Esta ponencia fue presentado por el Dr. George Veni
en el Primer Seminario Sobre el Manejo Sostenible de Karst
en Coban, Alta Verapaz, Guatemala el 16-19 de Julio de 2003.

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ENVIRONMENTAL PROBLEMS IN KARST AREAS

General Principals

Environmental problems

Result from excessive
consumption, contamination, and modification of a resource

Environmental solutions

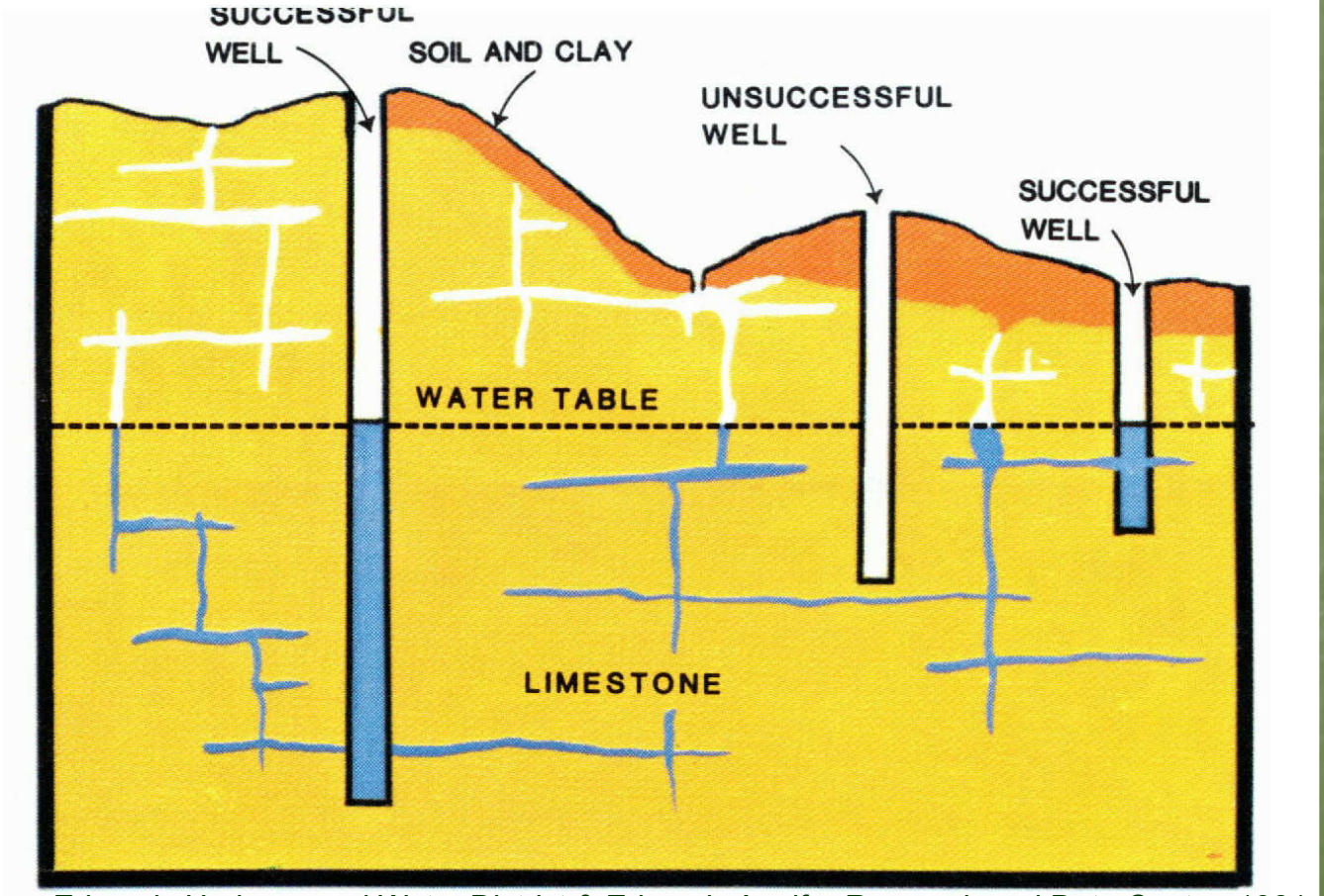
Require sustainable use of a resource

and identifying the carrying capacity
How much is too much?

Karst-Specific Groundwater and Land Management Problems

Groundwater problems

Water quantity

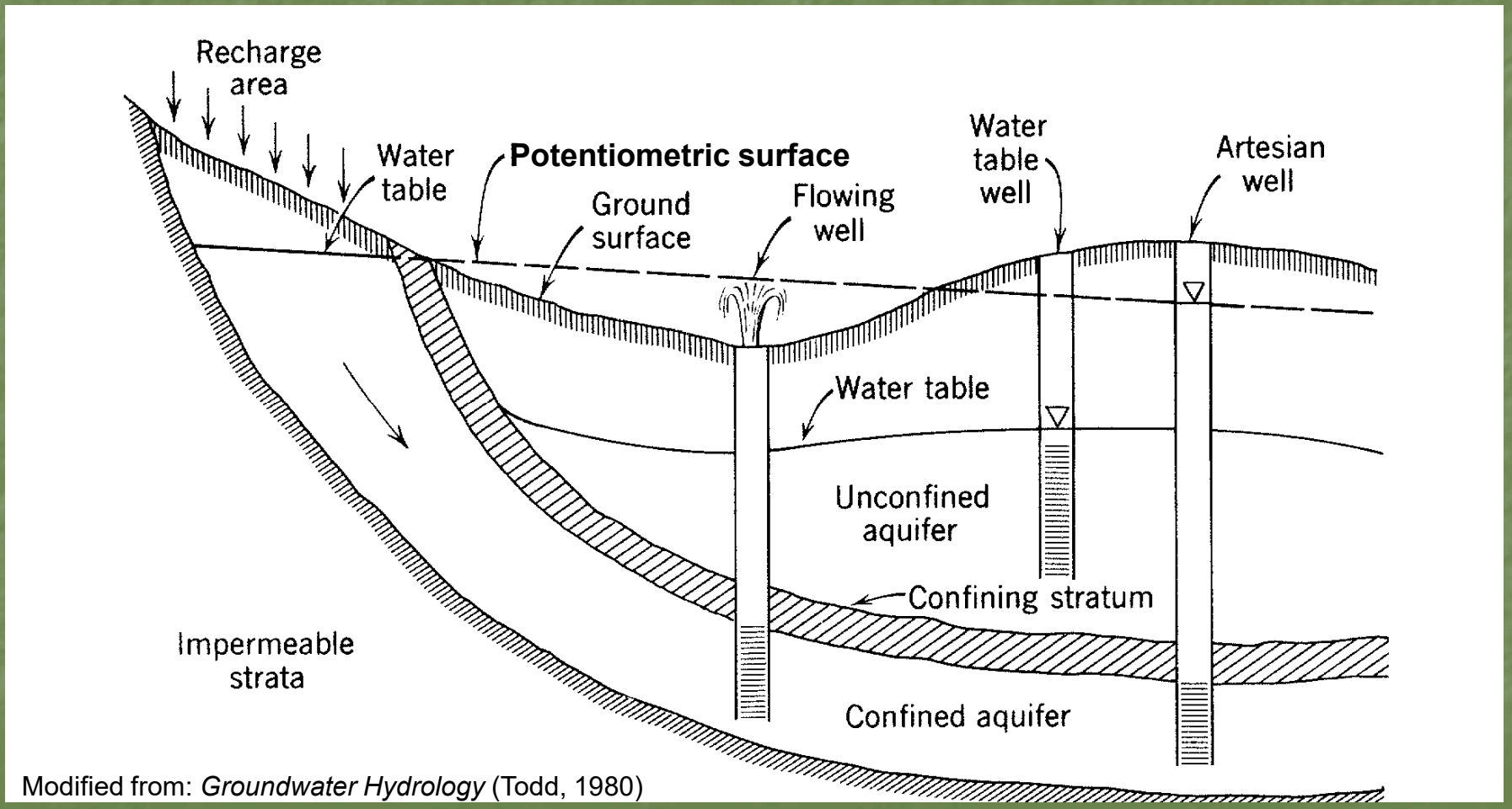


From: Edwards Underground Water District & Edwards Aquifer Research and Data Center, 1981

Karst aquifers have potential
for rapid recharge

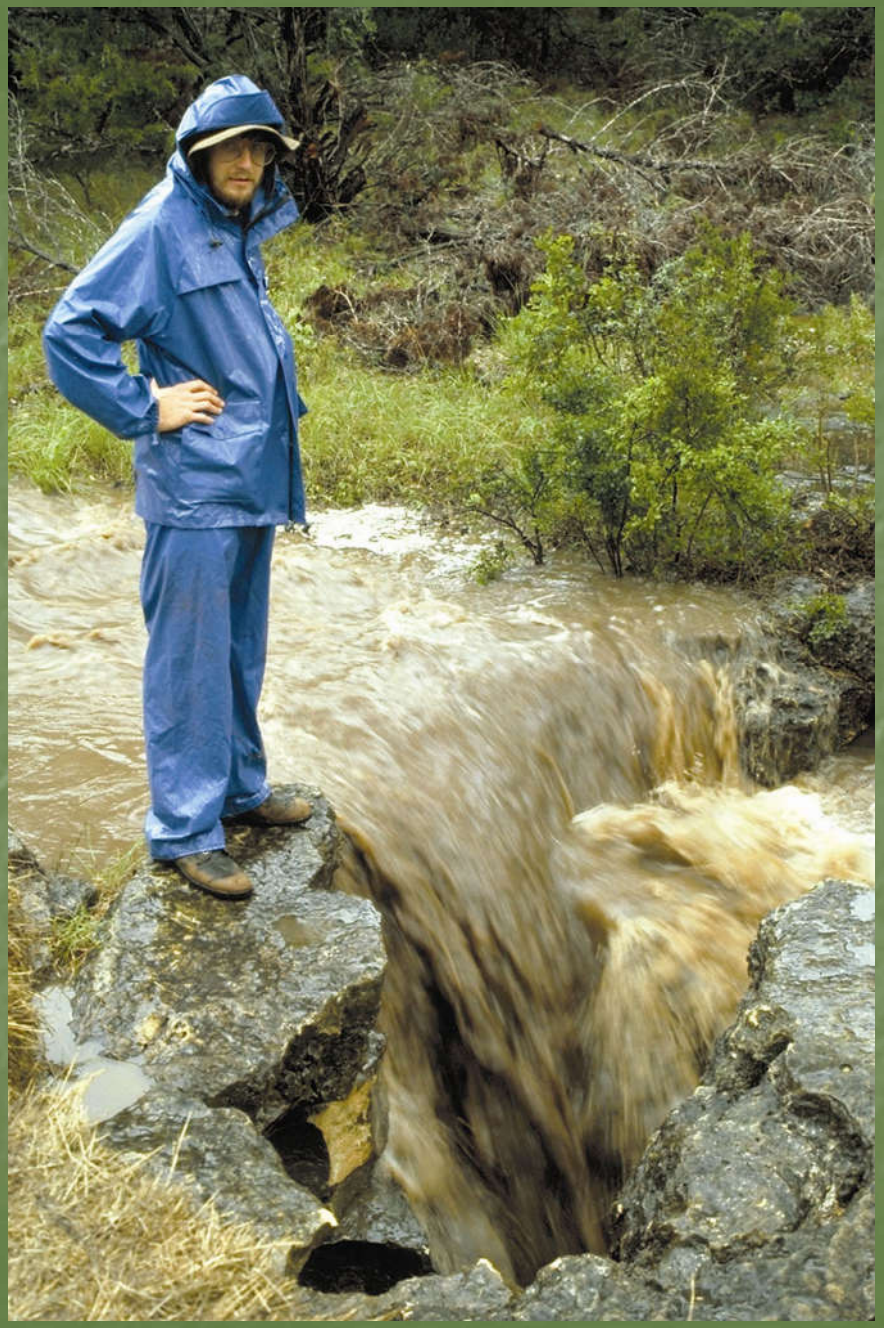
… and rapid discharge

Groundwater storage
Confined vs. unconfined aquifers



Modified from: *Groundwater Hydrology* (Todd, 1980)

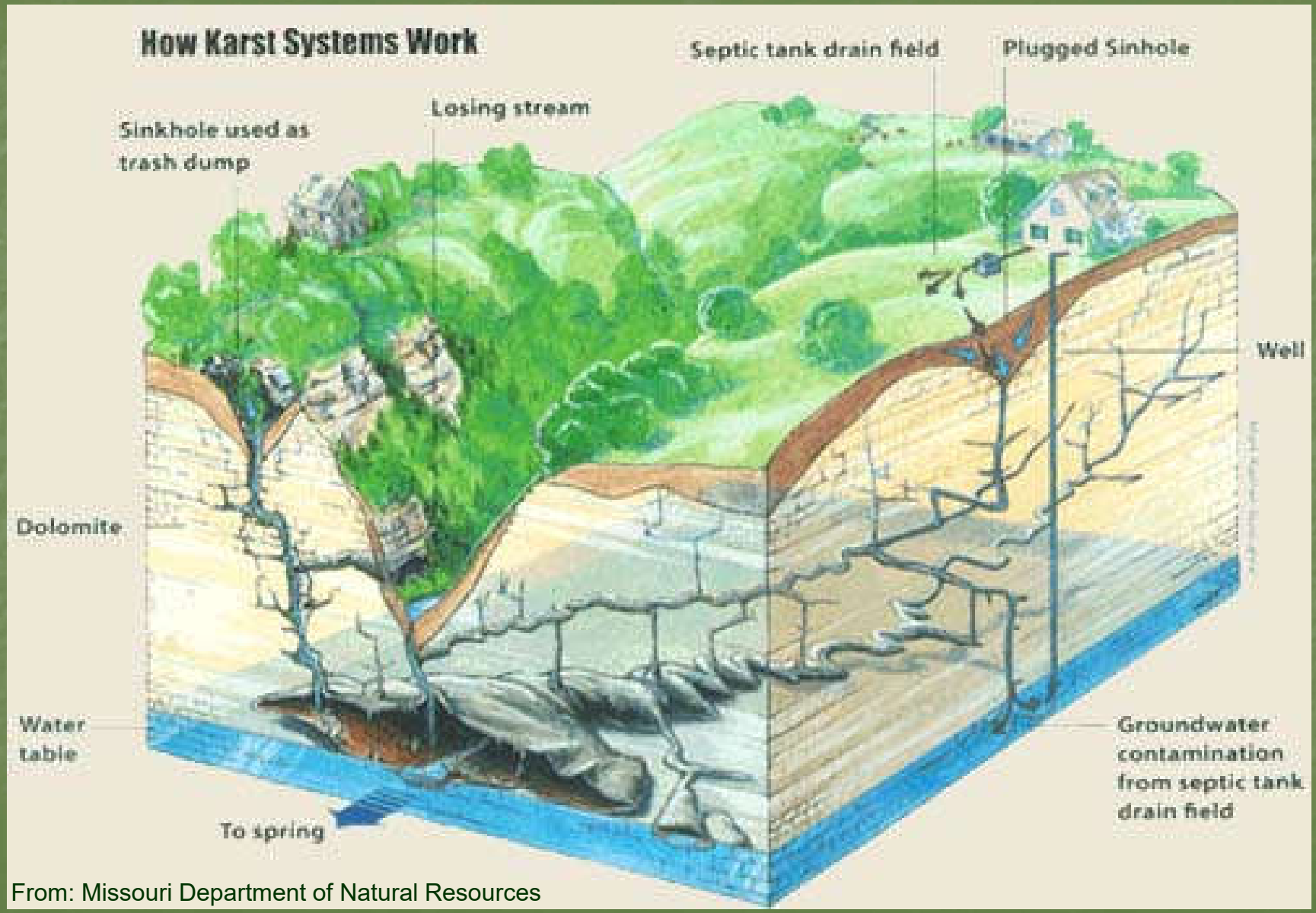
Sinkhole flooding
Sediment clogs conduits
Increased runoff
Decreased sinkhole size



Groundwater contamination

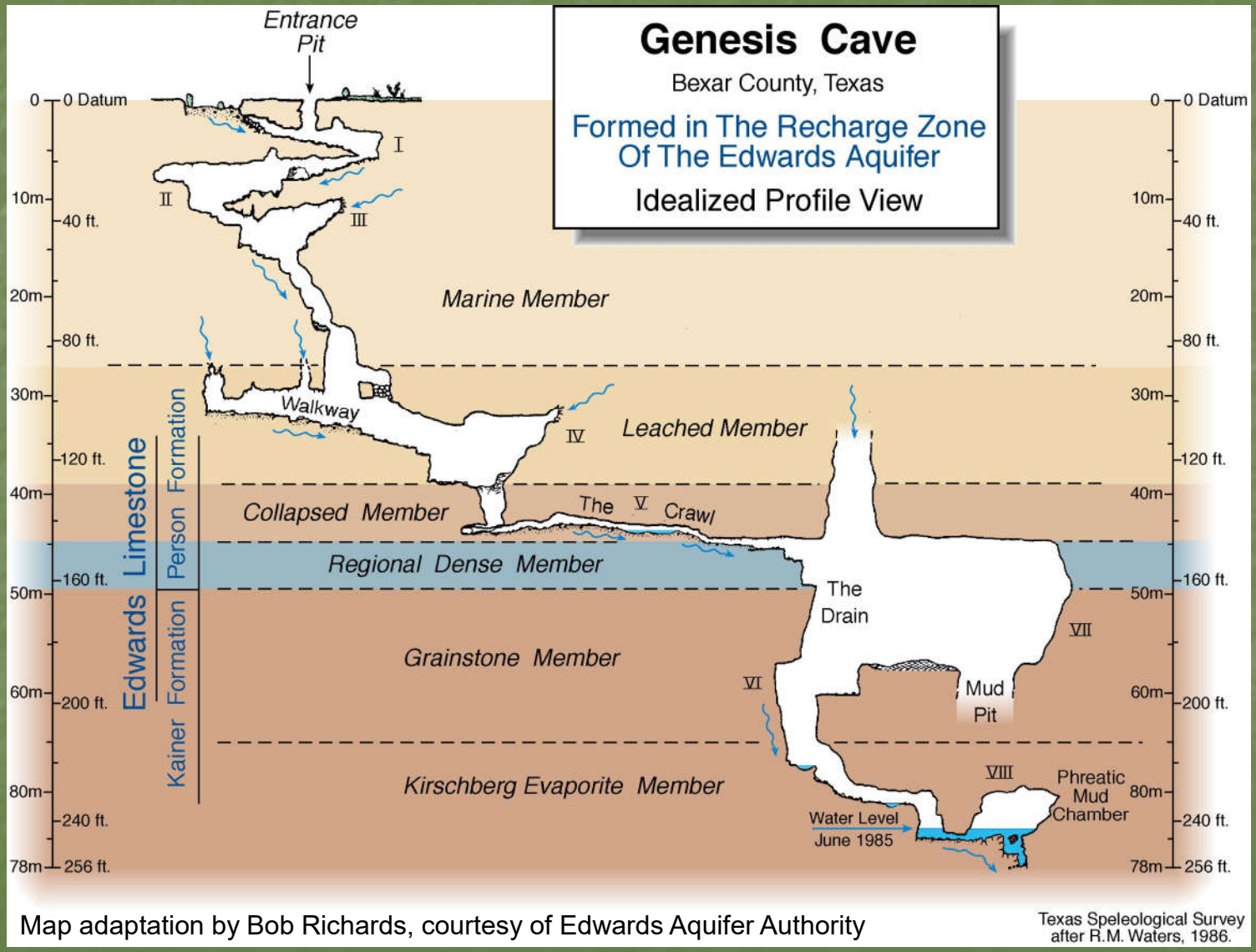
Karst aquifers are the most vulnerable due to rapid recharge and travel, and no filtration

Contaminant sources and avenues into karst aquifers



From: Missouri Department of Natural Resources

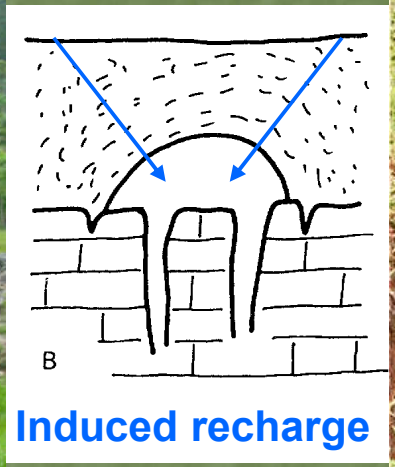
Karst aquifers have complex flows and difficult-to-predict flow paths



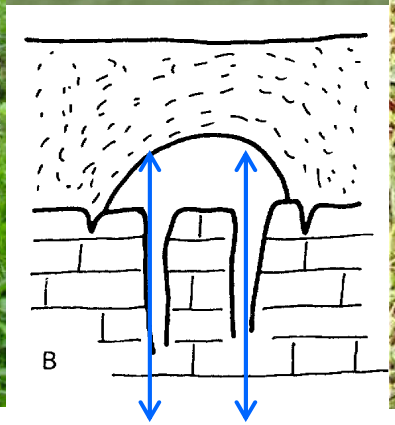
Map adaptation by Bob Richards, courtesy of Edwards Aquifer Authority

“Bathtub ring” effect in conduits and fractures

Land management problems
Soil sinkhole collapse



Induced recharge



Fluctuating water table

Modified from: *Geomorphology & hydrology of karst terrains* (White, 1988)
Photos courtesy of Jason Pielemeier

Bedrock sinkhole collapse

Agricultural problems in karst
Groundwater contamination

Soil erosion
reduces agricultural productivity
and increases sedimentation in caves

Problems from the destruction of caves

Loss of recharge, research, and monitoring of aquifers

Loss of archaeological and paleontological materials

Loss of cavernicole habitat

Karst ecosystem problems
No. 1 problem is habitat damage and loss

Damage outside caves
reduces forage and areas for reproduction

Damage outside caves
results in pollution harmful to cave ecosystems

Photo courtesy of Geary Schindel