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STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor
Allen Biaggi, Director
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Peter Kozelka
Regional 303(d)/TMDL Coordinator
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105

February 17, 2009

RE: Nevada's Final 2006 303(d) Impaired Waters List

Dear Mr. Kozelka:
Enclosed for your approval is Nevada's Final 2006 303(d) Impaired Waters List. The final report documents the methodology used in the listing. Attachments 1, 2 and 3 to the Final 2006 list show respectively listed waters, delisted waters and database stations used in the evaluations. The draft list was available for public input process. For your files I have enclosed copied of the draft list comments we received and our responses.

Thank you for your Agency's assistance in developing Nevada's Final 2006 303(d) Impaired Waters List. Please contact me at (775) 687-9449, to schedule a convenient time to discuss any questions or comments you may have.

Sincerely

John Heggeness
Nevada Division of Environmental Protection
901 S. Stewart Street, Suite 4001
Carson City, Nevada 89701
Enclosure

Nevada's 2006 303(d) Impaired Waters List

Prepared by:

Nevada Division of Environmental Protection
Bureau of Water Quality Planning
February 2009

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Nevada's 2006 303(d) Impaired Waters List

CHAPTER 1
INTRODUCTION

1.1 PURPOSE OF DOCUMENT

This document presents the State of Nevada's 2006 303(d) List of Impaired Waters (Attachment 1) and provides information about the procedures used by the Nevada Division of Environmental Protection (NDEP) to develop the 2006 303(d) List.

Section 303(d) of the Clean Water Act (CWA) requires that States develop a list of waterbodies needing additional work beyond existing controls to achieve or maintain water quality standards. This list, referred to as the Section 303(d) List, provides a comprehensive inventory of waterbodies impaired by both point and nonpoint sources of pollution. The 303(d) List is the basis for targeting waterbodies for watershed-based solutions. The total maximum daily load (TMDL) process provides an organized framework to develop these solutions.

1.2 TRANSITION TO AN INTEGRATED REPORT

In July 2005, the U.S. Environmental Protection Agency (EPA) issued the *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act.* The document provides a recommended reporting format and suggested content to use in developing a single document that integrates the reporting requirements of the CWA sections 303(d), 305(b) and 314. EPA has established the goal that all states and territories utilize the integrated reporting format by 2008. NDEP is issuing a separate 2006 305(b) Report and 2006 303(d) List and intends to utilize the IR format for the 2008 reporting cycle.

1.3 GENERAL LISTING CRITERIA

In general, a waterbody was included on the 2006 303(d) List when there was adequate documentation that at least one beneficial use was not supported and/or water quality standards were not met during the five-year period October 1, 2000 through September 30, 2005

- For conventional pollutants and some toxic parameters, waters were listed if the numeric criteria were exceeded more than 10 percent of the time.
- For toxic parameters with acute and chronic criteria, waters were listed if there were two or more exceedances in any three year block.
- Waters were listed if a fish consumption, drinking, or swimming advisory was in effect for the waterbody either during or subsequent to the listing period;
- Waters included on a prior 303(d) list were listed if there was insufficient information to delist the waterbody.

Specific details and exceptions to these criteria are discussed in Chapter 5—Methodology used for Development of the 2006 303(d) List.

1.4 2006 303(D) LIST SUMMARY

The 2006 303(d) List identifies approximately 2270 river miles and 118,620 acres of lakes or reservoirs as impaired. The most common causes of impairment are temperature, total phosphorus, iron, turbidity, total dissolved solids, total suspended solids, zinc and pH.

CHAPTER 2
NEVADA'S WATER QUALITY STANDARDS PROGRAM

2.1 BENEFICIAL USE STANDARDS

Nevada's water quality standards, as contained in the Nevada Administrative Code (NAC) 445A.118 – 445A.225, define the water quality goals for a waterbody, or a portion of a waterbody, by designating beneficial uses of the water and setting criteria necessary to protect the beneficial uses. Beneficial uses include, but are not limited to, irrigation, recreation, aquatic life and drinking water supply.

In many cases, two or more reaches exist for a river or stream system, with each reach possibly having different beneficial uses and numeric criteria. Reaches are established at specific control points pursuant to NAC 445A.145 (often referred to as the "Tributary Rule"). On a given waterbody, the standards apply to that control point and the remainder of the waterbody upstream, all surface waters upstream (in Nevada) or to the next control point upstream, if any. If there are no control points downstream from a particular control point, the standards for that control point apply for the remainder of the waterbody downstream, all surface waters downstream (in Nevada) or to the next waterbody downstream named in the NAC.

Nevada's water quality standards contain both narrative and numeric criteria. The narrative standards contained in NAC 445A.121 apply to all surface waters of the state and require waters to be "free from" various pollutants in sufficient levels so as to not be unsightly, interfere with any beneficial uses, create a public nuisance, be toxic to human, animal, plan or aquatic life or have any adverse effects.

There are two types of numeric standards for conventional pollutants, class and waterbody specific. For the class waters, criteria for various pollutants are designed to protect the beneficial uses of classes of water, from A to D; with class A being the highest quality. The waterbodies included in these classes are named in the regulations. The Tributary Rule provides protection for those surface waters that are not specifically defined as a class or designated water.

Site specific numeric standards have been developed for the major waterbodies in Nevada, often referred to as "designated" waters. The standards for designated waters include criteria designed to protect the beneficial uses (referred to as beneficial use standards) and, in certain cases, antidegradation requirements.

Numeric criteria for toxic materials which apply to class and designated waters are contained in NAC 445A.144. Numeric criteria in NAC 445A.144 are specified for four beneficial uses. The aquatic life, irrigation and watering of livestock beneficial use numeric standards are based on ambient water quality criteria published by EPA. Numeric criteria contained in 445A.144 for the protection of municipal and domestic water supply are generally based on maximum contaminant levels (MCLs) which have been adopted by the Nevada Board of Health as standards for drinking water.

2.2 ANTIDEGRADATION

Antidegradation requirements are contained in the Nevada Revised Statutes (NRS). NRS 445A.565 states:

> "Any surface waters of the state whose quality is higher than the applicable standards of water quality as of the date when those standards became effective must be maintained in their higher quality. No discharges of waste may be made which will result in lowering the quality of these waters unless it has been demonstrated to the commission that the lower quality is justifiable because of economic or social considerations. This subsection does not apply to normal agricultural rotation, improvement or farming practices".

NRS 445A.565 is implemented by establishing requirements to maintain existing higher quality, also known as RMHQs. RMHQs are set when existing water quality for individual parameters is better than the criteria necessary to protect the beneficial uses. This system of directly linking antidegradation to water quality standards provides a manageable means for implementing antidegradation through permits and other programs.

CHAPTER 3
NDEP'S LONG RANGE PLAN FOR WATERSHED MANAGEMENT AND TMDL DEVELOPMENT

The Clean Water Act (CWA) and 40 CFR Part 130 require States to develop total maximum daily loads (TMDLs) for waterbodies on the 303(d) List. The 303(d) List must contain a prioritized schedule for establishing TMDLs for these waters.

Nevada's TMDL Program is implemented according to the Bureau of Water Quality Planning's (BWQP) 5-Year or Long Range Plan,

3.1 LONG RANGE PLAN

The Long Range Plan (LRP) outlines activities that will be conducted through the major BWQP programs including monitoring, assessment, water quality standards, TMDLs, nonpoint source pollution management and public education in order to meet BWQP short and long term goals. The LRP is a dynamic and fluid document that is regularly updated under an adaptive management approach to reflect changing needs, priorities and funding.

BWQP's long term goals as discussed in the LRP include:

- Improve water quality standards through more appropriate beneficial use assignments (such as tiered aquatic life uses) and more appropriate numeric criteria;
- Protect existing water quality through the addition and or revision of RMHQs;
- Provide protection for waters currently without specific standards by adding these waters to the Nevada Administrative Code;
- Develop effective TMDLs which address real problems (based upon appropriate beneficial uses and numeric criteria) and where needed to support local efforts to address the problems;
- Improve assessment tools through the development of biological/physical integrity indices, nutrient and sediment screening protocols and other tools;
- Engage and empower local stakeholders to address water quality problems.

The LRP is implemented on a rotational basin approach that is generally represented by 6 basic steps, with the first 5 steps taking approximately 4 years. The duration of Step 6 will be highly dependent upon the specific needs of the watershed under investigation. The 6 steps include:

1. Select the basin of interest;
2. Obtain input from other local, state and federal agencies or groups such as the Nevada Department of Wildlife (NDOW), U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Bureau of Land Management (BLM), Natural Resources Conservation Service, conservation districts, irrigation districts, etc;
3. Compile and review available information;
4. Develop and implement monitoring strategy;
5. Review and revise water quality standards as appropriate;
6. Perform additional work as needed including TMDL development if deemed appropriate.

The current version of the LRP covers the July 2006 through June 2011 planning period and is available for download at www.ndep.nv.gov/bwqp . Efforts will be focused in the Upper Humboldt River Basin during this period.

Ensuring appropriate water quality standards (both beneficial uses and numeric criteria) for Nevada's surface waters forms the core of the LRP. Many of Nevada's water quality standards were adopted more than thirty years ago with little water quality data, limited guidance from EPA, and little knowledge of the beneficial uses that existed or could exist given land use, flow alterations and other watershed conditions. However, water quality standards are the foundation of all CWA programs including discharge permits, watershed management plans and nonpoint source pollution abatement projects. Appropriate water quality standards are necessary to ensure these actions are apposite, cost effective and truly protect or improve water quality and watershed health. Likewise, as the benchmarks for establishing waterbody impairment and the basis for TMDL development, appropriate standards are necessary to ensure that effective TMDLs are developed and implemented. Inappropriate or deficient standards will result in flawed 303(d) listings and flawed TMDLs.

The linkage between physical and biological conditions and waterbody health must also be considered. With few exceptions, Nevada's 303(d) List is developed solely on the basis of water chemistry. However, NDEP recognizes that water column chemistry data alone are not sufficient to assess waterbody health or impairment status. Biological data and other types of information that characterize channel condition, riparian habitat, fisheries, and periphyton (attached algae) are needed. Additionally the diurnal and/or seasonal nature of water quality needs to be better monitored and understood. These types of data and information are necessary to better understand the ways in which waterbodies are impaired and will lead to the development of more meaningful and appropriate TMDLs.

The LRP provides a broad, more encompassing approach for assessing beneficial uses and 303 (d) listed impairments and outlines a basic methodology for re-evaluating water quality standards prior to TMDL development. The LRP also discusses statewide strategies for addressing key 303(d) listings including nutrients, total suspended solids and turbidity, iron, temperature and total dissolved solids.

3.2 Methodology Used to Prioritize Listed Waters for TMDL Development

Pursuant to 40 CFR Part 130 the 303(d) List must contain a prioritized schedule for establishing TMDLs for the listed waters. Prioritizing waterbodies enables the state to make efficient use of available resources to meet the objectives of the CWA. Priority ranking takes into account the severity of the pollution and the uses to be made of such waters. Key drivers for TMDL development include existing or proposed point source discharges or watersheds where local interests exist to address water quality impairments and TMDLs are needed to support appropriate best management practices.

Under the umbrella of the LRP, the 303(d) List serves as a primary planning document and tool for guiding NDEP water quality management efforts that include beneficial use and numeric criteria reviews and/or revisions and TMDL development. As discussed above, NDEP intends to conduct in-depth assessments of the causes of impairments and evaluate the applicable water quality standards prior to developing TMDLs. Therefore, with the exception of Lake Tahoe, all TMDLs are designated as low priority for development over the next two years. Lake Tahoe is assigned a high priority as a TMDL is currently being developed, with a planned completion date of late 2009. Additionally NDEP is currently working with the Cities of Reno and Sparks and Washoe County to review the existing Truckee River nutrient TMDLs; however, a timeline for completion of the review has not yet been established.

NDEP is committed to developing appropriate TMDLs for waters where the impairment has been verified with a detailed physical, chemical and biological assessment and where TMDL implementation is supported by local landowners and resources management agencies. Without interest at the local level, TMDLs become just another paper exercise that consumes resources but does little to foster protection or recovery of water quality.

CHAPTER 4
SOURCES OF DATA USED FOR DEVELOPMENT OF THE 2006 303(D) LIST

As required by the CWA section 303(d) and CFR 130.7(B)(5), NDEP compiled and considered "all existing and readily available water quality related data and information" such as chemical and physical water column data, sediment, fish tissue, biological information, toxicity testing results and narrative and qualitative information to identify waters eligible for listing.

Existing and readily available data and information include, but are not limited to, the following:

- Most recent 303(d) List;
- Most recent 305(b) Report;
- NDEP monitoring data;
- Data, information, and water quality problems reported from local, State, Territorial or Federal agencies (especially the USGS National Water Quality Assessment (NAWQA) and National Stream Quality Accounting Network (NASQAN)), Tribal governments, the public and academic institutions;
- Clean Water Act section 319 nonpoint source assessments;
- Safe Drinking Water Act section 1453 source water assessments;
- Dilution calculations, trend analyses or predictive models for determining the physical, chemical or biological integrity of streams, rivers, lakes and estuaries;
- Fish consumption or other health advisories issued by the Nevada Division of Health or other public agencies.

For most waterbodies, the most comprehensive readily available water quality related data or information are physical and chemical water column monitoring data, and widely distributed scientifically defensible special studies (including chemical and biological information). Other types of data such as sediment, fish tissue, narrative information, etc., are generally not as common for waterbodies throughout Nevada. While NDEP examined all types of data, a majority of the listing decisions were based upon numeric data primarily because these types of data are most available.

While it is relatively straightforward to define methods for evaluating numeric data for numeric standard compliance, it is much more challenging to define how other types of data and information will be used in the listing process. In general, with the exception of fish tissue data, these other types of data or information were not used as the sole basis for listing a waterbody.

Regardless of the data source, it is imperative that the decision to list a waterbody be based on credible data. NDEP evaluated data submitted by outside entities to ensure that the data was collected according to basic quality assurance/quality control procedures. NDEP data was aggregated with outside agency data whenever possible.

4.1 NDEP MONITORING DATA

Ambient water quality data collected through NDEP's statewide monitoring program was the primary data source for development of the 2006 303(d) List. This data set is mostly comprised of grab samples collected at varying frequencies. Samples are collected according to procedures outlined in the Nevada Quality Assurance Project Plan. The data is available on the NDEP website at www.ndep.nv.gov/bwqp.

The NDEP monitoring program encompasses the State's 110,000 square miles and 14 hydrographic regions (Figure 1). More than 100 sites are regularly monitored for physical and chemical quality. In addition to the fixed monitoring stations, several water quality intensive field studies are conducted on select waterbodies on a progressive cycle. Qualitative information to evaluate the narrative standards is also collected by NDEP at all monitoring sites. Staff note whether or not the water contains substances attributable to domestic or industrial waste or other controllable sources including settleable solids that form bottom or sludge deposits, floating debris, oil, grease, scum and other floating materials, odor, color, turbidity or other conditions. A summary of the NDEP monitoring sites is shown in Attachment 3.

A subset of lakes and reservoirs is monitored on a rotating biennial basis. Whenever possible, depth integrated samples at several sites within a particular waterbody are collected; however, at times, the sampling points may be limited to one point that is easily accessible to the monitoring crew.

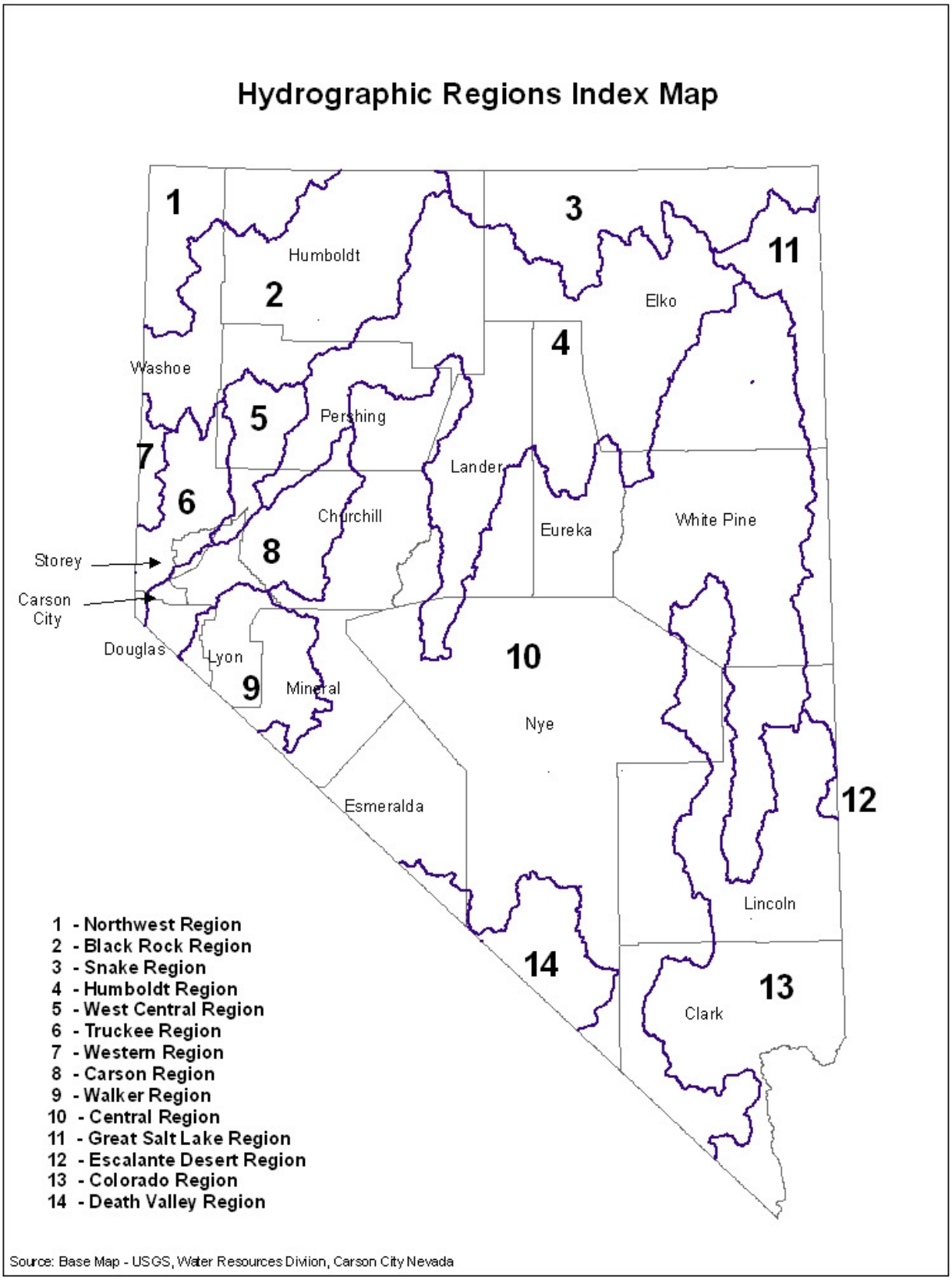
In 2000, NDEP initiated a biological assessment program with the overall goal of developing three to five years of baseline data within each watershed and then alternating the sampling frequency to every other year. To date more than 250 sites have been established throughout the state. Macroinvertebrate, periphyton, sediment and fish samples are collected and physical habitat assessments are conducted at each site. As yet, reference sites and conditions have not been fully identified and established.

4.2 OTHER SOURCES OF MONITORING DATA

Data from other entities was solicited for development of the 2006 303(d) List. Also, the public notice and comment period for the draft list provides the opportunity for individuals and groups to present any additional monitoring data, ongoing research or other publications for consideration. Data was submitted by the Carson Valley Conservation District, Desert Research Institute (DRI), NDOW, BLM, U.S. Geological Survey, Southern Nevada Water Authority, Truckee Meadows Water Reclamation Facility (TMWRF), Idaho Department Environmental Quality and the Lahontan Regional Water Quality Control Board. A summary of the types of data submitted by these agencies is shown in Attachment 4.

Many of the new listings for temperature were based on continuous monitoring data provided by NDOW and BLM.

In 2005, NDOW in cooperation with NDEP and EPA Region 9, initiated a sampling program to determine mercury concentrations in fish species found in waterbodies throughout the state. NDOW collected 193 fish samples representing 12 species from 15 waterbodies during July through November 2005; and 339 fish samples representing 20 species from 23 waterbodies during 2006. All samples were analyzed at the U.S. EPA Region IX laboratory in Richmond, California. Complete reports are available on the NDOW website at www.ndow.org.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Source: Base Map - USGS, Water Resources Division, Carson City Nevada

CHAPTER 5
METHODOLOGY USED FOR DEVELOPMENT OF THE 2006 303(D) LIST

5.1 GENERAL LISTING CRITERIA

A waterbody was included on the 2006 303(d) List when there was adequate documentation that at least one beneficial use was not supported and/or beneficial use numeric criteria were not met during the five-year period October 1, 2000 through September 30, 2005.

Listings were determined according to the following general guidelines:

- For conventional pollutants and some toxic parameters waterbodies are listed if:
  - there were more than 10 data points and the beneficial use standard was exceeded more than ten percent of the time;
  - there were 10 or fewer data points and 2 or more exceedances of a beneficial use standard; only one exceedance was considered insufficient evidence to list.
- For toxic parameters with acute and chronic criteria, waters were listed if there were two or more exceedances in any three year block.
- Wherever appropriate, data were evaluated according to timeframes, or averaging periods, specified in the water quality standards (i.e. dissolved oxygen and temperature).
- Waterbodies were listed if a fish consumption, drinking or swimming advisory was in effect for the waterbody either during or subsequent to the listing period;
- All waters listed on the 2004 303(d) List were included on the 2006 303(d) List unless delisting was justified pursuant to section 5.3 Delisting Criteria.

5.2 SPECIFIC LISTING CRITERIA

The following sections provide more detailed information and discussion of other factors considered during development of the 2006 303(d) List.

Annual Average/Median, Seasonal, Monthly and Single Value Standards

The water quality standards for some parameters are defined as a maximum annual average or annual median concentration. For these types of standards, a waterbody was listed if the annual average or median was exceeded at least once during the five-year listing period.

Some standards contain both single value and annual average values. For these cases, a waterbody was listed if either the single value standard was exceeded more than 10% of the time (assuming a minimum of ten samples) or the annual average standard was exceeded at least once during the five-year listing period.

Seasonal or monthly restrictions were evaluated using the 10% rule and if more than 10 percent of the data was exceeded within the seasonal or time period restrictions, the waterbody was listed.

Biological Data

Biological data collected by NDEP or other entities was considered but not solely used to list a waterbody as reference site conditions have not yet been established. The exception was the listing for 6 waterbodies based on fish tissue data collected by NDOW and for which fish consumption advisories have been issued by the Nevada Division of Health.

Continuous Monitoring versus Grab Sample Data
Instantaneous grab samples represent quality conditions for a specific point in time. Depending upon the time of day the sample is collected, the data may not be adequate to determine standard compliance for some parameters such as temperature, pH and dissolved oxygen, which naturally vary over a 24-hour period. Nonetheless, due to resource constraints, grab sample data are all that exist for many waterbodies and are therefore the basis for some of the 303(d) listings for these parameters.

However, NDEP and other agencies including DRI, NDOW, BLM and TMWRF have collected continuous monitoring data for temperature, pH, dissolved oxygen and specific conductance in some waterbodies. Evaluation of these datasets provides a more accurate assessment of compliance.

In most cases the continuous monitoring data did not have a complete record set for the five-year listing period. These data were evaluated as follows for inclusion on the 303(d) List:

- Data for each day was examined to determine a violation. Standard violations for any length of time for a given day were considered one violation.
- A reach was listed if the standard violations occurred for more than 10% of the total days monitored.

Control Points and the Tributary Rule
As previously discussed, NDEP maintains an extensive water quality monitoring network throughout Nevada. In many cases, the associated sampling locations are at control points. If the standards were exceeded at the control point (in accordance with the criteria described herein), the entire reach associated with that control point was listed unless there was available information to divide the reach into sub-reaches. In cases where two or more monitoring stations are located on a reach, the data from all monitoring stations were combined and compared to the reach standard. If the standards were exceeded a determination was made to either list the entire reach or to split the reach into sub-reaches.

Pursuant to the Tributary Rule, the water quality criteria for the nearest control point or classified water (upstream or downstream) was applied to evaluate unclassified or undesignated waters.

Copper Listing and Delisting
Until recently the Nevada State Health Lab reported Copper values below the detection limit as estimated values. These data points were interpreted as actual values and evaluated as such. All Copper listings were reevaluated using the corrected detection limit. All Cu listings that met water quality standards were delisted. All waterbodies met copper standards except for 1) Owyhee River from Mill Creek the Duck Valley Indian Reservation tribal boundary and 2) Mill Creek below the Rio Tinto mine. Both the Owyhee River and Mill Creek have an approved TMDL.

Detection Limits
Toxics concentrations in waterbodies throughout Nevada are frequently less than the detection limit of the applicable laboratory procedure. According to NAC 445A.144 Footnote (3), if the water quality standard "…is less than the detection limit of a method that is acceptable to the division, laboratory results which show that the substance was not detected [below detection limit] will be deemed to show compliance with the standard unless other information indicates that the substance may be present."

Of particular concern are parameters for which the standards are based on the hardness of the water including cadmium, chromium, copper, lead, nickel, silver and zinc. The standards for these parameters become more restrictive as hardness levels decrease. Some waterbodies in Nevada have low hardness levels around 30 mg/l. It is difficult for the laboratory to detect concentrations at or below the standard for samples from these waterbodies.

For purposes of developing the 2006 303(d) List, samples with toxic concentrations reported "as less than the detection limit" were assumed to comply with the water quality standards if the certified laboratory method is acceptable to NDEP, and no other information indicated that the substance in question existed in levels detrimental to the beneficial uses.

Extreme Events

NAC 445A.121(8) states: "The specified standards are not considered violated when the natural conditions of the receiving water are outside the established limits, including periods of extreme high or low flow ....". Extreme flow conditions are characterized as $7Q10_{high}$ and $7Q10_{low}$ values. The 7Q10 flows are developed by the USGS from historic streamflow data and are defined as a predicted high or low flow for a consecutive seven day period with an expected recurrence interval of ten years.

Although water quality data collected during extreme events may be excluded from the listing assessment, no data evaluated for the 2006 303(d) List was identified as being associated with 7Q10 flows; and therefore, no data was excluded for this reason.

Fecal Coliform

For many waterbodies, the fecal coliform criteria reads:

> "Based on a minimum of not less than 5 samples taken over a 30-day period, the fecal coliform bacterial level may not exceed a geometric mean of 200 per 100 ml nor may more than 10 percent of the total samples taken during any 30-day period exceed 400 per 100 ml."

There were no instances where the available data were of adequate frequency (at least 5 samples per month) to appropriately evaluate compliance with this standard. For 303 (d) listing purposes the 200/100 ml standard was evaluated as an annual geometric mean, and the 400/100 ml standard was evaluated as a single value.

Field verses Laboratory pH Data

Many of the available datasets include both field and laboratory pH values. Field pH is considered to be the more accurate measure since pH can change over time before the sample arrives at the laboratory. Therefore, field pH values were used whenever possible to determine compliance. Laboratory pH was utilized in cases where field pH was not available.

Fish Tissue Data

Waterbodies were included on the 2006 303(d) List if a fish consumption, drinking or swimming advisory was in effect for the waterbody either during or subsequent to the listing period. The Nevada Division of Health (NDH) is responsible for issuing fish consumption advisories. NDH advisories are based on the Federal Drug Administration (FDA) fish tissue mercury action level of 1.0 mg/kg wet weight (ww).

In January 2006, NDH issued fish consumption advisories for the Carson River from Dayton to Lahontan Dam and all waters in the Lahontan Valley, Big and Little Washoe Lakes, Rye Patch Reservoir, Chimney Dam Reservoir and Comins Lake. These waterbodies were all included on the 2006 303(d) List.

Lakes and Reservoirs

The only available chemistry data for some lakes and reservoirs were samples collected at the shoreline. As these types of waterbodies are rarely homogeneous, the samples are likely not representative of the entire waterbody. However, the entire waterbody was included on the 2006 303(d) list if a standard was exceeded at one site unless the standard specifies discrete portions of a particular waterbody.

Narrative Water Quality Standards

Qualitative information related to the narrative standards was not used as the sole basis for any waterbody listings; however this type of information was used as additional supporting evidence for some listings. Narrative data for waterbodies without specific numeric criteria and that are not tributary to waterbodies with criteria was considered insufficient evidence to list the waterbodies as impaired.

Natural Background Considerations

Pursuant to NAC 445A.120(2) and NAC 445A.121(8), in cases where a water quality standard is exceeded solely due to naturally occurring conditions the exceedance is not considered a violation of the water quality standard.

One or more of the following conditions must be met to designate a waterbody as impaired by natural conditions:

- Human activities (for example, urbanization, grazing or mining) within the affected waterbody are not significant sources of pollutant in question.
- The pollutant in question is known to occur naturally in the form found in the waterbody.
- A probable natural source (for example, hot springs or mineralized outcropping) is located within the watershed.

NDEP believes that some of the waters listed on the 2006 303(d) list are due to naturally occurring conditions. However, NDEP did not exclude any waterbodies due to natural background conditions. When NDEP determines that a parameter on a particular reach is naturally occurring, a standard will be established for that parameter reflecting the natural conditions.

Natural Condition Based Water Quality Standards

In some cases the water quality criteria contained in the NAC are defined as a specific level above or below the "natural conditions." "Natural conditions" are the water quality characteristics that would exist in a waterbody without the impacts of modern human development. Although the NAC does not actually define "natural conditions", "natural waters" are defined as those which have not been degraded or enhanced by actions attributable to man.

Application of these standards to the 303(d) listing process is effectively impossible as the natural conditions have not been quantified. Therefore, the following natural condition based standards were not evaluated for the 2006 303(d) List:

- Alkalinity—less than 25% change from natural conditions.
- Color—Increase in color must not be more than 10 PCU above natural conditions.
- Fecal Coliform—the annual geometric mean of fecal coliform concentration must not exceed that characteristic of natural conditions by more than 200 per 100 milliliter nor may the number of fecal coliform in a single sample exceed that characteristic of natural conditions by more than 400 per 100 milliliter.
- Total Dissolved Solids—must not exceed 500 mg/l or one-third above that characteristic of natural conditions (whichever is less). [NOTE: For these cases, the 500 mg/l standard was used to determine impairment.]
- Turbidity—Increase in turbidity must not be more than 10 NTU above natural conditions.

Requirements to Maintain Existing Higher Quality (RMHQs)

RMHQs were not used to determine waterbody impairment. Only beneficial use standards were evaluated.

Re-Segmented Waterbodies

A number of waterbodies were re-segmented to better reflect hydrologic characteristics or the existing NAC. These adjusted segments may have affected the associated listing or delisting. The reasons a waterbody were re-segmented were:

- Splitting a reservoir from a stream or river, for example differentiating Rye Patch Reservoir from the Humboldt River reach , Imlay to Woolsey;
- A standards change split the reach, for example separating trout/non-trout waters (Class B and C waters) showing which waters supported cold water Aquatic Life; and
- The listing in 2002 or 2004 included two separate reaches as one and did not reflect the existing NAC. For example First Creek in Tahoe Basin was listed in 2004 for Zn and described as First Creek above Lake Tahoe. The NAC shows two segments, First Creek above Dale and Knotty Pine Dr. and First Creek at Lakeshore Drive.

Often one of the re-segmented portions of the original reach does not have any water quality or assessment data associated with the adjusted reach. For the re-segmented reaches with no data NDEP delisted the associated parameter and in USEPA's Assessment Database (ADB) showed the use support for the associated beneficial use as insufficient information .

For example Molybdenum (Aquatic Life) was listed for the Humboldt River from Imlay to Woolsey. NDEP re-segmented the Imlay to Woolsey into two reaches, 1) "Rye Patch Reservoir" and 2) "the Humboldt River from Imlay to Woolsey excluding Rye Patch Reservoir". The full reach, including Rye Patch Reservoir was listed for Mo in 2002 and 2004. There is no water quality or assessment data associated with Rye Patch Reservoir, therefore Mo was delisted for the reservoir, but the Use Support for Aquatic Life for the reservoir was adjusted to Insufficient Information. The Humboldt River from Imlay to Woolsey, excluding Rye Patch Reservoir, is still listed for Mo.

Standards That Are Expressed As "Not to Exceed", "Not More Than", "Within Range"
NDEP evaluated the "not to exceed" standards, including "not less than", "not more than", "within range" by assuming all of these examples were equivalent to a S.V. standard and then followed the 10% rule described above. .

Toxics
NAC 445A.144 defines water quality standards for various toxic materials that are applicable to the waters specified in NAC 445A.124 to 127 and NAC 445A.145 to 225, inclusive. The aquatic life numeric criteria for some of the toxic parameters have 1-hour average (acute) and/or 96-hour average (chronic) maximum acceptable concentrations, with the 96-hour criteria being the most restrictive. The acute and chronic concentration limits may be exceeded only once every 3 years. Parameters with acute and/or chronic standards include arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, selenium, silver and zinc.

To determine exceedance of the acute and chronic standards, the data were valuated in three year blocks over the five year listing period. For example, block one included years 1, 2 and 3; block two included years 2, 3, and 4; and block three included years 3, 4 and 5. Waterbodies were listed if the acute or chronic water quality standards were exceeded two or more times during any 3 year block.

Non acute/chronic aquatic life and other beneficial use (i.e. municipal/domestic supply, irrigation and livestock watering) toxic standards were evaluated according to the general listing criteria described above. These parameters include arsenic, boron, cadmium, chromium, copper, cyanide, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, selenium and zinc.

EPA's Assessment Database was used to compile the 2006 303(d) list. The database does not differentiate between the total or dissolved fractions for the metals criteria. NDEP assessed the applicable criteria for both the total and dissolved fractions and the metal was listed if it exceeded either criteria. However, Nevada's 2006 303(d) list and delists do not differentiate between fractions.

Waters Located on Tribal Lands
The 2006 303(d) List does not include any impaired waterbodies on tribal lands as the State of Nevada has no authority to address these waterbodies.

Zinc
A number of waterbodies are listed for exceedance of the dissolved zinc criteria. However, in many cases the data on which the listings are based are questionable, as the dissolved portions are significantly greater than the total recoverable concentrations. This data integrity issue was first identified during the 2004 303(d) listing process. At that time, NDEP proposed to exclude the dubious data from the listing evaluation. However, at EPA’s insistence the data was not eliminated and waters were listed based on all available data.

Subsequently, NDEP and the Nevada State Health Laboratory conducted studies to determine the source of the problem and it was ultimately concluded that the filters used during sample collection were contaminated. The quality of the data has improved since NDEP began using a different brand of filter in January 2006 which was after the 2006 listing period (October 2000 through September 2005).

It is expected that many of the waterbodies included on the 2006 303(d) List due to faulty zinc data will be delisted in future years.

Despite the data quality concerns, no data points were eliminated from the dataset used for determining the 2006 303(d) listings. Waterbodies were only delisted for zinc when the data indicated the standards were being met according to the criteria discussed in the Toxics section.

5.3 DELISTING CRITERIA

As a general approach, similar data is needed to delist a waterbody as to list. If the procedures described above indicated a waterbody was not impaired, the waterbody was delisted. For the 2006 303(d) List, waterbodies were delisted if:

- For conventional pollutants and some toxic parameters, ten or more data points indicated 10 percent or less exceedance of the beneficial use standard;
- For toxic parameters with acute and chronic criteria, there were one or zero exceedances during all three year blocks of the 5 year listing period.
- A standard was no longer exceeded due to a change of the water quality standard, and that waterbody meets the delisting criteria;
- The waterbody was previously listed in error due to faulty data, information or analysis.
- A TMDL was developed by NDEP and approved by EPA.

The Delist Table shown in Attachment 2 indicates the specific reason for each delisting.

Glossary

Geometric Mean. The value obtained by taking the "nth" root of the product of "n" numbers. Example: For the dataset (10, 15, 12, 11), the geometric mean = $(10 \times 15 \times 12 \times 11)^{1/4}$

Impaired waterbody. A water that does not attain/maintain the water quality standards throughout the waterbody due to individual or multiple pollutants or other causes of pollution.

Median. For a given set of numbers, the median is the value which has an equal number of values greater and less than it.

Narrative standards. Nonquantitative guidelines that describe the desired water quality goals.

Nonpoint sources. Pollution that is discharged over a wide land area and not from one specific location.

Point sources. Pollutant loads discharge at a specific location from pipes, outfalls, and conveyance channels from either municipal wastewater treatment plants or industrial waste treatment facilities. This term does not include return flows from irrigated agriculture or agriculture storm water runoff.

Total Maximum Daily Load (TMDL). A TMDL is a written, quantitative plan and analysis for attaining and maintaining water quality standards in all seasons for a specific waterbody and pollutant. Total maximum daily loads or TMDLs are an assessment of the maximum amount of pollutant a waterbody can receive without violating water quality standards. TMDLs take into account pollution from all sources, including discharges from sewage treatment facilities and industry; runoff from farms, forests and urban areas; and natural sources. TMDLs provide a way to integrate the management of both point and nonpoint sources of pollution through the establishment of wasteload allocations (WLA) for point source discharges and load allocations (LA) for nonpoint sources of pollution. The TMDL Program is designed to help bring waterbodies into compliance with the water quality standards as needed to support their designated uses such as irrigation, aquatic life, municipal or domestic supply, and water contact recreation.

ATTACHMENT 1
Nevada's 2006 303(d) List of Impaired Waters

Nevada's 2006 303(d) List is organized with the following columns:

- Column 1 is the Waterbody Identification (ID) number.
- Column 2 is the Nevada Administrative Code (NAC) 445A reference for the water quality standard.
- Column 3 is the size of the waterbody or reach in mile(s) or acre(s).
- Column 4 is the waterbody name.
- Column 5 describes the extent of the waterbody or reach.
- Column 6 identifies the parameter identified as impaired.
- Column 7 indicates if the waterbody/parameter was on the 2004 List or if it is a new 2006 listing.
- Column 8 indicates the priority ranking for TMDL development.

ATTACHMENT 2
Nevada's 2006 303(d) Delisted Waters

Nevada's 2006 303(d) Delisted Waters is organized with the following columns:

- Column 1 is the Waterbody Identification (ID) number.
- Column 2 is the Nevada Administrative Code (NAC) 445A reference for the water quality standard.
- Column 3 is the size of the waterbody or reach in mile(s) or acre(s).
- Column 4 is the waterbody name.
- Column 5 describes the extent of the waterbody or reach.
- Column 6 identifies delisted parameter
- Column 7 indicates the reason the waterbody was delisted
- Column 8 indicates the waterbody has a TMDL and whether meets water quality standards.
- Column 9 indicates the waterbody has a TMDL and if it does NOT meet water quality standards.
- Column 10 indicates the year a TMDL was developed.

ATTACHMENT 3
Nevada Database Stations Used In the Evaluation

Nevada Database Stations Used is organized with the following columns:

- Column 1 is the Waterbody Identification (ID) number.
- Column 2 identifies the USGS HUC in which the waterbody is located
- Column 3 indicates the sampling agency.
- Column 4 identifies the STORET Id (Post 1998).
- Column 5 identifies the STORET Id (Pre 1999).
- Column 6 identifies the Station Id.
- Column 7 identifies Station Name

ATTACHMENT 4
Summary of Other Agency Data and Information Evaluated for the 2006 303(d) list

Summary of Data and Information Evaluated for the 2006 303(d) List

In addition to NDEP monitoring data, the primary water chemistry data sources that were either compiled by NDEP or submitted to NDEP, and were used to evaluated for inclusion on the 303(d) List were:

- **U.S. Geological Survey**
  The main U.S. Geological Survey data used in the listing analysis included water quality and temperature data for the Humboldt River and tributaries, Lake Tahoe tributaries, and Carson River.

- **Desert Research Institute**
  DRI collects Truckee River water quality data in conjunction with NDEP's monitoring network. DRI also performed special studies on the Carson River, the results of which were reviewed for listing.

- **University of Nevada, Reno**
  UNR has studied mercury levels in Steamboat Creek. These data along with NDEP were evaluated.

- **Tahoe Research Group – U.C. Davis**
  Tahoe Research Group collects data for a variety of parameters – clarity, nutrients, sediment. The light extinction data were used to list Lake Tahoe for clarity in 2002.

- **Truckee Meadows Water Reclamation Facility**
  TMWRF collects extensive Truckee River water quality data with grab samples and physical characteristics with Hydrolabs. All these data were evaluated in the listing analyses.

- **City of Las Vegas, Clark County Sanitation District and City of Henderson, Southern Nevada Water Authority**
  These entities collected extensive data which were evaluated for listing purposes for the Las Vegas Wash and tributaries, and Lake Mead.

- **U.S. Bureau of Land Management**
  BLM – Elko District and Idaho submitted continuous temperature data and water quality for numerous streams in the Snake and Humboldt Basins.

- **South Tahoe Public Utilities District**
  Nutrient data collected by STPUD on the lower reaches of Indian Creek were evaluated.

- **Leviathan Mine Database (multiple sources)**
  Superfund contractors are developing a comprehensive database of water quality data associated with the Leviathan Mine site and area. These data were evaluated in the listing process.

- **Nevada Bureau of Mining Regulation and Reclamation**
  The Bureau of Mining maintains files of discharge monitoring reports (DMRs) submitted by various mining operations in accordance with permit requirements. These data were evaluated for listing purposes.

- **Health Advisory**
  The State Health Division has issued health advisories for a number of waters due to elevated mercury in fish tissue. These advisories were used as the basis for listing these waters.

- **Carson River Mercury Superfund Site**
  A portion of the Carson River is designated as a superfund site due to elevated mercury levels. The Carson River Mercury Site consists of: 1) sediments in an approximately 50-mile stretch of the Carson River in Lyon and Churchill Counties, beginning between Carson City and Dayton, Nevada, and extending downstream through the Lahontan Reservoir to Stillwater National Wildlife Refuge; and 2) tailing piles associated with the river. This designation was used as the basis for listing these waters.

- **Walker Lake**
  In 2002, EPA approved the beneficial uses and criteria promulgated by the State of Nevada for Walker Lake. The propagation of aquatic life was included as one of the beneficial uses. While the standards do not include numeric criteria for TDS, the Nevada Division of Wildlife has shown that TDS levels have impaired the aquatic life beneficial use. NDOW found that hatchery Lahontan Cutthroat Trout experienced high death rates upon release into the high TDS waters of Walker Lake. In the mid-1990s, the Nevada Department of Wildlife began acclimating the hatchery trout in high TDS water prior to releasing into Walker Lake. While this acclimation process has improved initial fish survival, the health and lifespan of the LCT and its food sources are impaired due to the elevated TDS levels. Increasing TDS concentrations have caused significant biological changes in Walker Lake, including a reduction in biological diversity and the extinction of at least one zooplankton species. The declining water quality is also directly related to the loss of native species of fish (Tahoe sucker, Lahontan redside shiner, and Lahontan speckled dace). Additionally, the 2002 305(b) Report identified Walker Lake as "Not Supporting". Sources include: "Walker Lake Limnological Report, 1995-1996", Horne & Beutel, UC Berkeley, 1997; Communications with M. Sevon, Nevada Division of Wildlife, various years; Written communications with Robert Williams, U.S. Fish and Wildlife Service, October 29, 2001.

- **Lake Tahoe Water Purveyors**
  Raw water data (specifically pH) collected by various public water systems were evaluated along with NDEP data to determine Tahoe's pH status.

- **Nevada Department of Wildlife**
  The Nevada Department of Wildlife (NDOW) submitted continuous temperature data for a number of waterbodies throughout the state.