

# THE CONTROL OF NATURE: STRUGGLES BETWEEN PEOPLE AND NATURAL DISASTERS

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What happens when people attempt to control natural disasters such as floods, landslides, and volcanic eruptions? Can human ingenuity and determination overcome these geological, hydrological, and ecological processes? In the *Natural Disasters and Earth Science* course offered at Emerson College, we explore case studies from Louisiana, Iceland, and southern California in which such attempts have brought varying degrees of success and failure. Each of these case studies is a chapter from *The Control of Nature* by John McPhee (1989).

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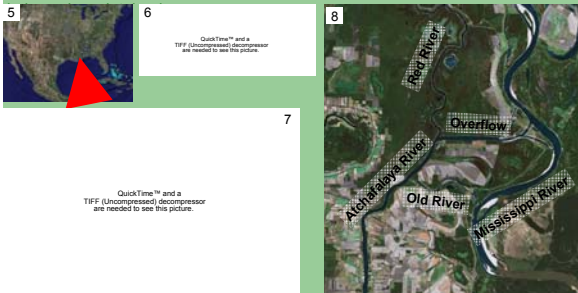
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## Atchafalaya

### Summary

This Mississippi River is of great economic importance, allowing transport of agricultural and other products to and from the middle of the continent via the port of New Orleans. But the giant river is dynamic, changing its course over the centuries and inundating the adjacent floodplain on a regular basis. This has led to a conflict between people and the river system where the Red River flows near the Mississippi. The rivers are connected at a place called "Old River," and there is a risk that the main flow of the Mississippi could be captured there, causing its flow to shift and follow the Atchafalaya River to the Gulf of Mexico. To avoid this outcome, the Army Corps of Engineers has developed an elaborate system of dams and channels at Old River, and for decades the scheme has been successful. However, the situation is complicated by the fact that, for agricultural and environmental reasons, 30% of the flow of the Mississippi must be allowed to flow down the Atchafalaya. This arrangement requires constant monitoring and adjustment of flows to ensure that this delicate



### Questions for discussion and analysis

Will we be able to keep the waters of the Mississippi out of the Atchafalaya indefinitely? Is it worth the expense and effort? A similarly precarious situation exists in the city of New Orleans, highlighted by what occurred during Hurricane Katrina. In that case, should the Army Corps of Engineers make bigger, stronger levees to protect New Orleans? Should people be allowed to rebuild and live in the areas that were flooded during and after Hurricane Katrina?

### Scientific learning

(1) Frequency and magnitude of floods; (2) Exacerbation of flooding by land-use activities; (3) Fluvial geomorphology; (4) Engineering of dams and levees.

## Cooling the Lava

### Summary

A volcanic eruption in 1973 threatened to destroy the town of Vestmannaeyjar on Heimaey Island, just south of Iceland. The town's harbor is vital to the Icelandic fishing fleet, and thus its loss would have been economically devastating to the nation. When lava flows began covering neighborhoods and inching towards the harbor, geologists and engineers joined forces to battle the looming disaster. Over the course of several months they used pumps and hoses to soak the lava with millions of gallons of seawater. The strategy was eventually successful, sparing most of the town and allowing its population to return safely. In fact, the lava-cooling efforts provided long-term benefit to Vestmannaeyjar by improving the



### Questions for analysis and discussion

What about Iceland's geological setting allowed the people of Heimaey Island to be successful in their attempt to stop the lava flow when other volcanic eruptions kill thousands? What is another example of a situation where people have attempted to control a natural process or disaster? In that case, was the solution to the problem as successful as in the Vestmannaeyjar story? In general, do you think it is a good or bad idea to try to control natural processes?

### Scientific learning

(1) Plate tectonics; (2) Types of volcanic eruptions and deposits; (3) Geothermal processes.

### Image credits

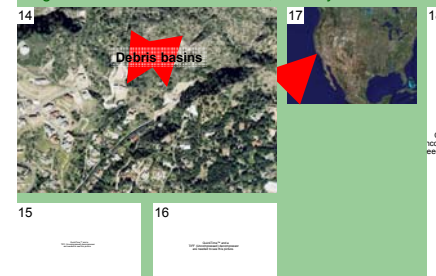
johnmcphee.com/controlofnature.htm (1)  
usgs.gov/hazards (2,3,4,15,18)  
earth.google.com (5,8,9,11,14,17)

users.sticc.edu/jangert/olddriver/olddriver.html (6)  
americaswetlandresources.com (7)  
volcano.und.edu/wdocs/volc\_images (10,12,13)  
pubs.usgs.gov/of/2001/ofr-01-0144 (16)

## L.A. Against the Mountains

### Summary

The megalopolis of Los Angeles sprawls in all directions, including towards the San Gabriel Mountains. Many people have chosen to live at the base of the San Gabriels to take advantage of relatively clean air and proximity to nature. However, under certain circumstances, devastating debris flows of mud, rocks, and boulders can pour out of the mountains into the neighborhoods below. People have been killed and homes have been destroyed. Landslides occur in this region because: (1) the normally dry climate results in discontinuous vegetation, so there are few plants to anchor the soil; (2) frequent wildfires result in even sparser plant cover, and decades of fire suppression has resulted in increased fire intensity; (3) when precipitation does take place, torrential downpours occur, dumping huge amounts of water onto the landscape and creating debris flows capable of wiping out entire homes. Local communities have responded to this hazard by building huge dams and basins to collect debris-flow material when landslides occur. This strategy protects many neighborhoods in the San Gabriels, but may foster a false sense of security.



### Questions for analysis and discussion

Is it good public policy for the local governments to provide this service to residents living in the San Gabriels? Should people be allowed to live wherever they choose, regardless of the risk of landslides and other natural disasters? In cases like this, who should pay to protect the lives and property that are at risk? What is another example of a situation where governmental funding or resources protect people from natural disasters?

### Scientific learning

(1) Earthquake faults and mountain building; (2) Mass-wasting processes; (3) Wildfires and consequences of fire suppression; (4) Severe weather.