Developing a Cave Potential Map of Wind Cave to Identify Land Management Partners and Guide Land Management Decisions

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Abstract

The known boundaries of Wind Cave are continually being expanded, reflecting on-going exploration and survey work by cavers. Many threats to this expanding cave system exist, including pressure from development within the cave watershed, existing and future Park facilities and infrastructure, and surface land uses. Due to the existence of direct hydrological connections between surface gullies and the cave system, it is logical to base surface land management decisions on the potential of Wind Cave being located below any given point or within the cave watershed boundaries. However, the boundaries are not sufficiently well-defined at present to be used to guide land management decisions for Wind Cave National Park, except directly over known cave. To promote better surface land management decisions above the entire cave system, a cave potential map was developed. This map serves several purposes, including: (1) determining the likely maximum extent of the Wind Cave system, (2) refining knowledge of cave watershed boundaries, (3) identifying potential land management partners, (4) estimating the length of the cave, and (5) guiding future land management decisions. To develop the cave potential map, several data sets were gathered, including: (1) structural geological factors, (2) a contour map, (3) GIS-generated Triangular Irregular Network Data Sets, (4) plan and profile views of the cave survey, (5) cave radio location data, (6) geology map, (7) blowhole location map, (8) water table contour map, (9) orthophotoquads, and (10) land ownership maps. It was determined that two land managers, the National Park Service and the USDA-Forest Service, manage lands covering the potential scope of Wind Cave. The maximum potential boundaries derived indicate that 98% of Wind Cave lies within the current boundaries of Wind Cave National Park.