

NAWAPA 1960

The greatest of all the historically proposed, great concepts

Sufficient water for all - [by Rolf A. F. Witzsche](#)



Will the concept be implemented with a New Ice Age ahead?

The NAWAPA Project was drawn up by the Pasadena, Calif.-based firm of Ralph M. Parsons Co., and had a favorable review by Congress in the 1960s for completion in the 1990s, but it was never implemented. The idea is to divert southward some 15% of the Mackenzie and Yukon River runoff in northern Canada and Alaska, now going into the Arctic Ocean, channeling it south through the 500-mile Rocky Mountain trench, then along various routes, reaching as far as Mexico.

NAWAPA is envisioned as a project of no less than 369 separate projects for constructing a series of dams for hydroelectric power development, and canals and tunnels for water diversion from the raised levels of the resulting reservoirs. The 15% of the water collected that is not used for hydroelectric power development, would be channeled into a manmade reservoir 500 miles long, 10 miles wide, and 300 feet deep, constructed out of the natural mountain gorge known as the Rocky Mountain Trench in the Canadian province of British Columbia. The water diversion would be accomplished through a series of connecting tunnels, canals, lakes, dams, and pump-lifts, as the trench itself is located at an elevation of 3,000 feet. To the east, a thirty-foot deep canal would be cut from the Trench to Lake Superior, to maintain a constant water level there and clean out pollution in the entire Great Lakes system from Duluth to Buffalo.

Does it conform to the Least Action Principle?

See: **Infrastructures** (the nature of infrastructures)

The Mackenzie and Yukon Rivers produce an outflow into the oceans at an annual rate of 409 million acre-feet per year. Under the updated NAWAPA plan, 160 million acre-feet of fresh water per year would be diverted southward (app. 39%), derived primarily from their tributaries. From the total average volume of 6,260 cubic meters per second (equivalent to 160 MAF), Canada would receive 22%, mostly destined for the Great Lakes, and the United States would receive 78% (4,800 cm/s, equivalent to about 64% of the current average outflow of the Columbia River into the Pacific ocean at 7,500 cm/s).

Here the question presents itself if the NAWAPA project's produced benefits are beneficial enough to

justify the required extremely large physical action on the scale of a 30 to 50-year construction effort that would be required to divert the arctic waters to southward, primarily into the USA?

Some very large elevation differences would be overcome with pumping actions under this plan. (Actually, the original plan is no longer possible as perceived in the 1960s, as the Peace River waters have become private property, feeding the great Peace River hydro=electric power development. This loss of capacity is taking 1,800 cm/s away from the NAWAPA supply side. To make up the shortfall, the now necessary alternate supply would have to be lifted up from much lower elevations, adding a potential 1,500 to 2,000 feet to the needed up-lift that would be synonymous with running a sizable rivers massively uphill.

The natural world is organized differently. It is organized by the Least Action Principle, where the greatest outcome is produced with the least action, and not necessarily on the shortest path. Everything in the natural world is built on this principle, by which the maximum of good is achieved with the least amount of action to produce it.

If this principle is applied, the NAWAPA project is not justifiable in comparison with alternatives. Such an alternative would involve the utilization of existing 'local' water resources nearer to where the need exists, but which are flushed unused into the ocean, as for example the Columbia River that produces an outflow at a rate that is one and a half times larger than what the total NAWAPA plan would deliver to the USA. While the diversion of this outflow of the 'local' rivers (Columbia River and also the Mississippi) would require some infrastructures, the construction effort would be comparably minimal and would accord with the Least Action Principle, while producing a larger affect in the destination area with its larger flow rate, and would produce the desired effect in 5 years instead of the potential 50 years. In addition, this process would be expandable at a rate that is only limited by the available manpower for the development for high-technology industries, power systems, high speed rail, manufacturing, and so on, for the process, and other industrial processes for the newly developed areas, including farming, which would be required massively. For a 5-year cycle, and every cycle thereafter, the manpower factor is the bottle neck.

Another option along the Least Action Principle that would require far less water uplift to meet an objective would be to collect outflow of rivers that flow into the northern end of James Bay, into a submerged reservoir, both of which are 'easily' constructed, and then pump-lift the water 600 feet up into the Great Lakes system for revitalizing the lakes, which would then soon thereafter become available for distribution across North America, requiring a far lesser pump-lift than the NAWAPA system.

The least action process for bringing water close to where it is needed is to transport the water at zero-latitude differential by submerged pipelines in the ocean whereby large distances can be crossed with minimal effort.

Since the NAWAPA concept is perceived as a continental revitalization project, the Least Action Principle should not be ignored as a means for the efficient realization of the desired continental improvement.

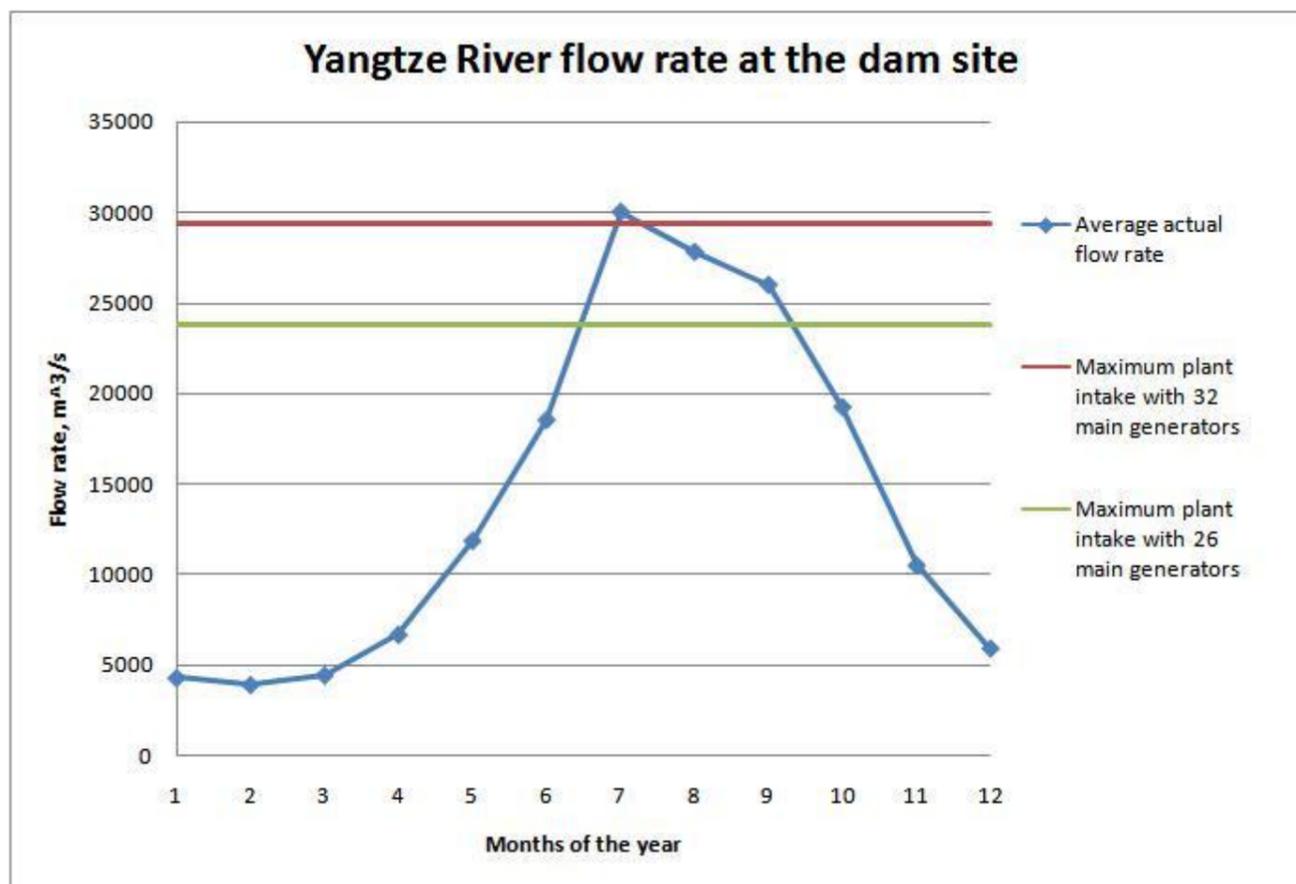
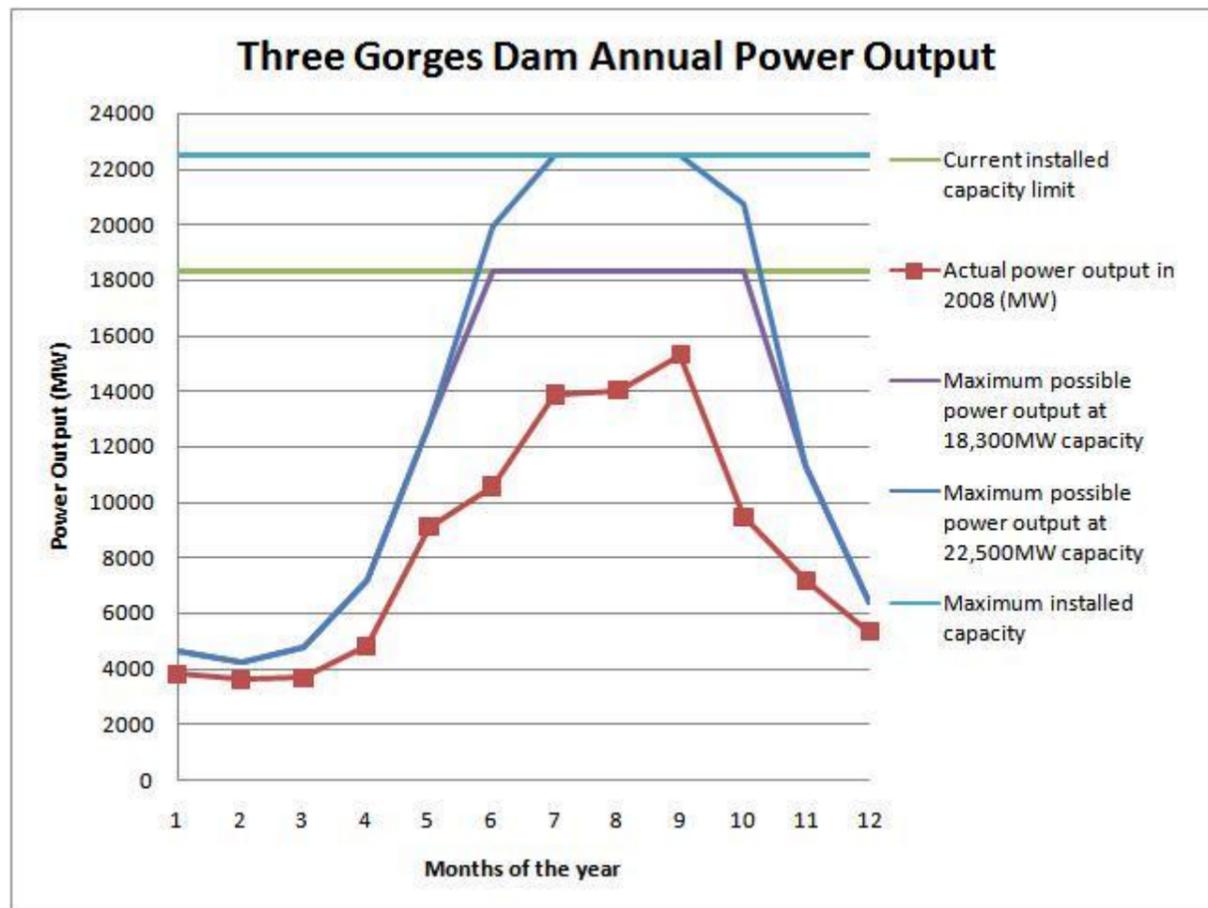
The current NAWAPA plan lacks the Power Flux Density

The proposed "flushing out" of the Great Lakes system, under the current NAWAPA plan is somewhat of a dream. The maximum allocated NAWAPA flow rate for this purpose (if all of Canada's allotment was applied to it), would amount to only 96,000 acre feet per day, for the entire Great Lakes system, which compares as rather minuscule with the natural dynamics of this system. For a single one of the five Great Lakes, Lake Michigan for example, the daily inflow and outflow adds up to a dynamic system in the range of 180,000 acre feet per day. If the entire NAWAPA allotment was divided only between the three major lakes, an additional inflow of 32,000 acre feet for each of them would amount to little more than a 'drop into a bucket.' The additional inflow is so small that 1200 years of it would be required to replace half the volume in Lake Superior. This hardly qualifies for the term "flushing out." The inflow 'power density' for any reasonable cleaning action simply cannot be achieved with the current NAWAPA plan. This part remains a dream.

The NAWAPA project includes greater dreams than resources

One of these is located in the area of electric power production. Under the NAWAPA plan 90,000 MW of

surplus electric power is expected to be produced, which is roughly the equivalent of 90 nuclear reactors. The power is to be shared between Canada, the US. and Mexico. However, the estimate of the surplus power appears to be highly optimistic. Compare this number with what is actually achieved in hydro-power production. China's Three Gorges Dam for example produces 22,500 MW of electric power from a water flow-rate and elevation differential that is roughly equivalent to that of the Mackenzie and Yukon River systems. Both utilize an elevation differential of roughly 600 feet and an average flow-rate of 15,000 cubic meters per second. (The Yangtze river produces an average outflow of 30,000 cm/s, with the dam dividing the catchment area roughly in half. And even at the mighty Yagtze the maximum generating capacity of 22,500 MW is achieved only for three months in a year, during the flood season when the flow rate at the dam site exceeds 25,000 cubic meters per second.



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The NAWAPA plan for producing 90,000 MW of excess power with roughly the same water resource and elevation, not considering the amount that is diverted, appears very much like a dream, especially if one considers that it takes large amounts of power to lift the diverted stream of water of roughly a third of the

average outflow-rate of the Columbia River, to a height of over 3000 feet (and some of that once more in Montana). The typical power production at the Three Gorges Dam actually drops down to a mere 4 to 5,000 MW for four months of the year, during the winter when the flow-rate is low. For the NAWAPA system the annual fluctuation would be much more pronounced, since the entire Yukon and Mackenzie River system and its catchment area is in a frozen state for 7 months of the year.

The high north that is frozen over for seven months of the year, including its tributaries, is far from an ideal environment for hydroelectric development. While Russia operates some hydro plants in Siberia, like the one that is fed with the waters from Lake Baikal, these plants are located a long distance south from the Arctic Circle where the Mackenzie Power System would be located.

The NAWAPA plan requires nuclear power as input

Instead of producing an excess of 90,000 MW, it would be surprising if any excess power is produced at all.

Just consider the uplift that is required of the diverted water. The plan calls for a diverted flow of an average annual rate of 6,200 cubic meters per second, of which two thirds would originate at the 2,100 foot level, and the rest near the 600-foot level. Both would need to be uplifted into the Rocky Mountain Trench, to the 3,000 foot level. This 2,400 foot uplift would have to be accomplished with the available average 500 foot drop of the McKenzie river that would be utilized for power production. To accomplish this feat with a 100% efficiency in power conversion would require a 5-times greater downstream volume than the planned uplift volume. Which means that there is not enough capacity in the river system to power the expected distribution volume, minuscule as it is. In reality the conversion efficiency from water-power, to electrical power, and back to mechanical power to up-lift the water to the required height, is far less than 100%, which means that the NAWAPA project can only be realized with a massive input in nuclear power, although some of the invested power may be recovered later on, which again involves conversion inefficiencies and evaporation losses along the way, and underground leakages. Most likely the system will require vast amounts of power input, instead of being a huge power producing engine as it was advertised in the 1960s. And when it was completed in 35 years time, it wouldn't be sufficient in diverted volume to cover the need, nor would it be dynamically expandable.

Just consider that any major irrigation system that feeds the Great Plains of the American West, and the Great Plains of Texas, can only be realized with a massive input of nuclear power, as the water that would feed such a system would have to be lifted to the high elevation of the plains, no matter where it came from. The elevation of the western Great Plains ranges from 2,000 feet to 6,000 feet, and the Great Plains of Texas from 2,500 feet to 4,700 feet. The general irrigation of these regions has not been realized so far, for reasons of the vast power requirement to accomplish such a feat that cannot be met without nuclear power. However, with nuclear power available at low cost, the local resources of the many rivers that already exist in the high-altitude regions, that flow from the mountains across the Great Plains, could be distributed across the plains with far greater volume than what NAWAPA has allocated for the plains.

The great toxicity question

An additional unknown factor at this point is determined by the various types and concentrations of minerals the diverted water will pick up along their 2000+ miles long rocky journey south, and how the different minerals will interact, which could potentially render the diverted water toxic by the time it arrives at its destination, and potentially unusable, even for agriculture.

In order to avoid this potential uncertainty, a pipeline version had been proposed back in the 1970, with the delivering pipeline being submerged into the ocean. This was proposed as a less expensive, safer, and more power-efficient alternative to the overland route as it would eliminate the high construction cost of environmental alteration, the need for vast power systems, increased delivery volume, and most important of all, eliminate the potential environmental impact on the water on the way to its destination. However, this option was dropped in the 1980s, primarily for fiscal reasons for which the entire project was shelved as it was unjustifiable under the imperial monetary system.

The pipeline option would have the extended capacity to divert possibly up to 80% of the outflow of the two rivers by means of a submerged reservoir to capture the high outflow rates during the short ice-free season that peaks at a rate of app. 45,000 cubic meters per second for the two rivers, for a deliverable steady-flow volume of app. 13,000 cubic meters per second - 5 times the rate of the overland plan.

One of the assumptions for which the NAWAPA plan is promoted is that the northern waters are pollution free, which is not the case. The waters of the Yukon River are presently considered not drinkable, while extensive efforts are made to keep the Mackenzie water drinkable, though mercury and other pollutants are found in the outflow delta. In other words, the water quality of the northern rivers is not pristine, as is the case today with any other river. Even the Amazon River is no longer pollution free, which renders the northern waters not exceptional, apart from the extent of the pollution. In some cases the pollution is potentially beneficial, as we find in the Mississippi River that is primarily polluted with nutrients from agricultural runoff that would be potentially beneficial for greening the deserts. In other words, the NAWAPA plan does not offer an exceptional resource that would make the plan justifiable for this reason. To the contrary, the Amazon and the great high-volume rivers are considered drinkable, and in some cases very much so. It makes no sense to bring polluted rivers into the south from the high north, when far better quality sources are available that are actually usable.

The Ice Age factor

The most critical factor before us at the present time when considering the dynamics of the biosphere is the changing global climate as the Earth may already be in the transition zone towards the next glaciation cycle of the Pleistocene Ice Age period that gave us 100,000-year Ice Age cycles for the last million years with a high regularity, and 41,000-year glaciation cycles for one-and-a-half million years prior to that. Since these cycles recur with near 'clockwork regularity' with a brief warm period in-between, like the current interglacial period that is ending, their potential effect on the biosphere cannot be ignored in long-term planning, especially when large climate dependent projects are considered that of marginal value, such as NAWAPA, for which alternatives exist that are not climate sensitive and are fundamentally more efficient. While the full Ice Age may yet be a hundred years distant, or a thousand years as some hope, we simply don't know when and how fast, and in what manner, the transition will unfold. According to some judgments the dynamically recurring transition is already five centuries overdue, which might also have already started.

Heat-flux models have been devised to compute the Earth's climatic variances in accord with the Earth orbital variances (The Milankovitch cycles). However, the observed reality does not match the computed expectation, and this sometimes by a measure of many thousands of years where the effect precedes the computed cause. The resulting uncertainty makes this yardstick unusable, so that we have only the statistic yardstick available, which too appears to be unreliable, primarily for the lack of accurate data extending across several ice ages. It is just as reasonable to assume that we may have still a thousand years left of the current interglacial period that is nicely agriculture-friendly for a large range of latitudes, than it is to assume that the transition will happen 100 years from now, or has already started. The current cooling trend that began in 1998 may be just another anomaly, or it could just as easily be the start of the long-expected transition.

With the causative factors being located at a great distance from our solar system, rooted in the electromagnetic dynamics of the galaxy, forecasts with a pinpoint accuracy are simply not possible, especially given the long-term nature of the Ice Age cycles. When according to statistics the expected transition is currently overdue by 500 years, as Professor Zbigniew Jaworowski, M.D., Ph.D., D.Sc. (Chairman of the Scientific Council of the Central Laboratory for Radiological Protection Warsaw, Poland) points out (**The Ice Age Is Coming**), then he is speaking about an inaccuracy in expectations of half a percent. But it also means that we might be getting close to 'D-Day.' Zbigniew Jaworowski suggests that the transition might be as short as a single year or extend over fifty years, and might start in 150 years, or might have already started.

Under these circumstances, with an uncertain supply for the NAWAPA system, it makes absolutely no sense to engage in long-term development projects as planned in the high arctic, that would be the first affected. It makes even less sense to go this route when more efficient alternatives are available that are not affected by the expected climatic cooling. Why would we be considering an uncertain option when we are in a

cooling trend already, even though this trend may turn out to be an anomaly? The potential that it isn't, but is the start of a slow transition, is also quite real. Shouldn't we then react to that, considering that the consequences are deadly if the Ice Age finds us unprepared for it?

The Milankovitch cycles that were once thought to serve as a yardstick for climate determinations, have been disproved, as the experienced phenomena tend to precede their supposed computed cause by many thousands of years, thus indicating that the Milankovitch cycles are likely subsequent phenomena instead of being causative of Ice Age cycles.

The NAWAPA plan: A disaster on moral grounds

Leading up to 1974 the scientific community became concerned about the potentially near return of the Ice Age, and the preparations that society requires to protect its food supply in the coming cold and dry climate where agriculture becomes severely challenged and eventually largely disabled. This unfolding scientific concern over the Ice Age challenge, was hijacked in 1974 with the forceful instigation of the global warming hoax.

Mankind's natural response to the coming Ice Age challenge would have been to develop an economic and technological renaissance of such power that the return of the Ice Age would have no effect on mankind's living. However, the development of a renaissance with such power would have left no room in the world for any empire to exist, or to ever exist again. The global warming hoax was therefore evidently imposed to prevent this development from taking off, even at the cost of losing 80% of the world population by starvation when the cold climates will find the world unprepared. In the face of suddenly losing much of its agriculture, without a ready-made protection for its agriculture in indoor facilities, and without preceding long-term large-scale programs for developing agriculture in the tropics, mankind would be doomed. As the saying goes, "Where there is no vision, the people perish."

Unfortunately, this kind of tragedy is an object of intention by the masters of empire. The eradication of 80% of the world population has been stated many times as the desired goal of the masters of empire in the hope that this vast genocide would protect the existence of the imperial system. The global warming hoax and its intentions falls within this framework, for which the near return of the Ice Age is kept carefully hidden.

The NAWAPA plan falls into this same framework. The pursuit of this plan at the present time would be in effect a statement of disregard of the potentially unfolding Ice Age danger. To propose a 50-year development project in the arctic with an expected 50-year service life afterwards, would be a powerful declaration of the expectation that the return of the Ice Age is yet a very long ways off. The declaration would be even stronger if the mega project proposed is of a type for which better alternatives exist. The very act of pushing such a development in the arctic, is functionally synonymous with the global warming declaration that has been invented to hide the potentially near reality of the Ice Age challenge.

The potential for the near return of the Ice Age does exist. This fact should not be hidden or be downplayed. No one can say with certainty that the expected natural transition won't happen, or that it won't happen soon. The earth is presently experiencing the deepest cooling trend of the last 100 years, with generally dryer climates as during the dustbowl days. The trend coincides with a corresponding reduction in solar activity, increased cosmic radiation, and the shrinking of the heliosphere by 20% over the last 50 years. These factors are measurable. They have occurred. While no one can say with certainty whether we are experiencing merely a temporary fluctuation, or the beginning of a major trend, these factors cannot be ignored when so much is at stake as the potential of 80% of mankind when the preparations for the Ice Age transition is prevented by powerful psychological influences and denials.

In an arena of such great uncertainty as the Ice Age cycles, but with such enormous potential consequences on a scale that unspeakable genocide results when the preparations are missed, any form of gambling with the future existence of mankind, especially on the global scale, is morally inexcusable. Nothing but the greatest caution is justified here. And this is where the danger of the NAWAPA plan comes into play, as the plan proclaims in essence, "don't worry; we have a thousand years yet to go so; make no preparations; don't

even think about the possibility...; think like we do, we feel justified in making exceedingly long term investment in the high arctic where the transition to the next Ice age climate would logically begin.

Economically, gambling against the Ice Age potential is not a big deal. So what, if a 50-year investment becomes lost, or becomes inoperable before it even becomes useful? The economic loss wouldn't cause a big chock. But with a bold commitment to the NAWAPA project that hides the climate challenge and may psychologically prevent the needed response to the challenge that determines the future existence of mankind. Such a huge gambling factor is morally inexcusable. The pursuit of the NAWAPA plan under such circumstances would, like the global warming hoax, put another nail into the coffin of civilization by preventing mankind from initiating its crucial life-saving response to the coming Ice Age conditions, in time.

The NAWAPA plan is, on in this basis, callously immoral and should not be considered for this reason all by itself, much less be implemented.

NAWAPA, the concept versus the plan

The NAWAPA concept for greening the deserts (contrary to the defined plan for implementation), is an excellent one. The underlying idea is an excellent one, as it proposes the development of the life-giving process of bringing fresh water into the water-lean areas of the world via great infrastructures. This kind of process is indeed becoming evermore essential in the modern world, especially now that the cooling climate results in more droughts in many places, just as it once did during the dustbowl days of the early 1900s when the solar activity was low and the climate colder than normal and much dryer. Thus, the underlying idea is great.

Unfortunately the implementation plan to implement the idea was drawn up 50 years ago and is no longer a practical one for the reasons that mankind's needs have changed over the last fifty years, and the technologies for meeting those needs have changed likewise, and the imperatives have changed. The NAWAPA project was primarily envisioned as a chain of hydro-electric power-development projects, to which 85% of the waters of the Mackenzie and Yukon River were allocated under to the plan, and only 15% for diversion. Under this economic parameters that NAWAPA plan has become a doubly impractical one, because modern nuclear power technologies obsolete hydro-electric development. Nuclear power is less costly, simpler to generate, and the modern plants are faster to build, and can be build where needed, while in addition the NAWAPA plan is obsolete by being insufficient for meeting the real needs of today's world. For this the plan is significantly too small. The needs for irrigation water have dramatically increased over the fifty years since the NAWAPA plan had been created, which the plan is far from able to meet. For this reasons too, the plan is a dead horse. It's obsolete. The diversion of fresh water from the arctic is not a requirement to facilitate large-scale water development across North America, as the locally available resources are far greater that what the plan would provide, and can be much more rapidly developed, in some cases for 'instant' use.

Local resources greater than NAWAPA

For water-development purposes the NAWAPA project is obsolete for the simple reasons that locally available water resources are significantly larger than the projected NAWAPA flow rate.

The NAWAPA water diversion, as the plan provides for it, would, at the end of a 30 to 50-year development period, provide a flow rate of 6,260 cubic meters per second of diverted water, of which the USA would receive two thirds, or 4,100 cm/s, and Canada less than one third, with Mexico receiving a trickle. This minuscule flow rate that would be produced under this plan, 30 to 50 years down the road, would be so small in every one of these areas that it would be hardly worth the trouble of a multi-decade development project to divert water from the arctic that is a frozen for 7 months of the year, including its catchments basin. Why would one go to the arctic to get a trickle from there when there are local resources close at hand that are significantly larger and are presently dumped unused into the ocean?

The Columbia River in Washington State, for example, produces an average outflow of 7,500 cubic meters per second. This means that the river dumps almost twice as much water into the ocean than the allocated

NAWAPA flow would provide at this point, and this resource would be closer to where it is needed.

For the Mississippi outflow into Gulf of Mexico (12,700 cm/s), the figures are nearly double, so that if likewise only half of the Mississippi outflow was diverted for re-use, it would provide a 3 times larger flow than the U.S. portion of the NAWAPA flow would become available, and this almost immediately.

It stands to reason then, that for meeting the current needs for irrigation water, especially watering the southern deserts, that the locally available water resources become developed first, with effects being felt 'immediately' not 30 to 50 years down the road. The need for irrigation, and to create the desired effects from greening the deserts, is immediate. This locally available 6-fold greater resource than what NAWAPA promises, would be sufficient as a first stage response to meet America's needs. On this scale NAWAPA would fall short in a big way.

Later, when the 5-fold increase over NAWAPA should prove to be not sufficient to meet America's growing needs, the St. Lawrence River that dumps 9,800 cubic meter per second into the ocean, would for a time make up the shortfall.

The western Canadian irrigation needs can likewise be easily met from Lake Winnipeg and its tributaries as a source, which together drain 2,000 cubic meters per second into Hudson Bay, unused, 100% of which can be diverted with no impact on anything, thus providing two and a half times as much water for Canada from its local resources as Canada's NAWAPA allocation would.

The Atlantic distribution system

At the stage when the local resources become insufficient, especially when the world is getting drier in the increasingly colder climate, the water resources of the Amazon River will then become utilized. The Amazon dumps 219,000 cubic meters per second (35 times the volume of the NAWAPA project) into the Atlantic Ocean, unused.

In order to fulfill the NAWAPA concept of implementing continent-wide water enrichment projects, extended globally, the Amazon River will most certainly become developed as a water source, both for its large out flow rate and also for its being less affected by the coming return of the Ice Age. The Amazon River promises to be an ideal fresh-water source that can meet the water requirements of the entire Atlantic region with 'ease.' Even if only portion of the Amazon outflow that now flows into the Atlantic Ocean, becomes utilized, all of the water-needs of the Atlantic region would be fully met. The diverted water would then become distributed via a submerged 'pipeline' distribution system that might become connected to a large submerged reservoir that would be placed in a suitable location in the Atlantic. The inflow, as required by the needs, would then be drawn from the Amazon outflow at points just before the outflow waters mingle with the waters of the Atlantic Ocean.

In later years, as the needs increase, portions of the outflow of the Congo River (40,000 cm/s) would be added as a further input into the network, and likewise portions of the Orinoco River in Venezuela (33,000 cm/s), and the Parana River in Brazil (25,000 cm/s) might be added. The so-supplied international Atlantic fresh-water collection and distribution system would quickly span most of the Atlantic region. The resulting system will then not only meet the needs of the water-starved regions of the USA, Canada, Mexico, and South America, but will also water the Sahara, Arabia, and other water-starved regions in Africa and Europe.

The Atlantic system, being fed from the tropics, would of course not be affected by the eventual glaciation in the north, and its being fully contained, its water would not be subject to mineralization before it reached its destination, which makes such a system so highly attractive that it will surely be built in the near future.

A similar system, though with a lesser capacity, will most likely be build in the Asia Pacific region as well, with the Yangtze River (31,000 cm/s) feeding into it, and the **Brahmaputra River** (19,200 cm/s), the Ganges River in India (12,300 cm/s), the Pearl River in China (13,600 cm/s), the **Ayeyarwady River** in Myanmar (13,000 cm/s), the Indus River in Pakistan (7,100 cm/s), and other great rivers..

This type of a universal Atlantic distribution system appears at first glance to be prohibitively large as a

concept. In real terms such a system is easily built, and inexpensively, and rather rapidly, with the use of automated production methods utilizing molten basalt and automated assembly processes. Basalt is a high grade material that is non-corrosive, light weight, stronger than steel, and is infinitely abundant in the surface deposits around the world. It only requires nuclear powered process heat, pumped up to 1,400 degrees, for liquid injection molding, casting, extrusion into fibers and micro-fibers, or for other types of automated processing. The construction period for the entire Atlantic distribution system, made of basalt, once the infrastructures are built, would likely be in the range of a single year, in comparison with the currently envisioned construction period for the NAWAPA project in a projected 30 to 50-year timeframe. Of course, with the Atlantic system, vastly larger rates of distribution become possible, on a scale that dwarves the NAWAPA project into insignificance.

How would one build the Atlantic distribution system?

The answer is that it would be build almost completely in automated processes, and with almost no effort. The flow of water in water does not require strong separation boundaries for containment, as would be the case on land. The distribution system would require nothing more than a thinly woven hose, like a woven fire hose, for example, only much thinner and slightly vinyl impregnated, made several hundred meters wide. The hose would likely produced in continuous sections several kilometers in length and a few hundred meters wide, transported to site by ship, clipped together with a joining machine, and then become sunk into place. Once the giant hose is laid it would simply be connected to the inflow collection system. The in-flowing waters would inflate it, and the system would be ready to use. For the first run, fed by the Amazon River, the hose itself would serve as the system's own reservoir and would slightly expand or contract with the available inflow or needed outflow. This simple system, easily produced, and easily operated, propelled with input pressure produced with nuclear power, would deliver 40,000 cm/s to America's door step at the far end of the Gulf of Mexico, as an input source for a continent-wide distribution network of pipelines with appropriate nuclear powered pump-lifts for the final destination. An uplift from the Columbia River just before it enters the coastal mountains could provide for a large chunk of the water needs north west of the continental divide. The rest could come from the Atlantic system.

The goal is to make the light-brown areas of the western USA green. For this much larger water resources would be required than the trickle that the NAWAPA plan could possibly supply.



NASA Satellite "Blue Marble" image.

In comparison, the Mackenzie River and Yukon River systems that are proposed as water sources under the NAWAPA plan, have not much to offer. Contrary to perception they don't represent a humungous water source. The combined average outflow rate of the two rivers is 16,000 cubic meters per second, roughly twice that of the Columbia River, but of this outflow only 39% is expected to be diverted south. The rest is expected to be used for hydroelectric power production to uplift the outflow into the Rock Mountain Trench. In comparison with that, the Amazon River produces an average outflow of 219,000 cubic meters of fresh water per second (All of this could be used if it was needed). Initially only 20% of that outflow might be diverted into the Atlantic distribution system at a flow rate of 40,000 cm/s that would amount to a 7-fold increase over the envisioned NAWAPA capacity. Then, adding the Congo River as a second source would increase the capacity of the system by another 25%, and so on, until the total capacity of 382,000 cm/s would be utilized meeting global requirements.

Of course it is possible to lay a collection hose to the outflow of the Yukon River in Alaska to harvest its 6,000 cm/s average flow-rate. Unfortunately its water is not drinkable, being too polluted. Of course, one might also extend this hose by a thousand miles into the Arctic Ocean to collect the outflow of the Mackenzie River (10,000 cm/s average), but even that might be doubtful as the long-term effect on agriculture of its slight mercury pollution, and its secondary effect on human beings through the food chain is presently unknown. The Amazon does not have these problems (yet) except in some isolated locations where gold mining and other industrial activities have caused some minor pollution.

For the USA and Mexico, the Amazon outflow is located much closer to the dry regions where water is needed, than the Mackenzie River and Yukon River systems are, that are located at the edge and within the Arctic circle. The laying down of a submerged distribution system from the Amazon River would be so easy and quick that the NAWAPA Plan would not be considered even if the quality of the water was comparable. Constructing canals and pipelines on land in the high north, which is frozen over for seven months of the year, and is a bogy mess for the remaining five months, is simply not a viable alternative to the Atlantic supply system.

What about the Great Lakes?

In order to meet the water needs of the Great Lakes system, that will likely require substantial inputs as the climate is becoming drier during the unfolding boundary conditions towards the next Ice Age, a 30-meter diameter pipeline might be built from the Great Slave Lake and the Great Bear Lake in the North - the two are major contributors to the Mackenzie River system - in order to meet the needs of the Great Lakes system for as long as water continues to flow in the Arctic regions. Also another option might be considered, to divert the waters of the major rivers flowing into the southern part of Hudson Bay and pump them up 600 feet into the Great Lakes system. (The water in Hudson Bay itself is saline, not as saline as the oceans, but saline enough to be unusable.)

However, most of these 'local' projects wouldn't likely be built in the near future as it would be far simpler for the Great Lakes system to simply become attached to the Atlantic distribution network that offers a year-round supply, and which can be built much more 'inexpensively.' It requires substantial efforts build a pipeline into the far north and to heat and operate it in the mostly 'deep' subzero climate. For the other option, diverting the southern rivers in the Hudson Bay watershed into the lakes would likewise pose major problems as the catchments area is frozen for most of the year, and is in a 'flood' stage for the rest of the time, which is rather brief. It would be far simpler to utilize the waters from the Amazon outflow once the Atlantic distribution system is built, and pump it into the Great Lakes system with nuclear power at a steady rate of flow, than to construct huge projects in the mostly-frozen wilderness in the north.

Since the Least Action Principle applies to human systems as surely as it does to the natural world, the Atlantic distribution option will invariably become utilized in the American, African, and European region, and might even be extended to support the Pacific distribution system that would by then serve Australia, China, India, the Middle East, Arabia, and so on, with the needs of Russia being supplied largely by the Atlantic system that would be extended through the Mediterranean and the Black Sea.

NAWAPA isn't dead though. As a concept, it will be implemented

The Amazon-fed water distribution system is the kind of NAWAPA type concept that will surely be build, because it is 'inexpensive' in comparison with any other system (with a few special exceptions of course), and offers an extremely long service life while it serves a vastly wider area where it meets the critical requirement of a large portion of mankind when fully implemented, including areas in Russia and the Ukraine for as long as food can be grown there before the onset of the cold climate disables all agriculture there.

The disabling of agriculture may reach as far south as the Mediterranean in Europe, and in North America all the way down to the middle of the USA, including disabling all of Canada. But for as long as water makes a difference in open agriculture, the Atlantic distribution system, fed by the Amazon and the Congo, will supply it.

Nuclear power, of course, will power the vast distribution flow throughout the Atlantic, and the filtration, sterilization, and demineralization processes that will be a part of the Atlantic reservoir complex. The mass-use of nuclear power will not pose a problem, as many fear, because the leading type of nuclear reactor for all of these large-scale applications will likely be of the **Liquid Fluoride Thorium Reactor (LFTR)** type (also called the *Molten Salt Thorium Reactor*), that has been tested in the 1960s to be safest, cleanest, and easiest-to-run high-temperature nuclear reactor to date, and for which vast fuel resources exist on our planet, and this in easy accessible deposits. The use of thorium as fuel in the *Liquid Fluoride Thorium Reactor* can delivers the kind of infinite energy resource that nuclear fusion had once promised but can't deliver. With infinite energy and infinite water, the future is bright. That's what NAWAPA symbolizes.

The impractical and the essential

When the NAWAPA project was envisioned in the 1960s, its large potential for hydroelectric power production was the key incentive, for which it looked great in the 1960's to the 1980s. But hydroelectric power is no longer a factor as nuclear power is far less expensive than hydro power, and is safer, and simpler to produce, and can be produced locally were it is needed, rather than it being transmitted for thousands of miles. Thus, the once ideal system is no longer practical or even desirable.

The go-ahead for the NAWAPA project was proposed by Lyndon H. LaRouche in a big way in 1988. (This is where the illustration at the top of the page originated). In the 1980s the project would still have made a difference in power production potential. But in today's world, the once idea remains as but a symbolic idea, considering the advances of technology and the potentially irresolvable climate uncertainty. With these considered the original NAWAPA project has become obsolete and will never be built, though the acronym may be retained, signifying for example what it will become: *Nuclear-Age Water Availability Project Atlantic*.

Considering the needs of today's world, the original NAWAPA system would be far too small. If it was built, it would be too limited in scope and inefficient in its proposed construction, in comparison with the alternatives, and would be too uncertain in terms of its actual usefulness. But this does not mean that the pioneering concept as an idea behind the historic NAWAPA proposals stands any less-tall and grand, for the simple reason that the pioneering idea has got the ball rolling towards the implementation of a sufficient system that will supercede the original NAWAPA goal by a long way and has the potential to serve the entire Atlantic community, from Europe to the South of Africa, and from Canada to Argentina.

With a similar system being built in the Pacific, fed by the Yangtze River, the Mekong River, the Ganges River, and the Indus River, which together amount to roughly half the flow-rate of the Amazon River, Asia's needs will likewise be met. In future times both systems might become connected together. Towards these now achievable goals, the real goals, the numerous promotional efforts for the NAWAPA concept as an idea, put forward over the past fifty years, have been an essential component. Great infrastructure efforts on the global scale require great efforts in the development of the underlying idea and the merging of it with the ever-growing technological potential and needs of mankind.

For many ages the idea has been growing in the background to green the Sahara with lush fields for food production, and with forests of fruit trees, and to make the deserts of the world bloom. We stand at the threshold of this becoming a reality with the aid of great global infrastructure systems, sparked by great ideas from the past that are now maturing and are becoming possible on a larger scale than ever envision before.

The idea of greening the dessert is the key element of the infrastructure development that LaRouche is proposing. He is fully acknowledging that NAWAPA is not practical as a project, but that its concept is essential as an idea. Identifying the mission orientation that the NAWAPA project represents, he states, "It is not a practical project, but rather essential for the survival of human civilization for many generations to come."

Greening the desert

So, it is the idea of the greening the deserts that he is promoting, both botanically and socially. In terms of its creative and productive potential the American economy has become a dessert indeed, where most of its industrial and human potential has wilted away in the wasteland of monetarism. If civilization is to survive, this will have to be revitalized, and in the most efficient manner possible. Here is where the NAWAPA concept (not the project) becomes the Golden Gate to not only the revival of civilization, but to its advance to a bright new renaissance with the richest potential yet imagined.

Towards this end many of the already existing new technologies, power resources, and materials, will become rapidly developed and utilized, such as the molten-basalt technologies for the automated construction of houses that can then be produced so inexpensively that they can be given away for free by the millions of houses as an investment by society into itself. Efficient housing is a primary infrastructure for society's humanist self-development. Slum living and homelessness amounts to a gargantuan waste of society's human potential. Similar automated basalt-casting processes will also provide the thousands of miles of pipelines for the water distribution systems that are essential for a new humanist renaissance.

If we are to have a future we need a quantum jump in the creative power of our productive enterprises, which can be realized with higher quality and more efficient materials, especially those that lend themselves easily to automated production processes in high temperature environments, supplied by high temperature nuclear reactors. The concept of "greening the desert" has in immediate reflection in advanced industrial

processes that in an energy-desert are simply not even thought of, and for that we a 'greening' of the human culture in science, technologies, and human self-perceptions. And whatever 'watering' is required for this 'greening' in terms of housing, jobs, education, special training, and special technological institutes along the line of Admiral Rickover's famous Oakridge School for Reactor Technology.

When society decides to give itself a future

The concept of the 'greening of the desert' will be immediately applied to education once society has committed itself to give itself a new space ahead for bold new steps of development. Education is one of the key infrastructures that enable a new future. As an infrastructure, education needs to be provided for free, and be paid for by the economic power it develops, not by mortgaging the children into debtor's impotence. The entire concept of monetarism will then to be scrapped. Every universal development project, no matter the type, which are currently measured as cost items, must then be measured as wealth-creating engines for their wealth producing capacity. The key factor in economics is wealth creation in terms of uplifting the power of society. The rest is secondary.

Health-support systems are also a part of society's wealth creating infrastructure, as are efficient transportation, energy production, scientific development, quality culture, and sufficient quality foods and employment. None of these are inherently cost items, but are wealth-creating items. That is how they must be measured, which means that the more a society invests into itself, the greater is wealth will become.

See: [Free Houses For All](#)

Towards these ends vast amounts of materials and large scale power systems are needed. The molten-basalt technology offers infinite material resources on this basis, for countless industrial processes, and the "Molten Salt Thorium Nuclear Reactor" sometimes called the "Liquid Fluoride Thorium Reactor" (LFTR) offers near infinite, save, clean, and high-temperature energy resources. The globally existing basalt deposits are a resource that cannot be exhausted, and for electric power development the utilization of the galactic electric power that our planet is surrounded with, offers a near infinite power resource that will likely reach the implementation stage in the near term. When this results, every freshwater system, even those fed by the Amazon River, will no longer be needed as large-scale desalination will then become possible to meet the global needs. Most likely, however, the global water distribution systems will continue to be built, and will be maintained and expanded even if infinite electric power becomes available, simply because the need for fresh water is one of the most basic needs of mankind. And this need, it so happens, can be 'easily' met in numerous ways, for which with the Atlantic distribution system would most likely continue to be leading the way for a long time yet to come.

Gate to a golden future

That's the kind of infinite future that mankind has before it. The question that we need to answer to ourselves today is whether we want to experience the existing potential and its benefits. The answer would then channel our actions accordingly.

In real terms our future has the potential to be bright indeed, and the implementation of the footsteps towards this future is fully possible today, and will most definitely start as soon as the imperial political roadblocks are removed from the global landscape that presently promote poverty and genocide. So, what about it? What is our answer going to be?

Rolf A. F. Witzsche

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