



Q units. Ignore these until Andy has a chance to sketch them in. For now just consider whether anything should be mapped as Q or what's underneath. In many places it could go either way.

Tertiary -

- Qoa** Conglomerate and sandstone - The Pole Line Conglomerate (put that in Geolex). Coarse, dominated by clasts of mafic lava flows (Tba probably). Sometimes very well rounded and bedded, sometimes unsorted & matrix supported. Mapped as Qoa by B&G.
- Ts** Siebert Formation undivided. Either because we can't divide it, or we just haven't looked yet. These subdivisions are provisional for the Mt Butte quad but will need to be reconciled with Crescent Dunes.
- Tss** Siebert Formation, clastic flavor. Lots of fine, thin-bedded stuff, some sandstone, crops out best when silicified. Mostly north and west of the Heller caldera although probably overlaps it on the NW corner. Sketched a little capping 3 Hills based on Rodney's thesis that we should look at.
- Tsp** Siebert Formation, pyroclastic flavor. Punky weathering, interbedded thick coarse pyroclastic deposits and finer-grained reworked ashy stuff. White, usually full of biotite flakes, overall similar (and probably related to) Brougher domes. Locally has beds of silicified coarser sandstone and conglomerate. So far seems confined to Heller caldera
- Tb** Brougher rhyolite. The good flow banded abundantly porphyritic stuff with lots of biotite. Postdates Heller and Tba
- Tba** Basaltic andesite flows and dikes. Fine-grained, dark, sparsely porphyritic lava, mostly flows and some dikes, intrudes and overlies pyroclastic Siebert at Mount Butte and elsewhere. Mapped as Red Mountain by B&G but would rather not make that correlation here. 3 analyses from Ed's data in the Mt Butte quad are 55% SiO2 so called them basaltic andesite.
- To** Oddie rhyolite. Usually sparsely porphyritic with a few quartz phenocrysts. Intrudes Heller, often altered.
- Tr** Rhyolite. Rhyolites that aren't Brougher and not obviously Oddie either, some will be sorted if we look at them, some may stay in the general unit.
- Tht** Heller Tuff. In biotite we trust. Tan-weathering, forms low-relief bedrock surface over the eastern part of the quad. Caldera margin sketched from outcrop and Dave's collection of drill hole intercepts. I drew the margin where Heller was present, since it doesn't thicken so drastically the way Fraction does. We can move this though.
- Thtx** Heller Tuff mega- and mesobreccia. Within the Heller caldera, esp along its northern margin. Gradational into the base of the pyroclastic Siebert; difficult contact to map. Most obvious blocks are Fraction, also some rhyolite. Various mapped as Fraction Tuff and Siebert Breccia by B&G, mapped here as Heller breccia because fundamentally related to Heller caldera (could add breccia pattern if we want)
- Ththf** Larger blocks (mappable) of Fraction Tuff in Heller breccia (will add breccia pattern later)
- Tft** Fraction Tuff. The OG. Much restricted from B&G but still dipping steeply in the NE part of the Mount Butte quad (mostly exposed on Tonopah and Rays). More quartz, notably less biotite than Heller, tends to weather more of a darker gray color which makes breccia blocks stand out on imagery.
- Tthx** Fraction Tuff megabreccia. Mizpah blocks for days. Mostly on the Tonopah quad, only a tiny bit on the edge of Mt Butte.
- Tm** Mizpah (Formation or Trachyte, but don't like either of those names). Its mostly 60-65% SiO2 making it a weakly trachytic andesite to dacite. Barely crops out in the NE part of the quad, intercepted in numerous drill holes on the outskirts of town.
- Tt** Tonopah Formation. Flow-banded sparsely porphyritic rhyolite, only crops out one place in Mt Butte but intercepted in numerous drill holes close to town between the Fraction and Heller calderas. Older stuff not exposed but intercepted in drill holes