SURFICIAL GEOLOGIC MAP OF THE ROCKFORD BAY QUADRANGLE, KOOTENAI COUNTY, IDAHO

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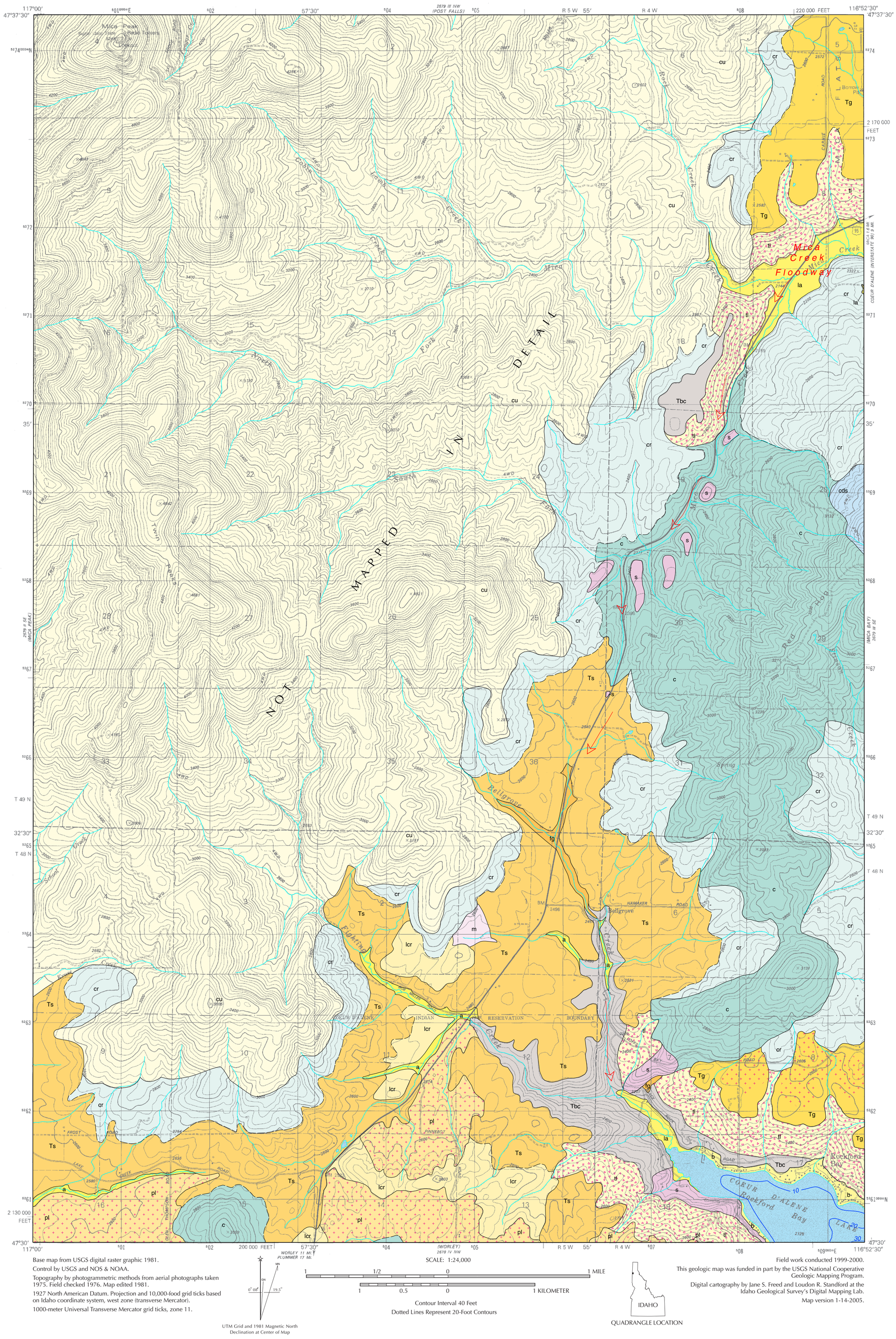
2005



Base map from USGS digital raster graphic 1981.
Control by USGS and NOS & NOAA.
Topography by photogrammetric methods from aerial photographs taken 1975. Field checked 1976. Map edited 1981.
1927 North American Datum. Projection and 10,000-food grid ticks based on Idaho coordinate system, west zone (transverse Mercator).
1000-meter Universal Transverse Mercator grid ticks, zone 11.

UTM Grid and 1981 Magnetic North Declination at Center of Map

SCALE: 1:24,000

1 MILE 1/2 0
1 KILOMETER 1 0.5 0

Contour Interval 40 Feet
Dotted Lines Represent 20-Foot Contours

Field work conducted 1999-2000.
This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.
Digital cartography by Jane S. Freed and Loudon R. Standford at the Idaho Geological Survey's Digital Mapping Lab.
Map version 1-14-2005.

IDAHO
QUADRANGLE LOCATION

INTRODUCTION

This map product addresses the increasing demand for geologic information in urban areas. The area covered by the map is experiencing some of the most rapid growth in Idaho. The geologic mapping was funded in part by STATEMAP, a national cooperative program of the U.S. Geological Survey with the state geological surveys.

The Rockford Bay quadrangle is located on the west side of Coeur d'Alene Lake at the edge of the Columbia Plateau and the Coeur d'Alene Mountains. Elevations range from 2238 feet at average pool of Coeur d'Alene Lake to over 5200 feet at Mica Peak. Lake Coeur d'Alene is dammed by glacial flood gravels at the northern end near the City of Coeur d'Alene and provides substantial subsurface recharge to the Rathdrum aquifer. The lake is fed by the St Joe and Coeur d'Alene river systems and the lake outlet is the source of the Spokane River. Catastrophic outbursts of Ice age floods from Glacial Lake Missoula inundated the present Coeur d'Alene Lake basin to at least 2600 feet in elevation creating floodways between some of the tributary bays. The Mica Creek floodway crosses the Rockford Bay Quadrangle and was scoured by water flowing southward from Mica Bay across a divide and into Rockford Bay. The plateaus west of the lake are underlain by Miocene lavas of the Columbia River Basalt Group. Gneissic rocks of the Precambrian Belt Supergroup and associated intrusive granitic rocks of Cretaceous age form buttes that rise above the plateau lavas and control the flow of basalt into embayments. The eastern margin of the Columbia Plateau is covered by Miocene sediments and soils that are in turn blanketed by Palouse loess. The Palouse Formation becomes progressively thicker toward the west and south.

The map represents the geology of the materials and soils exposed near the earth's surface. The thickness of these deposits varies from a few feet to tens of feet. The map is useful for determining the type and characteristics of the geologic materials found at the surface and in the shallow subsurface by agricultural activities, building excavations, construction material excavations, ditches, and well holes. The information can be used by government, industry, and the public for planning, development, and resource characterization. The map can be used as a guide for site locations but is not intended as a substitute for a detailed, site-specific geotechnical evaluation.

Most users of geologic maps are familiar with traditional lithologic descriptions of bedrock units. Surficial maps show units with more diverse characteristics than rock type or lithology. Most surficial deposits are geologically young, Quaternary in age, and unconsolidated. The Quaternary units are subdivided on the basis of their physical characteristics and the boundaries between them (allostratigraphy). In many places, the boundaries between these units are manifested by morphologic features.

DESCRIPTION OF MAP UNITS

ARTIFICIAL DEPOSITS

m — **Made ground (historical)**—Manmade deposits include disturbed, transported, and emplaced construction materials derived from various local sources. Here includes the Kootenai County Landfill. Many smaller areas of disturbance and fills are too small to be mapped.

ALLUVIAL AND LACUSTRINE DEPOSITS

a — **Alluvium (Holocene)**—Primarily stream and slope wash deposits. Silt interbedded with silty sand, granules, and pebbles. Silt is mostly reworked from Palouse Formation (*pl*). Locally, pebble and cobble gravel of reworked Tertiary gravel (*Ts*) or basalt (*Tcb*) is exposed in channels.

b — **Beach deposits and disturbed slopes (historical-Holocene)**—Natural and manmade deposits include disturbed, transported, and emplaced construction materials derived from various local sources. Many smaller areas of made ground have not been mapped and include berms and fills along the waterfronts and beachfront of Coeur d'Alene Lake. The shore zone is near the contact of two Grande Ronde Basalt units and often includes a weathered flowtop and peperite breccia and pillow basalt. These units are generally slope-forming and attractive for development as much as 75 feet above the water level.

la — **Lacustrine sediments and alluvium (Holocene)**—Silt and sand deposits in Rockford Bay of Coeur d'Alene Lake. The deposits are mainly located within the lake's high-water zones and are interbedded with and grade upstream into alluvium of tributary streams. Soils are deep, poorly drained, and includes muck of the Pywell series and silt loams of the Cald, series (Weisel, 1981).

Ts — **Sediments and lag gravels on relict alluvial surfaces (Tertiary)**—Sandy cobble and pebble gravels consisting of mature rounded quartzites and mixed lithologies derived from the Precambrian Belt Supergroup rocks and Mesozoic-Tertiary intrusives. Matrix of weathered saprolite. Exposed on flat upland surfaces. The unit forms a flat to gently sloping upland surface 2,400-2,600 feet in elevation that is underlain by basalt of the Priest Rapids Member (Wanapum Basalt). The unit grades laterally into thick colluvium or residuum of pre-Tertiary rocks. Soils are silt-loams of the Kruse and Taney series on the uplands and stony loam of the Blinn series where soils thin over basalt. The alluvial deposits are probably graded to high base levels formed when the Miocene plateau basalts blocked and diverted stream drainages (Othberg and Breckenridge, 1998).

Tg — **Lag gravels on relict alluvial surfaces (Tertiary)**—Cobble and pebble gravels consist of mature rounded quartzites and mixed lithologies derived from the Precambrian Belt Supergroup and Mesozoic-Tertiary intrusive rocks . Matrix of weathered saprolite. Exposed on flat upland surfaces. The unit forms a flat to gently sloping upland surface, 400-2,600 feet in elevation that is underlain mostly by basalt of the Priest Rapids Member (Wanapum Basalt). The unit grades laterally into thick colluvium or residuum of pre-Tertiary rocks. The alluvial deposits are probably graded to high base levels formed when the Miocene plateau basalts blocked and diverted stream drainages (Othberg and Breckenridge, 1998).

fg — **Fluvial gravels (Pleistocene and Holocene)**—Sandy gravel and sandy silt in abandoned drainageways of the latest Lake Missoula floods. The Coeur d'Alene Lake basin was inundated by the largest releases from glacial Lake Missoula (Dort, 1960, O'Connor and Baker, 1992) and erosion by flood water was limited. This unit is mostly reworked Miocene sediments and colluvium that were deposited by lower energy floodwaters in slackwater areas. Includes a variable thickness of Holocene alluvium and wetland bog deposits. Thickness up to 10 feet.

EOLIAN DEPOSITS

pl — **Palouse Formation loess (Pleistocene and Holocene)**—Silty and clayey loess remnants that are distal outliers of the Palouse Hills of the eastern Columbia River Plateau. The Palouse Formation overlies a Miocene-Pliocene surface primarily developed on the basalt of the Priest Rapids Member (Wanapum Basalt) and Tertiary alluvial deposits (*Ts*). Shown as a pattern where thin loess mantles Tertiary lag gravels (*Tg*). Soils include the Santa and the Taney series (Weisel, 1981).

lcr — **Loess, colluvium, and residuum (Holocene and late Pleistocene)**—Silt loess and clay remnants and formed on moderately dissected Miocene basalt surface. Soils developed in the thin loess include the Larkin, Setters, Southwick, and Taney series (Weisel, 1981). Subsurface is rich in clay and grades with depth into basalt. Along drainages, basalt may be within a few feet of the surface. Typically borders and grades laterally into areas of thick Palouse loess (*pl*), but may grade into areas of Tertiary sediment aprons adjacent to hills of pre-Tertiary bedrock (*Ts*).

COLLUVIUM AND LANDSLIDE DEPOSITS

tl — **Talus and landslide deposits of Columbia River Basalt Group (Holocene and late Pleistocene)**—Poorly sorted and poorly stratified angular basalt cobbles and boulders mixed with silts and clays. Mass-movement slope deposits mainly associated with steep basalt rimrock and the interbedded sediments. Locally may include basalt columns either from mass movement processes or deposited by Lake Missoula floods. Gradations from talus to smaller landslide deposits are present and difficult to distinguish. Thickness as much as 40 feet.

cr — **Colluvium and residuum (Quaternary and Tertiary)**—Colluvium is composed of angular to subrounded pebble and cobble gravel in a silty sand matrix. Colluvium is up to six feet thick. The coarseness of the gravel and the matrix typically increases with depth as the colluvium grades into Precambrian gneiss, schist, and quartzite on the west side of Coeur d'Alene Lake, and argillite, siltite, and quartzite on the east side of the lake. Residuum is a clayey to silty, sandy saprolite, typically more than 6 feet thick, that grades with depth into bedrock. The residuum is relict from Tertiary weathering of bedrock and is thickest on stable remnant surfaces where it is associated with Tertiary gravel (*Tg*). The unit is predominant on lower, gentler foothill slopes and grades into colluvium and common small rock outcrops (*c*).

c — **Colluvium and common small rock outcrops (Quaternary**)—Colluvium is composed of angular pebble and cobble gravel in a sandy silt matrix that overlies relatively unweathered Precambrian gneiss and arkosic quartzite on the west side of Coeur d'Alene Lake, and argillite, siltite, and quartzite on the east side of the lake. Where slopes are steep the unit may include landslide and debris flow deposits. Thickness of colluvium less than 6 feet.

cds — **Colluvium, debris-flow, and solifluction deposits (Quaternary**)—Colluvium is composed of angular pebble and cobble gravel in a sandy silt matrix that overlies Precambrian gneiss, schist, and quartzite on the west side of Coeur d'Alene Lake, and argillite, siltite, and quartzite on the east side of the lake. Debris flows and solifluction deposits occur on steep, north-facing slopes of higher ridges. Probably periglacial in origin and Pleistocene in age.

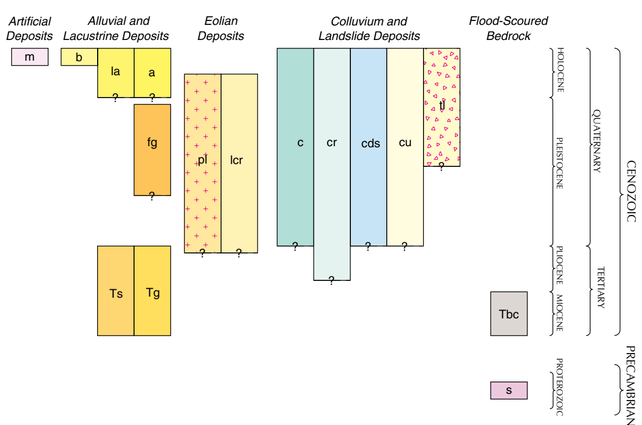
cu — **Colluvium, undivided (Quaternary)**—Colluvium of mixed origin in areas not mapped in detail. Includes debris-flow and solifluction deposits (*cds*) in mountain areas, colluvium and common small rock outcrops (*c*) as well as colluvium and residuum (*cr*).

FLOOD-SCOURED BEDROCK

Tbc — **Basalt scoured by Missoula Floods (Miocene)**—Columbia River Basalt Group. Forms sporadic rimrock along the margins of Rathdrum Prairie and around Coeur d'Alene Lake. Mostly eroded by Pleistocene glaciation and repeated Missoula Floods. The Priest Rapids Member (Wanapum Basalt) and Grande Ronde Basalt are recognized in the area. Shallow surface soils are stony clay loam of the Lacey-Bobbitt association (Weisel, 1981). Locally scattered flood erratics are common. Surface deposits are 2 to 15 feet thick.

s — **Precambrian metamorphic rocks of the Belt Supergroup and granitic Mesozoic intrusive rocks scoured by Missoula Floods (Precambrian and Cretaceous)**.

CORRELATION OF MAP UNITS



SYMBOLS

Contact: dashed where approximately located.

Abandoned channels of Lake Missoula Floods; generally erosional pathways.

40 — Bathymetric contours in meters (Woods and Berenbrock, 1994).

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Published and sold by the Idaho Geological Survey
University of Idaho, Moscow, Idaho 83844-3014