

Living ^{with} Unstable Ground



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Before



After

Fig. 31. (Before) Sinkhole that formed on June 11, 2002, in Pine Hills, Central Florida, and created a 150-ft-wide and 60-ft-deep cavity. It forced evacuation of 100 occupants living in apartments in background. (After) Site was permanently stabilized with a 50-ft-deep wall consisting of 3-ft-diameter interlocking piles.

Although geologists can map the distribution of soluble rock, predicting the location of underground cavities is more challenging. Detection of these cavities usually requires extensive drilling or geophysical exploration. Once detected, if the cavities are not too large, they may be filled with grout made of a cement or clay slurry. Stabilizing an active sinkhole may be a difficult task. Commonly practiced methods include filling the void or stabilizing the soil around a sinkhole. To permanently stabilize the collapse shown in Figure 31,

50-ft-long interlocking piles were driven into the ground to form an underground "wall" around the sinkhole.

Many collapses are caused by either lowering of the water table, which reduces support for the cavern ceiling, or by diverting of surface runoff into small preexisting voids, which cause them to erode and enlarge. Thus, stabilizing water tables and preventing surface runoff from entering the small preexisting voids often can deter collapse.

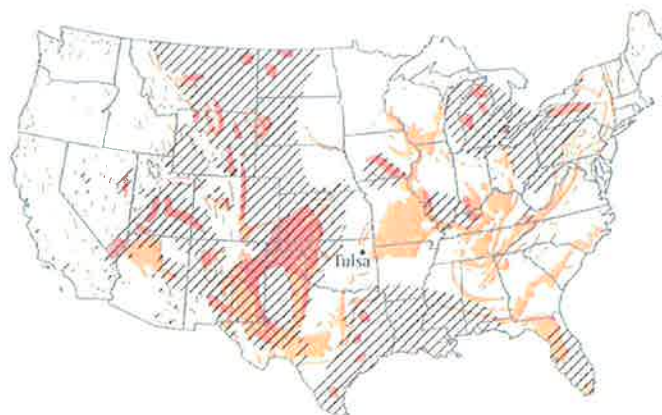





Fig. 32. The map shows areas in the United States underlain by soluble rock.

 Evaporite rocks — salt and gypsum
 Karst from evaporite rock
 Karst from carbonate rock

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Thomas L. Holzer

*M*ost of us take the stability of the ground for granted. However, many ongoing natural processes and human activities, and occasionally complex combinations of both, displace the ground. Whether ground displacements are large and catastrophic or small and slow, their cumulative impact during the lifetimes of humans or civilizations may be large and destructive. Parts of every state in the United States are affected by these instabilities of the ground. As the demand for land grows and humans increasingly modify their environment, more and more people will be exposed to these instabilities and suffer the consequences. *Living with Unstable Ground*, the 11th publication in this series, is a practical guide. It will increase your awareness and understanding of how you can build safely in areas with unstable ground and what society can do to reduce the impact of unstable ground.

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