CalCAST Updates

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Modeling Workgroup Quarterly Review

01/09/2024

Developing a reproducible workflow to download water quality data from EPA's Water Quality Portal (WQP)
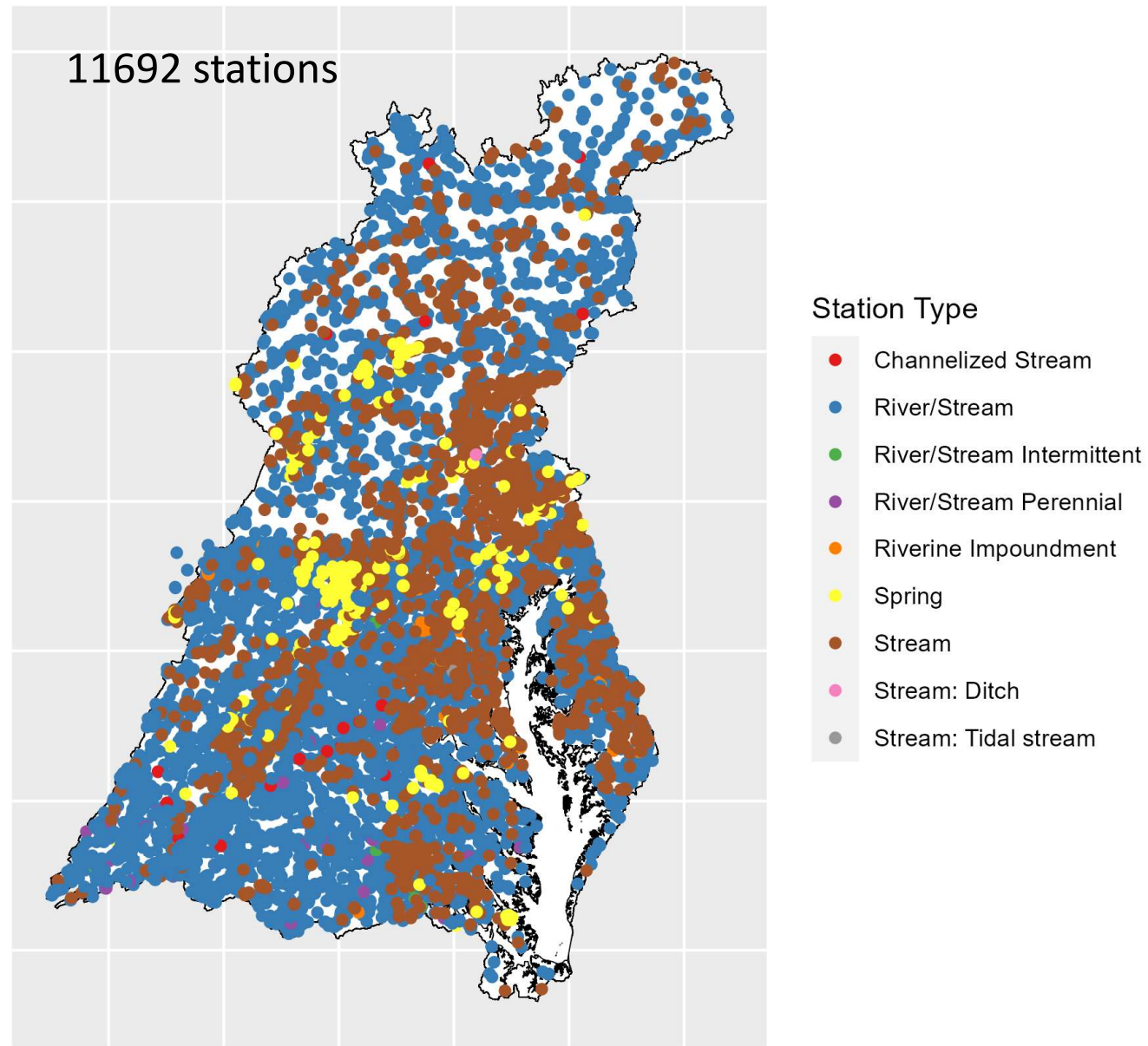
Motivation

- We need to update the watershed model calibration dataset for P7

- The P6 calibration dataset was obtained through an ad-hoc process that is not easily reproducible

- We would like to develop an automated workflow that allows us to regularly update and expand our calibration dataset without major efforts

- March 2023: STAC Workshop "Using Local Monitoring Results to Inform CBP's Watershed model":
    - It is very important to local monitoring agencies that their stations are used to calibrate the CBP watershed model if possible
    - Need for a transparent and streamlined process to submit monitoring data for use in watershed model calibration
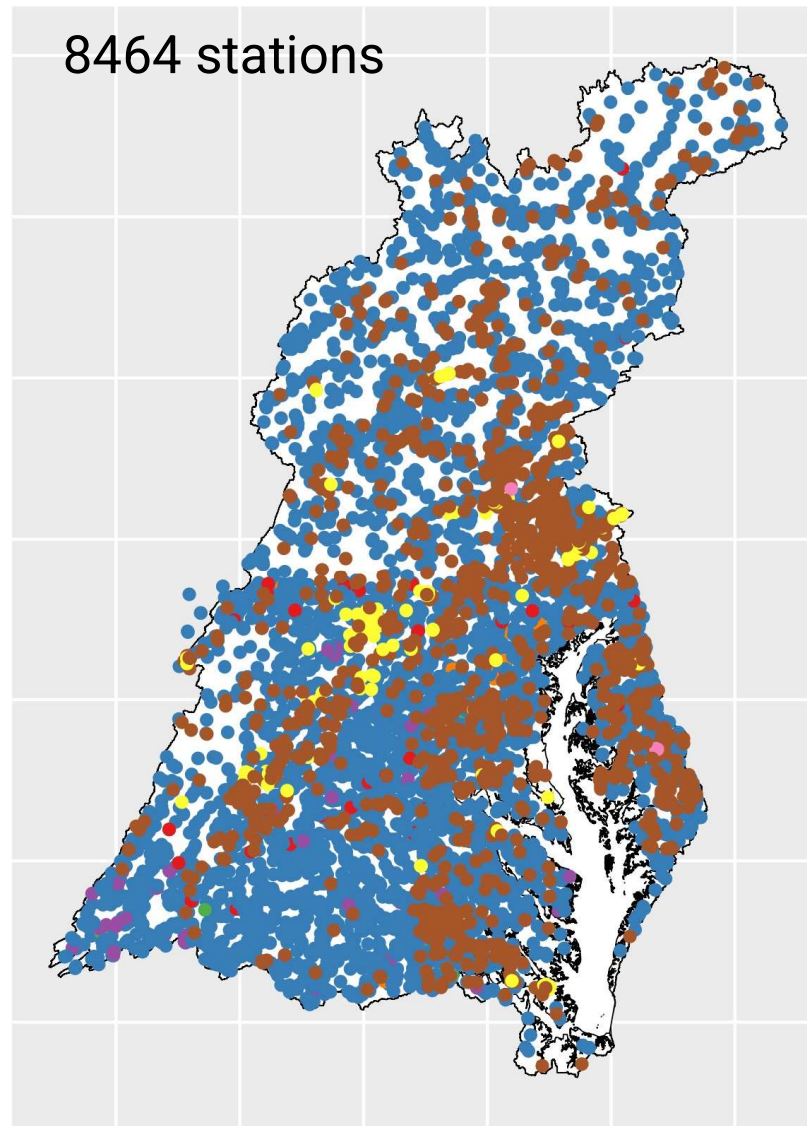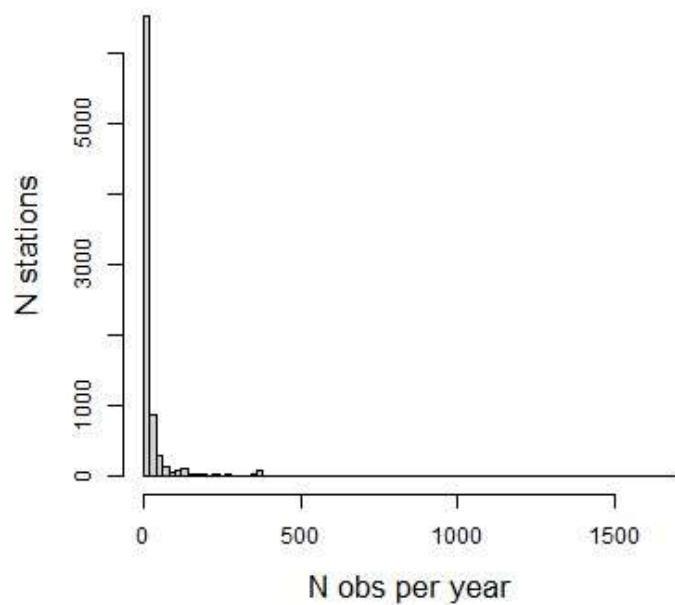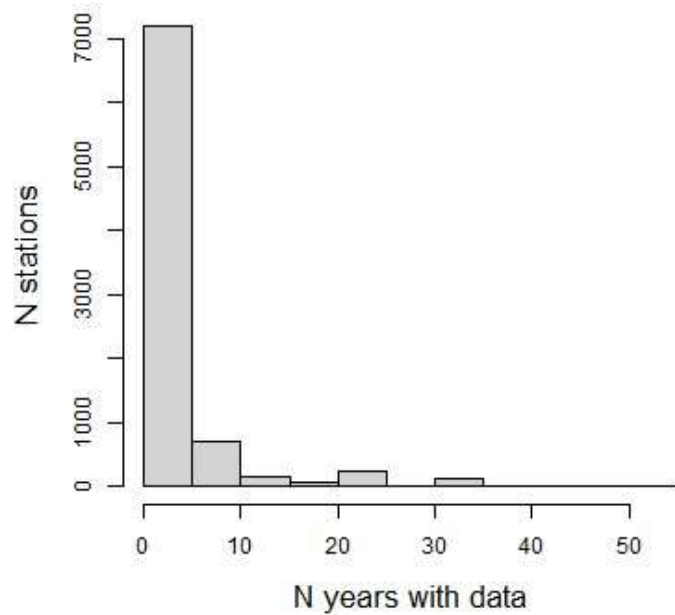
Three main purposes for WQP dataset

Each purpose has different data requirements and different criteria for station/data inclusion

- **Dynamic watershed model** calibration and verification
    - Raw constituent concentrations (for calibration)
    - Load estimation (for verification)

- **CalCAST** calibration
    - Load estimation

- **Other forthcoming applications** (e.g., Machine Learning project)
    - Retain as much data as possible (while flagging/fixing issues)

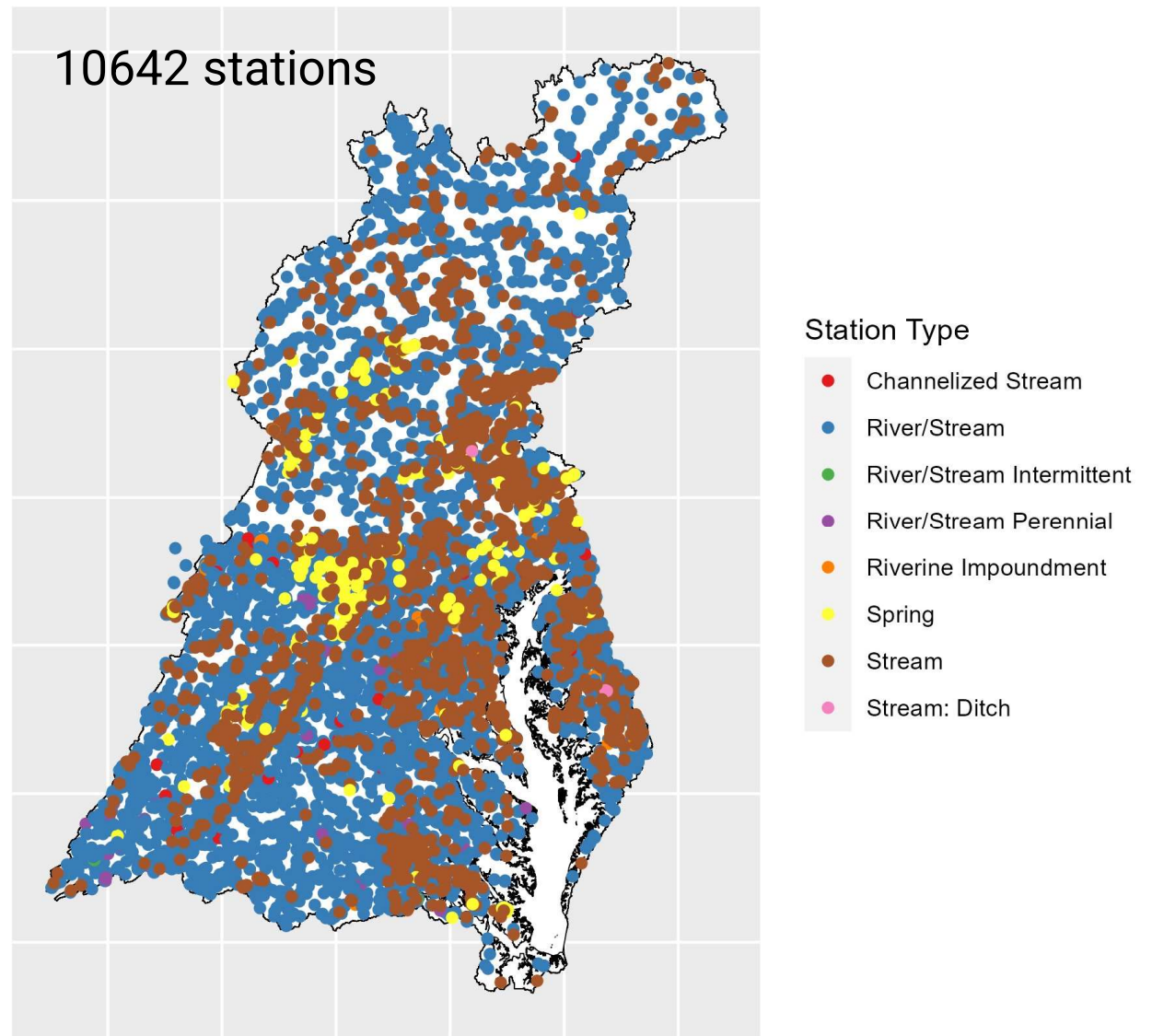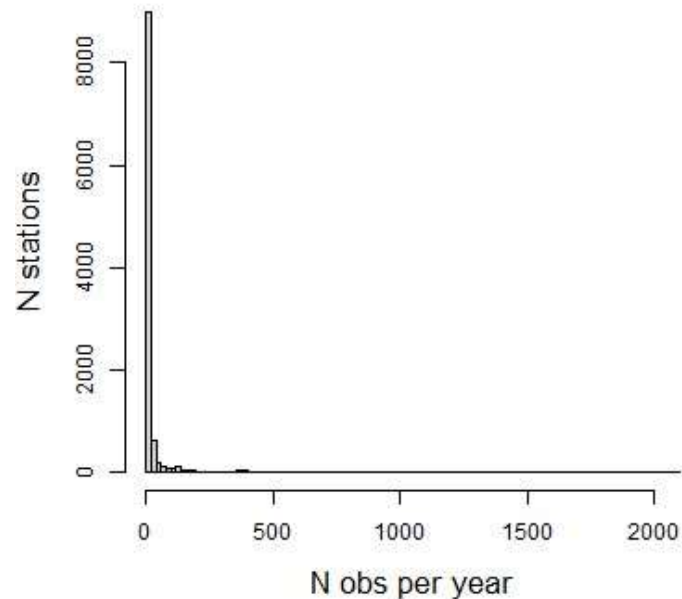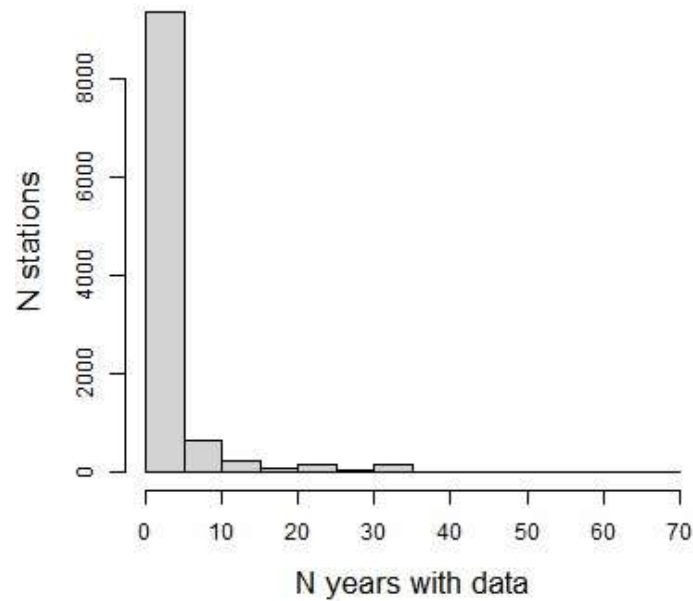# Monitoring stations with **N** and/or **P** data in the WQP
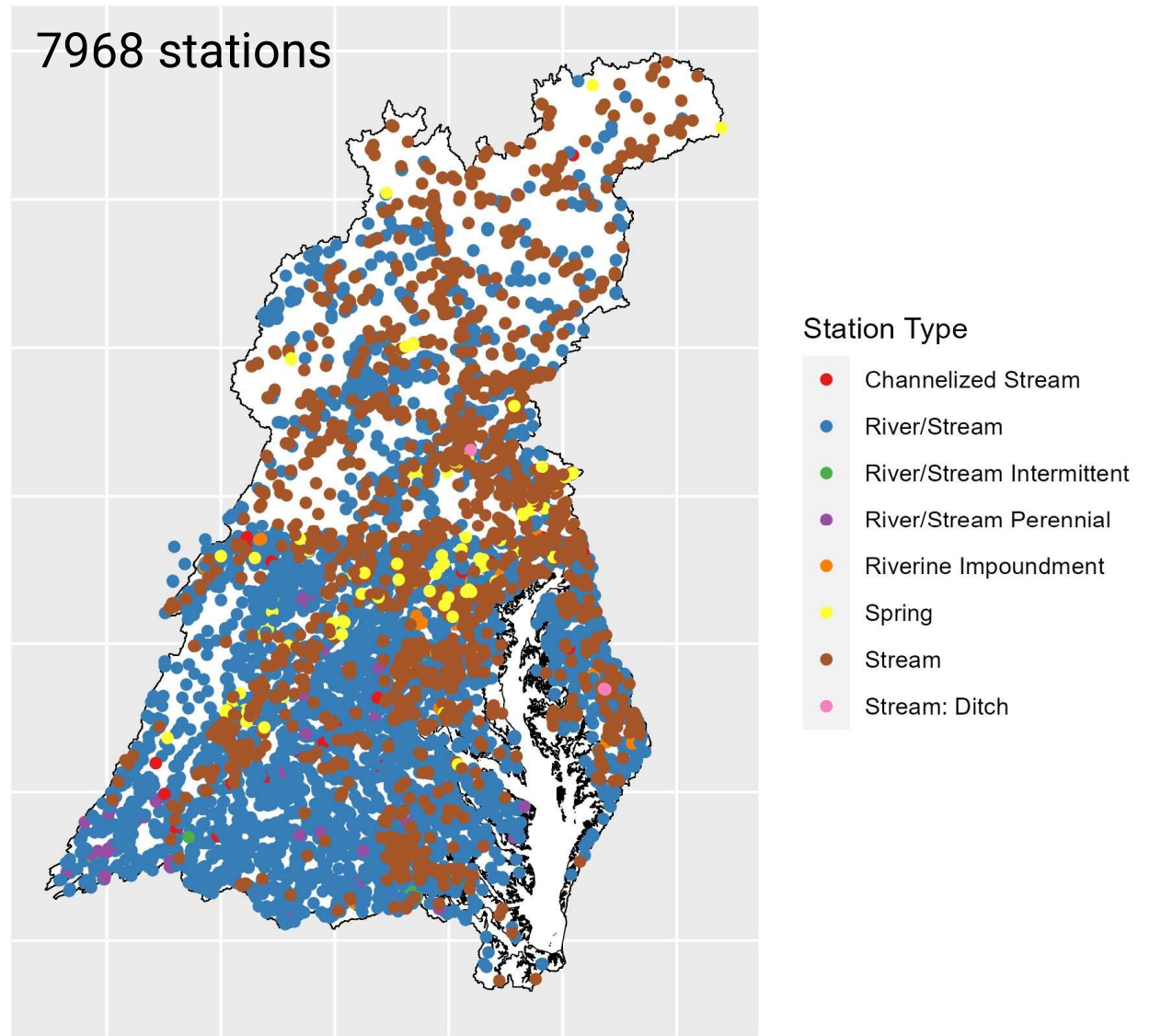

11692 stations

Station Type
- Channelized Stream
- River/Stream
- River/Stream Intermittent
- River/Stream Perennial
- Riverine Impoundment
- Spring
- Stream
- Stream: Ditch
- Stream: Tidal stream

Monitoring stations with processed **TN concentrations**

8464 stations

Station Type
- Channelized Stream
- River/Stream
- River/Stream Intermittent
- River/Stream Perennial
- Riverine Impoundment
- Spring
- Stream
- Stream: Ditch

Monitoring stations with processed **NO3 concentrations**

10642 stations

Station Type
- Channelized Stream
- River/Stream
- River/Stream Intermittent
- River/Stream Perennial
- Riverine Impoundment
- Spring
- Stream
- Stream: Ditch

Monitoring stations with processed **TP concentrations**

7968 stations

Station Type
- Channelized Stream
- River/Stream
- River/Stream Intermittent
- River/Stream Perennial
- Riverine Impoundment
- Spring
- Stream
- Stream: Ditch
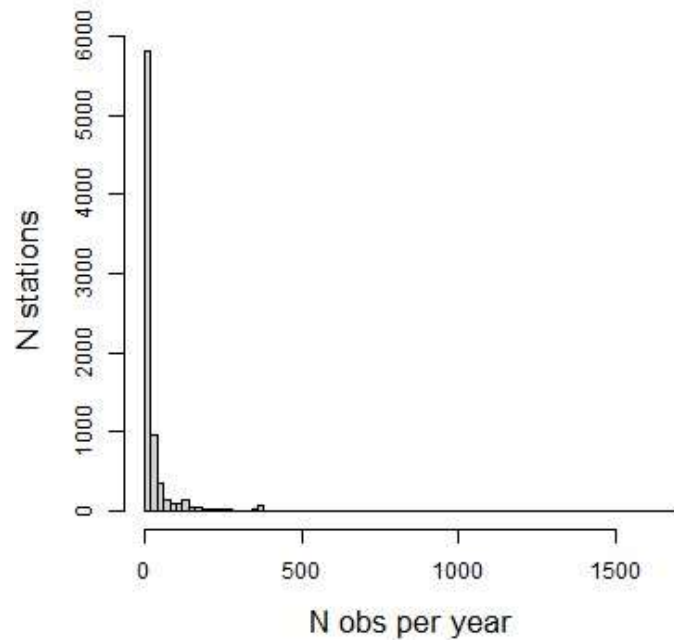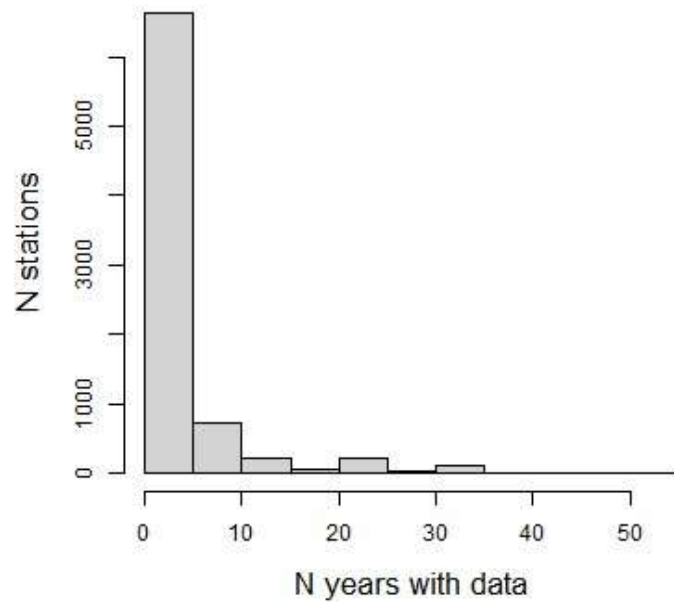
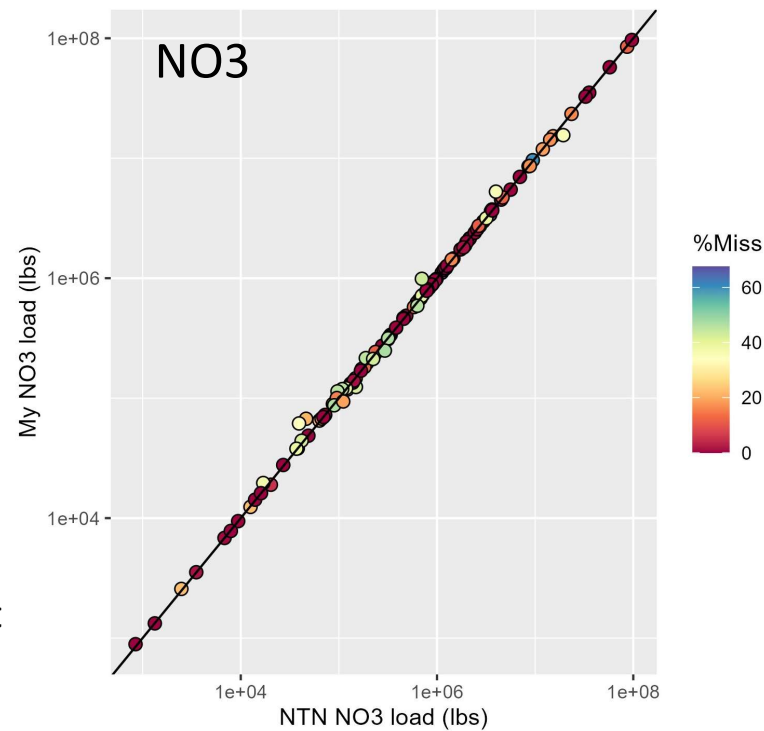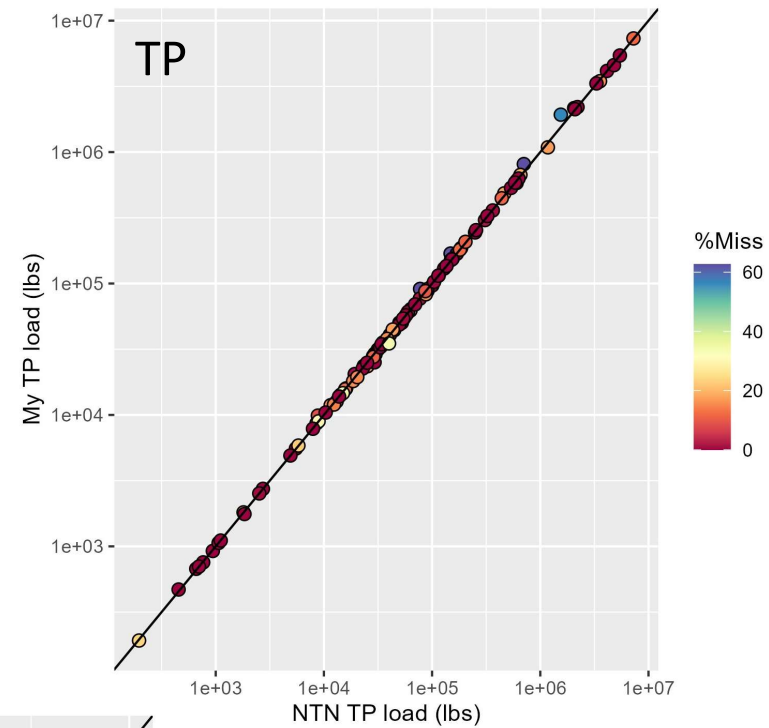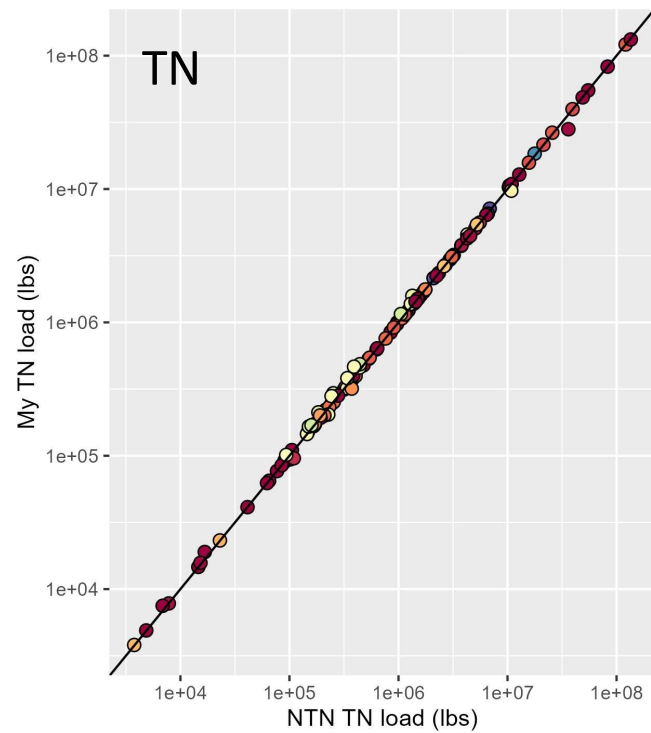# Monitoring stations passing criteria* for **TN load** estimation

264 stations

FM
WRTDS

N years
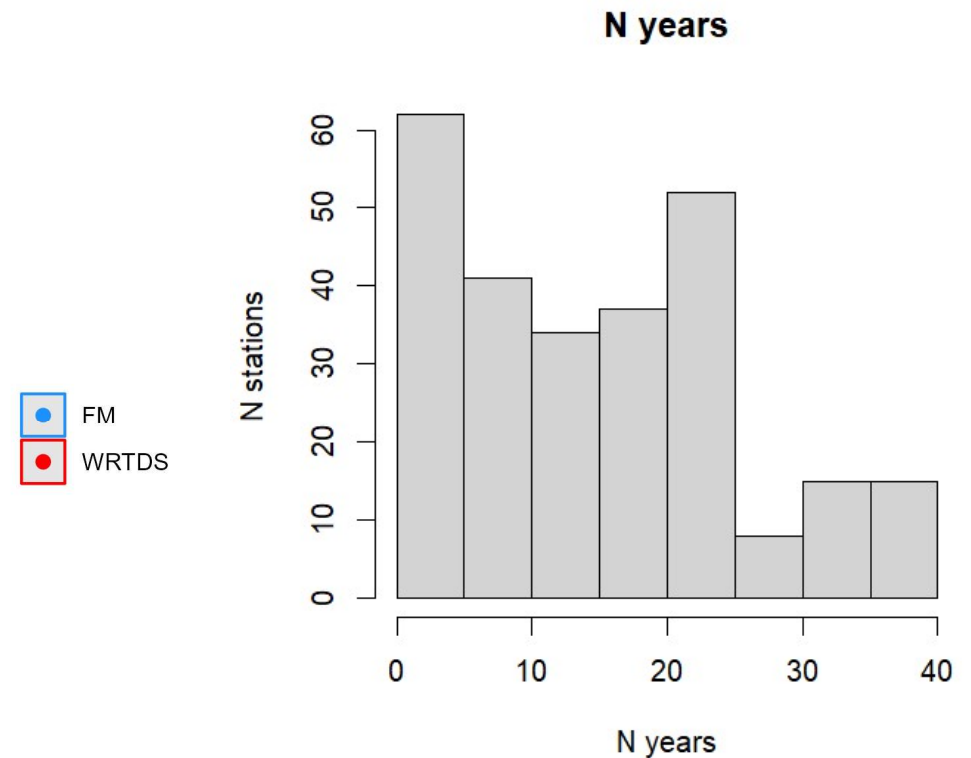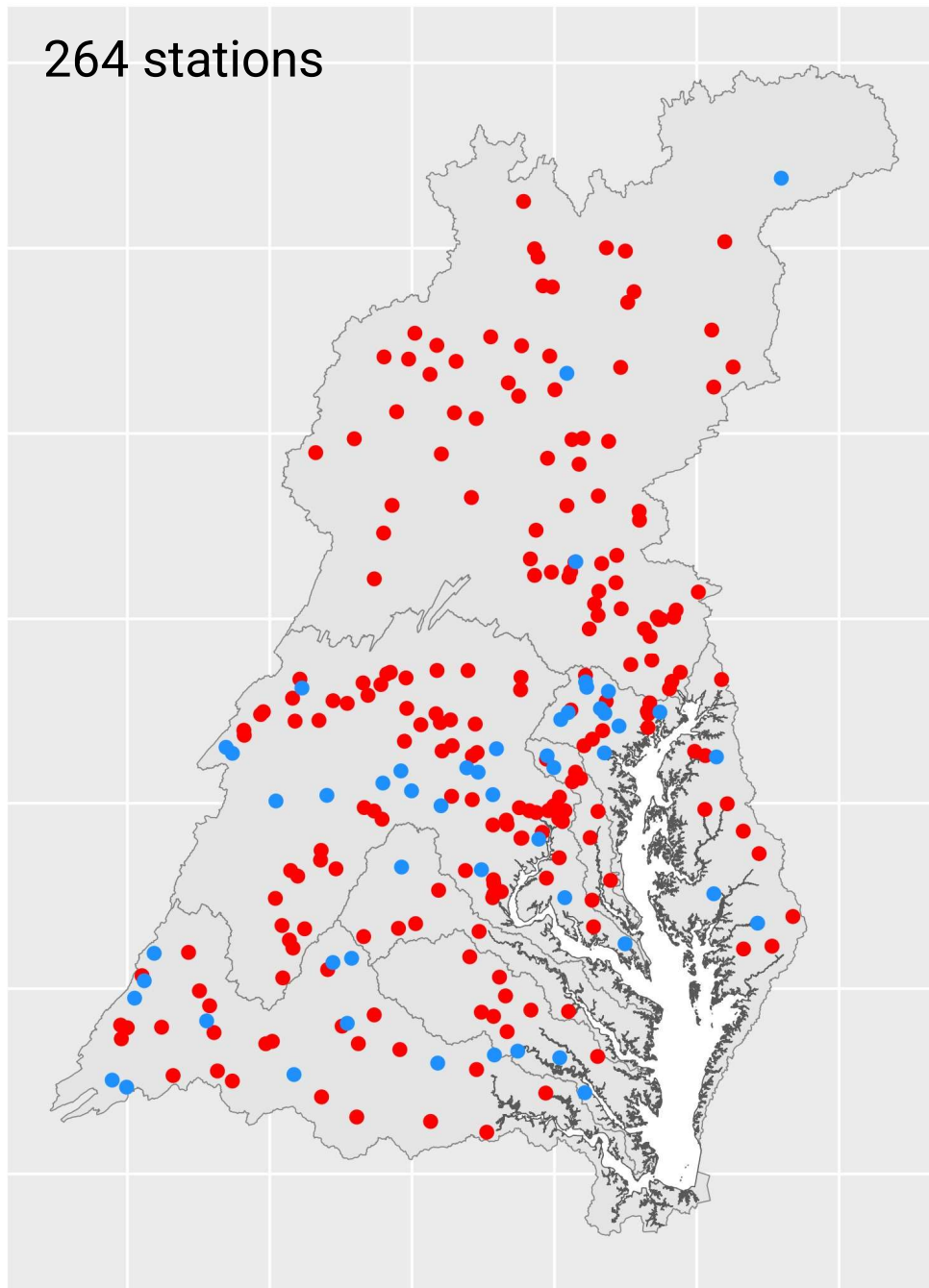
*For detailed FluxMaster (FM) and WRTDS criteria, see MWG October Quarterly Presentation

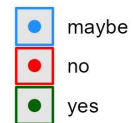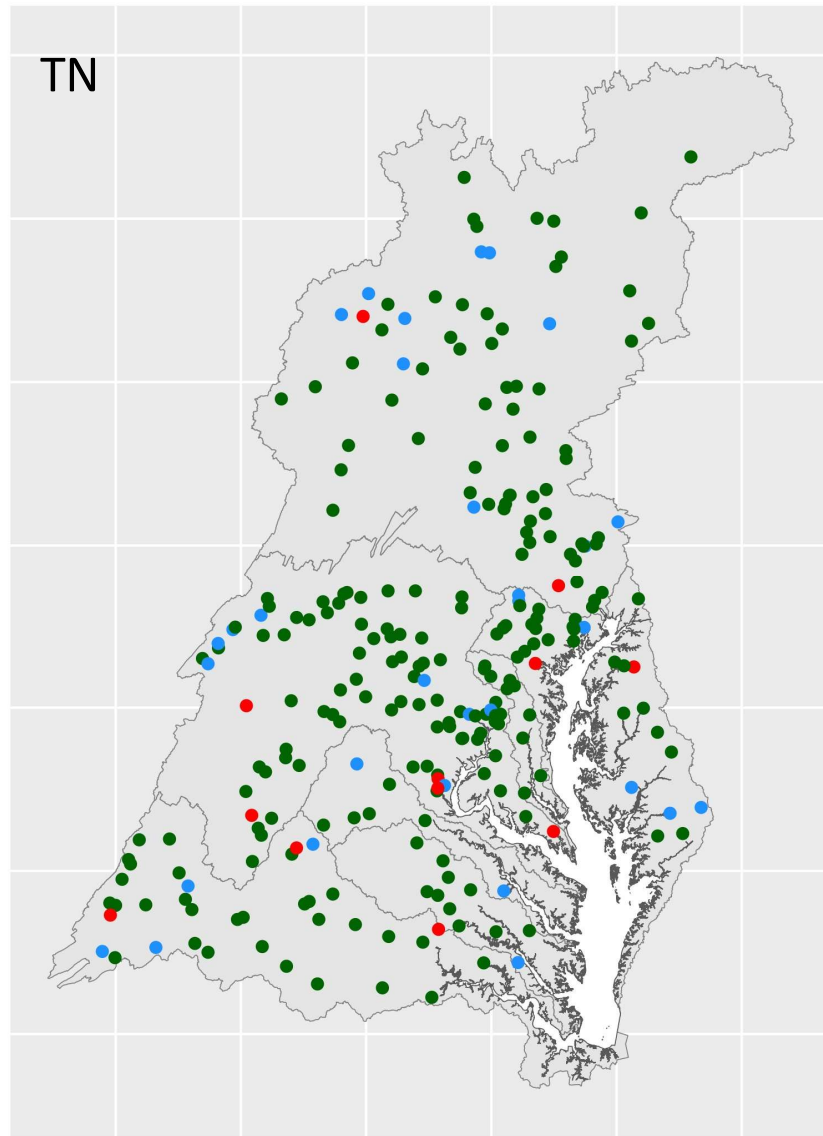# Monitoring stations passing criteria* for **TP load** estimation

265 stations

FM
WRTDS

N years

*For detailed FluxMaster (FM) and
WRTDS criteria, see MWG October
Quarterly Presentation
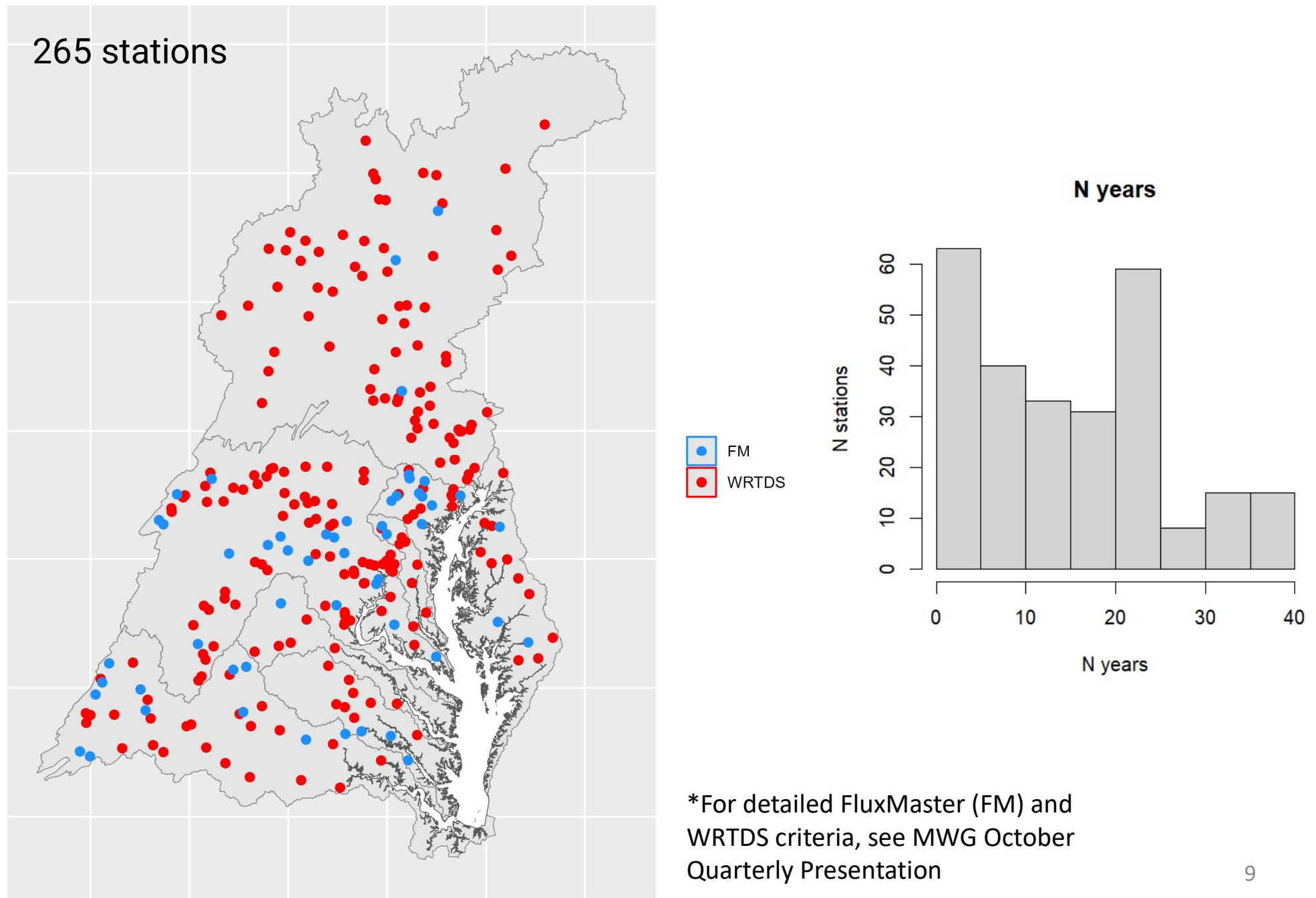
Average annual WRTDS load at NTN* stations – NTN vs WQP

%Miss: % of samples present in NTN dataset but missing from WQP

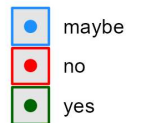***NTN**: CBP's Nontidal Network
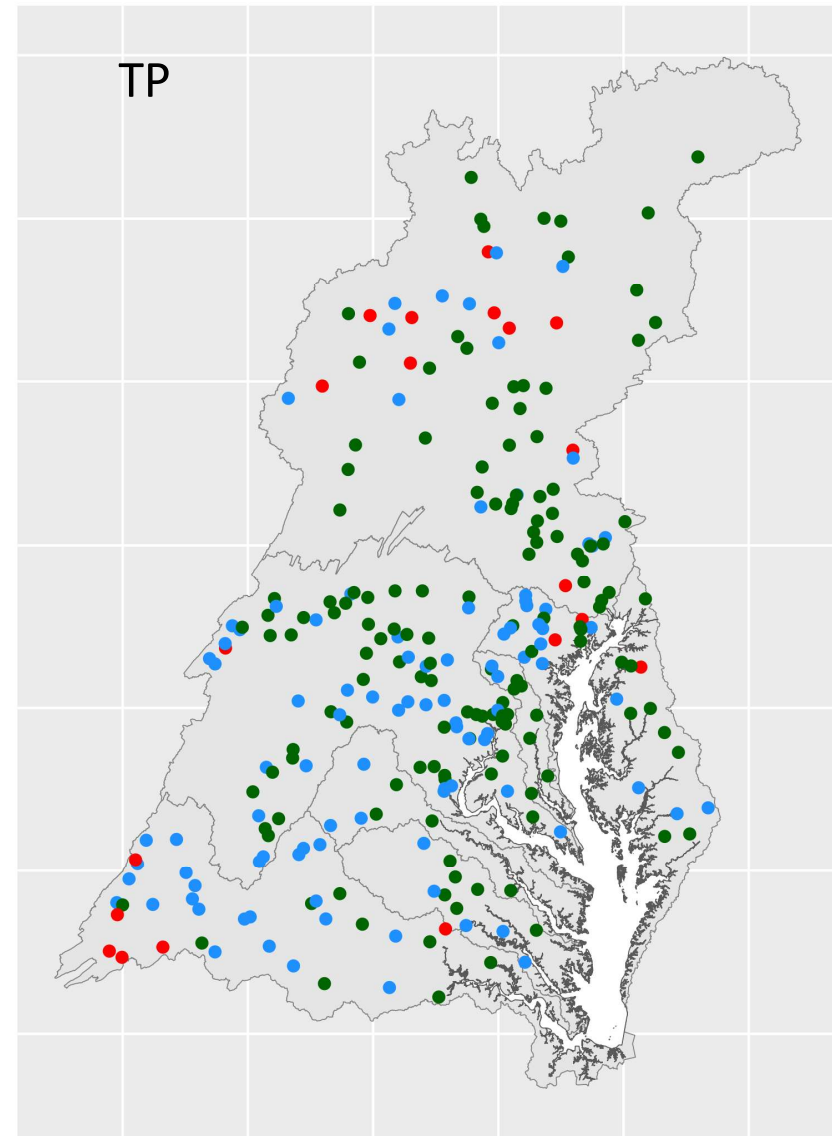https://www.usgs.gov/tools/geonarrative-nontidal-network-mapper

We estimated TN and TP loads using WRTDS at all stations

TN

TP

maybe
no
yes

Retain

Yes	221
Maybe	31
No	12

Retain

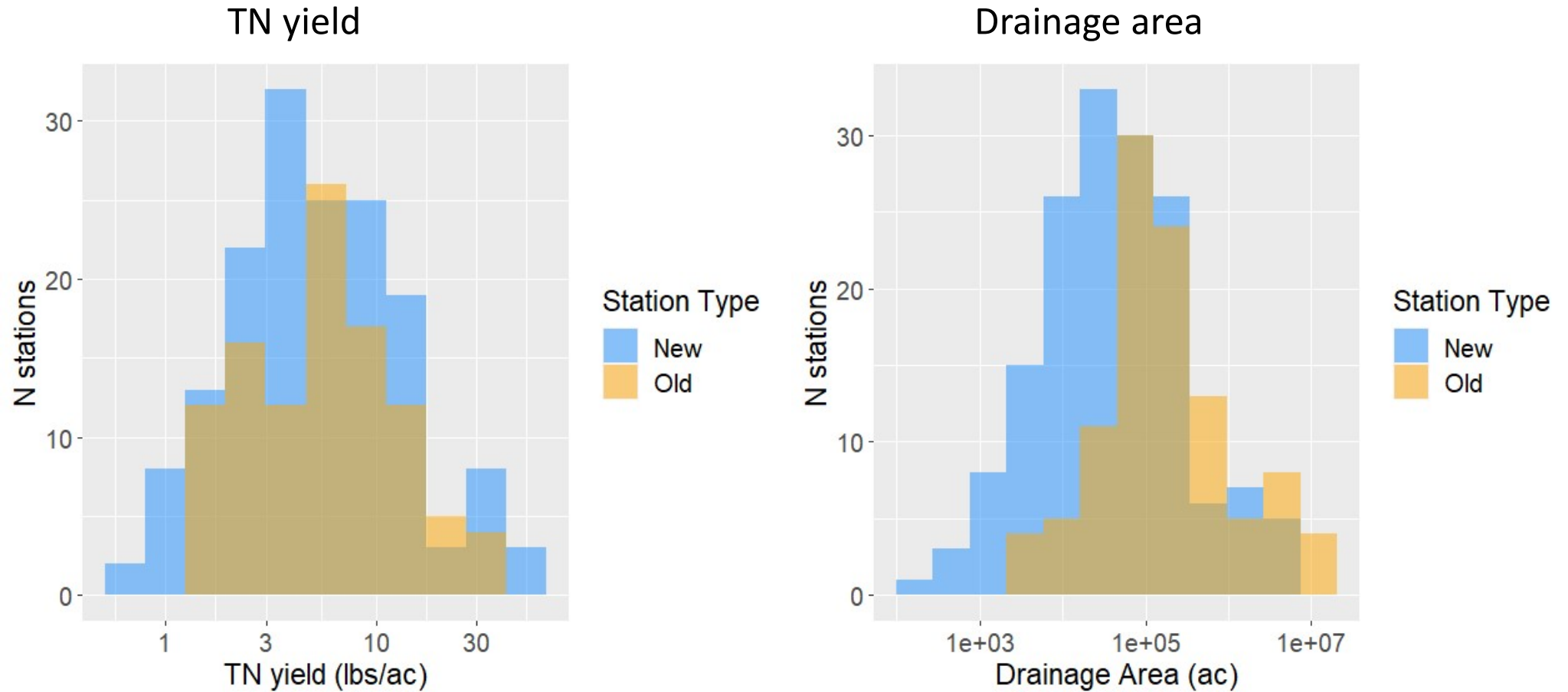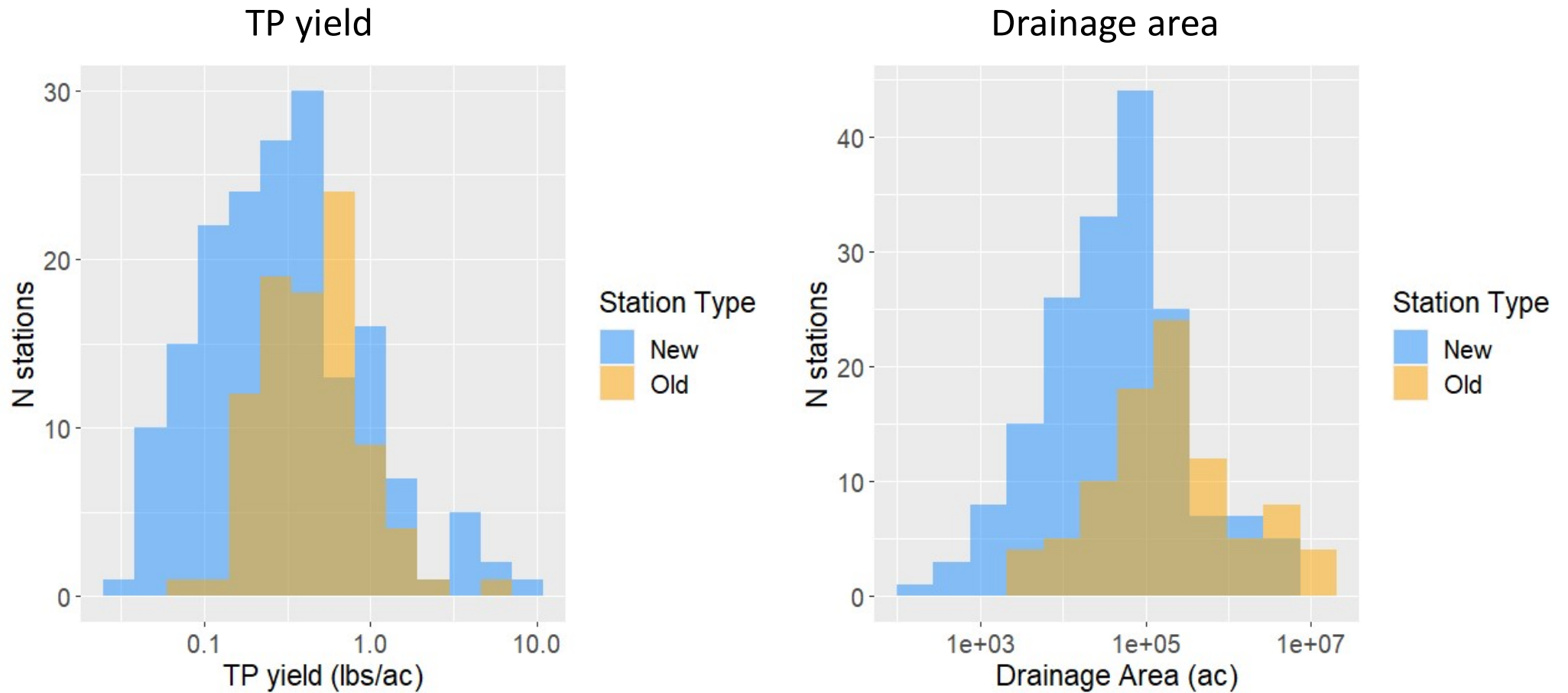|	
Yes	145
Maybe	100
No	20

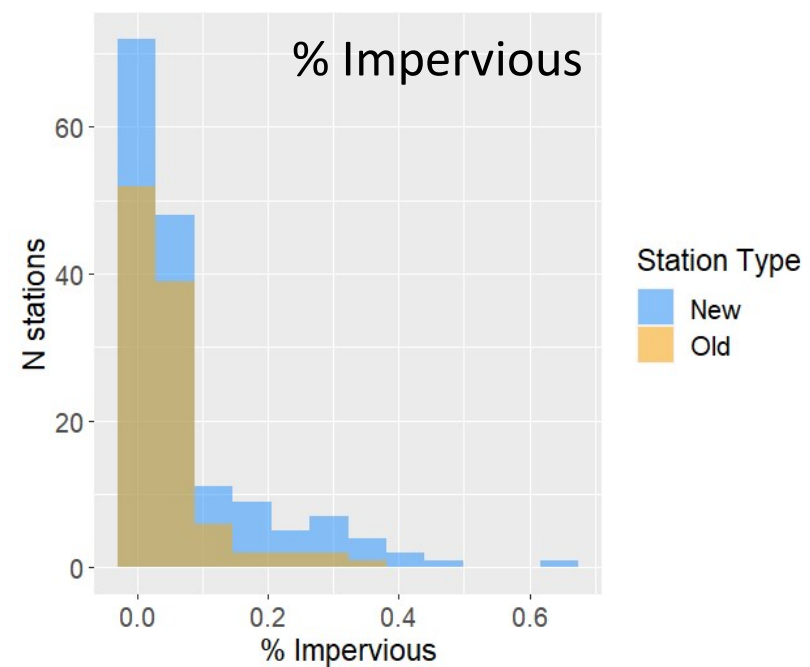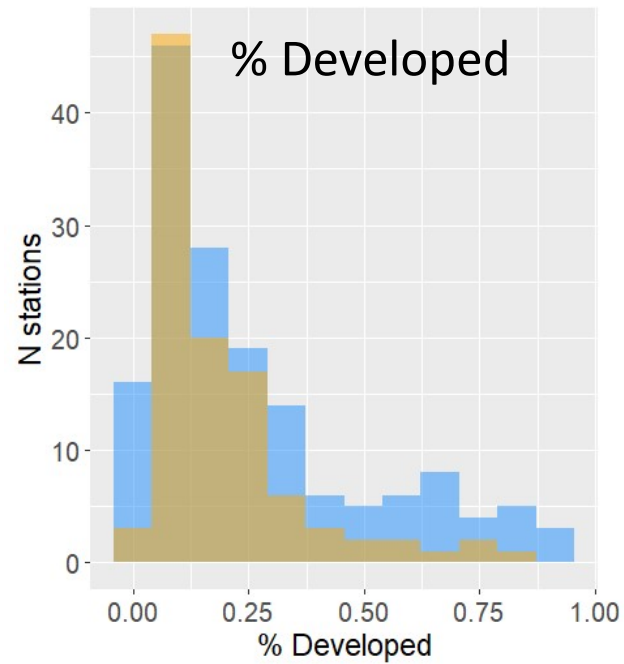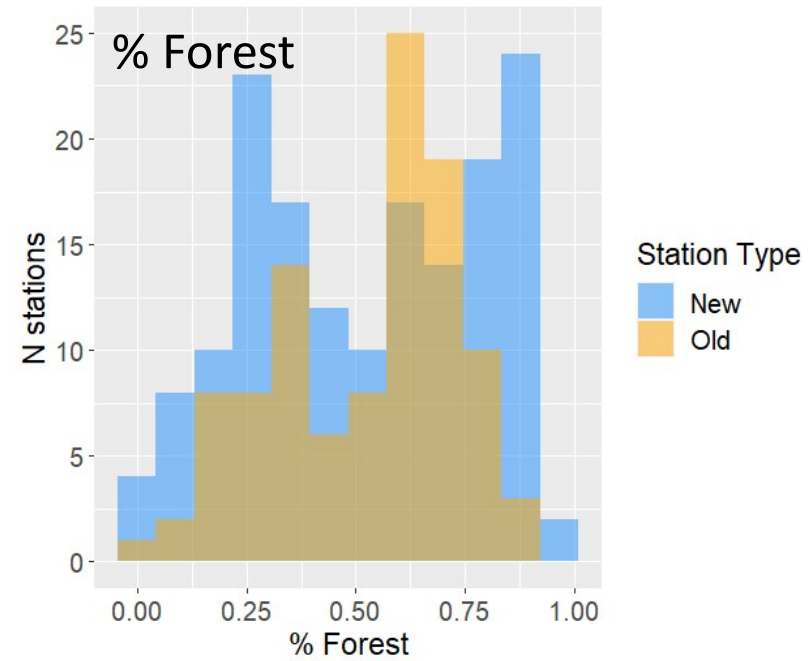# Monitoring stations passing criteria for load estimation – Average annual yield
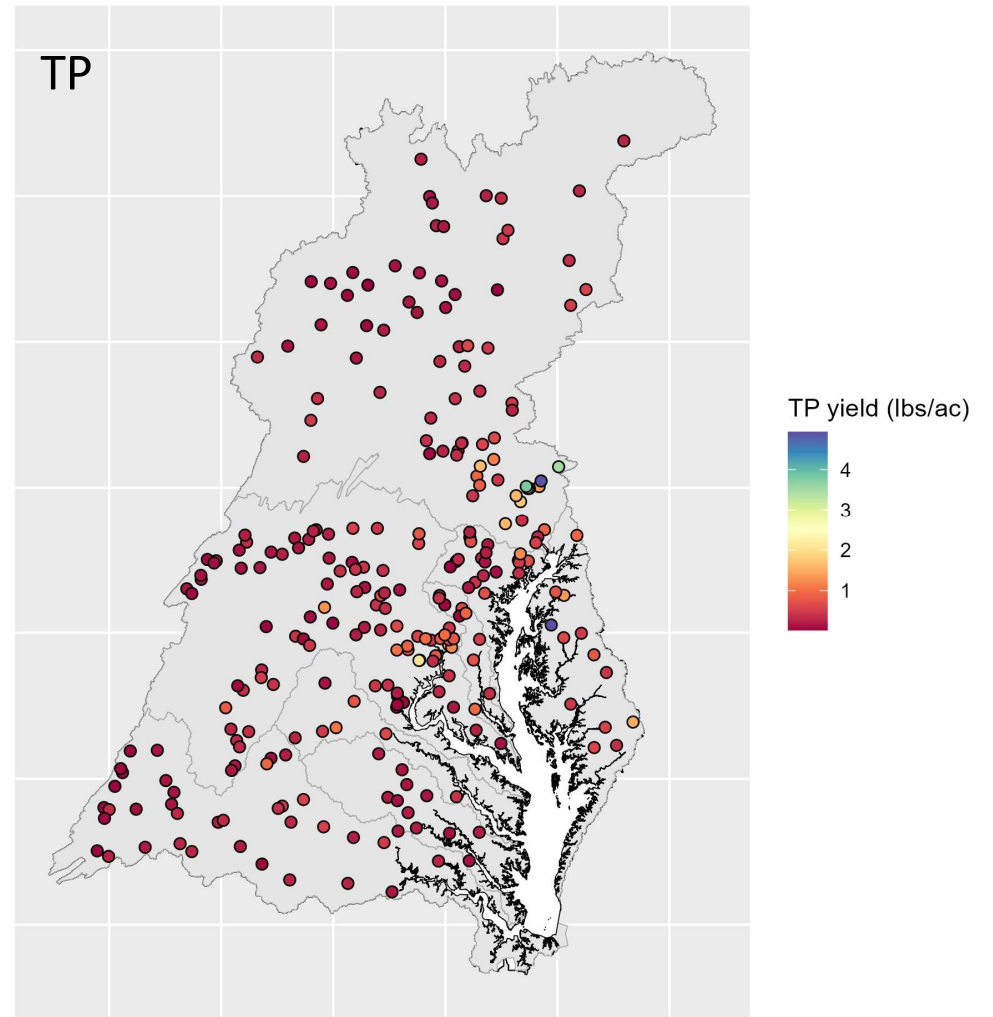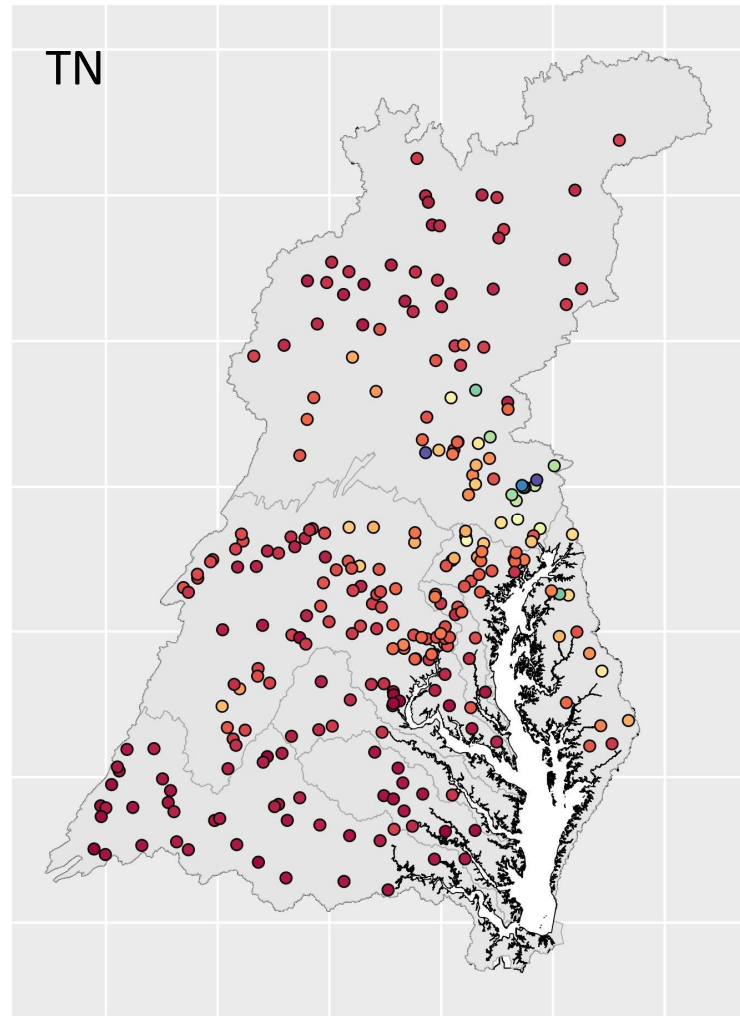
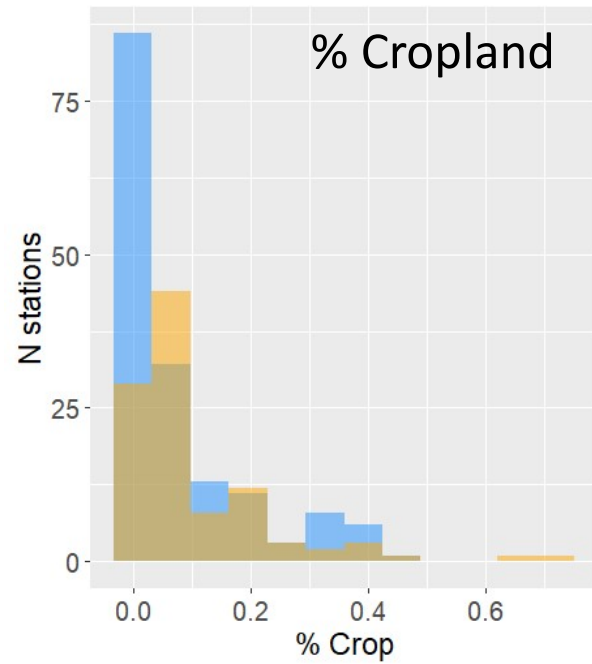# Variability in TN station characteristics

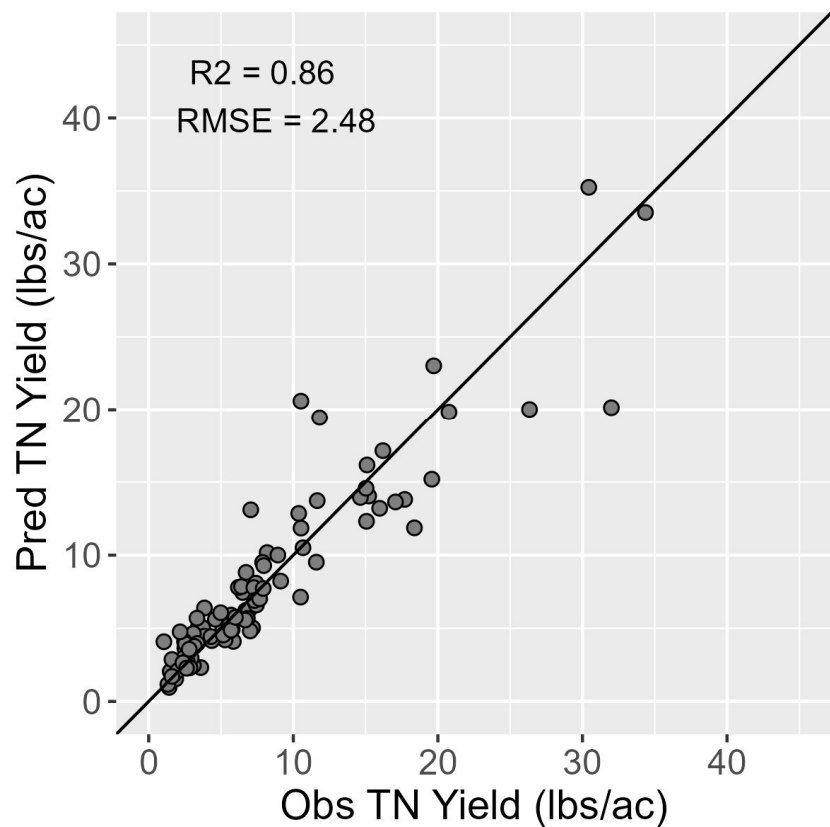# Variability in TP station characteristics

TP yield

Drainage area
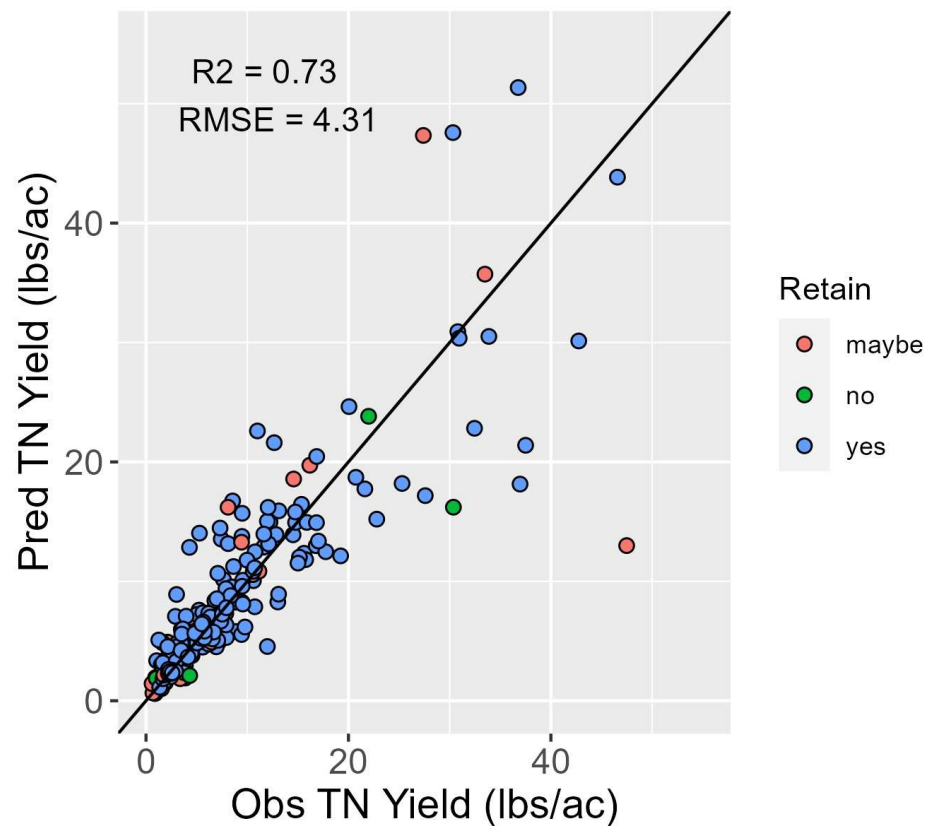
Variability in TN station land use

Total Nitrogen – Observed vs. Predicted

Average annual TN CalCAST

Old calibration dataset (NTN stations)

Expanded calibration dataset

Next Steps

- Work on improving CalCAST model performance with new calibration datasets (both average annual and annual)

- Process sediment data

- Finalize data processing workflow and prepare documentation

- Ask Monitoring Agencies to provide feedback and fill in data gaps

- Re-do data pull and processing in 2025