APPENDIX J

WATER RESOURCES

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1 ## J.1 NEVADA ADMINISTRATIVE CODE 445A

Water Resources

Appendix #

Nevada Administrative Code, Chapter 445A

Water Controls

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[NAC-445A Revised Date: 6-16]

CHAPTER 445A - WATER CONTROLS

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445A.0608	**Adoption by reference of *National Environmental Laboratory Accreditation Conference-Constitution, Bylaws and Standards*.**

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445A.0612	Adoption by reference of certain publications related to sample collection procedures, analytical methodologies and requirements for certification.
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Standards for Water Quality

Standards for Water Quality

NAC 445A.11704 Definitions. (NRS 445A.425, 445A.520) As used in NAC 445A.11704 to 445A.2234, inclusive, unless the context otherwise requires, the terms and symbols defined in NAC 445A.11708 to 445A.1178, inclusive, have the meanings ascribed to them in those sections.

(Added to NAC by Environmental Comm'n, eff. 6-29-84; A 11-9-95; R226-03, 4-23-2004; R160-06 & R083-08, 8-26-2008) — (Substituted in revision for NAC 445A.128)

NAC 445A.11708 "A-Avg." or "A.A." defined. (NRS 445A.425, 445A.520) "A-Avg." or "A.A." means annual average.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.129)

NAC 445A.11712 "Δ" defined. (NRS 445A.425, 445A.520) "Δ" means the difference between two points.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.130)

NAC 445A.11716 "Δ pH" defined. (NRS 445A.425, 445A.520) "Δ pH" means the change in pH.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.131)

NAC 445A.1172 "Δ T" defined. (NRS 445A.425, 445A.520) "Δ T" means the change in temperature.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.132)

NAC 445A.11724 "Geometric mean" defined. (NRS 445A.425, 445A.520) "Geometric mean" means the mean of n positive numbers obtained by taking the nth root of the product of the numbers.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.133)

NAC 445A.11736 "M.D.B. & M." defined. (NRS 445A.425, 445A.520) "M.D.B. & M." means Mount Diablo Base and Meridian.

(Added to NAC by Environmental Comm'n by R226-03, eff. 4-23-2004)

NAC 445A.1174 "mg/l" defined. (NRS 445A.425, 445A.520) "mg/l" means the concentration of a substance, in milligrams, present in one liter of the water.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.134)

NAC 445A.11744 "No./100ml" defined. (NRS 445A.425, 445A.520) "No./100ml" means the number of organisms present in 100 milliliters of the water.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.135)

NAC 445A.11748 "NTU" defined. (NRS 445A.425, 445A.520) "NTU" means nephelometric turbidity units, a measure of turbidity.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.136)

NAC 445A.11752 "PCU" defined. (NRS 445A.425, 445A.520) "PCU" means platinum cobalt unit, a measure of color.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.137)

NAC 445A.1176 "SAR" defined. (NRS 445A.425, 445A.520) "SAR" means sodium adsorption ratio.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.139)

NAC 445A.11764 "SU" defined. (NRS 445A.425, 445A.520) "SU" means standard pH units.

(Added to NAC by Environmental Comm'n by R226-03, eff. 4-23-2004)

NAC 445A.11768 "S.V." defined. (NRS 445A.425, 445A.520) "S.V." means single value.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.140)

NAC 445A.11772 "Trout water" defined. (NRS 445A.425, 445A.520) "Trout water" means a reach of water that the Commission determines is suitable as a habitat for trout.

(Added to NAC by Environmental Comm'n by R226-03, eff. 4-23-2004)

NAC 445A.11776 "≥" defined. (NRS 445A.425, 445A.520) "≥" means greater than or equal to.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.141)

NAC 445A.1178 "≤" defined. (NRS 445A.425, 445A.520) "≤" means less than or equal to.

(Added to NAC by Environmental Comm'n, eff. 6-29-84) — (Substituted in revision for NAC 445A.142)

NAC 445A.118 Water quality criteria for total ammonia. (NRS 445A.425, 445A.520)

1. The acute criteria of water quality with regard to the concentration of total ammonia are subject to the following:

(a) The 1-hour average concentration of total ammonia, in milligrams of nitrogen per liter, for the protection of freshwater aquatic life is shown in Table 1.

(b) For cold-water fisheries, the concentration of total ammonia, in milligrams of nitrogen per liter, must not exceed the applicable acute criterion listed under "Cold-Water Fisheries" set forth in Table 1, more than once every 3 years on average.

(c) For warm-water fisheries, the concentration of total ammonia, in milligrams of nitrogen per liter, must not exceed the applicable acute criterion listed under "Warm-Water Fisheries" set forth in Table 1, more than once every 3 years on average.

2. The chronic criteria of water quality with regard to the concentration of total ammonia are subject to the following:

(a) The 30-day average concentration of total ammonia, in milligrams of nitrogen per liter, for the protection of freshwater aquatic life is shown in Tables 2 and 3.

(b) The concentration of total ammonia, in milligrams of nitrogen per liter, expressed as a 30-day average must not exceed the applicable chronic criterion listed in Tables 2 and 3 more than once every 3 years on average, and the highest 4-day average within the 30-day period must not exceed 2.5 times the applicable chronic criterion.

(c) Table 3 must not be used unless the Division receives acceptable documentation of the absence of freshwater fish in early life stages.

TABLE 1: ACUTE WATER QUALITY CRITERIA FOR TOTAL AMMONIA FOR FRESHWATER AQUATIC LIFE (mg nitrogen/l)		
pH	Cold-Water Fisheries[1]	Warm-Water Fisheries[2]
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

[1] The acute water quality criteria for total ammonia for cold-water fisheries were calculated using the following equation, which may also be used to calculate unlisted values:

Acute water quality criteria for ammonia (cold-water fisheries) =

$$\left[\frac{0.275}{1+10^{7.204-pH}}\right]+\left[\frac{39.0}{1+10^{pH-7.204}}\right]$$

[2] The acute water quality criteria for total ammonia for warm-water fisheries were calculated using the following equation, which may also be used to calculate unlisted values:

Acute water quality criteria for ammonia (warm-water fisheries) =

$$\left[\frac{0.411}{1+10^{7.204-pH}}\right]+\left[\frac{58.4}{1+10^{pH-7.204}}\right]$$

TABLE 2: CHRONIC WATER QUALITY CRITERIA FOR TOTAL AMMONIA FOR WATERS WHERE FRESHWATER FISH IN EARLY LIFE STAGES MAY BE PRESENT (mg nitrogen/l)[1]

1

pH	Temperature (°C)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

[1] The chronic water quality criteria for total ammonia for waters where freshwater fish in early life stages may be present were calculated using the following equation, which may also be used to calculate unlisted values:

Chronic water quality criteria for ammonia (fish in early life stages present) =

$$\left[\frac{0.0577}{1+10^{7.688-pH}}+\frac{2.487}{1+10^{pH-7.688}}\right] x\ MIN\left[2.85, 1.45\ x\ 10^{0.028x(25-T)}\right]$$

where:

T=°C
x means multiplication
MIN means the lesser of the two values separated by the comma

TABLE 3: CHRONIC WATER QUALITY CRITERIA FOR TOTAL AMMONIA FOR WATERS WHERE FRESHWATER FISH IN EARLY LIFE STAGES ARE ABSENT (mg nitrogen/l)[1]										
pH	Temperature (°C)									
	0-7	8	9	10	11	12	13	14	15[2]	16[2]

TABLE 3: CHRONIC WATER QUALITY CRITERIA FOR TOTAL AMMONIA FOR WATERS WHERE FRESHWATER FISH IN EARLY LIFE STAGES ARE ABSENT (mg nitrogen/l)[1]										
pH	Temperature (°C)									
	0-7	8	9	10	11	12	13	14	15[2]	16[2]
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

[1] The chronic water quality criteria for total ammonia for waters where freshwater fish in early life stages are absent were calculated using the following equation, which may also be used to calculate unlisted values:

Chronic water quality criteria for ammonia (fish in early life stages absent) =

$$\left[\frac{0.0577}{\left(1+10^{7.688-pH}\right)}+\frac{2.487}{\left(1+10^{pH-7.688}\right)}\right] x\, 1.45\, x \left[10^{0.028 x (25-MAX(T,7))}\right]$$ where:

T=°C

x means multiplication

MAX means the greater of the two values separated by the comma

[2] At 15°C and above, the criteria for waters where freshwater fish in early life stages are absent is the same as the criteria for waters where freshwater fish in early life stages may be present.

NOTES FOR TABLES 1, 2 AND 3:

- pH and temperature are field measurements that must be taken at the same time and location as the water sample destined for the laboratory analysis of ammonia.

- If the field-measured pH or the temperature values, or both, fall between the tabular values set forth in this section, the field-measured values or temperature values, as appropriate, must be rounded according to standard rounding procedures to the nearest tabular value to determine the applicable ammonia standard, or the equations provided in this section may be used to calculate unlisted values.

(Added to NAC by Environmental Comm'n by R099-02, eff. 12-17-2002)

NAC 445A.120 Applicability. (NRS 445A.425, 445A.520)

1. NAC 445A.070 to 445A.2234, inclusive, apply to all natural streams and lakes, reservoirs or impoundments on natural streams and other specified waterways, unless excepted on the basis of existing irreparable conditions which preclude such use. Man-made waterways, unless otherwise specified, must be protected for public health and the use for which the waterways were developed.

2. The quality of any waters receiving waste discharges must be such that no impairment of the beneficial usage of water occurs as the result of the discharge. Natural water conditions may, on occasion, be outside the limits established by standards. The standards adopted in NAC 445A.070 to 445A.2234, inclusive, relate to the condition of waters as affected by discharges relating to human activities.

3. NAC 445A.11704 to 445A.2234, inclusive, do not apply to waters within the exterior borders of an Indian reservation.

[Environmental Comm'n, Water Pollution Control Reg. § 4.1, eff. 5-2-78] — (NAC A 12-3-84; R017-99, 9-27-99; R160-06 & R083-08, 8-26-2008; R093-13, 12-23-2013)

NAC 445A.121 Standards applicable to all surface waters. (NRS 445A.425, 445A.520) The following standards are applicable to all surface waters of the State:

1. Waters must be free from substances attributable to domestic or industrial waste or other controllable sources that will settle to form sludge or bottom deposits in amounts sufficient to be unsightly, putrescent or odorous or in amounts sufficient to interfere with any beneficial use of the water.

2. Waters must be free from floating debris, oil, grease, scum and other floating materials attributable to domestic or industrial waste or other controllable sources in amounts sufficient to be unsightly or in amounts sufficient to interfere with any beneficial use of the water.

3. Waters must be free from materials attributable to domestic or industrial waste or other controllable sources in amounts sufficient to produce taste or odor in the water or detectable off-flavor in the flesh of fish or in amounts sufficient to change the existing color, turbidity or other conditions in the receiving stream to such a degree as to create a public nuisance or in amounts sufficient to interfere with any beneficial use of the water.

4. Waters must be free from high temperature, biocides, organisms pathogenic to human beings, toxic, corrosive or other deleterious substances attributable to domestic or industrial waste or other controllable sources at levels or combinations sufficient to be toxic to human, animal, plant or aquatic life or in amounts sufficient to interfere with any beneficial use of the water. Compliance with the provisions of this subsection may be determined in accordance with methods of testing prescribed by the Department. If used as an indicator, survival of test organisms must not be significantly less in test water than in control water.

5. If toxic materials are known or suspected by the Department to be present in a water, testing for toxicity may be required to determine compliance with the provisions of this section and effluent limitations. The Department may specify the method of testing to be used. The failure to determine the presence of toxic materials by testing does not preclude a determination by the Department, on the basis of other criteria or methods, that excessive levels of toxic materials are present.

6. Radioactive materials attributable to municipal, industrial or other controllable sources must be the minimum concentrations that are physically and economically feasible to achieve. In no case must materials exceed the limits established in the 1962 Public Health Service Drinking Water Standards (or later amendments) or 1/30th of the MPC values given for continuous occupational exposure in the "National Bureau of Standards Handbook No. 69." The concentrations in water must not result in accumulation of radioactivity in plants or animals that result in a hazard to humans or harm to aquatic life.

7. Wastes from municipal, industrial or other controllable sources containing arsenic, barium, boron, cadmium, chromium, cyanide, fluoride, lead, selenium, silver, copper and zinc that are reasonably amenable to treatment or control must not be discharged untreated or uncontrolled into the waters of Nevada. In addition, the limits for concentrations of the chemical constituents must provide water quality consistent with the mandatory requirements of the 1962 Public Health Service Drinking Water Standards.

8. 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. Where effluents are discharged to such waters, the discharges are not considered a contributor to substandard conditions provided maximum treatment in compliance with permit requirements is maintained.

[Environmental Comm'n, Water Pollution Control Reg. § 4.1.2 subsecs. a-g, eff. 5-2-78] — (NAC A 9-26-90; R017-99, 9-27-99)

NAC 445A.122 Standards applicable to beneficial uses. (NRS 445A.425, 445A.520)

1. The following standards are intended to protect both existing and designated beneficial uses and must not be used to prohibit the use of the water as authorized under title 48 of NRS:

(a) Watering of livestock. The water must be suitable for the watering of livestock without treatment.

(b) Irrigation. The water must be suitable for irrigation without treatment.

(c) Aquatic life. The water must be suitable as a habitat for fish and other aquatic life existing in a body of water. This does not preclude the reestablishment of other fish or aquatic life.

(d) Recreation involving contact with the water. There must be no evidence of man-made pollution, floating debris, sludge accumulation or similar pollutants.

(e) Recreation not involving contact with the water. The water must be free from:

(1) Visible floating, suspended or settled solids arising from human activities;

(2) Sludge banks;

(3) Slime infestation;

(4) Heavy growth of attached plants, blooms or high concentrations of plankton, discoloration or excessive acidity or alkalinity that leads to corrosion of boats and docks;

(5) Surfactants that foam when the water is agitated or aerated; and

(6) Excessive water temperatures.

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(f) Municipal or domestic supply. The water must be capable of being treated by conventional methods of water treatment in order to comply with Nevada's drinking water standards.

(g) Industrial supply. The water must be treatable to provide a quality of water which is suitable for the intended use.

(h) Propagation of wildlife. The water must be suitable for the propagation of wildlife and waterfowl without treatment.

(i) Waters of extraordinary ecological or aesthetic value. The unique ecological or aesthetic value of the water must be maintained.

(j) Enhancement of water quality. The water must support natural enhancement or improvement of water quality in any water which is downstream.

2. This section does not entitle an appropriator to require that the source meet his or her particular requirements for water quality.

[Environmental Comm'n, Water Pollution Control Reg. § 4.1.1, eff. 5-2-78] — (NAC A 11-22-82; 12-3-84; 11-9-95)

NAC 445A.123 Classification and reclassification of waters. (NRS 445A.425, 445A.520)

1. Stream standards and classifications in NAC 445A.123 to 445A.2234, inclusive, do not preclude the Commission from establishing standards and classifications for additional public waters nor reclassifying the waters covered by those sections.

2. The Commission will consider classification of a body of public water not contained in NAC 445A.123 to 445A.2234, inclusive, upon a request for a permit to discharge into that body of water.

[Environmental Comm'n, Water Pollution Control Reg. § 4.2, eff. 5-2-78] — (NAC A 12-3-84; R160-06, 8-26-2008) — (Substituted in revision for NAC 445.121)

NAC 445A.1233 Cooperation regarding Colorado River; salinity standards. (NRS 445A.425, 445A.520)

1. The State of Nevada will cooperate with the other Colorado River Basin states and the Federal Government to support and carry out the conclusions and recommendations adopted April 27, 1972, by the Reconvened 7th Session of the Conference in the Matter of Pollution of the Interstate Waters of the Colorado River and its Tributaries.

2. Pursuant to the "2011 Review - Water Quality Standards for Salinity, Colorado River System," as adopted by the Colorado River Basin Salinity Control Forum, the flow weighted annual average concentrations for the calendar year for total dissolved solids in mg/l at the three lower main stem stations of the Colorado River are as follows:

Station	Salinity in mg/l
Below Hoover Dam	723
Below Parker Dam	747
At Imperial Dam	879

[Environmental Comm'n, Water Pollution Control Reg. Appendix B, eff. 5-2-78] — (NAC A 12-3-84; R017-99, 9-27-99; R159-06, 9-18-2006; R130-10, 12-16-2010; R132-12, 12-20-2012) — (Substituted in revision for NAC 445A.143)

NAC 445A.1236 Standards for toxic materials applicable to designated waters. (NRS 445A.425, 445A.520)

1. Except for waters which have site-specific standards for toxic materials or as otherwise provided in this section, the standards for toxic materials prescribed in subsection 2 are applicable to the waters specified in NAC 445A.123 to 445A.2234, inclusive. The following criteria apply to this section:

(a) If the standards are exceeded at a site and are not economically controllable, the Commission will review and may adjust the standards for the site.

(b) If a standard does not exist for each designated beneficial use, a person who plans to discharge waste must demonstrate that no adverse effect will occur to a designated beneficial use. If the discharge of a substance will lower the quality of the water, a person who plans to discharge waste must meet the requirements of NRS 445A.565.

(c) If a criterion 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 shall be deemed to show compliance with the standard unless other information indicates that the substance may be present.

2. The standards for toxic materials are:

Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[1,2] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
INORGANIC CHEMICALS[3]				
Antimony	146[a]	-	-	-
Arsenic	50[b]	-	100[c]	200[d]
1-hour average	-	340[e,(4)]	-	-
96-hour average	-	150[e,(4)]	-	-
Barium	2,000[b]	-	-	-
Beryllium	0[a]	-	100[c]	-
Boron	-	-	750[a]	5,000[d]
Cadmium	5[b]	-	10[d]	50[d]
1-hour average	-	$(1.136672-\{\ln(hardness)(0.041838)\})*e^{(1.0166\{\ln(hardness)\} - 3.924)}$ [e,(4)]	-	-
96-hour average	-	$(1.101672-\{\ln(hardness)(0.041838)\})*e^{(0.7409\{\ln(hardness)\} - 4.719)}$ [e,(4)]	-	-
Chromium (total)	100[b]	-	100[d]	1,000[d]
Chromium (VI)	-	-	-	-
1-hour average	-	16[e,(4)]	-	-
96-hour average	-	11[e,(4)]	-	-
Chromium (III)	-	-	-	-
1-hour average	-	$(0.316) * e^{(0.8190\{\ln(hardness)\} + 3.7256)}$ [e,(4)]	-	-
96-hour average	-	$(0.860) * e^{(0.8190\{\ln(hardness)\} + 0.6848)}$ [e,(4)]	-	-
Copper	-	-	200[d]	500[d]
1-hour average	-	$(0.960) * e^{(0.9422\{\ln(hardness)\} - 1.700)}$ [e,(4)]	-	-
96-hour average	-	$(0.960) * e^{(0.8545\{\ln(hardness)\} - 1.702)}$ [e,(4)]	-	-
Cyanide	200[a]	-	-	-
1-hour average	-	22[e,(5)]	-	-
96-hour average	-	5.2[e,(5)]	-	-
Fluoride	-	-	1,000[d]	2,000[d]
Iron	-	-	5,000[d]	-
96-hour average	-	1,000[e]	-	-

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Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[(1,2)] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
Lead	50[a,b]	-	5,000[d]	100[d]
1-hour average	-	$(1.46203-\{\ln(hardness)(0.145712)\})*e^{(1.273\{\ln(hardness)\} - 1.460)}$ [e,(4)]	-	-
96-hour average	-	$(1.46203-\{\ln(hardness)(0.145712)\})*e^{(1.273\{\ln(hardness)\} - 4.705)}$ [e,(4)]	-	-
Manganese	-	-	200[d]	-
Mercury	2[b]	-	-	10[d]
1-hour average	-	1.4[e,(4)]	-	-
96-hour average	-	0.77[e,(4)]	-	-
Molybdenum	-	-	-	-
1-hour average	-	6,160[f]	-	-
96-hour average	-	1,650[f]	-	-
Nickel	13.4[a]	-	200[d]	-
1-hour average	-	$(0.998) * e^{(0.8460\{\ln(hardness)\} + 2.255)}$ [e,(4)]	-	-
96-hour average	-	$(0.997) * e^{(0.8460\{\ln(hardness)\} + 0.0584)}$ [e,(4)]	-	-
Selenium	50[b]	-	20[d]	50[d]
1-hour average	-	20[a]	-	-
96-hour average	-	5.0[e]	-	-
Silver	-	-	-	-
1-hour average	-	$(0.85) * e^{(1.72\{\ln(hardness)\} - 6.59)}$ [e,(4)]	-	-
Sulfide (undissociated hydrogen sulfide)	-	-	-	-
96-hour average	-	2.0[e]	-	-
Thallium	13[a]	-	-	-
Zinc	-	-	2,000[d]	25,000[d]
1-hour average	-	$(0.978) * e^{(0.8473\{\ln(hardness)\} + 0.884)}$ [e,(4)]	-	-
96-hour average	-	$(0.986) * e^{(0.8473\{\ln(hardness)\} + 0.884)}$ [e,(4)]	-	-
ORGANIC CHEMICALS				
Acrolein	320[a]	-	-	-
1-hour average	-	3[e]	-	-
96-hour average	-	3[e]	-	-
Aldrin	0[a]	-	-	-
1-hour average	-	3.0[e]	-	-
alpha-Endosulfan	-	-	-	-
1-hour average	-	0.22[e]	-	-
96-hour average	-	0.056[e]	-	-
beta-Endosulfan	-	-	-	-
1-hour average	-	0.22[e]	-	-
96-hour average	-	0.056[e]	-	-
Benzene	5[b]	-	-	-
Bis (2-chloroisopropyl) ether	34.7[a]	-	-	-
Chlordane	0[a]	-	-	-
1-hour average	-	2.4[e]	-	-
96-hour average	-	0.0043[e]	-	-
Chloroethylene (vinyl chloride)	2[b]	-	-	-
Chlorpyrifos	-	-	-	-
1-hour average	-	0.083[e]	-	-
96-hour average	-	0.041[e]	-	-
2,4-D	100[a,b]	-	-	-
DDT & metabolites	0[a]	-	-	-
4,4'-DDT	-	-	-	-
1-hour average	-	1.1[e,(6)]	-	-
96-hour average	-	0.001[e,(6)]	-	-
Demeton	-	-	-	-
96-hour average	-	0.1[e]	-	-

Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[(1,2)] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
Diazinon	-	-	-	-
1-hour average	-	0.17[e]	-	-
96-hour average	-	0.17[e]	-	-
Dibutyl phthalate	34,000[a]	-	-	-
m-dichlorobenzene	400[a]	-	-	-
o-dichlorobenzene	400[a]	-	-	-
p-dichlorobenzene	75[b]	-	-	-
1,2-dichloroethane	5[b]	-	-	-
1,1-dichloroethylene	7[b]	-	-	-
2,4-dichlorophenol	3,090[a]	-	-	-
Dichloropropenes	87[a]	-	-	-
Dieldrin	0[a]	-	-	-
1-hour average	-	0.24[e]	-	-
96-hour average	-	0.056[e]	-	-
Di-2-ethylhexyl phthalate	15,000[a]	-	-	-
Diethyl phthalate	350,000[a]	-	-	-
Dimethyl phthalate	313,000[a]	-	-	-
4,6-dinitro-2-methylphenol	13.4[a]	-	-	-
Dinitrophenols	70[a]	-	-	-
Endosulfan	75[a]	-	-	-
Endrin	0.2[b]	-	-	-
1-hour average	-	0.086[e]	-	-
96-hour average	-	0.036[e]	-	-
Ethylbenzene	1,400[a]	-	-	-
Fluoranthene (polynuclear aromatic hydrocarbon)	42[a]	-	-	-
Guthion	-	-	-	-
96-hour average	-	0.01[e]	-	-
Heptachlor	-	-	-	-
1-hour average	-	0.52[e]	-	-
96-hour average	-	0.0038[e]	-	-
Heptacholor Epoxide	-	-	-	-
1-hour average	-	0.52[e]	-	-
96-hour average	-	0.0038[e]	-	-
Hexachlorocyclopentadiene	206[a]	-	-	-
Isophorone	5,200[a]	-	-	-
Lindane	4[b]	-	-	-
1-hour average	-	0.95[e]	-	-
Malathion	-	-	-	-
96-hour average	-	0.1[e]	-	-
Methoxychlor	100[a,b]	-	-	-
96-hour average	-	0.03[e]	-	-
Mirex	0[a]	-	-	-
96-hour average	-	0.001[e]	-	-
Monochlorobenzene	488[a]	-	-	-
Nitrobenzene	19,800[a]	-	-	-
Nonylphenol	-	-	-	-
1-hour average	-	28[e]	-	-
96-hour average	-	6.6[e]	-	-
Parathion	-	-	-	-
1-hour average	-	0.065[a]	-	-
96-hour average	-	0.013[a]	-	-
Pentachlorophenol	1,010[a]	-	-	-
1-hour average	-	$e^{1.005(pH) - 4.869}$[e]	-	-
96-hour average	-	$e^{1.005(pH) - 5.134}$[e]	-	-
Phenol	3,500[a]	-	-	-
Polychlorinated biphenyls (PCBs)	0[a]	-	-	-

Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[(1,2)] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
96-hour average	-	0.014[e]	-	-
Silvex (2,4,5-TP)	10[a,b]	-	-	-
Tetrachloromethane (carbon tetrachloride)	5[b]	-	-	-
Toluene	14,300[a]	-	-	-
Toxaphene	5[b]	-	-	-
1-hour average	-	0.73[a]	-	-
96-hour average	-	0.0002[a]	-	-
Tributyltin (TBT)	-	-	-	-
1-hour average	-	0.46[e]	-	-
96-hour average	-	0.072[e]	-	-
1,1,1-trichloroethane (TCA)	200[b]	-	-	-
Trichloroethylene (TCE)	5[b]	-	-	-
Trihalomethanes (total)[(7)]	100[b]	-	-	-

Footnotes:

(1) One-hour average and 96-hour average concentration limits may be exceeded only once every 3 years. See reference a.

(2) Aquatic life standards apply to surface waters only; "hardness" is expressed as mg/L $CaCO_3$; and "e" refers to the base of the natural logarithm whose value is 2.718.

(3) The standards for metals are expressed as total recoverable, unless otherwise noted.

(4) This standard applies to the dissolved fraction.

(5) This standard is expressed as free cyanide.

(6) This standard applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

(7) The standard for trihalomethanes (TTHMs) is the sum of the concentration of bromodicholoromethane, dibromocholoromethane, tribromomethane (bromoform) and trichloromethane (chloroform). See reference b.

References:

a. U.S. Environmental Protection Agency, Pub. No. EPA 440/5-86-001, *Quality Criteria for Water* (Gold Book) (1986).

b. Federal Maximum Contaminant Level (MCL), 40 C.F.R. §§ 141.11, 141.61 and 141.62 (1992).

c. U.S. Environmental Protection Agency, Pub. No. EPA 440/9-76-023, *Quality Criteria for Water* (Red Book) (1976).

d. National Academy of Sciences, *Water Quality Criteria* (Blue Book) (1972).

e. U.S. Environmental Protection Agency, *National Recommended Water Quality Criteria*, May 2009.

f. Nevada Division of Environmental Protection, *Aquatic Life Water Quality Criteria for Molybdenum,* Tetra Tech, Inc., (June 2008).

(Added to NAC by Environmental Comm'n, eff. 9-13-85; A 9-25-90; 7-5-94; 11-29-95; R158-06, 9-18-2006; R160-06, 8-26-2008; R186-08, 12-17-2008; R129-12, 12-20-2012) — (Substituted in revision for NAC 445A.144)

NAC 445A.1239 Control points: Prescription and applicability of numerical standards for water quality; designation of beneficial uses. (NRS 445A.425, 445A.520)

1. Control points are locations where water quality criteria are specified. Criteria so specified apply to all surface waters of Nevada in the watershed upstream from the control point or to the next upstream control point or to the next water named in NAC 445A.123 to 445A.2234, inclusive.

2. If there are no control points downstream from a particular control point, the criteria for that control point also apply to all surface waters of Nevada in the watershed downstream of the control point or to the next water named in NAC 445A.123 to 445A.2234, inclusive.

3. Each standard is set to protect the beneficial use which is most sensitive with respect to that particular standard.

4. NAC 445A.1242 to 445A.2234, inclusive, prescribe numerical standards for water quality and designate beneficial uses at particular control points.

[Environmental Comm'n, Water Pollution Control Reg. § 4.2.5, eff. 5-2-78; A 1-25-79; 8-28-79; 1-25-80; 12-3-80] — (NAC A 11-22-82; 9-25-90; R160-06, 8-26-2008) — (Substituted in revision for NAC 445A.145)

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J.2 SUMMARY OF PREVIOUS SURFACE WATER INVESTIGATIONS ON THE NEVADA TEST AND TRAINING RANGE

Table J-1. Summary of Previous Surface Water Investigations on the Nevada Test and Training Range

Report	Methodology Used	Results
Nellis Air Force Base (AFB), 99 CES/CEIEA. 2013. Seeps, Springs, and Wildlife Water Developments of the South Range of the Nevada Test and Training Range. June 2013.	Helicopter transects were flown across most of the NTTR South Range to confirm the location of previously reported springs (based on information collected between 1996 and 2009), identify previously unidentified seeps and springs, and identify any other surface water features. The distance between transects varied by vegetation and terrain type. Any differences in the current location of water features versus the location noted in historic information was documented.	The field investigation resulted in documentation of: 14 surface water-fed wildlife water developments 2 spring-fed wildlife water developments 1 perennial spring 2 historical springs (1 unconfirmed by the Nellis Natural Resources Program)
Nellis Air Force Base (AFB), 99 CES/CEIEA. 2014a. Seeps and Springs of the Northwest North Range of the Nevada Test and Training Range. Federal Contract No. W9128F-09-D-0036 DO #0002, Project No. 8068-002-04-01, Work Authorization 007, Document No. 79. October 2014.	Helicopter transects were flown across most of the NTTR North Range to confirm the location of previously reported springs (based on information collected between 1996 and 2009), identify previously unidentified seeps and springs, and identify any other surface water features. The distance between transects varied by vegetation and terrain type. This report presents the results for the northwest quadrant. Any differences in the current location of water features versus the location noted in historic information was documented.	The field investigation resulted in documentation of: 12 perennial springs 4 intermittent springs 4 perennial seeps 8 intermittent seeps 3 construction ponds 2 wells 3 historical seeps and springs
Nellis Air Force Base (AFB), 99 CES/CEIEA. 2014b. Seeps and Springs of the Northeast North Range of the Nevada Test and Training Range. Federal Contract No. W912PP-10-D-0021 DO #0008, Project No. 8098-008-01-01, Work Authorization 014, Document No. 79. March 2014.	Helicopter transects were flown across most of the NTTR North Range to confirm the location of previously reported springs (based on information collected between 1996 and 2009), identify previously unidentified seeps and springs, and identify any other surface water features. The distance between transects varied by vegetation and terrain type. This report presents the results for the northeast quadrant. Any differences in the current location of water features versus the location noted in historic information was documented.	The field investigation resulted in documentation of: 13 perennial springs 7 intermittent springs 3 perennial seeps 16 intermittent seeps
Nellis Air Force Base (AFB),	Helicopter transects were flown	The field investigation resulted in

Table J-1. Summary of Previous Surface Water Investigations on the Nevada Test and Training Range

Report	Methodology Used	Results
99 CES/CEIEA. 2014c. Seeps and Springs of the Southwest North Range of the Nevada Test and Training Range. Federal Contract No. W9128F-09-D-0036 DO #0002, Project No. 8068-002-04-01, Work Authorization 007, Document No. 79. September 2014.	across most of the NTTR North Range to confirm the location of previously reported springs (based on information collected between 1996 and 2009), identify previously unidentified seeps and springs, and identify any other surface water features. The distance between transects varied by vegetation and terrain type. This report presents the results for the southwest quadrant. Any differences in the current location of water features versus the location noted in historic information was documented.	documentation of: 4 perennial springs 2 intermittent springs 7 intermittent seeps 1 surface water accumulation 1 historical spring
Nellis Air Force Base (AFB), 99 CES/CEIEA. 2014d. Seeps and Springs of the Southeast North Range of the Nevada Test and Training Range. Federal Contract No. W9128F-09-D-0036 DO #0002, Project No. 8068-002-04-01, Work Authorization 007, Document No. 79. October 2014.	Helicopter transects were flown across most of the NTTR North Range to confirm the location of previously reported springs (based on information collected between 1996 and 2009), identify previously unidentified seeps and springs, and identify any other surface water features. The distance between transects varied by vegetation and terrain type. This report presents the results for the southeast quadrant. Any differences in the current location of water features versus the location noted in historic information was documented.	The field investigation resulted in documentation of: 8 perennial springs 8 intermittent springs 4 intermittent seeps 1 surface water accumulation 3 dugouts 8 historical water sources
Nellis Air Force Base (AFB), Natural Resources Team, 99 CES/CEIEA. 2014e. 2013 Seeps and Springs Database Draft Final Project Report. Natural Resources Program, Nellis Air Force Base, Nevada. Prepared through the U.S. Army Corps of Engineers Contract # W9128F-09-D-0036 DO# 0002, Project 8068-002-02-01, Report No. 71-2. July 2014.	This draft report provides the results of a database project summarizing seeps and springs information based on surveys conducted through the end of 2013 (the starting date and specific surveys are not provided). The purpose was to document the locations of confirmed as well as potential seeps and springs on the Nevada Test and Training Range (North and South Ranges). Information was entered into a Microsoft Access database, which is managed by the Nellis Natural Resources Program.	Information contained in the database indicated the following results: Confirmed: 236 seeps and springs across the range Potential: 2 perennial springs 26 intermittent seeps 2 surface water accumulations 18 washes and in-channel features
Nellis Air Force Base (AFB), Natural Resources Team, 99 CES/CEIEA. 2014f. 2013 Final Report: Wetlands, Seeps and Springs Surveys,	Helicopter transects were flown across most of the NTTR North Range to confirm the location of previously reported springs (based on information collected between	Results of the study are as follows: 91 potential seeps and springs identified by infrared satellite imagery were investigated.

Table J-1. Summary of Previous Surface Water Investigations on the Nevada Test and Training Range

Report	Methodology Used	Results
Nevada Test and Training Range. Natural Resources Program, Nellis Air Force Base, Nevada. Prepared through the U.S. Army Corps of Engineers Contract # W9128F-09-D-0036 DO# 0002, Project 8068-002-02-01, Report No. 79. September 2014.	1996 and 2009), identify previously unidentified seeps and springs, and identify any other surface water features. The distance between transects varied by vegetation and terrain type. In addition to helicopter observation, investigators located potential water features using false color infrared imagery. Infrared reflectance of plant leaves is strongly correlated with chlorophyll concentration. In dry areas, more robust plants (which exhibit bright red reflectance) tend to occur in areas with water or high soil moisture. Therefore, using the characteristically bright red color associated with vegetation, potential seeps and springs were located using infrared satellite imagery. All potential seeps and springs detected in this manner were investigated in the field.	Of this total, 46 sites had a water feature present (perennial or intermittent spring, seep, or wash). 5 of the sites were man-made water features. 40 of the sites had non-water or upland features. Overall, 29 new water features (perennial spring, intermittent spring, perennial seep) were identified an added to the NTTR database. The report notes that as of September 2013, combined survey methods on the NTTR have resulted in identification of approximately 113 seeps and springs, as well as 17 wildlife water developments.

J.3 CONFIRMED SEEPS AND SPRINGS IN THE POTENTIAL EXPANSION AREAS

Figure J-1 shows potential seeps and springs that were identified in 2013, primarily through satellite imagery. Near-infrared reflectance off vegetation was considered a possible indicator of wet conditions. The potential seeps and springs were field-verified by helicopter and/or ground observations in 2013 (existing NTTR) and 2016 (potential expansion areas). Figure J-2 through Figure J-4 show seeps and springs in the potential expansion areas that were confirmed by the field investigations.

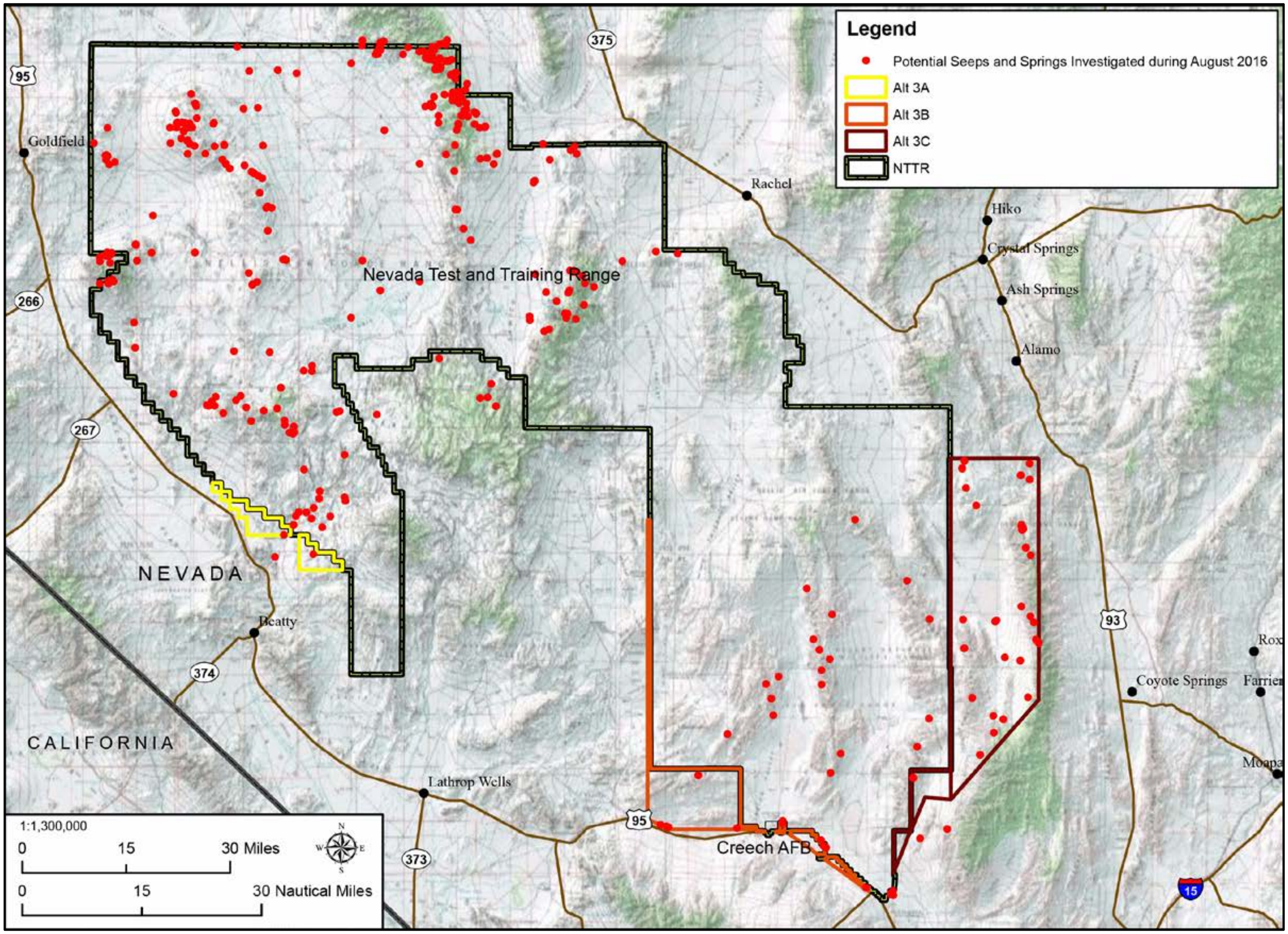

Figure J-1. Potential Seeps and Springs Investigated During August 2016

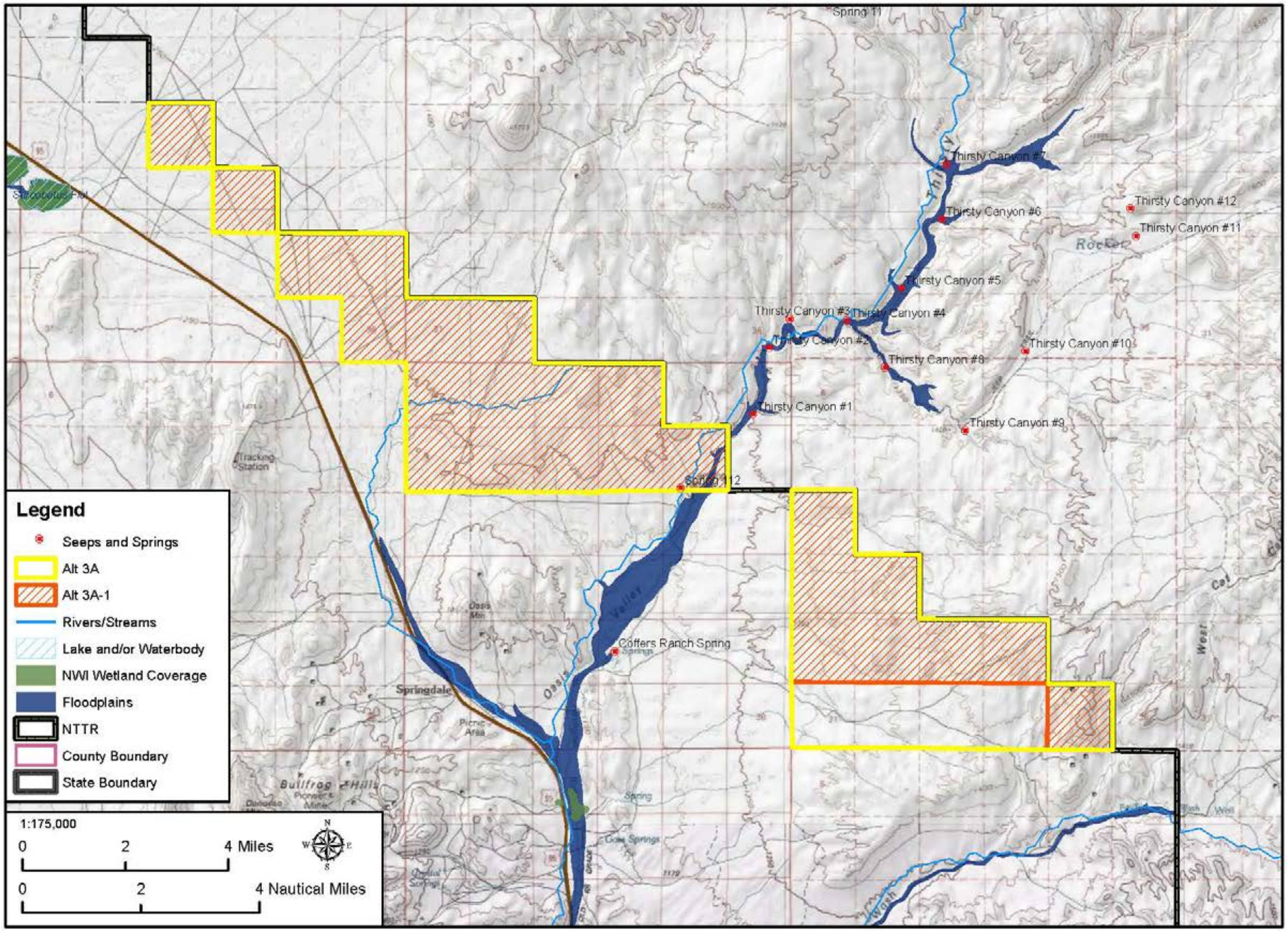

Figure J-2. Confirmed Seeps and Springs in the Potential Expansion Areas (Image 1 of 3)

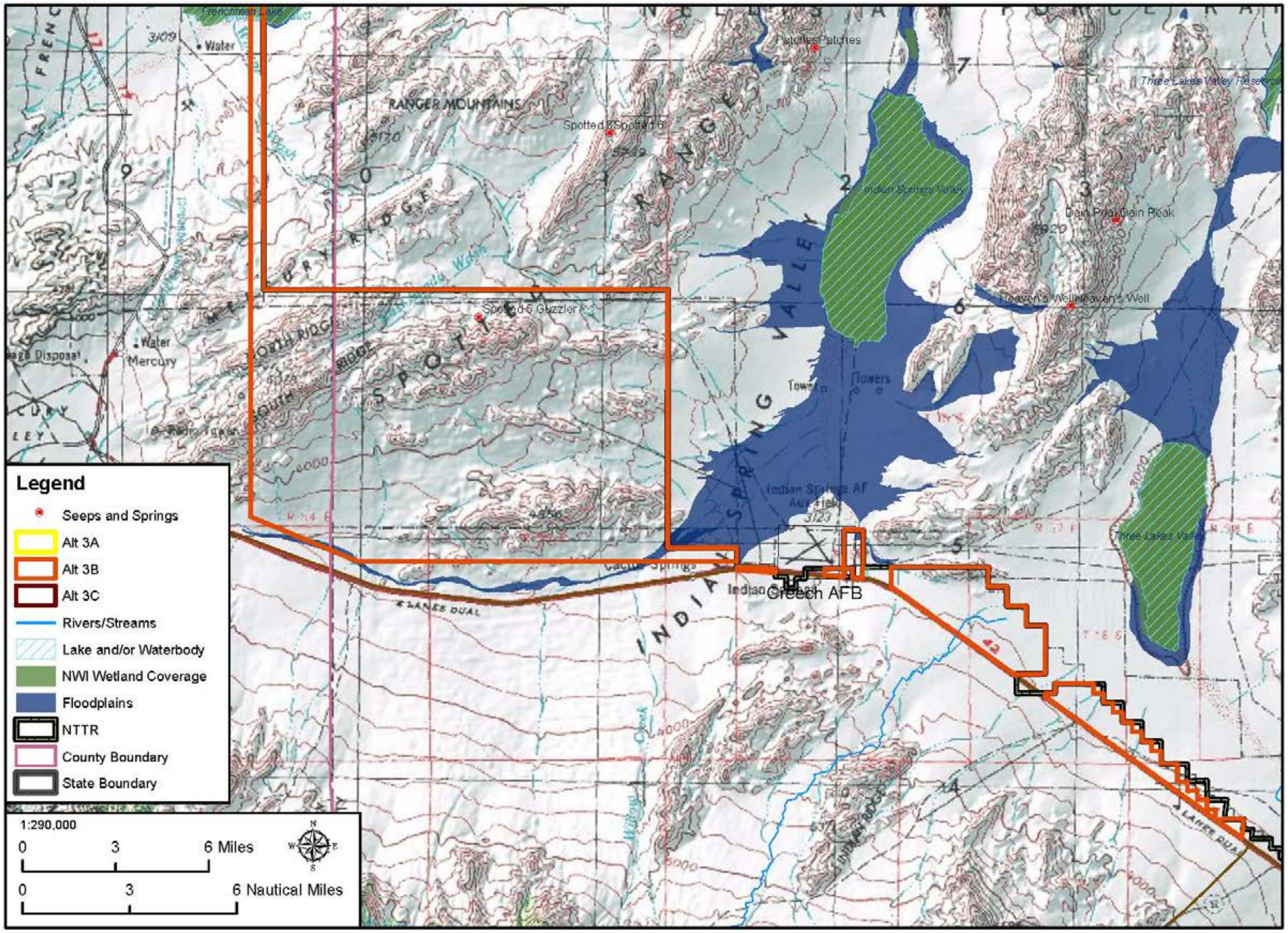

Figure J-3. Confirmed Seeps and Springs in the Potential Expansion Areas (Image 2 of 3)

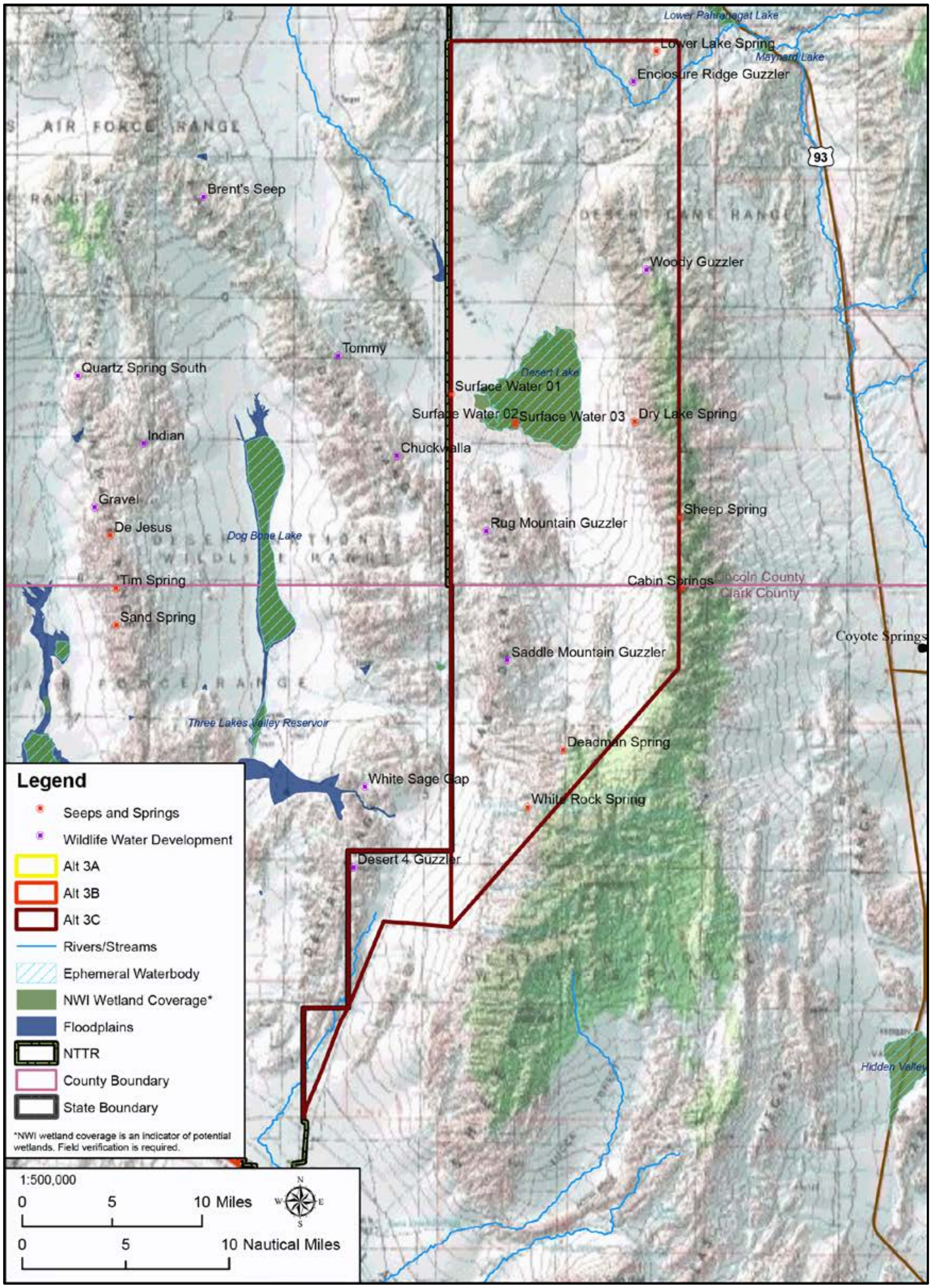

Figure J-4. Confirmed Seeps and Springs in the Potential Expansion Area (Image 3 of 3)

J.4 HYDROGRAPHIC BASINS WITHIN THE NEVADA TEST AND TRAINING RANGE

Figure J-5 shows all hydrographic basins associated with the existing NTTR and potential expansion areas. Table J-2 provides information on the total area of these basins, as well as the area of each basin that occurs within the NTTR boundary.

Table J-2. Hydrographic Basins Within the Nevada Test and Training Range

Hydrographic Basin Number and Name	Total Basin Area (square miles)	Approximate Area in NTTR (square miles)
141 – Ralston Valley	980	87
144 – Lida Valley	532	14
145 – Stonewall Flat	374	338
146 – Sarcobatus Flat	801	294
147 – Gold Flat	682	579
148 – Cactus Flat	395	335
149 – Stone Cabin Valley	979	49
157 – Kawich Valley	350	295
158A – Emigrant Valley – Groom Lake Valley	656	629
158A Excluding Range 4808A	242	216
158B – Emigrant Valley – Papoose Lake Valley	102	102
158B Excluding Range 4808A	65	65
159 – Yucca Flat	304	3
159 Excluding Range 4808A	303	2
160 – Frenchman Flat	457	212
160 Excluding Range 4808A	457	212
161 – Indian Spring Valley	671	369
168 – Three Lake Valley (northern)	289	257
169A – Tikapoo Valley (northern)	621	241
169A Excluding Range 4808A	570	190
169B - Tikapoo Valley (southern)	369	90
170 – Penoyer (Sand Springs) Valley	694	146
173A – Railroad Valley (southern)	602	71
209 – Pahranagat Valley	768	1
210 – Coyote Spring Valley	616	0
211 – Three Lake Valley (southern)	320	175
212 – Las Vegas Valley	1,544	9
225 – Mercury Valley	64	0
227A – Fortymile Canyon – Jackass Flats	267	12
227B - Fortymile Canyon – Buckboard Mesa	237	7
228 – Oasis Valley	461	264
229 – Crater Flat	181	33

NOTES: NTTR = Nevada Test and Training Range
Source: SBC, 2016

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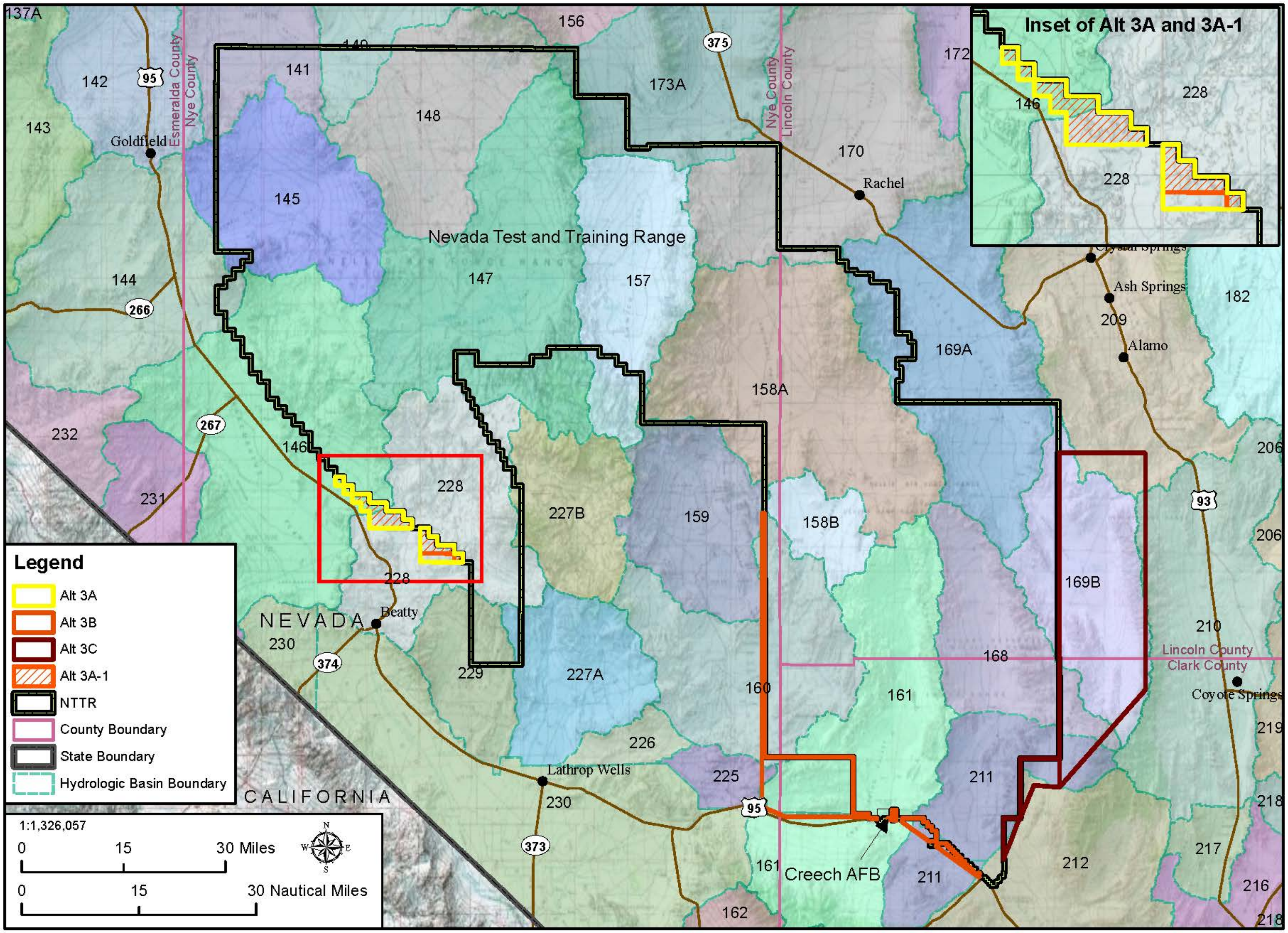

2 **Figure J-5. Hydrographic Basins Within the Nevada Test and Training Range**

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