OnePlan Nutrient Management Software

Developed by:

Idaho Department of Agriculture
Natural Resource Conservation Service
United States Environmental Protection Agency
USDA Agricultural Research Service
University of Idaho College of Agriculture
And
Marshall and Associates
OnePlan NMP Version 1.86 was updated
By
Information Designs, Inc.

Planner's Version 1.86 User's Guide

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User's Guide Written by

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Introduction

Version 1.86 of Idaho's OnePlan Nutrient Management Software is now available for development of CNMPs and for preparation of Field Annual Nutrient Budgets. We have corrected several of the bugs that were apparent in the original version. Although we have made many improvements to the program, because of time and money constraints, Idaho OnePlan version 1.86 does not correct all changes requested by the OnePlan user base, but goes along way in making OnePlan a more user friendly program.

This version, like the original version has been developed to allow planners to develop nutrient management plans that will meet the Idaho Department of Agriculture's requirements for plans for dairy and beef producers. In addition, we have made changes in the data base that allows this tool to be used by the fertilizer industry as the Nutrient Planning tool that field men would use working with growers who participate in USDA programs.

The Idaho OnePlan Nutrient Management Planner is the only officially recognized planning tool for creating certified nutrient management plans in Idaho.

Idaho OnePlan is an extremely complex program that makes use of the latest technology in the development of plans. The mapping program takes advantage of the GIS information that has been collected by various agencies and housed at the Idaho Department of Water Resources. Users access the map via the Internet. Once the farm map data is located, it must be "clipped" and saved as a file, which is then accessed by the software. When the data is "clipped" and saved, several layers of GIS data are also saved, such as FSA CLUs, soil types and soil data, resource concerns, stream and waterway data, soil slopes, field maps, climatic data, HUC information, stream listing information, buildings, corrals and other features.

As stated in the previous version, Idaho OnePlan Nutrient Management Planner is designed for planners and will continue to be an evolving tool. As new technologies become available, our technical personnel will continue to look at programming in an attempt to streamline this highly sophisticated, technical piece of software. As with previous version many countless hours have been spend by our technical experts and software programmers in trying to improve the performance and accuracy of the data utilized in the program. We ask you continue in offering areas and items for ongoing improvements, we ask you to be patient as we work together, through the challenges that may accompany using such a complex program, to improve the performance and quality of the finished product. Again, if users can document problems or suggest improvements and forward those to the design team, these suggestions will be taken into consideration. If you encounter major glitches in the program, please contact, NRCS/ID's Nutrient Management Specialist @ 208-685-6992.

As with any program, the output is no better than the information that is provided to the program. The University of Idaho Nutrient Planning Worksheets provides an excellent start in the collection of the appropriate information (**DATA COLLECTION FORMS**

and GUIDELINES). There is no substitute for personally involving the producers in the process of development of the plans; they are "their" plans.
Discussing the input with the producers as the information is being entered will help eliminate miscommunication that might otherwise occur.

General Operating Information

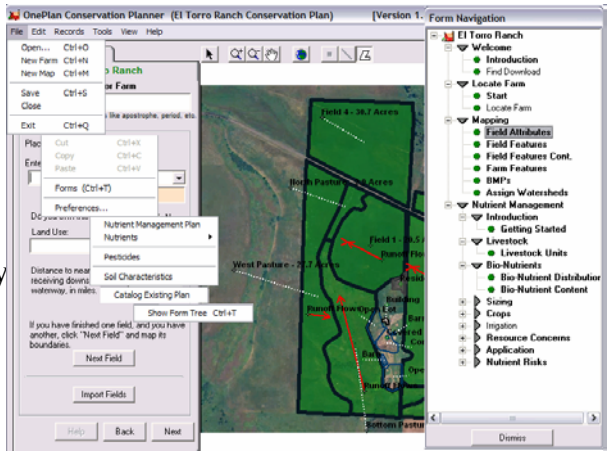
Many of the features of Windows programs are also a part of the One Plan Nutrient Management Software. The program is designed to operate on Windows 2000 and Windows XP.

Initial Start-up - The program upon initial startup following installation has a default setting for (security reasons) for saving the farm NMPs files in the: C:\Documents and Settings\your.name\Application Data\OnePlan folder. This default setting can be changed on install or it can be changed within the program by editing the "Edit preference" tab to C:\OnePlan folder for future NMP file storage.

Progressing Through the Program – The best practice is to follow the path provided by the program, as it will request information in the order in which it is needed, however the program is now very stable allowing the user to move from one screen to another without interfering with operation of the program. Upon completion of data entry into a cell or blank, the data is automatically being stored into the appropriate database when the "next" button is pressed moving the user to the next input screen. When revising existing data, it is essential that the "next" button always be pressed to save the data and to initiate recalculations made by the program. There is no action required by the user to insure that information is stored except to leave the completed cell. (There are a few exceptions; data is stored by pressing, "Enter", "Next" or "Finished." These instances are fairly obvious as you use the program.)

Unlike many programs, when the software is closed, it remembers where you finished. When the software is restarted, the program will resume where you ended your last session.

The program is laid out in "Tabs." Each "Tab" contains a different set of information; in much the same manner as a set of "Tabs" or dividers in a notebook is used to divide groups of data into similar categories. When the user completes a section and presses "next" they are automatically moved to the section or "tab" and entered data is saved. The user can move from tab to tab by placing the cursor on the desired tab and left

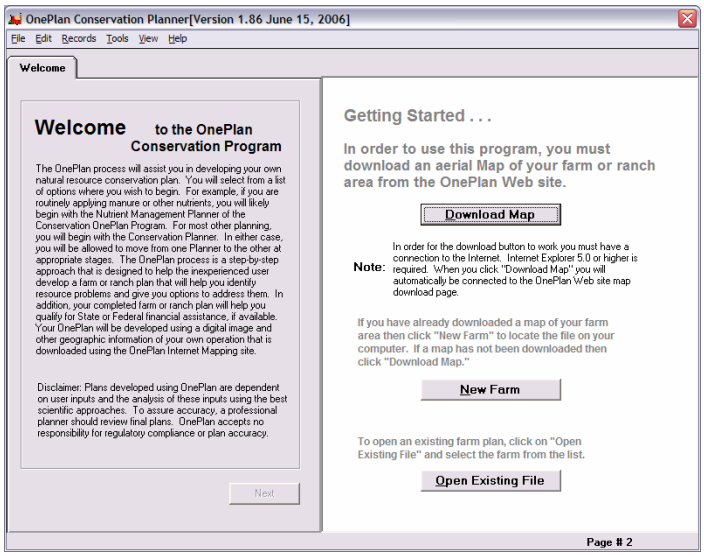


clicking or by accessing the “Forms Navigation (Ctrl+T)” or by clicking on tab “View”. The tree is similar to the tree found in the directory of Windows programs. Move through the tree to the desired screen and left click. When an item in the tree is preceded by a “+”, the item has one or more items which are hidden. These hidden items can be displayed by “clicking” the “+”. A list of items that has been opened may be re-closed by “clicking” the “-“, which appears after the list is opened.

Buttons are used as controls in the program. Three buttons that are commonly used are “Finished”, “Next”, and “Back”. Many of the sections of the program require the use of the “Finished” button to signal the program that you have completed the active part of the program. Generally, there is information on the screen that will make the purpose for the “Finished” button clear. The “Next” button signals the program to continue to the next screen set to request new information. The “Next” button may provide the next step of loop through similar information (for example, continue from entering data on one animal group to the next of a series of animal groups). The “Next” button may also cause the program to move from one “Tab” to the next “Tab.”

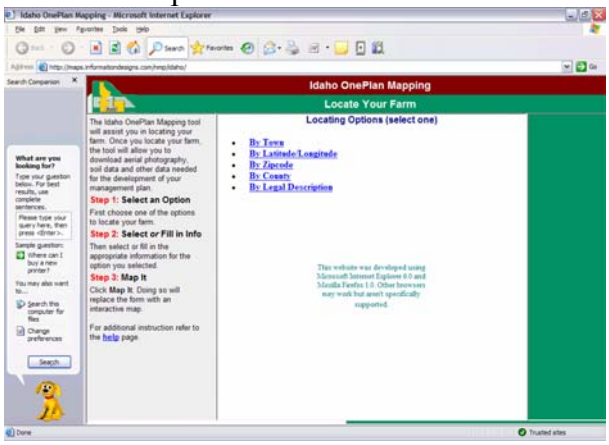
Starting a New Plan

One of the upgrades to version 1.86 of OnePlan is a change in the download format. The new format design format is similar to the format utilized by IDWR mapping services. The first window opened in OnePlan is the "Welcome Page". The planner's Welcome page has three options:



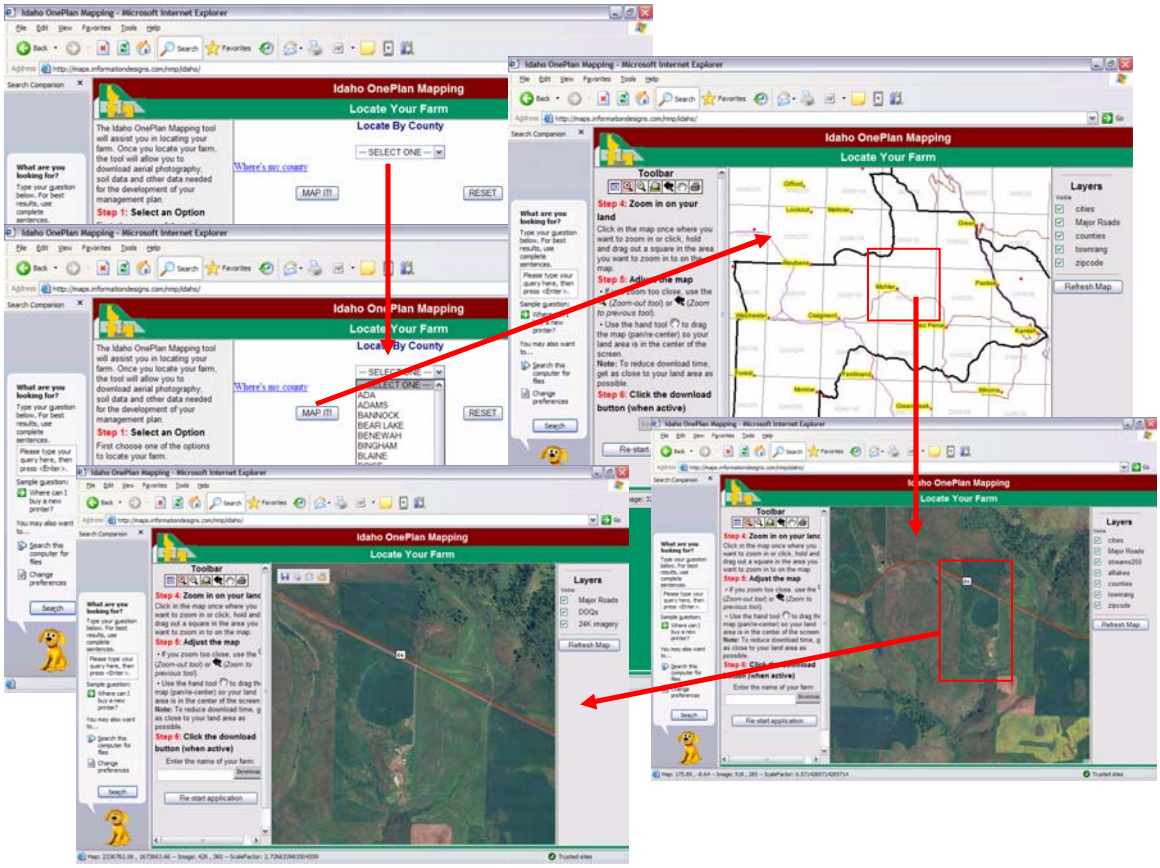
1. Downloading a new map file for creation of a new planning unit.
2. Starting a new Farm Nutrient Management Plan using the downloaded data, or
3. Opening a existing NMP file for completing a partial plan or revisiting and/or updating an existing plan.

To start a new plan the user must first download a map file and its associated Soils data

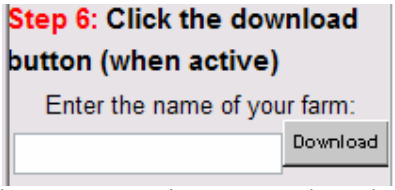


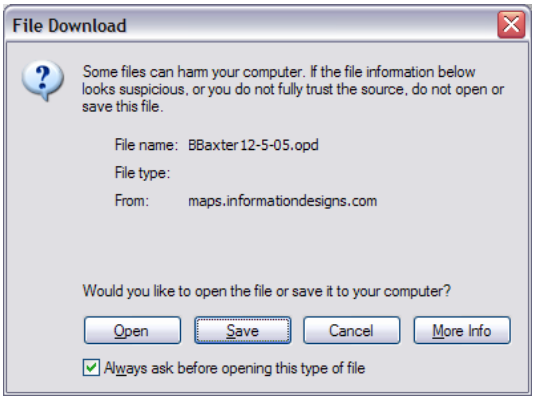
from the IASCD server. To create the map file for a new plan, click on Download Map" on the first page of the program. The user is automatically liked to the IASCD server. The display at the left is the first page of that site. Once this selection has been made the user will be connected to the Internet map server where the opportunity to select the area containing the map will be available. The area can be identified by selecting a location using the legal description (which includes the township, range and section), by giving the GPS location of the property (using latitude and longitude values), by entering the zip code, or by entering the county or town from the dropdown listings. When the map is displayed, select the smallest portion of the map that contains all of the land to be included in the there is more cropland than can be included in the 1 square mile map, additional maps downloads will be needed for the additional farms included in the plan.

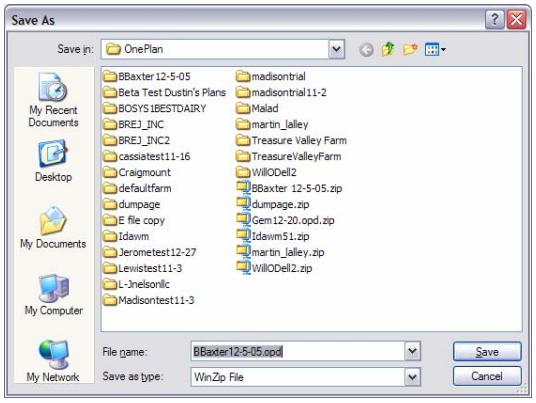
The downloading windows format has specific direction located on the left panel of each downloading window. By following these instruction the planner can easily navigate through the following sequence in the map downloading process:



Once the desired area has been delineated, the planner is required to enter a unique name for the download file in the "download" box. Give the file an appropriate name then download. The user than will be asked to either open or save the file, "Save the file".





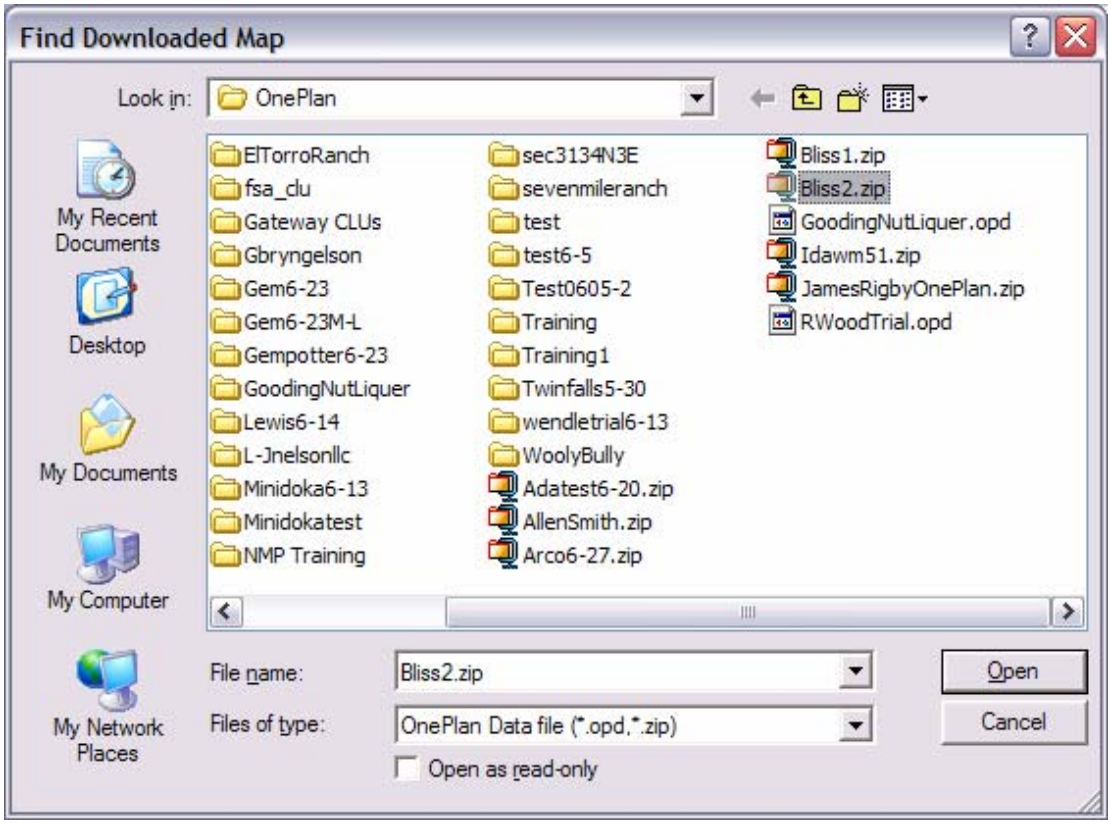


Unless the planner selects a specific file address for saving the download, the file will be saved that the file that the last IASCD download was saved.
Once the Save option is selected the program then extracts the data from the IASCD Server. The extracted data is saved as a zipped file.

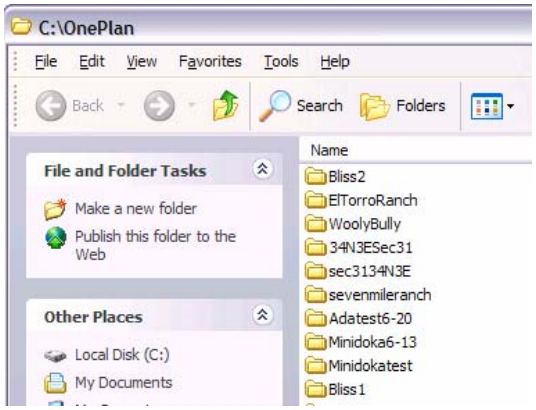
Creating a New Farm

Once the map file is down loaded from IASCD and saved, the next step will be to develop the new farm. Since the data downloading is outside the OnePlan model, NM Planner has to be activated by clicking on the OnePlan icon on the window taskbar. If you try to reload the OnePlan module, you will get an error message.

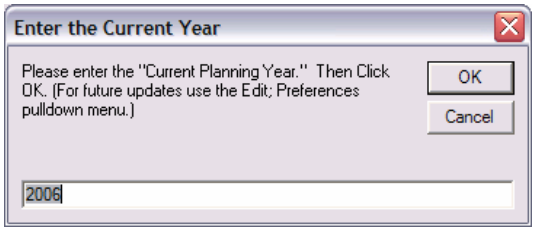
By clicking on OnePlan icon the OnePlan Conservation Planner model will open to the "Welcome Tab". By selecting the "New Farm" option, the model will ask the user to locate the downloaded data file for unzipping into a new farm data file.



Two (2) operations will take place. The program will upload the database files from the OnePlan program file and download the IASCD data into the new farm database.

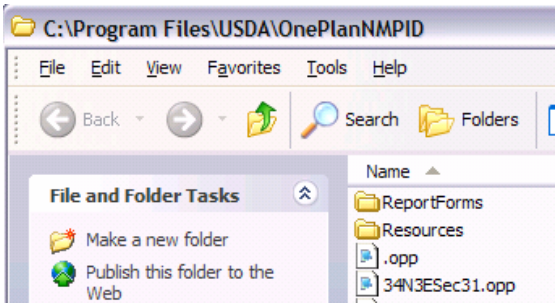


Link that the program uses to load and store data in as an existing farm plan database.



The new farm file will be stored as a file in the C:/OnePlan folder.

Secondly the program will develop an ".OPP file in the C:\Program Files\USDA\ OnePlanNMPID file. The OPP file is the



At the initiation of the new farm the user will be asked to enter the current planning year. This is critical in establishing the farm plan's base year.

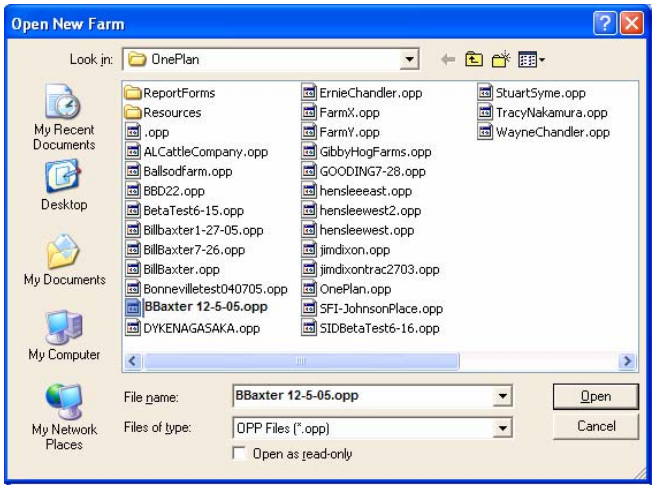
Farm Plan / Data Security

Once the planner initiates a farm plan, it is the responsibility of the planner to secure the information being developed. The program will store updated data to the file where the plan is cataloged. The default file is C:\OnePlan. This file may not be secured or backed-up. To secure the file the planner needs to transfer the file to a secured file. It is recommended that the file be saved in a created file, "OnePlan" in C:\Documents and Settings\your file\My Document. An alternative option would be to save the file on the share drive. The reason being if more than one planner is working on the file, then the data can be shared. Remember if more than one planner is working on the file, work together and share that you have the file open. Following the transfer, use the "Catalog Existing Plan" tool by opening the "Tools" tab. The program will open a new window "Choose Database for OPP Creation". The planner is asked to locate the file where the data for the saved NMP was stored.

Once you are finished working on the file, then "Close" the file using the "File" tab. This will insure that the updates of all planners working on the farm plan are properly saved.

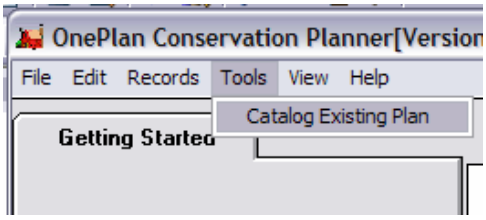
For NRCS generated NMP, once the farm plan is completed. Move the plan file to the grower's file on the "Customer files on the F:/ drive (NRCS). This is the most secured site. For nonNRCS planners save the file on a grower folder that is secure and can be backup.

Opening A Existing Plan

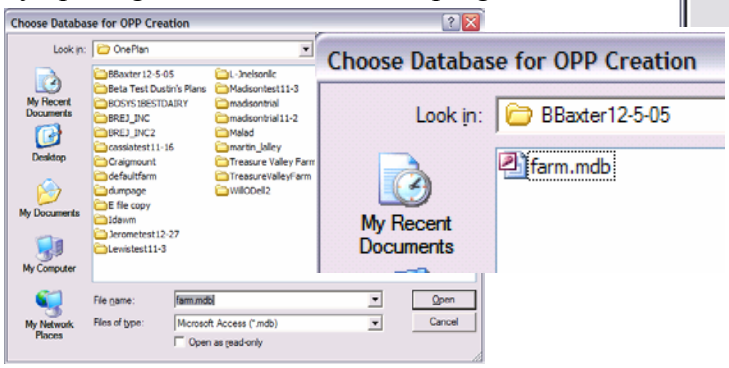


The third option on the Welcome page is the option to "Opening Existing File". This option is used when the planner wants to reopen an existing plan closed file for completion, revision and updating. Upon selecting the "Open Existing File" an "Open New Farm" window appears. The window lists all the existing plan .opp links for files that are currently recognized by OnePlan.

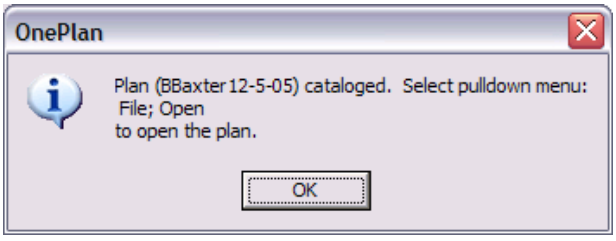
What if I do not see my saved file?



If you see the file you want opened simply highly and open the file. If you do not see the file the planner can use the "Catalog Existing Plan" tool by opening the "Tools" tab. The program will



open a new window "Choose Database for OPP Creation". The planner is asked to located the file where the data for the saved NMP was stored (generally in a file on the C:\ drive). Once the date file is located the planner will highlight the file, which open and lists the farm.mdb file for the NMP. The planner will highlight the .mdb file and a window will open stating that plan has been cataloged to the OnePlan file and now can be opened with the "Open Existing Plan" procedure.



Getting Started Mapping Your Farm

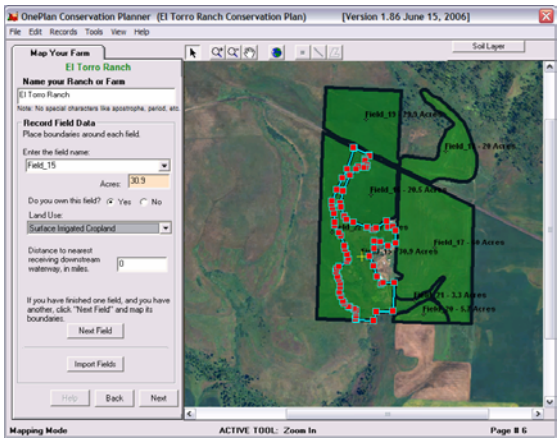
As previously mentioned, the map data must be "Clipped", or downloaded from the map source found on the Internet and saved as a file. The view to the left is an example of the map feature that you will use. Notice the  tools on the tool bar. Selecting the tool  allows the user to zoom in on the map by clicking in the map after the tool is selected. Likewise, selecting the  tool and clicking in the map will zoom out on the map. The  tool allows the user to move the map in the window. Selecting the tool and then clicking in the map window while dragging in the desired direction results in the movement of the map. Once the map has been loaded as part of the program file, the first step is to outline the fields.

Import Fields

A new feature to OnePlan version 1.86 in the ability to import FSA CLU digitized field boundaries into the OnePlan Mapping Model.

When the "Mapping your Farm" window is opened. The first action is to give the NMP plan a name that is unique and will be used as the document farm name title. Once the farm is named then the import field window can be opened by activating the "Import Fields" button. Upon opening a new window "Select a shapefile to import", is activated that list all the shapefiles that are associated with the downloaded file. The window that has the CLU.shp file as a default setting. Select "Open" to activate the CLU.shp window. The "Farm Map" will open showing all the FSA CLU field boundaries. The fields to be imported into the farm plan are selected by clicking on the fields, which turn green, indicating that the filed has been selected.

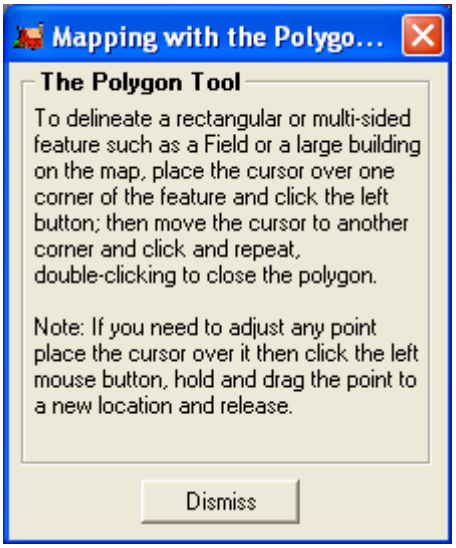
Once all the fields are selected then the import process is initiated by clicking on the button in the upper right side of the window. Following the import, the FSA field boundaries are mapped into the "Map Your Farm" map. The fields are mapped using default field names. The planner will be required to rename the fields to fit the growers plan.



The "Land Use" designation has an imported "Surface Irrigated Cropland". The planner will have to update the "Land Use" to the correct designation.

Important – fields must be outlined first using the polygon tool. See the following help box for instruction on outlining the fields.

Note that each corner or turn in the boundary must be clicked. Note that the points that are clicked can be modified or edited by left clicking on the point and dragging the point to the new location. Notice that the area of the field as outlined is calculated and reported in acres. The calculated acreage cannot be over-ridden; however, if the outline results in too large or too small an acreage, adjust the size of the perimeter to create the correct acreage. Remember that features such as rock outcrops will be automatically subtracted from the acreages when they are identified on the map. The tool to calculate the acreage is very accurate, so if care is taken when outlining the fields, the results should be accurate.



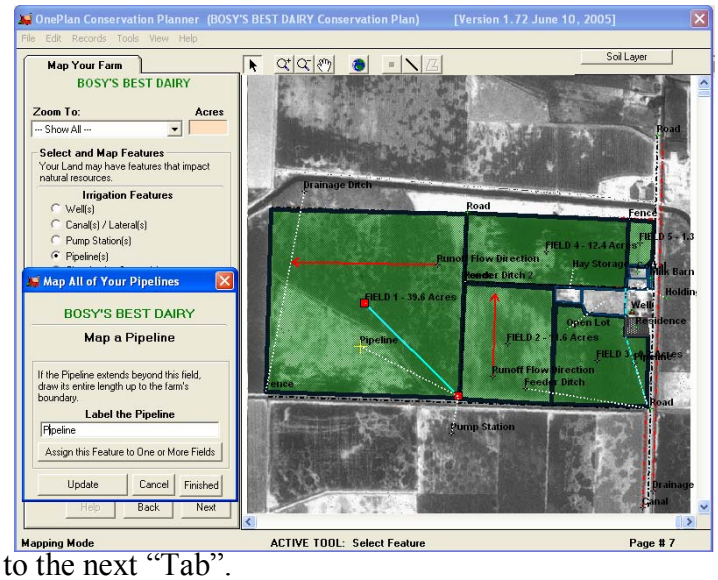
Important. OnePlan "applies" waste to fields in the order that they are digitized, therefore they must be digitized in that sequence if that is important to the producer.

Mapping Features – Irrigation - Hydrological

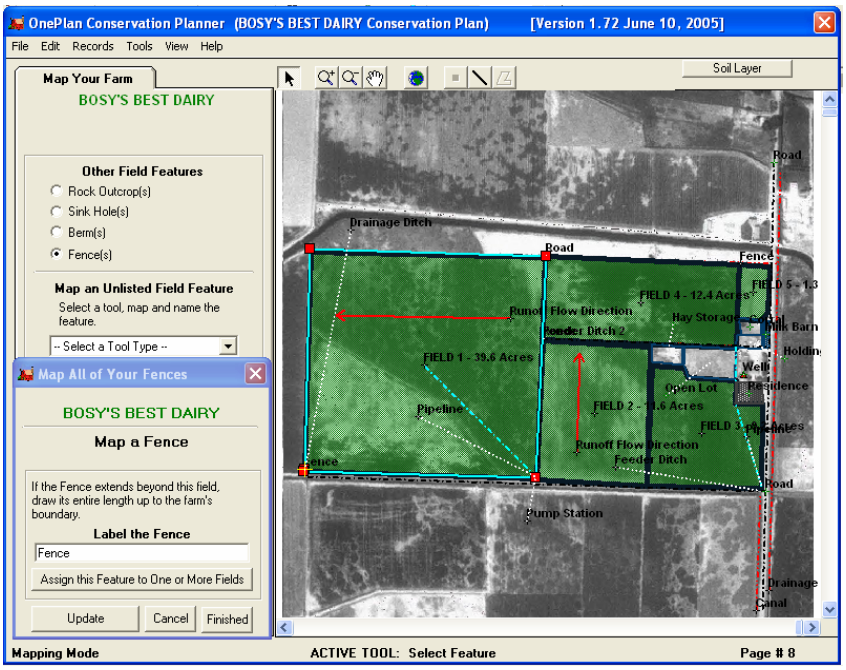
Once the field has been identified, name the field in the place provided in the "Enter the Field's Name" box. Notice that once the field is named, the field is labeled on the map with the name and acreage. The next step is to identify if the field is owned and

to identify the appropriate land use by selecting one of the appropriate choices in the drop down boxes. Enter the distance to the nearest downstream waterway. Distance is entered in miles, therefore if the distance is half a mile enters .5. If this field is left blank the program assumes the worst case scenario and assumes the field discharges directly into a water body. When finished, press the "Next Field" button, which will give the user the opportunity to trace a new field. The user will repeat the process until all fields are entered. When all of the fields have been entered, press the "Finished" button and then the "Next" button to proceed to the next "Tab" or part of the program.

The next stage of mapping requires that the user first select the field for which additional Information is being provided. Once a field is selected, the Irrigation features and Hydrological features that apply to the selected field are mapped. When a feature is selected, an appropriate drawing tool is activated for the user to identify the selected feature. To map features for a different field, select the desired field by selecting the correct field from the drop down box at the top of the information column. When all fields have been mapped, press the "Next" button to move to the next "Tab".



Other Field Features

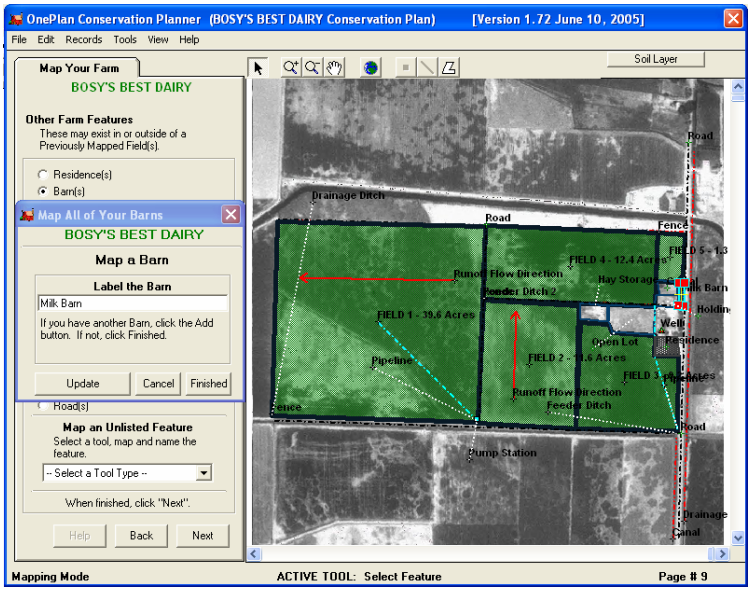


When "Other Field Features" are selected the overlaying window seen to the left appears. The user must then draw the feature on the field and can quit by clicking "Finished" and select a different feature. The user can press the "Add an Outcrop" button to add additional rock outcrops to the field or may select another field to add an outcrop.

Important – clicking on the boundary of a feature and pressing the "Delete" key on the keyboard will remove a feature. Once a feature is deleted, the label associated with it will not be removed. There is no way to remove labels once they are on the map.

Other Farm Features

Mapping other farm features is very similar to other mapping features. Simply select the feature you wish to include and a window that identifies the feature will appear. You will have the opportunity to add an additional feature such as the "Add a Barn" as seen at the left or you may Press "Finished" and return to select another feature or to continue. You can select the appropriate drawing tool for the feature you are entering. Lagoons are found under the category of liquid manure handling. Solid manure and feed storage are found under storage areas or facilities. Fields or labels for digitized labels can be moved once they are digitized. The program will frequently lay one label over the top of another making it impossible to read unless it is moved.



Editing Fields and Features

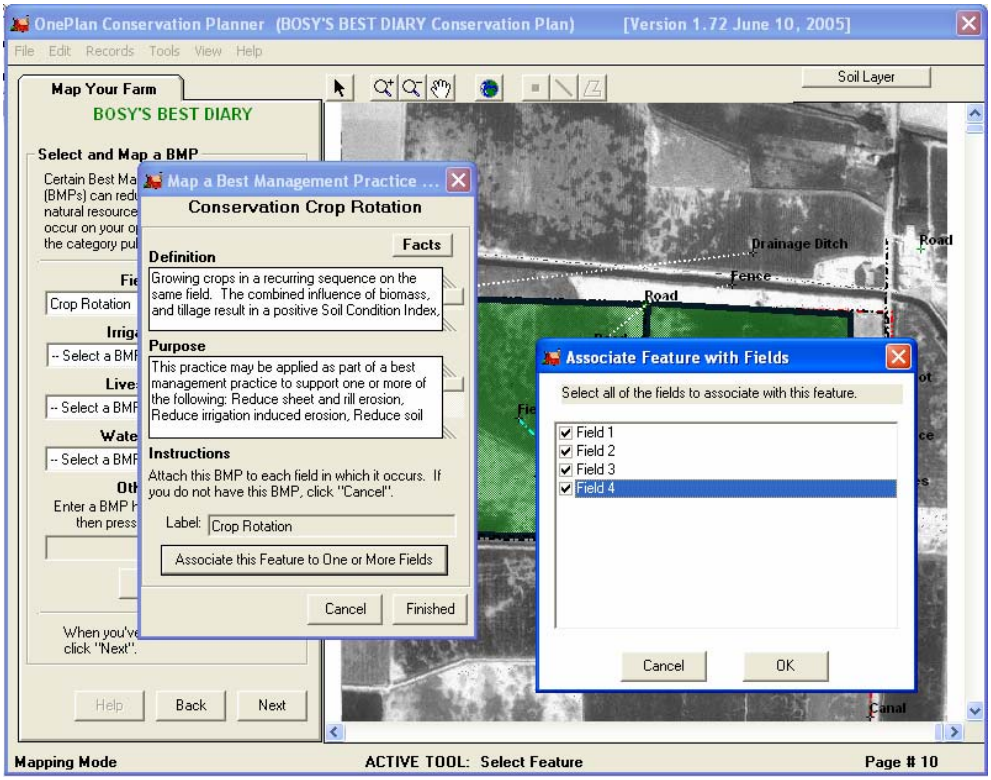
To delete a field: Go to the "Map Your Farm" Tab "Record Field Data" screen and select the field to be deleted. Click on the field then press delete.

To delete a digitized feature: Go the screen where the feature was originally digitized. Click on, or select the feature that will be deleted to activate the dropdown box. Activate the "Pointer" tool on the tool bar. Left click on the feature to be edited to make it active, press delete.

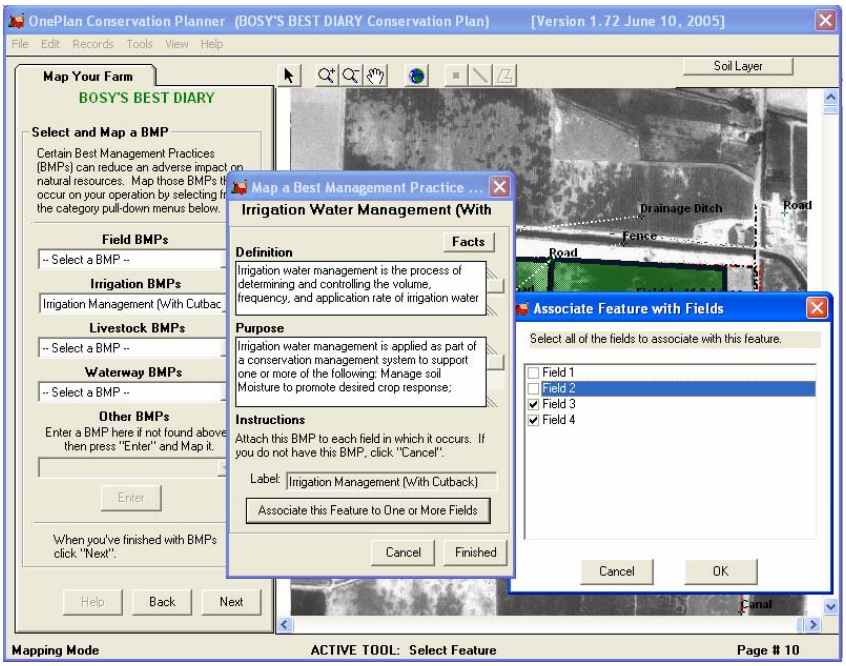
To move the label for a digitized feature. Go the screen where the feature was originally digitized. Click on, or select the feature to be edited. Click on the "Pointer" tool on the tool bar. Move the cursor to the feature that will be edited and left click to make it active. Move the cursor to the location where the label is to be moved to and right click. The label will be moved and a line drawn from the label to the feature to associate it.

Field BMP's

Select the Field BMP that applies to your farming practices.
Next select the field and attach the BMP to the field by checking the small check box to the right of the field name. The label will be applied to the field.



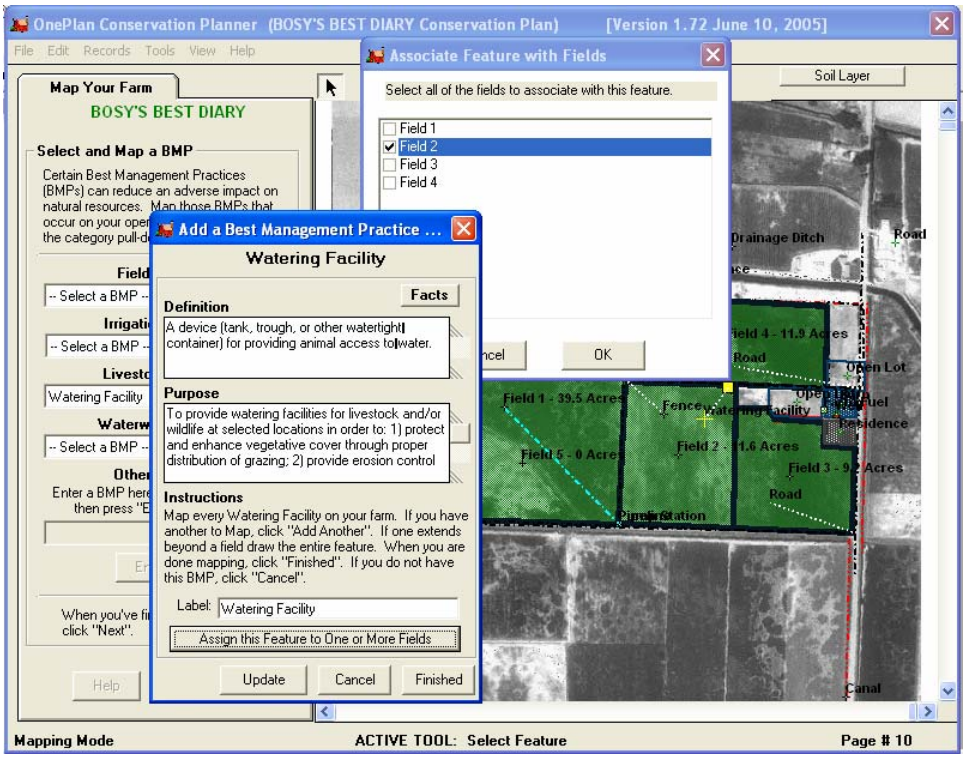
Irrigation BMP's



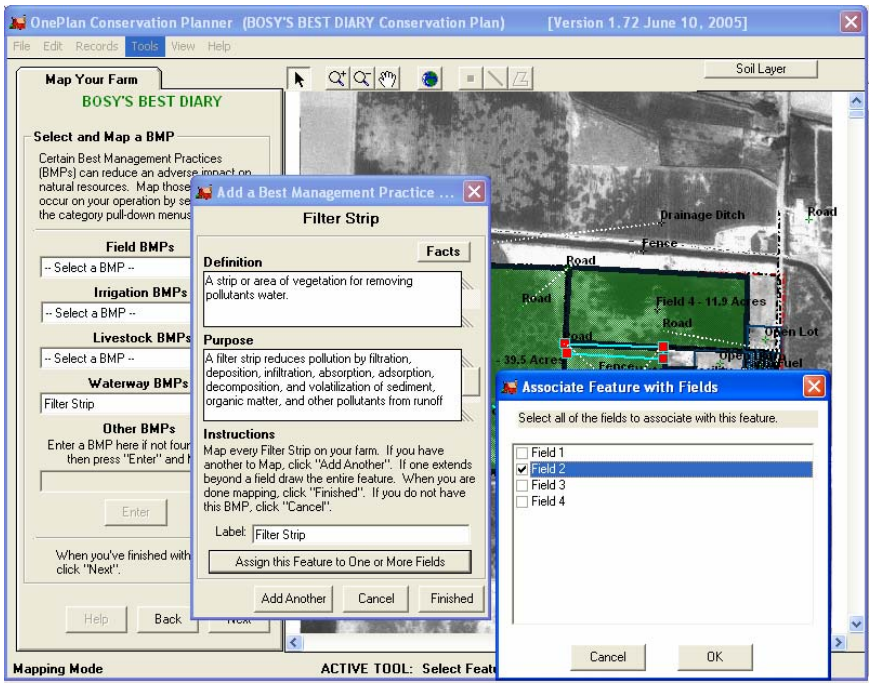
Select an Irrigation Water Management with the desired field selected. When the field and BMP are selected, check the box to attach the BMP to the field.

Livestock BMP's

Select a Livestock BMP with the desired field selected. When the field and BMP are selected, check the box to attach the BMP to the field.



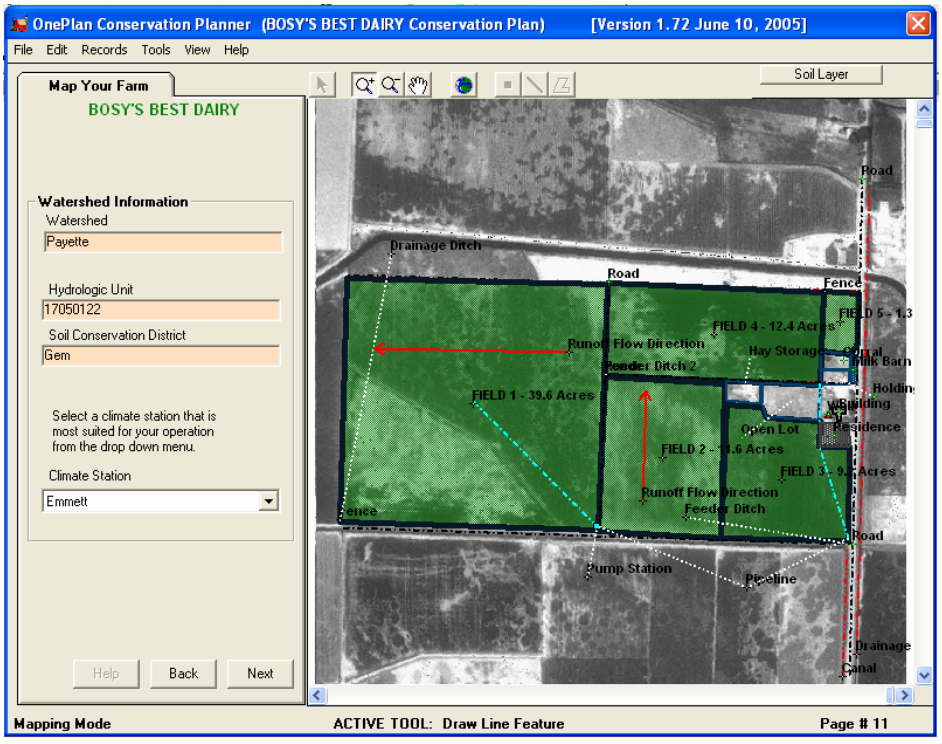
Waterways BMP's



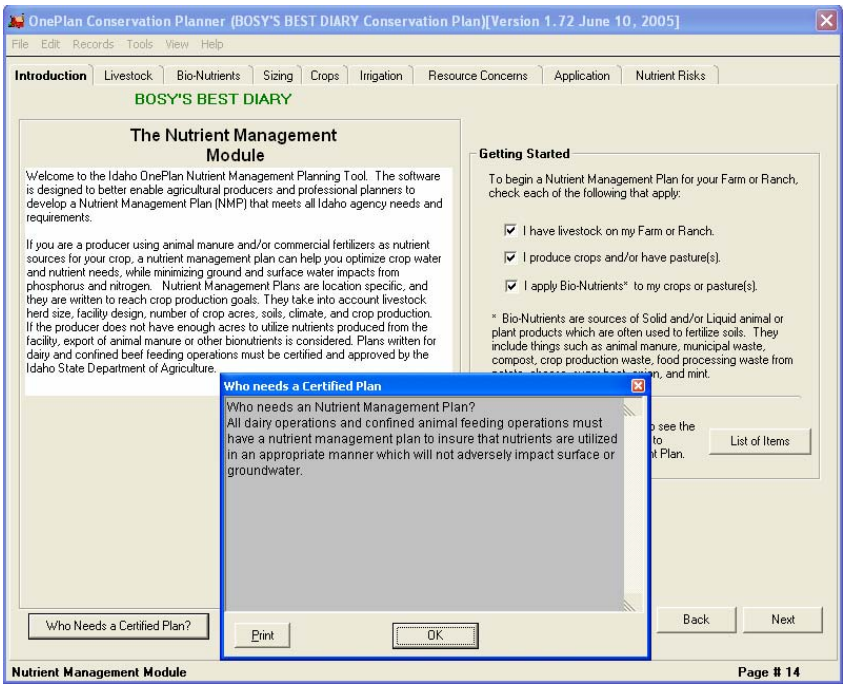
Select a Waterway BMP. The waterway BMP's usually extend across field boundaries so they are not specifically attached to a field but are drawn on the field or fields where appropriate.

Assigning Watersheds

Once the waterways are completed the program will advance the user to the next Tab, which brings the data from the GIS layers. The watershed or HUC, including the HUC Unit number, is automatically populated in the cells. The soil conservation district is also placed in the file. The user is asked to select the climate station. The appropriate climate station or a station that most closely resembles the amount of precipitation at the facility location should be used.



Nutrient Management Module

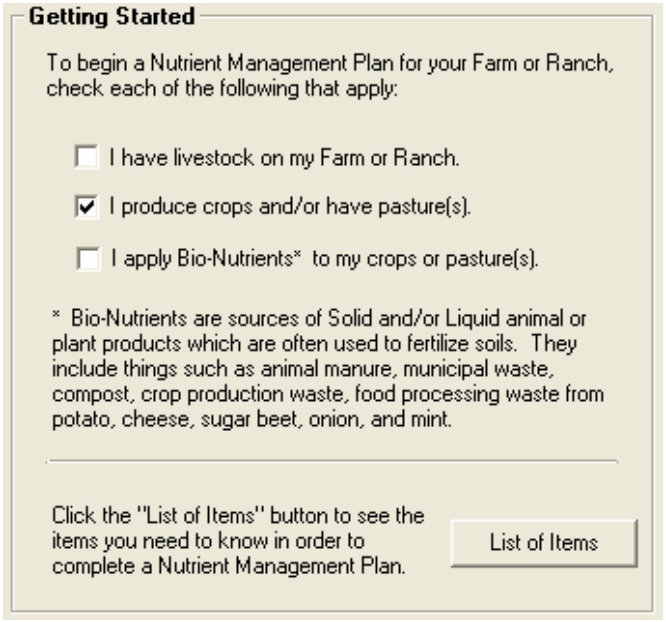


The "Who Needs a Certified Plan?" button at the lower left hand corner of the screen will provide a brief overview for the user to help them determine if they do, in fact, need to develop a plan.

Getting Started (Commercial Fertilizer or Biosolids)

The Nutrient Management Module contains the "Tabs" that will be used to collect the information necessary to complete the preparation of the nutrient management plan.

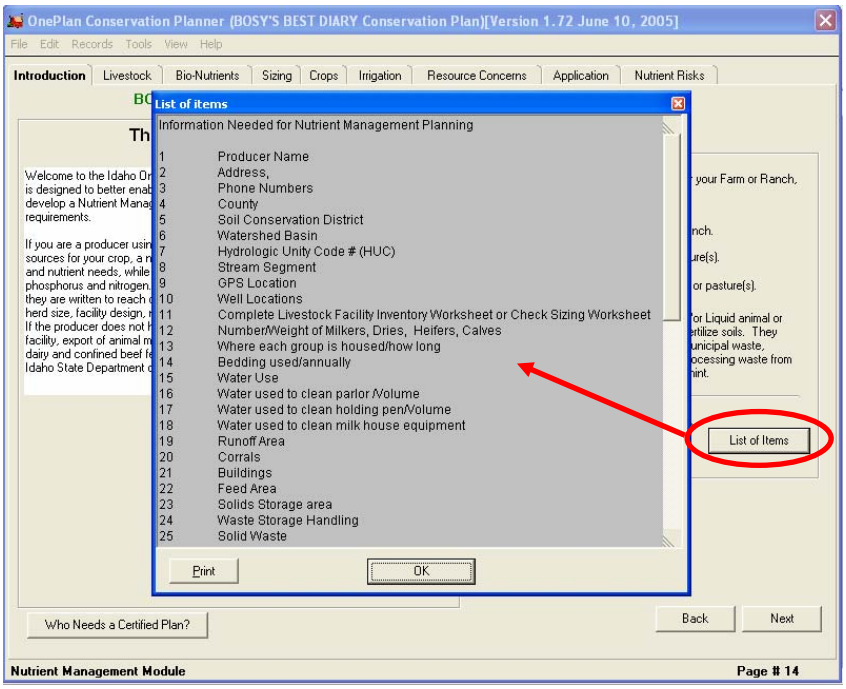
NMP for Commercial Fertilizers



The NM Module can be used for development of Comprehensive Nutrient Management Plans (CNMP) that can involve application of biosolids (animal waste) and/or commercial fertilizers. If the NM model is used for development of only commercial fertilizers, then the planner will check the "I produce crops and/or have pasture(s) option. These actions will by-pass the Animal Waste tabs in the model and take the planner to the cropping "Crops" tab. Once the CNMP has been developed for the farm then the module can be used to develop Annual Nutrient Budgets for each field included in the CNM Plan.

Once the situation has been defined by selecting the appropriate responses in the check boxes as displayed in the screen to the left, the necessary "Tabs" will require the user to input information for the required "Tabs" before completing the plan. The "Tabs" in this part of the program will require input for livestock, bio-nutrients, sizing, crops, irrigation, resource concerns, application and nutrient risks, depending on the situation for each farm.

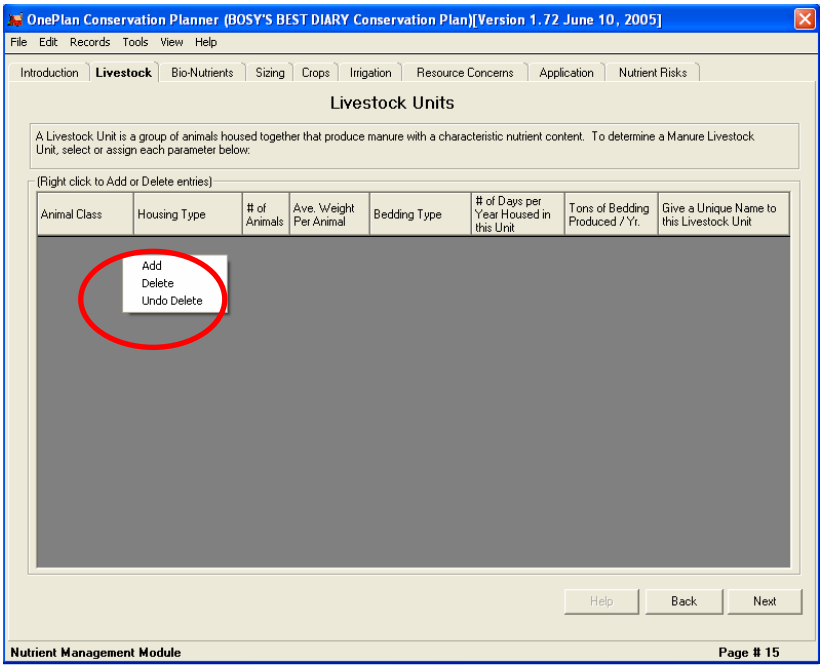
List of Items Required to Complete a Plan

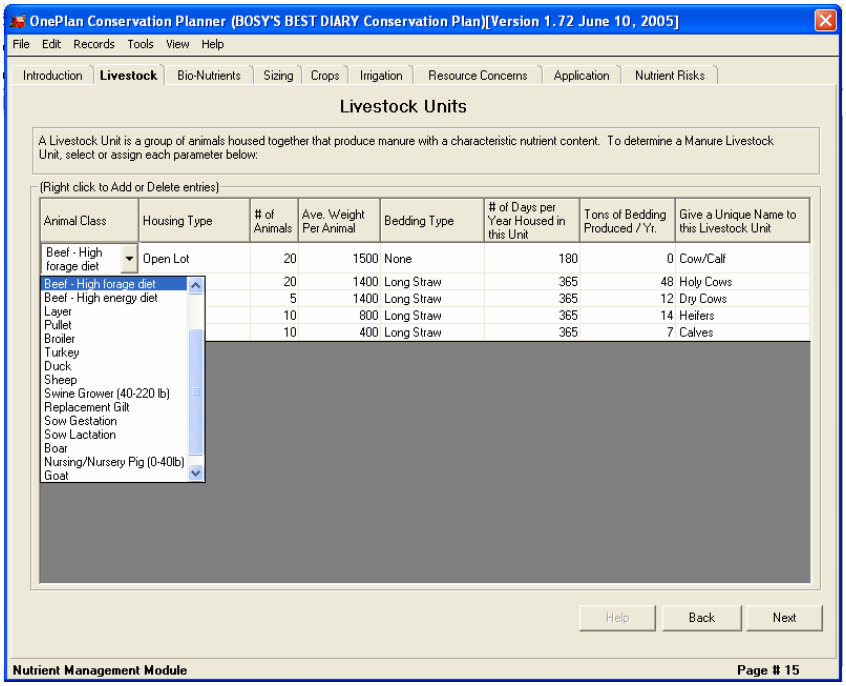


The introductory window for the nutrient management module has a button that when pressed will display a list of items that a producer or planner will need to have to complete a plan. The list can be viewed on the screen or it may be printed for reference.

Determine the Livestock Units on Facility (when Livestock Tab is selected)

Livestock units or manure production units are those groups of animals that contribute manure to the total amount of nutrients to be applied on owned land or exported to other farm land. The different groups of animals contributing manure must be identified individually by completing the "Livestock Unit Parameters" information at the top part of the page. To add a livestock unit move the cursor to the grayed area of the Livestock Units page and right click to activate the add, delete, or undo delete drop down box. Click the add option to add the livestock unit.

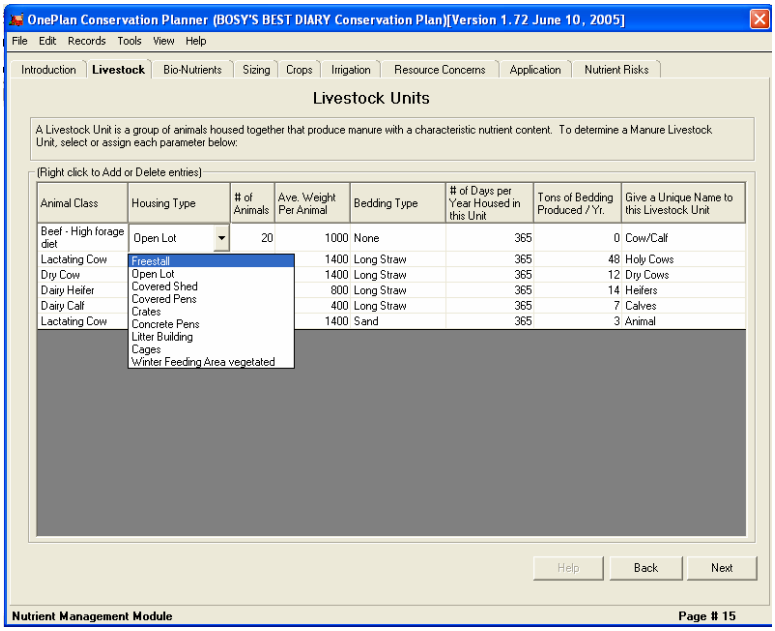


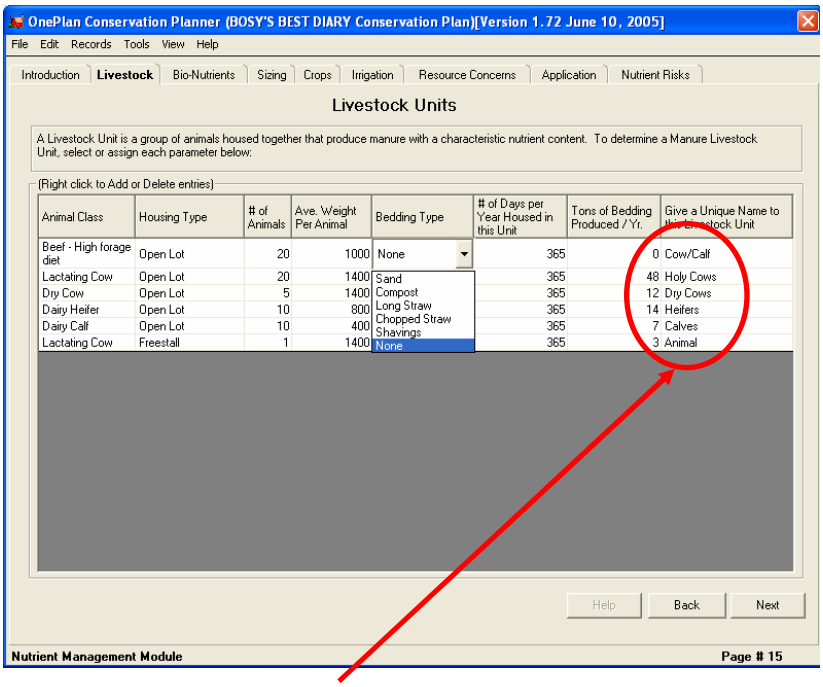


Several of the requested inputs utilize drop down boxes such as the "Animal Class" box shown below.

The user must select one of the choices in the box by moving the cursor up or down to the chosen selection using the arrow keys or by "Left Clicking" the mouse on the proper choice.

Continue by providing the requested information in the remaining boxes.



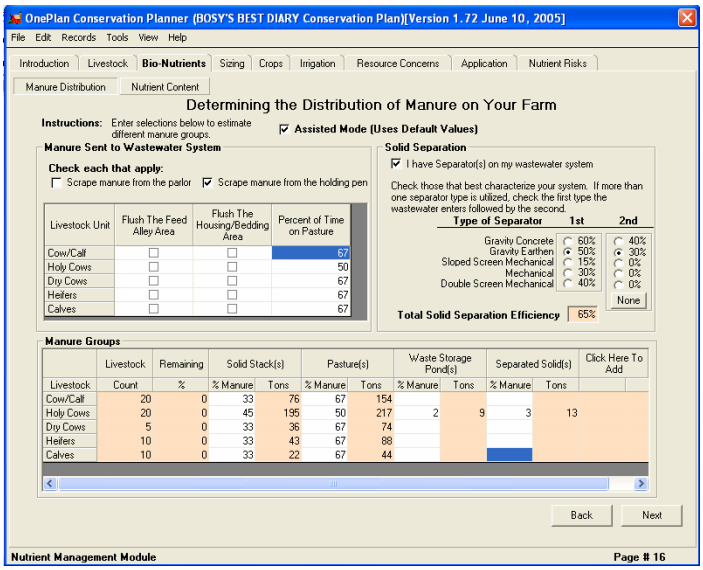


NOTE: Bedding type is an optional entry, but if it is not entered, the nitrogen values will be inaccurate, as there is no compensation for the nitrogen tied up by the incorporation of the straw in the manure. Animal weights can be overridden.

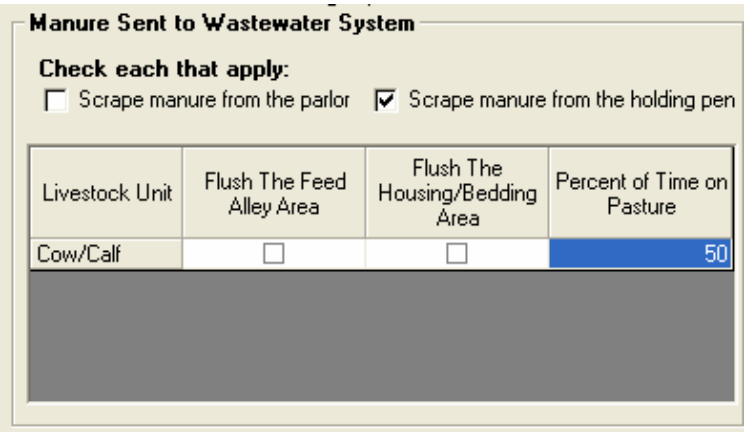
NOTE: Give the Livestock Unit a Unique Name. This will individualize each Livestock Unit. To delete a group, highlight the group you wish to delete, click the right button on the mouse to activated the Add, Delete, or Undo Delete drop down box and left click the mouse to finish the delete. To complete the Livestock Unit, press the "Next" which stores the "Livestock Units".

Determining Manure Distribution on the Farm

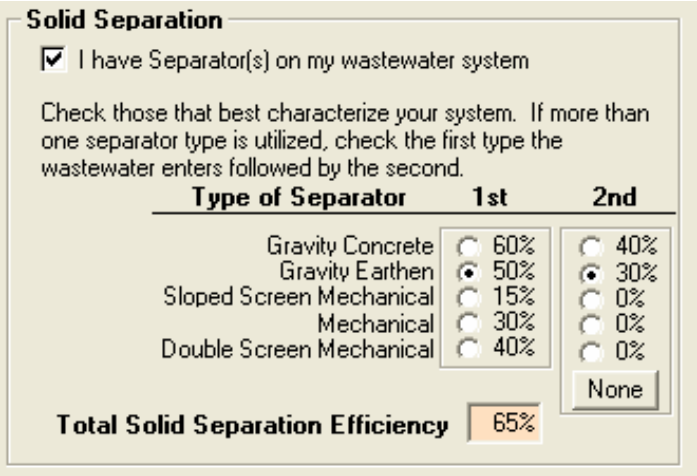
Manure is produced and stored in a variety of ways on livestock operations. Some manure is stored as liquid, while other manure is stored as a solid and some manure is deposited directly onto cropland when animals are pastured for all or part of the year. On those facilities having a solid separator to remove part of the solids from the liquids so that they may be handled as dry manure, separated solids are created. The storage and handling of each of these types of manure affect the nutrients that are retained for crop usage. When the livestock units were defined in the preceding "Tab" the amount and nutrient value of the manure was determined.



It is now necessary to determine where the manure will be deposited and stored. Note the check box at the top of the page the allows the user to select to use the "Assisted Mode." This mode will utilize a set of default values for the manure distribution. Advanced users or special situations may require use values that are different from the defaults. To use this feature, remove the check in the box by "left clicking" in the box.

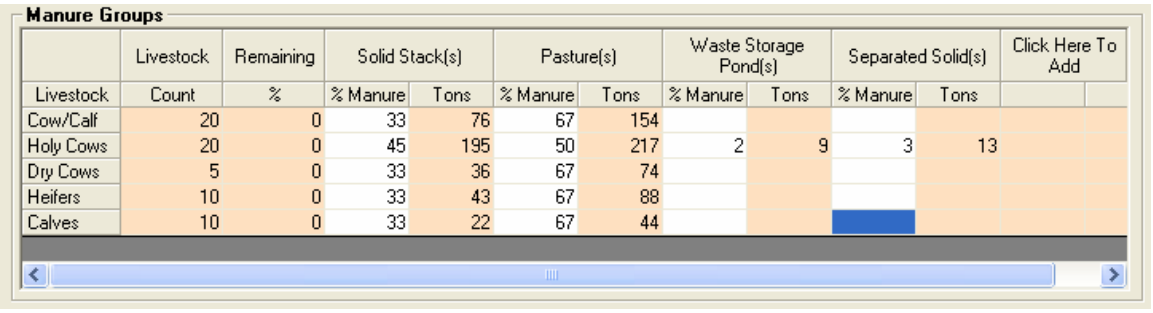


The Manure Distribution Screen is divided into three parts. The first part requires the user to identify what part of the manure is being handled with water. The check boxes at the top allow the user to identify if waste in dairy operations is being scraped from the parlor and holding pen. The program estimates the amount of manure on a dairy operation to be 10% from the parlor and 5% from, the holding pen. If either is being scraped, the amount of manure entering the liquid stream is reduced to 0% for the value where scraping is being done. When the boxes in the "Flush Feed Alley" or "Flush The Housing / Bedding Area" are checked the amount of manure entering the liquid waste stream is increased accordingly. When animals are pastured, while on feed, the number of days on pasture is used to calculate the amount of manure that is removed from the solid and liquid manure being stored in the system. Only show the time the animals are on feed. If the animals are grazed on pasture, then the pasture needs to be considered as a separate unit.



Once the amount of manure entering the liquid waste stream is calculated, planners can elect to calculate the amount of separated solids that are removed when solid separation is a part of the waste handling system. Planners have the option of using either 1) no separation, 2) one separator, or 3) a combination of separators. Once the separator or combinations of separators have been selected, the program will calculate the expected amount of solids that will be removed from the liquids. The amount of separated solids is also reported and will need to be included in the plan for applying or exporting nutrients.

The Manure Group table is populated based on the inputs in the two preceding sections

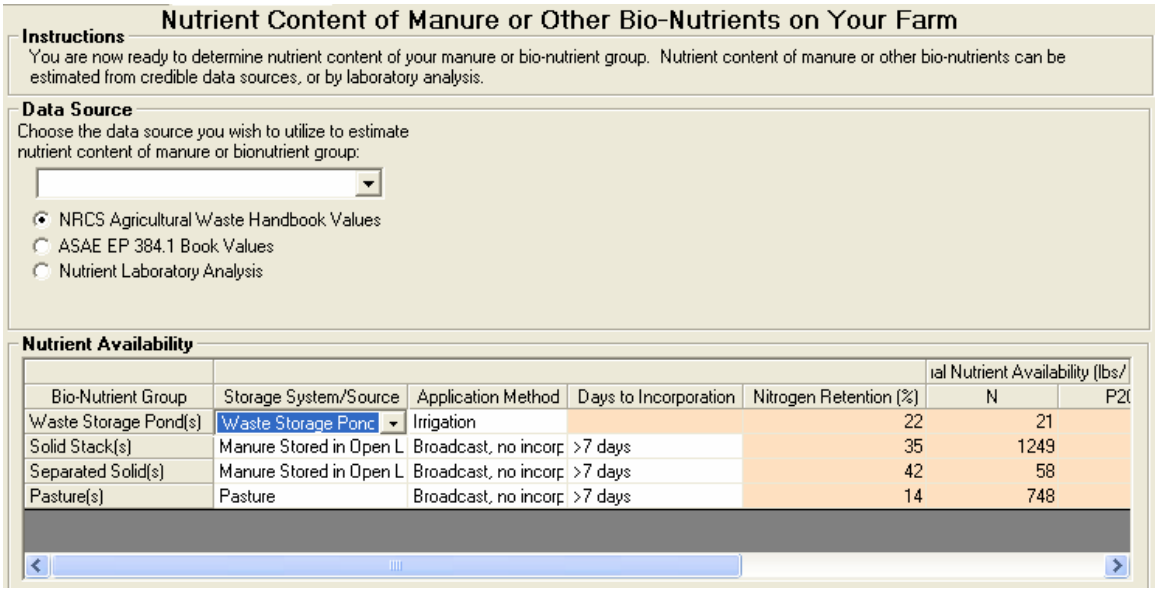


	Livestock	Remaining	Solid Stack(s)		Pasture(s)		Waste Storage Pond(s)		Separated Solid(s)		Click Here To Add
Livestock	Count	%	% Manure	Tons	% Manure	Tons	% Manure	Tons	% Manure	Tons	
Cow/Calf	20	0	33	76	67	154					
Holy Cows	20	0	45	195	50	217	2	9	3	13	
Dry Cows	5	0	33	36	67	74					
Heifers	10	0	33	43	67	88					
Calves	10	0	33	22	67	44					

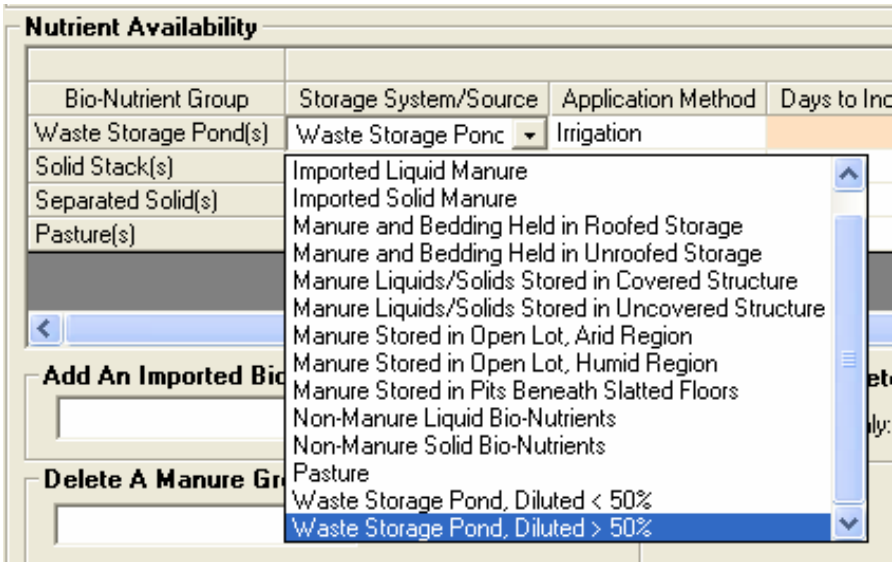
and by the inputs from the Livestock Units Section. When the "Assisted Mode" is not active (not checked) planners can use their own values in the % manure columns. Caution should be taken when using other than default values to be certain the differing values are warranted. Using other than default values should be documented in the plan summary.

Nutrient Content and Other Bio-Nutrients

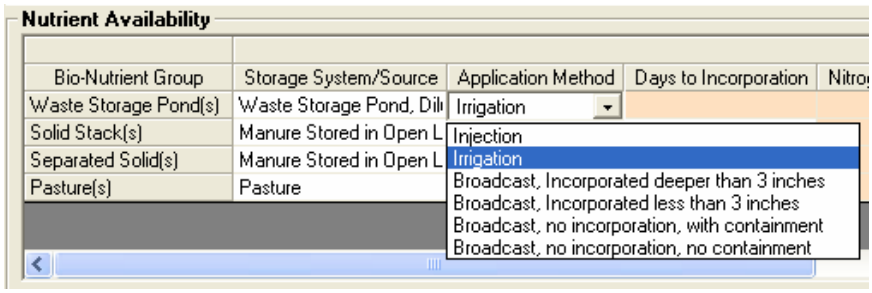
The program estimates the amount of nitrogen loss that occurs based on the type of storage and the method of application. In this section, the planner will be required to enter information that describes the handling of manure in 1) waste storage ponds, 2) solid stacks and 3) separated solids. Storage, handling and application all have an impact on the amount of nutrients retained for crop production.



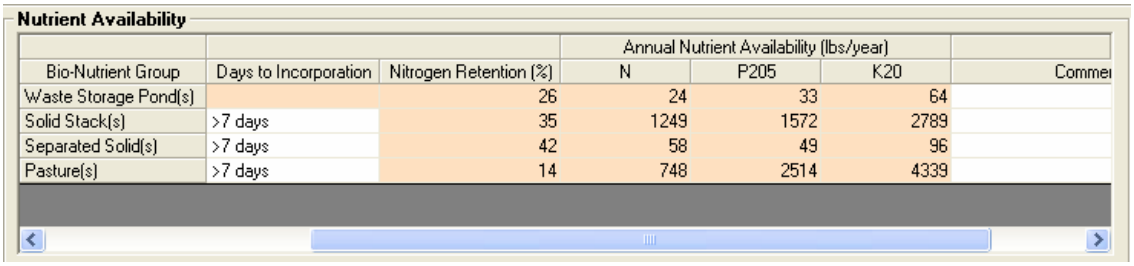
The Nutrient Availability section of the screen requires the planner to define type of storage is being
Used for each of the types of manure being stored. Storage types will dictate the amount of nitrogen that is lost during the storage period.



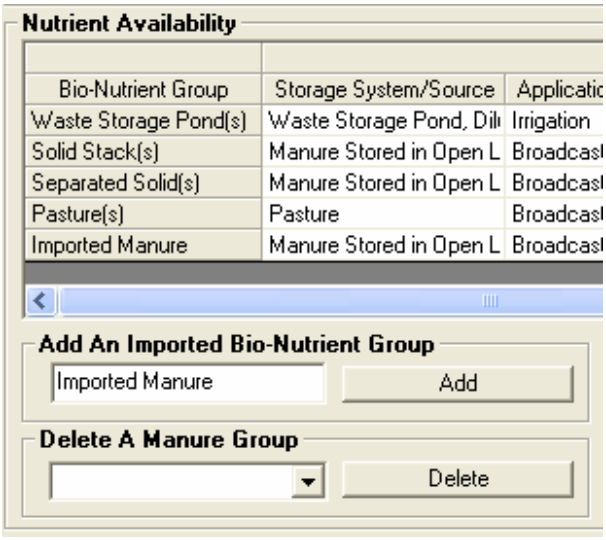
Planners will also have to identify the method of application that is being used for each of the manure groups. Application methods have varying values for loss of nutrients.



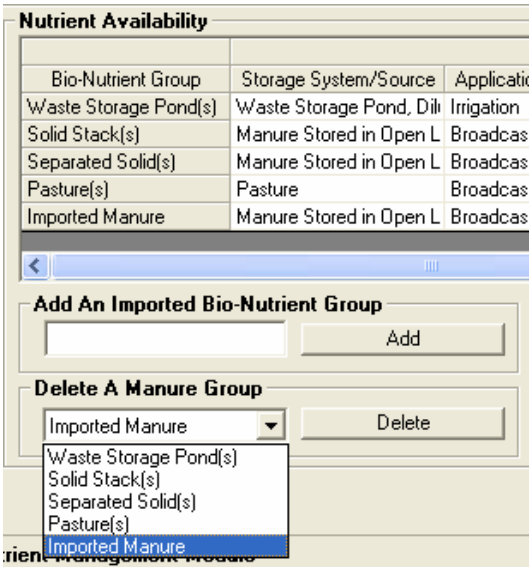
The planner's final action is to determine the days between application and incorporation of the manure group. The result of profiling the manure group storage, application and length of time for incorporation determine the pounds of N, P_2O_5 and K_2O that will be available for crop production.



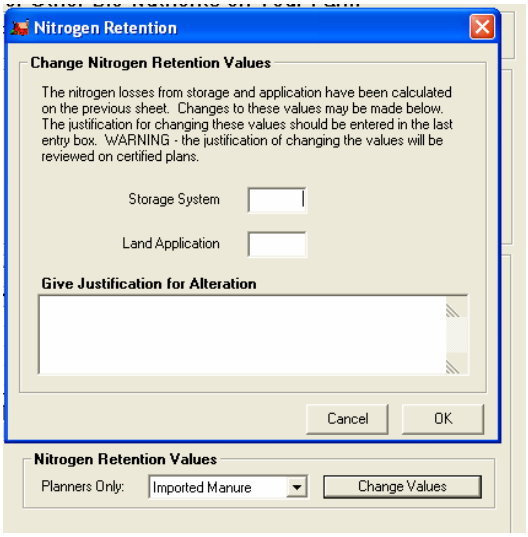
When it is necessary to add an imported bio-nutrient group, the planner can simply name the imported bio-nutrients by entering the appropriate name in the space provided and press the "Add" button.



Should it become necessary to remove a bio-nutrient group, the planner can select the appropriate group from the drop down list and press the "Delete" button to remove the unwanted group.

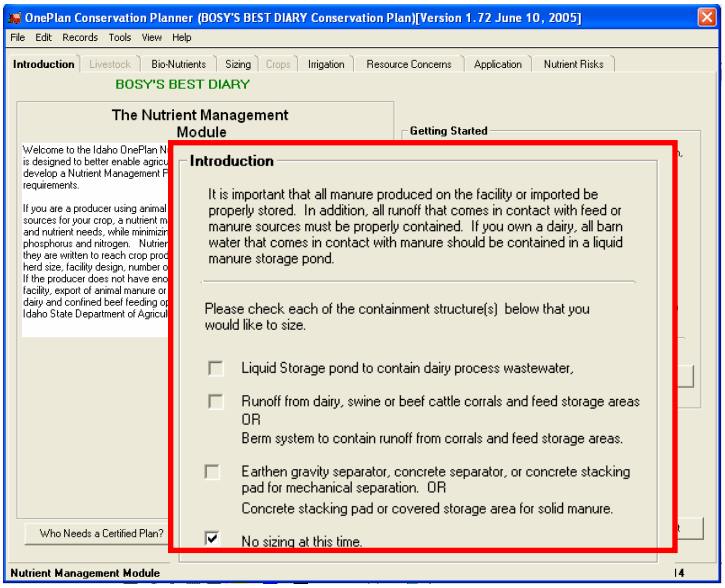


When a special situation occurs where the default values for nitrogen retention are not appropriate the planner can input his/her own values. When a change is necessary, select the manure group and then press the "Change Values" button to access the screen as shown on the right, which allows entry of the new? value. **Note** that when changing the default value, the planner must give a justification for the change being made. This justification will be noted on the final printout. Remember that a change in the value must be justified and approved by the Department of Ag.

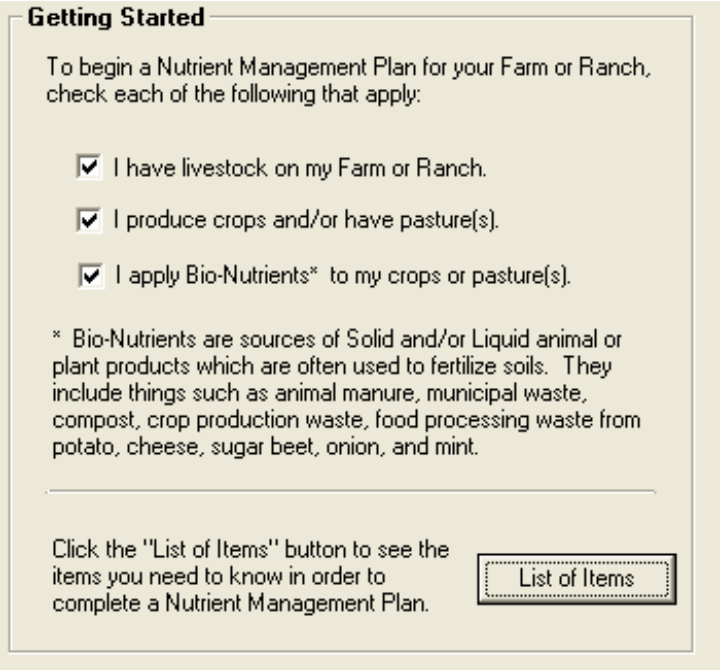


Animal Facilities Sizing

The sizing module is intended for those facilities needing a sizing of storage facilities for process water, runoff, solid manure storage or a gravity separator. If the planner is preparing a risk assessment only on the manure produced on farm, manure exported off farm, or manure import on farm he/she can opted not to develop the facilities storage facilities needs. To activate this option the planner will check the "No sizing at this time" option.

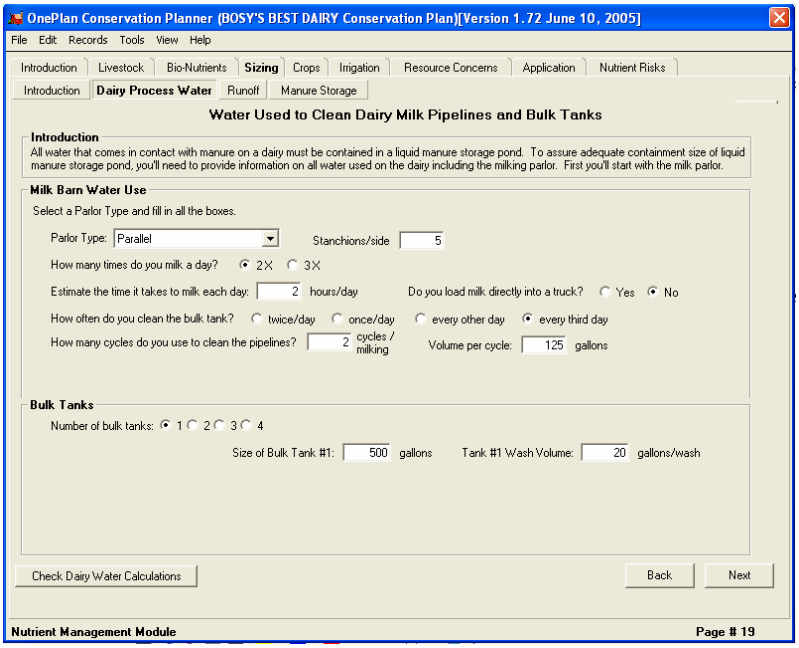


If multiple species are a part of the operation, process water entry will be required for each of the animal species. The "Tabs" for each of the species asks for appropriate information regarding the process water used by the various types of production and management practices used with the selected specie. Planners can select to perform sizing



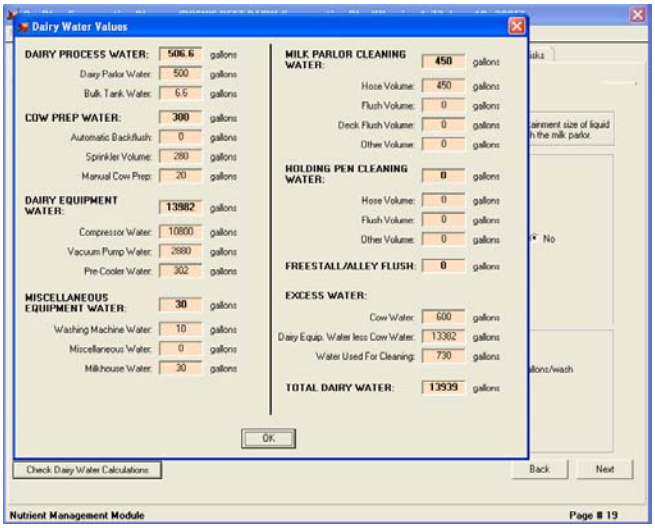
operations, if needed, for liquid storage ponds, runoff areas where there is manure and from feed storage areas.
Additionally, planners can use the software to size
separators and storage areas for separated solids or scraped solids. The user can choose to send corral runoff to either a lagoon or to contain the runoff using a runoff containment berm.
The module will provide a means for the user to select the appropriate components and to determine the correct size based on the animals contributing process water and runoff.

Water Used to Clean Pipelines/Bulk Tanks



The initial input requires the entry of the parlor type, which is selected from a drop down box. The user must enter the number of cows per side in the parlor, in the case where there are multiple parlors in the barn, use all cows in the barn when full and divide by 2 to get the appropriate number of stanchions per side. The number of hours used per day is used in the calculation for water and should represent actual milking time. The question regarding direct loading of milk will eliminate the need for the entry of water use relative to the bulk tank. For smaller herds where milk is not shipped daily, the radio buttons to indicate frequency of shipment are used to factor the amount of cleaning water for the bulk tank. The number of cleaning cycles for the pipeline combined with the volume information is used to calculate the total amount of water

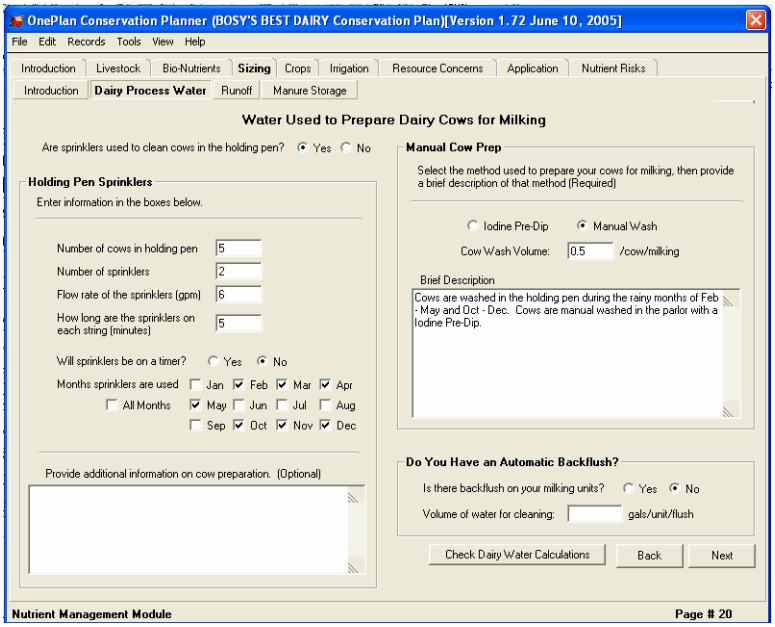
used for cleaning the pipeline. When entering the number of bulk tanks, press "Return" to get the entry windows that contain the input cells for bulk tank water requirements.



Note: The "Check Dairy Water Calculations" button provides a summary page that displays all of the various water uses in the dairy barn. It is quite handy to review all of the sources of water that have been entered up to that point. When the "Dairy Process Water" tab is selected, the user will be given the opportunity to provide the necessary input, which will be used to determine the size of storage needed to meet all state requirements.

Water Used to Prepare Cows for Milking

The second entry screen for entering the "Dairy Process Water" information deals with the preparation of cows for milking. The use of a wash pen requires the entry of the appropriate information for determining water use. The number of cows in the holding pen is used to calculate the number of times the holding pen will be used on a daily basis. Enter the total number of sprinklers that will be used to wash the cows. If it is unknown, consult with the equipment dealer for assistance in calculating this information. The length of time that the sprinklers are on each string will be used to determine the amount of water used; overestimation of the time is better than underestimation. The month's sprinklers are used will be used in the calculation of total water needed for sprinklers. Again, overestimation of use is better than underestimation. There is a text box for use in explaining the procedures in the wash pen. When in doubt, add comments to be sure the entries are explained.



Once the information on the wash pen is entered, the user will be given the opportunity to

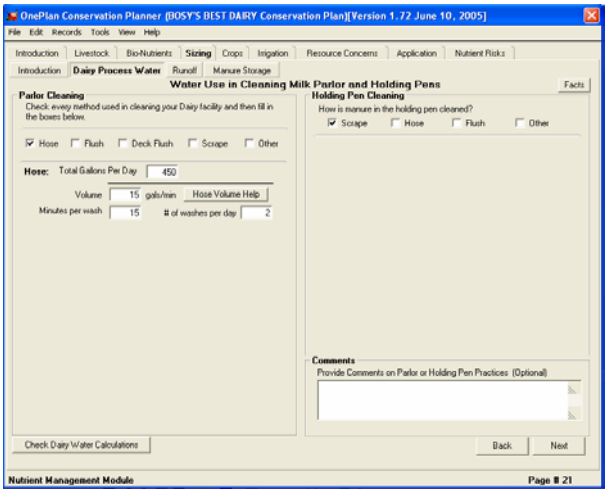
enter information about cow prep in the barn. Normally, about .5 gallons per cow is used to wash cows in the barn when drop hoses are being used. Users can include water from a backflush system by checking the "Yes" radio button. Automatic systems use about .5 gallons per cow. When manually backflushing, .5 gallons per cow is a reasonable number to use for water usage.

Note: The "Check Dairy Water Calculations" button is again available to provide a summary page that now includes the additional water that has been added as a result of the input from this screen. It is quite handy to review all of the water that has been included up to this point.

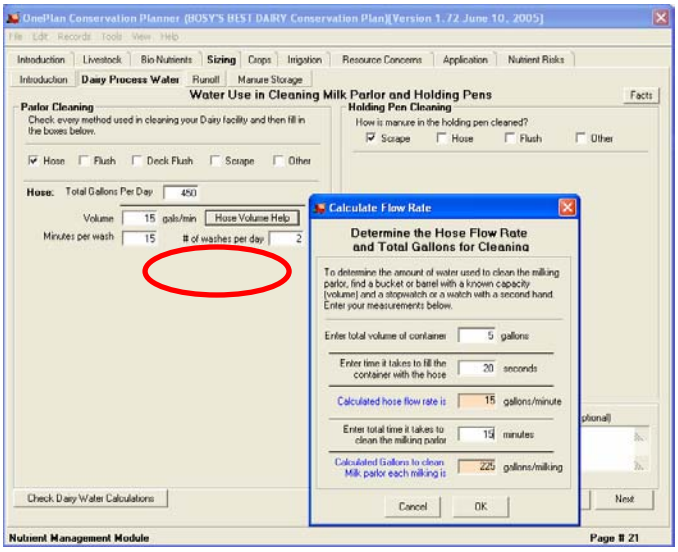
Water Used in Cleaning Milk Parlor and Holding Pens

The next step is to enter the water used in cleaning the barn and holding pen. The various methods of barn cleaning and holding pen cleaning are listed in "Check Boxes" on the Water Use "Tab".

Check the cleaning method or methods being used in the barn or holding pen or the method that best describes how your barn or holding pen is cleaned. The method(s) selected will become active and will allow you to enter data.



Hose Volume Help



Note: The hose method has a "Hose Volume Help" to assist the user in determining the flow rate by timing a collection in a bucket. When the user enters the volume of the container and the time it takes to fill the container; the program displays the calculated flow rate. Entering the time to clean the parlor results in the display of the calculation for gallons per milking.

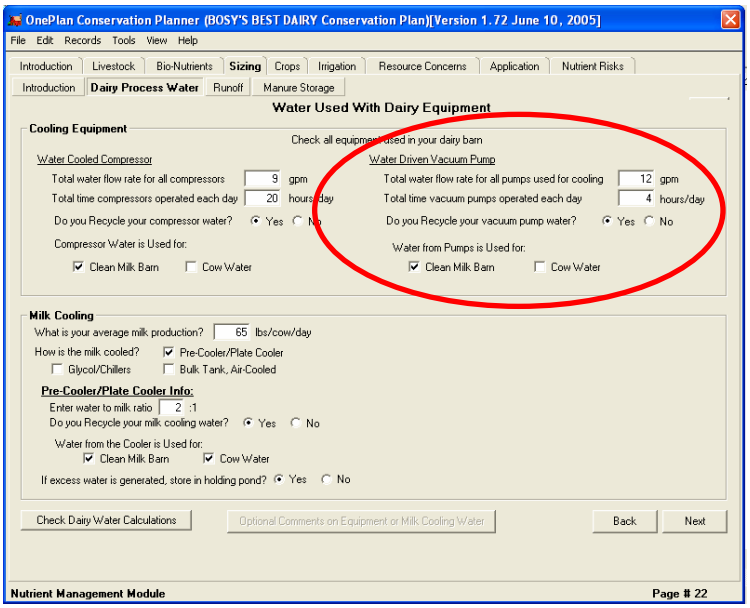
When using the flush method of barn cleaning, the user will need to know the flow rate of the flush. If this information is not available, consult the dairy equipment dealer.

The deck flush method will require the entry of the number of nozzles being used to do the deck flushes. The flow rate and minutes per flush must be entered, along with the number of flushes per day. Again, overestimating the amount of water used is better than underestimating water use.

Water Used with Diary Equipment

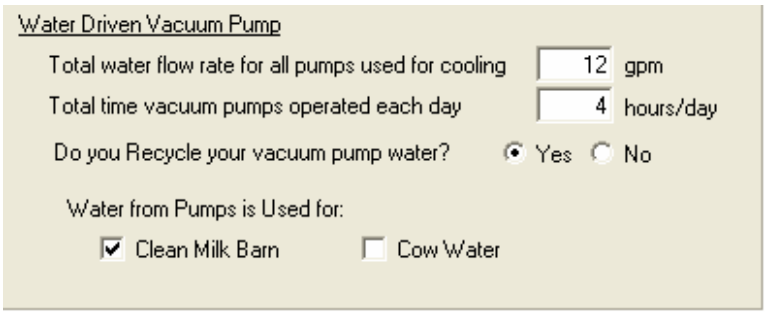
In some cases, cooling equipment water can make up a sizeable amount of the total water to be stored. The planner must visit with the producer and determine all sources of water that comes from the cooling equipment. Cooling water may be used for vacuum pumps, compressors for cooling equipment on bulk tanks and for cooling the milk equipment itself. The use of water to cool can increase efficiency and reduce energy requirements for the dairy operation, but in many cases, poor planning for disposal of cooling water has created an extra problem in the management of waste. Cooling water should be recycled where possible to take advantage of the increased temperature of the water once it has been used for cooling. Use of this water for washing cows and for cow drinking water can be highly beneficial from an energy conservation standpoint.

Compressors are often cooled with water. If a water-cooled compressor is used in the barn, check the "Check Box" and the cells become active and ready to accept data. Enter the flow rate in gallons per minute for the compressor. If unknown, try to contact equipment dealers to help identify the water use. Enter the total time the compressor is operated daily.



Note: This entry requires that the information be entered in minutes per day. If water is recycled, it is not added to the lagoon unless the amount of water needed in the areas that utilize recycled water is less than the amount of water generated through cooling of the compressor.

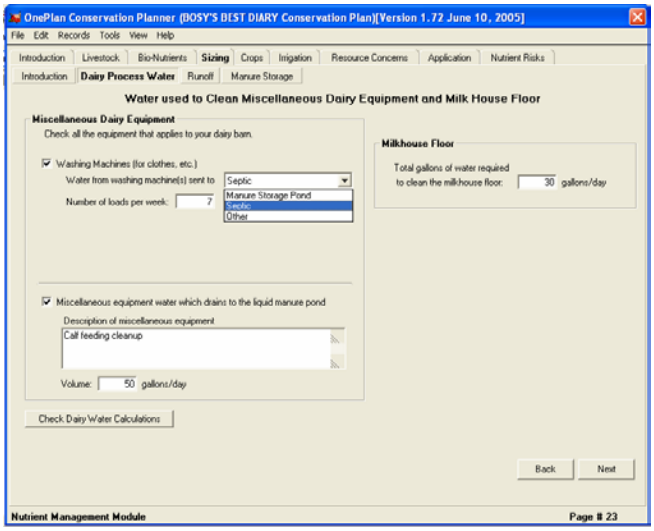
When the radio button Indicating that cooling water is being recycled is selected, the planner will be required to identify where water is being recycled. Check the appropriate "Check Box (es)" to indicate where the recycled water is being used.



Vacuum pumps may also be water-cooled. Just like compressors, the user must provide the gpm usage of clean water and the minutes per day that the cooling is needed. Again, identify if the water is recycled and where the recycled water is used. If the water used for recycling is less than the amount of water needed, the excess water will be sent to the lagoon, unless otherwise specified.

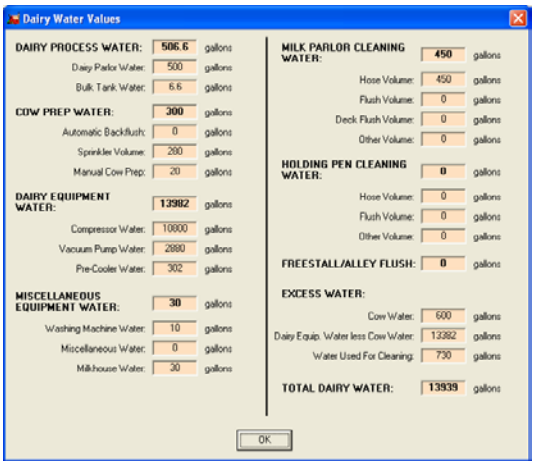
Milk cooling is another source of water used for cooling. Plate coolers generally use up to 2 gallons of water to cool 1 gallon of milk. The program will allow the user to adjust the ratio values as needed. Entering the production allows the program to calculate water usage for cooling. Check the boxes for each system if multiple systems are being used. For example, a producer may use a glycol chiller and a plate cooler.

Water Used in Cleaning Miscellaneous Equipment/Milk House Floor



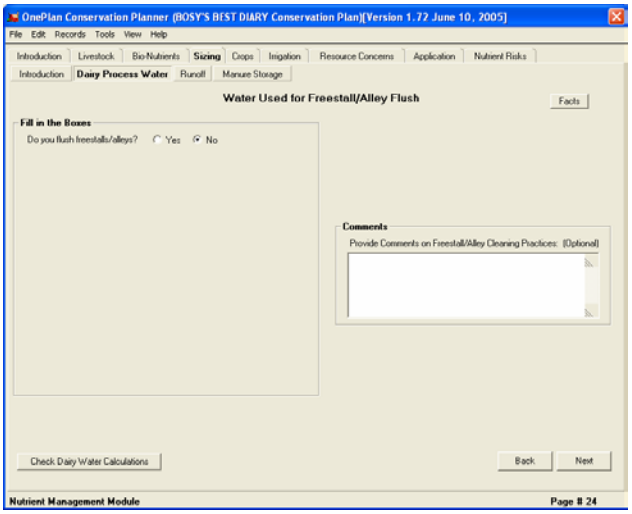
The final entry will gather miscellaneous uses of water. These uses are generally not considered recyclable. The washing machine water drop down allows the user to identify the disposition of the water; it may go to the lagoon, septic tank or be handled separately.

Dairy Water Calculations Page



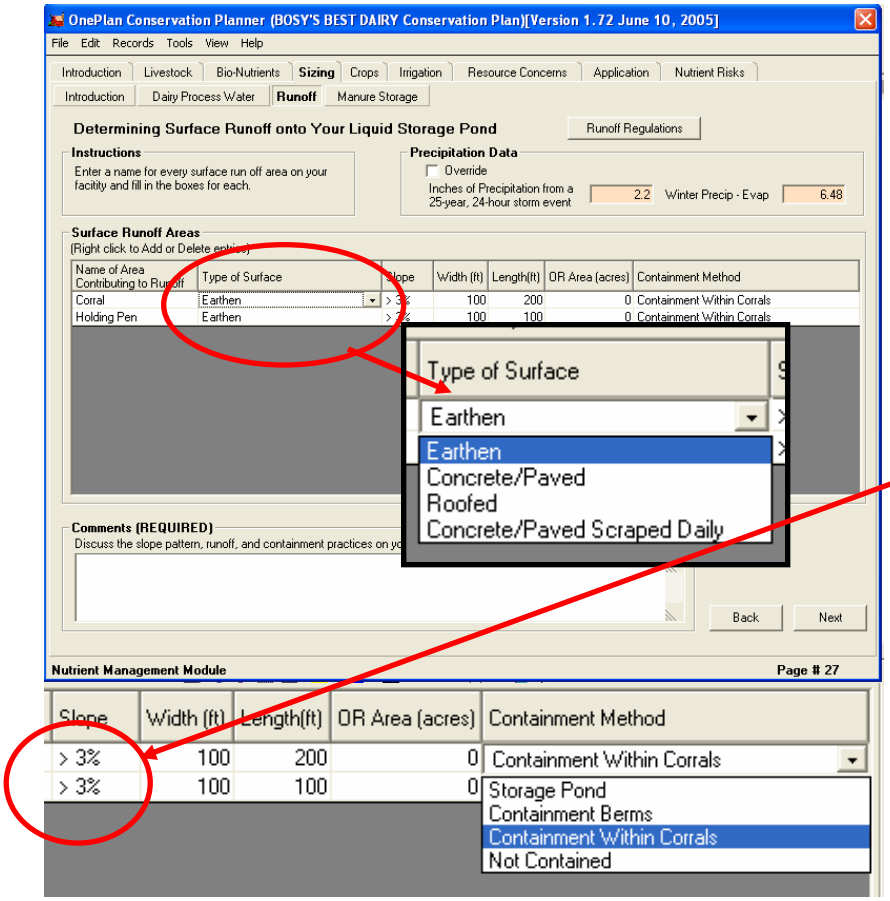
Note: The "Dairy Water Calculation Sheet" gives a view of all of the water uses that have been entered. You cannot edit in this screen, so you will need to go to the tree (CTRL T) to move to the correct spot to make the edit or correction.

Flush of Freestalls and Feed Alleys



The flush for freestalls and alleys will affect the amount of water to be stored if flushing is done with non-recycled water. When non-recycled water is used, the amount of storage required increases by a large amount. When recycled water is used, the volume changes only by the amount of manure that enters the storage since the water has been used previously. Be sure to accurately reflect the amount of manure being stored in the Bionutrient group.

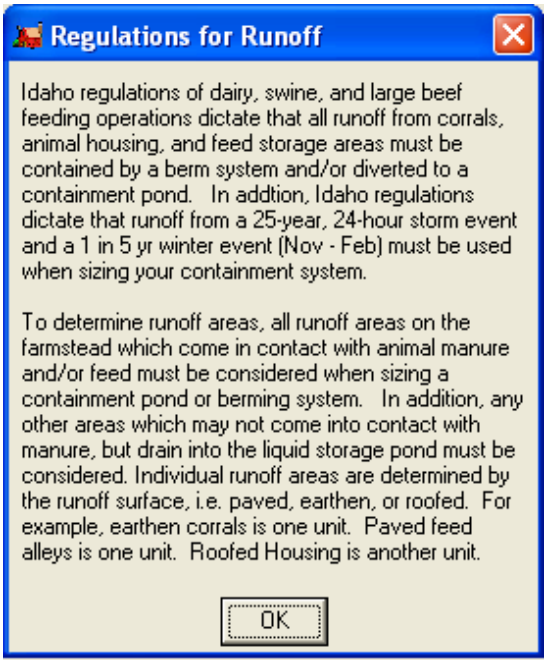
Runoff Calculations



The Runoff Section must be completed to have a certified plan. Field runoff containment, if there is a potential for runoff, should also be described in this section. There are that provide the type of surface from which the runoff originates, the slope of the area contributing to runoff and the method being used to contain runoff. The rainfall data, which is populated in the cells at the top of the page, is based on the weather station selected earlier in the program. These values can be increased but must not be decreased. The calculation for runoff is made for each runoff area. Individual areas are entered on the top line (Surface Runoff Areas). **Note:** The type of surface that is used and the percent of slope will dictate the runoff factor being used.

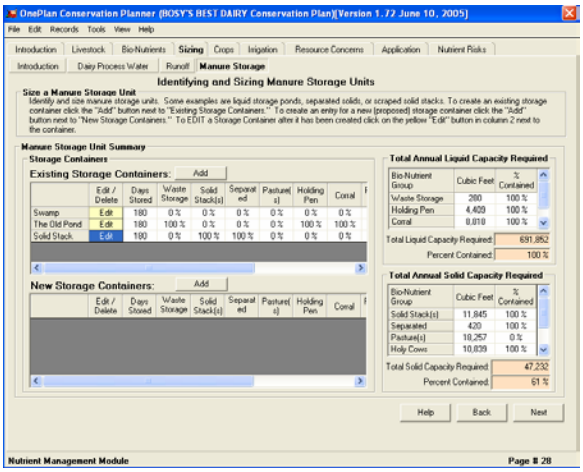
When all information is entered for an area, press "Next Runoff Area" to proceed to a blank line to enter a new area, or "Finished" to save the current entry and allow the program to proceed to the next entry "Tab".

Note: If an area is incorrectly entered, the user must select the faulty entry and delete it. Once the bad data is deleted, the area may be re-entered.



The Runoff Regulations button on the upper part of the screen will provide the planner with a brief overview of the regulations that apply for runoff on livestock operations in the state of Idaho. This information has been provided for the convenience of the user; however, for up-to-date information, check
with the Idaho State Department of Agriculture.

Identifying and Sizing Storage Units



When the sizing option was selected earlier in the program, the software will require the user to identify storage units to store all of the liquid waste from process water, runoff and manure being stored. The planner can identify the existing storages and, if necessary, add additional storages to contain all of the liquids that must be contained. The "Annual
Liquid Capacity Required" table on the right hand side of the entry screens provide the planner a quick check to insure that all liquid manure and runoff that was identified as requiring storage has been accounted for in the module. In addition to liquids the "Annual Solids Capacity Required Portion" table will provide the same check for solid manure insuring that adequate storage is provided for the manure which requires storage.

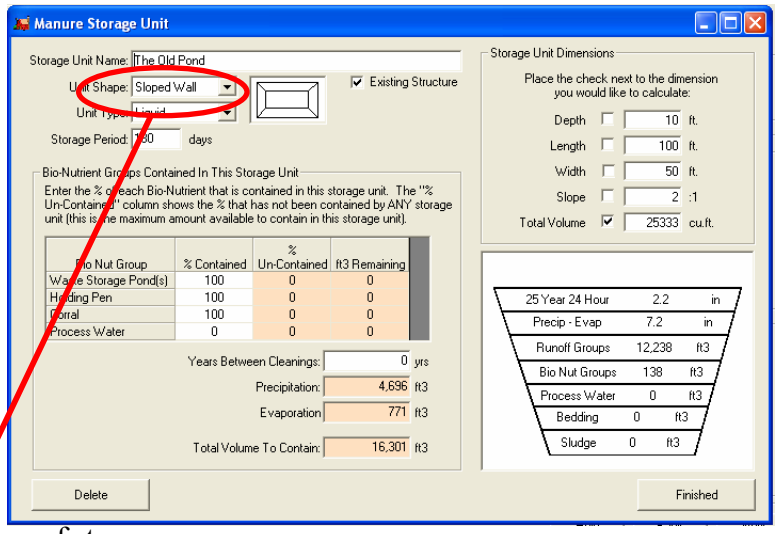
The program has a feature that allows the planner to calculate the amount of storage provided by existing storage and to add additional storage if needed to meet the necessary storage requirements.

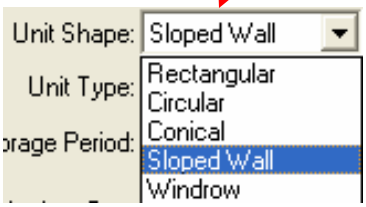
The sizing tool is used by first determining the % of a particular source of waste that must be stored in a particular storage unit. In the example below, one half of the source

is being stored in this sloped wall liquid storage unit for a total period of 180 days.

Storage Sizing Tool – Side Slope Storage

When entering the Information for the structure, the planner may either enters the dimensions and solve for the amount of volume, or enter the volume and solve for any one of the dimensions by checking the box of the dimension for which they wish to solve. This is particularly useful when calculating either new facilities or for additional storage units on an existing facility when there is a shortage of storage.

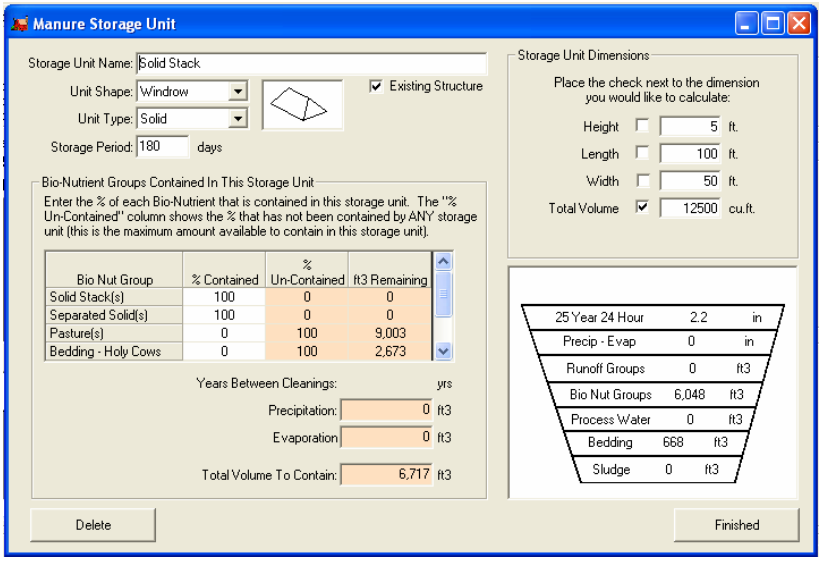




Several different types of storages or several of the same type of storages can be used to contain the necessary waste. The different types of storages that can be calculated with the storage calculation tools are listed to the left.

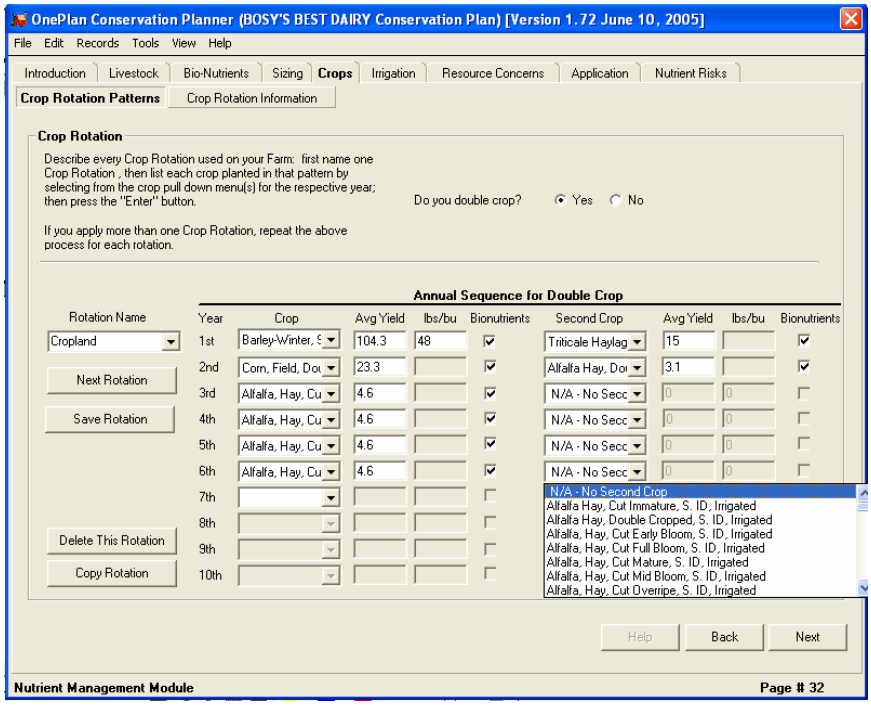
When the planner selects the "Add" button in either the "Existing Storage Container" or the "New Storage Container" he/she will be given a screen in which he/she can name and determine the quantity that can be stored in a given structure. The planner will define the actual containers for the storage and will need to continue to add and size storages until all of the waste is contained. The program will calculate the remaining amount of storage needed, updating the values after each storage is added until all of the storages have been created and sized. The tables on the preceding page will be updated with each storage that is added.

Just as in the liquid storage structure design feature of the program, the planner has the option of selecting a solid storage structure design. When developing a plan, a planner should refer back to the Sizing Manure Storage Screen to see that all of the required storage is accounted for before moving on to the next section of the plan.



Crop Rotations Patterns

In preparation to calculate the amount of nutrients that are being used by crops and how much manure that we will be able to apply, cropping information must be entered. The first step is to develop the various crop rotations that the producer is using in the farming operation. An infinite number of rotation patterns can be developed. The program is designed to allow the planner to use either single or double cropping patterns.

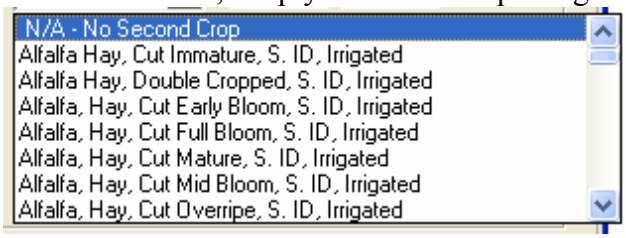


Double Cropping

The double cropping system has been revised to allow the planner to use pre-exist soil test data for Phosphorus and Potassium (test data within the last 9 months). The module utilizes nutrient uptake rate for each crop selected in the rotation. Uptake rates for double cropped rotations have been developed and are listed in the crop selection drop down box. Crop uptake for the various crops is based on the crop yield. It is important that the planner uses the same unit of yield as the data entered in the programs data base. Units of Yield can be in tons, cwt, lbs or bu/acre, In the case of small grains, it is also

based on the test weight for the grain produced, and the exception is barley production in Northern Idaho where it is listed in lbs/acre. **Note:** Make sure that you do not duplicate the name of any of the rotations. If two rotations using the same Rotation Name are entered, the program will fail.

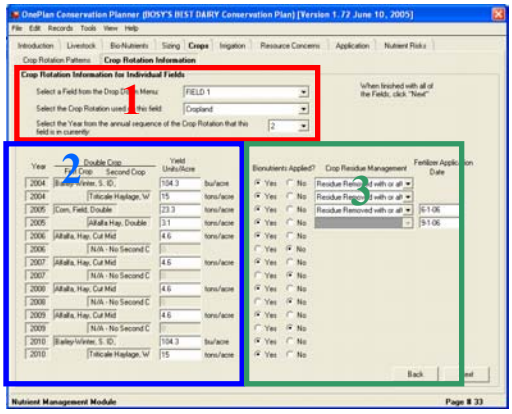
To enter a rotation, simply select the crop using the drop down box (shown at left) for each year in the rotation. **Note:** If there are more years in your rotation than the ten allowed, enter the first ten in the rotation beginning with the previous year crop. **In addition:** The user can easily scroll through the crops by pressing the first letter of the crop desired. If the double crop "Radio Button" was checked, a second set of columns in which to enter the second crop grown for the year will appear. **Note:** The rotational crops information required includes whether bio-nutrients will be used on a given crop. If the check box for bio-nutrients is not checked when the program calls for bio-nutrient application later in the program, the crop will not be available. In years when a second crop is not grown, enter "N/A - No Second Crop" as the second crop.



When finished entering a rotation, press the "Save this Rotation" button to insure the rotation is saved. If you have additional rotations to enter you may just press the "Next Rotation" button and the current rotation will be saved and a new blank screen will be displayed for an addition rotation. If a new rotation that is nearly identical to one that already has been entered is needed, press the copy rotation button, make the necessary changes, including providing a new name and the rotation will be created. When all rotation patterns have been entered, press the "Next" button to proceed to the next section.

Assigning Crop Rotation Patterns

Once the rotations have been completed, each field must be associated with one of the crop rotation patterns that have been entered**. In SECTION 1** the planner will need to assign the desired rotation schedule, and when the assignment is made, the user will be asked to identify which of the years in the rotation selected is the current year for the field. **In SECTION 2,** the planner will be given an opportunity to adjust the yield information for the specific field being entered. The use of bio-nutrients can also be changed for a specific field at this point, as well.



SECTION 3 asks for the fertilizer application date. **The fertilizer application date is the date by which the producer would normally have applied nitrogen fertilizer.** The program uses the date to evaluate if the soil test data can be used so that fertilizer application recommendations can be made. If the soil test is out of date, (within 90 days of the fertilizer application) no

nitrogen recommendations can be made. **Note that Phosphorus and Potassium application dates has to be within 9 months of the application date.**

Crop Residue Management

Section 3 also requests specific information on the practices used for residue management. The information requested is input by selecting the appropriate item from the drop down box.
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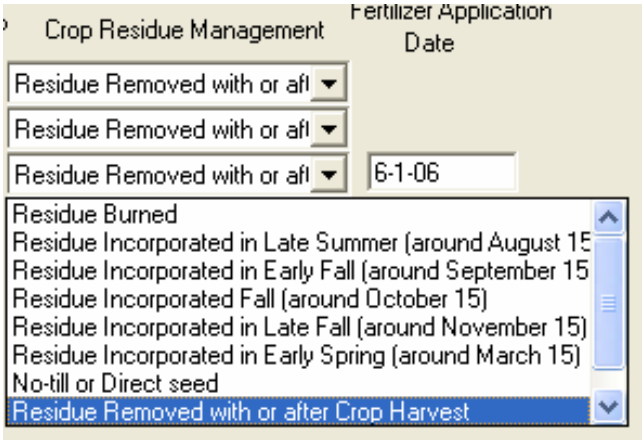


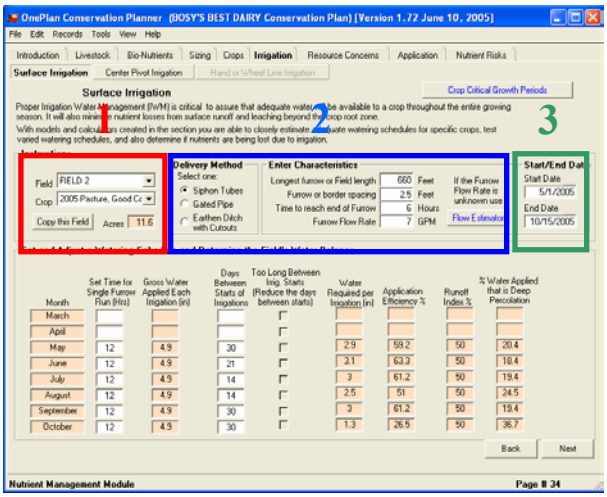
Irrigation Planning

Irrigation plays a major role in the movement of nutrients, both off the field when runoff occurs and in field when nutrients can move through the soil profile under deep leaching conditions. Proper irrigation will result in making the best use of nutrients for crop production and will reduce the potential for environmental degradation due to the movement of nutrients from a beneficial site (crop root zone) to a non-beneficial site (surface and ground water). This section is required for a certified plan. If the user follows the irrigation plan he/she will maximize the use of water and nutrients for crop production and at the same time will minimize the impact of those nutrients on the environment.

Once the field, its crop rotation, and year in the crop rotation have been determined, each field will be associated with the irrigation system that was established in the "land use" selection on the "Map Your Farm" window. The three irrigation tabs (Surface Irrigation, Center Pivot Irrigation, or Hand or Wheel Line Irrigation) are automatically activated as the planner proceeds through the irrigation model. Each irrigation model is unique in its ability to evaluate the system. However, all three systems are similar in type of information required. The instruction section for each system contains three sections:

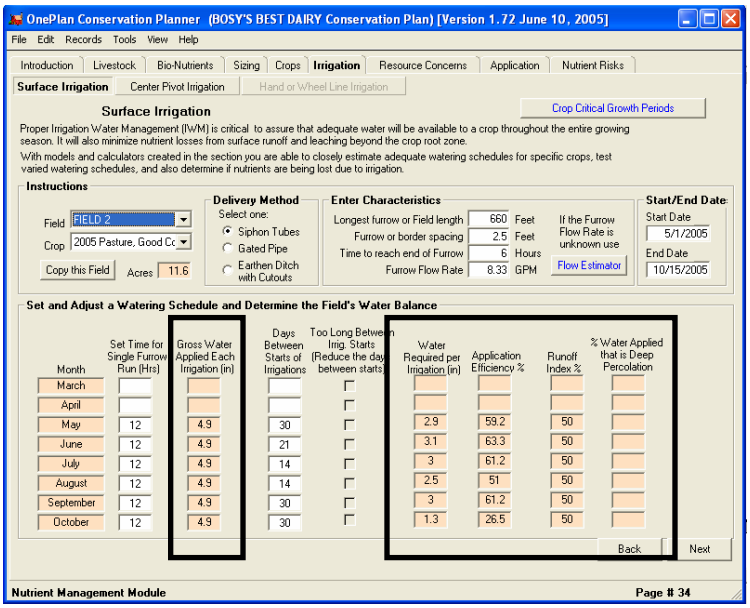
1) **Field Selection,**
2) **Irrigation System Characteristics, and**
3) **Irrigation Start/End Date.**

The first step in the surface irrigation process, **Field Selection section**, is for the planner to identify the field.
In Irrigation System Characteristics section, the planner will be given an opportunity to characteristics of the Irrigation System and the Field.
Irrigation Start/End Date section asks the planner for seasonal irrigation start and end dates. These dates are used by the model to evaluate irrigation efficiencies based in Net Irrigation Requirement (NIR) and determines the date of water balance accounting to evaluate whether the system is under deficit or leaching moisture conditions.



Surface Irrigation

Surface irrigation is the least efficient of all irrigation systems. This section serves as a tool to evaluate the efficiency and the potential damage that can result from using a surface irrigation system.



The system has been revised allowing auto calculation and immediate viewing of "Gross Water Applied Each Irrigation, Water Required per Irrigation, Application Efficiency, Runoff Index Percent and Percent Water Applied that is Deep Percolation".

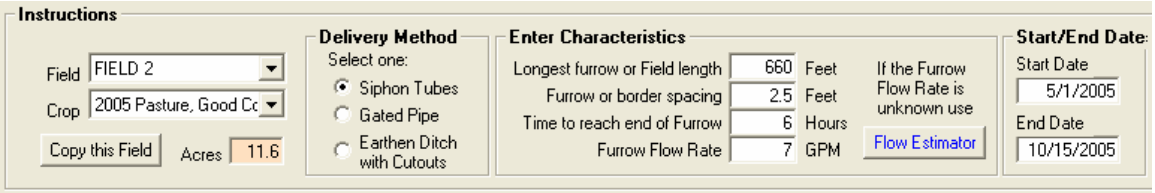
To use the surface irrigation tool, the user must first define the type of delivery method the surface irrigation system is using.

The three types of Delivery methods that a producer may be using are:

1) siphon tubes,
2) gated pipe, and
3) earthen ditch with cutouts.

Siphon tube and Gated pipe allow the producer to control the water better than the earthen ditch.

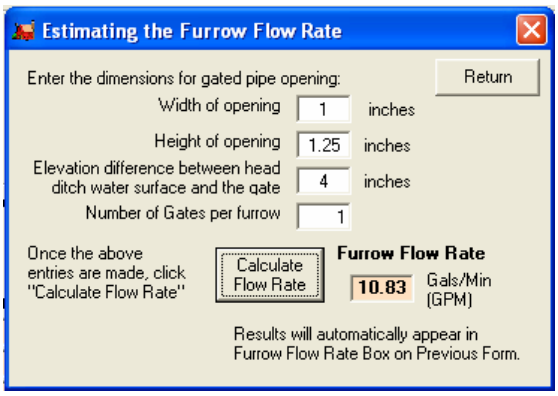
The next step to take in evaluating a surface irrigation system is to "Enter Characteristics" of the field. These values of furrow or field length furrow or border



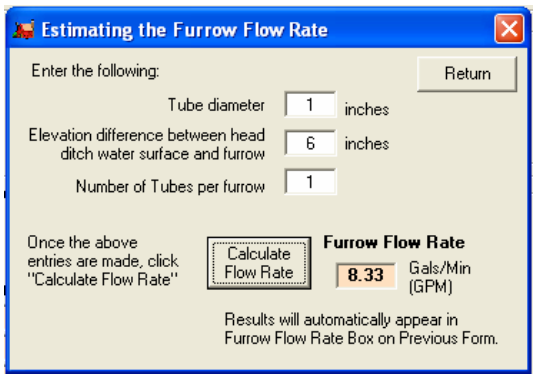
spacing and time to reach end of furrow, and furrow flow rate are used by the model to calculate gross water applied, irrigation required, %runoff , application efficiencies %, and the % potential for deep leaching.

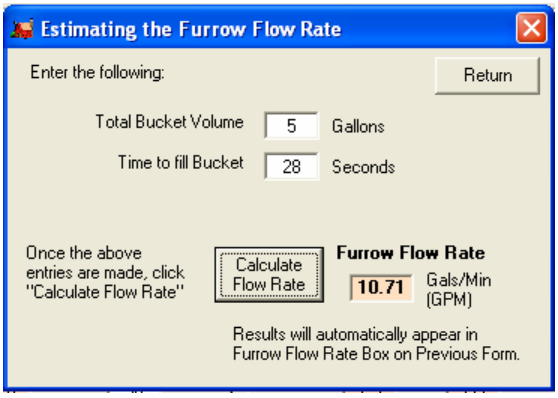
Flow Rate Estimator

The surface irrigation model uses a number of parameters that influence the flow rate in a furrow. The model uses a flow estimator, can be invoked by pressing the "Flow Estimator" button, to assist the planner in determining the furrow flow rate for the Delivery Method. For example, if the grower is irrigating with siphon tubes. This tool requires the user to enter the diameter of the tube, the elevation difference between the water level in the ditch, and the level where it is discharged from the tube into the furrow. The greater the difference in elevation and the larger the tube, increases the resulting flow rate.



To estimate flows for Gated Pipe systems the planner would select the "Flow Estimator" for a Gated Pipe system, selects the width and height of the gate opening on gated pipe, select the elevation difference between the gate and the level of water in the ditch. The flow will be provided by the "Flow Estimator". This flow value is then entered in the appropriate line on the data entry form.

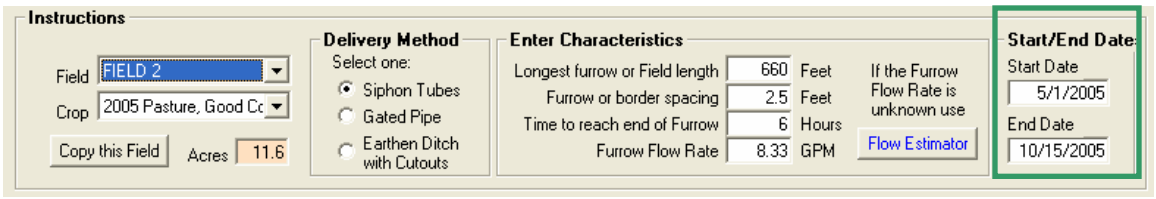




The program also provides a "Flow Estimator" for earthen cutouts. This tool requires the user to collect a volume of water in a bucket and to record the time to collect the volume. The bucket collection method may be somewhat difficult to complete. Another method to consider would be to identify the flow delivered by the irrigation district or company, i.e., 1 cfs = 454 gallons per minute. If 1 cfs is distributed to 100 furrows, the flow rate would be 4.54 cfs.

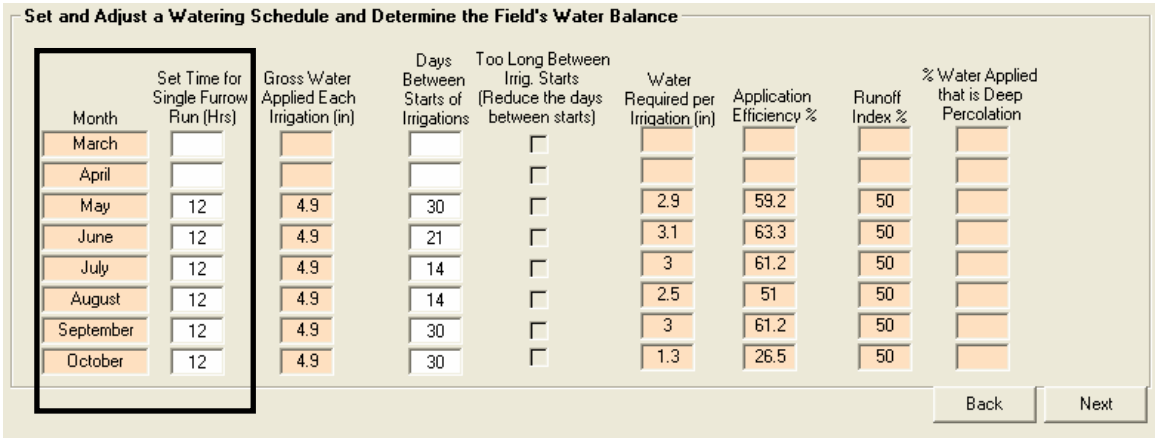
Irrigation Start/End Dates

The **third** step to take in evaluating a surface irrigation system is to enter the seasonal Start/End dates.



The dates start the NIR calculations for the current crops in the rotation and are utilized to determine if the system is over or under irrigating.

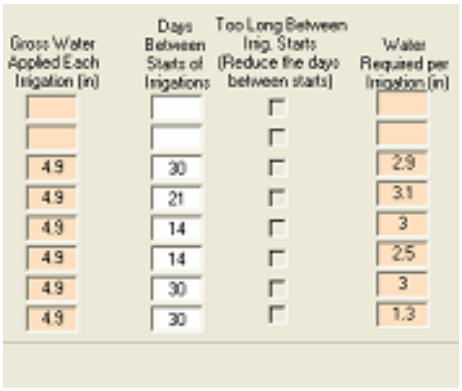
The next major step in evaluating a surface irrigation system is to enter the "Set Times for Single Furrow Run".



Enter the set times for each month when the selected field will typically be watered. In the example above, set times are for 12 hours and the months of irrigation are from May l until October. Once the set times are entered the program will automatically calculate "Gross Water Applied Each Irrigation (in).

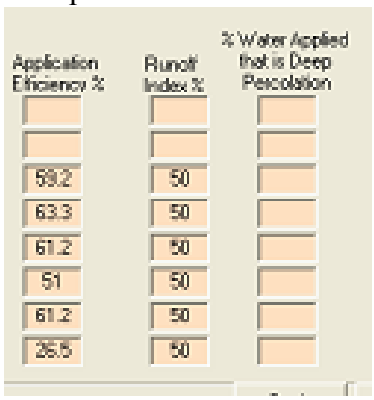
Irrigation Efficiency

The planner will then proceed to enter the "Days Between Start of Irrigations". Since the surface irrigation module works on monthly Net Irrigation Requirement (NIR) averaged over the month, the model assumes start of irrigation at the beginning of each month and will carryover NIR data from the last day of the preceding month. When the planner provides the approximate number of days between Irrigations and evaluates the irrigation system's ability to provide the needed water for crop production based on the length of set time and the flow rate. The water holding capacity is based on information found in the soils layer of the GIS data. **Note:** After the each "Days Between Start of Irrigations" information is entered the "Too Long Between Irrig. Starts" months with check marks in the check boxes indicate a lack of water to meet crop needs. Also when the planner enters each "Days Between Start of Irrigations", the program will calculate the NIR, "Water Required per Irrigation" and evaluate the system's ability to deliver the necessary water to meet crop production needs without applying excess water that will move nutrients through the profile. The planner can make adjustments in the length of sets, flow rate and/or the interval to allow the system to meet the crop needs while maximizing the "Application Efficiency %" and reducing the movement of water through the crop root zone into the ground water.



Determining Excessive Runoff

The Surface "Runoff Index %" is calculated as an indicator of the potential for loss of soil and nutrients due to surface runoff. A runoff index of at least 25% is necessary to allow for uniform wetting of the soil by providing enough time for water infiltration at the end of the field. Runoff indexes of shorter durations indicate a higher potential for erosion and nutrient losses. To increase the index, increase the set time and/or increase flow to reduce time to end of the furrow. To reduce the index, reduce the set time or reduce the flow in the furrows.



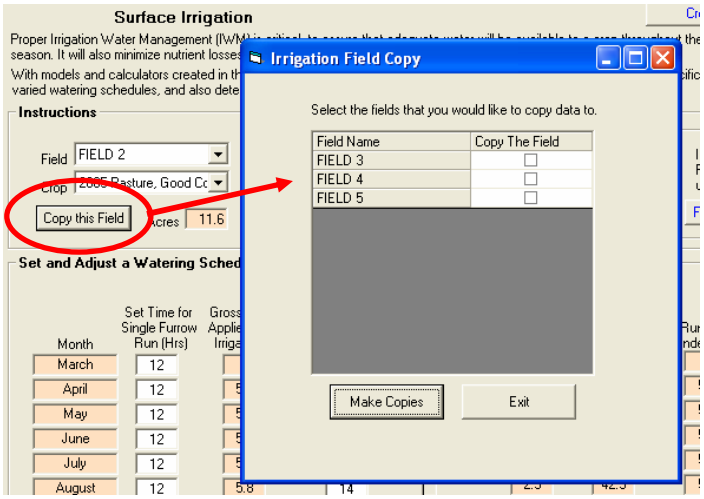
Estimating Effects of Deep Percolation

Deep percolation of irrigation water may carry nutrients through the soil profile and potentially could reach groundwater. The "% Water Applied that is Deep Percolation" calculation will evaluate the potential for moving water through the soil profile. The evaluation examines the amount of water used by the crop compared to the amount of water applied through irrigation. The difference between the amount of water used by the plant, evaporation from soil and plant plus that lost through runoff, and the total amount of water which was applied is considered to be

deep percolation which is water moving to the aquifer. This process has the potential to carry nutrients through the soil profile to the ground water and can generally be considered a waste of water. It is important to remember that aquifer recharge is also an important result of deep percolation of irrigation water. In many places in the state, irrigation is responsible for a substantial change in the ground water depth.

Irrigation Field Copy

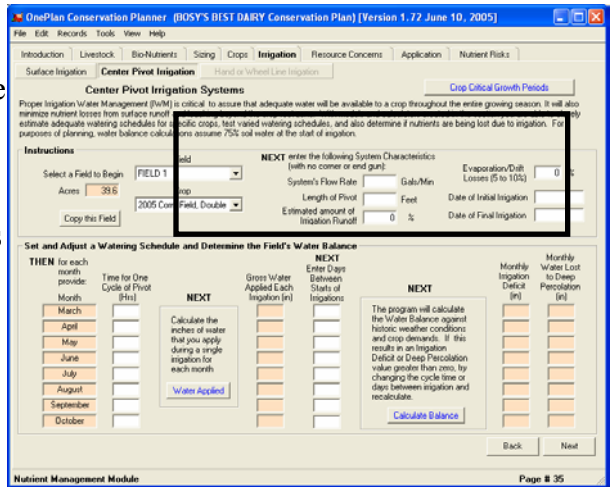
Once the planner has completed the entry for a field, the next field can be entered by returning to the top portion of the screen and selecting the name of a new field. The planner has a new option, "Copy this Field" for copying the finished field's irrigation information to the next field under the same system for irrigation.



When the irrigation information is entered for all fields under the Surface Irrigation, pressing the "Next" button will take the planner user out of this "Tab" and on to the "Center Pivot" or "Hand /Wheel Line" tab. If there are no fields identified as being irrigated with hand lines or with a center pivot, the program will move on to the next section in which the user will identify the fields with runoff.

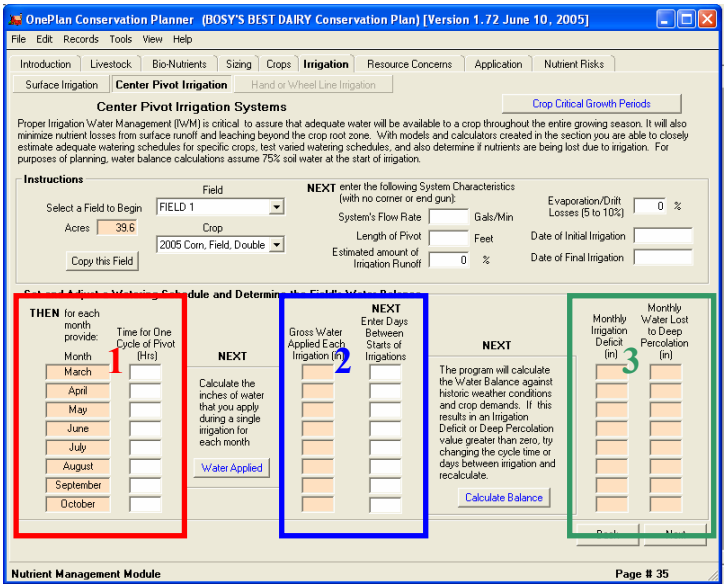
Center Pivot Irrigation

The center pivot system is one of the best and easiest ways to deal with the application of liquid manure. The flexibility in customizing application rates allows the producer to spread the liquid manure at the desired rate and uniformity across the field. As in the surface irrigation system, when the field is selected, the acreage and the crop for the current year information is populated. Enter the flow rate of the system in gallons per minute. If this information is not readily available, the irrigation equipment people who installed the system should be able to provide it. The next step will be for the planner to



estimate the amount of runoff associated with this method of irrigation. The amount of evaporation will also need to be estimated. The normal range for evaporation is from 10 to 15%. The higher pressure and smaller droplets will result in a greater amount of evaporation. The date of the expected first and last irrigations must be entered so the program can calculate water usage by the crop.

Once the system information has been entered, the next step is to enter the Irrigation Management information.



Section 1 in the lower part of The entry screen requires the planner to enter the number of hours that it will take to make a complete circle with the pivot. Typically, early and late season irrigation producers will speed up the travel of the pivot so that less water is applied. During the early and late season, crop evapotranspiration is lower than in the middle of the irrigation season. During the middle of the season, the system will need to apply more water to maintain crop ET needs. Care must be taken to avoid planning application rates that exceed soil infiltration rates. If application rate exceeds infiltration rate, runoff or ponding become a concern. Many systems are designed to meet less than the total crop ET needs during the high demand periods in July and August. Once the travel time for the pivot is entered in Section 1 of the screen, press the "Water Applied" button to calculate the amount of water applied per acre per revolution (irrigation) of the pivot.

The next step in evaluating the pivot irrigation system management is to provide the number of days between irrigations in **Section 2**. Early and late season irrigation will again require less frequent irrigation since crop ET levels are at their lowest point. Enter the estimated days between irrigations. Press the "Calculate Balance" button to calculate whether crop needs are being met or if excess water is being applied, resulting in deep percolation of water and nutrients. This information is displayed in **Section 3** of the screen.

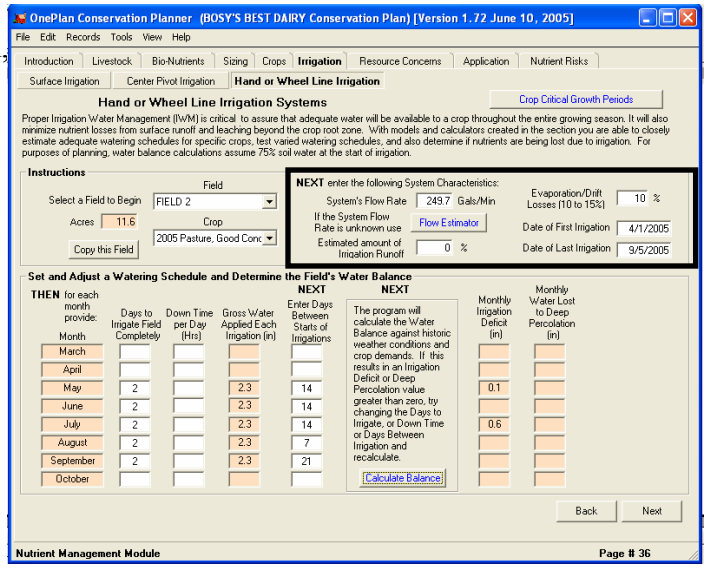
If soil moisture is at deficit levels, the planner should adjust the amount of water applied by either increasing the number of hours to make a revolution or by decreasing the interval in days between irrigations. Make the necessary adjustment and press the "Water Applied" button to recalculate the water application and then press the "Calculate Balance" button to recalculate the water balance information.
If deep percolation of moisture and nutrients is indicated, the planner should adjust the amount of water applied by either decreasing the number of hours to make a revolution or by increasing the interval in days between irrigations. Make the necessary adjustment, press the "Water Applied"

button to recalculate the water application and then press the “Calculate Balance” button to recalculate the water balance information.

Once the user has completed the entry for a field, select the next field to be entered in the drop down box on the top part of the screen. If there are additional fields having pivot irrigation systems, the program will provide a new input screen for the next field the planner chooses. Pressing the “Next” button will take the planner out of this “Tab” and on to the “Hand or Wheel Line” tab, if there are no fields with hand lines or wheel lines, the planner will exit the “Irrigation” tab and move on to the next section, in which the user will identify the fields with runoff.

Hand or Wheel Line Irrigation

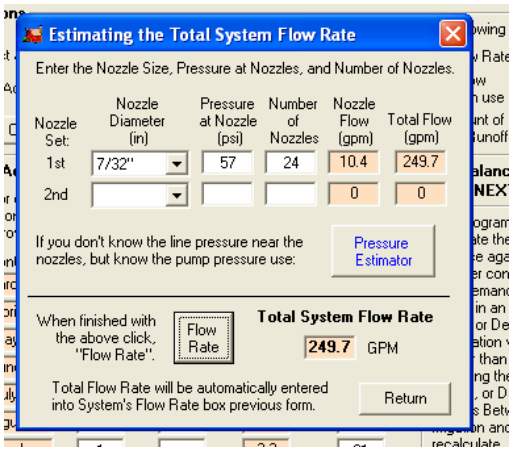
The hand line or wheel line irrigation systems are also a good method to deal with the application of liquid manure. The flexibility in customizing application rates by varying application times allows the producer to spread the liquid manure at the desired rate and uniformity across the field. Just as in the previous two irrigation methods, when the field is selected, the acreage and the crop for the current year’s information is populated.
To use the Hand or Wheel Line Systems section, begin by entering the flow rate of the system in gallons per minute. If the flow rate of the system is unknown, refer to the irrigation equipment manufacturer or the company that installed the equipment. If the user can not obtain the flow rate information, the “Flow Estimator” should be helpful in providing the information. An example of using the “Flow Estimator” can be found later in this section. The next step will be for the planner to estimate the amount of runoff associated with this method of irrigation. The amount of evaporation will also need to be estimated. The normal range for evaporation is from 10 to 15%. The higher pressure and smaller droplets will result in a greater amount of evaporation. The date of the expected first and last irrigations must be entered so the program can calculate water usage by the crop.



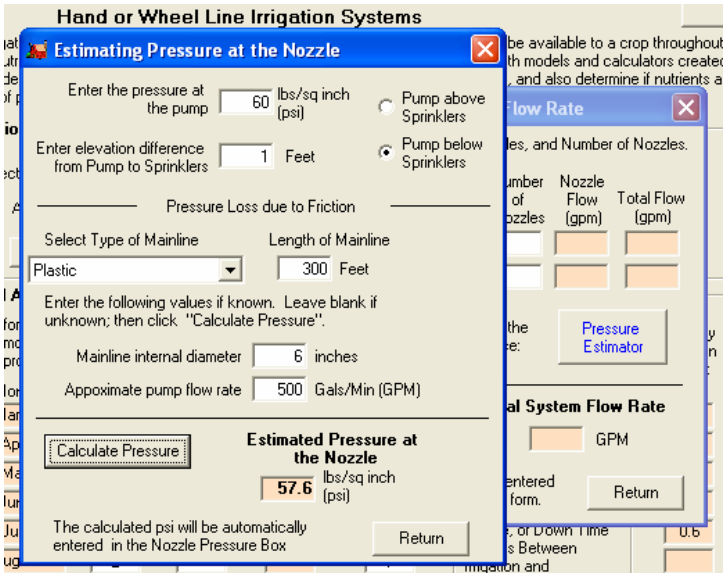
Flow Rate Estimator

To use the “Flow Estimator” the planner will need to enter the nozzle size for the birds being used. If birds have a second nozzle, the second nozzle must also be entered. The pressure at the nozzle must be taken so that it may be used in the calculations for the amount of water output per bird. If the pressure at the nozzles is unknown, the program

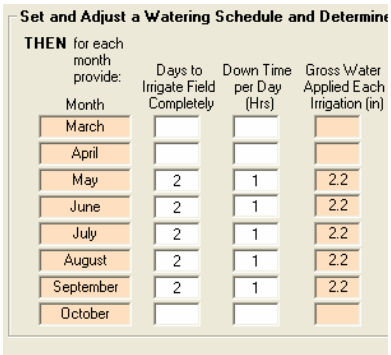
has a pressure estimator. The number of nozzles entered must be all nozzles used simultaneously on the selected field. For example, on our sample field; assume 2 hand lines are being used to irrigate the field. If each line has 18 nozzles, the number of nozzles would be 36 if the normal practice is to use both hand lines simultaneously.



When the pressure at the nozzles is unknown, the pressure can be estimated using the estimation tool. Enter the pressure at the pump and the difference in elevation between the pump and the sprinklers. The planner must identify if the pump is located above or below the sprinklers. The location will determine if there is a pressure loss or gain in the system. The type of mainline must be entered; different types of pipe have different coefficients of friction which affects the amount of pressure loss. The size of the pipe and the flow rate also affect the amount of pressure loss within the mainline and must be entered. When all of the information has been provided, press "Calculate Pressure" and the estimated pressure will be displayed and returned to the pressure blank on the Flow Rate Calculator.



After the flow information has been entered the planner must provide irrigation information such as the number of days it takes to irrigate the field using the current irrigation system. Upon enter "Days to Irrigate Field Completely" and "Down Time per Day" the program calculates the "Gross Water Applied Each Irrigation". Depending on the operation, the producer may or may not be able to adjust the rate at which they are able to cover the entire field. Some canal systems are not designed so that producers can take periodic delivery of water; that is, they must take delivery 24 hours per day.

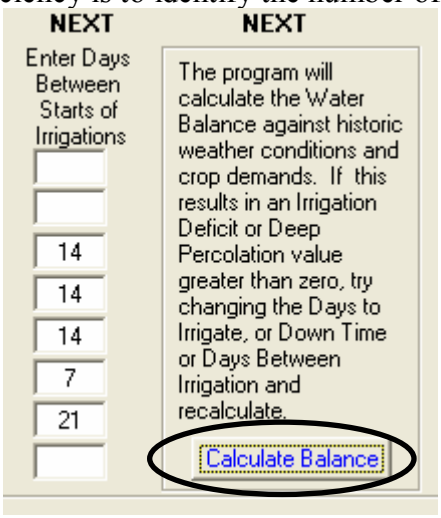


This practice can limit the flexibility in adjusting application rates to the crop ET needs. The time it takes to change the position of the lines on the field or the time the system is off for part of a day is called down time. The water that would have been applied during the time if the system were running will be subtracted from the total and can amount to a significant amount of water, particularly if the user is using a set time of 18 hours with the system being down for 6 hours.

During the early and late season, crop evapotranspiration is lower than in the middle of the irrigation season. Producers typically may adjust application from 12-hour sets to 24-hour sets. During the middle of the season, the system will need to apply more water to maintain crop ET needs, which usually results in the longer set times.

Care must be taken to avoid planning application rates that exceed soil infiltration rates. If application rate exceeds infiltration rate, runoff or ponding become a concern. Many systems may lack the ability to provide application timing or rates that meet the total crop ET needs during the high demand periods in July and August. Once the days to cover the field are entered, press the "Water Applied" button to calculate the amount of water applied per acre, per irrigation.

The next step in maximizing the irrigation system efficiency is to identify the number of days between irrigations. Early and late season Irrigation will again require less frequent irrigation since crop ET levels are at the lowest. Enter the estimated days between irrigations. Press the "**Calculate Balance**" button to calculate whether crop needs are being met or if excess water is being applied, resulting in deep percolation of water and nutrients. If soil moisture is at deficit levels, the planner should adjust the amount of water applied by either increasing application rate or by decreasing the interval in days between irrigations. When the planner makes application adjustment, press the "**Calculate Balance**" button to recalculate the water balance information.

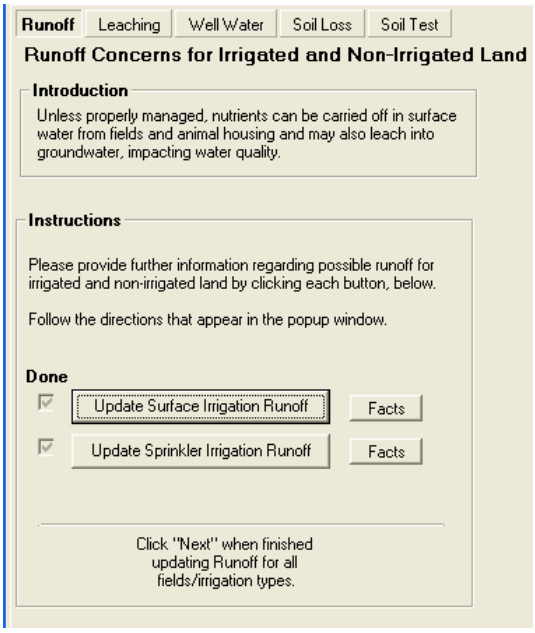


If deep percolation of moisture and nutrients is indicated, the planner should adjust the amount of water applied by either decreasing the application rate or by increasing the interval in days between irrigations. Make the necessary adjustment, press the "Water Applied" button to recalculate the water application, and then press the "Calculate Balance" button to recalculate the water balance information.

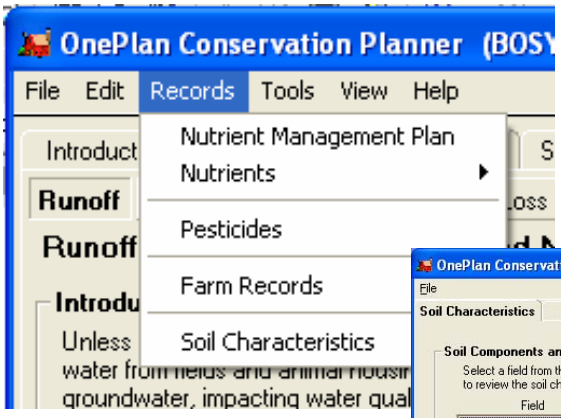
Once the user has completed the entry for a field, selecting a new field name will provide a new input screen for the next field the user chooses to select. Pressing the "Next" button will take the user out of this "Tab" and move on to the next section in which the user will identify the fields with runoff.

Resource Concerns

Field resource concerns must be identified to determine the proper method of plan development from a regulatory perspective. Those fields determined to have surface water as the primary resource concern will have different parameters than those classified as having ground water resource concerns. In this section the planner will identify if there are concerns from runoff due to surface irrigation or from sprinkler irrigation. The planner must identify runoff from both surface irrigation runoff or from sprinkler irrigation runoff. Checking the buttons as seen on the screen to the right will give the planner a map displaying the fields for the individual category selected (either surface or sprinkler).

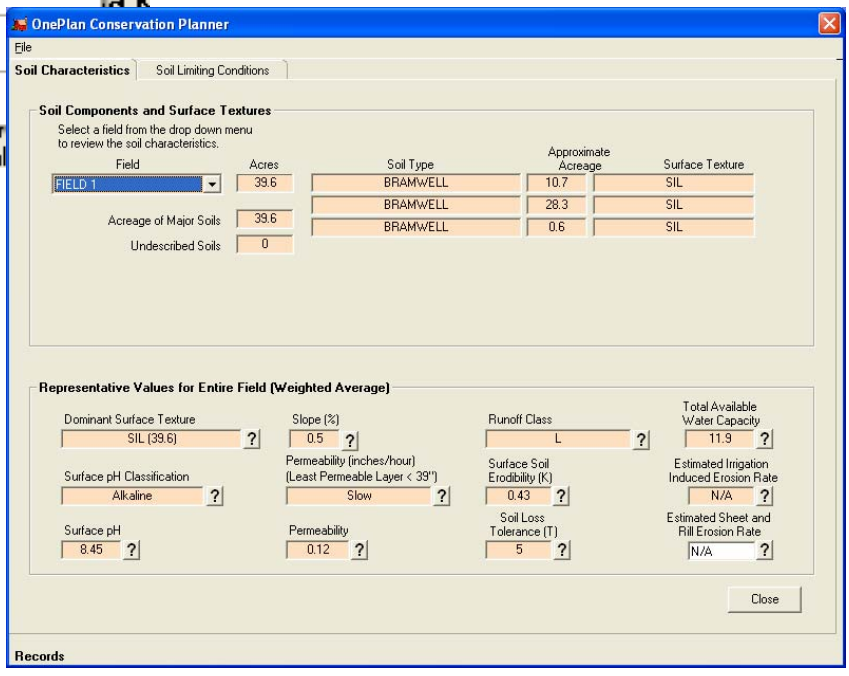


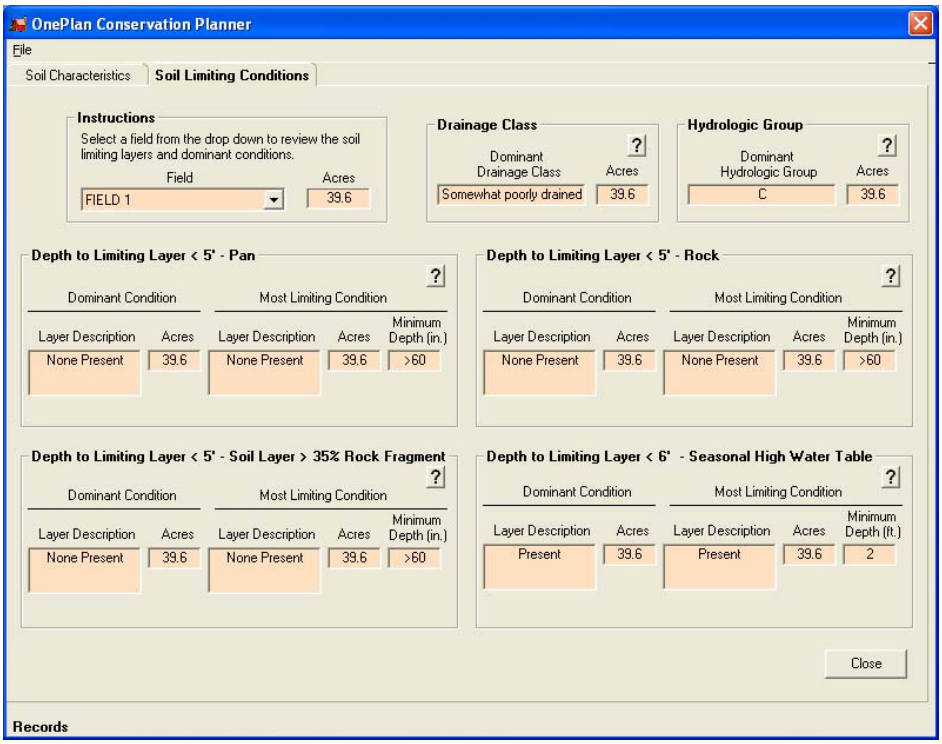
Records (Soil Characteristics)



By selecting the "Record" Tab the planner can access the data that are being stored and used by OnePlan in developing the calculated soil related data.

The "Soil Characteristics" file contains basic soil information.

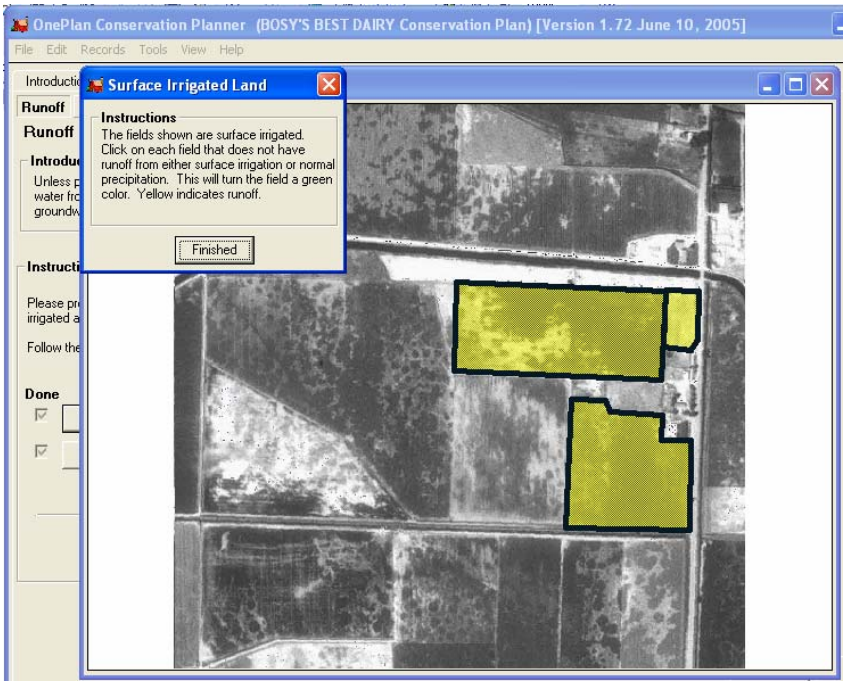




The "Soil Limiting Conditions" file contains data that the program utilizes in determining the presence of a subsurface feature that the program utilizes in determining groundwater risk assessment.

Field Runoff

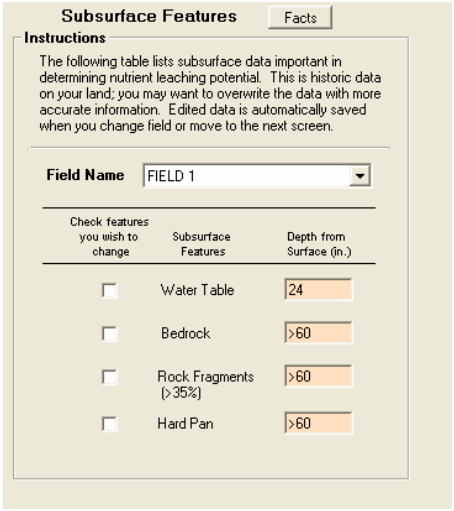
Fields receiving manure pose a special problem from runoff whether from irrigation or from precipitation. Either way, if runoff exists from the field, the Resource Concern becomes a "Surface Water" resource concern. Fields that are surface irrigated and do not utilize a pump back system are automatically assumed to have runoff. If a surface irrigated field does not have runoff the planner will identify that field by clicking within its boundaries which will turn the field green while the others remain yellow. See Example to left.



The sprinkler fields as seen in the screen to the right must be identified if they **DO NOT** have runoff by "Clicking" on the field. If a field is not identified by selecting it, the assumption will be made that there is runoff, and thus, the resource concern is for surface water.

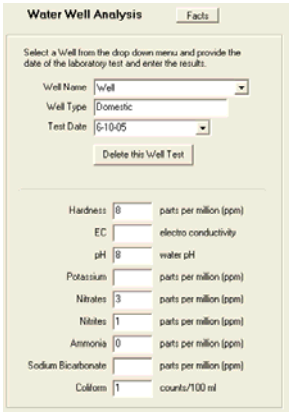
Subsurface Features

The GIS layers which are downloaded with the maps include a great deal of information about each of the fields. This information is part of the soil classification information. In some cases this information may not be accurate for a small site such as an individual field. The Subsurface Features screen allows planners to modify the information that was imported with the maps if it does not accurately describe the individual field. The planner will check the box or boxes of the information which needs to be changed? One the box has been checked the planner simply makes the necessary change and moves on to the next field or presses the "Next" button to continue on to the next section.



Well Water Analysis

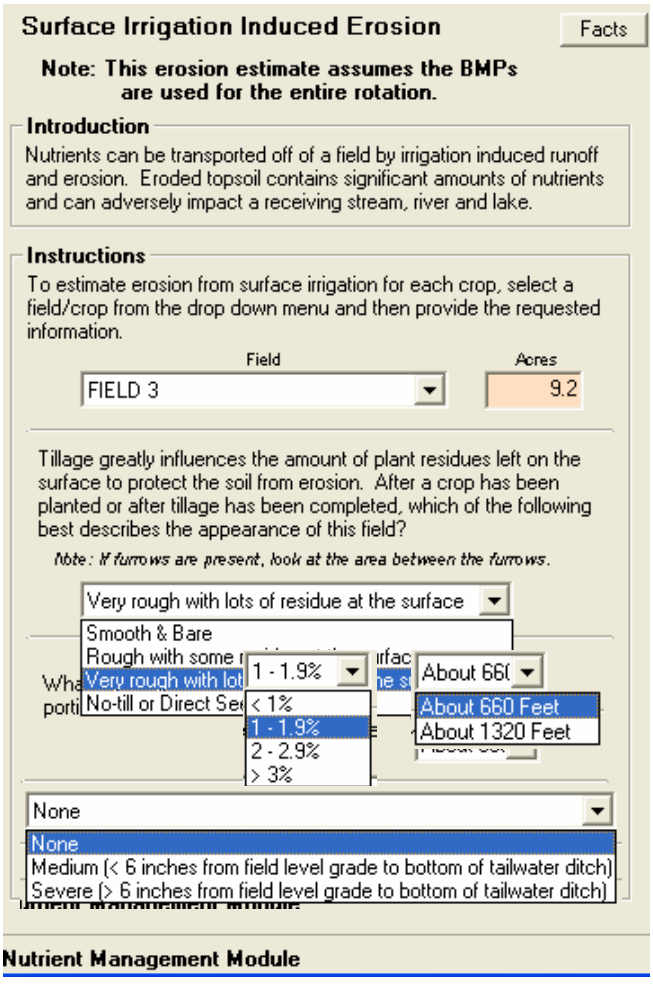
The Idaho State Department of Agriculture has tested every dairy well and has the test data on file. This data is available to individual producers. It is highly recommended that this information be included as a part of the plan. The well name drop down box will have the names of those wells that were previously identified on the maps. Each well can be selected and the information entered specifically for the individual well. Enter as much of the information for each well as is available. Remember to



identify the type of well. Examples of well types would include: agricultural, residential, commercial and stock water. Enter the date of the test of the well. It is highly advisable to maintain a list of the well tests to initially establish a baseline and as additional tests become available, to develop trend data. Should it be necessary to edit a test that was previously entered, first select the well for which the information should be edited and then select the date of the test you wish to edit from the Test Date drop box. Once the screen is populated with the test information, simply make the necessary changes.

Irrigation Induced Erosion

Irrigation induced erosion has an impact on the phosphorus index which is used in the calculations and nutrient application recommendations. The purpose of this "Tab" is to identify if the practices being used on an individual field are holding soil losses to an acceptable level. If levels of soil losses are at an excessive level, the planner can, in consultation with the producer, utilize conservation practices, which will help reduce soil losses with the goal of reducing losses to an acceptable level.

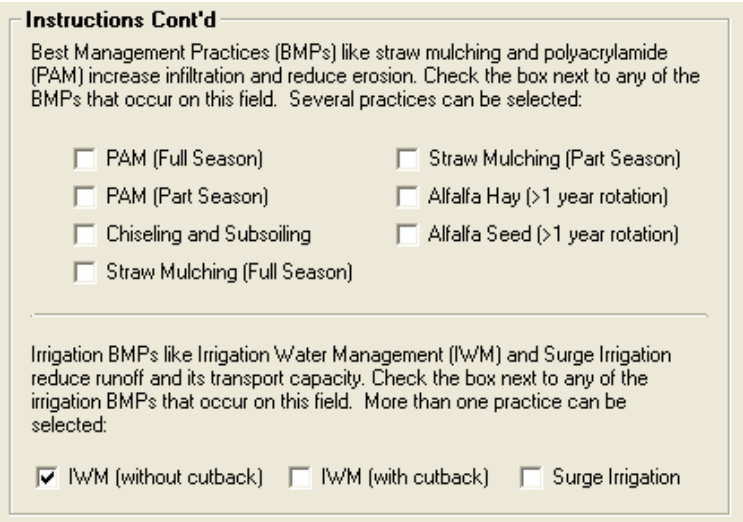


Selecting a field will also select the soils information pertinent to the selected field and that data will be taken into consideration in the calculation of soil losses. The GIS information also provides the Soil Erodibility factor (K), which is used in calculating total erosion in tons of soil per acre.

The planner will select tillage practices that are being used on the field to evaluate soil loss potential. The residue factors will affect the phosphorus index which in turn affects allowable application of nutrients.

Irrigation considerations include the slope of the field (user entered – in %), length of run, condition at the end of the furrows, and irrigation Best Management Practices that are being used. These items are entered by selecting the appropriate category from a drop box as seen in the example to the left.

Irrigation Best Management Practices



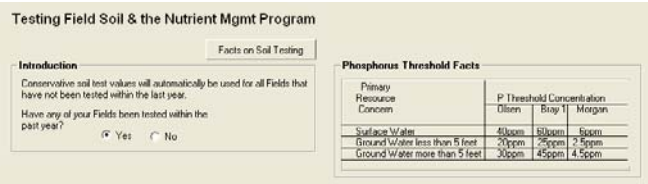
The "Irrigation – BMP's section of the screen will allow the planner to identify the practices being used that will help to reduce erosion.

Selecting PAM as an irrigation BMP, the use of conservation tillage practices and soil conserving crops as a part of the crop rotation will result in reduced erosion due to irrigation and impact the phosphorus index which is used in calculating allowable nutrient applications. The use of specific irrigation BMPs such as Irrigation Water Management and Surge Irrigation will also have an impact by reducing erosion. Select applicable BMPs by checking the appropriate check box for those applicable.

Soil Testing

Soil testing is the key to the whole nutrient management planning process. The objective to nutrient management planning is to provide the adequate nutrients for crop production, and at the same time, to insure that excessive nutrients are not applied or left in the soil where they can be leached into the ground water or eroded away into surface waters.

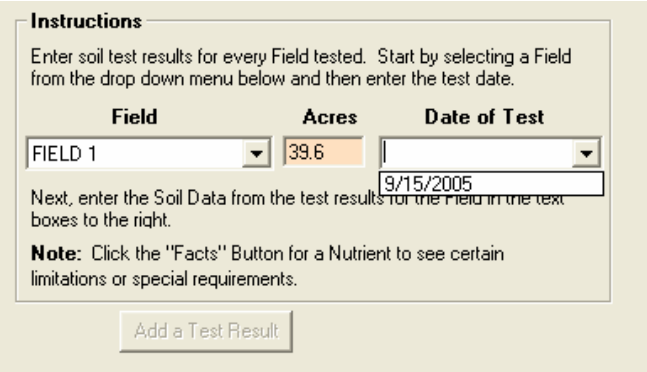
Proper sampling is critical to obtaining credible test results. Refer to the University of Idaho Soil Sampling Guide for the proper procedures in soil sampling to obtain a good sample.



Note: No nitrogen results can be given for those fields that have been tested more than 3 months (9 months for phosphorus) before the fertilizer application date (remember, this information was entered with the crop information as Date of Fertilization).

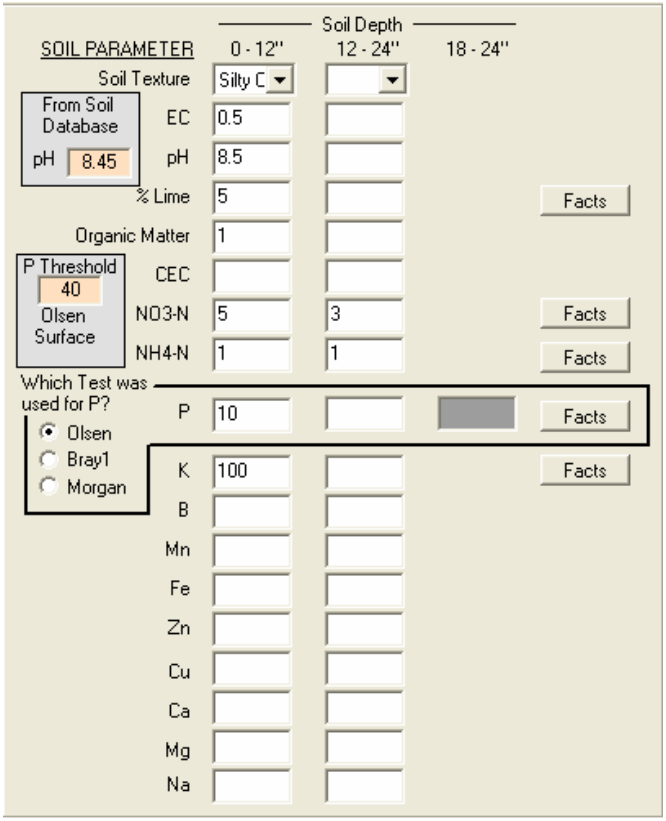
Selecting the "Yes" radio button will allow the user to enter the information for any of the fields on file. Soil test results should be entered on all fields. If some fields have not been tested, enter the results for those fields that have been done in the last year. Note that the Phosphorus Threshold levels are provided for reference.

Soil Test Data Entry



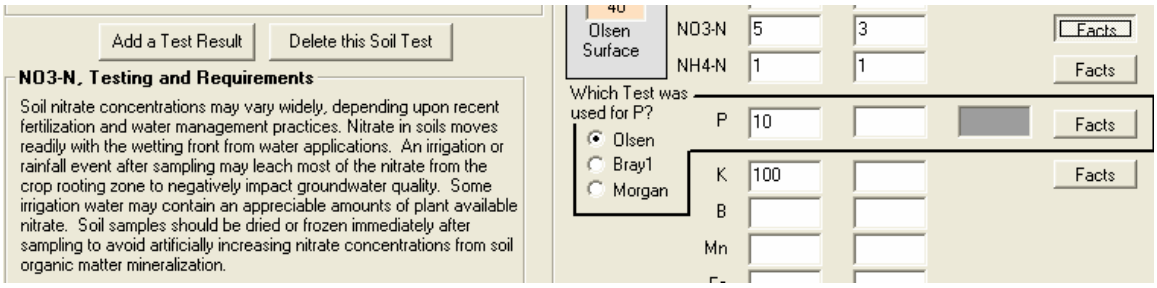
Regular (annual) testing is beneficial to establish baseline data and to build a history or to develop trends. The soil test entry screen allows the planner to compile a history of tests when multiple tests are entered for the selected field by using the "Add a Test Result" button. As many additional tests can be added for the selected field as the planner has available. This type of information will allow planners and producers to evaluate plans in the future to be able to fine tune plans to insure the environmental soundness of the plans being used.

The drop down box under "Field" allows the user to select from all fields on file for entry of a soil test. The date of the test must be filled in to identify one test from another. To edit an existing test simply select the field for which test you wish to modify from the drop box, next select the date of the test to be modified from the drop box and make the necessary changes on the data entry portion of the screen.

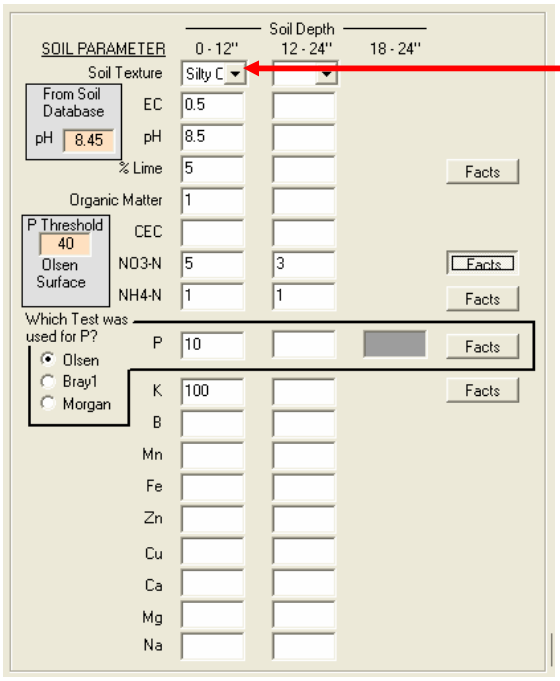


Note: Once again, data from the GIS layers is used in this section of the program. The soil database provides the expected pH for the soils in this field. The P threshold is displayed for this field based on the GIS layers, plus the previous information entered. **Also, note** that since the example is for a surface water runoff resource concern, the 40 ppm P threshold is in place, and soil test information will be from the 0"-12" and the 12"-24" levels. If a ground water resource concern was identified the P threshold would reflect the depth to ground water or the presence of a subsurface feature, and the soil test would ask for an addition P test in the 18"-23" levels.

Note: Nutrient lines with the fact buttons have information regarding the management or



regulation of that nutrient.

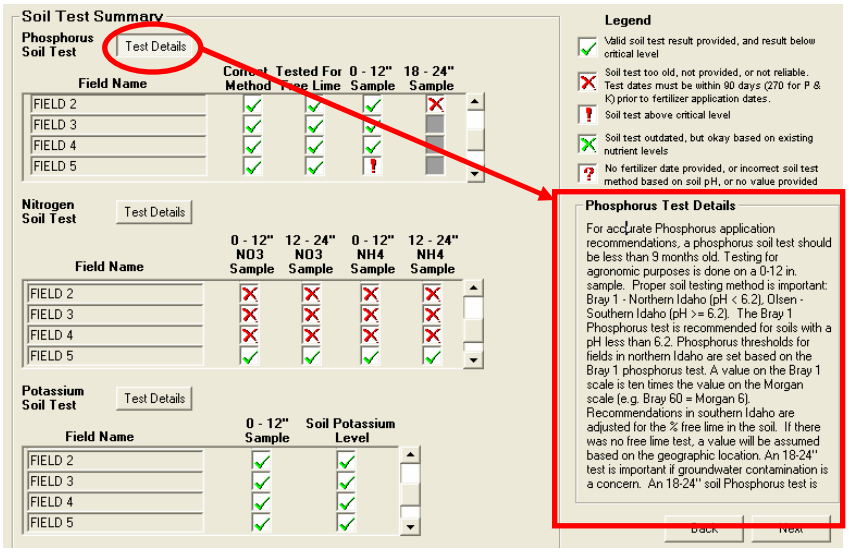


The soil test data entry screen requires the planner to identify the soil textures from the drop down box shown above for both the 0-12" and 12-24" soil tests. The planner will enter any of the additional soil test information that is available. It is important that the planner identify the type of lab test that was used to determine the phosphorus reading since the correct type of test must be used based on soil pH.

If it is necessary to edit a previously entered soil test data, simply select the field and the date of the test and the data entry screen will contain the previously entered information. Simply enter the new information and the test has been updated.

Soil Test Summary

From this visual perspective, the planner can identify shortcomings in the soil-testing program. Items that have been provided by the test information entered is identified by the checks in the boxes. A checked ✓ item has either been entered and is in compliance with the testing requirements. Those items identified with an "✗" are not in compliance while those with an "!" indicate that the soil test levels exceed allowable levels. A"?" indicates that no date for fertilizer application was given or that an incorrect testing method was used for the phosphorus test. If the user has questions about a specific test, they can get further details by using the "**Test Details**" button.



Application of Nutrients to Cropland

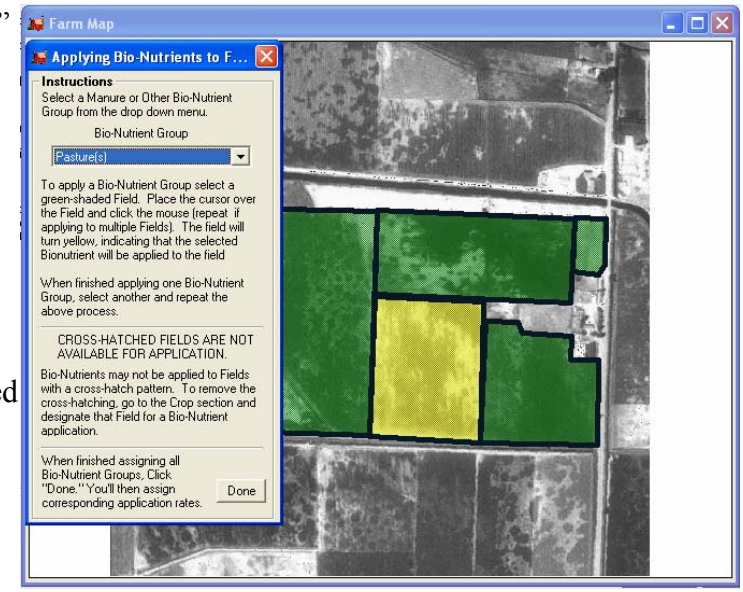
The application section of the program will lead the planner through the following tasks:

- Determine the crop nutrient requirements for each field based on the crop grown
- Quantify the existing and expected nutrient sources in a field
- Schedule the application of manure or other bio-nutrients to meet crop requirements
- Schedule commercial nutrients, if needed, to satisfy remaining crop needs
- Identify application methods and timing of nutrient application
- Report excess bio-nutrients which must be exported

Identification of Fields for Application

The first step in the application of Bio-nutrients will be the identification of the fields and the nutrient groups to be considered for each field in the application process.

First select the “Apply to Fields” button to begin assigning the fields that will receive Bionutrient applications. Select the group of Bionutrient you wish to apply and then simply click on the fields which will receive bio-nutrients.



After all of the fields for a specific group have been selected the planner can select the next bio-nutrient group to apply. Simply repeat the process of selecting fields for the application until all bio-nutrient groups that will be applied have been selected.

Once the fields receiving bio-nutrients have been selected, the program displays a screen which identifies the Bio-nutrient Application Schedule and the Crop Bio-nutrient Budget. This summary can be displayed for any one of the years which are included in the plan.

Bio-nutrient Application & Timing

Once a year has been selected the planner can calculate the application rate necessary to

Bio-Nutrient Application Schedule and Crop Bio-Nutrient Budget

Bio-Nutrient Application Schedule

OnePlan has scheduled application of Bio-Nutrient groups on your fields at an average phosphorus uptake rate for the rotation, with a cross-check to assure that nitrogen is not over-applied. If there is no runoff on the field, the soil test phosphorus is below the threshold, and the soil has recently been tested for nitrogen, you can apply bio-nutrients to nitrogen rates only during the current crop year. However, application rates are based on mineralization of nitrogen in manure, and that mineralization can be affected by a multitude of things and cannot be predicted with good precision. Because the bio-nutrients applied may not be immediately available, consider starter fertilizer. Nutrients applied in pounds per acre are displayed to the right.

Select a year: 2005 **View/update all years to calculate application rates.**

Application Rate Type					Bio-Nutrient Group Application Rate-tons/acre				Lbs/acre Applied		
N Limit	P Limit	None	Field	Acres	Waste Storage Pond(s)	Pasture(s)	Solid Stack(s)	Separated Solid(s)	N	P205	K20
☐	☑	☐	FIELD 1-Corn, Field, Dou	39.6	Not Applied	Not Applied	Not Applied	Not Applied	0	0	0
☐	☑	☐	FIELD 1-Alfalfa Hay, Dou	39.6	Not Applied	Not Applied	Not Applied	Not Applied	0	0**	0
☐	☑	☐	FIELD 2-Pasture, Good (	11.6	Not Applied	17.4	Not Applied	Not Applied	10	73	126
☐	☑	☐	FIELD 3-Pasture, Good (	9.2	Not Applied	Not Applied	Not Applied	Not Applied	0	0	0
☐	☑	☐	FIELD 4-Corn, Field, Dou	12.4	Not Applied	Not Applied	Not Applied	Not Applied	0	0	0
☐	☑	☐	FIELD 4-Alfalfa Hay, Dou	12.4	Not Applied	Not Applied	Not Applied	Not Applied	0	0**	0
☐	☑	☐	FIELD 5-Pasture, Good (	1.3	Not Applied	Not Applied	Not Applied	Not Applied	0	0	0
			Tons Remaining		**9**	**395.2**	**387**	**13**			

☐ Schedule Editor (planners, only)

OnePlan will assume all excess bionutrients will be exported.

Calculate Application Rates

View Full Bio-Nutrient Budget

(Valid only for years where Application Schedule has been run.)

Less than Crop Rotational P205 (use "None" button to decrease application acres)

Acceptable Rate

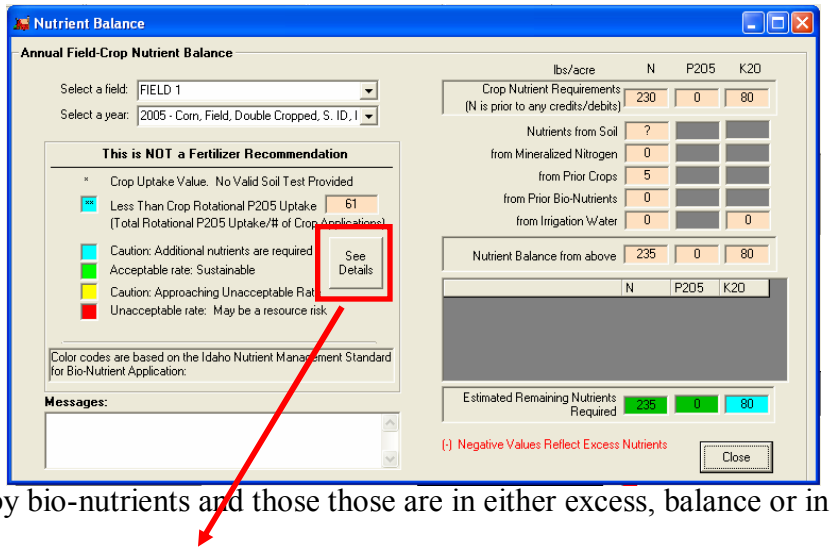
Unacceptable Rate

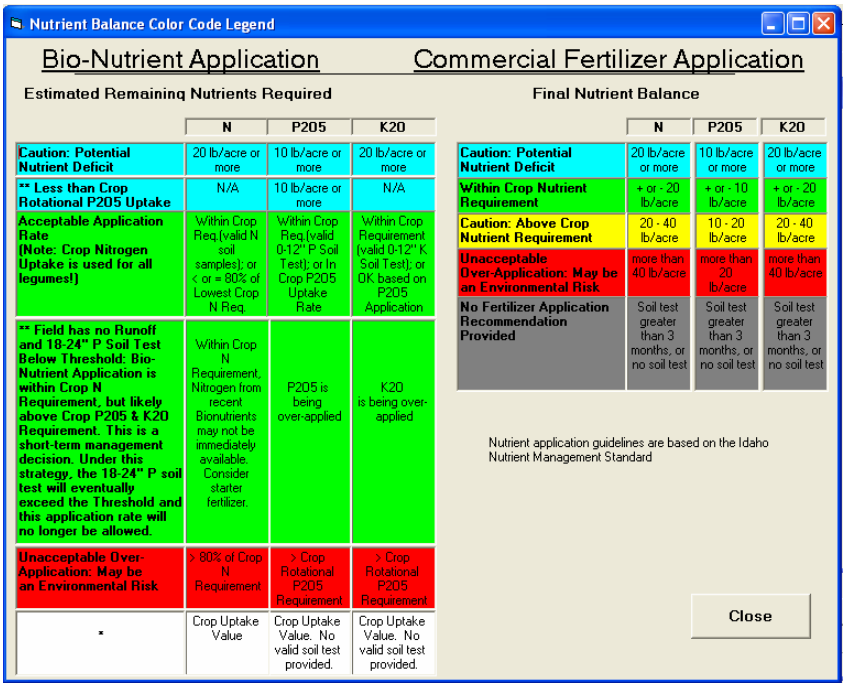
meet crop uptake needs for the specific crops and in the specific fields. The calculation

can be updated by pressing the "Calculate Application Rates" button found on the lower left corner of the screen. After the rates have been calculated the planner can "View Full Bio-Nutrient Budget" by pressing the button in the lower right hand corner of the screen.

Note: The nutrient balance table on the right side of the screen is populated. All of the acceptable parameters are green. Those fields where nutrient application rates exceed recommended levels are colored red. Those fields where bio-nutrients fail to meet the nutrient needs for crop production are shown in light blue. These fields will need additional bio-nutrients or commercial fertilizer if yield potentials are to be reached. Parameters identified by red must be corrected for the plan to become certified.

When the Annual Field-Crop Nutrient Balance is activated by pressing the "View Full Bio-Nutrient Budget" button planners can view the individual fields for a given year to obtain detailed nutrient information based on the recommend bio-nutrient application rates. The left side of the screen provides an evaluation of the nutrients taken up by the crop, those provided by bio-nutrients and those those are in either excess, balance or in deficit.

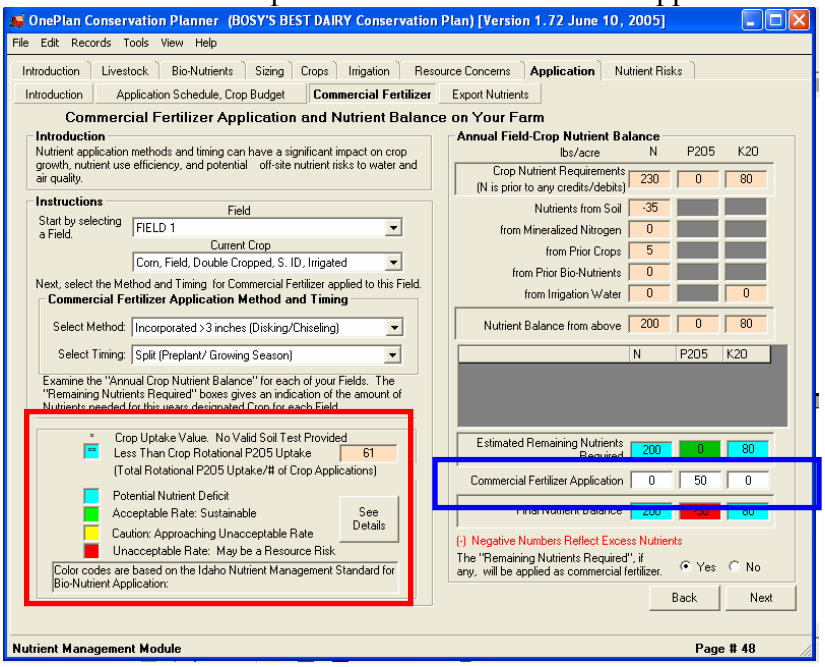




When the planner selects the "See Details" button, the screen to the left appears and provides planners with the details for the legends which are used to categorize bio-nutrients and nutrient balances. The parameters used to determine each of the categories blue, green, yellow, red and grey are explained.

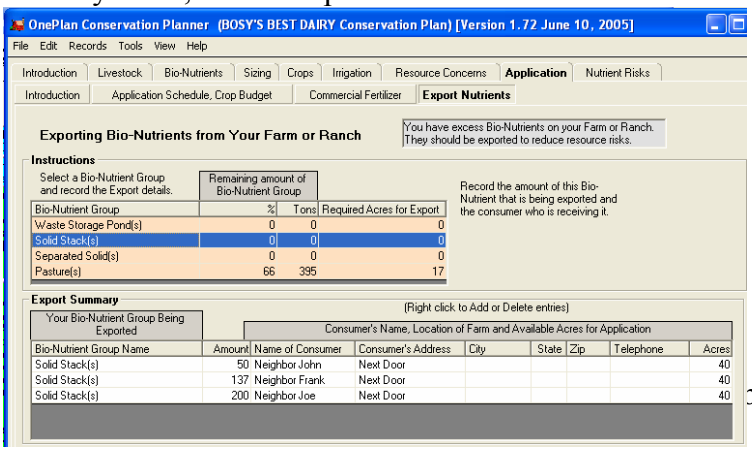
Commercial Nutrient Application & Timing

Planners using commercial nutrients will be required to enter the method of application and timing of application. Both the timing and application provide drop down boxes where the user selects the method, or the one that most closely describes the application and timing of application. The planner can enter the amount of commercial fertilizer being used in the box on the lower right side of the screen. **Note:** The balance is updated as the pounds of commercial fertilizer are entered. When excess commercial nutrients are added the color of the cell will go from blue which presents a potential nutrient deficiency to green which is acceptable levels then to yellow which is a cautionary level and finally to red which is an unacceptably high level of nutrients.



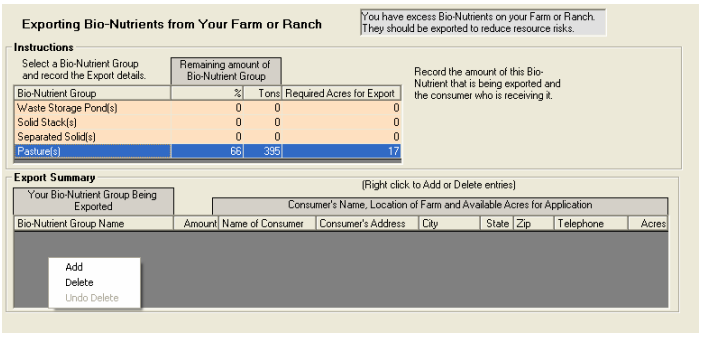
Exporting Nutrients

In many cases, livestock producers have more nutrients than they can utilize on their own cropland. Some producers may have agreements with other farmers who produce their feed. A producer will buy feed in exchange for the farmer taking manure. The nutrients to be exported must first be identified by bio-nutrient group and then assigned to producers who will be taking the nutrients to their farms. The farmers to



by completing the form shown Continue to add farms for exports until all of the nutrients are accounted for. Remember to account for all of the bio-nutrient groups. The plan is not considered complete until all excess nutrients from all groups have been accounted for. To assign the export of a bio-nutrient group the highlights

the bio-group and then moves the cursor to the gray area of the table and right click to activate the add, delete, undo delete dropdown box. Right click on the add option will Load the bio group to the export summary. The planner then can input the quantity, Customer information.



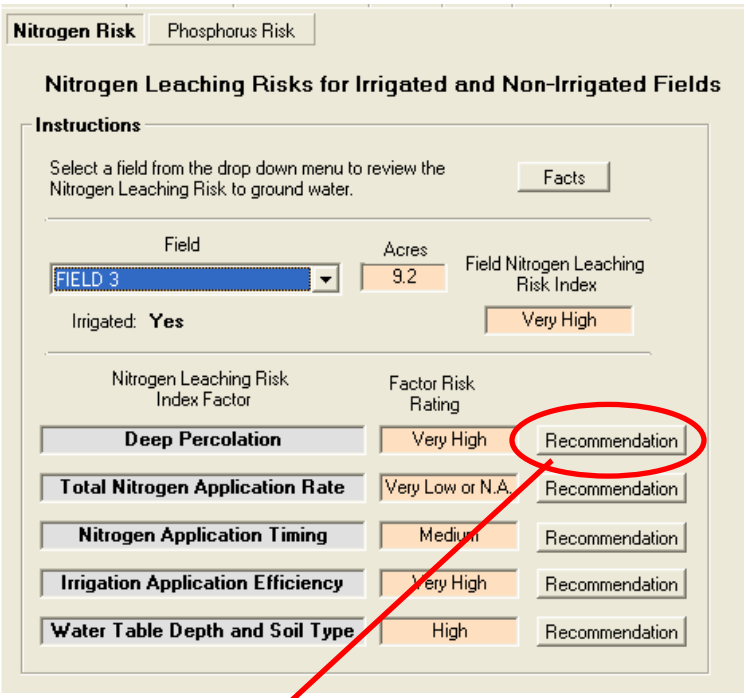
Note: The planner can add as many customers as necessary to export the Bio-nutrient group.

Nutrient Risk Analysis

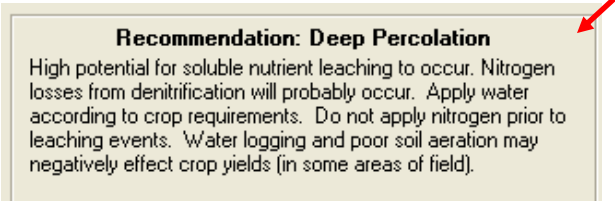
Once the application information has been completed, the final step in completing the plan will be to evaluate potential risks and to provide recommendations for minimizing the risks that have been identified. Each field has a list of risk index factors displayed for both nitrogen and phosphorus.

Nutrient Risk Analysis - Nitrogen

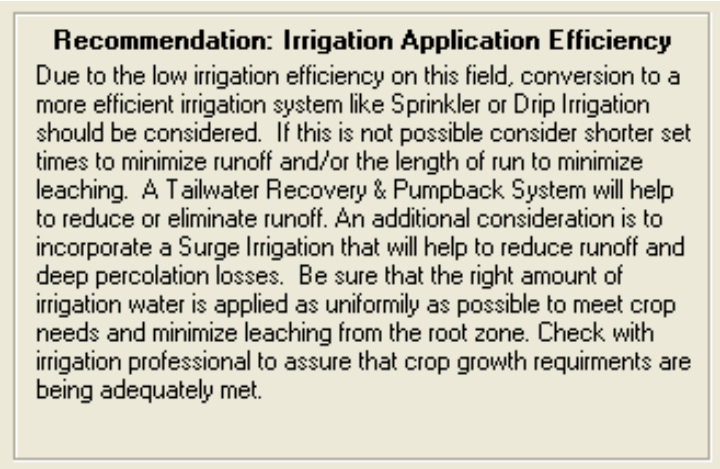
Once the application information has been completed, the final step in completing the plan will be to evaluate potential risks and to provide recommendations for minimizing the risks that have been identified.



Each field has a list of risk index factors displayed. In the example to the right the risk index for "Deep Percolation" and "Irrigation Application Efficiency" are both listed at "Very High." **Note:** as a result of the two very high ratings the entire field has been classed as "Very High" for Nitrogen Leaching Risk Index. The planner should use the "Recommendation" button to access the text entry box for that index and place recommendations for reducing the Irrigation Application Efficiency risks.

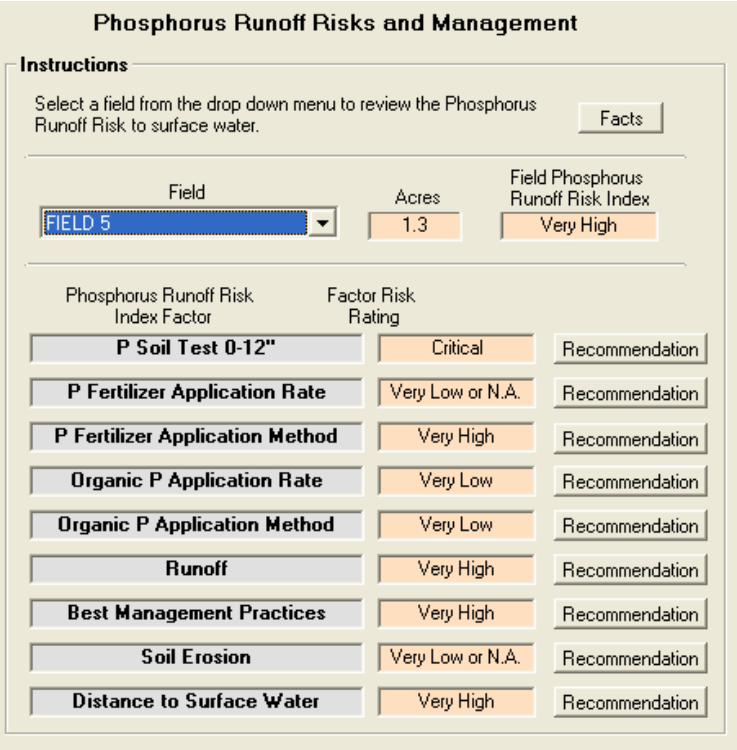


Note: The Recommendations for addressing the concern in Irrigation Application Efficiency are displayed to the right of the screen when the "Recommendation" button is pressed.



Nutrient Risk Analysis - Phosphorus

The phosphorus risk evaluation is similar to that used for nitrogen risk evaluation. There are several additional risk areas that are examined in relation to phosphorus runoff.

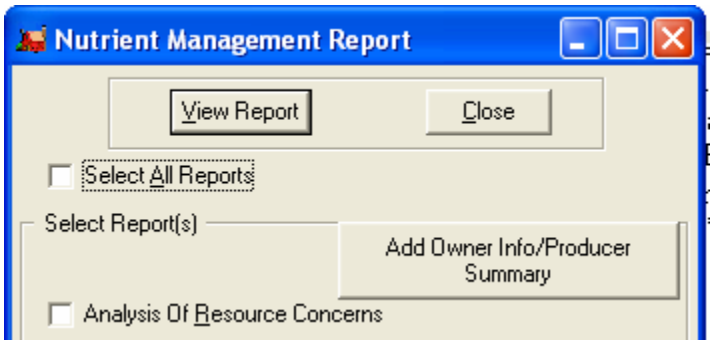


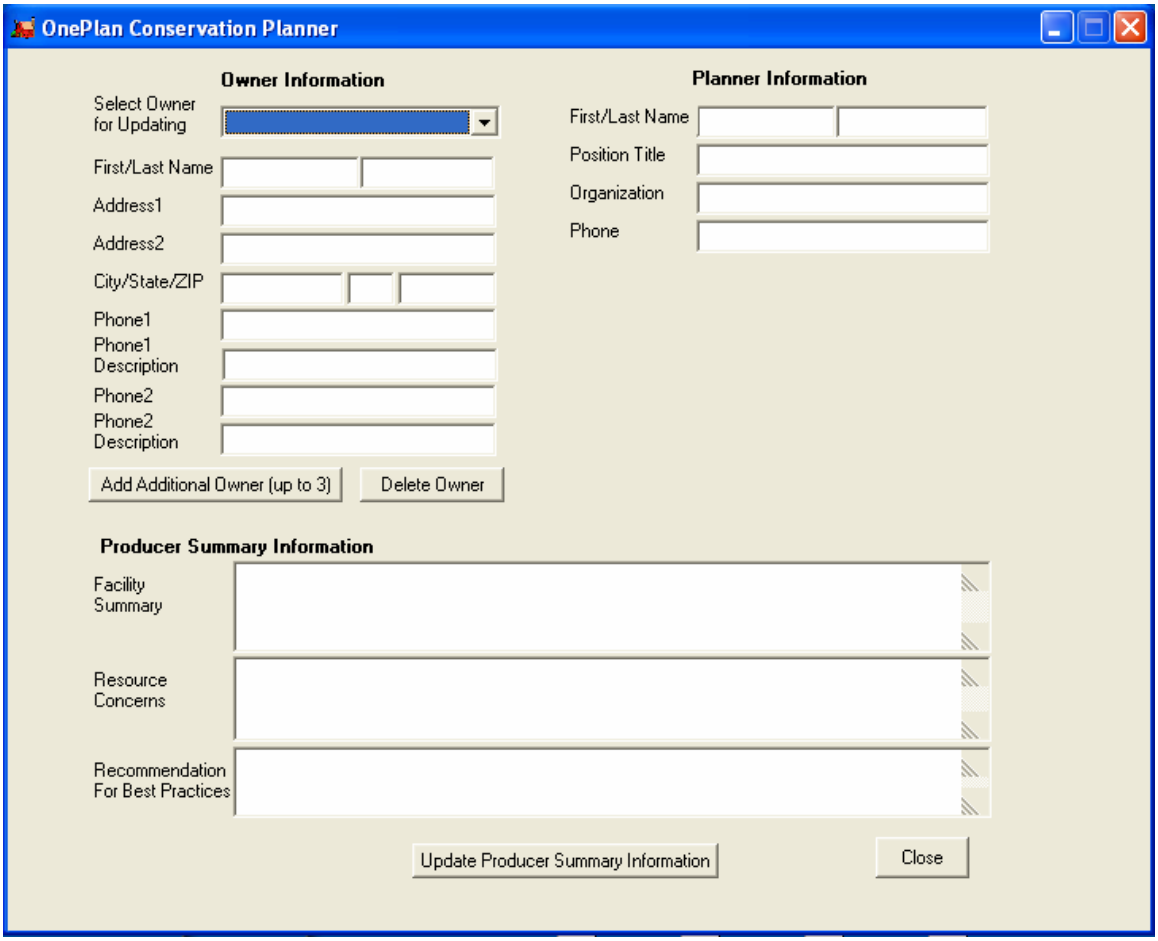
Each field has a list of risk Index factors displayed. In the example to the left, the risk index for "P Soil Test 0-12" is listed at "Critical." This level poses major cause for concern; the planner should use the "Recommendation" button to access the text box which will provide recommendations for dealing with the concern.

Note: Several categories are at the Very High level which places the entire field into the "Very High" Category.

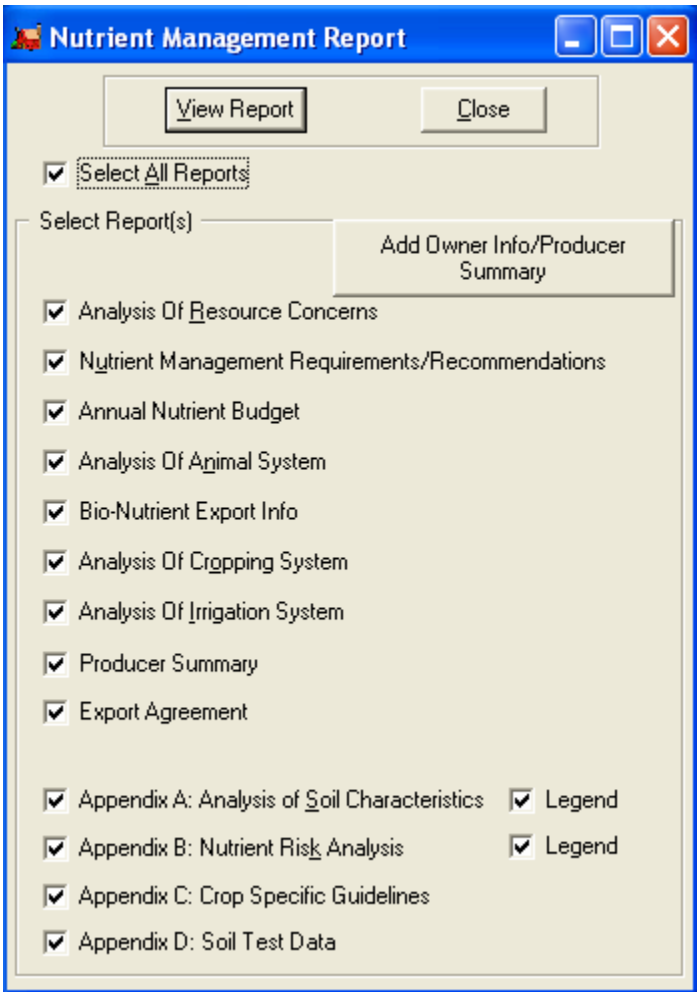
Finishing the Plan

The data entry for the plan has now been completed. The final step is to provide the producer's name and address. The planner will also be required to enter their name and address. By clicking on the "Add Owner Info/Producer Summary" the following window will be activated.





Producing the Printed Plan



Once all of the data is input, the calculations have been made; the plan can be printed out. The printout can be of the entire report or any one or more of the individual components of the report.

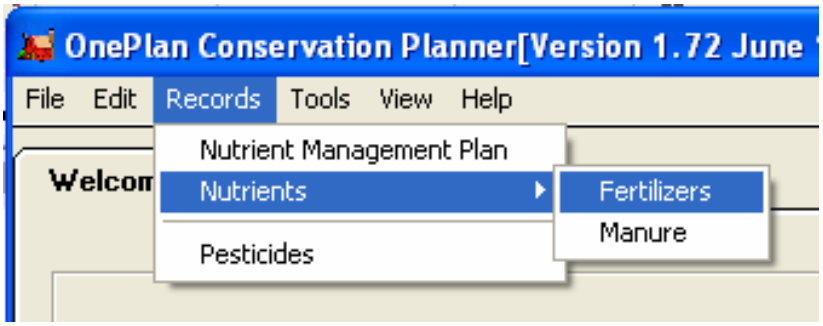
The reports can be printed to a printer, a file or to a special program such as a PDF writer. The print out may be 70 – 110 pages in length and may occupy a slow printer for a long time.

Records

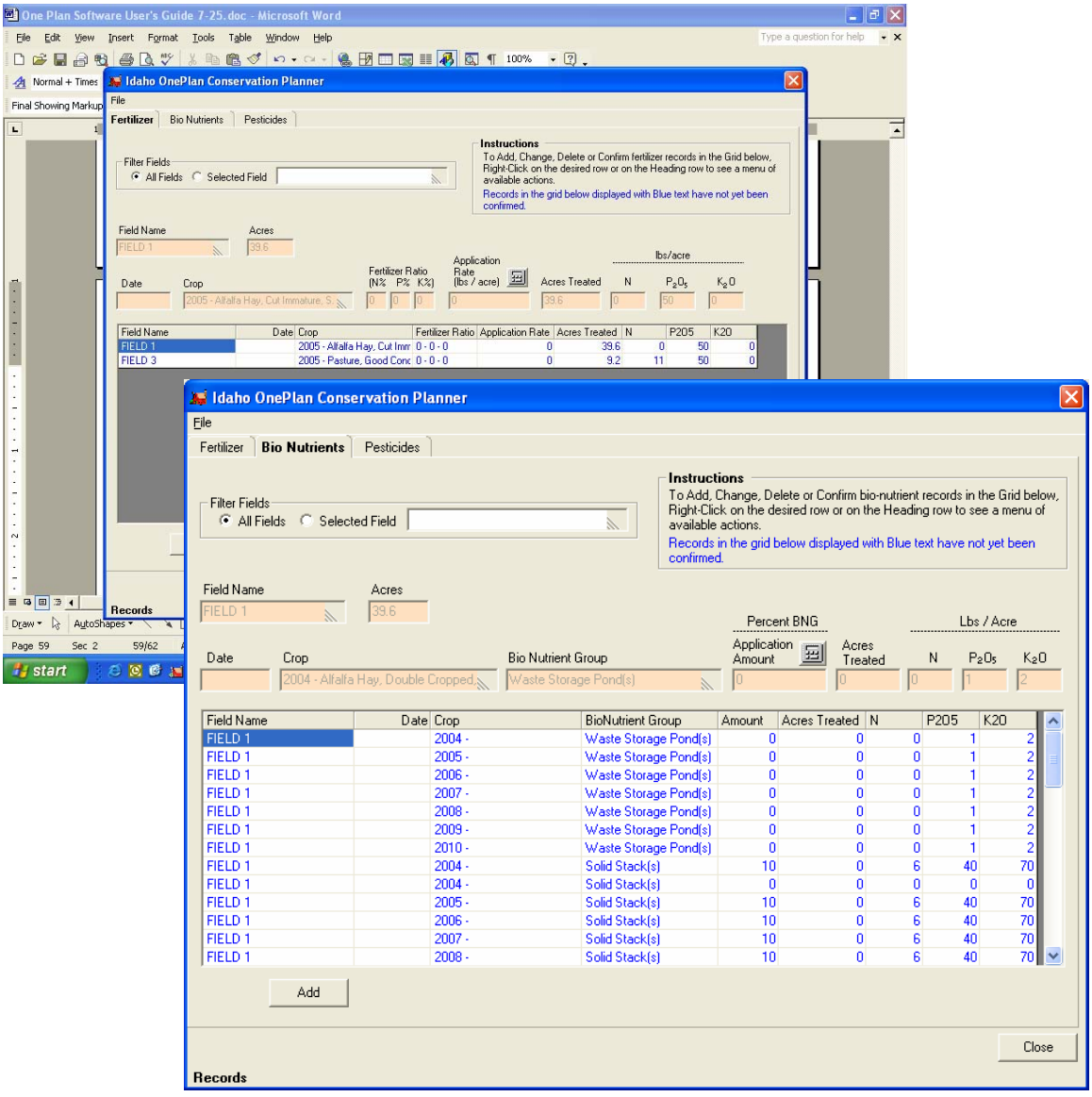
The records tab contains the links to three important items.

Nutrient Management Plan
Nutrients
Pesticides

The Nutrient Management Plan will give the planner a printout of the plan report. This is the a way of gaining access to the report without having to navigate the program.



The Nutrient option gives the planner access to the history of application of nutrients whether applied in the form a bio-nutrients (manure waste) or commercial fertilizer.



The Pesticides option will give the planner the same historical database when the IMP module to OnePlan is developed.

REQUIRED COMPONENTS OF A PRODUCER SUMMARY

The software pack does the majority of the work required to produce a certified nutrient management plan. The planner will need to provide a Producer Summary. The summary will need to be written using the information found in the output from the One Plan software. The following outline is provided as a guide for a planner to follow to insure all of the required information is provided.

FACILITY DESCRIPTION

A general description of the facility that includes:

- Type of facility
- Describe livestock unit(s): Number of animals, weight ranges, and species for which the plan is designed
- Current number of animals
- Future growth of facility
- Type of housing used related to livestock unit
- General description of nearby residential and public use areas

RESOURCE CONCERNS

Summarize all environmentally sensitive issues (as outlined in the Field Phosphorus Threshold Table in the NMP), how the producer is managing them and specific BMPs to improve management. Summarize overall nutrient risk ratings (nitrogen leaching and phosphorus runoff) by field in a table, or refer the producer to the Nutrient Risk Analysis in the One Plan NMP printout.

STORAGE AND HANDLING PLAN REQUIREMENTS

Describe all required upgrades or changes in the storage and handling of animal waste on the facility. If additional waste storage needs to be constructed to meet storage requirements (180 days or sooner if hydraulic balance allows), provide necessary information on size, ISDA contact information, and compliance date. The compliance date should be in October of the current year, (if October is not realistic, another date should be approved by the ISDA).

NUTRIENT MANAGEMENT PLAN REQUIREMENTS

Refer the producer to the Nutrient Management Requirements/Recommendations section in the One Plan NMP printout.

IRRIGATION MANAGEMENT PLAN REQUIREMENTS

Enter all required upgrades or changes in irrigation management. Example, required changes are:

- If a field is currently a surface water concern, and the plan is written as if the field is a groundwater resource concern (the plan states a sprinkler system will be installed).
- If the producer is over-applying animal waste and the planner will require irrigation set times.

FACILITY TESTING REQUIREMENTS

Input the following statement:

Regulatory soil phosphorus samples are required from each field every 3-5 years. Samples will be taken from the 0-12" soil depth for surface water concerns and the 18-24" soil depth for groundwater concerns. The samples will be reviewed for phosphorus level and compared with previous test data. These tests will indicate compliance with the nutrient management plan. The producer is not responsible to take or analyze these samples. Refer the producer to the Field Threshold Table in Resource Concern section of the One Plan NMP printout for the individual field's resource concern and phosphorus threshold.

RECOMMENDATIONS

Provide recommendations to upgrade storage and handling, nutrient management, and irrigation management on the facility. Include site-specific Best Management Practices that would improve nutrient management, irrigation, and waste management practices.