

**Question 6: To what extent is Katrina a natural/unnatural disaster?
What are the important things to know to understand NOLA?**

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Natural disasters arise from nature. To qualify as natural, phenomena need to be distinguished from elements that are (1) human-made or artificial, and/or (2) unreal or supernatural. Our concern here is with type (1) naturalness, though type (2) aspects get embodied in the term “Act of God.” “Act of God” has meaning in both a legal and a political/popular sense. For any natural science, this term is absolutely meaningless by definition. Nevertheless, the term is very useful politically. Humans do not control God’s actions, so those using the term can be secure in the delusion that they have no human responsibility for the disaster.

A disaster is the realization of a hazard. Hazards are processes or events that have the potential to create loss. They can be naturally occurring or human-induced. Question 6 concerns the “Katrina...disaster,” but this terminology already biases the potential answer. “Katrina” is the name given to a hurricane, and hurricanes are natural phenomena. However, disasters do not arise solely because of extreme processes. There must also be a potential to create loss, and many hurricanes occur without creating loss. They are not disasters. Katrina would not have created loss were it not for a great many human factors.

There are two ways in which the New Orleans hurricane-related disaster (NOHRD) can be considered unnatural in the human/artificial sense. The first of these is by far the least important, but it has interestingly received considerable attention from the news media and the public. The first unnaturalness arises from the influence of global climate change, specifically human-induced global warming, on hurricane intensities. Though the scientific theory for this is very straightforward, developed most recently by Kerry Emanuel of the Massachusetts Institute of Technology, the specific application is not. Recent empirical studies, published in *Science* and *Nature*, document that increased hurricane intensities over the past 30 years correlate to increased sea-surface temperatures. Surface water temperatures in the Gulf of Mexico, in particular, were unusually hot during the strengthening of Katrina. The uncertainty here (and all natural science is inherently uncertain – despite the myths perpetrated by politicians) is that there are also decadal cycles in sea-surface temperatures. Moreover, older records on hurricane intensities are not exactly comparable to modern records. Though theory would suggest that human-induced warming is likely imposed on this natural cycle, the data are not sufficient to make an ironclad case. There are many meteorologists, notably those expressing the “official” U.S. government agency position from NOAA (U.S. Dept. of Commerce), who state that there is no proven link between hurricanes and global warming. Nevertheless, despite the interesting technical controversy, this whole line of analysis is pretty much a red herring in regard to the magnitude of the NOHRD.

The second type of human/artificial unnaturalness for the NOHRD is much more important. This is the role of humans in contributing to the circumstances that create

loss. The Katrina storm surge that approached New Orleans was focused and accentuated by engineering works designed to facilitate shipping, not to protect against flooding. (This was particularly pronounced for the MRGO channel just east of the city.) The levees constructed at New Orleans were widely perceived to afford “protection” to the city against storm-surge flooding. Citizens were not informed by more accurate information, namely that New Orleans levees afforded protection against relatively small storm surges and that less certain protection against somewhat larger surges was provided by relatively thin floodwalls atop the levees (some of which may we now know to have been inadequately designed or constructed). Moreover, no protection was provided for particularly intense (but reasonably possible) hurricane storm surges. Indeed, the existing construction works would likely exacerbate the impacts of such rare, great surges. I know of few examples where accurate statements of this type are actually conveyed to citizens at risk from flooding. Such statements go against the political instincts of government officials and leaders.

The elevations of New Orleans land, inundated because of breached floodwalls and levees, were made lower by human actions. As people moved to low-lying areas away from the natural levees of the Mississippi River, they had to dewater the swampy land. This caused the oxidation of organic matter in the underlying muddy sediments. The oxidation decreased the volume of the sediment, thereby lowering the land surface. Thus, the same level of flooding was able to inundate much more land than would have been the case in a “natural” condition.

Finally, the very choice of the city site (it was flooded by the Mississippi within a year or two of its founding 300 years ago) was to place people in a hazardous location. Subsequent investment in infrastructure was focused mainly on protecting the navigation of the river. The artificially augmented Mississippi River levees at New Orleans are immensely more massive and protect for much greater hazard levels than do the Lake Pontchartrain levees (the latter being the source of the NOHRD). Some of this infrastructure affords limited protection for (mainly small) floods, and this was widely promoted by those who wished to see economic development.

The second aspect of the question concerns understanding New Orleans, presumably in the context of the disaster. Understanding involves full awareness of knowledge and meaning for something. In popular terms, one has understanding when one “gets it.” How do we “get it” in regard to the NOHRD? It is clear from the NOHRD experience that authoritative statements from trusted public officials do not provide understanding. The details of the disaster document that hundreds of thousands of people did not “get it.”

Humans have long had a means of achieving understanding. That means is their collective experience. History, the study of that collective experience, is the source of the existing construction works understanding, particularly when history is properly considered in its larger context. Previous flooding at New Orleans shows what might happen. Previous large hurricanes demonstrate what processes might occur. Trends in development, land elevation changes, etc. show what might be at risk. Taken together, such facts, appropriately conveyed to all with ability to act, would afford understanding.

However, this understanding does not derive from pre-packaged authoritative pronouncements. Understanding must be developed through a process of inquiry, tempered by testing. As Mahatma Gandhi observed, “Life is an endless series of experiments.” Of course, the understanding achieved by such an unconstrained process of inquiry might not be what promoters of New Orleans development would want publicized.

The most important thing to understand about NOHRD is that there are powerful forces that benefit from the misunderstanding this and other hazards. Such misunderstanding includes the inherent unnaturalness of the hazard, the misrepresentation of the hazard itself, and the failure to see the hazard in larger contexts of time and space. The latter issues involve self-enhancing patterns that lead one disaster to pave the way for exacerbated future disasters. The “levee effect” is one relevant example of this principle, as follows: (1) Levees, promoted as “flood protection,” provide an artificial sense of security, alleviating risk for small, common floods, but exacerbating risk for larger, rarer floods. (2) This promotes more costly development in flood-prone areas, erroneously perceived as “protected” against flooding. (3) When the inevitable rare, great hazard is realized as a disaster, it is labeled as an “Act of God” or as an unanticipated “force of nature.” The resulting crisis, and need to alleviate suffering, creates the political consensus to generate huge public expenditures to improve the “flood protection.” (4) The new levee construction brings us back to point (1) above.

It is ignorance, not understanding that is actively promoted in regard to disasters. This is not the irritating ignorance that motivates the scientist to learn more about things. Instead, it is the kind of complacent ignorance that contents itself with the short-term benefits that accrue from not knowing. Great sums of public money are committed to construction works, repairing vital infrastructure, all with minimal political wrangling and scrutiny, given the crisis mode that surrounds those who have suffered from an “Act of God.” Politicians achieve public attention and support for their apparent willingness to bring immediate aid to individuals “ravaged by nature.” These formulas are well known world-wide in regard to disasters. Only when the magnitude of calamity gets so large that the game fails to flow smoothly do we get an inkling of its existence. The NOHRD provides an opportunity to recognize this problem. Will it also be forgotten as we once again slide back into complacent ignorance?