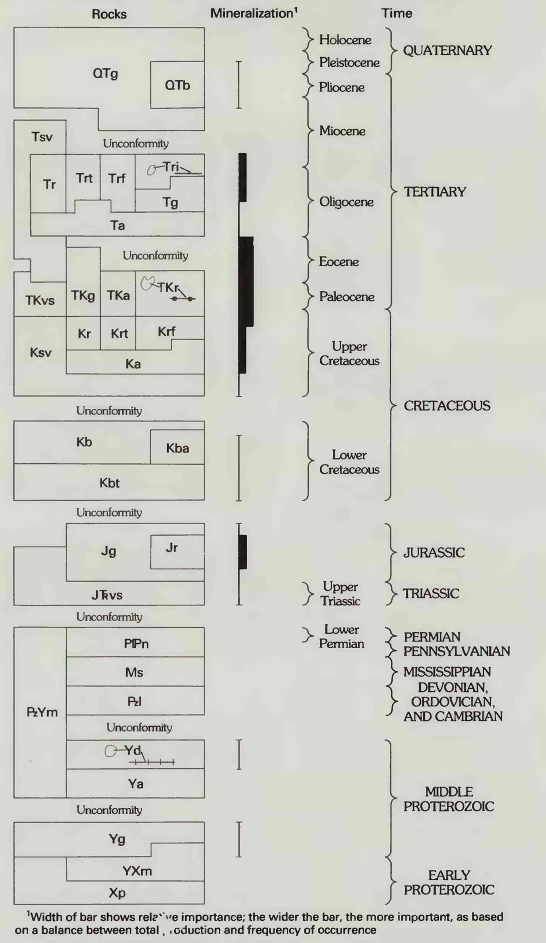
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

CORRELATION OF MAP UNITS AND MINERALIZATION



[1]Width of bar shows relative importance; the wider the bar, the more important, as based on a balance between total production and frequency of occurrence

DESCRIPTION OF MAP UNITS

[All units may not appear on all maps]

- **QTg** **Gravel, sand and conglomerate (Holocene to Miocene)**—Alluvium filling intermontane basins, on pediments, in alluvial aprons and stream terraces, and along watercourses
- **QTb** **Basalt (Pleistocene to Miocene)**—Lava flows and cinder deposits
- **Tsv** **Sedimentary and volcanic rocks, undivided (Miocene to Eocene)**—Rhyolitic to andesitic lava and tuff, and some interbedded conglomerate, sandstone, and shale
- **Tr** **Rhyolitic rocks (Miocene and Oligocene)**—Includes lava flows, tuffs, and tuffaceous sandstone
- **Trt** **Rhyolitic tuffs (Miocene and Oligocene)**—Airfall tuff, ash-flow tuff, tuff breccia, welded tuff, and some sedimentary rocks
- **Trf** **Rhyolitic lava flows (Miocene and Oligocene)**—May include some intrusive bodies

Intrusive rocks (Miocene and Oligocene)

- **Tri** **Rhyolite (Miocene and Oligocene)**—Dikes and plugs
- **Tg** **Granite (Oligocene)**—Stocks
- **Ta** **Andesitic rocks (Oligocene)**—Lava flows, breccia deposits, and interbedded sedimentary rocks
- **TKg** **Intrusive rocks (Eocene to Late Cretaceous)**—Mainly Eocene to Late Cretaceous granite, monzonite, granodiorite, and diorite; some Oligocene to Late Cretaceous peraluminous (two-mica and garnet-bearing) granite. Includes Copper Creek Granodiorite
- **TKvs** **Volcanic and sedimentary rocks (Eocene to Upper Cretaceous)**—Andesitic lava flows and breccia sheets, rhyolitic tuff and welded tuff, and volcaniclastic sedimentary rocks
- **TKa** **Andesite (Eocene to Late Cretaceous)**—Plugs, dikes, and stocks
- **TKr** **Rhyolite (Eocene to Late Cretaceous)**—Plugs and dikes
- **Ksv** **Sedimentary and volcanic rocks, undivided (Upper Cretaceous)**—Volcaniclastic conglomerate, sandstone, lacustrine shale, and some andesitic and rhyolitic tuff
- **Kr** **Rhyolite (Upper Cretaceous)**—Lava flows, tuffs, and interbedded conglomerate and sandstone
- **Krt** **Rhyolite tuff (Upper Cretaceous)**—Includes airfall and ash-flow tuffs, tuff breccia, welded tuff, and sedimentary rocks
- **Krf** **Rhyolite lava flows (Upper Cretaceous)**—Includes some tuff and sedimentary rocks
- **Ka** **Andesite (Upper Cretaceous)**—Lava flows, breccia sheets, and interbedded conglomerate and sandstone
- **Kb** **Bisbee Group (Lower Cretaceous)**—Mainly gray shale and siltstone, and some sandstone, conglomerate, and limestone
- **Kba** **Basaltic andesite and andesite (Lower Cretaceous)**—Lava flows, cinder deposits, and some dikes, sills, and plugs
- **Kbt** **Bathtub and Temporal Formations, undivided (Lower Cretaceous)**— Andesitic to rhyolitic rocks, conglomerate, and sandstone

Intrusive rocks (Jurassic)

- **Jg** **Granite stocks**
- **Jr** **Rhyolite plugs**
- **JŦvs** **Volcanic and sedimentary rocks (Jurassic to Upper Triassic)**—Rhyolitic welded tuff and lava flows, andesitic lava flows, eolian sandstone, and redbeds. Includes Walnut Gap Formation, Canelo Hills Volcanics, and Gardner Canyon and Mount Wrightson Formations
- **PzYm** **Metamorphic rocks (Paleozoic or Middle Proterozoic)**—Metaquartzite, hornfels, and calc-silicate carbonate rocks
- **PIPn** **Naco Group (Lower Permian and Pennsylvanian)**—Mainly limestone and dolomite; some siltstone, sandstone, and marlstone
- **Ms** **Sedimentary rocks (Mississippian)**—Generally only Escabrosa Limestone; to the east unit also includes Paradise Formation, mostly shale
- **Pzl** **Lower Paleozoic formations, undivided (Upper Devonian to Middle Cambrian)**—Mainly limestone and dolomite; some sandstone, shale, and conglomerate. Includes Percha Shale, Portal, Swisshelm, Martin, El Paso, and Abrigo Formations, Coronado Sandstone, and Bolsa Quartzite
- **Yd** **Diabase (Middle Proterozoic)**—Includes some metadiorite; in sills, dikes, and plugs; line shows more acidic rock
- **Ya** **Apache Group (Middle Proterozoic)**—Sandstone, shale, argillite, some conglomerate, and possibly some limestone
- **Yg** **Intrusive rocks (Middle Proterozoic)**—Granite, granodiorite, and some alaskite, aplite, and lamprophyre
- **YXm** **Gneissic rocks (Middle and Early Proterozoic)**—Metamorphosed granite and older schist or gneiss
- **Xp** **Pinal Schist (Early Proterozoic)**—Schist, phyllite, metaquartzite, metagraywacke, and meta-igneous rocks

Contact—Dotted where concealed, queried where uncertain

Fault—Showing dip; dotted where concealed or intruded, queried where uncertain. Where solid line becomes dotted line within a map unit, that unit is a composite of several formations, of which a younger one conceals faulting in an older one

- **Normal fault**—Ball and bar on downthrown side; dotted where concealed, queried where uncertain
- **Thrust fault**—Sawteeth on upper plate
- **Glide fault**—Open sawteeth on glide plate
- **Complex fault**—Earlier thrust fault on which later glide (gravity) faulting took place
- **Strike-slip fault**—Arrow-couple shows relative movement; queried where uncertain
- **Oblique-slip fault**—Composite of strike-slip and normal movement likely, but either type of movement may have occurred without the other

Fold axis—Dotted where concealed; arrow shows direction of plunge

- **Anticline**
- **Anticline in foliation**
- **Overturned anticline**—Side of closure of arrow ends is side of fold crest relative to fold axis
- **Syncline**
- **Syncline in foliation**
- **Overturned syncline**—Side of closure of arrow ends is side of fold trough relative to fold axis

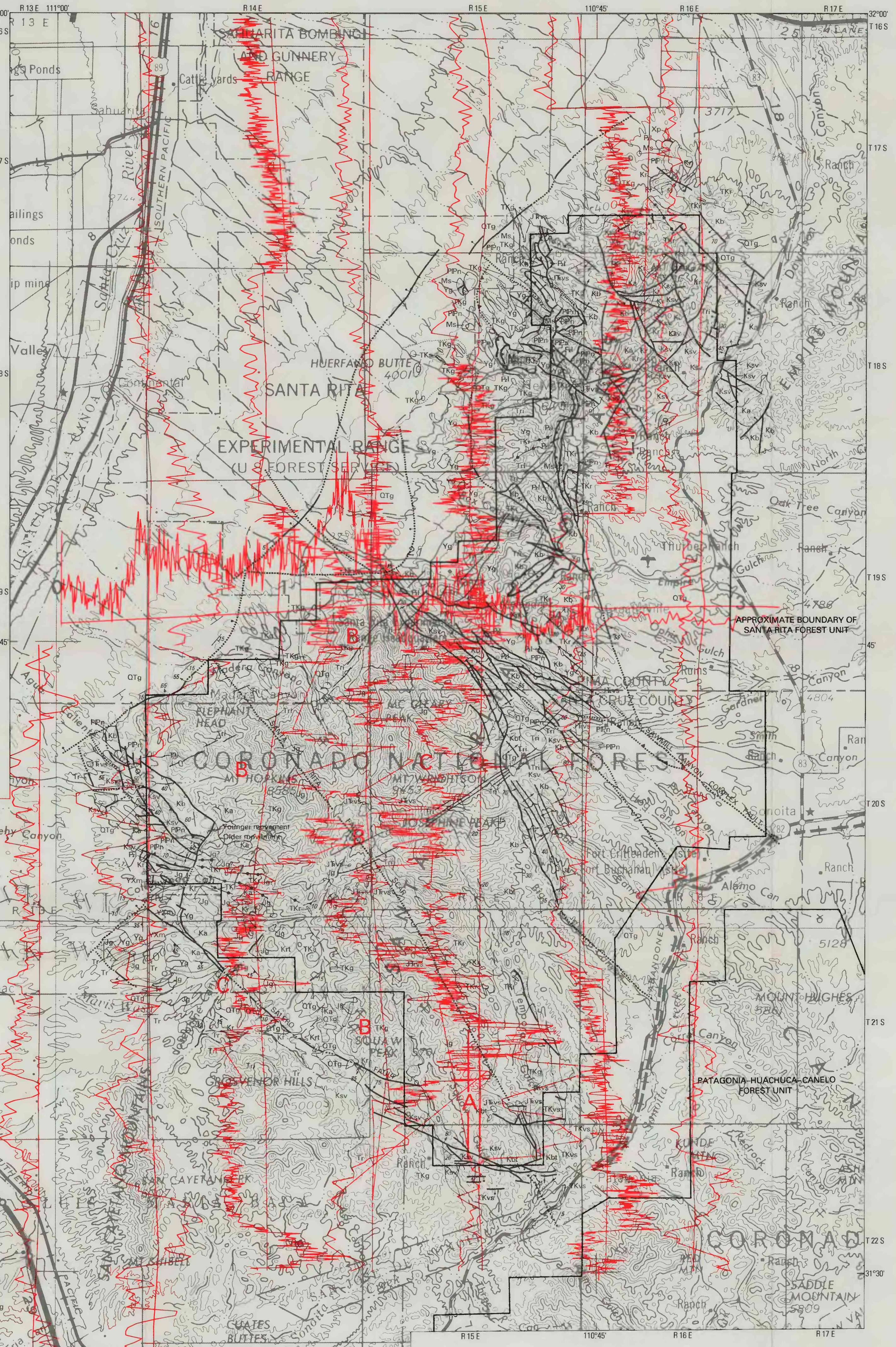
Strike and dip of beds

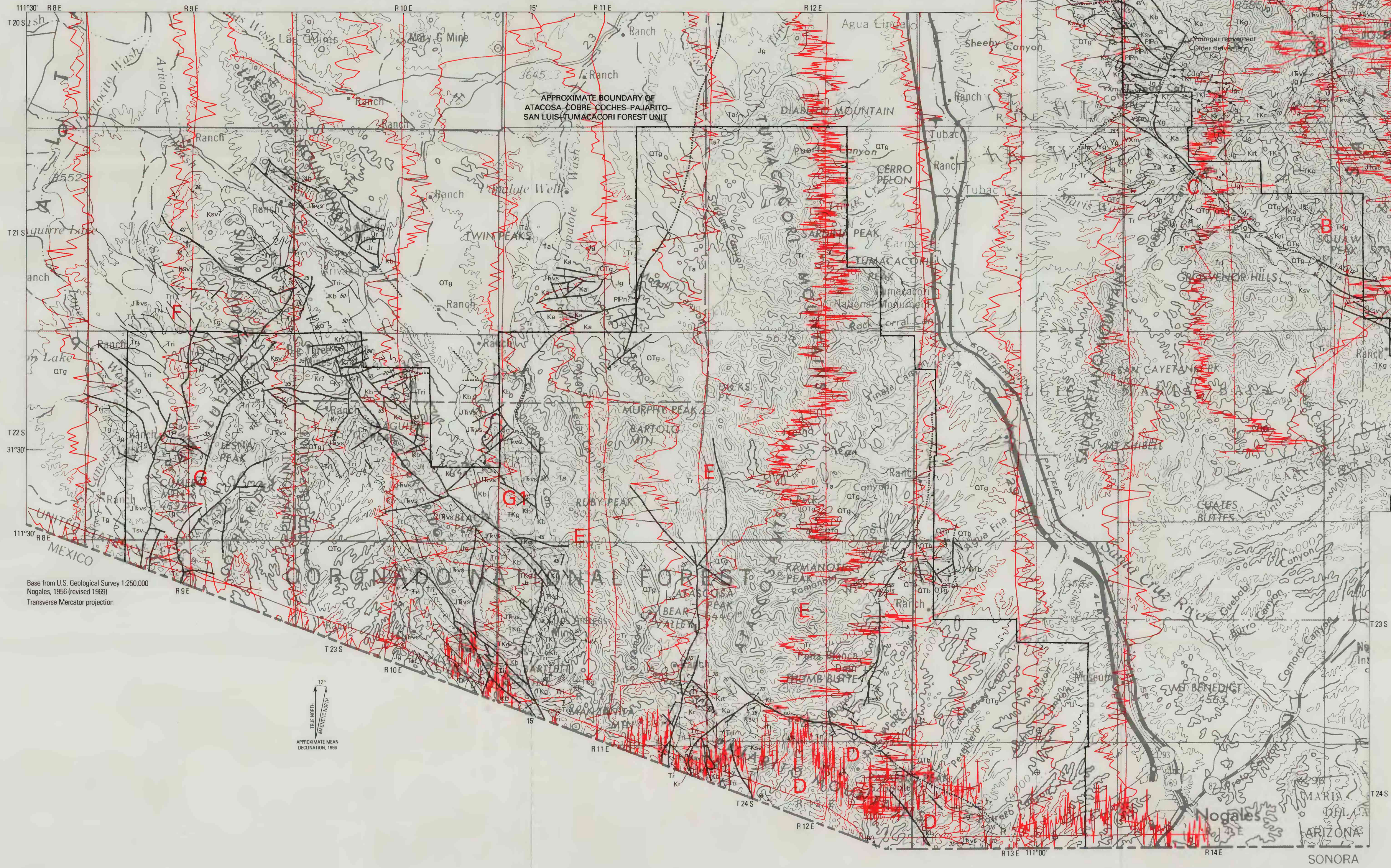
- **Horizontal**
- **Inclined**
- **Vertical**
- **Overturned**

Strike and dip of foliation

- **Inclined**
- **Vertical**

Cinder cone—Queried where uncertain

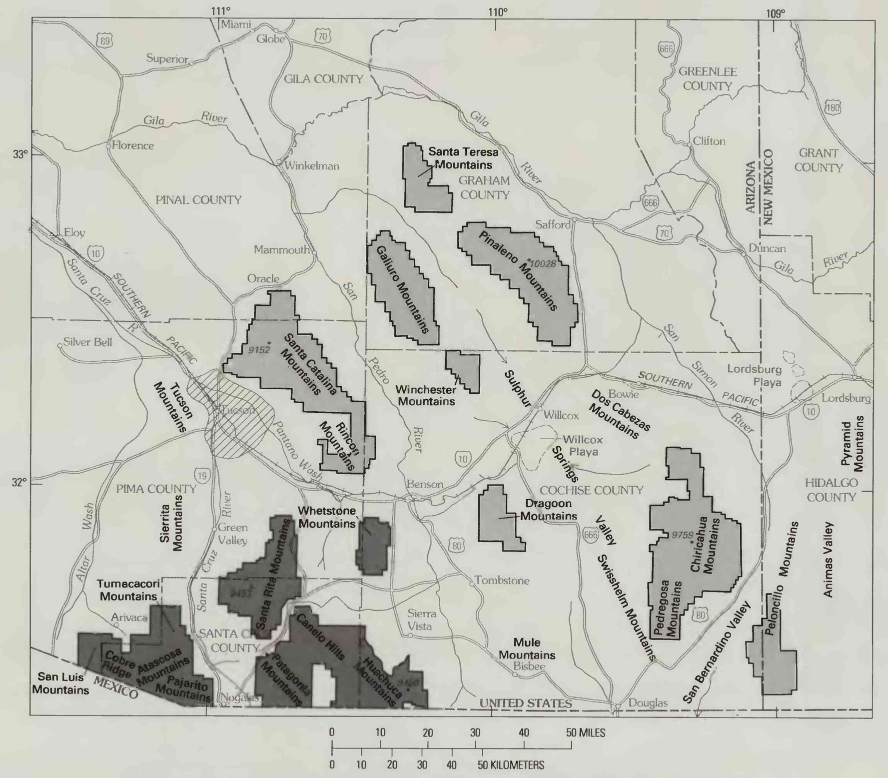




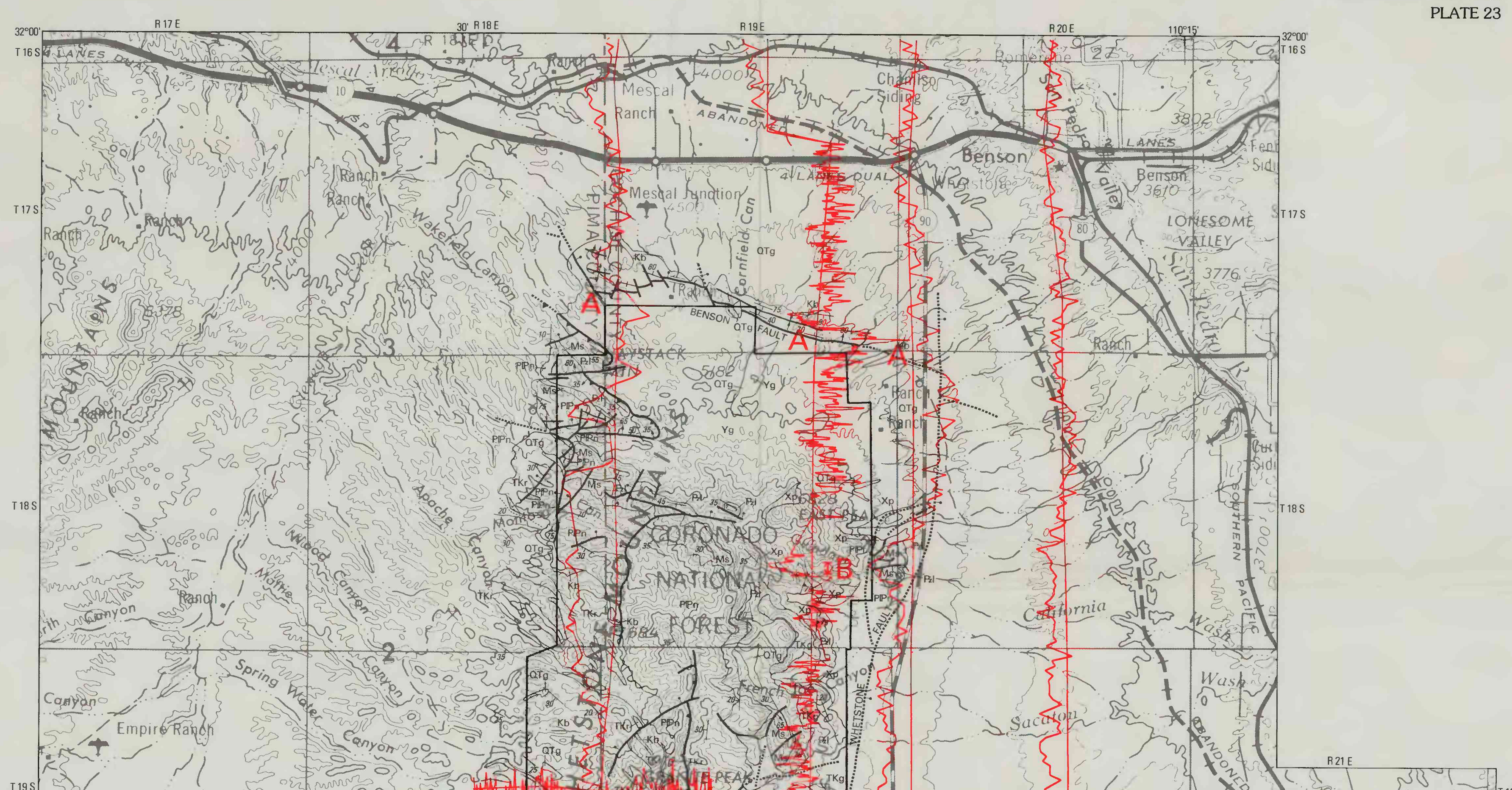
Base from U.S. Geological Survey 1:250,000 Nogales, 1956 (revised 1969)
Transverse Mercator projection

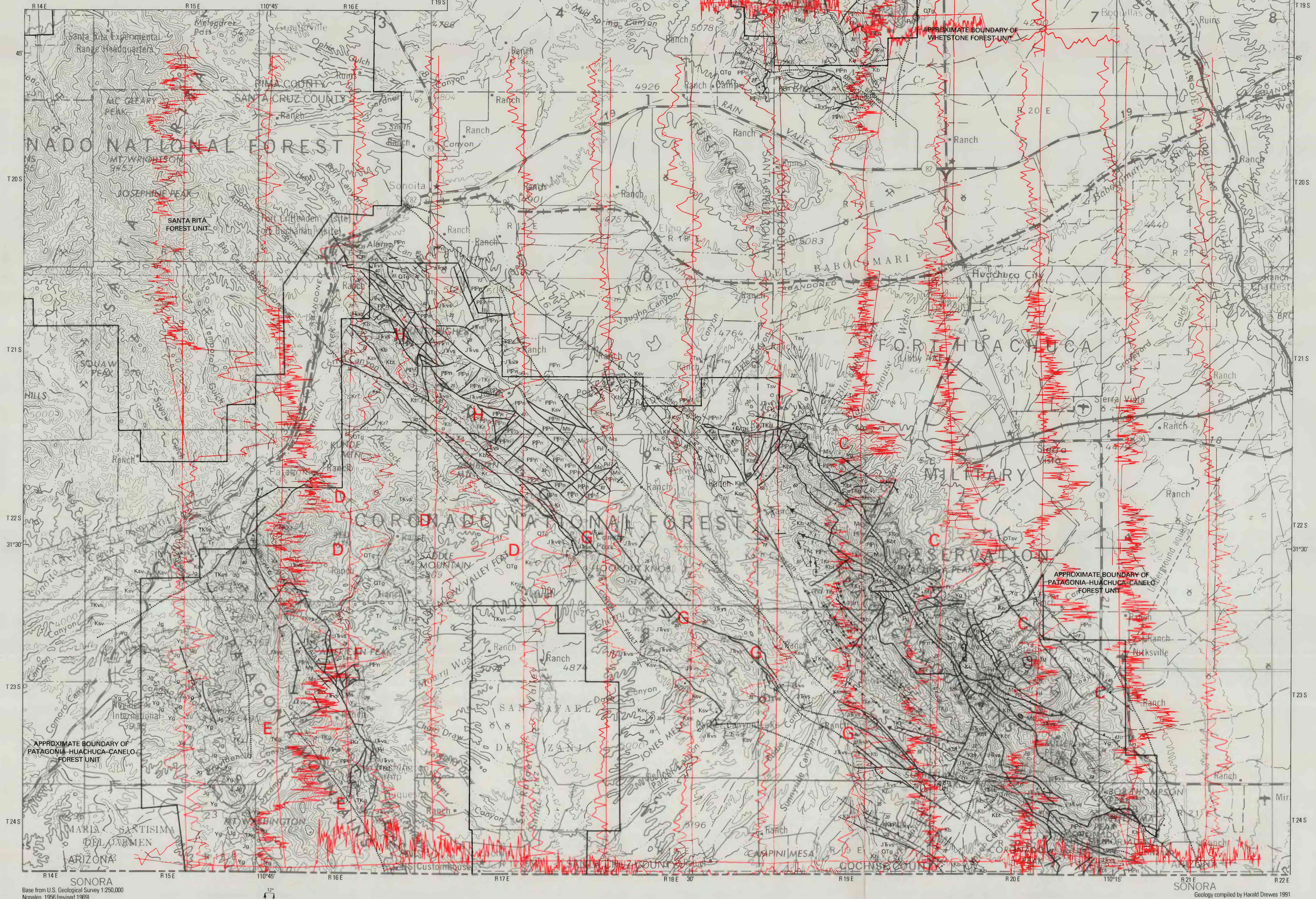
Geology compiled by Harald Drewes 1991

Santa Rita and Atascosa–Cobre–Coches–Pajarito–San Luis–Tumacacori Forest units



INDEX MAP SHOWING LOCATION OF CORONADO NATIONAL FOREST (GRAY AREAS).
Forest units shown on this plate are dark gray.





Base from U.S. Geological Survey 1:250,000 Nogales, 1956 (revised 1969)
Transverse Mercator projection

Geology compiled by Harald Drewes 1991

Whetstone and Patagonia-Huachuca-Canelo Forest units

EXPLANATION OF THORIUM DATA

Residual NURE radiometric-thorium values plotted as deflection off flight path—Base value 65 CPS in Whetstone and Patagonia-Huachuca-Canelo Forest units, 85 CPS in the Santa Rita Forest unit, and 100 CPS elsewhere; scale factor 50 CPS/minute of latitude or longitude

C **Thorium anomaly discussed in chapter D, this volume**

INTRODUCTION

Residual NURE radiometric field data (observed field minus base value) plotted as a deflection off the flight path. For north-south flight lines, deflections right and left of flight lines are positive and negative anomalies, respectively. For east-west lines, deflections above (north) and below (south) of flight lines are positive and negative anomalies, respectively. A value near the mean anomaly for the data set was chosen as the base value, that is, the anomaly value that would plot on the flight path, and the scale factor was usually chosen to be about twice the standard deviation of the data. The scale factor is the number of anomaly units (CPS, counts per second) per minute of latitude or longitude on the map. Scale factors were chosen such that plotted profiles are easily read and display as much detail in the data as possible. For the 5-km-spaced NURE data and the 1:126,720-scale maps, a scale factor equivalent to two standard deviations proved satisfactory.

SCALE 1:126 720
1 0 1 2 3 4 5 6 7 8 9 10 MILES
1 0 1 2 3 4 5 6 7 8 9 10 11 12 KILOMETERS

CONTOUR INTERVAL 200 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

NURE EQUIVALENT-THORIUM PROFILES FOR THE SOUTHWESTERN PART OF CORONADO NATIONAL FOREST AND ADJACENT AREAS, SOUTHEASTERN ARIZONA AND SOUTHWESTERN NEW MEXICO

Compiled by
Mark E. Gettings
1996