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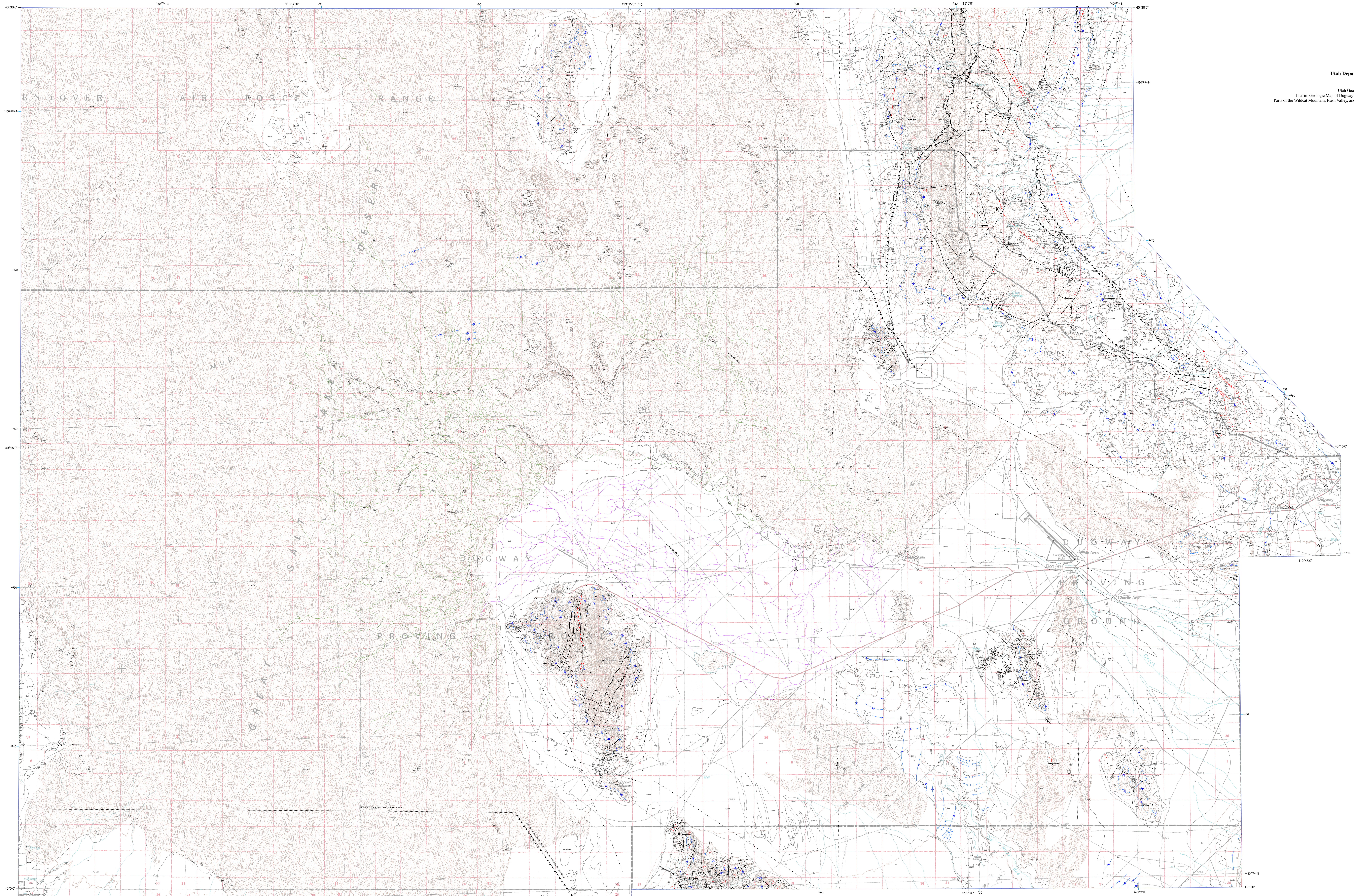
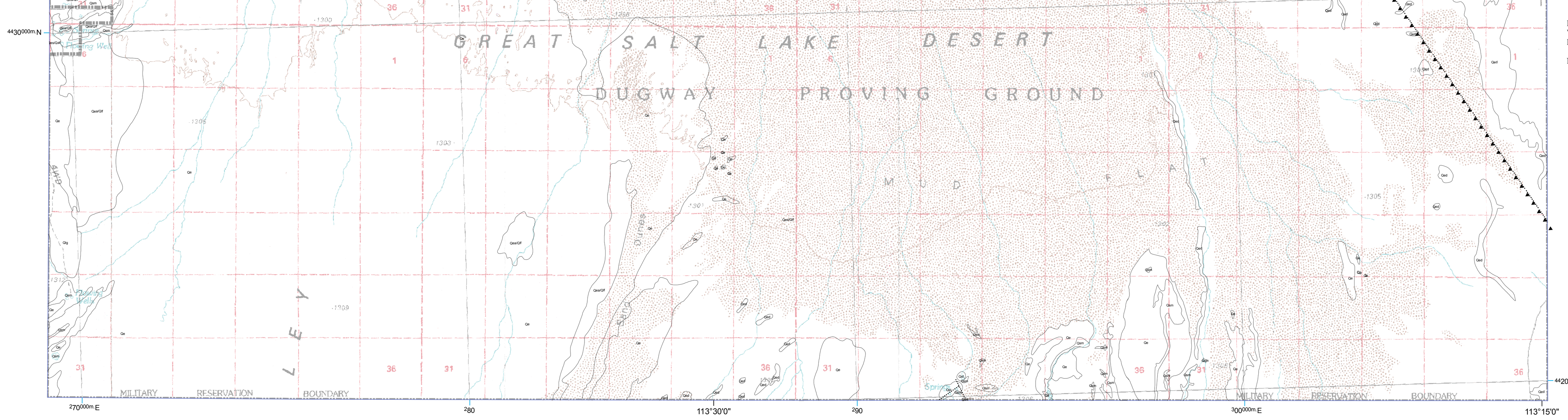
Plate 1
Utah Geological Survey Open-File Report 532
Interim Geologic Map of Dugway Proving Ground and Adjacent Areas,
Parts of the Wildcat Mountain, Rush Valley, and Fish Springs 30' x 60' Quadrangles,
Tooele County, Utah (Year 2 of 2)





Base from U.S. Geological Survey,
Wildcat Mountain, Rush Valley, and
Fish Springs Quadrangles, Utah

North American Datum of 1927 (NAD27).

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This geologic map was funded by the Utah Geological Survey and the U.S. Geological Survey, National Cooperative Geologic Mapping Program through USGS STATEMAP award number 07HQAG0141. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

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Scale 1:75,000

Interim Geologic Map of Dugway Proving Ground and Adjacent Areas, Parts of the Wildcat Mountain, Rush Valley, and Fish Springs 30' x 60' Quadrangles, Tooele County, Utah (Year 2 of 2)

by

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2008

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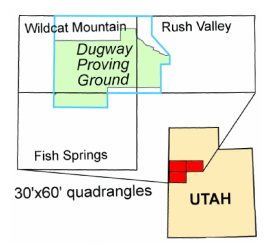


Table 1. Ages and elevations of major shorelines of Lake Bonneville in Dugway Proving Ground and adjacent areas.

Lake Cycle and Phase	Shoreline (map symbol)		Age: radiocarbon years B.P.	Age: calendar years B.P.[1]	Elevation feet (meters)
Lake Bonneville					
Transgressive Phase	Stansbury (S)		22,000-20,000[2]	24,400-23,200	4450-4480 (1357-1366)
	Bonneville (B)	flood	15,500-14,500[3]	18,000-16,800	5220-5262 (1591-1604)
Regressive Phase	Provo (P)	flood	14,500-12,000[4]	16,800-13,500[5]	4860-4880 (1482-1488)
	Gilbert		11,000-10,000[6]	12,800-11,600	Not exposed

[1]Calendar-calibrated ages of most shorelines have not been published. Calendar-calibrated ages shown here, except for the age of the end of the Provo shoreline, are from D.R. Currey, University of Utah (written communication to Utah Geological Survey, 1996; cal yr B.P. = 1.16 ^{14}C yr B.P.).
[2]Oviatt and others (1990); Currey (written communication to Utah Geological Survey, 1996, assumed a maximum age for the Stansbury shoreline of 21,000 ^{14}C yr B.P., which is used in the conversion to calendar years).
[3]Oviatt and others (1992), Oviatt (1997).
[4]Godsey and others (2005) revised the timing of the occupation of the Provo shoreline and subsequent regression; Oviatt and others (1992) and Oviatt (1997) proposed a range from 14,500 to 14,000 ^{14}C yr B.P. Oviatt and Thompson (2002) summarized many recent changes in the interpretation of the Lake Bonneville radiocarbon chronology.
[5]Calendar-calibrated age of the end of the Provo shoreline estimated by interpolation from data in Godsey and others (2005), table 1, who used Stuiver and Reimer (1993) for calibration.
[6]Murchison (1989), figure 20.

Table 2. Summary of U-Pb zircon age analyses from Granite Peak.

Map Number	Sample Number	Map Unit	Rock Name	7.5' Quadrangle	Latitude (N)	Longitude (W)	Weighted Average $^{238}U/^{206}Pb$ Age Mean (Ma)
Jgd1	GP102605-3	Jgd	Granodiorite	Granite Peak	40°05'16.2"	113°16'45.9"	149.8±1.3
Jg1	GP081605-9	Jg	Granite porphyry	Granite Peak	40°07'40"	113°18'23"	148.8±1.3

Notes:
Location data in NAD27.
Analyses performed by Eric H. Christiansen (Brigham Young University) and Jeffrey D. Vervoort (Washington State University).
Analyses by laser ablation-inductively coupled mass spectrometry.
See Christiansen and Vervoort (in preparation) for complete presentation of data.

Table 3. Summary of $^{40}Ar/^{39}Ar$ age analyses from Dugway Proving Ground and adjacent areas.

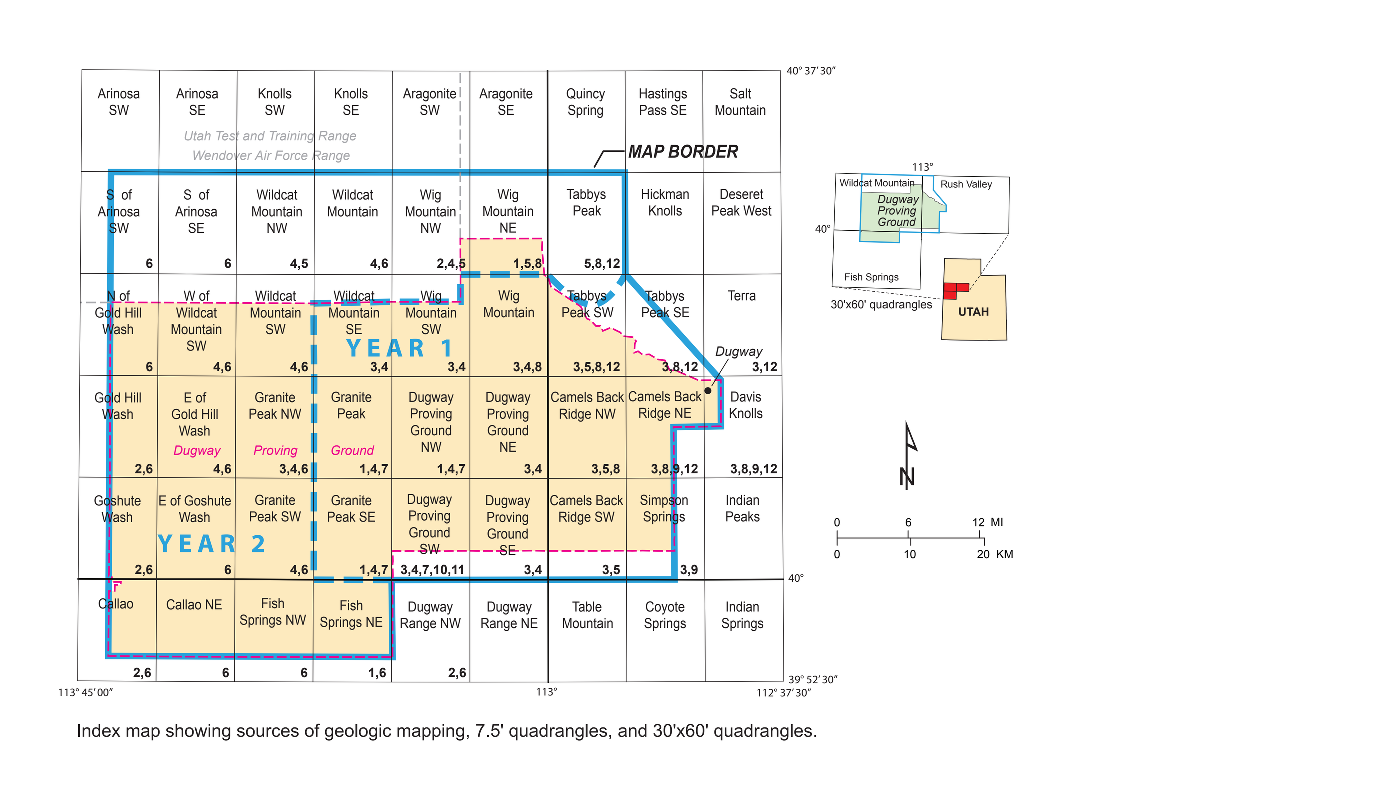
Map Number	Sample Number	Map Unit	Rock Name	7.5' Quadrangle	Latitude (N)	Longitude (W)	Age ± 2sd (Ma)	Material Dated	Comments
Trd1	GP081605-6c	Trd	Rhyolite	Granite Peak	40°07'44"	113°17'04"	7.78 ± 0.05	sanidine	single-crystal laser fusion
Trs1	SM071405-11	Trs	Rhyolite	Granite Peak SE	40°03'55.4"	113°16'18.5"	8.20 ± 0.05	sanidine	single-crystal laser fusion
Jgd1	GP102605-3	Jgd	Monzonite	Granite Peak SE	40°05'16.2"	113°16'45.9"	15.97 ± 0.04	biotite	step heating, plateau age
Jgd1	GP102605-3	Jgd	Monzonite	Granite Peak SE	40°05'16.2"	113°16'45.9"	27.13 ± 0.05	K-feldspar	integrated age
Jg2	GP102605-1	Jg	Granite	Granite Peak	40°09'58.2"	113°15'56.2"	13.69 ± 0.12	muscovite	step heating, plateau age
Jg2	GP102605-1	Jg	Granite	Granite Peak	40°09'58.2"	113°15'56.2"	19.14 ± 0.08	K-feldspar	integrated age
Tdi1	FM083105-1	Tdi	Dacite	Camels Back Ridge NE	40°12'08"	112°50'16"	40.95 ± 0.32	hornblende	step-heating, plateau age
Tdi1	FM083105-1	Tdi	Dacite	Camels Back Ridge NE	40°12'08"	112°50'16"	39.56 ± 0.10	biotite	integrated age
Tdi2	D-4	Tdi	Dacite	Tabbys Peak SW	40°19'17.9"	112°54'01.1"	38.69 ± 0.10	sanidine	laser total fusion
Tac1	D-7	Tac	Andesite	Wig Mountain	40°21'37.8"	113°00'04.0"	41.73 ± 0.24	hornblende	furnace step-heat
Tac3	D-17	Tac	Andesite	Tabbys Peak SW	40°18'39.6"	112°56'36.3"	38.17± 0.47	groundmass concentrate	furnace step-heat
Tac5	D-42	Tac	Andesite	Wig Mountain NE	40°26'55.3"	113°01'57.8"	40.66 ± 0.45	groundmass concentrate	furnace step-heat
Taci1	D-6	Taci	Andesite	Wig Mountain	40°20'03.3"	113°01'42.2"	39.55 ± 0.22	groundmass concentrate	furnace step-heat
Taci2	D-40	Taci	Andesite	Tabbys Peak	40°27'47.7"	112°59'13.8"	40.61 ± 0.78	groundmass concentrate	furnace step-heat

Notes:
Location data in NAD27.
All analyses performed at the New Mexico Geochronology Research Laboratory, Socorro, New Mexico.
Results for Jgd1 and Jg2 are considered cooling ages rather than intrusion ages.
NMGRL reported unreliable age data for samples D-2, D-15, D-25, D-47, as samples were too felsic for good groundmass concentrate analysis and/or were unable to separate any other datable mineral phases.
See UGS & NMGRL (2007), UGS & NMGRL (2008), UGS & NMGRL (in preparation) for complete presentation of data.

Table 4. Fossil identifications and ages from Dugway Proving Ground and adjacent areas.

Sample No.	Map Unit	Rock Type	7.5' Quadrangle	Latitude (N)	Longitude (W)	Fossil Type	Fauna	Preservation & Abrasion	Calcareous Algae Present	Age
D-77	Pp	biomicrite wackestone	Wig Mountain NE	40°24'05.2"	113°02'06.2"	fusulinid	*Parafusulina*	Poor	None	lower Leonardian
D-74	Pp	biomicrite wackestone	Wig Mountain NE	40°29'06.5"	113°07'07.3"	fusulinid	*Parafusulina*, *Schwagerina*	Poor	None	Leonardian
D-60	Pofc	silicified shale	Wig Mountain NE	40°23'25.8"	113°01'49.1"	fusulinid	*Schwagerina longissimoidea*	Poor	None	middle Wolfcampian
D-69	Pofc	biomicrite wackestone	Tabbys Peak SW	40°27'48.0"	112°59'49.6"	fusulinid	*Triticites* cf. *T. meeki*	Good	None	lower Wolfcampian
D-75	Pofc	biomicrite mudstone	Tabbys Peak SW	40°28'10.9"	112°58'46.9"	fusulinid	*Triticites* cf. *T. meeki*	Fair	None	lower Wolfcampian
D-76	Pobm	biomicrite wackestone	Tabbys Peak SW	40°29'53.8"	112°56'41.1"	fusulinid	*Triticites*	Fair	None	Virgilian
D-68	Pobm	biomicrite wackestone	Tabbys Peak SW	40°23'37.1"	112°59'45.3"	fusulinid	*Triticites*	Poor	None	Virgilian
D-65	Pobm	biomicrite wackestone	Tabbys Peak SW	40°21'18.4"	112°59'14.5"	fusulinid	*Pseudofusulinella*, *Triticites*	Fair	None	lower Virgilian
D-57	Pobm	biosparite packstone	Tabbys Peak SW	40°19'31.0"	112°58'13.0"	fusulinid	*Triticites cullomensis*	Good	None	lower Virgilian
D-71	Pobm	biomicrite mudstone	Tabbys Peak SW	40°23'05.6"	112°59'05.3"	fusulinid	*Triticites*	Good	None	Missourian
D-78	Pobm	biomicrite wackestone	Tabbys Peak SW	40°20'04.3"	112°58'34.9"	fusulinid	*Triticites*	Fair	None	Virgilian
D-70	Pobp	biomicrite wackestone	Tabbys Peak SW	40°23'08.4"	112°58'34.7"	fusulinid	*Beedeina*	Fair	Fragments	lower Desmoinesian
D-50	Powc	crinoidal packstone	Tabbys Peak SW	40°22'38.9"	112°57'57.4"	conodont	*Adetognathus lautus*	-	-	latest Mississippian to early Permian

Note: Location data based on NAD27.
Fusulinids identified by A.J. Wells (independent).
Conodonts identified by S.R. Ritter (Brigham Young University).



Index map showing sources of geologic mapping, 7.5' quadrangles, and 30'x60' quadrangles.

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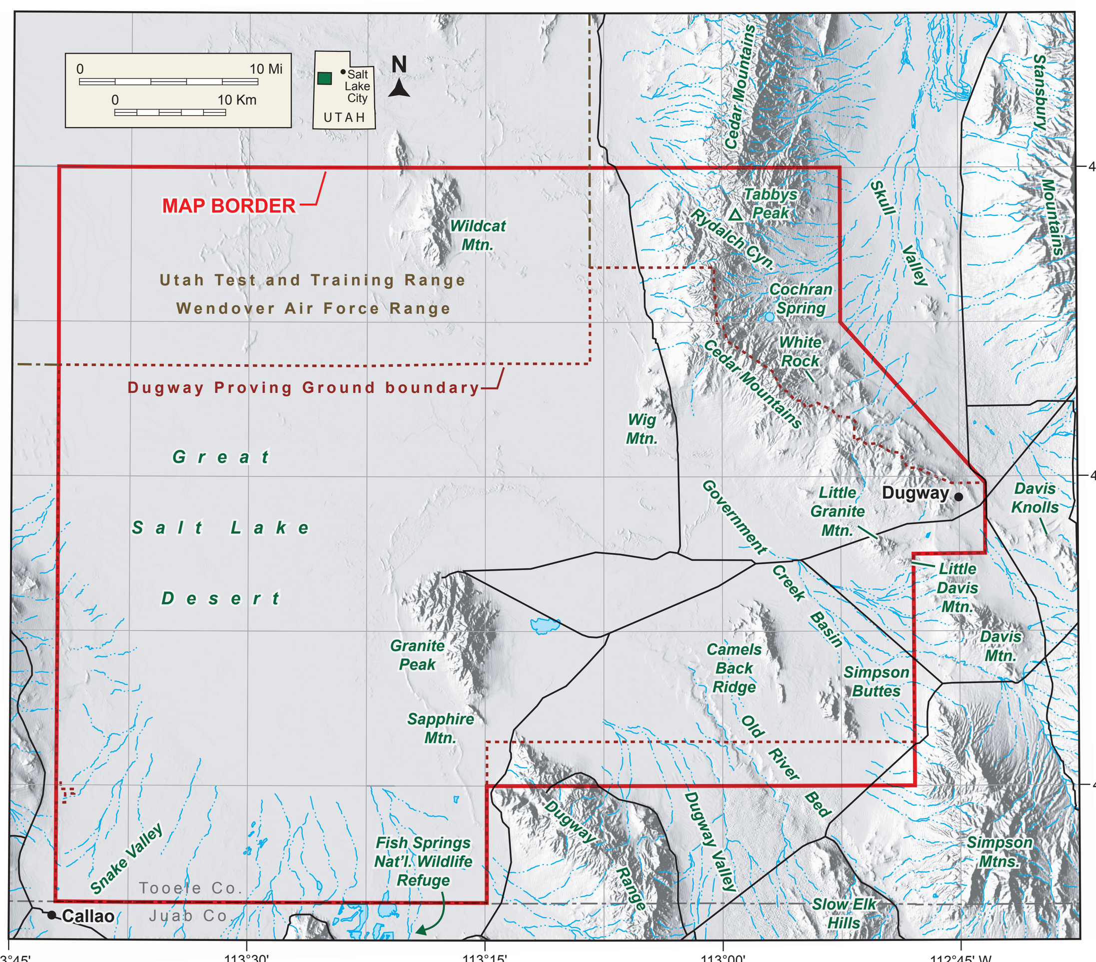


Figure 1. Location map showing primary geographic features associated with Dugway Proving Ground and adjacent areas.

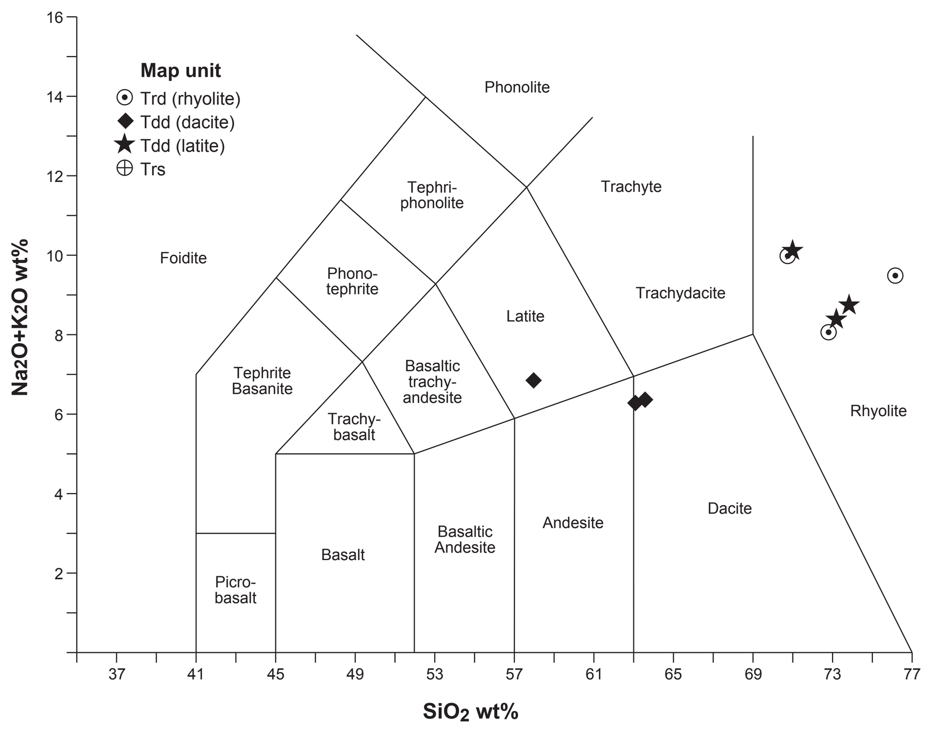


Figure 2. Total alkali-silica classification plot (after LeBas and others, 1986) for Tertiary dikes and volcanic rocks of the Granite Peak and Sapphire Mountain area.

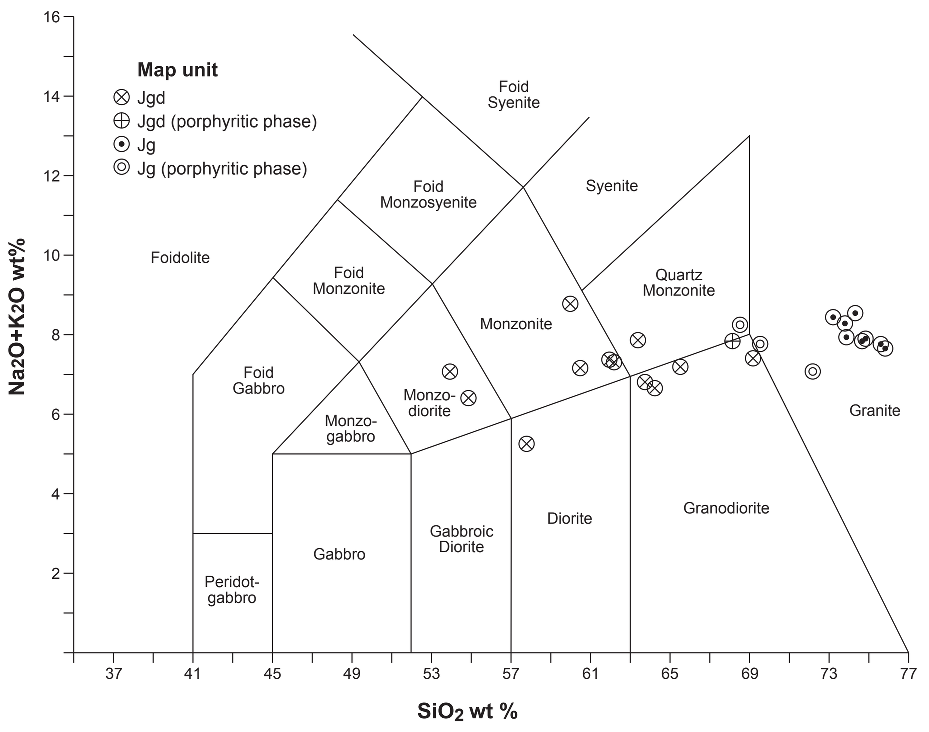


Figure 3. Total alkali-silica plot (after Middlemost, 1994) with field names for plutonic rocks of Granite Peak.

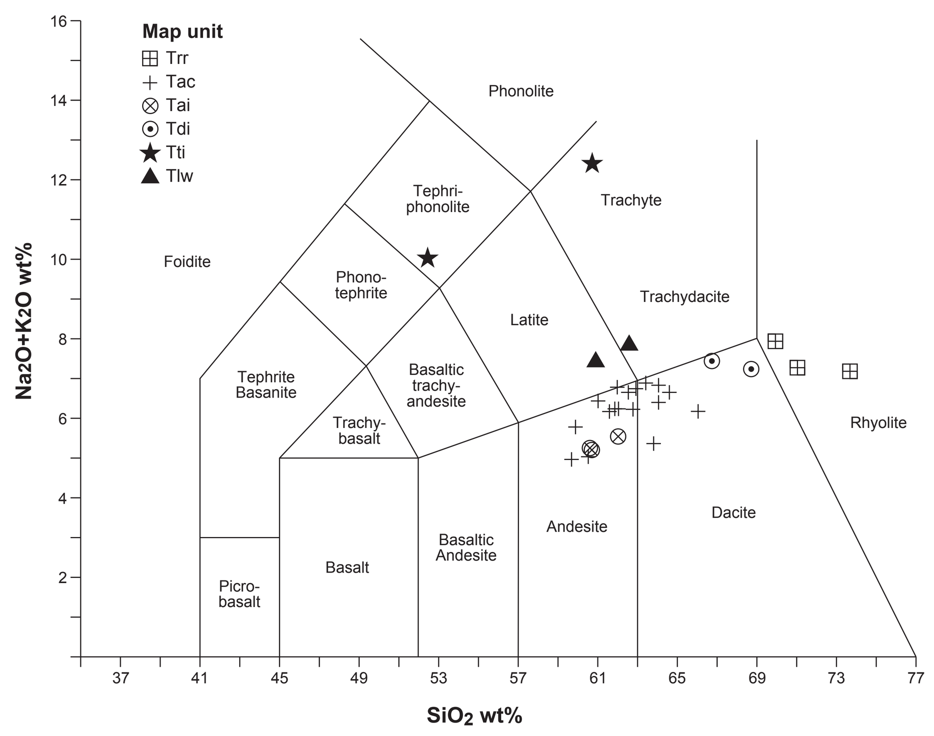


Figure 4. Total alkali-silica plot (after LeBas and others, 1986) for extrusive and intrusive rocks from southern Cedar Mountains and northern Dugway Range.

Maurer (1970)

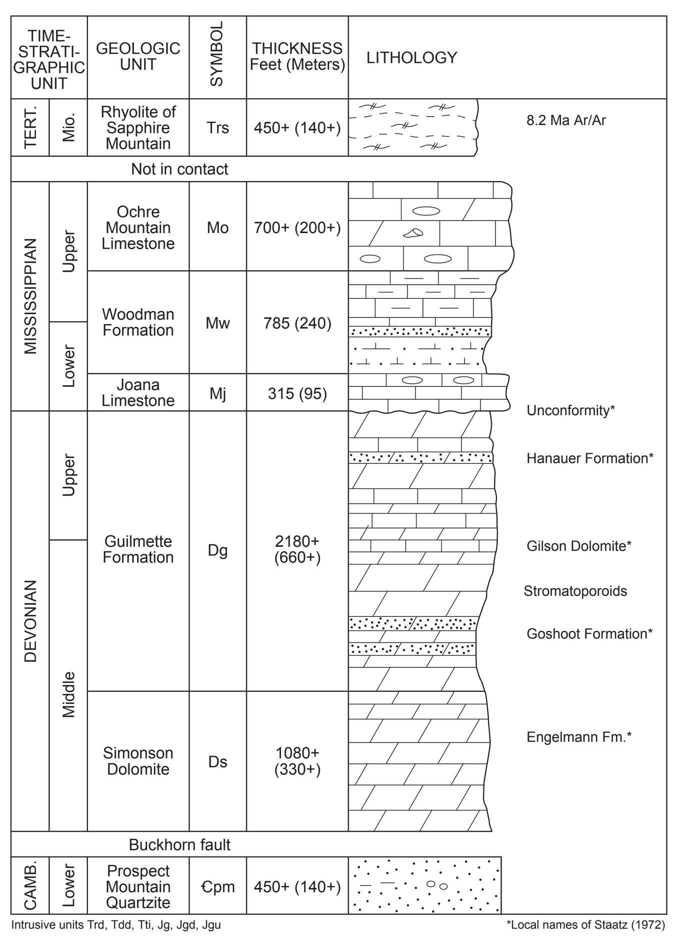
Time-stratigraphic unit		Cochran Spring section Feet (Meters)	Overall Feet (Meters)	Oquirrh Formation unit
PERMIAN	Wolf-campian	340+ (104+)	1935+ - 2750 (590+ - 838)	Unit 5
PENNSYLVANIAN	Virgilian	2762 (842)	2762 - 3000 (842 - 915)	Unit 4
PENNSYLVANIAN	Desmoines.- Missourian	2556 (779)	2556 - 3000+ (779 - 915+)	Unit 3
PENNSYLVANIAN	Morrowan - Atokan	715 (218)	715 - 1400 (218 - 427)	Unit 2
MISS.	? Chest.	434 (132)	434 (132)	Unit 1
		6807 (2075)	8402+ - 10,584+ (2562+ - 3229+)	

This Map

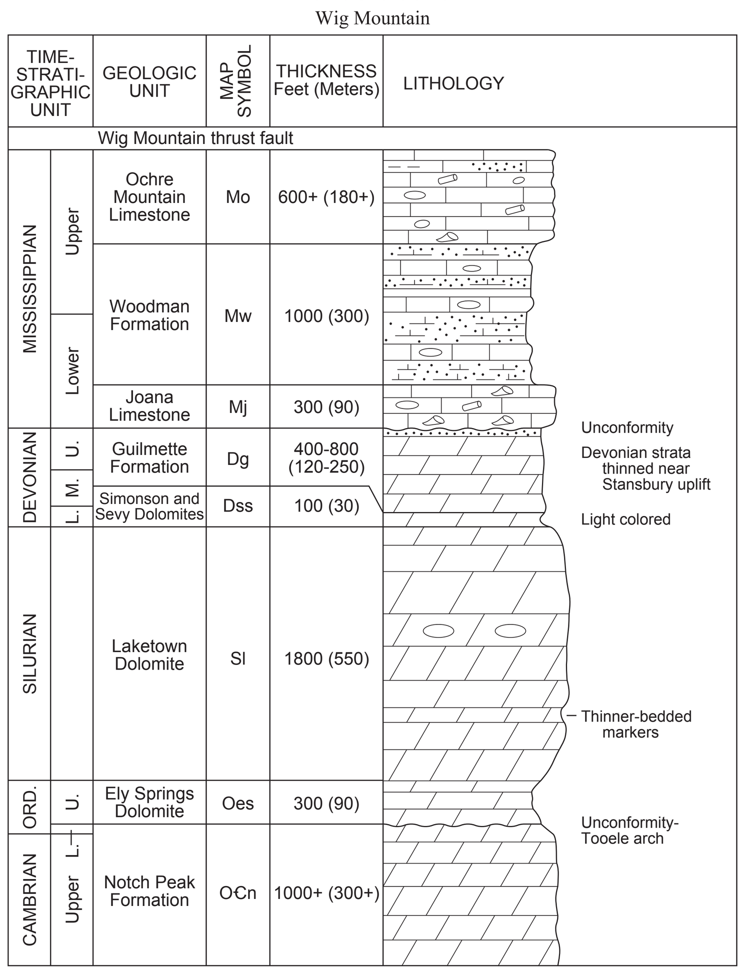
Map unit		Cochran Spring section Feet (Meters)	Overall Feet (Meters)	Sample Numbers	Time-stratigraphic unit	
PPo	Pofc	2713 (827)	3500 (1070)	— D-60 — D-75 D-69	Wolfcampian	PERMIAN
PPo	Pobm	1000 (305) fault	2800 (850)	— D-76 D-68 — D-52 D-57 — D-71	Misso. -Virgil.	PENNSYLVANIAN
PPo	Pobp	fault 2660 (811)	5400 (1650	— D-70	Atokan-Desmoinesian	PENNSYLVANIAN
PPo	Powc	500 (150)	500-800 (150-245)	— D-50	Morro-wan	PENNSYLVANIAN
		6873 (2095)	12,350 (3770)			

Figure 5. Comparison of Oquirrh strata of the southern Cedar Mountains. Maurer (1970) provided thicknesses for his units measured in the Cochran Spring section and overall estimates. Our work indicated the Cochran Spring section is incomplete and provide revised thickness estimates. The stratigraphy used in this map for the Lower Permian (Wolfcampian) and Pennsylvanian formations is based on that of the Oquirrh Mountains/Bingham mining district.

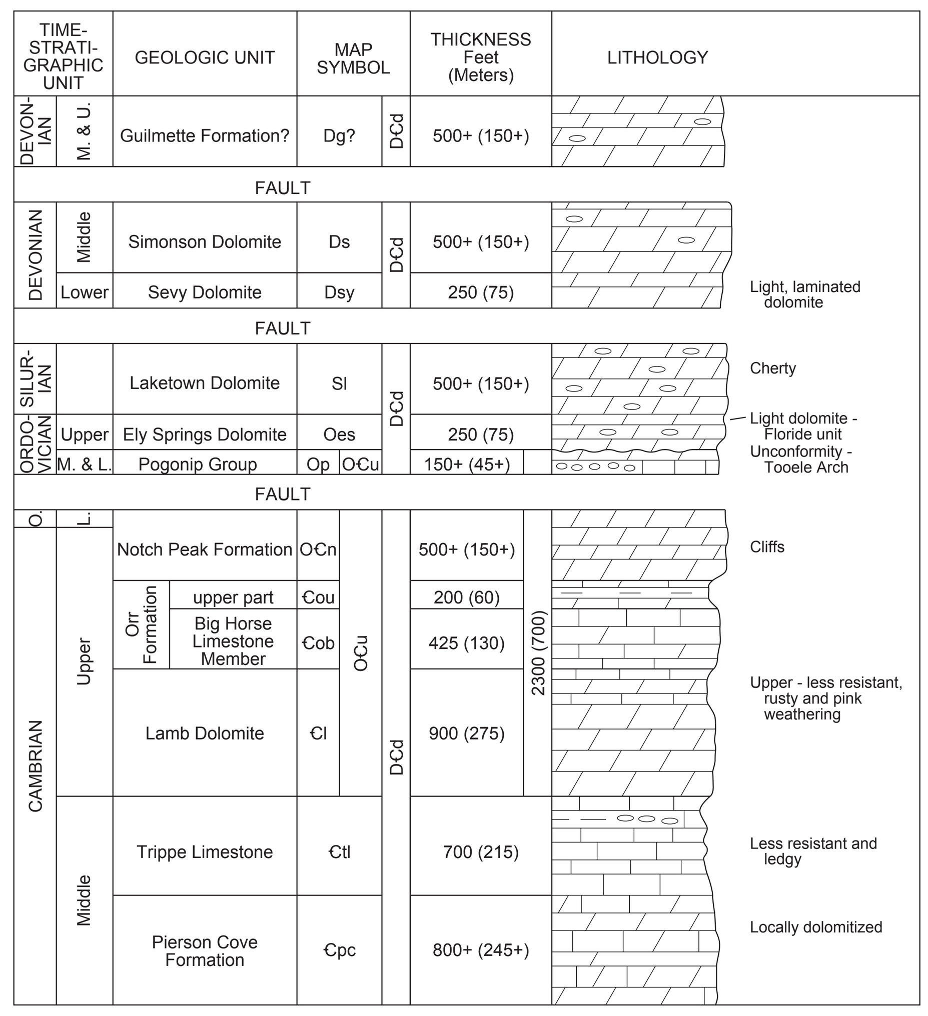
LITHOLOGIC COLUMN
Northern Dugway Range, Sapphire Mountain, and Granite Peak



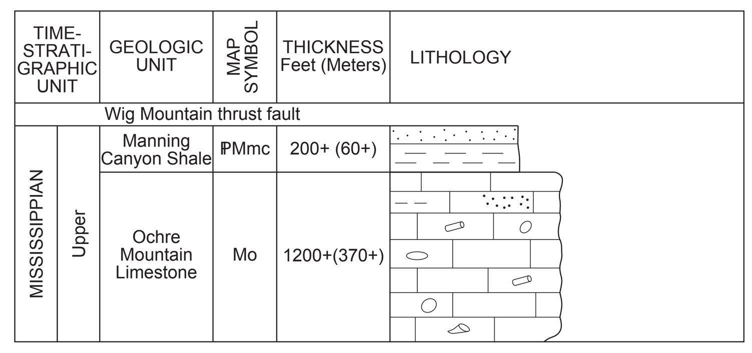
LITHOLOGIC COLUMN
Wig Mountain



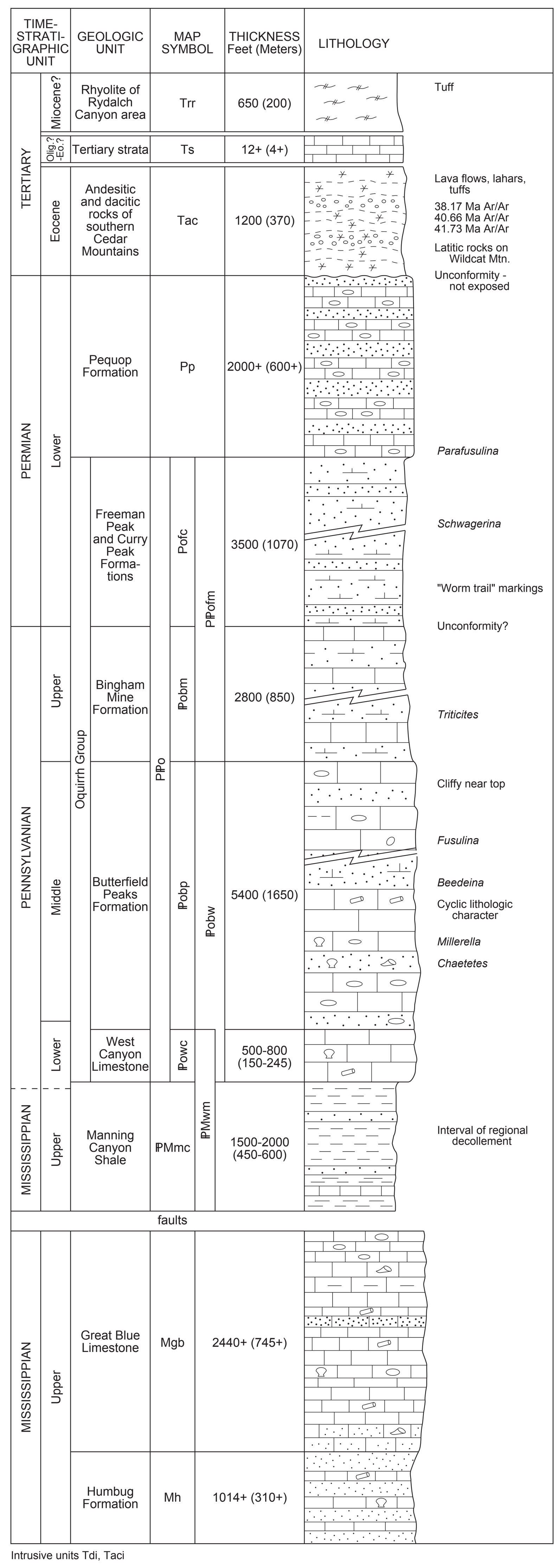
LITHOLOGIC COLUMN
Camels Back Ridge and Simpson Buttes



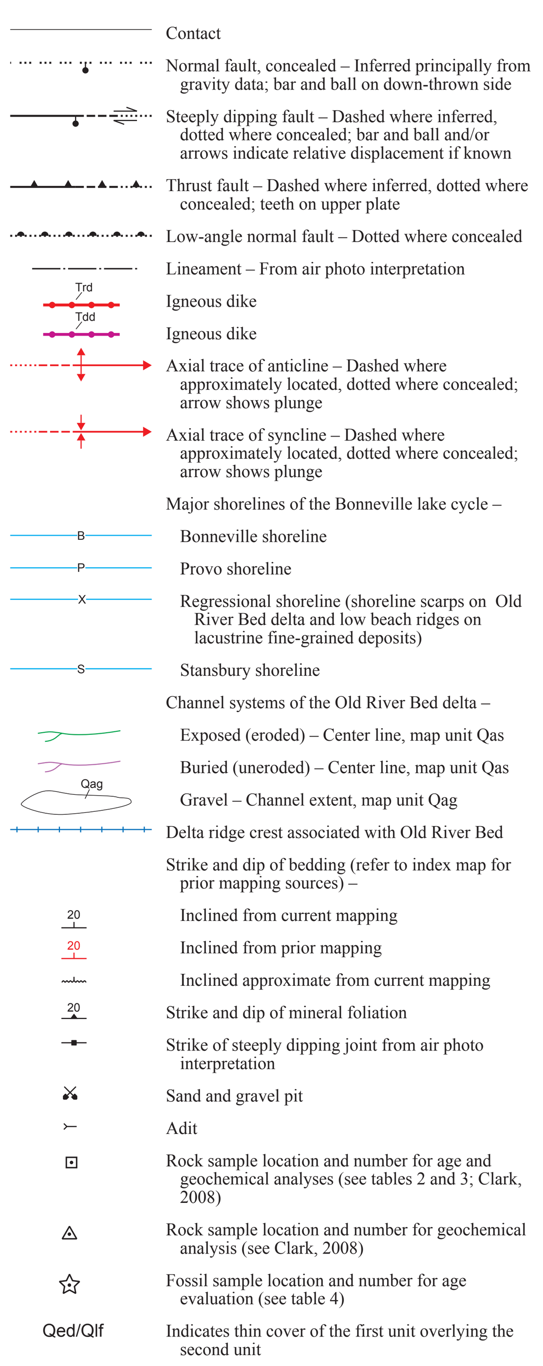
LITHOLOGIC COLUMN
Little Davis Mountain



LITHOLOGIC COLUMN
Southern Cedar Mountains and Wildcat Mountain



GEOLOGIC SYMBOLS



CORRELATION OF GEOLOGIC UNITS