Should New Orleans Be Rebuilt?

by Walter Youngquist

The environment on which we depend consists of energy resources, and the biological and mineral resources of the earth. It also involves biological processes such as species competition and adaptation to a changing physical environment. It includes the physical processes which go to shape the earth's surface, as well as modify both the surface and the interior of the earth as evidenced by earthquakes and volcanic eruptions.

Rivers, Sediment, and Deltas

One of the obvious processes that modifies the earth's surface is erosion, the loosening of materials at the earth's surface and their transport mostly by streams. With few minor exceptions, all streams terminate in the ocean. At the mouths of streams where they enter quiet water, they drop their sediment load into a deltaic complex formed by a network of smaller channels called distributaries. As sediment accumulates in one area blocking channels, the distributaries will veer off to seek the ocean by a shorter unobstructed route that too will eventually become blocked with sediment. The distributaries of a river over the centuries migrate back and forth across the delta area, gradually building it seaward. The sediments as they are initially deposited are loose but with time they compact, and the delta surface gradually sinks below sea level if more sediment is not deposited on it.

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The City on a Sinking Delta

New Orleans is built on part of the Mississippi River delta complex. As man-made levees have kept sediments from being deposited in the area, much of the city is now below sea level. It will continue to sink as the sediments compact. Withdrawal of groundwater by numerous wells in the area also causes the sediments to compact and the land surface to subside, a situation known in many other areas. To compound the problem, sea level is slowly rising. A study from Texas A & M University projects that New Orleans in 100 years will be three feet lower than it is today if present trends persist.

Simple Elementary Geology

The facts of deltas – distributaries, compaction of sediments, levee maintenance problems in keeping a river where it does not naturally want to go, and how withdrawal of groundwater causes subsidence of ground levels in unconsolidated sediments – are all presented in Geology 101. I and many of my university colleagues teaching that elementary course cited these facts as reasons why the location of New Orleans was no place to build a city.

Maintaining an Unnatural River Course

The Mississippi River is the navigational access to New Orleans keeping it the most important port on the Gulf Coast. But to maintain the river's course through New Orleans, levees had to be built from the mouth of the Mississippi to New Orleans and up the river. Normally the Mississippi River years ago would have taken a more direct route to the sea. A short distance below Baton Rouge, at about Carville, the river, given its normal action, would have cut off southwest to reach salt water in a distance of no more than 50 miles. But its course from that place, now artificially controlled by levees to keep it through New Orleans, takes it more than 135 miles to the sea. Look on a map of south Louisiana and see the odd-looking,

elongate, very slim stretches of land bordering both sides of the river, extending out into the Gulf of Mexico and ending in Southwest Pass. This is the levee system constructed to keep the river in a narrow channel, constantly dredged to navigational depth by the U.S. Army Corp of Engineers in order to keep New Orleans a seaport.

Levees Need Constant Care

To maintain the river through New Orleans to the sea, levees have to continually be maintained along the Mississippi from well above New Orleans, at New Orleans, and below New Orleans farther and farther out into the Gulf of Mexico. Also sediments are not now being distributed back and forth along the coast by the river as would normally happen. So the brackish water marshes, nursery to so much aquatic life, are not being replenished by sediment, but are being invaded by the sea. This is destroying the once prolific fisheries around the delta. Hurricane damage and flooding is now more severe because in Louisiana some 25 square miles of wetlands become seawater every year as the marsh areas slowly disappear from lack of sediments. That means less protection from storm surges (Bunch, 2005). Special levees have been built around New Orleans to replace the protection which would otherwise have been afforded by the marshes.

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River on Stilts

As you walked down the streets of New Orleans, you looked *up* to the ships on the river. In effect, the Mississippi River is supported on stilts, carrying it out into the Gulf beyond what clearly can be seen are the normal limits of the delta. Sooner or later that structure and other levees protecting New Orleans from adjacent bodies of water are doomed to collapse – an environmental disaster waiting to happen. In late August 2005, "Katrina," a category four hurricane with heavy rain and a more than 30-foot storm surge, breached two major levees protecting New Orleans and flooded 80 percent of the city. The disaster was no longer pending. As much of New Orleans is below sea level, the water cannot flow out but has to be pumped out. Clogged sewage systems throughout the city have to be cleared. Houses have either floated off their foundations or are infiltrated with mud, many damaged beyond repair. The water supply system was contaminated. It is said by those on the scene to be a catastrophe beyond description. The cost in human tragedy is immeasurable.

Future of New Orleans

Now the future of the city is being considered. President Bush has predicted that New Orleans will be rebuilt to be even better than before. But within his own Republican party, the Speaker of the House, Dennis Hastert, made the newspaper headline "Hastert Questions Reconstructing City," (Associated Press, September 2, 2005). "'It doesn't make sense to me,' Hastert said of any long-term rebuilding effort, 'and it's a question that certainly we should ask.' He's since backtracked from his comments, but he was right." (Abbott, 2005). Bunch (2005) writes:

> *If you threw a dart at a map of the United States 999 times, you could not hit a worse spot to locate a metropolis.*
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> *Surrounded by two large flood-prone bodies of water, New Orleans lies as much as 10 feet below sea level in some places, and is sinking deeper every year. With scientists seeing an era of more intense and more frequent tropical storms, it sits in the bull's eye of Hurricane Alley … And so, with much of the city under water, some are wondering: Is it really a good idea to rebuild New Orleans, and will it be done?*
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> *Fox News analyst Jack Chambless, an economics professor, said American taxpayers*

shouldn't foot the bill for people to live there … "it makes no sense to have levees keeping the Mississippi River from flooding into New Orleans, like it naturally should."

Given all circumstances, should New Orleans be rebuilt? Located at the lower end of the Mississippi where, by barge, much of the United States interior can be served by economical transport, New Orleans plays an important economic part in the U.S. economy. But maintaining it as a port will be costly. Whether it is cheaper to do that than to arrange to ship and receive commodities by rail to other Gulf ports which could be expanded should be examined. Established Gulf Coast ports, without the levee and below-sea level hazards of New Orleans, can pick up much of the shipping needs. Retaining New Orleans just as a port might be justified, but maintaining New Orleans as a major city with a convention center, a superdome, huge hotels, numerous businesses large and small, and home to half a million people where floods can mean life or death is another matter.

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To many now, New Orleans does not look like a good place to call home. The future role of New Orleans needs careful thought. This is the opportunity to do so.

Even if New Orleans is rebuilt to proposed "new standards," it is being done in defiance of geologic history and environmental principles. In the longer term, or perhaps even in the shorter term, it is an unsustainable situation. Southwest Pass would have to be built farther out into the Gulf. Upstream, levees would have to continue to be built higher. Around New Orleans, as it continues to sink, the other levees which also protect the city have to be raised. This is a continual problem, for as one engineer noted, for every five feet added to a levee, the levee sinks three feet deeper into the muck. Sooner or later the levees will break gain. As the U.S. Army Corps of Engineers is a federal agency, the continuing and increasing cost of maintaining a city where the environment clearly says it should not be, will be borne by all U.S. taxpayers. And, inevitably the natural regimen of the Mississippi River will prevail, permanently. Residents of the city can never feel secure.

Nevertheless, the statement by the President and preliminary discussions indicate New Orleans will be rebuilt. But many people now evacuated to the Astrodome in Houston and other emergency centers, with only the clothes on their backs, say they will not go back to New Orleans. From dire experience, perhaps they understand the basic workings of the environment better than do people in Washington, D.C. who apparently missed Geology 101 in their educations.

Further Lessons from New Orleans

The morning paper, as I write this, is headlined, "Death, Grief, and Chaos." When people are under stress the thin veneer of civilization comes off quickly. Some of the widespread looting of stores may be excused by the need to get food and water. But the rape and murder that occurred, and looting firearms and ammunition and other goods beyond the basic necessities, are not excused. Shots were fired at helicopters trying to bring aid. Snipers fired on medical facilities. Engineers trying to repair a bridge came under fire, police were called in and in the ensuing battle five people were killed. As rescuing those still living took priority, bodies remained floating in the flooded streets, and for lack of food, water, and sanitary facilities, more died. Hundreds of thousands of people were homeless. People became desperate simply to survive. One observer said, "It is anarchy even beyond a Third World [country], and in the United States!" "Even in America civil order is more fragile than we think." (*The Wall Street Journal*, September 2, 2005).

New Orleans is an example of the environment being ignored and violated with sudden tragic results. It is an extreme situation, but world population has now exceeded Earth's environmental carrying capacity

and we are largely living on diminishing resources (Brown, 2004; Catton; 1982; Ehrlich and Ehrlich, 2004; Wackernagel, 2002). Although not as dramatic as the New Orleans catastrophe, we now see the slow degradation of many aspects of our environment, especially soil and water, and no significant progress made toward altering economies and lifestyles to accommodate the impending decline and eventual loss of nonrenewable energy sources. All this combined with continued growth of population are a prelude to future local disasters, and then spreading anarchy. The current course must be changed to bring humanity's demands consistent with what Earth can sustainably provide.

It's a Question of Numbers

The most important element of a change in course is population size. Haiti and parts of Africa such as Niger are ongoing examples of where environmental degradation and resulting stress from overpopulation have already brought chaos and misery. Kaplan in his book *The Coming Anarchy* (2000) foresees what may happen. It is up to the human species to prove him wrong. We have the intellect to do it. Action must follow and the hour is already late.

> *People should understand that, when dealing with nature, we have already exceeded the bounds of the permissible far too much. The situation is becoming dangerous … If we go on treating nature as we do now, we might find ourselves in a very difficult situation.* (Michael Gorbachev in Swanson, 2001).

In overflowing numbers people are moving into parts of the environment that should better be left as vital elements of a sustainable future. "Los Angeles keeps pushing into mountains where suburban development makes every flood and brush fire more dangerous than the last." (Abbott, 2005) Watershed areas are severely degraded, as loss of topsoil and associated plant life no longer act as the sponge needed to store and then slowly release water.

Population now has grown beyond the former abundance of relatively inexpensive basic resources. As costs of the necessities of life rise, strains are appearing across the world. Even in what has been called 'the richest nation" – the United States – the fabric of everyday life is coming under stress. With the addition each year of three million people, the stress can only increase. One can begin to feel a growing uneasiness about the future, both here and abroad. There is good cause for unease, with world population increasing at the rate of nearly 80 million a year continuing the assault on the life-sustaining environment.

Ignoring and degrading the environment and not dealing with population growth will lead to more sudden tragic events, and gradually more widespread difficulties and hardships in societies and economies. The late Gaylord Nelson, founder of Earth Day, regarded overpopulation our most compelling issue, and wrote, "I don't think most people understand where we are headed."

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