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TECHNICAL REPORT FOR THE TENORIBA PROJECT SOUTHWESTERN CHIHUAHUA STATE, MEXICO

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Dacitic breccia at the Carneritos prospect at Tenoriba altered to quartz, kaolinite, and iron oxides

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1.0 SUMMARY

The purpose of this report is to provide Mammoth Resources Corp. (“Mammoth”; TSX-V:MTH) with an independent assessment of its early to mid-stage Tenoriba gold exploration project (“Tenoriba”), Mexico, including its geology and exploration potential. Tenoriba is located in the rugged central Sierra Madre Occidental in southwestern Chihuahua State, Mexico, approximately 170km east of Los Mochis, Sinaloa and 280km southwest of the city of Chihuahua. The authors have reviewed the data for the Tenoriba project, and Dr. Michael Ressel conducted five days of fieldwork at the Tenoriba site from November 17 through 21, 2020.

Epithermal deposits in the northern Sierra Madre Occidental (“SMO”) are subdivided into two main types: low- to intermediate-sulfidation vein-dominated deposits, and less abundant high-sulfidation, replacement-type deposits. The low- and intermediate-sulfidation vein deposits of the SMO are historically among the world’s most prolific and have made Mexico the world’s top producer of silver with over 10.6 billion ounces through 2010 (Clark and Fitch, 2013). The discovery of significant high-sulfidation epithermal deposits (e.g., Los Mulatos, El Sauzal, El Indio) in the early 2000s has spawned new interest in exploration in the SMO. In particular, the generally higher Au/Ag ratios and replacement style (i.e., bulk-disseminated) of high-sulfidation deposits has attracted the interest of many gold-producing companies as well as junior explorers focused more on gold than silver. The lack of discrete veins and therefore, vein-controlled bonanza grades, among most high-sulfidation deposits in the region resulted in little or no historical exploration and exploitation.

Tenoriba is an early- to mid-stage exploration project that contains four historically explored areas and several prospects that have yet to be evaluated. The four partly overlapping areas of historical exploration are aligned along a roughly 6km-long west-to-east zone and are referred to as Cerro Colorado, El Moreno, Masuparia and Carneritos, respectively. Three of the four areas have been drilled, and all of these returned significant gold intercepts. Cerro Colorado remains undrilled.

Mineralization at Tenoriba occurs in a south-tilted sequence of intermediate lavas, flow breccias, poorly welded ash-flow tuffs, and lesser volcaniclastic sedimentary rocks that are correlated with the regional Lower Volcanic Series of Eocene age. The volcanic and sedimentary units are underlain by Eocene granodiorite and diorite stocks. The Lower Volcanic Series rocks are locally overlain by an unaltered, nearly horizontal unit of silicic ash-flow tuff, which is correlated with the Upper Volcanic Series of Oligocene age. Gold mineralization at Tenoriba defined to date occurs near the angular unconformity between Lower and Upper Series volcanic units. Numerous epithermal deposits in the Sierra Madre Occidental occur in proximity to the regional unconformities developed between Lower and Upper Series volcanic rocks.

Features of altered and mineralized rocks at Tenoriba are consistent with a high-sulfidation epithermal style. Among some of the more distinguishing high-sulfidation features at Tenoriba, vuggy quartz and quartz-kaolinite (which includes abundant dickite) alteration occur in all four main exploration areas with the largest exposed bodies of vuggy quartz, up to 0.5 km^2, present to the east at Carneritos.

Several other geological and geochemical features (low Ag:Au ratio; a volcanic vent association, sulfide mineralogy) at Tenoriba are consistent with the interpretation that mineralized rocks are the product of a high-sulfidation epithermal system. The vuggy quartz and other replacement quartz bodies at Tenoriba are commonly hosted in a dacite breccia unit that is part of an eruptive volcanic center. The Mulatos and El Sauzal deposits, both large, economic, high-sulfidation deposits in the Sierra Madre Occidental are similarly spatially and temporally related to Lower Series dacitic domes, and dome rocks host most of the ore in these deposits. The Mulatos mine, located 170km northwest of Tenoriba in Sonora State, produced more than 2.0 million ounces of gold since 2005 and contains combined reserves, and measured and indicated resources of 6.2 million ounces of gold. The El Sauzal mine, located 75km north of Tenoriba in Chihuahua State went into production in 2004 and produced about 1.8 million ounces of gold through 2014.

Drill-ready targets are present at Masuparia, Carneritos, and El Moreno based on abundant mapping, surface sampling, geophysical surveying, and historical drilling. The Cerro Colorado area to the west of El Moreno remains undrilled and data for it are sparse. Cerro Colorado contains ledges of vuggy quartz with surface geochemistry of up to a few grams Au per tonne in rock-chip samples but lacks systematic sampling and other work.

Future exploration at Tenoriba would benefit from additional work as outlined below, including:

- Map and sample the north-facing exposures on the property.
- Re-assess the stratigraphic order of Mihalynuk and Pang (2008) through outcrop and core examination of tuff and epiclastic units that possess well-defined foliation or bedding.
- Contour absorption spectrometer data of clays (both down-hole and surface samples) as such information can help identify the highest temperature parts of the hydrothermal system, whether of a narrow and structurally defined character or broad, replacement style.
- Create an outcrop-style alteration map from existing data and new mapping. This can be overlaid with absorption spectrometry data, surface geochemistry, and surface geophysical plans for drill hole planning purposes.
- Draft cross sections for each exploration area. North-south sections are probably most appropriate to accurately depict unit dips. East-west “longitudinal” sections may be less useful in delineating unit geometries.

- Re-assessment of historical induced polarization ("IP") survey data at Carneritos with a geophysical consultant (in progress). It is important to have confidence in the IP, and the striking differences in overall resistivity (and chargeability) between Carneritos (relatively low resistivity) and Masuparia (high resistivity) demand a bit more scrutiny. Comparing resistivity data with physical properties obtained from hand samples may be useful.
- Fill gaps between existing geophysical surveys with IP and ground magnetics.
- Also, the Centerra and Geofísica resistivity models of the same dataset differ quite a bit; understanding what assumptions were made in the processing and the estimation parameters is important.
- Follow-up highly anomalous soils at lower elevations in tuffs and andesitic rocks because these units are interpreted to overlie favorable dacitic units. Thus, soil gold values in clay-altered tuff and andesite may reflect "leakage" into overlying units.
- Reconnaissance N-S soil lines in the area from Cerro Colorado to El Moreno may delineate new areas of targeted exploration.
- Follow up on locally sourced coarse gold in regolith at El Moreno.
- Drill hole planning that utilizes the full range of geologic, geochemical, and geophysical data available to assess and rank target areas accordingly.

Tenoriba is a high-quality early to mid-stage exploration project with potential to host an economic high-sulfidation epithermal deposit. The authors recommend a thorough and consistent exploration program over at least two years to evaluate the main prospect areas and also addresses areas that have to date seen little or no work, particularly to the east and west of the explored areas.

2.0 FREQUENTLY USED UNITS OF MEASURE, CONVERSIONS, ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

In this report, measurements are generally reported in metric units. Where information was originally reported in Imperial units, MDA has made the conversions as shown below.

Currency, units of measure, and conversion factors used in this report include:

Linear Measure

1 centimeter	= 0.3937 inch	
1 meter	= 3.2808 feet	= 1.0936 yard
1 kilometer	= 0.6214 mile	

Area Measure

1 hectare	= 2.471 acres	= 0.0039 square mile

Weight

1 tonne	= 1.1023 short tons	= 2,205 pounds
1 kilogram	= 2.205 pounds	

Concentration and Mass

1 troy ounce per short ton	= 34.2857 grams per metric tonne
1 weight percent	= 10,000 parts per million
1 gram per metric tonne	= 1 part per million

Currency Unless otherwise indicated, all references to dollars ($) in this report refer to currency of the United States.

<u>Frequently used acronyms and abbreviations</u>

Ag	silver
Au	gold
Cu	copper
Pb	lead
Zn	zinc
As	arsenic
Sb	antimony
Hg	mercury
cm	centimeters
core	diamond core-drilling method
ºC	degrees centigrade
°F	degrees Fahrenheit
ft	foot or feet

g/t	grams per tonne
GxT	grade-thickness (grams per tonne x length)
ha	hectares
IP	induced polarization (an electrical geophysical method)
kg	kilograms
km	kilometers
µm	micron
m	meters
Ma	million years old
Moz	million troy ounces
mi	mile or miles
mm	millimeters
nT	nanotesla, a unit of measure for magnetism
oz	troy ounce
ppm	parts per million
ppb	parts per billion
RC	reverse-circulation, a drilling method
SMO	Sierra Madre Occidental
t	metric tonne or tonnes
ton	Imperial short ton
%	percent

3.0 LOCATION AND ACCESS

The Tenoriba project ("Tenoriba") is located in rugged terrain of the Sierra Madre Occidental in the far southwestern corner of Chihuahua State, Mexico (Figure 3.1). The property is on a high, steep ridgeline between the Río Tenoriba and Arroya Santa Rosa adjacent to the communities of Santa Rosa, Durazno, and Manzano. The Masuparia prospect, located near the center of the property has coordinates: 26°24'23.4" N, 107°24'34.8" W. Elevations for the main prospect areas range from about 1580m to 2075m.

Tenoriba is approximately 280km southwest of Ciudad Chihuahua and 170km east of Los Mochis, Sinaloa; both Chihuahua and Los Mochis have international airports. The drive from Ciudad Chihuahua to Tenoriba is approximately 11 hours. The project is about 6km north of the village of San Juan de Nepomuceno, which has some basic services and a small dirt airstrip. The larger town of Baborigame, which has a population of about 4,000, is about 55km by dirt road but only 13km in a straight line east of Tenoriba but takes approximately 2.5 hours by vehicle. The preferred access to Tenoriba is via sporadic commercial, or charter, fixed-wing aircraft from Los Mochis to San Juan de Nepomuceno, which takes approximately 45 minutes. A rough dirt road that provides access to the communities of Durazno and Manzano follows the Río Tenoriba north of San Juan de Nepomuceno and is also the only road access to the project.

The principal exploration areas for Tenoriba lie on a high ridge with elevations between about 1400m and 2500m. Deeply incised canyons of the perennial Río Tenoriba and Arroya Santa Rosa that bound the ridge on the south and north, respectively, have base elevations of between 1000m and 1400m.

Pine and oak forest cover the entire Tenoriba property. Open forests characterize the south-facing slopes whereas forests are dense on north-facing aspects. Precipitation is seasonal, with the wet season generally from July to October. Climate is variable at Tenoriba, with cold, dry winters often with nighttime temperatures at or below freezing, and humid, wet summers with daytime temperatures commonly exceeding 40°C.

Figure 3.1 Location Map of the Tenoriba Exploration Project, Chihuahua, Mexico

The project falls within the Guachochi 1:250,000-scale topographic sheet (map G13-4) and the Basonopa 1:50,000-scale topographic sheet (map G13-A72), both issued by the Instituto Nacional de Estadística y Geografía ("INEGI"). Geologic maps of both map sheets are available through INEGI and the Servicio Geológico Mexicano.

4.0 REGIONAL GEOLOGY

The northern Sierra Madre Occidental ("SMO") in Sonora, Chihuahua, Sinaloa, and Durango states hosts many important volcanic-hosted epithermal precious-metal deposits (Figure 4.1; Camprubí et al., 2003). The deposits are coeval with Eocene and Oligocene volcanic rocks that comprise most exposed rocks in the SMO. Epithermal mineralization in the northern SMO spans a broad time range from Eocene to early Oligocene (~45-27 Ma), however two distinct age belts are present. One belt that occurs in the western SMO contains deposits that are generally older than ~38 Ma whereas those on the eastern flank of the SMO at this latitude are younger, generally less than ~35 Ma Figure 3.1; Camprubí et al., 2003). The dividing line between the two roughly defined belts lies near the drainage divide for the SMO, so broadly overlapping the Tenoriba project area.

The two distinct ages of mineralization within the northern SMO coincide with two equally distinct pulses of magmatism, an older one active from 46-40 Ma, and a younger pulse from 36 to 28 Ma.

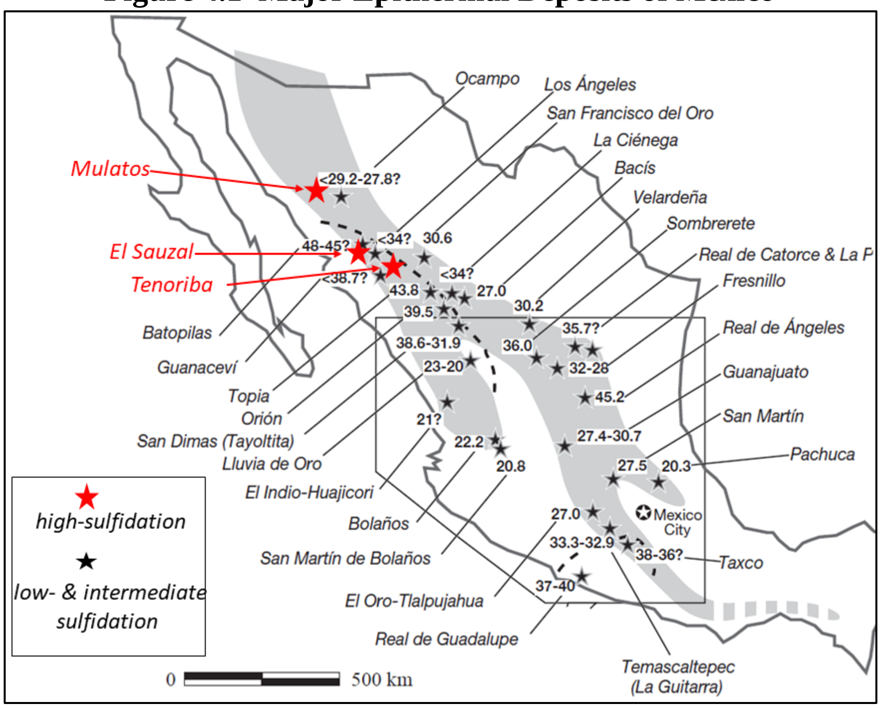
The older pulse corresponds to rocks regionally assigned to the Lower Volcanic Series, whereas the younger pulse overlaps the ages of regional unconformities between the Lower and Upper Volcanic Series. The compositions of arc rocks assigned to Lower versus Upper Volcanic Series differs. The Lower Series rocks are characterized by intermediate lavas and coeval intrusions with subordinate tuffs and silicic rocks. In contrast, the Upper Series rocks comprise more silicic ash-flow tuff with subordinate intermediate to silicic lavas, domes, and associated rocks. The time-space progression of magmatism was generally northeast-to-southwest (McDowell and McIntosh, 2012), which is generally attributed to steepening of the subducted Farallon plate or "slab rollback". Why magmatism was episodic and changed composition through time is still debated.

Periods of faulting both during and postdating magmatism disrupt the high volcanic plateau that comprises much of the SMO. Earliest east-striking faults are considered tensional in nature by Horner and Enriques (1999) and related to oblique late Eocene subduction. North-striking faults are considered to have initiated as compression-related dextral-slip faults, but these were later reactivated as normal faults as compression transitioned to extension in the late Oligocene. Younger northwest-striking normal faults also reflect the Oligocene to Miocene extension (Henry and Aranda-Gomez, 1992). Cenozoic extension in the SMO is variable. Eastern and western margins of the SMO have undergone significant extension, whereas the plateau interior of the SMO has seen little or no extension (McDowell and McIntosh, 2012).

4.1 Epithermal Deposits of the Sierra Madre Occidental

Epithermal deposits in the northern SMO are subdivided into two main types: low- to intermediate-sulfidation vein-dominated deposits, and less abundant high-sulfidation, replacement-type deposits. The low- and intermediate-sulfidation vein deposits of the SMO are historically among the world's most prolific and have made Mexico the world's top producer of silver with over 10.6 billion ounces through 2010 (Clark and Fitch, 2013). The discovery of significant high-sulfidation epithermal deposits (e.g., Los Mulatos, El Sauzal, El Indio) in the early 2000s has spawned new interest in exploration in the SMO. In particular, the generally higher Au/Ag ratios and replacement style (i.e., bulk-disseminated) of high-sulfidation deposits has attracted the interest of many gold-producing companies as well as junior explorers focused more on gold than silver. The lack of discrete veins and therefore, vein-controlled bonanza grades, among most high-sulfidation deposits in the region resulted in little or no historical exploration.

Figure 4.1 Major Epithermal Deposits of Mexico



The Sierra Madre Occidental belt is the gray-shaded belt extending from the U.S. border southward and nearest the Pacific coast. Dashed line separates older epithermal deposits on the west from younger deposits on the east (Camprubí et al., 2003).

Several important epithermal deposits occur in the northern SMO including several historic bonanza low- or intermediate- sulfidation Ag-Au vein systems at Batopilas, Guadalupe y Calvo, Guanacevi, and Tayoltita. Cumulative production from these four vein systems alone totals more than 12.8 million ounces of gold and 1.1 billion ounces of silver (Drobek, 2005; unpublished report). In addition, other major economic discoveries made in the northern SMO since 1985 include La Cienéga, Piños Altos, Ocampo, Palmarejo, Dolores, Mulatos, and El Sauzal, the latter two from gold-rich high-sulfidation deposits. El Sauzal is located about 75km north of Tenoriba and produced about 1.8 million ounces of gold between 2004 and 2014.

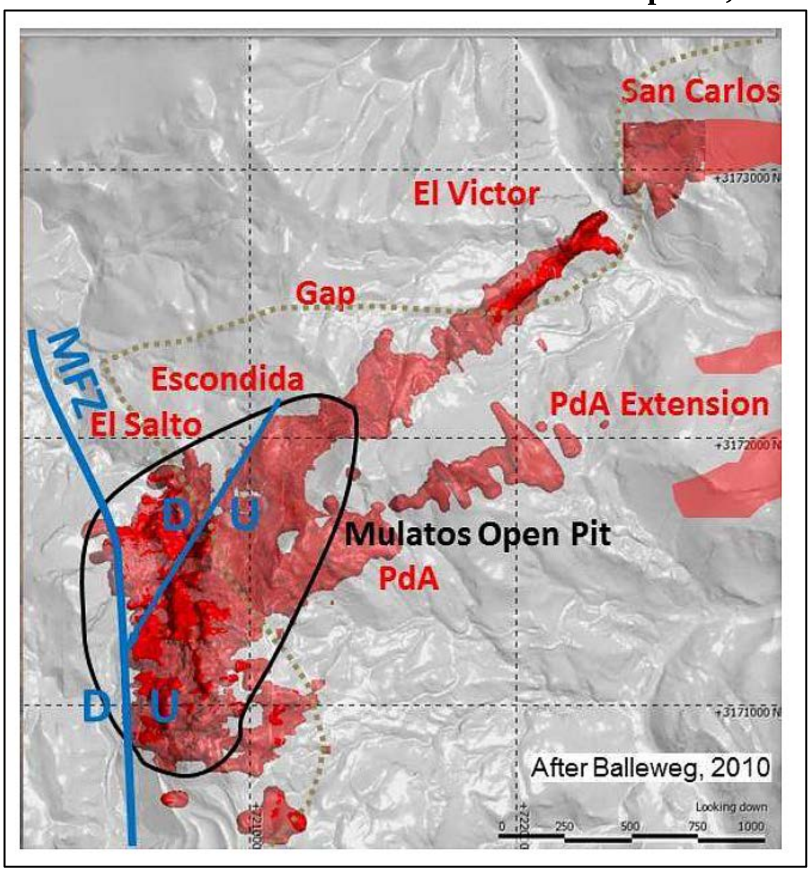
4.1.1 Mulatos High-Sulfidation Gold Deposit

Mulatos is a large high-sulfidation gold deposit located in southernmost Sonora State, about 170km northwest of the Tenoriba project. Mulatos has produced more than 2.0 million ounces of gold since 2005, and it contains combined reserves and measured + indicated resources of 6.2 million ounces of gold; Mulatos' global endowment is 8.5 million ounces of gold (Alamos Gold, 2020 annual report). Forecast gold production for 2020 is 140-150Koz. Mining takes place in several open pits and processing is through conventional heap-leaching of oxide ores with crushing and agglomeration circuits.

Economic oxide gold at Mulatos occurs almost entirely in dacite dome-related rocks including flow-banded flows, carapace breccias, block and ash flows, and small-volume dome-related pyroclastic and volcaniclastic rocks that cover about 10km^2 along a northeasterly trend (Balleweg, 2016). The gold mineralization using a lower gold grade cutoff and silicic alteration is essentially continuous along a 3km-long zone from El Salto/Mina Vieja on the southwest to El Victor/San Carlos on the northeast (Figure 4.2). Although long, this corridor of silicic alteration and gold mineralization averages about 300m width (plan view) but gradually thins northeastward. The thickness of siliceous bodies associated with gold mineralization are relatively consistent between about 200 and 250m, although adjacent to the Mulatos fault on the west, the mineralized zone is as much as 350m thick (Figure 4.3). This relationship suggests that early ore fluids (perhaps vapor-dominant) may have migrated long these faults initially before bleeding out into the receptive dome-associated volcaniclastic hosts beneath the Upper Series ash-flow tuffs and to a lesser degree in dacite and rhyolite flows and flow breccia. Of note, the NW-striking Mulatos fault is a regional down-to-west normal fault that has an estimated post-mineral displacement of >300m. Another prominent fault, the NE-striking, Escondido fault has as much as 350m of post-mineral displacement (Figure 4.3).

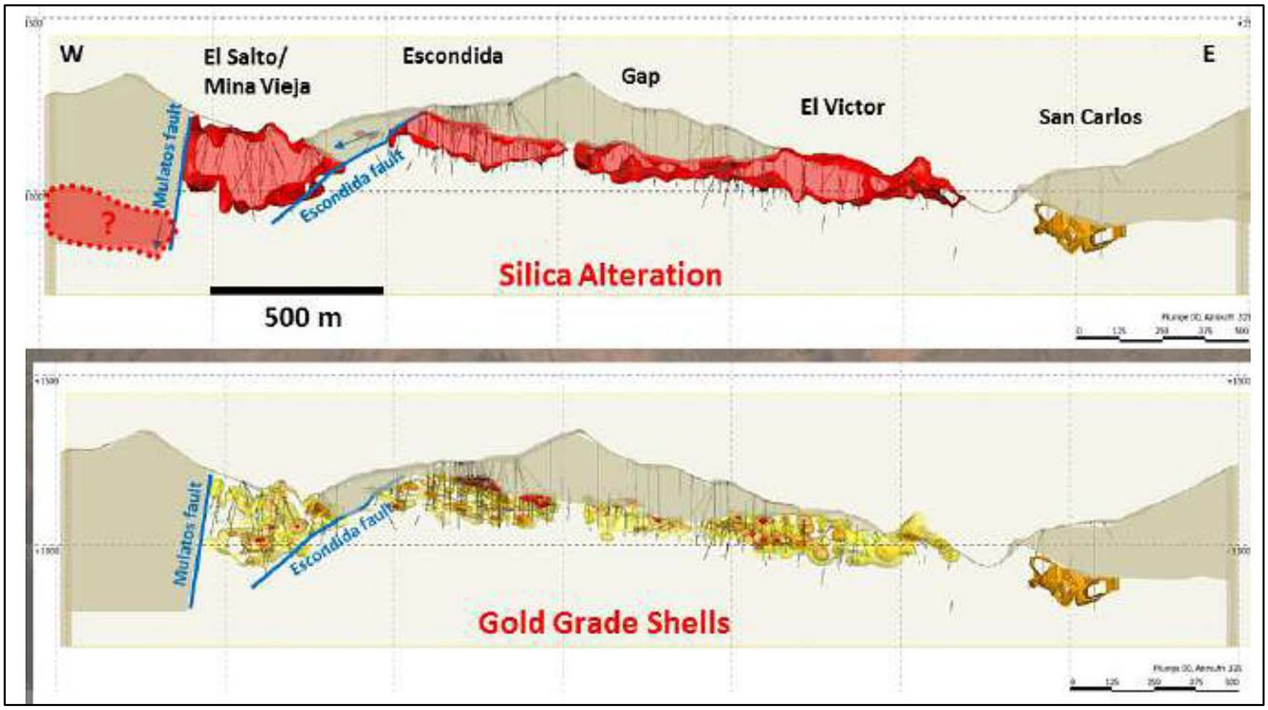
The volcanic dome complex at Mulatos occurs stratigraphically between weakly to unaltered ash-flow tuff of the Upper Volcanic Series and underlying Lower Volcanic Series clay-altered andesite flows and flow breccias (Figure 4.4; Balleweg, 2016; Staude, 2001). Dome-related rocks occur only sporadically along this contact in the Mulatos district. Thus, the hosting dacite-rhyolite domes occur at the unconformity between Upper and Lower Series rocks. Importantly, the domes have been partly eroded such that dacite-hosted ore immediately underlies essentially unaltered Upper Series ash-flow tuff (Figure 4.4). Erosion and weathering during the hiatus represented by the unconformity contributed to the deep oxidation observed in multiple sub-deposits at Mulatos. While domes control the distribution of mineralization at Mulatos, more permeable host strata, particularly very coarse to fine grained volcaniclastic rocks interpreted to be the pyroclastic aprons associated with the edge of individual domes are an important bulk-disseminated host. Although gold mineralization is related to early dacite domes, age dating by Staude (2001) suggests that the domes and gold mineralization are only slightly older than basal ash-flow tuff of the Upper Volcanic Series, with all having been emplaced between 32 and 30 Ma.

Figure 4.2 Silicic Alteration Associated with the Mulatos Deposits, Sonora, Mexico



Silicic alteration depicted in red at the Mulatos complex of high-sulfidation deposits. The thickest zones of silicic rock occur on the west along the Mulatos fault (MFZ). Silicic alteration occurs mainly in dacitic dome rocks and related breccia and tuff (Balleweg, 2016).

Figure 4.3 Long Sections of the Mulatos Deposits



Long sections of the Mulatos deposits showing widespread continuity of silicic alteration (red solids on top diagram) and gold grade shells (light yellow=Au>1g/t; red=Au>3g/t). Gold mineralization extends almost continuously for 2.5 kilometers. Tan solids above the mineralized zones are post-mineral rocks of the Upper Volcanic Series (Balleweg, 2016).

Hypogene mineralization at Mulatos occurs variably with pyrite, enargite, and native gold. Hypogene mineralization at the more distal (northeast) end of the deposit occurs only with pyrite and rare gold tellurides, whereas in the more proximal areas to the west (Estrella), gold occurs with enargite. Alteration also varies from proximal kaolinite-pyrophyllite-quartz to more distal kaolinite-quartz (and chalcedony)-barite. Two gold events are recognized, a main-stage event associated with quartz addition and advanced argillic alteration (alunite, pyrophyllite, kaolinite), and a late-stage event containing native gold, bismuthinite, barite, and quartz. Illite and illite-chlorite alteration assemblages occur outside the ore zones in weakly gold-mineralized rocks, particularly beneath and lateral to zones of residual or vuggy quartz and quartz-alunite-kaolinite-pyrophyllite-altered rocks. Epidote also is common at depth beneath vuggy quartz.

Figure 4.4 Escondida Pit at Mulatos and Close-up of Carapace Breccia

Image on the left shows the extensive cover considered part of the post-mineral Upper Volcanic Series that overlies ore-hosting dome-complex rocks at the high-grade Escondida pit, Mulatos mine. Right image is an outcrop of silicic alteration affecting the carapace breccia of a syn-mineral dacite dome in the Mulatos district (Balleweg, 2016).

Conduits for localizing fluid flow at depth are difficult to distinguish, although zoning of alteration and gold grade occurs symmetrically above an interpreted feeder dike to the silicic flow dome at Cerro Estrella (Staude, 2001). Deep core holes (>300m) under Mulatos encountered secondary biotite and chalcopyrite, characteristics permissive for porphyry-type mineralization.

4.1.2 El Sauzal High-Sulfidation Gold Deposit

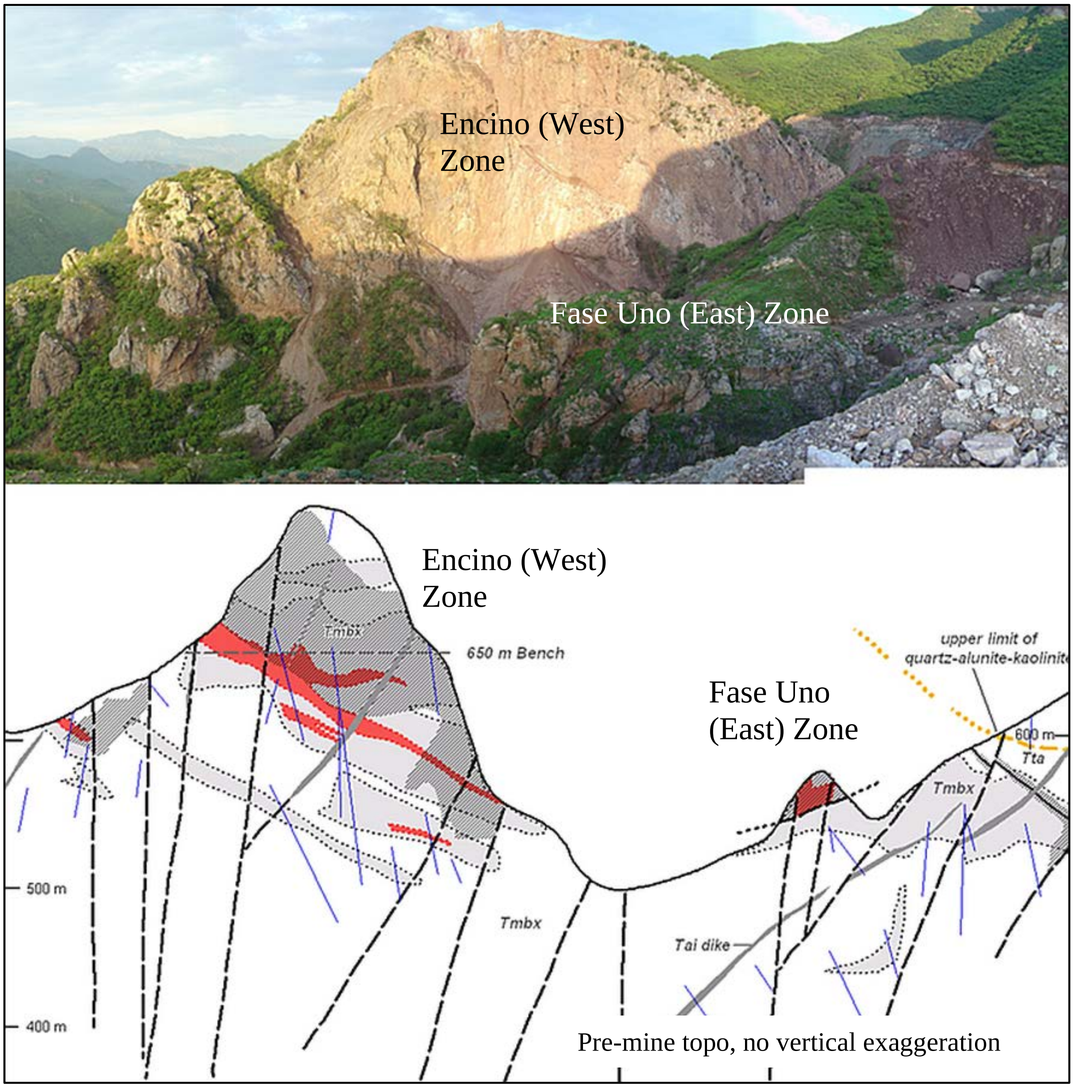
El Sauzal is located 75km north of Tenoriba in Chihuahua State but close to the borders of both Sinaloa and Sonora states. Sauzal is located about 15km west of Batopilas, a major historic low-sulfidation epithermal camp. However, no evidence of early workings are recognized at Sauzal. Sauzal was discovered in 1995 and went into production in 2004, producing about 1.8 million ounces of gold through 2014. Mining was from an open pit, and ores were treated through conventional oxide milling and tank-leaching. The sulfide potential at El Sauzal is not known.

Gold mineralization is associated with, from lowest to highest: coarse-clast megabreccia tuff, dome-related rhyolitic to dacitic lavas and tuff, and capping andesite flows and flow breccia (Figure 4.5 and Figure 4.6; Weiss and Espinoza, 2007).

A mineralized porphyritic andesite stock is located to the west of the El Sauzal mine (Weiss and Espinoza, 2007). Volcanic rocks at Sauzal were originally interpreted (Charest et al., 2005) to be the upper part of the Lower Volcanic Series, but Weiss and Espinoza (2007) suggest that the distinction between Lower and Upper Series is unclear at Sauzal based on a lack of precise dating of units and conflicting interpretations from various studies; Weiss and Espinoza suggest the entire ore-hosting sequence at Sauzal is Oligocene and therefore wholly within what is traditionally termed the Upper Volcanic Series. Two alunite ages from mineralized rocks at Sauzal by Sellepack (1997) constrain mineralization to between about 29.5 and 31.4 Ma.

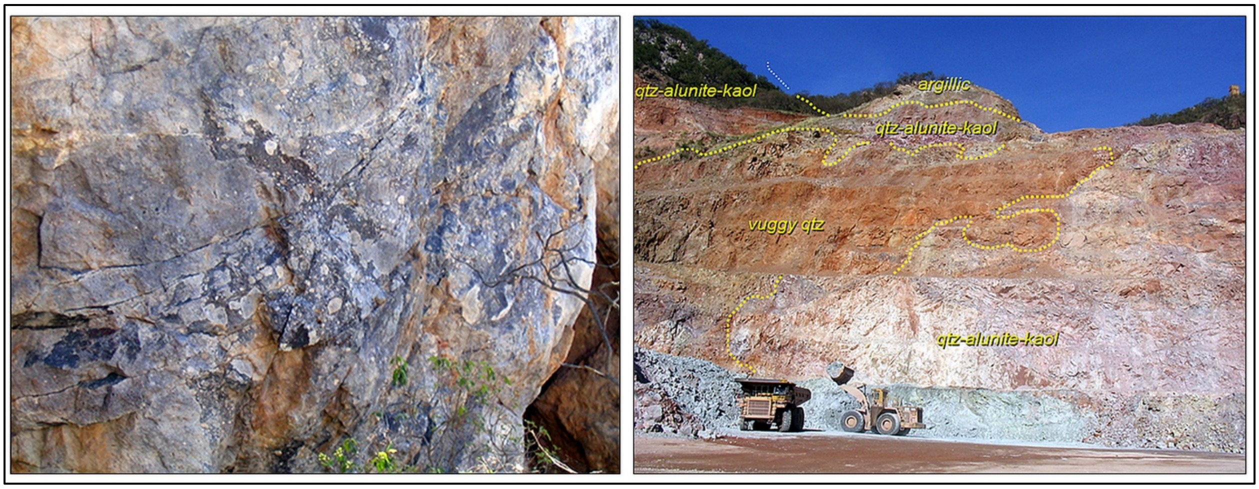
Most of the ore at Sauzal was contained in the megabreccia unit, and weaker mineralization extended into overlying units. In the megabreccia, higher-grade mineralization (≥10g Au/t) was mostly contained in quartz-kaolinite-alunite rock immediately beneath overlying vuggy to massive quartz rock that contained generally lower grades (Weiss and Espinoza, 2007); small volumes of high-grade ore extended into vuggy quartz rock. Between 50% and 75% of ore at Sauzal consisted of quartz-kaolinite-alunite rock, and the rest was contained in friable to vuggy quartz (Figures 4.5, 4.6 and 4.7). The upper zone of quartz-kaolinite-altered rock encloses cores of vuggy quartz; quartz-kaolinite alteration grades outward and upward into strongly clay-altered rocks (Figure 4.5 and Figure 4.7). Visible gold occurred in the highest-grade rocks (10-50g Au/t) altered to both vuggy quartz and quartz-kaolinite and containing abundant hematite.

Figure 4.5 Pre-Mining View of El Sauzal Deposit, Chihuahua, Mexico



Top is a view to southwest toward the prominent cliff of quartz-kaolinite-alunite and vuggy quartz rock that comprised the El Sauzal deposit pre-mining. Kaolinite dominates proximal alteration above and lateral to the deposit, which eventually grades outward to mixed clays, and farther out, a chlorite-dominant assemblage. The bottom cross section looks northwest. Most ore was hosted in a heterolithic volcanic breccia (unit Tmbx) associated with dacitic/rhyolitic domes. Red shapes are Au>10g/t; light gray areas with stippled borders are Au>0.8g/t. Dark gray shading are areas of vuggy quartz alteration; quartz-kaolinite alteration represents all areas outside of vuggy quartz. Note that much of the highest gold grades at El Sauzal were located at the transition between vuggy quartz and underlying quartz-kaolinite rock. From Weiss and Espinoza (2007) and Weiss et al. (2011).

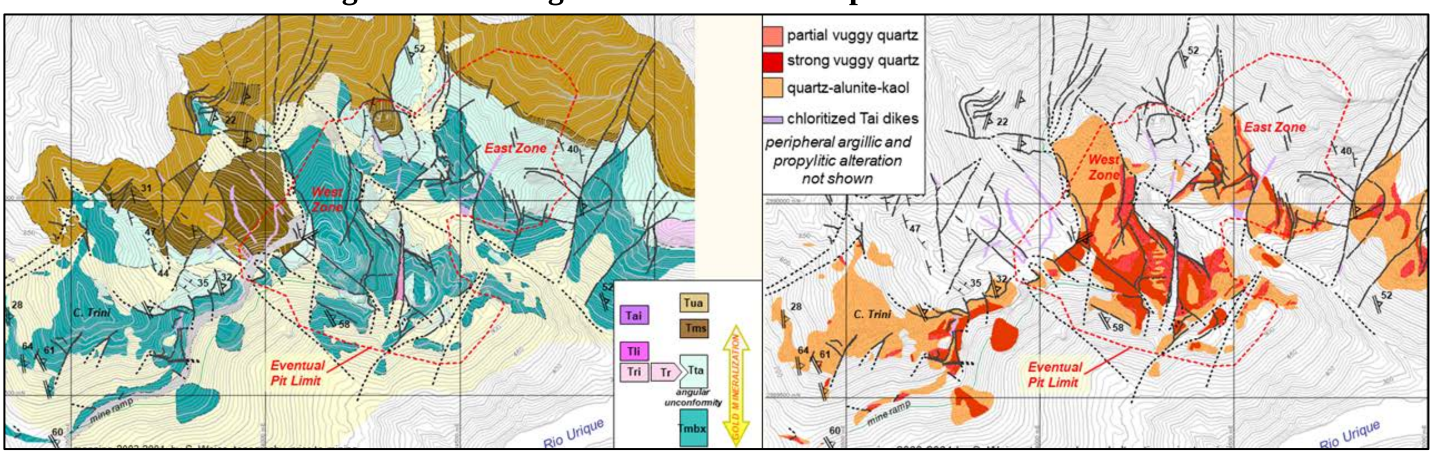
Figure 4.6 Typical Dacite Breccia and Alteration Zoning, El Sauzal



Left image is of typical quartz-alunite-kaolinite altered dacite breccia (unit Tmbx), the principal host unit at El Sauzal. Image on right depicts alteration zoning pattern from a core of vuggy quartz rock enclosed by quartz-alunite-kaolinite, both of which host ore. The quartz-alunite-kaolinite zone gives way outward to rocks that are argillic.

Weiss and Espinoza (2007) and Weiss et al.; (2011) regard the mineralization to be genetically related to eruptions that resulted in deposition of the megabreccia and overlying silicic lavas and tuff, with only localized mineralization extending into the period that overlying andesite lavas were erupted. Angular discordance (20-30°) between the megabreccia and overlying units indicates faulting and rotation during the period of mineralization.

Figure 4.7 Geologic and Alteration Maps of El Sauzal



Main ore host is the stratigraphically lowest dacite breccia (Tmbx), which is flanked by dome-related flows. Overlying rocks are andesite flows and breccia. Alteration map (right) shows distribution of vuggy quartz (red) and quartz-alunite-kaolinite (orange). Maps from Weiss and Espinoza (2007) and S.I. Weiss SME conference presentation (2007). West zone = Encino; East zone = Fase Uno in Figure 4.5.

5.0 TENORIBA PROJECT

5.1 Introduction

Tenoriba is an early- to mid-stage exploration property located in the southwestern corner of Chihuahua State in rugged terrain of the Sierra Madre Occidental. The project covers about 5,333ha in four mining concessions (Figure 5.1; MAPY, MAPY2, MAPY3, Fernanda), which are owned 100% by Mammoth Resources Corp. (TSX-V:MTH). A 2% production royalty exists for the MAPY, MAPY2, and Fernanda concessions. The royalty can be purchased for a payment of US $1.5 million anytime within two years following commercial production.

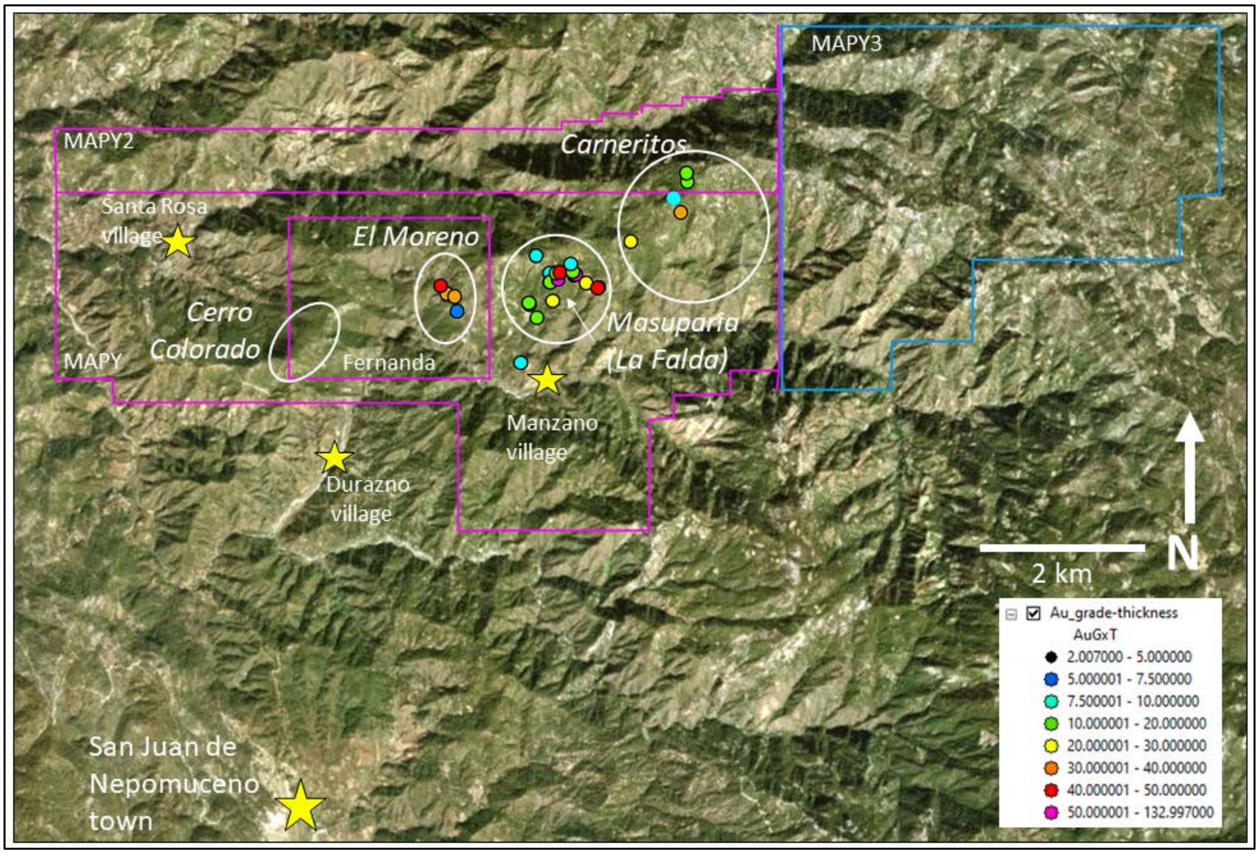
Four main areas have been the focus for most exploration at Tenoriba. The areas follow the ridgeline on which the property is centered for over 6km. The areas, from west to east are Cerro Colorado, El Moreno, Masuparia, and Carneritos (Figure 5.1). Hydrothermal alteration is continuous between the areas such than the entire zone is regarded as part of a single, large hydrothermal system.

5.2 Exploration History

Historical prospecting at Tenoriba was limited to a few small adits and shallow pits at El Moreno, Masuparia, and La Verde; La Verde is located north of El Moreno (Figure 5.1). Little information is available for these workings, including in many cases, the commodities being sought. Two small workings at El Moreno are in an area that contains coarse gold currently being worked on a small-scale beneath thin colluvial cover in clay- and iron oxide-altered pyroclastic rocks. The coarse gold occurs mostly as fine flakes and grains but several irregular to subround nuggets up to 1cm diameter from panning material excavated from an area of ~50m^2 and 1m depth. This "alluvial" gold almost certainly is derived from weathering and short-distance transport of mineralized vuggy quartz and/or quartz-kaolinite rock, which underlies the entire area. No unconsolidated gravels or other transported materials is present (Figure 5.2).

Beyond sparse sampling and reconnaissance prospecting from the 1970s through early 2000s, most exploration at Tenoriba has taken place over just the past 12 years by four companies: Masuparia Gold Corp., Yale Resources Ltd., Mammoth Resources Corp., and Centerra Gold, Inc. Owing to the inherent variability of commodity cycles, junior company funding, and changing ownership, exploration at Tenoriba has been somewhat sporadic despite continuous ownership since 2008. Only two drill programs, one by Masuparia Gold in 2007-2008 (15 holes), and another by Mammoth in 2017-2018 (13 holes) have been conducted, resulting in 28 drill holes for 5,725 meters of core. Most holes were drilled at the Masuparia area, with only sparse drilling in El Moreno and Carneritos prospects. Other areas like Cerro Colorado have not been drilled. Several other areas at Tenoriba remain unexplored including Santa Rosa and the Au-Cu occurrence at La Verde, both of which lie at lower elevations.

Figure 5.1 Tenoriba Property Concessions and Drill Hole Gold Grade-Thickness



Property concessions (pink and blue outlines with white, capitalized labels), main exploration areas (white outlines), and drill holes with grade-thickness. Yellow stars are communities. San Juan de Nepomuceno has a small airstrip and basic goods. Coordinates for San Juan de Nepomuceno are: 256,500E/2,916,300N (UTM, Zone 13, WGS 84).

Of the 28 drill holes, 19 were drilled a Masuparia, 4 at El Moreno, and 5 at Carneritos. Two northernmost Carneritos holes were drilled mainly to satisfy work commitments on the MAPY3 concession. Results from drilling at Masuparia include 1.9m at 45.9g Au/t in a broader interval of 47m at 1.96g Au/t (TDH-7) and 5.5m at 4.92g Au/t in a broader interval of 23.5m at 1.3g Au/t (TEN17-5). Drilling at El Moreno yielded 5.9m at 3.41g Au/t (TEN17-1), and one hole (TEN17-6) at Carneritos intersected 25.0m at 1.10g Au/t. Most of the drilling at Masuparia and El Moreno targeted steep, northwest-trending veins or faults that were historically prospected (Cirett, 2009; Simpson, 2014, 2018, 2019).

Figure 5.2 Coarse Gold in Saprolite, El Moreno Prospect, Tenoriba Project

Coarse gold panned from base of altered dacite breccia saprolite marked by the color change, El Moreno prospect, Tenoriba. Prospector: Adelmo Carillo. Scale weight is in grams.

One moderately detailed geologic map was done in 2008 by Masuparia Gold (Mihalynuk and Pang, 2008) and the area is covered by the Basonopa 1:50,000-scale geologic map (Flores and Ibarra, 2011). Rock-chip sampling is dense at Masuparia and moderate to sparse in other areas at Tenoriba. A 2,600-sample grid soil survey was conducted on 200m-spaced lines (50m sample spacing) from El Moreno to Carneritos, a distance of ~4.3km. The eastern and western segments of the property lack soil sampling entirely and have only sparse rock-chip samples. Small ground magnetics and induced polarization ("IP") surveys were done at El Moreno (three lines) and between Masuparia and Carneritos (18 lines, 100m-spaced lines over 1.7km E-W). The IP lines cover approximately 40% of the area between El Moreno and Carneritos. Data from government-supported regional programs include magnetics, gravity, and ASTER coupled with regional mapping and sampling.

The principal areas of exploration interest at Tenoriba mostly follow the east-northeast-trending ridgeline on which the property is centered. From west to east, four main exploration areas thus far identified are: Cerro Colorado, El Moreno, Masuparia, and Los Carneritos. All exploration areas are characterized by widespread clay alteration and moderate bleaching on surface. The easternmost part of the property consists of massive, welded ash-flow tuff that is weakly altered or fresh that overlies clay- and quartz-altered ash-flow tuff, rhyolite breccia, and underlying mixed andesite lava and flow breccia.

Centerra joint ventured the property in 2018 and primarily conducted mapping, surface sampling and sampled core and rock samples for analysis using a Terraspec near-infrared absorption spectrometer to identify clay minerals. By January 2020, Centerra had been permitted to drill 139 holes, mostly in the Carneritos area. Despite the permit to drill, Centerra terminated its Tenoriba exploration agreement with Mammoth in September 2020, citing that it was ceasing all exploration in Mexico.

5.2.1 Stratigraphy and Structure

General observations: The volcanic stratigraphy at Tenoriba is generally consistent over the entire property. The map of Mihalynuk and Pang (2008) reasonably documents the units. However, some significant differences in interpretation from this study based on spatial and stratigraphic relationships observed on site (e.g., rule of "v's") and in drill core, and bedding orientations from Mihalynuk and Pang are:

1) The Lower Volcanic Series consists of a series of south-dipping units at Tenoriba, which changes the stratigraphic order of units based on Miyalynuk and Pang's mapping, who mapped units as progressively older from topographic top to bottom (Figure 5.3, Figure 5.4, Figure 5.5, and Figure 5.6).
2) A major angular unconformity between Upper and Lower Series units is exposed at Carneritos, and dips between the two are opposing: i.e., 35°SSE dips for the Lower Series, and 10°E to 10°W for the Upper Series (Figures 5.3, 5.4, 5.5, and 5.6). Small areas exposing this unconformity occur at El Moreno and Cerro Colorado as well.
3) The 'silicified chaotic breccia' unit is part of a dacite dome complex (i.e., near vent) and represents the oldest unit in the south-dipping Lower Series. As such, it may be exposed on the cliffs on the north side of the property.
4) The Upper Series tuffs are broadly arched over Tenoriba, forming a NW-oriented broad or regional antiformal structure that likely is due to faulting along similarly oriented faults.

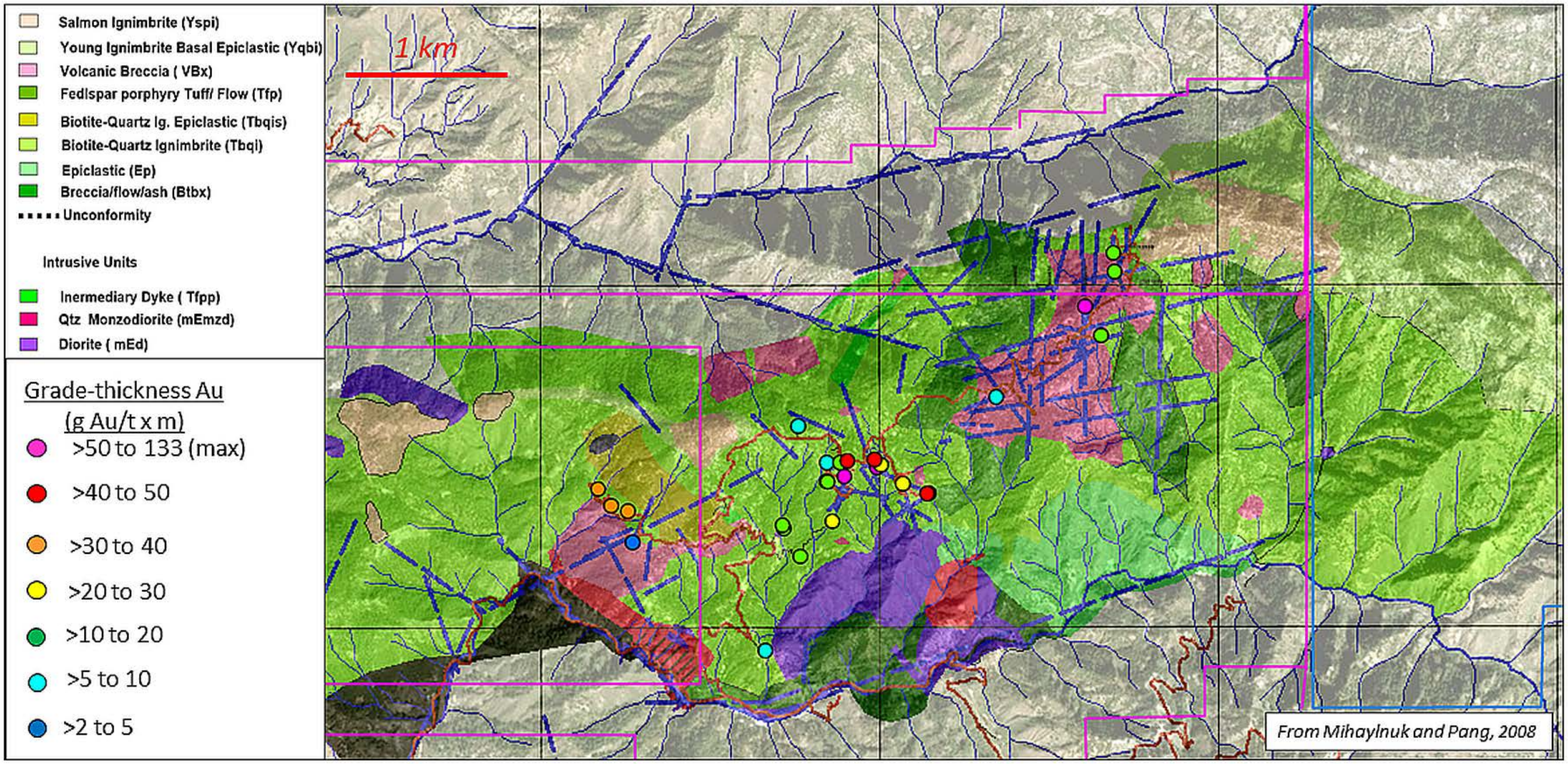
Below are brief descriptions of stratigraphic units as presented in this study. Volcanic rocks are discussed in apparent age from younger to older; intrusive rocks are listed at the bottom. Included in the descriptions are some interpretations and implications from the site visit. Further discussion of the stratigraphic implications from this study are provided in the section entitled, "*Assessment of the Exploration Potential at Tenoriba*."

Young ash-flow tuff (Yqbi and Yspi): Post-mineral rhyolitic ash-flow tuff overlies much of the eastern third of the property (MAPY3 concession) and parts of Carneritos, and it locally overlies altered units at El Moreno and areas north of Cerro Colorado (unit Yqbi of Mihalynuk and Pang, 2008). The ash-flow tuff consists of a massive, thick, porous and pumiceous base that grades upward into a cliff-forming densely welded section. Collectively, cooling units of this upper ash-flow tuff cap the conspicuous, gently east-tilted (~10°) mesa that comprises the headwaters of Río Tenoriba. This young ash-flow tuff also caps the ridgeline north and northeast of El Moreno, where it dips gently west ~10°. The young ash-flow tuff probably also forms a thin, gently west-dipping capping unit of the ridge in the Cerro Colorado area. Note that a change in the dip of the young tuff's base coincides with the low-relief saddle between El Moreno and Carneritos. This central area of Tenoriba is the hinge of a broad NW-trending antiformal warp perhaps due to faulting. Similar dip changes to the unaltered capping tuff are easily observed on satellite images to the north and south of Tenoriba and probably are related to regional faulting.

Angular unconformity and the Lower versus Upper Volcanic Series: The fresh and younger capping ash-flow tuff (Ybqi) overlies with an angular discordance (Figures 5.4 through Figure 5.6) discontinuous but generally highly altered porphyritic dacite flows, flow breccia, and block and ash flows (Tfp and Tcbx) and a stratigraphically lower sequence of poorly exposed and generally clay-altered silicic ash-flow tuff (Tbqi). The dips on the Tfp, Tcbx, and Tbqi and Btbx units are significantly steeper and southerly (22-43°SSE; bedding by Mihaylnuk and Pang, 2008) in stark contrast to the post-mineral Ybqi tuff, which dips ≤10° to the either the west or east. This difference in dip direction is important to note for a couple of reasons. For one, while the younger, Ybqi tuff dips only gently either east or west, units under it in the Tenoriba area have a dip-slope to the south toward the Río Tenoriba. Exploration drill holes drilled at moderate angle to the east or west may thus track along the dip of older units. *This is important to note because drill-testing orthogonal to units is critical if mineralization, such as in many high-sulfidation deposits, is lithologically controlled. The implication of a southward dip on the older (and mineralized) units at Tenoriba is that the stratigraphic column as shown by Mihalynuk and Pang (2008) is inverted, and the oldest units lie to the north and successively younger layered units to the south (*Figure 5.5 and Figure 5.6). *Thus, the lower epiclastic mapped by Mihalynuk and Pang is stratigraphically higher than the chaotic dacite and Tbqi tuff (*Figure 5.7*).* Because older, south-dipping units host mineralization, constructing north-south cross sections is recommended in order to better assess stratigraphic controls on mineralization.

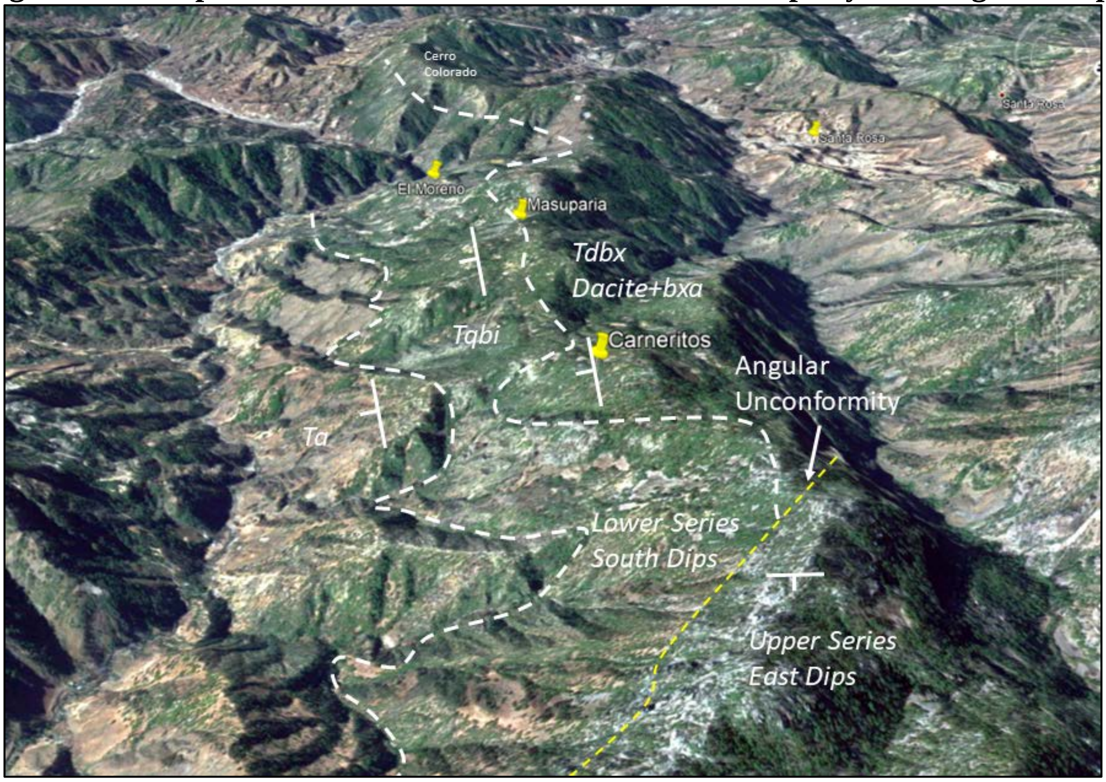
Figure 5.3 Geologic Map of Mihalynuk and Pang (2008)

modified by R. Simpson (Mammoth Resources Corp.)



Dark brown unit in the lower left is medium-grained Eocene biotite granodiorite (not shown in legend). The stratigraphic units listed in the upper left are interpreted to be youngest to oldest downward. See section entitled, "Assessment of the Exploration Potential at Tenoriba" for additional discussion. Drill holes are shown with color-coded dots depicting grade-thickness.

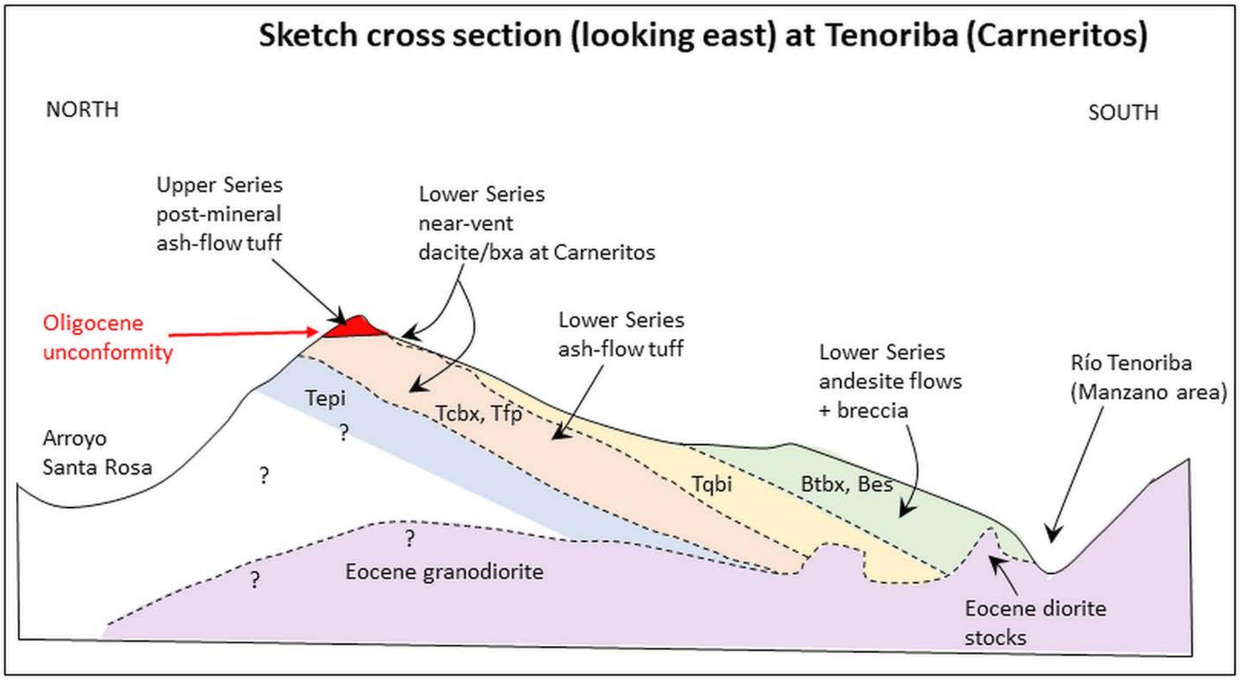
Figure 5.4 Perspective View West Across the Tenoriba Property Showing Unit Dips



Westward view showing the south-tilted bench at Tenoriba. Yellow dashed line in the lower right approximates the sharp angular unconformity between Upper and Lower Volcanic Series. Dips on young ash-flow tuff of the Upper Series (unit Yqbi) is approximately 10°E, whereas dips on bedding of the Lower Series are steeper (22-43° from Mihalynuk and Pang, 2008) and to the south. Implications of a southerly dip of Lower Series strata are that the stratigraphic order is reversed from Mihalynuk and Pang, and the dacite breccia unit (here “Tdbx) underlies other units at Tenoriba. In the top-center is the prominent hill of Yqbi breccia and the above El Moreno; the tuff here dips west in contrast with the young tuff near Carneritos defining an arch-like regional pattern. From Google Earth.

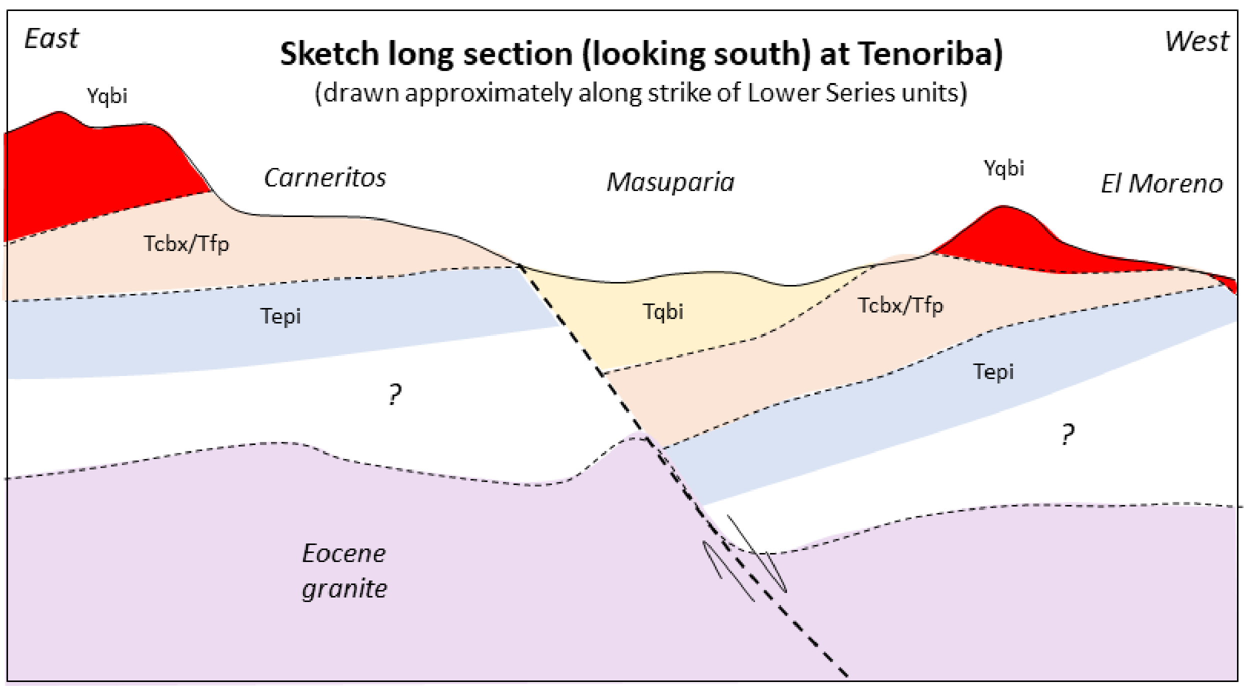
Porphyritic dacite (unit Tfp) and flanking flow breccia/block and ash flows (Tcbx): Discontinuous bodies of porphyritic dacite flows and breccia lie between the upper, unaltered and lower, altered ash-flow tuffs. Given a southward dip, the dacitic flows and breccias *underlie* the clay-altered ash-flow tuff. Intensely silicified brecciated dacite is multi-lithic, and locally angular to subangular blocks are several meters in diameter (Figure 5.8). Flow-banded to dense, non-foliated rhyolite or dacite is the most common clast type. The breccia was mapped by Mihalynuk and Pang (2008) as the “silicified chaotic breccia” (unit Tcbx) because of its intense silicic alteration, large volcanic blocks up to 4m diameter, and fine-grained,

Figure 5.5 Schematic Cross Section of Tenoriba at the Carneritos Prospect



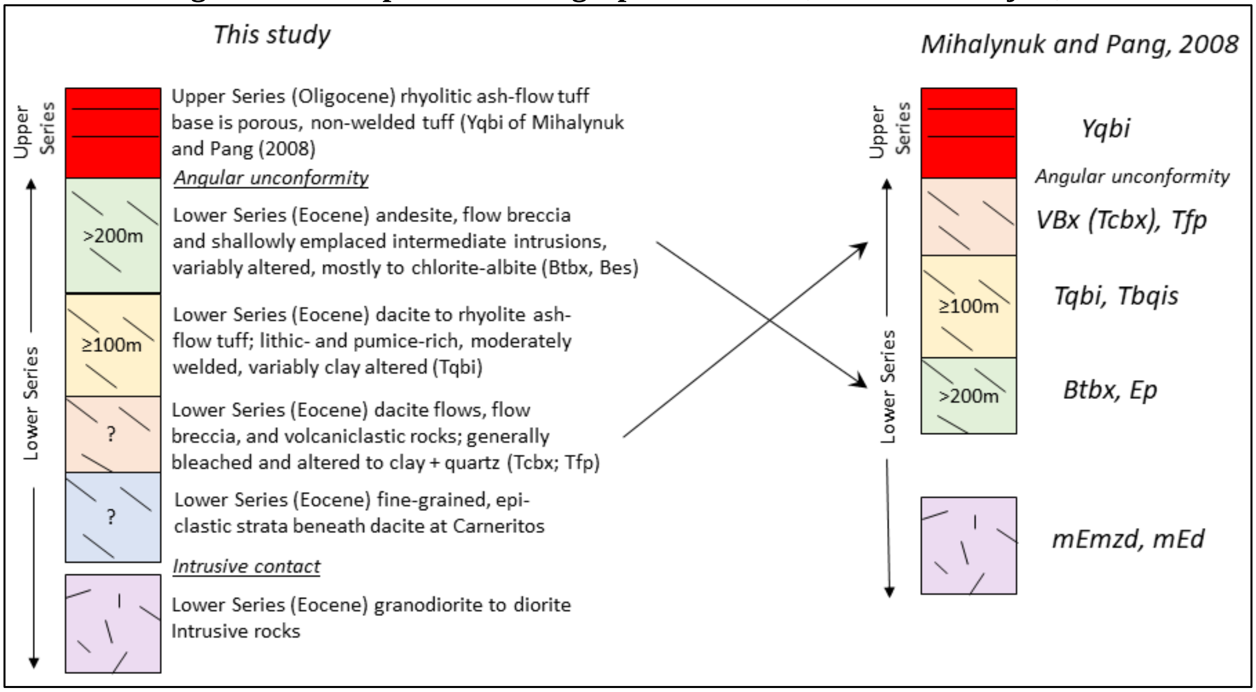
Schematic north-south cross section looking east at Tenoriba (Carneritos area) showing generalized stratigraphic relationships observed from this study

Figure 5.6 Schematic Long Section



Schematic east-northeast to west-southwest long section that roughly parallels the ridgeline at Tenoriba.

Figure 5.7 Comparison Stratigraphic Columns, Tenoriba Project, Mexico



Stratigraphic columns of Lower Series units from this study (left) and Mihalynuk and Pang (2008). The reversal of stratigraphic order interpreted in this study is due to consideration of unit dips. Equivalent unit abbreviations from Mihalynuk and Pang are in parentheses after unit descriptions.

originally tuffaceous(?) matrix. At Carneritos, the predominant breccia clasts consist of porphyritic dacite or rhyolite, much of which is flow-banded. The breccia is best interpreted as dome-related block-and-ash deposits and debris flow breccia. The dacitic breccia occurs in all four main exploration areas at Tenoriba, although its extent ranges from only a few tens of square meters at Masuparia to large, south-dipping ‘ledges’ at Carneritos, including the largest zone that is about 0.8km^2. Coherent but also strongly altered dacite flanks the breccia and represent lava flows and perhaps shallow intrusions where encountered on surface and more likely are just dikes where intersected in drill holes.

The locally sourced dacite units represent the oldest and the most intensely altered units at Tenoriba. The dacites and associated flow breccia and small-volume ash-flow tuff are considered part of volcanic domes, and thus are vent and near-vent units. Such vent facies are typical settings for high-sulfidation deposits including at Mulatos and El Sauzal, where dacite domes and related rocks are genetically related to and indeed, host, most of the mineralization. The dacites at Tenoriba as well as at Mulatos and El Sauzal likely occur near the top of the Lower Volcanic Series.

Biotite-quartz ash-flow tuff (Tqbi): This distinctive unit of bleached white, poorly welded, pumice- and lithic-rich rhyolitic ash-flow tuff is everywhere altered at Tenoriba. The unit contains a few percent each of quartz, feldspar, and biotite, but both feldspar and biotite are bleached white or tan and altered to mixtures of clays and pyrite. Partly compressed pumice or fiamme tend to be large with longest dimensions of 1-3cm that are ubiquitously altered to chlorite-smectite in the weakest zones to mixtures of illite-kaolinite-pyrite in the most intensely altered zones. The groundmass of the tuff is also pervasively clay altered and varies in clay composition similar to that of pumice. The unit has a dip-slope to the south that averages about 30°.

Plagioclase-pyroxene andesite flows and breccia (Btbx): A distinct unit of south-dipping andesite flows and flow breccias lie at middle and low elevations to the south toward the Río Tenoriba in the Manzano area (Segura, 2018). The stratigraphically lowest levels of this andesite are mostly flow breccia and strongly clay-altered near the contact with the underlying Tbqi ash-flow tuff. The breccias are monolithologic of 3 to 10cm roundish clasts of finely porphyritic andesite in a similar clay-altered, possibly tuffaceous andesitic matrix. This basal breccia may represent agglomerate or other near-vent deposits associated with andesitic volcanism. Up-section (i.e., downhill) to the south, the breccias grade into massive olive green, finely plagioclase- and hornblende-phyric andesite flows, which are beautifully exposed in deeply incised gullies (barrancas) that drain into Río Tenoriba in the Manzano area. The massive andesite flows are altered to chlorite, epidote, and possibly tourmaline, and they contain variable amounts of pyrite but remain strongly magnetic. Much of the andesite exposures were assigned to fine-grained diorite (unit Emd) by Mihalynuk and Pang (2008), and it is possible some andesite is intrusive. However, the field relationships of the andesite show that it is bound by crudely bedded andesitic flow breccia at its base and top, which argue that most of the massive andesite forming the core of the unit is volcanic in origin.

Intrusions (Egd, Ed): In the large barranca southeast of Masuparia, bleached, quartz-bearing, coarser-grained rocks that occur within the andesite body are intensely altered to quartz-muscovite-pyrite ("QSP"), and these poorly exposed rocks were mapped as quartz monzonite porphyry. Andesite flows (Segura, 2018) and breccia were mapped as three different units by Mihalynuk and Pang (2008), including fine-grained diorite (their unit mEd), volcanic breccia and tuff (unit Btbx), and a basal epiclastic suite (Ep). Pyritic fine-grained dioritic rocks underlie the basal flow breccia along Río Tenoriba at

Manzano, and a distinct hornblende granodiorite unit (Amp-mEmzd) may be a border phase of the large granodiorite pluton exposed along Río Tenoriba between Manzano and Durazno because the two units are in contact with each other.

Figure 5.8 Images of Dacite and Dacite Breccia

Left: El Moreno vuggy qtz altered dacite breccia; top center: Carneritos "silicified chaotic breccia" of Mihalynuk and Pang (2008), contains prominent flow banding in dacite clasts; bottom right: sheeted pyrite-marcasite veins cutting quartz-kaolinite(?)-altered dacite porphyry, TEN17-2, El Moreno; top right: large clast of flow-banded dacite altered to vuggy quartz at Carneritos; right center: quartz-sulfide breccia infill of dacite, TEN17-7, Carneritos.

The age of intrusive rocks at Tenoriba is uncertain. However, the Tenoriba property was previously mapped as entirely underlain by a large Eocene pluton measuring 26km NNW by 9km EW (Flores et al., 1999); this pluton was isotopically dated using K-Ar on its south end 15 to 18km south of Tenoriba at 48±1.2 Ma and 46.3±1 Ma (Flores et al., 1999). Later more detailed mapping of the Basonopa quadrangle (50,000-scale) more accurately depicts the Eocene intrusion, and Eocene and Oligocene volcanic rocks (Flores and Ibarra, 2003). The ages of intrusion are consistent with other Eocene intrusions that comprise part of the Lower Series of the Sierra Madre Occidental. Based on the regional context, Eocene granodiorite to diorite intrusions at Tenoriba are interpreted to be broadly coeval with Lower Volcanic Series rocks.

5.3 Hydrothermal Alteration

5.3.1 Vuggy Quartz and Quartz-Kaolinite

The most intense hydrothermal alteration observed at Tenoriba consists of vuggy quartz and quartz-kaolinite rock (Figure 5.9, 5.10, and 5.11) that is characteristic of high-sulfidation epithermal deposits. The siliceous rocks, often forming prominent bedding-controlled "ledges" are commonly, although not always, associated with higher gold and silver contents in all economic high-sulfidation systems.

Thicknesses of exposed vuggy quartz and quartz-kaolinite ledges range from a few meters to as much as 30 or 40m in outcrops at Carneritos. The exposed vuggy quartz and quartz-kaolinite zones comprise lobes that plunge 20-30° south consistent with unit dips. The lobes are separated by steep barrancas that have partly incised through siliceous ledges. The most extensive areas of vuggy quartz is at Carneritos, and one nearly continuous blanket covers an area of about 1km by 0.5km. Non-brecciated porphyritic dacite with rare quartz phenocrysts flanks breccia bodies and lies predictably at depth beneath the exposed ash-flow tuff at Masuparia and much of El Moreno. Dacite also projects through to the steep, north-facing slope of the Tenoriba ridgeline that has yet to be explored. *Both porphyritic dacite and heterolithic breccia are near-vent features, and emphasis is placed on the importance of such features in localizing high-sulfidation deposits elsewhere.*

Discontinuous bodies of vuggy to granular quartz ("silicic alteration") and quartz-kaolinite alteration straddle the ENE Tenoriba ridgeline from elevations of 1520m at El Moreno on the west to 2060m on the east at Carneritos. Despite elevation differences between Moreno and Carneritos, silicic alteration occurs at the top of or above a distinctive, thick, post-mineral ash-flow tuff, thus in approximately the same stratigraphic position interpreted to be the base of the dacitic breccia unit. Silicic alteration follows the dacite horizon. The siliceous bodies also project southward as lithologically controlled ledges projecting down-dip. *Rooted vuggy quartz and quartz-kaolinite rock may lie along the steep feeder dikes to dacite domes or along coeval faults, which may be expressed in IP cross sections as linear or pipe-like zones of very high resistivity.*

5.3.2 Clay Alteration and Zoning

Clay alteration is by far the most widespread alteration type at Tenoriba, covering large areas between smaller zones of silicic alteration (Figure 5.12). No analysis of hydrothermal clay distribution was done at Tenoriba for this study. However, abundant raw spectral data collected from absorption spectrometer analyses (i.e., “Terraspec) by Mammoth (43 hand samples) and Centerra (773 drill samples; 256 hand samples) is useful and should be interpreted and investigated further. In particular, the Centerra data is comprehensive enough that it should provide a picture of the distribution of various clays and other minerals in drill holes. In turn, this can be used to contour temperature useful for vectoring purposes at Tenoriba. Identification of dickite (a high-temperature, entirely hydrothermal polymorph of kaolinite) is important because its widespread distribution in the principal exploration areas at Tenoriba is consistent with high-sulfidation epithermal systems.

Figure 5.9 Outcrops of Vuggy Quartz and Quartz-Kaolinite-Altered Dacite Breccia

Left: Roadcut showing vuggy quartz (top) progressively grading into quartz-kaolinite and kaolinite-altered rock; middle: typical larger outcrop of mixed vuggy quartz and quartz-kaolinite; top right and bottom right: typical rounded forms of large outcrops of vuggy quartz.

Commonly, zones of silicic-altered rocks occur in a distinct coarse-clast dacitic breccia unit at and near its contact with overlying ash-flow tuff (Tqbi). Clay-dominant alteration (Figure 5.12) with some weak to moderate silicification occurs in the overlying coarse lithic- and fiamme-bearing ash-flow tuff. Clay alteration at all four main prospects at Tenoriba covers a wide spectrum from smectite through mixed layer illite-chlorite-smectite, illite-chorite, illite, and kaolinite-dickite.

Clay mineralogy is directly correlative with relative strength of alteration and mineralization as indicated by the progressive hydrothermal destruction of primary minerals and of rock texture, quartz addition, and the abundance of pyrite and marcasite. Smectite and chlorite are associated with the weakest and most distal alteration at Tenoriba, whereas illite and kaolinite-dickite, and finally vuggy residual quartz, progressively indicate more intense and proximal alteration, respectively. Recognition of such zoning in clay mineralogy, and inferred fluid temperature, is critical for exploration to locate the more intense core of mineralized areas where metal grades are typically higher. In other high-sulfidation systems, ore-grade precious-metal mineralization occurs largely or entirely in the residual quartz cores and/or quartz-kaolinite-(alunite) zones.

Figure 5.10 Outcrop Photos of Vuggy Quartz Textures Developed in Dacite and Dacite Breccia

Upper left: Masuparia; right: Carneritos vuggy, “wormy” quartz; lower left: El Moreno residual quartz with late porcelaneous chalcedony infill (white); lower center: Cerro Colorado, fine-grained vuggy quartz with hematite stain.

Figure 5.11 Quartz Textures at Tenoriba

Upper left: quartz-kaolinite-goethite with late chalcedony, TEN17-7, Carneritos; lower left: intense vuggy quartz in sulfide zone in TEN17-7, Carneritos; bottom center: vuggy quartz in TEN17-7, Carneritos; right: vuggy quartz with abundant very fine-grained olive-colored iron sulfide and copper oxide stain after enargite or tetrahedrite, TEN17-10, Masuparia. Diameter of all core = 6.4cm.

5.3.3 Sulfide Mineralogy

A reflectance microscopy study by Segura (2013a,b) is useful for understanding the nature of higher-grade precious metal mineralization at Tenoriba. Not surprisingly, the study indicates that iron sulfides are the predominant type of sulfide present in higher-grade intercepts studied. This fits with the observations easily made from core logging that show relative gold grade is associated with generally higher iron sulfide contents, and in particular, very fine-grained iron sulfides that replace mafic components in igneous rocks and occur in thin, irregular veinlets. In many cases, the iron sulfide veinlets are sheeted. Petrographic examination shows that the iron sulfides at Tenoriba are largely pyrite and marcasite; no pyrrhotite or arsenopyrite was identified. The lack of pyrrhotite and arsenopyrite is significant because they are typical a low-sulfidation state. Marcasite is less stable than pyrite in atmospheric conditions and commonly weathers rapidly to hydrated white sulfates like melanterite or gypsum. *In much of the core observed from Tenoriba during the site visit, active alteration of fine-grained iron sulfides to a white, powdery crust of containing tiny acicular crystals probably suggests abundant marcasite. Marcasite is significant because its hydrothermal stability is narrower than pyrite,* *forming under acidic conditions of pH<5. Thus, abundant marcasite in unoxidized rocks at Tenoriba is consistent with a high-sulfidation state wherein fluids had low pH and relatively high oxidation state* (Murowchick and Barnes, 1986).

Figure 5.12 Pervasive Kaolinite Alteration in Roadcut Below El Moreno and Above Manzano

Roadcut below El Moreno and above Manzano showing extensive clay (probably kaolinite) alteration of tuff and epiclastic rocks of the Tqbi unit. If tilting post-dates alteration, this widespread clay alteration would overlie silicic alteration capping the ridgeline to the north.

Residual quartz and quartz-kaolinite alteration occur at Tenoriba with fine-grained sulfides that mostly comprise pyrite and marcasite, with variable amounts of tennantite-tetrahedrite, Fe-poor sphalerite, and galena. Small grains of gold in unoxidized rocks from Tenoriba have been documented in petrographic and SEM study by Segura (2013a) where they are invariably associated with pyrite and marcasite. Enargite, luzonite, covellite, bornite, barite, and native sulfur, which are distinctive minerals of high-sulfidation deposits, are rarely if at all recognized at Tenoriba. Similarly, the relatively high gold grade El Sauzal high-sulfidation deposit was characterized by only rare enargite and other copper-bearing sulfosalts, and copper grades were consistently low in both oxide- and sulfide-bearing rocks, e.g., <100ppm Cu (Steven Weiss, personal communication, 2020). In contrast, the Mulatos high-sulfidation system contains abundant enargite in unoxidized rocks (Staude 2001). Thus, abundant enargite-luzonite is not a ubiquitous feature of high-sulfidation deposits.

Enargite, covellite, and bornite are diagnostic sulfide minerals in the high-sulfidation setting, where they reflect a higher content of dissolved sulfur in the ore fluid. The amount of sulfur solubilized in fluid is proportional to its oxidation state, and a higher oxidation state infers much higher dissolved sulfur. Barite, anhydrite, and native sulfur are thus reflective of this high-sulfur, highly oxygenated condition, and are common high-sulfidation associates.

The presence of tennantite-tetrahedrite (Segura, 2013a; Einaudi et al., 2003) in vuggy rocks having the highest gold grades at Tenoriba may reflect a slightly lower sulfidation state. Lack of recognition of enargite, covellite, native sulfur, or abundant barite are supportive of a slightly lower sulfidation state. An inferred lower sulfidation state may in part be due to lower fluid cooling rates alone. *In terms of sulfidation state, rocks encountered thus far at Tenoriba may lie at the low-end of the high-sulfidation spectrum, but not intermediate-sulfidation based on its rock textures, and clay and sulfide mineralogy. Because temperature imparts a significant control on sulfidation state, it is possible that the core of the Tenoriba system has yet to be discovered.*

5.3.4 Weathering and Oxidation

The depth of surface oxidation and weathering at Tenoriba is highly variable based on limited drilling. At Masuparia, where most drilling has been conducted, the redox boundary varies from a few meters to as much as ~100m depth below surface. Oxidation generally extends to deeper levels in fault zones and breccia bodies. In cases where small streams or arroyos have cut into bedrock, pyrite is commonly present in exposed wall rocks. The absence of thick weathered profiles (e.g., >100m) at Tenoriba reflects the rapid exhumation and erosion in this part of the Sierra Madre.

All four mineralized zones at Tenoriba are geochemically similar with higher gold associated with high Au/Ag ratios and elevated Ag, As, and Te concentrations. A second group of elements, including Ag, Cu, Mo, Pb, Zn, Cd, Sb, Hg, and Bi are moderately to highly correlative between each other. The elemental associations are consistent with petrographic and scanning electron microscope data that reveal tennantite, tetrahedrite, and native gold in association with fine-grained pyrite and marcasite.

6.0 SURFACE SAMPLING

Tenoriba contains comprehensive surface sampling in the form of rock chips, soils, and lesser stream sediments. The data for rock chips and soils are shown on Appendix Figures A1, A2, and A3. Tenoriba soil geochemistry is particularly impressive, with a large central anomaly covering an area roughly 4km by 1.4km (~5.6km^2; Appendix Table A3) that contains consistent values ranging from 50ppb to >250ppb gold. Some of the soil anomaly undoubtedly reflects down-slope dispersion to the south, but the longest dimension (E-W) of the soil anomaly tracks along the ridgeline in an area of strong hydrothermal alteration at surface and highly anomalous gold in rock chips that have been verified with drilling, and therefore demonstrates continuity between the various exploration zones. Both rock chips and soil samples are sparse or non-existent in the northern, western, and eastern parts of the property. The soil and rock geochemical data define several areas that have largely not been followed up with additional exploration.

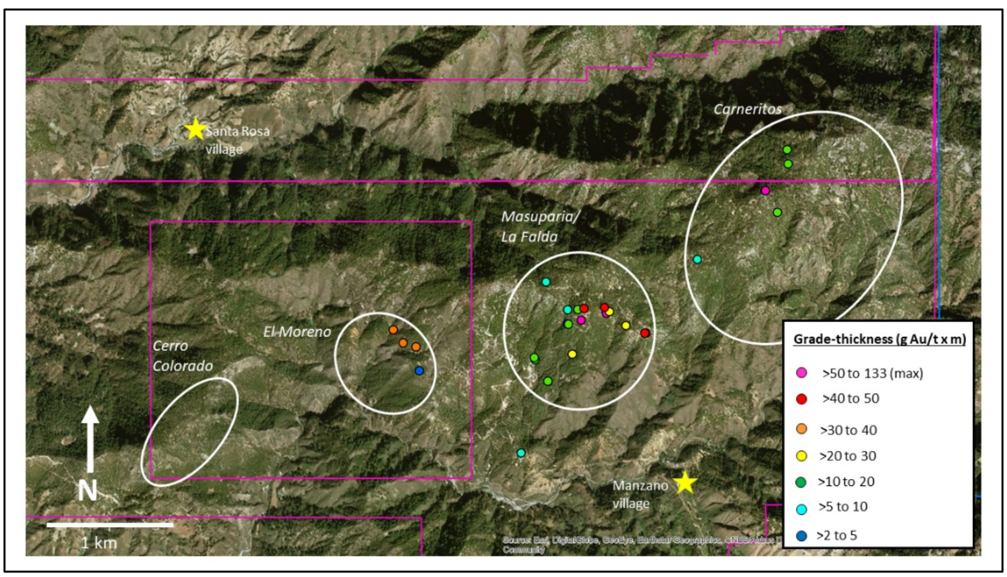
7.0 DRILLING

Twenty-eight core holes have been drilled by two companies along the +5km-long corridor of altered rock at Tenoriba (Figure 7.1; Table 7.1). By far, most drilling was done in the Masuparia-La Falda area, where 19 of the 28 total holes have been drilled. All of Masuparia Gold's 15 holes were drilled at the Masuparia zone in 2007-2008. Five holes were drilled at Carneritos, and four holes at El Moreno, all by Mammoth during 2017-2018. One of the Mammoth holes at Carneritos (TEN17-08) was abandoned due to difficult drilling conditions in silicic rock, and two other Carneritos holes were drilled to satisfy work commitments in the MAPY2 concession. One core hole was drilled by Masuparia in andesitic rocks at the far south end of the property near the village of Manzano.

The two past drilling campaigns encountered significant mineralization in most holes (Table 7.2; Appendix Table A1). A depiction of grade-thickness (g Au/t x meters, or "GxT") identifies 12 holes that have GxT >20, which is equivalent to 20m grading 1g Au/t, or 1m grading 20g Au/t but distributed over the length of a given hole. The highest GxTs (133, 83, and 61) were from holes at Masuparia that encountered thin but high-grade intervals of 25.4g Au/t over 1 m, 45.7g Au/t over 1.9m over broader intervals of >0.1g Au/t.

Figure 7.1 Tenoriba Exploration Areas and Drill Hole Grade-Thickness

Drill hole data are summarized in Table 7.1

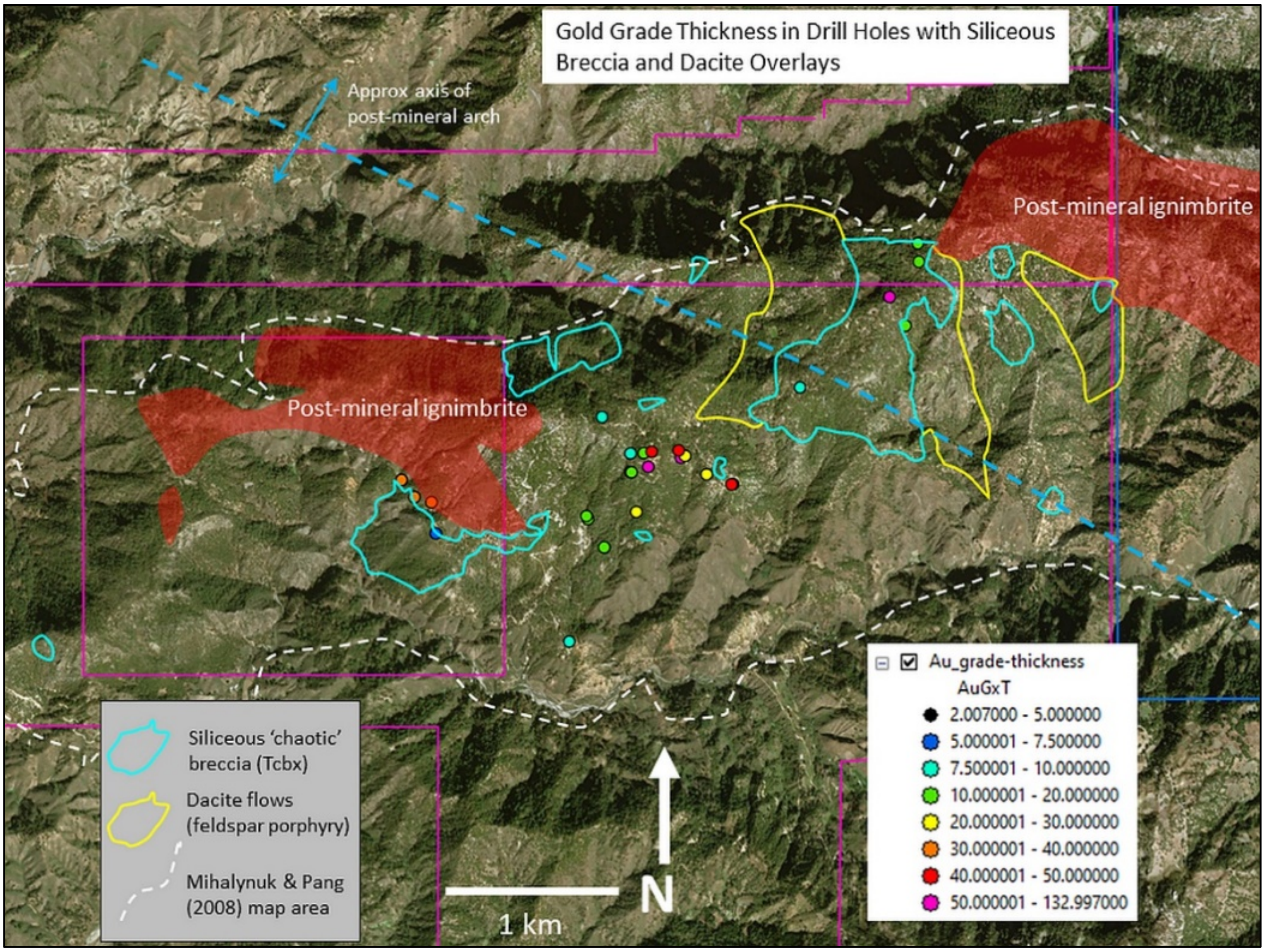


Map showing principal exploration areas at Tenoriba and drill hole grade-thickness. Drill holes are summarized in Table 7.1.

Worth mentioning is the observation that most historical drill holes at Tenoriba were collared outside of mapped areas of siliceous breccia and/or dacite (Figure 7.2). The Carneritos area shows excellent correlation between surface samples with high gold contents and mapped areas of dacitic rocks. *Recognition of the importance of the dacitic units for localization of high sulfidation-type gold mineralization should be considered for future assessment.*

A review of the multi-element data from drilling at Tenoriba reveals that all four areas are similar in terms of hydrothermal additions of certain metals and associated elements. Average values of selected elements from drilling are shown in Table 7.2. In general, the geochemical expression of all deposits at Tenoriba is characterized by the addition of Au, Ag, Cu, Pb, Zn, As, Sb, Bi, Hg,Te, and S. Molybdenum is only weakly anomalous. Comparisons between exploration areas show significant variations in element averages; the wide variation may reflect a number of factors. *The highest average Cu and lowest Ag/Au and Pb+Zn occur at El Moreno, which is suggestive of perhaps a more proximal (i.e., higher temperature) setting for high-sulfidation epithermal systems. In contrast, La Falda and Masuparia areas have the highest Pb+Zn and Ag/Au averages, perhaps suggesting a more distal (i.e., relatively lower temperature) setting for high-sulfidation systems. The terms proximal and distal are relative terms that relate to the vertical and/or lateral distance away from the center of a hydrothermal system, proximal equating to relatively higher temperatures nearer the center whereas distal being relatively farther away and somewhat lower temperature. The inferred temperature is critical because of the sensitivity of mineral (and thus, metal) precipitation to temperature.* See also correlation diagrams in Appendix Tables A2, A3, A4, and A5.

Figure 7.2 Drill Hole Gold Grade-Thickness (g Au/t x m) in Relation to Key Units



Drill hole gold grade-thickness (g Au/t **x** m) showing relationship of historical drilling relative to mapped bodies of daciticflows and breccia. The close spatial association between these dacitic dome rocks and high-sulfidation-type gold mineralization at Tenoriba is probably the most important property-wide exploration parameter, yet many areas remain untested for this potential. In addition, the lower stratigraphic position of the dacitic unit means that the unit may underlie areas to the south, and it may be exposed along steep north-facing exposures to the north.

Table 7.1 Summary of Tenoriba Core Holes

Hole_ID	Target	UTME_84 meters	UTMN_84 meters	Elev_m meters	Azimuth degrees	Incl degrees	Td_m meters	AuGxT (g/t x m)
TDH-01	Masuparia	259314	2921832	1465	295	-50	59.75	7.9
TDH-02	Masuparia	259710	2922596	1620	280	-50	203.75	26.0
TDH-03	Masuparia	259520	2922388	1555	115	-50	203.5	13.7
TDH-04	Masuparia	259423	2922555	1568	300	-50	200	15.4
TDH-05	Masuparia	259416	2922572	1568	115	-50	173.5	12.1
TDH-06	Masuparia	259508	2923158	1807	230	-50	229.5	8.1
TDH-07	Masuparia	259974	2922915	1772	212	-60	193.2	133.0
TDH-08	Masuparia	259676	2922942	1752	293	-60	200.4	8.2
TDH-09	Masuparia	259674	2922832	1731	275	-60	164	12.3
TDH-10	Masuparia	259681	2922830	1731	74	-50	185.4	14.3
TDH-11	Masuparia	259780	2922862	1758	90	-60	203	82.8
TDH-12	Masuparia	260126	2922818	1740	165	-50	131.8	21.8
TDH-13	Masuparia	260281	2922763	1731	90	-50	142.5	28.1
TDH-14	Masuparia	260272	2922760	1730	164	-65	119.7	40.3
TDH-15	Masuparia	259755	2922944	1786	68	-60	160.4	18.3
TEN17-01	El Moreno	258400	2922686	1531	180	-50	317.10	38.4
TEN17-02	El Moreno	258499	2922655	1548	360	-45	295.80	37.4
TEN17-03	El Moreno	258525	2922470	1552	353	-50	172.95	6.0
TEN17-04	Masuparia	259800	2922952	1769	181	-65	204.35	41.9
TEN17-05	Masuparia	259960	2922960	1748	216	-50	102.60	45.6
TEN17-06	Carneritos	261207	2923866	2009	183	-60	190.7	60.6
TEN17-07	Carneritos	261299	2923696	1958	360	-45	222.6	19.5
TEN17-08	Carneritos	260679	2923331	1846	220	-50	102.2	9.8
TEN17-09	Masuparia	259937	2923053	1759	234	-50	115.80	2.0
TEN17-10	Masuparia	259998	2922927	1735	195	-60	243.45	30.0
TEN17-11	El Moreno	258324	2922787	1499	353	-50	248.30	30.2
M2-17-1	Carneritos	261381	2924073	1943	266	-60	238	14.8
M2-17-2	Carneritos	261374	2924182	1871	25	-70	250.8	12.4
Total	**28 core holes**						**5275.1**	

Table 7.2 Average Concentrations of Metals and Associated Elements from Drill Holes

	# samples	Au	Ag	Ag/Au	Cu	Mo	Pb	Zn	As	Sb	Bi	Hg	S%
El Moreno	245	0.19	1.91	7.8	915	14	93	330	137	59	-	0.37	4.3
La Falda	113	0.24	4.83	20.7	395	10	347	1115	533	43	3.7	0.86	4.3
Masuparia	412	0.49	3.82	11.3	60	37	155	636	1304	23	0.6	0.53	1.8
Carneritos	167	0.37	4.23	16.1	74	12	237	238	244	18	1.8	0.43	1.8
Tenoriba-All	970	0.47	3.59	12.0	348	23	176	545	738	34	1.0	0.51	2.7

Values in ppm except sulfur (in percent); data for individual areas are from the Au>100ppb population and exclude samples with Au>11 ppm.

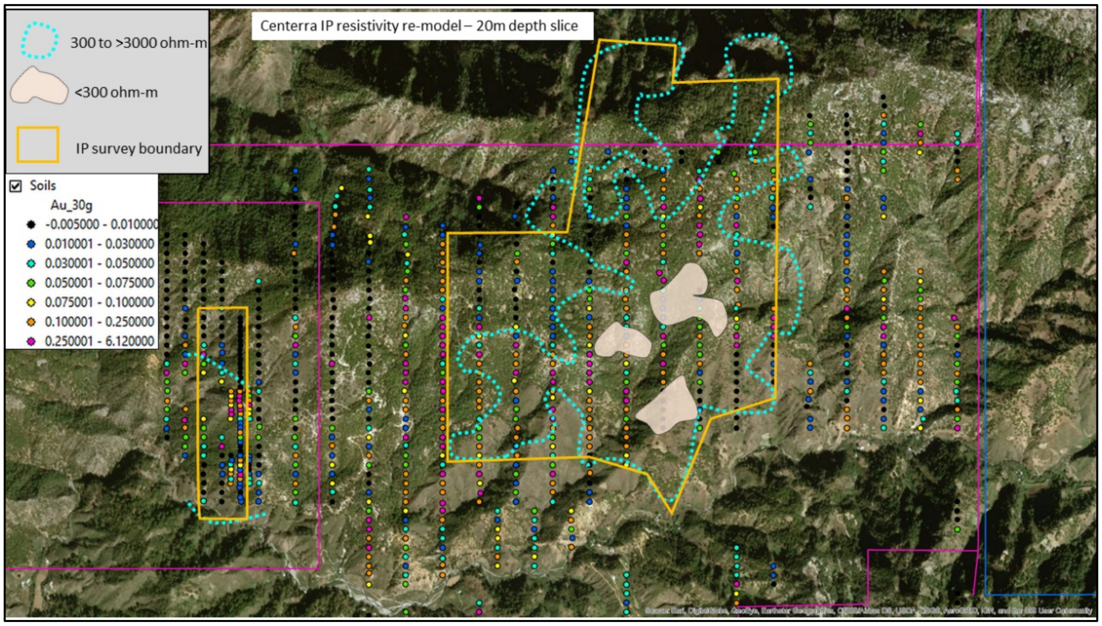
8.0 GEOPHYSICS

Ground magnetics and IP surveys were conducted in 2013 by Geofísica TMC de S.A. based in Mazatlán, on behalf of Mammoth along north-south lines in the Carneritos and Masuparia areas as well as one line at El Moreno. The data were initially processed and interpreted at the time of the surveys by Geofísica. The magnetics data largely supports the regional air magnetic survey completed by the Servicio Geológico Mexico for the Basonopa 1:50,000-scale quadrangle (Appendix Figure A4). The regional magnetics data show that the IP data were subsequently remodeled by Centerra in 2019 (Figure 8.1 and Figure 8.2). The Carneritos area is characterized by a complex IP resistivity response characterized by high variability over short distances, both vertically and laterally. This varied response is likely a reflection of the varied occurrence of siliceous knobs or ledges in the area. Silicic alteration, while covering a large area at Carneritos, is "pockety". The Centerra re-modeled resistivity data shows greater variability than the earlier Geofísica model. The complex pattern of resistivity with abrupt and discontinuous gradients correlates well with the discontinuous exposures of the dacitic breccia unit at surface.

Farther west between Masuparia and Carneritos Sur, a north-northwest linear break in resistivity (Figure 8.3) is observed in multiple lines (60100E, 60200E, 60300E, and 60500E) and is thus mapped for over one kilometer. The 100-m depth slice in the Geofísica model clearly depicts this resistivity gradient. The break corresponds to the contact between porphyritic dacite (low resistivity) on the east and ash-flow tuff of unit Tqbi (high resistivity) on the west.

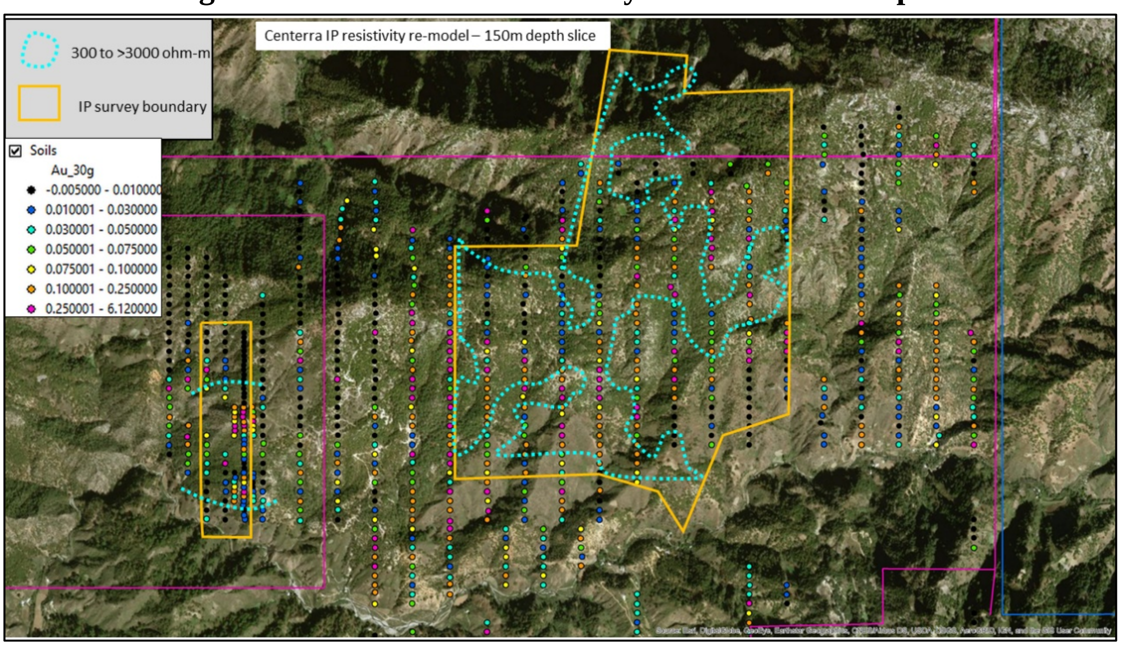
In general, vent-facies volcanic units show very complex geometries that reflect their dynamic depositional environment. The overprint of hydrothermal alteration at Tenoriba only complicates this picture. The resistivity response at depth (>150m) in the original Geofísica model appears broader and more continuous, although this may reflect poorer resolution near the survey limits. To evaluate the differences between Geofisica and Centerra IP resistivity models as well as the variability in IP resistivity response between Masuparia and Carneritos, Mammoth has recently contracted the services of Intelligent Exploration in Toronto, Ontario, Canada ("IE"). IE will also generate 3D models of the IP data once planned infill lines are completed at El Moreno, Masuparia, and Carneritos.

Figure 8.1 Centerra IP Resistivity Remodel 20m Depth Slice



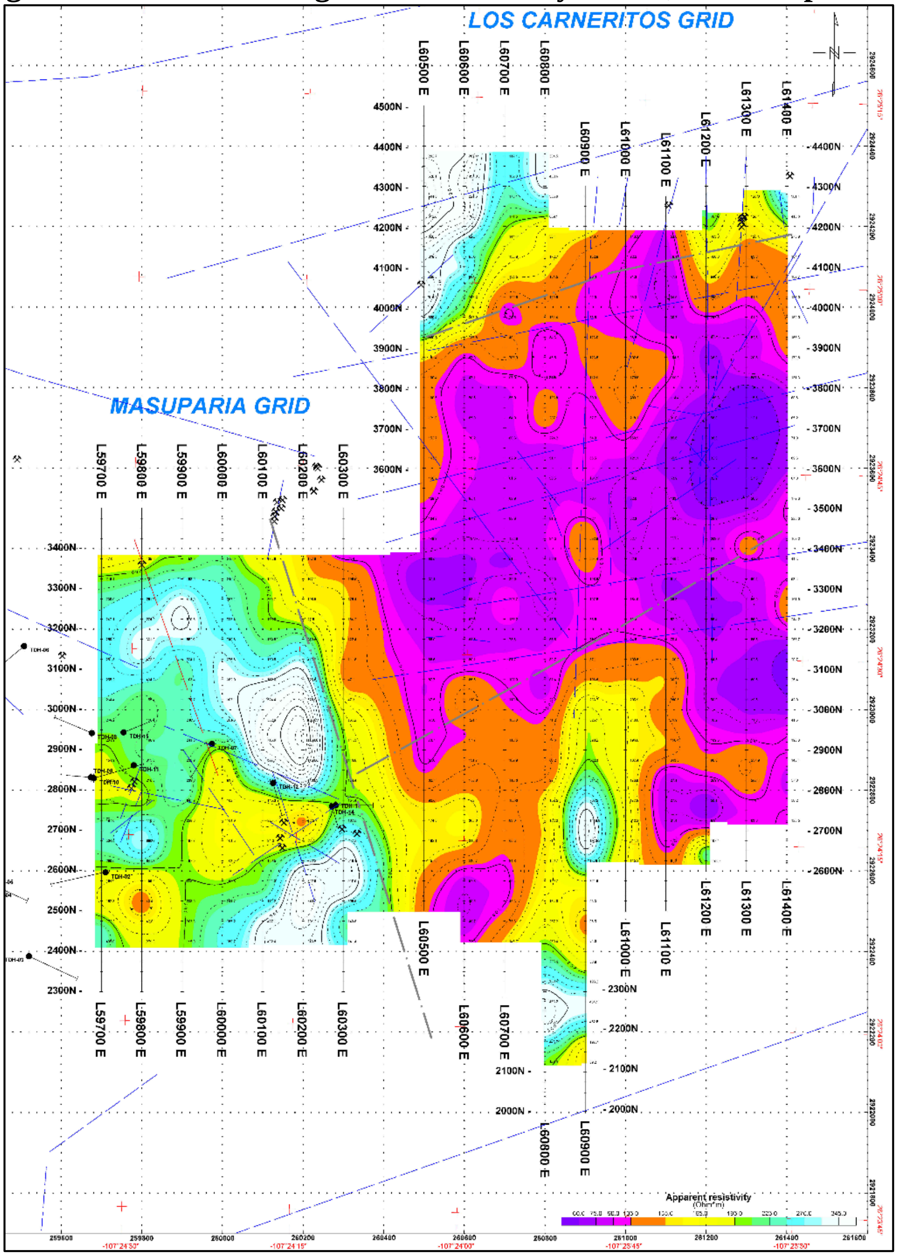
Centerra IP resistivity 20-meter depth slice showing contour of resistivity >300 ohm-meters and gold-in-soil values (in ppm). The soils data for Carneritos (including Carneritos Sur) show good correlation with resistivity >300 ohm-m at 20-meter depth. Resistivity data for Figure 8.1 and Figure 8.3 extracted from Kotlyar and Sharomov (2019). Soil gold values are in ppm.

Figure 8.2 Centerra IP Resistivity Remodel 150m Depth Slice



Centerra IP resistivity 150-meter depth slice showing contour of resistivity >300 ohm-meters and gold-in-soil values (in ppm). The pattern is similar to the 20-meter depth slice but tightens in the northeast and southeast corners of the geophysical survey area and expands to the east-central.

Figure 8.3 Geofísica Original IP Resistivity Model, 100m Depth Slice



Geofísica IP resistivity 100-meter depth slice showing the prominent resistivity break between Carneritos and Masuparia areas. The pattern is similar to the 20-meter depth slice but tightens in the northeast and southeast corners of the geophysical survey area and expands to the east-central. Note the resistivity scale at bottom. The Carneritos area is underlain by extensive areas of vuggy quartz and quartz-kaolinite alteration that yielded anomalously low IP resistivity response further discussed in Section 9.

9.0 ASSESSMENT OF THE EXPLORATION POTENTIAL AT TENORIBA

9.1 Comparisons Between Tenoriba, Mulatos, and El Sauzal

Several features of the mineralization at Tenoriba support the interpretation that it is a high-sulfidation epithermal system (Table 9.1). The most intense alteration at Tenoriba is expressed as blocky to rounded, massive outcrops of typically vuggy, quartz-rich rock. The outcrops vary from a few meters diameter to large, rubbly areas of rock made up of vuggy quartz and quartz-kaolinite. The largest area of quartz alteration recognized to date is at Carneritos, where one zone of siliceous rocks discontinuously covers about 0.5km^2 (1km x 0.5km). Intense clay and silicic alteration over the Tenoriba concession has produced a broad east-west magnetic low (Appendix Figure A4). The magnetic high along the north edge of the survey at Carneritos may reflect the influence of a thin cover of young, post-mineral tuff (unit Yqbi).

Widespread dickite in surface and drill hole samples from all main exploration areas demonstrates the acidic character of hydrothermal fluids. In most cases, higher gold contents are associated with dickite or kaolinite, although illite is also present in some higher-grade intervals as determined with ASD (Hernández, 2012). High-temperature phyllosilicates like pyrophyllite are not widely recognized at Tenoriba, which suggest a shallower exposure level. El Sauzal, 70 km northwest of Tenoriba, is characterized by extensive quartz-alunite-kaolinite alteration assemblages, though dickite is widespread at surface and minor diaspore ± pyrophyllite (higher-temperature advanced argillic alteration minerals) have been recognized (Weiss and Espinoza, 2007) at the level of open pit mining. Argillic alteration lacking gold caps the El Sauzal deposits (Weiss and Espinoza, 2007). In contrast, Mulatos contains widespread pyrophyllite, which may reflect its deeper exposure level or hotter fluids (Staude, 2001); kaolinitic alteration, possibly of steam-heated derivation, dominates surface exposures above deeper-seated gold mineralization at Mulatos such as the high-grade Escondida deposit.

The main access road from Manzano to Tenoriba exposes a thick (~200m) section of strong clay alteration in mixed ash-flow tuff and volcaniclastic strata (unit Tqbi) similar to that observed in lithocap environments of porphyry systems for which high-sulfidation deposits are widely thought to lie within. If the stratigraphic section at Tenoriba is reversed from Mihalynuk and Pang (2008) due to bedding dip considerations as discussed previously, the extensive clay in unit Tqbi would overlie zones of vuggy quartz along the Tenoriba ridgeline. The thick interval of clay alteration may thus reflect steam-heated (i.e., distal) alteration in the near-paleosurface setting. This interpretation would mean that more proximal intense silicic alteration could underlie broad areas of clay alteration in the southern part of Tenoriba, thereby supporting an extensive exploration target in which to test. Alternatively, the extensive clay could represent intense weathering of pyritic rocks, although deep weathering profiles are not evident in most areas.

Alunite is a common mineral in most high-sulfidation deposits, and hypogene alunite with quartz occurs in proximal locations just outboard of vuggy quartz. Alunite has yet to be widely recognized at Tenoriba in hypogene alteration, including in zones flanking vuggy quartz. Hypogene alunite is also conspicuously missing from Mulatos, although dickite and pyrophyllite are ubiquitous (Staude, 2001). The apparent lack of quartz-alunite rock at Tenoriba is curious and may reflect a slightly higher fluid pH based on phase equilibria (e.g., Stoffregen, 1987). For example, at Summitville, Colorado, vuggy quartz grades outward to quartz-alunite rock containing enargite in the upper 200m of exposed acid-sulfate alteration. However, at depth at Summitville, kaolinite (including dickite) occurs in place of alunite in tennantite-chalcopyrite assemblages, which Stoffregen (1987) argues reflects somewhat higher pH and less oxidizing conditions. A slightly higher fluid pH at Tenoriba may thus explain the paucity of alunite as well as enargite.

Barite was noted by Cirett (2009) as common at Tenoriba, although it is not widely reported by more recent workers. Barite is common in both Mulatos and El Sauzal deposits (Balleweg, 2016; Charest et al., 2005).

Copper oxides are present in a few of the vuggy quartz exposures at Tenoriba where they appear more prevalent at lower elevations including at the La Verde prospect in the north-central part of the property. The copper oxides derive from weathering of enargite and tennantite-tetrahedrite, although copper sulfosalts are not particularly abundant in transional and non-oxidized rocks encountered in drilling. Electrum with low silver contents is associated with tennantite from the Masuparia area (Segura, 2013a,b). Segura’s petrographic work also identified chalcopyrite at Tenoriba. At Summitville, Colorado, tennantite replaces enargite as the dominant sulfide at depths of more than ~200m beneath the top of exposed vuggy quartz (Stoffregen, 1987). El Sauzal was characterized by low copper contents in the oxidized ore and only minor enargite in sulfide zones (Weiss and Espinoza, 2007; Steven Weiss, personal communication, December 2020). In contrast, Mulatos contains abundant enargite and tennantite in non-oxidized rocks in and near ore zones (Staude, 2001).

Very fine-grained pyrite and marcasite are the most abundant ore minerals at Tenoriba (Segura, 2013a). Iron sulfides comprise as much as 10% of some mineralized rocks where they are disseminated in the groundmass, replace mafic minerals in igneous rocks, and form sheeted veinlets in more competent host rocks. In ash-flow tuff, pyrite and marcasite form 1-2 mm thick rims on pumice. The fine-grained iron sulfides at Tenoriba are less stable and weather rapidly to gypsum and Fe-bearing sulfates, which commonly encrust surfaces of drill core. Marcasite is stable under low pH hydrothermal conditions and is therefore common in high-sulfidation deposits. El Sauzal is characterized by abundant iron sulfides and a paucity of copper sulfosalts in unoxidized zones.

Another similarity between Tenoriba, El Sauzal, and Mulatos is their close relationship to near-vent silicic volcanism. All districts contain volcanic domes and flows of dacitic to rhyolitic composition. A wide range of dome-related volcanic and volcaniclastic rocks are associated with the domes, including flows, flow breccia, talus breccia, block and ash flows, enigmatic polylithic breccia, and tuffaceous rocks associated with dome collapse. Polylithic breccia bodies are an important host to gold mineralization in all three districts. Polylithic breccias are highly irregular and diverse in terms of their matrices, which can be tuffaceous, and the composition and size of their contained clasts. At the Carneritos and El Moreno prospects at Tenoriba, a jumbled array of angular to subround clasts up to 4m in diameter occur in highly siliceous, vuggy rock that comprises cliffy exposures up to 30 meters high that Mihalynuk and Pang (2008) termed “silicified, chaotic breccia”. The thickness of the siliceous, polylithic breccias at Carneritos are not evaluated due to sparse drilling. Similar but more extensive polylithic breccias at El Sauzal hosted nearly all of the ore (Weiss and Espinoza, 2007). Balleweg (2016) stressed the importance of carapace breccias at the tops and sides of domes for hosting mineralization at Mulatos. Carapace breccias are an important ore-controlling feature of the well-studied Julcani high-sulfidation deposits in Peru (Petersen et al., 1977). At Mulatos, dome-related stratified tuffs and volcaniclastic rocks host much of the ore proximal to domes (Balleweg, 2016; Staude, 2001).

An intimate relationship between dome emplacement and mineralization is characteristic for high-sulfidation deposits. A tendency is for high-sulfidation ores to be hosted in dome rocks, diatremes, and dikes of coeval age to mineralization, thereby genetically linking dome magmatism to mineralization (John et al., 2010).

High-sulfidation epithermal deposits and areas of advanced argillic alteration are widespread in the Sierra Madre Occidental. However, these types of deposits were not exploited historically on a significant basis because of a characteristic lack of bonanza-grade veins. For example, the El Sauzal area did not have any evidence of historical mining when it was discovered in 1995 (Weiss and Espinoza, 2007; Charest et al., 2005). An emerging understanding of the geological processes related to and characteristics of different types of epithermal deposits in the 1980s and early 1990s provides a framework in which to assess many areas containing widespread replacement-type silicic alteration of the high-sulfidation advanced argillic origin, enveloped by more extensive clay alteration.

Another interesting feature of epithermal deposits in the SMO is their spatial relationship to the regional unconformity between Eocene and Oligocene volcanic rocks, the distinction between the two commonly assigned as the contact between andesite-dominant rocks and overlying silicic pyroclastic rocks. This distinction is muddied by the recognition that smaller-scale variability in the compositions and ages of igneous rocks exist in the province. For example, El Sauzal was initially interpreted to lie at or near the unconformity based on field relationships described in Charest et al. (2005). However, subsequent mapping and correlation by Weiss and Espinoza (2007) suggest the Sauzal host rocks are probably entirely Oligocene as is the age of mineralization. Similarly, Mulatos is interpreted to lie at the contact between Upper and Lower Series volcanic rocks, although the Oligocene ages of both host rocks and mineralization indicate that its volcanic and hydrothermal activity was coincident with the Upper Series. It seems plausible based on the dating of precious metal mineralization in the SMO (e.g., Camprubí et al., 2003) that early Upper Series effusive volcanism predating major pyroclastic activity may have generated many of the SMO's epithermal deposits, and the associated effusive rocks are commonly assigned to the Lower Series based on their effusive character and more intermediate compositions.

Two igneous sequences are evident at Tenoriba, one lower sequence of altered andesite, dacite, and ash-flow tuff, and an upper sequence of unaltered rhyolitic ash-flow tuff. An angular unconformity marks the contact between these upper and lower sequences. The lower sequence is tilted from 20-40° south, whereas the overlying ash-flow tuff has gentle (10°) dips to either the east or west. The more tilted lower units at Tenoriba are interpreted to be of the Eocene Lower Series, whereas the less tilted (and unaltered) tuffs that cap the highest ridges are considered part of the Oligocene Upper Series volcanic rocks. No isotopic ages on volcanic strata exist for the area around Tenoriba.

Table 9.1 Comparisons Between Tenoriba, Mulatos, and El Sauzal

Deposit	Assoc Elements	Ag/Au	Avg Cu	Sulfides	Alteration	Shallow Alt	Deep Alt
Mulatos							
Cerro Estrella	Ba-Cu-Mo-Te-Zn-As	8	mod	enar, ten, elec, py	qtz-kao-pyro	v-qtz at surface	kao-dia; ser-chl-epi
Mina Vieja	Ba-Cu-Mo-Te-Zn-As	8	mod	enar, elec, py	qtz-kao-pyro	v-qtz at surface	kao-dia; ser-chl-epi
Escondida	Ba-Cu-Mo-Te-Zn-As	8	mod	enar, elec, Au, py	qtz-kao-pyro	kao	
El Victor	Ba-Cu-Mo-Te-Zn-As	8	mod	py+/- elec, Au	kao-qtz-bar	kao	
San Carlos	Ba-Cu-Mo-Te-Zn-As	8	mod	py, Au tel, Au	kao-qtz	v-qtz at surface	
El Sauzal							
Cerro Trini	As-Cu-Bi-Sb	~5	low	elec, py+/-enar	qtz-alu-kao-bar > min v-qtz	"argillic"=ill-smec(?)	dia-pyro?; ser-chl
Encinos	As-Cu-Bi-Sb	~5	low	elec, py+/-enar	qtz-alu-kao-bar ≈ abun v-qtz	"argillic"=ill-smec(?)	dia-pyro?; ser-chl
Fase Uno	As-Cu-Bi-Sb	~5	low	elec, py+/-enar	qtz-alu-kao-bar > min v-qtz	"argillic"=ill-smec(?)	dia-pyro?; ser-chl
Tenoriba*							
Carneritos	As-Sb-Mo-Hg-Bi-Pb-Zn	16	74	py, ten-tet, enar?	qtz>kao; abun v-qtz	v-qtz at surface	?
Masuparia	As-Sb-Mo-Hg-Bi-Pb-Zn	11	60	ten-tet, elec, py	kao>qtz; minor v-qtz	min v-qtz; ill-smec	?
El Moreno	As-Sb-Mo-Hg-Bi-Pb-Zn	8	915	py, elec, Au	qtz>kao; mod v-qtz	v-qtz at surface	?
C. Colorado	As-Sb-Mo-Hg-Bi-Pb-Zn	?	?	?	kao>qtz?; mod v-qtz	min v-qtz	?

*geochemical characterization based on drill samples with >100ppb Au; Tenoriba samples Au>11 ppm excluded

Deposit	Deposit Age	Belt Size/ Elongation	Host Rocks	Strat. Position	Ore Control	Oxidation Depth	Placers
Mulatos							
Cerro Estrella	>25, <32 Ma	3x1km; NE	dacitic domes, assoc tuff	Upper Series	lith contacts	up to 200m	minor
Mina Vieja	>25, <32 Ma	3x1km; NE	dacitic domes, assoc tuff	Upper Series	lith contacts	up to 200m	Taunas
Escondida	>25, <32 Ma	3x1km; NE	dacitic domes, assoc tuff	Upper Series	lith contacts		
El Victor	>25, <32 Ma	3x1km; NE	dacitic domes, assoc tuff	Upper Series	lith contacts		
San Carlos	>25, <32 Ma	3x1km; NE	dacitic domes, assoc tuff	Upper Series	lith contacts		
El Sauzal							
Cerro Trini	31.4-29.5 Ma	1.6x0.8km; ENE	silicic megabreccia, tuffs, lavas	prob. Upper Ser.	lith contacts	50-100m	
Encinos	31.4-29.5 Ma	1.6x0.8km; ENE	silicic megabreccia, tuffs, lavas	prob. Upper Ser.	lith contacts	50-100m	?
Fase Uno	31.4-29.5 Ma	1.6x0.8km; ENE	silicic megabreccia, tuffs, lavas	prob. Upper Ser.	lith contacts	50-100m	Batopilas
Tenoriba*							
Carneritos	>32 Ma	5x2km; NE	porph dacite, rhyolite flow bxa	Upper Series	lith contacts	unknown	
Masuparia	>32 Ma	5x2km; NE	ash-flow tuff, porph dacite	Upper Series	lith contacts, veins/faults	up to 100m	minor to
El Moreno	>32 Ma	5x2km; NE	aft, porph dacite	Upper Series	lith contacts	unknown	unknown
C. Colorado	>32 Ma	5x2km; NE	andesite, flow bxa porph dacite	Upper Series	lith contacts	unknown	

A potentially confusing issue at Tenoriba, relates to the dacite and dacite breccia (units Tfp and Tcbx of Mihalynuk and Pang, 2008). The dacite and breccia are best exposed immediately beneath the basal contact of the Upper Series ash-flow sheet at Carneritos. This relationship was reasonably interpreted by Mihalynuk and Pang to mean that the dacite units are the youngest of the Lower Series units because at

Carneritos, dacite underlies young ash-flow tuff. However, field observations from this site visit and Mihalynuk and Pang's mapping show that moderate bedding dips in Lower Series rocks are consistently to the south-southeast (Figure 5.5), suggesting that the dacites, if part of the Lower Series, are the stratigraphically lowest of the Lower Series units exposed at Tenoriba, and they underlie Lower Series altered ash-flow tuff (Tqbi) and andesitic rocks (e.g., unit Btbx; Figures 5.5 through 5.7). Thus, the main host for silicic alteration at Tenoriba would lie at relatively shallow depths beneath the tuff instead of having been eroded.

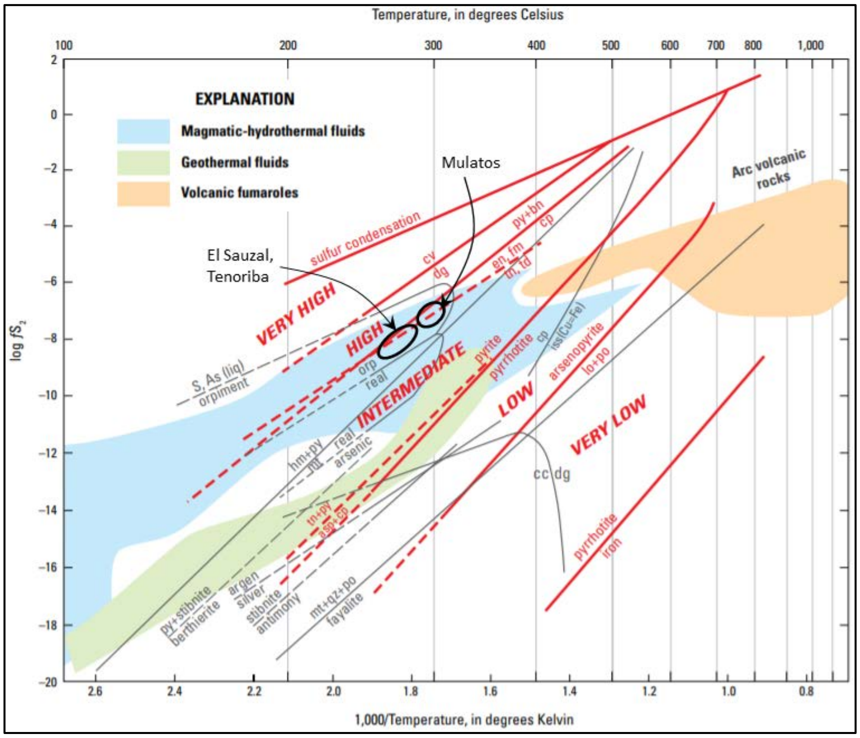
Tenoriba shares many geologic characteristics with El Sauzal and Mulatos (Table 9.1) as well as other high-sulfidation systems in the North American Cordillera. Among its shared traits with high-sulfidation deposits in the SMO are a spatial association with the Oligocene unconformity and a spatial and likely temporal association with dacite dome magmatism. Other more deposit-specific characteristics include widespread vuggy quartz and quartz-kaolinite replacement of volcanic host rocks, low Ag/Au ratios, and association with marcasite, tennantite, enargite(?), and barite, many of which are indicative of a lower pH fluid (Figure 9.1). Some differences regarding the Tenoriba high-sulfidation system as currently known include a predominance of kaolinite (and dickite) over alunite in areas immediately outboard of vuggy quartz, and possibly more tennantite-chalcopyrite instead of enargite-covellite. These characteristics could suggest slightly less acidic ore fluids and/or a somewhat deeper exposure level for parts of Tenoriba. However, such differences should not be considered matters of concern at this early stage, because the clays and sulfides have yet to be systematically characterized, there are widespread occurrences of vuggy quartz alteration are distinctive of a shallow, high-sulfidation setting, and there are good gold grades already intersected in drill holes.

9.2 Attributes of Tenoriba

- Tenoriba is a robust high-sulfidation system with excellent exploration potential. The property is extensive, with over 6km of strike length, including widely distributed areas containing vuggy quartz alteration (Appendix Figures A1, A2, A3).
- Gold in soils and rock-chip samples is widespread, consistent, and robust and extends into clay-altered areas. Gold values in surface samples are excellent and correlate reasonably well with As, Sb, Bi, Hg, Cu, Pb, and Zn (Appendix Figures A1, A2, A3)
- The highest gold values in surface samples correlate with areas of silicic alteration.

- Large areas of Tenoriba to the east and west of the more extensively explored 6km strike length have not been explored beyond 200m-spaced soils lines, yet soils data yield quite good results. Additional field exploration is recommended in these areas (Appendix Figures A2, A3).
- Regional magnetics data (Appendix Figure A3) exhibits a prominent E-W low approximately coincident with the extent of hydrothermal alteration at Tenoriba. This association suggests that areas west of Cerro Colorado are potentially prospective.
- The project is target rich and only modestly tested through sparse drilling (Appendix Table A4). Existing drilling has intersected significant mineralization at El Moreno, Masuparia, and Carneritos. Carneritos and El Moreno are large, less explored, high-quality targets that are drill ready. Cerro Colorado has not been drilled. For these reasons, Tenoriba is considered an early- to mid-stage exploration project.
- High Au/Ag ratios are characteristic of most mineralization at Tenoriba. However, very low copper contents may prove advantageous, because such low concentrations may be more amenable to cyanide leach recovery of gold.
- Nearly all past drilling at Tenoriba took place outboard of strongly silicified zones, which means there is significant untested exploration opportunity. A strong correlation of gold with silicic alteration is clear in the sampling data and future drilling should emphasize targets into known or inferred silicic zones.
- A recognition by Mammoth geologists that the near-vent dacitic volcanic rocks at Tenoriba are critical for hosting high-sulfidation mineralization is important. The proximal setting of high-sulfidation systems to such vents considerably narrows the playing field.

Figure 9.1 Sulfur Fugacity Versus Temperature Plot



Sulfur fugacity versus temperature plot showing distinctiveness of various types of epithermal deposits. Possible conditions for Tenoriba, El Sauzal, and Mulatos are shown. Sulfosalts described for Tenoriba include tennantitite, tetrahedrite, chalcopyrite, and rare enargite, suggesting deposits may have formed from fluids with slightly lower temperature and sulfidation states than Mulatos (Einaudi et al., 2003; John et al., 2010).

9.3 Challenges at Tenoriba

- Incompletely evaluated redox. Both El Sauzal and Mulatos treat oxidized ores only. The potential for deep oxidation exists outside of areas already drilled at Tenoriba. Drilling at Masuparia, El Moreno, and Carneritos indicates highly variable redox. Additional drilling to define the redox boundary in target areas will be important for advancing the project.
- There is a suggestion that parts of the Tenoriba high-sulfidation system (e.g., at Masuparia) are relatively deep (e.g., kaolinite>>alunite; tennatite>>enargite) because kaolinite and tennantite occur in the deeper parts of some systems like Summitville (see following bullet, which in contrast, indicates large areas of Tenoriba are probably high level).
- Barren clay caps demonstrate a much larger (and preserved) system. Exploration in pre-mineral covered areas will require more than a reliance on surface geochemistry. However, soils data show that large clay-altered areas contain significant gold, and these occurrences may be indicative of more extensive mineralization at depth.

- Complex, "pockety" resistivity highs in IP surveys at Carneritos are suggestive of lower continuity of silicic alteration (see "Other Considerations" below), or the pockety nature reflects the top of a more extensive zone of silicic alteration at depth.
- Challenging topography in the unexplored north part of Tenoriba also should be viewed as an opportunity.

9.4 Other Considerations

- Consider that the Lower Volcanics are tilted ~30° S, which means units young southward. This is different than the layer cake approach of previous mapping.
- Silicic "ledges" at Tenoriba also plunge ~20-30°S, suggesting they are lithologically controlled and not just related to down-slope weathering effects.
- Through a stratigraphic reinterpretation, test the concept that pre-mineral cover rocks may preserve greater volumes of silicic alteration at depth at Tenoriba.

  A south tilt means that favorable dacite (Tfp and Tcbx) may underlie clay altered Tqbi to the south toward Manzano. Assessing such targets will require more detailed mapping, careful sampling, and geophysics. ASD analysis could help to distinguish higher-temperature conduits within or cutting the clay cap.

  A south tilt also means favorable Tfp and Tcbx units are probably exposed along the steep north-facing slope of Arroyo Santa Rosa (refer to the cliff exposures that were the discovery outcrop for Sauzal). Sampling and mapping this difficult-to-reach area represents an excellent opportunity to assess deeper parts of the system near known mineralization in the corridor from Carneritos to El Moreno.

- Should permitting and cost-efficient access permit the use of RC drilling, a center-return RC bit is potentially a good method for getting good-quality, larger samples in replacement-style mineralization. Balleweg (2016) indicates RC proved much better than core at Mulatos for exploration and for resource drill out in areas of intense silicification where core recovery was compromised. Similarly, RC proved reliable at El Sauzal where sufficient access was provided. RC is also significantly cheaper, assuming cost efficiencies gained by RC drilling are not offset by costs to create the larger road access required by an RC rig. Track and buggy-mounted rigs can navigate tight roads. RC is not recommended where substantial ground water is encountered in drilling. Track- or buggy-mounted RC rigs routinely drill to 500 meters.
- Anomalously low resistivity occurs in many areas at Carneritos despite abundant vuggy quartz outcrops. In fact, the resistivity is much lower at Carneritos than adjacent area of Masuparia that are not underlain by extensive areas of silicified rocks. Similarly, chargeability is broadly low at Carneritos despite abundant sulfide encountered in the few drill holes there. A

possibility is that the IP signal at Carneritos may have been attenuated, perhaps by the large boulder fields of silicic rock, which may adversely affect current.

- Historical holes at Tenoriba mostly were drilled southward, east, or west at moderate angles. Only one north-directed hole was drilled at the north end of Carneritos, and it was drilled to satisfy work commitments. If the unit dips are mainly to the south, then testing lithologically-controlled mineralization may be better assessed with north-directed or vertical holes to intersect units orthogonally.

10.0 SPECIFIC RECOMMENDATIONS

- Map and sample the north-facing exposures on the property.
- Re-assess the stratigraphic order of Mihalynuk and Pang (2008) through outcrop and core examination of tuff and epiclastic units that possess well-defined foliation or bedding.
- Contour ASD drill hole and surface sample spectral data; such information can help identify the hottest parts of the hydrothermal system, whether of a narrow and structurally defined character or broad, replacement style.
- Create an outcrop-style alteration map from existing data and new mapping. This can be overlaid with ASD data, surface geochemistry, and surface geophysical plans for drill hole planning purposes.
- Draft cross sections for each exploration area. North-south sections are probably most appropriate to accurately depict unit dips. East-west "longitudinal" sections may be less useful.
- Re-assessment of historical IP data at Carneritos with a geophysical consultant is in progress. It is important to have confidence in the IP, and the striking differences in overall resistivity (and chargeability) between Carneritos (relatively low resistivity) and Masuparia (high resistivity) demand a bit more scrutiny. Comparing resistivity data with physical properties obtained from hand samples may be useful.
- Also, the Centerra and Geofísica resistivity models of the same dataset differ quite a bit; understanding what assumptions were made in the processing and the estimation parameters is important.
- Follow-up highly anomalous soils at lower elevations in tuffs and andesitic rocks because these units are interpreted to overlie favorable dacitic units. Thus, soil gold values in clay-altered tuff and andesite may reflect "leakage" into overlying units.
- Reconnaissance N-S soil lines in the area from Cerro Colorado to El Moreno may delineate new areas of targeted exploration.
- Follow up on locally sourced coarse gold in regolith at El Moreno.

11.0 CONCLUSIONS

The Tenoriba project contains extensive high-sulfidation mineralization in Eocene volcanic rocks of the Lower Volcanic Series. Four main exploration areas lie within a robust 6km-long zone of anomalous gold in rocks and soils samples. Anomalous surface geochemistry is open to the north, west, and east and there is reasonable evidence to suggest that additional exploration prospects will be identified with further mapping and surface sampling.

Twenty-eight core holes were drilled at Tenoriba to date. Nineteen of the holes were drilled at Masuparia, many holes targeted narrow structures that were prospected historically. Four holes were drilled at El Moreno, and five holes were drilled at Carneritos. Significant gold intercepts were encountered in 23 of 28 holes, including one hole with a single 2m interval of >47g Au/t, and 10 holes with >30 grade-thickness (g Au/t **x** m).

A new stratigraphic interpretation from this report suggests that the Lower Series volcanic rocks generally dip southward. A southward dip on older volcanic rocks would effectively invert the established stratigraphic column of Mihalynuk and Pang (2008). Implications for southward dips on older units would be that near-vent dacites associated with vuggy quartz alteration would underlie parts of the Tenoriba property instead of having been eroded.

The authors have reviewed the data for the Tenoriba project and believe that the project has potential to host an economic high-sulfidation epithermal deposit. Three target areas have received the most exploration (El Moreno, Masuparia, and Carneritos) in terms of surface sampling, geophysical surveys, and drilling, although only Masuparia has had even moderate drilling. The El Moreno and Carneritos areas, while only sparsely drilled, have large areas of silicic alteration and gold in surface samples. Other target areas remain undrilled, and many lack follow-up sampling despite positive results from reconnaissance work. For these reasons and others noted in this report, Tenoriba is a high-quality gold exploration project that merits additional exploration.

12.0 REFERENCES

Balleweg, K., 2016, Los Venados field examination: unpublished technical report prepared for: Wolverine Minerals Corp., 16 p.

Camprubí, A., Ferrari, L., Cosca, M.A., Cardellach, E., and Canals, A., 2003, Ages of epithermal deposits in Mexico: Regional significance and links with the evolution of Tertiary volcanism: Economic Geology, v. 98, p. 1029-1037.

Charest, A.R., Lewis, P.D., and Taite, S.P., 2005, Discovery of the El Sauzal gold deposit in Chihuahua, Mexico: Mining Engineering, v. 57, p. 25-29.

Cirett, J., 2009, Report on the geology of the Tenoriba property and description of targets: unpublished technical report prepared for Masuparia Gold Corp., February 2009, 51 p.

Clark, K.F., Fitch, D.C., 2009. Evolución de Depósitos Metálicos en Tiempo y Espacio en México. In: Clark, K.F., Salas-Pizá, G., Cubillas-Estrada, R. (Eds.), Geología Económica de México, 2nd ed. Servicio Geológico Mexicano & Asociación de Ingenieros de Minas, Metalurgistas y Geólogos de México, pp. 62–133.

Clark, K.F., and Fitch, D.C., 2013, Evolution of metallic deposits in time and space in Mexico: unpublished manuscript, 72 p.

Drobek, P., 2005, Mexico scoping study: unpublished technical report, 123 p.

Einaudi, M.T., Hedenquist, J.W., Inan, E.E., 2003, Sulfidation state of fluids in active and extinct hydrothermal systems: Transitions from porphyry to epithermal environments, in S.F. Simmons, ed., Society of Economic Geologists Special Publication 10, pp. 285-314.

Flores, J.L., Salazar Reyes, S., Pérez de la Cruz, J.A., Miranda Huerta, A., Maldonado Sanchez, G., Torreblanca, T., and Prian, J.P., 1999, Carta geológico y minera: Guachochi G13-4, Chihuahua, Sinaloa, y Durango: Servicio Geológico Mexicano, 1:250,000-scale.

Flores, J.L., and Ibarra, I.G., 2003, Carta geológico y minera: Basonopa G13-A72, Chihuahua, Mexico: Servicio Geológico Mexicano, 1:50,000-scale.

Henry, C.D., and Aranda-Gómez, J.J., 1992, The real southern Basin and Range: Mid- to late Cenozoic extension in Mexico: Geology, v. 20, p. 701-704.

Hernández, L.G.Z., 2012, Terraspec analysis and interpretation of hand samples from the Tenoriba project: unpublished technical report prepared for Mammoth Resources Corp., December 2012, 49 p.

Horner, J. T., and Enriquez, E., 1999, Epithermal precious metal mineralization in a strike-slip corridor: The San Dimas district, Durango, Mexico: Economic Geology, v. 94, p. 1375-1380.

John, D.A., Vikre, P.G., duBray, E.A., Blakely, R.J., Fey, D.L., Rockwell, B.W., Mauk, J.L., Anderson, E.D., and Graybeal, F.T., 2010, Descriptive models for epithermal gold-silver deposits: U.S. Geological Survey Scientific Investigations Report 2010-5070-Q, 264 p.

Kotlyar, B., and Sharomov, A., 2019, Mineral Centerra – Mexico monthly report, April 2019, Tenoriba Chihuahua joint venture with Mammoth Resources Corp., unpublished technical report, 6 p.

McDowell, F.W., and McIntosh, W.C., 2012, Timing of intense magmatic episodes in the northern and central Sierra Madre Occidental, western Mexico: Geosphere, v. 8, p. 1505-1526.

Mihalynuk, M., and Pang, G.H.E., 2008, Tenoriba project: Report on regional mapping and prospecting, Tenoriba concession, Chihuahua State, Mexico: unpublished technical report prepared for Masuparia Gold Corp., May 20, 2008, 37 p.

Murowchick, J.B., and Barnes, H.L., 1986, Marcasite precipitation from hydrothermal solutions: Geochimica et Cosmochimica Acta, v. 50, p. 2615-2629.

Petersen, U., Noble, D.C., Arenas, M.J., and Goodell, P.C., 1977, Geology of the Julcani mining district, Peru: Economic Geology, v. 72, p. 931-949.

Segura, E.P., 2013a, Reflected-light petrography of drill samples from the Tenoriba project, Chihuahua, Mexico: unpublished technical report prepared for Mammoth Resources Corp., February 22, 2013, 20 p.

Segura, E.P., 2013b, Characterization of metallic minerals in mineralized sample from drill hole TDH-07 (#3655) and TDH-11 (#5165), Tenoriba project, Chihuahua, Mexico: unpublished technical report prepared for Mammoth Resources Corp., March 8, 2013, 13 p.

Segura, E.P., 2018, Transmitted-light petrography of samples from TEN17-10 and TEN17-11 drill holes of the Tenoriba project, Chihuahua, Mexico: unpublished technical report prepared for Mammoth Resources Corp., June 4, 2018, 16 p.

Sellepack, S.M., 1997, The geology and geochemistry of the El Sauzal gold prospect, southwest Chihuahua, Mexico: unpublished M.S. thesis, University of Texas, El Paso, 89 p.

Simpson, R., 2014, Field status report and recommendations for future work, Tenoriba project, Chihuahua State, Mexico: unpublished technical report prepared for Mammoth Resources Corp., January 2014, 155 p.

Simpson, R., 2018, Summary of the 2017-18 diamond drill results, Tenoriba property: unpublished memo and data table prepared for Mammoth Resources Corp., 2 p.

Simpson, R., 2019, Report on the 2017-18 diamond drill campaign and recommendations for future work, Tenoriba property, Guadalupe y Calvo Municipality, Chihuahua State, Mexico: unpublished technical report prepared for Mammoth Resources Corp., January 2019, 36 p.

Staude, J-M., 2001, Geology, geochemistry, and formation of Au-(Cu) mineralization and advanced argillic alteration in the Mulatos district, Sonora, Mexico: Society of Economic Geologists Special Publication 8, p.199-216.

Stoffregen, R.E., 1987, Genesis of acid-sulfate alteration and Au-Cu-Ag mineralization at Summitville, Colorado: Econ. Geol., v. 82, p. 1575-1591.

Weiss, S.I., and Espinoza, E., 2007, Geologic setting and gold grade patterns of the El Sauzal high-sulfidation gold-silver deposit, Chihuahua, Mexico: Society of Mining, Metallurgy, and Exploration, pre-print 07-092, SME annual meeting, February 25-28, 2007, Denver, CO, 7 p.

Weiss, S.I., Espinoza, E., and Ronkos, C., 2011, Update on the El Sauzal high-sulfidation gold-silver deposit at the initiation of mining, Municipio de Urique, Chihuahua, Mexico in Gastelum, G., ed., Northern Sierra Madre Occidental Gold-Silver Mines, Mexico: Society of Economic Geologists, field trip guidebook 42, October 5-9, 2010, p. 95-102.

APPENDIX A

DRILL HOLE GOLD GRADE-THICKNESS, SURFACE SAMPLE GEOCHEMISTRY, DRILL HOLE SUMMARIES, AND DOWN-HOLE GEOCHEMICAL CORRELATION DIAGRAMS

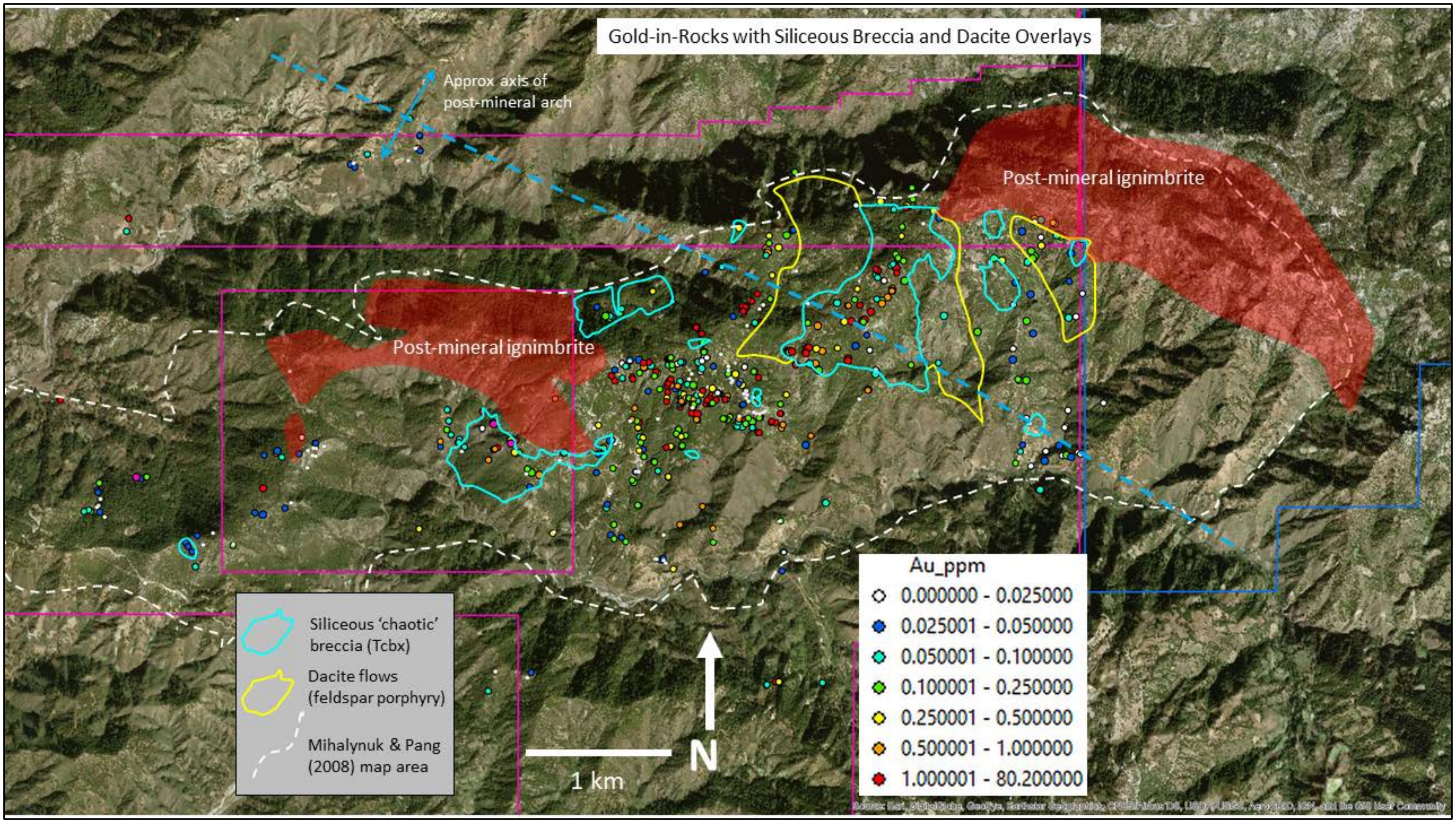


Figure A1. Gold-in-rock samples with overlays depicting post-mineral ignimbrite (Yqbi) in red, siliceous "chaotic" breccia (Tcbx; cyan outline), and dacite (Tfp, feldspar porphyry; yellow outline) of Mihalynuk and Pang (2008). The northwest corner has UTM (Zone 13, WGS 84) coordinates: 255,000E; 2,925,400N.

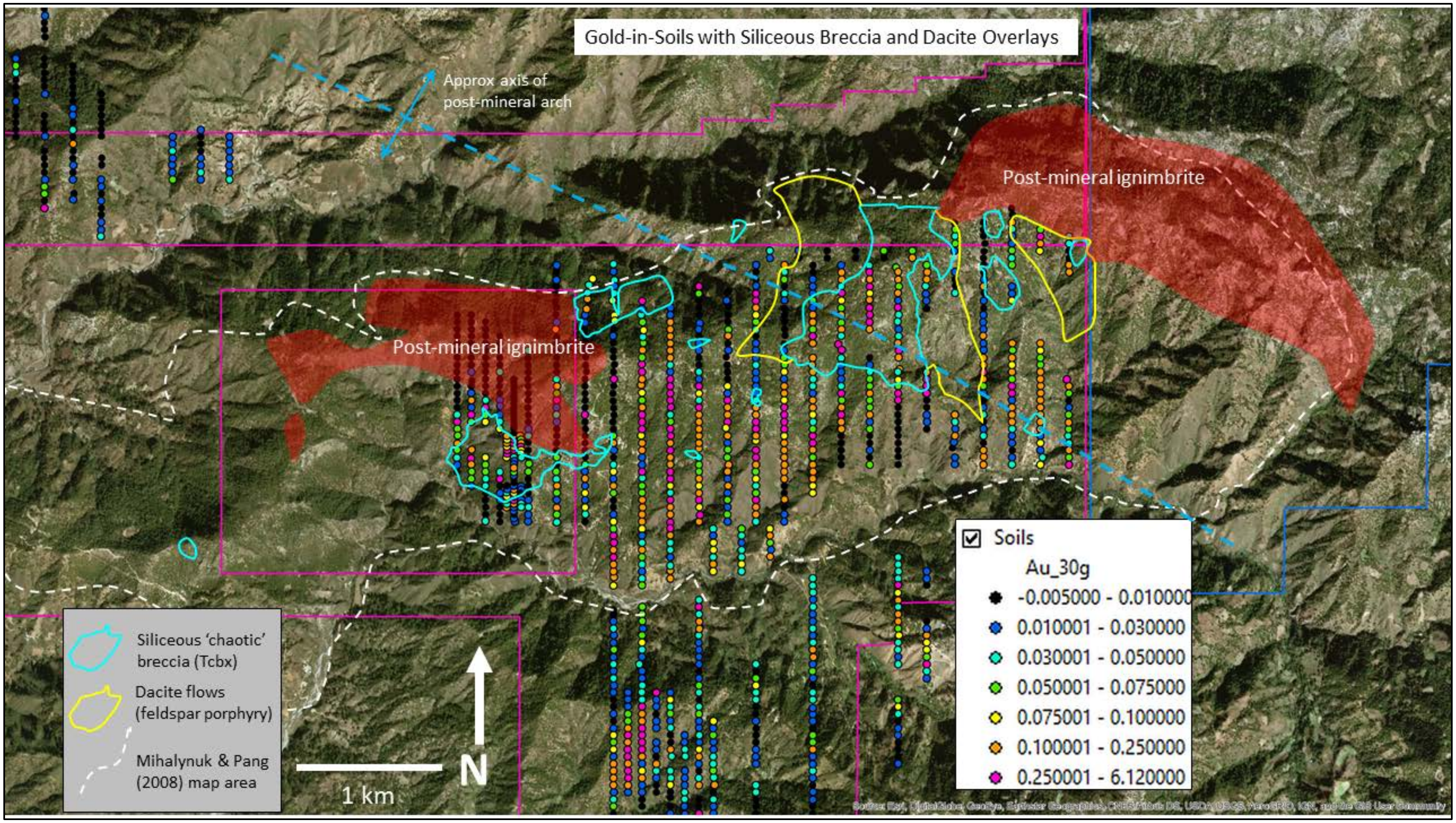


Figure A2. Gold-in-soils with overlays depicting post-mineral ignimbrite (Yqbi) in red, siliceous "chaotic" breccia (Tcbx; cyan outline), and dacite (Tfp, feldspar porphyry; yellow outline) of Mihalynuk and Pang (2008). Gold values in soil samples are in ppm. The northwest corner has UTM (Zone 13, WGS 84) coordinates: 255,000E; 2,925,400N.

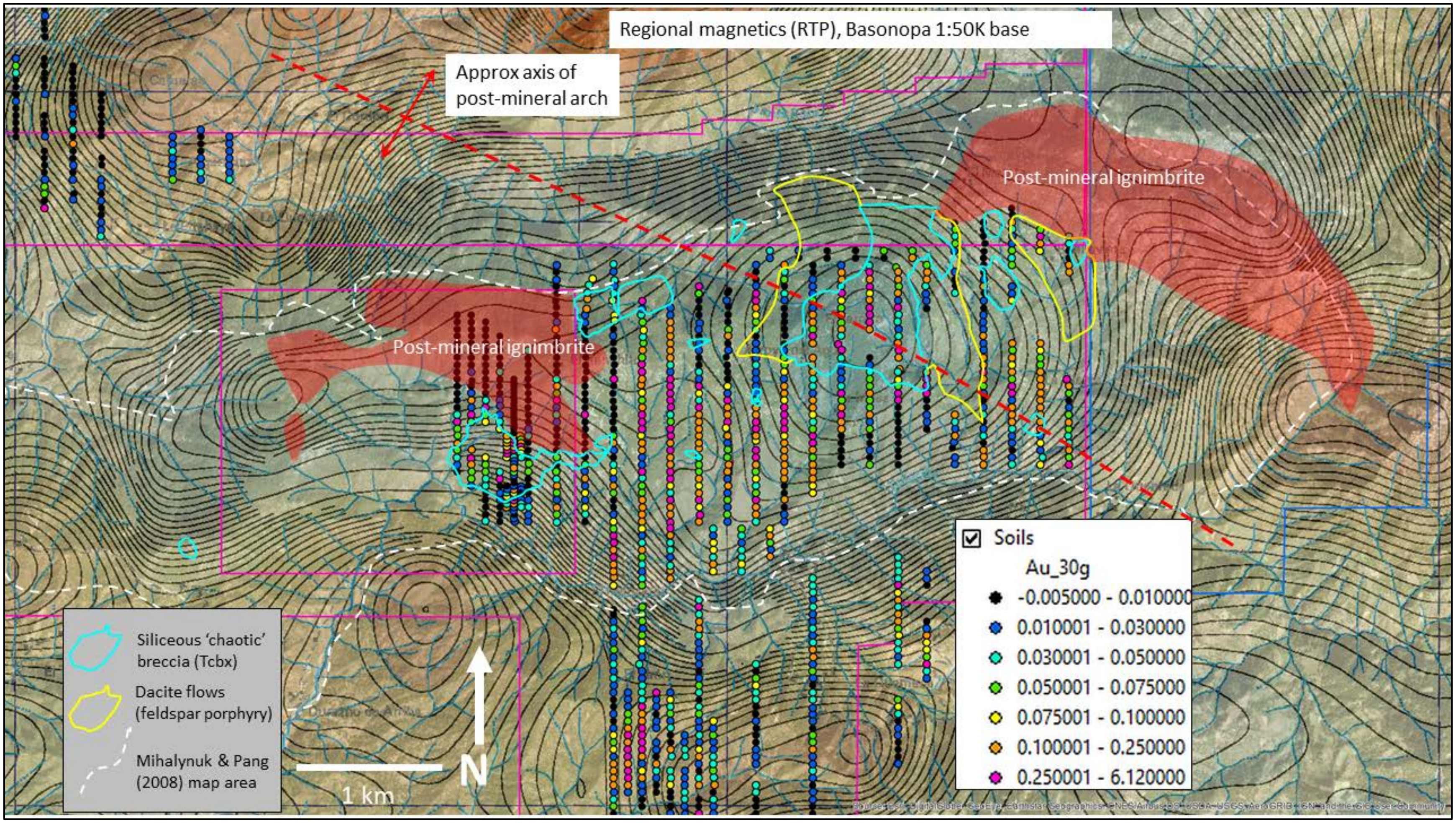


Figure A3. Gold-in-soils with overlays depicting post-mineral ignimbrite (Yqbi) in red, siliceous "chaotic" breccia (Tcbx; cyan outline), and dacite (Tfp, feldspar porphyry; yellow outline) of Mihalynuk and Pang (2008). Basemap is the Basonopa 1:50,000-scale regional magnetics (reduced to pole), showing the major magnetics low associated with alteration at Tenoriba. Gold values in soil samples are in ppm. The northwest corner has UTM (Zone 13, WGS 84) coordinates: 255,000E; 2,925,400N.

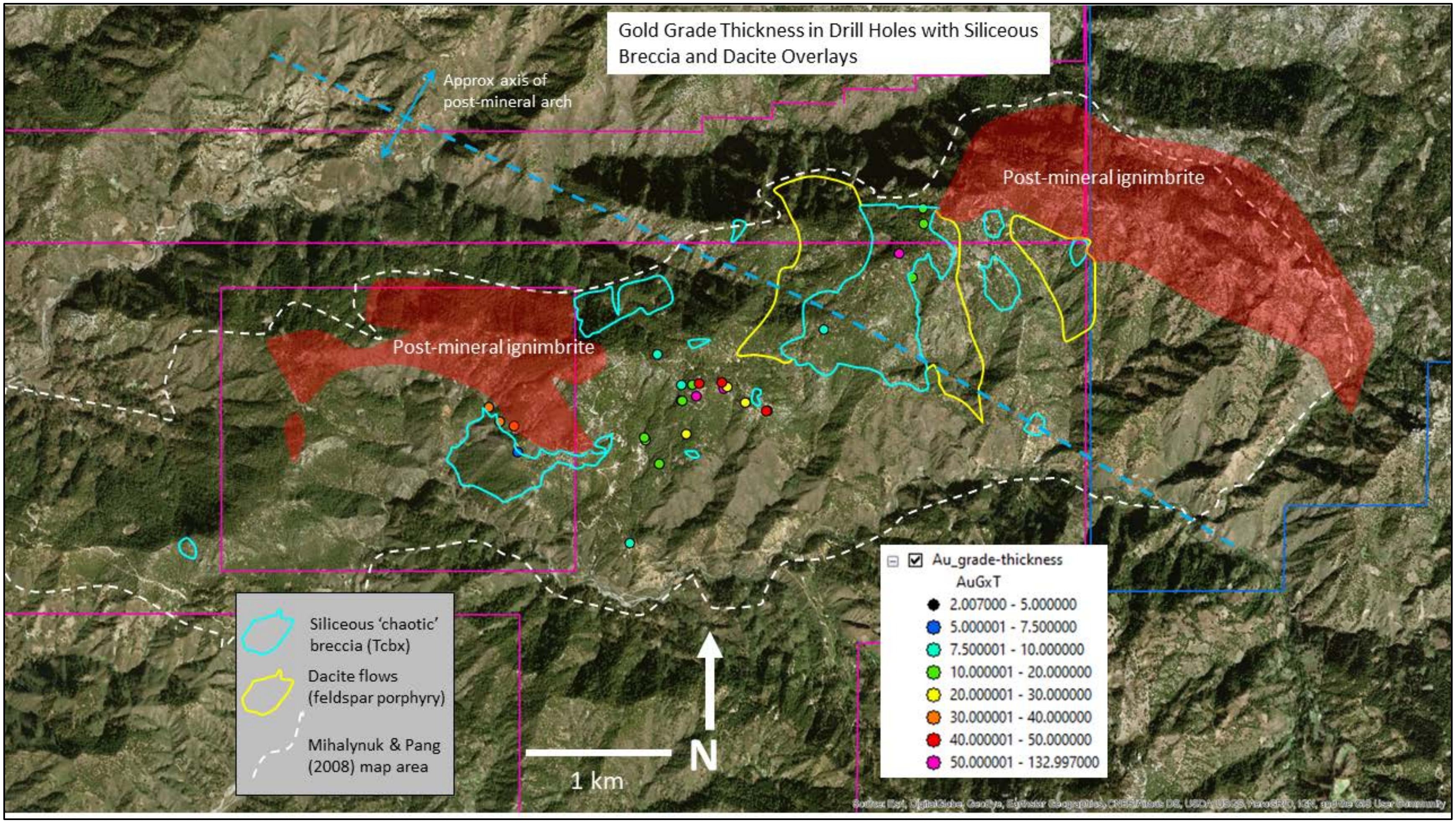


Figure A4 Gold grade-thickness in drill holes with overlays depicting post-mineral ignimbrite (Yqbi) in red, siliceous “chaotic” breccia (Tcbx; cyan outline), and dacite (Tfp, feldspar porphyry; yellow outline) of Mihalynuk and Pang (2008). Grade-thickness values are in ppm Au x thickness in meters. The northwest corner has UTM (Zone 13, WGS 84) coordinates: 255,000E; 2,925,400N.

Table A1. Significant Intercepts, Mammoth Resources Corp. 2017-18 Drilling (Simpson, 2018)

Summary of 2017-18 Diamond Drill Results, Tenoriba Property

Location	Hole Number	From (m)	To (m)	Total (m)	Weighted Average Gold Grade (g/t)	Weighted Average Silver Grade (g/t)	Weighted Average Copper Grade (%)	Weighted Average Gold Equivalent* Grade (g/t)
El Moreno	**TEN 17-01**	169.0	209.0	**30.0**	0.77	2.0		**0.79**
	(including)	198.5	204.5	**5.9**	**3.41**	7.2		**3.51**
	TEN 17-02	180.5	260.5	**80.0**	0.17	0.3		**0.18**
	(including)	187.0	196.0	**9.0**	0.51	5.3		**0.52**
	(including)	180.5	196.0	**15.5**	0.35	8.6		**0.36**
	TEN 17-03	85.0	92.2	**7.2**	0.23	36.3	**3.59**	**4.34**
	TEN 17-11	96.5	143.0	**46.5**	0.18	0.5		**0.19**
		230.0	246.5	**16.5**	0.16	0.9		**0.17**
Central	**TEN 17-04**	0.0	10.0	**10.0**	**1.12**	1.3		**1.13**
		45.1	90.5	**45.4**	0.53	6.6		**0.63**
	(including)	45.1	59.8	**14.7**	0.61	16.7		**0.86**
	(including)	72.5	90.5	**18.0**	0.78	2.4		**0.83**
	TEN 17-05	28.0	55.0	**27.0**	0.51	8.9		**0.63**
	(including)	46.6	55.0	**8.4**	**1.30**	6.6		**1.39**
		70.0	93.5	**23.5**	**1.30**	1.6		**1.32**
	(including)	83.5	93.5	**10.0**	**2.89**	3.2		**2.93**
	(including)	86.5	92.0	**5.5**	**4.92**	5.1		**4.99**
	TEN 17-09	66.5	69.5	**3.0**	0.19	10.1		**0.42**
	TEN 17-10	25.5	30.0	**4.5**	0.42	7.9		**0.52**
		33.0	37.5	**4.5**	0.45	2.6		**0.48**
		58.5	81.0	**22.5**	0.35	4.3		**0.40**
		144.5	147.5	**3.0**	**1.31**	**50.3**		**1.99**
		159.5	162.5	**3.0**	0.65	5.5		**0.72**
		170.0	194.0	**24.0**	0.31	3.7		**0.36**
Carneritos	**TEN 17-06**	43.7	170.5	**126.8**	0.47	7.2		**0.52**
	(including)	70.7	129.0	**58.2**	0.73	3.9		**0.80**
	(including)	70.7	95.7	**25.0**	**1.10**	2.7		**1.21**
	(including)	95.7	111.0	**15.0**	0.51	0.4		**0.54**
	TEN 17-07	11.5	53.5	**42.0**	0.21	5.0		**0.28**
		65.5	78.0	**12.5**	0.33	2.4		**0.36**
	TEN 17-08	52.5	62.7	**14.9**	0.58	3.1		**0.62**

Table A1. Significant Intercepts, Masuparia Gold Corp. 2007 Drilling (Simpson, 2018)

Summary of 2007 Diamond Drill Results, Central Area, Tenoriba Property

Hole Number	From (m)	To (m)	Total (m)	Weighted Average Gold Grade (g/t)	Weighted Average Silver Grade (g/t)	Weighted Average Gold Equivalent* Grade (g/t)
TDH - 01	3.5	14.7	**11.2**	0.39	2.8	**0.43**
TDH - 02	0.0	4.4	**4.4**	**0.93**	8.6	**1.04**
	33.3	48.3	**15.0**	0.29	8.5	**0.40**
	109.8	113.8	**4.0**	0.40	5.4	**0.48**
TDH - 03	40.0	54.0	**14.0**	0.21	14.6	**0.40**
TDH - 04	105.0	110.0	**5.0**	0.59	1.2	**0.60**
TDH - 06	24.0	50.0	**26.0**	0.25	2.7	**0.29**
TDH - 07	35.0	82.0	**47.0**	**1.96**	3.6	**2.01**
(including)	40.0	64.7	**24.7**	**3.91**	6.8	**4.00**
	120.5	132.0	**11.5**	**2.26**	4.3	**2.32**
TDH - 08	0.0	20.0	**20.0**	0.23	2.1	**0.26**
TDH - 11	4.0	11.0	**7.0**	0.55	1.0	**0.56**
	27.3	32.0	**4.7**	0.51	1.3	**0.53**
	40.8	67.5	**26.7**	0.63	2.2	**0.66**
	106.0	147.0	**41.0**	0.91	0.6	**0.92**
	185.0	188.7	**3.7**	**1.48**	4.1	**1.53**
TDH - 12	15.9	24.6	**8.7**	0.28	3.5	**0.32**
	51.8	57.8	**6.0**	0.56	2.4	**0.59**
	76.8	85.8	**9.0**	0.35	2.1	**0.38**
	119.8	131.8	**12.0**	0.43	2.5	**0.47**
TDH - 13	21.0	59.0	**38.0**	0.44	3.9	**0.49**
	104.0	121.0	**17.0**	0.28	1.3	**0.30**
TDH - 14	4.0	39.9	**35.9**	0.65	2.6	**0.69**
	49.0	79.0	**30.0**	0.33	3.4	**0.37**
TDH - 15	50.0	62.0	**12.0**	0.64	4.6	**0.71**
	99.3	112.9	**13.6**	0.45	1.4	**0.47**

Table A2. Spearman Correlation for El Moreno Drill Samples

	Au	*Ag*	*Cu*	*Mo*	*Pb*	*Zn*	*As*	*Sb*	*Ba*	*Bi*	*Cd*	*Mn*	*Fe*	*S*	*Hg*
Au	1.000														
Ag	0.156	1.000													
Cu	0.171	0.994	1.000				Moreno								
Mo	0.025	0.051	0.057	1.000											
Pb	-0.035	0.084	0.029	0.176	1.000										
Zn	-0.020	0.363	0.303	-0.001	0.400	1.000									
As	0.688	0.779	0.792	0.031	0.012	0.209	1.000								
Sb	0.040	0.986	0.989	0.062	0.033	0.307	0.712	1.000							
Ba	-0.032	-0.021	-0.025	-0.134	0.033	-0.115	-0.029	-0.021	1.000						
Bi	0.095	0.019	-0.016	0.199	0.202	0.180	0.034	-0.028	0.045	1.000					
Cd	-0.012	0.530	0.482	-0.015	0.354	0.851	0.337	0.488	-0.117	0.153	1.000				
Mn	-0.021	-0.057	-0.029	-0.292	-0.206	-0.086	-0.056	-0.035	-0.003	-0.252	-0.120	1.000			
Fe	0.171	0.179	0.208	0.234	-0.110	-0.053	0.210	0.188	-0.208	-0.095	-0.029	0.315	1.000		
S	0.207	0.141	0.153	0.369	0.016	0.074	0.209	0.131	-0.522	-0.003	0.096	-0.163	0.740	1.000	
Hg	0.053	0.967	0.967	0.054	0.037	0.340	0.692	0.975	-0.027	-0.025	0.507	-0.029	0.201	0.144	1.000

Groups:

Au-As

Ag-Cu-Zn-(Pb)-As-Sb-Hg

Mo

Table A3. Spearman Correlation for Lower La Falda Drill Samples (west of Masuparia)

	Au	*Ag_ppm*	*Cu*	*Mo*	*Pb*	*Zn*	*As*	*Sb*	*Ba*	*Bi*	*Cd*	*Mn*	*Fe*	*S*	*Hg*
Au	1.000														
Ag_ppm	0.433	1.000													
Cu	0.302	0.849	1.000												
Mo	0.136	0.113	0.015	1.000						La Falda					
Pb	0.230	0.268	0.112	0.157	1.000										
Zn	0.171	0.144	0.012	0.182	0.452	1.000									
As	0.436	0.468	0.383	0.428	0.295	0.176	1.000								
Sb	0.218	0.725	0.886	0.007	0.154	-0.011	0.325	1.000							
Ba	-0.085	-0.077	-0.077	0.045	-0.111	-0.128	-0.014	-0.053	1.000						
Bi	0.606	0.572	0.281	0.036	0.270	0.162	0.123	0.201	-0.146	1.000					
Cd	0.176	0.150	0.047	0.116	0.345	0.855	0.104	-0.003	-0.088	0.198	1.000				
Mn	-0.169	-0.157	-0.123	-0.177	-0.192	-0.128	-0.103	-0.097	0.020	-0.209	-0.120	1.000			
Fe	0.509	0.384	0.324	0.019	0.128	0.033	0.151	0.188	-0.171	0.491	0.050	-0.112	1.000		
S	0.457	0.476	0.374	0.187	0.380	0.284	0.293	0.253	-0.411	0.561	0.253	-0.251	0.593	1.000	
Hg	0.268	0.583	0.489	0.179	0.289	0.672	0.327	0.471	-0.049	0.301	0.498	-0.194	0.140	0.344	1.000

Corr1	Au, Ag, As, Bi, Fe, S
Corr2	Ag, Cu, As, Sb, Bi, Fe, S, Hg

Table A4. Spearman Correlation for Masuparia Drill Samples

	Au	Ag	Cu	Mo	Pb	Zn	As	Sb	Ba	Bi	Cd	Mn	Fe	S	Hg
Au	1														
Ag	0.269	1.000													
Cu	0.073	0.753	1.000												
Mo	0.171	0.498	0.294	1.000					Masuparia						
Pb	0.122	0.319	0.146	0.337	1.000										
Zn	0.056	0.462	0.202	0.290	0.450	1.000									
As	0.350	0.156	0.031	0.393	0.131	0.092	1.000								
Sb	0.096	0.801	0.918	0.396	0.118	0.221	0.141	1.000							
Ba	-0.034	-0.031	-0.027	-0.101	-0.068	-0.085	-0.104	-0.040	1.000						
Bi	0.069	0.288	0.216	0.047	0.270	0.162	-0.003	0.177	-0.004	1.000					
Cd	0.077	0.543	0.267	0.347	0.487	0.956	0.129	0.288	-0.082	0.184	1.000				
Mn	-0.093	-0.128	-0.034	-0.280	0.027	0.001	-0.278	-0.086	0.020	-0.043	-0.065	1.000			
Fe	0.086	0.208	0.233	0.040	0.399	0.178	0.087	0.153	-0.139	0.329	0.185	0.376	1.000		
S	0.150	0.322	0.276	0.288	0.476	0.332	0.301	0.235	-0.282	0.364	0.359	0.015	0.732	1.000	
Hg	0.188	0.378	0.264	0.394	0.154	0.246	0.446	0.383	-0.042	0.244	0.292	-0.228	0.126	0.285	1.000

Corr 1	Au, Ag, As
Corr2	Ag, Cu, Mo, Pb, Zn, Sb, Cd, S, Hg

Table A5. Spearman Correlation for Carneritos Drill Samples

	Au	Ag	Cu	Mo	Pb	Zn	As	Sb	Ba	Bi	Cd	Mn	Fe	S	Hg
Au30_ppm	1.000														
Ag_ppm	0.444	1.000													
Cu_ppm	0.512	0.401	1.000												
Mo_ppm	0.124	0.163	-0.015	1.000						Carneritos					
Pb_ppm	0.417	0.460	0.370	0.251	1.000										
Zn_ppm	0.021	0.126	0.149	0.035	0.498	1.000									
As_ppm	0.154	0.253	0.027	0.235	0.121	0.244	1.000								
Sb_ppm	0.549	0.403	0.601	0.355	0.490	0.216	0.168	1.000							
Ba_ppm	-0.005	0.094	0.015	-0.078	0.067	-0.104	-0.089	-0.026	1.000						
Bi_ppm	0.179	0.390	0.126	0.121	0.203	-0.102	-0.052	0.237	0.027	1.000					
Cd_ppm	0.171	0.221	0.296	0.044	0.606	0.695	0.173	0.291	-0.089	-0.051	1.000				
Mn_ppm	-0.252	-0.271	-0.245	-0.106	-0.290	0.012	-0.028	-0.253	-0.140	-0.193	-0.161	1.000			
Fe_%	0.153	0.122	0.262	-0.030	0.249	0.044	-0.046	0.202	-0.006	0.297	0.096	-0.131	1.000		
S_%	0.121	-0.119	0.204	0.134	0.060	0.247	0.029	0.170	-0.438	-0.052	0.215	0.032	0.340	1.000	
Hg_ppm	0.425	0.410	0.312	0.058	0.406	0.247	0.206	0.415	0.066	0.066	0.330	-0.176	0.073	-0.205	1.000

Corr1 Au, Ag, Cu, Pb, Sb, Hg, (Bi), (Mo)