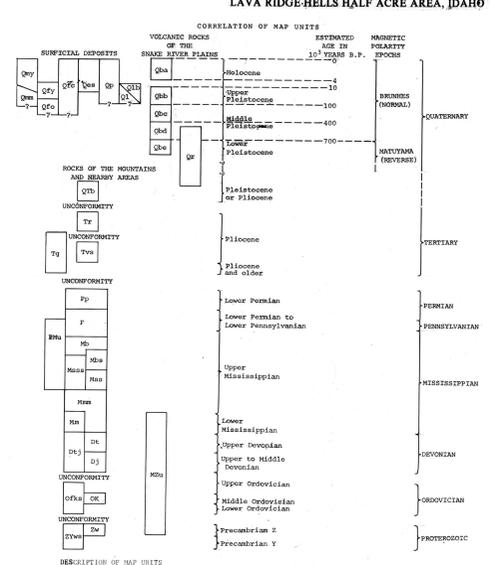
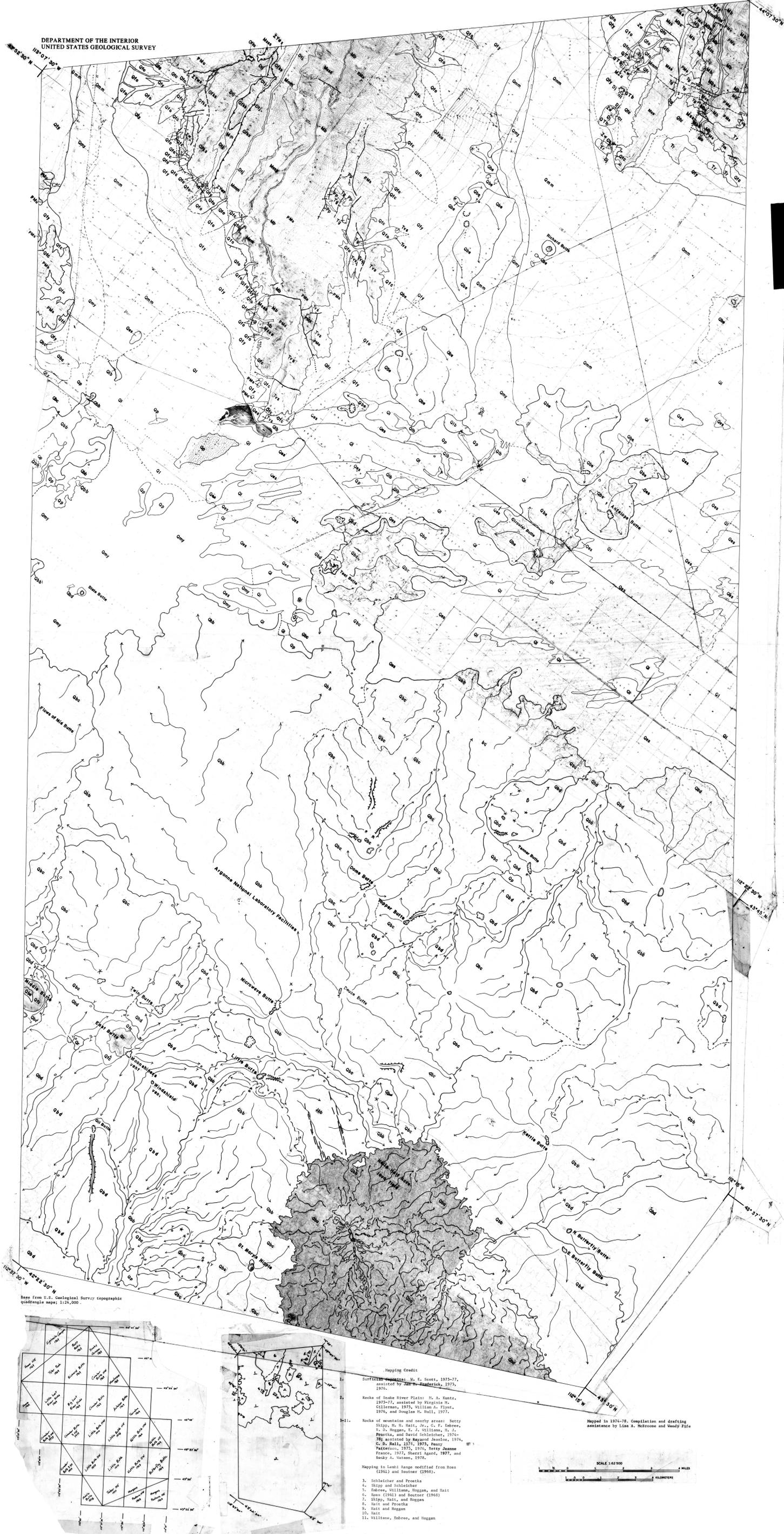


DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY



- DESCRIPTION OF MAP UNITS**
- ALUVIAL AND COLLUVIAL DEPOSITS**
- Qv Younger alluvium (Holocene to upper Pleistocene)—Pebbly sand and gravel, locally well sorted; moderately to well sorted; parallel bedding and cross-stratification. In area south of mouth of Little Lost River Valley, deposits are poorly sorted and clayey silt, which is thought to be poorly drained areas. Locally subject to flooding.
 - Qc Poorly sorted fan deposits of alluvium and colluvium (Holocene to middle Pleistocene)—Pebbly to boulder gravel, sand, and silt; poorly sorted; crudely bedded. On distal portions of larger fans become better sorted and stratified and grades to Qv. Fan draining areas of Little Lost River contain quartzite boulders as large as 3 m in diameter. Fragments of same in size from Holocene to middle Pleistocene but cannot be differentiated on map scale. Locally subject to flash flooding and debris flows, and mudflows. Includes talus of large, well-sorted boulders on the flanks of Scott Butte and Middle Butte.
 - Qm Older alluvium (middle Pleistocene)—Pebbly to boulder gravel, locally well sorted; moderately to well sorted; parallel bedding and cross-stratification. Upper 1 m or less of unit is sand and silt of alluvial and/or eolian origin. Forms low terraces, the top of which is less than 4 m above modern flood plain. Lower terraces are Little Lost River, Little Lost River, and Birch Creek only. Inundated by floods. Based on degree of soil formation and relation to outwash and moraines of Pinedale age observed north of map area, upper parts of unit appear to be of Pinedale age (about 50,000-100,000 years old).
 - Qy Younger fan alluvium (upper Pleistocene)—Pebbly and boulder gravel, locally bouldery near fan heads, with sand and silt; poorly to moderately sorted; moderately to well bedded with parallel bedding and cross-stratification. Degree of soil development suggests upper parts of unit are of Pinedale age. Locally include alluvium of Holocene age that is mostly confined to channels.
 - Qo Older fan alluvium (middle Pleistocene)—Pebbly and boulder gravel, locally bouldery near fan heads, with sand and silt; poorly to moderately sorted; moderately to well bedded with parallel bedding and cross-stratification. Degree of soil development suggests alluvium is greater than 100,000 yrs old. Locally includes small areas of Qc. Displaced by normal faults on side of Lava Ridge.
- WINDBLOWN DEPOSITS**
- Qes Silt and sand (Holocene to upper Pleistocene)—Very fine to coarse sand; well sorted; well stratified. Generally form longitudinal dunes with interdune areas of this sand sheet; locally forms transverse dunes. Dunes stabilized; local active areas of deflation and migrating dunes, particularly where ground cover disturbed by cultivation or construction. 1-5 m thick.
- MIXED ALUVIAL AND LAKESTRINE DEPOSITS**
- Qp Flays deposits (Holocene to upper Pleistocene)—Silt, clay, and sand, with minor gravel. Form flat to shallow depressions of less than 5 m that are laterally flooded. Locally contain stratified lacustrine deposits near centers of playas. Moderately sorted and stratified alluvium with scattered basalt boulders marginally. 1 to more than 10 m thick; commonly less than 3 m thick.
- LAKESTRINE DEPOSITS**
- Ql Lake-floor deposits (upper Pleistocene)—Silt, clay to sandy silt; moderately to well sorted; well bedded. Forms low-lying plain that was previously lake bottom. Lake Terevot, which formerly covered the volcanically formed basin in the north-central and northeastern parts of the map area, filled and was drained by runoff from drainages north of Lava Ridge and was coincident with Pinedale glaciation.
 - Qlb Shoreline deposits (upper Pleistocene)—Sand and silt and locally gravel; moderately to well sorted; well bedded. Includes deposits of beaches, bars, and deltas at margins of former lakes. Includes small areas of Qe. Also includes beach deposits of Holocene age associated with Big Lost River fans. Generally less than 5 m thick.
- VOLCANIC ROCKS OF THE SNAKE RIVER PLAIN**
- VOLCANIC ROCKS OF THE BRIDGES MAGNETIC POLARITY**
- Qba Basalt lava flow and related pyroclastic deposits (Holocene)—From unweathered gray to black, tubefed pahoehoe and minor amounts of a lava flow and of scoria, cinders, and ash of the Hills Half Acre lava field. All flows of this map unit were erupted from an elongated, fissure-controlled vent area. Two major lava tube systems fed pahoehoe lava flows that travelled from the vent area as much as 20 km to the south and southeast. Pyroclastic deposits occur within the main vent area and in small cinder cones and spatter ramparts located less than 1 m southeast of the main vent area. Based on radiocarbon methods on burnt soil obtained from beneath the flow at 4,100 ± 200 [±] yrs (R. Rubin, written comm., 1977).
 - Qbb Basalt lava flow and related pyroclastic deposits (upper Pleistocene)—Assigned to be 100,000 to 100,000 years old [±]—Dark-gray to black, tubefed pahoehoe lava flow and bedded, moderately oxidized scoria, cinders, and ash; locally covered by as much as 1 m of unmapped loess and silt. Flow of this map unit was erupted from three fissure-controlled vent areas (McGowan Creek, Little Lost River, and Kettle Butte) in the southeastern part of this map area. Flow is about 15 m east of Arco, Idaho, from which flow travelled as much as 25 m southeast toward here, in the west central part of this map area.
 - Qbc Basalt lava flow and related pyroclastic deposits (middle Pleistocene)—Assigned to be 400,000 to 700,000 years old [±]—Dark-gray to black, tubefed pahoehoe lava flow and bedded, moderately oxidized scoria and cinders, covered locally by as much as several meters of unmapped loess and silt. Flow of this map unit was erupted from fissure-controlled vent in the southeastern part of the map area (e.g., at Dome Butte, Topper Butte, Deuce Butte).
 - Qbd Basalt lava flow and pyroclastic deposits (middle Pleistocene)—Assigned to be 400,000 to 700,000 years old [±]—Gray to black, tubefed pahoehoe lava flow, vented by as much as several meters of unmapped loess and silt. Flow of this map unit was erupted from fissure-controlled vent in the central and southern parts of the map area.
- VOLCANIC ROCKS OF THE HAYMA MAGNETIC POLARITY**
- Qbe Basalt lava flow and related pyroclastic deposits (middle Pleistocene)—Older than 700,000 years [±]—Gray to black, tubefed pahoehoe basalt lava flow and oxidized pyroclastic deposits vented by as much as 10 m or more of unmapped loess, silt, sand, and alluvial deposits. Some lava flow of this map unit was erupted from fissure-controlled vents along old range-front faults, now inactive, on Lava Ridge on the east side of the Lava Ridge in the northwest part of the map area. Lava flow of this map unit are of reversed magnetic polarity; they were presumably erupted during the Matuyama magnetic polarity epoch.
 - Qc Rhyolite lava flow (related flow breccia) (middle to lower Pleistocene)—Chickenshewn to blocky, individual flow breccia of basaltic form a dome at East Butte (0.58 ± 0.09 m.y.; Armstrong and others, 1975). Also flow breccia consisting of coarse ash and angular clasts of rhyolite lava and scoria; form a small, unmaped flow between Middle Butte and East Butte (1.4 ± 0.0 m.y.; G. B. Halverson, U.S. Geological Survey, written comm., 1977).
- NOTE ON AGE DETERMINATION OF BASALT LAVA FLOWS:** Basalt lava flows have been assigned to age groups on the basis of a limited amount of geochronological data. Flow of map units Qba, Qbb, and Qbc are of normal magnetic polarity; they were erupted during the Matuyama magnetic polarity epoch and are thus younger than approximately 700,000 years. Flow of unit Qbe are of reversed magnetic polarity; they were presumably erupted during the Matuyama magnetic polarity epoch and are thus older than 700,000 years. Relative age relations have been determined from flow along contacts; older flows are covered by thicker deposits of loess and silt; and from assignment of flow to absolute age groups that exist radiometric age determinations.

- DESCRIPTION OF MAP SYMBOLS**
- CONTACT—Dashed where approximately located, particularly between beds that are weathered by thin deposits of eolian sand and loess. Dashed contact separates basalt flow units erupted from the same vent. "T" and "B" denote younger and older flows, respectively.
 - FLOW LINE—Linear flow features and lava tubes; arrow shows flow direction. Open symbol on flow line indicates flow line is open to the surface; closed symbol on flow line indicates flow line is closed to the surface.
 - LAVA CHANNEL—Depressions in lava flow that carried lava to flow front. Lava levees occur along margins of most channels.
 - LAVA FLOW—Shows crest of levees surrounding pooled accumulations of lava.
 - VENT—Outline of crater rim, dashed where approximately located. Tick marks on vent indicate depression, tick marks are not shown on symbol for small craters (less than 10 m diameter) in vent for Hills Half Acre lava field.
 - CONES—Small lava cones, cinder cones, and spatter cones.
 - ROCKPILE—Secondary source of lava not directly related to conical vent; magma to the surface from deep magma reservoir; chiefly openings in lava tubes.
 - FISSURE—Open fracture in rock, width generally less than 1 meter.
 - FAULT—Half and bar on downthrown block; dashed where approximately located, dotted where buried.
 - THRUST FAULT—Teeth on overlying plate.
 - LOW-ANGLE FAULT—Younger rocks on older rocks. May have gravity glide block. Teeth on overlying plate.
 - TRENCH SITE ACROSS ROCK SCARP—(1) Open trench (Omla, 1971); (2) Filled trench (for information contact of R. H. Hilt, Jr., U.S.G.S. Mail Stop 913, Federal Center, Denver, CO 80225).
 - CONNECTOR—Indicates same map unit.
- REFERENCES (and sources of stratigraphic, structural, and mapping information)**
- Armstrong, R. L., Lawson, W. P., and Wicks, H. R., 1975. Eole deltas, Outer Snake River, Idaho: volcanic rocks of the Snake River Plain. Idaho: American Journal of Science, v. 275, p. 225-250.
 - Bestler, R. C., 1968. Structure and tectonics of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-B, 11 p.
 - Bestler, R. C., 1971. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-C, 11 p.
 - Bestler, R. C., 1972. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-D, 11 p.
 - Bestler, R. C., 1973. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-E, 11 p.
 - Bestler, R. C., 1974. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-F, 11 p.
 - Bestler, R. C., 1975. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-G, 11 p.
 - Bestler, R. C., 1976. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-H, 11 p.
 - Bestler, R. C., 1977. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-I, 11 p.
 - Bestler, R. C., 1978. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-J, 11 p.
 - Bestler, R. C., 1979. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-K, 11 p.
 - Bestler, R. C., 1980. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-L, 11 p.
 - Bestler, R. C., 1981. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-M, 11 p.
 - Bestler, R. C., 1982. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-N, 11 p.
 - Bestler, R. C., 1983. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-O, 11 p.
 - Bestler, R. C., 1984. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-P, 11 p.
 - Bestler, R. C., 1985. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-Q, 11 p.
 - Bestler, R. C., 1986. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-R, 11 p.
 - Bestler, R. C., 1987. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-S, 11 p.
 - Bestler, R. C., 1988. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-T, 11 p.
 - Bestler, R. C., 1989. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-U, 11 p.
 - Bestler, R. C., 1990. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-V, 11 p.
 - Bestler, R. C., 1991. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-W, 11 p.
 - Bestler, R. C., 1992. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-X, 11 p.
 - Bestler, R. C., 1993. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-Y, 11 p.
 - Bestler, R. C., 1994. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-Z, 11 p.
 - Bestler, R. C., 1995. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AA, 11 p.
 - Bestler, R. C., 1996. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AB, 11 p.
 - Bestler, R. C., 1997. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AC, 11 p.
 - Bestler, R. C., 1998. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AD, 11 p.
 - Bestler, R. C., 1999. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AE, 11 p.
 - Bestler, R. C., 2000. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AF, 11 p.
 - Bestler, R. C., 2001. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AG, 11 p.
 - Bestler, R. C., 2002. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AH, 11 p.
 - Bestler, R. C., 2003. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AI, 11 p.
 - Bestler, R. C., 2004. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AJ, 11 p.
 - Bestler, R. C., 2005. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AK, 11 p.
 - Bestler, R. C., 2006. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AL, 11 p.
 - Bestler, R. C., 2007. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AM, 11 p.
 - Bestler, R. C., 2008. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AN, 11 p.
 - Bestler, R. C., 2009. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AO, 11 p.
 - Bestler, R. C., 2010. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AP, 11 p.
 - Bestler, R. C., 2011. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AQ, 11 p.
 - Bestler, R. C., 2012. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AR, 11 p.
 - Bestler, R. C., 2013. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AS, 11 p.
 - Bestler, R. C., 2014. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AT, 11 p.
 - Bestler, R. C., 2015. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AU, 11 p.
 - Bestler, R. C., 2016. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AV, 11 p.
 - Bestler, R. C., 2017. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AW, 11 p.
 - Bestler, R. C., 2018. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AX, 11 p.
 - Bestler, R. C., 2019. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AY, 11 p.
 - Bestler, R. C., 2020. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-AZ, 11 p.
 - Bestler, R. C., 2021. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-BA, 11 p.
 - Bestler, R. C., 2022. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-BB, 11 p.
 - Bestler, R. C., 2023. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-BC, 11 p.
 - Bestler, R. C., 2024. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-BD, 11 p.
 - Bestler, R. C., 2025. Geologic map of the Snake River Plain, Idaho. U.S. Geological Survey Bulletin 1100-BE, 11 p.

GEOLOGIC MAP OF THE LAVA RIDGE-HILLS HALF ACRE AREA, EASTERN SNAKE RIVER PLAIN, IDAHO

Mel A. Kuntz, William E. Scott, Betty Skipp, M. H. Hilt, Jr., Glenn F. Embree, Roger D. Hoggan, and E. J. Williams
1979