

**GED Subject Area:** Language Arts - Lesson 17 – **Water Scarcity in Las Vegas: Citing Evidence**

**Basic Skill Focus/Standard:** To understand whether a statement is supported by a written source.

**CCR Reading Anchor Standard:**

**Anchor 1:** Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text

**Level D:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

**Anchor 7:** Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

**Level D:** Integrate information presented in different media or formats (charts, graphs, photographs & maps) as well as in words to develop a coherent understanding of a topic or issue.

**Foundation Skills Framework:** Reads with understanding, Uses Technology, Works in Teams

**Learning Objective/Purpose:**

Students will evaluate whether statements can be supported by evidence in a text and can then explain why by using quotes from the text.

Students will use information from maps and photos to enhance understanding of the text.

**Time Frame:** Reading Anchor portion will take 3-3.5 hours over one or two days.  
Extension writing activity could take 3-6 hours over one or two days.

**Materials and Resources:**

Telegraph **article** on “The Race to Stop Las Vegas from Running Dry”

<http://www.telegraph.co.uk/news/worldnews/northamerica/usa/10932785/The-race-to-stop-Las-Vegas-from-running-dry.html>

**Worksheet** for the Las Vegas article

National Geographic **website:**

<http://environment.nationalgeographic.com/environment/freshwater/change-the-course/colorado-river-map/>

**Worksheet** for the Colorado River website

Handouts of drought maps and photos of Nevada, California, Lake Mead & the Colorado River

Projector or Smartboard for visuals to enhance the lesson

Computers

**Prior Experience/Knowledge:**

Lesson 16 on aquifers and the “Toilet to Tap” article. If lessons have not been done in sequence, spend some time discussing aquifers and water scarcity before beginning.

**Vocabulary:**

**Tier 2 words** (merit more time & attention):

-mammoth    -catastrophic    -inevitable    -reservoir    -dire

**Tier 3 words** (merit less time & attention):

-epochal      -desalination      -tsunami      -canal      -gondolas

### **Instructional Process:**

#### **First Day/Hours**

1. Read through the **Basic Skill Focus/Objectives** and **Anchor Standards** of the lesson. Explain why these skills are important for the high school equivalency test as well as for post-secondary school, work and life.
2. Review what students learned and discussed about ground water and aquifers in the previous class.
3. Ask students what they know about Nevada – location, major cities, climate? Locate it on a map and discuss proximity to California, location of the Colorado River and Las Vegas.
4. Explain that today’s lesson is going to build on the previous one on the issues of water scarcity.
5. Pass out the worksheet and go over the vocabulary words, having students write the meanings next to each word – using cell phones, computers or dictionary.
6. Hand out the Telegraph article, “The Race to Stop Las Vegas from Running Dry.” Read the article together, with students taking turns. As you read, check for understanding of the other vocabulary words listed above.
7. Also, as you read about Nevada, California, Lake Mead and the Colorado River, pass around the map, photos and graph. Discuss and then ask students if and how this information helps in their understanding of the situation faced by the people in the west. (Project images if projector is available.)
8. Refer students back to the worksheet to complete the questions. Read directions together, and go through each of the 8 statements and, as a class, determine if they are supported by the article. Then students should pick 3 of the checked statements to complete the last part of the worksheet on their own. Go over their responses and discuss. **You could choose to end the session here. If so, summarize and give an overview of what will be happening the next day.**

#### **Second Day/Hours**

9. **If you are doing this part of the lesson on Day 2, do a brief review of Day 1.** Then have students go to the computer in pairs and go to <http://environment.nationalgeographic.com/environment/freshwater/change-the-course/colorado-river-map/>
10. This is an interactive map of the Colorado River. Do a quick overview of the site, showing students how to read the map key and how to click through the options on the left side of the screen. Distribute one worksheet per pair to complete as they investigate the website. One person can take charge of the worksheet while the other navigates the website. This should take about 15-20 minutes.
11. After they have completed the worksheet, review the responses. Spend the most time on question 6 that requires them to list specific facts they learned from the website that support the thesis of the article –Las Vegas and much of the southwestern part of the country are in a water crisis.
12. Re-read the **Skill Focus** and **Anchor Standards** of the lesson and ask students if they feel these were adequately covered.
13. If you want to extend this lesson another day, assign one of the essay writing extension activities below. The essay should contain an introduction, body and conclusion and **cite relevant evidence** to support the thesis. Take time to fully explain your expectations of the writing.

## Third Day/ or Second Day

### Additional Practice/Extension Activity:

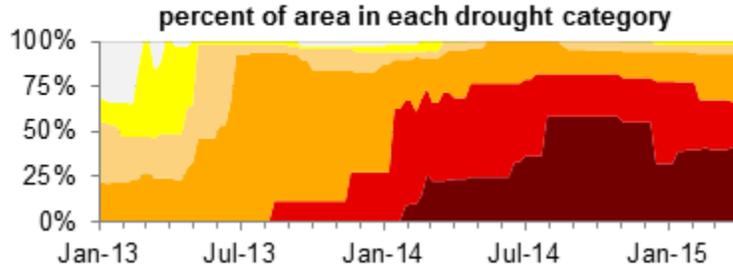
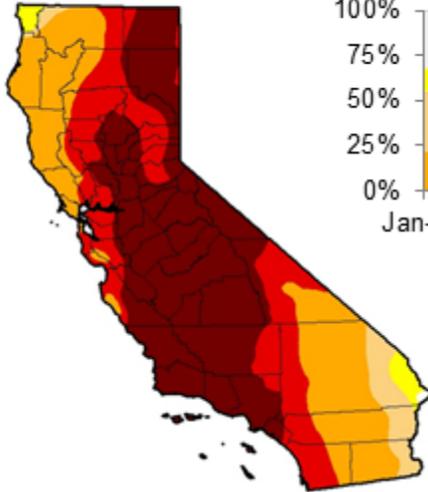
1. Since the article was written in 2014, ask students to research the current water situation in Nevada and Colorado. Tell them to use the most recent **US Drought Monitor** report. Have water levels improved, worsened or remained the same? What current events may have affected the water levels? Have students search the internet for current events information and use this as a class discussion.
2. As a class, have students brainstorm and propose possible creative solutions to the water shortage, such as the one in “Toilet to Tap” in Lesson 16. Students will choose one of the solutions and write an essay on the merits of the solution and how it will help get us through the water crisis.
3. Feel free to come up with another extension.

### Notes to Instructor:

1. This lesson will need to be adapted to both your technology and student capabilities.
2. When reading the article you may want to read all of it out loud, or do some as a class and then have students complete it silently.
3. If you choose to do it out loud you may want to do all the reading and have students annotate while listening, or you may want them to take turns reading.
4. If you don't have a projector or smartboard, you can use handouts and a wall map to show all of the supporting material.
5. Ideally, you will have enough computers to have students work in pairs all at the same time. But you don't, you may have to stagger this part of the lesson.
6. The sequencing of the lesson could also be changed, putting the website portion first and then doing the article.
7. The lesson is broken into 3 distinct parts: article & worksheet, website & worksheet and extension writing activity. The first 2 parts can be done in a total of 3-3.5 hours, either done on one day or two. The extension activity can be a 3 hour session of brainstorming and research and then the actual writing.
8. Use the extension activity to highlight the type of writing you want your students to do. If they are doing the first activity, it could be an informative piece of writing, or comparing two opinions on the topic. If they are doing the second activity, it could be a piece of persuasive writing. **Define the expectations clearly by determining which Writing Anchor and Level** you are working on and communicating expectations to the students.
9. After completing the lesson, take the time to evaluate it, making note of what worked well, and what might need to be changed.

### Evaluation of Lesson:

California drought status  
as of April 7, 2015



- None
- Abnormally Dry
- Moderate Drought
- Severe Drought
- Extreme Drought
- Exceptional Drought

# SAVE WATER SAVE CALIFORNIA

U.S. Drought Monitor  
California

March 1, 2011  
(Released Thursday, Mar. 3, 2011)  
Valid 7 a.m. EST

U.S. Drought Monitor  
California

March 3, 2015  
(Released Thursday, Mar. 5, 2015)  
Valid 7 a.m. EST



4 YEARS AGO CALIFORNIA'S  
RESERVOIRS WERE AT 99.94%

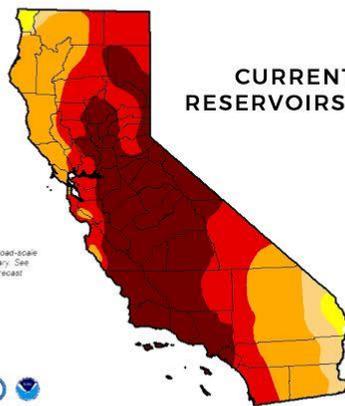
Intensity:  
 D0 Abnormally Dry  
 D1 Moderate Drought  
 D2 Severe Drought  
 D3 Extreme Drought  
 D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:  
Laura Eddlestone  
Western Regional Climate Center

USDA, NOAA, NWS, NCEP, NCEP/Climate Prediction Center, NCEP/Climate Prediction Center

<http://droughtmonitor.unl.edu/>



CURRENTLY CALIFORNIA'S  
RESERVOIRS ARE AT APPROX 16%

Intensity:  
 D0 Abnormally Dry  
 D1 Moderate Drought  
 D2 Severe Drought  
 D3 Extreme Drought  
 D4 Exceptional Drought

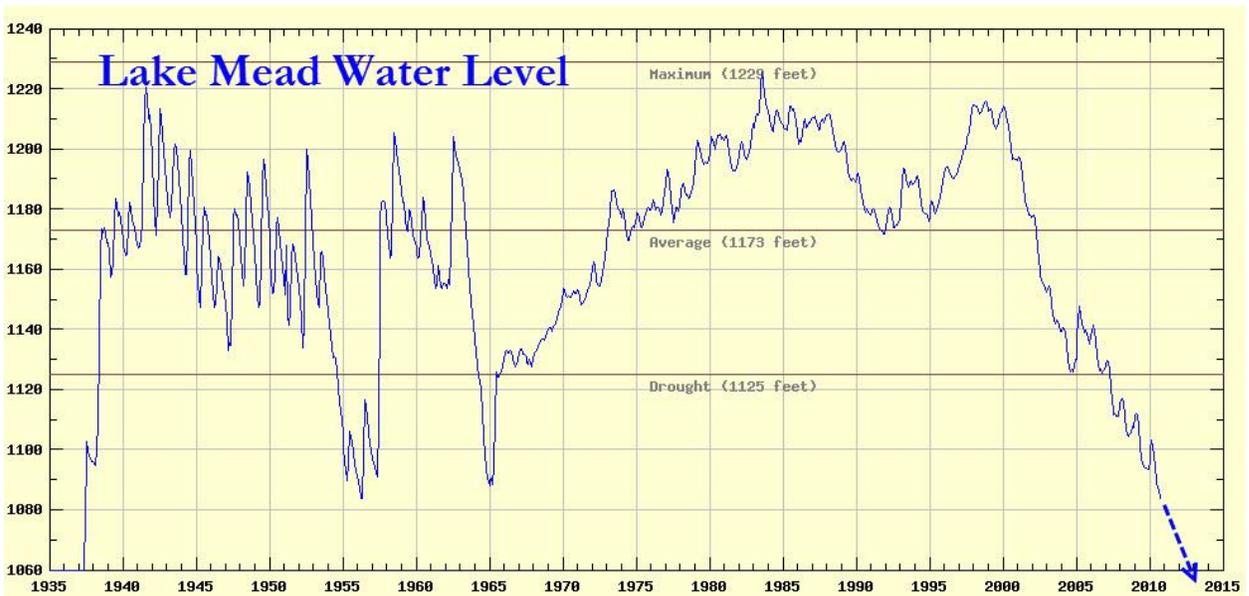
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Author:  
David Smeral  
Western Regional Climate Center

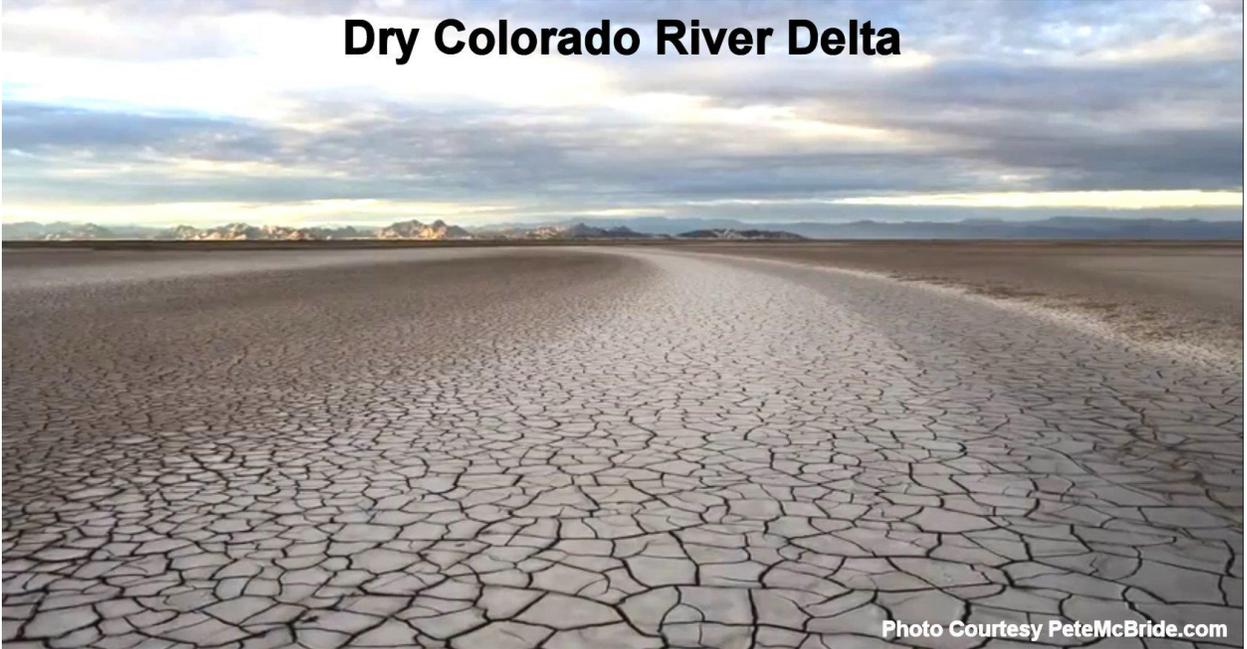
USDA, NOAA, NWS, NCEP, NCEP/Climate Prediction Center, NCEP/Climate Prediction Center

<http://droughtmonitor.unl.edu/>

# REDUCE LAWN WATERING



## Dry Colorado River Delta



Where the Colorado River meets the Gulf of California between the U.S. & Mexico.  
This area once supported a large population of plant, bird, aquatic and terrestrial life.



Lighter rock shows the previous level of the river.



**A river no longer runs through it  
Colorado River Delta | 2014**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Colorado River Map Worksheet

#### Review the interactive map at this website

<http://environment.nationalgeographic.com/environment/freshwater/change-the-course/colorado-river-map/>

Take a few minutes to look over the map, paying attention to the key at the bottom. You will then complete the questions on this worksheet as you click through the options on the left side of the screen.

1. What are the 4 situations that are causing the growing challenges faced by the Colorado River?
2. In a complete sentence or two, explain what aspects of climate change could potentially affect the Colorado River and why?
3. Where does 90% of the water in the Colorado River come from?
4. What **activity** consumes the largest percentage of the Colorado River's water?
5. Given the answer for #4, how would low water levels in Colorado affect people in Pennsylvania?
6. Which **7 states** rely on the Colorado River for water?
7. In addition to the website, review all of the readings, graphs, pictures and charts. In a short paragraph, select three of these resources and explain why you feel they show the best picture of the water crisis in the American West.

## The Race to Stop Las Vegas from Running Dry



Lake Mead: boaters seen in front of a white "bathtub ring" on the rocks on the upstream side of the Hoover Dam Photo: Getty



By Nick Allen, Las Vegas

4:11PM BST 28 Jun 2014

1. Outside Las Vegas's Bellagio hotel tourists gasp in amazement as fountains shoot 500ft into the air, performing a spectacular dance in time to the music of Frank Sinatra.
2. Gondolas ferry honeymooners around canals modelled on those of Venice, Roman-themed swimming pools stretch for acres, and thousands of sprinklers keep golf courses lush in the middle of the desert.
3. But, as with many things in Sin City, the apparently endless supply of water is an illusion. America's most decadent destination has been engaged in a potentially catastrophic gamble with nature and now, 14 years into a devastating drought, it is on the verge of losing it all.

4. "The situation is as bad as you can imagine," said Tim Barnett, a climate scientist at the Scripps Institution of Oceanography. "It's just going to be screwed. And relatively quickly. Unless it can find a way to get more water from somewhere Las Vegas is out of business. Yet they're still building, which is stupid."
5. The crisis stems from the Las Vegas's complete reliance on Lake Mead, America's largest reservoir, which was created by the Hoover Dam in 1936 - after which it took six years to fill completely.
6. It is located 25 miles outside the city and supplies 90 per cent of its water. But over the last decade, as Las Vegas's population has grown by 400,000 to two million, Lake Mead has slowly been drained of four trillion gallons of water and is now well under half full. Mr Barnett predicts it may be a "dead pool" that provides no water by about 2036.
7. The lake currently looks as if someone has removed a giant plug from it.
8. Around its edges a strip of bleached rock known locally as the "bath tub ring" towers like the White Cliffs of Dover, showing where the water level used to be. Pyramid-shaped mountains rise from the shallow waters.
9. Tying up his 15ft boat at the water's edge Tom Merrit, 51, who has fished on the lake for years, pointed to the top of a faraway hill and said: "My boat used to be right up there. We've had to keep moving down and down as the water recedes."
10. "That rock never used to be there," he added, gesturing to a newly-emerging island several hundred feet long. "It's really sad because this used to be a great lake. But if they don't do something soon it'll be gone."
11. Lake Mead's water level is currently at 1,087ft above sea level. There are two pipes, known as "straws", that take water from it to Las Vegas.



An aerial view of

Lake Las Vegas (GETTY IMAGES)

12. The first extracts water at an elevation of 1,050ft and is likely to be sucking at air, rather than water, soon. The second straw is at 1,000ft.
13. Lake Mead is expected to fall another 20ft towards that critical point by the end of this year.

14. Beneath the ground a mammoth effort is already under way to complete a new, lower straw which will be able to draw the last of the water from the lake.
15. But it is a painfully slow process as a giant drill the size of two football pitches advances at a rate of one inch per day.
16. That rescue project is costing \$817 million and is currently expected to be complete by late 2015, but it is not viewed as a long-term solution.
17. Las Vegas also wants to build a separate \$15.5 billion pipeline that would pump 27 billion gallons of groundwater a year from an aquifer 260 miles away in rural Nevada.
18. But a judge has refused permission after environmentalists sued on the basis that it would adversely affect 5,500 acres of meadows, 33 miles of trout streams, and 130,000 acres of habitat used by sage grouse, mule deer, elk and pronghorn, an antelope-like creature that is endangered in the region. The court heard that 25 species of Great Basin springsnails would be pushed toward extinction.
19. Rob Mrowka, a Las Vegas-based scientist at the Centre for Biological Diversity, which brought the legal case against the pipeline, said: "It's a really dumb-headed proposition. It would provide a false sense of security that there's plenty of water and it would delay the inevitable decisions that have to be taken about water conservation and restricting growth.
20. "The drought is like a slow spreading cancer across the desert. It's not like a tornado or a tsunami, bang. The effects are playing out over decades. And as the water situation becomes more dire we are going to start having to talk about the removal of people (from Las Vegas)."
21. Mr Mrowka cited Lake Las Vegas, a mega-resort where stars including Celine Dion live, as one of the "most egregious examples" of wasting water.
22. He said: "It's a community for the rich and famous and it has a 320-acre lake filled with three billion gallons of water from Lake Mead. That's three billion gallons of drinking water, and each year they take millions more to keep it from stagnating and smelling."
23. Las Vegas gets just four inches of rain in a good year, and in the first four months of 2014 there was just 0.31 of an inch.
24. The Southern Nevada Water Authority, which has the task of keeping the city from running dry, has described the effects of the drought as "every bit as serious as a Hurricane Katrina or a Superstorm Sandy".
25. But spokesman JC Davis said water-hogging developments like Lake Las Vegas were "artifacts from an earlier time that wouldn't be allowed today."
26. He said: "The days of having things like a shopping centre lined with grass are over."
27. Even environmentalists acknowledge that the glitzy hotels on the Las Vegas Strip have made big strides toward using water wisely.
28. The Strip now uses only seven per cent of the city's water while accounting for 70 per cent of its economy.
29. All the water from sinks and showers in hotel rooms is recycled, and even water from some lavatories ends up treated and back in Lake Mead.
30. Some hotels automatically only wash bedroom linen once every two days, and restaurants have stopped serving glasses of water unless requested to do so.



31. Hoover Dam, a concrete arch-gravity dam in the Black Canyon of the Colorado River (AFP)
32. While it may look extravagant the Bellagio fountain does not in fact use water from Lake Mead, instead being filled from an underground lake on the hotel's land which is undrinkable anyway.
33. However, Las Vegas still uses 219 gallons of water per person per day, one of the highest figures in the US. In San Francisco the figure is just 49 gallons.
34. Most of that water is used to sprinkle golf courses, parks and lawns so the water authority has declared war on grass, paying homeowners to remove it from their gardens at the rate of \$1.50 per square foot.
35. So far 165 million square feet of turf has been destroyed. Laid end to end in an 18-inch strip it would stretch 90 per cent of the way around the Earth.
36. "I've lost count of how much grass I've ripped up," said Matt Baroudi, 53, an award-winning British landscape designer who moved to Las Vegas 15 years ago and installs eco-friendly gardens and back yards.
37. "Today I've just taken out a lawn that will save 20,000 gallons of water a year. People are changing but I think ultimately they will have to make it illegal to sell grass seeds.
38. "I go boating on Lake Mead and I've watched it dry up. It's just astonishing. You see a rock poking out and then three weeks later it's 15ft high. I don't know what they are going to do."
39. There is pressure on the neighbouring state of California to take pity on Las Vegas and give it water. But California is dealing with its own three-year drought, possibly its worst in half a millennium, which Governor Jerry Brown has described as "epochal".
40. 100 per cent of California is now classified as in "severe drought" and rivers are so low 27 million young migrating salmon are having to be taken to the ocean in trucks.
41. Nevada and California are just two of seven states that rely for water on the 1,450-mile Colorado River, which rises in the Rocky Mountains and used to empty into the Gulf of California in Mexico - but which now rarely reaches the sea, running dry before that.

42. In 1922 seven US states - California, Nevada, Arizona, Wyoming, Utah, Colorado and New Mexico - first divided up how much river water each could use, and the amounts have been bitterly contested ever since, including by Mexico, which also takes water from it.
43. One proposal is for landlocked Nevada to pay billions of dollars to build solar-powered desalination plants in the Pacific off Mexico, taking Mexico's share of Colorado River water in exchange.
44. But Mr Mrowka said: "The Colorado is essentially a dying river. Ultimately, Las Vegas and our civilisation in the American South West is going to disappear, like the Indians did before us."

<http://www.telegraph.co.uk/news/worldnews/northamerica/usa/10932785/The-race-to-stop-Las-Vegas-from-running-dry.html>

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Questions on “The Race to Stop Las Vegas from Running Dry”

**Pre-Reading: Define the following vocabulary words:**

Mammoth

Reservoir

Dire

Potable

Inevitable

Put a check mark next the statements that are supported by the article.

1. \_\_\_\_ Businesses in Las Vegas use water extravagantly and have made few concessions to conservation efforts.
2. \_\_\_\_ Building a pipeline to import water from 260 miles away has proved to be dead end for the city of Las Vegas.
3. \_\_\_\_ Lake Mead serves as a reservoir for Las Vegas.
4. \_\_\_\_ The Water Authority of Las Vegas has made an effort to control water consumption by regulating grass.
5. \_\_\_\_ Las Vegas’ per person daily water usage is mammoth due to the amount of water needed by businesses.
6. \_\_\_\_ Taking measures like re-using water and washing linens less frequently may help alleviate the inevitable water crisis in Las Vegas.
7. \_\_\_\_ The Colorado River is a resource that Las Vegas hoards for itself.
8. \_\_\_\_ California may give up a percentage of its water to help Las Vegas with its water crisis.

Pick three of the statements from front page. In 2-3 sentences, explain how the statement is supported or unsupported in the article. Use a quote of no more than 3 words to demonstrate this. Try to incorporate at least 3 of the vocabulary words you defined above.

Statement \_\_\_\_

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Statement \_\_\_\_

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Statement \_\_\_\_

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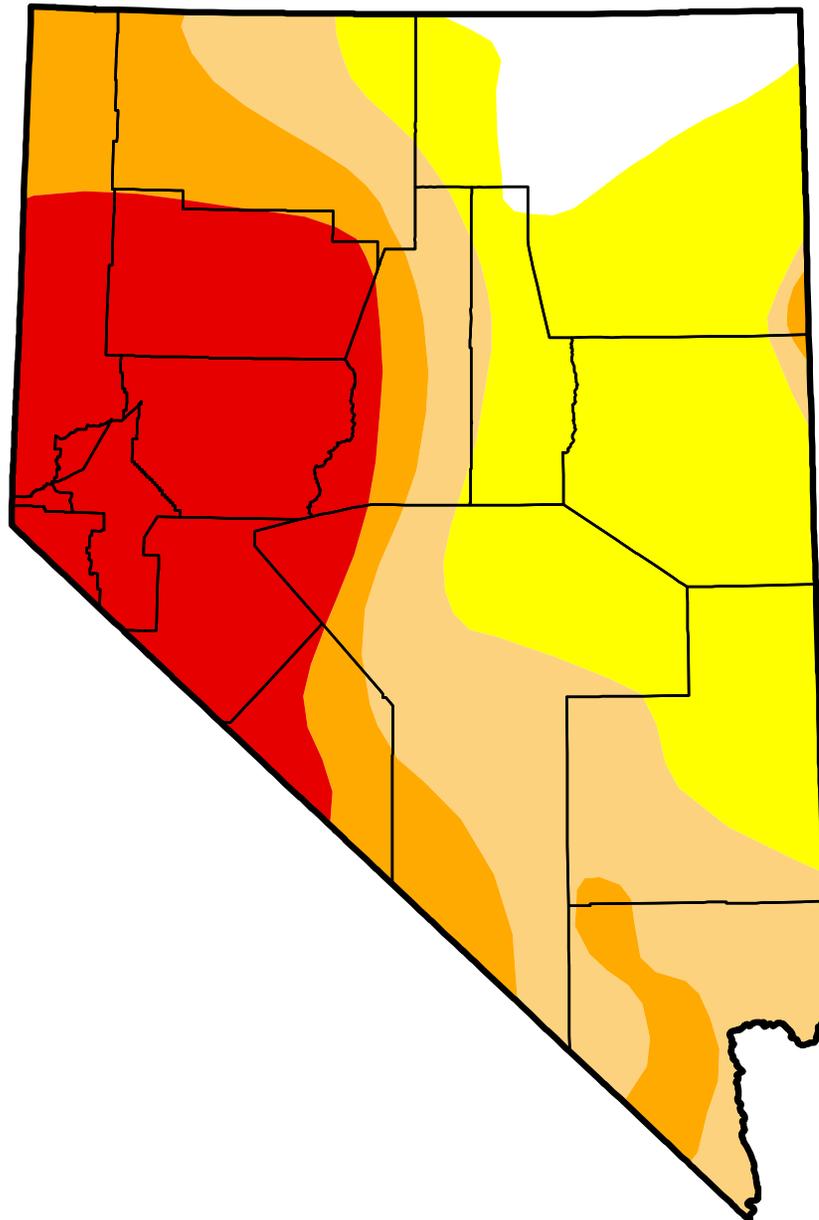
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# U.S. Drought Monitor

## Nevada

**April 26, 2016**  
 (Released Thursday, Apr. 28, 2016)  
 Valid 8 a.m. EDT



*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	6.19	93.81	62.81	38.84	23.17	0.00
<b>Last Week</b> <i>4/19/2016</i>	6.19	93.81	62.81	38.84	23.17	0.00
<b>3 Months Ago</b> <i>1/26/2016</i>	1.35	98.65	71.74	40.76	25.48	4.80
<b>Start of Calendar Year</b> <i>12/29/2015</i>	1.34	98.66	93.08	65.49	31.74	9.35
<b>Start of Water Year</b> <i>9/29/2015</i>	0.00	100.00	94.76	76.08	37.52	15.93
<b>One Year Ago</b> <i>4/28/2015</i>	0.00	100.00	99.93	87.00	49.21	18.38

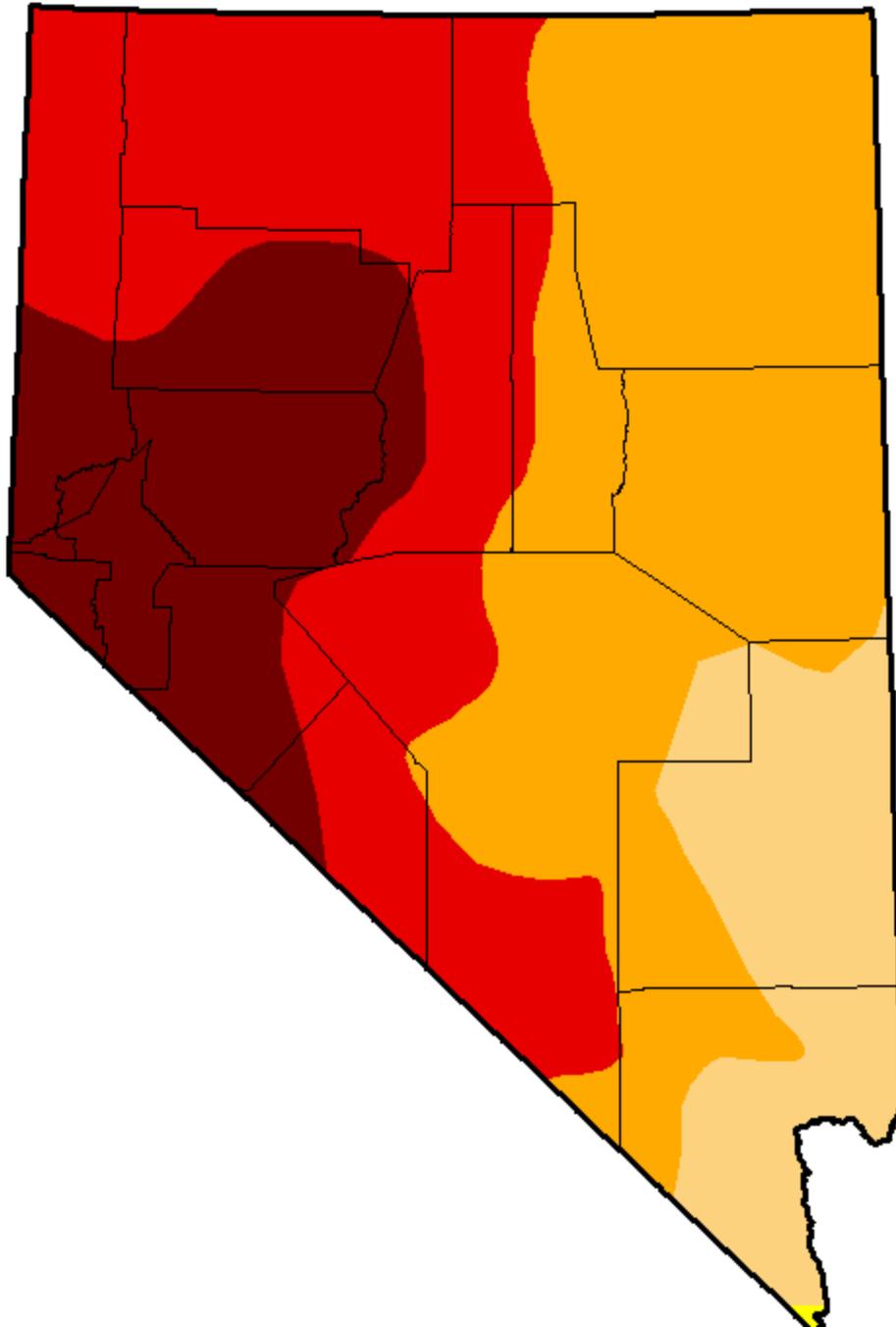
***Intensity:***

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

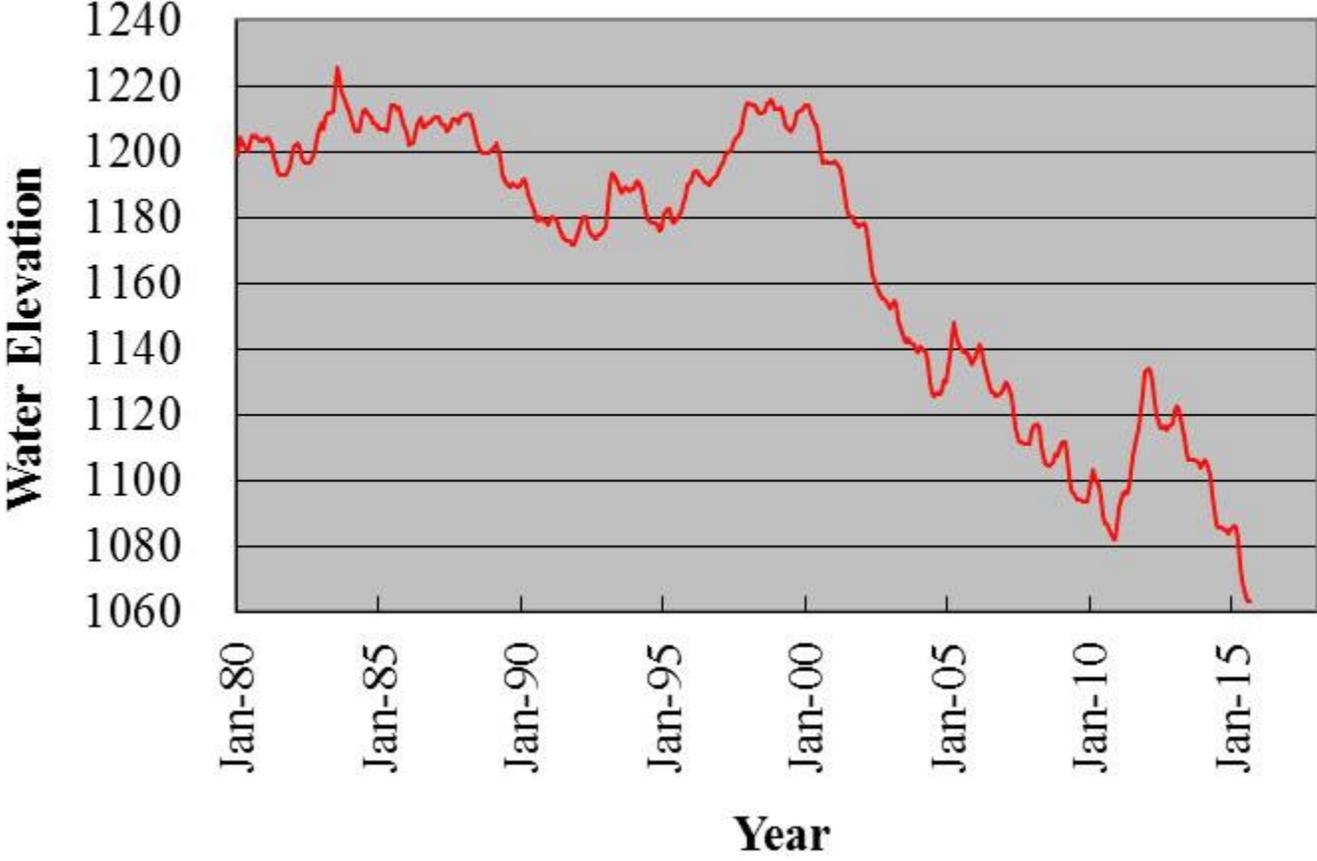
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**Author:**  
 Richard Heim  
 NCEI/NOAA

**April 28, 2015**



# Lake Mead Water Elevation





**1983**



**2007**

