Methodology – Data Collection, Aggregation, and Load Reduction Modeling of Completed Conservation Practices in Indiana

Related to the Indiana Conservation Partnership's "Conservation Accomplishments Report" 2013, 2014, 2015, 2016, 2017, etc. http://www.in.gov/isda/2991.htm

Updated 4/9/2020

OVERVIEW

The Indiana Conservation Partnership's (ICP) use of the EPA Region 5 load reduction model (the model) to estimate nutrient and sediment load reductions in Indiana is part of a collective effort to generate a comprehensive statewide picture of government assisted, voluntary conservation impact across the state. Cooperation in this effort by local, state and federal partners in the ICP allows for conservation tracking and load reduction estimation at an order of magnitude greater than any single agency or entity could achieve alone. The ICP utilizes the end products of this process to establish baselines and measure load reduction trends by watershed for each calendar year, allowing for prioritization of workload and staffing needs, all while serving as a tangible component of Indiana's Nutrient Reduction Strategy.

DATA COLLECTION AND AGGREGATION

The collection of practice data is the first step in this effort. Several members of the ICP participate on this front end, which makes the Division of Soil Conservation's (the Division) use of the model and subsequent mapping possible. Practice information from several sources is consolidated by the Division Accountability and Technology Program Manager and the Division Data Analytics Program Manager. These data include Clean Water Indiana and the Conservation Reserve Enhancement Program conservation tracking data in Microsoft SharePoint (ISDA, Soil and Water Conservation Districts), practice data from Farm Bill programs (NRCS/FSA)[1], practice data from EPA-319 funded projects (IDEM) and practice data from the Lake and River Enhancement[2] program (IDNR).[3] It should be noted that data not related to the Region 5 model is also consolidated in this way, though it is instead published in reports online.[4] These include tillage transect data and conservation financial reports.

LOAD REDUCTION MODELING

When utilizing the Region 5 model, practice data from ICP partners is collated into an Annual ICP Conservation Accomplishments datasheet, which includes Best Management Practice (BMP) types, practice locations, measurements and other necessary attributes to enter into the Region 5 model. Implemented in 2017, the Division created a tool to batch process large amounts of similar practices, thus reducing the modeling workload on individual Division Field Staff by 90 percent. The remaining 10 percent of practice data (that require more detailed site knowledge) are then divided up by county and assigned to Division Field Staff (4-6 assigned counties each).[5] All completed practices within a given calendar year are modeled with maps and reports generated in March of the following year. As practice reduction estimates are completed in the model by Division staff, the nitrogen, phosphorus and sediment load reduction numbers are entered back into the

[1] Section 1619 Data Sharing Agreement on file
[2] MOU on file
[3] This data collection process is represented with the green boxes at the top of the ICP Workload Accountability Data flow chart seen on page 3
[4] Represented in the yellow rectangular boxes in the Workload Accountability flow chart. These are published on ISDA and ICP websites (small purple rectangle, lower left quadrant of the Workload Accountability flow chart) seen on page 3
[5] Represented in the two small orange circles on the Workload Accountability flow chart seen on page 3

Annual ICP Conservation Accomplishment datasheet.[6] Once completed, the Accountability and Technology Program Manager lays over watershed or county layers in GIS with practice locations and their respective nutrient and sediment reductions. In this way, a cumulative picture of conservation impact is created at watershed scales.[7] Value ranges are assigned for load reduction to illustrate the load reductions across the state by watershed at the HUC-8 level.

QUALITY CONTROL

As part of a continued focus on quality control, the Division has implemented new automation tools to reduce human error in data entry. While over reporting load reductions was the largest concern, the analysis led to a more careful examination of location information tied to each conservation practice installed. With this information, the Division team back-calculated the Region 5 Load Reduction Model estimates, and created a tool to batch process large amounts of similar practices, thus reducing the modeling workload on conservationists by 90 percent. The Division team used this tool on all ICP practice data back to 2013, in an effort to consistently fix any errors of this nature retroactively. A standard quality control protocol was established, utilizing spatial analysis tools to double check UTM entries, HUC8 watersheds, and County information.

SUPPORTING LINKS

USEPA Region 5 Load Reduction Model:

http://it.tetratech-ffx.com/steplweb/default.htm

Region 5 Model Training Webinar:

What Is the Region 5 Model and How Do You Use It?
https://engineering.purdue.edu/watersheds/webinars/Region5/

Indiana Nutrient Reduction Strategy:

http://www.in.gov/isda/2991.htm

[6] Represented in the two small orange circles on the Workload Accountability flow chart seen on page 3
[7] Represented in the small blue rectangle in the lower right quadrant of the Workload Accountability flow chart seen on page 3

Indiana Conservation Partnership Annual (CY) Workload Accountability Data Flow

Original Data Source
Data Server Location
Agency Point of Contact

ISDA Data
CREP & CWI
Indianapolis
Trevor Laureys

NRCS Data
Farm Bill[1]
Washington, D.C.
Jennifer Chen

IDEM Data
EPA - 319
Indianapolis
Lou Renshaw

DNR Data
LARE
Indianapolis
Doug Nusbaum

Spring/Fall Tillage Transect Data[3]
http://www.in.gov/isda/2342.htm
(Tillage Trends By County)
(Separate Data Flow Process)

Data Consolidation
Trevor Laureys
Sam Stroebel
ISDA

ICP Financial Reports Web Application[3]
http://www.in.gov/isda/icpreports/
(Total Funding By County)
(Separate Data Flow Process)

EPA Region 5 Model Load Reduction Analyses[2]
ISDA Field Staff

EPA Region 5 Model Quality Control
Trevor Laureys
Sam Stroebel
ISDA

Carbon Sequestration Analysis[4]
Sam Stroebel
ISDA

Compile Annual ICP Conservation Workload Report[3]
Leah Harmon
ISDA

Published to ISDA and ICP Websites
http://www.in.gov/isda/2342.htm
http://iaswcd.org/icp/

[1]Data Sharing Privacy Agreements are in place
[2]http://it.tetratech-ffx.com/steplweb/models$docs.htm
[3]Incorporated into the Indiana Nutrient Reduction Strategy
[4]C. Poeplau, A. Don / Agriculture, Ecosystems and Environment 200 (2015) 33–41
https://www.sciencedirect.com/science/article/abs/pii/S0167880914004873

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