## COLORADO GEOLOGICAL SURVEY COLORADO SCHOOL OF MINES GOLDEN, COLORADO

Ма	Period	Epoch	Stage	Pale magn	eo- etics	NALM "ages"	Western Interior Ammonite Zones	NW San Juan Paradox Basins	Piceance Basin and SJ Volcanics	Sand Wash Basin	Eagle Basin	San Luis Basin Upper Arkansas	Middle-North Park Basin	South Park Basin	Front Range Outcrops Basi
61 - 62 - 63 - 64 - 65 -	PALEOGENE	Paleocene	Danian	C27n C28n 64.5 64.9 C29n 65.8	C27 C28 C29	<sup>p</sup> uercan Jonianan		Ojo Alamo	Wasatch Atwell	Ft Union		Animas	Middle Park	South Park	D1 Sequence Denver
67 - 68 - 69 - 70 - 71 - 72 -			Maastrichtian <sup>22.1</sup>	66.4 C30n C31n C31r	C30 C31 C32	dmontonian Lancian	J. nebrascensis H. nicolletii H. birkelundae * B. clinolobatus * B. grandis B. baculus * B. eliasi * B. jenseni * P. roosidai	Sub Ojo Alamo Unc Kirkland	Sub Ohio Ck Unc Williams Fork Lion Cyn Coal Canyon Yampa Ash Bed	Sub Moffat Unc Lance Fox Hills Lewis	K-Pg Boundary	Laramide	Sub Windy Gap Unc	Reinecker Ridge Cgl Sub Reinecker Ridge Unc Laramie	Arapahoe Cgl 0000 0 00 00 00 0 Sub Arapahoe Unc Laramie Fox Hills Sub Fox Hills Bentonite Larimer/Rocky Ridge
73 · 74 · 75 · 76 · 77 · 78 ·			Campanian	C33n	C33	Judithian Ec	<ul> <li>* B. reesidei B. cuneatus</li> <li>* B. compressus</li> <li>* D. cheyennense</li> <li>* D. cheyennense</li> <li>* D. stevensoni D. nebrascense</li> <li>* B. scotti</li> <li>B. reduncus</li> <li>B. gregoryensis</li> <li>B. gregoryensis</li> <li>B. perplexus</li> <li>B. sp (smooth)</li> <li>B. asperiformis</li> <li>B. mclearni</li> </ul>	Fruitland Pictured Cliffs Huerfanito Bentonite Lewis	Cameo Rollins Cozzette Iles Corcoran Sego Buck Tongue	Trout Creek Illes Tow Creek Morapas	Cozzette ? Sego ?		Carter Hygiene Kremmling	Hygiene	Terry Hygiene
80 - 81 - 82 - 83 - 83 -	EOUS	Upper	83.6	C33r		Aquilian	B. obtusus B. sp (w fl ribs) B. sp (smooth) S. hippocrepis III * S. hippocrepis I S. hippocrepis I S. hippocrepis I	Cliffhouse Mesaverde/ Menefee Point Lookout	Prairie Canyon (Mancos B) Mancos	Meeker	Mancos		Sharon Springs Pierre	Apache Creek Pierre	Pierre
85 - 86 - 87 - 88 - 88 -	CRETAC		Con- E <sup>98</sup> San- iacian Etonia				D. bassieri D. erdmanni C. choteauensis C. vermiformis C. saxitonianus * S. depressus S. ventricosus S. ventricosus S. mariasensis P. germari S. nigricollensis S. ferronensis	Smoky Hill Mancos Montezuma Valley	Smoky Hill Niobrara Fort Hays Juana Lopez	S Niobrara Juana Lopez	Niobrara Juana Lopez		Niobrara Fort Hays Juana Lopez	Niobrara Fort Hays Juana Lopez	Smoky Hill Niobrara Juana Lopez
90 - 91 - 92 - 93 - 94 - 95 -			89.8 Laconian 93.9	C34n	C34		<ul> <li>* P. hyatti</li> <li>* P. hyatti</li> <li>C. praecox</li> <li>C. woollgeri</li> <li>M. nodosoides</li> <li>* V. birchbyi</li> <li>* V. diartianum</li> <li>* D. pondi</li> <li>* A. amphibolum</li> </ul>	ensis ni nbi nbi geri isoides oyi anum i nibolum	Frontier	Frontier Greenhorn	Dakota Group	Cretaceous Shale	Codell Frontier	eenhorn	Carlile Fairport C Bridge Creek Greenhorn Hartla Lincoln Graneros
96 - 97 - 98 - 99 - 100 -			Cenomanian				* C. tarrantense Dakota Group (Naturita)	Dakota Group (Naturita)	Dakota Group	Dakota Group			Mowry		
101 - 102 - 103 - 104 - 105 - 106 -	-	Lower	Albian					Durro Cariyon	Cedar Mountain Buckhorn Cgl	Sub Dakota Unconformity	Sub Dakota Unconformity		Dakota Group	Dakota Group	Horsetooth Muddy J Van Bibber Kassler Skull Cr Plainview
107 <sup>-</sup> 108 -						* D								Unconformity	Sub Dakota Unconform

Ammonite Range Zones from USGS OF 2006-1250, \* indicates radiometric date. See also https://precisionstratigraphy.com for boundary info. Date for Coal Canyon Ash (Piceance Basin) is from Walker, J.T., Aslan, A., Cole, R., and Heizler, M.T., 2021, Mt Geologist, v. 58, p. 5–26. Dates for Codell, X Bentonite, and Clay Spur Bentonite from Longman, M., Gent, J., and Hagadorn, J., 2021, Mt Geologist, v. 58, p. 289–304. Pmag from GSA, 2009 with C32/C33 boundary shifted to 73.5 after Fassett USGS PP 1625-B, and Santonian Campanian boundary put at top of C34, C28r to C30n from Clyde et al., 2016.

Stage boundaries from International Committee on Stratigraphy *https://stratigraphy.org*.

## CRETACEOUS STRATIGRAPHY OF COLORADO

By Robert G. Raynolds 2022

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Additional Resource: Correlation of the Upper Cretaceous Strata of Wyoming, 2017, WSGS-2017-ofr-03, by Ranie M. Lynds and Joshua S. Slattery



Drafted by Larry Scott, CGS

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Colorado's stratigraphy is dominated by gaps. The distribution of strata reflects the tectonic and climatic evolution of these patterns, we have organized the stratigraphy using a the onset of accommodation associated with the transgreslinear timescale and illustrated where orogenic uplift has led to removal of strata or nondeposition. Not all orogenic features are illustrated on the chart. In the past ~10 Ma, seas. regional uplift has raised Colorado and has allowed the modern landscapes to be created due to erosion. The color scheme for stratigraphic units gives a sense of dominant lithologies and depositional environments across basins.

Updates to this chart, as well as additional stratigraphic resources, such as stratigraphic and structural cross-sections, can be found at *https://coloradostratigraphy.org*. To learn more about the unit names on this chart, resources are available at the U.S. Geological Survey's Geolex site: https://ngmdb.usgs.gov/Geolex.

This chart scaffolds on the work of Richard H. Pearl's 1977 compilation (Rocky Mountain Association of Geologists, Special Publication 2). This data has been recast against the International Commission on Stratigraphy's chrono-stratigraphic chart v. 2015/01, updated at: https://stratigraphy.org.

The Jurassic Morrison Formation is overlain unconformably by the basal sandstone beds of the Dakota Group. These each of the region's basin areas. To foster comparison of strata are often characterized by chert pebbles and represent sion of the Interior Seaway. For a time span on the order of thirty million years, Colorado was inundated by shallow

Coniacian A complex series of transgression and regression episodes are recorded in western Colorado, culminating in the regressive Fox Hills Sandstone representing the departure of the seaway. The overlying fluvial-dominated Kirkland, Williams Fork, and Laramie formations accumulated on the low elevation coastal plain that replaced the seaway.

## Stratigraphic Chart Basin Boundaries



Major Geologic Features



Scale Legend Organic-rich shale Coastal/near-shore sandstone Volcanic rocks Non-marine sandstone, mudstone Marine shale Coal seam Conglomerate Marine carbonates (limestone, dolostone) Laramide mountain building event with associated shed material Missing strata due to uplift and erosion



The thick organic-rich marine shale units that dominate the Cretaceous sedimentary package are source rocks for many hydrocarbon accumulations.

Submarine erosion and non-deposition resulted in subtle diastems and unconformities during the Turonian and

At the end of the Cretaceous, the Laramide Orogeny shattered the craton, defining basement-cored uplifts and adjacent downwarps that filled with synorogenic sediments.

0\_\_\_\_\_100 Miles



