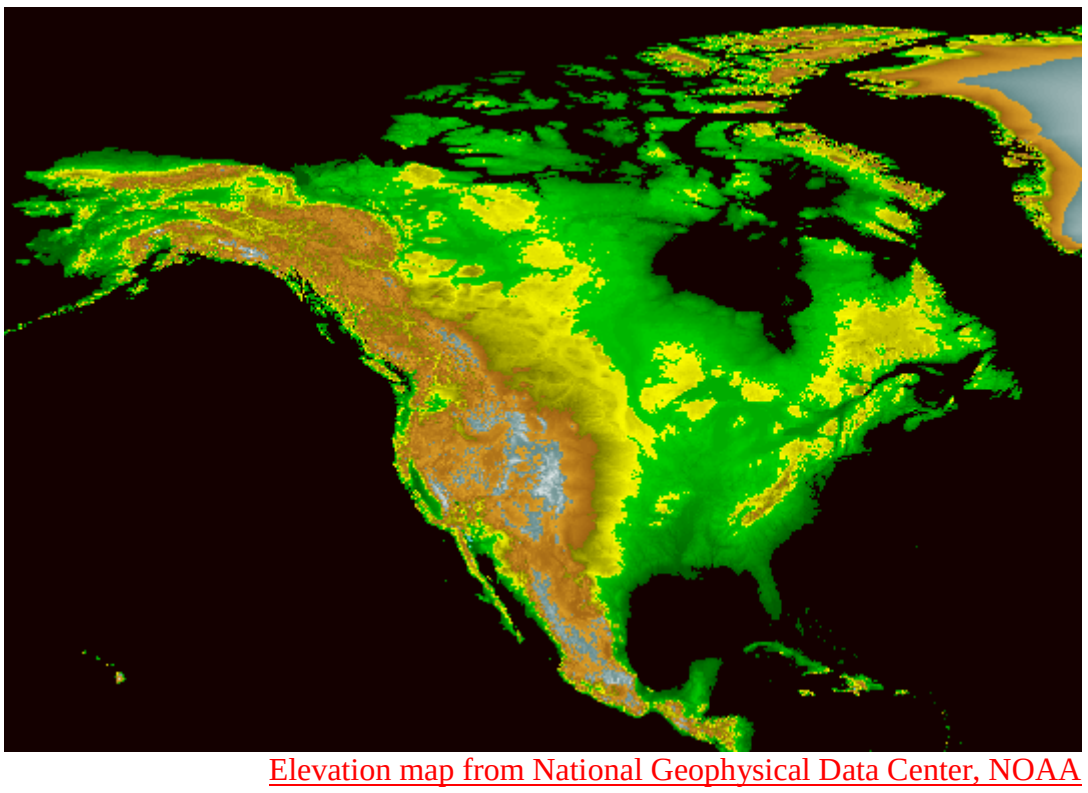
Water is essential for life

Rolf A. F. Witzsche - Aug. 2010



Elevation map from National Geophysical Data Center, NOAA

All living processes are growth oriented
As life expands, the need for water expands
without it life stops

The New Ice Age ahead changes the water balance
how would FDR respond?

The North American deserts.

The North American deserts are huge in size and form a single desert group made up of the Nevada Great Basin, the Mojave Desert, and Sonora Desert, covering together an area of 450,000 square miles or 288 million acres. To make the deserts biologically productive, 'precipitation' needs to be artificially enhanced by means of irrigation. Productive farm lands typically receive 35 to 40 inches of precipitation per year, for the desert block listed above the input requirement therefore adds up to 864 million acre/feet per year or 33,696 cubic meters per second.

The North American Great Plains.

The entire great plains area, roughly 500,000 square miles, is slightly larger than the area of the desert group listed above. However, the Great Plains area receives on average 15 inches of natural precipitation, so that the upgrade requirement adds up to only 400 MAF/yr or app, 15,600 cm/s. The rivers crossing the plains presently drain away 61 MAF/yr into the Mississippi via the Missouri River. If half of that can be recovered with advanced water management, a total of 370 MAF/yr of additional water would be required to make the area optimally productive.

Both requirements added together, the deserts and the plains, add up to 1,234 MAF/yr.

Where would one look for the needed resources?

At first glance it seems impossible that water needs on this gigantic scale can be met. In the early 1960s the Caliornia-based engineering firm of Ralph M. Parsons Co. put together a proposal to divert southward 15% of the Mackenzie and Yukon River runoff in northern Canada and Alaska now going into the Arctic Ocean. The plan is to tap the sources at a high altitude, and then to channel it south through the Rocky Mountain trench that would become a 500 mile long reservoir, staging the water for routing it across various routes, reaching as far as Mexico. The original proposal was for a transfer volume of 100 MAF/yr, which was later upgraded to 160 MAF/yr, of which 50 MAF/yr became lost due to the hydroelectric development at the Peace River, leaving a theoretical flow-through of 110 MAF/yr when the project becomes completed at the end of a 30 to 50 year construction period. The program became known as NAWAPA (North American Water and Power Alliance).

The plan is a typical (for the 1960s) corporate proposal that would have made the construction company that proposed it exceedingly rich, as the entire plan consists of 369 separate projects including a giant dam 1,700 feet tall (three and a half times as high as the Great Pyramid in Egypt), and two lesser dams, one only 900 feet tall, all to be built in the sub-arctic, in permafrost county that is frozen over for half a year.

After half a century of construction, the plan then would deliver 110 MAF/yr, for a 1,124 MAF/yr shortfall for what is needed. Nor would the plan be expandable.

The NAWAPA plan is currently in the news again to signify the necessary mission orientation as a starting platform to start the economic recovery of the USA after its near total collapse in the wake of years of bailout-looting of its economy on to top of decades of prior looting. A giant project is needed on the scale of the old NAWAPA to restart the US economy and that of the world. NAWAPA would provide millions of jobs almost instantly, the scale of the construction effort that is involved is that big. (See an interactive map of it). The American economist and statesman Lyndon LaRouche, who brought NAWAPA to the foreground again, concedes however that the plan itself is not practical, while its mission orientation is so critical that the continued existence of civilization may depend on it.

So, what would a practical plan look like?

An alternative to the original plan was proposed in the 1970s. The alternate plan was to collect the outflow of the Yukon River and divert it south via an underwater pipeline. This was considered a "cheap" option as it would bypass the huge construction efforts, but the option never got off the ground, most likely for the reason that the water of the Yukon River is considered undrinkable. And even then, had this plan been carried out, diverting the entire Yukon outflow, this option would have upgraded the plan to only 160 MAF, leaving a deficit of over a billion acre feet per year.

The Venezuela pipeline

An option that President Franklin Delanor Roosevelt (FDR) might have considered, would involve creating an underwater pipeline, fed by the outflow of the Orinoco River in Venezuela at an average outflow of 33,000 cm/s - app. 846 MAF/yr. This massive flow rate (almost three times that of the Mississippi) would be sufficient to satisfy the needs of the North American deserts. FDR would likely have chosen this option. He was always thinking in big terms, never in tiny terms and dribbles. When he launched the TVA (the Tennessee Valley Authority), he was thinking in terms of uplifting an entire region. The TVA was a huge enterprise in its days, and it did more than meet a need.

Building a thin-walled flexible pipeline from Venezuela across the Gulf of Mexico to the gulf-side of the USA, and Mexico, would be in the TVA kind of tradition. It would be relatively easily built with high temperature manufacturing processes that nuclear power readily enables. The line would also have a below-sea-level branch across the states of Veracruz and Oxaca, and from there be routed north to the top end of the Gulf of California and into the western deserts. The construction effort would have been relatively short term in duration.

FDR's TVA projects were all 'quick' projects, not 30-50 year projects. The TVA started in 1933. Seventeen later, after numerous projects had come on line, the TVA was the largest electricity producer in the USA. And

even now, it is still growing. It is adding nuclear units to its capacity. The Venezuela pipeline could be on that time scale. It could have the first water flowing in five to seven years, with a fully functioning distribution network in operation in ten to fifteen years, complete with brand new cities, millions of free houses, and brand new industries springing up dynamically along the progress lines of the greening of the deserts. The economic benefits derived from the process would of course be shared across the region.

Irrigating the Great Plains

Most likely, no massive water input into the Great Plains region would be needed. The effect of hydrolyzing 300 million acres of dessert area in the west would have a sufficiently massive spill-over effect in the east across the Mountains. In most areas of the plains the need for irrigation would become minuscule.

And even when the worst case should materialize that the new moisture would not fall behind the mountains, the needed 370 MAF/yr of irrigation waters that the plains would then require to become optimally productive, can be supplied from 'local' sources - local meaning the watershed surrounding Hudson Bay. The inflowing waters can be collected with an underwater pipeline system, stored in an underwater reservoir, and pumped out from there for distribution through an overland pipeline system, pumped all the way up to the needed elevations with nuclear-powered pumping stations at various places along the way. In five to seven years the first water would be flowing in this system as well.

The building of nuclear power plants is no longer a decades long effort. Quick results can now be wrought. With the simple reactor design of the Liquid Fluoride Thorium Reactor (LFTR) that requires no huge pressure vessels as the boiling water reactors do, many thousands of LFTR units could be mass produced, scaled to any size, and be in operation in a relatively short timeframe.

The Hudson Bay supply feature might be included in FDR's option for the Great Plains requirements. The Hudson Bay watershed is so large that some of it might even be used later on to augment the Venezuela line, should the needs for fresh water in the south increase. The augmenting of the Venezuela line might be implement with a pipeline flowing out of Hudson Bay through the Atlantic and south to the Gulf of Mexico.

With the Venezuela pipeline and the additional waters, the South American deserts would also be richly supplied, and in short order. The Sechura Desert in Peru (188,000 sqkm) and the Atacama Desert in Chile (46,000 sqkm) would be high priority candidates. Their combined area of 57 million acres would be adequately supplied with 170 MAF/yr, a relatively small amount in the over-all scheme of 1,400 MAF/yr for the entire North/South region.

The Eurasian Response

An FDR-type water project on this scale would naturally be matched by the Eurasian and African nations, once it becomes recognized that productive projects are wealth-creating for any nation through the end-products that they enable. It would be logical then that the long-outstanding Sahara Dessert project would get under way almost instantly, and in a similar big way (not in dribbles and drabs). The Sahara is 3.6 million square miles big (2.3 billion acres). To bring this giant land up to farm standard, a total of 7 billion acre feet of water per year would be required (or 273,000 cm/s). There is just enough water in the combined outflow of the Amazon and Congo Rivers to meet this need. The submerged distribution system could feed into the Sahara at several different low-elevation places. Also there might be enough slack in the system to supply in addition the needs of the Kalahari Desert in South Africa, and the Namib Desert.

Aiming for big results

Aiming for big results to meet the big needs, and this as fast as possible and in the most efficient manner, is the only option mankind has. We need results fast, because mankind is dying under many decades of forced underdevelopment. A billion people - a sixth of all mankind - are living in a state of chronic hunger, if one can call this "living". The old NAWAPA plan was designed to make a construction company rich, but not the world. FDR would have taken the orientation of the plan and turned it into something really big in results, something

that meets the immediate needs of mankind and beyond that makes the entire world rich thereby.

Desalination of seawater

Another option, and a practical option to some degree, is desalination. The current technology is beginning to utilize the waste heat that is inherent in nuclear power systems, and to apply it to the desalination of seawater. Rates of 500,000 cubic meters per day, per unit, are found to be possible, about 6cm/s per unit (4 times the current flow rate of the Arkansas River.)

The next option, beyond desalination, would be water-conservation in indoor agricultural systems. While nuclear desalination is on the upswing, indoor agriculture will likely overtake this trend in the distant future.

And then there is one more option

This option would likely come into play long before we would run out of water. This option is to collect the melt waters of the arctic and Antarctic, and even to utilize the waters of the lakes within their ice. Antarctica is known to have 140 freshwater lakes imbedded in its ice. The largest is believed to have a volume of 5,400 cubic kilometers (5,400 billion cubic meters). At a drainage rate of 11,000 cm/s (slightly less than the Mississippi,) such a lake would flow for 540 years.

There is just one catch with that. The water is at minus three degrees C.. It remains liquid only because of the great pressure from the ice resting above it, which makes the recovery of the water it a bit of a challenge. But what of it? More difficult challenges have been met.

The point is, if we think big, we will never run out of options, but if we grind ourselves to the bone for small results in distant times, as the 1960s NAWAPA scheme would have us to do, we won't live long enough to see the end of it. Lyndon LaRouche said recently, "If you don't think big, your thinking is less than tiny."

Rolf Witzsche

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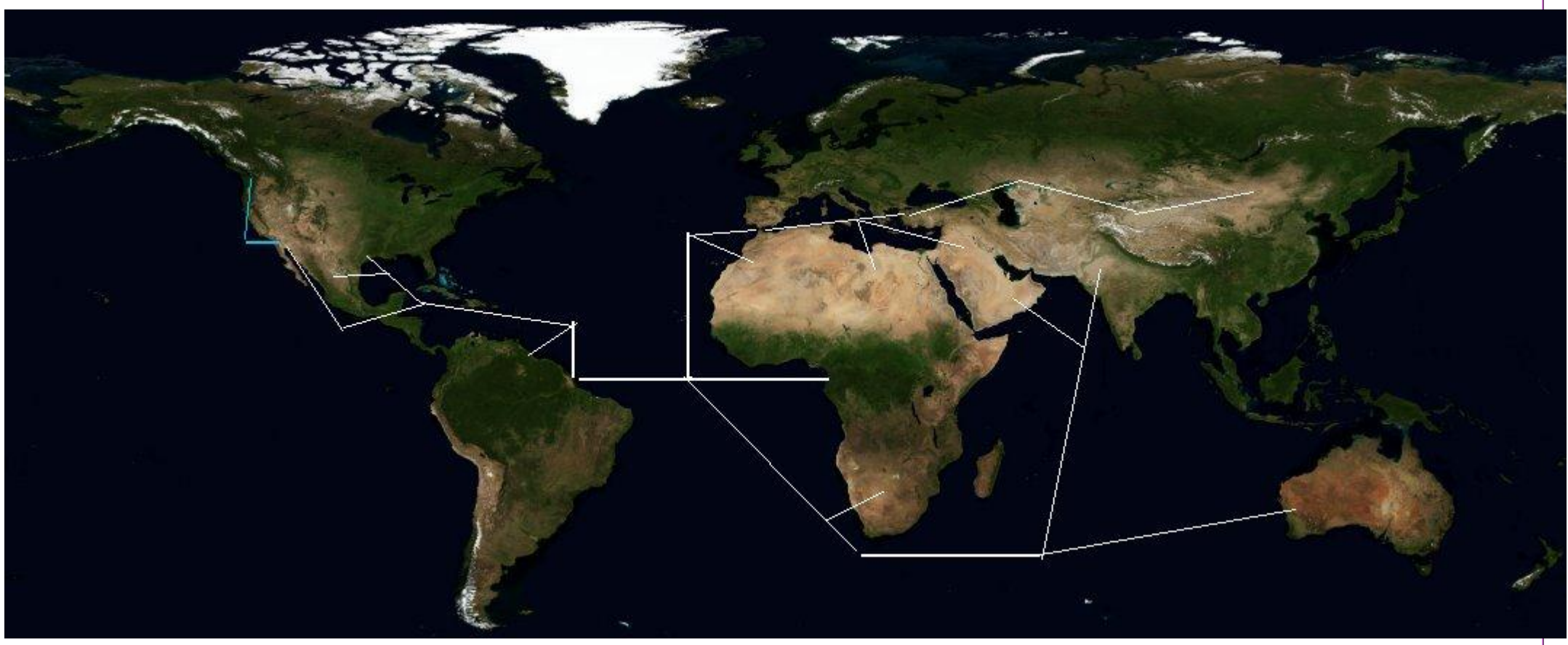

An example of an FDR type NAWAPA system, superimposed onto a NASA satellite composite image

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