

EXECUTIVE SUMMARY

- This study examines the economic importance of the Colorado River for the Upper and Lower Basin Regions for one calendar year (2012).
- Modified IMPLAN input-output models are used to estimate the Colorado River’s economic importance to Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming at a state level and also for seven contiguous Southern California counties (treated as a single economy). The Southern California counties are Imperial, LA, Orange, Riverside, San Bernardino, San Diego, and Ventura.
- A separate, single IMPLAN run is then implemented for all recipients of Colorado River water in the entire Basin Region, to take into account the total flow of dollars among all states and counties examined in the Basin Region.¹
- Economic impacts are estimated based on two assumptions:
 - The non-availability of Colorado River water for one full year (2012).²
 - The non-substitutability of the Colorado River water - that is, no other sources of water are available to compensate for the loss of Colorado River water deliveries for the study year.
- Three measures of economic impact are assessed for each geographical area studied. These are: Gross State Product (GSP),³ employment,⁴ and labor income.⁵
- The United States Bureau of Reclamation’s (USBR) 2015 water demand projections for the Basin Region are used in conjunction with historical consumption data collated by the Federal agency as a proxy for water demand in each geographical area of study.⁶
- The following Table estimates the total amount of water consumption by geography in 2015 for a split of water demand into two categories: Agriculture, and Municipal & Industrial.

¹ This is greater than a simple summation of the analyses for the Basin Region constituents studied because each state-specific analysis only takes into account any transactions wholly occurring within their state. They do not take into account any transactions made with other Basin Region states. For a more detailed explanation, please see page 31 in this report.

² The authors recognize that the total non-availability of Colorado River water for one full year is an unlikely scenario. However, it is the best way to arrive at a comprehensive estimate of the value of the Colorado River for the Basin Region economy.

³ GSP represents the dollar value of all goods and services produced for final demand in a state. It is often used as a key measure of the health of a specific state’s economy.

⁴ Employment is a count of full- and part-time jobs for one full year.

⁵ Labor income includes employee compensation (wages and benefits) and proprietor income.

⁶ The latest available year of historical water consumption varies by Basin Region state, so it is possible that USBR’s 2015 projections could be higher or lower than actual use.

Estimated Annual Water Consumption, and Percent Sourced from Colorado River, by Geography

GEOGRAPHY	AGRICULTURAL ⁷		MUNICIPAL & INDUSTRIAL ⁸	
	Total Requirement <i>Million Acre Feet (MAF)</i>	Percent Sourced from Colorado River	Total Requirement <i>Million Acre Feet (MAF)</i>	Percent Sourced from Colorado River
Arizona	2.20	49%	1.98	41%
Colorado	6.13	31%	1.25	41%
Nevada	0	0%	0.37	79%
New Mexico	0.72	15%	0.30	60%
Southern Cal. 7 Counties	3.52	92%	4.17	37%
Utah	2.04	22%	0.84	34%
Wyoming	1.95	20%	0.15	70%
<i>Entire Basin Region</i>	16.56	43%	9.05	41%

Source: USBR (2012)⁹

- The study assumes that over 7.15 MAF of the Basin Region’s annual Agricultural water usage, and 3.72 MAF of the Basin Region’s annual Municipal and Industrial water usage, are sourced from the Colorado River.
- The estimated total economic impacts of Colorado River water loss by Basin Region geography for one full calendar year is estimated in the following Table.

⁷ Agricultural demand is defined by USBR as the water used to meet the irrigation requirements of crops, maintain stock ponds, and sustain livestock.

⁸ Municipal & Industrial is defined by USBR as the water used to meet urban and rural population needs, including any industrial needs within urban areas. Commercial is included as part of the USBR’s Municipal & Industrial estimates. Seidman has also included Energy and Mineral sector consumption in these totals.

⁹ Source: USBR, (2012). *Technical Memorandum C – Quantification of Water Demand Scenarios*, available for download at: <http://www.usbr.gov/lc/region/programs/crbstudy/techmemoC.html>

Estimated Total Economic Impacts of Colorado River Water Loss by Geography

GEOGRAPHY	GROSS STATE PRODUCT <i>Billions 2014 \$</i>	EMPLOYMENT <i>Job Years¹⁰</i>	LABOR INCOME <i>Billions 2014 \$</i>
Arizona	185.01	2,147,770	107.80
Colorado	188.95	2,147,141	115.97
Nevada	115.39	1,417,283	70.57
New Mexico	59.76	771,618	34.17
Southern Cal. 7 Counties	657.45	7,046,110	406.58
Utah	69.79	969,735	43.30
Wyoming	21.67	284,276	13.18

Source: Authors' Calculations

- The contribution of the Colorado River for the annual GSP of each Upper Basin state (Colorado, New Mexico, Utah, and Wyoming) is estimated to range from approximately \$22 billion to \$189 billion (2014 \$).
- The contribution of the Colorado River for the annual GSP of each Lower Basin state (Arizona, Nevada, and the Southern California 7 counties) is estimated to range from \$115 billion to over \$657 billion (2014 \$).
- The economic importance of the non-availability of Colorado River water for the *entire* Basin Region economy as a whole is summarized in the following Table.¹¹

Estimated Impact of Colorado River Water Loss for the Entire Basin Region Economy

ECONOMIC IMPACT TYPE	GROSS STATE PRODUCT <i>Billions 2014 \$</i>	EMPLOYMENT <i>Job Years¹²</i>	LABOR INCOME <i>Billions 2014 \$</i>
Direct Losses	694.78	7,859,245	434.29
Indirect Losses	231.12	2,361,250	139.35
Induced Losses	508.22	5,780,501	297.81
Total Estimated Economic Losses¹³	1,434.12	16,000,996	871.45

Source: Authors' Calculations

¹⁰ A job year is equivalent to one person having a full-time job for exactly one year.

¹¹ For the purpose of these estimates, the Basin Region economy encompasses Arizona, Colorado, Nevada, New Mexico, Utah, Wyoming, and seven Southern California counties.

¹² A job year is equivalent to one person having a full-time job for exactly one year.

¹³ Columns may not correspond exactly to totals due to rounding.

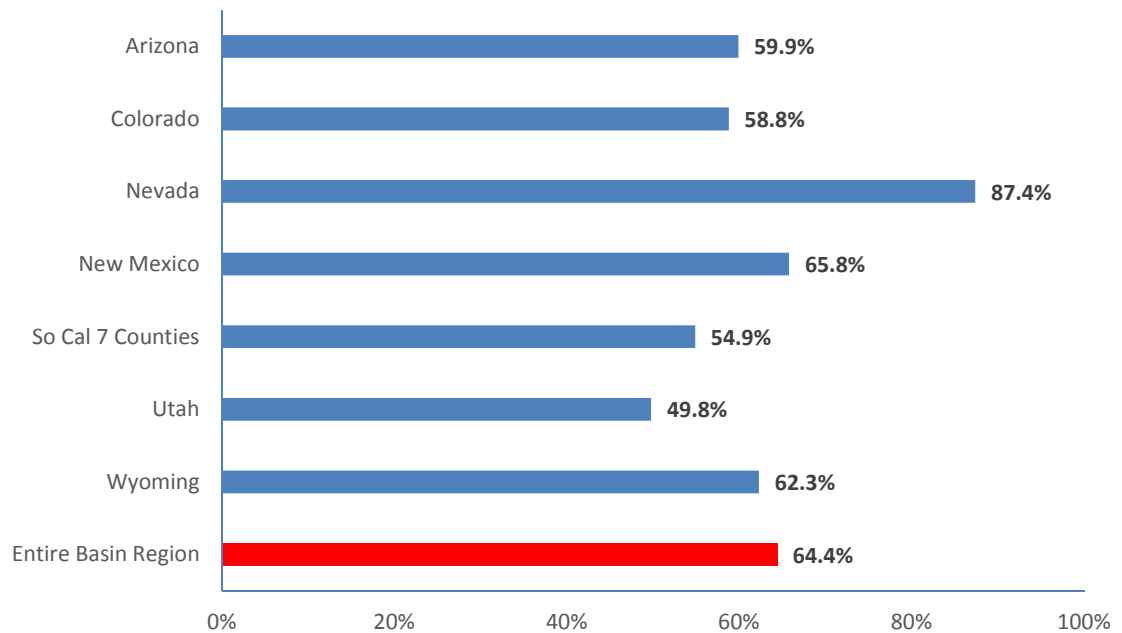
- Approximately 64.4% of the Basin Region’s annual GSP could be lost if the Colorado River water is no longer available to residents, businesses, industry, and agriculture.
- To put this into perspective, the annual contribution of the Colorado River to the combined GSP of the Basin Region is equivalent to approximately one twelfth of total U.S. gross domestic product (GDP) in fiscal year (FY) 2012.¹⁴
- The annual contribution of the Colorado River to Basin Region GSP is also equivalent to approximately three times the total U.S. retail sales of Walmart in FY 2012.¹⁵
- The Top 5 private (non-Government) sectors estimated to experience the biggest shortfall in total GSP contributions if Colorado River water is unavailable for a year are:
 - Real Estate and Rental (e.g. any establishment engaged in renting, leasing or allowing the use of property, motor vehicles, consumer goods, and nonfinancial intangible assets) - \$174.3 billion.
 - Healthcare and Social Services (e.g. ambulatory healthcare; child day care; hospitals; nursing; residential care; and vocational rehabilitation) - \$148.6 billion.
 - Finance and Insurance (e.g. banking; credit intermediation; insurance; securities, commodities and trusts) - \$137.1 billion.
 - Professional, Scientific and Technical Services (e.g. accounting and bookkeeping; advertising; architectural and engineering; computer services; consulting; legal; photography; research; translation services; veterinary services) - \$130.6 billion.
 - Retail Trade (e.g. any establishment engaged in retailing merchandise) - \$96.2 billion.
- Over 16 million public and private sector jobs in the Basin Region rely on the availability of Colorado River water each year, and \$871 billion (2014 \$) labor income.
- Focusing exclusively on private employment, the Colorado River is estimated to help generate almost 12.2% of national private employment in the Basin Region.¹⁶
- The availability and delivery of Colorado River water to municipal, industrial, and agricultural customers therefore has a crucial impact on the economic development of the region.
- The annual losses to GSP resulting from the non-availability of Colorado River water range from 49.5% to 87.4%, dependent on the geography studied.

¹⁴ GDP is the national equivalent of GSP. The GDP of the U.S. in current dollars in FY 2012 is \$16.16 trillion (current \$). Source: <http://www.statista.com/statistics/188105/annual-gdp-of-the-united-states-since-1990/>

¹⁵ Source: <http://fortune.com/fortune500/2013/>

¹⁶ Total U.S. private employment in 2012 was 115,610,216. Source: U.S. Census Bureau, (2014). State and County Quick Facts, available at: <http://quickfacts.census.gov/qfd/states/00000.html>

Percent GSP Losses in the Absence of Colorado River Water for One Year



Source: Authors' Calculations

- Given the linear nature of the IMPLAN models, an extrapolation of economic impacts based on uniform percentage declines in the availability of Colorado River water throughout the Basin Region's constituent geographies for one year, rather than its total absence, is possible and shown below.¹⁷

Extrapolated Estimates of Total Economic Impacts of Different Amounts of Colorado River Water Loss for the Entire Basin Region

PERCENT DECLINE IN AVAILABILITY OF COLORADO RIVER WATER	GROSS STATE PRODUCT <i>Billions 2014 \$</i>	EMPLOYMENT <i>Millions Job Years</i>	LABOR INCOME <i>Billions 2014 \$</i>
10%	143.4	1.6	87.1
15%	215.1	2.4	130.7
25%	358.5	4.0	217.9
50%	717.1	8.0	435.7

Source: Authors' Calculations

¹⁷ This extrapolation is only possible if, for example, a 10% decline in Colorado River water availability applies equally throughout the six Basin Region states and the seven Southern California counties studied. If the decline in water availability is not shared at a uniform percentage rate between the constituent geographies, the level of trade between those geographies will decline at different percentage rates, which will have non-linear consequences for the estimated combined economic impacts in the entire Basin Region.