



- **What are the costs of providing water for Los Angeles?**
- **What is owed to the Owens Valley for supplying water to the Los Angeles Aqueduct?**

Introduction 01-02

Aqueduct Futures Project [AF] was launched to commemorate the centennial of the Los Angeles Aqueduct [LAA] in 2012 by Barry Lehrman, Assistant Professor of Landscape Architecture at Cal Poly Pomona. With the assistance of 127 (and counting) Cal Poly Students, the project has mapped the connections among water, energy, ecology, and the growth of Los Angeles and the Owens Valley. AF's goal is to inspire civic imagination about opportunities for the next hundred years of the Los Angeles Aqueduct.

At the opening of the LAA, William Mulholland famously said, 'Here it is. Take it!' referring to the water from the Owens Valley. One hundred years later, AF is seeking ways to give it back.

History 04-07

These panels are a timeline (left to right) that illustrate the influence and connections between the LAA and Los Angeles from the end of the Ice Age through 2014. From top to bottom, the maps and charts are:

- Changes to the Owens Valley and the Los Angeles Aqueduct
- Regional maps for the watershed Los Angeles: the Zanja Madre (1781-1913), alternatives to the LAA (1906), LAA (1913), Colorado River Aqueduct (1939), and California Aqueduct/State Water Project (1971)
- Map of the US with every major diversion of water and the date when urban water systems were established (far right)
- Comparison of the area of the City of Los Angeles and property owned by the City in the Owens Valley and Mono County
- Maps showing the growth of the City of Los Angeles
- Chart of flow of water in the LAA to LA with ground water pumping in Owens Valley

The background pattern indicates droughts in Southern California and Owens Valley, and charts total annual precipitation in Los Angeles.

Flows 08-11

The Los Angeles Aqueduct is a very complex system. Panels 09 & 10 provide 'Sankey diagrams' of water and energy flows for the Aqueduct that illustrate the origins (sources) and uses (sinks) of water and energy across the entire system (line thickness indicates the amount). Panel 11 illustrates the impacts caused by pumping on the plants in the Owens Valley (left) and all the court ordered projects to repair the damaged habitat (right).

Replacement 12-13

How much water does Los Angeles need and how much water is available from local sources? These panels chart how *it is* possible to replace the entire amount currently delivered via the LAA with recycled water and ground water.

Futures 14-16

With or without the Aqueduct, what is the future of the Owens Valley? Among the possibilities, perhaps it can become a park, where American Bison and wolves are reintroduced to California. If the Aqueduct remains in use, can the Aqueduct be revitalized into the cultural focus of the communities it passes through on its journey south? Can the aqueduct be transformed into a living river instead of a dead pipe?

Lexicon

Acre-Feet: a volume of water covering an area of one acre with one foot deep (43,560 cubic feet), about 326,000 US gallons or 1,230,000 liters

Adjudicated Groundwater Basin: an aquifer managed by a court-negotiated plan

Allocated: distributed for a certain purpose

Annexation: the process to enlarge the boundaries of a city

Aquifer: water underground in porous soil (such as sand and gravel), shallow aquifers are close to the surface, while deep aquifers are far below

Bolster: to support or strengthen

Brine Pool: the shallow remnants of Owens Lake that are very salty

Buffalo Commons: a proposal to return a large portion of the Great Plains to native prairie, removing all the fences so American Bison (buffalo) can resume migrating [see <http://gprc.org>]

Bullion: bricks of a precious metal such as gold or silver/lead ore (as transported from Cerro Gordo Mine to Los Angeles)

Catalyst: something that sparks an event or enables a chemical reaction

Compensation: payment for an injury, damage to property, or lost use of property caused by others

Conduit: a channel for moving water

Conservation Easement: a real-estate contract that prevents future construction to preserve habitat

Delirious: a wildly excited or euphoric feeling

Desiccation: a state of extreme dryness

Diversion: turning something away from its original path

Divestment: reducing financial involvement

Dredging: digging out soil from underwater

Ecology: the connections of animals and plants to climate and geology

Enfranchise: to have the right to vote and a voice in making decisions

Evaporation: when water changes phase into a gas

Extirpated: when animals (or plants) become extinct in a region (but still live elsewhere)

Fauna: animals

Flora: plants

Groundflow: water flowing out of the ground into a lake or stream from a shallow aquifer

Habitat: the place where animals live

Halophyte: plants that tolerate high salt levels in the soil or water

Imported water: water moved from one watershed or groundwater basin to another by an aqueduct

Infrastructure: public works engineered to support society including roads, pipes, and wires

Irrigation: supplying water to grow plants

Landscape: the features of a place or area

Latitude: geographic measurement of how far north or south from the equator a place is, measured in degrees (0 to 90), minutes (1/60 a degree), and seconds (1/60 of minute), or in decimal degrees

Longitude: geographic measurement of far east or west a place is from Greenwich, England, measured in degrees (0 to 180), minutes, and seconds, or in decimal degrees

Metabolism: the flow of energy and resources used by living organism, can also be applied to resource flows supporting cultural/ engineered system

Metropolis: a highly populated urban area with many cities

Mitigation: reducing the severity of

Nexus: a series of connections

Obsolete: out of date

Overdraft: pumping too much so a well goes dry

Phreatophytes: Plants with very deep roots that survive on groundwater

Pleistocene: the most recent ice age from 2 million to 10,000 years ago

PM10: dust particles that are smaller than 10 microns (millionths of a meter), so can be absorbed by human lungs causing health problems

Precipitation: rain

Rambunctious: out of control

Rangeland: open land for grazing

Recharge: filling up an aquifer from rain or imported water

Reservoir: a natural or artificial lake storing water

Rewilding: restore an area of land to its natural state including reintroducing wild animals that were driven out

Right of Way: a legal right (**easement**) to pass through property that belongs to someone else

Riparian Vegetation: Plants along the edge of a river or lake

Sankey Diagram: a diagram of flow/movement where the arrow widths are proportionate to the quantities in different parts of the system

Siphon: a pipe allowing water to flow across a high or low spot

Transpiration: evaporation of water by plants

Tufa: volcanic ash used to make concrete

Verdant: lush green with plants

Watershed: an area where water flows into a single river, stream, or lake; also called a **Basin**

Wellfield: an area with many wells

Xeric landscape: a very dry landscape

Xerophytes: plants adapted to very dry place

Aqueduct Futures Credits

1-2\\ Introduction + Los Angeles Aqueduct Photograph and graphics by Lehrman. 2015.

Logo and Aqueduct Futures Word Mark by Lehrman & Melissa Noriega. 2013.

3\\ [Not printed for After the Aqueduct]

4\\ Before 1915

Graphics by Lehrman with Tiernan Doyle, Eric Haley, James Powell, Devon Santy, Ernesto Perez, & Stephen Miller. 2013 & 2015.

5\\ 1915-1950

Graphics by Lehrman with Ernesto Perez & Stephen Miller. 2013 & 2015.

6\\ 1950-1980

Graphics by Lehrman with Ernesto Perez & Stephen Miller, Roy Guillen & Diego Lopez. 2013 & 2015.

7\\ 1980-2015

Graphics by Lehrman with Ernesto Perez & Stephen Miller. 2013 & 2015.

8\\ Aqueduct Flows + Well 103

Photograph and graphics by Lehrman. 2015.

9\\ Water Sankey 2003-2013

Graphics by Lehrman with Anais Placido & Sid Bhalinge. 2013.

10\\ Energy Flows

Graphics by Lehrman with Anais Placido, Diego Lopez, Jesse Hirakawa, Rosa Soria, & Roy Guillen. 2013.

11\\ Ecological Flows

Graphics by Lehrman, Jonathan Linkus, & Jane Tsong, with Tyler Joyce, James Powell, & Kevin Yuan. 2013 & 2015.

12\\ Obsolescence + Owens Lake Dust Control

Photograph and graphics by Lehrman. 2015

13\\ Recycled Water & Groundwater

Cartography & Graphics by Lehrman with Sara Abed & Misa Sullivan. 2012 & 2015.

14\\ Aqueduct Futures Scenarios/Aqueduct in Antelope Valley

Photograph and graphics by Lehrman. 2015.

15\\ Rewilding Owens Valley

Cartography & Graphics by Lehrman with Misa Sullivan, Tiernan Doyle, Eric Haley, James Powell, & Devon Santy. 2015.

16\\ Living Aqueduct

Cartography & Graphics by Lehrman, Jonathan Linkus, Carlos Flores, Tyler Prestien, Katie Russell, & Jane Tsong. 2015.

Colophon

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