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91429R

NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Level 3 Geography, 2015

91429 Demonstrate understanding of a given environment(s) through selection and application of geographic concepts and skills

9.30 a.m. Wednesday 25 November 2015
Credits: Four

RESOURCE BOOKLET

Refer to this booklet to answer the questions for Geography 91429.

Check that this booklet has pages 2–14 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.

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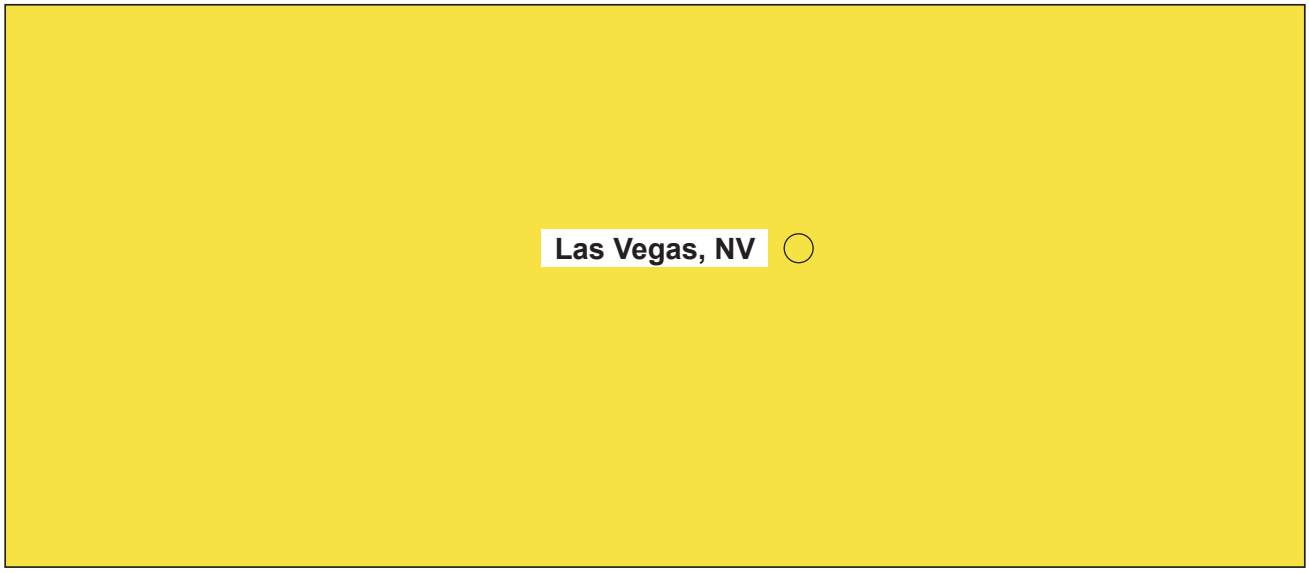
THE ENVIRONMENT

RESOURCE A: LOCATION OF LAS VEGAS

Las Vegas is located in Clark County, in the centre of Vegas Valley, Nevada. It is a desert region within the Mojave Desert of about 1 500 square kilometres, which is surrounded by the Sierra Nevada Mountains and the Spring Mountains. The mountains around Las Vegas reach elevations of over 3 000 metres, acting as barriers to moisture from the Pacific Ocean.



THE CLIMATE

RESOURCE B: LAS VEGAS CLIMATE DATA

Las Vegas has a subtropical desert climate, typical of the Mojave Desert in which it is located. It has an average of about 300 sunny days per year, with more than 3 800 hours of sunshine.

Annual precipitation in Las Vegas is roughly 110 mm, which on average occurs over 29 days per year.

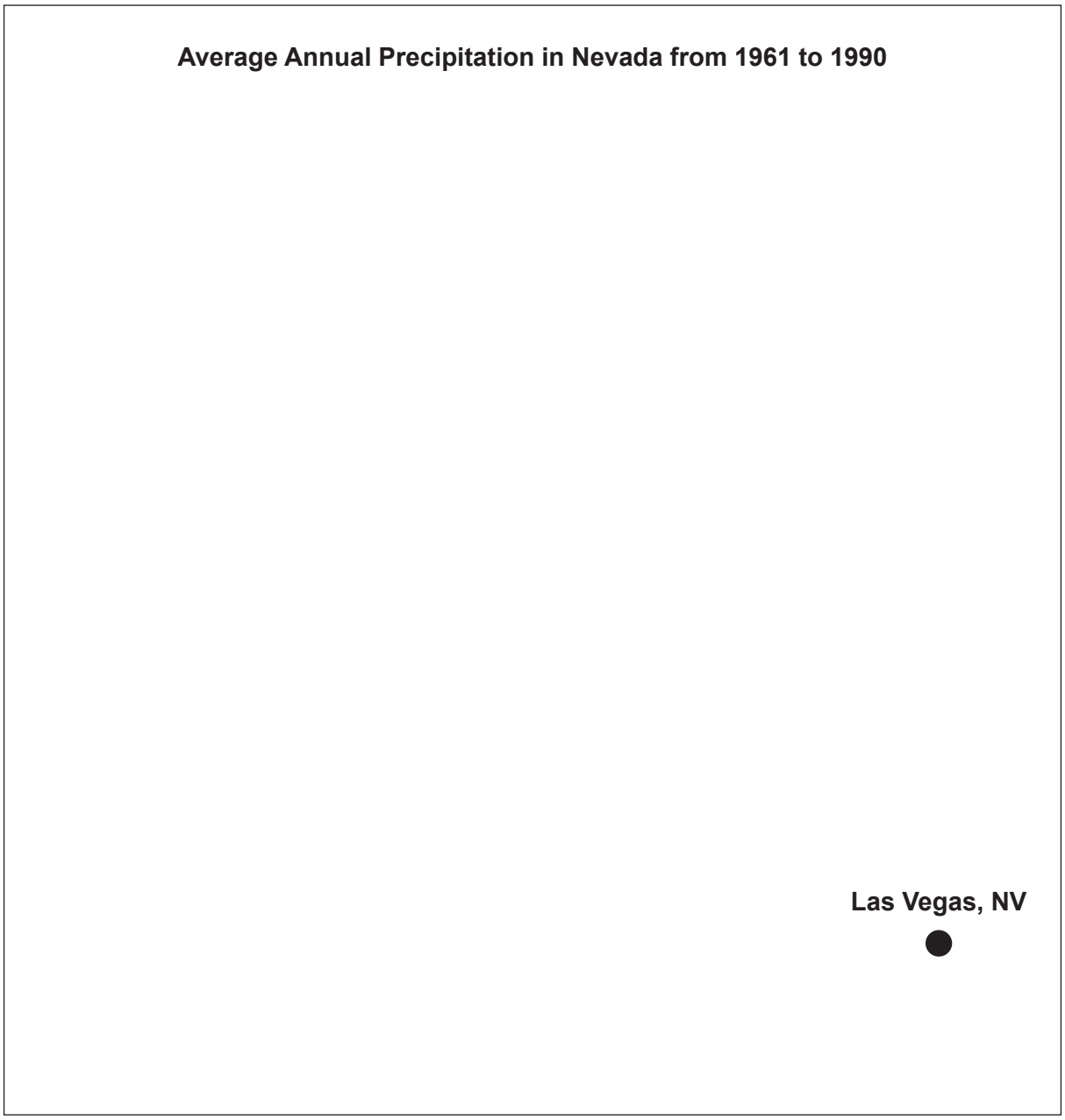
Average Yearly Distribution of Temperature and Rainfall

RESOURCE C: NEVADA'S CLIMATE

During the last century, Nevada has experienced a slight increase in temperature, increased precipitation, shortened snow seasons, and more storms overall.

The decreased availability of water statewide is likely to affect development, tourism, and power production.

Average Annual Precipitation in Nevada from 1961 to 1990



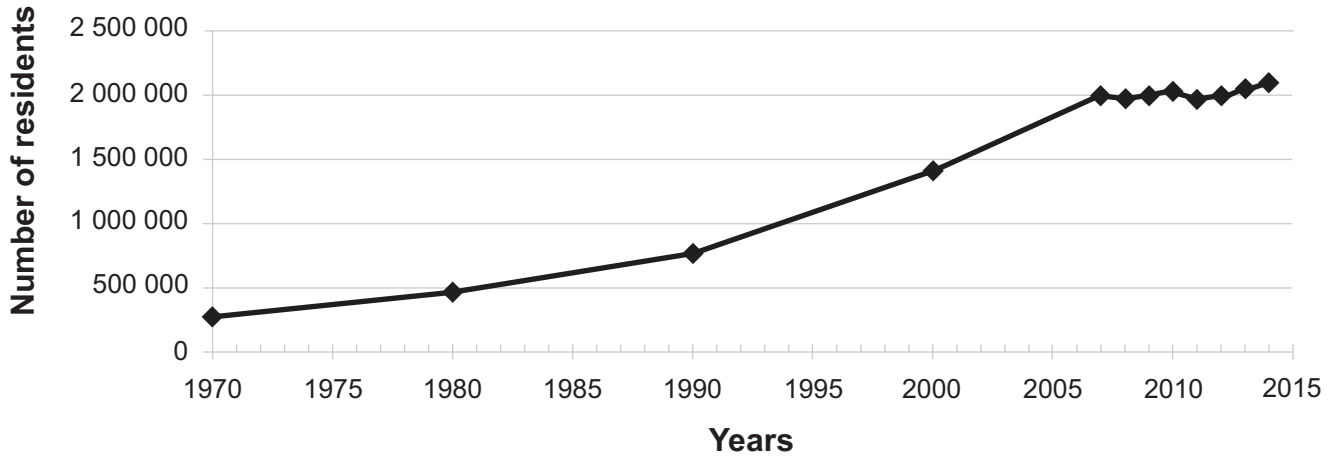
POPULATION GROWTH AND URBAN SPRAWL

RESOURCE D: THE CITY OF LAS VEGAS

After its establishment in 1905, Las Vegas was initially an important railroad town and a stopover for miners working in the area.

The once dusty desert town, with a population of only 8 422 in 1940, had an approximate population of just over 2 million people in 2014, living in the Las Vegas metropolitan area.

RESOURCE E: POPULATION GROWTH IN LAS VEGAS (1970–2014)



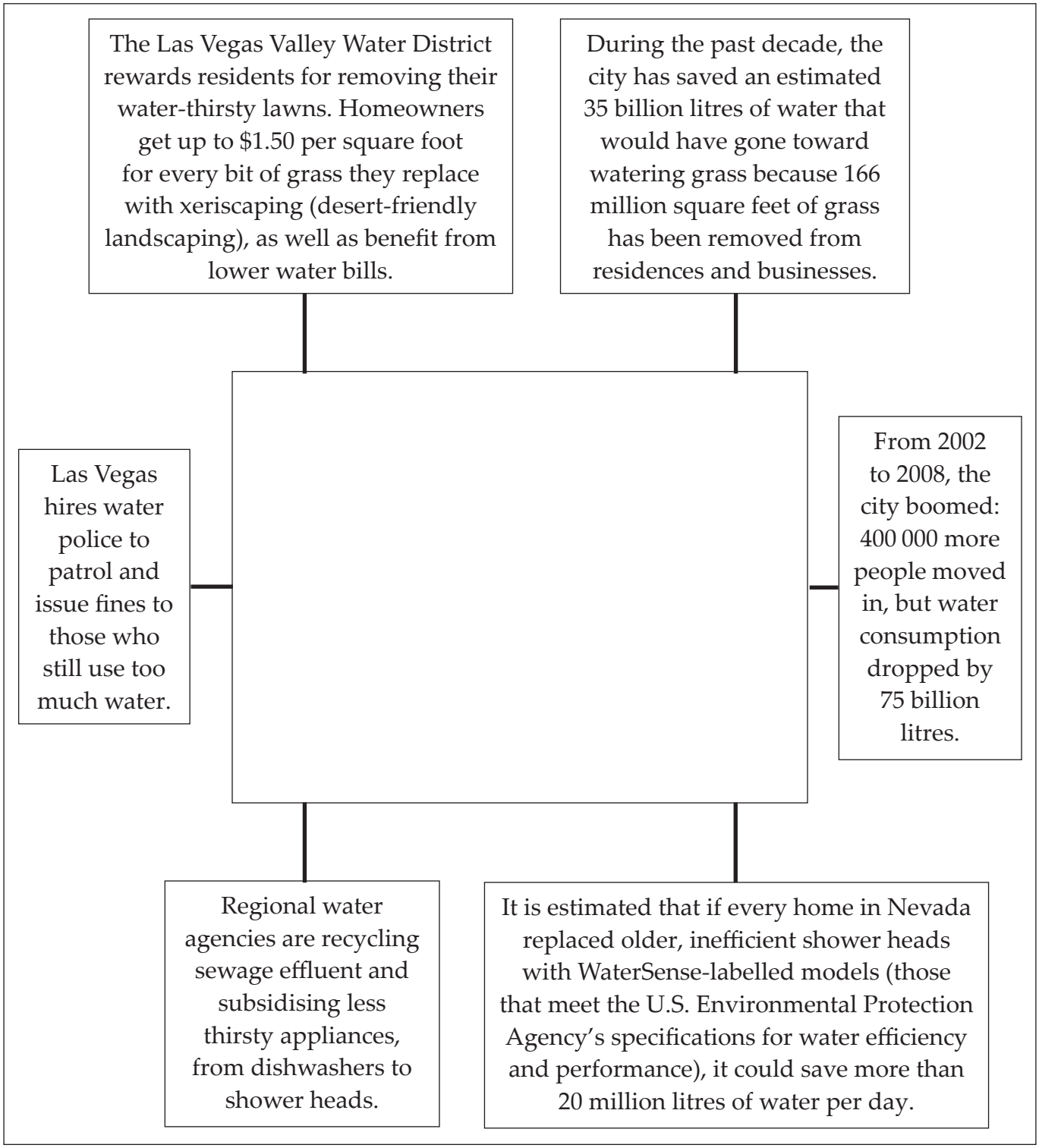
RESOURCE F: URBAN SPRAWL IN LAS VEGAS

The desert city of Las Vegas has gone through a massive growth spurt. The outward expansion of the city over the last quarter of a century is shown with two false-colour Landsat* 5 images below (3 August 1984, and 2 November 2011). The dark purple grid of city streets and the green of irrigated vegetation grow out in every direction into the surrounding desert.

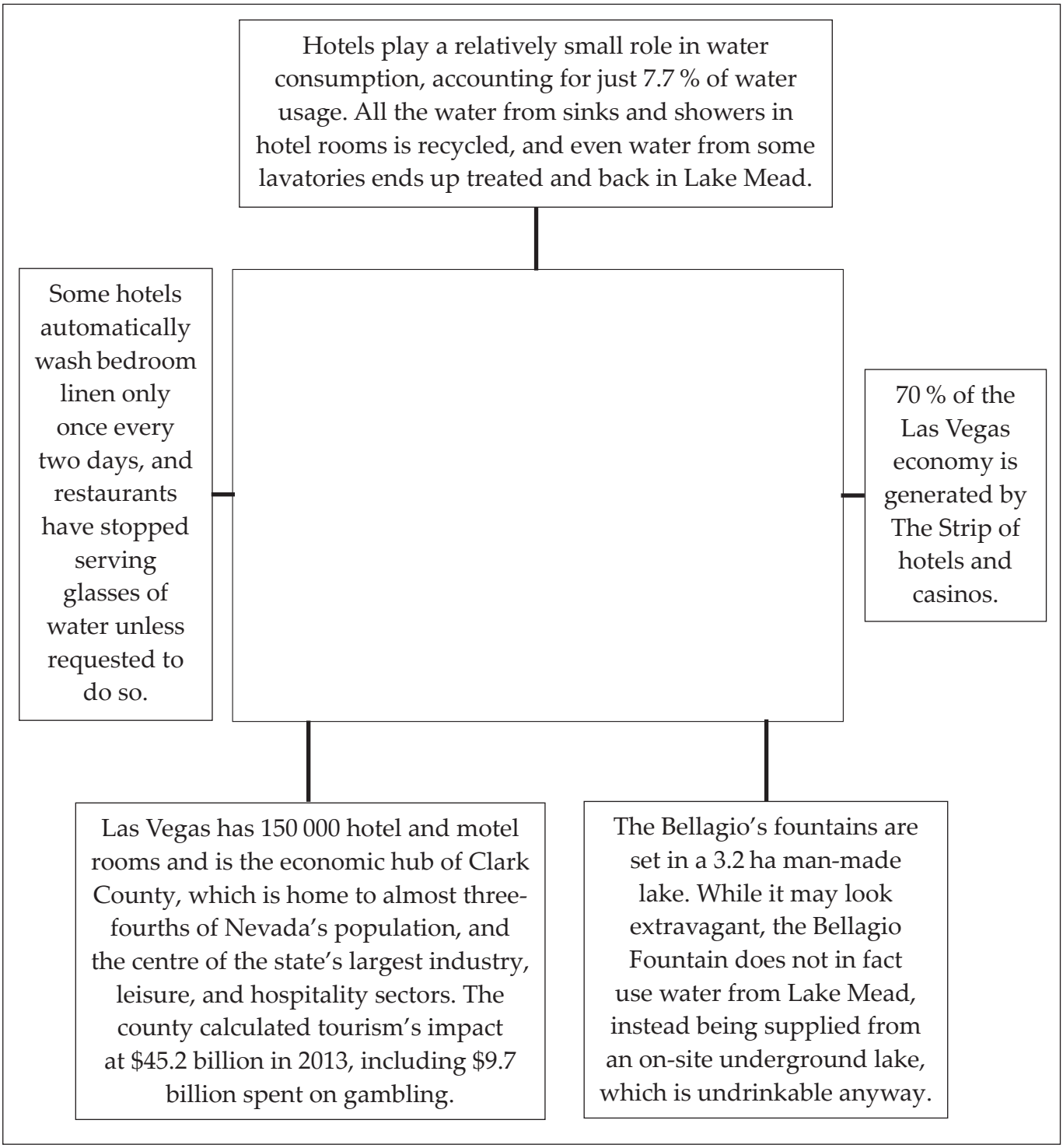
*The Landsat satellite programme is the longest continuous archive of images of Earth from space in existence.

WATER

RESOURCE G: RESIDENTIAL WATER USE IN LAS VEGAS



RESOURCE H: HOTEL WATER USE IN LAS VEGAS



RESOURCE I: LAKE MEAD

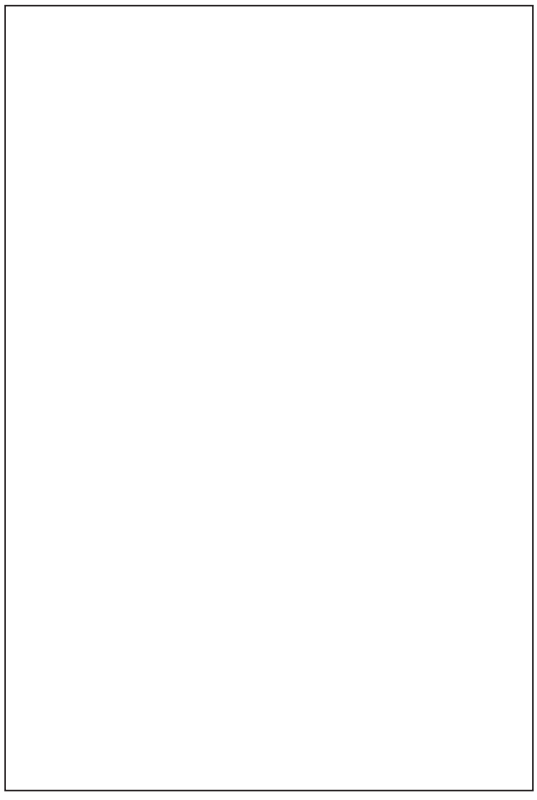
When it was created in 1935 by the building of the Hoover Dam, Lake Mead was the largest artificial lake in the world.

Water Levels in Lake Mead from 2005 to 2014 (Elevation above Sea Level)										
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Water Level (m)										

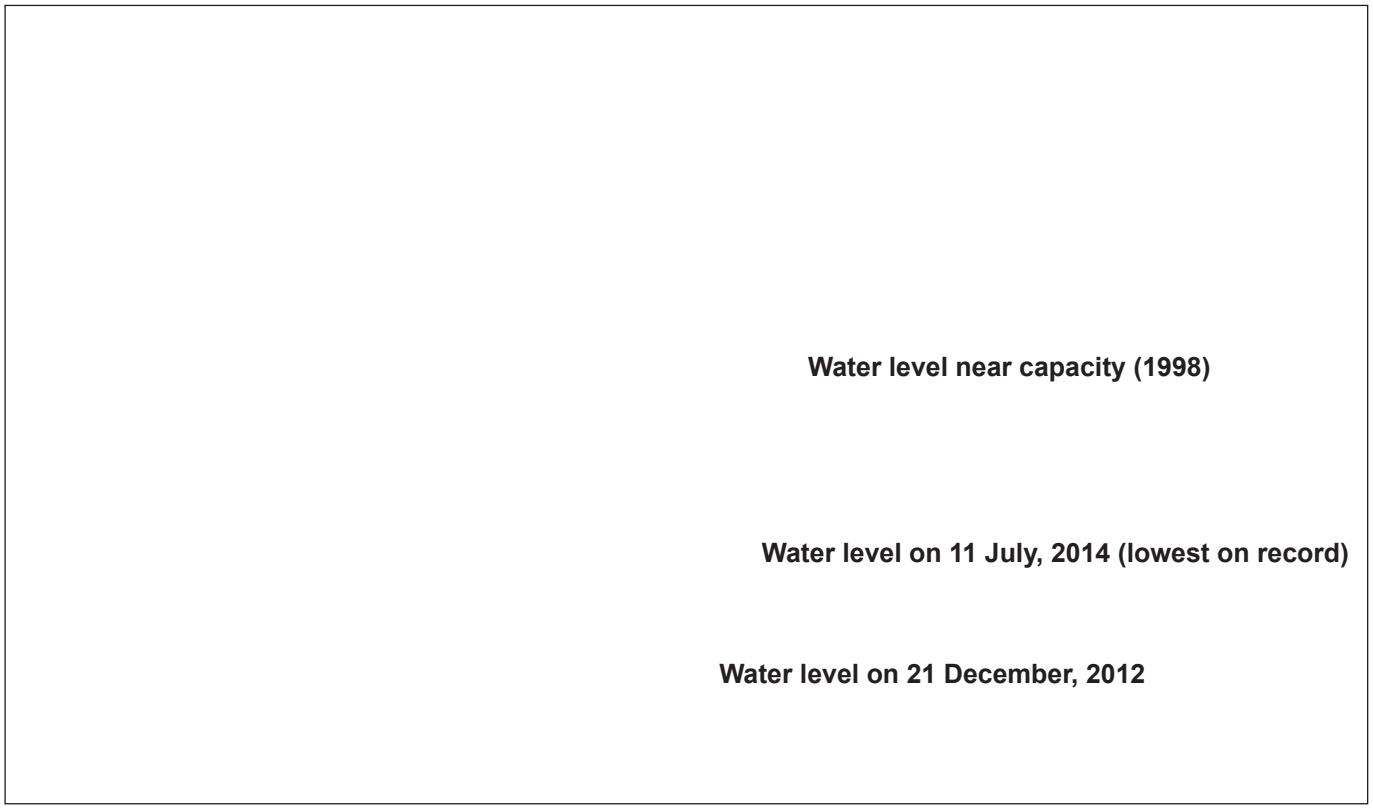
In 2008, contractors began boring through rock to create a third conduit to draw water from as low as 260 metres (860 feet), although the project has since been deferred.

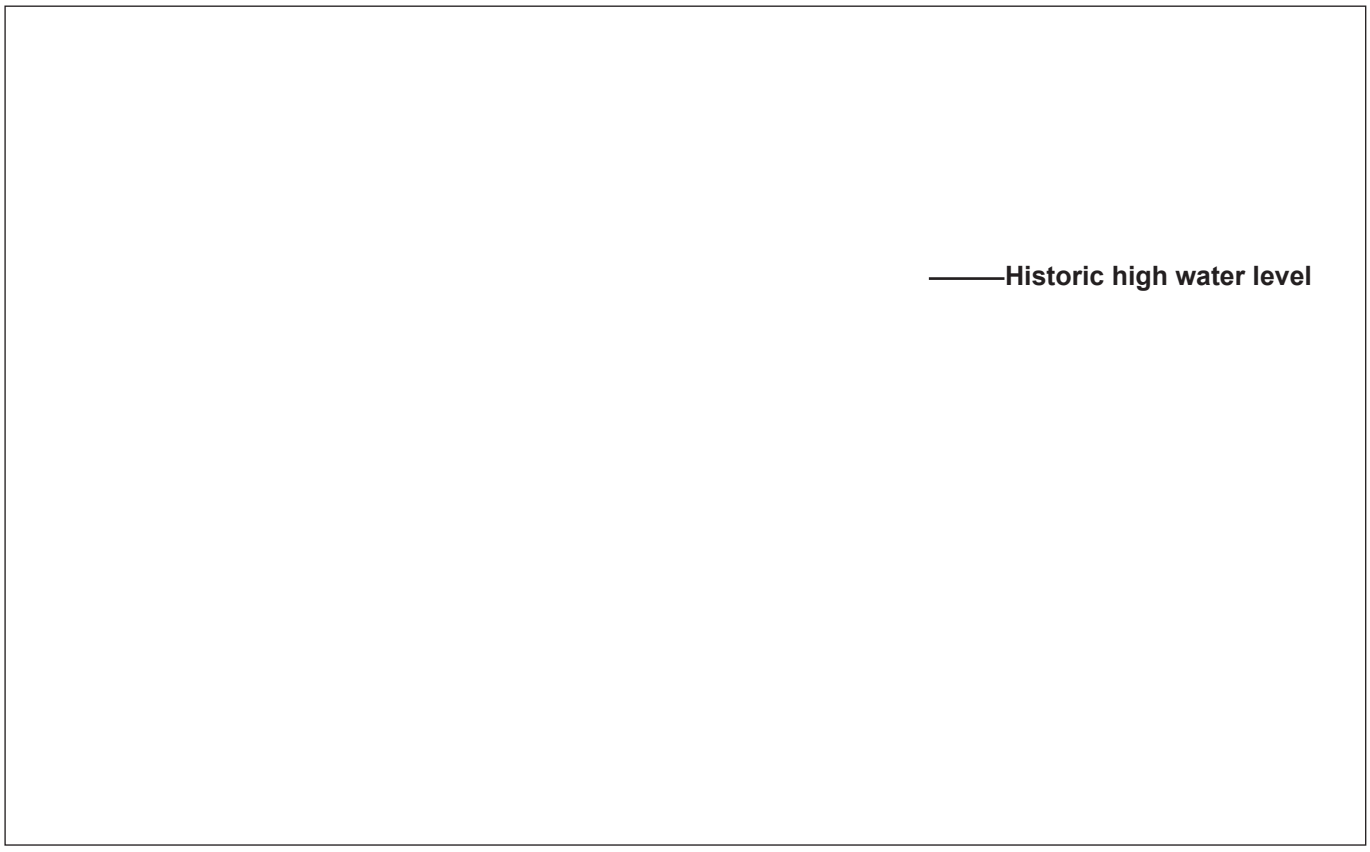
Note: Lake bottom is at 200 metres (650 feet) elevation above sea level.

RESOURCE J: LAKE MEAD ELEVATION



RESOURCE K: LAKE MEAD, COLORADO RIVER

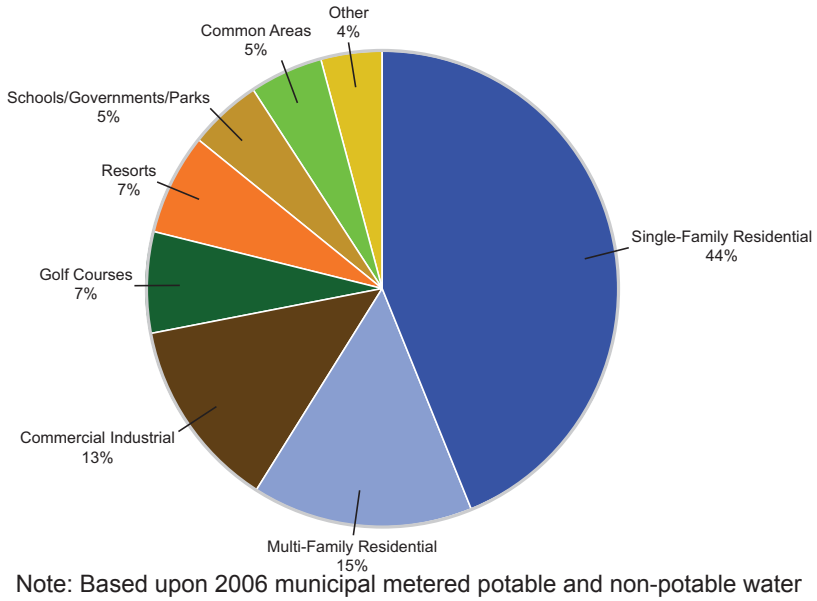




RESOURCE L: CONSUMPTIVE WATER USE IN SOUTHERN NEVADA

Of the total annual water budget for Las Vegas, approximately 57.9 % was used by residents in single-family and multifamily residential areas.

In 1999, water pumped from underground aquifers constituted about 25 % of Las Vegas's entire water budget.



Note: Based upon 2006 municipal metered potable and non-potable water use in the Southern Nevada Water Authority's metered service area.

Average Daily Water Use Per Person

Acknowledgements

Material from the following sources has been adapted for use in this examination.

Page Source

3 Resource A:

First image from epodunk.com, accessed 6 March 2015, http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=17700.
Text from City-Data.com, “Cities of the United States: The West, Las Vegas: Geography and Climate”, accessed 6 March 2015, http://www.city-data.com/us-cities/The-West/Las-Vegas-Geography-and-Climate.html.
Second image from Google Maps, accessed 6 March 2015, https://www.google.com/maps/d/viewer?mid=z4f-ZuCLmiKg.kKv_9iJdsQOs&hl=en.

4 Resource B:

Text from H.I.S. America, “Climate Change and the Economy, Nevada: Assessing the Costs of Climate Change” (National Conference on State Legislatures, 2008), p 1, accessed 6 March 2015, http://his-america.com/activities/city/las/kihon_list.php?tgt=0 and http://cier.umd.edu/climateadaptation/Climate%20change--NEVADA.pdf.
Graph from U.S. Climate Data, accessed 6 March 2015, http://www.usclimatedata.com/climate/las-vegas/nevada/united-states/usnv0049/2014/1.

5 Resource C:

Image from Western Regional Climate Center, accessed 6 March 2015, http://www.wrcc.dri.edu/pcpn/nv.gif.

6 Resource D:

Text, accessed 6 March 2015, from http://www.museumofthecity.org/1940s-growth-of-las-vegas/.
Image from Wikipedia, accessed 6 March 2015, http://en.wikipedia.org/wiki/Welcome_to_Fabulous_Las_Vegas_sign.

Resource E:

Graph data, accessed 22 June 2015, from http://www.lvcva.com/includes/content/images/MEDIA/docs/Population-2014.pdf.

7 Resource F:

Text and images from wired.com, B. Mason, “40 Years of Massive City Growth as Seen From Space”, *Science* (2012), accessed 6 March 2015, http://www.wired.com/2012/07/landsat-city-change/.

8 Resource G:

Image from MuchPics, accessed 6 March 2015, http://muchpics.com/arizona-desert-front-yard-xeriscaping-idea-with-a-fake-dry-stream-bed-large-decorative-boulders-gravel-ground-cover-native-plants-and-cactus-xeriscaping-would-be-flat-without-the-natural-sculptur/.
Text from CBS News, M. Strassmann, "America's Dwindling Water Supply" (2010), accessed 6 March 2015, http://www.cbsnews.com/news/americas-dwindling-water-supply/, M. Wines, "Colorado River Drought Forces a Painful Reckoning for States" (2014), accessed 6 March 2015, http://www.nytimes.com/2014/01/06/us/colorado-river-drought-forces-a-painful-reckoning-for-states.html?_r=0, and EPA Water Sense, "Nevada Water Fact Sheet" (EPA, 2010), p 2, accessed 6 March 2015, http://www.epa.gov/watersense/docs/nevada_state_fact_sheet.pdf.

9 Resource H:

Text, accessed 6 March 2015, from http://www.telegraph.co.uk/news/worldnews/northamerica/usa/10932785/The-race-to-stop-Las-Vegas-from-running-dry.html.
Image from Earth 911, P. Felps, "Las Vegas Plugs the Drain on Water Resources", accessed 6 March 2015, http://www.earth911.com/home-garden/las-vegas-saving-water/.

10 Resource I:

Table data, accessed 6 March 2015, from http://www.usbr.gov/lc/region/g4000/hourly/mead-elv.html.
Text from Mail Online, "Could Lake Mead Dry Up? Shocking Pictures Reveal How Hoover Dam Reservoir is Shrinking So Fast it Could Threaten Las Vegas Water Supply" (2014), accessed 6 March 2015, http://www.dailymail.co.uk/news/article-2549619/Shocking-pictures-reveal-Lake-Mead-shrinking-dangerously-low-levels-threatening-Las-Vegas-water-supply.

Resource J:

Image by Las Vegas Sun from National Park Service, "Lake Mead National Recreation Area AZ, NV: Lowering Lake Levels", accessed 6 March 2015, http://www.nps.gov/lake/naturescience/lowering-lake-levels.htm.

11 Resource K:

Images by Ken Dewey from Climate.gov Science & Information for a Climate-Smart Nation (NOAA), "Western Drought Brings Lake Mead to Lowest Level Since it Was Built", accessed 6 March 2015, http://www.climate.gov/news-features/featured-images/western-drought-brings-lake-mead-lowest-level-it-was-built.

12 Resource L:

Pie graph by Southern Nevada Water Authority, and text from www.indiana.edu, A McRae, "Volcanoes of the Eastern Sierra Nevada: Geology and Natural Heritage of the Long Valley Caldera, Land Subsidence in Las Vegas Valley as a Result of Aquifer-System Pumping", accessed 6 March 2015, http://www.indiana.edu/~sierra/papers/2009/mcrae.html.

Image from CBS News, M. Strassmann, "America's Dwindling Water Supply" (2010), accessed 6 March 2015, http://www.cbsnews.com/news/americas-dwindling-water-supply/.