DIGITAL MAPPING TECHNIQUES 2013

The following was presented at DMT'13
(June 2-5, 2013 - Colorado Geological Survey and Colorado School of Mines
Golden, CO)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2013)

http://ngmdb.usgs.gov/info/dmt/

Natural Resources Canada

Automating Tasks for Map Production and Data Dissemination

by Vic Dohar

DIGITAL MAPPING TECHNIQUES 2013
GOLDEN, CO
JUNE 2-5, 2013

Presentation Goals

- Overview of geological map production at the Geological Survey of Canada
- Tasks that we have automated to support map production and publication outputs
- Provide ideas and inspiration for automation

Background

- GSC has six regional offices, cartography and GIS sections

- Using ESRI software for map production since the early 1990's
- Recent integration with Geological Map Flow

Geological Map Flow

- GMF is a project of the GEM Program (Geo-mapping for Energy and Minerals)
  - The Government of Canada is investing $100 million over five years (2008-2013)
  - GEM will focus mainly on mapping the Arctic and will use modern geological methods and standards to identify the potential for energy and mineral resources
- Support the implementation of a streamlined and robust procedure for the collection, the preparation and the dissemination of geological information

GMF Components

MAJORITY OF WORK

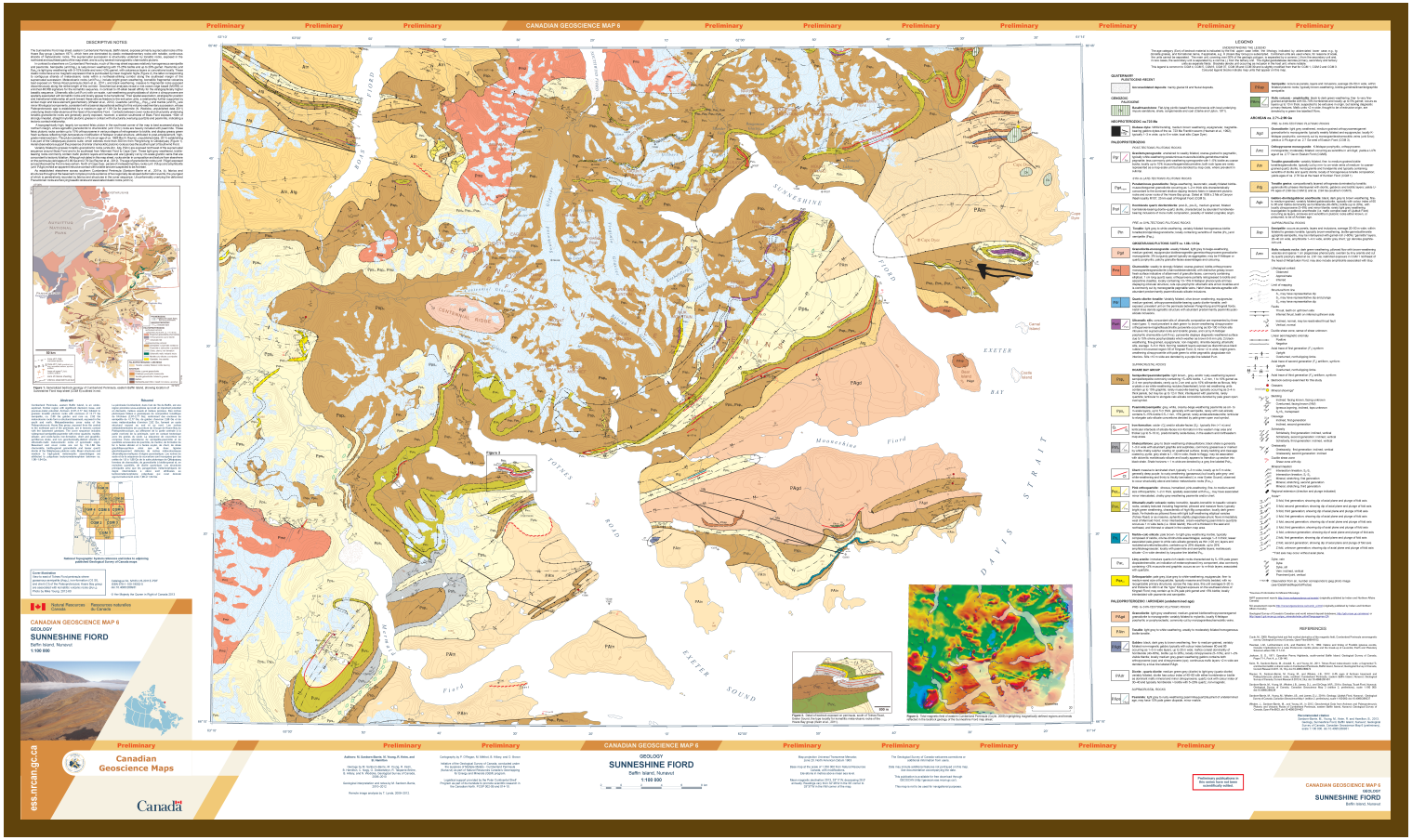
1. Field Data Collection – field work and surveys, GanFeld mobile/tablet application, aerial photography interpretation, analysis
2. Geodatabase Management – integrating field data and the interpreted geological map with data models and common science language
3. Data Dissemination – map production and digital ready products for Canadian Geoscience Map publications

Data Dissemination

- Major challenges:
  - Adapting to new process and methodologies
    - Passing ownership and management of geological data to geologist
    - Elimination of print product
  - Adapting to new software technologies
    - Transition from Workstation to ArcMap
    - Requires new procedures and documentation
    - New symbols and agreement on standard
    - Re-writing programs and scripts
  - Ensure everyone is on board

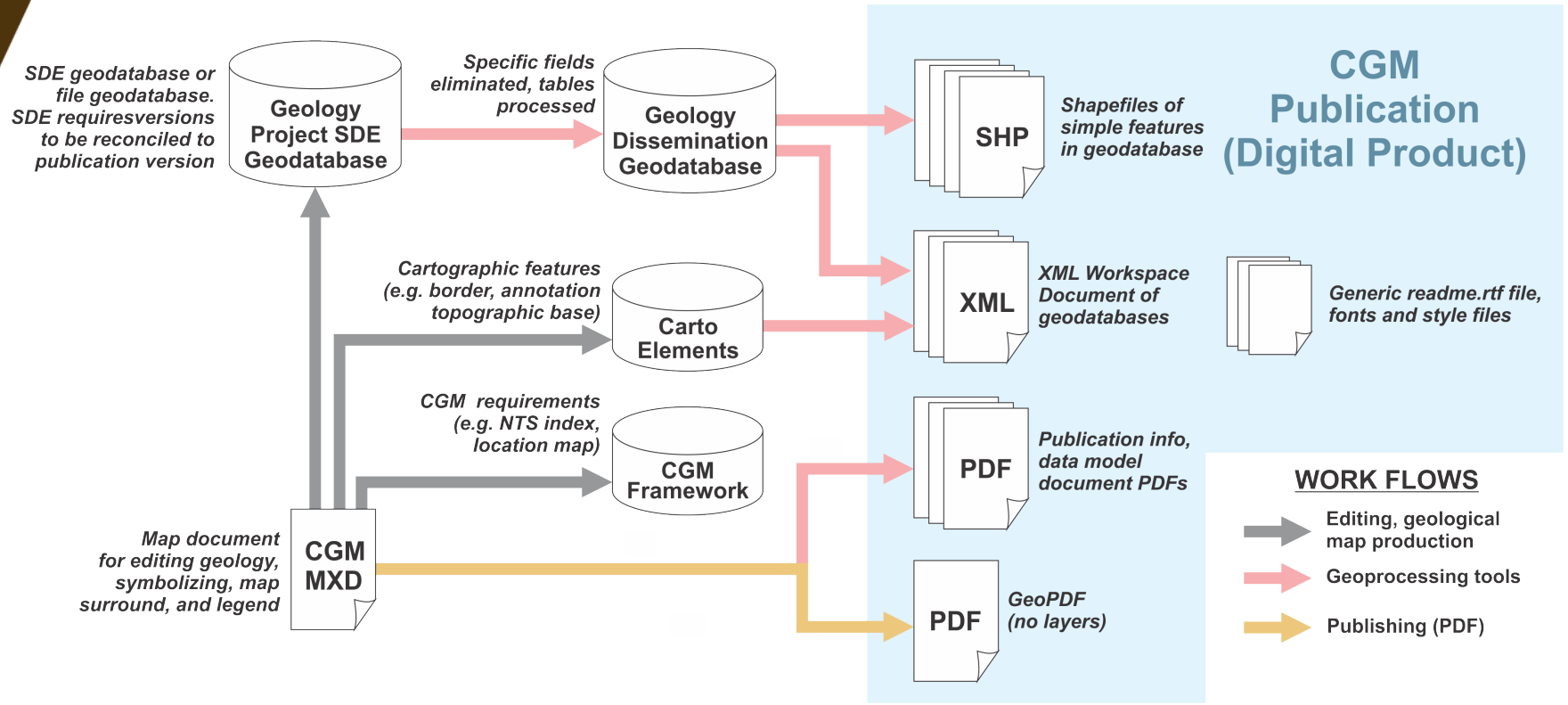
CGM Publication

- No more printing. Only PDF and digital data.



Publication Workflow

- Keeping it simple!

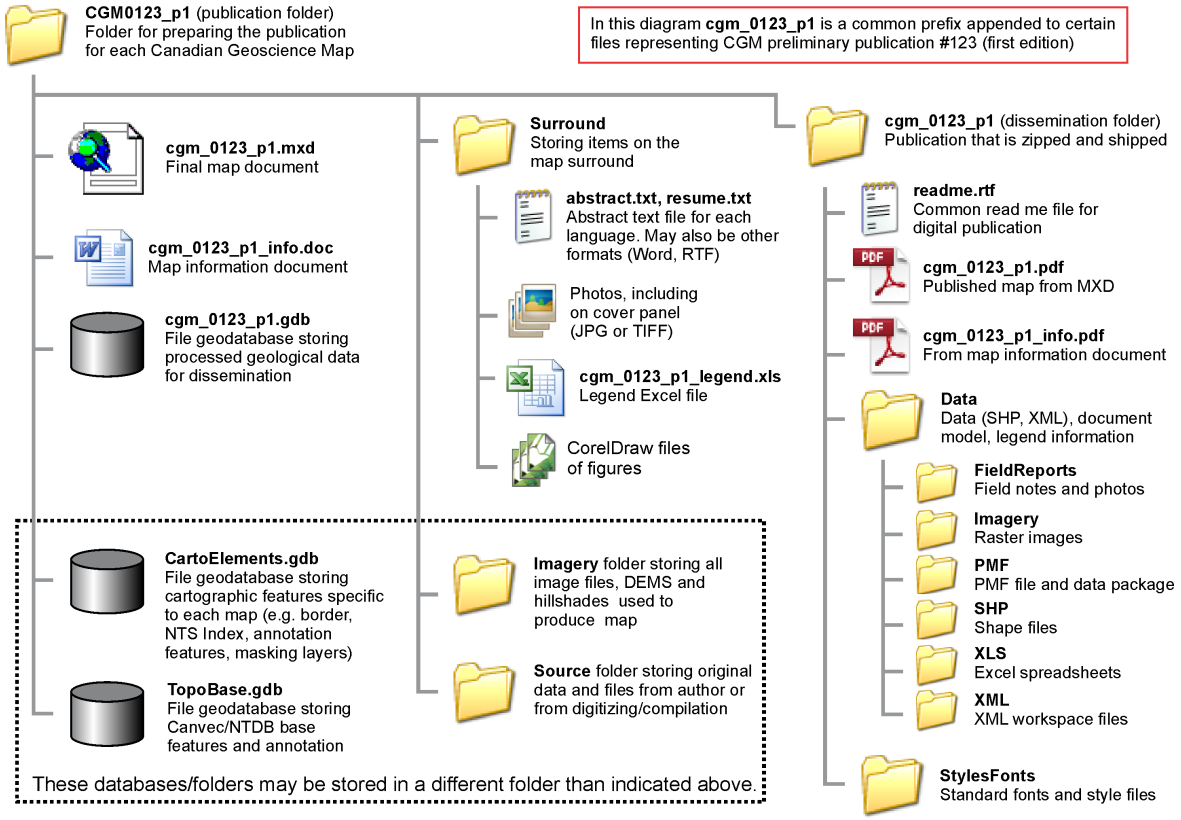


Automation - Python/VB

- Establishing the project workspace
- Create map border and UTM grid for publication
- Extract topographic base data
- Map layout management wizards
- Create publication/disseminate data

Establishing Workspace

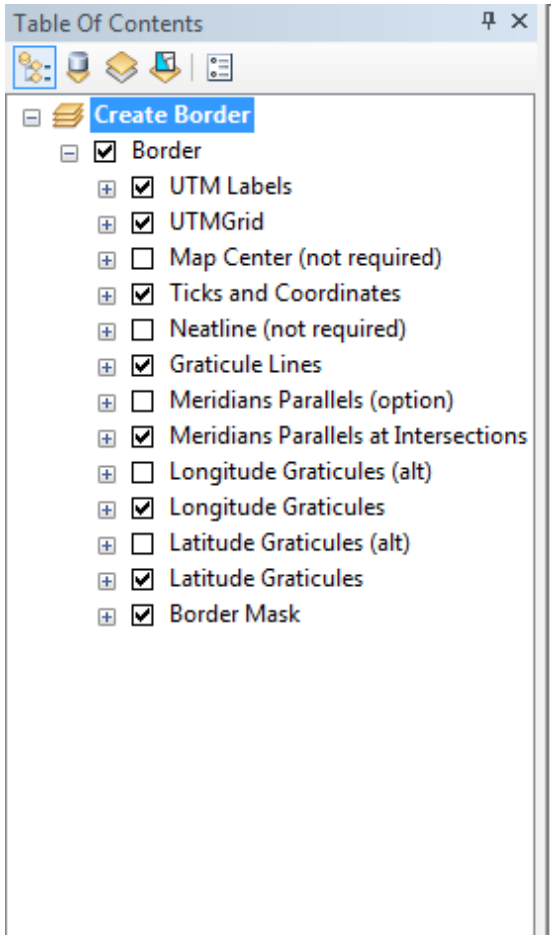
- Simple python script to create the required folders and files

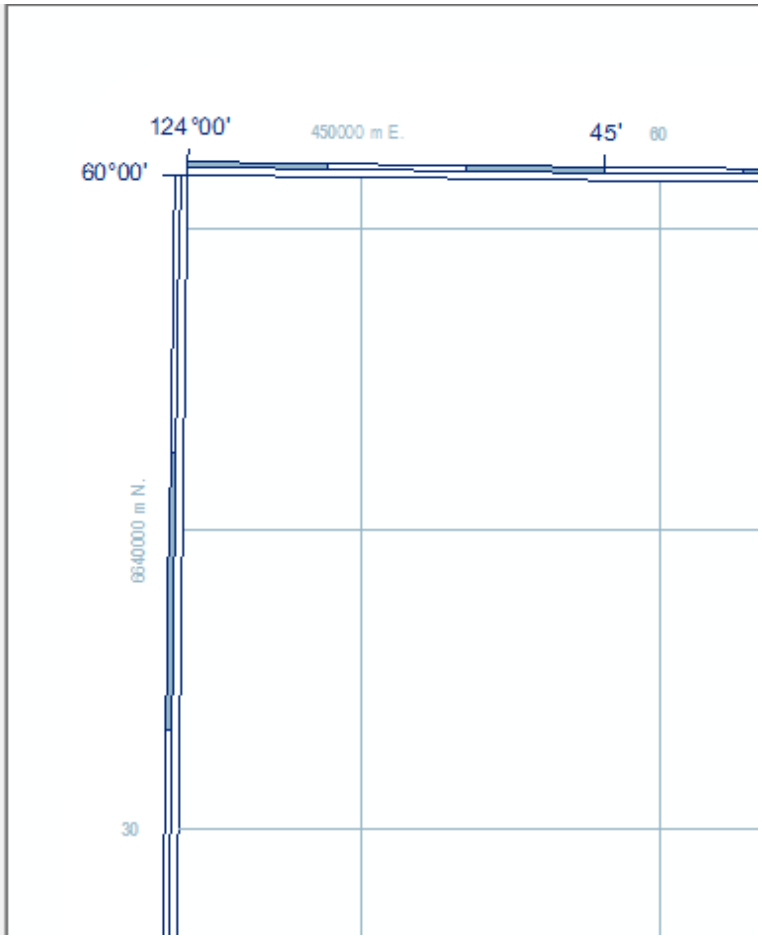


Creating Map Border

- Custom latitude and longitude border with UTM grid coordinates
- Features created based on publication scale
- Uses Maplex labelling for coordinates
- Creates other features (e.g. neatline polygon)

Creating Map Border



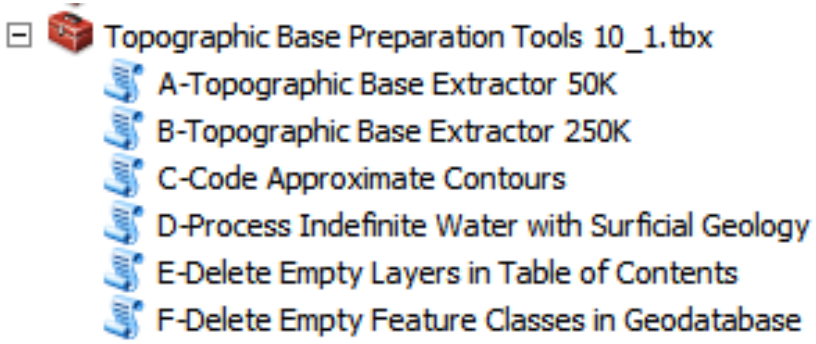


Base Data Sources

- Canadian National Topographic System (NTS)
  - 1:50,000 (+13,400 tiles/sheets, CanVec)
  - 1:250,000 (+1500 tiles/sheets, NTDB - National Topographic Database)
- National Atlas data for smaller scale maps
- Data stored in SDE geodatabase
- Also available as shape files per tile/sheet

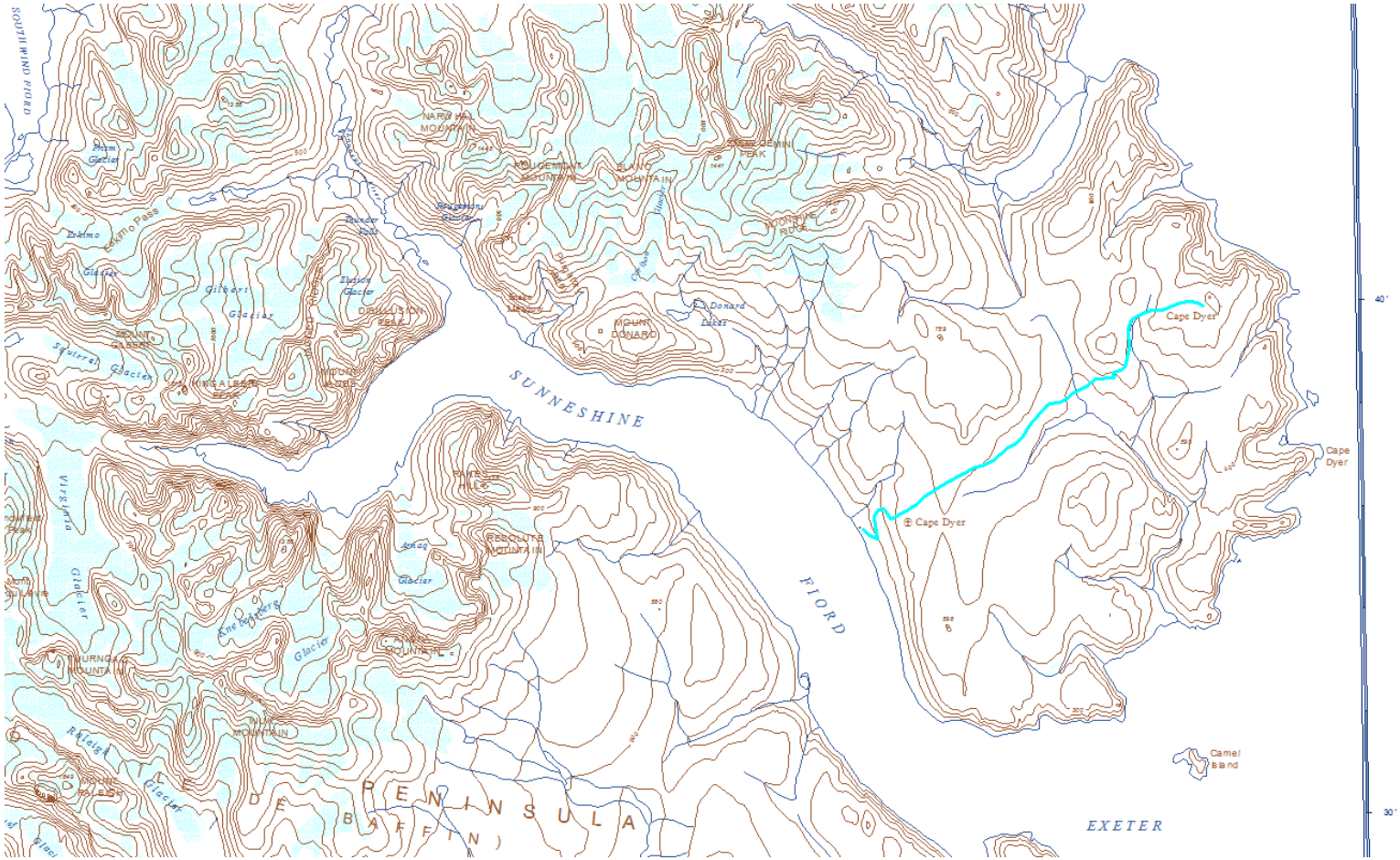
Base Extraction Script

- Use neatline from border to clip base features into a file geodatabase



- Processing of contours, creating shoreline from water bodies, bedrock/surficial specific tasks
- Template/MXD with defined layers and symbology
- Labelling of point features for all base text (contours, elevations, hydrology, base text)
- Remove empty feature classes and layers from TOC

Topographic Base Sample



Map Production

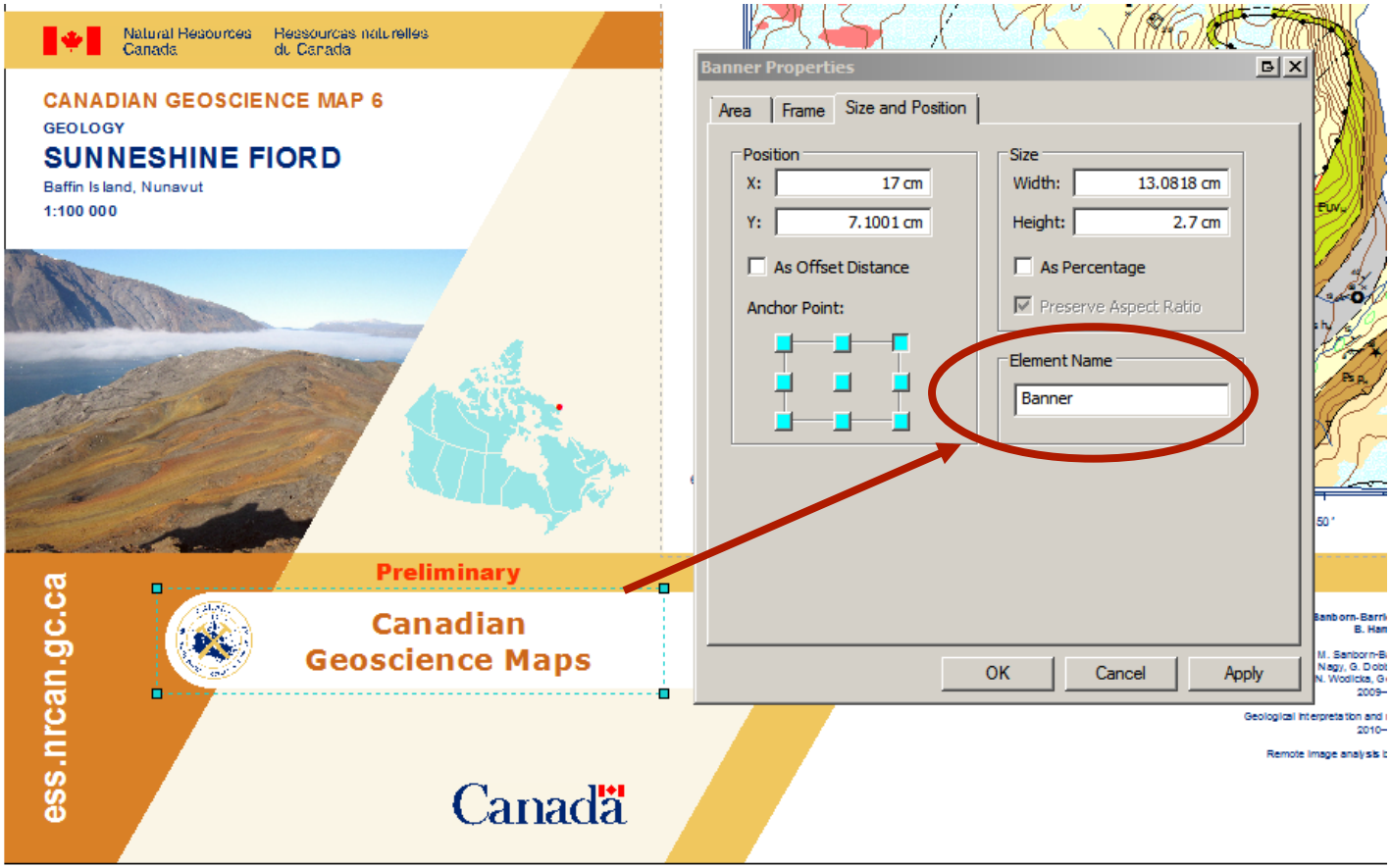
- Template/MXD containing graphics for CGM

Map Layout Management

- Application manages surround graphic elements
  - Placement and rotation of main map data frame
  - Position and size map surround elements (default location or relative to other elements)
  - Corrects drawing order
  - Updates map titles and citation
  - Adjust page size to fit map, surround and legend
- Guarantees adherence to design specifications
- Achieved by application using graphic properties: Element Name

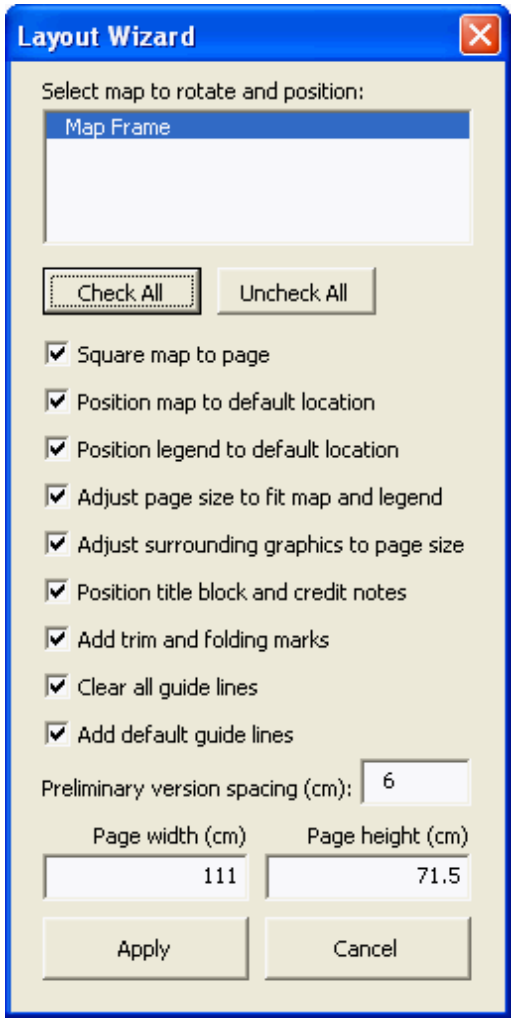
Graphic Element Properties

- Each graphic element has a unique name



Layout Wizard

- VBA application written for ArcGIS 9.x (runs in 10.1 with VBA plug-in for ArcMap)
- Migrating to Python with new mapping module in 10.1
  - MapDocument, GraphicElement, TextElement, DataFrame classes all have properties to perform similar functionality
  - Except…



Layout Wizard

- MapDocument:pageSize property is read-only

pageSize (Read Only)	Provides the ability to get the layout's page size. It returns a named tuple with the properties `width` and `height`.	tuple

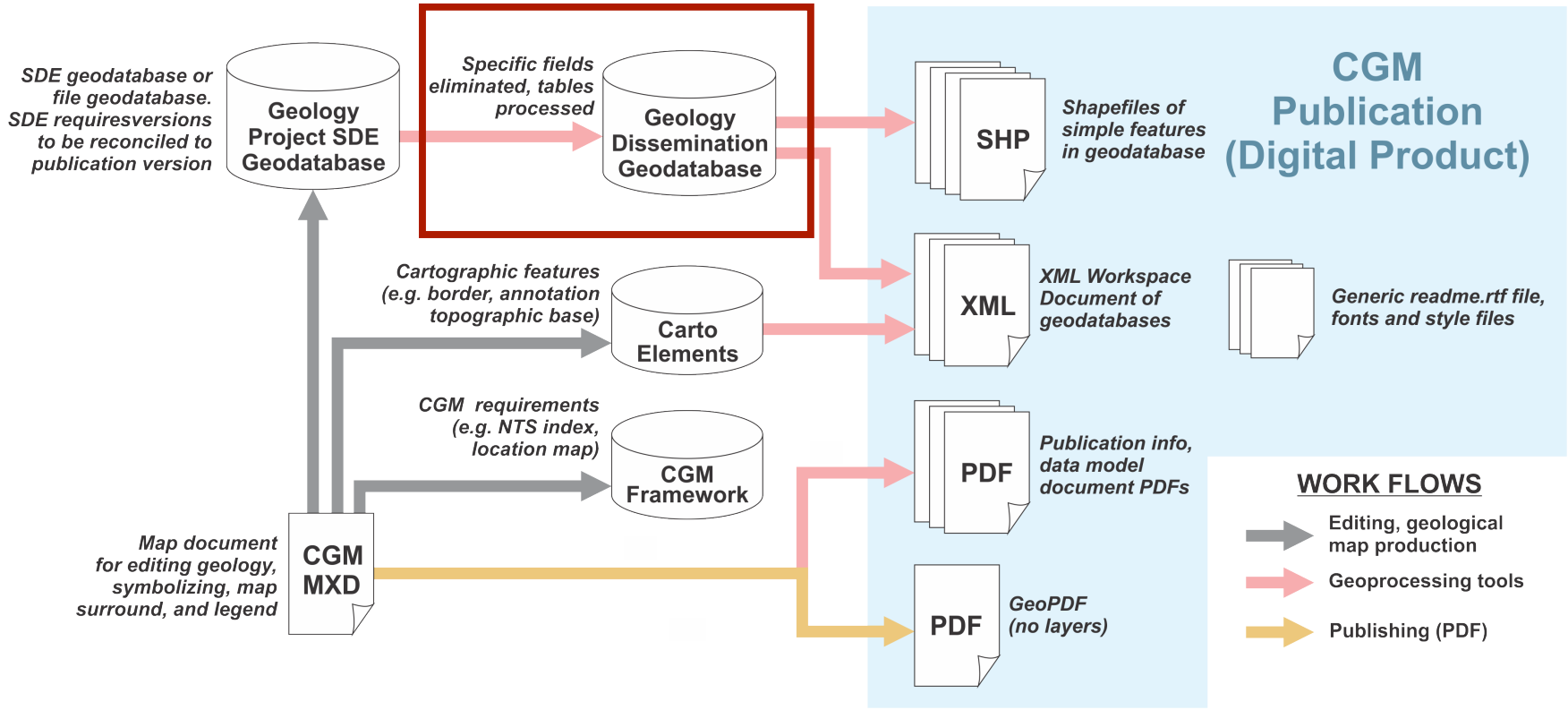
- Solution is to run some ArcObjects code from Python

CGM Publication

- No more print products (offset or on-demand)
- Digital download (zip file from Geogratis)
  - PDFs
    - Map
    - Map information document (source is map)
    - Data model description
  - Shape Files (geology, base, cartography)
  - XML Workspace Document of geodatabases
  - Images, tables and other supporting datasets
  - Symbols (TrueType and style files)
  - Generic readme

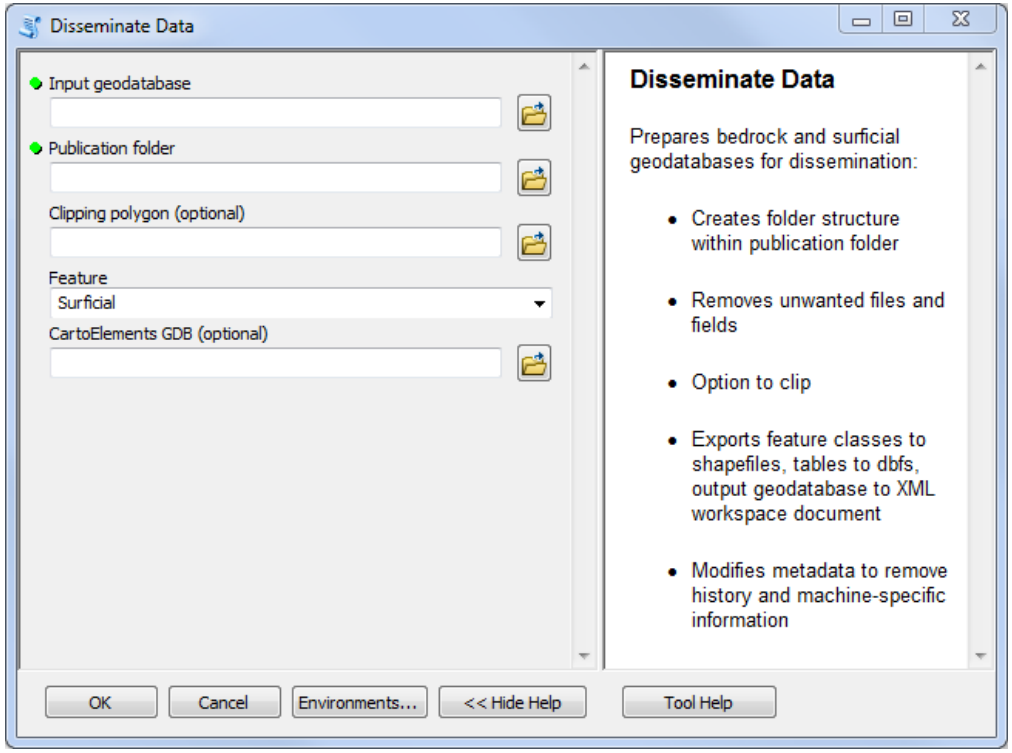
Disseminate Data

- Project data copied to temporary file GDB for dissemination (processing, prepare for XML file)



Disseminate Data Script

- Project area may span more than one CGM publication, therefore data is clipped into separate file GDB



Preparation for XML File

- Local storage information, geoprocessing history, FGDC metadata lineage, and empty elements are removed from temporary file GDB
  - Found to contain connection details, IP addresses, user names, servers, file paths
- Accomplished using XSLT (XML style sheets) Check under ArcGIS installation path:
  …`\ArcGIS\Desktop10.1\Metadata\Stylesheets\gpTools`
- Export to XML Workspace Document
  - Data stored as binary
  - With metadata

Future Challenges

- Automate as much map surround information as possible (e.g. descriptive notes, credit notes)
- New application to generate a geological legend
  - Content driven from database
  - Adherence to standard symbology and appearance
- Editing annotation
- Implementing cartographic representation

Thank you

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