

Cost Resources for Municipal Stormwater Programs

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Stormwater Asset Management and Funding

Costs

Revenues

Collect data on stormwater system assets

Asset Inventory Workbook

Identify desired maintenance regime

Level of Service: Existing System

Permit Compliance Costs

Future Buildout Cost Estimates

Total Costs Workbook

Compile costs together

Land Use Characteristics



Average Water Costs



Household Characteristics

Rate Structure Analysis Workbook

Utility Finance Structure and Funding Gap

A Storyboard with Local & National Resources



1. Develop an Asset Inventory

The asset inventory is a record of the components in your system, including their condition and the risk and consequences of failure. These records can be collected and stored using paper files, simple spreadsheets, or more specialized software. Information may come from many sources, including as-built drawings, maintenance records and contracts, GIS databases, and city parcel and tax assessor data.

Resources

- [Region 9 EFC Asset Inventory Workbook](#)
- [Region 9 EFC Stormwater Asset Management and Funding Guide \(Coming Soon\)](#)
- [Grand Rapids, MI, Stormwater Asset Management Report](#)
- [San Diego Asset Management Case Study](#)
- [EPA Asset Management Planning for Stormwater and Wastewater Systems \(2017\)](#)

The Steps

- 1 **Develop an Asset Inventory**
- 2 **Define Levels of Service**
- 3 **Estimate costs**
- 4 **Solicit input and listen**
- 5 **Financial capability analysis**
- 6 **Identify funding options**
- 7 **Determine funding gaps**
- 8 **Public outreach**

An Open-Source Toolkit

Asset Inventory Worksheet

Level-of-Service Worksheet

Rate Structure Worksheet

Toolkit to Support Financial Planning for Municipal Stormwater Programs
 US EPA Region 9 Environmental Finance Center at Sacramento State
 August 2018

Introduction

The TEC at Sacramento State is operated by the Office of Water Programs (OWP) at California State University, Sacramento. The EFC serves Region 9 state and local governments, tribal communities, and the private sector in the areas of financial planning and asset management. The goal of the TEC is to enable these entities to become capable of leading environmental and public health services, in the short term, and to be able to adapt to future needs as regulations, technology, and resources change.

In managing stormwater, municipalities throughout the U.S. must maintain conveyance infrastructure to mitigate urban flooding and comply with National Pollutant Discharge and Elimination System (NPDES) permits. As part of its applied research and outreach activities, the EFC developed a stormwater financing toolkit to assist communities in identifying short- and long-term municipal stormwater program expenses and developing a stormwater utility fee that may be used as (partial) revenue. The toolkit guides users in assembling costs for maintaining current assets, ensuring permit compliance, and building assets in the future. The toolkit also provides a means to record data and conduct calculations for estimating a stormwater utility rate structure, including an ability-to-pay analysis for residential property owners. The toolkit was assembled as part of direct municipal assistance in the EPA Region 9 jurisdiction and has been tested in real-life planning situations for municipal stormwater.

Like most analysis and modeling efforts, data collection and integration contributes the majority of work. Stormwater utility managers may have to update or develop from scratch system asset inventories. Unit and program cost data will need to be mined from accounting records, and property and census data will need to be assembled to estimate key factors that support utility billing systems. The toolkit and this document were developed to guide the user in not just what to do, but how to do it where to get the necessary data.

The document is divided into the following sections:

- Background
- Assembling Program Costs and Evaluating Stormwater
- Review of the EFC Stormwater Financing Toolkit

Guide

Types of Costs

- Permit compliance
- Existing infrastructure
(operations and maintenance)
- New infrastructure

Example Cost Categories

Labor

Materials

Operations

Contingencies

Planning

Permitting

Permit Compliance Cost Categories

- 1) Construction Site Stormwater Runoff Control
- 2) Illicit Discharge Detection and Elimination
- 3) Industrial and Commercial Management
- 4) Pollution Prevention/Good Housekeeping for Municipal Operations
- 5) Post-Construction Stormwater Management for New/Re-Development
- 6) Public Education, Outreach, Involvement, and Participation
- 7) Water Quality Monitoring
- 8) Overall Stormwater Program Management

Existing System Maintenance Costs

- Activities:
 - Inspection
 - Corrective and preventative maintenance
 - Replacement/renewal

Asset	Inspection	Corrective Maintenance	Preventive Maintenance	System Renewal	Total
Gravity Mains	\$82,000	\$99,000	\$352,000	\$838,000	\$1,371,000
Force Mains	\$500	\$0	\$0	\$1,800	\$2,300
Catch Basins	\$176,500	\$80,000	\$9,000	\$119,000	\$384,500
Outfalls	\$47,000	\$14,000	\$17,000	\$1,700	\$79,700
Detention Basins	\$6,500	\$0	\$0	\$22,500	\$29,000
Culverts	\$19,300	\$0	\$86,000	\$17,000	\$122,300
Subtotal of Asset Classes	\$181,800	\$118,000	\$359,000	\$950,000	\$1,608,800
O&M (inspection, corrective and preventive maintenance)					\$658,800
Capital Renewal (system renewal)					\$950,000
Total					\$1,608,800

Costs for New Infrastructure

- Many municipalities are facing significant costs for new infrastructure
- Requires new funding sources and partnerships
 - Financing vs. pay-as-you go
 - Grants, loans, collaborations
- Design considerations
 - Green or grey?
 - Sizing?



Assembling Cost Data

- 1) Surveying current data sources
- 2) Understanding ways to report costs
- 3) Looking for new sources to address data gaps
- 4) Recommendations

Collecting Standardized Data vs. Integrating Collected Data:

Separate tasks, both are useful

Reporting Program Costs: A Simple Example

EXPENDITURES - OVERVIEW BY FUND AND FUNCTION							
DEPARTMENT	FISCAL YEAR 2013-14			BUDGET			
	AS ADOPTED	AS AMENDED	PROJECTED 6/30/2014	FY 2014-15	FY 2015-16	FY 2016-17	
GENERAL FUND							
GENERAL GOVERNMENT							
City Council	\$ 266,650	\$ 266,650	\$ 265,632	\$ 280,493	\$ 296,838	\$ 311,208	
Administration	1,415,802	1,589,451	2,154,439	1,513,603	1,716,165	1,787,386	
Housing & Neighborhood Services	995,525	1,011,865	990,459	1,093,108	1,031,899	1,070,015	
City Attorney	719,600	719,600	679,300	720,300	720,300	720,300	
City Clerk	425,714	445,839	417,182	484,391	463,938	513,978	
Human Resources/Risk Management	3,103,275	3,406,154	3,630,779	3,588,474	3,487,916	3,397,814	
Finance/Information Systems	2,558,178	2,838,755	2,630,307	2,491,226	2,558,839	2,579,926	
Real Property Services	3,826,531	4,015,826	4,035,775	4,339,081	4,225,831	4,091,311	
Total General Government	13,311,275	14,294,140	14,803,873	14,510,676	14,501,726	14,471,938	
PUBLIC WORKS							
Operations	8,643,572	8,678,132	7,997,200	8,638,972	8,712,664	8,990,176	
Engineering	2,884,044	2,891,699	2,805,047	3,182,262	3,182,128	3,334,280	
Storm Water Program Management	1,056,233	1,056,833	597,510	659,069	678,379	696,094	
Total Public Works	12,583,849	12,626,664	11,399,757	12,480,303	12,573,171	13,020,550	
DEVELOPMENT SERVICES							
Planning	1,527,676	1,554,701	1,312,984	1,713,310	1,668,361	1,545,530	
Building	1,174,564	1,176,988	979,761	1,330,947	1,327,248	1,394,720	
Total Development Services	2,702,240	2,731,689	2,292,745	3,044,257	2,995,609	2,940,250	

Reporting Program Costs: A Complex Example

Units in Thousand dollars

PROGRAM ELEMENT	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	SOURCE OF FUNDS
A.1 Maintenance of Structural Controls	823.0	848.0	933.0	979.4	1,034.0	1,065.0	1,065.0	1,065.0	1,065.0	1,250.0	4,800.0	4,800.0	4,800.0	4,800.0	4,800.0	4,800.0	Sewer Enterprise Fund & Water Enterprise Fund
A.2 New Development/Redevelopment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/A
A.3 Road Operation & Maintenance	5,022.0	5,173.0	5,690.0	5,975.0	6,273.6	6,462.0	6,462.0	6,462.0	6,462.3	7,500.0	9,000.0	19,900.0	19,900.0	19,900.0	19,900.0	19,900.0	Gas Tax, Sewer, General and Refuse Fund
A.4 Flood Management Projects	0	0	0	0	0	0	0	0	0	0	0	20.0	22.0	22.0	22.0	22.0	Water Enterprise Fund
A.5 Controls for Landfills	236.0	6,050.0	3,559.0	3,559.0	3,381.0	3,482.0	3,482.0	3,482.0	3,482.4	3,400.0	4.0	4.0	4.0	4.0	4.0	4.0	Solid Waste Fees
A.6 Controls for Pesticides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/A
A.7 Illicit Discharge Controls	19.0	19.5	24.5	25.7	26.9	27.7	27.7	27.7	27.8	4.8	8.6	6.5	6.3	6.3	6.3	6.3	Sewer Enterprise Fund
A.8 Spill Prevention	421.0	426.0	469.0	492.0	517.0	533.0	533.0	533.0	533.1	499.0	499.0	552.3	580.0	580.0	580.0	580.0	Business Service Fees (Fire Prevention Services)
A.9 Illegal Dumping Controls	1.5	1.5	1.9	2.1	2.5	2.6	2.6	2.6	2.6	0.5	0.8	0.6	0.6	0.6	0.6	0.6	Sewer Enterprise Fund
A.10 Leaking Sanitary Controls	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/A
A.11 Inspection & Control Measures	28	29	31.9	33.5	35.2	36.3	36.3	36.3	36.3	6.3	11.5	8.6	8.4	8.4	8.4	8.4	Sewer Enterprise Fund
A.12 Industrial Monitoring	552.0	598.0	658.0	691.0	725.0	747.0	747.0	747.0	747.0	131.3	237.9	178.6	174.8	174.8	174.8	174.8	Sewer Enterprise Fund + Fees
A.13 Site Planning Procedures	241.0	248.0	260.0	273.5	287.0	295.0	295.0	295.0	295.7	475.0	475.0	475.0	475.0	475.0	475.0	475.0	Development Fees
A.14 Structural & Non-Structural BMP's	26.0	27.0	29.7	31.2	32.8	33.8	33.8	33.8	33.9	30.0	30.0	30.0	30.0	30.0	30.0	30.0	Development Fees
A.15 Site Inspections & Control Measures	62.0	63.0	69.0	72.8	76.4	78.7	78.7	78.7	78.7	30.0	30.0	30.0	30.0	30.0	30.0	30.0	Development Fees
A.16 Education/Training for Constr. Site Operators	1.4	1.5	1.8	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Development Fees
B. Estimate of Loads & EMC's	7.6	7.6	8.1	8.1	8.5	8.8	8.8	8.8	8.8	9.6	10.2	10.7	10.6	10.6	10.6	10.6	Water Enterprise Fund
C. Wet-weather Monitoring and Administration of the NPDES Program	70.0	75.0	82.5	82.5	82.5	85.0	85.0	85.0	85.1	95.0	160.0	200.0	200.0	200.0	200.0	200.0	Water Enterprise Fund
TOTALS	7,510.5	13,567.1	11,818.4	12,227.7	12,484.3	12,858.9	12,858.9	12,858.9	12,860.7	13,433.5	15,269.0	26,218.3	26,243.7	26,243.7	26,243.7	26,243.7	

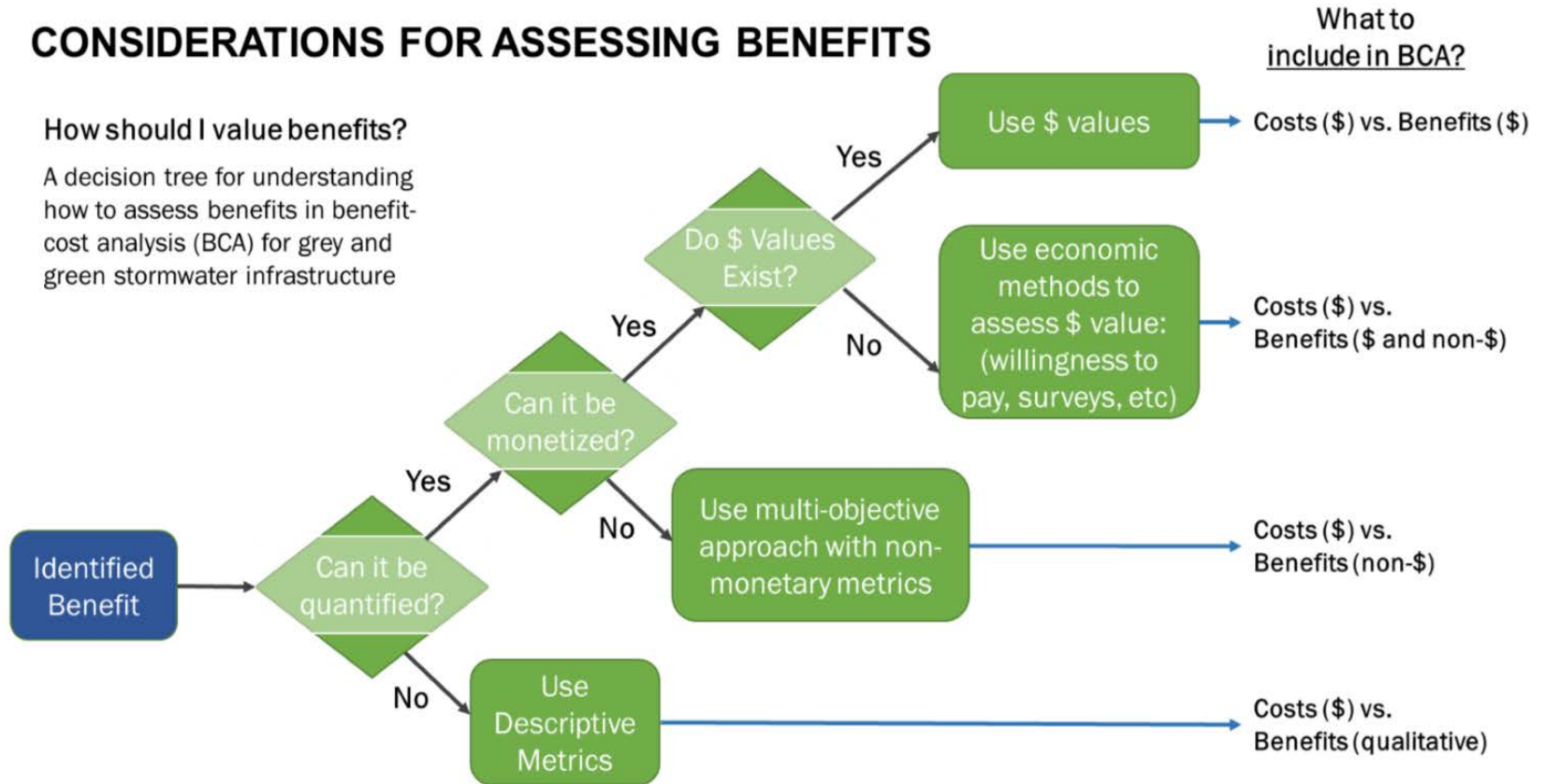
Notes : Values of expenditures are approximate only.

Incorporating Benefits

CONSIDERATIONS FOR ASSESSING BENEFITS

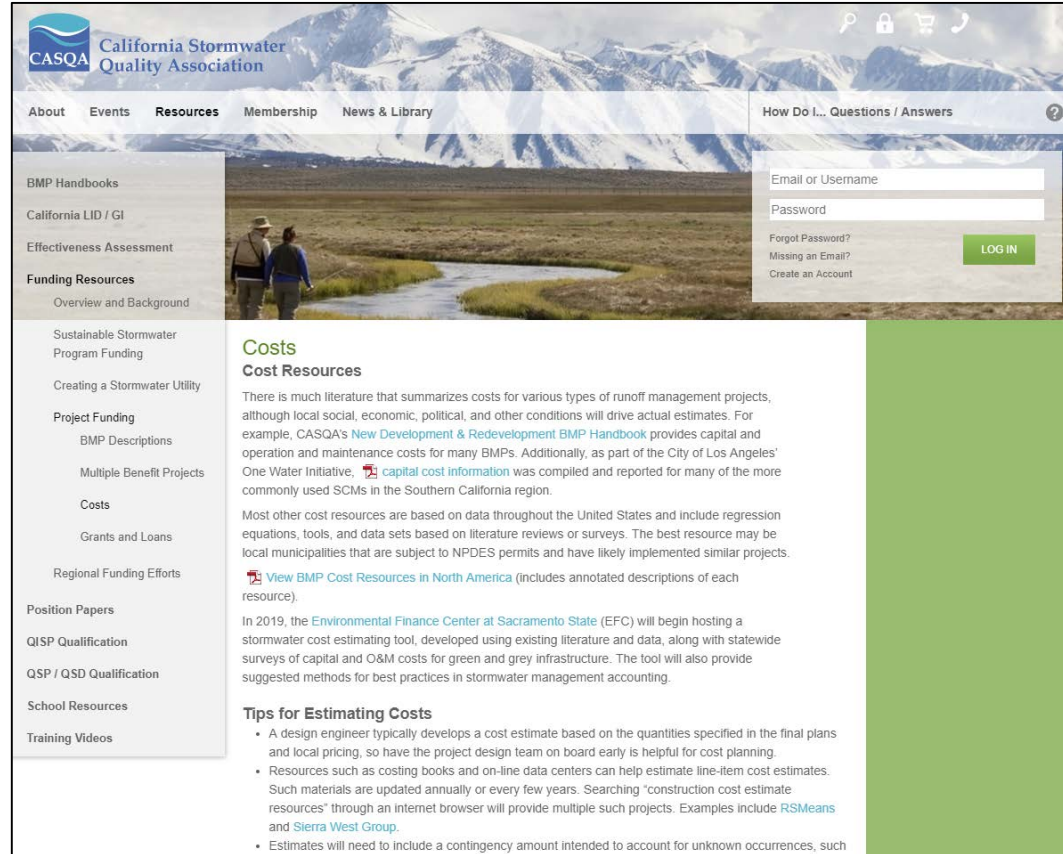
How should I value benefits?

A decision tree for understanding how to assess benefits in benefit-cost analysis (BCA) for grey and green stormwater infrastructure



More Resources

- Data sources for costs
- Methods for creating comparable costs
- Additional needs and gaps



The screenshot shows the CASQA (California Stormwater Quality Association) website. The header includes the CASQA logo and navigation links: About, Events, Resources, Membership, and News & Library. A search bar and a 'How Do I... Questions / Answers' link are also present. The main content area is titled 'Costs' and 'Cost Resources'. It contains a paragraph of text, a link to 'View BMP Cost Resources in North America', and a section titled 'Tips for Estimating Costs' with a bulleted list of advice.

CASQA California Stormwater Quality Association

About Events **Resources** Membership News & Library

How Do I... Questions / Answers

Email or Username
Password
Forgot Password?
Missing an Email?
Create an Account **LOG IN**

BMP Handbooks
California LID / GI
Effectiveness Assessment

Funding Resources
Overview and Background
Sustainable Stormwater Program Funding
Creating a Stormwater Utility

Project Funding
BMP Descriptions
Multiple Benefit Projects
Costs
Grants and Loans
Regional Funding Efforts

Position Papers
QISP Qualification
QSP / QSD Qualification
School Resources
Training Videos

Costs

Cost Resources

There is much literature that summarizes costs for various types of runoff management projects, although local social, economic, political, and other conditions will drive actual estimates. For example, CASQA's [New Development & Redevelopment BMP Handbook](#) provides capital and operation and maintenance costs for many BMPs. Additionally, as part of the City of Los Angeles' One Water Initiative, [capital cost information](#) was compiled and reported for many of the more commonly used SCMs in the Southern California region.

Most other cost resources are based on data throughout the United States and include regression equations, tools, and data sets based on literature reviews or surveys. The best resource may be local municipalities that are subject to NPDES permits and have likely implemented similar projects.

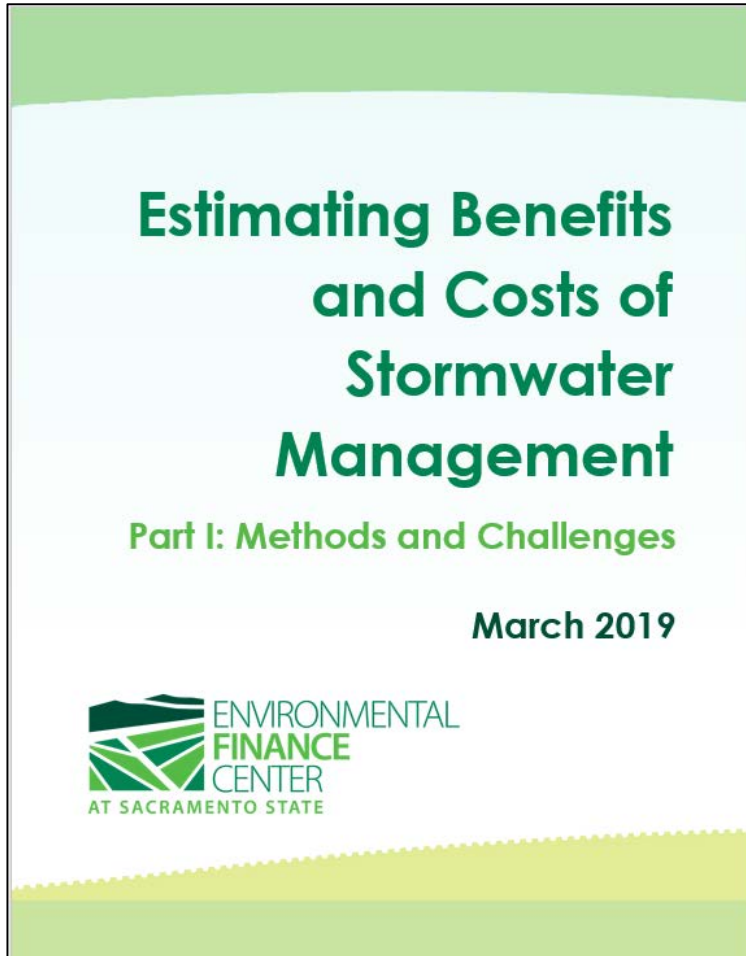
[View BMP Cost Resources in North America](#) (includes annotated descriptions of each resource).

In 2019, the [Environmental Finance Center at Sacramento State](#) (EFC) will begin hosting a stormwater cost estimating tool, developed using existing literature and data, along with statewide surveys of capital and O&M costs for green and grey infrastructure. The tool will also provide suggested methods for best practices in stormwater management accounting.

Tips for Estimating Costs

- A design engineer typically develops a cost estimate based on the quantiles specified in the final plans and local pricing, so have the project design team on board early is helpful for cost planning.
- Resources such as costing books and on-line data centers can help estimate line-item cost estimates. Such materials are updated annually or every few years. Searching "construction cost estimate resources" through an internet browser will provide multiple such projects. Examples include [RSMMeans](#) and [Sierra West Group](#).
- Estimates will need to include a contingency amount intended to account for unknown occurrences, such

Guidance for Benefit-Cost Analysis



- Current project to develop resources for costs of stormwater management
- Filling in gaps in available resources
 - Program costs
 - Regional differences
 - Compiling resources

Links

EPA Region 9 Environmental Finance Center:

<http://www.efc.csus.edu>

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Understanding Terms

- **Stormwater Plan:** Description of activities to meet water quality and integrated water management goals.
- **Stormwater Program:** Institutions (personnel, departments, \$\$ accounts) that carry out plans.
- **Asset Management:** Organized process improve your systems and spend money wisely.
- **Financial Plan:** Data-driven analysis to justify your existence.