Region2="Test HUC 2",AWC=.5
12 SetClimateStation(ID="station1",Name="Station 1",Latitude=44,Elevation=5500,Region1="County1",IfNotFound=Add)
13 SetClimateStation(ID="station2",Name="Station 2",Latitude=44,Elevation=5502,Region1="County2",IfNotFound=Add)
14 SetCULocationClimateStationWeights(ID="*",Weights="station1,.2,.3;station2,.8,.7")
15 # Write as list and StateCU files, to illustrate output formats.
16 WriteCULocationsToStateCU(OutputFile="example-out.str")
17 WriteCULocationsToList(OutputFile="example-out.csv")
18 # Check the results
19 CheckCULocations(ID="*")
20 WriteCheckFile(OutputFile="example2-StateCU-checks.StateDMI.check.html",Title="Check CU Locations")
21
22
23
24
Log file is useful for troubleshooting
Use comments to describe processing, data, and history
Use relative paths to allow files to easily be moved and shared
Use check commands and a check file to help with quality control, and try to eliminate all warnings and failures in final products
Run Selected Commands
Run All Commands
Results
Output Files
Problems
StateCU Components
StateMod Components
Severity Type Command Problem Recommendation
1 WARNING CommandRun CheckCULocations(ID="*") CU location "2000505" climate station "station1" orographic tempe... Specify as DEGF/1000 FT 0 to 5.
2 WARNING CommandRun CheckCULocations(ID="*") CU location "2000505" climate station "station1" orographic precipi... Specify as fraction 0 - 1.
Processed: WriteCheckFile(OutputFile="example2-StateCU-checks.StateDMI.check.html",Title="Check CU Location
100%
100%
Ready

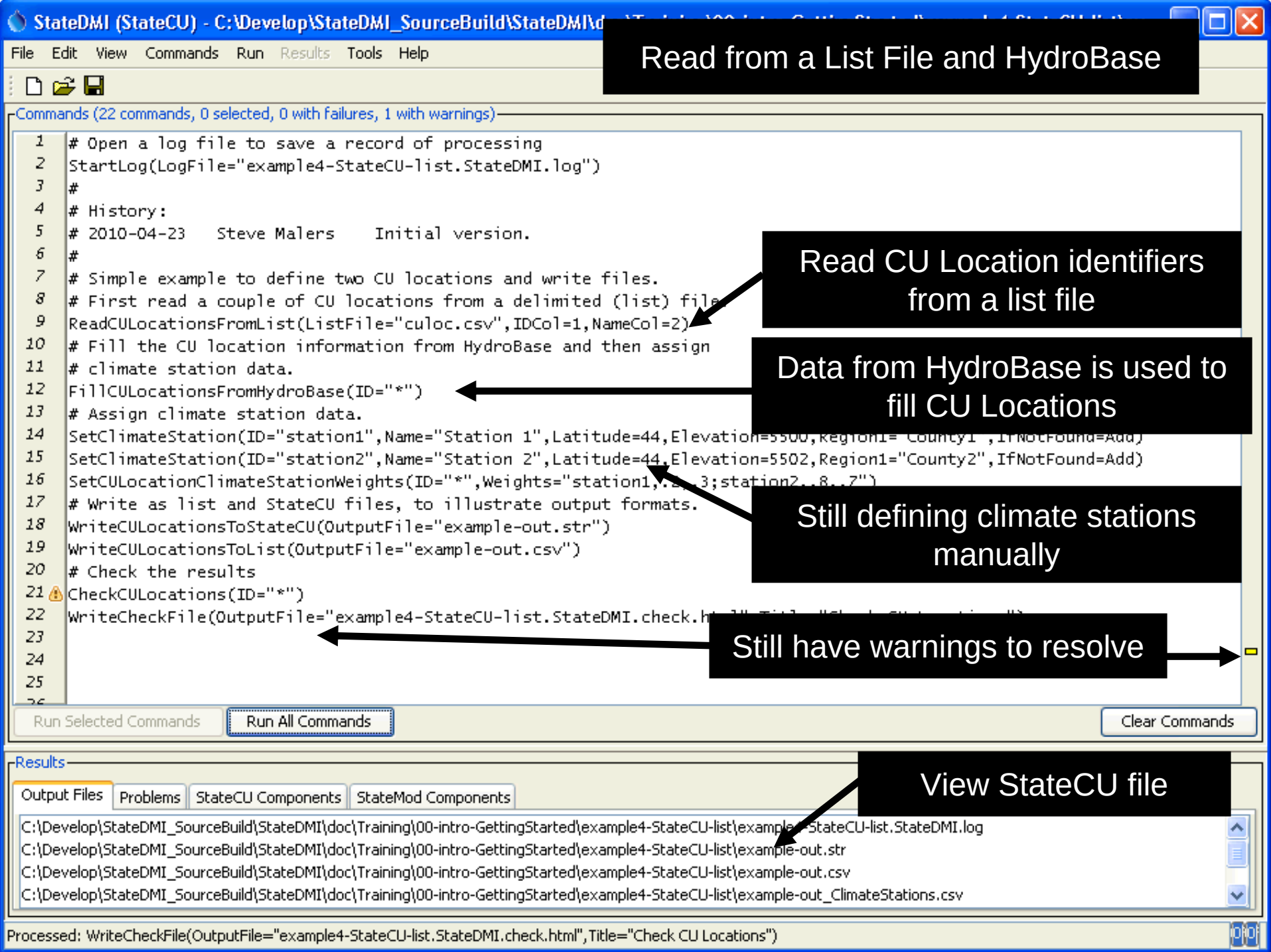
Reading Data from HydroBase

- File…Open…Command File
- Select example3-StateCU-hydrobase.StateDMI)
- Press the Run All Commands button under the command list
- View the output files


StateDMI (StateCU) - C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Traini
File Edit View Commands Run Results Tools Help
Read from HydroBase
Commands (24 commands, 0 selected, 0 with failures, 1 with warnings)
1 # Open a log file to save a record of processing
2 StartLog(LogFile="example3-StateCU-hydrobase.StateDMI.log")
3 #
4 # History:
5 # 2010-04-23 Steve Malers Initial version.
6 #
7 # Simple example to define two CU locations and write files.
8 # First define a couple of locations, in this case using state c
9 # water district identifiers (WDIDs). Other data is fabricated.
10 SetCULocation(ID="2000505",IfNotFound=Add)
11 SetCULocation(ID="2000812",IfNotFound=Add)
12 # Fill the CU location information from HydroBase and then assi
13 # climate station data.
14 FillCULocationsFromHydroBase(ID="*")
15 # Assign climate station data.
16 SetClimateStation(ID="station1",Name="Station 1",Latitude=44,Elevation=5500,Region1="County1",IfNotFound=Add)
17 SetClimateStation(ID="station2",Name="Station 2",Latitud
18 SetCULocationClimateStationWeights(ID="*",Weights="station1,.2,.3;sta
19 # Write as list and StateCU files, to illustrate output formats.
20 WriteCULocationsToStateCU(OutputFile="example-out.str")
21 WriteCULocationsToList(OutputFile="example-out.csv")
22 # Check the results
23 CheckCULocations(ID="*")
24 WriteCheckFile(OutputFile="example3-StateCU-hydrobase.StateDMI.ch
25
Note that only CU Location identifiers are assigned here
Data from HydroBase is used to fill CU Locations
Still defining climate stations manually
Still have warnings to resolve
Run Selected Commands
Run All Commands
Clear Commands
Results
Output Files
Problems
StateCU Components
StateMod Components
View StateCU file
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example3-StateCU-hydrobase\example3-StateCU-hydrobase.StateDMI.log
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example3-StateCU-hydrobase\example-out.str
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example3-StateCU-hydrobase\example-out.csv
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example3-StateCU-hydrobase\example-out_ClimateStations.csv
Processed: WriteCheckFile(OutputFile="example3-StateCU-hydrobase.StateDMI.check.html",Title="Check CU Locations")

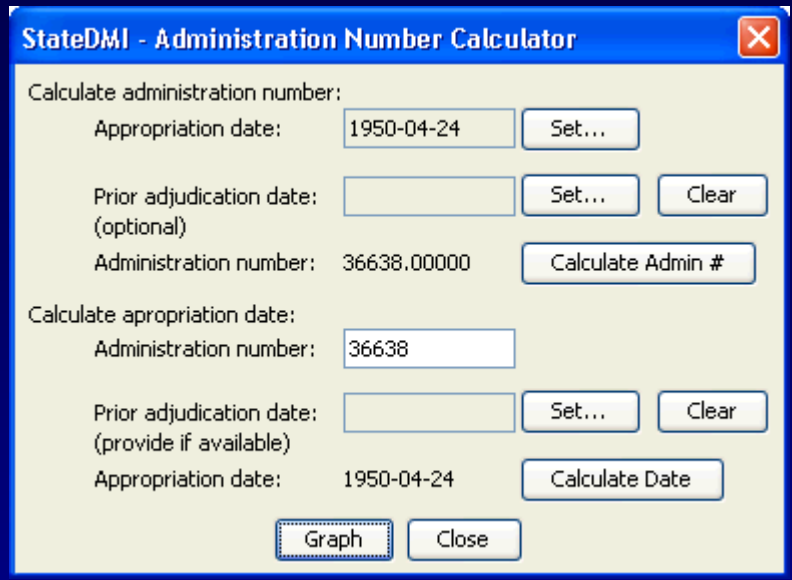
Reading Data from a List File and HydroBase

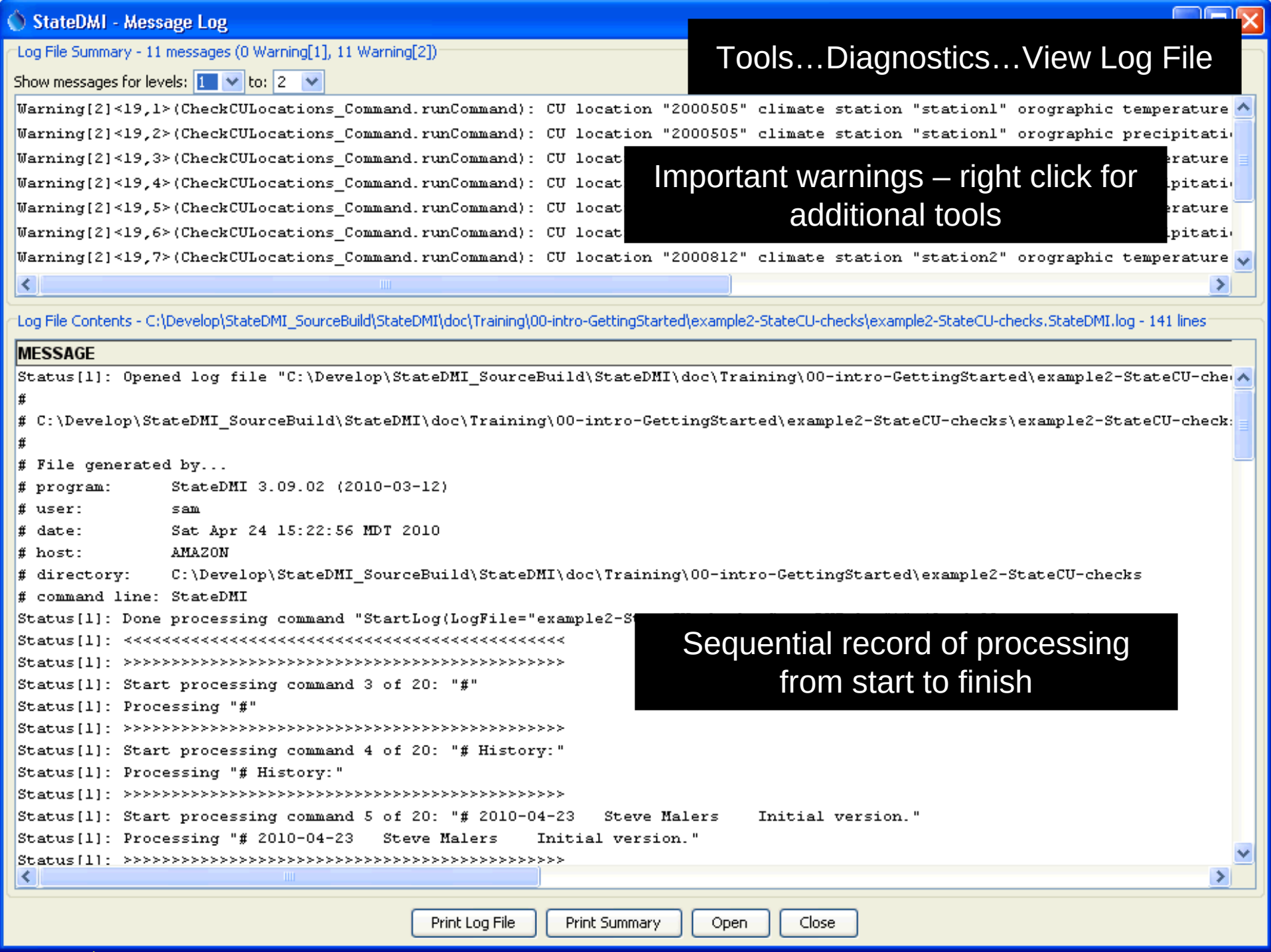
- File…Open…Command File
- Select example4-StateCU-list.StateDMI)
- Press the Run All Commands button under the command list
- View the output files


StateDMI (StateCU) - C:\Develop\StateDMI_SourceBuild\StateDMI\d
File Edit View Commands Run Results Tools Help
Read from a List File and HydroBase
Commands (22 commands, 0 selected, 0 with failures, 1 with warnings)
1 # Open a log file to save a record of processing
2 StartLog(LogFile="example4-StateCU-list.StateDMI.log")
3 #
4 # History:
5 # 2010-04-23 Steve Malers Initial version.
6 #
7 # Simple example to define two CU locations and write files.
8 # First read a couple of CU locations from a delimited (list) file
9 ReadCULocationsFromList(ListFile="culoc.csv",IDCol=1,NameCol=2)
10 # Fill the CU location information from HydroBase and then assign
11 # climate station data.
12 FillCULocationsFromHydroBase(ID="*")
13 # Assign climate station data.
14 SetClimateStation(ID="station1",Name="Station 1",Latitude=44,Elevation=5500,Region1="County1",IfNotFound=Add)
15 SetClimateStation(ID="station2",Name="Station 2",Latitude=44,Elevation=5502,Region1="County2",IfNotFound=Add)
16 SetCULocationClimateStationWeights(ID="*",Weights="station1,.3;station2,.8,.7")
17 # Write as list and StateCU files, to illustrate output formats.
18 WriteCULocationsToStateCU(OutputFile="example-out.str")
19 WriteCULocationsToList(OutputFile="example-out.csv")
20 # Check the results
21 CheckCULocations(ID="*")
22 WriteCheckFile(OutputFile="example4-StateCU-list.StateDMI.check.h
23
24
25
Read CU Location identifiers from a list file
Data from HydroBase is used to fill CU Locations
Still defining climate stations manually
Still have warnings to resolve
Run Selected Commands
Run All Commands
Clear Commands
Results
Output Files
Problems
StateCU Components
StateMod Components
View StateCU file
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example4-StateCU-list\example4-StateCU-list.StateDMI.log
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example4-StateCU-list\example-out.str
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example4-StateCU-list\example-out.csv
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example4-StateCU-list\example-out_ClimateStations.csv
Processed: WriteCheckFile(OutputFile="example4-StateCU-list.StateDMI.check.html",Title="Check CU Locations")

Tools… Administration Number Calculator

- Water right administration number is used by StateMod to allocate water.
- Enter dates and then calculate administration number.
- Or, enter administration number and calculate dates.




StateDMI - Message Log
Log File Summary - 11 messages (0 Warning[1], 11 Warning[2])
Tools…Diagnostics…View Log File
Show messages for levels: 1 to: 2
Warning[2]<19,1>(CheckCULocations_Command.runCommand): CU location "2000505" climate station "station1" orographic temperature
Warning[2]<19,2>(CheckCULocations_Command.runCommand): CU location "2000505" climate station "station1" orographic precipitati
Warning[2]<19,3>(CheckCULocations_Command.runCommand): CU locat
Warning[2]<19,4>(CheckCULocations_Command.runCommand): CU locat
Warning[2]<19,5>(CheckCULocations_Command.runCommand): CU locat
Warning[2]<19,6>(CheckCULocations_Command.runCommand): CU locat
Warning[2]<19,7>(CheckCULocations_Command.runCommand): CU location "2000812" climate station "station2" orographic temperature
Important warnings – right click for additional tools
Log File Contents - C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example2-StateCU-checks\example2-StateCU-checks.StateDMI.log - 141 lines
MESSAGE
Status[1]: Opened log file "C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example2-StateCU-che
#
C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example2-StateCU-checks\example2-StateCU-check
#
File generated by...
program: StateDMI 3.09.02 (2010-03-12)
user: sam
date: Sat Apr 24 15:22:56 MDT 2010
host: AMAZON
directory: C:\Develop\StateDMI_SourceBuild\StateDMI\doc\Training\00-intro-GettingStarted\example2-StateCU-checks
command line: StateDMI
Status[1]: Done processing command "StartLog(LogFile="example2-S
Status[1]: <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
Status[1]: >>
Status[1]: Start processing command 3 of 20: "#"
Status[1]: Processing "#"
Status[1]: >>
Status[1]: Start processing command 4 of 20: "# History:"
Status[1]: Processing "# History:"
Status[1]: >>
Status[1]: Start processing command 5 of 20: "# 2010-04-23 Steve Malers Initial version."
Status[1]: Processing "# 2010-04-23 Steve Malers Initial version."
Status[1]: >>
Sequential record of processing from start to finish
Print Log File
Print Summary
Open
Close

Recommendations for Modelers

- Use best practices for command files.
- Define data once – use HydroBase and list files.
- When creating a new data set, start with command files from existing data sets.
- In all cases, understand the processing logic.
- Build quality control into processing.
- Provide feedback on software, data sets, and documentation to foster continued improvement.

More Information

Help…View Documentation to view the StateDMI documentation.

Basin model documentation describes in detail the sources of data, estimates, and processes that were used to create the data sets, and summarizes results.

Numerous task memoranda, reports, software documentation, and other documents provide technical information and are available on the CDSS web site:

http://cdss.state.co.us (see Products links)