Introduction to River Architect

Sebastian Schwindt
sschwindt@ucdavis.edu | https://sebastian-schwindt.org

Kenneth Larrieu
kglarrieu@ucdavis.edu | https://kglarrieu.github.io

Prof. Gregory B. Pasternack lab – http://pasternack.ucdavis.edu

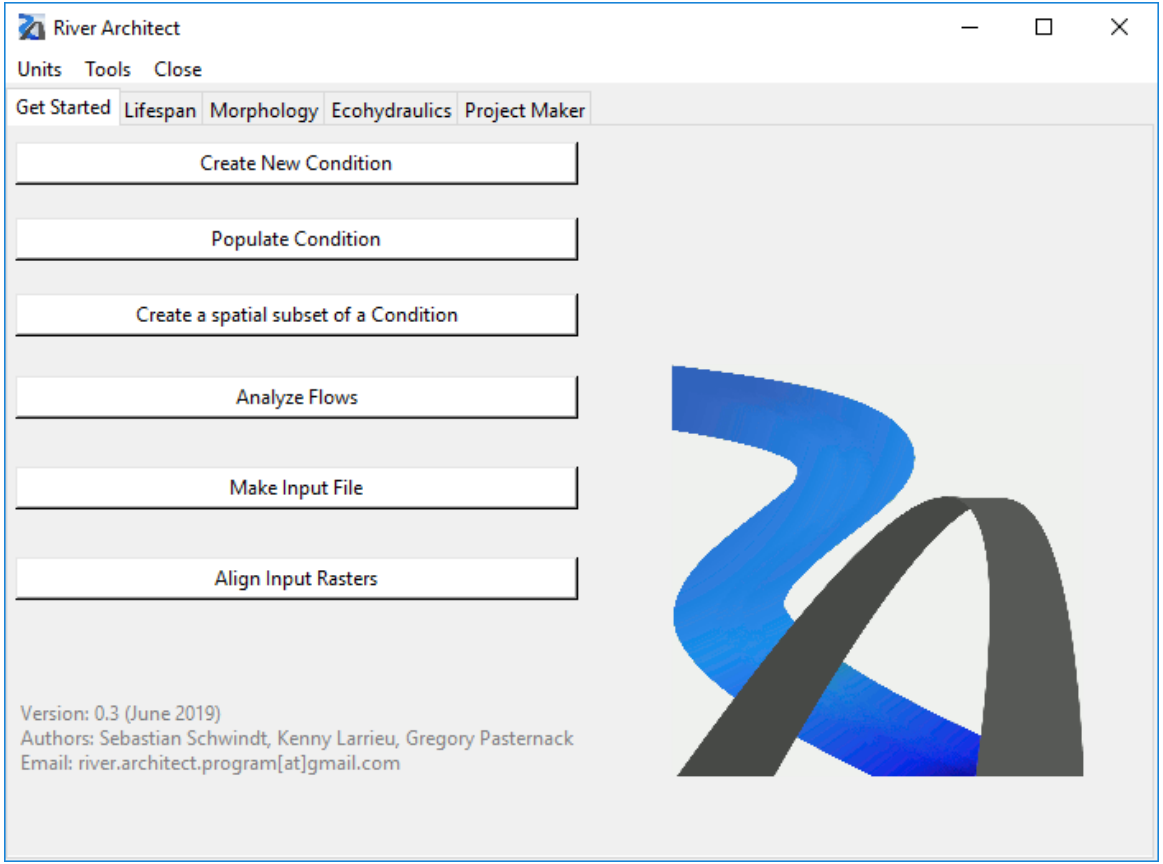
Department of Land, Air, and Water Resources
239 Veihmeyer Hall, University of California, Davis
Davis, CA 95616-8628

Getting started

Getting started

1. **Go to https://riverarchitect.github.io & navigate to the Wiki [2 min.]**
2. **Get familiar with the Wiki pages [3 min.]**
   - Find module pages
   - Troubleshooting?
   - Looking for keywords?
3. **Install River Architect [10 min.]**
   - Check requirements
   - Install using Git Bash (Wiki instructions or download River Architect as zip - deprecated)
   - After installation: Check folder & file structure (compare with wiki)
4. **Launch River Architect [5 min.]**
   - Prepare first start (https://riverarchitect.github.io/RA_wiki/Installation#launch_ra)
   - Launch program & toggle through tabs, check drop-down menus

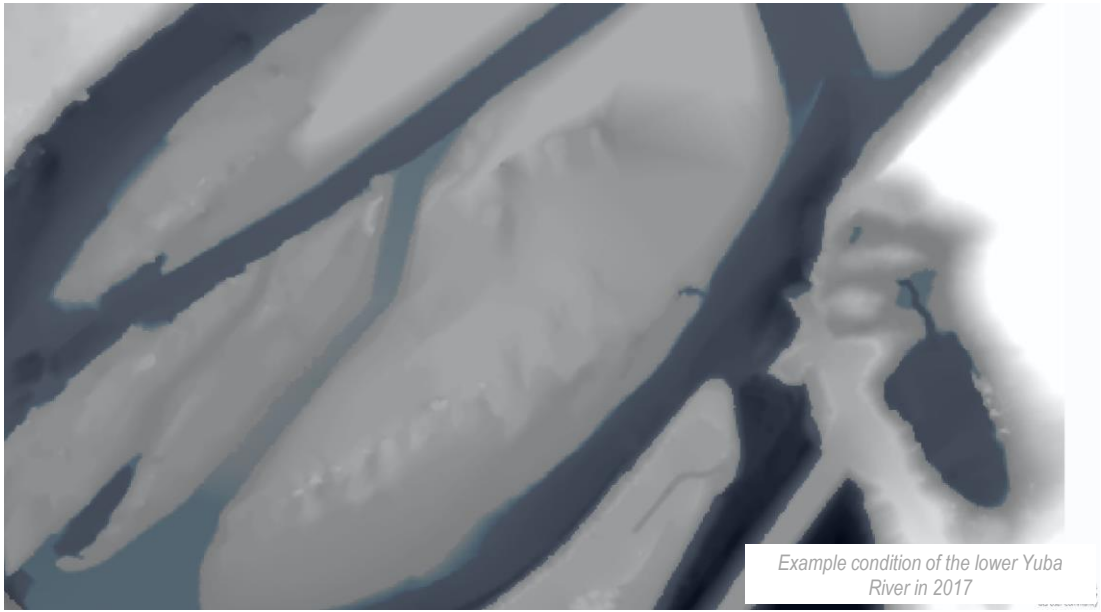
Getting started



Get started → Launch RA

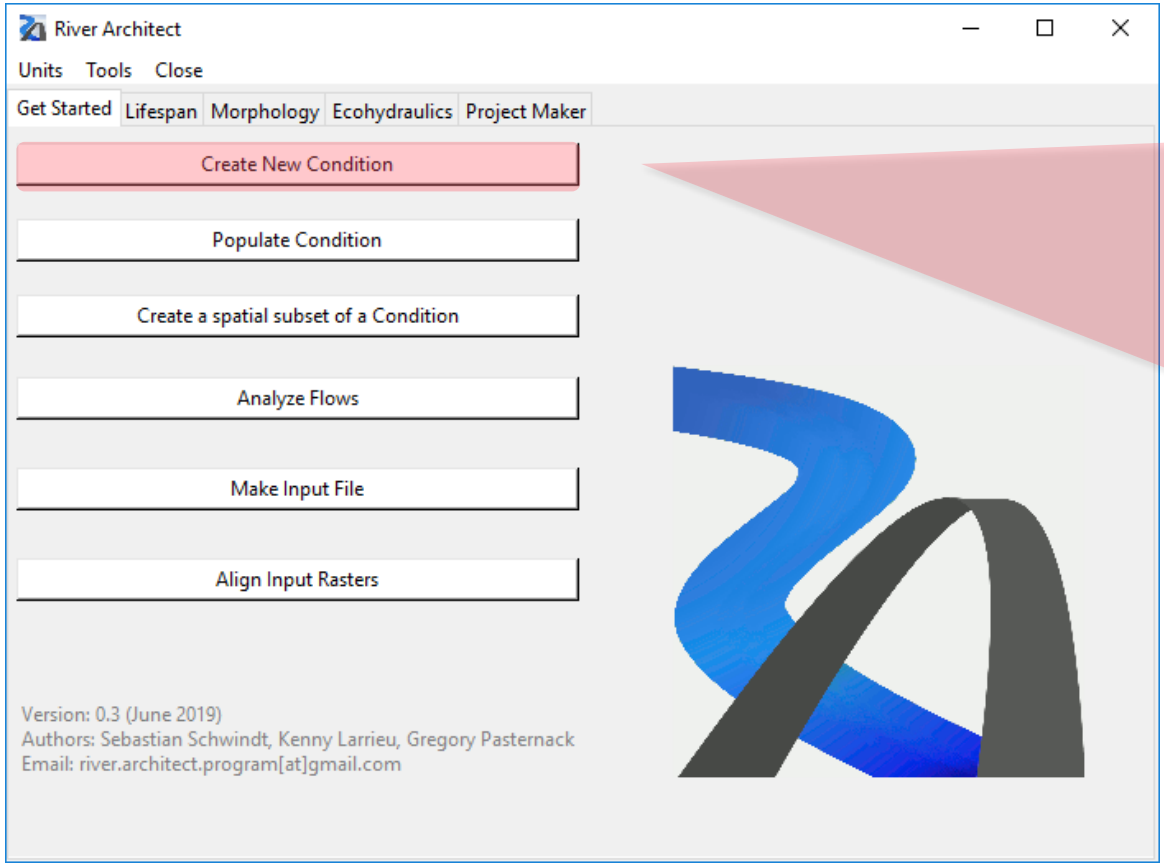
Conditions in River Architect

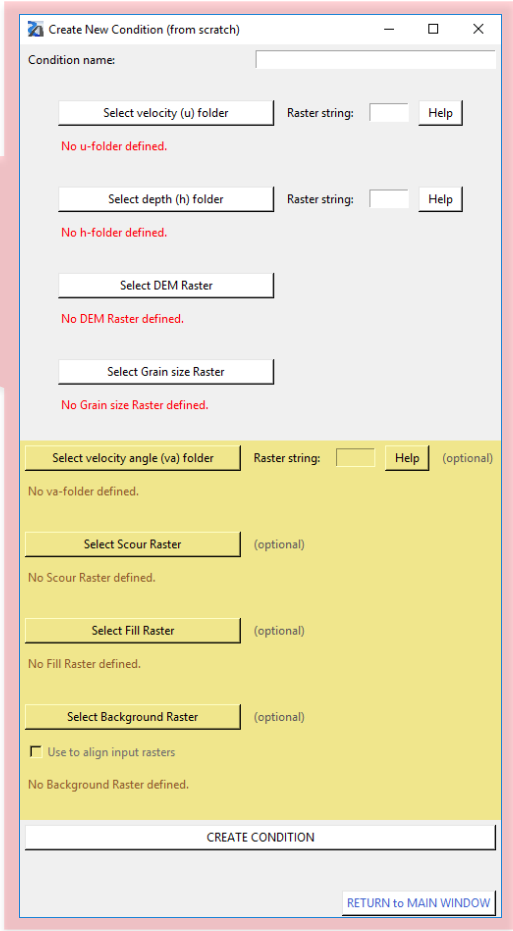
- Snapshot of river topography, sedimentology & hydraulic properties
- Stored in /01_Conditions/
- Looks empty ? … let's create a new Condition with the sample data …



Example condition of the lower Yuba River in 2017

Getting started





Get started > Create Condition

Getting started

1) Name for initial condition – be precise, no space (e.g., 2017_initial)

2) Select copied folder from
Z:\resources\Software\2_Geo\RiverArchitect\workshop_data\velocity\
Only use rasters with ”initial” in their file name Z

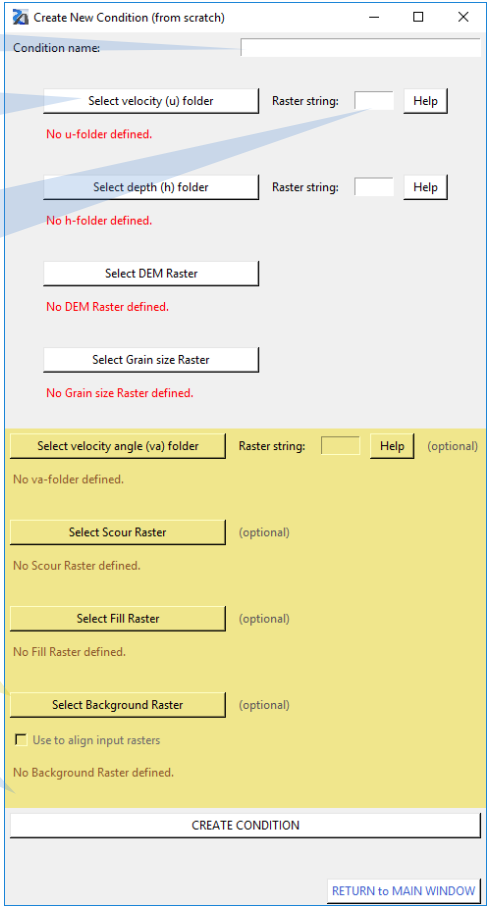
3) Repeat 2) for depth rasters:
Z:\resources\Software\2_Geo\RiverArchitect\workshop_data\depth\

4) Select DEM & Grain size raster:
Z:\resources\Software\2_Geo\RiverArchitect\workshop_data\terrain\initial\

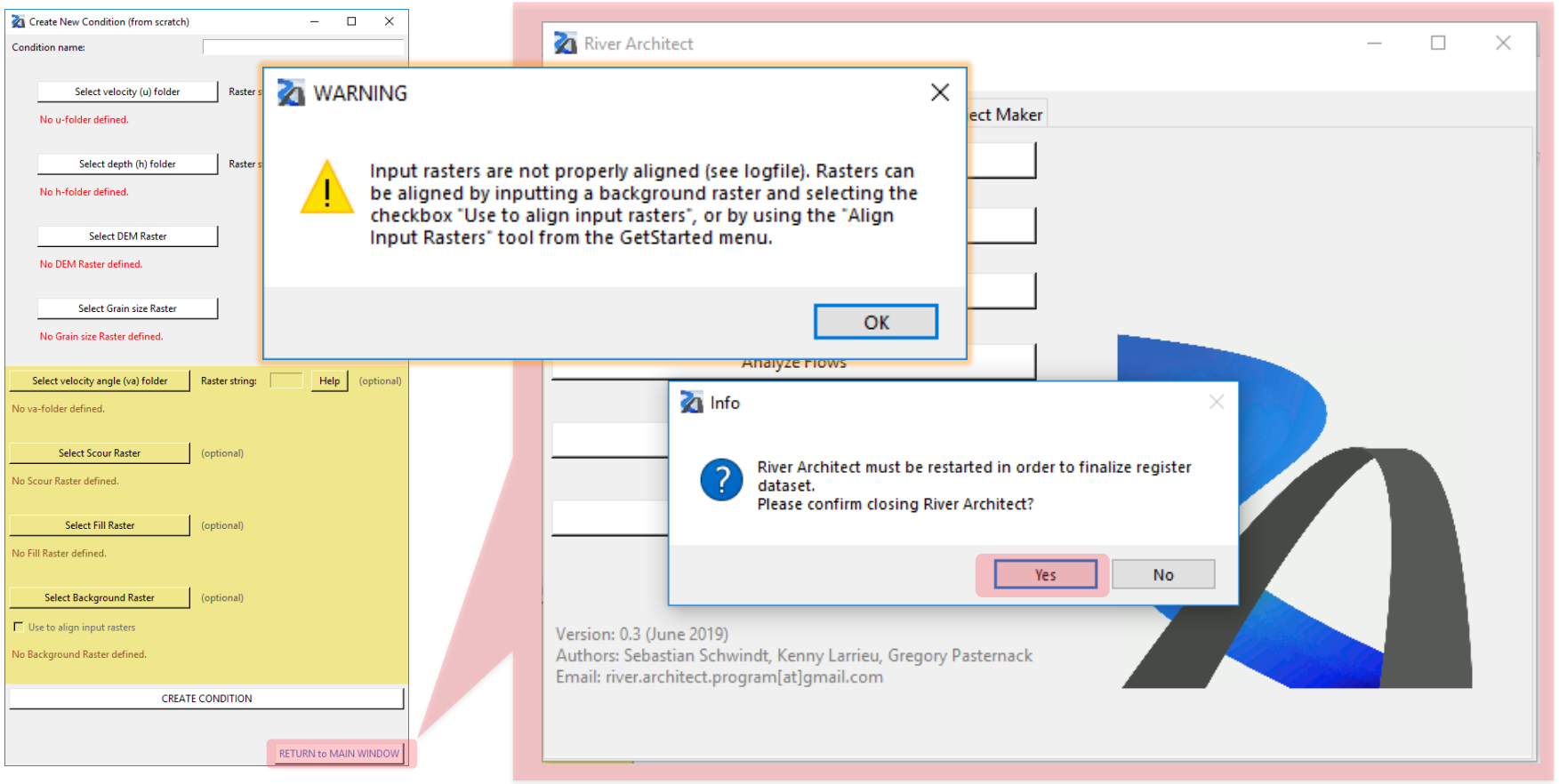
5) Select background Raster:
Z:\resources\Software\2_Geo\RiverArchitect\workshop_data\terrain\initial\

6) Create Condition & Verify 01_Conditions/ folder

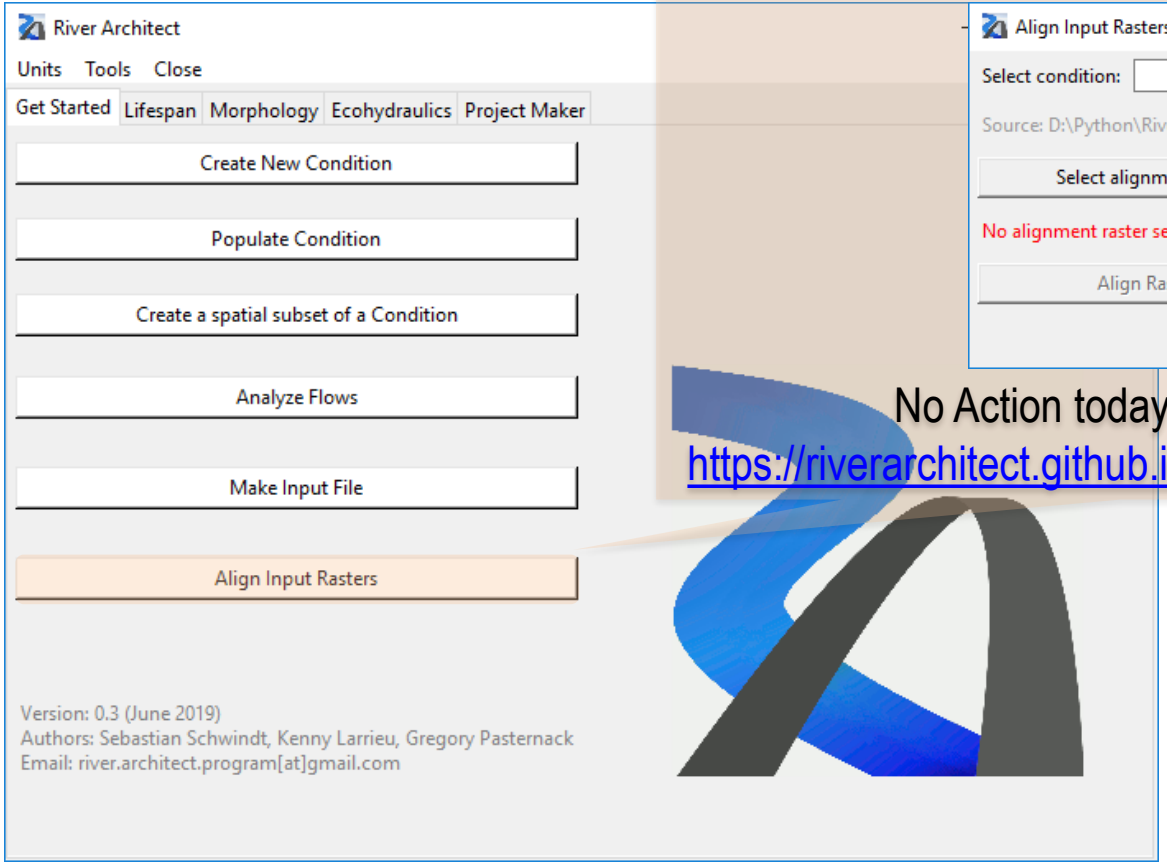
7) Repeat steps 1)-6) to create another “remod” Condition

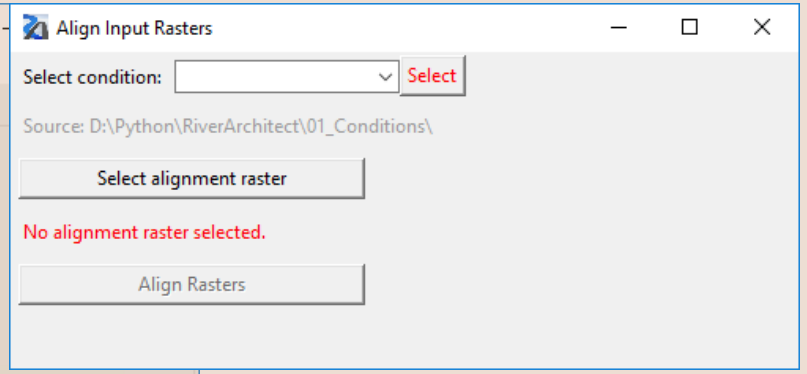


Getting started



Getting started



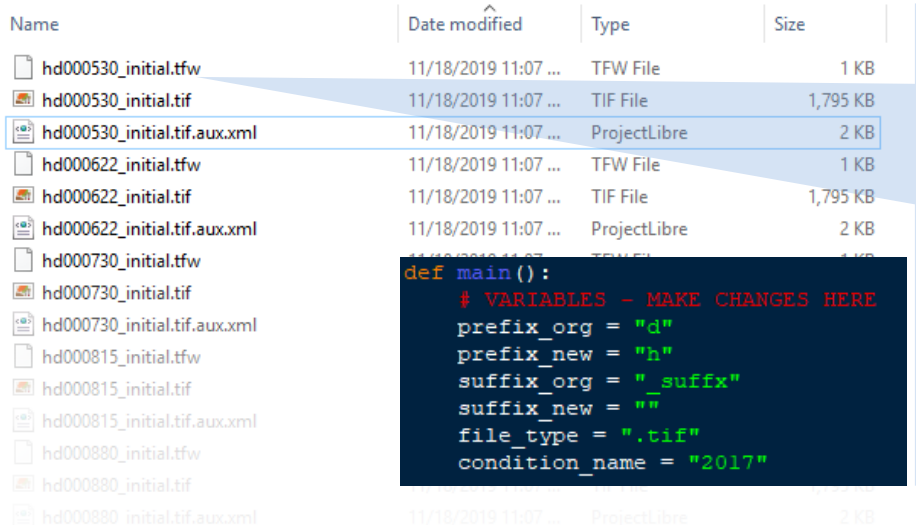


No Action today – Kenny & the Wiki tell you more

https://riverarchitect.github.io/RA_wiki/Signposts#align-inputs

Get started

The rasters were copied, but: https://riverarchitect.github.io/RA_wiki/Signposts#terms



Name	Date modified	Type	Size
hd000530_initial.tfw	11/18/2019 11:07 ...	TFW File	1 KB
hd000530_initial.tif	11/18/2019 11:07 ...	TIF File	1,795 KB
hd000530_initial.tif.aux.xml	11/18/2019 11:07 ...	ProjectLibre	2 KB
hd000622_initial.tfw	11/18/2019 11:07 ...	TFW File	1 KB
hd000622_initial.tif	11/18/2019 11:07 ...	TIF File	1,795 KB
hd000622_initial.tif.aux.xml	11/18/2019 11:07 ...	ProjectLibre	2 KB
hd000730_initial.tfw			
hd000730_initial.tif			
hd000730_initial.tif.aux.xml			
hd000815_initial.tfw			
hd000815_initial.tif			
hd000815_initial.tif.aux.xml			
hd000880_initial.tfw			
hd000880_initial.tif			
hd000880_initial.tif.aux.xml			

```
def main():
    # VARIABLES - MAKE CHANGES HERE
    prefix_org = "d"
    prefix_new = "h"
    suffix_org = "_suffx"
    suffix_new = ""
    file_type = ".tif"
    condition_name = "2017"
```

Does not match River Architect **filename conventions**

- Depth: hQQQQQQ.tif
- Velocity: uQQQQQQ.tif

So what - rename 100 files manually ?

→ Check out River Architect Tools:
RiverArchitect/Tools/rename_files.py

→ Open with IDLE (ArcGIS standard tool)

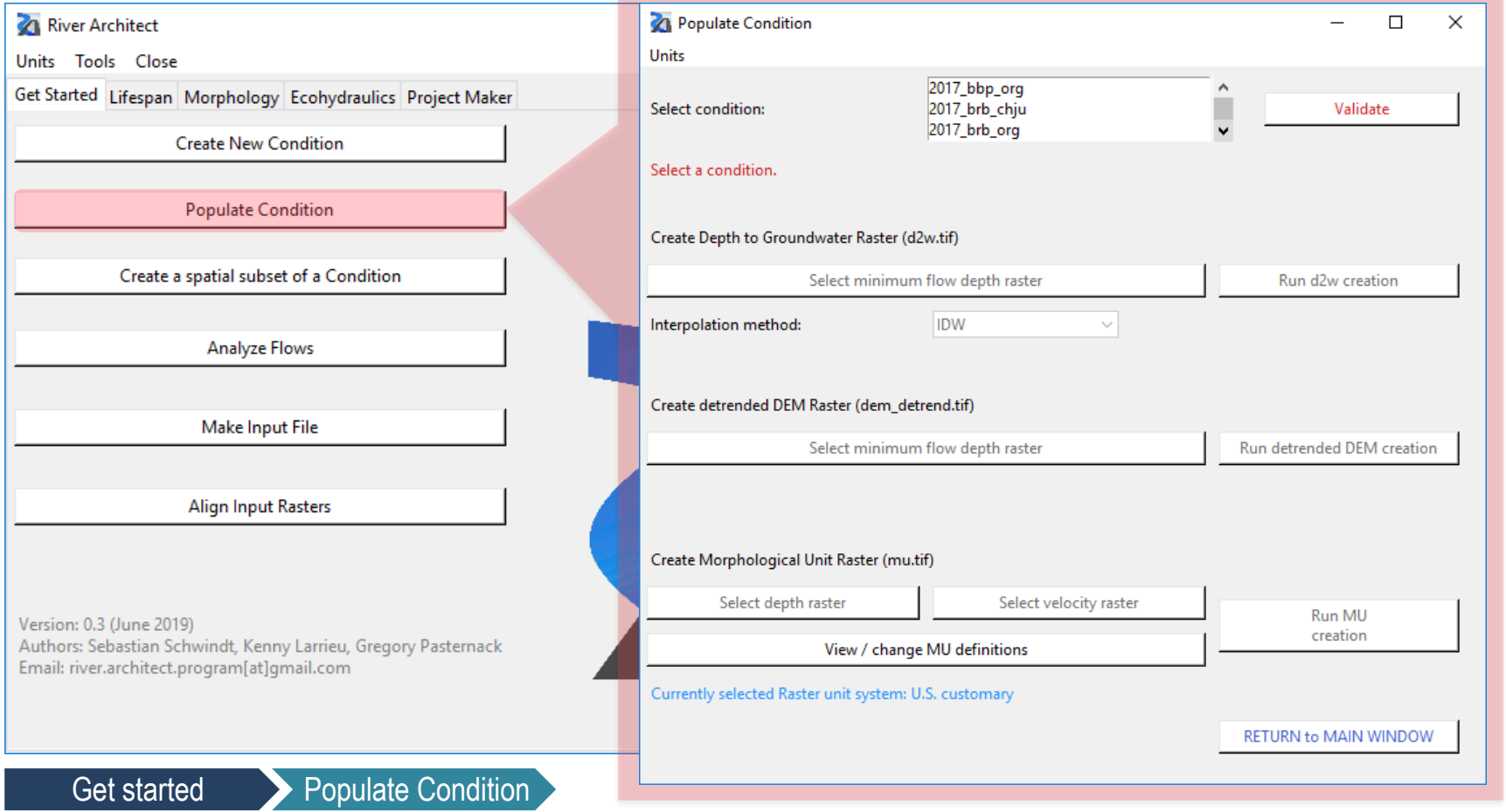
Define prefix_org = "hd", prefix_new = "h", suffix_org = "_remod", suffix_new = "", condition_name = "2017_remod"

→ Run script (press F5 or click Run > Run Module)

→ Repeat for velocity (change: prefix_org = "uv", prefix_new = "u")

→ Repeat both depth & velocity for init. Condition (change: suffix_org = "_initial", condition_name = "2017_i...")

Getting started

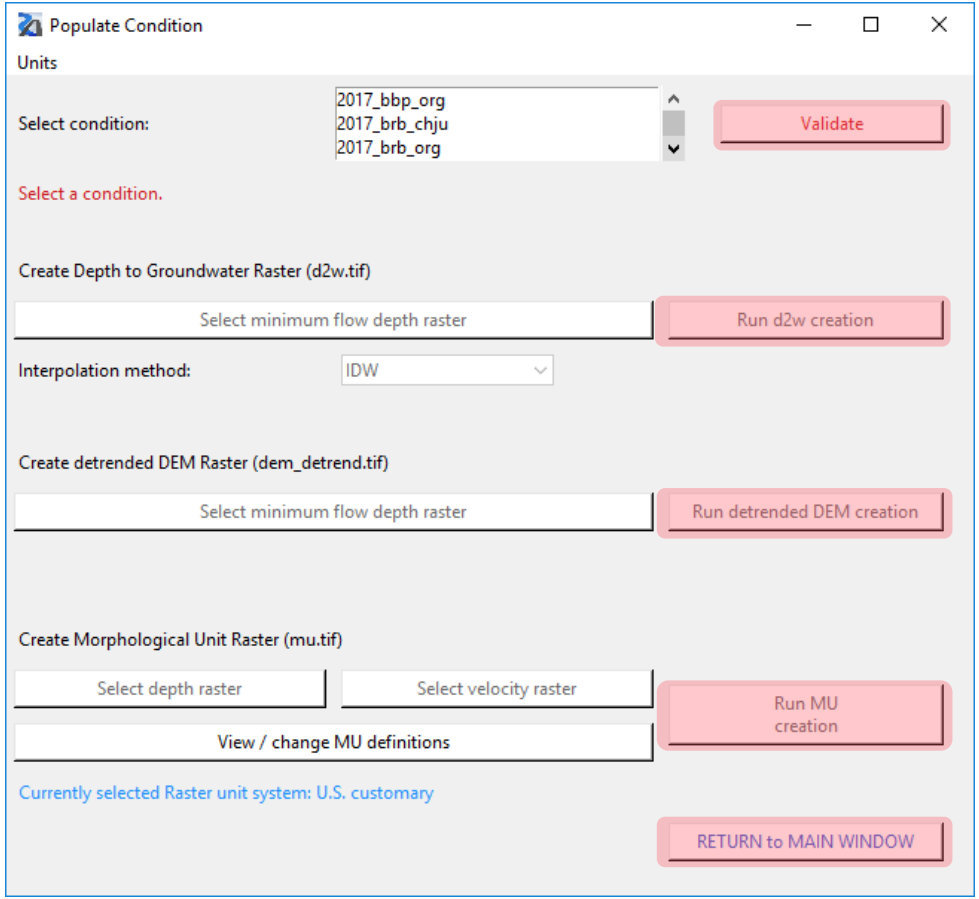


Getting started

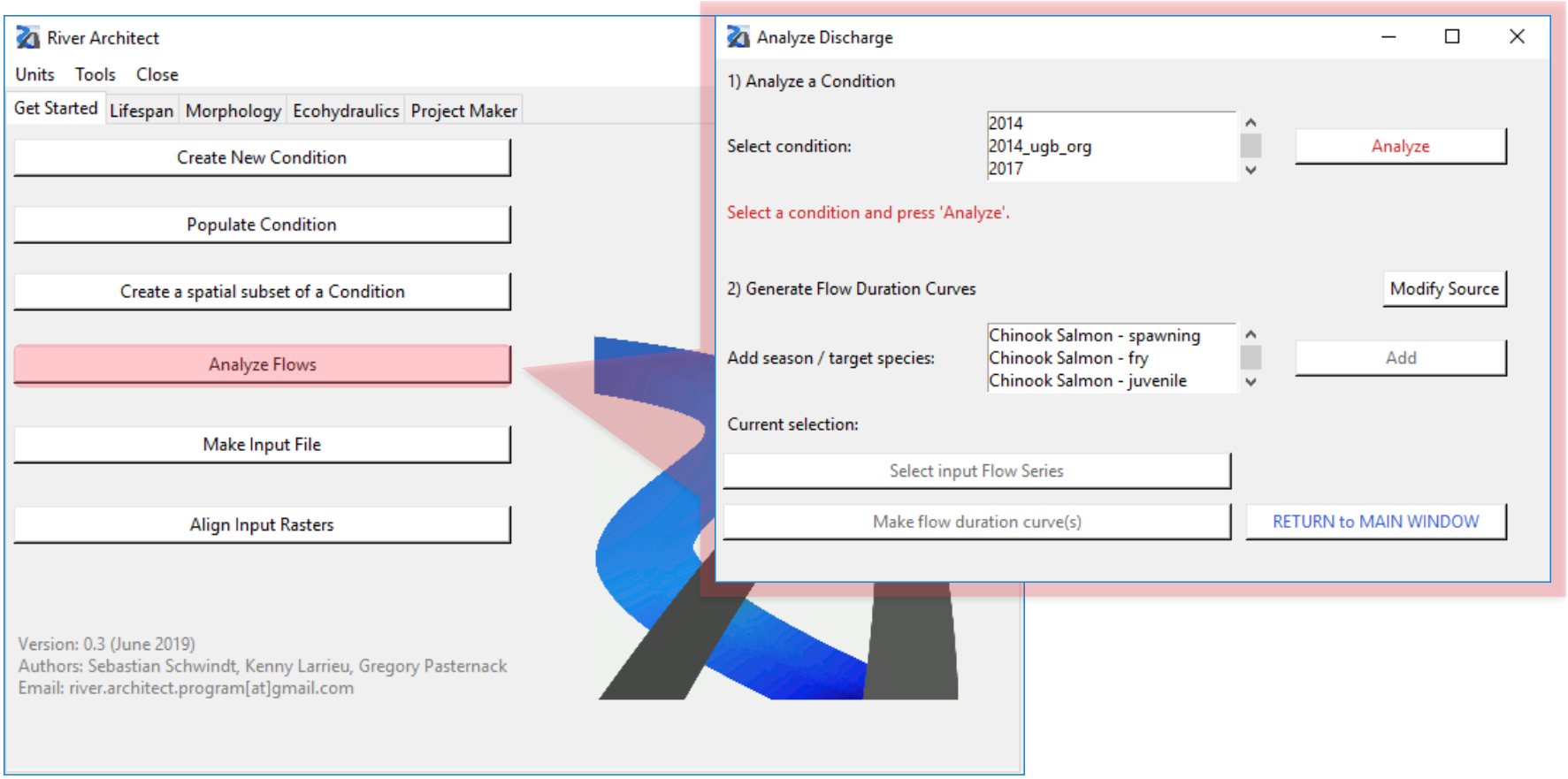
1) Select remod condition
2) Create d2w.tif with 530-cfs raster
3) Create detrended_dem.tif with 530-cfs raster
4) Create mu.tif with 880-cfs rasters

Read more

https://riverarchitect.github.io/RA_wiki/Signposts#pop-condition

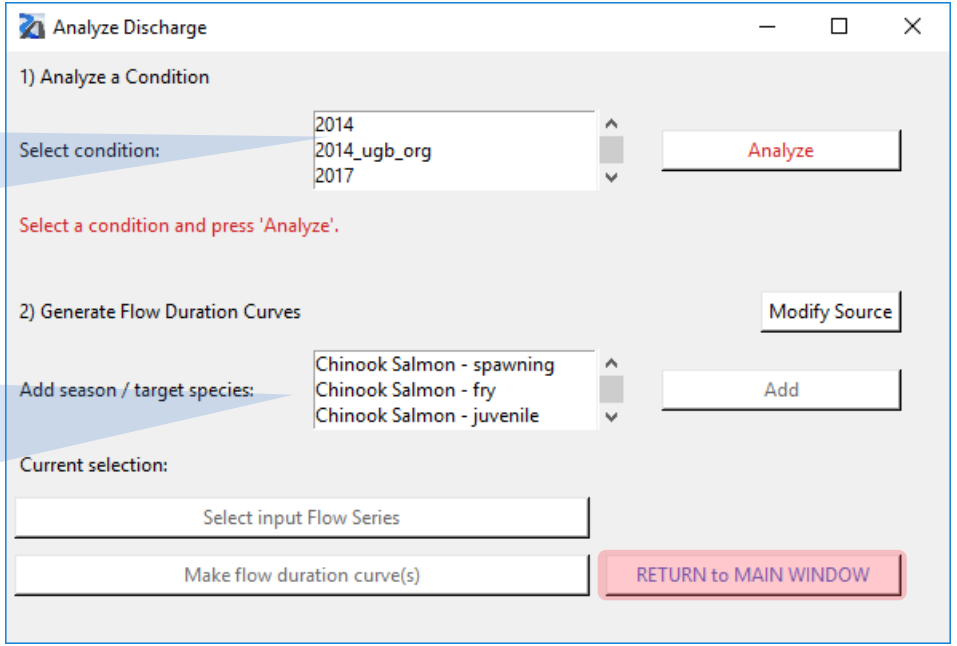


Getting started



Getting started

1) Highlight initial condition and click on Analyze
2) A workbook will open – **use** Z:\resources\Software\2_Geo\RiverArchitect\workshop_data**flows.xlsx** to define Return periods (frequency sheet)

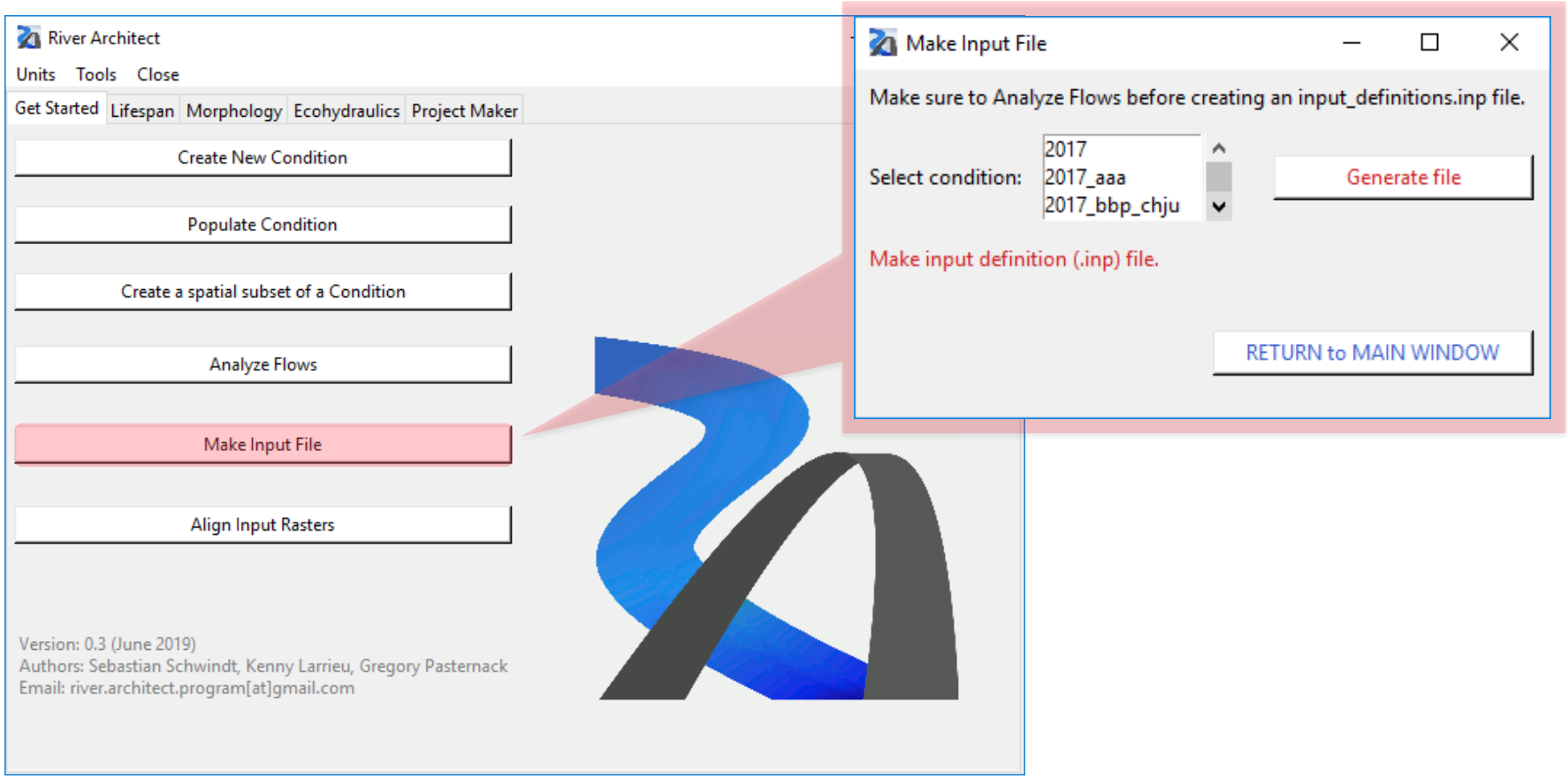


3) Add Chinook Salmon - juvenile
4) Select input Flow series: Z:\resources\Software\2_Geo\RiverArchitect\workshop_data**flows.xlsx** (flow data sheet)
5) Click on Make flow duration curve(s)

6) **Verify new workbooks in** RiverArchitect/: /00_Flows/INITAL/flow_duration_chju.xlsx **&** /01_Conditions/INITIAL/flow_definitions.xlsx

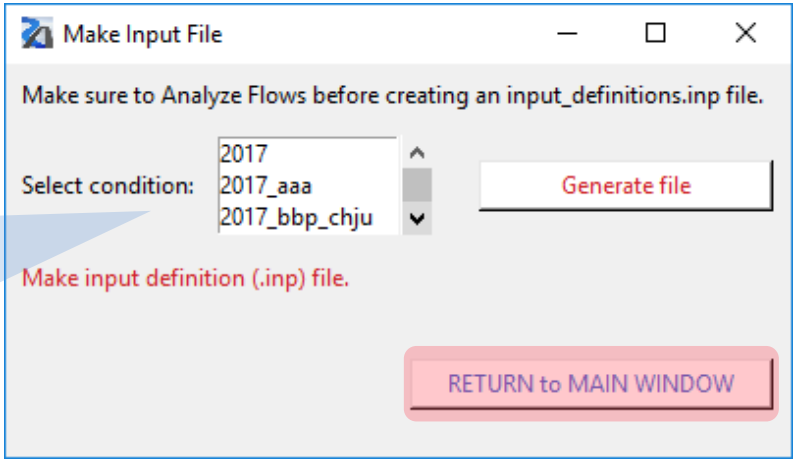
7) **Repeat steps 1)-6) to create flow statistics for the "remod" Condition**

Getting started



Getting started

- Select initial condition & click on Generate file
- Select remod condition & click on Generate file
- Verify input files:
  - /01_Conditions/INITIAL/input_definitions.inp
  - /01_Conditions/REMOD/input_definitions.inp



Main purpose: Lifespan & Design mapping

More about input definition files: https://riverarchitect.github.io/RA_wiki/Signposts#inpfile

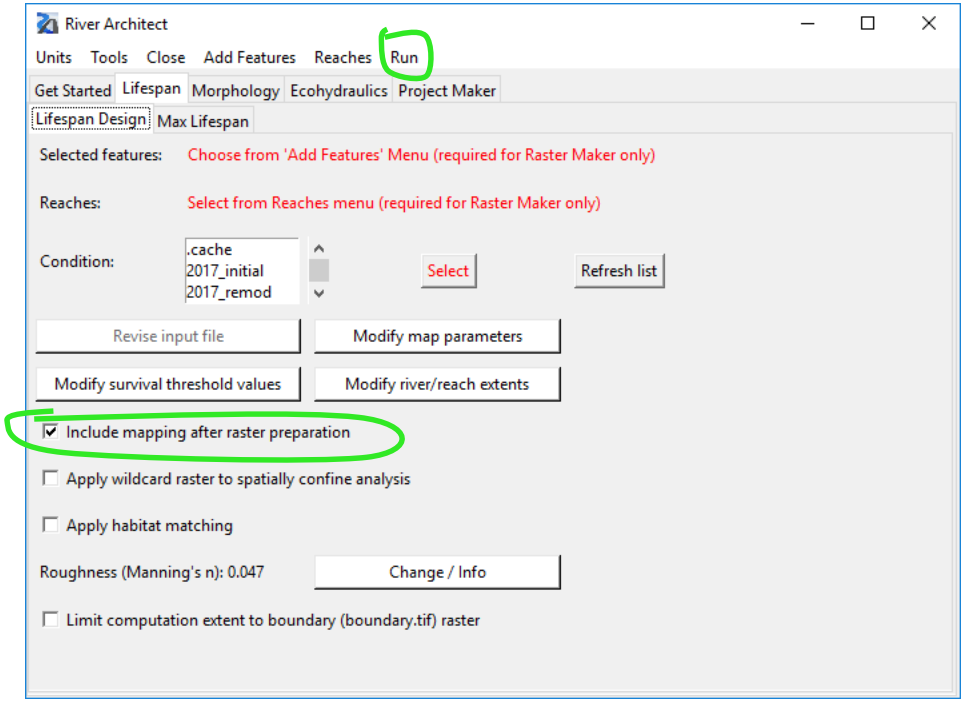
Mapping

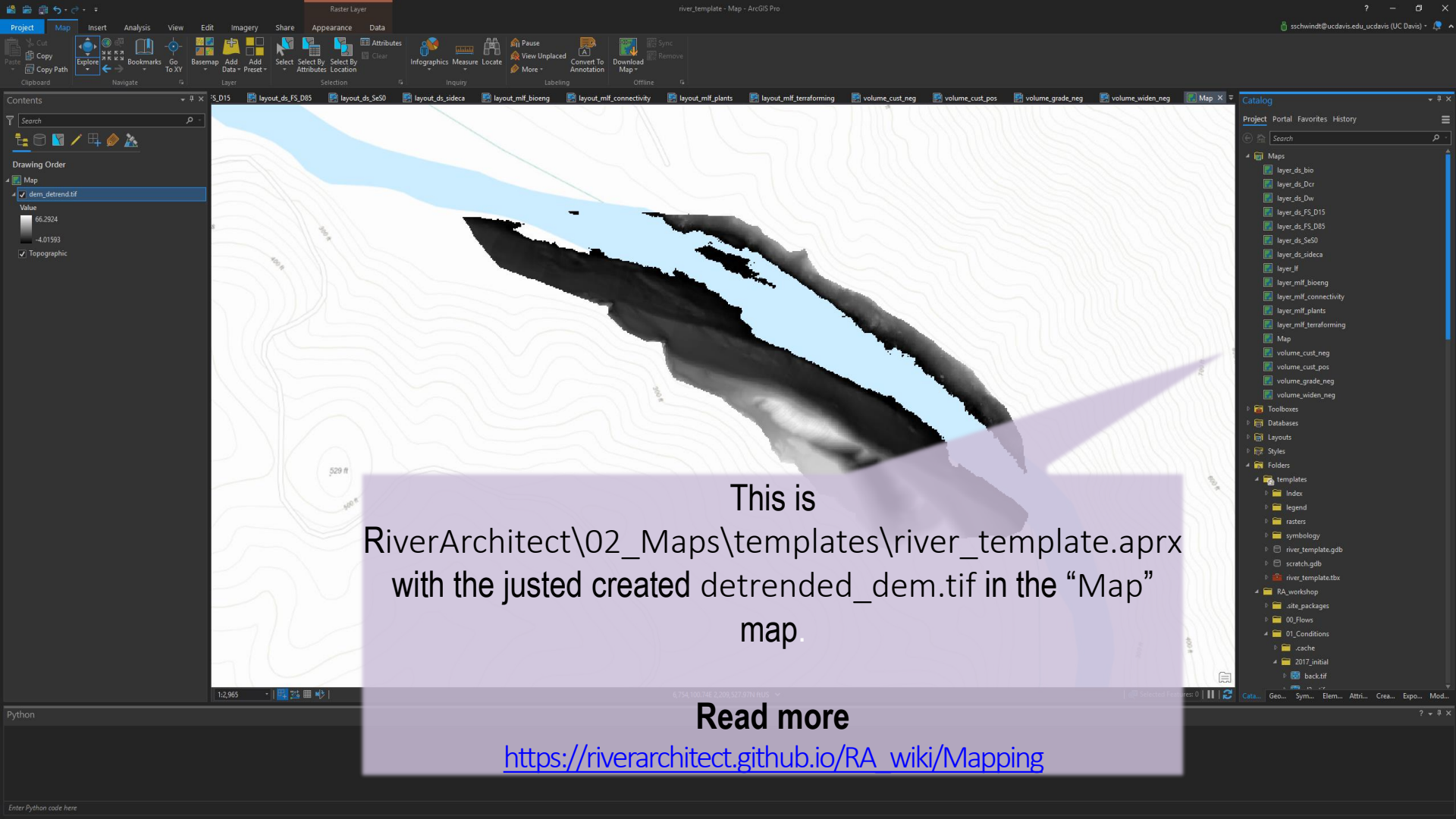
Mapping

→ Lifespan-modules use RiverArchitect\02_Maps\templates\river_template.aprx for each condition (if activated in River Architect)

→ Project Maker module uses RiverArchitect\ProjectMaker\.templates\Project_vii_TEMPLATE\ProjectMaps.aprx

→ Projects (.aprx files)contain layout templates for automated map generation




This is
RiverArchitect\02_Maps\templates\river_template.aprx
with the justed created detrended_dem.tif in the “Map”
map.
Read more
https://riverarchitect.github.io/RA_wiki/Mapping

Detailed documentation & reading for this chapter
https://riverarchitect.github.io/RA_wiki/Signposts