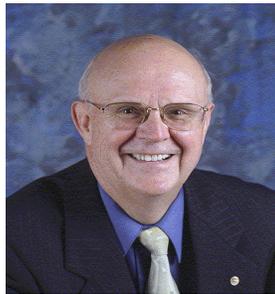


Understanding New Regulations, Rules and Practice and I want to get a permit in a timely manner = FAST



By: Marty Wanielista

January 2026



Learning Objectives

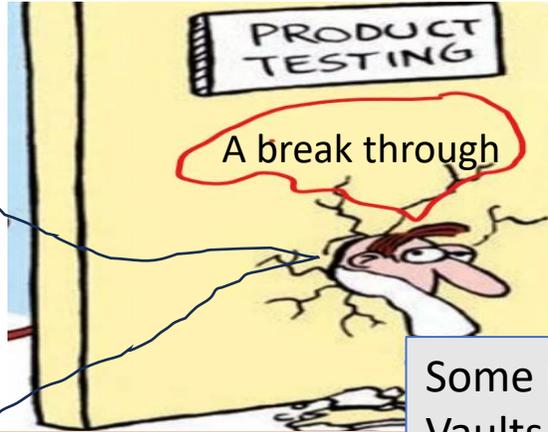


1. How new rules, regulations and practice affect stormwater management water quality permit applications. They do change over the years.
2. What can be used to assist in getting a permit in a timely manner and be consistent with new regulations and practice? What is in my toolbox?



Where are these improvements coming from?

Research and Testing

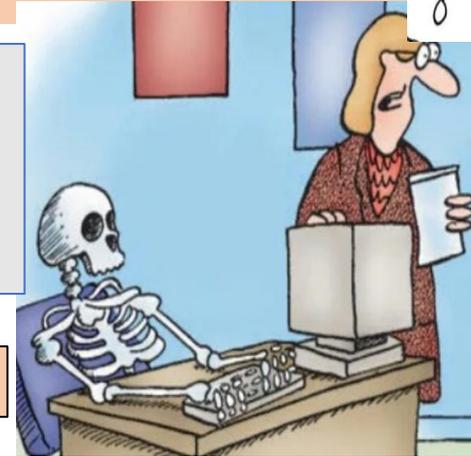


New Stormwater Rule tells us how to analyze (June 28, 2024)
Full implementation Dec 28, 2025
"I hope to understand this stuff soon"

Software to use these improvements must be approved by at least one regulatory agency.

FS 288.860 - foreign control of IP
2021 legislature, guidance Dec 2022
and new AI and ML programming

Some Examples: EMCs
Vaults, Detention options,
New Permeable Pave,
Harvesting, Retention



"I hope the jumper cables work. I've got to start her up and finish my report."

Security of Software

Environmental Stewardship Groups,

Municipal Representatives

Reviewers and Consultants

The Applicant's Handbooks (A.H.)

Picture Source: complements of Reader's Digest

Need for more tools in the toolbox (WHY?)

- 1. Incorporate recent improvements from: rules, regulations and practices using a tool that takes less time to complete an analysis of effectiveness.
- 2. The need for consistency in assessment of an ERP. Also, the results should be helpful with other TMDL, BMAP, flood control and consumptive or water use permits.
- 3. Must use data from Florida, not something for a different climate or enforcement program (in Florida, effectiveness is on an annual basis).
- 4. Professional discovery and understanding of hydrologic events leading to “better” design.

A list of some improvements for the analysis of BMPs found in Applicant's Handbooks and other sources.

1. EMCs and aggregate (formed from separate area) EMCs
2. Wet Detention with no littoral zone, MAPs, maximum ART
3. Annual Rainfall Data
4. Performance Standards
5. Fast retention volume recovery
6. Runoff reduction methodology when reducing the DCIA
7. Media service life to include or not to the performance of pre BMPs
8. Security protection and State law on IP related to foreign use
9. Terminology changes, example ROC vs C factor

There is an expressed need to complete all of these in a timely manner

A list of some improvements for the analysis of BMPs found in Applicant Handbooks and other sources.

10. Clarity and help in understanding, example fraction vs %, error catches
11. Inclusion of BMP names and effectiveness as found in A.H. Vol 1
12. Stormwater harvesting calculations
13. Additional permeable pavements
14. Allow retention after wet detention
15. Effectiveness calculations for systems in series (Equation 9.5, A.H. Vol 1)
16. Pre and post volume calculations for resiliency and flood control efforts
17. Cost data improvements
18. Data for other program impacts, TMDL, BMAP, resiliency and WUP (CUPs)
19. Wet Detention performance as affected by upstream retention

Again, there is an expressed need to complete all of these to be consistent with regulations and practice

Let's consider first performance standards from the new rule

From research with water quality impacts Specified Performance Standards from new rule

Source: AH vol 1, sec 8.3, June 28, 2024

Project Name:
 Select Meteorological Zone for Project: ?
 Enter the Mean Annual Rainfall: inches ?

Performance Standard of Surface Discharge Analysis:

Conduct Groundwater Discharge
 Nitrogen Removal Efficiency (%): 1.
 Phosphorus Removal Efficiency (%): 2.

Attempting to maintain past Worksheet formats.

Note, most existing software does not have new performance standards and thus sometimes results in delays in obtaining a permit.
 Solution: "hard-wire" the standards and provide a software to do it.

Project Scenario	TP	TN	Additional Criteria
All Sites	80	55	or Post<=Pre
OFW	90	80	or Post<=Pre
Impaired Water	80	80	& Post<=Pre +WQ Targets
Impaired + OFW	95	95	& Post<=Pre + WQ Targets
Redevelopment	80	45	none
Redevelopment + OFW	90	60	none
Redevelopment + IMP	80	45	and WQ Targets

WQ Targets are water quality standards in receiving water (net improvements)

Add the following standards to address other local needs and discovery or sensitivity analysis.

Post <= Pre
 Specified % removals
 BMP Analysis

Example of more changes specified in the new rule

Annual Rainfall Data from new rule

Source: AH Vol 1, June 28, 2024, Appendix M Figure 2



Picture Source: complements of Reader's Digest

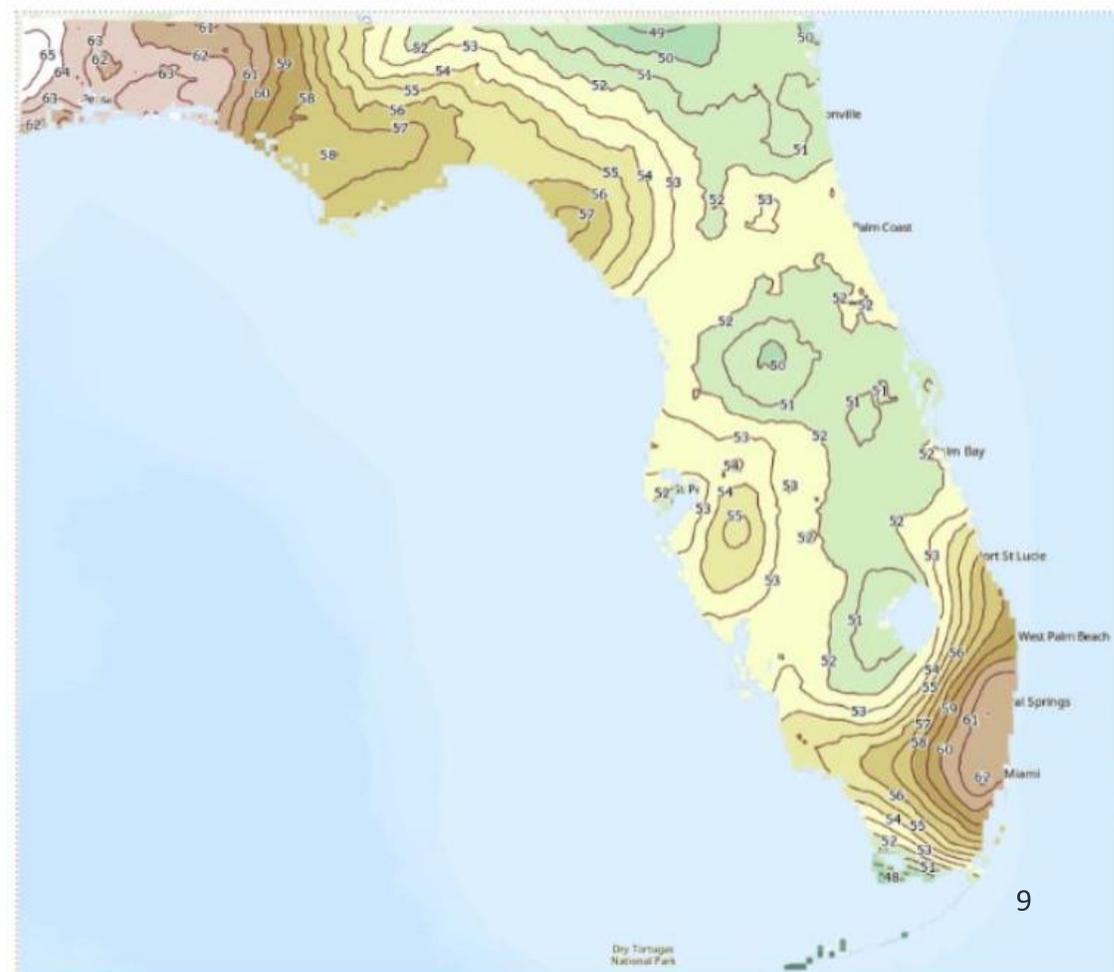
Change to meet need for updated annual rainfall
as specified in the new rule

Annual Rainfall

From Appendix M
Figure 2
AH 1, (Rule) 2024

Shows the need for site
specific evaluations

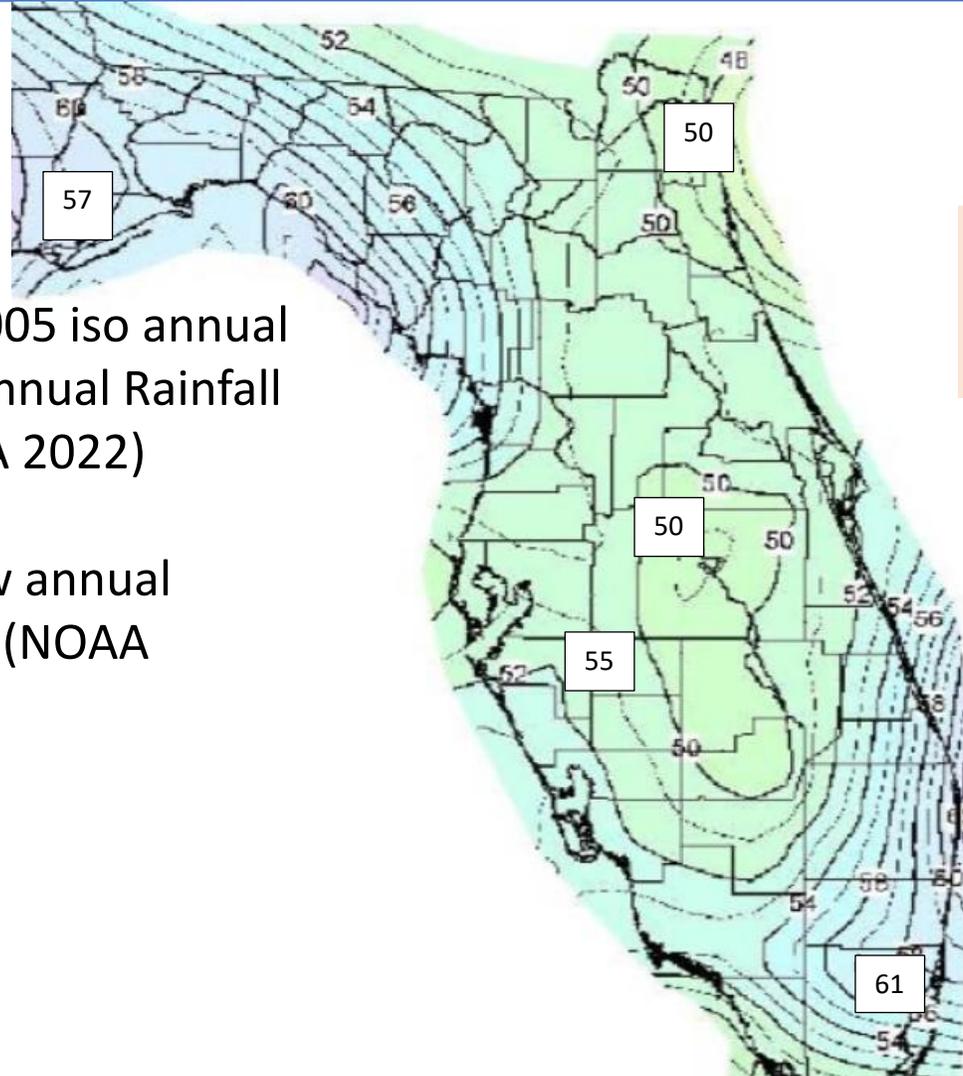
2022 NOAA Average Annual Rainfall Depths (inches)



Range: 41.60 to 65.70

Keys to the Northwest Pan Handle

Comparison 2005 and 2022 annual rain (inches)



Comparing 2005 iso annual rain to new Annual Rainfall depths (NOAA 2022)

Boxes are new annual rainfall depth (NOAA 2022)

Most annual rainfalls are greater, some smaller, some about equal.

Continuing with examples of improvements (changes)

Source: AH vol 1, Table 9.2, June 28, 2024

Catchment Data: EMCs

Watershed Characteristics Worksheet

Add Catchment **Catchment 1**

Current Catchment Number : 1

Land Use Catchment Name: ?

Pre: ?

Post: ?

Total Pre-Development Catchment Area (ac): 9.20

Concentrations used in Analysis

Pre: Post:

EMC(N) mg/l + ?

EMC(P) mg/l + ?

Table 9.2 Standardized Statewide Stormwater Nutrient EMC Values

Land Use Category	Total N (mg/l)	Total P (mg/l)
Low Density Residential	1.65	0.270
Single Family	1.77	0.327
Multi-Family	1.84	0.520
Low Intensity Commercial	0.93	0.19
High Intensity Commercial	2.40	0.345
Light Industrial	1.20	0.260
Highway	1.25	0.173
Dry Prairie	2.025	0.184
Marl Prairie	0.684	0.012
Mesic Flatwoods	1.087	0.043
Ruderal/Upland Pine	1.694	0.162
Scrubby Flatwoods	1.155	0.027
Upland Hardwood	1.042	0.346
Upland Mixed Forest	0.606	1.166
Wet Flatwoods	1.213	0.021
Wet Prairie	1.095	0.015
Xeric Scrub	1.596	0.156
Rangeland/parkland	1.150	0.055
General Agricultural	2.29	0.381
Pasture	3.03	0.593
Citrus	2.11	0.180
Row Crops	2.50	0.577

If an EMC is not in the “Pull-Down” list or other values, User Defined are suggested. Site specific ones can be input.

Problem with User Defined
Usually takes time to justify the numbers.
“hard-wire” numbers are usually not questioned.

Wet Detention Pond Options

Source: AH vol 1, Appendix O and AHs vol 2

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%

200 days
As the ART

Check if there is a littoral zone

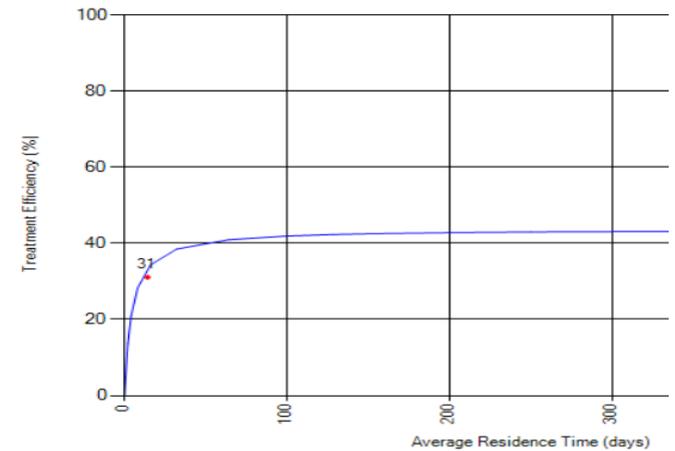
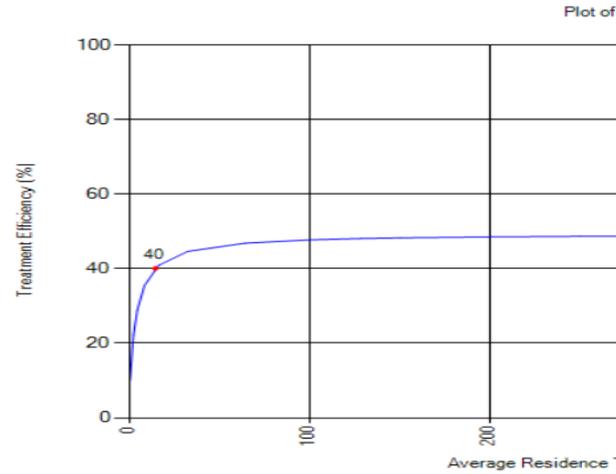
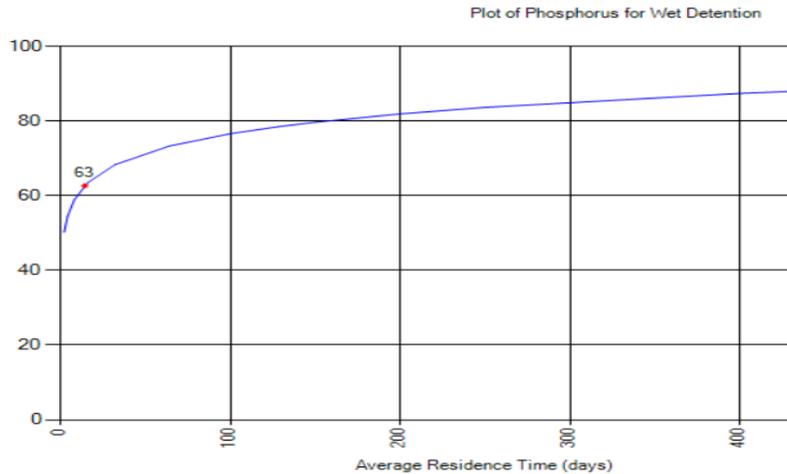
Permanent Pool Volume (acre-feet): 0.7

Floating Wetland or Mats Improvement Credit (%):

12 in AH 1, app O

Input Pond TP (ug/l) if data available 0

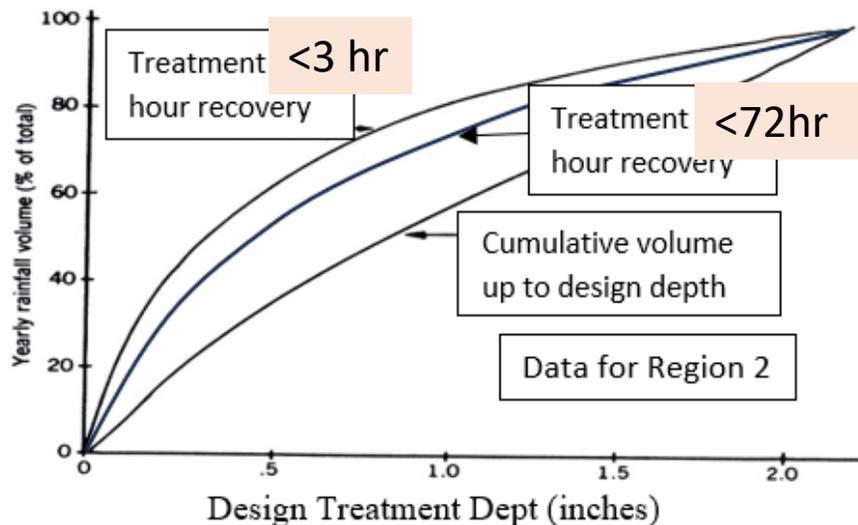
Note 5% coverage



Fast Recovery Retention Systems like Exfiltration Pipes and Vaults in Limestone Areas or pumped (where allowed)

Source: AH vol 1, Appendix O (retention), and SFWMD AH vol 2.

In fast recovery retention, like exfiltration and vaults in limestone areas, the annual effectiveness increases compared to slower recovery (72 hours).



Source: Wanielista 1978, Harper, 2007 (<72)

Note challenging interpolation for other than CN and DCIA in increments of 5.

Then for fast recovery, adjust using the above graph: Increase is up to 10%

For Runoff and up to 72 hr recovery, apply the removal efficiency tables of the new rule (2024), AH 1, Appendix O (80 of them)

Zone 2 by Percent DCIA 1 inch

Non DCIA CN	70	75	80	85	90	95	100
30	80.0	77.9	75.9	74.0	72.2	70.3	68.6
35	79.9	77.9	75.9	74.0	72.1	70.3	68.6
40	79.8	77.8	75.8	73.9	72.1	70.3	68.6
45	79.6	77.7	75.8	73.9	72.1	70.3	68.6
50	79.5	77.5	75.6	73.8	72.0	70.3	68.6
55	79.2	77.3	75.5	73.7	72.0	70.2	68.6
60	78.9	77.1	75.3	73.6	71.9	70.2	68.6
65	78.5	76.8	75.1	73.4	71.8	70.2	68.6
70	77.9	76.4	74.8	73.2	71.6	70.1	68.6
75	77.2	75.8	74.3	72.9	71.5	70.0	68.6
80	76.3	75.0	73.8	72.5	71.2	69.9	68.6
85	74.9	74.0	72.9	71.9	70.8	69.7	68.6
90	73.2	72.5	71.8	71.0	70.3	69.4	68.6
95	70.9	70.6	70.2	69.9	69.5	69.0	68.6
98	69.4	69.3	69.2	69.0	68.9	68.8	68.6

Assumes initial abstraction of 0.1 inch

Cost Considerations from AHs

Cost and O&M considerations: Source: AH vol 1, Section 12 O&M

Interest Rate (%) 4.000
 Project Duration (yr) 30.000
 Cost of Water (\$ /1000 gal) 0.000

Even have an option for income from harvesting.

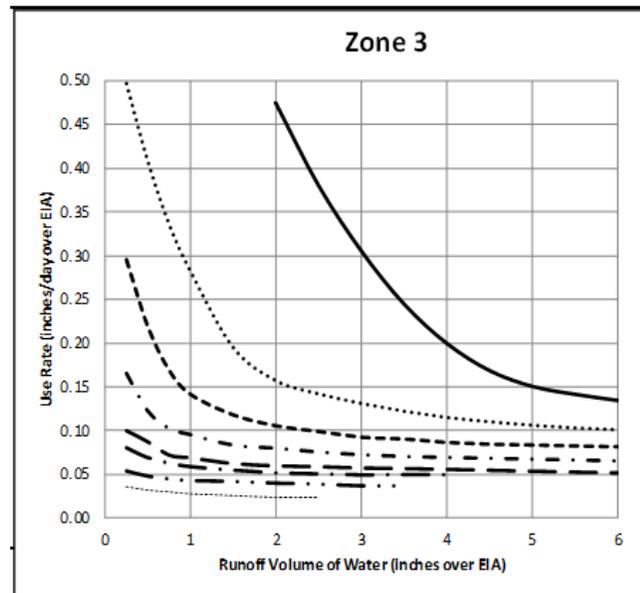
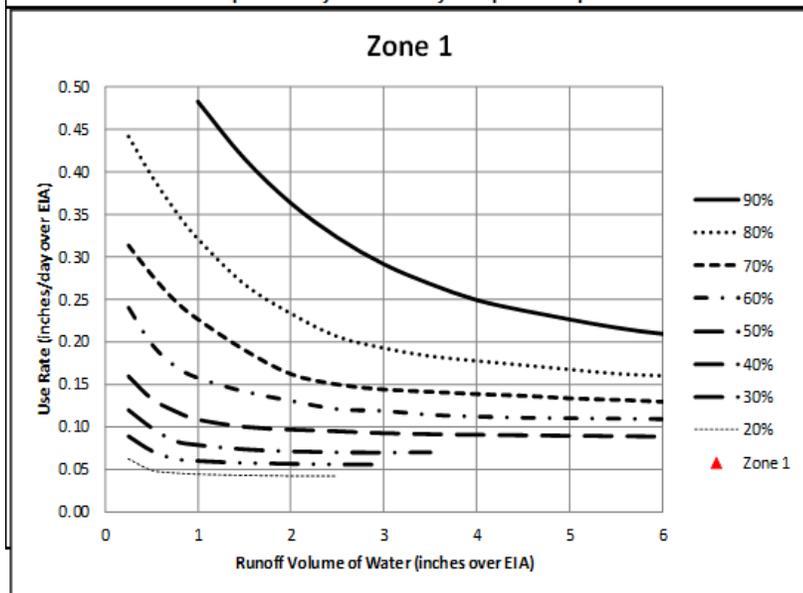
Road and Commercial Center (Catchment #1)

BMP Type	Treatment Volume (ac-ft)	Land Cost (\$)	Expected Life (yr)	Fixed Cost (\$)	BMP Cost (\$/ac-ft)	Initial BMP Cost (\$)	BMP Maintenance (\$/yr)	Annual Recovery (\$/yr)	Total Annual Cost (\$/yr)	Future Replace Cost (\$)
Retention	0.50	10,000	30	5,000	6,000	18,000	500	0	500	35,000
Exfiltration	0.07	0	30	2,000	265,000	20,311	800	0	800	0
Tree Well	0.07	0	30	2,000	95,000	8,543	800	0	800	0
Multiple BMP	0.64	10,000	0	9,000	0	46,854	2,100	0	2,100	0

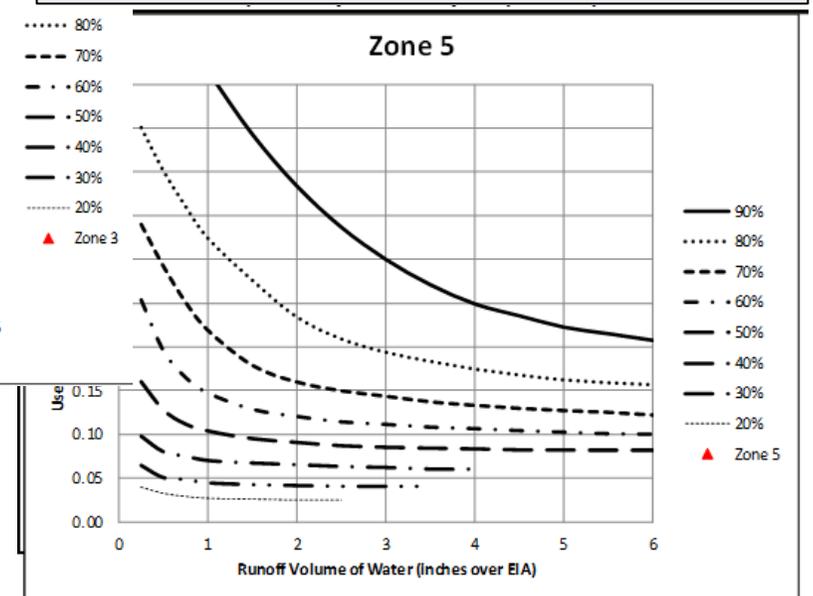
Screen captures from software.
 See FSA (Cunningham) publications and credit for calculations to Mike Hardin

Present Value to Replace (\$)	Present Value/Life Cycle Cost (\$)	Nitrogen Mass Reduction (lb/yr)	Phosphorus Mass Reduction (lb/yr)	PV Cost per Pound N Removed (\$/lb)	PV Cost per Pound P Removed (\$/lb)
10,791	26,646	34.61	5.76	25.67	154.26
0	34,145	8.49	1.41	134.01	805.01
0	22,376	8.47	1.41	88.09	529.20
10,791	83,167	37.54	6.25	73.85	443.91

Stormwater Harvesting Performance a.k.a. REV Curves for Stormwater Harvesting



Older software fixed the runoff volume (0.8) resulting in a conservative estimate of removal.



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.

One REV curve for each meteorological zone, as an average of those for that zone.

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

Other Permits (CUP and Harvesting)

Consumptive Use Permits

Source: Applicant's Handbook for Water Use Permit Applications, SFWMD JUNE 13, 2022, SWFWMD (WUP), May 2014, SJRWMD, Aug 2014, and others... Example data and calculations using software.

Meteorological Zone:	2	2	Mean Annual R_i of DCIA Pe	
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

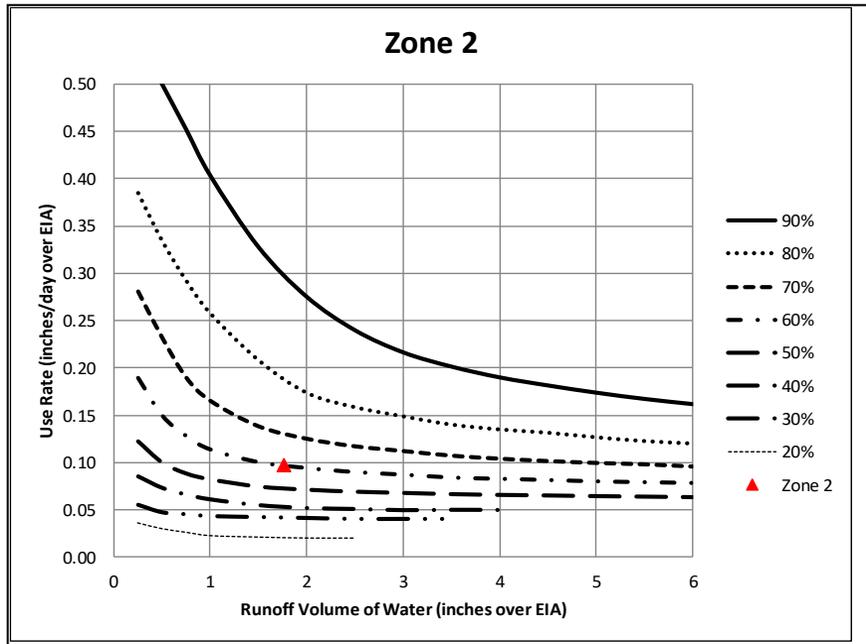
<u>Supplemental Water:</u>		
Average yearly demand for harvested water:	13.13	13.131
Average supply of harvested water:	12.83	7.673
The average supplemental water needed per year:	0.29	5.458

12.83	7.673
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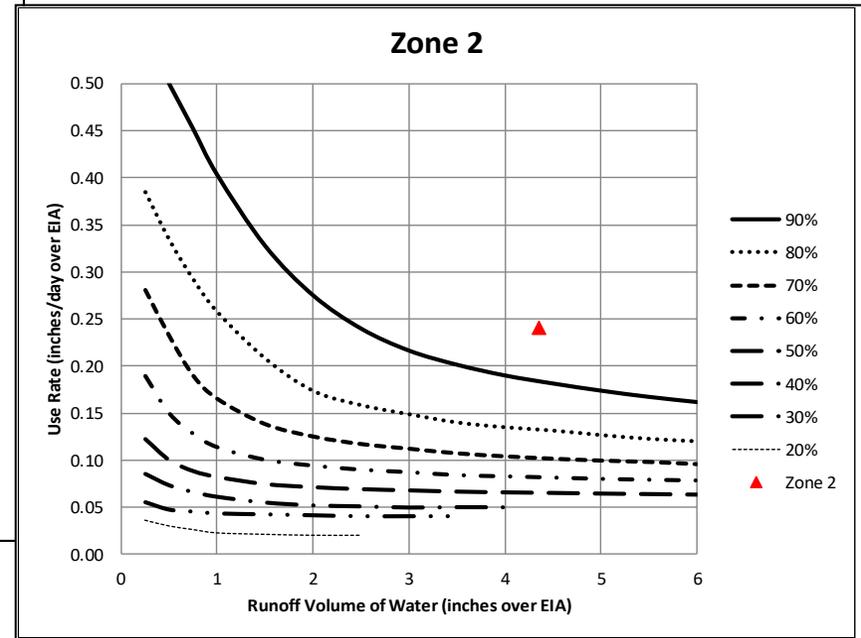
Source: AH Vol 1 Appendix N, zone 2 and Appendix O Table 1 "harvesting"

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

Flood Impacts and Example

File name: AG to SF with GSI and Vault for Harvesting

Source: AH Vol 1, Part III, "There is at least a **neutral** factor in the public interest balance with respect to the potential for causing or alleviating flooding problems if the applicant meets the water quality criteria."

16.95-acre **general agriculture** to single family residential. The **performance standard** is 55/80% or post= \leq pre loading. Annual rainfall is **61 inches**. Net improvement for *Ecoli* will be met. Planned is ½ inch retention on site (**GSI**) followed by a detention vault to **conduct harvesting on 9.3 acres** of irrigation land at an average of 1"/week. Must also obtain a **water use permit** and a **volume discharge** limitation (post \leq pre **volume**).

Volume of Runoff Pre-Condition 4.5 inches/yr

Volume of Runoff Post-Condition 18.53 inches/yr

Post-Condition Runoff with BMPs (inches/year over 16.95 acres): 3.23

Target Removals

Is system total nitrogen target removal met? **Yes** (Required: 55% Provided: 82.57%)

Is system total phosphorus target removal met? **Yes** (Required: 80% Provided: 82.57%)

Pre vs. Post Removals

Harvested Water Supply (MGY) 5.176

Water Use (MGY) 13.132

Is % less than predevelopment system loading for TN met? **Yes** (Required: 68.55% Provided: 82.57%)

Is % less than predevelopment system loading for TP met? **Yes** (Required: 71.68% Provided: 82.57%)

Can new software help with all the improvements?

Older software may be used but is limited and should be checked for a particular application

Stormwater BMPs must be applied to **all sites** in the state

New rule info and regulatory decisions that are “hardwired” in software result in more accurate and timely completion of a permit and reduces review time.

Provision to add new BMPs and regulatory decisions should be included.

Easy and secure access to software is needed. There may be a user fee for the development, maintenance and security of the software.

New software called BMPFast is planned for release.
Where and how released depends on the source of funding.

What is the current thinking?

BMPFast: a C# (C++) software for estimating annual removal effectiveness.

Note: granted an extender for all saved data, namely .BMPT

The acronym is derived from the perception that BMPs must be analyzed in a reasonable time (fast) and meet practice and regulations.

The software acronym reflects its use as

**Best Management Pactices For annual Assessment of Stormwater Treatment
or **Best Management Pactices with Florida based annual Assessment of
Stormwater Treatment****

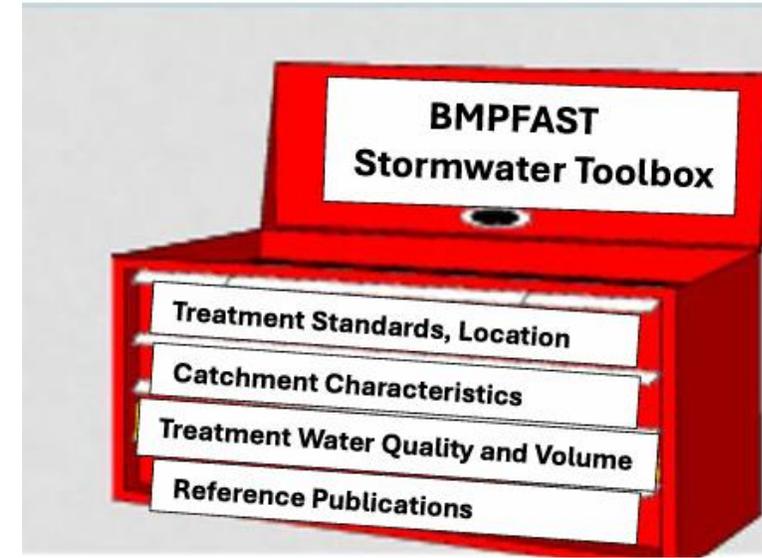
To help in understanding regulations --- learning modules like this are useful.

Secure software that responds to our needs
can be helpful and for
the next generation of professionals



Learning Objectives

1. Some new rules, regulations and practice do affect stormwater management water quality permit applications.
2. Examples of some changes as they affect permit applications were discussed.
3. Software called BMPFast can be used to assist in calculations in a timely manner while being consistent with new rules, regulations and practice.



Understanding New Regulations, Rules and Practice and I want to get a permit in a timely manner (fast).

By: Marty Wanielista

January 2026

