APPENDIX A. DESCRIPTION OF UNITS COMBINED IN THE DIGITAL LITHOLOGICAL MAP OF NORTHERN MEXICO AND SOUTHWESTERN US

1. Precambrian rocks (Sedimentary, Igneous and Metamorphic rocks)

Mexico

Abrev.	Description
	Sonora
pE (?)CM	Proterozoic metamorphic complex.
pTiE-Gn	Paleoproterozoic metamorphic rocks. Includes Bamori Metamorphic complex
pTmE-Gn, pTmE	Mesoproterozoic metamorphic rocks. Includes Pinal Schist.
pTmGr-Gn	Mesoproterozoic gneiss. Includes San Isidro Gneiss
pTmGr	Mesoproterozoic granites. Includes Aibó, Mesteñas, Cananea and Santa Margarita Granites.
pTmGr-Gd, pTm(?)D	Mesoproterozoic intrusive rocks, mainly diorite, granite and granodiorite.
pTsAr, pTsDo-C	Neoproterozoic sandstone, quarzite and dolomite, undivided.
pTsDo-Ar, pTsAr-Do, pTsCz-Ar	Neoproterozoic sandstone and dolomite. Includes El Arpa, Carborca, Clemente, Pitiquito, Gamuza, Gachupin and Tecolote Formations.
	Chihuahua
pE(?)Gn-Af	Mesoproterozoic schists, gneiss and amphibolites. Includes Sierra de Bahues Metamorphic Complex.
pTmGn, pTmGr-Af	Mesoproterozoic metamorphic rocks, unidivided.
	Sinaloa
pE(?)CM	Proterozoic metamorphic complex.
	Tamaulipas
pTmGn	Mesoproterozoic rcoks. Includes Novillo Gneiss

US

Abrev.	Description
	California
pCAc	Complex of Paleoproterozoic igneous and metamorphic rocks.
sh11	Paleoproterozoic schist of various types and ages.

grpCA	Mesoproterozoic granitic rocks. Includes the intrusive rocks in the San Gabriel Mountains Anorthosite.
pCA2	Mesoproterozoic gneiss, marble and hornfels; may be Paleozoic in part. Includes Baldwin Gneiss, Essex Series, Fenner Gneiss, Johannesburg Gneiss, Kilbeck Gneiss, Mendenhall Gneiss and Waterman Gneiss.
pCA1	Mesoproterozoic and Neoproterozoic conglomerate, shale, sandstone, limestone, dolomite, marble, gneiss, hornfels, and quartzite. Includes Beck Spring Dolomite, Crystal Spring Formation, Johnnie Formation, Kingston Peak Formation, Marvel Dolomitic Limestone, Mountain Girl Quartzite, Noonday Dolomite, Pahrump Group, Panamint Metamorphic Complex, Stirling Quartzite, Wildrose Formation, World Beater Porphyry and Wyman Formation
Nevada	
Xm	Paleoproterozoic metamorphic rocks.
Ygr	Mesoproterozoic porphyritic rapakivi granite.
Zw	Neoproterozoic metamorphic rocks. Includes Wyman Formation.
Zqs	Neoproterozoic quartzite, phyllitic siltstone, conglomerate, limestone and dolomite. Includes McCoy Creek Group and Johnnie Formation.
Arizona	
Xm	Paleoproterozoic metamorphic rocks.
Xg	Paleoproterozoic granitic rocks (1600–1800 Ma).
Xq	Paleoproterozoic quartzite. Includes Mazatzal Group.
Xms, Xmv	Paleoproterozoic metasedimentary rocks. Includes part of Pinal Schist, Yavapai Supergroup, Tonto Basin Supergroup and Vishnu Schist.
Ys	Mesoproterozoic sedimentary rocks. Includes Grand Canyon Supergroup, Chuar Group, Unkar Group, Apache Group and Troy Quartzite.
Yg	Mesoproterozoic granitic rocks. Includes Oracle Granite and Ruin Granite.
Yd	Mesoproterozoic diabase (1050–1150 Ma).
TXgn	Neoproterozoic metamorphic rocks.
New Mexico	
Xp	Paleoproterozoic plutonic rocks older than 1600 Ma.
X	Paleoproterozoic rocks, undivided.
Xmo, Xm	Paleoproterozoic metamorphic rocks. Includes Vadito and Hondo Group.
Xms	Paleoproterozoic metasedimentary rocks.
Ys	Mesoproterozoic sedimentary rocks.
Yp, YXp	Mesoproterozoic and Neoproterozoic plutonic rocks.
Oklahoma	
pCg	Mesoproterozoic igneous rocks. Includes the Spavinaw Granite.
pCt	Mesoproterozoic igneous rocks. Includes Tishomingo and Troy Granites.
Texas	
pCp	Paleoproterozoic schists and quarzites. Includes Packsaddle Schist.

pCr	Mesoproterozoic gneiss, marble and hornfels; may be Paleozoic in part. Includes the Red Mountain Gneiss.
pCv, pCb, pCl	Mesoproterozoic gneiss, marble and hornfels; may be Paleozoic in part. Includes Valley Spring Gneiss, Big Branch Gneiss and Lost Creek Gneiss.
pCm	Mesoproterozoic mafic igneous rocks.
pCc	Mesoproterozoic serpentinite. Includes Coal Creek Serpentinite
pCs, pCi	Mesoproterozoic and Neoproterozoic rocks. Includes Carrizo Mountain Group.
pCt	Mesoproterozoic to Neoproterozoic granite. Includes Town Mountain Granite.
pCry	Mesoproterozoic to Neoproterozoirc rhyolite.
pCg	Mesoproterozoic to Neoproterozoic granite. Includes Red Bluff Granite**.**
pCa, pCh, pCmc	Mesoproterozoic to Neoproterozoic conglomerate, shale, sandstone, limestone, dolomite, and quartzite; may be Paleozoic in part. Includes Allamore Formation, Hazel Formation Mundy Breccia and Castner Limestone.
pCy	Neoproterozoic ignenous rocks. Includes Oatman Creek Granite.

2. Paleozoic Rocks

Mexico

Abrev.	**Description**
	Baja California Norte
PspMS, PcpMs	Paleozoic metalimestone, phylite, slate and metavolcanic and metasedimentary rocks. Includes Zamora and Cerro Volcan Formation.
PE-F, P(?)E	Paleozoic schist, quartzite and marble.
PoC-Ma PcMs EiE-C, PdcE-Ma	Ordovician to Carboniferous schist, quartzite and marble.
PcCz-Ma	Carboniferous limestone and marble.
	Sonora
P(?)E-MCz	Paleozoic schist. Inclides Tesia Schist.
P(?)Ms, EiMAr-MCz	Paleozoic metasedimentary rocks.
PCz, PCz-Ar	Paleozoic limestone and sandstone.
EmsCz-Ar, EmsCz, EimCz-Ar	Cambrian to Ordovician limestone and sandstone. Includes Abrigo Formation.
Em(?)C, EiC, EmPoLu-Ca	Cambrian quartzite and lutite. Includes Los Changos Orthoquarzite, Bolsa Quarzite, Proovedora Formation, Buelna Formation, El Gavilán Formation, Cerro Prieto Formation, Arrojos Formation and El Tren Formation.
PdpCz-Ar, pTs(?)Ar-Do	Ordovician to Permian limestone and sandstone. Includes Horquilla Formation.

PodCz-Lu, *PoPpCz-Ar,*	Ordovician to Devonian limestone, lutite and sandstone.
Pdp(?)MCz, *PpTRs(?)Ma-E*	Devonian to Permian metamorphic rocks, undivided.
pTiGd	Permian granodiorite
PpsTRsCz-Lu, *PpsCz-Lm*	Permian limestone, limolite and lutite. Includes Los Monos Formation.
Chihuahua	
P?MVs	Paleozoic schist and metavolcanosedimentary rocks. Includes San José de Gracia Metamorphic Complex.
P(?)E-Ms,	Paleozoic schist and metasedimentary rocks. Includes Uruachic Schist.
P(?)E	Paleozoic schist, undivided.
E(?)Gn	Cambrian gneiss.
pTs(?)Ar-Do, *PdpCz-Ar,* *PcppiCz-Ar*	Ordovician to Permian limestone, dolomite and sandstone. Includes Horquilla Formation.
PcmDo-Lu	Devonian to Carboniferous dolomite and lutite. Includes Escabrosa Group and Monillas Formation.
PeiLu-Ar *PpLm-Lu,* *PpiCz-Ar* *Pc(?)Ag*	Carboniferous to Permian lutite, limolite and sandstone, undivided.
PpiPR	Permian rhyolite porphyry, undivided.
PpAr-Lu *PpiLu-Ar,*	Permian sandstone and lutite. Includes Rara, Pastor and Hueco Formations.
PpipsDo-Ar	Permian dolomite and sandstone. Includes Concha limestone.
Sinaloa	
P(?)F-Pz, *P(?)Ms,* *P(?)MVs*	Paleozoic phylite, slate, metavolcanic and metasedimentary rocks. Includes San José de Gracia Metamorphic Complex.
P(?)Gr-Gd	Paleozoic granite and granodiorite.
Durango	
Pp?CM	Paleozoic gneiss and metamorphic complex, undivided.
P(?)MVs	Paleozoic volcanosedimentary rocks. Includes San José de Gracia Metamorphic Complex.
PdE-Gn	Devonian schist and gneiss. Includes Gran Tesoro Formation.
PcE	Carboniferous schist.
PpCz	Permian limestone, undivided.
Coahuila	
EPsi(?)Pz-C, *Pd(?)E*	Cambrian to Devonian schist, slate and quartzite
PosdmCz-Lu	Ordovician to Devonian limestone and limestone. Includes Caliza Solis.

PoCz-Lu	Ordovician limestone and lutite. Includes Sóstenes Formation.
PcCz	Carboniferous limestone.
PcpVs, PeLu-E, PeLu-Ar	Carboniferous to Permian volcanosedimentary rocks, lutites and sandstone. Includes Las Delicias Formation.
PpGd-Gr, PpTRGr-Gd	Permian granodiorite and granite.
	Nuevo León
PcppiE	Carboniferous schist. Includes Arramberri Schist.
	San Luis Potosí
PsF-E	Paleozoic phylite and schist.

US

Abrev.	**Description**
	California
sch	Paleozoic schists of various types; may be Mesozoic and Precambrian in part. Includes Mesquite Schist and part of Sur Series.
um	Paleozoic peridotite, gabbro, and diabase. Includes Feather River peridotite, Kings River ophiolite and Kings-Kaweah ophiolite melange
PZ1, PZ2	Paleozoic metasedimentary rocks, includes slate, sandstone, shale, chert, conglomerate, limestone, dolomite, marble, phyllite, schist, hornfels, and quartzite, Saragossa Quartzite, Chicopee Canyon Formation, Maria Formation, Stirling Quartzite, Wood Canyon Formation, Zabriskie Quartzite, part of Bean Canyon Formation, Garlock Series and Robbers Mountain Formation
PZ3	Paleozoic shale, sandstone, conglomerate, limestone dolomite, chert, hornfels, marble, and quartzite; may be Mesozoic in part. Includes Mt. Aggie, Convict Lake, Aspen Meadow, part of Squares Tunnel and Bright Dot Formations; and Mt. Baldwin Marble.
ls	Paleozoic limestone, dolomite and marble; may be Mesozoic in part. Includes part of Calaveras Complex, Gabilan Limestone, and part of Hite Cove Formation, Riggs Formation and part of Sur Series.
CA	Cambrian to Devonian sandstone, shale, limestone, dolomite, chert, quartzite, and phyllite. Includes part of Bonanza King Formation, Bright Angel Shale, Cadiz Formation, Carrara Formation, Chambless Limestone, Cornfield Springs Formation, part of Goodsprings Dolomite, Harkless Formation, Latham Shale, Lead Gulch Formation, Lotus Formation, Monola Formation, Mule Spring Limestone, part of Nopah Formation, Pioche Shale, Poleta Formation, Prospect Mountain Quartzite, Racetrack Dolomite, Saline Valley Formation, Tamarack Canyon Dolomite, Tapeats Sandstone, Wood Canyon Formation and part of Zabriskie Quartzite.
Gb1, um1	Ordovician to Devonian mafic and ultramafic rocks, serpentinete, gabbro and dark dioritic rocks; may be Mesozoic in part. Includes Trinity Ophiolite.
SO1, SO2	Ordovician to Devonian sandstone, shale, conglomerate, chert, slate, quartzite, hornfels, marble, dolomite and phyllite. Includes Al Rose Formation, Badger Flat Limestone, Barrel Spring Formation, Ely Springs Dolomite, Eureka Quartzite, Hidden Valley Dolomite, Johnson

	Spring Formation, Pogonip Group, Sunday Canyon Formation, Vaughn Gulch Limestone, Buzztail Spring Formation, Hilton Creek Marble, part of Convict Lake Formation, part of Mount Aggie Formation, part of Mount Morrison Sandstone, Aspen Meadow Formation, Squares Tunnel Formation. Formation, Bright Dot Formation, Mt. Baldwin Marble.
C	Ordovician to Permian shale, sandstone, conglomerate, limestone dolomite, chert, hornfels, marble, and quartzite. Includes Aspen Meadow Formation, Mount Morrison Sandstone, part of Squares Tunnel Formation Rest Spring Shale, Keeler Canyon Formation, Mexican Spring Formation, Leaning Rock Formation, Kearsage Formation, Furnace Limestone, Monte Cristo Limestone, part of Zabriskie Quartzite, Oro Grande Series, Bird Spring Formation, Nopah Formation, part of Bonanza King Formation, Anvil Spring Formation, Stone Canyon Formation, Indian Springs Formation, Perdido Group, Santa Rosa Hills Limestone, Tihvipah Limestone, Baird Formation, Bragdon Formation and upper part of Peale Formation,
D1	Devonian limestone, dolomite, sandstone and shale; in part tuffaceous. Includes Sultan Limestone, Lost Burro Formation, Nevada Formation and Devils Gate Limestone.
PZv1	Devonian to Permian metavolcanic rocks, mostly flows, breccia and tuff, greenstone, diabase, and pillow lavas.
Mv1	Possibly Ordovician to Permian metavolcanic rocks, includes latite, dacite and tuff and greenstone.
P1	Pennsylvanian shale, conglomerate, limestone, dolomite, sandstone, slate, hornfels, quartzite. Includes Owens Valley Group, Anvil Spring Formation, Bird Spring Formation, Bloody Mountain Formation, Kaibab Limestone, Darwin Canyon Formation, Osborne Canyon Formation, Keeler Canyon Formation, Lone Pine Formation, Conglomerate Mesa Formation and Fairview Valley Formation
	Nevada
CZs	Neoproterozoic to Cambrian phyllitic siltstone, quartzite, and lesser amounts of limestone and dolomite. Includes Reed Dolomite, Deep Spring Formation, Campito Formation, Poleta Formation, Harkless Formation and Saline Valley Formation, and Mule Spring Limestone.
CZq	Cambrian quartzite and minor amounts of conglomerate, phyllitic siltstone, limestone, and dolomite; may be Upper Proterozoic in part. Includes Prospect Mountain Quartzite, Osgood Mountain Quartzite, Gold Hill Formation, Stirling Quartzite, Wood Canyon Formation, Zabriskie Quartzite and Stella Lake Quartzite.
Cc	Cambrian limestone, dolomite, shale and siltstone. Includes Pioche Shale, Eldorado Dolomite, Geddes Limestone, Secret Canyon Shale, Hamburg Dolomite, Dunderberg Shale, Windfall Formation, Carrara Formation, Bonanza King Formation and Nopah Formation.
Css	Cambrian sandstone and quartzite, includes Tapeats Sandstone.
OCc, DCc	Cambrian to Devonian dolomite, marble, quarzite and limestone. Includes Goodsprings Dolomite.
Oc	Ordovician limestone, dolomite, shale, and quartzite, includes Pogonip Group, Eureka Quartzite, Ely Springs Dolomite, part of Hales Limestone, Stoneberger Shale.
PZ4	Ordovician slate, sandstone, shale, chert, conglomerate, limestone, dolomite, marble, phyllite, schist, hornfels, and quartzite. Includes Calaveras Complex (part), Shoo Fly Complex (part), Blue Canyon Fm., Briceburg Formation, Cape Horn Slate, Delhi Formation, Hite Cove Fm., Kanaka Formation, Relief Quartzite and Tightner Formation.
Sc	Silurian to Devonian dolomite, includes Laketown Dolomite, Lone Mountain Dolomite, possibly part of Sevy Dolomite and part of Nevada Formation.

Dc	Devonian dolomite, limestone, minor amounts of sandstone and quartzite. Includes Sevy and Simonson Dolomites, Devils Gate Limestone, Wenban Limestone, part of Pilot Shale, Rabbit Hill Limestone, McMonnigal Limestone, Tor Limestone, Sultan Limestone, Muddy Peak Limestone, Guilmette and Nevada Formations.
MDs	Devonian to Mississippian shale, siltstone, sandstone, chert-pebble conglomerate, and limestone. Includes Pilot Shale, Joana Limestone, Chainman Shale, Narrow Canyon Limestone, Mercury Limestone, Eleana Formation, Tonka Formation and Diamond Peak Formation.
PPc	Mississippian to Permian limestone, sparse dolomite, siltstone, and sandstone. Includes Riepe Spring Limestone, Ely Limestone, part of Spring Formation, Bluepoint Limestone, Hogan Formation, Ferguson Mountain Formation, part of Rib Hill Formation, Strathearn Formation and Callville Limestone.
Mc	Mississippian limestone, minor amounts of dolomite and shale. Includes Rogers Spring and Monte Cristo limestones.
Psc	Permian siltstone, sandstone, limestone, dolomite and gypsum, includes Rib Hill Sandstone, Pequop Formation, Loray Formation, Arcturus Formation, Queantoweap Sandstone, Hermit Shale and Coconino Sandstone.
Pc	Permian cherty limestone, sparse dolomite, shale, and sandstone. Includes Park City Group, Nevada, Phosphoria, Murdock Mountain, Grandeur, Plympton and Toroweap Formations, Kaibab Limestone and Gerster Limestone.
Arizona	
Pz	Paleozoic limestone, dolostone, quartzite, shale and other related sedimentary rocks.
Mo	Cambrian to Mississippian sandstone, includes Tapeats Sandstone, Bright Angel Shale, Muav Limestone, Temple Butte Formation, Redwall Limestone, Bolsa Quartzite, Redwall Limestone, Escabrosa Limestone, Abrigo Formation and Martin Formation.
P3	Pennsylvanian to Permian sandstone, shale, and limestone, includes Supai and Naco Group, Hermit Formation and Schnebly Hill formation.
P	Permian cherty limestone, includes Kaibab and Toroweap Formations, and Coconino Sandstone.
New Mexico	
PZ, SO, SOCA, P	Paleozoic sedimentary rocks, undivided.
OCA, OCAp, MCA	Cambrian to Mississipian sandstone, limestone and plutonic rocks. Includes Bliss Sandstone, Lake Valley Limestone, El Paso Formation and Montoya Formation.
D	Devonian shale and limestone. Includes Percha Shale, and Onate and Sly Gap Formations.
PAlc	Carboniferous limestone and shale. Includes Lead Camp Formation.
PA, PAm, PAme	Pennsylvanian sedimentary rocks. Includes Sandia Formation, Madera Limestone, La Pasada, Alamitos, Los Moyos Limestone, Wild Cow Formation, Beeman Formation, Holder Formation and Flechado Formations; elsewhere may include Bar-B, Nakaye, Red House, Oswaldo, and Syrena Formations.
PPA, PPAsc	Pennsylvanian to Permian sandstone and limestone. Includes Horquilla Limestone, Earp Formation, Epitaph Formation, Sangre de Cristo Formation Scherrer Formation, and Concha Limestone.
PAps	Pennsylvanian sandstone and limestone. Includes Panther Seep Formation.
PAs	Pennsylvanian sandstone and shale. Includes Sandia Formation and Osha Canyon Formation.

M, MD	Mississippian limestone. Includes Arroyo Penasco Group, Lake Valley Limestone, Caballero Formations, Las Cruces Formations, Rancheria Formations, Onate Formations, Sly Gapa Formations, Contadero Formation, Helms shale and Escabrosa Group.
Pgq	Guadalupian sandstone, gypsum, anhydrite, dolomite and red mudstone. Includes Grayburd and Queen Formations.
Psr	Guadalupian gypsum, anhydrite, salt, dolomite, and siltstone. Includes Seven Rivers Formation.
Pqm, Pqr, Pr, Pay Pty, Pa, Pal, Pau	Permian sandstone, siltstone, limestone, dolomite mudstone and dolostone. Includes Quartermaster, Yates, Tansill, Abo, Yeso and Rustler Formations.
Psl	Permian evaporite and sandstone. Includes Salado Formation.
Pat	Permian sandstone and dolostone. Includes Artesia Group, and Grayburg, Queen, Seven Rivers, Yates and Tansill Formations
Pb	Permian shale and sandstone. Includes Bursum Formation.
Pbc, Pcc	Permian sandstone, limestone and shale. Includes Bell Canyon and Cherry Canyon Formations.
Pc	Permian evaporie and limestone. Includes Castile Formation.
Pco	Permian shale. Includes Cutoof Shale.
Pcp	Permian limestone. Includes Capitan formation.
Pct, Pg	Permian sandstone and limestone. Includes Cutler Formation and Glorieta Sandstone
Ph	Permian limestone, shale and conglomerate. Includes Hueco Formation
Psa, Psg, Py, Pys	Permian limestone, siltstone gypsum, sandstone, and dolomite. Includes San Andres Formation and Glorieta Sandstone.
Pvp	Permian Victorio Peak Limestone.
	Oklahoma
Cat, Cb, Cbf, Cth	Cambrian limestone, dolomite, siltstone, sandstone, conglomerate, and shale. Includes lower part of Arbuckle Group and Timbered Hills Group, Butterfly Dolomite, Signal Mountain Limestone, Royer Dolomite and Fort Sill Limestone.
Cr	Cambrian gabbro, anorthosite, and diorite, includes Raggedy Mountain Gabbro Group.
Ccr, Cp	Cambrian rhyolite, conglomerate and diorite. Includes Carlton Rhyolite Group, and Colbert Porphyry.
Cwg, d	Cambrian granite and diorite sill. Includes Wichita Granite Group.
Oc	Cambrian to Ordovician shale and phyllite, includes Collier Shale.
Ob	Ordovician Blakely Sandstone.
Ocm, Ok	Ordovician limestone and dolostone, includes Kindblade Formation, Cool Creek Formation McKenzie Hill Formation.
Ocs	Ordovician sandstone and conglomerate, includes Crystal Mountain Sandstone
Om, Op	Ordovician shale and phyllite. Includes Mazarn Shale and Polk Creek Shale.
Ooj, Osfv	Ordovician limestone and shale. Includes Simpson Group, Oil Creek, Joins Formation, Sylvan Shale, Fernvale Limestone and Viola Limestone.
Obf, Obm	Ordovician chert, shale and limestone. Includes Bigfork Chert, Bromide, Tulip Creek and McLish Formations.
Oua	Ordovician limestone and dolomite. Includes Upper part of Arbuckle Group.
Ow	Ordovician sandstone and phyllite. Includes Womble Formation.

Owk, Ows	Ordovician West Spring limestone and dolostone. Includes Creek and Kindblade Formations.
Sb	Silurian sandstone and shale. Includes Blaylock Sandstone.
Sm, Smb, SmOp	Silurian shale, sandstone and phyllite. Includes Missouri Mountain Shale, Blaylock Sandstone and Polk Creek Shales.
DSh	Silurian to Devonian shale and limestone. Includes Hunton Group.
Da	Devonian novaculite and shale. Includes Arkansas Novaculite.
IPm, IPmh, IPn, IPnh, IPnw, IPf, IPjv, IPol	Pennsylvanian shale, limestone and sandstone. Includes McAlester Formation, Hartshorne Formation, Nellie Bly Formation, Hogshooter Limestone, Nowata Formation, Jackfork Sandstone and Johns Valley Formation and Oolagah Formation
IPsa, IPse, IPsl, IPst, IPta, IPth, IPsm, IPsma, IPsmh, IPto, IPw, IPto, IPwe, IPwi	Pennsylvanian shale and sandstone. Includes Savanna Formation, Senora Formation, Seminole Formation, Stuart Shale, Tallant Formation and Thurman Sandstone, Savanna Formation and McAlester Formation, Torpedo Formation, Wewoka Formation, Wetumka Shale, Wann Formation and Iola Formation
IPo	Pennsylvanian shale, limestone and sandstone. Includes Oscar Group.
IPwal, IPwas	Carboniferous shale and sandstone. Includes Wewoka Formation.
IPul, IPus	Pennsylvanian limestone and sandstone. Includes Union Valley formation.
IPwa, Ipwc, IPv, IPva	Pennsylvanian limestone, sandstone and shale. Includes Wapanucka Formation, Vamoosa Group and Chickachoc Chert.
Md	Mississippian Delaware Creek Shale.
Msw	Mississippian Sycamore and Welden Limestones.
Mkr	Mississippian chert and limestone. Includes Keokuk and Reeds Spring Formations, and St. Joe Group.
Mp, Mpfh, Mst, Mu	Mississippian limestone, sandstone and shale. Includes Sycamore and Welden Limestones, Pitkin, Fayetteville, Hindsville, Batesville and Moorefield Formations, and Stanley Group.
Mg	Mississippian shale and sandstone. Includes Goddard Shale.
Pb, Pbe, Pbv, Per	Permian evaporate and shale. Includes Blaine Formation, El Reno Group
Pbi, Pch, Pd, Psp, Pu, Pw	Permian shale and sandstone. Includes Bison Formation, Cedar Hill Sandstone, Duncan Sandstone,and Salt Plains and Wellington Formations
Pc	Permian conglomerate and shale. Includes Chickasha Formation.
Pcc, Phy, Pf, Pfa	Permian shale and siltstone. Includes Cloud Chief Formation, Hennessey Group, Flowerpot Shale and Fairmont Shale.
Pdc, Pdy, Pec	Permian shale, sandstone and siltstone. Includes, Dog Creek Shale, Doxey Formation and Elk City Sandstone.
Pg, Psa	Permian sandstone and conglomerate. Includes Garber and San Angelo Sandstones.
Pk, Pm, Pmd, Pmv	Permian siltstone and sandstone. Includes Kingman, Doe Creek Lentil, Verden Sandstone Lentil, Marlow Formation
Pp, Ppo	Permian sandstone, conglomerate and shale. Includes Purcell Sandstone and Post Oak Conglomerate.
Pr, Prw	Permian sandstone, evaporite, and shale. Includes Rush Springs Formation.
Pwh	Permian sandstones and siltstones of the Whitehorse Group.

Texas

pCvh	Cambrian conglomerate, shale, sandstone, limestone, dolomite, and quartzite. Includes Van Horn Sandstone
Cpw, Cs, Ch, Clc	Cambrian sandstone and conglomerate. Includes Moore Hollow Group, Wilberns Formation, Riley Formation, Cap Mountain Limestone and Hickory Sandstone Member.
O, OC	Ordovician shale, limestone and sandstone. Includes Woods Hollow Shale, Fort Pena Formation, Alsate Shale, Marathon Limestone, and Dagger Flat Sandstone.
OCe	Ordovician limestone, dolostone and sandstone. Includes El Paso Formation and Bliss Sandstone.
Og, Oh, Ot	Ordovician limestone and dolostone. Includes Ellenberger Group, Gorman Formation, Tanyard Formation and Honeycut Formation.
Om, Ob	Ordovician dolomite, limestone and sandstone. Includes Montoya Dolomite, Aleman Chert Member, Upham Member, Cable Canyon Sandstone Member and Burnam Limestone.
Sf	Silurian dolostone and limestone. Includes Fusselman Dolomite.
MDO, MDc	Mississippian novaculite and limestone. Includes Maravillas Formation, Caballos Novaculite, Maravillas Formation, Woods Hollow Shale, Fort Pena Formation, and Marathon Limestone.
MDh	Mississippian limestone and shale. Includes Helms Shale, Rancheria Formation, Las Cruces Limestone, Percha Shale, and Canutillo Formation.
IPMt	Mississippian to Pennsylvanian sandstone, chert, arkose and conglomerate. Includes Tesnus Formation.
MD	Mississippian to Permian limestone. Includes Barnett Formation, Chappel Limestone, Houy, Zesch, Bear Spring, and Stribling Formations, and Pillar Bluff Limestone.
IPd	Pennsylvanian limestone and shale. Includes Dimple Formation.
Ph, IPbr, IPst	Pennsylvanian sandstone and conglomerate. Includes Haymond Formation, Strawn Group and Brazos River Formation..
IPgt, IPci	Pennsylvanian sandstone, limestone and conglomerate. Includes Gaptank Formation, Mineral Wells Formation and Cienequita Formation.
IPcr	Pennsylvanian limestone. Includes Graford Formation and Chico Ridge Limestone.
IPhc	Pennsylvanian shale, limestone, sandstone. Includes Canyon Group, Salem School Limestone, Kisinger Sandstone, Cundiff Limestone, Home Creek Limestone and Colony Creek Shale.
IPlb, IPm, IPmf	Pennsylvanian shale, sandstone and limestone. Includes Strawn Group, Meek Bend Limestone, Dennis Bridge Limestone, Kickapoo Falls Limestone Goen Limestone, Dobbs Valley Sandstone, Santo Limestone, Mingus Formation, Marble Falls Limestone and Lazy Bend Formation.
IPjc	Pennyslvanian shale. Includes Jasper Creek Formation
PIPm, IPca	Pennsylvanian limestone and shale; may be Permian in part. Includes Magdalena Formation, Cedarton Shale and Adams Branch Limestone
IPpp, IPm	Pennsylvanian sandstone and shale. Includes Wiles Limestone, Oran Sandstone and Palo Pinto Formation.
IPr, IPrp, IPu, IPv, PPw, IPmw, IPgr, IPsw	Pennsylvanian limestone, shale, and sandstone. Includes Canyon Group, Merriman Limestone, Staff Limestone, Ventioner Formation, Winchell Limestone, Wolf Mountain Shale, Ranger Limestone, Placid Creek Shale, Grindstone Creek Formation, Eastland Lake Formation, Parks Lake Formation and Smithwick Formation.
IPwp	Pennsylvanian limestone. Includes Willow Point Formation.

IPcn, IPtg	Upper Pennsylvanian limestone, shale and conglomerate. Includes Home Creek Limestone, Salem School Limestone, Kisinger Sandstone, Colony Creek Shale, Cundiff Limestone, Ranger Limestone, Thrifty Formation and Graham Formation, and Placid Shale Canyon Group.
Pac	Permian mudstone, sandstone and mudstone. Includes Cisco Group, Bowie Group, and Archer City Formation.
Pbg	Permian dolostone. Includes Briggs Formation
IPd, IPj, Pad	Permian shale, sandstone, mudstone and limestone. Includes Albany Group, Wichita Group Overall Limestone, Hords Creek Limestone, Coleman Junction Formation and Admiral Formation.
Pb	Permian mudstone, evaporite and dolostone. Includes Pease River Group, Guthrie Dolomite, Acme Dolomite, Mangum Dolomite and Blaine Formation.
Pbb, Pbc	Permian sandstone, limestone and siltstone. Includes Bell Canyon, Cherry Canyon, and Brushy Canyon Formation.
Pbe, Pcj, Pec, Pgc, Pjv, Plu, Pta, Pwr.	Permian shale, mudstone and limestone. Includes Albany Group, Wichita Group; Rendham Limestone, Beaverburk Limestone, Coleman Junction Formation, Elm Creek Formation, Grape Creek Formation, Jagger Bend Formation, Valera Formation, Lueders Formation, Talpa Formation, Waggoner Ranch Formation and Bead Mountain Formation.
Pbr, Pw	Permian sandstone, limestone and shale. Includes Brushy Canyon Formation, Pipeline Shale Member, Vidrio Limestone, Appel Ranch, China Tank Members and Word Formation.
Pbs, Pc	Permian limestone, dolomite, sandstone, and shale. Includes Bone Spring Formation and Capitan Formation.
Pcb, Psr, Pt, Py	Permian limestone, sandstone, dolostone and siltstone. Includes Carlsbad Group; Tansill, Yates, Seven Rivers Formations.
Pcc	Permian sandstone, siltstone and limestone. Includes Cherry Canyon Formation.
Pcf	Permian mudstone, sandstone and dolostone. Includes Clear Fork Group, Merkel Dolomite, Bullwagon Dolomite and Lytle Limestone.
Pcl	Permian gypsum (evaporite), shale and sandstone. Includes Cloud Chief Formation.
Pcm, Pci	Permian shale, chert and limestone; conglomerate. Includes Cathederal Mountain and Cibolo Formations.
Pco	Permian shale and siltstone. Includes Cutoff Formation.
Pd	Permian sandstone and evaporite, includes Dewey Lake Red beds.
Pgs	Permian limestone and sandstone. Includes Goat Seep Formation.
Ph	Permian limestone, sandstone, shale and dolostone. Includes Hueco Limestone, Alacran Mountain Formation, Upper member of Alacran Mountain Formation, Deer Mountain Red Shale Member, Cerro Alto Limestone, Hueco Canyon Formation, Powow Conglomerate Member.
Pln	Permian shale, limestone and siltstone. Includes Lenox Hills and Neal Ranch Formations.
Pm, Pmg	Permian dolomite, limestone, siltstone, and sandstone. Includes Munn and Mina Grande Formations.
Pmo, PIPma, Ppu, Pse, Psm, PIPh	Permian mudstone, limestone and sandstone. Includes Cisco Group, Bowie Group, Sedwick limestone, Watts Creek shale and sandstone, Brekenridge Limestone, Santa Anna shale, Sedwick limestone, Moran Formation, Virgil Series, Newcastle Coal, Crystal Falls Limestone, Pueblo Formation and Harpersville Formation.

Pp, Pn	Permian sandstone and mudstone. Includes Petrolia and Nocona Formations.
Ppc	Permian limestone, siltstone and chert. Includes Pinto Canyon Formation.
Pq, Pqw, Pwb, Pwh	Permian shale, siltstone, sandstone, gypsum, and dolomite. Includes Whitehorse Group; Quartermaster Formation, Blaine Formation, Claytonville Dolomite, Eskota Gypsum and Childress Dolomite.
Prc, Psc	Permian evaporate. Includes gypsum of Rustler, Salado, and Castile Formations.
Pru	Permian limestone, siltstone, gypsum, and clay. Includes Rustler Formation.
Psa	Permian mudstone, sandstone, siltstone, and gypsum. Includes Pease River Group; San Angelo Formation.
Psh, Pts, Pvc	Permian limestone, dolostone and conglomerate. Includes Hess Limestone, Tessey Limestone, Skinner Ranch formation
Pss, Psb, Pr	Permian mudstone, shale and sandstone. Includes Santa Anna Branch Shale and Sedwick, Ross Mine Formation and Moran Formations.
Pwi	Permian marlstone, limestone and conglomerate. Includes Wilke Ranch Formation.
Pa	Permian sandstone and shale. Includes Alta Formation

3. Triassic rocks

Mexico

Abrev.	Description
	Baja California Norte
TriMs, TRsJmMS	Triassic metasedimentary rocks. Includes El Indio and Rancho Vallecitos Formations.
TRsCM,	Triassic Metamorphic Complex. Includes Franciscaino Complexes.
TRJi(?)Gn-E, TRsJm(?)E-Gn	Triassic and Jurassic gneiss and schist of various types.
	Baja California Sur
TRs(?)E, TRs(?)E-MGa, TRsSe	Trassic schist, serpentinite and metagabbro.
TRsDi, TRsGa	Triassic intrusive rocks, mainly gabbro and diabase.
TRsJi-Cz-Ar	Triassic and Jurassic limestone and sandstone. Includes San Hipolito Formation.
	Sonora
TRJiLu-Cz, TRmAr-Cz	Triassic sandstone and limestone. Includes Tepahui Formation.
TRsAr-Cgp, TRsAr-Lu	Triassic sandstone, lutite and conglomerate. Includes Barranca Group.
TRsGr	Undivided Triasic intrusive rocks, mainly granite.
	Chihuahua

TRJmAr-Cgp, TRJmCgp	Triassic and Jurassic sandstone and polymictic conglomerate. Includes Samalayuca Formation.
	Zacatecas
TRsAr-Lu	Upper Cretaceous sandstone and lutite. Includes Zacatecas Formation.
	Nuevo León/Tamaulipas
TRsJiAr-Lm	Triassic and Jurassic sandstone and limolite. Includes Huizachal Formation.

US

Abrev.	Description
	California
sch1	Triassic(?) schist, quartzite, gneiss, amphibolite, marble, conglomerate and metavolcanic rocks. Includes Julian Schist.
grPZ2	Triassic intrusive rocks. Includes Mount Lowe Granodiorite and Parker Quartz Diorite.
TR1, TR6	Triassic to Jurassic shale, conglomerate, limestone, dolomite, sandstone, slate, hornfels and quartzite. Includes Butte Valley, Chinle, Moenkopi, Silver Lake, Soda Mountain, Union Wash and Warm Spring Formations.
	Nevada
TRmt	Lower Triassic to Middle Triassic shale, siltstone, limestone, and sparse conglomerate. Includes Moenkopi Formation, Thaynes Formation and Dinwoody Formation.
TRch	Upper Triassic claystone, siltstone, sandstone, gypsum, conglomerate and limestone. Includes Chinle Formation: Timothy Sandstone and Nugget Sandstone.
	Arizona
TRm	Lower and Middle(?) Triassic sandstone, mudstone, siltstone, claystone, arenite, and gypsum. Includes Moenkopi Formation.
TRsc, TRc	Upper Triassic conglomerate, sandstone, mudstone, calcarenite, limestone, siltstone and claystone. Includes Chinle Formation.
	New Mexico
TR	Triassic continental red beds.
TRb, TRc, TRm	Triassic mudstone, sandstone and conglomerate. Includes Chinle Group; Bull Canyon Formation.
TRc, TRm	Triassic sandstone, limestone, conglomerate, chert and evaporate. Includes Moenkopi Formation and Chinle Group.
TRcu, TRr, TRt, TRg, TRg, TRs	Triassic sandstone, mudstone and limestone. Includes Upper Chinle Group; Garita Creek, Trujillo, Bull Canyon and Redonda Formations.
TRrp	Triassic sandstone and siltstone. Includes Rock Point Formation of Chinle Group; may locally include Lukachukai Member of Wingate Sandstone.
	Oklahoma
TRd	Upper Triassic shale, siltstone, limestone, conglomerate and sandstone. Includes Dockum Group.
	Texas
TRc	Upper Triassic shale, siltstone, sandstone, limestone and mudstone. Includes Chinle Formation.

TRd, TRj, TRv	Upper Triassic sandstone, shale, limestone and conglomerate. Includes Dockum Group, Santa Rosa Formation, Tecovas Formation, Trujillo Formation and Chinle Formation.

4. Jurassic rocks

Mexico

Abrev.	Description
	Baja California Norte
TRsJiCM	Triassic and Jurassic Metamorphic Complex. Cedros Metamorphic Complexes.
JimA-BvA	Jurasic extrusive rocks, mainly andesite. Includes Choyal Formation.
JsMCz-Pz, JsMV	Jurassic metamorphic rocks of various types and ages.
JmsAr-Cgp,	Jurassic sedimentary rocks, mainly sandstone and conglomerate. Includes Coloradito Formation.
	Baja California Sur
J(?)MS	Jurassic metamorphic rocks of various types and ages. Includes El Batamote Metamorphic Complex.
JiMDi-MDa, JmsMV	Jurassic metaigneous and metavolcanic rocks.
Jm-sA	Jurassic extrusive rocks, mainly andesite. Includes San Andres Volcanic-Plutonic Complex.
JsGa, JsGr, JsTn	Jurassic intrusive rocks, mainly granite, tonalite and gabbro.
	Sonora
TRs(?)MAr-MLu JiAr-Cgp, JiAr-Lm.	Triassic to Jurassic sedimentary and metasedimentary rocks, mainly sandstone, limolite and conglomerate. Includes Antimonio Formation.
Ji?R-Ar, JimR-Ar	Jurassic extrusive with sedimentary rocks, mainly andesite, sandstone. Includes Pinito Rhyolite.
JiA-Ar	Lower Jurassic extrusive with sedimentary rocks, mainly andesite, sandstone. Includes Sierra de Santa Rosa Formation.
JiCz-Ar	Lower Jurassic limestone and sandstone. Includes Caracahui Formation
Jm(?)Gd, JmGr, JsGr-Gd	Jurassic intrusive rocks, mainly granodiorite amd granite.
Jm(?)MS, Jm?E-MAr	Jurassic metamorphic rocks of various types and ages. Includes El Batamote Metamorphic Complex.
Jm(?)MV-MS, JsMs	Jurassic metavolcanic and metasedimentary rocks.
Jm?E-MCz, Jm?E-Gn, Jm?E-C	Jurassic metamorphic complex. Inlcude Santa Ana Metamorphic Complexes.
JmE-MV	Jurassic schist and metavolcanic rocks. Includes Coyotillo Group.
Js(?)Vs	Jurassic volcanosedimentary rocks.
JsA-Ar	Upper Jurassic extrusive with sedimentary rocks, mainly andesite and sandstone. Includes Chino Group.

JsAr-Lm	Upper Jurassic sandstone and limolite. Includes Dos Naciones Formation.
JsAr-Lu, JsLu-Ar	Upper Jurassic sandstone and lutite. Includes Cucurpe and La Colgada Formations
JsKiCgp-Ar	Upper Jurassic conglomerate and sandstone. Includes Glance Conglomerate.
JtKaVs	Lower Jurassic and Lower Cretaceous volcanosedimentary rocks.
	Chihuahua
PpiLm-Cgp	Jurassic limolite and polymictic conglomerate, includes Plomosas Formation.
TRmJiTA	Triassic volcanic rocks. Includes Nazas Formation.
JoAr-Cz, JsAr	Jurassic limestone and sandstone. Includes La Gloria Formation.
Js(?)Mar-MLu	Upper Jurassic metasedimentary rocks, undivided.
JsKnCgp-Ar	Upper Jurassic conglomerate and sandstone. Includes Glance Conglomerate.
JsLu-Ar, JkpoCz-Lu, JkpoAr-Lu	Upper Jurassic limestone, lutite and sandstone. Includes La Casita Formation.
	Sinaloa
Jm-sMA-MT	Jurasic metavolcanic rocks. Includes Borahui Complex
JtMAr-Pz	Jurassic metasedimentary rocks.
JtKaVs	Upper Jurassic and Lower Cretaceous volcanosedimentary rocks.
	Durango
TRJ(?)MV, TRmJiA-MLu, TRmJiMV, TRmJiMV-Cgp	Triassic and Jurassic volcanic and metavolcanic rocks. Includes the igneus part of the Nazas and Rodeo Formations.
Ji(?)MV-F	Jurassic pyllite and metavolcanic rocks.
JtMAr-Pz	Jurassic slate and metasedimentary rocks.
JsD	Jurassic intrusive rocks, mainly diorite. La Parrita-El Cuarenta Batholith.
JoAr-R, JoC-Cz	Jurassic sandstone, quartzite, limestone and rhyolite. Includes La Gloria Formation
JokCz-Ar	Upper Jurassic limestone and lutite. Includes La Caja Formation and Zuloaga Limestone.
JktMg-Lu, JtPz-Cz, JtAr-Lu	Upper Jurassic and Cretaceous limestone, sandstone, lutite and slate. Includes La Casita Formation.
	Coahuila
TRJ(?)	Triassic and Jurassic metavolcanic rocks. Includes part of Nazas Formation.
JokCz-Ar	Upper Jurassic limestone and sandstone. Includes La Gloria Formation
JokY-Cz	Upper Jurassic limestone and gypsum. Includes Olvido Formation.
JotCz-Lu, JtLu-Lm, JtLu-Cz, JtLm-Cz, JokCz, JokCz-Y	Upper Jurassic limestone, gypsum, limolite and lutite. La Caja Formation and Zuloaga Limestone.
JtLu-Ar, JtAr, JsCz-Lu	Upper Jurassic sandstone, limestone and lutite. Includes La Casita Formation.
JcoY, JsY-Lu	Upper Jurassic gypsum and lutite. Includes Minas Viejo Formation.
	Zacatecas

TRmJiMGr, TRmJiMV, TRsJiA-Lm	Triassic and Jurassic metagranite, volcanic and metavolcanic rocks. Includes Nazas and Rodeo Formations.
Jm(?)PA	Jurassic porphyry andesite.
JmCgp-Ar	Jurassic polymictic conglomerate. Includes La Joya.
JokCz, JotCz-Lu, JtLm-Cz, JtLu-Lm, JoCz, JsLm-Cz	Jurassic limestone and limolite. Includes La Caja Formation and Zuloaga Limestone.
JtAr	Jurassic sandstone. Includes La Casita.
Nuevo León	
JcoY, JsY-Lu	Jurassic gypsum and lutite. Includes Minas Viejo Formation.
JokCz	Upper Jurassic limestone. Includes Zuloaga Limestone.
JokY-Cz, JokY-Do	Upper Jurassic limestone and gypsum. Includes Olvido Formation.
JtCz-Lu	Upper Jurassic limestone and lutite. Includes Pimienta Formation.
JtLm-Cz, JtLu-Ar	Upper Jurassic limolite and limestone. Includes La Caja and La Casita Formations.
San Luis Potosí	
TRsLmCgp, TRmJiMV	Triassic to Jurassic limolite and polymictic conglomerate. Includes part of Nazas and Rodeo Formations.
JokCz, JsCz	Upper Jurassic limestone. Includes Zuloaga Limestone.
JsLm-Cz	Jurassic limestone and limolite. Includes La Caja Formation
JsCgp	Upper Jurassic polymictic conglomerate. Includes La Joya Formation.
Tamaulipas	
TRmJiMV	Triassic metavolcanic rocks. Includes part of Nazas and Rodeo Formations.
JtLu-Ar	Upper Jurassic lutite and sandstone. Includes La Casita Formation.

US

Abrev.	Description
California	
J1	Triassic to Upper Jurassic shale, sandstone, minor conglomerate, chert, slate and limestone. Includes Agua Fria Formation, Colfax Formation, Cosumnes Formation, Galice Formation, Hunter Valley Cherts, Mariposa Formation, Merced Falls Slate, Salt Spring Slate and Jasper Point Formation.
GrpCA3	Upper Triassic to Jurassic granite. Includes Echo Granite.
J4	Paleozoic(?) to Upper Jurassic shale, sandstone, conglomerate, chert, slate and limestone, Includes Bedford Canyon Formation, Santa Monica Slate and French Valley Formation.
MZv3	Triassic to Cretaceous andesite, rhyolite, greenstone, volcanic breccia (in part metamorphosed). Includes Inyo Mountains Volcanic Complex, Sidewinder Volcanic Series, Warm Spring Formation, Soda Mountain Formation and Ord Mountain Group.

mv2	Pre-Cenozoic andesite, basalt, greenstone, amphibolite and gabbro. Includes Hodge Volcanic Series, Franklin Canyon Formation (in part) and Slate Creek Complex (in part).
MZv2	Jurassic volcanic and metavolcanic rock. Includes Copper Hill Volcanics, Gopher Ridge Volcanics, Logtown Ridge Formation, Mariposa Formation (part), Monte de Oro Formation, Oregon City Formation, Peaslee Creek Volcanics, Penon Blanco Formation, Brower Creek Volcanic Member of Mariposa Formation, Smartville Complex.
Sch9	Jurassic(?) Gneiss, schist, quartzite, marble and amphibolite. Includes Tumco and Vitrefrax Formations.
Gb2	Triassic to Cretaceous gabbro and diorite. Includes Cuyamaca Gabbro, Elk Creek Gabbro, Gold Park Gabbro-Diorite, San Marcos Gabbro and Summit Gabbro.
Sch3	Jurassic metavolcanics rocks, greenschist, chert, sandstone, diorite and tonalite. Includes Santa Cruz Island Schist.
	Nevada
JTRa	Lower Jurassic non marine rocks. Includes Aztec sandstone.
Jgr	Jurassic igneous rocks, mainly quartz monzonite, granodiorite, granite, monzonite quartzdiorite
	Arizona
MZPZ	Cambrian to Jurassic metamorphosed sedimentary rocks
JTR	Triassic to Jurassic rhyolite, sandstone, phyllite, metarhyolite, orthoquartzite, rhyolite and conglomerate. Includes Planet Volcanics and Vampire Formation.
Jgc	Lower Jurassic mudstone, mudstone, siltstone, orthoquartzite and sandstone. Includes Glen Canyon Group, Kayenta and Moenave Formations.
Jv	Jurassic rhyolite, metarhyolite, conglomerate, dacite, quartz-feldspar schist, sandstone, arenite, arkose, granite, porphyry, meta-conglomerate, orthoquartzite and quartzite. Includes Ali Molina Formation, Topawa Group, Mount Wrightson Formation, Canelo Hills Volcanics, Cobre Ridge Tuff, Black Rock volcanics and Planet Volcanics.
Jg	Jurassic granodiorite, granite, diorite, pegmatite, leucogranite, aplite, granodiorite, porphyry, quartz monzonite, syenite and hornblendite. Includes Kitt Peak-Trigo Peaks and Ko Vaya superunits.
Jsv	Jurassic sandstone, conglomerate, rhyolite, schist, arenite, basalt, hornfels, latite, limestone and quartzite. Includes Gardner Canyon Formation, Rudolfo Redbeds, Recreation Redbeds, Topawa Group, Artesa sequence, Harquar Formation, Pitoikam Formation and Mulberry Wash volcanics.
Js	Middle to Upper Jurassic sandstone, siltstone, bentonite, mudstone, conglomerate, limestone, dolostone, orthoquartzite and gypsum. Includes San Rafael Group: Carmel Formation and Entrada Sandstone.
Jm	Upper Jurassic mudstone, sandstone, siltstone and conglomerate. Includes Morrison Formation.
	New Mexico
J	Jurassic clastic sedimentary rocks.
Je	Jurassic sandstone. Includes Entrada Sandstone of San Rafael Group.
Jm	Jurassic sandstone and limestone. Includes Morrison Formation.
Jmsu	Jurassic limestone and other sedimentary rocks. Includes Morrison Formation and upper San Rafael Group.

Jsr, Jz, Jze	Jurassic shale, sandstone and limestone. Includes San Rafael Group: Entrada Sandstone, Todilto and Summerville Formations, Bluff Sandstone, and locally Zuni Sandstone.
	Oklahoma
Je, Jm	Upper Jurassic sandstone. Includes Entrada Sandstone and Morrison Formation.
	Texas
Jm, Jmo	Upper Jurassic limestone, shale, siltstone, sandstone and conglomerate. Includes Malone and Morrison Formations.

5. Cretaceous Sedimentary

Mexico

Abrev.	Description
	Baja California Norte
Js-KiLu-Ar, JsAr-Cgp	Jurassic and Lower Cretaceous lutite and sandstone. Includes Eugenia Formation.
JsKiLu-Cz	Upper Jurassic to Cretaceous lutite and limestone. Includes Las Cumaras Formation.
KapaCz	Lower Cretaceous sedimentary rocks, mainly limestone. Includes sedimentary part of the Alisitos Group.
KatAr-Cgp, KtCgp-Ar	Cretaceous polymictic conglomerate and sandstone. Includes Valle Group and Redonda Formation.
KcmCgp, KcmLm-Ar	Upper Cretaceus polymictic conglomerate, limolite and sandstone. Includes Rosario Formation.
	Baja California Sur
Js-KiLu-Ar, KiAr-Lu, KsAr-Lu	Upper Cretaceous lutite and sandstone. Includes Eugenia Formation, Valle Group and Asunción Formation.
	Sonora
JsKaCz, JsKaVs	Upper Jurassic and Lower Cretaceous limestone and volcanosedimentary rocks. Includes sedimentary part of the Alisitos Group.
KapAr-Lu	Lower Cretaceous sandstone and lutite. Includes Morita Formation and Bisbee Group.
Ki(?)Lu-Ar, KiCz-Ar	Upper Cretaceous lutite, limestone and sandstone, undivided.
KsAr, KsTpaA-Ar	Upper Cretaceous sandstone and andesite. Includes Charro Group, El Tuli Formation (in part) , Mesa Formation, and Chanate Formation.
KsVs, KsAr-Cgp, Ks(?)Cgp	Upper Cretaceous volcanosedimentary and sedimentary rocks. Includes part of Cabullona Group.
	Chihuahua
JsKaCz, JsKaVs	Upper Jurassic and Lower Cretaceous limestone. Includes sedimentary and volcanosedimentary part of the Alisitos Group.
PpsCgp	Cretaceous polymictic conglomerate. Includes Mojina Formation.

JsKiLu-Cz	Upper Jurassic and Lower Cretaceous lutite and limestone. Includes Las Cumaras Formation.
KbeCz-Y, KnLu-Ar, KbehAr-Lu, KnAr-Lu, KvbAr-Lm	Lower Cretaceous sandstone, limestone and lutite. Includes Navarrete and Las Vigas Formations.
KhbLm-Cgo	Lower Cretaceous limolite and olymictic conglomerate. Includes Puerto Rico Formation.
KapaLu-Ar, KbapCz-Y, KbapCz-Lu, KiCz-Lu, KapaAr, KvapCz-Lu	Lower Cretaceous lutite, limestone, gypsum and sandstone. Includes Cuchillo Group, Agua Salada Formation and Mezcalera Group.
KapaLu-Cz, KapCz-Lu, KnapY-Cz	Lower Cretaceous sanstone, lutite and limestone. Includes Parral, La Virgen and La Peña Formations.
Ka(?)Lu-Ar, KaiCz	Lower Cretaceous limestone, lutite and sandstone. Inlcudes Naranjo Sequence and Tamaulipas Formation.
KaCz, KiCz, KaCz-Do, KaimCz-Lu	Lower Cretaceous limestone, lutite and dolomite. Includes Aurora Group, Benigno Formation, Salmon Peak and Georgetown Formations.
KaCz-Lu, KamsCz-Lu, KaCz-Ar, KaLu-Cz, KasmLu-Cz, KamiCz	Lower Cretaceous limestone and lutite. Includes Kiamichi, Finaly Formations, Benavides, Glen Rose and Walnut Formations.
KiCz-Ar, KsBro	Cretaceous limestone, breccia and sandstone, undivided.
Ki(?)A-Ar	Lower Cretaceous andesite and sandstone. Includes San Francisco Sequence.
KiAr-Cz	Lower Cretaceous sandstone and limestone. Includes Bisbee Group.
KamCz, KasCz, KaceCz, KaceCz-Do	Lower to Upper Cretaceous limestone. Includes Edwards, Loma de Plata, Cuesta del Cura and Aurora Formation.
KaceCz-Lu, KasceCz-Lu, KceCz-Lu, KiLu-Cz	Lower-Upper Cretaceous limestone and lutite. Includes Washita Group.
KsLu-Cz, KceseLu-Ar, KcetLu-Cz, KtCz-Lu	Upper Cretaceous lutite and limestone. Includes Indidura Formation, Ojinaga Formation and Eagle Ford Group.
KsAr-Lu, KseAr, KcomAr-Lu, KcossAr	Upper Cretaceous sandstone and lutite. Includes Mezcala, Parras and San Carlos Formations.
KceCz, KceLu-Cz	Upper Cretaceous limestone. Includes Buda and Del Rio Formation
KtcoAr-Lu	Upper Cretaceous sandstone and lutite. Includes Caracol Formation.
KsscAr-Lu, KcossLu-Cz	Upper Cretaceous sandstone and lutite. Includes Aguja and Austin Formation

KmAr-Cgp, KmCgo	Upper Cretaceous sandstone and polymictic conglomerate. Includes Progreso and Arados Formations.
	Sinaloa
JsKaVs	Upper Jurassic and Cretaceous volcanosedimentary rocks. Includes part of Alisitos Group
Ka(¿)Lu-Ar, KiCz, KsCz-Lu	Cretaceous lutite, limestone and sandstone, undivided.
Ki(?)A-Ar	Lower Cretaceos volcanic and sedimentary rocks, mainly andesite and sandstone. Includes San Francisco Formation.
KiLu-Ar	Lower Cretaceous lutite and sandstone. Includes Bacurato Formation
	Durango
JsKiAr-Lu, JtAr-Cz, KaceCz-Ar	Upper Jurassic and Lower Cretaceous sandstone and lutite. Includes Mezcalera Group.
KhapCz	Lower Cretaceous limestone. Includes Cupido Formation.
KbehCz-Lu, KbevCz-Lu, KnCz	Lower Cretaceous limestone and lutite. Includes Taraises Formation.
KapaCz-Lu, KapaLu-Cz	Lower Cretaceous limestone and lutite. Includes Mezcalera Group, Parral Formation and La Peña Formation.
KbapCz-Lu, KbevCgp-Ar, KvapCz-Lu, KvhAr-Lm	Lower Cretaceous limestone, polymictic conglomerate, limestone and lutite. Includes Mezcalera Group.
Kbece(?)Cz, KiCz-Lm, KisCz-Lu	Lower Cretaceous limestone. Includes Baluarte Formation.
KbeCgp, KbeLm-TA	Lower Cretaceous polymictic conglomerate, limolite and andesitic tuff, undivided.
KapceCz-Lu	Lower-Upper Cretaceous limestone and lutite. Includes Cuesta del Cura and La Peña Formations.
KaCz-Lu	Lower Cretaceous limestone and lutite, undivided.
KaCz-Y	Lower Cretaceous limestone and gypsum. Includes Acatita Formation.
KaceCz	Lower-Upper Cretaceous limestone. Includes Cuesta del Cura and Treviño Formations.
Ki(?)A-Ar, KsCz-Lu, KsscLu-Ar	Cretaceous limestone, lutite, andesite and sandstone, undivided.
KaceCz-Do, KaCz	Lower-Upper Cretaceous limestone and dolomite. Includes Aurora Formation.
KseAr	Upper Cretaceous sandstone. Includes San Carlos Formation
KcessLu-Cz, KsLu-Cz	Upper Cretaceous lutite and limestone. Includes Indidura Formation.
KcossLu-Ar, KseAr-Lu, KtcoAr-Lu	Upper Cretaceous lutite and sandstone. Includes Caracol Formation.
	Coahuila
KbevCz-Lm, KvhCz-Do	Lower Cretaceous limestone, dolomite and limolite. Includes Menchaca and Padilla Formations.

KnCz, KbehCz-Lu, KhapCz, KbapCz	Lower Cretaceous limestone and lutite. Includes Cupido and Taraises Formation
KiCz	Lower Cretaceous limestone. Includes Monclova, Aurora, Cupido and Treviño Formations.
KaceCz, KaceCz-Do, KapceCz-Lu, KatCz-Do	Lower-Upper Cretaceous limestone and dolomite. Includes Cuesta del Cura, El Abra and Treviño Formations.
KhbY-Cz, KhbLu-Cz, KhLu-Ar	Lower Cretaceous gypsum, lutite and limestone. Inclides La Virgen and La Mula Formations.
KbapCz-Ar, KapaCz-Lu, KapCz-Lu	Lower Cretaceous limestone and sandstone. Includes Parritas and La Peña Formations.
KaLu-Cz, KiLu, Ka(i)Cz-Lu	Lower Cretaceous lutite and limestone. Includes Kiamichi, McNight and Glen Rose Formations.
KiAr, KnAr	Lower Cretaceous sandstone. Includes San Marcos Formation.
KaCz-Lu, KaLu	Lower Cretaceous limestone and lutite. Includes Finlay, West Nueces and Edwards Formations.
KaCz-Y	Lower Cretaceous limeston and gypsum. Includes Acatita Formation.
KiCz-Lu	Lower Cretaceous limestone and lutite. Includes Washite Group.
KceCz, KceLu-Cz, KceCz-Lu	Upper Cretaceous limestone. Includes Buda, Baiuco and Del Rio Formations.
KsLu-Cz, KcetLu-Cz, KceseLu-Ar, KcessLu-Cz	Upper Cretaceous lutite and limestone. Includes Eagle Ford and Indidura Formations.
KcossAr-Lu, KseAr-Lu	Upper Cretaceous sandstone and lutite. Includes Caracol Formation.
KcossCz-Lu, KcossLu-Cz, KsCz-Lu	Upper Cretaceous limestone and lutite. Includes Austin Formation.
KsscAr-Lu	Upper Cretaceous sandstone and lutite. Includes Aguja Formation
KcLu-Lm, KsLu-Lm, KsscAr	Upper Cretaceous lutite and limestone. Includes Upson Formation.
KseAr, KssmAr	Upper Cretaceous sandstone. Includes San Carlos Formation.
KcAr-Lu, KsAr-Lm, KcmAr-Lu	Upper Cretaceous sandstone and lutite. Includes San Miguel Formation and Difunta Group (in part).
KcmLu, KcmLu-Ar, KcossCz-Lu, KsLu	Upper Cretaceous (Campanian-Maastrichtian) lutite. Includes Méndez Formation and Parras Lutite.
KmLm-Ar, KmLu-Ar, KsLu-Ar, KsAr-Lu	Upper Cretaceous (Maastrichtian) limolite, lutite and sandstone. Includes Difunta Group (in part), and Escondido and Olmos Formations.
Zacatecas	

KvhAr-Lu	Lower Cretaceous sandstone and lutite. Includes Mezcalera Formation.
KnCz, KhapCz, KhbCz, KiCz	Lower Cretaceous limestone. Includes Cupido and Taraises Formations.
KiCz-Lu, KapceCz-Lu, KbehCz-Lu, KaceCz, KaceCz-Lu	Lower-Upper Cretaceous lutite and limestone. Includes Cuesta del Cura, Taraises and La Peña Formations.
KapCz-Lu	Lower Cretaceous limestone and lutite. Includes La Peña Formation.
KbapCz-Lu, Ka(?)BrCz	Lower Cretaceous limestone, calcareous breccia and lutite, undivided.
KaCz-Y	Lower Cretaceous limestone and gypsum. Includes Acatita Formation.
KcessLu-Cz, KcetCz-Lu, KsCz-Lu	Upper Cretaceous lutite and limestone. Includes Indidura Formation.
KcossAr-Lu, KsAr-Lu, KseAr-Lu	Upper Cretaceous sandstone and lutite. Includes Caracol Formation.
KisAr-Lu, KnAr-Lu, KisCz-Lu, KsscLu-Ar	Upper Cretaceous sandstone, limestone and lutite, undivided.
Nuevo León	
KbehCz-Lu	Lower Cretaceous limestone and lutite. Includes Taraises Formation.
KbeLu-Ar	Lower Cretaceous lutite and sandstone. Includes La Carbonera Formation.
KiCz, KhapCz, KaCz	Lower Cretaceous limestone. Includes Tamaulipas, Cupido, Monclova and Aurora Formations.
KiCz-Lu, KapCz-Lu, KatCz-Do	Lower Cretaceous limestone and lutite. Includes Cuesta del Cura, El Abra and La Peña Formations.
KaceCz-Lu	Lower-Upper Cretaceous limestone and lutite. Includes Cuesta del Cura Formation and Washita Group.
KiLu	Lower Cretaceous lutite. Includes Kiamichi Formation.
KcetLu-Cz, KsLu-Cz	Upper Cretaceous lutite and limestone. Includes Eagle Ford Group.
KcossAr-Lu, KsAr-Lu, KcmAr-Lu	Upper Cretaceous sanstone, limestone and lutite. Includes Caracol Formation and Difunta Group (in part).
KsCz-Lu, KcossCz-Lu	Upper Cretaceous limestone and lutite. Includes Austin and Indidura Formation.
KcossLu-Ar, KcossLu-Cz	Upper Cretaceous limestone and lutite. Includes Parras and San Felipe Formations
KcLu-Lm, KsLu-Lm	Upper Cretaceous lutite and limolite. Includes Upson Formation.

KcmLu, KcmLu-Mg, KsLu	Upper Cretaceous lutite. Includes Méndez Formation.
KmLm-Ar, KmLu-Ar	Upper Cretaceous lutite, limolite and sandstone. Includes Escondido and Olmos Formations.
	San Luis Potosí
KbehCz-Lu	Lower Cretaceous limestone and lutite. Includes Taraises Formation.
KatCz-Do	Lower-Upper Cretaceous limestone. Includes El Abra Formation.
KceCz	Lower-Upper Cretaceous limestone. Includes Buda Formation
KapCz-Lu	Upper Cretaceous limestone and lutite. Includes La Peña Formation.
KaceCz-Lu, KsCz, KtCz	Upper Cretaceous limestone and lutite. Includes Cuesta del Cura and Tamasopo Formations.
KsLu-Ar	Upper Cretaceous lutite and sandstone. Includes Cardenas Formation.
	Tamaulipas
KhapCz, KiCz	Lower Cretaceous limestone. Includes Cupido and Tamaulipas Formations.
KiCz-Lu, KaceCz, KatCz-Do	Lower-Upper Cretaceous limestone and lutite. Includes El Abra, Cuesta del Cura and Tamaulipas Formations.
KcossCz-Lu	Upper Cretaceous limestone and lutite. Includes San Felipe Formation.
KcmLu-Ar, KcmLu-Mg	Upper Cretaceous lutite and sandstone. Includes Cardenas and Méndez Formation.

US

Abrev.	Description
	California
J2	Upper Jurassic to Lower Cretaceous shale, sandstone, minor conglomerate, chert, slate, limestone and minor pyroclastic rocks. Includes Knoxville Formation, Great Valley Sequence (in part), Stony Creek Formation (in part) and Elder Creek terrane (in part).
K?1	Middle Jurassic(?) to Upper Cretaceous sandstone, shale, and conglomerate, includes McCoy Mountains Formation.
KJf1	Jurassic to Cretaceous sandstone, shale, chert, limestone, and conglomerate. Includes Franciscan Complex; Dothan Formation, Honda Formation, San Luis Formation, Valentine Spring Formation (in part), Yolla Bolly terrane, Central terrane and San Simeon terrane.
KJfm	Jurassic to Cretaceous Franciscan complex rocks.
Kl	Lower Cretaceous sandstone, shale and conglomerate. Includes Espada Formation, Horsetown Formation, Marmolejo Formation, Ono Formation, Paskenta Formation, Rector Formation, Shasta Series, Toro Formation, Wisenor Formation, Great Valley Sequence (part), Stony Creek Formation (part), Lodoga Formation and Budden Canyon Formation (part).
K1	Lower to Upper Cretaceous sandstone, shale, and conglomerate. Includes Berryessa Formation, Del Valle Formation, Niles Canyon Formation, Oakland Conglomerate and Trabuco Formation.
Ku	Lower to Upper Cretaceous sandstone, shale and conglomerate. Includes Panoche Formation (in part), Asuncion Group (in part), Atascadero Formation, Bald Hills Formation, Chico Formation, Forbes Formation, Funks Formation, Gualala Group, Guinda Formation, Jack Creek Formation,

	Jalama Formation, Kione Sand, Ladd Formation, Moreno Formation, Panoche Formation, Pigeon Point Formation, Rosario Formation, Salt Creek Conglomerate, Sites Formation, Venado Formation, Williams Formation, Yolo Formation, Great Valley Sequence (in part), Boxer Formation, Cortina Formation, Rumsey Formation, Budden Canyon Formation (part), Tuna Canyon Formation, Rosario Group, Lusardi Formation, Point Loma Formation and Cabrillo Formation.
	Nevada
Ks	Cretaceous siltstone, shale, conglomerate and limestone. Includes King Lear Formation, Newark Canyon Formation, Willow Tank Formation and Baseline Sandstone.
	Arizona
KJs	Upper Jurassic to Cretaceous conglomerate, sandstone, limestone, mudstone, shale, siltstone, wacke, andesite, dacite, meta-conglomerate, arenite, argillite, metarhyolite, phyllite, calcarenite and schist. Includes Bisbee Group, Temporal Formation, Bathtub Formation, Sand Wells Formation and Fort Crittenden Formation.
Ks	Cretaceous sandstone, shale, arenite, bentonite, claystone, mudstone, siltstone, andesite, coal, conglomerate and gypsum. Includes Dakota, Mancos and Pinkard Formations.
Kmv	Upper Cretaceous Mesaverde Group sandstone, shale, black shale, coal, arkose, quartz sandstone, siltstone and gypsum. Includes Mesaverde Group.
Kv	Upper Cretaceous to Paleogene andesite, dacite, basalt, conglomerate, siltstone and wacke. Includes part of Williamson Canyon Volcanics.
	New Mexico
Kl	Lower Cretaceous sandstone and limestone. Includes Tucumcari Shale, Washita Group and Boquillas Formation.
K	Cretaceous clastic and volcacnic rocks.
Kbm, Kc	Cretaceous shale and sandstone. Includes Mancos Formation, Carlile Shale and Beartooth Quartzite.
Kcc	Cretaceous sandstone and coal. Includes Crevasse Canyon Formation, Dilco and Gibson Coal Members, Bartlett Barren, Dalton Sandstone and Borrego Pass Sandstone.
Kch, Kd	Cretaceous sandstone and shale. Includes Cliff House Sandstone, Dakota Group (in part), Oak Canyon, Cubero and Mancos Shale.
Kdg, Kdm	Cretaceous sandstone. Includes Dakota Group; Mesa Rica Sandstone, Pajarito Shale, Romeroville Sandstone, Tucumcari Shale and Glencairn Formation.
Kdr, Kth	Cretaceous sandstone, shale, conglomerate and limestone. Includes Dakota Sandstone, Tres Hermanos Formation and Rio Salado Tongue of the Mancos Shale.
Kgc, Kgg, Kgh, Kgr, Kls	Cretaceous shale and limestone. Includes Bridge Creek Limestone Member of Mancos Shale, Carlile Shale, Graneros Shale and Lewis Shale.
Kkf	Cretaceous sandstone mudstone and coal. Includes Kirtland and Fruitland Formations.
Klv	Cretaceous sandstone and shale. Includes Mesaverde Group; La Ventana Tongue of the Cliff House Sandstone.
Km, Kg, Kma Kmu, Kmc, Kmf, Kmg, Kml, Kmm, Kmr,Kms	Cretaceous shale, sandstone, limestone, mudstone and coal. Includes Gallup Sandstone, Mancos Shale, Moreno Hill Formation, Atarque Sandstone, Tres Hermanos Formation, McRae Formation, Menefee Formation, Mancos Shale (in part).

Kmv, Kph, Kpl, Kpg	Cretaceous sandstone, conglomerate and coal. Includes Mesaverde Group; Gallup Sandstone, Crevasse Canyon Formation, Point Lookout Sandstone (in part), Menefee Formation, and Cliff House Sandstone.
Knf, Kpn	Cretaceous limestone and shale. Includes Pierre Shale and Fort Hays Limestone Member of Niobrara Formation.
Kpc	Cretaceous sandstone and mudstone. Includes Pictured Cliffs Sandstone.
Kvt	Cretaceous sandstone, shale and coal. Includes Vermejo Formation and Trinidad Sandstone.
Ku	Upper Cretaceous sandstone, limestone and volcanic rocks. Includes Virden Formation and Ringbone Formation.
	Oklahoma
Ka	Lower Cretaceous mudstone, conglomerate and limestone. Includes Antlers Sandstone
Kb, Kdc	Lower Cretaceous claystone, limestone and sandstone. Includes Bokchito Formation, Pawpaw Clay, Quarry Limestone, Weno Clay and Denton Clay.
Kc, Kcf	Lower Cretaceous limestone and shale. Includes Colorado Group and Caddo Formation.
Kd, Kds, Kk	Lower Cretaceous shale, limestone, sandstone and conglomerate. Includes Dakota Group and Kiowa Formation
Kh	Lower Cretaceous conglomerate, mudstone and siltstone. Includes Holly Creek Formation.
Kki	Lower Cretaceous shale and limestone. Includes Kiamichi Formation.
Kp	Lower Cretaceous shale, sandstone and conglomerate. Includes Purgatoire Formation.
Kpm	Lower Cretaceous sandstone and limestone. Includes Pawpaw Sandstone and McNutt Limestone.
Kws	Lower Cretaceous mudstone and sandstone. Includes Weno Clay and Soper Limestone.
Kto	Upper Cretaceous sandstone and shale. Includes Tokio Formation.
Kbr	Upper Cretaceous carbonate, clay, mud, sand and limestone. Includes Brownstown Marl and Ozan Formation.
Kw, Kwl, Kwr, Kwd, Kwt	Upper Cretaceous sandstone, clay, shale, coalgravel and coal. Includes Woodbine Formation (in part).
Mzu	Upper Mesozoic (?) shale and sandstone, undivided.
	Texas
Kfr, Kfu, Kec, Ked, Ka, Kea	Lower Cretaceous limestone, mudstone, dolostone and chert, includes Fredericksburg Group; Edwards Limestone, Antlers Sand, Comanche Peak Limestone, Keys Valley Marl, Cedar Park Limestone and Bee Cave Marl.
Kem	Lower Cretaceous sandstone, limestone and dolostone, includes Fredericksberg Group and Maxon Sandstone.
Kwf, Kwfr, Kwl, Kwu	Lower Cretaceous mud, clad, limestone, dolostone, chert, mudstone and shale, includes Washita and Fredericksberg Groups.
Kcw, Kgw, Kwa	Lower Cretaceous limestone, includes Comanche Peak Limestone and Walnut Clay.
Kb, Kbf, Kf	Lower Cretaceous sandstone and limestone. Includes Benevides Formation and Finlay Limestone.
Kbb, Kbd, Kbe, Kbh, Kbu, Kdr	Cretaceous limestone and shale, includes Buda Limestone, Borache Limestone (in part) and Del Rio Clay.
Kbi	Lower Cretaceous conglomerate, limestone and shale, includes Bissett Conglomerate.
Kbm	Lower Cretaceous, limestone, sandstone and shale, includes Bluff Mesa Formation.

Kcg	Lower Cretaceous limestone, mudstone, sandstone and siltstone, includes Campagrande Formation.
Kcs	Lower Cretaceous limestone and shale, includes Cow Creek Limestone, Hammett Shale, and Sycamore Sand.
Kcx	Lower Cretaceous sandstone and limestone, includes Cox Sandstone.
Kdg, Kgt	Upper Cretaceous Del Rio Clay and Georgetown Limestone.
Kdk, Kdc, Kki	Lower Cretaceous Duck Creek Limestone and Kiamichi Formation.
Kfd	Lower Cretaceous limestone and mudstone. Includes Fort Worth Limestone and Duck Creek Formation.
Kse, Ksu, Kst, Kdm, Kpt,	Lower Cretaceous limestone, shale, mudstone and chert. Includes Santa Elena Limestone, Sue Peaks Formation, Del Carmen Limestone and Telephone Canyon Formation.
Kdp, Kda	Lower Cretaceous sandstone, shale and coal. Includes Dakota and Purgatoire Formations.
Kdv, Kmk, Klp	Lower Cretaceous limestone, dolomite and chert. Includes Devils River Limestone and McKnight and Loma Plata Formations.
Ket, Key	Lower Cretaceous conglomerate, shale, sandstone and limestone. Includes Etholen Conglomerate and Espy Formation
Kgm	Lower Cretaceous mudstone and limestone. Includes Grayson Marl, Bennington Limestone and Main Street Limestone.
Kpd, kpw	Lower Cretaceous mudstone, sandstone and clay. Includes Pawpaw Formation, Weno Limestone and Denton Clay.
Kpgr, Kgr, Kt, Kpa, Kh	Lower Cretaceous sandstone, limestone and claystone. Includes Paluxy Sand, Hensell Sand and Glen Rose Limestone.
Kpr, Kyu	Lower Cretaceous conglomerate, siltstone and sandstone. Includes Presidio and Yucca Formations.
Ksa	Lower Cretaceous limestone, mudstone and chert. Includes Salmon Peak Limestone.
Ktm	Lower Cretaceous sandstone, claystone and conglomerate. Includes Twin Mountains Formation.
Kto	Lower Cretaceous limestone, shale and mudstone. Includes Torcer Formation.
Ktp, Ksh	Lower Cretaceous conglomerate, sandstone and limestone. Includes Travis Peak and Shafter Formations.
Kw	Lower Cretaceous clay, mud and limestone. Includes Washita Group.
Kye, Kwn	Lower Cretaceous limestone, shale and conglomerate. Includes Yearwood and West Nueces Formation.
K, Koj	Upper Cretaceous limestone, shale, mudstone and sandstone. Includes Ojinaga Formation.
Kac, Kau	Upper Cretaceous limestone and mudstone. Includes Anacacho Limestone and Austin Chalk.
Kag	Upper Cretaceous sandstone and coal. Includes Aguja Formation.
Kan, Ker	Upper Cretaceous limestone. Includes Annona and Ector Chalk.
Kbl, Ku, Kbr	Upper Cretaceous, sand, clay and mud. Includes Blossom Sand and Brownstown Marl
Kbn	Upper Cretaceous mudstone and clay. Includes Bonham Formation.
Kbo	Upper Cretaceous limestone, mudstone and shale. Includes Bouquillas Formation.
Keb, Kef, Kew	Upper Cretaceous shale, sandstone, limestone and siltstone. Includes Eagle Ford Formation, Buda Limestone and Woodbine Formations.

Kes, Kna, Knb, Kol	Upper Cretaceous shale, siltstone and sandstone, includes Navarro Group; Escondido Formation, Marlbrook Marl, Olmos Formation, Kemp Clay and Nacatoch Sand.
Kne, Knm, Kmb	Upper Cretaceous Neylaanndville and Marlbrook Marl
Knt	Upper Cretaceous sandstone and limestone. Includes Navarro and Taylor Groups.
Kns	Upper Cretaceous sandstone. Includes Nacatoch Sand.
Kg	Upper Cretaceous mudstone, shale and limestone. Includes Gulfian rocks.
Kgc	Upper Cretaceous Gober Chalk and Roxton Limestone.
Kkc, Kke, Kp	Upper Cretaceous clay and sandstone. Includes Pern Formation, Kemp clay and Corsicana Mar.
Kwb	Upper Cretaceous shale, sand, clay, limestone, coal and mud, includes Woodbine Formation.
Ko	Upper Cretaceous Ozan Formation
Kpg	Upper Cretaceous limestone and sand. Includes Pecan Gap Chalk.
Kpi	Upper Cretaceous claystone, sandstone and coal, includes El Picacho Formation.
Ksc	Upper Cretaceous coal. Includes San Carlos Sandstone.
Ksm	Upper Cretaceous sandstone, limestone and clay. Includes San Miguel Formation.
Kuc, PNkj	Upper Cretaceous clay, sandstone and mud. Includes Tornillo Formation (in part), Taylor Group and Upson Clay.
Kwc	Upper Cretaceous sand, silt and mudstone. Includes Wolfe City Formation.

6. Cretaceous metamorphic rocks

Mexico

Abrev.	Description
	Baja California Norte
Ki(?)MGd-MD, Ki(?)MGr-MD	Cretaceous metagranite, metagranodiorite and metadiorite
KapaMs, KapaMV	Cretaceous metasedimentary and metavolcanic rocks. Includes Alisitos Group (metamorphic part)
	Chihuahua
Hf, Hf-Sk, Sk, Sk-Hf	Cretaceous contact metamorphic rocks, mainly hornfels.
	Sinaloa/Durango
Kn(?)MA	Lower Cretaceous mevolcanic rocks.
	Coahuila
Hf, Sk, Sk-Hf	Cretaceous and Paleogene contact metamorphic rocks, mainly hornfels.
Ma	Cretaceous and Paleogene marble.

US

Abrev.	Description
	California
KJfs, KJf2	Middle Cretaceous blueschist, schist, metavolcanic and metasedimentary rocks. Includes Franciscan Complex, Franciscan Schist and Catalina Schist.
MZv4	Upper Jurassic to Lower Cretaceous volcanic and metavolcanic rock. Includes Black Mountain Volcanics (in part), Santiago Peak Volcanics (in part) and Temescal Wash Quartz Latite Porphyry (in part).
M	Lower Proterozoic to Cretaceous schist, gneiss, quartzite, argillite, phyllite, metavolcanic rocks, slate, hornfels, marble, chert, sandstone, mudstone and conglomerate. Includes Kings Sequence, McCoy Mountains Formation (in part), Palm Canyon Complex and Placerita Formation.
Sch2	Upper Cretaceous to Eocene mica schist, amphibolite, quartzite, marble and serpentinite. Includes Pelona Schist, Orocopia Schist, Rand Schist, Schist of Sierra de Salinas.
Sch5	Mesozoic schist, gneiss and slate; may be Paleozoic and Precambrian in part. Includes schists in upper plate of Layton Well thrust.
	Arizona
Kjo	Upper Cretaceous to Middle Cenozoic quartz-feldspart schist, amphibolite, marble, quartzite, diorite and serpentinite. Includes Orocopia Schist.

7. Cretaceous and Paleogene igneous rocks

Mexico

Abrev.	Description
	Baja California Norte
JsKiA-BvA, JsKiRd-Da	Jurassic to Cretaceous extrusive rocks, mainly andesite, rhyodacite and dacite. Includes part of Alisitos Group and Santiago Peak Formation.
Ki(?)qMz, KiGd-Tn, KiGr	Lower Cretaceous intrusive rocks, mainly quartzmonzonite, granodiorite, granite and tonalite. Includes Peninsular Range Batholith, Potrero Pluton and El Topo pluton
Ki(?)Um, KsGa	Cretaceous and Paleocene mafic and ultramafic rocks, mainly gabbro.
Ks(?)Gd-Tn, KsD, KsGd, KsGd-Gr, KsGd-Tn, KsGr, KsTn, KsTpaD, TpaGd	Upper Cretaceous and Paleocene instrusive rocks, mainly granodiorite, diorite, granite and tonalite. Includes La Posta Granite, El Pinal pluton, San Fermin Diorite and Sierra San Pedro Martir Pluton.
	Baja California Sur
KiD, KiGd, KiGr KacePSi, KiGa, KiTn	Lower Cretaceous intrusive rocks, mainly gabbro, diorite, granodiorite, granite and sienite. Includes Peninsular Range Batholith.
KsD, KsGr	Upper Cretaceous intrusive rocks, mainly diorite and granite. Includes La Paz Batholith
	Sonora
Ki(?)Gr, KiGr	Lower Cretaceous intrusive rocks, mainly granite. Includes

KsA, KsA-TA, KsA-Tq, KseA-TA,	Lower Cretaceous extrusive rocks, mainly andesite, andesite tudd and trachyte. Includes Tarahumara Formation (in part).
KsR-A	Lower Cretaceous extrusive rocks, mainly rhyolite and andesite. Includes Charro Group (in part).
KsD, KsGa, KsGd, KsGd-Tn, KsTeGr-Gd, KsTn, KsTeGd-D, KsTpaGd-D, KsTpaGd-qMz, KsTpaGr-Gd, KsTpgGr-Gd, KsTpgPMz, TpaGd, TpaGr-Gd, TpaMz, TpaPDa,TeD-Gd	Upper Cretaceous and Paleocene intrusive rocks, mainly diorite, granodiorite, granite, quartzmonzonite, tonalite and gabbro. Includes El Jaralito Intrusive Suite, Sonora Batholith, Hermosillo Granite, El Empalme Granite.
TeGr, Te(?)Gd, TeGd-D, TeMz-qMz, TePA, TepMz, TePqMz-PA, ToGr, ToGr-MGr, ToPA, ToPMz, ToPR, ToPRd, TeMz-Gd, TeR TmGr, TmPD	Eocene and Oligocene intrusive rocks, mainy granodiorite, granite, diorite, quartzmonzonite, monzonite, andesitic porphyry, quartzmonzonitic porphyry.

Chihuahua

KsGd, KsTeGr-Gd, KsTeGr-Gd, KsTpaGr-Gd,	Upper Cretaceous and Paleocene intrusive rocks, mainly granite, granodiorite and diorite. Includes El Jaralito Intrusive Suite
KsA-Ar, KsA-TA, KsA-Tq	Upper Cretaceous andesite and sandstone. Includes Tarahumara Formation.
Te(?)D, Te(?)Tn, Te(?)qMz, TeD, TeGd, TeGd-D, TGr, ToD, ToGa, TeMz,TePA, ToTn, ToGd, ToGr, TePMz, TeqD, ToGr-Gd, ToMz, ToPA, ToPDa, ToPMz, ToPR, TopTq, ToSi, TpaGd, TpaGr, TpaqMz, TePMz-D	Eocene and Oligocene intrusive rocks, mainy diorite, granite, monzonite, granodiorite, quartzmonzonite, andesitic porphyry, syenite, quartzdiorite and tonalite.

Tm(?)D, TmD, TmGr-Gd	Miocene intrusive rocks, mainly diorite, granodiorite, granite.

Sinaloa	
K(?)Um, KiDu	Cretaceous ultramafic rocks.
Ki(?)A, KiA	Lower Cretaceous extrusive rocks, mainly andesite.
Ks(?)Gd, KsGd, KsD, Ks(?)D, KsTGd, TpaeGd, TpgPD, TpaeGr-Gd	Upper Cretaceous and Paleocene intrusive rocks, mainly granite, granodiorite and diorite. Includes Sinaloa and Piaxtla Batholith.
Te(¿)Gd, TeoGr-Gd, TeGd-D, TeoGr-Gd, ToPA TePDa,	Eocene and Oligocene intrusive rocks, mainly granodiorite, diorite and granite.
Tm(?)D, TmPA, TmGd-qMz	Miocene and Pliocene intrusive rocks, mainly diorite, andesitic porphyry, quartzmonznite and granodiorite.
Durango	
KceD, KceTn, KsGd, KsGr, TpaeGd, TpaqD, TpaeGr-Gd, TpgPA,	Upper Cretaceous and Paleocene intrusive rocks, mainly diorite, tonalite, granodiorite, granite and andesitic porphyry.
KcA, KiA	Upper Cretaceous andesite.
TeGd, TeGd-D, TeGr, TeGr-Gd, TeMz-Si, TeoGr-Gd, TePGd, TePMz, TePTq, To?Gr-D, ToGd, ToGr-D, TomGr, ToPA, ToPD, ToPR, ToPRd-Tq, ToPTq, ToqD, ToqMz, ToPqLa, ToPDa	Eocene and Oligocene intrusive rocks, mainly granodiorite, monzonite, quartzmonzonite, syenite, granite, granodioritic porphyry and diorite. Includes Piaxtla Batholith
TmPA, TmPD	Miocene intrusive rocks, mainly andesitic and dacitic porphyry.
Coahuila	
KmSi, TpgGd-D, TplqLa, TplPGr, TpgMz	Upper Cretaceous and Paleocene intrusive rocks, mainly syenite, granite and diorite.
TeD, TeGd, TePA, TeqMz, ToD, ToD-Gr, ToGr-Si, ToGr-Mz, ToPA, ToPR,	Eocene and Oligocene intrusive rocks, mainly granodiorite, granite, diorite, andesitic porphyry, quartzmonzonite.
TmGr	Miocene and Pliocene intrusive rocks, mainly granite.
Zacatecas	

JsKi?B-F	Jurassic to Cretaceous extrusive rocks. Includes Chilitos Formation.
TpaMz, TpaPA	Upper Cretaceous and Paleocene intrusive rocks, mainly monzonite and andesitic porphyry.
TeGd, TeGd-D, TeGr, TeMz-Si, TePA, TomGr, TomPR, ToMz, ToPMz, ToPR	Eocene and Oligocene intrusive rocks, mainly granodiorite, granite, monzonite, syenite, andesitic porphyry, rhyolitic porphyry, monzonite and diorite
Nuevo León	
KmSi, TpgGd-D, TpgSi	Upper Cretaceous and Paleocene intrusive rocks, mainly syenite.
TeD, TeSi, ToPR	Eocene and Oligocene intrusive rocks, mainly diorite, syenite and rhyolitic porphyry
San Luis Potosí	
JsKi?B-F	Jurassic to Cretaceous extrusive rocks. Includes Chilitos Formation (in part).
KmSi	Upper Cretaceous and Paleocene intrusive rocks, mainly syenite.
TeGd-Mz	Eocene and Oligocene intrusive rocks, mainly granodiorite and monzonite.
Tamaulipas	
TeSi	Eocene and Oligocene intrusive rocks, mainly syenite
TmD-Si, TmGa-D, TmGd-Mz, TmGd-Si	Miocene and Pliocene intrusive rocks, mainly diorite, syenite, mozonite, granodiorite and gabbro

US

Abrev.	Description
California	
Gr-m	Proterozoic to Upper Cretaceous plutonic rocks, gneiss, metasedimentary and metavolcanic rocks. Includes Ash Mountain Complex, Placerita Formation (in part) and Sur Series.
Gr1	Oligocene to Miocene plutonic rocks.
gr3	Jurassic(?) to Cretaceous(?) granitic rocks.
grCZ?	Lower to Upper Cretaceous quartz monzonite, quartz latite, monzonite, granodiorite and granite. Includes Skidoo Monzogranite.
grMZ1	Lower to Upper Cretaceous granite, quartz monzonite, granodiorite and quartz diorite, includes Bodega Diorite and Santa Lucia Quartz Diorite.
grMZ2	Middle Jurassic to Upper Cretaceous granite, tonalite, quartz monzonite, granodiorite and quartz diorite, includes Bonsall Tonalite, Bradley "Granodiorite", Cactus Quartz Monzonite, Cajalco Quartz Monzonite, Corona Hornblende Granodiorite Porphyry, Domenigoni Valley Granodiorite, Escondido Creek Leucogranodiorite, Estelle Tonalite, Fargo Canyon "Diorite", Green Valley Tonalite, Home Gardens Quartz Monzonite Porphyry, Indian Mountain Leucogranodiorite, Lakeview Mountain Tonalite, Lake Wolford Leucogranodiorite, La Sierra Tonalite, Mount Hole

	Granodiorite, Rattlesnake Granite, Roblar Leucogranite, San Jacinto "Granodiorite", Stonewall Quartz Diorite, Woodson Mountain Granodiorite and Southern California Batholith.
grMZ3	Permian to Tertiary granodiorite, quartz monzonite, tonalite, quartz diorite, diorite, granite, monzodiorite, quartz syenite, gabbro, trondhjemite, alkali-granite, pegmatite and monzonite. Includes Atolia Quartz Monzonite, Coxcomb Granodiorite, Holcomb Quartz Monzonite, Lar Quartz Diorite, Liebre Quartz Monzonite, Mount Pinos Granite, Palms "Granite" (Quartz Monzonite), Sands Granite, Teutonia Quartz Monzonite, White Tank Quartz Monzonite, Vermont Quartz Diorite, Cadiz Valley Batholith, Barcroft Granodiorite, Bass Lake Tonalite, Big Baldy Granite, Boundary Peak Granite, Bridalveil Granite, Burnside Lake Adamellite, Cabin Granodiorite, Cactus Point Granite, Carson Pass Tonalite, Cathedral Peak Granite, Clover Creek Granodiorite, Cottonwood Adamellite, Cow Creek Granodiorite, Dinkey Creek Granodiorite, Ebbetts Pass Granodiorite, El Capitan Granite, Evolution Basin Alaskite, Giant Forest Granodiorite, Half Dome Quartz Monzonite, Hunter Mountain Quartz Monzonite, Inconsolable Granodiorite, Isabella Granodiorite, Johnson Granite Porphyry, Knowles Granodiorite, Lake Edison Granodiorite, Lamarck Granodiorite, Leaning Tower Quartz Monzonite, Lebec Quartz Monzonite, Leidy Adamellite, Lodgepole Granite, Lookout Peak Tonalite, McAfee Adamellite, Mitchell Peak Granodiorite, Mono Creek Granite, Mount Clark Granite, Mount Givens Granodiorite, Pear Lake Quartz Monzonite, Paradise Granodiorite, Pellesier Granite, Pohono Granodiorite, Potwisha Quartz Diorite, Round Valley Peak Granodiorite, Sacatar Quartz Diorite, Sage Hen Adamellite, Sentinel Granodiorite, Stanislaus Meadow Adamellite, Taft Granite, Tamarack Leuco-Adamellite, Tejon Lookout Granite, Tinemaha Granodiorite, Tungsten Hills Quartz Monzonite, Ward Mountain Trondhjemite, Weaver Lake Quartz Monzonite, Wheeler Crest Quartz Monzonite, Whitney Granodiorite; and Hunter Mountain Batholith, Inyo Batholith, Sierra Nevada Batholith; Bald Rock Pluton, Bucks Lake Pluton, Bullfrog Pluton, Cartridge Pass Pluton, Cascade Pluton, Dragon Pluton, Grizzly Pluton, Independence Pluton, Merrimac Pluton, Paiute Monument Pluton, Papoose Flat Pluton, Pat Keyes Pluton, Sage Hen Flat Pluton, Santa Rita Flat Pluton, Swedes Flat Pluton; Tuolumne Intrusive Suite, John Muir Intrusive Suite, Shaver Intrusive Suite, Palisade Crest Intrusive Suite, Scheelite Intrusive Suite, Fine Gold Intrusive Suite, Soldier Pass Intrusive Suite and Mount Whitney Intrusive Suite.
Ti9	Tertiary gabbros; may be Mesozoic in part.
	Nevada
KJd	Jurassic to Cretaceous quartz monzonite, granite, quartz diorite, gabbro, granodiorite and serpentinite. Includes batholith of the Sierra Nevada.
Kgr	Cretaceous granodiorite, quartz monzonite, granite and peraliminous granite.
	Arizona
TKgm	Upper Cretaceous to Paleogene granite, pegmatite and aplite. Includes Wilderness Granite and Pan Tak Granite.
TKg	Upper Cretaceous to Paleogene granodiorite, granite, diorite, porphyry, quartz diorite, aplite, gabbro, pegmatite and skarn.
	New Mexico
Ki	Upper Cretaceous plutonic rocks.
TKi	Upper Cretatceous to Paleogene granodiorite and granitoid. Includes Hanover, Fierro, Tyrone, and Lordsburg granodiorite-quartz monzonite porphyries.
Ka	Upper Cretaceous andesite flows.
	Texas

Ki	Cretaceous igneous rocks.

8. Paleogene and Neogene volcanic and plutonic rocks

Mexico

Abrev.	Description
	Baja California Norte
TmA-B, TmB-Ar	Miocene extrusive rocks, mainly andesite and basalt. Includes Rosarito Beach Formation.
TmR, TmR-Da, TmR-TR, TmTq-A, TmTR, TmTR-R, TmTR-TA, TpaA	Miocene extrusive rocks, mainly andesite, basalt, andesitic tuff, rhyolitic tuff, andesitic trachyte, undivided.
TmA, TmB, TplB, TplBvDa-TR	Miocene to Pliocene extrusive rocks, mainly andesite, basalt. Includes Comondú Group (in part)
	Baja California Sur
TmB, TmBvA, TmBvA-TDa, TmDa, TmIg, TmTDa-TR	Miocene extrusive rocks, mainly basalt, andesitic tuff, andesitic tuff, dacitic tuff, rhyolitic tuff. Includes Comondu Group (in part).
TmBvA-TR, TmPc-TR, TmTR, TmplB, TmRD, TmplBvB-BvA	Miocene extrusive rocks, mainly basalt, andesitic tuff, andesitic tuff, dacitic tuff, rhyolitic tuff, anseditic porphyry; undivided
Tm(?)PDa, TmPDa, TmqMz, TmplPRd, TnPSi, TnPRd, TnPDa, TmPA, TmPD, TmPR,TmPRd	Miocene to Pliocene dacitic, andesitic, rhyolitic, quartzmonzonitic, syenitic and rhyodacitic porphyry; undivided
TplTa-Cgp	Miocene extrusive and sedimentary rocks, mainly acide tuff and polymictic conglomerate. Includes Boleo Formation (in part).
	Sonora
Ks-TpgR-TR, Ks-TpgA-TA	Upper Cretaceous and Paleocene extrusive rocks, mainly rhyolitic tuff and rhyolite, undivided
TpaeA-TA, TpaeTR-R	Upper Cretaceous and Paleocene extrusive rocks, mainly rhyolitic tuff, rhyolite, andesite, andesitic tuff. Includes Nacozari Group (in part)
TeoA-TA, ToA, ToA-Ig, ToA-TTq, ToB, TomTR-B, ToTR, ToTqA,	Eocene and Oligocene extrusive rocks, mainly andesite, ignimbrite, rhyolitic tuff, rhyolite and andesitic tuff; undivided.

ToTR-Ig, ToTR-R, TpaeR-TR, TomTR-B.	
ToIg-TR, TmTR-B	Oligocene extrusive rocks, mainly ignimbrite, basalt and rhyolitic tuff. Includes Yecora Group (in part).
ToA-B	Oligocene extrusive rocks, mainly andesite and basalt.
TmA-B, TmA-Da, TmTA-TDa, TmTR-B	Miocene extrusive rocks, mainly basalt, andesite, andesitic tuff and dacite; undivided
TmA-TR, TmA-TA,	Miocene extrusive rocks, mainly basalt, andesite, andesitic tuff and dacite. Includes Comondu Group (in part)
TmB	Miocene extrusive rocks, mainly basalt, andesite, andesitic tuff and dacite. Includes Comondu Group (in part) and Sierra Oculta basalt.
TmB-A	Miocene extrusive rocks, mainly basalt, andesite, andesitic tuff and dacite. Includes Bacaurit formation and Yecora Group (in part).
TmR, TmR-Da, TmR-Rd, TmTq-A, TmTRd-Rd, TmTq	Miocene extrusive rocks, mainly rhyolite, dacite, rhyodacite, trachyte; undivided.
TmTR, TmTR-R	Miocene extrusive rocks, mainly rhyolite, dacite, rhyodacite, trachyte. Includes Lista Blanca Formation
TmTR-A	Miocene extrusive rocks, mainly rhyolite, dacite, rhyodacite, trachyte. Includes Lista Blanca Formation, Yecora Group (in part)
Tpl(?)B	Pliocene extrusive rocks, mainly basalt.
TplA-TR, TplB, TplBvDa-TR	Pliocene extrusive rocks, mainly basalt, andesitic tuff, rhyolitic tuff. Includes Comondu Group (in part).
	Chihuahua
KsTeA-BvA, Ks-TpgR-TR, TpaR, TPR	Upper Cretaceous and Paleocene extrusive rocks, mainly andesite, rhyolite, rhyolitic tuff, andesitic tuff, rhyolitic porphyry
TpaA	Paleocene extrusive rocks, mainly andesite. Includes Viejo Andesite.
TpaBvA	Paleocene extrusive rocks, mainly andesitic breccia.
TpaeA-TA	Paleocene extrusive rocks, mainly andesitic tuff and andesite. Includes Nacozari Group (in part)
TeTR, TeR	Eocene extrusive rocks, mainly rhyolitic tuff and rhyolite. Includes Loma del Toro and Sepulveda Units.
TeA-B, TeA-TA, TeTR-Ig	Eocene extrusive rocks, mainly andesite, andesitic tuff and basalt; undivided.
To(?)TR-R, ToA-TA, ToBvR, ToLa, TomIg-TR, ToR, ToRd-TRd, ToTDa, ToTR-Ig, ToTR-R, ToR-Rd, ToA-Tq	Oligocene extrusive rocks, mainly rhyolitic tuff, andesite, andesitic tuff, latite trachyte and rhyolite; undivided

ToTR, ToTq	Oligocene extrusive rocks, mainly rhyolitic tuff and trachyte. Includes Abajo Unit and Ojo Caliente Trachyte.
ToB, ToA	Oligocene extrusive rocks, mainly basalt and andesite. Includes Pinto Unit and Ojo Blanco
ToIg-TR	Oligocene to Miocene extrusive rocks, mainly ignimbrite, andesite and rhyolitic tuff. Includes Yecora Group (in part) and Baucarit Formation.
TmBvA, TmR-TR, TmB	Miocene extrusive rocks, mainly basalt, andesitic breccia, andesite, rhyolite, rhyolitic tuff. Includes Sierra Oculta basalt.
TmTR	Miocene extrusive rocks, mainly rhyolitic tuff. Includes Lista Blanca Formation.
Tpl(?)TR, Tpl(?)B, TplBvB, TplTR	Pliocene extrusive rocks, mainly rhyolitic tuff, basalt, basaltic breccia.
TplB	Pliocene extrusive rocks, mainly basalt, andesitic tuff, rhyolitic tuff. Includes Comondu Group (in part).
	Sinaloa
TpaeA-TA, TpgA-TA	Paleocene extrusive rocks, mainly andesite and andesitic tuff.
ToBvR-Ig, ToIg-TR, TomIg-TR, TomR-TR, ToTR-Ig, ToRP	Oligocene extrusive rocks, mainly rhyolitic breccia, ignimbrite, rhyolite and rhyolitic tuff. Includes Superior Volcanic Group.
TmB, TmTR, TmB-A	Miocene extrusive rocks, mainly basalt, andesite and rhyolitic tuff. Includes Baucarit Formation
TplA-B, Tpl(?)PA	Pliocene extrusive rocks, mainly andesite, andesitic porphyry and basalt.
	Durango
KsTeA-BvA, TparA-BvA	Upper Cretaceous and Paleocene extrusive rocks, mainly andesite, andesitic tuff.
TeA-BvA, TeoTR-Ig	Eocene extrusive rocks, mainly andesite, ignimbrite, rhyolitic tuff and andesitic breccia.
ToBvR-Ig, TomIg, TomIg-R, TomIg-TR, TomR-Ig, TomR, TomRP, ToR, ToR-Ig, ToRP, ToTq-R, To(?)A-Tq, ToA, To(?)TR-R, ToBvR	Oligocene extrusive rocks, mainly rhyolitic breccia, rhyolite, rhyolitic porphyry, trachyte and ignimbrite; undivided
ToIg, ToIg-TR, ToIg-R, ToTR-Ig	Oligocene extrusive rocks, mainly ignimbrite, rhyolite and rhyolitic tuff. Includes Registro, Rio Chico and Carpintero Groups, and Gamon Formation.
ToTq	Oligocene extrusive rocks, mainly trachyte. Includes Ojo Caliente Trachyte.
ToPc	Oligocene pyroclastic rocks. Includes San Pablo (in part)
TmB-A, TmB	Miocene extrusive rocks, mainly basalt and andesite. Includes Baucarit and Metates Formations.
Tpl(?)B, Tpl(?)PA Tpl(?)B-A	Pliocene extrusive rocks, mainly basalt, andesitic porphyry and andesite.

Coahuila	
To(?)TR-R, ToA, ToA-TA, ToB, ToTA, ToDa, ToR, TomIg, ToPR, ToR-TR, ToTR, ToTR-Ig	Oligocene extrusive rocks, mainly rhyolitic tuff, rhyolite, andesite, basalt, dacite, andesitic tuff, ignimbrite, rhyolitic porphyry. Includes Mayran Unit.
TmB-A, Tpl(?)B, Tpl(?)B-A, TplB	Miocene and Pliocene extrusive rocks, mainly basalt and andesite.
Zacatecas	
ToBvR, ToIg-R, TomIg-R, TomR-Ig, TomRP	Oligocene extrusive rocks, mainly basalt, rhyolitic breccia, ignimbrite and rhyolitic porphyry.
Tm(?)R, TmB, TmB-A	Miocene extrusive rocks, mainly rhyolite andesite and basalt. Includes Baucarit Formation.
Nuevo León	
TpgR	Paleogene extrusive rocks, mainly rhyolite.
San Luis Potosí	
TomIg-R, ToR-A	Oligocene extrusive rocks, mainly rhyolite, ignimbrite and andesite; undivided.
TmB	Miocene extrusive rocks, mainly basalt.
Tamaulipas	
Tmb	Miocene extrusive rocks, mainly basalt.

US

Abrev.	Description
California	
grCZ1, grCZ2	Miocene quartz monzonite, quartzdiorite, quartz latite, monzonite, granodiorite and granite. Includes Kingston Range Monzonite Porphyry, Catalina Island pluton and Little Chief Granite.
grpCA?, grpCA4	Miocene granite, diorite, syenite, anorthosite and gabbroic rocks. Includes Willow Springs Diorite.
Ti2, Ti3, Ti4, Ti5, Ti6	Eocene rhyolite, dacite, andesite and basalt.
Ti7	Eocene rhyolite, basalt, dacite and trachyte. Includes Gem Hill Fomation (in part) and Fountain Peak Rhyolite.
Tv12, Tv2, Tvp3	Oligocene to Miocene basalt, rhyolite, dacite, ash-flow tuff, ignimbrite, volcanic breccia and tuff and andesite. Includes part of Tecuya, Pinnacles and Neenach Volcanic Formations.
Tv13	Miocene basalt, andesite, dacite and volcanic breccia. Includes Plush Ranch Formation and Vasquez Formation.

Tvp4, Tv15	Miocene rhyolite, dacite, ash-flow tuff, ignimbrite, volcanic breccia and tuff. Includes Obispo Tuff.
Tv9, Tv10, Tv11, Tv14	Miocene basalt, rhyolite, dacite and volcanic breccia. Includes Tranquillon Volcanics, Alverson Canyon Formation and Caliente Formation.
Tv1, Tvp6, Tv6	Miocene andesite, basalt, tuff, dacite and volcanic breccia. Includes Jacumba Pyroclastics, Quien Sabe Volcanics and Skooner Gulch Basalt.
Tv8, Tvp5	Miocene basalt, andesite dacite, volcanic breccia and tuff. Includes Glendora Volcanics (part), Conejo Volcanics (part) and El Modeno Volcanics (part).
Tvp7, Tv5	Miocene rhyolite, basalt, dacite, andesite, basalt, ash-flow tuff, volcanic breccia and tuff.
Tv16	Miocene rhyolite, basalt tuff, ash-flow tuff, ignimbrite, dacite, trachyte, trachyandesite and trachybasalt. Includes Alvord Peak Basalt, Artist Drive Formation, Barstow Formation (part), Funeral Fanglomerate (part), Gem Hill Formation (part), Greenwater Volcanics, Red Buttes Quartz Basalt, Ricardo Formation (part), Saddleback Basalt and Tropico Group (part).
Tvp8	Miocene rhyolite, dacite, andesite, basalt, volcanic breccia, tuff; ash-flow tuff, ignimbrite. Includes Gem Hill Formation (part), Kinnick Formation and Pickhandle Formation (part).
Tv3	Miocene to Pliocene dacite, rhyolite, andesite, basalt, ash-flow tuff, ignimbrite and tuff. Includes Sonoma Volcanics and St. Helena Rhyolite.
Tv18, Tv7	Pliocene tephrite, trachybasalt, trachyandesite and trachyte.
Tv17	Pliocene andesite, basalt, rhyolite, dacite and volcanic breccia. Includes Colestin Formation, Raymond Peak Andesites, Roxy Formation, Shasta Lavas, Silver Peak Andesites, Table Mountain Latite, Tryon Peak Flows, Warner Basalt (part) and Wasson Formation.
	Nevada
Ti. Tmi	Upper Cretaceous to Miocene alkali-granite, monzodiorite, granodiorite, tonalite and diorite.
Tri	Eocene to Miocene rhyolitic intrusive rocks.
Tbr	Eocene to Pliocene breccia.
Ta2, Tt2, Tob, Tr2, Tr3	Oligocene to Miocene andesite, rhyolite, dacite, basalt, trachyte and dacite.
Tba	Miocene to Pliocene andesite and basalt flows.
Trt, Tt3, Ta3, Tts	Miocene ash-flow tuffs, andesite, latite, trachyte, dacite, rhyolitic flows and shallow intrusive rocks.
QTa	Miocene to Quaternary andesite, rhyodacite and basalt.
QTb, Tb	Miocene to Quaternary basalt, andesite, latite and trachybasalt. Includes Mesa Basalt.
	Arizona
Tv, Ti, Tg	Oligocene to Miocene dacite, tuff, rhyolite, andesite; basalt, porphyry, diorite, granite, granodiorite, latite, trachybasalt, trachyte, conglomerate, sandstone, sedimentary breccia and serpentinite. Includes Navajo volcanic field, Peach Springs Tuff and Apache Leap Tuff.
Tsv	Oligocene to Miocene andesite, basalt, conglomerate, dacite, rhyolite, sandstone, sedimentary breccia, limestone and siltstone.
Tby	Miocene to Pliocene basalt, alkaline basalt, tholeiite, claystone, conglomerate, limestone, sandstone, sedimentary breccia, siltstone, tuff, chert and gypsum. Includes Hopi Buttes volcanic field and “Rim Basalts”.
Tvy, Tb	Miocene to Pliocene rhyolite, dacite, andesite, alkaline basalt, basalt, conglomerate, sandstone and sedimentary breccia. Includes Hickey Formation and Mohon volcanic field.

New Mexico	
Thb, Ti, Tli	Paleogene to Neogene basalt and rhyolite, includes Hinsdale Basalt.
Tlv	Eocene to Lower Oligocene intermediate volcanic rocks.
Tif	Oligocene felsic flows, includes phonolite, trachyte and rhyolite. Includes Ash Mountain.
Tlrf	Oligocene lava flow, tuff and conglomerate. Includes Mimbres Peak Formation.
Tlrp, Turf	Oligocene pyroclastic volcanic rocks and tuff. Includes includes Hell's Mesa, Kneeling Nun and Bell Top Formations; Caballo Blanco, Datil Well, Leyba Well, Rock House Canyon, Blue Canyon, Sugarlump, Taylor Creek, Fanney Rocky Canyon Rhyolites, and Tadpole Ridge Tuffs.
Tual	Oligocene andesite, basalt and rhyolite. Includes La Jara Peak Basaltic Andesite, Uvas Basalt, the basaltic andesite of Poverty Creek and Squirrel Springs Andesite.
Turp	Oligocene tuff, rhyolite, andesite and eolian. Includes Davis Canyon Tuff, South Crosby Peak Formation; La Jencia, Vick's Peak, Lemitar, South Canyon, Bloodgood Canyon and Shelley Peak Tuffs; tuff of Horseshoe Canyon, Park Tuff and Rhyolite Cany.
Tuau, Tla	Oligocene to Miocene andesite and basalt. Includes Bearwallow Mountain Andesite, Rubio Peak Formation, andesite of Dry Leggett Canyon and basaltic andesite of Mangas Mountain.
Tui, Tuim	Oligocene to Miocene silicic intrusive rocks.
Tuv, Tv	Upper Oligocene to Lower Miocene volcanic and volcaniclastic rocks.
Tmb, Tnb, Tnr, Tnv	Miocene basalt and andesite.
Tpb	Pliocene basalt and andesite flows.
Oklahoma	
Tb	Pliocene basalt of Black Mesa, includes Raton volcanic field.
Texas	
EOwm	Eocene trachyte, volcanic breccia and tuff. Includes Wiley Mountain caldera volcanic rocks.
EOd, EOi, EOv	Eocene rhyolite, trachyte and lava flow. Includes Sheep Pasture, Sleeping Lion, Frazier Canyon, Adobe Canyon, Huelster and Limpia formations; Gomez Tuff and Star Mountain Rhyolite.
EOin	Eocene trachyte, rhyolite, sandstone, trachyandesite, latite; trachybasalt, basalt, ash-flow tuff, mudstone and conglomerate. Includes Capote Mountain Tuff, Shely Group, Buckshot Ignimbrite and Morita Ranch Formation.
OGEOv, OGEOg	Eocene to Oligocene rhyolite, sandstone, ash-flow tuff, breccia and conglomerate. Includes Vieja Group; Bracks Rhyolite, Chambers and Colmena Tuffs, Devils Graveyard volcanic rocks, Gill Breccia and Jeff Conglomerate.
OGEOd	Eocene to Oligocene rhyolite, basalt, sandstone, conglomerate, limestone and tuff. Includes Duff Formation, Cottonwood Springs Basalt, Potato Hill Andesite, Sheep Canyon Basalt, Crossen Trachyte and Pruett Formation.
OGd	Oligocene trachyte, rhyolite, tuff and latite. Includes Brooks Mountain, Goat Canyon, Medley, Barrel Springs, Wild Cherry, Eppenaurer Ranch, Mount Locke, and Merrill Formations.
OGe, OGde	Oligocene rhyolite, trachyte and conglomerate. Includes Eagle Mountains caldera volcanic rocks, Duff Formation, Decie Member from Paisano caldera.
OGsa, OGsc	Oligocene ash-flow tuff. Includes Santana Tuff snd San Carlos Tuff.
OGsh	Oligocene rhyolite and basalt. Includes Shely Group and Morita Ranch Formation.
OGi, Ti	Oligocene basalt, trachyte, rhyolite, phonolite, latite and trachyandesite and intrusive rocks.

OGs	Oligocene rhyolite, ash-flow tuff, volcanic breccia and vitrohpyre. Includes Pine Canyon Rhyolite, Boot Rock Member, Lost Mine Member, Burro Mesa Rhyolite and South Rim Formation.
OGmr, OGj, OGq, OGr	Oligocene basalt, rhyolite and trachyte. Includes Morita Ranch Formation, Bell Valley Andesite, Jones Basalt, Quitman Mountains caldera volcanic rocks, Fresno Formation (in part) and Square Peak Volcanics.
OGcm	Oligocene rhyolite, basalt, ash-flow tuff, volcanic breccia, quartz monzonite, trachyte, andesite and dacite. Includes Chinati Mountains Group, Mitchell Mesa Ignimbrite, and Petan Basalt.
MIb	Miocene tuff and basalt. Includes Black Gap area volcanic rocks.
MIi	Miocene intrusive rocks and basalt.

9. Paleogene and Neogene sediments and sedimentary rocks

Mexico

Abrev.	Description
	Baja California Norte
TpaAr-Lm, TpaCgp, TpaLm-Ar	Paleocene sandstone, limolite and polymictic conglomerate.
TpaeAr-Lm	Paleocene sandstone and limolite. Includes Bateque Formation
TeAr-Lu	Eocene sandstone and lutite. Includes Delicias Formation
TeCgp-Ar	Eocene polymictic conglomerate. Includes Las Palmas
TmAr-Cgp	Miocene sandstone and polymictic conglomerate. Includes Rosario Beach Group (in part).
TmAr-Lm, TmAr	Miocene sandstone and limolite. Includes Tortugas and San Ignacio Formations.
TmCgp-Ar, TmCgp	Miocene polymictic conglomerate. Includes Baucarit Conglomerate.
TplAr-Lm	Pliocene sandstone and limolite. Includes Imperial Formation.
TplLm-Ar, TplCgp	Pliocene polymictic conglomerate, limolite and sandstone. Includes San Francisquito.
	Baja California Sur
TpaeAr-Lm	Paleocene sandstone and limolite. Includes Bateque Formation.
ToAr, ToAr-Cgp	Oligocene sandstone and polymictic conglomerate. Includes Salto Formation.
ToAr-Lu, TomLu-Ar	Oligocene sandstone and lutite. Includes San Gregorio Formation.
TmAr, TmAr-BvA, TmAr-Cgp, TmCgp	Miocene sandstone and polymictic conglomerate. Includes Valle de Diatomita Formation, San Ignacio Formation and Gomondu Group (in part).
TmAr-Lm, TmAr-Cq, TmAr-Lm	Miocene sandstone and limolite. Includes Comondu Group (in part), San Ignacio and San Isidro Formations.
TmplAr-Lu, TmLu-Ar, TmplAr-Cq	Miocene sandstone and lutite. Includes Trinidad, Tortugas and Refugio Formations.

TmplAr-Lm, TplAr-Lm	Miocene and Pliocene sandstone and limolite. Includes Salada Formation.
TplAr-Cgp, TplCgp	Pliocene sandstone and polymictic conglomerate. Includes Infierno Formation.
TplLm-Ar	Pliocene limolite and sandstones. Includes Almejas, Gloria and Tirabuzon Formations.
	Sonora
TpgCgp-Ar	Paleocene polymictic conglomerate and sandstone.
TmAr-Lu	Miocene polymictic conglomerate. Includes Navosaigame Conglomerate.
TmCgp-Ar, TmCgp-TR, TmCgp-B, Tmpl(?)Cgp-B	Miocene polymictic conglomerate, basalt and sandstone. Includes Baucarit Conglomerate.
TmLu-Ar, Tmpl(?)Cgp	Miocene lutite, polymictic conglomerate and sandstone.
TplAr, TplCgp-Ar	Pliocene sandstone and polymictic conglomerate.
	Chihuahua
KmTpaCgp-Ar, TpaAr-Cgp, TeAr-Cgp, Ks(?)TpaCgo	Paleocene to Eocene polymictic conglomerate and sandstone. Includes Sacramento Formation and Gasogachic Conglomerate.
TeoCgp-Ar	Eocene polymictic conglomerate and sandstone. Includes Navosaigame Conglomerate.
ToCgp-Ar, ToAr-Cgp	Oligocene polymictic conglomerate and sandstone. Includes Yecora Group (in part).
Tm(?)Ar-Cgp,	Miocene polymictic conglomerate and sandstone. Includes El Consuelo Formation.
TmAr-TR	Miocene sandstone and rhyolitic tuff. Includes Rosario Group (in part).
Tm(?)Cgp-B, Tm(?)Tr, TmAr-Cgp, Tm(?)Cgp-Ar	Miocene polymictic conglomerate, sandstone, travertine and basalt.
TmCgp-Ar, TmCgp, TmCgp-B	Miocene polymictic conglomerate, basalt and sandstone. Includes Las Palmas Formation and Baucarit Conglomerate.
TmCz-Ar	Miocene limestone and sandstone.
	Sinaloa
TeAr-A, TeoAr-Cgp, TeoAr-Cz, TeoCgp	Eocene sandstone, polymictic conglomerate and limestone.
ToCgp-Ar	Oligocene polymicitc conglomerate and sandstone. Includes Yecora Group (in part)
TmAr-Lm	Miocene sandstone and limolite. Includes San Ignacio Formation
TmCgp, TnCgp	Miocene polymicitic conglomerate and sandstone. Includes Los Llanos Formation
Tm-plCgp, TplCgp-Ar	Pliocene polymicitc conglomerate and sandstone.
	Durango

TeoCgp, TeCgp-Ar, TeAr, TpaeCgp, TeoCgo, Teo?Cgp	Paleocene to Eocene polymicitc conglomerate and sandstone. Includes Ahuichila and Las Palmas Formation.
Tm(?)Tr-Cz, TnCgp TmCgp, TmLm-Ar	Miocene travertine, polymicitc conglomerate, limolite, sandstone and limestone. Includes Los Llanos and Santa Ines Formations
	Coahuila
TpaLu-Ar	Paleocene lutite and sandstone. Includes Midway
TeAr-Lu, TeAr-Lm	Eocene sandstone, limolite and lutite. Includes Bigford and Wolcox Formation (in part)
TeCgp-Ar, TeCgp, TeoCgp, TpaeCgp	Eocene polymicitc conglomerate and sandstone. Includes Ahuichila Formation.
TnCgp, TplCgo	Miocene polymictic conglomerate. Includes Reynosa Conglomerate and Sabinas Formation.
	Zacatecas
TeoCgp, TpaeCgp, TnCgp	Eocene polymicitc conglomerate and sandstone. Includes Ahuichila and Los Llanos Formation.
TomAr-TR	Oligocene sandstone and rhyolitic tuff.
	Nuevo León
TpaLu-Ar	Paleocene lutite and sandstone. Includes Midway Formation
Te(s)Ar-Lu, TeAr-Lu	Eocene sandstone and lutite. Includes Jackson Formation and Bigford Formation (in part).
TeAr-Y	Eocene sandstone and gypsum. Includes Yegua Formation.
TeCpg-Ar	Eocene polymicitc conglomerate and sandstone. Includes Ahuichila Formation.
TeLd-Lu	Eocene lodolite and lutite. Includes Difunta Group (in part).
TeLu, TeLu-Ar	Eocene lutite and sandstone. Includes Laredo and Pico Clay Formation.
ToAr-Lu	Oligocene sandstone and lutite. Includes Meson and Vicksburg Formations
ToCgp, TomCgp	Oligocene polymicitic conglomerate. Includes Norma Conglomerate.
Tmpl(?)Bro	Miocene olymictic breccia.
TmplCz-Tr	Miocene limestone and travertine. Includes Providencia Formation.
TnCgp, TplCgp	Miocene polymictic conglomerate. Includes Reynosa Conglomerate.
TplCgo	Pliocene olymictic conglomerate. Includes Sabinas Formation
TplTr	Pliocene travertine.
	San Luis Potosí
TnCgp	Eocene polymictic conglomerate.
TeCpg-Ar, TeCpg	Eocene polymicitc conglomerate and sandstone. Includes Ahuichila Formation.
	Tamaulipas
ToAr-Cgp, TomCgp	Oligocene sandstone and polymictic conglomerate. Includes Palma Real Group and Meson Formation.
ToAr-Lm	Oligocene sandstone and lutite. Includes Meson and Velazco formations.
Te(s)Ar-Lu, TeAr-Lm	Eocene sandstone, limolite and lutite. Includes Jackson and Wolcox Formations.
TeAr-Y	Eocene sandstone and gypsum. Includes Yegua Formation.

TeLu-Ar, TeLu, TeMg-Ar, TeMg-Lu	Eocene lutite and sandstone. Includes Laredo, Chapopote and Pico Clay Formations
TmAr-Cgp	Miocene sandstone and polymicitc conglomerate. Includes Oackville Formation.
TmplCz-Tr	Miocene limestone and travertine. Includes Providencia Formation
TpaLu-Ar, TpaAr-Lu	Paleocene sandstone and lutite. Includes Velazco and Midway Formations.
Tplca	Pliocene caliche
TplCgp	Pliocene polymictic conglomerate. Includes Reynosa Conglomerate.

US

Abrev.	Description
	California
Ku-Ep	Upper Cretaceous to Paleocene sandstone, shale and conglomerate. Includes Dip Creek Formation, Asuncion Group (part), Shut-In Formation, Italian Flat Formation, Steve Creek Formation and El Piojo Formation
M+KJfs	Cretaceous(?) to Miocene sandstone, conglomerate, mudstone and dacite; undivided
Oc?	Cretaceous (?) to Pleistocene(?) sand, gravel conglomerate and sendimentary breccia.
TK	Upper Cretaceous to Pliocene sandstone, shale and conglomerate. Includes Franciscan Complex (part); Coastal terrane; King Range terrane (part).
Ep	Upper Cretaceous (?) to Eocene sandstone, mudstone and conglomerate. Includes Laguna Seca Formation, Las Virgenes Sandstone, Lodo Formation, "Martinez Formation ", Pattiway Formation, San Francisquito Formation, Silverado Formation, Simi Conglomerate, Vine Hill Sandstone, Locatelli Formation and Point Reyes Formation.
E	Paleocene to Oligocene shale, sandstone, conglomerate and limestone. Includes Anita Shale, Avenal Sandstone, Butano Sandstone, Canoas Siltstone, Capay Formation, Coldwater Sandstone, Cozy Dell Shale, Delmar Formation, Domengine Formation, Gredel Formation, Indart Sandstone, Markley Formation (in part), Juncal Formation, Junipero Sandstone, Kreyenhagen Shale, Llajas Formation, Los Muertos Creek Formation, Lucia Shale, Mabury Formation, Maniobra Formation, Markley Formation, Matilija Sandstone, Meganos Formation, Nortonville Shale, Point of Rocks Sandstone, Rose Canyon Shale, Sacate Formation, Santa Susana Formation, Santiago Formation, Sierra Blanca Limestone, Tejon Formation, Tesla Formation, The Rocks Sandstone, Tolman Formation, Torrey Sandstone, Tres Pinos Sandstone, Welcome Formation, Yokut Sandstone, Reliz Canyon Formation, Mount Soledad Formation, Ardath Shale, Scripps Formation, Friars Formation, La Jolla Group and German Rancho Formation
Tc	Paleocene to Pliocene conglomerate, sandstone, breccia, mudstone, limestone and siltstone. Includes Avawatz Formation, Bealville Fanglomerate, Caliente Formation (part), Goler Formation, Old Woman Sandstone, Titus Canyon Formation, Violin Breccia, Walker Formation and Witnet Formation.

Ec	Eocene sandstone, shale and conglomerate. Includes Dry Creek Formation, Ione Formation, Montgomery Creek Formation, Poway Group, Stadium Conglomerate, Mission Valley Formation, Pomerado Conglomerate and Ballena Gravels.
E	Eocene to Miocene(?) sandstone, siltstone, mudstone and conglomerate. Icludes Table Mountain Formation.
Oc	Eocene to Miocene sandstone, conglomerate, mudstone, siltstone and limestone. Includes Berry Conglomerate, Lospe Formation, Plush Ranch Formation (part), Sespe Formation, Simmler Formation, Tecuya Formation (part), Vasquez Formation (in large part), Diligencia Formation and Zayante Sandstone.
Mc	Oligocene to Pleistocene sandstone, conglomerate, siltstone, mudstone, limestone, dolostone, chert and basalt. Includes Barstow Formation, Bena Gravels, Bissell Formation, Bopesta Formation, Caliente Formation (part), Clews Fanglomerate, Coachella Fanglomerate, Fiss Fanglomerate, Mint Canyon Formation, Oso Canyon Formation, Pickhandle Formation, Punchbowl Formation, San Pablo Group, Santa Barbara Formation, Split Mountain Formation, Tick Canyon Formation, Tropico Group and Valley Springs Formation
M, M?	Oligocene to Pliocene Sandstone, shale, siltstone, conglomerate and breccia, includes Temblor Formation (in part), Alferitz Formation, Monterey Formation (in part), Branch Canyon Formation (in part), Briones Formation, Capistrano Formation (in paddrt), Castaic Formation, Cierbo Sandstone, Claremont Shale, Escudo Sandstone, Split Mountain Formation (in part), Freeman Silt, Gallaway Beds, Hambre Sandstone, Hannah Formation, Briones Sandstone (in part), Jewett Sand, Puente Formation (in part), McDonald Shale, Modelo Formation, Neroly Formation, Olcese Sand, Oso Mbr. of Oursan Sandstone, Vaqueros Formation (in part), Pismo Formation, Pleito Formation, Point Arena Beds, Point Sal Formation, Puente Formation, Pullen Formation, Quail Lake Formation, Reef Ridge Shale, Rincon Shale, Rodeo Shale, Round Mountain Silt, Salinas Shale, Sandholdt Shale, San Onofre Breccia (part), San Pablo Group, Santa Margarita Formation, Sisquoc Formation, Sobrante Sandstone, Split Mountain Formation (part), Tequepis Sandstone, Tice Shale, Topanga Formation, Vedder Sand, Whiterock Bluff Wimer Formation, San Mateo Formation.
O	Eocene to Miocene sandstone, siltstone and mudstone. Includes Alegria Formation, Church Creek Beds, Gaviota Formation, Kirker Formation, "San Emigdio Formation ", San Lorenzo Formation, San Ramon Formation and Tumey Formation
P	Miocene to Pleistocene sandstone, siltstone, shale and conglomerate. Includes Careaga Formation, Eel River Formation, Etchegoin Formation, Falor Formation, Fernando Formation, Foxen Mudstone, Imperial Formation, Jacalitos Formation, Merced Formation, Niguel Formation, Ohlson Ranch Formation., Pancho Rico Formation, Pico Formation, Purisima Formation, Repetto Formation, Rio Dell Formation, San Diego Formation, San Joaquin Formation, Scotia Bluffs Sandstone, St. George Formation, Saugus Formation (in part), Towsley Formation, Wildcat Group, Wilson Grove Formation.
QPc	Miocene to Pleistocene sandstone, conglomerate, claystone, shale, siltstone, limestone, coal and breccia. Includes Arroyo Seco Gravel, Cache Formation, Carlotta Formation, China Hat Gravel, China Ranch Beds, Coso Formation, Funeral Fanglomerate (part), Furnace Creek Formation, Glen Ellen Formation, Irvington Gravels, Kern River Formation, Laguna Formation, Livermore Gravel, McKittrick Formation, North Merced Gravel, Nova Formation, Packwood Gravels, Paso Robles Formation, Red Bluff Formation, Ricardo Formation, San Benito Gravels, Santa Clara Formation, Saugus Formation, Tehachapi Formation, Tulare Formation, Turlock Lake Formation, Alturas Formation, Anaverde Formation, Canebrake Conglomerate, Chanac Formation, Crowder Formation, Duarte Conglomerate, Esmeralda Formation, Etchegoin Formation, Green Valley

	Formation, Hathaway Formation, Horned Toad Formation, Hungry Valley Formation, Lockwood Clay, Mecca Formation, Meeke Mine Formation, Mehrten Formation, Morales Formation, Mount Eden Formation, Mulholland Formation, Neroly Formation, Orinda Formation, Oro Loma Formation, Painted Hill Formation, Palm Spring Formation, Panorama Hills Formation, Peace Valley Formation, Petaluma Formation, Potato Sandstone, Purisima Formation, Quatal Formation, Ricardo Formation (part), Ridge Route Formation, Santa Ana Sandstone, San Timoteo Formation, Siesta Formation, Tassajero Formation, Tehama Formation, Tropico Group and Wolfskill Formation
Nevada	
TKs, TKsu	Upper Cretaceous to Eocene conglometare, sandstone, mudstone, limestone and siltstone. Includes Pansy Lee Conglomerate, Gale Hills Formation and Horse Spring Formation.
Ths	Oligocene to Miocene limestone, sandstone, dolostone, mudstone, siltstone, tuff, and volcanic rocks. Includes Horse Spring Formation, Thumb Formation and Overton Conglomerate.
Ts	Eocene to Miocene sandstone, conglomerate, mudstone, dolostone and tuff. Includes Truckee Formation, Coal Valley Formation, Esmeralda Formation, Humboldt Formation, Panaca Formation and Muddy Creek Formation.
QToa	Miocene to Quaternary alluvial deposits.
Arizona	
Tso	Paleocene(?) to Oligocene conglomerate, sandstone, siltstone, limestone, mudstone and basalt, includes Chuska Sandstone and Rim Gravels.
Tsm	Oligocene to Miocene conglomerate, sandstone, mudstone and limestone.
Tsy	Miocene to Pliocene conglomerate, sandstone, gravel, sand, gypsum, limestone, mudstone and siltstone.
New Mexico	
TKa	Cretaceous to Paleogene clay, mud and tuff. Includes Animas Formation.
TKpr, TKr	Cretaceous to Paleogene sandstone, mudstone, coal and conglomerate. Includes Poison Canyon and Raton Formations.
Tps, Tc	Paleogene sandstone, limestone and sand. Includes Baca, Chuska Sandstone, Galisteo, El Rito, Blanco Basin, Love Ranch, Lobo, Sanders Canyon, Skunk Ranch, Timberlake, and Cub Mountain Formations.
Tpc	Paleocene limestone, sand, clay and mud. Includes Poison Canyon Formation.
Tn, Toa	Paleocene sandstone, shale and conglomerate. Includes Nacimiento and Ojo Alamo Formations.
Tsj	Eocene sandstone, sand, and volcanic rocks. Includes San Jose Formation.
Tlp	Oligocene to Miocene sand, gravel and basalt. Includes Los Pinos Formation of Lower Santa Fe Group.
Tos	Oligocene to Eocene sedimentary and volcaniclastic sedimentary rocks. Includes Espinaso, Spears, Bell Top, and Palm Park Formations.
Tsf	Oligocene to Miocene sand, tuff and chert. Includes Hayner Ranch, Rincon Valley, Popotosa, Cochiti, Tesuque, Chamita and Abiquiu Formations.
Tfl	Miocene sandstone and conglomerate. Includes Fence Lake Formation.
To	Miocene to Pliocene alluvial and eolian deposits. Includes Ogallala Formation.
Tus	Miocene to Pliocene clastic and volcanic rocks. Includes Bidahochi Formation, Picuris Formation and Las Feveras Formation.

	Oklahoma
Toa, To	Pleistocene to Pliocene sand, silt, clay, gravel, sandstone, caliche, limestone, conglomerate and volcanic ash. Includes Ogallala and Laverne Formations.
	Texas
PAmi	Paleocene limestone, sandstone and mudstone. Includes Wills Point Formation, Kincaid Formation, Pisgah Member, Littig Member and Midway Group.
PAs	Paleocene sand and mudstone. Includes Simsboro Formation.
Pak, PAw	Paleocene sand, clay and limestone. Includes Wills Point Formation and Kincaid Formation, Tehaucana, Pisgah, and Littig Members.
EPAc, EPAwi, PAh	Paleocene to Eocene mudstone, sandstone and coal. Includes Wilcox Group; Calvert Bluff Formation, Simsboro Formation and Hooper Formation.
EPAin, EPAu, Er, Ec	Paleocene Eocene sandstone and coal. Includes Reklaw Formation, Indio Formation, Carrizo Sand and Wilcox and Midway Group.
Emb	Eocene mudstone. Includes Jackson Group; Moodys Branch Formation.
Eqc	Eocene sandstone, siltstone and clay. Includes Queen City Sand.
Es	Eocene sand, silt, sandstone and coal. Includes Sparta Sand.
Evh	Eocene sandstone, tuff, trachyte, rhyolite and basalt. Includes Pantera Trachyte and Hogeye Tuff.
Ew	Eocene sand, clay and mud. Includes Weches Formation.
Ewb, Eca	Eocene sand, sandstone and clay. Includes Carlos Sandstone member, Cadell Formation and Wellborn Formation.
Ey	Eocene sandstone, clay, mud, limestone and coal. Includes Claiborne Group and Yegua Formation.
Eb	Eocene siltstone, sandstone, clay and mud. Includes Bigford Formation.
Ecm, Eep	Eocene clay, sandstone and coal. Includes Cook Mountain and El Pico Clay Formation.
Ehh	Eocene sandstone, conglomerate and clay. Includes Hannold Hill Member of Tornillo Formation.
Ejl	Eocene clay, sandstone and mudstone. Includes Manning, Wellborn, and Cadell Formations.
Em, Eya	Eocene clay, mud, sandstone sand, bentonite, siltstone and coal. Includes Manning Formation, Yazoo Formation and Plum Bentonite.
El	Eocene sandstone and clay. Includes Laredo Formation.
OEc, PAbp	Eocene to Oligocene sandstone, mudstone, tuff, conglomerate, basalt and trachyandesite. Includes Big Bend Park Group, Chilicotal Group, Alamo Creek Basalt, Bee Mountain Basalt, Mule Ear Spring Tuff, Chisos Formation, Big Yellow Sandstone Member, Black Peaks Member and Tornillo Formation.
OEw, OEj	Eocene to Oligocene sandstone, siltstone and sand. Includes Jackson Group, Whitsett Formation, Fashing Clay Member, Calliham Sandstone Member, Dubose Clay Member, Deweesville Sandstone Member, Conquista Clay Member, Conquista Clay Member and Dilworth Sandstone Member.
Oc, Ocf, Of	Oligocene mudstone, sand, tuff, sandstone and conglomerate. Includes Catahoula Formation, Frio Clay, Chusa Tuff Mmember, Soledad Volcanic Conglomerate Member and Fant Tuff Member.
On	Oligocene Nash Creek Formation.

Opf	Oligocene sandstone, conglomerate, ash-flow tuff and mudstone. Includes Perdiz Conglomerate, Tascotal Formation, and tuffaceous sediments of Fresno Formation.
Md	Miocene sandstone, basalt and conglomerate. Includes Delaho Fm, Smoky Creek Member, Rawls Formation and Closed Canyon Formation.
Mg	Miocene sandstone, clay, mudstone, limestone and conglomerate. Includes Goliad Formation.
Mf, Mfo, Io	Miocene clay and sandstone. Includes Fleming Formation and Oakville Sandstone.
Mt	Miocene gravel, tuff, trachyte, basalt, ignimbrite and limestone. Includes Tarantula Gravel.
POMo	Miocene to Pliocene sand, silt, clay and gravel includes. Includes Ogallala Formation.
POb	Pliocene sand, clay, limestone and gravel. Includes Blanco Formation.
PObo, POf	Pliocene clay, silt, sandstone and conglomerate. Includes Bolson and Fingers deposits.
Pow, POu, POr	Pliocene clay, mud, silt, sand and gravel. Includes Willis and Rita Blanca Formation.
QT, QTu	Pliocene to Pleistocene gravel, chert and conglomerate. Includes Quaternary-Tertiary deposits, Uvalde Gravel and Perdiz Conglomerate.
Qtu	Pleistocene sand, silt, clay and mud. Includes Tule Formation.

10. Quaternary volcanic rocks

Mexico

Abrev.	Description
	Baja California Norte
QptB, QpthoB-A	Quaternay basalt and andesite. Includes San Quintin Volcanic Field and volcanic rocks in Cerro Prieto
	Baja California Sur
QB, QLh, QTR,QB-Bva	Quaternay basalt, rhyolitic tuff and lahars. Includes Tres Virgenes Group.
QptB, QptB-Pc, QptBvB	Quaternay basalt, basaltic breccia and pyroclastic rocks, undivided.
	Sonora
QB	Quaternay basalt. Includes Picanate Volcanic Field.
	Chihuahua
QB, QptBvB-B	Quaternay basalt and basaltic breccia. Includes Palomas Volcanic Field and Camargo Volcanic Field.
	Sinaloa
QptB, QptA-B, QptBvB-B	Quaternay basalt, basaltic breccia and andesite.
	Durango
QhoB, QptA-TA	Quaternary basalt, andesite and andesitic tuff.
QptB	Quaternary basalt. Includes Guadiana Basalt.

Coahuila	
QB, Qho(?)B, QhoB, QpthB	Quaternary basalt, undivided.
Zacatecas/Tamaulipas	
QptB	Quaternary basalt, undivided.

US

Abrev.	Description
California	
Qv, Qv?	Quaternary basalt, rhyolite and andesite. Includes Black Mountain Basalt, Santa Rosa Basalt Coso Volcanic Field, Mammoth Mountain volcano and Long Valley Caldera
Qrv	Holocene volcanic flow rocks and pyroclastic deposits, includes rhyolite; may be Pleistocene in part. Includes Mono Craters.
Qrvp, Qv1?	Holocene andesite, basalt, pumice and volcanic mudflows, includes Cascade Volcanic Field.
Qvp	Holocene pyroclastic and volcanic mudflow deposits, includes rhyolite, ash-flow tuff and ignimbrite. Includes Bishop Tuff
Arizona	
QTb, QTv	Pliocene to Holocene alkaline basalt, basalt, andesite, trachyte, hawaiite, alkali rhyolite, latite and dacite. Includes San Francisco, Unikaret, Springerville, San Carlos, San Bernardino and Sentinal volcanic fields.
New Mexico	
Qbt, Qb, Qr	Quaternary rhyolite, tyff, basalt, andesite and pumice. Includes Tewa Group (part); Bandelier Tuff at Jemez Mountains.
QTb	Quarternary basalt, andesite and sedimentary rocks, Maybe Pleistocene and Pliocene in part.
Qv	Quaternary basaltic and pyroclastic volcanics; tuff rings, cinders, and lavas.
Qvr	Quaternary Valles Rhyolite at Jemez Mountains.
Qbo	Pleistocene basalt and basaltic andesite.

11. Quaternary sediments

Mexico

Abrev.	Description
Baja California Norte	
QpthoCgp, QCgp, QptCgp, Qptgv-ar, Qptar, QptCgp-Ar	Pleistocene polymictic conglomerate, gravel and sand. Includes Canebrake Formation.
Qholi, Qhopa	Holocene deposits in litoral zone and coastal areas

Qhoal, Qal, Qhola	Holocene alluvium and lacustrine deposits.
Qheo, Qeo	Quaternary eolian deposits.
	Baja California Sur
TplQptCgp-Ar	Quaternary polymictic conglomerate and sandstone. Includes Los Barriles Formation.
QCgp, QptCq-Ar, QptAr-Cq, QptAr-Lm, QptCgp, QptCq, QptAr, QptCq-Ar, QptAr-Cgp	Pleistocene sandstone, polymicitc conglomerate, limolite.
Qhoal, Qal, Qholag	Holocene alluvium and lacustrine deposits.
Qhoar-Lm, Qhoar-Cgp QhoCgp	Holocene sand and polymictic conglomerate
Qholi, Qli	Holocene deposits in litoral zone
Qhoeo, Qeo	Quaternary eolian deposits.
	Sonora
Qptgv-ar, QAr-Lm, QptCgp, Qptar-Lm	Pleistocene gravel, polymictic conglomerate, limolite and sandstone.
QptCgp-Ar	Pleistoncene polymicitic conglomerate. Includes Sonora Group.
Qholi, Qhopa	Holocene deposits in litoral zone and coastal areas
Qhoal, Qal, Qhola	Holocene alluvium and lacustrine deposits
Qholm-ar, Qhoar-Lm,	Holocene sand and limo
Qhoeo, Qeo	Quaternary eolian deposits.
	Chihuahua
QpthoCgp, QptCgo,QCgp	Pleistocene polymictic conglomerate.
Qholm-ar, Qholm, QhoCgp	Holocene sand, limo and polymictic conglomerate.
Qhola	Holocene lacustrine deposits
Qal, Qhoal, Qhoco	Holocene alluvium and colluvium deposits
Qhoeo, Qeo	Quaternary eolian deposits.
	Sinaloa
TplQptCgp, QhoCgp, QptAr-Cgp	Pleistocene and Holocene polymictic conglomerate, sandstone
Qli, Qhopa	Holocene deposits in litoral zone and coastal areas
Qal, Qhoal, Qhola, Qla,	Holocene alluvium and lacustrine deposits
Qeo	Quaternary eolian deposits.
	Durango

Qholm, QhoCgp,	Holocene limo and polymictic conglomerate.
Qal, Qhoal, Qhoco	Holocene alluvium and colluvium deposits
Qhola	Holocene lacustrine deposits
	Coahuila
QptTr, QphoCgp	Pleistocene travertine, polymictic conglomerate,
Qholm-ar, QhoCgp, QhoCgo	Holocene sand and polymictic conglomerate
Qhoal, Qhoco	Holocene alluvium and colluvium deposits
	Zacatecas
QptTr	Pleistocene travertine
Qhola, Qal	Holocene lacustrine and alluvium deposits
	Nuevo León
QptTr, QptCgp, QpthoCgp, Qcgp	Pleistocene travertine, polymictic conglomerate
QhoCgo, QCgo	Holocene polymictic conglomerate
Qhola	Holocene lacustrine deposits
Qal, Qhoal, Qhoco	Holocene alluvium and colluvium deposits
	San Luis Potosí
QptCgp, QCgp	Pleistocene polymictic conglomerate
Qhoal, Qal	Holocene alluvium deposit.
	Tamaulipas
QptCgp	Pleistocene polymictic conglomerate.
Qhola, Qhoal, Qal	Holocene lacustrine and alluvium deposits
Qholi	Holocene deposits in litoral zone
Qhoeo	Quaternary eolian deposits.

US

Abrev.	**Description**
	California
Qg	Pleistocene glacial deposits; glacial till and moraines.
Q	Alluvium deposits
Qs	Quaternary deposits in coastal areas, including beach sand and eolian dunes.
	Nevada
Qls	Quaternary landslide deposits, includes colluvium and sedimentary rocks.
Qp, Qa	Quaternary marsh and alluvial deposists. Includes Lake Lahontan deposits.
	Arizona
Qo, QTs	Pliocene to Pleistocene gravel and sand, includes coarse relict alluvial fan deposits.

Qm, Q	Pleistocene alluvial fan, terrace, and basin-floor and eolian deposits.
Qr, Qy	Holocene sand and gravel, includes river channel, fluvial associated deposits, alluvial fan deposits and floodplain deposits.
	New Mexico
Qd	Pleistocene gracial deposits: till and outwash.
Qeg, Qe	Quaternary gypsiferous eolian deposits.
Ql	Quaternary landslide deposits and colluvium.
Qoa, Qp, Qa	Quaternary alluvial, includes lacustrine and alluvial deposits.
Qpl	Quaternary alluvium, eoilian, lacustrine and playa-lake deposits.
QTg	Pleistocene conglomerate, sandstone and basalt, includes Gila Group and Mimbres Formation.
QTp	Quaternary piedmont alluvial deposits and shallow basin fill, includes Quemado Formation.
QTs, QTsf	Quaternary volcanic and unconsolidated deposits; may be Paleogene and Neogen in part; includes Santa Fe Group; Camp Rice, Fort Hancock, Palomas, Sierra Ladrones, Ancha, Puye and Alamosa Formations.
QTt	Quaternary limestone.
	Oklahoma
Qt	Pleistocene terrace deposits.
Qal	Holocene Clay, silt, sand, and gravel (Alluvium).
	Texas
QTb	Pliocene to Pleistocene clay, silt, sandstone, and conglomerate, includes bolson deposits.
Qao, Qdl, Qo	Pleistocene gravel, sand, silt and alluvial deposits. Includes Double Lakes Formation Onion Creek Marl
Qtl	Pleistocene (?) limestone, includes Toy Limestone.
Qbc, Qbs, Qbd, Qun	Pleistocene clay, sand and silt, includes Blackwater Draw Formation, Tahoka and Beaumont Formations.
Qse, Qhg	Pleistocene sand, gravel, clay and mud. Includes part of Paducha Group, Good Creek Formation, Groesbeck Formation and Seymour Formation.
Qta	Pleistocene lacustrine clay, silt, sand, and gravel. Includes Tahoka Formation, Vigo Dolomite and Rich Lake Dolomite.
Qg	Pleistocene (?) sand, conglomerate, evaporite, limestone, siltstone and shale. Includes Gatuna Formation.
Qb, Qgy	Quaternary lacustrine and fluviatile deposits of clay, silt, sand, and gypsum. Includes Bolson deposits.
Qbb, Qls	Quaternary barrier island deposits and land slide deposits.
Qc	Quaternary evaporite and caliche deposits.
Qd?, Qd	Quaternary (?) clay mud and silt. Includes Deweyville Formation.
Qf	Quaternary alluvial fan deposits.
Qt, Ql, Qu, Qbv	Quaternary sand, gravel, silt, clay and mud. Includes Terrace deposits and sand of Rio Grande delta.
Qp	Quaternary clay, mud, silt and playa deposits.
Qac, Qas, Hfs	Holocene sill, clay, sand and mud. Includes Alluvium in Rio Grande.

Qaf	Holocene evaporite, clay, mud and alkali flat deposits.
Qal, Qsu, Qbr, Qcd, Qds, Qs, Qsd, Qsi, Qli	Holocene sand, silt, clay, and gravel, includes alluvium and low terrace deposits. Includes Paducah Group and Lingos Formation.