Birkett Water - Birkett Lake Extraction

Version 2.0.0

Primary Contact: Mark Carroll Mark.Carroll@nasa.gov

Developers: Caleb Spradlin, Zach Williams

Overview

This documentation shows how to run the Birkett Lake Extraction application.

Installing with a singularity container

Installing the singularity software is out of scope of this documentation. See https://singularity-docs.readthedocs.io/en/latest/ for guidance on installing singularity.

Pulling the singularity container

Note: The version number is subject to change.

```
singularity pull oras://gitlab.nccs.nasa.gov:5050/cisto-ilab/containers/floodmap:4.1.4
```

```
INFO:    Downloading oras image
```

A `.sif` file should have been downloaded:

```
ls
```

```
floodmap_4.1.4.sif
```

User Guide

Birkett lake extract application command line invocations

```
$ python /usr/local/ilab/birkett_lake_extract/view/lakeExtractCLV.py \
    -bbox <BOUNDING BOX OF LAKE IN DECIMAL LAT LON FORM> \
    -lakenumber <LAKE NUMBER TO USE FOR OUTPUT FILE NAMES> \
    -start <START YEAR TO USE FOR MOD44W PRODUCT SEARCH> \
    -end <END YEAR TO USE FOR MOD44W PRODUCT SEARCH>
    [-o .]
```

Command-line-argument	Description	Required/Optional/Flag	Default	Example
`-bbox`	Bounding box of the lake to extract. Must be the largest water body in bounding box. LON_MIN LAT_MIN LON_MAX LAT_MAX	Required	N/a	`-bbox -122.52 42.8 -121.69 43.05`
`-lakenumber`	The lake number to use for output naming convention.	Required	N/a	`-lakeNumber 366`
`-start`	Start year to use for MOD44W product search. (Min 2001)	Optional	2001	`-start 2001`

Command-line-argument	Description	Required/Optional/Flag	Default	Example
`-end`	End year to use for MOD44W product search. (Max 2015)	Optional	2015	`-end 2015`
`-o`	Output directory.	Optional	`.`	`-o /path/to/output/directory`

Example

```
$ python /usr/local/ilab/birkett_lake_extract/view/lakeExtractCLV.py \
    -o output \
    -start 2001 \
    -end 2015 \
    -lakenumber 366 \
    -bbox -122.52 42.8 -121.69 43.05
```

Running birkett lake extract application with a container

To execute the birkett lake extract application with a container, you can use the `singularity exec`. Any singularity execution, you need to list the drives to mount to the container.

```
$ singularity exec -B <DRIVE-TO-MOUNT-0>,<DRIVE-TO-MOUNT-1> <PATH-TO-
CONTAINER> COMMAND
```

For example, in NCCS ADAPT, we need to mount our central storage

```
$ singularity exec -B /adapt,/gpfsm,/explore,/panfs,/css,/nfs4m
floodmap_4.1.4.sif COMMAND
```

Executing the birkett lake extract application follow these conventions:

```
$ singularity exec -B <DRIVE-TO-MOUNT-0>,<DRIVE-TO-MOUNT-1> <PATH-TO-
CONTAINER> \
    python birkett_lake_extract/view/lakeExtractCLV.py \
    -bbox <BOUNDING BOX OF LAKE IN DECIMAL LAT LON FORM> \
    -lakenumber <LAKE NUMBER TO USE FOR OUTPUT FILE NAMES> \
    -start <START YEAR TO USE FOR MOD44W PRODUCT SEARCH> \
```

```
    -end <END YEAR TO USE FOR MOD44W PRODUCT SEARCH>
    [-o .]
```

An example:

```
$ singularity exec -B /adapt,/gpfsm,/explore,/panfs,/css,/nfs4m
floodmap_4.1.4.sif \
    python /usr/local/ilab/birkett_lake_extract/view/lakeExtractCLV.py \
    -o output \
    -start 2001 \
    -end 2015 \
    -lakenumber 366 \
    -bbox -122.52 42.8 -121.69 43.05
```

Partial Run

```
$ singularity exec -B /adapt,/gpfsm,/explore,/panfs,/css,/nfs4m \
    /adapt/nobackup/people/iluser/ilab_containers/floodmap_4.1.4.sif \
    python /usr/local/ilab/birkett_lake_extract/view/lakeExtractCLV.py -o
output -start 2001 -end 2015 -lakenumber 366 -bbox -122.52 42.8 -121.69
43.05
```

Expected output messages:

```
/home/cssprad1/.local/lib/python3.8/site-
packages/geopandas/_compat.py:106: UserWarning: The Shapely GEOS version
(3.8.0-CAPI-1.13.1 ) is incompatible with the GEOS version PyGEOS was
compiled with (3.10.1-CAPI-1.16.0). Conversions between both will be slow.
  warnings.warn(
/gpfsm/ccds01/nobackup/people/cssprad1/projects/LakeExtract/testing/07.11.
22.develop/birkett_lake_extract/model/LakeExtract.py:192: UserWarning:
More than one results in CMR query. Num of results: 2
  warnings.warn(
2022-07-11 10:47:14; INFO; gdal_translate -projwin -122.52 43.05 -121.69
42.8 -projwin_srs EPSG:4326 -epo -eco -of GTiff output/2-
maxextent/MOD44W.h08v04.MaxExtent.2001.2015.20221921046.tif output/2-
maxextent/Lake.366.MOD44W.MaxExtentClipped.2001.2015.20221921046.tif
2022-07-11 10:47:14; INFO; Return code: None
2022-07-11 10:47:14; INFO; Message: b'ERROR 1: Computed -srcwin 5024 3336
118 120 falls completely outside raster extent.\n'
2022-07-11 10:47:44; INFO; gdal_translate -projwin -122.52 43.05 -121.69
42.8 -projwin_srs EPSG:4326 -epo -eco -of GTiff output/2-
maxextent/MOD44W.h09v04.MaxExtent.2001.2015.20221921046.tif output/2-
maxextent/Lake.366.MOD44W.MaxExtentClipped.2001.2015.20221921046.tif
2022-07-11 10:47:44; INFO; Return code: None
2022-07-11 10:47:44; INFO; Message: b''
2022-07-11 10:47:44; INFO; gdal_polygonize.py output/2-
```

```
maxextent/Lake.366.MOD44W.MaxExtentClipped.2001.2015.20221921046.tif
output/3-polygons/Lake.366.Polygonized.20221921046.shp -b 1 -f "ESRI
Shapefile" DN
2022-07-11 10:47:44; INFO; Return code: None
2022-07-11 10:47:44; INFO; Message: b''
2022-07-11 10:47:44; INFO; Failed to auto identify EPSG: 7
/home/cssprad1/.local/lib/python3.8/site-
packages/geopandas/io/file.py:299: FutureWarning: pandas.Int64Index is
deprecated and will be removed from pandas in a future version. Use
pandas.Index with the appropriate dtype instead.
  pd.Int64Index,
/home/cssprad1/.local/lib/python3.8/site-
packages/geopandas/io/file.py:299: FutureWarning: pandas.Int64Index is
deprecated and will be removed from pandas in a future version. Use
pandas.Index with the appropriate dtype instead.
  pd.Int64Index,
/home/cssprad1/.local/lib/python3.8/site-
packages/geopandas/io/file.py:299: FutureWarning: pandas.Int64Index is
deprecated and will be removed from pandas in a future version. Use
pandas.Index with the appropriate dtype instead.
  pd.Int64Index,
2022-07-11 10:47:45; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2001.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2001_C6.tif
2022-07-11 10:47:45; INFO; Return code: None
2022-07-11 10:47:45; INFO; Message: b''
2022-07-11 10:47:45; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2001_C6.tif
2022-07-11 10:47:45; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2002.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2002_C6.tif
2022-07-11 10:47:46; INFO; Return code: None
2022-07-11 10:47:46; INFO; Message: b''
2022-07-11 10:47:46; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2002_C6.tif
2022-07-11 10:47:46; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2003.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2003_C6.tif
2022-07-11 10:47:46; INFO; Return code: None
2022-07-11 10:47:46; INFO; Message: b''
2022-07-11 10:47:46; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2003_C6.tif
2022-07-11 10:47:46; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2004.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2004_C6.tif
2022-07-11 10:47:46; INFO; Return code: None
```

```
2022-07-11 10:47:46; INFO; Message: b''
2022-07-11 10:47:46; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2004_C6.tif
2022-07-11 10:47:47; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2005.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2005_C6.tif
2022-07-11 10:47:47; INFO; Return code: None
2022-07-11 10:47:47; INFO; Message: b''
2022-07-11 10:47:47; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2005_C6.tif
2022-07-11 10:47:47; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2006.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2006_C6.tif
2022-07-11 10:47:47; INFO; Return code: None
2022-07-11 10:47:47; INFO; Message: b''
2022-07-11 10:47:47; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2006_C6.tif
2022-07-11 10:47:47; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2007.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2007_C6.tif
2022-07-11 10:47:48; INFO; Return code: None
2022-07-11 10:47:48; INFO; Message: b''
2022-07-11 10:47:48; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2007_C6.tif
2022-07-11 10:47:48; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2008.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2008_C6.tif
2022-07-11 10:47:48; INFO; Return code: None
2022-07-11 10:47:48; INFO; Message: b''
2022-07-11 10:47:48; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2008_C6.tif
2022-07-11 10:47:48; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2009.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2009_C6.tif
2022-07-11 10:47:48; INFO; Return code: None
2022-07-11 10:47:48; INFO; Message: b''
2022-07-11 10:47:48; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2009_C6.tif
2022-07-11 10:47:49; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2010.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2010_C6.tif
2022-07-11 10:47:49; INFO; Return code: None
```

```
2022-07-11 10:47:49; INFO; Message: b''
2022-07-11 10:47:49; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2010_C6.tif
2022-07-11 10:47:49; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2011.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2011_C6.tif
2022-07-11 10:47:49; INFO; Return code: None
2022-07-11 10:47:49; INFO; Message: b''
2022-07-11 10:47:49; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2011_C6.tif
2022-07-11 10:47:50; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2012.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2012_C6.tif
2022-07-11 10:47:50; INFO; Return code: None
2022-07-11 10:47:50; INFO; Message: b''
2022-07-11 10:47:50; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2012_C6.tif
2022-07-11 10:47:50; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2013.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2013_C6.tif
2022-07-11 10:47:50; INFO; Return code: None
2022-07-11 10:47:50; INFO; Message: b''
2022-07-11 10:47:50; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2013_C6.tif
2022-07-11 10:47:50; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2014.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2014_C6.tif
2022-07-11 10:47:51; INFO; Return code: None
2022-07-11 10:47:51; INFO; Message: b''
2022-07-11 10:47:51; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2014_C6.tif
2022-07-11 10:47:51; INFO; gdalwarp -overwrite -of GTiff -te  -122.52 42.8
-121.69 43.05 -te_srs EPSG:4326 -t_srs ESRI:53008 -tr 231.656345
-231.656345 -dstnodata 3.0 output/4-buffered-
rasters/Lake.366.2015.20221921046.tif output/5-final-buffered-
rasters/lake_366_MOD44W_2015_C6.tif
2022-07-11 10:47:51; INFO; Return code: None
2022-07-11 10:47:51; INFO; Message: b''
2022-07-11 10:47:51; INFO; Generated output/5-final-buffered-
rasters/lake_366_MOD44W_2015_C6.tif
```

Expected final output files:

```
[cssprad1@ilab109 08.04.22.main.production]$ ls output/final-buffered-
rasters/
lake_366_MOD44W_2001_C6.tif  lake_366_MOD44W_2009_C6.tif
lake_366_MOD44W_2002_C6.tif  lake_366_MOD44W_2010_C6.tif
lake_366_MOD44W_2003_C6.tif  lake_366_MOD44W_2011_C6.tif
lake_366_MOD44W_2004_C6.tif  lake_366_MOD44W_2012_C6.tif
lake_366_MOD44W_2005_C6.tif  lake_366_MOD44W_2013_C6.tif
lake_366_MOD44W_2006_C6.tif  lake_366_MOD44W_2014_C6.tif
lake_366_MOD44W_2007_C6.tif  lake_366_MOD44W_2015_C6.tif
lake_366_MOD44W_2008_C6.tif
```