# Cost Guidelines Model User Manual

**Guidelines for Preparing**
**Cost Estimates of Water Supply and Conservation Projects**
**Prepared by Hazen and Sawyer**
**For the Southwest Florida Water Management District**
**Final Model, March 14, 2011**

## 1.0 Manual Purpose and Table of Contents

The purpose of this Manual is to describe the Cost Guidelines Model. This Excel-based model establishes consistent methods for calculating total, annualized, and unit costs associated with water supply and water conservation options that would be included in future water supply plans of the Southwest Florida Water Management District (District). These guidelines may also be used for estimating project costs outside the context of the Regional Water Supply Plan (RWSP). The model allows the user to enter the following information:

- Itemized capital and initial costs, non-annual recurring costs and annual O&M costs of a water supply project or conservation program;
- Project benefits including water production, reclaimed water offsets[1] and the amount of water saved;
- Discount rate for capital, initial, and non-annual recurring cost annualization;
- Inflation/deflation factors; and,
- Useful lives of project components.

The Cost Guidelines Model prompts the user to enter (1) itemized cost and benefit data and (2) document the basis for estimating these costs and benefits. This Guidance manual provides information and web links to certain data sources that could be used in the cost and benefit estimations. The Excel model then calculates the estimated total, annualized and unit costs of the project. The model is designed so that component and total costs, benefits, useful lives, discount rates, and inflation factors of multiple projects can be compared.

The model provides guidance regarding the discount rate, the method of conversion to current dollars, the useful life of project components, and the calculation of reclaimed water offsets. From the user-provided data, the model calculates the following cost measures:

- Capital or Initial cost in dollars;



[1] Offset is defined in this document as the amount of traditional, potable quality water supplies that will be replaced by the reclaimed water, expressed as an annual average in MGD.

- Capital cost per Gallon of Capacity;
- Non-Annual Recurring Costs in dollars;
- Annual O&M cost in dollars;
- Annualized capital, initial, recurring and O&M cost in dollars; and,
- Capital, initial, recurring, and O&M Costs per 1,000 gallons of water produced, saved or offset, separately and in total.

The Model calculates and organizes these cost measures in a summary table format.

The organization of this document is as follows.

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## 2.0 Description of Cost Guidelines Model Files

The Cost Guidelines Model (Model) is comprised of three distinct Excel files that are also called "sub-models". These three sub-models are listed as follows. Their filenames identify their purpose. The characters "V3" stand for Version 3 of this model.

Sub-Model 1 - District Project Summary V3

Sub-Model 2 - Cost Guidelines WATER SUPPLY V3

Sub-Model 3 - Cost Guidelines WATER CONSERVATION V3

Sub-Model 1 is an Excel file called "District Project Summary V3" that has one spreadsheet. This spreadsheet summarizes relevant information regarding all projects that were evaluated by the consultant, all projects included in the RWSP, or a subset of projects selected at the discretion of District staff. This spreadsheet allows District staff to quickly evaluate the outcomes of all projects of interest.

Sub-Model 2 is an Excel file called "Cost Guidelines WATER SUPPLY V3" that has two spreadsheets for each project evaluated; one spreadsheet that contains default values for useful lives of project components; and one summary spreadsheet that provides the relevant cost and benefit information on all the projects evaluated in this Excel file. The project information contained in the summary spreadsheet is the same as that provided in Sub-model 1 called "District Project Summary V3". These water supply projects may be of the following types:

- Surface Water / Stormwater, including storage such as aquifer storage and recovery (ASR);
- Reclaimed Water, including storage such as ASR;
- Brackish Groundwater Desalination;
- Seawater Desalination; and,
- Fresh Groundwater Options.

It is anticipated that each District consultant retained to estimate water supply project costs and benefits will receive this Sub-model 2 Excel file and this Cost Guidance Manual. All of the projects evaluated by the consultant will be contained in this one Excel file. The District would collect one completed Excel file from each consultant.

Sub-Model 3 is an Excel file called "Cost Guidelines WATER CONSERVATION V3" that has one spreadsheet for each project evaluated; one spreadsheet that contains default values for

useful lives of project components; and one summary spreadsheet that provides the relevant cost and benefit information on all the projects evaluated in this Excel file. The project information contained in the summary spreadsheet is the same as that provided in Sub-model 1 called "District Project Summary V3". The District would provide the Sub-model 3 Excel file and this Cost Guidelines Manual to those consultants who are evaluating the costs and benefits of water conservation options.

Once the completed Sub-models are submitted to the District, the District would then summarize the results for all projects or a subset of projects evaluated by all consultants using Sub-model 1 "District Project Summary V3". In addition, the District would review the information contained in each of the consultant's completed sub-model Excel files to ascertain the extent to which project costs and benefit estimates were consistently estimated.

In all three sub-model Excel files, the green shaded cells require the user to enter certain information. All green cells in the model must be addressed and the appropriate information must be entered by the user. Cells shaded white are computed by the model. Cells shaded gray are blank.

## 3.0 Sub-Model 1, District Project Summary V3 Description

This model is a summary spreadsheet that provides specific information for each water supply project and conservation option evaluated for the RWSP or other projects. At the District's discretion, the summary spreadsheet may be used to summarize a subset of all projects. This spreadsheet is reproduced in Table 3.1. In this table the Excel columns are condensed to fit on the page. Each column is a separate project and each row provides certain cost or benefit information regarding the project.

At this time the spreadsheet has summaries for 15 water supply projects and 15 water conservation options. The cells of the spreadsheet call certain cells located in the summary spreadsheets of the Sub-model 2 and Sub-model 3 Excel files. The District spreadsheet has cost and benefit data entered for one hypothetical water supply project and one hypothetical water conservation project. As the project evaluations are completed by the District and its consultants, more projects would be added to this spreadsheet. Example values have been entered only for two projects: Project 1 Water Supply and Project 1 Water Conservation. Values for the other six projects are either 0, $0 or NA. NA means "not applicable". The values for these projects come from summary spreadsheets of the completed Sub-models 2 and 3 where each spreadsheet cell is linked to a specific cell in Sub-models 2 and 3. It is anticipated that there would be one Sub-model 2 (Water Supply) or Sub-model 3 (Water Conservation) from each District consultant. So if there are five consultants, then there would be five completed Sub-models. For example, there would be four completed sub-model 2s and one completed sub-model 3. All five of these sub-models would be linked to Sub-model 1, District Project Summary.

The items included for each project in Sub-model 1, District Project Summary, are listed as follows.

- Project Name
- Project Type
- Average Daily Water Production in MGD (Flow)
- Average Daily Water Offset in MGD
- Average Daily Water Savings in MGD
- Year Represented by Costs
- Discount (or Interest) Rate, annual
- Capital or Initial Cost in dollars
- Non-Annual Recurring Cost in dollars
- Annual O&M Cost in dollars
- Total Annualized Cost in dollars
- Total Annualized Cost Per 1,000 Gallons:
    - Capital or Initial Cost
    - Non-Annual Recurring Cost
    - Annual O&M Cost
    - Total - All Costs
- Capital Cost per Gallon of Average Daily Capacity
- % Efficiency of Reclaimed Water Project
- Overall Comments
- Name of preparer
- Company name of preparer
- Email address of preparer
- Phone number of preparer

**Table 3.1**
**Sub-Model 1: District Summary of Water Supply and Water Conservation Project Costs and Benefits**

| 1 | **Project Name:** | **Project 1 Water Supply** | **0** | **0** | **0** | **Project Number 1 Water Conservation** | **0** | **0** | **0** |
|---|---|---|---|---|---|---|---|---|---|
| 2 | **Project Type:** | **Reclaimed Water** | **0** | **0** | **0** | **Water Conservation Options** | **Water Conservation Options** | **Water Conservation Options** | **Water Conservation Options** |
| 3 | Average Daily Water Production in MGD (Flow) | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Average Daily Water Offset in MGD | 25 | NA | NA | NA | 0 | 0 | 0 | 0 |
| 5 | Average Daily Water Savings in MGD | NA | NA | NA | NA | 25 | 0 | 0 | 0 |
| 6 | Year Represented by Costs | 2015 | 0 | 0 | 0 | 2015 | 0 | 0 | 0 |
| 7 | Discount (or Interest) Rate, annual | 0.04375 | 0 | 0 | 0 | 0.04375 | 0 | 0 | 0 |
| 8 | Capital or Initial Cost in dollars | $65,840,000 | $0 | $0 | $0 | $10,815,200 | $0 | $0 | $0 |
| 9 | Non-Annual Recurring Cost in dollars | $1,515,750 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 10 | Annual O&M Cost in dollars | $2,844,225 | $0 | $0 | $0 | $414,225 | $0 | $0 | $0 |
| 11 | Total Annualized Cost in dollars | $7,651,225 | $0 | $0 | $0 | $1,566,531 | $0 | $0 | $0 |

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## Table 3.1, CONTINUED

## Sub-Model 1: District Summary of Water Supply and Water Conservation Project Costs and Benefits

| 1 | Project Name: | Project 1 Water Supply | 0 | 0 | 0 | Project Number 1 Water Conservation | 0 | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| 12 | **Total Annualized Cost Per 1,000 Gallons:** | | | | | | | | |
| 13 | Capital or Initial Cost | $0.50 | NA | NA | NA | $0.13 | NA | NA | NA |
| 14 | Non-Annual Recurring Cost | $0.02 | NA | NA | NA | $0.00 | $0.00 | $0.00 | $0.00 |
| 15 | Annual O&M Cost | $0.31 | NA | NA | NA | $0.05 | NA | NA | NA |
| 16 | **Total - All Costs** | **$0.84** | **NA** | **NA** | **NA** | **$0.17** | **NA** | **NA** | **NA** |
| 17 | **Capital Cost per Gallon of Average Daily Capacity** | **$2.63** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |
| 18 | % Efficiency of Reclaimed Water Project | 83.33% | NA | NA | NA | NA | NA | NA | NA |
| 19 | Overall Comments | … irrigate …lawns and landscaping … | | | | Residential irrigation audit in Hillsborough County. | | | |
| 20 | Name of preparer: | Grace Johns | 0 | 0 | 0 | Grace Johns | 0 | 0 | 0 |
| 21 | Company name of preparer: | Hazen and Sawyer | 0 | 0 | 0 | Hazen and Sawyer | 0 | 0 | 0 |
| 22 | Email address of preparer: | gjohns@hazenandsawyer.com | 0 | 0 | 0 | gjohns@hazenandsawyer.com | 0 | 0 | 0 |
| 23 | Phone number of preparer: | (954) 987-0066 | 0 | 0 | 0 | (954) 987-0066 | 0 | 0 | 0 |

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# 4.0 Sub-Model 2, Cost Guidelines WATER SUPPLY V3 Description

**Summary.** Sub-Model 2 is comprised of two spreadsheets for each project; one spreadsheet that contains default values for useful lives of project components; and a summary spreadsheet of all projects in the Excel file.

The first spreadsheet is a summary of the costs of all projects evaluated in the sub-model Excel file and is called “Summary Costs Supply Projects”. The information in this spreadsheet is identical to the information provided in Sub-Model 1 “District Project Summary” except that only the projects included in the Sub-Model 2 file are included in this spreadsheet. The second spreadsheet in the sub-model Excel file is called “Useful Life” and contains default values for useful lives in years of certain components that might comprise a water supply project or a water conservation option. These values may be used by the consultant.

The spreadsheet called “Project #” contains the cost and benefit information of a specific project. The spreadsheet called “Project # Cost of Design etc” is a spreadsheet that provides information to the “Project #” spreadsheet. This supporting spreadsheet allows the user to enter the itemized costs associated with initiating and managing project construction. These costs include the costs of engineering design, construction management, administration, financing and legal, among other items. These costs are those that would be added to the estimated construction costs in order to obtain the total capital cost of the project.

**Adding Project Spreadsheets to the Excel file and Changing Spreadsheet Names**. Regarding the two spreadsheets for each project, there are as many of these spreadsheet pairs as there are water supply projects that are evaluated by the consultant. The main spreadsheets are named “Project 1”, “Project 2”, “Project 3”, etc. The supporting spreadsheets are named “Project 1 Cost of Design etc”, “Project 2 Cost of Design etc”, “Project 3 Cost of Design etc”, etc. These spreadsheets may be renamed to clarify each project. When renaming the “Project # Cost of Design etc” spreadsheet, be sure to edit the two white cells under “Entered” and “Calculated” in Model Row No. 21 of the “Project #” spreadsheet (spreadsheet row 22) so that the correct supporting spreadsheet is called. This is how the “Project # Cost of Design etc” is used by the “Project #” spreadsheet.

This version 3 of Sub-Model 2, WATER SUPPLY, has enough spreadsheets to evaluate 15 projects. If more projects need to be added to this Excel file, both the main and the supporting spreadsheet need to be copied. As noted in the previous paragraph, when copying these two project spreadsheets, note that Model Row No. 11 in the supporting spreadsheet is called by the “Project #” spreadsheet in Model Row 21 (Cost of Design, Construction Management, Administration, Finance & Legal) under "Entered" and "Calculated". The user will need to edit these two cells so that they call the correct "Project # Cost of Design etc" spreadsheet. Instructions are provided in all spreadsheets of the model.

In the "Summary Costs Supply Projects" spreadsheet, columns for the additional projects will need to be added so that the summarized results of these additional projects can be displayed. This is accomplished by copying one of the project columns in this summary spreadsheet to a blank column and replacing the spreadsheet name of the main project spreadsheet in each cell of the new column. The row numbers in the cells should not need to be changed.

## 4.1 "Project #" Spreadsheet and "Project # Cost of Design etc" Spreadsheet

The first spreadsheet called "Project #" is reproduced in Table 4.1 for a hypothetical project. In this table, the Excel columns have been condensed to fit on the page. The gray-shaded cells are to be blank at all times. The user must enter information in all cells that are Green in color. The information to enter is described below for each row of this spreadsheet.

**Row 1 – Project Name:** The user enters the Project Name. In this example, the Project Name is "Project 1 Water Supply".

**Row 1 - Brief Project Description & Comments (put in box below):** In the box below this heading, the user is to provide a brief description of the project; a brief description any additional benefits of the project other than the supply of water; any unusual characteristics of the project that should be considered; and any synergies the project would provide as it interacts with other projects being considered.

**Row 2 – Project Type:** From the drop down menu, the user indicates the type of water supply project. The choices are:

- Surface Water / Stormwater
- Reclaimed Water
- Brackish Groundwater Desalination
- Seawater Desalination
- Fresh Groundwater Options

These are the water supply project types that are listed in the draft 2010 RWSP. These project types may include the associated storage such as ASR. In the example provided in Table 4.1, the project type is Reclaimed Water.

**Row 3 – Alternative Project:** The user answers the question: Is this project an alternative to another project included in this file? A "Yes / No" drop down menu is provided. If the answer is Yes, the user enters the name of the other project that is the alternative to this project in the cell to the right of this question. The name should match the Project Name on the spreadsheet where this project information is located.

**Table 4.1**
**Sub-Model 2, "Project #" Spreadsheet - Summary of Project Cost and Benefit Estimates**

| Row | Summary of Project Cost and Benefit Estimates | | | | | | User Comments | |
|---|---|---|---|---|---|---|---|---|
| 1 | **Project Name:** | Project 1 Water Supply | | | | | **Brief Project Description & Comments (put in box below)** | |
| 2 | **Project Type:** | Reclaimed Water | | | | | This project would provide reclaimed water to irrigate common area lawns and landscaping at ten parks and apartment locations in Brooksville, Florida. | |
| 3 | **Is this project an alternative to another project included in this file?** | No | If Yes, enter Project Name of other project: | | | | | |
| 4 | **Average Daily Water Offset (a)** | | 25 | million gallons per day (mgd) | | | | |
| 5 | **If Reclaimed Water, Enter Average Daily Water Production in MGD (Flow)** | | 30 | million gallons per day (mgd) | | | % Efficiency of Reclaimed Water Project: | 83.33% |
| 6 | **Discount (or Interest) Rate-Annual (b)** | | 0.04375 | Annual and between 0 and 1 | | | | |
| 7 | **COSTS** | **Entered** | **Calculated** | **Cost Index Ratio (c)** | **Useful Life in Years** | **Annualized Cost** | **Describe the Cost Index Ratio used.** | **Describe Basis and Identify Sources for the Cost Estimates and Useful Life** |
| 8 | **1.0 CAPITAL COST** | | | | | | | |
| 9 | Year Represented by Costs | 2010 | 2015 | | | 2015 | | |
| 10 | Construction Cost: | | | | | | | |
| 11 | Plant | $6,000,000 | $6,900,000 | 1.15 | 25.0 | $459,361 | | |
| 12 | Storage | $3,000,000 | $3,600,000 | 1.20 | 20.0 | $273,765 | | |
| 13 | Transmission | $15,000,000 | $18,000,000 | 1.20 | 25.0 | $1,198,333 | | |
| 14 | Distribution | $10,000,000 | $14,000,000 | 1.40 | 25.0 | $932,037 | | |
| 15 | Other Cost 1 | $1,000,000 | $1,400,000 | 1.40 | 15.0 | $129,242 | | |
| 16 | Other Cost 2 | $2,000,000 | $3,400,000 | 1.70 | 15.0 | $313,872 | | |
| 17 | Other Cost 3 | $3,000,000 | $3,300,000 | 1.10 | 15.0 | $304,641 | | |
| 18 | Total | $40,000,000 | $50,600,000 | | | $3,611,250 | | |

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**Table 4.1, CONTINUED**
**Sub-Model 2, "Project #" Spreadsheet - Summary of Project Cost and Benefit Estimates**

| | COSTS | Entered | Calculated | Cost Index Ratio (c) | Useful Life in Years | Annualized Cost | Describe the Cost Index Ratio used. | Describe Basis and Identify Sources for the Cost Estimates and Useful Life |
|---|---|---|---|---|---|---|---|---|
| 19 | Basis for Incorporating Cost of Design, Construction Management, Administration, Finance & Legal, etc. | Sum of Itemized Costs | Sum of Itemized Costs | | | | If Sum of Itemized Costs selected, enter these costs in the spreadsheet called Cost of Design, etc. | |
| 20 | **If Used, Enter Percent Markup** for Design, Construction Management, Administration, Finance & Legal | 25.00% | 25.00% | | | | | |
| 21 | Cost of Design, Construction Management, Administration, Finance & Legal | $7,700,000 | $11,040,000 | | 25.0 | $734,978 | | |
| 22 | Cost of Land and/or Easements | $5,000,000 | $4,000,000 | 0.80 | | | | |
| 23 | Percent Markup for Land/Easement Transaction Cost | 5.00% | 5.00% | | | | | |
| 24 | Total Land Cost | $5,250,000 | $4,200,000 | | 30.0 | $254,065 | | |
| 25 | **Total Capital Cost** | $52,950,000 | **$65,840,000** | | | $4,600,293 | | |
| 26 | **Total Capital Cost per Gallon of Average Daily Capacity** | $2.12 | **$2.63** | | | | | |
| 27 | **Total Capital Cost per 1,000 Gallons** | | | | | **$0.504** | | |

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**Table 4.1, CONTINUED**
**Sub-Model 2, "Project #" Spreadsheet - Summary of Project Cost and Benefit Estimates**

| | COSTS | Entered | Calculated | Cost Index Ratio (c) | Useful Life in Years | Annualized Cost | Describe the Cost Index Ratio used. | Describe Basis and Identify Sources for the Cost Estimates and Useful Life |
|---|---|---|---|---|---|---|---|---|
| 28 | | | | | | | | |
| 29 | **2.0 NON-ANNUAL RECURRING COST** | | | | | | | |
| 30 | Year Represented by Costs | 2009 | 2015 | | | 2015 | | |
| 31 | Recurring Cost Item 1 | $50,000 | $65,000 | 1.30 | 5.0 | $14,755 | | |
| 32 | Recurring Cost Item 2 | $1,000,000 | $1,400,000 | 1.40 | 10.0 | $175,845 | | |
| 33 | Recurring Cost Item 3 | $25,000 | $33,750 | 1.35 | 3.0 | $12,248 | | |
| 34 | Recurring Cost Item 4 | $5,000 | $6,000 | 1.20 | 5.0 | $1,362 | | |
| 35 | Recurring Cost Item 5 | $10,000 | $11,000 | 1.10 | 5.0 | $2,497 | | |
| 36 | **Total Non-Annual Recurring Cost** | $1,090,000 | **$1,515,750** | | | $206,707 | | |
| 37 | **Non-Annual Recurring Cost Per 1,000 Gallons** | | | | | **$0.023** | | |
| 38 | | | | | | | | |
| 39 | **3.0 ANNUAL O&M COST** | | | | | | | |
| 40 | Year Represented by Costs | 2008 | 2015 | | | 2015 | | |
| 41 | O&M Cost Item 1 | $2,000,000 | $2,700,000 | 1.35 | | $2,700,000 | | |
| 42 | O&M Cost Item 2 | $14,500 | $18,125 | 1.25 | | $18,125 | | |
| 43 | O&M Cost Item 3 | $5,000 | $7,000 | 1.40 | | $7,000 | | |
| 44 | O&M Cost Item 4 | $2,500 | $3,100 | 1.24 | | $3,100 | | |
| 45 | O&M Cost Item 5 | $100,000 | $116,000 | 1.16 | | $116,000 | | |
| 46 | **Total Annual O&M Cost** | $2,122,000 | **$2,844,225** | | | $2,844,225 | | |

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**Table 4.1, CONTINUED**
**Sub-Model 2, "Project #" Spreadsheet - Summary of Project Cost and Benefit Estimates**

| | COSTS | Entered | Calculated | Cost Index Ratio (c) | Useful Life in Years | Annualized Cost | Describe the Cost Index Ratio used. | Describe Basis and Identify Sources for the Cost Estimates and Useful Life |
|---|---|---|---|---|---|---|---|---|
| 47 | **Total Annual O&M Cost Per 1,000 Gallons** | | | | | **$0.312** | | |
| 48 | | | | | | | | |
| 49 | **4.0 TOTAL ANNUALIZED COST** | | | | | **$7,651,225** | | |
| 50 | **Total Annualized Capital, Recurring and O&M Cost per 1,000 Gallons** | | | | | **$0.838** | | |
| 51 | (a) The average daily water offset is defined as the amount of traditional, potable quality water supplies that will be replaced by reclaimed water, expressed as an annual average in MGD. | | | | | | | |
| 52 | (b) This value is found at: http://www.economics.nrcs.usda.gov/cost/priceindexes/rates.html. | | | | | | | |
| 53 | (c) This index converts the entered values into values that represent the year of calculated costs. This index represents inflation from the Year represented by entered costs to the Year represented by calculated costs. The Calculated column is simply the Entered column times the Cost Index Ratio Column. See the Cost Guidelines manual for further explanation of the Cost Index Ratio. | | | | | | | |

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**Row 4 – Average Daily Water Production (Flow) or Reclaimed Water Offset in MGD:** If the project is a reclaimed water project, Row 4 prompts the user to provide the Average Daily Water Offset in MGD. Information regarding reclaimed water offsets is provided in Section 10 of this Manual. For all other project types, the user is prompted to provide the Average Daily Water Production in MGD (Flow). In this example, the reclaimed water offset is 25 mgd.

**Row 5 – Reclaimed Water Average Daily Water Production in MGD**: If the project type is Reclaimed Water, the user is prompted to enter the Average Daily Water Production in MGD (Flow) and the model calculates the % Efficiency of the Reclaimed Water Project. In this example, the flow is 30 mgd and the % Efficiency is 83.33%.

**Row 6 – Discount (or interest) Rate - Annual:** The user is prompted to enter the annual discount rate for the purpose of annualizing the capital and non-annual recurring costs. This value is between 0.0 and 1.0. In the example, the discount rate is 0.04375. Information regarding the discount rate is provided in Section 6 of this Manual.

**Section 1.0 Capital Cost (Rows 9 through 27)**

This Section of the spreadsheet is where the itemized construction costs and the construction-related cost are entered by the user. From this information, the model calculates the total capital cost; the total capital cost per gallon of average daily capacity; and the total capital cost per 1,000 gallons. Each row is explained as follows.

**Row 9 – Year Represented by Costs**: The user is prompted to enter the Years Represented by the "Entered" costs and the "Calculated" costs. These years correspond to the construction costs, the construction related costs and the land cost. The "Entered" Costs are those that will be entered by the user. The "Calculated" Costs are those that the model will calculate based on the Cost Index Ratios that the user will enter. In the example, the year represented by the "Entered" costs is 2010 and the year represented by the "Calculated" costs is 2015. The model shows the year for the "Calculated" costs under the "Annualized Cost" column.

In the event that the year of the "Entered" costs differs among the project components, then the user should enter the year represented by most of the project component costs and identify the correct year for each project component in the User Comments column titled "Describe the Cost Index Ratio Used" to be discussed later in this Manual.

**Rows 11 through 17 – Construction Cost**: Under the "Entered" column, the user enters the cost of each relevant project component that is part of the construction cost. For cost items other than Plant, Storage, Transmission, and Distribution, the user is prompted to enter the names of these items in place of the words "Other Cost 1", "Other Cost 2" and "Other Cost 3" as needed. The cost of ASR may be entered next to the row called "Storage".

Items that need to be replaced frequently, such as filters replaced every five years, should be itemized separately under either Section 1.0 Capital Cost or Section 2.0 Non-Annual Recurring Cost. To avoid double-counting, do not include the same cost item in both sections.

As a general rule, the cost of structures already installed should not be included because this is a benefit of the project. However, depending on the purpose of the evaluation and at the discretion of District staff, the cost of structures already installed may be allocated to the project in this spreadsheet.

Under the column titled "Cost Index Ratio", the user is to enter the ratio for each cost component. This index converts the entered values into the "Calculated" values. This index represents inflation from the Year represented by the entered costs to the Year represented by the calculated costs. The Calculated column is simply the Entered column times the Cost Index Ratio Column.

If the Year Represented by the Entered Cost is the same as the Year Represented by the Calculated Cost, then the user must put a 1.0 in the "Cost Index Ratio" column. If the year represented by the "Entered" cost differs among the cost items, the user is to identify the correct year in the column titled "Describe the Cost Index Ratio Used" and use a Cost Index Ratio that reflects the correct years for that cost item. Further explanation of the Cost Index Ratio for Non-Land Items is provided in Section 7.0 of this Manual.

Under the column titled "Useful Life in Years", the user is to enter the useful life of each project component. The model uses this useful life, the calculated cost, and the discount rate to annualize the construction cost for that project component. The annualized construction cost for that component is provided in the column titled "Annualized Cost". Information regarding the useful lives of project components is provided in Section 9.0 of this Manual.

In the column titled "Describe the Cost Index Ratio Used", the user is to briefly describe the basis for this ratio. For example, the ratio might be the ratio of the ENR Construction Cost Index for 2015 divided by the same index for 2010.

In the column titled "Describe Basis and Identify Sources for the Cost Estimates and Useful Life, the user is to briefly describe how the costs and useful lives were estimated. References to documents that provide lengthy descriptions should be entered here.

**Row 18 – Total Construction Cost:** The total Construction Cost for the "Entered" costs and the "Calculated" costs are provided by the model. In this example, the total "Entered" construction cost is $40,000,000 and the total "Calculated" construction cost is $50,600,000. Also in this row, the model provides the Annualized Construction Cost which is the sum of the itemized annualized costs. In this example, the total annualized construction cost is $3,611,250.

**Row 19 – Basis for Incorporating Cost of Design, Construction Management, Administration, Finance and Legal:** The user is to identify how the cost of design, construction management, administration, finance and legal is estimated. This answer is a drop down menu where the user has two choices: Sum of Itemized Costs or Percent Markup. If the user chooses "Sum of Itemized Costs", then the user will need to complete the second spreadsheet of the model titled "Project # Cost of Design etc". An example using this spreadsheet is reproduced in Table 4.2. In this spreadsheet, the user enters the name of the cost item under the "Cost Item" column and the estimated cost under the "Entered" column. The cost index ratio is also entered for each cost item. The last two columns prompt the user to describe the Cost Index Ratio used and to Describe the Basis and Identify the Sources for the Cost Estimates. The model converts the "Entered" costs into the "Calculated" costs and provides the total cost in Row 11. This total cost is then linked to the "Project #" spreadsheet in Row 21. In this example, the itemized costs are used where the "Entered" costs total $7,700,000 and the "Calculated" costs total $11,040,000.

**Table 4.2**
**Sub-Model 2, "Project # Cost of Design etc" Spreadsheet –**
**Estimated Itemized Cost of Design, Construction Management, Administration, Finance & Legal**

| Row No. | Cost Item | Entered | Calculated | Cost Index Ratio (a) | Describe the Cost Index Ratio used | Describe Basis and Identify Sources for the Cost Estimates |
|---|---|---|---|---|---|---|
| 1 | Cost Item 1 | $2,000,000 | $2,200,000 | 1.10 | | |
| 2 | Cost Item 2 | $5,000,000 | $8,000,000 | 1.60 | | |
| 3 | Cost Item 3 | $600,000 | $720,000 | 1.20 | | |
| 4 | Cost Item 4 | $100,000 | $120,000 | 1.20 | | |
| 5 | Cost Item 5 | $0 | $0 | | | |
| 6 | Cost Item 6 | $0 | $0 | | | |
| 7 | Cost Item 7 | $0 | $0 | | | |
| 8 | Cost Item 8 | $0 | $0 | | | |
| 9 | Cost Item 9 | $0 | $0 | | | |
| 10 | Cost Item 10 | $0 | $0 | | | |
| 11 | Total | $7,700,000 | $11,040,000 | | | |
| 12 | (a) This index converts the entered values into values that represent the year of calculated costs. This index represents inflation from the Year represented by entered costs to the Year represented by calculated costs. The Calculated column is simply the Entered column times the Cost Index Ratio Column. See Section 7.0 of this Cost Guidelines manual for further explanation of the Cost Index Ratio for Non-Land Items. | | | | | |

**Row 20 – If Used, Enter Percent Markup for Design, Construction Management, Administration, Finance and Legal:** In the event that "Percent Markup" is selected in Row 19 of Table 4.1 (Project # Spreadsheet), the user enters this percent markup in Row 20. This percent markup is the percent of the total construction cost that represents the cost of

engineering design, construction management, administration, finance & legal. The units are such that entering a 10 will result in 10%. In this example, 25 for 25% was entered but it is not used because, in Row 19, the "Sum of Itemized Costs" was selected.

**Row 21 – Cost of Design, Construction Management, Administration, Finance and Legal:** The model calculates the Cost of Design, Construction Management, Administration, Finance & Legal either: (1) by using the values in Row 11 of Table 4.2 (Project # Cost of Design etc Spreadsheet) or (2) by multiplying the total construction cost in Row 18 by the Percent Markup in Row 20. The user enters the number of years over which this cost should be annualized. It will likely be the useful life of the plant or 30 years, whichever value is lower. In the example, 25 years is entered. The model then calculates the Annualized Cost of this item using the total calculated cost, the 25 years, and the discount rate.

**Row 22 – Cost of Land and/or Easements:** Under the "Entered" column in this row, the user is to provide an estimate of the cost of land and/or easements associated with the project and the land's cost index ratio. A discussion of the Cost Index Ratio for Land is provided in Section 8.0 of this Manual. If the year represented by the "Entered" land cost is different from that for the "Entered" construction costs, then the user is to identify the year for the "Entered" land cost in the column titled ""Describe Cost Index Ratio Used" and make sure that the Cost Index Ratio represents the conversion from this year to the "Calculated" year.

**Row 23 – Percent Markup for Land / Easement Transaction Cost:** The user enters the percent markup that represents the transactions cost of purchasing the land or obtaining the easement as a percent of the cost of the land or easement. This cost represents the cost to identify the land and to negotiate the price of the land or easement. The units are such that entering a 10 will result in 10%. In the example, 5 for 5% was entered.

**Row 24 – Total Land Cost:** The model uses the cost of the land or easement and the percent markup to calculate the total land cost. In the example, the total "Entered" land cost is $5,250,000 and the total "Calculated" land cost is $4,200,000. The user is prompted to enter the useful life in years of this land. Because land is perpetual, a useful life of 30 years should be used. This is the value used in the example. The model then calculates the Annualized Cost of the land using the Total Calculated Land Cost, the 30 years, and the discount rate. In the example, the annualized land cost is $254,065.

**Row 25 – Total Capital Cost**: The model calculates the total capital cost of the project for the "Entered" and "Calculated" costs. It also calculates the total annualized capital cost as the sum of the annualized construction, non-construction and land costs in rows 18, 21, and 24. In the example, the total "Entered" capital cost is $52,950,000 and the total "Calculated" capital cost is $65,840,000. The annualized capital cost is $4,600,293.

**Row 26 – Total Capital Cost per Gallon of Average Daily Capacity:** The model calculates the capital cost per gallon of average daily water production or, in the case of reclaimed water,

per gallon of water offset. The calculation is total capital cost divided by gallons. In the example, the total "Entered" capital cost per gallon is $2.12 and the total "Calculated" capital cost is $2.63 per gallon.

**Row 27 – Total Capital Cost per 1,000 Gallons:** The model calculates the total capital cost per 1,000 gallons of water produced or, in the case of reclaimed water, offset. It is the sum of the annualized construction cost; the annualized engineering design, construction management, administration, finance and legal cost; and the annualized total land cost divided by the 1,000 gallons of water produced or offset in a year. In the example, the annualized capital cost per 1,000 gallons of water offset is $0.504.

**Section 2.0 Non-Annual Recurring Cost (Rows 30 through 37)**

This Section of the spreadsheet is where the itemized non-annual recurring costs are provided. From this information, the model calculates the total non-annual recurring cost; the annualized non-annual recurring cost; and the non-annual recurring cost per 1,000 gallons. Each row is explained as follows.

**Row 30 - Year Represented by Costs**: The user enters the year represented by the "Entered" costs and the year represented by the "Calculated" costs for the non-annual recurring cost items. In the example, 2009 is the year for the "Entered" costs and 2015 is the year for the "Calculated" costs. The model shows the year for the "Calculated" costs under the "Annualized Cost" column.

**Rows 31 through 35 – Itemized Non-Annual Recurring Costs**: In these rows, the user enters the cost item names, the "Entered" costs, the cost index ratio, and the useful life in years. The model uses this information and the discount rate to calculate the annualized cost for each item.

**Row 36 – Total Non-Annual Recurring Cost:** In this row the model calculates the total non-annual recurring costs and the total annualized cost which are the sums of rows 31 to 35. In the example, the total "Entered" cost is $1,090,000 and the total "Calculated" cost is $1,515,750. The total annualized cost is $206,707.

**Row 37 – Non-Annual Recurring Cost per 1,000 Gallons:** The model calculates the total annualized non-annual recurring cost per 1,000 gallons of water produced or, in the case of reclaimed water, offset. In the example, the cost per 1,000 gallons of offset is $0.023.

**Section 3.0 Annual O&M Cost**

This Section of the spreadsheet is where the itemized annual operations and maintenance (O&M) costs are provided. From this information, the model calculates the total annual O&M cost and the annual O&M cost per 1,000 gallons. Each row is explained as follows.

**Row 40 – Year Represented by Costs:** The user enters the year represented by the "Entered" costs and the year represented by the "Calculated" costs for the annual O&M cost items. In the example, 2008 is the year for the "Entered" costs and 2015 is the year for the "Calculated" costs. The model shows the year for the "Calculated" costs under the "Annualized Cost" column.

**Rows 41 through 45 Itemized Annual O&M Costs:** In these rows, the user enters the cost item names associated with the annual O&M cost and enters the cost estimates under the "Entered" costs column. The user also enters the cost index ratios. The cost may include any payments made to regional water authorities or other entities for water supply.

Remember to include the annual cost to repair and replace minor project components that were not included under Section 2.0 Non-Annual Recurring Cost. There is no need to include payments to an annual renewal and replacement fund as long as all costs associated with building, operating, and maintaining a water supply project are included in this spreadsheet. In this case, including annual payments to a renewal and replacement fund would be double-counting. The annualized cost for each item is simply the cost in the "Calculated" column.

**Row 46 – Total Annual O&M Cost:** The model calculates the total annual O&M costs. In the example, the total "Entered" cost is $2,122,000 and the total "Calculated" cost is $2,844,225. The total annualized O&M cost is the same as the "Calculated" cost.

**Row 47 – Total Annual O&M Cost per 1,000 Gallons:** The total annual O&M cost per 1,000 gallons of water produced or, in the case of reclaimed water, offset, is calculated by the model. In the example, the annual O&M cost per 1,000 gallons is $0.312.

### 4.0 Total Annualized Cost

In this section, the annualized costs calculated in Sections 1, 2, and 3 of the spreadsheet are added together and the total annualized cost per 1,000 gallons is calculated. Each row is explained as follows.

**Row 49 – Total Annualized Cost**: The model calculates the total annualized cost of all project components, including capital cost, non-annual recurring cost, and annual O&M cost. In the example, the total annualized cost is $7,651,225.

**Row 50 – Total Annualized Capital, Recurring and O&M Cost per 1,000 Gallons:** The model calculates the total annualized cost per 1,000 gallons of water produced or, in the case of reclaimed water, offset, of all project components, including capital cost, non-annual recurring cost and annual O&M cost. In the example, the total annualized cost per 1,000 gallons is $0.838.

## 4.2 "Summary Costs Supply Projects" Spreadsheet

The spreadsheet called "Summary Costs Supply Projects" takes the relevant information from each "Project #" spreadsheet so that users may easily compare the results of the multiple projects. A reproduction of this summary spreadsheet is provided in Table 4.3. The Excel columns were condensed to fit the page. The cost and benefit information for hypothetical Project 1 is included in this table. The costs and benefits for Projects 2 through 4 have not been entered so the cells contain 0s and NAs.

In the green shaded cells, the user enters the name and company of the person who prepared the project's cost and benefit information and the person's email address and phone number. The other cells are linked to the information in the "Project #" spreadsheets. The items included in this summary spreadsheet are the same as the items included in Sub-Model 1, District Project Summary.

| Row No. | Table 4.3<br>Sub-Model 2, "Summary Costs Supply Projects" Spreadsheet –<br>Summary of Water Supply Project Costs and Benefits | | | | |
|---|---|---|---|---|---|
| 1 | **Project Name:** | **Project 1 Water Supply** | **0** | **0** | **0** |
| 2 | Project Type: | Reclaimed Water | 0 | 0 | 0 |
| 3 | Average Daily Water Production in MGD (Flow) | 30 | 0 | 0 | 0 |
| 4 | Average Daily Water Offset in MGD | 25 | NA | NA | NA |
| 5 | Average Daily Water Savings in MGD (Flow) | NA | NA | NA | NA |
| 6 | Year Represented by Costs | 2015 | 0 | 0 | 0 |
| 7 | Discount (or Interest) Rate, annual | 0.04375 | 0 | 0 | 0 |
| 8 | Capital or Initial Cost in dollars | $65,840,000 | $0 | $0 | $0 |
| 9 | Non-Annual Recurring Cost in dollars | $1,515,750 | $0 | $0 | $0 |
| 10 | Annual O&M Cost in dollars | $2,844,225 | $0 | $0 | $0 |
| 11 | Total Annualized Cost in dollars | $7,651,225 | $0 | $0 | $0 |
| 12 | **Total Annualized Per 1,000 Gallons:** | | | | |
| 13 | Capital or Initial Cost | $0.504 | NA | NA | NA |
| 14 | Non-Annual Recurring Cost | $0.023 | NA | NA | NA |
| 15 | Annual O&M Cost | $0.312 | NA | NA | NA |
| 16 | **Total - All Costs** | **$0.838** | **NA** | **NA** | **NA** |
| 17 | Capital Cost per Gallon of Average Daily Capacity | $2.63 | NA | NA | NA |
| 18 | % Efficiency of Reclaimed Water Project | 83.33% | NA | NA | NA |
| 19 | Overall Comments | … irrigate …lawns and landscaping … | Comment 2 Here | Comment 3 Here | Comment 4 Here |
| 20 | Name of preparer: | Grace Johns | | | |
| 21 | Company name of preparer: | Hazen and Sawyer | | | |
| 22 | Email address of preparer: | gjohns@hazenandsawyer.com | | | |
| 23 | Phone number of preparer: | (954) 987-0066 | | | |

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# 5.0 Sub-Model 3, Cost Guidelines WATER CONSERVATION V3 Description

Sub-Model 3 is comprised of one spreadsheet for each water conservation project; one spreadsheet that contains default values for useful lives of project components; and a summary spreadsheet of all projects.

The first spreadsheet is a summary of the costs of all projects evaluated in the sub-model Excel file and is called “Summary Costs Conservation”. The second spreadsheet in the sub-model Excel file is called “Useful Life” and contains default values for useful lives in years of certain components that might comprise a water supply project or a water conservation option. These values may be used by the consultant.

For each project, there is a spreadsheet called “Project #” and there are as many of these spreadsheets as there are water conservation options to be evaluated. The spreadsheets are named “Project 1”, “Project 2”, “Project 3”, etc. These spreadsheets may be renamed to clarify each project.

This version 3 of Sub-Model 3, WATER CONSERVATION, has enough spreadsheets to evaluate 15 projects. If more projects need to be added to this Excel file, just the one project spreadsheet will need to be copied. In the “Summary Costs Conservation” spreadsheet, columns for the additional projects will need to be added so that the summarized results of these additional projects can be displayed. This is accomplished by copying one of the project columns in this summary spreadsheet to a blank column and replacing the spreadsheet name of the project spreadsheet in each cell of the new column. The row numbers in the cells should not need to be changed. When copying a spreadsheet, if a box appears asking a question about formula or worksheet names, just answer yes at all times.

## 5.1 “Project #” Spreadsheet

This spreadsheet contains the cost and benefit information of a specific project and is reproduced in Table 5.1 for a hypothetical project called “Project 1 Water Conservation”. In this table, the columns have been condensed to fit on the page. The gray-shaded cells are to be blank at all times. The user must enter information in all cells that are Green in color. The information to enter is described below for each row of this spreadsheet.

**Table 5.1**
**Sub-Model 3, "Project #" Spreadsheet - Summary of Water Conservation Project Cost and Benefit Estimates**

| Row | Summary of Project Cost and Benefit Estimates | | | | | | User Comments | |
|---|---|---|---|---|---|---|---|---|
| 1 | **Project Name:** | Project 1 Water Conservation | | | | | **Brief Project Description & Comments (put in box below)** | |
| 2 | **Project Type:** | Water Conservation Options | | | | | This is a residential irrigation audit in Hillsborough County. | |
| 3 | **Average Daily Water Savings** | | 25 | million gallons per day (mgd) | | | | |
| 4 | **Discount or Interest Rate-Annual (a)** | | 0.04375 | Annual and between 0 and 1 | | | | |
| 5 | **COSTS** | **Entered** | **Calculated** | **Cost Index Ratio (b)** | **Useful Life in Years** | **Annualized Cost** | **Describe the Cost Index Ratio used** | **Describe Basis & Identify Sources for Cost Estimates & Useful Life** |
| 6 | **1.0 INITIAL COST AND NON-ANNUAL RECURRING COST** | | | | | | | |
| 7 | Year Represented by Costs | 2010 | 2015 | | | 2015 | | |
| 8 | Cost Item 1 | $6,000,000 | $6,300,000 | 1.05 | 15.0 | $581,587 | | |
| 9 | Cost Item 2 | $100,000 | $115,000 | 1.15 | 12.0 | $12,522 | | |
| 10 | Cost Item 3 | $1,000,000 | $1,200,000 | 1.20 | 10.0 | $150,724 | | |
| 11 | Cost Item 4 | $2,000,000 | $2,400,000 | 1.20 | 10.0 | $301,448 | | |
| 12 | Cost Item 5 | $500,000 | $700,000 | 1.40 | 10.0 | $87,922 | | |
| 13 | Cost Item 6 | $50,000 | $70,000 | 1.40 | 7.0 | $11,825 | | |
| 14 | Cost Item 7 | $10,000 | $17,000 | 1.70 | 6.0 | $3,283 | | |
| 15 | Cost Item 8 | $12,000 | $13,200 | 1.10 | 5.0 | $2,996 | | |
| 16 | **Total Initial & Non-Annual Recurring Cost** | $9,672,000 | **$10,815,200** | | | $1,152,306 | | |
| 17 | **Total Initial & Non-Annual Recurring Cost per 1,000 Gallons** | | | | | **$0.126** | | |

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**Table 5.1, CONTINUED**
**Sub-Model 3, "Project #" Spreadsheet - Summary of Water Conservation Project Cost and Benefit Estimates**

| | COSTS | Entered | Calculated | Cost Index Ratio (b) | Useful Life in Years | Annualized Cost | Describe the Cost Index Ratio used. | Describe Basis/Identify Sources for Costs and Useful Life |
|---|---|---|---|---|---|---|---|---|
| 18 | | | | | | | | |
| 19 | **2.0 ANNUAL O&M COST** | | | | | | | |
| 20 | Year Represented by Costs | 2008 | 2015 | | | 2015 | | |
| 21 | O&M Cost Item 1 | $200,000 | $270,000 | 1.35 | | $270,000 | | |
| 22 | O&M Cost Item 2 | $14,500 | $18,125 | 1.25 | | $18,125 | | |
| 23 | O&M Cost Item 3 | $5,000 | $7,000 | 1.40 | | $7,000 | | |
| 24 | O&M Cost Item 4 | $2,500 | $3,100 | 1.24 | | $3,100 | | |
| 25 | O&M Cost Item 5 | $100,000 | $116,000 | 1.16 | | $116,000 | | |
| 26 | **Total Annual O&M Cost** | $322,000 | **$414,225** | | | $414,225 | | |
| 27 | **Total Annual O&M Cost Per 1,000 Gallons** | | | | | **$0.045** | | |
| 28 | | | | | | | | |
| 29 | **3.0 TOTAL ANNUALIZED COST** | | | | | **$1,566,531** | | |
| 30 | **Total Annualized Capital, Recurring and O&M Cost per 1,000 Gallons** | | | | | **$0.172** | | |
| 31 | (a) This value is found at: http://www.economics.nrcs.usda.gov/cost/priceindexes/rates.html. | | | | | | | |
| 32 | (b) This index converts the entered values into values that represent the year of calculated costs. This index represents inflation from the Year represented by entered costs to the Year represented by calculated costs. The Calculated column is simply the Entered column times the Cost Index Ratio Column. See the Cost Guidelines manual for further explanation of the Cost Index Ratio. | | | | | | | |

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**Row 1 – Project Name:** The user enters the Project Name. In this example, the Project Name is "Project 1 Water Conservation".

**Row 1 - Brief Project Description & Comments (put in box below):** In the box below this heading, the user enters a brief description of the project; a brief description any additional benefits of the project other than water conservation; any unusual characteristics of the project that should be considered; and any synergies the project would provide as it interacts with other projects being considered.

**Row 2 – Project Type:** The "Project Type" for this Model is "Water Conservation Options" for all projects.

**Row 3 – Average Daily Water Savings in MGD:** The user enters the estimated average daily water savings in MGD. The method used to estimate savings should be briefly described in the Overall Comments cell identified above. Documents that provide lengthy descriptions should be referenced in the User Comments section of this spreadsheet.

**Row 4 – Discount (or interest) Rate - Annual**: The user is prompted to enter the annual discount rate for the purpose of annualizing the initial and non-annual recurring costs. The rate is a number between and including 0.0 and 1.0. Information regarding the discount rate is provided in Section 6.0 of this Manual.

**Section 1.0 Initial and Non-Annual Recurring Cost (Rows 7 through 17)**

This Section of the spreadsheet is where the itemized initial costs and non-annual recurring costs are provided. From this information, the model calculates the total initial and non-annual recurring cost and the total initial and non-annual recurring cost per 1,000 gallons. Each row is explained as follows.

**Row 7 – Year Represented by Costs**: The user is prompted to enter the Years Represented by the "Entered" Costs and the "Calculated" Costs for the initial costs and the non-annual recurring costs. The "Entered" Costs are those that will be entered by the user. The "Calculated" Costs are those that the model will calculate based on the Cost Index Ratios that the user will enter. In the example, the year represented by the "Entered" costs is 2010 and the year represented by the "Calculated" costs is 2015. The model shows the year for the "Calculated" costs under the "Annualized Cost" column.

In the event that the year of the "Entered" costs differs among the project components, then the user should enter the year represented by most of the project component costs and identify the correct year for each project component in the User Comments column titled "Describe Cost Ratio Index Used". Be sure that the entered Cost Index Ratio represents the actual year of the entered cost for that project component. For additional information, see Section 7.0, "Cost Index Ratio for Non-Land Items".

**Rows 8 through 15 – Itemized Initial and Non-Annual Recurring Costs**: Under the "Entered" column, the user is prompted to enter the costs of all relevant project components that are part of the initial cost and non-annual recurring cost. The user must enter the names of these items in place of the words "Cost Item 1", "Cost Item 2" and "Cost Item 3", etc. as needed.

Under the column titled "Cost Index Ratio", the user is to enter the ratio for each cost component. This index converts the entered values into the "Calculated" values. This index represents inflation from the Year represented by the "Entered" costs to the Year represented by the "Calculated" costs. The "Calculated" column is simply the "Entered" column times the "Cost Index Ratio" Column.

If the Year Represented by the Entered Cost is the same as the Year Represented by the Calculated Cost, then the user must put a 1.0 in the "Cost Index Ratio" column. If the year represented by the "Entered" cost differs among the project components, the user is to identify the correct year in the column titled "Describe Cost Index Ratio Used" and use a Cost Index Ratio that reflects the correct year. Further explanation of the Cost Index Ratio for Non-Land Items is provided in Section 7.0 of this Manual.

Under the column titled "Useful Life in Years", the user is to enter the useful life of each project component. The model uses this useful life, the calculated cost, and the discount rate to annualize the initial or non-annual recurring cost for that itemized cost item. The annualized cost for that item is provided in the column titled "Annualized Cost". Information regarding the Useful lives of project components is provided in Section 9.0 of this Manual.

In the column titled "Describe the Cost Index Ratio Used", the user is to briefly describe the basis for this ratio. For example, the ratio might be the ratio of the U.S. CPI for all items and all urban consumers for 2015 divided by the same index for 2010.

In the column titled "Describe Basis and Identify Sources for the Cost Estimates and Useful Life", the user is to briefly describe how the costs and useful lives were estimated. References to documents with lengthy descriptions should be entered here.

**Row 16 – Total Initial and Non-Annual Recurring Cost:** The total Initial and Non-Annual Recurring Cost for the "Entered" costs and the "Calculated" costs are provided by the model. In this example, the total "Entered" initial and non-annual recurring cost is $9,672,000 and the total "Calculated" initial and non-annual recurring cost is $10,815,200. Also in this row, the model provides the Annualized Initial and Non-Annual Recurring Cost which is the sum of the itemized annualized costs. In this example, the total annualized initial and non-annual recurring cost is $1,152,306.

**Row 17 – Total Initial and Non-Annual Recurring Cost Per 1,000 Gallons:** Here the model calculates the annualized initial and non-annual recurring cost per 1,000 gallons of water saved.

In the example, the annualized initial and non-annual recurring cost per 1,000 gallons of water saved is $0.126.

**Section 2.0 Annual O&M Cost (Rows 20 through 27)**

This Section of the spreadsheet is where the itemized annual operations and maintenance (O&M) costs are provided. From this information, the model calculates the total annual O&M cost and the annual O&M cost per 1,000 gallons. Each row is explained as follows.

**Row 20 – Year Represented by Costs**: In this row, the user enters the year represented by the "Entered" annual O&M cost and the year represented by the "Calculated" annual O&M cost. The model inserts the year represented by the "Calculated" cost in the Annualized Cost column.

**Rows 21 through 25 – Itemized Annual O&M Costs:** In these rows, the user enters the cost item names associated with the annual O&M cost and enters the cost estimates under the "Entered" costs column. The user also enters the cost index ratios. The annualized cost for each item is simply the cost in the "Calculated" column.

**Row 26 – Total Annual O&M Cost**: The model calculates the total annual O&M cost. In the example, the total "Entered" cost is $322,000 and the total "Calculated" cost is $414,225. The total annualized O&M cost is the same as the "Calculated" cost.

**Row 27 – Total Annual O&M Cost per 1,000 Gallons:** The total annual O&M cost per 1,000 gallons of water saved is calculated by the model. In the example, the O&M cost per 1,000 gallons saved is $0.045.

**3.0 Total Annualized Cost**

In this section, the annualized costs calculated in Sections 1 and 2 of the spreadsheet are added together and the total annualized cost per 1,000 gallons of water saved is calculated. Each row is explained as follows.

**Row 29 – Total Annualized Initial, Recurring and O&M Cost:** The model calculates the total annualized cost of all project components, including initial and non-annual recurring cost and annual O&M cost. In the example, the total annualized cost is $1,566,531.

**Row 30 – Total Annualized Initial, Recurring and O&M Cost per 1,000 gallons:** The model calculates the total annualized cost per 1,000 gallons of water saved for all project components, including initial and non-annual recurring cost and annual O&M cost. In the example, the total annualized cost per 1,000 gallons saved is $0.172.

## 5.2 "Summary Costs Conservation" Spreadsheet

The spreadsheet called "Summary Costs Conservation" takes the relevant information from each "Project #" spreadsheet so that users may easily compare the results of the multiple projects. A reproduction of this summary spreadsheet is provided in Table 5.2. The Excel columns were condensed to fit the page. The cost and benefit information for "Project 1 Water Conservation" is included in this table. The costs and benefits for Projects 2 through 4 have not been entered so the cells contain 0s and NAs.

In the green shaded cells, the user enters the name and company of the person who prepared the project's cost and benefit information and the person's email address and phone number. The other cells are linked to the information in the "Project #" spreadsheets. The items included in this summary spreadsheet are the same as the items included in Sub-Model 1, District Project Summary for the water conservation projects. Rows 3, 4, 9, 14, 17 and 18 are blank to minimize cell linking errors with Sub-Model 1.

| Row | Table 5.2<br>Sub-Model 3, "Summary Costs Conservation" Spreadsheet –<br>Summary of Water Conservation Project Costs and Benefits | | | | |
|---|---|---|---|---|---|
| 1 | **Project Name:** | **Project 1 Water Conservation** | **Project 2 Water Conservation** | **Project 3 Water Conservation** | **Project 4 Water Conservation** |
| 2 | Project Type: | Water Conservation Option | 0 | 0 | 0 |
| 3 | | | | | |
| 4 | | | | | |
| 5 | Average Daily Water Savings in MGD | 25 | NA | NA | NA |
| 6 | Year Represented by Costs | 2015 | 0 | 0 | 0 |
| 7 | Discount (or Interest) Rate, annual | 0.04375 | 0 | 0 | 0 |
| 8 | Initial Cost, including non-annual recurring cost in dollars | $10,815,200 | $0 | $0 | $0 |
| 9 | | | | | |
| 10 | Annual O&M Cost in dollars | $414,225 | $0 | $0 | $0 |
| 11 | Total Annualized Cost in dollars | $1,566,531 | $0 | $0 | $0 |
| 12 | **Total Annualized Per 1,000 Gallons:** | | | | |
| 13 | Initial Cost | $0.126 | NA | NA | NA |
| 14 | | | | | |
| 15 | Annual O&M Cost | $0.045 | NA | NA | NA |
| 16 | **Total - All Costs** | **$0.172** | **NA** | **NA** | **NA** |
| 17 | | | | | |
| 18 | | | | | |
| 19 | Description and Overall Comments | This is a residential irrigation audit in Hillsborough County. | Comment 2 Here | Comment 3 Here | Comment 4 Here |
| 20 | Name of preparer: | Grace Johns | | | |
| 21 | Company name of preparer: | Hazen and Sawyer | | | |
| 22 | Email address of preparer: | gjohns@hazenandsawyer.com | | | |
| 23 | Phone number of preparer: | (954) 987-0066 | | | |

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## 6.0 Discount Rate

The discount rate is used to annualize the capital cost, the initial cost and the non-annual recurring cost associated with the project. The total annualized cost is the sum of the annualized capital cost, the annualized initial cost, the annualized non-annual recurring cost and the annual O&M cost. The total annualized cost is then divided by the benefit of the project. The benefit of a water supply project is the amount of water produced for reasonable and beneficial uses during a year. The benefit of a reclaimed water project is the amount of potable quality water replaced by the reclaimed water use during the year (also called offset). The benefit of a conservation project is the amount of water saved during the year.

The equation to annualize a capital, initial, or non-annual recurring cost is as follows.

$$\text{Annualized Cost} = \text{Present Value Cost} \times (D \times (1+D)^N) / ((1+D)^N - 1)$$

Where Present Value Cost is the estimated Capital, Initial and/or Non-Annual Recurring Cost;

D is the annual Discount Rate which is a value between and including 0 and 1; and

N is the number of years over which the Present Value Cost is to be annualized.

The "pmt" function of Excel will calculate the negative of this value. The "pmt" function and the conversion of the annualized cost to a positive number is:

Annualized Cost =-1*pmt(discount rate, years of useful life, calculated value)

So using the information in Row 8 of Table 5.1 as an example, if the discount rate is 0.04375, the useful life is 15 years and the calculated value is $6,300,000, then these values are entered by the model into the pmt function or:

Annualized Cost =-1*pmt(.04375,15,6300000) = $581,587

The Discount Rate, D, is the rate at which the future value of the Present Value Cost grows over time due to the time value of money. For example, if the Present Value Cost is borrowed at 4 percent annual interest, then the appropriate discount rate would be 4 percent per year. If the loan is repaid over ten years, then the Annualized Cost would reflect the principal and interest payments on the loan such that it is paid off in ten years (N=10). If the Present Value Cost is taken from a savings account that earns 3 percent interest per year, then the discount rate (D) would be equal to 3 percent.

For the purposes of preparing the District's Regional Water Supply Plan, the appropriate discount rate to use is the current Rate for Federal Water Projects published by the United States Department of Agriculture, Natural Resources Conservation Service at:

http://www.economics.nrcs.usda.gov/cost/priceindexes/rates.html

For example, the 2010 rate published in this link is 4.375 percent per year. This value, entered in the model as 0.04375, is the Discount Rate that should be used for projects evaluated in 2010.

## 7.0 Cost Index Ratio for Non-Land Items

For costs that must be converted from the year represented by the "Entered" costs to the year represented by the "Calculated" costs, cost index ratios may be used. The Cost Guidelines Excel model asks the user to enter the Cost Index Ratio which is the index representing the year of the "Calculated" cost divided by the index representing the year of the "Entered" cost. The user is responsible for choosing the most appropriate cost indices to use given the type and year of costs that are to be converted. Many types of cost indices are available and can represent a "basket" of goods or individual goods. The three types of cost indices described in this Guidelines document are the ENR cost indices, the CPI or consumer price index, and the GDP (Chained) Price Index.

The ENR cost indices should be used for construction cost components such as treatment plants or ASR systems. For all other cost items, the GDP (Chained) Price Index should be used. The exception is that the CPI may be used when the project component is commonly purchased by consumers (not producers). So the CPI can be used when evaluating the cost of low flow toilets and other water conserving household appliances and irrigation items such as rain sensors typically purchased by households. The CPI could also be used for these same types of items purchased by businesses for the use of their employees. More specific information on each of the three indices is described below.

**ENR Cost Indices.** A list of cost indices available from Engineering News Record (www.ENR.com) by subscription is as follows.

- Construction Cost Index History
- Building Cost Index History
- Materials Price Index
- Skilled Labor Index
- Common Labor Index

These cost indices represent the U.S. average. Cost indices are also available for each of 20 U.S. cities. None of these cities is located in Florida. Historic building material price data for 75 building materials is also available from ENR.com for a nominal charge.

To demonstrate the use of the ENR cost indices to calculate the Cost Index Ratio, a construction cost estimated in 2005 dollars (entered dollars) was converted to 2009 dollars

(calculated dollars) using the ENR Construction Cost Index History. This Construction Cost Index History represents:

> "200 hours of common labor at the 20-city average of common labor rates, plus 25 cwt of standard structural steel shapes at the fabricated 20-city price, plus 1.128 tons of Portland cement at the 20-city price, plus 1,088 board feet of 2 x 4 lumber at the 20-city price".

The annual average 2005 value for this index is 7446 as reported by ENR. The annual average 2009 value for this index is 8570. The desired 2009 calculated construction cost is estimated by multiplying the 2005 entered construction cost by the ratio of the 2009 ENR Construction Cost Index and the 2005 ENR Construction Cost Index. This ratio is called the ENR Cost Index Ratio and in this example is equal to 8570 / 7446 or 1.15. This ratio means that the desired 2009 construction cost is 15 percent higher than the entered 2005 construction cost. This is the ratio that is entered into the Excel model spreadsheet under the column titled "Cost Index Ratio".

Current costs may also be estimated directly using RSMEANS Costworks Software. A subscription to this software may be purchased from http://www.rsmeans.com/bookstore.

**Consumer Price Index (CPI**). The Consumer Price Index (CPI) is a measure of the average change in prices over time for a market basket of goods and services purchased by households. The CPI values are published by the U.S. Bureau of Labor Statistics and obtained from http://www.bls.gov/cpi/. There are many types of CPIs that are specific to certain geographic areas and types of goods and services. The CPI most commonly reported by the media is the CPI for all urban consumers, U.S. City Average. The percent change in the CPI from one time period to another is referred to as "inflation". This and the other CPIs can be used to construct a cost index ratio.

Use of the CPI in the Excel Cost Guidelines Model would be for the calculation of the Cost Index Ratio. For example, the 2009 cost to purchase and install a Soil Moisture Sensor would be equal to the 2005 cost times the ratio of the CPI for 2009 and the CPI for 2005. This ratio is equal to 214.5 / 195.3 or 1.10. This ratio means that the cost of living in the U.S. increased by 10 percent from 2005 to 2009.

**GDP (Chained) Price Index.** The GDP (Chained) Price Index measures the prices paid for the quantities of goods and services produced by the U.S. economy in a given year relative to the prices and quantities produced in a base year. It is derived from the prices associated with personal consumption expenditures, gross private domestic investment, net exports of goods and services, government consumption expenditures and gross investment. The values of this index are calculated by the U.S. Bureau of Economic Analysis and may be obtained from http://www.whitehouse.gov/omb/budget/Historicals/ under Table 10.1 on the site. The index is called "chained" because the weights given to items in the index are affected by the

substitutions that purchasers might make across item categories in response to changes in relative prices over time.

To demonstrate the calculation of the Cost Index Ratio, the 2009 cost to purchase and install a Soil Moisture Sensor would be equal to the 2005 cost times the ratio of the GDP (Chained) Price Index for 2009 and the corresponding index for 2005. This ratio is equal to 1.24 / 1.13 or 1.10. This ratio means that the cost of goods and services purchased in the U.S. increased by 10 percent from 2005 to 2009.

**Converting Future Costs to Current Costs.** In the event that the "Entered" cost is a future cost estimate and the current cost estimate is desired, then the Cost Index Ratio will be less than one when properly calculated. The Cost Guidelines Model will determine the "Calculated" cost from the "Entered" cost times the Cost Index Ratio. For example, if a 2005 soil moisture sensor value is desired from a 2009 soil moisture sensor value, then the "Entered" cost would be the 2009 cost and the "Calculated" cost would be the 2005 cost. Using the GDP (Chained) Price Index example above, the Cost Index Ratio would be 1.13 / 1.24 or 0.91.

If a specific inflation value was used to obtain the 2009 cost, then this same inflation value should be used to convert the 2009 value back to the 2005 value. So if the inflation value used was 10% then the Cost Index Ratio used to convert the 2009 value back to the 2005 value should be 0.91. This 0.91 value is equal to 1 / 1.10.

## 8.0 Cost Index Ratio for Land

The land cost should be itemized separately wherever possible. In the event that the land cost estimate needs to be updated to the current year, a cost index ratio could be used but would need to be constructed by the user based on the available land price data. The two sources of publicly available data on real estate prices in Florida are the Florida farm land price survey results published each year by the University of Florida, Institute of Food and Agricultural Sciences (UF-IFAS) and the county profiles documents published by the Florida Office of Economic & Demographic Research. These data could be used to create a Cost Index Ratio that converts the available land price data from prior years to the current year. Forecasts of land prices are not available from public sources and, if needed, would be purchased from economic or real estate firms specializing in this service.

**Florida Farm Land Values.** Each year, the UF-IFAS conducts a survey of rural appraisers, farm lenders, real estate brokers, farm managers, land investors, county property appraisers, and personnel from the Farm Services Agency and the Natural Resource Conservation Service. The survey responses are used to estimate the value of agricultural land per acre in the northern region of Florida and in the southern region of Florida. The northern region is defined as all counties north of and including Alachua, Flagler, Levy, and Putnam counties. The southern region is defined as all counties south of and including Citrus, Marion, and Volusia counties.

In the northern region, land values in seven land categories are provided including irrigated cropland, non-irrigated cropland, improved pastureland, unimproved pastureland, farm woods, and transitional farm land less than five miles to a major town and greater than five miles to a major town. In the southern region, land values are provided for these same seven land categories plus citrus land classified into mature oranges, mature grapefruit, and 5 to 7 year old citrus groves. Survey respondent expectations of farm land value changes over the next 12 months are also provided. The most recent survey results are reported in the UF-IFAS publication FE833 titled "2009 Florida Land Value Survey: Farm Land Prices Remain Down". It provides land values in May of 2007, 2008 and 2009. If land values in years prior to 2007 are needed, these publications are available from UF-IFAS, either on its web site or by contacting the study's authors. The 2009 publication is provided in Appendix A of this Cost Guidelines Manual and can be found at http://edis.ifas.ufl.edu.

**Percent Change in Median Sales Price of Existing Single-Family Homes.** The Florida Office of Economic & Demographic Research provides county profiles that include the percent change in the median sales price of existing single-family homes for each year from 2001-02 through 2008-09. These county profiles can be found at the following web site address.

http://www.edr.state.fl.us/Content/area-profiles/county/index.cfm

The profiles for Manatee County and for Levy County are provided in Appendix B of this Cost Guidelines Manual.

**Creating the Cost Index Ratio for Land.** At the user's discretion, the agricultural land values and/or the percent changes in the median sales prices of existing single-family homes can be used to create an index ratio that reflects the increase or reduction in land value from the "Entered" year to the "Calculated" year. For example, the estimated value of transitional land less than five miles from a major town in the southern Florida region was $54,442 per acre in 2007 and $29,619 per acre in 2009. Therefore, an appropriate cost index ratio to convert a 2007 land value to a 2009 land value would be $29,619 divided by $54,442 or 0.54. The user would enter 0.54 into the Cost Guidelines model under Cost Index Ratio in the row titled "Cost of Land and/or Easements" (Model Row 22 of Sub-Model 2 – "Project #" spreadsheet). The model then multiplies the "Entered" land value by 0.54 to convert the estimate of the 2007 cost of land to an estimate of the 2009 cost of land. This ratio might be appropriate for vacant or agricultural land that is near a major town.

If the land is located in a dense urban area, it may be more appropriate to consider the percent change in the value of single-family homes as a proxy for the change in land value. To this end, the county data from the Florida Office of Economic & Demographic Research may be used. For example, the percent change in the median sales price of existing single-family homes in Manatee County was -21.1 percent from 2007 to 2008 and -29.1 percent from 2008 to 2009. In this case, the Cost Index Ratio would be (1 - 0.211) times (1-0.291) equal to 0.56. The equation

is: Value2009 = Value2007 x (1+proportional change from 2007 to 2008) x (1+proportional change from 2008 to 2009) = Value2007 x (1 – 0.21) x (1 – 0.291) = Value2007 x 0.56.

## 9.0 Useful Life of Project Components

The Useful Life in years of project components should be determined by the user using the information in Table 9.1 or selected from values provided by the District if required. The useful life will depend on the type of item included in the cost estimate. For items with useful lives greater than 30 years, such as land, the user should enter 30 years in the Cost Guidelines Model. This requirement will provide consistency among project cost estimates and is the typical number of years used to finance construction projects through the sale of bonds. If the project cost is not itemized, the user should use a useful life that reflects the lives of the items that comprise most of the estimated cost.

Suggested useful lives of project components are provided in Table 9.1. This table is reproduced from the report prepared by Hazen and Sawyer for the District titled "Evaluation Model and Key Parameters for Alternative Water Resource / Supply Management Strategies in the Southern Water Use Caution Area", September 3, 1999, Table 4-12, page 4-23 to 4-25. Table 9.1 also includes an estimated useful life for soil moisture sensors and ET monitoring stations of five years. The table is reproduced in the sub-model Excel files as a spreadsheet called "Useful Life" that is the second spreadsheet in sub-model 2 – Cost Guidelines WATER SUPPLY V3 and in sub-model 3 – Cost Guidelines WATER CONSERVATION V3.

**Table 9.1**
**Useful Life for Selected Water Supply and Conservation Project Components**

| Component Type | Useful Life |
|---|---|
| Water Conveyance Systems (including pipelines, collection and distribution systems, interceptors, force mains, drop shafts, tunnels, spillways. etc) | 30 years |
| Other Structures (including buildings, concrete tankage, pumping station structures, and site improvements, etc.) | 40 years (use 30 years when calculating annual capital cost) |
| Process and auxiliary equipment (including treatment equipment such as clarifier mechanisms and filters, steel process tankage, chemical storage facilities, standby electrical generating equipment, pumps and motors, instrumentation and control facilities, mechanical equipment such as compressors, aeration systems, chlorinators, other electrical equipment in regular service, etc.) | 20 years |
| Water Control Structures | |
| Concrete | 25 years |
| Metal | |
| Temporary | 10 years |
| Permanent | 20 years |
| Pipe (PVC) | |
| Temporary | 10 years |
| Permanent | 40 years (use 30 years when |

**Table 9.1**
**Useful Life for Selected Water Supply and Conservation Project Components**

| Component Type | Useful Life |
|---|---|
| | calculating annual capital cost) |
| Tube (HDPE) | |
| Temporary | 1 year |
| Permanent | 10 years |
| Deep Wells | 40 years (use 30 years when calculating annual capital cost) |
| Drilling and Casting | |
| Power Units | |
| Diesel Engine | 20 years |
| Electric Motor | 25 years |
| Gasoline Engine | |
| Air-cooled | 5 years |
| Water-cooled | 10 years |
| Propane Engine | 15 years |
| Shallow Wells | |
| Drilling and Casting | 10 years |
| Power Units | |
| Diesel Engine | 10 years |
| Electric Motor | 20 years |
| Gasoline Engine | |
| Air-cooled | 3 years |
| Water-cooled | 8 years |
| Propane Engine | 13 years |
| Reverse osmosis membranes | 5 years |
| Pumps | |
| Centrifugal | 15 years |
| Turbine | |
| Bowls | 10 years |
| Column | 20 years |
| Control and auxiliary equipment including treatment equipment such as filters, instrumentation and control components, and other electrical equipment in regular service, etc. | 10 years |
| H-axis washing machines | 20 years |
| Soil Moisture Sensor | 5 years |
| ET Monitoring Station | 5 years |
| Plumbing Retrofit Kits | 4 years |
| ULV Toilets | 20 years |
| Waterless urinal | 20 years |
| ULV urinal | 20 years |

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**Table 9.1**
**Useful Life for Selected Water Supply and Conservation Project Components**

| Component Type | Useful Life |
|---|---|
| Water efficient landscape and irrigation systems | 5 years |
| Alternative onsite irrigation | 20 years |
| Residential water use survey | 5 years |
| ICI water use survey | 20 years |
| Large landscape survey | 5 years |

# 10.0 Reclaimed Water Offsets

For reclaimed water projects, the Cost Guidelines model asks the user to enter the average daily water offset in mgd associated with the reclaimed water project and the average daily reclaimed water production (or flow) in mgd. The District's document titled, "Cooperative Funding Initiative – FY 2011, Reclaimed Water", provides definitions and calculations regarding reclaimed water offsets and flows. Offset is defined in this document as "the amount of traditional, potable quality water supplies that will be replaced by the reclaimed water, expressed as an annual average in MGD". Flow is defined as "the amount of reclaimed water produced or delivered as a direct result of the project, expressed as an annual average in MGD". The Efficiency of the reclaimed water system is defined as "the amount of offset versus the amount of flow". This efficiency is calculated by the Cost Guidelines model. According to the Cooperative Funding Initiative document described above, the user is expected to estimate the amount of the reclaimed water offset using metered data. If metered data is not provided and documented, the efficiencies provided in Table 10.1 should be used.

**Table 10.1**
**District Default Values for Reclaimed Water Flows, Offsets and Efficiencies**

| Type of Reclaimed Water Use | Gallons per Day | | Efficiency (offset / flow) |
|---|---|---|---|
| | Offset | Flow | |
| Residential (single-family) or commercial aesthetic irrigation per household or building | | | |
| Metered connections | 300 | 600 | 50% |
| Unmetered connections | 300 | 900 | 33% |
| Golf course irrigation per 18 holes | 193,000 | 258,000 | 75% |
| Large landscapes, industrial and agricultural flow | | | |
| Industrial process uses | NA | NA | 100% |
| Natural system benefits | NA | NA | Up to 100% |
| Large landscapes, professionally managed | NA | NA | 75% |
| Other landscapes | NA | NA | 60% |
| Agricultural irrigation | NA | NA | 75% |

NA means "not applicable".

From: "Cooperative Funding Initiative – FY 2011, Reclaimed Water", Southwest Florida Water Management District, Brooksville, Florida, Part II – Definitions and Calculations.

A summary of the estimated offsets provided by reclaimed water systems in the District is provided in the District document titled, “Effective Use of Reclaimed Water Demonstrated to Offset Water Demand”. This document is provided in Appendix C of this Cost Guidelines manual.

# APPENDIX A

## 2009 Florida Land Value Survey

## University of Florida, Institute of Food and Agricultural Sciences

FE833

UF UNIVERSITY of FLORIDA
IFAS Extension

# 2009 Florida Land Value Survey: Farm Land Prices Remain Down[1]

Rodney L. Clouser, Ronald Muraro, Laila Racevskis, Charles Moss, and Robert A. Morris[2]

## Introduction

The Florida Land Value Survey, conducted by the Food and Resource Economics Department, University of Florida, provides estimates of the value of different types of agricultural land for geographic regions of the state. The most recent survey was conducted in November–December 2009 *for land values in May 2009*. Survey respondents come from varied backgrounds, including rural appraisers, farm lenders, real estate brokers, farm managers, land investors, personnel from the Farm Services Agency and the Natural Resource Conservation Service, county property appraisers, and other persons who develop and maintain information about rural land values in their areas. A total of 304 questionnaires were mailed; 17 were returned as undeliverable, moved, no longer active, etc. The overall response rate was 34.5 percent.

It is apparent from the survey responses in 2009 that the recessionary U.S. and Florida economies, the slower rate of Florida's population growth, and the decline in the Florida housing construction industry continue to be reflected in a further decline in most Florida farmland values. Other factors such as rising energy related costs, additional costs for disease control for some commodities, and commodity prices that were stable or declining also help explain the decline in the 2009 farmland values.

## Changes in 2009 Land Value Report

The 2009 land value report format is identical and consistent with other land value reports since 2006. It is not identical to land value reports prior to 2006. In the years prior to 2006, the reported land values were subdivided into four or five regions in Florida. Beginning with the 2006 report, the state has been divided into two regions: northern and southern. The northern region is defined as all counties north of and including Alachua, Flagler, Levy, and Putnam Counties. The southern region is defined as all counties south of and including Citrus, Marion, and Volusia Counties. This change was made to provide larger sample sizes and to enhance the reliability of

1. This is EDIS document FE833, a publication of the Food and Resource Economics Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. Published March 2010. Please visit the EDIS Web site at http://edis.ifas.ufl.edu.

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the estimated values. Citrus land values were not reported for 2006 because the numbers of surveys completed were insufficient for the purpose of analysis. Citrus land values were reported for 2007 and 2008. Transitional land values for metropolitan and non-metropolitan areas were combined due to limited data. Therefore, the data for 2009 are not directly comparable to reports from years prior to 2006.

## Summary of Results

The 2009 Florida Land Value Survey results indicate clearly that land values in most categories continued to decrease statewide in Florida. Changes in farmland value are comparable in both the northern and southern regions of the state (Table 1). Land values declined in the northern region between 3.1 and 17.7 percent except for farm woods, which was up 1 percent. Declines in farmland value in the southern region ranged between 10.5 and 30.7 percent except for pastureland and farm woods—these increased between 1.5 and 22 percent. The 22 percent increase was for unimproved pasture land and is thought to be a market correction for a large price decrease in 2008. The largest decline in the northern region of the state was for non-irrigated cropland at 17.7 percent. The largest decline for the southern region was for mature grapefruit at 30.7 percent.

Transitional land values, or land being converted or likely to be converted for non-agricultural uses, indicated larger declines in the southern region of the state. Transitional land values in the northern region range between a 4.1 percent increase for land within five miles of a major town and a 7.3 percent decrease for land greater than five miles from a major town (Table 3). In the southern region of the state, transitional land value changes range between a negative 10.6 percent and a negative 45.9 percent.

The survey results from land sales professionals indicate that the average value of agricultural land ranges from approximately $3,208 per acre for farm woods in the northern region to $12,086 per acres for mature orange groves in the southern region of the state. Values for most types of farmland were down in 2009. However, farm woods values were up slightly in 2009 although remaining close to the 2008 levels, while unimproved pastureland values reported in the southern region were up by 22 percent in 2009. This latter increase is believed to be a market correction for a substantial decrease reported in 2008. During 2008 and 2009, unimproved pastureland values were flat. Transitional land less than five miles from a major town in the northern region of the state also exhibited a modest increase in 2009 (about 4%). Even with this increase, however, transitional farmland value is still less than 50 percent of the 2007 values. The reasons mentioned most frequently for the continued decline in Florida farmland value were the weak U.S. and Florida economies, Florida's sluggish population growth, the decline in the Florida housing construction industry, and financing that remains difficult to obtain. The survey indicates that the downward trend in farmland values is expected to continue in 2010, but the decline will not be as steep since projections point to expected decreases of seven percent in the northern region and six percent in the southern region (these trends were reported by respondents but not reported in Table 4).

Land sales experts indicated that decreases in the value of Florida agricultural lands were primarily due to weak agricultural and non-agricultural demand for land and the fact that farmland ownership continued to be investment-based, not income-based. Responses from some of the experts in the survey included

> *almost no sales of land due to a poor economy; nothing is selling the market is stagnate; financing is difficult to achieve; most of the agricultural land being sold is (still) going into development; housing demand has dried up, land values continue to drop, sellers are getting realistic; everything is on hold, lots for sale but no money; and sales are down, values are down, and financing is hard to get.*

Many experts continue to note the slowness in sales. The number of land sales was estimated to be lower from 2008 to 2009 by 76 percent of the southern region experts and by about 58 percent of the northern region experts (information collected from survey but not reported in the tables). Some factors that were identified as affecting the number of agricultural land transfers included a slowing rate of

large housing developments, a poor housing market in general, difficulty in obtaining financing, and the general downturn in the economy.

## Changes by Type of Land Use

The value of agricultural land for 2009 by type of land use is reported in Table 1.

### *Cropland*

The value of all types of cropland decreased in the northern regions of the state (insufficient data were returned to evaluate southern cropland values). The value of irrigated cropland in the northern region decreased 16.1 percent, while the value of non-irrigated cropland in the northern region decreased 17.7 percent.

### *Citrus*

Citrus land values, like most other Florida farmland values, were down in 2009 according to the survey. The estimated value of mature oranges dropped 10.5 percent and mature grapefruit was down 30.7 percent in the southern region. The estimated value of mature oranges in the southern region for 2009 was $12,086, and mature grapefruit average price per acre was $7,369. Land with 5- to 7-year-old citrus plantings was estimated at $7,459 per acre, which represents a decline of 28.7 percent. These land value declines may seem relatively large, yet it must be remembered that, in addition to the general decline in the economy, the industry also has faced significant price and disease issues.

### *Pastureland*

According to the 2009 survey, the value of pastureland in the northern region continued to slide in value, improved pasture decreased 14.7 percent, and unimproved pasture declined 3.1 percent. The survey information in the southern region generated better news with both values being reported up: improved pasture by 2.7 percent and unimproved pasture by 22 percent. It is thought that the land value reported on unimproved pasture in 2009 is a market correction for an overly steep decline reported in 2008.

### *Farm Woods*

The value of farm woods in both the northern and southern regions of the state exhibited very minor increases. Farm wood values increased 1.0 percent in the northern region, and 1.5 percent in the southern region.

## Regional Comparisons of Agricultural Land Values

The southern region has more than double the per acre price of the northern region for similar types of land. In 2009, the value of improved pasture was $8,072 per acre in the southern region, and $3,737 per acre in the northern region. The value of unimproved pasture ranged from $6,939 per acre in the southern region to $3,558 per acre in the northern region, about 96 percent higher per acre in the southern region. In general, the gap in pastureland values between the southern and northern regions of the state increased between 2008 and 2009 because land values were down by a larger percentage in the northern portion of the state.

No comparisons of cropland values were possible between the northern and southern regions of the state due to insufficient data from the southern region.

## Cash Rents

Cash rents (Table 2) declined between 2008 and 2009 in both the northern and southern regions with the exception of cash rents for unimproved pasture. The estimated annual cash rent for non-irrigated cropland in the northern region was $48 per acre in 2008, and was estimated at $44 per acre in 2009. The estimated cash rent for improved pastureland in the northern region was $32 per acre in 2008, and was estimated at $29 per acre in 2009 by the experts. Cash rent for unimproved pastureland in the northern region was $21 per acre in 2008, and was estimated at $24 per acre in 2009. The estimated cash rent for improved pastureland in the southern region was $43 per acre in 2008, and was estimated at $37 in 2009. Cash rent for unimproved pastureland in the southern region was $13 per acre in 2008, and was estimated at $15 per acre in 2009.

Cash rental rates generally remain less than 1.5 percent of the value of the land for the different types of cropland and pasture. These rates are low compared to other areas of the country.

## Transitional Land

Transitional land was defined in the survey as agricultural land that is being converted or is likely to be converted to non-agricultural uses such as residential or commercial. Transitional land values are reported in Table 3.

According to the experts, the value of transitional land within five miles of a major town in the northern region increased by 4.1 percent from 2008 to 2009, and decreased 7.3 percent if located more than five miles from a major town. In the southern region of the state, the value of transitional land within five miles of a major town decreased by 10.6 percent from 2008 to 2009, and decreased 45.9 percent if located more than five miles from a major town. The value of transitional land within five miles of a major town ranged from $8,089 per acre in the northern region to $29,619 per acre in the southern region. The value of transitional land more than five miles from a major town ranged from $ 5,376 per acre in the northern region to $14,686 per acre in the southern region. Again, in 2009, the experts indicated land sales were slow, but sales had not stopped completely for development purposes.

## Expected Trends

Professional sales experts were asked if they expected agricultural land values to be higher, lower, or remain unchanged between May 2009 and May 2010. About 67 percent of the southern region respondents and 65 percent of the northern region respondents expected agricultural land values to exhibit no change during this time (Table 4 ). About 29 percent of the southern region respondents and 33 percent of the northern region respondents expected land values to decrease over the same period. Only three percent of the northern and five percent of southern region respondents expected agricultural land values to increase between May 2009 and May 2010. The average decline expected in the southern region between May 2009 and May 2010 was six percent, and in the northern region seven percent. If these predictions for 2010 are accurate, another year of declining land values lies ahead, but the experts are indicating the rate of decline may be slowing.

## Use of the Survey Results

The land value estimates provided in this report are based on the opinions of many people involved in the real estate market and may not reflect actual land sales data. Several factors must be considered when using this report. For example, the group of participating respondents changes from year to year, and some of the land use categories and values reported are based on sample responses with limited observations.

These estimates should serve as a guide to the relative average values of different land uses within and between areas in Florida. It must be understood that the value of a specific tract of land may vary substantially from these estimates because of the physical characteristics, location, and economic and institutional factors that may affect or restrict its use. Therefore, this survey should not be used to determine the value of a specific tract of land in Florida.

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**Table 1.** Estimated farm land values per acre, by geographic region and land use, May 2007, 2008, and 2009

| Region / Land Use | Dates | | | Changes | |
|---|---|---|---|---|---|
| | May 2007 | May 2008 | May 2009 | 2007–08 | 2008–09 |
| | (dollars per acre) | | | (percent) | |
| Northern Region | | | | | |
| Cropland | | | | | |
| Irrigated | 6,712 | 5,106 | 4,283 | (–23.9) | (–16.1) |
| Non-irrigated | 5,776 | 4,436 | 3,651 | (–23.2) | (–17.7) |
| Pastureland | | | | | |
| Improved | 4,706 | 4,381 | 3,737 | (–6.9) | (–14.7) |
| Unimproved | 4,479 | 3,670 | 3,558 | (–18.1) | (–3.1) |
| Farm Woods | 4,226 | 3,177 | 3,208 | (–24.8) | 1.0 |
| Southern Region | | | | | |
| Citrus | | | | | |
| Mature Oranges | 16,123 | 13,500 | 12,086 | (–16.76) | (–10.5) |
| Mature Grapefruit | 11,183 | 10,640 | 7,369 | (–4.9) | (–30.7) |
| 5–7 Year Citrus | 11,900 | 10,461 | 7,459 | (–12.1) | (–28.7) |
| Cropland | | | | | |
| Irrigated | 10,432 | 7,763 | *** | (–25.6)* | *** |
| Non-irrigated | *** | *** | *** | *** | *** |
| Pastureland | | | | | |
| Improved | 9,025 | 7,862 | 8,072 | (–12.9) | 2.7 |
| Unimproved | 7,752 | 5,684 | 6,959 | (–21.6) | 22.0 |
| Farm Woods | 8,369 | 7,627 | 7,739* | (–8.9) | 1.5 |

* Less than 20 observations
*** Insufficient data
Source: Florida Land Value Survey, Food and Resource Economics Department, University of Florida

**Table 2.** Cash rent for farm land, by geographic region, May 2007, 2008, and 2009

| Item | Northern Region | | | Southern Region | | |
|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 |
| | (dollars per acre) | | | (dollars per acre) | | |
| Land Class | | | | | | |
| Improved Pastureland | 36 | 32 | 29 | 33 | 43 | 37 |
| Unimproved Pastureland | 27 | 21 | 24 | 20 | 13* | 15 |
| Non-irrigated Cropland | 51 | 48 | 44 | *** | *** | *** |

* Less than 20 observations
*** Insufficient data

**Table 3.** Estimated value of transitional farm land, by geographic region, May 2007, 2008, and 2009

| Region / Category | Dates | | | Changes | |
|---|---|---|---|---|---|
| | May 2007 | May 2008 | May 2009 | 2007–08 | 2008–09 |
| | (dollars per acre) | | | (percent) | |
| Less than five miles to major town | | | | | |
| Northern Region | 17,414 | 7,771 | 8,089 | (–55.4) | 4.1 |
| Southern Region | 54,442 | 33,113 | 29,619 | (–39.2) | (–10.6) |
| Greater than five miles to major town | | | | | |
| Northern Region | 10,912 | 5,800 | 5,376 | (–46.8) | (–7.3) |
| Southern Region | 25,800 | 27,150 | 14,686 | 5.2 | (–45.9) |

**Table 4.** Respondent expectation of farm land value changes over the next twelve months, by geographic region, May 2009

| Region | Higher Expectations | No Change | Lower Expectations |
|---|---|---|---|
| | (percent of responses) | | |
| Northern Region | 2.5 | 65.0 | 32.5 |
| Southern Region | 4.8 | 66.1 | 28.6 |

# APPENDIX B

## County Profiles - Levy County and Manatee County

## Office of Economic & Demographic Research
## The Florida Legislature

**Source:**
**http://www.edr.state.fl.us/Content/area-profiles/county/index.cfm**

# Levy County


**Florida's 45th most populous county**

**with 0.2% of Florida's population**

## Population

| Population (Census, Estimates, & Projections) | Levy County | Florida |
|---|---|---|
| 1980 Census | 19,870 | 9,746,961 |
| 1990 Census | 25,912 | 12,938,071 |
| 2000 Census | 34,450 | 15,982,824 |
| % change 1990-00 | 32.9% | 23.5% |
| 2009 Estimate | 40,674 | 18,750,483 |
| % change 2000-09 | 18.1% | 17.3% |
| % of change 2000-09 due to net migration | 100.0% | 83.1% |
| | | |
| 2010 Projection | 40,680 | 18,773,356 |
| % change 2009-10 | 0.0% | 0.1% |
| 2015 Projection | 43,461 | 19,881,179 |
| % change 2010-15 | 6.8% | 5.9% |
| | | |
| % of 2008 population | | |
| Under 18 years of age | 22.4% | 22.3% |
| Over 64 years of age | 19.3% | 17.3% |
| Median age (2008) | 42.9 | 40.1 |
| | | |
| Persons per square mile (2009) | 36 | 348 |

## Households and Family Households

| Households | Levy County | Florida |
|---|---|---|
| Total households, 2000 Census | 13,867 | 6,338,075 |
| Total households, 2009 | 16,568 | 7,477,339 |
| % change 2000-09 | 19.5% | 18.0% |
| Family households, 2000 Census | 9,674 | 4,210,760 |
| % with own children under 18 | 39.3% | 42.3% |

According to Census definitions, a household includes all of the people who occupy a housing unit. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated people who share living quarters. A family includes a householder and one or more other people living in the same household who are related to the householder by birth, marriage, or adoption.

## Existing Single-Family Home Sales

| Percent Change in Homes Sold | Levy County | Florida |
|---|---|---|
| 2001-02 | NA | 9.9% |
| 2002-03 | NA | 13.1% |
| 2003-04 | NA | 10.7% |
| 2004-05 | NA | 2.5% |
| 2005-06 | NA | -27.6% |
| 2006-07 | NA | -29.2% |
| 2007-08 | NA | -4.3% |
| 2008-09 | NA | 31.4% |
| | | |
| **Percent Change in Median Sales Price** | | |
| 2001-02 | NA | 8.8% |
| 2002-03 | NA | 11.8% |
| 2003-04 | NA | 17.1% |
| 2004-05 | NA | 29.2% |
| 2005-06 | NA | 5.6% |
| 2006-07 | NA | -5.5% |
| 2007-08 | NA | -19.8% |
| 2008-09 | NA | -24.0% |

Note: Home sales data are calculated for Metropolitan Statistical Areas (MSAs). Data shown here reflect the value for the MSA in which the county is located.

## Housing

| Housing Counts | Levy County | Florida |
|---|---|---|
| Housing units, 2000 Census | 16,570 | 7,302,947 |
| Occupied | 13,867 | 6,337,929 |
| Owner-occupied | 11,591 | 4,441,799 |
| % owner-occupied | 83.6% | 70.1% |
| Renter-occupied | 2,276 | 1,896,130 |
| % renter-occupied | 16.4% | 29.9% |
| Vacant | 2,703 | 965,018 |
| % vacant | 16.3% | 13.2% |

| Units Permitted | Levy County | Florida |
|---|---|---|
| 2000 | 115 | 161,076 |
| 2001 | 151 | 169,171 |
| % change 2000-01 | 31.3% | 5.0% |
| 2002 | 149 | 186,503 |
| % change 2001-02 | -1.3% | 10.2% |
| 2003 | 155 | 215,488 |
| % change 2002-03 | 4.0% | 15.5% |
| 2004 | 225 | 254,026 |
| % change 2003-04 | 45.2% | 17.9% |
| 2005 | 259 | 284,120 |
| % change 2004-05 | 15.1% | 11.8% |
| 2006 | 232 | 219,087 |
| % change 2005-06 | -10.4% | -22.9% |
| 2007 | 238 | 122,300 |
| % change 2006-07 | 2.6% | -44.2% |
| 2008 | 79 | 61,088 |
| % change 2007-08 | -66.8% | -50.1% |
| 2009 | 65 | 32,615 |
| % change 2008-09 | -17.7% | -46.6% |
| Total Units Permitted 2000-2009 | 1,668 | 1,705,474 |

## State Infrastructure

| Transportation | Levy County | Florida |
|---|---|---|
| State Highway | | |
| Centerline Miles | 182.3 | 12,093.1 |
| Lane Miles | 515.0 | 42,541.8 |
| State Bridges | | |
| Number | 45 | 6,549 |

| State Facilities | Levy County | Florida |
|---|---|---|
| Buildings/Facilities | | |
| Number | 24 | 3,953 |
| Square Footage | 142,171 | 56,956,904 |

| State Lands | Levy County | Florida |
|---|---|---|
| Conservation Lands | | |
| Parcels | 314 | 37,323 |
| Acreage | 99,892.7 | 3,360,212.8 |
| Non-Conservation Lands | | |
| Parcels | 31 | 6,062 |
| Acreage | 264.2 | 254,398.2 |

## Employment by Industry

| Average Annual Employment, % by Category, 2008 | Levy County | Florida |
|---|---|---|
| Natural Resource & Mining | 6.0% | 1.2% |
| Construction | 9.3% | 6.7% |
| Manufacturing | 7.9% | 4.8% |
| Trade, Transportation and Utilities | 21.5% | 20.5% |
| Information | 0.8% | 2.0% |
| Financial Activities | 4.7% | 6.8% |
| Professional & Business Services | 3.9% | 14.9% |
| Education & Health Services | 9.6% | 13.2% |
| Leisure and Hospitality | 10.1% | 12.3% |
| Other services | 1.8% | 3.3% |
| Government | 24.4% | 14.1% |

| Average Annual Wage, 2008 | Levy County | Florida |
|---|---|---|
| All industries | $27,652 | $40,579 |
| Natural Resource & Mining | $30,542 | $23,981 |
| Construction | $33,840 | $42,040 |
| Manufacturing | $33,545 | $48,652 |
| Trade, Transportation and Utilities | $23,808 | $36,220 |
| Information | $34,338 | $58,194 |
| Financial Activities | $33,255 | $55,748 |
| Professional & Business Services | $25,744 | $46,997 |
| Education & Health Services | $23,104 | $42,245 |
| Leisure and Hospitality | $13,608 | $21,200 |
| Other services | $18,279 | $28,565 |
| Government | $33,385 | $46,424 |

## Labor Force

| Labor Force as Percent of Population Aged 18 and Older | Levy County | Florida |
|---|---|---|
| 1990 | 54.6% | 64.4% |
| 2000 | 54.4% | 63.4% |
| 2009 | 51.9% | 62.7% |

| Unemployment Rate | Levy County | Florida |
|---|---|---|
| 1990 | 5.7% | 6.3% |
| 2000 | 3.9% | 3.8% |
| 2009 | 11.7% | 10.5% |

## Financial Health

| Poverty | Levy County | Florida |
|---|---|---|
| % living below poverty, 2008 | 17.8% | 13.3% |
| % ages 0-17 living below poverty, 2008 | 27.6% | 18.4% |

| Personal Income ($000s) | Levy County | Florida |
|---|---|---|
| 2000 | $648,079 | $466,644,105 |
| 2001 | $704,885 | $487,503,637 |
| % change 2000-01 | 8.8% | 4.5% |
| 2002 | $704,604 | $508,401,577 |
| % change 2001-02 | 0.0% | 4.3% |
| 2003 | $743,917 | $531,215,779 |
| % change 2002-03 | 5.6% | 4.5% |
| 2004 | $821,188 | $582,767,302 |
| % change 2003-04 | 10.4% | 9.7% |
| 2005 | $901,073 | $633,198,348 |
| % change 2004-05 | 9.7% | 8.7% |
| 2006 | $956,912 | $690,273,244 |
| % change 2005-06 | 6.2% | 9.0% |
| 2007 | $977,060 | $713,489,866 |
| % change 2006-07 | 2.1% | 3.4% |
| 2008 | $1,005,932 | $719,707,709 |
| % change 2007-08 | 3.0% | 0.9% |

| Per Capita Personal Income | Levy County | Florida |
|---|---|---|
| 2000 | $18,721 | $29,080 |
| 2001 | $20,182 | $29,810 |
| % change 2000-01 | 7.8% | 2.5% |
| 2002 | $19,800 | $30,479 |
| % change 2001-02 | -1.9% | 2.2% |
| 2003 | $20,695 | $31,283 |
| % change 2002-03 | 4.5% | 2.6% |
| 2004 | $22,358 | $33,540 |
| % change 2003-04 | 8.0% | 7.2% |
| 2005 | $24,121 | $35,605 |
| % change 2004-05 | 7.9% | 6.2% |
| 2006 | $25,024 | $38,161 |
| % change 2005-06 | 3.7% | 7.2% |
| 2007 | $25,163 | $39,036 |
| % change 2006-07 | 0.6% | 2.3% |
| 2008 | $25,662 | $39,064 |
| % change 2007-08 | 2.0% | 0.1% |

| Personal Bankruptcy Filing Rate (per 1,000 population) | Levy County | Florida |
|---|---|---|
| 2000 | 2.89 | 4.45 |
| 2009 | 2.73 | 4.97 |
| State Rank | 51 | NA |

Note: Florida numbers exclude Miami-Dade County.

## Earnings by Place of Work

| Earnings ($000s) | Levy County | Florida |
|---|---|---|
| 2000 | $280,684 | $312,145,185 |
| 2001 | $314,018 | $325,018,624 |
| % change 2000-01 | 11.9% | 4.1% |
| 2002 | $314,057 | $340,360,544 |
| % change 2001-02 | 0.0% | 4.7% |
| 2003 | $342,704 | $361,091,583 |
| % change 2002-03 | 9.1% | 6.1% |
| 2004 | $370,783 | $389,502,660 |
| % change 2003-04 | 8.2% | 7.9% |
| 2005 | $410,318 | $423,331,870 |
| % change 2004-05 | 10.7% | 8.7% |
| 2006 | $412,396 | $452,353,587 |
| % change 2005-06 | 0.5% | 6.9% |
| 2007 | $410,750 | $460,365,819 |
| % change 2006-07 | -0.4% | 1.8% |
| 2008 | $404,225 | $455,176,422 |
| % change 2007-08 | -1.6% | -1.1% |

## Quality of Life

| Educational attainment, Persons aged 25 and older | Levy County | Florida |
|---|---|---|
| % HS graduate or higher | 73.9% | 79.9% |
| % bachelor's degree or higher | 10.6% | 22.3% |

| Crime | Levy County | Florida |
|---|---|---|
| Crime rate, 2009 (index crimes per 100,000 population) | 3,737.0 | 4,397.5 |
| Admissions to prison FY 2008-09 | 148 | 39,354 |
| Admissions to prison per 100,000 population FY 2008-09 | 363.9 | 209.9 |

## State and Local Taxation

| 2008 Ad Valorem Millage Rates | Levy County |
|---|---|
| County | 7.4212 |
| School | 7.7420 |
| Other | 1.9107 |
| Total | 17.0739 |

**Prepared by:**

Florida Legislature
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(850) 487-1402 http://EDR.state.fl.us


April 2010

# Manatee County


**Florida's 17th most populous county**

**with 1.7% of Florida's population**

## Population

| Population (Census, Estimates, & Projections) | Manatee County | Florida |
|---|---|---|
| 1980 Census | 148,445 | 9,746,961 |
| 1990 Census | 211,707 | 12,938,071 |
| 2000 Census | 264,002 | 15,982,824 |
| % change 1990-00 | 24.7% | 23.5% |
| 2009 Estimate | 318,404 | 18,750,483 |
| % change 2000-09 | 20.6% | 17.3% |
| % of change 2000-09 due to net migration | 95.4% | 83.1% |
| | | |
| 2010 Projection | 318,589 | 18,773,356 |
| % change 2009-10 | 0.1% | 0.1% |
| 2015 Projection | 339,927 | 19,881,179 |
| % change 2010-15 | 6.7% | 5.9% |
| | | |
| % of 2008 population | | |
| Under 18 years of age | 20.8% | 22.3% |
| Over 64 years of age | 22.5% | 17.3% |
| Median age (2008) | 44.1 | 40.1 |
| | | |
| Persons per square mile (2009) | 430 | 348 |

## Households and Family Households

| Households | Manatee County | Florida |
|---|---|---|
| Total households, 2000 Census | 112,460 | 6,338,075 |
| Total households, 2009 | 137,114 | 7,477,339 |
| % change 2000-09 | 21.9% | 18.0% |
| Family households, 2000 Census | 73,726 | 4,210,760 |
| % with own children under 18 | 35.0% | 42.3% |

According to Census definitions, a household includes all of the people who occupy a housing unit. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated people who share living quarters. A family includes a householder and one or more other people living in the same household who are related to the householder by birth, marriage, or adoption.

## Existing Single-Family Home Sales

| Percent Change in Homes Sold | Manatee County | Florida |
|---|---|---|
| 2001-02 | 7.4% | 9.9% |
| 2002-03 | 29.0% | 13.1% |
| 2003-04 | 23.8% | 10.7% |
| 2004-05 | -15.6% | 2.5% |
| 2005-06 | -34.1% | -27.6% |
| 2006-07 | -10.6% | -29.2% |
| 2007-08 | -4.4% | -4.3% |
| 2008-09 | 15.4% | 31.4% |
| | | |
| **Percent Change in Median Sales Price** | | |
| 2001-02 | 9.5% | 8.8% |
| 2002-03 | 18.1% | 11.8% |
| 2003-04 | 28.7% | 17.1% |
| 2004-05 | 32.2% | 29.2% |
| 2005-06 | -5.4% | 5.6% |
| 2006-07 | -6.7% | -5.5% |
| 2007-08 | -21.1% | -19.8% |
| 2008-09 | -29.1% | -24.0% |

Note: Home sales data are calculated for Metropolitan Statistical Areas (MSAs). Data shown here reflect the value for the MSA in which the county is located.

## Housing

| Housing Counts | Manatee County | Florida |
|---|---|---|
| Housing units, 2000 Census | 138,128 | 7,302,947 |
| Occupied | 112,460 | 6,337,929 |
| Owner-occupied | 82,947 | 4,441,799 |
| % owner-occupied | 73.8% | 70.1% |
| Renter-occupied | 29,513 | 1,896,130 |
| % renter-occupied | 26.2% | 29.9% |
| Vacant | 25,668 | 965,018 |
| % vacant | 18.6% | 13.2% |

| Units Permitted | Manatee County | Florida |
|---|---|---|
| 2000 | 3,333 | 161,076 |
| 2001 | 4,717 | 169,171 |
| % change 2000-01 | 41.5% | 5.0% |
| 2002 | 4,464 | 186,503 |
| % change 2001-02 | -5.4% | 10.2% |
| 2003 | 3,855 | 215,488 |
| % change 2002-03 | -13.6% | 15.5% |
| 2004 | 5,837 | 254,026 |
| % change 2003-04 | 51.4% | 17.9% |
| 2005 | 5,501 | 284,120 |
| % change 2004-05 | -5.8% | 11.8% |
| 2006 | 4,510 | 219,087 |
| % change 2005-06 | -18.0% | -22.9% |
| 2007 | 2,277 | 122,300 |
| % change 2006-07 | -49.5% | -44.2% |
| 2008 | 1,554 | 61,088 |
| % change 2007-08 | -31.8% | -50.1% |
| 2009 | 829 | 32,615 |
| % change 2008-09 | -46.7% | -46.6% |
| Total Units Permitted 2000-2009 | 36,877 | 1,705,474 |

## State Infrastructure

| Transportation | Manatee County | Florida |
|---|---|---|
| State Highway | | |
| Centerline Miles | 209.8 | 12,093.1 |
| Lane Miles | 710.6 | 42,541.8 |
| State Bridges | | |
| Number | 107 | 6,549 |

| State Facilities | Manatee County | Florida |
|---|---|---|
| Buildings/Facilities | | |
| Number | 16 | 3,953 |
| Square Footage | 132,702 | 56,956,904 |

| State Lands | Manatee County | Florida |
|---|---|---|
| Conservation Lands | | |
| Parcels | 102 | 37,323 |
| Acreage | 14,624.5 | 3,360,212.8 |
| Non-Conservation Lands | | |
| Parcels | 35 | 6,062 |
| Acreage | 494.7 | 254,398.2 |

## Employment by Industry

| Average Annual Employment, % by Category, 2008 | Manatee County | Florida |
|---|---|---|
| Natural Resource & Mining | 5.2% | 1.2% |
| Construction | 6.9% | 6.7% |
| Manufacturing | 8.8% | 4.8% |
| Trade, Transportation and Utilities | 18.0% | 20.5% |
| Information | 1.0% | 2.0% |
| Financial Activities | 4.4% | 6.8% |
| Professional & Business Services | 18.2% | 14.9% |
| Education & Health Services | 12.5% | 13.2% |
| Leisure and Hospitality | 11.1% | 12.3% |
| Other services | 2.9% | 3.3% |
| Government | 10.9% | 14.1% |

| Average Annual Wage, 2008 | Manatee County | Florida |
|---|---|---|
| All industries | $34,930 | $40,579 |
| Natural Resource & Mining | $18,194 | $23,981 |
| Construction | $40,900 | $42,040 |
| Manufacturing | $46,831 | $48,652 |
| Trade, Transportation and Utilities | $30,604 | $36,220 |
| Information | $50,871 | $58,194 |
| Financial Activities | $43,519 | $55,748 |
| Professional & Business Services | $34,169 | $46,997 |
| Education & Health Services | $39,235 | $42,245 |
| Leisure and Hospitality | $19,619 | $21,200 |
| Other services | $26,453 | $28,565 |
| Government | $45,969 | $46,424 |

## Labor Force

| Labor Force as Percent of Population Aged 18 and Older | Manatee County | Florida |
|---|---|---|
| 1990 | 56.0% | 64.4% |
| 2000 | 58.5% | 63.4% |
| 2009 | 57.4% | 62.7% |

| Unemployment Rate | Manatee County | Florida |
|---|---|---|
| 1990 | 4.0% | 6.3% |
| 2000 | 3.2% | 3.8% |
| 2009 | 11.5% | 10.5% |

## Financial Health

| Poverty | Manatee County | Florida |
|---|---|---|
| % living below poverty, 2008 | 12.2% | 13.3% |
| % ages 0-17 living below poverty, 2008 | 18.9% | 18.4% |

| Personal Income ($000s) | Manatee County | Florida |
|---|---|---|
| 2000 | $8,289,252 | $466,644,105 |
| 2001 | $8,722,745 | $487,503,637 |
| % change 2000-01 | 5.2% | 4.5% |
| 2002 | $9,154,380 | $508,401,577 |
| % change 2001-02 | 4.9% | 4.3% |
| 2003 | $9,459,931 | $531,215,779 |
| % change 2002-03 | 3.3% | 4.5% |
| 2004 | $10,510,788 | $582,767,302 |
| % change 2003-04 | 11.1% | 9.7% |
| 2005 | $11,620,649 | $633,198,348 |
| % change 2004-05 | 10.6% | 8.7% |
| 2006 | $12,556,661 | $690,273,244 |
| % change 2005-06 | 8.1% | 9.0% |
| 2007 | $12,819,833 | $713,489,866 |
| % change 2006-07 | 2.1% | 3.4% |
| 2008 | $12,754,061 | $719,707,709 |
| % change 2007-08 | -0.5% | 0.9% |

| Per Capita Personal Income | Manatee County | Florida |
|---|---|---|
| 2000 | $31,202 | $29,080 |
| 2001 | $32,065 | $29,810 |
| % change 2000-01 | 2.8% | 2.5% |
| 2002 | $32,759 | $30,479 |
| % change 2001-02 | 2.2% | 2.2% |
| 2003 | $33,056 | $31,283 |
| % change 2002-03 | 0.9% | 2.6% |
| 2004 | $35,643 | $33,540 |
| % change 2003-04 | 7.8% | 7.2% |
| 2005 | $38,094 | $35,605 |
| % change 2004-05 | 6.9% | 6.2% |
| 2006 | $40,303 | $38,161 |
| % change 2005-06 | 5.8% | 7.2% |
| 2007 | $40,824 | $39,036 |
| % change 2006-07 | 1.3% | 2.3% |
| 2008 | $40,353 | $39,064 |
| % change 2007-08 | -1.2% | 0.1% |

| Personal Bankruptcy Filing Rate (per 1,000 population) | Manatee County | Florida |
|---|---|---|
| 2000 | 4.07 | 4.45 |
| 2009 | 5.28 | 4.97 |
| State Rank | 19 | NA |

Note: Florida numbers exclude Miami-Dade County.

## Earnings by Place of Work

| Earnings ($000s) | Manatee County | Florida |
|---|---|---|
| 2000 | $4,868,545 | $312,145,185 |
| 2001 | $4,536,961 | $325,018,624 |
| % change 2000-01 | -6.8% | 4.1% |
| 2002 | $5,044,456 | $340,360,544 |
| % change 2001-02 | 11.2% | 4.7% |
| 2003 | $5,285,593 | $361,091,583 |
| % change 2002-03 | 4.8% | 6.1% |
| 2004 | $5,742,950 | $389,502,660 |
| % change 2003-04 | 8.7% | 7.9% |
| 2005 | $6,459,560 | $423,331,870 |
| % change 2004-05 | 12.5% | 8.7% |
| 2006 | $7,006,364 | $452,353,587 |
| % change 2005-06 | 8.5% | 6.9% |
| 2007 | $6,962,394 | $460,365,819 |
| % change 2006-07 | -0.6% | 1.8% |
| 2008 | $6,408,683 | $455,176,422 |
| % change 2007-08 | -8.0% | -1.1% |

## Quality of Life

| Educational attainment Persons aged 25 and older | Manatee County | Florida |
|---|---|---|
| % HS graduate or higher | 81.4% | 79.9% |
| % bachelor's degree or higher | 20.8% | 22.3% |

| Crime | Manatee County | Florida |
|---|---|---|
| Crime rate, 2009 (index crimes per 100,000 population) | 4,849.8 | 4,397.5 |
| Admissions to prison FY 2008-09 | 660 | 39,354 |
| Admissions to prison per 100,000 population FY 2008-09 | 207.3 | 209.9 |

## State and Local Taxation

| 2008 Ad Valorem Millage Rates | Manatee County |
|---|---|
| County | 6.3949 |
| School | 7.3720 |
| Other | 2.4305 |
| Total | 16.1974 |

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# APPENDIX C

# Effective Use of Reclaimed Water Demonstrated to Offset Water Demand

## Southwest Florida Water Management District

# EFFECTIVE USE OF RECLAIMED WATER DEMONSTRATED TO OFFSET WATER DEMAND

Prepared by: Anthony J. Andrade and Kathy F. Scott
Southwest Florida Water Management District

## BACKGROUND

The District has cooperatively funded reclaimed water projects since FY 1987 in order to offset (replace) existing or proposed high quality ground and surface-water withdrawals. In order to obtain a detailed inventory and profile of the offsets achieved to date, District staff researched utility reports, Florida Department of Environmental Protection (DEP) reports, District reports, and consulted utility staff regarding water demands and all known or planned reuse projects. In addition, since FY 1997, the District has required an offset report from its cooperators for all cooperatively funded reclaimed water projects. The offset reports are required to be submitted to the District three years after the completion of the project, and must demonstrate that the project meets specific offset criteria. Thus far the data in these reports, as well as in other reports on irrigation demand and reuse offsets, confirm that the use of reclaimed water directly correlates to reductions in the use of potable and untreated potable quality water. The methodology for determining irrigation demands and offsets is comparable to the methodology used in determining potable supply demands and projections.

## MEASURING OFFSETS

### Agricultural, Recreational and Industrial (Non-residential) Offsets

The offsets achieved by agriculture, golf course, recreational, and industrial customers are readily quantified, as most of these customer types have meters and were previously using a known quantity of water for a specified purpose (i.e. irrigation of a golf course, supply to a cooling tower). Offsets are determined on a case-by-case basis, and have been tracked since the mid-1980's by utilities, the DEP, and (if cooperatively funded) the District. Table 1 lists the average daily reclaimed water flows and offsets reported by cooperators in the Tampa Bay area (Hillsborough, Pasco and Pinellas counties) as of the year 2000.

**Table 1. Non-residential Reclaimed Water Use and Offset in the Tampa Bay Area, 2000**

| Category | Customers (#) | Use (mgd) | Offset (mgd*) |
|---|---|---|---|
| Agricultural | 7 | 0.7 | 0.5 |
| Recreational | 756 | 34.2 | 21.7 |
| Industrial | 35 | 12.2 | 12.2 |
| **TOTAL** | **798** | **47.1** | **33.4** |

* mgd = million gallons per day

### Residential Offset Requires More Analysis

The number of residential reclaimed water customers and the associated utilization amounts are readily quantified. According to residential reclaimed water use data reported by cooperators in the Tampa Bay area, as of the year 2000, there were 31,300

residential customers using nearly 28 million gallons per day (mgd) of reclaimed water. Determining the offsets achieved by supplying reclaimed water to residential customers requires more in-depth analysis. Measuring offset can be difficult, as most residential irrigation use is measured (metered) together with interior water uses such as showers, toilet flushing, and clothes washing. In addition, a number of factors can influence residential potable water use. These factors include, but are not limited to, climatic conditions, water rates, the degree of customer education, plumbing retrofit programs, and requirements such as irrigation restrictions.

Irrigation Meter Studies

Landscape irrigation is generally the targeted water demand to be offset with reclaimed water. As such, a good indicator of offsets achievable by each residential customer is the average amount of water used by a single-family residence for irrigation. Some irrigation systems are separately metered from indoor potable use, and some utilities have compiled measured, long-term data on the average amount of water used for irrigation. Data from three recently completed reports demonstrate an average of 395 gallons per day (gpd) per single-family residence of potable water used for irrigation, as illustrated in Table 2.

**Table 2. Metered Potable Irrigation Use**

| Utility | Source | Per Customer Use (gpd) |
|---|---|---|
| Tampa Water Department | *City of Tampa STAR Potable Irrigation Meter Study*, 2002 | 404 |
| Tampa Water Department | *City of Tampa City 2001 Irrigation Meter Use by Residential Customers, 2002* | 349 |
| Manatee County Utilities | *Manatee County Potable Irrigation Meter Use 1990-2001*, 2002 | 432 |
| **Average** | | **395** |

Reclaimed Water Irrigation Use Studies

Data is readily available from utilities that investigated the amount of potable water used by residential customers prior to reclaimed water service, and the amount of potable water used by the same customers after reclaimed water service was provided. These data clearly demonstrate that reclaimed water projects reduced potable water demand. For example, Table 3 illustrates data from reclaimed water projects in Pinellas County that resulted in an average of 330 gallons per day of potable water offset per single-family residence.

**Table 3. Potable Offsets by Residential Reclaimed Water Service**

| Utility Name | Source | Per Customer Offset (gpd) |
|---|---|---|
| Largo Reclaimed Water | *Potable Water Use Study-Del Robles Subdivision*, 1995 | 261 |
| Pinellas County Utilities | *Reclaimed Water Savings and Economic Impact in Tierra Verde*, 1999 | 544 |
| Pinellas County Utilities/St. Pete Beach Reclaimed Water | *Reclaimed Water Savings and Economic Impact in St. Pete Beach*, 1999 | 296 |
| St. Petersburg Utilities | *Florida Water Resources Journal*, August 2001 | 220 |
| **Average** | | **330** |

Tampa Bay Water

Tampa Bay Water and their consultant (Hazen and Sawyer) have reviewed data to quantify residential irrigation use, existing potable water offsets, and the impact of water conservation and reclaimed water efforts on future potable water demand. In conjunction with this review, the District's use of 300 gpd per single-family residential reclaimed water system hook-up is reasonable. In addition, Tampa Bay Water's 1998 *Regional Water Supply Demand Management Implementation Plan* indicates that the use of reclaimed water would offset 250 to 335 gpd per single-family residential reuse customer. Tampa Bay Water's consultant's report on long term demand forecasting, scheduled to be completed in 2003, is also expected to include information on reuse offsets and its impact on demand.

Per Capita Water Use

The per capita water use has generally declined within the District, although fluctuations are evident during prolonged drought periods, such as 1999 and 2000. The overall decline in per capita use is attributed, in part, to the utilization of reclaimed water in lieu of traditional sources. (*Water Supply Needs and Sources*. SWFWMD, 1992.)

## CONCLUSION

Available data that can be used to determine if the use of reclaimed water in lieu of potable (either treated or untreated) water sources reduces water demand have been described previously in the paper and include: (1) potable irrigation meter studies, (2) pre-post reclaimed water service studies, (3) utility's pre-project analysis for their reclaimed water cooperative funding project applications, (4) Tampa Bay Water data, and (5) per capita water use. The methodology for determining irrigation demands and offsets is comparable to the methodology used in determining potable supply demands and projections.

Upon evaluation of the data as described in this paper, it is clear that reclaimed water service to customers previously using potable-quality water sources results in the offset of those sources. The total estimated offset of potable-quality sources achieved by the year 2000 in all user groups within the Tampa Bay area is summarized in Table 4.

**Table 4. Reclaimed Water Use and Offset in the Tampa Bay Area, 2000**

| Category | Customers | Use (gpd) | Offset (gpd) |
|---|---|---|---|
| Agricultural | 7 | 0.7 | 0.5 |
| Recreational | 756 | 34.3 | 21.7 |
| Industrial | 35 | 12.2 | 12.2 |
| Residential | 31,303 | 27.9 | 9.3 |
| **Total** | **32,101** | **75.1** | **43.7** |

**St. Petersburg Reclaimed Water System Demonstrated to Offset Potable and Non-Potable Water Demand (2002 Data)**

The City of St. Petersburg's initial reclaimed water system was cooperatively funded by the US EPA and the City starting in 1977, and grew into one of the largest and most emulated reclaimed water system in the nation. To sum up the potable water benefits related to St. Petersburg's investment in reclaimed water, *"The growth in the reclaimed water system demand since 1977 has significantly contributed to suppressing potable water demands"* (William D. Johnson, Director of St. Petersburg Public Utilities Department, 1998). The District has cooperatively funded St. Petersburg reclaimed water projects since FY 1991 in order to offset (replace) existing potable quality water uses.

Available data that can be used to determine if the use of reclaimed water in lieu of potable (either treated or untreated) water sources reduces water demand include: (1) potable irrigation meter studies, (2) pre-post reclaimed water service studies, (3) utility's pre-project analysis for their reclaimed water cooperative funding project applications, (4) Tampa Bay Water data, and (5) per capita water use. The methodology for determining irrigation demands and offsets is comparable to the methodology used in determining potable supply demands and projections. Upon evaluation of the data it is clear that reclaimed water service to customers previously using potable, ground, and surface water sources results in the offset of those sources. District and City staff concurred on methodology and amounts for the total estimated offset of potable and non-potable sources achieved by the year 2000 in all user groups in St. Petersburg. An updated version with 2002 data is summarized below.

**Reclaimed Water Use and Offset in St. Petersburg, 2002**

| Category | Customers (#) | Use (mgd1) | Potable Offset (mgd1) | Non-Potable Offset (mgd1) | Total Offset (mgd1) |
|---|---|---|---|---|---|
| Agricultural | 0 | 0 | 0 | 0 | 0 |
| Recreational | 437 | 6.38 | 0.96 | 2.87 | 3.83 |
| Golf | 6 | 2.76 | 0 | 2.07 | 2.07 |
| Industrial | 20(2) | 1.84(3) | 1.38 | .46 | 1.84 |
| Residential | 9801 | 9.09 | 1.59 | 0.54 | 2.13 |
| **TOTAL** | **10,264** | **20.07** | **3.93(4)** | **5.94** | **9.87** |

1 mgd = million gallons per day.
2 Many industrial customers are listed as commercial customers by the City.
3 Amount of use reported to FDEP (2.32mgd) reduced to eliminate extraneous uses at WWTPs.
4 According to data supplied by St. Petersburg, between 1984 and 2002 the City reduced their total potable water demands by more than 11 million gallons per day. The reduction was achieved through multiple water conservation measures including irrigation restrictions, low volume toilet retrofit projects, indoor fixture retrofit projects and approximately 4 mgd in offsets achieved by their reclaimed water system.

Customer types and offset methodology include the following:
**Recreational** includes recreational, aesthetic, and commercial irrigation use and offset is calculated at 60 percent efficiency of which ¼ is associated with potable offset and ¾ non-potable offset. Examples of customers include parks, schools and businesses.

**Golf** includes only golf course use and offset is calculated at 75 percent efficiency with all offsets associated with non-potable water.

**Industrial** includes process and cooling water uses. Offset is calculated at 100 percent efficiency of which ¾ is associated with potable offset and ¼ non-potable offset. Examples of customers include the City's four wastewater treatment plants process water, Tropicana Field cooling towers, Ceridian cooling towers, and St. Anthony's Hospital cooling tower.

**Residential** includes single-family irrigation use (927 gpd City 2002 average) and offset is calculated at 217 gallons per day (gpd) per customer of which ¾ is associated with potable offset and ¼ non-potable offset.

RECLAIMED WATER OFFSET REPORT. The CITY must submit a report, three years after PROJECT completion, documenting that at least fifty percent (50%) of the PROJECT's reclaimed water, offsets existing or planned ground water or surface water withdrawals under normal operating conditions. The report will show the average annual daily flows three years previous and three years post reclaimed water, and the number of active reclaimed water customers. The CITY will obtain the DISTRICT's approval of the report before the report is finalized, and the DISTRICT will not unreasonably withhold its approval. This provision will survive the term of this Agreement.

# Example Three-Year Post Construction Reclaimed Water Offset Report

(For Example Purposes Only)

**Evening Shade Reclaimed Water Project (K000)**

In response to a Cooperative Funding Initiative request from the City of Evening Shade, the Manasota Basin Board approved the funding of this project as part of their fiscal year (FY) 2000 budget. The reclaimed water transmission and distribution project consisted of the construction of approximately 27,500 linear feet of a 12-inch reclaimed water transmission main, and 60,000 linear feet of 2-inch to 4-inch distribution lines.

The Evening Shade Reclaimed Water Project's main is designed to supply reclaimed water to the western area of the City along Reynolds Road. The project is providing reclaimed water service to "Jupiter Heights" residential subdivision, 12 commercial customers, two small City parks, the Jupiter Heights Golf Course, one industrial cooling tower at the City Hall and small local tree farm. The main part of the project is to provide reclaimed service to the residential development that consists of 1200 single-family homes that were previously using potable and well water for irrigation.

The project was anticipated have 720 active customers who would utilize 0.9 mgd of reclaimed water supply at build out (2010). The overall project cost was estimated at $4,000,000 and the offset at build out was estimated at 0.5 mgd. The estimated cost/benefit for this project was $1.98/1000 gallons. Construction was completed on budget on January 29, 2001; eleven months ahead of schedule and the project has since been online and supplying customers.

The City is continuing their commitment to the efficient use of reclaimed water and the conservation of the potable water supply. This is being accomplished through education of the public, daytime watering restrictions, requiring property owners to discontinue the use of potable water for irrigation purposes when reclaimed water is available, and all City reuse projects include the installation of individual meters coupled with volume based rates for all customer types.

The following information is to comply with the Reclaimed Water Offset Report requirement (50% minimum efficiency) (*Note: All Projects funded after FY2001 are 50% minimum efficiency)* contained in the SWFWMD Funding Agreement 00CON000000 (Paragraph 7 in exhibit A).

The project has 700 active (online and using reuse) residential reclaimed water customers, out of the total 1200 residences in the subdivision that received reclaimed water connection boxes as part of the project. Of the 700 active users, 633 were previously using potable water for all their irrigation needs, and 67 were primarily using deep wells with some supplemental potable irrigation. To date a total average of 548,100 gpd of reclaimed water is being supplied to offset 227,000 gpd of potable water

and 30,000 gpd of groundwater for a total residential offset of 257,000 gpd (annual daily average).

The project has 8 active commercial irrigation customers (of the 12 potential) that utilize an average total of 25,833 gpd to offset 15,500 gpd of potable water.

Both of the project's anticipated recreational park customers connected to the reuse system and have utilized an average of 8,257 gpd of reuse to offset 6,193 gpd of potable water previously used for irrigation of Fields Park and Anderson Park.

The Jupiter Heights Golf Course connected to the system and uses an average of 258,000 gpd of reclaimed water to offset 193,500 gpd of groundwater previously used for irrigation.

The Evening Shade City Hall connected their air conditioner cooling tower to the system and has been utilizing an average of 20,000 gpd of reclaimed water to offset 20,000 gpd of potable water previously used by the tower.

The Bandit Tree Farm is the project's lone agricultural customer and has utilized an average of 25,000 gpd of reclaimed water to offset 18,750 gpd of groundwater that it previously used for irrigation.

The project's 713 active customers represent a 59% connection rate, which complies with 50% minimum connection rate specified in the Cooperative Funding Initiative Agreement for the project (1217 total service boxes installed).

The total project utilizes an average of 885,190 gpd of reclaimed water to offset an average of 510,943 gpd of traditional water sources (268,693 gpd potable and 242,250 gpd deep well offsets), which results in a 58% Offset Efficiency (complies with 50% minimum offset efficiency specified in the Cooperative Funding Initiative Agreement).

**Evening Shade Reclaimed Water Project (K000) Calculations**
See Attached Spreadsheet

**3 YEAR RECLAIMED WATER OFFSET REPORT SPREADSHEET FOR THE EVENING SHADE RECLAIMED WATER PROJECT (K000)**

| Customer Type | Number of Reclaimed Water Services Installed in the Project Service Area | Number of Active Connections (online & using reuse) in the Project Service Area | Pre-Reuse Total Potable Consumption (domestic + irrigation), gpd | Post-Reuse Total Potable Consumption gpd | Actual Reclaimed Water Use gpd | Potable Offset gpd | Deep Well Offset gpd | Total Offset gpd |
|---|---|---|---|---|---|---|---|---|
| **Single Family Residential** | 1200 | 700 | 527,000 | 300,000 gpd | 548,100 gpd | 227,000 gpd | 30,000 gpd | **257,000 gpd** |
| **Commercial** | 12 | 8 | (37,945 + 7,570) = 45,515 gpd | 30,015 gpd | 25,833 gpd | 15,500 gpd | 0 | **15,500 gpd** |
| **Recreational** | 2 | 2 | 6,193 gpd | 0 | 8,257 gpd | 6,193 gpd | 0 | **6,193 gpd** |
| **Golf** | 1 | 1 | N/A | N/A | 258,000 gpd | N/A | 193,500 gpd | **193,500 gpd** |
| **Industrial** (cooling tower & process water) | 1 | 1 | 50,000 gpd | 30,000 gpd | 20,000 gpd | 20,000 gpd | 0 | **20,000 gpd** |
| **Agricultural** | 1 | 1 | N/A | N/A | 25,000 gpd | N/A | 18,750 gpd | **18,750 gpd** |
| **Natural System Restoration** | 0 | 0 | N/A | N/A | N/A | N/A | N/A | **N/A** |
| **Project Totals** | **1217** | **713** | **628,708 gpd** | **360,015 gpd** | **885,190 gpd** | **268,693 gpd** | **242,250 gpd** | **510,943 gpd** |

**Notes:**

1. The Project had a **Total Project Offset of 510,943 gpd.**
2. The Project had a total **Offset Efficiency of 58%**
(510,943 gpd in offsets divided by 885,190 gpd in reclaimed use)
3. The Project had an average residential use of 783 gpd and average offset of 367 gpd.
4. The Project has a **Connection Rate of 59%** (713 divided by 1217 customers).

# Reclaimed Water Customer Type and Efficiency

Approximate Beneficial Offset to the Environment

**Industrial and Power Generation** **100%**
(normally use the same regardless of source)

**Agricultural and Recreational/Aesthetic** **75%**
(normally do not over-water)

**Public Supply Irrigation** **40%**
(25%-35% for flat rate, 45%-55% for metered)

**All Type Customer Average** **60%**
(1/4 Ind&PG, 1/4 Ag.&R/A, and ½ PS)

**Southwest Florida Water Management District**
**2007 Reuse Information Sept. 23, 2009**

| County | IND | | | RAC | | | AG | | | GC | | | RES | | | NSR | | | Total | | | | | Disposal | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flow | Offset | # of Cus | Flow | Offset | # of Cus | Flow | Offset | # of Cus | Flow | Offset | # of Cus | Flow | Offset | # of Cus | Flow | Offset | # of Cus | WW | Reuse | Offset | # of Cus | Stored | Spray | RIB | Surface | Deepwell | Total |
| **CHARLOTTE** | | | | 0.09 | 0.05 | 3 | | | | 2.88 | 2.16 | 14 | 0.41 | 0.26 | 881 | | | | 8.51 | 3.38 | 2.47 | 898 | 0.21 | 0.09 | 0.17 | | 2.61 | 2.87 |
| **CITRUS** | | | | | | | | | | 0.02 | 0.01 | 1 | | | | | | | 3.20 | 0.02 | 0.01 | 1 | | 1.98 | 0.92 | | | 2.90 |
| **DESOTO** | | | | 0.10 | 0.06 | 1 | 0.26 | 0.20 | 7 | 0.18 | 0.14 | 1 | | | 1 | | | | 1.08 | 0.54 | 0.40 | 10 | | 0.37 | 0.10 | 0.13 | | 0.60 |
| **HARDEE** | 0.73 | 0.73 | 2 | | | | | | | | | | | | | | | | 1.10 | 0.73 | 0.73 | 2 | | 0.36 | | | | 0.36 |
| **HERNANDO** | 0.83 | 0.83 | 1 | | | | | | | 1.31 | 0.98 | 1 | | | | | | | 4.73 | 2.14 | 1.81 | 2 | | | 1.91 | | | 1.91 |
| **HIGHLANDS** | | | | | | | | | | | | | | | | | | | 1.91 | 0.00 | 0.00 | 0 | | | 1.88 | | | 1.88 |
| **HILLSBOROUGH - NTB** | 11.11 | 11.11 | 5 | 2.21 | 1.32 | 38 | | | 2 | 1.22 | 0.91 | 9 | 10.33 | 4.10 | 13696 | | | | 76.21 | 24.87 | 17.44 | 13750 | | 1.26 | 0.11 | 60.68 | | 62.05 |
| **HILLSBOROUGH - SWUCA** | 5.96 | 5.96 | 5 | 0.80 | 0.48 | 10 | 0.38 | 0.28 | 2 | 1.18 | 0.89 | 7 | 3.73 | 1.11 | 3699 | | | | 22.63 | 12.05 | 8.72 | 3723 | | 0.31 | 0.19 | 7.44 | | 7.94 |
| **LAKE*** ** | | | | 0.00 | 0.00 | 9 | | | | 0.00 | 0.00 | 6 | | | | | | | 0.00 | 0.00 | 0.00 | 15 | | | | | | 0.00 |
| **LEVY** | | | | | | | | | | | | | | | | | | | 0.16 | 0.00 | 0.00 | 0 | | 0.16 | | | | 0.16 |
| **MANATEE** | 0.11 | 0.11 | 1 | 1.24 | 0.75 | 24 | 5.60 | 4.20 | 4 | 1.78 | 1.34 | 9 | 8.65 | 2.34 | 7787 | | | | 27.56 | 17.38 | 8.74 | 7825 | | 0.39 | | 5.49 | 5.20 | 11.08 |
| **MARION**** | | | | 0.27 | 0.16 | 4 | | | | 1.17 | 0.88 | 5 | | | 4 | | | | 4.99 | 1.44 | 1.04 | 13 | | 2.95 | 0.51 | | | 3.46 |
| **PASCO** | 0.33 | 0.33 | 1 | 2.78 | 1.67 | 62 | 0.56 | 0.42 | 6 | 3.74 | 2.81 | 20 | 10.02 | 3.90 | 13014 | | | | 25.63 | 17.43 | 9.13 | 13103 | 0.93 | 0.66 | 8.16 | | | 8.82 |
| **PINELLAS** | 4.55 | 4.55 | 15 | 15.75 | 9.45 | 935 | 0.02 | 0.01 | 1 | 9.99 | 7.49 | 37 | 30.52 | 11.45 | 38169 | | | | 98.92 | 60.83 | 32.95 | 39157 | 0.20 | 1.20 | | 26.23 | 12.23 | 39.66 |
| **POLK** | 8.18 | 8.18 | 5 | 0.39 | 0.23 | 3 | 0.28 | 0.21 | 4 | 0.96 | 0.72 | 10 | 1.91 | 0.81 | 2703 | 0.78 | 0.78 | 1 | 28.25 | 12.50 | 10.93 | 2726 | | 2.04 | 4.94 | 10.44 | | 17.42 |
| **SARASOTA** | | | | 1.28 | 0.77 | 41 | 2.13 | 1.60 | 2 | 6.54 | 4.90 | 40 | 3.72 | 2.44 | 8131 | | | | 20.92 | 13.67 | 9.71 | 8214 | | | 0.07 | 3.72 | 2.41 | 6.20 |
| **SUMTER***** | | | | 1.45 | 0.87 | 10 | | | | 4.57 | 3.43 | 23 | | | | | | | 4.80 | 6.02 | 4.30 | 33 | | 0.37 | 0.10 | | | 0.47 |
| **Totals** | **31.80** | **31.80** | **35** | **26.36** | **15.81** | **1140** | **9.23** | **6.92** | **28** | **35.54** | **26.66** | **183** | **69.29** | **26.41** | **88085** | **0.78** | **0.78** | **1** | **330.60** | **173.00** | **108.38** | **89472** | **1.34** | **12.14** | **19.06** | **114.13** | **22.45** | **167.78** |

*** Some portion of (10 mgd) go to closed loop system at CF Industries and are classified as both Reuse and Disposal**
**** Portions of Flows come from WWTP outside of District.**
*****Sumter totals includes The Villages WWTP in Lake (1.08).**