Mexico's PLHIGON: Watering the Great American Desert

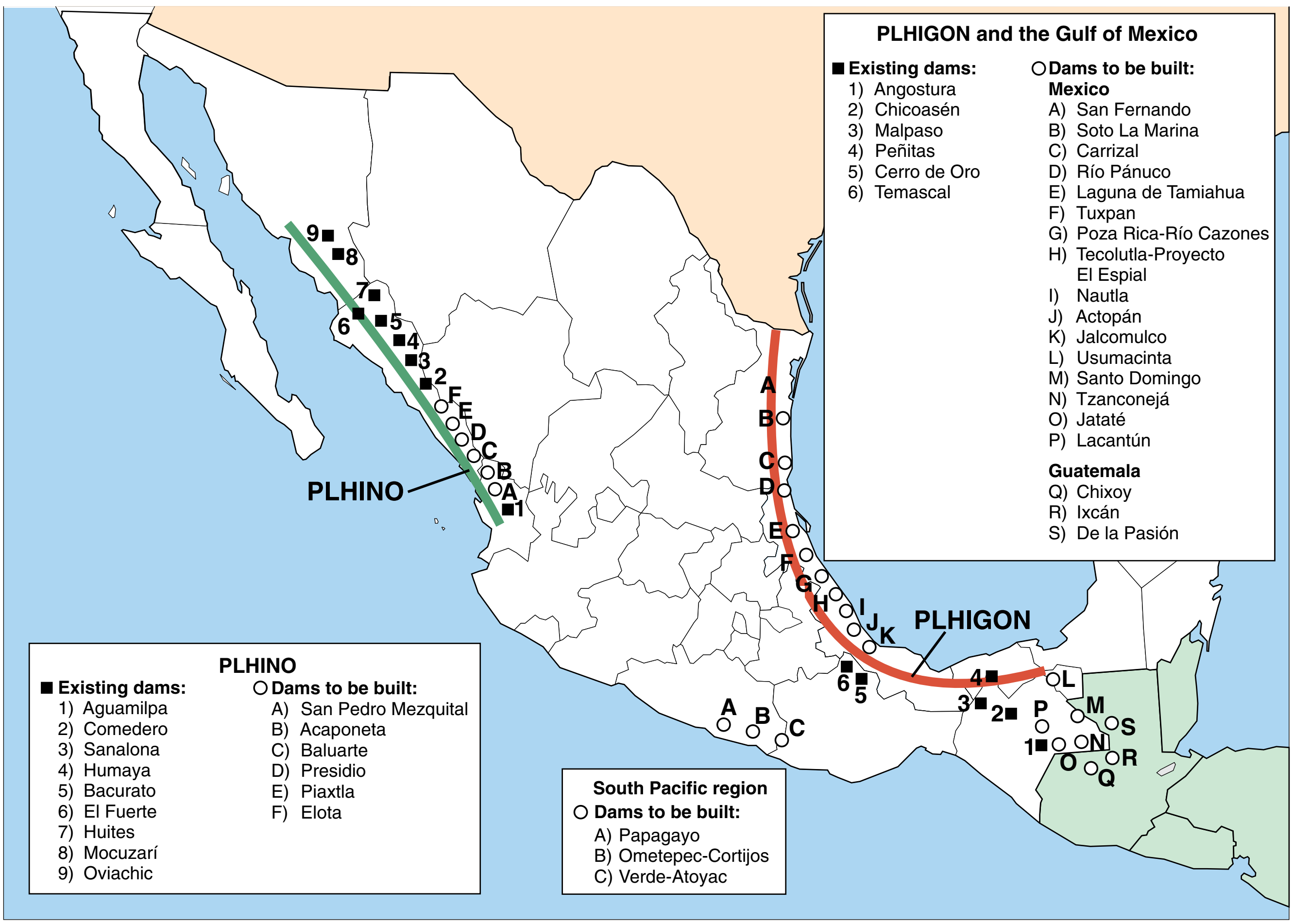
by Dennis Small

Aug. 6—Jorge Herrera, the governor of Mexico's parched state of Durango, called on July 27 for addressing the crisis that is currently devastating northern Mexico by building a system of aqueducts to bring water from Mexico's southeast to the drought-stricken north. Such a regional infrastructure project has long been designed and proposed, and is known as the PLHIGON, the Northern Gulf Hydraulic Plan. As with its sister-project, the PLHINO, or Northwest Hydraulic Plan, the LaRouche movement has promoted it for decades (**Figure 1**).

The PLHIGON will control the historic flooding problem in the Mexican Isthmus region, produce significant amounts of hydroelectric power, and move vast quantities of freshwater northwest along Mexico's Gulf Coast, part of which will then require complementary projects that will pump it up to Mexico's north-central plateau, which is part of the Great American Desert.

The total amount of water runoff to be controlled and withdrawn for use is enormous, and dwarfs the PLHINO's scope of 7 km^3 of water withdrawn, out of a total runoff of 9.5 km^3. The Southeast's four big

FIGURE 1
Mexico: the PLHINO and the PLHIGON



rivers (Grijalva-Usumacinta, Papaloapan, Coatzacoalcos, and Tonalá—the first, second, third, and sixth biggest in the country, respectively) jointly produce some 204 km^3 of runoff, of which only 15%, or 30 km^3, will be withdrawn for use in the PLHIGON. This is almost one-fifth the amount of water that will be transfered by the planet's most ambitious water-management project, the North American Water and Power Alliance (NAWAPA XXI)—some 165 km^3 per year.

In the detailed design for the PLHIGON drawn up by the distinguished Mexican engineer Manuel Frías Alcaraz, six major dams will be constructed on the Usumacinta River and its tributaries, some of which will involve binational projects with Guatemala. These will create hydroelectric installed capacity in the range of 9.5 gigawatts, nearly doubling Mexico's current hydroelectric installed capacity of 11 GW, out of a national total of 50 GW from all sources. It will also be necessary to increase the capabilities of the existing Malpaso and Peñitas dams on the Grijalva.

Besides producing electricity, these dams will be designed to control the rivers' runoff, and prevent future flooding. That will allow the rich lands, in what is now a vast coastal flood plain stretching across Tabasco and the neighboring state of Campeche, to be put into agricultural production, both for crops and pastureland. Frías estimates that more than 1.5 million hectares of land can be recovered, transforming the region into the country's number-one agricultural zone. As a rule of thumb, 1 km^3/year of water will irrigate some 100,000 hectares of land. That means that about 15 km^3 of the 204 km^3 of runoff from the four mentioned rivers, will be needed for the 1.5 million new hectares of agricultural land.

It will also be desirable to build a canal eastward into the Yucatán peninsula, where the relatively arid conditions have forced an over-reliance on aquifers, which are rapidly becoming depleted.

A second canal, 59 km in length, will be constructed to link the city of Villahermosa to the Gulf Coast, transforming that anguished, often-flooded city into a thriving internal port.

Nuclear Energy Also a Must

In a second stage, an additional 15 km^3 of water will be transported northwestward along the Gulf coast, building dams, canals, and pumping stations for that purpose. There are technical difficulties involved in transferring such vast amounts of water either over (or under, with tunnels) the neo-volcanic knot in the center of Mexico, but these can be solved with the significant increase in power production that will come as Mexico fully develops its nuclear industry.

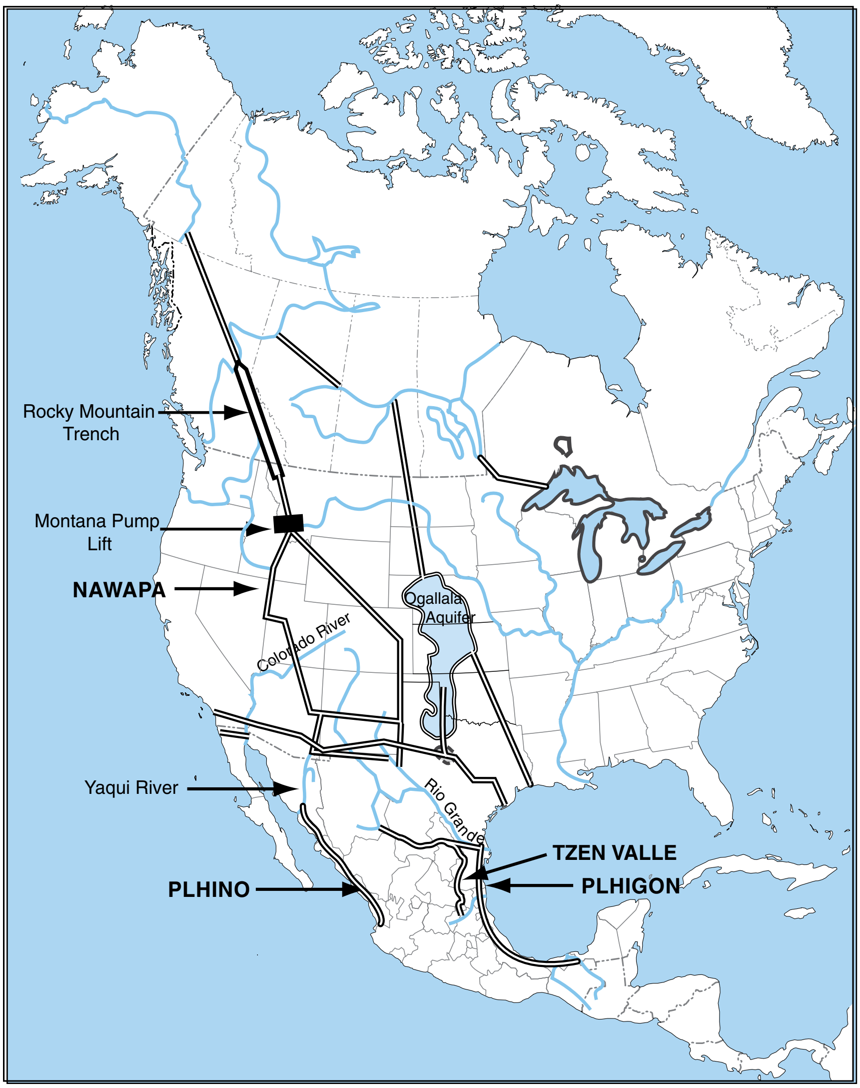
Substantial power will also be needed to pump water over the Eastern Sierra Madre into the Great American Desert region in north-central Mexico, the epicenter of today's drought.

It should be noted that neither the PLHINO nor the PLHIGON per se would carry water up to that area. They would have to be complemented by other projects that would bring water up from the coasts to the central highlands. From the western side, this is not very feasible in physical-economic terms, since the Western Sierra Madre is quite high—it reaches heights of 3,000 meters above sea level. But on the Gulf side, it is much more feasible, given that the Eastern Sierra Madre ranges between 2,000 and 2,500 meters above sea level.

One project that would be especially important for carrying water in that direction, at least as far as the

FIGURE 2

North America: 'NAWAPA-Plus'



Sources: Parsons Company, *North American Water and Power Alliance Conceptual Study*, Dec. 7, 1964; Hal Cooper; Manuel Frías Alcaraz; *EIR*.

city of Monterrey (which is just before you have to cross over the Eastern Sierra Madre into the highlands), is a proposal developed by engineer Frías, which he has dubbed the TzenValle System. The idea is to divert about one-third of the water from the Pánuco River (the fifth in the country, in terms of runoff) and its tributaries, where these originate in the Eastern Sierra Madre in the state of San Luis Potosí. By means of a series of dams, tunnels, and canals, located at some 250-300 meters above sea level, water would be carried north, and then pumped up as far as Monterrey, which is at 540 meters above sea level. In other words, the cost of the pumping would be kept to a minimum, because the water would only need to be lifted an additional 250 meters or so.

The TzenValle System would carry an additional 6.8 km^3 of water per year to this arid zone.

American engineer Hal Cooper has also proposed a couple of projects to carry water from the Gulf of Mexico to the Great American Desert. In the first, he calls for building a canal that would run from the extreme north of the PLHIGON, to Monterrey, and from there to Saltillo, Torreón and into the southern part of the state of Chihuahua, where it would connect to the Conchos River, a tributary of the Rio Grande (**Figure 2**). The most challenging stretch of the project would be to raise the water from Monterrey to Saltillo, a difference of about 1,050 meters. There is no way around pumping the water up, although you could possibly build some tunnels under the highest parts of the Eastern Sierra Madre.

But the PLHIGON and the PLHINO take on their real physical-economic significance for the region only when they are linked up with NAWAPA, in a project known as NAWAPA-Plus.

Under NAWAPA-Plus, NAWAPA would link up in Mexico with both the PLHINO and the PLHIGON, creating a single, integrated North American water project. As Figure 2 indicates, the eastern branch of NAWAPA would connect with the tributaries of the Rio Grande (Río Bravo), which forms the border between the United States and Mexico at that point. This would enable the transfer of large quantities of freshwater—some 6.8 km^3—to the arid Center-North of Mexico. Here, at the Rio Grande, is where NAWAPA and the PLHIGON meet.

The western branch of NAWAPA would feed water across the border to the Yaqui River in Sonora, which would receive nearly 12 km^3 of water a year. This is where NAWAPA and the PLHINO meet.

FIGURE 3

Mexico: Water Transfers

(km^3)

Sources: Parsons Company, *North American Water and Power Alliance Conceptual Study*, Dec. 7, 1964; Hal Cooper; Manuel Frías Alcaraz; *EIR*.

The western stretch of NAWAPA would also supply water to the north and center of California, and to the Colorado River, which in turn, would carry more than 5 km^3 of water a year to northern Baja California, in Mexico.

Figure 3 and **Table 1** present the full impact of the NAWAPA-Plus projects on water availability in Mexico. For the country as a whole, there will be 68 km^3 of new water available. Since Mexico currently gets 36% of its total water withdrawals from aquifers, and over-exploits more than 20% of them—i.e., withdrawing more water than the amount of annual recharge—it will be necessary to use some 10 km^3 of the newly available water to recharge the aquifers and reverse their depletion. That will leave net new water availability of some 58 km^3, a 75% increase over today's 77 km^3.

If this is looked at by region, as shown in Figure 3, the NAWAPA-Baja area (Mexico's hydrological Region I) will receive 5 km^3 of new water from NAWAPA, which will mean a net increase for the region of over 100%.

The NAWAPA-PLHINO area (Regions II and III) will get 12 km^3 from NAWAPA, and 7 km^3 from the PLHINO, for a total of 19 km^3 of new water. After aquifer recharge in this area, the net increase over today's level will be over 100%.

And for the NAWAPA-PLHIGON area (Regions VI, VII, IX, X, and XI), the 7 km^3 of water coming from NAWAPA into Mexico through the Rio Grande system, will be boosted by 30 km^3 coming from the lower PLHIGON region, and another 7 km^3 from the TzenValle project. That will create an increase of net new water availability of 168%. This dramatic upshift will create the basis for addressing, at long last, the pressing issues of the Mexican portion of the Great American Desert.

This increase in water availability will allow Mexico to irrigate some 5 million hectares of new land, a 75% increase over its current 6.5 million hectares of irrigated land. Of this newly irrigated land, 0.8 million hectares will be in Sinaloa and Sonora; 1.5 million will be in the Tabasco/Campeche flood plain; and about 2.7 million will be opened up in the upper reaches of the PLHIGON, including in the currently dry central highlands.

TABLE 1

Mexico: Water Transfers Under 'NAWAPA-Plus'

(km^3)

To:	NAWAPA-Baja (I)	NAWAPA-PLHINO (II, III)	NAWAPA-PLHIGON (VI, VII, IX, X, XI)	Total Mexico
From:				
NAWAPA	5	12	7	24
PLHINO	0	7	0	7
PLHIGON	0	0	37	37
—TzenValle			*7*	
—Isthmus Big Four Rivers			*30*	
Gross New Water to Region	**5**	**19**	**44**	**68**
Replace Aquifer Overuse	1	1.5	3.4	10
Net New Water to Region	4	17.5	40.6	58
Current Total Withdrawals	3.8	17	24.2	76.5
Percentage Increase	105%	103%	168%	75%

Sources: CNA 2006 (Mexico); Parsons Co.; Hal Cooper; Manuel Frías Alcaraz; *EIR*