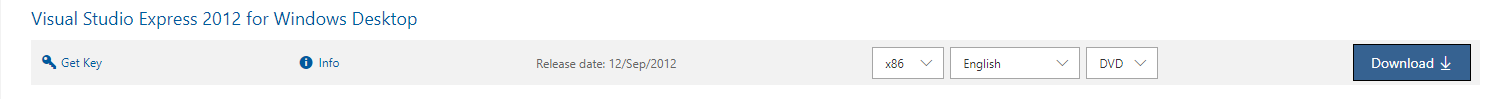
# Installation Instructions

The Geospatial Data Abstraction Library (GDAL) is a computer software library that is used to read, write, and modify geospatial datasets. It is an integral part of popular software packages such as QGIS and ESRI products. For the current application the GDAL libraries are used to automate the processing of large snow datasets within the Duchesne River Basin.

## GDAL Libraries

1. Option 1: Download Pre-Built GDAL Package
   * Download GDAL 2.2.3 installer from the following:
     + <https://www.gisinternals.com/query.html?content=filelist&file=release-1700-x64-gdal-2-2-3-mapserver-7-0-7.zip>
       - Download gdal-202-1700-x64-core.msi
       - <https://download.gisinternals.com/sdk/downloads/release-1700-x64-gdal-2-2-3-mapserver-7-0-7/gdal-202-1700-x64-core.msi>
   * Install the msi by double-clicking it. Go through all of the prompts.
   * The installer should create a new folder:
     + C:\Program Files\GDAL
   * Edit Paths on Computer
     + Go to Search  and type “Advanced system settings”.
       - Open up “View advanced system settings”
     + Under Advanced select “Environmental Variables…”
       - 
     + Add “C:\Program Files\GDAL” to Path variable
       - Do this for both Local User and “System variables”
       - Graphical user interface, application, Teams

         Description automatically generated
     + Add GDAL\_DATA variable and set to “C:\Program Files\GDAL\gdal-data”
       - Do this for both Local User and “System variables”
       - Graphical user interface, application

         Description automatically generated with medium confidence
2. Option 2: Install GDAL (Cumbersome but typically works for Windows 64-Bit Machines Only)
   * Download and Install Visual Studio Express 2012 for Windows Desktop (may have to create a free account).
     + <https://visualstudio.microsoft.com/vs/older-downloads/>
     + <https://my.visualstudio.com/Downloads?q=visual%20studio%202012&wt.mc_id=o~msft~vscom~older-downloads>
     + 
       - Select Download
     + In Download Folder double click “en\_visual\_studio\_express\_2012\_for\_windows\_desktop\_x86\_dvd\_1001986.iso” to install.
       - Double click on the executable and go through steps to install Visual Studio.
   * Download GDAL 2.2.3 from <https://trac.osgeo.org/gdal/wiki/DownloadSource#a2.2.3-November2017>
     + <http://download.osgeo.org/gdal/2.2.3/gdal223.zip>
     + Create “GDAL” folder on your C drive
       - C:\GDAL
     + Unzip the gdal223.zip file into the folder: C:\GDAL
       - Table

         Description automatically generated
   * Using a text editor (e.g. Notepad) make edits to C:\GDAL\gdal-2.2.3\nmake.opt
     + Line 48: MSVC\_VER=1700
     + Line 64: GDAL\_HOME = "C:\GDAL\gdal-2.2.3\bld"
     + Line 206: WIN64=YES (Delete the # to uncomment)
     + Save edits and close file.
   * Command Prompt in VS 2012 (Go to Start  and type “developer command prompt”)
     + Set Building Environment for 64 Bit
       - cd c:\Program Files (x86)\Microsoft Visual Studio 11.0\VC
         * Hit Enter
       - vcvarsall.bat amd64
         * Hit Enter
         * If an error comes up try “vcvarsall.bat x86\_amd64” and hit enter.
     + Build GDAL
       - cd C:\GDAL\gdal-2.2.3
       - nmake -f makefile.vc MSVC\_VER=1400 WIN64=1
       - nmake -f makefile.vc install
       - nmake -f makefile.vc devinstall
   * Edit Paths on Computer
     + Go to Search  and type “Advanced system settings”.
       - Open up “View advanced system settings”
     + Under Advanced select “Environmental Variables…”
       - 
     + Add “C:\GDAL\gdal-2.2.3\bld\bin” to Path variable
       - Do this for both Local User and “System variables”
       - Graphical user interface, application

         Description automatically generated with medium confidence
     + Add GDAL\_DATA variable and set to “C:\GDAL\gdal-2.2.3\bld\data”
       - Do this for both Local User and “System variables”
       - Graphical user interface, application, table

         Description automatically generated