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NEO Disaster Response and Recovery in the Context of Other Natural Hazards

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ABSTRACT

The consequences of a NEO impact on the Earth, e.g. as reported by the Purdue impact calculator (<http://www.purdue.edu/impactearth/>), are not particularly dissimilar from those of more common, familiar natural disasters. Effects resemble those of an earthquake, tsunami, wildfire, landslide, volcanic eruption, windstorm, and other disasters. The scale of effects varies enormously, depending on the size of the impactor, but then many natural disasters can span the range from minimal damage to destruction across a region as large as a small country. An NEO impact may happen essentially without warning (as for an earthquake) or with appreciable warning (as for a hurricane). Thus much of the understanding of how to prepare for and respond to common natural disasters can be applied to an NEO impact.

There are differences, of course. Natural disasters generally can threaten only very small regions on the Earth (e.g. “tornado alley”, along coastlines, along continental plate boundaries), permitting cost-effective preventive measures (e.g. strengthening structures where earthquakes are likely to occur). NEO impacts can occur anywhere and, additionally because of their infrequency, years-in-advance NEO-specific measures would not be cost-effective. Because of the infrequency of NEO impacts, hence lack of familiarity, people may develop unrealistic fears (e.g. belief that there is deadly radioactivity) which they would not do in the case of a familiar disaster, so the behavior of victims may be less predictable for first responders. A final difference is that many disasters raise the possibility of another similar disaster occurring in the same location in the comparatively near future, whereas an NEO impact is a singular event; in the extremely unlikely case of another one happening shortly afterwards, it certainly wouldn’t happen in the same locality.

Despite these differences, we should expect that the response to an NEO disaster would be mounted by existing disaster response agencies in customary ways, which

have a demonstrated degree of effectiveness (and also shortcomings and failures). By far the most likely NEO impact would be by a very small NEO; if it occurred in a populated locality, then it would be dealt with by local authorities in ways similar to responses to a building on fire, an airplane crash, or a tornado. Response to a much less likely large impact, e.g. by an impactor 100 m in diameter or larger, would probably resemble responses to major natural disasters, like the 2011 Japanese earthquake/tsunami or the 2004 Indian Ocean tsunami. Only if the impactor approached ~1 km diameter would the qualitative character of the consequences enter wholly uncharted territory, requiring kinds of international responses never before experienced or even contemplated.

The general form of response and recovery from natural disasters is applicable to most natural disasters and is summarized, for example, in Chapter 2 (“The Disaster Recovery Process”) of the 2006 book “Holistic Disaster Recovery” produced by the Natural Hazards Center of the Univ. of Colorado. Many aspects of disaster recovery described in this document would apply to an NEO impact disaster. Of course, recovery involves re-establishing community infrastructure, but the primary issues involve *people*, including restoring their individual lives as well as restoring the social elements that sustain a community. Availability of financial resources to effect recovery is a major issue.

The major emergency-planning differences between an NEO impact and other natural hazards concern the discovery of the potential disaster, evolving predictions of the event, warnings and mitigation strategies, etc., all taking place *before* the impact. But once an impact happens, the widely adopted “all-hazards” approaches to response and recovery apply to the NEO disaster just as they do to any other natural disaster.