Build infrastructure for El Niño's 'century floods' and droughts

by Marcia Merry Baker

For anyone concerned about planning for the public good, the El Niño phenomena show the necessity of building infrastructure to cope with extreme weather events, such as tidal waves, droughts, and what hydrological engineers call "century floods"—the infrequent, but to-be-expected grand-scale occurrences, for which special provision must be made. You don't just make plans for "average" weather, nor do you expose your economy "to chance."

How could anyone oppose this reasonable approach? The two common arguments made against infrastructure improvements are: 1) too costly; 2) hurts the environment. Both are false; moreover, the crisis posed by the breakdown of the international financial system today, provides the context for sweeping away such stupidities and excuses.

Wherever the right infrastructure systems have been built and maintained, the value of savings in lives and damage prevented, far exceeds the costs of the infrastructure in the first place.

Duff's Ditch

One such outstanding example from this year, is the case of "Duff's Ditch"—the Red River Floodway, in Manitoba, Canada. This 29-mile floodway, built to the east of Winnipeg, diverted the raging waters of the "century" flood on the Red River, safely around the city, protecting the 600,000 residents. In contrast, look at what happened upriver, at the town of Grand Forks, on the Red River in North Dakota (and East Grand Forks in Minnesota). All 50,000 residents had to evacuate their towns, inundated by floodwater, and devastated by broken power lines, fires, etc.

Duff's Ditch is named after Duff Roblin, the premier of Manitoba in the 1960s, who pushed the project through to completion in 1968, over all objections. The city of Winnipeg had been hit by floods in 1950 (an El Niño period), with 10,000 homes destroyed, and vast damage. Roblin and others pledged then to plan for the future, and to prevent any recurrence. Since the floodway's inauguration in 1968, it has been used 18 times, successfully. More of the specifications and savings are described in the accompanying photo-spread. (Note that the major media *have not shown* this kind of example of successful infrastructure; instead, the media publicize sandbags and suffering.) As of September 1997, the town of Grand Forks, N.D., is considering a new proposal from the Canadian grouping that built Duff's Ditch, to construct a spillway diversion channel around the western side of town.

The point about the successful Red River Floodway is that infrastructure works; and there are thousands of priority projects waiting to be built in the areas known to be in harm's way because of El Niño, or otherwise known to be potential disaster spots. There is so much devastation and loss from weather extremes because of policy failures—especially over the past 25 years—not because of Mother Nature.

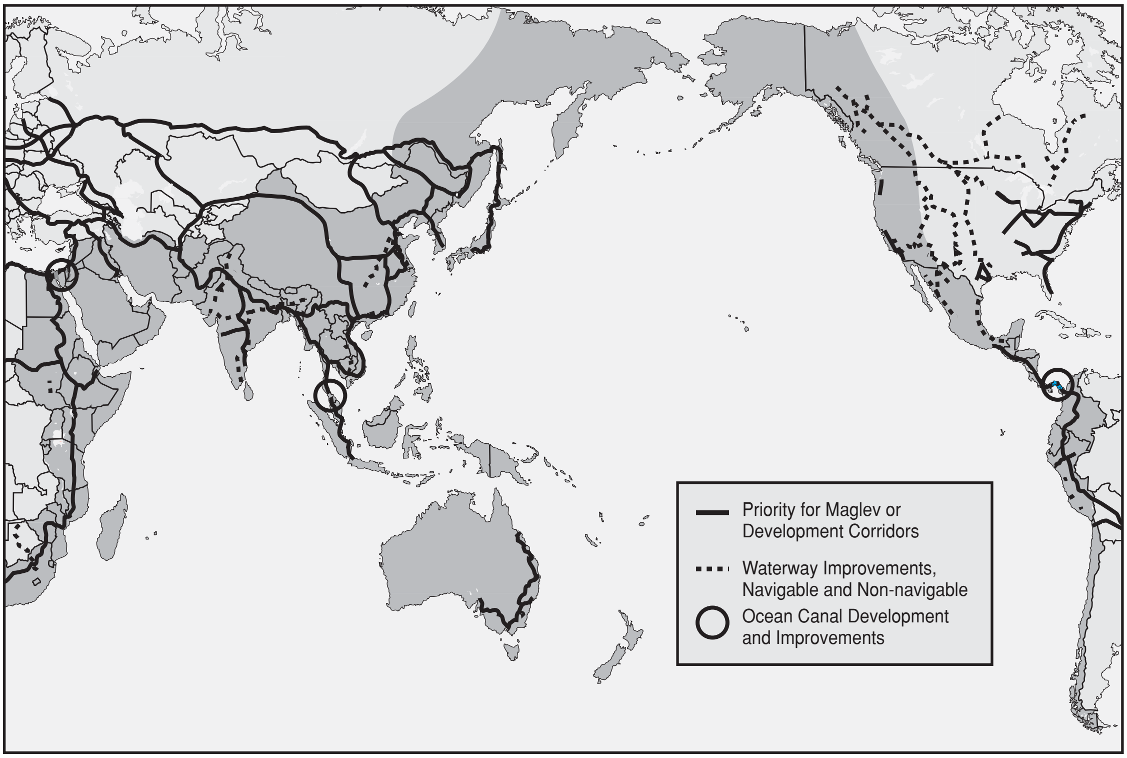
El Niño and the Pacific rim

We provide below a review of the immediate El Niño Pacific rim region, in terms of needless devastation, and certain essential, unbuilt projects; and we provide details on the vast, *preventable* damage toll from "century" floods in such areas as California, and in the Oder-Neisse basins in Germany, Poland, the Czech Republic, and Slovakia earlier this year.

Figure 1 shows the Pacific and Indian oceans' basins, with selected infrastructure features, shown schematically, that should be built or expanded. Depicted are only water and transportation facilities, but the map's implication is that all manner of needed projects should be constructed—ports, power production, etc. The priority ranking of essential projects corresponds to the physical geographic profile of each land mass: how much reliable precipitation and run-off exist, the type of rock and soil substrate, the slope of the land, and weather patterns. The urgency of infrastructure projects is dramatized by the spectacular weather events associated with El Niño, and also the tectonic activity of what is called the Pacific "Rim of Fire."

El Niño has been an observed phenomenon for centuries, which underscores the lunacy of stalling on infrastructure priorities. The first recorded account of the El Niño effect is attributed to Spanish explorer Francisco Pizarro, who wrote in 1525, of the unusual desert rainfall in Peru. Subseqently, droughts and floods of the El Niño pattern, were noted for centuries.

FIGURE 1
Pacific-Indian oceans basins: major infrastructure projects



The Pacific and Indian oceans' basins, home of most of humanity. Shown are selected infrastructure projects for priority water supply and transportation systems improvements, both for supporting economic development, and for protecting against adverse weather, earthquake, and volcanic activity. The Pacific rim nations are directly affected by the extreme weather and oceanic events associated with the El Niño Southern Oscillation.

Tectonically, the Pacific basin rim is highly active with volcanic eruptions and earthquakes, associated with the border regions of the huge Pacific Plate and adjacent geologic structures (Nazca Plate, west of South America; Antarctic Plate of the southern pole, etc.).

Begin on the western side of the North American continent, and proceed around the Pacific rim clockwise, considering certain of the needed infrastructure, in the context of the characteristic El Niño weather patterns, and the amount of damage documented in 1982-83, a particularly ferocious El Niño episode. The direct damage then totalled tens of billions of dollars, according to the most conservative data from the U.S. National Oceanographic and Atmospheric Administration. This does not take into account the drastically altered fish catches, from Peru to Alaska, and similar losses.

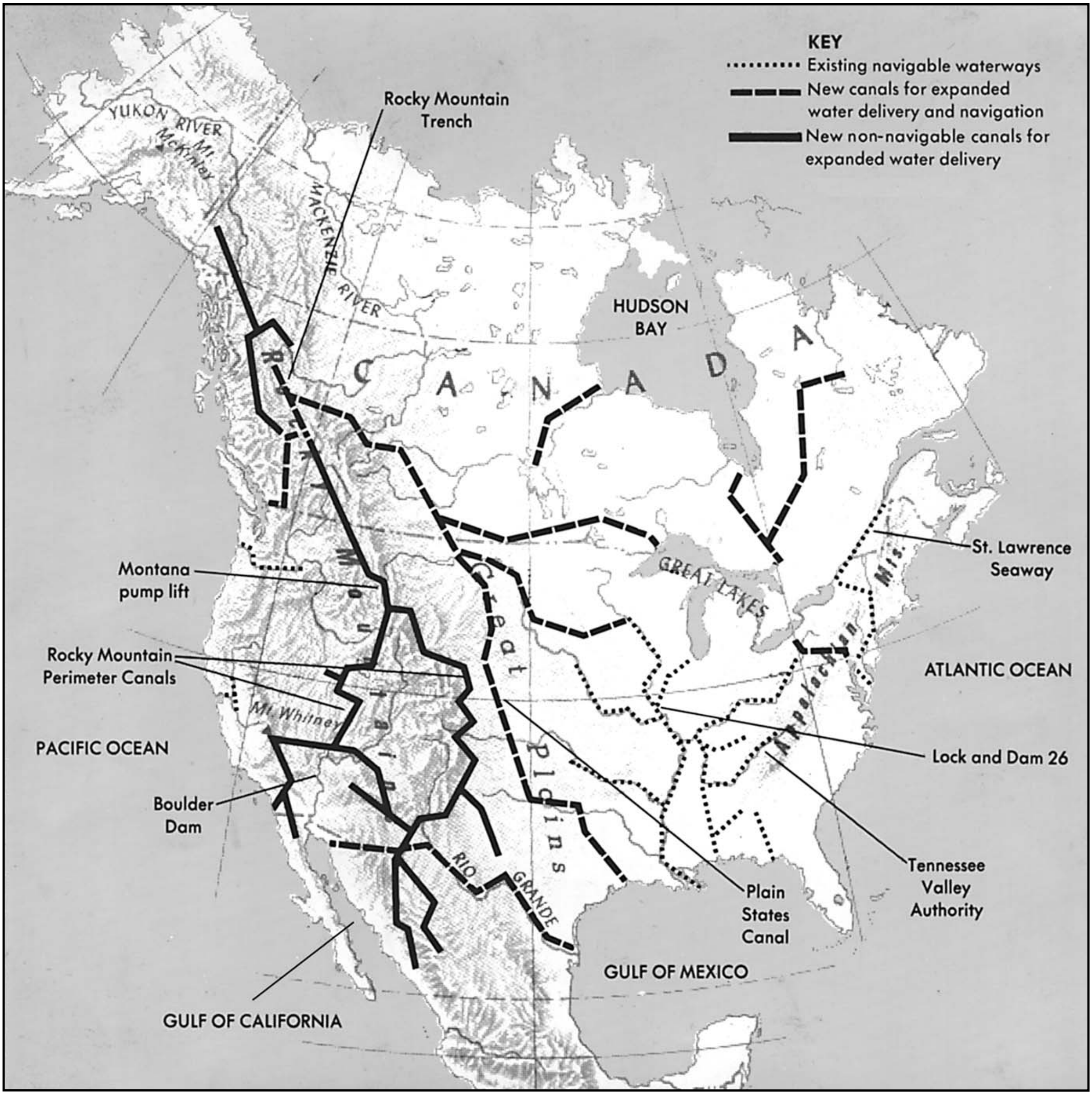
North America. Figure 1 shows the lines of flow of the continental-scale project, North American Water and Power Alliance (NAWAPA), shown in detail on **Figure 2.** This project, which interconnects with complementary hydraulic projects in Mexico, plus additional regional water management and flood control, would provide stable, ample water during droughts, and would moderate damage from flooding, for the entire western and southwestern regions of North America. The idea is to divert water southward, now flowing into the Arctic Circle, through navigable and non-navigable tunnels and channels, providing hydro-power, and millions of new acre-feet of fresh water. NAWAPA was conceived in the 1950s, promoted in Congress in the 1960s, and then shelved.

The El Niño pattern—very severe in 1982-83—brings warmer weather in latitudes of the U.S. Pacific Northwest (also in the Northeast), while the Southeast is typically wetter and cooler than average, and California is either wetter or drier, depending on the position of the jet stream. In 1982-83, floods hit hard in Florida and Louisiana. Storms in the western coastal states, and in Utah and elsewhere in the Great Basin, brought flooding, huge snowmelts, and mud slides. In the 1976-77 El Niño episode, California was hit by drought. Damage from West Coast storms totalled over $1.1 billion.

An example of large-scale drainage infrastructure in place, and in time, is the Atchafalaya River diversion system in Louisiana, to carry flood run-off from the Mississippi. Used during El Niño years in both 1973, and 1983, the diversion flow rate of this system reached 470,000 cubic feet of water per second in 1983. New Orleans was protected. The Atchafalaya is part of the Mississippi Lower Delta waterworks built by the Army Corps of Engineers, that handles the episodic El Niño storms.

FIGURE 2

The Nawapa plan for bringing additional fresh water to the United States, Canada, and Mexico



South America. Figure 1 also shows three schematic points of water systems, indicating that infrastructure is vital to be built and upgraded to serve the western coastal areas in Ecuador, Peru, Colombia, and Chile. The problem is that the El Niño pattern dumps gigantic volumes of water in a short period of time. In May 1983, Guayaquil, Ecuador received 20 times its usual rainfall. Needed projects range from safe water purification facilities, to contingency drainage systems. Without diversion channels and management systems, lands are awash; 600 people died in Peru and Ecuador. The secondary death toll is high: Thousands of livestock were hit by foot rot and fungus; epidemics of typhus, salmonella infection, and typhoid fever struck. The damage toll was at least $1 billion in Peru and Ecuador alone.

Of particular note is that right in Lima, the capital city of Peru, adequate urban water and sewage systems were not built in the 1980s, because the World Bank and International Monetary Fund refused to approve such construction. In 1991, cholera broke out in Lima. Over the subsequent months, it spread throughout South America; in 1993, cholera reached the Rio Grande River Basin, and is now found in Texas and border locations.

Australia. El Niño brings severe weather to Australia: drought and sudden storms. The 1982-83 episode was among the worst of the century. Huge dust storms rolled into towns, and over 75 people died, just from the bushfires whipped up by high winds; 8,000 people were made homeless. Herds suffered mass death. In February 1983, a giant storm struck Melbourne, depositing 11,000 tons of topsoil dust. Then, torrential rainstorms hit parts of eastern Australia, marooning people and livestock. Losses in agriculture alone were $2.5 billions.

Figure 1 shows just a transportation priority rail corridor, but the need for reliable water provision in Australia is well known, and also for emergency drainage systems. Less than 10% of the land area of this continent-nation has adequate rainfall. What is required is an "assembly-line" program of building and installing coastal nuclear-powered desalting facilities, to provide the man-made equivalent of "new rivers" to the dry continent. Also essential, is to build emergency systems for storms.

Southeast Asia. Indonesia, Malaysia, the Philippines, and other locations are periodically hard hit by drought under El Niño. Because of crop failures in 1982-83, Indonesia was drastically food-short; the official death toll from starvation was 340 people. Losses in Indonesia and the Philippines totalled at least $750 million in 1982-83. In these climates, provisions for strategic irrigation and "protected" agriculture infrastructure would avert such loss.

In Tahiti, and other islands of Polynesia, El Niño is associated with storms. In 1982-83, hurricanes left 25,000 homeless in Tahiti; Hawaii was also hit—an uncommon event. Damage totalled over $280 millions.

Africa. Across the Indian Ocean, the El Niño effect brings drought to southern Africa. Figure 1 shows a proposed canal to improve the southeastern watersheds—one of the many waterworks needed to increase and stabilize water supplies in the entire southern part of the continent. During the 1982-83 El Niño, for example, the Limpopo River Basin dried up. Lake Ngami dried up—one of the main watering spots for the many cattle in the region. The Okavango Delta shrank by one-third. Crop production was cut 40-70%; severe hunger and malnourishment spread. Losses way over $1 billion.

India, Sri Lanka. Drought can come with El Niño. In 1982-83, it caused significant crop damage, and a water shortage health emergency. Losses were an estimated $150 millions.

California's floods: no 'natural disaster'

Over the winter of 1996-97, northern and central California suffered severe flood damage, centered in the Sacramento River Valley and Delta, and in the Central Valley regions. While there was a specific coincidence of weather co-factors that caused the massive flooding—among them, early snowmelt, heavy rainfall, and warm temperatures—the damage toll resulted from the lack of provision and maintenance of infrastructure. In other words, a disaster of policy decisions, not nature. The systems needed to manage high run-off were not fully in place, nor maintained. In view of the target location of California for El Niño episodes, it is national insanity to continue this practice.

There are three kinds of projects needed to handle floods and droughts in California:

1. Continental-scale "geo-engineering," involving interbasin water transfers, to maximize the availability of water for the benefit of the economy, and the natural resources environment in the mutual interest of Canada, the United States, Mexico, and Central America. In western North America, this can be accomplished by the NAWAPA project, shown in Figure 2.

In Mexico, there are sister projects, known as the Hydraulic Project for the Northwest (Plhino) and the Hydraulic Project for the Gulf of the Northeast (Plhigon). These latter designs, worked up by the College of Civil Engineers, would move water through canals and existing dry river beds draining the slopes of the Sierra Madres, to the dry northern states of Sonora, Sinaloa, and Tamaulipas. NAWAPA, and Plhino and Plhigon, were ready to go in the 1960s, but over the last 30 years, the plans were shelved, during the era of the anti-development policies of the last decades of the failing International Monetary Fund system.

2. Full implementation of regional water management programs—construction and maintenance. Since 1957, California has had a master Water Plan, for an integrated state and regional water supply and management, which, however, was only partially implemented as of 1970, and then stalled. **Figure 3** shows some of the completed projects in California. **Figures 4-6** show aspects of the unfinished waterworks in the northern California watersheds, which set the stage for the vast damage of 1997.

3. Nuclear-powered desalination of seawater. California is well situated to enjoy guaranteed plentiful water supplies, even in the worst El Niño drought periods, if high-technology desalination facilities were built to desalt Pacific waters. Such facilities were proposed for the giant Metropolitan Water District for Los Angeles and sothern California, from San Diego-