

Calista Corporation

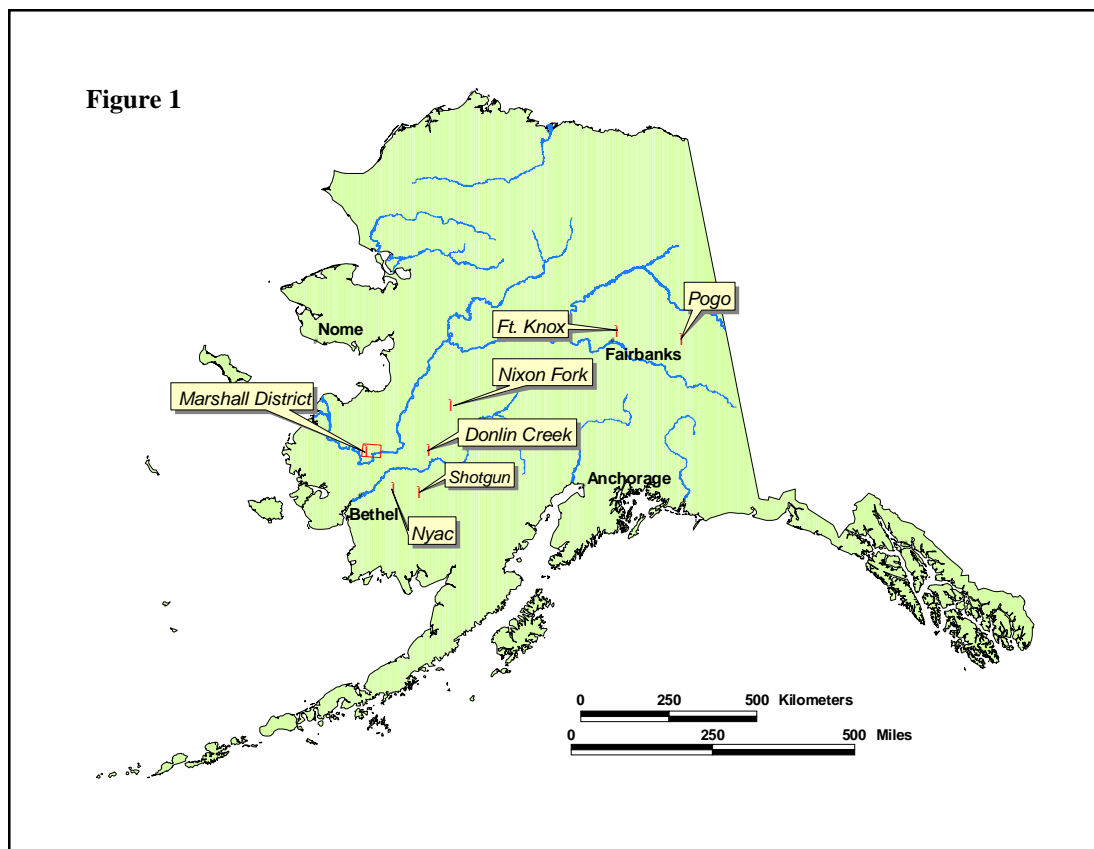
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The Marshall Mining District, southwestern Alaska

The Marshall Mining District, located in the lower Yukon River Region is at the western end of a gold-rich arc across Interior Alaska (Figure 1). The district may contain undiscovered world class gold deposits that are genetically related to the 11.5 million ounce Donlin Creek deposit. Lode occurrences in the Marshall District are associated with 61 to 71 m.y. biotite granite and quartz-feldspar porphyry dikes, the same age as plutonic-related deposits at Donlin Creek and elsewhere in the Kuskokwim Mineral Belt. The Marshall District contains three historic and

modern placer gold mining areas and several lode gold occurrences across a 650 square mile region. More than 130,000 ounces of placer gold have been produced from the district. Lode prospects that are deserving of trenching and possibly drilling programs have been identified. Extensive high-potential areas are covered by vegetation and sedimentary cover and remain virtually unexplored. Lands within the district are owned and selected by the Bureau of Land Management, the State of Alaska, and Calista Corporation (Figure 2).



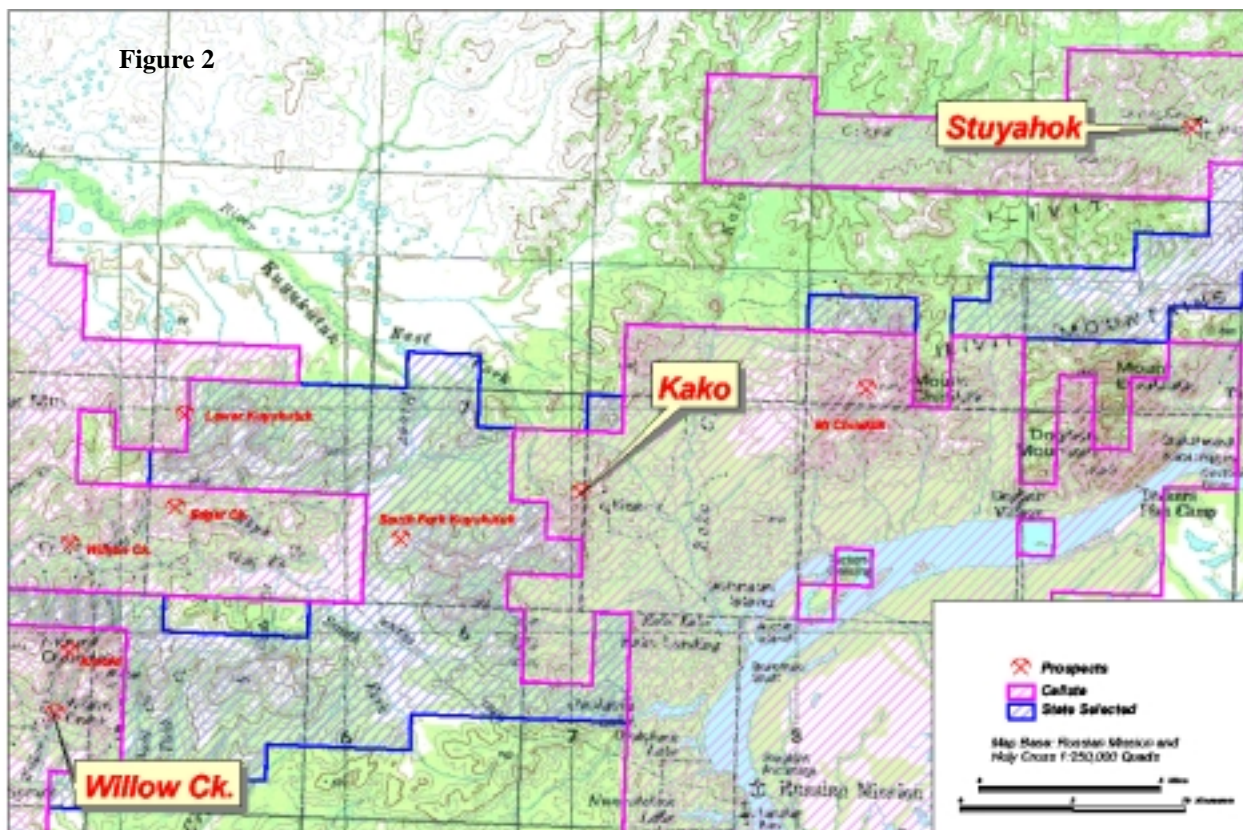
Regional Geology

The Marshall District (Figure 3) is at the southern edge of the 350 mile-long Yukon-Koyukuk basin (Patton and Box, 1989, Patton *et al.*, 1994). This wedge-shaped basin is a regional structural depression filled with a sequence of Mid-to-Upper Cretaceous flysch deposited upon mostly Lower Cretaceous, island arc complex volcanics of the Koyukuk Terrane (Patton *et al.*, 1994). A discontinuous belt of Late Cretaceous to early Tertiary volcanic-plutonic complexes, plutons, and extensive dike and sill swarms intrudes and overlies these older terranes throughout southwest Alaska (Decker *et al.*, 1994; Bundtzen and Miller, 1997). These Late Cretaceous-early Tertiary igneous units are related to numerous mineral occurrences within the Kuskokwim Mineral Belt (Bundtzen and Miller, 1997), including the 11.5 million ounce Donlin Creek gold deposit.

Economic Geology

The relatively small, but widespread placer gold

deposits in the district are eroded from hydrothermally altered plutonic and volcanic-plutonic rocks. Radiometric ages of peraluminous biotite granite porphyry and related dikes range from 61 to 71 m.y., the same age as igneous rocks at Donlin Creek and elsewhere in the Kuskokwim Mineral Belt (Miller *et al.*, in press). The small size of the placer deposits, their proximity to structurally controlled altered intrusive rocks and angular fabric of recovered gold particles indicate that the placers are shallowly eroded residual deposits that may obscure significant lode gold deposits. Epithermal Au-Ag-As geochemical signatures predominate throughout the district. Locally, deeper-seated base metals ± antimony signatures are present, as is one lode occurrence with native gold plus base metal sulfides. Chalcedonic silica is locally abundant in clastic volcanic and sedimentary rocks cut by the Late Cretaceous-early Tertiary intrusive rocks. These features suggest hydrothermal gold deposition took place during and subsequent to fault-controlled intrusive activity into extensional basin fill deposits of the Yukon-Koyukuk



basin.

Mineral Prospects

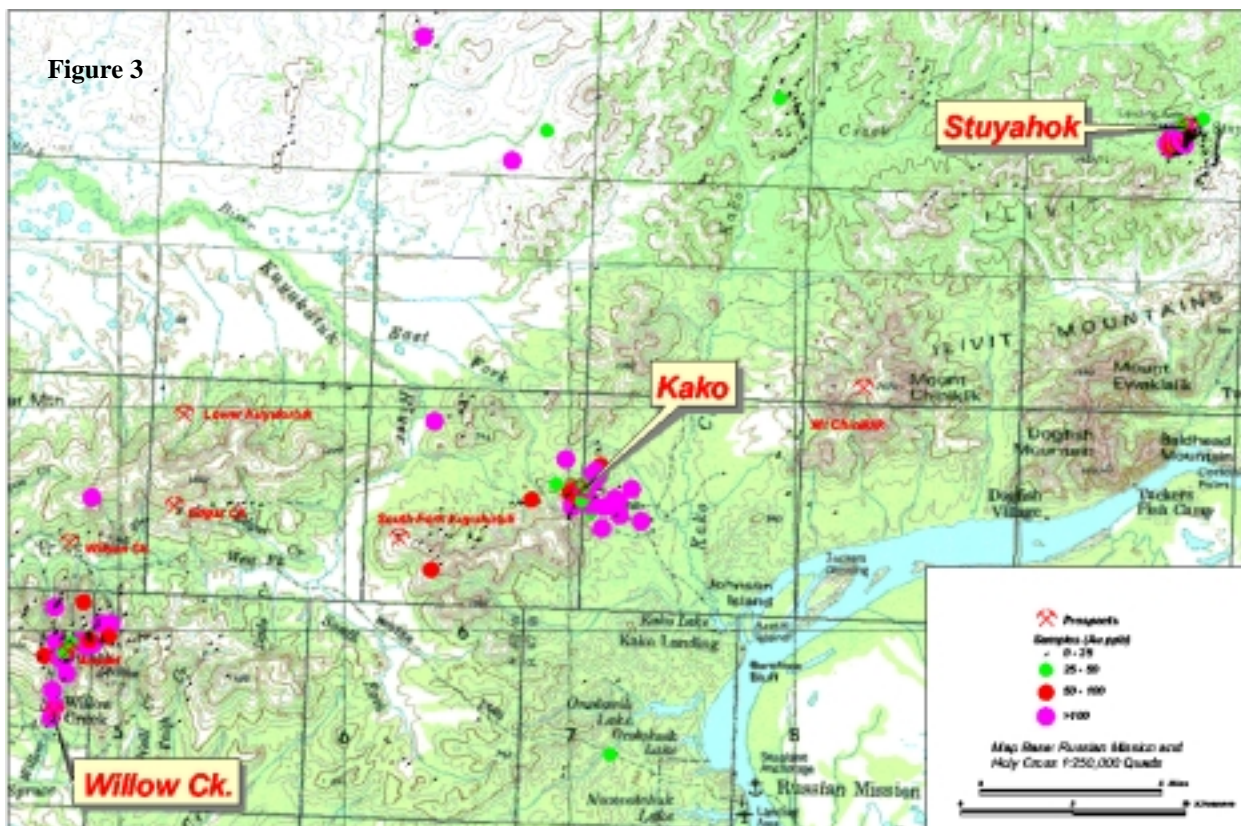
Stuyahok

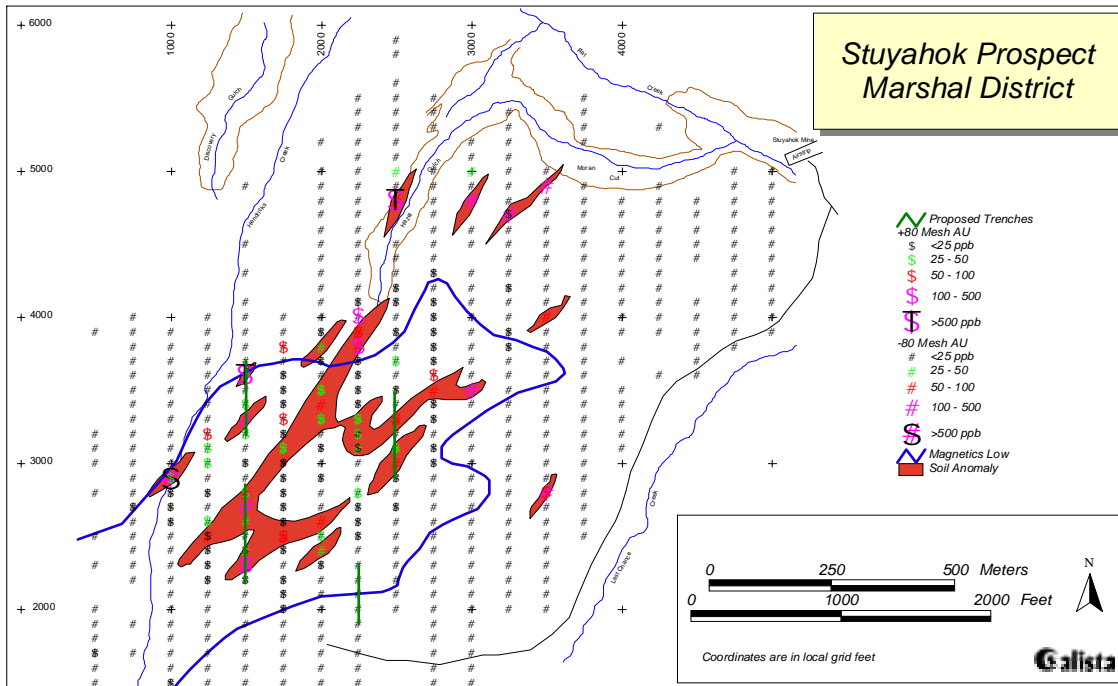
Near the Stuyahok placer deposit, which produced about 30,000 oz Au, lode mineralization occurs within, and adjacent to quartz-sericite-altered rhyodacite dikes (Figures 2-4). These Late Cretaceous - early Tertiary dike swarms intrude a sequence of tuff, volcanoclastics, and flows, likely correlative with lower Cretaceous rocks of the Koyukuk Terrane (Miller *et al.*, 1996). Soil sampling in 1996-1997 identified a 2000' by 500' area, southwest of the placer occurrence, anomalous in Au, As, and Ag, and moderately anomalous in Sb. In Hazel Gulch and Discovery Gulch, at the northern edge of this pronounced anomaly, outcrops of quartz-feldspar porphyry dikes are locally quartz-sericite-pyrite altered. These altered units may represent the lode source for the rich placer deposits at Stuyahok. Unconsolidated surficial deposits, including a thick cover of Pliocene-Pleistocene loess cover most of the prospect area.

The close association of placer gold with the distribution of rhyolite/dacite and biotite granite dikes at Stuyahok suggests similarities to Donlin Creek, as well as other "granite-porphry-associated" gold deposits in southwest Alaska (Bundtzen and Miller, 1997). This area may contain a significant gold resource and should be trenched or drilled.

Kako

Placer deposits at Kako produced about 25,000 oz Au (Figures 2, 3 and 5). West of the Kako Placer Mine, a mineralized zone at Buster Saddle, which separates the headwaters of the South Fork of Buster Creek and the East Fork of the Kuyukutuk River, is characterized by a limonite-stained, sericite-altered, quartz-feldspar porphyritic rhyolite breccia adjacent to a large coeval(?) quartz-monzonite stock. This breccia is part of a series of east-west trending quartz-feldspar rhyolite dikes, which intrude and locally hornfels metavolcanic and metasedimentary rocks of the Koyukuk terrane. Exposure is limited to an





east-west trending, 300' by 30' wide zone extending through the saddle with soil-sample values up to 3,300 ppb Au, 9.6 ppm Ag and >2,000 ppm As. Samples of the mineralized breccia contain as much as 2 g/t Au.

Hill 901, northeast of Buster Saddle, is a moderately anomalous zone occurring near the contact between a series of east-west trending, quartz-feldspar porphyry rhyolite dikes and a siliceous quartz-pebble conglomerate - marine (?) chert host. Soil-sample values of 100-300 ppb Au and 2-3 ppm Ag are reported from the RAA/ Calista Corporation dataset.

East and downhill from the Buster Saddle and Hill 901 prospects, is a large unexplored area covered by forest and overburden (Figure 5). This forested area is dissected by three streams with recorded placer gold production. The abundant presence of angular gold and altered quartz-feldspar porphyry

debris in tailings and alluvium along Buster, Montezuma and Bobtail Creeks indicate the presence of a large lode gold prospect.

Willow Creek

The Willow Creek area produced 80,000 oz Au and includes past placer producers at Willow Creek and Wilson Creek tributaries, all of which drain Mt. Okumiak (Figures 2 and 3). The Arnold lode prospect, on the south flank of Mt. Okumiak, is associated with an east-west trending band of polymetallic quartz veins with visible gold and associated "felsite" dikes. The area is mostly underlain by greenstone (chlorite-altered mafic volcanic flows and tuff) and siliceous metasediments (sandstone, conglomerate, siltstone and argillite), locally intruded by dikes of feldspar-hornblende-biotite porphyry. These dikes are locally quartz-carbonate-sericite altered and may be equivalent to felsic dike swarms noted at

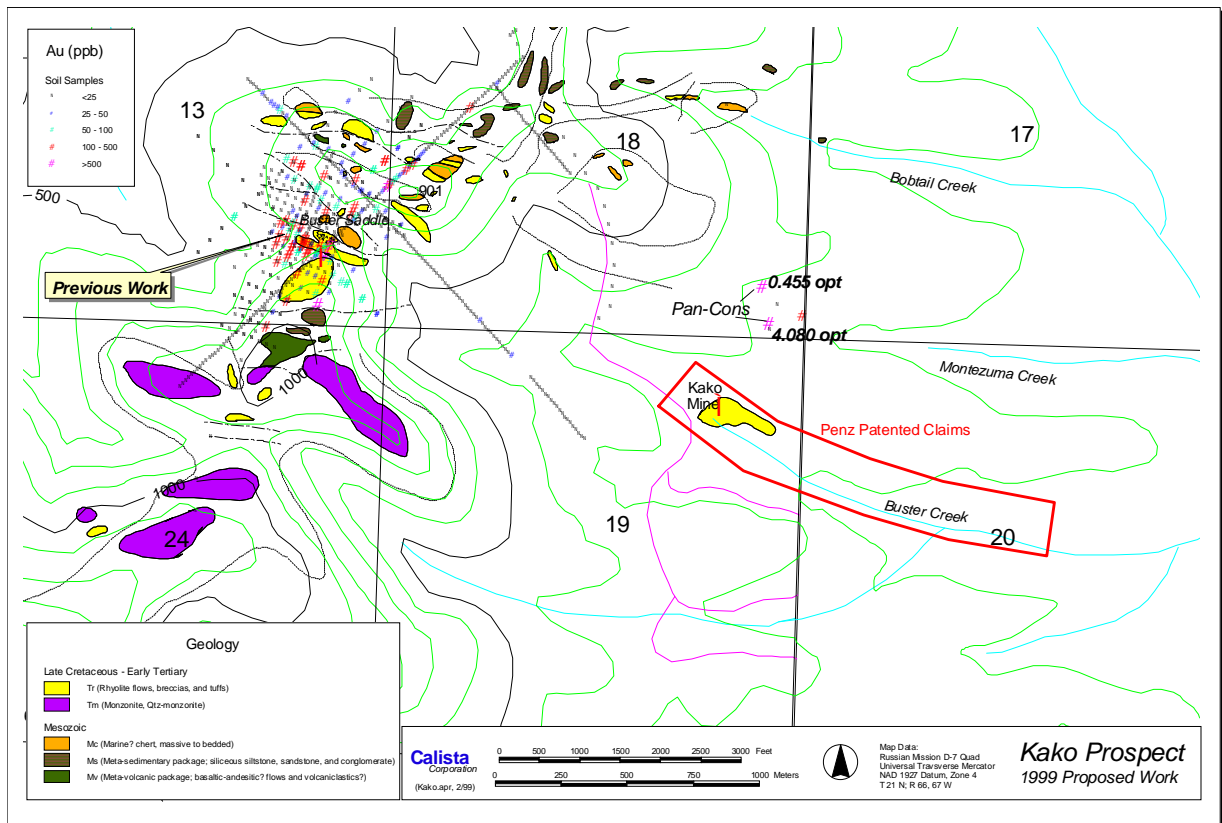


Figure 5

Stuyahok and Kako.

Summary

The Marshall Mining District remains unexplored for large-tonnage gold deposits. Geologic mapping has been limited in the region, and no modern geophysical work has been completed. Activities by exploration companies have been limited to brief, site-specific programs. Based on historic placer activity and geologic similarities to the Donlin Creek deposit, the Marshall Mining District is one of the most prospective areas in Alaska for world class gold deposits.

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