Integrating five hundred years of geological information in the search for new mines, Real de Minas de Zacualpan District, Central Mexico

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IMPACT SILVER

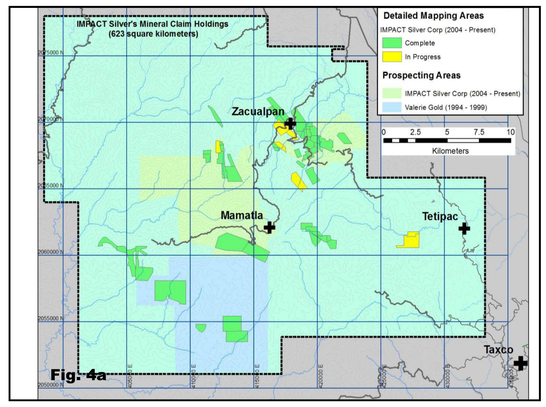
The Real de Minas de Zacualpan (Royal Mines of Zacualpan) District is located 100 km southwest of Mexico City and centered within an area of the oldest known mining activity in North America, pre-dating the arrival of Hernan Cortez in 1519. The area around Zacualpan also appears to be only the second place in the Americas (Pueblo Viejo of the Dominican Republic appears to be first in 1510) to use the mining methods that the Spanish imported from Europe.

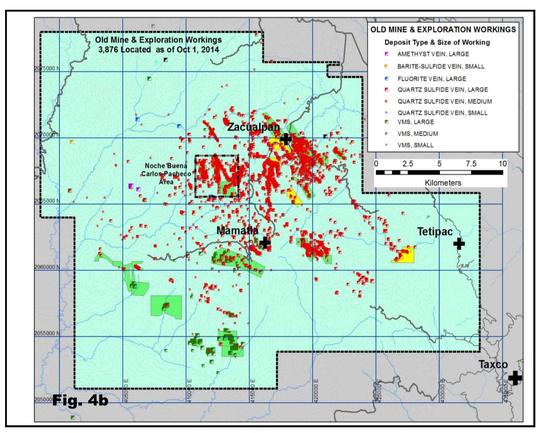
During the past ten years IMPACT Silver Corp. has been engaged in an aggressive exploration program that has included the compilation of roughly 500 years of mining activity into a GIS database. Using the computer program ArcGIS 10.1, geological mapping and rock samples (>35,000) from some 1,900 veins, of which 792 are known to contain elevated values for silver (>100 g/t) and gold (>0.5 g/t), have been inputted. As well over 3,800 old mine and exploration workings have been located, and most have been geologically mapped and sampled. Other layers of information include airborne geophysical surveys, ground geophysics (magnetometer, VLF-EM, gravity, and induced polarization), topography, LIDAR, and roughly 2,150 diamond drill holes. Cadastral information for the boundaries for private land owners, community, municipal, state, ejido (communal indigenous lands), ecological reserves, and other special lands or features are also included. Encompassed into this GIS dataset is information that has been taken from over seven thousand modern and historic maps, which collectively represent some fifty million dollars of exploration information, exclusive of the roughly hundred kilometers of old mine workings that have been documented. All of which has been integrated into a number of specific subject layers into this GIS database, with each piece of information carrying the appropriate metadata as to the source, authorship, and map of origin within the attribute table.

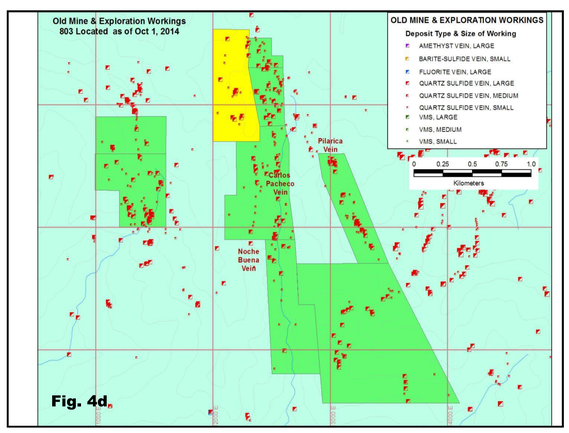
In terms of exploration the most powerful exploration methodology has been the digitization of "vein segments" for this 623 km^2 mining district. Combining geological information from surface, plus underground mapping and drill hole information that has been projected to surface, segments of each of the veins are digitized onto a surface map. To date over five thousand "vein segments" have been digitized, each carrying 165 fields of data concerning the width, dip, geochemical, textural, and metadata information which now reside within one layer of this ArcGIS database, which in turn contains over half a million cells of information. These "vein segments" are then connected to other "vein segments" for the same vein and symbolized in ArcGIS as to the assay values and width. In this manner the characteristics for any vein are readily visible on this one derivative map as to value of the commodities (represented by the geochemical data) as well as the width, length, dip and shape of a particular vein, and the relationship this vein bears to neighboring veins, and the Zacualpan District as a whole.

This map is then used to prioritize areas of exploration potential for drilling, and the specific targeting of drill holes. Utilizing the data handling and analysis methods developed by IMPACT Silver Corp. has resulted in a threefold increase in the success rate for IMPACT's exploration drilling, which in turn has led to the discovery and commissioning of five mines within the past seven years.

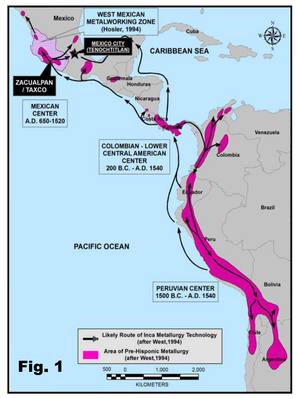
Brian V. Hall, P.Geo., a Qualified Person under Canadian National Instrument 43-101, is responsible for the technical content of this poster.



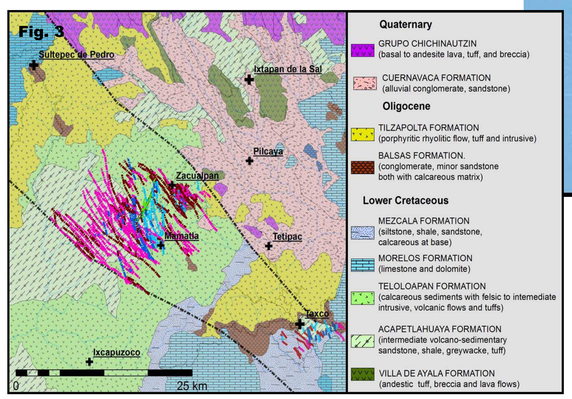




In 2009 Impact Silver announced the successful launch of the GIS Database using the computer program ArcGIS. One aspect of this Database is the documentation of 3,876 Historical Mine Workings, which continues to grow with the addition of ten each week. It has been found that the most cost effective manner to find and document the silver-gold veins is to first locate the old workings, many of which date back to the Spanish Colonial times. The larger workings (120) generally indicate areas of historic production, whereas the smaller workings can be used to trace the veins such that detailed mapping and sampling can be conducted. In order to systematically explore a 623 square kilometer property that is as richly endowed as the Zacualpan District, smaller areas are prioritized for detailed prospecting and geological mapping (Fig 4a) and subsequent drilling. Representing the black square in Fig 4b is a detailed subset centered over the Nochebuena– Carlos Pacheco Area (Fig 4d) which clearly shows the alignment of a number of major veins sets having northerly, north-westerly and north-easterly orientations.

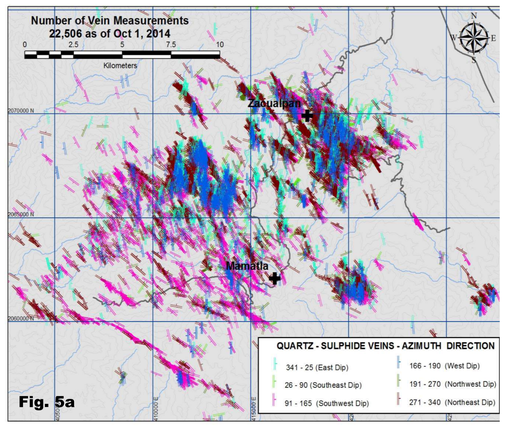


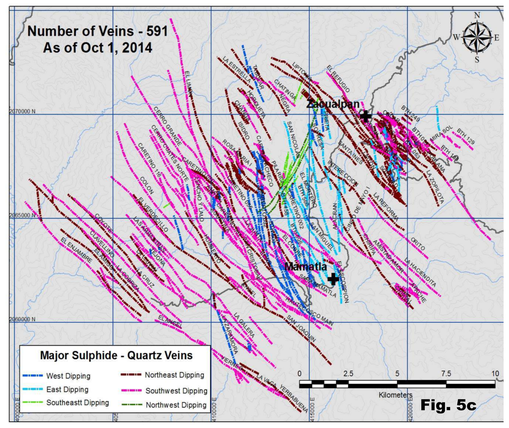
Shown on Fig 1 are the dispersion routes for the metal working techniques that were originally developed in Peru. When Cortés entered Mexico they first saw gold and silver ornaments in some abundance at the Aztec city of Tenochtitlan (now known as Mexico City) in 1521. Shortly afterward, the town of Zacualpan was incorporated in 1527, and mining leases bearing Cortés' name and the names of other conquistadors first appeared in the neighboring towns of Sultepec and Amatepec in 1531, and one year later in Taxco.

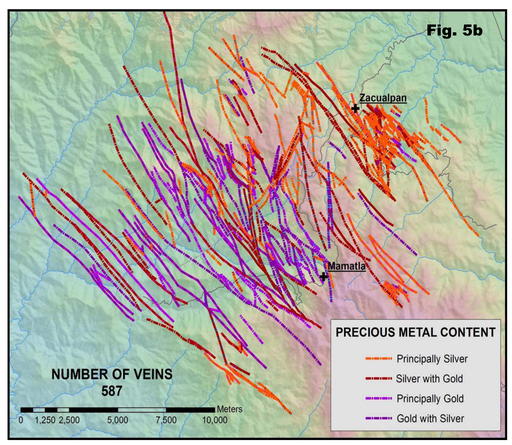


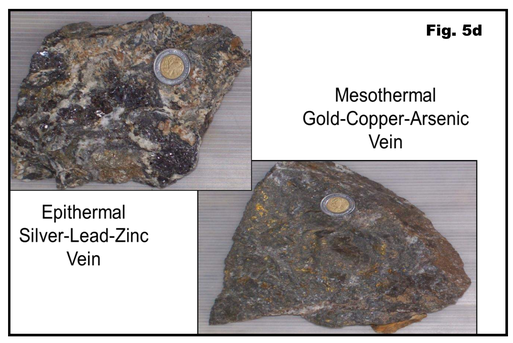
Cuernavaca Geology Mapsheet **E4-6** (Rivera C.E., De La Teja S. M.A., Miranda H., A., Lemus B. O., and Motolinia G. O.)

Showing the distribution of the "Mexico Silver Belt" along with the location of Zacualpan is Fig 2. The geology of the Zacualpan and neighboring Taxco and Sultepec Silver-Gold Districts is shown in Fig 3. Of particular interest is the structural corridor, which attains a width of twenty kilometers in the Zacualpan District. The porphyritic rhyolites of Tilzapolta Fm (shown in yellow) are thought to represent a local heat source, which in turn is responsible for the veins.

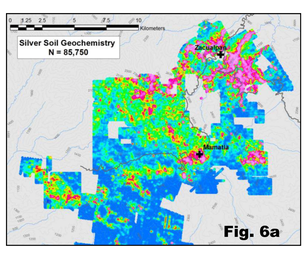


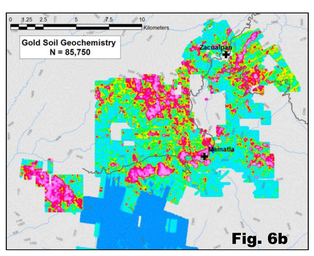


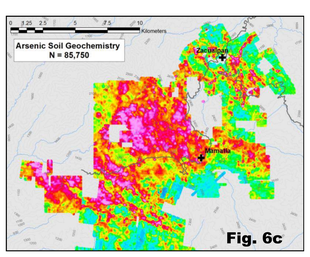


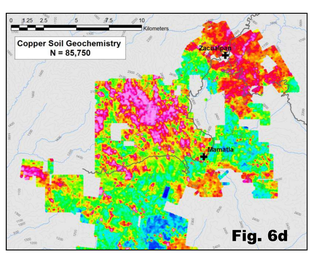


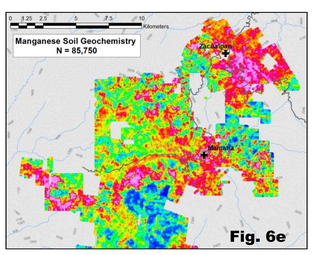
The district is zoned and tilted with Mesothermal Au-Cu-As veins occurring predominately to the southwest and the Epithermal Ag-Pb-Sb Veins in the northeast. As well based upon the dip directions of the major veins the overall structure appears to be that of a horst.

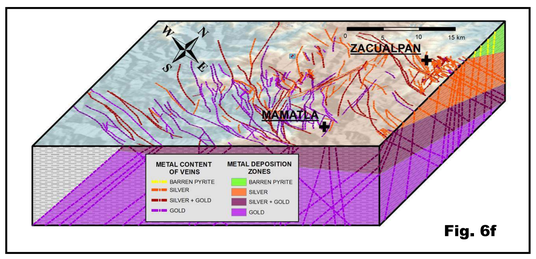












The soil geochemistry for silver and gold exhibit many of the same patterns, which in turn represent some of the more prominent veins, with silver being stronger in the northeast (Fig 6a) and gold in the central portion (Fig 6b). As well for arsenic (Fig 6c), copper (Fig 6d) and manganese (Fig 6e) a pronounced progression going from the central portion of the soil grid to the northeast is evident. This is interpreted in terms of the Zacualpan District having a northeast dip or tilt, with the deeper portions of the veins exposed in the center, and the uppermost and silver rich portions exposed in the northeast corner.

THE CONSTRUCTION OF THE VEIN SEGMENTS FROM THE VEIN ORIENTATION DATA AND THE COMBINING OF THE GEOCHEMICAL DATA TO PRODUCE A SERIES OF DERIVATIVE MAPS WHICH ARE THEN USED TO LOCATE AND RANK NEW EXPLORATION TARGETS, AS WELL AS GAINING NEW INSIGHTS INTO THE GEOLOGICAL PARAMETERS OF THE ZACUALPAN DISTRICT

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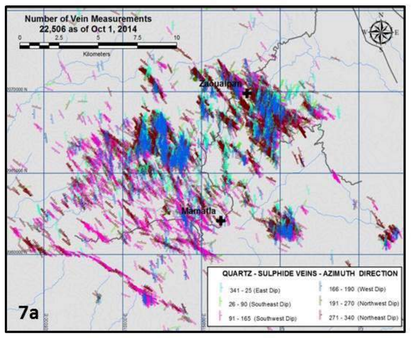
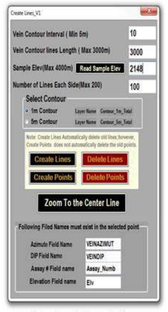


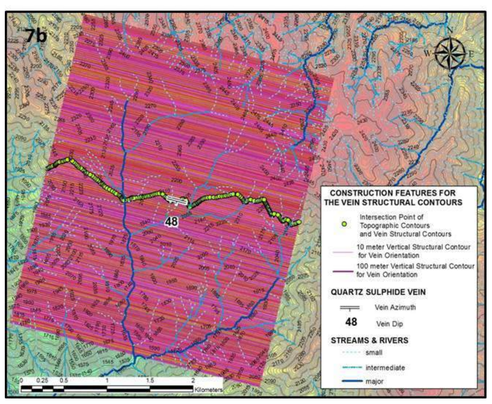


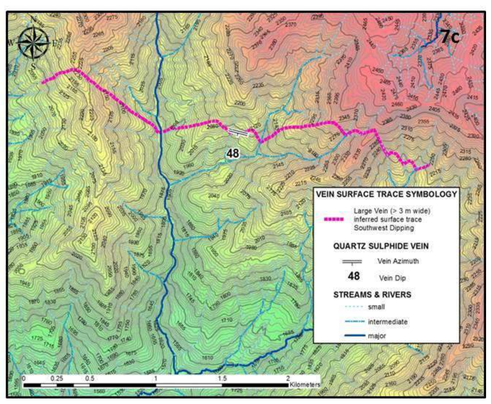
Control Panel for Behrozomatic

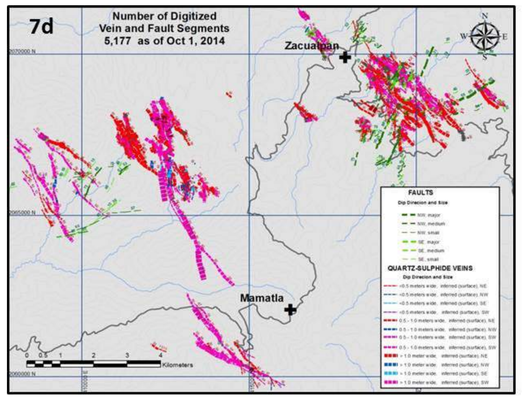
Figure 7a shows the vein orientations from IMPACT's current field mapping. As of October 1, 2014 there are currently 22,506 such measurements. In order to find a fast and accurate method of plotting the surface trace of a vein in areas of high relief the "Behrozomatic" software routine was created in house using Arc Objects. This automated process first creates structural contours for a particular vein using the strike and dip information, then intersection points between the topographic contours and the structural contours.

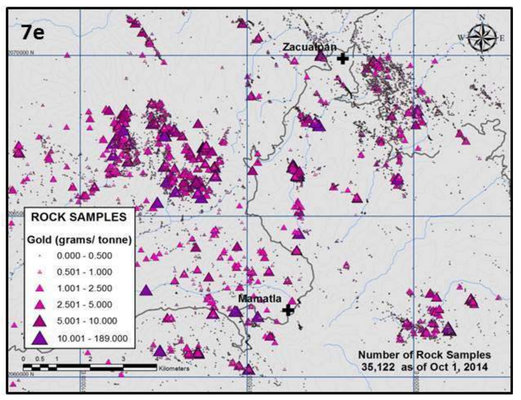
In Figure 7b the structural contours at ten meter intervals for the vein dip are shown. Each structural contour represents the horizontal displacement for ten meters of vertical distance, for in this case, a vein dipping at 48 degrees to the southwest. The green dots represent the intersection point between the topographic contours and the vein structural contours at a given elevation. The elevation of the vein orientation can be easily inputted into the "Control Panel" for the "Behrozomatic, as can the length of the desired structural contour lines, number of structural contours, and the vertical distance that these structural contours represent.

Having constructed the intersection points between the structural contours and the topographic contours, the Surface Trace of the Vein can easily by traced, as shown in Figure 7c.









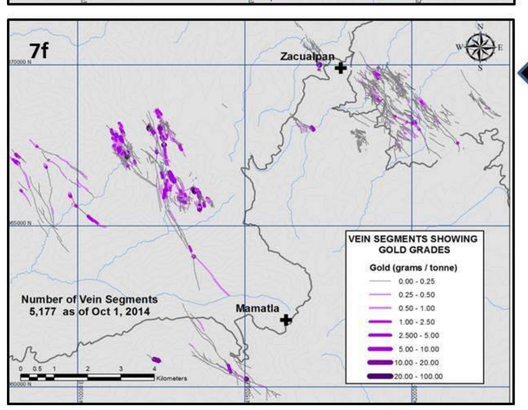
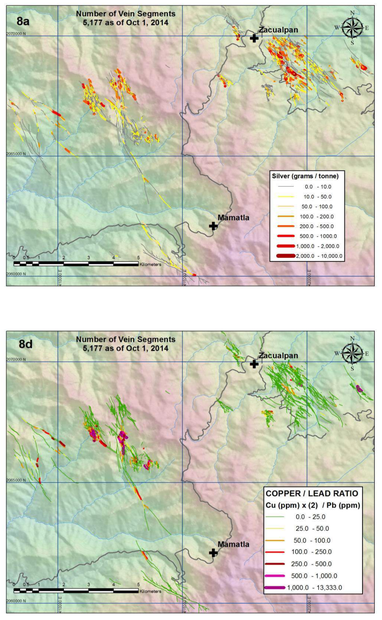


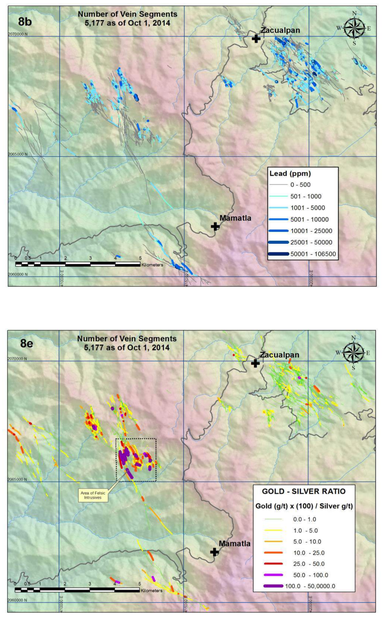
Figure 7d shows digitized vein segments according to the width of the vein, and its dip direction. This map consists of 5,177 different digitized vein segments, each of which corresponds to rock sample. The surface trace of these veins have been carefully digitized using the "Behrozomatic" in order to provide the best correlations possible given the mountainous terrain of the Zacualpan District. The rock samples from the underground workings as well have projected to surface, as well as drill hole intersections in those cases where sufficient surface or underground samples are not present. In case of some veins some fifty individual "vein segments" have been digitized.

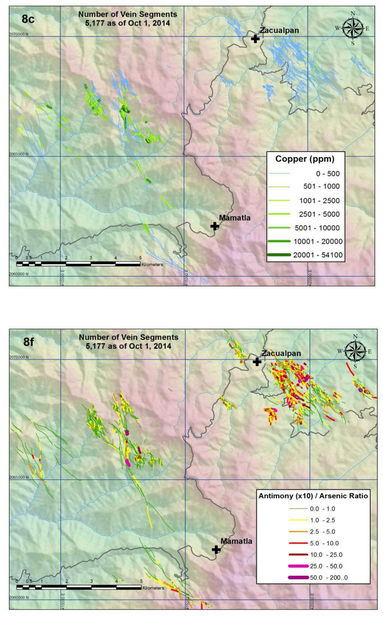
Figure 7e shows a portion of the rock sample database, in which the differing triangles represent different gold contents.

Figure 7f is produced when the Vein Interpretation Map of Figure 7d for the vein segments is combined with the gold assays from rock sample geochemical data from the Rock Sample Database from Figure 7e. This map not only shows the distribution of the gold bearing veins, but it also shows the orientation, and the degree of continuity for the gold grades.

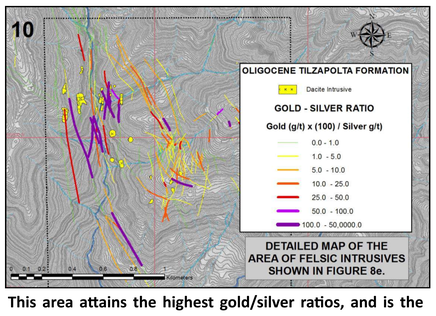
Fig 7. Construction of the Vein Segments using the Behrozomatic to accurately plot the surface trace of the vein in the mountainous terrain of Zacualpan, using the vein orientation data. The digitized vein segments are then combined with chemical, and textural information of the rock-sample database. In addition by combining the attribute information of the rock sample database, which contains 103 fields of information, such as assay information for thirty-one elements, metal ratios, vein widths, composite sample widths, textural information for the veins, visual percentages for the sulphide minerals, assay certificates, the name of the laboratory, the name of the sampler, with the attribute information of the Vein Segments, which contains an additional 23 fields, there are 126 possible different ways to symbolize the Vein Segment Information.



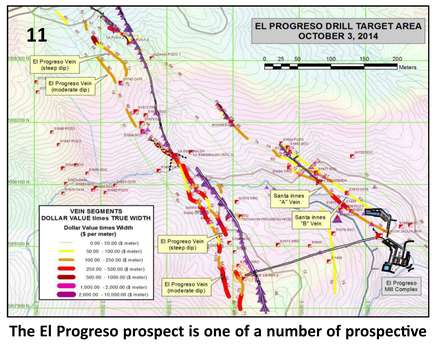




The Vein Segment Maps for Silver (Fig 8a) indicates where the best silver grades are found in the northeast near the town of Zacualpan and predominately within the northwesterly striking veins. Gold shown in (Fig 7f) and Copper (Fig 8c) on the other hand tend to be more abundant in the northerly striking veins and at lower elevations. The Copper/ Lead ratios (Fig 8d) and the Gold/Silver ratios (Fig 8e) more clearly show this relationship. On the other hand the Antimony/Arsenic ratios (Fig 8f) suggest a district wide zonation that may be attributed to the abundance of the ruby-silver mineral pyrargyrite (Ag_3SbS_3) in the northeast, and proustite (Ag_3AsS_3) to the west.



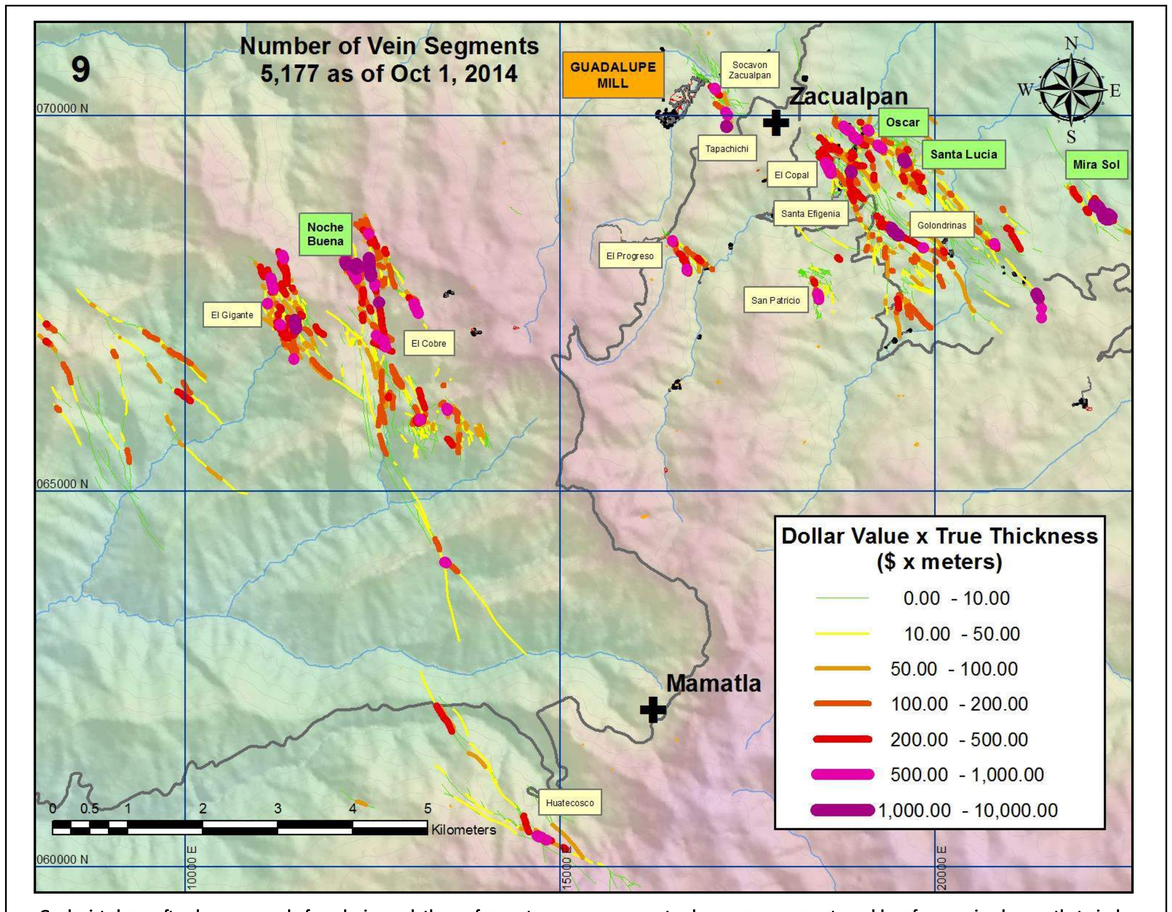
This area attains the highest gold/silver ratios, and is the only area where dacite intrusive rocks of the Oligocene Tilzapolta Formation outcrop, strongly suggesting heat a source for the hydrothermal solutions.



The El Progreso prospect is one of a number of prospective areas that have been outlined.

The digitizing team for IMPACT Silver's Exploration Department

We would like to take this opportunity to thank IMPACT Silver for their continuing support and being allowed to present the results of our work here today.



Geologists have often been accused of producing a plethora of maps to express a concept, whereas management would prefer one simple map that nicely summarizes where the best targets are, and ranks them in their order of economic significance.

Management here is your one map!!

Since the Zacualpan District can best be described as polymetallic, with silver, gold, lead and zinc contributing it was decided to go to an "in ground metal content" to provide a consistent datum for determining the value of a vein.

On this map the vein segments have been symbolized according to the "in ground metal values" according to the rock sample database, which in turn have then been multiplied by the width of the veins, and coloured according to importance. For reference some of the drilled deposits are shown in the pale yellow boxes, with some of IMPACT's currently producing mines in green, and the 500 tonne/day Guadalupe Processing Plant in orange.