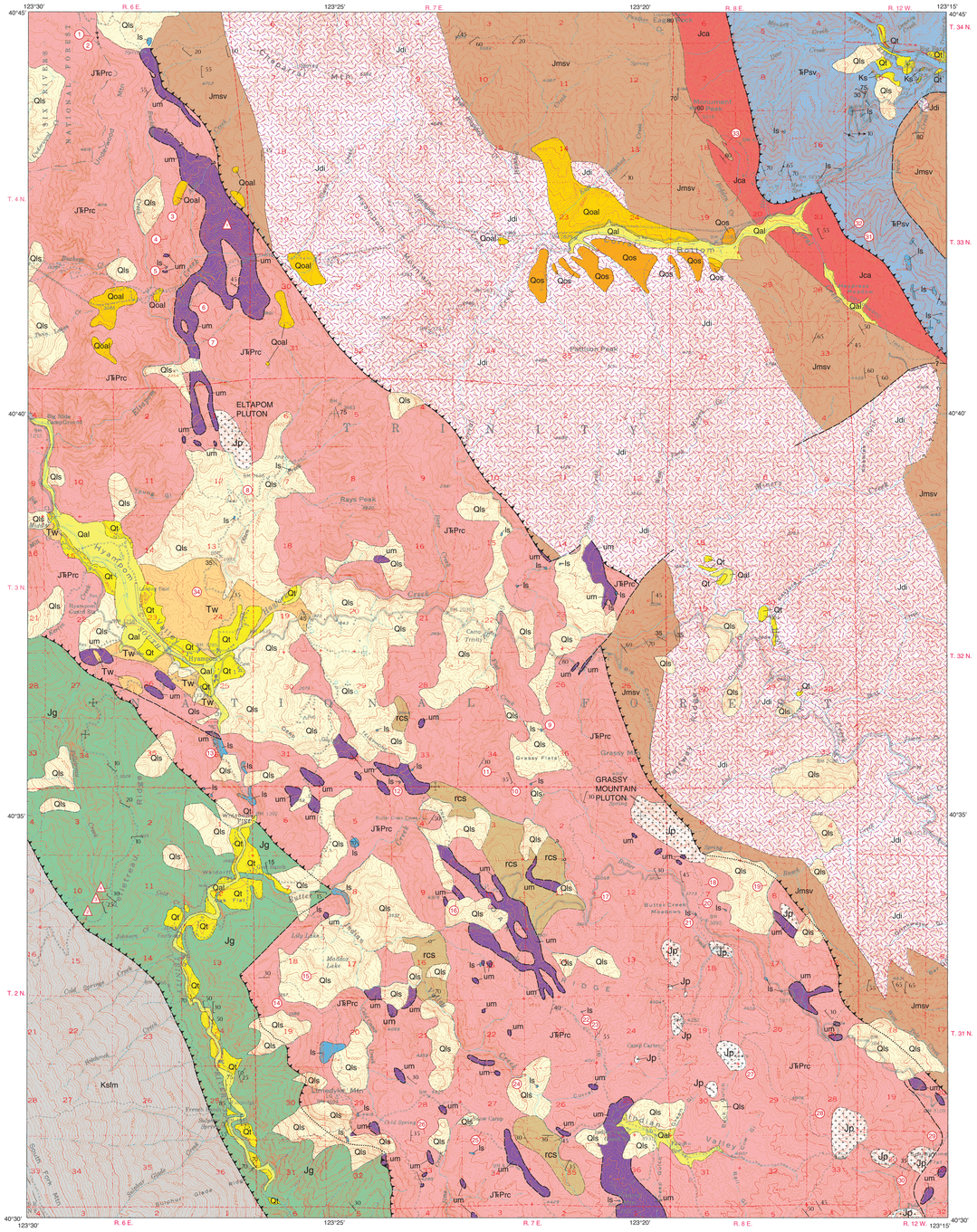
U.S. Department of the Interior
U.S. Geological Survey

Scientific Investigations Map 3129



Base: U.S. Geological Survey Hyampom 15-minute quadrangle, 1951; polyconic projection
North American Datum 1927.

19°
true north
magnetic north

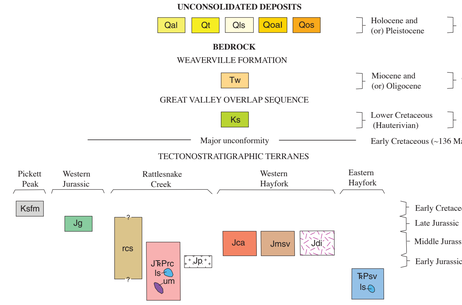
SCALE 1:50 000

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

AREA OF MAP — CALIFORNIA

Geology mapped by W.P. Irwin, 1972-1984.
GIS database and digital cartography by W.P. Irwin and C.M. Wentworth, 2009-10
Edited by T.A. Lindquist
Manuscript approved for publication June 8, 2010

CORRELATION OF MAP UNITS



MAP SYMBOLS

Contact; dashed where approximately located; queried where uncertain

Fault; dashed where approximately located; queried where uncertain; dotted where concealed; teeth on upper plate where thrust

Attitude of inclined bedding

Inclined Attitude of foliation

Vertical Attitude of foliation

Inclined Attitude of joints

Vertical Attitude of joints

Inclined Attitude of cleavage

Horizontal Attitude of cleavage

Small fold, showing plunge of axis where known

Fossil locality

Isotopic age locality

DESCRIPTION OF MAP UNITS

UNCONSOLIDATED DEPOSITS

Qal — **Younger alluvium (Holocene and (or) Pleistocene)**—Unconsolidated silt, sand, and gravel in modern stream channels and on associated low terraces. Alluvium in major streams located in Hayfork terrane has yielded placer gold, but little gold has been produced from streams located in Rattlesnake Creek, Western Jurassic, and Pickett Peak terranes in map area

Qt — **Terrace deposits (Holocene and (or) Pleistocene)**—Thin veneers of sand and gravel on terraces closely related to modern streams

Qls — **Landslides (Holocene and (or) Pleistocene)**—Many landslides in areas of Rattlesnake Creek terrane and South Fork Mountain Schist are not shown, although these areas are exceptionally unstable, and downslope movement resulting from mass wasting is widespread

Qoal — **Older alluvium (Pleistocene)**—Weakly consolidated nonmarine silt, sand, and conglomerate associated with topographically high remnants of old land surfaces. Most of these deposits are at elevations of 3,000 to 4,000 ft, about 2,000 ft or more higher than that of the South Fork of Trinity River. Deposits are generally less indurated than the Weaverville Formation, and bedding generally is near horizontal or dips more gently than in Weaverville Formation. Pebbles of red chert in deposits on divide between Eltapom and Buckeye Creeks contain Late Jurassic (Tithonian) radiolarians, implying Coast Ranges provenance

Qos — **Old land surface (Pleistocene)**—Remnants of old terrace and colluvium surfaces on south side of Corral Bottom

BEDROCK

WEAVERVILLE FORMATION

Tw — **Weaverville Formation (Miocene and (or) Oligocene)**—Weakly consolidated nonmarine sandstone, conglomerate, and thinly laminated, light-colored clay and tuff. Fossil plants abundant in some clay and tuff, and lignitic coal beds present locally. Thickness of stratigraphic section may be about 300 m. Age as indicated by fossil plants was previously considered Oligocene(?) (MacGinitie, 1937); however, more recent study of pollen and spores indicate late Oligocene or early Miocene age for unit (Barnett, 1982). A fossil minnow from lacustrine beds north of Hyampom (fossil loc. 34; table 1) is thought to be of Miocene age (LeRoy, 1993). Clay and tuff beds are locally fused and vesiculated by heat from underground fires in coal beds (MacGinitie, 1937; Lydon, 1964; LeRoy, 1993). Red chert pebbles from conglomerate beds in the vicinity of Hyampom contain middle Permian (Guadalupian) radiolarians. Formation generally poorly exposed

GREAT VALLEY OVERLAP SEQUENCE

Ks — **Great Valley sequence (Lower Cretaceous)**—Firmly consolidated shale, sandstone, and conglomerate that crop out as several small depositional outliers southwest of Big Bar and rest with high angular unconformity on Eastern Hayfork terrane. Stratigraphic thickness about 60 m. Lower part of section contains a coal bed that has been mined. Fossil plants are abundant near coal bed. Presence of both marine and nonmarine fossil mollusks suggests deposition near an Early Cretaceous (Valanginian) shoreline (see Diller, 1908; MacGinitie, 1937; Jones and Irwin, 1971)

TECTONOSTRATIGRAPHIC TERRANES

Eastern Hayfork Terrane

ŦPsv ls — **Mélange (Triassic and Permian)**—Slaty argillite and other clastic sedimentary rocks, thin-bedded chert, volcaniclastic rocks, sparse recrystallized limestone (ls, where divided), and minor amounts of mica schist, amphibolite, and serpentinite. Fossil foraminifers in limestone at fossil localities 31 and 32 are late Paleozoic in age (table 1). Radiolarians in chert from the mélange unit in Hyampom quadrangle have not been dated, but in the same mélange unit outside the quadrangle, they are mostly Late Triassic, and none is clearly of Jurassic age (Irwin and others, 1982)

Western Hayfork Terrane

Jca — **Chert and argillite unit (Middle Jurassic)**—Dominantly thin-bedded radiolarian chert, locally interlayered with argillite and meta-andesite. Generally overlies (conformably?) and locally interfingers with the Hayfork Bally Meta-andesite. Radiolarians in the chert generally are recrystallized but at fossil locality 33 are identifiable as Mesozoic (table 1)

Jmsv — **Hayfork Bally Meta-andesite (Middle Jurassic)**—Layered mafic volcanogenic rocks that range in texture from coarse agglomerate to crystal tuff; probably are deposits of oceanic volcanic arc. Commonly characterized by euhedral augite and plagioclase crystals in light- to dark-green groundmass. Locally includes interlayers of thin-bedded radiolarian chert and dark argillite. Age of meta-andesite is not clearly known, but it is thought to be Middle Jurassic on basis of probable cogenetic relation with the Ironside Mountain batholith (170 Ma, revised constant), as well as on K-Ar ages of 159 Ma (M.A. Lanphere, *cited in* Irwin, 1977; revised constant) and 168 to 177 Ma (Fahan and Wright, 1983) measured on hornblende from meta-andesite

Jdi — **Ironside Mountain batholith (Middle Jurassic)**—Mostly medium-grained monzodiorite but also includes quartz diorite, minor amounts of gabbro, and pyroxenite. Fine-grained and hybrid(?) varieties are common in zone as much as 1 km wide along much of boundary between this unit and the Hayfork Bally Meta-andesite. Age of batholith is Middle Jurassic on basis of isotopic ages of about 170 Ma, as determined by K-Ar analysis (Lanphere and others, 1968; revised constant) and by U-Pb analysis (Wright, 1982)

Rattlesnake Creek Terrane

JŦPrc ls um — **Broken formation of volcanic rocks and mélange (Middle Jurassic to Permian?)**—Consists dominantly of sheared and dislocated mafic volcanic rocks, including pillow basalt, flows(?), tuff, volcanic breccia, and volcaniclastic rocks that contain locally interbedded red and gray to black, thin-bedded radiolarian chert; includes minor amounts of intermediate and silicic volcanic rocks, lenses and knockers of limestone (ls, where divided), amphibolite, detrital sedimentary rocks (rcs), plutonic rocks (Jp), and serpentinite (um, where divided) which is dominantly serpentinized peridotite but includes associated metasomatized mafic rocks of uncertain origin as well as minor amounts of sheared-in volcanic rocks and chert. Radiolarians indicate that cherts of both Triassic and Jurassic ages are present (table 1). Color-alteration index (CAI) of conodonts (table 1) indicates temperatures of 300° to 500°C (Irwin and others, 1983). Several blocks of radiolarian chert in the serpentinite about 4 km southwest of Chaparral Mountain are metamorphosed to blueschist facies, and one of these (isotopic-age loc. 1) yielded K-Ar age of 185±8.8 Ma (M.A. Lanphere, written commun., 1982). Limestone at fossil localities 12 and 22 contains Late Triassic conodonts and, at localities 18 and 21, early Mesozoic or Permian foraminifers (table 1). Continuity of lithic units of Rattlesnake Creek terrane is disrupted by faults and obscured by widespread landslides

rcs — **Detrital sedimentary rocks (Jurassic?)**—Well-bedded, mildly slaty rocks that vary from mudstone to pebble conglomerate; they locally resemble the Galice(?) Formation (Jg) and may represent tectonic inliers or fault slices of Western Jurassic terrane

Jp — **Plutonic rocks (Jurassic?)**—Medium- to coarse-grained rocks that range from diorite to granite. They include Eltapom and Grassy Mountain plutons and other small unnamed plutons; may include some volcanic rocks of intermediate and silicic composition; thought to intrude mafic volcanic rocks of the broken formation (JŦPrc), but contact relations are unclear, and the plutons may be fault blocks; probably equivalent to rocks isotopically dated as Early Jurassic (193-207 Ma; Wright, 1982) in Dubakella Mountain and Chanchelulla Peak 15′ quadrangles (to southeast)

Western Jurassic Terrane

Jg — **Galice(?) Formation (Late Jurassic)**—Interbedded mudstone, graywacke, and conglomerate that ranges in texture from mildly slaty (textural zone 2 of Blake and others, 1967) to semischist (textural zone 2+). Fossils have not been found in the Galice(?) Formation in this quadrangle, but presumably correlative rocks in southwestern Oregon contain fossils that indicate Late Jurassic (late Oxfordian and middle Kimmeridgian) age (Imlay, 1959). Age of metamorphism is Late Jurassic (late Kimmeridgian?) on basis of K-Ar analysis of samples from isotopic-age localities 2, 3, and 4 on Pelletreau Ridge (respectively, 148±1.8 Ma, 151±4.4 Ma, and 153±4.5 Ma; Lanphere and others, 1978)

Pickett Peak Terrane

Ksfm — **South Fork Mountain Schist (Early Cretaceous)**—Mostly schistose metasedimentary rocks of textural zone 3 (Blake and others, 1967), represented by quartz-albite-muscovite-chlorite schist that commonly contains lawsonite. Formation locally includes the Chinquapin Metabasalt Member (undivided here), which is fine-grained albite-chlorite-actinolite-epidote gneiss that locally contains crossite-rich layers. Isotopic analysis by K-Ar and Rb-Sr methods indicates that the metamorphic event that formed the unit occurred 115 to 120 Ma ago during Early Cretaceous time (Lanphere and others, 1978). Age of deposition of sedimentary and volcanic protoliths probably was Late Jurassic and Early Cretaceous. Most of the unit is poorly exposed owing to thick cover of slope debris and forest overgrowth

Table 1. Fossil localities in Hyampom quadrangle

Map No.	Sample No.	Lithology*	Fossils*	Age	Reference
1	55-77	C	Radiolarians	Late Triassic	Loc. 77, *in* Irwin and others, 1982
2	56-77	C	Radiolarians	Late Triassic (late Karnian? to middle Norian)	Loc. 78, *in* Irwin and others, 1982
3	6-83	C	Radiolarians	Mesozoic (Triassic)	C.D. Blome, written commun., 1983
4	7-83	C	Radiolarians	Late Triassic(?) or Early Jurassic (Hettangian to Pliensbachian)	C.D. Blome, written commun., 1983
5	8-83	C	Radiolarians	Early or Middle Jurrasic	C.D. Blome, written commun., 1983
6	57-77	C	Radiolarians	Late Triassic	Loc. 79, *in* Irwin and others, 1982
7	58-77	C	Radiolarians	Mesozoic	Loc. 80, *in* Irwin and others, 1982
			Conodonts (CAI 7)	Late Triassic	Loc. 30, *in* Irwin and others, 1983
8	59-77	C	Radiolarians	Triassic or Jurassic	Loc. 81, *in* Irwin and others, 1982
9	12-71	L	Conodonts (CAI 7)	Ordovician to Triassic	Loc. 32, *in* Irwin and others, 1983
10	16-76	C	Radiolarians	Middle Triassic (Ladinian)	Loc. 83, *in* Irwin and others, 1982
			Vance Creek fauna		
11	32-81	C	Radiolarians	Mesozoic (Jurassic)	Loc. 82, *in* Irwin and others, 1982
12	6-72	L	Conodonts (CAI 5-6)	Late Triassic	Loc. 33, *in* Irwin and others, 1983
13	5-73	L	Conodonts (CAI 5)	Devonian to Triassic	Loc. 31, *in* Irwin and others, 1983
14	10-82	C	Radiolarians	Mesozoic (Jurassic?)	C.D. Blome, written commun., 1982
15	33-81	C	Radiolarians	Mesozoic (Jurassic?)	Loc. 87, *in* Irwin and others, 1982; C.D. Blome, written commun., 1982
	9-82				
16	24-81	C	Radiolarians	Mesozoic (Jurassic?)	Loc. 86, *in* Irwin and others, 1982
17	30-81	C	Radiolarians	Mesozoic	Loc. 85, *in* Irwin and others, 1982
18	5-71	L	Foraminifers	Permian or early Mesozoic	Loc. 60, *in* Irwin and Galanis, 1976
19	1-83	C	Radiolarians	Triassic or Jurassic	C.D. Blome, written commun., 1983
20	31-81	C	Radiolarians	Early Jurassic (Pliensbachian) to Middle Jurassic (Bathonian)	Loc. 84, *in* Irwin and others, 1982
21	11-71	L	Foraminifers	Permian or early Mesozoic	Loc. 61, *in* Irwin and Galanis, 1976
			Conodonts (CAI 6-7)	Ordovician to Triassic	Loc. 34, *in* Irwin and others, 1983
22	5-72	L	Conodonts (CAI 6-7)	Late Triassic	Loc. 35, *in* Irwin and others, 1983
23	17-76	C	Radiolarians	Mesozoic	Loc. 88, *in* Irwin and others, 1982
24	36-81	C	Radiolarians	Mesozoic	Loc. 89, *in* Irwin and others, 1982
25	35-81	C	Radiolarians	Mesozoic	Loc. 90, *in* Irwin and others, 1982
26	2-83	C	Radiolarians	Early Jurassic (Pliensbachian; Toarcian?)	C.D. Blome, written commun., 1984
27	32-84	C	Radiolarians	Mesozoic (Triassic?)	C.D. Blome, written commun., 1984
28	34-84	C	Radiolarians	Late Triassic (late Karnian to middle Norian)	C.D. Blome, written commun., 1984
29	5-77	C	Radiolarians	Triassic or Jurassic	Loc. 91, *in* Irwin and others, 1982
30	25-81	C	Radiolarians	Late Triassic (Norian) to Middle Jurassic	Loc. 92, *in* Irwin and others, 1982
31	16-69	L	Foraminifers	Late Paleozoic	Loc. 64, *in* Irwin and Galanis, 1976
32	5-74	L	Foraminifers	Pennsylvanian or early Permian	Loc. 124, *in* Irwin and Galanis, 1976
33	13-83	C	Radiolarians	Mesozoic	C.D. Blome, written commun., 1983
34	------	-------	Fish	Miocene	LeRoy, 1993

*Abbreviations: C, chert; CAI, color-alteration index; L, limestone

SYNOPSIS

The Hyampom 15′ quadrangle lies west of the Hayfork 15′ quadrangle in the southern part of the Klamath Mountains geologic province of northern California. It spans parts of four generally northwest-trending tectono-stratigraphic terranes of the Klamath Mountains, the Eastern Hayfork, Western Hayfork, Rattlesnake Creek, and Western Jurassic terranes, as well as, in the southwest corner of the quadrangle, a small part of the Pickett Peak terrane of the Coast Range province. Remnants of the Cretaceous Great Valley overlap sequence that once covered much of the pre-Cretaceous bedrock of the quadrangle are now found only as a few small patches in the northeast corner of the quadrangle. Fluvial and lacustrine deposits of the mid-Tertiary Weaverville Formation crop out in the vicinity of the village of Hyampom.

The Eastern Hayfork terrane is a broken formation and mélange of volcanic and sedimentary rocks that include blocks of chert and limestone. The chert has not been sampled; however, chert from the same terrane in the Hayfork quadrangle (Irwin, 2010) contains radiolarians of Permian and Triassic ages, but none clearly of Jurassic age. Limestone at two localities contains late Paleozoic foraminifers. Some of the limestone from the Eastern Klamath terrane in the Hayfork quadrangle contains faunas of Tethyan affinity.

The Western Hayfork terrane is part of an andesitic volcanic arc that was accreted to the western edge of the Eastern Hayfork terrane. It consists mainly of metavolcaniclastic andesitic agglomerate and tuff, as well as argillite and chert, and it includes the dioritic Ironside Mountain batholith that intruded during Middle Jurassic time (about 170 Ma). This intrusive body provides the principal constraint on the age of the terrane.

The Rattlesnake Creek terrane is a mélange consisting mostly of highly dismembered ophiolite. It includes slabs of serpentinized ultramafic rock, basaltic volcanic rocks, radiolarian chert of Triassic and Jurassic ages, limestone containing Late Triassic conodonts and Permian or Triassic foraminifers, and small exotic(?) plutons. The plutons probably are similar to ones to the southeast beyond the quadrangle boundary that yielded isotopic ages ranging from 193 Ma to 207 Ma (Wright, 1982). The Rattlesnake Creek terrane contains several areas of well-bedded sedimentary rocks (rcs) that somewhat resemble the Galice(?) Formation and may be inliers of the Western Jurassic terrane.

The Western Jurassic terrane in the Hyampom quadrangle appears to consist only of a narrow tectonic sliver of slaty to semischistose detrital sedimentary rocks of the Late Jurassic Galice(?) Formation. The isotopic age of metamorphism of the rocks is about 150 Ma (Lanphere and others, 1978), which probably indicates when the terrane was accreted to the Rattlesnake Creek terrane.

The Pickett Peak terrane, which is the most westerly of the succession of terranes in the Hyampom quadrangle, is the accreted eastern margin of the Coast Ranges province. It mainly consists of semischistose and schistose metagraywacke of the South Fork Mountain Schist and locally contains the blueschist-facies mineral lawsonite. Isotopic analysis indicates a metamorphic age of 120 to 115 Ma (Lanphere and others, 1978).

During the Cretaceous period, much of the southern fringe of the Klamath Mountains was onlapped by sedimentary strata of the Great Valley sequence. However, much of the onlapping Cretaceous strata has since been eroded away, and in the Hyampom quadrangle only a few small remnants are found in the northeast corner near Big Bar.

Near the west edge of the quadrangle, in the vicinity of the village of Hyampom, weakly consolidated fluvial and lacustrine rocks and coaly deposits of Oligocene and (or) Miocene age are present. These rocks are similar to the Weaverville Formation that occurs in separate sedimentary basins to the east in the Weaverville (Irwin, 2009) and Hayfork (Irwin, 2010) 15′ quadrangles.

This map of the Hyampom 15′ quadrangle is a digital version of U.S. Geological Survey Miscellaneous Field Studies Map MF-1809 (Irwin, 1985), with various improvements and additions.

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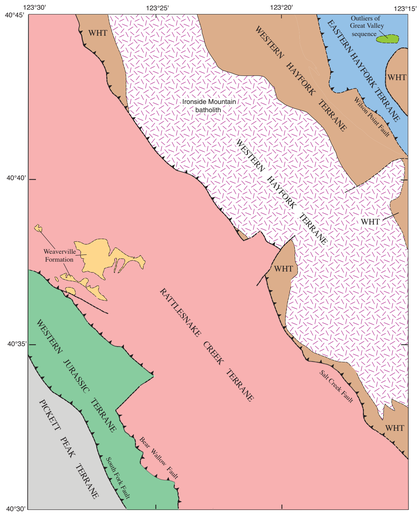

GENERALIZED TERRANE MAP

The Hyampom 15′ quadrangle includes parts of four generally subparallel northwest-trending terranes (the Eastern Hayfork, Western Hayfork, Rattlesnake Creek, and Western Jurassic terranes) that were sequentially accreted to North America during Jurassic time to become parts of the Klamath Mountains geologic province. Later, during Early Cretaceous time, a fifth terrane (Pickett Peak terrane) was accreted, to become part of the Coast Ranges geologic province. Closely scattered remnants of the Lower Cretaceous Great Valley sequence overlap assemblage are shown diagramatically as a single unit in the northeast corner of the quadrangle. The youngest rocks shown on this generalized terrane map are weakly consolidated mid-Tertiary nonmarine strata of the Weaverville Formation near the village of Hyampom. Abbreviations: WHT, Western Hayfork terrane.

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Reconnaissance Geologic Map of the Hyampom 15′ Quadrangle, Trinity County, California

By

William P. Irwin

2010