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# **Role of Science: Documenting Sources of Stormwater Pollution**

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# Outline

- **Stormwater Pollution – is it real?**
- **Sources**
- **Build-up and wash-off**
- **Some Best Management Practices**
- **Where do we go – prioritization**

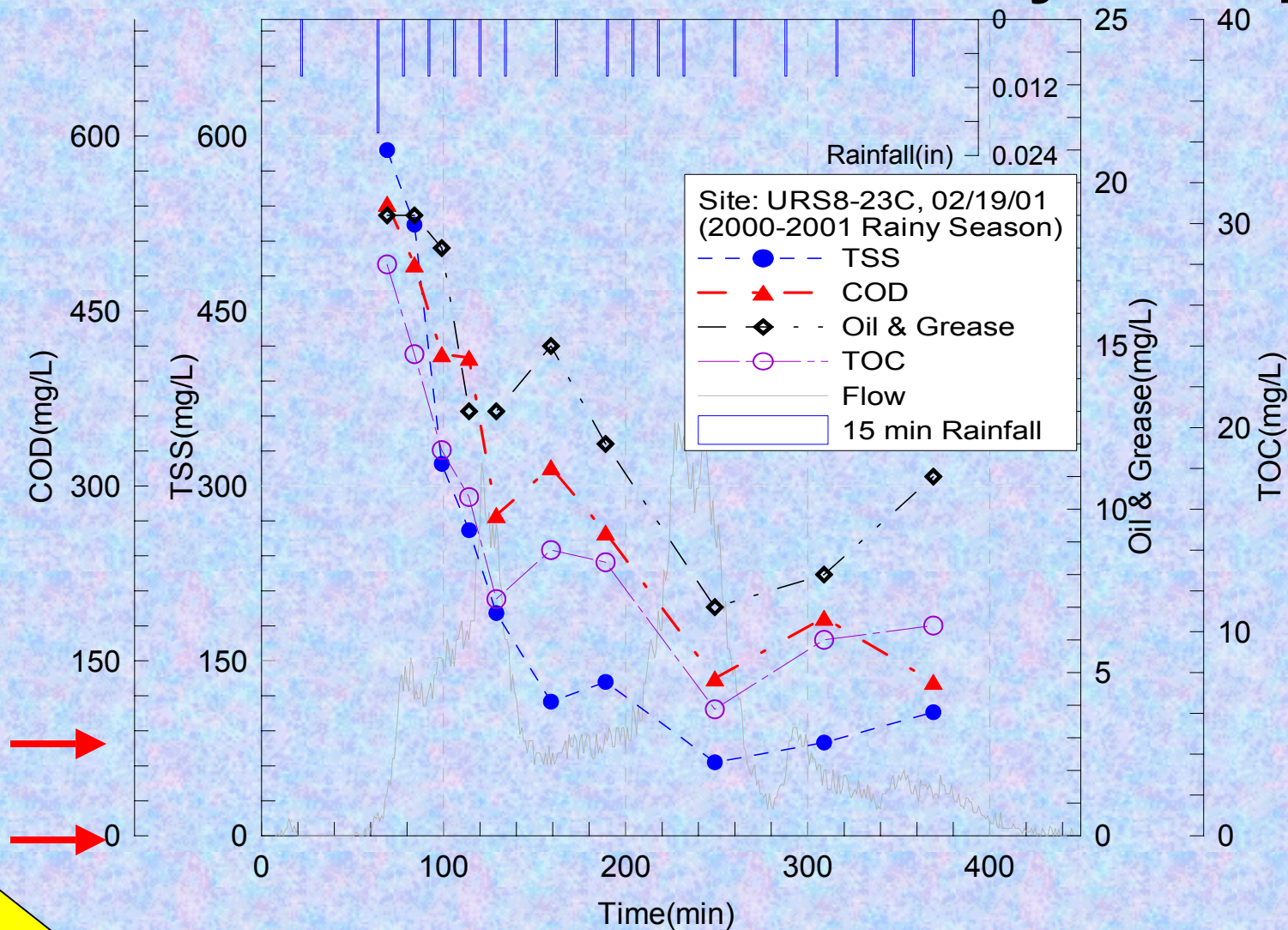


# Concentrations of Non-Point Sources

- **A highway example**
- **Chemical oxygen demand**
- **Oil and grease**
- **Total organic carbon**
- **Total suspended solids**



# Stormwater Runoff – A freeway example





# **Comparison of Point Sources to Non-Point Sources**

- **Hyperion Treatment Plant – the major point source to Santa Monica Bay**
  - **Partial secondary (~25-30%) until 1999**
  - **Full secondary after 1999**
- **GIS-based non-point source model for the Santa Monica Bay Watershed**



## Model Prediction vs. Hyperion Wastewater Treatment Plan (MT/Yr)

Parameter	Model	HTP	T. Load	%NPS (30% 2 <sup>nd</sup> )	%NPS (full 2 <sup>nd</sup> )
TSS	37,000	30,000	67,000	55	88
BOD	1,500	60,000	61,500	3	11
TP	80	1,500	1,580	5	7
NO2+NO3	180	250	430	42	47
Cu	10	30	40	25	44
Pb	37	22	59	63	80
Zn	54	90	144	38	59
O&G	1,200	7,800	9,000	13	50

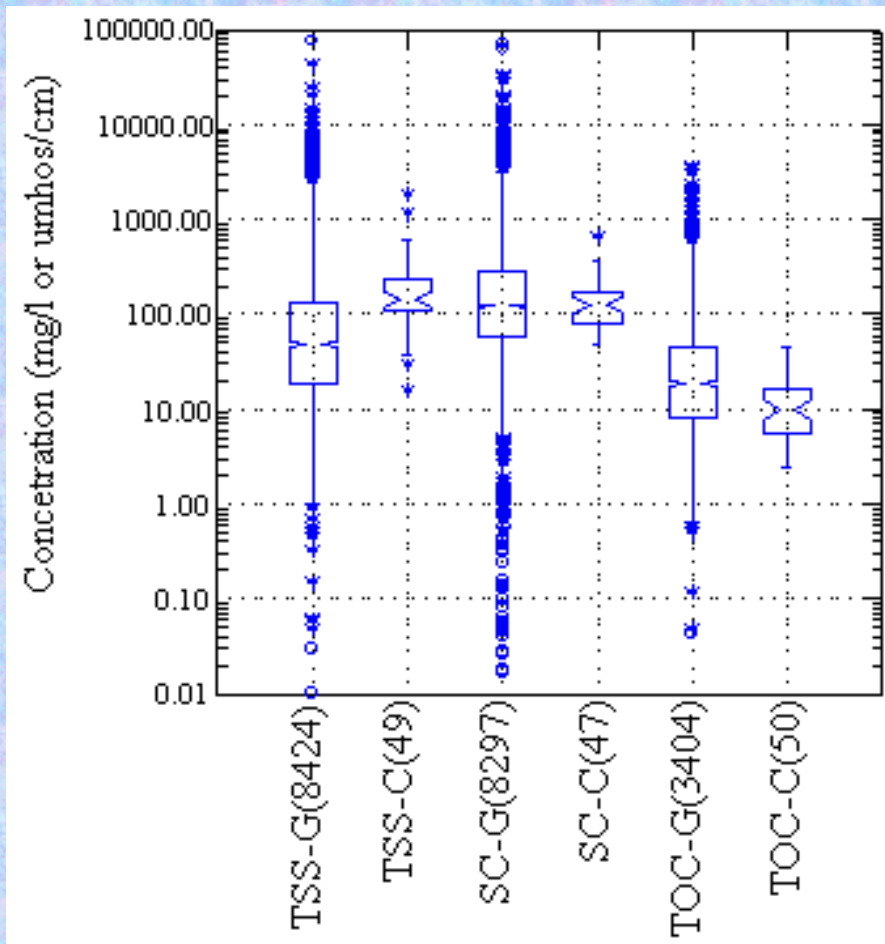
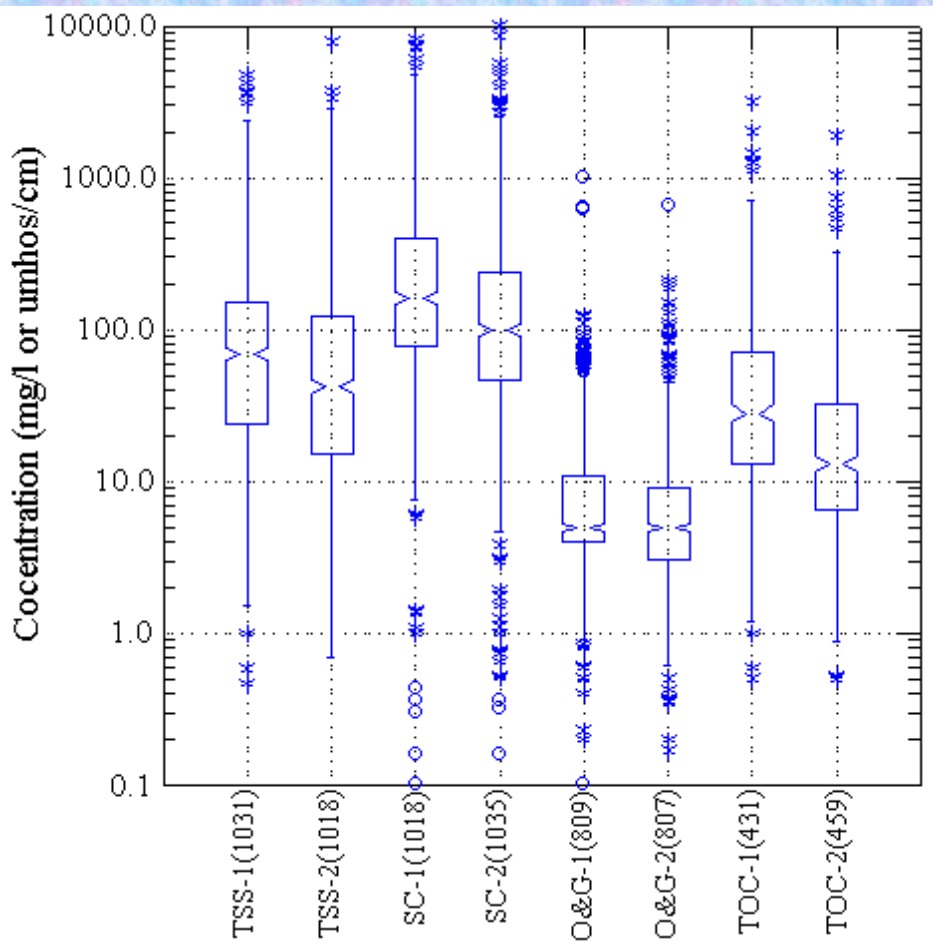


# Monitoring Problems

- **Industrial Monitoring Program**
- **Self monitoring**
- **SIC codes for classifications**
- **Comparison to an engineered monitoring program, using composite samplers and professional monitoring crews**



# Monitoring Problems



First versus Second Sample

Grab versus Composite

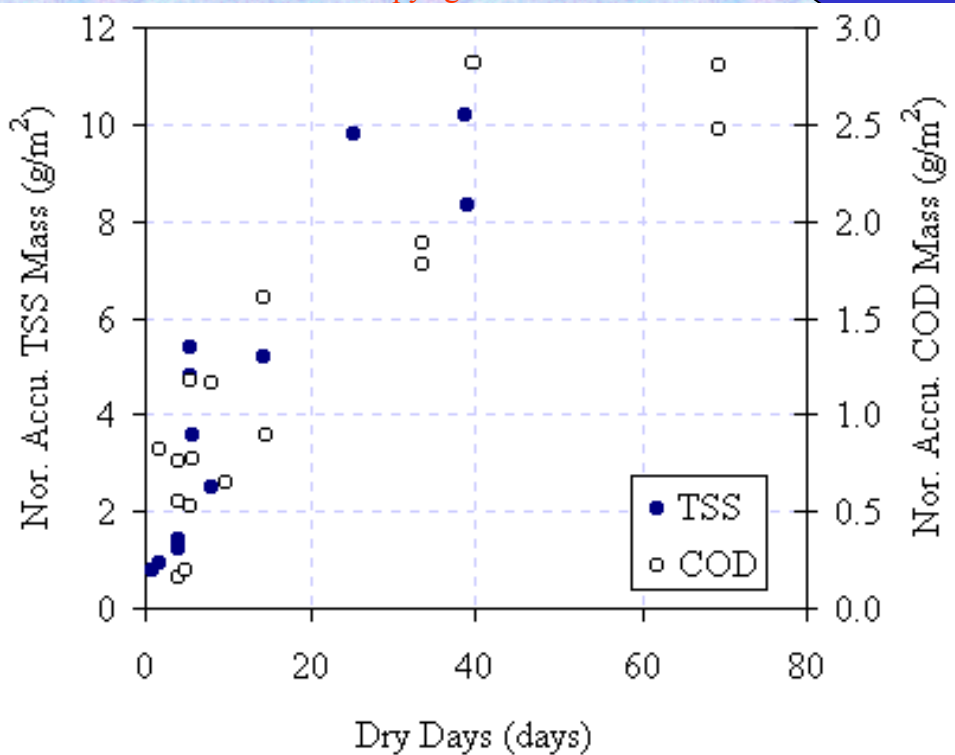
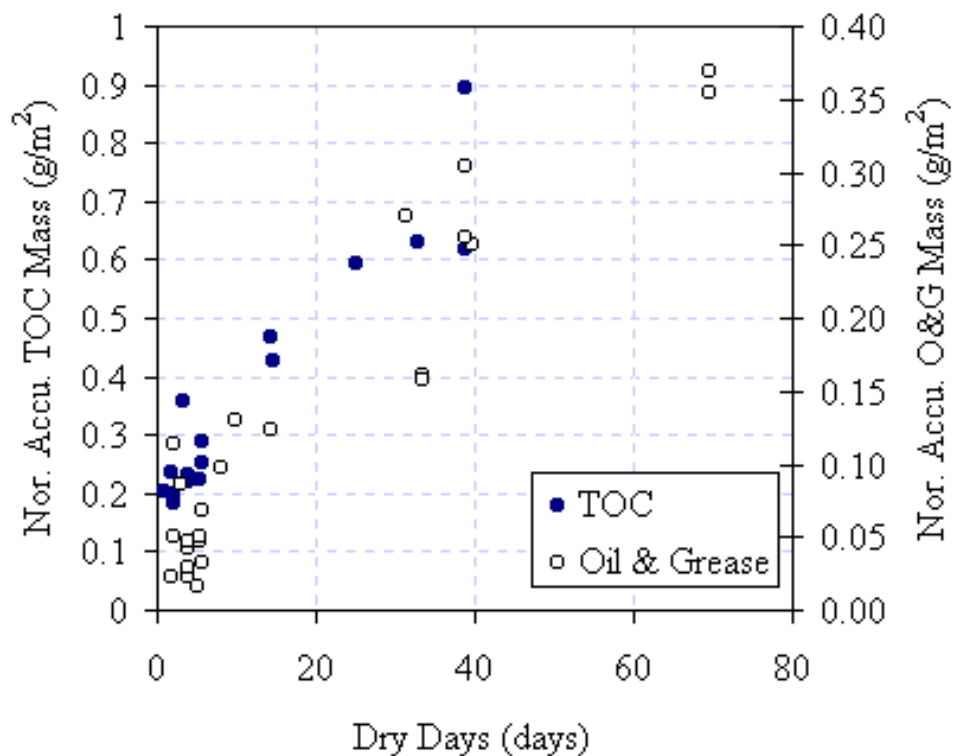


# Monitoring

- **Saving money on monitoring may be ill advised if it leads to over estimates of pollutants or increased variability of the results**
- **We depend on current monitoring programs for planning future activities – poor monitoring may result in more expensive future programs**
- **We are currently designing a new program to replace the existing industrial monitoring program**



# Pollutant Build Up





# Treatment or BMP Strategies

- **Consider Landuse**
- **Devices – structural treatment**
- **New designs**
- **Imperviousness**



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**Consider Landuse**  
**An example of a small urban**  
**watershed in Northern California**

# Sources

<b>Land Use</b>	<b>Area (acres)</b>	<b>Runoff Coefficient</b>	<b>O&amp;G EMC (mg/L)</b>	<b>Product</b>
<b>Open Land</b>	<b>85</b>	<b>0.02</b>	<b>0</b>	<b>0.0</b>
<b>Residential</b>	<b>1221</b>	<b>0.19</b>	<b>3.9</b>	<b>0.7</b>
<b>Industrial</b>	<b>70</b>	<b>0.76</b>	<b>7.1</b>	<b>5.4</b>
<b>Commercial</b>	<b>98</b>	<b>1.00</b>	<b>13.1</b>	<b>13.1</b>
<b>Parking Lots</b>	<b>94</b>	<b>0.94</b>	<b>12.8</b>	<b>12.0</b>
<b>Freeways &amp; Railroads</b>	<b>59</b>	<b>0.90</b>	<b>7.0</b>	<b>6.3</b>



# Treatment Strategy

<b>90% Pollutant Reduction</b>	<b>Percent Total Watershed Reduction</b>	<b>Reduction divided by area treated (leverage!)</b>
<b>Residential</b>	<b>19.9</b>	<b>0.3</b>
<b>Industrial</b>	<b>8.3</b>	<b>1.9</b>
<b>Commercial</b>	<b>28.4</b>	<b>4.7</b>
<b>Parking Lots</b>	<b>25</b>	<b>4.3</b>
<b>Freeways &amp; Railroads</b>	<b>8.3</b>	<b>2.3</b>
<b>Commercial &amp; Parking</b>	<b>53.4</b>	<b>4.5</b>



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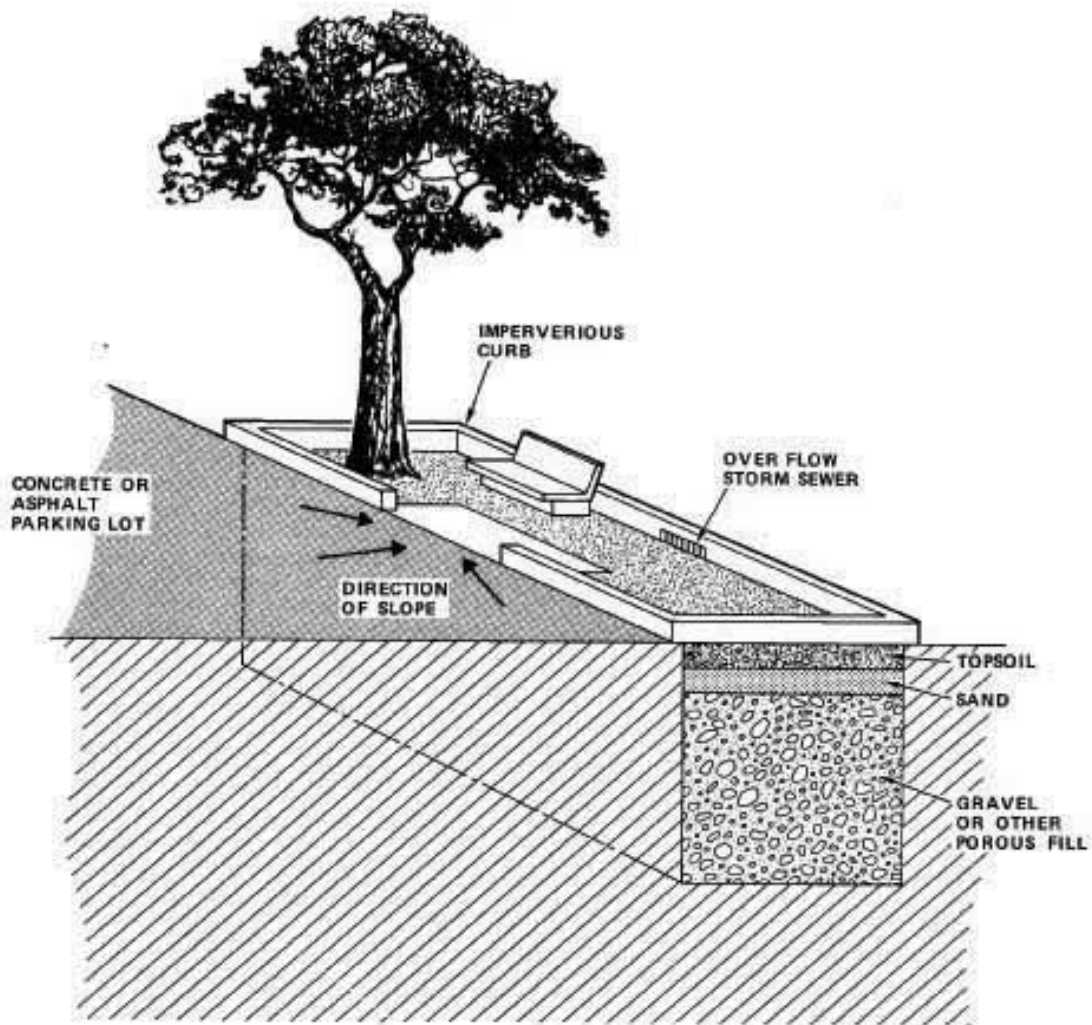
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# **New Construction Techniques**

**Think about pollutant reduction before  
designing**



# BiInfiltration Example

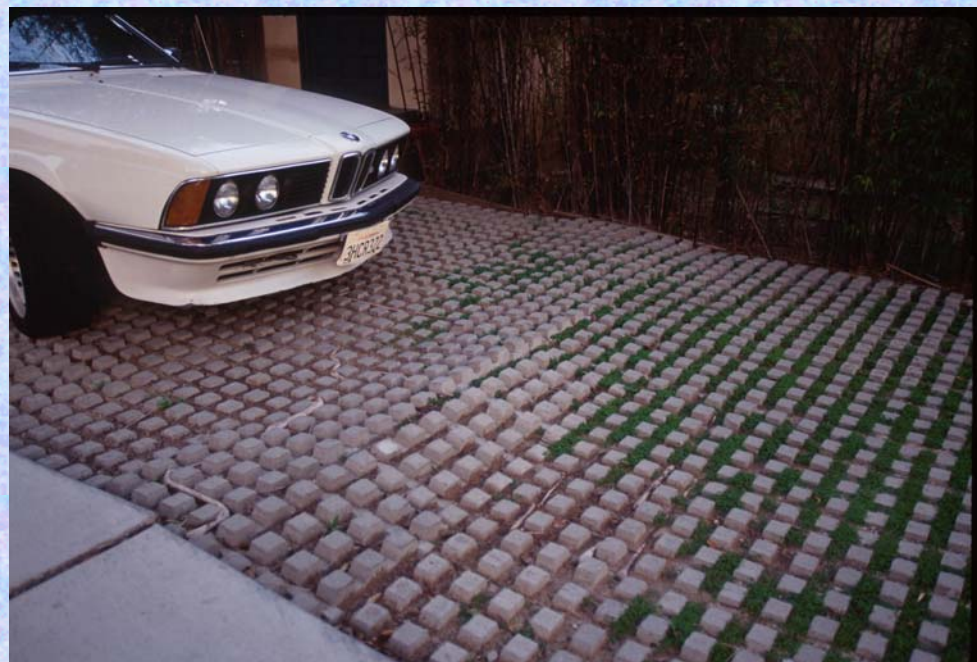




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# BiInfiltration





## **Other Examples**

- **Storm drain inserts of various sorts**
- **Special screens and filters**
- **Programs to reduce imperviousness**
- **Product replacements – friendlier products**
- **Detention facilities**
- **New design techniques and procedures**





## Conclusions

- **Stormwater pollution is real – we can quantify it and we are building databases to learn where it comes from and how much the sources contribute**
- **BMPs are in their infancy but many work well and others show great promise**

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