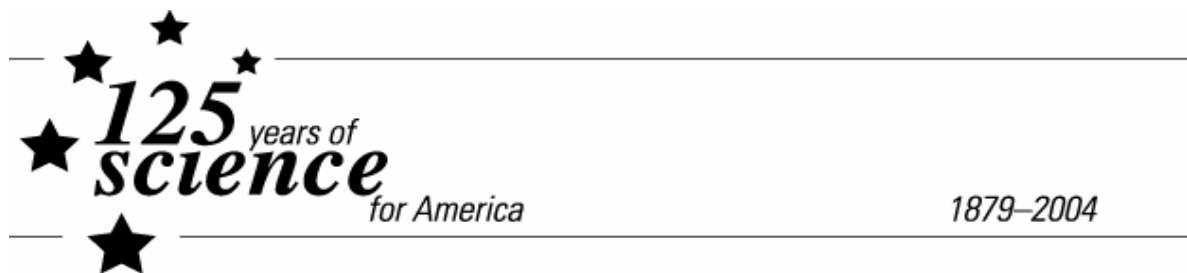**USGS**

science for a changing world

Readme and metadata for
Geologic Map of the Bonners Ferry 30´ X 60´ Quadrangle, Idaho and Montana

By Pamela M. Cossette and Pamela D. Derkey

Readme and metadata to accompany
Miscellaneous Field Studies Map MF-2426

125 years of science for America

1879–2004

2003

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

TABLE OF CONTENTS

INTRODUCTION

General

Miscellaneous Field Studies Map MF-2426 contains a digital geologic map database of the Bonners Ferry 30' x 60' quadrangle that includes:

1. ARC/INFO (Environmental Systems Research Institute, http://www.esri.com) version 8.1 (service pack 1) geospatial coverages (in interchange file format .e00) of the various components of the geologic map database, supporting INFO tables (in interchange file format .e00) and a tarred and zipped folder containing Southern California Areal Mapping Project (SCAMP) and USGS symbolsets used to display the geologic data.

2. PostScript file to plot:
   The geologic map on a metric base derived from USGS Digital Line Graph (DLG) data, along with a Correlation of Map Units diagram, a list of map units, an index map, a regional structure map and modal diagrams for most granitic units.

3. Portable Document (508-compliant) Format (.pdf) files of:
   a. This Readme; including in Appendix I, a copy of bferry_met.txt.
   b. Bonners Ferry_DMU.pdf; a detailed Description of Map Units, and a discussion of the structure and regional geology, including references.
   c. The same page as described in 2a.

The geologic map and accompanying graphics represented in the plot file are in the editorial format of USGS Miscellaneous Field Studies Map Series (MF-series) maps. Within the geologic map data package, map units are identified by standard geologic map criteria such as formation-name, age, and lithology. Detailed information and descriptions of units can be obtained from the Description of Map Units accessible by viewing or plotting the .pdf file of the Description of Map Units (3b above). If roads in some areas, especially forest roads that parallel topographic contours, do not show well on plots of the geologic map, we recommend use of the Bonners Ferry 30' X 60' topographic quadrangle (48116-E1-TM-100) in conjunction with the geologic map.

The data set for the Bonners Ferry 30' X 60' quadrangle has been jointly prepared by the U.S. Geological Survey Mineral Resource Program, the Southern California Areal Mapping Project (SCAMP) and the Idaho Geological Survey as part of an ongoing effort to utilize a Geographical Information System (GIS) format to create regional digital geologic databases. These regional databases are being developed as contributions to the National Geologic Map Database of the National Cooperative Geologic Mapping Program of the USGS.

The digital geologic map database for the Bonners Ferry 30' X 60' quadrangle has been created as a general-purpose data set that is applicable to other land-related investigations in the earth and biological sciences. For example, it can be used for mineral resource evaluation studies, animal and plant habitat studies, and soil studies in the Panhandle National Forests. The database is not suitable for site-specific geologic evaluations.

This Readme document describes the digital data, such as types and general contents of files that comprise the database and includes information on how to extract and plot the map sheet. Metadata information can be accessed at http://geo-nsdi.er.usgs.gov/cgi-bin/publication?map-mf and are included in Appendix I, Readme.

HOW TO OBTAIN PAPER PLOTS

For those having access to large-format plotters such as HP2500, plots may be made directly from the included plot files. For those needing paper plots of the geologic map and accompanying text, but who do not have access to large-format plotters, please contact the U.S. Geological Survey Plot-on-demand facility.

Phone: 1-800-USA-MAPS (1-800-872-6277)

HOW TO OBTAIN THE DIGITAL FILES

The export files, and subsequently the data and plot files, constituting the geologic map database of this Miscellaneous Field Studies Map may be obtained in two ways, both over the Internet.
1. The files can be obtained via the Web from Western Region Geologic Information Server. Go to the web page at http://wrgis.wr.usgs.gov/miscellaneousfieldstudiesmap/mf-2426 and follow the directions to download the files.
2. The files can also be obtained by anonymous ftp over the Internet from wrgis.wr.usgs.gov. The files are located in the directory /pub/miscellaneousfieldstudiesmap/mf-2426. Be sure to use binary transfer mode

DATABASE CONTENTS

The files constituting the geologic map database of this Miscellaneous Field Studies Map are listed below along with the interchange files from which they may be extracted.

Data Package

All files listed below are in a compressed tar file named **bferry.tar.gz** (7.5 MB); see section below titled, SOFTWARE UTILITIES.

ARC/INFO interchange files	Bonners Ferry coverages	Contains
bferry_geo.e00	**bferry_geo**	Contacts, faults, geologic unit labels and unit code link to bferry_geo.ru
bferry_pts.e00	**bferry_pts**	Structural point data. Dip values plotted as annotation.
bferry_fa.e00	**bferry_fa**	Fold axes
hypso.e00	**hypso**	Topography
hydro.e00	**hydro**	Water courses
trans_rds.e00	**trans_rds**	Roads
trans_rail.e00	**trans_rail**	Railroads
bferry_anno.e00	**bferry_anno**	Map annotation elements
id_mont.e00	**id_mont**	State boundaries – reference only

Additional INFO tables

ARC/INFO interchange files	Bonners Ferry coverages	Contains
bferry_geo.ru.e00	**bferry_geo.ru**	Geologic unit lookup table contains unit age, brief description and fill-color symbol (automatically imported with bferry_geo)
bferry_geo.con.e00	**bferry_geo.con**	Geologic lines (other than faults) lookup table (automatically imported with bferry_geo)
bferry.str.e00	**bferry.str**	Faults lookup table
bferry.att.e00	**bferry.att**	Structural point data lookup table
bferry.pattern.e00	**bferry.pattern**	Unit fill-pattern lookup table
bferry.orn.e00	**bferry.orn**	Geologic line ornamentation lookup table
lines.rel.e00	**lines.rel**	Line dictionary contains all SCAMP line codes (Matti and others, 1998a)
points.rel.e00	**points.rel**	Point dictionary, contains all SCAMP point codes (Matti and others, 1998b)
scamp2.shd.e00	**scamp2.shd**	SCAMP shade set

** An additional folder, **symbols.tar.zip** is included in the data package, which contains SCAMP and USGS symbolsets and fonts necessary to produce derivative maps that emulate the original map product.

ASCII text file

readme.txt   Readme text (this file)

The directory, info/, is produced in the process of importing interchange files to ARC coverages in ARC/INFO. The **bferry** (Bonners Ferry) info/ directory contains ARC/INFO feature attribute tables (as indicated above in the list of coverages) along with the supporting INFO tables and files (listed above).

Plot Package

PostScript plot file (.ps) of the Bonners Ferry single geologic map sheet, with CMU, abbreviated DMU diagram, and supporting data; please see section below titled, SOFTWARE UTILITIES for additional information.

Compressed file	Resultant image	Contains
bferry.ps.gz	**bferry.ps**	PostScript plot file of geologic map and supporting data

PostScript files are compressed UNIX files requiring gzip to uncompress them.

The uncompressed PostScript file **bferry.ps** (approx. 25MB) will plot a 1:100,000 scale, full color geologic map of the Bonners Ferry quadrangle that includes topography, hydrography and transportation information derived from Digital Line Graphs (DLGs). A detailed CMU diagram, a list of map units, sketch maps, and modal diagrams for granitic rocks are also included with the geologic map. The map sheet has been successfully plotted on Hewlett-Packard large-format plotters, models HP650C, HP755CM, and HP2500C.

Other files

Readme.pdf	This document in .pdf format
bferry_met.html	Bonners Ferry 100k map database metadata

SOFTWARE UTILITIES

Files which have .gz file extension were compressed using gzip. Gzip utilities are available free of charge via the internet at the gzip home page, http://www.gzip.org

The data package is additionally bundled into a single tar (tape archive) file. Individual files must be extracted using a tar utility, available free of charge via the internet through links on the Common Internet File Formats page, http://www.matisse.net/files/formats.html. One such utility is WinZip, available at http://www.winzip.com (WinZip can also decompress files).

Files in the plot package have been prepared to produce optimum plots using the shade, and marker sets listed below. The marker and line sets may be obtained form the included symbols folder or from the web site http://wrgis.wr.usgs.gov/docs/wgmt/scamp/html/sc_gis.html (fonts that are essential to the ability to utilize the SCAMP symbol sets are included in the symbols folder). GeoAge Symbol Font Family is similarly included in the symbols folder.

geoscamp2.lin	Lines
geoscamp2.mrk	Points
scamp2.shd	Colors
geology2.shd	Patterns
GeoAge fonts	Stratigraphic Age Symbols

.

HOW TO EXTRACT THE GEOLOGIC MAP DATABASE FROM THE TAR FILE

After downloading the files, they must be uncompressed using a gzip utility such as gzip itself or WinZip. The data files must then be extracted using a tar utility.

Digital database

To do this	Type this at the Unix command prompt
Make a 36 MB tar file named bferry.tar	gzip -d **bferry.tar.gz** (or use gzip utility of choice)
Go to the directory that will hold the directory **bferry** (if different from local_directory)	cd local_directory
Extract the **bferry** directory from the tar file	tar -xvbv {path to tar file} **bferry.tar** (or use tar utility of choice)

This process will create a directory, **bferry**/, that contains the ARC/INFO interchange files and supporting files that are created by importing the Bonners Ferry interchange file format (.e00) files listed in the Database Contents section.

The following are not included in the database tar file, and can be downloaded separately

Readme.pdf	This document
bferry_met.html	Bonners Ferry database metadata

PostScript plot files

Make a 23 MB uncompressed file, **bferry.ps** by typing **gzip -d bferry.ps.gz** (or use gzip utility of choice)

Portable Document Format (.pdf) files

PDF files are not stored as gzip files. They are accessed using Adobe Acrobat Reader software, available free from the Adobe website http://www.adobe.com. Follow instructions at the website to download and install the software. Acrobat Reader contains an on-line manual and tutorial.

HOW TO CONVERT THE ARC/INFO INTERCHANGE (EXPORT) FILES

The ARC interchange (.e00) files are converted to ARC coverages using the ARC command IMPORT.

ARC interchange files can also be read by some other Geographic Information Systems, including ArcView (ESRI) and MapInfo (http://www.mapinfo.com) (Environmental Systems Research Institute, Inc, 1991). Please consult your GIS documentation to see if you can use ARC interchange files and the procedure to import them.

DIGITAL GEOLOGIC MAP SPECIFICATIONS

Digital and geologic compilation of geologic map

The geologic map was compiled from geologic maps of eight 1:48,000 15'-quadrangle-blocks, each of which were made by mosaicking and reducing the four constituent 7.5' quadrangles. These 15'-quadrangle-blocks were mapped chiefly at 1:24,000 scale, but the detail of the mapping was constrained by the intention that it was to be compiled at 1:48,000 scale. The compilation at 1:100,000 scale entailed necessary simplification in some areas and combining of some geologic units. Overall, however, despite a greater than two times reduction in scale, most geologic detail found on the 1:48,000 maps is retained on the 1:100,000 map. Geologic contacts across boundaries of the 8 constituent quadrangles required minor adjustments, but none significant at the final 1:100,000 scale.

Even though all of the source geologic data are from significantly larger scale maps, the 1:100,000 scale compilation in this report is intended for use at that scale; digital or plotted enlargements of all or part of the map were not intended and could result in misleading map data.

The geologic map was compiled on a base-stable cronoflex copy of the Bonners Ferry 30' X 60' topographic map and then scribed. The scribe guide was used to make a 0.007"-thick blackline clear-film, which was scanned at 1200 DPI by Optronics Specialty Company, Northridge, California. This raster image was converted to vector and polygon GIS layers and minimally attributed by Optronics Specialty Company. Minor hand-digitized additions were made at the USGS. Lines, points, and polygons subsequently edited at the USGS used standard ARC/INFO commands. Digitizing and editing artifacts significant enough to display at a scale of 1:100,000 were corrected.

Base map

Hypsography (topography), and transportation data were converted from 1:100,000 DLGs (prepared by and available from The National Cartographic Information Center) to ARC/INFO coverages. Hydrologic data are limited to major or essential features to avoid clutter in areas of finely detailed geology, and was both hand digitized from a base-stable cronoflex copy of the Bonners Ferry 30' X 60' topographic map and derived from 1:100,000 DLGs.

Spatial resolution

Use of this digital geologic map database should not violate the spatial resolution of the data. Although the digital form of the data removes the constraint imposed by the scale of a paper map, the detail and accuracy inherent in map scale are also present in the digital data. The fact that this database was compiled and edited at a scale of 1:100,000 means that higher resolution information may not have been uniformly retained in the dataset. Plotting at scales larger than 1:100,000 will not yield greater real detail, although it may reveal fine-scale irregularities below the intended resolution of the database. Similarly, although higher resolution data is incorporated in most of the map, the resolution of the combined output will be limited by the lower resolution data.

Map accuracy standards

All contacts on the geologic map are shown as solid lines. Because uniform National geologic map accuracy standards have not yet been developed and adopted, lines and points on the Bonners Ferry 30' X 60' geologic map follow standards currently being used by the Southern California Areal Mapping Project (SCAMP) for 1:100,000 scale maps; lines and points that are located to within ±50 meters, relative to accurately located features on the base map, are considered to meet map accuracy standards. Published and unpublished mapping used on the Bonners Ferry 30' X 60' geologic map are known to generally meet this map accuracy standard.

Database specifics

The map database consists of ARC coverages which are stored in UTM projection (Table 1). Digital tics define a 15-minute grid of latitude and longitude that corresponds to alternate corners of the 32 1:24,000 7.5' quadrangles encompassed by the Bonners Ferry 30' x 60' quadrangle.

Table 1—Map Projection

Projection	UTM
Zone	11
Zunits	No
Units	Meters
Spheroid	Clark 1866
X shift	0.0000000000

Y shift   -5,000,000.00

The content of the geologic database can be described in terms of feature classes that include lines, points, and areas that comprise the map. See metadata text file (Appendix I) for detailed descriptions. . For traditional descriptions of the map units, see the Portable Document Format file **bferry_dmu.pdf**. List of map units in database is given in Appendix I.

REFERENCES

Environmental Systems Research Institute, Inc, 1991, ARC/INFO command references 6.0: Proprietary
        software manual

Matti, J.C., Powell, R.E., Miller, F.K., Kennedy, S.A., Ruppert, K.R., Morton, G.L., and Cossette, P.M.,
        1998a, Geologic-line attributes for digital geologic map databases produced by the Southern
        California Areal Mapping Project (SCAMP), Version 1.0: U.S.Geological Survey Open-File
        Report 97-861

Matti, J.C., Miller, F.K., Powell, R.E., Kennedy, S.A., Bunyapanasarn, T.P., Koukladas, Catherine, Hauser,
        R.M., and Cossette, P.M., 1998b, Geologic-point attributes for digital geologic map databases
        produced by the Southern California Areal Mapping Project (SCAMP), Version 1.0:
        U.S.Geological Survey Open-File Report 97-859

Identification_Information:

  Citation:
    Citation_Information:
      Originator: Fred K. Miller
      Originator: Russell F. Burmester
      Publication_Date: 2003
      Title: Geologic map of the Bonners Ferry 30' x 60' quadrangle, Idaho and Montana
      Edition: Version 1.0, 2003
      Geospatial_Data_Presentation_Form: vector digital data
      Series_Information:
        Series_Name: U.S. Geological Survey Miscellaneous Field Investigations
        Issue_Identification: USGS MF-2426
      Publication_Information:
        Publication_Place: Menlo Park, California
        Publisher: U.S. Geological Survey
      Online_Linkage: URL:http://geopubs.wr.usgs.gov/docs/wrgis/mfmap.html

  Description:

    Abstract:
      This data set maps and describes the geology of the Bonners Ferry 30' x
      60' quadrangle, Idaho and Montana. The bedrock geology of the Bonners
      Ferry quadrangle consists of sedimentary, metamorphic, and granitic rocks
      ranging in age from Middle Proterozoic to Eocene. Bedrock units include
      rocks of (1) the Middle Proterozoic Belt Supergroup (2) the Middle
      Proterozoic Deer Trail Group, (3) the Late Proterozoic Windermere Group,
      (4) miogeoclinal or shelf facies lower Paleozoic rocks, and (5) Mesozoic
      and Tertiary granitic rocks.

      The Belt Supergroup, a thick sequence of argillite, siltite, quartzite,
      and impure carbonate rocks up to 9,000 m thick, occurs in two
      non-contiguous sequences in the quadrangle: (1) the Clark Fork-Eastport
      Sequence east of the Purcell trench and (2) the Newport Sequence in the
      hanging wall of the Newport Fault. Only the two lowest Belt formations of
      the Newport Sequence are found in the Bonners Ferry quadrangle, but these
      two units are part of a continuous section, which extends southwestward to
      the town of Newport.

      Belt Supergroup rocks of the Clark Fork-Eastport Sequence are separated
      from those of the Newport Sequence by the Newport Fault, Priest River
      Complex, and Purcell Trench Fault. Some formations of the Belt Supergroup
      show differences in thickness and (or) lithofacies from one sequence to
      the other that are greater than those predicted from an empirical
      depositional model for the distances currently separating the sequences.
      These anomalous thickness and facies differences suggest that there has
      been a net contraction along structures separating the sequences despite

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Eocene extension associated with emplacement of the Priest River Complex. In addition to these two Belt sequences, probable Belt rocks are present in the Priest River Complex as high metamorphic grade crystalline schist and gneiss.

Northwest of the Newport Sequence of Belt Supergroup is the Deer Trail Group, a distinct Middle Proterozoic sequence of argillite, siltite, quartzite, and carbonate rocks lithostratigraphically similar to the Belt Supergroup, but separated from all Belt Supergroup rocks by the Jumpoff Joe Fault. Rocks of the Deer Trail Group are pervasively phyllitic and noticeably more deformed than rocks in the Belt Supergroup sequences. Lithostratigraphically the Deer Trail Group is equivalent to part of the upper part of the Belt Supergroup. Differences in lithostratigraphy and thickness between individual Deer Trail and Belt units and between the Deer Trail and Belt sequences as a whole indicate that they were probably much farther apart when they were deposited.

The Windermere Group is a lithologically varied sequence of volcanic rocks and coarse-grained, mostly immature, clastic sedimentary rocks up to 8,000 m thick. It is characterized by extreme differences in thickness and lithofacies over short distances caused by syndepositional faulting associated with initial stages of continental rifting in the Late Proterozoic. Strata of the Windermere Group unconformably overlie only the Deer Trail Group, and are nowhere found in depositional contact with Belt Supergroup rocks.

Paleozoic rocks in the Bonners Ferry quadrangle consist of a thin, fault-bounded remnant preserved within the Clark Fork-Eastport Belt Supergroup Sequence.

Mesozoic granitic rocks underlie at least 50 percent of the Bonners Ferry quadrangle. They fall into two petrogenetic suites, hornblende-biotite plutons and muscovite-biotite (two-mica) plutons, most of which are Cretaceous in age. Both suites are represented in the mid-crustal Priest River Complex and in the higher level plutons that flank the complex; by far the majority of the Priest River Complex are Cretaceous, two-mica bodies.

Tertiary rocks are restricted to a single small stock, numerous hypabyssal dikes that are too small to show at the scale of the map, and to cataclastic rocks related to the Newport Fault.

Quaternary deposits include unconsolidated to poorly consolidated glacial, alluvial, glacial-lacustrine, and landslide units.

Created using Environmental Systems Research Institute's ARC/INFO software, the data base consists of the following items: (1) a map coverage containing geologic faults, contacts and units, (2) a point coverage containing site-specific geologic structural data, (3) a line and point coverage containing structural data (fold axes) along with geologic line ornamentation, (4) a coverage containing cartographic elements (annotation), (5) four coverages derived from 1:100,000 Digital Line Graphs (DLG); topography, hydrography, and cultural data contained in two transportation coverages, road and rail, and (6) attribute and lookup tables for geologic units (polygons), contacts and faults (arcs), and site-specific data (points). In addition, the data set includes the

following graphic and text products: (1) A PostScript graphic plot-file containing the geologic map, topography, cultural data, a list of Map Units (DMU), modal diagrams for granitic rocks, an index map, a regional geologic and structure map, and a key for point and line symbols; (2) PDF files of the Readme, Description of Map Units (DMU) including a discussion of the geologic framework, (3) map-sheet and (4) this metadata file.

The geologic map database contains original U.S. Geological Survey data generated by detailed field observation and by interpretation of aerial photographs. The map was compiled from geologic maps of eight 1:48,000 15' quadrangle blocks, each of which was made by mosaicking and reducing the four constituent 7.5' quadrangles. These 15' quadrangle blocks were mapped chiefly at 1:24,000 scale, but the detail of the mapping was governed by the intention that it was to be compiled at 1:48,000 scale. The compilation at 1:100,000 scale entailed necessary simplification in some areas and combining of some geologic units. Overall, however, despite a greater than two times reduction in scale, most geologic detail found on the 1:48,000 maps is retained on the 1:100,000 map. Geologic contacts across boundaries of the eight constituent quadrangles required minor adjustments, but none significant at the final 1:100,000 scale.

The geologic map was compiled on a base-stable cronoflex copy of the Bonners Ferry 30' X 60' topographic base and then scribed. The scribe guide was used to make a 0.007 mil-thick blackline clear-film, which was scanned at 1200 DPI by Optronics Specialty Company, Northridge, California. This image was converted to vector and polygon GIS layers and minimally attributed by Optronics Specialty Company. Minor hand-digitized additions were made at the USGS. Lines, points, and polygons were subsequently edited at the USGS by using standard ARC/INFO commands. Digitizing and editing artifacts significant enough to display at a scale of 1:100,000 were corrected. Within the database, geologic contacts are represented as lines (arcs), geologic units as polygons, and site-specific data as points. Polygon, arc, and point attribute tables (.pat, .aat, and .pat, respectively) uniquely identify each geologic datum.
Purpose:
The data set for the Bonners Ferry 30' X 60' quadrangle has been jointly prepared by the U.S. Geological Survey National Cooperative Geologic Mapping Program, the Mineral Resource Program, and by the Southern California Areal Mapping Project (SCAMP), as part of an ongoing effort to utilize a Geographical Information System (GIS) format to create regional digital geologic databases. These regional databases are being developed as contributions to the National Geologic Map Data Base of the National Cooperative Geologic Mapping Program.

The digital geologic map database for the Bonners Ferry 30' X 60' quadrangle has been created as a general-purpose data set that is applicable to other land-related investigations in the earth and biological sciences. For example, it can be used for mineral resource evaluation studies, animal and plant habitat studies, and soil studies in the Idaho Panhandle National Forest. The database is not suitable for site-specific geologic evaluations.

Time_Period_of_Content:
 Time_Period_Information:
  Range_of_Dates/Times:
   Beginning_Date: 1977

Ending_Date: 1993
  Currentness_Reference: New data

Status:
  Progress: Complete
  Maintenance_and_Update_Frequency: As Needed

Spatial_Domain:
  Bounding_Coordinates:
    West_Bounding_Coordinate: -117.0000
    East_Bounding_Coordinate: -115.99002976
    North_Bounding_Coordinate: 49.00433371
    South_Bounding_Coordinate: 48.49565672

Keywords:
  Theme:
    Theme_Keyword_Thesaurus: None
    Theme_Keyword: geologic map
    Theme_Keyword: geology
    Theme_Keyword: bedrock geology
    Theme_Keyword: surficial geology
    Theme_Keyword: detachment fault
    Theme_Keyword: extensional tectonics
    Theme_Keyword: Kootenai Arc
    Theme_Keyword: core complex
  Place:
    Place_Keyword_Thesaurus: None
    Place_Keyword: Idaho and Montana
    Place_Keyword: Bonners, Boundary, and Lincoln Counties
    Place_Keyword: Bonners Ferry 30' x 60' quadrangle

  Stratum:
    Stratum_Keyword_Thesaurus: None
    Stratum_Keyword: Belt Supergroup
    Stratum_Keyword: Deer Trail Group
    Stratum_Keyword: Two-mica granitic rocks
    Stratum_Keyword: Priest River Complex
Access_Constraints: None
Use_Constraints:
  The Bonners Ferry 30' x 60' geologic-map database should be used to
  evaluate and understand the geologic character of the Bonners Ferry 30' x
  60' quadrangle as a whole. The data should not be used for purposes of
  site-specific land-use planning or site-specific geologic evaluations.
  The database is sufficiently detailed to identify and characterize
  geologic materials and structures. However, it is not sufficiently
  detailed for site-specific determinations.

  Use of this digital geologic-map database should not violate the spatial
  resolution of the data. Although the digital form of the data removes the
  constraint imposed by the scale of a paper map, the detail and accuracy
  inherent in map scale are also present in the digital data. The fact that
  this database was compiled and edited at a scale of 1:100,000 means that
  higher resolution information may not have been uniformly retained in the
  dataset. Plotting at scales larger than 1:100,000 will not yield greater
  real detail, although it may reveal fine-scale irregularities below the
  intended resolution of the database. Similarly, although higher

resolution data is incorporated in most of the map, the resolution of the
combined output will be limited by the lower resolution.

Point_of_Contact:
  Contact_Information:
    Contact_Person_Primary:
      Contact_Person: Fred K. Miller
      Contact_Organization:
        U.S. Geological Survey, Western Region,
        Earth Surface Processes Team
    Contact_Position: Project geologist
    Contact_Address:
      Address_Type: mailing address
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        U.S. Geological Survey
        Room 202
        West 904 Riverside Avenue
      City: Spokane
      State_or_Province: Washington
      Postal_Code: 99201-1087
      Country: United States of America
    Contact_Voice_Telephone: (509) 368-3121
    Contact_Facsimile_Telephone: (509) 368-3199
    Contact_Electronic_Mail_Address: fmiller@usgs.gov

Data_Set_Credit:
  Technical review by R. Lewis and A. Bookstrom led to significant improvements that
  eventually were reflected in aspects of the database, the plot file, and in the
  description of the geologic units of the Bonners Ferry 30' X 60' quadrangle.

  Geologic mapping and digital preparation of this report were sponsored jointly by (1)
  the National Cooperative Geologic Mapping Program of the U.S. Geological Survey, (2)
  the Southern California Areal Mapping Project (SCAMP), and (3) the Mineral Resources
  Program of the U.S. Geological Survey.

Native_Data_Set_Environment:
  SunOS, 5.8, sun4u UNIX
  ARC/INFO version 8.1

Cross_Reference:
  Citation_Information:
    Originator: F. K. Miller
    Publication_Date: 2000
    Title: Geologic map of the Chewelah 30' x 60' quadrangle, Washington and Idaho
    Geospatial_Data_Presentation_Form: vector digital data
    Series_Information:
      Series_Name: U.S. Geological Survey Miscellaneous Field Investigations
      Issue_Identification: USGS MF-2354
    Publication_Information:
      Publication_Place: Menlo Park, California
      Publisher: U.S. Geological Survey
    Online_Linkage: URl:http//geopubs.wr.usgs.gov/docs/wrgis/mfmap.html

Data_Quality_Information:
  Attribute_Accuracy:
    Attribute_Accuracy_Report:

Geologic-map units in the Bonners Ferry quadrangle database were described
using standard field methods. Consistent with these methods, the database
author has assigned standard geologic attributes to geologic lines,
points, and polygons identified in the database.

Nation-wide geologic-map accuracy standards have not been developed and
adopted by the U.S. Geological Survey and other earth-science entities.
Until such standards are adopted, SCAMP-related projects have developed
internal map-accuracy standards for 1:100,000-scale geologic maps produced
under the projects.

Geologic lines and points on 1:100,000 scale geologic maps are judged to
meet SCAMP's internal map-accuracy standards if they are located to within
+/-50 meters, relative to topographic or cultural features on the base
map. On any derivative geologic-map plot, line data for faults that are
judged to meet the SCAMP internal map-accuracy standard are denoted by
solid lines; line data that may not meet the SCAMP internal map-accuracy
standard are denoted by dashed or dotted lines. All non-fault contacts
are represented by solid lines. Because many of the contacts in the
Priest River Complex are highly gradational, they may not be located to
within +/-50m. There is no cartographic device for denoting the
map-accuracy for geologic-point data (eg. symbols representing bedding,
foliation, lineations, etc.).

Logical_Consistency_Report:
 Polygon and chain-node topology present.

 The areal extent of the map is represented digitally by an appropriately
 projected (UTM projection), mathematically generated box. Consequently,
 polygons intersecting the lines that comprise the map boundary are closed
 by that boundary. Polygons internal to the map boundary are completely
 enclosed by line segments which are themselves a set of sequentially
 numbered coordinate pairs. Point data are represented by coordinate pairs.

Completeness_Report:
 The geologic map and digital database of the Bonners Ferry 30'x 60'
 quadrangle contain new data that have been subjected to rigorous review and
 are a substantially complete representation of the current state of
 knowledge concerning the geology of the area.

Positional_Accuracy:
 Horizontal_Positional_Accuracy:
  Horizontal_Positional_Accuracy_Report:
   The maximum transformation RMS error acceptable for 30' x 60' quadrangle
   transformation and data input is 0.003 (7.6 meters). Horizontal
   positional accuracy was checked by visual comparison of hard-copy plots
   with base-stable source data.

   Initial transformation data for the Bonners Ferry quadrangle are as
   follows:

   >Scale (X,Y) = (2540.402,2539.610) Skew (degrees) = (-0.010)
   >Rotation (degrees) = (0.363) Translation = (498231.996,369742.063)
   >RMS Error (input,output) = (0.004,10.516)
   >

```
>Affine  X = Ax + By + C
>      Y = Dx + Ey + F
> A =      2540.351  B =       -16.554  C =      498231.996
> D =        16.094  E =      2539.557  F =      369742.063
>
>
```

Lineage:
 Process_Step:
  Process_Description:
   Field mapping and aerial photograph interpretation; iterative process (F.K.
   Miller and R.F. Burmester).
  Process_Date: 1977 - 1993

 Process_Step:
  Process_Description:
   Transfer of geologic linework and point data from field maps and aerial
   photographs to a scale-stable cartographic base of quadrangle (scribe
   guide) (F.K. Miller).
  Process_Date: 1996
 Process_Step:
  Process_Description:
   The geologic map information was scanned (initial raster scan in MS-DOS TIF
   format, 1200 dots per inch) from a clear-film, right-reading, 0.007 mil
   thickness, base-stable blackline positive (made by contact photograph from
   a scribe guide) of the author-prepared geologic map at 1:100,000 scale.
   The raster scan was auto-vectorized, converted to an ARC/INFO coverage
   using standard ARC/INFO commands, and minimally attributed by Optronics
   Specialty Company, Inc. Preliminary attribution and editing was completed
   in Spokane by Mineral Resource Program personnel (P.D. Derkey).
  Process_Date: 1997
 Process_Step:
  Process_Description:
   ARC/INFO database revised; polygon, arc and point attribute tables updated
   using model established for SCAMP coverages. Digitizing and editing
   artifacts significant enough to display at a scale of 1:100,000 were
   corrected (P.M. Cossette).
  Process_Date: 2001
 Process_Step:
  Process_Description:
   The four coverages that provide base map reference data
   (hypsography/topography, hydrography, and transportation/road/rail/cultural
   information) were derived from USGS 1:100,000-scale DLGs available on the
   Web: <URL:edcwww.cr.usgs.gov/glis/glis.html> (P.M.Cossette)
  Process_Date: 2001
 Process_Step:
  Process_Description:
   Science reviews completed by L. Reed and A. Bookstrom; technical/digital
   review completed by Rachel Alvarez.
  Process_Date: 2003
 Process_Step:
  Process_Description:
   First draft of metadata created by cossette using FGDCMETA.AML ver. 1.2
   05/14/98 on ARC/INFO data set
   /pool5/pool2/cossette/newbonner/bferry/bf_geo620
  Process_Date: 20010619

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: 2301
   SDTS_Point_and_Vector_Object_Type: String
   Point_and_Vector_Object_Count: 5347
   SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains
   Point_and_Vector_Object_Count: 2302

Spatial_Reference_Information:
 Horizontal_Coordinate_System_Definition:
  Planar:
   Grid_Coordinate_System:
    Grid_Coordinate_System_Name: Universal Transverse Mercator
    Universal_Transverse_Mercator:
     UTM_Zone_Number: 11
     Transverse_Mercator:
      Scale_Factor_at_Central_Meridian: 1.0
      Longitude_of_Central_Meridian: -116.50
      Latitude_of_Projection_Origin: 48.50
      False_Easting: 0.000
      False_Northing: 0.000
   Planar_Coordinate_Information:
    Planar_Coordinate_Encoding_Method: coordinate pair
    Coordinate_Representation:
     Abscissa_Resolution: 5.534124852595
     Ordinate_Resolution: 5.534124852595
    Planar_Distance_Units: Meters
  Geodetic_Model:
   Horizontal_Datum_Name: North American Datum of 1927
   Ellipsoid_Name: Clarke 1866
   Semi-major_Axis: 6378206.4
   Denominator_of_Flattening_Ratio: 294.98

Entity_and_Attribute_Information:
 Overview_Description:
  Entity_and_Attribute_Overview:
   Version 1.0 of the Bonners Ferry 30' x 60' quadrangle comprises eight
   ARC/INFO coverages, of which three contain geologic data, one contains
   cartographic features, and four provide base-map, DLG-derived, reference
   data: bferry_geo (geology), bferry_pts (structural point data), bferry_fa
   (fold axes and geologic line ornamentation), and bferry_anno (geologic
   unit annotation, label leaders, locality names), hypso (hypsography),
   hydro (hydrography), trans_rds and trans_rail (transportation and cultural
   data). Line and point identities are recorded in the .aat and .pat tables
   using a system of identity codes. Six lookup tables contain additional
   feature attribution: bferry_geo.ru (rock unit data), bferry.pattern
   (pattern overlays for drawing specific units), bferry.con (geologic
   contacts data), bferry.str (fault and fold axis data), bferry.att
   (structural point data), and bferry.orn (geologic line ornamentation).
   Two INFO tables, lines.rel and points.rel provide a full description of
   each of the geologic line and point codes in the database. A full source
   citation is provided in the Entity_and Attribute_Detail_Citation section

of this metadata document. However, many of the line and point
descriptions in the Bonners Ferry report are modified from those found in
the three sources listed in the following section, but are detailed in
this metadata document.
Entity_and_Attribute_Detail_Citation:
A complete description of the polygon, line, and point data coding schemes
is available in U.S. Geological Survey Open-File Reports OFR 97-859, OFR
97-860, and OFR 97-861 (full source citations follow):

Matti, J.C., Miller, F.K., Powell, R.E., Kennedy, S.A., Bunyapanasarn,
T.P., Koukladas, Catherine, Hauser, R.M., and Cossette, P.M., 1997b,
Geologic-point attributes for digital geologic-map databases produced by
the Southern California Areal Mapping Project (SCAMP), Version 1.0:
U.S.Geological Survey Open-File Report 97-859

Matti, J.C., Miller, F.K., Powell, R.E., Kennedy, S.A., and Cossette,
P.M., 1997c, Geologic-polygon attributes for digital geologic-map
databases produced by the Southern California Areal Mapping Project
(SCAMP), Version 1.0: U.S.Geological Survey Open-File Report 97-860

Matti, J.C., Powell, R.E., Miller, F.K., Kennedy, S.A., Ruppert, K.R.,
Morton, G.L., and Cossette, P.M., 1997a, Geologic-line attributes for
digital geologic-map databases produced by the Southern California Areal
Mapping Project (SCAMP), Version 1.0: U.S.Geological Survey Open-File
Report 97-861

Detailed_Description:
Entity_Type:
Entity_Type_Label: bferry_geo.pat
Entity_Type_Definition:
Geologic units (LABEL) and their corresponding names (NAME) identified in
the Bonners Ferry 30' x 60' quadrangle. One annotation subclass identifies
and labels the major, named faults.
Attribute:
Attribute_Label: UNIT
Attribute_Definition: unique value (integer) assigned to unit
Attribute:
Attribute_Label: LABEL
Attribute_Definition: geologic map unit label, in plain text
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Qag
Enumerated_Domain_Value_Definition: Glacial and alluvial material
Enumerated_Domain:
Enumerated_Domain_Value: Qls
Enumerated_Domain_Value_Definition: Landslide deposits
Enumerated_Domain:
Enumerated_Domain_Value: Ql
Enumerated_Domain_Value_Definition: Glacial-lacustrine deposits
Enumerated_Domain:
Enumerated_Domain_Value: Tcb
Enumerated_Domain_Value_Definition:
Chlorite breccia and cataclastic rocks associated with the Newport Fault
Zone
Enumerated_Domain:
Enumerated_Domain_Value: Ttp

Enumerated_Domain_Value_Definition: Quartz monzonite of Trapper Peak
Enumerated_Domain:
 Enumerated_Domain_Value: Kptc
 Enumerated_Domain_Value_Definition: Granodiorite of Trapper Creek
Enumerated_Domain:
 Enumerated_Domain_Value: Kplm
 Enumerated_Domain_Value_Definition: Mixed granitic and metamorphic rocks of Lookout
Mountain
Enumerated_Domain:
 Enumerated_Domain_Value: Kpgb
 Enumerated_Domain_Value_Definition: Garnet-bearing granodiorite
Enumerated_Domain:
 Enumerated_Domain_Value: Kpcc
 Enumerated_Domain_Value_Definition: Granodiorite of Caribou Creek
Enumerated_Domain:
 Enumerated_Domain_Value: Kpml
 Enumerated_Domain_Value_Definition: Mafic granodiorite of Marsh Lake
Enumerated_Domain:
 Enumerated_Domain_Value: Kpsl
 Enumerated_Domain_Value_Definition: Granodiorite of Search Lake
Enumerated_Domain:
 Enumerated_Domain_Value: Kplc
 Enumerated_Domain_Value_Definition: Mafic granodiorite of Lucky Creek
Enumerated_Domain:
 Enumerated_Domain_Value: Kpkm
 Enumerated_Domain_Value_Definition: Monzogranite of Klootch Mountain
Enumerated_Domain:
 Enumerated_Domain_Value: Kph
 Enumerated_Domain_Value_Definition: Two-mica granitic rocks of Horton Creek
Enumerated_Domain:
 Enumerated_Domain_Value: Kpcb
 Enumerated_Domain_Value_Definition: Mafic granodiorite of Cavanaugh Bay
Enumerated_Domain:
 Enumerated_Domain_Value: Kpcp
 Enumerated_Domain_Value_Definition: Mixed granitic rocks of Camels Prairie
Enumerated_Domain:
 Enumerated_Domain_Value: Kpms
 Enumerated_Domain_Value_Definition: Mixed granitic and metamorphic rocks of Soldier Creek
Enumerated_Domain:
 Enumerated_Domain_Value: Kpsh
 Enumerated_Domain_Value_Definition: Monzogranite of Shorty Peak
Enumerated_Domain:
 Enumerated_Domain_Value: Kpbc
 Enumerated_Domain_Value_Definition: Mixed two-mica rocks of Ball Creek
Enumerated_Domain:
 Enumerated_Domain_Value: Kpfc
 Enumerated_Domain_Value_Definition: Granodiorite of Falls Creek
Enumerated_Domain:
 Enumerated_Domain_Value: Kpsp
 Enumerated_Domain_Value_Definition: Tonalaite of Snow Peak
Enumerated_Domain:
 Enumerated_Domain_Value: Kpdc
 Enumerated_Domain_Value_Definition: Granitic and metamorphic rocks, undivided
Enumerated_Domain:
 Enumerated_Domain_Value: Kphc
 Enumerated_Domain_Value_Definition: Monzogranite of Hunt Creek

Enumerated_Domain:
  Enumerated_Domain_Value: Mzpl
  Enumerated_Domain_Value_Definition: Monzonite of Long Canyon
Enumerated_Domain:
  Enumerated_Domain_Value: Yppm
  Enumerated_Domain_Value_Definition: Prichard Formation, metamorphosed
Enumerated_Domain:
  Enumerated_Domain_Value: Kg
  Enumerated_Domain_Value_Definition: Monzogranite of Granite Pass
Enumerated_Domain:
  Enumerated_Domain_Value: Ktmc
  Enumerated_Domain_Value_Definition: Two-mica granitic rocks of Twenty Mile Creek
Enumerated_Domain:
  Enumerated_Domain_Value: Ktc
  Enumerated_Domain_Value_Definition: Monzogranite of Tango Creek
Enumerated_Domain:
  Enumerated_Domain_Value: Kh
  Enumerated_Domain_Value_Definition: Monzogranite of Hungry Mountain
Enumerated_Domain:
  Enumerated_Domain_Value: Kgm
  Enumerated_Domain_Value_Definition: Monzogranite of Gleason Mountain
Enumerated_Domain:
  Enumerated_Domain_Value: Kcu
  Enumerated_Domain_Value_Definition: Granitic rocks, undivided
Enumerated_Domain:
  Enumerated_Domain_Value: Mzw
  Enumerated_Domain_Value_Definition: Syenite of Wall Mountain
Enumerated_Domain:
  Enumerated_Domain_Value: Kbf
  Enumerated_Domain_Value_Definition: Granodiorite of Bonners Ferry
Enumerated_Domain:
  Enumerated_Domain_Value: Khbm
  Enumerated_Domain_Value_Definition: Boulder Mountain pluton of Granodiorite of Hall Mountain
Enumerated_Domain:
  Enumerated_Domain_Value: Krc
  Enumerated_Domain_Value_Definition: Granodiorite of Reeder Creek
Enumerated_Domain:
  Enumerated_Domain_Value: Krcp
  Enumerated_Domain_Value_Definition: Porphyritic, muscovite-bearing, biotite granodiorite
Enumerated_Domain:
  Enumerated_Domain_Value: Kgp
  Enumerated_Domain_Value_Definition: Galena Point Granodiorite
Enumerated_Domain:
  Enumerated_Domain_Value: Kru
  Enumerated_Domain_Value_Definition: Granodiorite of Ruby Creek
Enumerated_Domain:
  Enumerated_Domain_Value: Kco
  Enumerated_Domain_Value_Definition: Granodiorite of Copeland
Enumerated_Domain:
  Enumerated_Domain_Value: Kcu
  Enumerated_Domain_Value_Definition: Granitic rocks, undivided
Enumerated_Domain:
  Enumerated_Domain_Value: Kgpl
  Enumerated_Domain_Value_Definition: Granodiorite of Priest lake
Enumerated_Domain:
  Enumerated_Domain_Value: Kkp

Enumerated_Domain_Value_Definition: Granodiorite of Kelly Pass
Enumerated_Domain:
 Enumerated_Domain_Value: Kv
 Enumerated_Domain_Value_Definition: Granodiorite of Road V-78
Enumerated_Domain:
 Enumerated_Domain_Value: Jcm
 Enumerated_Domain_Value_Definition: Tonalite of Continental Mountain
Enumerated_Domain:
 Enumerated_Domain_Value: Jcmt
 Enumerated_Domain_Value_Definition: Trondhjemite of Continental Mountain
Enumerated_Domain:
 Enumerated_Domain_Value: Cl
 Enumerated_Domain_Value_Definition: Dolomite
Enumerated_Domain:
 Enumerated_Domain_Value: Zsc
 Enumerated_Domain_Value_Definition: Shedroof Conglomerate
Enumerated_Domain:
 Enumerated_Domain_Value: ZYmi
 Enumerated_Domain_Value_Definition: Mafic intrusive rocks
Enumerated_Domain:
 Enumerated_Domain_Value: Ybq
 Enumerated_Domain_Value_Definition: Buffalo Hump Formation
Enumerated_Domain:
 Enumerated_Domain_Value: Ys
 Enumerated_Domain_Value_Definition: Stensgar Dolomite
Enumerated_Domain:
 Enumerated_Domain_Value: Ym
 Enumerated_Domain_Value_Definition: McHale Slate
Enumerated_Domain:
 Enumerated_Domain_Value: Ywcu
 Enumerated_Domain_Value_Definition: Wabash-Detroit Formation and Chamokane Formation,
undivided
Enumerated_Domain:
 Enumerated_Domain_Value: Ycq
 Enumerated_Domain_Value_Definition: Quartzite unit
Enumerated_Domain:
 Enumerated_Domain_Value: Yt
 Enumerated_Domain_Value_Definition: Togo Formation
Enumerated_Domain:
 Enumerated_Domain_Value: Ymsu
 Enumerated_Domain_Value_Definition: Mount Shields Formation, upper part
Enumerated_Domain:
 Enumerated_Domain_Value: Ymsl
 Enumerated_Domain_Value_Definition: Mount Shields Formation, lower part
Enumerated_Domain:
 Enumerated_Domain_Value: Yhm
 Enumerated_Domain_Value_Definition: Argillite of Half Moon Lake
Enumerated_Domain:
 Enumerated_Domain_Value: Ysh
 Enumerated_Domain_Value_Definition: Shepard Formation
Enumerated_Domain:
 Enumerated_Domain_Value: Yss
 Enumerated_Domain_Value_Definition: Snowslip Formation
Enumerated_Domain:
 Enumerated_Domain_Value: Yw
 Enumerated_Domain_Value_Definition: Wallace Formation

Enumerated_Domain:
  Enumerated_Domain_Value: Ye
  Enumerated_Domain_Value_Definition: Empire Formation
Enumerated_Domain:
  Enumerated_Domain_Value: Ysr
  Enumerated_Domain_Value_Definition: St. Regis Formation
Enumerated_Domain:
  Enumerated_Domain_Value: Yr
  Enumerated_Domain_Value_Definition: Revett Formation
Enumerated_Domain:
  Enumerated_Domain_Value: Ybk
  Enumerated_Domain_Value_Definition: Burke Formation
Enumerated_Domain:
  Enumerated_Domain_Value: Ymi
  Enumerated_Domain_Value_Definition: Mafic sills
Enumerated_Domain:
  Enumerated_Domain_Value: Yp
  Enumerated_Domain_Value_Definition: Prichard Formation
Enumerated_Domain:
  Enumerated_Domain_Value: Ypf
  Enumerated_Domain_Value_Definition: Prichard Formation, fluidized
Enumerated_Domain:
  Enumerated_Domain_Value:
  Enumerated_Domain_Value_Definition: water body
Attribute:
  Attribute_Label: NAME
  Attribute_Definition: Geologic name of map unit (see list under LABEL attribute)
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry.pattern
  Entity_Type_Definition:
   INFO lookup table that contains codes (SYMBOL) from shadeset geology2.shd
   for drawing rock unit patterns
 Attribute:
  Attribute_Label: LABEL
  Attribute_Definition: as in .pat
 Attribute:
  Attribute_Label: SYMBOL
  Attribute_Definition: unit pattern code from shadeset geology2.shd
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry.ru
  Entity_Type_Definition:
   INFO lookup table that contains addditional rock unit attributes including
   color assignment (SYMBOL - from shadeset scamp2.shd included in data
   package) for plotting
 Attribute:
  Attribute_Label: UNIT
  Attribute_Definition: unique value assigned to unit (same as in .pat)
 Attribute:
  Attribute_Label: LABEL
  Attribute_Definition: as in .pat
 Attribute:
  Attribute_Label: SYMBOL
  Attribute_Definition: color symbol from shadeset scamp2.shd
 Attribute:

Attribute_Label: DESC
      Attribute_Definition: Summary rock-unit description
    Attribute:
      Attribute_Label: AGE
      Attribute_Definition: geologic age, as determined radiometrically
  Detailed_Description:
   Entity_Type:
      Entity_Type_Label: bferry_geo.aat
      Entity_Type_Definition:
        Geologic features such as contacts and faults that bound rock-unit
        polygons (a complete description of each line type is available in the
        data table, lines.rel.)
    Attribute:
      Attribute_Label: NAME
      Attribute_Definition: formal name of feature e.g. fault
    Attribute:
      Attribute_Label: L-TAG
      Attribute_Definition:
        Coded alpha-numerical symbol that relates arc to definition of line type
        in dictionary (lines.rel) and, for display purposes, to lookup tables,
        bferry.con and bferry.str. For a complete description of attributes in
        line classification dictionary, refer to USGS Open-File Report 97-861 (see
        Entity_and_Attribute_Detail_Citation)
      Attribute_Domain_Values:
        Enumerated_Domain:
          Enumerated_Domain_Value: C1
          Enumerated_Domain_Value_Definition: generic contact
        Enumerated_Domain:
          Enumerated_Domain_Value: C99
          Enumerated_Domain_Value_Definition: igneous, scratch contact
        Enumerated_Domain:
          Enumerated_Domain_Value: CL1
          Enumerated_Domain_Value_Definition: cartographic line, map boundary
        Enumerated_Domain:
          Enumerated_Domain_Value: F1
          Enumerated_Domain_Value_Definition: high-angle fault, unspecified slip, location meets map
accuracy standard
        Enumerated_Domain:
          Enumerated_Domain_Value: F10
          Enumerated_Domain_Value_Definition: high-angle fault, normal slip, location may not meet map
accuracy standard
        Enumerated_Domain:
          Enumerated_Domain_Value: F11
          Enumerated_Domain_Value_Definition:
            high-angle fault, reverse slip, observable, location may not meet map
            accuracy standard
        Enumerated_Domain:
          Enumerated_Domain_Value: F13
          Enumerated_Domain_Value_Definition:
            high-angle fault, unspecified slip, inferred, location may not meet map
            accuracy standard
        Enumerated_Domain:
          Enumerated_Domain_Value: F19
          Enumerated_Domain_Value_Definition:
            high-angle fault, unspecified slip, inferred beneath mapped covering unit,
            location may not meet map accuracy standard

Enumerated_Domain:
        Enumerated_Domain_Value: F19a
        Enumerated_Domain_Value_Definition:
          high-angle fault, multiply reactivated, inferred beneath mapped covering
          unit, location may not meet map accuracy standard
      Enumerated_Domain:
        Enumerated_Domain_Value: F22
        Enumerated_Domain_Value_Definition:
          high-angle fault, normal slip, inferred beneath mapped covering unit,
          location may not meet map accuracy standard
      Enumerated_Domain:
        Enumerated_Domain_Value: F23
        Enumerated_Domain_Value_Definition:
          high-angle fault, reverse slip, inferred beneath mapped covering unit,
          location may not meet map accuracy standard
      Enumerated_Domain:
        Enumerated_Domain_Value: F31
        Enumerated_Domain_Value_Definition:
          high-angle fault, unspecified slip, questionable, location may not meet
          map accuracy standard
      Enumerated_Domain:
        Enumerated_Domain_Value: F7a
        Enumerated_Domain_Value_Definition:
          high-angle fault, multiply reactivated, location may not meet map accuracy
          standard
      Enumerated_Domain:
        Enumerated_Domain_Value: F137
        Enumerated_Domain_Value_Definition:
          low-angle fault, normal slip, detachment, location meets map accuracy
          standard
      Enumerated_Domain:
        Enumerated_Domain_Value: F138
        Enumerated_Domain_Value_Definition:
          low-angle fault, normal slip, detachment, location may not meet map
          accuracy standard
      Enumerated_Domain:
        Enumerated_Domain_Value: F140
        Enumerated_Domain_Value_Definition:
          low-angle fault, normal slip, detachment, inferred beneath mapped covering
          unit, location may not meet map accuracy standard
Detailed_Description:
  Entity_Type:
    Entity_Type_Label: bferry.con
    Entity_Type_Definition:
      INFO lookup table that stores codes (lineset geoscamp2.lin, color.lin)
      that describe and depict the types of geologic contacts that define
      geologic units in the Bonners Ferry quadrangle
  Attribute:
    Attribute_Label: L-TAG
    Attribute_Definition: as in bferry_geo.aat
  Attribute:
    Attribute_Label: SYMBOL
    Attribute_Definition: line type symbol from lineset geoscamp2.shd
  Attribute:
    Attribute_Label: CONTACT-TYPE
    Attribute_Definition:

    contact (line) classification: generic, scratch, delineation of a water
    body or map boundary
  Attribute:
   Attribute_Label: DESC
   Attribute_Definition:
    summary description of contact type (for a complete description of
    attributes in line classification dictionary, refer to USGS Open-File
    Report 97-861 (see Entity_and_Attribute_Detail_Citation)
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry.str
  Entity_Type_Definition:
   INFO lookup table that stores codes (lineset geoscamp2.lin) that describe
   and depict the types of geologic faults and linear structural features
   that bound and define geologic units in the Bonners Ferry quadrangle
  Attribute:
   Attribute_Label: L-TAG
   Attribute_Definition: as in bferry_geo.aat
  Attribute:
   Attribute_Label: SYMBOL
   Attribute_Definition: as in bferry.con
  Attribute:
   Attribute_Label: FAULT-TYPE
   Attribute_Definition: fault classification
  Attribute:
   Attribute_Label: FOLD-TYPE
   Attribute_Definition: fold axis classification
  Attribute:
   Attribute_Label: DESC
   Attribute_Definition:
    summary description of fault or fold axis type (for a complete description
    of attributes in line classification dictionary, refer to USGS Open-File
    Report 97-861 (see Entity_and_Attribute_Detail_Citation)
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry_fa.aat
  Entity_Type_Definition:
   Fold axes (a complete description of each line type is available in the
   data table, lines.rel.)
  Attribute:
   Attribute_Label: L-TAG
   Attribute_Definition:
    Coded alpha-numerical symbol that relates arc to definition of line type
    in dictionary (lines.rel) and, for display purposes, to bferry.str. For a
    complete description of attributes in line classification dictionary,
    refer to USGS Open-File Report 97-861 (see
    Entity_and_Attribute_Detail_Citation)
  Attribute_Domain_Values:
   Enumerated_Domain:
    Enumerated_Domain_Value: FA33
    Enumerated_Domain_Value_Definition: upright anticline
   Enumerated_Domain:
    Enumerated_Domain_Value: FA97
    Enumerated_Domain_Value_Definition: upright syncline
Detailed_Description:
 Entity_Type:

Entity_Type_Label: bferry_fa.pat
Entity_Type_Definition: Geologic line ornamentation, point symbols
 Attribute:
 Attribute_Label: P-TAG
 Attribute_Definition:
  Coded alpha-numerical symbol that relates point to definition of point
  type in dictionary (points.rel) and, for display purposes, to bferry.orn.
  For a complete description of attributes in point classification
  dictionary, refer to USGS Open-File Report 97-859 (see
  Entity_and_Attribute_Detail_Citation)
 Attribute_Domain_Values:
  Enumerated_Domain:
   Enumerated_Domain_Value: FAC10
   Enumerated_Domain_Value_Definition: upright axial plane,syncline
  Enumerated_Domain:
   Enumerated_Domain_Value: FAC17
   Enumerated_Domain_Value_Definition: plunge direction, anticline
  Enumerated_Domain:
   Enumerated_Domain_Value: FAC19
   Enumerated_Domain_Value_Definition: plunge direction, syncline
  Enumerated_Domain:
   Enumerated_Domain_Value: FAC4
   Enumerated_Domain_Value_Definition: upright axial plane, anticline
  Enumerated_Domain:
   Enumerated_Domain_Value: FC1
   Enumerated_Domain_Value_Definition: bar and ball on downdropped fault block
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry.orn
  Entity_Type_Definition:
   INFO lookup table that stores codes (markerset geoscamp2.mrk) that
   describe and depict the types of geologic line ornamentation in the
   Bonners Ferry quadrangle
 Attribute:
  Attribute_Label: P-TAG
  Attribute_Definition: as in bferry_fa.pat
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry_pts.pat
  Entity_Type_Definition:
   Geologic structural point data includes site-specific information
   describing the types and orintation of bedding, foliation, and lineation.
   One annotation subclass, ANNO.VALUE, displays the respective dip and
   plunge values associated with individual point data.
 Attribute:
  Attribute_Label: P-TAG
  Attribute_Definition:
   Coded alpha-numerical symbol that relates point to definition of point
   type in dictionary (points.rel) and, for display purposes, to bferry.att.
   For a complete description of attributes in point classification
   dictionary, refer to USGS Open-File Report 97-859 (see
   Entity_and_Attribute_Detail_Citation)
 Attribute_Domain_Values:
  Enumerated_Domain:
   Enumerated_Domain_Value: B1
   Enumerated_Domain_Value_Definition: horizontal sedimentary bedding

Enumerated_Domain:
  Enumerated_Domain_Value: B2
  Enumerated_Domain_Value_Definition: inclined sedimentary bedding
 Enumerated_Domain:
  Enumerated_Domain_Value: B4
  Enumerated_Domain_Value_Definition: vertical sedimentary bedding
 Enumerated_Domain:
  Enumerated_Domain_Value: B6
  Enumerated_Domain_Value_Definition: overturned sedimentary bedding
 Enumerated_Domain:
  Enumerated_Domain_Value: FN13
  Enumerated_Domain_Value_Definition: primary, inclined igneous foliation
 Enumerated_Domain:
  Enumerated_Domain_Value: FN14
  Enumerated_Domain_Value_Definition: primary, vertical igneous foliation
 Enumerated_Domain:
  Enumerated_Domain_Value: FN31
  Enumerated_Domain_Value_Definition: inclined, strain-dominated foliation
 Enumerated_Domain:
  Enumerated_Domain_Value: FN42
  Enumerated_Domain_Value_Definition: inclined, metamorphic foliation
 Enumerated_Domain:
  Enumerated_Domain_Value: FN43
  Enumerated_Domain_Value_Definition: vertical, metamorphic foliation
 Enumerated_Domain:
  Enumerated_Domain_Value: L22
  Enumerated_Domain_Value_Definition: metamorphic lineation
 Enumerated_Domain:
  Enumerated_Domain_Value: L37
  Enumerated_Domain_Value_Definition: minor fold axis lineation
 Enumerated_Domain:
  Enumerated_Domain_Value: L6
  Enumerated_Domain_Value_Definition: igneous lineation
Attribute:
 Attribute_Label: STRIKE
 Attribute_Definition: Azimuthal strike of planar feature
Attribute:
 Attribute_Label: DIP
 Attribute_Definition: Dip (inclination) of planar feature
Attribute:
 Attribute_Label: DIPDIR
 Attribute_Definition: Azimuthal direction of dip of planar feature
Attribute:
 Attribute_Label: BEARING
 Attribute_Definition: Azimuthal direction of plunge of linear feature
Attribute:
 Attribute_Label: PLUNGE
 Attribute_Definition: Plunge of linear feature
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry.att
  Entity_Type_Definition:
   INFO lookup table that stores codes (markerset geoscamp2.mrk) that
   describe and depict the types of geologic structural point data in the
   Bonners Ferry quadrangle
 Attribute:

Attribute_Label: P-TAG
Attribute_Definition: as in bferry_pts.pat
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry_anno.pat
  Entity_Type_Definition: Point locality symbol for significant geographic features
 Attribute:
  Attribute_Label: P-SYMB
  Attribute_Definition:
   Coded integer value that relates point to cartographic point symbol in
   markerset, geoscamp2.mrk
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: bferry_anno.aat
  Entity_Type_Definition: Geologic unit label annotation leaders
 Attribute:
  Attribute_Label: L-SYMB
  Attribute_Definition:
   Coded integer value (1) that relates arcs to cartographic line symbol in
   lineset geoscamp2.lin
Detailed_Description:
 Entity_Type:
  Entity_Type_Label: hypso.aat, hydro.aat, trans_rds.aat, trans_rail.aat
  Entity_Type_Definition:
   Four DLG derived coverages that retain the original DLG attribution or are
   minimally attributed (hypso, trans_rds, and trans_rail) to facilitate
   display and plotting. These data are provided as base information, only.
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 Metadata_Date: 20031212
 Metadata_Review_Date: 20031220
 Metadata_Contact:
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   Contact_Organization_Primary:
    Contact_Organization: U.S. Geological Survey
    Contact_Person: Pamela M. Cossette
   Contact_Position: Geographer
   Contact_Address:
    Address_Type: mailing address
    Address: U.S. Geological Survey, Rm. 202, 904 West Riverside Avenue
    City: Spokane
    State_or_Province: Washington
    Postal_Code: 99201-1087
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   Contact_Voice_Telephone: 509-368-3123
   Contact_Facsimile_Telephone: 509-368-3199
   Contact_Electronic_Mail_Address: pcossette@usgs.gov
 Metadata_Standard_Name: FGDC Content Standard for Digital Geospatial Metadata (version 2.0)
 Metadata_Standard_Version: FGDC-STD-001-1998
 Metadata_Access_Constraints: none
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