

TWO-STAGE DITCH & WATER QUALITY

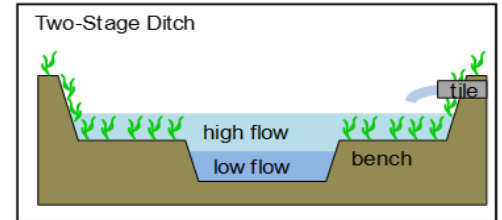
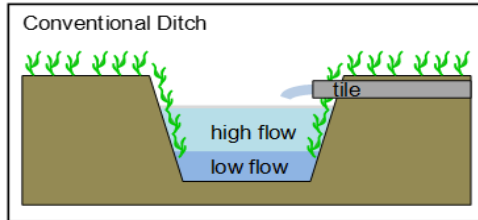
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the CHALLENGE: reducing nutrient and sediment export

Channelized ditches export excess nitrogen (N), phosphorus (P) and sediments. Excess nutrients contaminate drinking water, fuel algal blooms and harm fish. Excess sediments can impair fish spawning and suffocate mussels.

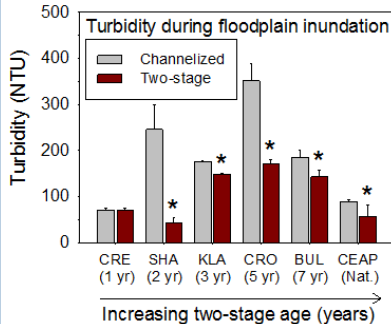
our STRATEGY

GOAL: Maximize sediment, N and P removal before downstream export using the two-stage ditch.



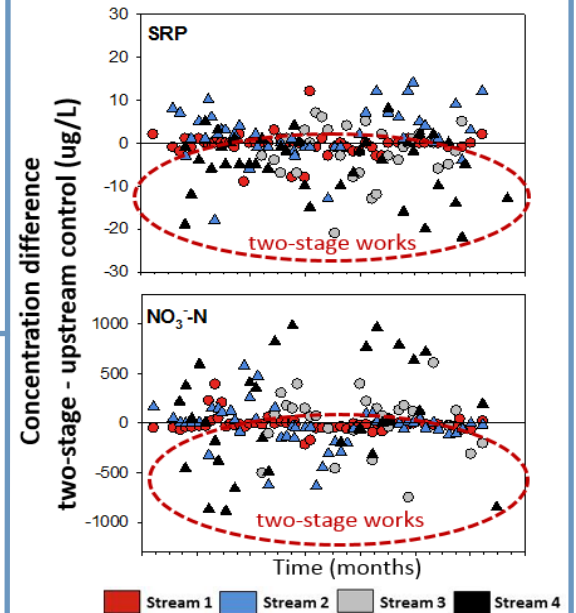
RESULTS so far

Reduces turbidity and sediments



Turbidity is a measure of water “cloudiness” and an indicator of sediment loading and export. The two-stage reduced turbidity in all but one stream and fewer sediments were exported downstream. With no additional maintenance, the two-stage slowed water velocity during storms, allowing sediment to deposit onto the benches.

Reduces phosphorus and nitrate export

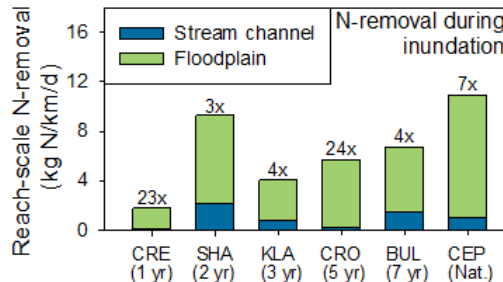


Short reaches (~1/2 mile) of two-stage ditch can reduce export of stream soluble reactive phosphorus (SRP) and nitrate but responses are variable.

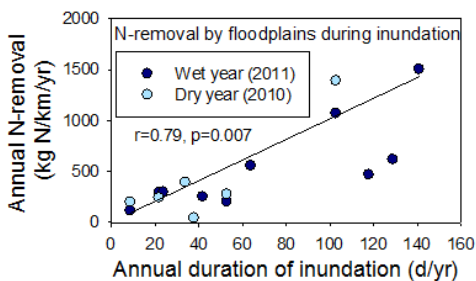
The two-stage promotes nutrient retention on floodplains, thereby improving downstream water quality.

Increases N removal capacity

During flooding, the two-stage ditch increases N-removal, 2-14x higher than channelized ditches. N-removal increases as the two-stage “matures”.



Annual N removal per km of two-stage increases when floodplains are inundated, without additional stream management.



CONCLUSIONS: Two-stage ditch consistently improved N removal, reduced turbidity and sediment export and improved channel habitat. These positive outcomes were consistent across a range of streams that varied in two-stage age.

