State of Oregon
Department of Geology and Mineral Industries
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Open-File Report O-08-01

PRELIMINARY GEOLOGIC MAP OF THE SPENCER CREEK 7.5' QUADRANGLE, KLAMATH COUNTY, OREGON

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2008

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Oregon Department of Geology and Mineral Industries Open-File Report O-08-01
Published in conformance with ORS 516.030

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Introduction

The Spencer Creek quadrangle, Klamath County, Oregon, has as its centerpiece Spencer Creek, one of the few perennial streams in this segment of the southern Cascade Mountains. Also unusual is the north-south orientation of the Spencer Creek drainage basin, specifically the John C. Boyle Reservoir, which extends from Buck Lake in the north to the Klamath River in the south. This quadrangle occupies predominantly low terrain between Surveyor Mountain and Buck Mountain to the west and the Aspen Butte – Little Aspen Butte – Clover Butte ridge to the east. Topographically, the elevation ranges from 1156 m, the water level under normal conditions at the John C. Boyle Reservoir, to 1695 m, the summit of Clover Butte in the northeast corner of the quadrangle.

The Klamath Falls to Ashland highway, Oregon Route 66, cuts across the southern part of the Spencer Creek quadrangle. Two paved access roads trend northwest-southeast, as does the pervasive faulting in this quadrangle. These roads connect the Dead Indian Memorial highway with Route 66 and are used mainly by outdoor enthusiasts, tourists, and loggers. Generally, the extrusive rocks are the oldest to the west-southwest (Middle to Late Pliocene, 3.6 to 1.806 Ma) and are progressively younger to the east (Middle Pleistocene, 0.781 to 0.126 Ma) (Gradstein and others, 2004).

In Aspen Lake quadrangle (the adjoining quadrangle to the north; see Figure 1), a steep east-facing mountain front formed by the linear arrangement of Mt. Harriman on the north end with Aspen Butte – Little Aspen Butte – Clover Butte to the south, is part of an uplifted fault block called a horst. The actual fault extends parallel to the mountain front in a N 10º to 20º W direction. To the east of the up-faulted ridge, which has 500 to 1000 m of relief over the surrounding terrain, is a structural valley known as a graben. This down-dropped fault block, drained of its shallow lakes and marshes, is currently home to productive pastureland and hay fields north and west of Klamath Falls. The actual fault plane itself does not break the land surface; rather, it is buried beneath a blanket of sediment that is being shed from the Aspen Butte – Little Aspen Butte fault-block ridge. At the intersection of mountain slope and valley floor several alluvial fans have developed. Similar faulting activity has sliced through many of the stratigraphic units in the Lake of the Woods South quadrangle. The strikes of the faults become more northwesterly from the east side of the Spencer Creek quadrangle to the west. Buck Lake and Spencer Creek are located at the low point of the depression, or graben, between several horst blocks, with Surveyor and Buck Mountain on the west side and Aspen Butte and Little Aspen Butte to the east side.

Within the Spencer Creek quadrangle are six excavated pits that supplied primarily road-building material. All but one of the pits are cinder pits marking volcanic vents of various geologic ages. These pits mostly contain poorly lithified layers of pyroclastic material, namely, volcanic ash, lapilli, and bombs/blocks (in order of increasing physical size) that can be relatively easily crushed and screened for the most usefully sized fragments. Excavation of these pits has revealed some lava flows, and, in one or two instances, has intersected a dike or dikes that brought magma to the Earth’s surface from plutons located at a depth of a few kilometers. The shallow pluton-dike-vent structure is only the uppermost segment of a rather complex magma plumbing system that extends 50-125 km below the surface (Blatt and

Others, 2005, see chapters 1 and 4). The solitary exception is a “hard-rock” quarry that is excavated into lava flows of platy andesite and is located near the east-west connector between the Clover Creek access road and the Keno access road in the central part of the quadrangle.

Two unusual geologic features occur within the Spencer Creek quadrangle; in fact, they are geographically juxtaposed to one another. The first feature consists of unconsolidated terrace-forming sands and gravels (see Qg on the map). These materials crop out along and are cut by the Keno access road west of Spencer Creek and north of the Ashland–Klamath Falls highway. At this locale is the present-day surface of the sediment has been visibly modified by periglacial/permafrost activity, forming “patterned ground,” that is, stone rings and polygons. See Figures 2 and 3 for graphic evidence. Pebbles and cobbles of volcanic rock were rounded and smoothed by stream activity before deposition and subsequently have been modified by significant permafrost activity into stone rings and polygons. This activity likely occurred 18,000 to 25,000 years ago at the time of the last glacial maximum, often referred to as the Late Wisconsin glacial advance and retreat. The second feature is located directly south of the Qg deposits described above and consists of two tuff cones that formed as a result of interaction between basaltic magma and ground water or surface water, perhaps the ancestral Klamath River. Direct contact between 1100-1200°C basaltic magma and water produces violent steam explosions that fragments and rapidly chills magma into coarse sand-sized particles plus a few larger pieces known as bombs. These bombs can form bomb-sags when they impact saturated volcanic sediment (see Figures 4 and 5). This style of volcanic eruption is often referred to as phreatomagmatic or hydrovolcanic (Fisher and Schmincke, 1984). Chemical analysis of several bombs from the tuff cones indicates they are quite similar to other samples from the Basalt of Buck Lake; as a result, these tuff rings have been included with this stratigraphic unit.

A comment on nomenclature: when geoscientists classify igneous rock samples they often use two classification schemes. One scheme is based on identifying the visible minerals in a hand sample (a modal mineral classification); the other is based on a chemical analysis of that sample (a chemical classification of igneous rocks; see Figure 6 as an example). Chemical classification is more precise and rigorous; hand specimen classification is looser and more open to opinion. The most common volcanic rock types (basalt, basaltic andesite, andesite, dacite, rhyolite) define a sequence in which the iron- and magnesium-bearing silicate minerals (olivine, orthopyroxene, clinopyroxene, hornblende, biotite) are most abundant on the left side of the sequence, forming 50-60 percent of the minerals present, and decrease to nearly zero on the right, namely, in rhyolite. The remaining 40-50 percent of the rock consists mostly of plagioclase feldspar, a non-iron- and non-magnesium-bearing silicate mineral, plus a few percent of chromium, iron, and titanium dominated oxide minerals. Silica (SiO_2) increases from basalt to rhyolite and correlates directly with increasing viscosity and greater explosivity.

Table 1, which accompanies the geologic map of the Spencer Creek quadrangle, contains chemical and age data for all analyzed rock samples. Figure 1 depicts the location of all samples for which age dates exist, both within the Spencer Creek quadrangle and immediately adjacent to it. Adjacent age dates are provided because they are from extensions of the volcanic rock units found within the Spencer Creek quadrangle. The goal is show all the ages for each volcanic unit discussed in the Explanation of Map Units. Figure 6 is a total alkali ($Na_2O + K_2O$) versus SiO_2 diagram that summarizes the rock types that are most germane for the volcanic materials present in this quadrangle. In addition, chemical data are displayed for each stratigraphic unit defined below using an individualized symbol that is summarized in the legend accompanying Figure 6. Mertzman (2000) and Mertzman (unpublished data, 2007) provide many new age dates, derived from both whole-rock K-Ar and $^{40}Ar/^{39}Ar$ methods, that have been measured through October 2007.

Explanation of Map Units

Surficial Units

Qal Alluvium (Holocene) Unconsolidated sediment found in close proximity to modern drainages.

Qg Undifferentiated colluvium and alluvium (Holocene and Pleistocene) Unconsolidated sediment whose origin is related to glacial activity. In this instance the sediment owes its origin to fluvial activity and was subsequently modified by periglacial/permafrost activity.

Qs Lacustrine deposits (Holocene and Pleistocene) Unconsolidated sediment found in association with the Aspen “Lake” enclosed basin.

Volcanic Rocks

Qbv, Tbv Basaltic to basaltic andesite vent deposits (Pliocene to Pleistocene) Poorly lithified to unconsolidated lapilli to ash-sized cinders, black to brown to red, with lesser amounts of similarly colored lava spatter, bombs, and scoria. These deposits mark volcanic vents areas that are often cinder cones.

Qbrl Basalt of Round Lake (Middle Pleistocene) One vent of this unit occurs in the extreme southeast corner of the Aspen butte quadrangle. Additional vents stretch out in a linear array to the southeast into the Keno quadrangle, culminating in Round Lake Hill, the focal point for this extrusion event. The lava is medium gray, somewhat diktytaxitic with 3 to 5 percent glomeroporphyritic clumps of olivine and plagioclase 0.5 to 2 mm across, as well as individual phenocrysts of the same minerals. This lava consists on average of 50 percent plagioclase, 25 percent clinopyroxene that is mostly confined to groundmass status, 20 percent olivine, some of which is partially altered to iddingsite, and 5 percent titanomagnetite. In terms of sample geochemistry this unit is most similar to the Basalt of Denny Creek; that is, a low-silica, high-alumina, relatively low K_2O basalt. One $^{40}Ar/^{39}Ar$ age date, 0.45 ± 0.17 Ma, is available for a sample just off the Aspen Lake map in the Keno quadrangle (see Hladky and Mertzman, 2002).

Qbaa Basaltic Andesite of Aspen Butte (Lower to Middle Pleistocene) Nearly one half of the adjoining Aspen Lake quadrangle is covered by medium gray, aphanitic, platy, basaltic andesite that originated from Aspen Butte and Little Aspen Butte and poured down into the northeast corner of the Spencer Creek quadrangle. The lavas from these two volcanoes are indistinguishable in hand specimen and have very similar major and trace element geochemistry. They have 2 to 5 percent, small (1 to 2 mm) phenocrysts of fresh green olivine, plagioclase, and orthopyroxene, both in clumps and as separate crystals, immersed in a fine-grained aggregate of the same minerals together with titanomagnetite and clinopyroxene. Plagioclase is the most abundant mineral. Two whole-rock K-Ar age dates are available for this stratigraphic unit; however, neither is located within the Spencer Creek quadrangle. Both are from the adjoining Aspen Lake quadrangle. The two age dates suggest Aspen Butte basaltic andesite volcanism occurred over several hundred thousand years, specifically from 0.86 ± 0.02 Ma to 0.47 ± 0.04 Ma. Late Pleistocene glaciation has substantially modified the summit region of Aspen Butte and has clearly exposed numerous interbedded layers of lava and pyroclastics, thus confirming that Aspen Butte is a composite volcano. Glacial erosion has been sufficiently intense that the conduit has been exposed. The conduit can be easily recognized by the much coarser grained texture of the constituent rock, clearly marking the slower rate of cooling for this intrusive mass. Little Aspen Butte, situated nearly 300 m lower in elevation, has not been glaciated in any substantial way.

Qbac Basaltic Andesite of Clover Butte (Lower Pleistocene) If no absolute age data were available for this unit and only field evidence existed, it would be difficult to determine if lava and pyroclastics from vents related to this unit lie on top of Little Aspen Butte lavas and are therefore younger in age or vice versa. Although Clover Butte is the dominant volcanic source point, it is part of a fissure system that extends for more than a mile along a N 20º W orientation. A line of that same orientation to the north and west passes through Little Aspen Butte and Aspen Butte, thus suggesting a significant fracture in the Earth's crust controls the location of these Middle to Late Pleistocene basaltic andesite volcanic vents. This N 10º to 20º W fracture-forming event could be associated temporally with the advent of Basin and Range tectonism in this part of southern Oregon. Pyroclastic samples ranging from cinders and lapilli to bombs are all relatively aphyric with only 1 to 2 percent small phenocrysts 0.5 to 1.5 mm in diameter. Plagioclase is much more abundant than iddingsitized olivine, the only two visible minerals present in these vesicular variably oxidized volcanic materials. Lavas contain 5 to 7 percent phenocrysts that are 1 to 2 mm in diameter with plagioclase much more abundant than olivine. No pyroxene is evident. Much incipient platy jointing is noticeable on the outcrop, which is a clue that this material is more siliceous than typical basalt. One $^{40}Ar/^{39}Ar$ age date, 1.12 ± 0.07 Ma, is available for the Basaltic Andesite of Clover Butte. The Basaltic Andesite of Clover Butte is clearly older than the Basaltic Andesite of Aspen Butte and therefore forms a kipuka of older volcanic rock surrounded on all sides by younger material.

Qbbp Basalt of Buck Peak (Lower Pleistocene) The volcanic source point for the lavas of this unit is located the southwest corner of the Aspen Lake quadrangle. On freshly broken surfaces the lava has 10 to 15 percent small (1 to 3 mm) phenocrysts of plagioclase and green olivine, some iridescent due to oxidation and partial alteration to iddingsite, with the plagioclase consistently more abundant than olivine. Pyroxene is confined to the matrix of the sample. Basalt of Buck Peak flows are higher silica basalts (50 to 53 weight percent) and as a result are found as thicker lava flows less extensive in nature that may be vesicular in texture but never diktytaxitic. As an example, the Basalt of Buck Peak is easily distinguishable from the Basalt of Keno based solely on texture. The Basalt of Keno is lower in silica (47 to 48 weight percent SiO_2) and has a lower viscosity that results in the formation of a diktytaxitic texture, which is an important distinguishing characteristic. A $^{40}Ar/^{39}Ar$ age date of 1.45 ± 0.01 Ma from a sample of this material from the southeast corner of the Lake of the Woods South quadrangle indicates these lavas were extruded in the Lower Pleistocene.

Qbar Basaltic Andesite of Roma (Lower Pleistocene) In the northeast quadrant of the Spencer Creek quadrangle are several volcanic hills that are truncated by a series of NW-SE trending faults. These hills are scoria/cinder cones from which emanated lava flows of mostly basaltic andesite, but several are sufficiently low in silica content to cross the composition boundary and therefore are termed basalt. Hand samples are medium gray to bluish-gray and are often broken off outcrops in which an incipient platiness is clearly evident. This feature is known as flow jointing and is the result of lava cooling and becoming increasingly viscous before flowage finally is halted. Imagine a deck of playing cards with each card slipping past the one below it, then freezing, with the one above it still able to move a short distance before it freezes into immobility and so on. Samples are characterized by 5 to 15 percent plagioclase phenocrysts ranging in diameter from 1 to 2 mm. Green olivine, sometimes marginally altered to dark brown iddingsite, is much less abundant, forming only 1 to 2 percent of the volume of the sample. Pyroxene is rarely seen as small phenocrysts and is invariably confined to the sample matrix. One salient characteristic of the matrix of Basaltic Andesite of Roma lavas is the presence of elongate tabular to acicular plagioclase crystals, 0.2 to 0.5 mm in length. Samples taken from flow interiors are mostly devoid of vesicles, whereas samples taken closer to the margins of a lava flow are pervasively vesicular, with the vesicles typically being secondary mineral free. One $^{40}Ar/^{39}Ar$ age, 1.46 ± 0.05 Ma, is available for the Basaltic Andesite of Roma.

Qbbl Basalt of Buck Lake (Lower Pleistocene) Lavas belonging to this unit were erupted from fissures aligned in a similar direction to the conspicuous NNW-SSE normal fault that cuts through the Lake of the Woods South quadrangle. Typical hand samples are medium gray to bluish gray, predominantly aphanitic with only several percent of 1- to 3-mm diameter phenocrysts that are primarily olivine, partially converted to iddingsite, and plagioclase. In order of decreasing abundance plagioclase, pyroxene, and opaque minerals dominate the matrix that is that is often finely vesicular, spongy almost but not quite diktytaxitic. Near the flow surfaces, larger, nearly spherical, vesicles up to 1 cm in diameter are thinly lined by cryptocrystalline material but are devoid of any secondary mineralization. Even though the radiometric ages for the Basalt of Buck Lake and the Basalt of Buck Peak are identical when analytical error is taken into account, the Basalt of Buck Lake is older on the basis of field data. Lava flows from Buck Peak flowed to the west and southwest and came in contact with earlier formed flows of the Buck Lake unit and were deflected in a southeast direction. Three $^{40}Ar/^{39}Ar$ age dates and one whole-rock K-Ar age date are available to document the timing of the Buck Lake volcanic activity. Three samples are from the Spencer Creek quadrangle, and one is from the Lake of the Woods South quadrangle (see sample 99-62), which is located adjacent to the Spencer Creek quadrangle to the northwest (see Figure 1). The four age dates range from 1.48 ± 0.10 to 1.19 ± 0.11 Ma.

Qbsc Basalt of Spencer Creek (Lower Pleistocene) The hill labeled 4728T in the east-central part of the Spencer Creek quadrangle is the point source for the Basalt of Spencer Creek. It is large scoria cone from which basaltic lavas were extruded. They flowed predominantly to the west and south of the vent area. Subsequently the vent area was cut by several faults that trend NW-SE. Hand samples are mostly medium gray, finely vesicular but definitely not diktytaxitic, with 10 to 12 percent plagioclase phenocrysts that range between 1 and 2 mm in diameter. Smaller-sized green olivine phenocrysts, about 1 mm in diameter, are less abundant, constituting only 3 to 5 percent of the sample volume. Some olivine crystals are iridescent, indicating that they have suffered some high-temperature oxidation. One petrographic characteristic of Basalt of Spencer Creek hand samples is the presence of 5 to 10 glomeroporphyritic clumps of plagioclase and olivine crystals. These clumps are 3 to 5 mm in diameter. The matrix is dominated by plagioclase and pyroxene, together with much smaller amounts of olivine and titanomagnetite. One $^{40}Ar/^{39}Ar$ age, 1.50 ± 0.01 Ma, is available for the Basalt of Spencer Creek.

Tpbas Basaltic Andesite of Surveyor Mountain (Upper Pliocene to Lower Pleistocene) This voluminous basaltic andesite unit is widespread in both the Spencer Creek and Surveyor Mountain quadrangles. Lavas of this unit are typically medium gray, darker toward the more vesicular tops and bottoms of lava flows, and have 5 to 7 percent, 1- to 2-mm diameter, phenocrysts of plagioclase and olivine. The matrix is characteristically aphanitic with scattered pinhead-sized vesicles present. Plagioclase dominates the matrix together with both orthopyroxene and clinopyroxene and scattered titanomagnetite granules. The elongate plagioclase crystals in the matrix are often flow aligned, producing what is termed a trachytic texture. Platy jointing is a fixture on the outcrops of this unit; plates average 3 to 5 cm thick. Dendrites of pyrolusite (MnO_2) often are found as staining on the flow joint planes. The Basaltic Andesite of Surveyor Mountain has been cut by several predominantly normal faults trending NW-SE, forming a classic fault-block mountain analogous to the Grand Teton Mountain front in Wyoming. The down-dropped blocks are located on the east-northeast sides of the faults and form the lowland in which Buck Lake and the Spencer Creek drainage reside. One $^{40}Ar/^{39}Ar$ age date, 1.98 ± 0.05 Ma, and one whole-rock K-Ar age date, 1.88 ± 0.22 Ma, are available for the Basaltic Andesite of Surveyor Mountain. The $^{40}Ar/^{39}Ar$ age date is from a Little Chinquapin Mountain quadrangle sample, and whole-rock K-Ar age is from a Surveyor Mountain quadrangle sample.

Tpbke Basalt of Keno (Upper Pliocene to Lower Pleistocene) The best exposures of the Basalt of Keno can be found along the Klamath River upstream from the reservoir impounded behind the John C. Boyle dam. It is surrounded by younger Basalt of Spencer Creek lava flows on the north side of the Klamath River, while on the south side of the river the Basalt of Keno laps up against the older Basaltic Andesite of Chase Mountain. The Basalt of Keno extends further to the east into the Keno quadrangle (Hladky and Mertzman, 2002). Rock specimens are light to medium gray and vesicular, with the vesicles often stretched out in the direction of flow. They are invariably aphanitic with virtually no grain larger than 1 mm in diameter. In thin section these lavas contain nearly 50 percent plagioclase feldspar, 20 percent olivine with some chromite inclusions, 20 to 25 percent clinopyroxene, and a few percent of opaque minerals, most likely titanomagnetite. Those mineral grains that are to some extent elongate in shape are aligned nearly parallel to one another due to post crystallization flowage down slope under the influence of gravity. The chemistry of several these basalts indicates they have very low alkali element content (K and Rb) and high Al_2O_3 and MgO, characteristics that make these lavas quite similar to mid-ocean ridge basalt (MORB). The much younger Basalt of Burton Butte has those same chemical attributes, too, while some the lavas that constitute the older Basalt of Penny Spring also resemble MORB. At least with respect to the Lake of the Woods South quadrangle the underlying crust and mantle has been capable of producing basaltic lavas with MORB-like chemistries and mineralogies for at least 2.5 m.y. One whole-rock K-Ar age, 2.0 ± 0.3 Ma, is available.

Tpbtr Basalt of Tom Reservoir (Upper Pliocene) The geographic feature “Tom Reservoir” is located a few miles to the southwest from the southwest corner of the Spencer Creek quadrangle. Light gray aphanitic lava, often denoted by two distinct sizes of vesicles, the larger 3 to 10 mm in diameter and the smaller the size of a head of a pin, gives each hand sample a spongy appearance. This latter physical characteristic is defined as a diktytaxitic texture. If samples are magnified through a hand lens, plagioclase feldspar grains projecting in and through the walls of the vesicle can be seen. In hand sample these diktytaxitic basalts are fine grained, with all mineral constituents $\leq$ 1 mm in diameter. With regard to physical appearance, either plagioclase feldspar or olivine may form slightly larger crystals and therefore be more noticeable. Plagioclase forms nearly 50 percent of these lavas, while olivine constitutes 20 to 25 percent and clinopyroxene another 20 percent. The remaining 5 to 10 percent is made up of spinel/chromite, most often seen as inclusions in early formed olivine crystals and titanomagnetite found scattered about in the matrix together with the clinopyroxene.

Fieldwork has confirmed that all of the lava flows that constitute the Basalt of Tom Reservoir have been extruded from dikes vented onto the Earth’s surface. These fissure-erupted lava flows follow a gully pattern, forming ribbons of lava that do not necessarily coalesce to form sheet-like masses. Several millions of years of erosion make it devilishly difficult to trace some of these “lava streams” back to their vents. One $^{40}Ar/^{39}Ar$ age, 2.49 ± 0.06 Ma, and two whole-rock K-Ar ages, 2.27 ± 0.24 and 2.26 ± 0.26 Ma, are available for the Basalt of Tom Reservoir. The $^{40}Ar/^{39}Ar$ age comes from a sample located in the Spencer Creek quadrangle (see 00-91); the two whole-rock K-Ar ages are from Mule Hill quadrangle samples to the southwest.

Tpbacm Basaltic Andesite of Chase Mountain (Upper Pliocene) Chase Mountain is located to the southeast in the Hamaker quadrangle. It and Hamaker Mountain are large Pliocene composite volcanoes with several thousand feet of relief over a countryside that averages approximately 4000 feet in elevation. Rock samples of Chase Mountain basaltic andesite are medium gray and have 10 to 12 percent plagioclase feldspar in grains that range from 1 to 3 mm in diameter. Of similar size or smaller are three ferromagnesian minerals and one opaque oxide phase. Olivine is the least abundant ferromagnesian mineral, ranging between 1 and 2 percent, often with rims of orthopyroxene and a few scattered inclusions of an opaque mineral. Orthopyroxene (hypersthene) and clinopyroxene (augite) constitute the bulk of the ferromagnesian mineral assemblage (20 to 25 percent), and in thin section one noteworthy characteristic is that many of the elongated tabular orthopyroxene crystals have thin and in some case discontinuous margins of clinopyroxene. This textural feature indicates the orthopyroxene crystallized from magma first and was followed later by crystallization of clinopyroxene. Plagioclase feldspar crystals dominate the matrix and fill in much of the available space between the phenocryst-forming minerals. Well-formed (subhedral to euhedral) small phenocrysts of titanomagnetite 0.5 to 1 mm in diameter form 2 to 4 percent of these lavas. One whole-rock K-Ar age date, 2.51 ± 0.07 Ma, is available for the Basaltic Andesite of Chase Mountain. The sample originates from the Hamaker Mountain quadrangle.

Tpbps Basalt of Penny Spring (Upper Pliocene) This volcanic unit is located in the southwest corner of the Spencer Creek quadrangle and extends into the adjoining quadrangles of Chicken Hills and Mule Hill. This region has been sliced by several NW-SE trending predominantly normal faults that clearly postdate the volcanic activity. The Basalt of Penny Spring crops out along the south to southeast margin of the somewhat older Pliocene Buck Mountain basaltic andesite composite volcano. Lava flows of the Lower Pleistocene Basalt of Buck Lake surround the Penny Spring unit to the east-southeast; thus, confirming that the Basalt of Buck Lake is younger in age. This evidence suggests an evolutionary magmatic pattern in which **the younger lavas are** more basaltic (less silica-rich) than their older counterparts. Basalt predominates over basaltic andesite by a small margin in the Basalt of Penny Spring; nothing more siliceous is present in this stratigraphic unit. Hand samples of the Penny Spring Basalt are medium to dark gray and range from having 5 to 10 percent olivine phenocrysts, partially altered to dark brown iddingsite, with a lesser amount of plagioclase, to having 5 to 10 percent plagioclase phenocrysts with a lesser amount of olivine. In each case the matrix is dominated by a nearly equal mix of plagioclase and pyroxene with only minor amounts of both olivine and titanomagnetite. One $^{40}Ar/^{39}Ar$ age date, 2.54 ± 0.05 Ma, is available for the Basalt of Penny Spring.

Tpbab Basaltic Andesite of Buck Mountain (Middle Pliocene) The Buck Mountain composite volcano is centered in the southeast section of the adjoining Surveyor Mountain quadrangle (see Figure 1) and is segmented by NW-SE trending normal faults. Most of the lava flows within this unit are medium gray, moderately porphyritic basaltic andesite, but several basaltic lava flows intercalated. Phenocrysts constitute 10 to 12 percent of a typical hand specimen, forming 1- to 3-mm diameter crystals that are dominated by plagioclase with olivine constituting only 3 to 4 percent. The olivine has been marginally altered to iddingsite, which also permeates through fractures present in the crystals. In the more mafic basaltic lavas, olivine is the more abundant phenocryst-forming phase and plagioclase is secondary. In either instance, the matrix is dominated by plagioclase with a smaller amount of pyroxene, both ortho- and clinopyroxene, together with approximately 5 to 10 percent titanomagnetite and 3 to 5 percent olivine. Much of the matrix-forming plagioclase is lathlike to acicular in crystal form. One whole-rock K-Ar age date, 2.76 ± 0.16 Ma, is available for the Basaltic Andesite of Buck Mountain and was determined on a sample from the adjacent Surveyor Mountain quadrangle (see Figure 1). It is abundantly clear that the pervasive faulting that cuts through both Buck Mountain and Surveyor Mountain postdates the last eruptions associated with both these volcanoes. Therefore the faulting activity must be < 1.8 Ma and Pleistocene in age.

Tpbak Basaltic Andesite of Kent Peak (Middle Pliocene) Younger volcanism and faulting has severed the Kent Peak extrusive rocks into two distinct areas on either side of the

Surveyor Mountain NW-SE extending ridge. Kent Peak is a small composite volcano. Its vent has been the point source of both lava flow extrusion and ejection of pyroclastic debris. Plagioclase feldspar forms 10 to 15 percent phenocrysts in the typical hand specimen. These crystals are 1 to 3 mm in diameter and quite commonly are tabular to lathlike in shape. The amount of visible olivine varies from 1 to 5 percent among the Kent Peak lava flows. Olivine has been altered in varying degrees, with some crystals showing minor serpentine or iddingsite along fractures/cracks while other crystals are surrounded by a corona of these secondary minerals. The olivine phenocrysts range from 1 to 2 mm with scattered poikilitic inclusions of spinel and have reacted with the surrounding magma at the time the lava was solidifying to form coronas or rims of the mineral pyroxene, most frequently orthopyroxene. Plagioclase and pyroxene dominate the matrix mineralogy with 7 to 8 percent granular subhedral opaque oxide crystals, 0.1 to 0.2 mm in diameter, peppered through the rocks, quite noticeable when a thin section of a Kent Peak lava flow is observed with a petrographic microscope. Two whole-rock K-Ar ages, 2.81 ± 0.14 Ma and 2.78 ± 0.10 Ma, and one $^{40}Ar/^{39}Ar$ age, 2.74 ± 0.03 Ma, are available from Kent Peak related volcanic rocks. All three samples, 94-4, 94-36, and 99-78, respectively, are located in the adjacent Surveyor Mountain quadrangle.

Tpbac Basaltic Andesite of Camp Creek (Lower to Middle Pliocene) This unit can be found in the far southwestern corner of the Spencer Creek quadrangle and spreads out westward into both the Mule Hill and Surveyor Mountain quadrangles (see Figure 1). Hand samples are characteristically light to medium gray and have 20 to 25 percent plagioclase phenocrysts that are 1 to 4 mm in diameter. Besides being notable for the pronounced porphyritic texture, these basaltic andesite lavas are somewhat unusual in that they contain nearly equal amounts of olivine and clinopyroxene phenocrysts (2 to 3 percent of each mineral) that range from 1 to rarely 3 mm in diameter. The olivine is substantially altered to iddingsite, while the clinopyroxene is pristine. Glomeroporphyritic clumps up to 5 mm across are dominated by clinopyroxene with only minor amounts of plagioclase, olivine, and orthopyroxene. These features make the Basaltic Andesite of Camp Creek relatively easy to identify. In outcrop the Basaltic Andesite of Camp Creek exhibits distinctive well-developed spheroidal weathering patterns. In areas that have been heavily logged, the surface is littered with rounded to ellipsoidal boulders 0.5 to 1 m in diameter. Two whole-rock K-Ar age dates, 3.85 ± 0.10 Ma and 3.44 ± 0.12 Ma, and one $^{40}Ar/^{39}Ar$ age date, 3.85 ± 0.10 Ma, are available. The three age date samples are from the Mule Hill quadrangle.

Acknowledgments

I thank Isaac Weaver for his ongoing help and cheerful support in bringing this geologic map to closure. His computer skills, particularly with regard to MapInfo® and Adobe Illustrator®, have been particularly valuable. I also thank Karen Mertzman for carefully preparing and analyzing countless samples on my behalf in the X-ray lab. I thank Franklin and Marshall College for its generous support of fieldwork over the past decade that has led to the completion of this geologic map. Support from the National Science Foundation and Franklin and Marshall College to facilitate the operation of the XRF laboratory in the Earth and Environment Department is greatly appreciated.

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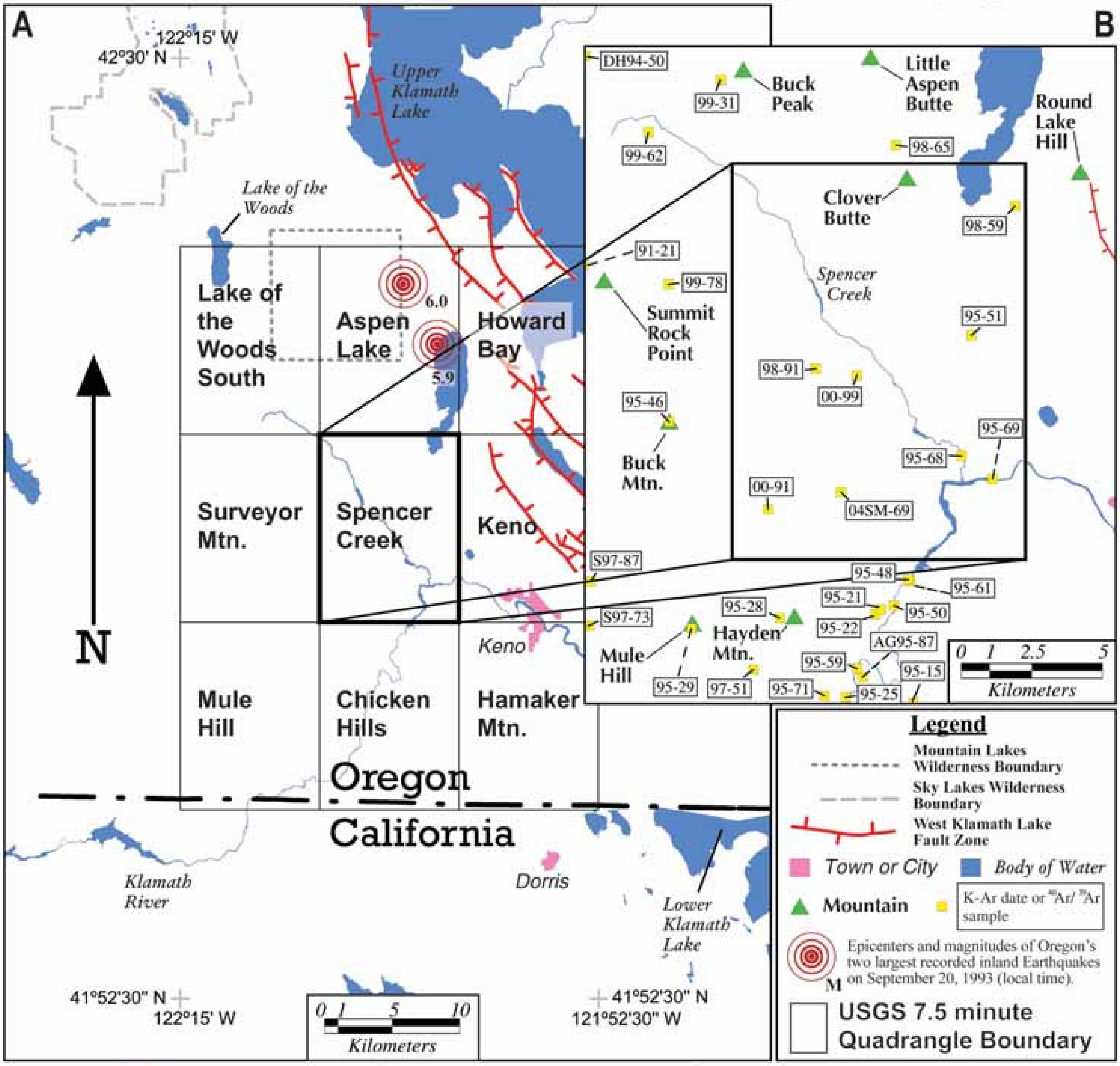

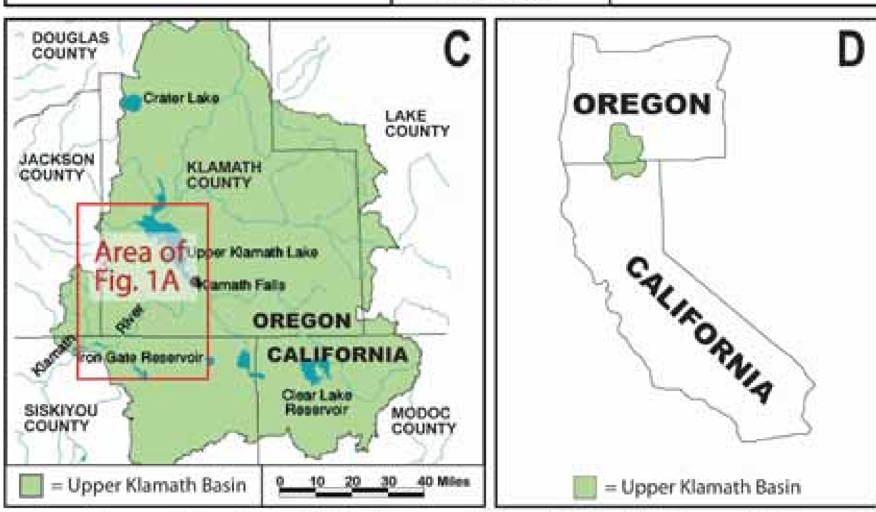

Figure 1. This series of location maps (A through D) provides a broad context in which to place the Preliminary Geologic Map of the Spencer Creek 7.5' Quadrangle, Klamath County, Oregon. Figures 1C and 1D were modified from U.S. Geological Survey (2006). Earthquake epicenter location and magnitude data are from The Pacific Northwest Seismic Network (2003).

Figure 2. Large-scale features associated with the unconsolidated terrace conglomerates (Qg) located in the south-central part of the Spencer Creek quadrangle along the Keno access road, 2.4 km (1.5 mi) northwest of the Route 66 Bridge over the Klamath River. These stone rings and polygons are 3-5 m across and are separated by linear concentrations of rounded to sub-rounded cobbles and pebbles. For scale, the hammer handle in the center of the image is approximately 40 cm long.

Figure 3. This close-up image demonstrates the nature of the stone ring/stone polygon boundary forming material (see Figure 2). The rounded to subrounded particle shape is the result of aqueous transport before final deposition and before periglacial/permafrost activity. The particles range in size from pebbles to cobbles with infrequent small boulders.

Figure 4. When magma related to Basalt of Buck Lake volcanic activity came in to contact with groundwater probably associated with the ancestral Klamath River, much phreatomagmatic activity occurred producing a topographic feature known as a tuff cone. Poorly bedded fragmental material forms the flanks of the structure.

Figure 5. When larger fragments (bombs and blocks) are blasted out by the violent interaction between effervescing basaltic magma and groundwater-saturated soil or sediment, the large, heavy fragments impact unconsolidated, relatively soft, surficial material to form bomb sags.

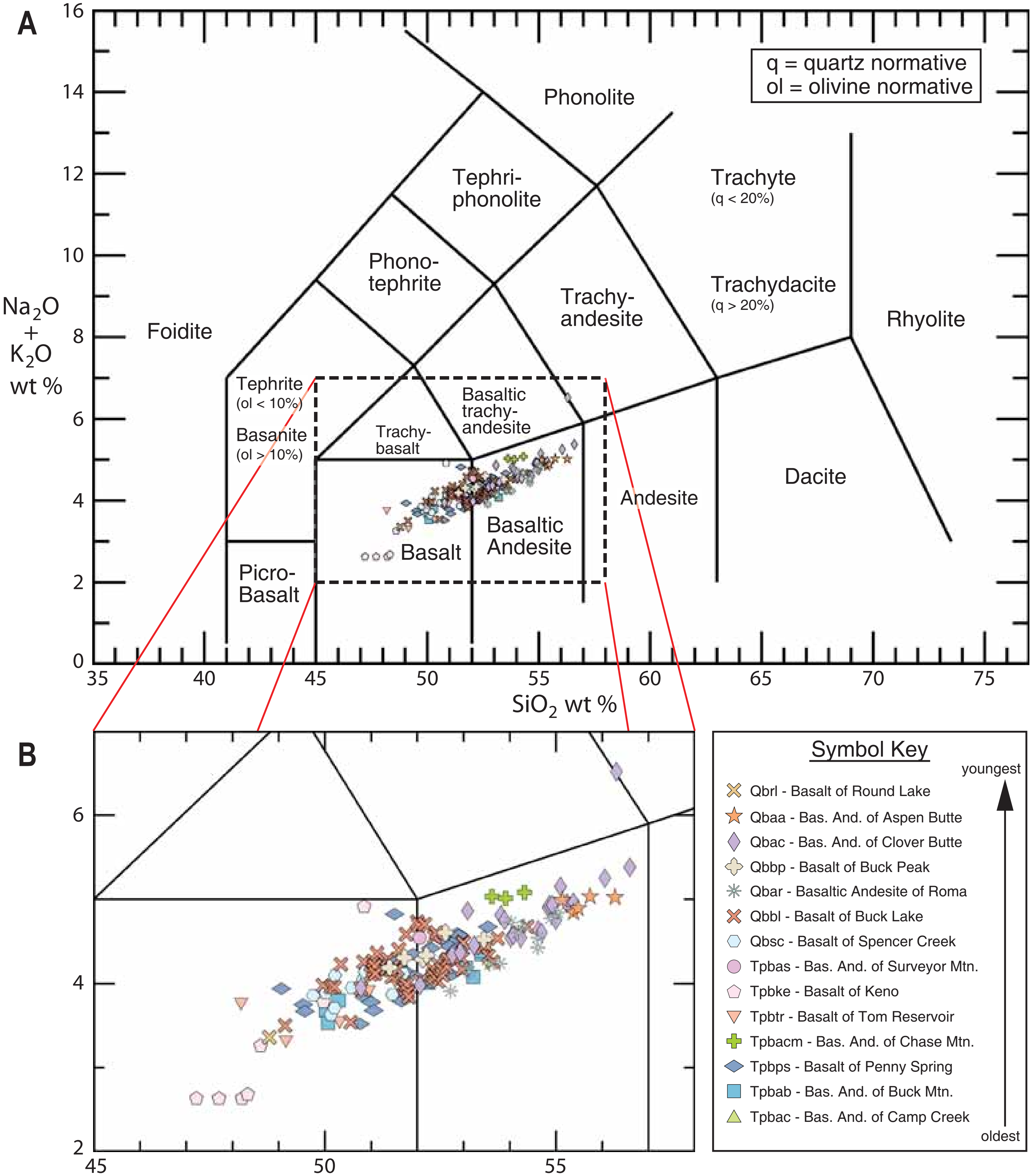

Figure 6. International Union of Geological Sciences (IUGS) classification system for volcanic rocks, which is based on total alkali ($Na_2O + K_2O$) vs. silica (SiO_2) content, with the data from analyzed Spencer Creek quadrangle samples (Table 1) superimposed (see Le Maitre, 2002).

Table 1 (page 1). In this compilation are the whole-rock chemical data and potassium-argon (K-Ar) ages (a indicates an argon-argon age) for the samples from the Preliminary Geologic Map of the Spencer Creek 7.5' Quadrangle, Klamath County, Oregon. Major element oxides are presented in weight percent, and trace elements are reported in parts per million (ppm). Chemical data are X-ray fluorescence (XRF) results and were measured in the X-ray laboratory of the Department of Earth and Environment, Franklin and Marshall College, Lancaster, Pennsylvania. The UTM coordinate values are according to the UTM Zone 10 (NAD 27 for US) projection. All UTM coordinates have been rounded to the nearest 10 m. The 1/4 of 1/4, 1/4, Section (Sec.), Township (T.), and Range (R.) columns are location descriptors of the Public Land Survey System (PLSS) (Willamette meridian and base line). In the Lithology column (Lith.), B = basalt (SiO_2 = 45-52%), BA = basaltic andesite (SiO_2 = 52-57%), A = andesite (SiO_2 = 57-63%), and TrA = trachyandesite (SiO_2 = 53-63%; $Na_2O + K_2O$ is variably higher than in basaltic andesites and andesites of same SiO_2 composition [see Figure 6]). See Figure 6 and Le Maitre (2002) for details regarding lithological classification. Consult the detailed descriptions in the text above or the geologic map for the full unit names. Please note that this table is 4 pages long.

Map no.	Sample no.	K-Ar Age([a]) Ma	1/4 of 1/4	1/4	Sec.	T. (S.)	R. (E.)	UTM E m	UTM N m	Unit	Lith.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI (%)	Total (%)	Fe_2O_3T	Rb	Sr	Y	Zr	V	Ni	Cr	Nb	Ga	Cu	Zn	Co	Ba	La	Ce	U	Th	Sc	Pb	Yb	Be
1	00-87	--	SE	SW	33	39	6	572740	4664040	Tpbac	B	51.57	1.07	17.89	1.52	7.18	0.16	6.01	8.81	3.44	0.63	0.30	1.00	99.58	9.50	6.8	597	22.5	96	202	78	144	3.5	18.7	62	79	30	371	13	25	0.9	1.4	26	6	--	--
2	06SM-20	--	SE	NE	16	39	6	573200	4669810	Tpbab	B	50.02	1.10	18.28	5.90	3.71	0.16	6.64	9.46	3.21	0.47	0.23	0.94	100.12	10.02	5.7	589	24.2	96	210	117	153	4.1	17,2	85	81	41	256	15	20	0.6	<0.5	29	6	--	--
3	06SM-19	--	NE	SE	16	39	6	573470	4669520	Tpbab	B	50.07	1.05	18.22	5.50	4.02	0.15	7.17	9.13	3.11	0.42	0.21	1.41	100.46	9.97	5.8	618	27.6	84	202	134	205	3.1	17.3	79	79	41	222	12	14	<0.5	1.2	29	6	--	--
4	06SM-29	--	NE	NE	28	39	6	573490	4666900	Tpbab	B	50.30	1.12	18.19	2.26	6.76	0.15	7.28	9.14	3.34	0.46	0.21	0.83	100.04	9.77	5.7	492	25.5	88	201	119	180	2.9	17.8	87	78	38	227	10	13	<0.5	0.8	31	6	--	--
5	06SM-18	--	SE	SE	9	39	6	573260	4670880	Tpbab	B	51.16	1.22	17.88	2.98	5.89	0.15	6.59	8.58	3.46	0.77	0.30	1.22	100.20	9.53	10.8	711	28.7	119	204	91	142	7.3	18.8	67	88	38	420	17	28	0.9	1	28	5	--	--
6	06SM-21	--	SW	NE	16	39	6	572820	4669800	Tpbab	BA	52.24	1.06	17.84	2.68	5.93	0.14	6.73	8.38	3.42	0.59	0.22	1.02	100.25	9.27	7.8	581	20.9	88	177	125	171	3.8	18.4	82	79	36	318	12	22	<0.5	1.2	26	6	--	--
7	06SM-22	--	SE	NE	21	39	6	573270	4668330	Tpbab	BA	53.05	1.04	17.77	2.32	5.90	0.14	6.35	8.35	3.55	0.64	0.27	0.80	100.18	8.88	9.4	598	22.1	89	185	116	157	3.8	19.0	85	80	36	330	10	21	1.1	1.4	24	6	--	--
8	04SM-21	--	SW	NW	16	39	6	572290	4669730	Tpbab	BA	53.21	1.06	17.50	2.95	5.74	0.15	6.28	8.36	3.46	0.62	0.22	0.55	100.10	9.33	8.4	568	23.2	93	147	100	150	4.0	19.4	71	71	30	354	--	--	<0.5	1.1	23	5	--	--
9	06SM-32	--	SE	SW	21	39	6	572740	4667550	Tpbab	BA	53.39	1.06	18.36	2.00	6.28	0.14	5.21	8.02	3.65	0.70	0.32	1.10	100.23	8.98	9.0	756	21.2	98	189	59	83	5.0	20.4	78	83	28	523	14	26	<0.5	1.5	22	7	--	--
10	06SM-39	--	SW	SE	28	39	6	572960	4665650	Tpbab	BA	53.39	1.08	18.09	2.08	6.33	0.14	5.61	7.92	3.59	0.80	0.33	0.83	100.19	9.11	10.7	734	20	99	189	89	98	4.6	19.6	80	85	33	436	12	25	1.3	1.3	23	7	--	--
11	04SM-69	2.54 +/- 0.05[a]	NW	SE	26	39	6	576110	4666180	Tpbps	BA	52.94	1.08	17.36	2.91	5.80	0.16	5.30	7.83	3.53	0.83	0.42	1.20	99.36	9.36	9.3	637	37.2	119	187	79	126	7.3	19.2	147	87	32	463	24	46	<0.5	1.1	25	6	--	--
12	00-102	--	NE	SE	22	39	6	575230	4667680	Tpbps	B	49.06	1.63	16.70	2.85	8.30	0.20	6.70	8.88	3.48	0.46	0.37	1.33	99.96	12.07	4.2	415	36.2	122	234	92	182	4.2	18.5	63	78	37	227	10	22	<0.5	0.7	32	5	--	--
13	CM04-19	--	NE	NW	22	39	6	574370	4668580	Tpbps	B	49.53	1.27	17.99	3.98	6.24	0.18	6.69	9.85	3.37	0.38	0.22	0.55	100.25	10.91	5.2	479	26.1	84	236	99	117	3.8	19.1	93	81	44	214	--	--	<0.5	<0.5	32	4	--	--
14	CM04-16	--	NE	NW	22	39	6	574100	4668460	Tpbps	B	49.57	1.27	17.77	4.10	6.10	0.17	6.59	9.64	3.28	0.39	0.23	0.73	99.84	10.88	5.7	483	28.4	88	231	102	105	4.1	19.4	95	82	43	191	--	--	<0.5	0.5	30	5	--	--
15	04SM-65	--	SE	NW	26	39	6	575680	4666760	Tpbps	B	50.76	1.21	17.33	1.15	8.01	0.16	6.79	9.54	3.06	0.46	0.23	0.85	99.55	10.05	5.2	449	24.5	102	217	83	173	6.2	18.9	66	75	34	249	9	20	<0.5	0.6	30	5	--	--
16	00-94	--	SW	NW	27	39	6	573910	4666700	Tpbps	B	50.85	1.14	17.61	1.45	7.52	0.16	6.88	9.05	3.35	0.49	0.20	0.92	99.62	9.81	7.1	461	23.1	103	190	109	197	3.5	17.5	66	74	35	223	8	17	<0.5	0.8	31	4	--	--
17	CM04-18	--	NE	NW	22	39	6	574190	4668500	Tpbps	B	51.00	1.03	18.03	3.35	5.69	0.16	7.25	9.29	3.30	0.48	0.25	0.43	100.26	9.67	7.4	603	20.7	77	191	119	184	3.9	17.7	84	71	37	208	--	--	<0.5	1	24	5	--	--
18	CM04-17	--	NE	NW	22	39	6	574160	4668480	Tpbps	B	51.06	1.06	17.43	3.88	5.37	0.16	7.12	8.99	3.19	0.49	0.25	0.77	99.77	9.85	7.3	588	21.8	79	197	111	172	4.0	17.9	79	71	37	236	--	--	0.5	1.6	29	5	--	--
19	04SM-68	--	NE	SE	34	39	6	575180	4664700	Tpbps	B	51.14	1.27	17.94	3.25	6.51	0.18	6.22	8.39	3.57	0.66	0.40	0.89	100.42	10.48	7.4	619	24.5	110	186	101	138	5.9	19.8	111	77	35	449	12	30	<0.5	0.9	25	6	--	--
20	95MH-35	--	SW	SW	35	39	6	575610	4664050	Tpbps	B	51.49	1.17	17.84	3.26	6.13	0.16	5.82	8.03	3.59	0.71	0.40	1.14	99.74	10.07	6.1	599	25.2	104	197	111	191	6.8	19.3	87	83	33	421	15.4	38.4	0.6	1.6	26.8	8	--	--
21	00-90	--	NW	NW	34	39	6	573790	4665530	Tpbps	B	51.51	1.14	17.45	8.48	0.59	0.14	4.40	9.44	3.24	1.58	0.55	1.65	100.17	9.14	30.1	1222	26.1	156	202	70	168	5.7	19.0	80	89	30	971	36	67	0.7	2.5	32	7	--	--
22	06SM-38	--	NW	SE	28	39	6	572990	4666430	Tpbps	B	51.58	1.07	18.27	2.74	5.91	0.15	6.74	8.71	3.45	0.43	0.22	0.80	100.07	9.31	3.4	591	22.7	89	185	125	164	3.6	18.4	82	81	36	323	9	22	1.4	0.5	28	7	--	--
23	04SM-67	--	SE	NE	34	39	6	575160	4664830	Tpbps	B	51.59	1.19	17.20	2.26	7.19	0.17	6.22	8.15	3.40	0.81	0.38	0.75	99.31	10.25	9.7	601	24	109	179	96	132	5.8	19.5	163	75	34	421	7	20	<0.5	<0.5	25	6	--	--
24	95MH-21	--	SW	NW	36	39	6	577270	4664880	Tpbps	B	51.63	1.11	17.56	2.95	6.24	0.17	6.38	8.46	3.31	0.86	0.34	0.87	99.88	9.88	9.1	560	26.7	97	201	115	191	6.6	18.8	77	82	32	492	14.5	33.4	1.2	1.3	23.6	7.8	--	--
25	04SM-66	--	NW	NW	26	39	6	575500	4667110	Tpbps	B	51.66	1.07	17.50	3.45	5.43	0.15	6.28	8.28	3.28	0.51	0.21	1.48	99.30	9.48	4.9	552	22.2	90	165	107	164	3.9	19.1	160	74	35	310	5	12	<0.5	<0.5	25	6	--	--
26	06SM-28	--	SW	SW	22	39	6	573760	4667600	Tpbps	B	51.71	1.06	18.10	2.86	5.71	0.15	6.65	8.43	3.50	0.51	0.23	1.38	100.29	9.21	3.4	607	20.7	91	175	132	168	3.0	19.1	84	82	36	325	11	20	<0.5	<0.5	26	6	--	--
27	95MH-90	--	SW	SE	25	39	6	577820	4665700	Tpbps	B	51.76	1.19	17.30	2.38	6.11	0.14	6.62	9.04	3.31	0.83	0.29	0.93	99.90	9.17	10.5	716	21.3	106	211	95	186	8.2	19.2	60	90	29	309	14.7	39.9	1.4	1.1	27.2	9.6	--	--
28	00-93	--	NE	SE	28	39	6	573580	4666340	Tpbps	B	51.80	1.05	17.80	1.51	6.96	0.16	6.37	8.73	3.53	0.54	0.22	1.66	100.33	9.24	5.0	528	35.1	98	182	104	217	2.1	18.0	65	76	34	296	13	22	0.7	1.1	26	6	--	--
29	00-89	--	NW	NW	34	39	6	573900	4665320	Tpbps	B	51.91	1.08	17.24	2.63	5.66	0.16	5.47	9.88	3.29	1.06	0.37	0.71	99.46	8.92	13.0	858	22.2	120	202	42	113	5.3	19.1	83	73	25	610	21	41	0.6	3.1	25	5	--	--
30	00-95	--	NW	SE	22	39	6	574500	4667960	Tpbps	B	51.94	1.03	17.62	2.41	6.18	0.15	6.20	8.46	3.45	0.64	0.23	1.02	99.33	9.28	8.0	549	20.5	102	188	106	185	3.4	18.2	56	76	30	281	9	19	<0.5	0.9	24	6	--	--
31	CM04-22B	--	SW	NE	26	39	6	576100	4666740	Tpbps	BA	52.01	1.11	18.02	5.86	3.78	0.16	5.86	7.54	3.29	0.73	0.37	1.67	100.40	10.06	8.4	598	23.7	107	191	106	170	6.2	19.6	47	88	33	388	--	--	0.5	1.2	25	6	--	--
32	97-52	--	SE	NE	35	39	6	576820	4664930	Tpbps	BA	52.29	1.12	17.87	2.31	6.55	0.16	5.48	8.18	3.56	0.86	0.42	1.10	99.90	9.59	8.8	641	21	115	202	74	141	7.0	20.7	53.8	82	24	441	17	42.4	0.8	2.5	22.5	9	--	--
33	06SM-31	--	NE	SW	27	39	6	574240	4666040	Tpbps	BA	52.29	1.04	17.50	2.46	6.16	0.14	6.40	8.41	3.44	0.57	0.22	0.88	99.51	9.31	7.9	571	21.9	86	183	116	164	3.3	18.7	72	78	34	294	11	19	0.7	0.5	24	7	--	--
34	95MH-43	--	SW	SW	36	39	6	577060	4664350	Tpbps	BA	52.55	1.07	17.79	2.26	6.44	0.15	5.60	8.08	3.53	0.98	0.39	0.77	99.61	9.42	9.4	670	19.3	108	183	81	141	7.1	19.7	70	81	27	420	15.9	41.3	1.2	1.7	21.7	23.1	--	--
35	06SM-30	--	NE	NE	34	39	6	574860	4665410	Tpbps	BA	52.57	1.11	17.97	3.63	5.45	0.16	5.52	8.01	3.66	0.88	0.40	0.90	100.26	9.69	10.7	687	28.1	120	176	83	117	7.1	19.2	77	89	31	516	15	39	<0.5	<0.5	22	7	--	--
36	95MH-38	--	SW	SW	35	39	6	575300	4664120	Tpbps	BA	52.62	1.07	17.87	2.20	6.43	0.15	5.47	8.07	3.53	0.98	0.38	0.86	99.63	9.35	10.3	660	20.2	106	193	88	143	7	19.5	67	83	23	422	15.5	46.4	0.5	2	24.1	9.4	--	--
37	04SM-72	--	NW	SE	34	39	6	574590	4664720	Tpbps	BA	52.66	1.07	17.52	1.90	6.75	0.16	5.61	8.01	3.36	0.96	0.39	1.14	99.53	9.40	10.1	639	28.8	113	180	74	123	6.8	19.3	111	80	31	520	10	23	<0.5	<0.5	23	6	--	--
38	04SM-74	--	SW	SW	36	39	6	577180	4664210	Tpbps	BA	52.71	1.09	17.67	2.15	6.65	0.16	5.54	8.05	3.47	0.97	0.41	1.12	99.99	9.54	11.1	643	23.1	115	186	75	123	6.7	19.8	67	79	28	435	19	42	<0.5	0.8	23	6	--	--
39	95-47	--	SE	NW	28	39	6	572590	4666440	Tpbps	BA	52.74	0.94	17.72	2.80	5.66	0.14	6.73	8.42	3.46	0.65	0.20	0.91	100.37	9.09	9	629	16	61	197	123	236	4	19	107	83	30	303	9	21.8	0.4	0.3	24.3	5.7	--	--
40	04SM-71	--	SW	SE	35	39	6	576150	4664070	Tpbps	BA	52.87	1.08	17.40	3.72	5.14	0.16	5.18	8.03	3.47	0.94	0.41	1.11	99.51	9.43	10.6	646	23.2	116	167	73	99	6.4	19.8	147	76	28	479	18	37	<0.5	0.7	22	6	--	--
41	95MH-15	--	NE	SW	35	39	6	576060	4664810	Tpbps	BA	52.87	1.07	17.66	1.74	6.87	0.15	5.64	8.02	3.57	1.02	0.38	0.72	99.71	9.37	10.3	624	20.1	112	188	81	143	7.3	19.8	78	83	27	429	14.3	44.6	1.2	1	23.9	9.4	--	--
42	95MH-87[1]	--	NW	NE	35	39	6	576430	4665310	Tpbps	BA	52.88	1.08	17.74	3.40	5.46	0.16	5.61	8.02	3.55	0.97	0.39	0.56	99.82	9.47	1.5	660	23.7	111	184	89	151	7.8	19.5	77	88	27	441	19.7	36.7	0.6	1.3	24.2	11.2	2.2	--
43	95MH-41	--	NW	SW	35	39	6	575560	4664680	Tpbps	BA	52.90	1.08	17.74	2.48	6.42	0.16	5.61	8.03	3.57	1.00	0.42	0.68	100.09	9.61	10.5	659	24	108	196	87	178	7.7	19.6	66	82	28	436	17.9	40.6	0.9	1.8	22.4	9.7	--	--
44	04SM-70	--	SE	NW	35	39	6	575930	4664830	Tpbps	BA	52.93	1.08	17.34	2.08	6.57	0.16	5.48	7.96	3.43	1.00	0.41	0.90	99.34	9.38	11.0	640	23	117	181	74	116	6.7	19.5	77	82	28	498	15	33	0.7	1.8	22	6	--	--
45	95-14	--	NE	SE	26	39	6	576710	4666230	Tpbps	BA	53.53	1.11	17.78	4.35	4.53	0.15	5.53	7.91	3.79	0.88	0.41	0.72	100.69	9.38	9.5	618	22.9	118	198	88	149	7.7	19.1	56	89	28	418	14	24.7	0.9	1.4	25.8	8.1	--	--
46	95MH-22	--	SW	SE	31	39	7	579650	4664170	Tpbacm	BA	53.62	1.10	17.63	3.72	4.41	0.14	4.71	8.22	3.78	1.25	0.39	0.61	99.58	8.62	15	1003	16.9	120	187	52	82	7.6	20.5	74	80	23	611	20	50.9	1.9	2	21.8	13.1	--	--
47	95MH-33	--	SW	SE	31	39	7	579540	4664390	Tpbacm	BA	53.91	1.08	17.59	3.70	4.43	0.16	4.80	8.05	3.77	1.24	0.36	0.85	99.94	8.62	14.8	1013	16.7	111	174	48	85	7.5	20.8	74	75	22	634	21.1	56.2	1.6	2.4	20.4	11.3	--	--
48	95MH-57	--	NE	SE	32	39	7	581620	4664700	Tpbacm	BA	54.32	1.07	18.41	2.47	5.15	0.14	3.76	8.11	3.76	1.32	0.34	1.16	100.01	8.19	16.4	874	20	134	188	22	46	7.6	21.8	81	77	17	760	20.2	56.9	1.6	2.9	23.1	11.1	--	--
49	00-91	2.49 +/- 0.06[a]	NE	NE	33	39	6	573530	4665580	Tpbtr	B	49.16	1.07	17.58	1.79	7.65	0.17	7.85	10.01	3.01	0.32	0.20	0.72	99.53	10.29	3.5	436	23.5	81	212	129	221	2.9	16.8	76	70	38	155	7	19	<0.5	1.1	29	4	--	--
50	00-88	--	SE	SW	33	39	6	572800	4664210	Tpbtr	B	48.19	1.53	17.25	1.87	9.11	0.19	7.50	9.15	3.43	0.35	0.34	1.34	100.25	11.99	2.6	415	31.2	117	211	115	170	3.4	16.9	84	71	40	204	10	22	<0.5	0.9	29	4	--	--
51	00-92	--	SW	SE	28	39	6	573140	4665730	Tpbtr	B	50.32	1.01	17.20	1.00	8.24	0.16	8.43	8.86	3.16	0.40	0.16	0.90	99.84	10.16	3.2	495	19.3	76	195	154	407	2.2	17.1	57	72	39	197	6	15	<0.5	1.3	27	5	--	--
52	CM04-46A	--	SW	SE	33	39	6	572870	4664180	Tpbtr	B	50.95	1.17	18.43	2.88	6.66	0.17	5.60	8.23	3.45	0.48	0.42	1.28	99.72	10.28	4.3	685	26.0	123	175	77	110	7.0	20.7	65	82	32	674	--	--	0.5	<0.5	23	7	--	--

[1] Certain elements that were not measured in most other samples were measured in sample 95MH-87 (values in ppm) (Hf = 2.7, Ta < 0.3, Nd = 20, Sm = 4.52, Eu = 1.4, Tb = 0.7, Lu = 0.33)

(continued on next page)

Table 1 (page 2).

Map no.	Sample no.	K-Ar Age([a]) Ma	1/4 of 1/4	1/4	Sec.	T. (S.)	R. (E.)	UTM E m	UTM N m	Unit	Lith.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI (%)	Total (%)	Fe_2O_3T	Rb	Sr	Y	Zr	V	Ni	Cr	Nb	Ga	Cu	Zn	Co	Ba	La	Ce	U	Th	Sc	Pb	Yb	Be
53	CM04-46B	--	SW	SE	33	39	6	572870	4664180	Tpbtr	B	51.52	1.11	18.06	1.91	7.07	0.16	5.72	8.28	3.28	0.77	0.42	1.31	99.61	9.77	7.9	673	23.8	121	195	79	132	6.8	20.2	72	85	32	471	--	--	<0.5	0.6	22	7	--	--
54	95-69	2.0 +/- 0.3	SE	NE	29	39	7	581460	4666740	Tpbke	B	48.21	0.93	17.45	2.94	6.46	0.17	9.13	11.64	2.50	0.13	0.12	0.77	100.45	10.12	2.4	270	22.8	48	225	171	234	3.3	16	91	67	41	60	5.6	7.8	0.5	1	38.7	5.5	--	--
55	99-69A	--	SE	NE	29	39	7	581550	4666730	Tpbke	B	47.22	0.87	17.95	4.81	4.68	0.17	8.61	11.35	2.51	0.12	0.10	1.45	99.84	10.01	0.5	297	24.9	58	206	168	231	2.8	15.6	96	63	43	114	3	9	1.4	1.5	30	3	--	--
56	99-69B	--	SE	NE	29	39	7	581560	4666780	Tpbke	B	47.71	0.92	17.79	4.81	4.94	0.17	8.63	11.57	2.54	0.09	0.07	0.90	100.14	10.30	1.2	296	25.1	59	221	170	265	2.8	15.7	113	65	43	83	2	10	1	0.5	34	3	--	--
57	95-54	--	NW	SE	20	39	7	581110	4668050	Tpbke	B	48.33	0.98	17.61	3.92	5.52	0.15	9.19	11.36	2.57	0.11	0.07	0.43	100.24	10.05	2.8	317	22	54	212	182	292	3.3	16.8	94	68	43	78	2	13.9	1.7	1.1	31.7	4.6	--	--
58	99-69C	--	SE	NE	29	39	7	581570	4666840	Tpbke	B	48.61	1.23	16.64	7.37	2.45	0.18	8.51	10.79	3.10	0.16	0.10	0.92	100.06	10.09	1.6	310	30.4	83	268	131	218	2.9	16.5	116	69	37	93	5	11	1.3	1.8	32	3	--	--
59	04SM-54	--	NE	SW	16	39	7	582260	4669400	Tpbke	B	49.97	1.59	17.39	2.08	7.95	0.18	6.61	9.20	3.21	0.57	0.34	0.90	99.99	10.92	7.5	441	28.6	140	182	84	148	9.8	19.7	281	72	37	306	--	--	1	1.1	26	5	--	--
60	95-53	--	NW	SE	20	39	7	581230	4667820	Tpbke	B	50.85	1.22	15.86	4.71	4.38	0.13	7.61	8.95	3.79	1.12	0.50	0.75	99.87	9.58	15.2	1129	17.6	149	181	116	284	8.4	21.5	37	94	30	471	30.7	69.6	1.4	3.6	19.7	4.5	--	--
61	06SM-14	--	SE	NW	9	39	6	572540	4671590	Tpbas	BA	52.05	1.10	19.32	2.25	6.25	0.14	5.30	7.85	3.87	0.67	0.18	1.23	100.21	9.20	11.3	734	21.4	82	188	74	40	2.7	20.3	80	74	33	367	12	18	<0.5	1.3	22	6	--	--
62	95-51	1.50 +/- 0.01[a]	SE	NW	8	39	7	580680	4671710	Qbsc	B	51.70	1.25	17.70	2.79	6.58	0.16	6.20	8.86	3.48	0.64	0.26	0.67	100.29	10.10	8.6	527	22.5	104	221	92	129	7.4	19.6	80	86	31	275	9.7	28.1	0.2	0.4	26.4	6.7	--	--
63	98-99	--	SE	SE	5	39	7	581560	4672210	Qbsc	B	49.75	1.28	18.40	4.75	5.18	0.16	5.96	8.77	3.49	0.37	0.25	1.16	99.52	10.51	1.6	532	26.6	114	211	91	126	8.0	21.7	90	87	31	314	12	32	1	1.3	27	9	--	--
64	99-72	--	SE	SE	12	39	6	578100	4670750	Qbsc	B	50.02	1.25	18.48	1.87	7.56	0.17	6.22	8.94	3.45	0.44	0.28	1.26	99.94	10.27	3.5	525	29.2	117	213	86	143	7.4	20.6	70	83	33	377	17	24	2.6	1.5	25	5	--	--
65	CM04-25	--	SW	SE	24	39	6	578090	4667600	Qbsc	B	50.13	1.28	18.29	3.47	6.41	0.17	5.95	9.05	3.16	0.47	0.28	1.33	99.99	10.59	6.5	528	24.9	113	237	89	138	6.5	20.2	75	87	38	321	--	--	<0.5	1.2	30	5	--	--
66	04SM-83	--	SW	SW	21	39	7	581870	4667540	Qbsc	B	50.21	1.21	18.17	2.45	6.73	0.16	6.39	8.89	3.23	0.48	0.27	1.15	99.34	9.93	5.6	541	25.5	107	198	93	127	6.3	19.9	69	78	34	419	8	22	<0.5	1.6	26	5	--	--
67	92-71	--	SE	SW	9	39	7	582370	4670910	Qbsc	B	50.22	1.28	17.45	4.31	5.62	0.16	6.41	8.87	3.47	0.63	0.28	0.97	99.67	10.56	8.3	505	23.7	108	192	94	131	7	20	61	80	29	277	11.6	29.5	1	1.1	25.2	6.8	2.8	1.4
68	98-98	--	NE	SW	5	39	7	580460	4672660	Qbsc	B	50.58	1.21	18.09	2.00	7.25	0.16	6.35	8.99	3.41	0.54	0.27	0.79	99.64	10.06	4.3	507	23.7	108	205	93	120	7.4	21.8	70	79	29	303	11	28	0.6	0.5	26	8	--	--
69	00-96	--	SW	SW	19	39	7	578710	4667570	Qbsc	B	50.83	1.25	18.00	1.79	7.67	0.17	6.18	8.92	3.44	0.61	0.28	0.91	100.05	10.31	5.8	508	25.4	121	214	93	141	5.9	19.2	63	83	34	301	15	27	<0.5	1.3	26	5	--	--
70	98-94	--	SW	SW	8	39	7	580250	4670650	Qbsc	B	50.87	1.25	17.64	3.09	6.41	0.16	6.37	8.75	3.53	0.61	0.29	0.58	99.55	10.21	4.2	487	24.5	113	216	91	134	7.3	20.4	59	82	32	272	11	31	1	<0.5	26	8	--	--
71	99-71	--	SE	NW	19	39	7	579230	4668470	Qbsc	B	51.03	1.24	17.73	2.85	6.51	0.16	6.06	8.81	3.57	0.64	0.28	0.71	99.59	10.08	6.9	516	26.6	118	217	81	151	7.6	19.7	61	83	31	287	11	26	1.3		27	5	--	--
72	98-93	--	SW	NW	21	39	7	581700	4668240	Qbsc	B	51.11	1.18	17.67	1.93	7.20	0.16	6.41	8.87	3.47	0.66	0.27	0.62	99.55	9.93	6.3	511	23.9	107	199	96	134	7.2	20.8	71	78	30	268	13	22	0.9	0.8	25	8	--	--
73	99-68	--	SE	SW	21	39	7	582440	4667660	Qbsc	B	51.27	1.17	17.64	1.26	7.62	0.16	6.48	8.74	3.52	0.64	0.27	0.87	99.64	9.73	8.1	528	24.5	113	174	92	153	7.3	19.9	76	76	30	287	10	26	1	2	22	5	--	--
74	92-70	--	NE	SW	9	39	7	582300	4670960	Qbsc	B	51.32	1.26	17.99	3.90	5.69	0.16	6.11	8.97	3.59	0.61	0.26	0.64	100.50	10.22	8	506	21.7	105	184	88	127	6.9	19.7	53	81	29	281	12	28.4	0.3	0.6	24.2	7.1	2.9	1.4
75	04SM-53	--	SE	SE	17	39	7	581610	4669100	Qbsc	B	51.46	1.19	18.07	1.80	7.26	0.16	6.38	8.70	3.31	0.56	0.27	0.75	99.91	9.87	6.4	536	22.7	106	178	90	113	6.0	19.6	68	75	34	308	--	--	1.1	1	25	5	--	--
76	06SM-65	--	SW	SE	6	39	7	579310	4672340	Qbsc	B	51.87	1.22	17.73	1.88	7.21	0.16	6.29	8.75	3.34	0.68	0.29	0.75	100.17	9.89	8.8	538	25	113	215	91	120	6.8	19.4	69	89	37	307	11	24	<0.5	2.3	27	6	--	--
77	98-91	1.29 +/- 0.03[a]	SE	SE	10	39	6	575200	4670520	Qbbl	B	51.03	1.18	17.19	3.53	5.55	0.15	6.93	8.87	3.50	0.71	0.29	0.65	99.58	9.70	3.4	661	22.5	109	205	98	182	7.9	19.7	63	81	30	328	12	32	<0.5	0.8	27	8	--	--
78	95-68	1.19 +/- 0.11	SW	SW	20	39	7	580350	4667530	Qbbl	BA	52.52	0.87	19.35	2.08	5.46	0.12	5.63	8.91	3.39	0.80	0.17	0.87	100.17	8.15	9.1	709	15	70	788	78	84	4.3	19.5	71	73	26	270	8.6	20	0.4	2	23.5	4.6	--	--
79	00-99	1.24 +/- 0.03[a]	NE	NE	14	39	6	576660	4670270	Qbbl	BA	52.97	0.96	18.89	2.54	5.54	0.14	5.05	8.08	3.61	0.69	0.19	1.02	99.68	8.70	8.7	649	23.9	89	186	56	91	3.6	19.3	65	71	26	372	15	28	1.4	1.5	22	5	--	--
80	CM04-26	--	SE	SW	24	39	6	577510	4667410	Qbbl	B	49.14	1.25	18.24	3.44	5.95	0.16	6.77	8.76	3.12	0.38	0.30	2.15	99.66	10.05	2.8	694	23.8	116	228	85	178	8.0	19.7	70	84	33	664	--	--	<0.5	2.4	29	5	--	--
81	98-101	--	SW	SE	14	39	6	576360	4669260	Qbbl	B	49.96	1.24	17.70	4.98	4.60	0.16	6.66	9.02	3.46	0.52	0.30	1.05	99.65	10.09	2.1	658	24.6	109	234	104	198	8.4	20.5	68	86	33	315	14	31	<0.5	1.1	30	9	--	--
82	00-97	--	SE	SE	13	39	6	578380	4669110	Qbbl	B	50.14	1.23	17.86	3.64	6.09	0.17	6.36	9.03	3.43	0.53	0.27	0.84	99.59	10.41	5.2	515	23.5	116	201	96	141	5.9	19.0	60	80	34	284	13	27	0.7	0.6	25	5	--	--
83	06SM-10	--	SE	SE	28	38	6	573350	4675520	Qbbl	B	50.21	1.24	19.00	2.76	6.41	0.15	6.09	8.65	3.55	0.41	0.22	1.63	100.32	9.88	2.8	608	33.6	89	215	89	115	3.9	19.1	80	82	39	356	10	19	<0.5	<0.5	27	6	--	--
84	07SM-36	--	SE	NW	31	39	7	579030	4665110	Qbbl	B	50.35	1.16	16.59	4.64	5.54	0.23	5.86	8.84	3.40	0.83	0.35	2.29	100.08	10.80	11.4	858	20.5	137	218	98	209	6.7	19.6	59	85	37	430	16	30	0.6	2.2	26	4	--	--
85	04SM-73	--	SW	SW	36	39	6	577240	4664060	Qbbl	B	50.56	1.20	17.43	2.10	6.99	0.16	6.73	9.44	2.96	0.58	0.23	1.17	99.55	9.87	8.7	442	27.8	101	225	87	178	6.2	18.5	71	80	37	209	14	25	<0.5	<0.5	31	5	--	--
86	CM04-21	--	SE	NW	23	39	6	575960	4668230	Qbbl	B	50.78	1.22	17.19	5.15	4.37	0.18	6.49	8.90	3.26	0.68	0.29	1.03	99.54	10.01	9.0	668	26.5	105	205	102	179	7.1	19.2	53	83	37	489	--	--	<0.5	2.7	28	5	--	--
87	06SM-17	--	NW	NE	4	39	6	572720	4673610	Qbbl	B	50.84	1.27	18.95	2.07	7.02	0.15	5.92	8.48	3.78	0.48	0.23	0.79	99.98	9.87	4.5	679	24.8	89	205	87	74	3.3	19.5	83	80	39	305	10	20	<0.5	1.6	26	6	--	--
88	07SM-35	--	SE	NW	31	39	7	578900	4664900	Qbbl	B	51.00	1.14	17.45	3.04	6.20	0.17	6.40	8.54	3.37	0.74	0.37	1.70	100.12	9.93	7.3	587	24.1	122	199	105	223	6.4	18.9	74	86	35	339	12	28	<0.5	1.5	25	4	--	--
89	06SM-15	--	NE	SW	10	39	6	574130	4670960	Qbbl	B	51.05	1.18	17.61	3.75	5.24	0.15	6.99	9.00	3.45	0.71	0.29	0.54	99.96	9.57	7.5	733	20.8	112	216	102	169	7.7	18.7	64	91	37	333	13	31	<0.5	1.4	31	6	--	--
90	06SM-16	--	NE	NW	10	39	6	574140	4671750	Qbbl	B	51.05	1.24	19.29	1.15	7.66	0.14	5.65	8.44	3.77	0.50	0.24	0.99	100.12	9.66	6.7	703	21.6	64	199	83	64	3.3	19.7	77	80	36	336	11	20	0.5	<0.5	23	6	--	--
91	98-90	--	SW	SE	4	39	6	572740	4672390	Qbbl	B	51.08	1.21	17.29	4.13	5.06	0.15	7.05	9.04	3.53	0.68	0.29	0.49	100.00	9.75	4.6	664	21.9	107	219	111	212	8.1	19.7	64	85	32	287	12	35	<0.5	1.1	28	9	--	--
92	06SM-40	--	NW	SE	15	39	6	574690	4669570	Qbbl	B	51.09	1.20	17.53	3.21	5.69	0.15	7.03	8.37	3.38	0.74	0.29	1.32	100.00	9.53	8.7	731	24.7	112	210	102	176	7.5	19.0	69	90	37	339	16	27	<0.5	2.8	27	6	--	--
93	98-87	--	SW	SW	11	39	6	575610	4670570	Qbbl	B	51.13	1.26	18.84	2.07	7.03	0.15	5.48	8.27	3.85	0.51	0.23	0.80	99.62	9.88	3.8	635	30.6	87	192	74	69	5.3	21.4	72	74	26	312	13	26	1	0.6	20	9	--	--
94	06SM-41	--	NW	NE	22	39	6	574810	4668740	Qbbl	B	51.34	1.18	17.67	3.33	5.51	0.15	6.97	8.77	3.44	0.74	0.29	0.82	100.21	9.45	9.2	725	22.3	113	210	95	172	7.2	18.3	67	87	33	356	16	30	0.9	1.9	27	6	--	--
95	98-81	--	SE	NE	33	38	6	573510	4674700	Qbbl	B	51.36	1.25	18.48	2.95	5.82	0.15	5.95	8.62	3.75	0.54	0.23	1.06	100.16	9.42	5.0	579	25	91	172	83	125	4.8	20.7	60	70	31	266	6	22	<0.5	0.6	24	8	--	--
96	98-62	--	SE	NE	30	38	7	579770	4676380	Qbbl	B	51.43	1.17	18.07	2.16	6.65	0.15	6.02	8.96	3.48	0.69	0.27	0.92	99.97	9.55	6.5	528	22.4	105	212	83	112	7.2	18.7	67	80	30	281	14	32	0.9	<0.5	27	9	--	--
97	98-89	--	NW	NE	9	39	6	572910	4671880	Qbbl	B	51.43	1.18	17.29	3.34	5.50	0.15	6.72	9.00	3.35	0.81	0.30	0.85	99.92	9.45	8.3	663	21.3	112	217	99	203	8.2	19.7	60	87	31	287	14	36	<0.5	1.4	27	8	--	--
98	98-57	--	NE	SW	30	38	7	579070	4675880	Qbbl	B	51.45	1.10	17.99	1.85	6.70	0.15	6.43	8.83	3.40	0.68	0.26	0.76	99.60	9.30	5.9	529	21.7	101	207	98	152	6.6	18.8	66	80	31	270	11	29	0.8	<0.5	26	9	--	--
99	00-101	--	NE	NW	15	39	6	574390	4670140	Qbbl	B	51.47	1.19	17.50	3.40	5.50	0.16	6.55	8.74	3.47	0.73	0.30	0.84	99.85	9.51	7.0	661	22.9	121	207	85	180	6.5	18.3	45	81	31	341	16	33	<0.5	1.1	27	5	--	--
100	06SM-42	--	SE	SE	23	39	6	576640	4667320	Qbbl	B	51.47	1.19	17.43	3.35	5.50	0.16	6.68	8.86	3.46	0.75	0.30	0.98	100.13	9.46	10.4	730	29.1	112	214	92	168	7.9	18.8	79	88	35	382	15	34	<0.5	1.7	27	6	--	--
101	99-60	--	NE	SE	30	38	7	579840	4675970	Qbbl	B	51.57	1.15	18.04	2.30	6.51	0.16	5.88	8.81	3.48	0.69	0.26	0.79	99.64	9.53	6.9	546	23.3	110	198	75	112	7.4	19.9	78	77	30	297	13	26	1.1	2.6	22	5	--	--
102	06SM-44	--	NE	NE	10	39	6	574940	4671790	Qbbl	B	51.60	1.29	18.90	3.19	5.95	0.15	5.36	8.01	3.81	0.59	0.24	1.28	100.37	9.80	10.3	676	27.5	91	202	83	71	3.2	20.0	57	84	36	342	9	19	<0.5	3.6	23	6	--	--
103	06SM-3	--	NW	NW	11	39	6	575510	4671800	Qbbl	B	51.71	1.13	18.17	2.26	6.21	0.15	6.38	8.72	3.33	0.64	0.27	1.22	100.19	9.16	8.0	597	32.1	98	199	75	126	4.9	19.1	79	78	32	384	14	24	0.5	1.5	25	6	--	--
104	98-55A	--	SW	NE	31	38	7	579220	4674720	Qbbl	B	51.73	0.75	21.89	5.27	1.50	0.11	4.13	10.02	3.39	0.61	0.13	0.52	100.05	6.94	4.5	840	13.1	55	145	53	83	3.5	19.1	61	65	19	202	8	21	0.8	<0.5	23	8	--	--
105	CM04-20	--	NE	SE	15	39	6	574850	4669390	Qbbl	B	51.73	1.17	17.15	2.84	6.17	0.15	6.59	8.54	3.22	0.73	0.28	1.09	99.66	9.70	10.9	677	22.8	109	198	93	164	7.1	19.3	36	79	36	345	--	--	<0.5	2.6	26	4	--	--
106	98-86	--	SW	NE	11	39	6	576380	4671570	Qbbl	B	51.75	1.02	18.61	5.02	3.81	0.15	6.16	6.86	3.21	0.73	0.21	2.85	100.38	9.25	8.5	558	19.1	89	150	116	149	5.5	20.9	40	72	28	359	10	27	0.7	<0.5	20	8	--	--
107	06SM-4	--	NE	NE	3	39	6	574900	4673470	Qbbl	B	51.76	1.13	19.24	3.15	5.51	0.14	5.38	8.15	3.94	0.64	0.19	0.71	99.94	9.27	10.0	756	28.2	85	183	75	46	2.7	21.0	90	74	32	347	14	18	0.5	1.9	23	6	--	--
108	95-67	--	SW	SW	20	39	7	580240	4667660	Qbbl	B	51.77	0.92	19.72	2.60	5.30	0.13	5.61	8.86	3.49	0.50	0.17	0.51	99.58	8.49	4.3	720	16.9	73	200	72	77	4.6	20.3	66	75	29	326	9.7	14.1	0.7	1.5	23.4	6.2	--	--
109	00-98	--	NE	NW	13	39	6	577610	4670120	Qbbl	B	51.79	0.76	21.64	3.04	3.84	0.11	4.04	9.25	3.35	0.55	0.13	1.09	99.59	7.31	5.7	807	14.4	66	154	46	89	1.9	19.1	49	59	20	273	6	14	<0.5	0.9	20	3	--	--
110	CM04-23	--	NE	NE	23	39	6	576710	4668790	Qbbl	B	51.82	1.00	19.11	3.40	5.04	0.14	5.37	7.62	3.22	0.62	0.21	2.05	99.60	9.00	6.8	572	23.7	91	174	87	95	4.8	20.3	88	72	30	560	--	--	<0.5	<0.5	22	5	--	--
111	06SM-6	--	SW	NW	34	38	6	573610	4674790	Qbbl	B/BA	52.00	1.05	19.32	2.80	5.64	0.14	5.20	8.04	4.04	0.69	0.18	0.42	99.52	9.07	10.3	766	18.2	83	189	67	41	3.3	20.0	45	82	33	365	12	23	<0.5	0.9	22	7	--	--
112	06SM-5	--	NW	SW	34	38	6	573800	4674410	Qbbl	BA	52.03	1.08	19.30	3.55	5.20	0.14	5.04	7.83	3.99	0.70	0.19	0.82	99.87	9.33	11.5	754	18.2	84	190	67	33	2.8	20.6	70	78	32	378	10	19	<0.5	0.9	23	6	--	--
113	98-88	--	NW	SE	3	39	6	574670	4672880	Qbbl	BA	52.06	1.11	18.04	4.30	4.50	0.15	5.58	9.20	3.47	0.56	0.26	0.80	100.03	9.30	3.8	565	23.2	97	208	81	149	5.7	20.3	62	75	27	304	10	28	<0.5	1.3	24	8	--	--

(continued on next page)

Table 1 (page 3).

Map no.	Sample no.	K-Ar Age([a]) Ma	1/4 of 1/4	1/4	Sec.	T. (S.)	R. (E.)	UTM E m	UTM N m	Unit	Lith.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI (%)	Total (%)	Fe_2O_3T	Rb	Sr	Y	Zr	V	Ni	Cr	Nb	Ga	Cu	Zn	Co	Ba	La	Ce	U	Th	Sc	Pb	Yb	Be
114	06SM-7	--	NW	SW	34	38	6	573640	4674270	Qbbl	BA	52.16	1.08	19.59	2.99	5.53	0.14	5.01	7.65	3.98	0.72	0.20	1.43	100.48	9.14	11.6	734	18.4	84	197	75	35	2.8	20.1	93	81	35	393	11	20	1.3	0.5	21	6	--	--
115	98-83	--	NW	SE	12	39	6	577840	4671110	Qbbl	BA	52.32	0.78	21.41	1.64	4.90	0.11	4.21	9.05	3.49	0.57	0.14	1.26	99.88	7.09	3.2	824	13.7	58	158	47	69	3.7	21.0	49	60	23	254	7	16	1.1	<0.5	21	7	--	--
116	99-73	--	SE	NW	12	39	6	577370	4671450	Qbbl	BA	52.33	0.97	19.56	1.96	6.00	0.14	5.14	7.90	3.57	0.60	0.19	1.86	100.22	8.63	3.4	664	21.9	86	180	58	100	5.2	20.5	88	71	28	344	11	32	1	2.5	22	5	--	--
117	06SM-45	--	NE	NE	10	39	6	574970	4671900	Qbbl	BA	52.34	1.09	18.07	1.95	6.33	0.15	6.19	9.01	3.46	0.64	0.27	0.86	100.36	8.98	9.5	613	19.6	103	211	75	124	4.5	19.0	69	80	34	352	10	23	0.6	1.5	26	6	--	--
118	95-12	--	SW	NE	11	39	6	576060	4671430	Qbbl	BA	52.37	1.20	17.72	4.60	4.50	0.15	5.95	8.15	3.86	0.69	0.30	0.48	99.97	9.60	4.9	726	21.5	100	193	116	134	6.3	19.7	61	95	28	334	15.1	33.7	0.8	1.9	23	5.4	--	--
119	99-61	--	SW	SW	1	39	6	576940	4672190	Qbbl	BA	52.37	0.77	21.30	1.40	5.23	0.11	4.21	9.36	3.52	0.56	0.14	0.97	99.94	7.21	3.6	835	15.5	61	171	45	80	4.7	20.6	85	61	21	286	3	19	1.5	1.1	20	3	--	--
120	06SM-2	--	SE	NW	11	39	6	575800	4671360	Qbbl	BA	52.41	1.20	18.14	2.67	6.15	0.15	5.82	8.08	3.86	0.74	0.33	0.99	100.54	9.50	8.3	785	25.3	101	185	94	107	5.3	19.8	83	87	33	360	14	26	<0.5	<0.5	25	6	--	--
121	06SM-59	--	NW	SE	11	39	6	576180	4671140	Qbbl	BA	52.43	0.96	18.69	2.38	5.66	0.14	6.24	8.05	3.55	0.69	0.21	1.04	100.04	8.67	11.6	647	18.5	91	181	131	129	5.0	19.0	80	79	34	356	12	20	0.6	<0.5	23	6	--	--
122	06SM-43	--	NE	SW	24	39	6	577380	4667690	Qbbl	BA	52.45	0.95	19.14	1.94	5.96	0.14	6.01	8.65	3.50	0.53	0.27	0.85	100.39	8.56	5.2	672	17.5	88	179	104	106	4.4	19.5	70	78	33	340	10	23	<0.5	1.5	23	6	--	--
123	06SM-8	--	NE	NW	3	39	6	574110	4673430	Qbbl	BA	52.53	1.10	18.36	1.78	6.35	0.15	5.96	9.05	3.51	0.66	0.25	0.66	100.36	8.84	10.5	635	19.5	89	207	58	105	4.5	18.6	72	80	30	323	13	21	<0.5	2	24	6	--	--
124	CM04-24	--	SE	SW	13	39	6	577280	4669250	Qbbl	BA	52.55	0.96	18.38	4.26	4.98	0.14	5.33	8.32	3.44	0.66	0.21	0.97	100.20	9.79	8.9	620	21.1	87	168	91	93	4.5	20.0	72	70	30	434	--	--	0.8	1.9	22	5	--	--
125	00-100	--	NW	SE	11	39	6	576330	4670940	Qbbl	BA	52.64	0.93	18.28	3.13	4.88	0.14	6.09	8.02	3.53	0.67	0.21	0.73	99.25	8.55	7.3	593	18.5	98	179	123	171	4.0	18.1	51	75	31	319	12	24	<0.5	1.1	23	5	--	--
126	98-92	--	SE	NE	11	39	6	576550	4671680	Qbbl	BA	52.64	0.94	18.13	3.49	4.56	0.15	6.14	8.27	3.59	0.69	0.21	0.74	99.55	8.56	6.5	587	19.4	92	186	128	163	5.8	19.4	75	77	30	393	12	25	<0.5	<0.5	24	9	--	--
127	98-56	--	SE	SW	30	38	7	579110	4675340	Qbbl	BA	52.67	0.92	19.46	4.55	3.28	0.13	5.19	8.76	3.67	0.62	0.19	0.60	100.04	8.20	6.1	674	16.7	75	184	67	81	4.9	19.1	57	75	27	296	9	16	0.6	0.5	25	8	--	--
128	98-100	--	NE	SW	24	39	6	577320	4667940	Qbbl	BA	52.78	0.95	18.69	2.29	5.67	0.13	5.53	8.26	3.63	0.68	0.21	0.84	99.66	8.59	7.3	587	27.1	88	177	89	100	6.2	20.5	71	72	28	331	23	23	0.9	0.5	23	9	--	--
129	95-13	--	SW	NE	11	39	6	576240	4671400	Qbbl	BA	52.97	0.91	18.36	2.53	5.38	0.13	6.37	8.47	3.53	0.64	0.19	0.50	99.98	8.51	8.3	608	14.1	73	170	119	152	4.9	19.8	79	72	27	297	6.3	30	0.4	1.2	22.2	7.9	--	--
130	98-55B	--	SW	NE	31	38	7	579220	4674720	Qbbl	BA	52.99	1.09	19.86	8.67	0.38	0.20	2.76	7.54	3.93	0.56	0.27	1.39	99.64	9.09	4.5	706	17.2	89	165	19	41	4.9	21.3	65	92	27	338	10	27	<0.5	<0.5	28	9	--	--
131	99-70	--	SE	NE	19	39	7	579970	4668330	Qbbl	BA	53.00	0.91	18.83	2.89	4.93	0.14	5.10	8.46	3.64	0.84	0.19	0.82	99.75	8.37	8.6	692	18.9	83	194	61	98	5.0	19.3	81	73	26	326	9	18	0.9	1.5	21	4	--	--
132	95-62	--	SE	SW	16	39	7	582220	4669150	Qbbl	BA	53.42	1.03	17.96	3.09	5.20	0.14	6.08	8.01	3.63	0.80	0.24	0.60	100.20	8.87	11.8	594	17.2	77	190	114	167	5.1	19.5	72	78	29	332	10.4	21.1	1.1	2.4	23.4	7.2	--	--
133	98-85	--	NW	SE	1	39	6	577940	4672740	Qbbl	BA	53.52	0.88	20.08	2.17	5.08	0.12	3.94	8.55	3.75	0.69	0.16	0.98	99.92	7.82	4.9	757	17.6	67	184	33	55	4.4	21.3	73	66	21	308	9	18	0.9	0.7	23	8	--	--
134	95-55	--	NW	NE	20	39	7	580900	4668500	Qbbl	BA	53.54	0.93	19.02	2.41	5.32	0.13	5.08	8.46	3.62	0.71	0.18	0.70	100.10	8.32	10.1	691	16.2	77	190	63	83	4.6	19.8	68	73	25	319	12.2	24.7	0.5	1.1	23.7	6.4	--	--
135	95-56	--	SW	SW	17	39	7	580250	4669150	Qbbl	BA	53.63	0.93	18.92	4.81	3.16	0.13	5.09	8.46	3.55	0.71	0.18	0.64	100.21	8.32	9.7	689	16.5	78	192	66	73	4.3	19.9	75	79	26	302	10.7	24.6	0.7	1	24.3	6.2	--	--
136	99-76	--	NW	NE	12	39	6	577750	4672080	Qbbl	BA	53.74	0.90	20.03	3.67	3.90	0.13	3.85	8.47	3.89	0.64	0.15	0.79	100.16	8.00	5.2	775	18	73	178	27	83	4.4	21.2	68	69	21	304	8	25	<0.5	2.6	21	4	--	--
137	99-75	--	SE	SE	1	39	6	578340	4672200	Qbbl	BA	54.19	0.88	19.90	2.48	4.73	0.12	3.78	8.11	3.88	0.72	0.16	1.34	100.29	7.74	8.0	747	24.4	73	191	27	82	4.5	20.1	85	67	21	359	12	17	<0.5	1.7	21	4	--	--
138	98-82	--	SE	NW	33	38	6	572760	4674670	Qbbl	BA	54.38	0.90	18.32	1.64	5.70	0.13	4.84	8.20	3.76	0.91	0.26	0.75	99.79	7.97	10.7	721	17.2	106	176	44	77	6.1	20.8	76	69	20	455	13	36	1	0.9	20	9	--	--
139	98-59	1.46 +/- 0.05	SE	NW	28	38	7	582130	4676300	Qbar	BA	54.03	1.00	18.55	6.42	1.90	0.14	4.83	7.71	3.88	0.84	0.27	0.62	100.19	8.53	11.7	625	21	104	158	62	68	5.9	19.9	38	81	23	435	12	29	0.8	1	18	15	--	--
140	04SM-56	--	NE	NW	5	39	7	580610	4673690	Qbar	BA	52.72	0.97	18.78	2.75	5.49	0.14	5.62	8.55	3.37	0.54	0.21	1.10	100.24	8.85	6.7	634	20.0	90	176	91	95	4.7	20.1	240	72	31	378	--	--	<0.5	<0.5	22	5	--	--
141	04SM-58	--	NE	NW	32	38	7	580510	4675300	Qbar	BA	53.13	1.00	18.66	2.17	6.02	0.14	4.99	8.45	3.57	0.57	0.21	0.93	99.84	8.86	5.8	690	20.7	84	192	47	66	4.4	20.7	80	74	26	381	--	--	<0.5	<0.5	22	6	--	--
142	04SM-59	--	NW	SE	29	38	7	580920	4676080	Qbar	BA	53.56	0.98	18.43	2.55	5.57	0.14	4.95	8.29	3.59	0.64	0.20	1.03	99.93	8.74	7.2	676	18.7	83	182	47	70	4.0	20.4	89	71	28	386	--	--	<0.5	1.8	22	5	--	--
143	04SM-55	--	SE	SE	5	39	7	581410	4672480	Qbar	BA	53.79	0.97	18.45	2.55	5.57	0.14	4.99	8.16	3.56	0.68	0.20	1.01	100.07	8.74	10.2	674	19.8	80	161	47	68	3.8	20.1	275	67	27	346	--	--	0.8	0.9	23	5	--	--
144	98-60	--	SE	SW	33	38	7	582140	4674060	Qbar	BA	54.19	0.96	18.54	1.64	5.82	0.14	5.11	7.91	3.67	0.93	0.26	0.88	100.05	8.11	6.5	608	19.5	105	166	66	83	6.2	20.0	61	73	24	428	12	31	1.3	<0.5	21	10	--	--
145	06SM-69	--	SW	NE	31	38	7	579570	4674890	Qbar	BA	54.31	1.00	18.38	2.68	5.31	0.13	4.26	7.79	3.90	0.78	0.17	1.34	100.05	8.58	10.5	768	16.9	80	224	25	58	3.1	20.7	84	84	30	315	8	20	<0.5	1.4	25	6	--	--
146	04SM-57	--	SE	SE	32	38	7	581300	4674140	Qbar	BA	54.61	0.95	18.14	1.72	6.00	0.14	4.82	7.86	3.42	1.01	0.26	1.05	99.98	8.39	14.3	635	19.4	107	159	66	75	5.4	19.8	57	73	26	493	--	--	<0.5	1.8	22	7	--	--
147	06SM-70	--	SW	NE	31	38	7	579570	4674890	Qbar	BA	54.61	1.01	18.35	2.63	5.32	0.13	4.03	7.78	3.80	0.74	0.17	1.75	100.32	8.54	10.5	767	17.4	82	221	23	56	2.9	20.2	91	89	30	325	11	18	<0.5	1.5	26	5	--	--
148	98-58	--	SW	SE	28	38	7	582500	4675510	Qbar	BA	54.89	0.94	18.44	2.04	5.46	0.14	4.88	7.83	3.83	0.94	0.27	0.49	100.15	8.11	5.5	611	19.5	109	172	68	105	6.3	19.1	57	77	24	406	14	27	1.1	0.5	20	9	--	--
149	06SM-68	--	SE	SE	31	38	7	579800	4674050	Qbar	BA	55.05	1.01	17.58	2.45	5.43	0.13	4.12	7.82	4.07	0.77	0.19	0.74	99.36	8.48	10.5	766	17.7	82	220	21	50	3.3	20.6	123	80	29	364	9	23	<0.5	1.2	27	6	--	--
150	98-80	--	SW	NE	34	38	6	574630	4674760	Qbbp	B	51.40	1.01	18.75	3.05	5.23	0.14	5.64	9.32	3.59	0.60	0.19	0.95	99.87	8.86	5.0	700	20.5	88	189	75	97	5.5	19.9	63	74	28	305	12	25	<0.5	0.8	24	8	--	--
151	99-39	--	SE	NW	27	38	6	574080	4676140	Qbbp	B	51.72	1.17	18.31	1.05	7.66	0.15	6.05	8.89	3.68	0.63	0.22	0.75	100.28	9.56	5.9	598	22.6	82	204	78	125	3.0	20.2	70	75	31	272	10	25	0.9	1.9	24	4	--	--
152	98-69	--	NE	NE	28	38	6	573250	4676700	Qbbp	BA	52.12	0.95	18.85	1.88	5.79	0.13	5.62	8.97	3.58	0.71	0.20	0.97	99.77	8.31	7.7	679	19.7	82	188	64	112	5.5	19.5	61	67	24	324	12	21	0.7	0.8	22	9	--	--
153	98-68	--	NE	SW	22	38	6	573980	4677460	Qbbp	BA	52.20	0.99	18.42	2.93	5.01	0.13	5.69	9.01	3.61	0.73	0.20	0.73	99.65	8.50	8.8	665	24.5	85	178	68	111	5.8	19.2	54	69	25	301	14	27	0.8	1.3	22	9	--	--
154	95-11	--	SW	NE	34	38	6	574520	4674860	Qbbp	BA	52.61	1.06	19.18	2.74	5.69	0.13	4.95	7.90	3.92	0.68	0.17	1.03	100.06	9.06	9.8	717	17.4	76	183	65	31	4.1	21	85	74	25.2	331	9.2	22	0.6	0.4	19.7	5.9	--	--
155	99-38	--	NE	SE	28	38	6	573330	4676040	Qbbp	BA	53.44	1.02	18.54	2.11	5.55	0.13	4.82	9.07	3.73	0.79	0.22	0.81	100.23	8.28	8.4	768	20.9	94	168	35	87	4.7	21.1	63	70	23	337	14	29	1.2	3.3	22.4	4	--	--
156	06SM-26	--	NW	NE	2	39	6	576310	4673630	Qbac	B	50.78	1.02	19.37	2.97	5.24	0.14	5.73	9.49	3.49	0.46	0.20	1.18	100.07	8.79	2.9	773	19.0	91	206	78	88	4.5	20.4	86	79	20	359	12	25	<0.5	<0.5	24	6	--	--
157	06SM-67	--	SW	NW	5	39	7	580290	4673190	Qbac	BA	52.06	0.98	19.35	1.89	6.13	0.14	5.94	8.47	3.47	0.51	0.21	1.10	100.25	8.70	2.6	677	17.3	90	189	96	90	4.7	19.5	72	81	34	352	11	21	<0.5	<0.5	22	6	--	--
158	98-97	--	NE	SE	6	39	7	580010	4672840	Qbac	BA	52.76	0.98	18.62	3.16	5.12	0.14	4.97	8.06	3.68	0.66	0.20	1.09	99.44	8.85	6.1	658	20.8	79	203	52	83	5.1	21.0	80	75	25	316	14	20	1.7	0.6	23	8	--	--
159	06SM-66	--	NW	SE	6	39	7	579460	4672550	Qbac	BA	52.93	0.98	18.49	3.51	4.75	0.14	5.36	8.36	3.74	0.63	0.20	0.65	99.74	8.79	5.7	729	17.7	82	210	54	77	4.1	19.7	61	84	33	354	12	22	<0.5	0.8	25	6	--	--
160	06SM-27	--	SW	SE	2	39	6	576240	4672110	Qbac	BA	53.09	1.00	18.34	3.31	4.64	0.14	4.17	7.86	4.09	0.77	0.19	2.71	100.31	8.47	9.1	768	18.3	77	212	23	54	3.5	20.1	108	80	28	383	11	20	<0.5	1.2	25	6	--	--
161	95-9	--	NW	NE	6	39	7	579520	4673350	Qbac	BA	53.23	0.95	18.96	6.01	2.40	0.13	5.23	8.59	3.78	0.67	0.18	0.55	100.68	8.68	6.3	687	16.6	76	118	69	83	4.8	19.8	82	81	28	303	10.5	25	0.4	0.8	25.8	5.5	--	--
162	98-64B	--	SE	SE	24	38	6	578340	4677230	Qbac	BA	53.81	1.09	18.56	6.60	2.18	0.15	3.89	7.38	4.14	0.67	0.15	1.36	99.98	9.02	1.2	679	21.5	74	202	24	43	4.6	21.3	83	82	21	337	9	24	0.9	<0.5	27	9	--	--
163	06SM-25	--	NW	SE	2	39	6	576400	4672650	Qbac	BA	53.89	1.02	18.61	5.08	3.27	0.13	4.29	7.94	4.09	0.66	0.18	0.81	99.97	8.71	5.7	774	18.5	78	224	22	54	2.9	20.6	110	80	18	397	11	23	0.5	<0.5	25	6	--	--
164	06SM-1	--	SE	SE	34	38	6	575090	4674030	Qbac	BA	54.02	0.88	18.97	2.22	5.22	0.12	4.85	8.14	3.82	0.72	0.18	0.92	100.06	8.02	8.0	861	15.9	77	173	43	55	3.0	20.0	102	71	27	351	11	19	0.8	0.8	22	5	--	--
165	98-61	--	NE	SW	19	38	7	578810	4677580	Qbac	BA	54.08	0.87	18.95	1.82	5.45	0.13	4.71	8.08	3.84	0.73	0.18	0.69	99.53	7.88	5.8	758	17.8	68	181	42	51	4.2	19.6	62	70	24	314	12	21	<0.5	<0.5	21	8	--	--
166	98-79	--	NE	SW	35	38	6	575660	4674490	Qbac	BA	54.24	0.85	19.00	2.49	5.05	0.13	4.68	8.07	3.84	0.70	0.16	0.84	100.05	8.10	4.8	771	15	65	185	42	64	3.9	20.2	63	70	24	287	6	23	<0.5	<0.5	22	8	--	--
167	99-74	--	SE	NW	2	39	6	575770	4672900	Qbac	BA	54.62	0.86	18.97	2.69	4.76	0.13	4.58	7.93	3.90	0.73	0.17	0.79	100.13	7.98	6.8	799	21.8	74	165	38	86	4.7	20.3	50	68	23	310	10	28	1.1	2.2	20	5	--	--
168	99-46	--	NE	NE	34	38	6	575080	4675240	Qbac	BA	54.69	0.85	18.95	2.81	4.62	0.14	4.58	8.04	3.87	0.73	0.17	0.78	100.23	7.94	5.5	799	21	71	151	38	65	4.4	20.8	54	68	23	314	12	20	0.8	2.7	18	3	--	--
169	99-77	--	NW	SW	6	39	7	578520	4672550	Qbac	BA	54.83	1.01	18.17	3.02	5.11	0.14	4.05	7.98	4.21	0.69	0.18	0.65	100.04	8.70	4.5	725	24.2	81	219	19	79	4.8	20.8	108	74	22	337	12	23	0.7	2.8	27	4	--	--
170	99-52	--	NE	NW	1	39	6	577320	4673620	Qbac	BA	54.86	1.00	18.26	3.00	5.10	0.13	3.99	7.99	4.21	0.72	0.18	0.88	100.32	8.67	3.5	728	21.4	77	202	22	60	5.0	20.6	92	74	23	331	8	19	1.8	3.4	24	4	--	--
171	98-84	--	SE	NE	1	39	6	578250	4673050	Qbac	BA	54.92	1.01	17.76	3.14	4.87	0.14	4.11	7.94	4.16	0.77	0.18	0.40	99.40	8.55	6.2	699	17.7	74	219	20	48	4.4	21.4	118	74	22	319	11	25	<0.5	0.6	25	8	--	--
172	99-53	--	SW	NE	1	39	6	577620	4673270	Qbac	BA	55.00	0.87	18.64	3.23	4.36	0.14	4.45	7.99	3.98	0.77	0.18	0.65	100.26	8.08	6.8	766	17.5	78	183	30	69	4.3	19.8	67	71	21	291	6	18	1.6	2.7	21	3	--	--
173	98-64A	--	SE	SE	24	38	6	578340	4677230	Qbac	BA	55.10	1.06	18.01	3.85	4.31	0.14	3.82	7.58	4.33	0.82	0.18	0.68	99.88	8.64	7.1	703	21.2	72	230	22	42	4.9	20.1	88	79	20	338	9	24	0.9	<0.5	25	8	--	--
174	99-51	--	SE	SE	36	38	6	578370	4673910	Qbac	BA	55.24	1.01	18.28	4.83	3.35	0.14	3.85	7.69	4.18	0.77	0.18	0.51	100.03	8.55	5.6	729	20.1	79	183	19	48	4.9	21.1	75	74	22	336	6	22	1.1	4	21.7	4	--	--

(continued on next page)

Table 1 (page 4).

Map no.	Sample no.	K-Ar Age([a]) Ma	1/4 of 1/4	1/4	Sec.	T. (S.)	R. (E.)	UTM E m	UTM N m	Unit	Lith.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI (%)	Total (%)	Fe_2O_3T	Rb	Sr	Y	Zr	V	Ni	Cr	Nb	Ga	Cu	Zn	Co	Ba	La	Ce	U	Th	Sc	Pb	Yb	Be
175	99-50	--	SE	SE	36	38	6	578200	4673860	Qbac	BA	55.38	0.99	17.96	2.80	5.18	0.14	3.98	7.94	4.19	0.77	0.18	0.69	100.20	8.56	6.7	728	21.3	77	228	20	63	4.7	20.6	60	79	22	315	9	13	1.3	3.2	25	4.4	--	--
176	92-61	--	NE	SE	24	38	6	578330	4677600	Qbac	BA	56.06	1.10	17.54	2.87	5.23	0.13	3.56	7.28	4.39	0.86	0.20	0.34	99.56	8.68	9.1	700	19.3	71	249	16	35	3.7	22.8	106	79	24	357	8.5	16.2	1.2	3.6	26.4	4.9	--	--
177	99-49	--	SW	SE	36	38	6	577900	4674050	Qbac	TrA	56.31	1.20	17.25	5.67	3.31	0.16	2.91	6.68	5.57	0.95	0.20	0.73	99.94	9.35	7.1	672	25.3	87	256	10	25	5	21.3	96	79	22	426	12	21	2	3.2	22	5	--	--
178	95-10	--	NE	SE	35	38	6	576560	4674360	Qbac	BA	56.60	1.21	17.27	3.13	5.39	0.14	3.42	6.85	4.42	0.96	0.23	0.51	100.13	9.12	12.4	671	17.4	72	279	11	19	4.6	21.9	117	82	20	389	8.4	31.4	1.1	2.3	21.9	8.7	--	--
179	98-63	--	NW	NW	36	38	6	577050	4675290	Qbaa	BA	55.14	0.96	18.07	2.05	5.34	0.14	4.59	7.26	3.94	1.05	0.30	1.09	99.93	7.98	11.5	619	21.2	121	155	62	85	7	19.3	56	77	19	450	15	37	0.5	<0.5	21	11	--	--
180	99-44	--	NE	SE	22	38	6	574770	4677670	Qbaa	BA	55.38	1.00	18.26	1.14	6.54	0.14	4.51	7.36	3.92	0.92	0.32	1.10	100.59	8.41	9	615	23.9	131	162	56	96	6.5	20.5	70	79	23	493	17	36	1.9	2.9	20	7	--	--
181	06SM-33	--	NW	NE	36	38	6	577650	4675230	Qbaa	BA	55.48	0.96	18.16	1.85	5.56	0.13	4.54	7.26	3.82	1.07	0.30	1.09	100.22	8.03	15.8	665	32	123	151	62	77	5.9	19.1	76	80	24	505	20	32	1.7	1.1	19	8	--	--
182	99-45	--	SW	SW	26	38	6	575530	4675700	Qbaa	BA	55.74	0.96	17.80	2.11	5.46	0.14	4.49	7.26	3.86	1.17	0.30	0.96	100.25	8.18	12.8	632	26.3	118	164	60	106	4.9	19.7	67	81	23	451	19	31	1.7	2.4	19	7	--	--
183	99-48	--	SE	SW	24	38	6	577310	4677200	Qbaa	BA	56.28	0.94	17.84	1.80	5.48	0.14	4.30	7.18	3.86	1.16	0.29	0.83	100.10	7.89	14	609	23.2	129	152	55	98	7.9	19.4	58	79	24	425	16	32	1.9	3.6	19	7	--	--
184	04SM-60	--	SW	SW	21	38	7	581810	4677350	Qbrl	B	48.80	1.47	16.84	2.77	7.91	0.18	7.92	9.26	3.04	0.32	0.24	0.90	99.65	11.56	2.9	402	28.1	106	203	126	233	5	19.3	66	78	43	209	3	8	<0.5	0.8	28	4	--	--