



Evaluation of MS4 Program Effectiveness (and TMDL Implications)

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**Why is it that Gas Stations
Lock their Bathrooms?**

**Are They Afraid Someone
Might Clean Them?**

-George Carlin

Overview

- Municipalities are Facing Some Serious Issues...
- NPDES, TMDLs, and EPA are Forcing the Action
- Some Strategies for Assessing Effectiveness
- Meeting the TMDL Challenge

Status Quo is Changing

- Reporting on Activities no longer adequate
- Municipalities must Take Charge of Their Own Destinies
- MS4 Programs Must Engage in a Serious Evaluation/Assessment of the Effectiveness of the SWMP activities

SO....

What Does it all MEAN?



The (multi) Million Dollar Question:

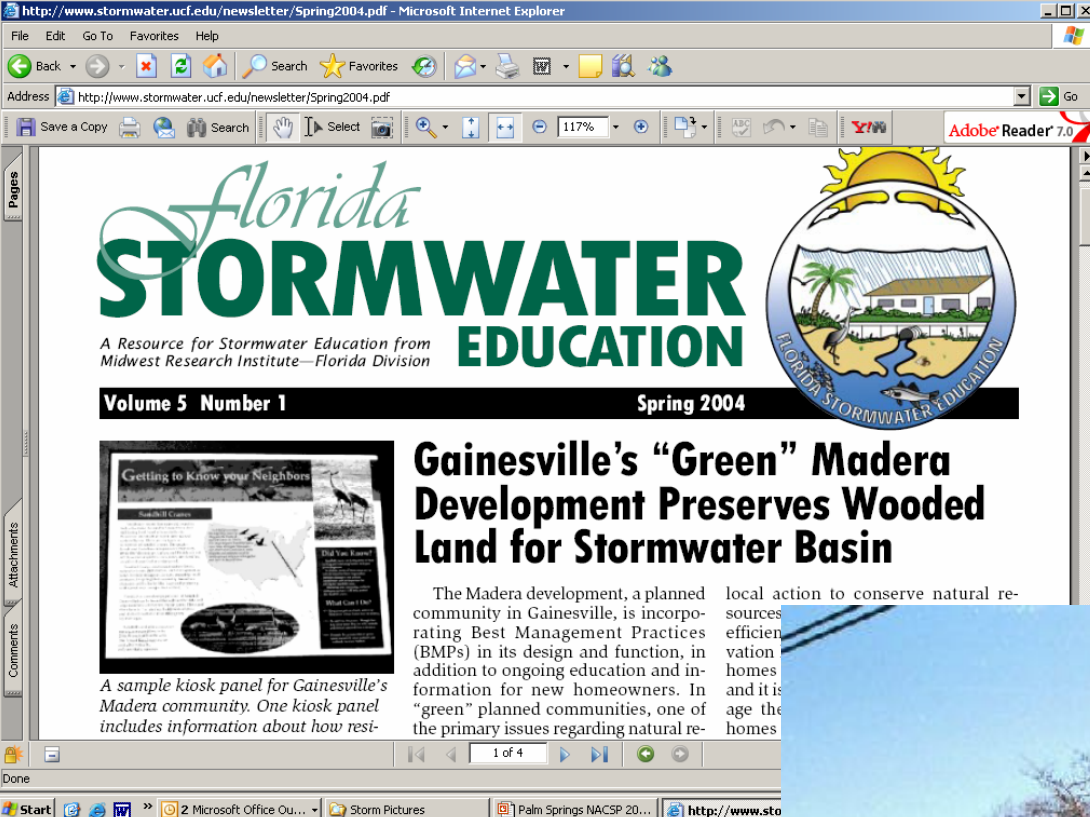
“How do MS4s Assess and Demonstrate Pollutant Load Reductions Resulting from Implementing their Programs?”

Estimate Reductions from “Hard” Capital/Retrofit Projects

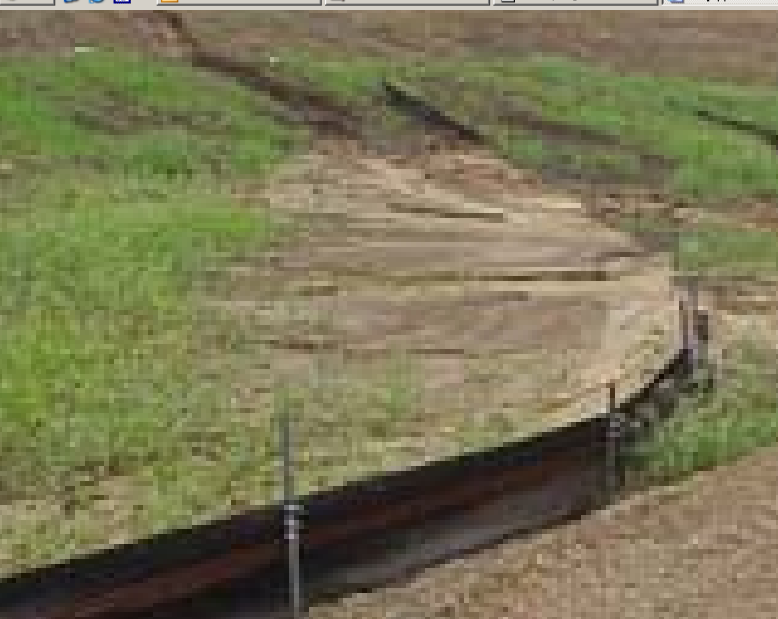


What about Everyday “Soft” Management Practices?





Other “Soft” Practices



Must Link Water Quality to Program

- Yet must be able to show linkage between program implementation and affects on water quality
- Critical that “linkage” is cost effective and practical
- Cannot have Assessment Process that costs more than the program itself!

California Assessment Approach

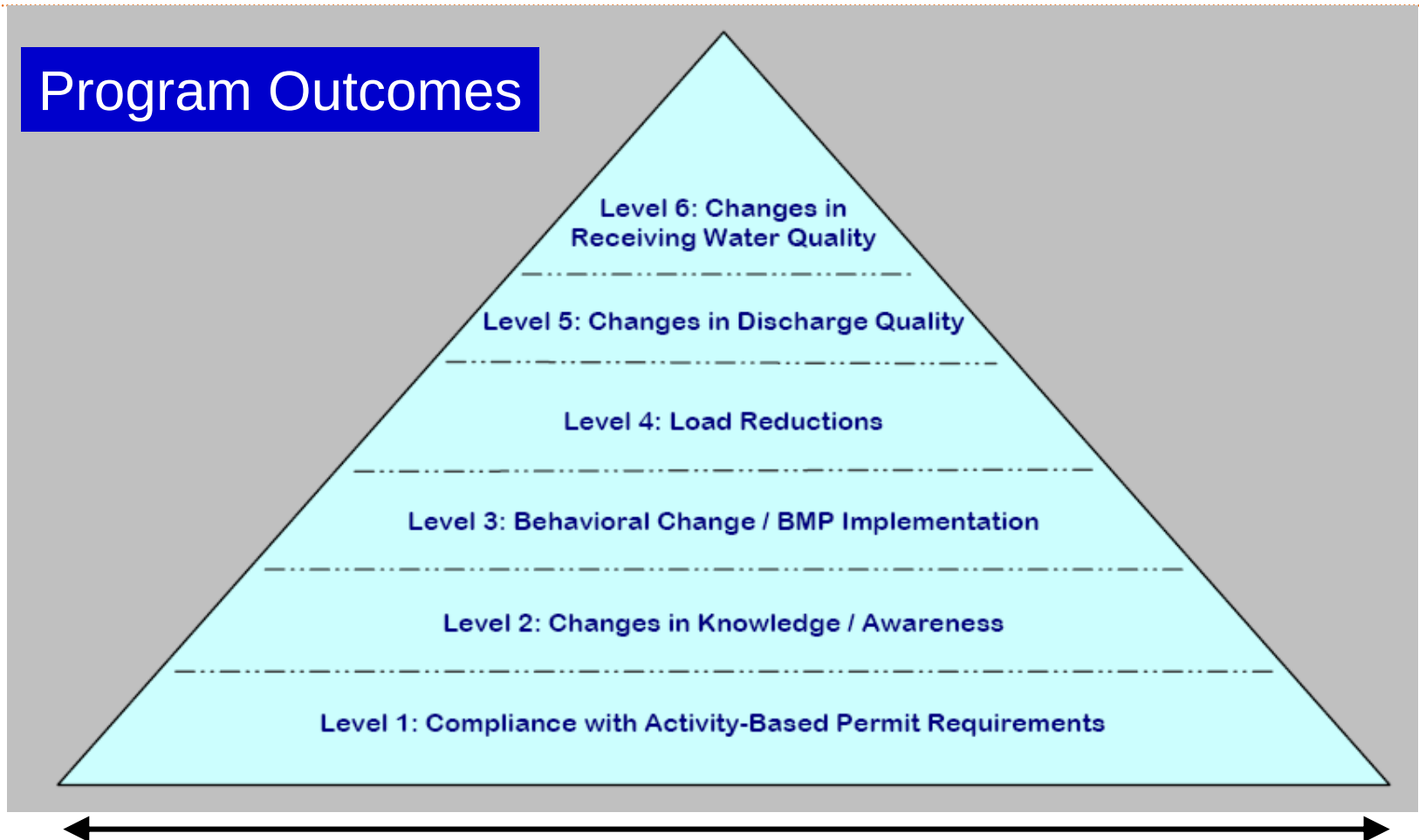
California Stormwater Quality Association: *“An Introduction to Stormwater Program Effectiveness Assessment”*

- Suggests Integrated Assessment Approach
- Suggests 6 Levels of Program Outcomes

Less Information

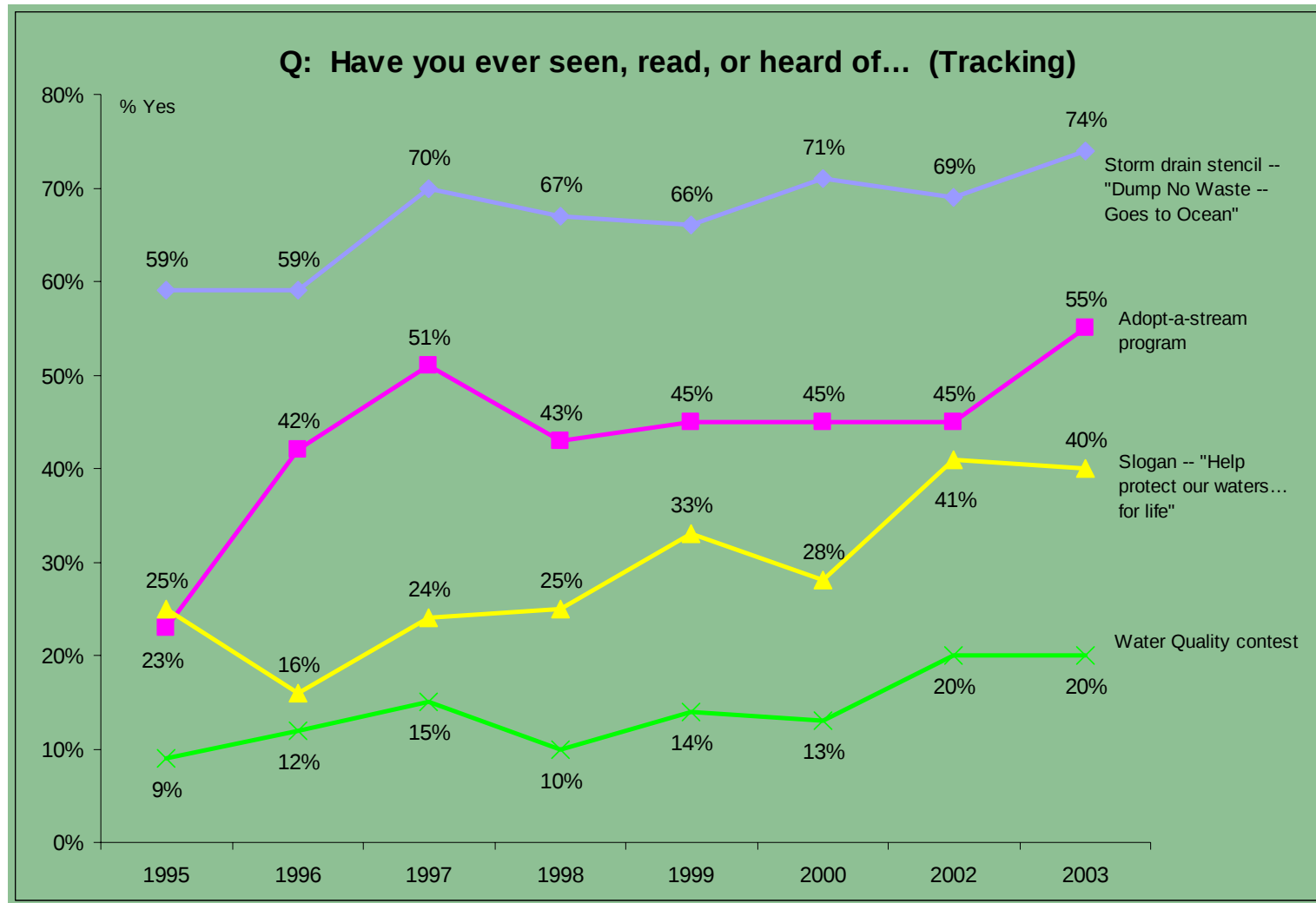


Program Outcomes

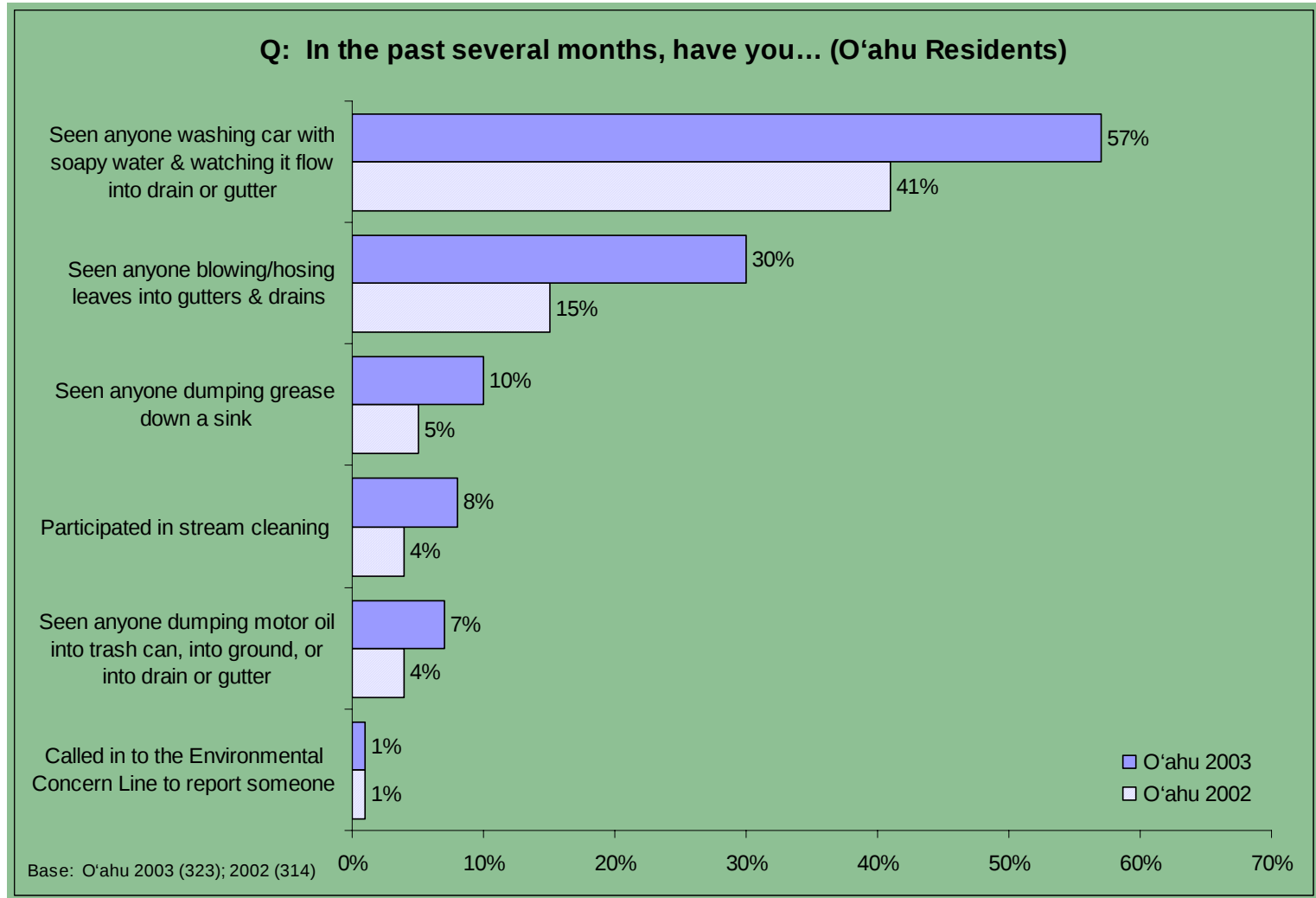


More Information

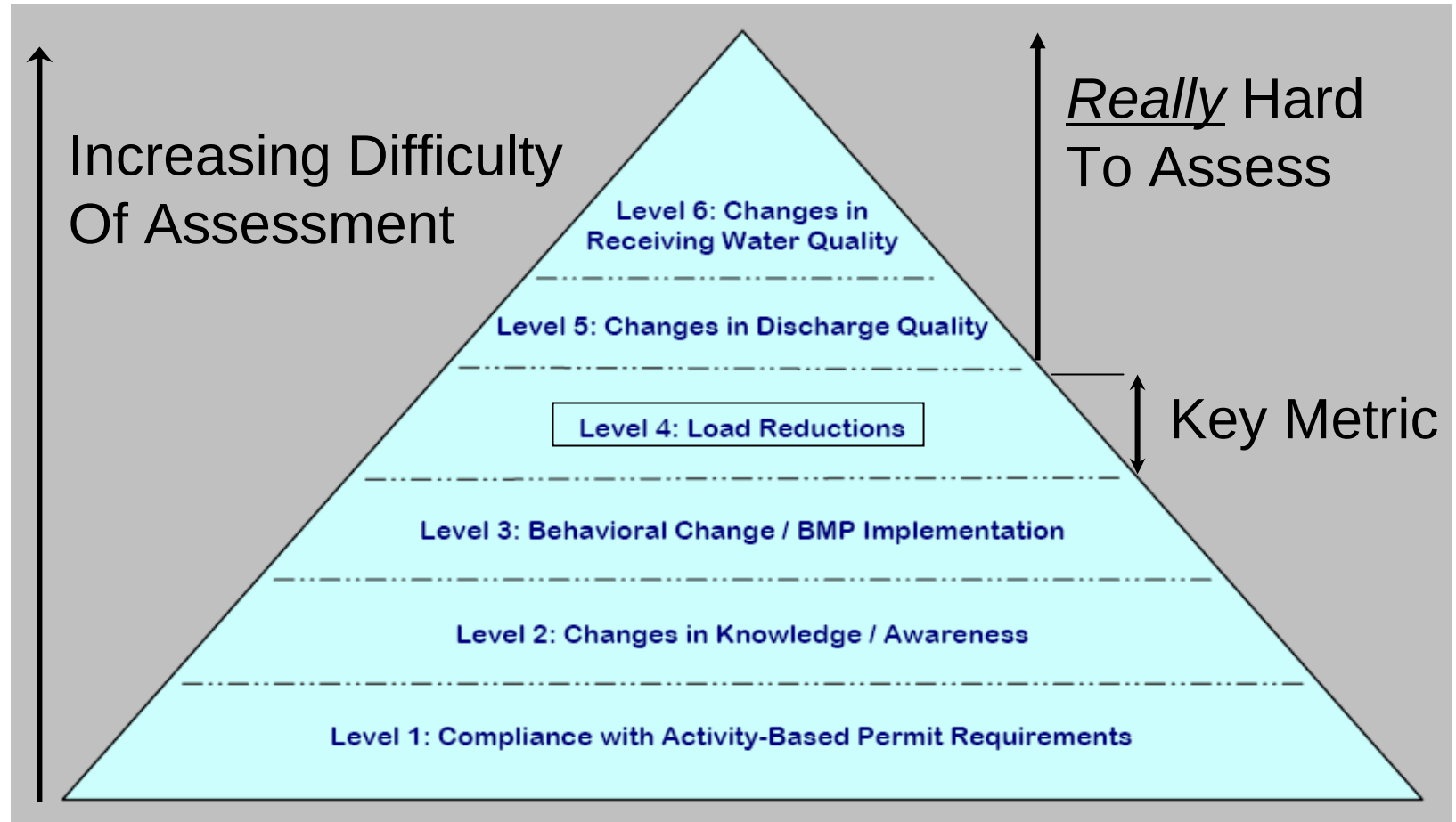
Hawaii Example: Tracking Stormwater Awareness



Hawaii Example: Tracking Behavior and Awareness



Program Outcomes



Florida Stormwater Association- Load Reduction Assessment Strategy:

- Focus on Day-to-day Management Practices Required by Permit
- Focus on Measured Materials Removed, on Mass Basis
- Assign Appropriate Pollutant Composition Values
- Spreadsheet Calculation of Pollutants Removed

Example – Roadway/System Maintenance:

Activities Currently Tracked:

- No. of Catch Basins Cleaned
- No. of Ponds Cleaned
- No. Sediment Traps Cleaned
- Miles of Streets Swept

Determine / Track Gross Removals

BMP type	Sediment Volume Removed (Cubic Feet)	Sediment Mass Removed (dry pounds)
Catch Basins (1,000)	2,427	212,000
Pond (1 rebuild)	4,235	370,000
Sediment Traps (38)	4,350	380,000
Sweeping (one sweeper)	8,207	717,000
Total	19,219	1,679,000

Pollutant Removals Based on Sediment Mass Fraction

Sediments Collected	Dry Wt. Sediments	Mass Values and Pounds Attributed					
		TP	TN	Cu	Zn	Pb	Cr
Catch Basin- Mass Fraction		0.0014	0.0038	0.000029	0.00015	8E-05	2E-05
Catch Basin Cleaning	212,000	297	806	6.1	31.8	16.1	3.6
Sediment Trap Cleaning	380,000	532	1,444	11.0	57.0	28.9	6.5
Retention Pond-Mass Fraction		0.0014	0.0038	0.000018	9.5E-05	5E-05	3E-05
Pond Cleaning	370,000	518	1,406	10.7	55.5	28.1	6.3
Street Sweeping-Mass Fraction		0.0014	0.0038	0.000017	6.5E-05	3E-05	3E-05
Street Sweeping	717,000	1,004	2,725	12.189	46.61	17.9	18.6
TOTAL REMOVED	1,679,000	2,351	6,380	40	191	91	35

Example – Illicit Discharge Program

Illicit Connections Detected & Eliminated:

- 10 Domestic Connections Removed, Flow 300 gallons per day
- 1 Sanitary Sewer Overflow Removed, 50,000 gallons of spill twice per year

Pollutant Removals Based on Volume Eliminated

Illicit Discharges Eliminated	Annual Volume (Gallons)	Mass Values and Pounds Attributed				Coliform Colonies
		BOD	TSS	TP	TN	
Sewage - Concentrations (mg/l)		200	200	10	40	3.8E+08
Domestic Connections Removed	1,095,000	1,823	1,823	91	365	4.1E+14
Sewer Overflow Repaired	100,000	167	167	8	33	3.8E+13
TOTAL REMOVED	1,195,000	1,990	1,990	99	398	4.5E+14

Total Removal Values for Selected
“Soft” Management Practices:

Pounds Removed								Coliform
Sediments	BOD	TP	TN	Cu	Zn	Pb	Cr	Colonies
1,681,000	1,990	2,450	6,778	40	191	91	35	4.5E+14

FSA Assessment Tool Initiative

- Working with University of Florida to Fully Develop Assessment Tool
- First Level Analysis Directed toward:
 - Sediments and Plant Material removed
 - Common Illicit Discharges
 - Construction Inspection Program
- Second Level Analysis to Follow...

Assessment Initiative (future)

- Second Level Analysis Might Include:
 - Plans Review/Changes in Development Code
 - Affect of Stormwater Code or Ordinances (i.e. Ft. Worth power washing example)
 - Education's tangible impact...(can we do this?)
 - Other...?

Benefits of Load Reduction Assessment

- Budget and Plan Management Activities According to Actual Pollutant Removals
- Begin to Manage for Environmental Results
- Concept Recently Endorsed by FL DEP and USEPA Headquarters
- Sets Foundation for true Mass Balance Approach

Conclusions

- There is Value in Assessing “Soft” Management Practices
- Requires Minimal Changes: Keep Excellent Records, Track Meaningful Material Quantities
- Key is Identifying Load Reductions
- Goal is Water Quality

Water is the lifeblood of Florida



Questions / Discussion?

