

New Mexico's Approach to Nutrient Impairments and TMDLs

Heidi Henderson
New Mexico TMDL Coordinator
April 26, 2011



*New Mexico Environment Department
Surface Water Quality Bureau*



New Mexico's current Nutrient Standard states:

“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.”



*New Mexico Environment Department
Surface Water Quality Bureau*



Development of Numeric Translators

- First, EPA compiled national nutrient data, divided by waterbody type, grouped into nutrient ecoregions, and published recommendations.
- Second, USGS staff created a regional dataset for NM using regional data from STORET, USGS, and SWQB. Threshold values were calculated using EPA methods and the median for each Level III Ecoregion.
- In 2004-2005, SWQB produced nutrient threshold values for streams based on ecoregion and aquatic life use. The AP for nutrient assessment of lakes was drafted in 2010.

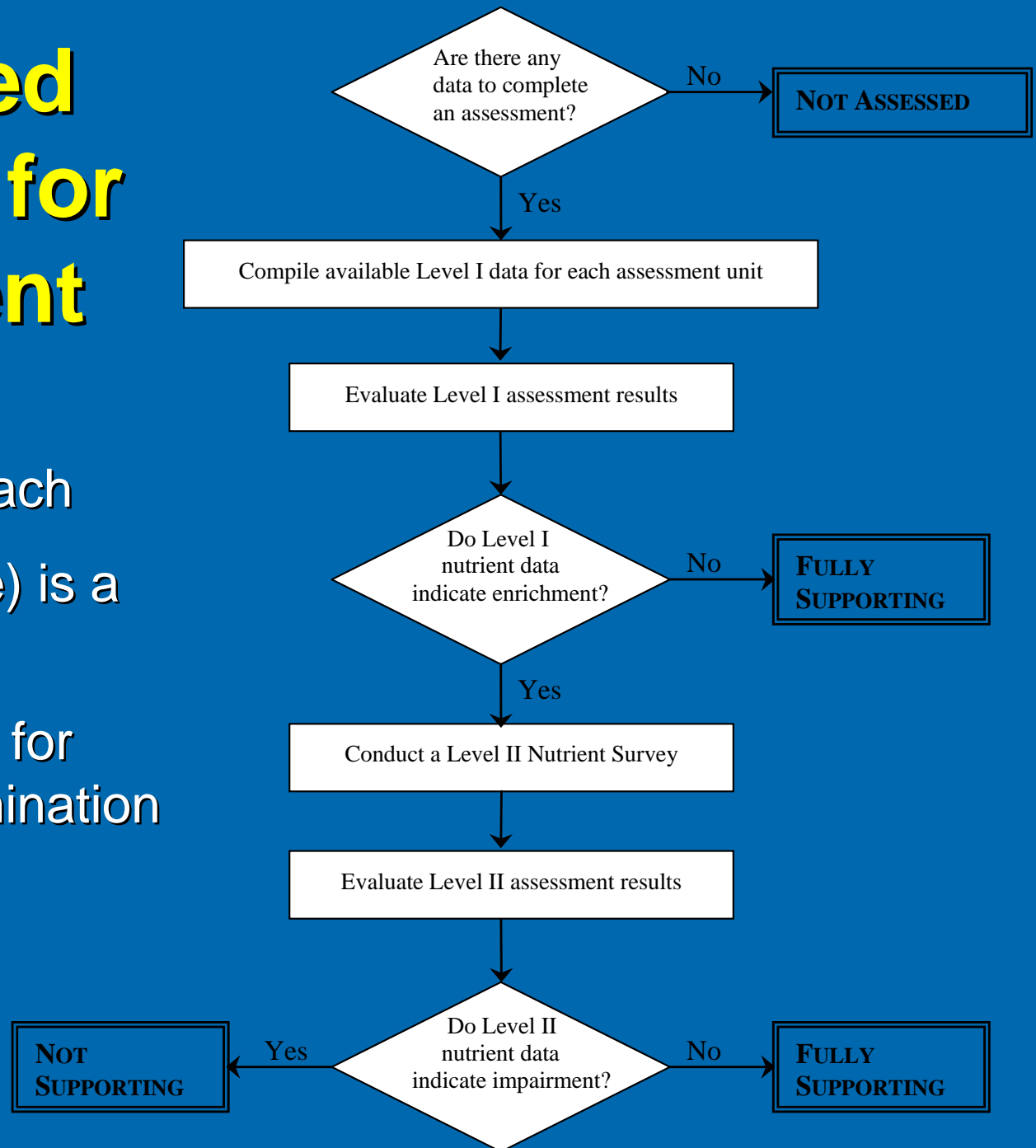


*New Mexico Environment Department
Surface Water Quality Bureau*



Generalized Flow Chart for Assessment

- Two-Tiered Approach
- Level 1 (qualitative) is a screen
- Level 2 is required for impairment determination



Nutrient Assessment

Weight-of-Evidence Approach is used:

- to strengthen the ASSESSMENT
- to account for various situations, such as:
the rapid assimilation of TN and TP by autotrophs and/or exceedences due to suspended solids during peak flows

Threshold values used in assessment are derived from water quality standards, SWQB analyses, or published literature.



*New Mexico Environment Department
Surface Water Quality Bureau*



NM's indicators of nutrient enrichment:

Indicator	Streams	Lakes	Rivers
Nutrient Concentrations	X	X	X
Dissolved Oxygen (mg/L)	X	X	X
DO % Local Saturation	X		
% DO profile below criterion		X	
Ave. Diurnal DO Flux			X
pH	X		
Secchi Depth		X	
Chlorophyll <i>a</i> Concentration	X	X	X
Algal Productivity	X		
% Bluegreen Algae		X	
% Algal Cover	X		X

TMDL Development

- NM writes Nutrient TMDLs that address causal variables (phosphorus and nitrogen)
- TP and TN targets are set to ecoregion – aquatic life use thresholds or to a value that is proven effective at maintaining the integrity of the waterbody
- WLA calculated as a percentage of the TMDL
 - Often times WLA is well below what is technologically feasible because NM doesn't have much water for dilution



*New Mexico Environment Department
Surface Water Quality Bureau*



Evolution of SWQB Process: Case Studies

- Rio Ruidoso – 2005
- Mora River – 2007
- Cieneguilla Creek (Angel Fire) – 2010



*New Mexico Environment Department
Surface Water Quality Bureau*



Rio Ruidoso

Based on 2003 data, Rio Ruidoso was determined impaired for nutrients.

Rio Ruidoso was co-limiting so TMDL addresses TP and TN.

4Q3 = 1.183 cfs (0.765 mgd)



Based on the data, phosphorus loading from the WWTP was approximately 30X the level that it should have been; nitrogen loading from the WWTP was 15X the appropriate level.

In-stream targets were set to:

0.1 mg/L for TP and 1.0 mg/L for TN

Rio Ruidoso – *continued*



The Rio Ruidoso in 2008



The Rio Ruidoso Today

Effluent limits based on the WLA were set to in-stream targets:
0.1 mg/L for TP and 1.0 mg/L for TN

The TMDL ultimately resulted in a Settlement Agreement in 2007 between NMED and the Villages of Ruidoso and Ruidoso Downs (WWTP) to define a compliance schedule to meet the new, stringent limits.

Mora River

The Mora River was determined to be impaired for nutrients.

Wastewater treatment system is an aerated lagoon system with 110 active hookups.

4Q3 = 0.87 cfs (0.562 mgd)



Based on the data, phosphorus loading from the effluent was approximately 6X the level that it should have been; nitrogen loading from the effluent was 5X the appropriate level.

In-stream targets were set to ecoregional median values of:
0.03 mg/L for TP and 0.38 mg/L for TN

Mora River – *continued*

Because there was absolutely no “wiggle room” (i.e., no dilution – 88% of TMDL allocated to WLA!), effluent limits were set to in-stream targets:

0.03 mg/L for TP and 0.38 mg/L for TN

Several options were outlined in the TMDL:

Option 1 = meet the WLA and stringent effluent limits

Option 2 = cluster system* instead of lagoons

*The NMED CPB and GWQB both supported this option

Other options to meet the WLA were not excluded.

Mora River – *continued*

- The new NPDES permit was issued on September 17, 2008.
- The permit allowed for a compliance schedule of 4 years from the issue date.

The TMDL and NPDES permit ultimately resulted in a Congressional request for assistance, an official response from EPA, more than one article highlighting this controversy

(e.g., WATER POLICY REPORT - 3/1/2010 - “New Mexico Permit Dispute Highlights Limits Of Ban On TMDL Trading”)

Issue is still unresolved... although village is now looking into cluster systems

Cieneguilla Creek

Based on 2006 data, Cieneguilla Creek was determined impaired for nutrients.

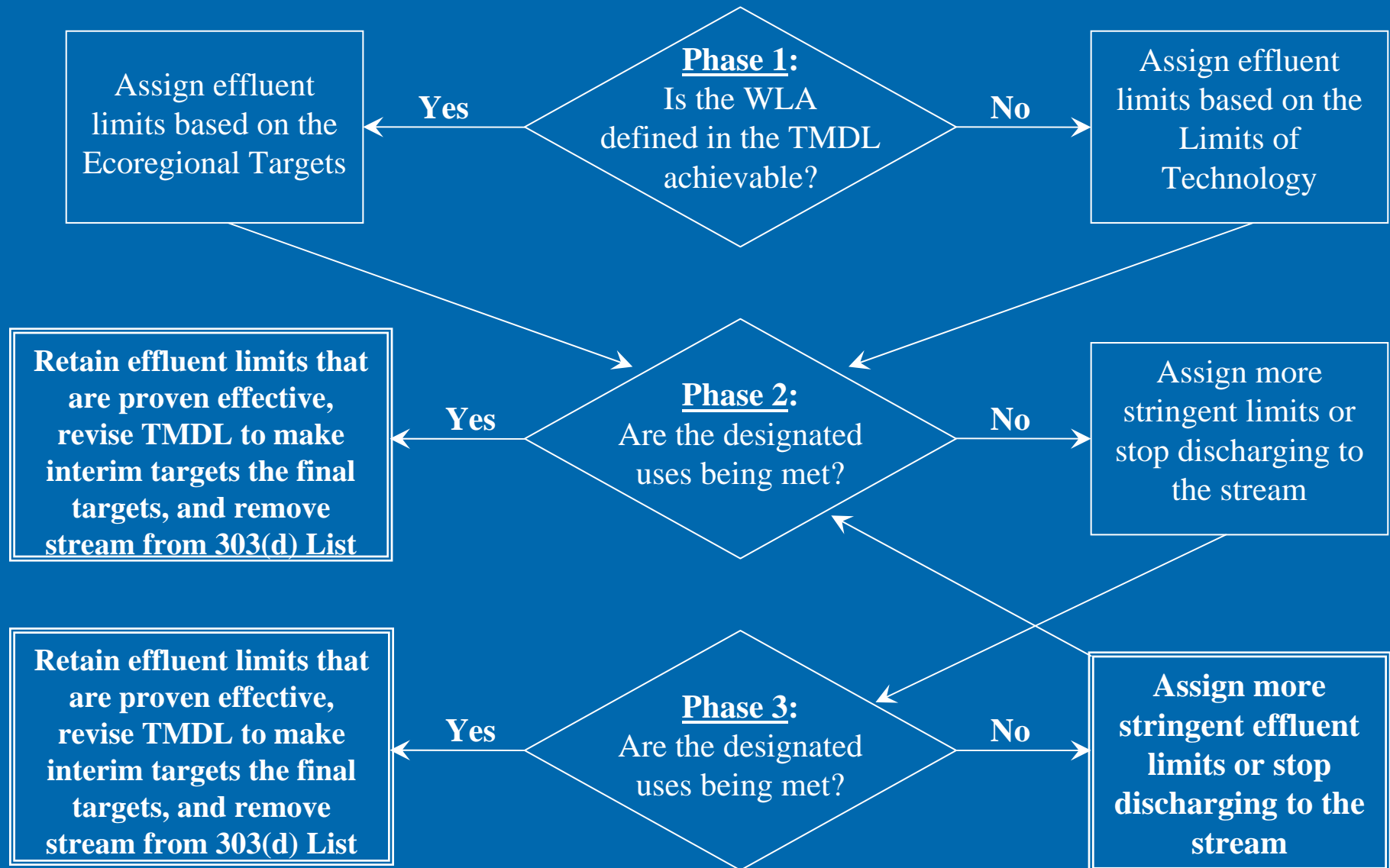
4Q3 = 0.31 cfs (0.20 mgd)



Based on the data, phosphorus loading from the WWTP was approximately 3X the level that it should have been; nitrogen loading from the WWTP was essentially the entire target load defined in the TMDL document.

In-stream targets were set to upstream (non-impaired) values:
0.06 mg/L for TP and 0.56 mg/L for TN

Cieneguilla Creek – *Phased Implementation*



In Conclusion...

- ☞ Nutrient cycling is a dynamic process that cannot (at least with our current data) be defined by a single threshold value. Despite this, there are reasonable and effective ways to monitor and assess a stream for nutrients.
- ☞ NM's tiered, weight-of-evidence approach provides a robust methodology to confidently assess use attainment in our waterways.
- ☞ Because nutrients are a moving target, NM would like to see implementation of the TMDL through the permit process to be flexible enough such that some treatment is required but there is a recognition of the limits of technology for nutrient treatment.
- ☞ The main idea behind this approach is that advanced treatment should substantially reduce the load of TP and TN that is introduced into the stream... it is an ITERATIVE process!
- ☞ NM developed numeric nutrient translators prior to the March 2011 EPA memo but part of our process may fit into Steps 2 and 8.

Contact Information

Heidi Henderson, NM TMDL Coordinator

heidi.henderson@state.nm.us

SWQB TMDL page-

<http://www.nmenv.state.nm.us/swqb/TMDL/>

SWQB Nutrient Criteria Homepage:-

<http://www.nmenv.state.nm.us/swqb/Nutrients/>



*New Mexico Environment Department
Surface Water Quality Bureau*

