



# Post-fire Regeneration Tool for Chaparral Shrublands

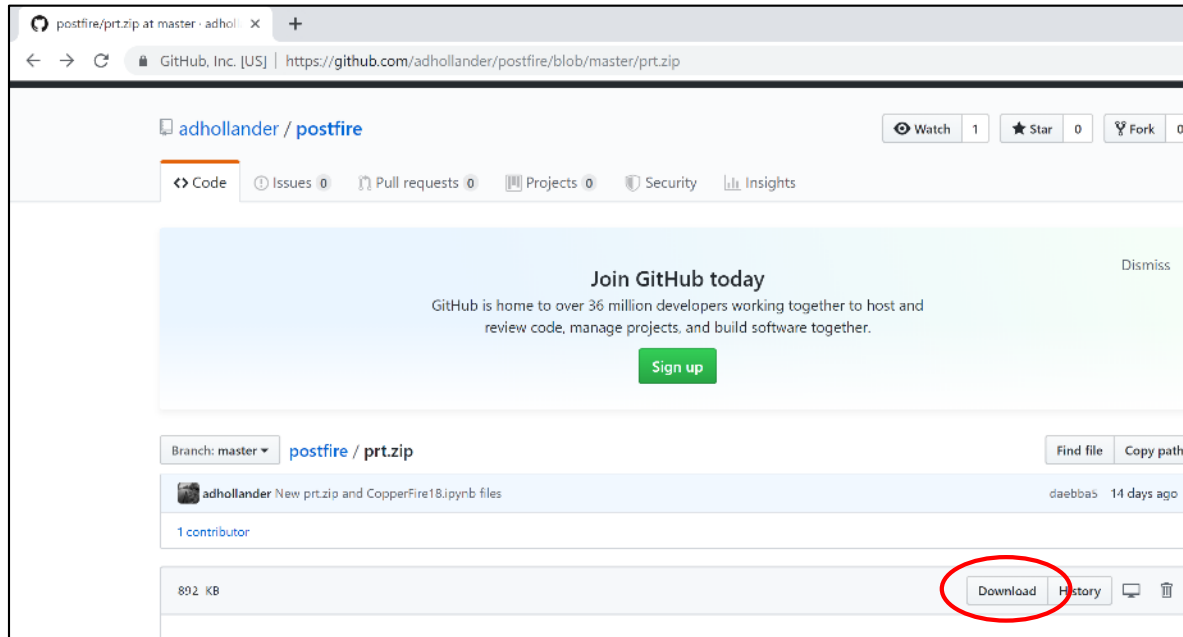
Instructions for setting up and running the tool  
in Jupyter Notebooks

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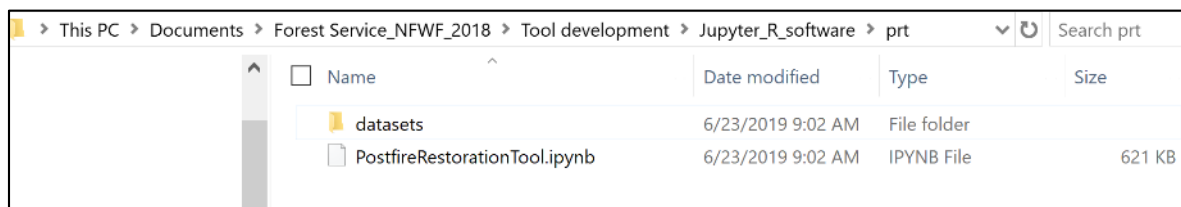
**Step 1.** To run the Post-fire Restoration Tool (PRT) download the zipped file from GitHub that includes the Jupyter notebook file (.ipynb). This zipped file includes example datasets for the Copper fire:

<https://github.com/adhollander/postfire/blob/master/prt.zip>



Once unzipped, the directory will contain:

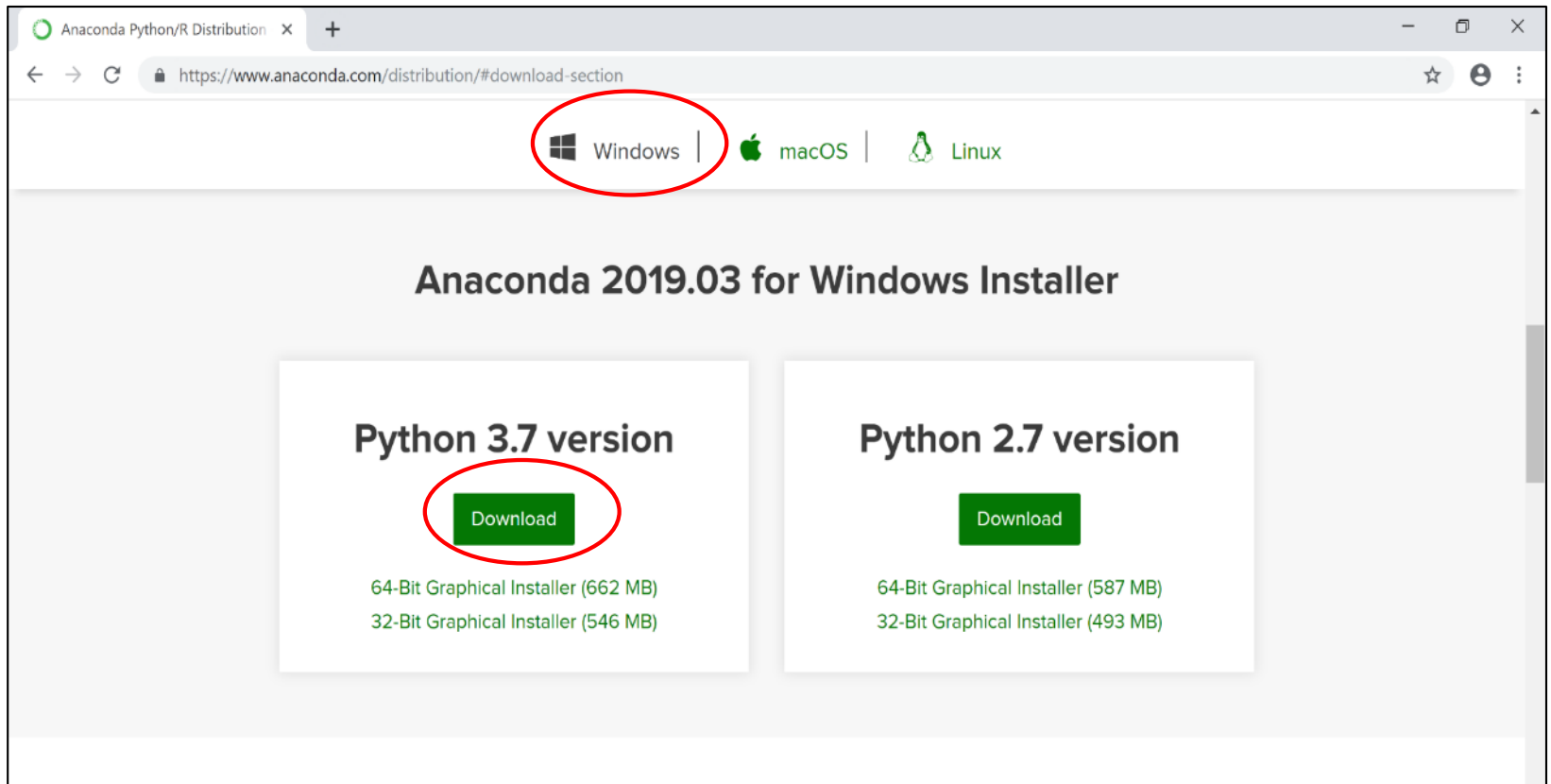
- /Datasets with 6 tif files for the Copper fire
- An 'ipynb' file to run the Jupyter notebook



**Step 2.** To open up the Jupyter notebook file, it is necessary to download and install the Anaconda program from:

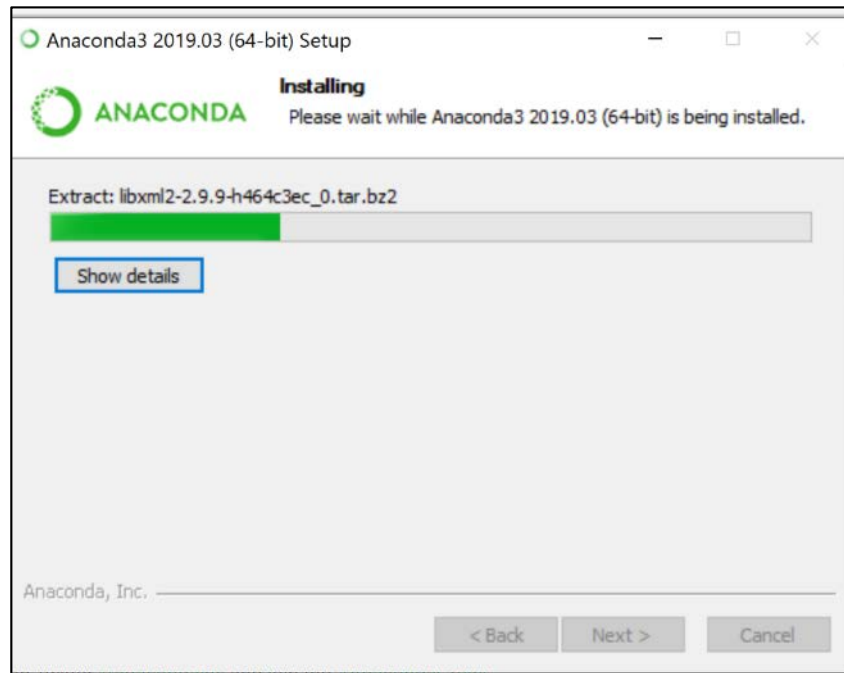
<https://www.anaconda.com/distribution/#download-section>

(note: select either the Windows or Mac version)





**Step 3.** Once Anaconda has downloaded, double click on the application to install it, using the default parameters

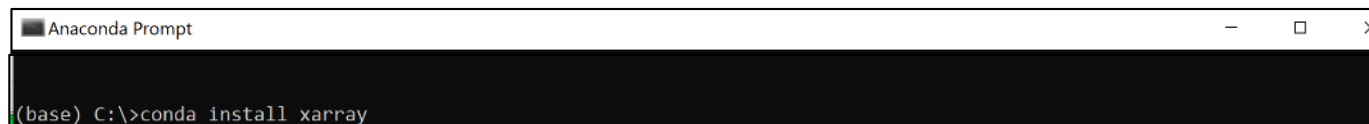


**Step 4.** Once Anaconda has downloaded, use the Start menu to open the 'Anaconda Prompt' and install the following Python libraries:

- xarray
- lpywidgets
- pyproj
- Gdal
- rasterio

Do this by typing:

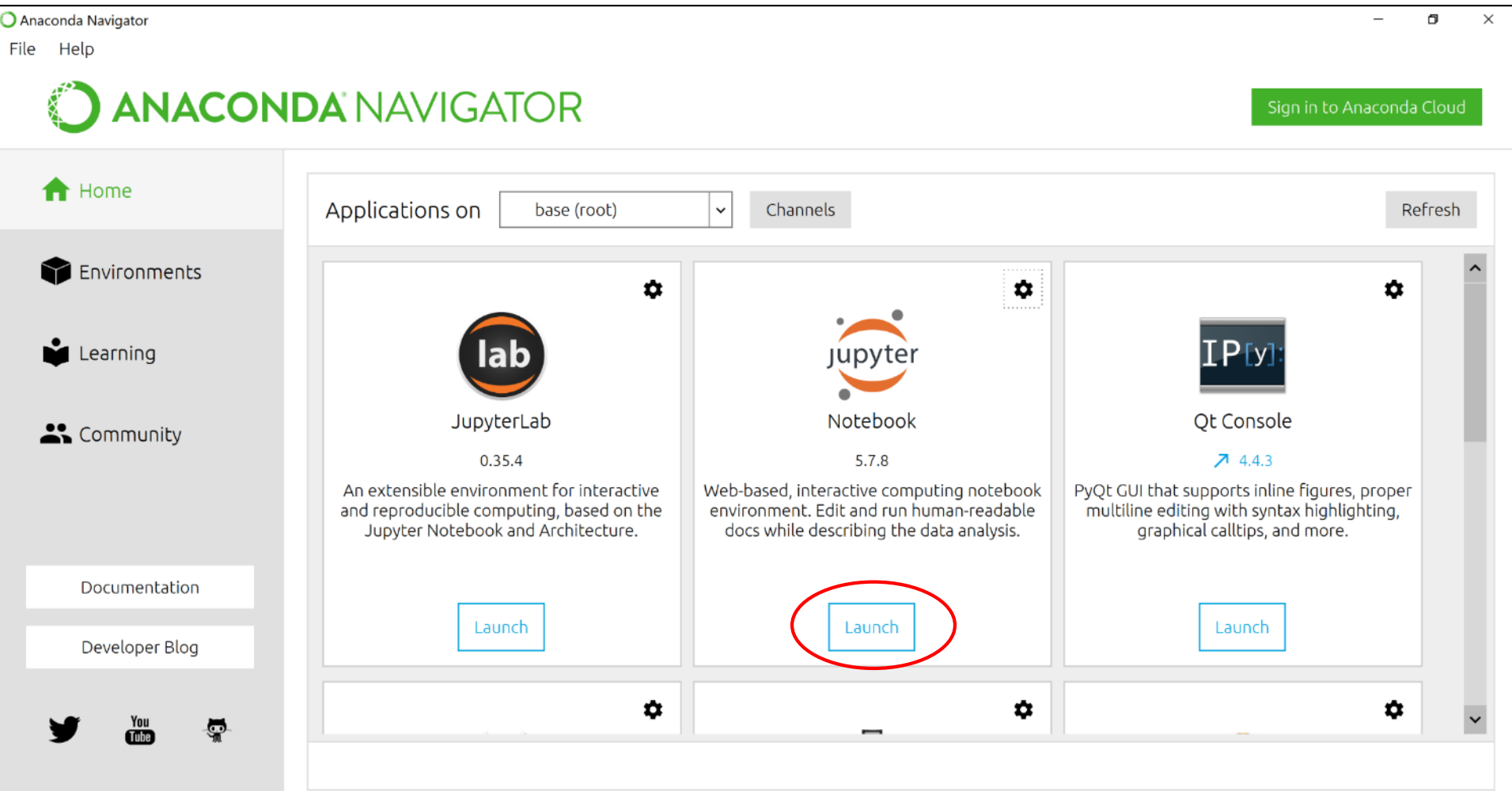
C\> conda install **xarray**

A screenshot of the Anaconda Prompt window. The title bar reads "Anaconda Prompt". The command prompt shows the text "(base) C:\>conda install xarray" in a light blue font on a black background.

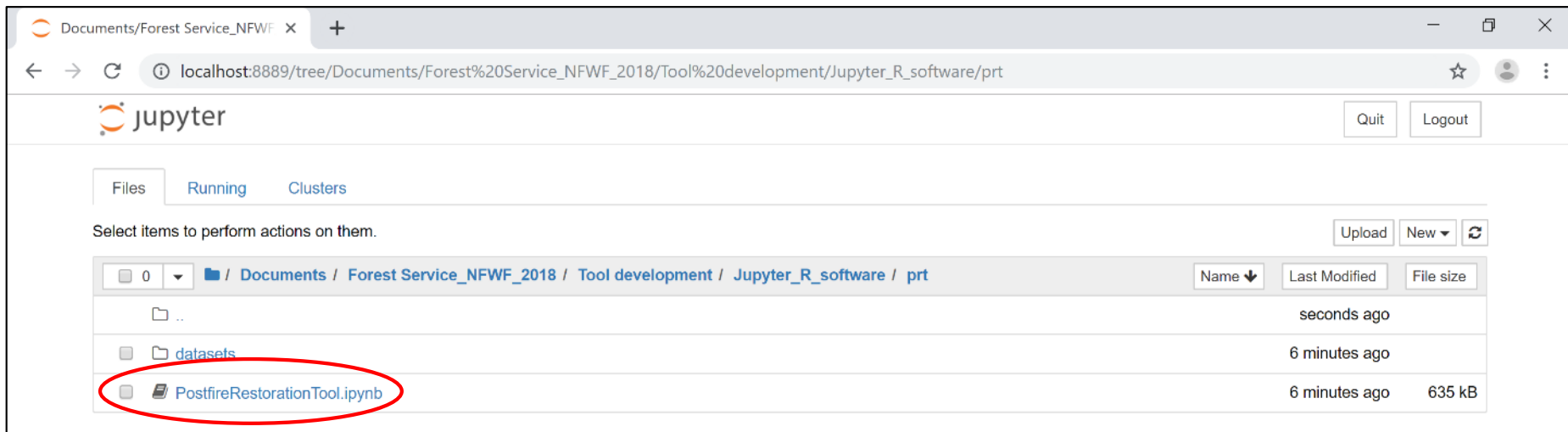
- Modify the word in bold for each of the other libraries
- Once completed for each library, exit this window
- Additional directions for installing these packages in Anaconda are available at:

<https://docs.conda.io/projects/conda/en/latest/user-guide/tasks/manage-pkgs.html>

**Step 5.** From the Windows menu, open 'Anaconda Navigator' and click 'Launch' on Jupyter notebook tile



**Step 5.** To run the Jupyter notebook (ipynb) file, click on 'Documents' and path to the directory where the file was installed, and select the ipnb file (using single mouse clicks)



**Step 6.** This will launch the interface for the tool.

Rational for the decision rules and scoring system used can be found in the PRT Technical Guide

The screenshot shows a web browser window displaying a Jupyter Notebook titled "PostfireRestorationTool". The address bar shows the URL: `localhost:8889/notebooks/Documents/Forest%20Service_NFWF_2018/Tool%20development/Jupyter_R_software/prt/PostfireRestorationTool.ipynb`. The Jupyter interface includes a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for saving, adding cells, and running code. The notebook content features a title "Post-fire Restoration Tool for Chaparral Shrublands" in blue, followed by a bulleted list of instructions and a diagram of the first step.

## Post-fire Restoration Tool for Chaparral Shrublands

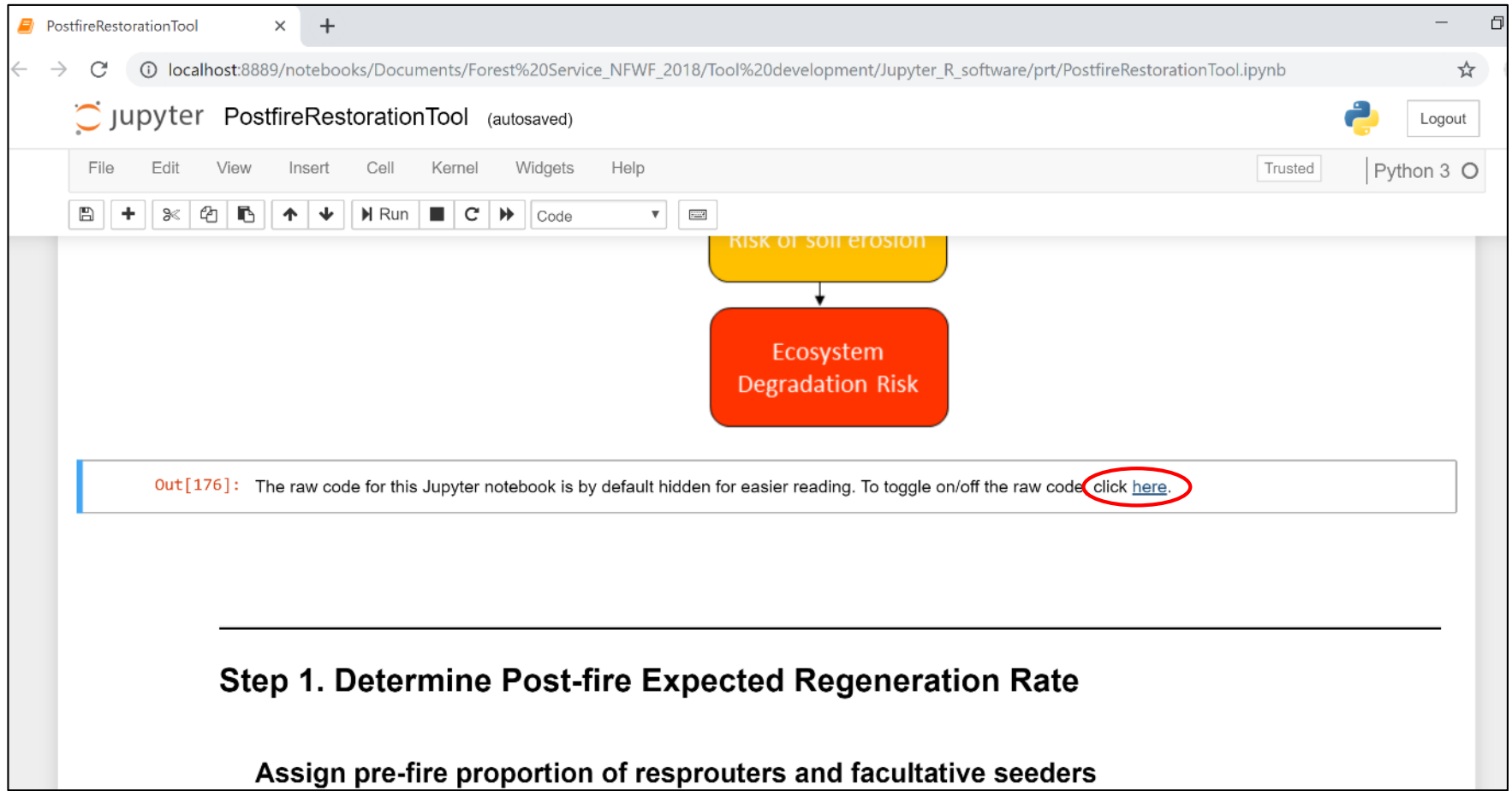
- The Post-Fire Restoration Tool provides a transparent and repeatable framework for resource managers to guide and prioritize post-fire restoration efforts in shrublands (see Technical Guide). The tool consists of five main steps (see schematic) to determine the regeneration capacity of the landscape post-fire based on the relative proportion of seeding, resprouting, and facultative seeding species, and the risk of post-fire soil erosion.
- Before running the tool it is necessary to have the data associated with the tool in the directory labeled 'datasets' below the location of the .ipynb file for the tool (see Technical Guide).
- To view the tool with the programming code, click on the link on the line below the figure.

Diagram illustrating Step 1: Species information.

```
graph TD; A[Step 1  
Species  
information] --> B[ ]
```



**Step 7.** To toggle between formats of seeing the code and hiding the code, click the button where indicated below



The screenshot shows a Jupyter Notebook titled "PostfireRestorationTool" running on a local host. The interface includes a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for saving, adding cells, and running code. The main content area displays a flowchart with two boxes: a yellow box labeled "RISK OF SOIL EROSION" and a red box labeled "Ecosystem Degradation Risk", connected by a downward arrow. Below the flowchart is a code cell with the output "Out[176]: The raw code for this Jupyter notebook is by default hidden for easier reading. To toggle on/off the raw code [click here.](#)". The text "click here." is circled in red. Below the code cell, there is a horizontal line followed by the text "Step 1. Determine Post-fire Expected Regeneration Rate" and "Assign pre-fire proportion of resprouters and facultative seeders".

PostfireRestorationTool

localhost:8889/notebooks/Documents/Forest%20Service\_NFWF\_2018/Tool%20development/Jupyter\_R\_software/prt/PostfireRestorationTool.ipynb

Jupyter PostfireRestorationTool (autosaved)

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

RISK OF SOIL EROSION

Ecosystem Degradation Risk

Out[176]: The raw code for this Jupyter notebook is by default hidden for easier reading. To toggle on/off the raw code [click here.](#)

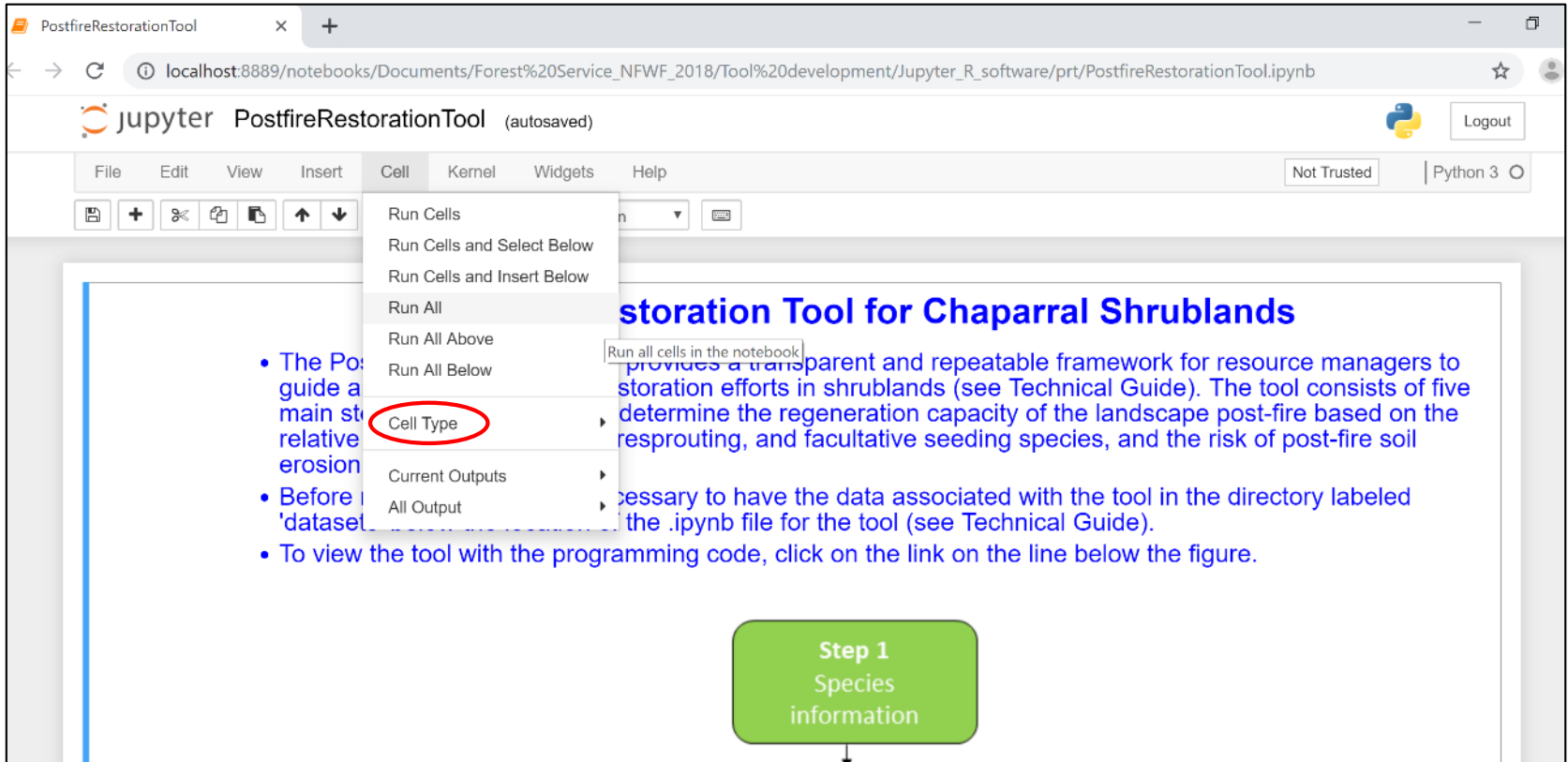
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**Step 1. Determine Post-fire Expected Regeneration Rate**

**Assign pre-fire proportion of resprouters and facultative seeders**

## Step 8. Running the tool

To run the tool once open, you need to go to 'Cell' on the top menu bar and 'Run All'.



The screenshot shows the Jupyter PostfireRestorationTool interface. The top menu bar includes File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. The 'Cell' menu is open, displaying options: Run Cells, Run Cells and Select Below, Run Cells and Insert Below, Run All (highlighted with a red circle), Run All Above, Run All Below, Cell Type, Current Outputs, and All Output. A tooltip for 'Run All' reads 'Run all cells in the notebook'. The notebook content features the title 'PostfireRestorationTool for Chaparral Shrublands' and a list of bullet points. A green box at the bottom indicates 'Step 1 Species information'.

PostfireRestorationTool (autosaved)

File Edit View Insert Cell Kernel Widgets Help

Run Cells  
Run Cells and Select Below  
Run Cells and Insert Below  
Run All  
Run All Above  
Run All Below  
Cell Type  
Current Outputs  
All Output

Run all cells in the notebook

### PostfireRestorationTool for Chaparral Shrublands

- The PostfireRestorationTool provides a transparent and repeatable framework for resource managers to guide restoration efforts in shrublands (see Technical Guide). The tool consists of five main steps to determine the regeneration capacity of the landscape post-fire based on the relative erosion, resprouting, and facultative seeding species, and the risk of post-fire soil erosion.
- Before using the tool, it is necessary to have the data associated with the tool in the directory labeled 'dataset'.
- To view the tool with the programming code, click on the link on the line below the figure.

Step 1  
Species  
information

## Step 9. Changing default options in tool

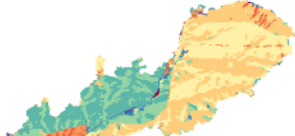
There are 5 places in the tool where the user has to enter data or change the default options (which relate to the Copper fire), if these values are changes from the default values, then the 'Update tool' button needs to be clicked to propogate these changes in the rest of the tool and output maps that follow, e.g., to select running the tool using WHR vegetation only, or updating the non-native species threshold

**Assign pre-fire proportion of resprouters and facultative seeders**

Landscape units ☐ Use WHR veg types only  
☒ Use WHR veg types x aspect x topography

Update tool

Landscape units



- Other: north-facing slopes, valleys, depressions
- Other: south-facing slopes, summits, ridges
- Coastal scrub: north-facing slopes, valleys, depressions
- Coastal scrub: south-facing slopes, summits, ridges
- Valley foothill riparian: north-facing slopes, valleys, depressions
- Valley foothill riparian: south-facing slopes, summits, ridges

## Step 4. Modify Regeneration Rate Based on Non-Native Grasses

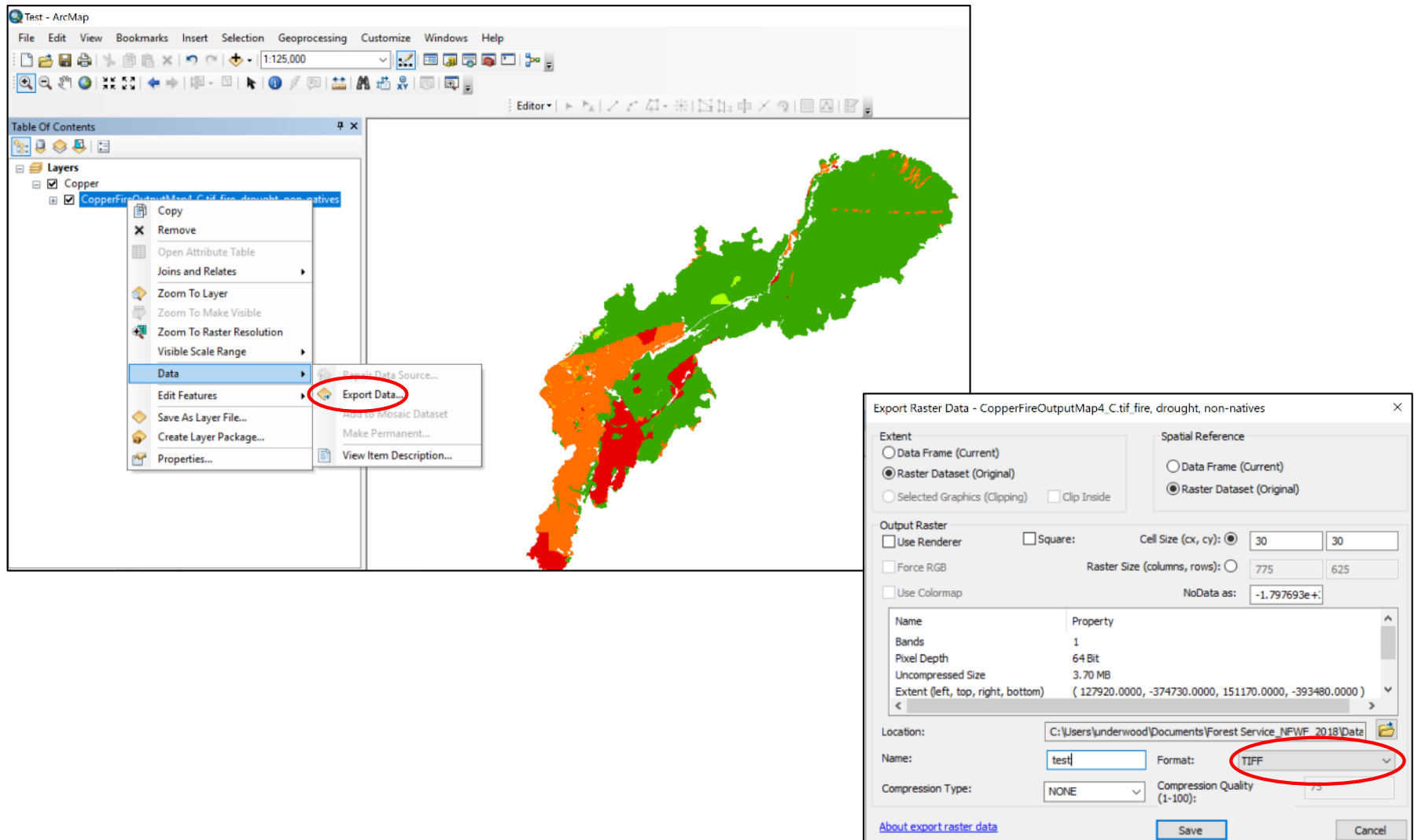
Specify abundance on non-native grasses

Enter % threshold of herbaceousou... 20

Update tool

## Tips on viewing downloaded output maps

The five Output Maps from the PRT can be downloaded in Geotiff format, which can then be opened in Arc or other GIS software. The easiest way to display the pixel values is to export this data as a new tiff (or ENVI) file format, and use this in Arc.



Displaying pixel values in Arc can be done using the 'lay properties' and selecting 'unique values'

