- **Integration of VFSMOD with EPA standard regulatory models enables site-specific simulation of VFS pesticide reduction efficiency.**
- **VFS reduction efficiency varies with scenario-specific combinations of soil and hydrologic factors.**
- **The simulated VFS reduction factors for standard scenarios can be used to support the development of look-up tables for VFS efficiency as a refinement option.**

Incorporating Vegetative Filter Strip (VFS) in the US Regulatory Environmental Exposure Assessment

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INTRO

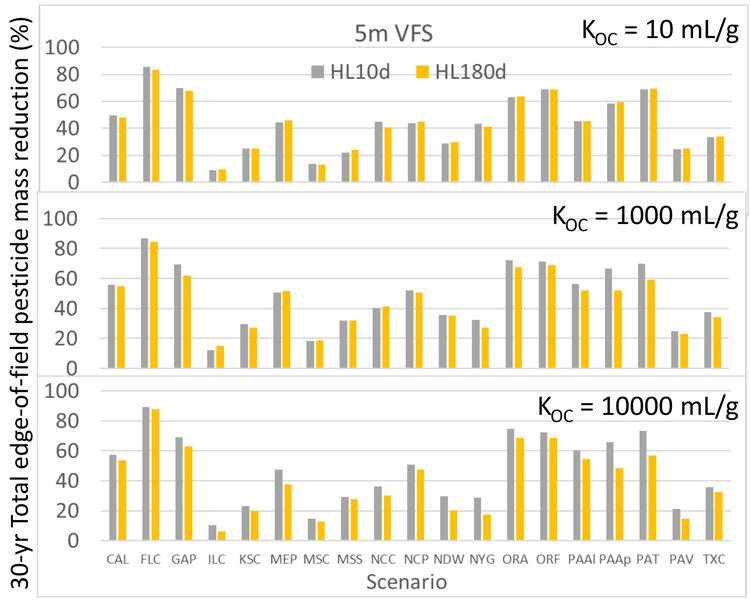
- Consensus statement has been developed in 2018 CERSA Workshop that "EPA should incorporate filter strip technology into risk assessments and risk management"
- Vegetative Filter Strips Modeling System (VFSMOD) is capable of simulating VFS pesticide reduction efficiency under a wide range of environmental conditions
- **Objective: Long-term VFSMOD simulations of VFS pesticide reduction efficiency across representative US scenarios**

METHOD

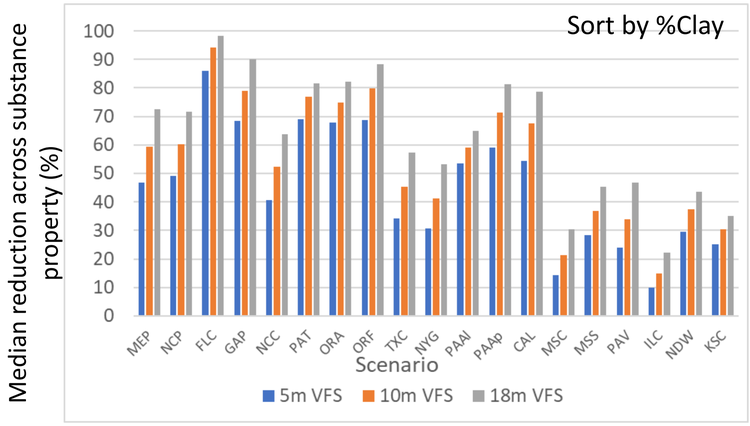
- PRZM5 + VFSMOD (v4.4.0) + VVWM
- Original Sabbagh (Eq. 1) for pesticide trapping
- VFS Width: 5, 10 and 18 m (16, 33 and 59 ft)
- Substance properties
  - Koc: 10, 1000, and 10000 mL/g
  - Soil half-life: 10 and 180d
- 19 representative field scenarios

Field Scenario	Scenario Characteristics				
	# of Events	Total Rainfall (cm)	Texture	Hydrologic Soil Group (HSG)	% Slope
CA lettuce	577	943	Sandy Loam	D	6.0
FL citrus	1401	4646	Fine Sand	D	1.0
GA pecan	1261	5009	Loamy Fine Sand	C	4.75
IL corn	1253	2764	Clay Loam	C	6.0
KS corn	1236	2685	Silty Clay Loam	D	3.4
ME potato	1363	2792	Silt Loam	D	6.0
MS cotton	1494	4179	Silt Loam	C	6.0
MS soybean	1360	4179	Silt Loam	C	2.0
NC cotton	1568	3159	Sandy Loam	D	6.0
NC peanut	1248	3159	Silt Loam	C	6.0
ND wheat	680	1487	Silty Clay Loam	C	1.5
NY grape	989	3170	Silt Loam	C	12.0
OR apple	1248	1175	Silt Loam	C	12.0
OR filbert	1174	1175	Silt Loam	C	12.0
PA alfalfa	1085	3089	Silt Loam	C	12.0
PA apple	857	3089	Sandy Loam	C	12.0
PA turf	347	3089	Silt Loam	C	12.0
PA vegetable	1267	3089	Silt Loam	C	6.0
TX cotton	832	2431	Fine Sandy Loam	D	5.0

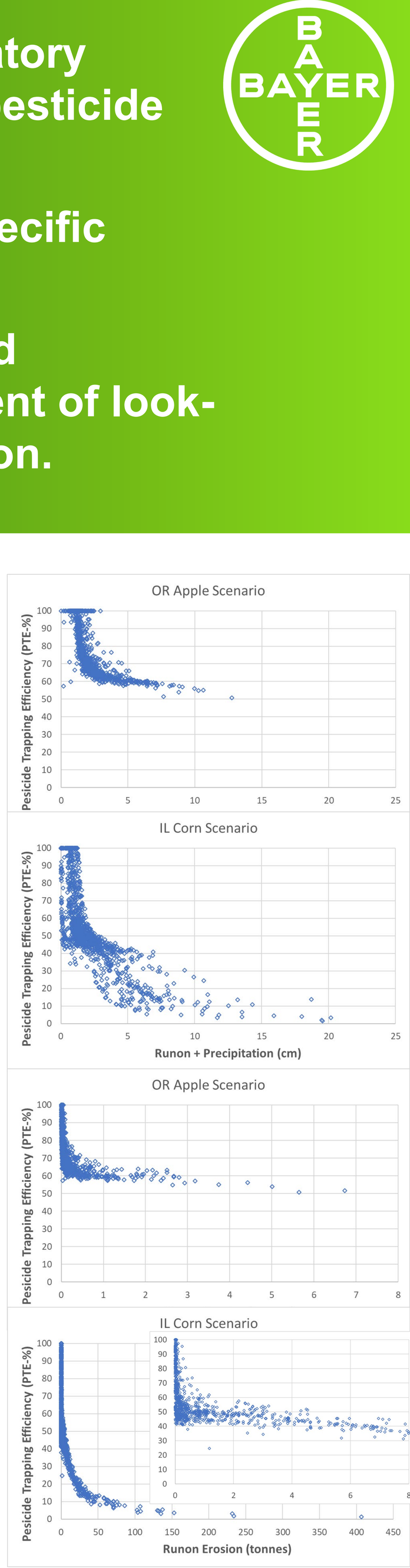
RESULTS & DISCUSSION



- Slightly higher reduction efficiency for shorter soil half-life



- The majority of reduction occurs within the first 5m of VFS
- Variability of reduction efficiency across scenarios was bigger than the variability due to changes in VFS width
- Light soils have higher 30-yr total reductions
  - More infiltration and trapping of coarse particles



- Event-based VFS efficiency is dependent on water and sediment input
- The lower 30-year total reductions tend to be dominated by large runoff events
  - For IL corn, 81% of the events trapped at least 40% of the pesticide loadings across 30 years (1253 events)
- Difference between OR apple and IL corn is partially due to the much higher erosion in IL corn (11.8 vs 0.344 30-yr avg. tons/ac/yr)