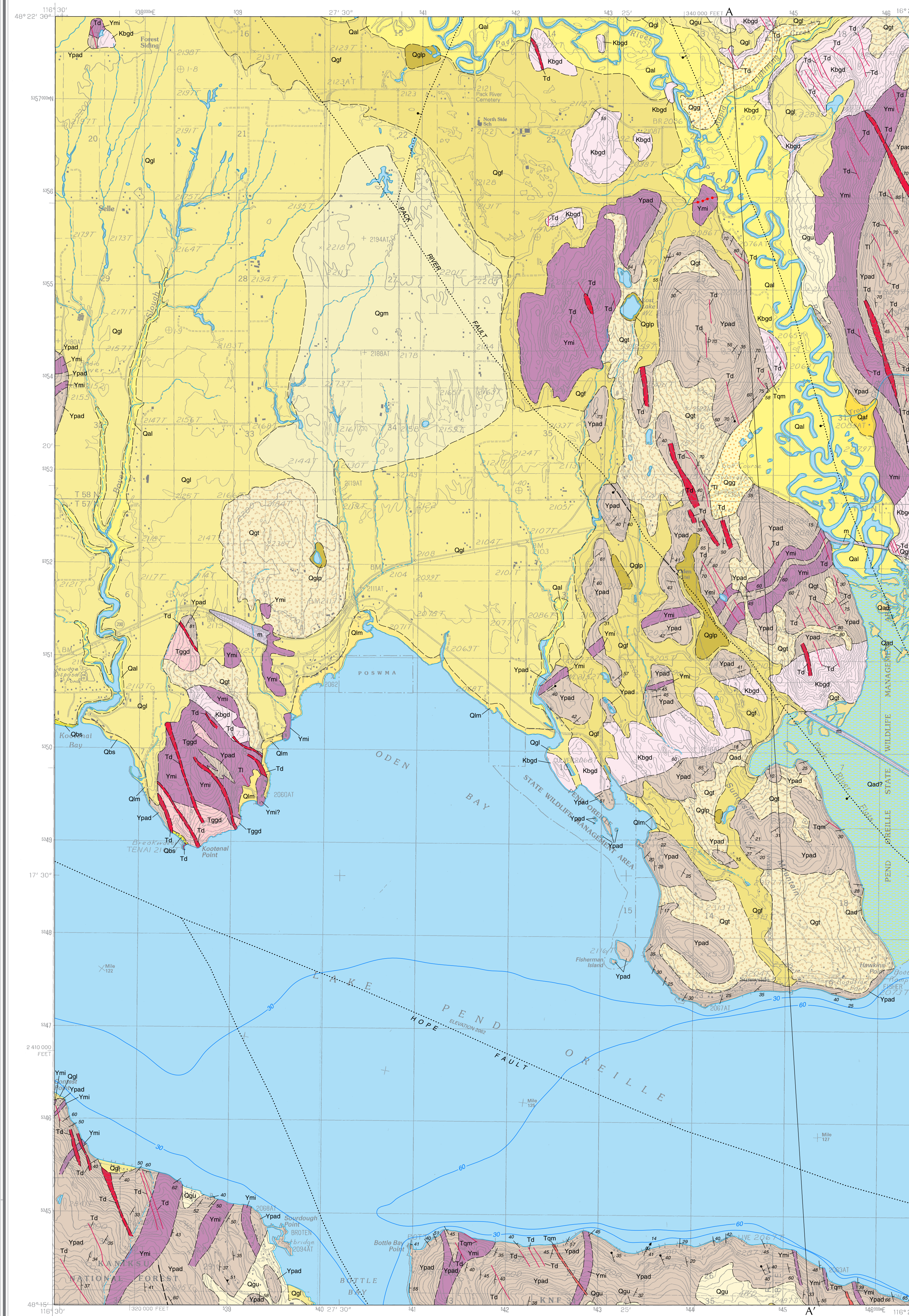


# GEOLOGIC MAP OF THE ODEN BAY QUADRANGLE, BONNER COUNTY, IDAHO

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## INTRODUCTION

Quaternary deposits on this 1:24,000-scale Oden Bay quadrangle were mapped in 1988-1989 and 2004-2006 by R.M. Breckenridge. Surficial mapping of part of the quadrangle by A.F. Harvey III (1984b) aided our compilation. Bedrock was mapped in 2005-2006 by R.S. Lewis, M.D. McFadden, and R.F. Burnmaster, and augmented by compilation from Harrison and Schmidt (1971), Doughty (1995), and unpublished 1994 mapping by Steve Box.

Low metamorphic grade metasedimentary rocks of the Belt-Purcell Supergroup, Precambrian in age, underlie much of the Oden Bay quadrangle. Granitic rocks of Cretaceous age increase eastward in the northern part of the quadrangle and a small Eocene pluton is exposed in the western part. Numerous Eocene dacite dikes cut both Belt Supergroup and the granitic rocks.

The geomorphic subsections of the quadrangle include parts of the Selle Lowland, the Pend Oreille Lake basin, and the Talache Uplands (Savage, 1967). During Pleistocene glaciations a lobe of the Cordilleran ice repeatedly advanced southward from Canada along the Purcell Trench. Tributary valley glaciers from the Selkirk Range on the west side of the trench and the Cabinet Range on the east side contributed to the main ice stream. The Pack River drainage was the source of a major tributary valley glacier in the Selkirk Range. The river flows across the Purcell Trench and drains into Lake Pend Oreille. East of this quadrangle the ice blocked the Clark Fork valley, formed Glacial Lake Missoula, and deeply scoured the Pend Oreille Lake basin to the south. After retreat of the continental ice, alpine glaciers persisted until nearly 10,000 years ago in the higher cirques of the Selkirk Range. Glacial deposits fill the depression of the Purcell Trench and form the Selle Lowland. Holocene alluvium, colluvium, sand deposits, and lacustrine sediments are mostly reworked glacial deposits.

## DESCRIPTION OF MAP UNITS

Intrusive rocks are classified according to IUGS nomenclature using normalized values of modal quartz (Q), alkali feldspar (A) and plagioclase (P) on a ternary diagram (Streckeisen, 1976). Mineral modifiers are listed in order of increasing abundance for both igneous and metamorphic rocks. Grain size classification of unconsolidated and consolidated sediment is based on the Wentworth scale (Lane, 1947). Bedding thickness and lamination type are after McKee and Weir (1963), and Winston (1986). Thicknesses and distances are given in abbreviation of metric units (e.g., dm=decimeter). Multiple lithologies within a rock unit description are listed in order of decreasing abundance. Soil series are from Weisel and others (1982). Unified Soil Classifications of the surficial units are from Harvey (1984a).

## MAN-MADE DEPOSITS

**Made land (historical)**—Highway and railway fills and causeways across the Pack River Flats. Numerous small fills along the shore of the lake are unmapped.

## ALLUVIAL AND LACUSTRINE DEPOSITS

**Alluvium (Holocene)**—Varied silt, sand, and gravel deposits in modern stream drainages. Coarser toward Cabinet Mountains and finer in the Selle Lowland. Moderately sorted to well sorted and pebble and cobble gravels with occasional boulders. Mostly reworked glacial deposits in the lowlands and post glacial colluvium in the mountains. Typical soils are silt loam to sandy- and gravelly loam. Unified Classification is GP-GM and SP-SM Soil series of Hooloo and Wendee. Thickness is thin to several meters.

**Alluvium and deltaic deposits of the Pack River (Holocene)**—Interbedded alluvium at the mouth of the Pack River and its delta in Pend Oreille Lake. Consists of silt clay silt; at depth is locally underlain by late glacial outwash, till, or Missoula Flood deposits. The pattern designates the distribution of the unit prior to construction of Albion Falls Dam.

**Beach deposits (Holocene)**—Coarse sand to silty sand and gravel deposited along the shoreline of Lake Pend Oreille. Mostly are moderately sorted. Forms accreted beaches, bars and spits in areas of lower wave energy along the shore. Deposits are classified as GW-GP and SW-SP and lack soil cover. Thickness up to several meters.

**Lake deposits (Holocene)**—Consists of silt clay silt; at depth is locally underlain by late glacial outwash, till, or Missoula Flood deposits. The upper limit of the unit and Lake Pend Oreille is controlled by Albion Falls Dam. The maximum water level is 631m (2071.7 feet) and the normal minimum is 625 m (2051.0 ft). The unit thickens into Pend Oreille Lake basin. Soils include Capehorn and Hooloo series. Thickness 1-10 m.

**Alluvial fan deposits (Holocene)**—Mixed pebble to cobble gravel deposited as fans at the mouths of local drainages. Mostly subangular to angular clasts derived locally from colluvium and glacial deposits on steep slopes. Unified Classification is GM and SM. Soils mainly of the Colburn, Pend Oreille, and Bonner series. Thickness 1-10 m (3-33 feet).

## GLACIAL AND RELATED DEPOSITS

**Peat deposits (Pleistocene to Holocene)**—Organic muck, mud and peat bogs in poorly drained paleoglacial outwash channels and kettles of the Selle Lowland. Interbedded with thin layers of fine sand, silt and clay. Soils of the Pywell series and Pt in the Unified Soil System. Thickness varies from 1-5 m.

**Glaciolacustrine deposits (Pleistocene to Holocene)**—Massive to finely laminated clay, silt, and sand deposited in ice marginal and post glacial lakes (L) occupying the Purcell Trench. Exhibits well developed rhythmites and beds of sand and silt. This unit includes deposits in the Selle Lowland and discontinuous terraces in tributary valleys at about 732 (2400 feet) and as high as 792 m (2600 feet). Mostly well sorted and finely laminated. Contorted bedding and loading structures are common. Overlain by glaciolacustrine outwash deposits on terraces and in tributary valleys. Soils are silt loam and silty sandy loams of the Mission-Cabinet-Odessa series. CL to ML and SM classes in the Unified Soil Classification. Thickness tens of meters to over hundreds of meters in drill holes of the Selle Lowlands.

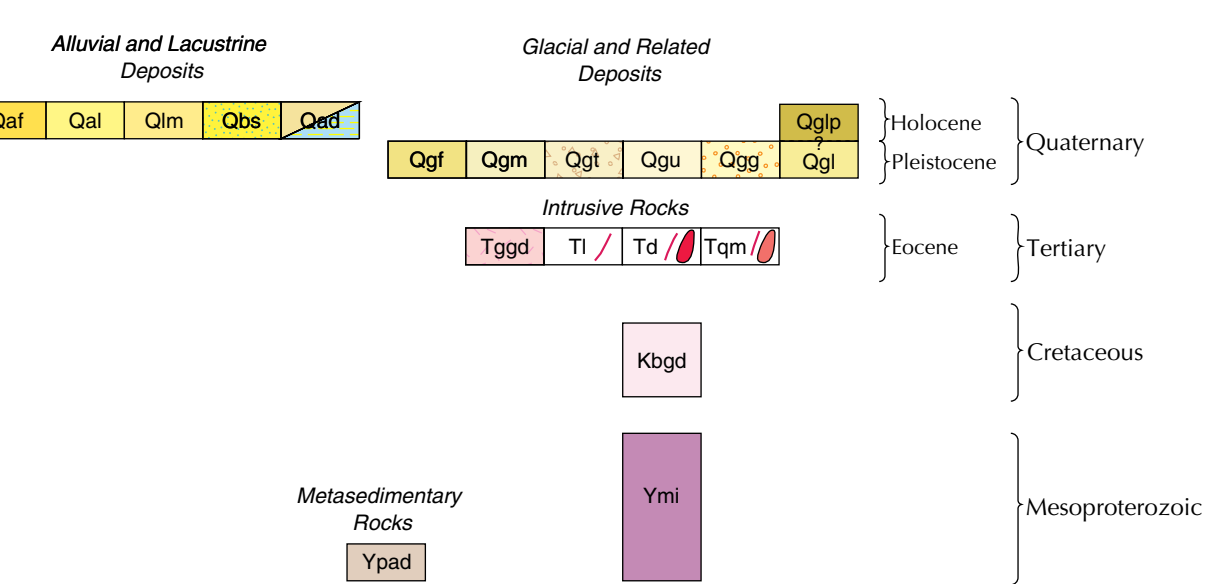
**Glacial deposits, undivided (Pleistocene)**—Mostly loose cobbly silty sand with a silty fine sand matrix; pebble-to boulder-sized gravel; includes deposits of till and associated proglacial outwash and glacial sediments. Occasional large boulders on bedrock and in till. Unstratified to poorly bedded, unsorted to moderately sorted. In tributary drainages and on slopes composed of discontinuous remnants of till and kame terraces, on steeper unstable slopes may take the form of mass movements. May include some interbedded lake sediments. Soils mainly silt loam of the Pend Oreille series. Thickness varies from several to tens of meters.

**Deposits of glacial outwash gravels (Pleistocene)**—Sandy cobble boulder gravel mostly preserved as terrace deposits from alpine valley glaciers in the Pack River valley probably underlies Qgl in the Selle Lowland, includes kame terraces of the Purcell Trench lobe along the east slopes of the Selkirk Mountains. Soils of the Bonner-Kootenai series. SP-SM and ML classes in the Unified Soil Classification. Thickness varies; may exceed 50 m (160 feet).

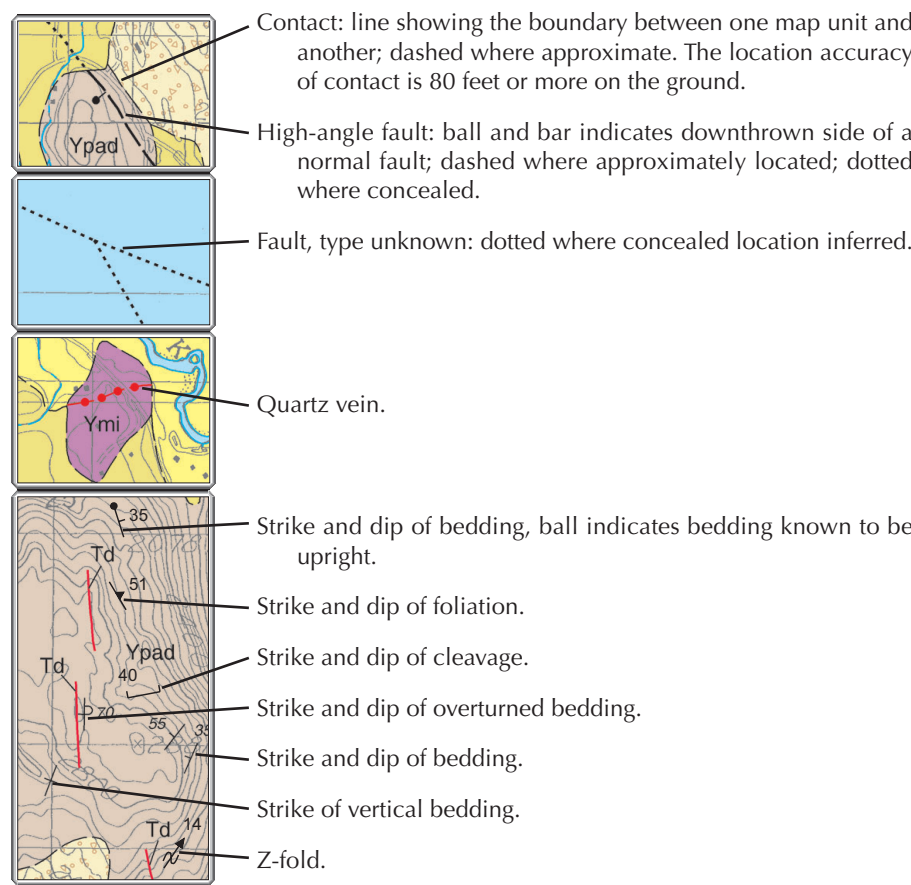
**Till deposits (Pleistocene)**—Dense silt pebble and cobble till with local boulders deposited by the Purcell Trench Lobe of the Cordilleran Ice sheet. Poorly stratified compact basal till includes ground moraine and some interbedded proglacial deposits. In this quadrangle mostly occurs in bedrock depressions and troughs. Soils include silty loams to gravelly silt loams of the Pend Oreille and Vay-Ardoos series. Thickness varies; may exceed 50 m (160 feet).

**Deposits of ground moraine (Pleistocene)**—Silty to sandy boulder till of poorly stratified compact lodgment till includes ground moraine and some interbedded proglacial deposits. Extensive deposit occupies the Selle Lowland and probably underlies Qgl, includes kame terraces along the east slopes of the Selkirk Mountains. Soils include silt loams and gravelly silt loams of the Pend Oreille and Vay-Ardoos series. Thickness varies; may exceed 50 m (160 feet).

## CORRELATION OF MAP UNITS



## SYMBOLS



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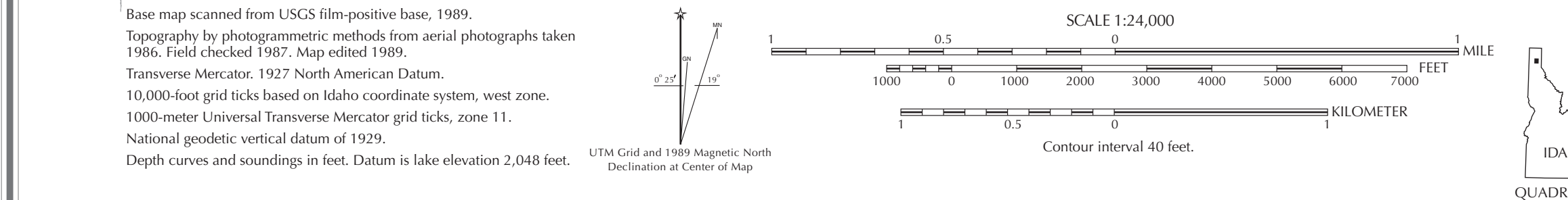
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