

TRANSPORTATION ASSET MANAGEMENT GAP ANALYSIS TOOL

USER'S GUIDE

Prepared For:

National Cooperative Highway Research Program
Transportation Research Board
of
The National Academies

TRANSPORTATION RESEARCH BOARD
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CHAPTER 1. GAP ANALYSIS PROCESS

Introduction to a Gap Analysis

Transportation Asset Management (TAM) is most successful when an agency's goals and objectives are closely aligned with investment decisions that consider agency risk, strategies to reduce life-cycle costs, and customer demands. Whether a novice or an established user of asset management principles, most agencies have found that the implementation of asset management is a continuous journey that occurs over time as a result of a series of incremental steps. Throughout that journey it is important for the agency to periodically conduct an objective assessment to identify areas of strength and weakness and to provide clear direction for enhancements that are needed to improve the decision-making process, enhance the data and tools that support the process, or build capacity and support for asset management both internally and externally. This type of assessment is referred to as a *gap analysis* because strengths and weaknesses are evaluated in terms of 'gaps' between desired practices and the agency's current state-of-the-practice. A gap analysis is commonly used in the TAM community to identify areas of improvement, to assess the level of maturity of a TAM program, and to benchmark against best practice.

The *Transportation Asset Management Guide – A Focus on Implementation* published by the American Association of State Highway and Transportation Officials (AASHTO) describes the gap analysis objective as a process that determines areas of improvement and that provides a basis for prioritizing the improvements so that resources are allocated effectively (AASHTO 2011). A gap analysis is considered part of the on-going TAM improvement cycle, providing a means of evaluating current and desired capabilities and establishing a plan for making necessary enhancements, as shown in figure 1-1.

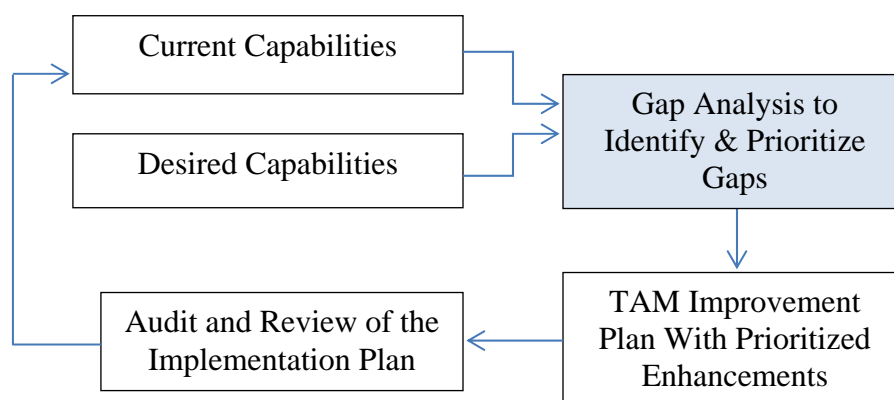


Figure 1-1. Role of the gap analysis within a TAM improvement cycle.

The 2011 AASHTO *Guide* introduced an Excel-based Gap Analysis Tool to illustrate the application of a gap analysis to identify and prioritize needed enhancements. While the tool served as a good starting point for several agencies, improvements to the functionality, flexibility, and user experience were needed for it to be widely used. These changes and enhancements were addressed under National Cooperative Highway Research Program (NCHRP) Project 08-90, which developed a new TAM Gap Analysis Tool. The results of the research study are documented in the Project final report, while this User's Guide supports the operation and use of the new tool that was developed under the research study.

Overview of the Gap Analysis Tool Framework

In order to be effectively used, there are several aspects to the Gap Analysis Tool framework that need to be understood, including the data structure and the rating scheme. These two components are introduced in this section of the User's Guide. A glossary of terms, which includes a description of the data structure components, is provided as Appendix A.

Gap Analysis Data Structure

The Gap Analysis Tool has been designed to evaluate current and desired asset management capabilities at three different levels, as depicted in figure 1-2 and described below.

- **Level 1: Assessment Areas.** The highest level of assessment is the Assessment Area, which consists of eight topic areas that are included in the Tool:
 1. Policy Goals and Objectives.
 2. Asset Management Practices.
 3. Planning, Programming, and Project Delivery.
 4. Data Management.
 5. Information Systems.
 6. Transparency and Outreach.
 7. Results.
 8. Workforce Capacity and Development.
- **Level 2: Elements.** Each Assessment Area has been subdivided into two or more Elements, which can be considered subsets of each of the eight broad topic areas. Table 1-1 presents the individual Elements included in each of the eight Assessment Areas incorporated into the Gap Analysis Tool.
- **Level 3: Criteria.** Within each Element, there are two or more criteria that are used to evaluate current and desired practices. Each criterion is presented as a statement representing a particular aspect of good practice. Raters are asked to evaluate how closely their agency adheres to the criteria to determine gaps. The number of Criteria in each Element is shown in parenthesis in table 1-1. The full list of Criteria is provided in Appendix B.

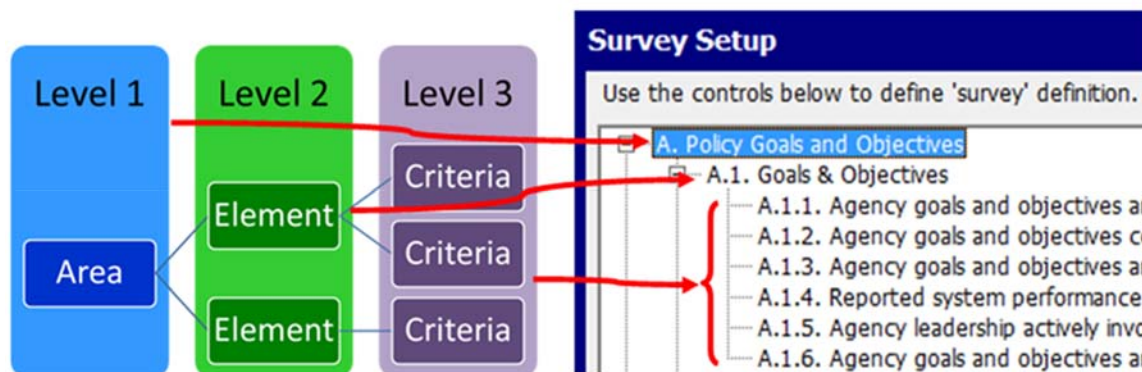


Figure 1-2. Three analysis levels in the Gap Analysis Tool.

Table 1-1. Assessment Areas and Elements in the Gap Analysis Tool.

Assessment Areas	Elements (and number of Criteria in parenthesis)
1: Policy Goals and Objectives	<ul style="list-style-type: none"> • Goals and Objectives (6) • Agency Policies (6)
2: Asset Management Practices	<ul style="list-style-type: none"> • TAM Framework (7) • Leadership Support for TAM (5) • Asset Management Plan Development (9) • Lifecycle Management (4)
3: Planning, Programming, and Project Delivery	<ul style="list-style-type: none"> • Planning and Programming Processes (9) • Performance-Based Management (6) • Resource Allocation (5) • Project Delivery (7)
4: Data Management	<ul style="list-style-type: none"> • Asset Inventory (9) • Asset Condition and Performance (8) • Data Governance (9)
5: Information Systems	<ul style="list-style-type: none"> • System Technology and Integration (5) • Decision-Support Tools (4) • System Features (9)
6: Transparency and Outreach	<ul style="list-style-type: none"> • Transparency and Accountability (4) • Benchmarking (5) • Communication and Outreach (4)
7: Results	<ul style="list-style-type: none"> • Compliance (4) • Data-Driven Targets (8) • Program and Plan Alignment (3)
8: Workforce Capacity and Development	<ul style="list-style-type: none"> • Workforce Capacity (5) • Workforce Development (2)

Rating Scheme

The Gap Analysis Tool uses a 5-point scale for evaluating current and desired capabilities. The scale was developed based on the TAM Maturity Scale introduced in the 2011 AASHTO *Transportation Asset Management Guide – A Focus on Implementation*. Each of the five maturity levels is described below:

- Initial – No effective support from strategy, processes, or tools. There can be lack of motivation to improve.
- Awakening – Recognition of a need and basic data collection. There is often reliance on heroic effort of individuals.
- Structured – Shared understanding motivation, and coordination. Development of processes and tools.
- Proficient – Expectations and accountability drawn from asset management strategy, processes, and tools.

- Best Practice – Asset management strategies, processes, and tools are routinely evaluated and improved.

The AASHTO *Guide* expanded on these definitions and provided a table that described characteristics associated with each of the five maturity levels in six different areas: 1) processes; 2) frequency; 3) sub-element emphasis; 4) process formality; 5) data and technology; and 6) outputs and results (AASHTO 2011). The table provides guidance for assessing the differences between each of the maturity levels within each area. For instance, under the category of data and technology, an agency with manual systems in place is considered to be at the lowest maturity level while an agency with state-of-the-art systems in place is considered to be at the highest level of maturity. The table provided in the AASHTO *Guide* was modified slightly to fit the 5-point scale used in the Gap Analysis Tool and is presented as figure 1-3. This figure is also built into the Tool as a *Help* feature that can be used by the raters as they assess agency practices.

Maturity Scale	Processes	Frequency	Sub-element Emphasis	Process Formality	Data & Technology	Outputs & Results
1	Initial stages of inquiry; focus is on literature search and peer reviews/calls	Occasionally do this	Receives minimal emphasis; some efforts underway	Done informally only; ad hoc procedures; minimal documentation; no organizational integration	Manual system exists; plans for automated system in place	Minimal results; long way to go
2	Identify nature/extent of capital assets; prompted by new financial reporting	Sometimes done on an as-needed basis for critical programs and activities	Moderately emphasized; try to adhere to this	Semiformal process; some routine procedures exist; limited organizational integration	Automated system exists; meets basic needs	Some results; still below expectations
3	Processes identify, assess, and value infrastructural assets; focus on preservation and replacement / rehabilitation	Often do this on many programs and activities	Generally emphasized; something that is done and checked	Formal process exists; modestly documented; good but still evolving; some organizational integration	Good system in place; widely available; meets all key user needs	Good results getting there
4	Processes extend to life-cycle development and preservation	Usually do this; omitted only in exceptional circumstances	Strongly emphasized; used to measure and reward by	Formal documented process; well-tested and well followed; considerable organizational integration	Strong system in place; fully integrated; meets nearly all user needs	Excellent results; still some room to improve
5	Fully integrated processes; across all functions; flexible to change	Always do this; standard operating procedure	Heavily emphasized; one of the principles by which business is done	Mastery of formal processes; well-documented; standardized; full organizational integration	State-of-the-art system in place; always seeking betterment	Unparalleled results; fully engaged organization; a total success

Figure 1-3. Rating scale used in the Gap Analysis Tool (adapted from AASHTO 2011).

Steps Involved in a Gap Analysis

The AASHTO *Guide* introduces a process for conducting a gap analysis that is presented in a slightly modified format as figure 1-4 (AASHTO 2011). The gap analysis is administered by an individual, often the Asset Management Coordinator in an agency, who is responsible for organizing the activity, distributing the evaluation criteria to the selected participants, and compiling the results. For purposes of this User's Guide, the individual serving in this capacity is referred to as the 'Tool Administrator.' The role of the Tool Administrator and the raters (the individuals evaluating each Criteria) are presented in the following discussion of each of the steps in the gap analysis process.

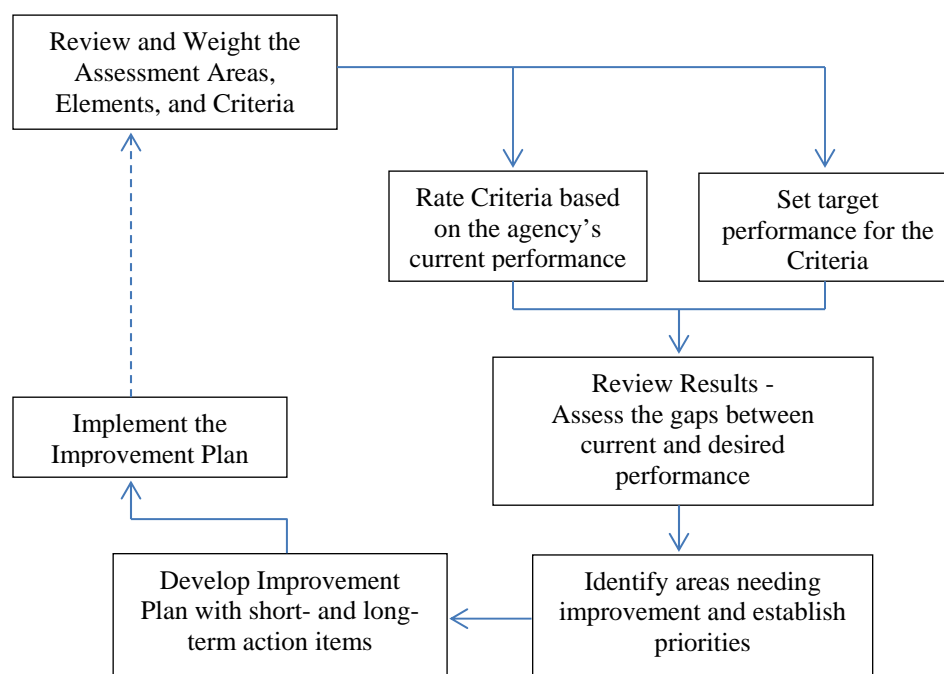


Figure 1-4. Gap analysis process (modified after AASHTO 2011).

Review and Weight the Assessment Areas, Elements, and Criteria

The gaps identified during an asset management gap analysis are based on differences between an agency's assessment of its targeted (or desired) and current practices. To facilitate this assessment, a gap analysis includes a series of statements (called Criteria) that represent best practice in the industry. Using the rating scale discussed earlier, raters are asked to individually assign a rating to each criterion that represents the maturity level the agency should strive for and the current level of maturity for the agency today. The difference between those ratings is identified as a gap that is considered for improvement.

Since the Criteria serve as the basis for identifying gaps, it is important that they are comprehensive enough to consider all aspects of an asset management program and representative of what is considered best practice. A total of 143 Criteria are included in the new Gap Analysis Tool within the 8 Assessment Areas and 24 Elements listed in table 1-1. The Tool has been designed with considerable flexibility so an agency can add to, delete, or modify any of the Assessment Areas, Elements, and Criteria that are included. There is also complete flexibility in determining which Criteria each rater is asked to rate. Therefore, it is important that

the Tool Administrator is familiar with the content of the Tool so it can be used as effectively as possible.

Some of the Assessment Areas, Elements, or Criteria may be more important than others to the agency, so a gap analysis provides an opportunity to apply a weighting so that the final results reflect the importance of each level. Unlike the original gap analysis tool that was provided with the 2011 AASHTO *Guide*, the new Tool does not force the raters to rank the importance of each Assessment Area, Element, or Criteria in the calculation of average scores. Instead, this feature is performed by the Tool Administrator. This ranking process, which provides an opportunity to weight certain Assessment Areas, Elements, or Criteria more than others, is used in calculating the Weighted Averages provided as results. If default weights are used for the Assessment Areas, Elements, and Criteria, the Tool assumes that each is weighted equally.

Rate Criteria Based on the Agency's Current Performance

As part of a gap analysis, individuals representing different Departments, Divisions, and Offices within a transportation agency are asked to complete a survey by rating a series of Criteria representing best practice. The surveys are distributed by the Tool Administrator.

To facilitate the distribution of the surveys to individuals within the agency, a user interface has been provided in the Gap Analysis Tool to establish 'Survey Groups.' For the purposes of this User's Guide, a 'Survey Group' is defined as a category of individual raters who have similar positions, responsibilities, and/or areas of expertise (e.g., 'Planning and Programming'). Because of these similarities, this group of individuals would be asked to rate similar subsets of the Criteria available in the Gap Analysis Tool. The individuals within a 'Survey Group' are each referred to as 'raters' who are sent a worksheet by the Tool Administrator containing the Assessment Areas, Elements, and Criteria selected for them. The rater will then be asked to score each Criterion using the rating scale introduced earlier and the rater's knowledge of current agency practices.

Set Target Performance For the Criteria

Since a gap is defined as the difference between current and desired performance, a gap analysis demands that scores are assigned to desired, or targeted, performance as well as to current capabilities.

The Gap Analysis Tool provides for the targeted performance levels to be entered in one of two ways. Either the Tool Administrator can enter the targeted performance levels for the agency or the performance level can be calculated based on scores assigned by individual raters. Both approaches use the 5-point rating scale described earlier. The only difference in producing the targeted performance level is that if the Tool Administrator sets the agency default values only one score is reflected in the number presented; however, if the desired ratings are user defined, the score will reflect the opinion of all raters. Using a user-defined performance target also adds a level of complexity for the rater because instead of just rating the agency's current practices, the rater is also responsible for assigning a score for the targeted performance for each criterion. The 'Survey Management' tab is used to select whether the targets will be defined by the Tool Administrator or the users.

Review Results - Assess the Gaps Between Current and Desired Performance

The heart of the gap analysis lies in the evaluation of the gaps between current and desired performance to help the agency assess areas of strength and weakness, and to identify needed enhancements to asset management practices.

The Gap Analysis Tool provides a number of features to facilitate this analysis, as described below.

- ‘Survey Groups’ can be combined in any way to create ‘Results Groups’ for comparing results. For example, the results from an Executive Leadership Survey Group could be combined with the results from the Asset Managers Survey Group to evaluate differences.
- Results can be evaluated at any of the three levels: Assessment Area, Element, or Criteria. In addition, an overall maturity score that considers all Assessment Areas can be calculated.
- The Tool provides a function that allows time series data to be compared so an agency can evaluate differences in results from one year to another, for example. The time series data can be evaluated at any of the three levels.
- Results are presented in a number of formats, including tables, bar charts, and spider charts. The results can be printed or exported to an Excel file.

Remaining Steps

The remaining steps in the gap analysis process involve interpreting the analysis results and identifying gaps that need to be addressed. The overall weighted ratings can be used to identify high priority items that need to be addressed and action items that will help to close the gap and bring the agency’s practices closer to the targeted level. If there are a lot of gaps that need to be addressed, the prioritization process can be assisted by considering the potential risk to the agency if the gap is not addressed, the relevance of a particular item to the agency’s performance objectives, the resources required to reduce the gap, regulatory requirements, or the length of time it would take to reduce the gap. Sometimes, especially when first getting started in asset management, there can be a lot of benefit in identifying some quick wins to build support.

The final product of the gap analysis process is the development of an Improvement Plan that outlines the short- and long-term actions that will be taken to close the gaps, the individuals responsible for each action, and the timeline for its completion. The latter items introduce an element of accountability to the process that helps ensure that the actions will be completed.

It is important to recognize that a TAM Improvement Plan is part of a continuous program of incremental enhancements that evolve based on each agency’s policies and practices. As a result, the Improvement Plan should be updated on a regular basis to ensure that the agency’s asset management practices continue to support the agency’s overall objectives. Agencies that are in the early stages of implementation may find it important to revisit the Improvement Plan every 6 months to a year, while more mature agencies may update the Plan on a 3- to 5-year cycle. Regardless of how often the Plan is updated, a gap analysis should be considered one of the first steps in the process to both identify and prioritize enhancements.

Using the Spreadsheet Tool to Support a Gap Analysis

The new Gap Analysis Tool is a powerful Excel-based spreadsheet that features a user-friendly interface that gives it the look, feel, and functionality of a stand-alone software program. The use of Visual Basic for Applications (VBA) programming language behind the user interface allows for easy customization of the Tool without the need for direct interaction with the spreadsheet. This has also improved the robustness and reliability of the Tool by reducing the potential for the user to corrupt the spreadsheet by trying to directly manipulate items on the spreadsheet interface.

Although the Tool does not support multiple users simultaneously, it is capable of importing, storing, analyzing, and reporting data received from multiple users. This is accomplished by a feature that allows a user to define customized worksheets that can be distributed to individual survey groups within an agency. The Tool Administrator within an agency can use the Tool to select specific Assessment Areas, Elements, and Criteria that are to be rated by a particular group of individuals within the agency (a 'Survey Group'), export it into a 'User Survey Workbook' and distribute it to the Survey Group. Once the Survey Group completes the survey, the Tool Administrator can import the data back into the master tool using features provided in the user interface.

The Tool also facilitates a number of different types of analyses, as discussed earlier. Perhaps the most useful of the results features is the ability to compare multiple time-series data to allow the agency to compare target ratings, current ratings, and gaps between multiple years. Another important feature is the ability to combine different Survey Groups into 'Result Groups' for comparison purposes.

The use of the new Gap Analysis Tool for conducting a gap analysis is described in detail in this User's Guide. Chapter 2 provides guidance in the operation of the main Gap Analysis Tool (designed for use by the Tool Administrator within an agency), with information detailing how each of the primary functions is to be performed. Chapter 3 provides guidance in the operation of the User Survey Workbooks that are designed and created by the main Gap Analysis Tool, and delivered to individual raters to collect rating scores. Chapter 4 focuses on the implementation of the Tool, providing guidance about how to use the tool most effectively. For example, Chapter 4 identifies which of the rating Criteria might be most applicable to different groups of transportation personnel and how to help advance your agency from one level of maturity to another. Appendix A features a glossary of terms that will be useful while using the Tool and Appendix B presents the full list of Assessment Areas, Elements, and Criteria that are available for use during the rating process.

Definition of Terms

Throughout the User's Guide there are certain terms that are encountered within the Tool. The following are definitions of these common terms that are used within the Gap Analysis Tool's user interface:

- **Assessment Area**—A broad category of a key transportation asset management area for which a strategic assessment is to be conducted. These are referred to as *level 1* items within a survey definition.
- **Element**— A subset of the Assessment Area that has a list of Criteria associated with it. These are referred to as *level 2* items within a survey definition.

- **Criteria**—Specific statements or questions that are individually assessed and weighted in order of importance (if desired) to determine the gap between target ratings and current ratings. These are referred to as *level 3* items within a survey definition.
- **Survey**—A user-defined list of Criteria that are organized further into broader categories of Element and Assessment Area. Within the Tool, the Assessment Area, Element, and Criteria items are visually displayed as level 1, level 2, and level 3 items within the survey definition tree view control.
- **Survey Group**—A category of individual raters who have similarities in their positions, their responsibilities, and/or their areas of expertise (e.g., Planning and Programming). Within the Tool, the Tool Administrator has the capability to associate a custom list of Criteria from the survey definition, with a defined and named survey group. This is an important function within the Tool because it allows the Tool Administrator to create and distribute survey group-specific User Survey Workbooks that **only** contain those Criteria that would be of interest to that survey group.
- **Rating Set**—A named *container* within the gap analysis tool that stores individual imported user rating data (e.g., ratings sets can be set up to store annual sets of ratings such as, “2012 Ratings,” “2013 Ratings,” and so on). The definition of ratings sets are important from an analysis standpoint because: 1) aggregated results are always summarized by rating set, and 2) the gap analysis tool allows the user to compare aggregated results between rating sets.
- **Results Group**—A named set of one or more survey groups. The concept of results group was introduced in the tool to provide the Tool Administrator with the ability to compare the results between individual survey groups, or combined groups survey groups.

CHAPTER 2. GAP ANALYSIS TOOL

Introduction

This chapter introduces the main Gap Analysis Tool workbook that is intended to help an agency conduct all aspects of a transportation asset management gap analysis assessment. The Gap Analysis Tool described in this chapter is the Excel workbook tool that has been specifically designed to help a Tool Administrator complete the following tasks within the gap analysis procedure:

- Setup survey definitions (i.e., named and organized lists of Assessment Area, Element, and Criteria items).
- Create customized User Survey Workbooks that are used by raters to enter assessment rating values.
- Collect rater data from completed User Survey Workbooks, and import the results back into the Gap Analysis Tool.
- Store and organize collected user rating data so that they are easily accessible for analysis and results viewing.
- Assign user-defined weight factors to Criteria, Element, and Assessment Area items in a survey definition so that weighted-average target and current ratings can be determined at different analysis levels (i.e., Overall, Assessment Area, and Element levels).
- View weighted-average target and current ratings (and computed gaps) at any analysis level (i.e., at the overall survey level, and for any specified Assessment Area, Element, or Criteria included in the survey definition). Results are presented in tabular and chart format.
- View weighted-average target and current ratings (and computed gaps) for a specified *series* of defined 'Rating Sets' or 'Results Groups.' This feature can be used to view time series ratings or gaps determined for any specified Assessment Area, Element, or Criteria included in the survey definition. Results are presented in tabular and chart format.

It is important to note that this main Gap Analysis Tool Excel workbook should not be confused with the User Survey Workbooks described in Chapter 3. Those User Survey Workbooks are separate data collection Excel workbooks that are actually created within the main Gap Analysis Tool by the Tool Administrator, and then distributed to selected raters to facilitate the collection of user ratings. Chapter 3 contains a separate discussion on how raters are intended to use the User Survey Workbooks to record their ratings for assigned Criteria.

The remainder of this chapter describes all aspects of the main Gap Analysis Tool workbook. The chapter provides needed information for setting up the Tool and getting it to run on your computer, and detailed descriptions of how to use the Tool's provided controls to complete an effective gap analysis.

Getting Started

Because the Gap Analysis Tool and the User Survey Workbooks are VBA-driven Microsoft Excel workbooks, there are a number of setup steps that must be completed within Excel to

allow those tools to run. The specific setup steps are described in detail in this section.

Target Excel Version

Before any setup steps are completed, it is worth noting that version 1.0 of the Gap Analysis Tool and the User Survey Workbooks have been specifically developed for (and tested in) versions 2007 and 2010 of Microsoft Excel. Therefore, there is no guarantee that these tools will run bug free within older or newer versions of Excel

Copying Needed Files to Your Computer

The Gap Analysis Tool is delivered as a stand-alone Excel workbook titled “GapAnalysisTool_v1.00.xlsm.” To get started using the tool, the first step is to copy the file to a chosen location on your computer. The instructions for completing this task are as follows:

1. Open Windows Explorer.
2. Create a folder/directory in which you want to store the Gap Analysis Tool workbook.
3. Copy the “GapAnalysisTool_v1.00.xlsm” file to your computer.

After you have copied the Gap Analysis Tool workbook to your computer, review the additional setup steps below before trying to run the tool.

Microsoft Excel Trust Center Settings

For security reasons, in Excel 2007 (and later versions of Microsoft Excel) you must set the Excel “Trust Center” settings to allow needed VBA code to execute on your computer. When the Gap Analysis Tool is opened, it checks that the “Trust Center” settings are set as needed. If the Gap Analysis Tool finds that the settings are not as needed, the warning message shown in figure 2-1 is displayed, and the workbook is automatically closed.

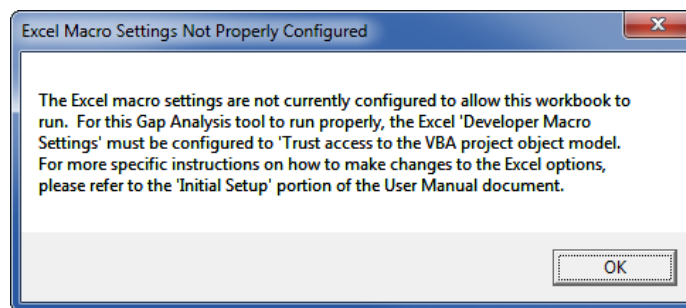



Figure 2-1. Warning message that is displayed when Excel “Trust Center” settings are not configured as needed.

If you encounter the warning message shown in figure 2-1 when you try opening the Gap Analysis Tool workbook, you will need to make some changes to your Excel “Trust Center” settings. The instructions for making those needed setting changes are the following:

1. In Excel 2007, click the Office  button at the top left of the Excel window. In Excel 2010, click on the “File” tab.
2. In Excel 2007, click the “Excel Options” button to open the *Excel Options* dialog box. In Excel 2010, click “Options.”

3. Select “Trust Center” in the list of options on the left-hand side of the *Excel Options* dialog box.
4. Click the “Trust Center Settings” button to open the *Trust Center* dialog box.
5. Set the “Trust Center” settings in the *Trust Center* dialog box to those shown in figure 2-2.

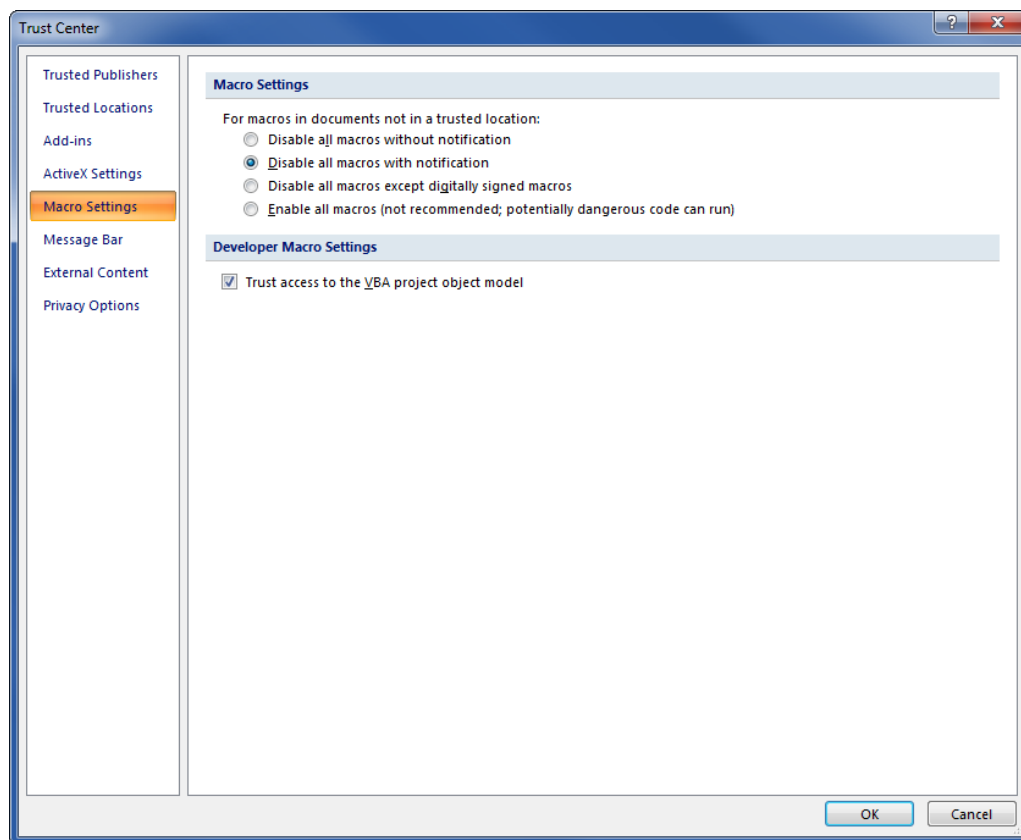


Figure 2-2. Example Excel Trust Center settings.

Needed Reference Libraries

The VBA-code used in the Gap Analysis Tool is also dependent on five specific “References” (or code object library files). Details of the five required reference files are:

Name: Visual Basic For Applications
Filename: VBE6.DLL

Name: OLE Automation
Filename: stdole2.tlb

Name: Microsoft Office 12.0 Object Library
Filename: MSO.DLL

Name: Microsoft Forms 2.0 Object Library
Filename: FM20.DLL

Name: Microsoft Windows Common Controls 6.0 (SP6)

Filename: MSCOMCTL.OCX

Each of these five reference files contains information and instructions that are required by Excel to make the Gap Analysis Tool run as designed. While the majority of these reference files are most likely on your computer (as they are common controls often packaged with Microsoft Office), there is no guarantee that that is the case. Therefore, when the Gap Analysis Tool workbook is opened, code runs that checks your computer to make sure that each needed reference file is available. If one of the needed files is missing, a warning message similar to the one shown in figure 2-3 will be displayed, and the Gap Analysis Tool workbook will be closed.

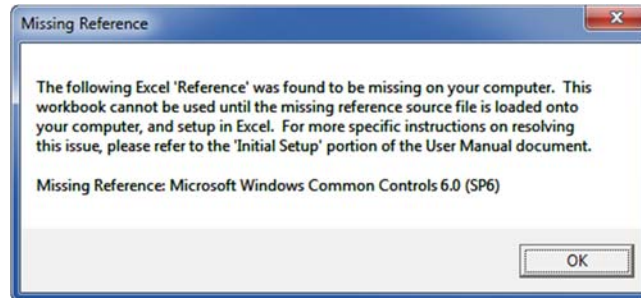


Figure 2-3. Example warning message that is displayed when a needed Excel reference is missing.

If you receive a “Missing Reference” warning, use the following procedure to add the needed reference to the Excel Reference List:

1. Make note of the name of the missing reference displayed in the warning message (e.g., “*Missing Reference: Microsoft Windows Common Controls 6.0 (SP6)*”).
2. Look in the list of required references described previously in this section, and determine the name of the file associated with the missing reference.
3. Locate the missing file (identified in step 2), in the provided reference files.
4. If desired, copy the missing reference file to a location under the C:\Windows directory. Note: this step is not required; however, most needed Excel reference files are typically stored somewhere within the C:\Windows directory.
5. Open the Excel application without opening a workbook.
6. Click the “Developer” tab and click the “Visual Basic” button to open the *Visual Basic Editor* window. Note: the *Visual Basic Editor* may also be opened by using the ALT+F11 key combination at any time when Excel is opened.
7. Click on the *Visual Basic Editor*’s “Tools” menu and select “References” to open the *References – VBAProject* dialog box.
8. Click the “Browse” button to open the *Add Reference* dialog box.
9. Use the provided controls to browse to the location of the needed reference file.
10. Select the needed file and click the “Open” button to add it to Excel’s list of “Available References.”
11. Close the *Visual Basic Editor* window.

Running the Tool

Because the Gap Analysis Tool is a VBA-driven (i.e., macro-driven) Excel workbook, macros must be “enabled” for the workbook to open and run correctly. If you set your macro security settings in the Excel “Trust Center” to the recommended choice of “Disable all macros with notification” (see figure 2-2), you will need to use the following steps to open the Gap Analysis Tool workbook:

1. Double click the “GapAnalysisTool_v1.0.xlsm” file in the “Gap Analysis Tool 1.0” folder that was copied to your computer.
2. If the macro security settings are set to “Disable all macros with notification” upon opening the workbook, a security warning will be displayed near the top of your Excel window similar (see figure 2-4). Click the “Options” button next to the security warning message to open the *Microsoft Office Security Options* dialog shown in figure 2-5.
3. Select the “Enable this content” option in the *Microsoft Office Security Options* dialog box and click the “OK” button to open the Gap Analysis Tool workbook.

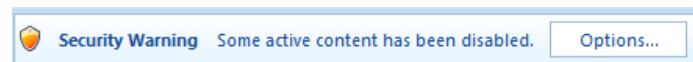


Figure 2-4. Excel security warning that is displayed when macros have not been enabled.



Figure 2-5. Setting macro security in the *Microsoft Office Security Options* dialog box.

Using the Gap Analysis Tool Workbook

The Gap Analysis Tool uses a tab-based user interface made up of the following four tabs:

- Home.
- Survey Setup.
- Survey Management.
- Results.

Detailed instructions on how to use the controls on these tabs to conduct gap analyses are provided in the sections below.

Home Tab

When the Gap Analysis Tool workbook is opened, this windows-based interface is automatically displayed with the main tab control set to the *Home* tab. The *Home* tab contains both general information about the gap analysis procedure, and basic instructions on how to use the Tool. The *Home* tab is displayed in figure 2-6.

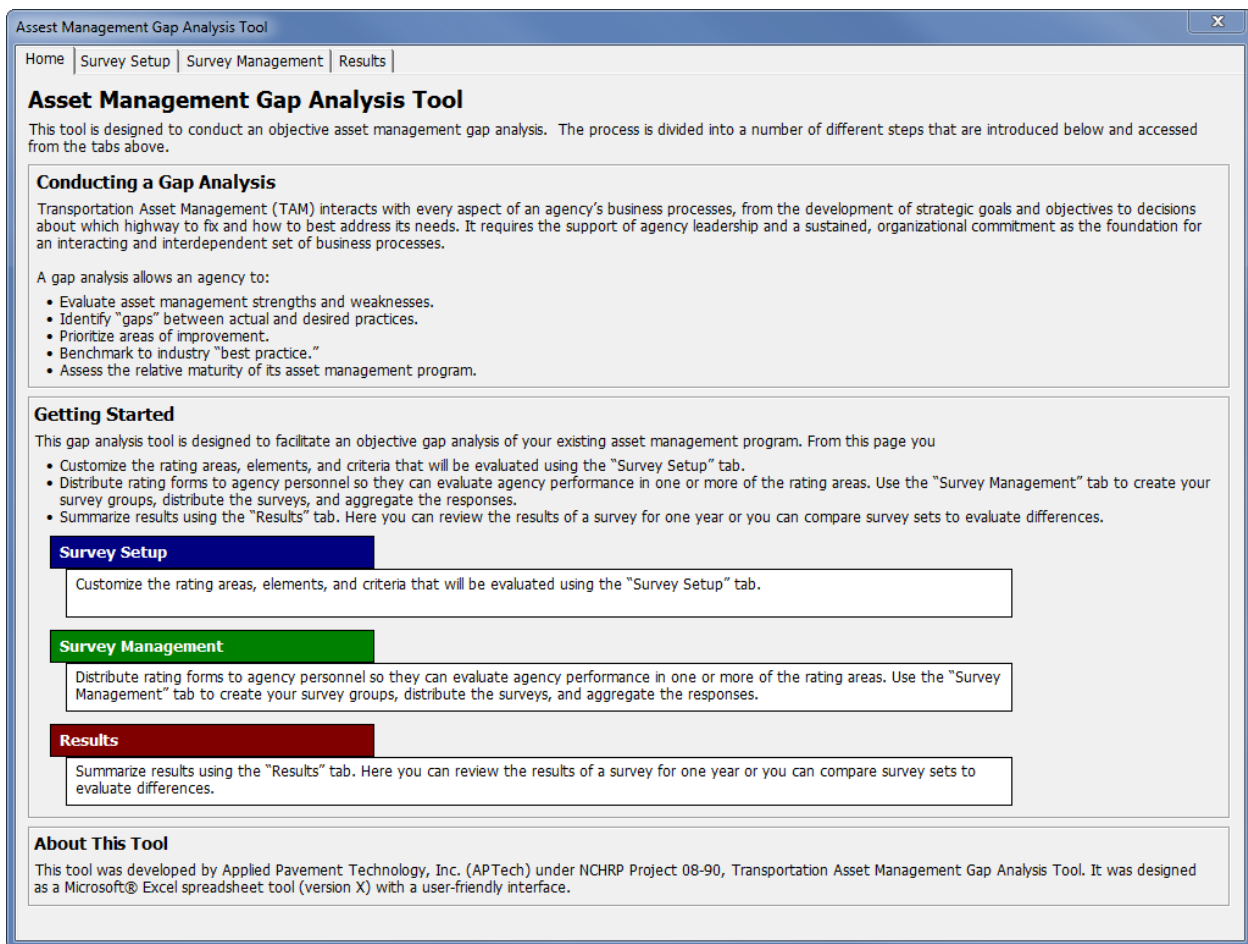


Figure 2-6. The main Gap Analysis Tool form with the *Home* tab selected.

Survey Setup Tab

The *Survey Setup* tab contains controls that allow you to create and customize gap analysis User Survey Workbooks that are used to solicit rating information from users. As described previously, a survey definition is a user-defined list of Criteria that are organized further into broader categories of Element and Assessment Area. Within the tool, these Assessment Area, Element, and Criteria items are visually organized into a tree structure of level 1, level 2, and level 3 items, respectively (see figure 2-7). The remainder of this section provides detailed instructions for creating and setting up user-defined survey definitions.

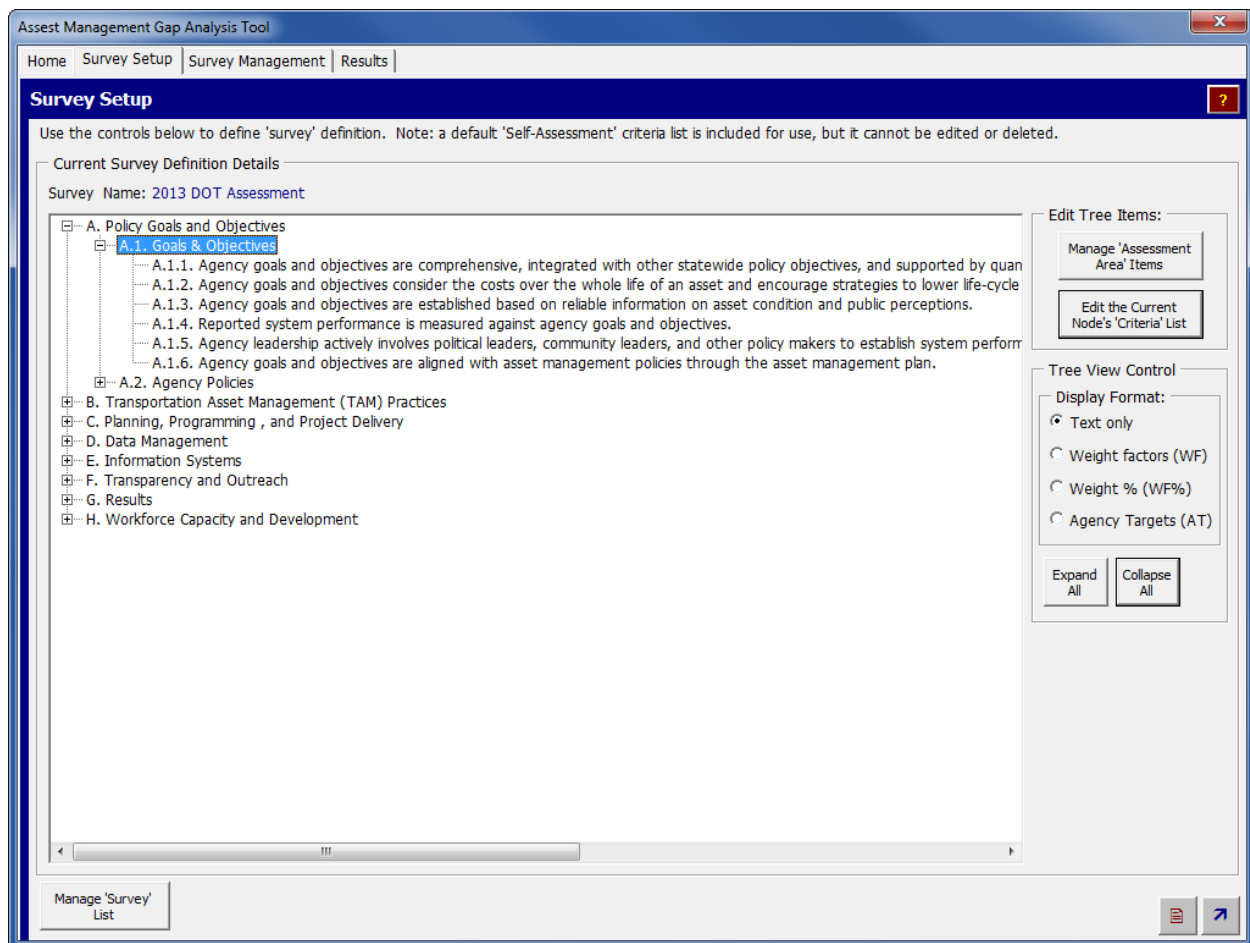


Figure 2-7. Example of the *Survey Setup* tab.

Managing the Survey List

The Gap Analysis Tool allows the user to define, save, and use different unique survey definitions. To manage the master list of user-defined surveys definitions, click the “Manage ‘Survey’ List” button on the *Survey Setup* tab. This action opens the *Survey List Management* dialog box shown in figure 2-8.

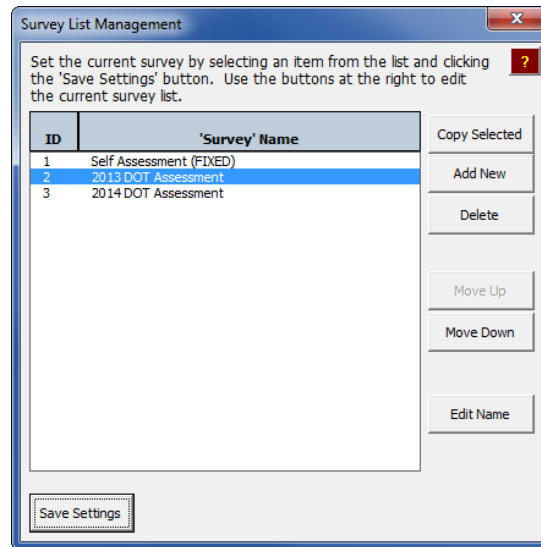


Figure 2-8. Example of the *Survey List Management* dialog box.

The list below provides more details about the available controls on the *Survey List Management* dialog box:

- **“Copy Selected” button**—Makes a copy of the currently selected survey in the survey list. Note: when you copy an existing survey in the list, the defined survey definition, survey groups, and results groups are copied to the newly defined survey. However, any defined rating sets, imported individual rating details, and associated results are not copied.
- **“Add New” button**—Adds a new blank survey to the survey list.
- **“Delete” button**—Deletes the currently selected survey from the survey list. Upon clicking this button, you will be asked to confirm your deletion before the survey is deleted from the list. Note: the “Self Assessment” survey (labeled “Self Assessment (FIXED)” in the list) is the default self assessment survey and cannot be deleted from the list.
- **“Move Up” button**—Moves the currently selected survey up one spot in the survey list. Note: the “Self Assessment” survey (labeled “Self Assessment (FIXED)” in the list) cannot be moved from the first position within the list.
- **“Move Down” button**—Moves the currently selected survey down one spot in the survey list. Note: the “Self Assessment” survey (labeled “Self Assessment (FIXED)” in the list) cannot be moved from the first position within the list.
- **“Edit Name” button**—Opens the *Edit Survey Name* dialog box (shown in figure 2-9). Use this dialog box to change the name of the currently selected survey. Note: the name of the “Self Assessment” survey (labeled “Self Assessment (FIXED)” in the list) cannot be changed.
- **“Save Settings” button**—Accepts any made changes to the survey list, and sets the currently selected survey to be the *current* survey in the Gap Analysis Tool. Note that all data within an analysis session (i.e., survey definition, survey group definitions, rating set definitions, imported ratings, results groups, and results) are associated and saved with a named *survey* in the survey list presented in the *Survey List Management* dialog box.

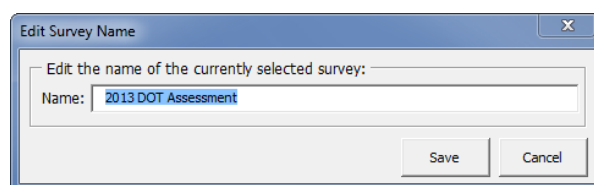


Figure 2-9. Example of the *Edit Survey Name* dialog box.

Defining Components of a Survey

Defining a new survey requires that you define level 1 Assessment Area items, level 2 Element items, and level 3 Criteria items, and that you define the relationships between the different items. That is, each Assessment Area is associated with one or more Element items, and each Element item is associated with one or more Criteria items. This organizational structure is best described as a tree structure where Assessment Area items are the parent nodes of related Element items, and Element items are the parent nodes of related Criteria items. Within the interface, as the survey definition is built, the corresponding tree structure is displayed in the main area on the left side of the *Survey Setup* tab (see figure 2-7). Detailed instructions on how to create these different Assessment Area, Element, and Criteria tree components are provided in the sections below.

Defining Assessment Area Items

Within a survey definition, Assessment Area items are defined as broad categories of a key transportation asset management area for which a strategic assessment is to be conducted. Note that these Assessment Area items are automatically assigned capital letter key ID values (e.g., A, B, C, D, and so on), and are displayed as level 1 items in the survey definition tree structure.

To create or edit the list of Assessment Area items within the current survey, click the “Manage Assessment Area Items” button in the “Edit Tree Items” frame on the *Survey Setup* tab. This action opens the *Manage Assessment Area List* dialog shown in figure 2-10. Note: the “Manage ‘Assessment Area’ Items” button will not be visible when the “Self Assessment (FIXED)” survey is the current survey. This is because the “Self Assessment (FIXED)” survey is not editable.

In the “Assessment Area’ List” frame on this dialog box, the following four columns of data are displayed:

- **“ID” column**—Displayed ID’s are unique, sequential, capital letters that are assigned to each item in the list (e.g., A, B, C, D, and so on). Note: the order of these ID values will always reflect the order of the items in the list (e.g., “A” will always be associated with the first item in the list, “B” will always be assigned to the second item, “C” to the third item, and so on).
- **“Assessment Area” column**—The user-defined description for the Assessment Area item.

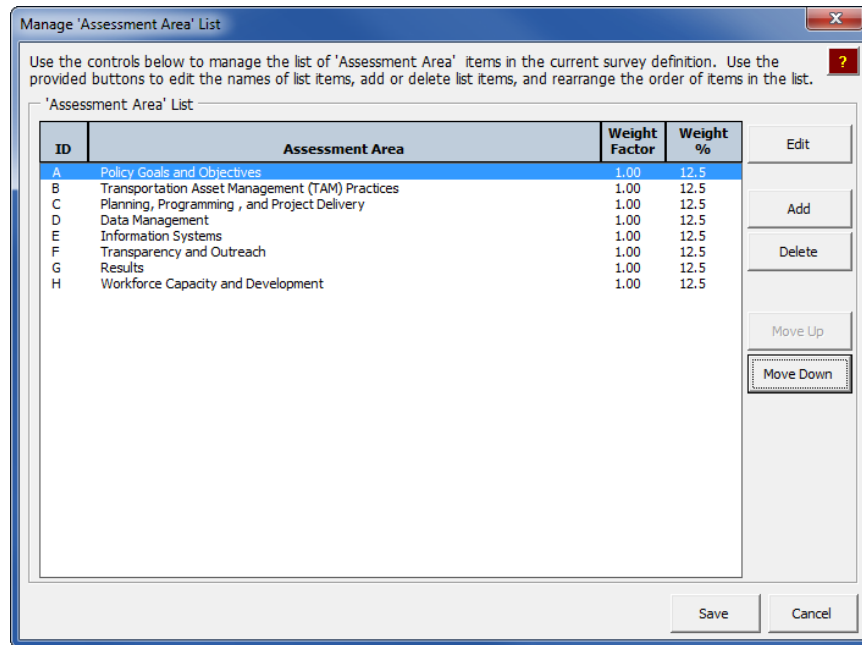


Figure 2-10. Example of the *Manage 'Assessment Area' List* dialog box.

- **“Weight Factor” column**—The user-defined weight factor for the Assessment Area item. Note that the entered weight factor values can be any number, and that it is the relative difference between assigned weight factors that is used to determine weighted averages (e.g., an Assessment Area item assigned a weight factor of 4.0 is deemed four times as important as an Assessment Area item assigned a weight factor of 1.0).
- **“Weight %” column**—The relative computed percentage of each weight factor to the sum of all user-defined weight factors. For example, in figure 2-10, each of the eight individual weight factors is 1.00. Therefore, during weight average computations, each Assessment Area is assigned a weight of 1/8 (or 0.125), which translates into 12.5%.

Several buttons are provided on the *Manage 'Assessment Area' List* dialog that allow the user to define the final Assessment Area list. The function of each of these buttons is described below:

- **“Edit” button**—Allows you to edit the details of the currently selected Assessment Area item in the list. Clicking the “Edit” button opens the *Edit New 'Assessment Area' Item* dialog box displayed in figure 2-11. Use the provided text boxes in the *Edit New 'Assessment Area' Item* dialog box to edit the current detailed description and weight factor.
- **“Add” button**—Adds a new Assessment Area item to the list. Clicking the “Add” button opens the *Add New 'Assessment Area' Item* dialog box displayed in figure 2-12. For each Assessment Area item that is added, you must define a detailed description and assign a weight factor.
- **“Delete” button**—Deletes the currently selected Assessment Area item from the list.

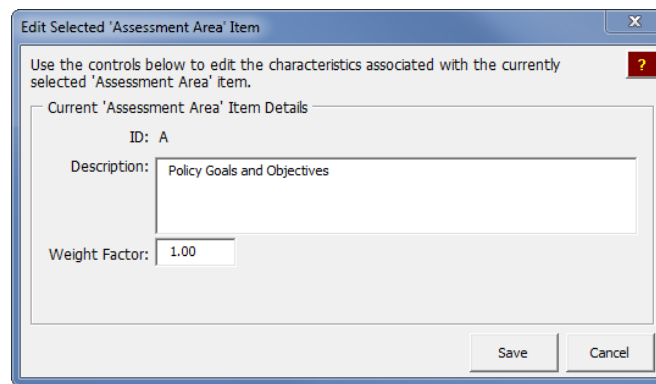


Figure 2-11. Example of the *Edit Selected 'Assessment Area' Item* dialog box.

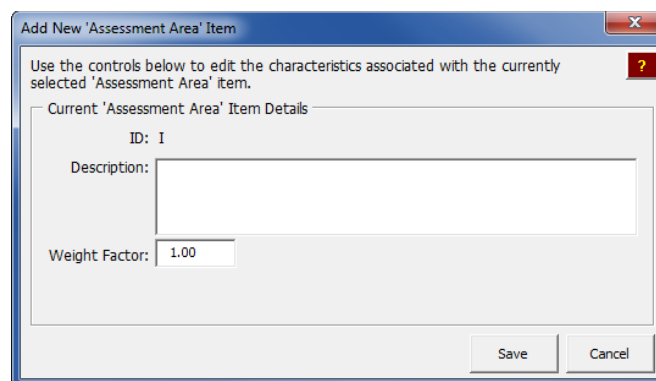


Figure 2-12. Example of the *Add New 'Assessment Area' Item* dialog box.

- **“Move Up” button**—Moves the currently selected Assessment Area item up one spot in the list. Note that the assigned capital letter ID values (i.e., A, B, C, D, and so on) will always reflect the order of the list, and will not move with the descriptions and weight factors.
- **“Move Down” button**— Moves the currently selected Assessment Area item down one spot in the list. Note that the assigned capital letter ID values (i.e., A, B, C, D, and so on) will always reflect the order of the list, and will not move with the descriptions and weight factors.
- **“Save” button**—Saves any current changes to the Assessment Area list, and closes the *Manage 'Assessment Area' List* dialog box.
- **“Cancel” button**—Closes the *Manage 'Assessment Area' List* dialog box without saving any of the current changes.

Defining Element Items

Within a survey definition, Element items are defined as subsets of an Assessment Area that have a list of Criteria items associated with it. These are referred to as level 2 items within the survey tree structure. Note that these Element items are automatically assigned key ID values that are a combination of the parent Assessment Area item capital letter ID and the row number within the Assessment Area item's Element list (e.g., A.1, A.2, A.3, and so on). Also note that these Element IDs are displayed alongside each level 2 Element item in the survey definition tree structure.

To create or edit a list of Element items associated with a given Assessment Area item, start by selecting the parent Assessment Area item in the *Survey Setup* tab's survey definition tree structure. Once an Assessment Area item is selected, the “Edit the Current Node's Element List” button will become visible in the “Edit Tree Items” frame on the *Survey Setup* tab. Click this button to open the *Manage 'Element' List* dialog shown in figure 2-13. Note: the “Edit the Current Node's 'Element' List” button will not be visible when the “Self Assessment (FIXED)” survey is the *current* survey. This is because the “Self Assessment (FIXED)” survey is not editable.

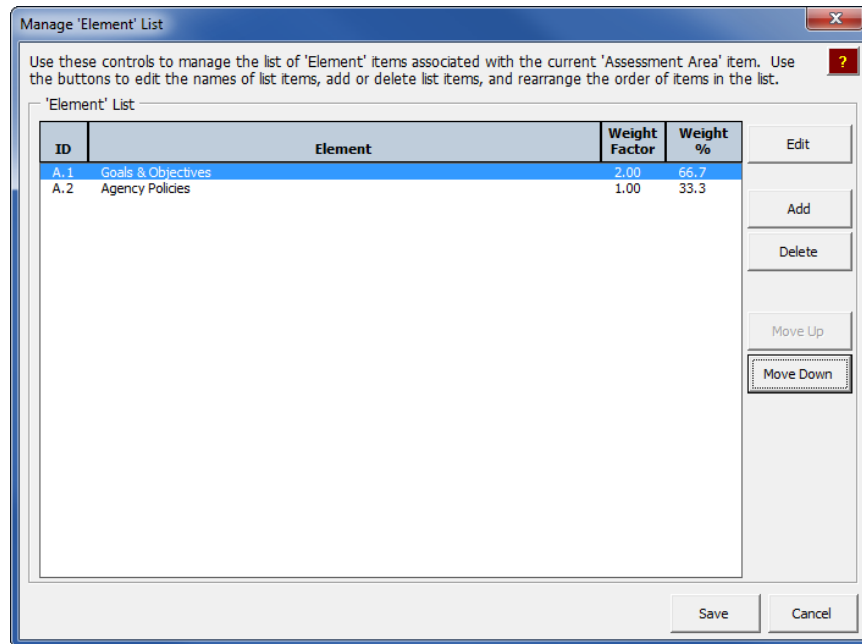


Figure 2-13. Example of the *Manage 'Element' List* dialog box.

In the “‘Element’ List” frame in this dialog box, the following four columns of data are displayed:

- **“ID” column**—Displayed ID’s are unique, sequential combinations of the parent Assessment Area capital letter ID, and the row number of each item in the list (e.g., A.1., A.2., A.3., and so on). Note: the numerical portion of the assigned ID values will always reflect the row number of the items in the list.
- **Element**—The user-defined description for the Element item.
- **“Weight Factor” column**— The user-defined weight factor for the Element item. Similar to Assessment Area weight factors, entered Element weight factor values can be any number; furthermore, it is the relative difference between assigned weight factors that is used to determine weighted averages (e.g., an Element item assigned a weight factor of 4.0 is deemed four times as important as an Element item assigned a weight factor of 1.0).
- **“Weight %” column**—The relative computed percentage of each weight factor to the sum of all user-defined weight factors. For example, in figure 2-13, the weight factor assigned to item A.1 is 2.00, while the total sum of all weight factors is $2.00 + 1.00 = 3.00$. Therefore, during weight average computations, the

weight percentage of the A.1 item is computed as $2.00/3.00 = 0.667$; which translates to a weight percentage of 66.7%.

Several buttons are provided on the *Manage 'Element' List* dialog box that allow you to define the final Element list. The function of each of these buttons is described below:

- **“Edit” button**—Allows you to edit the details of the currently selected Element item in the list. Click the “Edit” button to open the *Edit Selected 'Assessment Area' Item* dialog box (see figure 2-14). Use the provided text boxes to edit the current detailed description and weight factor.

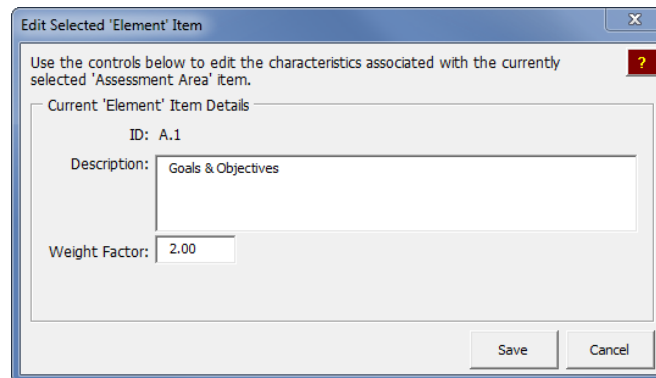


Figure 2-14. Example of the *Edit Selected 'Element' Item* dialog box.

- **“Add” button**—Adds a new Element item to the list. Click the “Add” button to open the *Add New 'Element' Item* dialog box displayed in figure 2-15. Note that a new item added to the Element list is appended to the end of the current list, and the ID of the new item automatically reflects the row number in the list. For each Element item that is added, you must define a detailed description, and assign a weight factor.

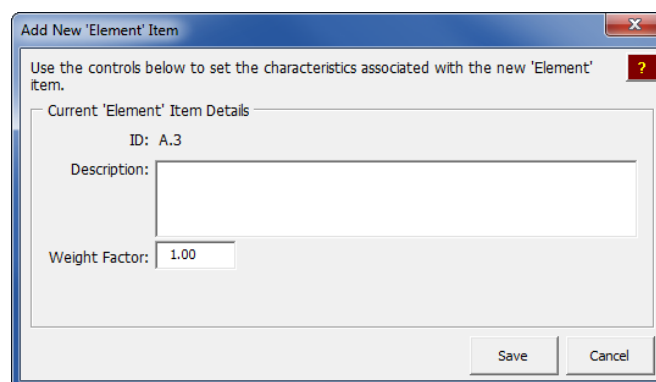


Figure 2-15. Example of the *Add New 'Element' Item* dialog box.

- **“Delete” button**—Deletes the currently selected Element item from the list.
- **“Move Up” button**—Moves the currently selected Element item up one spot in the list. Note that the assigned Element ID values (e.g., A.1, A.2, A.3, A.4, and so on) will always reflect the order of the list, and will not move with the descriptions and weight factors.

- **“Move Down” button**—Moves the currently selected Element item down one spot in the list. Note that the assigned Element ID values (e.g., A.1, A.2, A.3, A.4, and so on) will always reflect the order of the list, and will not move with the descriptions and weight factors.
- **“Save” button**—Saves any current changes to the Element list, and closes the *Manage ‘Element’ List* dialog box.
- **“Cancel” button**—Closes the *Manage ‘Element’ List* dialog box without saving any of the current changes.

Defining Criteria Items

Within a survey definition, Criteria items are defined as specific statements or questions that are individually assessed and weighted in order of importance (if desired) to determine the gap between target and current ratings. These are referred to as level 3 items within the survey tree structure. Note that these Criteria items are automatically assigned key ID values that are a combination of the parent Element item ID and the row number within the Element item’s Criteria list (e.g., A.1.1, A.1.2, A.1.3, and so on). Note that these Element IDs are displayed alongside each level 3 Criteria item in the survey definition tree structure.

To create or edit a list of Criteria items associated with a given Element item, start by selecting the parent Element item in the *Survey Setup* tab’s survey definition tree structure. Once an Element item is selected, the “Edit the Current Node’s ‘Criteria’ List” button will become visible in the “Edit Tree Items” frame on the *Survey Setup* tab. Click this button to open the *Manage ‘Criteria’ List* dialog box shown in figure 2-16. Note: the “Edit the Current Node’s ‘Criteria’ List” button will not be visible when the “Self Assessment (FIXED)” survey is the current survey. This is because the “Self Assessment (FIXED)” survey is not editable.

In the “Criteria’ List” shown in this dialog box, the following five columns of data are displayed:

- **“ID” column**—Displayed ID’s are unique combinations of the ID associated with the parent Element item and the row number of each Criteria item in the list (e.g., A.1.1, A.1.2, A.1.3, and so on). Note: the numerical portion of the assigned ID values will always reflect the row number of the items in the list.
- **“Criteria” column**—The user-defined description for the Criteria item.
- **“Weight Factor” column**— The user-defined weight factor for the Criteria item. Similar to the Assessment Area and Element weight factors, the entered Criteria weight factor values can be any number, but it is the relative difference between assigned weight factors that is used to determine weighted averages (e.g., an Criteria item assigned a weight factor of 4.0 is deemed four times as important as an Criteria item assigned a weight factor of 1.0).

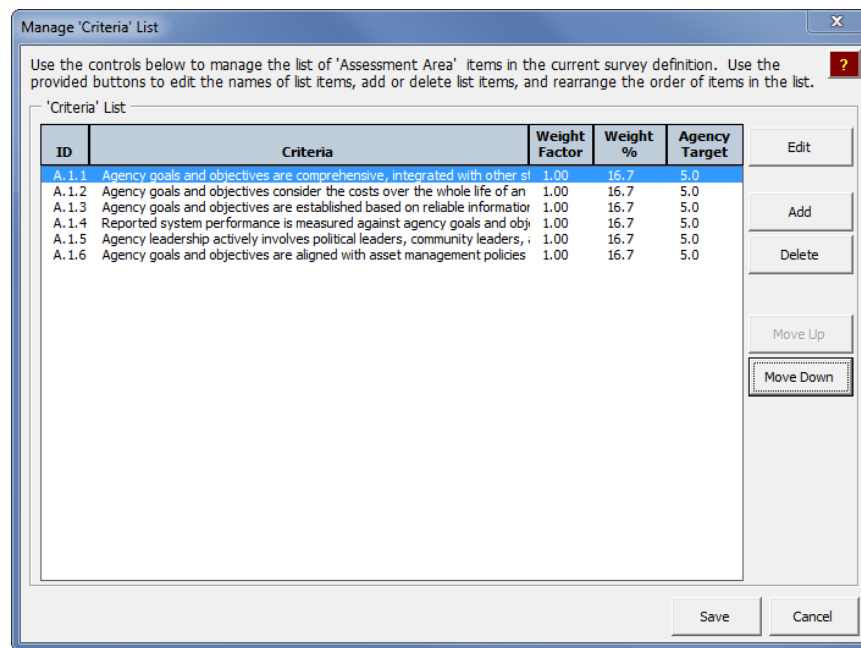


Figure 2-16. *Manage ‘Criteria’ List* dialog box.

- **“Weight %” column**—The relative computed percentage of each weight factor to the sum of all user-defined weight factors. For example, in figure 2-16, a weight factor of 1.00 is assigned to each of the six list items; resulting in a sum of all weight factors equal to 6.00. Therefore, during weight average computations, the weight percentage of each of the list items is computed as $1.00/6.00 = 0.167$, which translates into 16.7%.
- **“Agency Target” column**—Defined agency target ratings (integer values between 1 and 5, inclusive) associated with each Criteria item. These target ratings represent the current numerical rating goals for each included Criteria item.

Several buttons are provided on the *Manage ‘Criteria’ List* dialog box that allow you to define the final Criteria list for the currently selected Element item. The function of each of these buttons is described below:

- **“Edit” button**—Allows you to edit the details of the currently selected Criteria item in the list. Clicking the “Edit” button opens the *Edit Selected ‘Criteria’ Item* dialog box shown in figure 2-17. Use the text boxes to edit the current detailed description, weight factor, and select the appropriate agency target rating.
- **“Add” button**—Adds a new Criteria item to the list. Clicking the “Add” button opens the *Add New ‘Criteria’ Item* dialog box displayed in figure 2-18. Note that a new item added to the Criteria list is appended to the end of the current list. Therefore, the ID that is automatically assigned to the new item reflects the new item’s position in the list. For each Criteria item that is added, you must define a detailed description, assign a weight factor, and define an agency target rating.

Defined agency target ratings represent the current achievable numerical rating *goals* (from the Agency’s perspective) for each included Criteria item. When conducting a gap analysis, target ratings (i.e., integer values between 1 and 5,

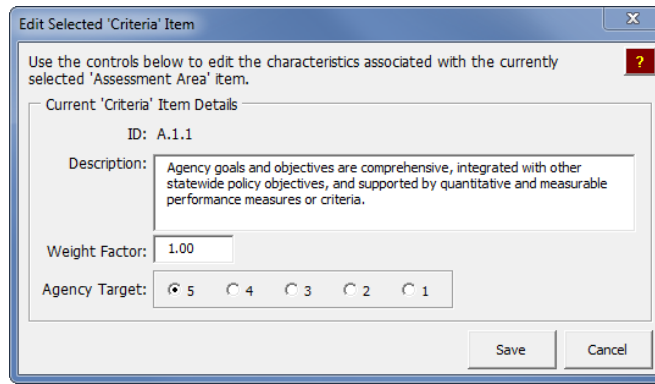


Figure 2-17. Example of the *Edit Selected 'Criteria' Item* dialog.

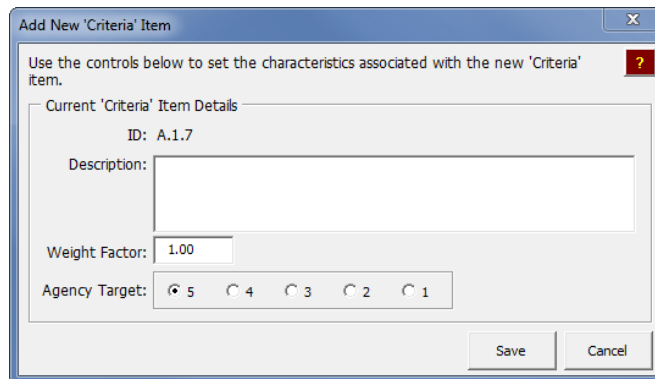


Figure 2-18. Example of the *Add New 'Criteria' Item* dialog box.

inclusive) are compared to current ratings to determine gaps (i.e., differences between target and current ratings). However, the Gap Analysis Tool provides two methods of setting those target ratings before a User Survey Workbook is created and delivered to raters. These two methods consist of 1) using agency targets, or 2) asking the individual raters to provide their own target ratings. Because the survey preparer has the option of choosing one of these methods at the time of User Survey Workbook preparation, the Gap Analysis Tool requires that an agency target be defined with each Criteria during the survey definition process. To set the agency target associated with the current Criteria item, select the appropriate integer from the provided *Agency Target* radio buttons in the *Add New 'Element' Item* dialog box.

- **“Delete” button**—Deletes the currently selected Criteria item from the list.
- **“Move Up” button**—Moves the currently selected Criteria item up one spot in the list. Note that the assigned Criteria ID values (e.g., A.1.1, A.1.2, A.1.3, A.1.4, and so on) will always reflect the order of the list, and will not move with the descriptions, weight factors, and agency targets.
- **“Move Down” button**—Moves the currently selected Criteria item down one spot in the list. Note that the assigned Criteria ID values (e.g., A.1.1, A.1.2, A.1.3, A.1.4, and so on) will always reflect the order of the list, and will not move with the descriptions, weight factors, and agency targets.

- **“Save” button**—Saves any current changes to the Criteria list, and closes the *Manage ‘Criteria’ List* dialog box.
- **“Cancel” button**—Closes the *Manage ‘Criteria’ List* dialog box without saving any of the current changes.

Tree View Control

The “Tree View Control” frame on the *Survey Setup* tab contains controls that let the user interact with and define the look of the survey definition tree control on the *Survey Setup* tab. Detailed descriptions of these controls are provided below.

Setting the Display Format

When viewing the survey definition tree view control, the user has control over what data gets provided with each tree item (i.e., tree node). The four format options are the following:

- **Text only**—Only the user-defined Assessment Area, Element, and Criteria item descriptions are displayed (i.e., no associated numerical data is displayed with the descriptions).
- **Weight factors (WF)**—The user-defined weight factors are displayed in parenthesis next to the user-defined Assessment Area, Element, and Criteria item descriptions.
- **Weight %**—The computed weight factor percentages (based on the user-defined weight factors) are displayed in parenthesis next to the user-defined Assessment Area, Element, and Criteria item descriptions.
- **Agency Targets (AT)**—The user-defined agency target ratings are displayed in parenthesis next to the user-defined Criteria item descriptions. Note: that “(AT = ‘N/A’)” is displayed next to the Assessment Area and Element items as the agency targets are only defined for Criteria items.



You can use the provided radio buttons in the “Display Format” frame to set the desired display format of the survey definition tree view control.


Expand All and Collapse All Buttons

For the user’s convenience, the following two buttons are provided in the “Tree View Control” frame to apply two common formatting scenarios to the survey definition tree view control:

- **“Expand All” button**—Click this button to format the survey definition tree view control so that all Assessment Area, Element, and Criteria items in the tree are visible.
- **“Collapse All” button**—Click this button to format the survey definition tree view control so that all only the Assessment Area list is visible (i.e., all Element and Criteria items in the tree are hidden).

Printing and Exporting a Survey Definition

To print or export the current survey definition, use the   buttons in the lower right hand corner of the *Survey Setup* tab. Details about each output method are provided below:

- **Print**—Click the print button (i.e., ) to open the *Print: Survey Definition* dialog box shown in figure 2-19. To print the current survey definition from this dialog, select an available printer from the provided list and click the “Print” button. To close the dialog box without printing, click the “Close” button.

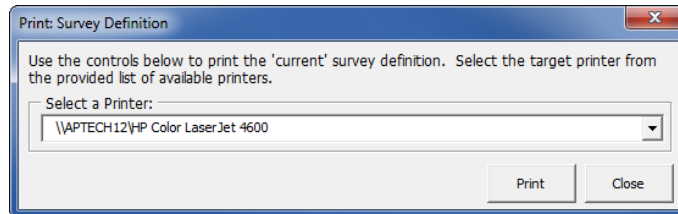



Figure 2-19. Example of the *Print: Survey Definition* dialog box.

- **Export to an Excel Workbook**—Click the export button (i.e., ) to open the *Export: Survey Definition* dialog box shown in figure 2-20. From the *Export: Survey Definition* dialog box, click the “Export” button to open the *Define a Name for the Current Output Workbook* dialog box shown in figure 2-21. Use the controls in this dialog box to 1) browse to the folder to which you want to export the survey definition, and 2) enter the name for the Excel output file that will be created. Click the “Save” button to create and save the output Excel workbook. Click the “Cancel” button to cancel the export procedure.

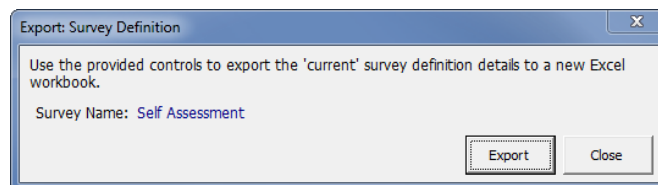


Figure 2-20. Example of the *Export: Survey Definition* dialog box.

Survey Management Tab

The *Survey Management* tab contains controls that allow you to accomplish the following two important analysis-related tasks:

1. Create customized User Survey Workbooks that can be distributed to different groups of selected raters.
2. Import user rating data from completed User Survey Workbooks into the Gap Analysis Tool in preparation for analysis.

To accomplish these needed tasks, the *Survey Management* tab is divided into two subtabs: *Distribute Surveys* and *Import Surveys*. The contents and intended function of each of these subtabs is discussed in the sections below.

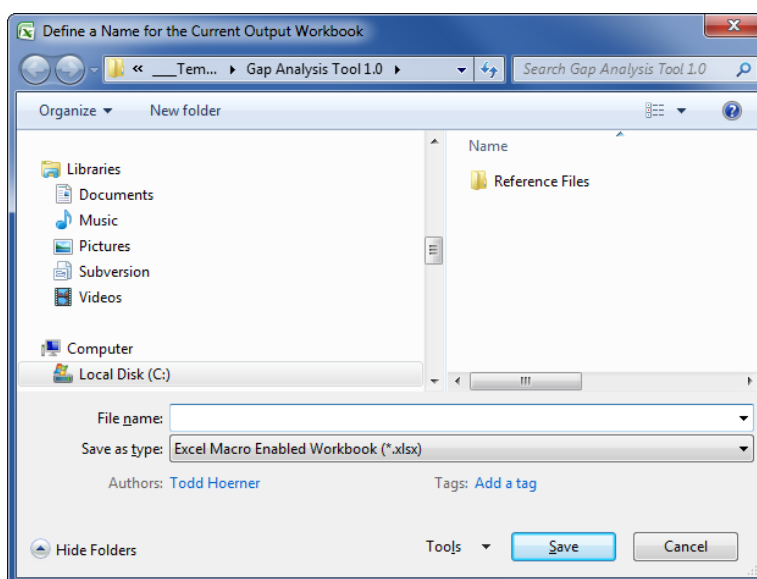


Figure 2-21. Example of the *Define a Name for the Current Output Workbook* dialog box.

Distribute Surveys Subtab

Because all Criteria within a survey definition do not necessarily apply to all users who may be asked to provide feedback, the concept of *survey groups* was introduced within the Gap Analysis Tool. A *survey group* is defined as a category of individual raters who have similarities in their positions, responsibilities, and/or areas of expertise (e.g., Planning and Programming). The main function of the *Distribute Survey* subtab is to setup and create survey group-specific User Survey Workbooks that can be distributed to selected agency personnel. Specifically, the provided controls on this tab allow you to:

1. Define and manage a list of *survey groups*.
2. Select the specific Criteria (from the current survey definition) that are associated with each survey group.
3. Set the target definition method that gets used when a User Survey Workbook is created.
4. Create survey group-specific User Survey Workbooks that can be distributed to solicit user ratings from selected agency personnel.

An example of the *Survey Management* tab with the *Distribute Surveys* subtab displayed is shown in figure 2-22. More details on each of the specific *Distribute Survey* subtab functions are provided below.

Managing the Survey Group List

To manage the master list of *Survey Groups*, click the “Manage ‘Survey Group’ List” button. This action opens the *Manage Current Survey’s ‘Survey Group’ List* dialog box shown in figure 2-23.

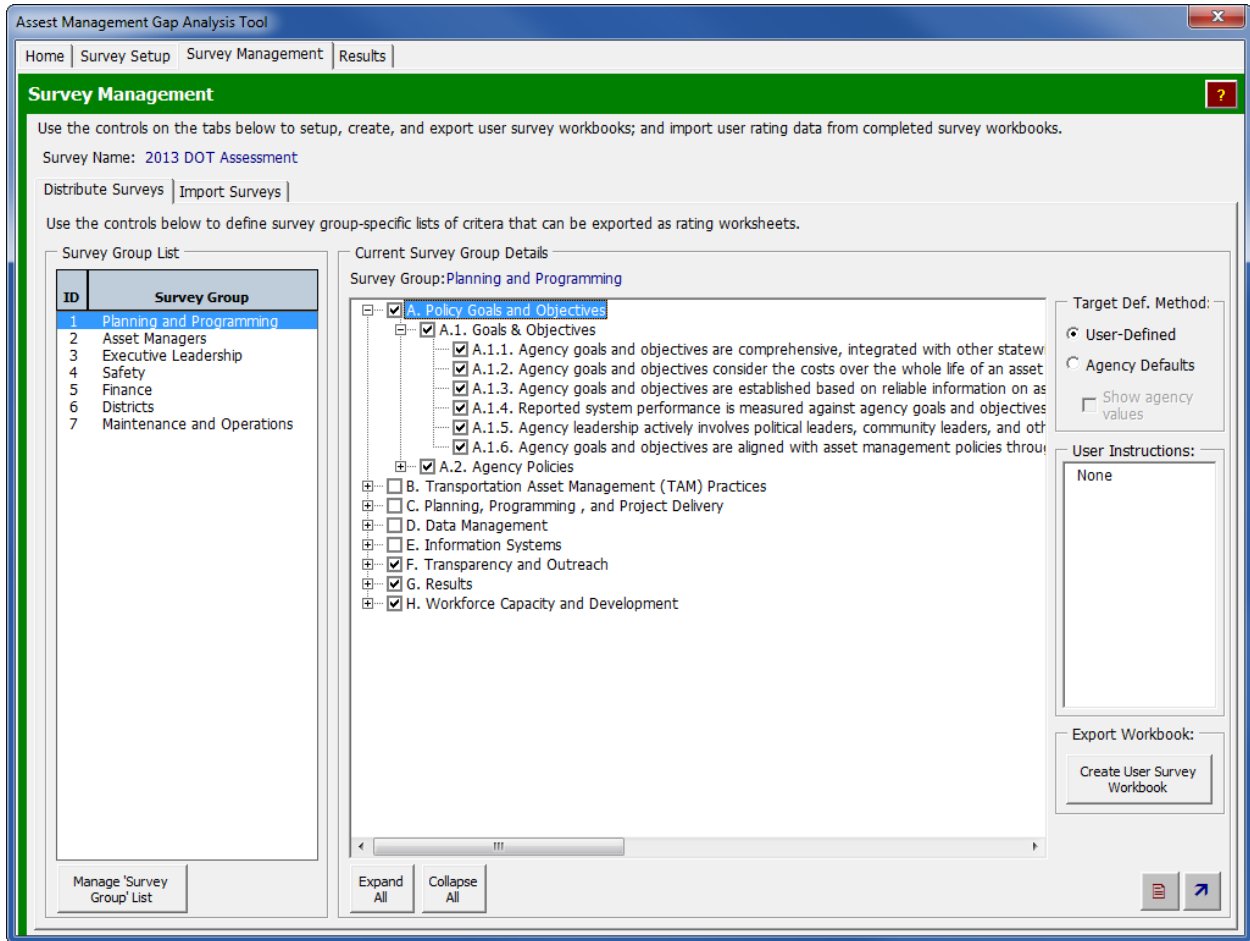


Figure 2-22. Example of the *Survey Management* tab with the *Distribute Surveys* subtab displayed.

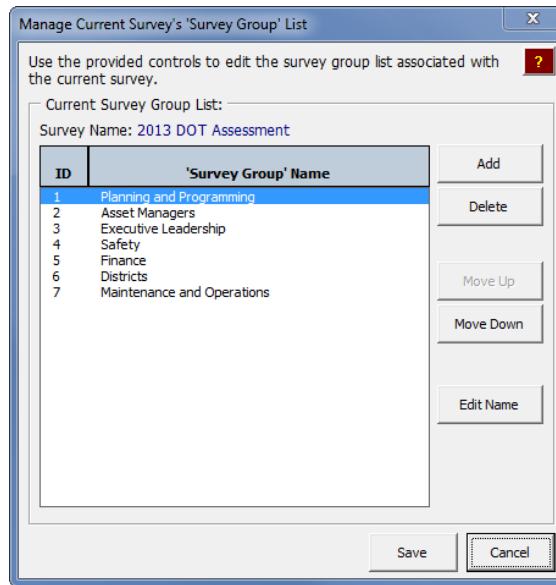


Figure 2-23. Example of the *Manage Current Survey's Survey Group List* dialog box.

The following list provides more details about the available controls on the *Manage Current Survey's 'Survey Group' List* dialog box:

- **“Add” button**—Adds a new survey group to the end of the survey group list. When this button is clicked the *Add New 'Survey Group'* dialog box (shown in figure 2-24) is displayed. Enter a name for the new survey group and click the “Save” button to add the survey group to the list.

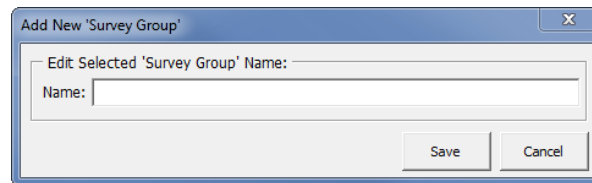


Figure 2-24. Example of the *Add New 'Survey Group'* dialog box.

- **“Delete” button**—Deletes the currently selected survey group from the list. Upon clicking this button, you will be asked to confirm your deletion before the survey group is deleted from the list.
- **“Move Up” button**—Moves the currently selected survey group up one spot in the list.
- **“Move Down” button**—Moves the currently selected survey group down one spot in the list.
- **“Edit Name” button**—Opens the *Edit Current 'Survey Group' Name* dialog box (shown in figure 2-25), which allows you to change the name of the currently selected survey group.

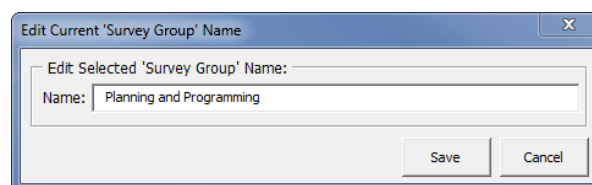


Figure 2-25. Example of the *Edit Current 'Survey Group' Name* dialog box.

- **“Save” button**—Accepts any made changes to the survey group list, and closes the *Manage Current Survey's 'Survey Group' List* dialog box.
- **“Cancel” button**—Closes the *Manage Current Survey's 'Survey Group' List* dialog box without saving any changes.

Defining the Survey Group Details

Within the Gap Analysis Tool, the Tool Administrator has the capability to associate a *custom* list of Criteria from the survey definition with each defined and named survey group. This is an important function within the tool because it allows you to create and distribute survey group-specific User Survey Workbooks that contain **only** those Criteria that are of interest to a particular survey group.

To specify which Criteria get associated with each survey group, use the following step-by-step instructions:

1. Select the survey group of interest from the “Survey Group List.”
2. Use the checkboxes in the “Current Survey Group Details” frame of the *Distribute Surveys* subtab to select the level 3 Criteria you want to associate with the currently selected survey group.

Note that clicking the “Expand All” button will make visible all Criteria in the “Current Survey Group Details” frame, while clicking the “Collapse All” button will hide all level 2 Element and level 3 Criteria items in the “Current Survey Group Details” frame.

Setting the Target Definition Method for an Exported User Workbook

Before creating a User Survey Workbook for distribution, you must set the target definition method by using the controls in the “Target Def. Method” frame. The target definition method determines what type of target values get exported with a user workbook. Specifically, the following three target value definition options are available for use:

1. Use user-defined target ratings—The first of the three options is to ask the user to give estimates for both target and current ratings for assigned Criteria. Using this approach, for a given Criteria users give their opinions on what level they think the agency can achieve (i.e., the target rating) and on what level they think the agency is currently achieving (i.e., the current rating).
2. Use agency default target ratings, but hide them from the user in the User Survey Workbook—The second option is to use the agency default target ratings for each Criteria (i.e., those user-defined target ratings defined during the survey definition setup steps), but not show those agency values in the exported User Survey Workbook. To use this option, select the “Agency Defaults” option in the “Target Def. Method” frame, but keep the “Show agency values” checkbox unchecked.
3. Use agency default target ratings, and show them to the user in the User Survey Workbook—The third option is to use the agency default target ratings defined for each Criteria (i.e., those defined during the survey definition setup steps), and show them to the user in the exported User Survey Workbook. To use this option, select the “Agency Defaults” option in the “Target Def. Method” frame, and check the “Show agency values” checkbox.

Defining User Instructions for an Exported User Workbook

Before creating a User Survey Workbook for distribution, enter any survey group-specific instructions in the “User Instructions” text box. Any instructions entered here (when the User Survey Workbook is created) will be visible to the user when the exported User Survey Workbook is opened.

Creating a User Survey Workbook

After selecting a survey group, defining the survey group details, setting the target definition method, and entering any user instructions, click the “Create User Survey

Workbook” button to create and export a User Survey Workbook for distribution. Clicking this button opens the *Define a Name for the New User Survey Workbook* dialog box (shown in figure 2-26) that is used to define a file name and save location for the User Survey Workbook being created. See Chapter 3 for information on using produced User Survey Workbooks.

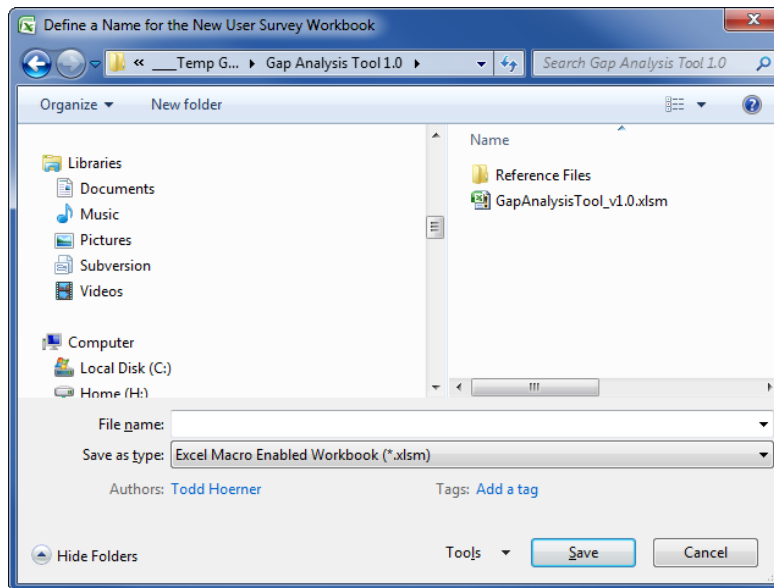





Figure 2-26. Example of the *Define a Name for the New User Survey Workbook* dialog box.

Note: remember that the created User Survey Workbook is specific to a selected survey group. That is, the exported User Survey Workbook will contain **only** those Criteria items that are selected in the “Current Survey Group Details” area for the current survey group.

Printing and Exporting Survey Group Information

To print or export the survey group details information, use the   buttons in the lower right hand corner of the *Survey Management* tab’s *Distribute Surveys* subtab. Details about each output method are provided below:


- **Print**—Click the print button (i.e., ) to open the “Print” dialog box that allows you to select an available printer, and print a summary of the Criteria associated with the currently selected survey group. The printed output shows a summary of the survey definition, with one column of information that shows whether or not the current Criteria item is included in the current survey group. An example of the printed output is shown in figure 2-27.

Gap Analysis Tool Output: Survey Group Definition Details

Survey Name: Self Assessment
 Survey Group: Planning and Programming

'Assessment Area' Information		'Element' Information		'Criteria' Information		Included In Survey Group
Key ID	Description	Key ID	Description	Key ID	Description	
A	Policy Goals and Objectives	A.1	Goals & Objectives	A.1.1	Agency goals and objectives are comprehensive, integrated with other statewide policy objectives, and supported by quantitative and measurable performance measures or criteria.	Yes
				A.1.2	Agency goals and objectives consider the costs over the whole life of an asset and encourage strategies to lower life-cycle costs, to reduce agency risk, and to provide long-term benefits.	Yes
				A.1.3	Agency goals and objectives are established based on reliable information on asset condition and public perceptions.	Yes
				A.1.4	Reported system performance is measured against agency goals and objectives.	Yes
				A.1.5	Agency leadership actively involves political leaders, community leaders, and other policy makers to establish system performance expectations that consider funding constraints, legislated requirements, public interests, and other similar factors.	Yes
				A.1.6	Agency goals and objectives are aligned with asset management policies through the asset management plan.	Yes
		A.2	Agency Policies	A.2.1	Agency policies encourage a business-oriented, customer-focused approach to asset management.	Yes
				A.2.2	Resource allocation decisions among programs and across geographic regions are based on expected performance rather than historical splits or formulas that do not correlate with an objective indication of system condition.	Yes
				A.2.3	Asset management systems are designed to provide meaningful information on policy choices and consequences.	Yes
				A.2.4	Political pressure to influence resource allocation decisions is met with objective information related to system performance expectations.	Yes
				A.2.5	An asset management policy is in place to guide investment decisions in transportation assets.	Yes

Figure 2-27. Example of the printed survey group details information.

- Export to an Excel Workbook**—Click the export button (i.e., ) to open the *Export* dialog box that allows you to export survey group details to a new Excel workbook of your choosing. In the exported output the survey group details information is included for **all** survey groups in the *Survey Management* tab's *Distribute Survey* subtab's "Survey Group List." An example of the exported survey group details output is shown in figure 2-28.

'Assessment Area' Information		'Element' Information		'Criteria' Information	Survey Group						
Key ID	Description	Key ID	Description	Description	Planning and Programming	Asset Managers	Executive Leadership	Safety	Finance	Districts	Maintenance and Operations
A	Policy Goals and Objectives	A.1	Goals & Objectives	A.1.1 Agency goals and objectives are comprehensive, integrated with other statewide policy objectives, and supported by quantitative and measurable performance measures or criteria.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
				A.1.2 Agency goals and objectives consider the costs over the whole life of an asset and encourage strategies to lower life-cycle costs, to reduce agency risk, and to provide long-term benefits.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.1.3 Agency goals and objectives are established based on reliable information on asset condition and public perceptions.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.1.4 Reported system performance is measured against agency goals and objectives.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.1.5 Agency leadership actively involves political leaders, community leaders, and other policy makers to establish system performance expectations that consider funding constraints, legislated requirements, public interests, and other similar factors.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.1.6 Agency goals and objectives are aligned with asset management policies through the asset management plan.	Yes	Yes	Yes	Yes	Yes	Yes	No
		A.2	Agency Policies	A.2.1 Agency policies encourage a business-oriented, customer-focused approach to asset management.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.2.2 Resource allocation decisions among programs and across geographic regions are based on expected performance rather than historical splits or formulas that do not correlate with an objective indication of system condition.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.2.3 Asset management systems are designed to provide meaningful information on policy choices and consequences.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.2.4 Political pressure to influence resource allocation decisions is met with objective information related to system performance expectations.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.2.5 An asset management policy is in place to guide investment decisions in transportation assets.	Yes	Yes	Yes	Yes	Yes	Yes	No
				A.2.6 Policies and procedures are in place for the rapid	Yes	Yes	Yes	Yes	Yes	Yes	No

Figure 2-28. Example of the exported survey group details information.

Import Surveys Subtab

In the Gap Analysis Tool, all imported user ratings are stored in named containers called *rating sets*. The definition of *rating sets* are important from an analysis standpoint because 1) aggregated results are always summarized by rating set, and 2) the gap analysis tool allows the user to compare aggregated results between rating sets. The main function of the *Import Surveys* subtab is to import User Survey Workbook data into the Gap Analysis Tool so that it can be analyzed and results viewed. Specifically, the provided controls on this tab allow you to:

1. Define and manage a list of *rating sets*.
2. Import and manage User Survey Workbook rating data (i.e., import user surveys, delete user surveys, and move user surveys between survey groups or rating sets).
3. View individual user survey/rating information.

Figure 2-29 shows an example of the *Survey Management* tab with the *Distribute Surveys* subtab displayed.

More details on each of the specific *Import Surveys* subtab functions are provided below.

Managing the Rating Set List

The Gap Analysis Tool allows the user to define, save, and use different named rating sets. To manage the master list of rating sets, click the “Manage ‘Rating Set’ List” button. This action opens the *Manage Current Survey’s ‘Rating Set’ List* dialog box shown in figure 2-30.

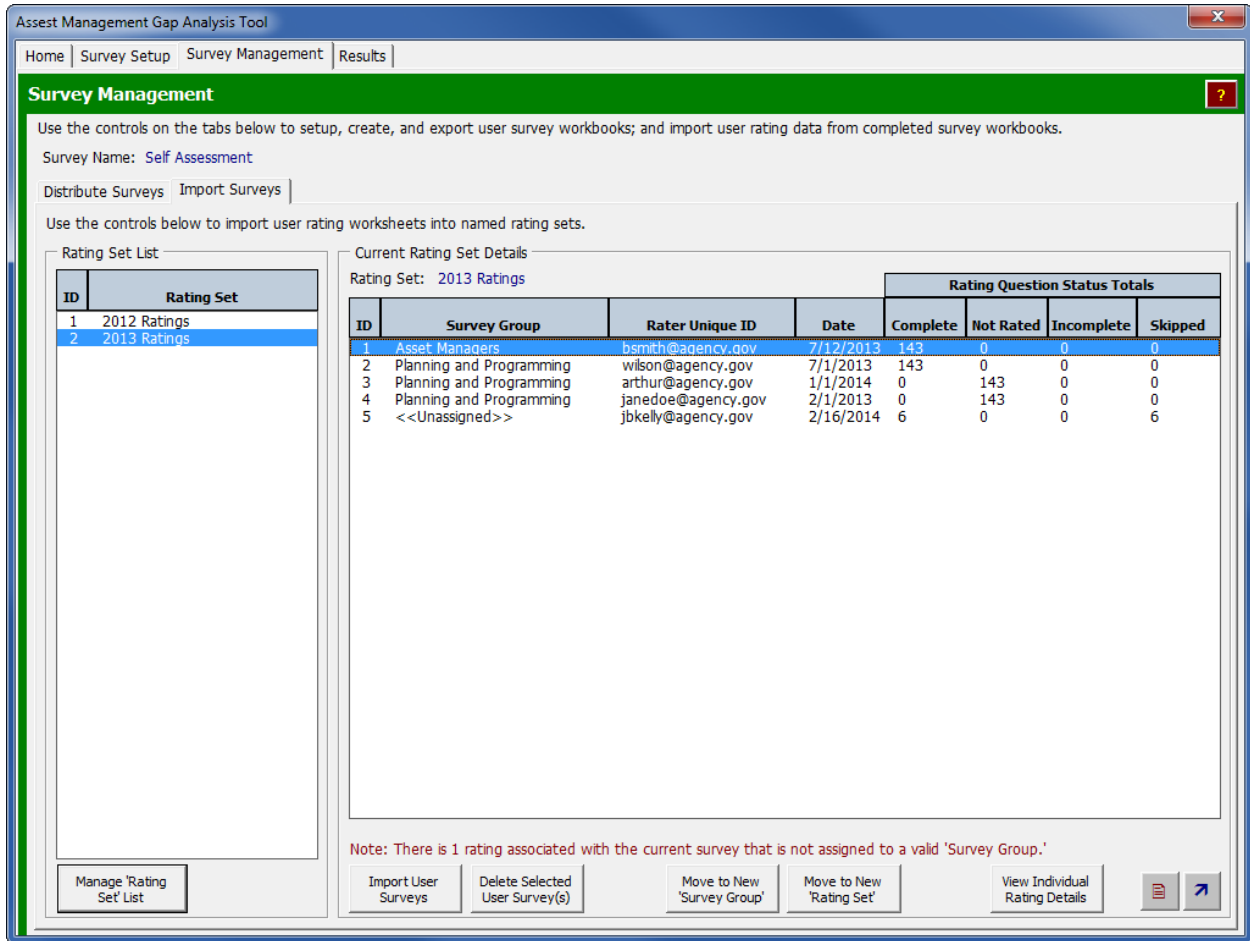


Figure 2-29. Example of the *Survey Management* tab with the *Import Surveys* subtab displayed.

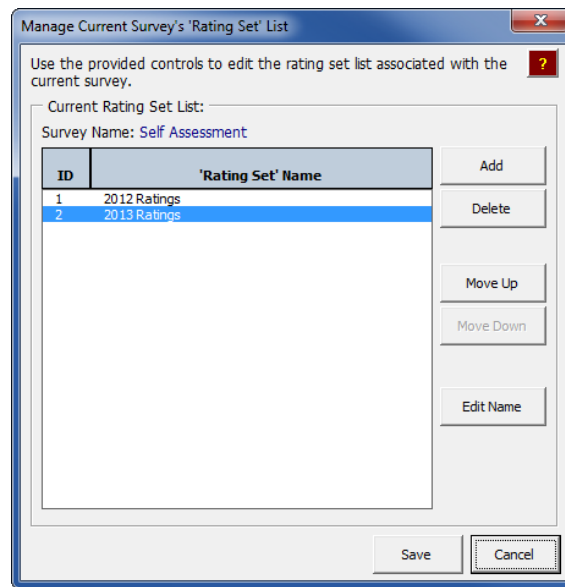


Figure 2-30. Example of the *Manage Current Survey's 'Rating Set' List* dialog box.

The following provide more details about the available controls on the *Manage Current Survey's 'Rating Set' List* dialog box:

- **“Add” button**—Adds a new rating set to the end of the rating set list. When this button is clicked the *Add New 'Rating Set'* dialog box (shown in figure 2-31) is displayed. Enter a name for the new rating set and click the “Save” button to add the rating set to the list.

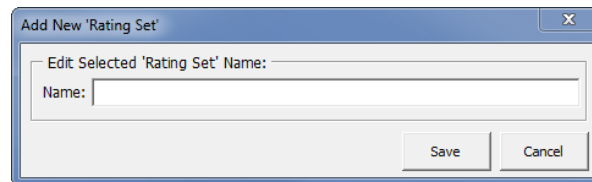


Figure 2-31. Example of the *Add New 'Rating Set'* dialog box.

- **“Delete” button**—Deletes the currently selected rating set from the list. Upon clicking this button, the warning dialog box shown in figure 2-32 is displayed asking you to confirm your deletion. Note: as the warning indicates, deleting a rating set from the rating set list will also delete all individual ratings that are associated with the rating set.

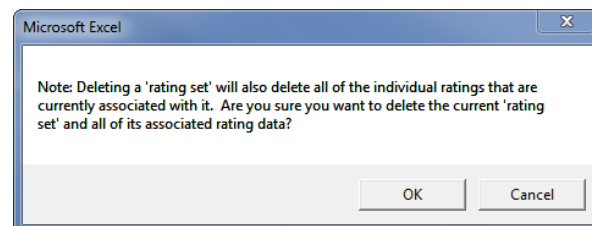


Figure 2-32. Warning dialog box that is displayed to confirm the deletion of a rating set.

- **“Move Up” button**—Moves the currently selected rating set up one spot in the list.
- **“Move Down” button**—Moves the currently selected rating set down one spot in the list.
- **“Edit Name” button**—Opens the *Edit Current 'Rating Set' Name* dialog box (shown in figure 2-33). Use the provided controls on this dialog box to change the name of the currently selected rating set.

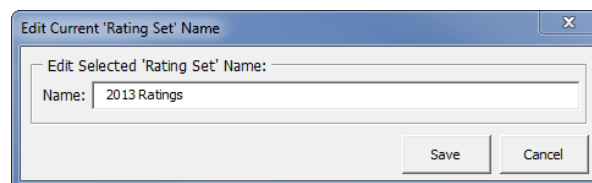


Figure 2-33. Example of the *Edit Current 'Rating Set' Name* dialog box.

- **“Save” button**—Accepts any made changes to the rating set list, and closes the *Manage Current Survey's 'Rating Set' List* dialog box.
- **“Cancel” button**—Closes the *Manage Current Survey's 'Rating Set' List* dialog box without saving any changes.

Viewing User Data for a Selected Rating Set

To view a summary of the user data associated with a given rating set, first select a rating set of interest in the “Rating Set List” area of the *Import Surveys* tab. With a rating set selected in the list, details of the individual user surveys associated with that rating set are displayed in the “Current Rating Set Details” frame. Specifically, the table contains the following columns of information:

- **“ID” column**—A numerical ID that indicates the current user survey’s position (i.e., row number) in the “Current Rating Set Details” list.
- **“Survey Group” column**—The survey group associated with the individual user survey.
- **“Rater Unique ID” column**—The rater-defined unique ID associated with the individual user survey. Note: rater unique ID’s must be unique identifiers of raters; therefore, it is recommended that rater e-mail addresses (or similar unique identifiers) be used for this ID.
- **“Date” column**—The rater-defined date that indicates when the individual user survey was completed.
- **“Rating Question Status Totals” columns**—These columns in the table provide Criteria rating counts for the “Complete,” “Not Rated,” “Incomplete,” and “Skipped” status types.
 - **Rating Question Status Totals “Complete” column**—The number of Criteria in the current individual user survey with a status = “Complete.” This is a count of the number of Criteria that the user provided the requested actual ratings (and target ratings if user-defined target values were requested).
 - **Rating Question Status Totals “Not Rated” column**—The number of Criteria in the current individual user survey with a status = “Not Rated.” This is a count of the number of Criteria in the User Survey Workbook where the rater did not provide the requested actual rating values (and target rating values if user-defined targets were requested).
 - **Rating Question Status Totals “Incomplete” column**—The number of Criteria in the current individual user survey where the rater had been asked to provide both a target rating and current rating, but has only provided one.
 - **Rating Question Status Totals “Skipped” column**—The number of Criteria in the current individual user survey that were intentionally skipped by the rater.

Importing User Surveys

Once users have completed their ratings in their User Survey Workbooks, the data needs to be imported into a defined rating set before it can be analyzed. To import completed user survey data, use the following step-by-step procedure:

1. Select a rating set in the “Rating Set List” into which you want to import new User Survey Workbook data.

- Click the “Import User Surveys” button. This action opens the *Survey Management – Import Surveys* dialog box shown in figure 2-34. As a reminder, this dialog box provides feedback to the user about the current “Survey Name” and “Target Rating Set” (i.e., the rating set into which the data will be imported).

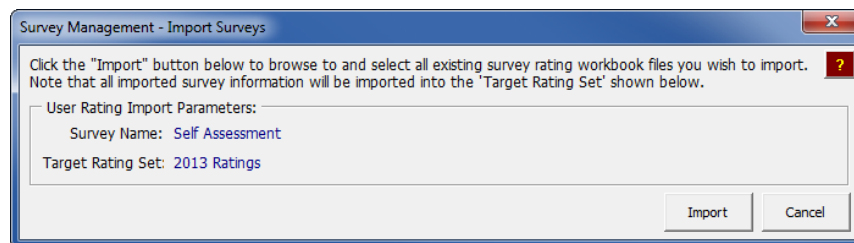


Figure 2-34. Example of the *Survey Management – Import Surveys* dialog box.

- Click the “Import” button on the *Survey Management – Import Surveys* dialog box. This action opens the *Select Existing User Survey Workbooks to Import* dialog box shown in figure 2-35.

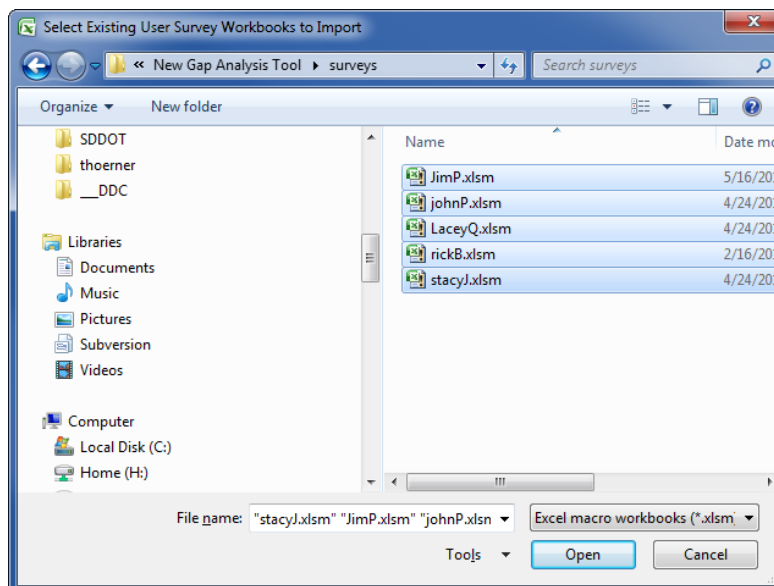


Figure 2-35. Example of the *Select Existing User Survey Workbooks to Import* dialog box.

- Use the controls in the *Select Existing User Survey Workbooks to Import* dialog box to browse to and select the User Survey Workbooks that you want to import into the current rating set.
- Click the “Open” button to import the selected User Survey Workbooks. Once the import is complete, the imported user surveys will show up in the “Current Rating Set Details” list on the *Survey Management* tab’s *Import Surveys* subtab.

Deleting User Surveys From a Rating Set

Use the following procedure to delete individual user surveys from an existing rating set:

1. Select one or more individual user surveys in the “Current Rating Set Details” list on the *Survey Management* tab’s *Import Surveys* subtab.
2. Click the “Delete Selected User Survey(s)” button at the bottom of the tab. This action opens a dialog box asking you to confirm your deletion request.
3. Click the “OK” button to complete the deletion request, or the “Cancel” button to cancel the request.

Moving Surveys to a New Survey Group

When you encounter the need to move an individual user survey from one survey group to another, use the following step-by-step instructions to complete this task:

1. Select one or more individual user surveys in the “Current Rating Set Details” list on the *Survey Management* tab’s *Import Surveys* subtab.
2. Click the “Move to new ‘Survey Group’” button at the bottom of the tab. This action opens the *Move User Survey(s) to New ‘Survey Group’* dialog box shown in figure 2-36.

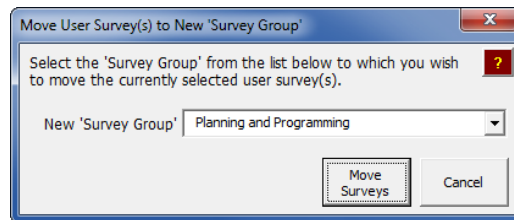


Figure 2-36. Example of the *Move User Survey(s) to New ‘Survey Group’* dialog box.

3. Select a new target survey group from the “New ‘Survey Group’” drop-down list box.
4. Click the “Move Surveys” button to complete the move request, or click the “Cancel” button to cancel the request.

Moving Surveys to a New Rating Set

When you encounter the need to move an individual user survey from one rating set to another, use the following step-by-step instructions to complete this task:

1. Select one or more individual user surveys in the “Current Rating Set Details” list on the *Survey Management* tab’s *Import Surveys* subtab.
2. Click the “Move to new ‘Rating Set’” button at the bottom of the tab. This action opens the *Move User Survey(s) to New ‘Rating Set’* dialog box shown in figure 2-37.
3. Select a new target rating set from the “New ‘Rating Set’” drop-down list box.
4. Click the “Move Surveys” button to complete the move request, or click the “Cancel” button to cancel the request.

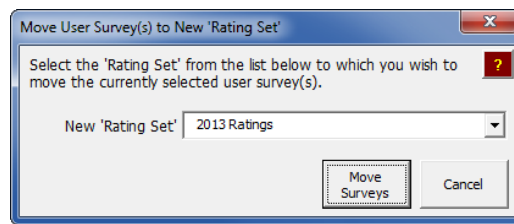


Figure 2-37. Example of the *Move User Survey(s) to New ‘Rating Set’* dialog box.

Viewing Individual User Survey Details

To view detailed information associated with an individual survey, use the following step-by-step procedure:

1. Select a single individual user survey row in the “Current Rating Set Details” list on the *Survey Management* tab’s *Import Surveys* subtab.
2. Click the “View Individual Rating Details” button at the bottom of the tab. This action opens the *Individual User Rating Details* dialog box shown in figure 2-38. Note: if more than one survey row is selected in the “Current Rating Set Details” list, the “View Individual Rating Details” button will not be available.
3. Click “OK” to close the *Individual User Rating Details* dialog box.

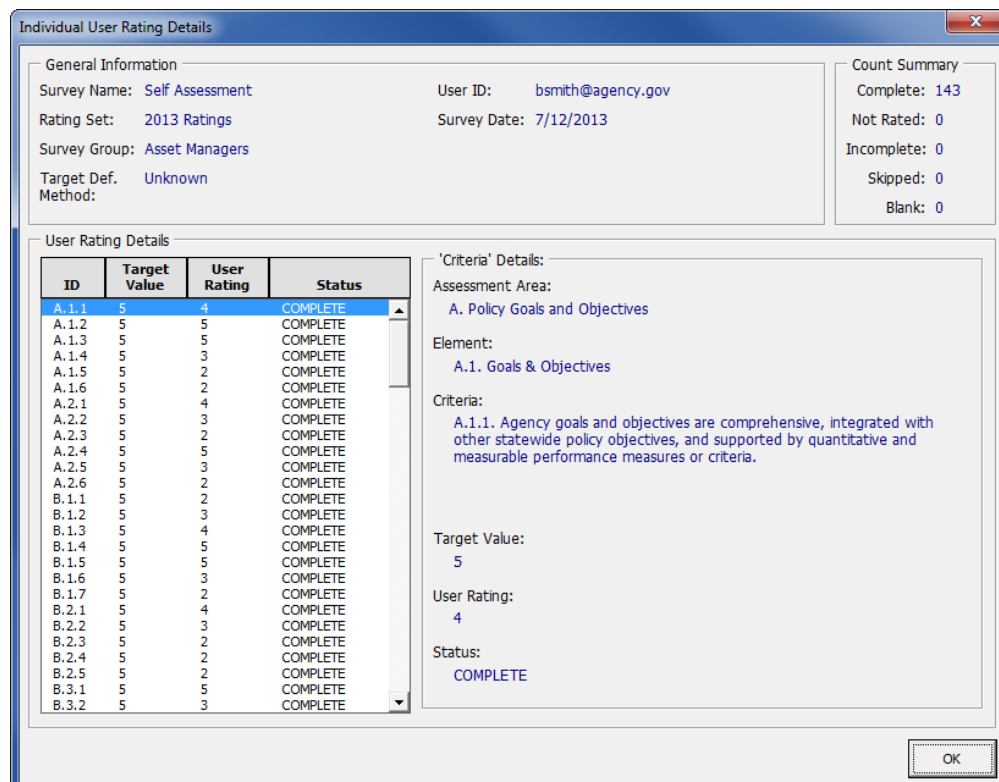




Figure 2-38. Example of the *Individual User Rating Details* dialog box.


A brief summary of the type of information that is displayed in the *Individual User Rating Details* dialog box is as follows:

- General Information—The “General Information” frame contains the following information:
 - Survey Name—Name of survey definition with which the current individual user survey is associated.
 - Rating Set—Name of the rating set in which the current individual user survey is stored.
 - Survey Group—Name of the survey group with which the current individual user survey is associated.
 - Target Definition Method—The target definition method that was used to set the target ratings associated with the current individual user survey. Possible scenarios include: “Agency Defaults (Hidden from Rater),” “Agency Defaults (Visible to Rater),” and “User-Defined.”
 - User ID—The rater-defined unique ID associated with the individual user survey.
 - Survey Date—The rater-defined date that indicates when the individual user survey data was completed.
- Count Summary—The “Count Summary” frame provides Criteria counts by status type. Specific descriptions of each provided count are as follows:
 - Complete—The number of Criteria in the current individual user survey with a status = “Complete.” This is a count of the number of Criteria that the user provided the requested actual ratings (and target ratings if user-defined target values were requested).
 - Not Rated—The number of Criteria in the current individual user survey with a status = “Not Rated.” This is a count of the number of Criteria in the User Survey Workbook where the rater did not provide the requested actual rating values (and target ratings if user-defined target values were requested).
 - Incomplete—The number of Criteria in the current individual user survey where the rater had been asked to provide both a target rating and current rating, but has only provided one.
 - Skipped—The number of Criteria in the current individual user survey that were intentionally skipped by the rater.
 - Blank—The number of Criteria in the current survey definition that the rater was **not** asked to rate.
- User Rating Details—In the “User Rating Details” frame, the list on the left contains one row for each Criteria item in the current survey definition. Within the list, the following columns of data are presented:
 - “ID” column—The Criteria key ID.
 - “Target Value” column—The target rating associated with the current Criteria row (i.e., either an agency default or user-defined value).

- “User Rating” column—The user-defined current rating value for the current Criteria row.
- “Status” column—The determined rating status associated with the current Criteria row.
- The “Criteria Details” frame provides additional information about the Criteria item that is selected in the list on the left. This additional presented information related to the current Criteria includes:
 - The associated Assessment Area and Element items.
 - The detailed Criteria description.
 - Target rating, current rating, and status information associated with the current Criteria item.

Printing and Exporting Rating Set Details

To print or export rating set details, use the   buttons in the lower right hand corner of the *Survey Management* tab’s *Import Surveys* subtab. Details about each output method are provided below:

- Print—Click the print button (i.e., ) to open the “Print” dialog box that allows you to select an available printer and print a simple summary of information presented in the “Current Rating Set Details” list on *Import Surveys* subtab. An example of the printed output is shown in figure 2-39.


Gap Analysis Tool Output: Rating Set Summary

6/2/2014

Survey Name: Self Assessment
 Rating Set: 2013 Ratings
 Results Type: Summary

ID	Survey Group	Rater Unique ID	Date	Rating Question Status Totals			
				Complete	Not Rated	Incomplete	Skipped
1	Asset Managers	bsmith@agency.gov	7/12/2013	143	0	0	0
2	Planning and Programming	wison@agency.gov	7/1/2013	143	0	0	0
3	Planning and Programming	arthur@agency.gov	1/1/2014	0	143	0	0
4	Planning and Programming	janedoe@agency.gov	2/1/2013	0	143	0	0
5	<<Unassigned>>	ibkelly@agency.gov	2/16/2014	6	0	0	6

Figure 2-39. Example of the printed rating set details information.

- Export to an Excel Workbook—Click the export button (i.e., ) to open the *Export* dialog box that allows you to export rating set details to a new Excel workbook of your choosing. The exported output differs from the printed output in that the exported rating set information includes detailed information about each individual user rating included in the current rating set. Also, for each included user survey (i.e., row), the exported information contains the target rating, current rating, and status information for every Criteria in the survey definition. An example of the exported rating set details output is shown in figure 2-40.

Rating ID	Data Type	Survey Group	User ID	Date	Target Display Method	A.1.1	A.1.2	A.1.3	A.1.4	A.1.5
1	Target	Asset Managers	bsmith@agency.gov	7/12/2013	User	5	5	5	5	5
1	Rating	Asset Managers	bsmith@agency.gov	7/12/2013		4	5	5	3	2
1	Status	Asset Managers	bsmith@agency.gov	7/12/2013		COMPLETE	COMPLETE	COMPLETE	COMPLETE	COMPL
2	Target	Finance	rogerB@agency.gov	7/24/2013	User	5	5	5	5	5
2	Rating	Finance	rogerB@agency.gov	7/24/2013		3	4	2	2	4
2	Status	Finance	rogerB@agency.gov	7/24/2013		COMPLETE	COMPLETE	COMPLETE	COMPLETE	COMPL
3	Target	Finance	jstate@agency.gov	7/25/2013	User	5	5	5	5	5
3	Rating	Finance	jstate@agency.gov	7/25/2013		4	3	2	5	2
3	Status	Finance	jstate@agency.gov	7/25/2013		COMPLETE	COMPLETE	COMPLETE	COMPLETE	COMPL
4	Target	Planning and Programming	wison@agency.gov	7/1/2013	User	5	5	5	5	5
4	Rating	Planning and Programming	wison@agency.gov	7/1/2013		3	3	2	3	2
4	Status	Planning and Programming	wison@agency.gov	7/1/2013		COMPLETE	COMPLETE	COMPLETE	COMPLETE	COMPL
5	Target	Planning and Programming	arthur@agency.gov	1/1/2014	User	5	5	5	5	5
5	Rating	Planning and Programming	arthur@agency.gov	1/1/2014		2	4	2	3	3
5	Status	Planning and Programming	arthur@agency.gov	1/1/2014		NOT RATED	NOT RATED	NOT RATED	NOT RATED	NOT RA
6	Target	Planning and Programming	janedoe@agency.gov	2/1/2013	User	5	5	5	5	5
6	Rating	Planning and Programming	janedoe@agency.gov	2/1/2013		5	5	3	5	2
6	Status	Planning and Programming	janedoe@agency.gov	2/1/2013		NOT RATED	NOT RATED	NOT RATED	NOT RATED	NOT RA
7	Target	Finance	sara@agency.gov	4/1/2013	User	5	5	5	5	5
7	Rating	Finance	sara@agency.gov	4/1/2013		2	2	4	2	4
7	Status	Finance	sara@agency.gov	4/1/2013		NOT RATED	NOT RATED	NOT RATED	NOT RATED	NOT RA
8	Target	Safety	rsmith@agency.gov	2/15/2014	Agency-Hidden	5	5	5	5	5
8	Rating	Safety	rsmith@agency.gov	2/15/2014		2	4	4	2	3
8	Status	Safety	rsmith@agency.gov	2/15/2014		COMPLETE	COMPLETE	COMPLETE	COMPLETE	COMPL
9	Target	<<Unassigned>>	jbkelly@agency.gov	2/16/2014	UserDefined	5	4	3	0	0
9	Rating	<<Unassigned>>	jbkelly@agency.gov	2/16/2014		4	3	2	0	0
9	Status	<<Unassigned>>	jbkelly@agency.gov	2/16/2014		COMPLETE	COMPLETE	COMPLETE	SKIPPED	SKIPP
10	Target	Maintenance and Operations	ssally@agency.gov	2/16/2014	Agency-Visible					
10	Rating	Maintenance and Operations	ssally@agency.gov	2/16/2014						
10	Status	Maintenance and Operations	ssally@agency.gov	2/16/2014		UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAP

Figure 2-40. Example of the exported rating set details information.

Results Tab

The *Results* tab is where analysis scenarios are defined and the associated results are viewed. Within the Gap Analysis Tool, two different general types of results are available: *Results by Category* and *Results by Series*. Each of which are accessible from the *Results* tab subtabs with the same names. Detailed information about the contents of both of these subtabs is presented separately in the sections below.

Results by Category

Within the *Results by Category* subtab, results are compiled and displayed for a unique combination of:

- Results group (i.e., one or more survey groups).
- Rating set.
- Survey definition *category* (i.e., “Overall,” “Assessment Area,” “Element,” or “Criteria”).

Figure 2-41 shows an example of the *Results* tab with the *Results by Category* results shown for different included Assessment Area items. The user determines what specific results are compiled and displayed by using the provided controls on the *Results by Category* subtab. Detailed descriptions of these provided are described in the remainder of this section.

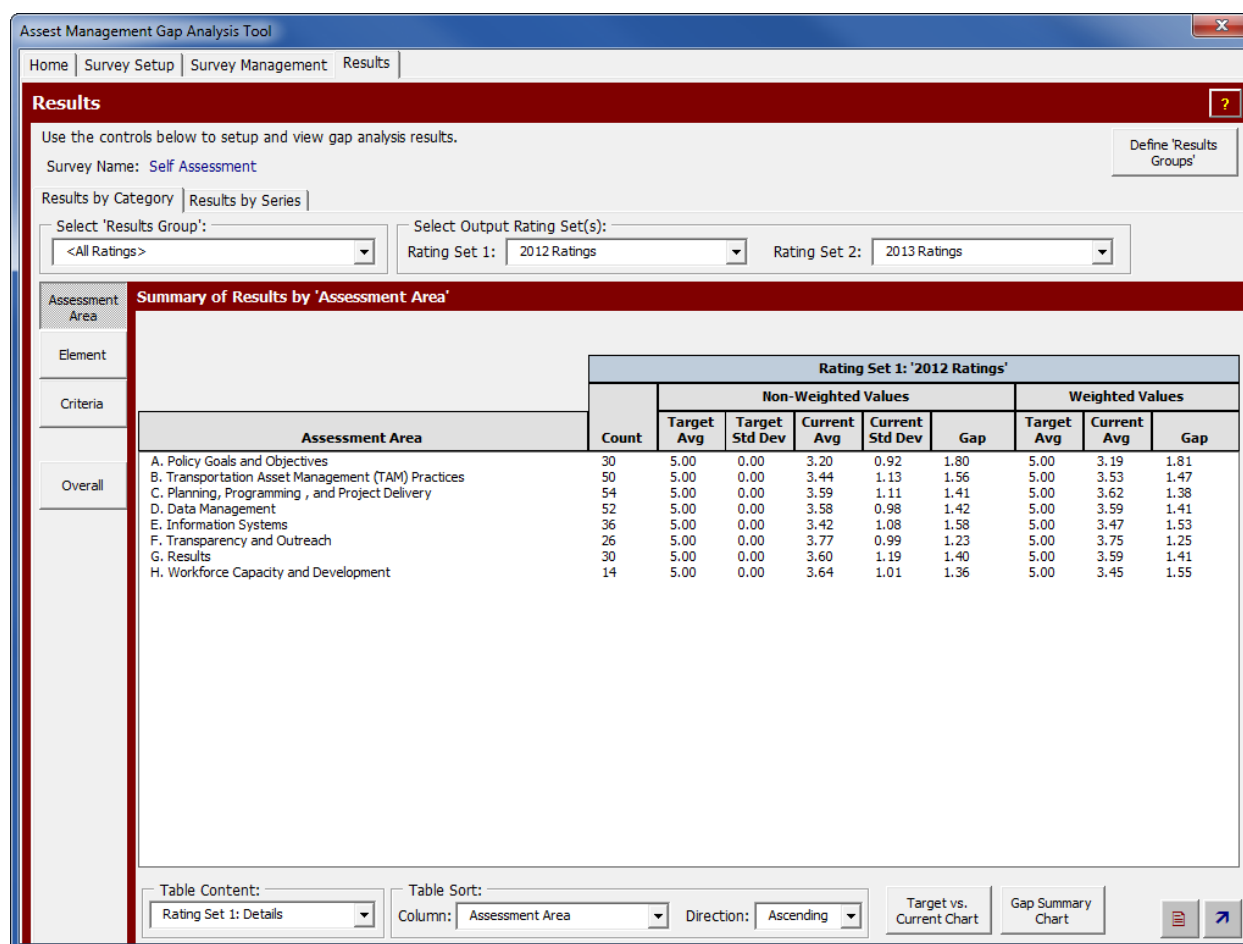


Figure 2-41. Example of Results tab with the Results by Category subtab displayed.

Defining Results Groups

To be able to compare results between survey groups (or groups of survey groups), the concept of a *results group* is included in the Gap Analysis Tool. As described previously, a results group is a named set of one or more survey groups for which the user wants to view results. The Gap Analysis Tool allows you to define, save, and use different named results groups. To manage the master list of results groups, click the “Define ‘Results Groups’” button. This action opens the *Manage User-Defined ‘Results Group’ List* dialog box shown in figure 2-42.

The following list provides more details about the available controls on the *Manage User-Defined ‘Results Group’ List* dialog box:

- **“Add” button**—Adds a new results group to the end of the “‘Results Group’ List.”
- **“Delete” button**—Deletes the currently selected results group from the list. Upon clicking this button, a warning dialog box will be displayed asking you to confirm your deletion.
- **“Move Up” button**—Moves the currently selected results group up one spot in the list.

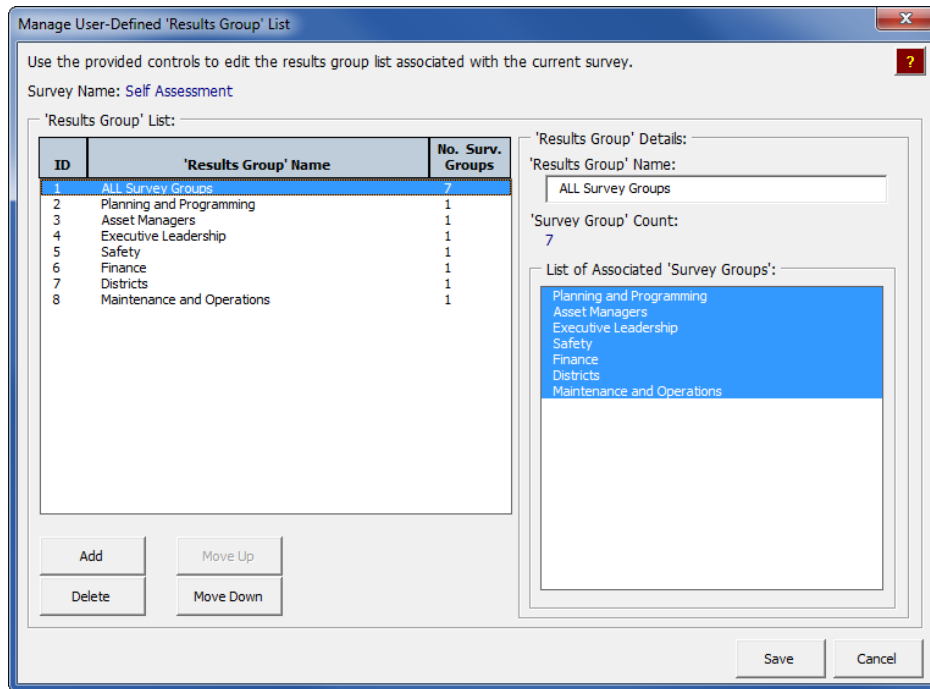


Figure 2-42. Example of the *Manage User-Defined Results Group List* dialog box.

- **“Move Down” button**—Moves the currently selected results group down one spot in the list.
- **“Results Group Name” text box**—To set or change the name for a selected results group, click a results group in the “Results Group List” and enter a name in this text box.
- **“List of Associated Survey Groups” list box**—This list box contains a list of all survey groups defined for the current survey definition. To associate one or more survey groups with a defined results group, use this procedure:
 1. Select a results group from the “Results Group List” list box.
 2. Select one or more survey groups in the “List of Associated Survey Groups” list box to associate them with the selected results group.
- **“Save” button**—Accepts any made changes to the “Results Group List,” and closes the *Manage User-Defined Results Group List* dialog box.
- **“Cancel” button**—Closes the *Manage User-Defined Results Group List* dialog box without saving any changes.

Selecting a Results Group for the Current Analysis Scenario

When setting up a results scenario, the first step is to select one of the available results groups from the “Select Results Group” drop-down list box. Because results groups are associated with one or more survey groups, this selection is used to filter the data and only include data from survey groups associated with the selected results group.

Note that the default value in the “Select Results Group” drop-down list box is the “<All Ratings>” entry. While this list entry is not a *user-defined* results group, it is

included in the list to provide a quick way to include *all* ratings from *all* survey groups in the results scenario.

Selecting Output Rating Set(s)

In the “Select Output Rating Set(s)” frame, you have the choice to select up to two rating sets of interest in the “Rating Set 1” and “Rating Set 2” drop-down list boxes. The results in the main results area will reflect the rating set selections.

Selecting the Survey Definition ‘Category’

The button bar along the left side of the main results area give you results *category* choices of “Overall,” “Assessment Area,” “Element,” and “Criteria.” This category selection determines what type of results scenario gets displayed in the main results area. Descriptions of the specific results summaries associated with each category selection are the following:

- **Overall**—This selection shows weighted-average results aggregated to single overall values for the entire survey. Specifically, the following weighted-average aggregation approach is used to get these overall values:
 1. Individual Criteria values (i.e., target and current rating values) are averaged for each Criteria item.
 2. Weighted-average values are determined for each Element item by weight-averaging the individual Criteria item averages from step 1. Note the user-defined Criteria weight factors are used to accomplish this step.
 3. Weighted-average values are determined for each Assessment Area by weight-averaging the Element-specific weighted averages determined in step 2. Note the user-defined Element weight factors are used to accomplish this step.
 4. Single weighted-average values (i.e., overall values) are determined for the entire survey by weight-averaging the Assessment Area-specific weighted averages determined in step 3. Note the user-defined Assessment Area weight factors are used to accomplish this step.
- **Assessment Area**—This selection shows weighted-average results aggregated for each Assessment Area in the survey definition. Specifically, the following weighted-average aggregation approach is used to get these Assessment Area-specific values:
 1. Individual Criteria values (i.e., target and current rating values) are averaged for each Criteria item.
 2. Weighted-average values are determined for each Element item by weight-averaging the individual Criteria averages from step 1. Note the user-defined Criteria weight factors are used to accomplish this step.
 3. Weighted-average values are determined for each Assessment Area by weight-averaging the Element-specific weighted averages determined in step 2. Note the user-defined Element weight factors are used to accomplish this step.

- **Element**—This selection shows weighted-average results aggregated for each Element within a selected Assessment Area. Specifically, the following weighted-average aggregation approach is used to get these Assessment Area-specific values:
 1. Individual Criteria values (i.e., target and current rating values) are averaged for each Criteria item.
 2. Weighted-average values are determined for each Element item by weight-averaging the individual Criteria averages from step 1. Note the user-defined Criteria weight factors are used to accomplish this step.

Note: when “Element” is selected as the results category, an “Assessment Area” drop-down list box is displayed above the main results table. Use this drop-down list box to display Element results associated with different Assessment Area items.

- **Criteria**—This selection shows average results for each Criteria item within a selected Element item. Note: when “Criteria” is selected as the results category, “Assessment Area” and “Element” drop-down list boxes are displayed above the main results table. Use these drop-down list boxes to display Criteria results associated with different combinations of Assessment Area and Element items.

Defining the Table Content

There are three different types of table *content* that can be displayed in the main results table on the *Results by Category* tab: rating set details, rating set count summary, and a comparison of the details for two rating sets. Descriptions and examples of the main results table for each of these cases are presented below.

- **Rating Set Details**—To view detailed summary information associated with a selected rating set, select “Rating Set 1: Details” or “Rating Set 2: Details” (if available) from the “Table Content” drop-down list box. Note that the displayed results are associated with the unique combination of results group, selected rating set, and the chosen results category from the left side button list (i.e., “Overall,” “Assessment Area,” “Element,” or “Criteria”). An example of the rating set details table content is displayed in figure 2-43. The remainder of this section describes the different columns of data that are displayed when the “Table Content” drop-down list box is set to “Rating Set 1: Details” or “Rating Set 2: Details.”

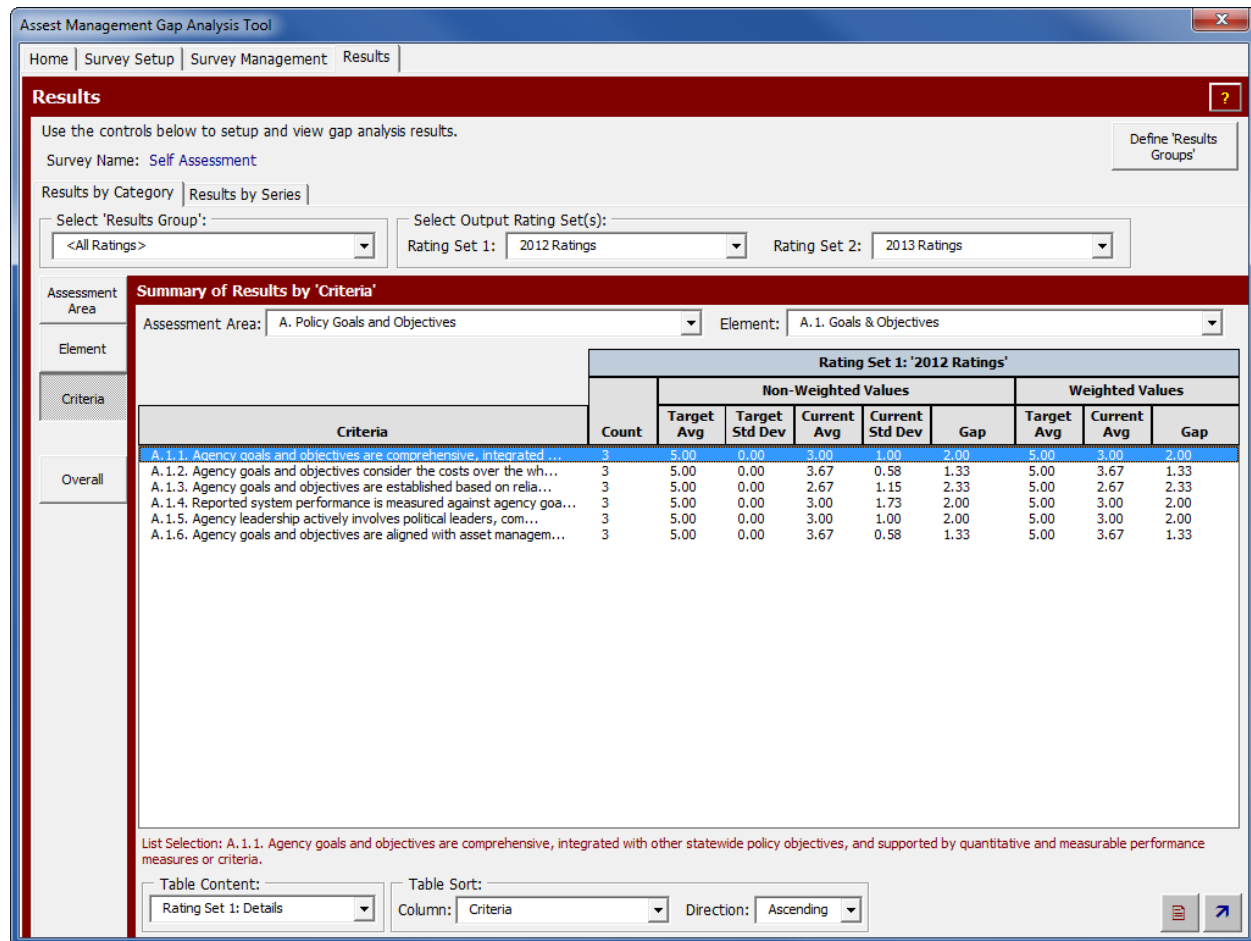


Figure 2-43. Example of the *Results by Category* tab showing “Rating Set Details” table content.

- Description column—The first column in the table is a description column that displays the survey definition item associated with each results table row. Note that the header of this column will reflect the currently selected results category (i.e., “Assessment Area,” “Element,” and so on). Because some of these descriptions may be long, when needed, the full description associated with the current selected results row will be displayed directly below the survey table in a “List Selection:” string (see figure 2-43).
- “Count” column—The number of individual user ratings associated with the current survey definition item. This can also be described as the number of ratings that are used in the computation of that row’s statistical results.
- “Non-Weighted Values” columns—Within the results table, there are five columns of data under the “Non-Weighted Values” heading. The data in each of these columns is computed **without** applying any user-defined weight factors during the results aggregation process. More specific definitions of the contents of each column are as follows:
 - Non-Weighted Values “Target Avg” column—Simple average of the target ratings associated with **all** Criteria included in the current row in the results table.

- Non-Weighted Values “Target Std Dev” column—Simple standard deviation of the target ratings associated with **all** Criteria included in the current row in the results table.
 - Non-Weighted Values “Current Avg” column—Simple average of the current rating values associated with **all** Criteria included in the current row in the results table.
 - Non-Weighted Values “Current Std Dev” column—Simple standard deviation of the current rating values associated with **all** Criteria included in the current row in the results table.
 - Non-Weighted Values “Gap” column—Computed difference between the current row’s non-weighted values “Target Avg” and non-weighted values “Current Avg” (i.e., “Target Avg” – “Current Avg”). Note: a displayed value of “Target Met” in this column indicates that the computed gap value is less than or equal to zero.
- “Weighted Values” columns—Within the results table, there are three columns of data under the “Weighted Values” heading. The values presented in each of these columns are weighted-average values determined during the results aggregation process. Note that the applied weight factors are those user-defined weight factors defined for each Criteria, Element, and Assessment Area during the survey setup process. More specific definitions of the contents of each column are as follows:
- Weighted Values “Target Avg” column—Weighted average of the target ratings associated with **all** Criteria included in the current row in the results table.
 - Weighted Values “Current Avg” column—Weighted average of the current rating values associated with **all** Criteria included in the current row in the results table.
 - Weighted Values “Gap” column—Computed difference between the current row’s weighted values “Target Avg” and weighted values “Current Avg” (i.e., weighted “Target Avg” – weighted “Current Avg”). Note: a displayed value of “Target Met” in this column indicates that the computed gap value is less than or equal to zero.
- Count Summary—It is often useful to know the detailed count of observed ratings by rating value (e.g., how many users rated a particular Criteria a 5, how many rated it a 4, and so on). The count summary table content provides this needed summary of ratings by value. To view count summary information associated with a selected rating set, select “Rating Set 1: Count Summary” or “Rating Set 2: Count Summary” (if available) from the “Table Content” drop-down list box. An example of the count summary table content is displayed in figure 2-44. The remainder of this section describes the different columns of data that are displayed when the “Table Content” drop-down list box is set to “Rating Set 1: Count Summary” or “Rating Set 2: Count Summary.”

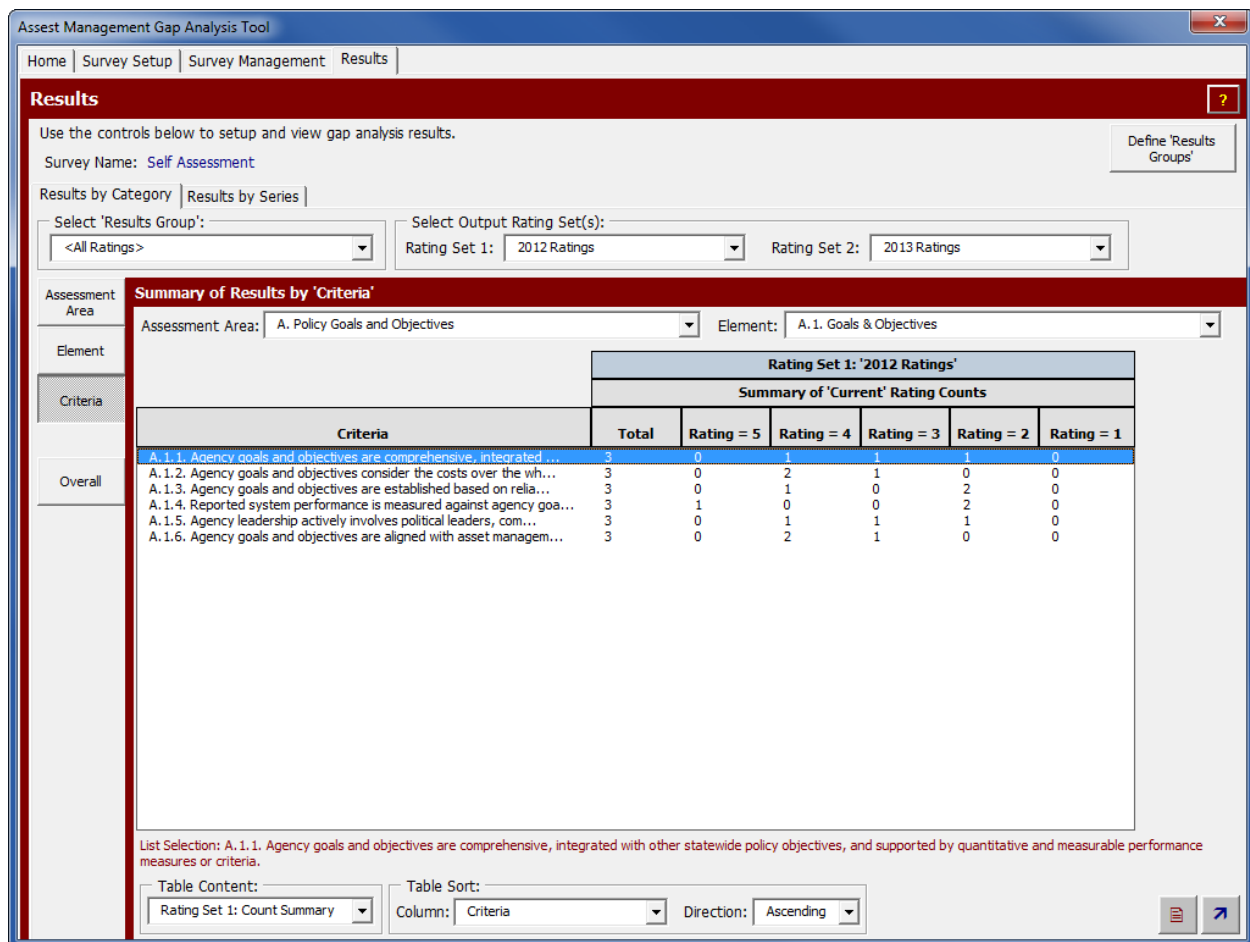


Figure 2-44. Example of the *Results by Category* tab showing “Count Summary” table content.

- **Description column**—The first column in the table is the description column that displays the survey definition item associated with each results table row. Note that the header of this column will reflect the currently selected results category (i.e., “Assessment Area,” “Element,” and so on). Because some of these descriptions may be long, when needed, the full description associated with the current selected results row will be displayed directly below the survey table in a “List Selection:” string (see figure 2-44).
- **“Total” column**—The total number of individual Criteria user ratings associated with the current results row.
- **“Rating = 5” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 5.
- **“Rating = 4” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 4.
- **“Rating = 3” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 3.
- **“Rating = 2” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 2.

- **“Rating = 1” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 1.
- **Comparison of Rating Set 1 and Rating Set 2 Details**—The last table content allows you to compare results (weighted-average results only) determined for rating set 1 and rating set 2. To view this comparison summary, select “Compare Rating Sets 1 and 2” from the “Table Content” drop-down list box. Note that this option will not be available unless you have both a rating set 1 and rating set 2 selected in the “Select Output Rating Set(s)” drop-down list boxes. An example of this table content is displayed in figure 2-45. The remainder of this section describes the different columns of data that are displayed for each rating set when this rating set comparison table content option is selected:
 - **“Count” column**—The total number of user ratings that are both 1) included in the affiliated rating set, and 2) associated with **all** Criteria included in the current results table row.
 - **“Wgt. Avg. Target” column**—Weighted average of the target ratings that are both 1) included in the affiliated rating set, and 2) associated with **all** Criteria included in the current results table row.
 - **“Wgt. Avg. Current” column**—Weighted average of the current rating values that are both 1) included in the affiliated rating set, and 2) associated with **all** Criteria included in the current results table row.
 - **“Gap” column**—Computed difference between the current row’s “Wgt. Avg. Target” and “Wgt. Avg. Current” values (i.e., “Wgt. Avg. Target” – “Wgt. Avg. Current”). Note: a displayed value of “Target Met” in this column indicates that the computed gap value is less than or equal to zero.

Sorting the Results Table

The controls provided in the “Table Sort” frame allow you to sort the results in the main results table. Use the available values in the “Column” drop-down list box to select the column you want to use to sort the table, and choose “Ascending” or “Descending” from the “Direction” drop-down list box to set the sort order.

Target vs. Current Chart

When the results category option is set to “Assessment Area” or “Element,” the “Target vs. Current Chart” button is displayed at the bottom of the *Results by Category* tab (see figure 2-41). Clicking this button will display a chart version of the results (weighted-average data only) currently being displayed in the main results table. When the chart is displayed, the *Chart Control* dialog box shown in figure 2-46 is also displayed. Use the controls on the *Chart Control* dialog box to set the chart type, display data content, and print the current chart (if desired). Click the “Return” button on the *Chart Control* dialog box to close the chart and return to the *Results by Category* tab. Examples of the *Target vs. Current* chart (with different *Chart Control* dialog box settings) are displayed in figures 2-47 and 2-48.

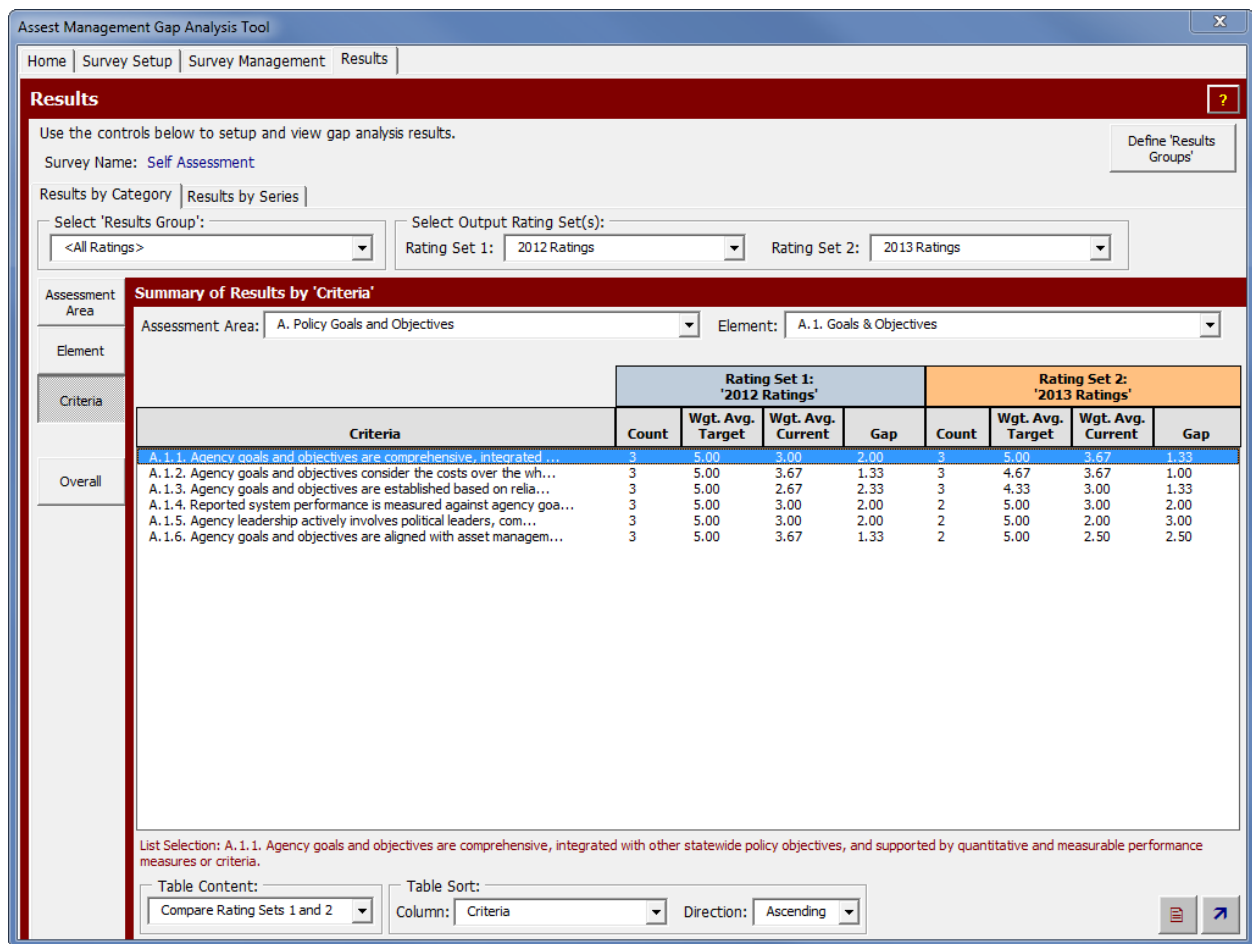


Figure 2-45. Example of the *Results by Category* tab showing the “Compare Rating Sets 1 and 2” table content.

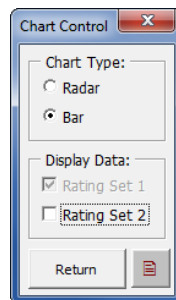


Figure 2-46. Example of the *Chart Control* dialog box.



Figure 2-47. Example *Target vs. Current* chart that illustrates the *bar* chart type.

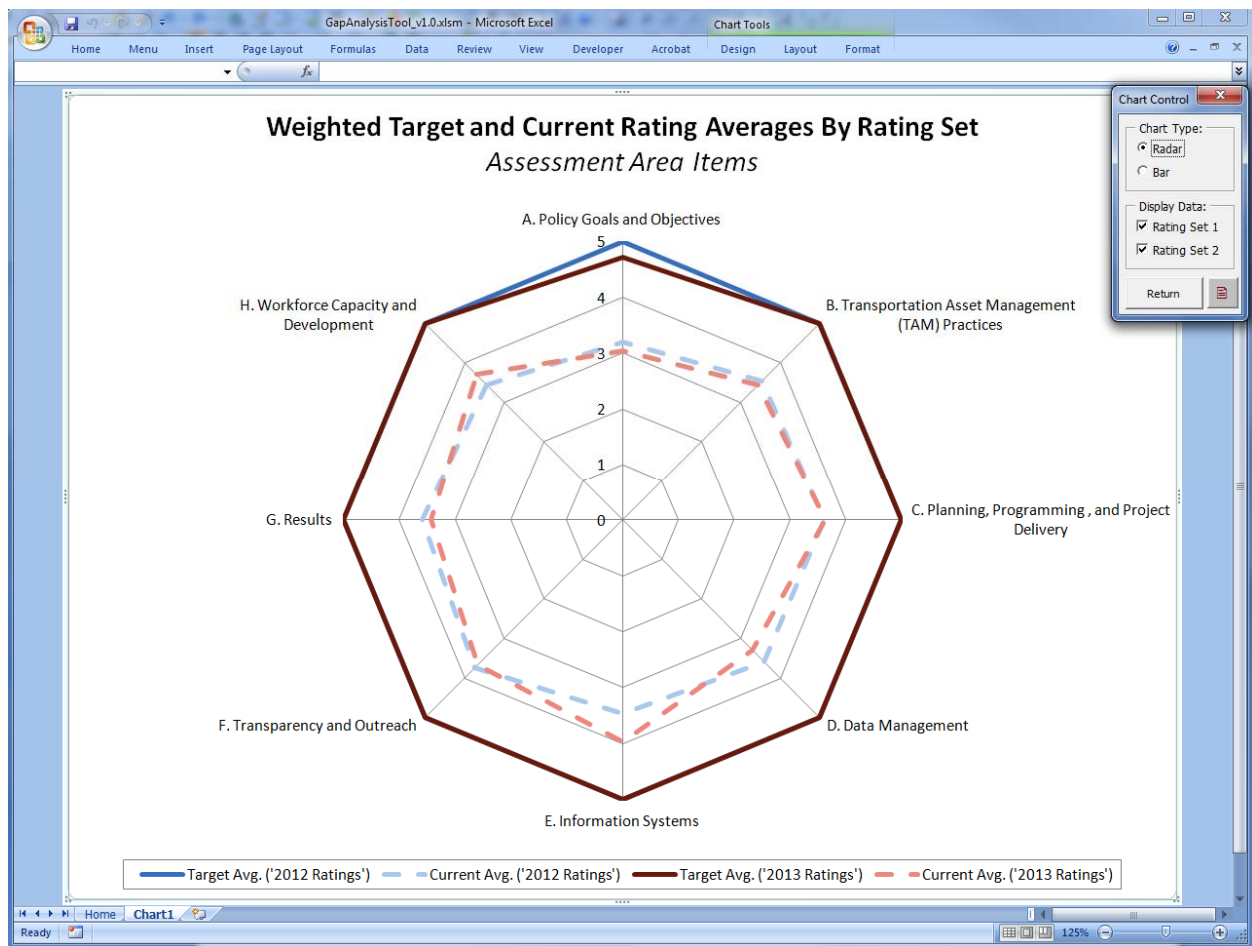


Figure 2-48. Example *Target vs. Current* chart that illustrates the *radar* chart type.

Gap Summary Chart

When the results category option is set to “Assessment Area” or “Element,” the “Gap Summary Chart” button is displayed at the bottom of the *Results by Category* subtab (see figure 2-41). Clicking this button displays a *Gap Summary* chart that shows a summary of the computed gap information currently being displayed in the main results table. When the chart is displayed, the *Chart Control* dialog box shown in figure 2-46 is also opened. Use the controls on the *Chart Control* dialog to set the chart type, display data content, and print the current chart (if desired). Click the “Return” button on the *Chart Control* dialog to close the chart and return to the *Results by Category* subtab. Examples of the *Gap Summary* chart, with different *Chart Control* dialog box settings, are displayed in figures 2-49 and 2-50.



Figure 2-49. Example *Gap Summary* chart that illustrates the *bar* chart type.

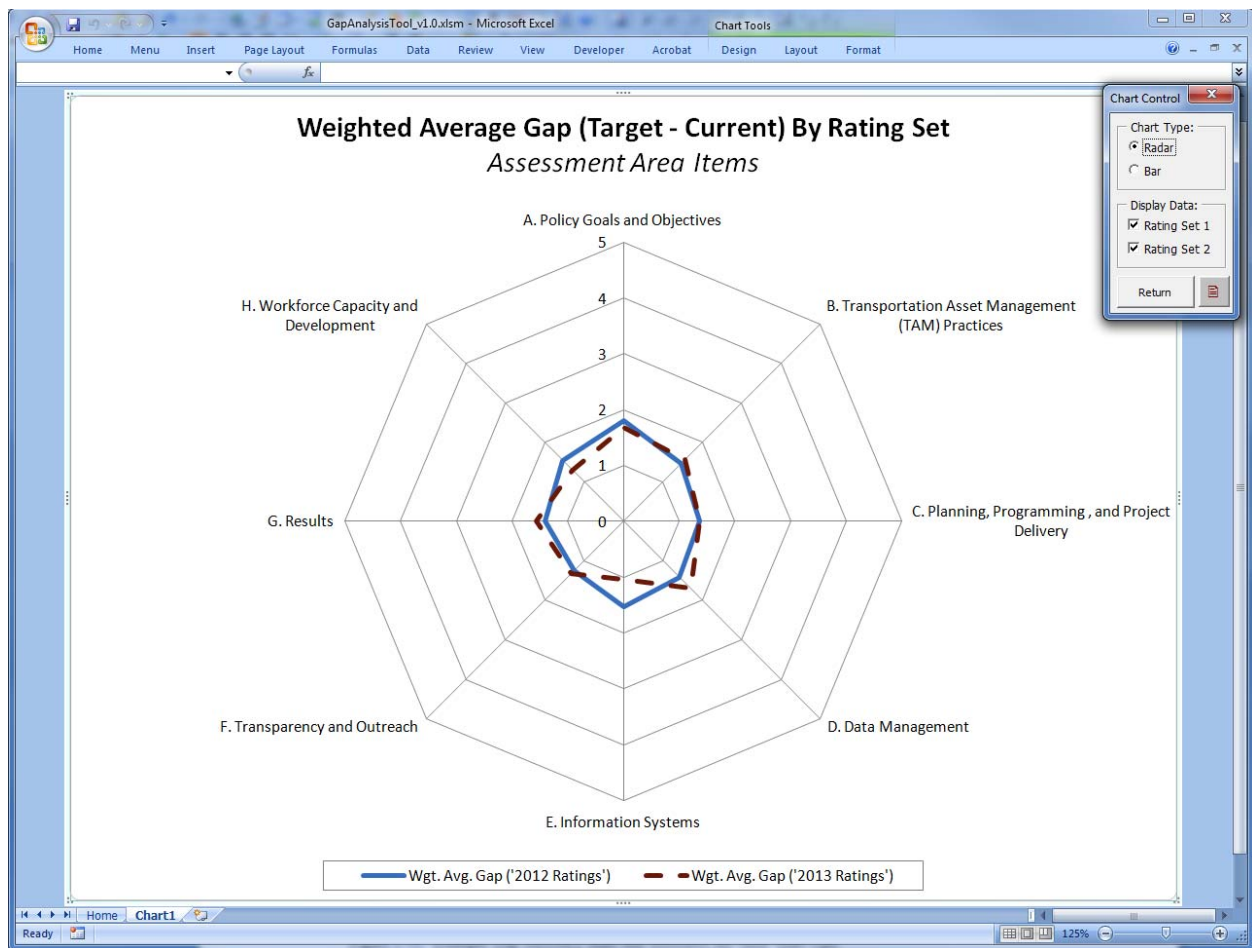





Figure 2-50. Example *Gap Summary* chart that illustrates the *radar* chart type.

Printing and Exporting ‘Results by Category’ Results

To print or export the results, use the   buttons in the lower right hand corner of the *Results by Category* subtab. Details about each output method are provided below:


- Print**—Click the print button (i.e., ) to open the “Print” dialog box that allows you to select an available printer and print a simple summary of information presented in the main results table on the *Results by Category* subtab. An example of the printed output is shown in figure 2-51.

Gap Analysis Tool Output: 'Results by Category' Summary

Survey Name: Self Assessment
 Results Type: Results by Category
 Description: Summary of Results by 'Assessment Area'
 Table Content: Rating Set 1: Details
 Selected 'Rating Set': Rating Set 1 = '2012 Ratings'

'Assessment Area'	Rating Set 1: '2012 Ratings'								
	Count	Non-Weighted Values					Weighted Values		
		Target Avg	Target Std Dev	Rating Avg	Rating Std Dev	Gap	Target Avg	Rating Avg	Gap
A. Policy Goals and Objectives	30	5.00	0.00	3.20	0.92	1.80	5.00	3.19	1.81
B. Transportation Asset Management (TAM) Practices	50	5.00	0.00	3.44	1.13	1.56	5.00	3.53	1.47
C. Planning, Programming, and Project Delivery	54	5.00	0.00	3.59	1.11	1.41	5.00	3.62	1.38
D. Data Management	52	5.00	0.00	3.58	0.98	1.42	5.00	3.59	1.41
E. Information Systems	36	5.00	0.00	3.42	1.08	1.58	5.00	3.47	1.53
F. Transparency and Outreach	26	5.00	0.00	3.77	0.99	1.23	5.00	3.75	1.25
G. Results	30	5.00	0.00	3.60	1.19	1.40	5.00	3.59	1.41
H. Workforce Capacity and Development	14	5.00	0.00	3.64	1.01	1.36	5.00	3.45	1.55

Figure 2-51. Example of the printed *Results by Category* information.

- Export to an Excel Workbook**—Click the export button (i.e., ) to open the *Export: Results by Category* dialog box shown in figure 2-52. This dialog box is different than the typical *Export* dialog box used throughout the Gap Analysis Tool in that it contains controls to customize the exported output without returning to the *Results by Category* subtab. To customize the data that will be exported, use the provided drop-down list boxes to select a unique combination of rating set and results group that will define your exported results. Click the “Export” button to export the results to a new Excel workbook of your choosing.

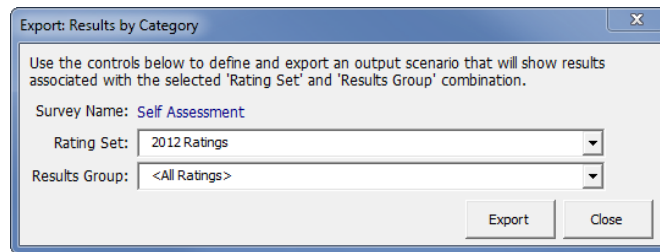


Figure 2-52. Example of the *Export Results by Category* selection dialog box.

Note that the *exported* output contains much more detailed information than what is contained in the *printed* output. First, the exported data contains a results row for every Assessment Area, Element, and Criteria item defined in the survey definition. Second, count summary, non-weighted statistics, and weighted statistics are included for every included results row. An example of the exported *Results by Category* output is shown in figure 2-53.

Results by Series

Within the *Results by Series* subtab of the *Results* tab, you may use the provided controls to view results for 1) a series of *results groups* for a given *rating set*, or 2) a series of *rating sets* for a given *results group*. Figure 2-54 shows an example of the *Results by Series* subtab with results for a series of ratings sets displayed. An explanation of each of the provided controls on the *Results by Series* subtab, and the types of analysis scenarios that can be defined, are described in the remainder of this section.

The screenshot shows an Excel spreadsheet titled 'resultsByCategory.xlsx'. The data is organized into a table with the following structure:

Category	Key ID	Description	User Rating Count Summary					Non-Weighted Statistics					Weighted Statistics			
			Count of Ratings	Rating = 5	Rating = 4	Rating = 3	Rating = 2	Rating = 1	Target Avg	Target Std Dev	Rating Avg	Rating Std Dev	Gap Avg	Target Avg	Rating Avg	Gap Avg
Overall	Overall	Overall	292	62	93	72	65	0	5.00	0.00	3.52	1.06	1.48	5.00	3.52	1.48
Assessment Area	A	Policy Goals and Objectives	30	1	13	7	9	0	5.00	0.00	3.20	0.92	1.80	5.00	3.19	1.81
Assessment Area	B	Transportation Asset Management (TAM) Practices	50	13	8	17	12	0	5.00	0.00	3.44	1.13	1.56	5.00	3.53	1.47
Assessment Area	C	Planning, Programming, and Project Delivery	54	14	16	12	12	0	5.00	0.00	3.59	1.11	1.41	5.00	3.62	1.38
Assessment Area	D	Data Management	52	10	18	16	8	0	5.00	0.00	3.58	0.98	1.42	5.00	3.59	1.41
Assessment Area	E	Information Systems	36	7	10	10	9	0	5.00	0.00	3.42	1.08	1.58	5.00	3.47	1.53
Assessment Area	F	Transparency and Outreach	26	7	9	7	3	0	5.00	0.00	3.77	0.99	1.23	5.00	3.75	1.25
Assessment Area	G	Results	30	8	11	2	9	0	5.00	0.00	3.60	1.19	1.40	5.00	3.59	1.41
Assessment Area	H	Workforce Capacity and Development	14	2	8	1	3	0	5.00	0.00	3.64	1.01	1.36	5.00	3.45	1.55
Element	A.1	Goals & Objectives	18	1	7	4	6	0	5.00	0.00	3.17	0.99	1.83	5.00	3.17	1.83
Element	A.2	Agency Policies	12	0	6	3	3	0	5.00	0.00	3.25	0.87	1.75	5.00	3.25	1.75
Element	B.1	TAM Framework	14	5	1	4	4	0	5.00	0.00	3.50	1.29	1.50	5.00	3.50	1.50
Element	B.2	Leadership Support for TAM	10	1	2	5	2	0	5.00	0.00	3.20	0.92	1.80	5.00	3.20	1.80
Element	B.3	Asset Management Plan Development	18	2	4	7	5	0	5.00	0.00	3.17	0.99	1.83	5.00	3.17	1.83
Element	B.4	Lifecycle Management	8	5	1	1	1	0	5.00	0.00	4.25	1.17	0.75	5.00	4.25	0.75
Element	C.1	Planning and Programming Processes	18	4	5	4	5	0	5.00	0.00	3.44	1.15	1.56	5.00	3.44	1.56
Element	C.2	Performance-Based Management	12	3	3	4	2	0	5.00	0.00	3.58	1.08	1.42	5.00	3.58	1.42
Element	C.3	Resource Allocation	10	4	3	1	2	0	5.00	0.00	3.90	1.20	1.10	5.00	3.90	1.10
Element	C.4	Project Delivery	14	3	5	3	3	0	5.00	0.00	3.57	1.09	1.43	5.00	3.57	1.43
Element	D.1	Asset Inventory	18	4	5	6	3	0	5.00	0.00	3.56	1.04	1.44	5.00	3.56	1.44
Element	D.2	Asset Condition and Performance	16	4	8	3	1	0	5.00	0.00	3.94	0.85	1.06	5.00	3.94	1.06
Element	D.3	Data Governance	18	2	5	7	4	0	5.00	0.00	3.28	0.98	1.72	5.00	3.28	1.72
Element	E.1	System Technology and Integration	10	3	3	3	1	0	5.00	0.00	3.60	1.03	1.20	5.00	3.60	1.20
Element	E.2	Decision-Support Tools	8	2	2	1	3	0	5.00	0.00	3.38	1.30	1.63	5.00	3.38	1.63
Element	E.3	System Features	18	2	5	6	5	0	5.00	0.00	3.22	1.00	1.78	5.00	3.22	1.78
Element	F.1	Transparency and Accountability	8	1	3	3	1	0	5.00	0.00	3.50	0.93	1.50	5.00	3.50	1.50
Element	F.2	Benchmarking	10	3	4	3	0	0	5.00	0.00	4.00	0.82	1.00	5.00	4.00	1.00
Element	F.3	Communication and Outreach	8	3	2	1	2	0	5.00	0.00	3.75	1.28	1.25	5.00	3.75	1.25
Element	G.1	Compliance	8	3	3	0	2	0	5.00	0.00	3.88	1.25	1.13	5.00	3.88	1.13
Element	G.2	Data-Driven Targets	16	4	6	1	5	0	5.00	0.00	3.56	1.21	1.44	5.00	3.56	1.44
Element	G.3	Program and Plan Alignment	6	1	2	1	2	0	5.00	0.00	3.33	1.21	1.67	5.00	3.33	1.67
Element	H.1	Workforce Capacity	10	2	6	1	1	0	5.00	0.00	3.90	0.88	1.10	5.00	3.90	1.10
Element	H.2	Workforce Development	4	0	2	0	2	0	5.00	0.00	3.00	1.15	2.00	5.00	3.00	2.00
Criteria	A.11	Agency goals and objectives are comprehensive, integrated with other statewide policy objectives, and supported by quantitative and measurable performance measures or	3	0	1	1	1	0	5.00	0.00	3.00	1.00	2.00	5.00	3.00	2.00
Criteria	A.12	Agency goals and objectives consider the costs over the whole life of an asset and encourage strategies to lower life-cycle costs, to reduce agency risk, and to provide long-term benefits.	3	0	2	1	0	0	5.00	0.00	3.67	0.58	1.33	5.00	3.67	1.33
Criteria	A.13	Agency goals and objectives are established based on reliable information on asset condition and public perceptions.	3	0	1	0	2	0	5.00	0.00	2.67	1.15	2.33	5.00	2.67	2.33
Criteria	A.14	Reported system performance is measured against agency goals and objectives. Agency leadership actively involves political leaders, community leaders, and other policy makers to establish system performance expectations that consider funding constraints.	3	1	0	0	2	0	5.00	0.00	3.00	1.73	2.00	5.00	3.00	2.00
Criteria	A.15	Agency goals and objectives are established based on reliable information on asset condition and public perceptions.	3	0	1	1	1	0	5.00	0.00	3.00	1.00	2.00	5.00	3.00	2.00

Figure 2-53. Example of the exported Results by Category information.

Setting Up a Series

In the *Results by Series* subtab, the first step is to define the *type* of series you want to view. Use the controls in the “Series Setup” frame to define whether you want to view a series of rating sets for a given results group or a series of results groups for a given rating set.

To illustrate this series setup step, a common analysis task is to determine how measured gaps are changing over time for specified Assessment Area, Element, or Criteria items. To setup such a scenario in the *Results by Series* subtab, you would first need to create rating sets that contain annual data (i.e., “2011 Ratings,” “2012 Ratings,” “2013 Ratings,” and so on). Next, you would set the “View Series of:” drop-down list box to “Rating Sets” (i.e., you want to view a series of rating sets), and the “For ‘Results Group’” drop-down list box to a desired results group. Using this setup, your results table would display one row of results for each defined annual rating set. This is just one example of applying the “Series Setup” frame controls to view how data changes over time or between survey groups.

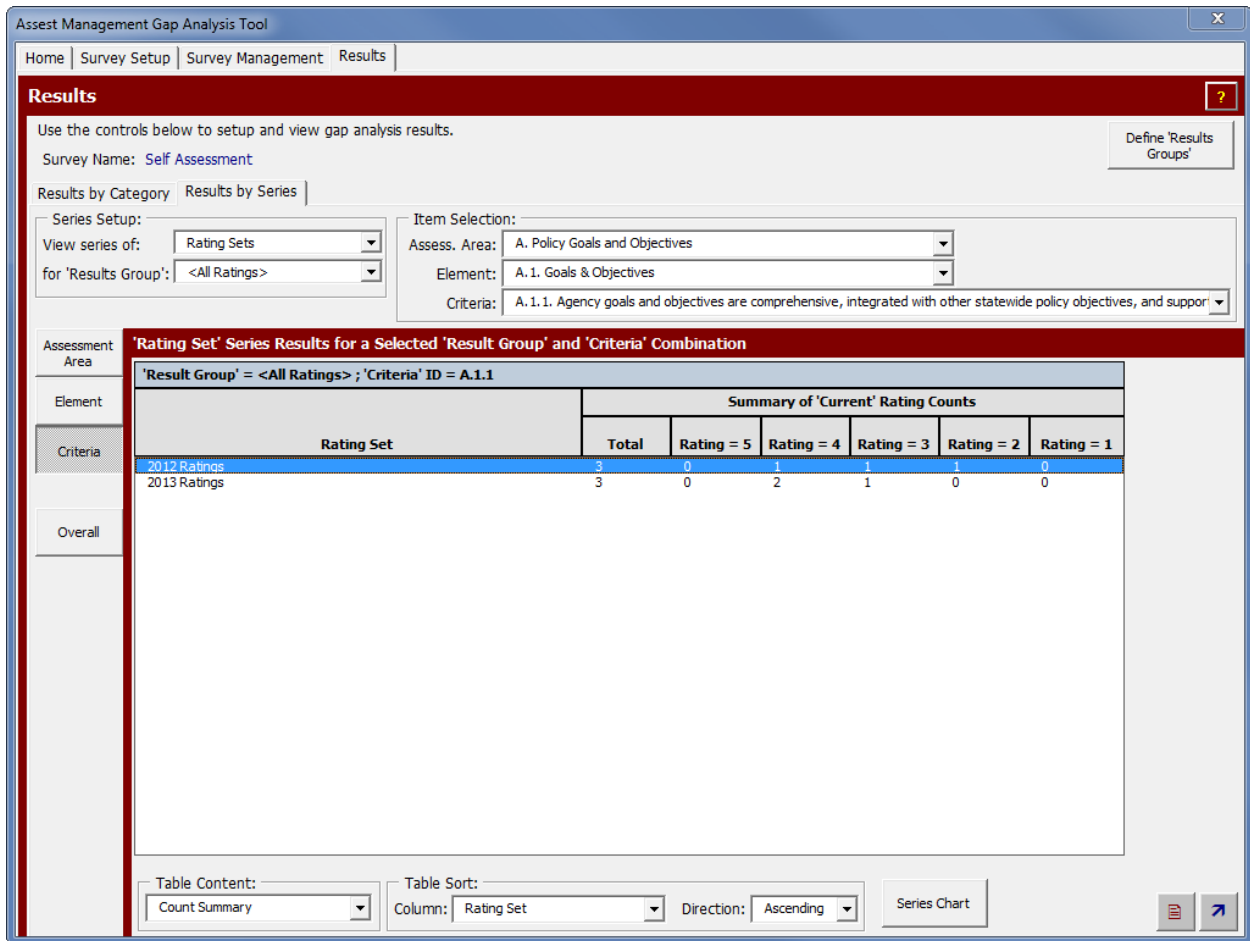


Figure 2-54. Example of the *Results by Series* subtab with a series of rating sets displayed.

Selecting the Survey Definition ‘Category’ and ‘Item Selection’ Details

Similar to the *Results by Category* subtab, the results category button bar along the left side of the main results area give you choices of: “Overall,” “Assessment Area,” “Element,” and “Criteria.” This category selection determines what results gets displayed in the main results area. For the *Results by Series* table, the main results table always contains the number of unique rating sets or results groups (depending on the user define “Series Setup” settings) included in the series. However, the selected survey definition category determines what user rating Criteria information gets aggregated into the results presented for each row. More information on the data aggregation approach used for each survey category option is described in the following list:

- **Overall**—This results category selection shows results that are aggregated into single overall values representative of the entire survey. That is, data for **all** Criteria included in the survey definition are used to determine values for each included row in the table of series data.
- **Assessment Area**—This selection shows results that are aggregated for a chosen Assessment Area in the survey definition. That is, data for all Criteria associated with a selected Assessment Area are used to determine values for each included row in the table of series data.

- **Element**—This selection shows results that are aggregated for a chosen Element in the survey definition. That is, data for all Criteria associated with a selected Element are used to determine values for each included row in the table of series data.
- **Criteria**—This selection shows results that are aggregated for a chosen Criteria in the survey definition. That is, data for all user data associated with a single selected Criteria are used to determine values for each included row in the table of series data.

Selecting the Survey Definition ‘Item’ Filtering Information

The provided drop-down list box choices in the “Item Selection” frame of the *Results by Series* subtab allow you to further filter the results that are displayed. Set the “Assess. Area,” “Element,” and “Criteria” drop-down list boxes (when displayed) to define what data gets presented in the main results table.

Defining the Table Content

There are two different types of table content that can be displayed in the main results area of the *Results by Series* subtab: “Count Summary” and “Details.” Descriptions and examples of the main results table for each of these cases are presented below.

- **Count Summary**—The “Count Summary” table content includes a detailed count of observed ratings by rating value (e.g., how many users rated a particular Criteria a 5, how many rated it a 4, and so on). To view count summary information associated with the current series, select “Count Summary” from the “Table Content” drop-down list box. An example of this table content is displayed in figure 2-55. The different columns of data that are associated with the “Count Summary” table content are described below.
 - **Description column**—The first column in the table contains descriptive information about the series items. If a series of rating sets is being displayed, the column will have a header of “Rating Set” and the column will show the names of all rating sets included in the series. If a series of results groups is being displayed, the column will have a header of “Results Group” and the column will show the names of all results groups included in the series.
 - **“Total” column**—The total number of individual Criteria user ratings associated with the current results row.
 - **“Rating = 5” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 5.
 - **“Rating = 4” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 4.
 - **“Rating = 3” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 3.
 - **“Rating = 2” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 2.
 - **“Rating = 1” column**—The total number of individual Criteria user ratings associated with the current results row where the user rating value equals 1.

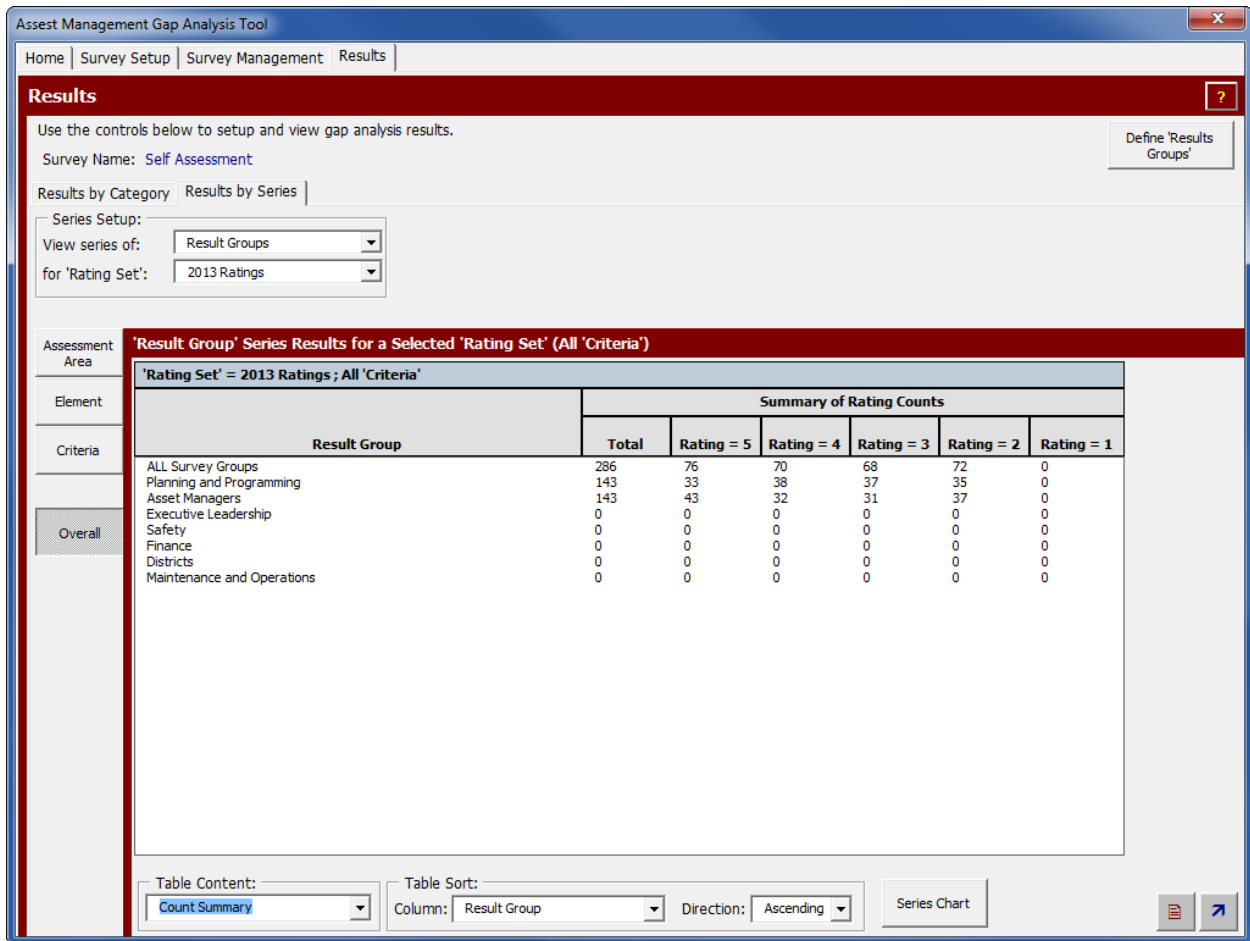


Figure 2-55. Example of the *Results by Series* subtab showing “Count Summary” table content.

- Details—To view detailed summary information associated with a selected results series, select “Details” from the “Table Content” drop-down list box. An example of the rating set details table content is displayed in figure 2-56. The remainder of this section describes the different columns of data that are displayed when a “Details” table content is selected.
 - Description column—The first column in the table contains descriptive information about the series items. If a series of rating sets is being displayed, the column will have a header of “Rating Set” and the column will show the names of all rating sets included in the series. If a series of results groups is being displayed, the column will have a header of “Results Group” and the column will show the names of all results groups included in the series.
 - “Count” column—The number of individual user ratings associated with the current survey definition item. This can also be described as the number of ratings that are used in the computation of that row’s statistical results.
 - “Non-Weighted Values” columns—Within the results table, there are five columns of data under the “Non-Weighted Values” heading. The data in each of these columns is computed **without** applying any user-defined weight factors during the results aggregation process. More specific definitions of the contents of each column are as follows:

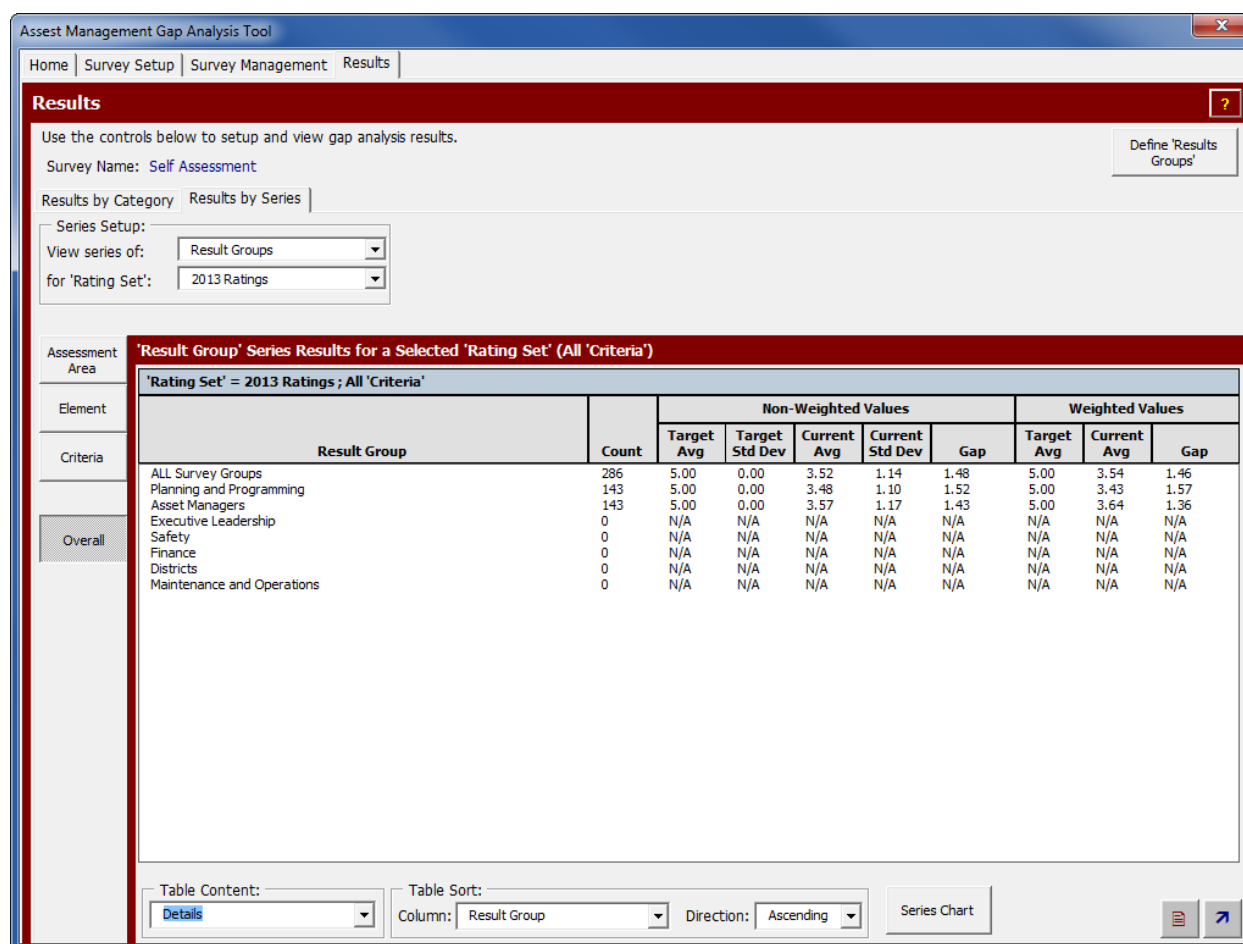


Figure 2-56. Example of the *Results by Series* tab showing “Details” table content.

- Non-Weighted Values “Target Avg” column—Simple average of the target ratings associated with **all** Criteria included in the current row in the results table.
- Non-Weighted Values “Target Std Dev” column—Simple standard deviation of the target ratings associated with **all** Criteria included in the current row in the results table.
- Non-Weighted Values “Current Avg” column—Simple average of the current rating values associated with **all** Criteria included in the current row in the results table.
- Non-Weighted Values “Current Std Dev” column—Simple standard deviation of the current rating values associated with **all** Criteria included in the current row in the results table.
- Non-Weighted Values “Gap” column—Computed difference between the current row’s non-weighted values “Target Avg” and non-weighted values “Current Avg” (i.e., “Target Avg” – “Current Avg”). Note: a displayed value of “Target Met” in this column indicates that the computed gap value is less than or equal to zero.
- “Weighted Values” columns—Within the results table, there are three columns of data under the “Weighted Values” heading. The values presented

in each of these columns are weighted-average values determined during the results aggregation process. Note that the applied weight factors are those user-defined weight factors defined for each Criteria, Element, and Assessment Area during the survey setup process. More specific definitions of the contents of each column are as follows:

- Weighted Values “Target Avg” column—Weighted average of the target ratings associated with **all** Criteria included in the current row in the results table.
- Weighted Values “Current Avg” column—Weighted average of the current rating values associated with **all** Criteria included in the current row in the results table.
- Weighted Values “Gap” column—Computed difference between the current row’s weighted values “Target Avg” and weighted values “Current Avg” (i.e., weighted “Target Avg” – weighted “Current Avg”). Note: a displayed value of “Target Met” in this column indicates that the computed gap value is less than or equal to zero.


Sorting the Results Table

The controls provided in the “Table Sort” frame allow you to sort the results in the main results table. Use the available values in the “Column” drop-down list box to select the column you want to use to sort the table, and choose “Ascending” or “Descending” from the “Direction” drop-down list box to set the sort order.

Series Chart

To view a visual chart of the current *Results by Series*, click the “Series Chart” button displayed at the bottom of the *Results by Series* subtab. Clicking this button will display a chart version of the results (weighted-average data only) currently being displayed in the main results table. When the chart is displayed, the *Chart Control* dialog box shown in figure 2-57 is also opened.

Within the *Chart Control* dialog, use the provided controls to accomplish the following:

- Select series items to display—Use the “Series Item Selector” list to select the specific series items you want to display on the chart. Click on items in the list to toggle between selecting and deselecting them.
- Set chart type—Set the chart type by selecting the desired “Line” or “Bar” chart type in the “Chart Type” frame.
- Print the chart—Click the “” button to open the “Print” dialog box that allows you to select an available printer and print the chart.
- Return to the Results by Series subtab—Click the “Return” button on the *Chart Control* dialog to close the chart and return to the *Results by Series* subtab.

Examples of the *Series* chart (with different chart types) are displayed in figures 2-58 and 2-59.

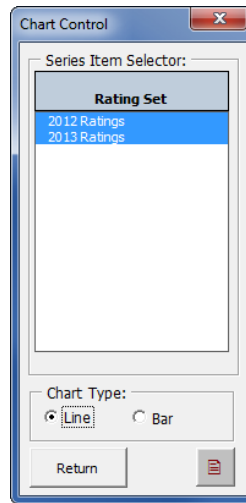


Figure 2-57. Chart Control dialog box for the Series chart.

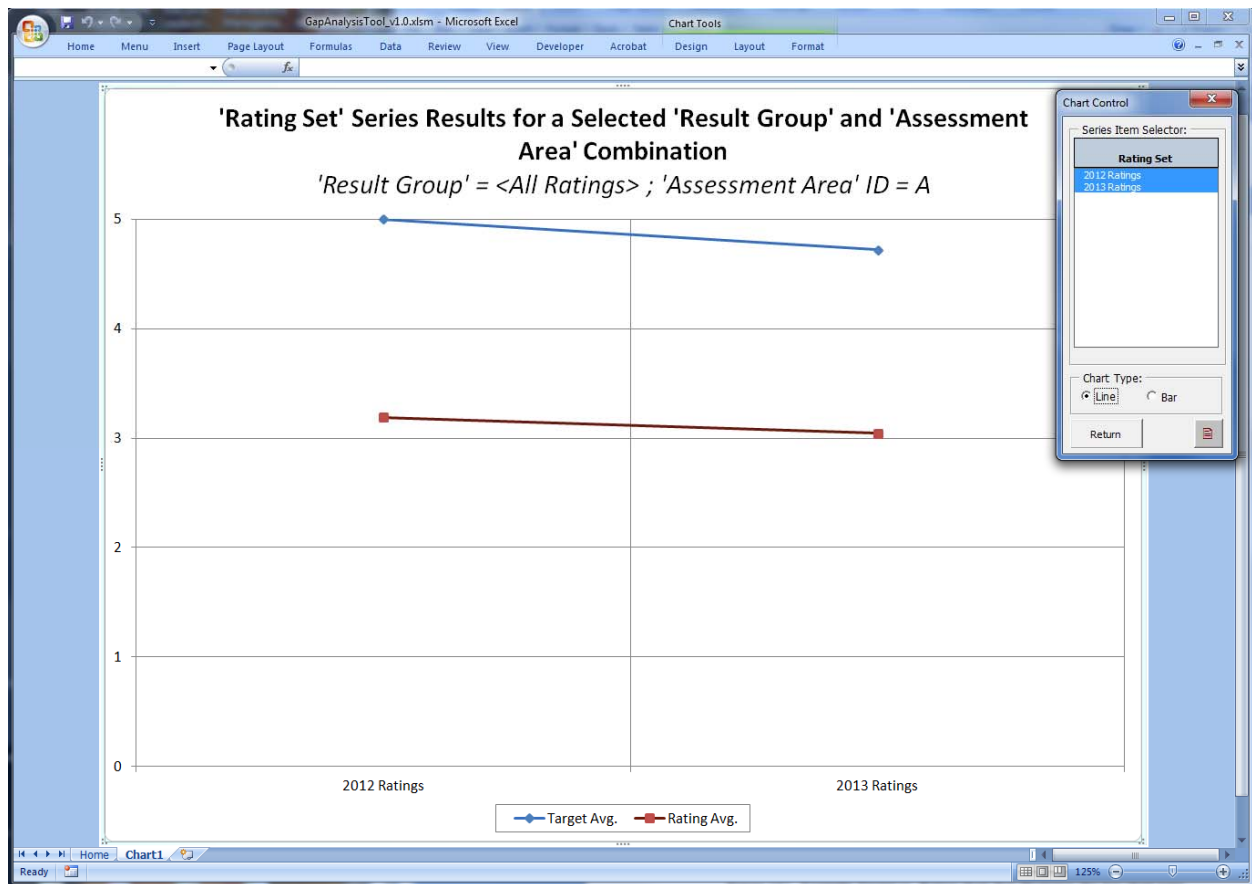


Figure 2-58. Example Series chart that illustrates the “Line” chart type.

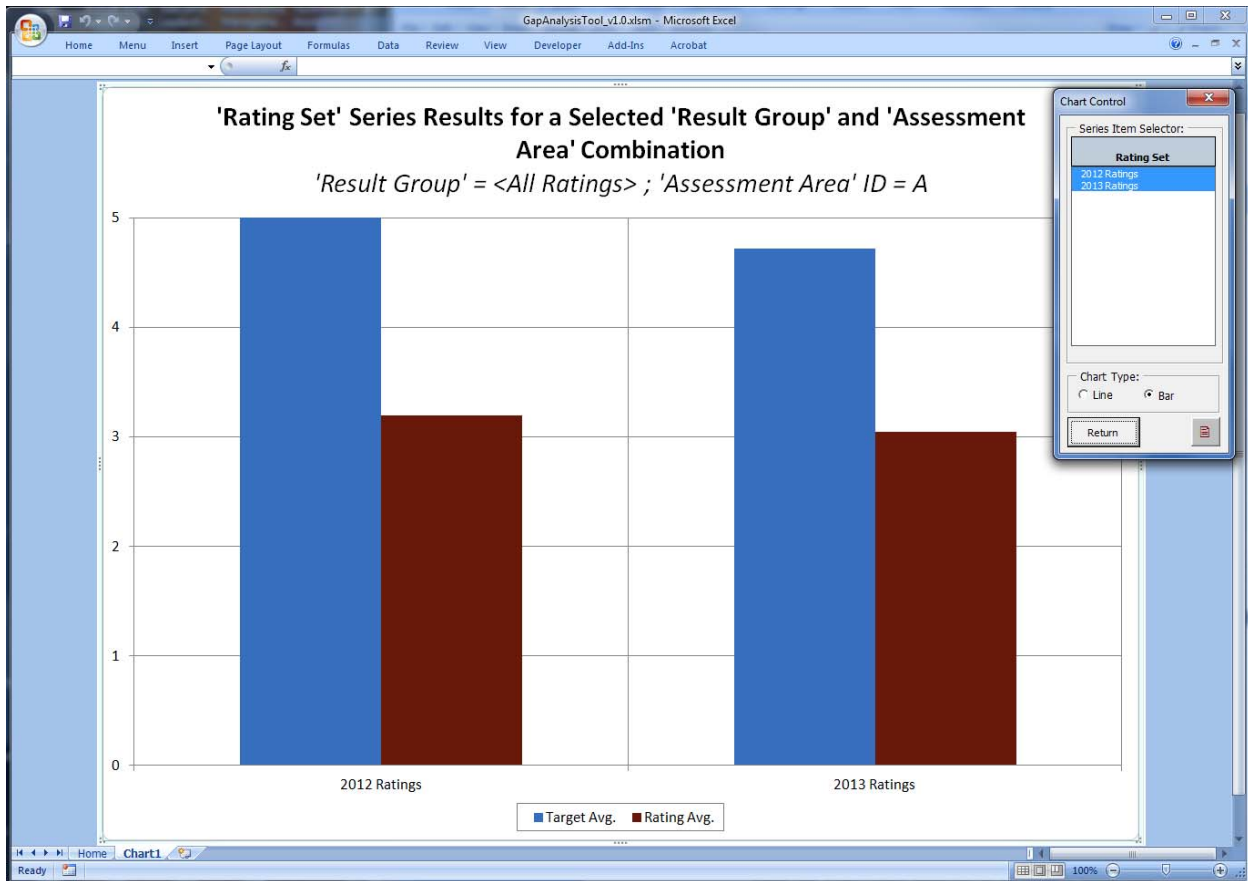






Figure 2-59. Example *Series* chart that illustrates the “Bar” chart type.

Printing and Exporting ‘Results by Series’ Results

To print or export the results, use the   buttons in the lower right hand corner of the *Results by Series* subtab. Details about each output method are provided below:

- **Print**—Click the print button (i.e., ) to open the “Print” dialog box that allows you to select an available printer and print a simple summary of information presented in the main results table on the *Results by Series* subtab. An example of the printed output is shown in figure 2-60.
- **Export to an Excel Workbook**—Click the export button (i.e., ) to open the *Export: Results by Series* dialog box shown in figure 2-61. This dialog box provides feedback about the series data that are being exported. Click the “Export” button to export the results to a new Excel workbook of your choosing. Click the “Cancel” button to close the dialog without exporting the data. An example of the exported *Results by Category* output is shown in figure 2-62.

Gap Analysis Tool Output: 'Results by Series' Summary

Survey Name: Self Assessment
 Results Type: Results by Series
 Description: 'Rating Set' Series Results for a Selected 'Result Group' and 'Assessment Area' Combination
 Selected 'Survey Group': <All Ratings>
 Selected 'Assessment Area': A. Policy Goals and Objectives

Rating Set	Count	Non-Weighted Values				Weighted Values			
		Target Avg	Target Std Dev	Rating Avg	Rating Std Dev	Gap Avg	Target Avg	Rating Avg	Gap Avg
2012 Ratings	30	5.00	0.00	3.20	0.92	1.80	5.00	3.19	1.81
2013 Ratings	30	4.60	1.00	3.07	1.14	1.53	4.72	3.05	1.68

Figure 2-60. Example of the printed *Results by Series* information.

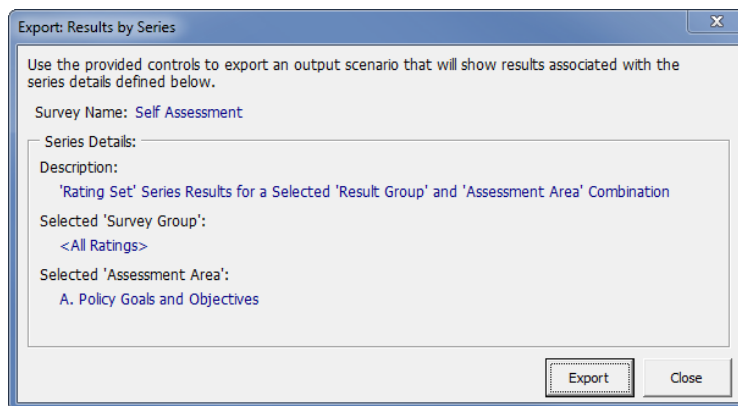


Figure 2-61. Example of the *Export Results by Series* dialog box.

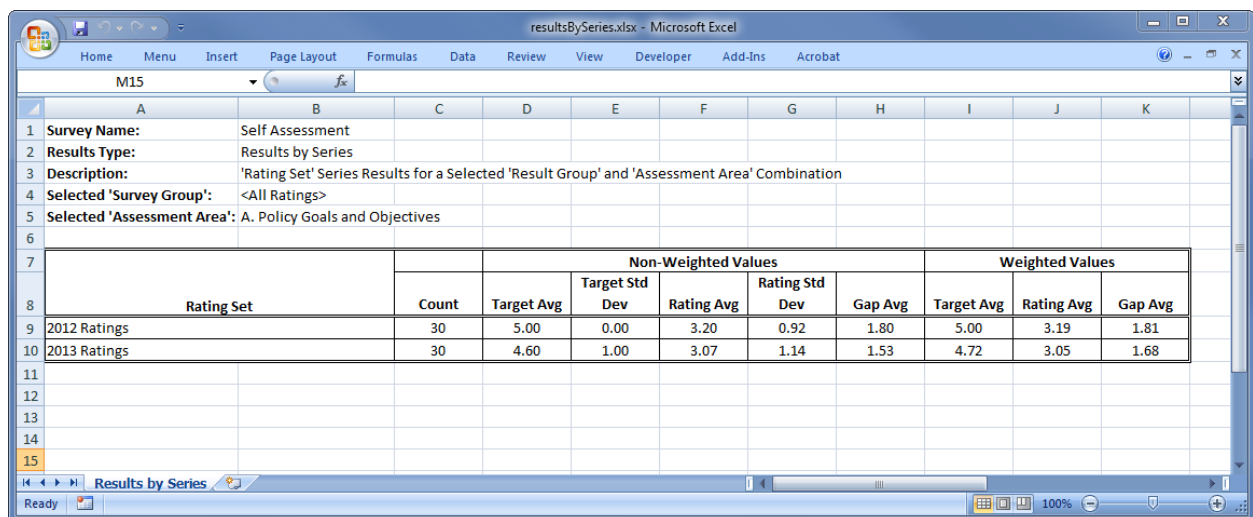


Figure 2-62. Example of the exported *Results by Series* information.

CHAPTER 3. USER SURVEY WORKBOOKS

Introduction

Within the gap analysis process, an analysis cannot be completed until data are collected from individual raters and imported back into the main Gap Analysis Tool. Therefore, soliciting and collecting rating data from selected agency personnel is a crucial part of the analysis process. Within the current gap analysis approach, all Criteria rating data are collected from selected agency personnel using customized Microsoft Excel workbooks referred to as User Survey Workbooks.

In the main Gap Analysis Tool workbook, the Tool Administrator uses the controls in the *Survey Management* tab to define survey group-specific lists of Criteria from a survey definition, and then exports only that selected list of Criteria to a separate User Survey Workbook. Therefore, by design, a produced User Survey Workbook contains only Criteria that the Tool Administrator has deemed appropriate for selected raters in that survey group.

The delivered User Survey Workbooks are also VBA-based (i.e., macro-driven) Excel workbooks that use a windows-based user interface to guide the rater through the rating process. The user interface not only helps the user navigate through the specific list of Criteria they have been asked to rate, but also provides feedback on the *status* of the survey (i.e., how many total Criteria the rater is being asked to rate, how many Criteria have and have not been rated so far, and so on). When completed, the rater saves the User Survey Workbook and submits it back to the Tool Administrator so that the user rating data can be collected from the User Survey Workbook, and imported into the main Gap Analysis Tool for use in selected analysis scenarios. This chapter provides general information about the User Survey Workbook, along with detailed instructions for recording user ratings for assigned Criteria.

Using the User Survey Workbook

As mentioned previously, while the User Survey Workbook is an Excel workbook, a form-based (i.e., windows-based) user interface has been implemented in the workbook to give the Tool more of a stand-alone Windows software feel. The user interface used by the User Survey Workbook consists of two main windows referred to as the *Home* and *Survey* pages. Detailed information on each of these pages is included in the sections below.

Home Page

When the User Survey Workbook is opened, the main user interface form (i.e., window) is featured with the main *Home* page displayed (see figure 3-1). The *Home* page has the following main functions:

- Provides the rater with general information and special instructions from the Tool Administrator.
- Solicits detailed rater-defined information about the rater and the survey itself (e.g., date completed).
- Provides feedback to the user about the current status of the user survey (e.g., feedback about how much of the survey has been completed).

Figure 3-1. Example of the *Home* page of the User Survey Workbook.

- Provides the user with access to additional input/output functions such as importing data from previous user surveys, and printing or exporting survey information.

Each of the specific controls on the *Home* page is described in detail below.

General Survey Information

The “General Survey Information” frame on the *Home* page provides the user with general identifying information about the current survey workbook, specific instructions for completing the survey, and access to help-type information for using the tool. More detailed explanations about the different information and controls provided in this frame are presented below.

- Survey Name—The *survey* (i.e., survey definition) from which the included Criteria are associated.
- Survey Group—The survey group with which the included Criteria are associated.
- “Specific Instructions” text box—This text box contains any survey group-specific special instructions entered by the Tool Administrator at the time the User Survey Workbook was created.

- **“Using This Survey Tool” button**—This button opens the *Detailed Instructions for Selected Topics* dialog box shown in figure 3-2. Use the “Selection” drop-down list box in this dialog box to select a topic of interest and view help information about that topic. Click the “OK” button to close the dialog and return to the *Home* page.

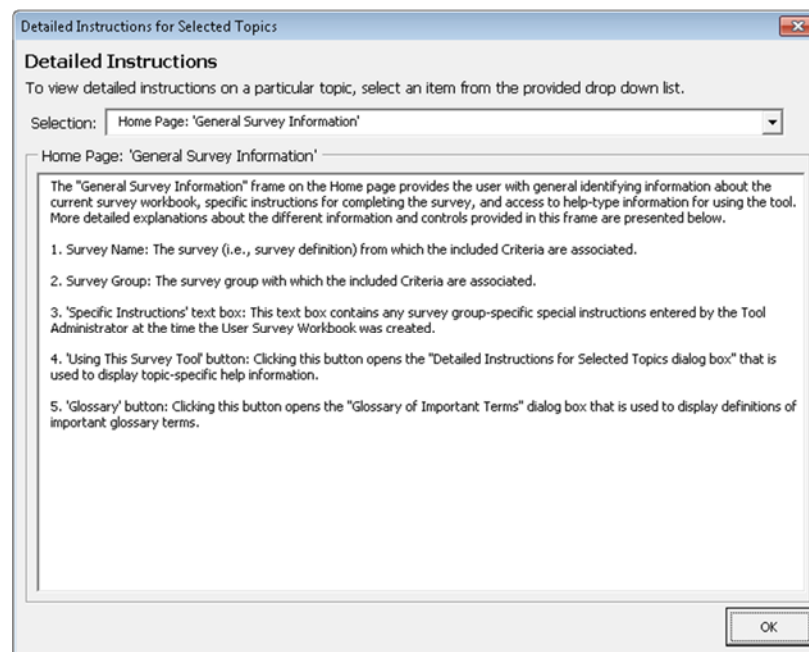


Figure 3-2. Example of the *Detailed Instructions for Selected Topics* dialog box.

- **“Glossary” button**—Click this button to open the *Glossary of Important Terms* dialog box shown in figure 3-3. Use the “Selection” drop-down list box on this dialog to select a glossary item of interest and view that item’s definition. Click the “OK” button to close the dialog and return to the *Home* page.

User-Defined Information

The “User-Defined Information” frame provides controls to solicit information from the user. Specific details about the different controls included in this frame are presented below.

- **“Rater Unique ID” text box**—Use this text box to enter a unique identifying string for the rater. Because the entered string must be unique to each rater, it is recommended that a unique identifier (such as a rater e-mail address) be used for this ID. Note: a rater unique ID **must** be entered in this text box before the User Survey Workbook can be saved.
- **“Survey Date” text box**—Enter a date in this field that indicates the date the survey was completed.
- **“Rater Comments” text box**—Use this text box to record any comments associated with the current survey. Note that any comments entered here are only for the benefit of the rater when opening this User Survey Workbook again; that is, these comments are **not** imported into the main Gap Analysis Tool when rating data are imported.

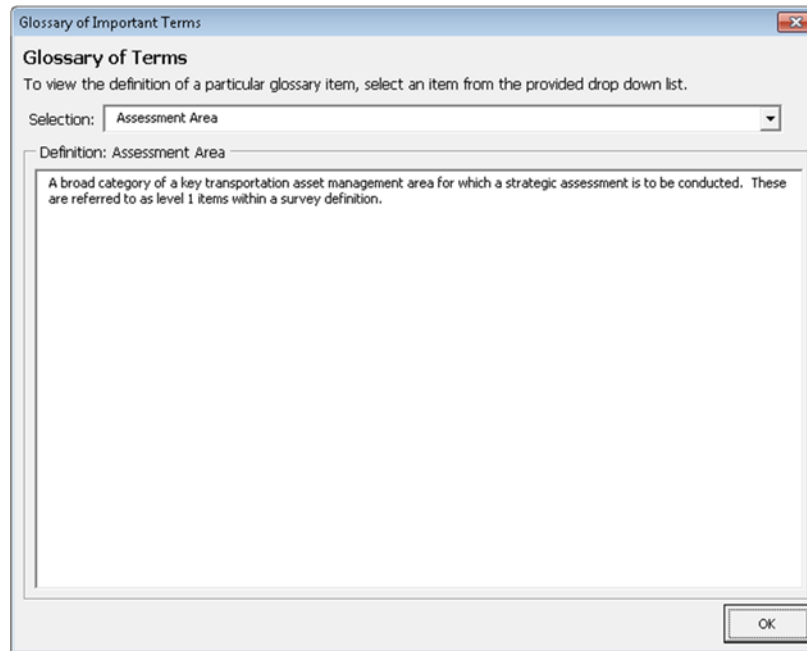


Figure 3-3. Example of the *Glossary of Important Terms* dialog box.

Import Previous Ratings

If similar *User Workbook Surveys* are sent out to selected users on an annual basis, the rater may want to import Criteria ratings from a previous survey (e.g., last year's ratings) as a starting point in the survey. If most ratings do not change from year to year, this feature has the potential to save a lot of time. However, note that this import process will only import rating information for those Criteria that **exactly** match those that are defined in the current User Survey Workbook (in other words, the survey name and Criteria descriptions must match exactly).

To import ratings from a previous User Survey Workbook, click the “Import Ratings from Previous Survey” button to open the *Import Rating Data from Other Workbook* dialog box shown in figure 3-4. Click the “Import” button in this dialog to open the *Select an Existing User Survey Workbook* dialog box shown in figure 3-5. Use the controls in the *Select an Existing User Survey Workbook* dialog box to browse to and select the existing *User Survey Workbook* file from which you want to import previous rating data.

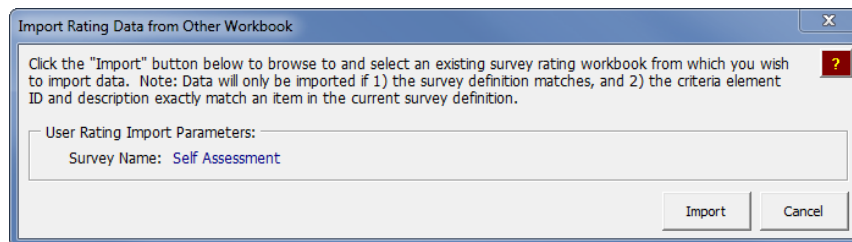


Figure 3-4. Example of the *Import Rating Data from Other Workbook* dialog box.

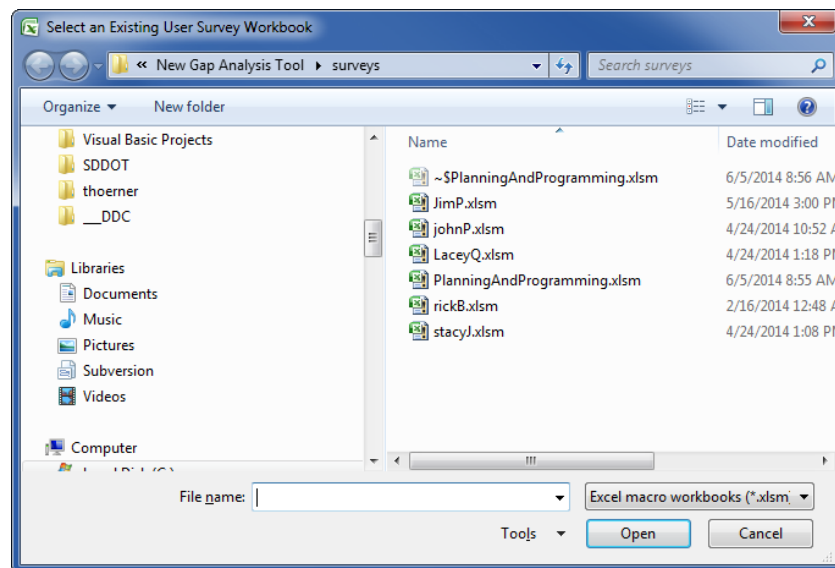


Figure 3-5. Example of the *Select an Existing User Survey Workbook* dialog box.

Survey Status Tree View

The survey status frame on the *Home* page provides color-coded feedback on the status of each Assessment Area and Element item in the provided survey definition tree (see figure 3-6). Note that this provided tree view control contains **only** those Assessment Area and Element items associated with Criteria that were specifically selected by the Tool Administrator for inclusion in the User Survey Workbook. Therefore, the contents of the tree view control may be a subset of the Assessment Area and Element items contained in the original survey definition.

Within the User Survey Workbook, individual survey Criteria items are marked as “Not Rated,” “Complete,” “Incomplete,” or “Skipped.” The “Survey Status” tree view Assessment Area and Element items, therefore, are color coded based on the collective status of the individual Criteria items that are associated with them. For each Element and Assessment Area tree view item, the status determination is based on the following prioritized rules:

- If all associated Criteria items have a status of “Complete” or “Skipped,” the tree view item’s status is set to “Complete.”
- If all associated Criteria items have a status of “Not Rated,” the tree view item’s status is set to “Not Rated.”
- For all other combinations of status for the associated Criteria items, the tree view item’s status is set to “Incomplete.”

As illustrated in figure 3-6, “Complete,” “Incomplete,” and “Not Rated” items are highlighted in the tree as green, yellow, and white, respectively.

Figure 3-6. Example of the *Home* page illustrating the use of color-coded feedback in the “Survey Status” tree view control.

Criteria Selection Count Summary

The “Criteria Selection Count Summary” frame at the bottom of the *Home* page displays a summary of Criteria status counts associated with 1) the entire survey (i.e., all of the criteria included in the User Survey Workbook) or 2) the currently selected tree item. The two different count summary modes are described in more detail below:

- **Entire Survey**—When the “Entire Survey” button is selected, the display area shows Criteria counts for the following:
 - **Total**—Total number of Criteria items included in the User Survey Workbook; that is, the total number of Criteria for which the Tool Administrator requested user ratings.
 - **Complete**—Number of Criteria items in the User Survey Workbook with a status of “Complete.”
 - **Skipped**—Number of Criteria items in the User Survey Workbook with a status of “Skipped.”
 - **Incomplete**—Number of Criteria items in the User Survey Workbook with a status of “Incomplete.”

- Not Rated—Number of Criteria items in the User Survey Workbook with a current status of “Not Rated.”
- Selected Tree Item—When the “Selected Tree Item” button is selected, the display area shows Criteria counts for the following:
 - Total—Total number of Criteria items associated with the currently selected tree item.
 - Complete—Number of Criteria items associated with the currently selected tree item that have a status of “Complete.”
 - Skipped—Number of Criteria items associated with the currently selected tree item that have a status of “Skipped.”
 - Incomplete—Number of Criteria items associated with the currently selected tree item that have a status of “Incomplete.”
 - Not Rated—Number of Criteria items associated with the currently selected tree item that have a status of “Not Rated.”

Accessing the ‘Survey’

Click the “Go To Survey” button to switch to the *Survey* page where user defined *current* and *target* ratings (if applicable) are entered. To jump to a particular Assessment Area or Element in the survey, select that item in “Survey Status” tree control and click “Go To Survey.”

Exiting the Workbook

To close the User Survey Workbook, click the “Exit Workbook” button. This action opens the *Close Workbook* dialog box shown in figure 3-7. Details on each of the buttons included in this dialog box are provided in the list below.

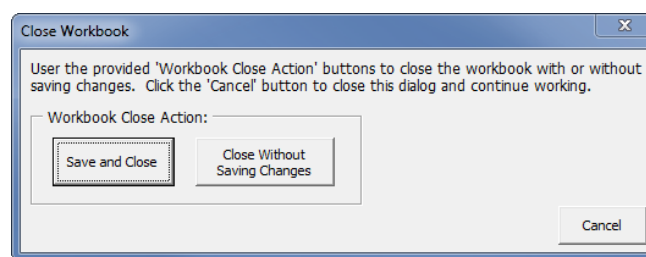


Figure 3-7. Example of the *Close Workbook* dialog box.

- “Save and Close” button—Click this button to save all changes in the User Survey Workbook and close the workbook. Note: when saving the workbook, the workbook will be checked to make sure that all fields have required data defined. If some data are found to be missing, an alert message box similar to the one in figure 3-8 will identify what data are missing.
- “Close Without Saving Changes” button—Click this button to close the workbook without saving any changes.
- “Cancel” button—Click this button to close the “Close Workbook” dialog and return to the *Home* page.

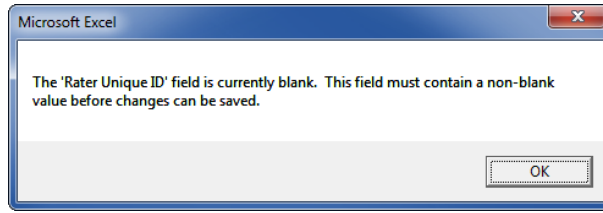





Figure 3-8. Sample alert dialog box that is displayed when required data have not been entered before attempting to save the workbook.

Printing and Exporting Data


To print or export User Survey Workbook information, use the   buttons in the lower left hand corner of the *Home* page. Details about each output method are provided below:

- **Print**—Click the print button (i.e., ) to open the “Print” dialog box that allows you to select an available printer and print a summary of the current User Survey Workbook information. An example of the printed output is shown in figure 3-9.

Survey Name: Self Assessment
 Survey Group: Planning and Programming
 Rater Unique ID:
 Rater Comments:
 Date: 6/5/2014
 Selection Summary: Total = 131, Complete = 0, Skipped = 0, Incomplete = 0, Not Rated = 131.

'Assessment Area' Information		'Element' Information		'Criteria' Information		Target Score (User-Defined)	Rating Score	Status
Key ID	Description	Key ID	Description	Key ID	Description			
A	Policy Goals and Objectives	A.1	Goals & Objectives	A.1.1	Agency goals and objectives are comprehensive, integrated with other statewide policy objectives, and supported by quantitative and measurable performance measures or criteria.	5	4	COMPLETE
				A.1.2	Agency goals and objectives consider the costs over the whole life of an asset and encourage strategies to lower life-cycle costs, to reduce agency risk, and to provide long-term benefits.	5	3	COMPLETE
				A.1.3	Agency goals and objectives are established based on reliable information on asset condition and public perceptions.	5	3	COMPLETE
				A.1.4	Reported system performance is measured against agency goals and objectives.	5	4	COMPLETE
				A.1.5	Agency leadership actively involves political leaders, community leaders, and other policy makers to establish system performance expectations that consider funding constraints, legislated requirements, public interests, and other similar factors.	-	-	SKIPPED
				A.1.6	Agency goals and objectives are aligned with asset management policies through the asset management plan.	5	-	INCOMPLETE
		A.2	Agency Policies	A.2.1	Agency policies encourage a business-oriented, customer-focused approach to asset management.	5	4	COMPLETE
				A.2.2	Resource allocation decisions among programs and across geographic regions are based on expected performance rather than historical splits or formulas that do not correlate with an objective indication of system condition.	5	5	COMPLETE
				A.2.3	Asset management systems are designed to provide meaningful information on policy choices and consequences.	5	4	COMPLETE
				A.2.4	Political pressure to influence resource allocation decisions is met with objective information related to system performance expectations.	5	3	COMPLETE
				A.2.5	An asset management policy is in place to guide investment decisions in transportation assets.	5	4	COMPLETE
				A.2.6	Policies and procedures are in place for the rapid and structured response to emergency management situations and for business continuity planning.	5	5	COMPLETE

Figure 3-9. Example of the printed User Survey Workbook information.

- Export to an Excel Workbook—Click the export button (i.e., ) to open the *Export: Survey Rating Summary Details* dialog box shown in figure 3-10. Click the “Export” button to export the current survey information to a new Excel workbook of your choosing. Click the “Cancel” button to close the dialog without exporting the data. An example of the exported User Survey Workbook output is shown in figure 3-11.

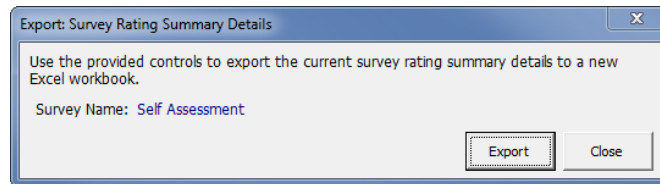


Figure 3-10. Example of the *Export: Survey Rating Summary Details* dialog box.

'Assessment Area' Information		'Element' Information		'Criteria' Information		Target Score (User-Defined)	Rating Score	Status
Key ID	Description	Key ID	Description	Key ID	Description			
A	Policy Goals and Objectives	A.1	Goals & Objectives	A.1.1	Agency goals and objectives are comprehensive, integrated with other statewide policy objectives, and supported by quantitative and measurable performance measures or criteria.	5	4	COMPLETE
				A.1.2	Agency goals and objectives consider the costs over the whole life of an asset and encourage strategies to lower life-cycle costs, to reduce agency risk, and to provide long-term benefits.	5	3	COMPLETE
				A.1.3	Agency goals and objectives are established based on reliable information on asset condition and public perceptions.	5	3	COMPLETE
				A.1.4	Reported system performance is measured against agency goals and objectives.	5	4	COMPLETE
				A.1.5	Agency leadership actively involves political leaders, community leaders, and other policy makers to establish system performance expectations that consider funding constraints, legislated requirements, public interests, and other similar factors.	-	-	SKIPPED
				A.1.6	Agency goals and objectives are aligned with asset management policies through the asset management plan.	5	-	INCOMPLETE
		A.2	Agency Policies	A.2.1	Agency policies encourage a business-oriented, customer-focused approach to asset management.	5	4	COMPLETE
				A.2.2	Resource allocation decisions among programs and across geographic regions are based on	5	5	COMPLETE

Figure 3-11. Example of the exported User Survey Workbook information.

Survey Page

When the user clicks the “Go To Survey” button on the *Home* page, the *Survey* page is displayed (see figure 3-12). The main function of the *Survey* page is to collect all necessary *current* and *target* ratings (if necessary) from the rater. To accomplish this task, the provided user interface is divided into two distinct parts:

- A set of controls at the top of the “Current Criteria Categories” frame that allow you to navigate through the survey.
- A “Current Detailed Criteria List” at the bottom of the page that displays detailed rating information associated with the current selected Element.

Asset Management Gap Analysis - Survey Tool

Use the controls below to provide your scores to all assigned criteria. Use the 'Previous' and 'Next' buttons to move to another group of criteria (i.e., another 'Element'). Assign your ratings in the 'Criteria List' area.

Return To 'Home' Page

Current Criteria Categories

Criteria Category	Description	Category Index
Assessment Area	B. Transportation Asset Management (TAM) Practices	2 of 8
Element	B.3. Asset Management Plan Development	1 of 2

Previous

Next

Current Detailed Criteria List

Criteria Index	ID	'Criteria' Description	Target Rating	Current Rating	Skip?	Status
1 of 9	B.3.1	The agency uses a documented process for identifying asset requirements and developing investment strategies that are linked to the financial plan that is consistent and systematic.	5	5	<input type="checkbox"/>	COMPLETE
2 of 9	B.3.2	Adequate resources are provided for developing the asset management plan.	5	4	<input type="checkbox"/>	COMPLETE
3 of 9	B.3.3	The agency has developed an asset management plan that meets or exceeds federal requirements and that documents how trends in road usage and state demographics are reflected in agency objectives and investment strategies.	5	5	<input type="checkbox"/>	COMPLETE
4 of 9	B.3.4	The agency identifies gaps in actual and future (predicted) performance and investment strategies to reduce the gaps.	5	4	<input type="checkbox"/>	COMPLETE
5 of 9	B.3.5	Asset investment strategies contained in the asset management plan are fully aligned with projects recommended in the agency's statewide improvement plans.	-	-	<input checked="" type="checkbox"/>	SKIPPED
6 of 9	B.3.6	Risks have been identified, recorded, and assessed against the agency's strategic objectives at a level of detail appropriate to the risk exposure.	5	-	<input type="checkbox"/>	INCOMPLETE
7 of 9	B.3.7	Financial and performance forecasts included in the asset management plan are based on sound asset information and analysis.	4	5	<input type="checkbox"/>	COMPLETE
8 of 9	B.3.8	The asset management plan is a concise document providing sufficient information to demonstrate that agency assets are being appropriately maintained.	5	-	<input type="checkbox"/>	INCOMPLETE

Page Up Page Down Criteria Page: 1 of 2 View Rating Scale

Figure 3-12. Example of the *Survey* page of the User Survey Workbook.

More detailed information on the *Survey* page controls is provided below.

Survey Navigation Controls

The controls provided in the top of the “Current Criteria Categories” frame are used to navigate the list of Criteria included in the User Survey Workbook. Descriptions of the individual survey navigation controls are described separately below.

“Assessment Area” and “Element” Drop-Down List Boxes

The “Assessment Area” and “Element” drop-down list boxes are used to quickly jump to the list of Criteria associated with the selected items in these drop-down list boxes. Specific details associated with each of these controls are included in the following list.

- “Assessment Area” drop-down list box—Use this drop-down list box to display Criteria items (in the “Current Detailed Criteria List” frame) that are associated with a particular Assessment Area. Note that when you choose a particular Assessment Area in this drop-down list box, the “Element” drop-down list box will be populated with only those Element items associated with the selected Assessment Area.

- **“Element” drop-down list box**—Use this drop-down list box to display Criteria items (in the “Current Detailed Criteria List” frame) that are associated with a particular Element.

Note that the “Category Index” column next to the “Assessment Area” and “Element” drop-down list box indicate 1) the position of the currently selected item in the corresponding drop-down list box, and 2) the total number of items in the corresponding drop-down list box. For example, a “Category Index” column value of “2 of 6” indicates you are currently viewing the second of six total items in the corresponding drop-down list box.

“Next” and “Previous” Buttons

The “Previous” and “Next” buttons are provided so that the rater may “walk through” the survey (forwards or backwards, respectively) one step at time. It is important to remember, however, a maximum of eight Criteria items can be displayed at one time. Therefore, when an Element has more than eight associated Criteria, the Criteria are divided into multiple *pages* of Criteria. More specific details are provided below on how the “Next” and “Previous” buttons are used to navigate the survey Criteria list.

- **“Next” button**—Depending on the current location within the survey (i.e., depending on what list of Criteria are currently being displayed), a click of the “Next” button will do one of the following:
 - Advance the survey to the next *page* of Criteria for the current Element. This will only occur when the current Element has multiple *pages* of Criteria, and you are **not** currently on the last page.
 - Advance the survey to the next Element ID in the survey within the same *Assessment Area*. This will occur when both of the following are true: 1) the current Element is **not** the last Element in the current Assessment Area, and 2) the current Element has just one *page* of Criteria (or for an Element with multiple pages of criteria, the last *page* of Criteria is currently being displayed).
 - Advance the survey to the next *Assessment Area ID* in the survey. This will occur when the following are all true: 1) the current Element is the last Element in the current Assessment Area, 2) the current Element has just one *page* of Criteria (or for an Element with multiple pages of criteria, the last *page* of Criteria is being displayed), and 3) the current Assessment Area is **not** the last Assessment Area in the survey.
- **“Previous” button**—Depending on the current location within the survey (i.e., depending on what list of Criteria are currently being displayed), a click of the “Previous” button will do one of the following:
 - Advance the survey to the previous *page* of Criteria for the current Element. This will only occur when the current Element has multiple *pages* of Criteria, and you are **not** currently on the first page.
 - Advance the survey to the previous Element ID in the survey within the same *Assessment Area*. This will occur when both of the following are true: 1) the current Element is **not** the first Element in the current Assessment Area, and

- 2) the current Element has just one *page* of Criteria (or for an Element with multiple pages of criteria, the first *page* of Criteria is currently being displayed).
- Advance the survey to the previous Assessment Area ID in the survey. This will occur when the following are all true: 1) the current Element is the first Element in the current Assessment Area, 2) the current Element has just one *page* of Criteria (or for an Element with multiple pages of criteria, the first *page* of Criteria is being displayed), and 3) the current Assessment Area is **not** the first Assessment Area in the survey.

“Page Up” and “Page Down” Buttons

On the *Survey* page, a maximum of eight Criteria can be shown at one time in the “Current Detailed Criteria List” frame. Therefore, when a given Element has more than eight associated Criteria, the Criteria are divided up into *pages*, and the “Page Up” and “Page Down” buttons are displayed (see figure 3-12). Use the “Page Up” and “Page Down” buttons to move between pages of Criteria for a given Element.

“Current Detailed Criteria List” Table

The controls within the “Current Detailed Criteria List” table are used to define *current* ratings for all included Criteria, and *target* ratings if the Tool Administrator chose a target definition method of “User Defined.” This table can display up to eight rows (i.e., Criteria) at one time, with each row presenting the details associated with a single Criteria. The specific Criteria presented in the table are always reflective of the Assessment Area and Element selected in the drop-down list boxes at the top of the “Current Criteria Categories” frame. Detailed explanations of each column in the “Current Detailed Criteria List” table are included below.

- “Criteria Index” column—The data in this column provide an indicator of the total number of Criteria within the current Element, and the position of the current Criteria item within that list.
- “ID” column—The key ID associated with the current row’s Criteria value.
- “Criteria’ Description” column—The full description of the current row’s Criteria.
- “Target Rating” column—*Target* ratings are integer values between 1 and 5 that indicate the agency’s current achievable implementation level of a particular Criteria item. However, the contents of this column (and even whether or not the column is visible) is dependent on the Tool Administrator’s choice for target definition method at the time of User Survey Workbook creation. The different characteristics of this column (depending on the chosen target definition method) are described below.
 - Target Definition Method = “User Defined”—When the “User Defined” target definition method is specified, the rater is asked to enter a *target* rating in addition to a *current* rating. Therefore, for this case the data entry controls are included in the “Target Rating” column so the user can define *target* ratings. The up and down arrows can be used to set the *target* rating to an integer value between 1 and 5. Figure 3-13 illustrates the look of the *Survey* page when the “User Defined” target definition method is selected.

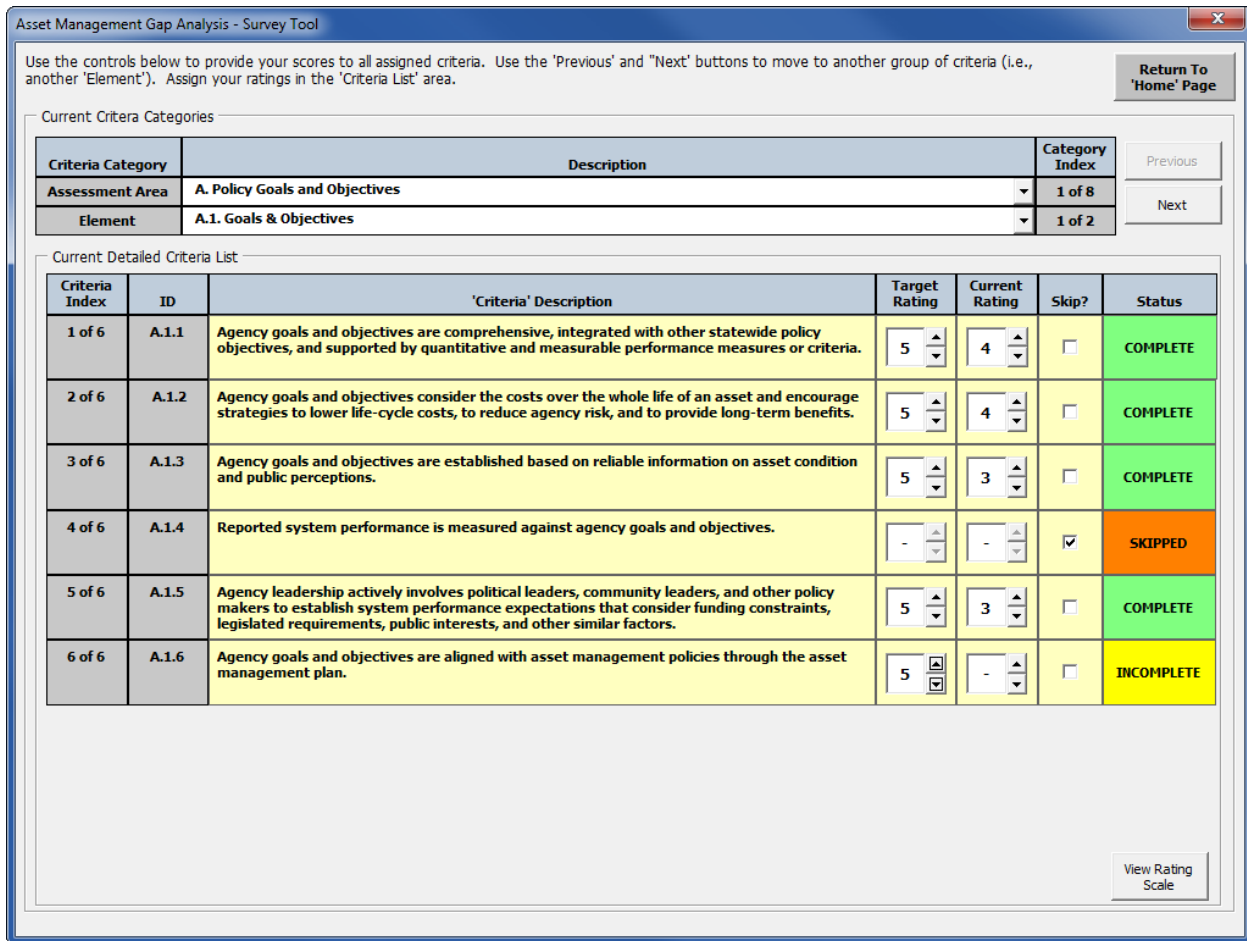


Figure 3-13. Example of the *Survey* page with the “User Defined” target definition method selected.

- Target Definition Method = “Agency Defaults (Visible to Rater)”—When the “Agency Defaults (Visible to Rater)” target definition method is specified, the agency default *target* ratings are shown in the “Target Rating” column, but are not editable. The agency default targets are simply provided for reference. Figure 3-14 illustrates the look of the *Survey* page when the “Agency Defaults (Visible to Rater)” target definition method is selected.
- Target Definition Method = “Agency Defaults (Hidden from Rater)”—When the “Agency Defaults (Hidden from Rater)” target definition method is specified, the agency default *target* ratings are used, but are hidden from the user. For this case, the entire “Target Rating” column is removed from the table. Figure 3-15 illustrates the look of the *Survey* page when the “Agency Defaults (Hidden from Rater)” target definition method is selected.
- “Current Rating” column—User-defined *current* ratings are entered in this column using the up and down arrows. *Current* ratings are integer values between 1 and 5 that record the rater’s estimate of the current implementation level of a particular Criteria item. For more details on the meaning of the integer rating scale, click the “View Rating Scale” button to open the *Gap Analysis Rating Scale* dialog box.

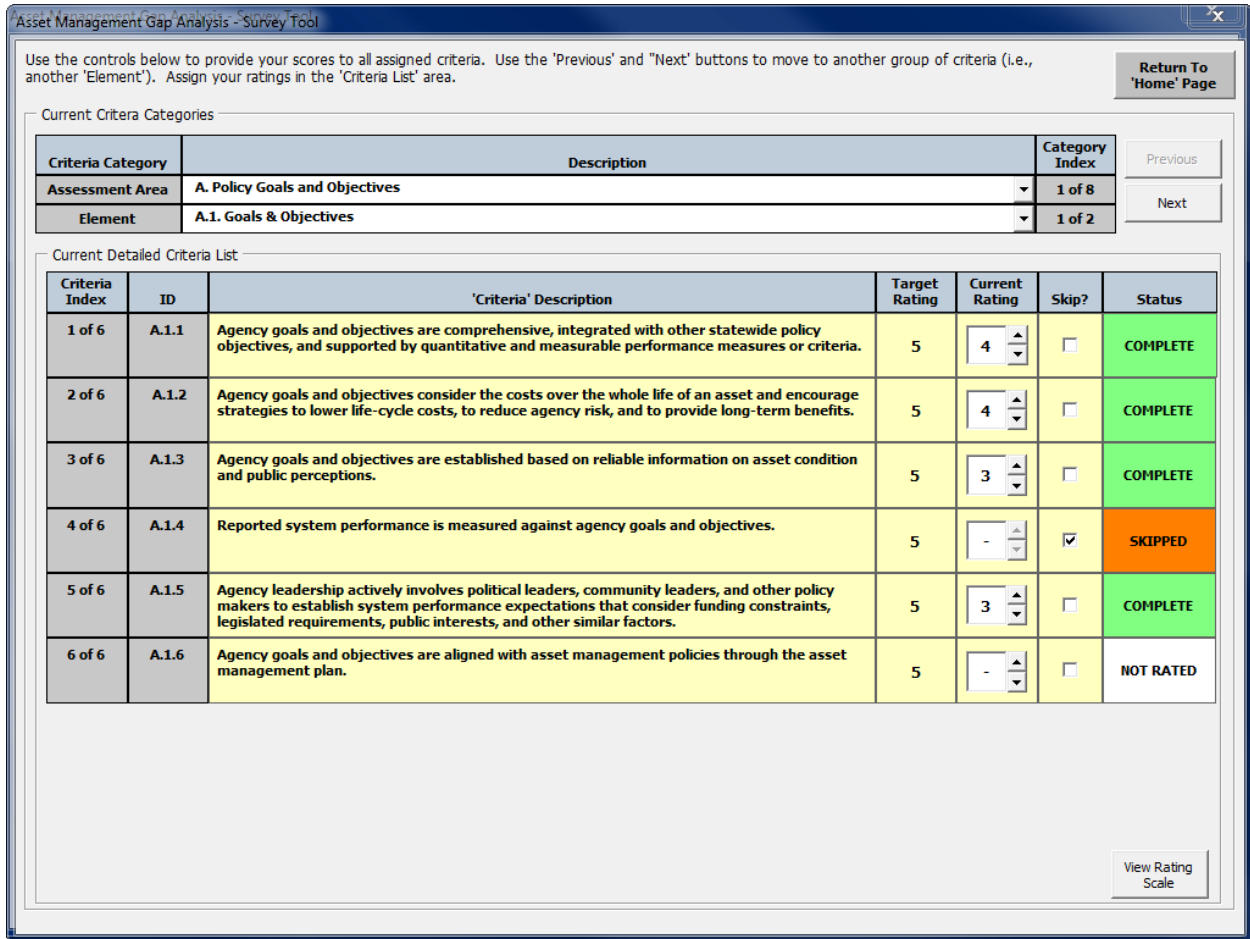


Figure 3-14. Example of the *Survey* page with the “Agency Defaults (Visible to Rater)” target definition method selected.

- **“Skip?” column**—This column contains check boxes that the user checks to indicate that the current Criteria is being intentionally skipped in the survey.
- **“Status” column**—This column indicates the rating status of the current Criteria row. The following four different status types are possible:
 - **Complete**—A status of “Complete” is displayed when the both *target* and *current* ratings have been defined for the current Criteria.
 - **Not Rated**—A status of “Not Rated” is displayed when one of two different scenarios occur.
 1. The target definition method is set to “User-Defined,” and both the *target* and *current* ratings have not been set.
 2. The target definition method is set to “Agency Defaults (Visible to Rater)” or “Agency Defaults (Visible to Rater),” and the *current* rating has not been set.
 - **Incomplete**—When the target definition method is set to “User-Defined,” the status will be “Incomplete” when one of the *target* and *current* ratings has been set, but the other has not.
 - **Skipped**—A status of “Skipped” is displayed when the user has checked the checkbox in the “Skipped?” column.

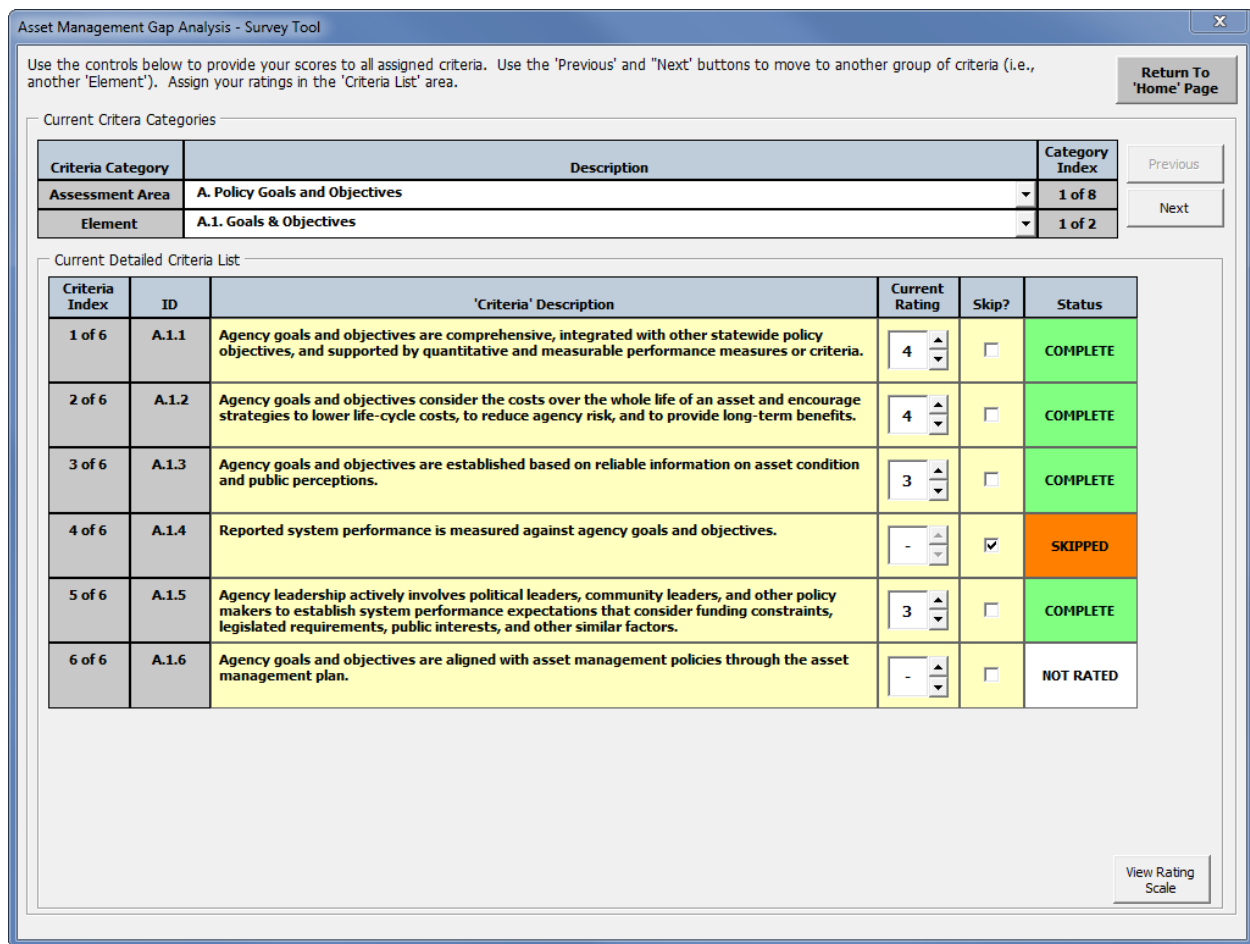


Figure 3-15. Example of the *Survey* page with the “Agency Defaults (Hidden from Rater)” target definition method selected.

View Rating Scale

Click the “View Rating Scale” button to open the *Gap Analysis Rating Scale* dialog box shown in figure 3-16. This dialog provides quick access to the table that provides guidance for assessing the differences between each of the maturity levels within each area. Click “OK” to close the dialog box.

Return to Home Page

Click the “Return To ‘Home’ Page” button to switch to the *Home* page in the user interface.

Gap Analysis Rating Scale

Rating Scale

Maturity Scale	Processes	Frequency	Sub-element Emphasis	Process Formality	Data & Technology	Outputs & Results
1	Initial stages of inquiry; focus is on literature search and peer reviews/calls	Occasionally do this	Receives minimal emphasis; some efforts underway	Done informally only; ad hoc procedures; minimal documentation; no organizational integration	Manual system exists; plans for automated system in place	Minimal results; long way to go
2	Identify nature/extent of capital assets; prompted by new financial reporting	Sometimes done on an as-needed basis for critical programs and activities	Moderately emphasized; try to adhere to this	Semiformal process; some routine procedures exist; limited organizational integration	Automated system exists; meets basic needs	Some results; still below expectations
3	Processes identify, assess, and value infrastructural assets; focus on preservation and replacement / rehabilitation	Often do this on many programs and activities	Generally emphasized; something that is done and checked	Formal process exists; modestly documented; good but still evolving; some organizational integration	Good system in place; widely available; meets all key user needs	Good results getting there
4	Processes extend to life-cycle development and preservation	Usually do this; omitted only in exceptional circumstances	Strongly emphasized; used to measure and reward by	Formal documented process; well-tested and well followed; considerable organizational integration	Strong system in place; fully integrated; meets nearly all user needs	Excellent results; still some room to improve
5	Fully integrated processes; across all functions; flexible to change	Always do this; standard operating procedure	Heavily emphasized; one of the principles by which business is done	Mastery of formal processes; well-documented; standardized; full organizational integration	State-of-the-art system in place; always seeking betterment	Unparalleled results; fully engaged organization; a total success

OK

Figure 3-16. Gap Analysis Rating Scale dialog box.

CHAPTER 4. IMPLEMENTATION

Introduction

The mechanics of operating the Gap Analysis Tool were presented in Chapters 2 and 3. This chapter focuses on the use of the Tool to improve practices within the organization. It begins with a section on the implementation and use of the Gap Analysis Tool. In this section, the user is provided guidance in setting up the Tool to fit the needs of the agency. For instance, this section includes a discussion of the advantages and disadvantages of setting user-defined targets rather than agency default targets and provides guidance as to which Assessment Areas, Elements, and Criteria to send to different groups within an agency.

The next section of this chapter provides guidance in interpreting and using the results of the gap analysis to improve practices. Information is provided on interpreting the various scores that are provided, comparing results across years or across survey groups, and using the results to identify needed changes. This is followed by a section containing suggestions for helping an agency move from one level of maturity to another. The chapter then concludes with a summary of the benefits to conducting a gap analysis and using the results to develop an Asset Management Implementation Plan.

Implementation and Use of the Gap Analysis Tool

The purpose of a gap analysis is to identify and prioritize areas in which the agency is not performing at the desired level of maturity. These “gaps” in performance represent elements of the agency’s asset management program that are not well understood, are not well supported, or are not fully integrated into the decision-making process. Gathering a cross-section of agency representatives to discuss the results of the gap analysis will help agency leadership better understand the factors contributing to each gap and the resources that would be needed to address the gap. This discussion should culminate in the development of an Asset Management Improvement Plan that identifies the actions that will be taken, the individuals responsible for completing each activity, and the completion schedule. The Implementation Plan should be reviewed periodically and agency reassessments, using the Gap Analysis Tool, should be an integral part of an agency’s asset management culture.

As discussed throughout this User’s Guide, the Gap Analysis Tool has been designed to provide a great deal of flexibility to the user in how the Tool is used to identify gaps. For instance, the user can add, delete, or modify Assessment Areas, Elements, and Criteria to ensure that the evaluation focuses on items of greatest importance to the agency. In addition, the Tool provides the user with flexibility in terms of which Criteria are sent to different agency representatives and how the results are grouped to perform different types of analyses.

To help use the Tool most effectively, this section of the User’s Guide provides guidance in the following five areas:

- Establishing Targeted (or Desired) Performance.
- Setting Up the Survey.
- Distributing the User Survey Worksheets.
- Establishing and Using Result Groups.
- Repeating the Survey in Future Years.

Establishing Targeted (or Desired) Performance

The Gap Analysis Tool provides two options for setting targeted or desired performance levels for each of the Criteria being rated: either the agency can set default targets or they can be calculated based on ratings provided as part of the survey process. Performance targets are scored based on the same 1 to 5 rating scale used to evaluate current agency performance, with a 5 representing a mature program and a 1 representing an agency in the initial stages of establishing a program. A correlation between the rating scale and the overall level of maturity (as described in the AASHTO *Transportation Asset Management Guide – A Focus on Implementation*) is provided in table 4-1.

Table 4-1. Correlation of rating scale and maturity levels.

Rating Scale Used in Gap Analysis Tool	Maturity Level (from AASHTO 2011)
1	Level 1 - Initial
2	Level 2 – Awakening
3	Level 3 – Structured
4	Level 4 – Proficient
5	Level 5 – Best Practice

Each of the Criteria included in the Gap Analysis Tool (and presented in Appendix B) was designed to represent best practice within an asset management program. Therefore, it is reasonable that an agency may elect to set the targeted performance at a rating of “5” for each of the Criteria considered in the gap analysis. However, it is possible that there are instances in which an agency might only establish a rating of “4” as the target. For example, under the Assessment Area of Data Management and under the Element “Asset Inventory,” the following Criteria are included:

- The agency maintains an inventory of state-maintained pavement assets that is complete, accurate, and current.
- The agency maintains an inventory of state-maintained bridge assets that is complete, accurate, and current.
- The agency maintains an inventory of other state-maintained assets that is complete, accurate, and current.

For a variety of reasons, it is feasible that an agency could set a target of 5 for pavements and bridges, since those are critical assets in most organizations. However, if it is not practical for the agency to establish complete inventories for all of the other state-maintained highway assets, the agency might establish a rating of 3 or 4 as the target for the last of the Criteria listed above. The Tool provides the flexibility to allow an agency to establish a separate rating target for each Criterion.

The ‘Survey Management’ tab allows the Tool Administrator to determine whether user-defined or agency-default targets will be used during the survey process. If the Tool Administrator elects the option to set user-defined targets, each of the survey participants will be asked to set both a target rating and a current rating for each Criteria included in their ‘User Survey Workbook.’

When the surveys are imported back into the Gap Analysis Tool, the target value is calculated from the surveys submitted and both weighted and straight averages are presented in the results. If, on the other hand, the Tool Administrator chooses the option to use agency default targets, these values will be entered as prompted in the 'Survey Management' tab. If agency default targets are used, a single target is entered by the Tool Administrator for each Criteria. Therefore, when results are presented the target rating reflects the value selected by the Tool Administrator rather than a value calculated by the raters. The Tool Administrator is also given the choice of "displaying" or "not displaying" the agency default target rating on the survey worksheets distributed to the raters. For more information on performing these options, see page 32 of the User's Guide.

The decision to select either user-defined or agency default targets is typically a function of 1) the institutional knowledge of asset management within the agency, 2) the culture of the organization, and 3) the amount of time the raters will spend completing the survey. General guidance on this decision is presented below.

- Select user-defined targets when:
 - There is a strong culture of asset management within the organization and the program objectives are well understood.
 - The organizational culture is very inclusive and employee input is regularly used to influence decisions.
 - The Tool Administrator does not have the authority, knowledge, and/or support to enter the agency ratings.
 - Individuals selected to participate in the gap analysis will invest the time in providing thoughtful ratings for both the targeted performance and the current performance of the agency.
- Use agency default targets when:
 - The Tool Administrator has the authority, knowledge, and support to enter the agency ratings.
 - The agency is in the early stages of implementing asset management.
 - The agency plans to set most, or all, of the targets at a rating of "5."
 - There is some concern that the survey needs to be kept as short as possible to be completed. By selecting agency default targets, this cuts the ratings on each survey in half.
- Choose to display the agency default targets on the 'Survey Worksheet' when:
 - It is important to provide a reference for the raters to use to determine a rating for current agency performance. For instance, if it is important for the raters to know the agency's target is "5" when rating current performance, then the agency default targets should be displayed.

Setting Up the Survey

One of the most important jobs of the Tool Administrator is to perform the activities required under the 'Survey Setup' tab. In particular, the Tool Administrator is responsible for 1)

determining whether any changes are needed to the Assessment Areas, Elements, and Criteria, and 2) setting weights for Assessment Area and Element. The operation of these functions is described beginning on page 16 of the User's Guide.

Changes to Assessment Areas, Elements, or Criteria

The Assessment Areas, Elements, and Criteria provided in the Gap Analysis Tool (and documented in Appendix B) are intended to comprehensively address the most important aspects of a strong asset management program, as shown in table 4-2. In rare instances, there may be additional Assessment Areas and Elements that are unique to a particular agency that need to be added to the gap analysis. If so, the Tool provides the ability to add these items to the survey and save them for use in future years. The Tool also allows the Tool Administrator to delete an Assessment Area or Element from the gap analysis, but caution should be exercised before electing to use this feature since a comprehensive gap analysis that is intended to benchmark agency practice to best practice really needs to include each of these items. The Tool Administrator can also modify the wording used in describing the Assessment Areas and Elements if there are more appropriate agency-specific terms that would help the raters better understand what is being evaluated. For instance, the 'Compliance' Element under the 'Results' Assessment Area includes Criteria related to whether Federal and State legislation requirements are addressed in the agency's asset management plans and programs. An agency might elect to modify the title of this Element to specific legislation, such as MAP-21, if that language will resonate better with agency personnel.

The more common changes that are expected to be made in the 'Survey Setup' tab are to the individual Criteria so they are better suited to the specific needs of the agency. As with the Assessment Areas and Elements, an agency can add, delete, or modify the Criteria within the Tool.

When considering making changes to the Assessment Areas, Elements, or Criteria, the following guidance is offered:

- Retain at least two Criteria for each Element and at least two Elements within each Assessment Area so the averages are meaningful.
- Consider rating a particular Assessment Area or Element even if it is not currently important to the agency. To provide a broad assessment of the agency's asset management program there may be merit in rating the gaps in all Assessment Areas and Elements rather than deleting these items from the survey. The decision as to which gaps will actually be addressed is considered during the process of developing the Implementation Plan. Thus, an Assessment Area or Element that is not of great importance to an agency now may be reported as part of the gap analysis but not necessarily addressed in the Implementation Plan.
- Save the changes that are made to the 'Survey' in the 'Survey List' for future use. By doing this, modifications to the survey are preserved for use in a future gap analysis.

Table 4-2. Assessment Areas and Elements in the Gap Analysis Tool.

Assessment Areas	Elements
1: Policy Goals and Objectives	<ul style="list-style-type: none"> • Goals and Objectives • Agency Policies
2: Asset Management Practices	<ul style="list-style-type: none"> • TAM Framework • Leadership Support for TAM • Asset Management Plan Development • Lifecycle Management
3: Planning, Programming, and Project Delivery	<ul style="list-style-type: none"> • Planning and Programming Processes • Performance-Based Management • Resource Allocation • Project Delivery
4: Data Management	<ul style="list-style-type: none"> • Asset Inventory • Asset Condition and Performance • Data Governance
5: Information Systems	<ul style="list-style-type: none"> • System Technology and Integration • Decision-Support Tools • System Features
6: Transparency and Outreach	<ul style="list-style-type: none"> • Transparency and Accountability • Benchmarking • Communication and Outreach
7: Results	<ul style="list-style-type: none"> • Compliance • Data-Driven Targets • Program and Plan Alignment
8: Workforce Capacity and Development	<ul style="list-style-type: none"> • Workforce Capacity • Workforce Development

- Don’t worry about losing an original version of the survey. A version of the original Assessment Areas, Elements, and Criteria is saved as the ‘Self Assessment’ survey in the ‘Survey List.’ This version of the survey cannot be changed; however, it can be copied and saved under a different name and modified. This provides an element of protection so that an agency can always go back to the original information provided in the Tool if desired.

Setting Weights

The ‘Survey Setup’ tab also facilitates the activity of assigning weights to the Assessment Areas, Elements, or Criteria. These weights are used in calculating a weighted average rating for presentation in the ‘Results’ tab. The weights allow an agency to place more importance on one Assessment Area (or Element or Criteria) over another when calculating the current and target ratings.

By default, the Gap Analysis Tool weights each Criteria within an Element, and each Element within an Assessment Area equally with a default weight factor of 1.0. This means that if there

are four elements within an Assessment Area, the ratings for each Element represent 25 percent of the total score (i.e., $1/4 = 0.25$). Each Assessment Area is also weighted equally, so the ratings for each of the eight Assessment Areas represent 12.5 percent of the total score (i.e., $1/8 = 0.125$). If the default weight factors of 1.0 are used in the analysis, the Weighted Average and Average scores presented in the 'Results' tab will be identical.

For most applications, these default weightings (i.e., weight factors = 1.0) will satisfactorily represent the gaps for purposes of the analysis. However, if there is a particular area represented by one or more of the Assessment Areas (or Criteria or Elements) that the agency has determined to be most important to the success of its asset management program, the custom weight factors may be used to evaluate the impact of that weight on the overall results (since both weighted averages and straight averages can be viewed).

Distributing the User Survey Worksheets

Perhaps the biggest challenge for the Tool Administrator is determining what parts of the survey (i.e., what specific Criteria from the survey) are sent to each of the 'Survey Groups' that will be participating in the gap analysis. The activities involved in establishing 'Survey Groups' and distributing the surveys begins on page 29 of the User's Guide. This section provides guidance to help determine which Assessment Areas and Elements might be appropriate for different groups within a transportation agency. While each of the Assessment Areas and Elements are appropriate for everyone within the agency, table 4-3 provides guidance as to the most appropriate groups for each Element if the agency feels the need to reduce the number of Criteria that each individual rates. The following groups of individuals are referenced in the table:

- Executive leadership, including Division Directors and Assistant Directors.
- Asset managers, such as Pavement and Bridge Management Engineers.
- Planning and Programming personnel.
- Finance personnel.
- Maintenance and operations personnel.
- District personnel.
- Asset Management personnel.
- Performance Measurement personnel.
- Policy personnel.
- Information Technology personnel, including Geographic Information Systems (GIS) personnel.
- Design personnel.
- Construction personnel.
- Public Information Office personnel.
- Local or Regional Planning personnel.

Transportation agencies are encouraged to evaluate the recommendations provided herein and modify them as appropriate to fit their unique organizational structure and culture. Ideally, the

agency will send all of the Criteria being used to each of the gap analysis participants to get a comprehensive sense of how well the asset management program is working at all levels of the organization. If only the individuals most closely involved with a particular Assessment Area are surveyed, they may not be able to objectively assess how their practices are viewed by the rest of the organization and the gap analysis may not provide meaningful results that are representative of the organization as a whole. In other words, there is a lot to be learned from how individuals at all levels of the organization view agency practices to truly determine strengths and weaknesses, to pinpoint areas that are not well understood at all levels of the organization, or to identify disconnects in practices at different levels of the organization.

Table 4-3. Guidance for reducing the number of Criteria sent to agency personnel.

Assessment Areas	Elements	This Element Evaluates:	At a Minimum, Send This Element to These Groups:
1: Policy Goals and Objectives	1.a. Goals and Objectives	The extent to which agency goals & objectives are based on quality data, are monitored, and are aligned with good asset management practices	<ul style="list-style-type: none"> • Executive leadership • Asset managers • Asset management • Policy • Performance measurement
	1. b. Agency Policies	The existence and use of policies supporting asset management practices	Same as 1.a.plus: <ul style="list-style-type: none"> • Planning and programming • Finance
2: Asset Management Practices	2. a. TAM Framework	The degree to which asset management practices drive investment decisions for transportation assets, is updated regularly, and considers risk, changes to asset value, and long-term impacts	<ul style="list-style-type: none"> • Executive leadership • Asset managers • Planning and programming • Finance • Maintenance & operations • Districts • Asset management
	2. b. Leadership Support for TAM	The existence of a strong asset management team with clearly defined roles and responsibilities and support from upper management	Same as 2.a. plus: <ul style="list-style-type: none"> • Local or regional planning
	2. c. Asset Management Plan Development	The content and development of an asset management plan that is comprehensive and demonstrates that assets are managed effectively	<ul style="list-style-type: none"> • Executive leadership • Asset managers • Finance • Asset management
	2. d. Lifecycle Management	The consideration of lifecycle costs in designing and maintaining agency assets	<ul style="list-style-type: none"> • Asset managers • Maintenance & operations • Districts • Asset management • Design

Assessment Areas	Elements	This Element Evaluates:	At a Minimum, Send This Element to These Groups:
3: Planning, Programming, and Project Delivery	3.a. Planning and Programming Processes	Whether agency long-range plans are aligned with asset management objectives, whether both capital and maintenance options are considered, and whether there is a process used for stakeholder consultation	<ul style="list-style-type: none"> • Executive leadership • Asset managers • Planning & programming • Maintenance & operations • Districts • Asset management • Local or regional planning
	3. b. Performance-Based Management	The degree to which performance measures are defined, monitored, and used to drive decisions	<ul style="list-style-type: none"> • Executive leadership • Asset managers • Maintenance & operations • Asset management • Performance measurement
	3. c. Resource Allocation	Whether program trade-offs are used to drive resource allocations and whether program development activities consider a range of treatment and delivery options	<ul style="list-style-type: none"> • Asset managers • Planning & programming • Maintenance & operations • Districts • Asset management
	3. d. Project Delivery	The degree to which projects delivery is consistent with agency policies, representative of actual costs, and monitored	<ul style="list-style-type: none"> • Maintenance & operations • Districts • Construction personnel
4: Data Management	4.a. Asset Inventory	The completeness and reasonableness of existing asset inventories	<ul style="list-style-type: none"> • Asset managers • Maintenance & operations • Districts • Asset management
	4. b. Asset Condition and Performance	The consistency and reliability of asset condition information and the degree to which documented processes are in place	<ul style="list-style-type: none"> • Same as 4.a.
	4. c. Data Governance	The degree to which a data governance plan is in place with clearly defined roles, responsibilities, and business rules	<ul style="list-style-type: none"> • Asset managers • Maintenance & operations • District personnel • Asset management • Information technology
5: Information Systems	5. a. System Technology and Integration	The degree to which computerized systems are used to manage and integrate system data	<ul style="list-style-type: none"> • Executive leadership • Asset managers • Maintenance & operations • Districts • Asset management • Information technology
	5. b. Decision-Support Tools	The availability and use of computerized management systems to evaluate capital and maintenance investment options	<ul style="list-style-type: none"> • Asset managers • Maintenance & operations • Districts • Asset management • Information technology

Assessment Areas	Elements	This Element Evaluates:	At a Minimum, Send This Element to These Groups:
	5. c. System Features	The degree to which management system features support asset management	<ul style="list-style-type: none"> • Same as 5. b.
6: Transparency and Outreach	6.a. Transparency and Accountability	The degree to which a transparent decision process exists, individuals are held accountable, and information is shared	<ul style="list-style-type: none"> • Executive leadership • Asset managers • Planning & programming • Maintenance & operations • Districts • Asset management • Policy • Public information office • Local or regional planning
	6. b. Benchmarking	The agency’s use of benchmarking to improve agency practices	<ul style="list-style-type: none"> • Executive leadership • Asset management
	6. c. Communication and Outreach	The degree to which a communication plan is followed to share information with stakeholders	<ul style="list-style-type: none"> • Executive leadership • Asset management • Performance measurement • Public information office • Local or regional planning
7: Results	7. a. Compliance	The degree to which federal and state legislation requirements are met	<ul style="list-style-type: none"> • Executive leadership • Asset management • Policy
	7. b. Data-Driven Targets	The degree to which national goal areas are being met	<ul style="list-style-type: none"> • Executive leadership • Asset management • Performance measurement
	7. c. Program and Plan Alignment	The alignment between agency plans, performance targets, and external priorities	<ul style="list-style-type: none"> • Executive leadership • Planning & programming • Finance • Districts • Asset management • Local or regional planning
8: Workforce Capacity and Development	8. a. Workforce Capacity	The degree to which asset management roles and responsibilities are defined and transition plans are established	<ul style="list-style-type: none"> • Executive leadership • Asset management
	8. b. Workforce Development	The degree to which core competencies for asset management are defined and workforce development occurs	<ul style="list-style-type: none"> • Same as 8.a.

Establishing and Using Results Groups

The concept of a ‘Results Group’ was introduced in the tool to provide the Tool Administrator with the ability to compare the results between survey groups, or combined groups of survey groups. For example, if an agency wanted to combine the survey results from Executive Leadership and Asset Management ‘Survey Groups’ to see how their responses compare to those of the rest of the survey participants, two ‘Results Groups’ would be established: one combining

the 'Survey Groups for Executive Leadership and Asset Management, and another combining all the remaining 'Survey Groups.' Virtually any number of 'Results Groups' can be created for comparing results. The procedures for developing 'Results Groups' begin on page 45 of the User's Guide.

Some suggestions for 'Results Groups' that might be beneficial are provided below; although, the applicability of these suggestions is entirely dependent on how the agency's 'Survey Groups' were established and how the organization is structured. Therefore, each agency should evaluate the combinations of results that will provide the most insight into the organizational challenges that the agency faces. Suggestions for using 'Results Groups' include:

- Consider establishing 'Results Groups' that compare the results from Executive Leadership and the rest of the organization. These can provide excellent insights into how policies and practices are perceived throughout the organization.
- A 'Results Group' may be an effective way of monitoring whether the agency is making progress towards improving a process for a particular subset of individuals within the agency. For instance, if an agency is working on improving the relationship between central office and field personnel, a 'Results Group' that includes District personnel and Maintenance and Operations personnel might be created. The scores for that group could be compared to another 'Results Group' made up of all remaining surveys. By tracking the scores for these 'Results Groups' over time, an agency can evaluate whether improvements are being made.

When working with combined results it is important to remember that if 'Results Groups' are formed from 'Survey Groups' that received different Criteria, there may be differences in how the ratings are calculated because of the different number of questions be used to calculate the scores. In addition, differences in the Criteria that were distributed to each 'Survey Group' could prevent the ability to compare some metrics. For example, consider a situation in which an Executive 'Survey Group' was not sent the Criteria for an entire Element such as Lifecycle Management (which is in the Asset Management Practices Assessment Area). If the Tool Administrator tries to compare the ratings for the Executives with a 'Results Group' comprised of all other surveys, it would be impossible to compare the scores for that specific Element since the Executives did not rate the Criteria in that Element. However, scores could be compared at the Assessment Area level, but the Tool Administrator would have to recognize that the scores for the Executives are based on the average scores for the remaining three Elements in that Assessment Area while the scores for the others are based on the average scores for all four of the Elements.

Repeating the Survey in Future Years

One of the advantages to the structure of the Gap Analysis Tool is that once a Tool Administrator has customized the Tool, the changes are saved for use in future assessments. This helps reduce the amount of administrative work required to use the Tool once the agency is comfortable with the way it works.

Each time a gap analysis will be run, it is suggested that the Tool Administrator use the following procedure:

- In the Survey Setup tab: Select the 'Survey Name' of interest from the 'Survey List.' Verify that no changes are needed to the Assessment Areas, Elements, and Criteria and that the weights are still appropriate.
- In the Survey Management tab:
 - Review the 'Survey Groups' and the elements of the survey that will be sent to each group. Make any adjustments required to the selected list of Criteria that get associated with each survey group. Determine whether any changes are needed to the method used to set the targeted performance values. Update the 'User Instructions' with current information, such as the date the survey should be returned or who to contact with questions. When the settings are all verified for a particular survey group, create the new 'User Survey Workbook,' and distribute it to agency personnel considered to be part of that survey group.
 - Create a new rating set and define a name for it that has the current year in the name. Once user surveys are completed, import the current year's rating information into the newly created rating set.

Interpreting and Using Results to Advance Asset Management Maturity

The results of a gap analysis should lead to the development of an Asset Management Improvement Plan that guides the agency towards achieving its goals for its asset management program. An Asset Management Improvement Plan should describe the strengths and weaknesses identified during the gap analysis and summarize the gaps observed in each of the Assessment Areas. The action items that are included in an Asset Management Improvement Plan should be based on the results of the gap analysis, reflect feedback from a representative group of agency personnel who participated in the gap analysis (e.g., the Asset Management Committee), and have the full support of agency leadership. An Asset Management Improvement Plan typically ends with a listing of the short- and long-term actions that will be taken, the individual(s) responsible for completing each action, and the schedule that will be followed.

This section of the User's Guide provide guidance in interpreting the results of a gap analysis to help advance the level of maturity in the agency's asset management program.

Evaluating Scores

The Gap Analysis Tool provides several different formats for presenting the analysis results, including tables, bar graphs, and spider charts. The results can also be exported into a Microsoft Excel spreadsheet so that additional methods of displaying results can be used. When viewing the results in any of these formats, it is important for the users to understand what the scores mean and how the results can be used to identify gaps between current and desired agency practices. This section provides guidance to help an agency interpret the scores resulting from a gap analysis.

The Gap Analysis Tool provides the following information through the 'Results tab:'

- **Weighted Average Target Rating:** This is the weighted average of the *target* ratings representing desired conditions. If the Tool Administrator elected to have the user's define the target ratings, this is a calculated value. If, on the other hand, the Tool

Administrator set the targets to be agency default values, the value is displayed here. The weights are based on the values assigned in the 'Survey Setup' tab for Assessment Areas, Elements and Criteria.

- **Weighted Average Current Rating:** This is the weighted average of the *current* ratings submitted representing the agency's current practices. The weights are based on the values assigned in the 'Survey Setup' tab for Assessment Areas, Elements, and Criteria.
- **Gap:** This is the difference between the weighted average *target* and *current* ratings. A larger gap represents a greater differential between current and desired practices. In the 'Results tab,' instances where the gap is computed as 0 (or less than zero if the *current* rating is greater than the *target* rating) are indicated by a "Target Met" value.
- **Non-Weighted Average Values:** In addition to the weighted values, non-weighted average target and current ratings are calculated to show the impact that the weights had on the final results. If weight factors of 1.0 are used for all items in the survey, the non-weighted values will be equal to the weighted values since the weight factors of 1.0 result in each Assessment Area, Element, and Criteria item being weighted equally.
- **Rating Standard Deviation:** In addition to reporting the target and current rating averages, the Gap Analysis Tool also calculates the standard deviation of the target and current ratings so a user can evaluate the variability in the results.

The following guidance is offered to assist in evaluating the scores presented as a result of the gap analysis.

- In the early stages of implementation, a gap greater than 2 represents an area that should be considered for enhancement. As an agency matures in its asset management program, larger gaps will no longer occur and the agency can move on to address smaller gaps.
- Average current ratings or weighted average current ratings of less than 3 represent areas significantly lower than the recommended industry practice. Significant efforts may be required to advance the maturity of these items.
- In general, target ratings should be in the 4 to 5 range, which is representative of a relatively mature program. Areas that pose a significant risk to the agency, such as legislative compliance, should have the highest targets if different target ratings are used.
- Average ratings at the Assessment Area level may mask an Element with lower scores. Therefore, it is recommended that the ratings be evaluated at the Element level within each Assessment Area. Within Elements where significant gaps exist, each of the Criteria should be evaluated to determine the issue that needs to be addressed.
- To present results to executives, it may be helpful to present a table showing the current and targeted maturity level for each Assessment Area, as shown in table 4-4. To develop this table, assume ratings of 4.5 to 5.0 represent Best Practice, ratings 3.5 to 4.5 represent Proficient, ratings 2.5 to 3.5 represent Structured, ratings 1.5 to 2.5 represent Awakening, and ratings less than 1.5 represent Initial.

Table 4-4. Sample summary of maturity levels.

Assessment Area	Current Maturity Level	Targeted Maturity Level
Policy Goals and Objectives	Structured	Best Practice
Asset Management Practices	Awakening	Best Practice
Planning, Programming, and Project Delivery	Structured	Proficient
Data Management	Awakening	Proficient
Information Systems	Awakening	Proficient
Transparency and Outreach	Awakening	Best Practice
Results	Awakening	Best Practice
Workforce Capacity and Development	Awakening	Proficient

- An overall weighted average is calculated based on the ratings for each Assessment Area to provide a general sense of the level of the agency's asset management program maturity (see table 4-1 to correlate the scores to a maturity level). However, agencies are cautioned about using the rating for more than a general assessment. The true value in the gap analysis results lies in the perspective they provide with respect to asset management improvements that need to be made.

Interpreting the Results

Interpreting the results of a gap analysis provides useful information to enable an agency to enhance its current practices. Some of the ways the results can be interpreted are summarized below.

- **To build consensus on the current situation.** By including a wide cross section of agency representatives in the gap analysis, an agency is provided a clear perspective of the agency's current asset management practices and the degree to which the practices represent an industry viewpoint of good practice. The closer the ratings are to a score of "5," the closer the agency is to what is considered to be good practice.
- **To set agency priorities for enhancements.** The largest gaps typically represent the areas where the agency has the most to gain from making improvements. In most instances, these are also the highest priorities. However, an agency that is just getting started in asset management may be overwhelmed with the number of significant gaps that are identified. In that case, an agency might want to set priorities by 1) identifying several improvements that could be made quickly and have a visible impact on the agency to help build buy-in, 2) identifying actions that will have the greatest impact on reducing agency risk, or 3) identifying activities that will bring each Assessment Area to a 'Proficient' level of maturity (i.e., a rating of "4" on the 5-point scale).
- **To identify policies, practices, and programs that are not well understood in the agency.** If there are Criteria where the ratings vary widely from one another (in other words, where some participants rate a Criteria very low and others rate it very high), it is

probable that the item being evaluated is not well known or not well understood by the group that rated it low. Alternatively, this type of rating could indicate that one group is under the impression that a practice is well established while another group is aware of shortcomings in the system. Regardless, it is important for the differences to be discussed so that the inconsistencies can either be reconciled or a plan can be developed for improving communication among the various parties.

- **To evaluate improvements over time.** The Gap Analysis Tool provides a feature that enables an agency to compare results over a time series. As a result, an agency can track changes at any of the three analysis levels (i.e., Assessment Area, Element, or Criteria) by monitoring the trends in average values over time. These trends can be viewed in tables or bar charts, as appropriate.

Executive Level Guidance for Advancing to the Next Maturity Level

According to the literature, the results of a gap analysis typically lead to improvements in one of the following six areas (INGENIUM 2006):

- Asset management plan preparation and corporate overview.
- Asset management process improvements.
- Asset management information system improvements.
- Asset management data improvements.
- Organizational and people issues.
- Asset management commercial tactics.

Figure 4-1 presents some typical improvement activities that relate to each of these areas (INGENIUM 2006). These suggestions represent general guidance to address that influence each of the six areas listed above.

<p>1. AM Preparation/Corporate Overview</p> <ul style="list-style-type: none"> • Confirm AM team/co-ordinator roles • Confirm corporate AM objectives/programmes • Confirm AM plan formats/scope • Prepare detailed activity AM improvement plans • Define current levels of service/performance measures • List AM policies (existing/required) • Prepare initial AM plans • Update existing/initial AM plans • Review selected levels of service 	<p>3. AM Information System Improvements</p> <ul style="list-style-type: none"> • Confirm AM system development plan • AM system purchase/training • Develop a strategy for integrating mapping, financial and asset information systems • Review AM system development plan
<p>2. AM Process Improvement</p> <ul style="list-style-type: none"> • Confirm the following processes for each asset: <ul style="list-style-type: none"> - service delivery tendering - level of service review/service performance monitoring - asset condition assessment/performance monitoring - attribute data collection/validation/recording - customer enquiries - AM accounting and economics - renewal decision-making/demand management - capital expenditure approvals - QA/continuous improvement • Include confirmed processes in AM plans • Review AM processes 	<p>4. AM Data Improvements</p> <ul style="list-style-type: none"> • Confirm data classification/identification system • Confirm data collection priority • Confirm data collection/recording contract requirements • Collect and input priority AM systems attribute data • Collect/input priority geographic information systems spatial attribute data
	<p>5. Organisational/People Issues</p> <ul style="list-style-type: none"> • Review of corporate AM structure and project brief • Review of training needs and revision of training programme
	<p>6. AM Commercial Tactics</p> <ul style="list-style-type: none"> • Core business review • Review packaging and scope of contracts • Review incentives to encourage desired contractor behaviour • Review contract management/supervision processes • Modify specifications to incorporate contract requirements associated with revised AM processes • Implement project management systems

Figure 4-1. Typical asset management improvements from a gap analysis (INGENIUM 2006).

In addition, more specific guidance tailored to the Assessment Areas and Elements included in the Gap Analysis Tool is provided. This information provides assistance with references that might be useful, focus areas that the agency might address, and other resources that might offer ideas for enhancing the agency’s existing practices. These suggestions are summarized in table 4-5. As agencies become more familiar with asset management practices, and the available resources continue to increase, it is anticipated that the suggestions offered in this table should be updated to reflect the changes in asset management practices.

Benefits

A gap analysis is a valuable tool whether an organization is just beginning the implementation of asset management principles or the agency has been advancing the maturity of its program over time. The process provides an agency with a good understanding of what it wants to achieve from its asset management efforts and an objective assessment of its current capabilities. By performing a gap analysis at regular intervals, an agency can monitor its success and demonstrate value for the efforts expended towards an asset management program.

Agencies that have gone through the process of conducting a gap analysis and developed an Asset Management Improvement Plan have recognized a variety of benefits from completing the activity. For instance, the gap analysis results have provided a good understanding of the agency’s strengths and weaknesses, and have helped establish consensus regarding next steps to improve agency practices. In addition, the process of conducting a gap analysis has led to:

- Greater consistency in the message from state leadership and the priorities that are established.
- A well-vetted plan for improving agency practices.
- Agency buy-in into planned enhancements.
- Better use of available resources to address high-priority items.
- A more comprehensive and critical assessment of current practices.
- A better appreciation of what constitutes “good practice” in asset management.
- A stronger basis for allocating resources to organizational or technological changes within the agency.
- Improved accountability for instituting change.
- Enhanced vertical and horizontal communication within the organization as well as with other stakeholder organizations.
- Improved agency awareness of asset management practices, procedures, and capabilities.
- A quantitative basis for determining and monitoring progress in an agency’s asset management program.
- A formal process for identifying the expectations of agency leaders.

Table 4-5. Suggestions for advancing to the next maturity level.

Assessment Area	Elements Included	Improvements to Consider	Helpful Resources
Policy Goals and Objectives	<ul style="list-style-type: none"> Goals and Objectives Agency Policies 	<ul style="list-style-type: none"> Review the process used to establish agency goals and look for ways to better incorporate asset management practices Evaluate whether performance measures are tied to agency objectives Establish an asset management policy 	<ul style="list-style-type: none"> Chapter 2, AASHTO <i>Transportation Asset Management Guide – A Focus on Implementation</i> National Highway Institute (NHI) Course 131106A, An Introduction to Transportation Asset Management
Asset Management Practices	<ul style="list-style-type: none"> TAM Framework Leadership Support for TAM Asset Management Plan Development Lifecycle Management 	<ul style="list-style-type: none"> Document existing business processes and look for areas of improvement Confirm agency objectives for asset management Establish links between asset management and executive leadership Prepare/update an asset management plan Identify strategies for accounting for maintenance trade-offs associated with capital investments 	<ul style="list-style-type: none"> AASHTO <i>Transportation Asset Management Guide – A Focus on Implementation</i> National Highway Institute (NHI) Course 131106A, An Introduction to Transportation Asset Management NHI Course 131106B, Developing a Transportation Asset Management Plan FHWA Asset Management Website (http://www.fhwa.dot.gov/asset/)
Planning, Programming, and Project Delivery	<ul style="list-style-type: none"> Planning and Programming Processes Performance-Based Management Resource Allocation Project Delivery) 	<ul style="list-style-type: none"> Document existing business processes and look for areas of improvement Evaluate appropriateness of current performance measures and targets Identify data needed to improve these functions 	<ul style="list-style-type: none"> FHWA Performance-Based Planning and Programming Guidebook (https://www.fhwa.dot.gov/planning/performance_based_planning/pbpp_guidebook/)
Data Management	<ul style="list-style-type: none"> Asset Inventory Asset Condition and Performance Data Governance 	<ul style="list-style-type: none"> Prioritize data needs based risk and other key factors Develop a quality plan to improve the quality of available data Establish a data governance plan 	<ul style="list-style-type: none"> FHWA Practical Guide for Quality Management of Pavement Condition Data Collection (http://www.fhwa.dot.gov/pavement/pub_details.cfm?id=864) FHWA Data Integration Primer (http://www.fhwa.dot.gov/asset/dataintegration/if10019/dip05.cfm) FHWA Asset Management Website (http://www.fhwa.dot.gov/asset/)
Information Systems	<ul style="list-style-type: none"> System Technology and Integration Decision-Support Tools System Features 	<ul style="list-style-type: none"> Review the current capabilities of existing management system and prioritize needed enhancements Improve or develop performance models Incorporate a range of treatments into existing management systems 	<ul style="list-style-type: none"> AASHTO Pavement Management Guide FHWA Bridge Management Website (http://www.fhwa.dot.gov/Bridge/management/index.cfm) AASHTO Guidelines for Maintenance Management Systems AASHTOWare Bridge Management Website (http://aashtowarebridge.com/)
Transparency and Outreach	<ul style="list-style-type: none"> Transparency and Accountability Benchmarking Communication and Outreach 	<ul style="list-style-type: none"> Establish a communications plan for asset management Include a representative from the Public Information Office on the Asset Management Committee 	<ul style="list-style-type: none"> FHWA Transportation Performance Management Case Study: North Carolina DOT (http://www.fhwa.dot.gov/tpm/resources/docs/nc_casestudy.pdf)

Assessment Area	Elements Included	Improvements to Consider	Helpful Resources
Results	<ul style="list-style-type: none"> • Compliance • Data-Driven Targets • Program and Plan Alignment 	<ul style="list-style-type: none"> • Develop a Transportation Asset Management Plan that meets legislated requirements. • Review existing performance measures and targets to determine suitability. • Document the role of the Transportation Asset Management in planning and programming activities. 	<ul style="list-style-type: none"> • FHWA Asset Management Website (http://www.fhwa.dot.gov/asset/) • FHWA Performance Management Website (https://www.fhwa.dot.gov/tpm/) • NCHRP Report 551, Performance Measures and Targets for Transportation Asset Management (http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_551.pdf) • FHWA Performance-Based Planning and Programming Guidebook (https://www.fhwa.dot.gov/planning/performance_based_planning/pbpp_guidebook/) • AASHTO <i>Transportation Asset Management Guide – A Focus on Implementation</i> • NHI Course 131106B, Developing a Transportation Asset Management Plan
Workforce Capacity and Development	<ul style="list-style-type: none"> • Workforce Capacity • Workforce Development 	<ul style="list-style-type: none"> • Define asset management roles and responsibilities. • Identify skills needed at each position. • Develop a training plan for acquiring needed skills. 	<ul style="list-style-type: none"> • FHWA Asset Management Website (http://www.fhwa.dot.gov/asset/) • NHI Courses on Asset Management (https://www.nhi.fhwa.dot.gov/training/course_search.aspx?tab=0&key=asset%20management&res=1)

REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). 2011. *Transportation Asset Management Guide – A Focus on Implementation*. American Association of State Highway and Transportation Officials, Washington, DC.

INGENIUM. 2006. *International Infrastructure Management Manual*. Version 3.0. Association of Local Government Engineering NZ Inc. (INGENIUM), Wellington, New Zealand.

APPENDIX A. GLOSSARY OF TERMS USED IN THE GAP ANALYSIS TOOL

GLOSSARY OF TERMS

The following terms are used in the Gap Analysis Tool interface.

- **Assessment Area**—A broad category of a key transportation asset management area for which a strategic assessment is to be conducted. These are referred to as *level 1* items within a survey definition.
- **Asset Management Implementation Plan**—A product developed at the conclusion of a gap analysis listing the agency's strengths and weaknesses (from a gap analysis), areas of improvement, and actions that will be taken to close the gaps.
- **Element**—A subset of the Assessment Area that has a list of Criteria associated with it. These are referred to as *level 2* items within a survey definition.
- **Criteria**—Specific statements or questions that are individually assessed and weighted in order of importance (if desired) to determine the gap between targeted and current scores. These are referred to as *level 3* items within a survey definition.
- **Gap**—Difference between a target and current rating for a given survey definition item.
- **Gap Analysis**—A formal process used in an asset management program to identify areas of improvement, to assess the program's level of maturity, and to benchmark against best practice. A gap analysis typically concludes with an Asset Management Implementation Plan for addressing the necessary enhancements.
- **Rating Set**—A named *container* within the gap analysis tool that stores individual imported user survey data (e.g., ratings sets can be set up to store annual sets of ratings such as, "2012 Ratings," "2013 Ratings," and so on). The definition of ratings sets are important from an analysis standpoint because: 1) aggregated results are always summarized by rating set, and 2) the gap analysis tool allows the user to compare aggregated results between rating sets.
- **Results Group**—A named set of one or more survey groups. The concept of results group was introduced in the tool to provide the Tool Administrator with the ability to compare the results between individual survey groups, or combined groups survey groups.
- **Survey**—A user-defined list of Criteria that are organized further into broader categories of Element and Assessment Area. Within the Tool, the Assessment Area, Element, and Criteria items are visually displayed as level 1, level 2, and level 3 items within the survey definition tree view control.
- **Survey Group**—A category of individual raters who have similarities in their positions, their responsibilities, and/or their areas of expertise (e.g., Planning and Programming). Within the Tool, the Tool Administrator has the capability to associate a custom list of Criteria from the survey definition, with a defined and named survey group. This is an important function within the Tool because it allows the Tool Administrator to create and distribute survey group-specific User Survey Workbooks that **only** contain those Criteria that would be of interest to that survey group.
- **Tool Administrator**—The individual responsible for administering the gap analysis for the agency.

**APPENDIX B. ASSESSMENT AREAS, ELEMENTS, AND CRITERIA
INCLUDED IN THE GAP ANALYSIS TOOL**

Assessment Area	Element	Criteria
<p>Policy Goals and Objectives</p>	<p>Goals & Objectives</p>	<p>Agency goals and objectives are comprehensive, integrated with other statewide policy objectives, and supported by quantitative and measurable performance measures or criteria.</p>
		<p>Agency goals and objectives consider the costs over the whole life of an asset and encourage strategies to lower life-cycle costs, to reduce agency risk, and to provide long-term benefits.</p>
		<p>Agency goals and objectives are established based on reliable information on asset condition and public perceptions.</p>
		<p>Reported system performance is measured against agency goals and objectives.</p>
		<p>Agency leadership actively involves political leaders, community leaders, and other policy makers to establish system performance expectations that consider funding constraints, legislated requirements, public interests, and other similar factors.</p>
		<p>Agency goals and objectives are aligned with asset management policies through the asset management plan.</p>
	<p>Agency Policies</p>	<p>Agency policies encourage a business-oriented, customer-focused approach to asset management.</p>
		<p>Resource allocation decisions among programs and across geographic regions are based on expected performance rather than historical splits or formulas that do not correlate with an objective indication of system condition.</p>
		<p>Asset management systems are designed to provide meaningful information on policy choices and consequences.</p>
		<p>Political pressure to influence resource allocation decisions is met with objective information related to system performance expectations.</p>
		<p>An asset management policy is in place to guide investment decisions in transportation assets.</p>
		<p>Policies and procedures are in place for the rapid and structured response to emergency management situations and for business continuity planning.</p>
		<p>Transportation Asset Management (TAM) Practices</p>
<p>Asset management strategies that reduce the overall life cycle cost of asset preservation are used throughout the agency.</p>		
<p>Asset management practices are widespread within the agency and are not limited to a few assets of high value.</p>		
<p>Guidelines for the asset management planning process, which clearly identify roles and responsibilities, are developed and endorsed by Senior Leadership.</p>		
<p>Updates and revisions to the agency’s asset management framework are based on a gap analysis that is performed regularly to reflect changes in policy, technology, or agency practices.</p>		
<p>The asset management framework has a process for considering risk, long-term investments, and trade-off considerations in the identification and prioritization of investment strategies.</p>		
<p>The agency has a methodology in place for assessing and reporting changes in asset value based on planned investment strategies.</p>		

Assessment Area	Element	Criteria
	Leadership Support for TAM	A strong, cross-functional team with a direct link to upper management has been established to support asset management activities.
		The agency's functional structure clearly identifies responsibility for the asset management process, its deployment, and its on-going improvement.
		Agency leadership is committed to asset management as a core process, and this commitment is demonstrated by what they say and do, both internally and externally.
		Asset management principles are fully embraced through the agency's organizational culture.
		Agency leadership and senior management are involved in developing and endorsing the content of the asset management plan and any changes to the plan.
	Asset Management Plan Development	The agency uses a documented process for identifying asset requirements and developing investment strategies that are linked to the financial plan that is consistent and systematic.
		Adequate resources are provided for developing the asset management plan.
		The agency has developed an asset management plan that meets or exceeds federal requirements and that documents how trends in road usage and state demographics are reflected in agency objectives and investment strategies.
		The agency identifies gaps in actual and future (predicted) performance and investment strategies to reduce the gaps.
		Asset investment strategies contained in the asset management plan are fully aligned with projects recommended in the agency's statewide improvement plans.
		Risks have been identified, recorded, and assessed against the agency's strategic objectives at a level of detail appropriate to the risk exposure.
		Financial and performance forecasts included in the asset management plan are based on sound asset information and analysis.
		The asset management plan is a concise document providing sufficient information to demonstrate that agency assets are being appropriately maintained.
		A plan is in place for including additional assets and improving the level of detail in future asset management plans.
		Lifecycle Management
	The agency follows documented maintenance policies for assets covering both planned and unplanned activities that outline overall maintenance objectives and strategies.	
	The agency performs analysis to determine the cause of failures and to prevent their recurrence.	
	The agency's operations and maintenance strategy is risk-focused and considers preventive maintenance strategies.	
	Planning, Programming, and Project Delivery	Planning and Programming Processes

Assessment Area	Element	Criteria
		Long-range planning processes are aligned with the asset management plan and have strong linkages to ensure agency objectives are achieved.
		Funding allocation and project prioritization criteria used in agency plans are consistent with the agency’s policy goals and objectives.
		Long-range plans identify and evaluate a range of program alternatives and, as appropriate, modal alternatives to meet present and future transportation demand.
		The planning and programming process identifies the resources required to maintain existing assets at targeted performance levels and to lower the overall life cycle cost.
		Planning and programming processes consider capital, operational, and maintenance considerations on a statewide and corridor basis.
		Asset investment and prioritization strategies are primarily driven by data and analysis results, including the consequences of investment options.
		The interface between the asset management plan and other corporate planning and programming processes are documented to ensure their efficient and effective integration.
		Agency guidelines have been developed, endorsed, and implemented for stakeholder consultation as part of the planning processes.
	Performance-Based Management	Performance-based budgeting concepts guide program planning and development by relating project costs to expected levels of service or performance.
		Performance measures or levels of service are defined and regularly applied to quantify the impacts of program decisions and actions and to provide feedback for future planning and programming priorities, or consideration of adjustments to policy objectives.
		Tactical performance measures have been defined for each strategic objective.
		Performance targets are established based on historical trends, current conditions, and/or stakeholder expectations and reviewed regularly.
		Progress towards stated system performance targets is measured and reported regularly.
		The agency has documented and endorsed its performance measures and has used the methodology consistently over the last few years to monitor trends in performance.
	Resource Allocation	Program trade-offs (e.g., preservation versus rehabilitation) are based upon an analysis of benefits and costs rather than arbitrary formulas or historical splits.
		The resulting implications of changes in resources allocated to each program are clearly communicated in terms of levels of service or system performance.
		Program development activities identify and evaluate a range of program delivery options.
		Program development activities result in projects that are guided by agency plans and that represent realistic estimates of costs, benefits, and impacts on system performance.
		The program development process results from statewide competition among projects based on objective criteria.

Assessment Area	Element	Criteria
	Project Delivery	Projects that are designed and built are consistent with, and respond to, overall policy guidance for system preservation.
		The agency knows its costs for delivering its programs and services.
		The agency periodically evaluates its options for delivering programs and services using agency resources, partnering agreements, outsourcing, or other mechanisms.
		Project procurement options are evaluated on price and/or quality as appropriate to the project risk and complexity.
		The agency has the ability to track actual project and service delivery against the program plan so that adjustments can be made.
		A formal program change process exists to make needed adjustments in cost, schedule, and scope, document causes, and reallocate funds.
		Program delivery accomplishments are tracked and reported regularly to gauge the efficiency and effectiveness of the program.
Data Management	Asset Inventory	The agency maintains an inventory of state-maintained pavement assets that is complete, accurate, and current.
		The agency maintains an inventory of state-maintained bridge assets that is complete, accurate, and current.
		The agency maintains an inventory of other state-maintained assets that is complete, accurate, and current.
		Critical components of an asset type have been established to assist in identifying critical maintenance needs and risks.
		Asset tiers (e.g. primary, secondary, tertiary) have been established to assist with project prioritization and high-level investment strategies.
		Location-based data collection practices (such as Global Positioning Systems or GPS) are widespread in the agency to support data integration.
		The agency applies the appropriate mix of data collection technology to ensure high quality inventory and condition information is available and to provide the level of coverage and confidence needed to cost-effectively maintain the quality of the data.
		The right level of detail for identifying and categorizing assets has been established considering maintenance costs, accuracy, and criticality of the asset in terms of safety and risk to the traveling public.
	Inventory information is updated at least annually to reflect system changes.	
	Asset Condition and Performance	Pavement condition data are updated on a periodic schedule sufficient to meet regulatory or agency requirements and to provide timely and accurate information on status and performance.
		Bridge condition data are updated on a periodic schedule sufficient to meet regulatory or agency requirements and to provide timely and accurate information on status and performance.
		Performance data on other roadway assets is collected regularly in accordance with a periodic schedule sufficient to meet regulatory or agency requirements and to provide timely and accurate information on status and performance.

Assessment Area	Element	Criteria
		The survey methodologies being used provide adequate levels of coverage to ensure the objectivity, consistency, and repeatability of the performance data.
		Condition assessments are completed regularly by person/s with knowledge of the type of asset being assessed.
		Documented processes are in place to capture, update, and report on asset condition data and to ensure consistent application.
		The agency is able to monitor performance of assets and ensure that they are operational when required.
		Information from focus groups, customer surveys, complaint tracking, and other feedback mechanisms is updated regularly and used to gauge public perception of asset condition and agency performance.
	Data Governance	A data governance plan with oversight and approval authority for all data elements has been developed.
		The data sets that are managed at the enterprise level have been determined.
		Single authoritative sources for shared data entities have been determined.
		Data stewardship roles and responsibilities have been formalized.
		Data definitions, structures, values, and naming conventions have been standardized.
		A central repository for creation and management of metadata about each of the data elements maintained by the agency is available.
		Business rules on how key data entities are added, updated, or deleted have been formalized.
		New data elements and applications that help in minimizing or eliminating redundancy in data collection, storage, and processing are constantly being reviewed.
		Data quality expectations and methods for quality assessment and improvement have been established.
		Information Systems
Information requirements and/or standards for data management are in place to ensure that future system and database development efforts within the agency will integrate with existing system and meet asset management information and analysis improvement needs.		
Systems and information are based upon a common geographic referencing system and a common map-based interface for analysis, display, and reporting.		
A procedure to manage changes in referencing systems over time has been established and documented.		
Geographic Information Systems (GIS) are used to integrate agency data and the system functionality is available to staff as appropriate for their role.		

Assessment Area	Element	Criteria
	Decision-Support Tools	The agency's decision-support tools facilitate exploration of capital versus maintenance tradeoffs for different asset classes.
		The agency has a pavement management system that enables network modeling of pavement condition, the identification of gaps in network performance and projects to fill the gaps, and the prioritization of projects within budget constraints.
		The agency has a bridge management system that enables network modeling of bridge conditions, the identification of gaps in network performance and projects to fill the gaps, and the prioritization of projects within budget constraints.
		The agency has a maintenance management system for roadway assets that tracks maintenance work activities, estimates budget needs to achieve targeted levels of service, and assists in planning resource scheduling and allocation.
	System Features	Treatment intervention recommendations are based on optimizing system performance while taking into consideration best practice, engineering experience, and the costs over the whole life of an asset.
		Information on actual costs and accomplishments by project, asset category, work type, and location are maintained in a form that can be used to predict performance and improve cost estimations.
		Current pavement condition data is used to predict future demand and pavement needs using robust and reliable models that are customized to reflect specific network conditions.
		Current bridge condition data is used to predict future demand and bridge needs using robust and reliable models that are customized to reflect specific network conditions.
		Methods for estimating future demand and asset requirements for other assets have been developed and are in place.
		The treatment intervention strategies, performance models, and treatment costs are reviewed regularly to reflect changes in usage and agency objectives.
		Reliable cost data is used to determine the costs associated with construction, maintenance, and preservation activities.
		The impacts of maintenance and preservation activities on asset performance are considered during the asset deterioration modeling process.
		A benefit/cost or optimization analysis is used to assess the performance of various treatments and strategies conducted.
		Transparency and Outreach
Investment decisions are based on a clear and transparent process that is understood at all levels of the organization.		
The agency is held accountable to stakeholders for asset performance.		
Individuals within the organization are held accountable for performance.		
Benchmarking	Agency asset management practices are benchmarked against similar agencies on a regular basis.	

Assessment Area	Element	Criteria
		A review of current asset management practices in comparable agencies is performed on a regular basis to validate agency practices.
		Agency staff participate in national activities promoting asset management to support technology transfer.
		Lessons learned from benchmarking activities are put into practices.
		The agency culture supports innovation and advancement of current practices.
	Communication and Outreach	A communication plan for sharing asset management plans and performance within the agency and to stakeholders has been established.
		Agency performance metrics are presented internally on a regular basis using appropriate methods of communicating the information.
		Agency performance metrics are presented to external stakeholders on a regular basis using appropriate methods of communicating the information.
		A variety of techniques are used effectively to communicate asset management information both internally and externally.
Results	Compliance	Federal and state legislation requirements are addressed in agency asset management plans and programs.
		The scope of the agency’s asset management plan exceeds the requirements outlined in legislation.
		The agency conducts regular and on-going interaction with FHWA to ensure that Federal requirements are met.
		The agency monitors possible legislative changes or changes in standards that may have an impact on asset management policies or practices.
	Data-Driven Targets	Contributions towards national goal areas are documented.
		The agency is making acceptable progress towards meeting performance targets for safety.
		The agency is making acceptable progress towards meeting performance targets for infrastructure condition.
		The agency is making acceptable progress towards meeting performance targets for congestion reduction.
		The agency is making acceptable progress towards meeting performance targets for system reliability.
		The agency is making acceptable progress towards meeting performance targets for freight movement and economic vitality.
		The agency is making acceptable progress towards meeting performance targets for environmental sustainability.
	Program and Plan Alignment	Investment strategies outlined in the asset management plan are aligned with agency maintenance and construction programs.
		The agency’s STIP and TIP are aligned with agency performance targets.
		The agency’s plans are aligned with MPO and local agency priorities.

Assessment Area	Element	Criteria
<p>Workforce Capacity and Development</p>	<p>Workforce Capacity</p>	<p>Asset management roles and responsibilities and clearly defined and documented.</p>
		<p>Employees have the appropriate skills and training needed for the roles and responsibilities assigned to them.</p>
		<p>Asset management teams with appropriate skills, direction, and staffing are available to deliver on-going improvements in asset management.</p>
		<p>Planning is in place to minimize risks relating to the loss of key staff knowledge in asset management.</p>
		<p>Relevant local and international developments and innovations in asset management are monitored regularly and shared internally.</p>
	<p>Workforce Development</p>	<p>The agency has identified core competencies required for the successful implementation of asset management and has implemented a training program that enables the employees to acquire these competencies.</p>
		<p>The agency encourages a learning climate by periodically organizing seminars on asset management and/or by participating in asset management conferences, peer exchanges, webinars, and other forms of technology transfer.</p>