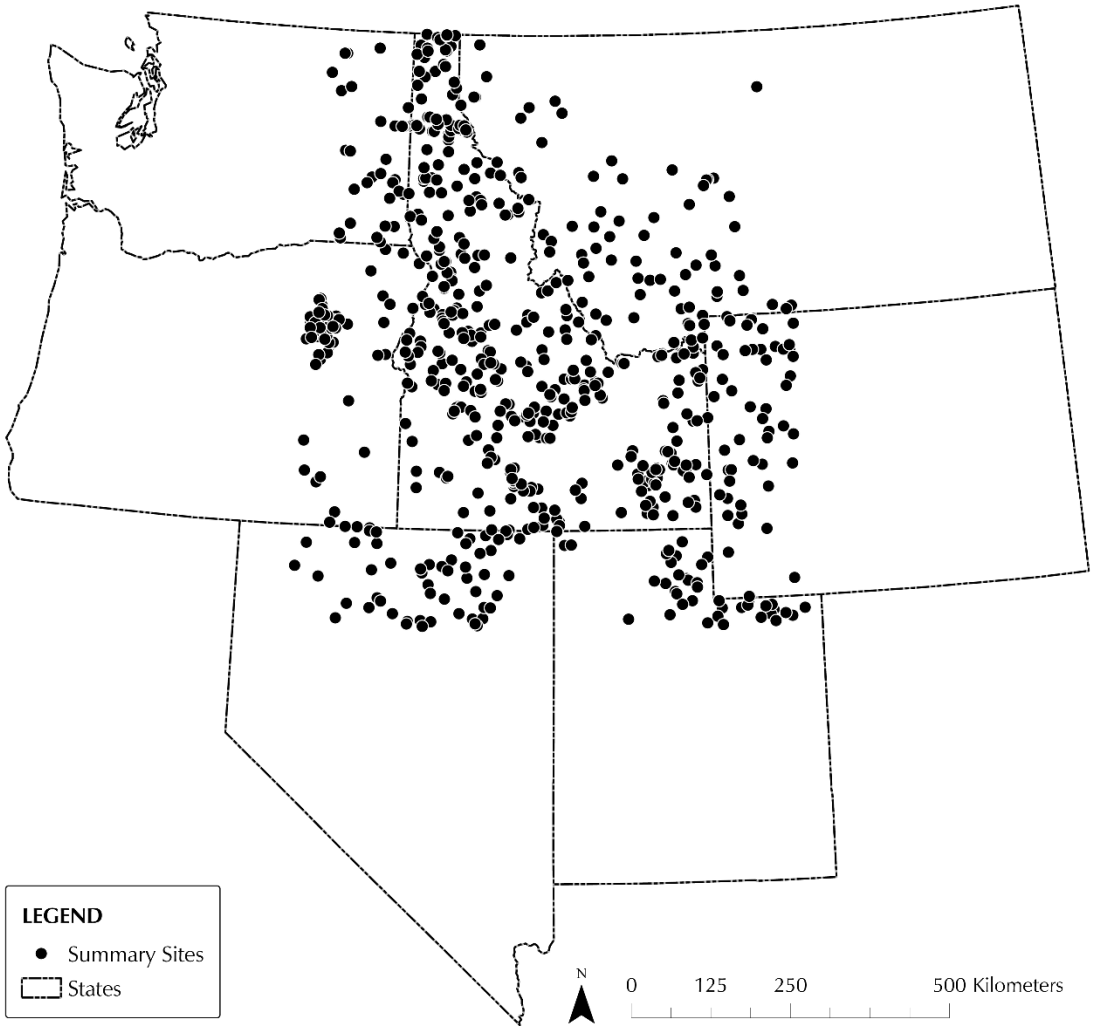
N-STEPS in Idaho

Goal

- Develop numeric interpretation of Idaho's narrative criterion:
  - *Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses.*

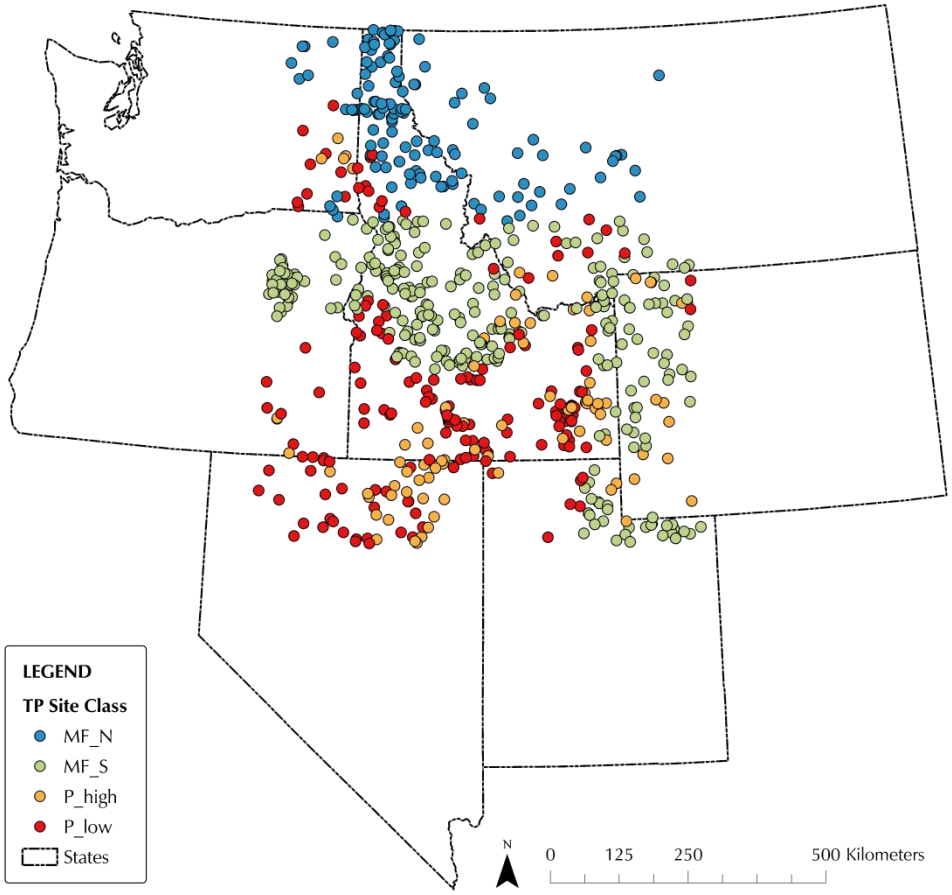
Approach

- Identify stream site classes that reduce natural variability in nutrient data (ecoregional groupings)
- Assign streams to site classes
- Reference condition approach
  - Define thresholds using distribution of TN and TP at minimally disturbed sites
- Stressor-response approach
  - Correlation analysis, regression interpolation, and change point analysis
    - what concentrations lead to changes in diatom community
    - Use many different diatom metrics
- Use stream aesthetic ratings to evaluate protectiveness of potential nutrient thresholds

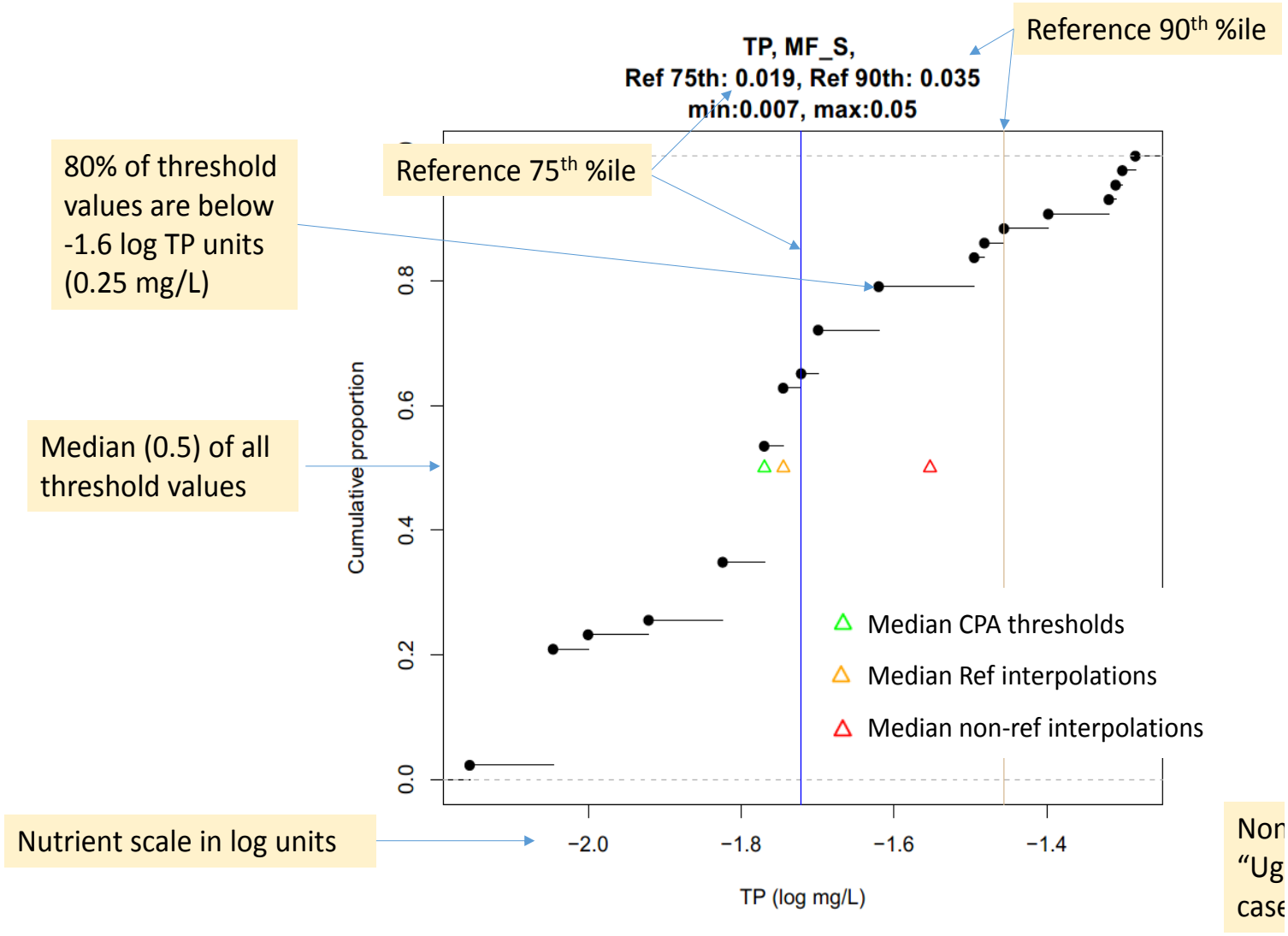


- 724 sites with nutrient data
- 535 sites with diatom data
- Data sources:
  - ID DEQ
  - EMAP-W
  - NAWQA-NWIS
  - NRSA
  - Cao et al. 2007
  - USGS

Site Class - TP



Results


TP, MF_S,
Ref 75th: 0.019, Ref 90th: 0.035
min:0.007, max:0.05
Reference 90th %ile
Reference 75th %ile
80% of threshold values are below -1.6 log TP units (0.25 mg/L)
Median (0.5) of all threshold values
Nutrient scale in log units
Cumulative proportion
0.0
0.2
0.4
0.6
0.8
−2.0
−1.8
−1.6
−1.4
TP (log mg/L)
Median CPA thresholds
Median Ref interpolations
Median non-ref interpolations

Results

TP	MF_N	MF_S	P_high	P_low
Reference Distribution 75th	**0.011**	**0.019**	**0.025**	**0.046**
Reference Distribution 90th	0.015	0.035	0.033	0.082
Median CPA	**0.013**	**0.017**	0.043	**0.049**
Median Reference Regr. Interp.	0.004	**0.018**	0.017	0.131
Median non-reference Regr. Interp.	0.017	0.028	0.061	0.076
Potential Threshold Range	0.011-0.013	0.017-0.019	0.025	0.046-0.049

TN	North	S_hi_E	S_hi_W	S_low
Reference Distribution 75th	**0.15**	**0.38**	**0.22**	0.58
Reference Distribution 90th	0.26	0.45	**0.24**	0.81
Median CPA	0.76	**0.31**	**0.13**	1.29
Median Reference Regr. Interp.	**0.14**	**0.30**	**0.14**	na
Median non-reference Regr. Interp.	1.04	1.55	0.44	na
Potential Threshold Range	0.14 - 0.15	0.30 – 0.38	0.13 - 0.24	0.58 - 0.81