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## 1 The Risk in Risk Reduction

2

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Decision making using imperfect information is complicated and results in outcomes that may be suboptimal. Yet this is the context for risk assessment regarding natural hazards. As a result, decisions about hazard identification and warning, loss avoidance and reduction measures, and mitigation policy and regulation involve large uncertainties and can be improved. This decision risk reduces the willingness to invest in safety and protection measures for private and public property and infrastructure.

Less than perfect information affects the accuracy of hazard prediction. The physical processes that trigger

the frequency, severity, and extent of landslides such as earthquakes, rainstorms, and human impacts (road construction, etc.), have large prediction errors. Improved science information reduces uncertainty and results in decisions with less risk. Our research links earth science information with mitigation investment choices by integrating earth science and economics to evaluate the socioeconomic implications of applying a performance-based regulatory standard for landslide hazards in Ventura County, CA. The regional-scale approach was used to evaluate risk/benefit and benefit/cost tradeoffs. Inputs include: landslide susceptibilities and probabilities, building regulations and standards, and property valuations and mitigation costs. The probabilistic risk analysis compares hypothetical mitigation strategies and their cost effectiveness and decision risk. From the example, it is demonstrated that systematic scientific investigations result in decisions with improved clarity and more effective investments. Further, improved scale and accuracy of the earth science information can affect decisions on loss-reduction policies.