RESEARCH TOOLS 2011
LECTURE 17
2011-Oct-27
Kurt Schwehr
http://schwehr.org
UNH CCOM/JHC
GDAL and QGIS: Viewing Raster and Vector Charts

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Research Tools Class 17: GDAL and QGIS

2011-Oct-27
Kurt Schwehr
UNH CCOM/JHC

researchtools@ubuntu:~/.class/17

$ cd class
researchtools@ubuntu:~/class$ mkdir 17
researchtools@ubuntu:~/class$ ls
09 11 13 15 17 examples-20110913.tar.bz2 screencapture
10 12 14 16 examples-20110913 old-15
researchtools@ubuntu:~/class$ cd 17
researchtools@ubuntu:~/class/17$
2011 Research Tools

rearchtools@ubuntu:~$ cd class
rearchtools@ubuntu:~/class$ mkdir 17
rearchtools@ubuntu:~/class$ ls
09 11 13 15 17 examples-20110913.tar.bz2 screencapture
10 12 14 16 examples-20110913 old-15
rearchtools@ubuntu:~/class$ cd 17
Resolving vislab-ccom.unh.edu... 192.168.3.3
Connecting to vislab-ccom.unh.edu[192.168.3.3]:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 13011 (13K) [text/plain]
Saving to: `17-qgis-gdal.org'

100%[=====================================================>] 13011 --.--K/s in 0.004s
2011-10-27 11:03:25 (2.77 MB/s) - `17-qgis-gdal.org' saved [13011/13011]
rearchtools@ubuntu:~/class/17$

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CGIS and GDAL

Introduction

It's time to go for some more traditional style GIS and take a short break from python.

* Setup

BEGIN_SRC sh
mkdir -p ~/class/17
cd ~/class/17
END_SRC

* Getting NOAA charts

- What is an S57?  What is a BSB?
- Why is proprietary bad?
- S10x standards
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cd ~/class/17
#+END_SRC
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* Getting NOAA charts

- What is an S57?  What is a BSB?
- Why is proprietary bad?
- S10x standards

http://www.nauticalcharts.noaa.gov/mcd/enc/

"Download NOAA ENCs" - Registered trade mark - hmmm.

http://www.nauticalcharts.noaa.gov/mcd/enc/download_agreement.htm

"Permitted Use":  This is US Government data, so we can use it for what ever we want, but if you are navigating with this data you are stuck will all kinds of archaic rules.  Sorry.  But for the class, it's use and abuse!

```
Click “Download NOAA ENC”
Click “Proceed to Chart Downloader”
Click the top “Here”
Click “NH”
information on ENC Distributorships.

Copying of the NOAA ENCs to any other server or location for further distribution is discouraged unless the following guidelines are followed: 1) this User Agreement is displayed and accepted by anyone accessing the NOAA ENCs, and 2) a reference to this Web site is included so that anyone accessing the NOAA ENCs is advised of their origin.

If these NOAA ENC's are incorporated into any other product in a form other than as provided by NOAA, the producer of that product assumes full liability and must adhere to conditions described in the paragraph above concerning copying.

4. Warnings

Weekly updates to the ENCs are done on a "best efforts" basis. The timing of their availability is not guaranteed. You are responsible for ensuring that your ENCs are the most current edition and that the most recent updates have been applied.

While NOAA has accuracy standards for each step in the data collection and chart production process, much of the depth information found on NOAA charts is based on surveys conducted before 1940, the shoreline is more than 20 years old, and paper charts used to be compiled manually. For more information regarding the accuracy of electronic charts, click http://chartmaker.ncd.noaa.gov/mcd/enc/encartcl.htm.

5. Trademarks and Copyright

"NOAA" and the NOAA emblem are registered trademarks of the National Oceanic and Atmospheric Administration.

NOAA ENC is a registered trademark of the National Oceanic and Atmospheric Administration.

Click **OK** to download NH ENCs.zip
information on ENC Distributorships.

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NOAA ENC is a registered trademark of the National Oceanic and Atmospheric Administration.

Click OK to download NH_ENCs.zip
But we can still grab the direct link
Just get it directly

While NOAA has accuracy standard, the production process, much of the data on surveys conducted before 1940, paper charts used to be compiled manually. The accuracy of electronic charts, click encartcl.htm.

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"NOAA" and the NOAA emblem are trademarks of the National Oceanic and Atmospheric Administration.

NOAA ENC is a registered trademark of the National Oceanic and Atmospheric Administration.

Click OK to download NH_ENCs.zip.

```
BEGIN_SRC sh
wget http://www.charts.noaa.gov/ENCs/NH_ENCs.zip
md5sum NH_ENCs.zip
# 8b942e2f3b240a8529851e22bbc11395  NH_ENCs.zip
sha256sum NH_ENCs.zip
# 3e57084aac502cc1f1060b8213225ebe8dbeea82f0776f4be0049fcb33ec63
BEGIN_SRC
Note that their zip files do not have version numbers or checksums.
Not good.
```

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<td>18:19</td>
<td>b84cd56</td>
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</table>
```

17-ggis-gdal.org  19%  L85  [#] (Org)
researchtools@ubuntu:~$ wget http://www.charts.noaa.gov/ENCs/NH_ENCs.zip
Resolving www.charts.noaa.gov... 140.172.17.23, 129.15.96.23, 140.90.33.23, ...
Connecting to www.charts.noaa.gov[140.172.17.23]:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 7578527 (7.2M) [application/zip]
Saving to: 'NH_ENCs.zip'
100%[==============================================]=> 7,578,527 643K/s in 11s
2011-10-27 11:21:21 (683 KB/s) - `NH_ENCs.zip' saved [7578527/7578527]
researchtools@ubuntu:~$ md5sum NH_ENCs.zip
8b942e2f3b240a8529851e22c011395  NH_ENCs.zip
researchtools@ubuntu:~$ sha
sha1pass  sha224sum  sha384sum  shadowconfig  shasum
sha1sum    sha256sum  sha512sum  shares-admin
researchtools@ubuntu:~$ sha256sum NH_ENCs.zip
3e57084aac502cc1f1060b8213225ebe8db6ea82f0776f4be004f9fcb3ee634  NH_ENCs.zip
researchtools@ubuntu:~$ 

++BEGIN_SRC sh
man unzip
unzip -h
unzip -l -v NH_ENCs.zip
++END_SRC

++BEGIN_EXAMPLE
Archive:  NH_ENCs.zip
Length  Method   Size  Compr  Date   Time  CRC-32  Name
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13698     Defl:N    2711   80%     2011-10-25 18:19  4b571cc5  ENC_ROOT/CATALOG.031
3673      Defl:N    1717   53%     2011-10-25 18:19  b84cdd65  ENC_ROOT/README.TXT
5172      Defl:N    2126   59%     2011-10-25 18:19  a6832ba0  ENC_ROOT/USERAGREEMENT
516       Defl:N    285    45%     2011-10-25 18:19  12ff4111  ENC_ROOT/US2EC03M/US00
--------  --------  ------  -------  -------  ------  -------  

17-ggis-gdal.org  23% L101  (Org)
See "unzip -hh" or unzip.txt for more help. Examples:
unzip data1 -x joe => extract all files except joe from zipfile data1.zip
unzip -p foo | more => send contents of foo.zip via pipe into program more
unzip -o foo ReadMe => quietly replace existing ReadMe in archive file

researchtools@ubuntu:~/class/17$ unzip -l -v NH_ENCs.zip

---

```bash
# BEGIN_SRC sh
man unzip
unzip --help
unzip -l -v NH_ENCs.zip
# END_SRC

# BEGIN_EXAMPLE
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| 3673   | Defl:N | 1717 | 53%  | 2011-10-25| 18:19| b84cdd56 | ENC_ROOT/README.TXT
| 5172   | Defl:N | 2126 | 59%  | 2011-10-25| 18:19| a6832ba0 | ENC_ROOT/USERAGREEMENT
| 516    | Defl:N | 285  | 45%  | 2011-10-25| 18:19| 12ff4111 | ENC_ROOT/US2EC03M/US00
```

---
-K keep setuid/setgid/tacky permissions  -M pipe through "more" pager
-O CHARSET specify a character encoding for DOS, Windows and OS/2 archives
-I CHARSET specify a character encoding for UNIX and other archives

See "unzip -hh" or unzip.txt for more help. Examples:
unzip data1 -x joe => extract all files except joe from zipfile data1.zip
unzip -p foo | more => send contents of foo.zip via pipe into program more
unzip -fo foo ReadMe => quietly replace existing ReadMe if archive file newer
researchtools@ubuntu:~/class/17$ unzip -l -v NH_ENCs.zip

Archive:  NH_ENCs.zip

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man unzip
unzip --help
unzip -l -v NH_ENCs.zip
#END_SRC

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<td>2011-10-25 18:19</td>
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<td>2351</td>
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<td>e66156e0</td>
<td>ENC_ROOT/US5NH02M/US5NH02M.001</td>
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</table>

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103 files

```
# BEGIN_SRC
man unzip
unzip --help
unzip -l -v NH_ENCs.zip
# END_SRC
```

```
# BEGIN_EXAMPLE

```

```
```
discouraged unless the following guidelines are followed: 1) the NOAA ENC files and supplementary files including the CATALOG.031 and README.TXT are included in their entirety, 2) this disclaimer is displayed to and accepted by anyone who accesses the NOAA ENC files, and 3) a reference to this Web site is included so that anyone accessing the NOAA ENC files is advised of where they originated.

If these NOAA ENC files are incorporated into any other product in a form other than as provided by NOAA, the producer of that product assumes full liability and must adhere to conditions 2 and 3 described in the paragraph above concerning copying or reproduction.

List of Datasets In This Exchange Set:

<table>
<thead>
<tr>
<th>Chart</th>
<th>Title</th>
<th>Edition</th>
<th>Update Application Date</th>
<th>Update</th>
<th>Issue Date</th>
<th>Cell Name</th>
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<tbody>
<tr>
<td>13003</td>
<td>Cape Sable to Cape Hatteras</td>
<td>22</td>
<td>2011-10-24</td>
<td>0</td>
<td>2011-10-24</td>
<td>US2EC03M</td>
</tr>
<tr>
<td>13006</td>
<td>West Quoddy Head to New York</td>
<td>7</td>
<td>2011-06-02</td>
<td>2</td>
<td>2011-09-07</td>
<td>US2EC04M</td>
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<td>West Quoddy Head to New York</td>
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<td>2007-02-15</td>
<td>2</td>
<td>2009-03-20</td>
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<tr>
<td>13009</td>
<td>Gulf of Maine and Georges Bank</td>
<td>6</td>
<td>2010-08-31</td>
<td>0</td>
<td>2010-08-31</td>
<td>US3EC05M</td>
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<tr>
<td>13260</td>
<td>Bay of Fundy to Cape Cod</td>
<td>29</td>
<td>2011-04-20</td>
<td>4</td>
<td>2011-10-19</td>
<td>US3EC10M</td>
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<tr>
<td>13278</td>
<td>Portsmouth to Cape Ann</td>
<td>18</td>
<td>2011-05-19</td>
<td>2</td>
<td>2011-10-12</td>
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<tr>
<td>13286</td>
<td>Cape Elizabeth to Portsmouth</td>
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<td>2011-05-23</td>
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<td>2011-05-23</td>
<td>US4ME01M</td>
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<td>2010-04-23</td>
<td>US5MA04M</td>
</tr>
<tr>
<td>13274</td>
<td>Merrimack River Extension</td>
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<td>2011-05-03</td>
<td>2</td>
<td>2011-10-12</td>
<td>US5MA19M</td>
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<tr>
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<td>Cape Porpoise Harbor; Wells Harbor; Kennebunk River; Perkins Cove</td>
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<td>2010-06-16</td>
<td>0</td>
<td>2010-06-16</td>
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<td>Portsmouth to Dover and Exeter</td>
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<td>2011-06-01</td>
<td>1</td>
<td>2011-07-13</td>
<td>US5NH01M</td>
</tr>
<tr>
<td>13283</td>
<td>Portsmouth Harbor Cape Neddie Harbor to Isles of Shoals; Portsmouth Harbor</td>
<td>15</td>
<td>2011-06-01</td>
<td>1</td>
<td>2011-08-31</td>
<td>US5NH02M</td>
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Total Number = 13

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<th>Time</th>
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<th>Name</th>
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<td>2011-10-25</td>
<td>18:19</td>
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<td>ENC_ROOT/CATALOG.031</td>
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<td>53%</td>
<td>2011-10-25</td>
<td>18:19</td>
<td>b84cdd6</td>
<td>ENC_ROOT/README.TXT</td>
</tr>
<tr>
<td>5172</td>
<td>Defl:N</td>
<td>2126</td>
<td>59%</td>
<td>2011-10-25</td>
<td>18:19</td>
<td>a6832ba0</td>
<td>ENC_ROOT/USERAGREEMENT</td>
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<tr>
<td>516</td>
<td>Defl:N</td>
<td>285</td>
<td>45%</td>
<td>2011-10-25</td>
<td>18:19</td>
<td>12ff4111</td>
<td>ENC_ROOT/US2EC03M/US00</td>
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</tbody>
</table>

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**BEGIN EXAMPLE**

Archive: NH_ENCs.zip

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<thead>
<tr>
<th>Length</th>
<th>Method</th>
<th>Size</th>
<th>Cmpr</th>
<th>Date</th>
<th>Time</th>
<th>CRC-32</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>13698</td>
<td>Defl:N</td>
<td>2711</td>
<td>80%</td>
<td>2011-10-25</td>
<td>18:19</td>
<td>4b571cc5</td>
<td>ENC_ROOT/CATALOG.031</td>
</tr>
<tr>
<td>3673</td>
<td>Defl:N</td>
<td>1717</td>
<td>53%</td>
<td>2011-10-25</td>
<td>18:19</td>
<td>b84cdd6</td>
<td>ENC_ROOT/README.TXT</td>
</tr>
<tr>
<td>5172</td>
<td>Defl:N</td>
<td>2126</td>
<td>59%</td>
<td>2011-10-25</td>
<td>18:19</td>
<td>a6832ba0</td>
<td>ENC_ROOT/USERAGREEMENT</td>
</tr>
<tr>
<td>516</td>
<td>Defl:N</td>
<td>285</td>
<td>45%</td>
<td>2011-10-25</td>
<td>18:19</td>
<td>12ff4111</td>
<td>ENC_ROOT/US2EC03M/US00</td>
</tr>
</tbody>
</table>

---

ResearchTools@ubuntu:~/class/17/ENC_ROOT$ du -h

2.6M   ./US5NH02M
4.8M   ./US3EC10M
1.8M   ./US5NH01M
96K    ./US4MA19M
4.0M   ./US4MA04M
772K   ./US5ME01M
468K   ./US5MA19M
1.3M   ./US2EC03M
304K   ./US3EC05M
1.5M   ./US4ME01M
2.7M   ./US2EC04M
304K   ./US5MA04M
108K   ./US3EC04M
20M    .

ResearchTools@ubuntu:~/class/17/ENC_ROOT$ find .
researchtools@ubuntu:~/class/17/ENC_ROOT

File Edit View Search Terminal Help

./US5MA04M/US001766.TXT
./US3EC04M
./US3EC04M/US000092.TXT
./US3EC04M/US3EC04M.002
./US3EC04M/US3EC04M.000
./US3EC04M/US3EC04M.001
./US3EC04M/US13006P.TXT
researchtools@ubuntu:~/class/17/ENC_ROOT$ file *
CATALOG.031:    data
README.TXT:   ISO-8859 English text, with very long lines, with CRLF line terminators
US2EC03M:    directory
US2EC04M:    directory
US3EC04M:    directory
US3EC05M:    directory
US3EC10M:    directory
US4MA04M:    directory
US4MA19M:    directory
US4ME01M:    directory
US5MA04M:    directory
US5MA19M:    directory
US5ME01M:    directory
US5NH01M:    directory
US5NH02M:    directory
USERAGREEMENT.TXT: ISO-8859 English text, with very long lines, with CRLF line terminators
researchtools@ubuntu:~/class/17/ENC_ROOT$ file . | xargs file
find . | xargs file

researchtools@ubuntu:~/class/17/ENC_ROOT$ find . | xargs file


* Getting NOAA charts

- What is an S57? What is a BSB?
- Why is proprietary bad?

S10x standards

---
17-qgis-gdal.org 6% L32 (Org)
ISO-8859 English text, with very long lines, with CRLF line terminators
directory
ASCII English text, with CRLF line terminators
data
ASCII English text, with CRLF line terminators
directory
ASCII English text, with CRLF line terminators
data
ASCII English text, with CRLF line terminators
data
ASCII English text, with CRLF line terminators
researchtools@ubuntu:~/class/17/ENC_ROOT$ find . | xargs file | cut -d: -f2 | sort -u
Alias Maya Image File
ASCII English text, with CRLF, CR line terminators
ASCII English text, with CRLF line terminators
ASCII English text, with no line terminators
ASCII English text, with very long lines, with CRLF line terminators
ASCII English text, with very long lines, with no line terminators
ASCII text, with CRLF line terminators
data
directory
directory
ISO-8859 English text, with very long lines, with CRLF line terminators
ISO-8859 English text, with very long lines, with CRLF line terminators
Non-ISO extended-ASCII English text, with CRLF line terminators
researchtools@ubuntu:~/class/17/ENC_ROOT$ wget http://vislab-ccom.unh.edu/~schwehr/Classes/2011/esc1895-researchtools/src/
#+END_SRC
* Getting NOAA charts
- What is an S57? What is a BSB?
- Why is proprietary bad?
| S10x standards

17-ggis-gdal.org 6% L32 (Org)
Getting NOAA charts

- What is an SS7?  What is a BSB?
- Why is proprietary bad?
  S10x standards
NAME
ogrinfo - lists information about an OGR supported data source

SYNOPSIS
ogrinfo [-ro] [-q] [-where restricted where] 
[-spat xmin ymin xmax ymax] [-fid fid] 
[-sql statement] [-al] [-so] [--formats] 
 datasource_name [layer [layer ...]]

DESCRIPTION
The ogrinfo program lists various information about an OGR supported data source to stdout (the terminal).

- **-ro:**
  Open the data source in read-only mode.

- **-al:**
  List all features of all layers (used instead of having to give layer names as arguments).

- **-so:**
  Summary Only: supress listing of features, show only the summary information like projection, schema, feature count and extents.

Manual page ogrinfo(1) line 1
Supported Formats:
- "ESRI Shapefile" (read/write)
- "MapInfo File" (read/write)
- "UK NTF" (readonly)
- "SDTS" (readonly)
- "TIGER" (read/write)
- "S57" (read/write)
- "DGN" (read/write)
- "VRT" (readonly)
- "REC" (readonly)
- "Memory" (read/write)
- "BNA" (read/write)
- "CSV" (read/write)
- "GML" (read/write)
- "GPX" (read/write)
- "KML" (read/write)
- "GeoJSON" (read/write)
- "Interlis 1" (read/write)
- "Interlis 2" (read/write)
- "GMT" (read/write)
- "SQLite" (read/write)
- "ODBC" (read/write)
- "PGeo" (readonly)
- "OGDI" (readonly)
- "PostgreSQL" (read/write)
- "MySQL" (read/write)
- "XPlane" (readonly)


# END_SRC

* Getting NOAA charts
- What is an S57? What is a BSB?
- Why is proprietary bad?
  S10x standards
researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M

file

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ echo ~/class/17/ENC_ROOT/US5NH01M

/home/researchtools/class/17/ENC_ROOT/US5NH01M

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ pwd
/home/researchtools/class/17/ENC_ROOT/US5NH01M

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ ls

US000175.TXT US001793.TXT US002556.TXT US003445.TXT US5NH01M.000 US5NH01M.001

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ file *

US000175.TXT: ASCII English text, with CRLF line terminators
US001793.TXT: ASCII English text, with CRLF line terminators
US002556.TXT: ASCII English text, with CRLF line terminators
US003445.TXT: ASCII English text, with CRLF line terminators
US5NH01M.000: data
US5NH01M.001: data

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ less US5NH01M.000

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ ogrinfo

[-spat xmin ymin xmax ymax] [-fid fid]
[-sql statement] [-al] [-so] [-fields={YES/NO}]
[-geom={YES/NO/SUMMARY}][--formats]
datasource_name [layer [layer ...]]

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ man ogrinfo

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ ogrinfo --formats | less

researchtools@ubuntu: ~/class/17/ENC_ROOT/US5NH01M$ ogrinfo US5NH01M.000


### END_SRC

* Getting NOAA charts

- What is an SS7? What is a BSB?
- Why is proprietary bad?
- S10x standards
ERROR 4: S57 Driver doesn't support update.
Had to open data source read-only.
INFO: Open of 'US5NH01M.000'
    using driver 'S57' successful.
1: DSID (None)
2: BCNLAT (Point)
3: BRIDGE
4: BUISGL
5: BUARE
6: BOYLAT (Point)
7: BOYSPP (Point)
8: CBLARE (Polygon)
9: CBL0HD (Line String)
10: CTNARE
11: COALNE (Line String)
12: DAMCON
13: DAYMAR (Point)
14: DEPARE
15: DEPCNT (Line String)
16: DRGARE (Polygon)
-append: Append to existing layer instead of creating new if it exists
-overwrite: delete the output layer and recreate it empty
-update: Open existing output datasource in update mode
-select field_list: Comma-delimited list of fields from input layer to copy to the new layer (defaults to all)
-where restricted where: Attribute query (like SQL WHERE)
-sql statement: Execute given SQL statement and save result.
-skipfailures: skip features or layers that fail to convert
-gt n: group n features per transaction (default 200)
-spat xmin ymin xmax ymax: spatial query extents
-segmentize max_dist: maximum distance between 2 nodes. Used to create intermediate points
-disco NAME=VALUE: Dataset creation option (format specific)
-lco NAME=VALUE: Layer creation option (format specific)
-nln name: Assign an alternate name to the new layer
-nlt type: Force a geometry type for new layer. One of NONE, GEOMETRY, POINT, LINESTRING, POLYGON, GEOMETRYCOLLECTION, MULTIPOLYGON, or MULTILINESTRING. Add "3D" for 3D layers. Default is type of source layer.
-a_srs srs_def: Assign an output SRS
-t_srs srs_def: Reproject/transform to this SRS on output
-s_srs srs_def: Override source SRS

Srs_def can be a full WKT definition (hard to escape properly), or a well known definition (ie. EPSG:4326) or a file with a WKT definition.

researchtools@ubuntu:~/class/17/ENC_ROOT/US5NH01M$ ogr2ogr -f KML US5NH01M.kml US5NH01M.000
researchtools@ubuntu:~/class/17/ENC_ROOT/US5NH01M$ less *.kml

* Getting NOAA charts
  - What is an SS7? What is a BSB?
  - Why is proprietary bad?
  S10x standards
<?xml version="1.0" encoding="utf-8"?>
<kml xmlns="http://www.opengis.net/kml/2.2">
<Document><Folder><name>DSID</name>
<Schema name="DSID" id="DSID">
  <SimpleField name="Name" type="string"/>
  <SimpleField name="Description" type="string"/>
  <SimpleField name="DSID_EXPP" type="int"/>
  <SimpleField name="DSID_INTP" type="int"/>
  <SimpleField name="DSID_DSNM" type="string"/>
  <SimpleField name="DSID_EDTN" type="string"/>
  <SimpleField name="DSID_UPDN" type="string"/>
  <SimpleField name="DSID_UAAD" type="string"/>
  <SimpleField name="DSID_ISDT" type="string"/>
  <SimpleField name="DSID_STED" type="float"/>
  <SimpleField name="DSID_PRSP" type="int"/>
  <SimpleField name="DSID_PSDN" type="string"/>
  <SimpleField name="DSID_PRED" type="string"/>
  <SimpleField name="DSID_PROF" type="int"/>
  <SimpleField name="DSID_AGEN" type="int"/>
  <SimpleField name="DSID_COMT" type="string"/>
  <SimpleField name="DSII_DSTR" type="string"/>
  <SimpleField name="DSII_AALL" type="string"/>
  <SimpleField name="DSII_NALL" type="string"/>
  <SimpleField name="DSII_NOMR" type="string"/>
  <SimpleField name="DSII_NOCR" type="int"/>
  <SimpleField name="DSII_NOGR" type="int"/>
  <SimpleField name="DSII_NOLR" type="int"/>
</Schema></Folder></Document>
</kml>
* Getting NOAA charts

- What is an S57?  What is a BSB?
- Why is proprietary bad?
S10x standards
-lco NAME=VALUE: Layer creation option (format specific)
-nln name: Assign an alternate name to the new layer
-nlt type: Force a geometry type for new layer. One of NONE, GEOMETRY, POINT, LINESTRING, POLYGON, GEOMETRYCOLLECTION, MULTIPOLYGON, or MULTILINESTRING. Add "25D" for 3D layers.
Default is type of source layer.
-a_srs srs_def: Assign an output SRS
-t_srs srs_def: Reproject/transform to this SRS on output
-s_srs srs_def: Override source SRS

Srs_def can be a full WKT definition (hard to escape properly),
or a well known definition (ie. EPSG:4326) or a file with a WKT
definition.

```
researchtools@ubuntu:~/class/17/ENC_ROOT/US5NH01M$ ogr2ogr -f KML US5NH01M.kml US5NH01M.000
researchtools@ubuntu:~/class/17/ENC_ROOT/US5NH01M$ ogr2ogr -f CSV US5NH01M.csv US5NH01M.000
```

Warning 1: Attempt to create field of type StringList, but this is not supported for .csv files. Just treating as a plain string.
Warning 1: Attempt to create field of type IntegerList, but this is not supported for .csv files. Just treating as a plain string.
Warning 1: Attempt to create field of type StringList, but this is not supported for .csv files. Just treating as a plain string.
Warning 1: Attempt to create field of type IntegerList, but this is not supported for .csv files. Just treating as a plain string.
Warning 1: Attempt to create field of type StringList, but this is not supported for .csv files. Just treating as a plain string.
Warning 1: Attempt to create field of type IntegerList, but this is not supported for .csv files. Just treating as a plain string.

```
```

```
#+END_SRC

* Getting NOAA charts

- What is an SS7?  What is a BSB?
- Why is proprietary bad?
  S10x standards
```
Getting NOAA charts

- What is an S57?  What is a BSB?
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S10x standards
| RCID | PRIM | GRUP | OBJL | RVER | AGEN | FIDN | FIDS | LNAM | LNAM_REFS | FFPT_RIND | CONDTN | NOBJNM | OBJNAM | STATUS | INFORM | NINFORM | NTXTD | SCAMAX | SCAMIN | TXTDSC | RECDATA | RECEIND | SORDAT | SORIND |
|------|------|------|------|------|------|------|------|------|----------|-----------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1626 | 3    | 1    | 1    | 1    | 1    | 550  | 5081329 | 4536 | 0226004D88F111B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1627 | 3    | 1    | 1    | 1    | 1    | 550  | 3798052 | 4536 | 02260039F42411B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1628 | 3    | 1    | 1    | 1    | 1    | 550  | 3800174 | 4536 | 02260039FC6E11B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1629 | 3    | 1    | 1    | 1    | 1    | 550  | 3800183 | 4536 | 02260039FC7711B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1630 | 3    | 1    | 1    | 1    | 1    | 550  | 3800229 | 4536 | 02260039FCA511B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1631 | 3    | 1    | 1    | 1    | 1    | 550  | 3800187 | 4536 | 02260039F7B11B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1632 | 3    | 1    | 1    | 1    | 1    | 550  | 3800191 | 4536 | 02260039FC7F11B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1633 | 1    | 2    | 1    | 1    | 1    | 550  | 3800230 | 4536 | 02260039FCA611B8 | 119999, ..., 20050700, "US, US, graph, Chart 13285" |        |       |        |        |        |        |        |        |        |        |        |        |
| 1634 | 3    | 1    | 1    | 1    | 1    | 550  | 3800233 | 4536 | 02260039FCA911B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1635 | 3    | 1    | 1    | 1    | 1    | 550  | 3800237 | 4536 | 02260039FCAD11B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1636 | 3    | 1    | 1    | 1    | 1    | 550  | 3800240 | 4536 | 02260039FB011B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1637 | 3    | 1    | 1    | 1    | 1    | 550  | 3800243 | 4536 | 02260039FCB311B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1638 | 3    | 1    | 1    | 1    | 1    | 550  | 3800246 | 4536 | 02260039FC611B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1639 | 3    | 1    | 1    | 1    | 1    | 550  | 3800249 | 4536 | 02260039FCB911B8 | Hen Island, ............ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1640 | 3    | 1    | 1    | 1    | 1    | 550  | 3800252 | 4536 | 02260039FBC11B8 | Swan Island, ............ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1641 | 3    | 1    | 1    | 1    | 1    | 550  | 3800255 | 4536 | 02260039FCBF11B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1642 | 3    | 1    | 1    | 1    | 1    | 550  | 3800260 | 4536 | 02260039FC411B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1643 | 3    | 1    | 1    | 1    | 1    | 550  | 3800263 | 4536 | 02260039FC711B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1644 | 3    | 1    | 1    | 1    | 1    | 550  | 3800266 | 4536 | 02260039FCAA11B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1645 | 3    | 1    | 1    | 1    | 1    | 550  | 3800269 | 4536 | 02260039FCCD11B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1646 | 3    | 1    | 1    | 1    | 1    | 550  | 3800272 | 4536 | 02260039FDC011B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1647 | 3    | 1    | 1    | 1    | 1    | 550  | 3800276 | 4536 | 02260039FCD411B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1648 | 3    | 1    | 1    | 1    | 1    | 550  | 3800279 | 4536 | 02260039FCD711B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1649 | 3    | 1    | 1    | 1    | 1    | 550  | 3800282 | 4536 | 02260039FCA11B8 | Nannie Island, ............ |        |       |        |        |        |        |        |        |        |        |        |        |
| 1650 | 3    | 1    | 1    | 1    | 1    | 550  | 3800285 | 4536 | 02260039FCD11B8 | ................ |        |       |        |        |        |        |        |        |        |        |        |        |

Getting NOAA charts

- What is an S57? What is a BSB?
- Why is proprietary bad?
- S10x standards
Getting NOAA charts

- What is an S57? What is a BSB?
- Why is proprietary bad?

S10x standards
Thursday, October 27, 11

* Getting NOAA charts
  - What is an S57?  What is a BSB?
  - Why is proprietary bad?
  S10x standards
Open an OGR Supported Vector Layer

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</tr>
<tr>
<td>US001793.TXT</td>
<td>793 bytes</td>
<td>Tuesday</td>
</tr>
<tr>
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<td>3.9 KB</td>
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<tr>
<td>US003445.TXT</td>
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- What is an S57? What is a BSB?
- Why is proprietary bad?
  S10x standards

17-qgis-gdal.org 6% L32 (Org)
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- What is an S57? What is a BSB?
- Why is proprietary bad?
- S10x standards
* Getting NOAA charts

- What is an S57? What is a BSB?
- Why is proprietary bad?

S10x standards
This is the list of all layers available in the datasource of the active layer. You can select the
layers to load. The layers will be loaded when you press "OK".

The layer name is format dependent. Consult the OGR documentation or the
documentation of your data format to determine the nature of the included information.

**Be advised:** selecting an already opened layer will not generate an error message and the
layer will end up loaded twice!

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<thead>
<tr>
<th>Layer ID</th>
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</table>
Thursday, October 27, 11

* Getting NOAA charts
  - What is an S57? What is a BSB?
  - Why is proprietary bad?
  S10x standards
Sub layers list

This is the list of all layers available in the datasource of the active layer. You can select the layers to load. The layers will be loaded when you press "OK".

The layer name is format dependent. Consult the OGR documentation or the documentation of your data format to determine the nature of the included information.

**Be advised:** selecting an already opened layer will not generate an error message and the layer will end up loaded twice!

<table>
<thead>
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<th>Layer ID</th>
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<td>9</td>
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</tr>
</tbody>
</table>
Getting NOAA charts

- What is an SS7? What is a BSB?
- Why is proprietary bad?

S10x standards
* Start QGIS and view the data
- Applications -> Science -> Quantum GIS
- Layer -> Add Vector Layer. Browse
  - researchtools/class/17/ENC_ROOT/US5NH01M
  - Change the type selection to "All Files"
  - Select US5NH01M.000
  - From the "Sub layers list", select Layer id 19, LNDARE.
- Repeat opening the S57 chart and select "5 BOYLAT"
- Use the Arrow-i "Identify Feature" button to select buoys
- Right click on the "BOYLAT" layer and select properties.
  - change the symbol
  - Right click on LNDARE and select properties
  - change the color

* Getting a raster navigation chart (RNC) - BSB
- The dangers of proprietary formats and what NOAA had to go through. Yuck.

- http://www.charts.noaa.gov/RNCs/RNCs.shtml
- http://www.charts.noaa.gov/RNCs/Download

```bash
# BEGIN_SRC sh
cd ~/class/17
wget http://www.charts.noaa.gov/RNCs/NH_RNCs.zip
ls -l NH_RNCs.zip
md5sum NH_RNCs.zip
  # 52193d8561302805b35af2da62149502  NH_RNCs.zip
  sha256sum NH_RNCs.zip
  # ca996f7958026fc7d1c26f27bb8dbb8f887a998892b1d9b369bfb9adc86dfe78  NH_RNCs.zip
```
There are several options for downloading:
1. Select a zip file of an [Individual RNC].
2. Select up to twenty [Specific RNCs] that will be dynamically zipped and made available for download.
3. Write an application or script that uses the data in the [RNC Product Catalog], an XML file that contains the status of the RNCs available for download.
4. Select one of the pre-packaged zip files below:

### All RNCs:

<table>
<thead>
<tr>
<th>Name</th>
<th>XML</th>
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### RNCs by Coast Guard Districts (map):

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<td>11 CGD</td>
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### RNCs by States:

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<tr>
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<td>View</td>
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Resolving www.charts.noaa.gov... 140.172.17.23, 129.15.96.23, 140.90.33.23, ...
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HTTP request sent, awaiting response... 200 OK
Length: 26861545 (26M) [application/zip]
Saving to: 'NH_RNCs.zip'
100%[======================================================================] 26,861,545 1.03M/s in 36s
2011-10-27 12:09:25 (738 KB/s) - 'NH_RNCs.zip' saved [26861545/26861545]

researchtools@ubuntu:~/class/17$ unzip -l -v NH_RNCs.zip

RNCs by Region (list):

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#BEGIN_SRC sh

cd ~/class/17
wget http://www.charts.noaa.gov/RNCs/NH_RNCs.zip
ls -l NH_RNCs.zip

md5sum NH_RNCs.zip
# 52193d8561302805b35af2da62149502 NH_RNCs.zip
sha256sum NH_RNCs.zip
# ca996f7958026fc7d1c26f27bb8dbb8f887a998892b1d9b369bb9ad86dfe78 NH_RNCs.zip

unzip -l -v NH_RNCs.zip

#END_SRC

#BEGIN_EXAMPLE

Archive: NH_RNCs.zip
Length Method Size Cmpr Date Time CRC-32 Name

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Resolving www.charts.noaa.gov... 140.172.17.23, 129.15.96.23, 140.90.33.23, ...
Connecting to www.charts.noaa.gov[140.172.17.23]:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 26861545 (26M) [application/zip]
Saving to: 'NH_RNCs.zip'

100%[==============================================] 26,861,545 1.03M/s in 36s

2011-10-27 12:09:25 (738 KB/s) - 'NH_RNCs.zip' saved [26861545/26861545]

researchtools@ubuntu:~/class/17$ #unzip -l -v NH_RNCs.zip
researchtools@ubuntu:~/class/17$ md5sum NH_RNCs.zip
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researchtools@ubuntu:~/class/17$ md5sum ~/Dropbox/rt/class/17/NH_RNCs.zip
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researchtools@ubuntu:~/class/17$ unzip -l -v NH_RNCs.zip

RNCs by Region (list):
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7.2M  BSB_ROOT/13260
4.2M  BSB_ROOT/13009
6.3M  BSB_ROOT/13274
5.2M  BSB_ROOT/13285
4.4M  BSB_ROOT/13283
4.8M  BSB_ROOT/13278
6.2M  BSB_ROOT/13006
4.8M  BSB_ROOT/13286
47M   BSB_ROOT/

researchtools@ubuntu:~$ cd BSB_ROOT/
researchtools@ubuntu:~$ find . | xargs file | cut -d: -f2 | sort -u

ASCII English text, with CRLF line terminators
data
directory
directory
Non-ISO extended-ASCII English text, with very long lines, with CRLF line terminators

researchtools@ubuntu:~/class/17/BSB_ROOT$

--- http://www.charts.noaa.gov/RNCs/Download

#BEGIN_SRC sh
cd ~/class/17
wget http://www.charts.noaa.gov/RNCs/NH_RNCs.zip
ls -l NH_RNCs.zip
md5sum NH_RNCs.zip
# 52193d8561302805b35af2da62149502  NH_RNCs.zip
sha256sum NH_RNCs.zip
# ca996f7958026fc7d1c26f27bb8dbb8f887a998892b1d9b369bfb9adc86dfe78  NH_RNCs.zip
unzip -l -v NH_RNCs.zip

#END_SRC

#BEGIN_EXAMPLE
Archive:  NH_RNCs.zip
Length  Method  Size  Cmpr  Date    Time    CRC-32  Name

- 17-ggis-gdal.org  46%  L193  (Org)
researchtools@ubuntu:~$ cd /class/17/BSB_ROOT/13274
ls -l

total 6392
-rw-r--r-- 1 researchtools researchtools 1454473 2011-10-27 08:35 13274 1.KAP
-rw-r--r-- 1 researchtools researchtools 1337453 2011-10-27 08:35 13274 2.KAP
-rw-r--r-- 1 researchtools researchtools 86989 2011-10-27 08:35 13274 3.KAP
-rw-r--r-- 1 researchtools researchtools 69890 2011-10-27 08:35 13274 4.KAP
-rw-r--r-- 1 researchtools researchtools 3566436 2011-10-27 08:35 13274 5.KAP
-rw-r--r-- 1 researchtools researchtools 12525 2011-10-27 08:35 13274.BSB

--- http://www.charts.noaa.gov/RNCs/Download

#BEGIN_SRC sh

## BEGIN_SRC

```bash
sh

cd ~/class/17
wget http://www.charts.noaa.gov/RNCs/NH_RNCs.zip
ls -l NH_RNCs.zip

md5sum NH_RNCs.zip ||
# 52193d8561302805b35af2da62149502  NH_RNCs.zip
sha256sum NH_RNCs.zip
# 5a996f7953026cf7d0c26f27bbdb8f887a99889b1db369bfb9ad86dfe78  NH_RNCs.zip

unzip -l -v NH_RNCs.zip
```

#END_SRC

```bash
#END_SRC
```

#BEGIN_EXAMPLE

Archive: NH_RNCs.zip

<table>
<thead>
<tr>
<th>Name</th>
<th>View</th>
<th>XML</th>
<th>Zip File</th>
<th>Date Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>View</td>
<td>207MB</td>
<td>10/20/2011 18:08</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>View</td>
<td>133MB</td>
<td>10/20/2011 18:08</td>
<td></td>
</tr>
</tbody>
</table>

```bash
17-qgis-gdal.org 46% L193 (Org)
```

```bash
-----
```
KAP is the actual image. The BSB is metadata.
CRR/This electronic chart was produced under the authority of USA-NOAA/NOS.
By using this chart you acknowledge that you have read, understood
and accepted the terms and conditions stated in the User Agreement:
http://www.nauticalcharts.noaa.gov/mcd/Raster/download_agreement.htm

CHT/NA=CAPE ANN TO HAMPTON HARBOR SIDE A LEFT,NU=13274
CHF/SMALL CRAFT ROUTE, IW ROUTE
CED/SE=28,RE=01,ED=04/01/2011
NTM/NE=28.15,ND=10/22/2011
VER/3.0
CHK/1,2074,2075,2076,2077,2078
CGD/1
ORG/USA-NOAA/NOS
MFR/USA-NOAA/NOS
RGN/2
K01/NA=CAPE ANN TO HAMPTON HARBOR SIDE A LEFT,NU=2074,TY=BASE,FN=13274 1.KAP
K02/NA=MERRIMACK RIVER EXT. HAVERHILL,NU=2075,TY=EXTENSION,FN=13274_3.KAP
13274.BSB

RNCs by Region (list):

<table>
<thead>
<tr>
<th>Name</th>
<th>XML</th>
<th>Size</th>
<th>Zip File Date/Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>View</td>
<td>207 MB</td>
<td>10/20/2011 18:00</td>
</tr>
<tr>
<td>06</td>
<td>View</td>
<td>133 MB</td>
<td>10/20/2011 18:00</td>
</tr>
</tbody>
</table>

---

```
#+BEGIN_SRC sh
unzip NH_RNCs.zip
du -h BSB_ROOT
cd BSB_ROOT
find . | xargs file | cut -d: -f2 | sort -u
dl -ks * | sort -n
ls -l 13274
#+END_SRC

KAP is the actual image. The BSB is metadata.
```

```
#+BEGIN_SRC sh
ls -l 13274
less 13274/*.BSB
rep CHT */*.BSB
#+END_SRC

#+BEGIN_EXAMPLE

--- 17-qgis-gdal.org  53% L232 (Org)
```
KAP is the actual image. The BSB is metadata.
researchtools@ubuntu:~$ cd /class/17/BSB_ROOT/13274
researchtools@ubuntu:~$ cd /class/17/BSB_ROOT/13274$ clear

researchtools@ubuntu:~$ /class/17/BSB_ROOT/13274$ gdalinfo --formats

Supported Formats:
VRT (rw+): Virtual Raster
GTiff (rw+): GeoTIFF
NITF (rw+): National Imagery Transmission Format
RPFTOC (ro): Raster Product Format TOC format
HFA (rw+): Erdas Imagine Images (.img)
SAR_CEOS (ro): CEOS SAR Image
CEOS (ro): CEOS Image
JAXAPALSAR (ro): JAXA PALSAR Product Reader (Level 1.1/1.5)
GFF (ro): Ground-based SAR Applications Testbed File Format (.gff)

ELAS (rw+): ELAS

---

RNCs by Region (list):

<table>
<thead>
<tr>
<th>Name</th>
<th>XML</th>
<th>Size</th>
<th>Zip File Date Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>View</td>
<td>207 MB</td>
<td>10/20/2011 18:00</td>
</tr>
<tr>
<td>06</td>
<td>View</td>
<td>133 MB</td>
<td>10/20/2011 18:00</td>
</tr>
</tbody>
</table>

HAP is the actual image. The BSB is metadata.

---

KAP is the actual image. The BSB is metadata.

---

#BEGIN_SRC sh
unzip NH.RNCs.zip
du -h BSB_ROOT
cd BSB_ROOT
find . | xargs file | cut -d: -f2 | sort -u
du -ks * | sort -n
ls -l 13274
#END_SRC

#BEGIN_SRC sh
ls -l 13274
less 13274/*.BSB
rep CHT */*.BSB
#END_SRC

#BEGIN EXAMPLE
---

17-ggis-gdal.org 53% L232 (Org)---

---

#BEGIN EXAMPLE

---

#BEGIN_SRC sh

#END_SRC
Input file size is 627, 1402
0...10...20...30...40...50...60...70...80...90...100 - done.

researchtools@ubuntu:~/class/17/BSB_ROOT/13274$ ls -l
total 8560
-rw-r--r-- 1 researchtools researchtools 1454473 2011-10-27 08:35 13274_1.KAP
-rw-r--r-- 1 researchtools researchtools 1127790 2011-10-27 12:24 13274_1.png
-rw-r--r-- 1 researchtools researchtools 10245 2011-10-27 12:24 13274_1.png.aux.xml
-rw-r--r-- 1 researchtools researchtools 1337453 2011-10-27 08:35 13274_2.KAP
-rw-r--r-- 1 researchtools researchtools 1015550 2011-10-27 12:24 13274_2.png
-rw-r--r-- 1 researchtools researchtools 9511 2011-10-27 12:24 13274_2.png.aux.xml
-rw-r--r-- 1 researchtools researchtools 86989 2011-10-27 08:35 13274_3.KAP
-rw-r--r-- 1 researchtools researchtools 44953 2011-10-27 12:24 13274_3.png
-rw-r--r-- 1 researchtools researchtools 3686 2011-10-27 12:24 13274_3.png.aux.xml
-rw-r--r-- 1 researchtools researchtools 69890 2011-10-27 08:35 13274_4.KAP
-rw-r--r-- 1 researchtools researchtools 3566436 2011-10-27 08:35 13274_5.KAP
-rw-r--r-- 1 researchtools researchtools 12525 2011-10-27 08:35 13274.BSB

researchtools@ubuntu:~/class/17/BSB_ROOT/13274$ display *.png

#BEGIN_SRC sh
unzip NH.RNCs.zip
du -h BSB_ROOT
cd BSB_ROOT
find . | xargs file | cut -d: -f2- | sort -u
du -ks * | sort -n
ls -l 13274
#END_SRC

KAP is the actual image. The BSB is metadata.

#BEGIN_SRC sh
ls -l 13274
less 13274/*.BSB
rep CHT */*.BSB
#END_SRC

#BEGIN_EXAMPLE

--- 17-ggis-gdal.org 53% L232 (Org) ---

---

---