Yesterday's Phosphorus, Today's Water Quality: Conservation Insights from the USDA Legacy Phosphorus Assessment

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Conservation Outcomes Webinar Series | August 22,

Conservation Effects Assessment Project

USDA's Conservation Effects Assessment Project, CEAP, is a multi-agency efforts led by the Natural Resources Conservation Service (NRCS) that builds the science base for voluntary conservation efforts nationwide. CEAP findings are used to guide conservation program development and support conservationists, producers an other land managers, and partners in making informed management decisions backed by data and science. Assessments are carried out at the national, regional, and watershed scales for conservation efforts related to cropland, grazing land, wetlands, and wildlife.

CEAP Watershed Assessments

Through CEAP, the Natural Resources Conservation Service (NRCS) works with agricultural producers and partners including other agencies like the USDA Agricultural Research Service, universities, conservation districts, and watershed groups to quantify the effects of voluntary conservation on factors such as water quality, water availability, and soil health in select small watersheds across the nation. There are currently 25 active watershed studies. Findings from these studies strengthen the science base for voluntary conservation, improve conservation planning, refine methods and tools, and ultimately help USDA deliver more focused, strategic conservation opportunities to support productive agricultural lands and environmental benefits nationwide.

August 2024 Conservation Outcomes Webinar

Phosphorus, a critical fertilizer nutrient required for crop production, can trigger unwanted changes to aquatic systems when it ends up in our water bodies. For producers and conservationists, testing the soil and managing today's additions of phosphorus in fertilizer and manure is just the first important step. Historical sources of phosphorus accumulate in soils, wetlands, and streams. As a result, today's water quality may reflect a phosphorus legacy that doesn't readily respond only to SMART Nutrient Management. Mitigating legacy phosphorus requires targeted conservation in fields, at the edges of fields, and in watersheds. This may require new approaches to conservation.

Findings will be presented from Conservation Effects Assessment Project watersheds within the Chesapeake Bay, Lake Champlain, Lake Erie, Mississippi River, and Snake River. Producers, conservationists, and researchers may use the conservation insights shared during this webinar to strengthen legacy phosphorus mitigation efforts and improve water quality nationwide on-the-ground management decisions, in riverscapes across the region.

Conservation Outcomes Webinar Series

This series provides key findings, data, and tools to support producers and partners in pursuing voluntary conservation efforts across the nation.

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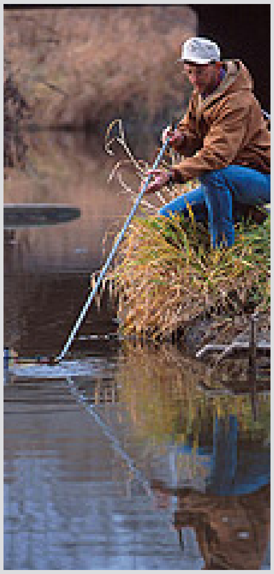

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Webinar Resources

OVERVIEWS OF LEGACY PHOSPHORUS

Kleinman, P.J.A., A.N. Sharpley, A.R. Buda, R.W. McDowell, and A.L. Allen. 2011. Soil controls of phosphorus runoff: management barriers and opportunities. Canad. J. Soil Sci. 91: 329-338. https://doi.org/10.4141/cjss09106

Jarvie, H.P., A.N. Sharpley, B. Spears, A.R. Buda, L. May and P.J. A. Kleinman. 2013. Water quality remediation faces unprecedented challenges from "Legacy Phosphorus." Environ. Sci. Technol. 47: 8997-8998. https://doi.org/10.1021/es403160a

Sharpley, A., H. P. Jarvie, A. Buda, L. May and P. Kleinman. 2013. Phosphorus legacy: Overcoming the effects of past management practices to mitigate future water quality impairment. J. Environ. Qual. 42: 1308-1326. https://doi.org/10.2134/jeq2013.03.0098

TRADE-OFFS INVOLVING CONSERVATION AND LEGACY PHOSPHORUS

Kleinman, P.J.A., Osmond, D.L., Christianson, L.E., Flaten, D.N., Ippolito, J.A., Jarvie, H.P., Kaye, J.P., King, K.W., Leytem, A.B., McGrath, J.M., Nelson, N.O., Shober, A.L., Smith, D.R., Staver, K.W., Sharpley, A.N. 2022. Addressing conservation practice limitations and trade-offs for reducing phosphorus loss from agricultural fields. Agricultural and Environmental Letters. 7(2). Article e20084. https://doi.org/10.1002/ael2.20084.

Kleinman, P.J.A., A.N. Sharpley, R.W. McDowell, D. Flaten, A.R. Buda, L. Tao, L. Bergstrom and Q. Zhu. 2011. Managing Agricultural Phosphorus for Water Quality Protection: Principles for Progress. Plant and Soil 349: 169-182. https://doi.org/10.1007/s11104-011-0832-9

LEGACY PHOSPHORUS IN STREAM/RESERVOIR SEDIMENTS

Missimer, T.M., S. Thomas, and B.H. Rosen. 2021. Legacy Phosphorus in Lake Okeechobee (Florida, USA) Sediments: A Review and New Perspective. Water 13 (1): 39. https://doi.org/10.3390/w13010039

Koch, S., E.I. Rosewig, and B. Lennartz. 2023. Legacy Phosphorus in Sediments of Lowland Waterways. Environments 10 (3): 43. https://doi.org/10.3390/environments10030043

LEGACY PHOSPHORUS AS AN AGRICULTURAL RESOURCE

Pavinato, P.S., Cherubin, M.R., Soltangheisi, A. et al. Revealing soil legacy phosphorus to promote sustainable agriculture in Brazil. Sci Rep 10, 15615 (2020). https://doi.org/10.1038/s41598-020-72302-1

Luke Gatiboni, G. Brunetto, P.S. Pavinato and T.S. George. 2020. Legacy Phosphorus in Agriculture: Role of Past Management and Perspectives for the Future. Front. Earth Sci., 19 (8): | https://doi.org/10.3389/feart.2020.619935