U.S. Army Corps of Engineers
Institute for Water Resources

IWR Planning Suite Annualization Tool User's Guide

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Section 1
Introduction

Annualizing ecosystem costs and outputs is required by U.S. Army Corps of Engineers (Corps) planning guidance. While annualizing costs is typically performed by economists, annualizing ecosystem outputs requires knowledge on the part of biologists or ecologists in terms of ecosystem response rates for various project alternatives. Responses over the period of analysis are compared to future without project conditions to estimate the "lift" or "benefit" provided by project alternatives. While the process and calculations may sound simple, they are fraught with error. Miscalculations or failure to even consider average annual outputs are frequently cited as problems by higher level reviewers. The annualizer utility allows users to interpolate NED and NER benefits and costs over the period of analysis.

The utility also estimates average annual equivalent NED costs and benefits and net present values, and estimates the average annual NER outputs. While there are many interpolation techniques for non-monetary units of cost and benefit, the NER annualizer provides users with options for estimating values between point measurements. The two options presently available to users of the annualizer module include linear interpolation, rate of growth, and user input at each point. While the annualizer is intended to serve as an aid to planners and economists, it remains the user's responsibility to apply annualization techniques appropriate to the level of accuracy and fidelity of the benefits and costs quantification effort.

In order to demonstrate the newly added Annualizer, the Cedar Lake, Indiana Feasibility Study (referred to as Cedar Lake Study) is provided as a case study application. In this document, Section 2 provides background on the Cedar Lake Study including relevant data on the costs and environmental outputs. Sections 3 and 4 provide a step-by-step user guide for the Annualizer module using data from the Cedar Lake Study as a case example.

The user is encouraged to review the following references and Corps guidance for further information:

- The Planning Guidance Notebook (ER 1105-2-100), April 2000
- Principles and Guidelines, March 1982
- Economic Guidance Memorandum on the Federal Interest Rate, Published Yearly
- The National Economic Development Manuals Website (http://www.iwr.usace.army.mil/ned/)

Section 2
Case Study Background

The Town of Cedar Lake, Indiana and the U.S. Army Corps of Engineers (Corps) have partnered to investigate the feasibility of an aquatic ecosystem restoration project at Cedar Lake. Historically, Cedar Lake supported a biologically diverse ecosystem with native flora and fauna characteristics of glacial lakes. Since the late 1800's, alterations to Cedar Lake have caused major adverse impacts to its fringe wetland habitat, littoral zone habitat, lake-bottom substrate, and water quality. The primary objective of this potential ecosystem restoration project is to:

- Restore Cedar Lake to mesotrophic or eutrophic status and reduce turbidity in the water column by achieving water quality standards. Incidental recreation benefits are expected
- Restore the lacustrine habitat of Cedar Lake by restoring fringe wetlands, the littoral zone, and confluent streams and wetlands
- Gain outputs of native lacustrine biodiversity through increases in diversity and abundance of aquatic macrophytes, increases in diversity and abundance of macroinvertebrates, increases in diversity and abundance of native glacial lake fishes, and reduced abundance of non-native common carp and whiter perch

Several restoration measures were considered in the Cedar Lake Study including sediment removal, nutrient inactivation, dilution and flushing, creation of in-lake structures, littoral zone creation, shoreline restoration, institutional controls, fish community management and aquatic invasive species control, bank stabilization of tributaries, storm water management, farmland improvements, woodland management, and creation of filtration wetlands. These measures were evaluated for cost effectiveness based on habitat output and implementation costs. Combinations of restoration measures are formulated into alternatives for evaluation.

Since implementation time can vary depending on the measure, construction costs and operation and maintenance costs were distributed appropriately over the entire 50-year project life. Implementation costs were brought to present value based on federal discount rate of 4.875%[1]. Once all implementation distributed costs were converted to present values, the annual equivalent cost of implementing each measure was determined.

Habitat outputs were estimated over the entire project life. In order to restore the aquatic ecosystem of Cedar Lake, both ecosystem function and structure must be addressed. The

[1] The discount rate is representative of the example. The current federal discount rate as of FY09 is 4 5/8%.

level of habitat suitability, which takes into account the function and structure of the ecosystem, is calculated by developing a habitat suitability index (HIS). The HIS is an algebraic function that uses various indicators of the quality of habitat function and structure. Several species-specific HSIs were developed by the U.S. Fish and Wildlife Service. There are limitations to using a species-specific index when the goal is to restore the overall natural habitat because outputs are focused on one species and other species may be overlooked or negatively impacted. Unfortunately, there is not an established HIS for lacustrine habitats; therefore one was developed for Cedar Lake. Total habitat outputs, in terms of habitat units (Hus) were calculated by multiplying the habitat suitability index times the area of habitat affected.

For purposes of this document, two measures developed for the Cedar Lake Study were selected for input into the Annualization module: Measure A.3 and Measure B.2.

Measure A.3 involves physical removal of bottom sediments aimed at reducing both the internal nutrient loading as well as turbidity caused by resuspension. This scenario only dredges areas that contain elevated levels of phosphorus, which is approximately 83 acres total to a depth of 2.7 feet.

Measure B.2 applies Aluminum Sulfate (Alum) to 83 acres that contain elevated levels of phosphorus to reduce the internal nutrient loading caused by the interaction between nutrient rich sediments and the water column. The release of phosphorus from bottom sediments to the water column has been shown to be the major contributor to water quality degradation in Cedar Lake.

Section 3
User Guide

In this section, step-by-step instructions are provided for using the Annualizer module. This documentation is meant to be in addition to the IWR Planning Suite User's Guide published in November 2006. The Cedar Lake Study data for Measure A3 and Measure B2 are used in the examples.

The overall process for the Annualizer is to first open the calculator; save measures needed for the study; input cost, NED, and NER data; print graphics and tables as needed; and create graphics of the measures to be compared. Each of these steps is described in detail. For reference, a list of definitions is provided at the end of this section.

3.1 Open Annualizer

Open the IWR Planning Suite. Open a Plan Study or create a new one. To open the Annualizer, click on the Annualizer icon located on the toolbar or select 'View' from the File menu and then 'Annualizer'. Both options are shown in **Figure 1**.

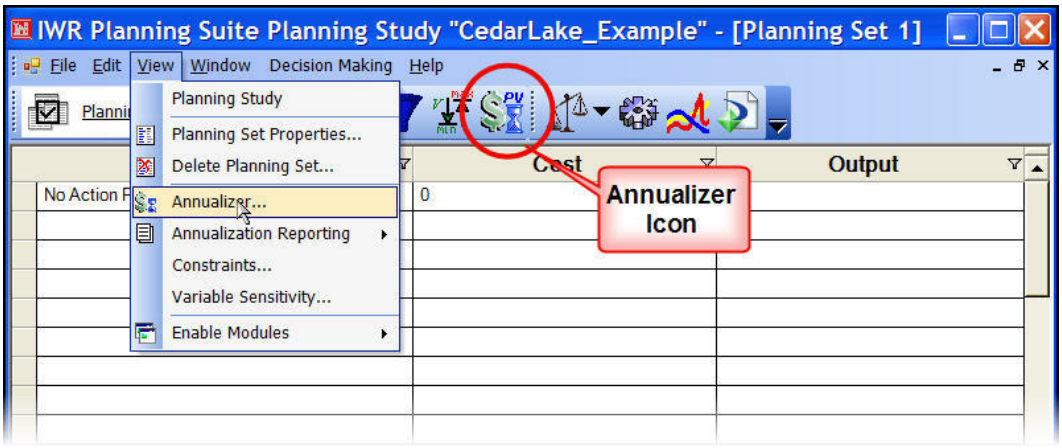


Figure 1
Opening Annualizer Module

Figure 2 displays the Annualizer module. If no Annualizer data are saved in the opened Planning Set, all data entry fields are default upon open. By default, the discount rate is set to 0 percent, period of analysis is set to 50 years, NER max output is set to 100 units, and all other values are set to zero.

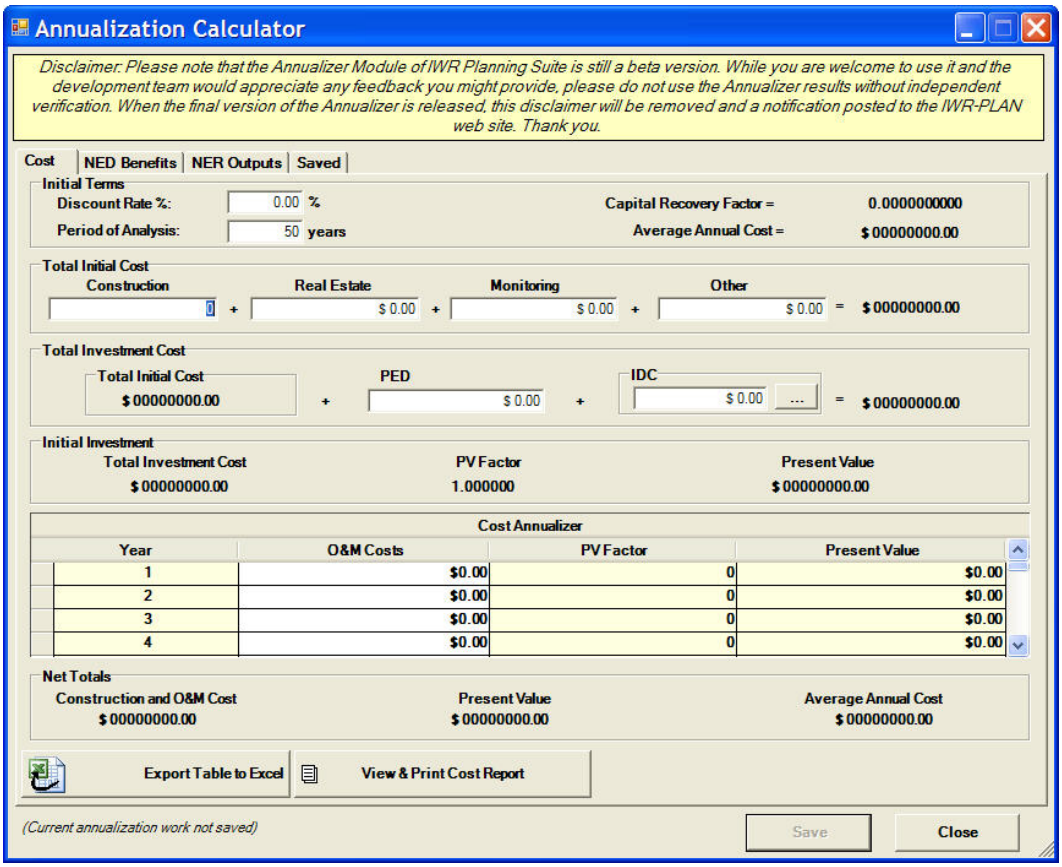


Figure 2
Annualizer Module

As shown in Figure 2, the Annualizer module has four "Tabs" that can be selected for data input, Cost, NED Benefits, NER Outputs, and Saved. The Cost, NED Benefits, and NER Outputs tabs are where data are entered and calculations are computed. The purpose of the Saved tab is storing and accessing data for multiple measures for the study.

3.2 Add and Save New Measure

To begin, click the Saved tab. To add a new plan measure that annualized costs and benefits will be computed for, click the 'Add New' button, as shown in **Figure 3**. Once clicked, a new row will appear under the 'Annualizations Library' and the cursor will appear in the 'Name' box. Enter the desired name of the alternative. In the example, the measure is named "MeasureA3". Press the TAB button on the keyboard, the 'Date Last Saved' box is automatically updated with the date and time. Repeat the process to add additional measures. In the example, Cedar Lake Study Measure B.2 is added to the library. Select Measure A.3 to begin entering data, as shown in **Figure 4**.

Notes:

- To delete a measure from the library, select as shown in Figure 3 and press DELETE button on keyboard. A dialog box will appear confirming the deletion. Select 'Yes' to delete the measure and 'No' to cancel and return to the Saved tab.
- When a new measure is added, the data entered into the Annualizer at that moment is saved to the added measure.

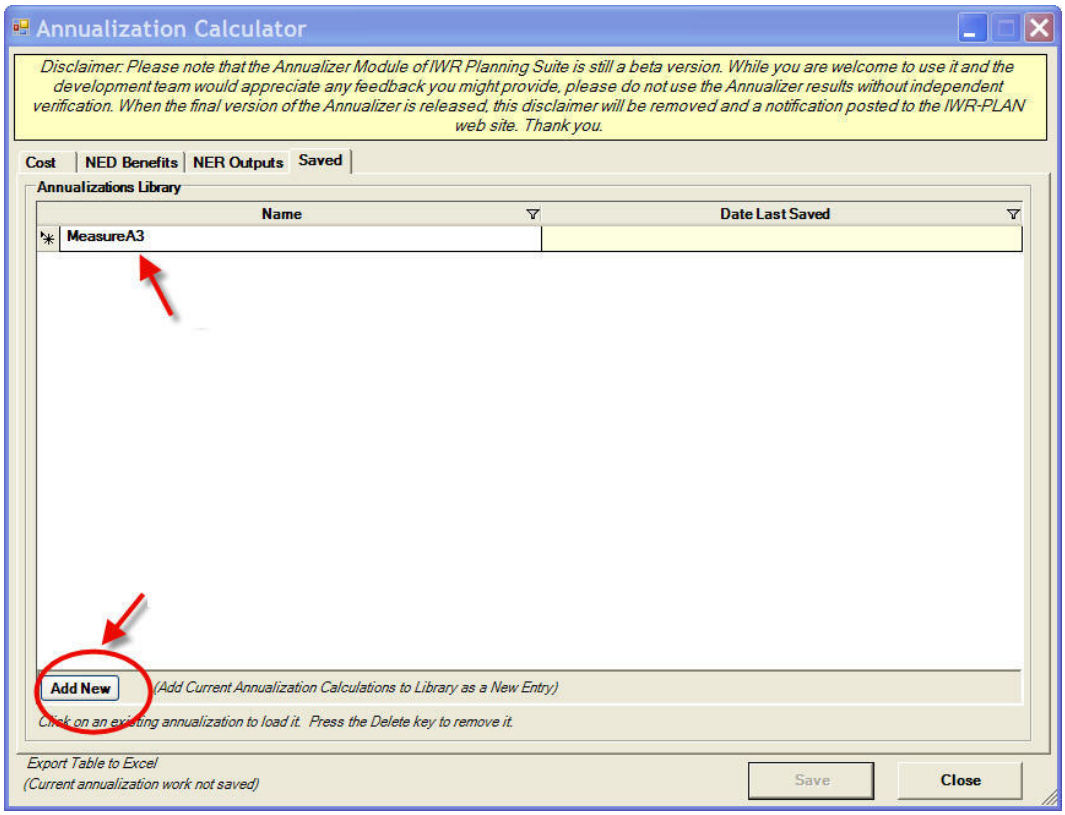


Figure 3
Add and Save New Measure

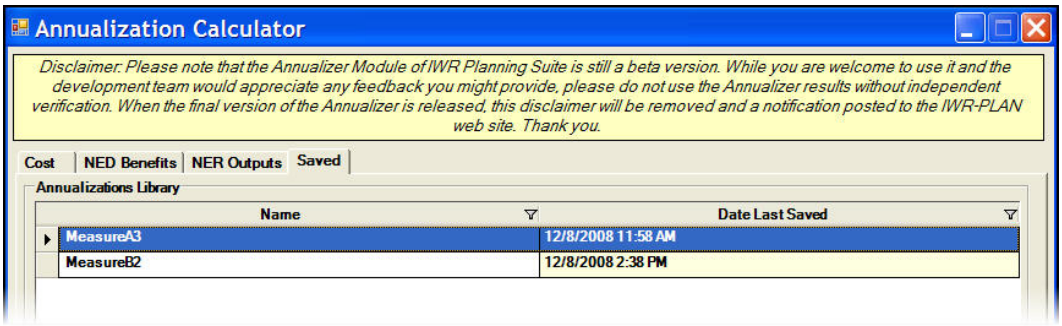


Figure 4
Select Measure to Begin Adding Data

3.3 Add Cost Data

Next, add data to the Cost tab. To move from the Saved tab to the Cost tab, left click on the Cost tab. When viewing the Cost tab, notice that the cells are colored both white and soft yellow. The white cells indicate data input cell. The soft yellow cells are calculated by the Annualizer and thus no input is required. This pattern is also true for the NED Benefits and NER Outputs tabs.

Figure 5 displays the Cost tab of the Annualizer. As identified, there are seven main areas of the Cost tab. Each are briefly described below and then further discussed:

(1) Initial Terms—in this area enter the project discount rate and the period of analysis; the capital recovery factor and average annual cost are automatically calculated.

(2) Total Initial Cost—input areas for initial construction, real estate, monitoring, and other initial costs; the total initial costs are automatically calculated.

(3) Total Investment Cost—total initial costs are carried from above and input boxes are provided for PED and IDC; calculator for IDC; total investment costs are automatically calculated.

(4) Initial Investment—here the total investment cost, present value (PV) factor, and present value (in dollars) are automatically calculated as data are entered.

(5) Cost Annualizer Table—in this table, enter all annual costs in column "Total Future Costs", the PV factor and present value are automatically updated.

(6) Net Totals—automatically provides summary of Total Initial Cost, Total Investment Cost and Total Future Costs costs in total cost, present value, and the average annual cost of the management measure.

(7) Action Buttons—these are the buttons that allow the user to export the table to excel, print the table, save changes to the measure, and close the Annualizer.

3.3.1 Initial Terms

The *Initial Terms* area is shown in detail in **Figure 6**. Enter the discount rate for the project and the period of analysis. The capital recovery factor automatically calculates and the 'Cost Annualizer' table automatically adds the number of years. Inputting the discount rate and period of analysis should be completed before adding data to the 'Cost Annualizer' table. In the example, data for Measure A.3 of the Cedar Lake Study is entered. The discount rate is 4.875 percent and the period of analysis is 50 years.

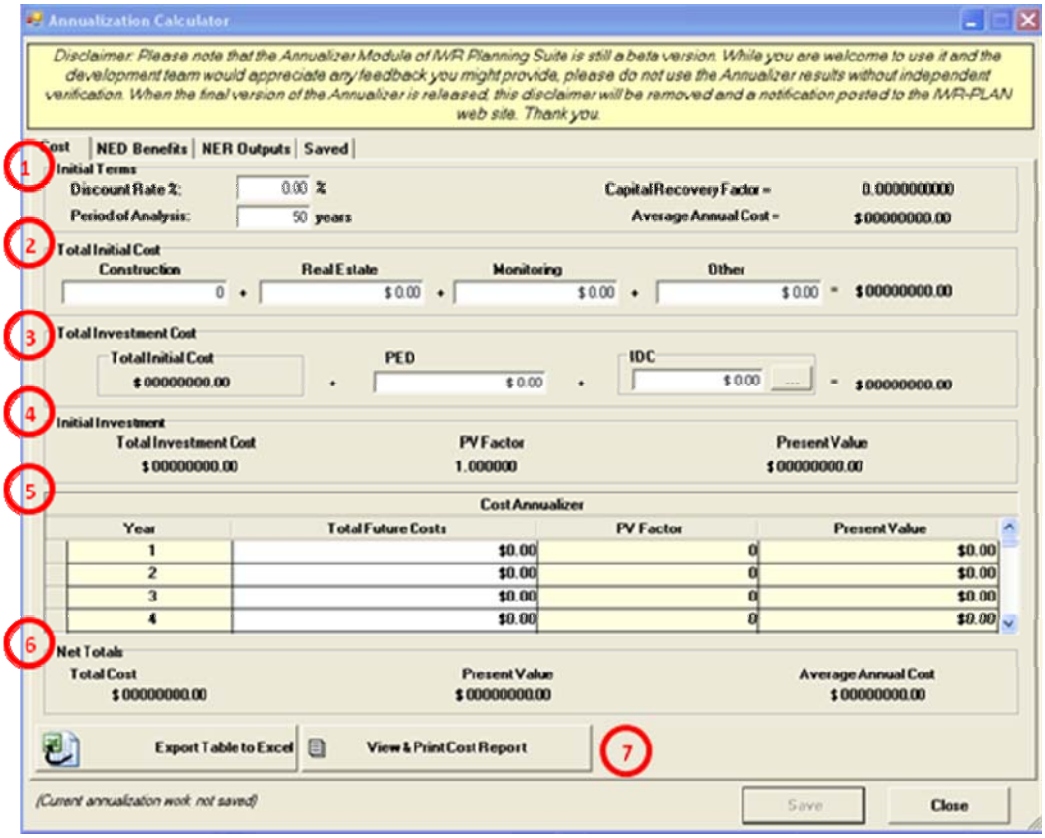


Figure 5
Cost Input Areas

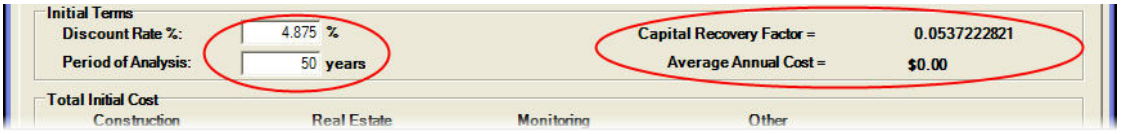


Figure 6
Input Initial Terms

3.3.2 Total Initial Cost

The *Total Initial Cost* area is shown in detail in **Figure 7**. Enter the initial costs for the project. The input boxes are labeled as Construction, Real Estate, Monitoring, and Other. These boxes are for costs incurred during year zero of the project. To enter a value, click in the box, enter the desired value, and click somewhere else on the calculator. The total is automatically updated. The input boxes are designed to be general, as all projects do not have these exact categories. Use them as needed but be sure to only enter costs incurred in year zero in these cells. For the Cedar Lake Study Measure A.3, there are no initial construction costs or real estate costs but there are initial monitoring costs in the amount of $32,500.

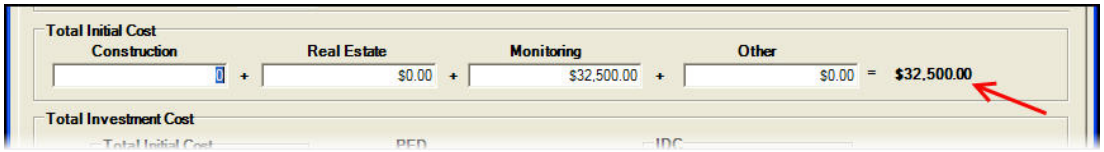


Figure 7
Input Total Initial Costs

3.3.3 Total Investment Cost

The *Total Investment Cost* area is shown in detail in **Figure 8**. The total initial costs are carried down and added to the Preconstruction Engineering and Design (PED) costs and the Interest During Construction Costs (IDC) to calculate the total investment cost. The user enters the PED costs. In this example, PED costs are $682,500. There is a calculator for the IDC input box, as described below. The user can enter an IDC value or use the calculator to compute IDC. In this example, the project's IDC costs are zero.

Figure 8
Input Total Investment Costs

As shown in Figure 8, the Total Investment Cost area has an input box for IDC. Also shown in the figure is a red arrow pointing to a button with three dots. The arrow points to a button that opens an IDC calculator.

To open the IDC calculator left click with the mouse once on the button. The 'Interest During Construction Calculator' will appear, as shown in **Figure 9**. Because the interest rate is carried from the Cost tab, *Initial Terms* section, the IDC calculator will not open if a discount rate has not been entered.

Within the IDC calculator, the user inputs the construction period and can indicate the number of periods per year. This section should be completed before entering the annual construction costs. To enter an annual construction cost, click in the box adjacent to the given year, enter the value, and click out. To move from year to year use the UP and DOWN arrow keys on the keyboard. As annual construction costs are entered, the IDC (shown at the bottom of the calculator tool) is automatically computed.

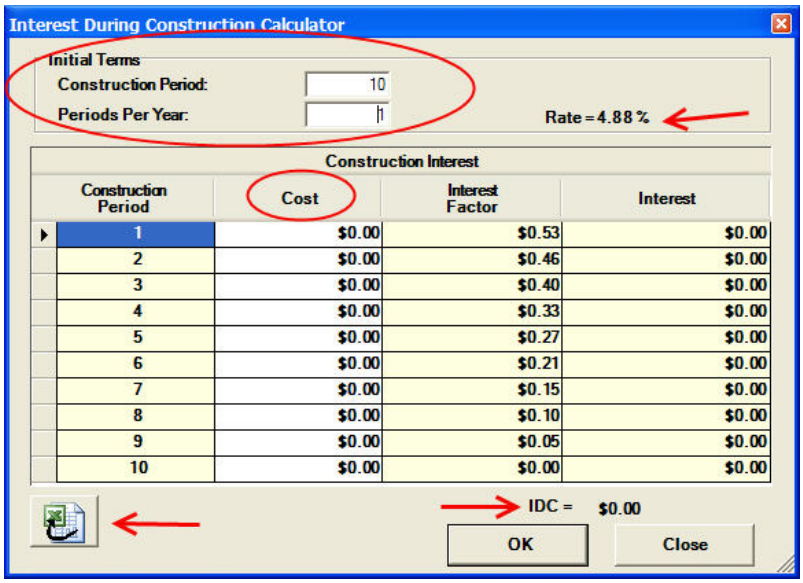


Figure 9
Interest During Construction Calculator

To export the Construction Interest table to an Excel workbook, click the Excel icon, located at the bottom left-hand of the calculator. A standard dialog box appears, as shown in **Figure 10**, to allow the user to save the Excel workbook to a desired location. The file name is automatically 'IDC_Interest.xls'. Click in the file name box to change. To save the file navigate to the desired folder and click the 'Save' button located at the bottom right-hand of the dialog box. To cancel the action click the 'Cancel' button located at the bottom right-hand of the dialog box.

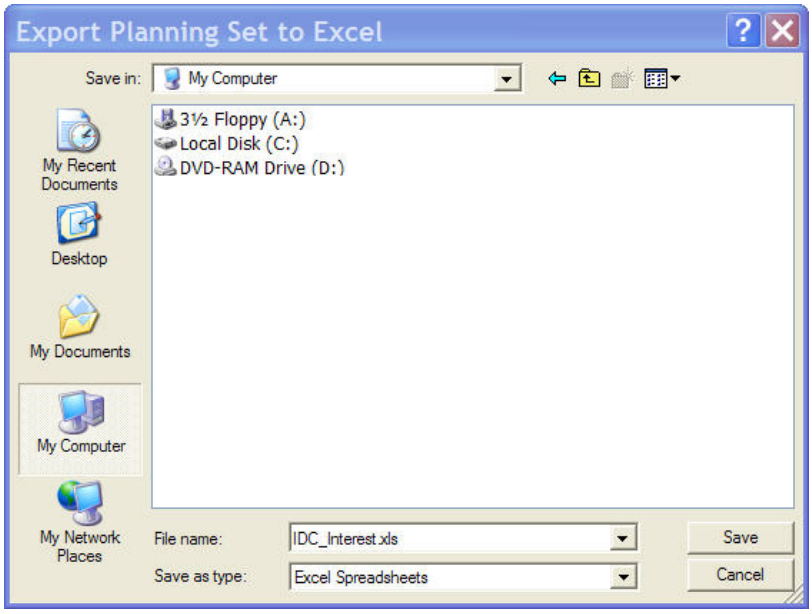


Figure 10
Export Construction Interest Table to Excel

Once the IDC table has been exported to Excel (if desired) and all values are correct in the IDC calculator, click 'OK' to close the IDC calculator. The IDC value is automatically carried to the IDC box in the *Total Investment Cost* area.

3.3.4 Initial Investment

The *Initial Investment* area is shown in detail in **Figure 11**. There are three values calculated in this area: total investment cost, present value factor, and present value. These values represent a sum of the total investment cost. These values change as data are entered into the *Initial Terms, Total Initial Cost, and Total Investment Cost* sections. For Measure A3 of the Cedar Lake Study, initial investment costs equal $715,000.

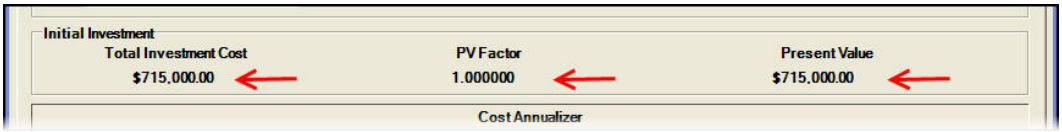


Figure 11
View Initial Investment Calculations

3.3.5 Cost Annualizer Table

The *Cost Annualizer Table* is shown in detail in **Figure 12**. There are four columns to the table: Year, O&M Costs, PV Factor, and Present Value. The Year column is automatically calculated based on the value input into the 'period of analysis' box. In the Cedar Lake Study example, the period of analysis is 50 years so the Cost Annualizer Table has 50 rows, one for each year. In the O&M column, input the total costs incurred for a given year in the corresponding box. These costs could include any construction costs, engineering and design during construction (EDDC) costs, project management costs, and any OMRR&R costs. All the costs incurred in a given year should be summed and then entered into the table. Values should be entered in future value. The table then converts the future value of the costs to present value and updates the Present Value Column. For Measure A3 of the Cedar Lake Study, cost incur every year for OMR&R in the amount of $23,800 for mowing and fence repair. Costs also occur in the first two years for dredging.

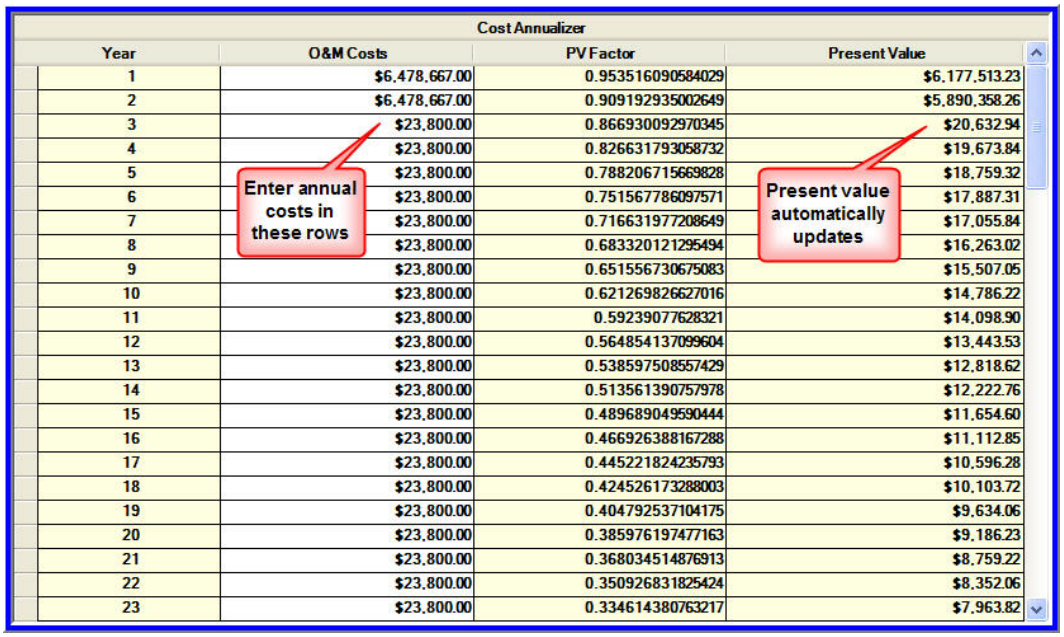


Figure 12
Cost Annualizer Table

3.3.6 Net Totals

Once the initial costs, investment costs, and annual costs are entered into the Cost tab, the construction and O&M costs (in future dollars and present dollars), and average

annual costs are automatically calculated and the totals are shown in the *Net Totals* area, as shown in **Figure 13**. For the Cedar Lake Study, construction and O&M costs in future value equal $14.8 billion, and $13.2 billion in present value. The average annual cost is $708.1 million. This value is also updated in the *Initial Terms* area, as discussed in Section 3.3.1.

Figure 13
Net Totals Area, Calculated

3.3.7 Action Buttons

The final area of the Annualizer Cost tab is where the "action buttons" are located. These are buttons that initiate an action when clicked. The action buttons are as follows: (1) Export Cost Annualizer Table to Excel, (2) View/Print Report, (3) Save, and (4) Close. The buttons are shown in **Figure 14** and described below.

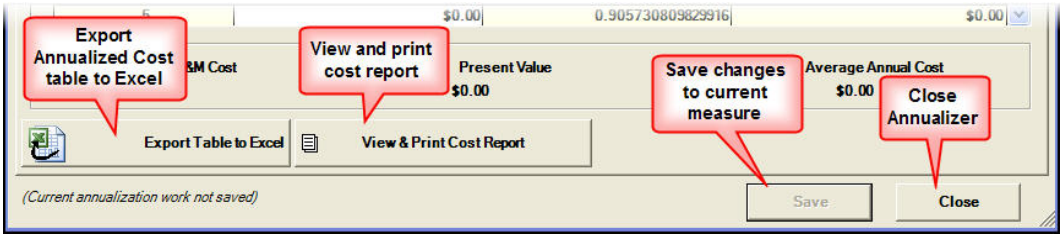


Figure 14
Action Buttons on Cost Tab

1. Export Cost Annualizer table to Excel

Click this button to export only the Cost Annualizer Table to an Excel workbook. The dialog box that appears is exact to Figure 10, except the default file name is "AnnualizedCosts.xls". Click in the file name box to specify a name for the file. Navigate to the desired folder and click the 'Save' button, located at the bottom right-hand of the dialog box, to save the file. To cancel the action, click the 'Cancel' button, located at the bottom right-hand of the dialog box.

2. View/Print Report

Click this button to view the annualized costs report. A window appears with the report, as shown in Figure 15. There are many options on the report dialog. Each button is briefly described on Figure 15. To close the report, click the "Close" button, located at the bottom right-hand of the report.

Notes:

(1) The export option on the report allows for the following file types: Crystal Reports, Adobe Acrobat, Microsoft Excel, Microsoft Excel (data only), Microsoft Word, and Rich Text Format.

(2) The "refresh" button will refresh the report if changes have been made to any data on the Cost tab. Changes can be made to the Cost tab while the report is open.

3. Save

This buttons saves the changes made to the current measure. This option is available from all tabs on the Annualizer Calculator.

4. Close

This buttons closes the Annualizer. This option is available from all tabs on the Annualizer Calculator. If changes have been made to the Annualizer but were not saved, a dialog box will appear asking if you would like to save the changes to the current measure.

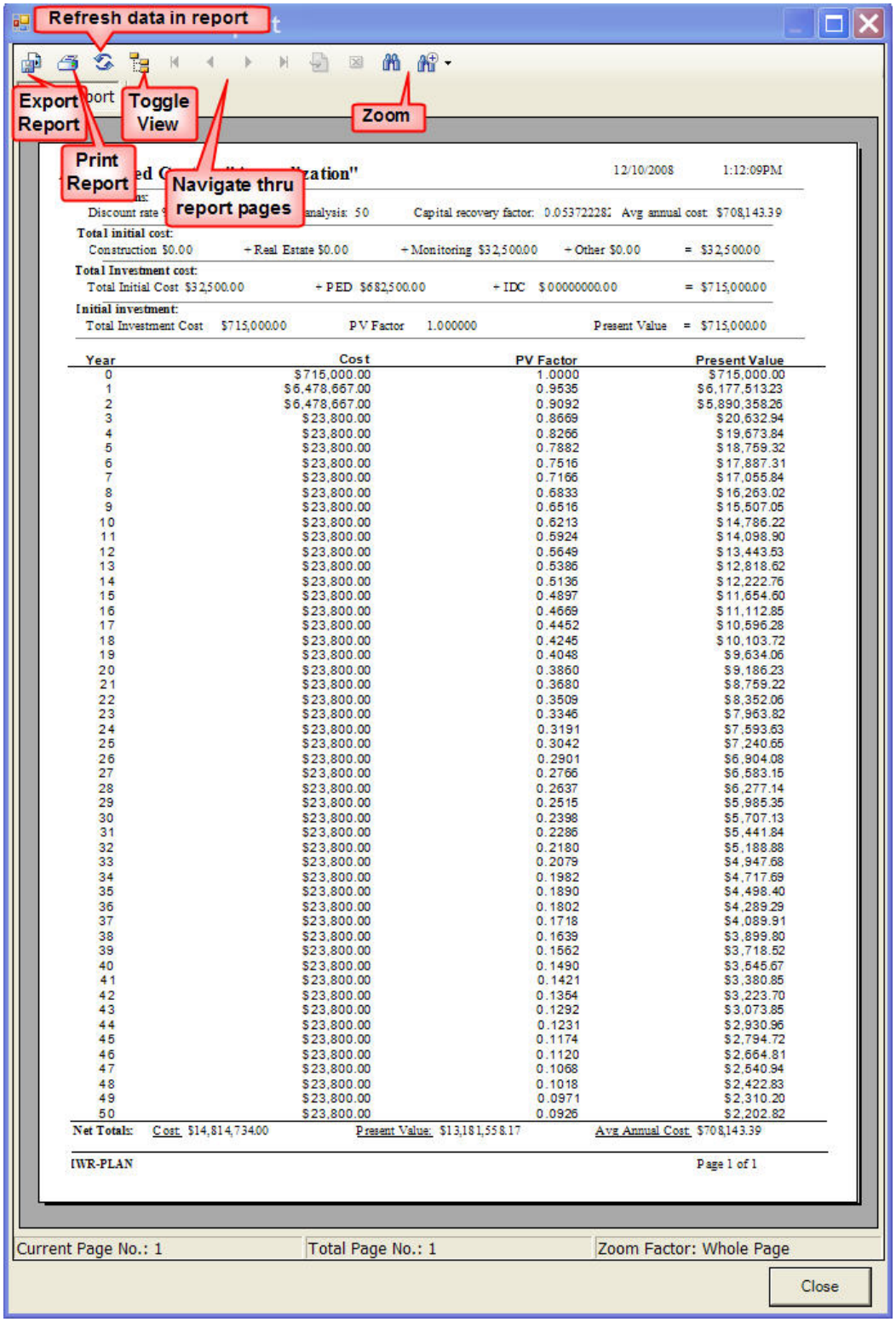


Figure 15
Annualization Report

3.4 Add NED Benefits Data

Next, add data to the NED Benefits tab (Note: data can be input to the Cost, NED Benefits, and NER Outputs tabs in any order). To move from the Cost tab to the NED Benefits tab, left click on the NED Benefits tab with the mouse. **Figure 16** displays the NED Benefits tab. Enter the discount rate and period of analysis.

Similar to the cost data, the NED benefit tab has a table for entering benefits for each year of the project for annualization. The benefits are entered in future value and the table converts them to present value. To enter a value in the 'Benefit' column of the table, click once in the row that corresponds to the given year and enter the value. To move to the next year press either the TAB or DOWN ARROW button on the keyboard. In our example, Measure A3 does not have NED benefits.

Similar to the Cost tab, the Net Totals are calculated for NED Benefits. Net totals include the total cost of benefits in future value, total cost of benefits in present value, and the average annual cost. The NED Benefits Annualizer table can be exported to Excel by clicking the Excel icon located at the bottom left-hand of the NED Benefits tab. The dialog box that appears is exact to Figure 10, except the default file name is "AnnualizedNEDBenefits.xls." Click in the file name box to change to the file name. Navigate to the desired folder and click the 'Save' button, located at the bottom right-hand of the dialog box, to save the file. To cancel the action, click the 'Cancel' button, located at the bottom right-hand of the dialog box.

Also located at the bottom left-hand of the NED Benefits tab is an icon to view/print the NED Benefits report. Click this button to view the NED Benefits report. A window appears with the report identical to as shown in Figure 15, only data are for the NED Benefits. Refer to Section 3.3.7 for more information on how to use the report dialog.

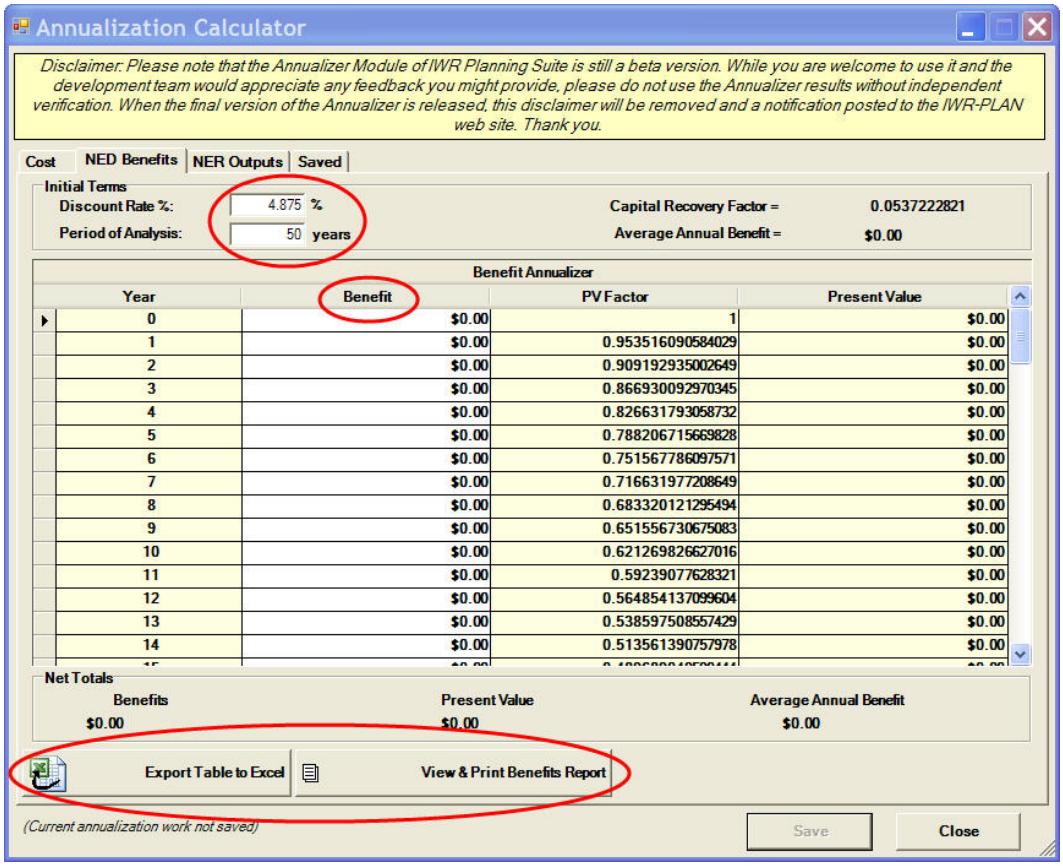


Figure 16
NED Benefits Review

3.5 Add NER Outputs Data

Next, add data to the NER Outputs tab (Note: data can be input to the Cost, NED Benefits, and NER Outputs tabs in any order). To move from the NED Benefits tab to the NER Outputs tab, left click on the NER Outputs tab with the mouse.

Figure 17 displays the NER Outputs tab with default settings. As shown, there are six main areas of the NER Outputs tab. Each is briefly described below. To best explain how to use the functions of the NER Outputs tab, this section is organized by calculation type (selection options of area 2 in Figure 17). First discussed is how to perform linear interpolation of NER Outputs. This is followed by a discussion of how to calculate NER Outputs based on specified growth rates. While these two techniques are presently the only featured by IWR Planning Suite's annualizer module, users should be aware that other annualization techniques exist and might be used where higher levels of accuracy and precisions are known and sought. At the end of this section, table and report functions are discussed, as they are applicable to both options.

Note: the Corps does not discount non-monetary outputs; therefore, no technique for discounting non-monetary benefits exist in the annualizer module at this time.

(1) Initial Terms—in this area enter the project max NER output, select the option for no max output, and enter period of analysis

(2) Calculate—select calculation options and view the average annual NER output

(3) Annual NER Output Table—use this table to specify annual NER outputs

(4) Graphic Output—displays data from the NER Output Table

(5) Table and Report Options—export NER Output Table or view/print NER Output report

(6) Graphic Options—export or print graph in area 4

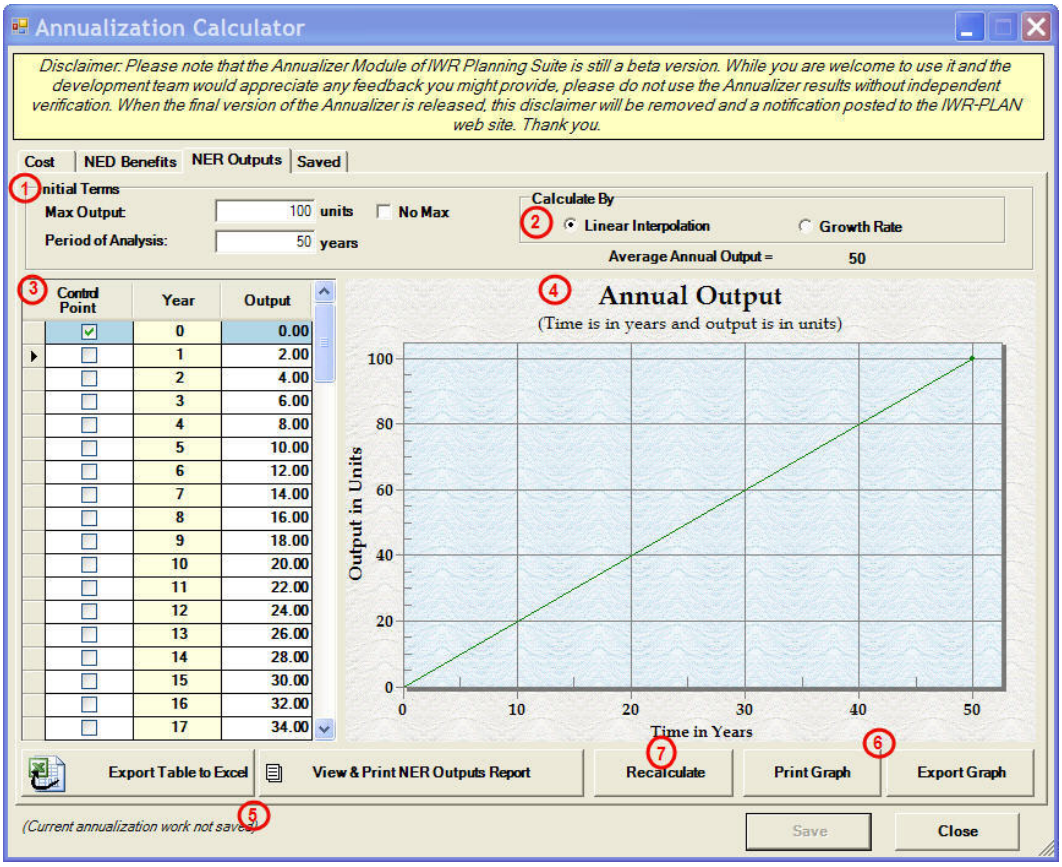


Figure 17
NER Outputs

(7) Recalculate—use this button to recalculate the NER Output Table after changing inputs

3.5.1 Calculate by Linear Interpolation

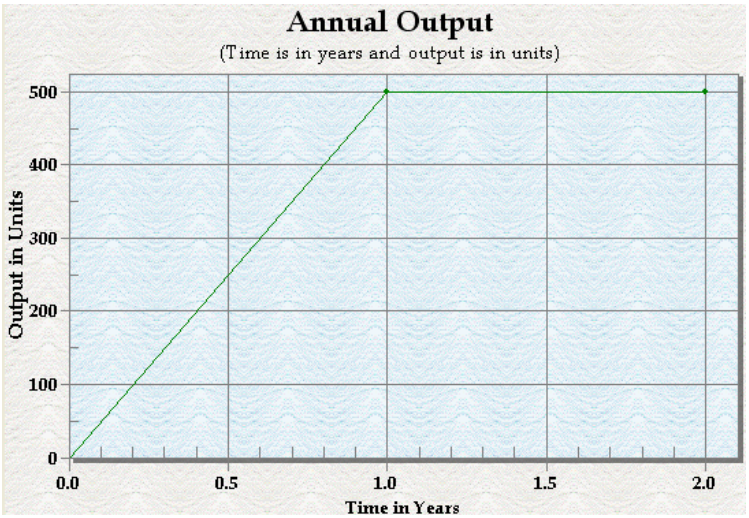
The Annualization Calculator allows the user to calculate NER outputs using linear interpolation. This is a method of curve fitting using linear polynomials. Use this type of calculation method when NER output values are known for two or more years, but not all years. The values for the unknown years will be calculated using linear interpolation. Also, select this option if the NER output values for all years are calculated elsewhere, thus known, and simply need to be input. The latter is the case for the simplified example below and for the Cedar Lake Study Measure A3, where values are known for the beginning of the project and the outputs max out at year six.

Simplified Example: The start of the period of analysis has 0 output lift. At the end of year 1, there are 500 units and at the end of year 2 there is an additional 500-unit lift. To simplify, the project only has 2 years of life. The inputs would be as shown on the left. The sample calculations to find the average annual output are:

Control Point	Year	Output
☐	0	0.00
☑	1	500.00
☑	2	500.00

*Step 1: [(500*1)/2] + [500*1] = 750*

Step 2: 750/2 years = 375 average annual output



The model finds the area under the curve and divides that area by the period of analysis.

To illustrate how to employ the tool for either scenario, an arbitrary example is provided that highlights the functionality of the linear interpolation option. Data for the example is provided in **Table 1**. After the linear interpolation tool is explained, the Cedar Lake Study Measure A3 data entry methodology is demonstrated.

Data for Linear Interpolation Example	
Max Output	60
Period of Analysis	50
Known Control Points	
Year	**Value**
0	15
20	40
30	55
40	60

To begin using the NER Outputs tab when linear interpolation is desired, first select the 'Linear Interpolation' radio button located in area 2 of the tab by left clicking the option, as shown in **Figure 18**.

Once 'Linear Interpolation' is selected, the initial terms of the NER outputs can be set. First, set the period of analysis. Default setting is 50 years. In the example provided, period of analysis is set to 50 years. Next set the max output. Default is 100 units. In the example, max output is set to 60 units.

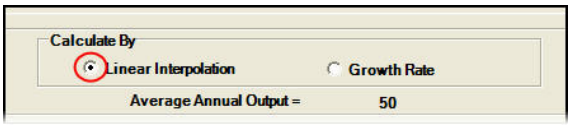
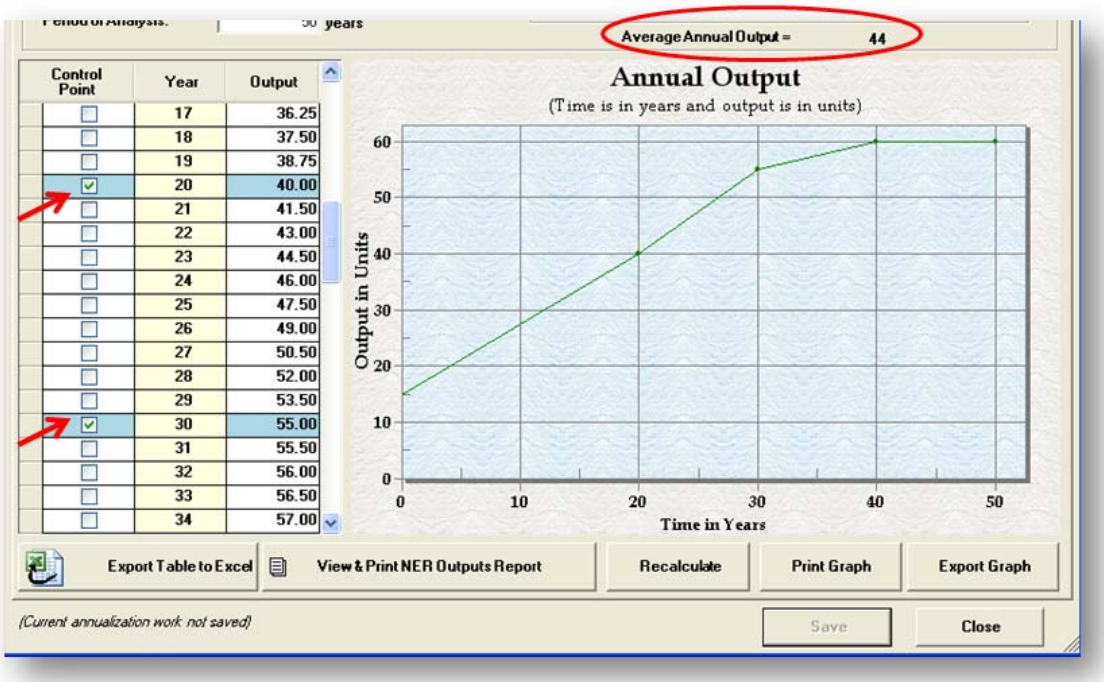


Figure 18
NER Outputs Calculation Options

Next, add the remaining data from Table 1 to the Annual NER Output Table. For each year with known outputs, select the 'Control Point' box next to the corresponding year. To input the data from Table 1, select the control box for years 20 and 30, as shown in **Figure 19**. In the 'Output' box for the corresponding year, enter the desired output by clicking once in the box, deleting the automatic value, and entering the new value. For year 20 enter 40 for the output; for year 30 enter 55 for the output. Linear interpolation is automatically employed to reconfigure the in-between years. Notice the graphic automatically updates as well as the average annual outputs.



Control Point	Year	Output
☐	17	36.25
☐	18	37.50
☐	19	38.75
☑	20	40.00
☐	21	41.50
☐	22	43.00
☐	23	44.50
☐	24	46.00
☐	25	47.50
☐	26	49.00
☐	27	50.50
☐	28	52.00
☐	29	53.50
☑	30	55.00
☐	31	55.50
☐	32	56.00
☐	33	56.50
☐	34	57.00

Figure 19
NER Outputs: Calculating with Linear Interpolation Option

The linear interpolation tool is designed with flexibility so that the user can enter project specific NER outputs as well. The average annual output for the period between two user-provided control points is calculated to yield the average annual output for the period. For the Cedar Lake Study Measure A3, NER outputs are specified for the beginning years of the project and reach a max output of 61.2 at year 6. To enter these into the NER Outputs Table on the Annualizer, set the max output to 61.2 units and the period of analysis to 50 years, as shown in **Figure 20**. Next, select the control point box for years 0-6. Enter the output for each year in the Output column. Again, notice the graphic and average annual output is automatically updated.

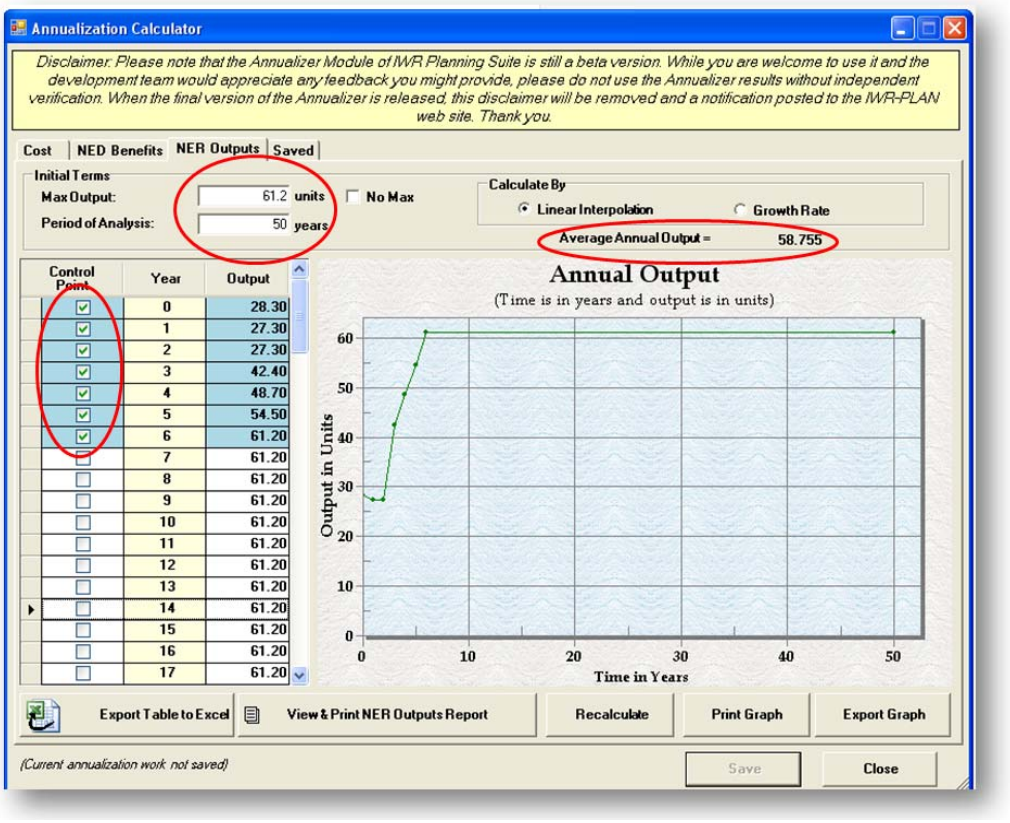


Figure 20
Entering NER Outputs When Values are Known

3.5.2 Calculate by Growth Rate

The NER Outputs tab also allows to user to calculate NER outputs based on specified growth rates. Because the Cedar Lake Study does not have any measures with NER outputs calculated solely on growth rates, an arbitrary example is provided to demonstrate the use of this option. The criterion for this example follows:

- The period of analysis for the project is 50 years and the max output is 50.
- NER output at year 0 is 20 units.
- This grows 3 percent each year until year 20, where the growth rate slows to 2 percent.
- At year 30, the growth rate slows again to 1 percent.

To begin, select the "Growth Rate" radial button located in area 2 of the NER Outputs tab, as indicated in **Figure 21**. A column appears in the Annual Output table labeled

"Growth Rate %". Next, change the max output to 50 units and the period of analysis to 50 years. Click year zero control point box and set the Output column to 20.

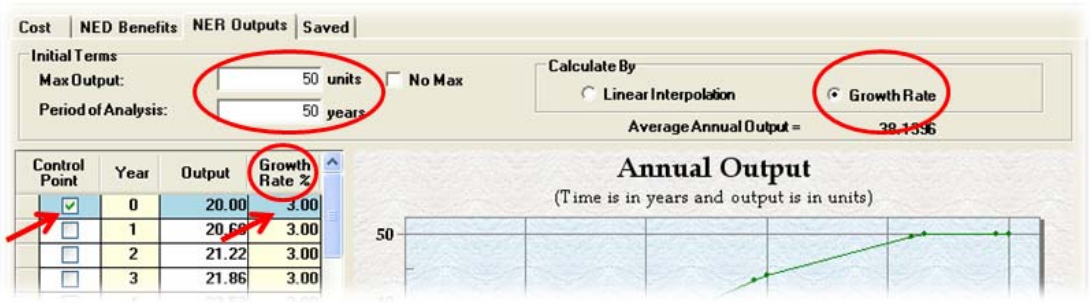


Figure 21
Input Data for Calculating NER Outputs Using Growth Rate

Next, set the growth rate at year zero to 3 percent by clicking in the corresponding growth rate cell for year zero and entering "3". Repeat this process for year 20 by clicking the control point box and changing the growth rate to "2". Again, repeat this process for year 30, clicking the control point box changing the growth rate to "1". Results of this are shown in **Figure 22**.

For this example, the max outputs are reached in year 43 and the growth rate past this year is automatically set to zero. In order for the graphic to correctly display, click the control point box for the year the max output is reached (year 43 in the example), as shown in **Figure 23**. The growth rate calculator tool is designed with flexibility so that the user can determine project specific NER outputs.

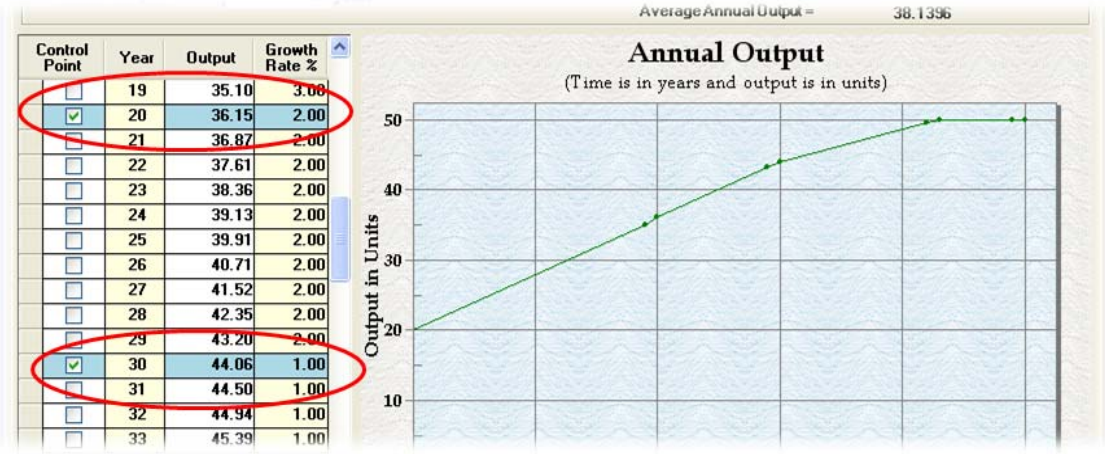


Figure 22
NER Outputs Using Growth Rate

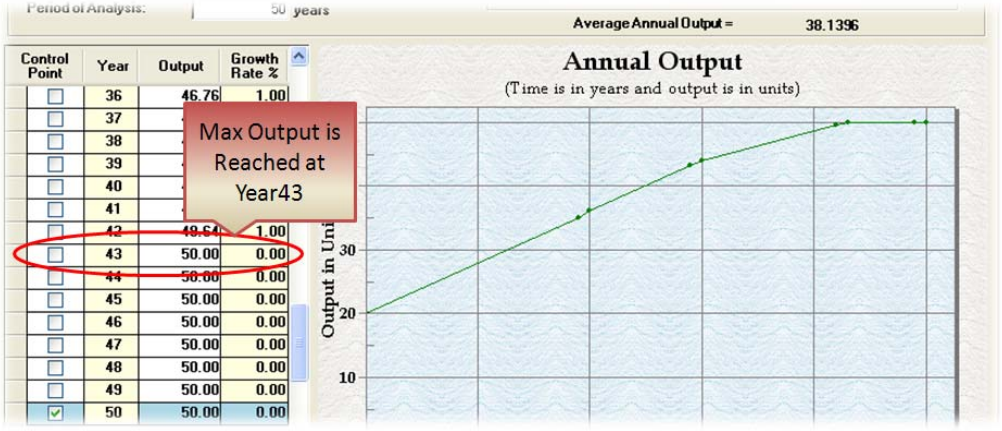


Figure 23
Max NER Output Reached Through Growth Rate

3.5.3 NER Output Export and Print Options

The NER Output tab offers print and export options for the table, report, and graph. The export options for the NER Output Table and Report are similar to the options on the NED Benefits and Cost Tab. All the options are described below.

1. Export NER Outputs table to Excel

Click this button to export only the NER Outputs Table to an Excel workbook. The dialog box that appears is exact to Figure 10, except the default file name is "AnnualizedNEROutputs.xls". Click in the file name box to change. Navigate to the desired folder and click the 'Save' button, located at the bottom right-hand of the dialog box, to save the file. To cancel the action, click the 'Cancel' button, located at the bottom right-hand of the dialog box.

2. View/Print Report

Click this button to view the NER Outputs report. A window appears with the report, similar to the report shown in Figure 15. There are many options on the report dialog. Each button is briefly described on Figure 15. To close the report, click the "Close" button, located at the bottom right-hand of the report.

Notes:

(1) The export option on the report allows for the following file types: Crystal Reports, Adobe Acrobat, Microsoft Excel, Microsoft Excel (data only), Microsoft Word, and Rich Text Format.

(2) The "refresh" button will refresh the report if changes have been made to any data on the NER Outputs tab.

3. Print Graph

This buttons opens a dialog box that allows the user to directly print the graphic to a printer connected to the computer, as shown in **Figure 24**. Printing options include color, monochrome, and mono plus symbol. The 'Setup' button allows the user to change printing preferences such as orientation, single or double sided printing, page order, and pages per sheet. Press 'OK' to print, 'Cancel' to return to the NER Outputs tab, and 'Help' for assistance.

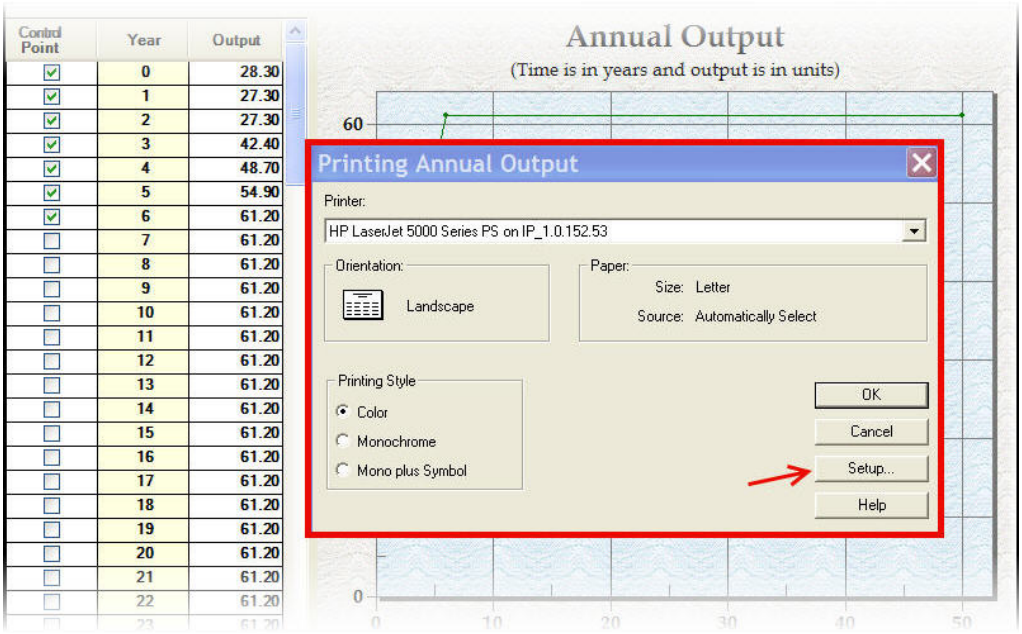


Figure 24
Print Graph for NER Outputs

4. Export Graph

This buttons opens a dialog box that allows the user to export the graphic to file, as shown in **Figure 25**. The file options are: Meta File, BMP, JPG, PNG, and Text/Data Only. The graphic can be exported to the clipboard, to a file, or to a printer. The user can specify the file size, if desired.

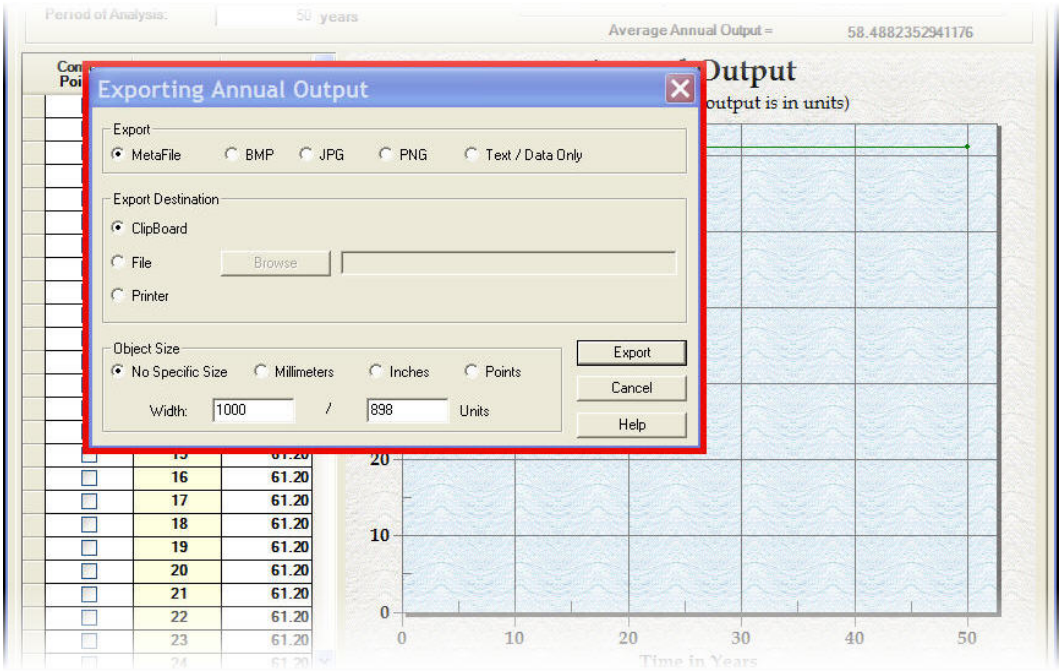


Figure 25
Export Graph for NER Outputs

5. Save

This buttons saves the changes made to the current measure. This option is available from all tabs on the Annualizer Calculator.

6. Close

This buttons closes the Annualizer. This option is available from all tabs on the Annualizer Calculator. If changes have been made to the Annualizer but were not saved, a dialog box will appear asking if you would like to save the changes to the current measure.

3.5.4 Print Reports and Compare Measures

IWR Planning Suite allows the user to print the reports created using the Annualization module from the main menu. The user can also compare annualized annual outputs from multiple measures in a single graph. Before moving to this phase, please save any changes to a measure as needed. The user can print reports and compare measures with the Annualizer open or closed.

To begin, select 'View' from the File menu and then 'Annualization Reporting', as shown in **Figure 26**. There are four options: Costs Report, NED Benefits Report, NER Outputs Report, and Graph Multiple NER Outputs.

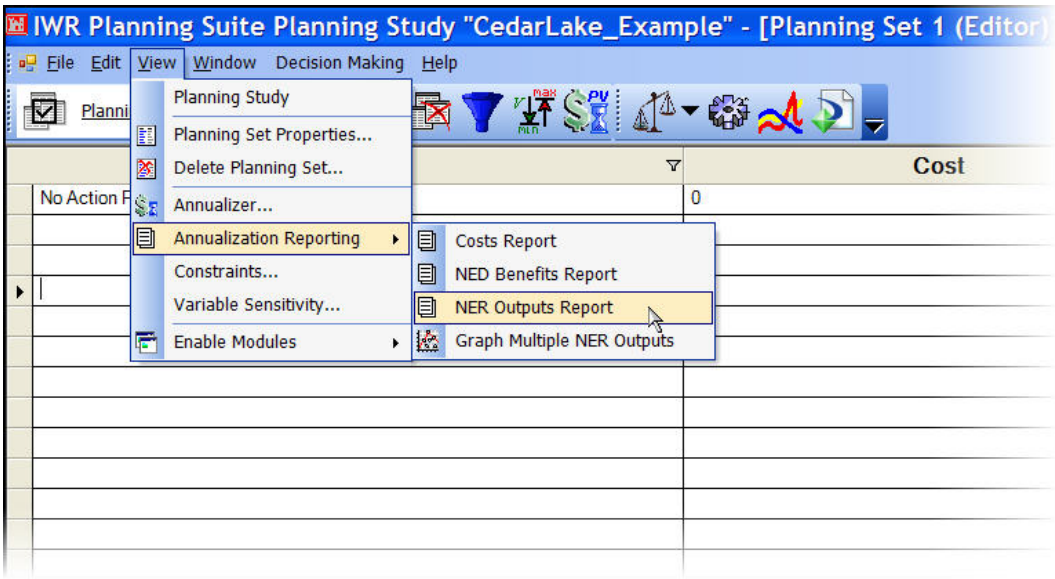


Figure 26
Access Reports and Graph Multiple Outputs from Main Menu

To print a Cost, NED Benefits, or NER Outputs report, select the desired report from the menu and left click once. A dialog box appears asking the user which stored annualization measure to print, as shown in **Figure 27**. Highlight the desired measure and click 'OK'. Only one report can be printed at a time. The user is then directed to the report screen described in Section 3.3.7, Figure 15. Please refer to that section for details on how to navigate this screen. To cancel the action or close the dialog box left-click once on the 'Close' button.

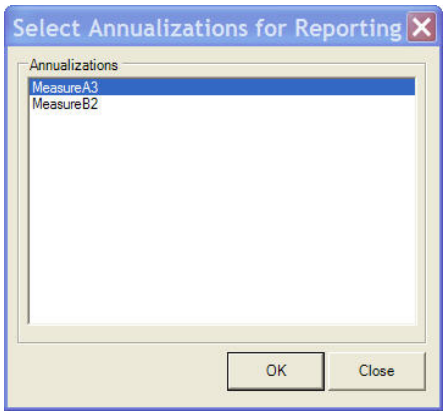


Figure 27
Select Measure for Report

To graph multiple annualized NER outputs for comparison purposes, select 'Graph Multiple NER Outputs' from the menu. A dialog box appears asking the user to select annualization for reporting, as shown in **Figure 28**. To select multiple saved measures, click the first desired measure, press and hold the CTRL [control] button on the keyboard and left-click with the mouse any additional measures to be graphed. Several measures can be added. In the example, Measure A3 and B2 from the Cedar Lake Study were selected. The resulting graphic is shown in **Figure 29**. Click the 'Print' button to print the graph. The same dialog box appears as Figure 24 in Section 3.5.3. Refer to that section for details on how to navigate the print dialog. Press the 'Close' button to close the graphic.

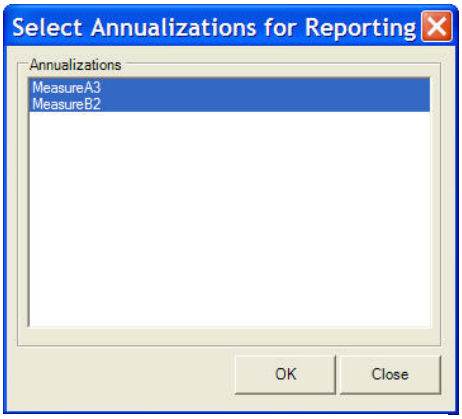


Figure 28
Select Annualizations

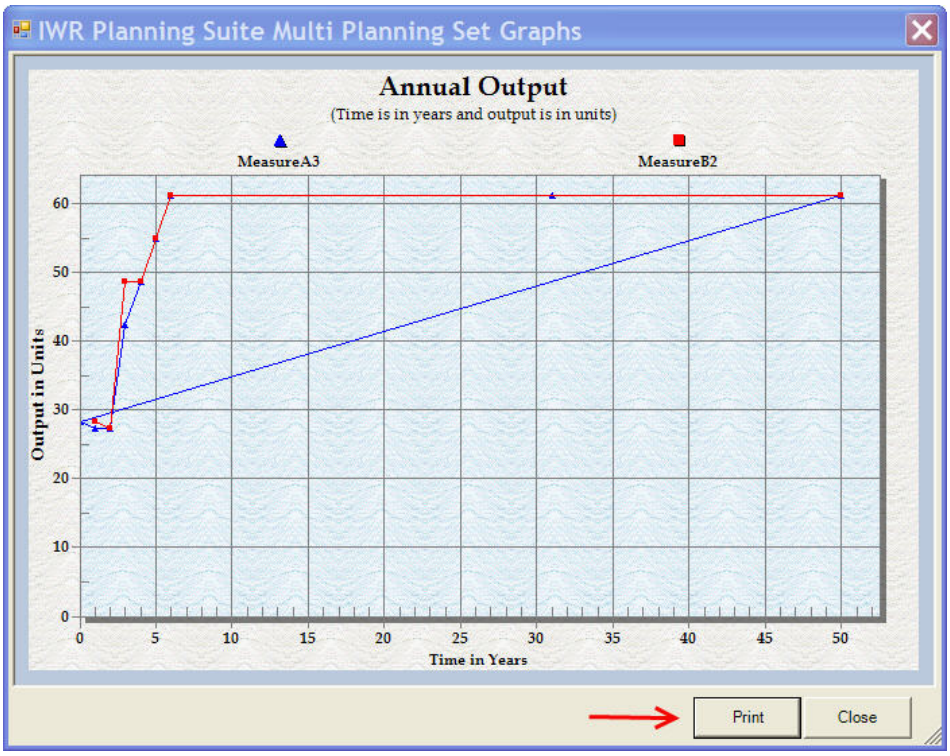


Figure 29
Graphing Multiple Measures

3.6 Definitions

Capital Recovery Factor (CFR)—the ratio of a constant annuity to the present value receiving that annuity for a given length of time. The CFR is calculated using the interest rate.

Construction Costs—these costs are the direct cost of installing project measures. They should be based on the market value of goods and services required to install project measures. They should include the cost of purchased materials; equipment rental or purchase; construction wages or salaries; and contractors' management, supervision, overhead, and profit. These costs will be based on current contract bid items in the project area or on the current market value of purchased materials and services, etc.

Discount Rate—the rate established annually for use in evaluating Federal water projects.

Interest During Construction (IDC)—this represents the opportunity cost of capital incurred during the construction period. The cost of a project to be amortized is the investment incurred up to the beginning of the period of analysis. The investment cost at that time is the sum of construction and other initial cost plus interest during construction. Cost incurred during the construction period should be increased by adding compound interest at the applicable project discount rate from the date the expenditures are incurred to the beginning of the period of analysis.

National Economic Development Cost (NED Costs)--Project measures require the use of various resources. NED costs are the opportunity costs of resource use. Proper NED analysis requires that project NED costs and benefits be compared at a common point in time. Costs are calculated in annualized terms and converted to an annual equivalent value over the period of analysis.

Net Ecosystem Restoration Benefits (NER Benefits)—these are the non-monetized outputs of ecosystem restoration projects.

OMRR&R Costs—the expected costs over a period of analysis for operation, maintenance, repair, rehabilitation, and replacement necessary to maintain the benefit stream and agreed-upon levels of mitigation of losses to fish and wildlife habitats.

Period of Analysis—the time horizon for project benefits, deferred installation costs, and operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) costs. The same period of analysis should be used for all alternative plans. Appropriate

consideration should be given to environmental factors that may extend beyond the period of analysis.

Preconstruction, Engineering and Design Cost (PED)—these costs are the direct costs for investigations, field surveys, planning, design, and preparation of specifications and construction drawings for project measures.