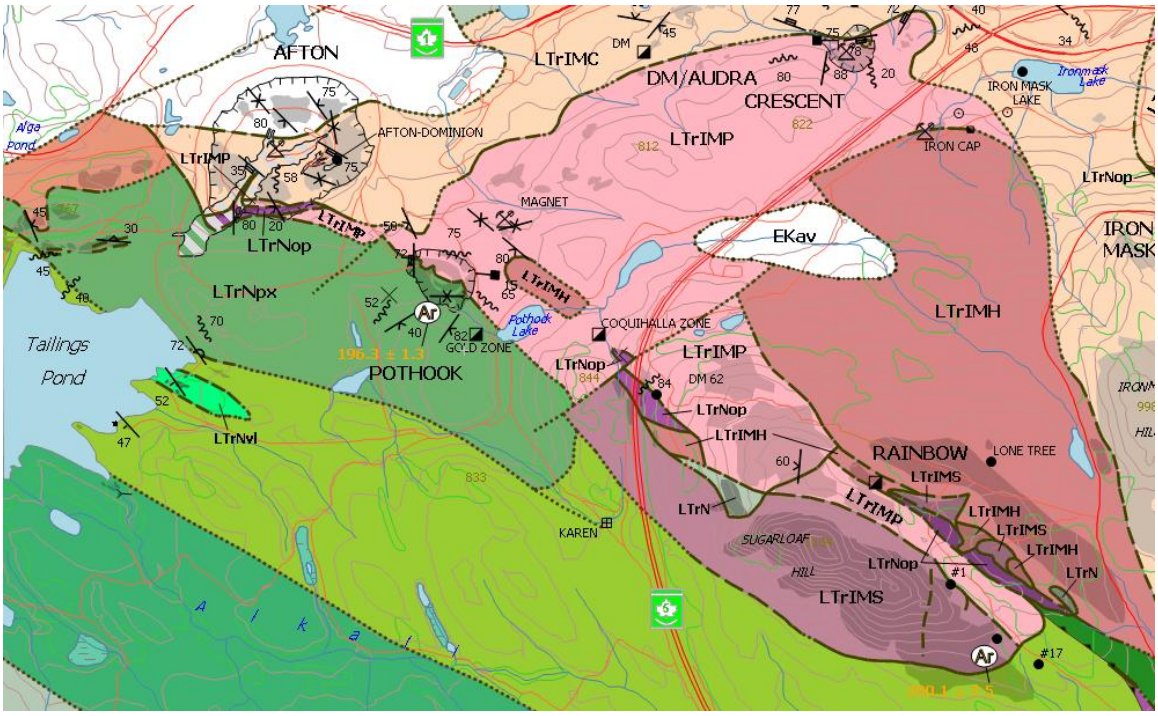
Geofile 2006-6



British Columbia Geological Survey Branch symbols V1.7 and V2.0 for Manifold® Geographic Information System

By: Mitchell G. Mihalynuk, Brian Grant and Shannon M.S. Mallory

Introduction

Geofile 2006-6 supersedes Geofile 2005-16, providing more complete and correct geological symbol, line type, and pattern libraries for Manifold® Geographic Information System (GIS). Manifold® is a full-featured, inexpensive, commercial GIS that costs one or two orders of magnitude less than other GIS software suites having comparable functionality. It operates under Windows XP, providing formidable GIS analytical and display capabilities to anybody with a modest budget, and has been adopted as the principal GIS tool for map production at the British Columbia Geological Survey Branch.

For the production of geological maps, Manifold®[1] right out of the box, lacks some key functionality. Manifold6.0 lacked a suitable thrust fault line type, or the ability to build custom line types (mostly an issue for thrust faults), and no version of Manifold includes a library of geological symbols or geological pattern fills. Manifold6.0 includes a built-in triangle barb line type that can be used as a proxy for the thrust fault line type (see the figure on the cover of Geofile 2005-16, which is modified after Logan and Mihalynuk, 2006). Problematic lack of a thrust fault, or other fault line symbols (as well as isograds or other isopleths) is partly solved in Manifold6.5, with the ability to build custom line styles through a pared-down implementation of Extensible Markup Language (XML). Custom line styles are provided as part of Geofile 2006-6 (thrust and normal fault styles: defined, approximate, assumed) which produce cartographically pleasing results within Manifold6.5.

Geofile 2006-6 provides more than 180 geological and related symbols and two dozen fill patterns ("area styles" in Manifold), some of which were originally released as Geofile 2005-16, and have been corrected and enhanced. Geofile 2006-6 is principally comprised of seven digital files, plus a collection of image files (*.png):

1. This report, Geofile2006-6.pdf
2. Version 1.7 XML coded symbols and fills for Manifold 6.0 or legacy maps: *BCGSgeosymbolV1.7.3.xml*
3. Manifold project file named *BC Geological Survey symbols V1.7.3.map* (hereafter referred to as V1.7). It includes drawings of version 1.7 (BCGS GeosymbolsV1.7) symbols and fills and tabulation of codes.
4. Version 1.7 Manifold point style theme: *BCGSgeosymbolsV1.7Theme.xml*

Version 1.7

5. Version 2.0 XML coded symbols, fills and line styles for Manifold 6.5: *BCGSgeosymbolV2.0.4.xml*
6. Manifold project file named *BC Geological Survey symbols V2.0.4.map* (hereafter referred to as V2.0). It includes drawings and tabulations of the most up-to-date version of symbols, patterned fills and line-types publicly available from the BC Geological Survey Branch (BCGS GeosymbolsV2.0).
7. Version 2.0 Manifold point style theme: *BCGSgeosymbolsV2.0Theme.xml*
8. Portable Network Graphics image files: 8 files, about 800 bytes each, which are shaded, 3-D representations of coloured dew drops. To use these files, they must be copied to a subdirectory of the "*Manifold System\Config*" directory named "*images*" i.e.: "*...\Manifold System\Config\images*".

Version 2.0

[1] Hitherto referred to as "Manifold".

Which version is for you:
Version 1.7: for users of Manifold6.0 or for those who want to preserve the appearance of symbols in existing map projects with minimal changes as a result of the new symbol set.

Version 2.0: for users of Manifold6.5 if you have no prior investment in Manifold, or have not used BCGSgeosymbols before, use this version. WARNING: use of this symbol set with maps containing V1.5 symbols will need to have new thematic formatting applied. Not tested with older versions of Manifold.

BCGSgeosymbols V1.7

V1.7 is the public release of corrections to earlier version, V1.5 (May, 2005) of a library of geological symbols for use in Manifold (Figure 1). Symbols are based upon Specifications and *Guidelines for Bedrock Mapping in British Columbia* (BC Geological Survey, 1997), and *Geoscience Reporting Guidelines* (Grant, 2003). The most significant correction in V1.7 is the placement of ticks on the brittle shear and pillow layering symbols. Numerous other refinements have been included, mainly improvements to the aesthetics of the symbols and streamlining of the xml code. We recommend that you use BCGSgeosymbols V 2.0 and spend the few minutes that it might take to update the thematic point style formatting.

BCGSgeosymbols V2.0

BCGSgeosymbols V2.0 is the public release and enhancement of version, V1.7 library of geological symbols and patterns. It includes many additional symbols, and thrust fault line styles and is intended for use in Manifold 6.5 (custom line styles are not supported by Manifold 6.0). Symbols are grouped on common theme and some symbols are presented with different colour schemes. BCGSgeosymbols V2.0 includes reference to several very compact .png image files which must be copied to the subdirectory …Manifold\Config\images before they can be accessed.

Installation

Users gain access to the symbol library by copying *BCGSgeosymbolV1.7.3.xml* **OR** *BCGSgeosymbolV2.0.4.xml* (**NOT BOTH**) to the *...Manifold\Config* subdirectory and then restarting Manifold.

IMPORTANT:

- If you are currently using BCGSgeosymbolV1.5, rename *BCGSgeosymbolV1.5.xml* so that it will not load when Manifold is started (e.g. rename *BCGSgeosymbolV1.5.**xml*** to *BCGSgeosymbolV1.5.**bak***).
- If you choose to use *BCGSgeosymbolV2.0.4.xml*, ensure that you include the ***images*** subdirectory (e.g. C:\Program Files\Manifold System\Config\images) containing the .png files that are called by *BCGSgeosymbolV2.0.4.xml*.

All of the symbols can be scaled, rotated and coloured, like other symbols available in Manifold (except for coloured dew drops). They can be selected by scrolling to near the bottom of the symbol pick box.

HINT: if you use standard BC Geological Survey Branch feature codes which label each symbol in Figure 1, you can apply either the *BCGSgeosymbolV.1.7Theme.xml* OR the *BCGSgeosymbolV.2.0Theme.xml* theme file to automatically assign geological symbols to a coded point. Otherwise, if you prefer to manually pick symbols for a thematic query, it is best to apply a default geological symbol to all points representing structural measurements and then edit them. Assigning a default geological symbol will avoids the tedium of scrolling to the end of the symbol pick box list each time you wish to select a geological symbol. Version 2.0 symbol set contains an appropriately sized default symbol located in the pick list between the bedding/contact symbols and the pillow layering symbols.

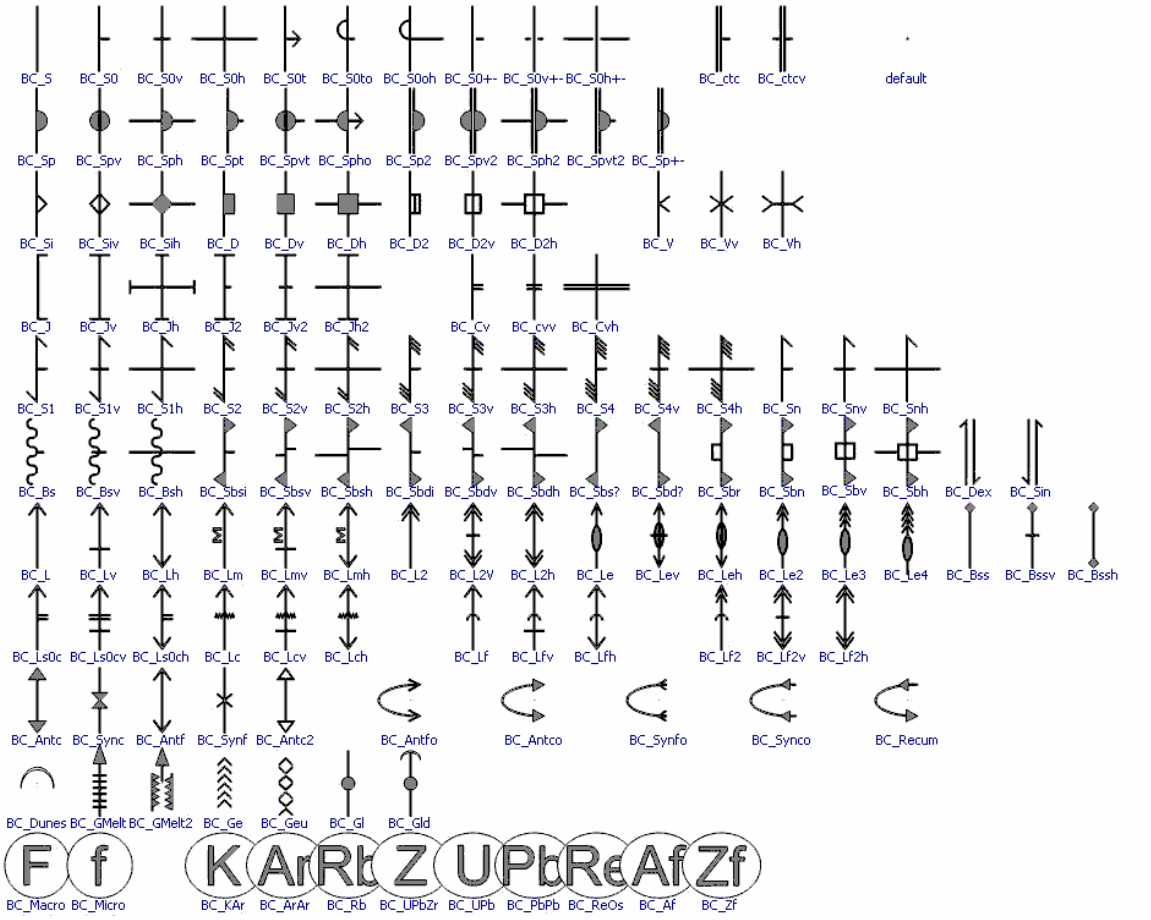
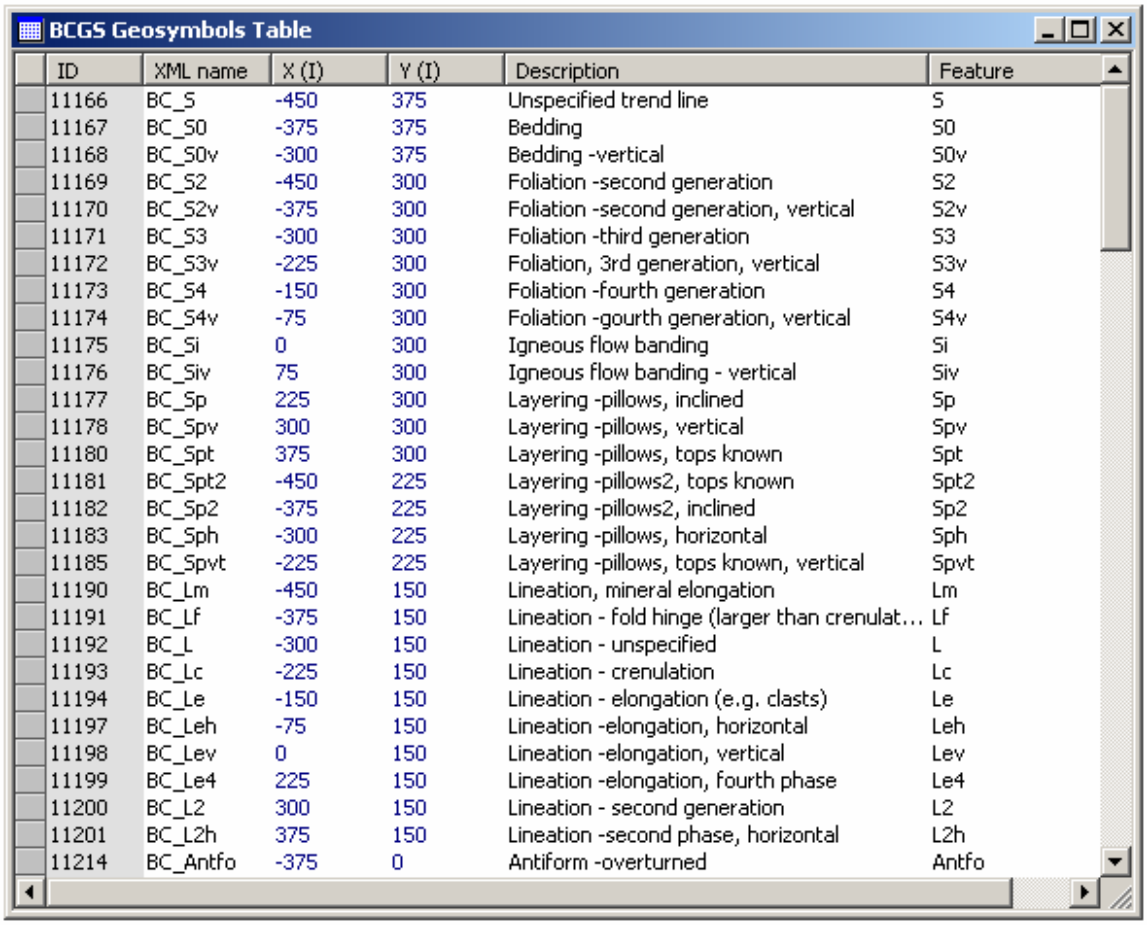


Figure 1. A portion of the map provided in *BCGSsymbol&patternV2.0.map* as displayed from the MapOfVer2Symbols from within Manifold. These symbols are available in Manifold once *BCGSgeosymbolV2.0.4.xml* is copied to the *...\Manifold\Config* subdirectory and the program is restarted. Note that the point background colour is set to grey, but it could be set to any colour.



BCGS Geosymbols Table

ID	XML name	X (I)	Y (I)	Description	Feature
11166	BC_S	-450	375	Unspecified trend line	S
11167	BC_S0	-375	375	Bedding	S0
11168	BC_S0v	-300	375	Bedding -vertical	S0v
11169	BC_S2	-450	300	Foliation -second generation	S2
11170	BC_S2v	-375	300	Foliation -second generation, vertical	S2v
11171	BC_S3	-300	300	Foliation -third generation	S3
11172	BC_S3v	-225	300	Foliation, 3rd generation, vertical	S3v
11173	BC_S4	-150	300	Foliation -fourth generation	S4
11174	BC_S4v	-75	300	Foliation -gourth generation, vertical	S4v
11175	BC_Si	0	300	Igneous flow banding	Si
11176	BC_Siv	75	300	Igneous flow banding - vertical	Siv
11177	BC_Sp	225	300	Layering -pillows, inclined	Sp
11178	BC_Spv	300	300	Layering -pillows, vertical	Spv
11180	BC_Spt	375	300	Layering -pillows, tops known	Spt
11181	BC_Spt2	-450	225	Layering -pillows2, tops known	Spt2
11182	BC_Sp2	-375	225	Layering -pillows2, inclined	Sp2
11183	BC_Sph	-300	225	Layering -pillows, horizontal	Sph
11185	BC_Spvt	-225	225	Layering -pillows, tops known, vertical	Spvt
11190	BC_Lm	-450	150	Lineation, mineral elongation	Lm
11191	BC_Lf	-375	150	Lineation - fold hinge (larger than crenulat...	Lf
11192	BC_L	-300	150	Lineation - unspecified	L
11193	BC_Lc	-225	150	Lineation - crenulation	Lc
11194	BC_Le	-150	150	Lineation - elongation (e.g. clasts)	Le
11197	BC_Leh	-75	150	Lineation -elongation, horizontal	Leh
11198	BC_Lev	0	150	Lineation -elongation, vertical	Lev
11199	BC_Le4	225	150	Lineation -elongation, fourth phase	Le4
11200	BC_L2	300	150	Lineation - second generation	L2
11201	BC_L2h	375	150	Lineation -second phase, horizontal	L2h
11214	BC_Antfo	-375	0	Antiform -overturned	Antfo

Figure 2. Part of the geocoded table as displayed within Manifold, which was used to create the map on the title page.

BCGSgeopatterns

Two dozen different, geological pattern fills are coded and included as part of *BCGSgeosymbolV.1.7.xml* and *BCGSgeosymbolV.2.0.xml*. (Figure 3). One or the other will be available for use once the respective file is copied into the *...Manifold\Config* directory and the program is restarted. These patterned fills can be scaled, and different foreground and background colours can be applied like any other “area style” built into Manifold.

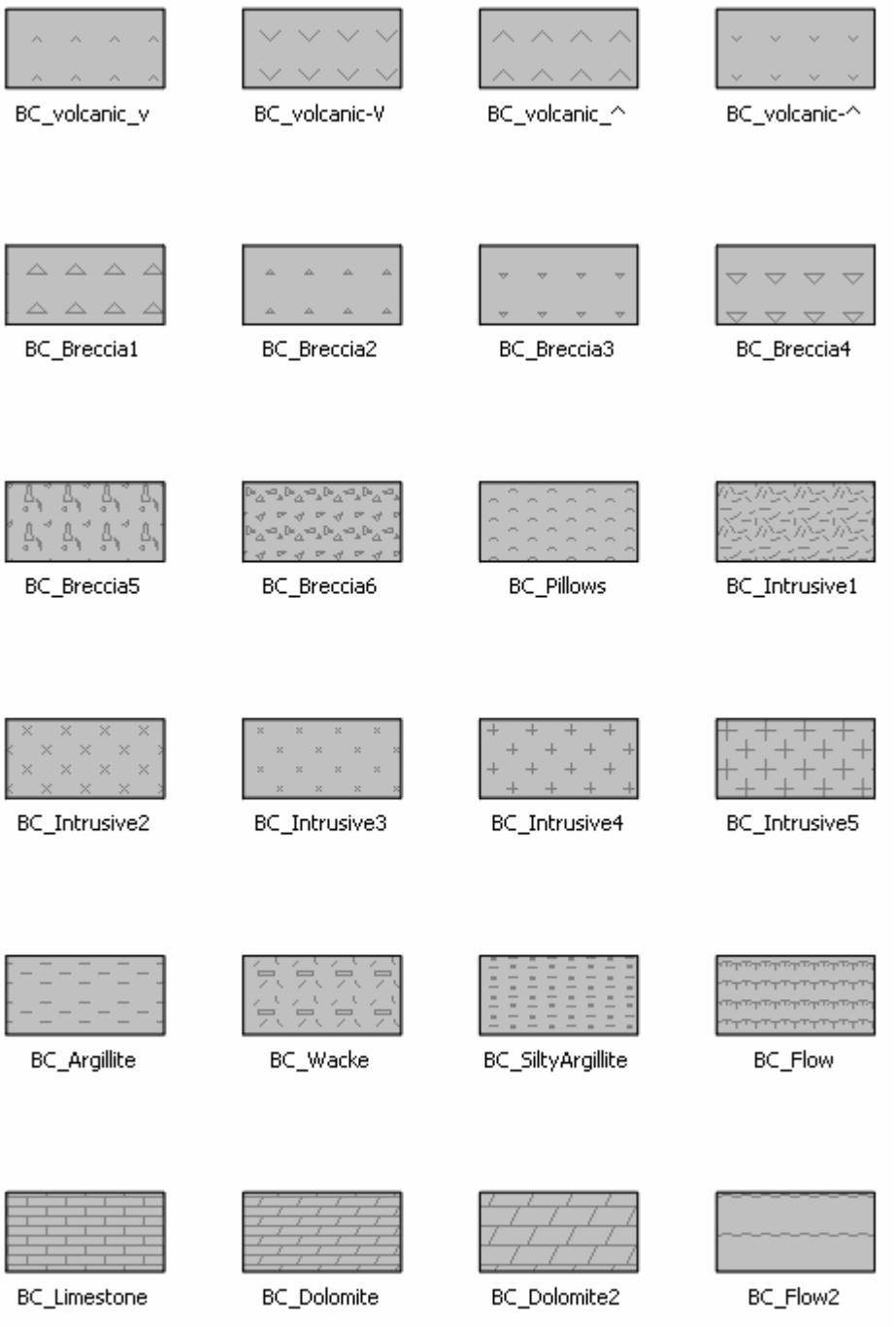


Figure 3. A portion of the map provided in *BCGSsymbol&patternV1.7.3.map* as displayed from within Manifold. These fill patterns are available in Manifold once *BCGSgeosymbolV1.7.3.xml* OR *BCGSgeosymbolV2.0.4.xml* is copied to the *...\Manifold\Config* subdirectory and the program is restarted.

Terms of use

Any person may freely use, copy and distribute these files. However, please ensure that use of this material is appropriately referenced and that all files are distributed as a package with the documentation. By doing so, you will help to justify future development of this and other geological mapping facilities at the BC Geological Survey. Use at your own discretion. We cannot accept responsibility for damages that may arise from the use of these symbols.

References Cited

BC Geological Survey (1997): Specifications and Guidelines for Bedrock Mapping in British Columbia; *BC Ministry of Energy and Mine*s, Information Circular 1997-3, 186 pages, ISBN 0-7726-2950-1; URL http://www.em.gov.bc.ca/Mining/Geolsurv/Publications/InfoCirc/IC1997-03/toc.htm

Grant, B. (2003): *Geoscience Reporting Guidelines*; Victoria, BC, Canada, ISBN 0-9687963-1-4, 356 pages. http://members.shaw.ca/geomanual/

Logan, J. M., and Mihalynuk, M. G. (2006): Geology of the Iron Mask Batholith, Open File 2006-11, 1:25000 scale. http://www.em.gov.bc.ca/Mining/Geolsurv/Publications/OpenFiles/OF2006-11/toc.htm

Mihalynuk, M.G., Mallory, S.M. and Grant, B. (2005): British Columbia Geological Survey Branch symbols for Manifold® Geographic Information System; Geofile 2005-16.