

Natural Hazards: Challenges to the Creation Mandate of Dominion?

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Natural Hazards and Natural Evil

Natural hazards (earthquakes, volcanic eruptions, fire, floods, and storms) are part of the problem of evil, or more particularly, part of the problem of “natural evil.” Such potentially destructive events have been understood theologically in a variety of ways. Within the history of Christian reflection on the problem of evil, “natural evil” has been viewed as a consequence of the fall of free moral beings, or as part of the very good creation intended by God.¹ Also important in shaping Christian views on “natural evil” has been the place of the natural world in the eschatological vision.

Paul Santmire traces three prominent metaphors in Christian theology: (1) the metaphor of ascent, (2) the metaphor of fecundity, and (3) the metaphor of migration to a good land.² In the first metaphor, humanity is called not only upward toward God but “above and beyond the world of nature, in order to enter into communion or union with God who is thought of as pure spirit.”³ The latter two metaphors form the foundation for a less anthropocentric and more ecological theology in which humanity is redeemed with nature in the formation of a new heavens and a new Earth. Related to these eschatological visions, and equally important in influencing theological reflection on the human relationship to nature, is our understanding of what it means to exercise dominion as beings created in the image of God.⁴

One popularly held view is that hazardous natural events are reflections of the fallenness of the creation. Natural hazards along with other unpleasant or “untamed” aspects of nature are attributed to

the consequences of Adam’s disobedience. Humanity is thus placed in a position of conflict with fallen nature. The creation mandate of dominion becomes a struggle to control or subjugate the forces of nature. Resonating with common American cultural values, this theological view expresses itself by attempting to defy natural forces through the application of technology.

The view that natural processes are fallen, and not part of God’s “very good” creation, however, finds little support in Scripture. Natural events, even destructive ones, are attributed solely to God’s purposeful action. Such events are understood in Scripture as expressions of God’s creative power that call forth our praise, not as satanic corruptions of a previously placid creation order. The revelation of God’s power, holiness, and majesty to his people was often accompanied by manifestations of fire, storm, and earthquake, as at Mt. Sinai during the deliverance of the Law. Furthermore, the historical record of creation itself testifies that such destructive events have always been integral components of the created order. Catastrophic geologic events are recorded throughout Earth’s history where they played important roles in the evolution of Earth’s landscapes, environments, and biological communities.

Destructive natural events have also commonly been viewed as agents or signs of God’s judgment. Scripture certainly views some events in this way. The plagues of the Exodus are one clear example. God can, and does, use such events to affect the course of human events and execute his justice. However, great caution must be exercised in identifying any specific catastrophic event as an act of

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divine judgment. Jesus himself made it clear that it is wrong to assume that the victims of these events are deserving of special judgment (Luke 13:1-5). Furthermore, *all* physical events or processes are under God's providential control and may be used by God to accomplish his purposes in human redemptive history. Although God sometimes uses dramatic natural events to reveal or to carry out his will in human history, this does not make such events "unnatural" or outside the range of physical events God has ordained for the continual renewal of his creation. These events are still a normal and necessary part of his creation. If earthquake, fire, and flood are aspects of God's providential activity in the natural world, then how do we as God's stewards of creation exercise our biblical mandate?

Defining Natural Hazards

Before discussing our response, let us understand in what ways "natural hazards" are natural. First, these events are necessary consequences of the physical forces acting on the Earth.⁵ Earthquakes and volcanic eruptions are part of the dynamic processes driven by the release of the Earth's internal heat by which the Earth's crust is continually created and destroyed. Landslides, avalanches, and mud slides are mechanisms by which the weathered materials of the Earth's surface are transported by the forces of gravity eventually to be deposited and become incorporated into the rock cycle. Intense storms, and the flooding rains and high winds they contain, are consequences of atmospheric circulation driven by differences in the amount of solar radiation received and absorbed at the Earth's surface, and by the effects of the Earth's rotation.

Secondly, an examination of both the dynamics of modern ecosystems and the geologic record demonstrates that apparently destructive events are important components of natural systems to which organisms have adapted and on which they are dependent. The characteristics of ecosystems are determined in part by the nature and frequency of physical disturbance. Floods, for example, clear stream beds and banks of fine sediment and maintain critical riverbed and riparian habitats. Flooding rivers also supply nutrient-rich sediment to their

floodplains and carry sediment to delta wetlands, preserving them against the effects of subsidence. Similarly, wind and waves from coastal storms are vital parts of the highly dynamic sediment transport systems of coastlines. The ecosystems of these environments adapt to this continual disturbance. Storm waves washing over barrier islands, for example, clear dune vegetation and provide critical new habitat for beach-nesting birds. Also, the intensity and frequency of storm events are major controlling factors in shallow marine ecosystems affecting both species diversity and composition. Fire is increasingly being recognized as an integral part of both grassland and forest ecosystems. Certain plants even require fire to reseed themselves.

Why are natural events such as earthquakes, storms, fire, and flood that are clearly vital parts of the created order considered "hazards"? The obvious answer is that they are "hazardous" in the sense of being threats to human life, property, or other economic interests. These threats are caused by the human development of disturbance-dominated landscapes. Such development is often done either without an awareness of the natural processes characteristic of the area, or in a conscious attempt to defy those processes. Typically, the development of naturally disturbed areas is accompanied by efforts to forcefully control or alter the natural system by the application of technology. This commonly has the unintended consequence of requiring even more technological intervention and increased economic costs. Furthermore, the technologies being applied are often ineffectual and have significant negative impacts on the ecosystems involved.

Dominion as Technological Control

Flood control is one example where the application of technology in many cases has increased the threat of economic loss while degrading the river habitat. When rivers are allowed to occupy their floodplains, flood waters spread out and slow down, thus broadening the flood crest and reducing flood levels downstream. In the process, the fine sediment that is deposited enriches and builds up floodplain

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soils. Confining rivers within artificial levee systems has resulted in both higher river levels and higher flow velocities during floods. When the levees are breached, higher water velocities have more erosive ability and deposit coarse sediments over agricultural land. Flood-control dams also have consequences for river behavior and ecology. Without regular flooding, riparian habitats down river become choked with invasive vegetation and fine sediment accumulates on river beds and banks. The trapping of sediment behind dams reduces the sediment supply to coastal areas resulting in increased shoreline erosion and flooded delta areas. The altered temperatures and oxygen levels of the water impounded behind dams result in the loss of native river species. Many river species, especially mollusks, have become extinct or highly threatened as a result of intensive construction of levees and dams.

A further danger of levee and dam construction is "serial engineering." The false sense of security generated by these structures encourages building on the floodplain. When flooding ultimately occurs, the response is often to build more flood control structures which stimulate yet more development. As a result, more and more human lives and property are placed under threat, and the human and economic loss associated with floods is increased, not decreased. In most cases, the best course of action is to prevent further development of the floodplain, setting aside areas where rivers are free to occupy their floodplains.

The catastrophic flooding of the Midwest in 1993 brought renewed attention to these issues and brought existing floodplain management practices into question.⁶ Of particular significance was the extensive governmental report on the '93 floods by the Interagency Floodplain Management Review Committee.⁷ This report recognized the failure of primary reliance upon flood protection structures and the vulnerability of floodplain development. As a result of the reevaluation process, government agencies and many local communities have begun to think more seriously about hazard avoidance and floodplain restoration and to embrace a more ecological ethic.⁸

Coastlines provide other examples of dynamic and disturbance-adapted environments that can be developed only with significant alteration to the natural system. These environments also are host to a wide range of ecologically important terrestrial and marine habitats. Barrier islands, in particular, are highly dynamic and mobile landforms. The sand of which they are composed is being continually transported down the coast by wave action. Storms

transport beach sediment seaward where it accumulates to form offshore sandbars. These sandbars provide breakwaters for large storm waves. Storms also transport sand over the islands resulting in their gradual landward shift.

Structures designed to protect beachfront property from storm waves interfere with this sediment transport system. Jetties and groins act as sediment dams blocking the shore-parallel transport of sand and starving beaches further down the coast with resulting increases in beach erosion. Seawalls prevent the onshore/offshore movement of sand by which the shoreline adjusts to changes in storm intensity. Pilkey and Dixon have dramatically documented the consequences of these efforts at beach stabilization.⁹ The management of beachfront properties frequently becomes another case of serial engineering in which increasing development generates more and more dramatic and costly intervention. Yet, despite these technological interventions, barrier islands remain mobile unstable features, and the threat of significant economic and human loss grows with increasing development.

Fire is another example of a natural disturbance whose attempted elimination has resulted in unexpected, significant negative consequences. Terrestrial ecosystems have evolved within particular regimes of fire intensity and frequency. Many aspects of plant ecology are adapted to, and dependent on periodic burning.¹⁰ In native grassland, fire is a critical factor in maintaining the ecology and productivity of the prairie.¹¹ The frequency of burning controls the balance of grasses to herbaceous plants and bushes. Fire suppression favors forbs and bushes over grasses, and over time will result in the replacement of the grassland by a scrub woodland. In more arid regions, fire controls the growth of creosote bushes that sap up precious water and inhibit the growth of other plants. In mature conifer forests, fire eliminates undergrowth that chokes out young fire-resistant trees in the understory, and opens the resinous cones of reproducing trees. For these and other reasons, fire is increasingly being used as a management tool for a wide range of terrestrial ecosystems.¹²

The aggressive suppression of fire in both grasslands and forests has also ironically resulted in increased fire hazards. Regularly occurring fires remove built-up thatch or forest litter, controlling the amount of available fuel. When fires are continually suppressed, the amount of available fuel accumulates to dangerous levels resulting in hotter and more extensive burns. The suppression of fire also has encouraged the construction of homes in

areas normally subject to frequent fires, thus requiring even more expensive fire suppression efforts. Firefighters are forced to protect properties located in areas where controlling fires is difficult and where the risk to firefighters is greater. Again, the attempts to defy natural processes have increased rather than decreased the hazards.

A Stewardship Perspective

How can a Christian environmental ethic inform the management of disturbance-dominated environments? One important way is by opposing cultural forces in our society that elevate economic interests and personal desires above creation stewardship and societal responsibilities. Development is often pursued, not only in ignorance of its geological and ecological consequences, but also without regard to the interests of other people. Individual property rights can take precedence over responsibility for the costs of development to both the environment and society. This is exacerbated by a “can do” attitude that sees technological solutions to any potential problem. What often results is escalating spirals of technological intervention and ill-advised development that increase the hazard to human life and property while negatively altering natural habitats. The biblical view of our position as stewards of God’s creation should provide a powerful antidote to this perspective. For those who recognize that we cannot claim ultimate ownership of anything, the goal of land management becomes the preservation of that which has been entrusted to us by God. In place of the forceful domination and exploitation of nature, Christians should heed the call to serve and care for that which God created and called “very good.” However, this must also be accompanied by a conscious effort to become more aware of our physical and biological environment. We simply cannot exercise proper stewardship armed only with a good theology. We must also become familiar with the creation over which God has made us stewards. Much of our society has become isolated from the natural environment both physically and spiritually. We will continue to be in conflict with our environment as long as we fail to learn from God’s creation.

It should be emphasized that the stewardship perspective that I am advocating is not equivalent to a call for the abandonment of an active human role in environmental management. Humans are now an integral component of the world’s ecological and geological system. We could not isolate the environment from our influence even if we so desired. Furthermore, the creation mandate of service given to us by God is an active, not a passive one. My

appeal is not to abandon technology, but to apply it in appropriate ways that recognize the dynamics and ecological roles of natural disturbance.

Events or processes seen as hazards or obstacles to human activity are vital parts of the created order. They are integral to the continual renewal of the Earth’s land and ecosystems—restoring the fertility of soils, maintaining ecosystem diversity, and creating vital habitats for animal and plant species. “Destructive” natural events are not processes to be fought and overcome, but aspects of God’s “very good” creation to be understood and accommodated. The exercise of our divine commission to have dominion over creation must be done in humble service, not in power.¹³ This mandate requires that we understand the dynamics of the creation over which we have been made stewards. The human suffering and property destruction resulting from natural hazards may indeed be expressions of God’s judgment—the consequences of our sinful self-interested use of the environment and our failure to respect those natural processes established by God as agents of creation’s renewal. *

Notes

- ¹J. Hick, *Evil and the God of Love*, rev. ed. (New York: Harper Collins, 1977), 389.
- ²H. P. Santmire, *The Travail of Nature: The Ambiguous Ecological Promise of Christian Theology* (Minneapolis, MN: Fortress Press, 1985), 274.
- ³*Ibid.*, 21.
- ⁴D. J. Hall, *Imaging God: Dominion as Stewardship* (Grand Rapids: Wm. B. Eerdmans Publishing, Co., 1986) 248.
- ⁵L. W. Lundgren, *Environmental Geology*, 2d ed. (New York: Prentice Hall, 1999).
- ⁶D. Snyder, and S. P. Bruner, “The Galloway Report: New floodplain Management or Business as Usual?” *Journal of Soil and Water Conservation* (Nov/Dec 1994): 528–34; and S. A. Changnon, ed., *The Great Flood of 1993: Causes, Impacts, and Responses* (Boulder, CO: Westview Press, 1996), 319.
- ⁷Interagency Floodplain Management Review Committee (Brigadier General G. E. Galloway, Chair), *Sharing the Challenge: Floodplain Management into the 21st Century* (Washington, DC: U.S. Government Printing Office, 1994).
- ⁸Snyder and Bruner, “The Galloway Report: New Floodplain Management or Business as Usual?”
- ⁹O. H. Pilkey and K. L. Dixon, *The Corps and the Shore* (Washington, DC: Island Press, 1996), 272.
- ¹⁰W. J. Bond and B. W. van Wilgen, *Fire and Plants* (London: Chapman & Hall, 1996), 263.
- ¹¹O. J. Reichman, *Konza Prairie: A Tallgrass Natural History* (Lawrence, KS: University Press of Kansas, 1987), 226.
- ¹²L. F. DeBano, D. G. Neary, and P. F. Ffolliott, *Fire’s Effects on Ecosystems* (New York: John Wiley & Sons, 1998), 333.
- ¹³This is a point emphasized by Douglas John Hall in *Imaging God*.