



Chapter 11

# Outcrop Descriptions and Fossils from the Upper Cretaceous Frontier Formation, Wind River Basin and Adjacent Areas, Wyoming

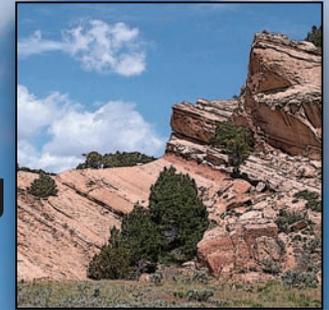
By E.A. Merewether and W.A. Cobban

Chapter 11 of

**Petroleum Systems and Geologic Assessment of Oil and Gas in the Wind River Basin Province, Wyoming**

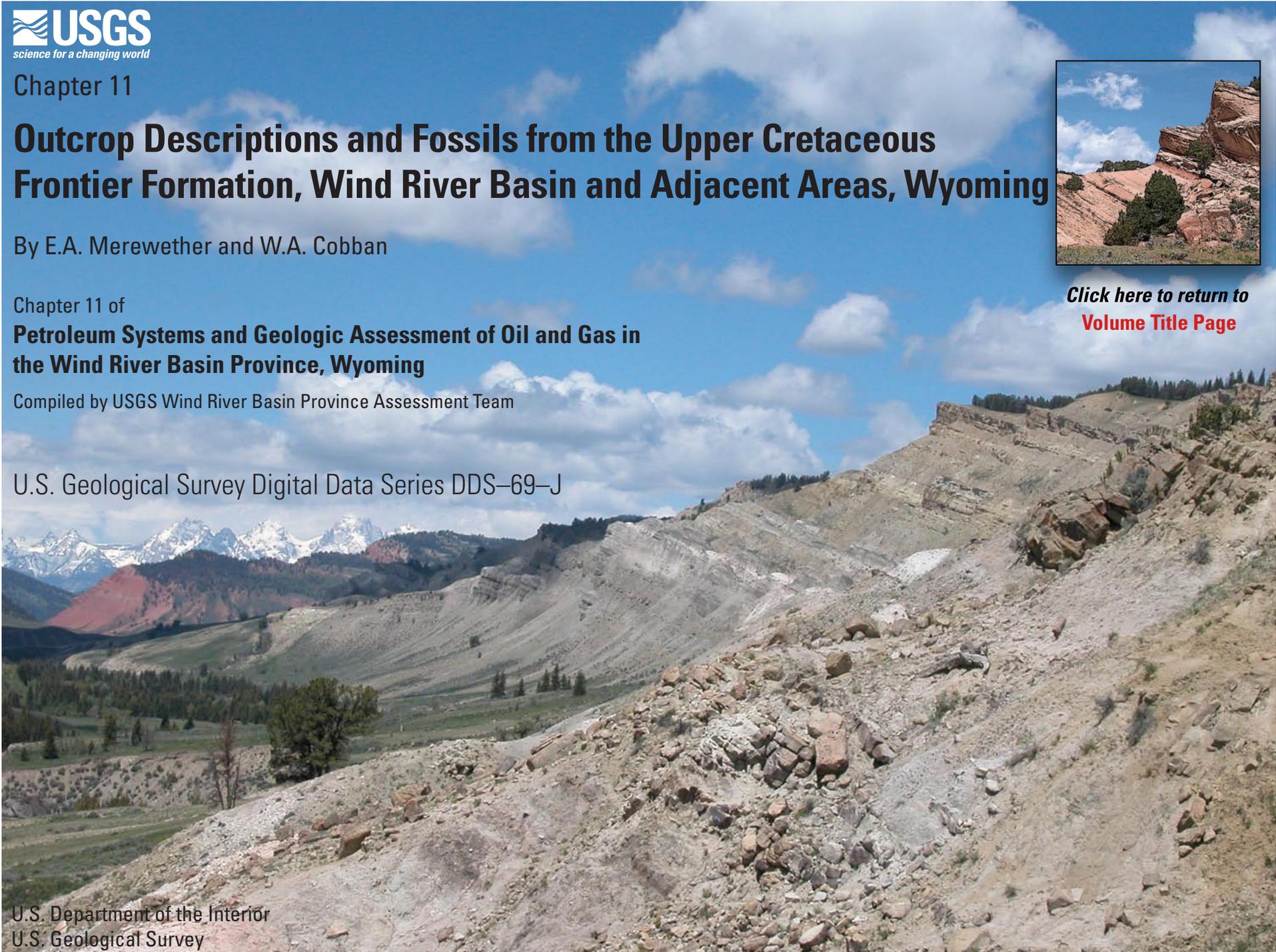
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# **Outcrop Descriptions And Fossils From The Upper Cretaceous Frontier Formation, Wind River Basin and Adjacent Areas, Wyoming**

By E.A. Merewether and W.A. Cobban

***Introduction***

***Index Map***

***Biostratigraphy Chart***

***Table of Locations***

# Outcrop Descriptions And Fossils From The Upper Cretaceous Frontier Formation, Wind River Basin and Adjacent Areas, Wyoming

By E.A. Merewether and W.A. Cobban

## Introduction

The Wind River Basin of central Wyoming trends west-northwest from near the community of Alcova to near the town of Dubois (fig. 1). On the perimeter of the basin, outcrops of the Frontier Formation were examined and described during the years 1972-1975. Invertebrate fossils were collected from those outcrops during the years 1972-1996, in places with the assistance of other earth scientists (see Acknowledgments).

The Frontier Formation in the Wind River Basin, ranging in thickness from 650 to 1,000 ft thick, consists mainly of sandstone, siltstone, shale, and bentonite of early Late Cretaceous age. The Frontier conformably overlies the Mowry Shale and is conformably overlain by the Cody Shale. A basal unit of the Cody, a sequence of marine noncalcareous shale, is named the Sage Breaks Member. The Frontier consists of two or three members, separated by disconformities; in ascending order, the Belle Fourche, Emigrant Gap, and Wall Creek. At several localities, the Emigrant Gap Member is missing. The formation was deposited mainly in marine environments, although nonmarine beds are conspicuous in the western part of the basin. Strata of the Frontier record a succession of marine regressions and transgressions. Molluscan fossils from the marine beds were identified and related to the chronostratigraphic chart shown in figure 2. The absolute ages on the chart were determined and supplied by J.D. Obradovich (Cobban and others, 2006). In this region, the Belle Fourche is of Cenomanian age, the Emigrant Gap is of early middle Turonian age, and the Wall Creek is of late Turonian and early Coniacian ages.

The main purpose of this report is to present biostratigraphic information from studies of the Frontier Formation in the Wind River Basin that could be useful for future stratigraphic investigations of the formation throughout Wyoming. Locations of outcrop sections and associated fossil collections are depicted on accompanying maps and aerial photographs. Graphic descriptions of strata in the outcrops and identifications of fossils from nearby localities also are presented. Those fossils named on the graphic sections commonly have the most restricted time-spans. Fossils collected near the outcrops studied are not always named on the enclosed graphic

sections because (1) the specimens are less useful for dating the enclosing beds, (2) the specimens are duplicates, or (3) the specimens could not be related to specific strata in the sections. The names, locations, and members of the outcrop sections and the approximate ages of the constituent strata are summarized in table 1.

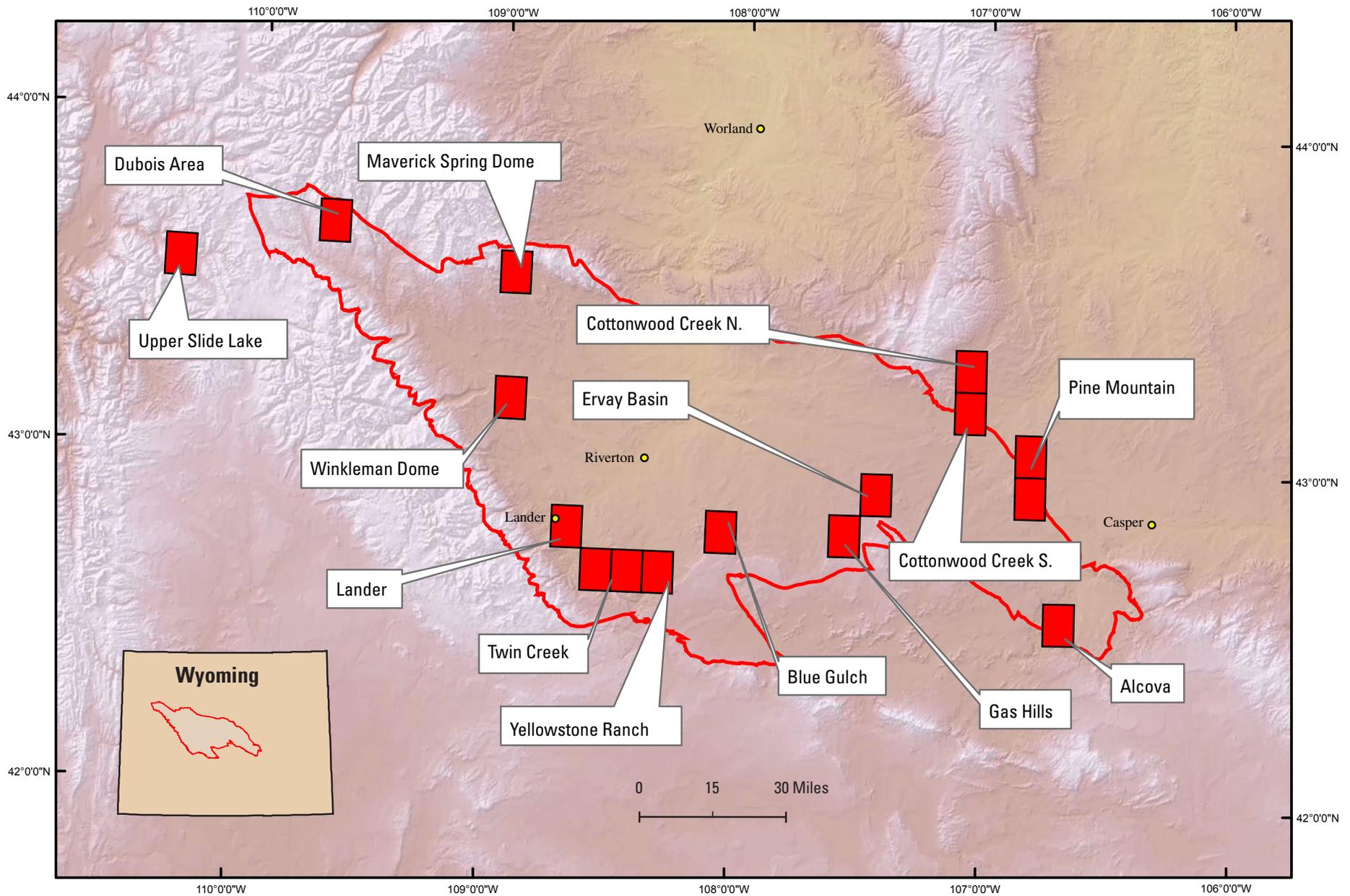
The index maps used to show locations of outcrop sections and fossil collections are from scanned versions of U.S. Geological Survey topographic maps of various scales and were obtained from TerraServer®. The portion of each map used depended on the areal distribution of the localities involved. The named quadrangles used for locality descriptions, however, all refer to 7½-minute, 1:24,000-scale quadrangles (for example, "Alcova"). The aerial photographs also are from TerraServer®; <http://www.terraserver.com/>.

## Acknowledgments

While examining outcrops and collecting fossils in the Wind River Basin, the authors were accompanied occasionally by other earth-scientists, including B.L. Mieras EchoHawk, S.C. Hook, M.C. Huff, E.R. Mignardot, R.W. Tillman, and the late R.E. Burkholder of the U.S. Geological Survey. E.R. Mignardot also studied outcrops of the upper part of the Frontier Formation in the south-central part of the basin for a master's of science thesis (1984). The expertise and assistance they provided were helpful and are much appreciated.

A proposal and the initial plan for this report were supplied by M.A. Kirschbaum. Most of the figures in the report were drafted by Kreg Lyles; revisions of the figures and text were contributed by Christa Lopez. Gregory Gunther organized and digitized data for display on a website on the internet. Reviews of this report were provided by L.N. Roberts, S.M. Condon, D.J. Nichols, and W.R. Keefer. The essential and significant contributions of the preceding specialists affiliated with the U.S. Geological Survey are gratefully acknowledged.

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**Figure 1.** Map of the Wind River Basin (approximately outlined in red), Wyoming, showing areas of selected outcrops of the Frontier Formation and associated fossil localities (red boxes). Data from each area shown in table 1.

SERIES	Stages		Western Interior ammonite range zones and radiometric ages (Ma)	Zone nos.	Western Interior inoceramid range zones	
	Informal substages					
UPPER CRETACEOUS (part)	Santonian (part)	Lower			<i>Cladoceramus undulatopectatus</i>	
		Upper	<i>Scaphites depressus</i> 87.14 ± 0.39	1	<i>Magadiceramus crenelatus</i> <i>Magadiceramus subquadratus</i>	
	Coniacian	Middle		<i>Scaphites ventricosus</i>	2	<i>Volvicceramus involutus</i>
					3	<i>Volvicceramus koeneni</i>
		Lower	88.55 ± 0.59	<i>Scaphites preventricosus</i>	4	<i>Cremnoceramus crassus crassus</i> <i>Cremnoceramus crassus inconstans</i> <i>Cremnoceramus deformis dobrogensis</i> <i>Cremnoceramus deformis erectus</i>
					5	
					6	
	Turonian	Upper		<i>Scaphites mariasensis</i>	7	<i>Cremnoceramus waltersdorfensis</i>
				<i>Prionocyclus germari</i>	8	<i>Mytiloides scupini</i>
				<i>Scaphites nigricollensis</i>	9	<i>Mytiloides incertus</i>
				<i>Scaphites whitfieldi</i>	10	<i>Inoceramus dakotensis</i>
				11	<i>Inoceramus perplexus</i>	
		Middle		<i>Scaphites ferronensis</i>	12	] <i>Inoceramus dimidius</i>
				<i>Scaphites warreni</i>	13	
				<i>Prionocyclus macombi</i> 90.21 ± 0.54	14	<i>Inoceramus aff. dimidius</i>
				<i>Prionocyclus hyatti</i> 92.46 ± 0.58	15	<i>Inoceramus howelli</i>
				<i>Collignoniceramus praecox</i>	16	<i>Inoceramus n.sp.</i>
				<i>Collignoniceramus woollgari</i>	17	<i>Mytiloides hercynicus</i> <i>Mytiloides subhercynicus</i>
	Lower		<i>Mammites nodosoides</i>	18	<i>Mytiloides mytiloides</i>	
			<i>Vascoceras birchbyi</i> 93.48 ± 0.58	19	] <i>Mytiloides kossmati</i>	
			<i>Pseudaspidoceras flexuosum</i> 93.19 ± 0.42	20		
			<i>Watinoceras devonense</i>	21	<i>Mytiloides puebloensis</i>	
	Cenomanian (part)	Upper		<i>Nigericeras scotti</i>	22	<i>Mytiloides hattini</i>
				<i>Neocardioceras juddii</i> 93.32 ± 0.38 93.82 ± 0.30	23	] <i>Inoceramus pictus</i>
				<i>Burroceras clydense</i>	24	
				<i>Euomphaloceras septemseriatum</i> 93.68 ± 0.50	25	
				<i>Vascoceras diartianum</i> 93.99 ± 0.72	26	
				<i>Dunveganoceras conditum</i>	27	] <i>Inoceramus ginterensis</i>
				<i>Dunveganoceras albertense</i>	28	
				<i>Dunveganoceras problematicum</i>	29	
				<i>Dunveganoceras pondi</i> 94.71 ± 0.49	30	
		Middle		<i>Plesiacanthoceras wyomingense</i>	31	] <i>Inoceramus prefragilis</i>
				<i>Acanthoceras amphibolum</i> 94.96 ± 0.50	32	<i>Inoceramus rutherfordi</i>
			<i>Acanthoceras bellense</i>	33	<i>Inoceramus arvanus</i>	
			<i>Acanthoceras muldoonense</i>	34	] <i>Inoceramus macconnelli</i>	
	<i>Acanthoceras granerosense</i>		35			
	<i>Conlinoceras tarrantense</i> 95.73 ± 0.61		36			

**Figure 2.** Molluscan fossil zones, radiometric ages, and informal zone numbers for marine strata of Cenomanian, Turonian, Coniacian and Santonian Stages in the Western Interior, U.S.A. (modified after Cobban and others, 2006). Brackets indicate the range span of species to the right of the brackets. Ma, million years before present.

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**Table 1.** Names, locations, members, and stages for outcrops of the Frontier Formation in the Wind River Basin and adjoining areas, Wyoming. Locations shown in figure 1.

Outcrop Title	County	Quadrangle	Sections	Township	Range	Probable Members-Frontier Formation	Stages of Fossils Collected
Alcova	Natrona	Alcova	5, 6 31, 32	29 N. 30 N.	82 W. 82 W.	Belle Fourche, Wall Creek	Cenomanian, Turonian
Pine Mountain	Natrona	Reid Canyon, Natrona	16 13, 18, 20	34 N. 35 N.	83 W. 83 W.	Belle Fourche, Emigrant Gap, Wall Creek	Cenomanian, Turonian, Coniacian
Cottonwood Creek North	Natrona	Three Buttes	4, 9, 10	38 N.	85 W.	Belle Fourche, Wall Creek	Cenomanian, Coniacian
Cottonwood Creek South	Natrona	Notches Dome	20, 21	38 N.	85 W.	Belle Fourche, Wall Creek	Cenomanian
Ervay Basin	Natrona	Ervay Basin	19, 28	34 N.	88 W.	Belle Fourche, Emigrant Gap, Wall Creek	Cenomanian, Turonian, Coniacian
Gas Hills	Fremont	Gas Hills	2	33 N.	90 W.	Belle Fourche, Wall Creek	Cenomanian
Blue Gulch-Conant Creek	Fremont	Blue Gulch	13, 14, 22, 24, 27	33 N.	94 W.	Belle Fourche, Emigrant Gap, Wall Creek	Cenomanian, Turonian, Coniacian
Yellowstone Ranch	Fremont	Yellowstone Ranch	27	31 N.	96 W.	Belle Fourche, Wall Creek	Cenomanian, Turonian
Twin Creek	Fremont	Del Monte Ridge, Weiser Pass, Yellowstone Ranch	26, 27, 35	32 N.	98 W.	Belle Fourche, Wall Creek	Turonian, Coniacian
Lander	Fremont	Lander	3, 11	33 N.	99 W.	Belle Fourche, Wall Creek	Coniacian
Winkleman Dome	Fremont	Argo Butte	16, 20, 21	2 N.*	1 W.*	Belle Fourche, Emigrant Gap, Wall Creek	Turonian, Coniacian
Maverick Spring Dome	Fremont	Antelope Ridge Maverick Spring	18 13	6 N.* 6 N.*	1 W.* 2 W.*	Belle Fourche, Wall Creek	(Not determined)
Dubois area	Fremont	Ramshorn Peak	1	42 N.	107 W.	Belle Fourche, Emigrant Gap, Wall Creek	Turonian, Coniacian
Upper Slide Lake, East & West	Teton	Upper Slide Lake	19	42 N.	112 W.	Belle Fourche, Emigrant Gap, Wall Creek	Turonian, Coniacian

\* Wind River Meridian

# Alcova Reservoir

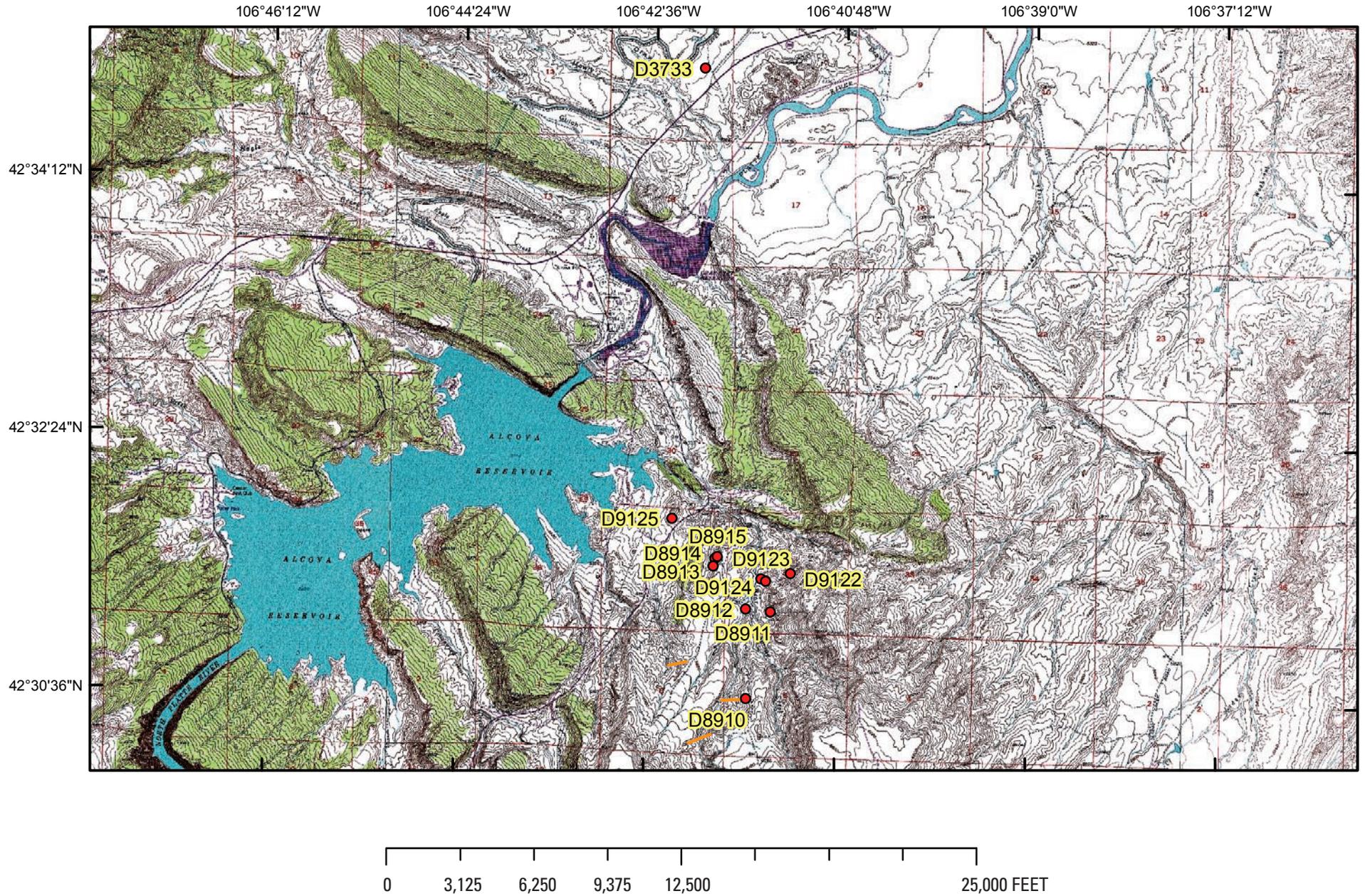
*Topographic map*

*Aerial photograph*

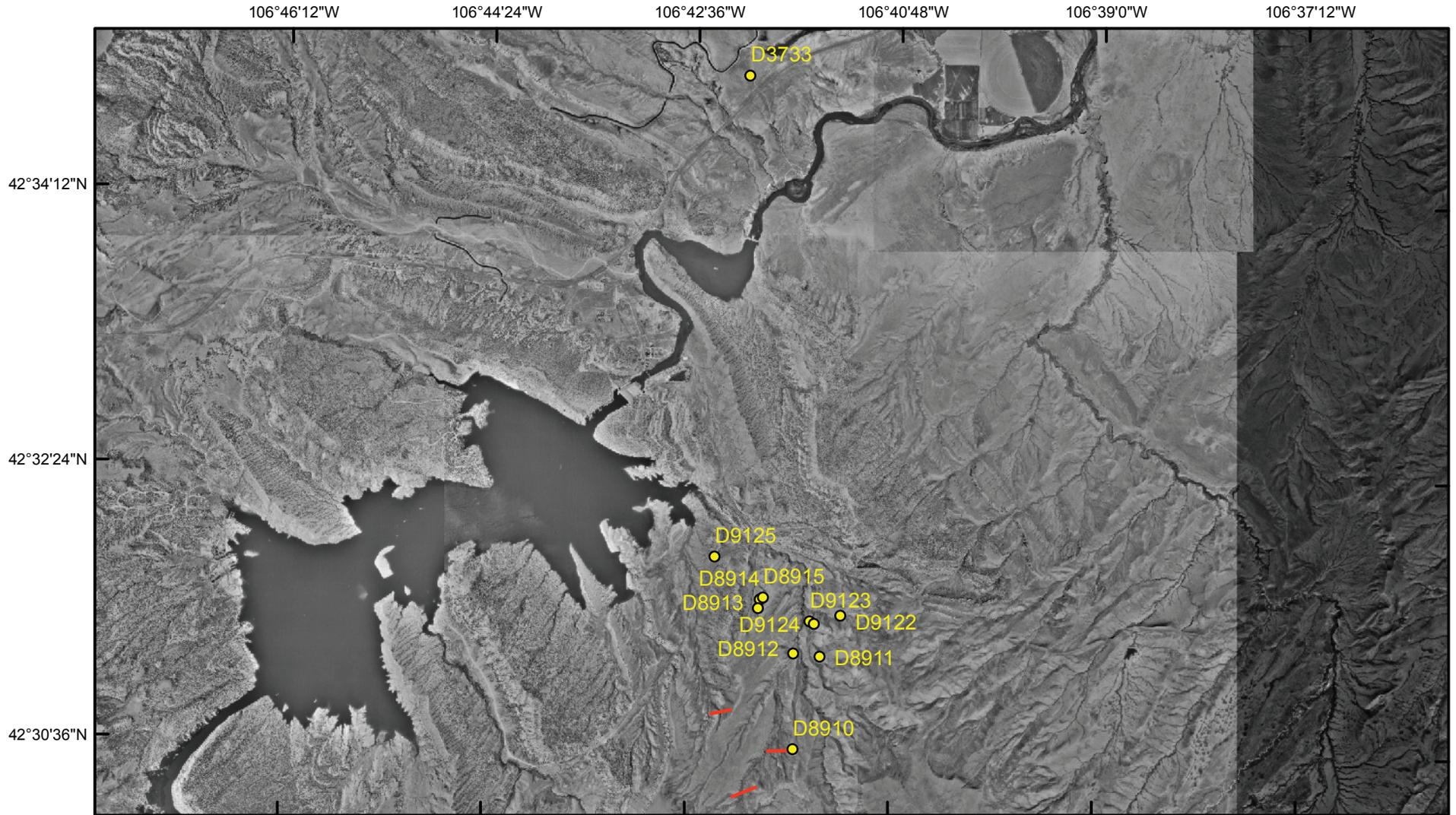
*Fossil locations*

*Measured section*

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**Alcova Reservoir.** Topographic map of Alcova area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. Contour interval: 20 feet.



**Alcova Reservoir.** Aerial photograph of Alcova area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Alcova fossil locations

### USGS Mesozoic fossil locality: D3733

Location:

Outcrop area: Alcova

County: Natrona

Township and range: SW1/4 sec. 8, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.578° N., long 106.693° W.

Alcova quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether and Cobban

Collection date: 8/31/61, 7/25/73 and 6/8/74

Fossils:

*Inoceramus cf. I. incertus (Mytiloides incertus)*

*Scaphites corvensis*

*Eutrephoceras sp.*

Age: middle late Turonian

### USGS Mesozoic fossil locality: D8910

Location:

Outcrop area: Alcova

County: Natrona

Township and range: NE1/4 NW1/4 SW1/4 sec. 5, T. 29 N., R. 82 W.

Geographic coordinate: lat 42.509° N., long 106.694° W.

Alcova quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/24/73

Fossil:

*Calycoceras sp. ?*

Age: Cenomanian

### USGS Mesozoic fossil locality: D8911

Location:

Outcrop area: Alcova

County: Natrona

Township and range: SE1/4 SW1/4 sec. 32, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.520° N., long 106.690° W.

Alcova quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 7/24/73

Comment: from basal part of member

Fossils:

*Inoceramus cf. I. incertus (Mytiloides incertus)*

*Geoceramus aff. I. perplexus*

*Prionocyclus reesei*

Age: middle late Turonian

### USGS Mesozoic fossil locality: D8912

Location:

Outcrop area: Alcova

County: Natrona

Township and range: NE1/4 SW1/4 SW1/4 sec. 32, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.520° N., long 106.694° W.

Alcova quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/24/73

Comment: from about 30 feet (ft) above a thick bentonite bed

Fossils:

*Calycoceras canitaurinum*

*Dunveganoceras pondi*

Age: earliest late Cenomanian

### USGS Mesozoic fossil locality: D8913

Location:

Outcrop area: Alcova

County: Natrona

Township and range: SE1/4 NE1/4 sec. 31, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.525° N., long 106.699° W.

Alcova quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/25/73

Comment: from soft sandstone

Fossil:

*Dunveganoceras pondi*

Age: earliest late Cenomanian

## Alcova fossil locations—Continued

### USGS Mesozoic fossil locality: D8914

Location:

Outcrop area: Alcova

County: Natrona

Township and range: SE1/4 NE1/4 sec. 31, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.526° N., long 106.699° W.

Alcova quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/25/73

Comment: from brown-weathering sandy limestone concretions at top of soft sandstone in the member

Fossils:

*Inoceramus prefragilis*

*Plicatula* sp.

*Stomohamites* sp.

*Calycoceras?* *canitaurinum*

*Dunveganoceras pondi*

*Tarrantoceras* n. sp.

*Metoicoceras praecox*

Age: earliest late Cenomanian

### USGS Mesozoic fossil locality: D8915

Location:

Outcrop area: Alcova

County: Natrona

Township and range: SE1/4 NE1/4 sec. 31, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.526° N., long 106.698° W.

Alcova quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/25/73

Comment: stratigraphically higher than D8914

Fossils:

*Inoceramus prefragilis*

*Calycoceras?* sp.

*Dunveganoceras pondi*

Age: earliest late Cenomanian

### USGS Mesozoic fossil locality: D9122

Location:

Outcrop area: Alcova

County: Natrona

Township and range: NW1/4 SE1/4 sec. 32, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.524° N., long 106.687° W.

Alcova quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Cobban

Collection date: 6/13/74

Comment: from top of member

Fossils:

*Inoceramus* sp.

*Metoicoceras* sp.

Age: middle late Cenomanian

### USGS Mesozoic fossil locality: D9123

Location:

Outcrop area: Alcova

County: Natrona

Township and range: NE1/4 SW1/4 sec. 32, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.523° N., long 106.691° W.

Alcova quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether and Cobban

Collection date: 6/13/74

Comment: from 30 ft-thick, ridge-forming sandstone near top of formation

Fossils:

*Inoceramus lamarcki* (*Inoceramus sachsi*)

*Inoceramus* cf. *I. incertus* (*Mytiloides incertus*)

*Bostrychoceras* n. sp. (*Eubostrychoceres matsumotoi*)

*Prionocyclus reesidei*

Age: late late Turonian

## Alcova fossil locations—Continued

### USGS Mesozoic fossil locality: D9124

Location:

Outcrop area: Alcova

County: Natrona

Township and range: NE1/4 SW1/4 sec. 32, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.523° N., long 106.691° W.

Alcova quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Cobban

Collection date: 6/13/74

Comment: from a tan-weathering concretion near top of formation

Fossil:

*Prionocyclus reesidei*

Age: late late Turonian

### USGS Mesozoic fossil locality: D9125

Location:

Outcrop area: Alcova

County: Natrona

Township and range: NW1/4 NE1/4 sec. 31, T. 30 N., R. 82 W.

Geographic coordinate: lat 42.530° N., long 106.706° W.

Alcova quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collectors: Merewether and Cobban

Collection date: 6/8/74

Comment: from a 15 ft-thick soft sandstone overlying a dark-gray shale that contains several beds of bentonite

Fossils:

*Inoceramus prefragilis*

*Gyrodes* sp.

*Pseudomelania?* sp.

*Stomohamites* sp.

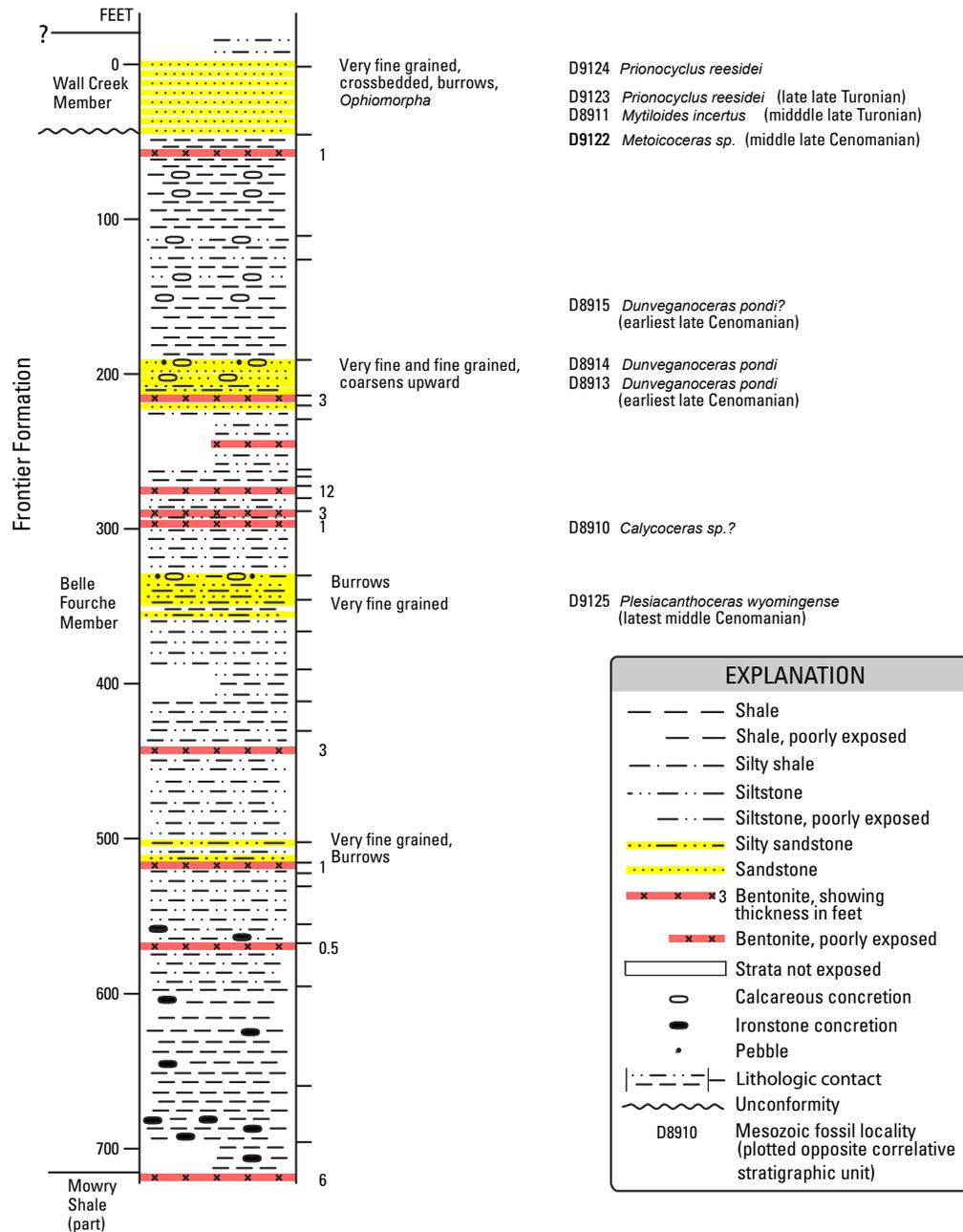
*Plesiacanthoceras wyomingense*

*Tarrantoceras* n. sp.

Age: latest middle Cenomanian

**Alcova**

Natrona County, Wyoming  
 Alcova quadrangle  
 Sections 5 and 6, T. 29 N., R. 82 W.  
 Sections 31 and 32, T. 30 N., R. 82 W.



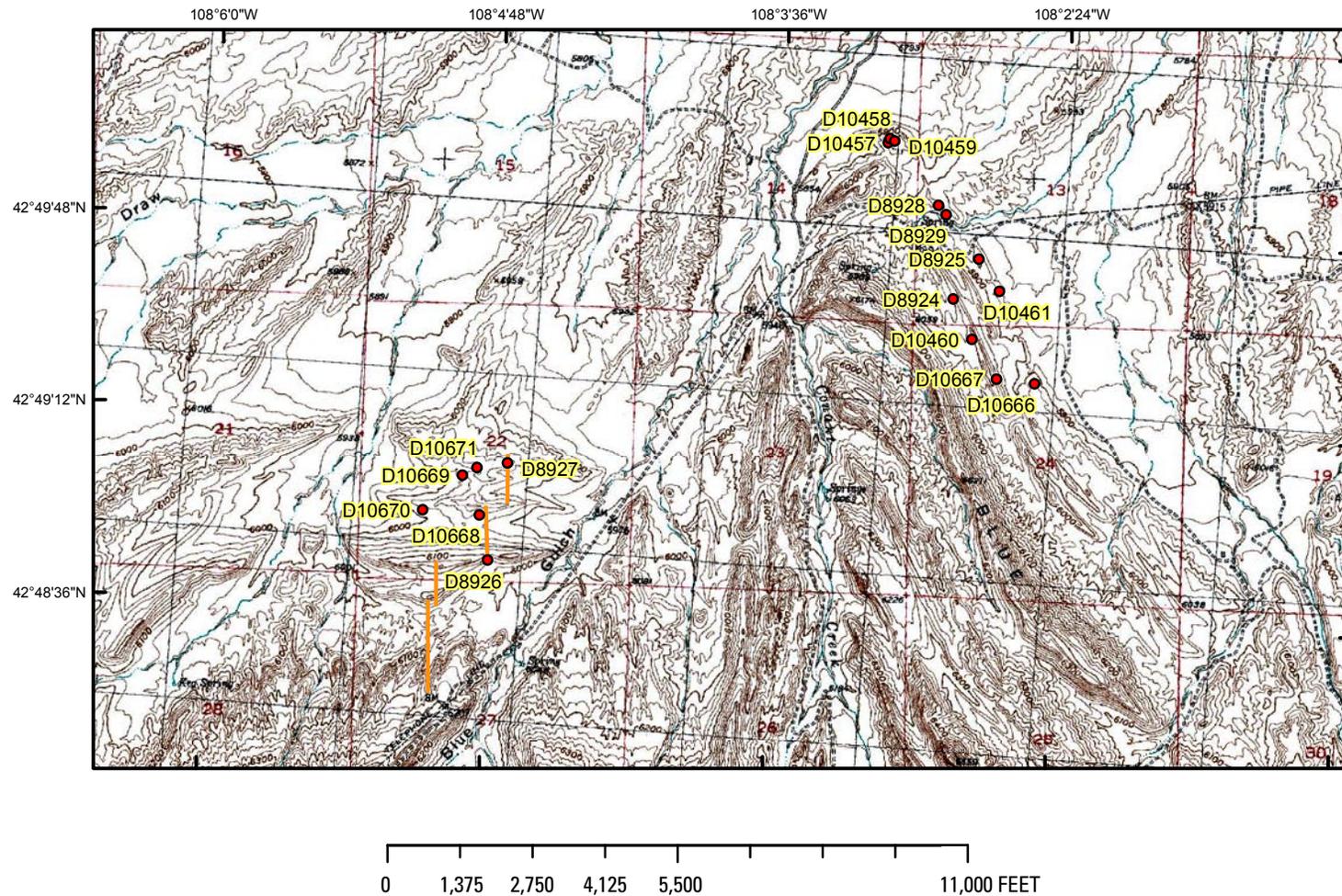
## Blue Gulch

*Topographic map*

*Aerial photograph*

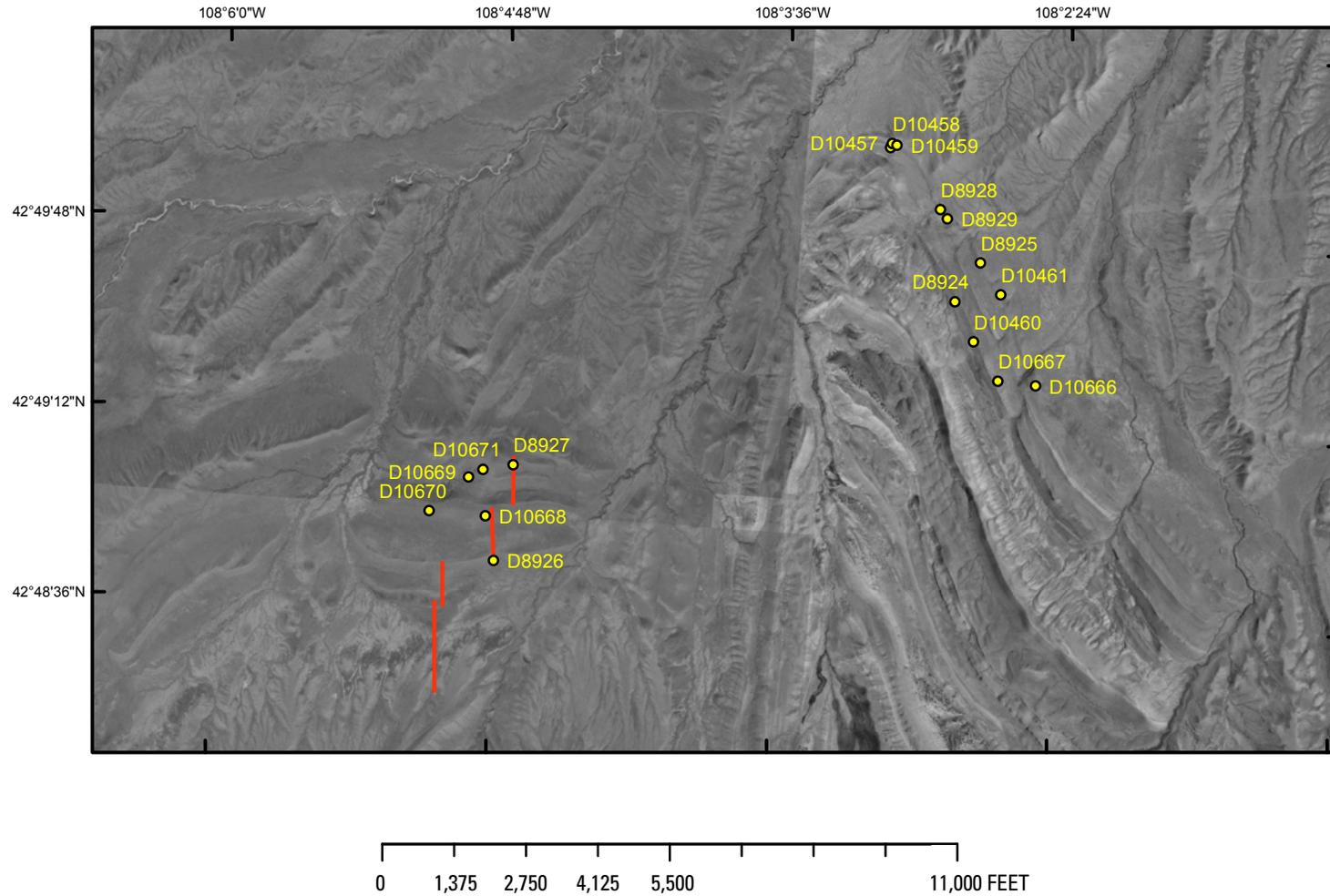
*Fossil locations*

*Measured section*



**Blue Gulch.** Topographic map of Blue Gulch area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Contour interval: 20 feet.

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**Blue Gulch.** Aerial photograph of Blue Gulch area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Blue Gulch fossil locations

### USGS Mesozoic fossil locality: D8924

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: SE1/4 SW1/4 SW1/4 sec. 13, T. 33 N., R. 94 W.

Geographic Coordinates: lat 42.826° N., long 108.047° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/30/73

Fossil:

*Plesiacanthoceras wyomingense*.

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D8925

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NE1/4 SW1/4 SW1/4 sec. 13, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.828° N., long 108.045° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 7/30/73

Fossils:

*Inoceramus aff. I. perplexus (Mytiloides scupini)*

*Homomya sp.*

*Anisomyon apicalis*

*Turritella sp.*

*Baculites yokoyamai*

*Scaphites sp.*

*Placentoceras sp.*

Age: late late Turonian

### USGS Mesozoic fossil locality: D8926

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: SE1/4 SW1/4 sec. 22, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.812° N., long 108.079° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/30/73

Comment: from upper part of member

Fossil:

*Plesiacanthoceras wyomingense*

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D8927

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NW1/4 SE1/4 sec. 22, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.817° N., long 108.078° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 7/30/73

Fossils:

*Serpula sp.*

*Inoceramus aff. I. perplexus (Mytiloides incertus)*

*Ostrea sannionis*

*Camptonectes sp.*

*Crassatella wyomingensis*

*Cardium ? sp.*

*Tellina ? sp.*

*Laternula sp.*

*Gastropods*

*Baculites yokoyamai*

*Placentoceras sp.*

Age: middle late Turonian

## Blue Gulch fossil locations—Continued

### USGS Mesozoic fossil locality: D8928

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NW1/4 SW1/4 sec. 13, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.831° N., long 108.048° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 7/31/73

Fossils:

*Pinna dolosoniensis*

*Inoceramus lamarcki*

*Syncyclonema* sp.

*Cardium* ? sp.

*Baculites yokoyamai*

*Scaphites* sp.

*Aptychus*

Age: late late Turonian

### USGS Mesozoic fossil locality: D8929

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NW1/4 SW1/4 sec. 13, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.831° N., long 108.048° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 7/31/73

Comment: from upper part of member

Fossils:

*Inoceramus* aff. *I. perplexus*

*Gyrodes* sp.

*Baculites yokoyamai*

*Scaphites corvensis*

Age: late late Turonian

### USGS Mesozoic fossil locality: D10457

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: SE1/4 NE1/4 sec. 14, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.834° N., long 108.052° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether and R.E. Burkholder

Collection date: 9/23/77

Fossils:

*Modiolus* cf. *M. attenuatus*

*Pinna* sp.

*Inoceramus frechi* (*Inoceramus dakotensis*, *Inoceramus perplexus*)

*Syncyclonema* cf. *S. simplicius*

*Lopha sannionis*

*Crassatella wyomingensis*

*Cardium pauperculum*

*Cymbophora emmonsii*

*Tellinimera* cf. *T. scitula*

*Cyprimeria* ? sp.

*Legumen ellipticum*

*Corbulamella* ? sp.

*Pholadomya coloradoensis*

*Anatimya* n. sp.

*Baculites yokoyamai*

*Prionocyclus quadratus*

*Proplacenticerias* sp. (*Placenticerias* sp.)

Bryozoan

Crab

Age: middle late Turonian

## Blue Gulch fossil locations—Continued

### USGS Mesozoic fossil locality: D10458

Location:

Outcrop area: Blue Gulch-Conant Creek  
 County: Fremont  
 Township and range: SE1/4 NE1/4 sec. 14, T. 33 N., R. 94 W.  
 Geographic coordinates: lat 42.835° N., long 108.052° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether and R.E. Burkholder

Collection date: 9/23/77

Comment: 40 to 45 ft above D10457

Fossils:

*Inoceramus frechi* (*Mytiloides scupini*)  
*Anisomyon apicalis*  
*Baculites yokoyamai*  
*Scaphites corvensis*  
*Proplacenticeras* (*Placanticeras* sp.)  
*Inoceramus lamarcki*  
*Tellinimera* sp.  
*Cymbophora* sp.  
*Rostellinda* cf. *R. dalli*  
*Forresteria* (*Texasia*) cf. *F. dentatocarinarum*

Age: late Turonian

### USGS Mesozoic fossil locality: D10459

Location:

Outcrop area: Blue Gulch-Conant Creek  
 County: Fremont  
 Township and range: SE1/4 NE1/4 sec. 14, T. 33 N., R. 94 W.  
 Geographic coordinates: lat 42.834° N., long 108.834° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether and R.E. Burkholder

Collection date: 9/23/77

Fossils:

*Inoceramus frechi* (*Mytiloides scupini*, *Mytiloides incertus*)  
*Cymbophora emmonsii*  
*Baculites yokoyamai*  
*Scaphites sagensis*  
*S. corvensis*  
*Placenticeras pseudoplacenta*

Age: late Turonian

### USGS Mesozoic fossil locality: D10460

Location:

Outcrop area: Blue Gulch-Conant Creek  
 County: Fremont  
 Township and range: NW1/4 NW1/4 sec. 24, T. 33 N., R. 94 W.  
 Geographic coordinates: lat 42.824° N., long 108.046° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collectors: Merewether and R.E. Burkholder

Collection date: 9/21/77

Fossils:

*Exogyra* sp.  
*Plesiacanthoceras wyomingense*

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D10461

Location:

Outcrop area: Blue Gulch-Conant Creek  
 County: Fremont  
 Township and range: SE1/4 SW1/4 sec. 13, T. 33 N., R. 94 W.  
 Geographic coordinates: lat 42.827° N., long 108.044° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether and R.E. Burkholder

Collection date: 9/21/77

Fossil:

*Inoceramus deformati* (*Cremnoceramus crassus*)

Age: late early Coniacian

## Blue Gulch fossil locations—Continued

### USGS Mesozoic fossil locality: D10666

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NE1/4 NW1/4 sec. 24, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.822° N., long 108.041° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether, Cobban, and S.C. Hook

Collection date: 7/17/78

Fossils:

*Inoceramus frechi* (*Mytiloides* aff. *ratonensis*)

*I. lamarcki* (*Inoceramus sachsi*)

*Pachymya?* sp.

*Scaphites corvensis*

*Baculites yokoyamai*

*Placenticerias* sp.

Age: late Turonian

### USGS Mesozoic fossil locality: D10667

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NE1/4 NW1/4 sec. 24, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.822° N., long 108.044° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collectors: Merewether and Cobban

Collection date: 7/17/78

Comment: from a hogback of sandstone, about 450 ft below top of formation

Fossils:

*Inoceramus* cf. *I. pefagilis*

*Exogyra* sp.

*Plesiacanthoceras wyomingense*

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D10668

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: SE1/4 SW1/4 sec. 22, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.814° N., long 108.081° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Emigrant Gap Member

Collectors: Merewether, Cobban, and S.C. Hook

Collection date: 7/17/78

Fossil:

*Inoceramus howelli*

Age: early middle Turonian

### USGS Mesozoic fossil locality: D10669

Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NE1/4 SW1/4 sec. 22, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.817° N., long 108.082° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether, Cobban, and S.C. Hook

Collection date: 7/17/78

Fossils:

*Modiolus n. sp.*

*Pinna* sp.

*Inoceramus lamarcki*

*I. cf. I. frechi*

*Camptonectes* sp.

*Lopha* sp.

*Crassatella wyomingensis*

*Pleuriocardia* sp.

*Cymbophora* sp.

*Cyprimeria* sp.

*Pholadomya* sp.

*Anatimya lineata*

*Baculites yokoyamai*

*Scaphites corvensis*

*Prionocyclus quadratus*

*Placenticerias* sp.

Crab

Gastropods

Age: late late Turonian

**Blue Gulch fossil locations—Continued****USGS Mesozoic fossil locality: D10670**

## Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NW1/4 SW1/4 sec. 22, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.815° N., long 108.085° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Emigrant Gap Member

Collectors: Merewether, Cobban, and S.C. Hook

Collection date: 7/17/78

## Fossils:

*Inoceramus sp.**Prionocyclus hyatti*

Age: middle middle Turonian

**USGS Mesozoic fossil locality: D10671**

## Location:

Outcrop area: Blue Gulch-Conant Creek

County: Fremont

Township and range: NE1/4 SW1/4 sec. 22, T. 33 N., R. 94 W.

Geographic coordinates: lat 42.817° N., long 108.081° W.

Blue Gulch quadrangle

Formation: Frontier

Unit: Wall Creek Member

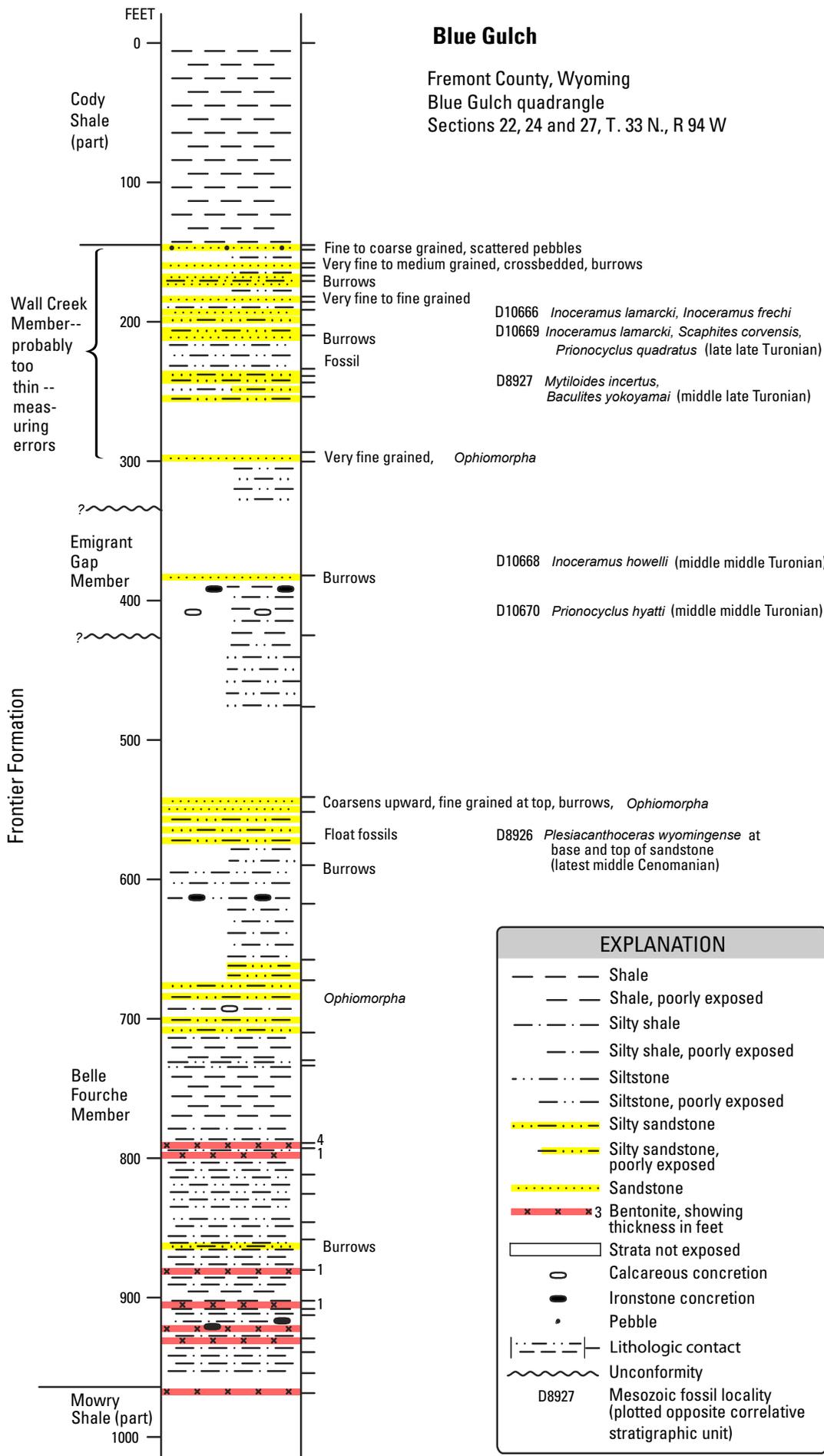
Collectors: Merewether, Cobban, and S.C. Hook

Collection date: 7/17/78

## Fossils:

*Inoceramus sp.**Anisomyon apicalis**Gyrodes conradi**Baculites yokoyamai**Scaphites corvensis*

Age: late Turonian



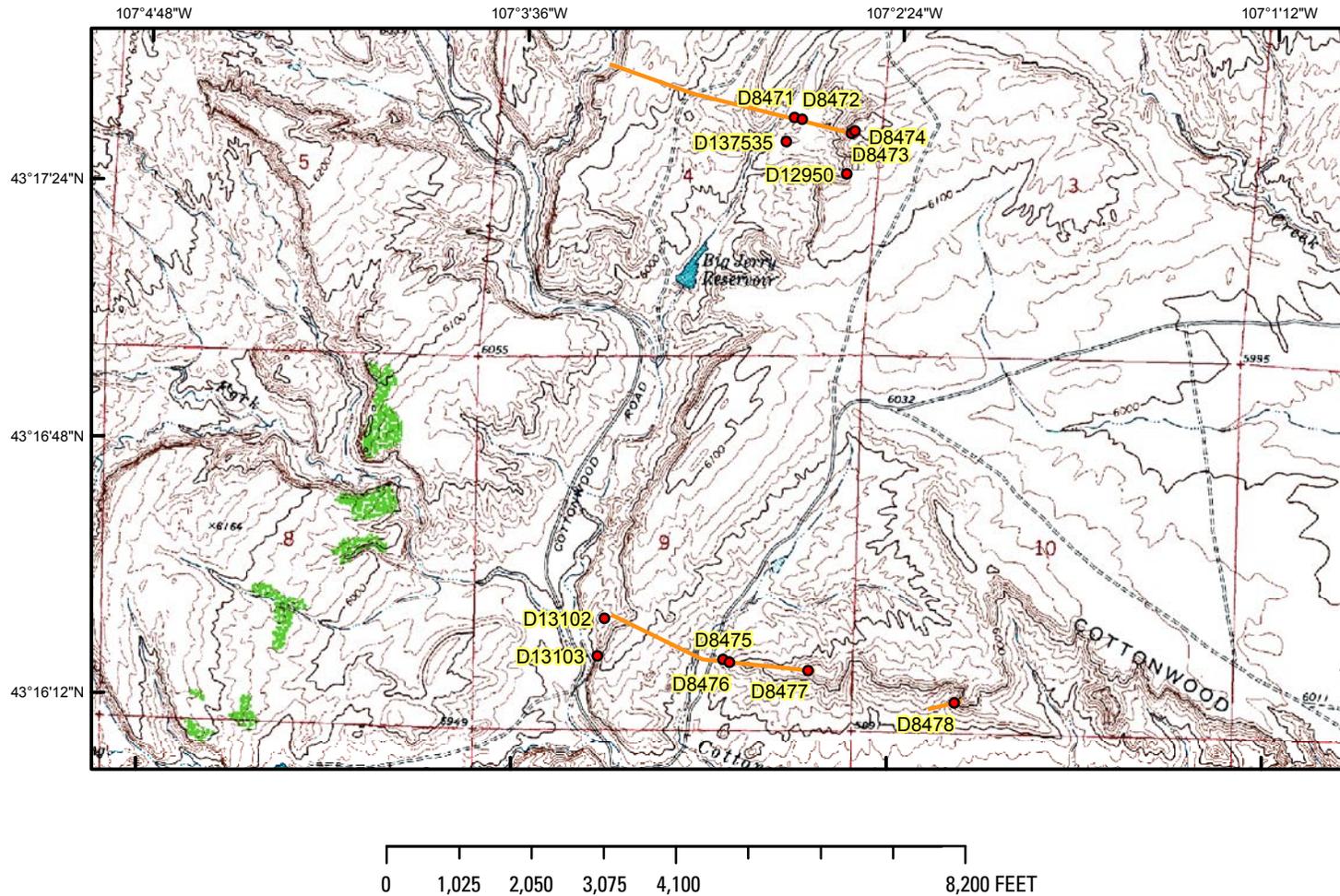
# Cottonwood Creek North

*Topographic map*

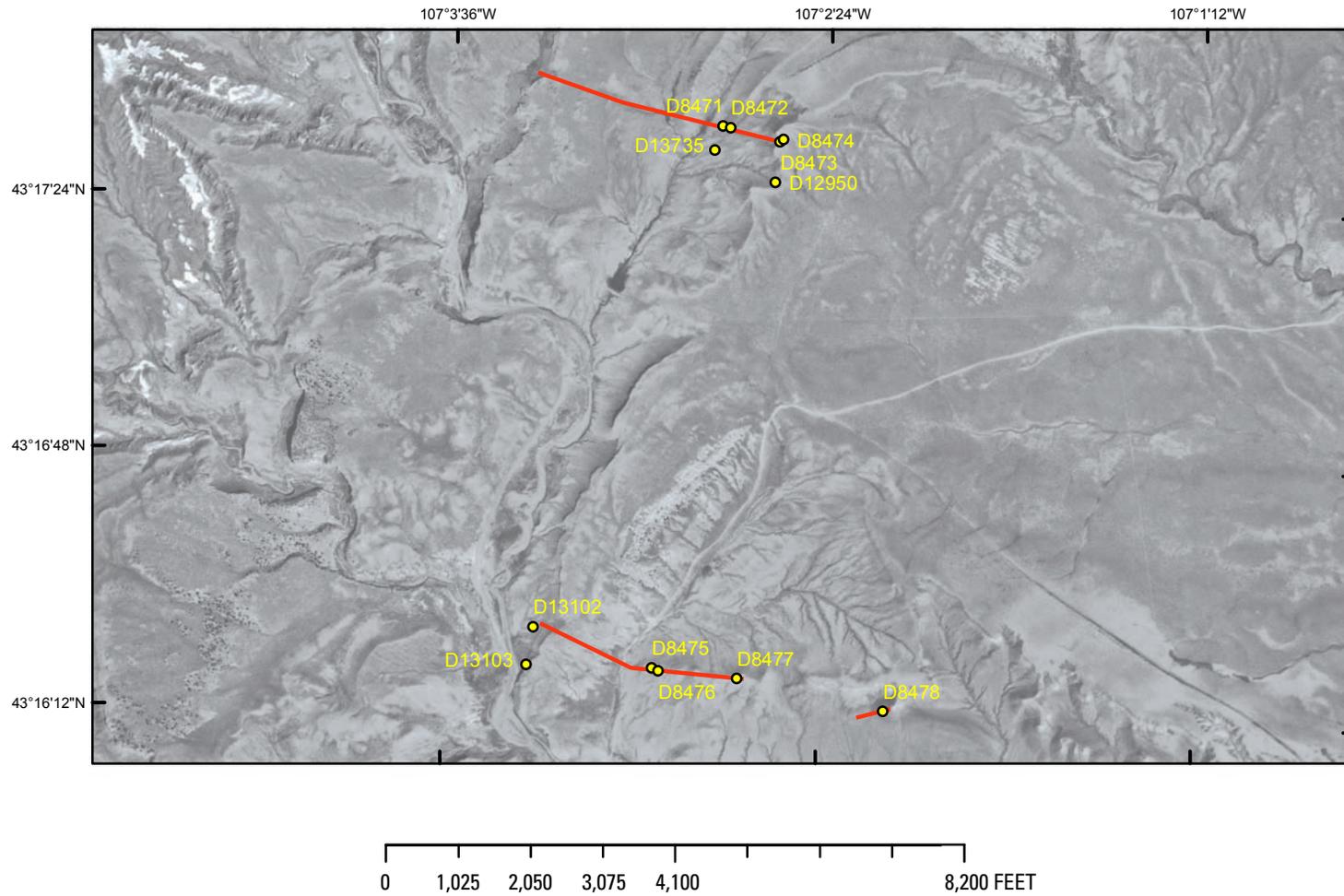
*Aerial photograph*

*Fossil locations*

*Measured section*



**Cottonwood Creek North.** Topographic map of Cottonwood Creek North area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. Contour interval: 20 feet.



**Cottonwood Creek North.** Aerial photograph of Cottonwood Creek North area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Cottonwood Creek North fossil locations

### USGS Mesozoic fossil locality: D8471

Location:

Outcrop area: Cottonwood Creek North  
County: Natrona  
Township and range: NW1/4 SE1/4 NE1/4 sec. 4, T. 38 N., R. 85 W.  
Geographic coordinate: lat 43.293° N., long 107.046° W.

Three Buttes quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 9/2/72

Fossils:

*Inoceramus arvanus*  
*Ostrea beloiti*  
*Acanthoceras amphibolum*

Age: late middle Cenomanian

### USGS Mesozoic fossil locality: D8472

Location:

Outcrop area: Cottonwood Creek North  
County: Natrona  
Township and range: NW1/4 SE1/4 NE1/4 sec. 4, T. 38 N., R. 85 W.  
Geographic coordinate: lat 43.293° N. long 107.045° W.

Three Buttes quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 9/2/72

Fossils:

*Inoceramus pictus*  
*Calycoceras canitaurinum*

Age: earliest late Cenomanian

### USGS Mesozoic fossil locality: D8473

Location:

Outcrop area: Cottonwood Creek North  
County: Natrona  
Township and range: NE1/4 SE1/4 NE1/4 sec. 4, T. 38 N., R. 85 W.  
Geographic coordinate: lat 43.292° N., long 107.043° W.

Three Buttes quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 9/2/72

Fossils:

*Dunveganoceras albertense*  
*Metoicoceras muelleri*

Age: early late Cenomanian

### USGS Mesozoic fossil locality: D8474

Location:

Outcrop area: Cottonwood Creek North  
County: Natrona  
Township and range: Slightly east of NE1/4 SE1/4 NE1/4 sec. 4, T. 38 N., R. 85 W.  
Geographic coordinate: lat 43.293° N., long 107.042° W.

Three Buttes quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 9/2/72

Comment: from higher in formation than D8473

Fossils:

*Inoceramus pictus*  
*Metoicoceras defordi*

Age: early late Cenomanian

## Cottonwood Creek North fossil locations—Continued

### USGS Mesozoic fossil locality: D8475

Location:

Outcrop area: Cottonwood Creek North  
 County: Natrona  
 Township and range: NE1/4 SW1/4 SE1/4 sec. 9, T. 38 N., R. 85 W.  
 Geographic coordinate: lat 43.272°N., long 107.049° W.

Three Buttes quadrangle

Formation: Cody Shale

Collector: Merewether

Collection date: 9/3/72

Comment: from lower part of formation

Fossils:

*Inoceramus sp.*  
*Cremnoceramus crassus*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D8476

Location:

Outcrop area: Cottonwood Creek North  
 County: Natrona  
 Township and range: Slightly east of NE1/4 SW1/4 SE1/4 sec. 9,  
 T. 38 N., R. 85 W.  
 Geographic coordinate: lat 43.272° N., long 107.048° W.

Three Buttes quadrangle

Formation: Cody Shale

Collector: Merewether

Collection date: 9/3/72

Comment: from lower part of formation

Fossils:

*Inoceramus erectus*  
*Scaphites sp.*

Age: earliest Coniacian

### USGS Mesozoic fossil locality: D8477

Location:

Outcrop area: Cottonwood Creek North  
 County: Natrona  
 Township and range: Near center of SE1/4 SE1/4 sec. 9, T. 38 N., R. 85 W.  
 Geographic coordinate: lat 43.272° N., long 107.044° W.

Three Buttes quadrangle

Formation: Cody Shale

Collector: Merewether

Collection date: 9/3/72

Comment: from lower part of formation

Fossils:

*Spirorbis sp.*  
*Nucula sp.*  
*Inoceramus inconstans (Cremnoceramus crassus inconstans)*  
*Cremnoceramus crassus crassus*  
*Camptonectes sp.*  
*Pycnodonte ? sp.*  
*Crassatella wyomingensis*  
*Thetiopsis sp.*  
*Gastropods*  
*Baculites mariasensis*  
*Scaphites impendicostatus*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D8478

Location:

Outcrop area: Cottonwood Creek North  
 County: Natrona  
 Township and range: Center of S1/2 S1/2 SW1/4 sec. 10, T. 38 N., R. 85 W.  
 Geographic coordinate: lat 43.270° N., long 107.036° W.

Three Buttes quadrangle

Formation: Cody Shale

Collector: Merewether

Collection date: 9/3/72

Comment: From about 280 ft above base of formation

Fossils:

*Inoceramus inconstans (Cremnoceramus crassus inconstans)*  
*Camptonectes sp.*  
*Pycnodonte ? sp.*  
*Crassatella wyomingensis*  
*Cardium sp.*  
*Turritella sp.*  
*Baculites sp.*  
*Mytiloides incertus*

Age: late early Coniacian

## Cottonwood Creek North fossil locations—Continued

### USGS Mesozoic fossil locality: D12950

Location:

Outcrop area: Cottonwood Creek North  
County: Natrona  
Township and range: SE1/4 NE1/4 sec. 4, T. 38 N., R. 85 W.  
Geographic coordinate: lat 43.291°N., long 107.043° W.

Three Buttes quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/19/88

Comment: from silty concretions below cliff-forming *Metoicoceras*-bearing sandstone

Fossils:

*Dunveganoceras conditum*

*Metoicoceras mosbyense*

Age: middle late Cenomanian

### USGS Mesozoic fossil locality: D13102

Location:

Outcrop area: Cottonwood Creek North  
County: Natrona  
Township and range: Center of SW1/4 sec. 9, T. 38 N., R. 85 W.  
Geographic coordinate: lat 43.273° N., long 107.055° W.

Three Buttes quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 5/19/90

Fossil:

*Metoicoceras frontierense*

Age: late Cenomanian

### USGS Mesozoic fossil locality: D13103

Location:

Outcrop area: Cottonwood Creek North  
County: Natrona  
Township and range: SE1/4 SW1/4 sec. 9, T. 38 N., R. 85 W.  
Geographic coordinate: lat 43.272° N., long 107.055° W.

Three Buttes quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: M.C. Huff

Collection date: 5/19/90

Comment: From near top of sandstone

Fossil:

*Metoicoceras sp.*

Age: middle late Cenomanian

### USGS Mesozoic fossil locality: D13735

Location:

Outcrop area: Cottonwood Creek North  
County: Natrona  
Township and range: SE1/4 NE1/4 sec. 4, T. 38 N., R. 85 W.  
Geographic coordinate: lat 43.292° N., long 107.046° W.

Three Buttes quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/30/96

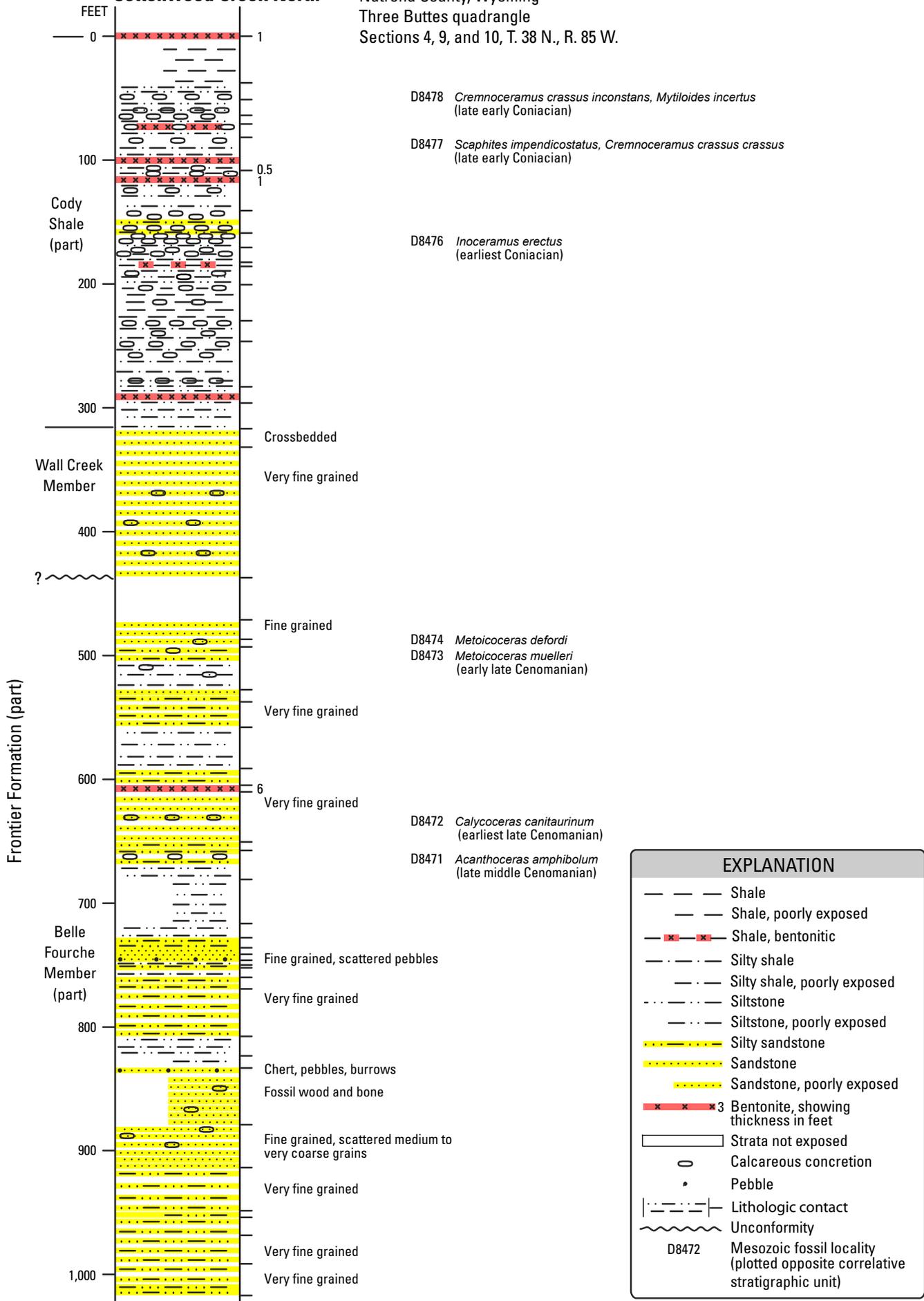
Fossil:

*Acanthoceras amphibolum*

Age: late middle Cenomanian

# Cottonwood Creek North

Natrona County, Wyoming  
 Three Buttes quadrangle  
 Sections 4, 9, and 10, T. 38 N., R. 85 W.



EXPLANATION	
— — —	Shale
- - -	Shale, poorly exposed
- x - x -	Shale, bentonitic
- . - . -	Silty shale
- . . - .	Silty shale, poorly exposed
- . . . -	Siltstone
- . . - .	Siltstone, poorly exposed
- . . . .	Silty sandstone
- . . . .	Sandstone
- . . . .	Sandstone, poorly exposed
- x - x - x	Bentonite, showing thickness in feet
□	Strata not exposed
○	Calcareous concretion
•	Pebble
- - -	Lithologic contact
~ ~ ~	Unconformity
D8472	Mesozoic fossil locality (plotted opposite correlative stratigraphic unit)

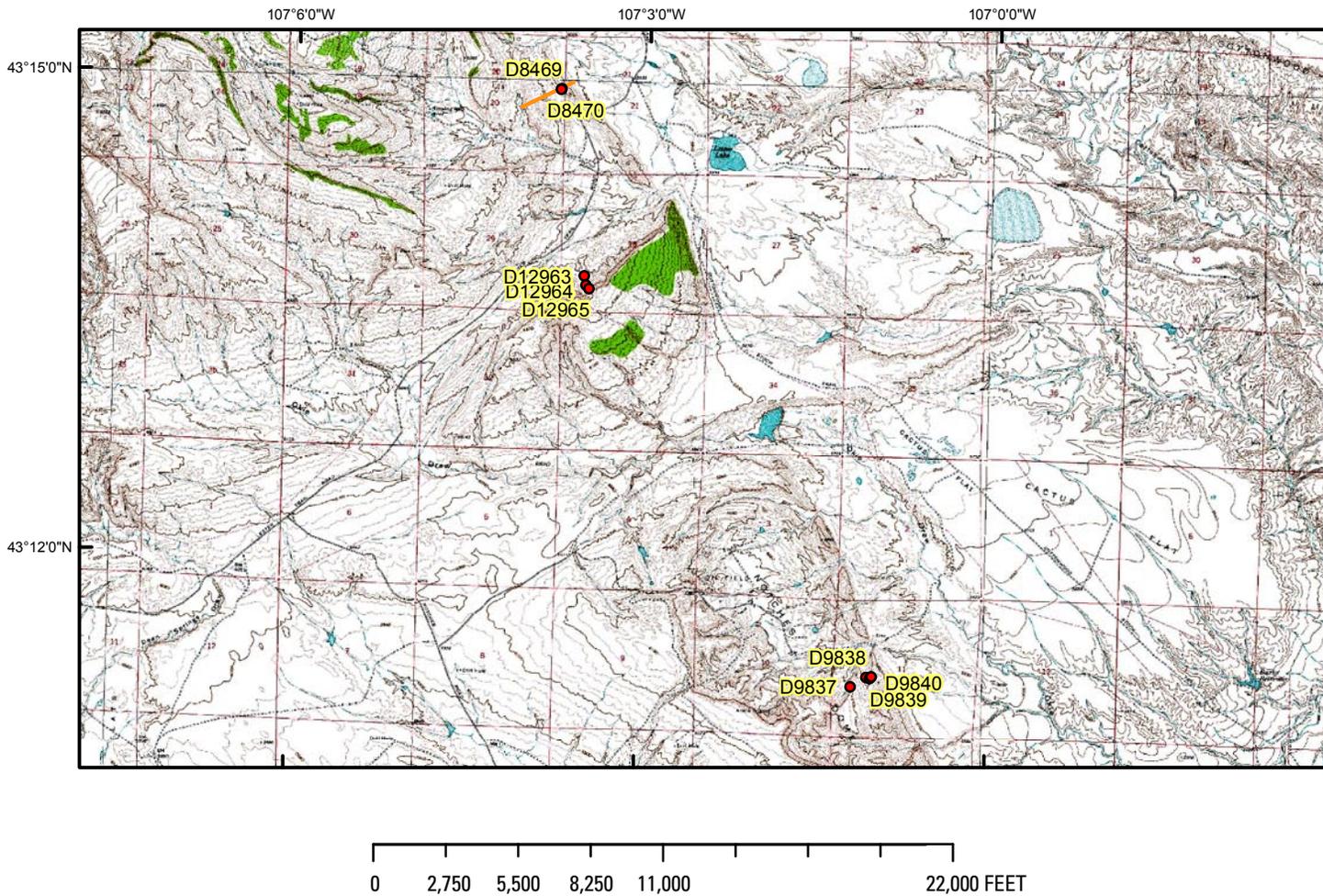
# Cottonwood Creek South

*Topographic map*

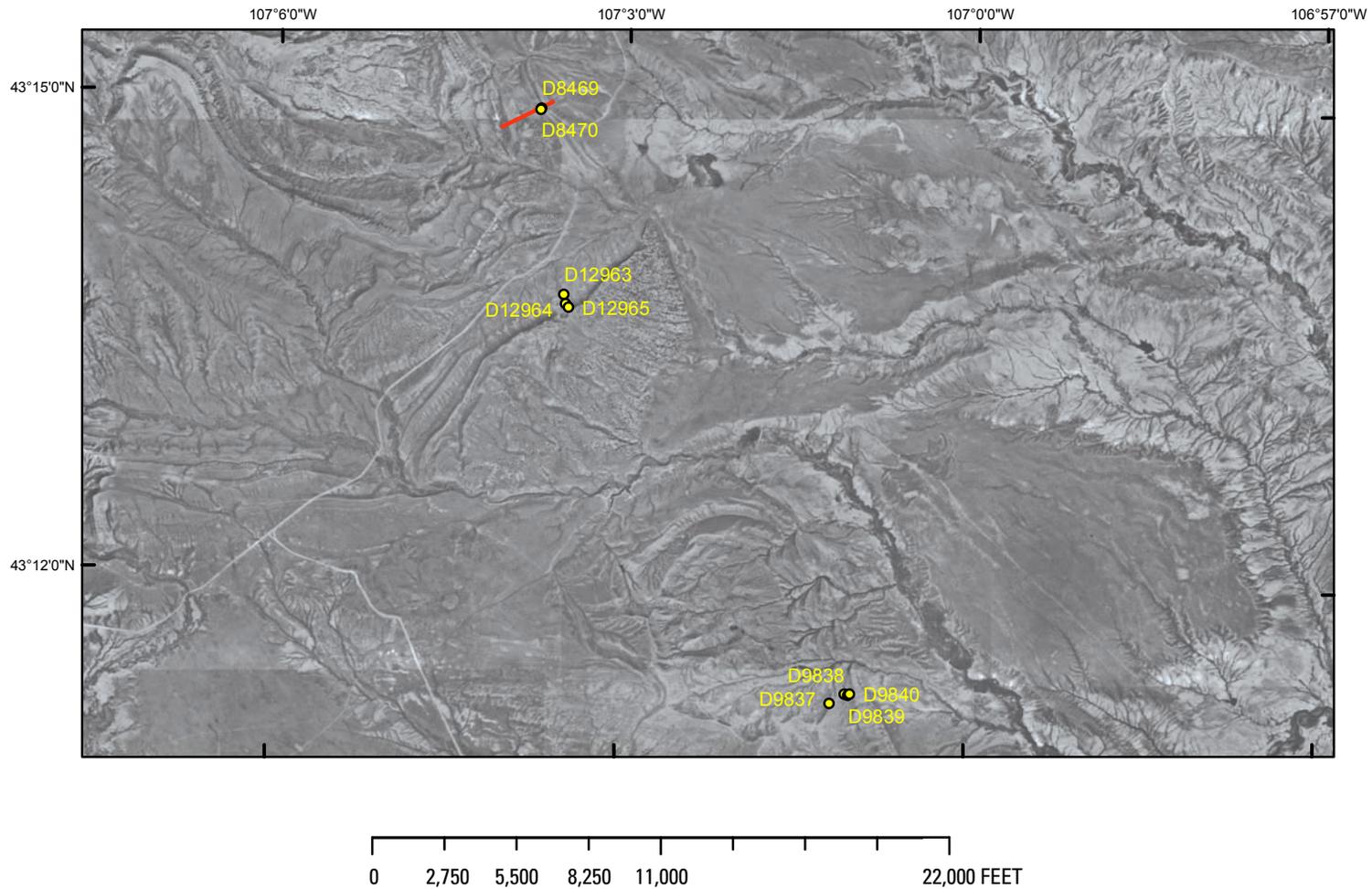
*Aerial photograph*

*Fossil locations*

*Measured section*



**Cottonwood Creek South.** Topographic map of Cottonwood Creek South area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. Contour interval: 20 feet.



**Cottonwood Creek South.** Aerial photograph of Cottonwood Creek South area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Cottonwood Creek South fossil locations

### USGS Mesozoic fossil locality: D8469

Location:

Outcrop area: Cottonwood Creek South  
 County: Natrona  
 Township and range: SE1/4 SE1/4 NE1/4 sec. 20, T. 38 N., R. 85 W.  
 Geographic coordinate: lat 43.249° N., long 107.062° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/30/72

Fossil:

*Metoicoceras muelleri*

Age: early late Cenomanian

### USGS Mesozoic fossil locality: D8470

Location:

Outcrop area: Cottonwood Creek South  
 County: Natrona  
 Township and range: SE1/4 SE1/4 NE1/4 sec. 20, T. 38 N., R. 85 W.  
 Geographic coordinate: lat 43.249° N., long 107.063° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/30/72

Comment: from 25 or 30 ft above D8469

Fossils:

*Inoceramus pictus*

*Pycnodonte ? sp.*

*Dunveganoceras sp.*

*Metoicoceras defordi*

Age: early late Cenomanian

### USGS Mesozoic fossil locality: D9837

Location:

Outcrop area: Cottonwood Creek South  
 County: Natrona  
 Township and range: NW1/4 NW1/4 SW1/4 sec. 11, T. 37 N., R. 85 W.  
 Geographic coordinate: lat 43.187° N., long 107.019° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 10/16/75

Comment: from a unit of interbedded siltstone and sandstone

Fossil:

*Plesiacanthoceras wyomingense*

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D9838

Location:

Outcrop area: Cottonwood Creek South  
 County: Natrona  
 Township and range: NE1/4 SW1/4 sec. 11, T. 37 N., R. 85 W.  
 Geographic coordinate: lat 43.188° N., long 107.017° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 10/16/75

Comment: from sandstone higher than at D9837

Fossil:

*Dunveganoceras albertense*

Age: early late Cenomanian

### USGS Mesozoic fossil locality: D9839

Location:

Outcrop area: Cottonwood Creek South  
 County: Natrona  
 Township and range: NE1/4 SW1/4 sec. 11, T. 37 N., R. 85 W.  
 Geographic coordinate: lat 43.188° N., long 107.017° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 10/16/75

Comment: from soft clayey sandstone unit above D9838

Fossil:

*Metoicoceras mosbyense*

Age: middle late Cenomanian

## Cottonwood Creek South fossil locations—Continued

### USGS Mesozoic fossil locality: D9840

Location:

Outcrop area: Cottonwood Creek South

County: Natrona

Township and range: NE1/4 SW1/4 sec. 11, T. 37 N., R. 85 W.

Geographic coordinate: lat 43.188° N., long 107.016° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 10/16/75

Comment: from medium- to dark-gray sandy shale higher than at D9839

Fossil:

*Metoicoceras mosbyense*

Age: middle late Cenomanian

### USGS Mesozoic fossil locality: D12963

Location:

Outcrop area: Cottonwood Creek South

County: Natrona

Township and range: SW1/4 SW1/4 sec. 28, T. 38 N., R. 85 W.

Geographic coordinate: lat 43.230° N., long 107.059° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 1988

Comment: from concretionary siltstone

Fossils:

*Inoceramus rutherfordi*

*Ostrea beloiti*

*Acanthoceras amphibolum*

Age: late middle Cenomanian

### USGS Mesozoic fossil locality: D12964

Location:

Outcrop area: Cottonwood Creek South

County: Natrona

Township and range: SW1/4 SW1/4 sec. 28, T. 38 N., R. 85 W.

Geographic coordinate: lat 43.229° N., long 107.058° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 1988

Comment: from silty concretions

Fossils:

*Dunveganoceras conditum*

*Metoicoceras mosbyense*

Age: middle late Cenomanian

### USGS Mesozoic fossil locality: D12965

Location:

Outcrop area: Cottonwood Creek South

County: Natrona

Township and range: SW1/4 SW1/4 sec. 28, T. 38 N., R. 85 W.

Geographic coordinate: lat 43.228° N., long 107.058° W.

Notches Dome quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 1988

Comment: from silty concretions

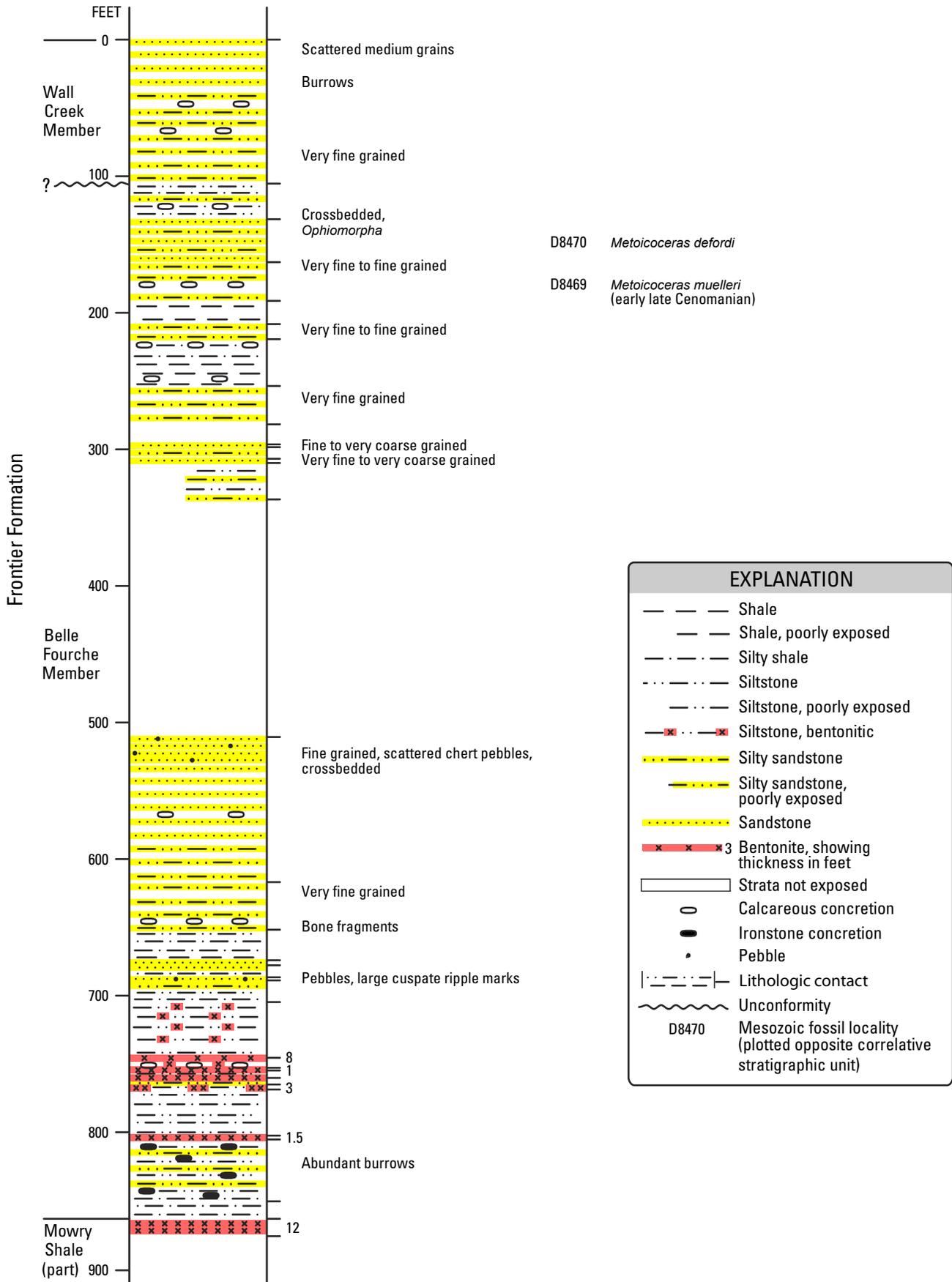
Fossil:

*Metoicoceras mosbyense*

Age: middle late Cenomanian

# Cottonwood Creek South

Natrona County, Wyoming  
 Notches Dome quadrangle  
 Sections 20 and 21, T. 38 N., R. 85 W.



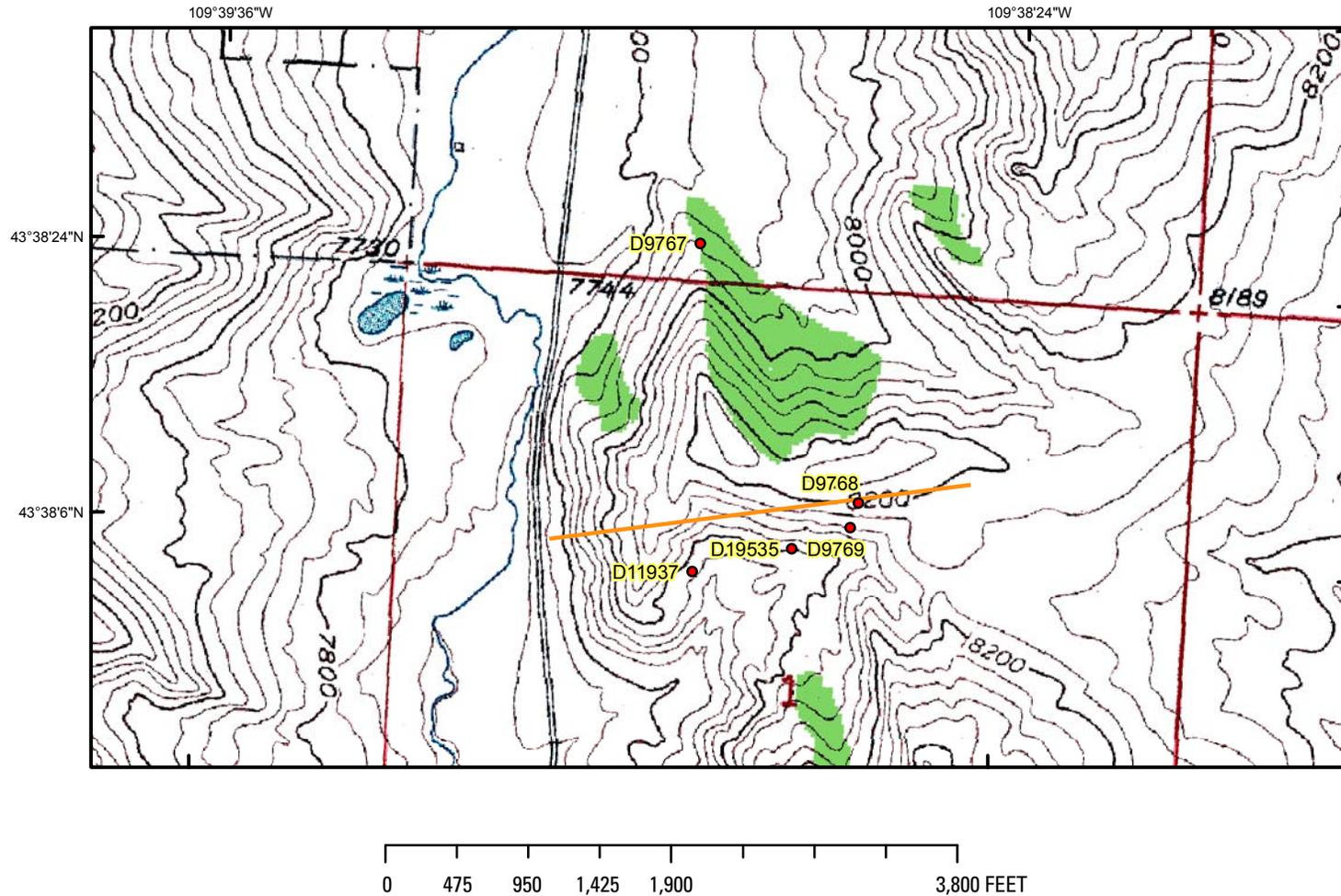
## Dubois Area

*Topographic map*

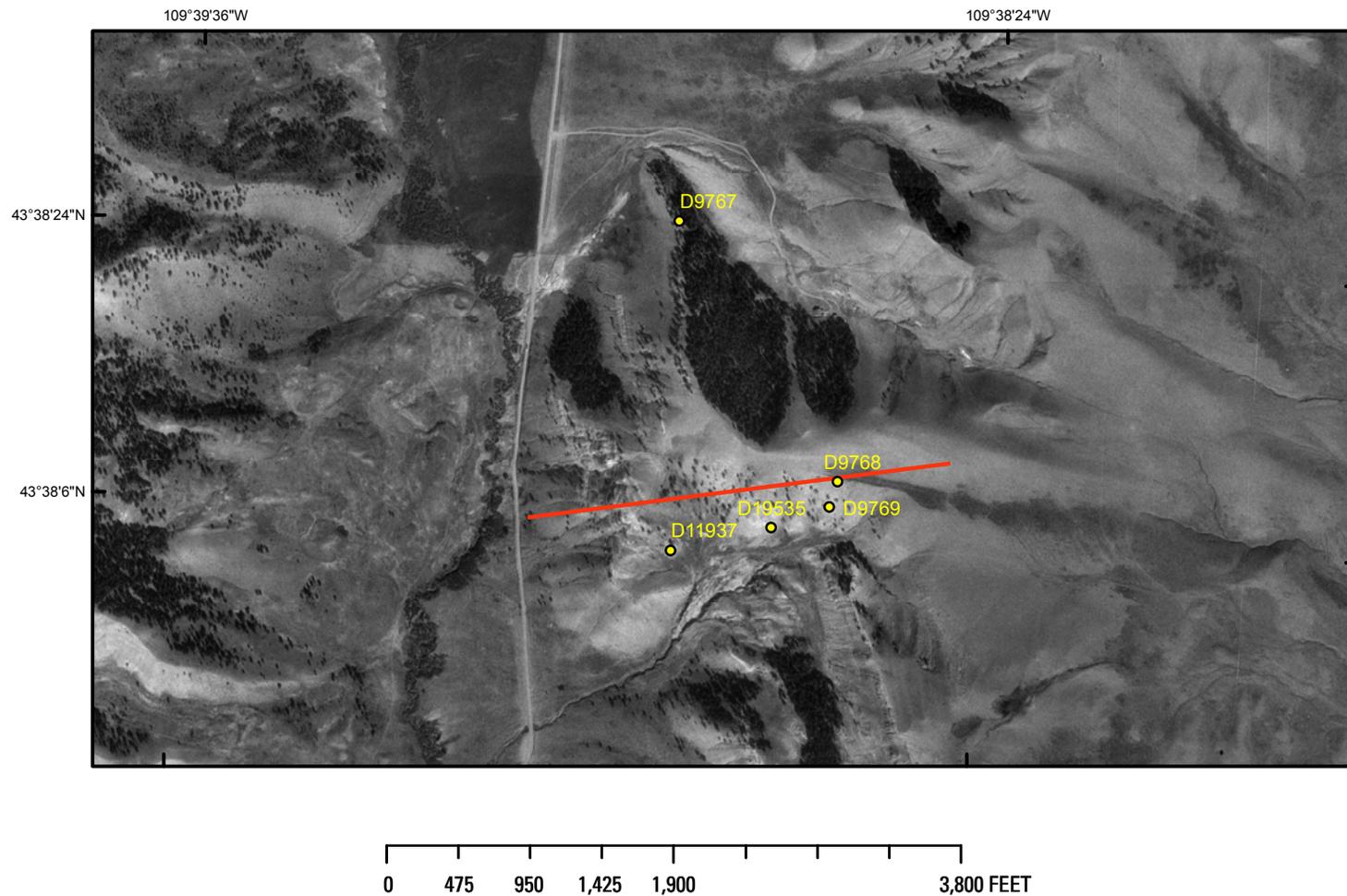
*Aerial photograph*

*Fossil locations*

*Measured section*



**Dubois Area.** Topographic map of Dubois area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded area shown in green. Contour interval: 40 feet.



**Dubois Area.** Aerial photograph of Dubois area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Dubois Area fossil locations

### USGS Mesozoic fossil locality: D9767

Location:

Outcrop area: Dubois  
 County: Fremont  
 Township and range: SW1/4 SE1/4 SW1/4 sec. 36, T. 43 N., R. 107 W.  
 Geographic coordinate: lat 43.640° N., long 109.648° W.

Ramshorn Peak quadrangle

Formation: Frontier

Collector: Merewether

Collection date: 7/29/75

Comment: from uppermost ridge-forming sandstone

Fossils:

*Inoceramus deformatis* (*Cremnoceramus crassus*)  
*Ostrea anomioides*  
*Camptonectes n. sp.*  
*Cardium curtum*  
*Trachycardium cf. T. ochilleanum*  
*Tellinimera sp.*  
*Gastropod*  
*Echinoid*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D9768

Location:

Outcrop area: Dubois  
 County: Fremont  
 Township and range: NW1/4 SW1/4 NE1/4 sec. 1, T. 42 N., R. 107 W.  
 Geographic coordinate: lat 43.636° N., long 109.644° W.

Ramshorn Peak quadrangle

Formation: Frontier

Collector: Merewether

Collection date: 7/30/75

Comment: from uppermost part of formation

Fossils:

*Ostrea cretacea*  
*Camptonectes n. sp.*  
*Trachycardium cf. T. ochilleanum*  
*Tellinimera sp.*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D9769

Location:

Outcrop area: Dubois  
 County: Fremont  
 Township and range: NW1/4 SW1/4 NE1/4 sec. 1, T. 42 N., R. 107 W.  
 Geographic coordinate: lat 43.635° N., long 109.644°

Ramshorn Peak quadrangle

Formation: Frontier

Collector: Merewether

Collection date: 7/30/75

Comment: from upper part of formation

Fossils:

*Nucula sp.*  
*Inoceramus inconstans* (*Cremnoceramus crassus*)  
*Exogyra ? sp.*  
*Trachycardium sp.*  
*Cyprimeria sp.*  
*Legumen sp.*  
*Placenticerias sp.*  
*Corbulid*  
*Gastropods*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D11937

Location:

Outcrop area: Dubois  
 County: Fremont  
 Township and range: NW1/4 sec. 1, T. 42 N., R. 107 W.  
 Geographic coordinate: lat 43.635° N., long 109.648° W.

Ramshorn Peak quadrangle

Formation: Frontier

Unit: Emigrant Gap Member

Collector: Cobban

Collection date: 7/20/82

Comment: from a 1-inch-thick bed of olive siltstone 56 ft above a bentonitic unit

Fossil:

*Collignoniceras woollgari*

Age: earliest middle Turonian

## Dubois Area fossil locations—Continued

### USGS Mesozoic fossil locality: D19535

Location:

Outcrop area: Dubois

County: Fremont

Township and range: NW1/4 sec. 1, T. 42 N., R. 107 W.

Geographic coordinate: lat 43.635° N., long 109.645° W.

Ramshorn Peak quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether and Cobban

Collection date: 7/20/82

Comment: from sandstone overlying paludal and intertidal deposits

Fossils:

*Phleopteria gastrodes*

*Ostrea sp.*

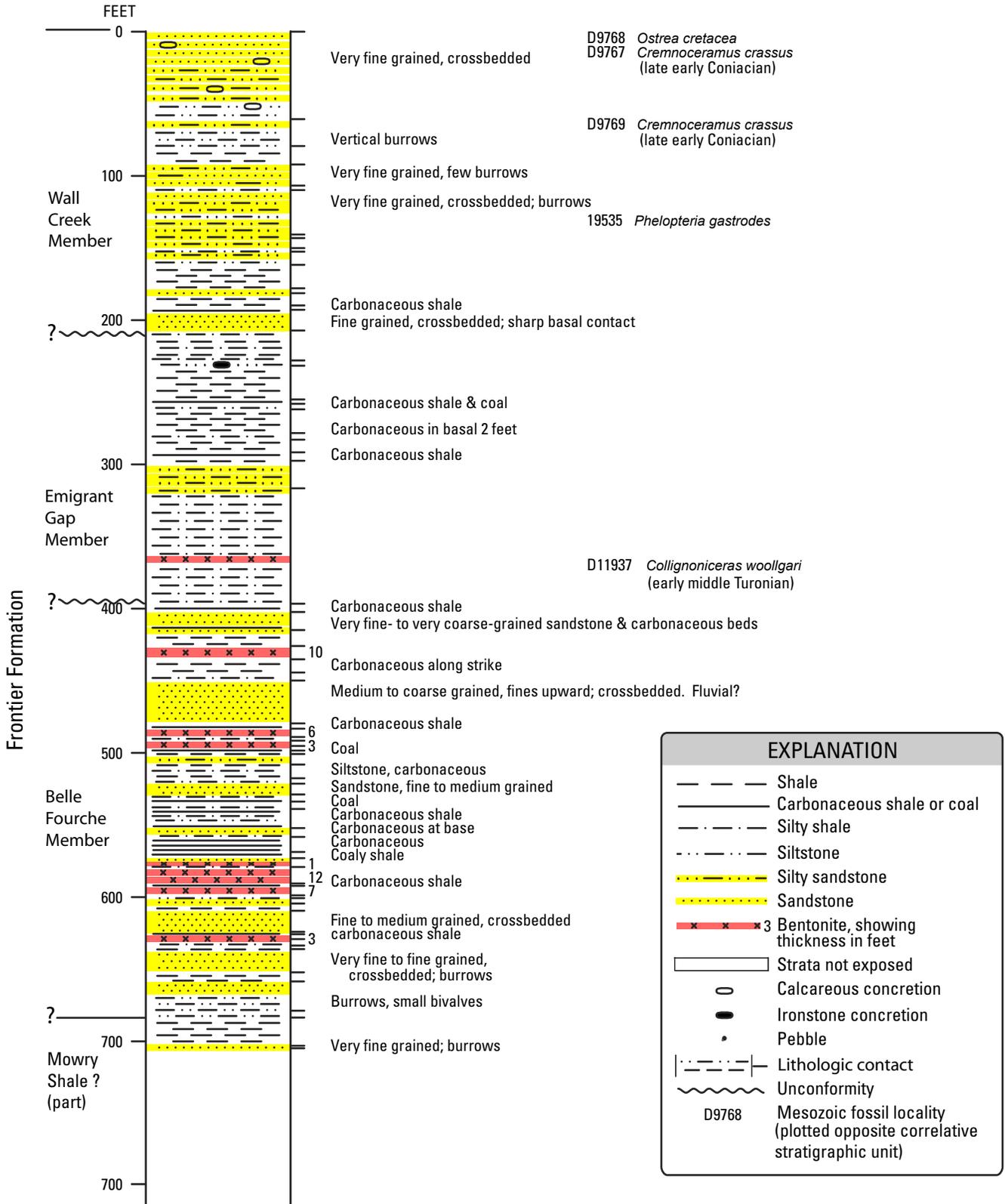
*Pleuriocardia curtum*

*Cymbophora sp.*

*Pugnellus sp.*

# Dubois Area

Fremont County, Wyoming  
 Ramshorn Peak quadrangle  
 Section 1, T.42 N., R. 107 W.



EXPLANATION	
— — —	Shale
— — — —	Carbonaceous shale or coal
- . - . - .	Silty shale
- - - - -	Siltstone
— · — · — ·	Silty sandstone
— · — · — ·	Sandstone
— x — x — x	Bentonite, showing thickness in feet
□	Strata not exposed
○	Calcareous concretion
●	Ironstone concretion
·	Pebble
· · · ·	Lithologic contact
~ ~ ~ ~	Unconformity
D9768	Mesozoic fossil locality (plotted opposite correlative stratigraphic unit)

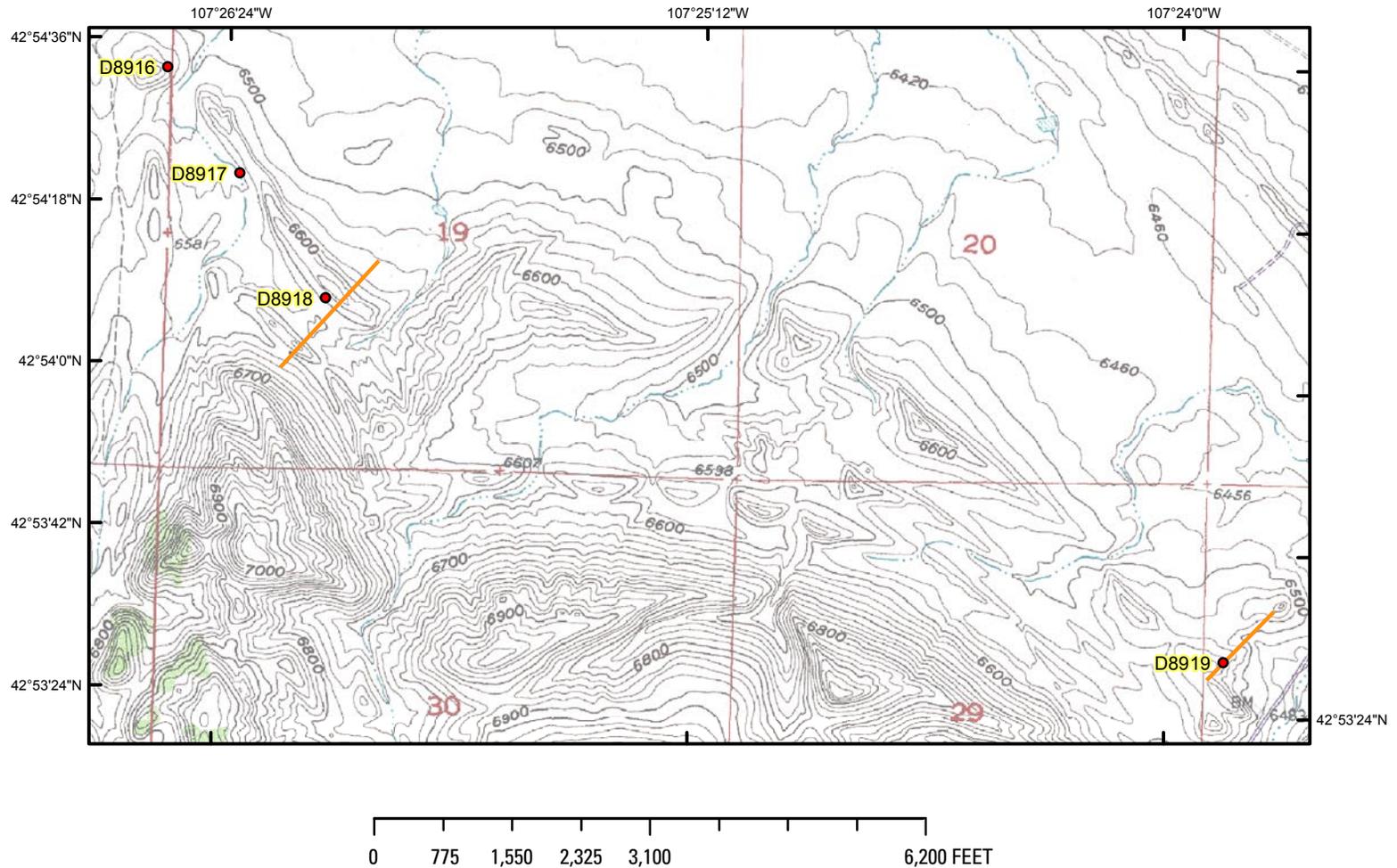
## **Ervay Basin**

***Topographic map***

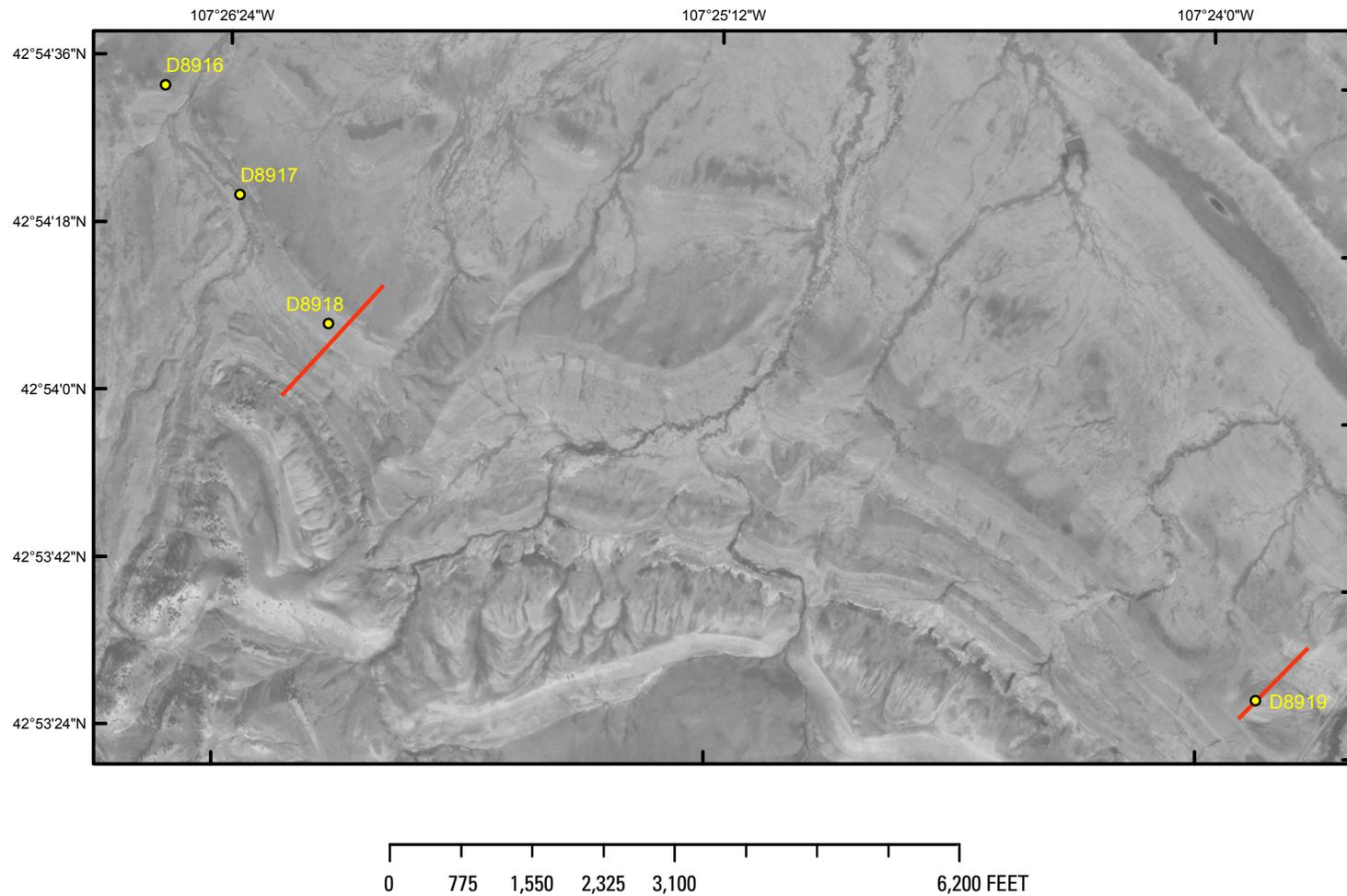
***Aerial photograph***

***Fossil locations***

***Measured section***



**Ervay Basin.** Topographic map of Ervay Basin area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. Contour interval: 20 feet.



**Ervay Basin.** Aerial photograph of Ervay Basin area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Ervay Basin fossil locations

### USGS Mesozoic fossil locality: D8916

Location:

Outcrop area: Ervay Basin

County: Natrona

Township and range: NE1/4 NE1/4 sec. 24, T. 34 N., R. 89 W.

Geographic coordinate: lat 42.909° N., long 107.443° W.

Ervay Basin quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 7/27/73

Comment: from upper part

Fossils:

*Inoceramus waltersdorfensis* (*Mytiloides scupini*)

*Baculites yokoyamai*

Age: late late Turonian

### USGS Mesozoic fossil locality: D8917

Location:

Outcrop area: Ervay Basin

County: Natrona

Township and range: SW1/4 NW1/4 sec. 19, T. 34 N., R. 88 W.

Geographic coordinate: lat 42.906° N., long 107.439° W.

Ervay Basin quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/27/73

Comment: from upper part

Fossils:

*Inoceramus prefragilis*

*Plesiacanthoceras wyomingense*

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D8918

Location:

Outcrop area: Ervay Basin

County: Natrona

Township and range: NE1/4 SW1/4 sec. 19, T. 34 N., R. 88 W.

Geographic coordinate: lat 42.902° N., long 107.436° W.

Ervay Basin quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/27/73

Comment: from upper part

Fossils:

*Plesiacanthoceras wyomingense*

*Pseudocalycoceras n. sp.* (*Eucalycoceras templetonense*)

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D8919

Location:

Outcrop area: Ervay Basin

County: Natrona

Township and range: SW1/4 NW1/4 sec. 28, T. 34 N., R. 88 W.

Geographic coordinate: lat 42.892° N., long 107.398° W.

Ervay Basin quadrangle

Formation: Cody Shale

Unit: Sage Breaks Member

Collector: Merewether

Collection date: 7/28/73

Comment: probably from base

Fossils:

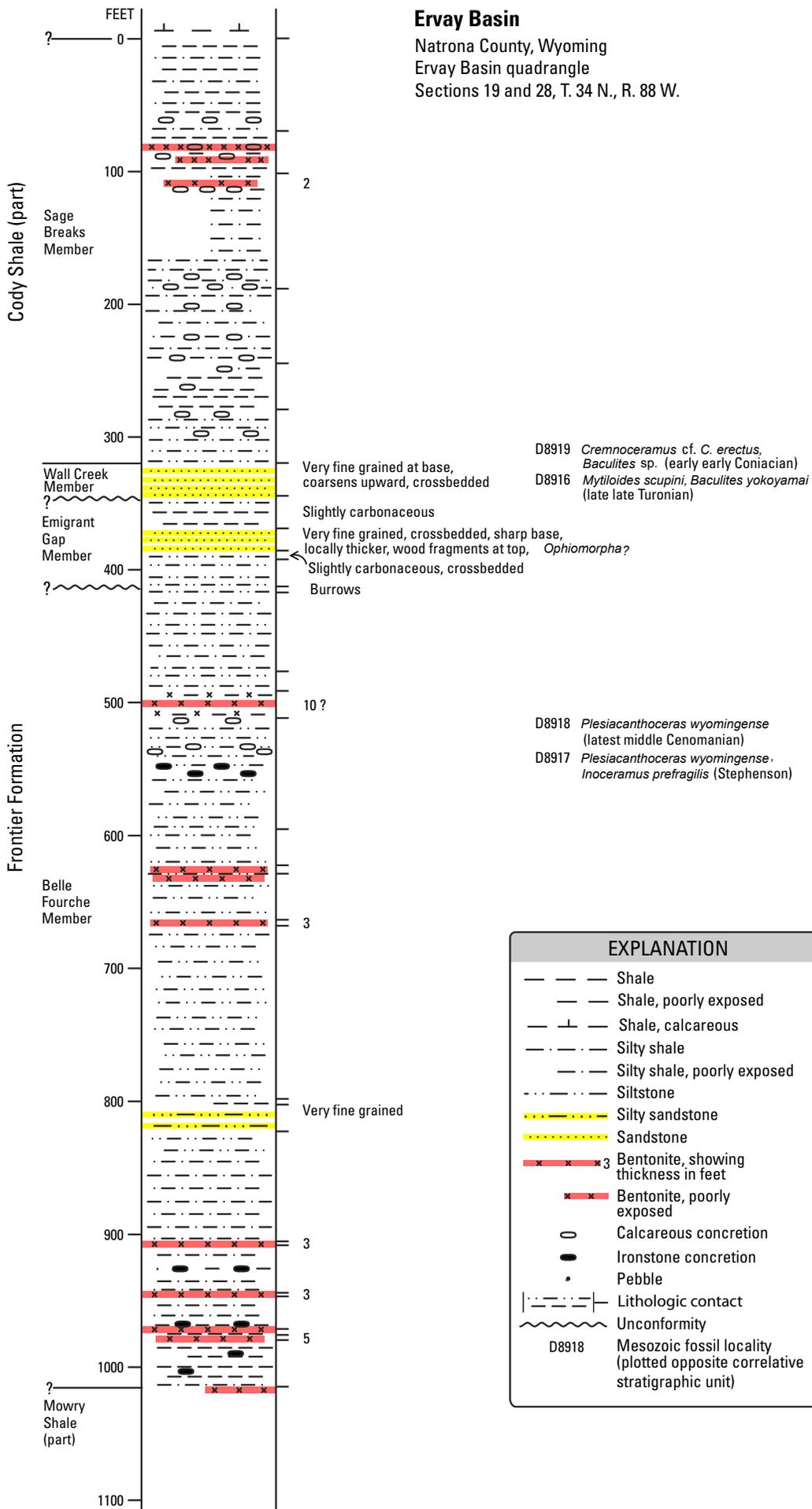
*Inoceramus cf. I. rotundatus fiege* (*Cremnoceramus cf. C. erectus*)

*Baculites sp.*

Age: early early Coniacian

### Ervey Basin

Natrona County, Wyoming  
 Ervey Basin quadrangle  
 Sections 19 and 28, T. 34 N., R. 88 W.



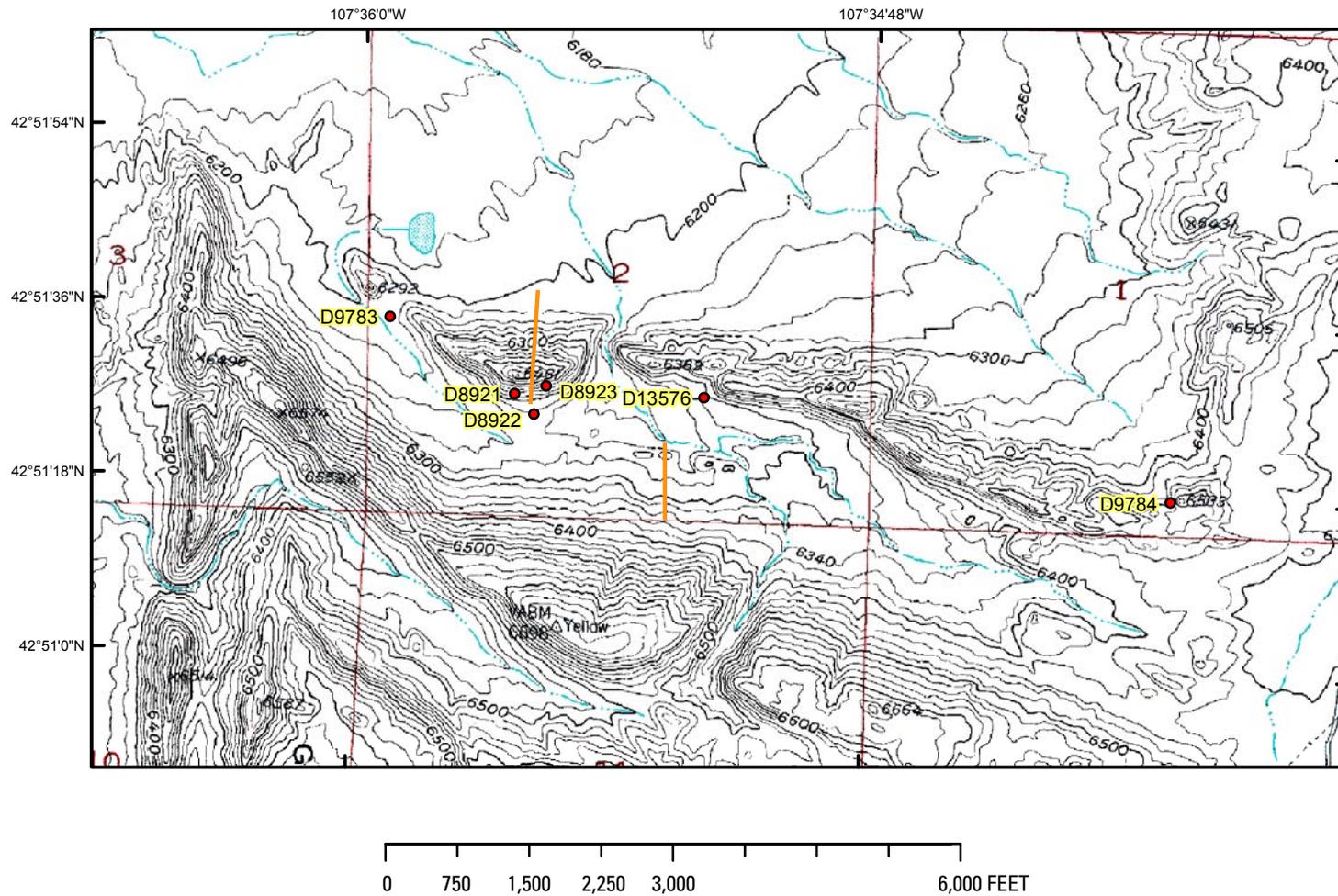
## Gas Hills

*Topographic map*

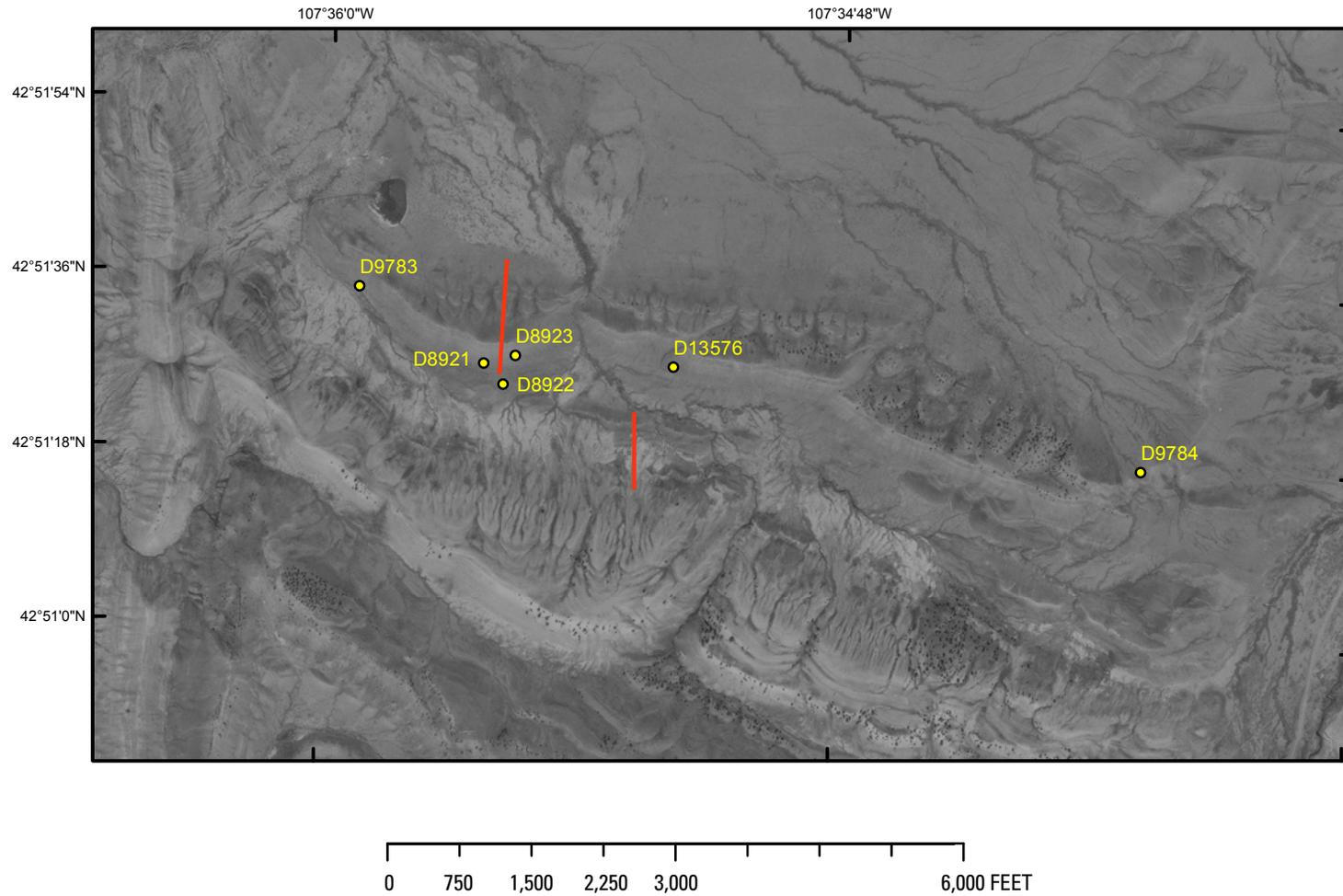
*Aerial photograph*

*Fossil locations*

*Measured section*



**Gas Hills.** Topographic map of Gas Hills area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Contour interval: 20 feet.



**Gas Hills.** Aerial photograph of Gas Hills area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Gas Hills fossil locations

### USGS Mesozoic fossil locality: D8921

Location:

Outcrop area: Gas Hills  
County: Fremont  
Township and range: Near center of SW1/4 sec. 2, T. 33 N., R. 90 W.  
Geographic coordinate: lat 42.858° N., long 107.594° W.

Gas Hills quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/29/73

Comment: from sandy limestone concretions in upper part

Fossil:

*Phelopteria gastrodes*

Age: late middle Cenomanian

### USGS Mesozoic fossil locality: D8922

Location:

Outcrop area: Gas Hills  
County: Fremont  
Township and range: Center SW1/4 sec. 2, T. 33 N., R. 90 W.  
Geographic coordinate: lat 42.858° N., long 107.594° W.

Gas Hills quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/29/73

Comment: from sandstone concretions 10 ft above D8921

Fossils:

*Inoceramus rutherfordi*

*Ostrea beloti*

*Acanthoceras amphibolum*

Age: late middle Cenomanian

### USGS Mesozoic fossil locality: D8923

Location:

Outcrop area: Gas Hills  
County: Fremont  
Township and range: NE1/4 SW1/4 sec. 2, T. 33 N., R. 90 W.  
Geographic coordinate: lat 42.858° N., long 107.593° W.

Gas Hills quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 7/29/73

Comment: from upper part

Fossil:

*Plesiacanthoceras wyomingense*

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D9783

Location:

Outcrop area: Gas Hills  
County: Fremont  
Township and range: NW1/4 SW1/4 sec. 2, T. 33 N., R. 90 W.  
Geographic coordinate: lat 42.860° N., long 107.599° W.

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/4/75

Comment: from above zone of large brown concretions

Fossil:

*Plesiacanthoceras wyomingense*

Age: latest middle Cenomanian

### USGS Mesozoic fossil locality: D9784

Location:

Outcrop area: Gas Hills  
County: Fremont  
Township and range: SW1/4 SE1/4 sec. 1, T. 33 N., R. 90 W.  
Geographic coordinate: lat 42.855° N., long 107.568° W.

Gas Hills quadrangle

Formation: Cody Shale

Collector: Merewether

Collection date: 8/4/75

Comment: from possibly 50 ft above base of formation

Fossils:

*Inoceramus rotundatus* (*Creminoceramus crassus*)

*Baculites* sp.

*Scaphites impendicostatus*

Age: late early Coniacian

## Gas Hills fossil locations—Continued

### USGS Mesozoic fossil locality: D13576

Location:

Outcrop area: Gas Hills

County: Fremont

Township and range: SW1/4 SE1/4 sec. 2, T. 33 N., R. 90 W.

Geographic coordinate: lat 42.858° N., long 107.586° W.

Gas Hills quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/20/94

Comment: from large dark-brown, calcareous, silty concretions

Fossils:

*Inoceramus rutherfordi*

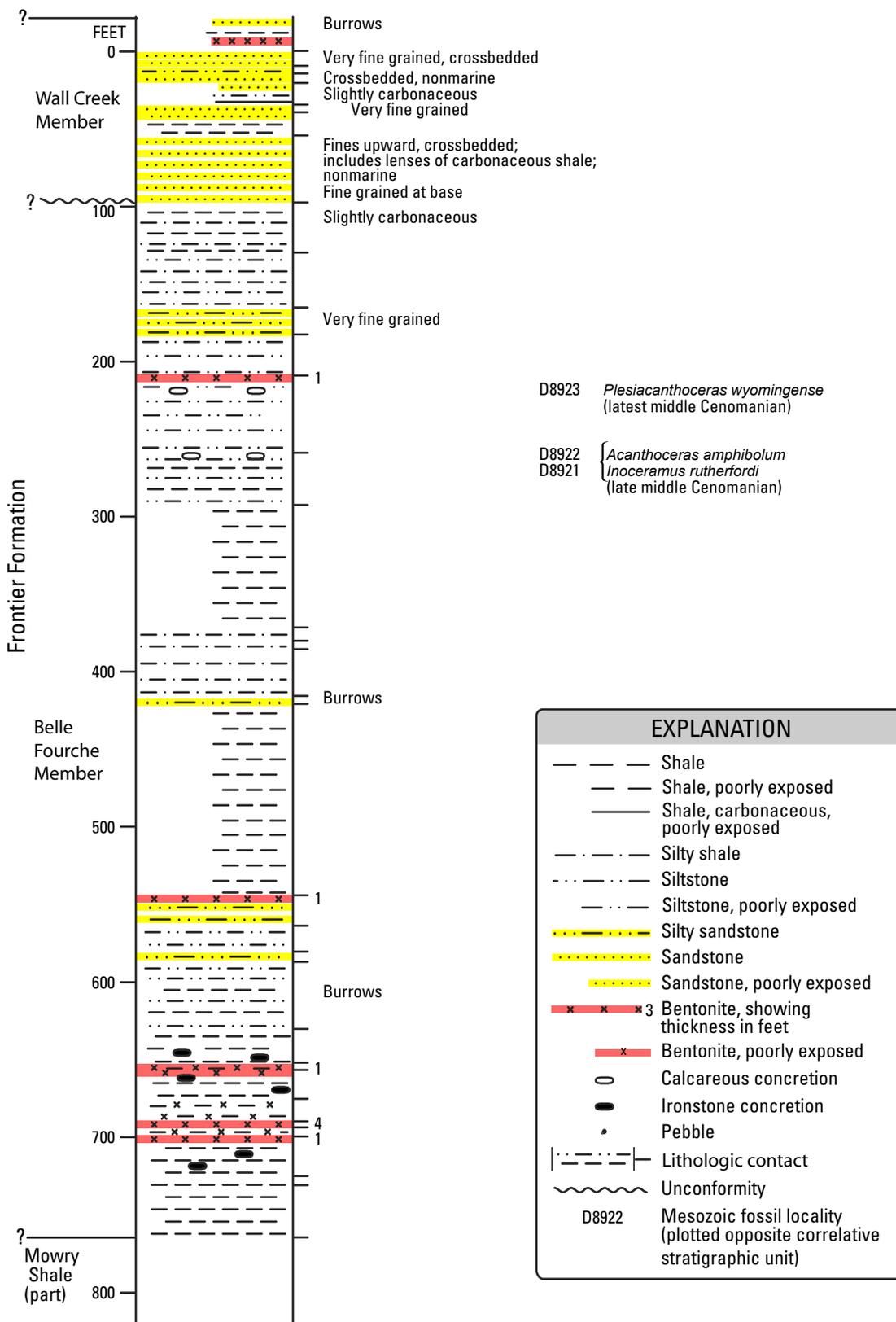
*Ostrea beloiti*

*Acanthoceras amphibolum*

Age: late middle Cenomanian

### Gas Hills

Fremont County, Wyoming  
 Gas Hills quadrangle  
 Section 2, T. 33 N., R. 90 W.



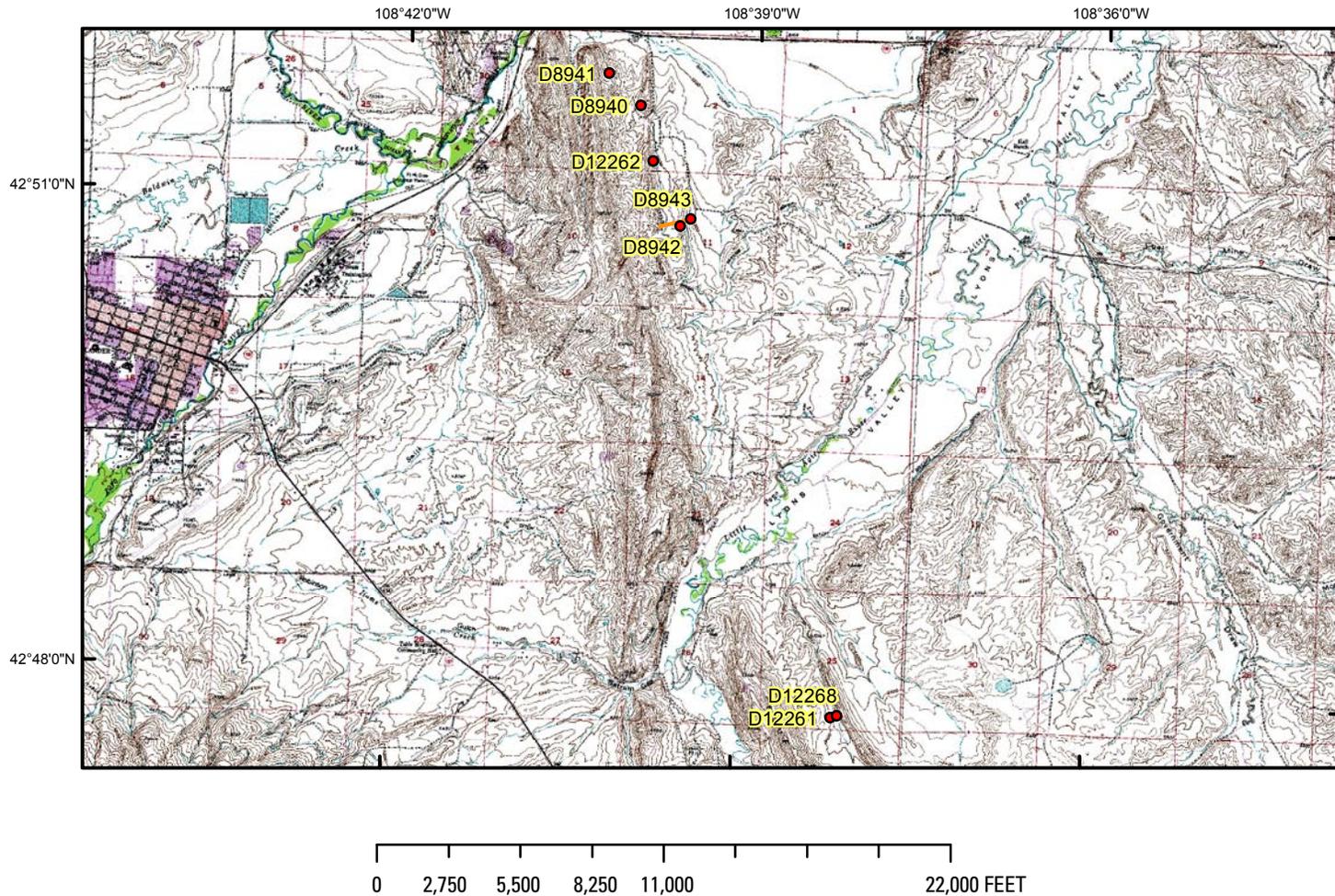
# Lander

*Topographic map*

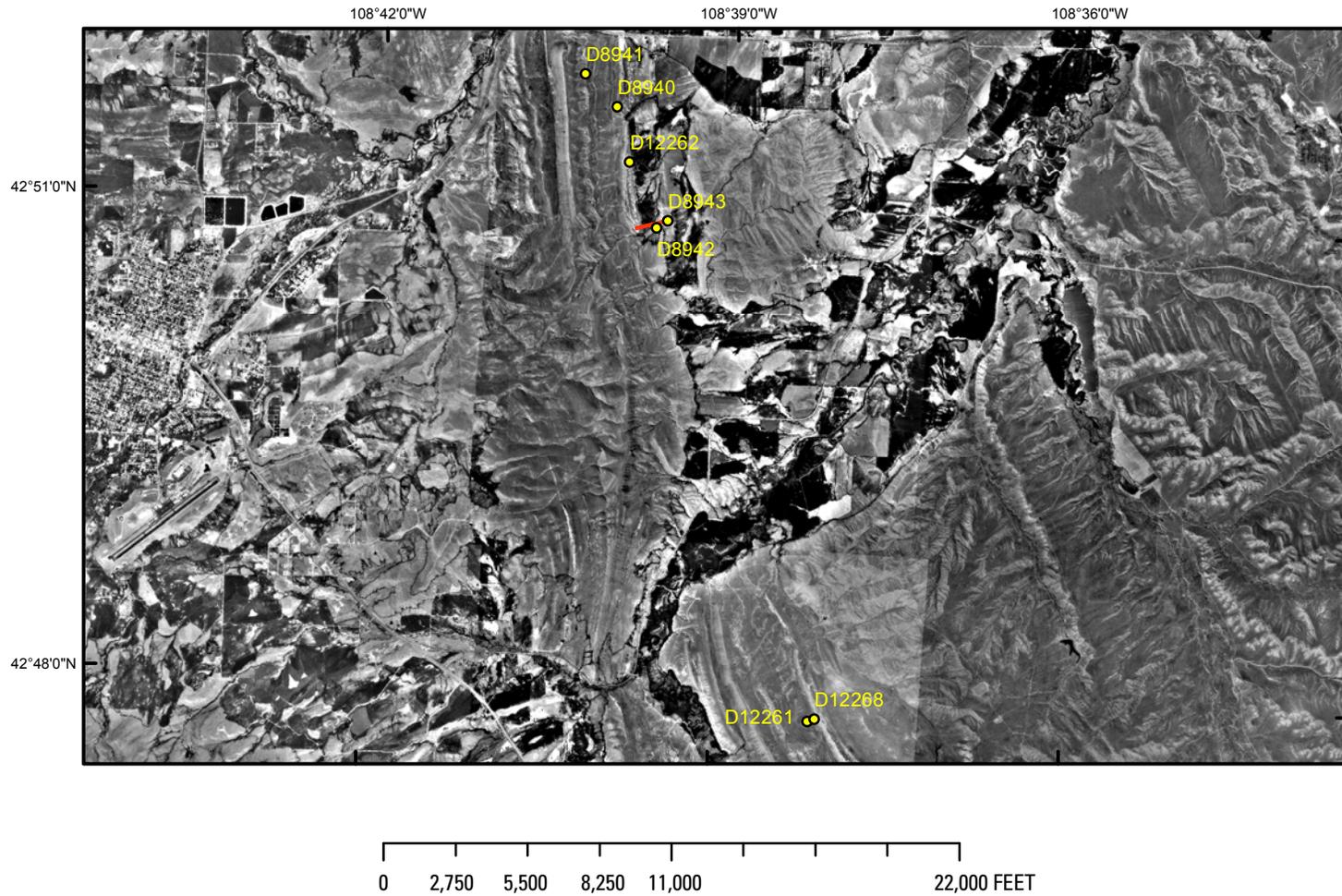
*Aerial photograph*

*Fossil locations*

*Measured section*



**Lander.** Topographic map of Lander area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. Area of town of Lander shown in purple. Contour interval: 20 feet.



**Lander.** Aerial photograph of Lander area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Lander fossil locations

### USGS Mesozoic fossil locality: D8941

Location:

Outcrop area: Lander  
County: Fremont  
Township and range: SW1/4 NE1/4 sec. 3, T. 33 N., R. 99 W.  
Geographic coordinate: lat 42.864° N., long 108.671° W.

Lander quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/16/73

Comment: from lower part

Fossils:

*Brachidontes sp.*  
*Corbula ? sp.*  
*Pleurobema? cf. P. dowlingi*

Age: early Cenomanian

### USGS Mesozoic fossil locality: D8942

Location:

Outcrop area: Lander  
County: Fremont  
Township and range: SE1/4 NW1/4 sec. 11, T. 33 N., R. 99 W.  
Geographic coordinate: lat 42.848°N., long 108.660° W.

Lander quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/16/73

Comment: from upper part of formation

Fossils:

*Pinna sp.*  
*Inoceramus inconstans (Cremnoceramus crassus)*  
*Inoceramus deformis (Cremnoceramus deformis)*  
*Gastropods*  
*Baculites sp.*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D8943

Location:

Outcrop area: Lander  
County: Fremont  
Township and range: SE1/4 NW1/4 sec. 11, T. 33 N., R. 99 W.  
Geographic coordinate: lat 42.849° N., long 108.659° W.

Lander quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/16/73

Comment: from near top of member

Fossils:

*Pinna sp.*  
*Inoceramus inconstans (Cremnoceramus crassus inconstans)*  
*Inoceramus deformis (Cremnoceramus deformis)*  
*Ostrea sp.*  
*Camptonectes sp.*  
*Homomya sp.*  
*Baculites mariasensis*  
*Scaphites impendicostatus*  
*Placenticerias sp.*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D12261

Location:

Outcrop area: Lander  
County: Fremont  
Township and range: SW1/4 SE1/4 sec. 25, T. 33 N., R. 99 W.  
Geographic coordinate: lat 42.797° N., long 108.636° W.

Lander quadrangle

Formation: Frontier

Collector: E.R. Mignardot

Collection date: 1983

Comment: from upper part of formation

Fossils:

*Inoceramus deformis (Cremnoceramus crassus inconstans)*  
*I. Inconstans*  
*Ostrea sp.*  
*Gyrodes sp.*

Age: late early Coniacian

## Lander fossil locations—Continued

### USGS Mesozoic fossil locality: D12262

Location:

Outcrop area: Lander

County: Fremont

Township and range: SW1/4 SW1/4 sec. 2, T. 33 N., R. 99 W.

Geographic coordinate: lat 42.855° N., long 108.665° W.

Lander quadrangle

Formation: Frontier

Collector: E.R. Mignardot

Collection date: 1983

Comment: from upper part of formation

Fossil:

*Inoceramus inconstans* (*Cremnoceramus crassus inconstans*)

Age: late early Coniacian

### USGS Mesozoic fossil locality: D12268

Location:

Outcrop area: Lander

County: Fremont

Township and range: SW1/4 SE1/4 sec. 25, T. 33 N., R. 99 W.

Geographic coordinate: lat 42.797° N., long 108.635° W.

Lander quadrangle

Formation: Frontier

Collector: E.R. Mignardot

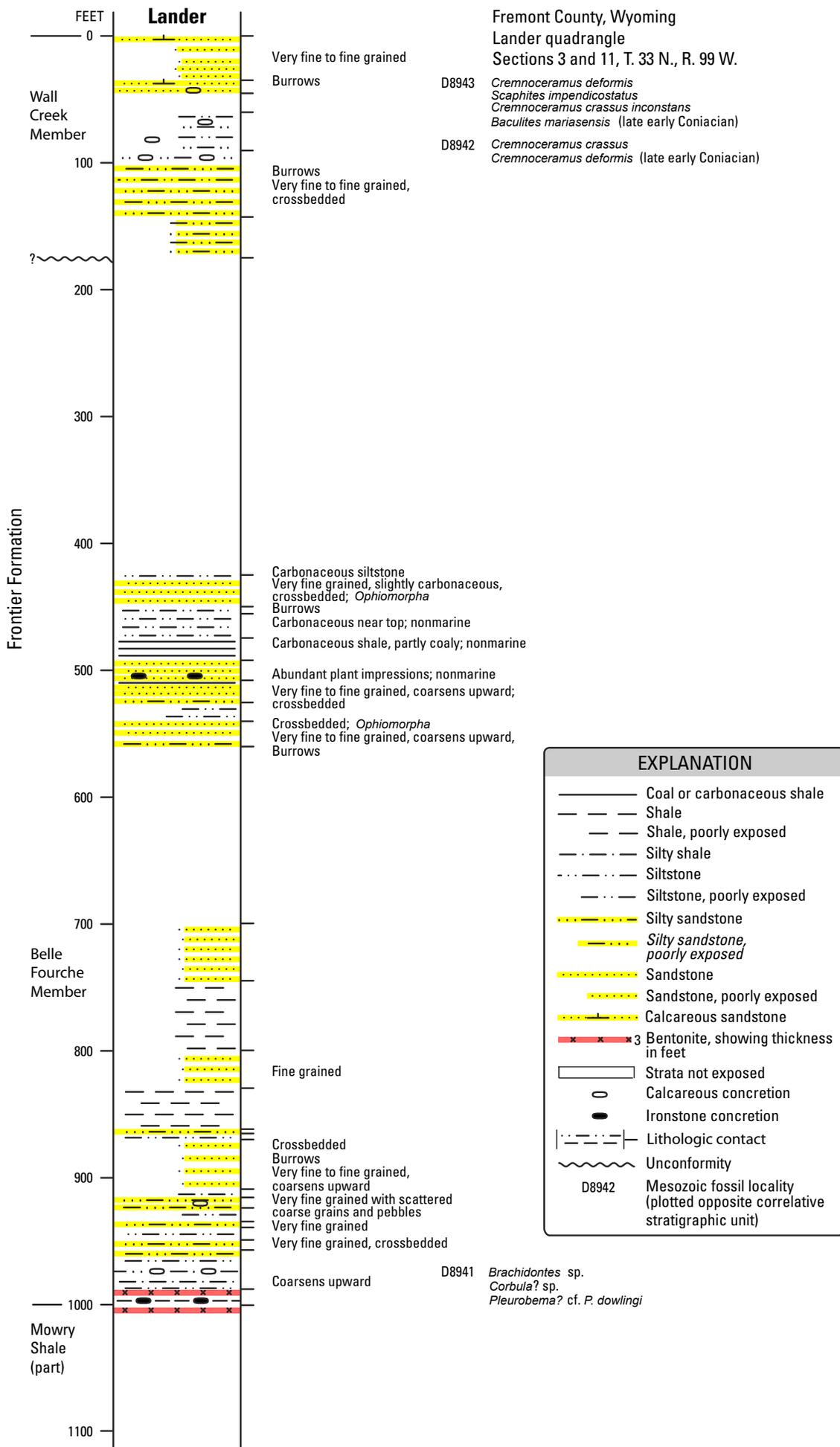
Collection date: 1983

Comment: from upper part of formation

Fossil:

*Inoceramus frechi* (*Cremnoceramus erectus?*)

Age: early Coniacian



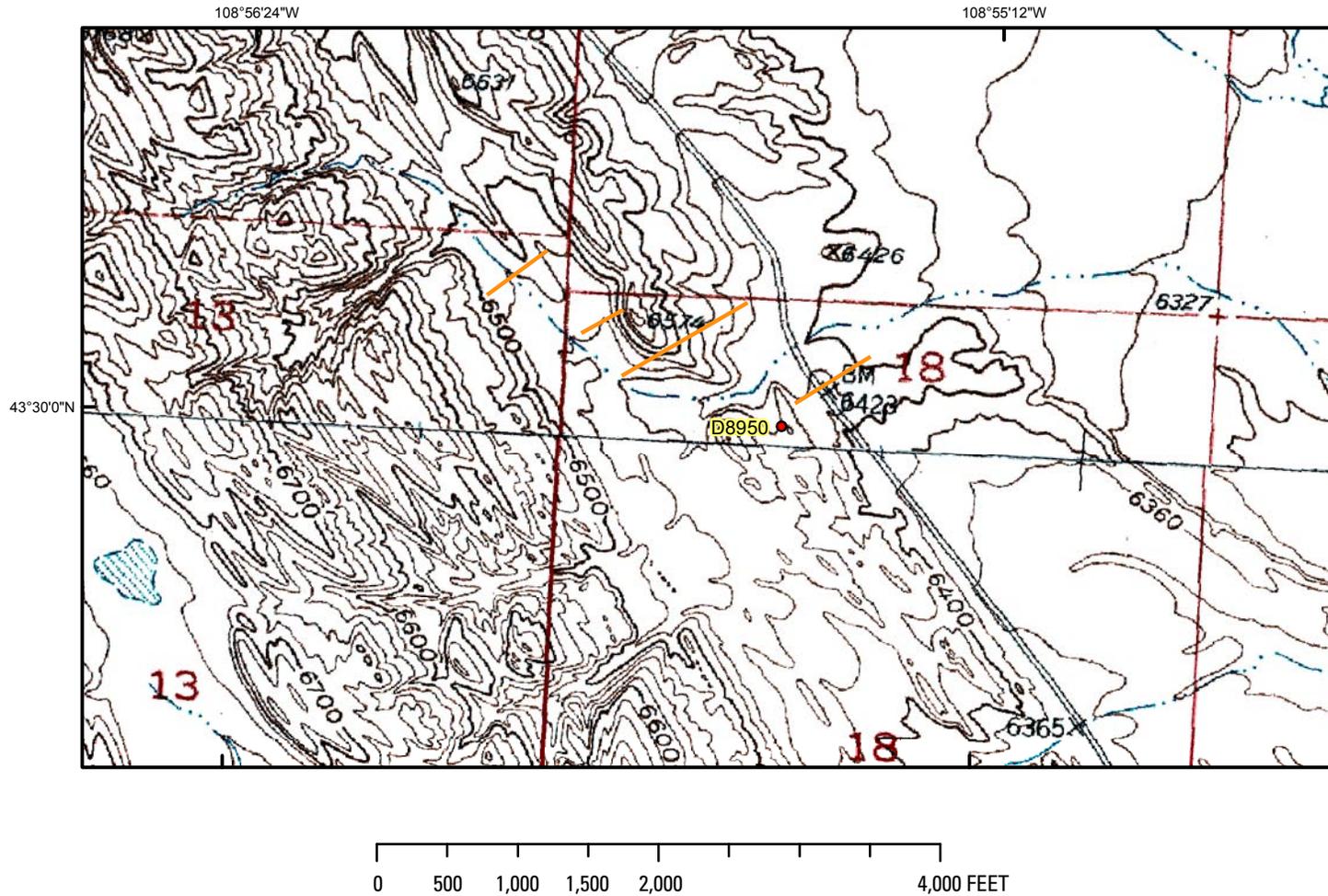
# Maverick Spring Dome

*Topographic map*

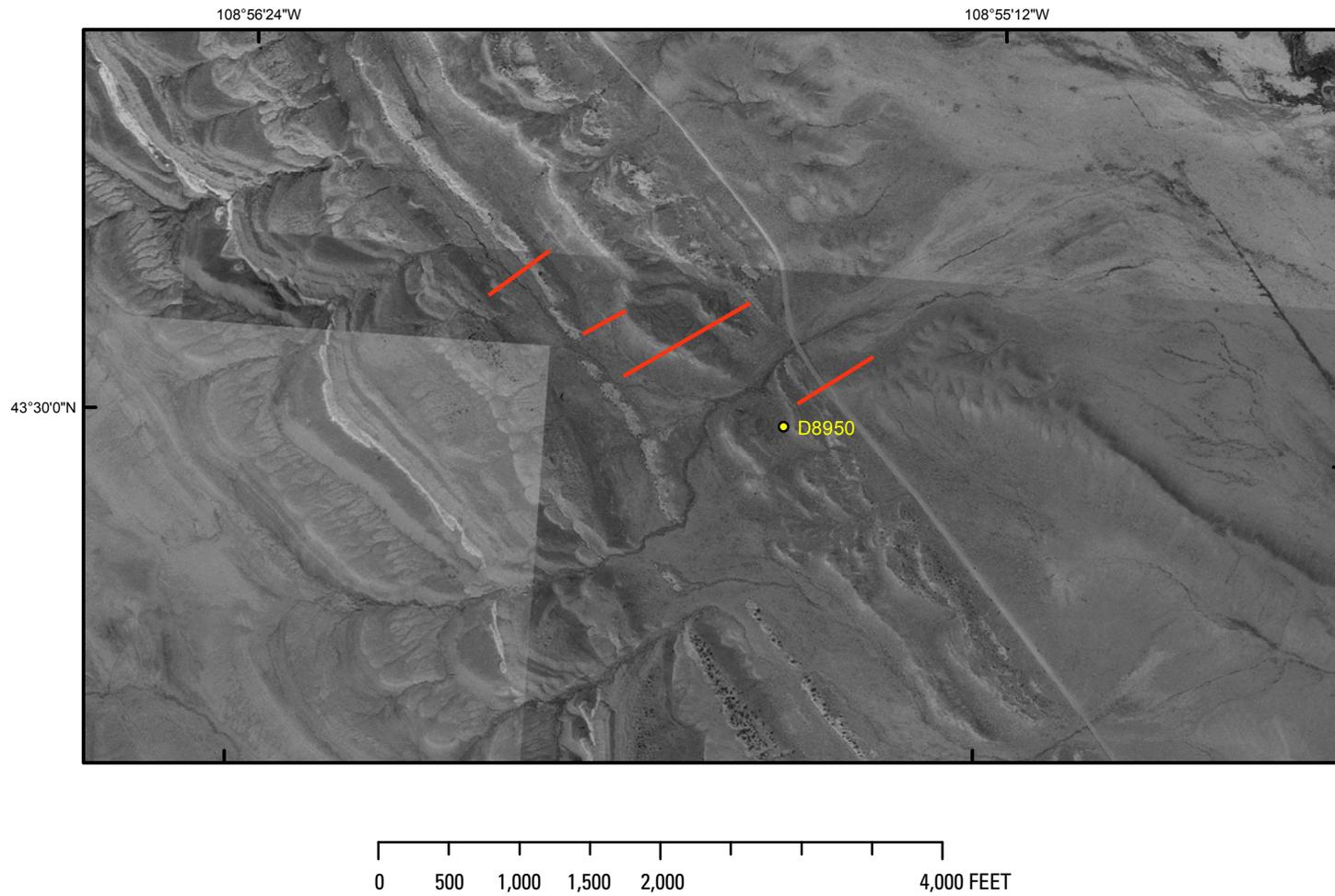
*Aerial photograph*

*Fossil locations*

*Measured section*



**Maverick Spring Dome.** Topographic map of Maverick Spring Dome area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Contour interval: 20 feet.



**Maverick Spring Dome.** Aerial photograph of Maverick Spring Dome area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Maverick Spring Dome fossil location

**USGS Mesozoic fossil locality: D8950**

Location:

Outcrop area: Maverick Spring Dome

County: Fremont

Township and range: NE1/4 NW1/4 sec. 18, T. 6 N., R. 1 W.

Geographic coordinate: lat 43.500° N., long 108.925° W.

Antelope Ridge quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/21/73

Comment: from uppermost sandstone of formation

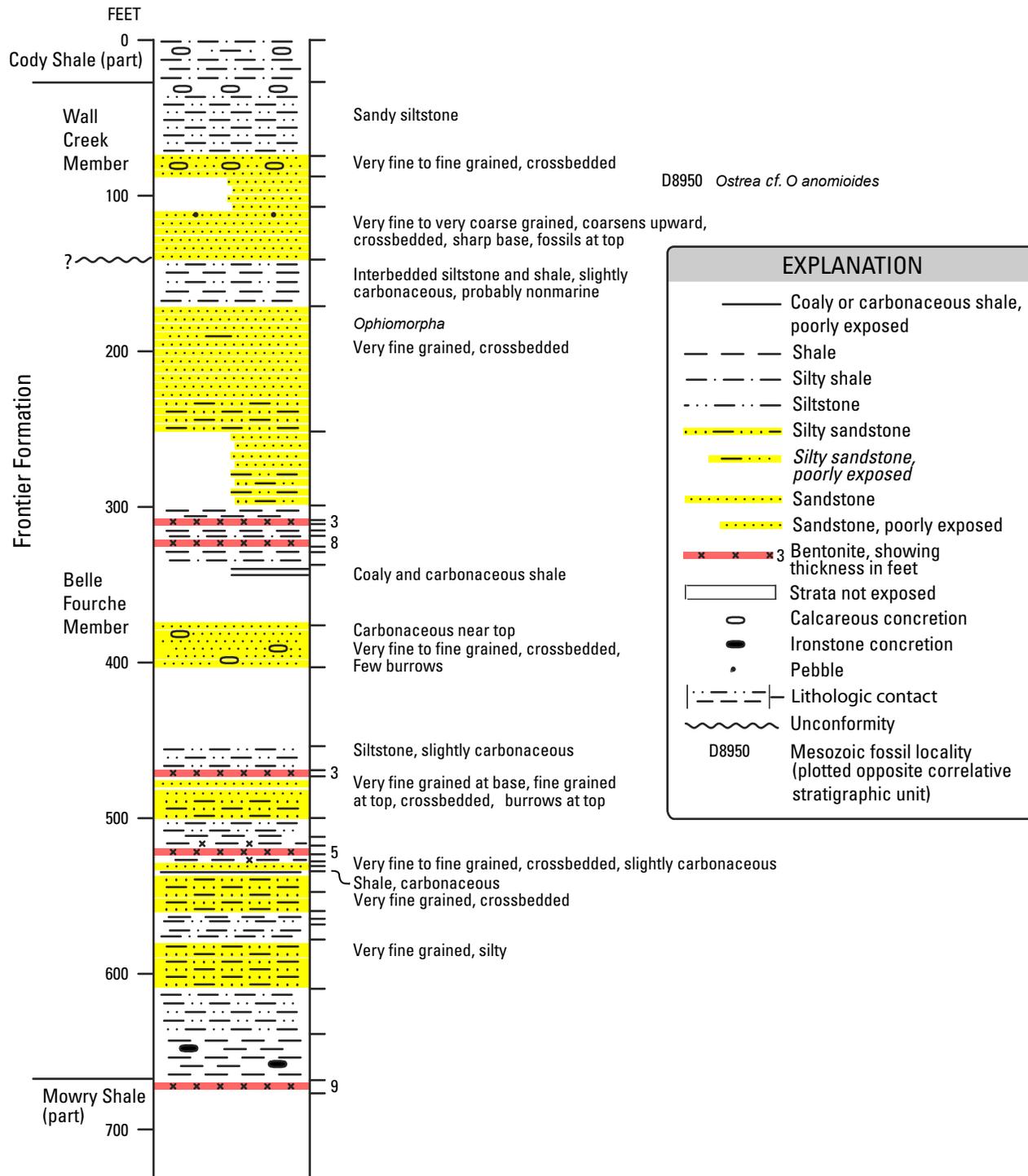
Fossil:

*Ostrea cf. O. anomioides*

Age: Coniacian

# Maverick Spring Dome

Fremont County, Wyoming  
 Antelope Ridge and Maverick Spring quadrangles  
 Section 18, T. 6 N., R. 1 W., Section 13, T. 6 N., R. 2 W., Wind River Meridian



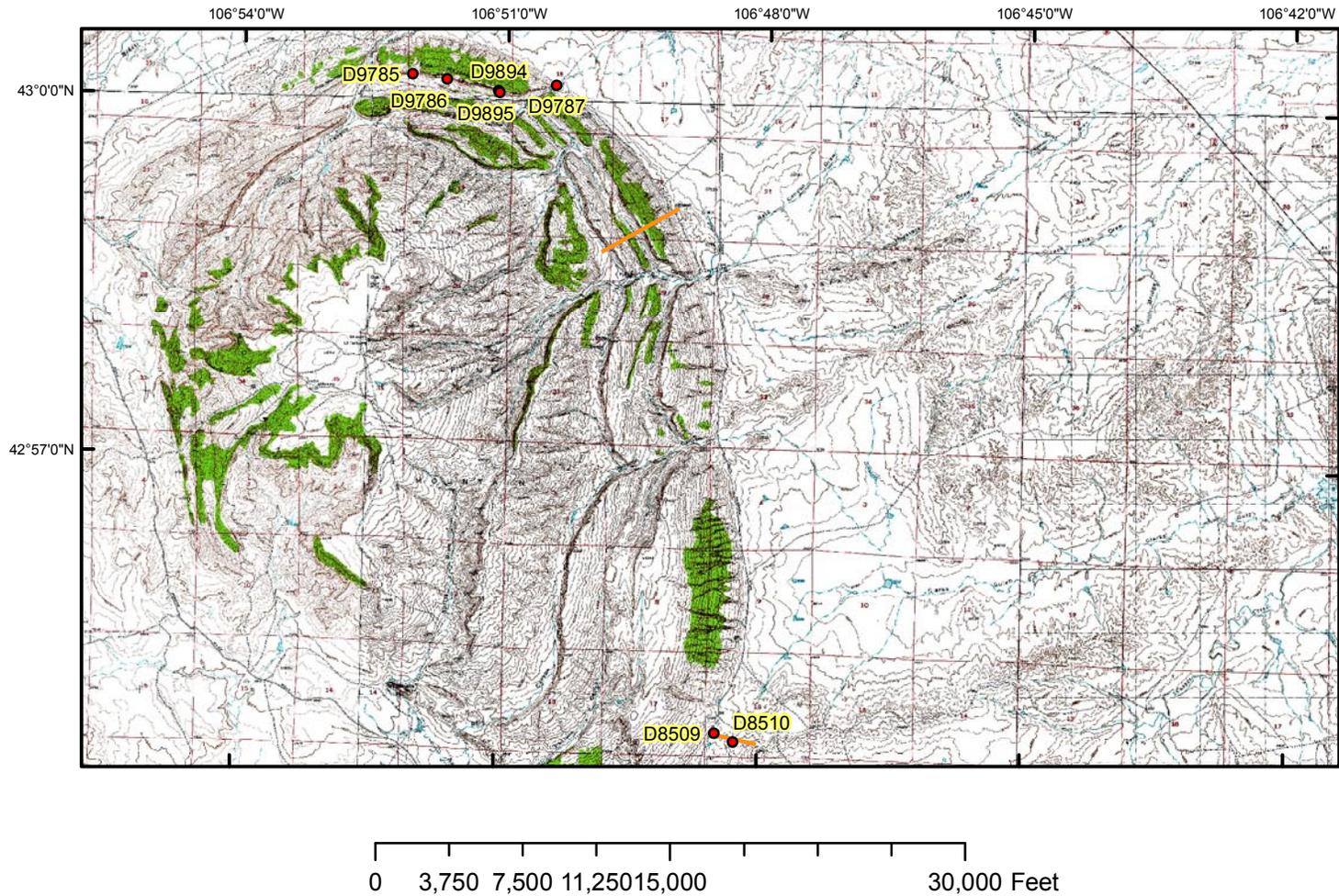
# Pine Mountain

*Topographic map*

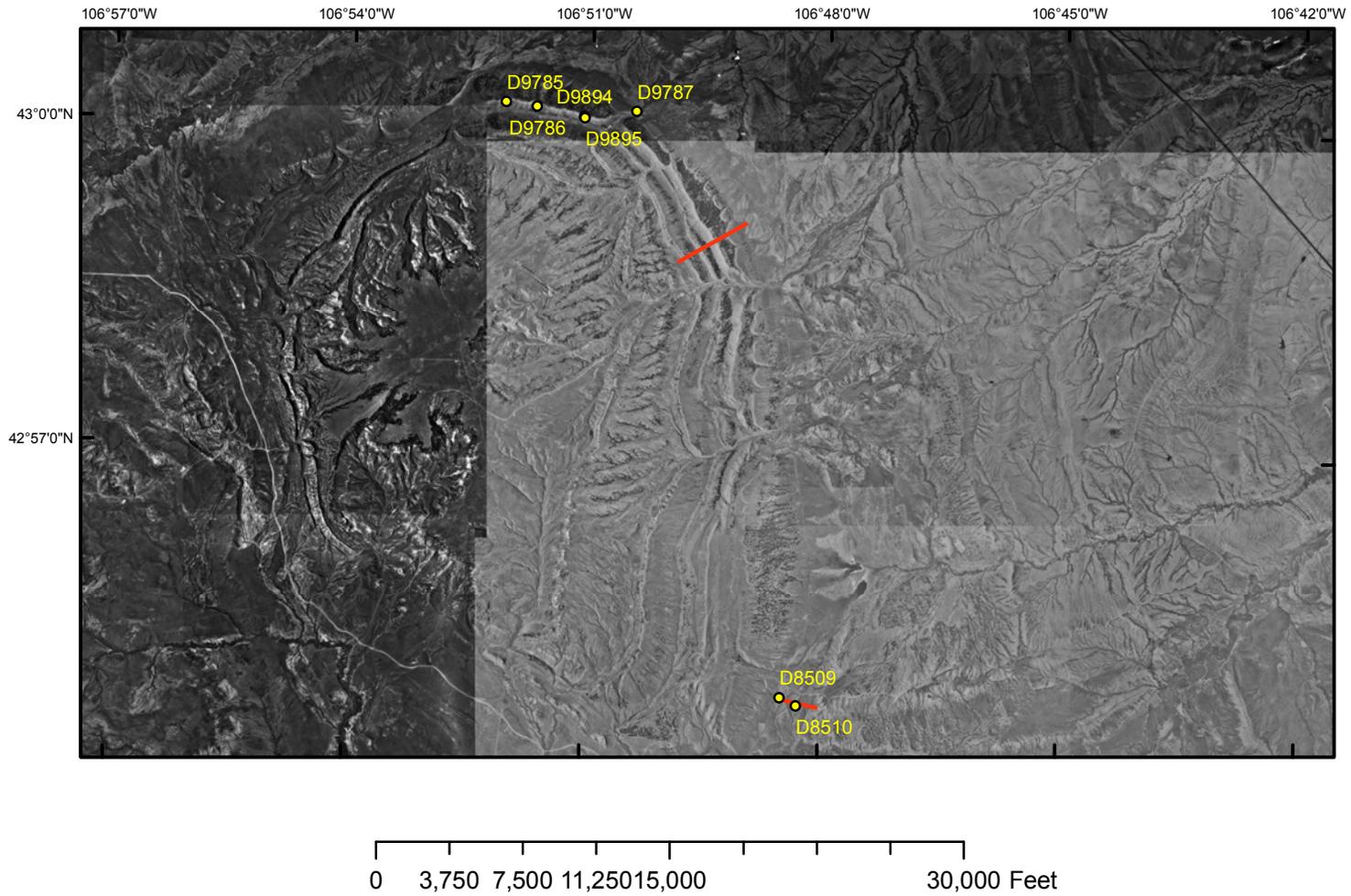
*Aerial photograph*

*Fossil locations*

*Measured section*



**Pine Mountain.** Topographic map of Pine Mountain area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. Contour interval: 20 feet.



**Pine Mountain.** Aerial photograph of Pine Mountain area, Natrona County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Pine Mountain fossil locations

### USGS Mesozoic fossil locality: D8509

Location:

Outcrop area: Pine Mountain  
 County: Natrona  
 Township and range: NW1/4 SW1/4 SW1/4 sec. 16, T. 34 N., R. 83 W.  
 Geographic coordinate: lat 42.911° N., long 106.804° W.

Reid Canyon quadrangle

Formation: Cody Shale

Collector: Merewether

Collection date: 10/72

Comment: from lower part of formation

Fossil:

*Inoceramus erectus* (*Cremnoceramus erectus*)

Age: early early Coniacian

### USGS Mesozoic fossil locality: D8510

Location:

Outcrop area: Pine Mountain  
 County: Natrona  
 Township and range: S1/2 SW1/4 sec. 16, T. 34 N., R. 83 W.  
 Geographic coordinate: lat 42.912° N., long 106.808° W.

Reid Canyon quadrangle

Formation: Cody Shale

Collector: Merewether

Collection date: 10/72

Comment: from lower part of formation

Fossils:

*Inoceramus erectus* (*Cremnoceramus erectus*)

*Camptonectes* sp.

*Crassatella* sp.

Age: early early Coniacian

### USGS Mesozoic fossil locality: D9785

Location:

Outcrop area: Pine Mountain  
 County: Natrona  
 Township and range: SW1/4 SW1/4 NW1/4 sec. 13, T. 35 N., R. 84 W.  
 Geographic coordinate: lat 43.003° N., long 106.868° W.

Natrona quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/5/75

Comment: from about 50 ft below Wall Creek Member

Fossils:

*Inoceramus ginterensis*

*Metoicoceras* sp.

(*Dunveganoceras albertense* age)

Age: early late Cenomanian

### USGS Mesozoic fossil locality: D9786

Location:

Outcrop area: Pine Mountain

County: Natrona

Township and range: Near center of E1/2 W1/2 sec. 13, T. 35 N., R. 84 W.

Geographic coordinate: lat 43.003° N., long 106.861° W.

Natrona quadrangle

Formation: Frontier

Unit: Emigrant Gap Member

Collector: Merewether

Collection date: 8/5/75

Comment: 30-40 ft below Wall Creek member

Fossils:

*Baculites yokoyamai*

*Collignoniceras woollgari*

Age: earliest middle Turonian

### USGS Mesozoic fossil locality: D9787

Location:

Outcrop area: Pine Mountain

County: Natrona

Township and range: NE1/4 SW1/4 sec. 18, T. 35 N., R. 83 W.

Geographic coordinate: lat 43.002° N., long 106.841° W.

Natrona quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/6/75

Comment: from about 40 ft below top of formation

Fossils:

*Inoceramus lusatiae*

*I. cf. I incertus* (*Mytiloides ratonensis*)

*Anisomyon apicalis*

*Gyrodus* sp.

*Baculites yokoyamai*

*Scaphites corvensis*

*Prionocyclus reesidei*

Age: late late Turonian

## Pine Mountain fossil locations—Continued

### USGS Mesozoic fossil locality: D9894

Location:

Outcrop area: Pine Mountain

County: Natrona

Township and range: NE1/4 SE1/4 sec. 13, T. 35 N., R. 84 W.

Geographic coordinate: lat 43.001° N., long 106.852° W.

Natrona quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Cobban

Collection date: 6/21/76

Comment: from tabular limestone concretions in noncalcareous shale at 8 ft below a sandstone containing *Collignoniceras woollgari*

Fossil:

*Neocardioceras sp.*

Age: late Cenomanian

### USGS Mesozoic fossil locality: D9895

Location:

Outcrop area: Pine Mountain

County: Natrona

Township and range: NE1/4 SE1/4 sec. 13, T. 35 N., R. 84 W.

Geographic coordinate: lat 43.001°N., long 106.851°W.

Natrona quadrangle

Formation: Frontier

Unit: Emigrant Gap Member

Collector: Cobban

Collection date: 6/21/76

Comment: float from 26-ft-thick sandstone containing *Collignoniceras woollgari*

Fossil:

*Collignoniceras woollgari*

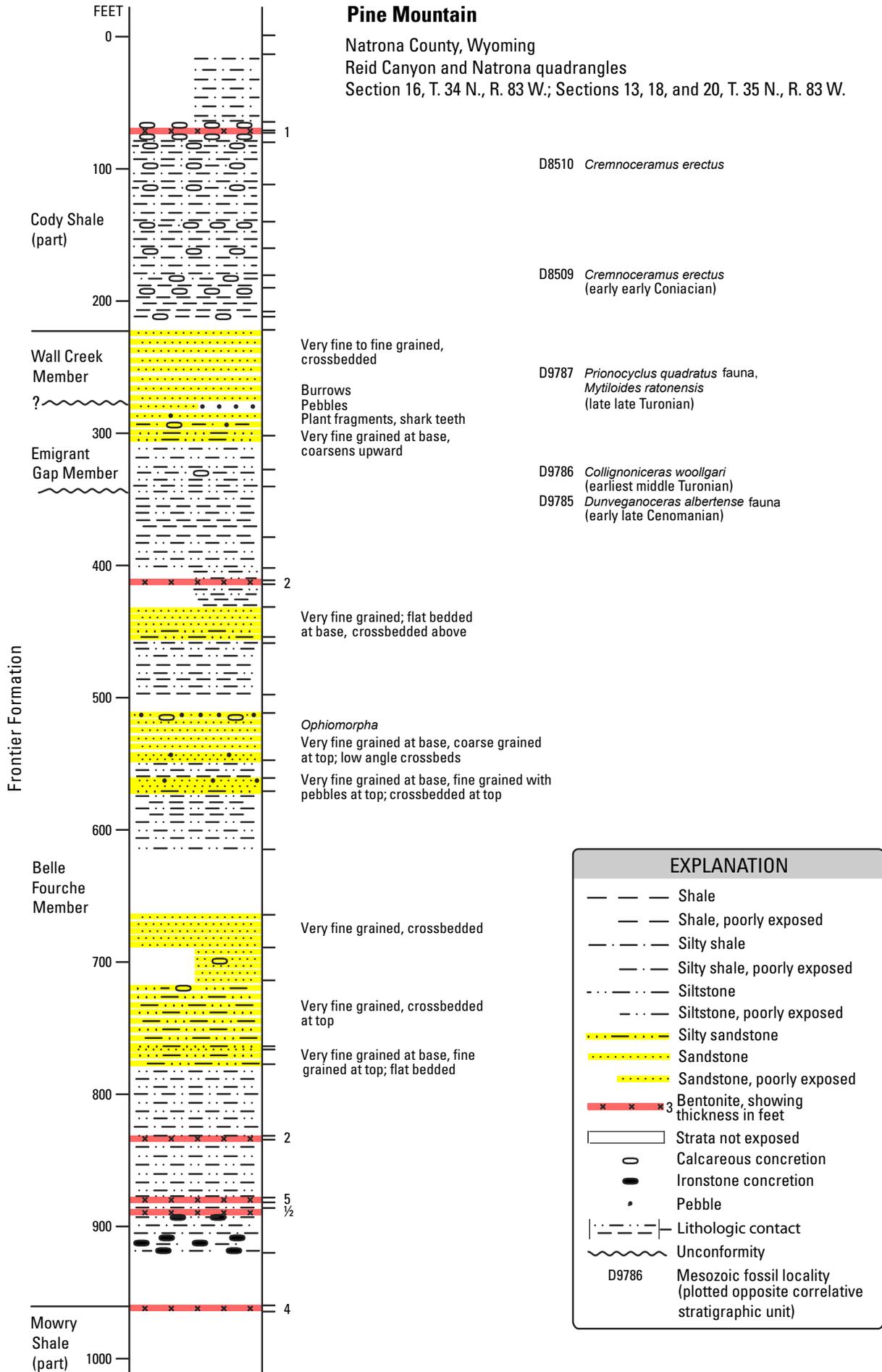
Age: earliest middle Turonian

# Pine Mountain

Natrona County, Wyoming

Reid Canyon and Natrona quadrangles

Section 16, T. 34 N., R. 83 W.; Sections 13, 18, and 20, T. 35 N., R. 83 W.



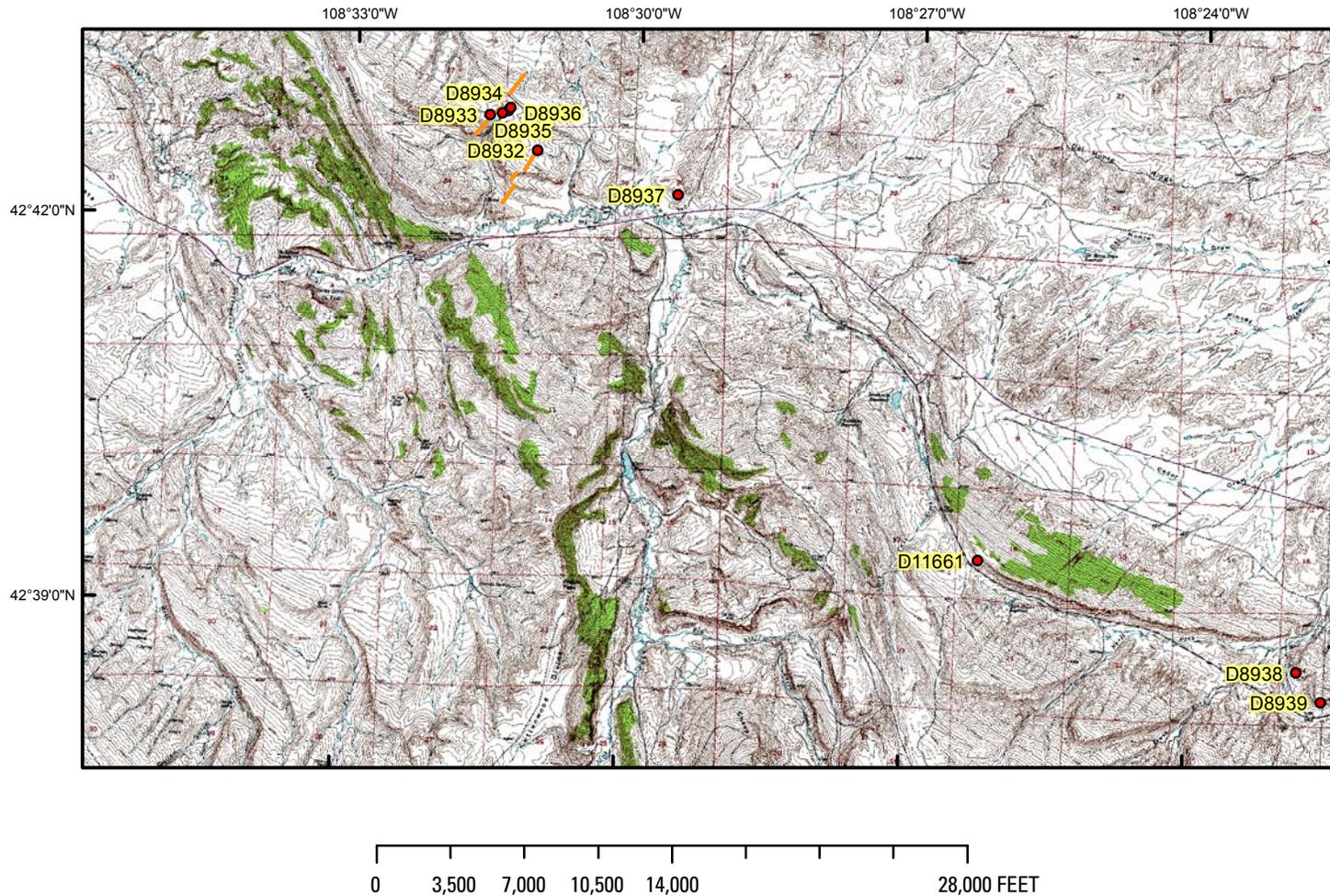
# Twin Creek

*Topographic map*

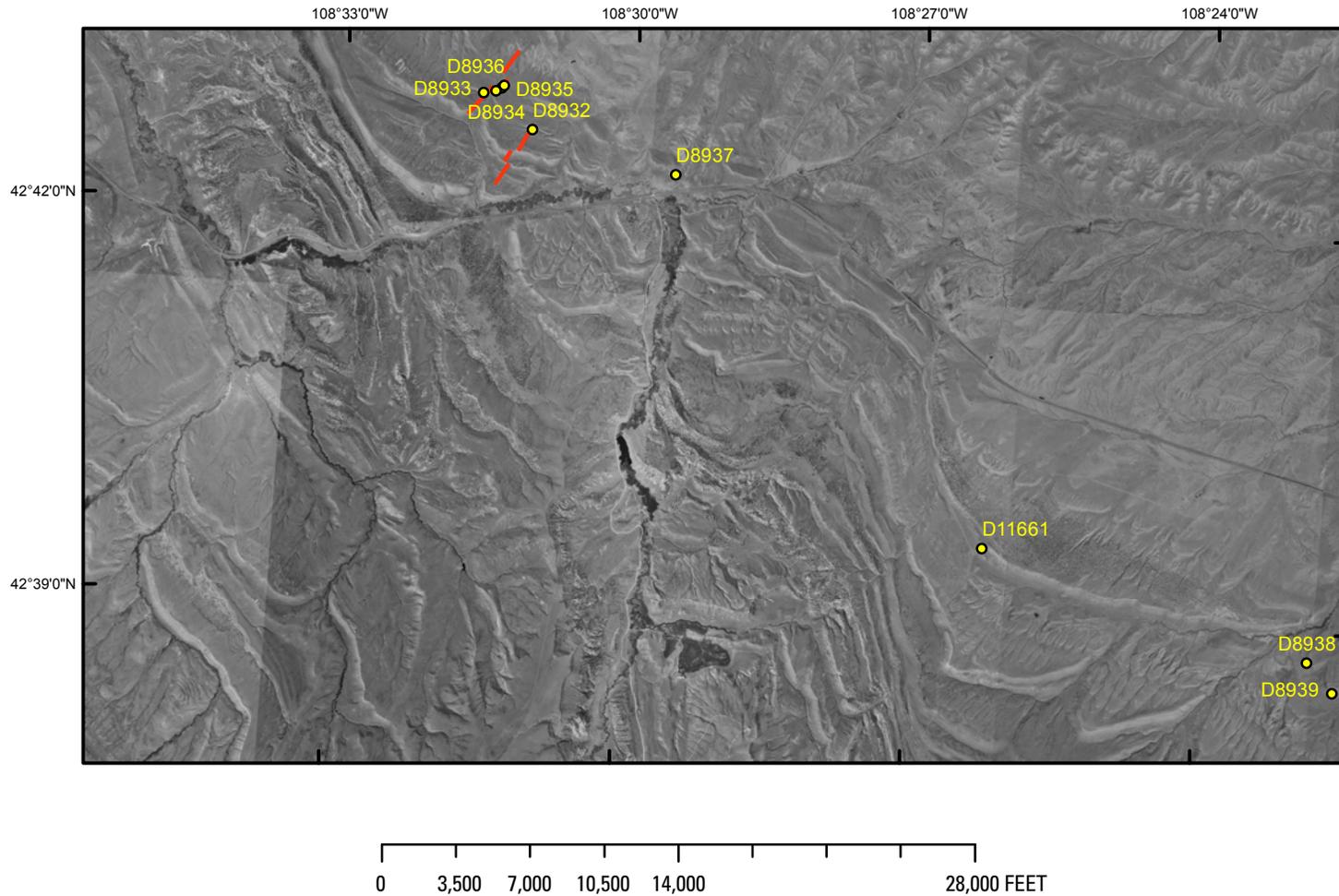
*Aerial photograph*

*Fossil locations*

*Measured section*



**Twin Creek.** Topographic map of Twin Creek area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. Contour interval: 20 feet.



**Twin Creek.** Aerial photograph of Twin Creek area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Twin Creek fossil locations

### USGS Mesozoic fossil locality: D8931

Location:

Outcrop area: Twin Creek  
 County: Fremont  
 Township and range: NW1/4 SE1/4 sec. 24, T. 31 N., R. 97 W.  
 Geographic coordinate: lat 42.643° N., long 108.371° W.

Yellowstone Ranch quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/7/73

Comment: from near middle of formation

Fossil:

*Dunveganoceras conditum*

Age: middle late Cenomanian

### USGS Mesozoic fossil locality: D8932

Location:

Outcrop area: Twin Creek  
 County: Fremont  
 Township and range: NE1/4 NW1/4 sec. 35, T. 32 N., R. 98 W.  
 Geographic coordinate: lat 42.710° N., long 108.518° W.

Weiser Pass quadrangle

Formation: Frontier

Collector: Merewether

Collection date: 8/8/73

Comment: from upper part of formation

Fossils:

*Inoceramus aff. I. perplexus (Mytiloides scupini)*

*Isognomon sp.*

*Homomya sp.*

*Baculites yokoyamai*

Age: late late Turonian

### USGS Mesozoic fossil locality: D8933

Location:

Outcrop area: Twin Creek  
 County: Fremont  
 Township and range: Center SE1/4 SE1/4 sec. 27, T. 32 N., R. 98 W.  
 Geographic coordinate: lat 42.715° N., long 108.526° W.

Weiser Pass quadrangle

Formation: Frontier

Collector: Merewether

Collection date: 8/9/73

Comment: from upper part of formation

Fossils:

*Inoceramus aff. I. perplexus (Mytiloides scupini)*

*Isognomon sp.*

*Liopistha sp.*

*Baculites yokoyamai*

Age: late late Turonian

### USGS Mesozoic fossil locality: D8934

Location:

Outcrop area: Twin Creek  
 County: Fremont  
 Township and range: NE1/4 SE1/4 SE1/4 sec. 27, T. 32 N., R. 98 W.  
 Geographic coordinate: lat 42.715° N., long 108.524° W.

Weiser Pass quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/9/73

Comment: from higher than D8933

Fossils:

*Inoceramus waltersdorfensis (Cremnoceramus crassus)*

*Inoceramus sp.*

*Baculites yokoyamai*

Age: late late Turonian

## Twin Creek fossil locations—Continued

### USGS Mesozoic fossil locality: D8935

Location:

Outcrop area: Twin Creek  
County: Fremont  
Township and range: NW1/4 SW1/4 SW-1/4 sec. 26, T. 32 N., R. 98 W.  
Geographic coordinate: lat 42.715° N., long 108.523° W

Weiser Pass quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/9/73

Comment: from higher than D8934

Fossils:

*Inoceramus aff. I. inconstans (Cremnoceramus crassus)*  
*Inoceramus cf. I. rotundatus (Cremnoceramus crassus)*  
*Gyrodes sp.*  
*Baculites yokoyamai*  
*Placenticeras sp.*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D8936

Location:

Outcrop area: Twin Creek  
County: Fremont  
Township and range: NW1/4 SW1/4 SW1/4 sec. 26, T. 32 N., R. 98 W.  
Geographic coordinate: lat 42.716° N., long 108.523° W.

Weiser Pass quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/9/73

Comment: from higher than D8935

Fossils:

*Inoceramus deformis (Cremnoceramus deformis)*  
*Inoceramus aff. I. inconstans (Cremnoceramus aff. C. crassus inconstans)*  
*Gyrodes sp.*  
*Baculites sp.*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D8937

Location:

Outcrop area: Twin Creek  
County: Fremont  
Township and range: NW1/4 SE1/4 sec. 36, T. 32 N., R. 98 W.  
Geographic coordinate: lat 42.705° N., long 108.493° W.

Del Monte Ridge quadrangle

Formation: Frontier

Collector: Merewether

Collection date: 8/10/73

Comment: from uppermost sandstone of formation

Fossils:

*Spirorbis sp.*  
*Inoceramus deformis (Cremnoceramus crassus)*  
*Inoceramus inconstans (Cremnoceramus crassus)*  
*Ostrea sp.*  
*Camptonectes sp.*  
*Crassatella wyomingensis*  
*Gyrodes sp.*  
*Baculites sp.*  
*Scaphites impendicostatus*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D8938

Location:

Outcrop area: Twin Creek  
County: Fremont  
Township and range: NW1/4 SW1/4 sec. 24, T. 31 N., R. 97 W.  
Geographic coordinate: lat 42.646° N., long 108.380° W.

Del Monte Ridge quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/10/73

Comment: from septarian limestone concretions

Fossils:

*Dunveganoceras conditum*  
*Metoicoceras muelleri*

Age: middle late Cenomanian

## Twin Creek fossil locations—Continued

### USGS Mesozoic fossil locality: D8939

Location:

Outcrop area: Twin Creek

County: Fremont

Township and range: SE1/4 SW1/4 sec. 24, T. 31 N., R. 97 W.

Geographic coordinate: lat 42.643° long 108.376° W.

Del Monte Ridge quadrangle

Formation: Frontier

Unit: Belle Fourche member

Collector: Merewether

Collection date: 8/10/73

Comment: from near middle of formation

Fossil:

*Corbula* ? sp. (brackish water species)

Age: ?

### USGS Mesozoic fossil locality: D11661

Location:

Outcrop area: Twin Creek

County: Fremont

Township and range: Center SW1/4 sec. 16, T. 31 N., R. 97 W.

Geographic coordinate: lat 42.658° N., long 108.438° W.

Del Monte Ridge quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 9/1/81

Comment: from sandstone in middle of formation

Fossils:

*Phelopteria gastroides*

*Inoceramus rutherfordi* (zone of *Acanthoceras amphibolum*)

*Ostrea beloiti*

Age: late middle Cenomanian

### USGS Mesozoic fossil locality: D11662

Location:

Outcrop area: Twin Creek

County: Fremont

Township and range: SW1/4 NE1/4 sec. 19, T. 31 N., R. 96 W.

Geographic coordinate: lat 42.646° N., long 108.350° W.

Yellowstone Ranch quadrangle

Formation: Frontier

Collector: Merewether

Collection date: 9/2/81

Comment: from upper part of formation

Fossils:

*Phelopteria* sp.

*Pinna dolosoniensis*

*Inoceramus rotundatus* (*Cremnoceramus erectus*)

*Lopha sannionis*

*Crassatella andrewsi*

*Pleuriocardia* sp.

*Cyprimeria* sp.

*Panopea* sp.

*Pholadomya* sp.

*Anisomyon apicalis*

*Rostellites ambigua*

*Pyropsis coloradoensis*

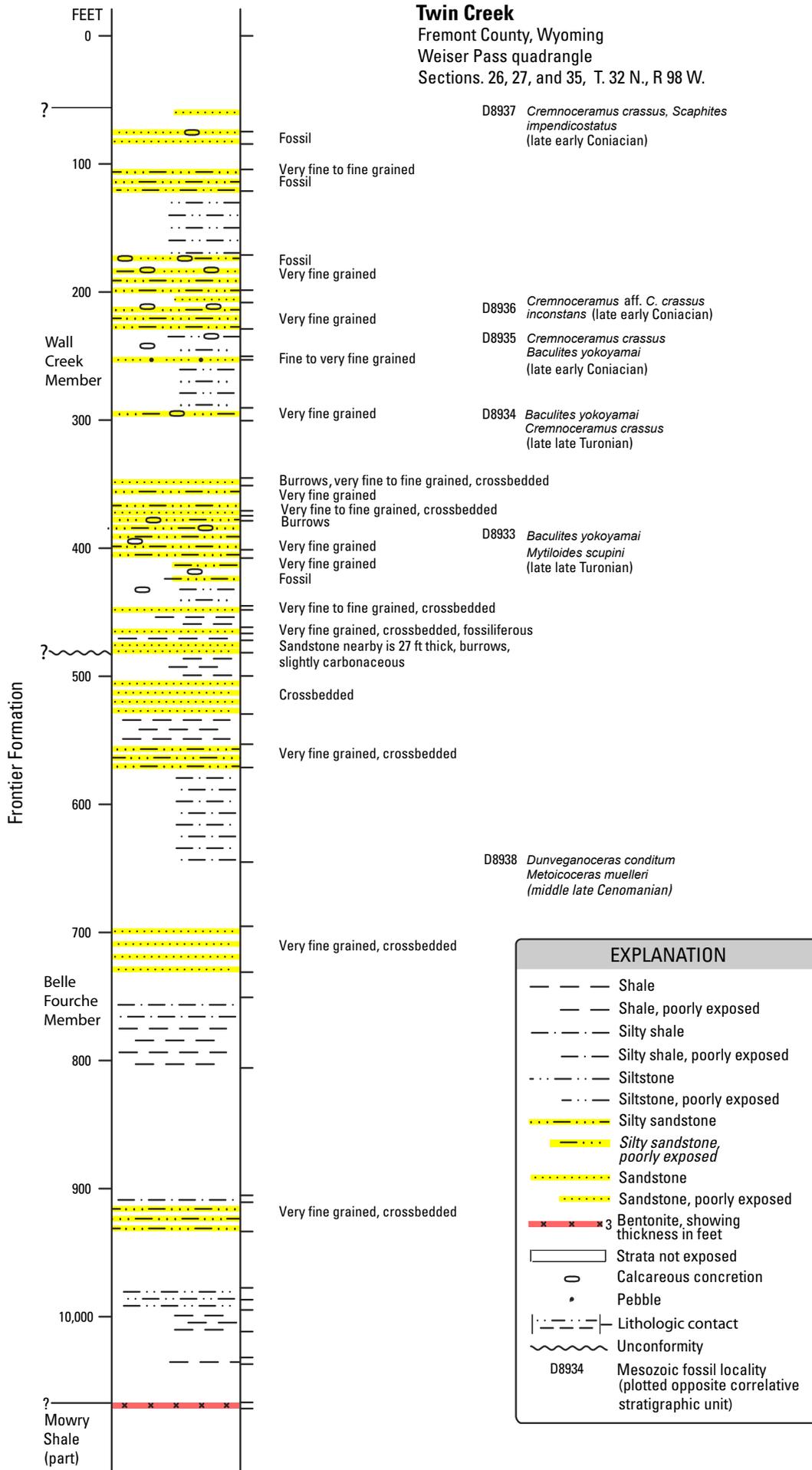
*Baculites yokoyamai*

*Scaphites* sp.

*Placenticerus pseudoplacenta*

Age: early early Coniacian

**Twin Creek**  
 Fremont County, Wyoming  
 Weiser Pass quadrangle  
 Sections. 26, 27, and 35, T. 32 N., R 98 W.



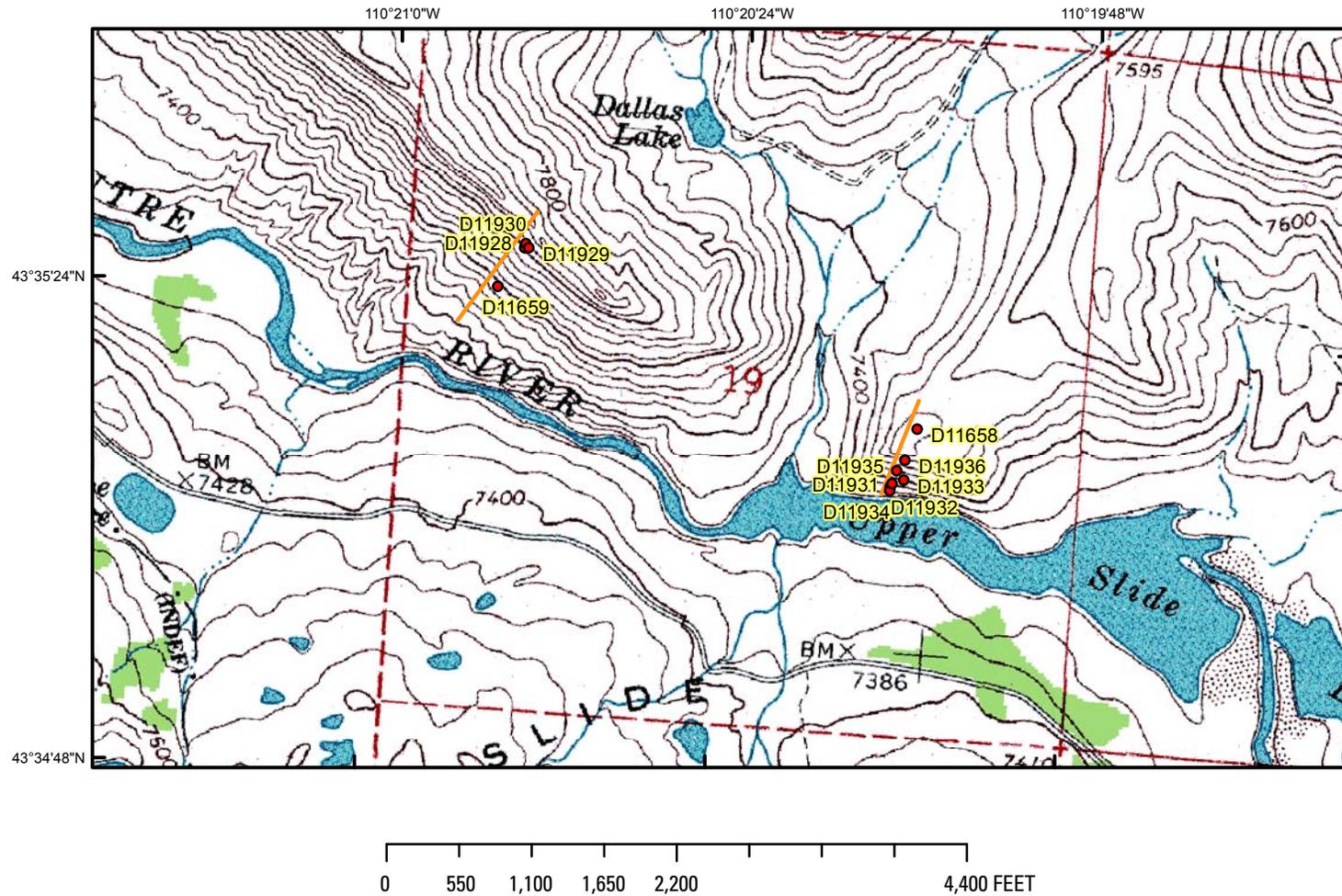
# Upper Slide Lake

*Topographic map*

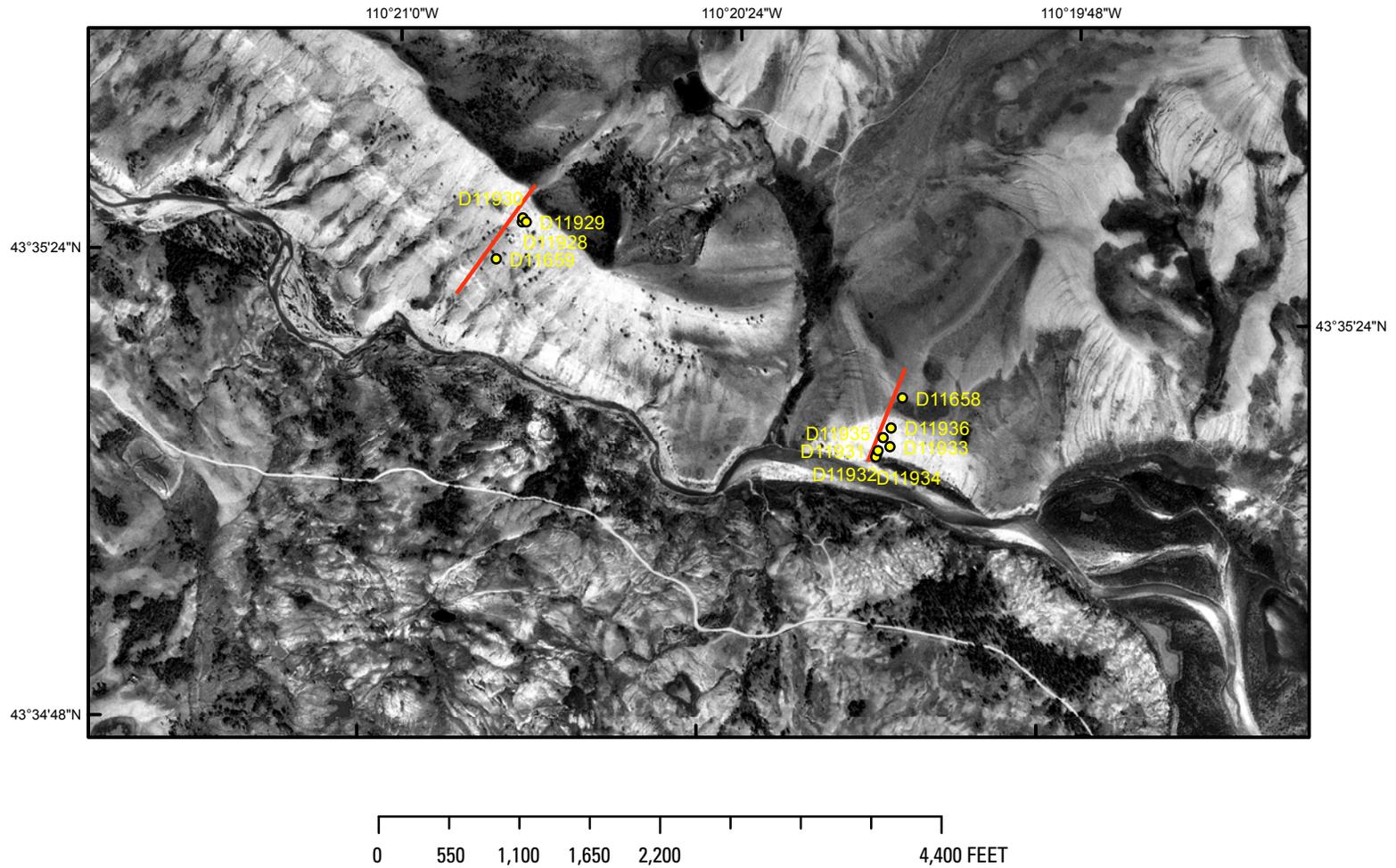
*Aerial photograph*

*Fossil locations*

*Measured sections*



**Upper Slide Lake.** Topographic map of Upper Slide Lake area, Teton County, Wyoming, showing locations of measured stratigraphic sections (east and west-orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. River and lakes shown in blue. Contour interval: 40 feet.



**Upper Slide Lake.** Aerial photograph of Upper Slide Lake area, Teton County, Wyoming, showing locations of measured stratigraphic sections (east and west-red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Upper Slide Lake fossil locations

### USGS Mesozoic fossil locality: D11658

Location:

Outcrop area: Upper Slide Lake East

County: Teton

Township and range: NW1/4 sec. 19, T. 42 N., R. 112 W.

Geographic coordinate: lat 43.588° N., long 110.335° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/31/81

Comment: from top of formation

Fossils:

*Inoceramus deformis* (*Cremonoceramus deformis*)

*Cremonoceramus inconstans* (*Cremonoceramus deformis*)

*Ostrea* aff. *O. anomioides*

*Pleuriocardia* sp.

*Crassatella* sp.

Age: late early Coniacian

### USGS Mesozoic fossil locality: D11659

Location:

Outcrop area: Upper Slide Lake West

County: Teton

Township and range: NW1/4 sec. 19, T. 42 N., R. 112 W.

Geographic coordinate: lat 43.590° N., long 110.347° W.

Upper Slide Lake quadrangle

Formation: Frontier

Collector: Merewether

Collection date: 8/31/81

Comment: in lower part of formation

Fossils:

*Pleuriocardia pauperulum*

*Veniella* sp.

Age: early Cenomanian

### USGS Mesozoic fossil locality: D11928

Location:

Outcrop area: Upper Slide Lake West

County: Teton

Township and range: NW1/4 sec. 19, T. 42 N., R. 112 W.

Geographic coordinate: lat 43.591° N., long 110.346° W.

Upper Slide Lake quadrangle

Formation: Frontier

Collector: Cobban

Collection date: 7/19/82

Comment: from coquina sandstone in lower part of formation

Fossils:

*Protarca* ? sp.

*Crassostrea soleniscus* (brackish-water bivalves)

Age: Cenomanian

### USGS Mesozoic fossil locality: D11929

Location:

Outcrop area: Upper Slide Lake West

County: Teton

Township and range: NW1/4 sec. 19, T. 42 N., R. 112 W.

Geographic coordinate: lat 43.591° N., long 110.346° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Emigrant Gap Member

Collectors: Merewether and Cobban

Collection date: 7/19/82

Comment: from top of 23-ft-thick sandstone in lower part of formation

Fossils:

*Pinna petrina*

*Ostrea* sp.

*Pleuriocardia pauperulum*

*Veniella mortoni*

*Collignonicerias woollgari*

Age: earliest middle Turonian

## Upper Slide Lake fossil locations—Continued

### USGS Mesozoic fossil locality: D11930

Location:

Outcrop area: Upper Slide Lake West  
 County: Teton  
 Township and range: NW1/4 sec. 19, T. 42 N., R. 112 W.  
 Geographic coordinate: lat 43.591°N., long 110.346° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Emigrant Gap Member

Collectors: Merewether and Cobban

Collection date: 7/19/82

Comment: from ledge of brown-weathering sandstone in lower part of formation

Fossils:

*Pinna petrina*  
*Pseudoptera propleura*  
*Ostrea sp.*  
*Pleuriocardia pauperculum*  
*Cyprimeria sp.*  
*Aphrodina sp.*  
*Veniella mortoni*  
*Gyrodes depressa*  
*Turritella sp.*  
*Collignoniceras woollgari*

Age: earliest middle Turonian

### USGS Mesozoic fossil locality: D11931

Location:

Outcrop area: Upper Slide Lake East  
 County: Teton  
 Township and range: SE1/4 sec. 19, T. 42 N., R. 112 W.  
 Geographic coordinate: lat 43.587° N., long 110.335° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 7/19/82

Comment: from 6-8 ft above base of a 36-ft-thick sandstone near middle of formation

Fossils:

*Phelopteria gastroides*  
*Inoceramus rotundatus (Cremnoceramus erectus)*  
*Pleuriocardia curtum*  
*Baculites sp.*

Age: early early Coniacian

### USGS Mesozoic fossil locality: D11932

Location:

Outcrop area: Upper Slide Lake East  
 County: Teton  
 Township and range: SE1/4 sec. 19, T. 42 N., R. 112 W.  
 Geographic coordinate: lat 43.587° N., long 110.335° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Cobban

Collection date: 7/19/82

Comment: from top of a 10-ft-thick sandstone and 73 ft above D11931

Fossils:

*Inoceramus rotundatus (Cremnoceramus erectus)*  
*Ostrea aff. O. anomioides*  
*Pleuriocardia curtum*

Age: early early Coniacian

### USGS Mesozoic fossil locality: D11933

Location:

Outcrop area: Upper Slide Lake East  
 County: Teton  
 Township and range: SE1/4 sec. 19, T. 42 N., R. 112 W.  
 Geographic coordinate: lat 43.587°N., long 110.335° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Cobban

Collection date: 7/19/82

Comment: from top of a 27-ft-thick sandstone and 70 ft above D11932

Fossils:

*Inoceramus rotundatus (Cremnoceramus deformis dobrogensis)*  
*I. deformis*

Age: late early Coniacian

## Upper Slide Lake fossil locations—Continued

### USGS Mesozoic fossil locality: D11934

Location:

Outcrop area: Upper Slide Lake East

County: Teton

Township and range: SE1/4 sec. 19, T. 42 N., R. 112 W.

Geographic coordinate: lat 43.587°N., long 110.335° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collectors: Merewether and Cobban

Collection date: 7/19/82

Comment: from coquinal sandstone 16 ft above D11933

Fossils:

*Ostrea aff. O. anomioides*

*Pleurocardia curtum*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D11935

Location:

Outcrop area: Upper Slide Lake East

County: Teton

Township and range: SE1/4 sec. 19, T. 42 N., R. 112 W.

Geographic coordinate: lat 43.587° N., long 110.335° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Cobban

Collection date: 7/19/82

Comment: from 6-in-thick conglomerate 22.5 ft above D11934

Fossil:

*Ostrea aff. O. anomioides*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D11936

Location:

Outcrop area: Upper Slide Lake East

County: Teton

Township and range: SE1/4 sec. 19, T. 42 N., R. 112 W.

Geographic coordinate: lat 43.587° N., long 110.335° W.

Upper Slide Lake quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Cobban

Collection date: 7/19/82

Comment: float from about 40 ft above D11935 and 50 ft below top of formation

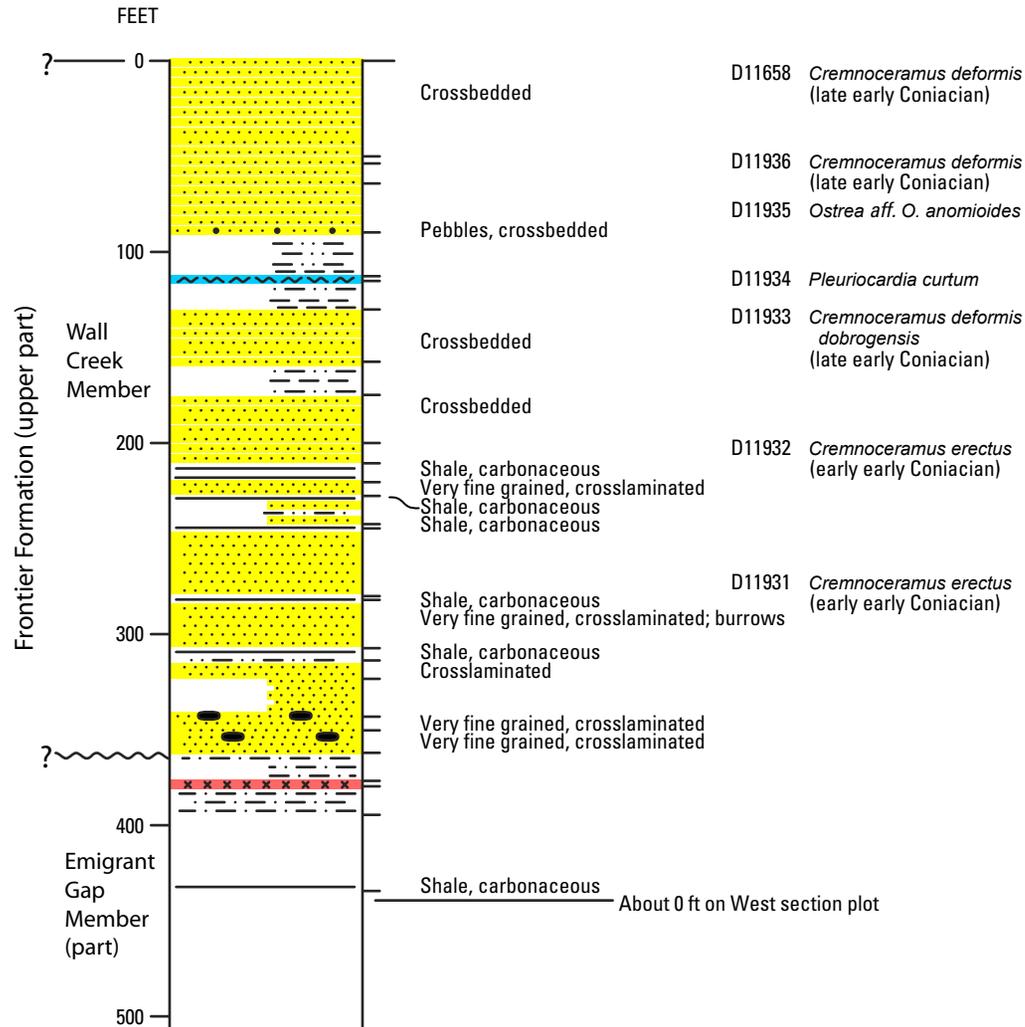
Fossil:

*Inoceramus deformis (Cremnoceramus deformis)*

Age: early early Coniacian

**Upper Slide Lake East**  
(thicknesses estimated)

Teton County, Wyoming  
Upper Slide Lake quadrangle  
Section 19, T. 42 N., R. 112 W.  
Frontier Formation, upper part

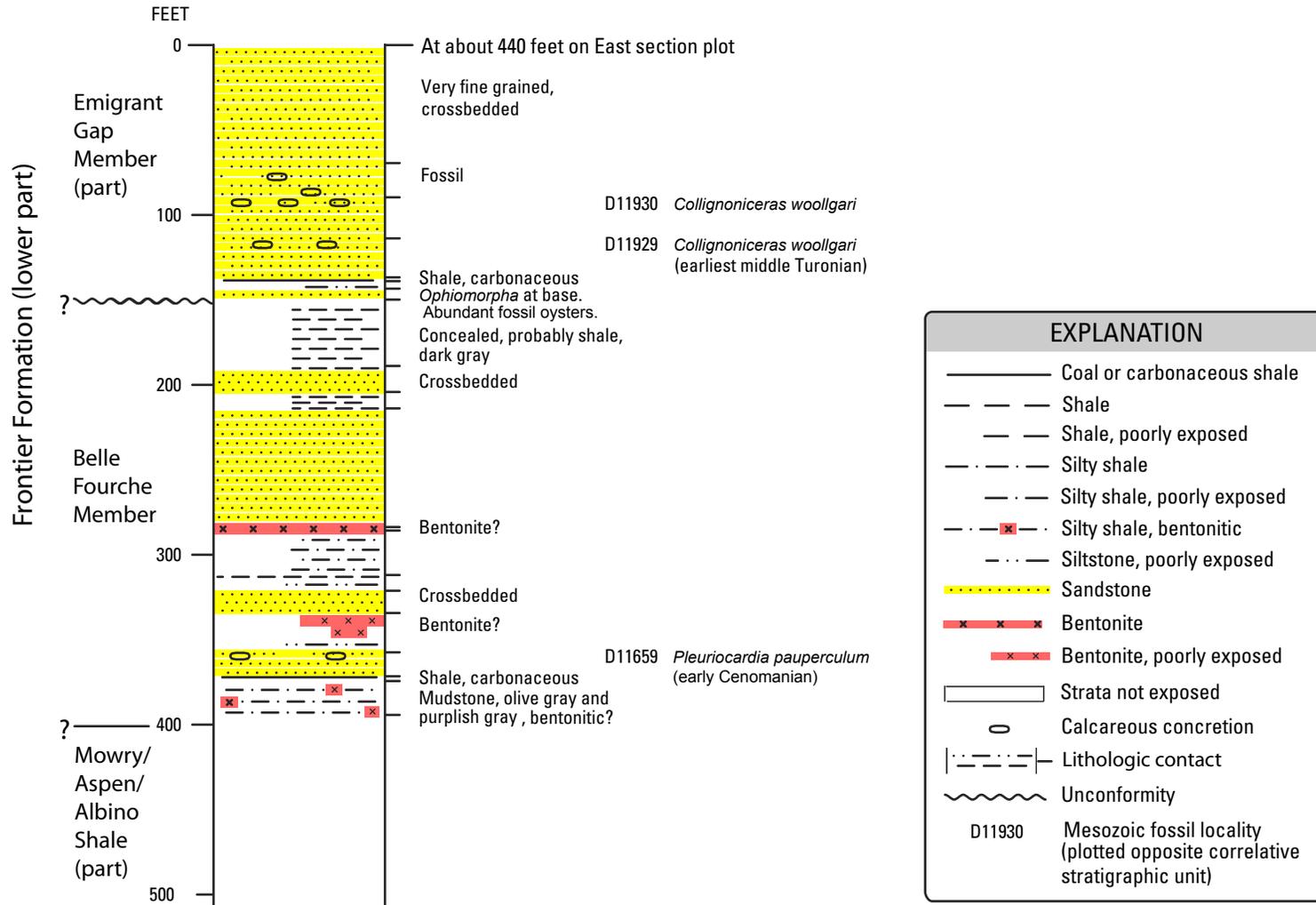


**EXPLANATION**

- Limestone, fossiliferous
- Coal or carbonaceous shale
- Shale, poorly exposed
- Silty shale
- Silty shale, poorly exposed
- Siltstone, poorly exposed
- Sandstone
- Sandstone, poorly exposed
- Bentonite
- Strata not exposed
- Ironstone concretion
- Pebble
- Lithologic contact
- Unconformity
- D11932 Mesozoic fossil locality (plotted opposite correlative stratigraphic unit)

**Upper Slide Lake West**  
(thicknesses estimated)

Teton County, Wyoming  
Upper Slide Lake quadrangle  
Section 19, T. 42 N., R. 112 W.



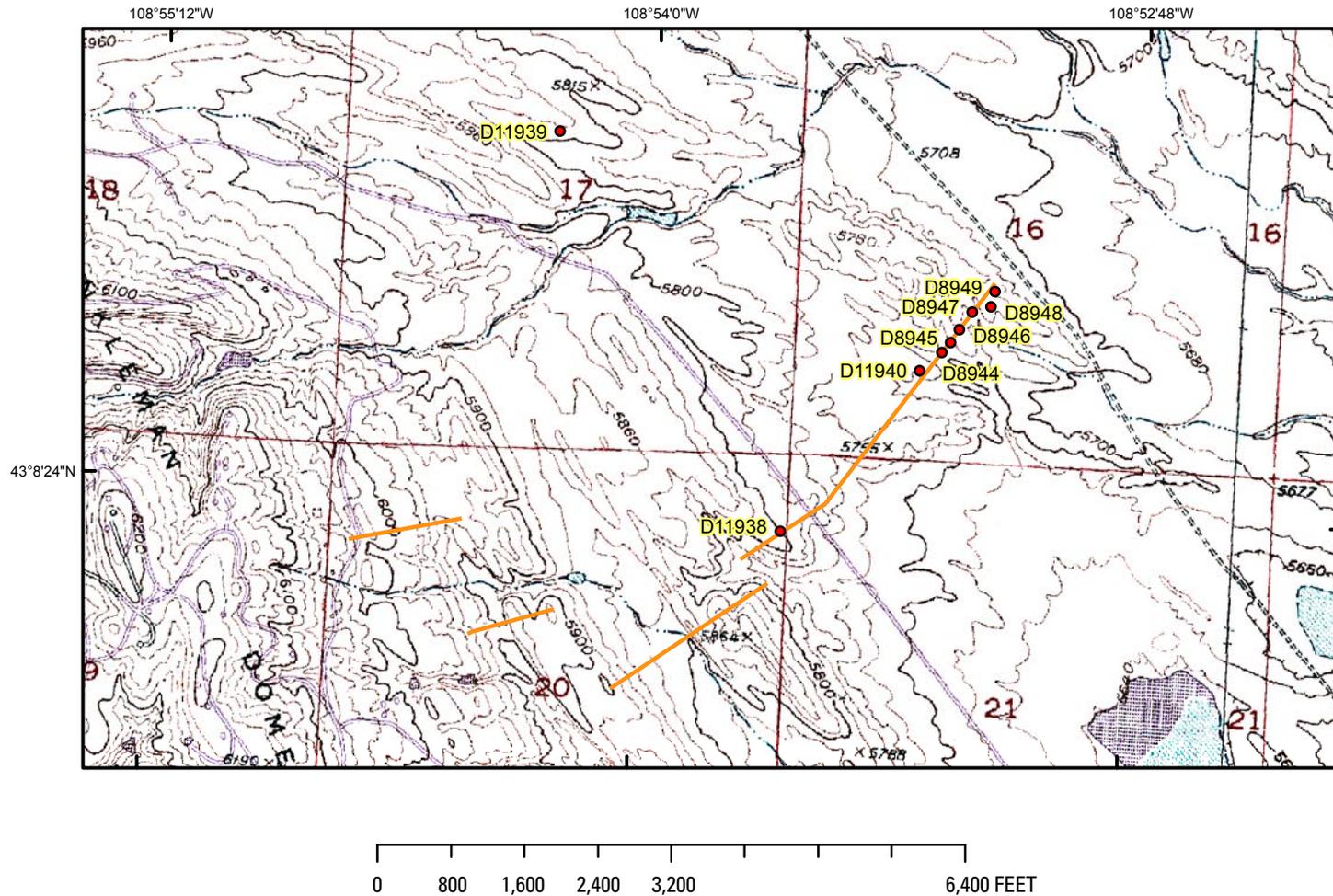
# Winkleman Dome

*Topographic map*

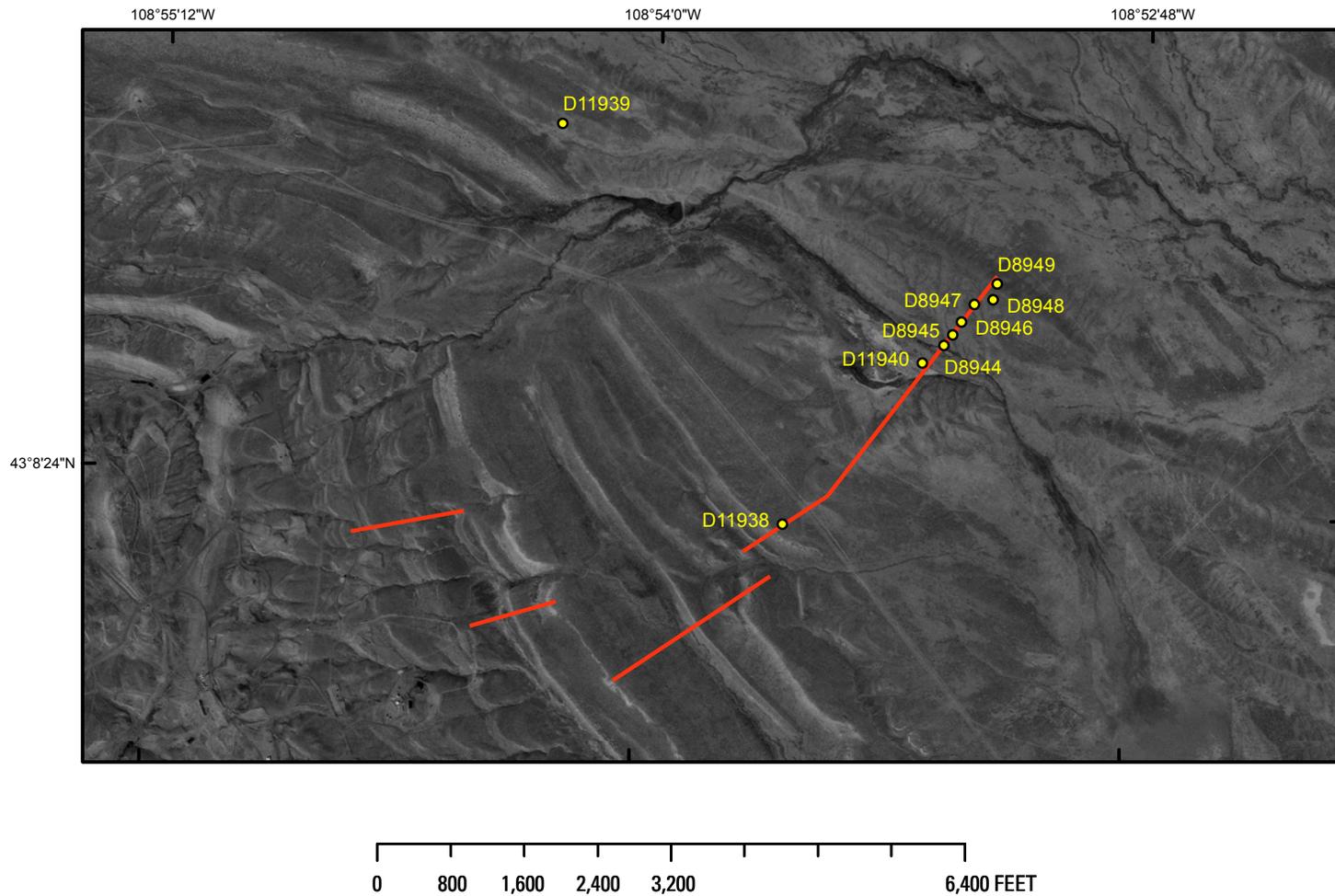
*Aerial photograph*

*Fossil locations*

*Measured section*



**Winkelman Dome.** Topographic map of Winkelman Dome area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Intermittent lakes shown in blue. Contour interval: 20 feet.



**Winkleman Dome.** Aerial photograph and topographic map of Winkleman Dome area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Winkleman Dome fossil locations

### USGS Mesozoic fossil locality: D8944

Location:

Outcrop area: Winkleman Dome  
County: Fremont  
Township and range: NE1/4 SW1/4 sec. 16, T. 2 N., R. 1 W.  
Geographic coordinate: lat 43.145° N., long 108.888° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/19/73

Comment: from upper part of formation

Fossils:

*Inoceramus rotundatus* (*Cremnoceramus erectus*)  
*Cymbophora* sp.  
*Homomya* sp.  
*Psilomya* sp.  
*Turritella* sp.  
*Anisomyon frontieriensis*  
*Baculites yokoyamai*  
*Scaphites* sp.  
*Placenticerias* sp.

Age: earliest early Coniacian

### USGS Mesozoic fossil locality: D8945

Location:

Outcrop area: Winkleman Dome  
County: Fremont  
Township and range: NE1/4 SW1/4 sec. 16, T. 2 N., R. 1 W.  
Geographic coordinate: lat 43.145° N., long 108.888° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/19/73

Comment: from upper part of formation

Fossils:

*Inoceramus rotundatus* (*Cremnoceramus erectus*)  
*Inoceramus erectus* (*Cremnoceramus erectus*)  
*Homomya* sp.  
*Baculites yokoyamai*  
*Scaphites* sp.  
*Placenticerias* sp.

Age: earliest early Coniacian

### USGS Mesozoic fossil locality: D8946

Location:

Outcrop area: Winkleman Dome  
County: Fremont  
Township and range: NE1/4 SW1/4 sec. 16, T. 2 N., R. 1 W.  
Geographic coordinate: lat 43.145° N., long 108.887° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/19/73

Comment: from upper part of formation

Fossils:

*Inoceramus rotundatus* (*Cremnoceramus erectus*)  
*Inoceramus erectus* (*Cremnoceramus erectus*)  
*Legumen* sp.  
*Homomya* sp.  
*Baculites yokoyamai*  
*Scaphites corvensis*  
Age: earliest early Coniacian

### USGS Mesozoic fossil locality: D8947

Location:

Outcrop area: Winkleman Dome  
County: Fremont  
Township and range: NE1/4 SW1/4 sec. 16, T. 2 N., R. 1 W.  
Geographic coordinate: lat 43.146° N., long 108.887° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/19/73

Comment: from upper part of formation

Fossils:

*Inoceramus deformis* (*Cremnoceramus crassus*)  
*Ostrea* sp.  
*Baculites* sp.  
*Scaphites impendicostatus*

Age: late early Coniacian

## Winkleman Dome fossil locations—Continued

### USGS Mesozoic fossil locality: D8948

Location:

Outcrop area: Winkleman Dome  
 County: Fremont  
 Township and range: NE1/4 SW1/4 sec. 16, T. 2 N., R. 1 W.  
 Geographic coordinate: lat 43.146° N., long 108.886° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/19/73

Comment: from upper part of formation

Fossils:

*Inoceramus deformis* (*Cremnoceramus crassus inconstans*)  
*Inoceramus inconstans* (*Cremnoceramus crassus inconstans*)  
*Baculites* sp.  
*Scaphites preventricosus*  
*Placenticeras* sp.  
*Gastropods*

Age: late early Coniacian

### USGS Mesozoic fossil locality: D8949

Location:

Outcrop area: Winkleman Dome  
 County: Fremont  
 Township and range: NE1/4 SW1/4 sec. 16, T. 2 N., R. 1 W.  
 Geographic coordinate: lat 43.147° N., long 108.886° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/19/73

Comment: from uppermost part of formation

Fossil:

*Inoceramus* sp. (*Mytiloides ratonensis*)

Age: late early Coniacian

### USGS Mesozoic fossil locality: D11938

Location:

Outcrop area: Winkleman Dome  
 County: Fremont  
 Township and range: NE1/4 NE1/4 sec. 20, T. 2 N., R. 1 W.  
 Geographic coordinate: lat 43.151° N., long 108.904° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Emigrant Gap Member

Collectors: Merewether and Cobban

Collection date: 7/21/82

Comment: from a ridge of white sandstone

Fossil:

*Inoceramus* aff. *I. cuvieri*

Age: probably middle Turonian

### USGS Mesozoic fossil locality: D11939

Location:

Outcrop area: Winkleman Dome  
 County: Fremont  
 Township and range: SE1/4 NW1/4 sec. 17, T. 2 N., R. 1 W.  
 Geographic coordinate: lat 43.139° N., long 108.894° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Wall Creek member

Collectors: Merewether and Cobban

Collection date: 7/21/82

Comment: from brown-weathering sandstone concretions in sandstone ridge

Fossils:

*Pinna* sp.  
*Phelopteria gastroides*  
*Inoceramus rotundatus* (*Cremnoceramus erectus*)  
*Homomya* sp.  
*Laternula* sp.  
*Liopistha* sp.  
*Legumen* sp.  
*Gyrodes* sp.  
*Baculites yokoyamai*  
*Scaphites preventricosus*  
*Placenticeras pseudoplacenta*

Age: earliest early Coniacian

## Winkleman Dome fossil locations—Continued

### USGS Mesozoic fossil locality: D11940

Location:

Outcrop area: Winkleman Dome

County: Fremont

Township and range: Center SW1/4 sec. 16, T. 2 N., R. 1 W.

Geographic coordinate: lat 43.145° long 108.888° W.

Argo Butte quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Cobban

Collection date: 7/21/82

Comment: from ferruginous sandstone in second sandstone ridge above D11938

Fossils:

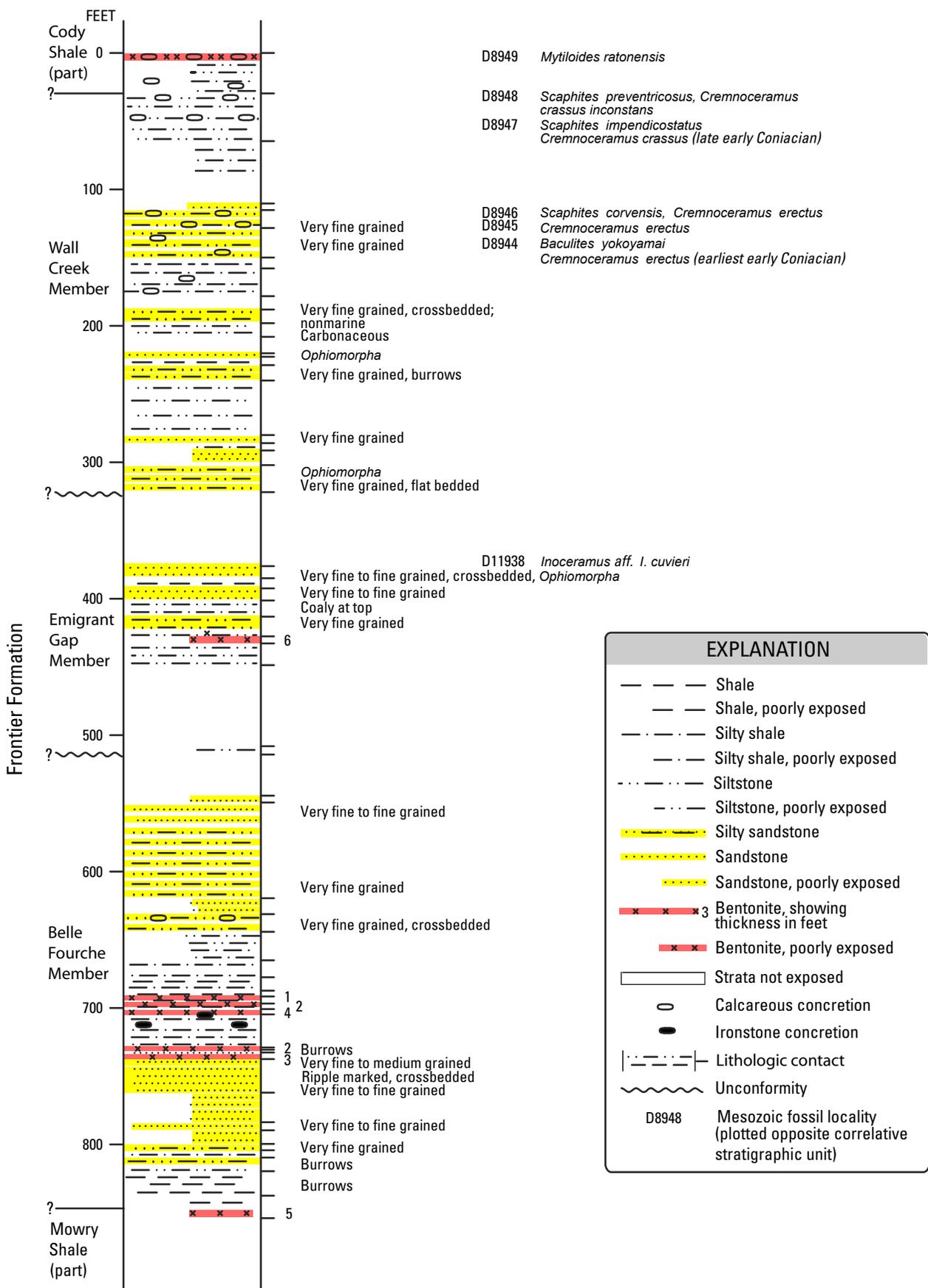
*Tellina? sp.*

*Cymbophora sp.*

Age: ?

# Winkleman Dome

Fremont County, Wyoming  
Argo Butte quadrangle  
Sections 16, 20, and 21, T. 2 N., R. 1 W. (Wind River Meridian)



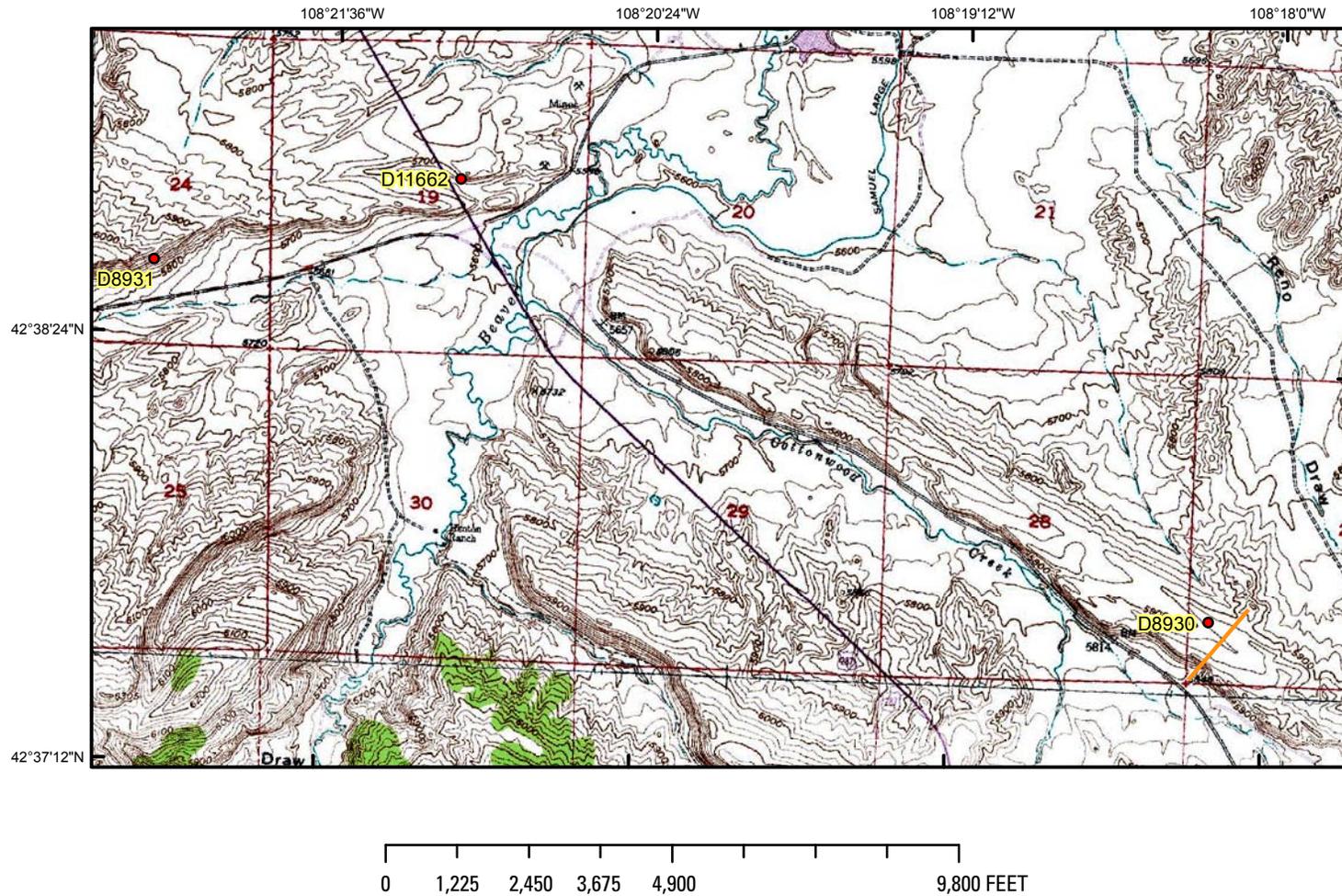
# Yellowstone Ranch

*Topographic map*

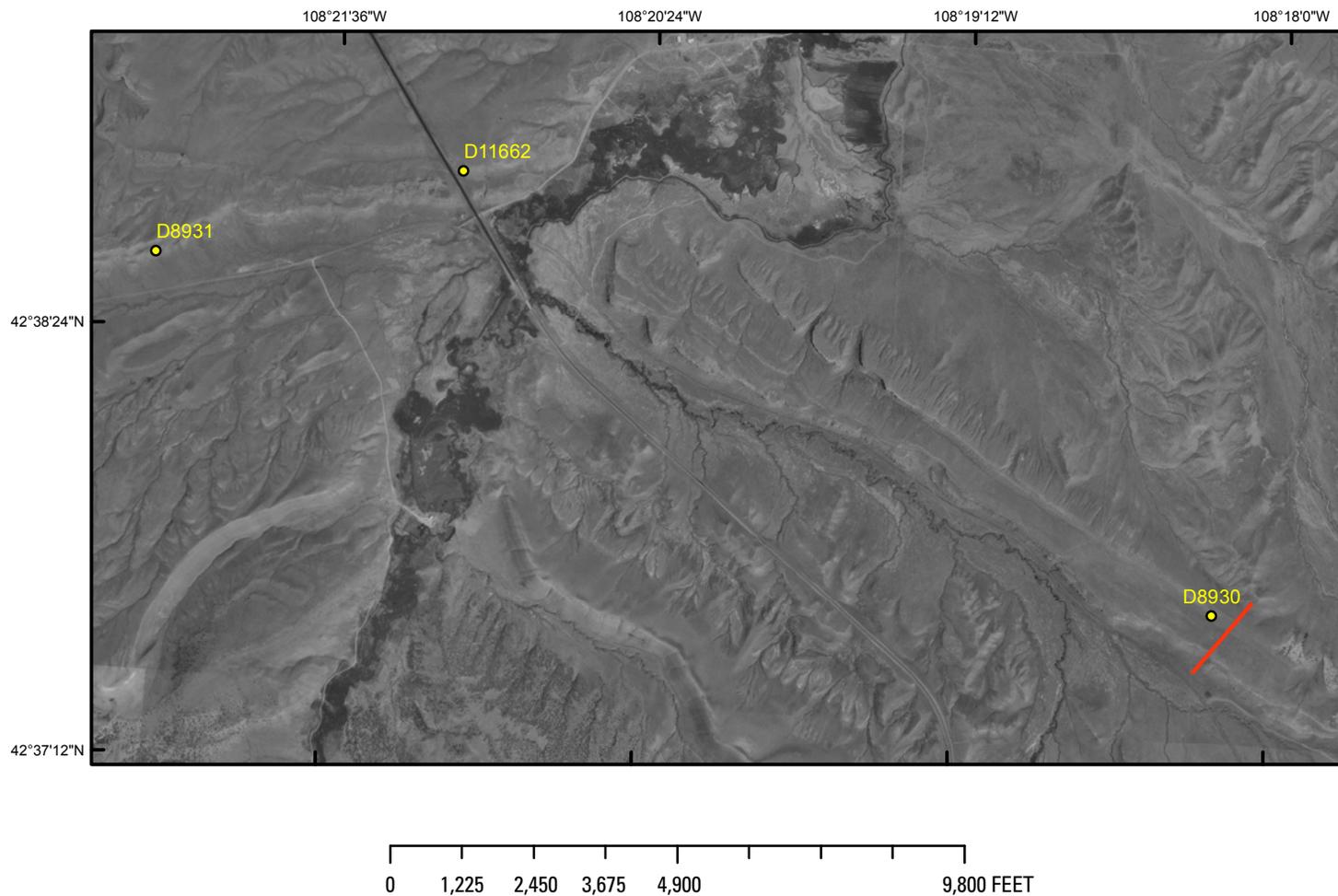
*Aerial photograph*

*Fossil locations*

*Measured section*



**Yellowstone Ranch.** Topographic map of Yellowstone Ranch area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (orange lines) and fossil collections (red dots). Yellow numbers indicate specific fossil collections. Wooded areas shown in green. Contour interval: 20 feet.



**Yellowstone Ranch.** Aerial photograph of Yellowstone Ranch area, Fremont County, Wyoming, showing locations of measured stratigraphic sections (red lines) and fossil collections (yellow dots). Yellow numbers indicate specific fossil collections.

## Yellowstone Ranch fossil locations

### USGS Mesozoic fossil locality: D8930

Location:

Outcrop area: Yellowstone Ranch

County: Fremont

Township and range: SW1/4 SW1/4 sec. 27, T. 31 N., R. 96 W.

Geographic coordinate: lat 42.628° N., long 108.304° W.

Yellowstone Ranch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 8/6/73

Comment: slightly below top of formation

Fossils:

*Pinna dolosoniensis*

*Inoceramus aff. I. perplexus (Mytiloides scupini)*

*Cardium ? sp.*

*Baculites yokoyamai*

*Placenticeras sp.*

*Prionocyclus reesidei*

Age: late late Turonian

### USGS Mesozoic fossil locality: D8931

Location:

Outcrop area: Yellowstone Ranch

County: Fremont

Township and range: NW1/4 SE1/4 sec. 24, T. 31 N., R. 97 W.

Geographic coordinate: lat 42.643° N., long 108.371° W.

Yellowstone Ranch quadrangle

Formation: Frontier

Unit: Belle Fourche Member

Collector: Merewether

Collection date: 8/7/73

Comment: from near middle of formation

Fossil:

*Dunveganoceras conditum*

Age: middle late Cenomanian

### USGS Mesozoic fossil locality: D11662

Location:

Outcrop area: Yellowstone Ranch

County: Fremont

Township and range: SW1/4 NE1/4 sec. 19, T. 31 N., R. 96 W.

Geographic coordinate: lat 42.648° N., long 108.352° W.

Yellowstone Ranch quadrangle

Formation: Frontier

Unit: Wall Creek Member

Collector: Merewether

Collection date: 9/2/81

Comment: from upper part of formation

Fossils:

*Phelopteria sp.*

*Pinna dolosoniensis*

*Inoceramus rotundatus (Mytiloides scupini)*

*Lopha sannionis*

*Crassatella andrewsi*

*Pleuriocardia sp.*

*Panopea sp.*

*Pholadomya sp.*

*Anisomyon apicalis*

*Rostellites ambigua*

*Pyropsis coloradoensis*

*Baculites yokoyamai*

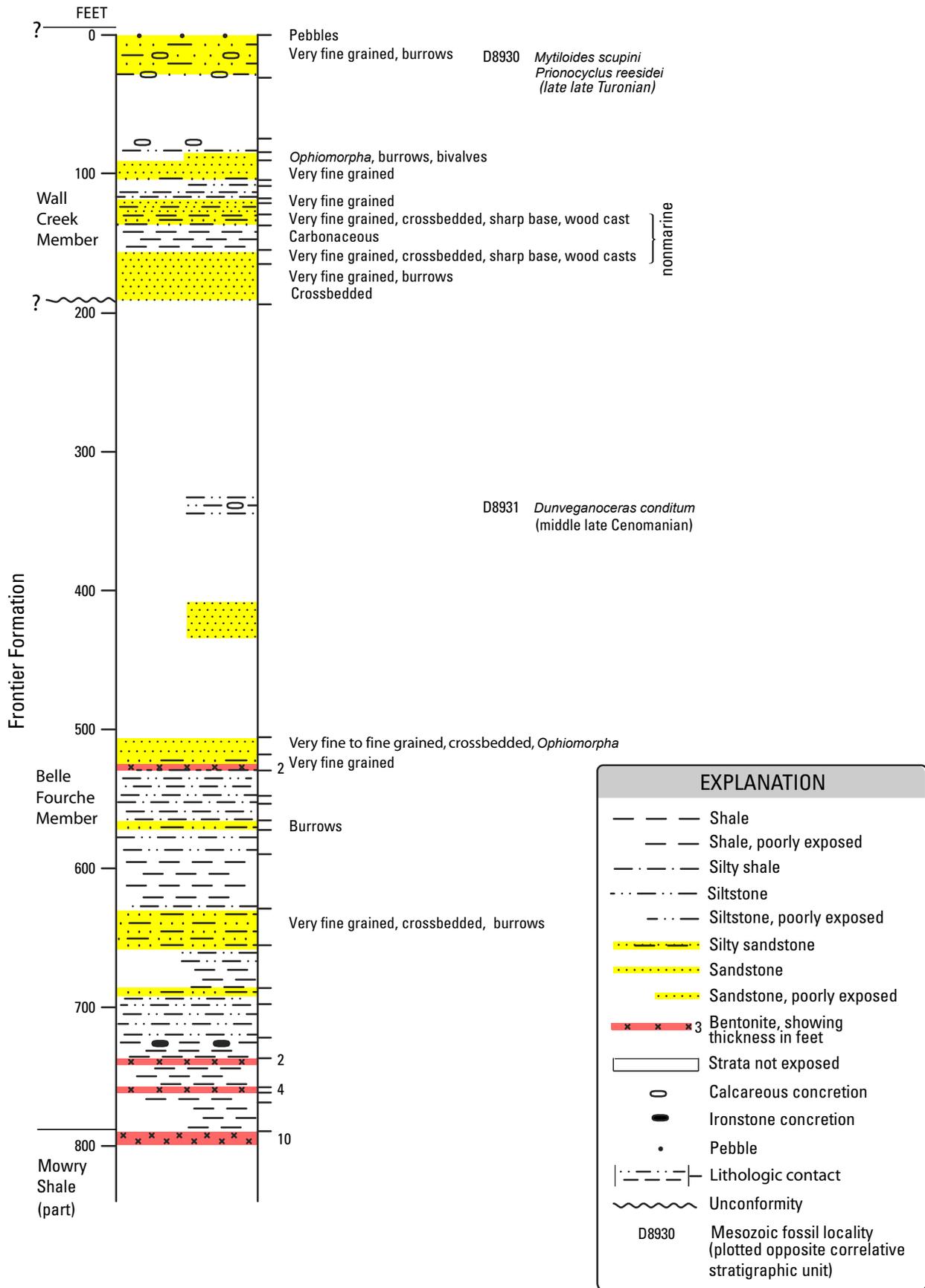
*Scaphites sp.*

*Placenticeras pseudoplacenta*

Age: late late Turonian

# Yellowstone Ranch

Fremont, County, Wyoming  
 Yellowstone Ranch quadrangle  
 Section 27, T. 31 N., R 96 W.

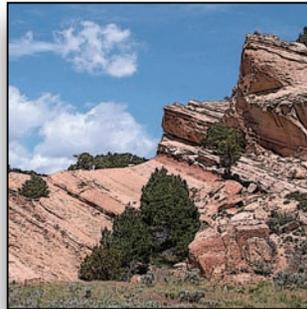


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