

Section 319 Technical Tools and Resources

2024 Clean Water Cross-Program Workshop

June 7, 2024

Cyd Curtis, EPA Office of Water
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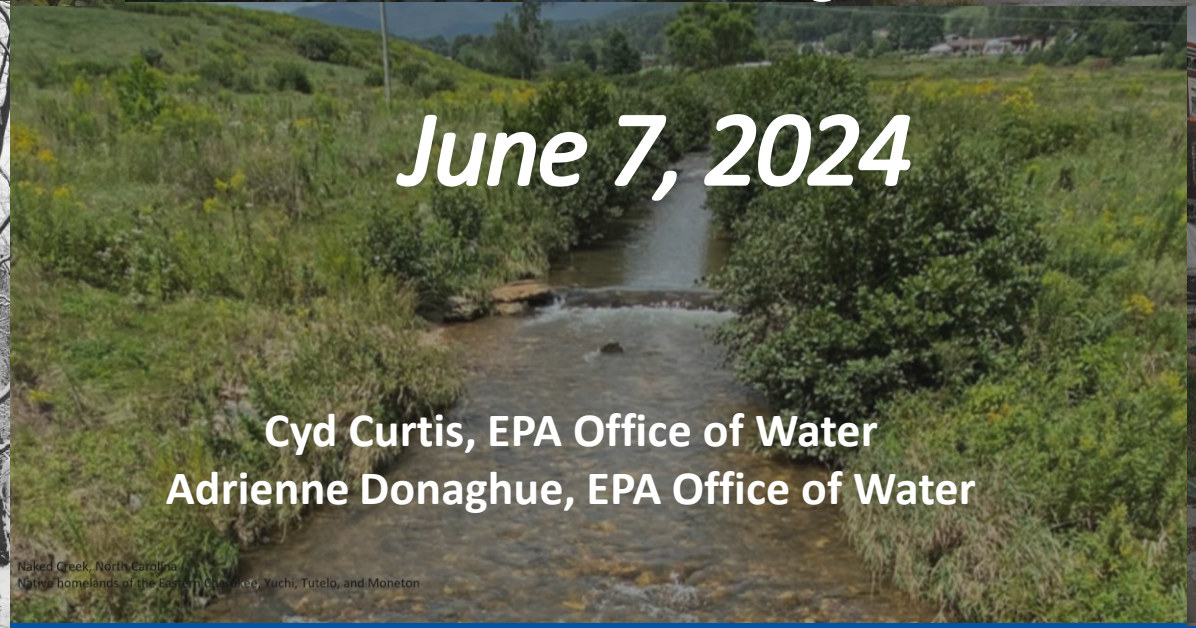
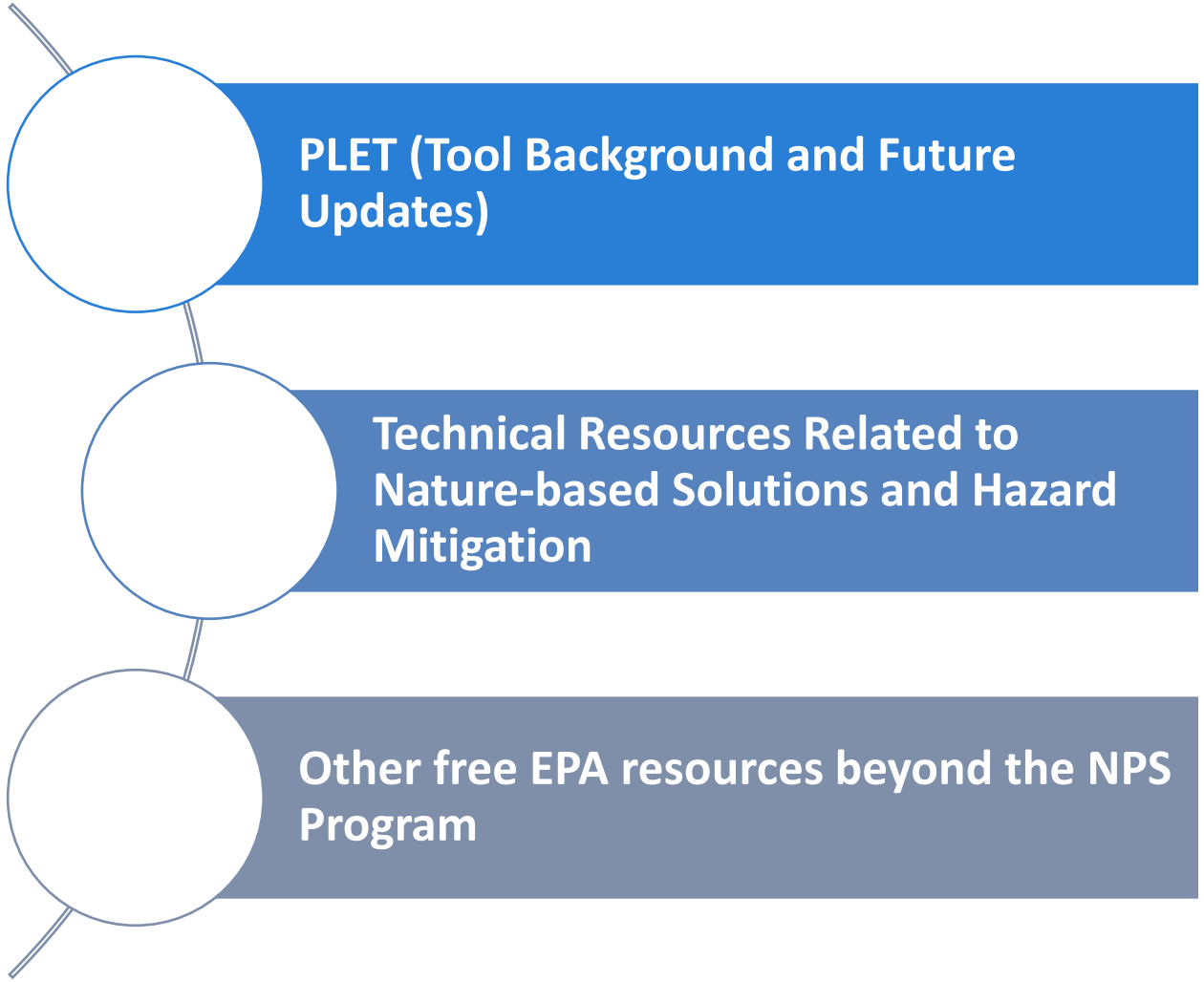


United States Environmental Protection Agency

Office of Water

Section 319 Nonpoint Source (NPS) Technical Tools and Resources Available for Cross-Program Coordination to Restore Impaired Waters



Pollutant Load Estimation Tool (PLET)

Pollutant Load Estimation Tool (PLET)

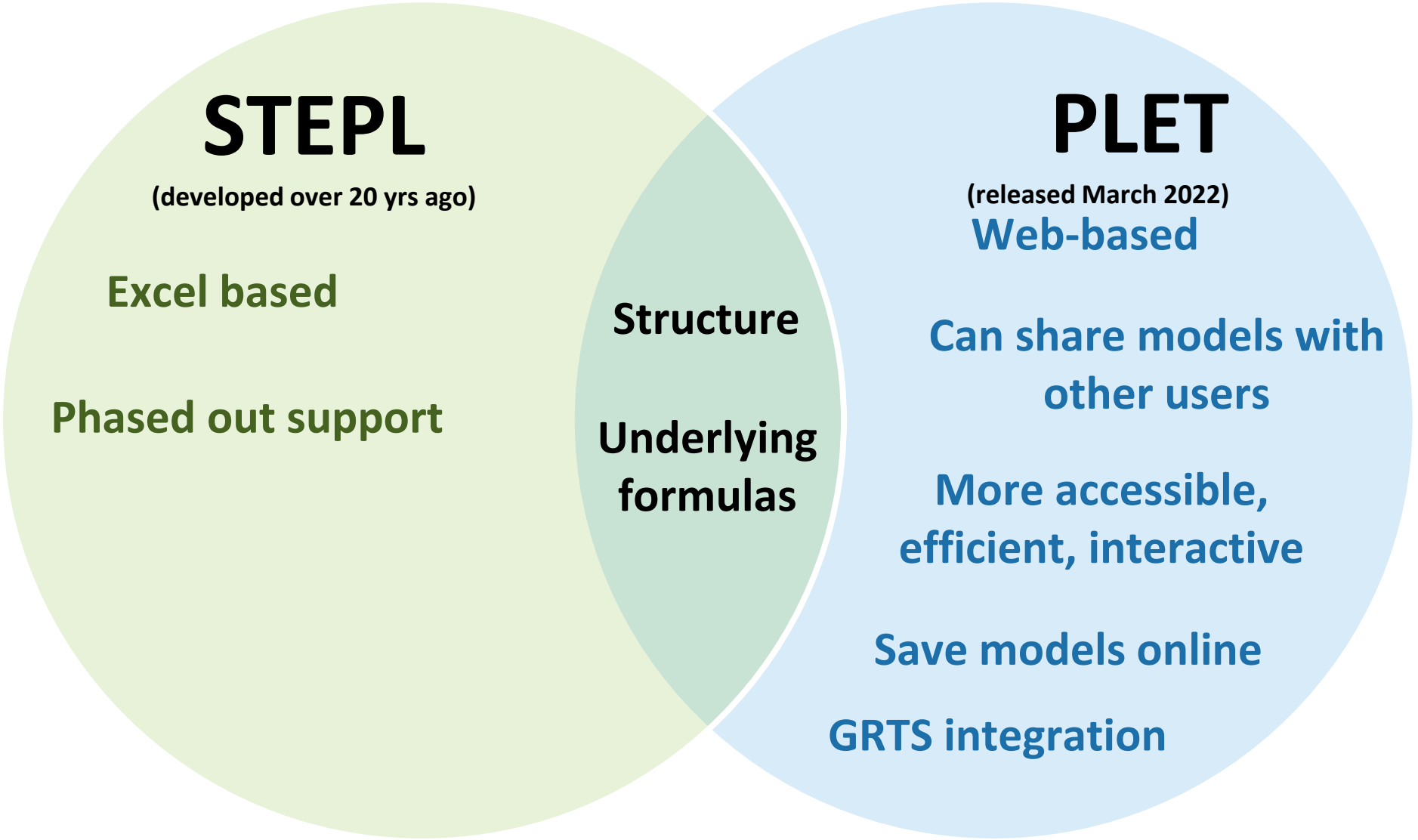
Web-based tool that ***estimates*** annual, long-term ***nutrient and sediment loads*** from ***surface runoff*** over cropland, pastureland, feedlots, forest and urban land uses and load reductions resulting from BMP implementation

Section 319 subgrantees, watershed planners, academics, conservation districts (30 different counties), and others

Report annual load reductions* and planning purposes (i.e. watershed-based plans)

*319 grant recipients report load reductions in the Grants Reporting and Tracking System (GRTS)

What is the difference between STEPL and PLET?

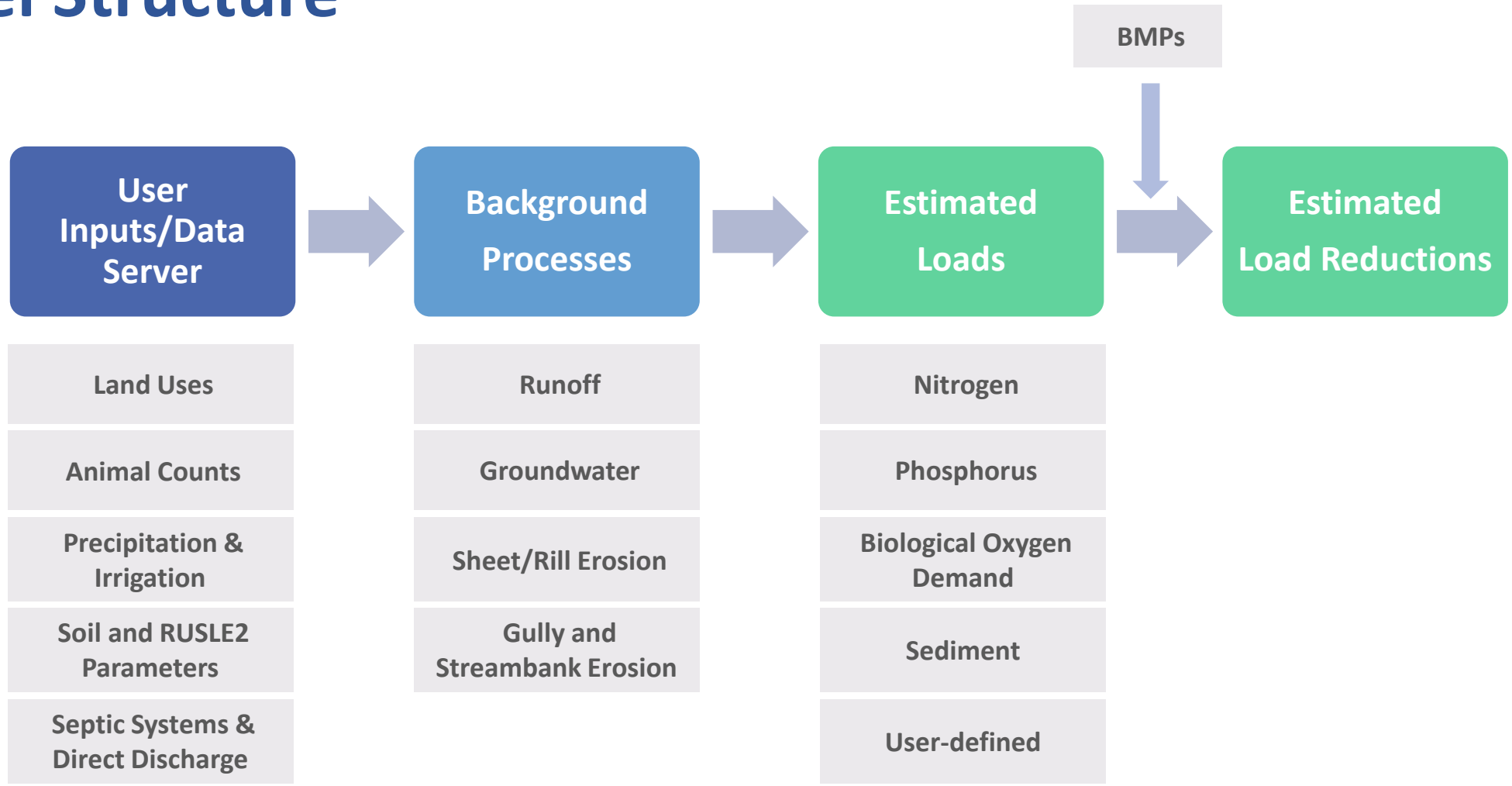


STEPL = Spreadsheet Tool for Estimating Pollutant Loads

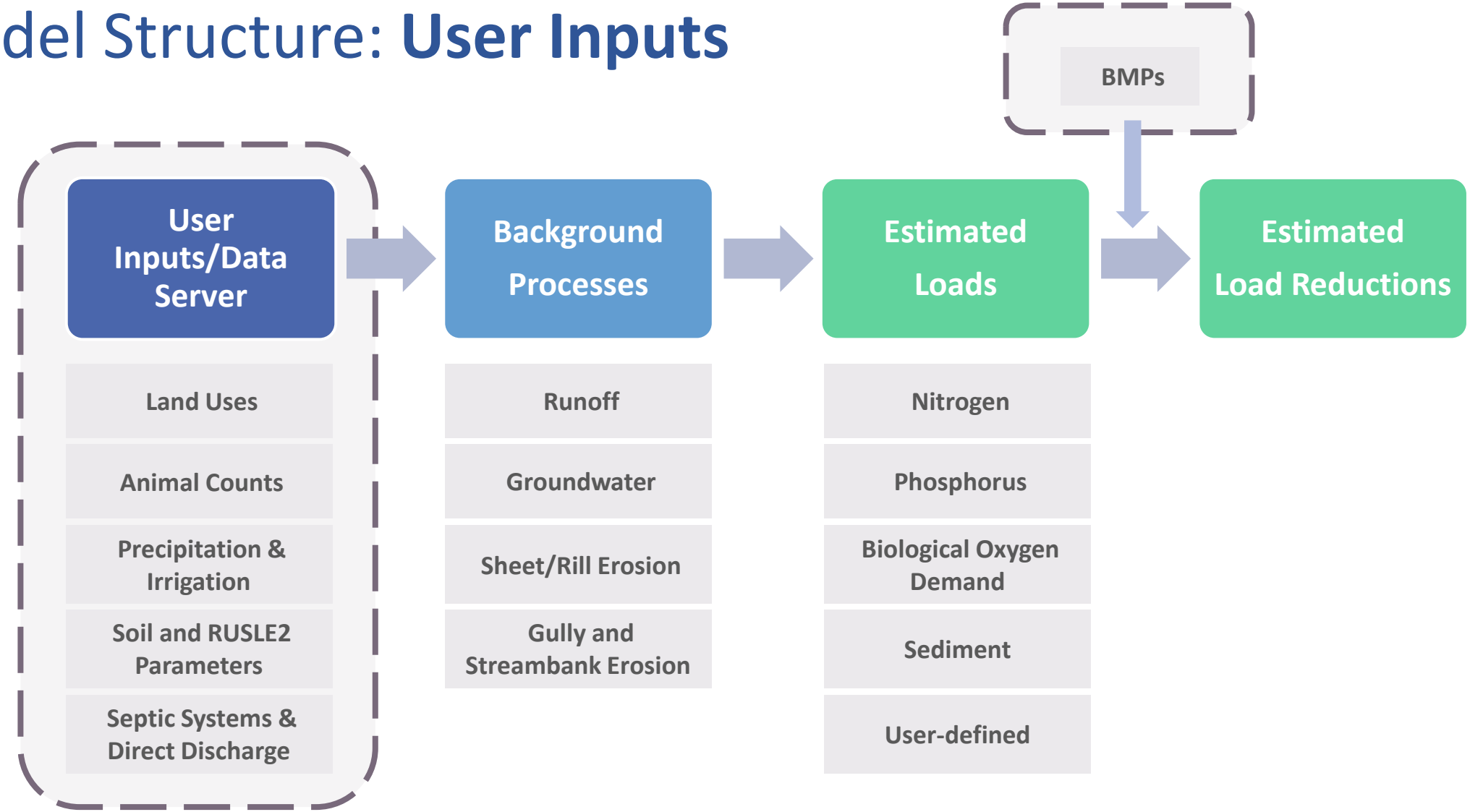
PLET Snapshot Summary

Features	Description
Scale	Field, county level, and HUC12; multiple fields and HUC12s can be considered simultaneously
Outcomes	Long-term (30-yr) average annual loads pre and post BMP implementation • Nitrogen, Phosphorus, Biological Oxygen Demand (BOD): **lbs/year** • Sediment: **tons/year** Volume Reductions • Applies to select urban BMPs: **gallons/year**
Best Management Practices	Includes more than 60 BMPs for both agriculture and urban settings such as: • Conservation tillage, contour farming, cover crops, bioretention, porous pavement, and infiltration basin
Land uses	Cropland, Pastureland, Urban*, Forest, Feedlots, and User Defined *9 different urban land use types
Coverage	Contiguous United States + Hawaii *(for HUC12 input data and precipitation data)*
Time and Data Demands	Simple Most inputs are auto populated for the HUC12 scale

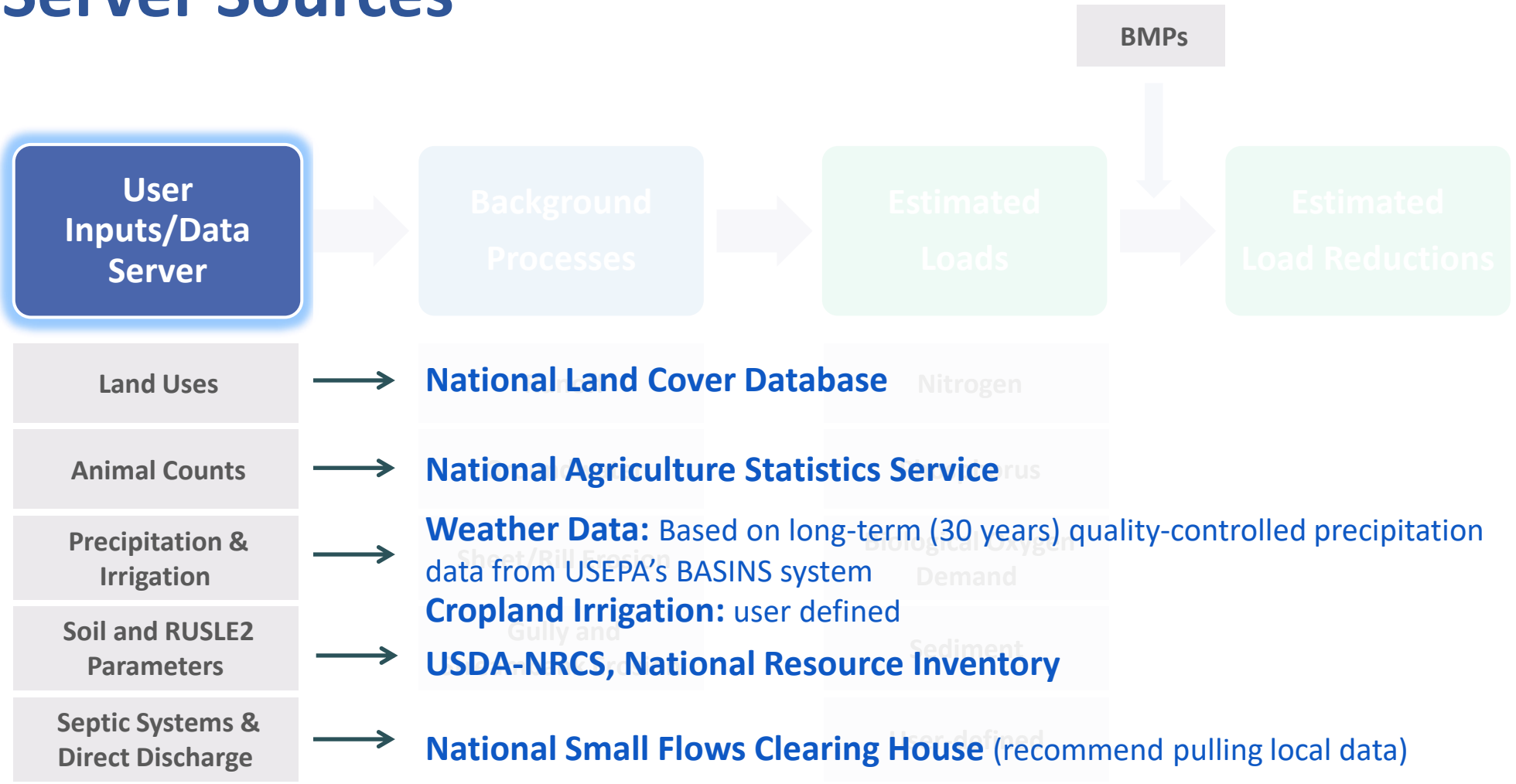
Model Structure



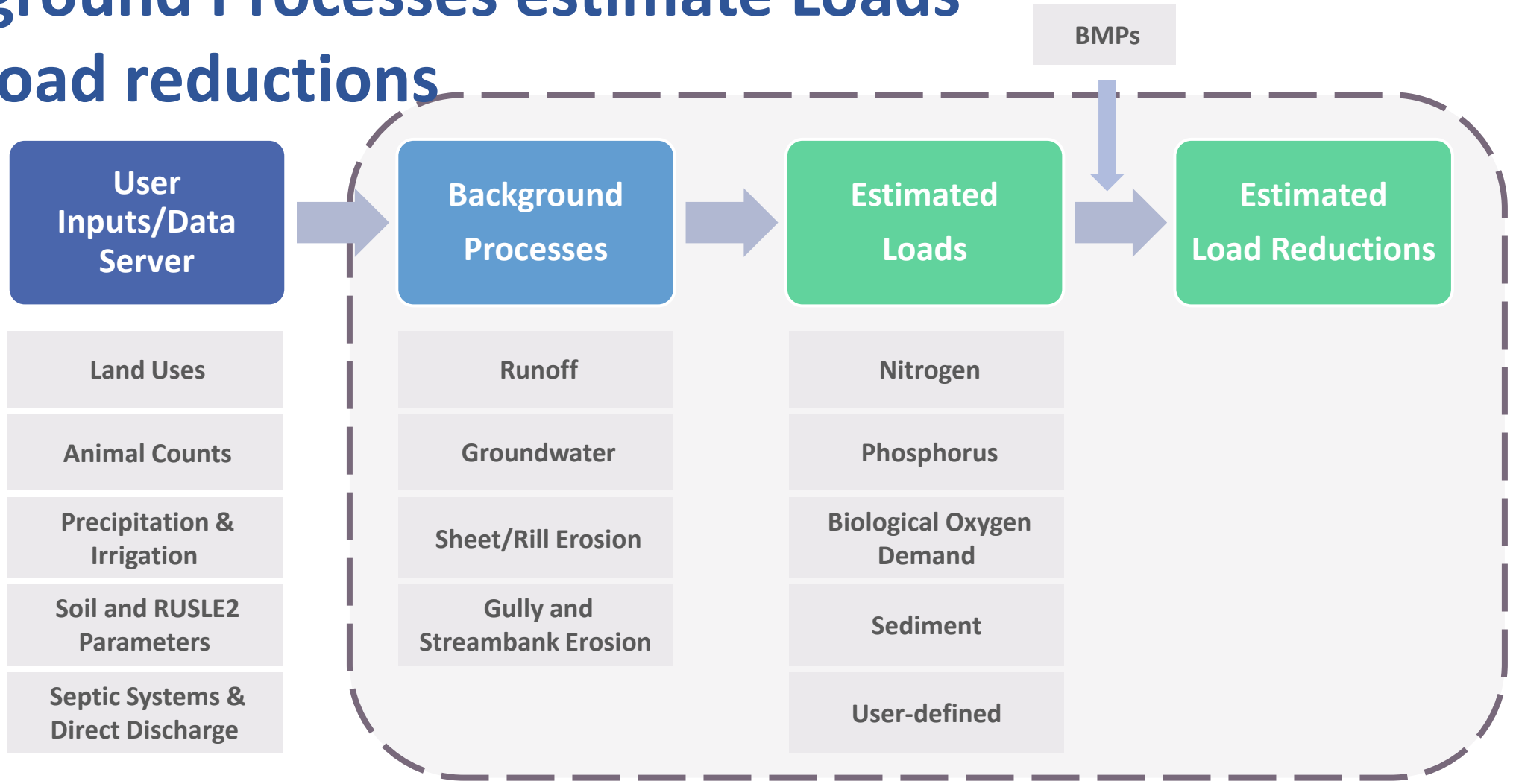
Model Structure: **User Inputs**



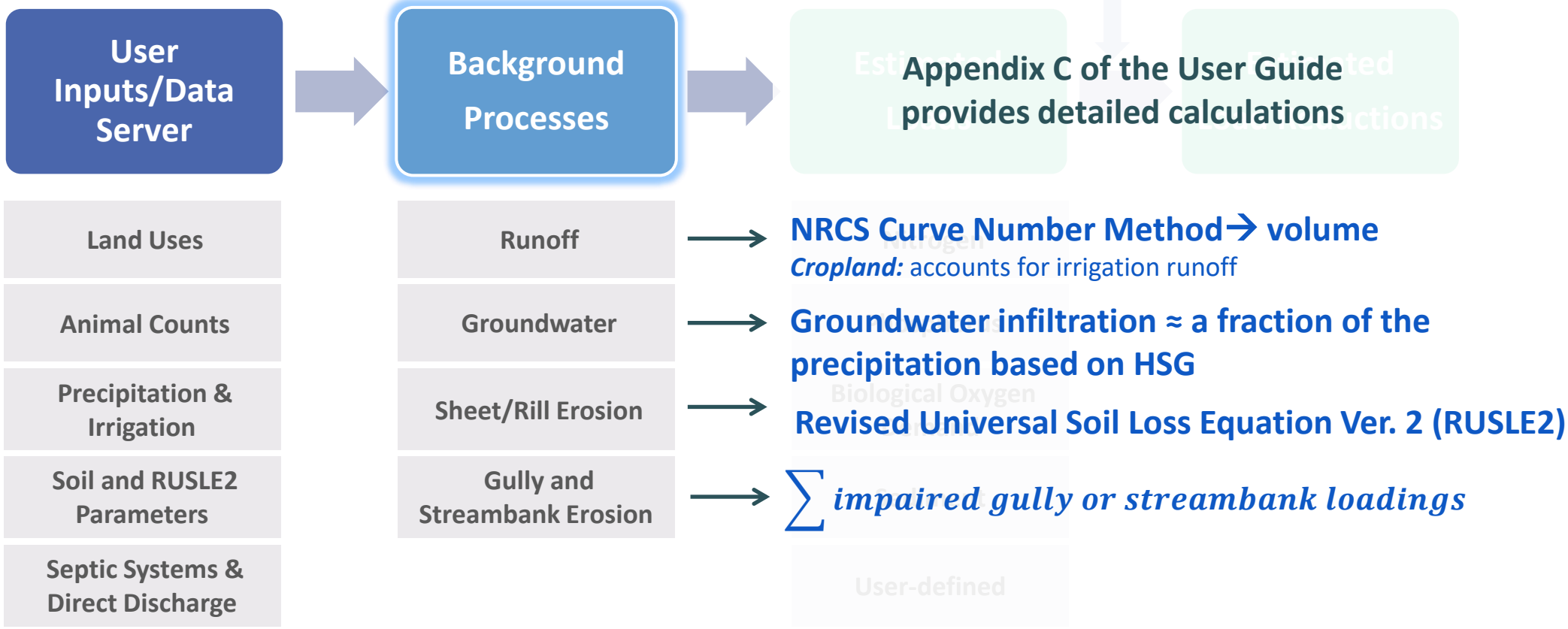
Data Server Sources



Background Processes estimate Loads And load reductions



Background Processes and Calculations

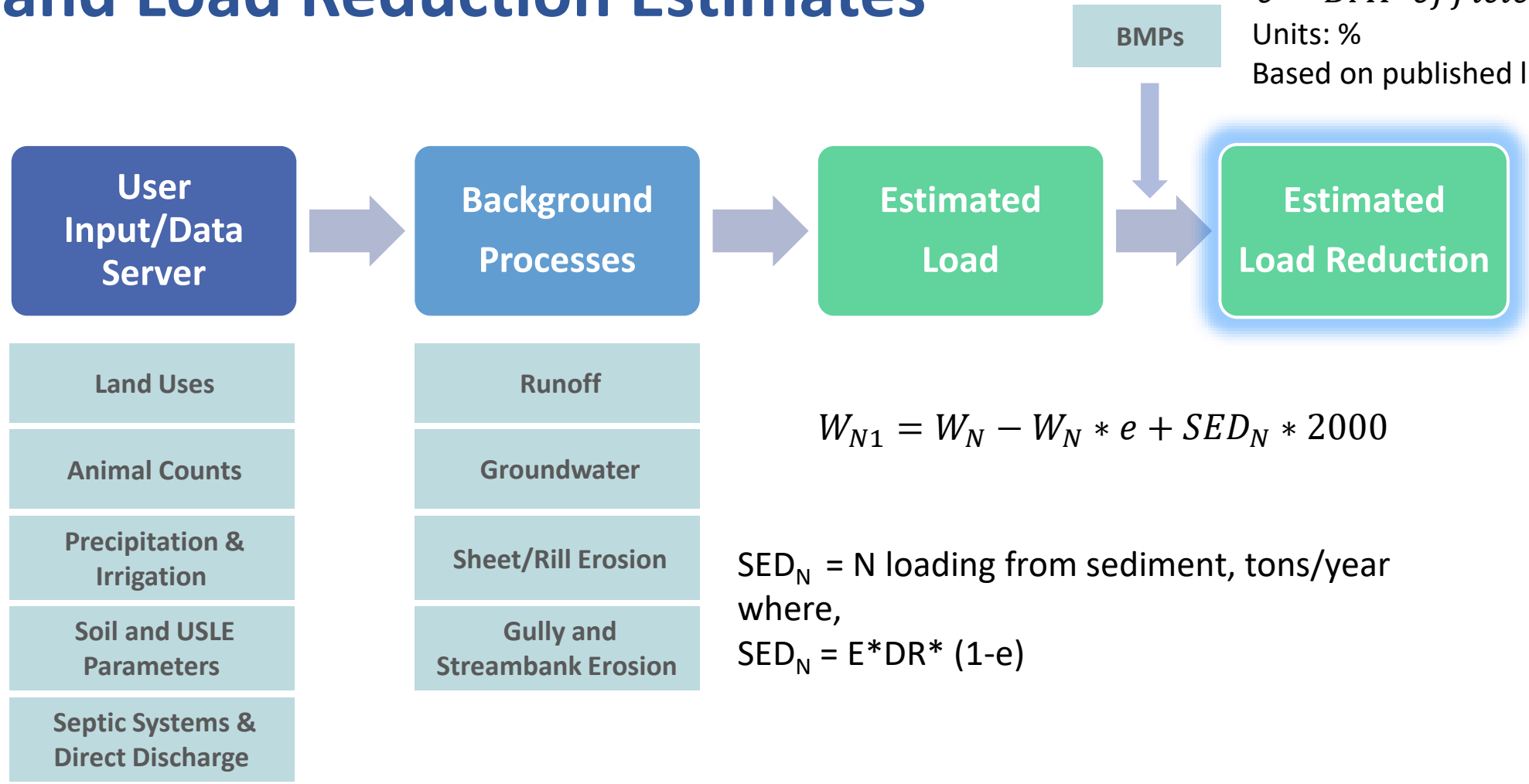


Load and Load Reduction Estimates

$e = BMP\ efficiency$

Units: %

Based on published literature



$$W_{N1} = W_N - W_N * e + SED_N * 2000$$

SED_N = N loading from sediment, tons/year

where,

SED_N = E*DR* (1-e)

PLET Strengths and Limitation

Strengths

- Appropriate for planning and screening level
- Estimates nonpoint sources from surface runoff
- Simple
- Share models with other users
- Customizable:
  - User-defined land use
  - Custom BMP
  - Combined BMP efficiencies (parallel and in series)
  - Other pollutants

Limitations

- Is a stand-alone web-based application
- Not appropriate for design of BMPs
- For multiple HUC12, weather data is based on the primary watershed
- Does not include sub-surface drainage

Examples of project types: watershed-base plans (WBPs)

Table 19- Prioritized Nutrient Load Reductions required (lbs/day)

Priority	Reach ID	BASINS TN Load (lbs/day)	TN Load Reduction Required (lbs/day)	BASINS TP Load (lbs/day)	TP Load Reduction Required (lbs/day)
1 (TP) & 2 (TN)	Reach 4 (Mora below confluence with Wolf Creek including Wolf Creek subwatershed)	3.175	1.424	0.348	0.209

Example: WBP for the Mora River Upper Canadian Plateau

- Pollutant loading rate determined using EPA's Better Assessment Science Integrating Point and Nonpoint Sources (BASINS)
- Load reductions for BMP implementation were calculated using STEPL

Special thanks to Brian Fontenot, EPA R6 for highlighting this project!

Conservation Tillage	Cover Crops	Nutrient Management	Prairie Strips	Rotational Grazing	Regenerative Agriculture
Conservation tillage on 50% or more* acres	Cover crops on 25% of acres	Precision nutrient management on an additional** 50% of conservation tillage acres	5% of acres south of Green Bay treated with prairie strips	Rotational grazing on 25% of pasture acres	Combination of all previous scenarios

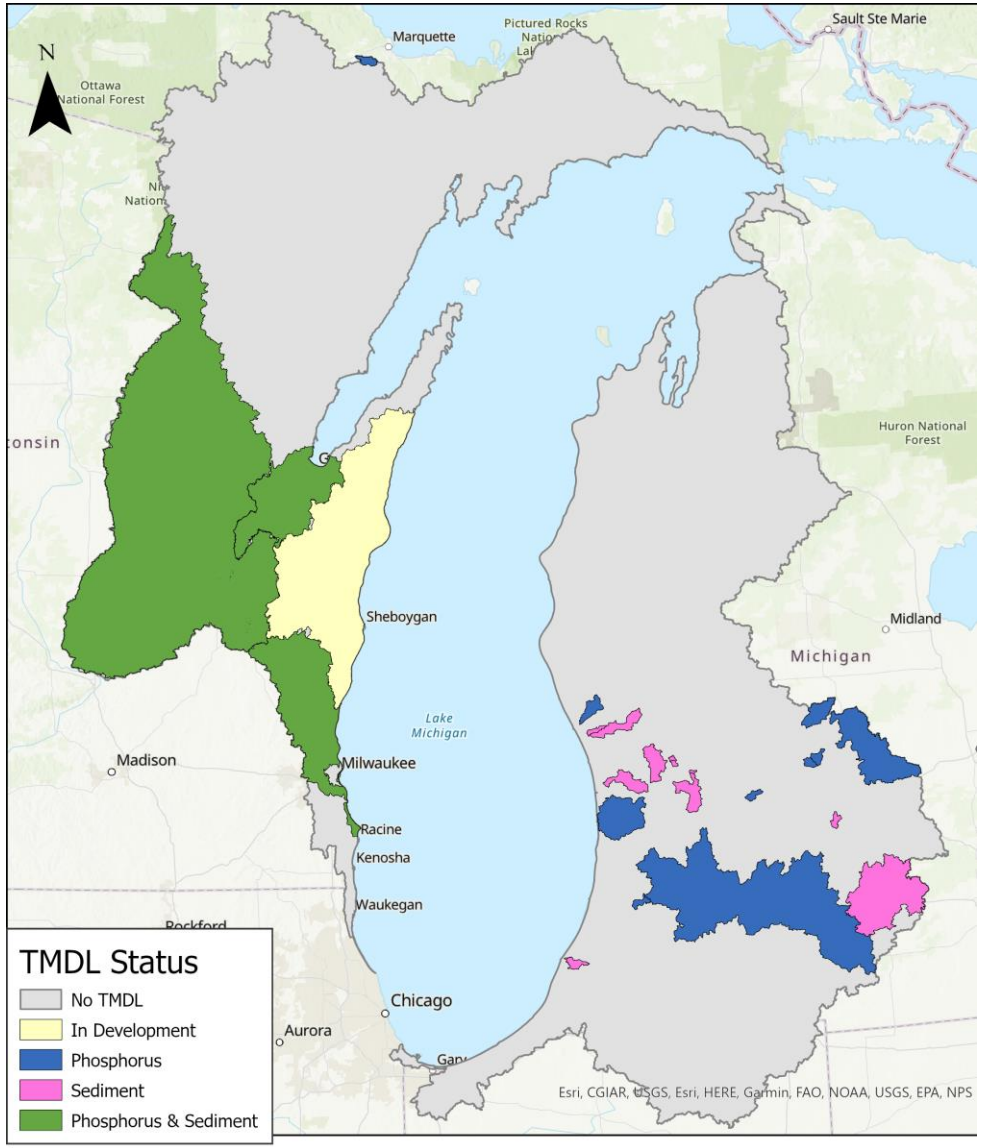
* If current adoption is greater than 50%, add an additional 10% of acres. Adoption rates based on 2021 conservation tillage adoption rates from the Operational Tillage Information System (OpTIS); data supplied by Regrow Ag.

** We assumed that all row crop acres using cover crops or no-till practices also use precision nutrient management.

Groups involved: General Mills, Sand County Foundation

Examples of project types: evaluating the impact of regenerative ag practices

- Considering 6 different BMP adoption scenarios (above)
- Current focus includes the **Phosphorus** and **Sediment** TMDLs
- Anticipated outcomes: estimation of Phosphorus load reductions and comparison to water quality goals

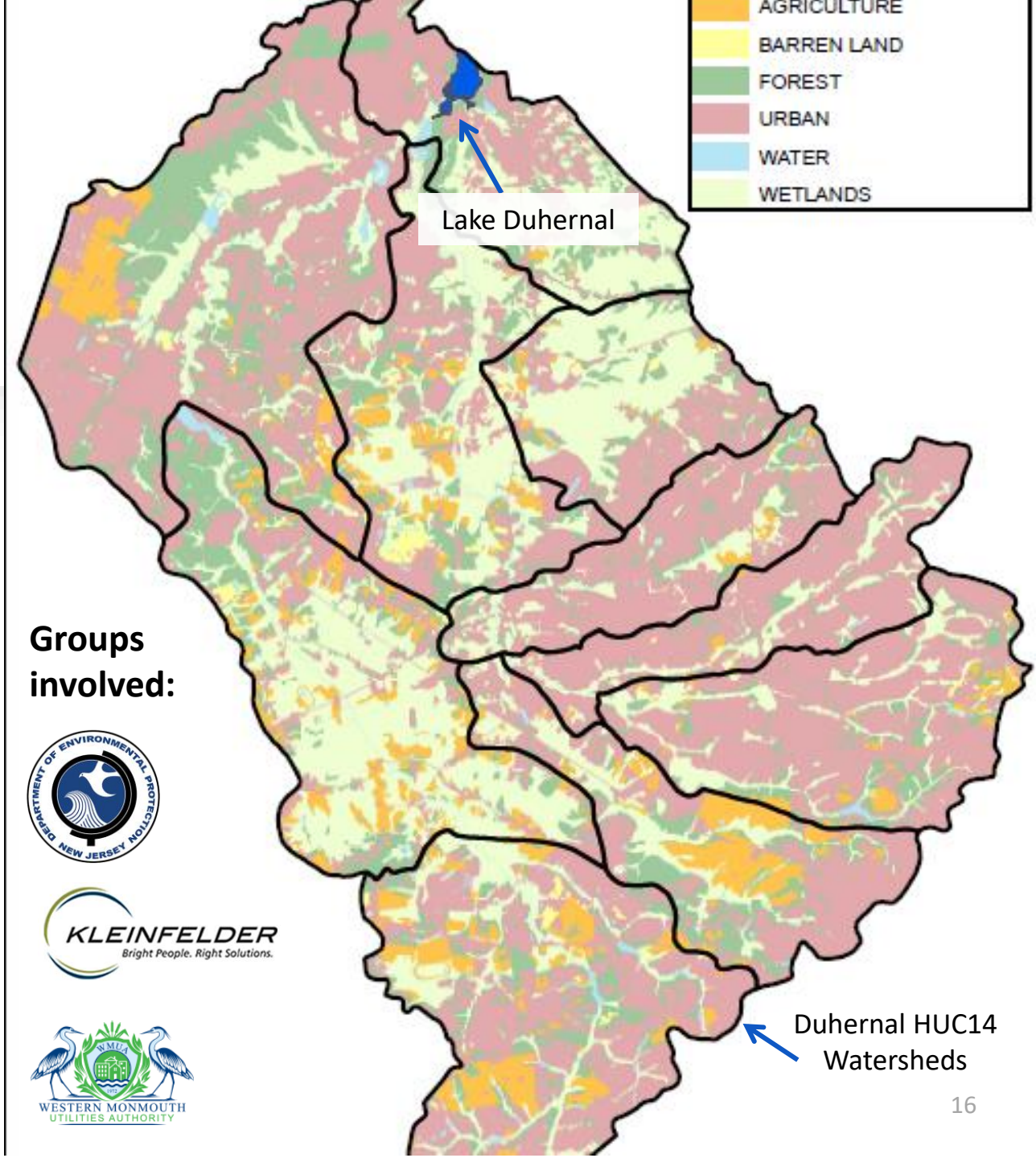


Lake Michigan Basin

Special thanks to Haleigh Summers, Sand County Foundation for sharing this project!

Examples of project types: watershed and lake protection plan

- Evaluating the use of PLET to determine nonpoint source loads to Lake Duhernal
- Conducting **wet weather sampling** to determine current **event mean concentrations (EMCs)** for land uses for comparison with model calculated nonpoint source loads.
- Future phases of the project will determine candidate locations for BMPs and associated TP load reductions

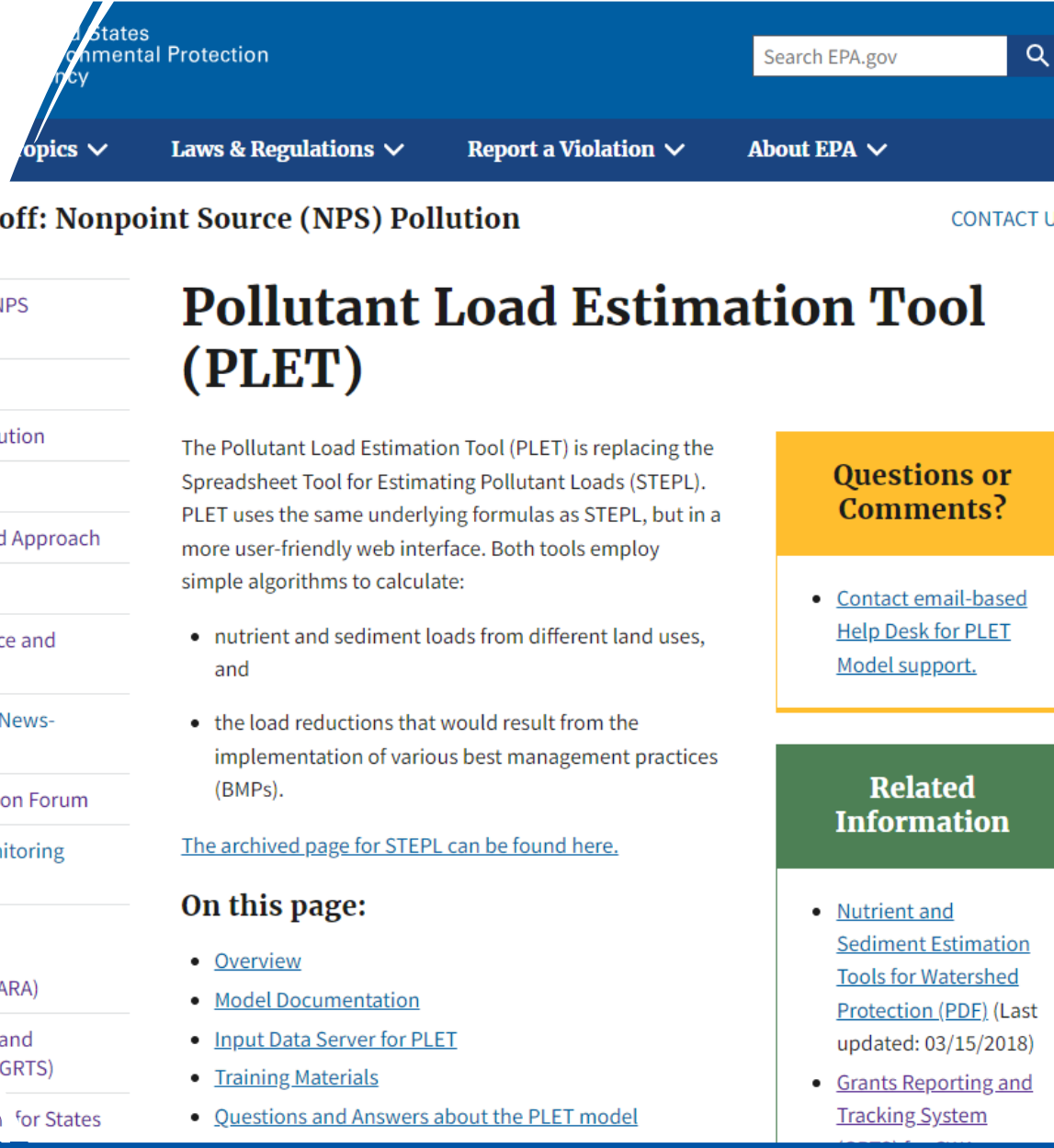


Groups involved:

Special thanks to Erin Dovel, Kleinfelder for sharing this project!

Want to learn more?

- PLET Website
- PLET User Guide → See the PLET Quick Guide
- BMP Definition Doc
- PLET Training Videos
- PLET Help Materials Menu → BMP Efficiency References; RUSLE2 Factor Updates
- Help Desk Email: plet@tetratech.com



Looking ahead – new release

We are always evaluating opportunities to update and improve.

Be on the lookout for a new release coming soon!

- Adding a new functionality to estimate water quality and quantity outcomes from protection work.
- Updating precipitation date with coverage through 2022 using PRISM data processed from HAWQS model.

Stay in touch!

- **Email:** donaghue.adrienne@epa.gov

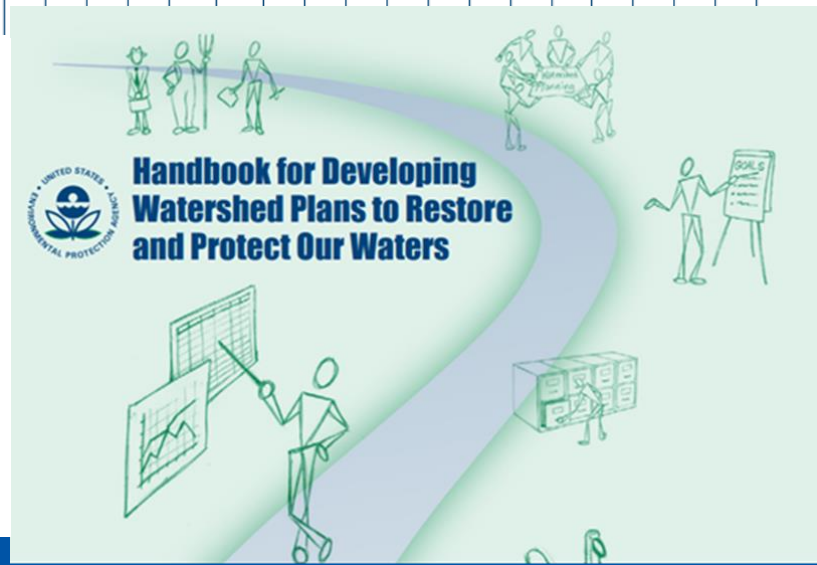
"..but wait there is more!"

- Chapter 8 - Handbook for Developing watershed plans

Model Acronym	Source	Landscape only	Comprehensive	Export coefficients	Loading functions	Physically based	Sub-daily	Daily	Monthly	Annual	Surface	Surface and ground water	User-defined	Sediment	Nutrients	Toxic/pesticides	Metals	BOD	Bacteria	Detention basin	Infiltration practices	Vegetative practices	Wetlands	Other structures
P8-UCM	Dr. William Walker	—	—	●	●	—	●	—	—	—	●	—	●	●	●	—	●	—	—	●	●	●	—	●
PCSWMM	Computational Hydraulics Int.	—	●	—	●	●	●	—	—	—	—	●	●	●	●	●	●	—	●	●	●	—	—	●
PGC–BMP	Prince George's County, MD	—	—	—	●	—	●	—	—	—	—	—	—	●	●	—	●	—	—	●	●	●	●	●
REMM	USDA-ARS	—	—	—	—	—	—	—	—	—	—	—	—	●	●	●	●	—	—	—	—	●	—	—
SHETRAN	University of Newcastle (UK)	—	●	—	—	●	●	●	—	—	—	●	—	●	—	—	—	—	—	—	—	—	—	—
SLAMM	University of Alabama	—	—	—	—	—	●	—	—	—	●	—	—	●	●	—	●	—	—	●	●	●	●	●
SPARROW	USGS	—	●	—	—	—	—	—	—	●	●	—	—	●	●	●	—	—	—	—	—	—	—	—
STORM	USACE (mainframe version), Dodson &																							

Table 8-5. Water Quality Endpoints Supported by the Selected Watershed Models

Parameter/Endpoint	AGNPS	STEPL	GWLF[a]	HSPF	P8-UCM	SWAT	SWMM
Total phosphorus (TP) load	◗	○	◗	●	●	◗	●
TP concentration	◗	—	◗	●	●	◗	●
Total nitrogen (TN) load	◗	○	◗	●	●	◗	●
TN concentration	◗	—	◗	●	●	◗	●
Nitrate concentration	—	—	—	●	—	◗	●
Ammonia concentration	—	—	—	●	—	◗	●
TN:TP mass ratio	—	—	◗	●	—	◗	●
Dissolved oxygen	◗	—	—	●	—	◗	●
Chlorophyll *a*	—	—	—	●	—	◗	—



Technical Resources Related to Nature-based Solutions (NBS) and Hazard Mitigation

The EPA defines nature-based solutions (NBS) as:

*actions that **protect, conserve, restore and sustainably manage** natural or modified ecosystems. They **use natural features or processes** to address public health and environmental challenges while **providing multiple benefits to people and nature**.*

Environmental co-benefits, occur when NBS achieve benefits beyond the intended primary function of restoring or protecting water quality

Environmental Co-Benefits of §319 Practices

Range of BMP types: ag conservation, green stormwater infrastructure, etc.

Many BMPs implemented through §319 have been flagged as having potential environmental co-benefits.

Examples include: cover crops, no-till/reduced-till farming, constructed wetlands, bioretention

In 2022 ~300 §319 projects were recorded that have/will implement practices with potential environmental co-benefits (>600 total projects in 2022).

Resource Coming Soon!

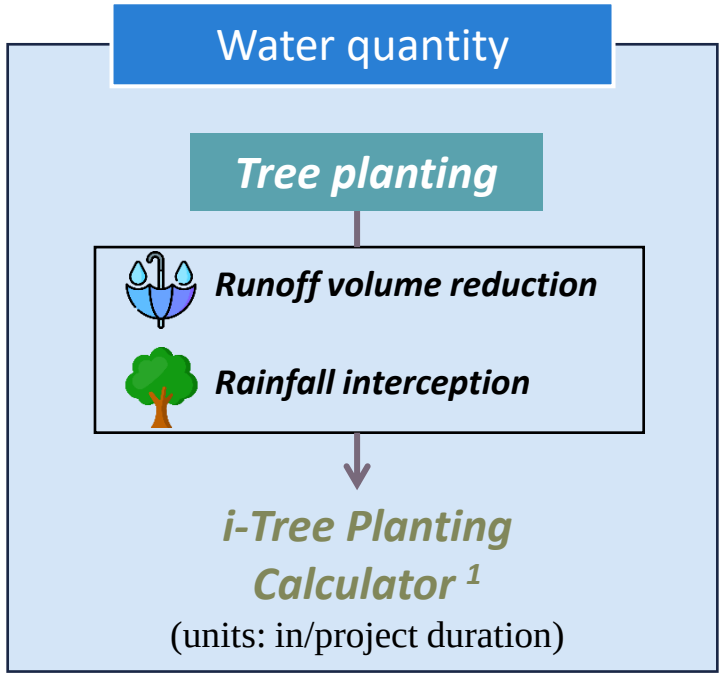
NBS Environmental Co-benefits Accounting Compendium

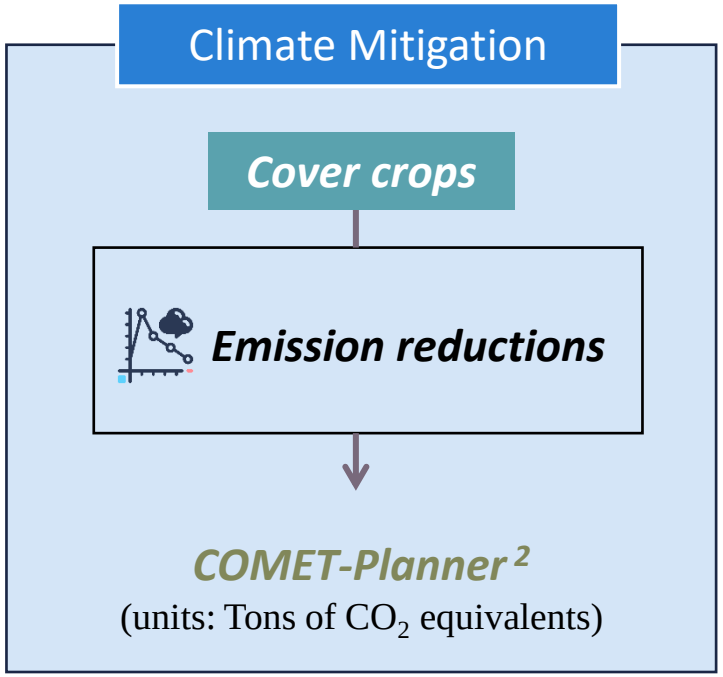
Scope: the compendium **connects** urban and agricultural **nature-based solutions** to identified **environmental co-benefits** and **quantification tools** or methods.

NBS type:

Identified co-benefit:

Tool:





[1] US Forest Service and partners

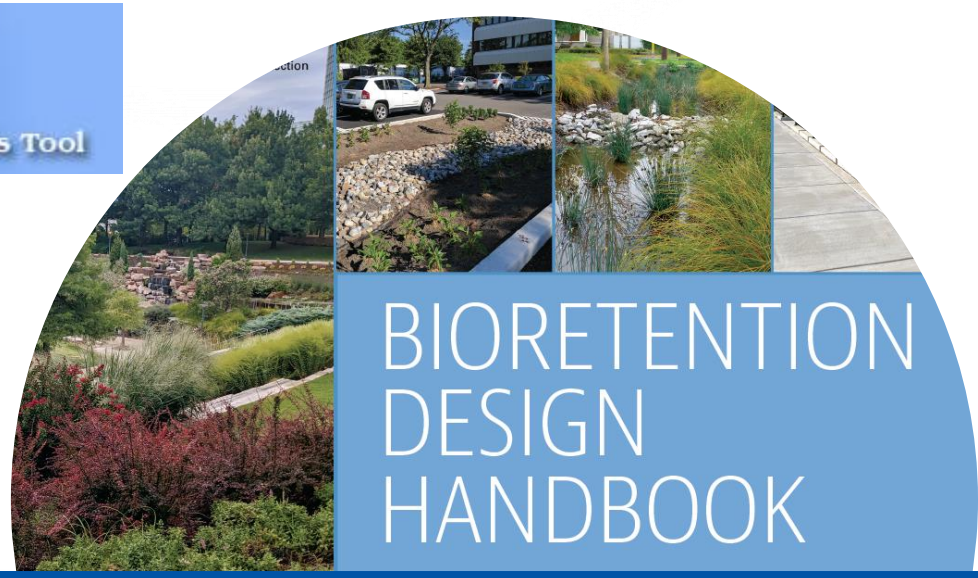
[2] USDA and Colorado State University

Other free EPA tools and resources

- Bioretention Design Handbook *(NPS Branch)*
- Hazard Mitigation Module *(NPS Branch)*
- Recovery Potential Screening Tool *(Watershed Branch)*
- EPA Data & Tools for Characterizing Your Watershed
  - EJScreen *(Office of Information Management)*
  - How's My Waterway (Water Data Integration Branch)
  - Water Quality Data (Water Data Integration Branch)
  - Social indicator Data Analysis Management Tool, SIMDA (Institute of Water Research with EPA support)

Creating Co-Benefits Through Hazard Mitigation Planning and Water Resource Management

SIDMA
Social Indicators
Data Management and Analysis Tool



Questions?

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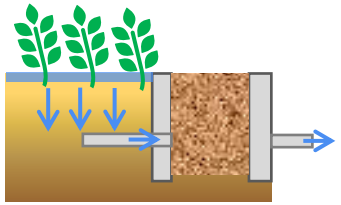
Slide Title

- **Substance**

Slide Title

- **Substance**

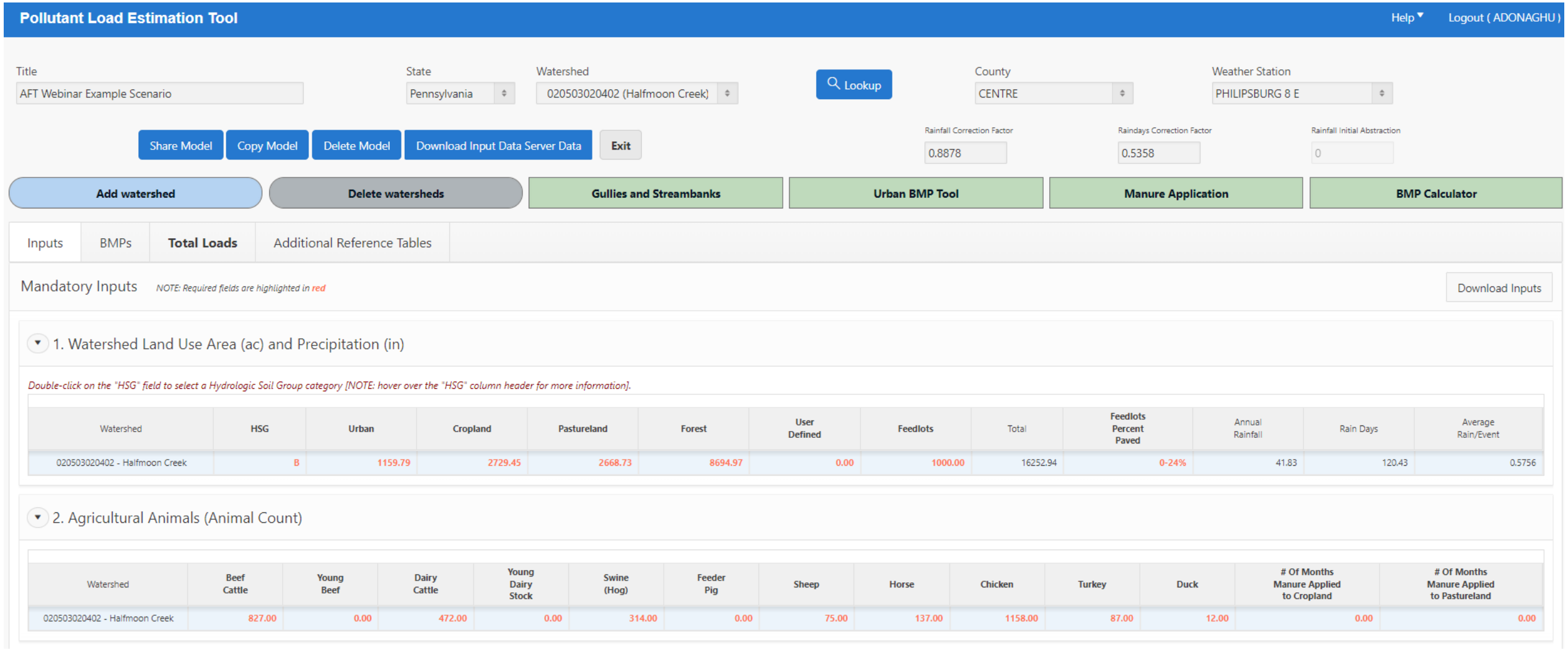
CHALLENGE:
Accounting for subsurface or tile drainage



denitrifying bioreactor

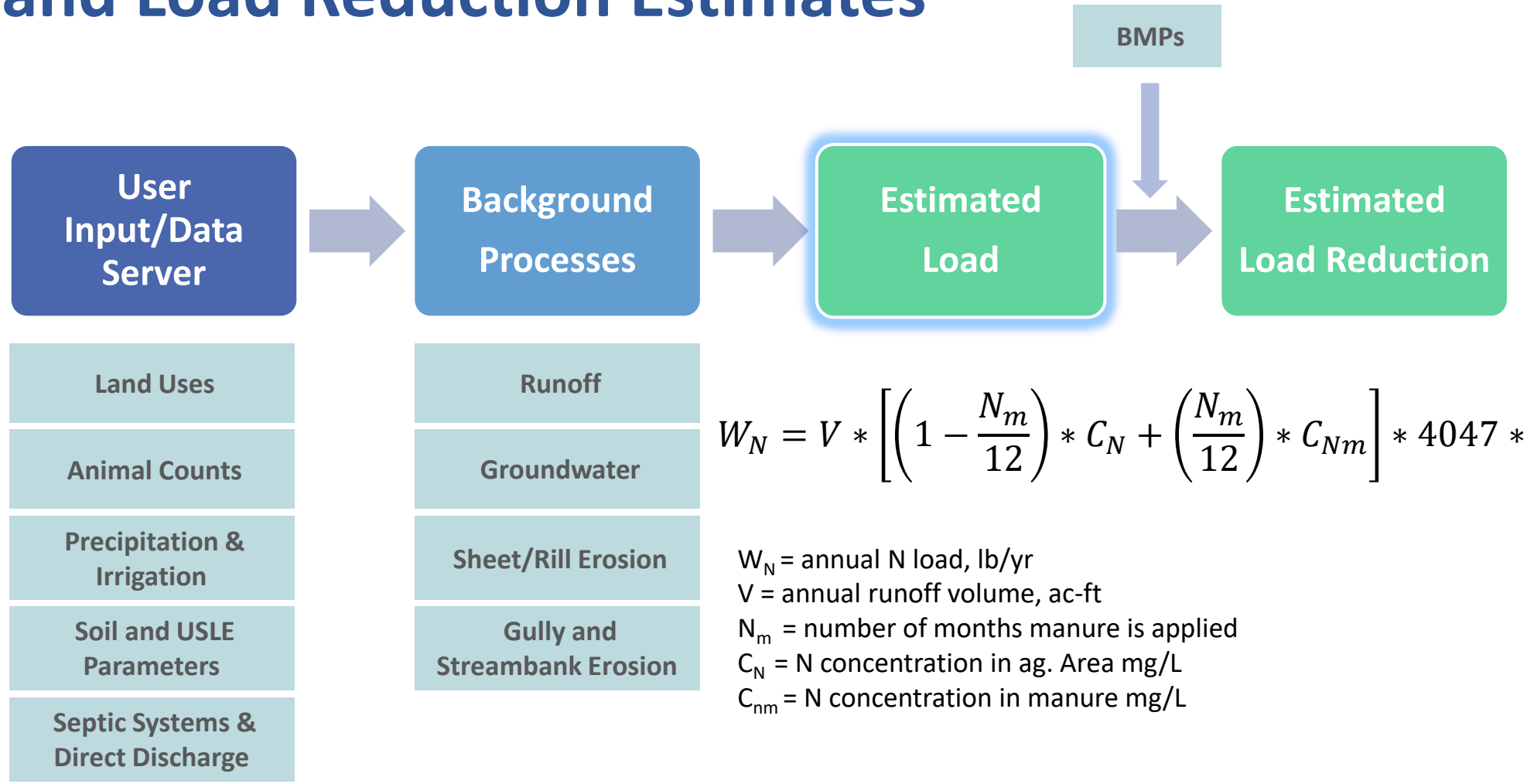
- Users can represent BMPs in PLET such as ***bioreactors***, ***controlled drainage***, and ***two-stage ditches***
- However, equations to account for the movement of water and pollutants in the sub-surface or via tile drains are not represented
- We are considering simple PLET advancements to add estimates of sub-surface drainage from rainfall. For example, such as:
  - Determine % cropland area tile drained in a HUC12 using Ag Census Data.
  - Partition rainfall into surface and sub-surface drainage using modified SCS-CN for subsurface drainage flow (Yuan 2001).
  - Application of conservation drainage-related BMPs could only be applied to sub-surface drainage volumes and load estimates.

PLET Input Tab: Tables 1-5 populated based on selected HUC12



Values in red = required

Load and Load Reduction Estimates



$$W_N = V * \left[\left(1 - \frac{N_m}{12}\right) * C_N + \left(\frac{N_m}{12}\right) * C_{Nm}\right] * 4047 * \frac{0.3048}{454}$$

W_N = annual N load, lb/yr
V = annual runoff volume, ac-ft
N_m = number of months manure is applied
C_N = N concentration in ag. Area mg/L
C_{nm} = N concentration in manure mg/L

Who is it for?

A **multidisciplinary audience** of green stormwater infrastructure professionals.

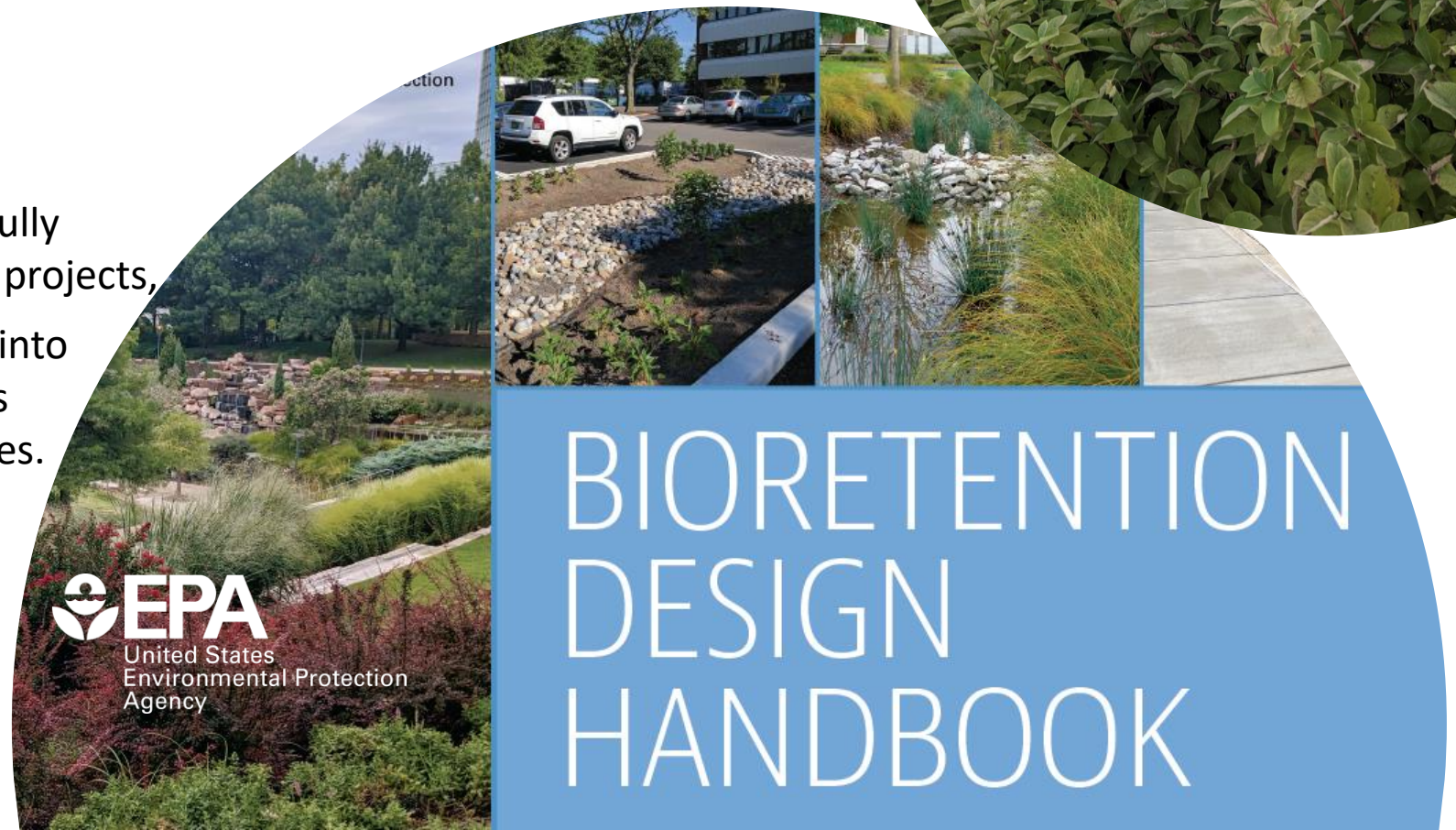
What is the scope?

The handbook emphasizes projects in the **right-of-way** and compiles the **current state of knowledge**.

Why was is developed?

To help readers successfully implement bioretention projects, incorporate **adaptive management** into all project phases, and share lessons learned from across the United States.

Released November 2023



NPS Program Efforts to Promote Natural Hazard Mitigation and Climate Resilience

- Developed an entry-level self-paced training that explores how FEMA Hazard Mitigation planning and CWA water quality planning can align around nature-based practices to achieve water quality and climate resilience co-benefits.
  - **Title:** *Creating Co-Benefits Through Hazard Mitigation and Water Resource Management*:
  - **Link** to training and other related resources: https://www.epa.gov/nps/natural-hazard-mitigation-resources
- Established a cooperative agreement with NAWM and ASFPM to provide 5 in-person workshops on integrating hazard mitigation planning and CWA programs.
  - Includes nature-based water quality practices in climate resilience/hazard mitigation planning.