

DELINEATING SOURCE AREAS TO CAVE DRIPS IN FLINT RIDGE CAVE

June 18, 2014

City of Austin Environmental Board



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City of Austin

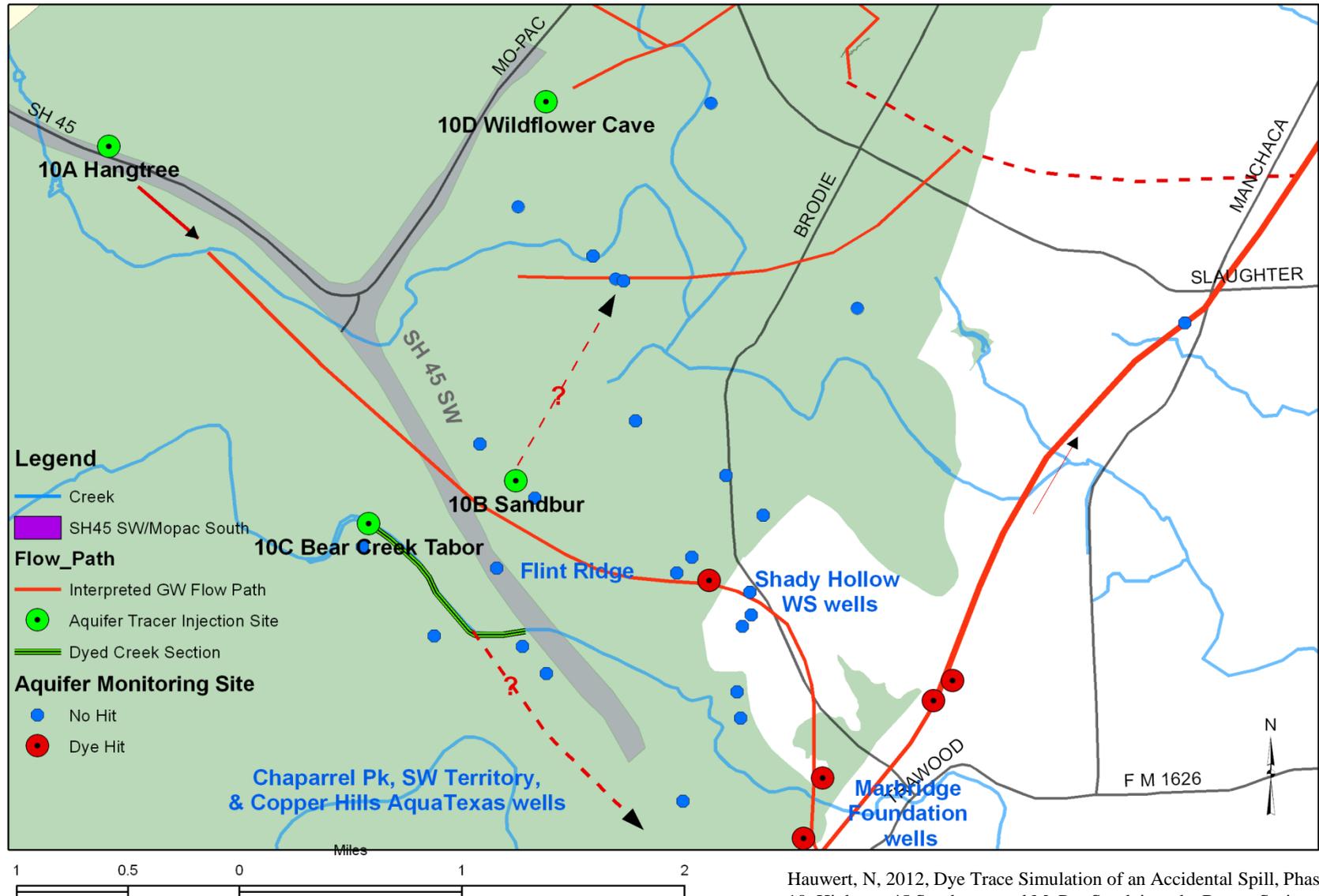
Watershed Protection Department

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Previous Studies

Well Recovery of 2007 Groundwater Traces



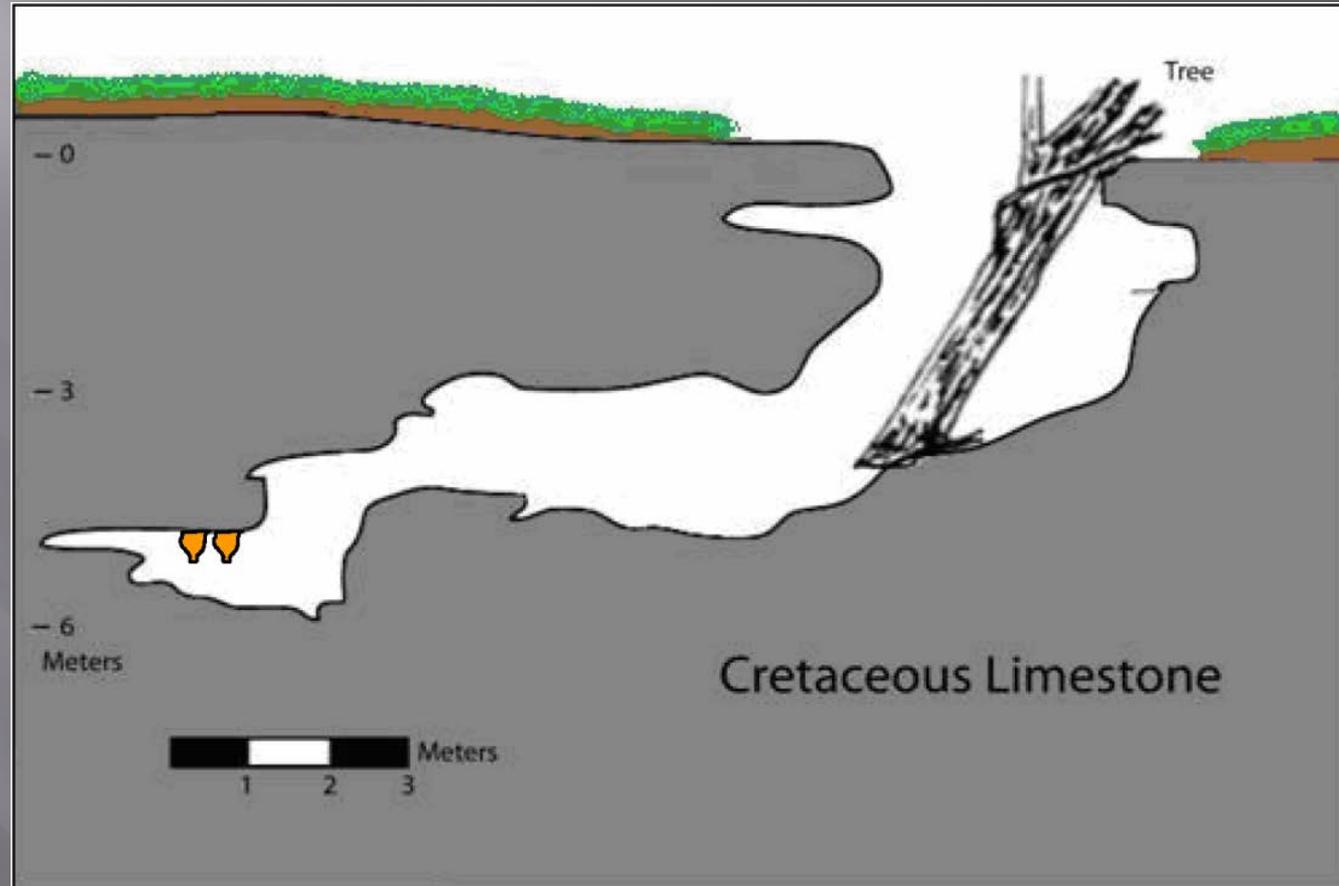
Hauwert, N, 2012, Dye Trace Simulation of an Accidental Spill, Phase 10: Highway 45 Southwest and MoPac South into the Barton Springs Segment of the Edwards Aquifer Travis County, Texas: City of Austin Short Report SR-13-01, 75 p.

2007 Surface Tracing to Barker Ranch #1 Cave Drips

-Traced 6 soil-covered sites 100 to 300 feet from cave entrance.

-Tracers from 4 out of 6 sites were detected in cave drip.

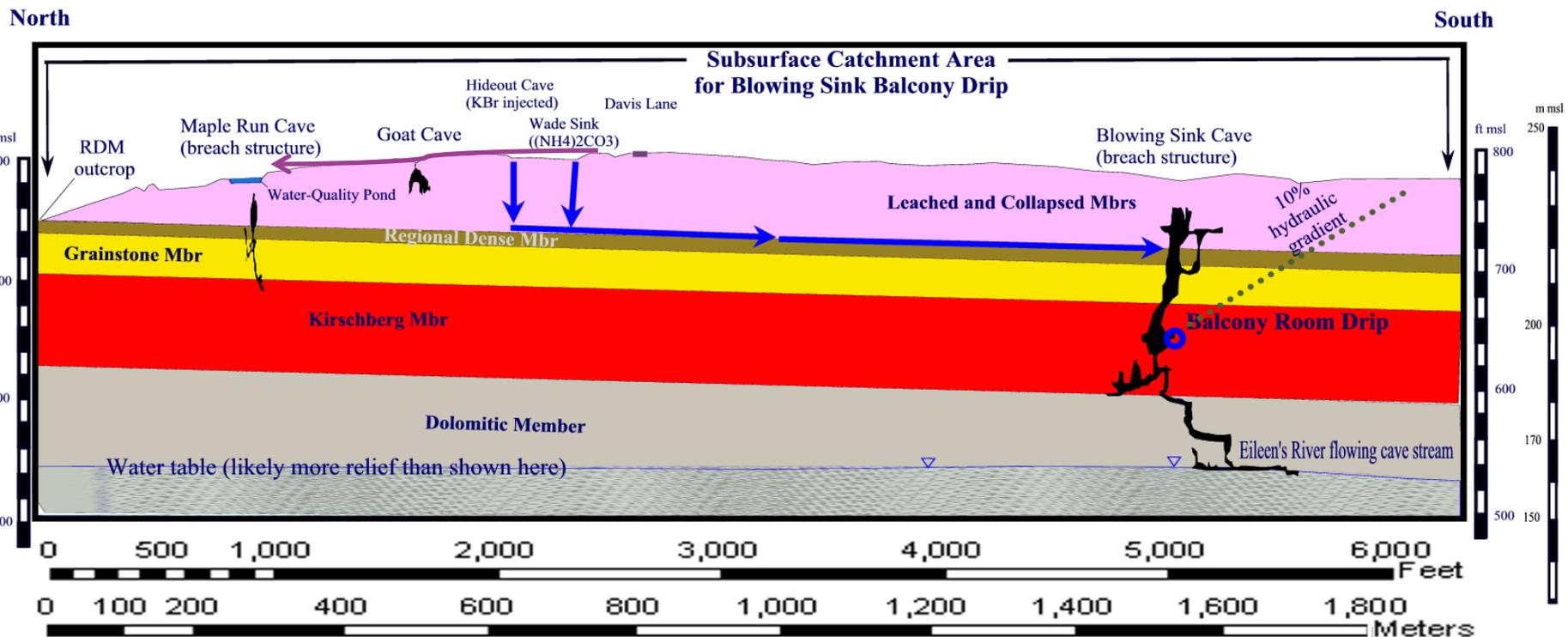
-Most work conducted by Brian Cowan (UT Geology/Zara Environmental).



Cowan, B. and Hauwert, N., 2013, Use of Physical and Chemical Response in Cave Drips to Characterize Upland Recharge in the Barton Springs Segment of the Edwards Aquifer, Central Texas, USA: 13th Sinkhole Conference, Carlsbad, NM. <http://www.karstportal.org/node/11735?destination=node/11735>

Davis Lane Realignment

- Tracing showed that roadway runoff infiltrates to Goat Cave, Maple Run, and Blowing Sink Caves.
- Drainage diverted to water-quality ponds in natural thick clay.
- Drip quality expected to improve even with more road traffic.



Drafted by Nico Hauwert, Ph.D, PG, Nov 2012

Purpose and Objective

- Flint Ridge Cave is included on a federal Balcones Canyonland Preserve (BCP) permit held by the City of Austin and Travis County.
- Cave species require clean sources of water.
- Adequate protection of the karst species and the 62 permit caves they inhabit is vital to allow infrastructure development and associated land disturbance in other areas of Travis County.
- The minimum protected area for a BCP permit cave is delineated by the combination of the surface and subsurface drainage basins for the cave.



Speodesmus sp.
Dr. William Elliott



Cicurina bandida
Photo by Dr. Jean Krejca



Rhadinexia austinica
American Museum of Natural History

Purpose and Objective (Continued)

- When these basins are not adequately delineated with hydrogeological studies, the surface contour interval representing the bottom of the cave is assumed to be the protection interval.
- A detailed understanding of subsurface drainage to Flint Ridge Cave is required to:
 - Ascertain the degree to which there may be adverse impacts to water quantity and/or quality from the construction and operation of SH45 SW; and
 - Determine the degree to which roadway design changes and construction management practices can be employed to avoid, minimize, and mitigate potential adverse impacts.
 - Assure that Flint Ridge Cave environmental integrity is adequately protected while not unreasonably requiring actions that may not benefit permit compliance.

Subsurface Catchment Area

- Defining infiltration source area to cave drips and streams

- Methods
 - Cave Drip Spatial Relations
 - Direct Tracing
 - Water Chemistry
 - Geological Framework
 - Local Breach Structures descending below drip horizon

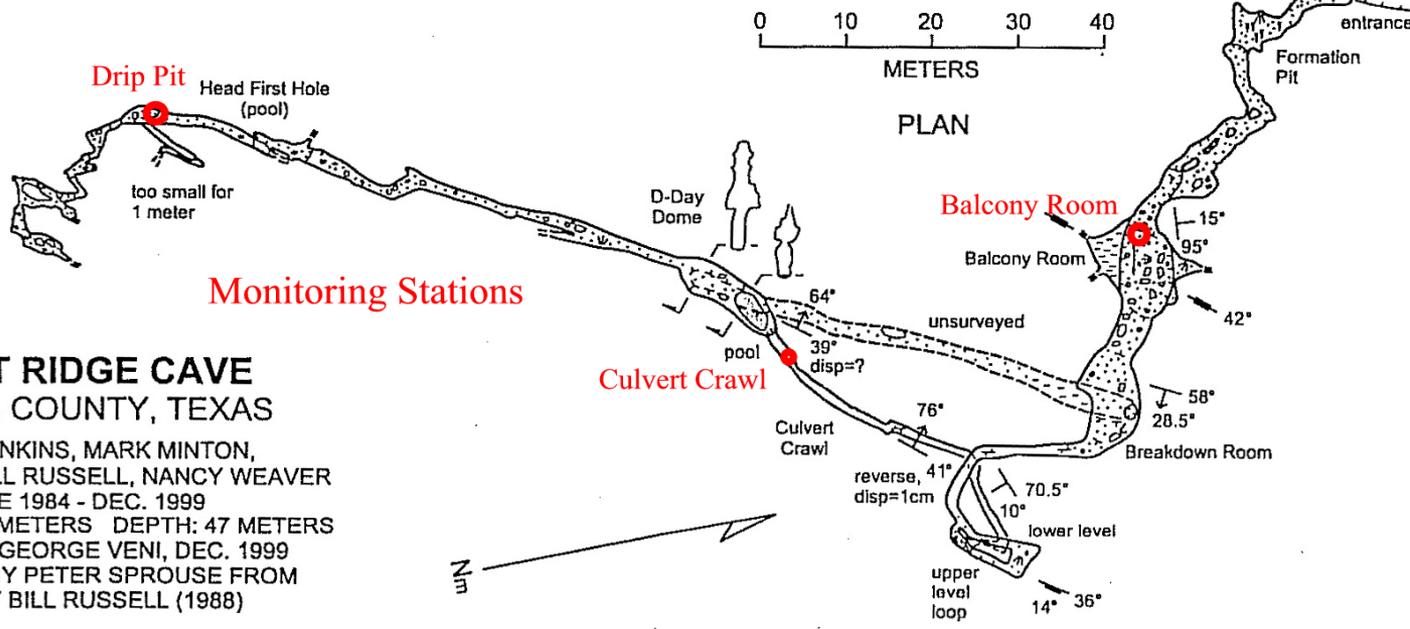
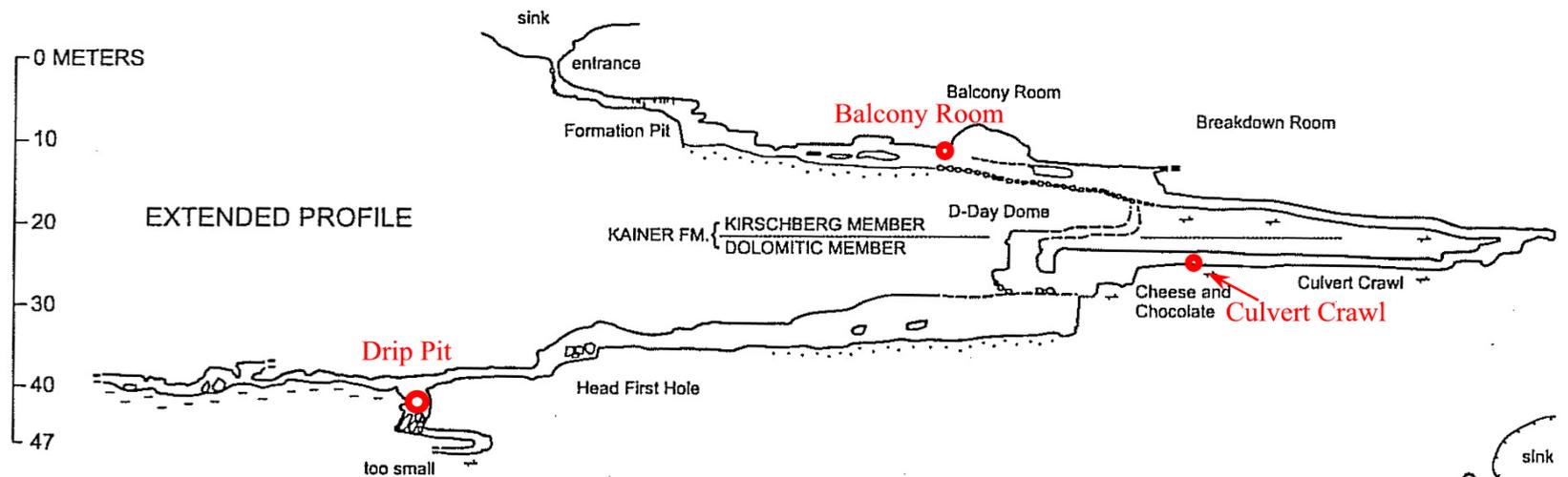
Hauwert, N., and Cowan, B. 2013, Delineating Source Areas To Cave Drips And Cave Streams In Austin Texas, USA: 13th Sinkhole Conference, Carlsbad, NM.
<http://www.karstportal.org/node/11735?destination=node/11735>



Schedule

Task	Begin	Complete
Cave Evaluation	3/24/2014	5/1/2014
Geological Mapping	3/24/2014	5/1/2014
QAPP prepared	3/1/2014	6/1/2014
Water-Quality Monitoring	6/1/2014	4/1/2015
Vadose Tracing	6/1/2014	1/31/2015
Final Report	2/1/2015	6/1/2015

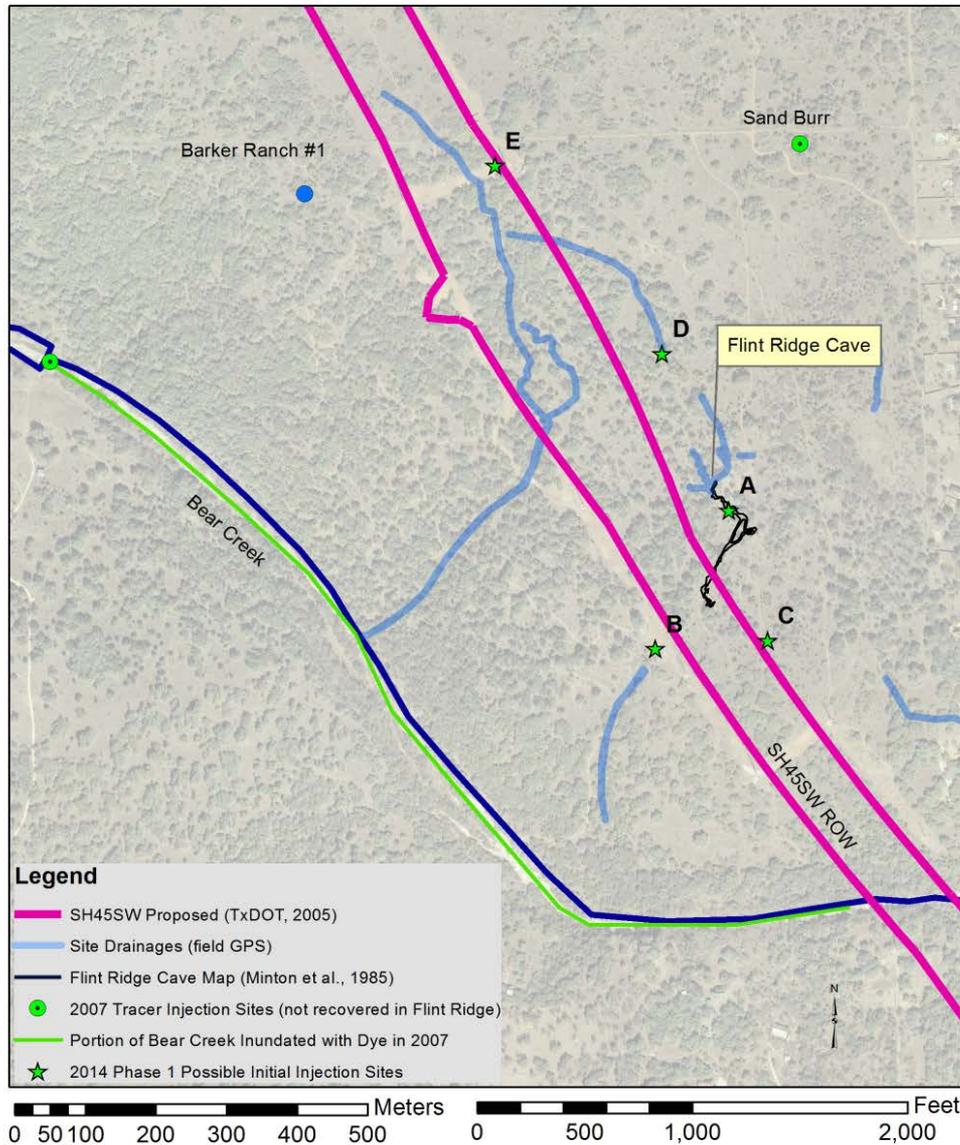
Proposed Monitoring Stations in Flint Ridge Cave



FLINT RIDGE CAVE TRAVIS COUNTY, TEXAS

JULIE JENKINS, MARK MINTON,
DALE PATE, BILL RUSSELL, NANCY WEAVER
JUNE 1984 - DEC. 1999
LENGTH: 316.4 METERS DEPTH: 47 METERS
GEOLOGY: GEORGE VENI, DEC. 1999
REDRAWN BY PETER SPROUSE FROM
MAP BY BILL RUSSELL (1988)

Study Area for Flint Ridge Cave Subsurface Catchment Delineation



Possible
Initial
Injection
Sites
(Phase 1 of 3)

END

