Stormwater Monitoring Coalition BMP Regional Monitoring Network Biofilter BMP Performance

SCCWRP Commission

Elizabeth Fassman-Beck, Ph.D.
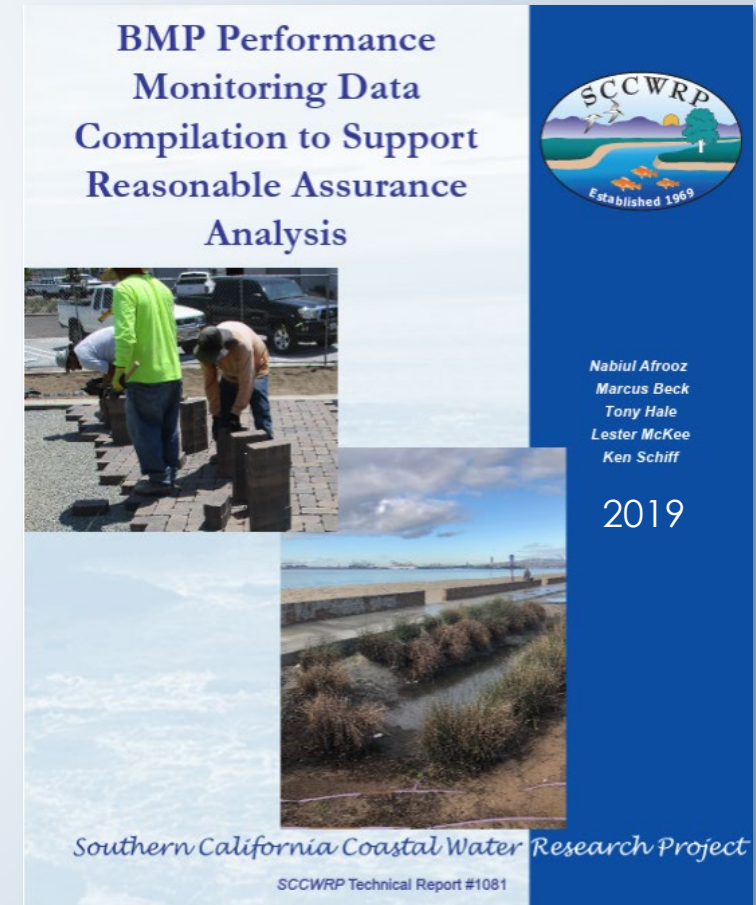elizabethfb@sccwrp.org

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Structural BMPs are big financial investments

- Multi-million dollar investments across SoCal
  - County of Los Angeles ~**$280M *per year*** for BMP design, construction, and maintenance
  - South OC **~$390M** capital projects across 46 projects + O&M
  - North OC **~$20M + $10.5M** O&M for FY 2024-'25
  - County of San Diego **~$15-30M** per year for past 5 yrs; 32 projects in development

We don't know if actual BMP performance aligns with assumptions

- Very little evidence in SoCal documenting effectiveness

- Challenges in consolidating data across one-off studies

- If actual performance differs from assumptions, either

  - Never reach compliance, - or -
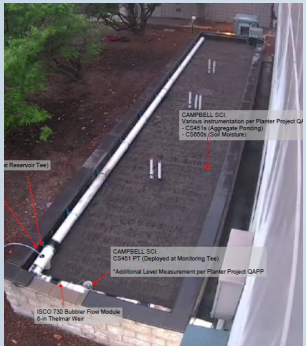
  - Over-allocating resources

BMP Performance Monitoring Data Compilation to Support Reasonable Assurance Analysis

SCCWRP
Established 1969

Nabiul Afrooz
Marcus Beck
Tony Hale
Lester McKee
Ken Schiff

2019

Southern California Coastal Water Research Project

SCCWRP Technical Report #1081

Approach: SMC Regional BMP Monitoring Network

Roadway

Parking Lot / Parking Deck

Roofs

Mixed Urban

Drainage Area (acres)	# of BMPs
<1	5
1-2	2
3-6	5
11	1

Approach: Coordinated Regional BMP Monitoring through the Stormwater Monitoring Coalition
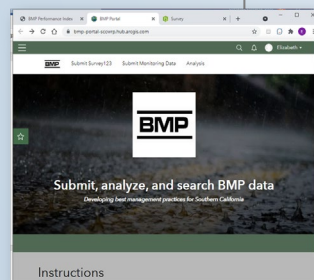
Establish protocols & procedures

➤ Instrumentation & sample collection

➤ Data processing
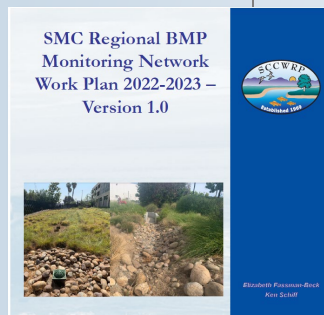
SCCWRP

Develop & implement information management plan

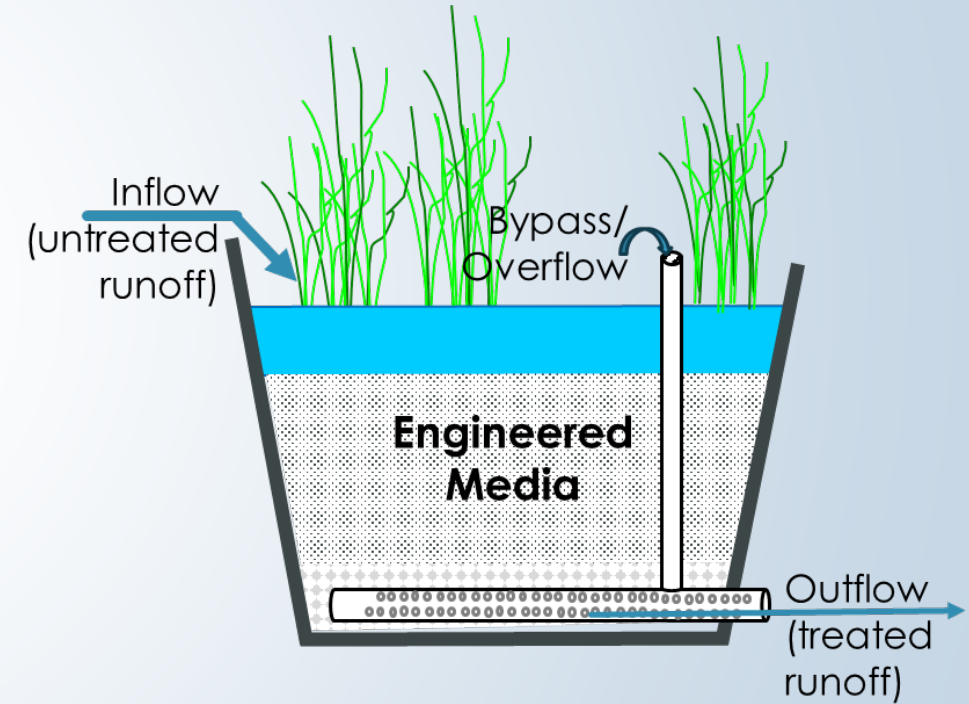➤ Data submission portals

➤ Analysis tools & dashboards

Member Agencies

Storm event monitoring with support from SCCWRP as needed

Initial focus: Partial-capture biofilters

Inflow (untreated runoff)

Bypass/ Overflow

Engineered Media

Outflow (treated runoff)

SMC Regional BMP Monitoring Network

Influent (untreated runoff)

Bypass/ Overflow

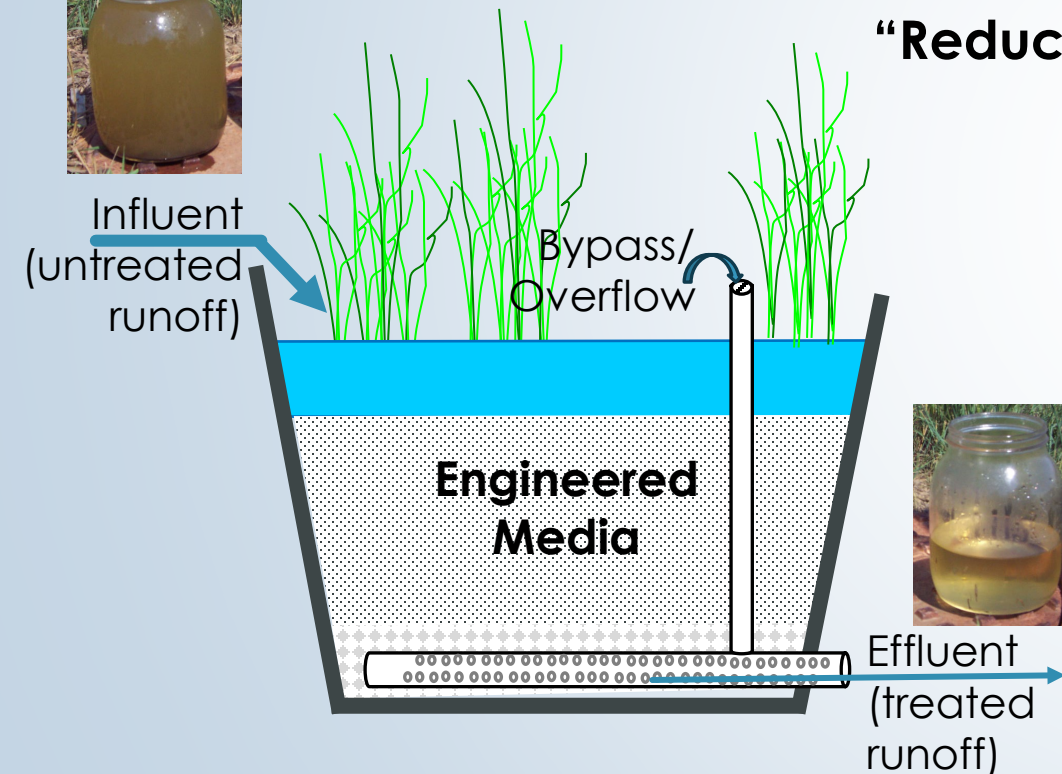Engineered Media

Effluent (treated runoff)

Mass Load "Reduction" =

Retention

✓ Runoff hydrographs (flow)

x

Treatment

✓ Event Mean Concentrations (EMCs)

- Fecal indicator bacteria
- Nutrients
- Sediment
- Heavy metals
- Microplastics

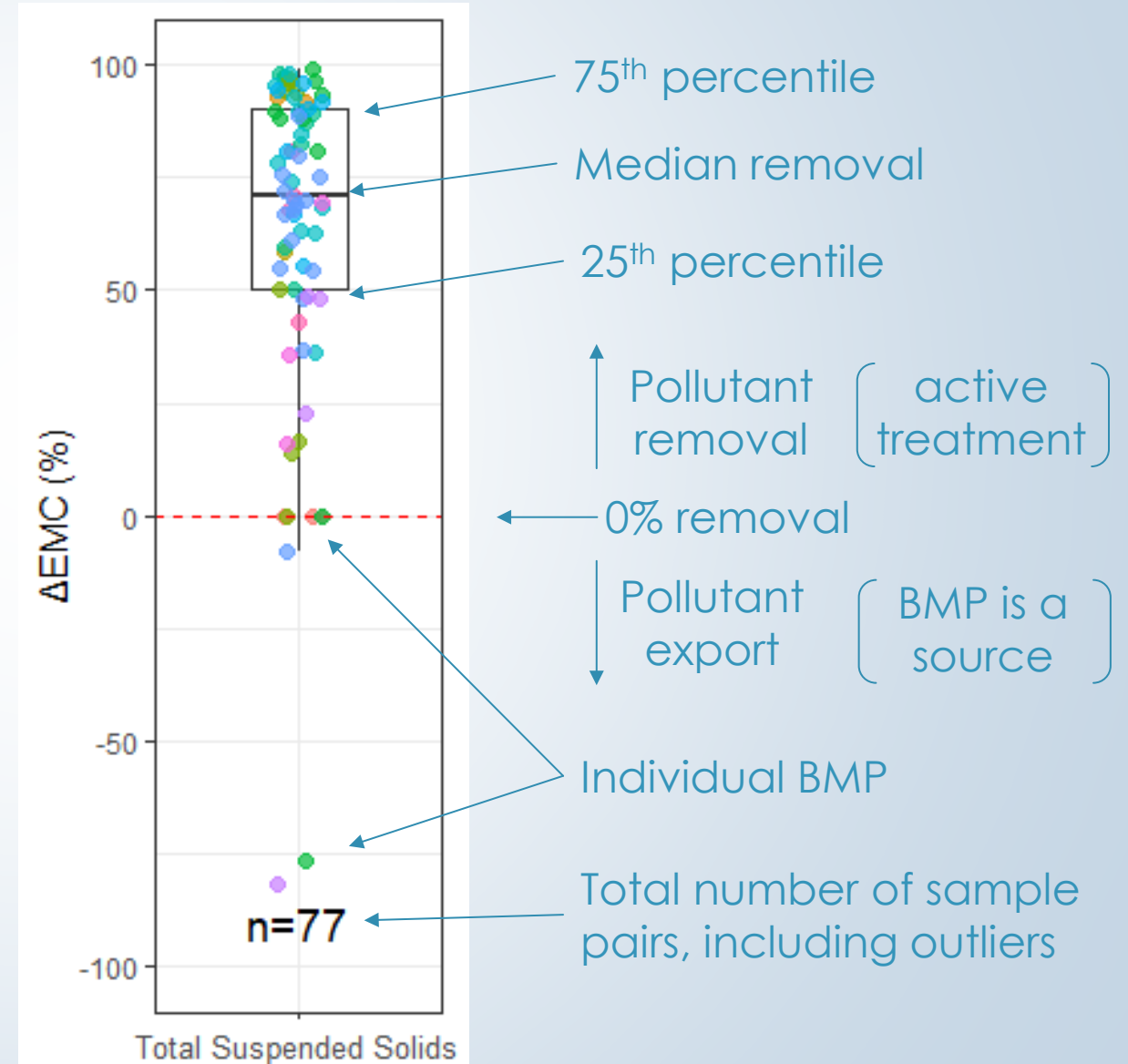# Partial-capture biofilters are retaining a lot of runoff

- BMPs meet or exceed expectations in 74% of all events
  - 91/123 events

- There are isolated BMPs that are not capturing runoff as intended.

- There are a few BMPs capturing much more runoff than anticipated.

Treatment - Results orientation
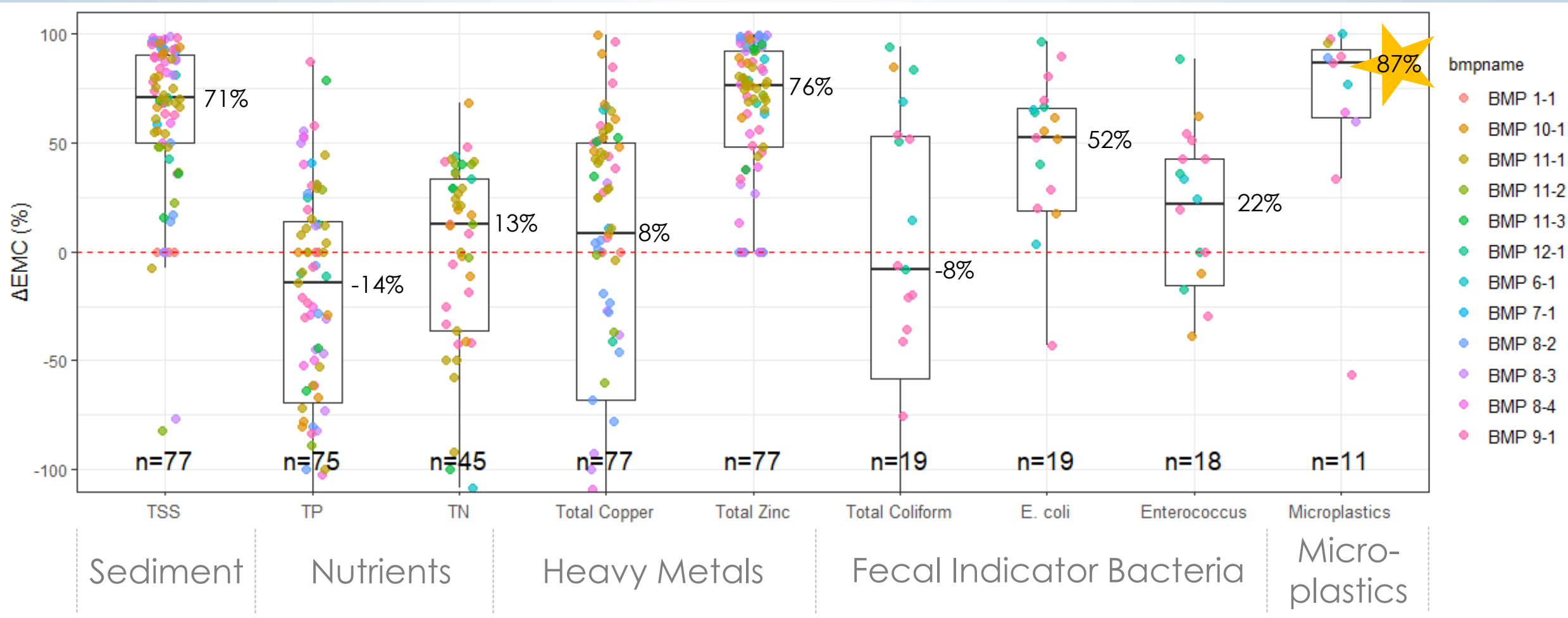
Characterizing treatment

- EMC = event mean concentration

- "typical" → median

- expect variability (long bars)

- statistical outliers omitted from graphs for clarity

75th percentile

Median removal

25th percentile

Pollutant removal — active treatment

0% removal

Pollutant export — BMP is a source

Individual BMP

Total number of sample pairs, including outliers

ΔEMC (%)

n=77

Total Suspended Solids

Answers to Initial Research Questions
Treatment

Next questions to answer: How do we make biofilters work better?

- Maximize retention & treatment by manipulating engineered media

- Identify appropriate materials' screening/testing procedures

- Incorporate them into design guidance to ensure as-installed BMP meets design expectations

Questions?

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