



NUTRIENT ASSESSMENTS USING NARRATIVE CRITERIA IN NEW MEXICO

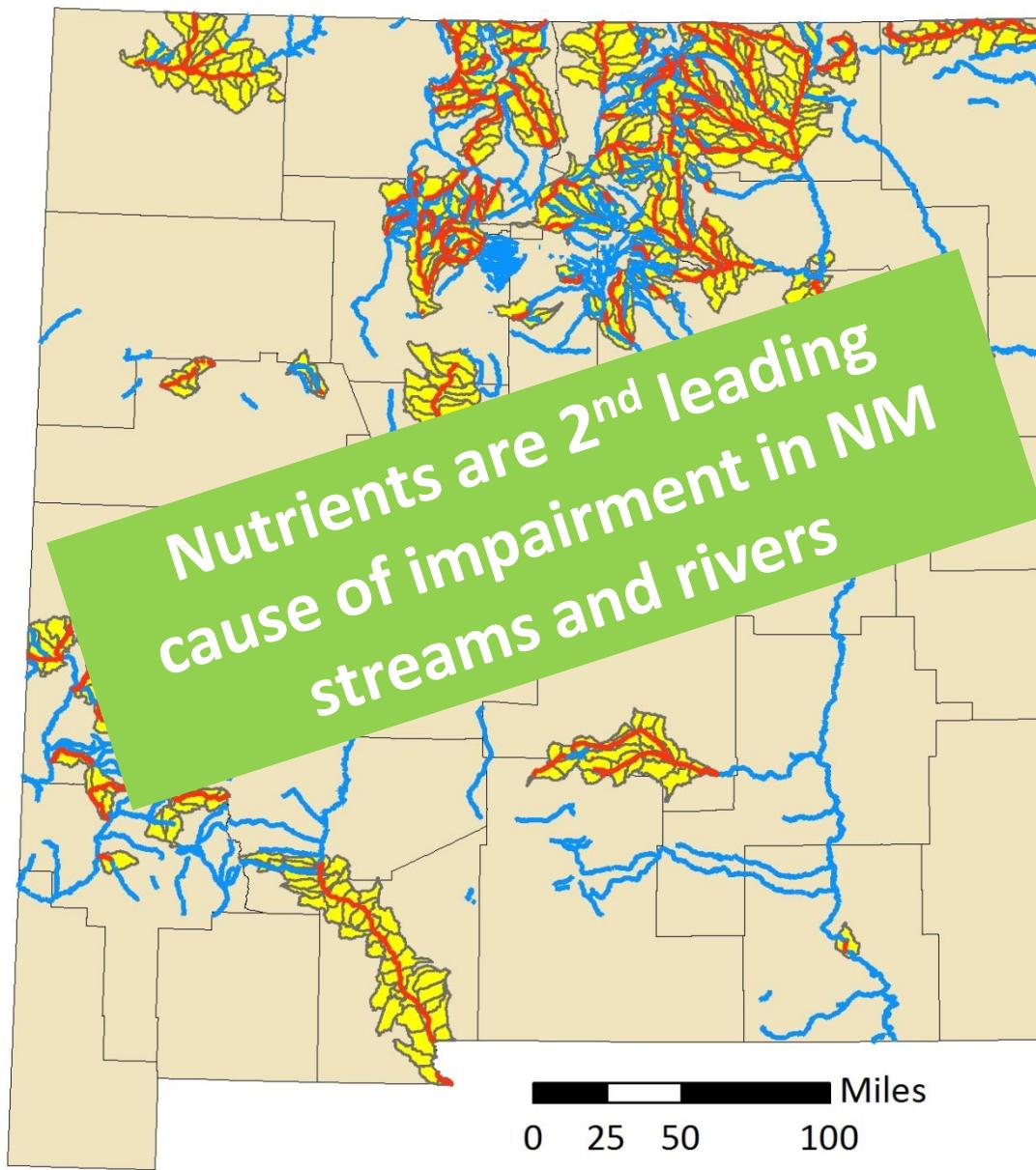
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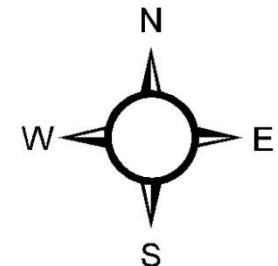
Watershed Priorities

New Mexico Environment Department



Legend

- Impaired Streams
- Assessed Waters
- Priority Watersheds
- County



NM's Narrative Nutrient Standard

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“Plant nutrients from other than natural causes shall not be present in concentrations which will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.”



The question is, how to assess for attainment of this standard and define *quantifiable endpoints*.



New Mexico Stream Work to Date

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- In 2004 developed a weight of evidence nutrient assessment protocol for wadeable, perennial streams using threshold values for both cause (TP & TN) and response (Chlorophyll and DO) variables.
- The thresholds used by SWQB were the 50th quantiles of all sites grouped by ecoregion and aquatic life use with no link to use impairment or definition of “natural” conditions.
- The TN and TP thresholds were frequently exceeded at sites with little human activities in the watershed and therefore did not provide an effective filter for identifying Impairment.



Refinement of Nutrient Thresholds

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To address these issues, in 2013 NMED in cooperation with EPA and a contractor began a project to refine NM's nutrient thresholds using stressor response analyses and defined reference conditions and site classes.

The Project included the following steps:

- Compile Data
- Identify Reference Sites
- Classify Sites
- Analyze Nutrient Value Distributions
- Conduct Stressor-Response Analysis
- Synthesize Resulting Thresholds

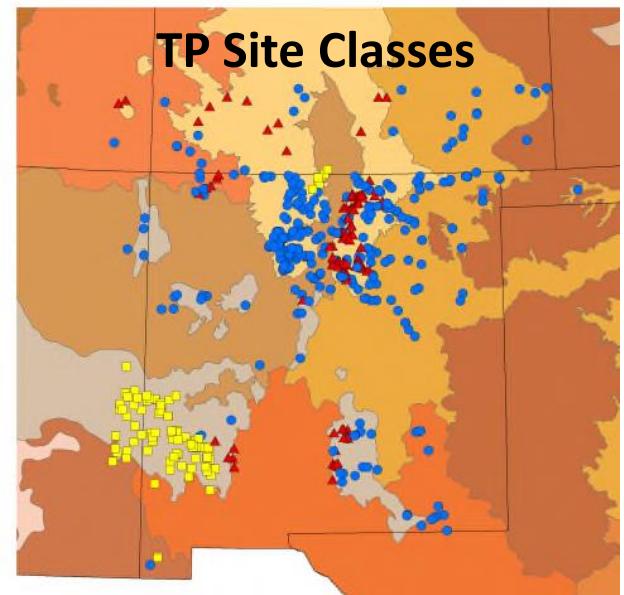
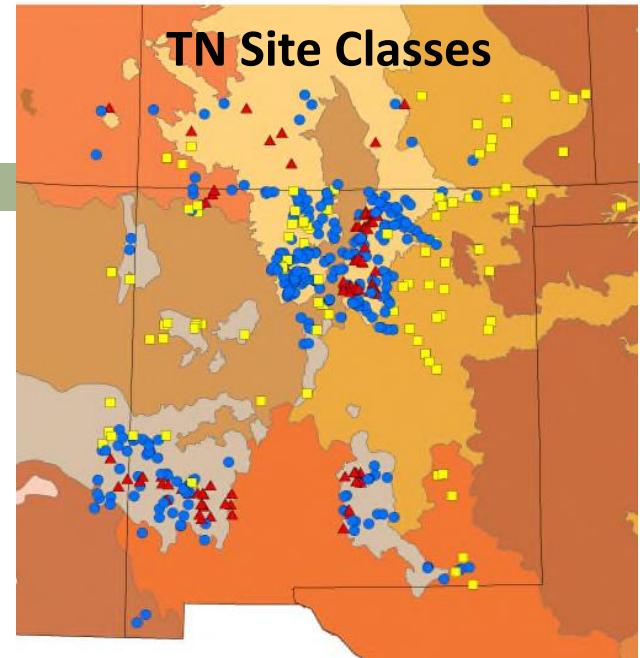


Nutrient Site Classes

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Classification and Regression Tree (CART) models resulted in the following nutrient site classes:

- Both Phosphorus and Nitrogen values were partitioned by longitude and average land slope (**flat, moderate, steep**)
- TP longitude split driven by **high background TP** in soils



Stressor-Response Analysis

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Benthic chlorophyll *a* only showed significant correlation with one TP site class. The strength of chlorophyll relationships does not support its continued use as a response variable in stream assessments



O₂

Dissolved oxygen metrics significantly correlated to TP, benthic chlorophyll *a*, Pmax, Rmax, & GPP. Thresholds for this metric showed the best division between the site classes.



NM Stressor-Response “Translators”

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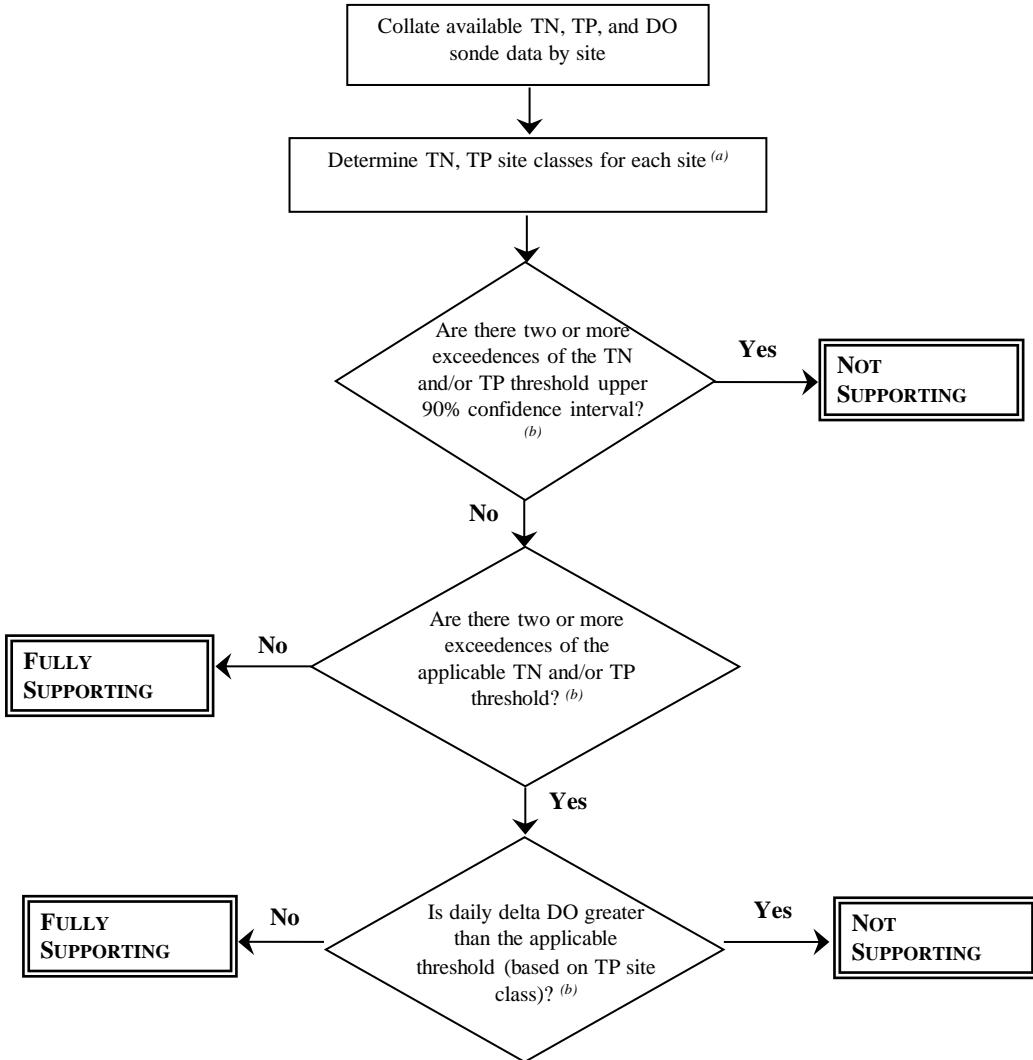
	TN (mg/L)			TP (mg/L)		
	Flat	Moderate	Steep	High-Volcanic	Flat-Moderate	Steep
Thresholds	0.65	0.37	0.30	0.084	0.061	0.03
Upper 90% CI	0.85	0.51	0.34	0.114	0.069	0.053
Daily delta DO threshold (mg/L)	-	-	-	5.02	4.08	1.79

- Thresholds (i.e., “numeric translators”) represent nutrient conditions above which, “...produce undesirable aquatic life or result in a dominance of nuisance species...”
- Protective of stream and scientifically defensible!



2017 Nutrient Listing Methodology

<https://www.env.nm.gov/surface-water-quality/calm/>



- Incorporates the new, more robust thresholds
- Removes chlorophyll as response variable
- Uses bioconfirmation approach (i.e., nutrient enrichment with a concurrent response) with DO variable.



2018-2020 CWA 303(d) List

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- 2018-2020 CWA 303(d) List primarily addresses the Canadian River and Dry Cimarron River watersheds.
- Seven new nutrient listings for Canadian and Dry Cimarron watersheds using 2017 CALM.
- IR Categories 4 & 5 - 18 nutrient impaired streams. 12 impaired lakes/reservoirs. No nutrient CALM for large rivers yet.



Nutrient Thresholds and TMDLs

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- To date, New Mexico has developed 39 plant nutrient TMDLs and assigned WLA to 11 NPDES permitted facilities.
- TN and TP are co-limiting in New Mexico streams and TMDLs are developed with both TN and TP limits.
- TMDLs are written to nutrient threshold targets that are protective of the stream and scientifically defensible.



In Summary...

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- There are reasonable and effective ways to monitor and assess a stream for nutrients.
- NM's approach provides a robust methodology to confidently assess standards attainment in our surface waters.
- TMDLs should be written to nutrient targets/thresholds that are protective of the stream and scientifically defensible.
- Implementation of TMDLs through the permit process should be flexible such that treatment improvements are required but there is a recognition of the limits of technology for nutrient treatment.
- NM is beginning the process of implementing the recently approved Temporary Standards process to aid in nutrient TMDL implementation



Questions?

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Canadian River, 2016



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www.env.nm.gov/surface-water-quality/