

Phosphorus Legacies: Mitigating Future Water Resource Impairment

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Impacts of reducing “legacy phosphorus” in agricultural soils



European Sustainable
Phosphorus Platform

UofA
DIVISION OF AGRICULTURE
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System legacy drivers

Soil processes

Mitigation response

Hydro-chemical response

System response

Decline in soil P with crop offtake is slow relative to soil build-up

Wetlands & buffers can trap then recycle P

CPs can take time to decrease P runoff become fully effective

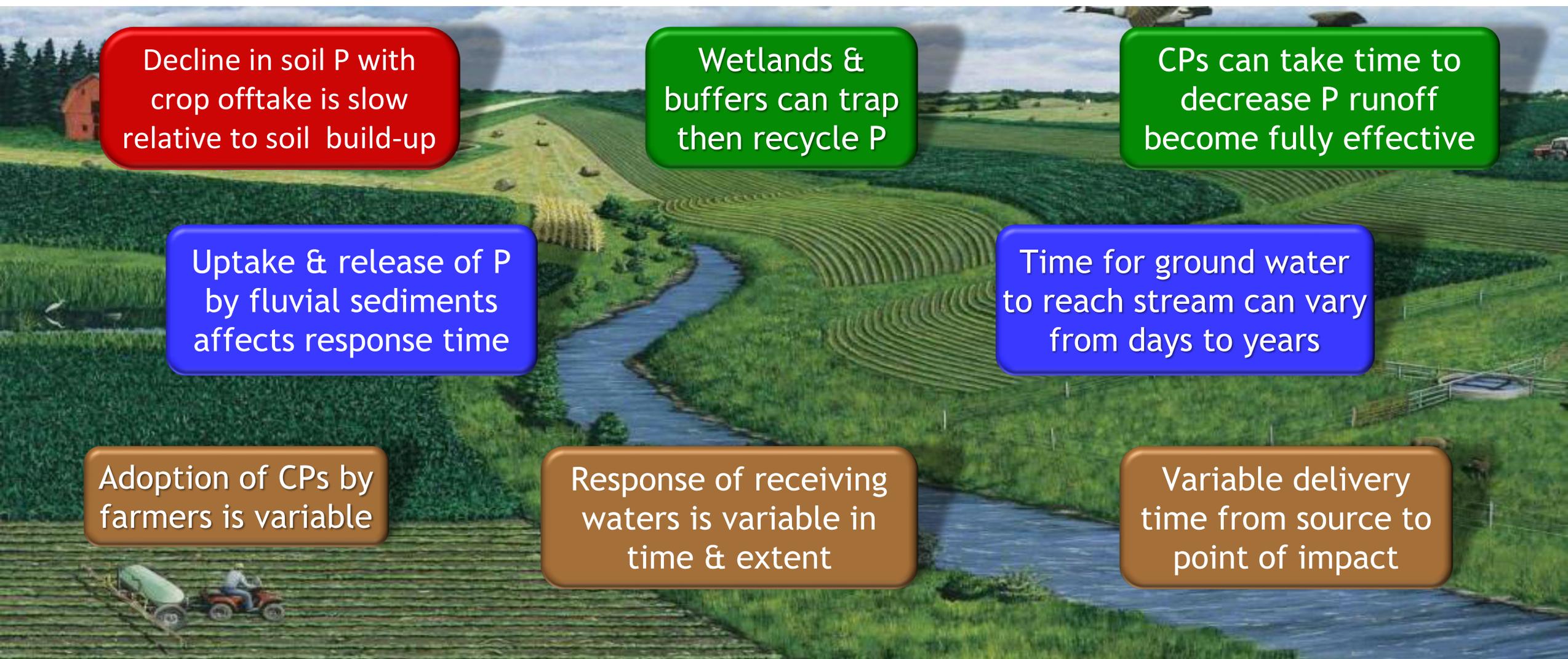
Uptake & release of P by fluvial sediments affects response time

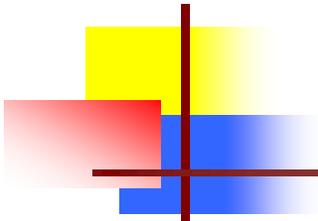
Time for ground water to reach stream can vary from days to years

Adoption of CPs by farmers is variable

Response of receiving waters is variable in time & extent

Variable delivery time from source to point of impact





Where do we go from here?

- ✓ Some Conservation Practices (CPs) transition from sinks to sources of P
 - E.g., no-tillage, vegetative buffers, constructed wetlands
 - These tradeoffs should be considered during planning & implementation
 - CPs must be adaptively managed, reviewed, & revised as needed
- ✓ Minimizing future buildup of legacy P
 - Apply P based on current soil test P recommendations
 - Easier said than done for mineral fertilizer than manure-based P
 - Once entering fluvial system, fate, & transport of legacy P much harder to predict & thus manage