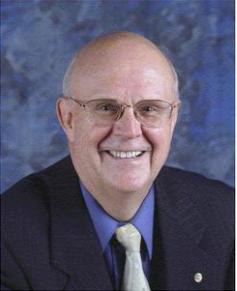


BMPFast Analysis for Harvesting

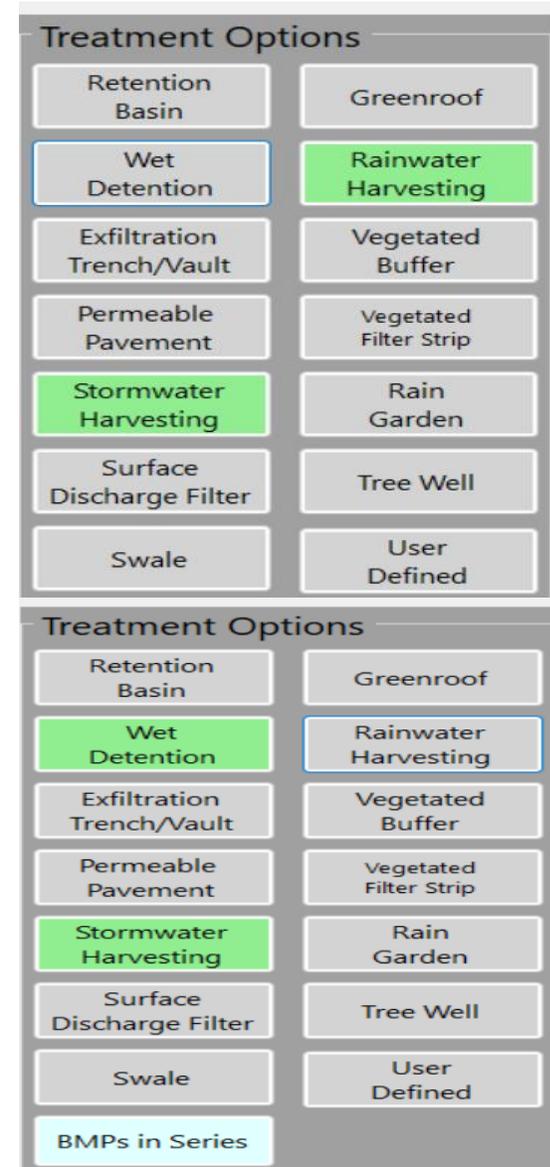
By: Marty Wanielista

January 2026



Learning Objectives

1. What is Harvesting? Rainwater and Stormwater.
2. Navigation of the software.
3. Enter data for annual mass removal analysis and understand output using harvesting as the BMP.
4. Wet detention and stormwater harvesting.
5. Demonstrate the use of worksheets and discovery with REV curves.
6. Example Problems.



What is it and Why do it?

WHAT? Retained stormwater for non-potable uses, such as irrigation, car washing, cooling tower make-up, toilet flushing, wet-land enhancement, etc.

WHY? (some reasons)

1. Get an ERP permit or estimate the BMAP credit.
2. Reduce stormwater pollution into surface waters.
3. Save and maintain ground water.
4. To lower the cost of potable water supply.
5. Reduce salt water intrusion.
6. Lower the cost of stormwater management (revenue source).
7. Some or all of the above.



Rainwater Harvesting & Stormwater Harvesting

The operation and effectiveness

Rainwater harvesting effectiveness is estimated based on the **potential for use of the contained water every day**. In general, used for a catchment area where the runoff can be contained for use with **no groundwater and rainwater interactions**. An example is a building roof top using a cistern. No credit is given for concentration reduction.

Stormwater harvesting effectiveness is estimated based on the **potential for use of the contained water two times per week** and for a catchment area that is **affected by groundwater and rainwater**. An example is runoff from surface drainage areas into a wet detention pond. Credit for concentration reduction is obtained from the wet detention pond.

Examples: Over 700 in Florida

Sources: Horizontal Subsurface Systems and www.stormwater.ucf.edu

1. South Bay Utilities

- Upscale residential irrigation demand
- No FPSC
- 50¢/1,000 gallons (2015)
- Customer agreements
900 homes - HOA
- Coastal / fragile resource



2. Winter Park Florida (retrofit)

Regional Pond Serving roadway
and commercial property



COLLECTS RUNOFF WATER



CONTROLS POLLUTION

Water harvesting for irrigation of lawns
Community saved potable water and money.

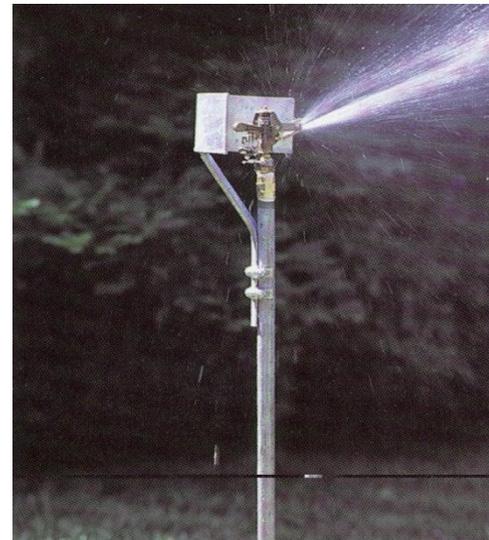


And replaces potable water

3. Southeast Central Florida

- Approximately 550,000 acres
- FPSC (Exclusive)

- 19.2¢/1,000 gallons (2004)
 - 2024 estimated as 89 ¢/1,000 gallons
- Canals, Ponds and Wells
- 20 MGD
- Expandable

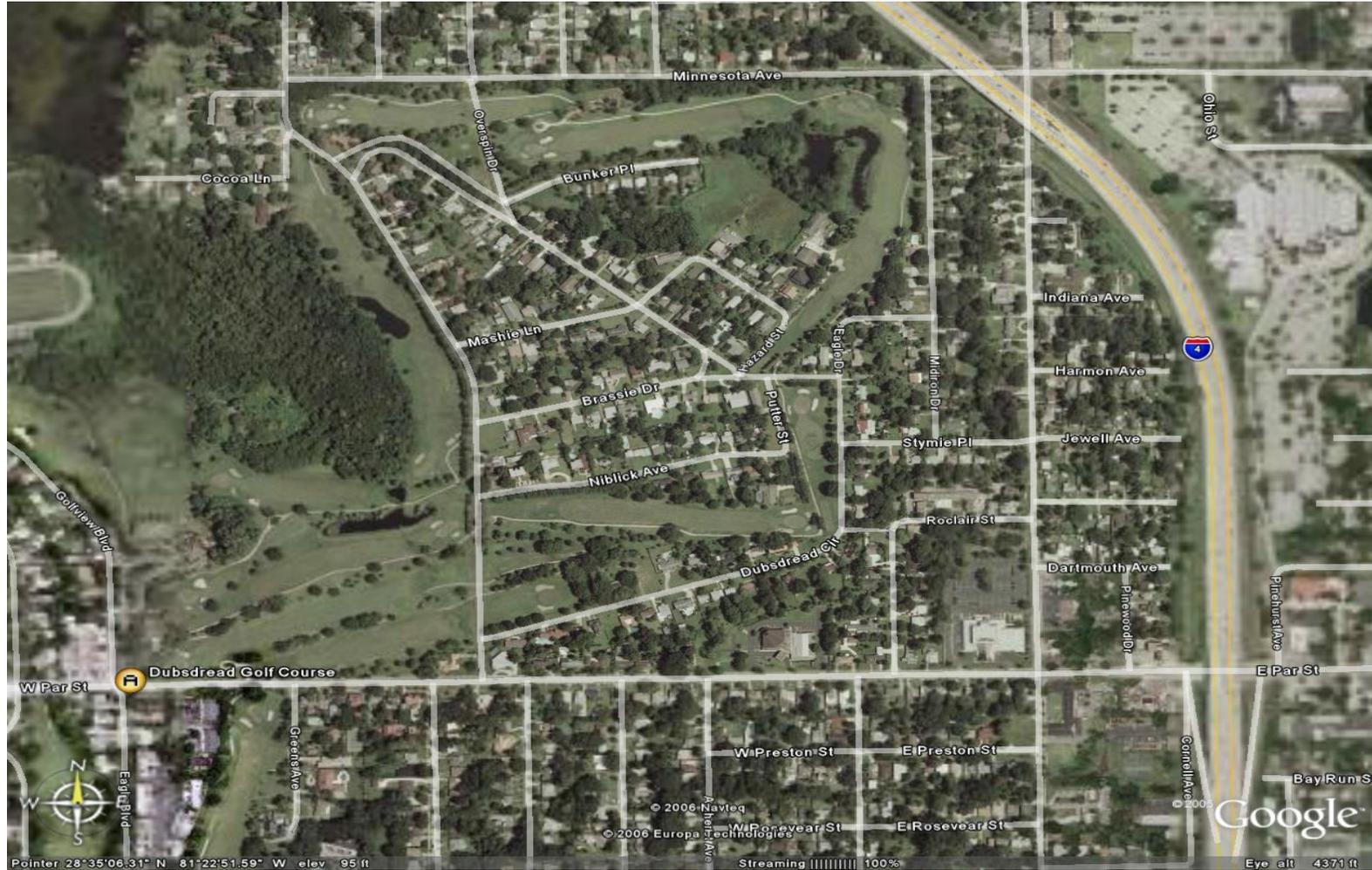


4. Golf Course and I-4 Stormwater Management Plan

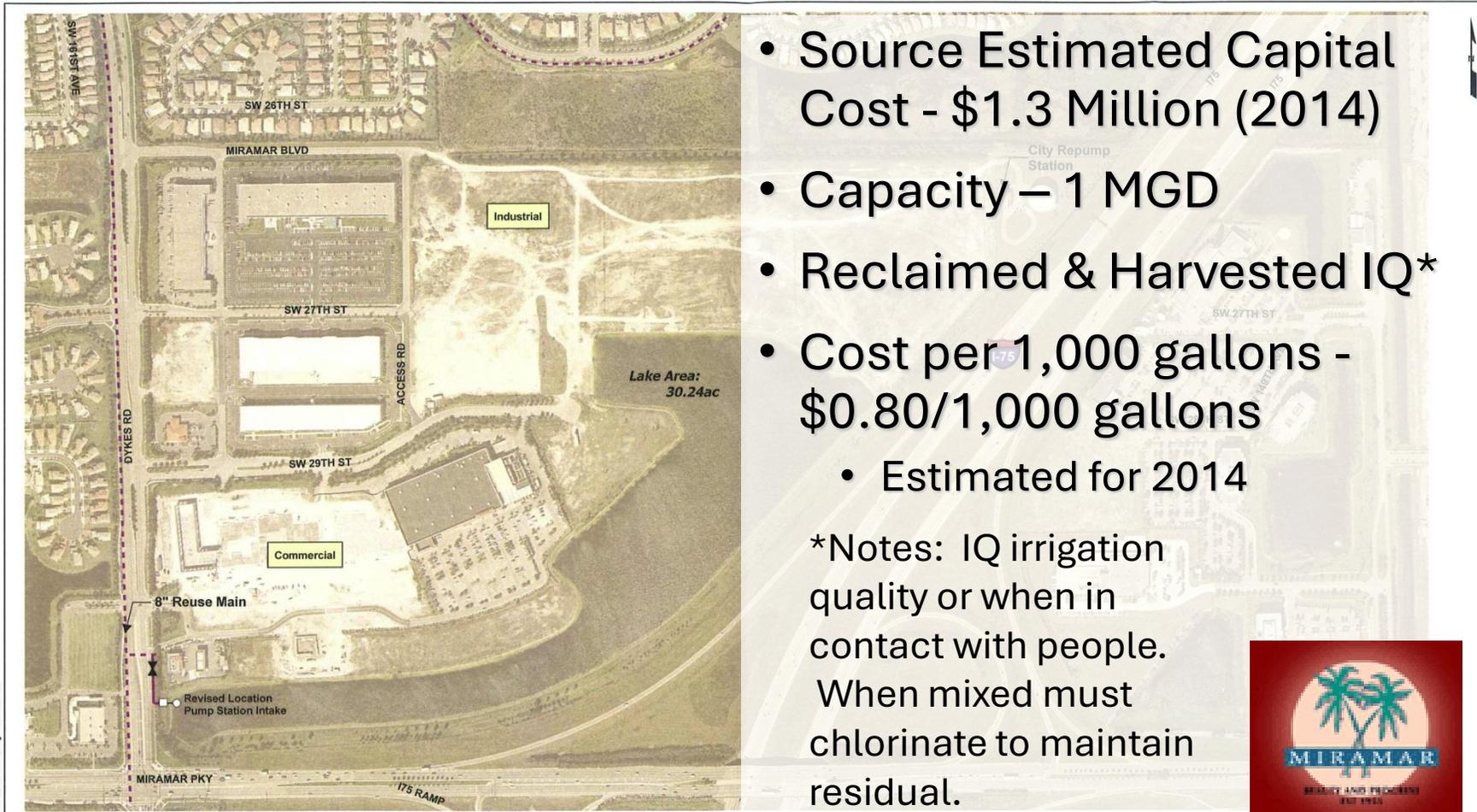
- Plan – Provide water on golf course to improve the play and image of the course.
- FDOT – We got the water for you.
- WIN WIN FDOT and a high school meet stormwater regs, citizens get a new golf course.
- All get stormwater treatment and saving of potable water that would otherwise be used for irrigation.
- And oh yes, Wekiva River is protected.



FDOT District Signature Project



City of Miramar – Broward County



Filepath: M:\CAD\DWG\2010\06\07_0006\07_0006.dwg 1:2 Aerial.mxd

H Hartman Consulting & Design
301 E. Pine Street - Suite 1020 - Orlando, Florida 32801
Phone 407-447-9095 - Fax 407-447-9406

CITY OF MIRAMAR
PROPOSED STORMWATER SUPPLY SYSTEM
PLAN VIEW

FIGURE
1-2



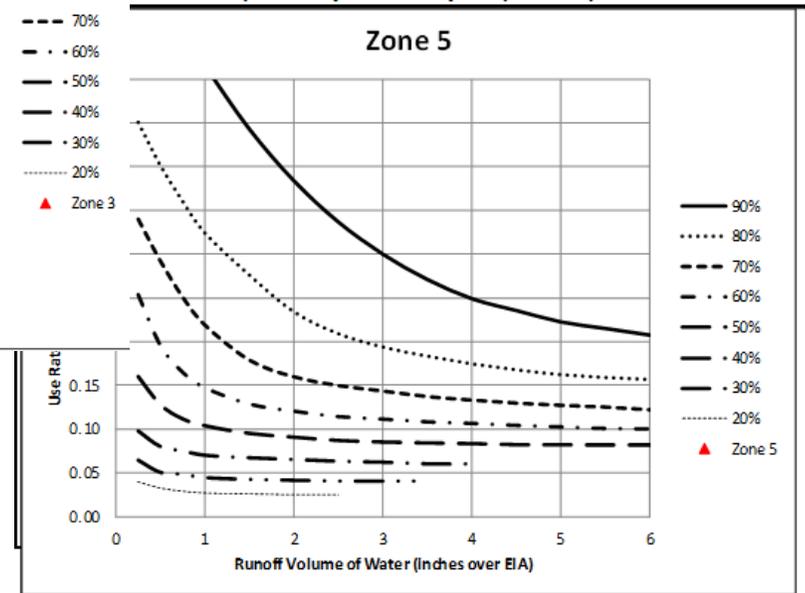
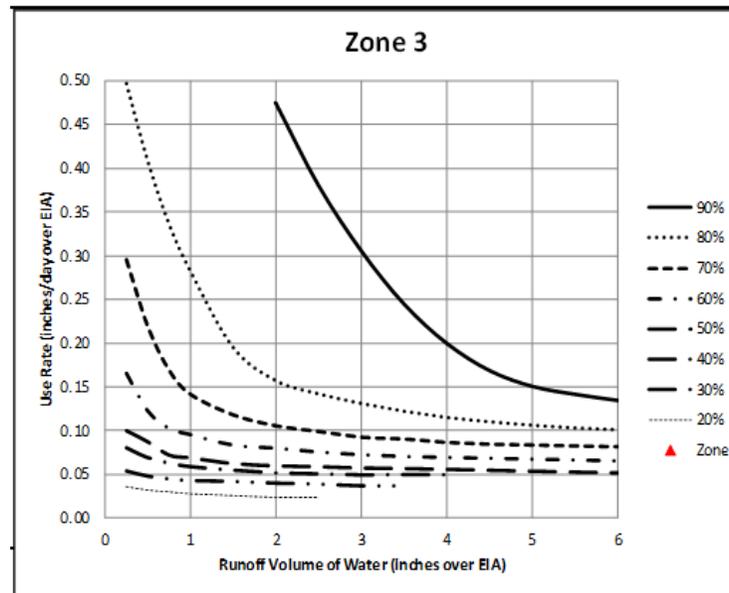
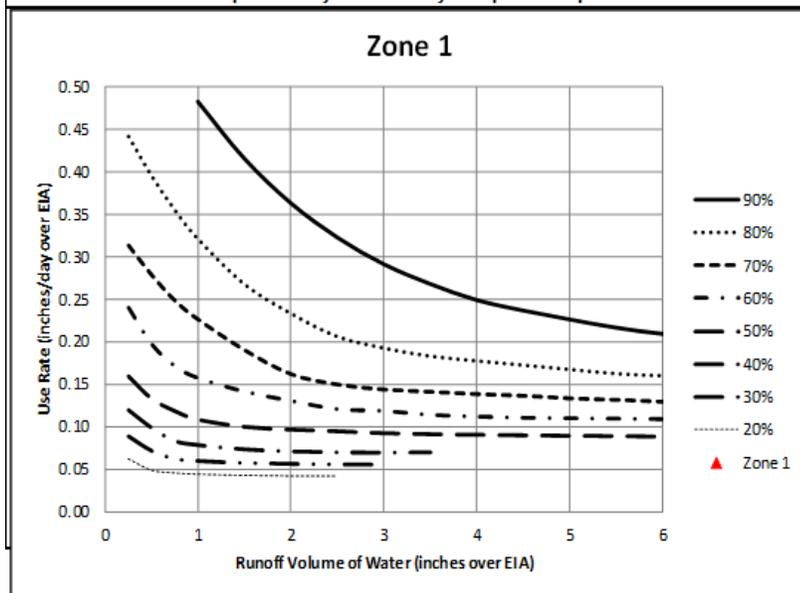
Cocoa Village Harvesting and Use Area

Note: harvesting name preferred so as to not confuse with treated wastewater or reuse of treated wastewater.



Annual removal curves a.k.a. REV Curves for Stormwater Harvesting

When combined with wet detention, a concentration reduction is added.



R is the “Y” axis and for average daily **R**ate of use.
E is the annual removal (retention) or **E**fficiency.
V is the **V**olume of storage for harvesting.

Source: A.H. Vol 1, Appendix O, Table 1.

Project Description

Redevelopment (increase in directly connected impervious area) of a 2-acre site that is classified as light industrial is expected in met zone 4. The municipality requires that the runoff water be used for irrigation on the project 0.93-acre plot of land. The CN is 60 and the percent of the total area that is directly connected before redevelopment is 20% and after it is 32%. The loading from the 0.28-acre wet pond is not part of the catchment loading.

A stormwater harvesting plan is recommended. The average yearly irrigation rate of 1 inch per week and a 0.25 ac-ft harvest volume area has been approved. There is no littoral zone in the wet pond. What is the BMP plan to meet the redevelopment performance standard?

OPEN BMPFast and show screen captures

Help and Documentation

Project Name:

Select Meteorological Zone for Project: ?

Enter the Mean Annual Rainfall: inches ?

Performance Standard of Surface Discharge Analysis:

Conduct Groundwater Discharge Analysis:

Nitrogen Removal Efficiency (%):

Phosphorus Removal Efficiency (%):

1.

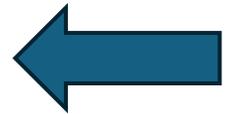
2.

3.

4.

5.

6.



Add Catchment **Catchment 1 southwest catchment**

Current Catchment Number : 1 southwest catchment

and Use

Catchment Name: **southwest catchment**

Pre: Light Industrial: (TN=1.200 TP=0.260)

Post: Light Industrial: (TN=1.200 TP=0.260)

Total Pre-Development Catchment Area (ac): 2.00

Total Post-Development Catchment Area (ac): 2.00

Pre-Development Non DCIA Curve Number: 60.00 +

Pre-Development DCIA Percentage (0 - 100%): 20.00

Post-Development Non DCIA Curve Number: 60.00 +

Post-Development DCIA Percentage (0 - 100%): 32.00

Wet Pond Area (No loading from this area, ac): 0.28

Concentrations used in Analysis

?
?
?

	Pre:	Post:	
EMC(N) mg/l	1.200	1.200	
EMC(P) mg/l	0.260	0.260	
Annual ROC	0.197	0.291	?
Runoff (ac-ft/yr)	1.707	2.166	
N Loading (kg/yr)	2.526	3.205	?
P Loading (kg/yr)	0.547	0.694	

Report

Calculate

Wet Detention Analysis: Redevelopment

Note: For credit, in some applications, annual residence times cannot exceed an upper limit.
Pond must include a littoral zone. If no littoral zone, the credit is reduced by 10%.

Check if there is a littoral zone

Permanent Pool Volume (acre-feet):

Floating Wetland or and other MAPs Credit (%):

Input Pond TP (ug/l) if data available

Calculate

Anoxic Depth

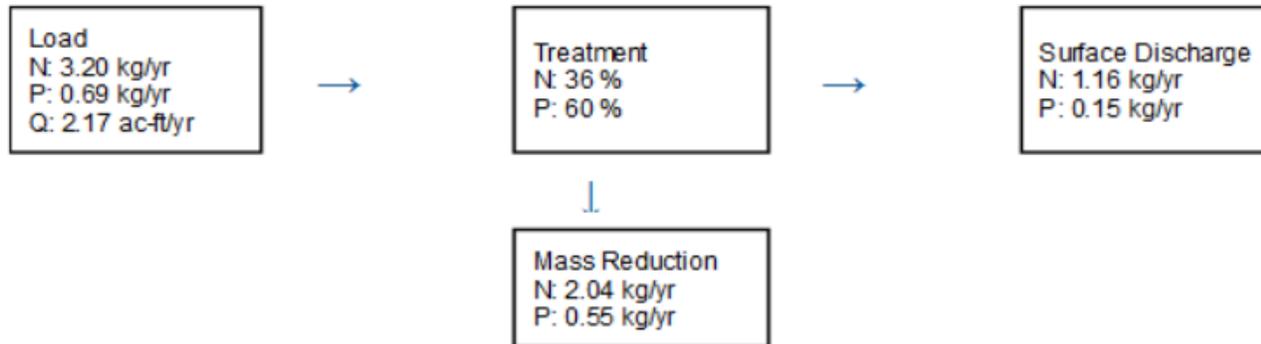
Cost

Print

Plot

Back

Load Diagram for Wet Detention (stand-alone)



Area Available for Irrigation (ac):

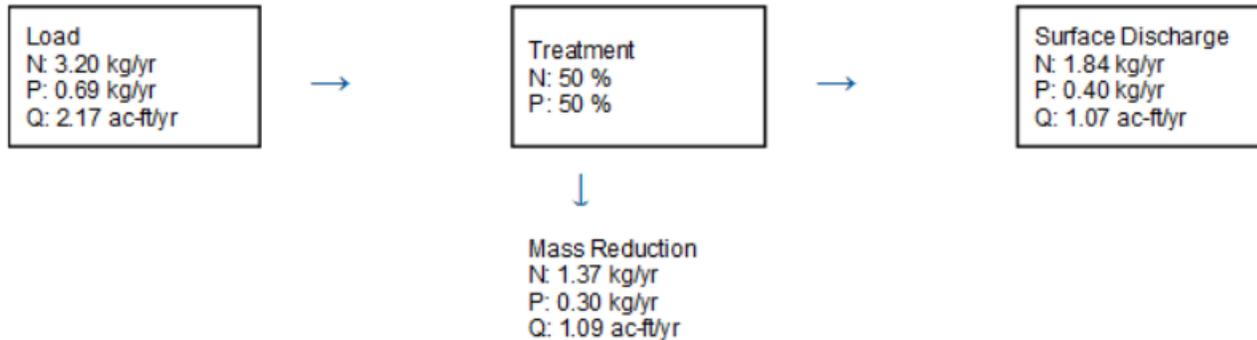
Max Available Harvest Volume (ac-ft):

Harvest Rate (0.1 - 4.0 in/week)

Required Phosphorus Treatment Efficiency (%)	80.00
Provided Phosphorus Treatment Efficiency (%)	50.4

[Plot REV](#)

Load Diagram for Stormwater Harvesting (stand-alone)



[Calculate](#)

[Cost](#)

[Print](#)

[Copy](#)

[Back](#)

Multiple BMP Worksheet for Catchment 1

Add up to 4 BMP's to each catchment in order of routing

BMP 1: Wet Detention

BMP 2: Stormwater Harvesting

BMP 3:

BMP 4:

Surface Water Discharge

Required Nitrogen Treatment Efficiency (%)

Provided Nitrogen Treatment Efficiency (%)

Required Phosphorus Treatment Efficiency (%)

Provided Phosphorus Treatment Efficiency (%)

Load for Multiple BMP in Series

Load
N: 3.20 kg/yr
P: 0.69 kg/yr
Q: 1.09 ac-ft/yr

Treatment
N: 68 %
P: 80 %

Surface Discharge
N: 1.16 kg/yr
P: 0.15 kg/yr
Q: 0.35 ac-ft/yr

Mass Reduction
N: 2.04 kg/yr
P: 0.55 kg/yr
Q: 0.74 ac-ft/yr

3. **Configure Catchments**

Select Catchment Configuration

	From	To	Area	BMP Used	Edit
▶	1	0	2.00	Multiple BMP	<input type="button" value="Edit"/>
*					<input type="button" value="Edit"/>

1. Enter Catchment
2. Enter Treatment
3. Configure Catchments
4. Summary Treatment Report
5. Complete Report
6. Cost Comparisons

Project: harvesting

File: 2025 harvesting example redevelopment with pond.bmpt

Date: 01/17/2026

Generated by: martinwanielista@gmail.com

Summary Treatment Report

Catchments and Associated BMP Types

ID	Catchment Name	Catchment BMP	Routing Destination
1	southwest catchment	Multiple BMP 1: Wet Detention 2: Stormwater Harvesting	Routed to Outlet

Volume of Runoff Summary

Scenario	Effective Area (acres)	Runoff Volume (ac-ft/yr)	Runoff Volume (in/year)
Pre-Condition	2	1.71	10.24
System Post-Condition (with BMPs)	1.72	.69	4.82
Post-Condition (no BMP)	1.72	2.17	15.11

Effective Area is the watershed area used to normalize runoff (acres). Runoff volumes are shown in acre-feet per year and converted to depth (inches/year) by dividing by area and multiplying by 12.

Summary Loading Analysis

% Target Removals

Is system total nitrogen target removal met? **Yes** (Required: 45% Provided: 68.13%)
 Is system total phosphorus target removal met? **Yes** (Required: 80% Provided: 80.29%)

CUP or WUP permit impacts

Consumptive Use Permits To illustrate how new software can help.

Source: Applicant's Handbook for Water Use Permit Applications, SFWMD JUNE 13, 2022, SFWMD (WUP), May 2014, SJRWMD, Aug 2014, and others... Example data and output from an older EXCEL model

Meteorological Zone:	2	2	Mean Annual R_i of DCIA P_e	
Total Area Contributing to the Harvesting System:	16.95	16.95	30	35
Total Green Area Available for Irrigation:	9.3	9.3	0.244	0.285
Weighted Rational Runoff Coefficient (0.00 to 1.00):	.8	.325	0.246	0.286
			0.248	0.288
			0.250	0.290
			0.254	0.293
			0.258	0.298
			0.264	0.303
			0.272	0.311
			0.283	0.321
			0.298	0.335
			0.320	0.355
			0.355	0.387
			0.412	0.440
			0.525	0.546
			0.659	0.670

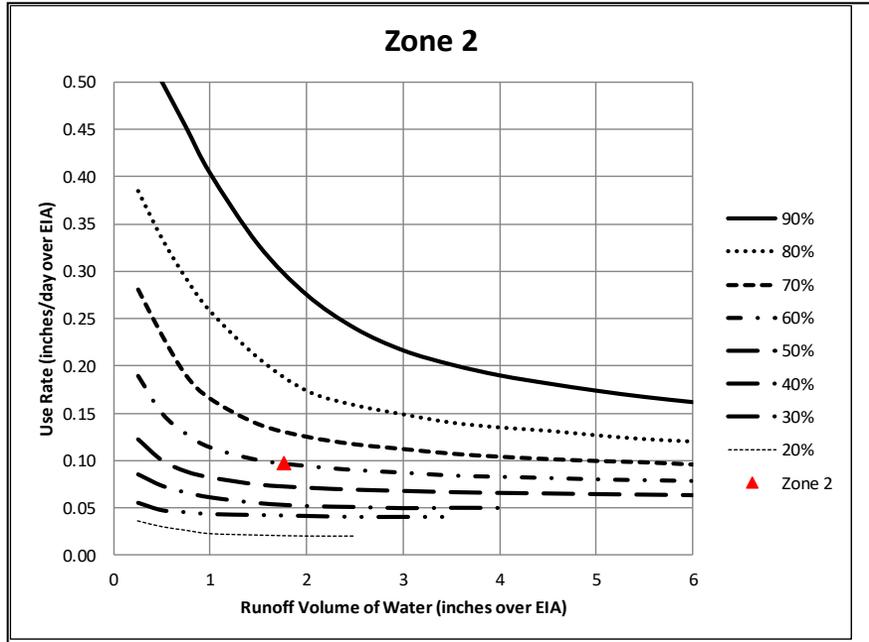
Supplemental Water:		
Average yearly demand for harvested water:	13.13	13.131
Average supply of harvested water:	12.83	7.673
The average supplemental water needed per year:	0.29	5.458

	12.83	7.673
--	-------	-------

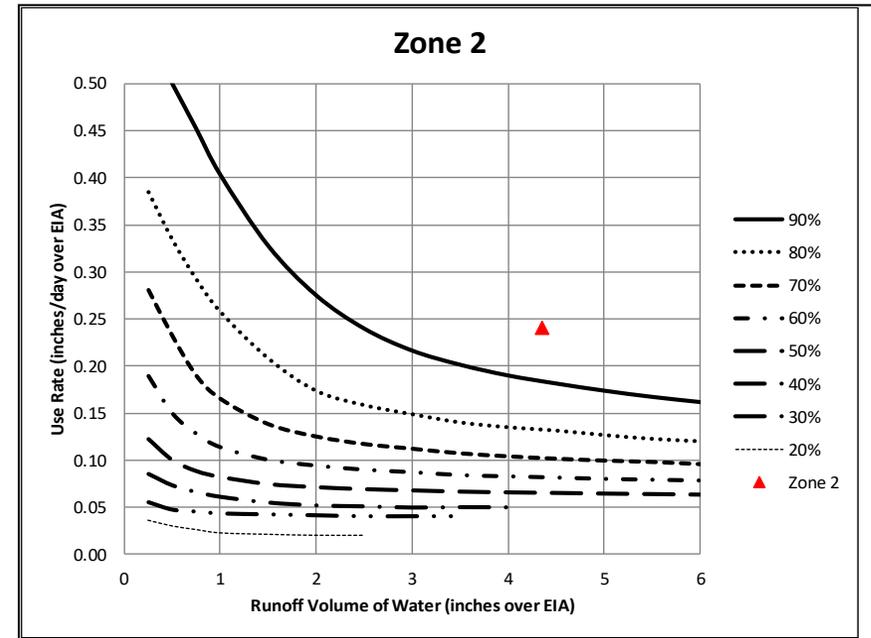
Source: AH Vol 1 Appendix N, zone 2 and Appendix O Table 1 "harvesting"

REV curves (efficiency of harvesting)

Source: AH vol 1, Appendix O, Table 1 stormwater harvesting



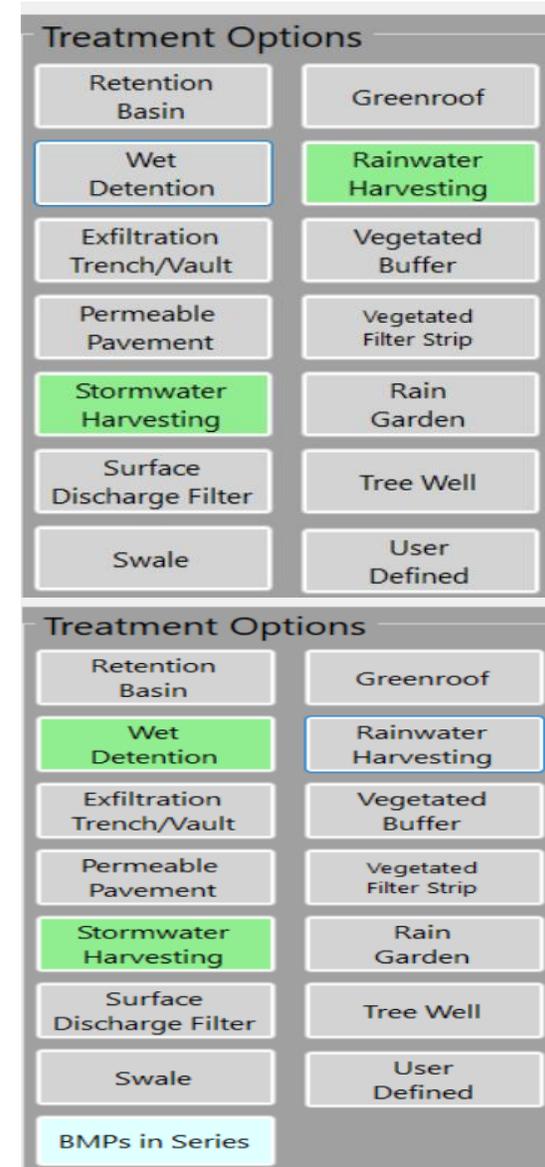
61% harvested Efficiency when ROC = 0.80



90% harvested efficiency when ROC = 0.325

What did we learn?

1. What is Harvesting? Rainwater vs Stormwater.
2. Navigation of the software.
3. Enter data for annual mass removal analysis and understand output using harvesting as the BMP.
4. Demonstrate the use of worksheets and discovery with REV curves.
5. Output can help with Water Use Permits.
6. Example Problem.



BMPFast Analysis for Harvesting

By: Marty Wanielista

January 2026

