Cumulative and Aggregate Risk Evaluation System

User Guide

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CARES Version 1.0

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Name Change

CropLife America was formerly known as the American Crop Protection Association.

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Chapter 1 – About This Guide

- Welcome
- Version
- Goal
- How the Guide is Organized
- How to Use the Guide
- Online Help
- Conventions

Welcome

Welcome to the Cumulative and Aggregate Risk Evaluation System (CARES). This program provides a user-friendly software environment for conducting discrete or aggregate risk assessment analysis for single chemicals or cumulating results for multiple chemicals having a common mode of toxicity. The program accommodates dietary, residential, and drinking water as sources of exposure. The program also allows the user to conduct a comprehensive suite of contribution, sensitivity, and other data analyses. A unique feature of CARES is the ability to identify and statistically describe exposure contributions across the matrices of source, route, and population sub-group.

Version

This User Guide corresponds to CARES 1.0.

Goal

The standard guide, *Developing User Interfaces for Microsoft Windows* (Everett N. McKay, Microsoft Press; 1999) made the following comments regarding good program interface design. Programs provide features. Users perform tasks. To perform their tasks, users have to understand the program interface enough to translate the tasks into a sequence of steps that will utilize the features offered by the program. The easier it is to translate the tasks, the easier it is to understand and make maximum use of the program.

To perform a task,

- the user needs to identify the right program features,
- determine how to use those features,
- determine how to perform the task using those features,
- correctly predict the outcome off all those actions,
- and see the results.

The goal of this User Guide is to provide a task-oriented description of the operation of CARES patterned after the above five-steps. This is accomplished primarily through the use of detailed, hands-on tutorials.

How the Guide is Organized

This guide is arranged to first introduce you to the fundamental operation and environment of CARES (Chapters 1-4), and then progressively to show you how to use CARES through a series of hands-on tutorials (Chapters 5-10).

Introductory Features

Chapter 2 gives you instructions for installing, uninstalling, and upgrading the CARES application. Chapter 3 gives a brief background of CARES and describes its relation to its architectural parent, Notitia™. Chapter 4 shows you how to start the program and describes the main components and layout of the opening window. The intent here is only to familiarize you with the principal features of the main window. Later chapters provide more detailed descriptions about the purpose and use of many of the features available from the main window. Chapter 4 also comments on the general scheme of saving your projects and data files when working with CARES.

Case Study Tutorials

The case study tutorials (Chapters 5 - 10) guide you step-by-step through a series of hands-on instructions in the use of CARES. The series starts by illustrating how to perform simple, discrete dietary and residential studies, and progresses in complexity to show how to do aggregate and cumulative analyses across both routes of exposure. These tutorials are the central means of illustrating the operation of CARES. They are designed to give you a good grasp of the overall scope and operation of the program. When you have completed the tutorials, you should feel confident to set up and run your own risk assessment projects using CARES. Each tutorial starts with a list of the topics covered. You can refer to these topics or use the Table of Contents as a handy guide when you need to review specific instructions.

How to Use the Guide

You should read and follow the instructions in Chapters 1 through 4 in order to get familiar with the installation, setup, scope, and features of the main window of CARES.

"It is the sum of what you will learn in all the tutorials that will give you the knowledge on how to run any specific type of study."

The Case Study Tutorials (Chapter 5 -10) provide a step-by-step walk-through illustrating the main tasks and options for setting up and conducting dietary and residential, and risk assessments. Working through the tutorials is the easiest and fastest way to be-come familiar with using CARES. The tutorials are written with the first-time user in mind and are designed to lead you to a position of readiness and confidence in putting CARES to work for you.

You should work through each of the five Case Study Tutorials in order. Each chapter includes side ventures that either shows you how to accomplish a particular task or gives details on a topic that is passed over in other tutorials. Regardless of whether your main interest is in dietary or residential risk analysis, you should start your training in CARES by working through the tutorials in the order given.

While at first glimpse it may seem a daunting task to master the intricacies of CARES, you will soon discover that the program uses many common methods to setup, run, analyze, and display data regardless of the type of study being pursued. The repetition that you will find in doing the tutorials will help point out these common features. You will also find excursions in to details germane to any use scattered carefully among the five tutorials, while at other times you will be asked to use defaults without much explanation. It is the sum of what you will learn in all the tutorials that will give you the knowledge on how to run any specific type of study.

Online Help

The printed copy of the User Guide and the main online CARES Help file are designed to share the same content. Using the same content for both types of document allows you to look up and consult specific help topics while you are using CARES and provides the added convenience of having an identical printed copy that you can read and study anytime.

To access the CARES Help file online, click the blue CARES Help button on the main toolbar. In Version 1.0, the CARES Help file is an Adobe Acrobat (pdf file) version of this User Guide and may not be installed yet.

The general Notitia Help file is also supplied with the CARES program. This help document contains additional information about Notitia components present in CARES. Click the yellow help button to open.

In future versions, CARES will provide a variety of addition help aids, including animated tutorials, *in-situ* and context-sensitive help, metadata for file structures, and more.

Discrepancies

The guide was prepared during the final stages of program production. Consequently, small differences between the guide and your version of CARES in terms of described procedures and/or the screen shots may occur. Any such discrepancies are minor and will not interfere with the objective of teaching you how to run CARES.

Conventions

Terminology

- "Click" refers to the use of the mouse to perform an action. Click is the preferred term when referring to selecting or choosing commands, options, and dialog box buttons in procedures.
- "Choose" refers mainly to selecting one of the several options that appear on drop down menus.
- "Right click" refers to using the alternate mouse button, which may be set either as the left or right button on your mouse.
- "Press" refers to a keyboard action.
- "Select" refers to marking text, a cell, or other screen item that will be subject to a subsequent user action. The item appears as highlighted to indicate that it is selected.

Sequences

A sequence of mouse clicks through successive windows or though menus and submenus is denoted with by the symbol: **>** The sequence is also shown in bold type.

For example, **Start > Run > Browse** means click on each named button or command item as they appear, in that order.

Bold Type

Bold type is used whenever we refer to a visible screen element, such as the title of a window, the description of an option, a button, a menu sequence, etc. Bold type is also used for text entries you input..

Tips

TIP …	This example illustrates a tip inserted between paragraphs to provide additional information or insert a comment.

Chapter 2 – Installing CARES

- System Requirements
- Installation Procedure
- Specifying Where to Install the Program
- What is Installed
- Uninstall Procedure
- Reinstalling and Upgrading

System Requirements

It is recommended that your system meet the following *minimum* requirements:

- Pentium PC
- 500 MHz Intel Pentium III processor
- 512 MB installed RAM memory
- Video display capable of 1024 x 768 resolution with at least 256 colors
- 20 GB of free hard disk space
- CD-ROM or DVD drive
- Microsoft® Windows 98 (different versions), ME[1], 2000 (SP2), or XP.

[1]Windows ME has exhibited problems with some of the functionality of CARES and is not recommended.

It is highly recommended that you have Microsoft® Internet Explorer 5.x or higher installed to take full advantage of certain features of the product. If you have less than 512 MB of RAM, you will be unable to run the entire reference population in either a dietary or a residential assessment.

Installation Procedure

If you have a previous version of CARES installed on your computer, uninstall it first. Press **Start > Programs > CARES > uninstall CARES.** Be sure that the Notitia directory is removed before attempting this install.

Insert the CARES CD-ROM in your CD-ROM drive.

1. Click **Start > Run**, then type **x:\dcom.exe** (where x: is the CD-ROM drive letter).
2. Follow setup instructions and reboot if prompted.
3. Click **Start > Run**, then type **x:\mdac.exe** (where x: is the CD-ROM drive letter).
4. Follow setup instructions and reboot if prompted.
5. Click **Start > Run**, then type **x:\jet.exe** (where x: is the CD-ROM drive letter).
6. Follow setup instructions and reboot if prompted.
7. Click **Start > Run**, then type **x:\setup.exe** (where x: is the CD-ROM drive letter).
8. Follow setup instructions and reboot if prompted. Review the next section to specify a specific directory where CARES is installed.

Note: you may receive a warning message indicating that some files could not be registered. This is normal and should be ignored.

Note: older CD-ROMs may hang the system and require a reboot, but with persistence should be able to complete the installation.

Specifying Where to Install the Program

The installation procedure offers you the default directory C:\Program Files\Notitia as the location for the installed program. During the installation procedure, you will be prompted to accept the default location or click the Browse button to navigate to another folder where the program will be installed.

Because of the relatively large amount of disk space required for the CARES program, you may want to install the primary program files at a location other than on your C: drive, such as on a partitioned volume on your hard drive (for example, under D:\Notitia) or on a separate hard drive accessible to your computer. You are free to specify any location where the program is to be installed when prompted. The installation program will automatically install those components required to be in specific Windows and System folders on the C: drive, and then proceed to install the primary program files in the location you specify.

If you later want to change the hard drive location of the primary program, you must uninstall and then reinstall CARES to the new location.

What is Installed

The default installation procedure described above installs the following on your computer:

- The application and its main components in a folder called Notitia located in the directory C:\Notitia, or in a Notitia folder on the drive specified during the installation.

- A desktop icon that provides a quick shortcut for starting the CARES program.

- The Notitia application folder contains several additional folders used by the application whose name and contents are as follows:

Bitmaps	Contains images used in Notitia.
Data Folder	Contains Notitia data files.
User Files	Storage area for user-created files
Functions	Function modules and Help files.
Settings	Contains pre-defined settings.
System	Contains Notitia core files.
Toolbars	Contains settings for Notitia toolbars.
Novs	Contains *.nov files that provide pre-built Canvas setups.

- A Start Menu Program Folder called Notitia located under **Start > Programs** that contains shortcuts to the following:

  CARES Application – shortcut to the CARES program.

  CARES Help – shortcut to the CARES Help application.

  Notitia Help – shortcut to the Notitia Help application.

  Uninstall Notitia – shortcut to the log that initiates the removal of the software from your computer.

Uninstall Procedure

To uninstall CARES:

1. Click **Start > Settings > Control Panel**.
2. Click the **Add/Remove Programs** item.
3. Select '**CARES**' from the list of installed programs.
4. Click **Add/Remove** and follow the directions given in the screen prompts.

Alternately, you can remove the program by clicking **Start > Programs > Cares > uninstall Cares.**

Note: If you have Visual Basic installed on your computer, you should reinstall the **mdac.exe** from your original CARES CD after you uninstall CARES as follows:

Click **Start > Run** and then type **x:\mdac.exe** (where x: is the CD-ROM drive letter).

Reinstalling and Upgrading

To insure a proper installation, you must uninstall any prior version of the software before reinstalling or upgrading to a more recent version. Be sure the Notitia folder and all data inside is completely removed before beginning the new installation.

Chapter 3 – Introduction to CARES

- About Notitia
- About CARES
- CARES and Notitia
- Additional CARES Information

About Notitia

Notitia™ is a scientific data management engine developed to enhance user access to designated databases. The engine is designed to accommodate multiple data sets and potentially uses several analytical tools depending upon the specific database to be accessed. Notitia™ is a user-friendly software environment through which the user can query and perform statistical functions on user-defined data sets, and produce both digital and hard copy results.

Additionally, Notitia™ provides the architecture for the user to couple input databases with data analysis and data management functions. These functions are represented graphically and can be constructed to perform complex interactions using a novel “select-and-connect” approach.

In essence, Notitia™ is a shell application and programming approach that provides the architecture for database-rich programs like CARES to operate within. A distinguishing feature of Notitia™ is its strong use of graphics and icons that serve as visual-mnemonics, assisting with the user mastery and operation of the program. The direct manipulation of graphical elements, especially the construction of data analysis operations by means of select-and-connect actions, provides the user a rich and engaging media for data management and analysis.

About CARES

The Food Quality Protection Act of 1996 mandates that the US Environmental Protection Agency consider both aggregate and cumulative risks. Aggregate assessments account for multiple sources and routes of exposure for a single chemical. Cumulative assessments combine exposures to two or more chemicals that share a common mechanism of toxicity. A stand-alone, comprehensive computer program is needed to perform the mandated assessments. The Cumulative and

Aggregate Risk Evaluation System (CARES) was developed through a cooperative effort of stakeholders, including government, industry, and academia to address this need.

CARES utilizes currently accepted and other relevant databases to evaluate potential risk from dietary, drinking water, and residential sources. Risks can be calculated deterministically for Tier 1 screening, and probabilistically using Monte Carlo simulation of individuals for higher tier analyses. CARES allows users to estimate doses and risks from acute, short term, intermediate duration, and lifetime exposures. A unique feature of CARES is that it allows a risk manager to interactively query the program identify the factors contributing to the highest percentiles of risk. CARES is user-friendly, fast, intuitive, easy to use, and capable of providing accurate and reliable tabular and graphical reports.

CARES and Notitia

The CARES program is provided as a Notitia™ application. In other words, CARES is a self-contained database-simulation program designed to run within the Notitia™ programming framework. In itself, CARES is a modular program with flexible connections to external databases, but it is constructed to conform specifically to Notitia's coding methods and to make use of Notitia's graphical interface.

It is possible for other, independent programs to be maintained and run under the Notitia™ umbrella. Thus, when we take a closer look at CARES we will see that hierarchically it ranks as a data sub-set of Notitia™ and can coexist with any number of other applications designed to take advantage of the Notitia architecture and graphical approach.

Additional CARES Information

The **CARES 1.0 Technical Manual** (2002) contains detailed descriptions of the operation, assumptions, algorithms, and features for each major module and should be viewed as a companion document to this User Guide.

A preview of the **CARES 1.0 Code Manual** (2002) is available. When comp-leted, it will provide for inspection of the underlying code, assumptions, methodology, and algorithms used in CARES, which will facilitate both QA code inspection and continued testing and improvement.

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Chapter 4 – Getting Started with CARES

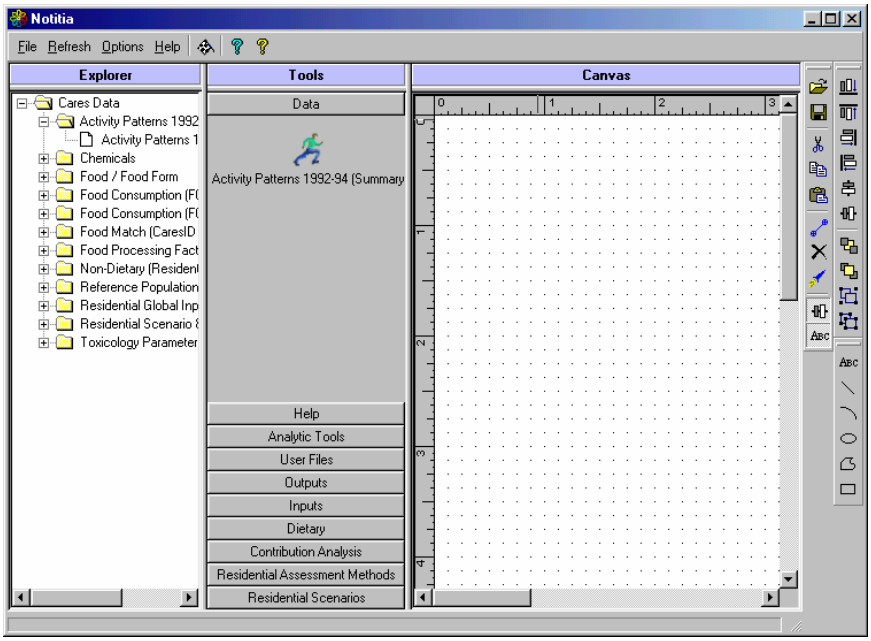
- To Start CARES
- The Main CARES Window
- Title and Menu Bar
- Toolbars
- Toolbar Buttons
- Work Panes
- Adjusting the Main Window
- Naming and Saving Files

Starting CARES

To start CARES, double-click the CARES shortcut icon, if it is located on your desktop. Alternately, click **Start > Programs > Notitia > CARES**.

The Main CARES Window

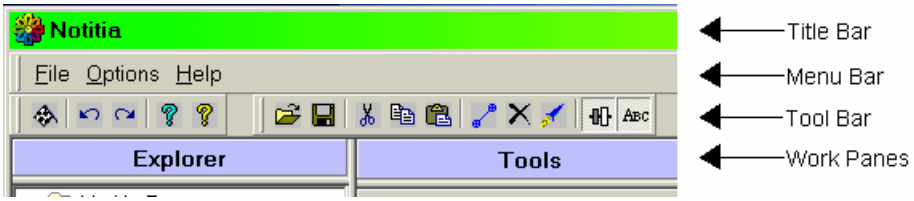
When CARES starts, it opens to the main window similar to the following:



The purpose of this section is to familiarize you with the components and layout of the main CARES window since this will be your starting point every time you launch CARES. You will have opportunity to learn more about the purpose and use of the window items and buttons in later chapters.

Title and Menu Bar

The first three bars in the main window consists of the following standard Windows items. The title bar and menu bar are discussed in this section, and the tool bars and work panes are described later.



Title Bar

The title bar always carries the Notitia symbol and name. Many programs display the name of the open file or project in the title bar. However, CARES may handle numerous files during any single run and these are viewed and handled more conveniently using the Explorer pane as described below. The three icons on the right side of the title bar (not shown) perform the standard minimize, maximize, and close (exit) functions. The color of the title bar will vary according to the user's setup.

Menu Bar Items

The menu bar contains four drop-down menu items and three standard buttons:

- **File Menu**

  Open Tool Bar Layout

  Opens the Open dialog windows for you to choose and load a pre-saved Toolbar Layout file. Opening a Toolbar Layout file restores the arrangement of toolbars on the main CARES window to the positions they were in when the file was created.

  Save Tool Bar Layout

  Opens the Save As dialog window for you to create a file name and save a Toolbar Layout file with a *.tlo extension. choose and load a pre-saved Toolbar Layout file.

  Exit

  Terminates the CARES program.

- **Refresh Menu**

Refresh Data Librarian

CARES maintains a function library file, called the Librarian, which keeps track of changes in data files, such as the addition or removal of files. When you first install Notitia, the Librarian is automatically updated. This is the only time this function is automatic. If changes are made in the data at any time after installation of the Notitia software, the program must be manually updated using this menu option (or corresponding button).

Refresh Userfiles Librarian

CARES maintains a user library file that keeps track of changes in data files prepared or modified by users. The user library file is automatically loaded when CARES starts. If you create or modify user files during your session, you need to manually refresh the user library file using this menu item (or corresponding button).

Refresh Settings Librarian

CARES maintains a setting library file keeps track of changes in all the settings you establish when your run a particular exposure module. Use this option to insure all the available files are registered for display.

Refresh Function Librarian

CARES maintains a library of all the functions and algorithms used by the program. If you add or alter a function, use this option to refresh the registration of available functions.

- **Options Menu**

Splash Screen

Choose this item to turn on (checked) or off the animated clip that appears when CARES is started.

- **Help Menu**

Contents…

Opens the Notitia General Help file at the Contents tab.

Index…

Opens the Notitia General Help file at the Index tab.

Search…

Opens the Notitia General Help file at the Search tab.

About CARES

Opens a graphic with CARES credits and version.

Toolbars

The main CARES window contains four toolbars whose purpose and contents are described as follows:

Menu Toolbar

Contains three buttons residing in the Menu Bar. Unlike the other toolbars, this toolbar is fixed in the Menu Bar and cannot be moved or docked. Also, the other tool bars cannot be added to the Menu Bar, but they can be docked above or below it.

	Close Application
	Display Notitia Meta Help
	Display Notitia General Help

Diagrammer (Canvas) Toolbar

Contains buttons that perform specific tasks with the Canvas, such as loading a new Canvas (*.nov) file, running an exposure module, and more. The following indicates the function of each button on the Diagrammer toolbar:

	Open .NOV File
	Save .NOV File
	Cut to Clipboard
	Copy to Clipboard
	Paste from Clipboard
	Link Components
	Delete Selected Items
	Run Canvas
	Show/Hide Alignment Toolbar
	Show/Hide Annotation Toolbar

Alignment Toolbar

Contains buttons that assist you with aligning objects on the Canvas background. The following indicates the function of each button on the Alignment toolbar:

	Align Bottom
	Align Top
	Align Right

	Align Left
	Align Center
	Align Middle
	Send to Back
	Bring to Front
	Group
	Ungroup

Annotation Toolbar

Contains buttons that allow you to do basic drawing functions on the Canvas background. The following indicates the function of each button on the Annotation toolbar:

ABC	Draw Text
	Draw Line
	Draw Arc
	Draw Ellipse
	Draw Polygon
	Draw Rectangle

Blank Toolbar

Blank toolbar that serves as a starting point for creating your own set of buttons on a custom toolbar.

Toolbar Operations

All of the toolbars are *moveable* and *dockable*. That is, you can move any toolbar to any position you want on the main window, or you can drag it close to either the top or the right side of the main window and it will automatically align itself there. You can also stack toolbars side-by-side or end-to-end.

To move a toolbar, place the mouse pointer over one end until the pointer changes to the four-arrow move shape. Then click on the toolbar at drag it to the position or side you choose. To dock a toolbar that is positioned over the screen, point to the title bar and drag the toolbar to its new location.

Right click on any tool bar will open a selection list for you to specify which toolbars are visible. As mentioned previously, the **File** menu contains options for saving or loading layout arrangements of the toolbars.

Work Panes

The three main work areas of CARES are the Data Explorer, Tool, and Canvas sections. These are arranged from left to right corresponding to the normal order that they are called into use.

Explorer

You will enter the program through the **Explorer**. Expand the tree in the **Data Explorer** (left window) to find the data file (extension: .not) you wish to open. Selecting a folder in the **Explorer** will display its contents as icons on the **Tools** pane (the gray portion of the window to the right of the **Explorer**). Click the icon that corresponds to the file you wish to view. A display window will open showing the requested data file.

If you do not see the file you need in **Tools**, press the Refresh Librarian button and tell the system to scan the directory in which that file resides.

Tools

The **Tools** drawer is the center gray portion of the **Data Explorer** window. It displays category icons that allow the user to access data sets, analytic tools for specific data sets, and **Canvas** functions. When you have selected a folder in the **Explorer**, the contents of that folder will appear as icons in **Tools** under the 'Data' tab.

Canvas

The far right window of the **Data Explorer** displays the **Canvas**. You will bring icons onto the **Canvas** (from **Tools**), create user specific settings, and link functions to run models.

Tool Tabs (Drawers) and Contents

Tools acts as a storage location from which the user can access data files, help files, analytic tools, inputs and function modules. The first four tabs (Data, Help, Analytic Tools and User Files) contain data specific to the Explorer. When a file is selected in the Explorer, these tabs will update and display data specific to that selection. The remaining tabs contain data and tools related to the Canvas and its operations.

Sometimes the tabs in the Tool section are referred to as tool drawers since they behave as such.

The following table describes the contents of each Tool tab, showing the icon along with its tool tip name and a description of its purpose or use:

	Tool Tip or Icon Name	Description
Data		
	Activity Patterns 1992-94 (Summary)	Data file related to activity patterns data from EPA's NHAPS
	Chemicals	Data file containing a list of chemicals based on CAS number
	Food / Food Form	Data file containing food codes and their descriptions based on FCID organization
	Food Consumption (FCID)	Data file containing FCID based food consumption data
	Food Match (CARES + FCID) (all months)	Data file that indicates the 365-day food consumption profiles for the CARES reference population; provides day-to-day matching between CARES IDs and FCID IDs
	Food Processing Factors	A preliminary data file that contains processing factors for foods and their food forms
	Reference Population (Reduced)	Data file that contains CARES reference population descriptions for 100,000 people
	Residential Global Inputs	Data file that contains global input parameters for the residential exposure algorithms
	Residential Scenario List	Data file that lists all the scenarios in the residential modules
	Residential Scenario Probabilities	Data file that lists the probability of occurrence of scenarios in the residential modules
	Residential Product List	Data file that contains a list of the products and their associated scenarios in the residential modules
	Toxicology Parameters	Data file that contains toxicological parameters for the chemicals in the "Chemicals" data file
	Water Consumption (FCID)	Data file that contains FCID based water consumption data
	Water Residues	Data file that contains residue data in water
Help		
	Help	Access help on the data file
Analytic Tools		
	Analytic Tools	Access to analytic tools specific to the selected dataset (not available for all datasets)
User Files		
	User Files	Represents files the user has created relative to a dataset.
Outputs		
		Not implemented yet
Inputs		
	Chemical Selector	Module that allows selecting one or more chemicals in an exposure analysis
	Pathway Selector	Module that allows selecting one or more exposure pathways in an exposure analysis
	Population Selector	Module that allows selecting a sub population in an exposure analysis
	Run Specifier	Module that accepts user identification information in an analysis
	Food Selector	Module that allows selecting foods of interest in a dietary exposure analysis
	Scenario Selector	Module that allows selecting appropriate scenarios in a residential exposure analysis

	Water Selector	Module that allows selecting water category in a drinking water exposure analysis
Dietary		
	Food Match	Module that allows selecting food matching (consumption data with residue data) in a dietary exposure analysis
Contribution Analysis		
	Contribution Analysis	Module that allows viewing exposure analysis output data to determine contributing factors
Residential Assessment Methods		
	Dermal 101 Unit Exposure	Residential exposure assessment module; applicator exposure; dermal
	Dermal 102: Unit Exposure, Amount of Formula Used	Residential exposure assessment module; applicator exposure; dermal
	Dermal 103: Transfer Coefficient (Residue)	Residential exposure assessment module; post application exposure, dermal
	Dermal 104: Transfer Coefficient (Area Treated)	Residential exposure assessment module; post application exposure; dermal
	Dermal 105: Transfer Factor (Residue)	Residential exposure assessment module; post application exposure; dermal
	Dermal 106: Transfer Factor (Area Treated)	Residential exposure assessment module; post application exposure; dermal
	Dermal 107: Fraction Transferred	Residential exposure assessment module; post application exposure; dermal
	Dermal 108: Flux Rate	Residential exposure assessment module; post application exposure; dermal
	Dermal 109: Water Concentration	Residential exposure assessment module; post application exposure; dermal
	Dermal 110: Film Thickness	Residential exposure assessment module; post application exposure; dermal
	Ingestion 101: Granules/Pellets (Formulation)	Residential exposure assessment module; post application exposure, ingestion
	Ingestion 102: Grass/Plants	Residential exposure assessment module; post application exposure, ingestion
	Ingestion 103: Soil	Residential exposure assessment module; post application exposure, ingestion
	Ingestion 104: Paint Chips	Residential exposure assessment module; post application exposure, ingestion
	Ingestion 105: Water Concentration	Residential exposure assessment module; post application exposure, ingestion
	Ingestion 106: Flux Rate	Residential exposure assessment module; post application exposure, ingestion
	Ingestion 107: Mass Balance	Residential exposure assessment module; post application exposure, ingestion
	Ingestion 108: Fraction Transferred	Residential exposure assessment module; post application exposure, ingestion
	Ingestion 109: EPA SOPs Method	Residential exposure assessment module; post application exposure, ingestion
	Inhalation 101: Unit Exposure, Area Treated	Residential exposure assessment module; applicator exposure; inhalation
	Inhalation 102: Unit Exp., Amount of Formula Used	Residential exposure assessment module; applicator exposure; inhalation
	Inhalation 103: Air Concentration, Specified	Residential exposure assessment module; post application exposure; inhalation
	Inhalation 104: Air Concentration, Calculated	Residential exposure assessment module; post application exposure; inhalation
Residential Scenarios		
	Residential (Lawn Care) Selector	Residential exposure route-specific assessment method selector module
	Residential (Tree Care) Selector	Residential exposure route-specific assessment method selector module
	Residential (Vegetable Garden Care) Selector	Residential exposure route-specific assessment method selector module

	Residential (Ornamental Plant Care) Selector	Residential exposure route-specific assessment method selector module
	Residential (Pick Own Fruits/Vegetables Care) Selector	Residential exposure route-specific assessment method selector module
	Residential (Crack Crevice Treatment Care) Selector	Residential exposure route-specific assessment method selector module
	Residential (Termite Control Care) Selector	Residential exposure route-specific assessment method selector module
	Residential (Rodent Control) Selector	Residential exposure route-specific assessment method selector module
	Residential (Pet Care) Selector	Residential exposure route-specific assessment method selector module
	Residential (Outdoor Fogger Use) Selector	Residential exposure route-specific assessment method selector module
	Residential (Indoor Fogger Use) Selector	Residential exposure route-specific assessment method selector module
	Residential (Indoor Treatment) Selector	Residential exposure route-specific assessment method selector module
	Residential (Paint/Wood Treatment) Selector	Residential exposure route-specific assessment method selector module
	Residential (Impregnated Material) Selector	Residential exposure route-specific assessment method selector module
	Residential (Detergent/Handsoap Use) Selector	Residential exposure route-specific assessment method selector module
	Residential (Swimming Pool Care) Selector	Residential exposure route-specific assessment method selector module
	Residential (Custom) Selector	Residential exposure route-specific assessment method selector module
	Residential (Golf Course) Selector	Residential exposure route-specific assessment method selector module
	Residential (Public Health) Selector	Residential exposure route-specific assessment method selector module
	Event Allocation	Residential exposure event allocator module for selected scenarios
	REx Accumulator	Module that accumulates route-specific outputs within a residential scenario
Drinking Water		
	Water Match	Module that allows selecting water matching (consumption data with residue data) in a water exposure analysis

Adjusting the Main Window

In addition to moving and docking toolbars, there are other ways you can change the viewable area of the main window. You can maximize the window to the full size of your monitor by clicking the maximize button on the right of the title bar. Reverse this action by clicking the same button that is now called the restore button. Alternately, resize the window to any size you want by clicking and dragging on the bottom right corner.

The width of each of the three work panes can be adjusted by moving the mouse pointer along the side until it turns to a double arrow pointer, then drag the window pane left or right to change its width.

Handling System and User Files

Data file management is one of the power features that CARES brings to risk assessment. Running a simple dietary or residential exposure assessment will normally involve creating or using half-dozen or more files. These range from saving user-defined subsets of the Reference Population, opening previously built consumption files, importing residue data, to saving analytical output files and others.

CARES makes extensive use of the Explorer pane to track and retrieve such files. Also, at various stages during the set up of risk assessments and analyses, you will use the Open dialog box to retrieve and/or name and save files needed for your run.

The Case Study Tutorials provide specific instructions for naming, saving, and retrieving system and user files in the course of performing a risk assessment.

Because CARES requires a multiple file management approach, the current version, at least, does not provide a global type of file save function. In other words, you will not find a feature to save your project run like you would save a Word document for later use. Nonetheless, CARES does provide a framework for saving and retrieving files, settings, and setups that allow you to recreate a study in progress, precisely repeat an analysis previously conducted, and modify and capture changes on the fly with the assurance of safe and efficient file management.

Chapter 5 – Introduction to the Case Study Tutorials

- Purpose
- Description
- Screen Shots

Purpose

The following five chapters contain a set of five case study tutorials. These are intended to be the primary instructions on how to use and make use of CARES for conducting dietary, residential, and drinking water risk assessments, including aggregation over exposure routes and sources and cumulative assessment of chemicals having a common mechanism of toxicity.

Description

The tutorials are self-tutoring, providing step-by-step instructions on running CARES. You should allow about one hour to run through each the first time. Other than saving some of the files you will create during each run, there is no provision in the current version of CARES to pause and retain all of your setup, source data, and interim settings information. Therefore, you should plan on running through each tutorial in a single sitting. Should you wish to repeat a tutorial, simply start from the beginning and follow the instructions afresh. You will soon discover the basic actions for running CARES and the features common to all exposure sources, which will make re-running a tutorial a much briefer activity.

The five case studies used in the tutorials are based on real and realistic data sets but use two fictitious chemicals called Safethrin (S) and Wobegon (W). The case studies cover dietary and residential as the two primary routes of exposure. They are also set up so as to teach you first how to do discrete exposure runs, with the final tutorial illustrating how to explore currently available contribution and sensitivity analyses.

The following list summarizes the scope of each case study:

Case 1:	Dietary I	One Food / Food Form Group
Case 2:	Dietary II	One Food / Food Form Group
Case 3:	Residential I	One Scenario
Case 4:	Residential II	Two Scenarios
Case 5:	Dietary plus Residential CSU	Two Foods with Food Forms Three Scenarios, Two Chemicals

As indicated, the case studies become progressively more complicated in terms of the number and type of assessments they encounter. This, in turn, allows for a progressive exploration of the data analysis options beginning with discrete, then aggregate, cumulative, and finally aggregate plus cumulative data analyses.

Two instructional methods are used in the tutorials. The most common method is simply to “follow along” performing the actions as described and illustrated. An example of this method is instructions showing you how to open a pre-built Canvas file ready for use.

In contrast, the second type of instructional method is aptly referred to as “do-it-yourself.” In this case, the instructions describe how to create a file or do something on your won, rather than rely on pre-built files and defaults. An example of the “Do-it-Yourself” method would be to have you create a Canvas file by dragging, dropping, and connecting objects on the Canvas, then saving it to disk, in contrast to being instructed to find and load a pre-built Canvas file.

The Case Study Tutorials are subdivided into sections. Each section covers a series of steps needed to perform a specific task or reach a goal along the path of performing a complete study assessment. The section descriptions are given at the beginning of each chapter and serve two purposes. First, they provide an overview of the main steps needed to run CARES for a particular type of analysis. Second, they serve as a handy reference for locating instruction for specific tasks.

Each Case Study Tutorial chapter begins with a table that summarizes the setup to be used for each module encountered in the running the tutorial. “Do-it-yourself” tasks are highlighted in the Description column of these tables.

Screen Shots

The screen shots and procedures described in the Case Study Tutorials were prepared during the final stages of development of CARES version 1.0. There may be some small differences between what you see in the program and the screen shots in the tutorials; however, the tutorial instructions will in any case accurately guide you through the procedures.

Chapter 6 – Tutorial 1: Dietary I

- Case Study Tutorial 1 - Summary
- Open Canvas File
- Specify the Run
- Define Sub-Population
- Select Sub-Population
- Select Chemical
- Setup Dietary Data Inputs
- Save Run Settings
- Run Dietary Module and View Results
- Conduct Data Analysis

Case Study Tutorial 1 — Summary

The following Table summarizes the main features of this Case Study Tutorial. The Module column indicates the applicable CARES module addressed. The Description column describes how you will do the various tasks or options within the module. Shaded description cells indicate "do-it-yourself" type tasks that provide additional detail into program use, rather than using pre-built files or default parameters.

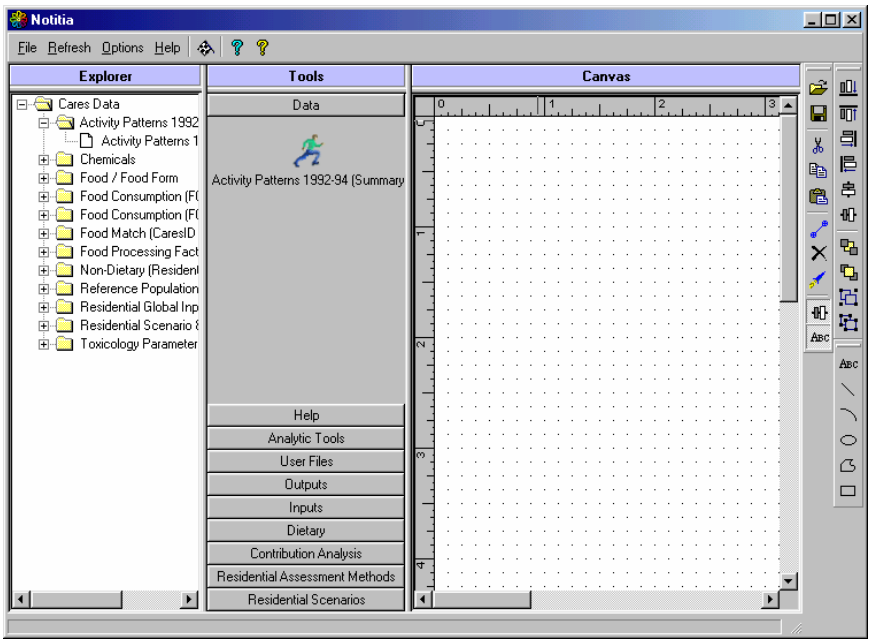
Module	Description
Canvas	Use pre-built Canvas file
Population	Subset and select sub-population
Chemicals	Safethrin
Food/Food Form	Create file of following Food/Food Forms: Tomatoes, Fruit Tomatoes, Paste Tomatoes, Puree
Consumption	Select above tomatoes list
Residue	Open residue file for tomatoes Use default Fraction Crop Treated
Toxicology	Use defaults
Data Analysis	Plot individual exposure profiles

Open Canvas File

TIP …	Allow at least a couple of hours to cover this tutorial. Some of the data sets you will encounter are purposfully large enough to be realistic, and may require from 15-90 minutes to process, depending on the speed of your computer. If you do get interrupted or need to pause, either start from scratch when you return or leave the computer running. If you follow this first tutorial carefully, you wil know 100% more about running CARES than you do now, and you will cover about 70% of what CARES does. So make it a good investment of your time. *Bon voyage. Gutte Reise.*

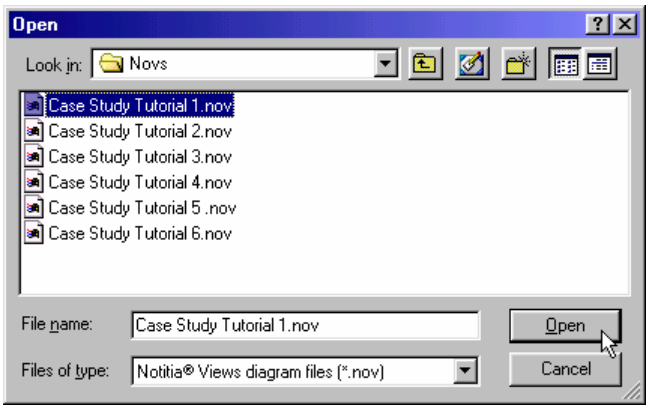
Begin this tutorial by starting CARES from scratch. To start CARES, double-click the CARES shortcut icon, if it is located on your desktop. Alternately, click **Start > Programs > Notitia > CARES**.

The main CARES window appears as follows:



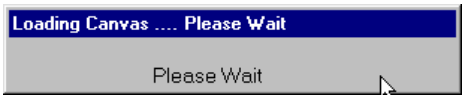
Click on the **Open NOV File** button located on the **Diagrammer** toolbar.

The standard Windows Open dialog box will appear as illustrated below:

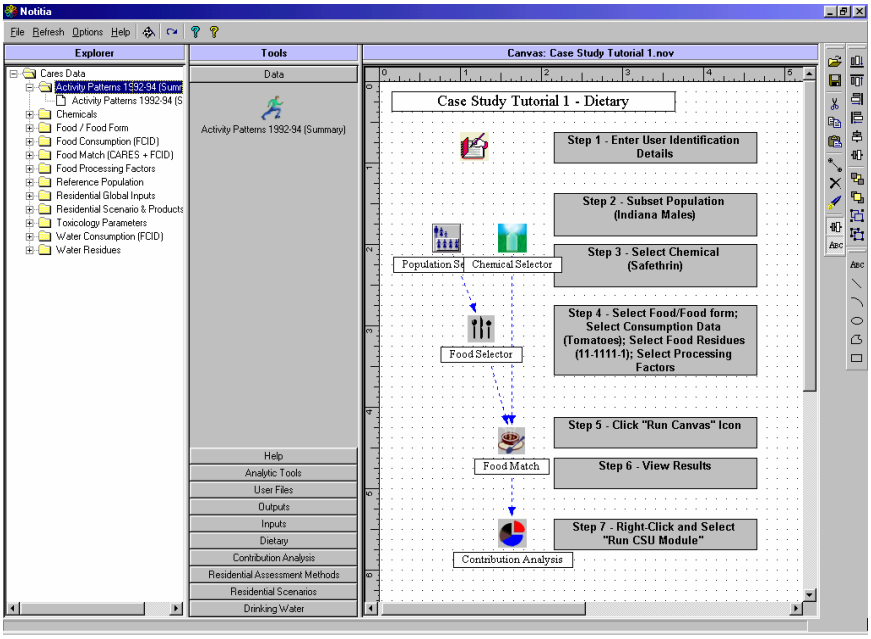


Note that the default location for the **Look in:** field is the Novs folder in the Notitia directory. If your Open window differs from that above, you will need to navigate to the Novs Folder, which is located in your Notitia directory (c:\notitia\novs). Files with the *.nov extension are used to capture and redisplay a pre-built Canvas setup. For this tutorial, select the file named **Case Study Tutorial 1.nov** then click **Open**.

After clicking the **Open** button, the system will respond with the following dialog indicating that the ***.nov** file is loading:



When finished, the Canvas will look like this:



You may need to resize the window or adjust the view in the Canvas pane with the scroll bars to view the whole Canvas.

The Canvas contains a number of icons representing the various CARES modules and components needed to perform a dietary risk analysis. You will learn more about how to prepare a Canvas diagram of this type and save it in Tutorial 2.

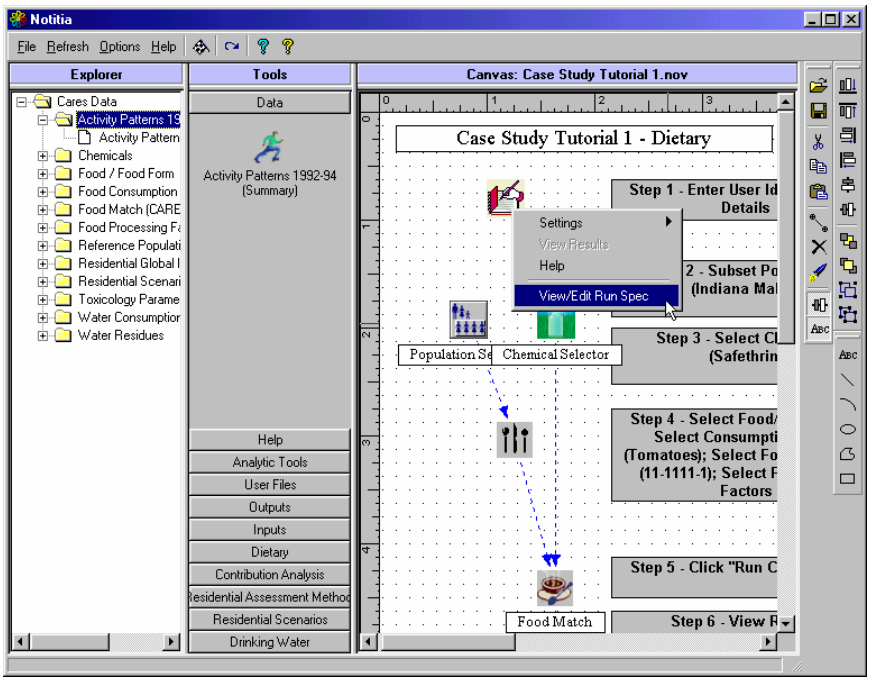
In addition to the module icons, this tutorial Canvas also illustrates the series of steps used to set up and run a dietary analysis, as followed in this tutorial.

When a Canvas file first opens, the name of each component appears in a box beneath it. The first time you pass the cursor over this name box, it disappears and remains hidden. To view the name again, place the cursor over the component and the box will reappear until the cursor is moved away.

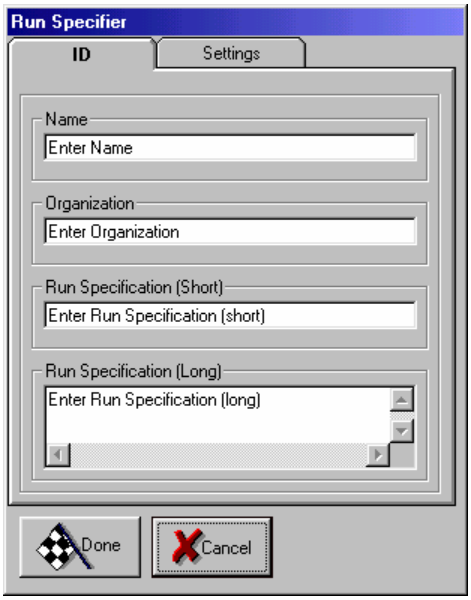
Note that the module icons respond to mouse clicks in two specific ways. First, if you simply click on an icon, it will become selected as indicated by the selection box appearing around the icon. In this mode, you can move the icon to another position on the Canvas and the connections, if any, will remain intact. Thus, clicking on a module icon simply allows you to move it. To perform an operation with a module or other component icon, you must *right click* on it to display a list of available action options. This operation is illustrated next.

Specify the Run

Right click on the **Run Specifier** icon to open a context menu list. Then select the **View/Edit Run Spec** menu option as illustrated:



The **Run Specifier** window will open as follows:



The **ID** tab in the **Run Specifier** window provides default instructions for each of the entry fields available for you to enter details describing this particular run. The **Settings** tab, which we shall use later, provides the options for saving all the module settings associated with this particular instance of a Canvas NOV file.

The logical use of the **Run Specifier** is as follows:

1. Start the **Run Specifier** and open to the **ID** tab. Fill in the identification information for the current run. Then click OK to close the window.
2. Continue applying the settings for each module or component on the Canvas.
3. Before clicking the **Run Canvas** button, return to the **Run Specifier** and open the **Settings** tab where you will find options to save the module settings you just established. The information on the **ID** tab is saved along with these settings to a file that you name.

For now, fill in the four information fields in the **ID** tab of the **Run Specifier** window with some appropriate identifying text, and then click **Done** to close the window. We will return to the **Run Specifier** to save the settings later.

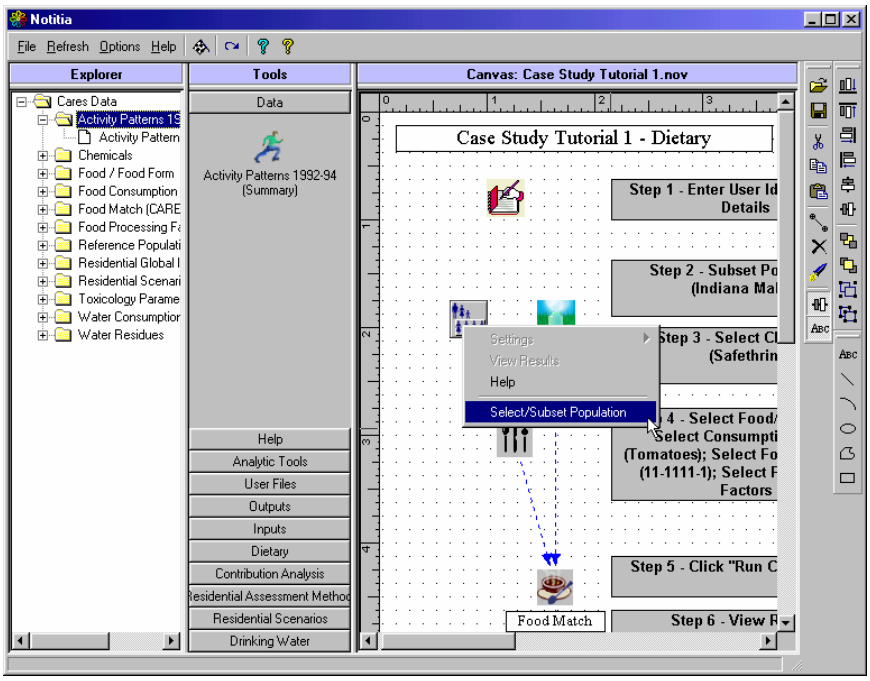
TIP …	Note that using the **Run Specifier** is a required step, even though you may not intend on reusing the settings in a future run. Its main advantage is that it *will* save you the time of redoing all the settings if you do decide to reload the same Canvas NOV file.

Define a Sub-Population

CARES uses a Reference Population of 100,000 people that is statistically representative of the total US population. You will start by creating a sub-population consisting of males in the state of Indiana to use in this dietary assessment tutorial.

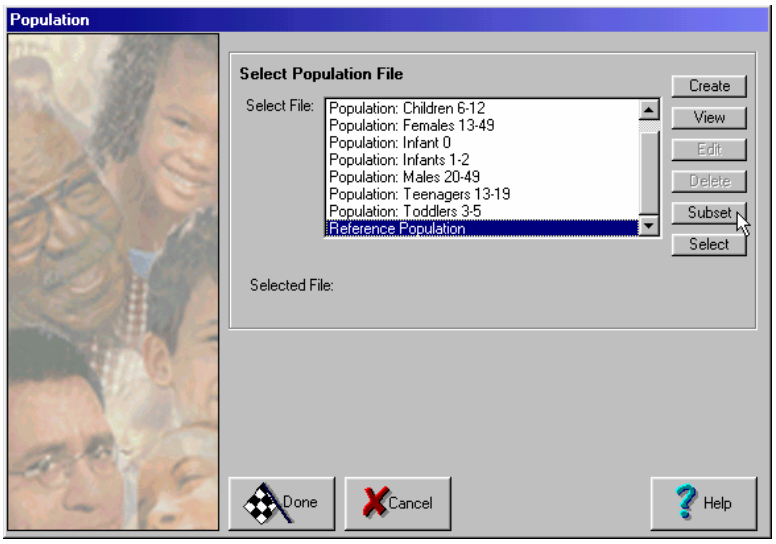
The actions and options available for all component and module icons on the Canvas are found in the menu that appears when you right click on the icon.

Right click on the **Population Selector** icon to view the context-sensitive sub-menu options as follows:



Click the **Select/Subset Population** menu option at the bottom of the context menu.

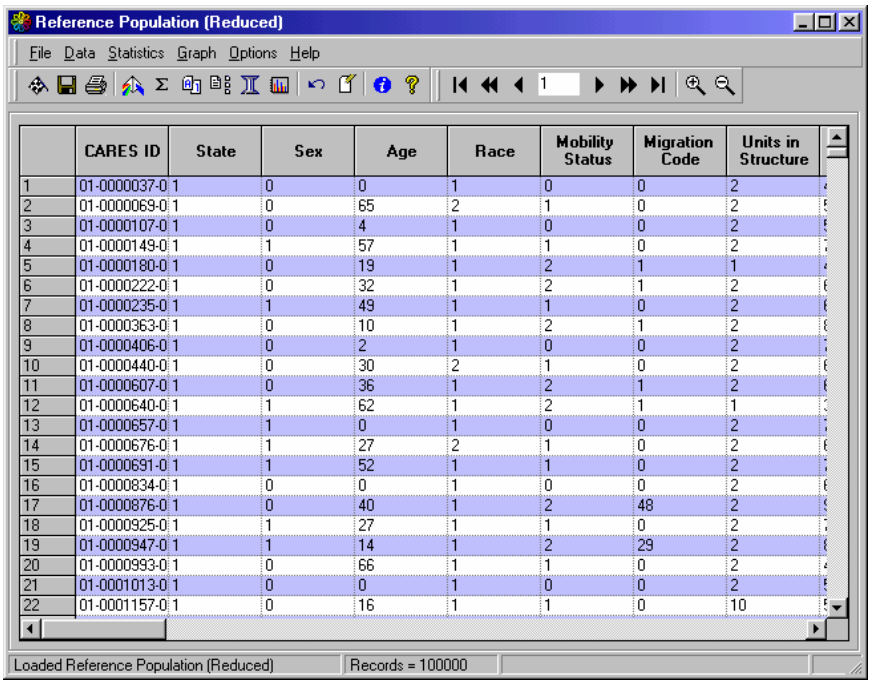
The Population Selector window will open as follows:



Note that there are several population subsets already available for use. To create your own Indiana Males sub-population, scroll to the bottom of the list and select the **Reference Population** file as shown above.

Click the **Subset** button.

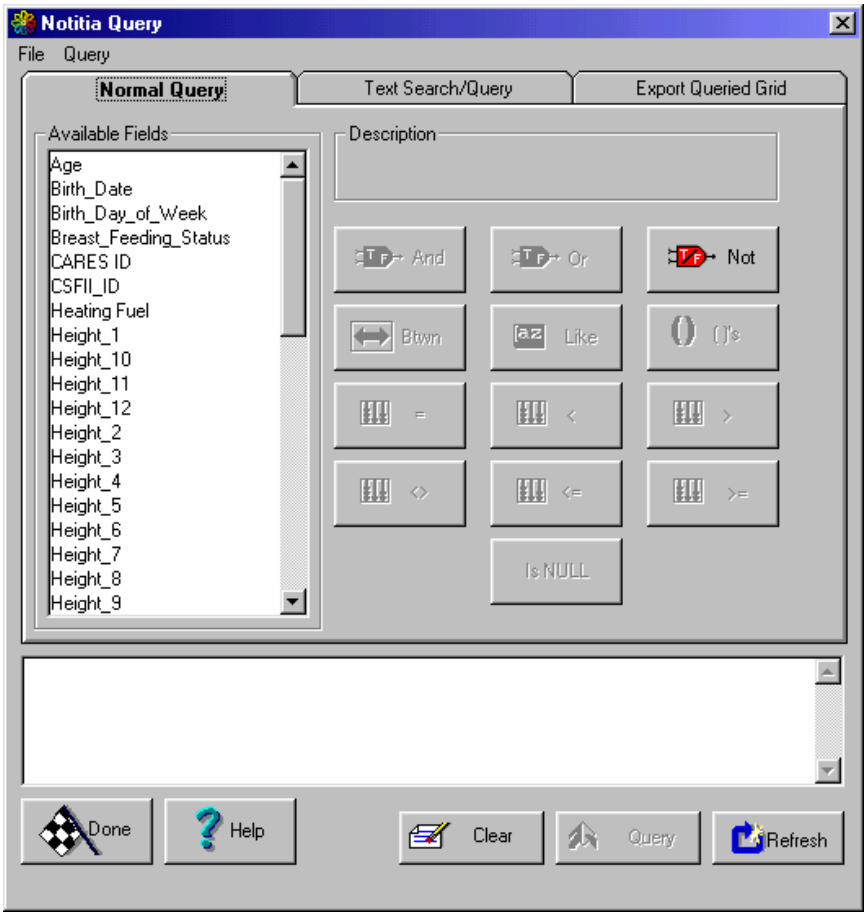
This will open what in CARES is called a **Data Grid** showing the contents of the data file as follows:



	CARES ID	State	Sex	Age	Race	Mobility Status	Migration Code	Units in Structure
1	01-0000037-0	1	0	0	1	0	0	2
2	01-0000069-0	1	0	65	2	1	0	2
3	01-0000107-0	1	0	4	1	0	0	2
4	01-0000149-0	1	1	57	1	1	0	2
5	01-0000180-0	1	0	19	1	2	1	1
6	01-0000222-0	1	0	32	1	2	1	2
7	01-0000235-0	1	1	49	1	1	0	2
8	01-0000363-0	1	0	10	1	2	1	2
9	01-0000406-0	1	0	2	1	0	0	2
10	01-0000440-0	1	0	30	2	1	0	2
11	01-0000607-0	1	0	36	1	2	1	2
12	01-0000640-0	1	1	62	1	2	1	1
13	01-0000657-0	1	1	0	1	0	0	2
14	01-0000676-0	1	1	27	2	1	0	2
15	01-0000691-0	1	1	52	1	1	0	2
16	01-0000834-0	1	0	0	1	0	0	2
17	01-0000876-0	1	0	40	1	2	48	2
18	01-0000925-0	1	1	27	1	1	0	2
19	01-0000947-0	1	1	14	1	2	29	2
20	01-0000993-0	1	0	66	1	1	0	2
21	01-0001013-0	1	0	0	1	0	0	2
22	01-0001157-0	1	0	16	1	1	0	10

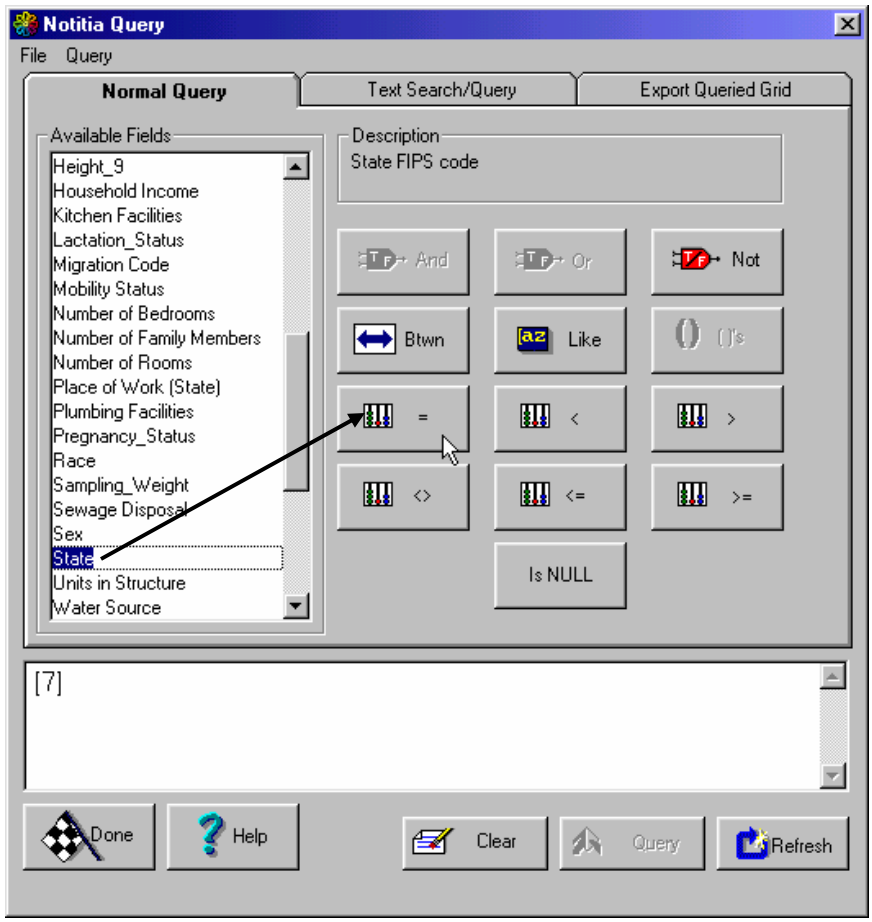
TIP … Other CARES windows may be hidden behind the data grid. To uncover them, simply grab any window by the title bar and move it to a new location. Clicking on a window brings it to the front.

Locate and click anywhere on the **Query** window to bring it to the front:



The **Query** window contains a set of mathematical and logical operators (buttons) that are used to subset the data fields present in the data grid. Using these operators, you will construct an equation defining your subset. The equation appears in the equation pane at the bottom of the window.

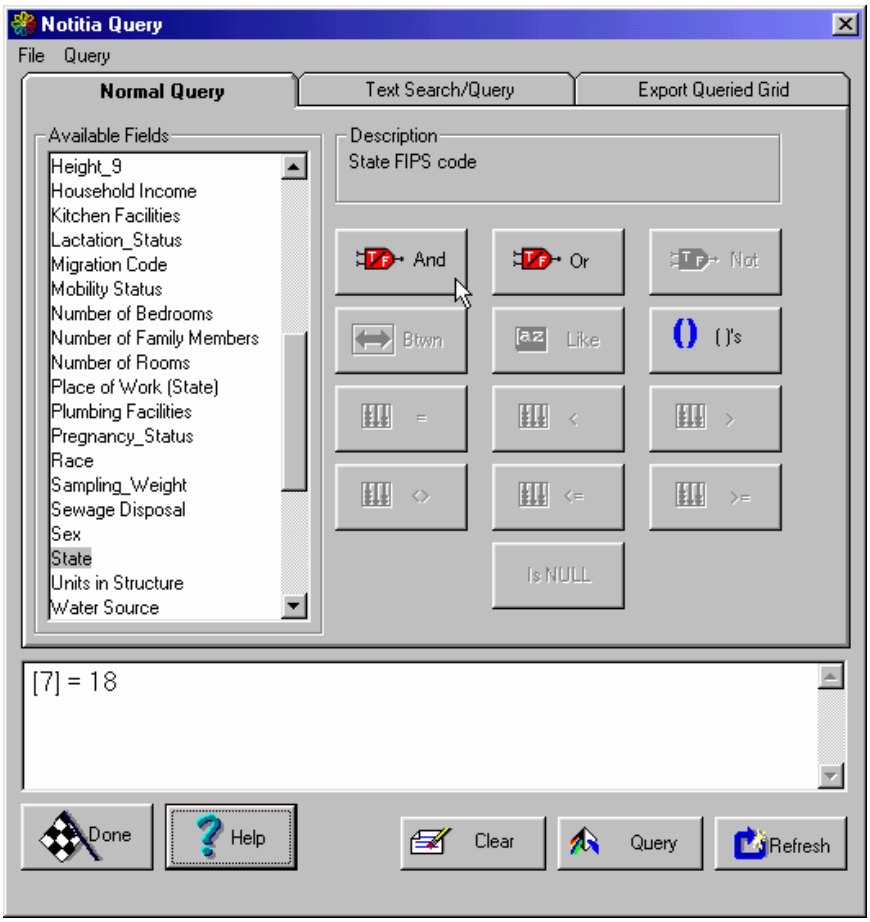
Begin defining the subset of Indiana males by scrolling down the **Available Fields** list until you come to the **State** field. Double click on the **State** field. This will activate the operator buttons on the **Query** window as follows:



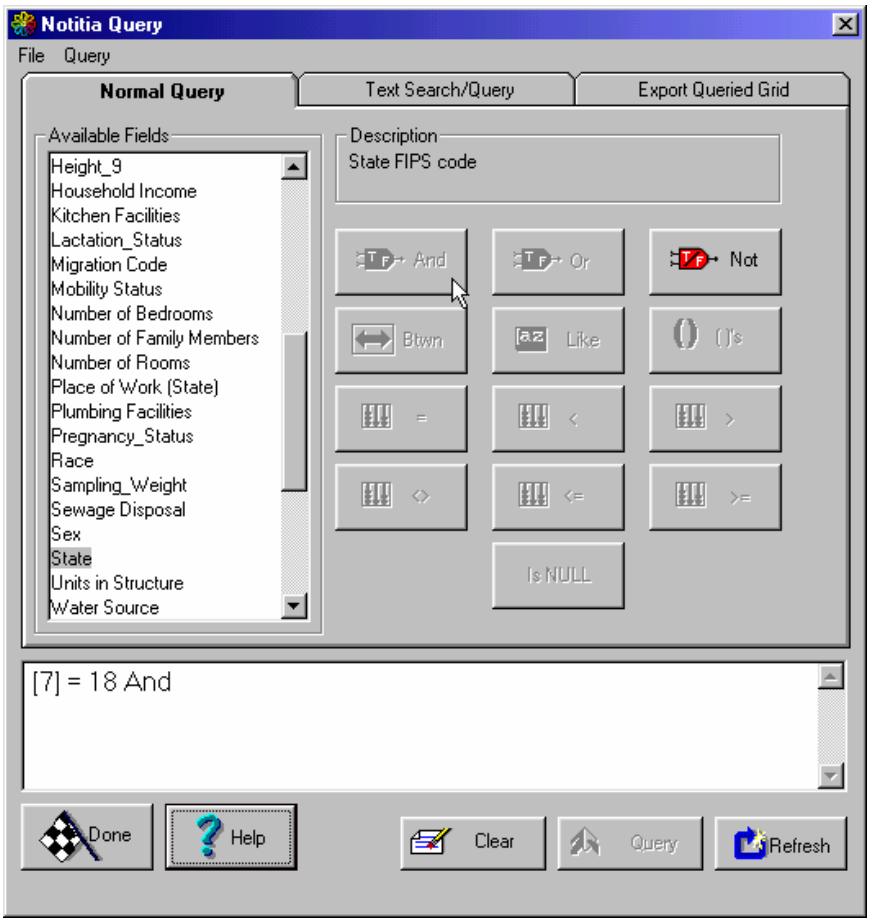
Click on the **Equals** button as shown above. This will open the following subset selection window prompting you to complete the query "Item State is Equal To …":

Find and select **Indiana** from the drop down list.

Click OK.

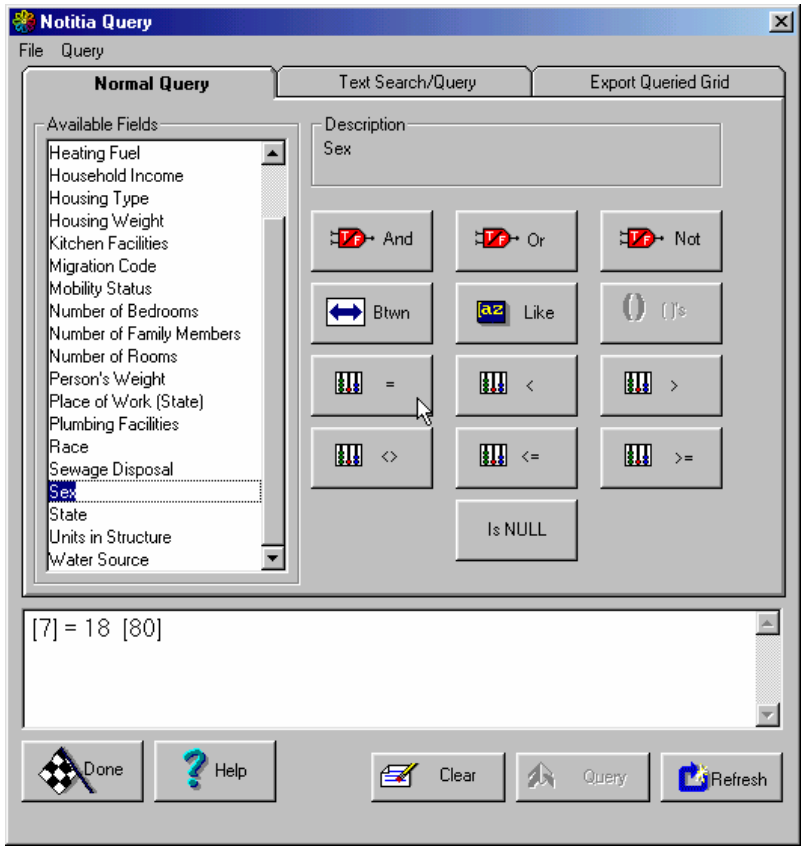


Click the **And** button to continue the subset equation.



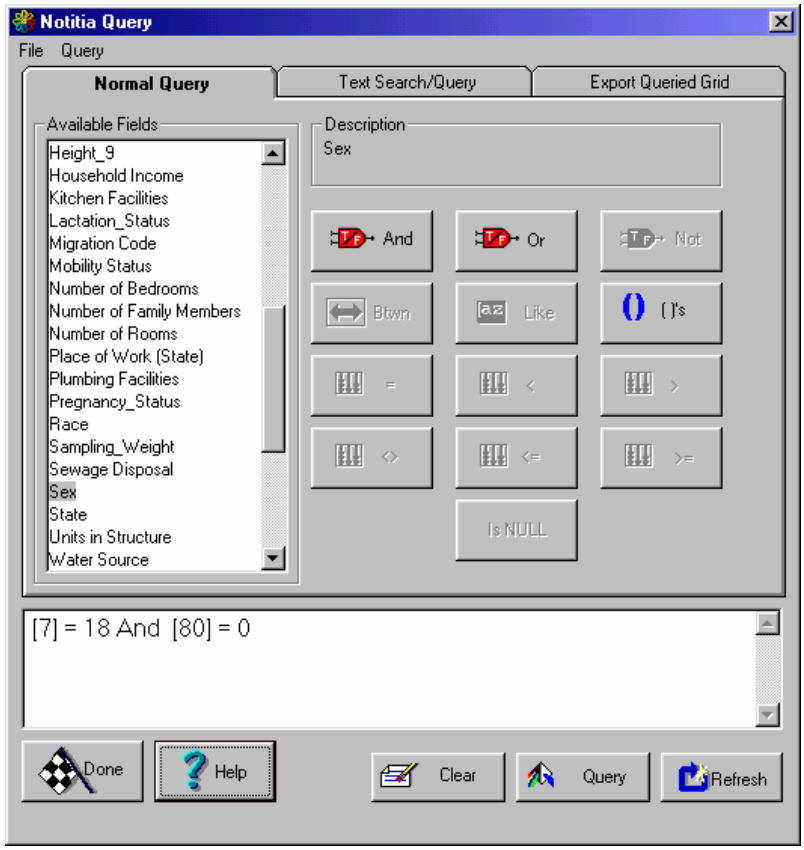
Double click on **Sex** in the **Available Fields** list.

Click the **Equals** button:



Select **Male** from the subset drop down selection list:

Click **OK**.

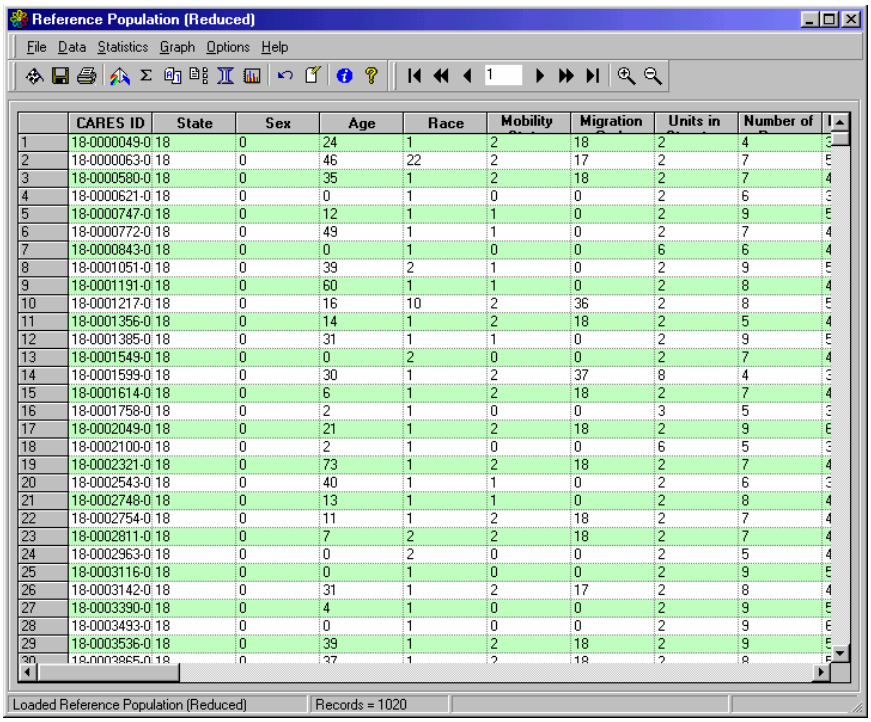


This sequence completes the query: “State equals Indiana and Sex equals Males” Note that this query appears in the equation pane using program code numbers for the named items in the expression. Finally, click the **Query** button to prepare the subset (sub-population) file.

TIP …	To avoid unexpected problems, it is recommended that you do not use other applications or work with your computer when CARES 1.0 is processing files such as this. Otherwise, when CARES is not processing data, feel free to simultaneously work with other applications while CARES is open and not processing.

When the query processing is finished, the results will appear as a data grid behind the **Query** window as shown below.

TIP …	New data grids often open with the column titles partially obscured. To adjust the height of the column titles, mov the cursor to the bottom edge of the blank square at the left side of the column title row. When the cursor changes to the “pull down” shape, click and drag the edge to change the height of the entire column header row.



Reference Population (Reduced)

File Data Statistics Graph Options Help

	CARES ID	State	Sex	Age	Race	Mobility	Migration	Units in	Number of
1	18-0000049-0	18	0	24	1	2	18	2	4
2	18-0000063-0	18	0	46	22	2	17	2	7
3	18-0000580-0	18	0	35	1	2	18	2	7
4	18-0000621-0	18	0	0	1	0	0	2	6
5	18-0000747-0	18	0	12	1	1	0	2	9
6	18-0000772-0	18	0	49	1	1	0	2	7
7	18-0000843-0	18	0	0	1	0	0	6	6
8	18-0001051-0	18	0	39	2	1	0	2	9
9	18-0001191-0	18	0	60	1	1	0	2	8
10	18-0001217-0	18	0	16	10	2	36	2	8
11	18-0001356-0	18	0	14	1	2	18	2	5
12	18-0001385-0	18	0	31	1	1	0	2	9
13	18-0001549-0	18	0	0	2	0	0	2	7
14	18-0001599-0	18	0	30	1	2	37	8	4
15	18-0001614-0	18	0	6	1	2	18	2	7
16	18-0001758-0	18	0	2	1	0	0	3	5
17	18-0002049-0	18	0	21	1	2	18	2	9
18	18-0002100-0	18	0	2	1	0	0	6	5
19	18-0002321-0	18	0	73	1	2	18	2	7
20	18-0002543-0	18	0	40	1	1	0	2	6
21	18-0002748-0	18	0	13	1	1	0	2	8
22	18-0002754-0	18	0	11	1	2	18	2	7
23	18-0002811-0	18	0	7	2	2	18	2	7
24	18-0002963-0	18	0	0	2	0	0	2	5
25	18-0003116-0	18	0	0	1	0	0	2	9
26	18-0003142-0	18	0	31	1	2	17	2	8
27	18-0003390-0	18	0	4	1	0	0	2	9
28	18-0003493-0	18	0	0	1	0	0	2	9
29	18-0003536-0	18	0	39	1	2	18	2	9

Loaded Reference Population (Reduced) | Records = 1020

Note that the subset consists of 1020 individuals as shown on the bottom of the data grid window. You will learn more about using data grids later.

TIP … Note that the row color on the data grid changes between the blue color you saw for the reference population and the green color for the sub-population. The color codes for the data grids indicate the following:

- Blue/white – original, stored, un-editable data
- Green/white – queried subset, un-editable data
- Yellow/white – editable data
- Pink/white – summarized data

Three Ways to Save the Query Results

There are three ways to save and/or export the query results:

1. Automatically make and name a user file by following the prompts after clicking **Done** on the **Query** window.
2. Create and export a comma delimited ASCII file from the Query window before clicking **Done**.
3. Save the data grid itself as a user file or comma delimited ASCII file using the **File** menu options.

We will cover each of these methods in turn:

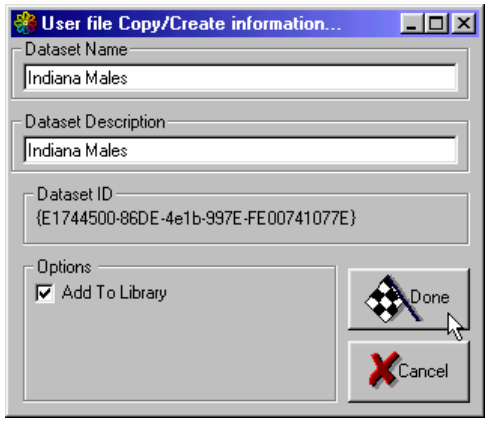
Method 1

To automatically make and name a user file from the **Query** window, immediately after the sub-population data grid appears behind the **Query** window, click **Done** on the **Query** window:

The following prompt will appear regarding saving the queried subset:

Click **Yes** to save the queried subset

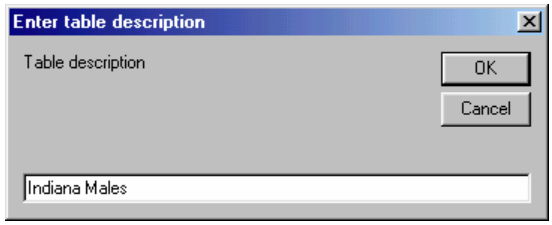
Enter **Indiana Males** for the two entries in the **User File Copy/Create Information** window as shown below:



Make sure the **Add To Library** box is checked.

Click **Done**.

Type **Indiana Males** as the Table Description in the following box:

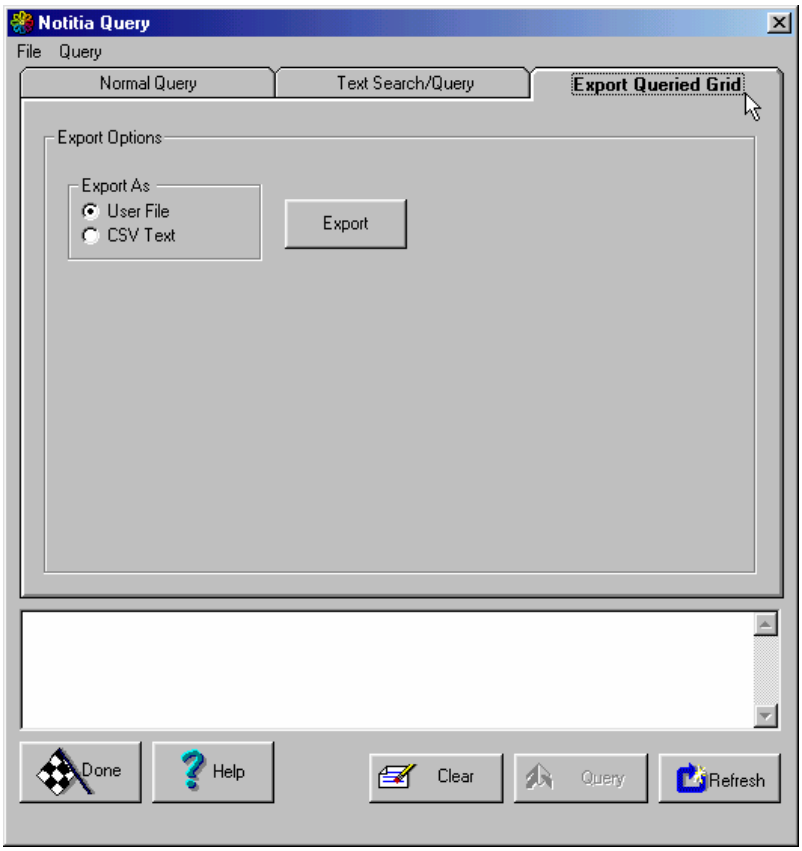


The following refresh reminder appears:

Click **OK** to refresh the datasets and close the notice box.

Method 2

To create and export a comma delimited ASCII file or a user file of the data grid contents from the **Query** window before clicking **Done**, click on the **Export Queried Grid** tab on the right of the **Query** window, which then opens as follows:

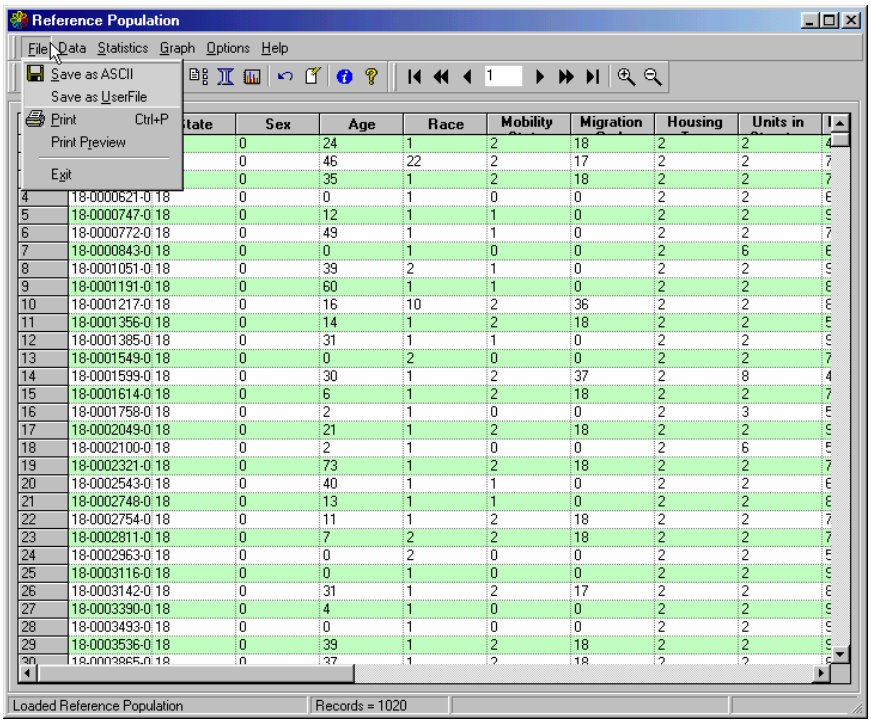


Choose the **Export As** file option and click **Export**.

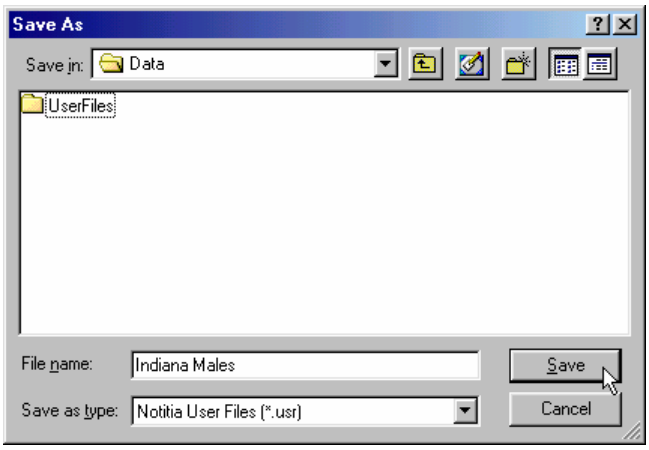
Follow the ensuing prompts for naming your file and navigating to the folder where you want to place it.

Method 3

To save the data grid as a user or text file directly from the data grid window, select the menu item **File > Save As ASCII** as shown:



Follow the ensuing prompts for naming your file and navigating to the folder where you want to place it using the **Save As** dialog box:

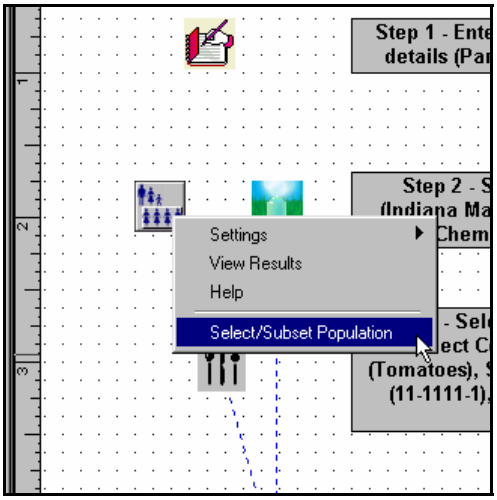


Note that selecting to create a User File from any of the above three methods will open the **Save As** box to the User File folder in the root Notitia directory. It is important to place User Files in this folder so that they can be automatically included in subsequent selection lists by the program.

Select Sub-Population

In the previous section, you created a sub-population of the Reference Population and saved the subset of individuals in a file that you named "Indiana Males." Now you will see how to retrieve that file for use in this tutorial using the **Population Selector**.

Right click on the **Population Selector** icon. As mentioned above, right clicking on a Canvas icon brings up a context-sensitive menu slightly offset from the icon as follows:

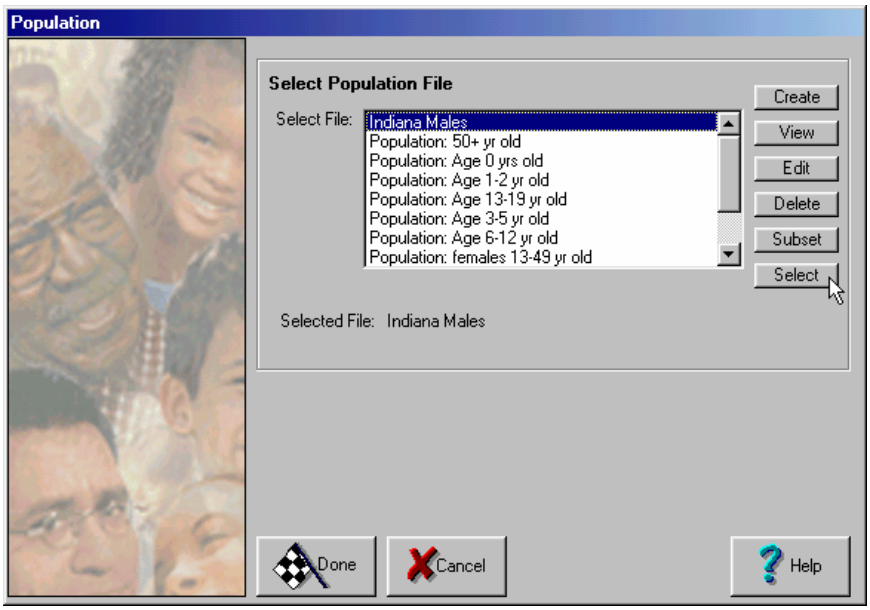


The context-sensitive selection window provides several menu options appropriate to the Canvas icon selected.

TIP …	Remember that clicking on a Canvas object or icon only allows you to move it. You must right-click on the icon to access the context-sensitive menu containing a list of actions appropriate for that specific icon.

Select the **Select/Subset Population** option at the bottom of the context-sensitive window, as illustrated above.

The **Population Selector** window opens as follows:



Observe that the **Population Selector** displays a number of previously prepared sub-population files, including the **Indiana Males** file you just made. The Reference Population containing 100,000 individuals is also accessed from this list.

Highlight the **Indiana Males** file and click **Select**. Alternately, you can double click on a file to select it.

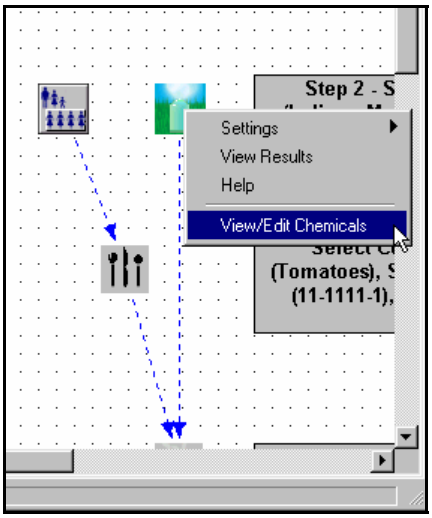
Click **Done** to close the **Population Selector** window

TIP …	The Population Selector window is one of five main module selector windows, all of which are characterized with a color picture panel on the left. Before closing these windows, make sure that the file or files you have identified for use are selected. Sometimes you may work through the process of creating or subsetting a file, but overlook finally selecting it for use. To insure that you have completed the file selection before closing a selector window, make sure there the name of the file you selected appears after the **Selected File:** text in the middle of the window, as illustrated above.

Select Chemical

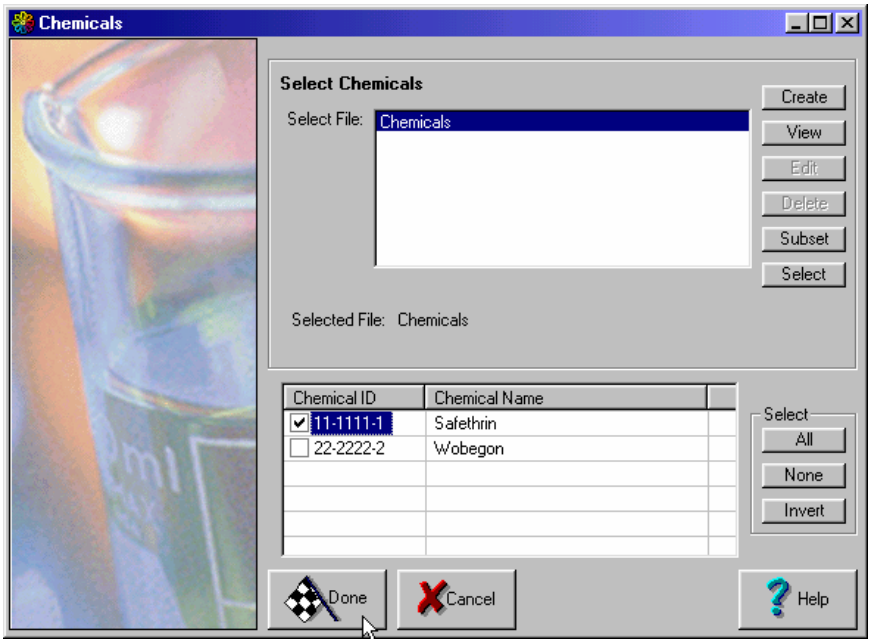
Next, you need to identify the chemical to be used in the analysis. It does not matter in what order you work with the Population and Chemical Selectors, as long as the settings are made in both.

Right click on the **Chemical Selector** icon to bring up the context-sensitive window as follows:



Click the **View/Edit Chemicals** option, as shown.

This opens the **Chemical Selector** window:



Note that when the above window first appears, the bottom pane is blank.

In the **Chemical Selector** window, the **Select File** pane displays saved files that contain the details of one or more chemicals that will appear in the lower grid when the file is selected.

To see how this works, highlight the file named **Chemicals** and click **Select**. Alternately, double click on the file name, **Chemicals**. In this case, there is only one file to select from, so it is already highlighted when the window first opens.

When the Chemicals file is selected, two chemicals appear in the bottom grid, as shown above. Select the chemical **Safethrin** for use in this tutorial by clicking on the check box next to the CAS number (**11-1111-1**) in the **Chemical ID** column.

Note that the chemical file you selected appears after the **Selected File:** text. This is a feed back notice showing the program's awareness of your chemical selection.

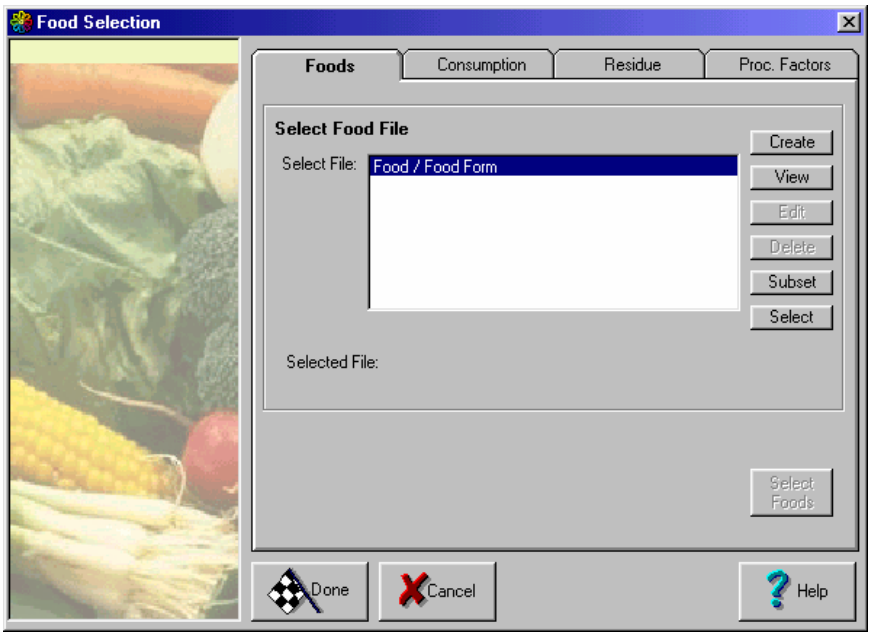
Click **Done** to close the **Chemical Selector** window and return to the main CARES window.

Setup Dietary Data Inputs

The Food Selector and Match Foods components on the Canvas together comprise the dietary exposure calculation module. In this tutorial, you will learn how to subset the available list of foods and food forms into a specific group and then save this subset as a file for later use. In the next tutorial, you will bypass the file creation procedures and simply retrieve the same food/food form list from a list.

To begin setting up the inputs for the dietary module, right click on the **Food Selector** icon on the Canvas, and then click on the **Select/Subset Files** menu option at the bottom of the context-sensitive window.

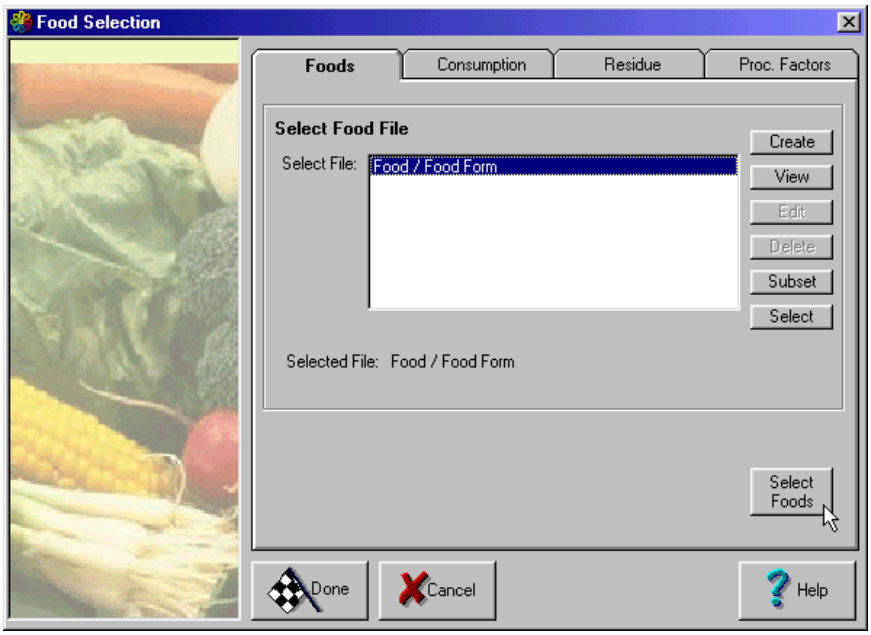
The **Food Selection** window opens as follows:



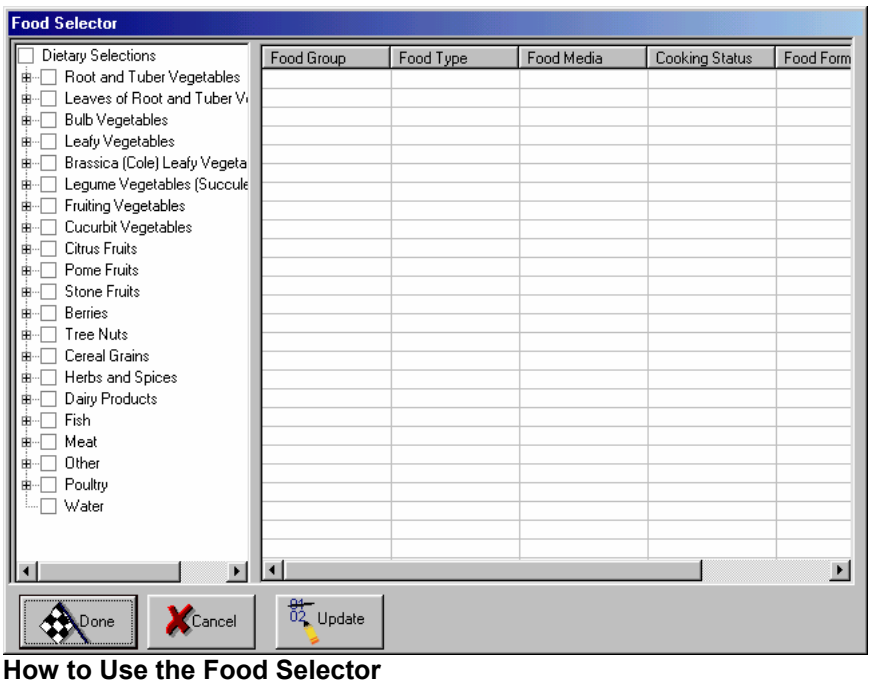
The **Food Selection** window contains four tabs that are accessed in order from left to right to set up a dietary database for analysis. By default, the **Foods** tab should be active when the window opens. If not, click on the tab to activate it (as shown above).

Double click on the file **Food / FoodForm** (or click on that file name and then click the **Select** button).

This action writes the selected filename as the **Selected File:** and activates the **Select Foods** button:



Click the **Select Foods** button. The Food Selector window opens as follows:



How to Use the Food Selector

The **Food Selector** window displays a hierarchical tree with 21 Food Groups listed under **Dietary Selections**. Clicking on the plus sign next to a Food Group expands the tree to show a list of the individual Foods/Food Forms under each Food Group. In some cases (for example, under Leafy Vegetables), a further subdivision of the Food Group occurs.

You indicate foods and food forms that you want to include in your dietary analysis, and/or save as a file, by placing a check mark in the box next to the item.

Clicking on the check box next to a Food Group places a check mark in that box as well as in the boxes for its associated Food/Food Form items that are accessed by clicking on the plus signs. Similarly, checking the box for Dietary Selections at the top of the hierarchy causes all items in the entire list to be checked.

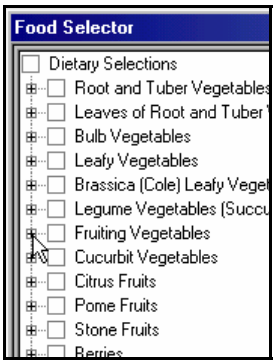
You can selectively check or uncheck a box at any level of the hierarchy. The check mark at a higher level box will appear dimmed (grayed) whenever any of the boxes at a lower level are unchecked.

TIP …	Feel free to familiarize yourself with how the check boxes and plus symbols work, but return the Food Selector to the totally unchecked status as shown above before continuing.

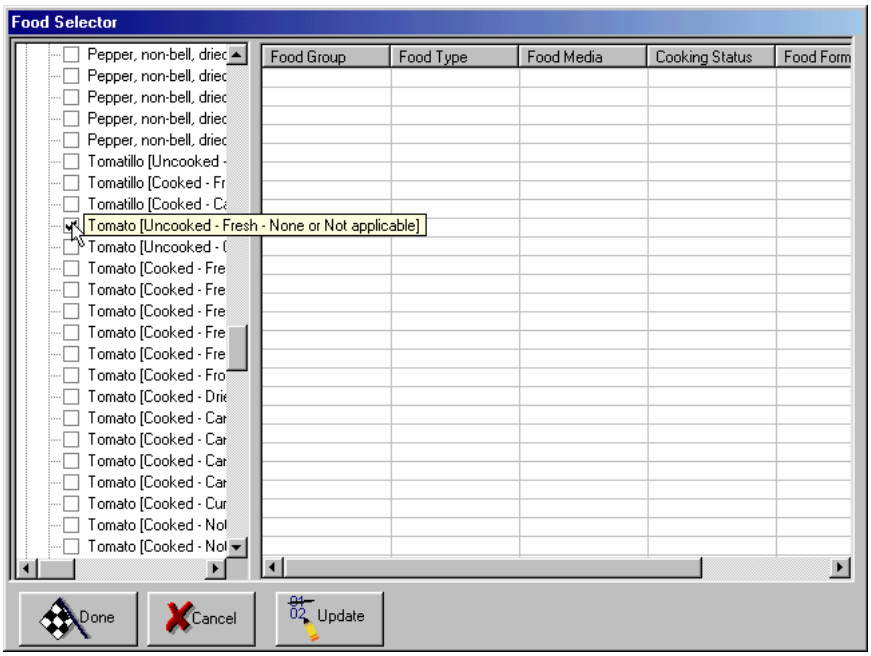
Creating the Tomato Food /Food Form File

You will now create a file that selects all food forms for tomatoes that are used as fruits (unprocessed), pastes, or purees, while excluding any baby food items.

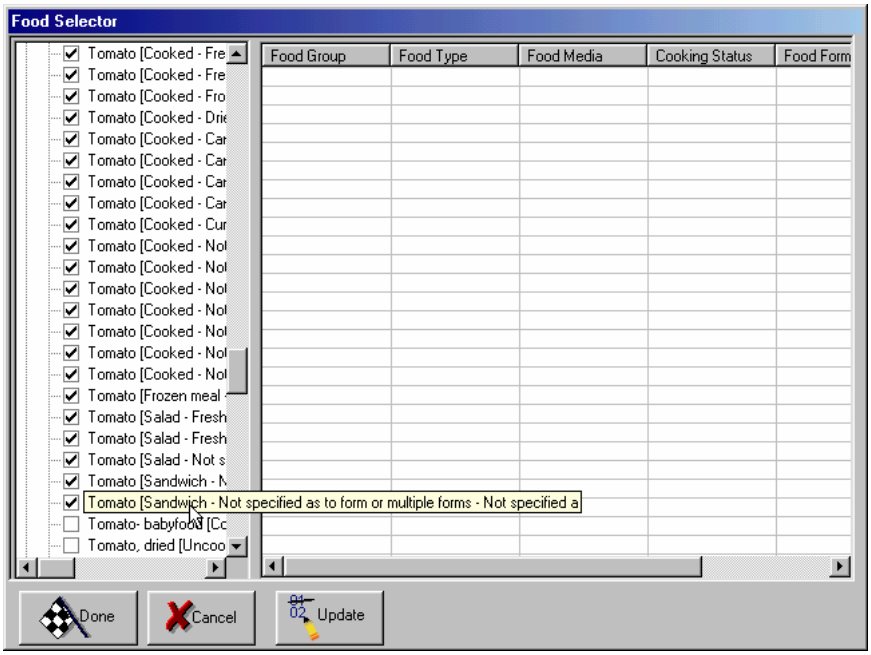
Under the Dietary Selections option, click the plus sign next to the **Fruiting Vegetables** Food Group:



This will expand the Fruiting Vegetables group to show that it includes Eggplants, Peppers, and Tomatoes. In the expanded tree, scroll down and place a check mark in the box next to the Food Form **Tomato [Uncooked Fresh None or Not applicable]**:

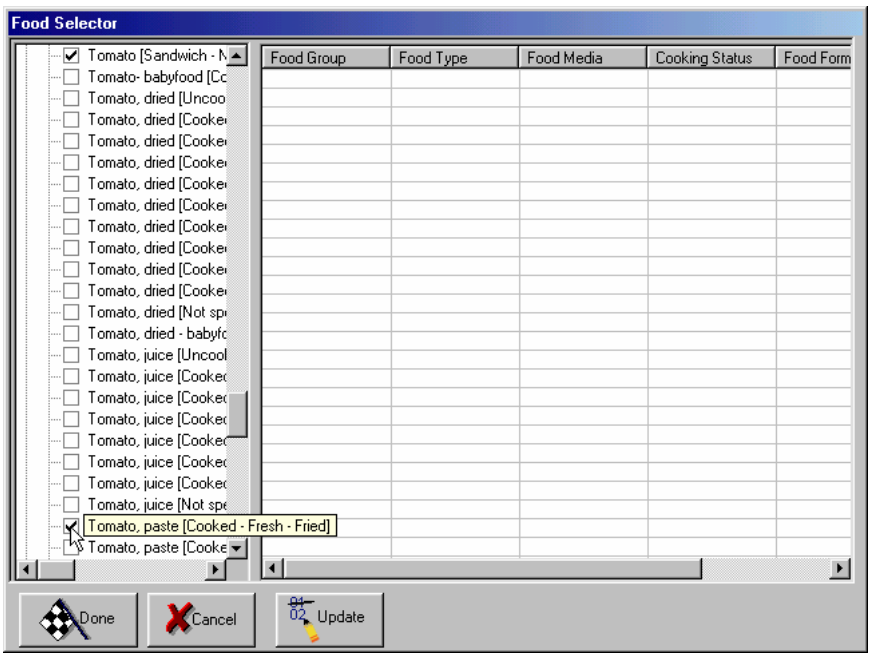


Continue checking the succeeding Tomato food form items until you reach and check the item **Tomato [Sandwich Not specified as to form or multiple forms -]**

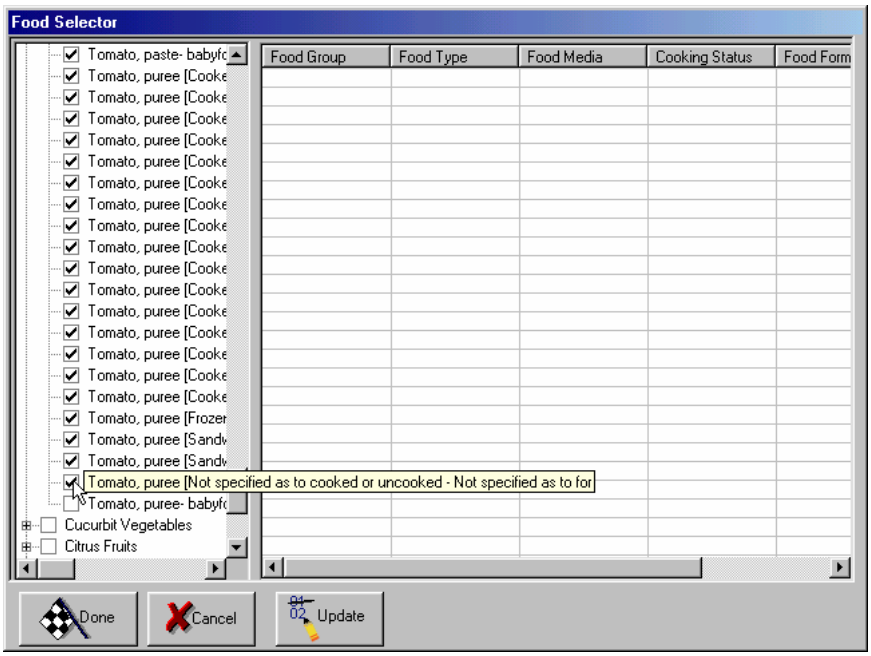


TIP …	Use the keyboard instead of the mouse to speed up multiple selections. After checking an item in the list, press the Down Arrow or the Up Arrow key to move to an adjacent item. Then press the Spacebar key to either check or uncheck its associated box. Repeating this "two key" operation will allow you to quickly check or uncheck a series of items.

Skip the "Tomato – baby food…", "Tomato, dried…", and "Tomato – juice…" items and begin a new group of selections starting at **Tomato, paste [Cooked - Fresh - Fried]**.

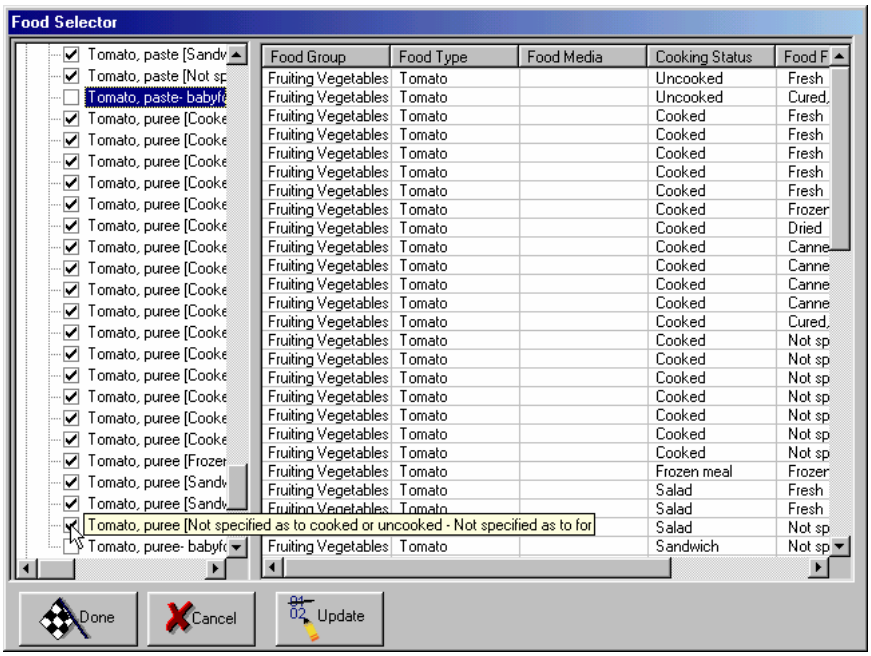


Select all the items between **Tomato, paste [Cooked – Fresh – Fried]** and **Tomato, puree [Not specified as to cooked or uncooked…]** as shown below:



Since we are excluding baby foods from the selection list, go back and remove the check mark to deselect the item **Tomato, paste - babyfood [Cooked – Canned – Not specified…]**.

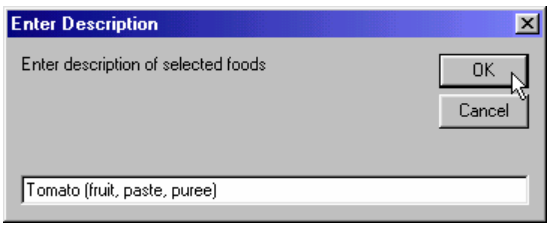
After you have made the selections described above, click the **Update** button. The items selected in the food tree now appear in the grid pane on the right:



Click **Done**.

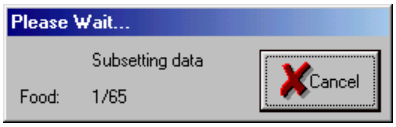
The following prompt appears:

Click **Yes** to save a new Food Consumption file based upon the food items you selected. A file description prompt appears. Enter the file name **Tomato (fruit, paste, puree)** as shown below:



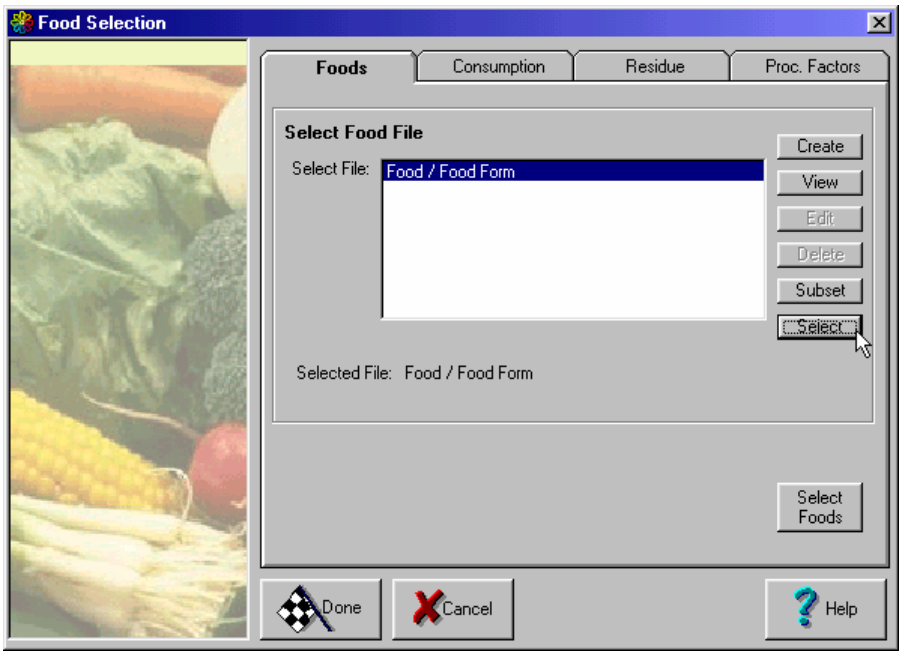
Click **OK**.

The following processing notice appears while your file is being created. Depending on the speed of your processor, it may take up to 20 minutes to create the file.



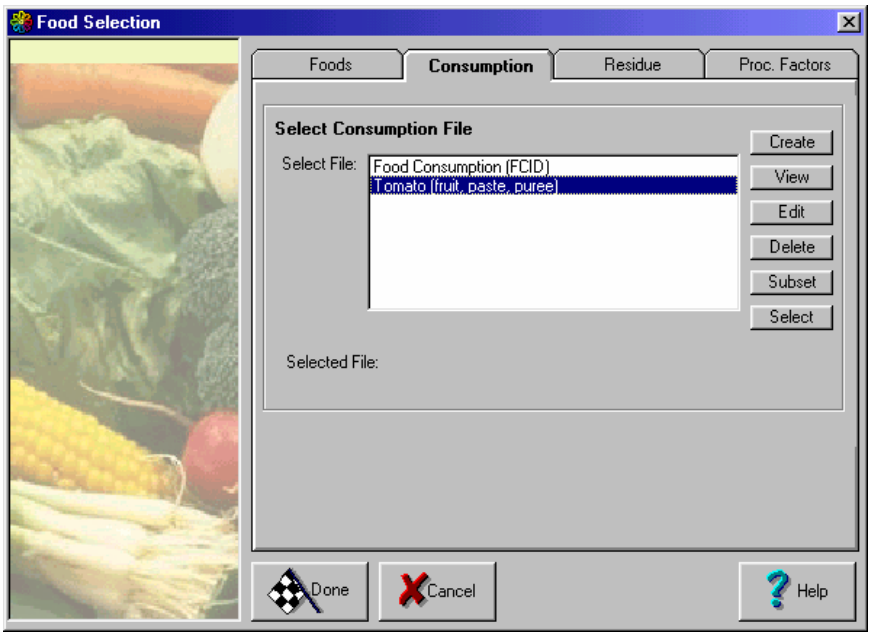
TIP …	A reminder: It is recommended that you do not use other applications or work with your computer when it is processing CARES 1.0 files. Otherwise, when CARES is not processing data, you can simultaneously work with other applications while CARES is open.

After the new Food Consumption file is created, the **Food Selector** window will close and you will be returned to the **Food Selection** window:

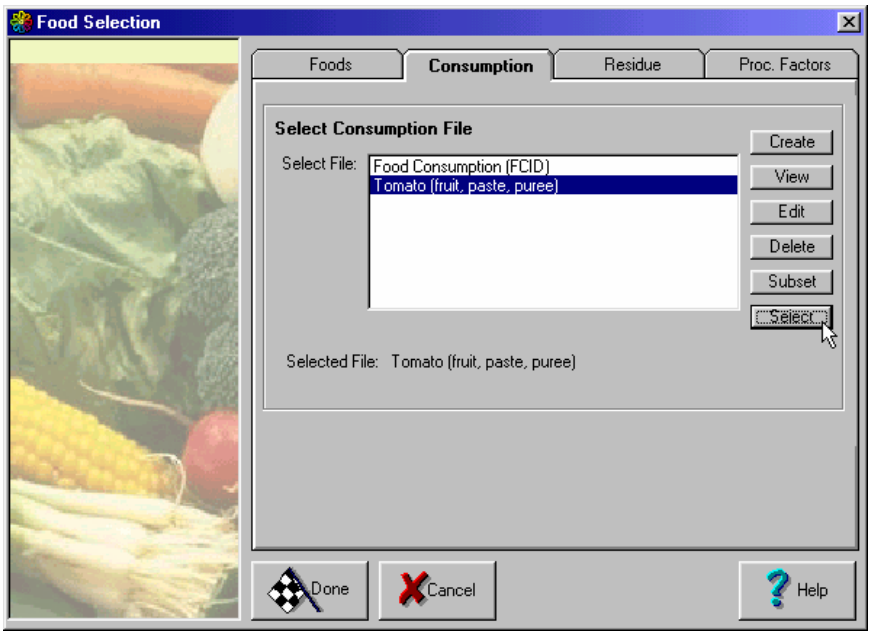


Click the **Select** button and double check that the Selected File appears after the **Selected File:** text in the center of the screen (as shown above) before continuing.

Click on the **Consumption** tab and note that the food file you just created now appears in the file list.

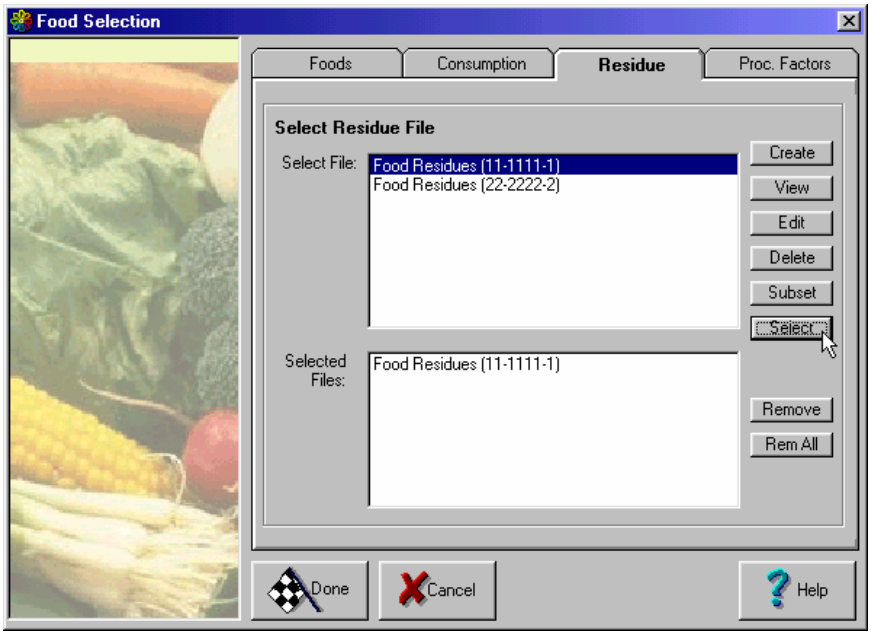


Click on the file **Tomato (fruit, paste, puree)** to highlight it, then click **Select**.



Observe that the selected file is now registered after the **Selected File:** text, as shown above.

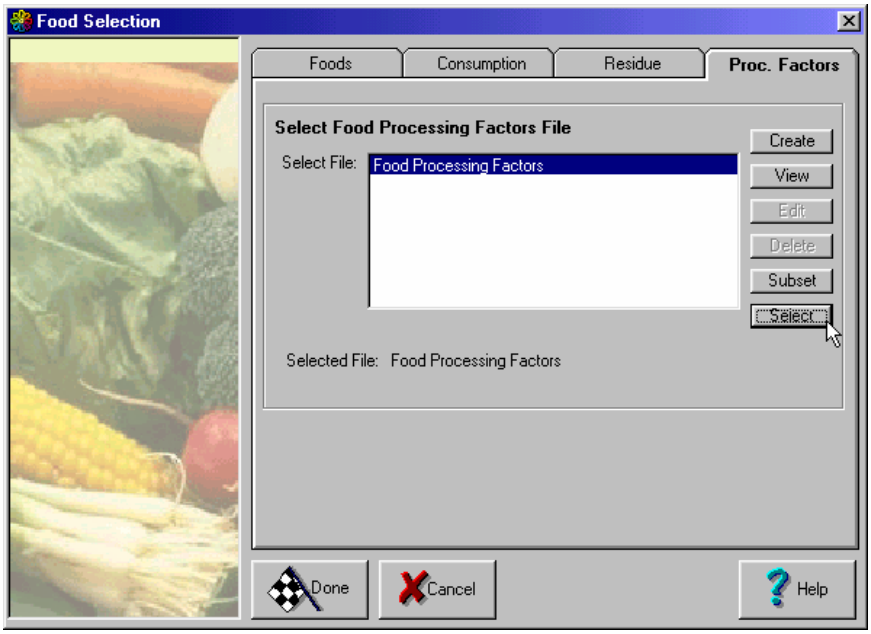
Continue with the dietary setup by clicking the **Residue** tab. In the next tutorial you will learn how to import residue data. For now, highlight the file named **Food Residues (11-111-1)** and click **Select**. This will place the file name in the **Selected Files** list as follows:



Click the **Proc. Factors** tab.

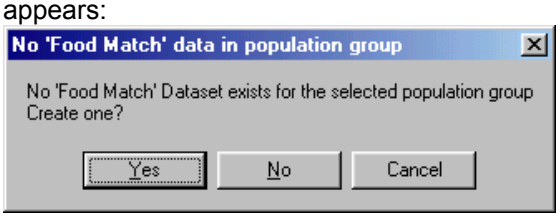
Highlight the file **Food Processing Factors** and click **Select**.

Your screen should appear as follows:



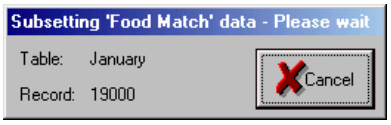
Click **Done** to exit the **Food Selection** window and return to the main window:

The first time you set up a new dietary data set, the following notice appears:



Click **Yes** to create a Food Match dataset for the selected sub-population group.

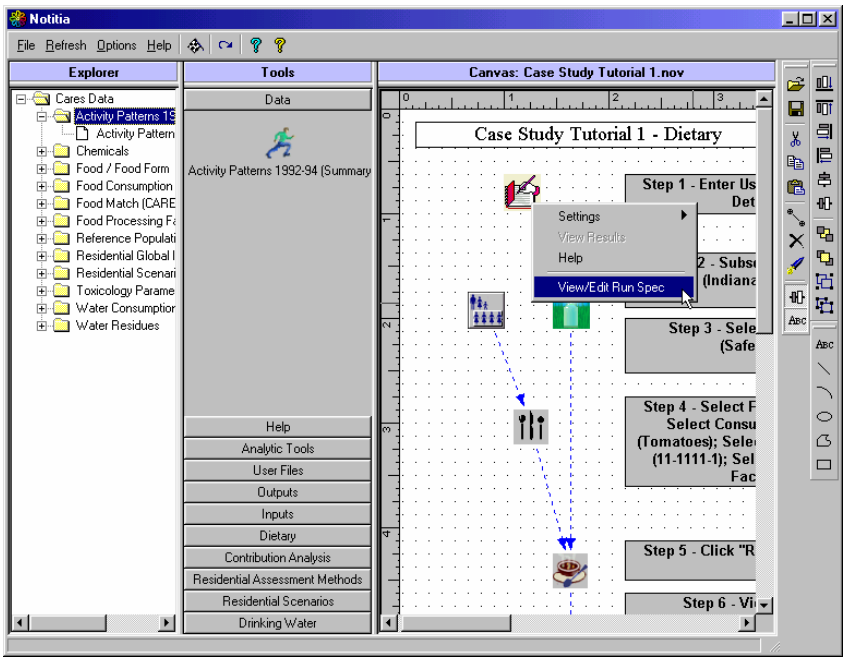
The following status notice will appear showing the progress as the individual dietary exposure records are subset into 365 days.



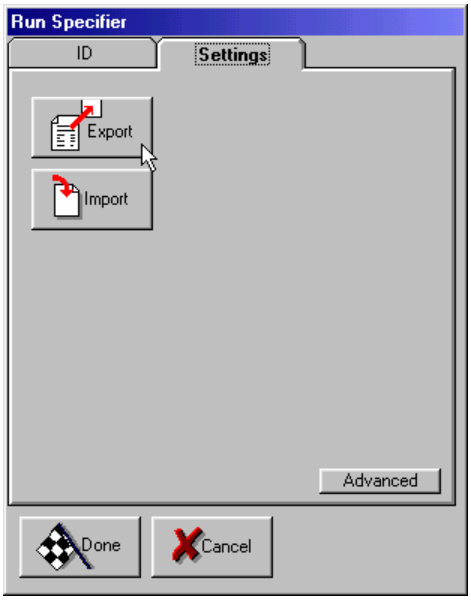
Save Run Settings

Before running the Canvas model, you need to save the settings that you have just established using the Population, Chemical, and Dietary Selectors. This will allow you to recall the same settings should you want either to repeat the run as is or make some modifications in the setup and then rerun the Canvas.

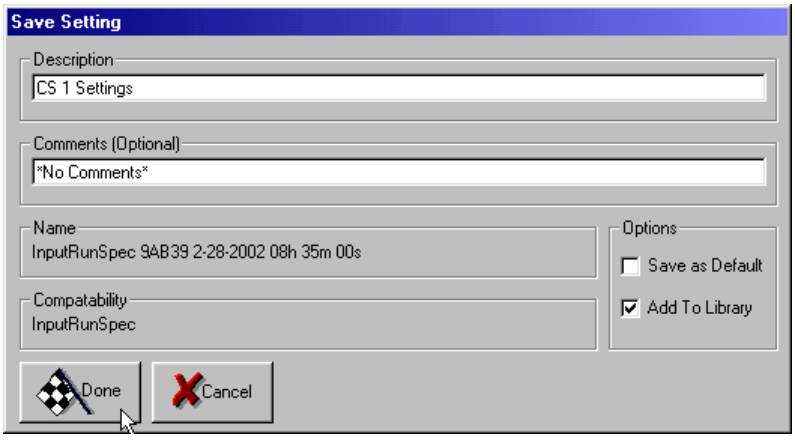
Right click on the **Run Specifier** icon and select the **View/Edit Run Spec** option as illustrated:



In the **Run Specifier** window, click the **Settings** tab.



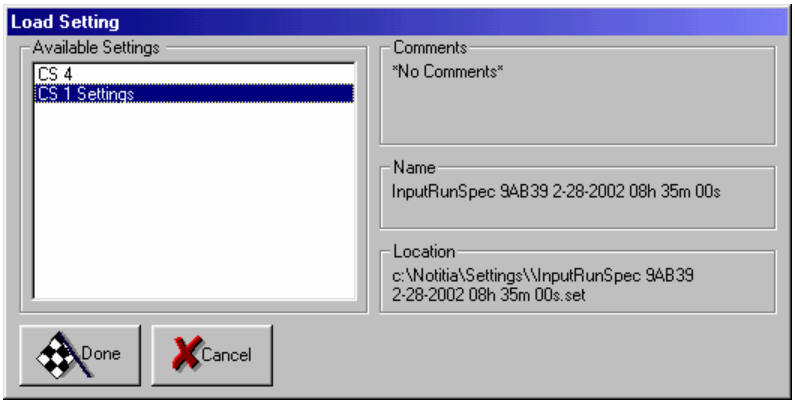
Click the **Export** button.



Replace the default 'No Description' entry with a short description of the setup you have just created for this run. For example, type **CS 1 Settings**, as illustrated. Optionally, you can include additional information in the 'Comments' field.

Click **Done** to return to the **Settings** tab.

To see how you can load these settings in the future, click the **Load Settings** button. A window similar to the following appears, and includes the setting description you just entered above.

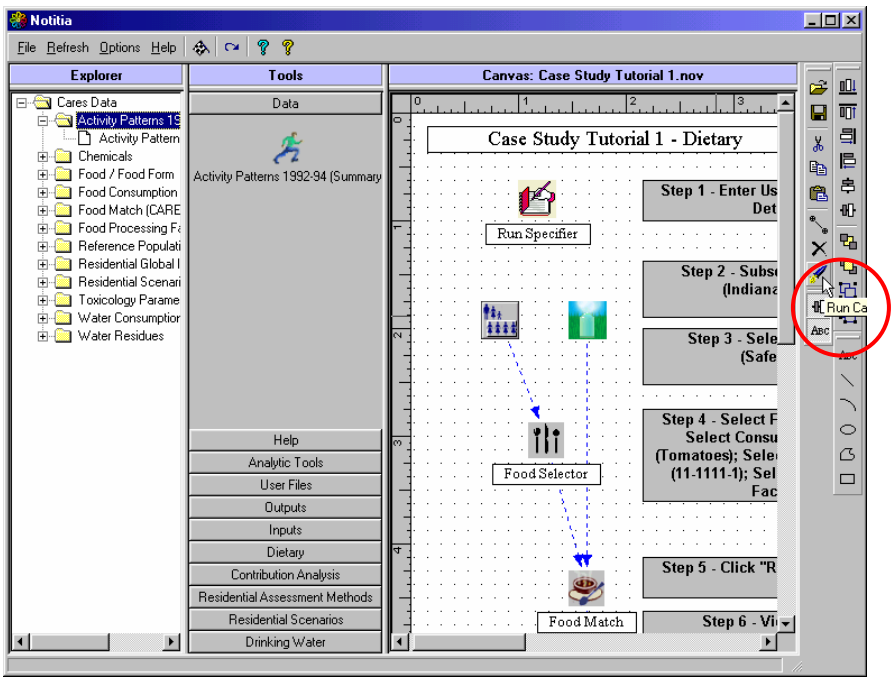


Click **Cancel** to close the Load Setting window.

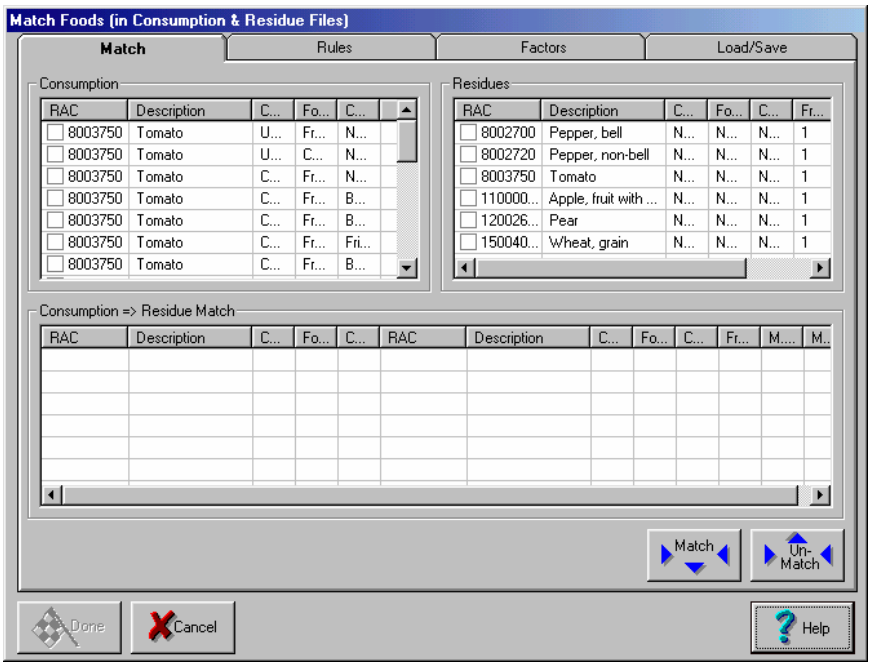
Click **Done** to close the **Run Specifier** window and return to the main window.

Run Dietary Module and View Results

At the main window, click the **Run Canvas** button on the **Diagrammer** toolbar as follows:

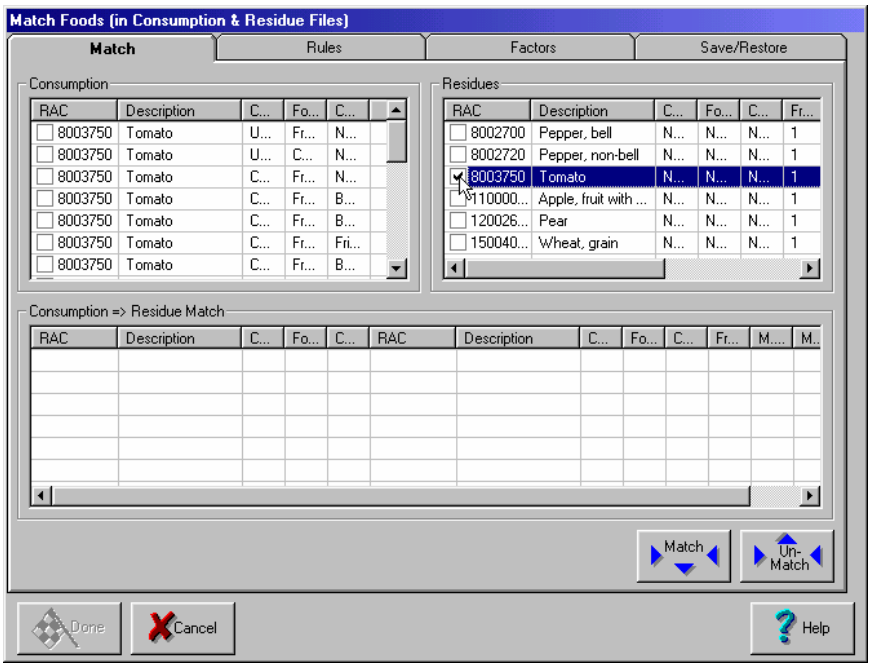


To initiate the run, you first have to match each of the items in the food list you created with a residue value. To assist you with this, the **Match Foods** window will open at the **Match** tab as follows:

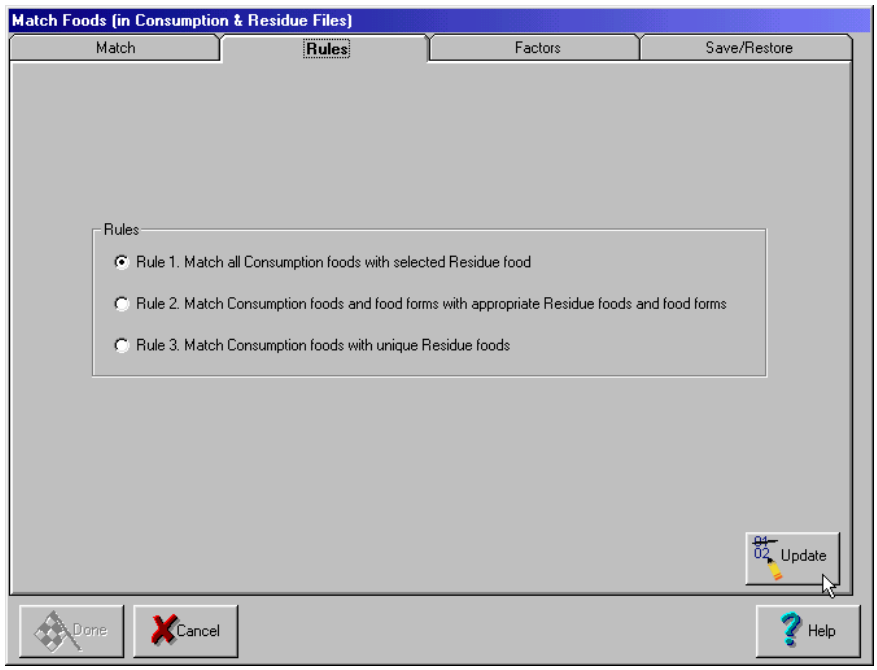


In the above window, the **Consumption** grid displays the Food/Food Form items that you specified when you created the “Tomato (fruit, paste, puree)” food consumption file using the Food Selection. The difference is that this grid only includes those items from the original list that correspond to a food item consumed by one or more individuals in the Indiana Males sup-population. The **Residue** grid displays foods for which residue values are available.

To perform the matching of residue values with selected foods, you must first select a residue from the **Residue** grid by clicking on the check box for the row labeled **RAC (Raw Agricultural Commodity) 8003750 – Tomato**.

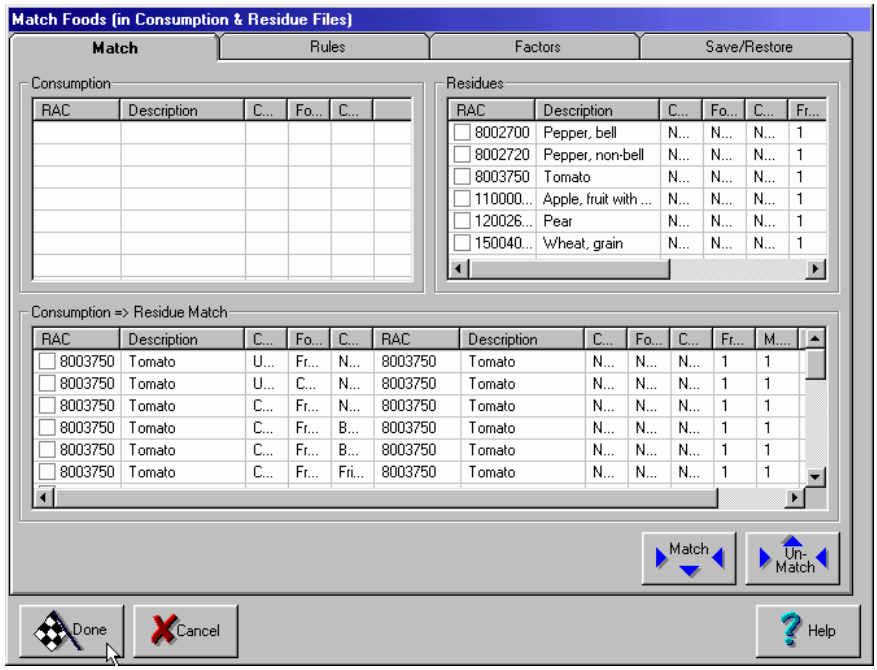


Next, click on the **Rules** tab and select the first option button for **Rule 1. Match all Consumption foods with selected Residue food**, as follows:



Click the **Update** button to perform the matching.

When the match is done, the **Match** tab view will appear displaying the matched foods in the lower **Consumption => Residue Match** grid, as follows:



TIP …	At this point, the selected foods and food forms have been matched with a residue value. Before clicking **Done**, you need to learn a bit more about matching procedures and take a look at the **Factors** and **Save/Restore** tabs.

Additional Matching Procedures

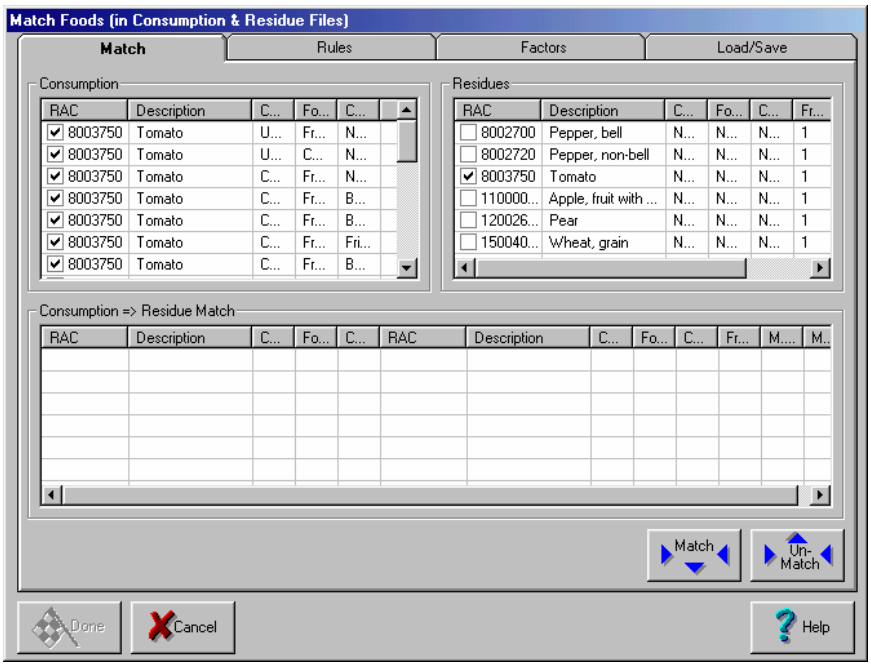
In the above procedure, you applied **Rule 1** (from the **Rules** tab) to automatically match the checked residue item in the Residue pane with all the Food/Food forms in the Consumption pane. The matching procedure was applied when you clicked the **Update** button on the **Rules** page. In effect, using the **Rule** option accomplished what you could otherwise do manually.

The manual method of making the same matching as done above is as follows:

After checking the **RAC** item **8003750 – Tomato** in the **Residue** pane, Click on each check box to select all the **RAC** items appearing in the **Consumption** grid. You may need to use the scroll bar to view them all.

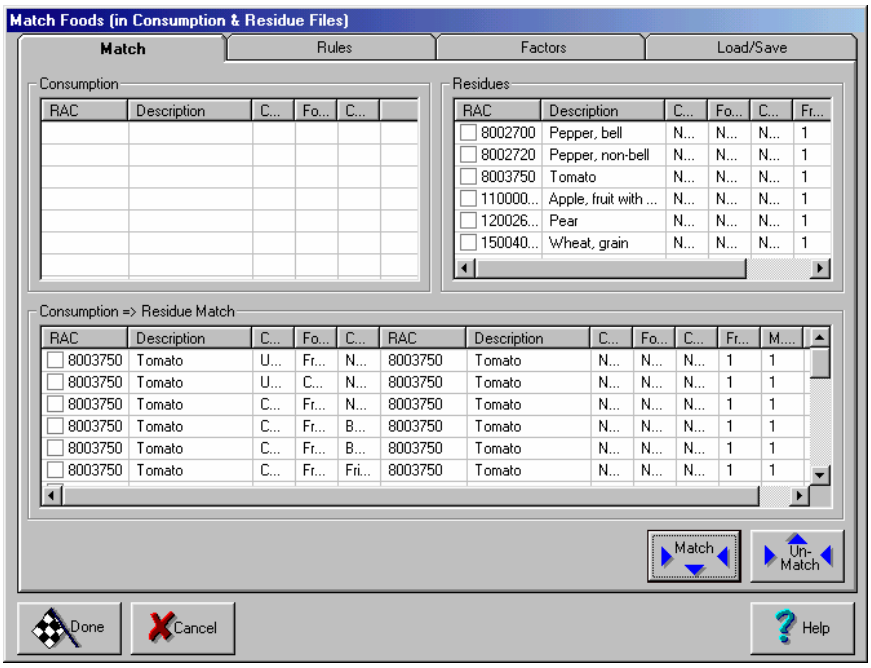
TIP …	As with all check box lists, you can use the keyboard Down and Up Arrows in conjunction with the Spacebar to quickly make multiple selections.

When you have completed making the matching selections, the **Match Food** window will look like this:



Note that the **Done** button is not accessible (grayed out) because at this point you have only specified the pairings, not performed them. To complete the paring (matching), click the **Match** button.

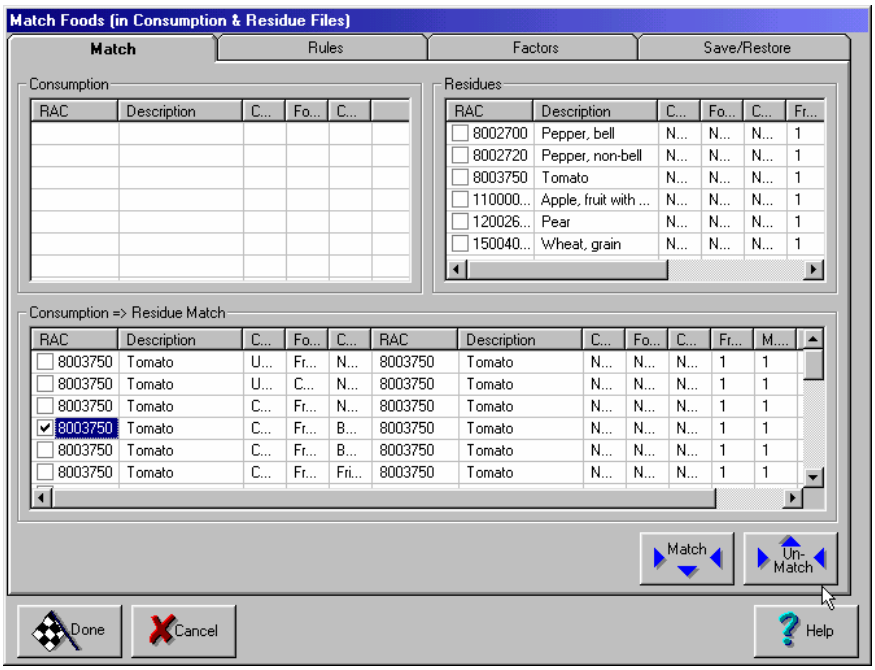
The matched items will appear in the **Consumption + Residue Match** grid as follows; identical to the screen you would obtain using **Rule 1**:



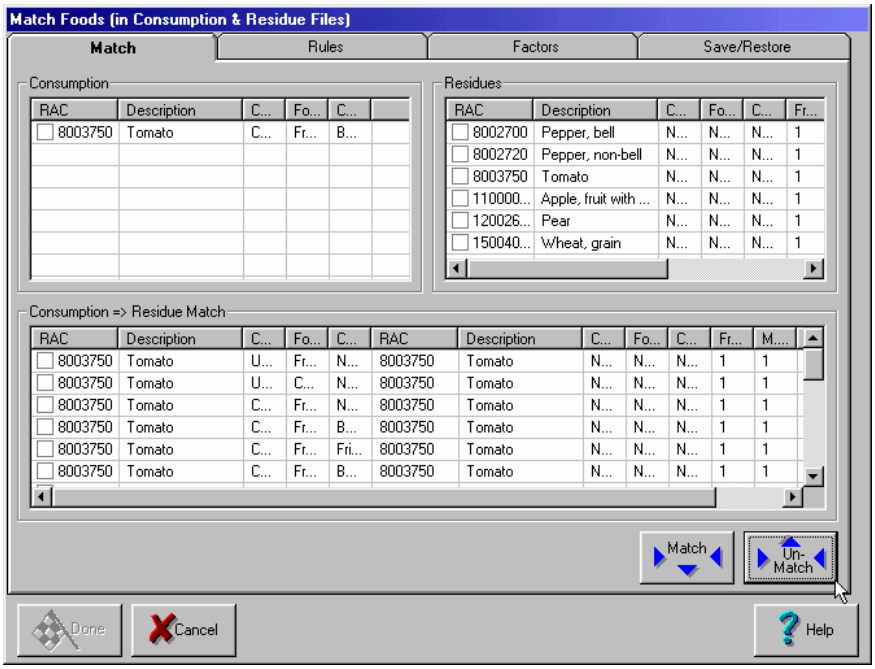
TIP …	The Match button will also perform and display pairings for single items or batches. For example, you can select several items in the Consumption grid to be matched with a selected Residue item and then click Match to view the pairings in the lower pane. You can continue selecting additional single or groups of Consumption items for matching and adding to the paired list. Once all the consumption items are matched, the Consumption grid will be empty, as illustrated above. Just as **Rule 1** in the **Rules** tab facilitates the matching of a single Residue item with all the Consumption items, applying **Rule 2** and **Rule 3** facilitate more specialized matchings, such as mentioned above.

To undo a match, check the matched item in the lower grid and click the **UnMatch** button.

For example, assume that you checked the matched item shown in the following screen:



If you then click **UnMatch**, the consumption item will reappear in the **Consumption** grid waiting a new matching, as illustrated below:

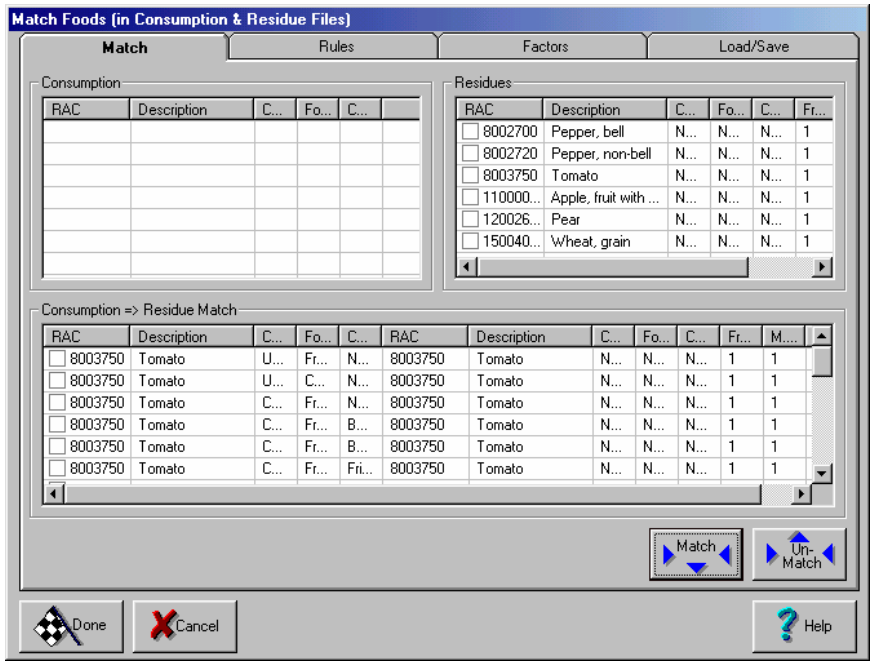


Note again that the **Done** button is unavailable if foods remain unmatched; you must match all foods in the **Consumption** grid before proceeding.

Completing the Food/Residue Matching

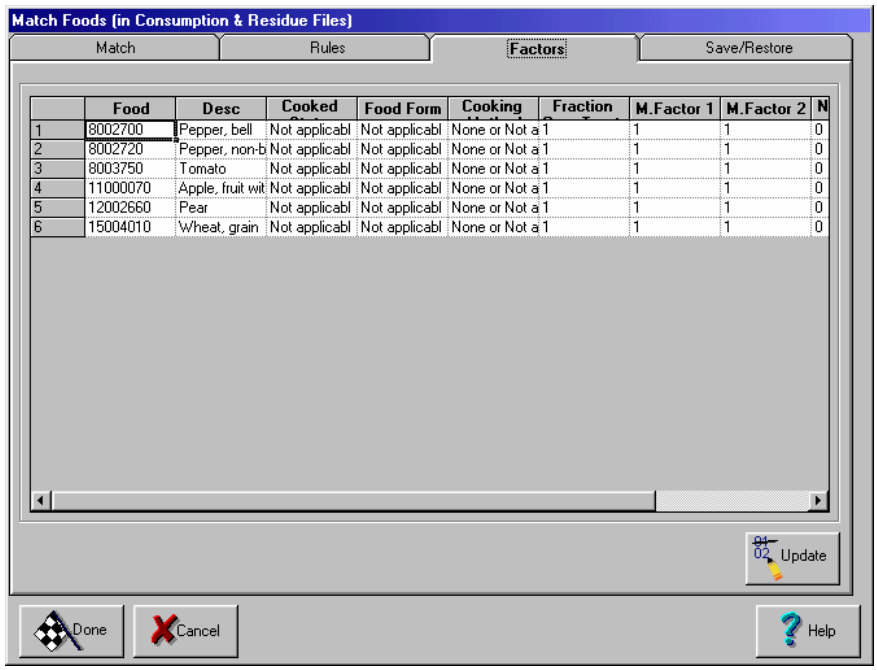
The previous discussion described how to match one or more Residue values with each of the Food/Food Forms either by using automated procedures based on applying and updating a **Rule Option** on the **Rule** tab, or manually using the **Match** button on the **Match** tab.

Make sure the **Match Food** window appears as follows:



Let's look at the remaining tabs before clicking **Done**.

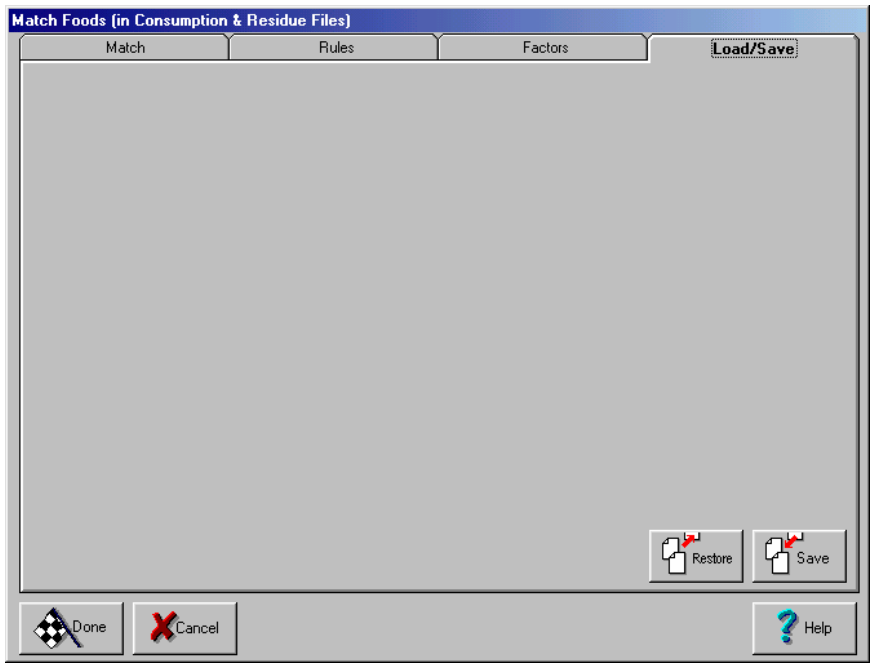
Click the **Factors** tab. Your data will be displayed as follows:



The **Factors** tab allows user input to modify a residue amount by entering processing factors for the **Fraction of Crop Treated** (**FTC**) and/or up to two additional **Multiplication Factors**.

For this tutorial, do not change any of the default values in the **Factor** grid.

Click the **Load/Save** tab.



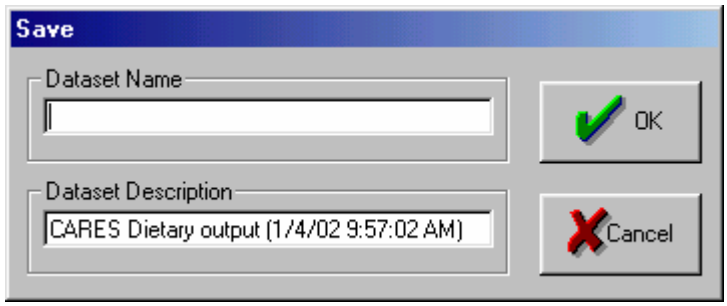
The **Load/Save** tab allows you to name and save a Matched Food set or retrieve a previously saved file. We will not explore these options at this point.

Now click **Done** to continue execution of the run.

Dialog boxes similar to the following will display the program operations during calculation and preparation of the dietary exposure data.

As mentioned earlier, do not run other applications while CARES is processing.

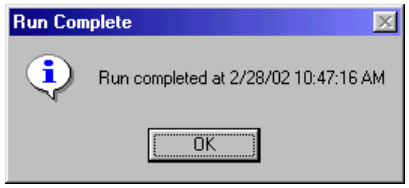
When the exposure calculation is finished, you will be prompted to save the dataset in a window similar to the following:



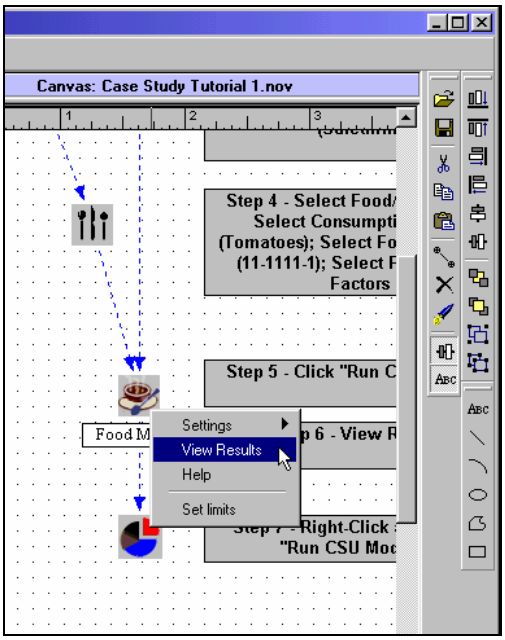
Enter **Dietary Exposure Output** in the **Dataset Name** field and click **Done**.

The following notice appears:

Click **OK** to close the **Run Complete** notice:

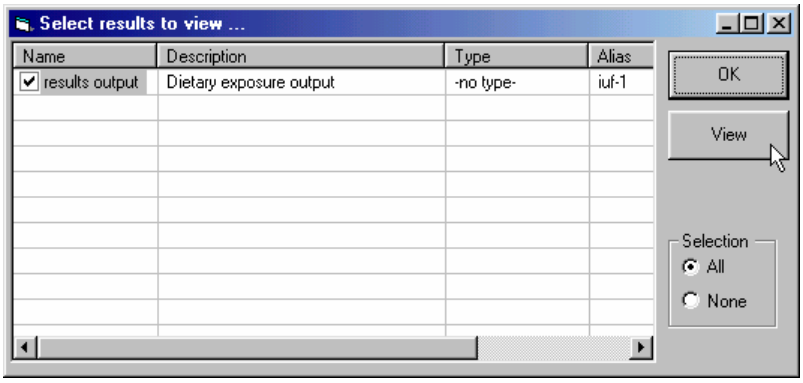


To view the results of the dietary exposure calculation, right click on the **Food Match** icon on the main window Canvas. The context sensitive menu list will appear as follows:



Click **View Results** on the menu.

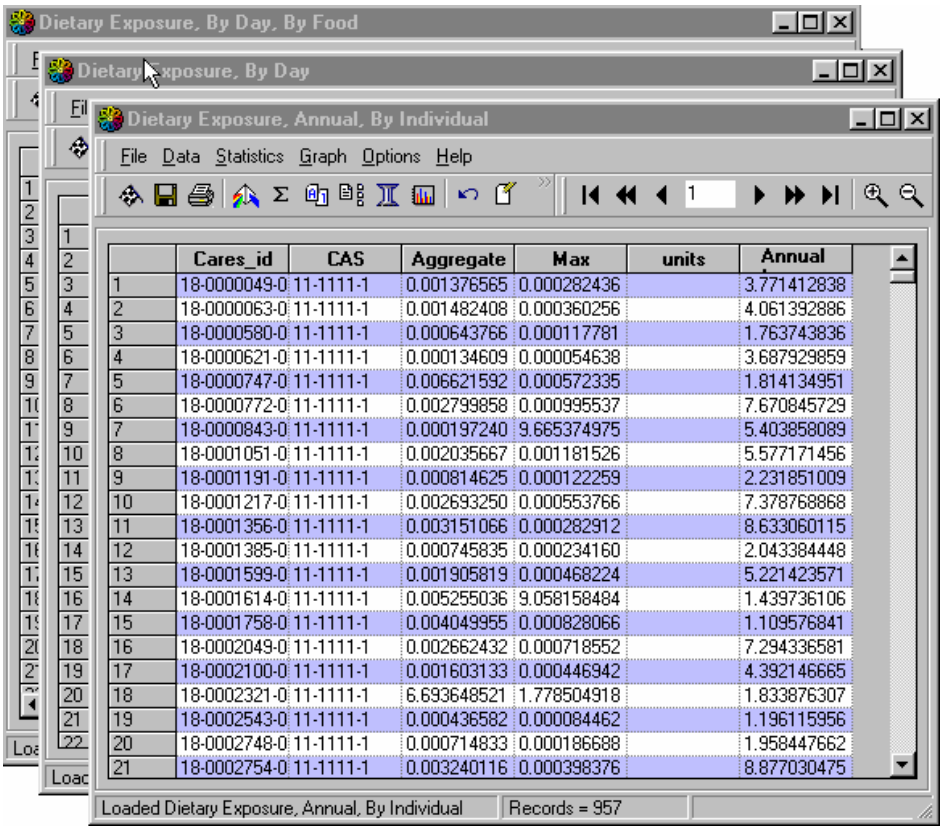
Check the **results output** line in the next window:



Click the **View** button to display the following list of available output files:

You may view any or all of the listed files. For this tutorial, use the **CTRL** key to make the three dietary selections indicated above, and click **Done**

The three outputs you selected will appear as three stacked data grids:

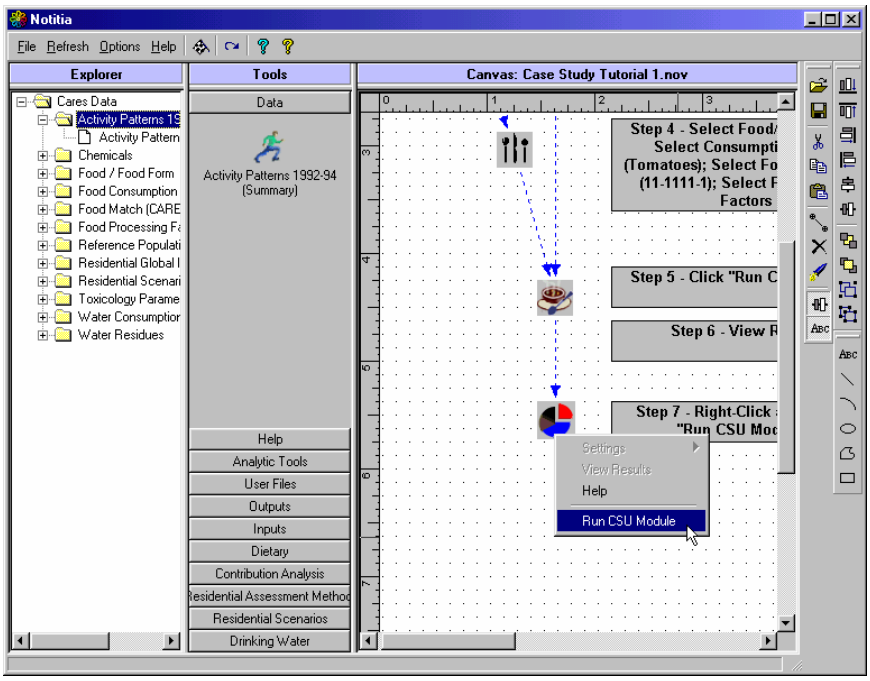


	Cares_id	CAS	Aggregate	Max	units	Annual
1	18-0000049-0	11-1111-1	0.001376565	0.000282436		3.771412838
2	18-0000063-0	11-1111-1	0.001482408	0.000360256		4.061392886
3	18-0000580-0	11-1111-1	0.000643766	0.000117781		1.763743836
4	18-0000621-0	11-1111-1	0.000134609	0.000054638		3.687929859
5	18-0000747-0	11-1111-1	0.006621592	0.000572335		1.814134951
6	18-0000772-0	11-1111-1	0.002799858	0.000995537		7.670845729
7	18-0000843-0	11-1111-1	0.000197240	9.665374975		5.403858089
8	18-0001051-0	11-1111-1	0.002035667	0.001181526		5.577171456
9	18-0001191-0	11-1111-1	0.000814625	0.000122259		2.231851009
10	18-0001217-0	11-1111-1	0.002693250	0.000553766		7.378768868
11	18-0001356-0	11-1111-1	0.003151066	0.000282912		8.633060115
12	18-0001385-0	11-1111-1	0.000745835	0.000234160		2.043384448
13	18-0001599-0	11-1111-1	0.001905819	0.000468224		5.221423571
14	18-0001614-0	11-1111-1	0.005255036	9.058158484		1.439736106
15	18-0001758-0	11-1111-1	0.004049955	0.000828066		1.109576841
16	18-0002049-0	11-1111-1	0.002662432	0.000718552		7.294336581
17	18-0002100-0	11-1111-1	0.001603133	0.000446942		4.392146665
18	18-0002321-0	11-1111-1	6.693648521	1.778504918		1.833876307
19	18-0002543-0	11-1111-1	0.000436582	0.000084462		1.196115956
20	18-0002748-0	11-1111-1	0.000714833	0.000186688		1.958447662
21	18-0002754-0	11-1111-1	0.003240116	0.000398376		8.877030475

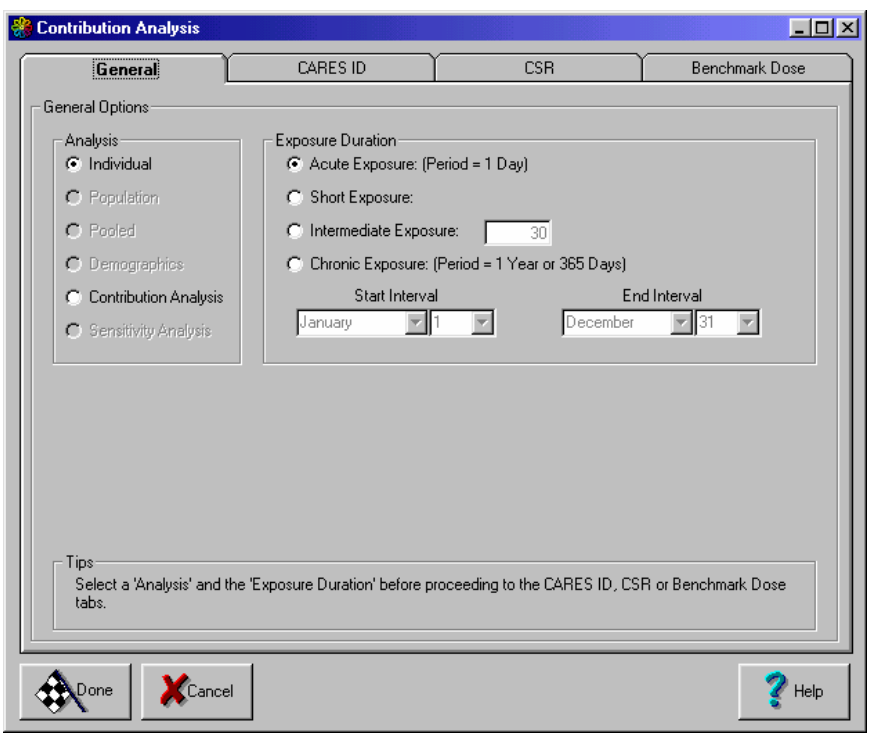
Click on the title bar to select and examine each output data grid in turn.

Conduct Data Analysis

To start the Contribution and Sensitivity Module (CSU), return to the Canvas on the main window. Then right-click on the **Contribution Analysis** icon and click the **Run CSU Module** menu option as illustrated:

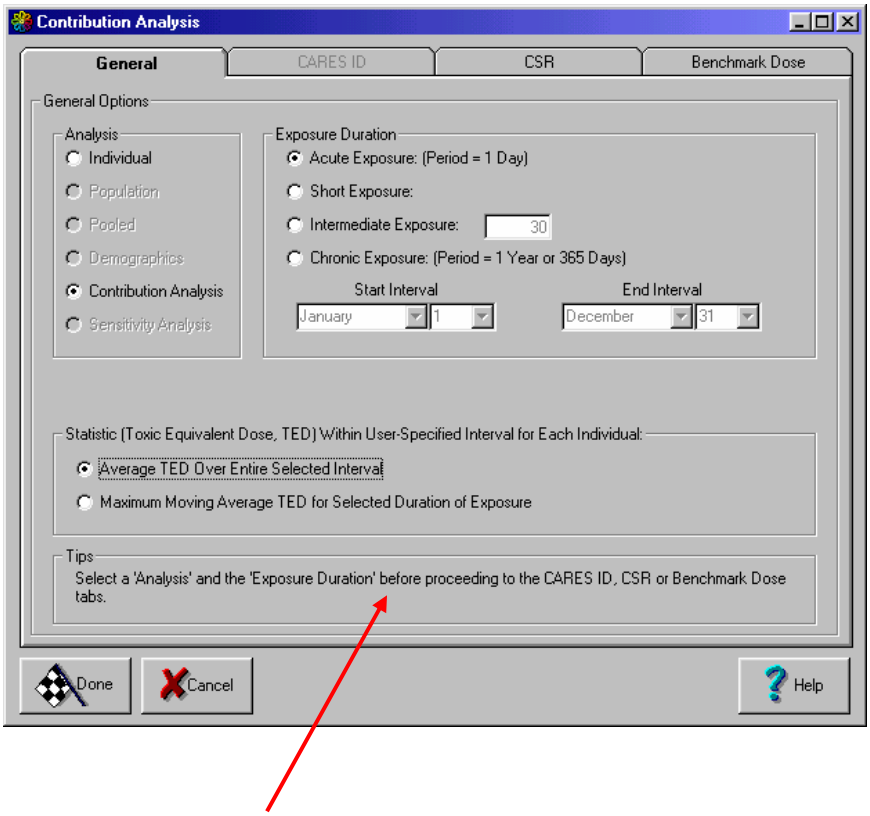


The **CSU Options Dialog** window will appear as follows:



The CSU (Contribution and Sensitivity Utility) is only partially implemented in CARES 1.0. The **General** tab shows six analysis options in the **Analysis** group. Only the **Individual** and **Contribution Analysis** options are available.

The options displayed on the **General** tab vary according to the **Analysis** option selected. For example, click the **Contribution Analysis** button, and the display on the **General** tab will change to the following:



Each tab contains a **Tips** box that gives helpful directions and information about the options available.

Note that the **CARES ID** tab is only enabled when the **Individual** analysis option is selected.

The **Exposure Duration** group provides four options for defining the exposure duration. Only the **Acute Exposure** option is currently available.

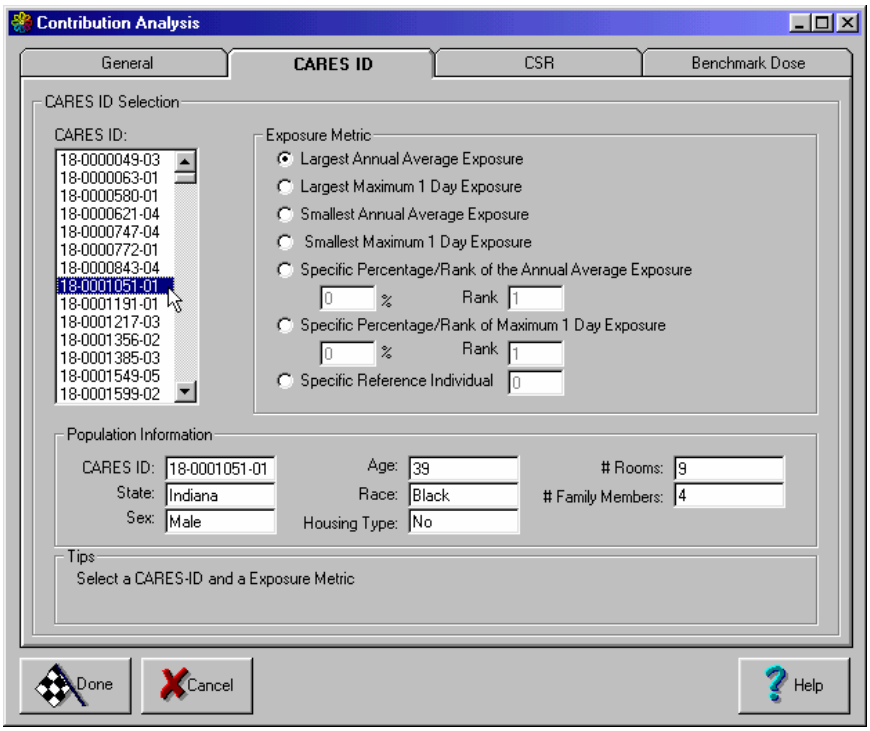
A Quick Look at the CSU

In this tutorial we will only look at one feature of the CSU. A more detailed examination of the available CSU components and displays will be presented in Case Study Tutorial 5 (Chapter 10).

To start, click radio button for **Individual** in the **Analysis** group on the **General** tab.

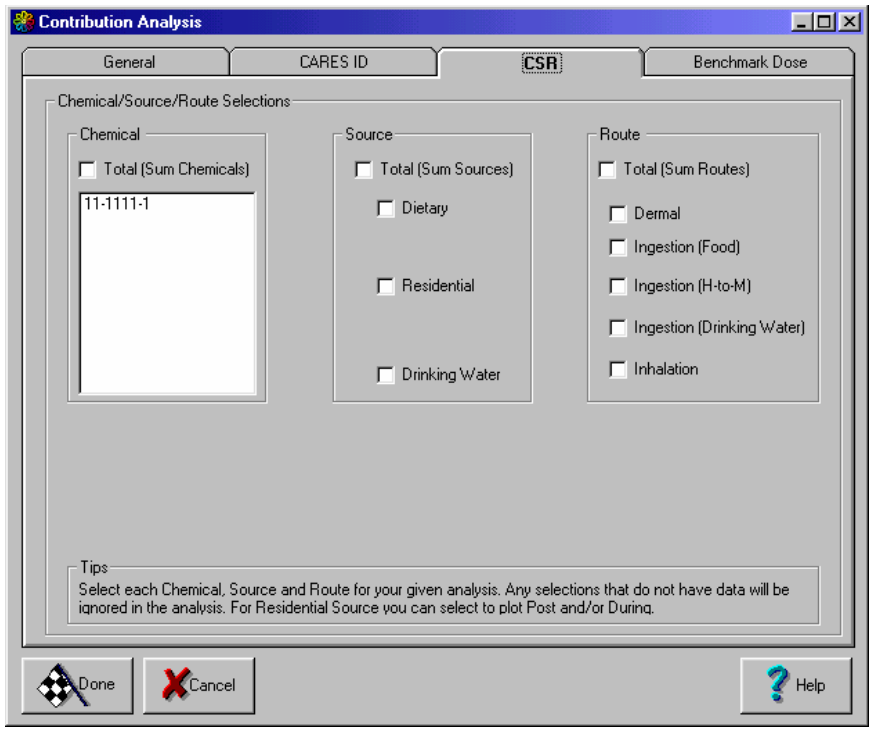
Click the **CARES ID** tab. As shown below, this tab contains a list of all the individuals included in the dietary run, a section for specifying an Exposure Metric, and a grid for displaying each individual's population characteristics:

Selecting an individual under the CARES ID list results in a display of that individual's demographic characteristics in the Population Information group. For example, select individual **18-0001051-01** to get the following screen:

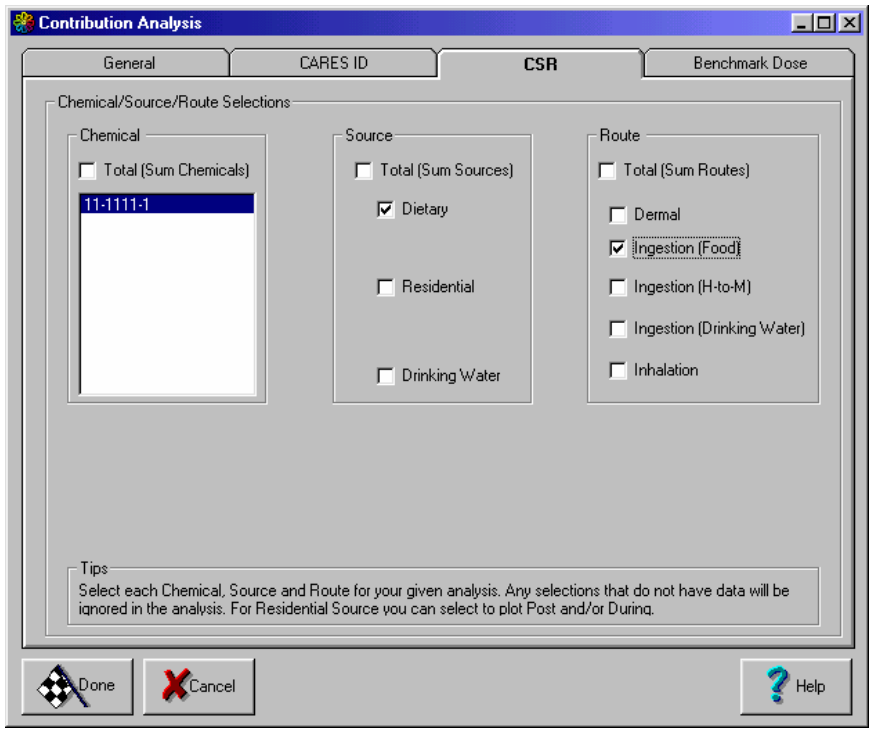


Click on any individual in the **CARES-ID** list to display information about that individual.

Before moving on, select the individual with CARES ID **18-0001217-03**, and then click the **CSR** (Chemical, Source, Route) tab:

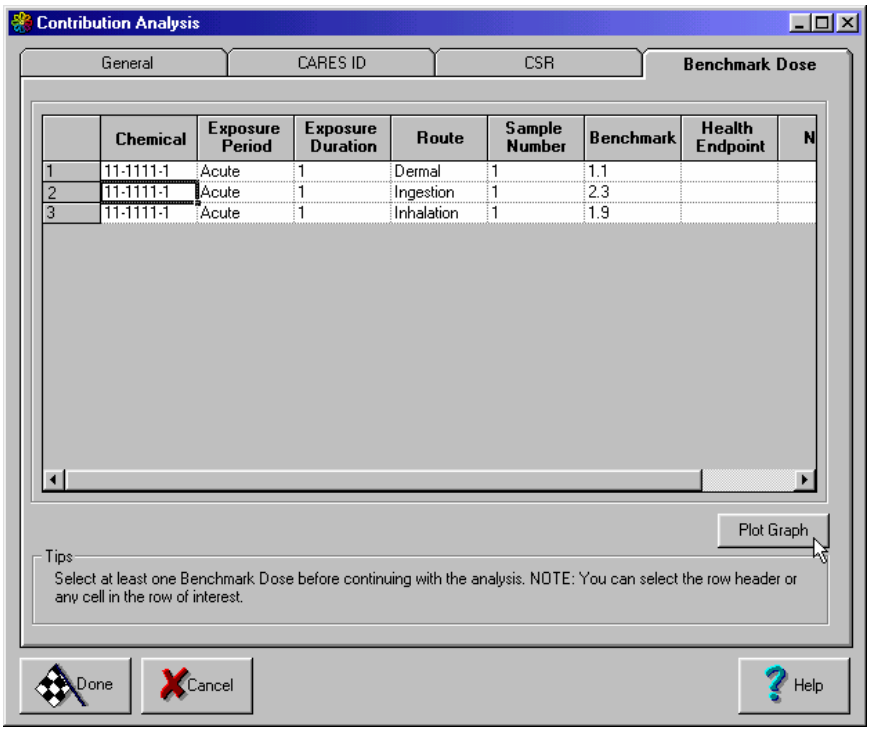


The **CSR** tab provides options for selecting the **Chemical**, the **Source**, and the **Route** of exposure for the individual currently selected in the **CARES ID** tab. Select the options for each of these as shown below:



TIP …	Note, if you select options in the **CSR** tab that are not in your data file, you will get nothing in the output. For instance, in this example we have selected 'Dietary' as the source — we would get no output from selecting the 'Residential' or 'Drinking Water' options.

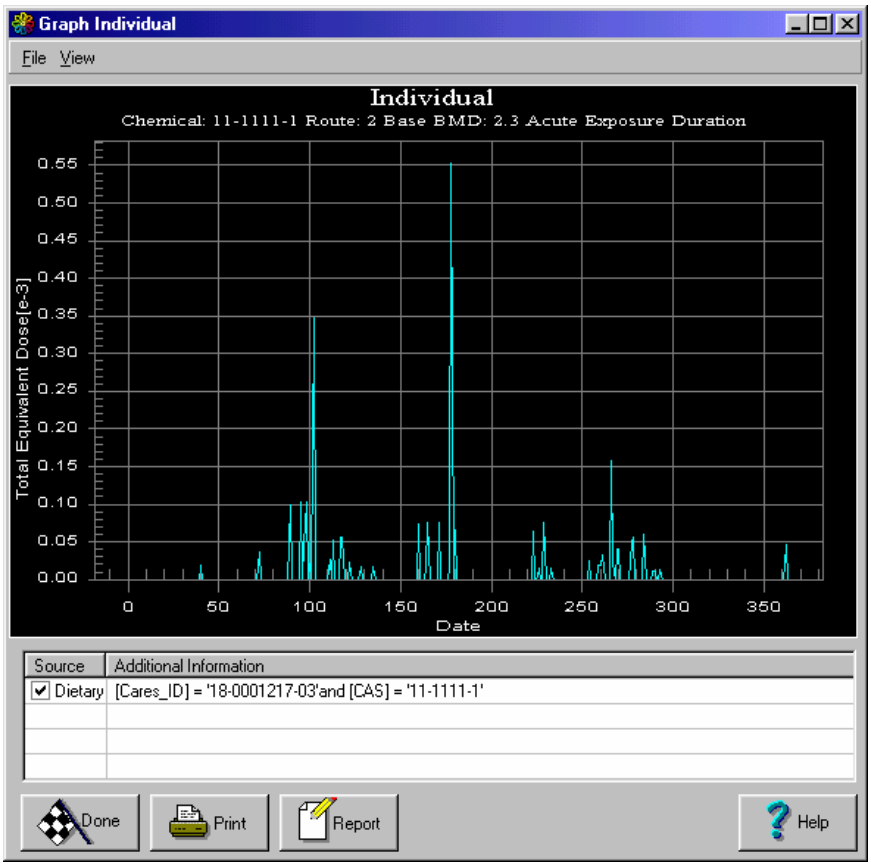
Now click the **Benchmark Dose** tab to reveal three available options as follows:



Since you are performing an acute dietary (ingestion) analysis, select the second row as the Benchmark Dose for the current individual, as illustrated above.

TIP …	To select a Benchmark Dose row, move the mouse icon over the row header until the pointer turns to a right arrow, and then click the mouse once. Alternately, click on any cell in the row of interest.

Next, click the **Plot Graph** button to display the following graph:



This plot uses the options currently in effect as specified in each of the four **Contribution Analysis** tab views. It shows the Total Equivalent Dose for the selected Indiana male individual over 365 days resulting from dietary exposure to Safethrin by ingestion of one or more of the tomato food/ food-forms previously selected.

Note: the CSU allows you to view multiple graphs simultaneously. Leave the first graph on screen, go back and select another CARES ID and click **Plot Graph**

TIP …	Note, the CSU allows you to view multiple graphs simultaneously. To do this, leave the first graph on the screen, and then go back to the **CARES ID** tab and select another individual. Then open the Benchmark Dose tab and click the **Plot Graph** button. A second **Graph Individual** window will open showing the plot of the second individual. You can create and view several plots at a time in this manner.

This concludes your first tutorial.

Click the **Done** button on the **Graph Individual** window to close it.

Click the **Done** button on the **Contribution Analysis** window to close it.

To close CARES, click on the **Close Application** icon on the menu bar of the main window. Alternately, select the menu option **File > Exit**.

Chapter 7 – Tutorial 2: Dietary II

- Case Study Tutorial 2 - Summary
- Create Canvas File
- Specify the Run
- Select Sub-Population
- Select Chemical
- Begin Dietary Data Inputs
- Create Excel File to Import Residue Data
- Continue Dietary Data Inputs
- Save Run Settings
- Run Dietary Module and View Results
- Conduct Data Analysis

Case Study Tutorial 2 — Summary

The following Table summarizes the main features of this Case Study Tutorial. The Module column indicates the applicable CARES module addressed. The Description column describes how you will do the various tasks or options within the module. Shaded description cells indicate "do-it-yourself" type tasks that provide additional detail into program use, rather than using pre-built files or default parameters. Like the first tutorial, this tutorial illustrates all the screen shots encountered in following the instructions so that it serves as a stand-alone tutor.

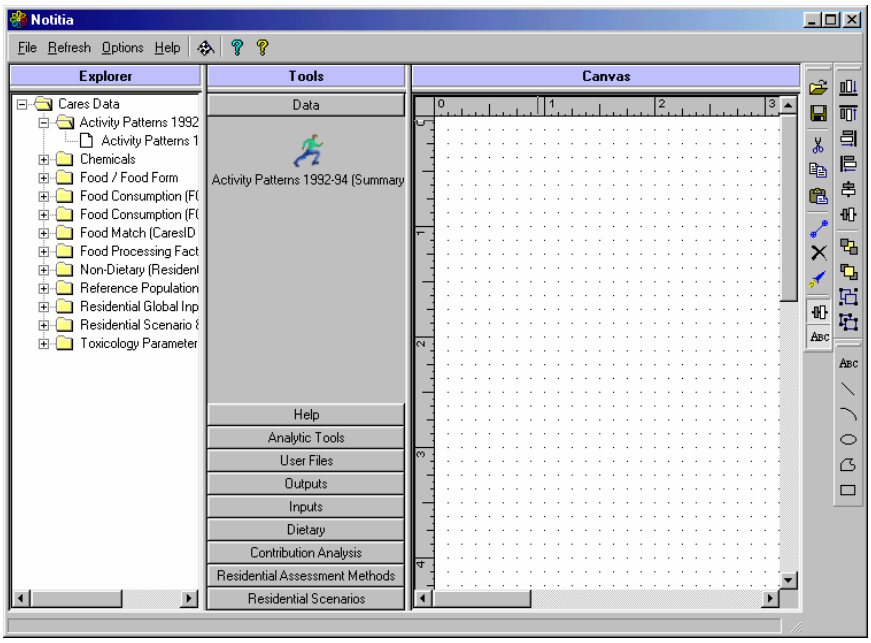
Module	Description
Canvas	Create Canvas file
Population	Select sub-population saved in Case 1
Chemicals	Wobegon
Food/Food Form	Select following file from list: Tomatoes (fruit, paste, puree)
Consumption	Select Tomatoes from list
Residue	Create Excel template and import data Modify Fraction Crop Treated (FTC)
Toxicology	Use defaults
Data Analysis	Plot individual exposure profiles.

Create Canvas File

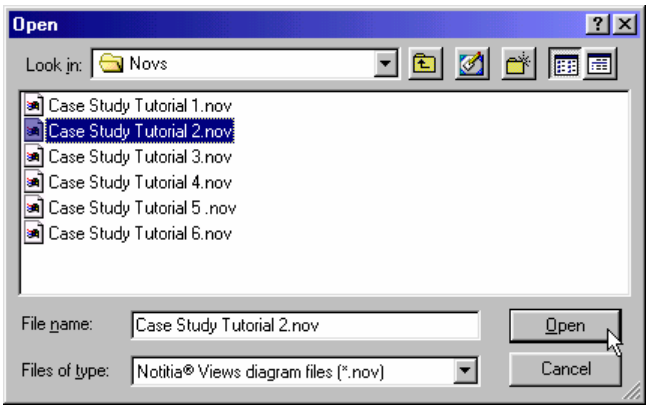
TIP …	In Case Study Tutorial 1, you opened a pre-built Canvas file (which are indicated with the *.NOV extension). In this section, you will learn how to set up and save a new Canvas file for conducting a dietary assessment. Case Study Tutorial 4 will give you another opportunity to create a Canvas model.

Begin this tutorial by starting CARES from scratch. To start CARES, double-click the CARES shortcut icon, if it is located on your desktop. Alternately, click **Start > Programs > Notitia > CARES**.

The main CARES window appears as follows:



Click on the **Open NOV File** button located on the Diagrammer toolbar. The standard Windows Open dialog box appears similar to the following:

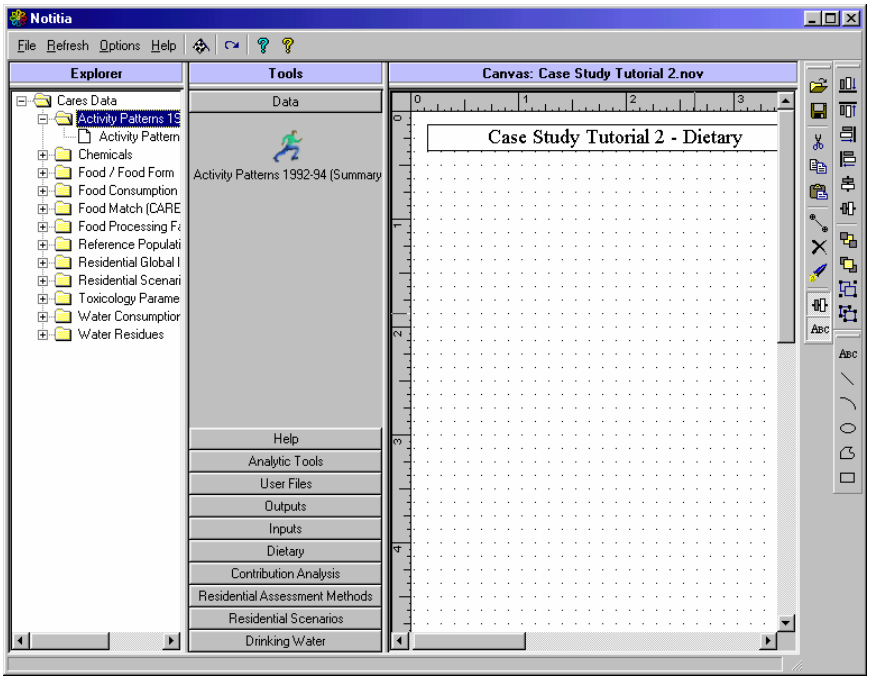


You may need to navigate to the Novs Folder, which is located in your Notitia directory (c:\notitia\novs). Files with the *.nov extension are used to capture and redisplay a pre-built Canvas setup.

For this tutorial, select the file named **Case Study Tutorial 2.nov** then click **Open**.

After clicking the **Open** button, the system will respond with the following dialog indicating that the ***.nov** file is loading:

When finished, the Main Window and Canvas will look like this:



TIP ... Draw Text Save NOV	Note that the only thing the Canvas you opened contains is the single line of text. You will add and connect icons representing the needed modules in the steps that follow. Although this simple Canvas was prepared in advance, you could just as well have started with the blank Canvas and added the text box yourself using the **Draw Text** tool on the **Annotation** toolbar. Then, saving the file with the name shown in the Canvas title bar (using the **Save .NOV** button on the **Diagrammer** toolbar) would bring you to the same point we are now: ready to open the Canvas file and add more items.

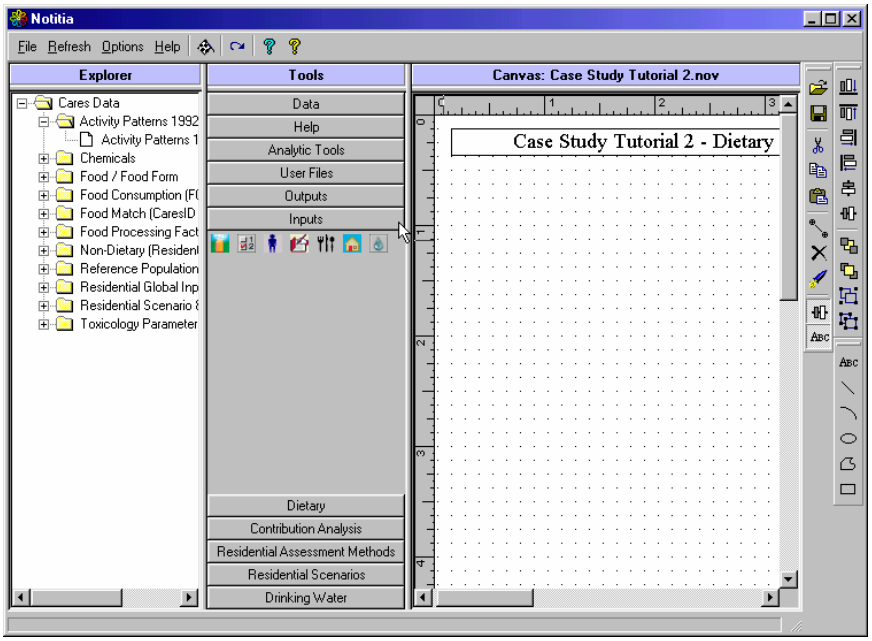
Building a CARES Model on the Canvas

A CARES model is built using icons representing various modules or calculation components. Arrows are attached to the icons to indicate how each serves as an input or output to others. The top-level hierarchy of icons (modules) common to any model consists of the **Chemical Selector**, the **Population Selector** and one or more selector for each of the three exposure modules: the Food Selector (**Dietary), Scenario Selector** (**Residential)**, or the **Water Selector** (Water).

These five top-level selector modules serve as the primary starting point for defining the characteristics of any risk analysis and assessment you wish to perform. There preeminence in the scheme of things is indicated by the pictorial panel appearing on the left side of each of their windows. The CARES logo consists of a collage of these five pictures.

Additional icons representing other functions and modules are placed and connected appropriately on the Canvas, as you will soon learn.

All the icons available for building a Canvas model are located in the various Tool Drawers in the center of the main window. To reach the top-level set of icons, click on the **Inputs** tab Tool Drawer, as follows:



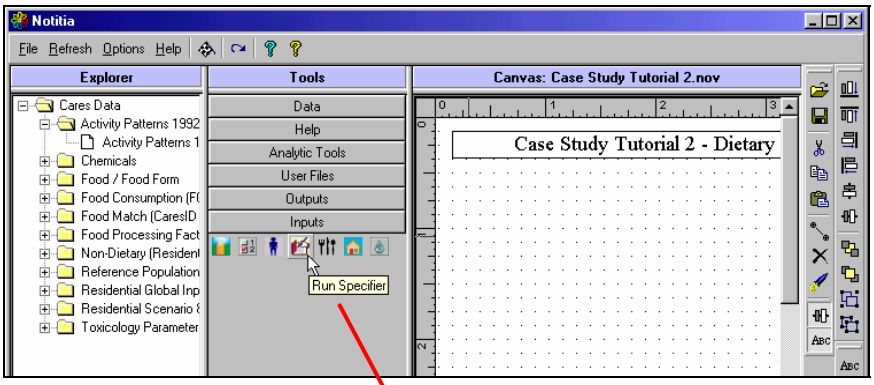
The first step in building any Canvas model is to add the **Run Specifier**. This component allows you to identify the run as well as save the settings configurations you specify for the modular components.

Click-and-Click

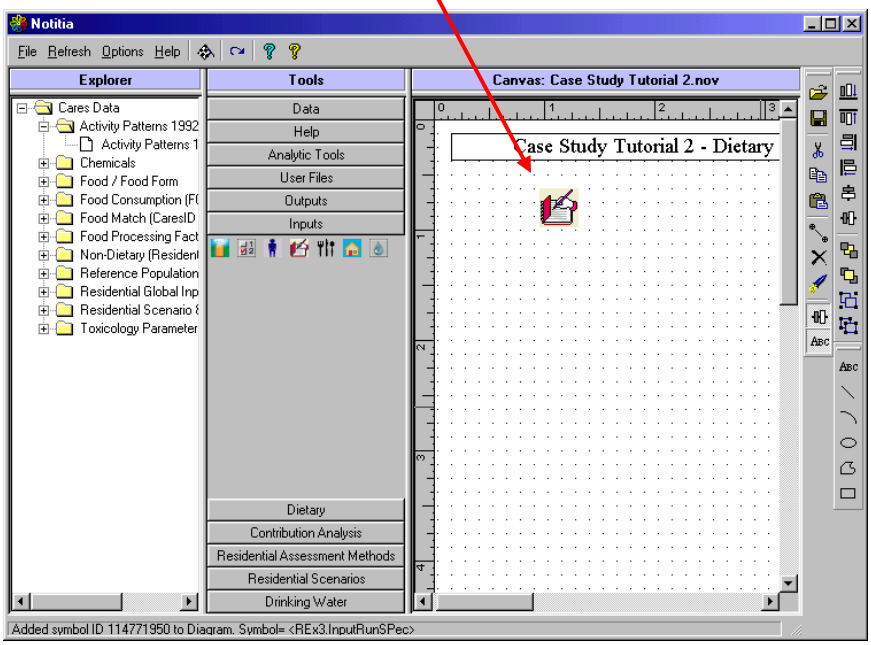
You must place the **Run Specifier** icon on the Canvas to make it available to the model. The technique for copying an icon from a Tool Drawer to the Canvas is called “click-and-click.”

First, look in the appropriate Tool Drawer tab and click on the icon you want to add to the Canvas. Then move the cursor to the area of the Canvas where you want the icon to appear and click again.

Use the click-and-click technique to place the Run Specifier on the Canvas as illustrated in the next two pictures. First, click on the **Run Specifier** icon in the **Inputs** tab:



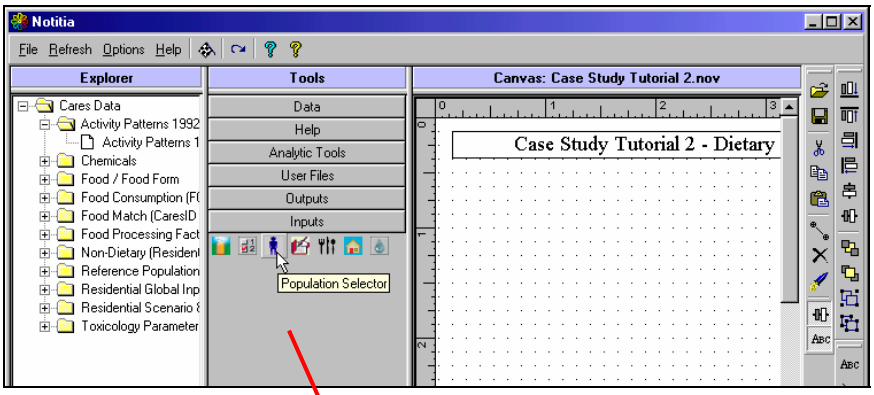
Then move the cursor to the Canvas … and click again:



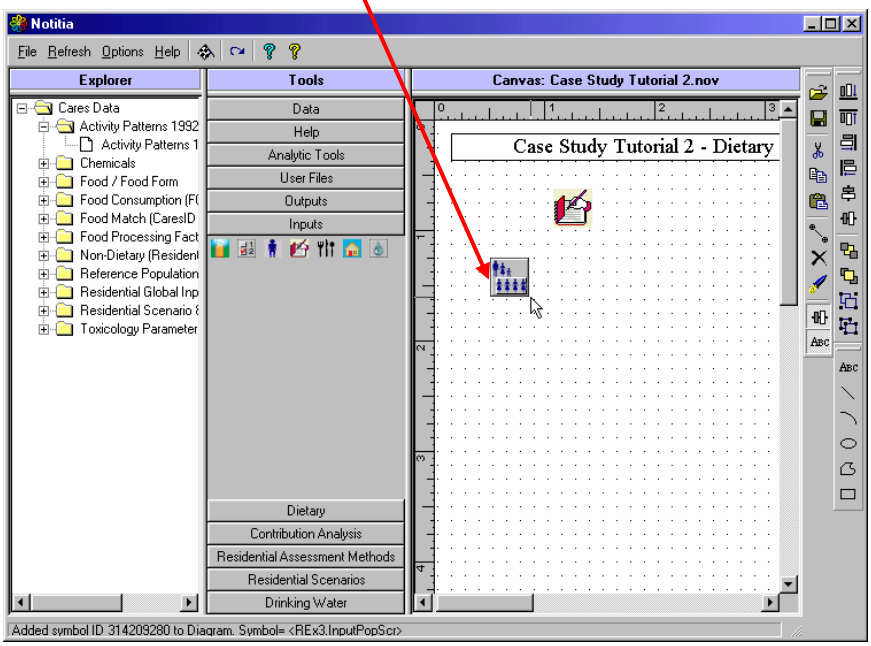
TIP …	**Moving Icons on the Canvas**. To move an icon on the Canvas, click on it. This selects the icon so you can move it to any location on the Canvas using the mouse. Click on an open area of the Canvas to deselect the icon and lock it to its new location. You can also drag the mouse pointer around a group of objects to select and move them as a group.

We will return to configure and apply settings to each item placed on the Canvas after we finish building the Canvas representation of the model and saving it as a NOV file. For now, continue adding model components as follows:

Click on the **Population Selector** icon in the **Inputs** Tool Drawer tab:

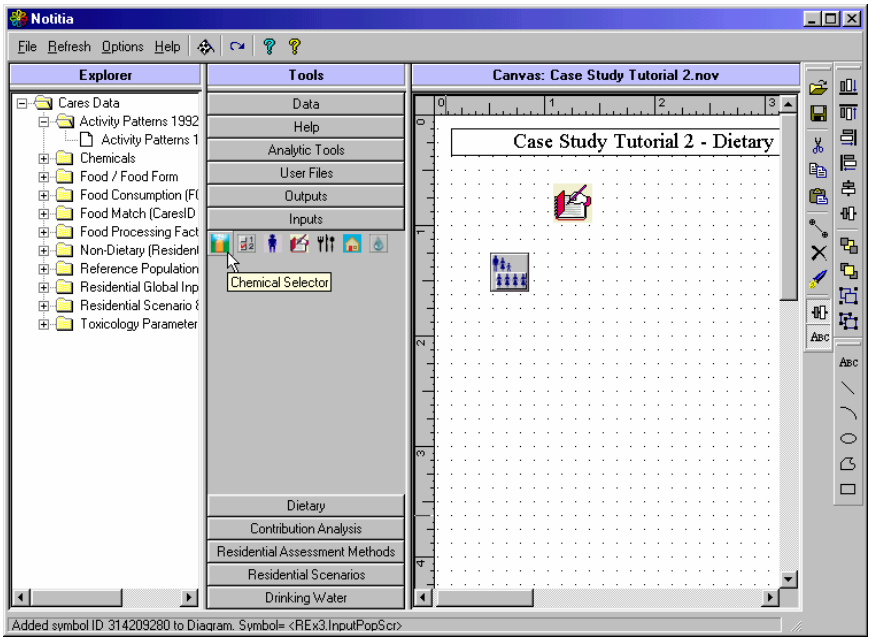


Then move the cursor to the Canvas as shown, and click again:

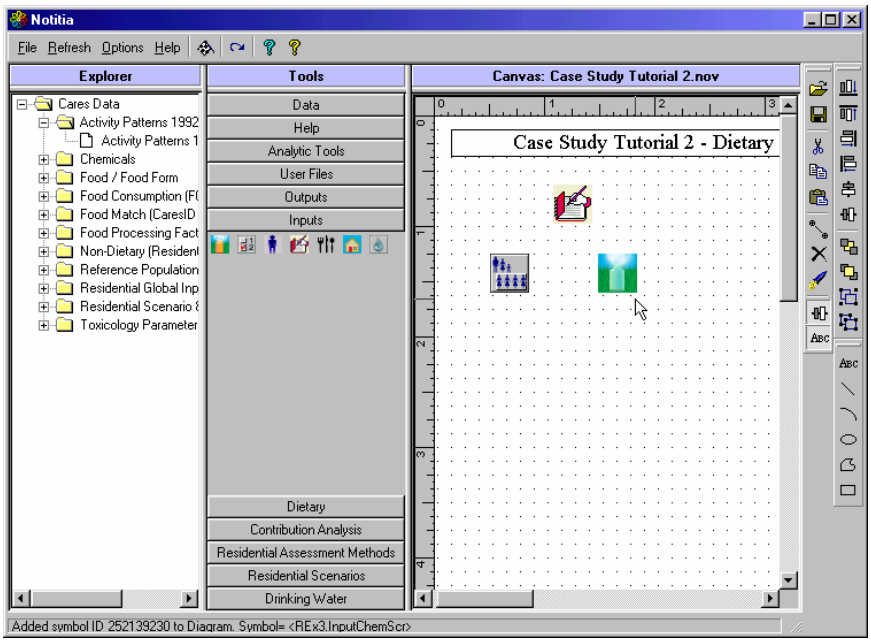


TIP …	Some of the small icons in the Tool Drawers will look slightly different when placed on the Canvas since their increased size allows more detail.

Click the **Chemical Selector** icon in the **Inputs** Tool Drawer tab:

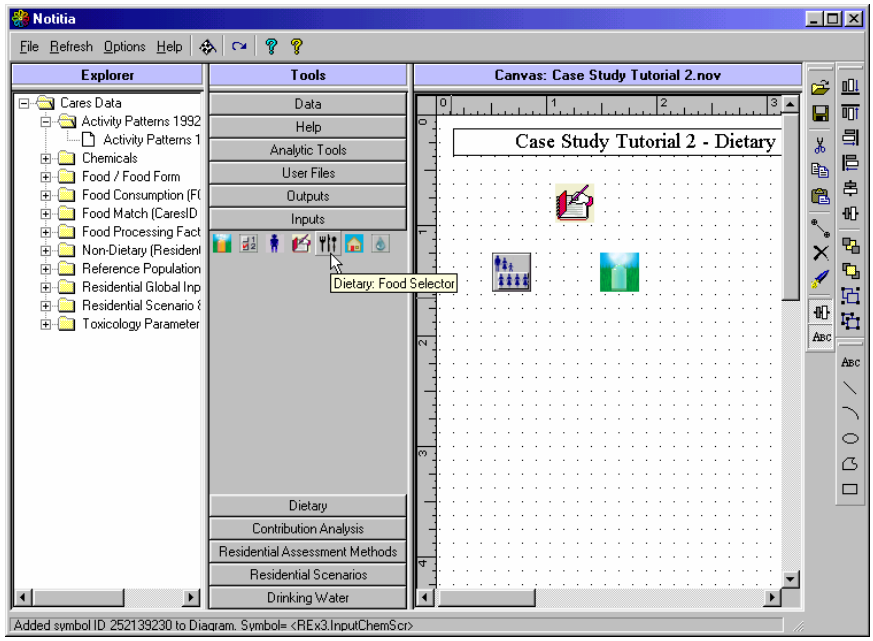


As before, move the cursor to the Canvas area indicated below, and then click again to place the icon:

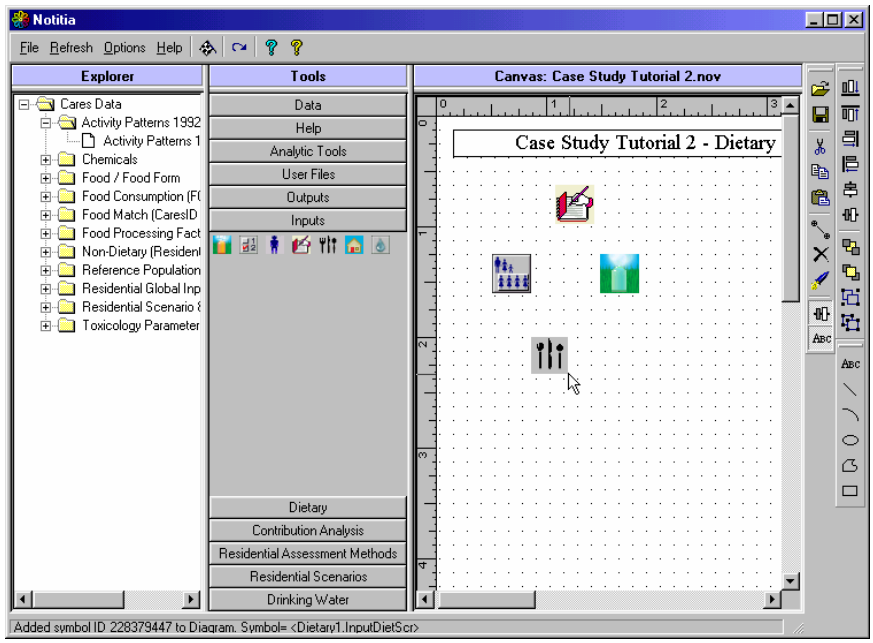


The three icons now placed in your Canvas are required for any model. Now you need to continue by adding the components used for the dietary exposure source module.

Since you are building a dietary model, click the **Food Selector** icon in the **Inputs** Tool Drawer tab:



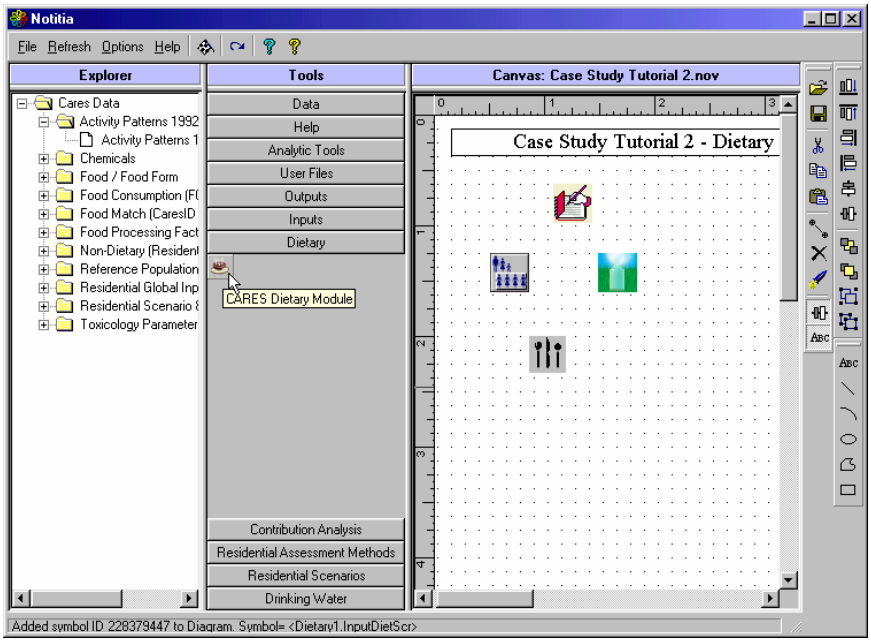
Move the cursor to the Canvas area indicated below, and click again to place the icon:



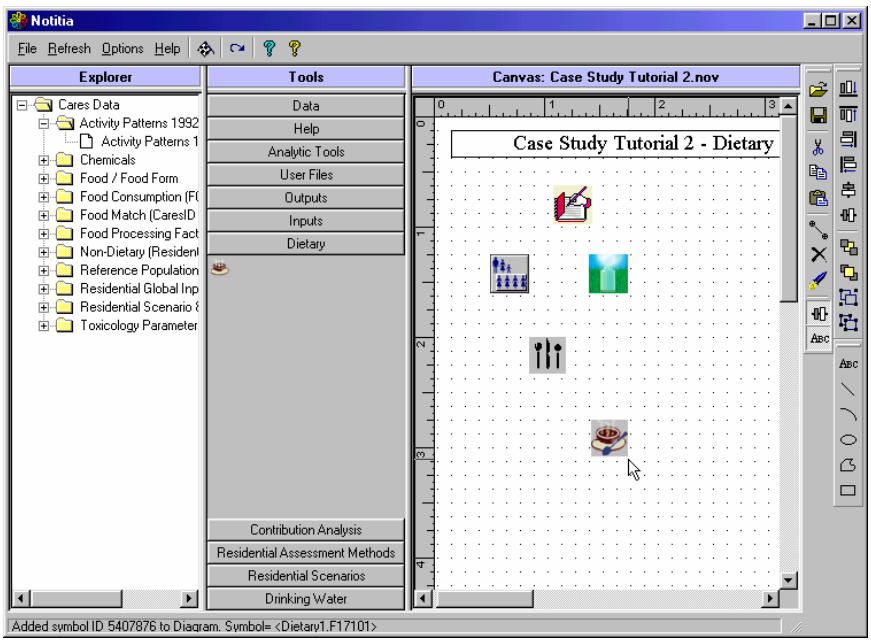
So far, the model consists of the **Run Specifier**, the two necessary **Population** and **Chemical Selectors**, and the **Food Selector** as the primary inputs.

Since this is a dietary model, you next need to add the **Dietary Module**, which will apply the dietary algorithms to the food selection inputs you set up in the Food Selector.

In the **Tools** panel, click the **Dietary** tab to open the drawer, and then click the CARES Dietary Module icon called **Food Match**:

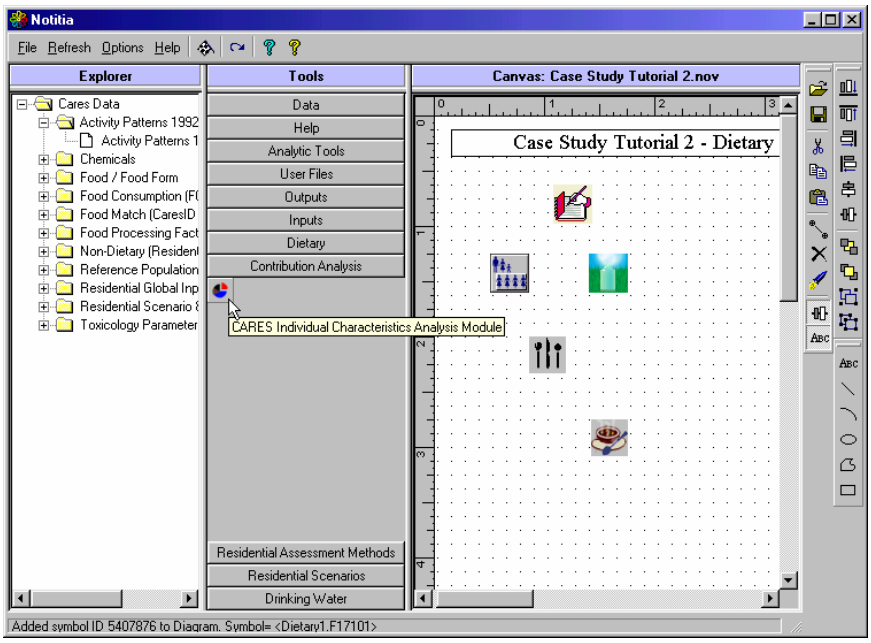


Move the cursor to the Canvas area indicated below, and click again to place the icon:

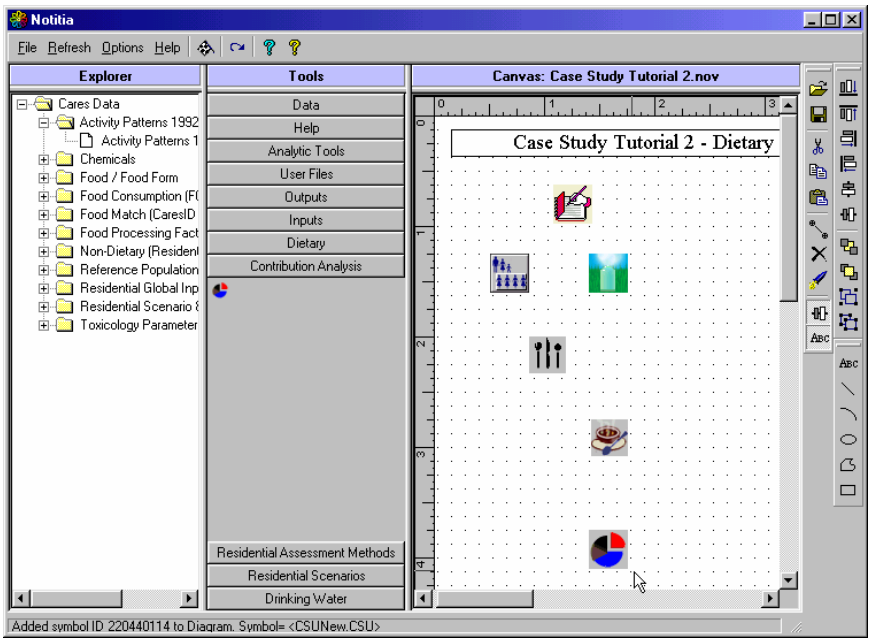


The final component needed for the dietary model is the contribution analysis module used to analyze and explore the results of the dietary exposure calculations.

In the **Tools** panel, click the **Contributions Analysis** tab to open the drawer, and then click the **CARES Individual Characteristics Analysis** icon:



Move the cursor to the Canvas area indicated below, and click again to place the icon:



Linking Canvas Components

After the objects that represent the components of your model are assembled on the Canvas, they need to be linked together to show how each is related to the other in terms of data inputs and outputs. In general, the top-level selectors (such as the Population Selector and Chemical Selector) serve as inputs to the exposure module components. The exposure components can in turn serve as inputs or outputs to each other, and ultimately provide data for contribution and sensitivity analysis of the exposure results.

For example, in this tutorial dietary model, the Population Selector generates a sub-population that is used as input for the Food Selector. The Food Selector, in turn, links to the Dietary Module. The Chemical Selector also links to the Dietary Module to define the chemical of interest. The Dietary Module uses these two data input streams to generate the sub-population food exposure results for the specified chemical and passes these results to the Contribution and Sensitivity Analysis module for further analysis and display.

Each individual exposure scenario (Dietary, Residential, and Water) is constructed with a specific set of model objects that are logically linked to each other. The various Canvas illustrations in these Case Study Tutorials illustrate model setup configurations for each type of discrete exposure analysis. Case Study Tutorial 5 (Chapter 10) illustrates how to combine exposure pathways and different chemicals to conduct aggregate and cumulative analyses.

How to Link Objects

The **Link** tool located on the **Diagrammer** toolbar is used to link two Canvas objects. You make a link by first clicking on the Link button to activate it, and then clicking in turn on each of the two Canvas objects in the order in which the data flow should proceed. If the link is allowable, a dashed blue arrow will connect the two objects together representing the link. Once made, the linking arrow will remain intact even if you move the objects around on the Canvas.

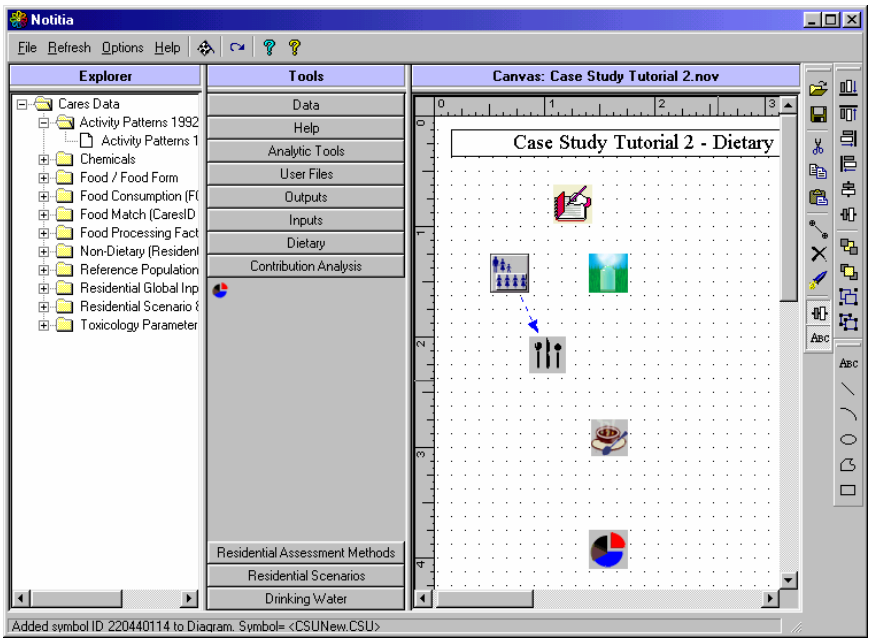
Continue building the dietary model on the Canvas by linking the Population Selector to the Food Selector as follows:

1. Click the **Link** button on the **Diagrammer** toolbar.

2. Move the cursor to the Canvas and click the **Population Selector** icon.

3. Immediately click on the **Food Selector** icon.

The dashed blue arrow indicating the linking of the objects will appear as shown:



TIP …	The Link button deactivates after the two objects are linked. You must click the button again for each connection you wish to make.

Continue linking the remaining Canvas objects as follows:

4 Click the **Link** button on the **Diagrammer** toolbar.

5 Move the cursor to the Canvas and click the **Food Selector** icon.

6 Immediately click the **Food Match** icon.

7 Click the **Link** button on the **Diagrammer** toolbar.

8 Move the cursor to the Canvas and click the **Chemical Selector** icon.

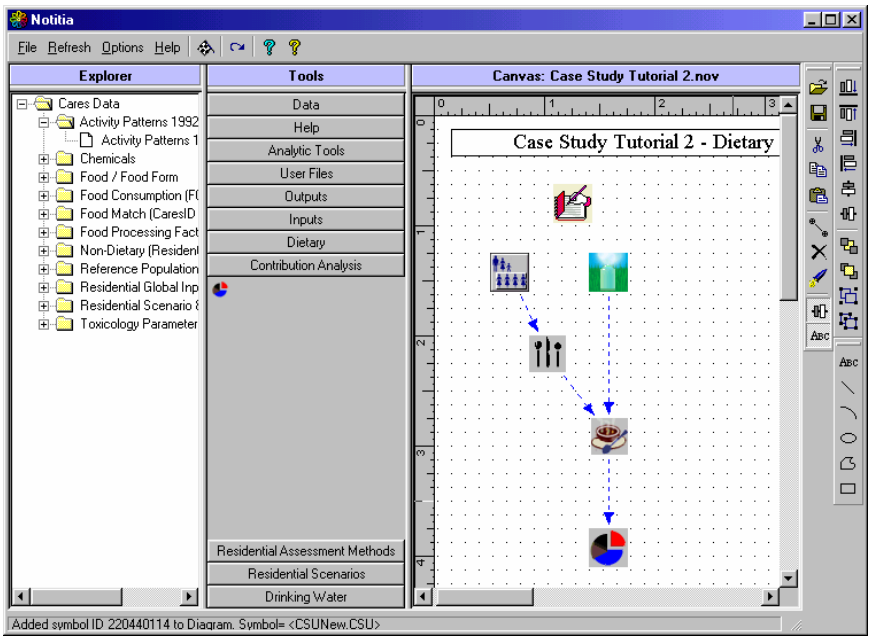
9 Immediately click the **Food Match** icon.

10 Click the **Link** button on the **Diagrammer** toolbar.

11 Move the cursor to the Canvas and click the **Food Match** icon.

12 Immediately click the **Contribution Analysis** icon.

When you have completed linking the objects, the Canvas should appear as follows:



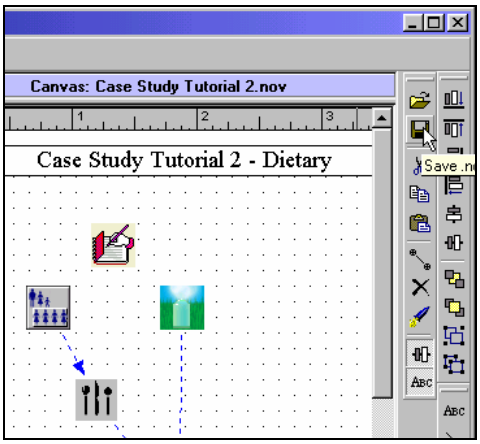
TIP …	Note that the **Run Specifier** is not included in a link because it is not part of the data flow. Rather, it functions globally each time this model is run to identify the run and save the settings for all the linked components.

You have completed building the Canvas model for a dietary exposure assessment. After learning how to save and reload this Canvas, we will continue with setting the configuration of each object in the model.

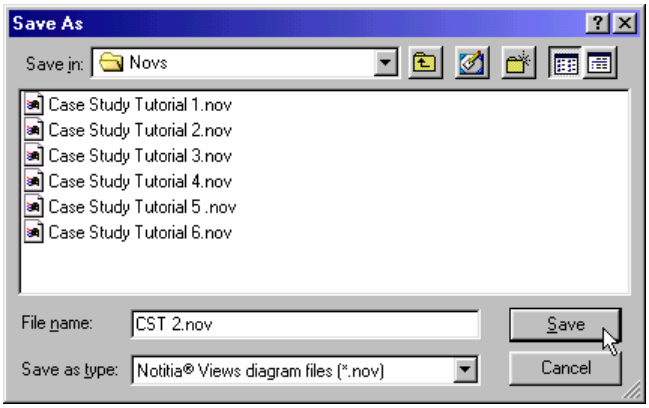
Saving and Re-opening the Canvas File

At this point you should save the Canvas file so you don't have to build it again each time your want to use it.

To save the Canvas model, click the **Save As** button on the **Diagrammer** tool bar:



The **Save As** dialog window will open by default to the Notitia **Novs** folder ready for you to name and save the Canvas file. If necessary, navigate to the c:\Notitia\Novs directory so that the **Save As** window appears as follows:



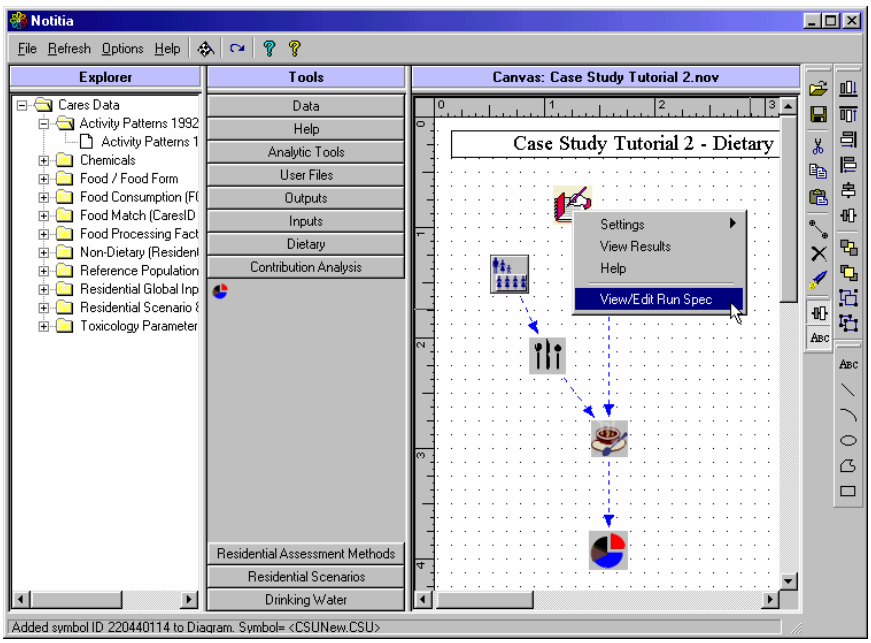
Enter a file name for the Canvas such as "**CST 2**" and click the **Save** button. The **nov** file type extension will automatically be added to your filename.

To open the Canvas file again, click on the **Open NOV File** button located on the **Diagrammer** toolbar. The standard Open dialog window will appear similar to the Save As window above, except it will contain the file you just saved. Select the file and click **Open**.

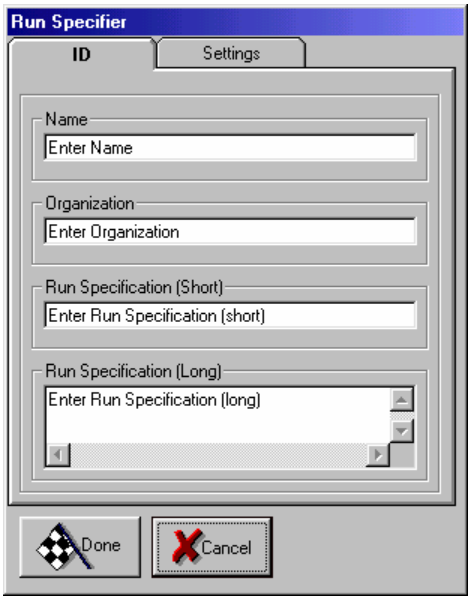
When you have completed saving and re-opening the Canvas, continue with adjusting the settings of each component of your dietary model, beginning with the **Run Specifier**.

Specify the Run

Right click on the **Run Specifier** icon to open a context menu list. Then select the **View/Edit Run Spec** menu option as illustrated:



The **Run Specifier** window will open as follows:



The **ID** tab in the **Run Specifier** window provides default instructions for each of the entry fields available for you to enter details describing this particular run. The **Settings** tab, which we shall use later, provides the

options for saving all the module settings associated with this particular Canvas when you save it as a NOV file.

The logical use of the **Run Specifier** is as follows:

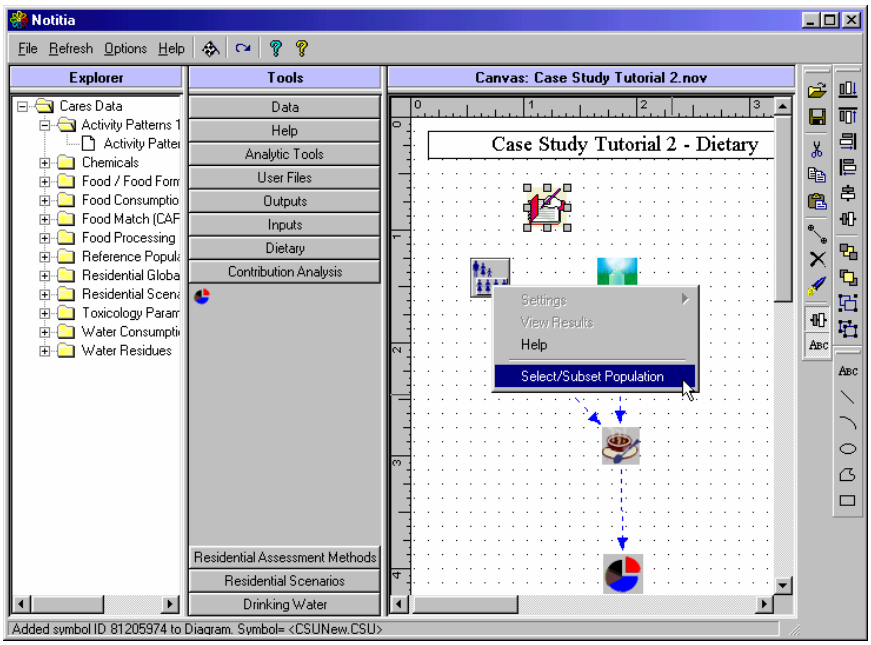
1. Start the **Run Specifier** and open to the **ID** tab. Fill in the identification information for the current run. Then click OK to close the window.
2. Continue applying the settings for each module or component on the Canvas.
3. Before clicking the **Run Canvas** button, return to the **Run Specifier** and open the **Settings** tab where you will find options to save the module settings you just established. The information on the **ID** tab is saved along with these settings to a file that you name.

For now, fill in the four information fields in the **ID** tab of the **Run Specifier** window with some appropriate identifying text, and then click **Done** to close the window. We will return to the **Run Specifier** to save the settings later.

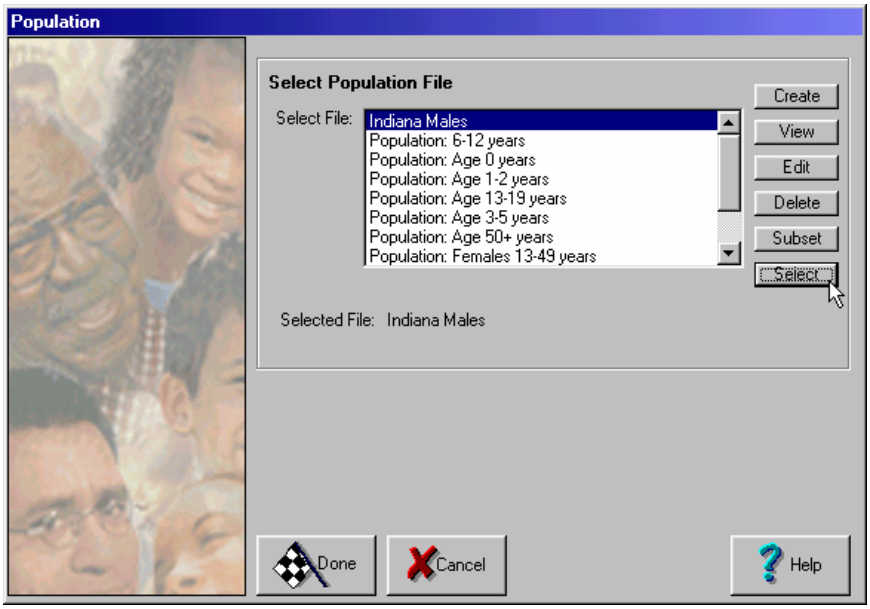
TIP …	Note that using the **Run Specifier** is a required step, even though you may not intend on saving the settings for reuse in this or a future run. Its main advantage is that it *will* save you the time of redoing all the settings if you do decide to reload the same Canvas NOV file.

Select Sub-Population

Right click on the **Population Selector** icon and select the **Select/Subset Population** menu option:



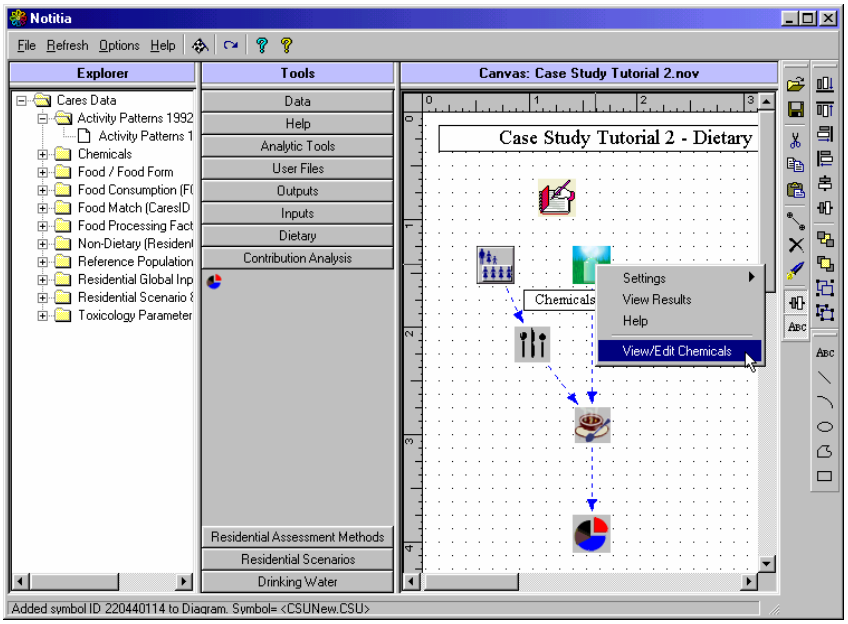
The **Population** window will open showing a list of available sub-population files similar to the following:



Select the '**Indiana Males'** file by highlighting the file name, and then click the **Select** button, as shown above. Note that the file name now appears as the **Selected File:** text. Click **Done**.

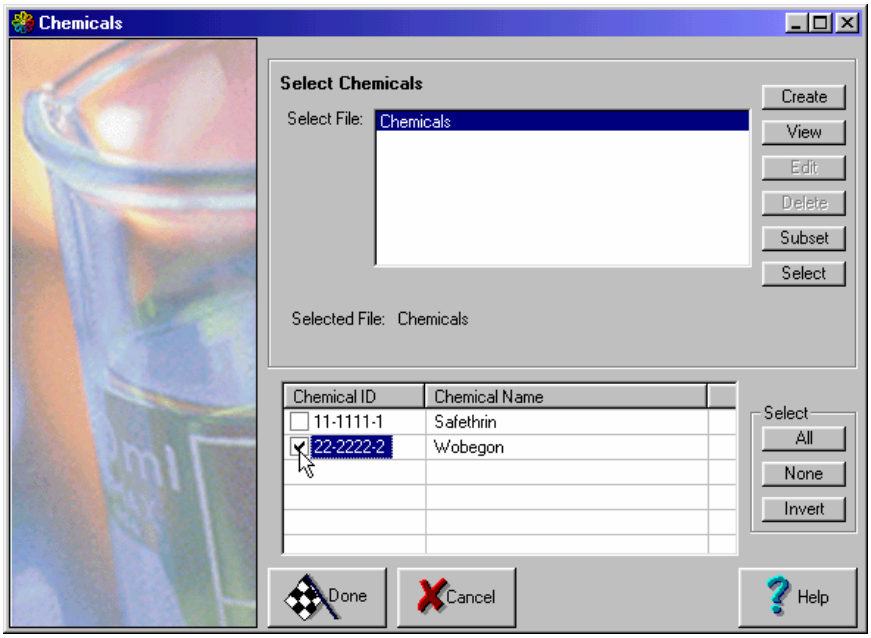
Select Chemical

Right click on the **Chemical Selector** icon to bring up the context-sensitive window as follows:



Click the **View/Edit Chemicals** option, as shown above.

This opens the **Chemical Selector** window:



Note that when the above window first appears, the bottom pane is blank.

In the **Chemical Selector** window, the **Select File** pane displays saved files that contain the details of one or more chemicals that will appear in the lower grid when the file is selected.

Highlight the file named **Chemicals** and click **Select**. Alternately, double click on the file name **Chemicals**. In this case, there is only one file to select from, so it is already highlighted when the window first opens.

When the Chemicals file is selected, two chemicals appear in the bottom grid, as shown above. Select the chemical **Wobegon** for use in this tutorial by clicking on the check box next to the CAS number (**22-2222-2**) in the **Chemical ID** column.

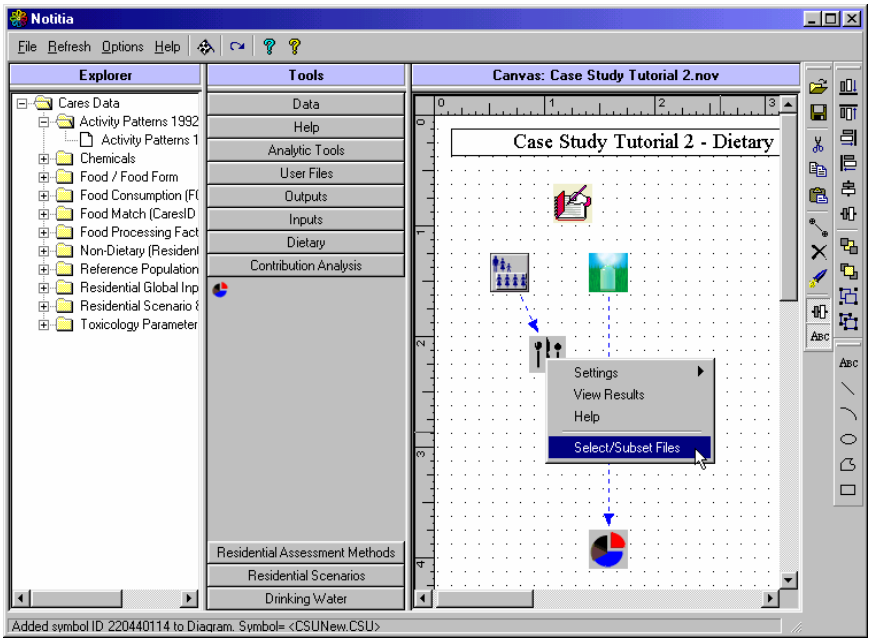
Note that the chemical file you selected appears after the **Selected File:** text. This is a feed back notice showing the program's awareness of your chemical selection.

Click **Done** to close the **Chemical Selector** window and return to the main CARES window.

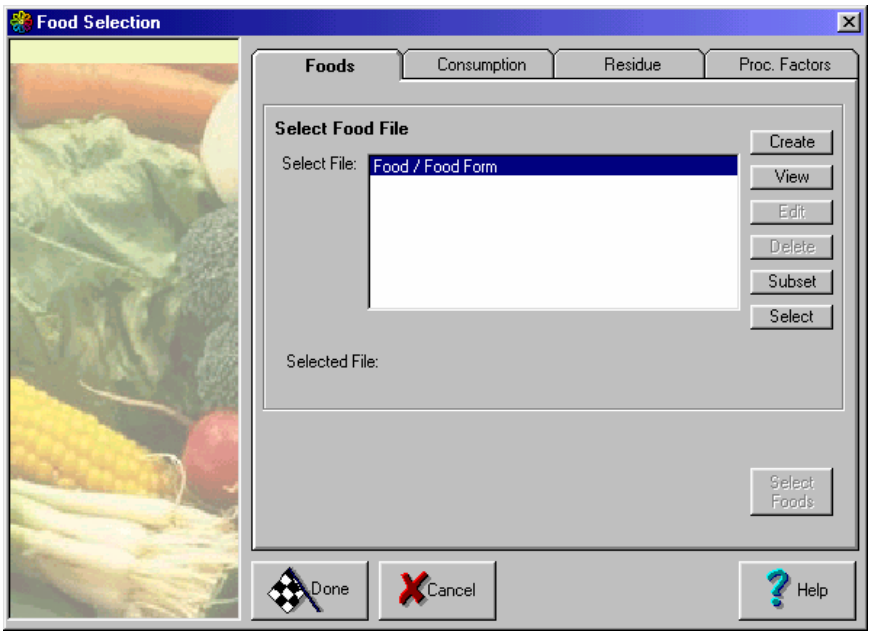
Begin Dietary Data Inputs

The Food Selector and Match Foods components on the Canvas together comprise the dietary exposure calculation module. In this section, you will begin working through the four tabbed parts of Food Selector window. In Case Study Tutorial 1, you created a Food/Food Form file for tomatoes and saved it. In this tutorial, you will simply call up and use the same file. By contrast, in the first tutorial you simply pointed to a residue file while working through the Food Selector options. In the next section, you will learn how to make use of an Excel template to import your own residue data. After completing the import procedure we will return to completing the set up of the dietary components.

To begin setting up the inputs for the dietary module components, right click on the **Food Selector** icon on the Canvas, and then click on the **Select/Subset Files** menu option at the bottom of the context-sensitive window.



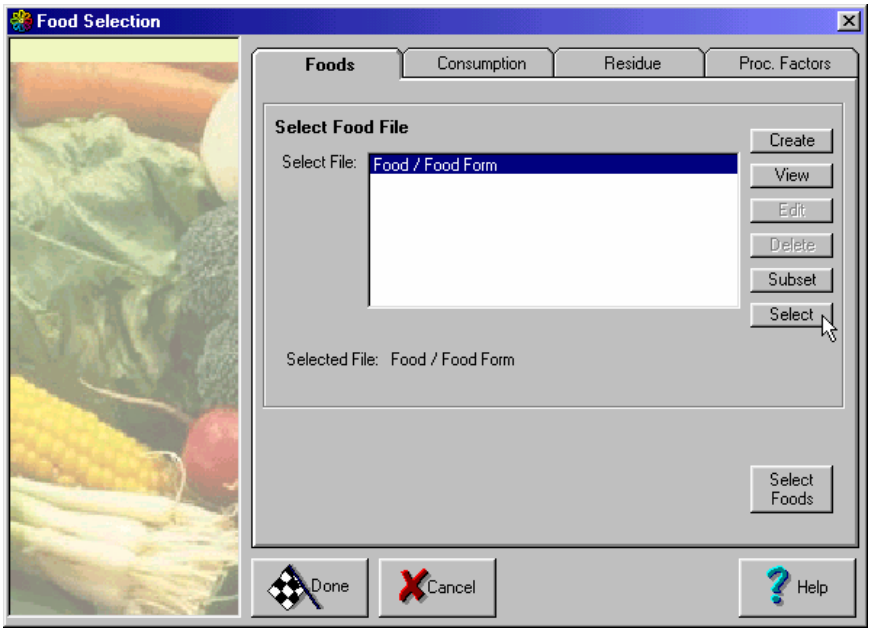
The **Food Selection** window opens as follows:



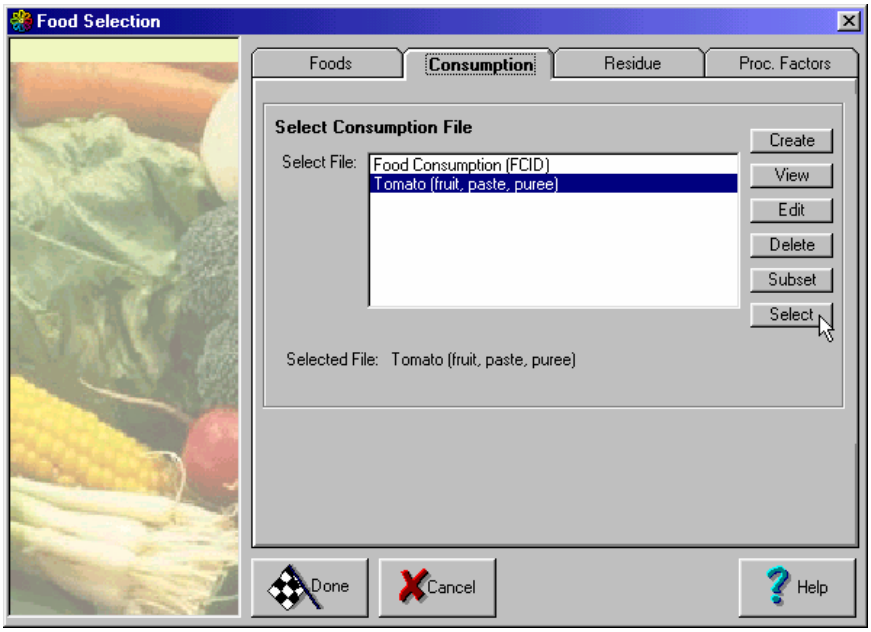
The **Food Selection** window contains four tabs that are accessed in order from left to right to set up a dietary database for analysis. By default, the **Foods** tab should be active when the window opens. If not, click on the tab to activate it (as shown above).

Double click on the file **Food / FoodForm** (or click on that file name and then click the **Select** button).

This action writes the selected filename as the **Selected File:** and activates the **Select Foods** button. In the previous tutorial you created and saved a subset of tomatoes by following the instructions after clicking the **Select Foods** button. You will recover and use that file in the next step. For now, click on the **Select** button, as shown:



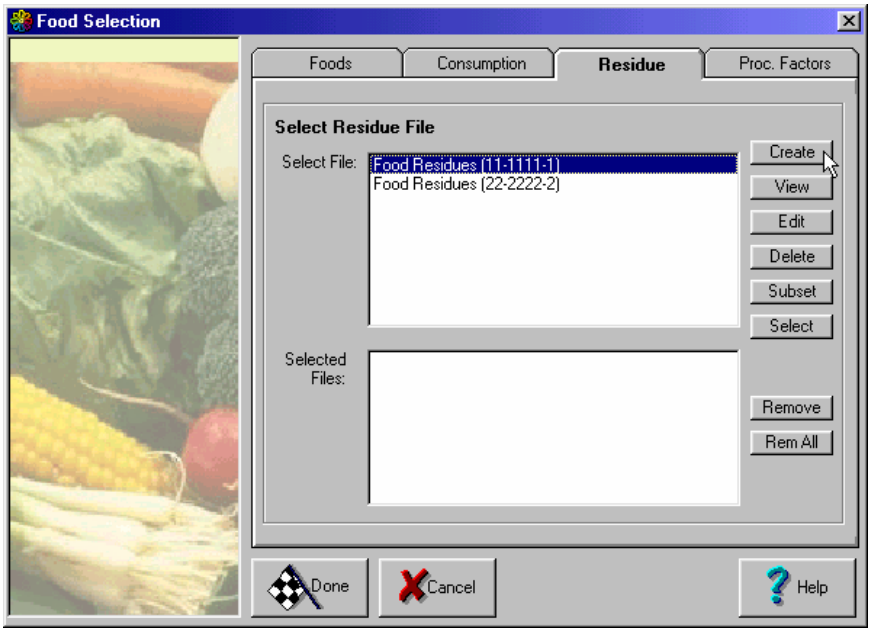
Click the **Consumption** tab and select the file **Tomato (fruit, paste, puree)** from the list to highlight it. Then click **Select**, as shown



TIP …	Reminder: before leaving any tab in the Food Selection, make sure that the selected file name appears after the **Selected File:** text.

Create Excel File to Import Residue Data

Click the Residue tab to obtain the following view:



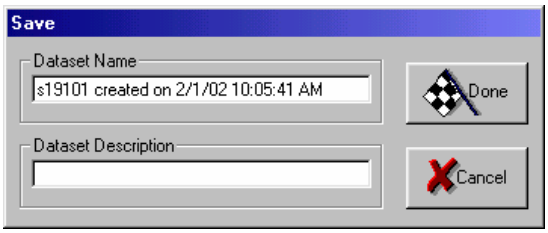
In this section, you will learn how to import your own residue data.

By way of background information, CARES uses specially constructed Notitia™ data grids or tables for handling data files. Although you can edit the content of some Notitia™ tables (as signified by an active **Edit** button appearing on editable data grids), you cannot create a Notitia™ table file directly – this has to be done for you by the program so that the file contains the right structure for use in the program.

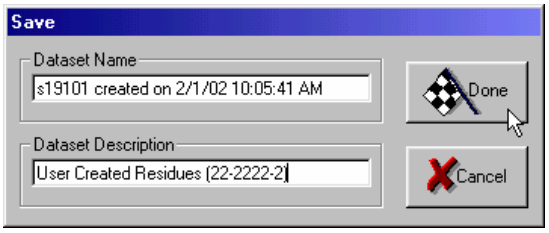
The method for importing your own data in a form that CARES can use starts with accessing a Microsoft® Excel template that will create a spreadsheet for you to place your data in. The spreadsheet is set up to collect your data in a standardized manner that CARES can handle. The program then reads the spreadsheet and imports the data, converting it into a readable Notitia™ table ready for use in your dietary module.

To begin this manual data importing process, click the **Create** button, as illustrated above.

A Save window will appear showing an assigned **Dataset Name**.

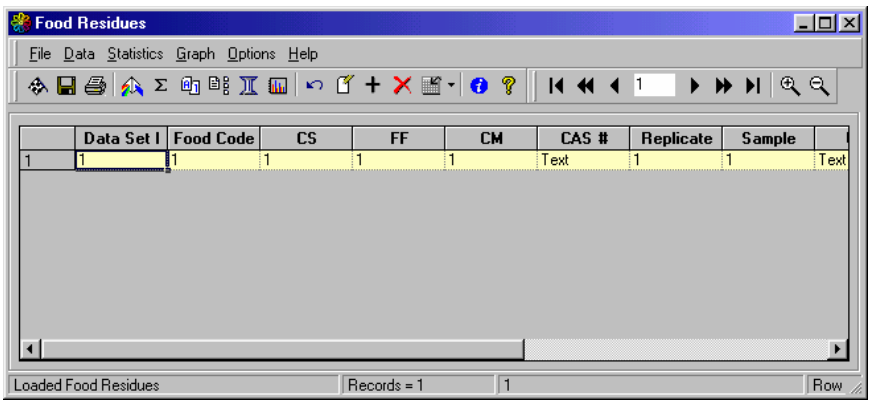


Do not change the assigned dataset name, but do type in an appropriate description in the Dataset Description field, such as that illustrated below. Later, you will use the same description as the name of your Excel file.



Click **Done**.

The Food Residues window opens as follows:



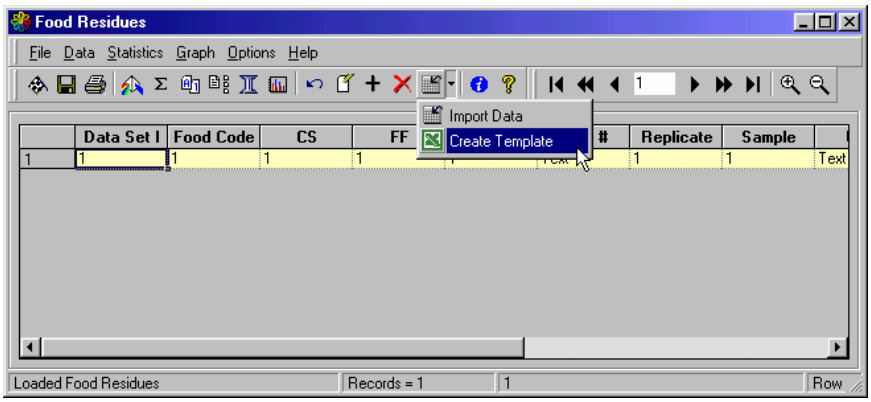
The **Food Residues** window is, in fact, an editable Notitia™ data grid showing a pre-defined set of column titles and a single data row containing placeholder data (which is required by the system to set up the grid).

TIP … Note that the row color on a data grid display changes depending on the type of grid, as follows::

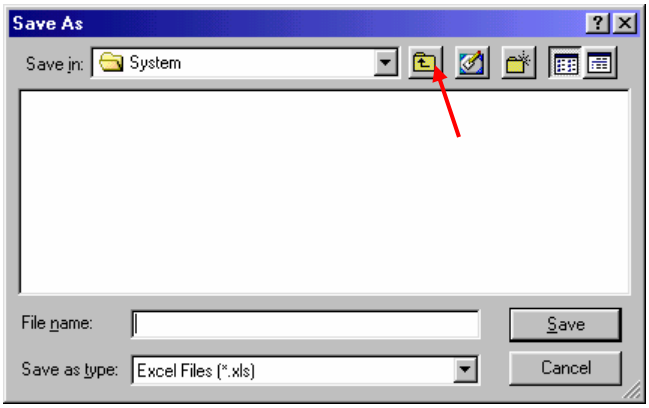
- Blue/white – original, stored, un-editable data
- Green/white – queried subset, un-editable data
- Yellow/white – editable data
- Pink/white – summarized data

Leave the Food Residue window open while you complete the following steps.

Click the drop-down arrow on the **Import** button and select the **Create Template** option, as follows:

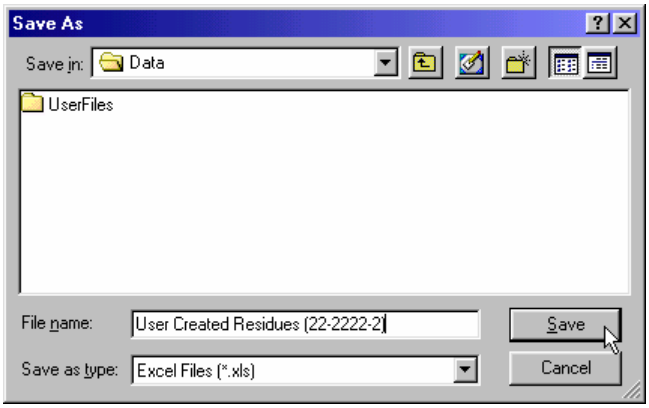


The standard Save As dialog box will appear as follows:



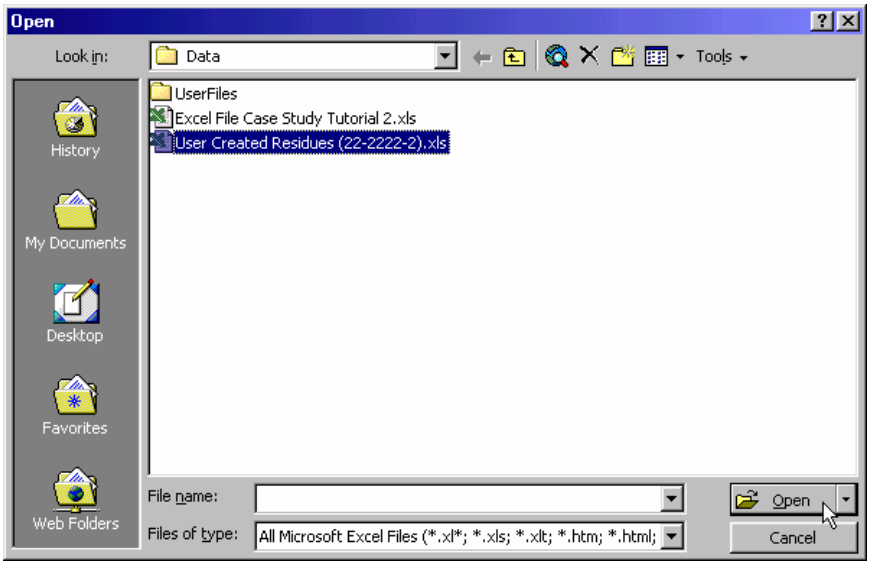
Observe that the default location for saving the file may be to the c:\Notitia\System folder. If necessary, click the **Up One Level** button and navigate to the c:\Notitia\Data folder.

Insure that **Excel Files (xls)** is the file type, and enter **User Created Residues (22-2222-2)** in the **File name** field. The **Save As** box looks like this:



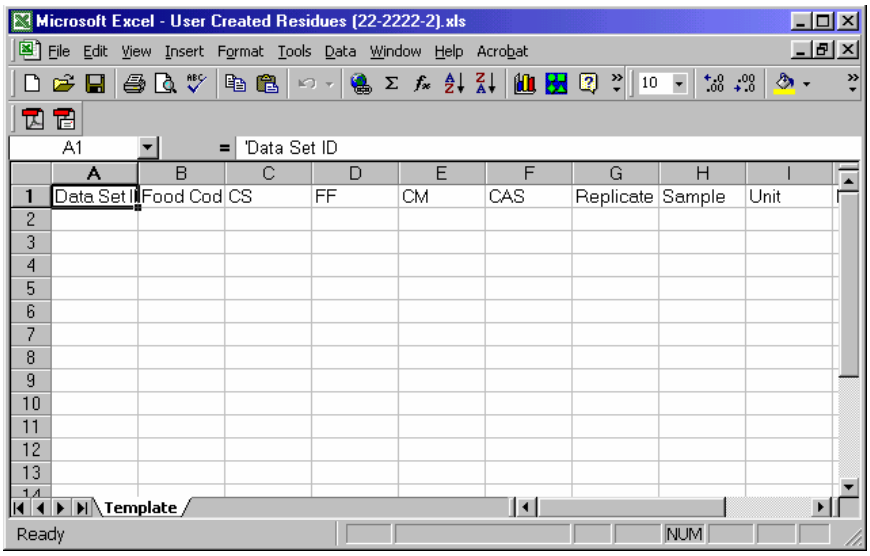
Click **Save**.

You are now ready to open the Excel file and edit the data. Use any standard method for opening the **User Created Residues (22-2222-2).xls** Excel file. For example, use the Explorer to navigate to its location in the Notitia directory, and double click on it. Alternately, start Excel, and then use the **File > Open** menu option to open a navigation window similar to the one shown below (this varies with your version of Excel):



Again, navigate to the c:\Notitia\Data folder, select the **User Created Residues (22-2222-2).xls** file, and click Open, as illustrated above.

The Excel workbook file will open similar to the following:



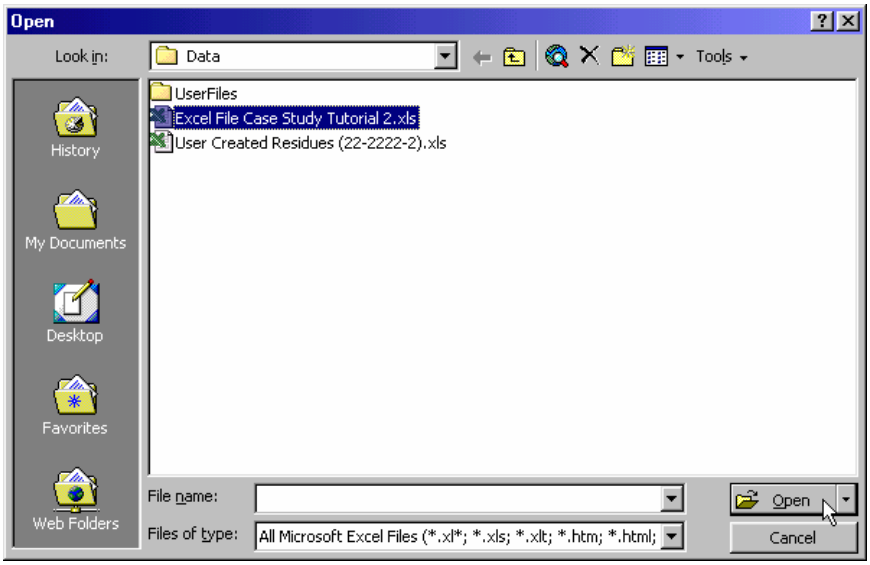
This spreadsheet, named **Template**, is initially blank except for the row of column titles. You will use this spreadsheet to enter the data that you wish to import into CARES.

Note that the column titles (field names) in the Excel Template spreadsheet correspond to the internal field names displayed in the above Notitia™ data grid. Do not alter the first row in any way because the arrangement of the columns is designed to matched internally with those in the data grid when the spreadsheet is imported into CARES.

TIP …	Note that the blank Excel file can be treated as a virtual template for future use. For example, you can copy or save it with another name. You can use copies later for when you want to add or import residue data. Or, you could create multiple worksheets to organize your residue data for subsequent import.

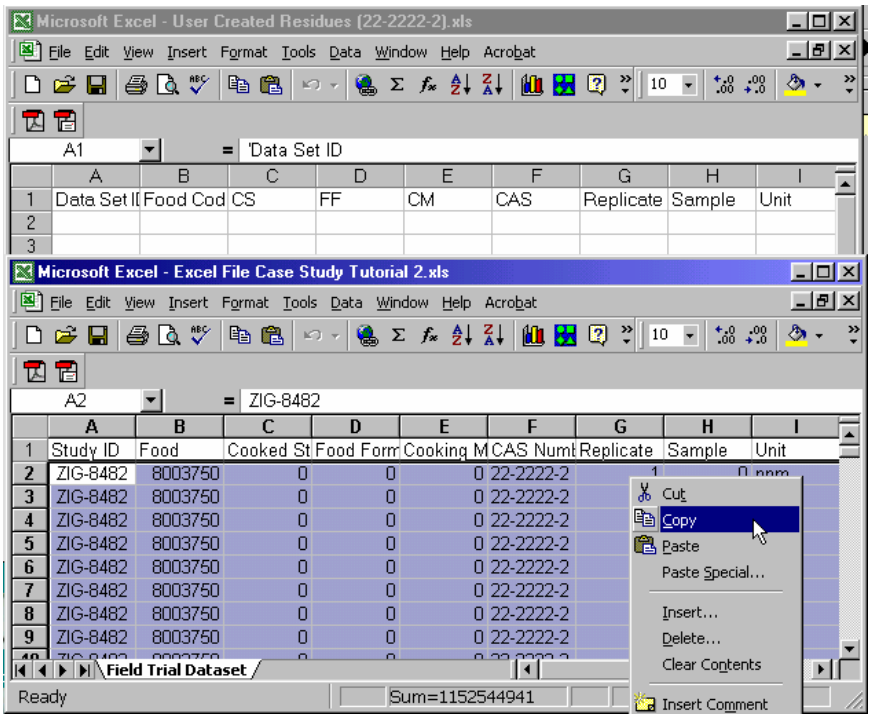
In this tutorial, you will add residue data to the blank **User Created Residues (22-2222-2).xls** file you just made by cutting and pasting it from another spreadsheet (rather than typing it in by hand).

The Excel data file you need is called **Excel File Case Study Tutorial 2. xls**, and it is located in the **c:\Notitia\Data** folder. If Excel is still open from the previous step, select the File > Open menu option again. If it is not already indicated, navigate to the **c:\Notitia\Data** folder and select the file: **Excel File Case Study Tutorial 2. xls**.as shown below:



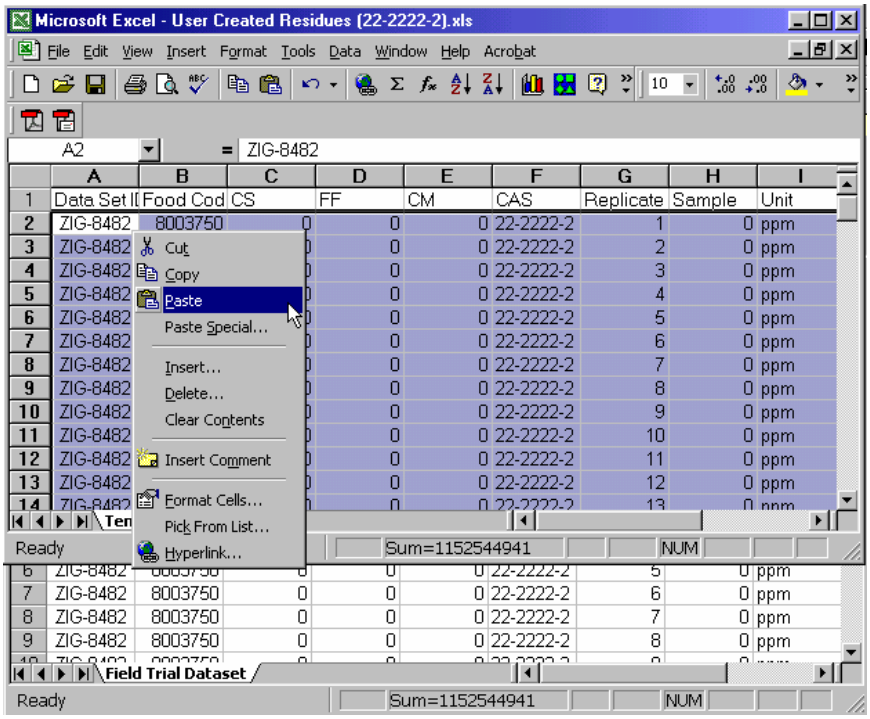
Click **Open**.

You should now have both the Excel template and the Excel data file workbooks open. These will appear either combined under the application window or in separate windows similar to the following (where the two windows are shown with one behind the other):



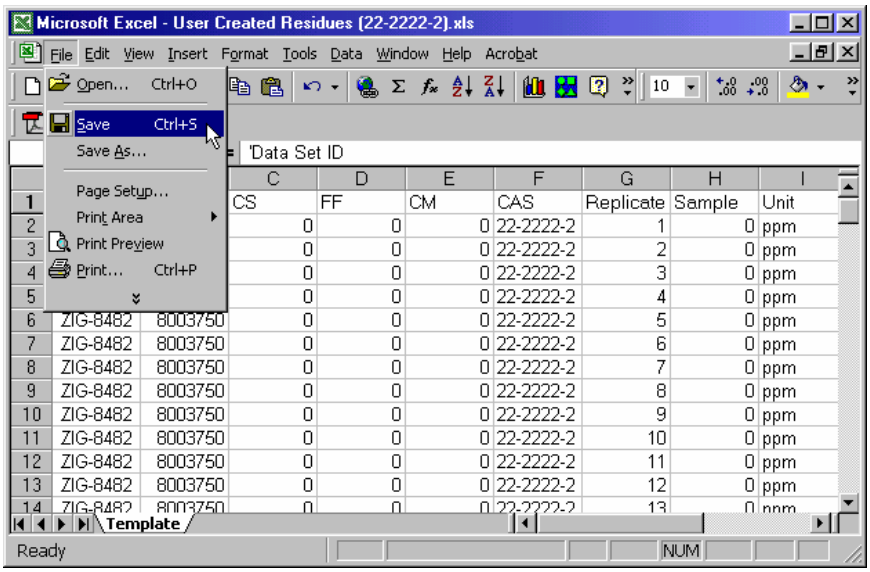
Select and **Copy** all the data cells in the **Excel File for Case Study Tutorial 2.xls** file (excluding the first row) as illustrated above**.**

Then paste the copied data cells into the template **User Created Residues (22-2222-2).xls** spreadsheet beginning at cell A2. as shown below. Take care not to duplicate or alter the column titles in row 1. The following screen shot illustrates completion of the paste step.



Close the data file: **Excel File for Case Study Tutorial 2.xls**.

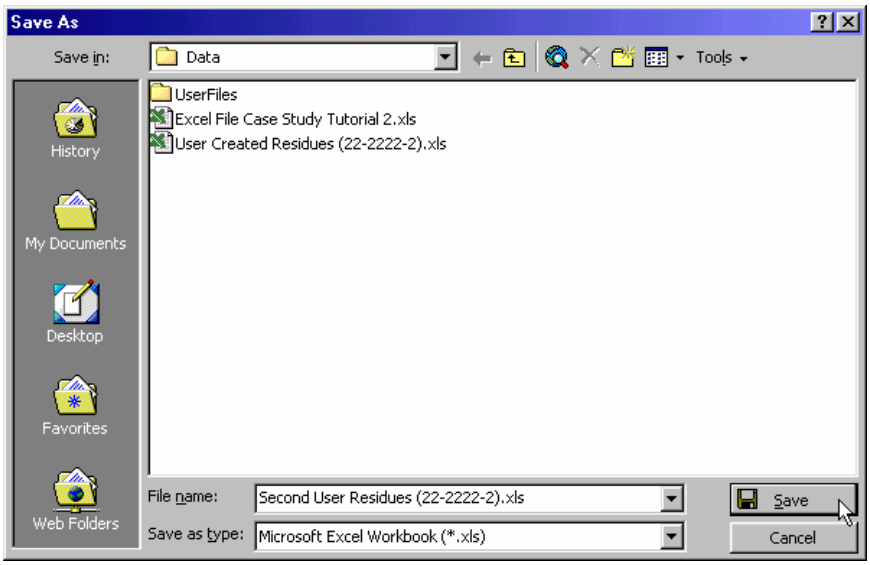
Click on the **User Created Residues (22-2222-2).xls** spreadsheet to bring it into focus and select **File > Save** from the menu:



This will replace the blank template spreadsheet with the one containing the residue data you just pasted. The file name **User Created Residues (22-2222-2).xls** will stay the same and the file will remain in the **c:\Notitia\Data** folder.

Option for Saving to a New File

In the future, you can choose to rename the new data file rather than overwrite the template. To do this, select **File > Save As** from the Excel menu. This will open the **Save As** dialog box to the **c:\Notitia\Data** folder. At this point you can choose either to overwrite the **User Created Residues (22-2222-2).xls** by selecting it and clicking Save, or you can enter a new filename to save the file as, and then click **Save**, as illustrated:

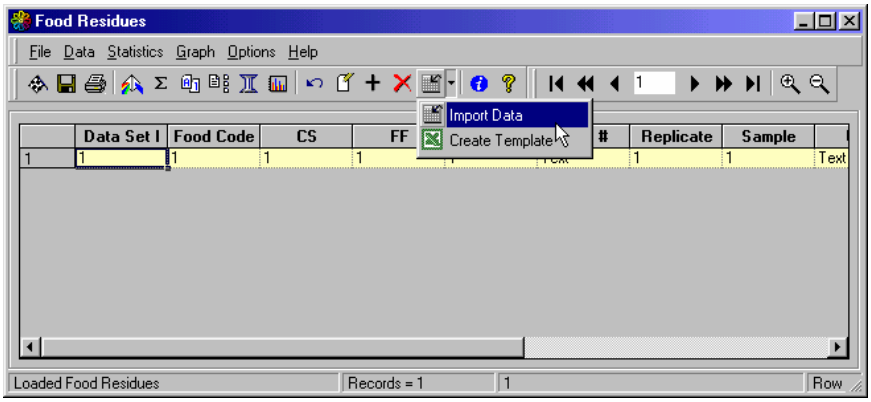


Close the Microsoft ® Excel application.

You are now ready to import the food residue data in the Excel file you just saved so it can be used in a Notitia™ data grid.

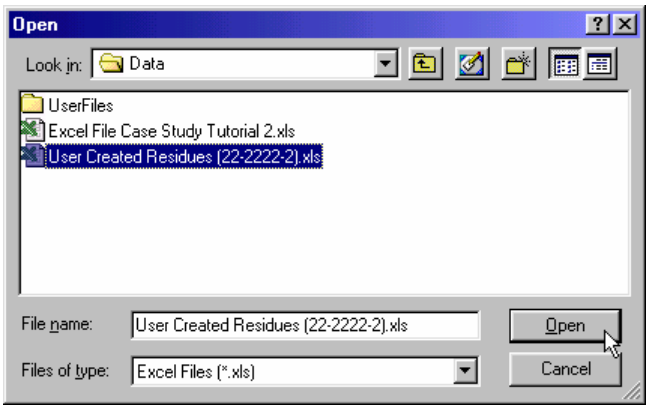
Click on the title bar of the Food Residues window to make it active.

Click the drop-down arrow on the **Import** button and select the **Import Data** option, as follows:

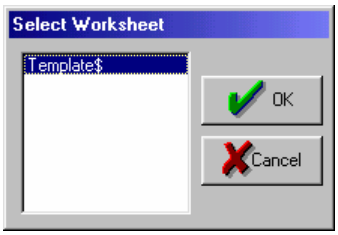


The Open dialog box will appear.

Navigate to the **c:\Notitia\Data** folder, click on the file **User Created Residues (22-2222-2).xls** to select it, and click **Open**, as shown:

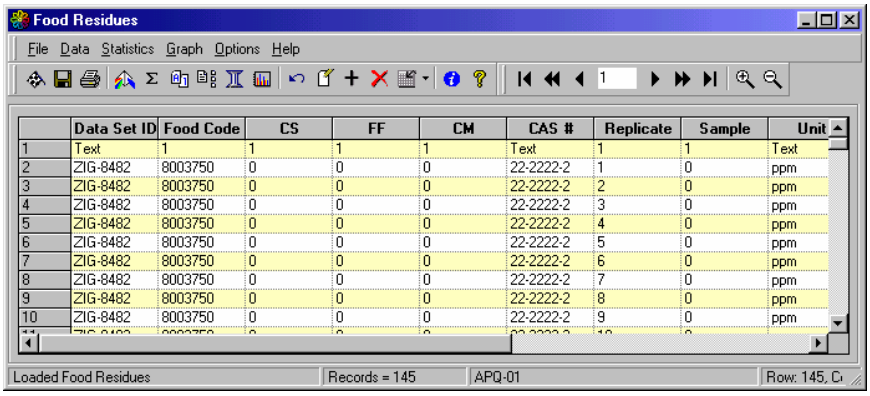


The Open window will close and the following import confirmation will appear:



Accept the default **Template$** entry by clicking **OK**. If more than one spreadsheet is listed, select the one you just made and click **OK** to close the window

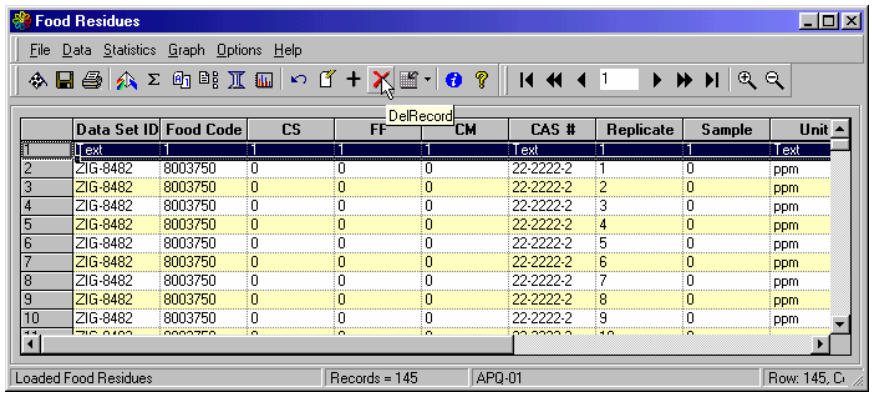
The imported data will be appended to the data grid in the **Food Residues** window as follows:



	Data Set ID	Food Code	CS	FF	CM	CAS #	Replicate	Sample	Unit
1	Text	1	1	1	1	Text	1	1	Text
2	ZIG-8482	8003750	0	0	0	22-2222-2	1	0	ppm
3	ZIG-8482	8003750	0	0	0	22-2222-2	2	0	ppm
4	ZIG-8482	8003750	0	0	0	22-2222-2	3	0	ppm
5	ZIG-8482	8003750	0	0	0	22-2222-2	4	0	ppm
6	ZIG-8482	8003750	0	0	0	22-2222-2	5	0	ppm
7	ZIG-8482	8003750	0	0	0	22-2222-2	6	0	ppm
8	ZIG-8482	8003750	0	0	0	22-2222-2	7	0	ppm
9	ZIG-8482	8003750	0	0	0	22-2222-2	8	0	ppm
10	ZIG-8482	8003750	0	0	0	22-2222-2	9	0	ppm

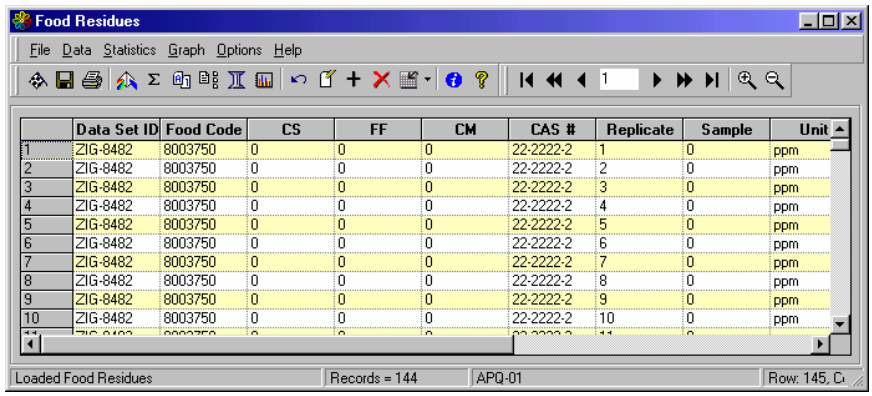
You now have to delete the first row of the data grid that originally created as a placeholder.

To delete Row 1, click on the row to highlight it as follows:



With Row 1 selected, click the **Delete** button on the toolbar, as indicated above.

The completed data grid containing your imported Excel data should now appear as follows:



TIP … **Data Grid Menus and Buttons** You will observe that Notitia data grid windows, such as the Food Residues window, contain their own special set of menu options and tool bars with their associated buttons. Several of these menus and/or buttons aid in viewing, adding, or deleting data. Others perform more specialized functions, such as allowing you to examine the data statistically or to plot it. Still others allow you to toggle the display to view alternately a code number or its corresponding text (such as for states, food codes, etc.).

For more information on working with data grids, click on the **Notitia Help** button on the main CARES window.

Appending More Data

You can use the same procedure as described above to import additional data into a residue data grid. First, assemble your data into a template spreadsheet, then select the **Import Data** option on data grid **Import** button and follow the directions given above. Imported records will be appended to the data grid in the order they are imported.

Continue Dietary Data Inputs

The above excursion described how to create a new residue file (data grid) and import data to the file using an Excel template. You will now continue where you left off.

First, click the **Done** (flag) to close the **Food Residues** data grid window.

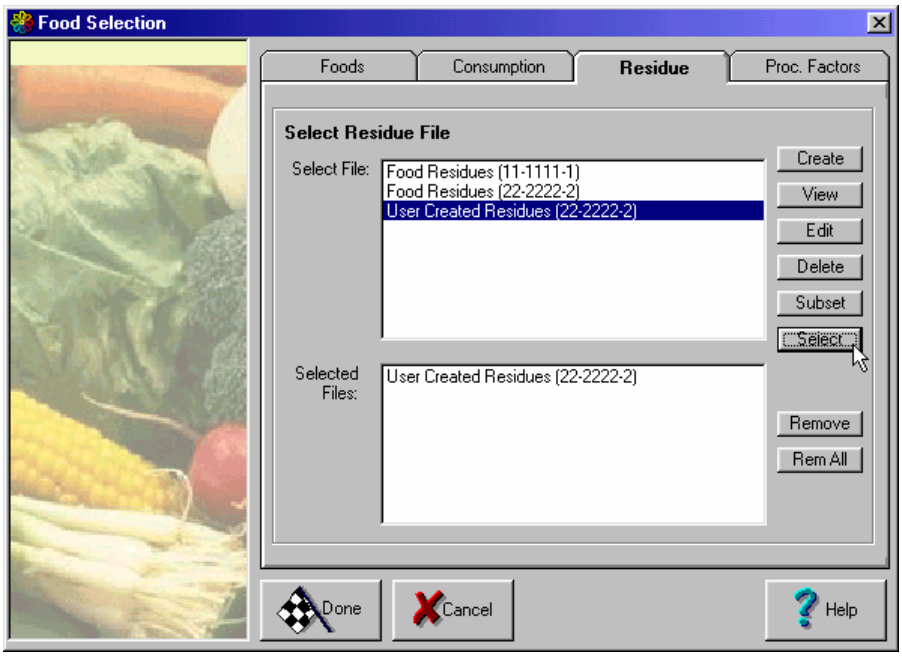
TIP …	Data grids, such as displayed in the Food Residues window, are actually views of Access files running behind the scenes. These files are automatically saved or updated (refreshed) and whenever they are created or changed. That is why you do not have to manually save Food Residues data grid before closing it.

Click on the **Food Selection** window to bring it to the front.

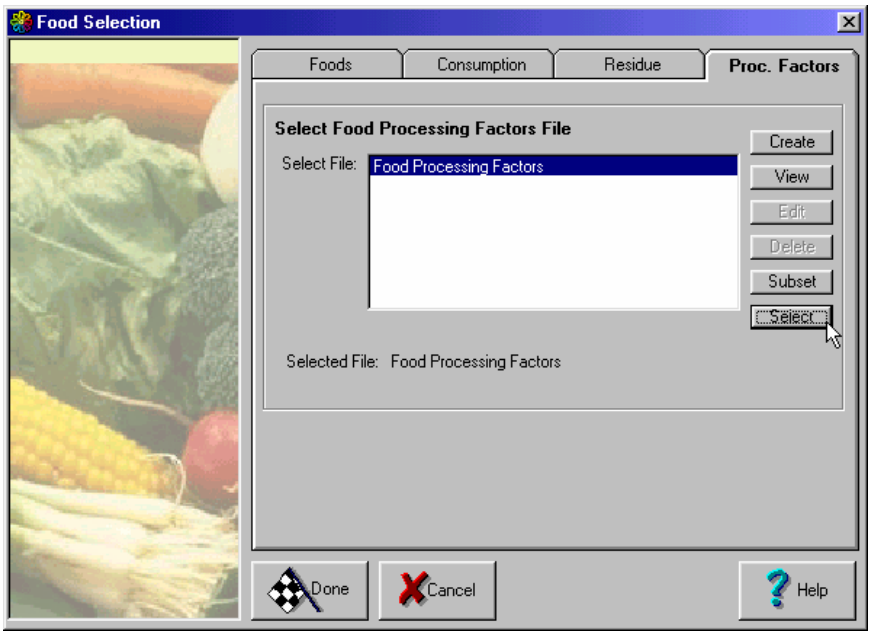
Click the **Residue** tab.

The **Select File:** list should now include the file **User Created Residues (22-2222-2)** that you created above. Click on this filename to highlight it, and then click the Select button.

the file **User Created Residues (22-2222-2)** will appear in the **Selected Files:** list as follows:



Click the **Proc. Factors** tab to view the following:

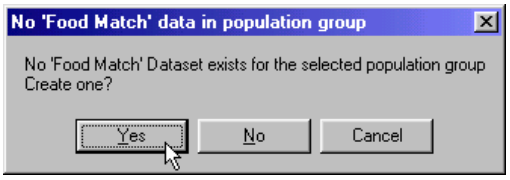


Highlight the file **Food Processing Factors** and click **Select** as shown above. Note the feedback of your selection appearing as the **Selected File:** item.

Your screen should appear as follows:

Click **Done** to exit the **Food Selection** window and return to the main window:

If you have not already created a **Food Match** data file for your selected sub-population, you will get a message prompting you to create one, as follows:



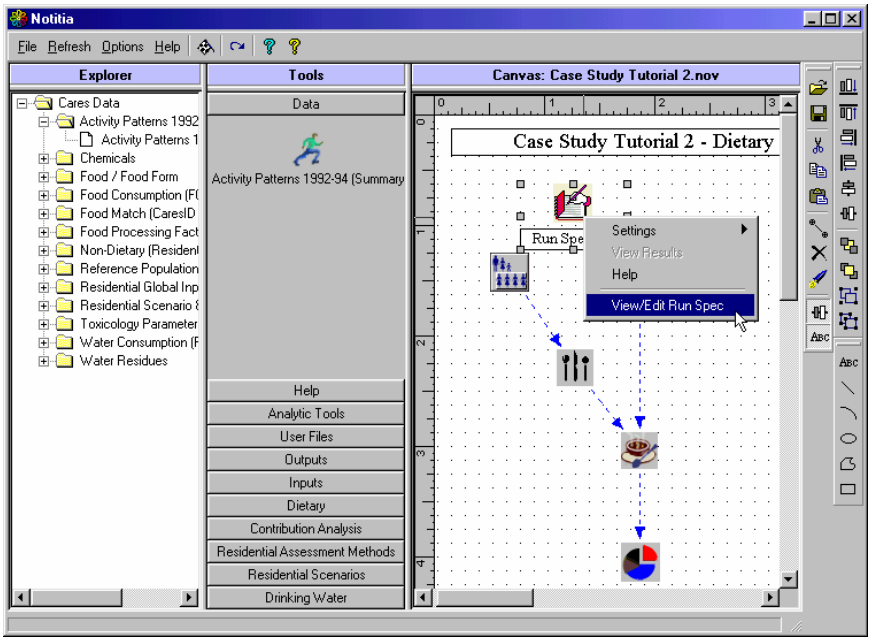
Click **Yes** to create a **Food Match** data file

The following status notice will appear showing the progress as the individual dietary exposure records are subset into 365 days.

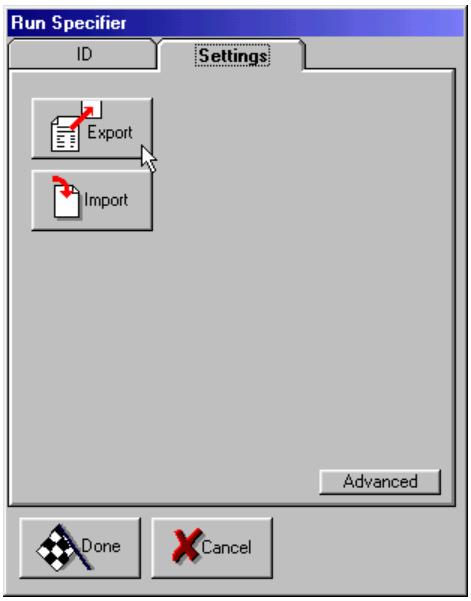
Save Run Settings

Before running the Canvas model, you need to save the settings that you have just established using the Population, Chemical, and Dietary Selectors. This will allow you to recall the same settings should you want either to repeat the run as is or make some modifications in the setup and then rerun the Canvas.

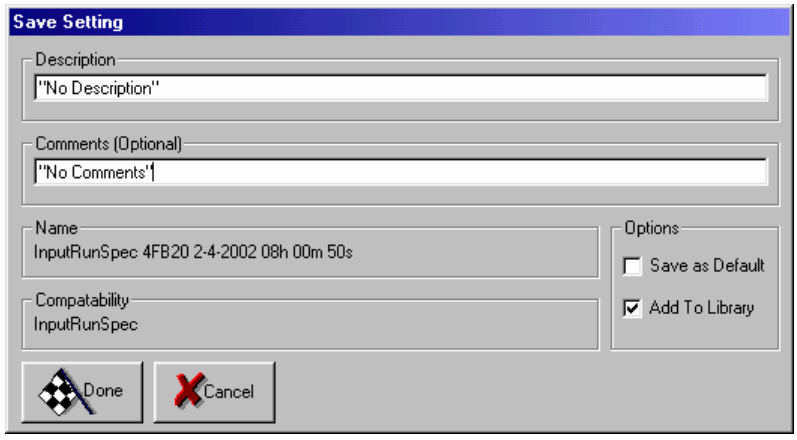
Right click on the **Run Specifier** icon and select the **View/Edit Run Spec** option as illustrated:



In the **Run Specifier** window, click the **Settings** tab.



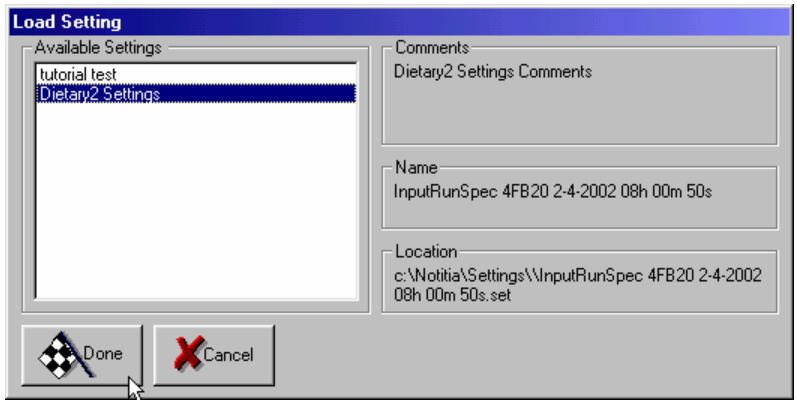
Click the **Export** button to open the following **Save Setting** window:



Replace the default 'No Description' entry with a short description of the setup you have just created for this run. For example, type **Dietary2 Settings**, as illustrated. Optionally, you can include additional information in the 'Comments' field.

Click **Done** to return to the **Settings** tab.

To see how you can load these settings in the future, click the **Load Settings** button. A window similar to the following appears, and includes the setting description you just entered above.

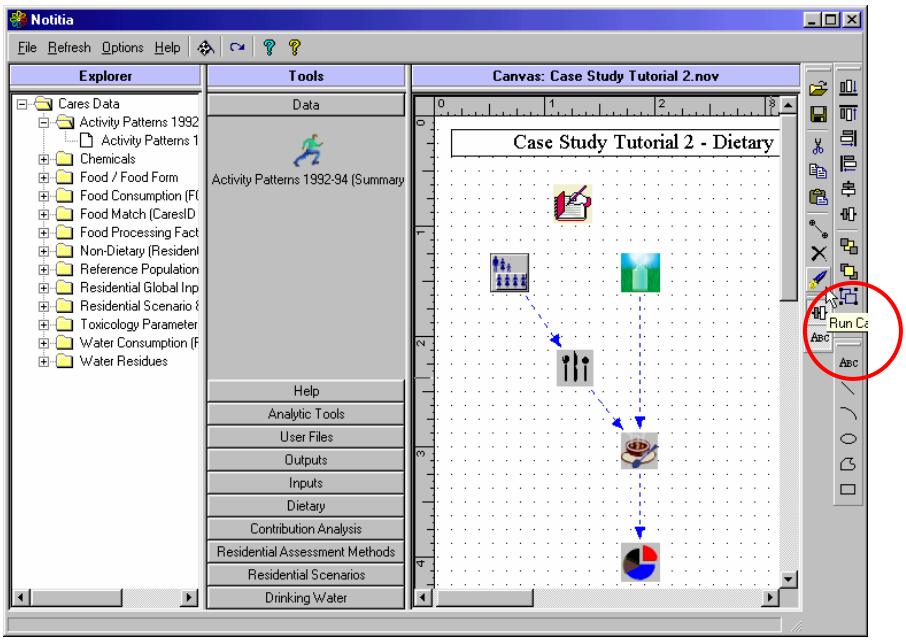


Click **Cancel** to close the Load Setting window.

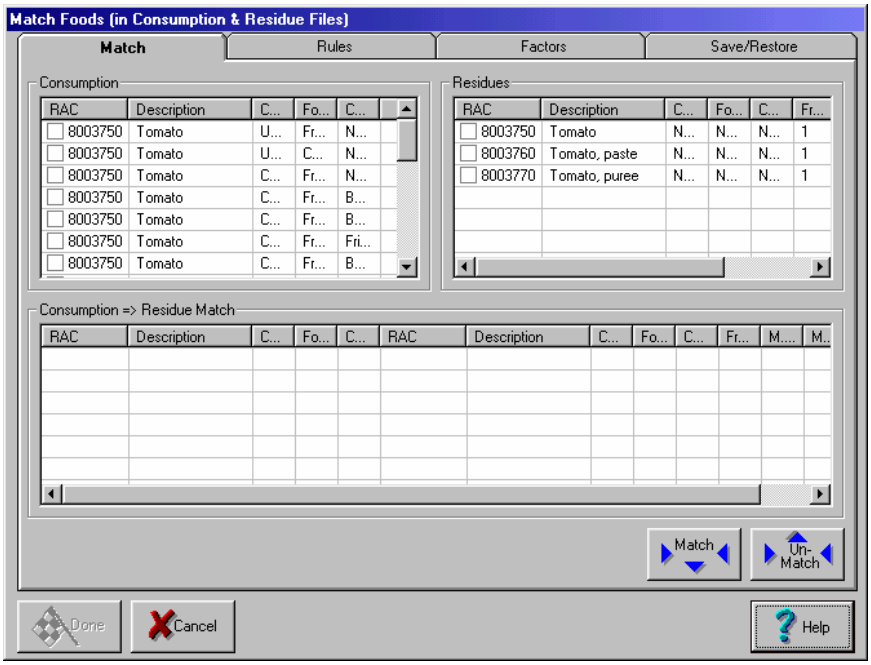
Click **Done** to close the **Run Specifier** window and return to the main window.

Run Dietary Module and View Results

At the main window, click the **Run Canvas** button on the **Diagrammer** toolbar as follows:



To initiate the run, you first have to match each of the items in the food list you created with a residue value. To assist you with this, the **Match Foods** window will open at the **Match** tab as follows:



TIP …	**What! Again?** The difference between the matching procedures that you did in Case Study Tutorial 1 and those you will do here starts with the fact that in this tutorial you are using a separate residue file **–** the one you created and imported above. Also, in this tutorial you will be shown more about how to manually match Residues and Consumption items. After you finish the manual method, we'll show you again how the Rules tab automates the matching process.

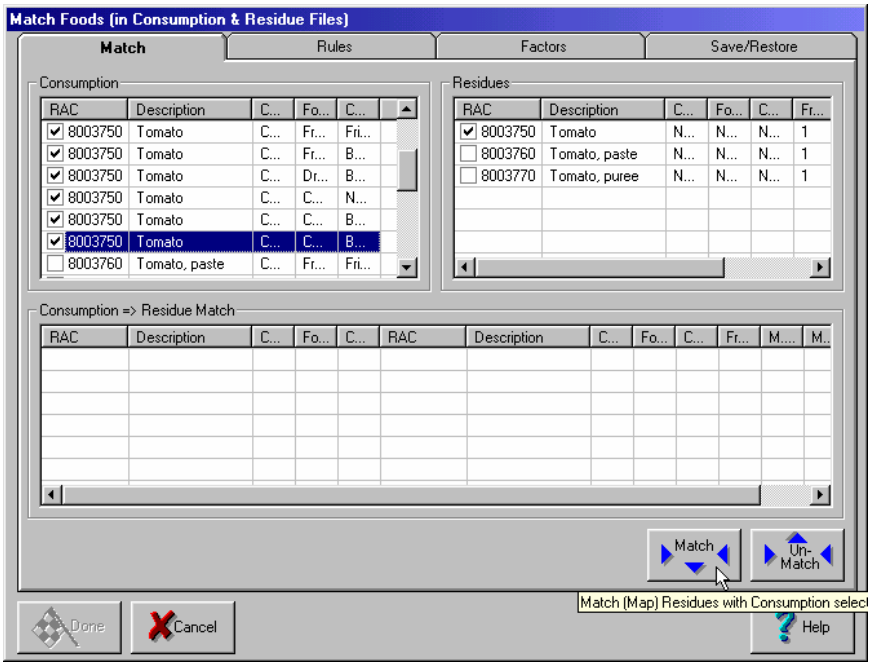
In the above window, the **Consumption** grid displays the Food/Food Form items that you specified when you created the “Tomato (fruit, paste, puree)” food consumption file using the Food Selection window. The difference is that this grid only includes those items from the original list that correspond to a food item consumed by one or more individuals in the Indiana Males sup-population. The **Residue** grid displays the three specific food forms of tomatoes, each having its own residue amount. This data was generated from the Excel residue file you imported.

In the following steps, you will match each consumed tomato food forms (fruit, paste, and puree) with its respective residue value.

To begin the matching, click the check box next to the first option (Tomato) in the **Residue** grid. Then select all the corresponding items with Tomato as the description that occur in the **Consumption** grid by clicking on their check box. Do not select ‘Tomato, paste’ or ‘Tomato, puree’ at this point.

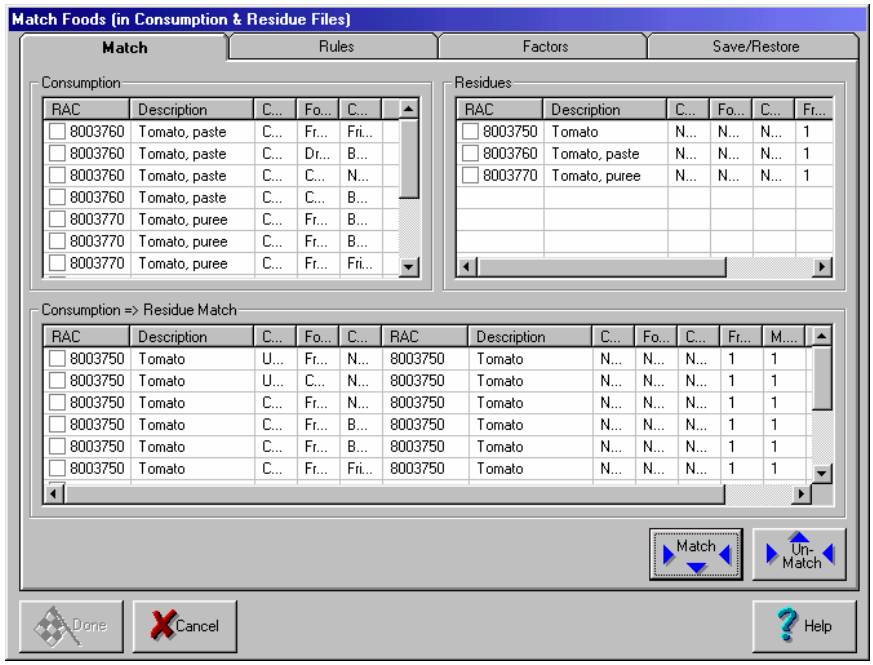
TIP …	As with all check box lists, you can use the keyboard Down and Up Arrows in conjunction with the Spacebar to quickly make multiple selections.

When you have made the above selections, the **Food Match** window should appear like this:

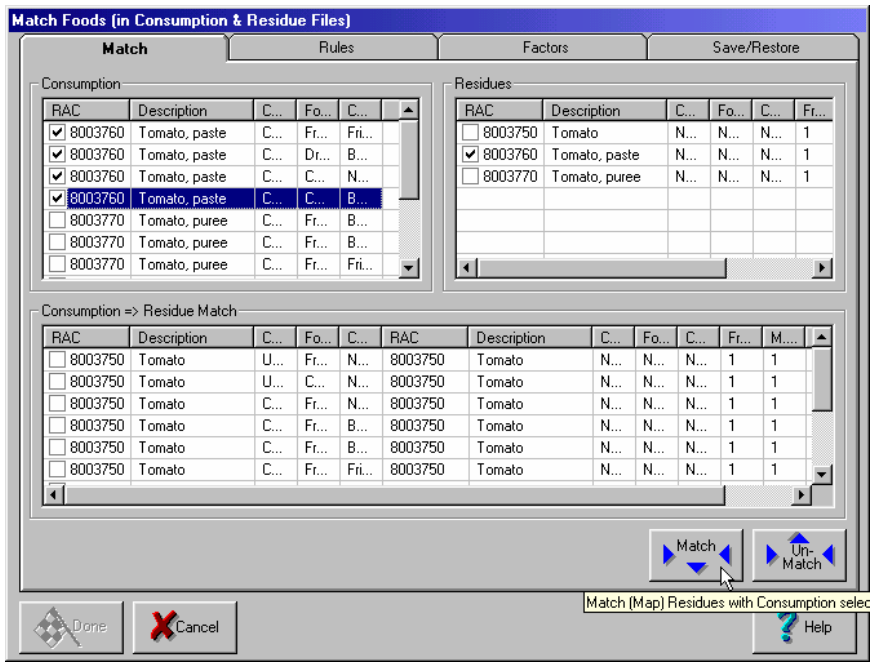


Note that the **Done** button is not accessible (grayed out) because at this point you have only specified the pairings, not performed them. To complete the paring (matching), click the **Match** button, as illustrated.

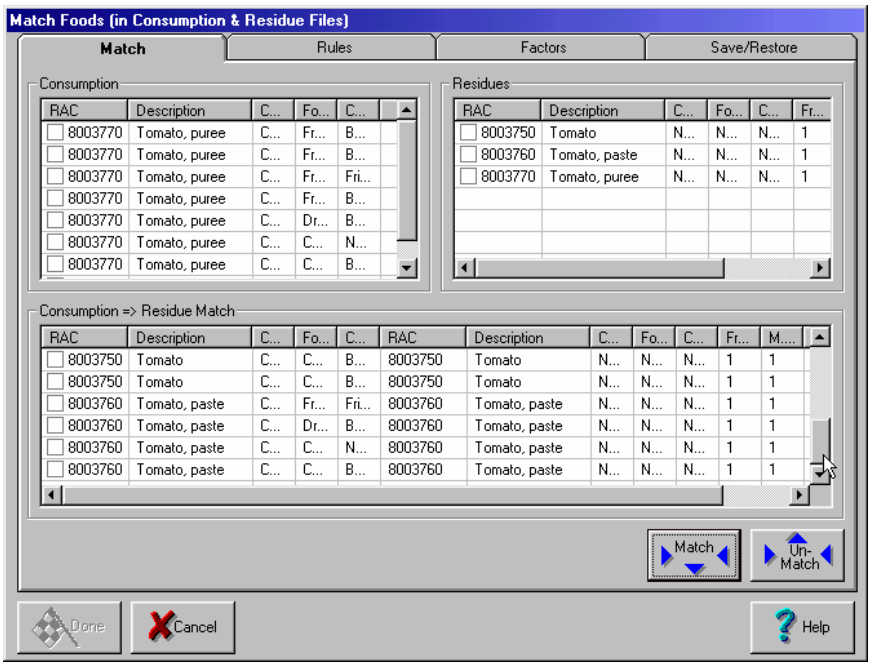
The matched items (Tomato) be removed from the Consumption window and appear in the **Consumption + Residue Match** grid as follows:



Repeat the matching process, this time selecting the 'Tomato, paste' residue in the **Residue** grid for matching with all the 'Tomato, paste' items in the **consumption** grid, as follows:

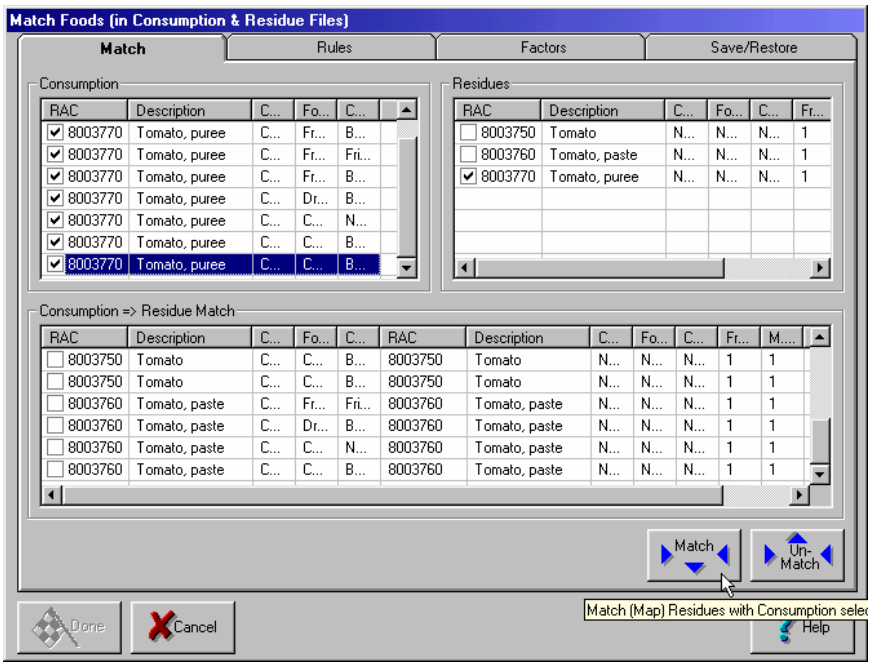


Click **Match** to move the matched consumption items to the **Consumption => Residue Match** window grid:

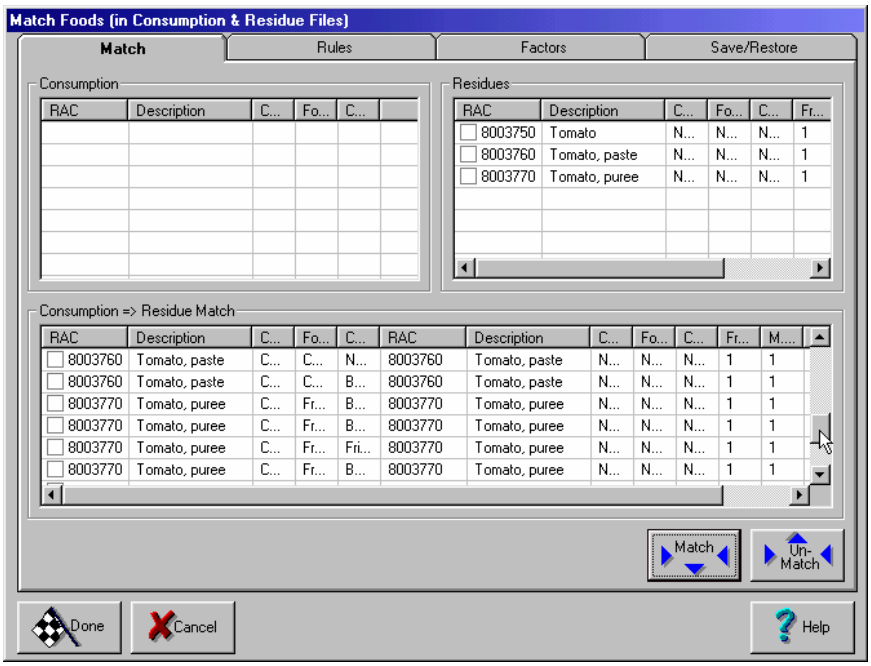


Use the scroll bar to view the appended contents of the **Consumption => Residue Match** grid.

Finally, repeat the same process, this time matching the 'Tomato, puree' residue item with all the corresponding 'Tomato, puree' consumption items:



Click **Match** to get the following:



The food matching is complete when no options should remain in the **Consumption** window, as shown above.

! Review the Following Options But Do Not Perform Them at This Time

Undoing Food Match Errors

Food match errors can be corrected by clicking the **Unmatch** button. All items you have checked in the lower window will be unmatched, removed from the **Consumption => Residue Match** grid, and restored in the **Consumption** grid. You can then start over with matching these items, perhaps to a different residue item.

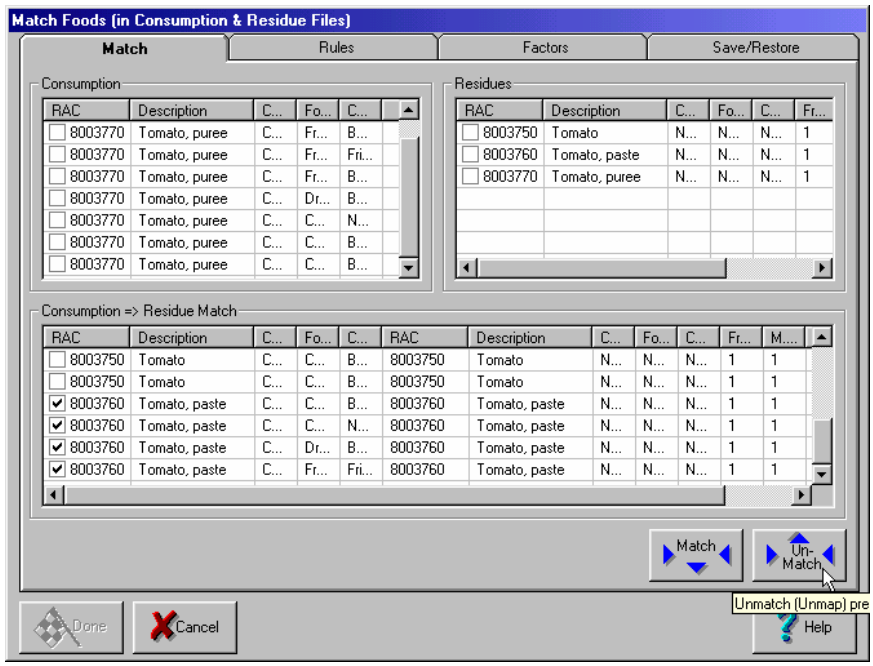
If you have not selected any matched items, clicking the **UnMatch** button will bring up the following notice:

Click **Yes** to unmatch all items and return the Match Foods window to its original state.

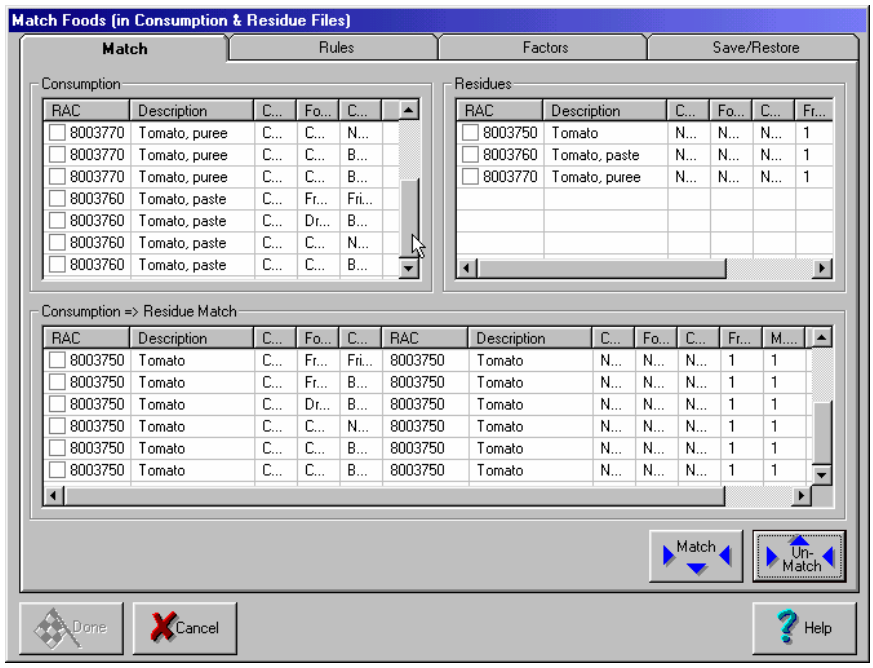
Click **No** or **Cancel** to exit the window without performing an unmatch operation.

The following two screens illustrate how to unmatch a ‘Tomato, puree’ pairing.

First, select all the matched ‘Tomato, puree’ items in the lower grid as follows:



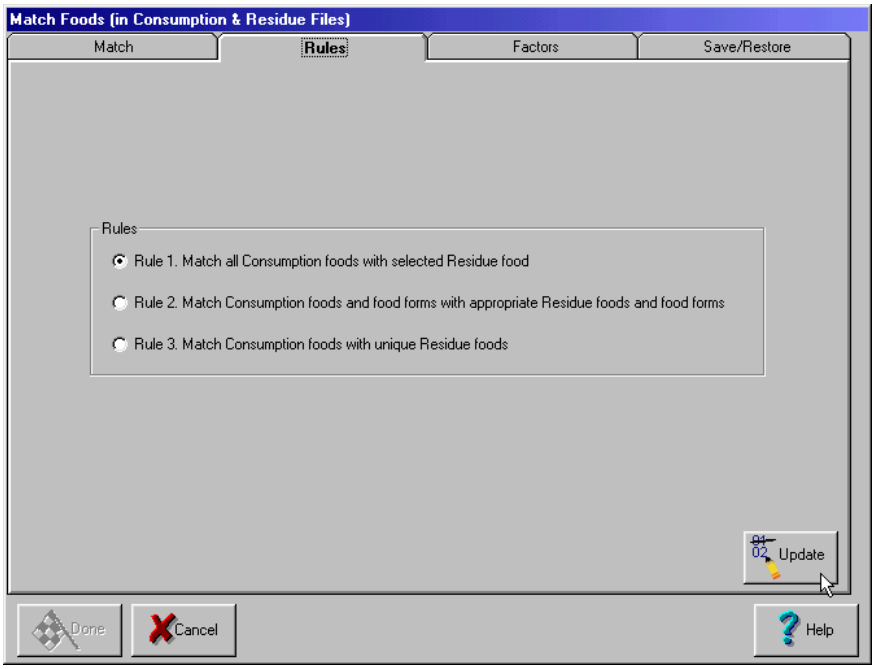
Click UnMatch and the ‘Tomato, puree’ items will return to the **Consumption** grid:



Remember, eventually all the Consumption items must be matched with a Residue for you to continue.

Using Rules to Automate the Matching

Click the **Rules** tab to show the following options:

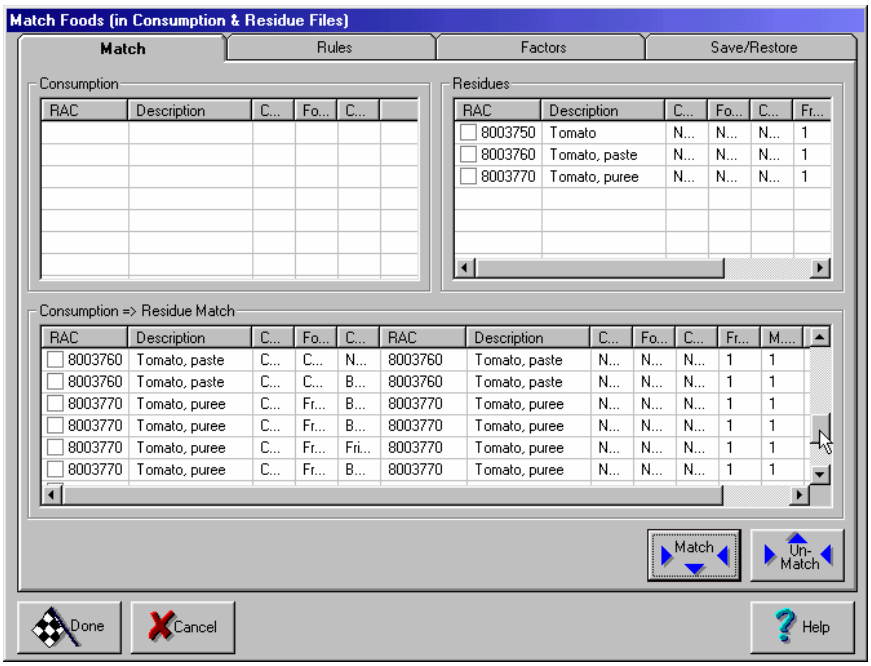


Note that the option labeled **Rule 2. Match consumption foods and food forms with appropriate Residue foods and food forms** describes the exact process you just did manually. You could have achieved the same result by going to this tab, selecting Rule 2, and then clicking Update.

Read the other two Rules to see what time-saving features they offer.

To automatically perform the matching process according to the select rule, click the appropriate radio button next to the rule, then click the **Update** button.

When the match is done, the **Match** tab view will appear displaying the matched foods in the lower **Consumption => Residue Match** grid identical to the result of using the manual method, as illustrated:



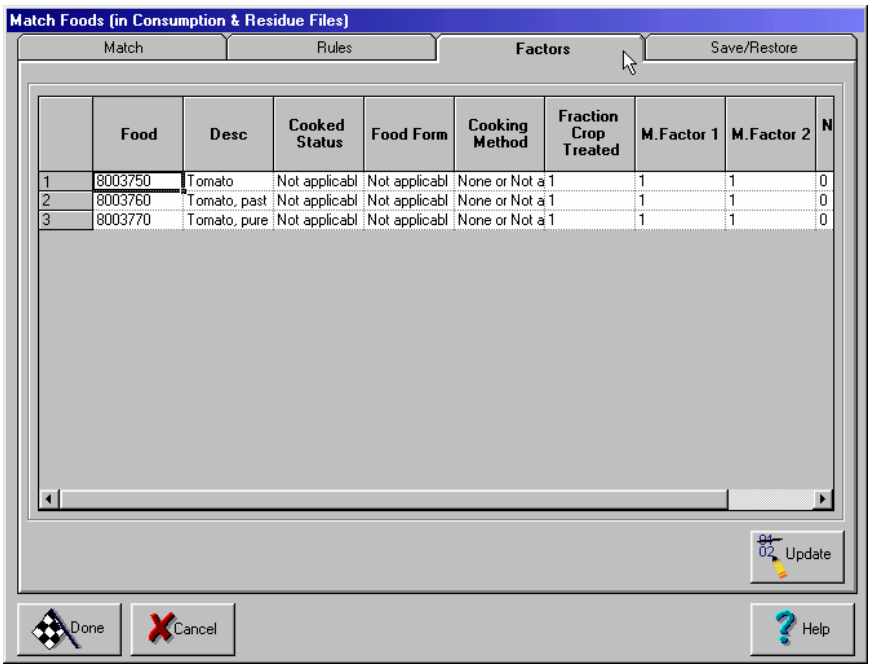
Completing the Food/Residue Matching

The previous discussion described how to match one or more Residue values with each of the Food/Food Forms either manually or by using the appropriate Rule to automate the match.

In the next steps, we will complete the procedure for the remaining tabs in the Match Foods window.

Make sure the **Match Food** window appears as above.

Click the **Factors** tab to view the following screen:

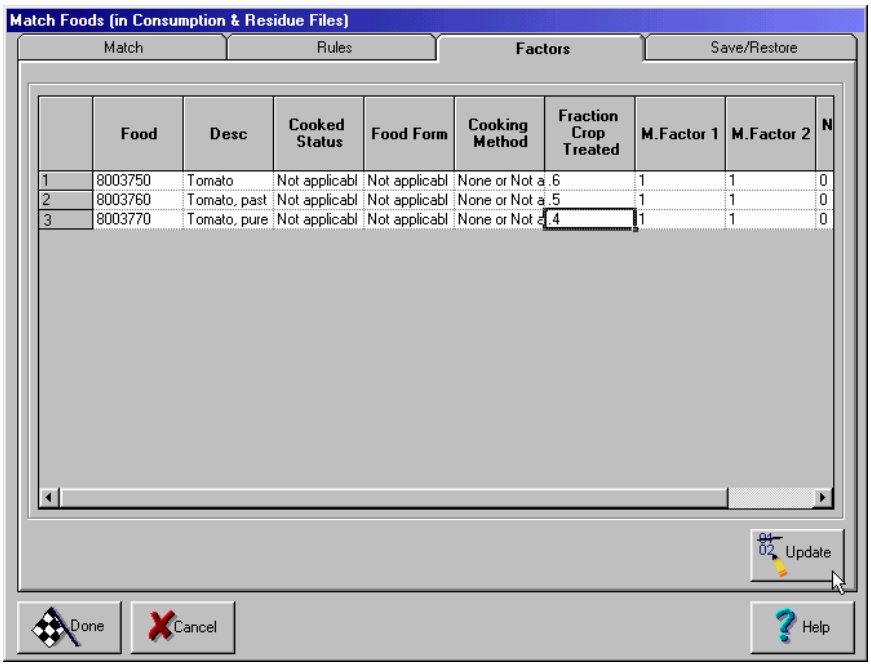


The **Factors** tab allows user input to modify a residue amount by entering processing factors for the **Fraction of Crop Treated** (**FTC**) and/or up to two additional **Multiplication Factors**.

For this tutorial, you will change the values in the **Fraction Crop Treated** field as follows. Highlight the text in each cell of the field and change the values as follows:

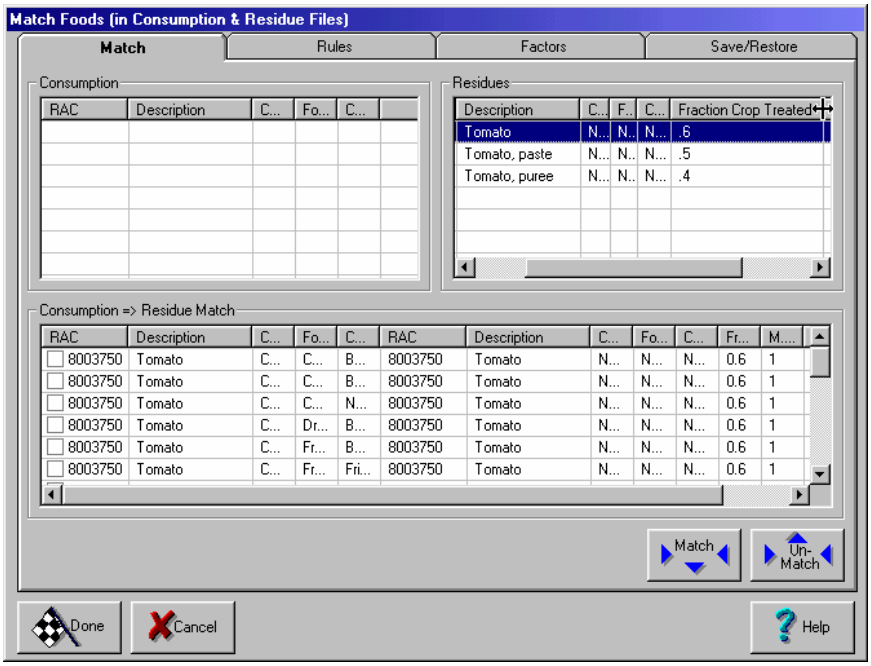
Row 1 (Tomato) = .6
Row 2 (Tomato, paste) = .5
Row 3 (Tomato, puree) = .4

The changes should appear as follows:



When finished, click **Update**.

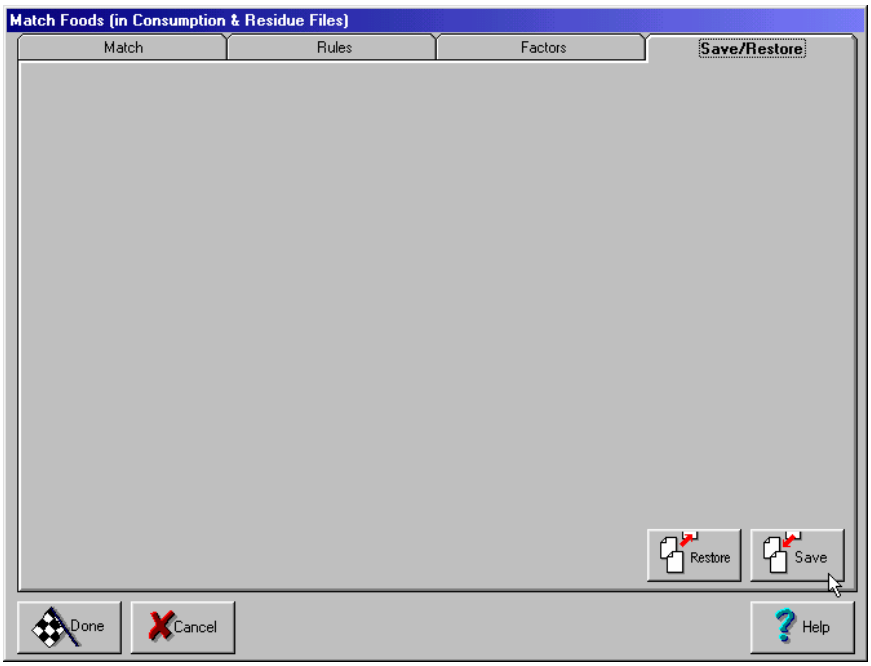
You will be returned to the Match tab display as follows:



Use the mouse pointer to grab and expand the width of the Fraction Crop Treated column in the Residues grid, as illustrated. You should observe that the values for the FTC have been updated to reflect the changes you just made, using the Factors tab.

This completes the Food Matching function. All that remains is to save the file for current or future use.

Click the **Save/Restore** tab:



Click the **Save** button.

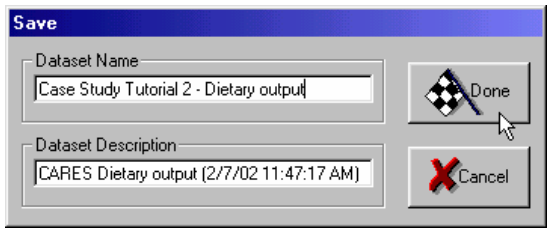
Enter a description for the file in the window that appears and click **Done** to exit the window.

Now click **Done** at the bottom of the **Match Foods** window to continue execution of the run.

Dialog boxes similar to the following will display the program operations during calculation and preparation of the dietary exposure data.

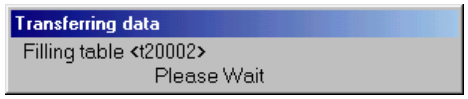
As mentioned earlier, do not run other applications while CARES is processing.

When the exposure calculation is finished, you may be prompted to save the dataset as follows:

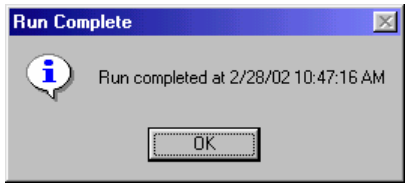


Enter **Case Study Tutorial 2 – Dietary Output** in the **Dataset Name** field and click **Done**.

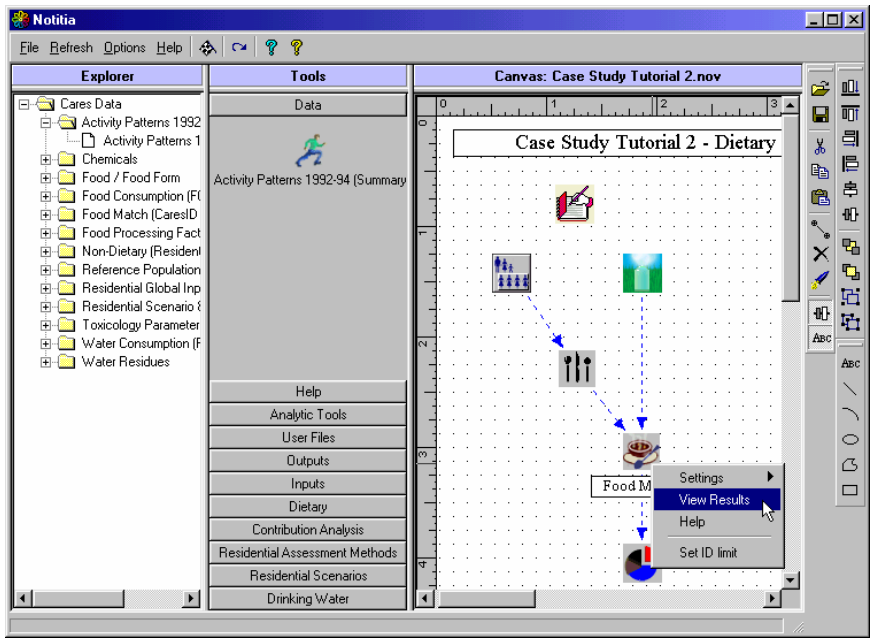
The following notice appears:



Click **OK** to close the **Run Complete** notice:

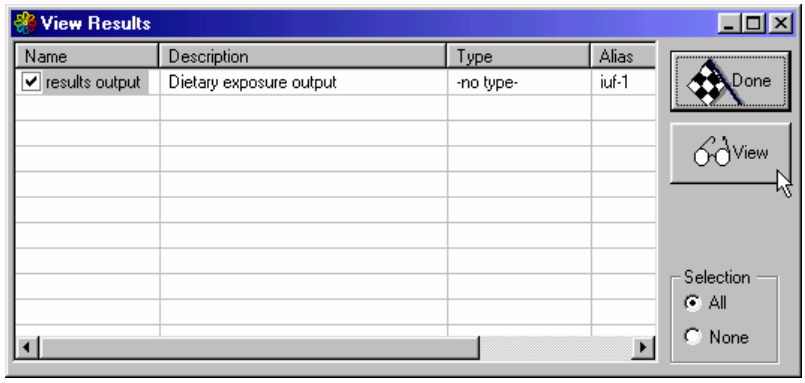


To view the results of the dietary exposure calculation, right click on the **Food Match** icon on the main window Canvas. The context sensitive menu list will appear as follows:



Click **View Results** on the menu.

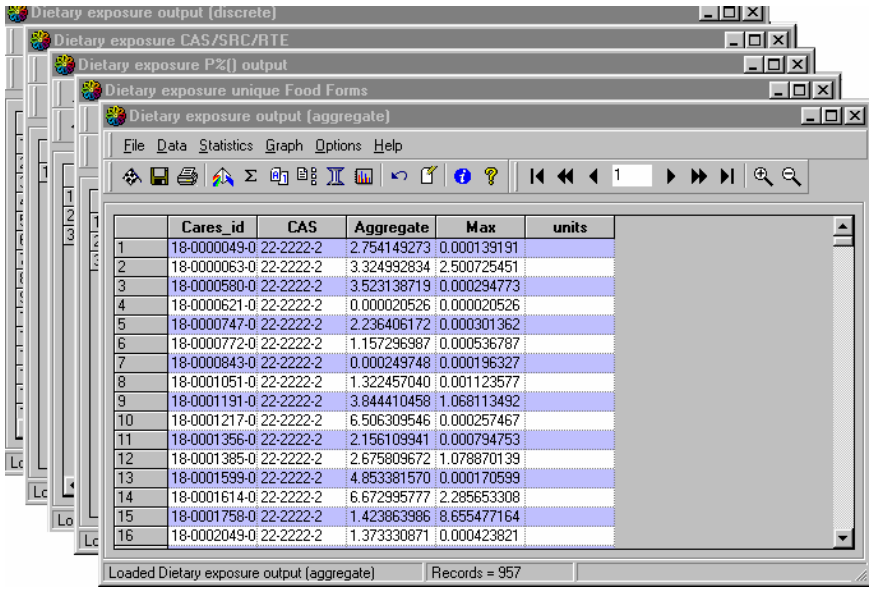
Check the **results output** line in the next window:



Click the **View** button to display the following list of available output files:

You may view any or all of the listed files. For this tutorial, highlight all five selections and click **Done**

The outputs you selected will appear as a stack of data grids:



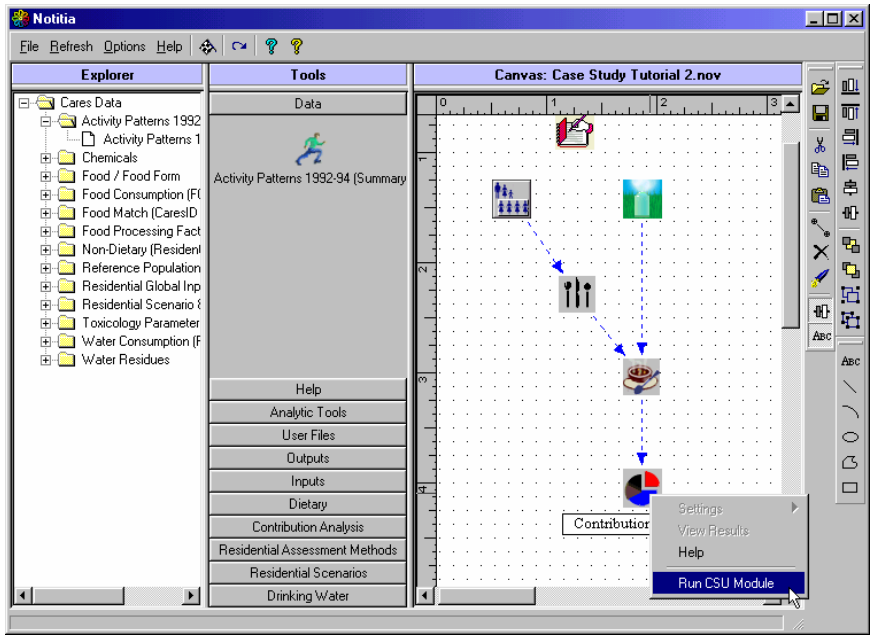
	Cares_id	CAS	Aggregate	Max	units
1	18-0000049-0	22-2222-2	2.754149273	0.000139191	
2	18-0000063-0	22-2222-2	3.324992834	2.500725451	
3	18-0000580-0	22-2222-2	3.523138719	0.000294773	
4	18-0000621-0	22-2222-2	0.000020526	0.000020526	
5	18-0000747-0	22-2222-2	2.236406172	0.000301362	
6	18-0000772-0	22-2222-2	1.157296987	0.000536787	
7	18-0000843-0	22-2222-2	0.000249748	0.000196327	
8	18-0001051-0	22-2222-2	1.322457040	0.001123577	
9	18-0001191-0	22-2222-2	3.844410458	1.068113492	
10	18-0001217-0	22-2222-2	6.506309546	0.000257467	
11	18-0001356-0	22-2222-2	2.156109941	0.000794753	
12	18-0001385-0	22-2222-2	2.675809672	1.078870139	
13	18-0001599-0	22-2222-2	4.853381570	0.000170599	
14	18-0001614-0	22-2222-2	6.672995777	2.285653308	
15	18-0001758-0	22-2222-2	1.423863986	8.655477164	
16	18-0002049-0	22-2222-2	1.373330871	0.000423821	

Click on the title bar to select and examine each output data grid in turn.

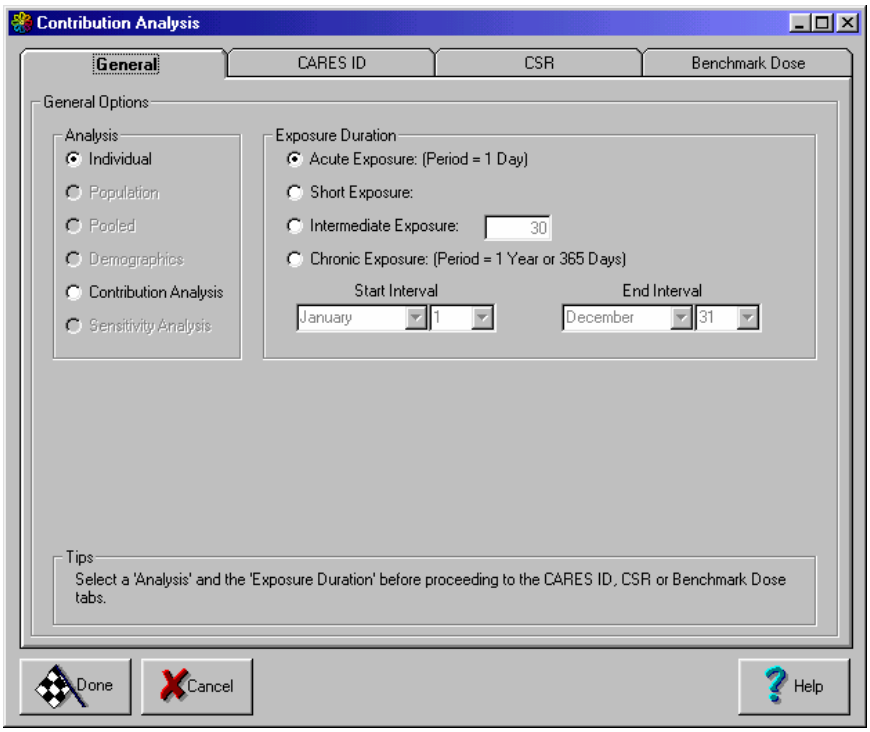
TIP …	Note, if you cancel the run and make changes to any of the modules and attempt to rerun functions, the program will return an error regarding missing data file. In order to rerun this case study, reload the .nov (Canvas) file.

Conduct Data Analysis

To start the Contribution and Sensitivity Module (CSU), return to the Canvas on the main window. Then right-click on the **Contribution Analysis** icon and click the **Run CSU Module** menu option as illustrated:



The **CSU Options Dialog** window will appear as follows:



The CSU (Contribution and Sensitivity Utility) is only partially implemented in CARES 1.0. The **General** tab shows six analysis options in the **Analysis** group. Only the **Individual** and **Contribution Analysis** options are available. Select the **Individual** Analysis, as shown above and click on the **CARES ID** tab:

TIP …	Each tab contains a **Tips** box that gives helpful directions and information about the options available.

Note that the **CARES ID** tab is only enabled when the **Individual** analysis option is selected.

The **Exposure Duration** group provides four options for defining the exposure duration. Only the **Acute Exposure** option is currently available.

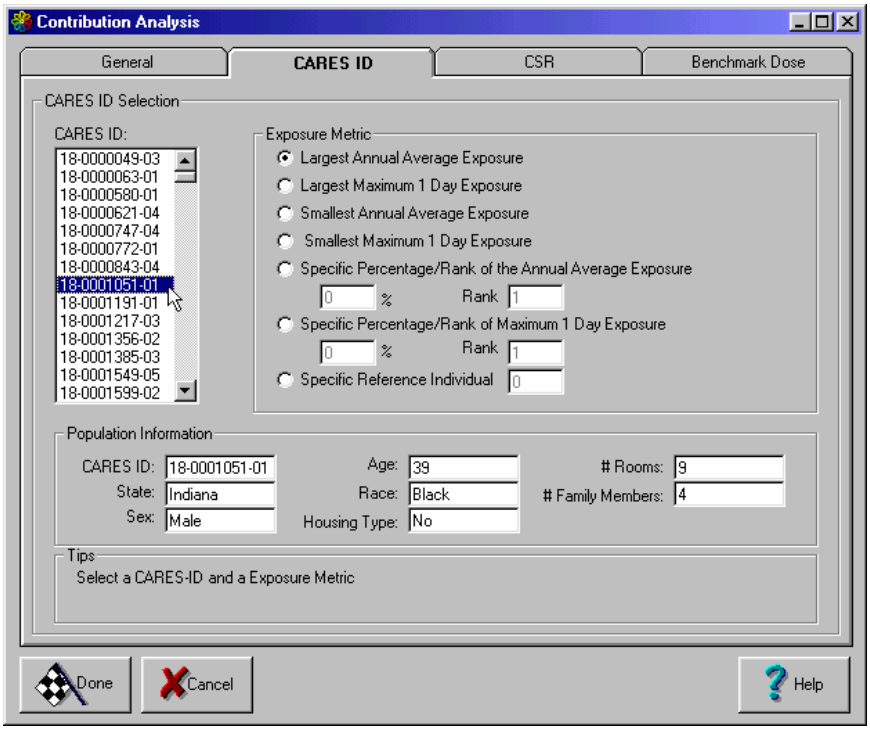
A Quick Look at the CSU

In this tutorial we will only look at one feature of the CSU. A more detailed examination of the available CSU components and displays will be presented in Case Study Tutorial 5 (Chapter 10).

To start, click radio button for **Individual** in the **Analysis** group on the **General** tab.

Click the **CARES ID** tab. As shown below, this tab contains a list of all the individuals included in the dietary run, a section for specifying an

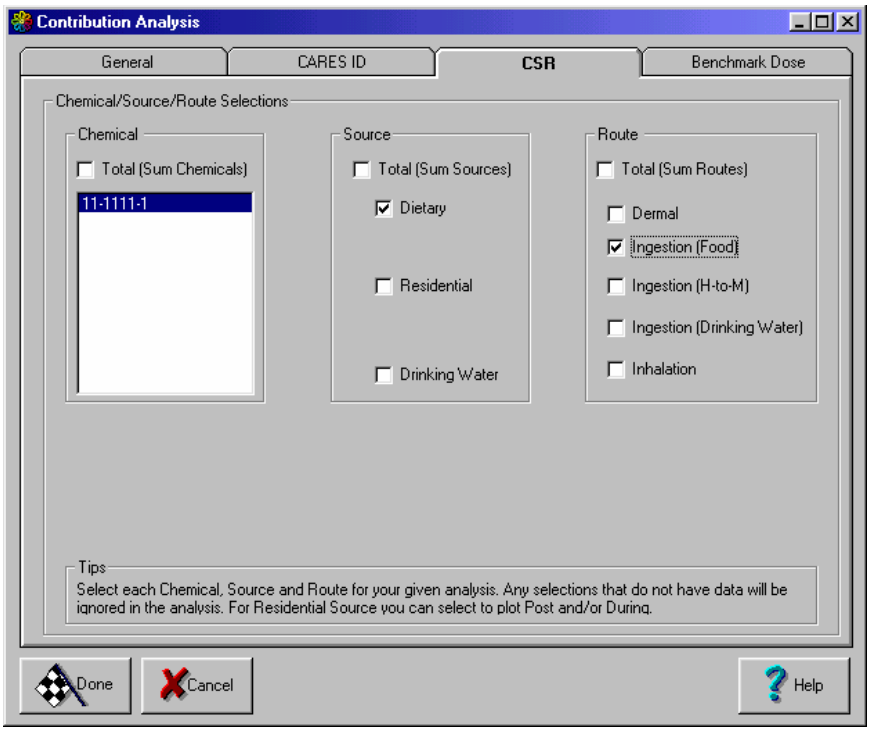
Exposure Metric, and a grid for displaying each individual's population characteristics:



Selecting an individual under the CARES ID list results in a display of that individual's demographic characteristics in the Population Information group. For example, select individual **18-0001051-01** to obtain the view depicted above.

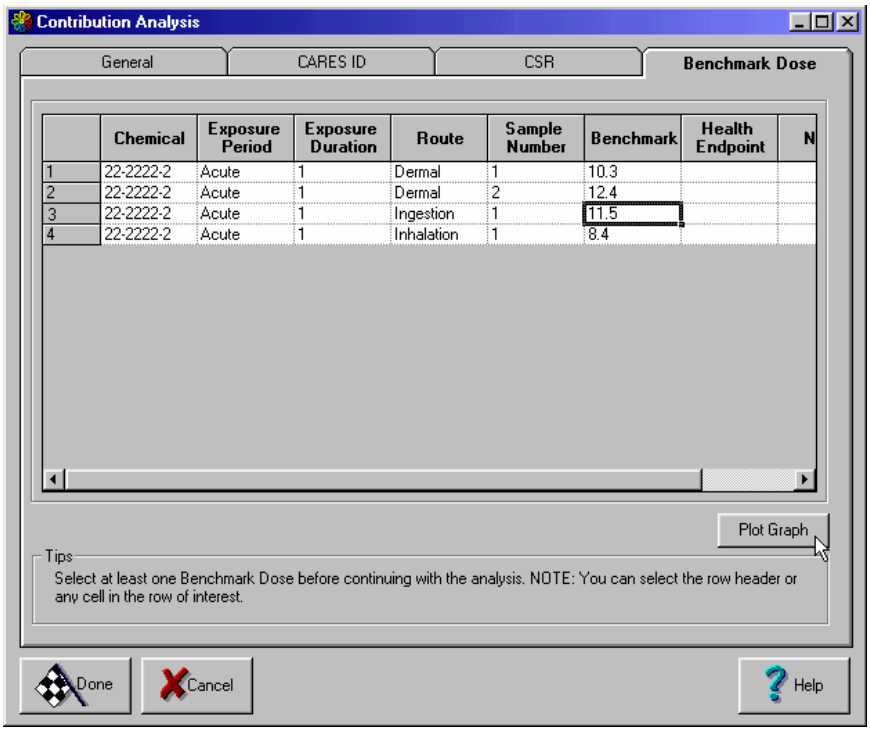
Click the **CSR** (Chemical, Source, Route) tab:

The **CSR** tab provides options for selecting the **Chemical**, the **Source**, and the **Route** of exposure for the individual currently selected in the **CARES ID** tab. Note that the CAS Code for the Wobegon chemical is listed in the **Chemical** group. Select the options for each CSR group as illustrated below:



TIP …	Note, if you select options in the CSR tab that are not in your data file, you will get nothing in the output. For instance, in this example we have selected 'Dietary' as the source — we would get no output from selecting the 'Residential' or 'Drinking Water' options.

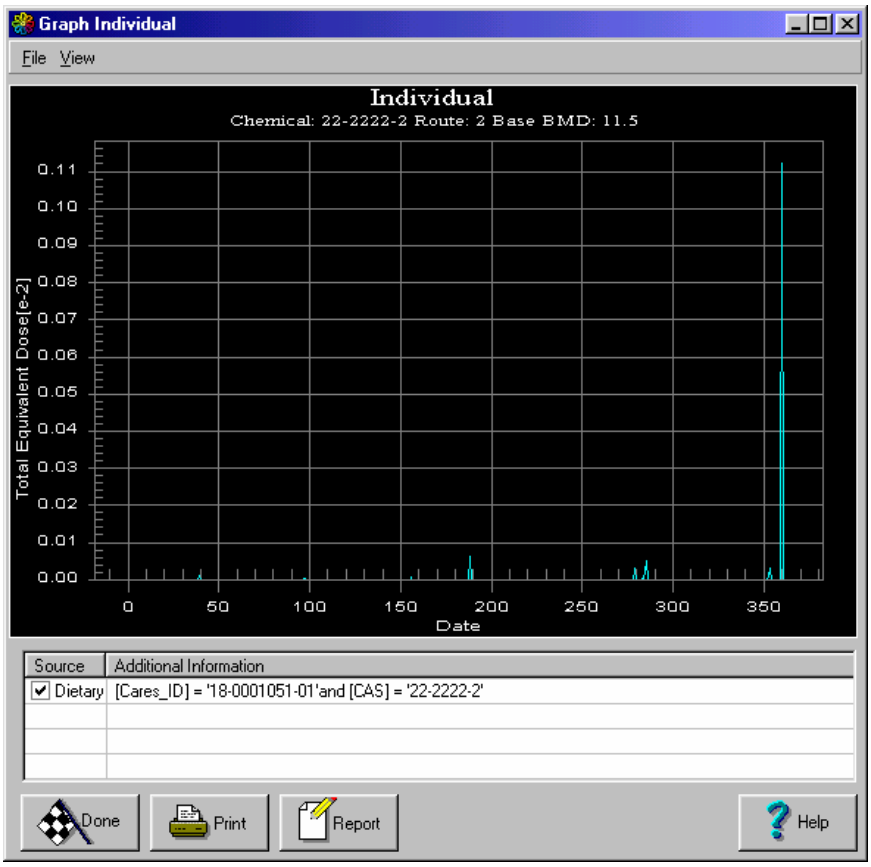
Now click the **Benchmark Dose** tab to reveal the available options as follows:



Since you are performing a acute dietary (injestion) analysis, select the Benchmark Dose cell as shown above.

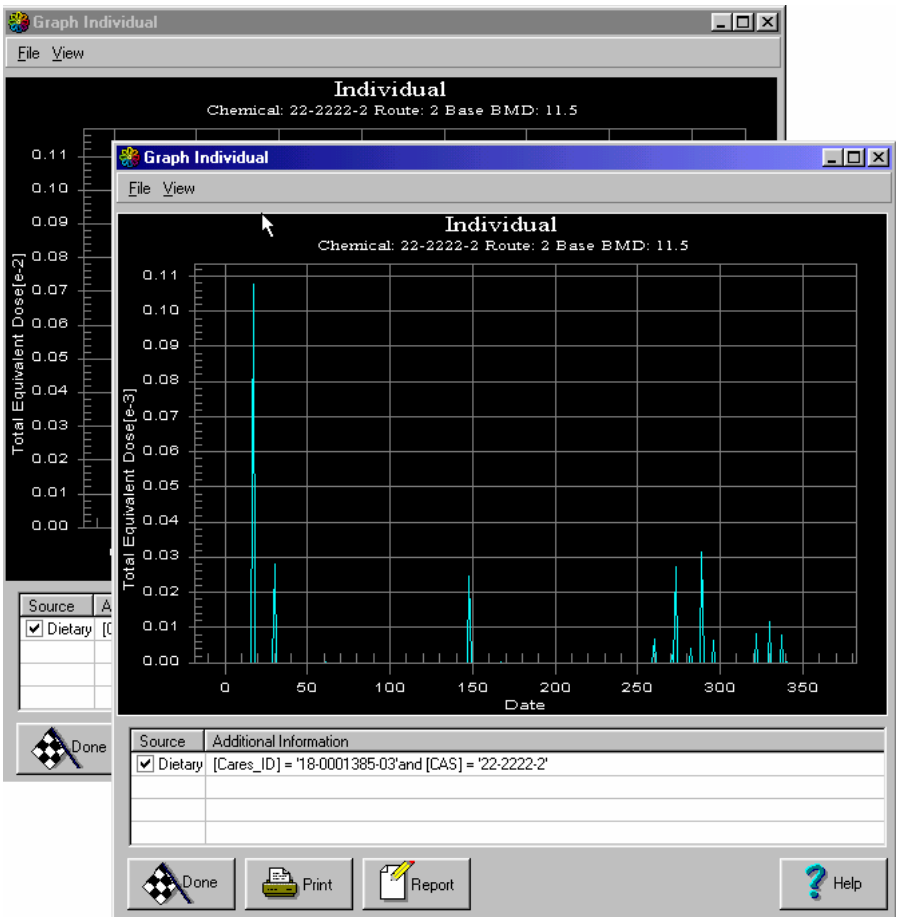
TIP …	To indicate your Benchmark Dose, You can select the cell as shown, or select the entire row. To select a Benchmark Dose row, move the mouse icon over the row header until the pointer turns to a right arrow, and then click the mouse once. Alternately, click on any cell in the row of interest.

Next, click the **Plot Graph** button to display the following graph:



This plot uses the options currently in effect as specified in each of the four **Contribution Analysis** tab views. It shows the Total Equivalent Dose for the selected Indiana male individual over 365 days resulting from dietary exposure to Wobegon by ingestion of one or more of the tomato food/ food-forms previously selected.

Note: the CSU allows you to view multiple graphs simultaneously. Leave the first graph on screen, go back and select another CARES ID and click **Plot Graph** to get another individual's graph:



This concludes Case Study Tutorial 2.

Click the **Done** button on each **Graph Individual** window to close it.

Click the **Done** button on the **Contribution Analysis** window to close it.

To close CARES, click on the **Close Application** icon on the menu bar of the main window. Alternately, select the menu option **File > Exit**.

Chapter 8 – Tutorial 3: Residential I

- Case Study Tutorial 3 - Summary
- Open Canvas File
- Select Sub-Population
- Select Chemical
- Setup Residential Data Inputs
- Save Run Settings
- Run Residential Module and View Results

Case Study Tutorial 3 — Summary

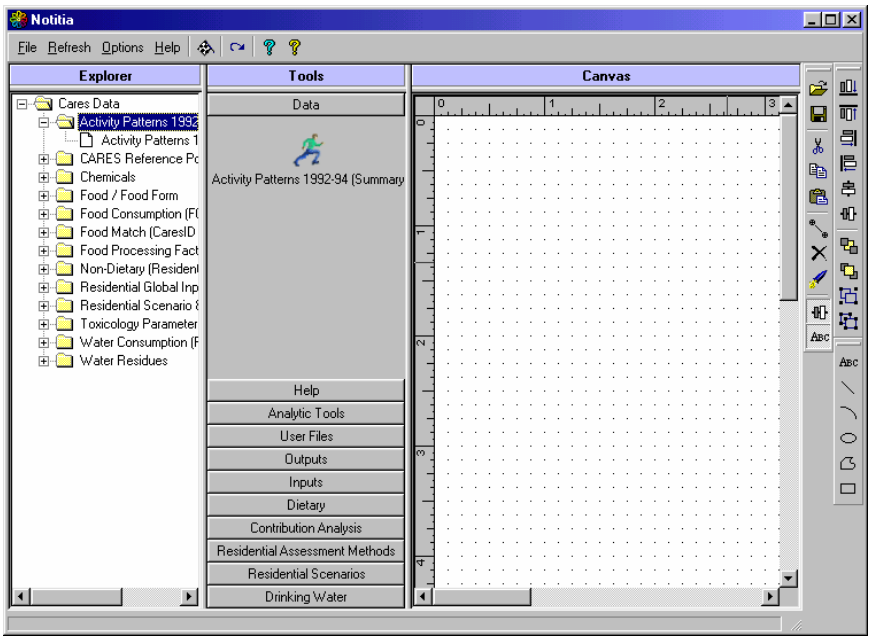
The following Table summarizes the main features of this Case Study Tutorial. The Module column indicates the applicable CARES module addressed. The Description column describes how you will do the various tasks or options within the module. For this first tutorial on residential assessments, you will work only with pre-built files and default parameters without modification. Refer to Case Study Tutorial 5 for instructions on performing Contribution and Sensitivity analysis for the run results.

Module	Description
Canvas	Use pre-built Canvas file
Population	Select sub-population saved in Tutorial 1
Chemicals	Safethrin
Scenario	Lawn Care
Event Allocation	Use defaults
Algorithms	Lawn Care: During App: Dermal: Unit Expo, Area Treated During App: Inhalation: Unit Expo, Area Treated Post App: Dermal: Transfer Coeff, Area Treated Post App: Ingestion: Hand-to-Mouth, Mass Bal
Algorithm Inputs	Use defaults
Toxicology	Use defaults
Data Analysis	Not described. See Case Study Tutorial 5.

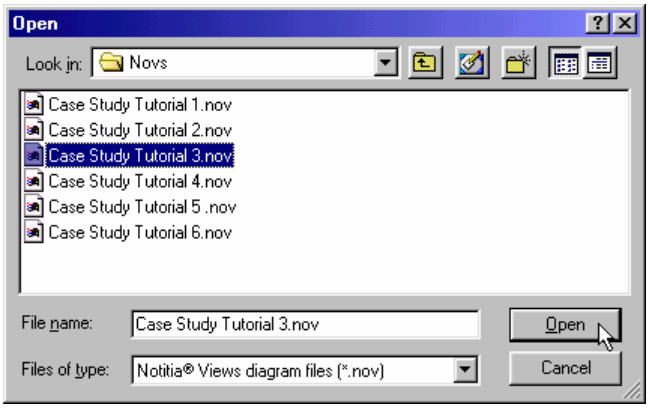
Open Canvas File

Begin this tutorial by starting CARES from scratch. To start CARES, double-click the CARES shortcut icon, if it is located on your desktop. Alternately, click **Start > Programs > Notitia > CARES**.

The opening screen appears as follows:



Click on the **Open NOV File** button located on the Diagrammer toolbar. The standard Windows Open dialog box appears similar to the following:

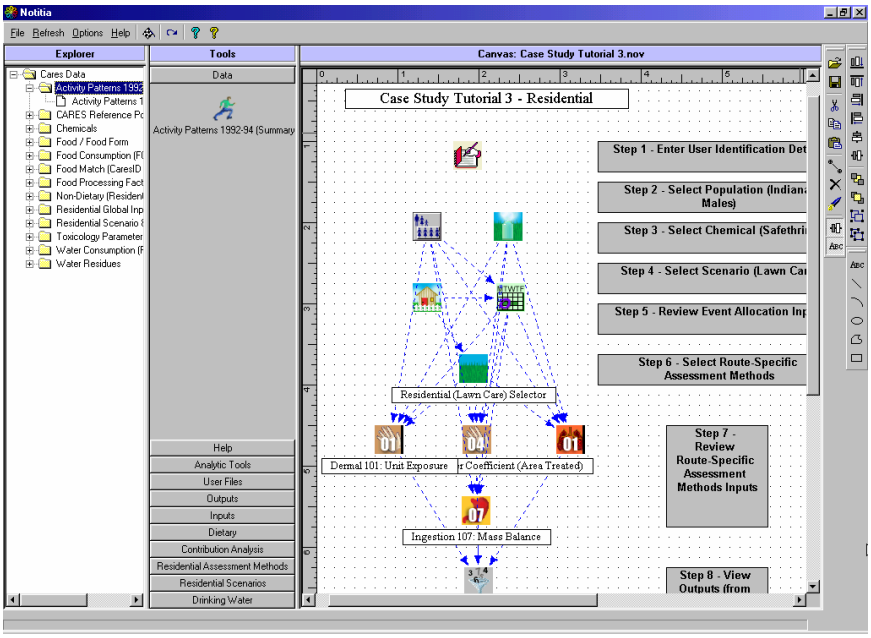


You may need to navigate to the Novs Folder, which is located in your Notitia directory (c:\notitia\novs). Files with the *.nov extension are used to capture and redisplay a pre-built Canvas setup.

For this tutorial, select the file named **Case Study Tutorial 3.nov** then click **Open**.

After clicking the **Open** button, the system will respond with the following dialog indicating that the ***.nov** file is loading:

When finished, the Main Window and Canvas will look like this:



You may need to resize the window or adjust the view in the Canvas pane with the scroll bars to view the whole Canvas.

The Canvas contains a number of icons representing the typical CARES modules and components needed to perform a residential risk analysis for a single scenario. Examine the layout carefully, observing the hierarchy of inputs and outputs. The text boxes indicate the steps needed to set up the model and run the analysis.

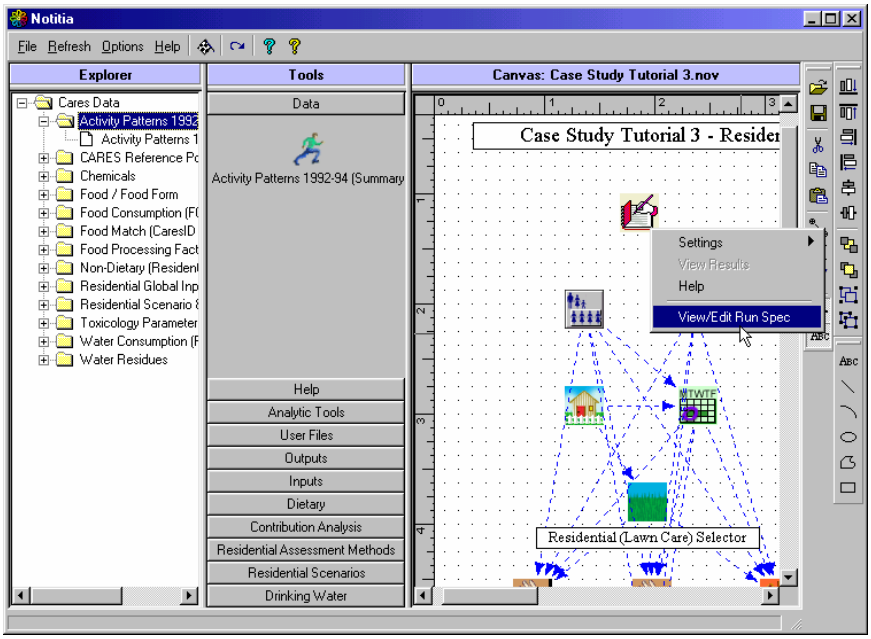
Building a Canvas, such as illustrated for the residential model, is accomplished following the same procedures described in Case Study Tutorial 2.

When a Canvas file first opens, the name of each component appears in a box beneath it. The first time you pass the cursor over this name box, it disappears and remains hidden. To view the name again, place the cursor over the component and the box will reappear until the cursor is moved away.

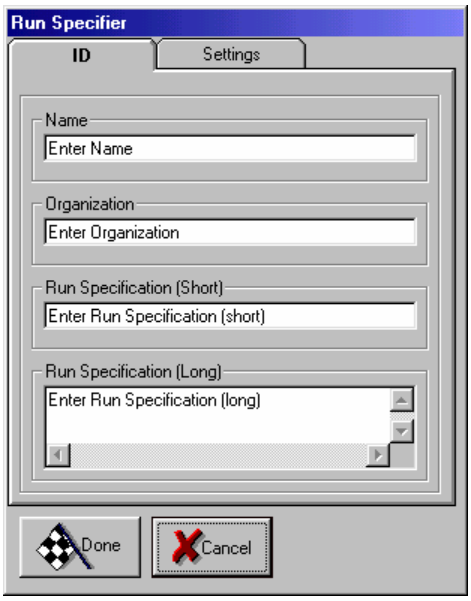
Note that the module icons respond to mouse clicks in two specific ways. First, if you simply click on an icon, it will become selected as indicated by the selection box appearing around the icon. In this mode, you can move the icon to another position on the Canvas and the connections, if any, will remain intact. Thus, clicking on a module icon simply allows you to move it. To perform an operation with a module or other component icon, you must *right click* on it to display a list of available action options, as illustrated next.

Specify the Run

Right click on the **Run Specifier** icon to open a context menu list. Then select the **View/Edit Run Spec** menu option as illustrated:



The **Run Specifier** window will open as follows:



The **ID** tab in the **Run Specifier** window provides default instructions for each of the entry fields available for you to enter details describing this particular run. The **Settings** tab, which we shall use later, provides the options for saving all the module settings associated with this particular instance of a Canvas NOV file.

The logical use of the **Run Specifier** is as follows:

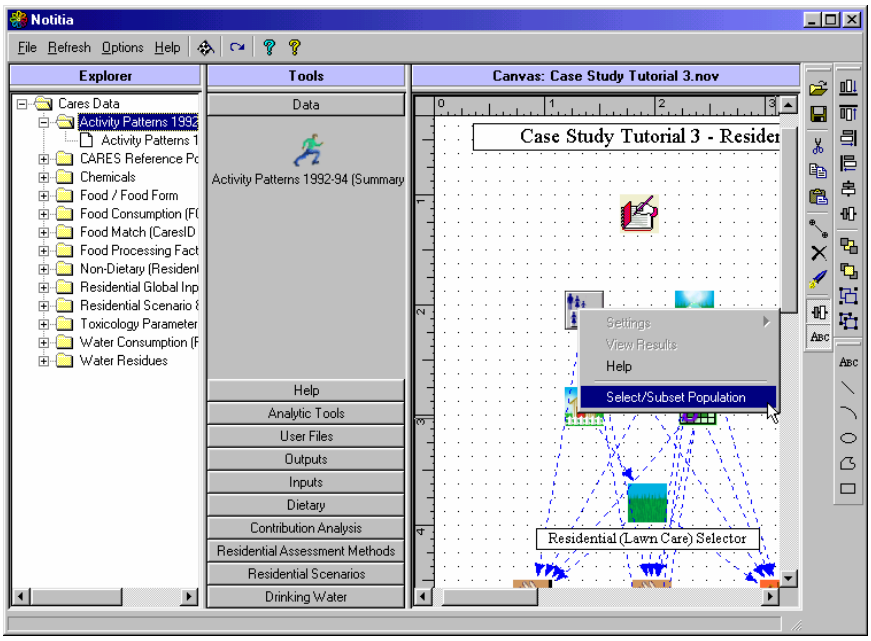
4. Start the **Run Specifier** and open to the **ID** tab. Fill in the identification information for the current run. Then click OK to close the window.
5. Continue applying the settings for each module or component on the Canvas.
6. Before clicking the **Run Canvas** button, return to the **Run Specifier** and open the **Settings** tab where you will find options to save the module settings you just established. The information on the **ID** tab is saved along with these settings to a file that you name.

For now, fill in the four information fields in the **ID** tab of the **Run Specifier** window with some appropriate identifying text, and then click **Done** to close the window. We will return to the **Run Specifier** to save the settings later.

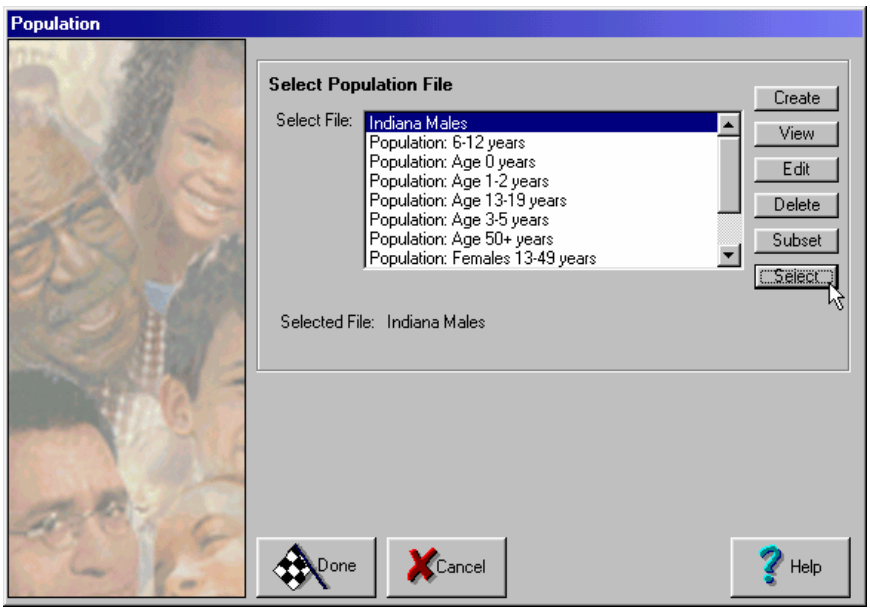
TIP …	Note that using the **Run Specifier** is a required step, even though you may not intend on reusing the settings in a future run. Its main advantage is that it *will* save you the time of redoing all the settings if you do decide to reload the same Canvas NOV file.

Select Sub-Population

Right click on the **Population Selector** icon and select the **Select/Subset Population** menu option:



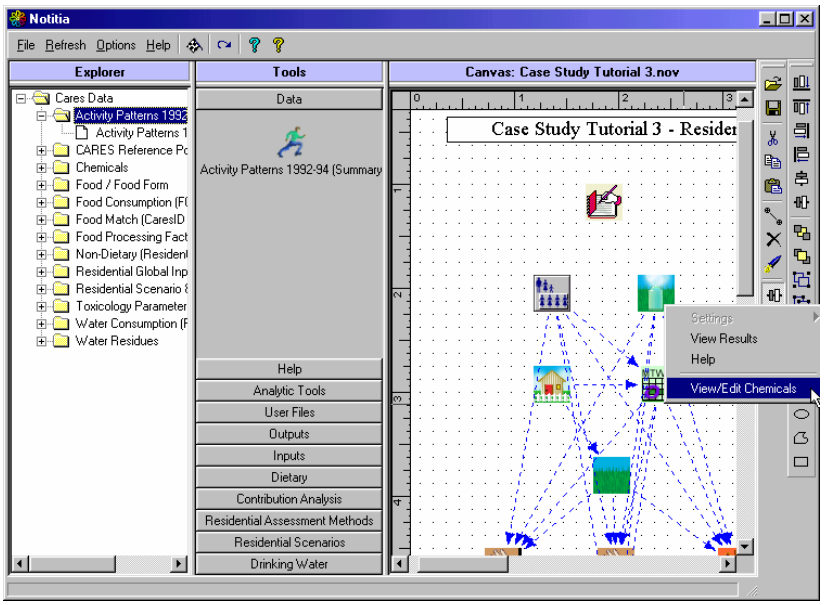
The **Population** window will open showing a list of available sub-population files similar to the following:



Select the '**Indiana Males'** file by highlighting the file name, and then click the **Select** button, as shown above. Note that the file name now appears as the **Selected File:** text. Click **Done**.

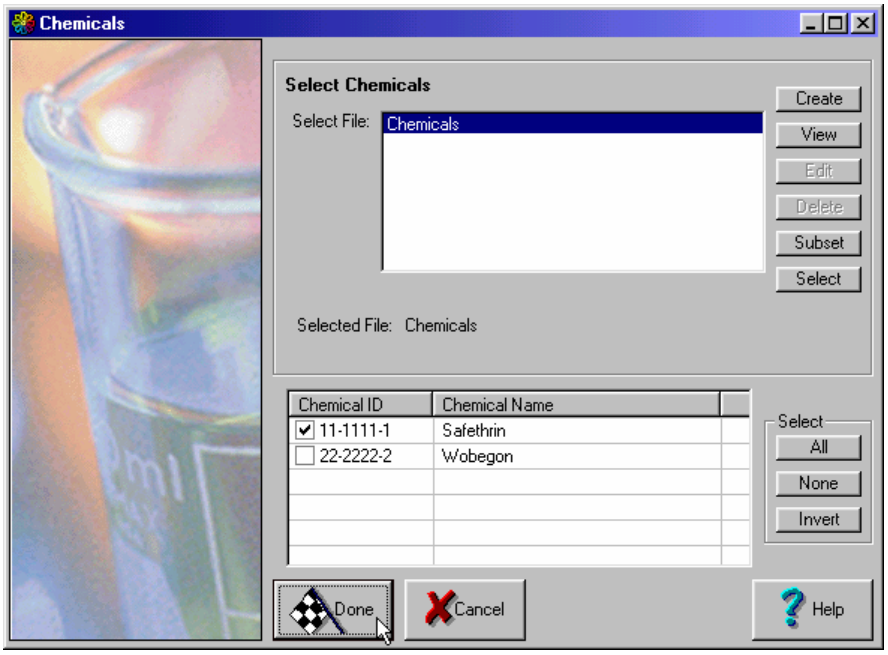
Select Chemical

Right click on the **Chemical Selector** icon to bring up the context-sensitive window as follows:



Click the **View/Edit Chemicals** option, as shown above.

This opens the **Chemical Selector** window:



Note that when the above window first appears, the bottom pane is blank.

In the **Chemical Selector** window, the **Select File** pane displays saved files that contain the details of one or more chemicals that will appear in the lower grid when the file is selected.

To see how this works, highlight the file named **Chemicals** and click **Select**. Alternately, double click on the file name, **Chemicals**. In this case, there is only one file to select from, so it is already highlighted when the window first opens.

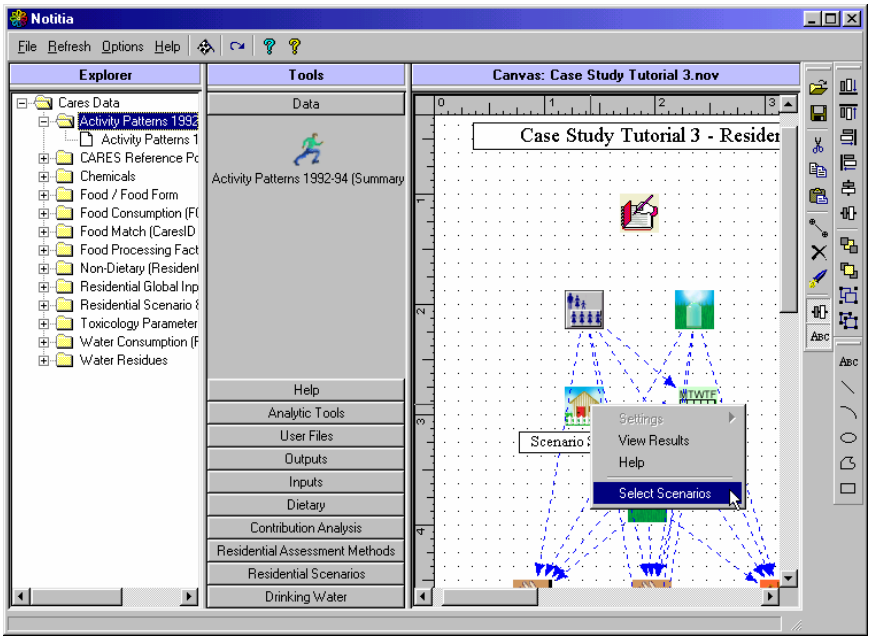
When the Chemicals file is selected, two or more chemicals appear in the bottom grid, as shown above. Select the chemical **Safethrin** for use in this tutorial by clicking on the check box next to the CAS number (**11-1111-1**) in the **Chemical ID** column.

Note that the chemical file you selected appears after the **Selected File:** text. This is a feed back notice showing the program's awareness of your chemical selection.

Click **Done** to close the **Chemical Selector** window and return to the main CARES window.

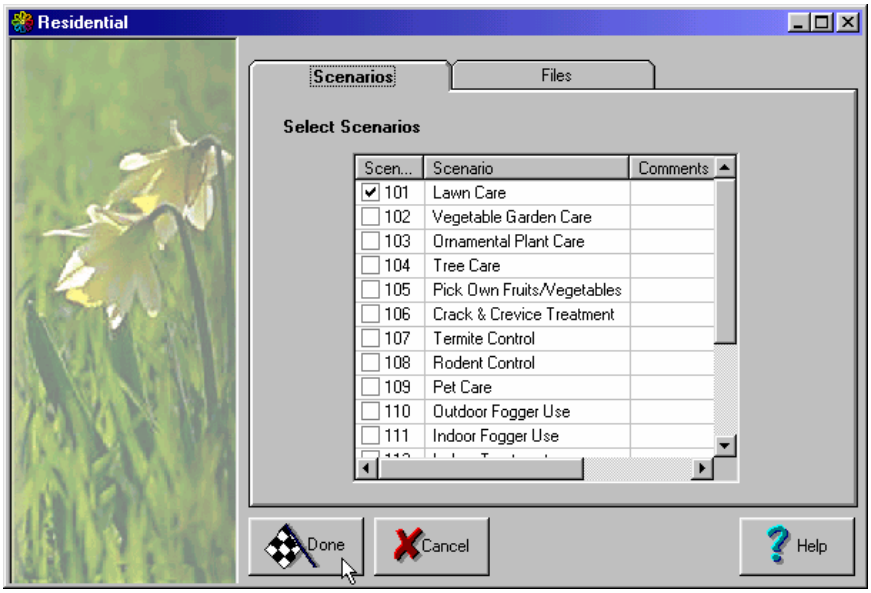
Setup Residential Data Inputs

Right click on the **Scenario Selector** to open the context-sensitive menu:



Select the **Select Scenarios** option, as shown above.

The Residential window will open. If necessary, click on the Scenarios tab to get the following view:

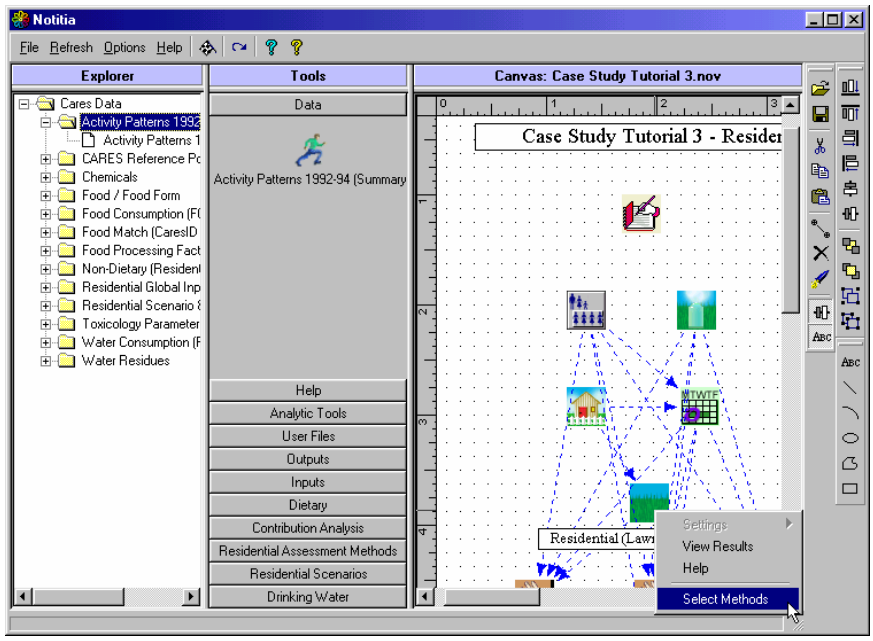


Click the check box for **Lawn Care** to select that scenario.
Click **Done** to exit the Residential window.

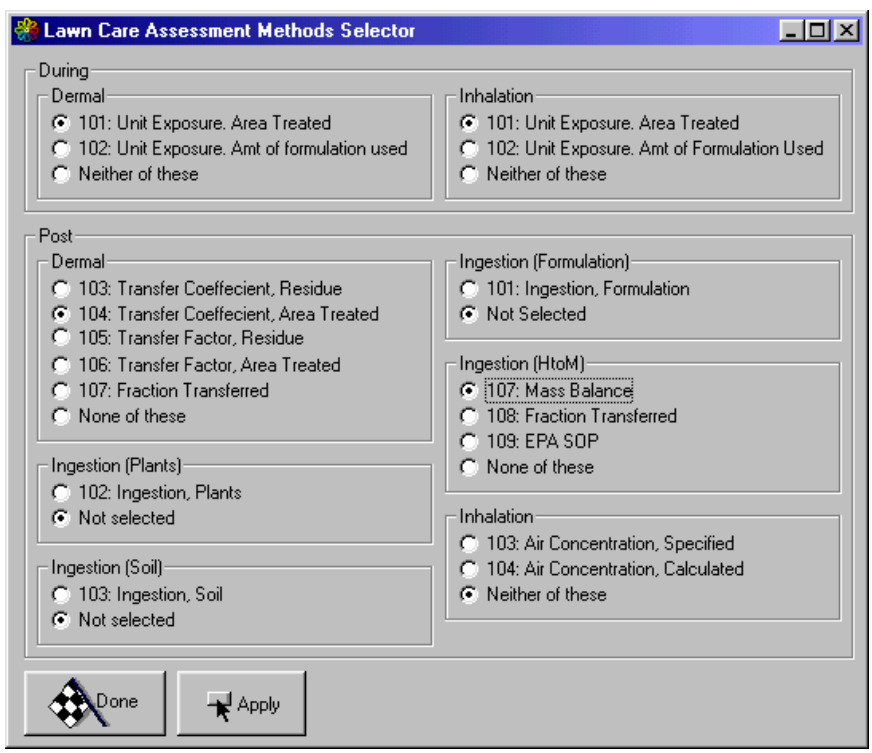
In this tutorial, we will use the default settings for the Event Allocation, so you do not have to configure this icon. In Case Study Tutorial 4 you will learn more about using the **Event Allocation**.

There are 19 residential scenarios available in CARES. Each scenario selected in the Residential window (see above) is represented on the Canvas by an icon that controls the settings specific to that scenario.

The lawn care scenario is the only exposure source included in this tutorial. Right click on the **Residential (Lawn Care) Selector** icon and select the **Select Methods** menu option from the context-sensitive window, as shown below:



The **Lawn Care Assessment Methods Selector** window opens as follows:



The **Lawn Care Assessment Methods Selector** window displays groups of algorithm options (or methods) for calculating each type of exposure opportunity the scenario contains. In the current window, you

will note that Lawn Care exposure includes temporal groups (such as **During** and **Post** application),and these, in turn, contain sub-groups of algorithms for various routes of exposure (e.g., **Dermal**, **Inhalation**, **Ingestion**).

TIP …	When setting up the Canvas model, a corresponding icon on the Canvas represents each numbered algorithm you select in the scenario selector.

The above window shows the four options you should choose for this run, and the following list shows the algorithm icon associated with the specific option:

During Application

	Dermal 101: Unit Exposure (Area Treated)
	Inhalation 101: Unit Exposure, Area Treated

Post Application

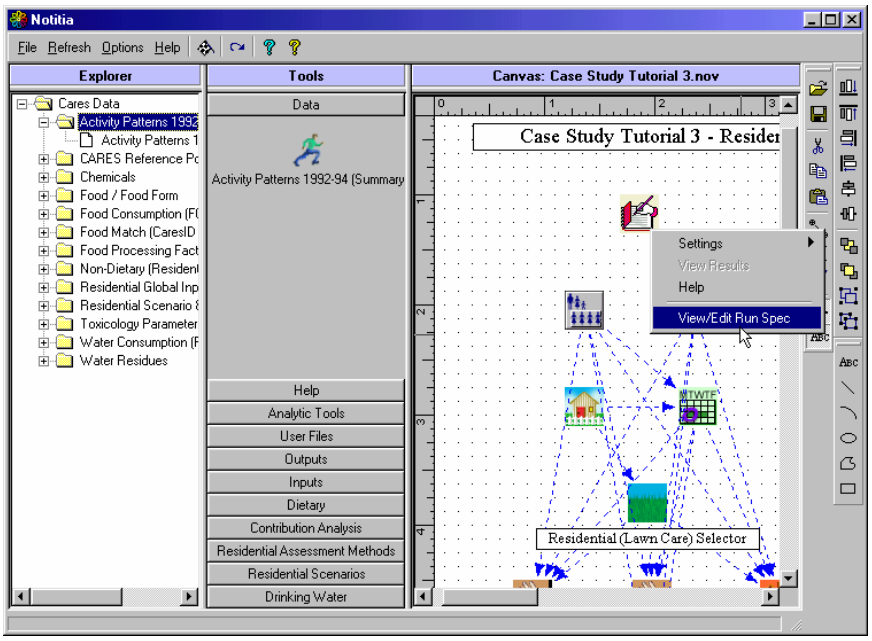
	Ingestion 107: Mass Balance
	Ingestion 107: Mass Balance

Click **Done** when finished selecting the options.

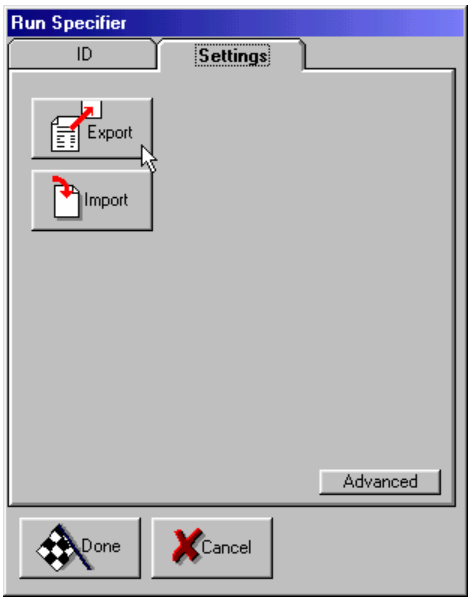
Save Run Settings

Before running the Canvas model, you need to save the settings that you have just established. This will allow you to recall the same settings should you want either to repeat the run as is or make some modifications in the setup and then rerun the Canvas.

Right click on the **Run Specifier** icon and select the **View/Edit Run Spec** option as illustrated:

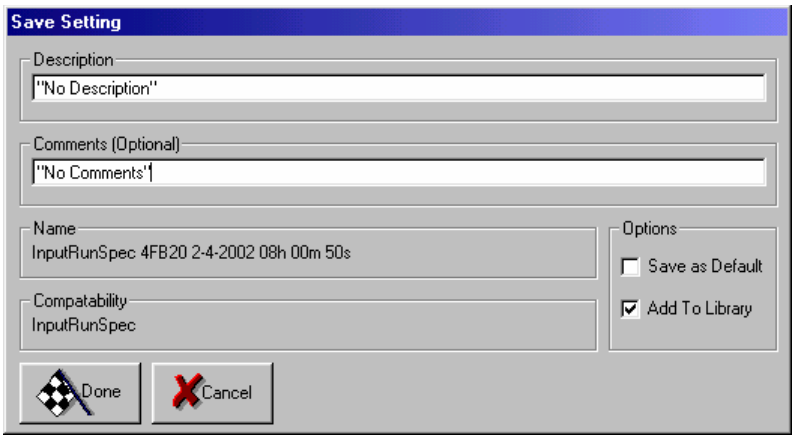


In the **Run Specifier** window, click the **Settings** tab.



Click the **Export** button.

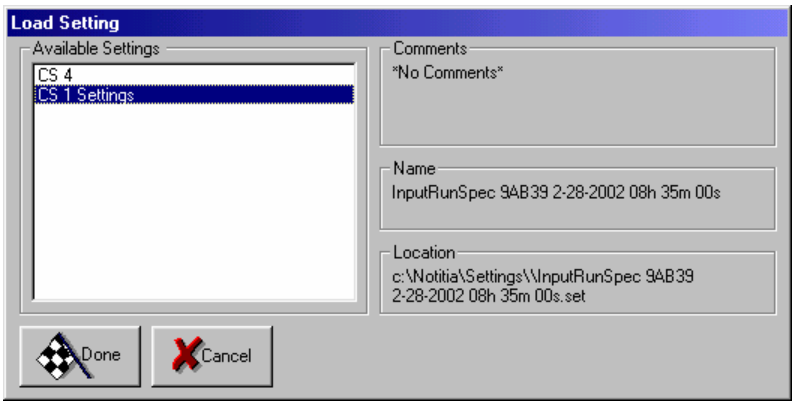
A **Save Setting** window will appear similar to the following:



Replace the default 'No Description' entry with a short description of the setup you have just created for this run. For example, type **CS 3 Settings**. Optionally, you can include additional information in the 'Comments' field.

Click **Done** to return to the **Settings** tab.

To see how you can load these settings in the future, click the **Load Settings** button. A window similar to the following appears:



Although not shown in the example, setting description you just entered will appear in the available list.

Click **Cancel** to close the Load Setting window.

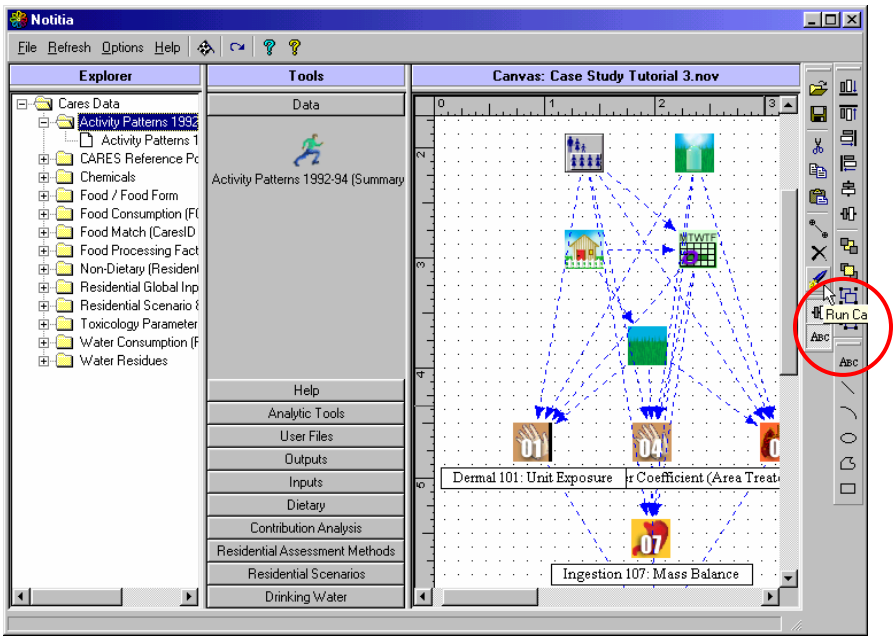
Click **Done** to close the **Run Specifier** window and return to the main window.

Run Residential Module and View Results

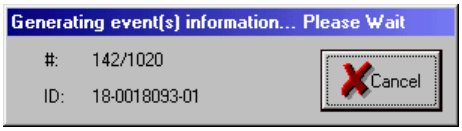
TIP …	Running the Residential model will require anywhere from 90 minutes using the minimum required processor to 15 minutes for a very fast processor.

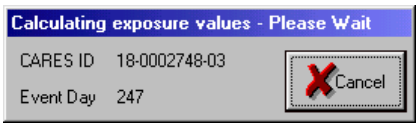
TIP …	To avoid unexpected problems, it is recommended that you do not use other applications or work with your computer when CARES 1.0 is processing files such as this. Otherwise, when CARES is not processing data, feel free to simultaneously work with other applications while CARES is open and not processing.

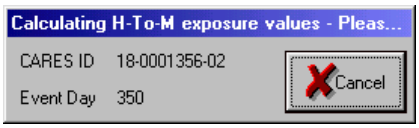
Click the **Run Canvas** button on the Diagrammer toolbar to execute the model::

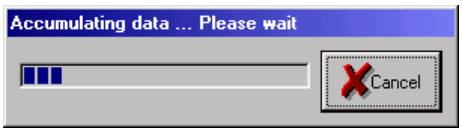


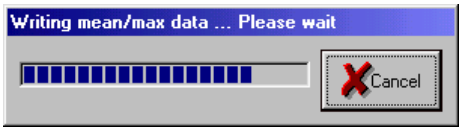
Once the **Run Canvas** button has been clicked, the program will begin executing and one or more dialogs may pop up indicating program status. Depending upon the setup choices made, this process could involve considerable time. You may see status windows such as these:

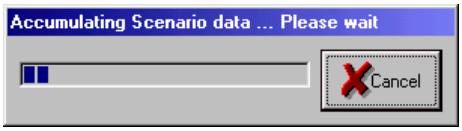


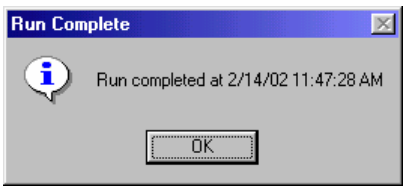










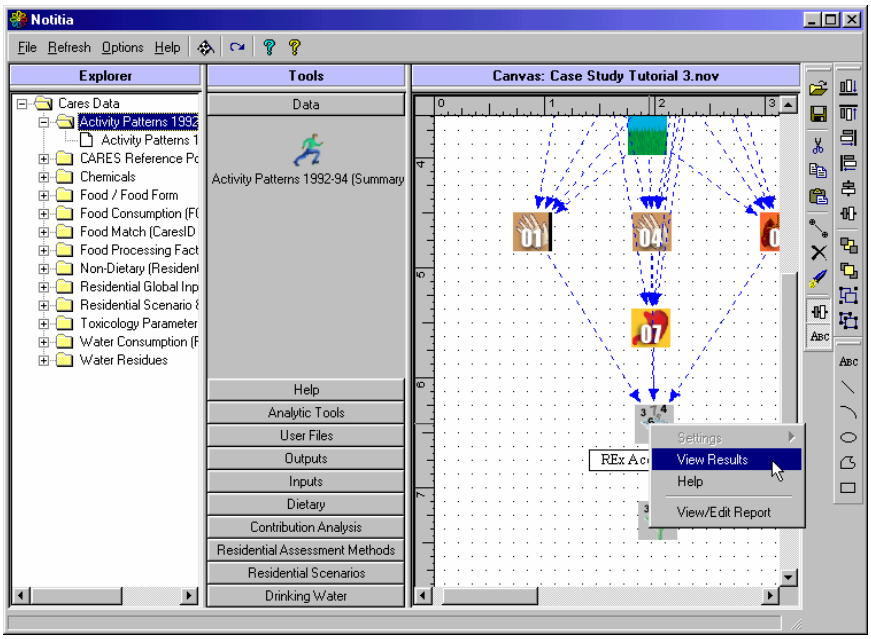


When the run has completed, as indicated by the above notice, click **OK**.

TIP …	If your computer memory runs low during the run, the run will continue, but the screen may not be redrawn correctly until the run is finished.

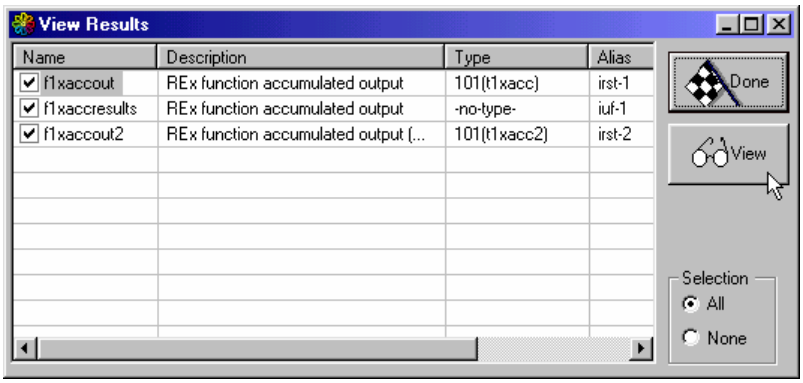
Viewing the Results

Right-click the **REx Accumulator** icon to view the outputs of all REx (Residential Exposure) functions for a given scenario, and then select the **View Results** menu option, as follows:



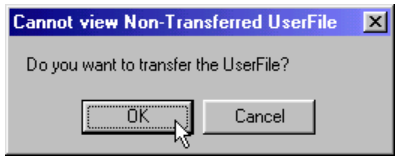
TIP …	Note: the above step allows viewing of all the functions in the run through one window. You may view individual results by right-clicking on any of the dermal, inhalation, or ingestion icons and selecting **View Results** from their respective context-sensitive menu.

The following **View Results** window will appear showing options for all functions in the current residential model run:



Click the appropriate check box to select the files you want to view, and then click the **View** button, as illustrated above.

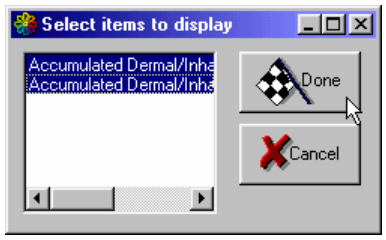
The data for the files you wish to view is stored in a temporary file. You will be prompted to save the data to a User File for viewing and analysis:



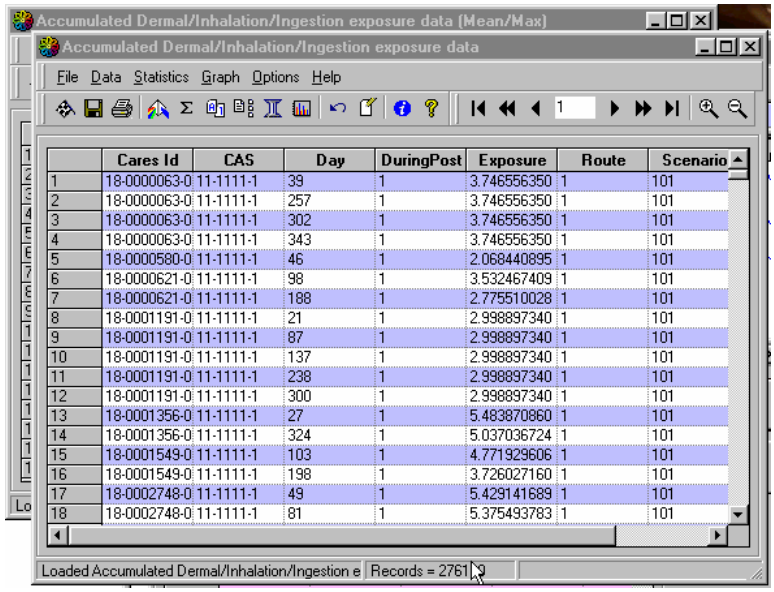
Click **OK** when prompted to transfer and save data in a User File.

The following status message will appear:

Preparing the User Files could take several minutes. When complete, a selection window with a list of available files for viewing will appear similar to the following:



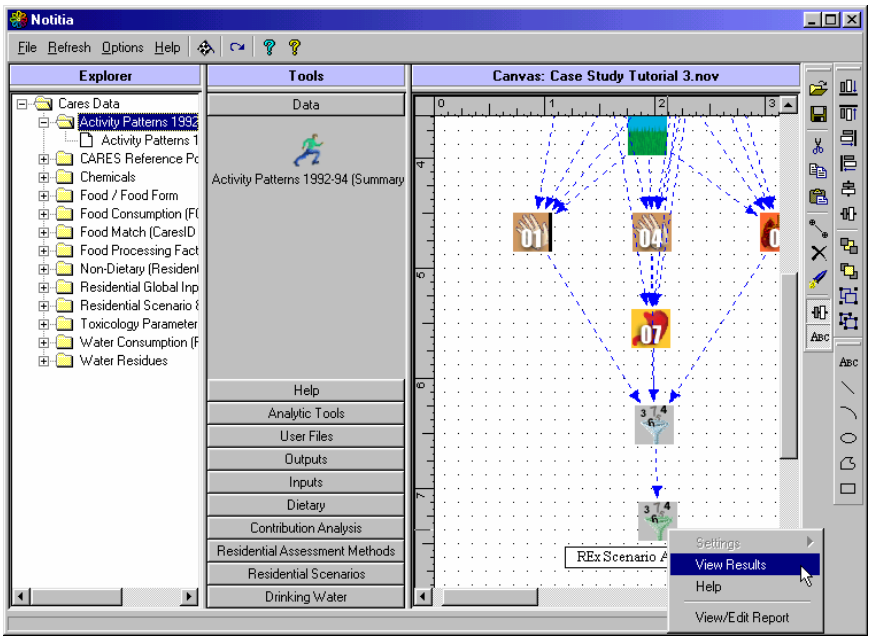
Select files to view and click **Done**.



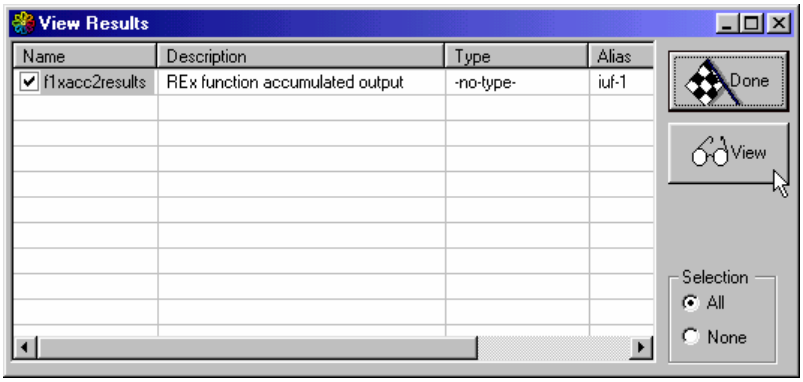
	Cares Id	CAS	Day	DuringPost	Exposure	Route	Scenario
1	18-0000063-0	11-1111-1	39	1	3.746556350	1	101
2	18-0000063-0	11-1111-1	257	1	3.746556350	1	101
3	18-0000063-0	11-1111-1	302	1	3.746556350	1	101
4	18-0000063-0	11-1111-1	343	1	3.746556350	1	101
5	18-0000580-0	11-1111-1	46	1	2.068440895	1	101
6	18-0000621-0	11-1111-1	98	1	3.532467409	1	101
7	18-0000621-0	11-1111-1	188	1	2.775510028	1	101
8	18-0001191-0	11-1111-1	21	1	2.998897340	1	101
9	18-0001191-0	11-1111-1	87	1	2.998897340	1	101
10	18-0001191-0	11-1111-1	137	1	2.998897340	1	101
11	18-0001191-0	11-1111-1	238	1	2.998897340	1	101
12	18-0001191-0	11-1111-1	300	1	2.998897340	1	101
13	18-0001356-0	11-1111-1	27	1	5.483870860	1	101
14	18-0001356-0	11-1111-1	324	1	5.037036724	1	101
15	18-0001549-0	11-1111-1	103	1	4.771929606	1	101
16	18-0001549-0	11-1111-1	198	1	3.726027160	1	101
17	18-0002748-0	11-1111-1	49	1	5.429141689	1	101
18	18-0002748-0	11-1111-1	81	1	5.375493783	1	101

TIP …	The **REx Scenario Accumulator** icon represents an aggregation function for use when two or more exposure modules are included in one run: for example, a model including both dietary and residential exposure.

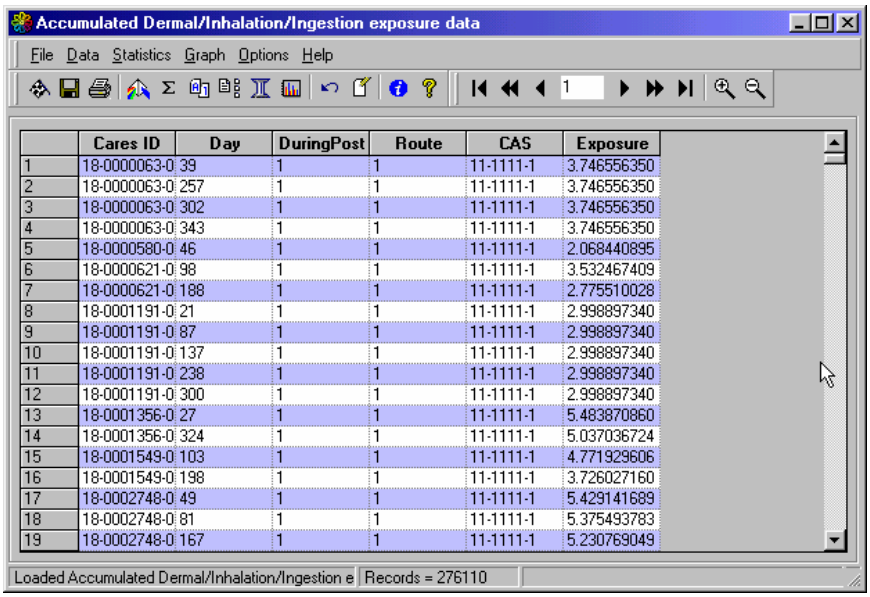
To view the accumulated scenario results, right-click the **REx Scenario Accumulator** icon, and then select the View Results menu option, as shown:



In the View Results window, select the output file to view and click the **View** button:



The data grid for the accumulated results will appear similar to the following:



Accumulated Dermal/Inhalation/Ingestion exposure data

File Data Statistics Graph Options Help

	Cares ID	Day	DuringPost	Route	CAS	Exposure
1	18-0000063-0	39	1	1	11-1111-1	3.746556350
2	18-0000063-0	257	1	1	11-1111-1	3.746556350
3	18-0000063-0	302	1	1	11-1111-1	3.746556350
4	18-0000063-0	343	1	1	11-1111-1	3.746556350
5	18-0000580-0	46	1	1	11-1111-1	2.068440895
6	18-0000621-0	98	1	1	11-1111-1	3.532467409
7	18-0000621-0	188	1	1	11-1111-1	2.775510028
8	18-0001191-0	21	1	1	11-1111-1	2.998897340
9	18-0001191-0	87	1	1	11-1111-1	2.998897340
10	18-0001191-0	137	1	1	11-1111-1	2.998897340
11	18-0001191-0	238	1	1	11-1111-1	2.998897340
12	18-0001191-0	300	1	1	11-1111-1	2.998897340
13	18-0001356-0	27	1	1	11-1111-1	5.483870860
14	18-0001356-0	324	1	1	11-1111-1	5.037036724
15	18-0001549-0	103	1	1	11-1111-1	4.771929606
16	18-0001549-0	198	1	1	11-1111-1	3.726027160
17	18-0002748-0	49	1	1	11-1111-1	5.429141689
18	18-0002748-0	81	1	1	11-1111-1	5.375493783
19	18-0002748-0	167	1	1	11-1111-1	5.230769049

Loaded Accumulated Dermal/Inhalation/Ingestion e | Records = 276110

This concludes Case Study Tutorial 3.

Directions and examples for running the Contribution and Sensistivity Analyis functions were breifly given in Case Study 1 and are covered in more detail in Case Study Tutorial 5

Click the **Done** button on each open data grid window to close it.

To close CARES, click on the **Close Application** icon on the menu bar of the main window. Alternately, select the menu option **File > Exit**.

Chapter 9 – Tutorial 4: Residential II

- Case Study Tutorial 4 - Summary
- Open Canvas File
- Specify the Run
- Select Sub-Population
- Select Chemical
- Setup Residential Data Inputs
- Run Residential Module
- Conduct Data Analysis

Case Study Tutorial 4 — Summary

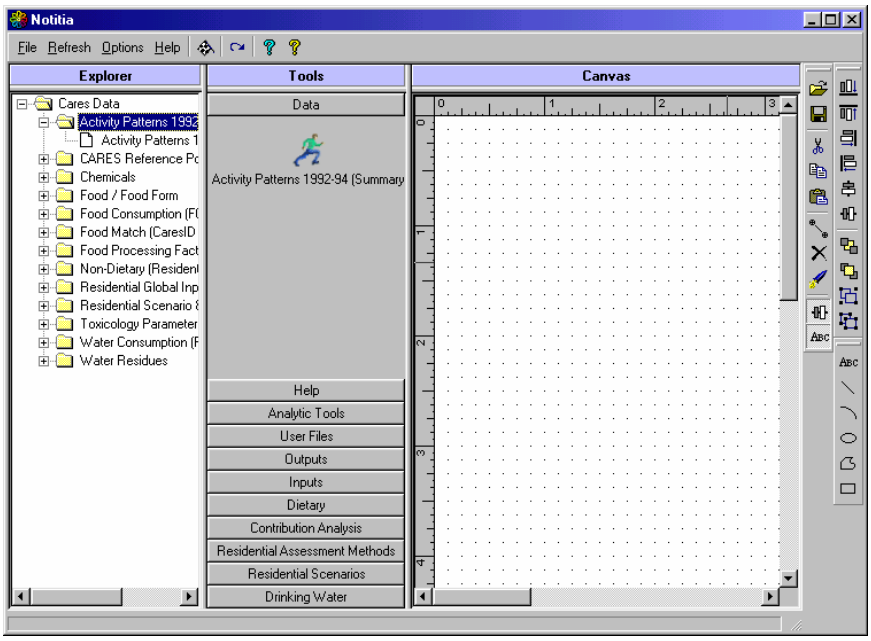
The following Table summarizes the main features of this Case Study Tutorial. The Module column indicates the applicable CARES module addressed. The Description column describes how you will do the various tasks or options within the module. Shaded description cells indicate "do-it-yourself" type tasks that provide additional detail into program use. In this tutorial, you will essentially work through the same procedures as described in Case Study Tutorial 3, except you will learn how to modify the Event Allocator and Algorithm inputs.

Module	Description
Canvas	Use pre-built Canvas file
Population	Select sub-population saved in Tutorial 1
Chemicals	Safethrin
Scenario	Lawn Care
Event Allocation	Modify inputs
Algorithms	Lawn Care: During App: Dermal: Unit Expo, Area Treated During App: Inhalation: Unit Expo, Area Treated Post App: Dermal: Transfer Coeff, Area Treated Post App: Ingestion: Hand-to-Mouth, Mass Bal
Algorithm Inputs	Modify inputs
Toxicology	Use defaults
Data Analysis	Not described. See Case Study Tutorial 5.

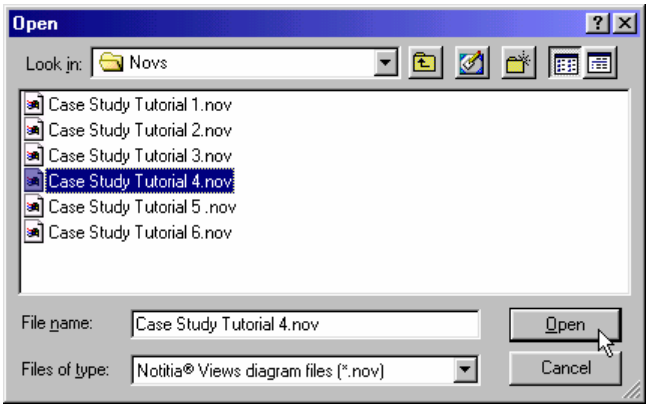
Open Canvas File

Begin this tutorial by starting CARES from scratch. To start CARES, double-click the CARES shortcut icon, if it is located on your desktop. Alternately, click **Start > Programs > Notitia > CARES**.

The opening screen appears as follows:



Click on the **Open NOV File** button located on the Diagrammer toolbar. The standard Windows Open dialog box appears similar to the following:

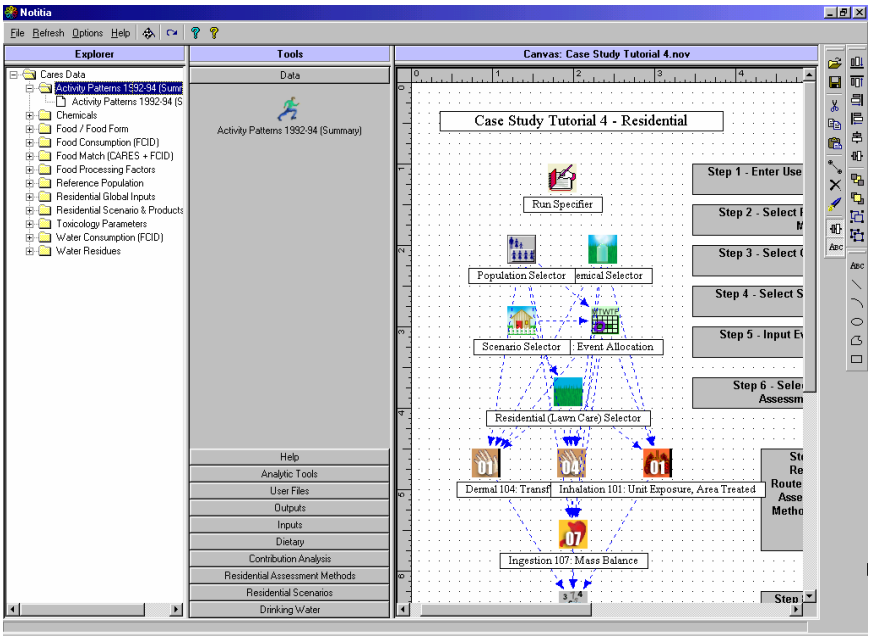


You may need to navigate to the Novs Folder, which is located in your Notitia directory (c:\notitia\novs). Files with the *.nov extension are used to capture and redisplay a pre-built Canvas setup.

For this tutorial, select the file named **Case Study Tutorial 4.nov** then click **Open**.

After clicking the **Open** button, the system will respond with the following dialog indicating that the ***.nov** file is loading:

When finished, the Main Window and Canvas will look like this:



You may need to resize the window or adjust the view in the Canvas pane with the scroll bars to view the whole Canvas.

The Canvas contains a number of icons representing the typical CARES modules and components needed to perform a residential risk analysis for a single scenario. Examine the layout carefully, observing the hierarchy of inputs and outputs. The text boxes indicate the steps needed to set up the model and run the analysis.

TIP …	Note that the Canvas in this tutorial contains the same model as used in Case Study Tutorial 3. The difference between the two will be in the settings that are applied to the components. You will also be instructed in this tutorial on how to make some addition data adjustments in the input data.

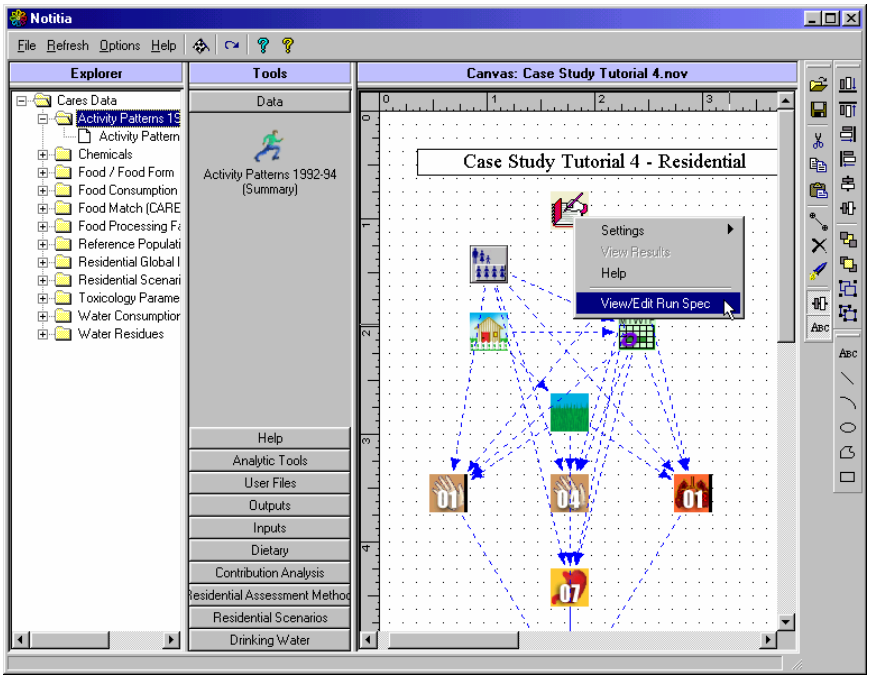
Refer to Case Study Tutorial 2 for details on how to construct a Canvas model.

When a Canvas file first opens, the name of each component appears in a box beneath it. The first time you pass the cursor over this name box, it disappears and remains hidden. To view the name again, place the cursor over the component and the box will reappear until the cursor is moved away.

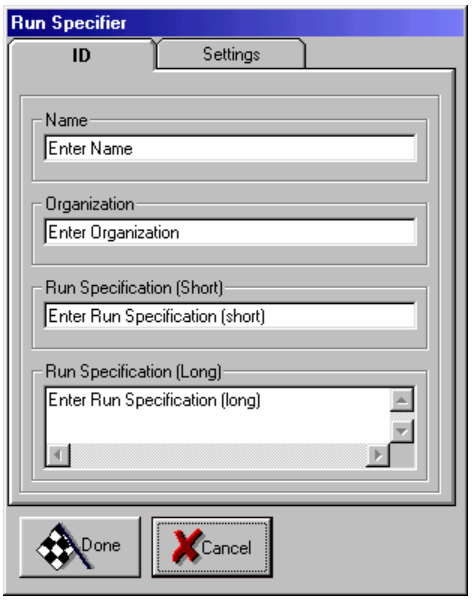
Note that the module icons respond to mouse clicks in two specific ways. First, if you simply click on an icon, it will become selected as indicated by the selection box appearing around the icon. In this mode, you can move the icon to another position on the Canvas and the connections, if any, will remain intact. Thus, clicking on a module icon simply allows you to move it. To perform an operation with a module or other component icon, you must *right click* on it to display a list of available action options, as illustrated next.

Specify the Run

Right click on the **Run Specifier** icon to open a context menu list. Then select the **View/Edit Run Spec** menu option as illustrated:



The **Run Specifier** window will open as follows:



The **ID** tab in the **Run Specifier** window provides default instructions for each of the entry fields available for you to enter details describing this particular run. The **Settings** tab, which we shall use later, provides the options for saving all the module settings associated with this particular instance of a Canvas NOV file.

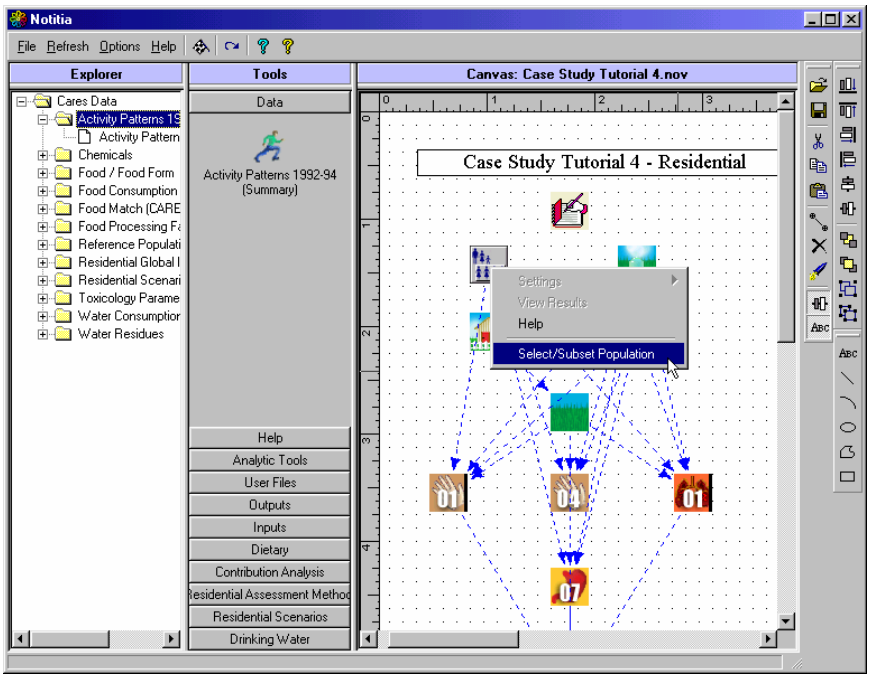
For now, fill in the four information fields in the **ID** tab of the **Run Specifier** window with some appropriate identifying text, and then click **Done** to close the window.

We will return to the **Run Specifier** to save the Canvas settings later.

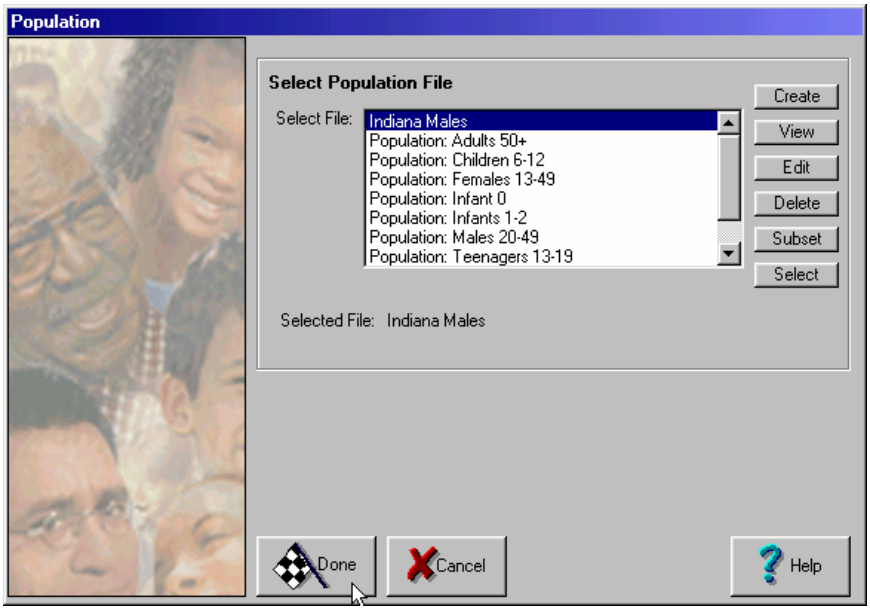
TIP …	Note that using the **Run Specifier** is a required step, even though you may not intend on reusing the settings in a future run. Its main advantage is that it *will* save you the time of redoing all the settings if you do decide to reload the same Canvas NOV file.

Select Sub-Population

Right click on the **Population Selector** icon and select the **Select/Subset Population** menu option:



The **Population** window will open showing a list of available sub-population files similar to the following:

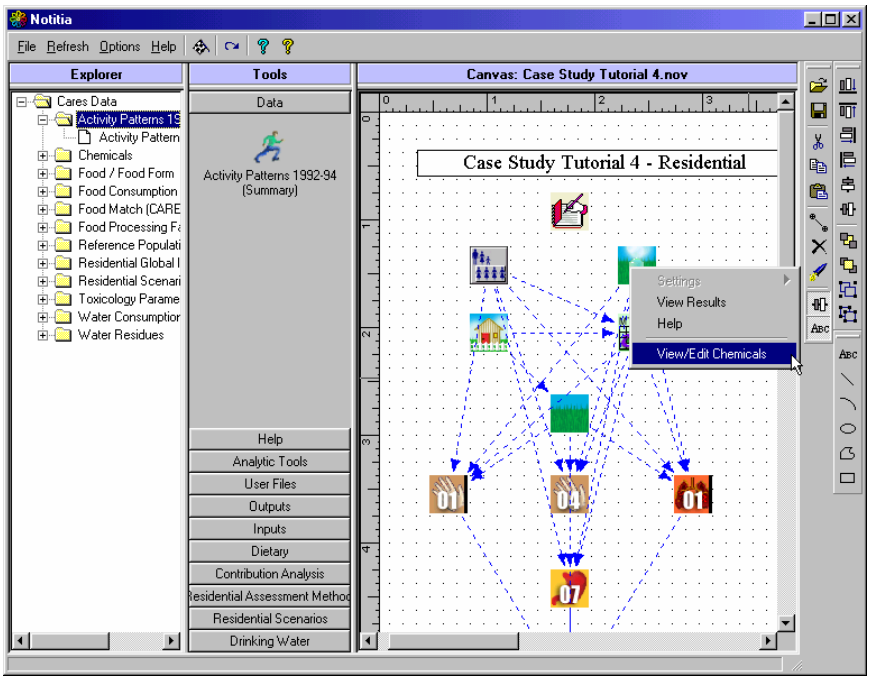


Select the '**Indiana Males**' file by highlighting the file name, and then click the **Select** button, as shown above. Note that the file name now appears as the **Selected File:** text confirming the selection.

Click **Done**.

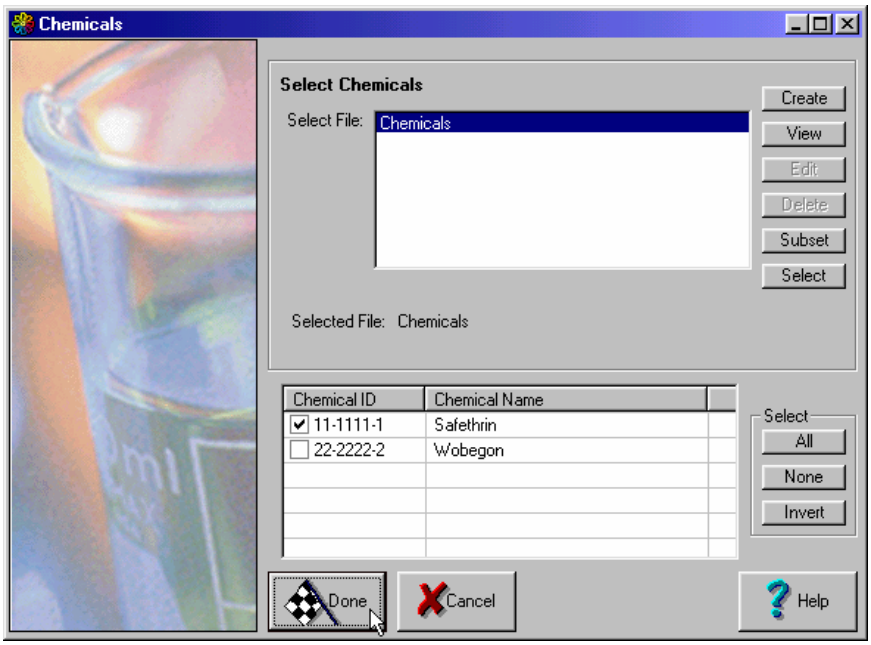
Select Chemical

Right click on the **Chemical Selector** icon to bring up the context-sensitive window as follows:



Click the **View/Edit Chemicals** option, as shown above.

This opens the **Chemical Selector** window:



Note that when the above window first appears, the bottom pane is blank.

In the **Chemical Selector** window, the **Select File** pane displays saved files that contain the details of one or more chemicals that will appear in the lower grid when the file is selected. In this case, there is only one file to select; namely, **Chemicals**.

Highlight the file named **Chemicals** and click **Select**.

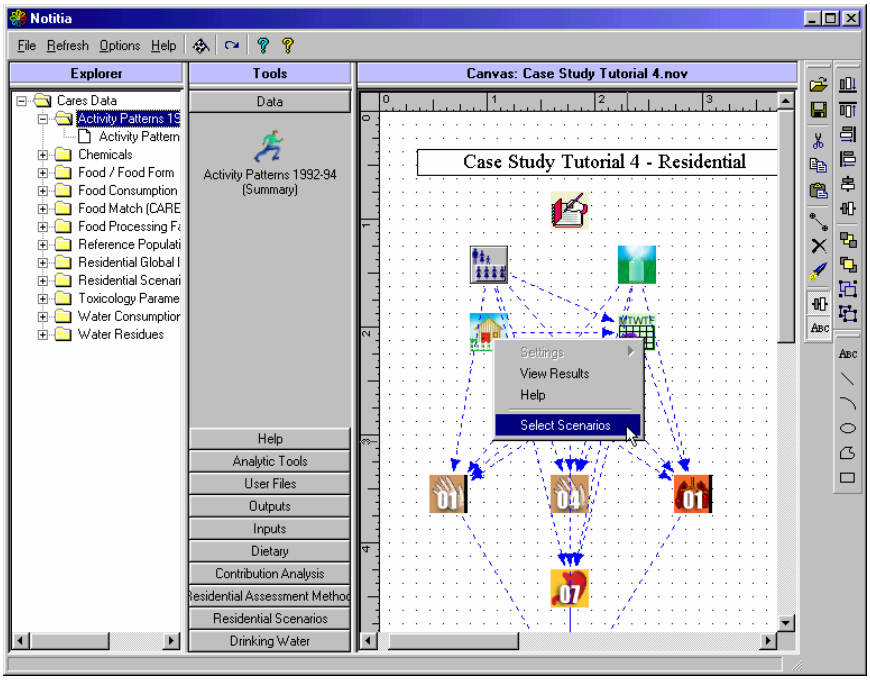
When the Chemicals file is selected, two or more chemicals appear in the bottom grid, as shown above. Select the chemical **Safethrin** for use in this tutorial by clicking on the check box next to the CAS number (**11-1111-1**) in the **Chemical ID** column.

Note that the chemical file you selected appears after the **Selected File:** text. This is a feed back notice showing the program's awareness of your chemical selection.

Click **Done** to close the **Chemical Selector** window and return to the main CARES window.

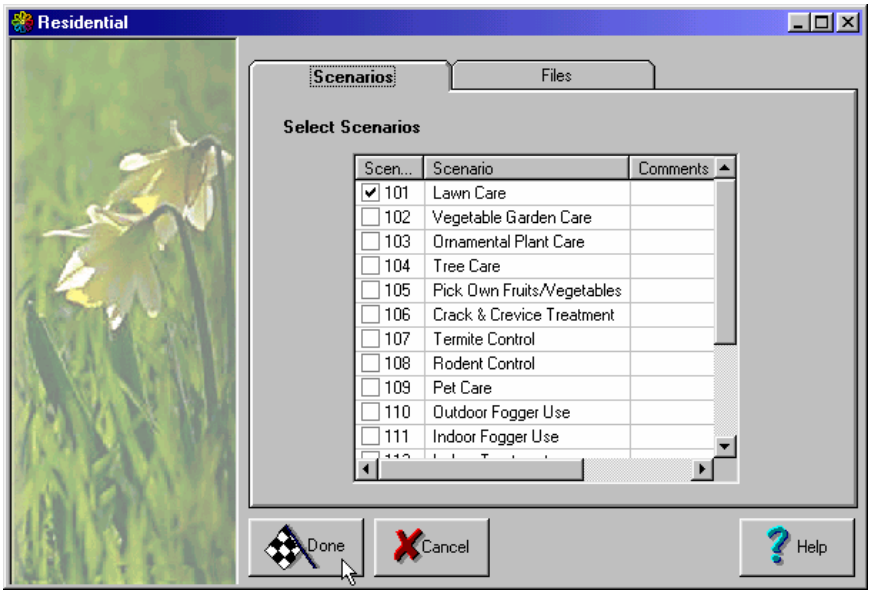
Setup Residential Data Inputs

Right click on the **Scenario Selector** to open the context-sensitive menu:



Select the **Select Scenarios** option, as shown above.

The **Residential** window will open. If necessary, click the **Scenarios** tab:



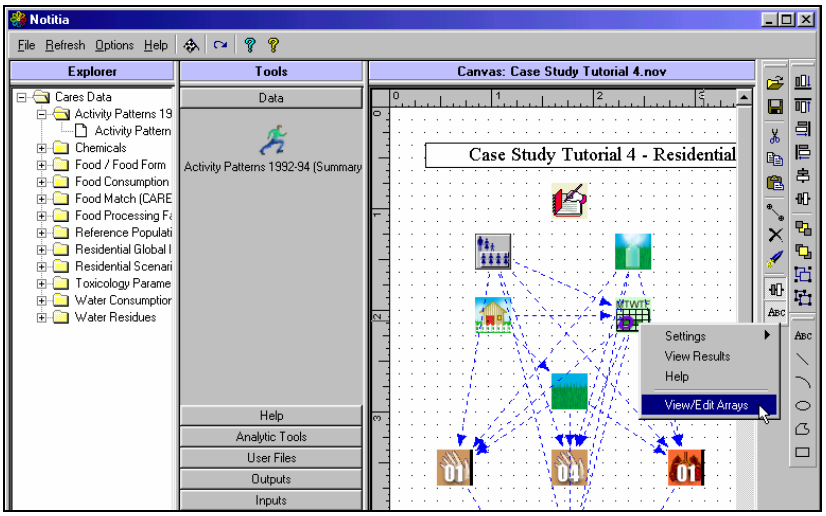
Click the check box for **Lawn Care** to select that scenario.

Click **Done** to exit the Residential window.

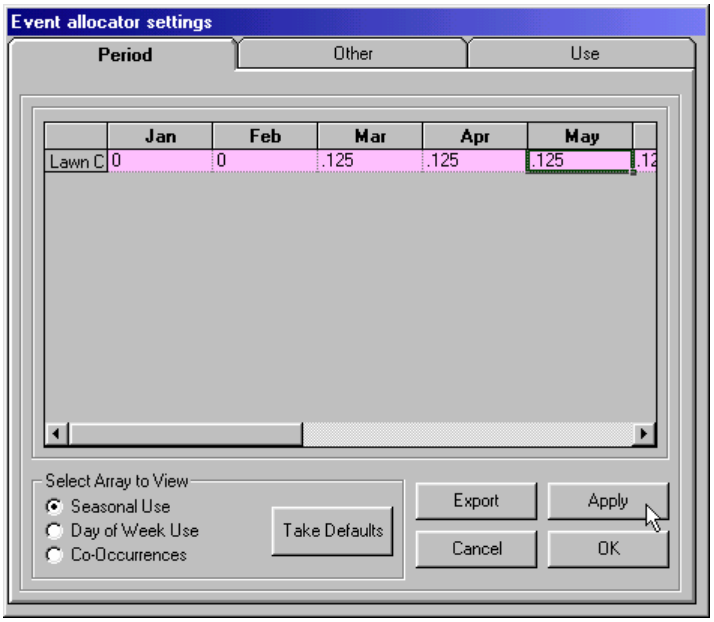
Changing the Event Allocation Settings

In Case Study Tutorial 3, you used the default settings for the Event Allocation. In this tutorial, you will learn how to adjust the settings for this function.

Right-click the **Event Allocation** and select the **View/Edit Arrays** menu option, as shown:



The **Event Allocator Settings** window with three tabs will open:



The Event Allocator provides several options for defiing the frequency of application of chemical according to the associated residential scenario.

TIP …	You will make a number of setting changes on the displayed tabs. Remember to click the **Apply** button before moving to another tab AND after changing an entry associated with a radio button selection. If you do not apply the settings immediately, they will revert to their defaults when you change tabs.

Click the **Period** tab to get the view shown above.

In the **Select Array to Use** group, click the radio button next to **Seasonal Use**.

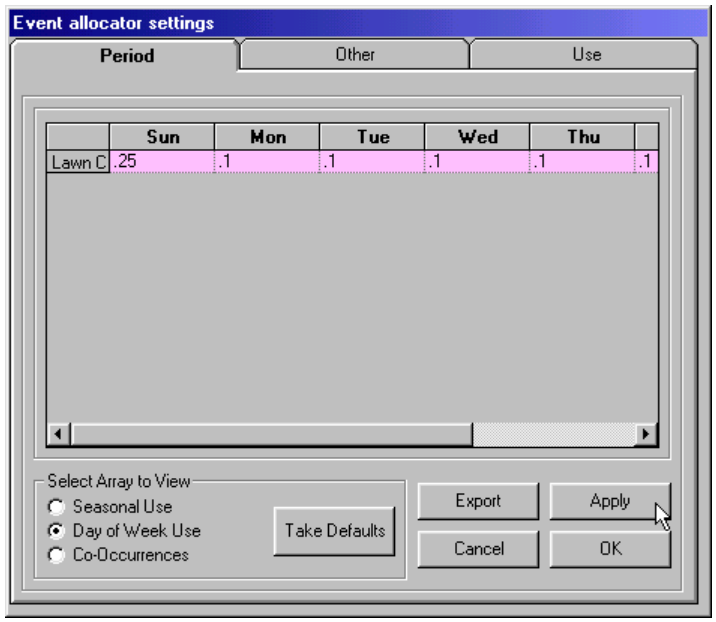
TIP …	To change the value in a editable data grid cell, simply select the cell and type in the new value.

On the **Lawn Care** Row, enter the value **0** (zero) November, December, January, and February. Enter the value **0.125** in the cells for the remaining months (March through October).

Click **Apply** to set the **Seasonal Use** changes you just made.

While still in the **Period** tab, click the radio button for the **Day of Week Use** option.

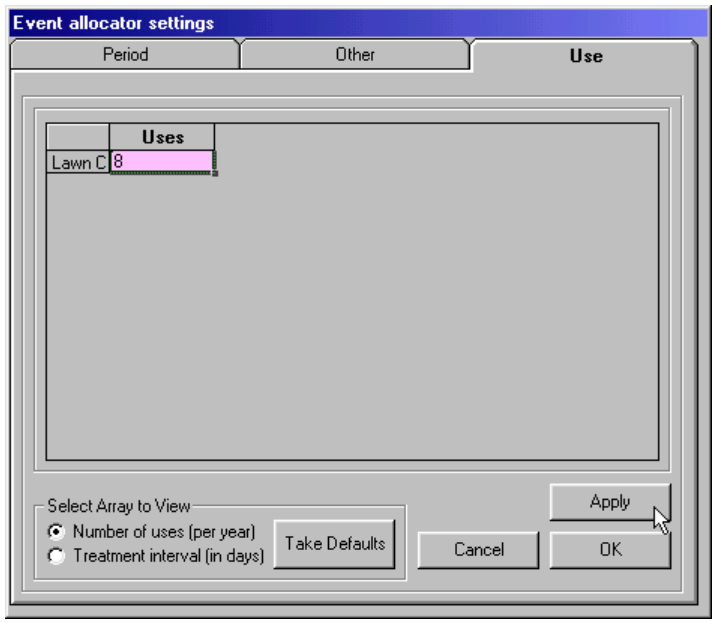
The display grid in the tab will now change to the following view:



Enter the value **0.25** in the cells for Saturday and Sunday, and enter).1 in the cells for Monday, Tuesday, Wednesday, Thursday, and Friday.

Click **Apply** to set the **Day of Week Use** changes you just made.

Click the **Use** tab to get the following display:



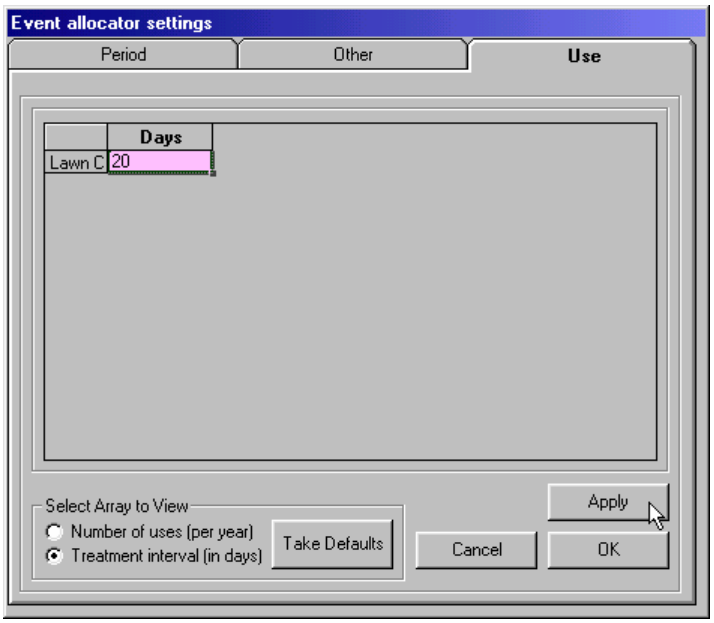
In the **Select Array to Use** group, click the radio button for the **Number of uses (per year)** option.

Select the **Uses** cell and change the value to **8**.

Click **Apply** to set the change in uses you just made.

While still in the **Use** tab, click the radio button for the **Treatment interval (in days)** option.

The display grid in the tab will now change to the following view:



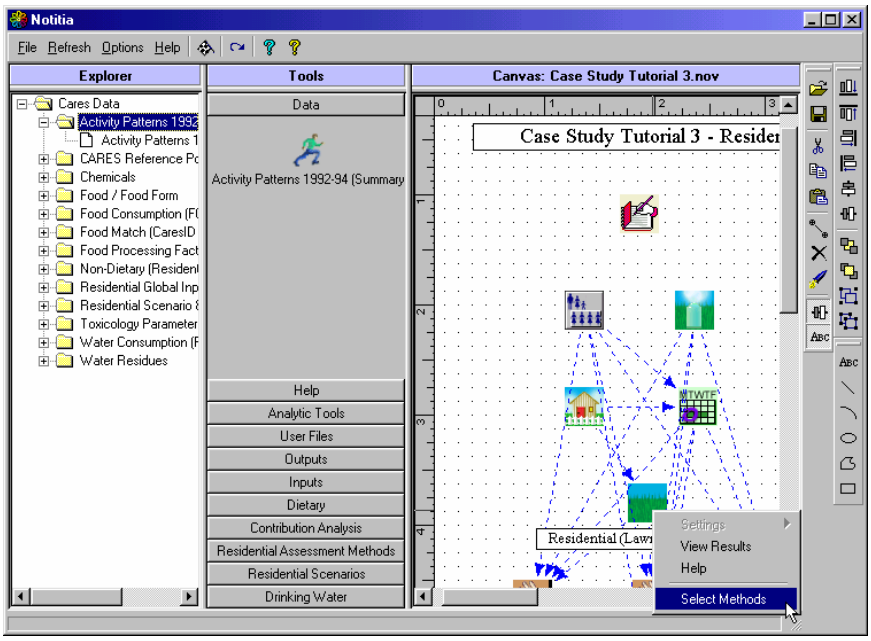
Select the **Days** cell and change the value to **20**.

Click **Apply** to set the change you just made.

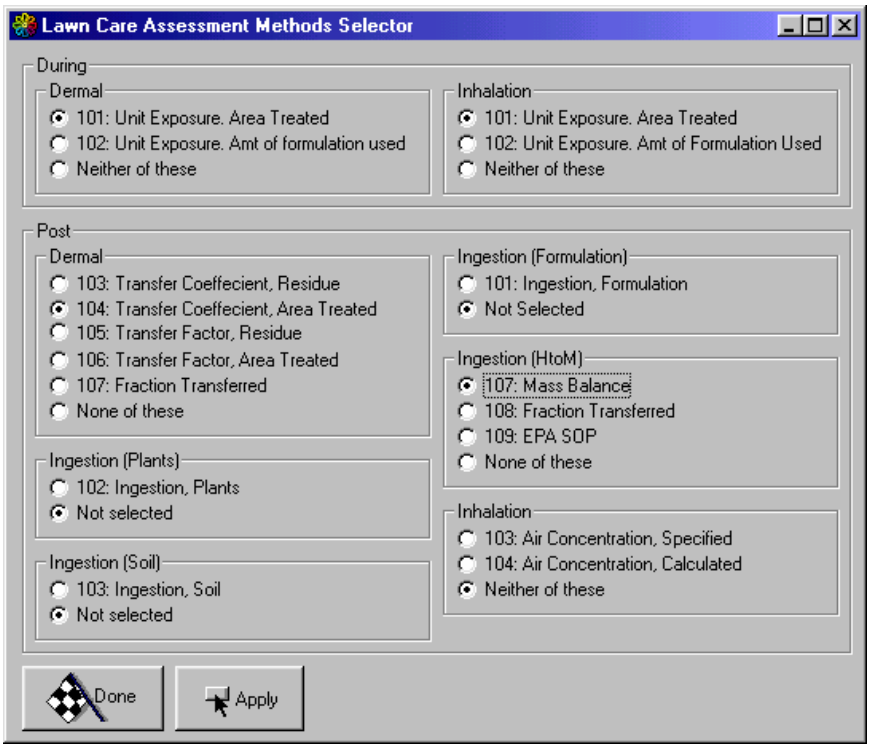
When satisfied that values have been entered as specified, click **OK** to close the **Event allocator settings** window.

Continue with Setting Up the Residential Module

The lawn care scenario is the only exposure source included in this tutorial. Right click on the **Residential (Lawn Care) Selector** icon and select the **Select Methods** menu option from the context-sensitive window, as shown below:



The **Lawn Care Assessment Methods Selector** window opens as follows:



Since you are using the same Canvas file in this tutorial as in the previous residential tutorial, there is no need to change any settings.

The **Lawn Care Assessment Methods Selector** window displays groups of algorithm options (or methods) for calculating each type of exposure opportunity the scenario contains. In the current window, you will note that Lawn Care exposure includes temporal groups (such as **During** and **Post** application), and these, in turn, contain sub-groups of algorithms for various routes of exposure (e.g., **Dermal**, **Inhalation**, **Ingestion**).

TIP …	When setting up the Canvas model, a corresponding icon on the Canvas represents each numbered algorithm you select in the scenario selector.

The above window shows the four options you should choose for this run, and the following list shows the algorithm icon associated with the specific option:

During Application

	Dermal 101: Unit Exposure (Area Treated)
	Inhalation 101: Unit Exposure, Area Treated

Post Application

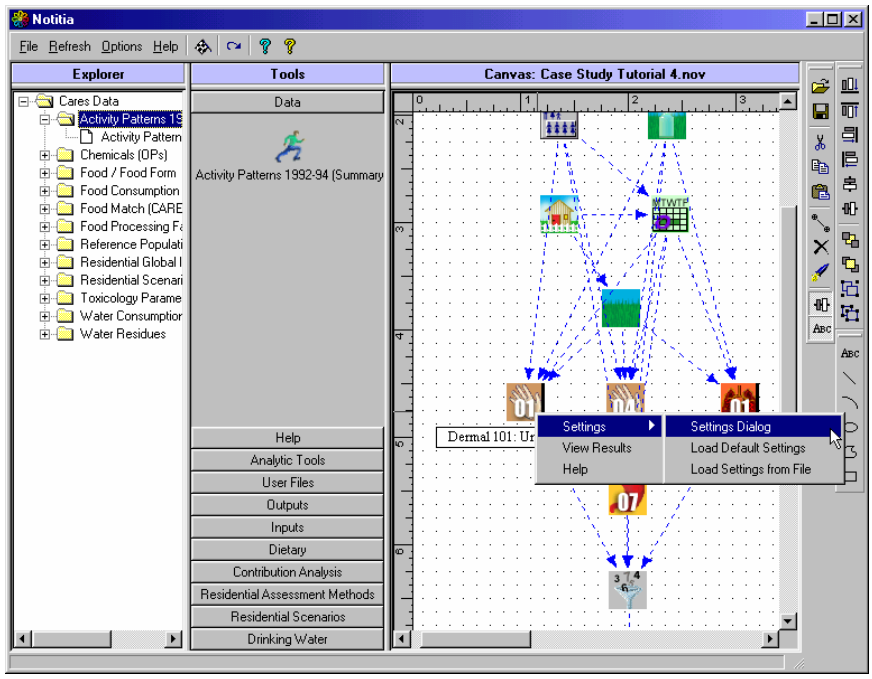
	Dermal 104: Transfer Coefficient (Area Treated)
	Ingestion 107: Mass Balance

Click **Done** when finished selecting the options.

How to Modify the Residential Assessment Methods

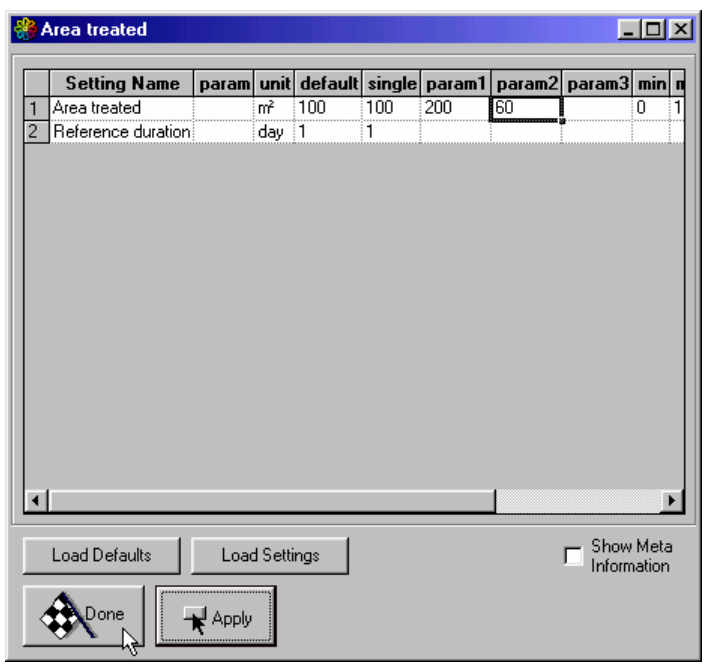
The next few steps illustrate how to modify the inputs and parameters for the three residential assessment methods included in the Canvas model.

Right-click on the **Dermal 101: Unit Exposure (Area Treated)** icon to open the context-sensitive menu, as shown below:



Click the **Settings** option on the menu. This will open a second menu. Slide the cursor to the second menu and click the **Settings Dialog** option, as illustrated above.

The following window will open showing the **Area Treated** parameters for the residential method (algorithm) referred to as **During: Dermal: 101: Unit Exposure (Area Treated).**



To change a parameter value, click on the cell and type in your change.

In the **Area treated** row, type in the following values for the columns indicated

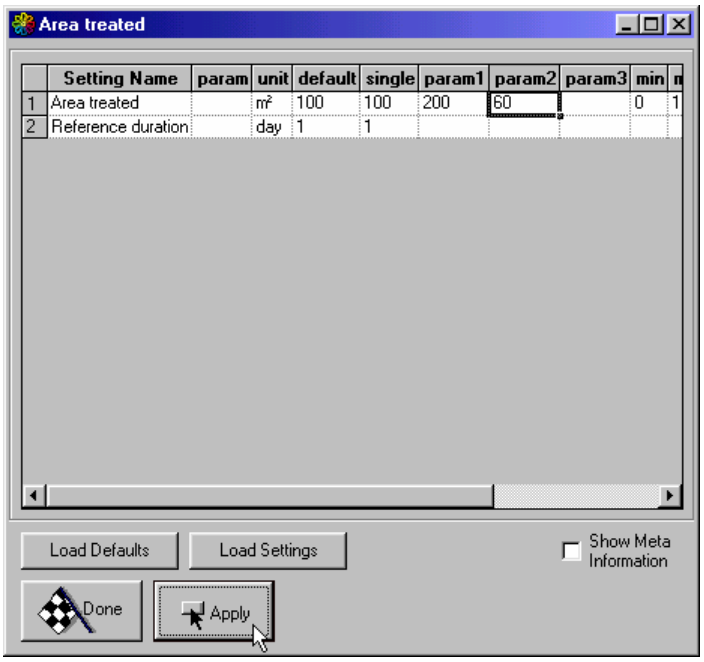
param1 = 200
param2 = 60
type = 2
min = 0
max = 1000

When finished, your inputs should appear as illustrated above.

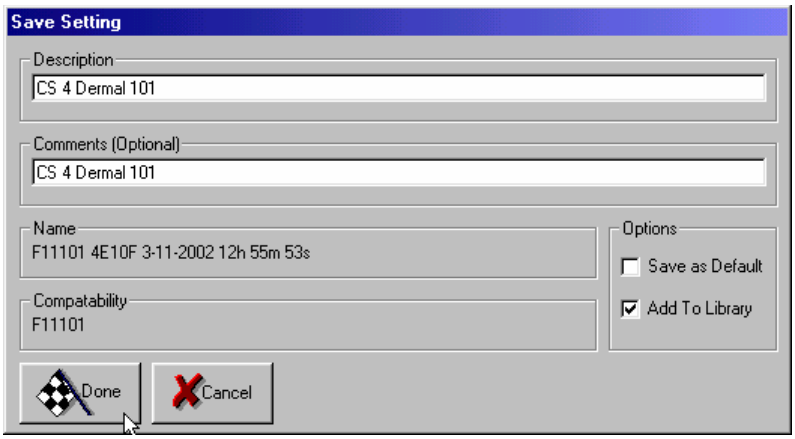
You can either use these settings one time for a current run, or you can save them for use future runs.

To use these setting for this run only (and not save them), click **Done** to exit the window.

To use the settings in the current run AND save them for future use, click the **Apply** button, as shown below:



The **Save Settings** window will appear as follows:



Enter a description and comment for the settings file, as illustrated above.

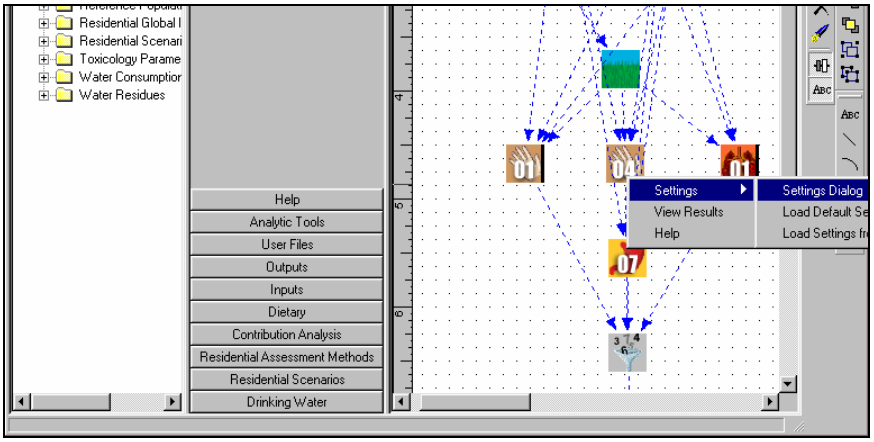
Make sure the **Add to Library** option is checked.

Click **Done** to save the settings.

To reload these settings, first right-click on the function icon on the Canvas. In the menus that appear, choose **Settings > Settings Dialog**, and then click **Load Settings**. then 'Settings' > 'Settings Dialog' and click **Load Settings.**

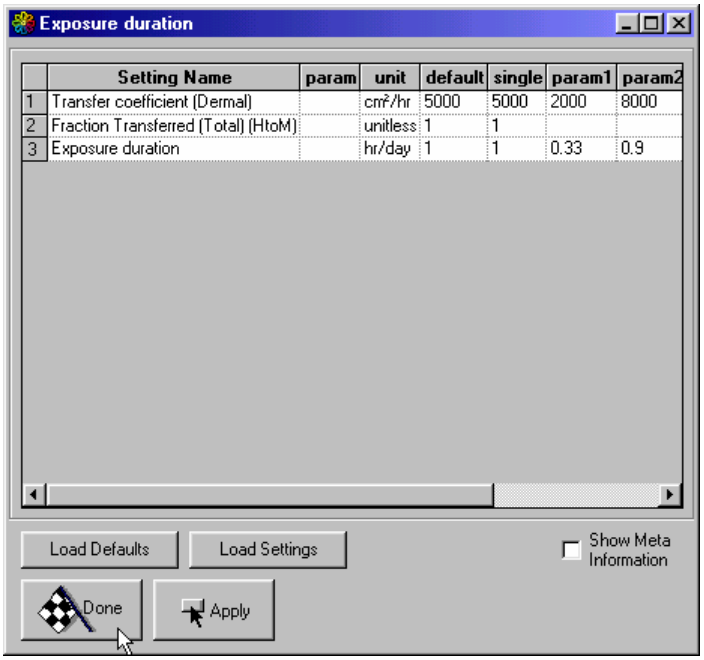
TIP …	You can make the current settings the default setting that will be used in all subsequent runs until changed again. To do this, click the check box next to **Save as Default** in the above window..

Right-click on the **Dermal 104: Transfer Coefficient (Area Treated)** icon to open the context-sensitive menu, as shown below:



In the popup menus, select **Settings > Settings Dialog**, as before.

This will open the **Exposure duration** window as follows:



	Setting Name	param	unit	default	single	param1	param2
1	Transfer coefficient (Dermal)		cm²/hr	5000	5000	2000	8000
2	Fraction Transferred (Total) (HtoM)		unitless	1	1		
3	Exposure duration		hr/day	1	1	0.33	0.9

Change the inputs for all three types of settings (rows) as follows:

Transfer coefficient (Dermal)(Adult/Child):
type = 4
param1 = 2000
param2 = 8000
param3 = 12000

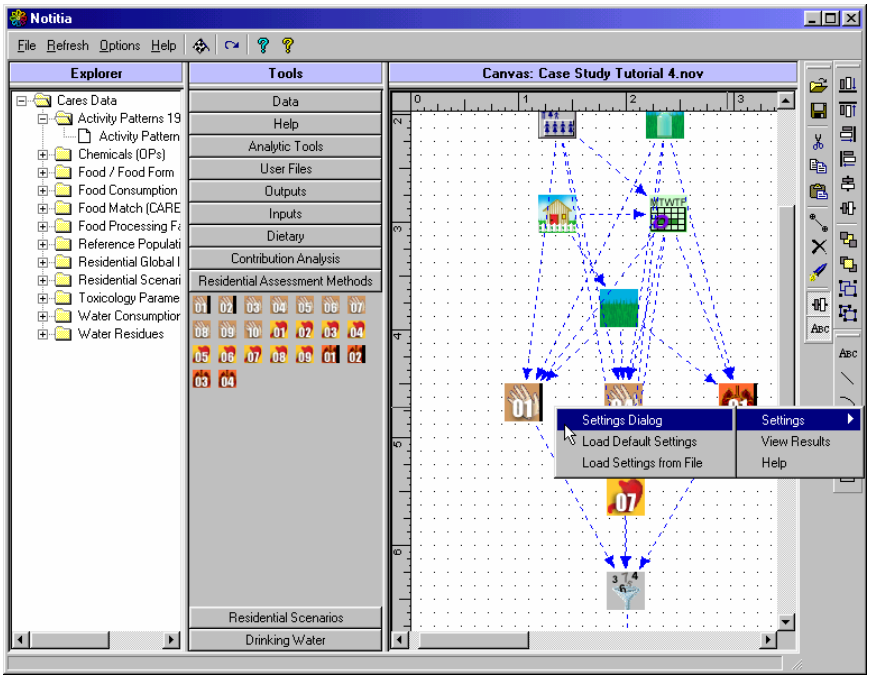
Fraction transferred to hand (Dermal):
type = 1
single = 1.0

Exposure duration (Adult/Child):
type = 4
param1 = .33
param2 = 0.9
param3 = 2.0

Click **Apply** to save these setting following the procedure described above.

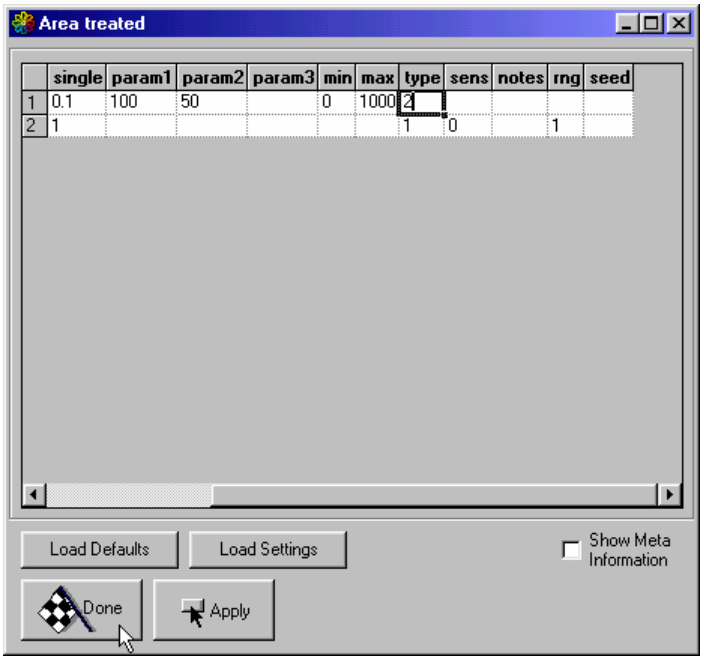
Click **Done** to exit the window and use these settings in this run only.

Right-click on the **Inhalation 101: unit Exposure (Area Treated)** icon to open the context-sensitive menu, as shown below:



In the popup menus, select **Settings > Settings Dialog**.

This will open the Area treated window again, as follows:



In the **Area treated** row, type in the following values for the columns indicated

param1 = 100
param2 = 50
type = 2
min = 0
max = 1000

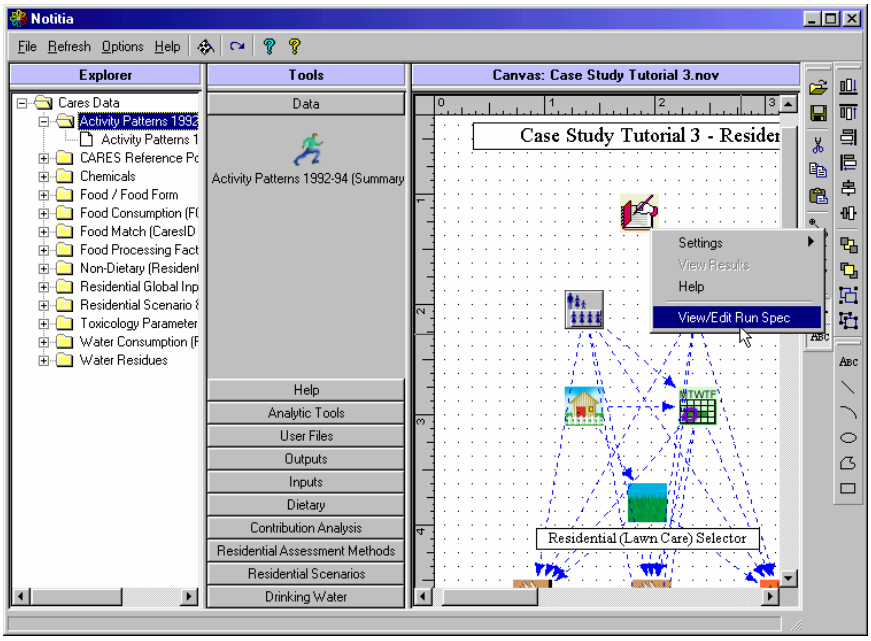
Click **Apply** to save these setting following the procedure described above.

Click **Done** to exit the window and use these settings in this run only.

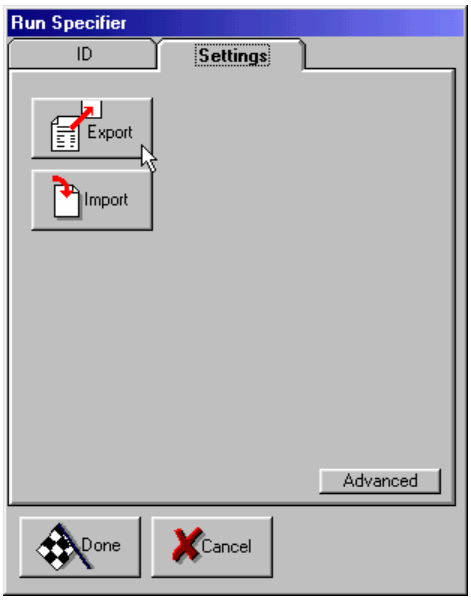
Save Run Settings

Before running the Canvas model, you need to save the settings that you have just established. This will allow you to recall the same settings should you want either to repeat the run as is or make some modifications in the setup and then rerun the Canvas.

Right click on the **Run Specifier** icon and select the **View/Edit Run Spec** option as illustrated:

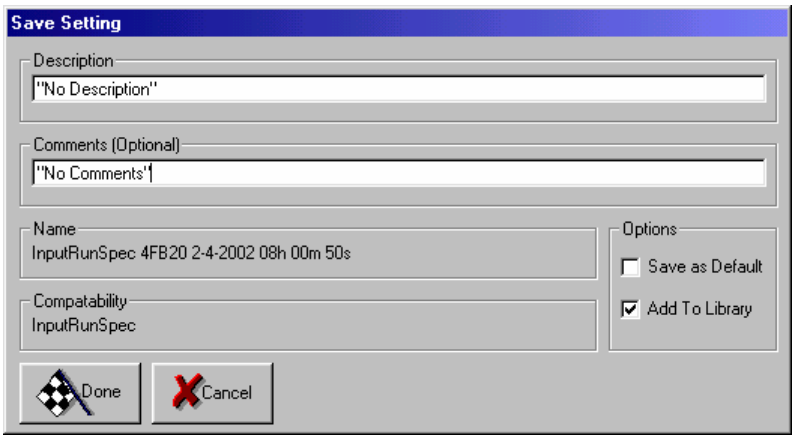


In the **Run Specifier** window, click the **Settings** tab.



Click the **Export** button.

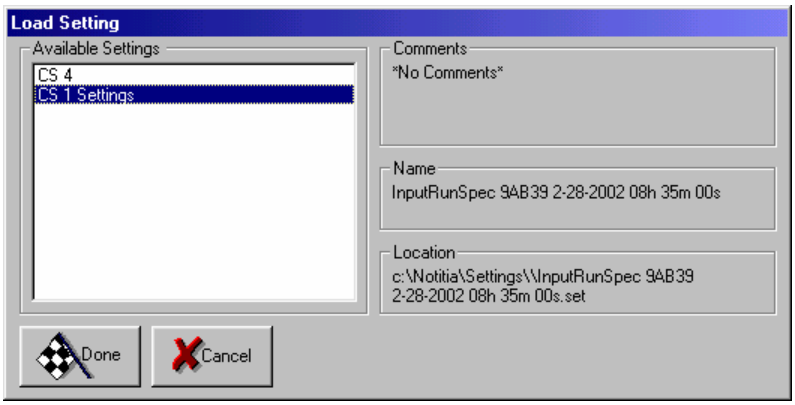
A **Save Setting** window will appear similar to the following:



Replace the default 'No Description' entry with a short description of the setup you have just created for this run. For example, type **CS 4 Settings**. Optionally, you can include additional information in the 'Comments' field.

Click **Done** to return to the **Settings** tab.

To see how you can load these settings in the future, click the **Load Settings** button. A window similar to the following appears:



Although not shown in the example, setting description you just entered will appear in the available list.

Click **Cancel** to close the Load Setting window.

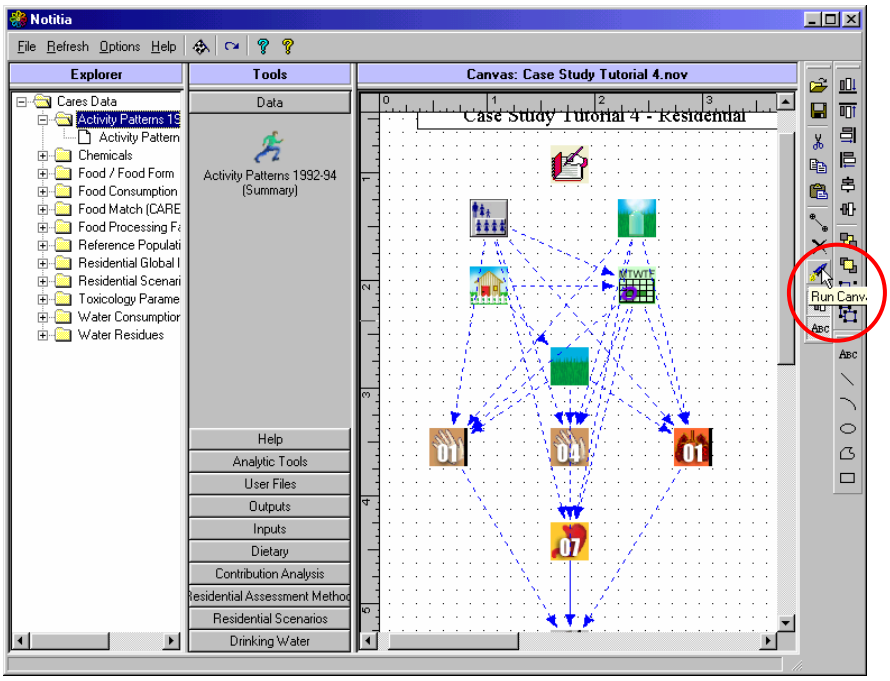
Click **Done** to close the **Run Specifier** window and return to the main window.

Run Residential Module and View Results

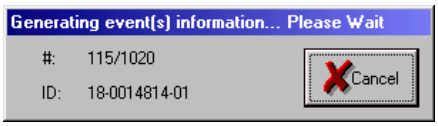
TIP …	Running the Residential model will require anywhere from 90 minutes using the minimum required processor to 15 minutes for a very fast processor.

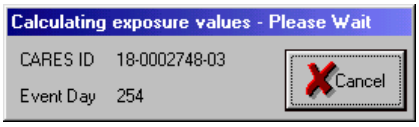
TIP …	To avoid unexpected problems, it is recommended that you do not use other applications or work with your computer when CARES 1.0 is processing files such as this. Otherwise, when CARES is not processing data, feel free to simultaneously work with other applications while CARES is open and not processing.

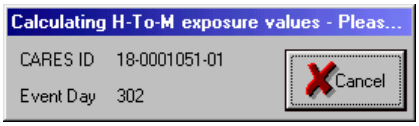
Click the **Run Canvas** button on the Diagrammer toolbar to execute the model:

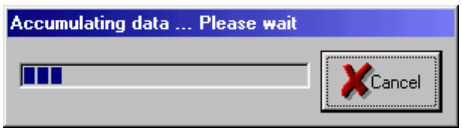


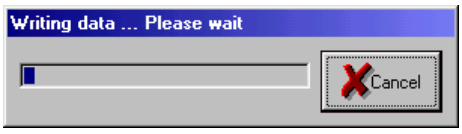
Once the **Run Canvas** button has been clicked, the program will begin executing and one or more dialogs may pop up indicating program status. Depending upon the setup choices made, this process could involve considerable time. You may see status windows such as these:

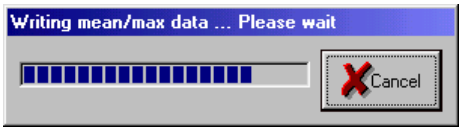


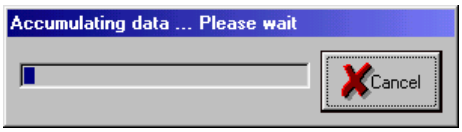


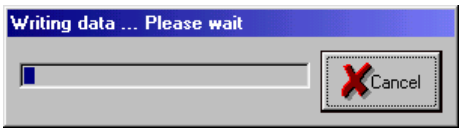


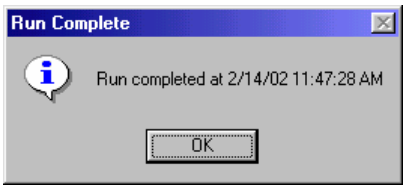










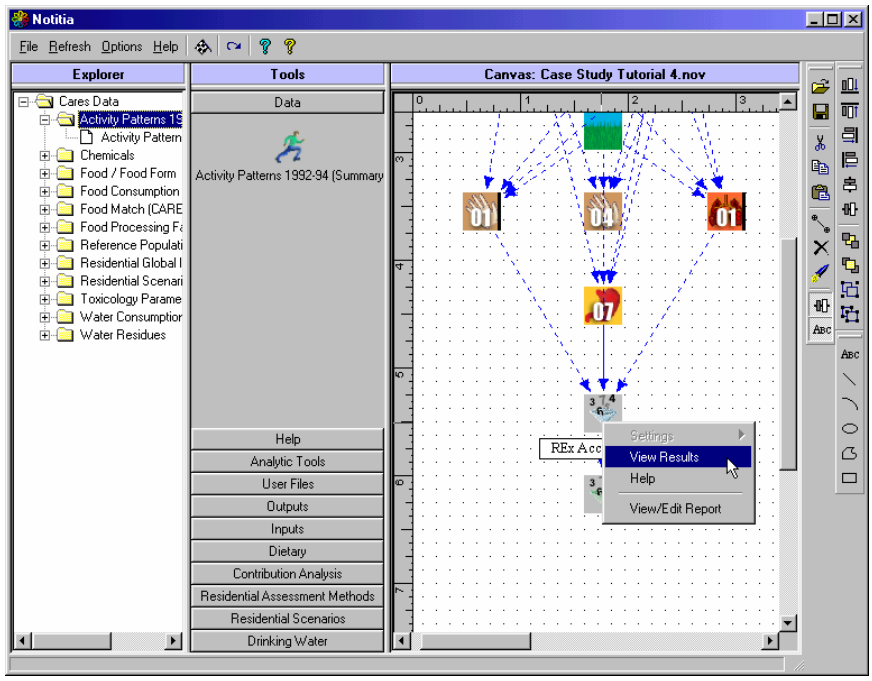


When the run has completed, as indicated above, click **OK**.

TIP …	If your computer memory runs low during the run, the run will continue, but the screen may not be redrawn correctly until the run is finished.

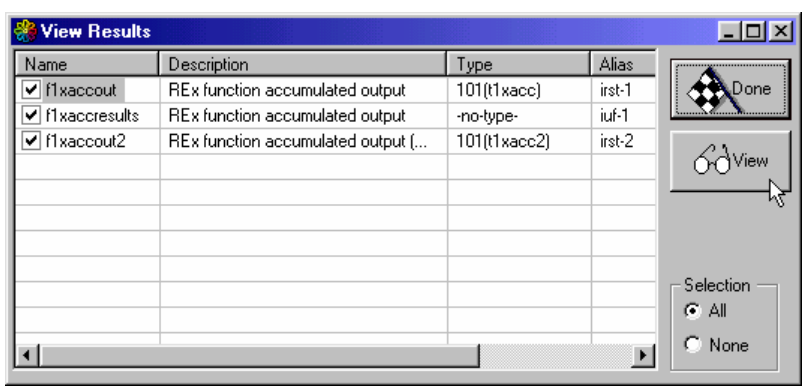
Viewing the Results

Right-click the **REx Accumulator** icon to view the outputs of all REx (Residential Exposure) functions for a given scenario, and then select the **View Results** menu option, as follows:



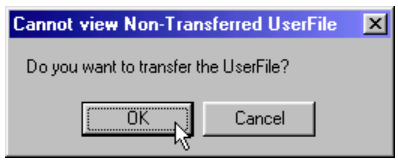
TIP …	Note: the above step allows viewing of all the functions in the run through one window. You may view individual results by right-clicking on any of the dermal, inhalation, or ingestion icons and selecting **View Results** from their respective context-sensitive menu.

The following **View Results** window will appear showing options for all functions in the current residential model run:



Click the appropriate check box to select the files you want to view, and then click the **View** button, as illustrated above.

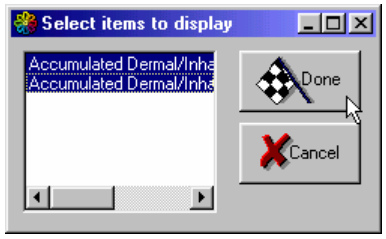
The data for the files you wish to view is stored in a temporary file. You will be prompted to save the data to a User File for viewing and analysis:



Click **OK** when prompted to transfer and save data in a User File.

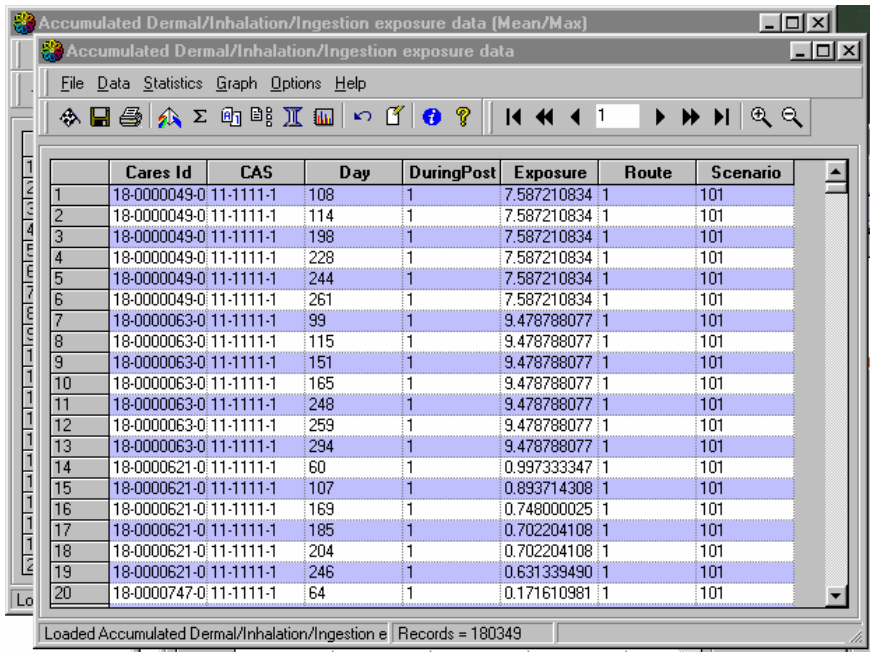
The following status message will appear:

Preparing the User Files could take several minutes. When complete, a selection window with a list of available files for viewing will appear similar to the following:



Select files to view and click **Done**.

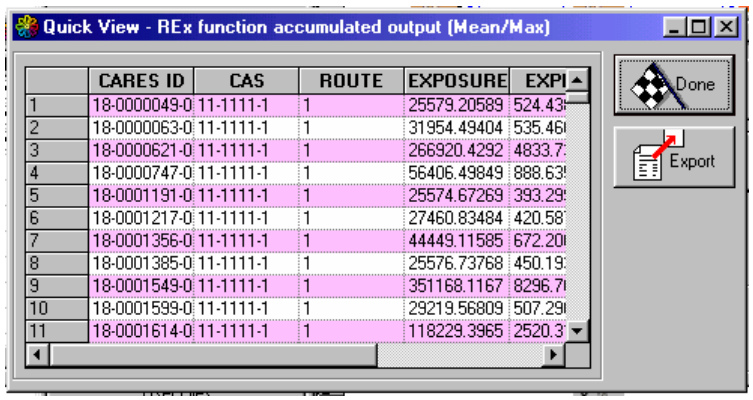
The files you choose will appear stacked one behind the other:



	Cares Id	CAS	Day	DuringPost	Exposure	Route	Scenario
1	18-0000049-0	11-1111-1	108	1	7.587210834	1	101
2	18-0000049-0	11-1111-1	114	1	7.587210834	1	101
3	18-0000049-0	11-1111-1	198	1	7.587210834	1	101
4	18-0000049-0	11-1111-1	228	1	7.587210834	1	101
5	18-0000049-0	11-1111-1	244	1	7.587210834	1	101
6	18-0000049-0	11-1111-1	261	1	7.587210834	1	101
7	18-0000063-0	11-1111-1	99	1	9.478788077	1	101
8	18-0000063-0	11-1111-1	115	1	9.478788077	1	101
9	18-0000063-0	11-1111-1	151	1	9.478788077	1	101
10	18-0000063-0	11-1111-1	165	1	9.478788077	1	101
11	18-0000063-0	11-1111-1	248	1	9.478788077	1	101
12	18-0000063-0	11-1111-1	259	1	9.478788077	1	101
13	18-0000063-0	11-1111-1	294	1	9.478788077	1	101
14	18-0000621-0	11-1111-1	60	1	0.997333347	1	101
15	18-0000621-0	11-1111-1	107	1	0.893714308	1	101
16	18-0000621-0	11-1111-1	169	1	0.748000025	1	101
17	18-0000621-0	11-1111-1	185	1	0.702204108	1	101
18	18-0000621-0	11-1111-1	204	1	0.702204108	1	101
19	18-0000621-0	11-1111-1	246	1	0.631339490	1	101
20	18-0000747-0	11-1111-1	64	1	0.171610981	1	101

TIP …	Due to the random number generator used in the exposure calculations, the values you observe in the data grids may not appear identical to those shown.

When you close the above grids, you may see the Quick View window. As follows:



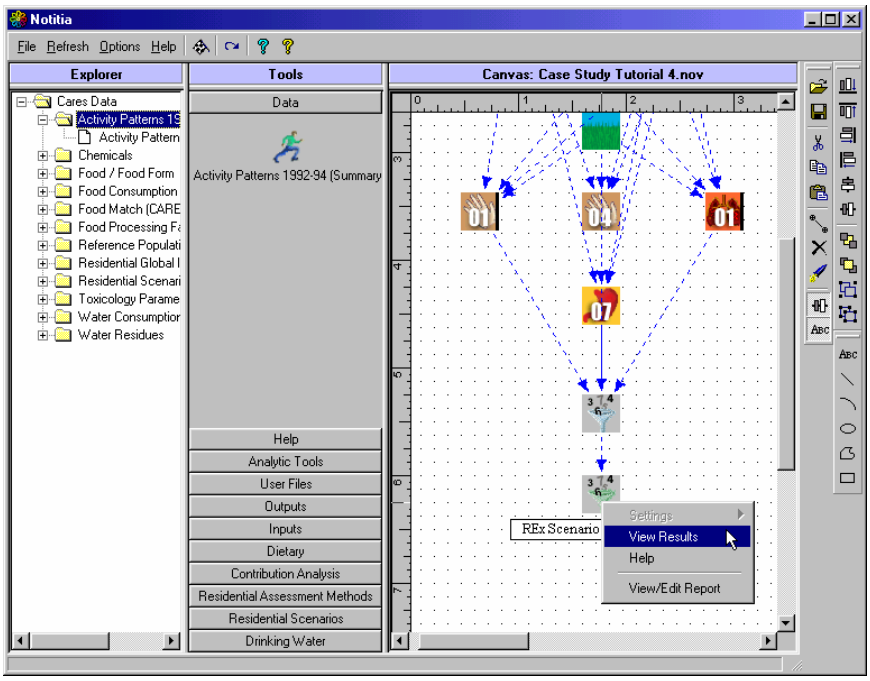
	CARES ID	CAS	ROUTE	EXPOSURE	EXPI
1	18-0000049-0	11-1111-1	1	25579.20589	524.43
2	18-0000063-0	11-1111-1	1	31954.49404	535.46
3	18-0000621-0	11-1111-1	1	266920.4292	4833.7
4	18-0000747-0	11-1111-1	1	56406.49849	888.63
5	18-0001191-0	11-1111-1	1	25574.67269	393.29
6	18-0001217-0	11-1111-1	1	27460.83484	420.58
7	18-0001356-0	11-1111-1	1	44449.11585	672.20
8	18-0001385-0	11-1111-1	1	25576.73768	450.19
9	18-0001549-0	11-1111-1	1	351168.1167	8296.7
10	18-0001599-0	11-1111-1	1	29219.56809	507.29
11	18-0001614-0	11-1111-1	1	118229.3965	2520.3

To close this window, click **Done**.

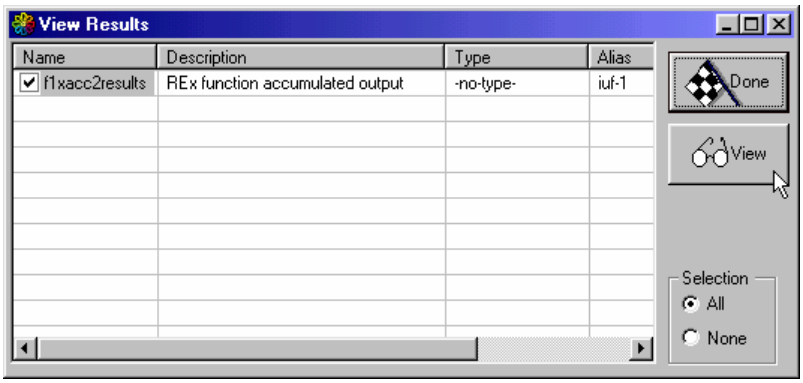
Additional Data Grid Views

TIP …	The **REx Scenario Accumulator** icon represents an aggregation function for use when two or more exposure modules are included in one run: for example, a model including both dietary and residential exposure.

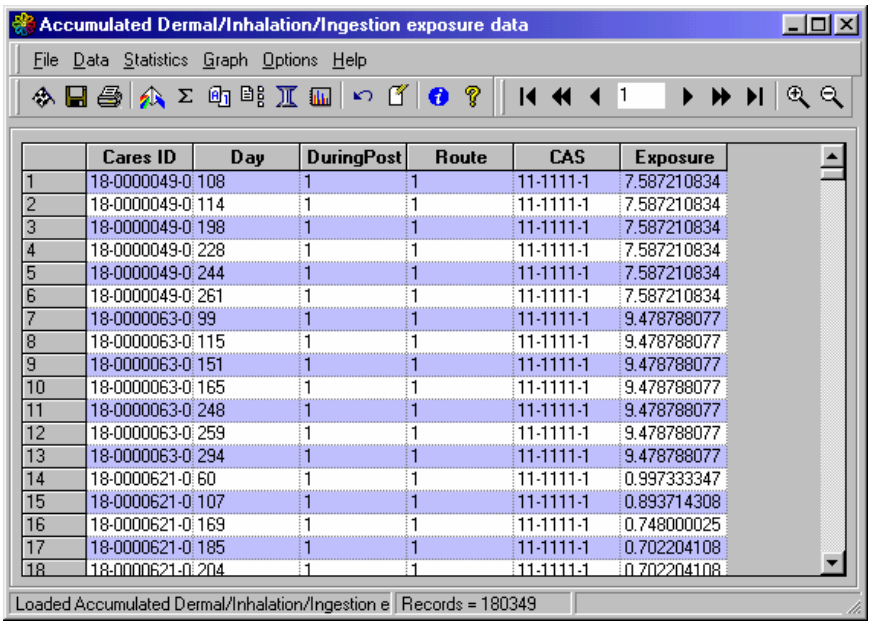
To view the accumulated scenario results, right-click the **REx Scenario Accumulator** icon, and then select the View Results menu option, as shown:



In the **View Results** window, select the output file to view and click the **View** button:



The data grid for the accumulated results will appear similar to the following:



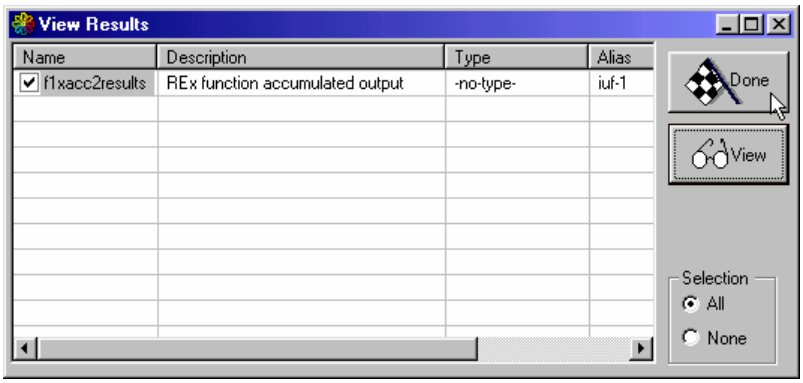
Accumulated Dermal/Inhalation/Ingestion exposure data

File Data Statistics Graph Options Help

	Cares ID	Day	DuringPost	Route	CAS	Exposure
1	18-0000049-0	108	1	1	11-1111-1	7.587210834
2	18-0000049-0	114	1	1	11-1111-1	7.587210834
3	18-0000049-0	198	1	1	11-1111-1	7.587210834
4	18-0000049-0	228	1	1	11-1111-1	7.587210834
5	18-0000049-0	244	1	1	11-1111-1	7.587210834
6	18-0000049-0	261	1	1	11-1111-1	7.587210834
7	18-0000063-0	99	1	1	11-1111-1	9.478788077
8	18-0000063-0	115	1	1	11-1111-1	9.478788077
9	18-0000063-0	151	1	1	11-1111-1	9.478788077
10	18-0000063-0	165	1	1	11-1111-1	9.478788077
11	18-0000063-0	248	1	1	11-1111-1	9.478788077
12	18-0000063-0	259	1	1	11-1111-1	9.478788077
13	18-0000063-0	294	1	1	11-1111-1	9.478788077
14	18-0000621-0	60	1	1	11-1111-1	0.997333347
15	18-0000621-0	107	1	1	11-1111-1	0.893714308
16	18-0000621-0	169	1	1	11-1111-1	0.748000025
17	18-0000621-0	185	1	1	11-1111-1	0.702204108
18	18-0000621-0	204	1	1	11-1111-1	0.702204108

Loaded Accumulated Dermal/Inhalation/Ingestion e | Records = 180349

Behind this data grid, you may see the **View Results** dialog:



View Results

Name	Description	Type	Alias
f1xacc2results	REx function accumulated output	-no-type-	iuf-1

Done

View

Selection

All

None

Click **Done** to close this window.

This concludes Case Study Tutorial 4.

Directions and examples for running the Contribution and Sensistivity Analyis functions were breifly given in Case Study 1 and are covered in more detail in Case Study Tutorial 5

Click the **Done** button on each open data grid window to close it.

To close CARES, click on the **Close Application** icon on the menu bar of the main window. Alternately, select the menu option **File > Exit**.

Chapter 10 – Tutorial 5: Dietary and Residential Aggregation and Cumulation

- Case Study Tutorial 5 - Summary
- Open Canvas File and Specify the Run
- Select Sub-Population
- Select Chemicals
- Setup Dietary Data Inputs
- Setup Residential Data Inputs
- Save Run Settings
- Run Canvas (Dietary and Residential)
- View Dietary Results
- View Exposure Aggregator Results
- Conduct Data Analysis

Case Study Tutorial 5 — Summary

The Table below summarizes the main features of this Case Study Tutorial. The Module column indicates the applicable CARES module addressed. The Description column describes how various tasks or options within the module will be performed or set up.

The primary focus of the tutorial is to describe the use of the functions available in CARES 1.0 for conducting contribution and sensitivity analyses. In Case Study Tutorials 1 and 2, you had a glimpse into the power of the data analysis component of CARES (the CSU). In this tutorial, you will have all the ingredients to conduct and aggregate (multiple source) and cumulative (multiple chemical) data analysis.

In order to move to the data analysis instructions as quickly as possible, you are supplied with a complex dietary and residential Canvas model. We will then walk you through the steps for selecting each model component and adjusting its settings or otherwise importing pre-made data files. You should be familiar with using these setup procedures from

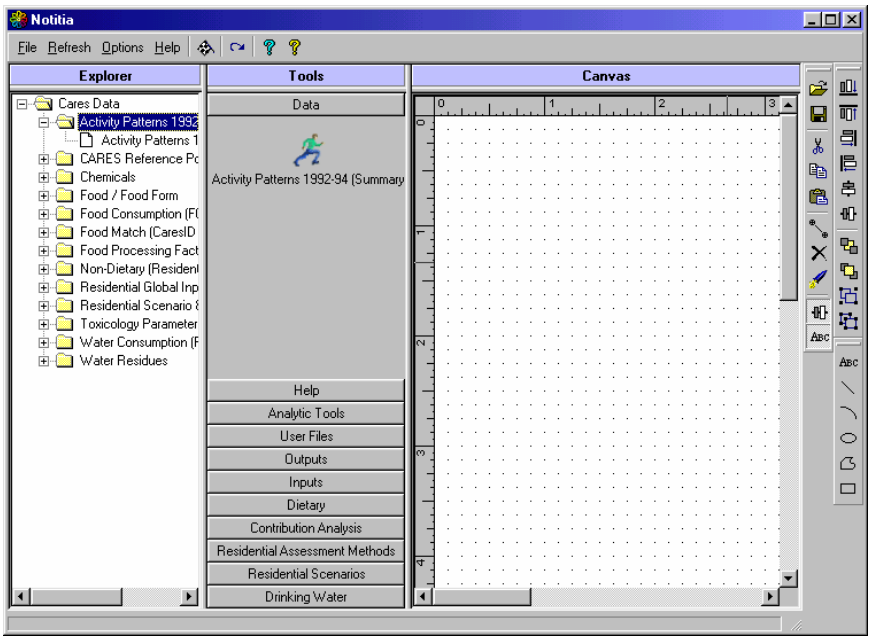
the earlier tutorials. Therefore, for the most part we will dispense with screen shots and simply describe the set up procedures. Once the Canvas model is run, you will then have opportunity to explore the available data analysis and plotting functions.

Module	Description
Canvas	Use pre-built file
Population	Select sub-population saved in tutorial 1
Chemicals	Safethrin and Wobegon
Dietary Food/Food Form	Select following from list: Tomatoes (fruit, paste, puree)
Consumption	Select Tomatoes from list
Residue	Open residue file for Tomatoes Use existing Fraction Crop Treated
Residential:	Lawn Care Scenario
Product List	Select from list
Event Allocation	Use defaults
Algorithms	Lawn Care: During App: Dermal: Unit Expo, Area Treated During App: Inhalation: Unit Expo, Area Treated Post App: Dermal: Transfer Coeff, Area Treated Post App: Ingestion: Hand-to-Mouth, Mass Balance
Algorithm Inputs	Use defaults
Toxicology	Use defaults
Data Analysis	Analyze for contributions from different chemicals, sources, foods, food forms, scenarios, and routes.

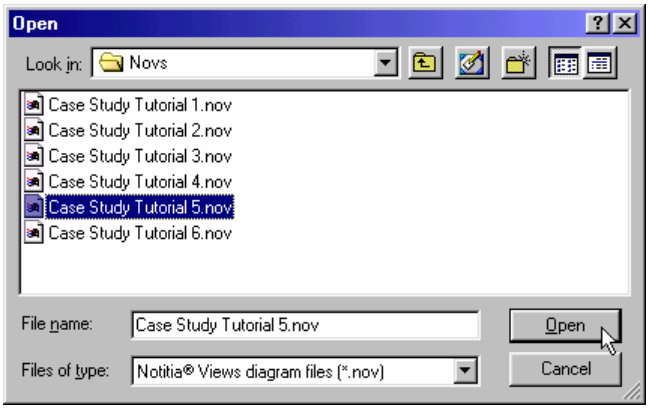
Open Canvas File and Specify the Run

Begin this tutorial by starting CARES from scratch. To start CARES, double-click the CARES shortcut icon, if it is located on your desktop. Alternately, click **Start > Programs > Notitia > CARES**.

The opening screen appears as follows:



Click on the **Open NOV File** button located on the Diagrammer toolbar. The standard Windows Open dialog box appears similar to the following:

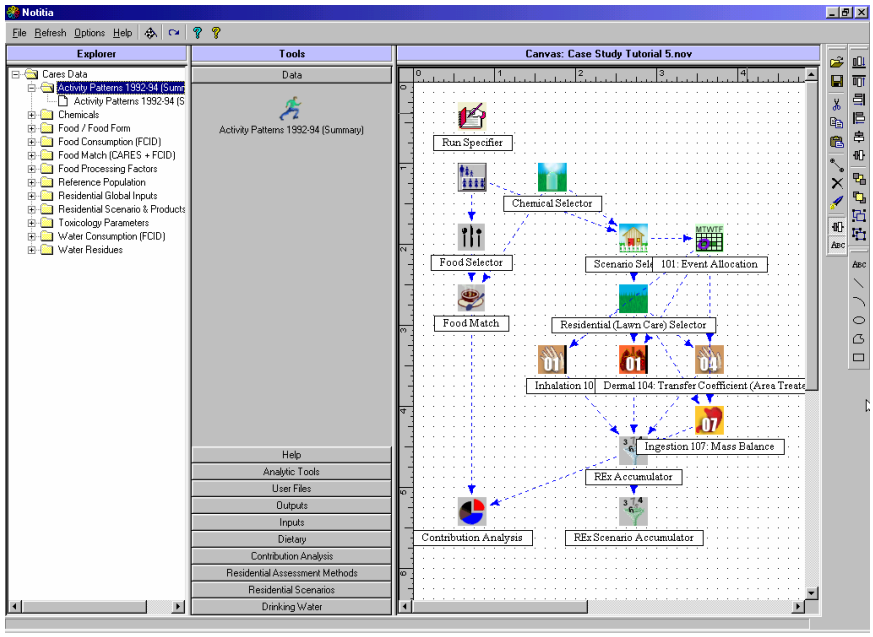


You may need to navigate to the Novs Folder, which is located in your Notitia directory (c:\notitia\novs). Files with the *.nov extension are used to capture and redisplay a pre-built Canvas setup.

For this tutorial, select the file named **Case Study Tutorial 5.nov** then click **Open**.

After clicking the **Open** button, the system will respond with the following dialog indicating that the ***.nov** file is loading:

When finished, the Main Window and Canvas will look like this:

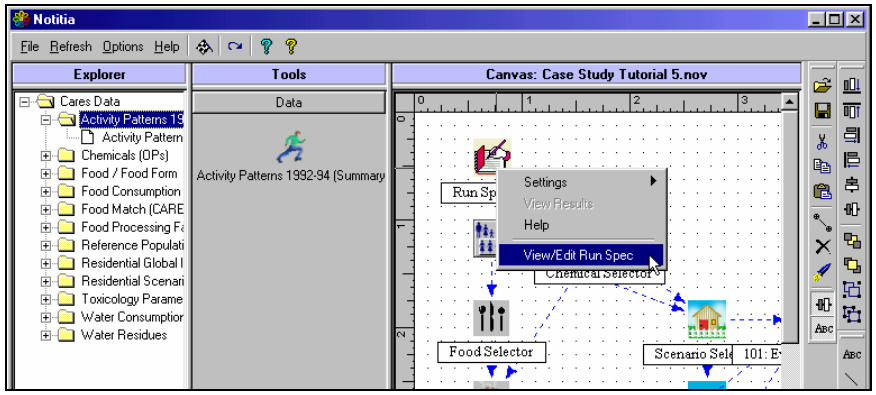


You may need to resize the window or adjust the view in the Canvas pane with the scroll bars to view the whole Canvas.

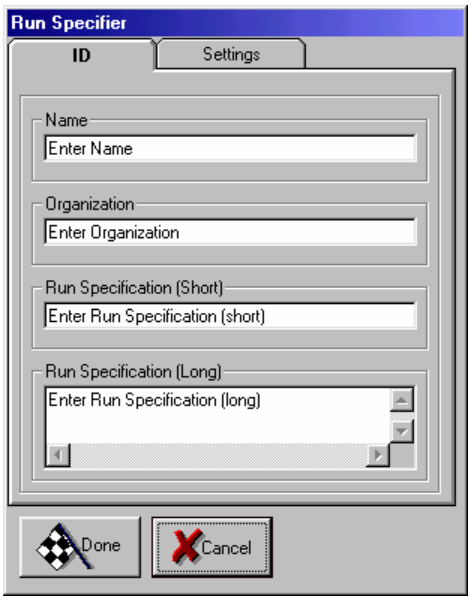
TIP …	Note how the Canvas model is constructed. It consists of the run Selector, which is not connected to any object because it provides a global function for the Canvas settings. Also present are the required Population Selector and Chemical Selector icons. Each of these connects as an input to both the Dietary group and Residential group of icons. The Dietary and Residential components are identical to the those covered in the preceding tutorials. Finally, the output from both the Dietary and Residential groups serve as inputs to the Contribution Analysis icon.

Right click on the **Run Specifier** icon to open the context menu.

Select the **View/Edit Run Spec** menu option, as shown:



The **Run Specifier** window will open as follows:



The **ID** tab in the **Run Specifier** window provides default instructions for each of the entry fields available for you to enter details describing this particular run. The **Settings** tab, which we shall use later, provides the options for saving all the module settings associated with this particular instance of a Canvas NOV file.

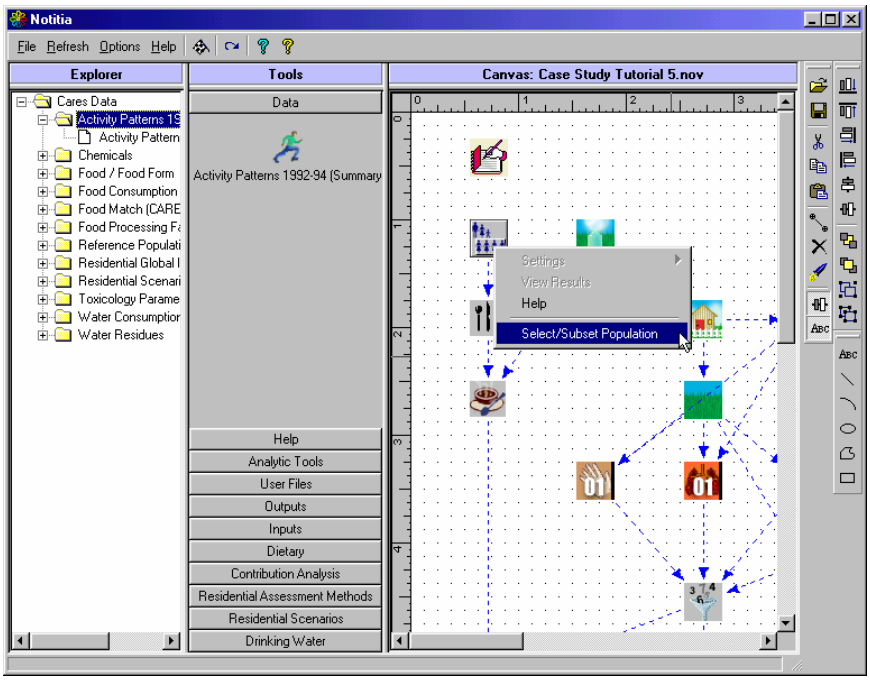
For now, fill in the four information fields in the **ID** tab of the **Run Specifier** window with some appropriate identifying text, and then click **Done** to close the window.

We will return to the **Run Specifier** to save the Canvas settings later.

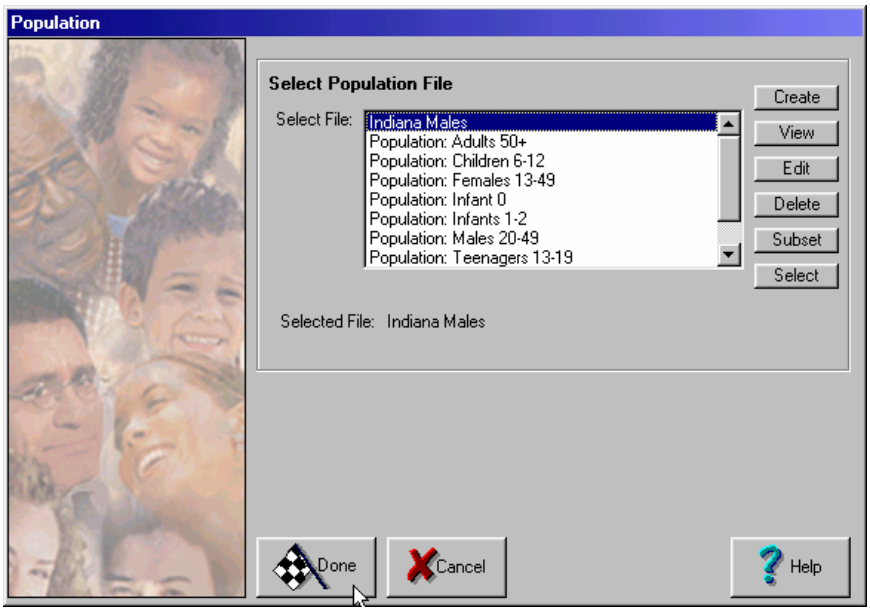
TIP …	Note that using the **Run Specifier** is a required step, even though you may not intend on reusing the settings in a future run. Its main advantage is that it *will* save you the time of redoing all the settings if you do decide to reload the same Canvas NOV file.

Select Sub-Population

Right click on the **Population Selector** icon and select the **Select/Subset Population** menu option:



The **Population** window will open showing a list of available sub-population files similar to the following:

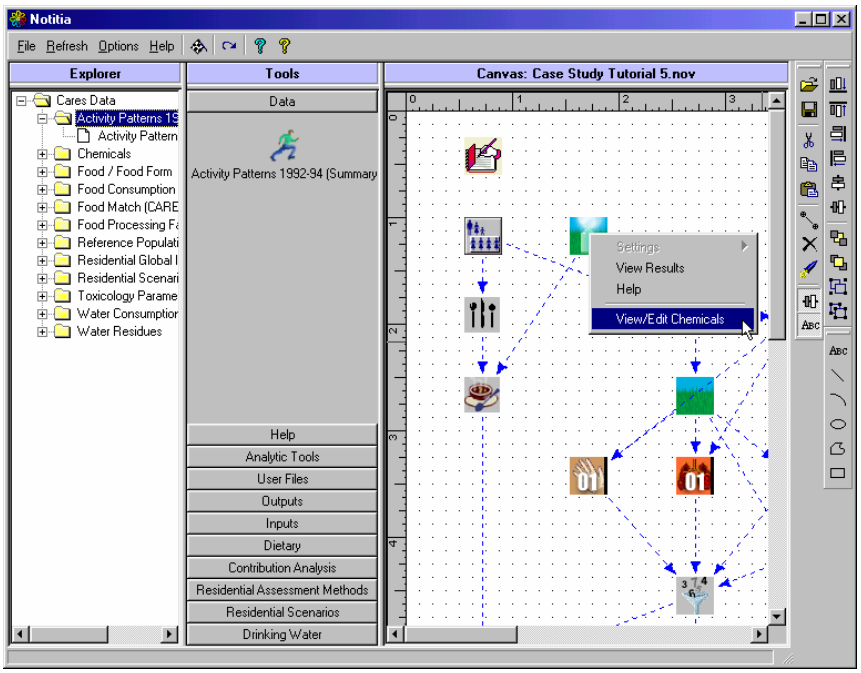


Select the '**Indiana Males'** file by highlighting the file name, and then click the **Select** button, as shown above. Note that the file name now appears as the **Selected File:** text confirming the selection.

Click **Done**.

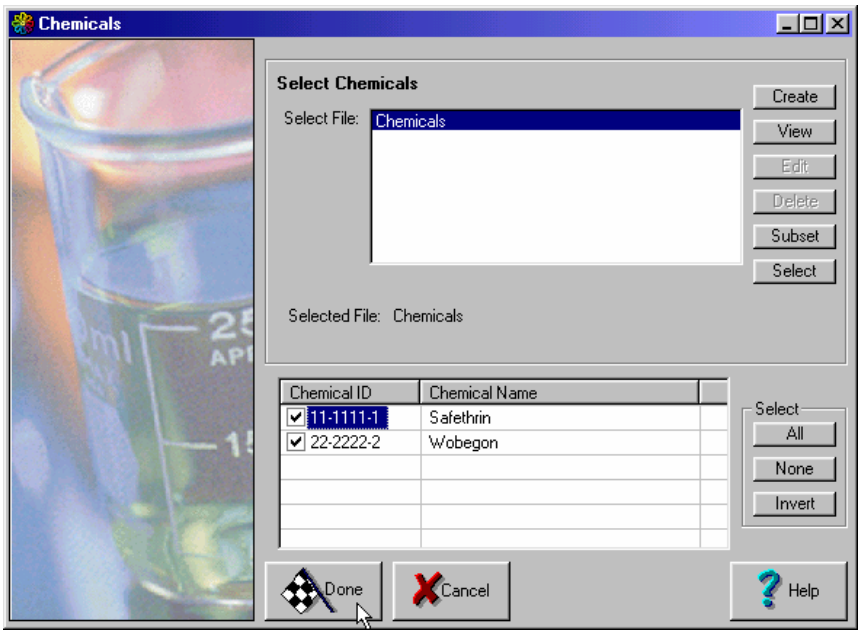
Select Chemicals

Right click on the **Chemical Selector** icon to bring up the context-sensitive window as follows:



Click the **View/Edit Chemicals** option, as shown above.

This opens the **Chemical Selector** window:



Note that when the above window first appears, the bottom pane is blank.

In the **Chemical Selector** window, the **Select File** pane displays saved files that contain the details of one or more chemicals that will appear in the lower grid when the file is selected. In this case, there is only one file to select; namely, **Chemicals**.

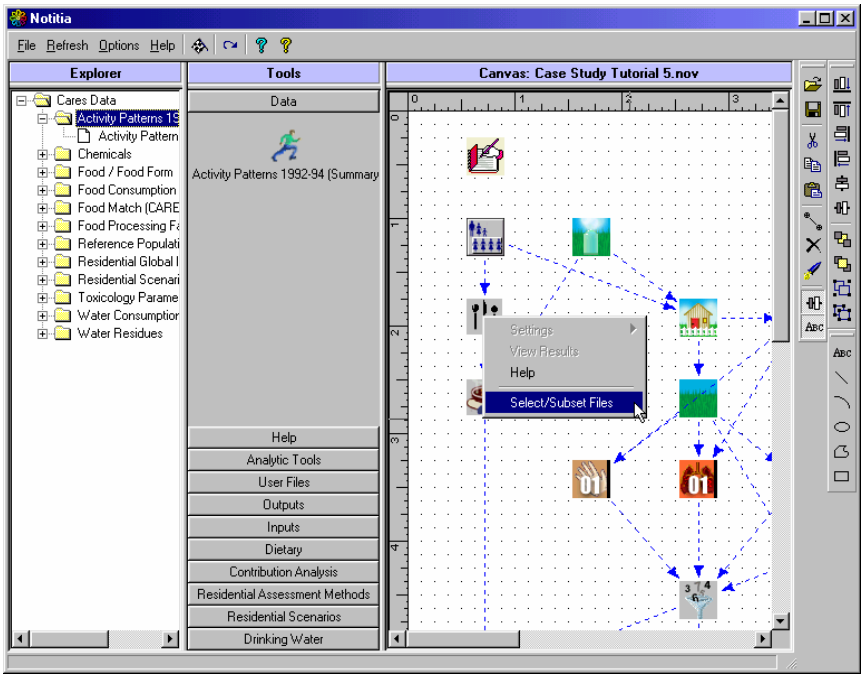
Highlight the file named **Chemicals** and click **Select**.

When the Chemicals file is selected, two or more chemicals appear in the bottom grid, as shown above. Select the chemicals **Safethrin** and **Wobegon** for use in this tutorial by clicking on the check box next to the CAS number (**11-1111-1** and **22-2222-2**) in the **Chemical ID** column.

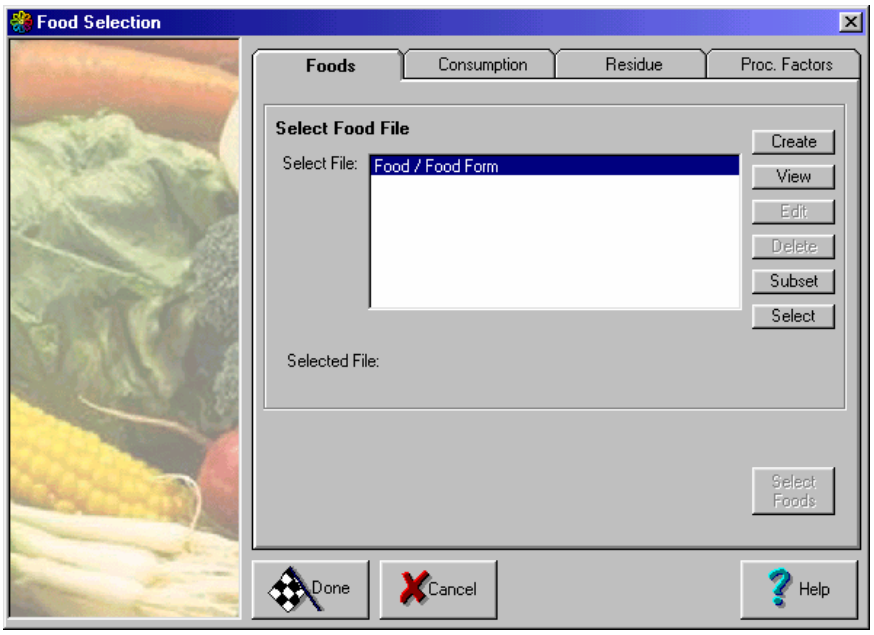
Click **Done** to close the **Chemical Selector** window and return to the main CARES window.

Setup Dietary Data Inputs

To begin setting up the inputs for the dietary module, right click on the **Food Selector** icon on the Canvas, and then click on the **Select/Subset Files** menu option at the bottom of the context-sensitive window.:



The **Food Selection** window opens as follows:

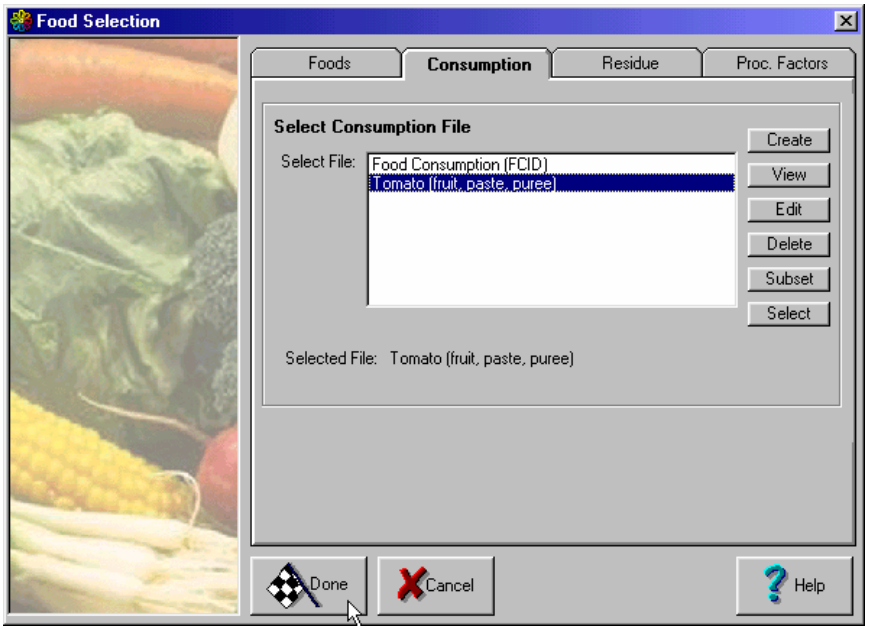


If necessary, click the **Foods** tab to get the display shown above.

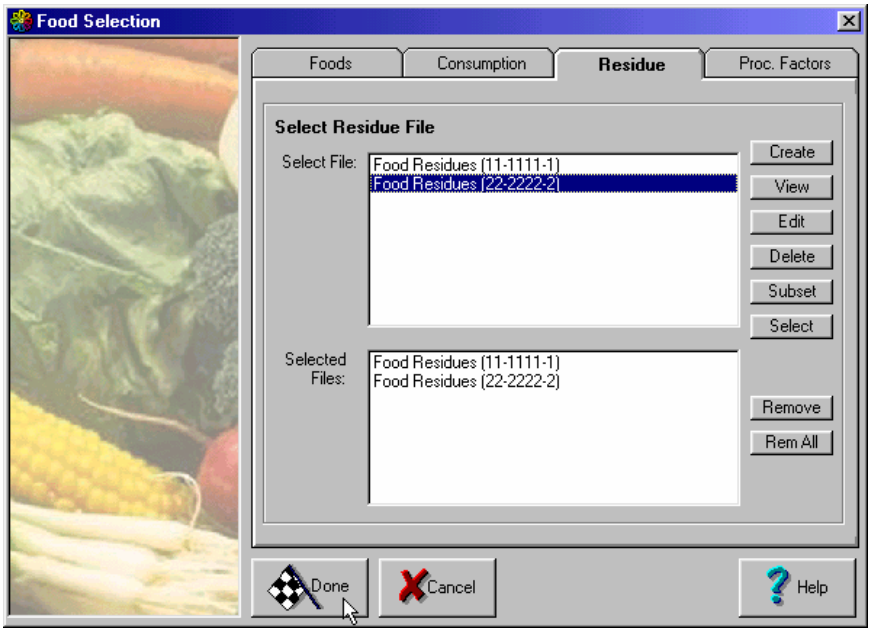
Double click on the file **Food / FoodForm** (or click on that file name and then click the **Select** button).

This action writes the selected filename as the **Selected File:** and activates the **Select Foods** button. In tutorial 1 you created and saved a subset of tomatoes by following the instructions after clicking the **Select Foods** button. You will recover and use that file in the next step. For now, click on the **Select** button, as shown:

Click the **Consumption** tab and select the file **Tomato (fruit, paste, puree)** from the list to highlight it. Then click **Select**, as shown

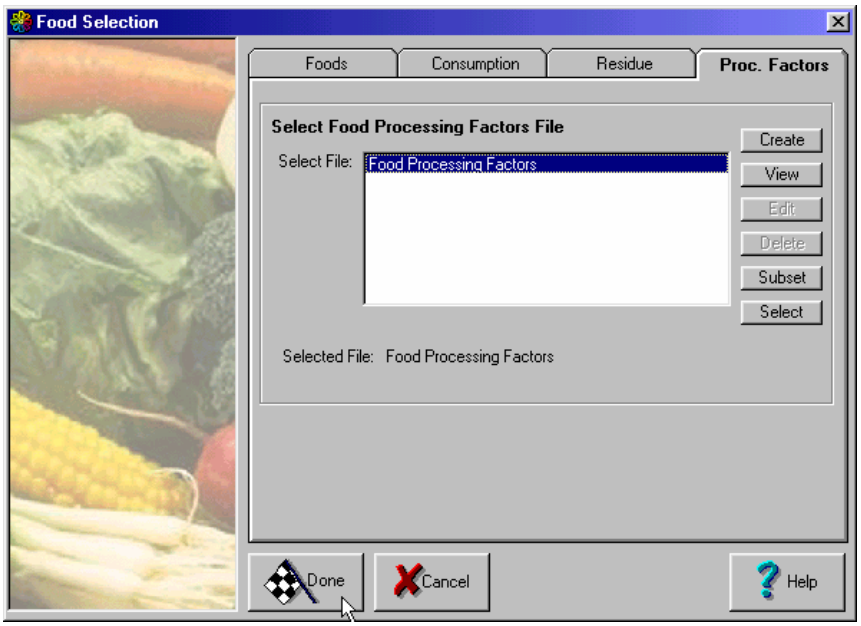


TIP …	Reminder: before leaving any tab in the Food Selection, make sure that the selected file name appears after the **Selected File:** text.



In the **Residue** tab, click on **Food Residues (11-1111-1)** and click **Select**. The chemical will appear in the **Selected Files** window. Return to the **Select File** window and click on **Food Residues (22-2222-2)**.

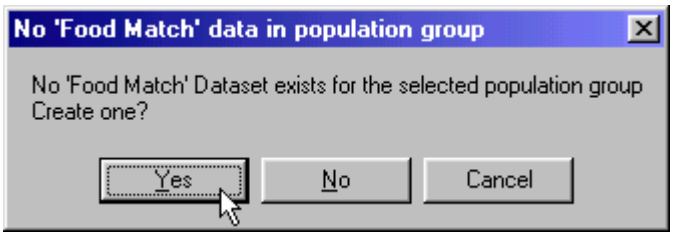
Click **Select**. Both chemicals should now appear in the **Selected Files** window.



In the **Proc. Factors** tab, click **Food Processing Factors**, then click **Select**. **Food Processing Factors** should appear by the **Selected File** text.

Click **Done** to exit the **Food Selection** window and return to the main CARES window.

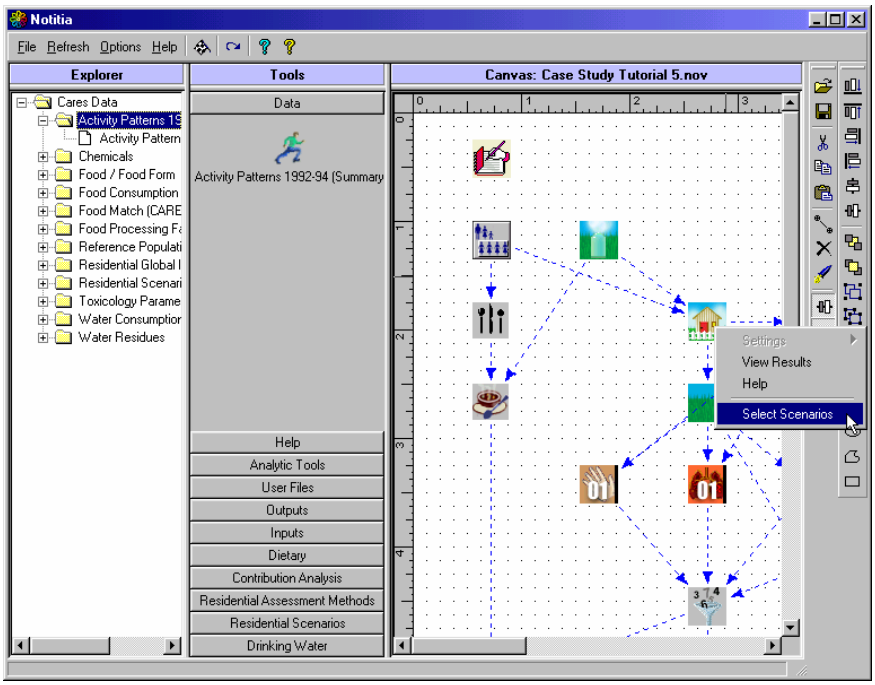
If you do not have a food match file created, you will be prompted to create one:



Click **Yes** to close the prompt and return to the main CARES window.

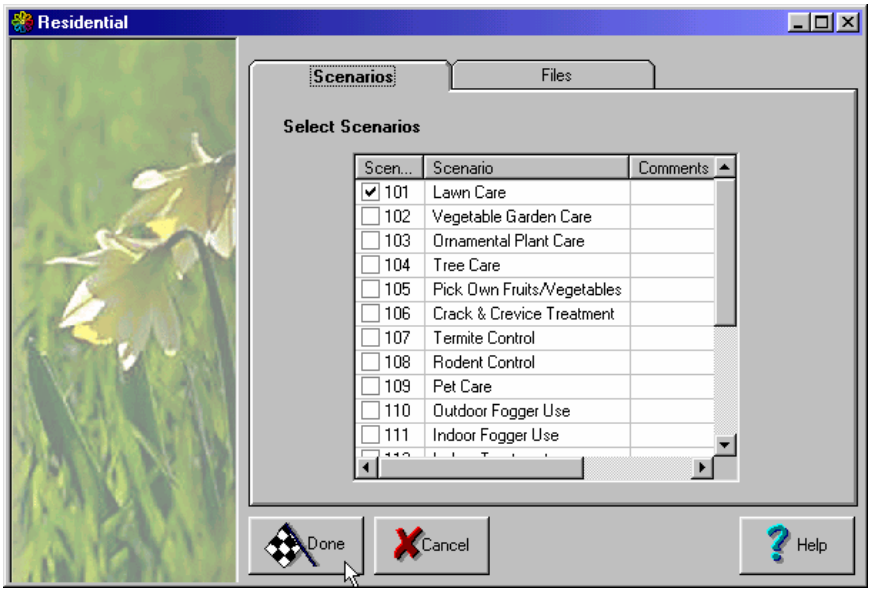
Setup Residential Data Inputs

Right click on the **Scenario Selector** to open the context-sensitive menu:



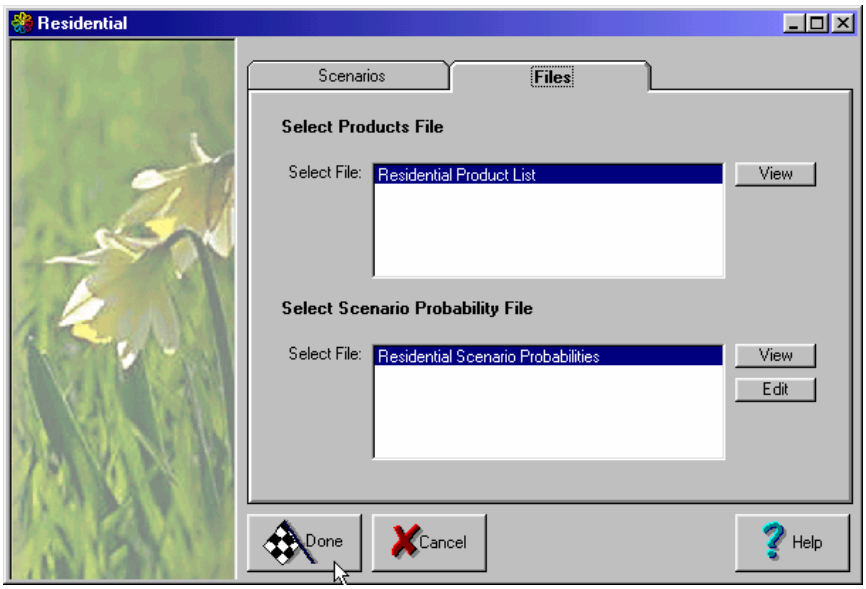
Select the **Select Scenarios** option, as shown above.

The **Residential** window will open. If necessary, click the **Scenarios** tab:



Click the check box for **Lawn Care** to select that scenario.

Click the **Files** tab to get the following display:

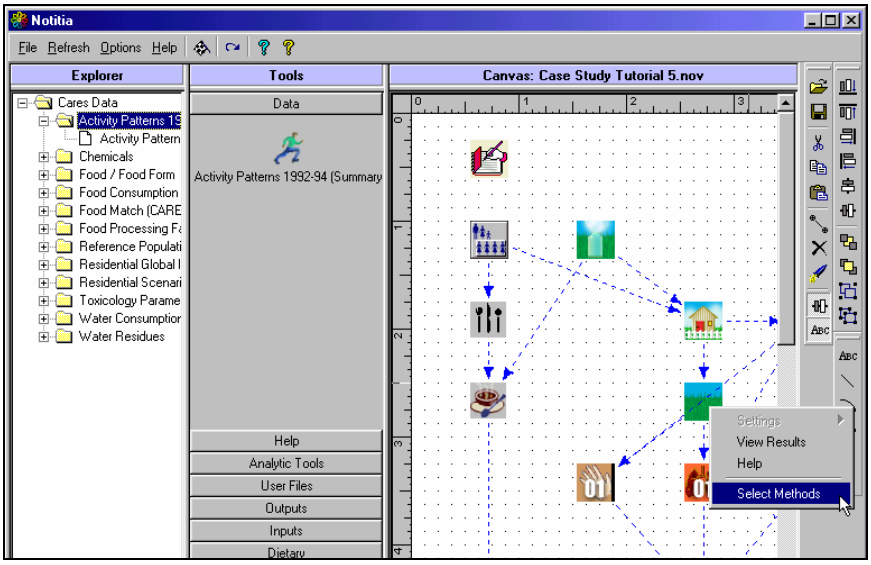


For this tutorial, accept the default files, as shown above.

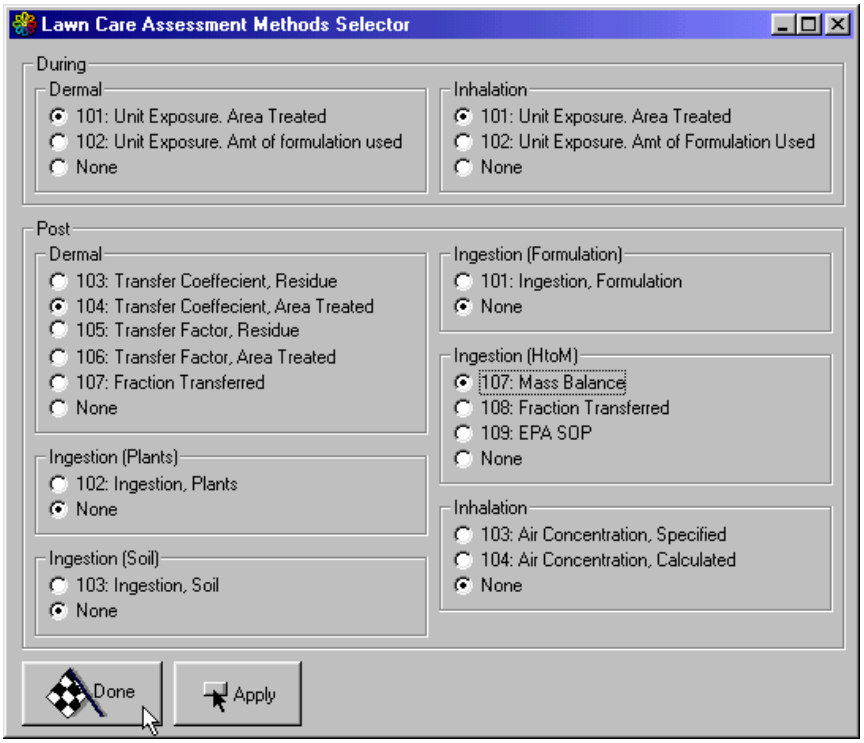
Click **Done** to exit the **Residential** window.

In this tutorial, we will use the default settings for the **Event Allocation**, so you do not have to configure this icon.

The lawn care scenario is the only exposure source included in this tutorial. Right click on the **Residential (Lawn Care) Selector** icon and select the **Select Methods** menu option from the context-sensitive window, as shown below:



The **Lawn Care Assessment Methods Selector** window opens as follows:



The **Lawn Care Assessment Methods Selector** window displays groups of algorithm options (or methods) for calculating each type of exposure opportunity the scenario contains. In the current window, you will note that Lawn Care exposure includes temporal groups (such as **During** and **Post** application),and these, in turn, contain sub-groups of algorithms for various routes of exposure (e.g., **Dermal**, **Inhalation**, **Ingestion**).

The above window shows the four options you should choose for this run, and the following list shows the algorithm icon associated with the specific option:

During Application

	Dermal 101: Unit Exposure (Area Treated)
	Inhalation 101: Unit Exposure, Area Treated

Post Application

	Dermal 104: Transfer Coefficient, Area Treated
	Ingestion 107: Mass Balance

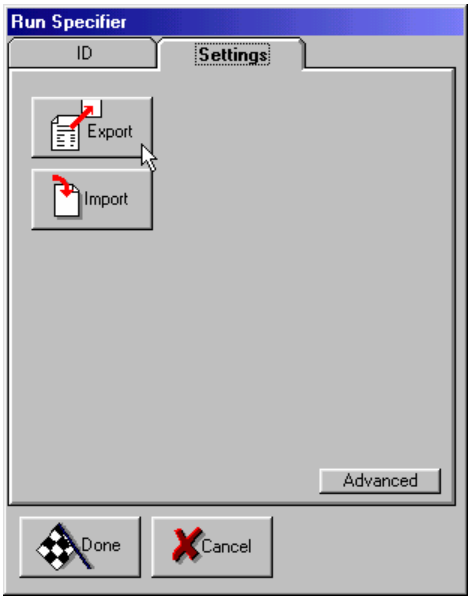
Click **Done** when finished selecting the options.

For this tutorial you will accept the default settings for the four function modules and do not, therefore, need to open or view in order to continue with the run.

Save Run Settings

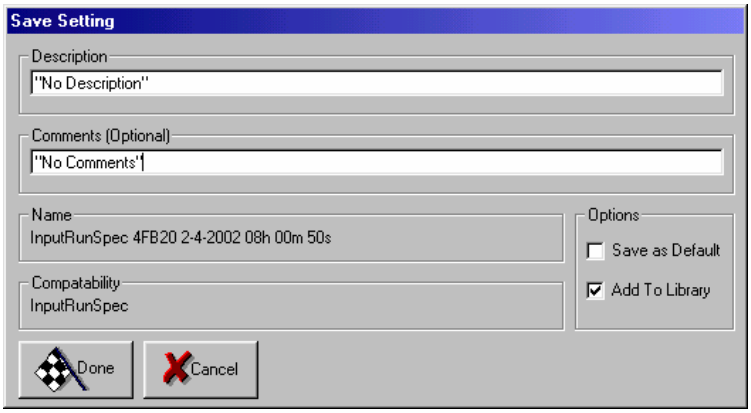
Before running the Canvas model, you should save the settings that you have just established. This will allow you to recall the same settings should you want either to repeat the run as is or make some modifications in the setup and then rerun the Canvas.

Right click on the **Run Specifier** icon and select the **View/Edit Run Spec** option. In the **Run Specifier** window, click the **Settings** tab.



Click the **Export** button.

A **Save Setting** window will appear similar to the following:



Replace the default 'No Description' entry with a short description of the setup you have just created for this run. For example, type **CS 5 Settings**. Optionally, you can include additional information in the **Comments** field.

Click **Done** to return to the **Settings** tab.

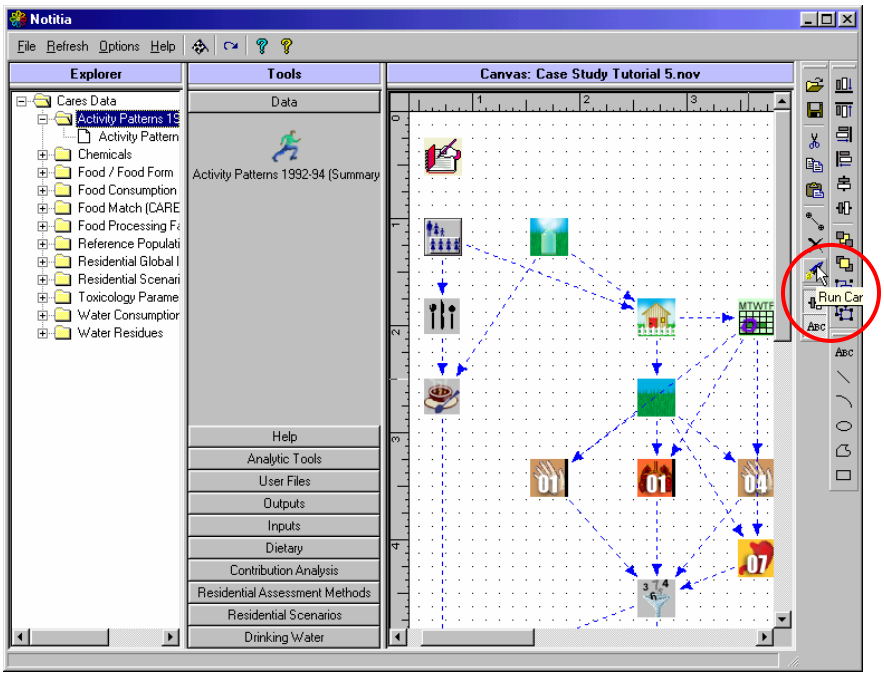
Click **Done** to close the **Run Specifier** window and return to the main window.

Run Canvas (Dietary and Residential)

TIP …	Running the combined Dietary and Residential model will require from 60 minutes to 6 hours total, depending on the speed of your computer processor.

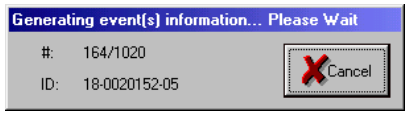
TIP …	To avoid unexpected problems, it is recommended that you do not use other applications or work with your computer when CARES 1.0 is processing files such as this. Otherwise, when CARES is not processing data, feel free to simultaneously work with other applications while CARES is open and not processing.

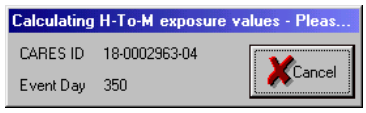
Click the **Run Canvas** button on the Diagrammer toolbar to execute the model:

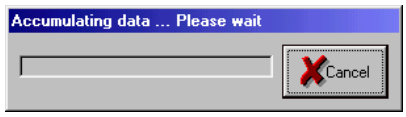


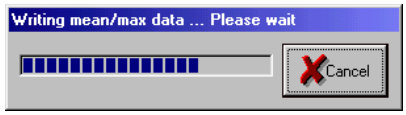
TIP …	The **Run Canvas** function will process both the dietary data and residential data. During the processing, you will revisit the same prompts and procedures as previously observed for each individual exposure run. To review these in more detail, see Chapter 7 for the Dietary run and Chapter 9 for the Residential run.

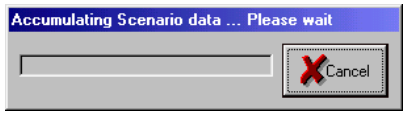
After the **Run Canvas** button is clicked, one or more dialog and status windows will appear indicating the progress of the run execution as follows:

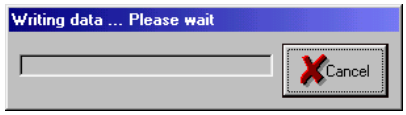


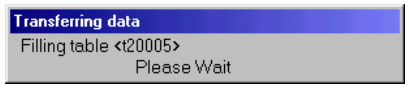






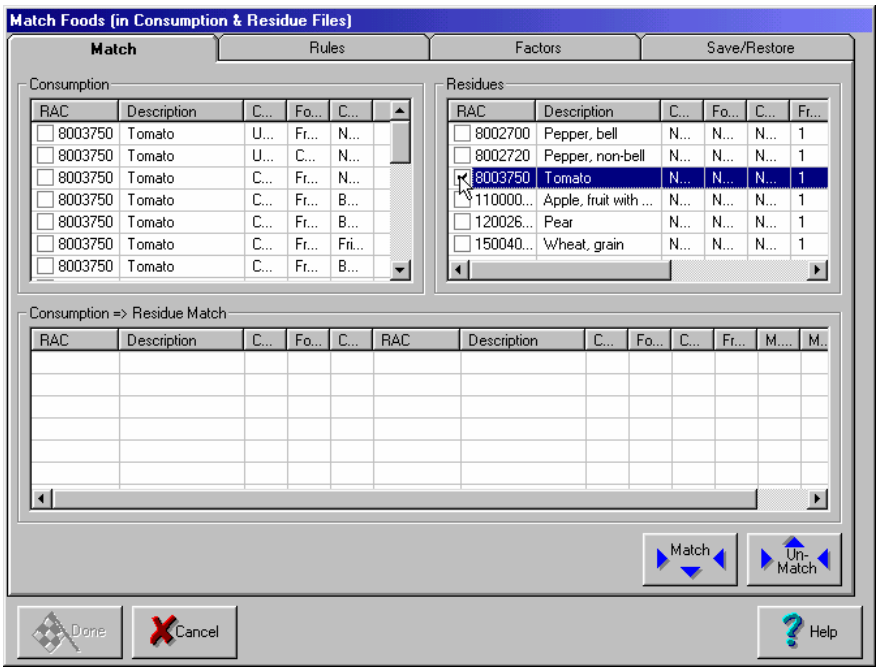




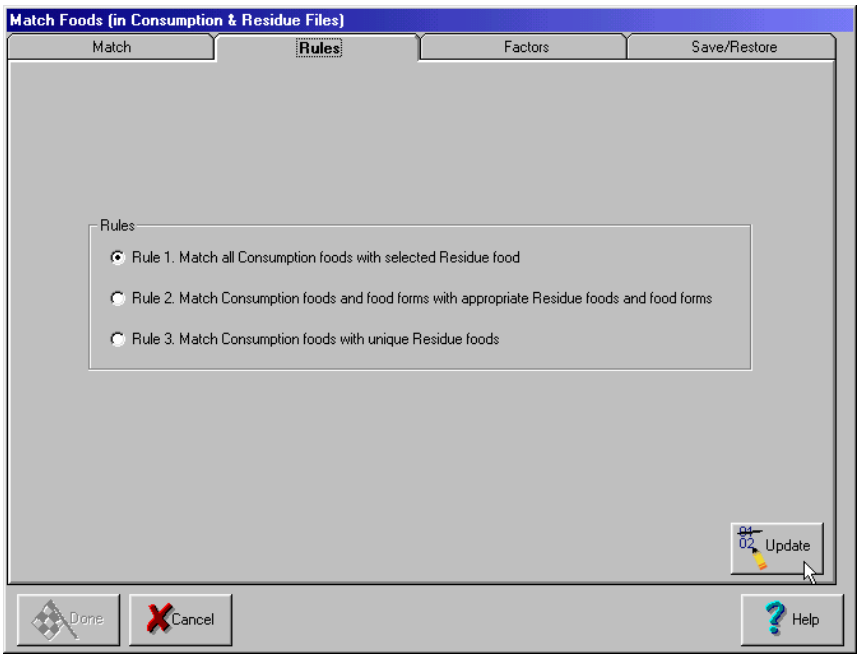


Matching Foods/Food Forms and Residues

As observed in Tutorials 1 and 2, during the execution of the dietary component of the model, the **Match Foods (in Consumption & Residue Files)** window will open:



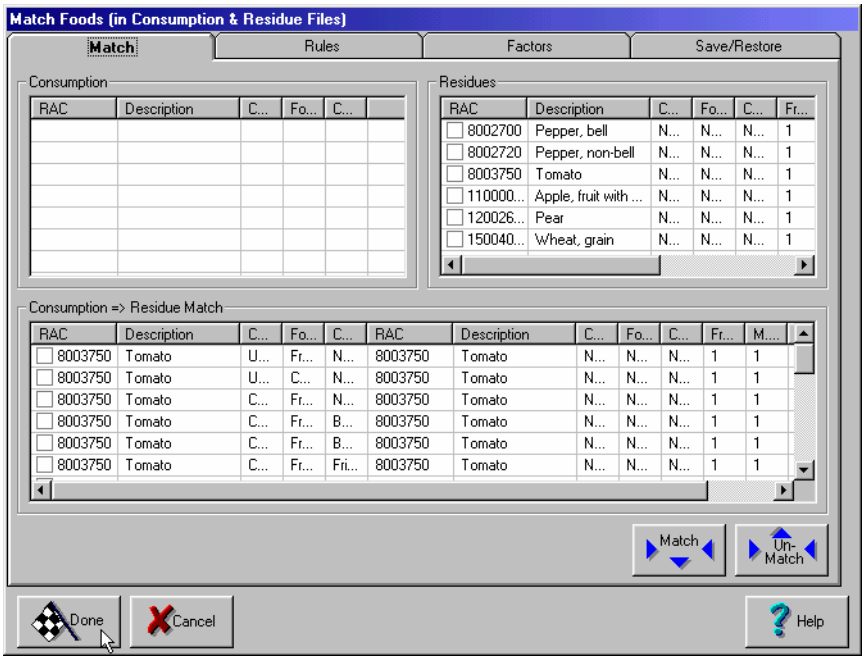
Select **Tomato** in the **Residues** grid, as illustrated above:



Click the **Rules** tab and select **Rule 1. Match all Consumption foods with selected Residue food.**

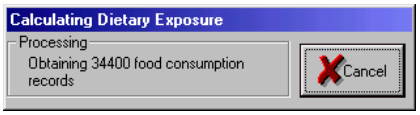
Click **Update.**

The **Match** tab view will reappear showing that all items in the **Consumption** window have been matched, as follows:



Click **Done** to close the **Match Foods** window and and continue with the run.

Additional status windows such as the following will appear:

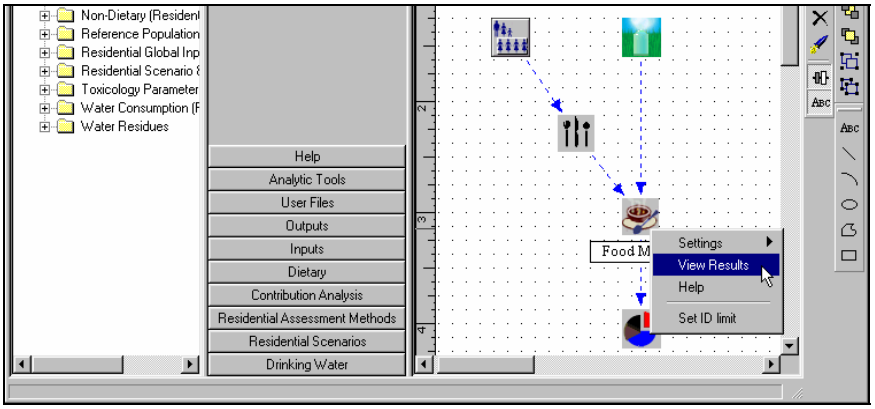


When the run has completed, as indicated above, click **OK**.

TIP …	If your computer memory runs low during the run, the run will continue, but the screen may not be redrawn correctly until the run is finished.

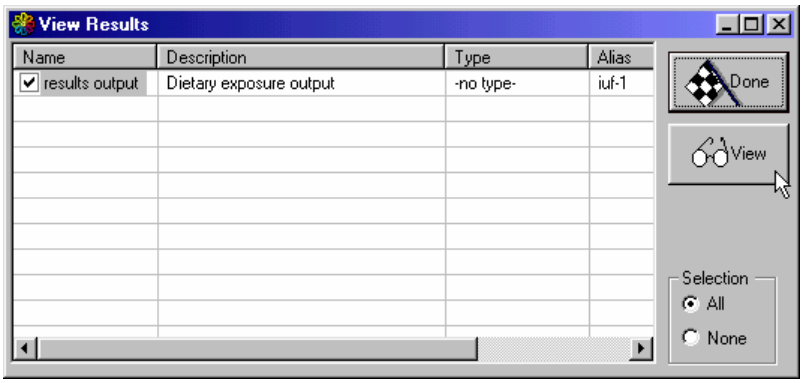
View Dietary Results

To view the results of the dietary exposure calculation, right click on the **Food Match** icon on the main window Canvas. The context sensitive menu list will appear as follows:



Click **View Results** on the menu.

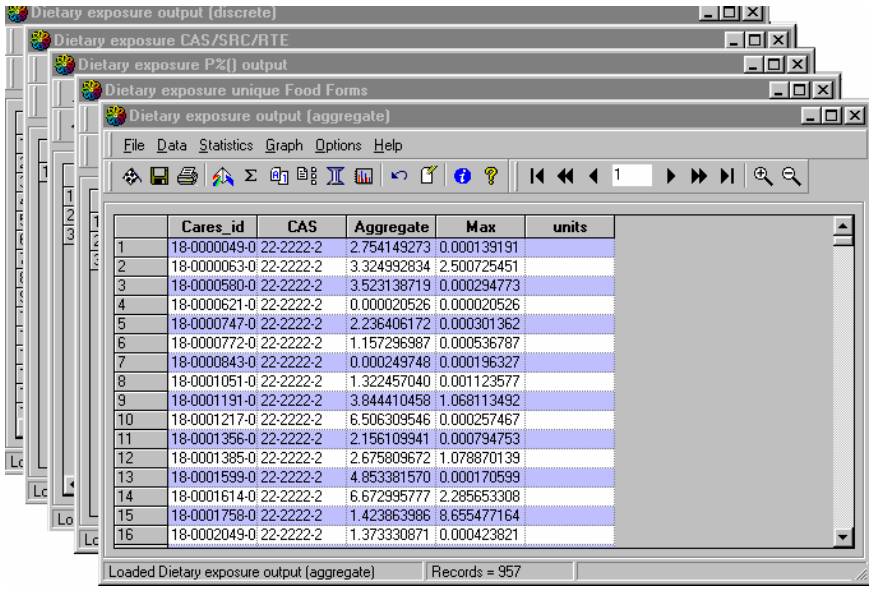
Check the **results output** line in the next window:



Click the **View** button to display the following list of available output files:

You may view any or all of the listed files. For this tutorial, highlight all five selections and click **Done**

The outputs you selected will appear as a stack of data grids, similar to the following:



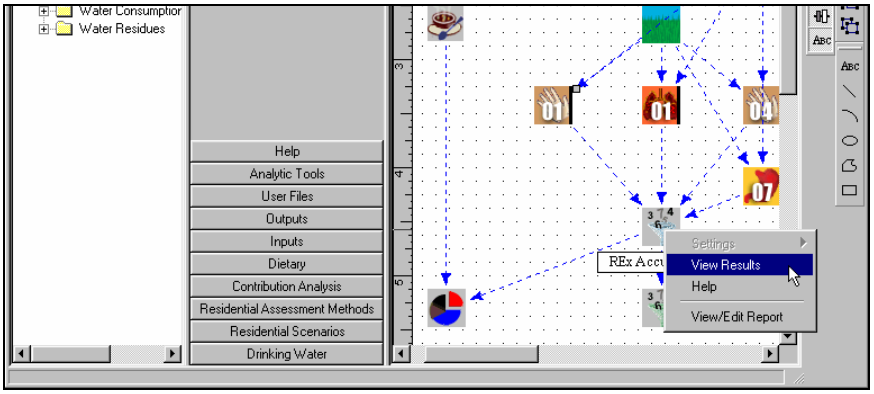
	Cares_id	CAS	Aggregate	Max	units
1	18-0000049-0	22-2222-2	2.754149273	0.000139191	
2	18-0000063-0	22-2222-2	3.324992834	2.500725451	
3	18-0000580-0	22-2222-2	3.523138719	0.000294773	
4	18-0000621-0	22-2222-2	0.000020526	0.000020526	
5	18-0000747-0	22-2222-2	2.236406172	0.000301362	
6	18-0000772-0	22-2222-2	1.157296987	0.000536787	
7	18-0000843-0	22-2222-2	0.000249748	0.000196327	
8	18-0001051-0	22-2222-2	1.322457040	0.001123577	
9	18-0001191-0	22-2222-2	3.844410458	1.068113492	
10	18-0001217-0	22-2222-2	6.506309546	0.000257467	
11	18-0001356-0	22-2222-2	2.156109941	0.000794753	
12	18-0001385-0	22-2222-2	2.675809672	1.078870139	
13	18-0001599-0	22-2222-2	4.853381570	0.000170599	
14	18-0001614-0	22-2222-2	6.672995777	2.285653308	
15	18-0001758-0	22-2222-2	1.423863986	8.655477164	
16	18-0002049-0	22-2222-2	1.373330871	0.000423821	

Note: the data shown in the grid may appear different in your run.

Click on the title bar to select and examine each output data grid in turn.

View Exposure Aggregator Results

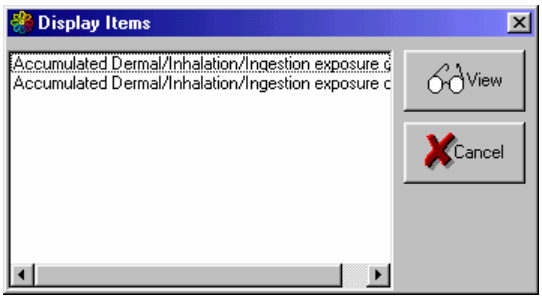
Right-click the **REx Accumulator** icon to view the outputs of all REx (Residential Exposure) functions for a given scenario, and then select the **View Results** menu option, as follows:

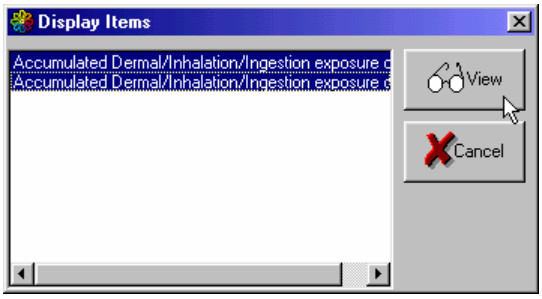


TIP …	Note: the above step allows viewing of all the functions in the run through one window. You may view individual results by right-clicking on any of the dermal, inhalation, or ingestion icons and selecting **View Results** from their respective context-sensitive menu.

A Status message will appear:

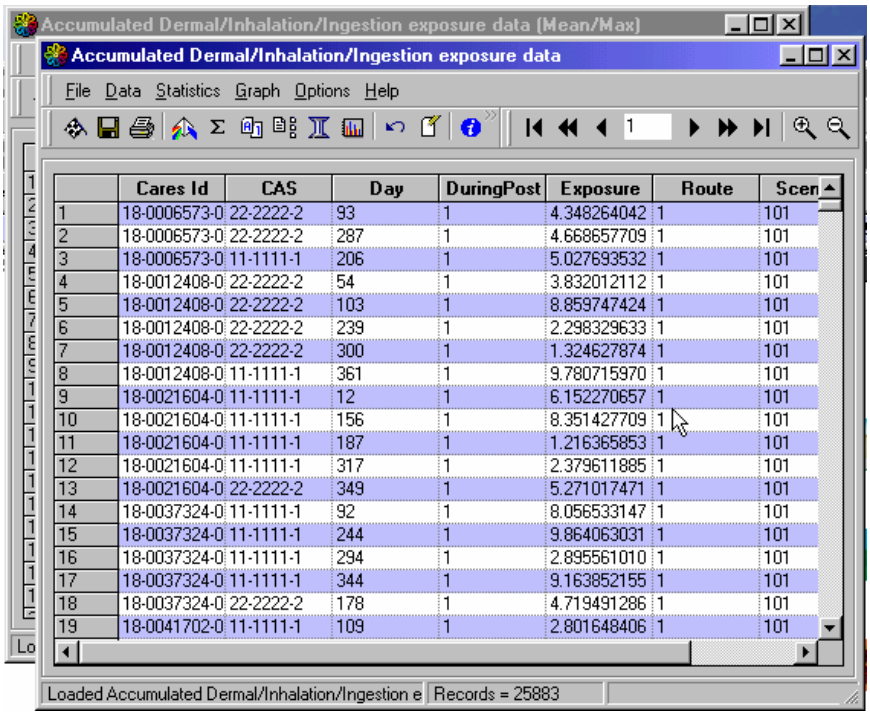
Preparing the User Files could take several minutes. When complete, a selection window with a list of available files for viewing will appear similar to the following:





Click the appropriate check box to select the files you want to view, and then click the **View** button, as illustrated above.

The data grids displaying the selected data files will appear similar to the following:

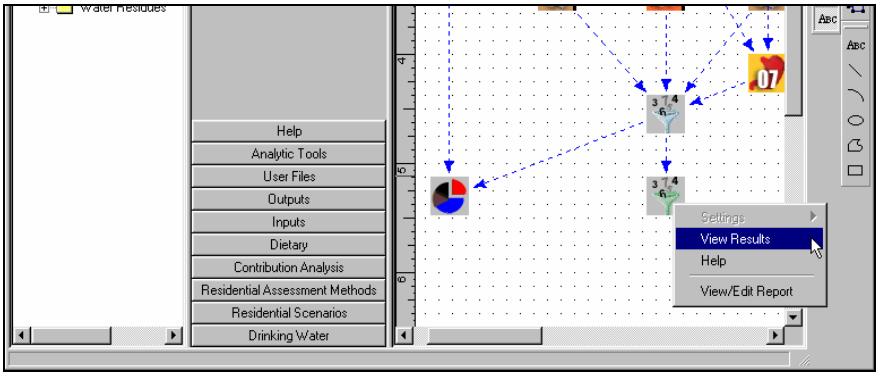


	Cares Id	CAS	Day	DuringPost	Exposure	Route	Scen
1	18-0006573-0	22-2222-2	93	1	4.348264042	1	101
2	18-0006573-0	22-2222-2	287	1	4.668657709	1	101
3	18-0006573-0	11-1111-1	206	1	5.027693532	1	101
4	18-0012408-0	22-2222-2	54	1	3.832012112	1	101
5	18-0012408-0	22-2222-2	103	1	8.859747424	1	101
6	18-0012408-0	22-2222-2	239	1	2.298329633	1	101
7	18-0012408-0	22-2222-2	300	1	1.324627874	1	101
8	18-0012408-0	11-1111-1	361	1	9.780715970	1	101
9	18-0021604-0	11-1111-1	12	1	6.152270657	1	101
10	18-0021604-0	11-1111-1	156	1	8.351427709	1	101
11	18-0021604-0	11-1111-1	187	1	1.216365853	1	101
12	18-0021604-0	11-1111-1	317	1	2.379611885	1	101
13	18-0021604-0	22-2222-2	349	1	5.271017471	1	101
14	18-0037324-0	11-1111-1	92	1	8.056533147	1	101
15	18-0037324-0	11-1111-1	244	1	9.864063031	1	101
16	18-0037324-0	11-1111-1	294	1	2.895561010	1	101
17	18-0037324-0	11-1111-1	344	1	9.163852155	1	101
18	18-0037324-0	22-2222-2	178	1	4.719491286	1	101
19	18-0041702-0	11-1111-1	109	1	2.801648406	1	101

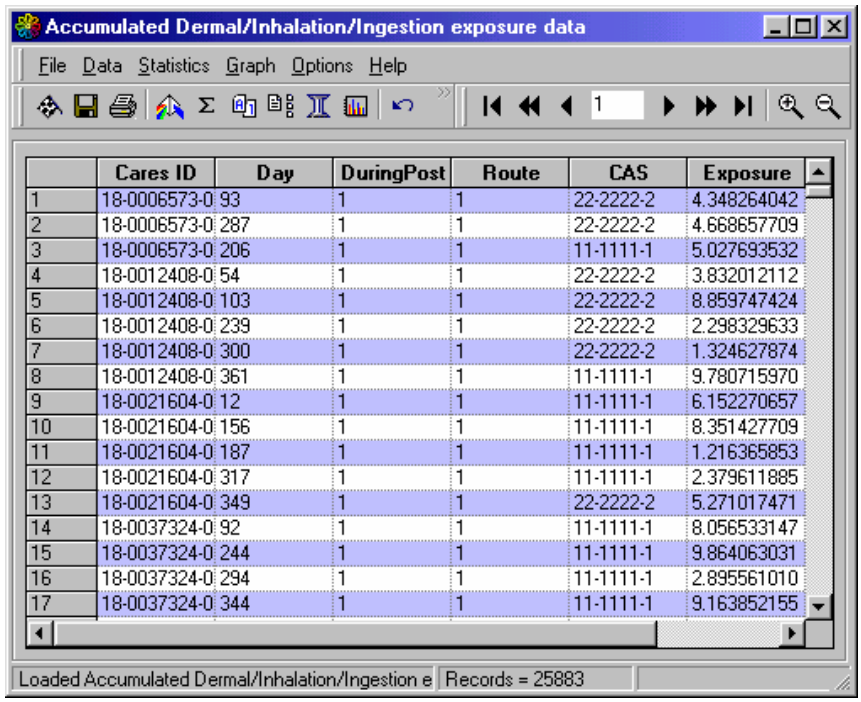
Additional Data Grid Views

TIP …	The **REx Scenario Accumulator** icon represents an aggregation function for use when two or more exposure modules are included in one run: for example, a model including both dietary and residential exposure.

To view the accumulated scenario results, right-click the **REx Scenario Accumulator** icon, and then select the **View Results** menu option, as shown:



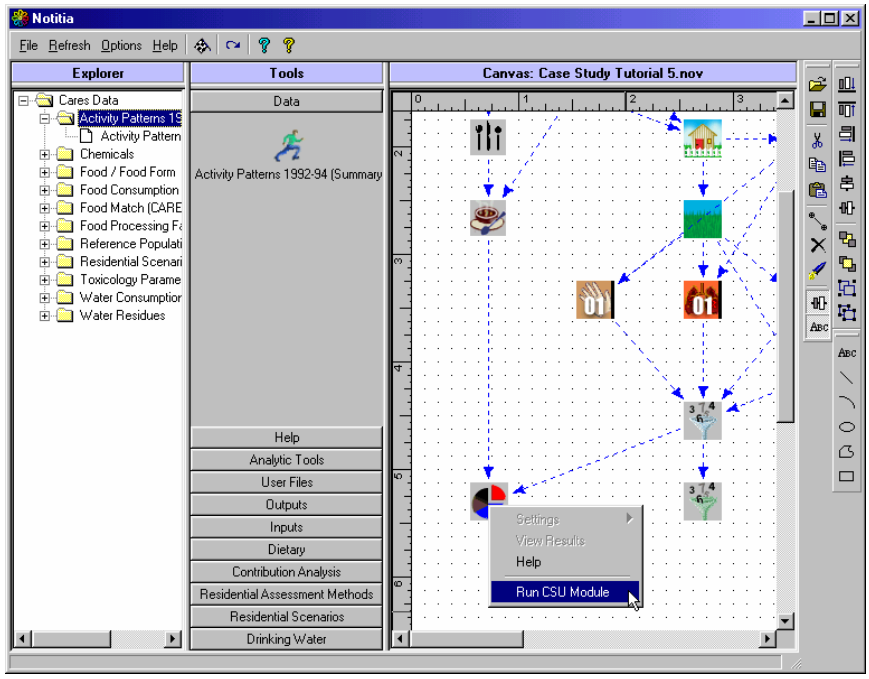
The data grid for the accumulated results will appear similar to the following:



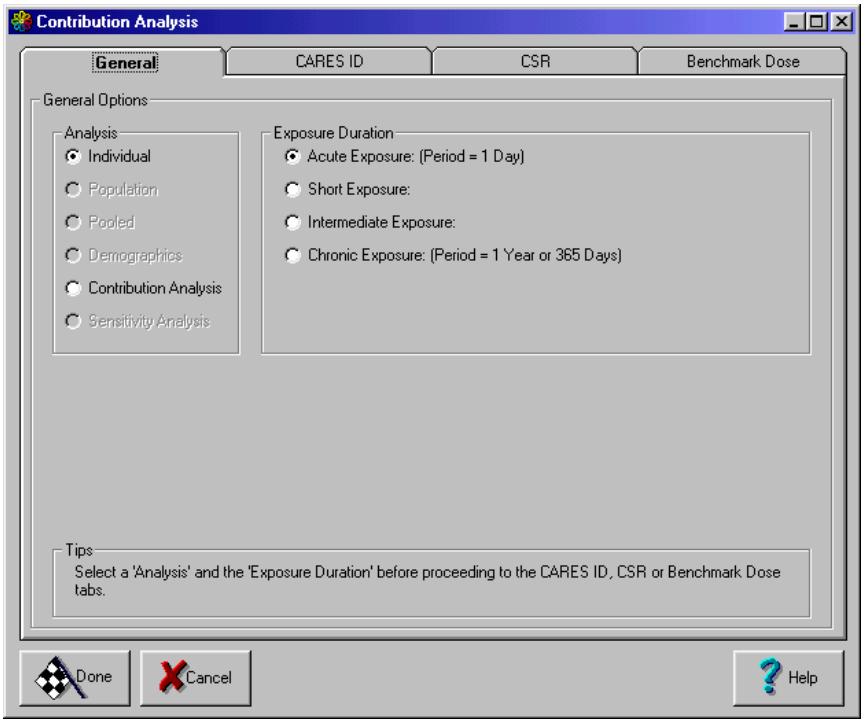
	Cares ID	Day	DuringPost	Route	CAS	Exposure
1	18-0006573-0	93	1	1	22-2222-2	4.348264042
2	18-0006573-0	287	1	1	22-2222-2	4.668657709
3	18-0006573-0	206	1	1	11-1111-1	5.027693532
4	18-0012408-0	54	1	1	22-2222-2	3.832012112
5	18-0012408-0	103	1	1	22-2222-2	8.859747424
6	18-0012408-0	239	1	1	22-2222-2	2.298329633
7	18-0012408-0	300	1	1	22-2222-2	1.324627874
8	18-0012408-0	361	1	1	11-1111-1	9.780715970
9	18-0021604-0	12	1	1	11-1111-1	6.152270657
10	18-0021604-0	156	1	1	11-1111-1	8.351427709
11	18-0021604-0	187	1	1	11-1111-1	1.216365853
12	18-0021604-0	317	1	1	11-1111-1	2.379611885
13	18-0021604-0	349	1	1	22-2222-2	5.271017471
14	18-0037324-0	92	1	1	11-1111-1	8.056533147
15	18-0037324-0	244	1	1	11-1111-1	9.864063031
16	18-0037324-0	294	1	1	11-1111-1	2.895561010
17	18-0037324-0	344	1	1	11-1111-1	9.163852155

Conduct Data Analysis

On the main CARES window, Right click the **CSU** icon and select **Run CSU Module**, as follows:



The **Contribution Analysis** window will appear, as follows:



There are four tabs with selection options:

1. **General** – Allows selection of the type of analysis and Exposure Duration (Acute, etc.).
2. **CARES ID** – For certain analyses, allows selection of an individual through CARES ID.
3. **CSR** (Chemical, Source, Route) – Allows selection of one or more chemicals, one or more sources (dietary, etc.), and one or more routes (dermal, etc.).
4. **Benchmark Dose** – Allows selection of a benchmark dose to estimate TEDs, MOEs and PODs.

A Quick Look at the CSU

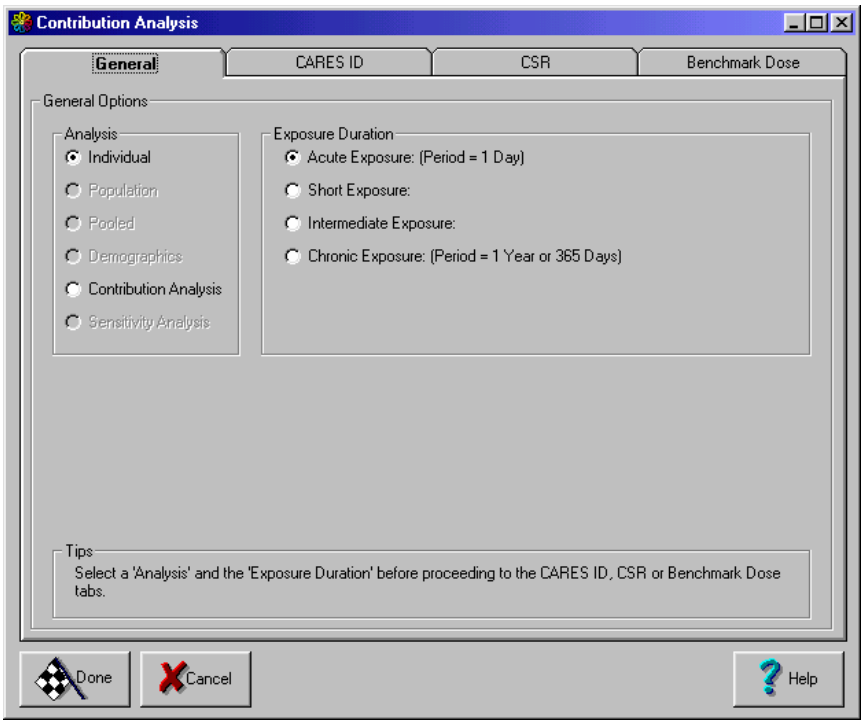
The **CSU** (Contribution – Sensitivity – Uncertainty) is partially implemented in CARES 1.0. The **General** tab shows six analysis options in the **Analysis** group. The **Individual** and **Contribution Analysis** options are currently available. The options displayed on different tabs changes according to the **Analysis** option selected.

Each tab contains a **Tips** box that gives helpful directions and information about the options available.

Note that the **CARES ID** tab is enabled when the **Individual** analysis option is selected.

Perform an “Individual” Analysis

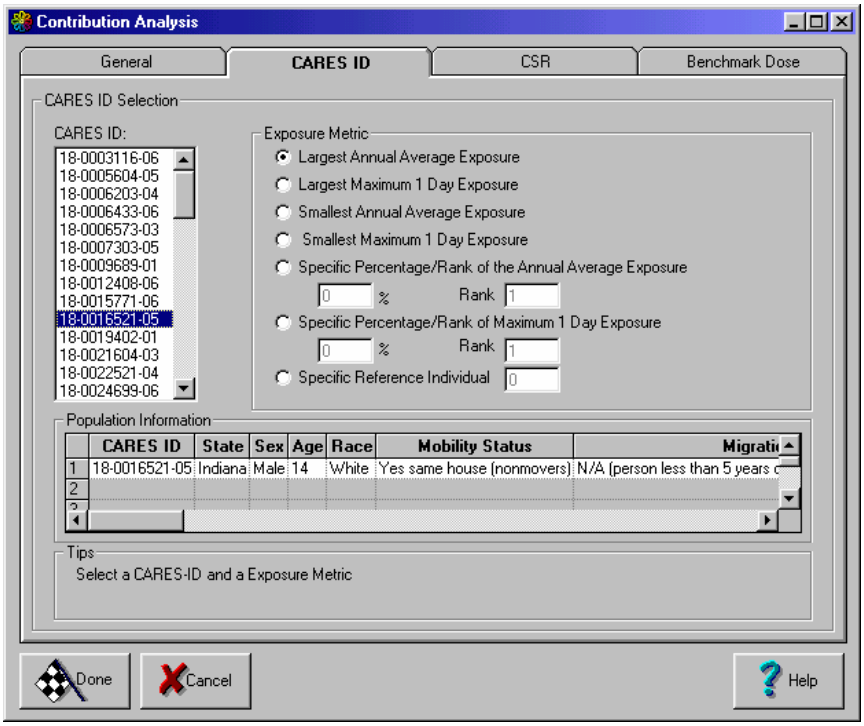
To start, click the radio button for **Individual** in the **Analysis** group on the **General** tab.



Select an **Exposure Duration** option**.** For this analysis, select **Acute Exposure (Period = 1 Day)**.

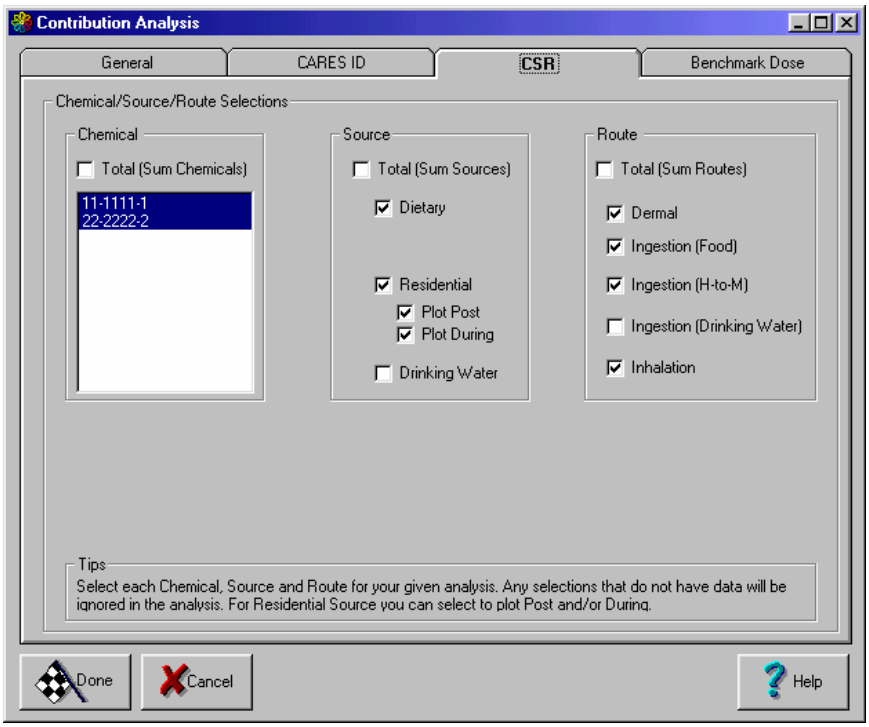
Click the **CARES ID** tab. As shown below, this tab contains a list of all the individuals included in the run, a section for specifying an **Exposure Metric** (not currently implemented), and a grid for displaying each individual’s population characteristics:

Selecting an individual under the **CARES ID** list results in a display of that individual’s demographic characteristics in the **Population Information** group. For example, select individual **18-0016521-05** to get the following screen:



You may click on any individual in the **CARES ID** list to display information about that individual. Future implementation of the **Exposure Metric** will allow specific exposure lengths (note that changing selections in the area will not currently affect the analysis).

For this tutorial, leave the individual with CARES ID **18-0016521-05** selected, and click the **CSR** (Chemical, Source, Route) tab to obtain the following view:



The **CSR** tab provides options for selecting the **Chemical**, the **Source**, and the **Route** of exposure for the individual currently selected in the **CARES ID** tab. Select the following options:

Chemical:

You may select the **Total (Sum Chemicals)**, or one or more chemicals from the list. For this tutorial, select **11-1111-1** and **22-2222-2** from the list.

Source:

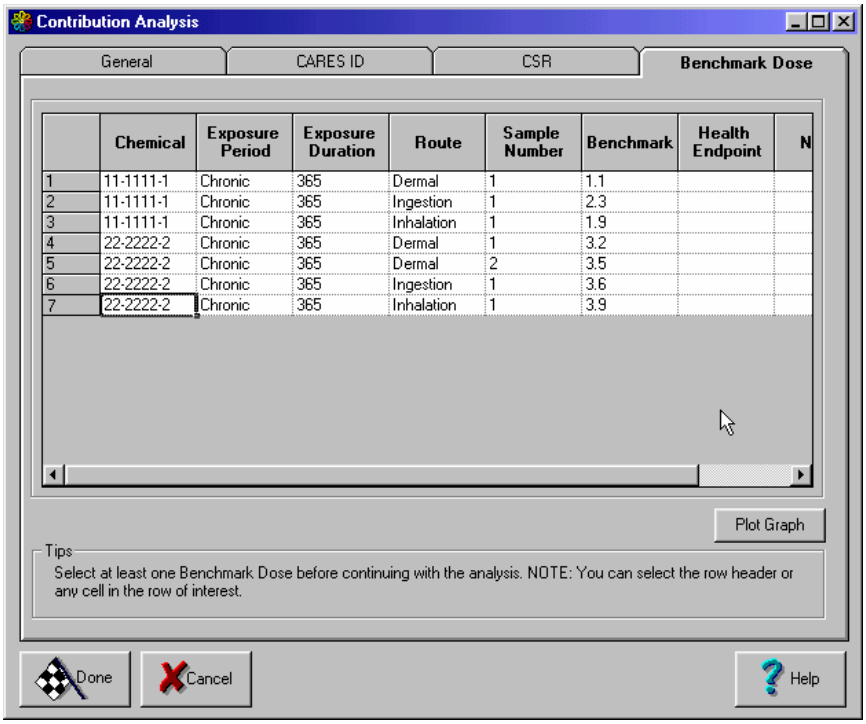
You may select the Total (Sum Sources), or one or more sources from the options. For this tutorial, select from the options: **Dietary**, **Residential** > **Plot Post** and **Residential** > **Plot During**. Drinking water data is not available, so that option is not chosen.

Route:

You may select the **Total (Sum Routes)** or one or more routes from the options. For this tutorial, select **Dermal, Ingestion (Food)**, **Ingestion (H-to-M)**, and **Inhalation**.

TIP …	Note: if you select options in the **CSR** tab that are not in your data file, you will get nothing in the output. For instance, in this example, we would get no output from selecting the 'Drinking Water' option.

Click the **Benchmark Dose** tab to reveal available options related to toxicology parameters as follows:



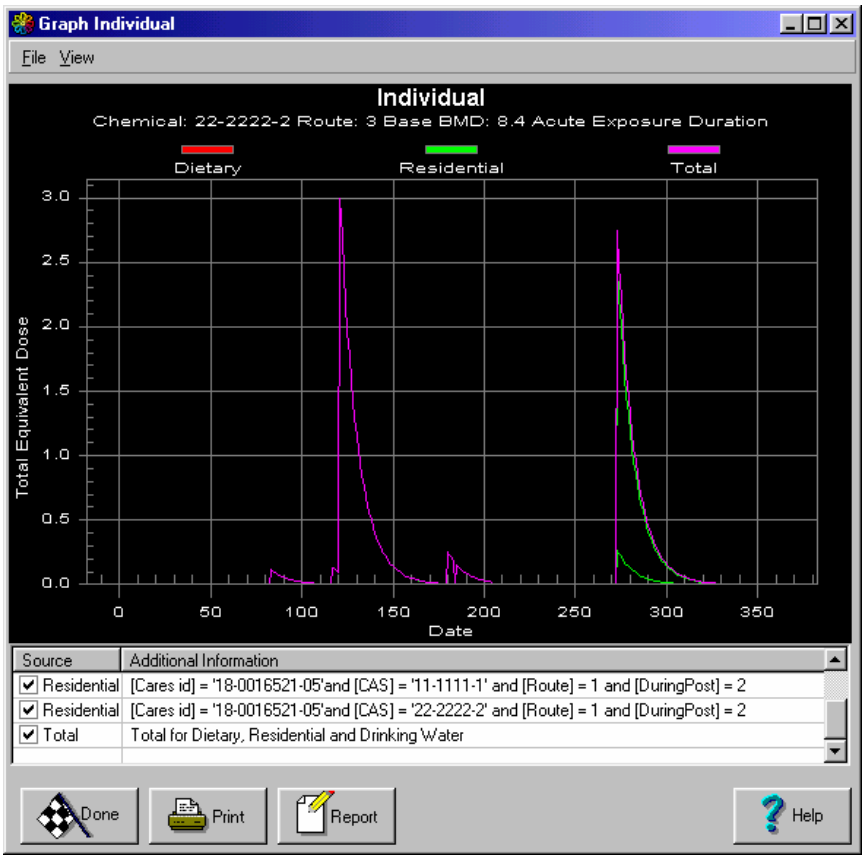
This window allows you to pick a benchmark dose that will be used as the base to determine chemical-specific and route-specific relative potency factors.

For this tutorial, select chemical **22-2222-2**, for the **Inhalation** row under **Route**, as shown above

Click **Plot Graph**.

TIP …	To select a Benchmark Dose row, move the mouse icon over the row header until the pointer turns to a right arrow, and then click the mouse once. Alternately, click on any cell in the row of interest.

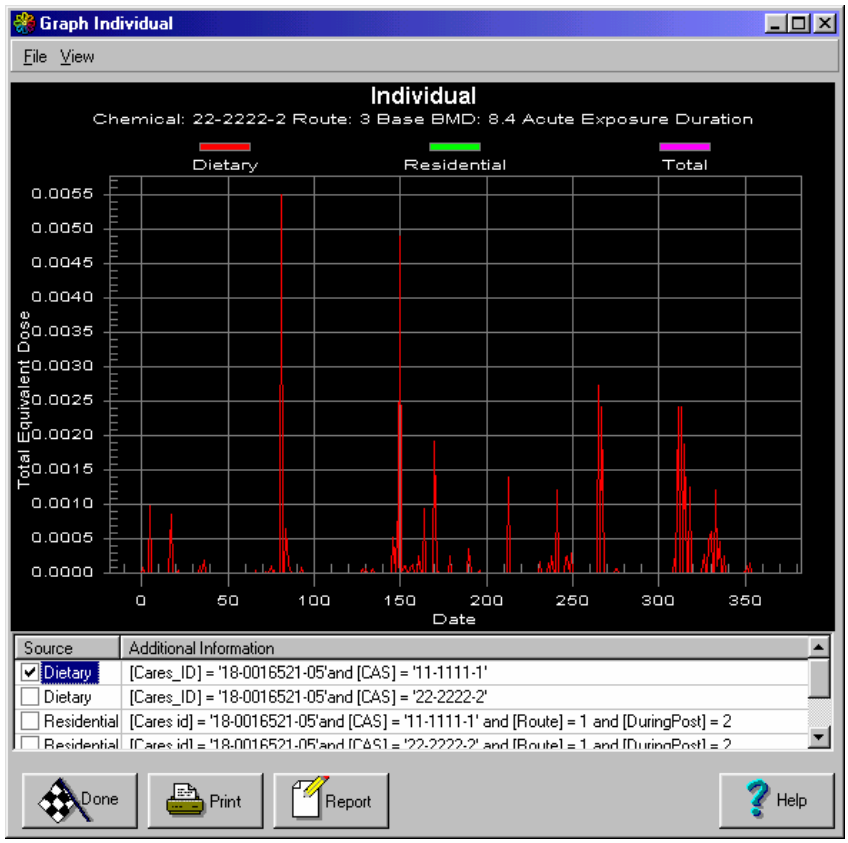
The following **Individual Plot** will appear:

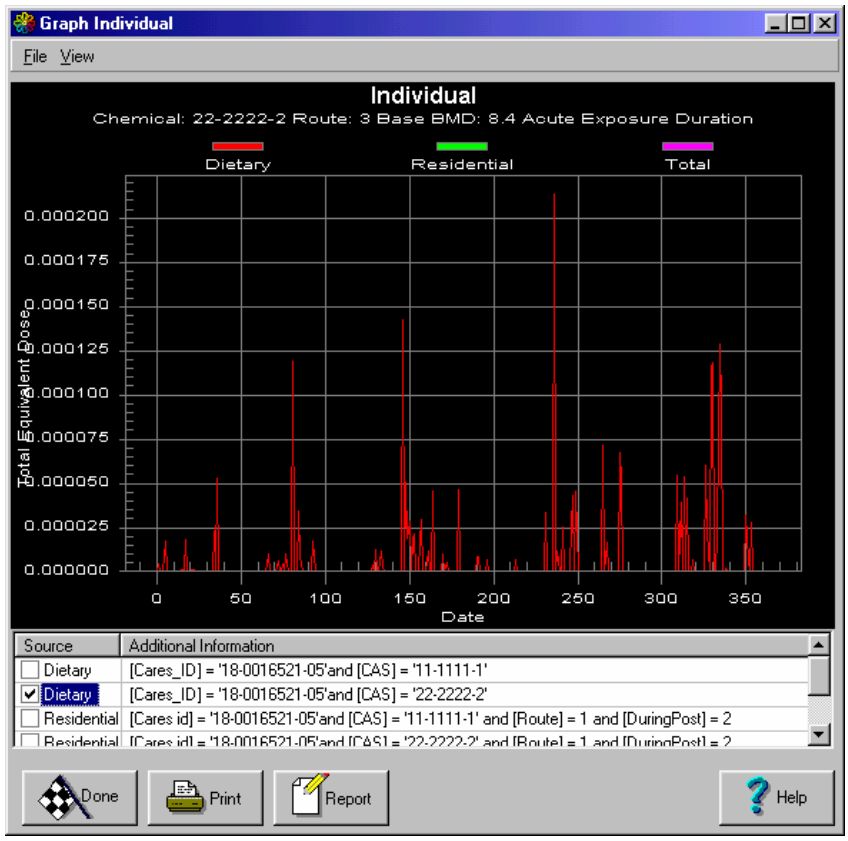


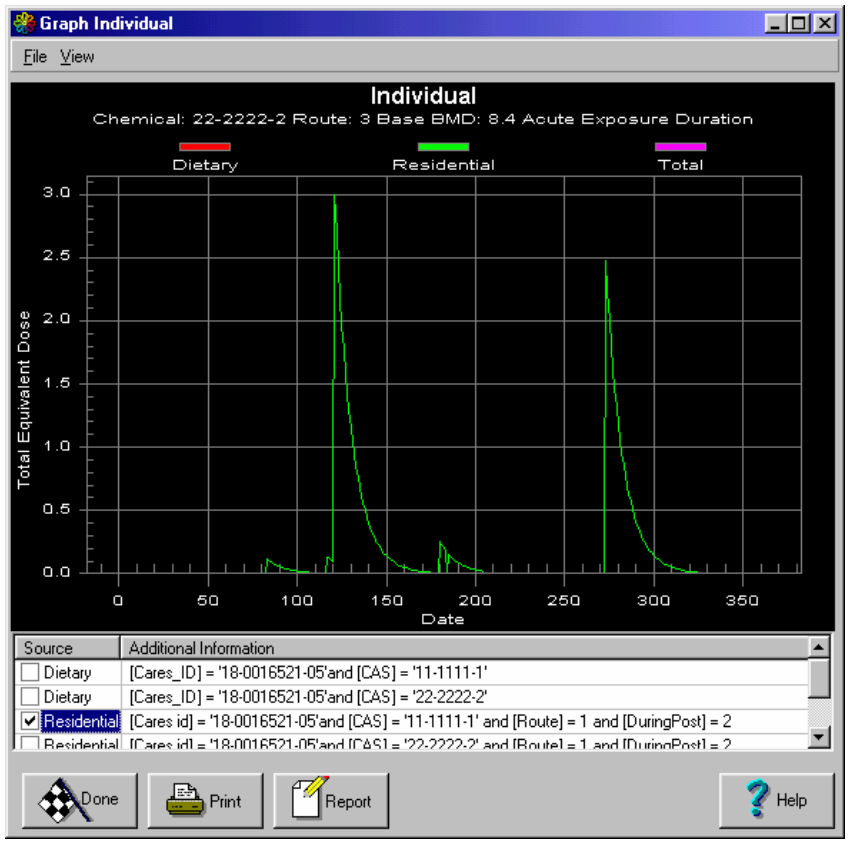
This plot uses the options currently in effect as specified in each of the four **Contribution Analysis** tab views. Select or deselect options in the Source window to view results with different emphasis.

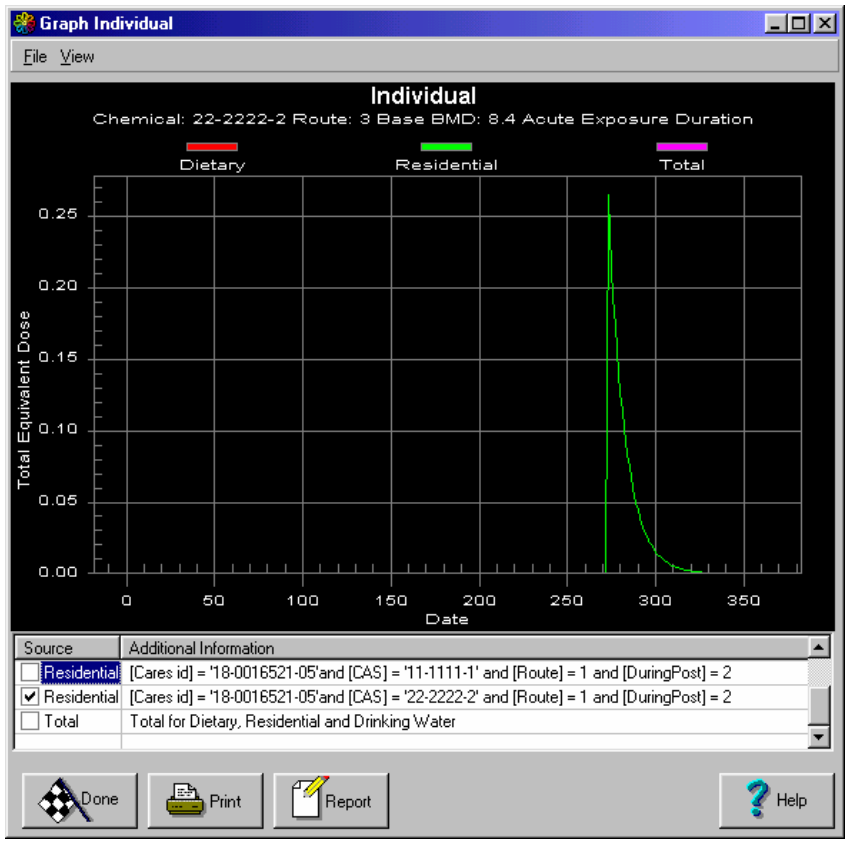
You may view the results for residential and dietary individually, or you may view the total for dietary, residential (and drinking water when implemented) on the graph.

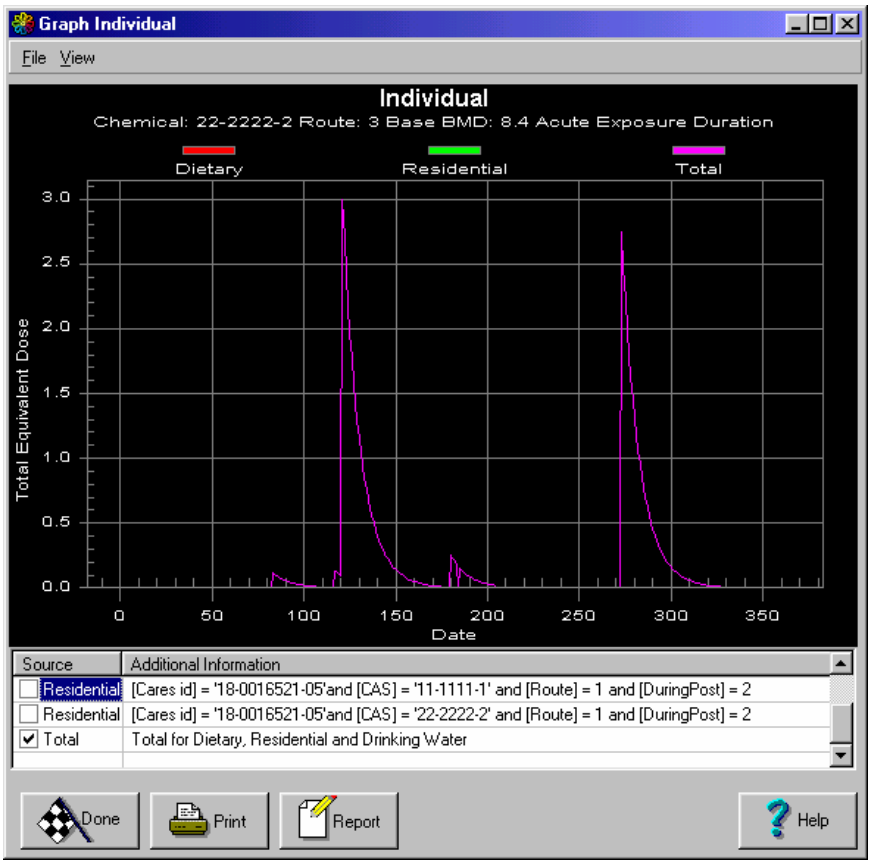
The following plots illustrate the Total Equivalent Dose for the selected individual over a 365-day period, based on the data **Source** checked:


Graph Individual
File View
Individual
Chemical: 22-2222-2 Route: 3 Base BMD: 8.4 Acute Exposure Duration
Dietary
Residential
Total
Total Equivalent Dose
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
50
100
150
200
250
300
350
Date
Source
Additional Information
Dietary
[Cares_ID] = '18-0016521-05'and [CAS] = '11-1111-1'
Dietary
[Cares_ID] = '18-0016521-05'and [CAS] = '22-2222-2'
Residential
[Cares id] = '18-0016521-05'and [CAS] = '11-1111-1' and [Route] = 1 and [DuringPost] = 2
Done
Print
Report
Help


Graph Individual
File View
Individual
Chemical: 22-2222-2 Route: 3 Base BMD: 8.4 Acute Exposure Duration
Dietary
Residential
Total
Total Equivalent Dose
0.000200
0.000175
0.000150
0.000125
0.000100
0.000075
0.000050
0.000025
0.000000
0
50
100
150
200
250
300
350
Date
Source
Additional Information
Dietary
[Cares_ID] = '18-0016521-05'and [CAS] = '11-1111-1'
Dietary
[Cares_ID] = '18-0016521-05'and [CAS] = '22-2222-2'
Residential
[Cares id] = '18-0016521-05'and [CAS] = '11-1111-1' and [Route] = 1 and [DuringPost] = 2
Done
Print
Report
Help


Graph Individual
File View
Individual
Chemical: 22-2222-2 Route: 3 Base BMD: 8.4 Acute Exposure Duration
Dietary
Residential
Total
Total Equivalent Dose
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
50
100
150
200
250
300
350
Date
Source
Additional Information
Dietary
[Cares_ID] = '18-0016521-05'and [CAS] = '11-1111-1'
Dietary
[Cares_ID] = '18-0016521-05'and [CAS] = '22-2222-2'
Residential
[Cares id] = '18-0016521-05'and [CAS] = '11-1111-1' and [Route] = 1 and [DuringPost] = 2
Done
Print
Report
Help


Graph Individual
File View
Individual
Chemical: 22-2222-2 Route: 3 Base BMD: 8.4 Acute Exposure Duration
Dietary
Residential
Total
Total Equivalent Dose
0.25
0.20
0.15
0.10
0.05
0.00
0
50
100
150
200
250
300
350
Date
Source
Additional Information
Residential
[Cares id] = '18-0016521-05'and [CAS] = '11-1111-1' and [Route] = 1 and [DuringPost] = 2
Residential
[Cares id] = '18-0016521-05'and [CAS] = '22-2222-2' and [Route] = 1 and [DuringPost] = 2
Total
Total for Dietary, Residential and Drinking Water
Done
Print
Report
Help

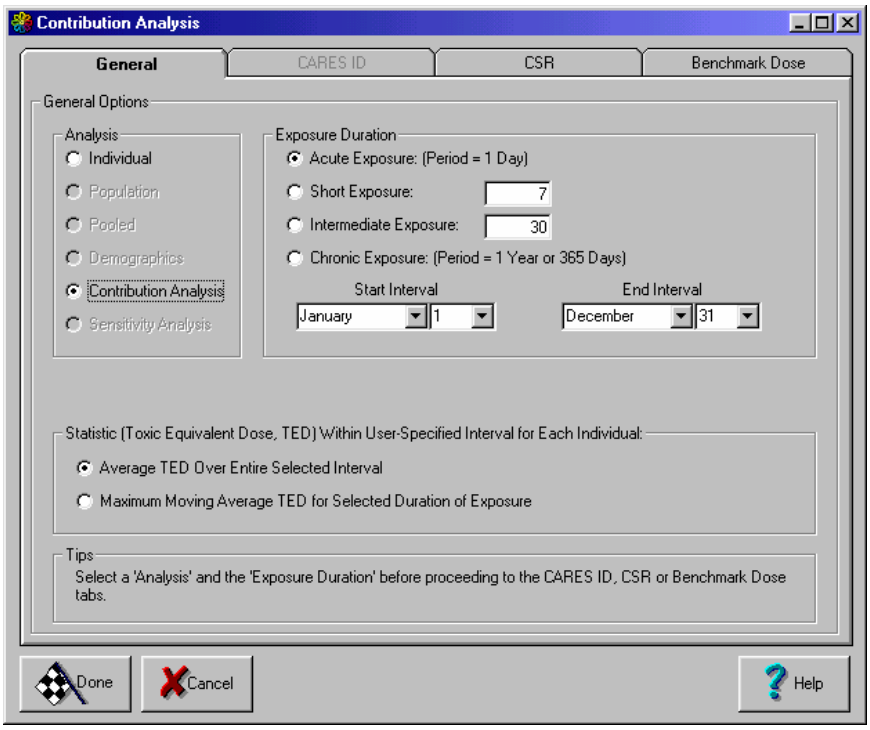


TIP …	Note, the CSU allows you to view multiple graphs simultaneously. To do this, leave the first graph on the screen, and then go back to the **CARES ID** tab and select another individual. Then open the Benchmark Dose tab and click the **Plot Graph** button. A second **Graph Individual** window will open showing the plot of the second individual. You can create and view several plots at a time in this manner.

Click **Done** to close the Graph Individual window.

Perform a "Contribution Analysis"

In the **General** tab, select **Contribution Analysis** from the **Analysis** section, as shown below:

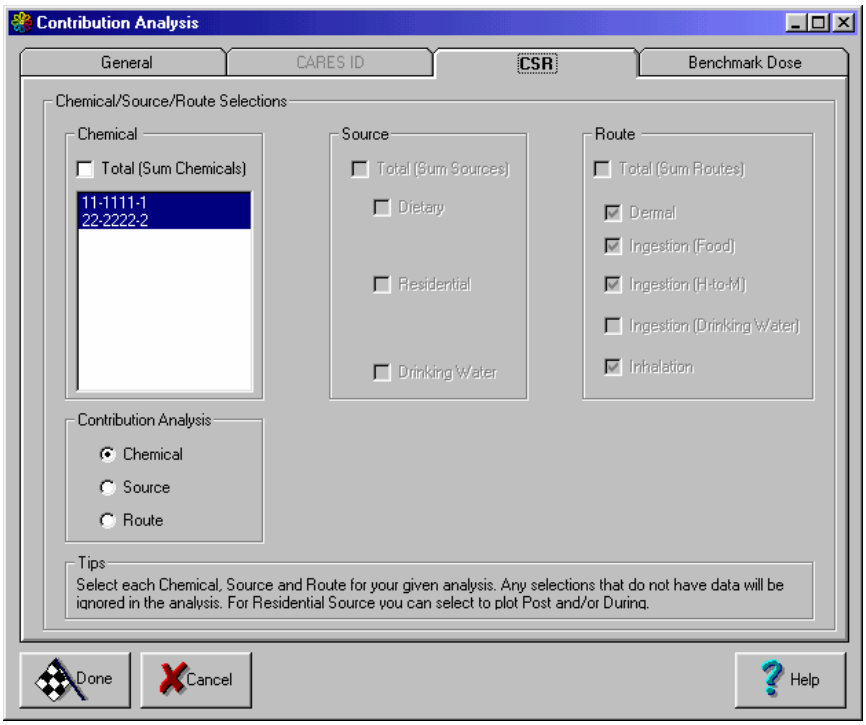


You may select any of the options in the **Exposure Duration** group by clicking on the corresponding radio button and typing an input where appropriate.

For this tutorial, accept the default: **Acute Exposure (Period = 1 Day)**.

Accept the default selection **Average TED Over Entire Selected Interval** in the **Statistic (Toxic Equivalent Dose, TED) Within User Specified Interval for Each Individual** group.

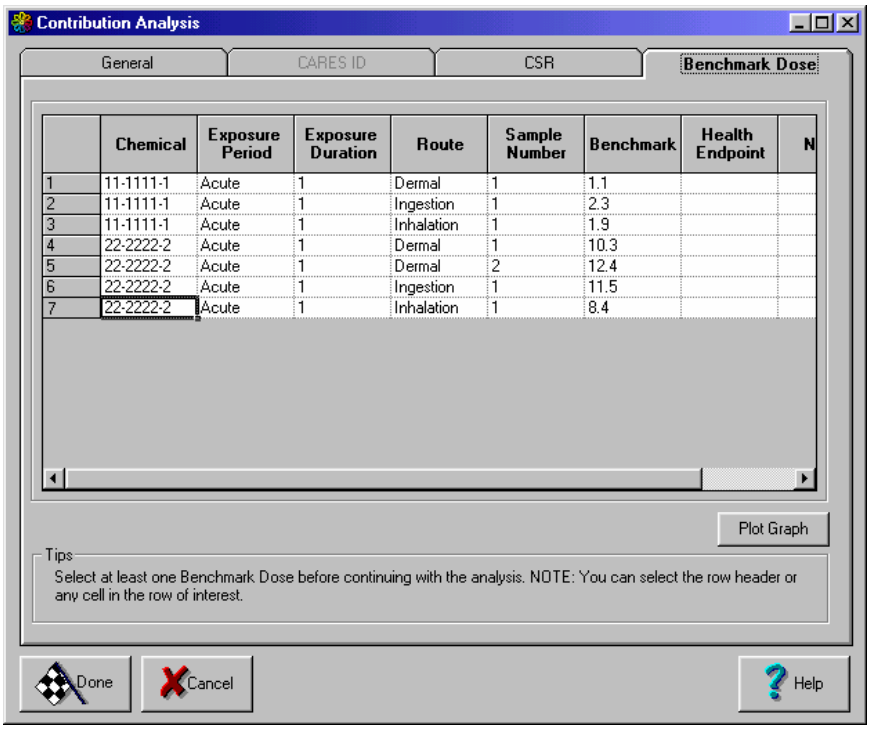
Click the **CSR** tab, to obtain the following view:



Available options vary depending upon whether you choose **Chemical**, **Source**, or **Route** in the **Contribution Analysis** group. For this tutorial, click the **Chemical** radio button in the group.

In the **Chemical** group, select chemicals **11-1111-1** and **22-2222-2**, as shown above.

Click the **Benchmark Dose** tab.



To make a selection, click the row header or any cell in the row. For this tutorial, select the row for Chemical as **22-2222-2** and Route as **Inhalation** (row 7), as illustrated.

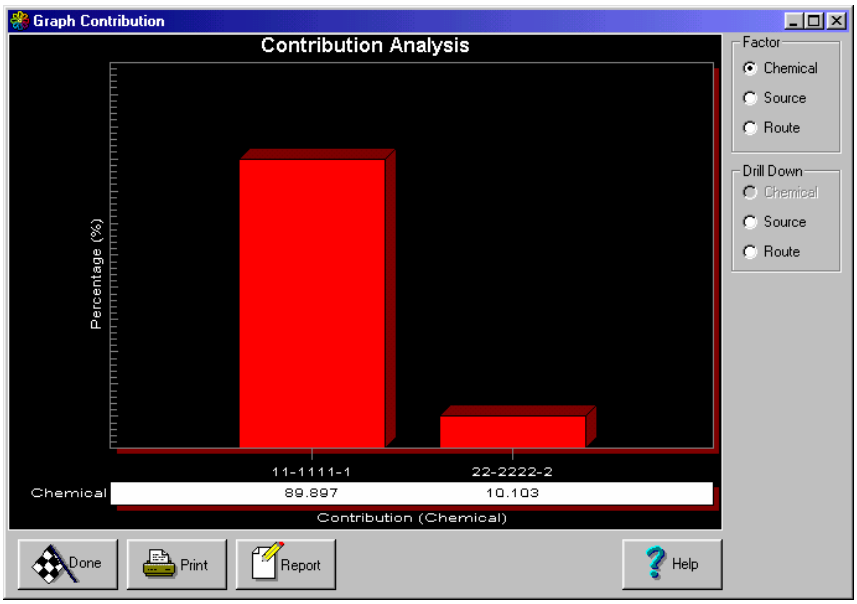
Click **Plot Graph**.

Status windows will appear showing the progress of the analysis.

You may see a message similar to the one below. This is not an error message, but simply a notification of data not available for the analysis

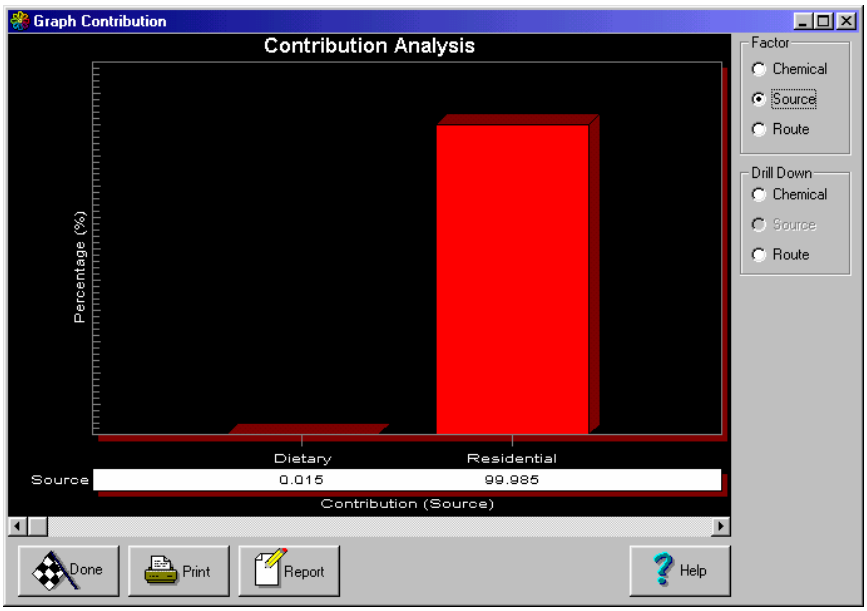
Click **OK** to close the window.

The **Contribution Analysis** plot you specified will appear in the following **Graph Contribution** plot window:

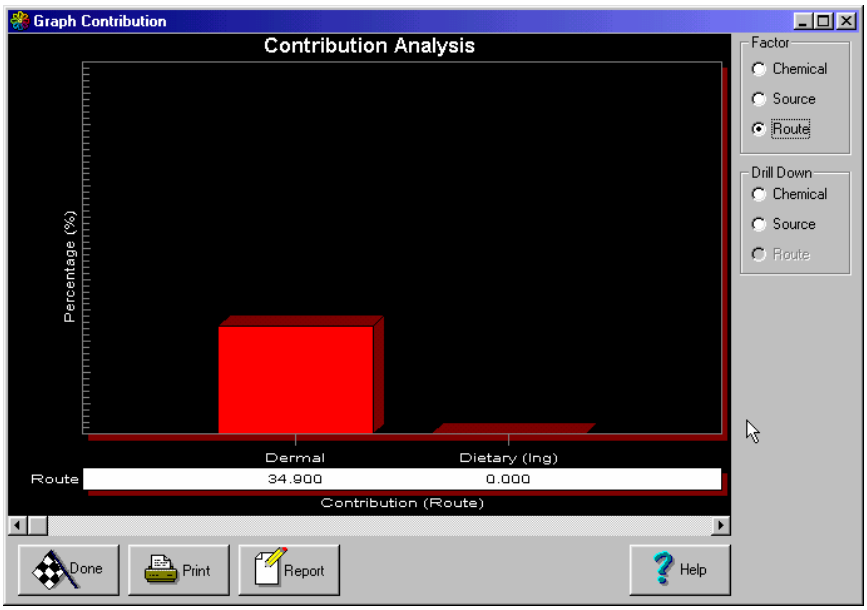


The above plot compares the contribution between the two selected chemicals.

Select other options in the **Factor** group to change the comparison. Foe example, click the **Source** factor to obtain the following:



Now select the **Route** factor to view the following:



Click **Report** to print the plot or to view a description of the selections made.

Click **Done** to close the **Graph Contribution** window.

This concludes Case Study Tutorial 5.

Directions and examples for running the Contribution and Sensistivity Analyis functions were breifly given in Case Study 1 and are covered in more detail in Case Study Tutorial 5

Click the **Done** button on each open data grid window to close it.

To close CARES, click on the **Close Application** icon on the menu bar of the main window. Alternately, select the menu option **File > Exit**.

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