Digital Geologic Map of the Coeur d’Alene 1:100,000 Quadrangle, Idaho and Montana

Digital compilation by Steven R. Munts¹

Open-File Report 00-135
Digital database, version 1.0

Prepared in cooperation with the Idaho Geological Survey

2000

Database approved for publication October 5, 2000

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U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

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Introduction

Between 1961 and 1969, Alan Griggs and others conducted fieldwork to prepare a geologic map of the Spokane 1:250,000 map (Griggs, 1973). Their field observations were posted on paper copies of 15-minute quadrangle maps. In 1999, the USGS contracted with the Idaho Geological Survey to prepare a digital version of the Coeur d’Alene 1:100,000 quadrangle. To facilitate this work, the USGS obtained the field maps prepared by Griggs and others from the USGS Field Records Library in Denver, Colorado. The Idaho Geological Survey (IGS) digitized these maps and used them in their mapping program. The mapping focused on field checks to resolve problems in poorly known areas and in areas of disagreement between adjoining maps. The IGS is currently in the process of preparing a final digital spatial database for the Coeur d’Alene 1:100,000 quadrangle. However, there was immediate need for a digital version of the geologic map of the Coeur d’Alene 1:100,000 quadrangle and the data from the field sheets along with several other sources were assembled to produce this interim product.

This interim product is the digital geologic map of the Coeur d’Alene 1:100,000 quadrangle, Idaho and Montana. It was compiled from the preliminary digital files prepared by the Idaho Geological, and supplemented by data from Griggs (1973) and from digital databases by Bookstrom and others (1999) and Derkey and others (1996). The resulting digital geologic map (GIS) database can be queried in many ways to produce a variety of geologic maps. Digital base map data files (topography, roads, towns, rivers and lakes, etc.) are not included: they may be obtained from a variety of commercial and government sources. This database is not meant to be used or displayed at any scale larger than 1:100,000 (e.g., 1:62,500 or 1:24,000). The digital geologic map graphics and plot files (cda100k.gra/.hp and cda-map.pdf) that are provided in the digital package are representations of the digital database.

The map area is located in north Idaho (Fig. 1). This open-file report describes the geologic map units, the methods used to convert the geologic map data into a digital format, the ArcInfo GIS file structures and relationships, and explains how to download the digital files from the U.S. Geological Survey public access World Wide Web site on the Internet.

Manuscript reviews by Pamela D. Derkey, Thomas P. Frost, and Michael L. Zientek are greatly appreciated. I wish to thank Michael L. Zientek for the map unit descriptions and review of the digital files.

Description of Map Units

Unit descriptions were not included with the field sheets obtained from the USGS Field Records Library. These units’ descriptions were modified from information published by Griggs (1973), Weis (1968), Weissenborn and Weis (1976), and Joseph (1990).

Qal Alluvial silt, sand, and gravel along stream valleys; silt and peat in filled ponds and lakes.
**Qgy** Younger glacial deposits - Glaciofluvial deposits of sand and gravel. Includes morainal till around the southwest end of Pend Oreille Lake.

**Qls** Landslide deposits - Areas of slump along valley walls.

**Qgo** Older glacial deposits - Glaciofluvial and glaciolacustrine deposits of silt, sand, and gravel, usually stratified and well sorted; includes some kame deposits and morainal material along margins of Spokane Valley and Rathdrum Prairie and in their tributary valleys.

**Qp** Palouse Formation-Loess deposits of tan to brown silt and fine sand, includes a number of overlapping soil zones of differing ages, some of which have well-developed clay and caliche layers; mantles the basalt plateau and the lower, gentler slopes of hills and ridges of pre-Tertiary rock that protrude above the top surface of the basalt flows and border the flows on the eastern side.

**QTg** Older gravel deposits - Poorly consolidated gravel, sand, and silt capping terraces and some flat ridge crests or other gently sloping surfaces. Accumulation of some deposits began after outpouring of basalt flows of the Columbia River Group, which dammed stream drainages; some result from blocking of drainage to west by glacial material in Pleistocene time. Deposits all of local origin.

**Tcr** Columbia River Basalt Group and Latah Formation - Flows of dense, dark, tholeiitic basalt, usually from 50 to 150 feet thick, and all essentially flat lying. Pillow-palagonite tuff complexes are present. The interlayered or underlying lacustrine beds of the Latah Formation are included with the basalt and not shown separately are. The Latah Formation consists of poorly-indurated siltstone, claystone, sandstone, and minor conglomerate that are tan to gray in color, thin bedded, and in part laminated.

**TKg** Granitic rocks - Plutons to batholithic complexes that predominantly consist of felsic igneous rocks of quartz monzonitic to granodioritic composition, but including differentiates ranging in composition from diorite to alaskite. Most of rocks are medium-to coarse grained and in large part porphyritic, but also include some sill-like bodies of fine-grained quartz monzonite intruded into the high-grade metamorphic rocks. Some, such as the small pluton south of Wolf Lodge Bay on Coeur d’Alene Lake, have apophyses and dikes of porphyries associated with them.

**Cl** Lakeview Limestone - Light- to dark-gray, thin- to thick-bedded, blocky limestone; includes blocky gray dolomite unit in upper part; contains some silty to sandy layers and zones. Metamorphosed to marble or hornfels adjacent to granitic intrusives.

**Crg** Rennie Shale and Gold Creek Quartzite – Rennie Shale - a fissile olive colored fossiliferous shale, about 100 feet thick; exposed only infrequently and generally poorly so. This units lies conformably between the Gold Creek Quartzite and the overlying Lakeview Limestone and is here mapped with the Gold Creek Quartzite. Gold Creek Quartzite –
White- to pinkish- vitreous, coarse-grained quartzite. Some pebble conglomerate is always present at base. The quartzites are usually thick-bedded and commonly crossbedded; the unit is about 500 feet thick.

**Metamorphosed sedimentary rock of the Belt Supergroup**

**Yl** Libby Formation - Dominantly medium-gray to olive-colored siltite or laminated siltite and argillite. Very thinly laminated dark argillite makes up the lowest part of section. The unit also contains rare chert laminae. Mud-chip breccia and ripple marks are common structural features; mud cracks are rare. It characteristically weathers in a blocky habit. Maximum thickness of eroded remnants is approximately 2,000 feet.

**Ysp** Striped Peak Formation – This formation consists of four distinct sub-units: 1) a basal mixed siltite, argillite, and quartzite member of red and green color overlain successively by 2) a tan dolomitic member, 3) a very thinly laminated dark-gray argillite-siltite member, and capped by 4) a dark-red arkosic quartzite unit (Harrison and Jobin, 1963). The combined thickness of the unit is nearly 2,000 feet and is about equally divided among the four sub-units. Basal unit thickens and overlying units wedge out southward. Mud cracks, ripple marks, and mud-chip breccia are found in red to green-colored rocks; salt casts and channeling are much less common structures. Several stromatolite layers occur in this unit. Micaceous sheen on bedding surfaces is characteristic at most outcrops. The transition into the overlying Libby Formation, and into the underlying upper part of Wallace Formation occurs through fairly narrow zones.

**Ywu** Upper part of Wallace Formation - Very thinly bedded dark-gray argillite or thinly laminated dark-gray argillite and light-gray siltite; a few beds or thin zones of lighter colored siltite are scattered through unit. A carbonate-bearing zone several hundred feet thick occurs near the center or toward the top of the map unit and appears to persist throughout area. It consists of greenish-gray to gray to dark-gray interbedded to interlaminated dolomitic argillite to siltite with some gray dolomite to dolomitic limestone beds, similar to basal unit of the lower part of Wallace. At some places dark-gray argillite, also contains carbonates. At most exposures, rocks are noticeably fissile, and fairly regularly bedded. Thickness is approximately 2,500 to 3,000 feet. The lower contact is gradational.

**Ywl** Lower part of Wallace Formation – This map units contains two distinguishable members, which were not differentiated on map. The upper unit consists predominantly of alternating black argillite and light-gray siltite or quartzite; the latter is usually carbonate bearing. Interspersed in the sequence are layers or zones of rock like that in the Wallace units above and below. The lower unit, green to greenish-gray or gray, usually carbonate-bearing, interbedded or interlaminated argillite and siltite, contains many bluish-gray dolomite and dolomitic limestone beds. Blocky weathering molar-tooth structure, and rusty-tan-weathering are characteristic. Mud cracks (nondesiccate in origin) and ripple marks are common; fine-textured cross bedding is evident on etched surfaces of some siltite and quartzite beds. Irregularity in bedding and
minor folds are characteristic. Thickness is estimated to vary from 5,000 to 7,000 feet; the thinnest section is in and around the Coeur d’Alene district.

**Ysr**  St. Regis Formation - Dark-red, purplish-red, green, or greenish-gray, interbedded or interlaminated, usually very thin- to thin-bedded argillite and siltite. The unit contains some quartzite beds in its basal part and becomes more argillitic toward top. Some carbonate-bearing beds are found in the upper part. Mud cracks, mud-chip breccia, and ripple marks are very common. It is gradational into units above and below. The unit weathers into platy or flaggy fragments.

**Yr**  Revett Formation -Blocky, white to light-gray, thick-bedded, fine- to medium-grained, vitreous quartzite that is somewhat feldspathic. Gray to greenish-gray, thin- to thick-bedded siltite with partings and interbeds of argillite are common in upper and lower parts of the unit; siltite may be dominant rock type over zones tens of feet thick. Cross bedding in vitreous quartzite is common, and a rusty speckling due to weathering of small round carbonate segregations is characteristic in some vitreous beds. The thickness ranges from 2,000 to 3,000 feet. The map unit is transitional over hundreds of feet into units above and below.

**Yrb**  Revett and Burke Formations, undivided – Units are lumped together where individual identity questionable in areas west of south end of Coeur d’Alene Lake.

**Yb**  Burke Formation - Light- to medium-gray to greenish-gray, thin- to thick-bedded siltite with partings and interbeds of argillite. Some light-gray to white quartzite occurs in scattered beds and zones. At some places, mostly peripheral to Coeur d’Alene mining district and in the lower middle part of section, rocks are reddish-purple to lavender in color. Ripple marks are common in places; some cross bedding is present. At many exposures, the rocks have a faded weathered rind that contrasts with darker fresh rock. Fine magnetite octahedral pepper many of siltite beds. It is transitional into formations above and below. The thickness ranges from 2,800 to 4,500 feet; at most places, it is between 3,000 and 3,500 feet.

**YP**  Prichard Formation undivided – The formation was mapped as a single unit in western part of Coeur d’Alene district near Kellogg. The upper transitional zone and argillitic rocks have not been mapped separately from the predominantly siltite to quartzite below in the western part of the Coeur d’Alene district.

**Ypu**  Upper part of Prichard Formation - Dark- to medium- gray, very thin-bedded argillite commonly interlaminated with light-gray siltite and also containing some siltite beds. This sequence grades upward into a interbedded and interzoned argillite, siltite, and quartzite sequence 500 to 1,000+ feet thick, which forms the transition zone into silititic and quartzitic units above. Argillite is rust-stained on weathered surfaces; occasional ripple marks are present in the upper part. Total thickness ranges from 2,500 to 3,500 feet.
**Ypl**  
Lower part of Prichard Formation -Predominantly medium- to light-gray, thin- and regularly bedded siltite, laminated in part; some argillite is present in laminae and beds. Some beds or zones of gray to white quartzite of lenticular habit are present. Disseminated pyrrhotite concentrated within certain laminae is characteristic, and its weathering results in a persistent rusty-red rind on fracture surfaces. Thickness is over 7,500 feet; the base of the unit is not exposed.

**Other Precambrian rock units**

**Yqd**  
Quartz diorite - Dark-green, fine- to coarse- grained, hornblende-plagioclase- (quartz-biotite) diabasic-textured rocks intruded as sills into Prichard Formation. The sills can be as much as 1,000 feet thick; only the larger bodies are shown on the map.

**pCbgh**  
Hauser Lake Gneiss - Rusty-weathering, medium-grained, thinly-layered biotite-orthoclase-plagioclase-quartz gneiss and schist that contains minor quartzite. These rocks are foliated and may show lineated, mylonitic fabrics. Sillimanite is common and widespread. Muscovite-biotite schist layers are less than 1 m thick and quartz-feldspar layers are more than 1 m thick. The gneiss is locally intruded by mafic igneous rocks that now are small bodies of garnet-bearing amphibolite. Abundant felsic dikes and irregular crosscutting bodies with wide range of textures and compositions are present. Griggs (1973) thought the Prichard Formation (Belt Supergroup) was the protolith for the gneiss.

**pCmu**  
Metamorphic rocks, undivided – Tan to light-gray, coarse-grained quartz-feldspar-mica gneiss; tan, pink, gray, brown, medium to fine-grained micaceous and sillimanitic schist; gray, prominently layered gneiss and schist, and quartzite. Individual layers in prominently layered gneiss and schist are generally less than 6 inches thick and include quartzite, feldspathic quartzite, micaceous quartz-feldspar gneiss, granitic rock, amphibolite, and schist. Finer-grained sillimanitic facies rocks generally have less well-developed schistosity and are commonly intricately folded and contorted on all scales. Intricate folding and contortion on larger-scale is widespread in coarser-grained rocks. Granitic and pegmatitic lenses, pods, and irregular crosscutting bodies are locally abundant. Amphibolite layers and small, irregular amphibolite bodies present in several places. Griggs (1973) thought the Prichard Formation (Belt Supergroup) was the protolith for the gneiss.

**pCmuq**  
Quartzite - Medium to coarse-grained, in part vitreous, but mostly micaceous; in zones to hundreds of feet thick with some interlayered, more micaceous rock. Shown separately only in the more highly metamorphosed rocks.

**Data Sources, Processing, and Accuracy**

The Idaho Geological Survey (IGS) digitized original paper copy field maps prepared by Allan B. Griggs, between 1961 and 1969, for the Athol, Coeur d’Alene, Kellogg, Kingston, Lakeview, Lane, and Spirit Lake 15-minute quadrangles. The preliminary
digital files for each quadrangle (not including point data) were given to the U.S. Geological Survey (USGS) in 1999. Robert J. Miller (USGS) first merged the files for each quadrangle into single topological ArcInfo datasets and then edge matched the individual quadrangle files together to create a single dataset containing all of the IGS-provided digital geologic data (contacts, faults, and map units). Steven R. Munts (contractor) digitized geology from Griggs (1973) to fill in the northeastern part of the quadrangle not covered by Griggs’ unpublished field maps. Digital geology (the contact between Quaternary sediments and older bedrock) from Bookstrom and others (1999) and digital geology from Derkey and others (1996) was inserted to complete the compilation. Munts also adjusted the Qal unit contacts to fit 1:100,000 topography. The digital files were then augmented with an interim geologic map data model (data base), further attributed and edited, and then plotted and compared to the original field geologic maps to check for digitizing and attributing errors. All processing by the U.S. Geological Survey was done in Arc/Info versions 7.2.1 and 8 installed on a Sun Ultra workstation.

The overall accuracy (with respect to the location of lines and points) of the digital geologic map (see Figs. 2 and 3 for page-size versions) is probably no better than +/- 13 meters. This digital database is not meant to be used or displayed at any scale larger than 1:100,000 (e.g., 1:62,500 or 1:24,000).
Figure 1. Index map showing the geographic extent of the mapped area (black fill) and the Coeur d’Alene quadrangle with respect to the Pacific Northwest.
Figure 2. Explanation for the Simplified Digital Geologic Map of the Coeur d’Alene 1:100,000 quadrangle, Idaho and Montana
Figure 3. Simplified Digital Geologic Map of the Coeur d’Alene 1:100,000 quadrangle, Idaho and Montana
GIS Documentation

The digital geologic map of the Coeur d’Alene 1:100,000 quadrangle includes a geologic linework arc attribute table, CDA100K.AAT, that relates to the CDA100K.CON, CDA100K.ST2 and CDA100K.REF files; a rock unit polygon attribute table, CDA100K.PAT, that relates to the CDA100K.RU and CDA100K.REF files; and a geologic map symbol point attribute table, CDA100KP.PAT, that relates to the CDA100KP.SYM and CDA100KP.REF files (see Fig. 4). These data files are described below.

Linear Features

Descriptions of the items identifying linear features such as contacts, boundaries (e.g., lines of latitude and longitude, state boundaries) and structures in the arc (or line) attribute table, CDA100K.AAT, are as follows:

<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>ITEM TYPE</th>
<th>ITEM LENGTH</th>
<th>ATTRIBUTE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>linecode</td>
<td>integer</td>
<td>3</td>
<td>Numeric code used to identify type of linear feature. Linecodes &lt; 100 are used for contacts and boundaries which are described in the CDA100K.CON file. Linecodes &gt; 100 and &lt; 600 represent structural features which are described in the CDA100K.ST2 file.</td>
</tr>
<tr>
<td>name</td>
<td>character</td>
<td>30</td>
<td>Name given to structural feature.</td>
</tr>
<tr>
<td>source</td>
<td>integer</td>
<td>4</td>
<td>Numeric code used to identify the data source for the linear feature. Complete references for the sources are listed in the CDA100K.REF file.</td>
</tr>
</tbody>
</table>
Arc attribute table and related look-up tables:

- **cda100k.aat**
  - linecode
  - name
  - source

- **cda100k.con**
  - linecode
  - symbol
  - type
  - modifier
  - certainty
  - desc

- **cda100k.st2**
  - linecode
  - symbol
  - type
  - horizontal
  - vertical
  - fold
  - plunge
  - accuracy
  - certainty
  - desc

- **cda100k.ref**
  - source
  - scale
  - authors
  - year
  - reference

Polygon attribute table and related look-up tables:

- **cda100k.pat**
  - unit
  - source
  - label
  - desc

- **cda100k.ru**
  - label
  - symbol
  - name
  - ss
  - lith
  - desc
  - minage
  - maxage

Point attribute table and related look-up tables:

- **cda100kp.pat**
  - pttype
  - symbol
  - strike
  - dip
  - calcang
  - sym$ang
  - source

- **cda100kp.sym**
  - pttype
  - symbol
  - desc

- **cda100kp.ref**
  - source
  - scale
  - authors
  - year
  - reference

Figure 4: Relationships between feature attribute tables and look-up tables.
Attribute descriptions for items in the contact (and boundary) look-table, CDA100K.CON [for use with the CARTO.LIN and GEOL_SFO.LIN linesets], are as follows:

<table>
<thead>
<tr>
<th>CDA100K.CON</th>
<th>ITEM NAME</th>
<th>ITEM TYPE</th>
<th>ITEM LENGTH</th>
<th>ATTRIBUTE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>linecode</td>
<td>integer</td>
<td>3</td>
<td></td>
<td>Numeric code (a value &lt; 100) used to identify type of contact or boundary. (This item also occurs in CDA100K.AAT.)</td>
</tr>
<tr>
<td>symbol</td>
<td>integer</td>
<td>3</td>
<td></td>
<td>Line symbol number used by Arc/Info to plot line. Symbol numbers refer to the CARTO.LIN lineset for linecodes gt 42 and lt 100 and to the GEOL_SFO.LIN lineset for linecodes gt 0 and lt 43.</td>
</tr>
<tr>
<td>type</td>
<td>character</td>
<td>10</td>
<td></td>
<td>Major type of line, e.g., contact, state boundaries, lines of latitude and longitude used for neatlines.</td>
</tr>
<tr>
<td>modifier</td>
<td>character</td>
<td>20</td>
<td></td>
<td>Line type modifier, i.e., approximate, concealed, gradational. No entry implies ‘known.’</td>
</tr>
<tr>
<td>certainty</td>
<td>character</td>
<td>15</td>
<td></td>
<td>Degree of certainty of contact or boundary, i.e., inferred, uncertain. No entry implies ‘certain.’</td>
</tr>
<tr>
<td>desc</td>
<td>character</td>
<td>100</td>
<td></td>
<td>Written description or explanation of contact or boundary.</td>
</tr>
</tbody>
</table>

Attribute descriptions for items in the structure look-up table, CDA100K.ST2 [for use with the GEOL_SFO.LIN lineset], are as follows:

<table>
<thead>
<tr>
<th>CDA100K.ST2</th>
<th>ITEM NAME</th>
<th>ITEM TYPE</th>
<th>ITEM LENGTH</th>
<th>ATTRIBUTE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>linecode</td>
<td>integer</td>
<td>3</td>
<td></td>
<td>Numeric code (a value &gt; 100 and &lt; 600) used to identify type of structural feature. (This item also occurs in CDA100K.AAT.)</td>
</tr>
<tr>
<td>symbol</td>
<td>integer</td>
<td>3</td>
<td></td>
<td>Line symbol number used by Arc/Info to plot arc (line). Symbol numbers refer to the GEOL_SFO.LIN lineset.</td>
</tr>
<tr>
<td>type</td>
<td>character</td>
<td>10</td>
<td></td>
<td>Major type of structure, i.e., fault, fracture, fold, other.</td>
</tr>
<tr>
<td>horizontal</td>
<td>character</td>
<td>20</td>
<td></td>
<td>Type of horizontal fault movement, e.g., left-lateral, right-lateral. No entry implies ‘unknown.’</td>
</tr>
<tr>
<td>vertical</td>
<td>character</td>
<td>20</td>
<td></td>
<td>Type of vertical fault movement, e.g., normal. No entry implies ‘unknown.’</td>
</tr>
<tr>
<td>fold</td>
<td>character</td>
<td>15</td>
<td></td>
<td>Type of fold, e.g., anticline, syncline.</td>
</tr>
<tr>
<td>plunge</td>
<td>character</td>
<td>15</td>
<td></td>
<td>Type of plunge on fold, i.e., horizontal, plunging, plunging in, plunging out.</td>
</tr>
<tr>
<td>accuracy</td>
<td>character</td>
<td>15</td>
<td></td>
<td>Line type modifier indicating degree of accuracy, i.e., approximately located, concealed, gradational. No entry implies ‘known.’</td>
</tr>
<tr>
<td>certainty</td>
<td>character</td>
<td>15</td>
<td></td>
<td>Degree of certainty of contact or boundary, i.e., inferred, uncertain. No entry implies ‘certain.’</td>
</tr>
<tr>
<td>desc</td>
<td>character</td>
<td>100</td>
<td></td>
<td>Written description or explanation of structural feature.</td>
</tr>
</tbody>
</table>
### Areal Features

Descriptions of the items identifying geologic units in the polygon attribute table, CDA100K.PAT, are as follows:

<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>ITEM TYPE</th>
<th>ITEM LENGTH</th>
<th>ATTRIBUTE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>unit</td>
<td>integer</td>
<td>4</td>
<td>Numeric code used to identify the rock unit which is described in the CDA100K.RU look-up table. (This item also occurs in CDA100K.RU.)</td>
</tr>
<tr>
<td>source</td>
<td>integer</td>
<td>4</td>
<td>Numeric code used to identify the data source for the rock unit. Complete references for the sources are listed in the CDA100K.REF file.</td>
</tr>
<tr>
<td>label</td>
<td>character</td>
<td>10</td>
<td>Rock unit label (abbreviation) used to label unit on map.</td>
</tr>
<tr>
<td>desc</td>
<td>character</td>
<td>250</td>
<td>Formal or informal unit name.</td>
</tr>
</tbody>
</table>

Attribute descriptions for items in the lithology (rock unit) look-table, CDA100K.RU (for use with the CALCOMP1.SHD shadeset), are as follows:

<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>ITEM TYPE</th>
<th>ITEM LENGTH</th>
<th>ATTRIBUTE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>unit</td>
<td>integer</td>
<td>4</td>
<td>Numeric code used to identify rock unit. (This item also occurs in CDA100K.PAT.)</td>
</tr>
<tr>
<td>label</td>
<td>character</td>
<td>10</td>
<td>Rock unit label (abbreviation) used to label unit on map.</td>
</tr>
<tr>
<td>symbol</td>
<td>integer</td>
<td>3</td>
<td>Shadeset symbol number used by Arc/Info to plot a filled/shaded polygon. The symbol numbers used in this file refer to the CALCOMP1.SHD shadeset.</td>
</tr>
<tr>
<td>name</td>
<td>character</td>
<td>7</td>
<td>The prefix portion of the rock unit label that does not include subscripts. (If subscripting is not used in the original unit label, then the ‘name’ entry is the same as the ‘label’ entry.)</td>
</tr>
<tr>
<td>ss</td>
<td>character</td>
<td>3</td>
<td>The suffix portion of the geologic unit label that includes subscripts.</td>
</tr>
<tr>
<td>lith</td>
<td>character</td>
<td>20</td>
<td>Major type of lithostratigraphic unit, i.e., unconsolidated sediments, sedimentary rocks, metasedimentary rocks, intrusive rocks, extrusive rocks, metamorphic rocks, water, ice.</td>
</tr>
<tr>
<td>desc</td>
<td>character</td>
<td>250</td>
<td>Formal or informal unit name</td>
</tr>
<tr>
<td>minage</td>
<td>character</td>
<td>7</td>
<td>Minimum stratigraphic age of lithologic unit, i.e., CRET, TERT, PCY.</td>
</tr>
<tr>
<td>maxage</td>
<td>character</td>
<td>7</td>
<td>Maximum stratigraphic age of lithologic unit</td>
</tr>
</tbody>
</table>
**Point Features**

Descriptions of the items identifying geologic map symbols are given in the point attribute table, CDA100KP.PAT, which is defined as follows:

<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>ITEM TYPE</th>
<th>ITEM LENGTH</th>
<th>ATTRIBUTE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>pttype</td>
<td>character</td>
<td>32</td>
<td>Type of point symbol, e.g., strike and dip of inclined bedding, strike and dip of inclined cleavage, geochemical sample location. (This item also occurs in the CDA100KP.SYM file.)</td>
</tr>
<tr>
<td>symbol</td>
<td>integer</td>
<td>3</td>
<td>Marker symbol number used by Arc/Info to identify type of geologic map symbol. Symbol numbers refer to the <strong>GEOSCAMP2.MRK markerset</strong> (Matti and others, 1997). (This item also occurs in the CDA100KP.SYM file.)</td>
</tr>
<tr>
<td>strike</td>
<td>integer</td>
<td>3</td>
<td>Strike of bedding, foliation or cleavage. Strike is an azimuthal angle (measured in degrees from 0 to 360 in a clockwise direction from North).</td>
</tr>
<tr>
<td>dip</td>
<td>integer</td>
<td>3</td>
<td>Dip of bedding, foliation or cleavage. This value is an angle measured (in degrees from 0 to 90) down from the horizontal; thus a horizontal dip is 0 degrees and a vertical dip is 90 degrees.</td>
</tr>
<tr>
<td>calcang</td>
<td>integer</td>
<td>4</td>
<td>An interim value used to calculate sym$ang. The various structural map symbols in the GEOSCAMP2.MRK markerset (Matti and others, 1997) had to be rotated by different amounts to achieve their proper map orientation. For the strike and dip symbols, calcang = strike – 270.</td>
</tr>
<tr>
<td>sym$ang</td>
<td>integer</td>
<td>4</td>
<td>The angle used to complete the mathematical rotation of the structural map symbol to its proper orientation on the map. This value is the $angle pseudoitem value for the point.</td>
</tr>
<tr>
<td>source</td>
<td>integer</td>
<td>4</td>
<td>Numeric code used to identify the data source for the structural map symbol. Complete references for the sources are listed in the CDA100KP.REF file.</td>
</tr>
</tbody>
</table>
Attribute descriptions for items in the geologic map symbols look-up table, CDA100KP.SYM, [for use with the GEOSCAMP2.MRK markerset (Matti and others, 1997)], are as follows:

<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>ITEM TYPE</th>
<th>ITEM LENGTH</th>
<th>ATTRIBUTE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>pttype</td>
<td>character</td>
<td>32</td>
<td>Type of point symbol, e.g., strike and dip of inclined bedding, strike and dip of inclined cleavage. (This item also occurs in the CDA100KP.PAT file.)</td>
</tr>
<tr>
<td>symbol</td>
<td>integer</td>
<td>3</td>
<td>Marker symbol number used by Arc/Info to identify type of structural map symbol. Symbol numbers refer to the GEOSCAMP2.MRK markerset (Matti and others, 1997).</td>
</tr>
<tr>
<td>desc</td>
<td>character</td>
<td>250</td>
<td>Written description or explanation of map symbol.</td>
</tr>
</tbody>
</table>

**Source Attributes**

Descriptive source or reference information for the CDA100K and CDA100KP ArcInfo datasets is stored in the CDA100K.REF and CDA100KP.REF files, respectively. Attribute descriptions for items in the CDA100K.REF and CDA100KP.REF data source files are as follows:

<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>ITEM TYPE</th>
<th>ITEM LENGTH</th>
<th>ATTRIBUTE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>source</td>
<td>integer</td>
<td>4</td>
<td>Numeric code used to identify the data source. (This item also occurs in the CDA100K.AAT, CDA100K.PAT, and CDA100KP.PAT files.)</td>
</tr>
<tr>
<td>scale</td>
<td>integer</td>
<td>8</td>
<td>Scale of source map. (This value is the denominator of the proportional fraction that identifies the scale of the map that was digitized or scanned to produce the digital map.)</td>
</tr>
<tr>
<td>authors</td>
<td>character</td>
<td>200</td>
<td>Author(s) or compiler(s) of source map entered as last name, first name or initial, and middle initial.</td>
</tr>
<tr>
<td>year</td>
<td>integer</td>
<td>4</td>
<td>Source (map) publication date</td>
</tr>
<tr>
<td>reference</td>
<td>character</td>
<td>250</td>
<td>Remainder of reference in USGS reference format.</td>
</tr>
</tbody>
</table>
Obtaining Digital Data

The complete digital version of the geologic map is available in Arc/Info interchange format with associated data files. These data and map images are maintained in a Universal Transverse Mercator (UTM) map projection:

- **Projection:** UTM
- **Zone:** 11
- **Y-offset (false northing):** -5,000,000 meters
- **Units:** meters

To obtain copies of the digital data:


The Internet site contains the digital geologic map of the Coeur d’Alene 1:100,000 quadrangle both in ArcInfo exchange-format files (cda100k.e00 and cda100kp.e00) and as a HPGL2 plot file (cda100k.hp) of the map area, as well as the associated data files and Arc/Info macro programs which are used to plot the map at a scale of 1:100,000.

To manipulate this data in a geographic information system (GIS), you must have a GIS that is capable of reading Arc/Info interchange-format files.

Obtaining Paper Maps

Paper copies of the digital geologic map are not available from the USGS. However, with access to the Internet and access to a large-format color plotter that can interpret either HPGL2 (Hewlett-Packard Graphics Language), or PDF (portable document format) files, a 1:100,000-scale paper copy of the map can be made, as follows:


This file can be plotted by any large-format color plotter that can interpret HPGL2 or PDF files. The finished plot is about 30 inches by 42 inches.

Paper copies of the map can also be created by obtaining the digital file as described above and then creating a plot file in a GIS.
References Cited


Appendix A - List of digital files in the Coeur d’Alene GIS

-- Use the ‘importfile.aml’ to IMPORT all of the *.E00 files for use in ArcInfo.
-- Use the ArcInfo ‘DRAW’ command to plot the *.GRA file to your screen. (Make sure the display is set with the ArcInfo ‘DISPLAY’ command.)
-- Use the ArcInfo ‘HPGL2’ command to create a HPGL2 file from the *.GRA file.
-- Use the UNIX ‘lpr -P<plotter_name> cda100k.hp’ command to send the cda100k.hp file to a large-format color plotter that can interpret Hewlett-Packard Graphics Language.
-- To re-create the *.GRA file, open the ArcPlot module, enter ‘display 1040’, enter a new filename for the graphics file, enter ‘&run cda100k’.

Primary ArcInfo exchange-format (*.e00) and metadata (*.met) files for the digital geology:
- cda100k.e00 – line and poly GIS
- cda100kp.e00 – point GIS
- cda100k.met - metadata

Arc/Info graphics (*.gra), HPGL2 map plot (*.hp), and portable document format (*.pdf) files for the geologic map sheet:
- cda100k.gra / .hp
- cda-map.pdf

Additional ArcInfo exchange-format files (*.e00) necessary to re-create the geologic map sheet:
- calcomp1.shd.e00 - shadeset
- cdabu11.e00 - exterior boundary of the Coeur d’Alene quadrangle
- fnt037.e00 – font 37
- fnt038.e00 – font 38
- fnt040.e00 – font 40
- geoscamp2.mrk.e00 - markerset
- hypsog.e00 - hypsography
AML, graphics, key, symbolset (*.lin), and text files (*.dat, *.prj, *.txt) necessary to re-create the geologic map sheet:
- cda100k.aml – program that creates a graphics file of the geologic map of the Coeur d’Alene quadrangle
- importfile.aml – program to import ArcInfo exchange-format (*.e00) files
- scale2a.aml – program to plot scale bar
- cdasourc.gra – map of data sources and 15-minute quadrangle outlines graphic file
- indexcda.gra - index map graphic file
- usgslogo.gra – USGS visual identity
- cda_line.key - lineset symbol values and descriptive text for lines on the map sheet
- cda_poly.key - shadeset symbol values and descriptive text for geologic map units on the map sheet
- cda_sym.key - markerset symbol values and descriptive text for map symbols (markers) on the map sheet
- geology.lin – lineset
- geol_sfo.lin – lineset
- cal.dat – plotter calibration data file
- geo.prj - a text file used to identify real-world (geographic) coordinates - for use in adding latitude and longitude notation around the margins of the map quadrangle
- u11.prj - a text file to identify UTM, zone 11 map projection - for use in adding latitude and longitude notation around the margins of the map quadrangle
- cdacrd.txt - text file listing map credits
- cdaref.txt - text file listing map references
Appendix B - ArcInfo Macro Language program (cda100k.aml) used to plot the geologic map of the Coeur d’Alene quadrangle

/*  cda100k.aml, 11/28/00, SRM
/*  This Arc/Info Macro Language (AML) program will plot the geologic map plate for the Coeur d'Alene quadrangle at 1:100,000 scale.
/*  To run this AML:
/*     1. Type 'ap' at the 'Arc:' prompt to enter the ArcPlot module,
/*     2. Type 'display 1040' at the 'Arcplot:' prompt to create a GRA file,
/*     3. Enter a filename of your own choosing (such as cda100k) at the 'Enter ARC/INFO Graphics filename :' prompt for the GRA to be created,
/*     4. Type '&run cda100k' at the 'ArcPlot:' prompt to start the program,
/*     5. Run the Arc/Info HPGL2 command to convert the GRA file to an HPGL2 file, i.e., hpgl2 cda100k cda100k.hp # 1.0 opaque # 0 # # # cal.dat
/*     6. Execute the UNIX 'lpr' command to print the 1:100,000-scale geologic map plot on your plotter, i.e., lpr -Ppicasso cda100k.hp
/*  **********************************************************

clear
clearselect

pagesize 40.5 29.0
pageunits inches
mapunits meters
mapscale 100000

maplimits 0.25 2.4 32 27

&set quad cdbabu11
&set cover cda100k
&sv logo = usgslogo.gra

/* hypsog is hypsography coverage
&set cover11 hypsog
&set pntcover cda100kp
/* where cda100kp uses symbols from geoscamp2.mrk
/* where cda_sym.key uses geoscamp2.mrk symbols
&s credits cdacrd.txt
&s refs cdaref.txt
&s disclaimer cdadisc.txt

/* where 'cover' contains contacts, structures and dikes;
/* 'pntcover' contains structural symbols for bedding and foliations;
/* and 'quad' is the quadrangle boundary.

mape %quad%

/*draw outside box
linesymbol 9
linecolor 1
box 0.5 0.5 40.0 28.5
textquality proportional
textfont 94021
line delete all
lineset plotter
lineset carto

/* cut marks
markerset plotter
markersymbol 1
markersize 0.1
marker 0 0
marker 0 29
marker 40.5 0
marker 40.5 29
&label shadepolys
/* color polygons for geologic rock units
shadedelete all
shadeset calcmap1
mapangle -0.3
polygonshade %cover% unit %cover%.

&goto contacts
/* remove the above line of code if contour lines are to be added
/* to the map.
Appendix B

&label hypso
/* (contours)
linedelete all
lineset color.lin
linecolor 14
asel %cover11% arcs
arcs %cover11%
linedelete all

&label contacts
/* plot contacts
linedelete all
lineset geol_sfo.lin
asel %cover% arcs
res %cover% arcs linecode gt 0 and linecode lt
42
arclines %cover% linecode %cover%.con
/*arcs %cover%
asel %cover% arcs

&label structures
/* plot structures with line patterns
linedelete all
lineset geol_sfo.lin
asel %cover% arcs
res %cover% arcs linecode gt 100 and linecode lt
800
arclines %cover% linecode %cover%.st2
asel %cover% arcs

&label mapquad
/* plot quadrangle boundary
linedelete all
lineset plotter
linesymbol 5
arcs %quad%

&label geolabels
textsize 0.10
res %cover% poly area gt 300000
labeltext %cover% unit %cover%.ru cc
asel %cover% poly
/*label Qls unit
resel %cover% poly unit = 759
labeltext %cover% unit %cover%.ru cc
asel %cover% poly

&label points
/* plot points for map symbols
markerdelete all
markerset geoscamp2.mrk
pointmarkers %pntcover% symbol

&label anno
/* plot annotation for all points
textset font.txt
/* annotext cover subclass # {level...level}
annotext %pntcover% dip # 1 2

&label titles
plot %logo% box 1.7 26.9 4.7 27.9
textfont 93715
textquality kern
textsize 0.35
move 4.8 27.55
text 'U.S. DEPARTMENT OF THE INTERIOR'
move 4.8 27.05
text 'U.S. GEOLOGICAL SURVEY'
move 39.3 27.55
text 'Open-File Report 00-135' lr
move 39.3 27.05
text 'Database, version 1.0, (Sheet 1)' lr
move 17.85 27.55
text 'Prepared in cooperation with the Idaho Geological Survey'
textfont 93711
textsize 0.4
move 16.65 2.75
text 'Digital Geologic Map of the Coeur d''Alene 1:100,000 Quadrangle, Idaho and Montana' lc
textsize 0.3
move 16.9 2.1
text 'Digital compilation by Steven R. Munts' lc
move 17 1.45
text '2000' lc

&label explan
/* plot explanation - geologic units
shadedelete all
shadeset calcomp1
textfont 93711
textsize 0.20
move 33.25 25.7
text 'Explanation'
textquality proportional
textfont 94021
/*keyarea 33.25 17.5 41.4 25.45
Keyarea 33.25 18.9 41.4 25.45
/*keybox 0.6 0.35
keybox 0.5 0.25
keyseparation 0.2 0.2
keyshade %key1%

&label linekey
/* plot explanation - line key
Appendix B

linedelete all
lineset geol_sfo.lin
keyarea 33.20 11.2 41.4 18.7
keybox 0.8 0.0
keyline %key2% nobox
linedelete all
&label strikedip
/*plot explanation - symbol key
textsize 0.12
textquality proportional
textfont 94021
markerdelete all
markerset geoscamp2.mrk
keyarea 33.20 10 42.4 14.5
keybox 0.8 0.0
keymarker %key4% nobox
markerdelete all
textsize 0.10
textquality proportional
move 33.6 14.0
text '10'

/* plots combined topo index and source map
&label topoindex
plot cdasourc.gra box 33.2 9.4 39.4 13.9
textfont 93713
textquality proportional
textsize 0.12
move 33.4 9.3
text 'Index map showing geology data sources and 15-minute quadrangle names within the'
move 35.6 9.1
text 'Coeur d'Alene 1:100,000 quadrangle.' lc

&label index-map
plot indexcda.gra box 34.77 7.2 36.8 8.67
textfont 93713
textquality proportional
textsize 0.12
move 35.6 7
text 'Index map showing Coeur d''Alene 1:100,000 quadrangle.' lc

&label refs
/* plot references
textfont 93711
textsize 0.20
textcolor 1
move 33.55 6.4
text 'References'
move 33.85 6.3
textsize 0.12

textquality proportional
textfont 94021

textfile %refs%
&label disclaimer
textfont 93713
textquality proportional
textsize 0.12
move 34.12 3.6
textfile %disclaimer%
&label scalebar
/* plot scale bars
linedelete all
lineset plotter
textsize 0.12
move 33.55 6.4
text 'Database approved for publication Oct. 5, 2000'

&label proj
/* plot map projection notes
textfont 94021
textquality proportional
textsize 0.12
move 1.75 3.7
text 'Map Projection: UTM, zone 11, NAD27'

&label lat-long
/* plot neat line labels (latitude and longitude)
mape %quad%
linecolor 1
mapprojection geo.prj u11.prj
neatline -117 47.5 -116 48 geo.prj
neatlinehatch 0.125 0.125 0.2 0 geo.prj
textset font.txt
textsymbol 1
textsize 8 pt
textstyle typeset
textoffset -0.30 0.15
neatlinelabels 0.125 top all geo.prj dms
"%1%!pat1857; %2%!pat1727; %3%!pat1728" textoffset -0.65 -0.042
neatlinelabels 0.125 left all geo.prj dms
'\%1\%!pat1857; \%2\%!pat1727; \%3\%!pat1728'  
textoffset 0.15 -0.042  
neatlinelabels 0.125 right all geo.prj dms
'\%1\%!pat1857; \%2\%!pat1727; \%3\%!pat1728'

&label done
quit
display 9999 3
draw cda100k

&return
Appendix C - Metadata file (cda100k.met) for the Coeur d’Alene GIS

Identification Information:
Citation:
Citation Information:
Originator: Steven R. Munts
Publication Date: 2000
Title: Digital geologic map of the Coeur d'Alene 1:100,000 quadrangle, Idaho and Montana
Edition: Version 1.0
Geospatial Data Presentation Form: map
Series Information:
Series Name: Open-File Report
Issue Identification: OF00-135
Publication Information:
Publication Place: Menlo Park, CA
Publisher: U. S. Geological Survey
Online Linkage: URL = http://geopubs.wr.usgs.gov/open-file/of00-135/

Description:

Abstract:

The digital geologic map of the Coeur d'Alene 1:100,000 quadrangle was compiled from preliminary digital datasets [Athol, Coeur d'Alene, Kellogg, Kingston, Lakeview, Lane, and Spirit Lake 15-minute quadrangles] prepared by the Idaho Geological Survey from A. B. Griggs (unpublished field maps), supplemented by Griggs (1973) and by digital data from Bookstrom and others (1999) and Derkey and others (1996). The digital geologic map database can be queried in many ways to produce a variety of derivative geologic maps.

Purpose:

This dataset was developed to provide geologic map GIS of the Coeur d'Alene 1:100,000 quadrangle for use in future spatial analysis by a variety of users. These data can be printed in a variety of ways to display various geologic features or used for digital analysis and modeling. This database is not meant to be used or displayed at any scale larger than 1:100,000 (e.g. 1:62,500 or 1:24,000).

Supplemental Information:
This GIS consists of two major Arc/Info datasets: one line and polygon file (cda100k) containing geologic contacts and structures (lines) and geologic map rock units (polygons), and one point file (cda100kp) containing structural data.

Time_Period_of_Content:
Time_Period Information:
Single_Date/Time:
  Calendar_Date: 2000
Currentness Reference: Publication date
Status:
Progress: complete

Maintenance and Update Frequency:
No USGS updates planned; however, the Idaho Geological Survey plans to update the geologic map content within the next few years.

Spatial Domain:
Bounding Coordinates:
West_BoundingCoordinate: -117.00
East_BoundingCoordinate: -116.00
North_BoundingCoordinate: 48.00
South_BoundingCoordinate: 47.50

Keywords:
Theme:
Theme.Keyword_Thesaurus: none
Theme.Keyword: geology
Place:
Place.Keyword_Thesaurus: none
Place.Keyword: Idaho
Place.Keyword: Athol
Place.Keyword: Coeur d'Alene
Place.Keyword: Kellogg
Place.Keyword: Kingston
Place.Keyword: Lakeview
Place.Keyword: Lane
Place.Keyword: Spirit Lake
Place.Keyword: Spokane
Place.Keyword: Bonner County
Place.Keyword: Kootenai County
Place.Keyword: Shoshone County
Place.Keyword: Pacific Northwest
Place.Keyword: USA

Access Constraints: none

Use Constraints:
This digital database is not meant to be used or displayed at any scale larger than 1:100,000 (e.g. 1:62,500).

Any hardcopies utilizing these data sets shall clearly indicate their source. If the user has modified the data in any way they are obligated to describe the types of modifications they have performed on the hardcopy map. User specifically agrees not to misrepresent these data sets, nor to imply that changes they made were approved by the US Geological Survey.

Point of Contact:
Contact Information:
Contact_Person_Primary:
  Contact_Person: Pamela D. Derkey
  Contact_Organization: U.S. Geological Survey
  Contact_Position: geologist
Contact_Address:
Address_Type: mailing and physical address
Address: 904 W. Riverside Ave., Rm. 202
City: Spokane
State_or_Province: WA
Postal_Code: 99201
Country: USA
Contact_Voice_Telephone: 1-509-368-3114
Contact_Facsimile_Telephone: 1-509-368-3199
Contact_Electronic_Mail_Address: pderkey@usgs.gov

Data_Set_Credit:
Between 1961 and 1969, Alan Griggs and others conducted field work to prepare a geologic map of the Spokane 1:250,000 map (Griggs, 1973). Their field observations were posted on paper copies of 15-minute quadrangle maps. In 1999, the USGS contracted with the Idaho Geological Survey to prepare a digital version of the Coeur d'Alene 1:100,000 quadrangle. To facilitate this work, the USGS obtained the field maps prepared by Griggs and others from the USGS Field Records Library in Denver, Colorado. The Idaho Geological Survey digitized these maps and used them in their mapping program. The mapping focused on field checks to resolve problems in poorly known areas and in areas of disagreement between adjoining maps. The IGS is currently in the process of preparing a final digital spatial database for the Coeur d'Alene 1:100,000 quadrangle. However, there was an immediate need for a digital version of the geologic map of the Coeur d'Alene 1:100,000 quadrangle and the data from the field sheets along with several other sources was assembled to produce this interim product. Other data sources include Bookstrom and others (1999) and Derkey and others (1996).

Pamela D. Derkey and Robert J. Miller (both of the USGS) provided technical assistance with the geologic systems data model, metadata, digital documentation, and map projections; Michael L. Zientek (USGS) provided map unit descriptions, Steven R. Munts (contractor) digitized new linework, edited digital files, combined existing data sets, built look-up tables, and prepared the composite data set.

Native_Data_Set_Environment:
SunOS, 5.7, sun4u UNIX
ARC/INFO version 7.2.1

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Attribute accuracy was verified by manual comparison of the source with hard copy printouts, plots, and on-screen evaluation.

Logical_Consistency_Report:
Polygon and chain-node topology present.
Segments making up the outer and inner boundaries of a polygon tie end-to-end to completely enclose the area. Line segments are a set of sequentially numbered coordinate pairs. No duplicate features exist nor duplicate points in a data string. Intersecting lines are separated into individual line segments at the point of intersection. Point data are represented by two sets of coordinate
pairs, each with the same coordinate values. All nodes are represented by a single coordinate pair which indicates the beginning or end of a line segment. The neatline was generated by mathematically generating the four sides of the quadrangle, densifying the lines of latitude and projecting the file to UTM zone 11 (with a y-shift).

Completeness_Report:
All geologic units were compiled from previously existing maps ranging in scale from 1:24,000 to 1:250,000.

Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
The horizontal position accuracy for the digital data is no better than 13 meters based on the digitizing RMS error.

Lineage:
Source_Information:
Source_Citation:
Citation_Information:
Originator: Griggs, A.B.
Publication_Date: 1973
Title: Geologic map of the Spokane quadrangle, Washington, Idaho, and Montana
Geospatial_Data_Presentation_Form: map
Series_Information:
Series_Name: Miscellaneous Geologic Investigations
Issue_Identification: Map I-768
Publication_Information:
Publication_Place: Denver, CO
Publisher: U.S. Geological Survey
Source_Scale_Denominator: 250000
Type_of_Source_Media: paper map
Source_Time_Period_of_Content:
Single_Date/Time:
Calendar_Date: 1973
Source_Currentness_Reference: publication date
Source_Citation_Abbreviation: Griggs (1973)
Source_Contribution:
Geology was digitized from the northeast part of this map source. Map units used in OF00-135 were described in Griggs (1973).

Source_Information:
Source_Citation:
Citation_Information:
Originator: Griggs, A. B.
Publication_Date: not published
Title:
Geospatial_Data_Presentation_Form: map
Publication_Information:
These seven field maps were digitized by the Idaho Geological Survey and used in the map compilation.
Appendix C

Series Information:
  Series Name: Open-File Report
  Issue Identification: OFR 96-299

Publication Information:
  Publication Place: Menlo Park, CA
  Publisher: U.S. Geological Survey
  Source Scale Denominator: 24000
  Type of Source Media: digital files
  Source Time Period of Content:
    Time Period Information:
    Single Date/Time:
      Calendar Date: 1996
    Source Currentness Reference: publication date
  Source Citation Abbreviation: Derkey and others, 1996

Source Contribution:
  This source provided digital geology for the southeast part of the Coeur d'Alene 1:100,000 quadrangle.

Process Step:
  Process Description:
    Preliminary digital geologic map information for seven 15 minute quadrangles obtained from the Idaho Geological Survey were compiled electronically into a single topologically correct coverage by R. J. Miller (USGS) using ARC/INFO ver. 7.2.1 on a Sun Unix system.

    S. R. Munts digitized the northeast corner part of Griggs's (1973) map plate on an Altek digitizing tablet (RMS input error = 0.002 [13 meters]) and incorporated the data into the Coeur d'Alene GIS.

    S. R. Munts projected the Coeur d'Alene GIS to UTM zone 11 (meters) and attributed it with an interim geologic data model.

    Digital data from Bookstrom and others (1999) was generalized and inserted into the Coeur d'Alene GIS to replace Griggs' unpublished field map data.

    Digital data from Derkey and others (1996) was inserted into the southeast part of the Coeur d'Alene 1:100,000 quadrangle.

  Process Date: 1999 - 2000

Spatial Data Organization Information:
  Direct Spatial Reference Method: Vector
  Point and Vector Object Information:
  SDTS Terms Description:
    SDTS Point and Vector Object Type: Point
    Point and Vector Object Count: 1689
    SDTS Point and Vector Object Type: String
    Point and Vector Object Count: 5637
    SDTS Point and Vector Object Type: GT-polygon composed of chains
    Point and Vector Object Count: 1690
Spatial_Reference_Information:
HorizontalCoordinateSystemDefinition:
Planar:
GridCoordinateSystem:
  GridCoordinateSystemName: UniversalTransverseMercator
  UniversalTransverseMercator:
    UTMZoneNumber: 11
    TransverseMercator:
      ScaleFactoratCentralMeridian: implied
      LongitudeofCentralMeridian: implied
      LatitudeofProjectionOrigin: implied
      FalseEasting: 0.000
      FalseNorthing: -5,000,000 meters
PlanarCoordinateInformation:
  PlanarCoordinateEncodingMethod: coordinate pair
  CoordinateRepresentation:
    AbscissaResolution: 0.000000028834
    OrdinateResolution: 0.000000028834
  PlanarDistanceUnits: Meters
GeodeticModel:
  HorizontalDatumName: North American Datum of 1927
  EllipsoidName: Clarke 1866
  Semi-majorAxis: 6378206.4
  DenominatorofFlatteningRatio: 294.98

EntityandAttributeInformation:
OverviewDescription:
EntityandAttributeOverview:
The 'Digital geologic map of the Coeur d'Alene 1:100,000 quadrangle, Idaho and
Montana' Open-File Report 00-135 contains a detailed description of each attribute
code and a reference to the associated map symbols on the map source
materials. The GIS includes a geologic linework arc attribute table,
cda100k.aat, that relates to the cda100k.con (contact look-up table),
cda100k.st2 (structure look-up table), and the cda100k.ref (source reference
look-up table) files; a rock unit polygon attribute table, cda100k.pat,
that relates to the cda100k.ru (rock unit look-up table) and cda100k.ref
(source reference look-up table) files; and a geologic map symbol point
attribute table, cda100kp.pat, that relates to the cda100kp.sym (structural
point data look-up tables) and cda100kp.ref (source reference look-up table)
files.
EntityandAttributeDetailCitation:
A detailed description of the items in the Coeur d'Alene 100k GIS are
given in the text of the Open-File Report 00-135 available in Adobe
Acrobat PDF format on the World Wide Web at
http://geopubs.wr.usgs.gov/open-file/of00-135/

DistributionInformation:
Distributor:
ContactInformation:
  ContactOrganizationPrimary:
    ContactOrganization: U.S. Geological Survey Information Services
  ContactAddress:
    AddressType: mailing and physical address
Address: Open-File Reports, Box 25286
City: Denver
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This digital geologic map GIS of the Coeur d'Alene 1:100,000 quadrangle, Idaho, is not meant to be used or displayed at any scale larger than 1:100,000 (e.g. 1:62,500 or 1:24,000).

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Metadata_Date: 20001130
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Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Access_Constraints: none
Metadata_Use_Constraints: none