Table 1.—Generalized stratigraphic and hydrogeologic nomenclature of Precambrian, Paleozoic, and Mesozoic rocks in the Upper Colorado River Basin [only Mesozoic formations immediately overlying the Paleozoic rocks are listed. Abbreviations used in this table include: Fm = Formation; Mbr = Member; Ss = Sandstone; Ls = Limestone; Dol = Dolomite; Sh = Shale. Colors relate component geologic units to hydrogeologic units and are symbolic of the predominant lithology in the hydrogeologic unit: yellow and brown indicate sandstone and quartzite; shades of green indicate mostly shale; shades of blue indicate mostly carbonate rocks; other colors indicate mixed lithology. Contacts within series are generalized]

ERA OR ERATHEM	PERIOD OP	EPOCH OR SERIES		SOUTHWESTERN WYOMING			NORTHWESTERN COLORADO			NORTHEASTERN UTAH		SOUTHEASTERN UTAH			NORTHEASTERN ARIZONA		SOUTHWESTERN COLORADO		LIVEROSESI SSIS	MAXIMUM
	PERIOD OR SYSTEM			Overthrust Belt	Wind River Mountains	Rawlins Uplift	Eastern Eagle Basin	White River Plateau	Elk Mountains	Southeastern Uinta Mountains	Southwestern Uinta Basin	San Rafael Swell	Henry Mountains Basin	Northern Monument Upwarp	Marble Platform	Defiance Plateau	Four Corners Platform	San Juan Mountains	HYDROGEOLOGIC UNIT	THICKNES IN FEET
MESOZOIC	JURASSIC	Late or Upper Middle Early or Lower							Entrada Sandstone								Wingate Sandstone		Not discussed in this report. (See Freethey and Cordy, 1991).	
	TRIASSIC	Late or Upper														Chinle Formation Shinarump Member	Chinle Formation Petrified Forest Mbr Shinarump Member	Dolores Formation lower member	Chinle-Moenkopi confining unit	Not discu in this rej (See Free and Cordy,
PALEOZOIC	PERMIAN	Late or Upper	Guadalupian	Dinwoody Formation 1 Retort Phosphatic Shale Mbr b Rex Chert Franson a	Dinwoody Formation 1 Ervay Limestone Member a Tosi Cheri	Little Medicine Mbr Freezeout Sh Mbr Ervay Limestone Member Difficulty Sh Mbr Forelle Ls Member Glendo Shale Mbr	upper shale member S. Canyon Cr Dol Mbr 3	upper shale member S Canyon Cr Dol Mbr	State Bridge Formation	Moenkopi Formation 1 Franson Member a	Woodside Shale	Moenkopi Formation lower slope- forming mbr	Moenkopi Formation lower slope- forming mbr	Moenkopi Formation Hoskinnini Member	Moenkopi Formation Lower Red Member					
		Early or Lower	Leonardian	1 Meade Peak Phosphatic Shale Member b 1 Grandeur Member a	1 Meade Peak Phosphatic Shale Member b 1 Grandeur Member	Minnekahta Ls Mbr Opeche Shale Member	lower shale member	lower shale member	Formation	Mackentire Tongue 6 of Woodside Shale 1 Meade Peak Phosphatic Shale Member 1 1 Grandeur Member a	Park City Formation	Kaibab Formation White Rim Sandstone	Kaibab Formation White Rim Sandstone Organ Rock Shale	White Rim Sandstone Organ Rock Shale	Kaibab Formation Toroweap Formation Coconino Sandstone Hermit Shale	White House Mbr Oak Springs Mbr Hunters Point Mbr	De Chelly Sandstone	nyonlands aquifer	Park City-State Bridge zone Weber-De Chelly zone	4,00
		Late or	Wolfcampian Virgilian	Wolls			Weber Sandstone Maroon Formation	Schoolhouse Member of Maroon Formation	Fryingpan Member of 4 Maroon Formation Maroon Formation	Weber Sandstone	Weber Sandstone Morgan Formation and equivalents 9	Elephant Canyon Formation	Cedar Mesa Sandstone Elephant Canyon Formation	Cedar Mesa Sandstone Halgaito Shale Rico Formation	Esplanade Sandstone Wescogame Formation	Supai Formation	Cutler Formation	Cutler Formation	Cutler-Maroon zone	16,5
	PENNSYLVANIAN	Upper Middle Early or	Missourian Desmoinesian Atokan Morrowan	Wells Formation Ranchester	Tensleep Sandstone	Tensleep Sandstone Ranchester Limestone Member	Jacque Mt Ls Mbr Minturn Formation Belden Formation	Maroon Formation Minturn Eagle Valley Evaporite Belden Formation	Eagle Valley Formation Belden Formation	Morgan Formation	Round Valley Limestone	upper member Paradox Member lower member Molas Formation	upper member Paradox Member lower member Molas Formation	upper member Paradox Member lower member Molas Formation	Manakacha Formation Watahomigi Formation	Paradox Member lower member Molas Formation	Paradox Member lower member Molas Formation	upper member Paradox Member lower member Molas Formation	Paradox–Eagle Valley subunit	9,7
	MISSISSIPPIAN	Late or Upper	Chesterian Meramecian Osagean	Limestone Member Moffat Trail Ls Mbr Horseshoe Sh Mbr Darwin Ss Mbr Mission Canyon Limestone	Limestone Member Moffat Trail Ls Mbr Horseshoe Sh Mbr Darwin Ss Mbr Full Stude Por Little Tongue Mbr Big Goose Mbr	Horseshoe Sh Mbr Darwin Ss Mbr Little Tongue Mbr Big Goose Mbr	Molas Formation	Molas Formation	Molas Formation	Doughnut Shale Humbug Formation	Doughnut Formation Humbug Formation	Molas Pormation	Horseshoe Mesa Mbr	Horseshoe Mesa Mbr	Surprise Canyon Formation Horseshoe Mesa Mbr	Wolas i Official	Moids Formation	Modes Portrailor	Belden-Molas subunit Darwin-Humbug zone	8
		Early or Lower	Kinderhookian	Cottonwood Canyon Member	Woodhurst Member Little Bighorn Member Cottonwood Canyon Member	Woodhurst Member basal sandstone mbr	Leadville Limestone Gilman Sandstone Dyer Dolomite	Leadville Limestone Gilman equivalent Dyer Dolomite	Gilman Sandstone Dyer Dolomite	Madison Limestone 7	Redwall Limestone Ouray Limestone	Redwall Limestone Ouray Limestone	Mooney Falls Mbr Thunder Springs Member Whitmore Wash Member Ouray Limestone	Mooney Falls Mbr Thunder Springs Member Whitmore Wash Member Ouray Limestone	Mooney Falls Mbr Thunder Springs Member Whitmore Wash Member Temple Butte Formation	Redwall Limestone Ouray Limestone	Leadville Limestone Ouray Limestone	Leadville Limestone Ouray Limestone	Redwall-Leadville zone	2,
	DEVONIAN	Early or Lower		Darby Formation Leigh Dolomite Member	Darby Formation		Parting Formation	Parting Formation	Parting Formation		Elbert Formation	Elbert Formation	Elbert Formation	Elbert Formation	Formation	Elbert Formation	Elbert Formation	Elbert Formation	Elbert-Parting confining unit	7
	ORDOVICIAN	Upper Middle Early or Lower		Bighorn Dolomite	Bighorn Dolomite Lander Ss Mbr		Harding Sandstone	Manitou Dolomite	Fremont Limestone Harding Sandstone Manitou Dolomite										Bighorn aquifer	3,
	CAMBRIAN	Late or Upper		Gallatin Limestone Park Shale Member	Open Door Limestone Member Dry Creek Shale Member 2 Du Noir Limestone Member Gros Ventre	Gros Ventre Formation	Peerless Formation Sawatch Quartzite	Dotsero Formation Sawatch Quartzite	Peerless Formation Sawatch Quartzite		Maxfield Limestone	Lynch Dolomite Maxfield Limestone	Lynch Dolomite Maxfield Limestone	Lynch Dolomite Maxfield Limestone	Muav Limestone	Muav 12 equivalent Bright Angel	Muav equivalent Bright Angel equivalent ?	Ignacio Quartzite	Gros Ventre confining unit	1,
		Middle		Death Canyon Limestone Member Wolsey Shale Member Flathead Sandstone	Flathead Sandstone	Flathead Sandstone				Lodore Formation 8	Ophir Shale Tintic Quartzite	Ophir Shale Tintic Quartzite	Ophir Shale Tintic Quartzite	Ophir Shale Tintic Quartzite	Bright Angel Shale Tapeats Sandstone	Bright Angel equivalent Tapeats equivalent	Ignacio Quartzite		Flathead aquifer	8
Late oterozoic		Early or Lower																		
arly Middle Proterozoic Pr										Red Pine Shale Uinta Mountain Group	Uinta Mountain Group				Chuar Group Nankoweap Fm Unkar Group				Basal confining unit	Not disc in this r (See Hed others,
							St. Kevin Granite Granitic and metamorphic rocks (?)	Granitic and metamorphic rocks	Granitic and metamorphic rocks		Granitic and metamorphic rocks	Granitic rocks	Granitic rocks	Metamorphic rocks	Zoroaster Complex Vishnu Schist	Slightly metamorphosed sedimentary and volcanic rocks Granitic and metamorphic rocks	Granitic and metamorphic rocks	Eolus Granite Uncompahgre Formation Granitic and metamorphic rocks		

FOOTNOTES

1. As suggested by McKelvey and others (1959), designation of the rocks of Park City/Phosphoria age as either "Park City Formation" or "Phosphoria Formation" is based on the predominant rock types, and each formation can include tongues of the other. Members of the Park City Formation are denoted by the letter *a*; members of the Phosphoria Formation are denoted by the letter *b*.

2. Of Shaw (1957); included in Open Door Limestone in some reports (for example, Keefer and Van Lieu, 1966).

- 3. Of Maughan (1980); also called South Canyon Creek Member (by Freeman, 1971, for example).
- 4. Of Johnson (1989); formerly considered a member of the State Bridge Formation (Freeman, 1971).
- 5. Of Langenheim (1952); also called "Minturn Formation."

6. The name "Mackentire Tongue of Woodside Shale," as used by McKelvey and others (1959), is applied to a sequence of red shale within the Park City Formation in the Uinta Mountains, even though the Woodside Shale generally is considered to be Triassic. Therefore, either the Mackentire Tongue is not a tongue of the Woodside Shale, or the Woodside Shale is partly Permian.

7. As indicated by Hallgarth (1959) and correlations made during this study, the lowermost beds of the Madison Limestone in the southeastern Uinta Mountains correlate with the uppermost beds of the Dyer Dolomite of northwestern Colorado. Therefore, either the uppermost Dyer Dolomite is Mississippian, as shown here, or the lowermost Madison Limestone in the southeastern Uinta Mountains is Late Devonian.

8. According to Untermann and Untermann (1954), fossils from the upper (shaly) part of the Lodore Formation where it crops out in the southeastern Uinta Mountains date the upper part of the Lodore Formation (an equivalent of the Gros Ventre Formation) as Late Cambrian. However, the lower part of the Lodore Formation (an equivalent of the Flathead Sandstone, Sawatch Quartzite, and Tintic Quartzite) is unfossiliferous. The age of the lower part of the Lodore Formation here is inferred to be Middle and Late Cambrian from its geographic position relative to equivalent quartzite/sandstone units. These formations range from Middle Cambrian on the north and west to Late Cambrian on the east.

9. Even though the Morgan Formation is considered to be Middle Pennsylvanian where it crops out in the Uinta Mountains (for example, Hansen and others, 1983), it can be traced southward in the subsurface into beds of the Elephant Canyon Formation of Baars (1962). Because the Elephant Canyon Formation is Early Permian where it crops out in the Monument Upwarp, both the Morgan and Elephant Canyon Formations must be Pennsylvanian and Permian in age where they merge (north of the San Rafael Swell).

10. The Round Valley Limestone correlates in the subsurface with the Eagle Valley Evaporite and the Paradox Member of the Hermosa Formation, both of which are Middle Pennsylvanian in age. Because the Round Valley Limestone where it crops out in the Uinta Mountains is Early Pennsylvanian, it is inferred to be time-transgressive in the subsurface. Hence, in the southwestern Uinta basin, where it merges with the Paradox Member, the Round Valley Limestone is interpreted to be Early and Middle Pennsylvanian. Similarly, the Doughnut Shale (Formation) is interpreted to be time-transgressive and is considered Late Mississippian and Early Pennsylvanian in the southwestern Uinta basin.

11. The Cutler Formation in southeastern Utah becomes divisible into several distinct units, to which the U.S. Geological Survey assigns member rank. Baars (1962), however, assigned these units formation rank and the Cutler, group rank, in southeastern Utah. A sequence of carbonate and clastic rocks that grades into the lowermost shally beds of the Cutler was designated by Baars (1962) as the Elephant Canyon Formation. The nomenclature of Baars (1962) regarding the Cutler rocks is used in this report.

12. Cambrian units cropping out in the Grand Canyon, the Tapeats Sandstone, Bright Angel Shale, and Muav Limestone, were traced during this study into northeastern Arizona and southwestern Colorado by means of borehole lithologic logs. Because no names for the shale and carbonate units currently are recognized by the U.S. Geological Survey in Colorado, the names "Bright Angel equivalent" and "Muav equivalent" were used beyond the Grand Canyon area where rocks characteristic of the Bright Angel Shale and Muav Limestone, respectively, were identified. An equivalent of the Tapeats Sandstone crops out in the San Juan Mountains of Colorado, where it is called the Ignacio Quartzite. In this report, an axis of thinning in southwestern Colorado was considered the boundary between the extension of the Tapeats Sandstone beyond the Grand Canyon area, the "Tapeats equivalent," and the Ignacio Quartzite. As shown by Baars (1983, p. 54), the Cambrian geologic units become progressively younger from the Grand Canyon to the San Juan Mountains. Hence, in the Defiance Plateau and Four Corners platform columns, the ages of the Tapeats equivalent, Ignacio Quartzite, Bright Angel equivalent, and Muav equivalent are depicted as intermediate between ages in outcrop areas to the west and east.

13. Excluding salt diapirs of small areal extent that can be as much as 15,000 feet thick.

14. Although Precambrian rocks do not crop out and have not been penetrated by boreholes in the Overthrust Belt within the Upper Colorado River Basin, Archean granitic and metamorphic rocks are exposed in the Farmington complex, about 30 miles west of the Utah-Wyoming State line (Bryant, 1988).