

**Prioritization Framework for TMDLs or  
Alternatives and Its Application for 2016-2022:  
Nevada's Approach for Prioritizing TMDLs or Alternatives under the  
Clean Water Act 303(d) Long-Term Vision**

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## Introduction

In December 2013, EPA announced a new collaborative framework for implementing the CWA 303(d) Program with States-- A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program (303(d) Vision). One of the goals of the vision addresses the prioritization of impaired watersheds or waterbodies for the development of TMDLs or alternative plans (watershed-based plans, etc.) to address these impairments. By 2016, EPA expects each State to identify their priority waters targeted for TMDLs or alternative plan development for the period 2016-2022. This document presents NDEP approach for prioritizing waters for future TMDL/alternative plan development, and the application of this framework using the 2012 Integrated Report in developing priorities for 2016-2022.

## 2012 303(d) List

Nevada's 2012 Integrated Report contains the most current list of impaired waterbodies and associated causes, and will be used in developing the 2016-2022 priorities. A summary of the impairment causes for waters included on the 2012 303(d) List is provided in Table 1. The most common causes of impairment for streams are phosphorus, iron, temperature, mercury, turbidity and bacteria. Lakes and reservoirs are most commonly impaired due to phosphorus, mercury, pH, arsenic, and selenium. Wetland impairments are primarily due to mercury, boron, arsenic, and temperature.

The 2014 Integrated Report is currently under development and is expected to lead to some changes in listed waters and the associated parameters. However the most common causes of impairment are expected to remain the same.

## Prioritization Framework

States have flexibility in how priorities are defined and may use a variety of ways including:

- by geographic unit: such as waterbody, watershed, ecoregion, etc.
- by pollutant: such as nutrients, bacteria, etc.
- by designated uses: such as aquatic life, municipal or domestic supply, etc.

NDEP has evaluated the numerous listings in the 2012 Integrated Report and has determined that prioritization based upon a selected set of pollutants would best serve the water quality management programs in Nevada. For the 2016-2022 Vision Prioritization, NDEP will focus on impairments due to: nutrients (phosphorus and nitrogen), temperature, sediment (turbidity and total suspended solids), and bacteria (E coli and fecal coliform). All other impairments will be assigned a low priority. It is believed that many of these selected impairments will be easier to address than with other impairments, such as toxics. For example, some of these selected impairments may be relatively easy to address through changes in grazing management. The same holds true for streams with temperature impairments as a result of less than potential riparian vegetation conditions due to grazing. On the other hand, some waterbodies may be in need of significant stream channel reconstruction, greatly increasing the cost of the restoration, and reducing its practicality.

**Table 1. Causes of Impairment – 2012 303(d) List (Category 5)**

<b>Impairment Cause</b>	<b>Streams (miles)<sup>1</sup></b>	<b>Lakes/Reservoirs (acres)<sup>2</sup></b>	<b>Wetlands (acres)<sup>3</sup></b>
<b><i>Nutrients</i></b>			
Nitrate	7.1	---	---
Nitrogen, Total	---	77	---
Phosphorus, Total	964.7	72,616	183
Phosphorus, Ortho	9.3	---	---
<b><i>Inorganic and Organic Toxics</i></b>			
Arsenic	33.3	35,692	26,133
Boron	113	---	28,053
Cadmium	29.5	---	---
Copper	45.5	---	---
Fluoride	122.6	2,177	---
Iron	928.1	16,810	1,920
Manganese	147.3	---	---
Mercury in Fish Tissue	620.4	44,436	47,012
Mercury in Sediment	110.0	14,633	31,075
Mercury in Water Column	25.8	---	---
Nickel	27.8	---	---
Selenium	123.1	35,490	---
Zinc	46.6	---	---
<b><i>Pathogens</i></b>			
Escherichia coli	335.7	---	---
Fecal coliform	44.7	---	---
<b><i>Other</i></b>			
Dissolved Oxygen	105	16,528	183
pH	195.6	38,109	838
Sulfate	50.8	---	---
Temperature	891.6	4,203	14,900
Total Dissolved Solids	283.4	857	183
Total Suspended Solids	203.7	14,180	---
Turbidity	495.3	14,275	---

Note: Some waterbodies may be impaired by more than one cause. As a results, numbers within a column may not be additive.

<sup>1</sup>Total length in Category 5 = 2,626.8 miles; Total length in all categories = 6,459.2 miles

<sup>2</sup>Total area in Category 5 = 82,014 acres; Total area in all categories = 229,021 acres

<sup>3</sup>Total area in Category 5 = 47,195 acres; Total area in all categories = 56,493 acres

TMDL priorities can be developed on either a parameter or a waterbody basis. If only Watershed-based Plans (WBP) open 319(h) funding doors, we should strive to only develop documents that meet the required elements. However, there may be instances where TMDLs are needed to support certain programmatic needs (such as establishment of WLAs for discharge permit issuance).

### **STEP 1: Assign LOW Priority to Non-Priority Pollutant Impairments**

In the first step, low TMDL/WBP development priorities are assigned to certain waterbodies impaired due to non-priority pollutants. As described above, NDEP has determined that TMDL/WBP development is best targeted for impairments due to: nutrients (phosphorus and nitrogen), temperature, sediment (turbidity and total suspended solids), and bacteria (E coli and fecal coliform). Overall, associated restoration activities to address these impairments can be more practically implemented. While iron is the 2<sup>nd</sup> most common cause on the 2012 303(d) list, there are significant concerns about the appropriateness of the iron water quality standard. There is a high likelihood that iron is not causing impairments in many of these waters and therefore a low priority is assigned to these impairments.

Some of the more challenging pollutants to address include toxic materials such as arsenic, cadmium, mercury, nickel, selenium, etc. that are often associated with mining activities, whether active or legacy. In the case of mercury in fish tissue impairments, air deposition of mercury in the atmosphere could be the source. The water quality improvement projects needed to deal with some of these listings may be impractical or hugely expensive and beyond the funding abilities of the 319(h) program. The non-priority pollutant impairments are assigned a low priority.

While the non-priority pollutant impairments are assigned a low priority, this does not preclude NDEP from pursuing a TMDL or alternative for any of these impairments if there is sufficient stakeholder interest.

### **STEP 2: Assign LOW Priority to Selected Priority Pollutant Impairments**

Step 2 involves assigning low priorities to some of the priority pollutant impairments where: 1) TMDL/WBP not needed to support restoration activity; 2) impairment is at the stateline due to conditions in the upstream state; and 3) impairment is based upon inappropriate water quality criteria.

- **TMDL/WBP not needed to support restoration activities**

For some of the priority pollutant impairments, remediation efforts are underway, such as efforts in the Rio Tinto Mine area (Mill Creek/Owyhee River drainage), or existing EPA-approved WBPs are in place for the waterbodies of interest. EPA-approved WBPs exist for Lake Tahoe and tributaries, Carson River basin waters, and Las Vegas Wash and tributaries.

For those impairments related to ongoing mining activities, BWQP will confer with the Bureau of Mining Regulation and Reclamation to identify potential regulatory (or other) actions that can be taken to address the impairments. These impairments are assigned a low priority.

It may be appropriate in some instances to work with the Bureau of Mining Regulation and Reclamation to investigate avenues within the state permitting framework to address some of the 303(d) listings. TMDLs/WBPs would not likely be needed for those situations.

- **Impairment in upstream state**

Some waterbody segments in the NAC consist of a point at the stateline with no length. Nevada has no authority to develop TMDLs/WBPs for the watershed above these locations. These impairments are assigned a low priority.

- **Impairment based upon inappropriate water quality criteria**

Some of the temperature listings may be based upon outdated/inappropriate numeric criteria. NDEP has begun an extensive effort to update the current temperature criteria. Work to date suggests that several of the streams have overly restrictive temperature criteria. In general, coldwater streams with temperature criteria limits at 21°C or less are believed to be inappropriate, (unless the stream is deemed a Bull Trout or Lahontan Cutthroat Trout stream) Until these criteria can be appropriately revised, these listings are assigned a low priority for TMDL/WBP development.

Additionally, some streams have no site-specific water quality criteria but are protected under the Tributary Rule whereby the temperature standards of the downstream water apply to the tributary without standards. In some cases, these standards are not appropriate and the impairment is assigned a low priority for TMDL/WBP development.

### **STEP 3: Rank the Remaining Priority Pollutant Impairments**

After implementing Steps 1 and 2, the remaining impairments are ranked for potential TMDL/WBP development for the following categories:

- Certainty and severity of impairment
- Number of priority pollutant categories with impairment
- Recreational, economic, and aesthetic importance of waterbody
- Risk to human and aquatic life
- Feasibility of needed restoration activity

Each waterbody listing is reviewed for these 5 categories with scores of 1 (lower priority) to 3 (higher priority) assigned to each category. A final ranking score is then calculated for each listing by averaging the 5 category scores. Following is a discussion on each of the 5 categories and the associated scoring methods.

- **Certainty and Severity of impairment**

TMDL/WBP development should focus on those waters where there is greater certainty that impairment actually exists and the severity of the impairment is greater. Certainty in the impairment increases with the increase on the amount of data, while the severity increases in an increased percentage of samples exceeding the standards.

The amount of data used in the assessments can vary greatly from waterbody to waterbody. In general, those waters with the most data typically provide a better characterization of conditions. This is especially true to parameters such as temperature that can have significant daily variations. For temperature assessments, it is preferable that continuous data be available for the assessments.

The extent of the exceedances can be evaluated based upon the percentage of samples that exceed the standard. Waters with higher exceedance percentages should have higher priorities than those with lower exceedances.

Ranking scores associated with this category are generally assigned following the rules presented in Table 2. For temperature impairments, low rankings are given to listings based upon grab samples or limited continuous data. In some instances, information other than water quality data may exist to assist in determining certainty of the impairment. For example, visual surveys for excess algae have been performed for some waters. This information could be useful in determining nutrient impairment status. Also, riparian vegetation conditions can be derived from field information and/or aerial imagery to determine the physical conditions. This information may be useful in determining temperature, sediment and nutrient impairment status. In instances where other information provides input on the certainty and severity of the impairment, best professional judgment can be used to modify the rankings indicated in Table 2.

**Table 2. Ranking Scores for Certainty and Severity of Impairment**

<b>Metric</b>	<b>No. of Samples</b>	<b>No. of Exceedances</b>	<b>Score</b>
Single Value	2 – 5	2 - 4	1
		5	2
	>10	2 - 5	1
		6 – 10	2
		≤ 25%	1
	Annual Average, Seasonal Average, AGM	NA	>25% to ≤ 50%
> 50%			3
1			1
Annual/Seasonal/AGM <b>AND</b> Single Value	NA	2 – 3	2
		4 - 5	3
		NA	3

- **Waters with multiple impairments**

Waters with multiple impairments should be given a higher ranking than those with only one impairment cause. For this category, waterbody ranking scores are given based on the number of priority pollutant groups (Nutrients, Temperature, Sediment, Bacteria) with impairments. Ranking scores associated with this category are assigned following the rules presented in Table 3.

**Table 3. Ranking Scores for Waters with Multiple Impairments**

Number of Priority Pollutant Groups with Impairments	Score
1	1
2	2
3-4	3

- **Recreational, economic, and aesthetic importance of a waterbody**

Waters with high recreational, economic and aesthetic importance should be given a higher priority. For example, this could include waters in the Lake Tahoe Basin, major streams such as Truckee River, waters previously categorized as Class A and other upper watershed streams, waters on NDOW’s Fishable Waters Maps, etc. Low ranking waters could include canals, drains, waters previously categorized as Class D, etc. Ranking scores associated with this category are generally assigned following the rules presented in Table 4. Best professional judgment may be necessary to other cases not covered.

**Table 4. Ranking Scores for Recreational, Economic, and Aesthetic Importance**

Criteria	Scoring
<b><i>For waters originally set as Class Waters</i></b>	
Waters previously Class A	3
Waters previously Class B	2
If significant length in Nat’l Forest	3
Waters previously Class C and D Waters	1
If significant water supply for irrigation, etc.	2
<b><i>For other waters, use following:</i></b>	
Waters shown on NDOW Fishable Waters Map	2
If significant length in Nat’l Forest	3
Water not on NDOW Fishable Map	1
If significant water supply for irrigation, etc.	2
If significant water supply in Nat’l Forest	2

- **Risk to human and aquatic life**

As described early, the priority pollutants have been identified as: nitrogen, phosphorus, temperature, turbidity, total suspended solids, E coli and fecal coliform. In general, these pollutants potentially affect the following primary beneficial uses:

- Aquatic life – nitrogen, phosphorus, temperature, turbidity, total suspended solids
- Contact recreation – E coli, nitrogen, phosphorus

- Irrigation – Fecal coliform

Those waters which are impaired for human uses and aquatic life uses should have higher priority for restoration efforts. Impairments to irrigation may not have the same urgency as human/aquatic impairments. For contact recreation, bacteria impairments are of more concern for this category than more aesthetic impairments such as nutrients.

Impairment which can affect threatened and/or endangered fish species will be considered higher priority for TMDL/WBP development than for waters without such species. Examples include Bull Trout in the Jarbidge watershed and Lahontan cutthroat trout in various watershed throughout northern Nevada. Additionally, NDEP may wish to prioritize streams considered having (or the potential for) healthy fishery versus waters considered marginal fisheries.

There are several waterbodies impaired for Contact Recreation due to exceedance of E coli standards. However, some of these waters have limited potential for actually be used for contact recreation purposes. These waters should be ranked lower for TMDL/WBP development priority than waters with known contact recreation activities.

Ranking scores associated with this category are generally assigned following the rules presented in Table 5. Adjustments may be made using best professional judgment.

**Table 5. Ranking Scores for Risk to Human and Aquatic Life**

<b>Criteria</b>	<b>Scoring</b>
<b><i>Contact Recreation impairment due to E coli.</i></b>	
High potential for contact rec (designated beach)	3
Medium potential (more urban areas, known recreation areas – NDOW Fishable map etc.)	2
Low potential (not on NDOW fishable map)	1
<b><i>Aquatic Life impairments</i></b>	
Waters with LCT/ Bull Trout (either with existing populations, or identified as priority restoration or potential recovery areas)	3
Other waters	2
<b><i>Irrigation impairments</i></b>	
	1

- **Feasibility of needed restoration activities**

Some parameter impairments may be easier to address than others are should be assigned a higher ranking score. For example, bacteria impairments may be relatively easy to address through changes in grazing management. The same holds true for streams with other impairments as a result of less than potential riparian vegetation conditions due to grazing. On the other hand, some waterbodies may be in need of significant stream channel reconstruction, greatly increasing the cost of the restoration, and reducing its practicality. Ranking scores associated with this category are



generally assigned following the rules presented in Table 6. Adjustments may be made using best professional judgment.

**Table 6. Ranking Scores for Restoration Feasibility**

<b>Parameter</b>	<b>Discussion</b>	<b>Score</b>
E coli/Fecal Coliform	Likely due to cattle, easier to address than many other parameters	3
Temperature/Nutrients/TSS/Turbidity	Where due to cattle grazing – may not always know specifics for a particular water. Use BPJ to adjust.	3
	Other cases	2

**STEP 4: Consider the level of public/stakeholder interest in implementing TMDL/WBP**

Following completion of Step 3, the scores are averaged to provide an overall potential prioritization for the selected waterbody-pollutant combinations. Under Step 4, the ranking list can then be used to engage potential stakeholders and the public in identifying desired TMDLs/WBPs.

This is likely the most important factor in prioritizing TMDLs/WBPs. A majority of Nevada’s waterbody impairments are due to NPS pollution, channel modification and flow diversions. As such, these impairments will only be addressed through voluntary measures. Therefore, NDEP needs to prioritize TMDLs/WBPs with buy-in from stakeholders in order to realize implementation of the TMDLs/WBPs. A waterbody-pollutant combination may rank high for a TMDL/WBPV, but without the interest and cooperation of implementing agencies and the private sector, a TMDL/WBP does little good towards waterbody restoration. The highest priorities are given to those TMDLs/WBPs which are likely to be implemented.

Initial prioritizing is done on the waterbody-pollutant combinations. As a result some pollutants for a given waterbody may be rated low while other pollutants for the same water may be rated high. If NDEP determines it desirable to develop TMDLs/WBPs for the high priority pollutants for a water, it may be advantageous to also address those lower priority pollutants.

## **Application of the Prioritization Framework using the 2012 303(d) List**

Nevada's 2012 Integrated Report contains the most current list of impaired waterbodies and associated causes, and will be used in developing the 2016-2022 priorities. For the 2012 Integrated Report, water quality for 658 streams, lakes, reservoirs and wetlands were assessed for compliance with the applicable water quality standard and were assigned to the following categories:

Category 1 – All uses fully supported

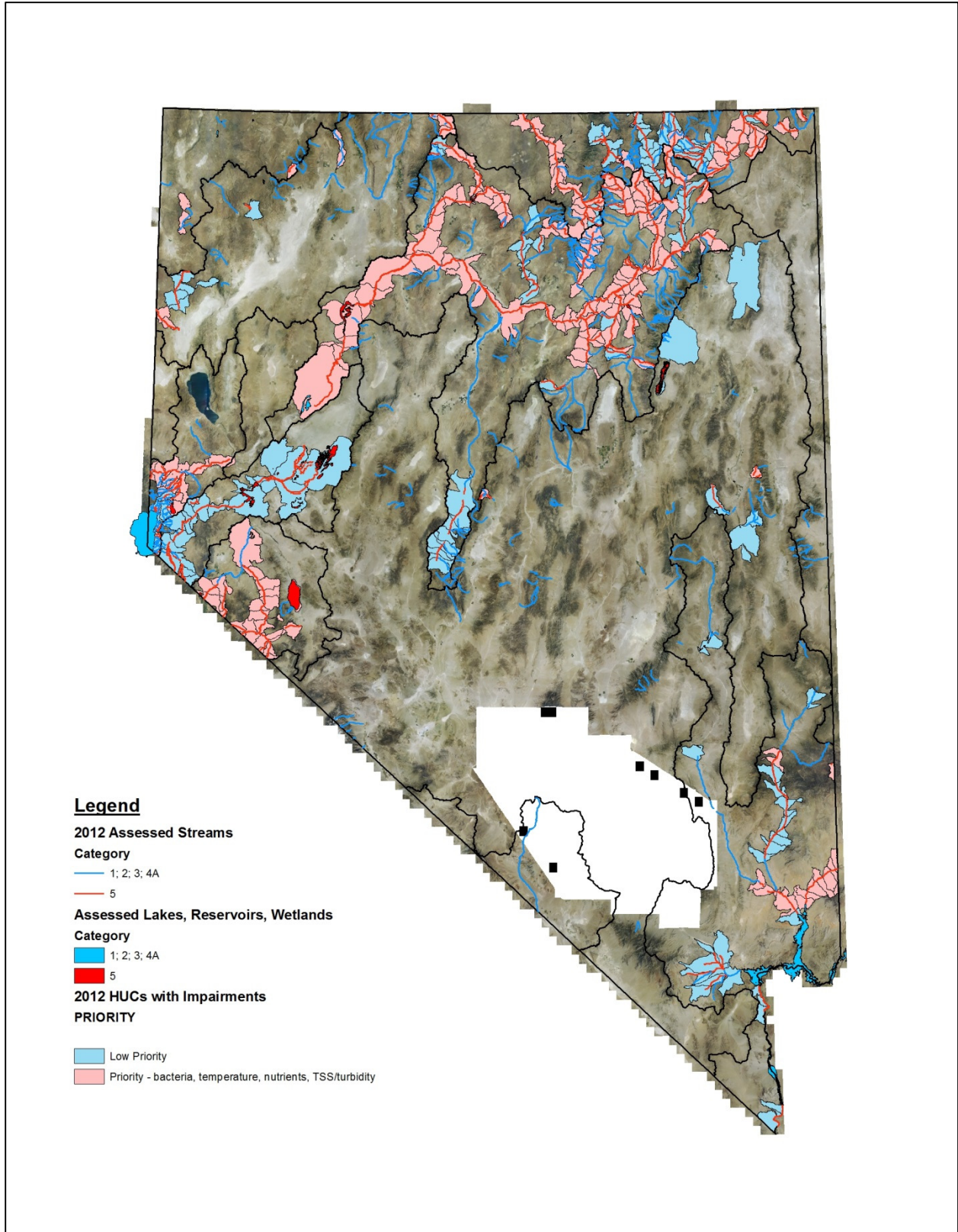
Category 2 – Some uses fully supported

Category 3 – Insufficient information available

Category 4a – Impaired for one or more use but approved TMDL is in place

Category 5 (303(d) List) – Impaired for one or more use and a TMDL is needed

Figure 1 presents the 2012 assessed waters in 2 groups: 1) Categories 1, 2, 3, 4a; and 2) Category 5 (303(d) List). Overall, 467 waterbody-pollutant combinations were identified as impaired (Category 5) due to a variety of causes. Following the application of Steps 1 and 2 where waterbody-pollutant combinations are assigned low priority, there remains 89 waterbodies with 124 waterbody-pollutant combinations for ranking using Step 3 scoring. These 89 waterbodies fall within 170 12-digit HUCs (Figure 1).



**Figure 1. 2012 Integrated Report Water Assessments and TMDL/WBP Prioritization**