

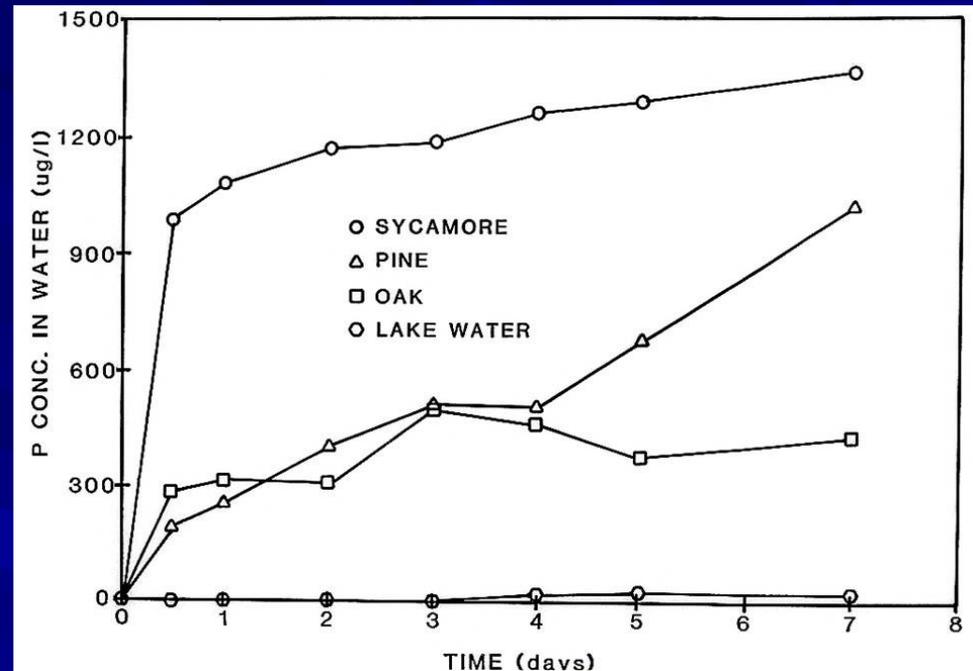
Gross Pollutant Separators

By: Harvey H. Harper

January 2026

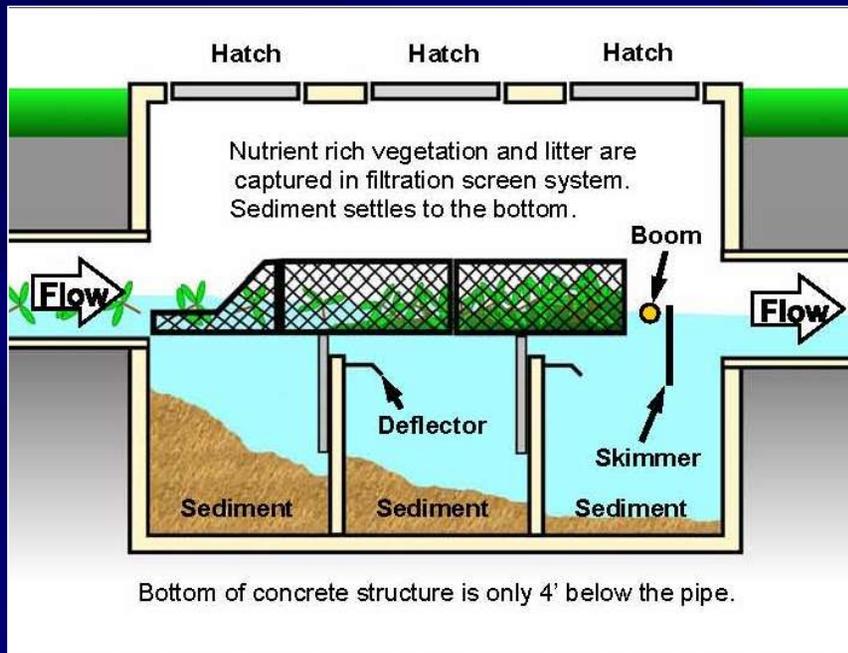


Release of Phosphorus from Saturated Leaves

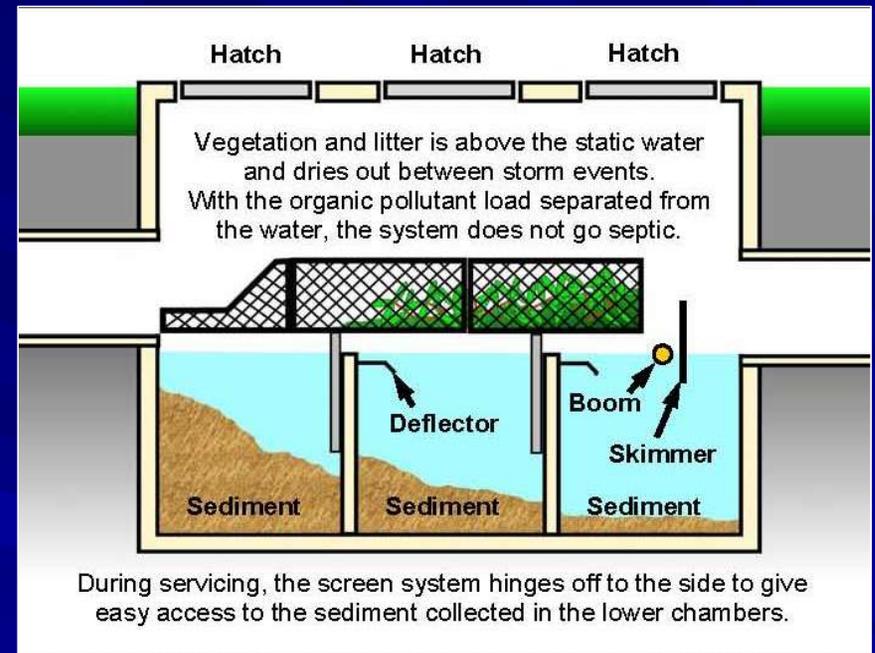


- After entering water, leaves and vegetation exhibit a rapid nutrient release
- Timely removal is essential
- Nutrient release is less when leaves are stored in a dry condition

Suntree Nutrient Separating Baffle Box

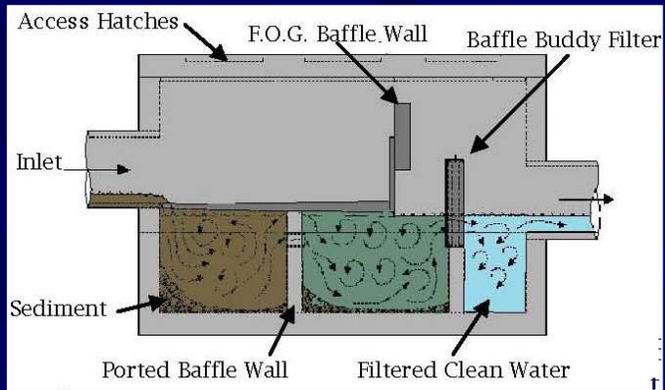


a. During storm event conditions



b. Following storm event

EcoVault Unit



a. Schematic flow patterns in the EcoVault Unit



b. Bottom solids screens



c. Vault-Ox equipment

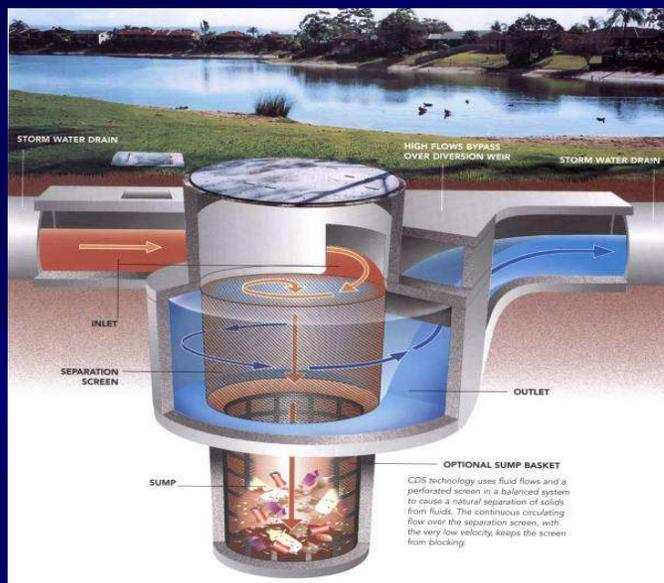


d. Bottom screens opened for cleaning

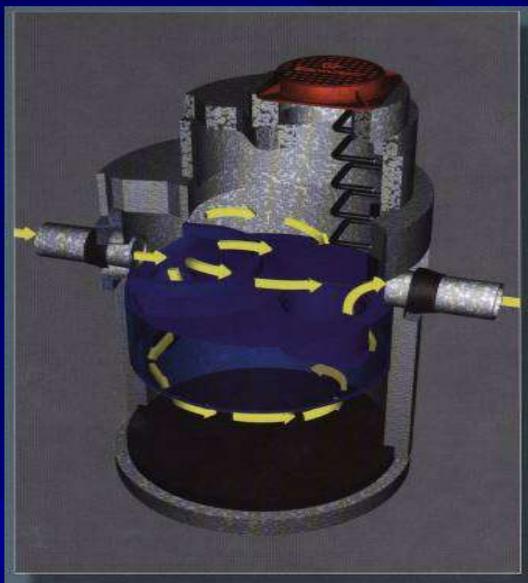


e. Outlet filter containing aluminum silicate

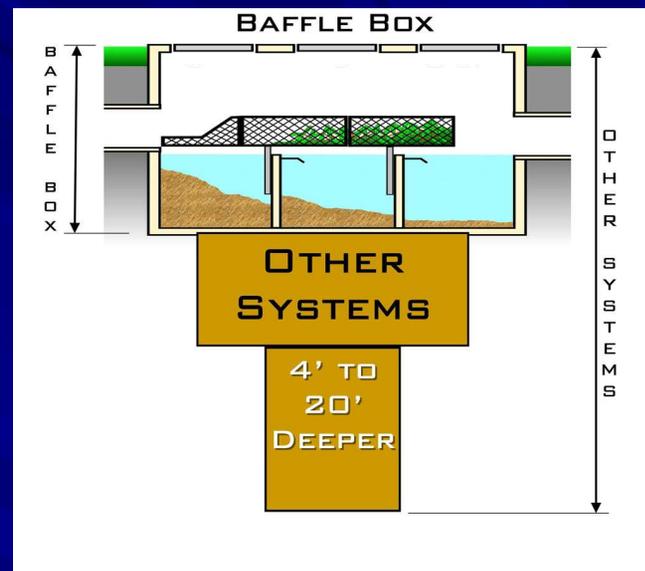
Swirl Separators



CDS Unit

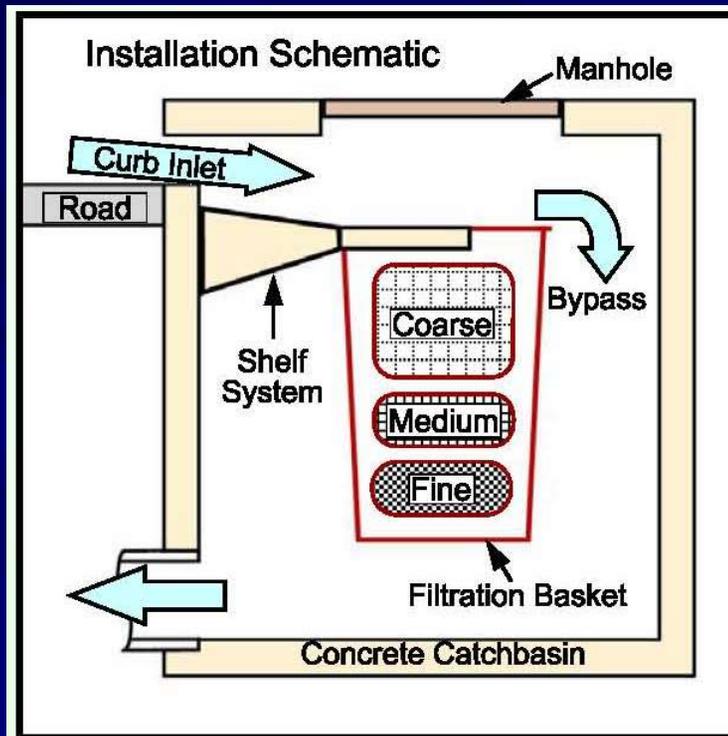


Stormceptor



- Literature removals are based on inflows at the design capacity
- Swirling motion is required to remove and screen solids
 - At lower flow rates the swirling is reduced
- Anoxic environment in sump impacts nutrient retention

Inlet Baskets



a. Schematic of the Suntree high-capacity curb inlet basket

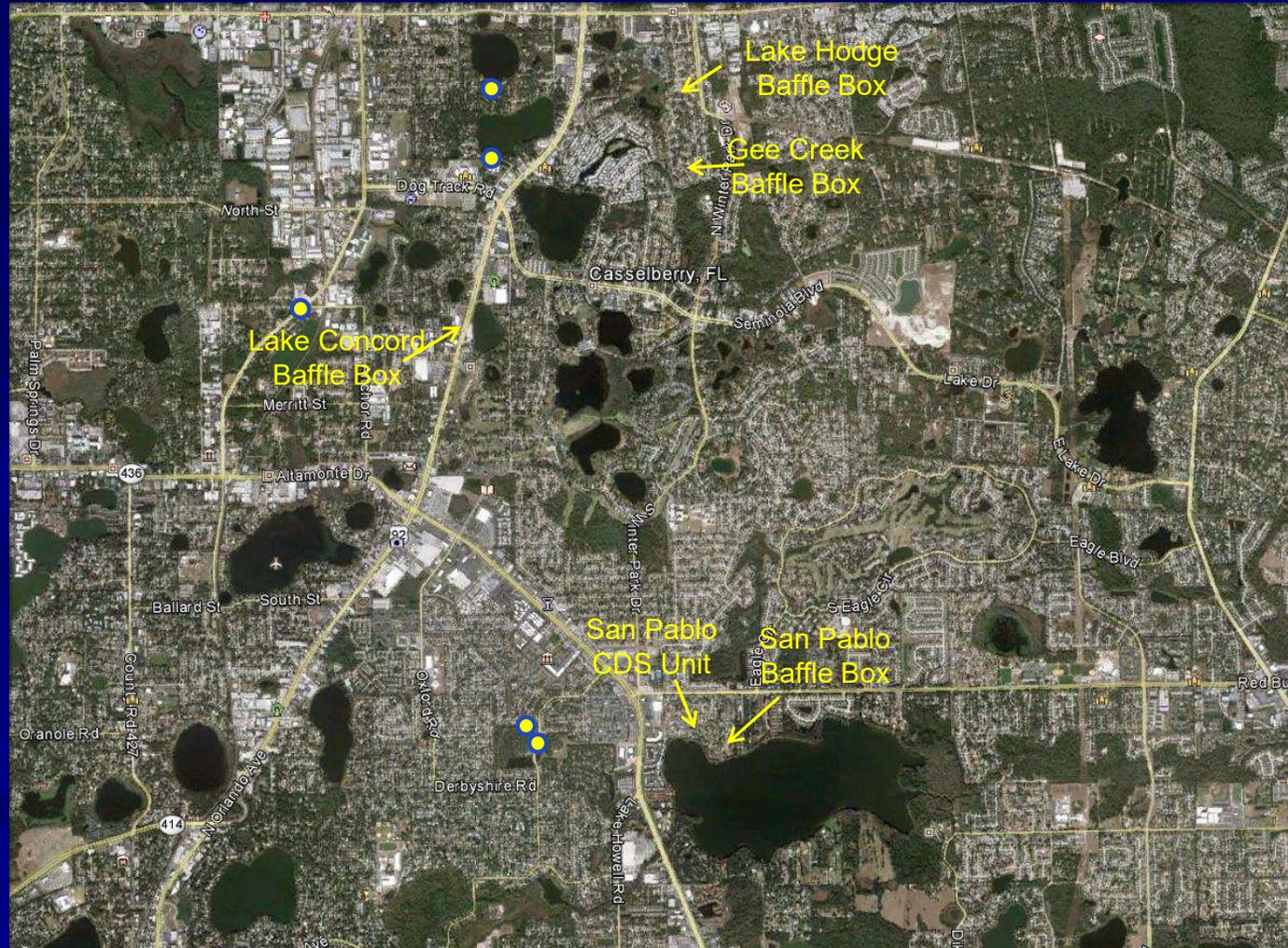


b. Basket filled with collected solids

- Only effective in watersheds with significant vegetation debris

Location Map for GPS Study Sites

- **Baffle Box**
 - Suntree 2nd generation nutrient separating baffle box
 - Ecosense with outlet filter
 - Ecosense without outlet filter
- **Swirl concentrator**
 - CDS unit
 - Stormceptor
- **Curb Inlet Baskets**



Drainage Basins Discharging to the Ecosense Baffle Box Sites

- Sub-basin G-1 - curb and gutter drainage
 - Residential with no runoff pre-treatment
- Sub-basin G-2 - roadside swale drainage
 - Residential with swale pre-treatment

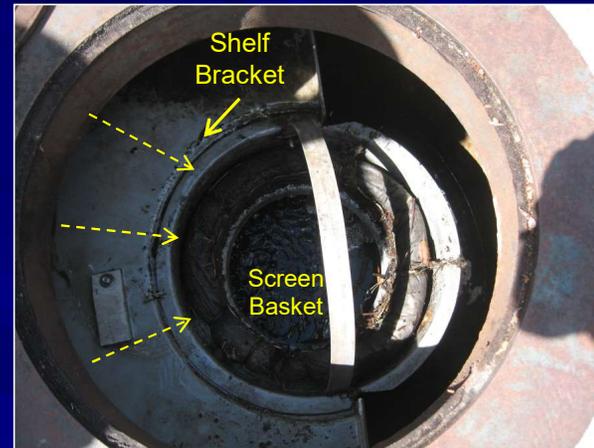


Drainage Basins Discharging to the Ecosense Baffle Box, CDS Unit, and Inlet Insert Sites

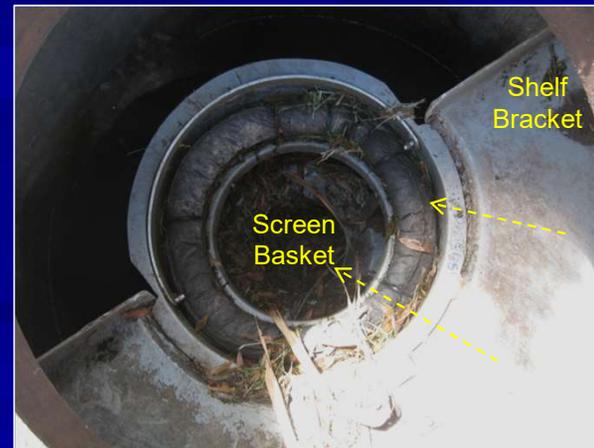
- Sub-basin H-3 - curb and gutter drainage
- Residential area with no runoff pre-treatment
- Sub-basin H-4 - curb and gutter drainage
Residential area with no runoff pre-treatment
- Sub-basin H-5 - curb and gutter drainage
Residential area with no runoff pre-treatment



Curb Inlet Basket Sites

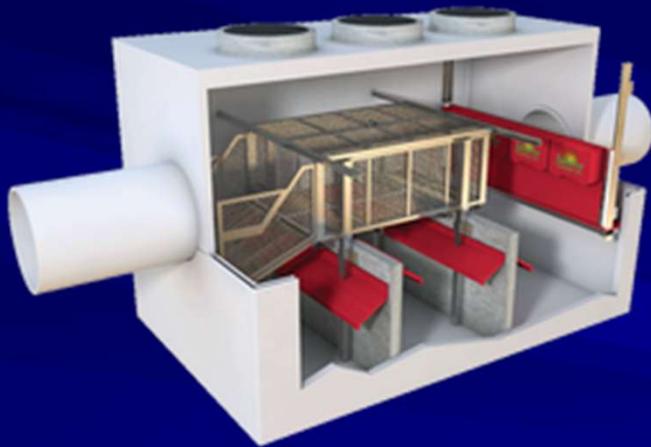


a. Interior of the 668 San Pablo inlet basket



b. Interior of the 669 San Pablo inlet basket

Suntree Baffle Box Monitoring Site



Internal View of Suntree
Baffle Box

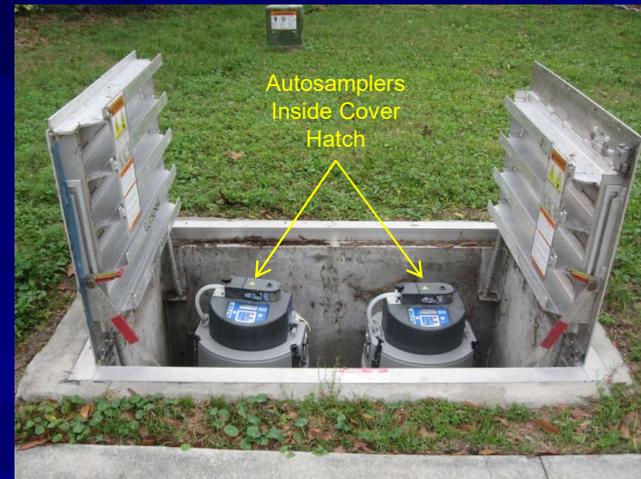


Exterior of the Lake Concord Suntree Baffle Box

Gee Creek EcoVault Unit Monitoring Equipment



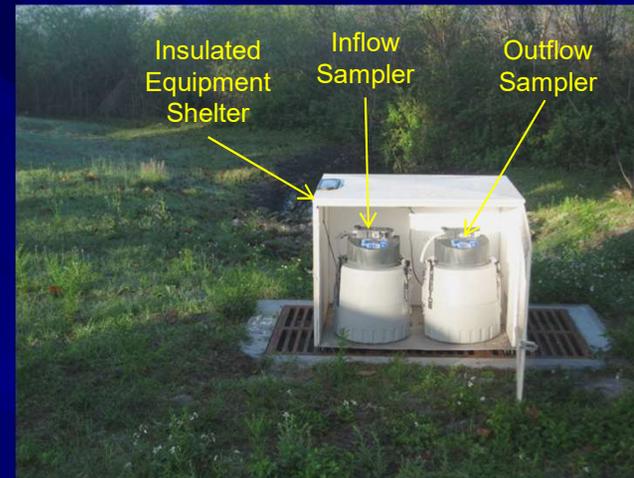
- Outlet filter with aluminum silicate media designed to remove dissolved P



Lake Hodge EcoVault Unit Monitoring Equipment



- Unit contained leaf/debris screen and outlet filter with aluminum silicate media



Lake Hodge Baffle Box Cleanout



a. Captured vegetation on the screen



b. Water pumped from sump area



c. Solids removed using Vactor truck



d. Screen following cleaning

Lake Howell Baffle Box Cleanout



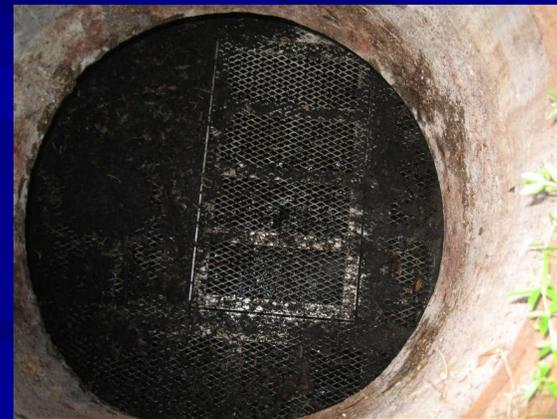
a. Cleanout operations



b. Standing water pumped from bottom chambers



c. Solids vacuumed from chambers



d. Screens following cleaning

Solids Collected from Evaluated Units



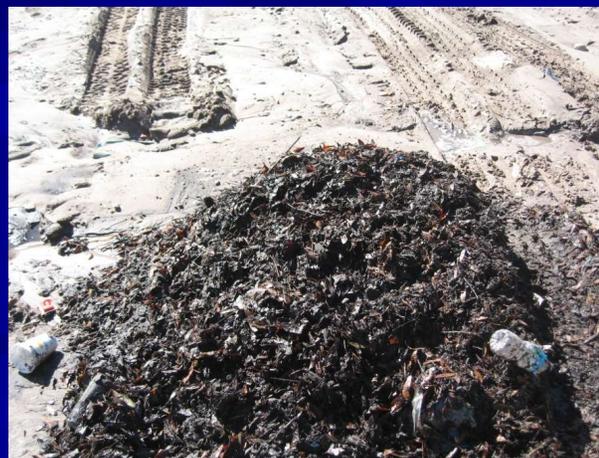
a. Material removed from the Lake Hodge B/B



b. Material removed from the Gee Creek B/B

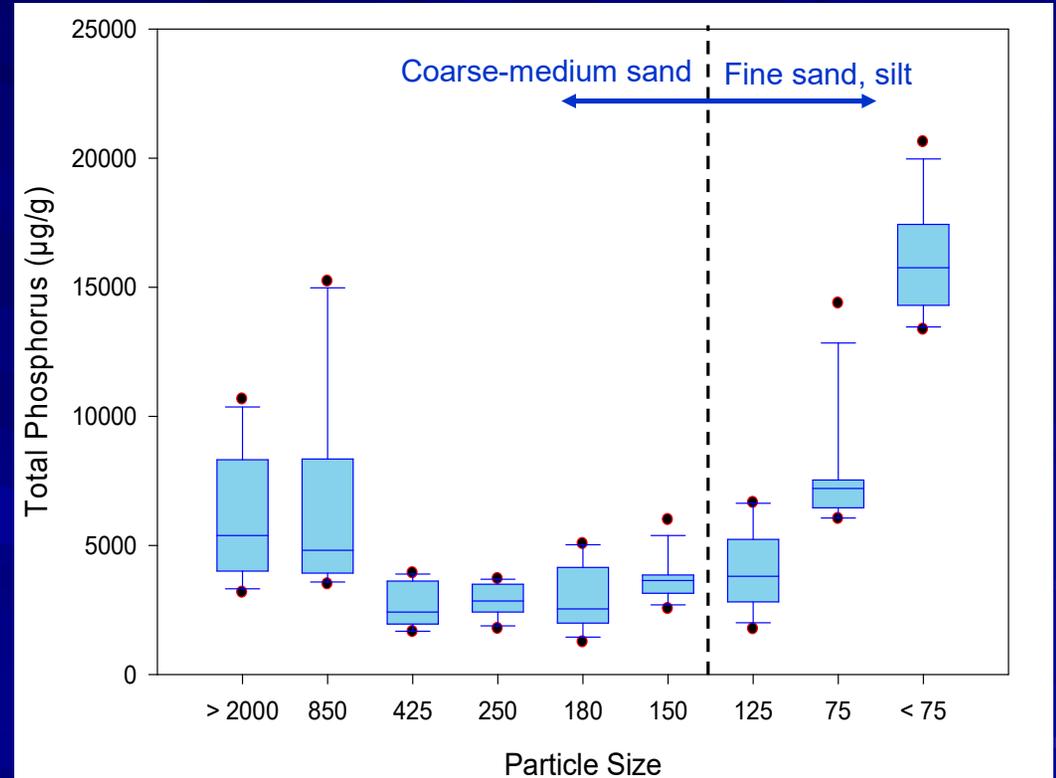
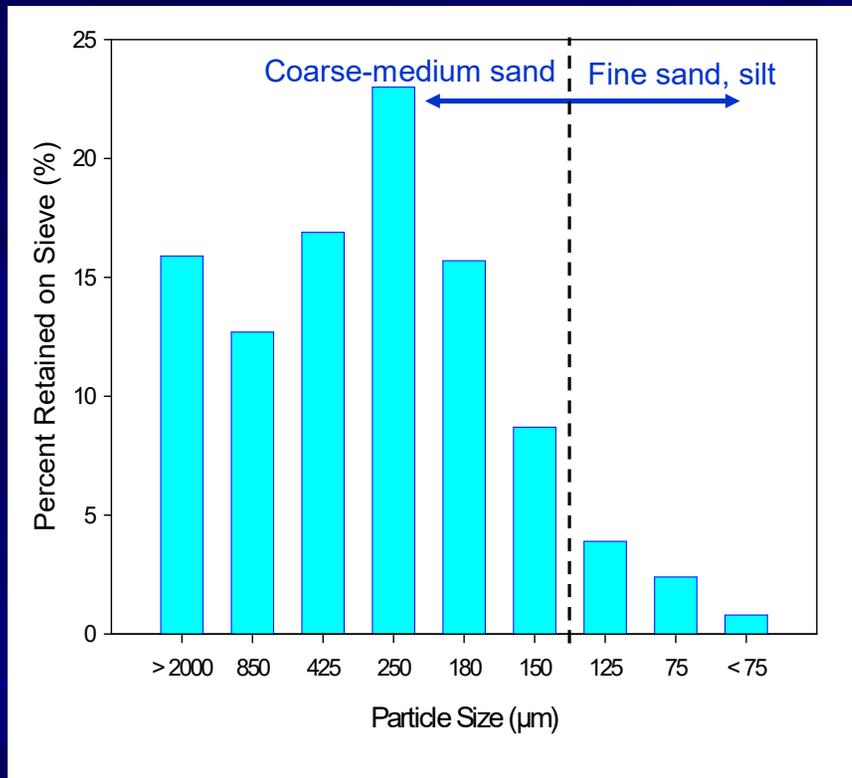


c. Material removed from the San Pablo B/B



d. Material removed from the Lake Concord B/B

Typical Distribution of Solids Removed from Gross Pollutant Separators



- GPS devices are highly effective in removing large particles with low nutrient content

GPS Removal Efficiencies and Costs

Site/Unit	Mass Removal (%)			Present Worth Removal Cost (\$/kg) (20-yr, i = 2.5%)		
	Total N	Total P	TSS	Total N	Total P	TSS
Concord Suntree Baffle Box	2	7	73	6,110	15,928	11.20
San Pablo CDS Unit	5	12	94	5,699	23,252	43.32
Lake Hodge EcoVault w/outlet filter	14	57	90	3,433	1,755	4.89
Gee Creek EcoVault w/outlet filter	2	41	78	34,377	10,188	14.05
San Pablo EcoVault w/o filter	14	11	89	3,393	25,582	14.49

Conclusions

- **Gross pollutant separators remove litter, leaves, gravel, and coarse-medium sand**
 - Provide low removals for nutrients
 - Total N: 10-12% removal
 - Total P: 8-12% removal
 - TSS: 30-60% removal
 - Extremely high mass removal costs
 - 1-2 orders of magnitude greater than wet detention
- **Gross pollutant separators are suited only for areas where solids are a significant problem**
 - Residential areas with large tree canopy
 - Urban areas with litter issues
- **Should not be used for nutrient removal projects**
 - Provide poor nutrient removal at an extremely high mass removal cost

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