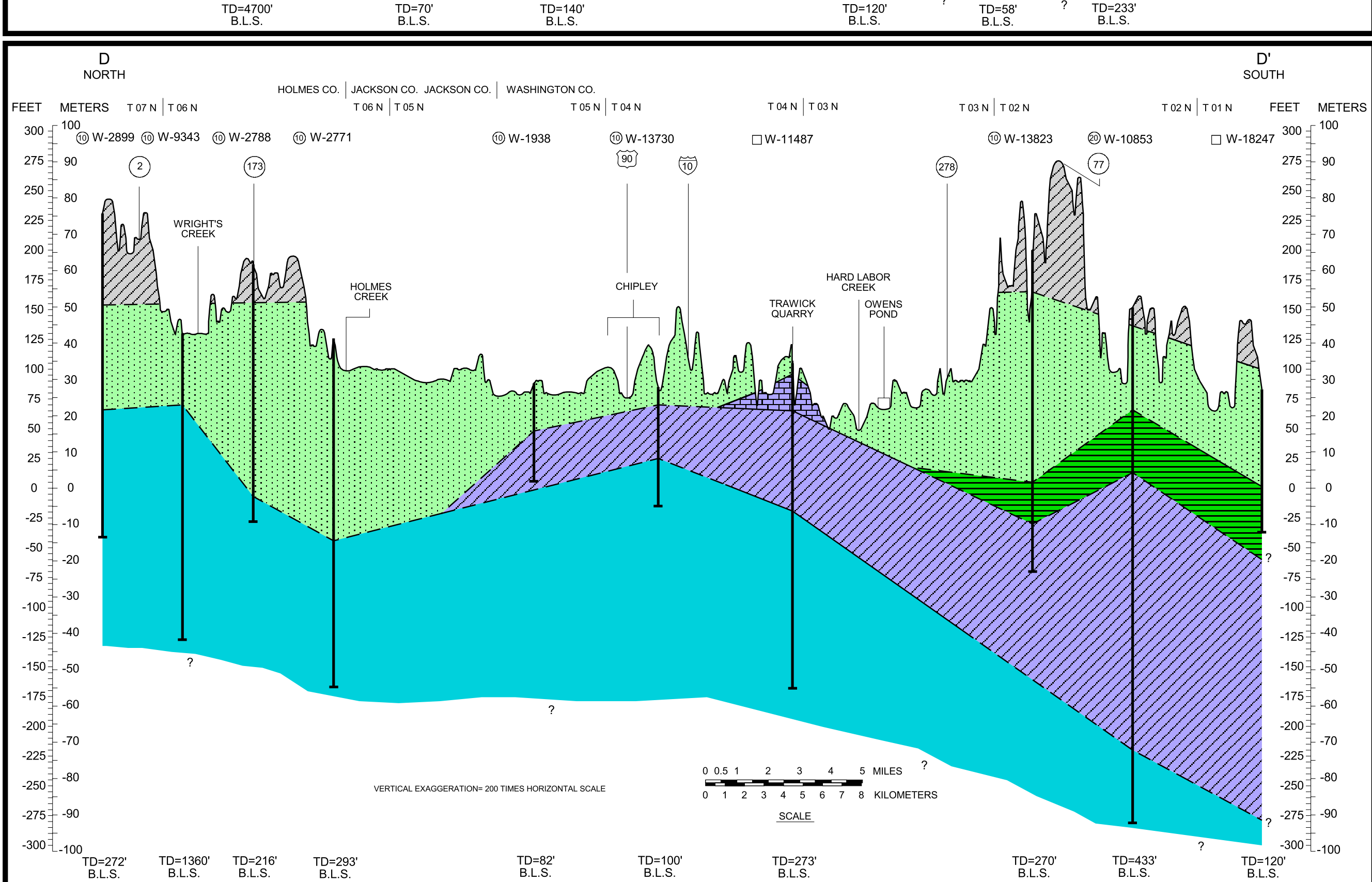
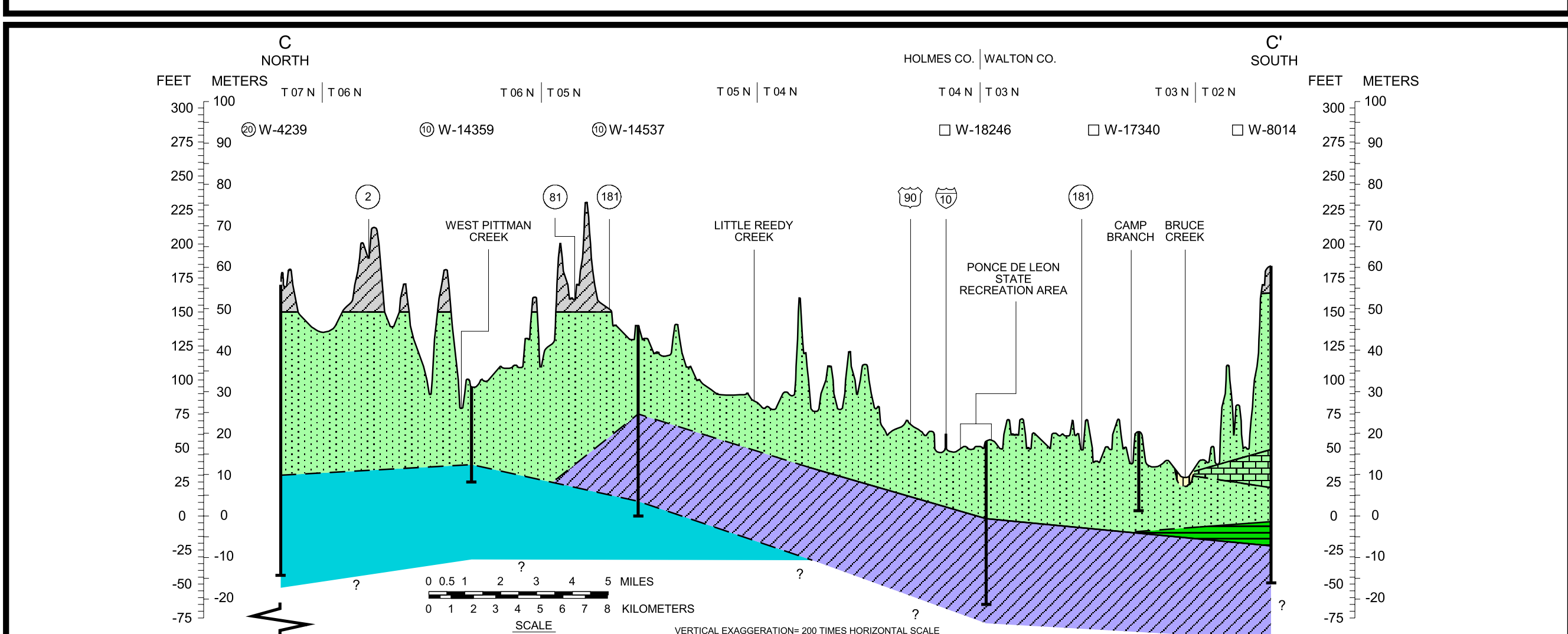
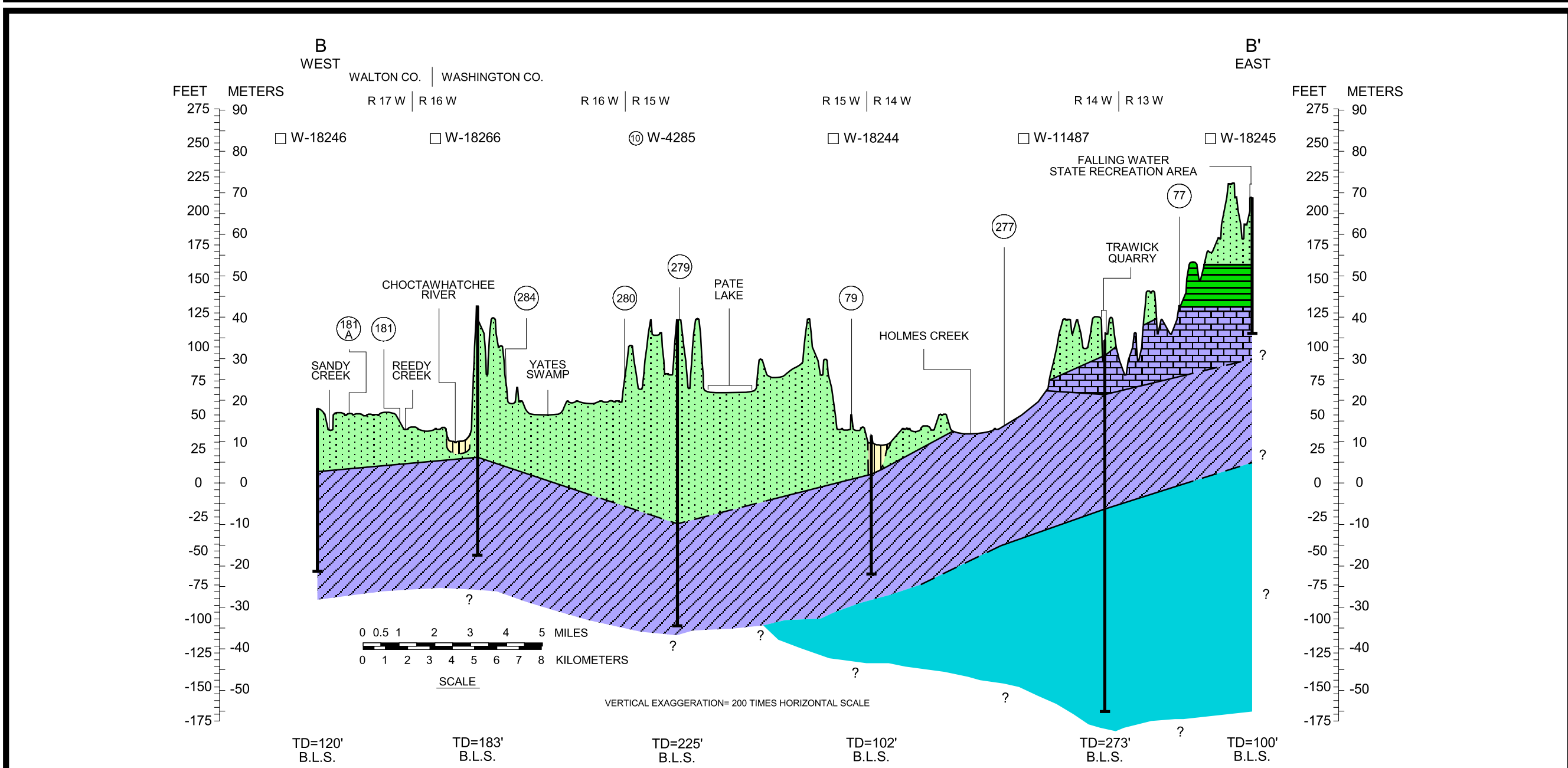
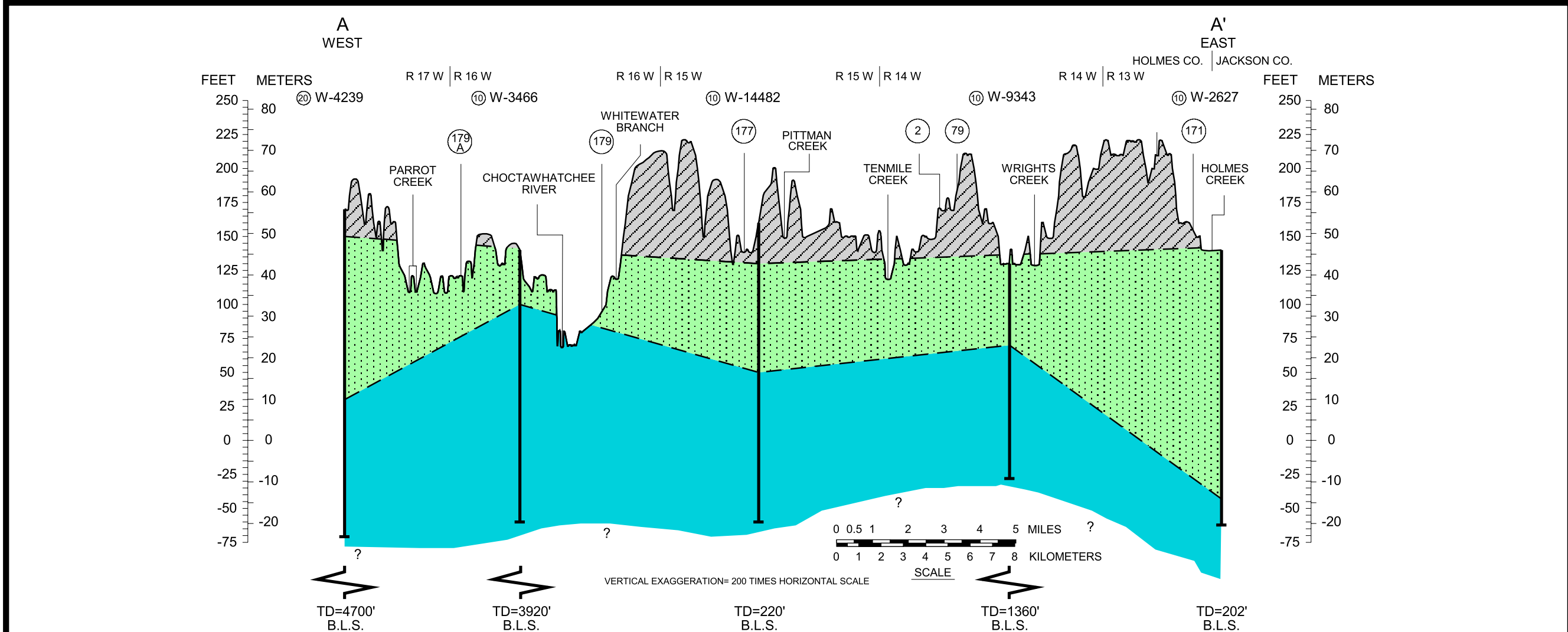
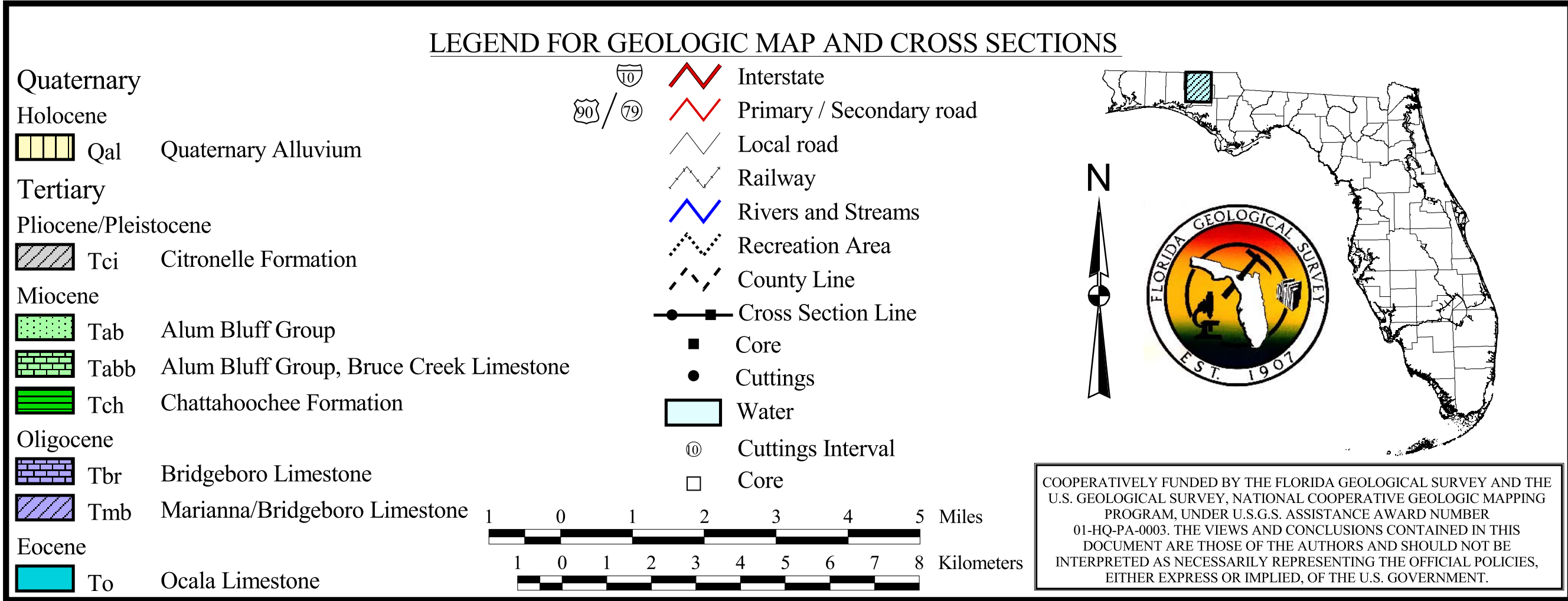


OPEN FILE MAP SERIES NO. 91-01
GEOLOGIC MAP OF THE WESTERN HALF OF THE U.S.G.S. 1:100,000 SCALE
MARIANNA QUADRANGLE, NORTHWESTERN FLORIDA

BY RICHARD C. GREEN, P.G., #1776, WILLIAM L. EVANS III, P. G.,
JONATHAN R. BRYAN, DAVID T. PAUL, AND MABRY M. GABOARDI, 2002



NOTES:

This map was created using FDEP databases and data obtained from the Florida Geological Survey. It was completed September 30, 2002, by the Florida Department of Environmental Protection, Division of Resource Assessment & Management, Florida Geological Survey, Geological Investigations Section. This document was prepared for the STATE MAP component of the National Cooperative Geologic Mapping Program under U.S.G.S. assistance award number 01-HQ-PA-0001 for the presentation of the geologic information shown and is not intended to replace site-specific or use-specific investigations. The Florida Geological Survey does not guarantee this document to be free from errors or inaccuracies and disclaims any responsibility or liability for inappropriate change of scale or interpretation or decisions based thereon. For more information please contact:

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Nummulites, bryozoans, and coralline algae (either as thin, encrusting laminae or small rhodoliths). Huddleston (1993) mapped this unit as the Bridgeboro Limestone (Duncan Church Beds). Bryan and Huddleston (1991) have determined the age of the Bridgeboro Limestone, based on the occurrence of larger diagnostic foraminifera, mollusks, and bryozoans, to be Early Oligocene (Vaskbergian). The top of the Bridgeboro Limestone ranges from 125 feet (38.1 meters) above MSL in W-18425, to 95 feet (29.0 meters) above MSL in W-11487 (cross section B-B') where the unit reaches a maximum thickness of 31 feet (9.5 meters).

The Bryan Formation conformably overlies the Bridgeboro Limestone west of the study area in the eastern portion of the U.S.G.S. 1:100,000 scale Crestview quadrangle (Moore, et al., 2000, and Green et al., 2001). The Bryan Formation crops out at Natural Bridge just west of the northern portion of the present study area. In the subsurface, however, it appears to pinch out to the west of cross section C-C' in the current study area. The Bryan Formation is a white to tan, moderately indurated, sandy, glauconitic wackestone that contains abundant larger foraminifera, mollusks, and bryozoans. Poor core control in the westernmost portion of the study area, combined with extensive dolomitization of the carbonates, makes differentiating the Bryan Formation within this area problematic. As such, the Bryan Formation has not been identified within the study area.

Due to the influence of the Chattahoochee Arch, the Bryan and other Oligocene and Eocene units are not present in the north portion of the study area. The Bryan was recognized in several exposures in Jackson County by Puri and Vernon (1964); however, Moore (1955) included the Bryan within the younger Sawannee Limestone. Vernon (1942) included all limestone below the Tampa Limestone and above the Marianna Limestone as Sawannee Limestone in Holmes and Washington Counties due to their lithologic similarity. This unit has traditionally been problematic for investigators and has been called numerous formations ranging from Chickasawhay (Marsh, 1966) to Chattahoochee-Chickasawhay (Schmidt and Cox, 1978; Clark and Schmidt, 1982) to Marianna Limestone (Yon and Hendry, 1969). A detailed study is needed to determine the exact affinity of this unit.

The Sawannee Limestone was originally identified in the study area by utilizing molluscan fauna (Mansfield, 1938, 1940; Cooke, 1939). Vernon (1942) stated that this correlation may be questionable because of the poor preservation of these organisms, and he defined the Sawannee Limestone in Holmes and Washington Counties, as "all limestone beds lying below the Tampa (Chattahoochee Formation) and above definite Marianna Limestone" (Vernon, 1942). The stratigraphic unit which Cooke, Mansfield and Vernon referred to as the Sawannee Limestone has been mapped by previous investigators under many different names (Rivers, 1961). Further analysis of cores and cuttings by these authors have concluded the unit mapped as Sawannee Limestone by previous authors is likely either Bridgeboro Limestone or undifferentiated Marianna-Bridgeboro Limestone. An excellent section of Bridgeboro Limestone may be seen underlying the Chattahoochee Formation in W-18425 (cross section B-B'), a core taken from Falling Waters State Recreation Area.

Lower Miocene sediments have been redefined numerous times since the name Tampa was first applied by Johnson (1888). Part (1953) described the Tampa sediments as Tampa "stage". Scott, et al. (2001) mapped these sediments as Chattahoochee Limestone in this area and his nomenclature is adhered to by these authors. The Chattahoochee Formation, which unconformably overlies the Marianna Limestone (cross section D-D') or Bridgeboro Limestone (cross section B-B') and is unconformably overlain by the Alum Bluff Group, is predominantly a brownish-gray, moderately indurated, sandy packstone to wackestone in southern and eastern Washington County. In the subsurface, the top of the Chattahoochee Formation is encountered in wells at elevations ranging from 160 feet (48.8 meters) above MSL in W-18425 (cross section B-B') to approximately MSL in W-18247 (cross section D-D'). It attains a maximum thickness of 50 feet (15.2 meters) in W-10853 (cross section D-D').

The top of the Miocene Alum Bluff Group unconformably overlies the Chattahoochee Formation. The Alum Bluff Group occurs throughout most of the study area and generally is seen in outcrop at topographic elevations below 150 feet (45.7 meters) MSL. The unit attains a maximum thickness of 180 feet (54.9 meters) in W-2627 (cross section A-A'). Lithologically, Alum Bluff Group sediments range from clayey sands and gravels, greenish, stiff, micaceous clays with variable admixtures of silt, sand, and shell. Huddleston (1984) and Akers (1972) looked at larval assemblages, primarily microfauna, and assigned the Alum Bluff Group a Middle to Late Miocene age. Jones et al. (1995) determined the strontium isotopic ratios in molluscan fossils collected from exposures along the Shoal River and calculated a mean age of 12.4 Ma, which agrees with other paleontologic dates.

The Bruce Creek Limestone of the Alum Bluff Group is present only in the southwestern portion of the study area. It thickens southward and is composed of thin, gray, gently to the southwest towards Crestview (Huddleston, 1984; Schmidt, 1984). In the present study area, the Bruce Creek Limestone was identified in only one well (W-8014, cross section B-B'), where it is a yellowish-gray, moderately indurated, clayey, phosphatic, molluscan-molded packstone to wackestone with abundant foraminifera. In W-8014, the top of the unit is located at a depth of 48 feet (14.6 meters) above mean sea level and has a

2001.

Many previous investigators have attempted to utilize fossils to establish formations and correlative facies within this region, a practice which has led to confusion within the literature regarding lithostratigraphy. In particular, units such as the Shoal River Formation, Oak Grove Sand, and Chipola Formation of the Alum Bluff Group are difficult to trace laterally without utilizing fossils. These units are not differentiated in this study due to a combination of similar lithologies and sparse core control. Summaries of previous work can be found in Huddleston (1984; 1988; and 1993), Schmidt (1984), Clark and Schmidt (1982), Schmidt and Clark (1980), Vernon and Puri (1956), and Vernon (1942).

Much of the study area is blanketed by a veneer of Quaternary sediments and soils (Copleland, et al., 1988). For this reason, the authors have adopted the policy of mapping the first true geologic unit within twenty feet (6.1 meters) of the surface. If the Quaternary sediments attain a thickness greater than twenty feet (6.1 meters), then they appear as the mapped unit on the geologic map. If the Quaternary sediments are less than twenty feet (6.1 meters) thick, then the underlying stratigraphic unit appears on the map.

A positive structural feature exists to the north and northeast of the study area. This feature, called the Chattahoochee Anticline by Yeach and Stephenson (1911) and Puri and Vernon (1964), and named the Chattahoochee Arch by Murray (1961), is a broad high mapped in the tri-state area of Alabama, Florida and Georgia. This high brings Oligocene and Eocene units to the surface (Schmidt and Cox, 1978; Schmidt, 1984; Huddleston, 1993). The Eocene Ocala Limestone is the oldest unit cropping out in Holmes and Washington Counties. Much of the northern portion of the study area is underlain by the Ocala Limestone, and where erosion has cut through overlying siliciclastics, it often crops out along major streams and rivers. The Ocala Limestone consists of an upper and lower facies.

The lower Ocala Limestone is exposed at the Florida-Alabama border on the east bank of the Choctawhatchee River and extends southward into northern Holmes County. It is exposed intermittently along the river banks and channel bottom. The facies consists of poorly indurated to well indurated, greenish-gray, glauconitic, sandy wackestone which may contain foraminifera, molds of mollusks, and echinoderms. The upper, and more typical, Ocala Limestone facies is exposed in stream channels south of the confluence of Whiteoaker Branch with the Choctawhatchee River. This limestone ranges from a light yellow to white, poorly to moderately indurated, moderately to highly porous, micro-fossiliferous, partially recrystallized packstone. Where weathered, the Ocala Limestone may be silicified. The lower facies of the Ocala Limestone is equivalent to Vernon's (1942) members of the Moody Branch Formation, while the upper facies is equivalent to the C-2 member of the Moody Branch Formation. The top of the Ocala Limestone is from 100 feet (30.5 meters) above MSL in W-3466 (cross section A-A'), to 50 feet (15.3 meters) below MSL in W-2627 (cross section A-A'). According to Miller (1986), the Ocala Limestone ranges from 200 feet (61 meters) thick in the northwestern part of the study area to 400 feet (122 meters) thick in the southwestern portion of the study area. The Ocala Limestone is unconformably overlain by the Marianna Limestone in the southern portion of the study area, and is unconformably overlain by Alum Bluff Group sediments in the northern portion of the study area.

The Early Oligocene (Vaskbergian) Marianna Limestone (Matson, and Chap, 1909) unconformably overlies the Ocala Limestone throughout the southern portion of the study area. In the east-south-central portion of the study area, it is gradationally overlain by the Bridgeboro Limestone (cross sections B-B' and D-D'). The Marianna Limestone is at or near the surface in the northeastern portion of Washington County. The best exposure of the unit may be seen at the Trawick Quarry southwest of Chipley (see W-11487, cross section B-B'). The Marianna Limestone ranges in color from white to cream to light gray. It is a soft, chalky, fine-grained, poorly indurated packstone, often containing abundant foraminifera. In the subsurface, the Marianna Limestone is often highly dolomitized and devoid of fossils. Where dolomitization occurs, the Marianna Limestone is a sacrosine, poorly to moderately indurated, fine-grained unit composed of dolomite rhombs. The top of the Marianna Limestone ranges from approximately 75 feet (22.9 meters) above MSL to 30 feet (9.1 meters) below MSL, and the unit attains a maximum thickness of 250 feet (76.2 meters) in W-10853 (cross section D-D').

The Bridgeboro Limestone conformably overlies the Marianna Limestone and is unconformably overlain by the Chattahoochee Formation. It is at or near the surface in isolated areas of northwestern Washington County and is also exposed by mining activities in the Trawick Quarry southwest of Chipley. The Bridgeboro Limestone is a wackestone to packstone which contains rhodoliths. Except for the presence or absence of rhodoliths, the carbonates of the lower Bridgeboro Limestone are very similar lithologically to the underlying Marianna Limestone and the Sawannee Limestone. In many of the wells used in this report, the lithologic samples consist of cuttings only. Where identification of these two units is problematic due to dolomitization and lack of core control, the authors have designated these carbonate units as Tertiary Marianna-Bridgeboro Limestone in the subsurface. The Bridgeboro Limestone is also exposed by mining activities in the Trawick Quarry southwest of Chipley. 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