Surface Water Transfer

by Benjamin Deniston

The last component of our water cycle, the management of the water that has precipitated over land, can also be greatly improved, overcoming the imbalances created by nature.

Life in the western regions of North America is supported by the water provided from the Pacific Ocean. As the Sun fills the air above the Pacific Ocean with fresh evaporation, westerly winds sweep up this atmospheric moisture for delivery to the western part of North America. However, this is not a fair distribution. As measured by freshwater runoff from the rivers, the water available in the northwestern section of the continent is over ten times greater than the water available in the southwestern section.

In the Southwest, the largest rivers, including the Colorado, the Sacramento, and the San Joaquin, each carry 15 to 20 cubic kilometers per year. In the Northwest the largest rivers are an order of magnitude larger, with the Yukon, the Mackenzie, and the Columbia each carrying between 200 and 300 cubic kilometers per year, and there are another ten rivers significantly larger than anything in the Southwest.

The 1960s design of the North American Water and Power Alliance (NAWAPA) stands as the most fully developed proposal to better manage the totality of the water cycle of this western range. Using existing rivers and geological features, along with many tunnels, reservoirs, and canals, the NAWAPA program would divert a fraction (around 10%) of this Northwestern water to the south, pumping it onto the Great Basin, and then distributing it throughout the southwestern United States and Northern Mexico.

Because the entire western coast is characterized by this flow of Pacific Ocean moisture, NAWAPA doesn't draw down finite water supplies. It modifies an existing cycle, ensuring that the natural precipitation deposited on the continent is as productive as possible, before it returns to the ocean.

For example, using information provided by NASA's Earth Observing satellites, we can measure the amount of new plant growth each year in different regions of the world. For the northwestern section of North America, an average of 1.5 billion tonnes of new plant life is created each year. Because the water cycle supporting this growth is about 1,500 cubic kilometers per year, we can determine that the average productivity of the water cycle in the northwestern region as a whole is about one million tonnes of plant life per cubic kilometer of water flow (both measured per year).

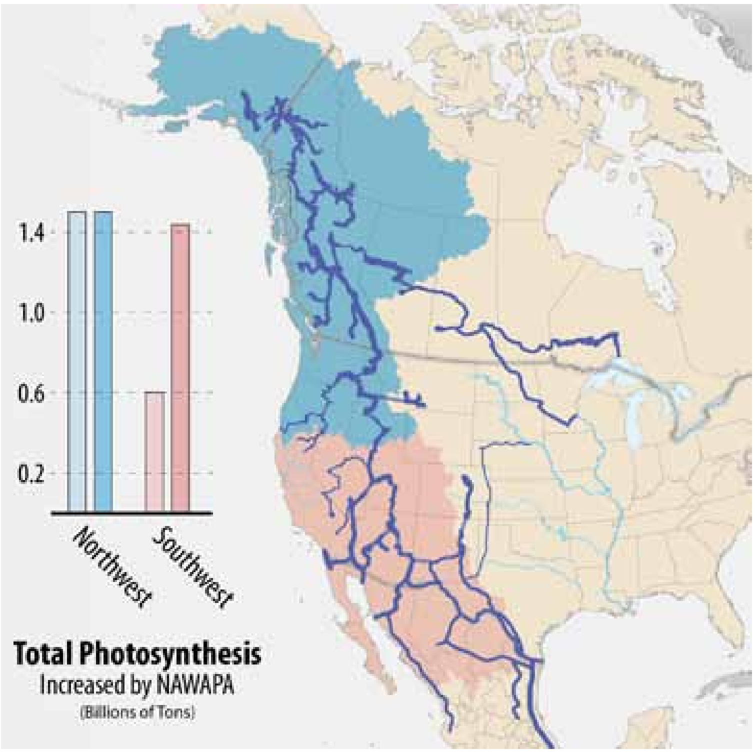
Compare this with the southwest, where about 0.6 billion tonnes of new plant life is created per year by a water cycle of 113 cubic kilometers per year, indicating a much higher productivity, 5.5 million tonnes per cubic kilometer of water flow.

Based on this comparison, we can make a rough assessment for how NAWAPA could potentially increase the productivity of the entire western cycle as a whole. By cycling about 160 cubic meters of freshwater from the northwest throughout the southwest (before it returns to the ocean), the amount of annual plant life produced in the southwest could increase from 0.6 billion tonnes to nearly 1.5 billion tonnes per year (assuming that the NAWAPA water would take on the average productivity rate which currently exists in the southwest).

For the total water cycle of the western half of the continent—characterized by the west to east transport of atmospheric moisture from the Pacific Ocean—the productivity could potentially be increased by around 50% with NAWAPA, from 2.1 to 3 billion tonnes per year.

This is without increasing the water supply one drop.

Nature's gifts are not evenly distributed. The northwest of the U.S. gets over a dozen times more run-off than does the southwest.



Water transferred by NAWAPA would play a much greater role in the biosphere, by dramatically increasing the biomass created by photosynthesis in the southwest and plains, while barely being missed in the northwest. The bars show billions of tons of biomass produced by photosynthesis currently, and as estimated with NAWAPA.

While this is obviously a very rough estimate, it serves as an indication of the principle at play. Under mankind's management, the existing water cycles can be improved, yielding higher rates of economic and biological productivity per amount of water in the cycle. Nothing here is being used up, or drawn down. The amount of work being done by an existing cycle is increased by better management.

In terms of distribution, by including some southern and other extensions, NAWAPA could provide a water flow equivalent to eight new Colorado Rivers, to be shared between seven states of the Southwest, three states of the High Plains, and six states of Northern Mexico.

NAWAPA, or something like it, can play an important role in the management of the surface distribution of the continental water system, and it can also open up the general economic development of the northern territories, providing a large economic opportunity to Canada, if they choose to participate in such a program. However, we must subsume the general conception of surface management with the new means of developing the water cycle discussed above.

Integration

While NAWAPA alone was an adequate plan for the 1960s, the crisis has gotten much worse, and the technological potential available to mankind has advanced further.

A new baseline of water input can be provided by large-scale desalination, powered by a nuclear driver program to increase the energy flux density of the economy. Mankind can subsume the role of the Sun —with respect to the water cycle—and create new freshwater inputs along the coast of California, Texas, and other appropriate regions. This goes beyond transferring the existing water distribution, by increasing the net, total volume of the cyclical freshwater interaction of the Pacific Ocean with North America.

Perhaps most promising will be the development of the atmospheric moisture systems. This has many critical implications for the management of the Pacific Ocean-North America interaction. The continent's rivers, lakes, groundwater stores, and snowpacks—along with the water transfer, reservoir, and related systems which depend upon them—are all products of the activity of the atmospheric moisture systems. With ionization technologies that we can take a higher level control over these systems, ensuring the precipitation continues where it has been expected, and bringing in new precipitation where it is desired.

The new era of water transfer systems includes the management of rivers in the sky, and rivers flowing from the ocean onto the land, creating stronger, more stable, and larger cycles of water flow.

California's survival depends upon this full conception of mankind's mission to develop the Pacific Ocean-to-North American interaction, and this serves in turn as a broader case study for water needs globally.

Understanding the cosmic components of climate, weather, and precipitation takes mankind off the Earth, beyond the Solar System, and into the Galaxy. With this perspective, the water cycle takes on a new meaning, with new properties, and new potentials available for use, to those with a galactic perspective.

There is no shortage of water, only a shortage of conception. Mankind can solve the water problem, in California and other regions of the globe—we just have to commit to do so, and remove those who are standing in the way.