

# Exercise: Hypothetical Planning Using Landscape Approach and REA Data and Methods

## Summary

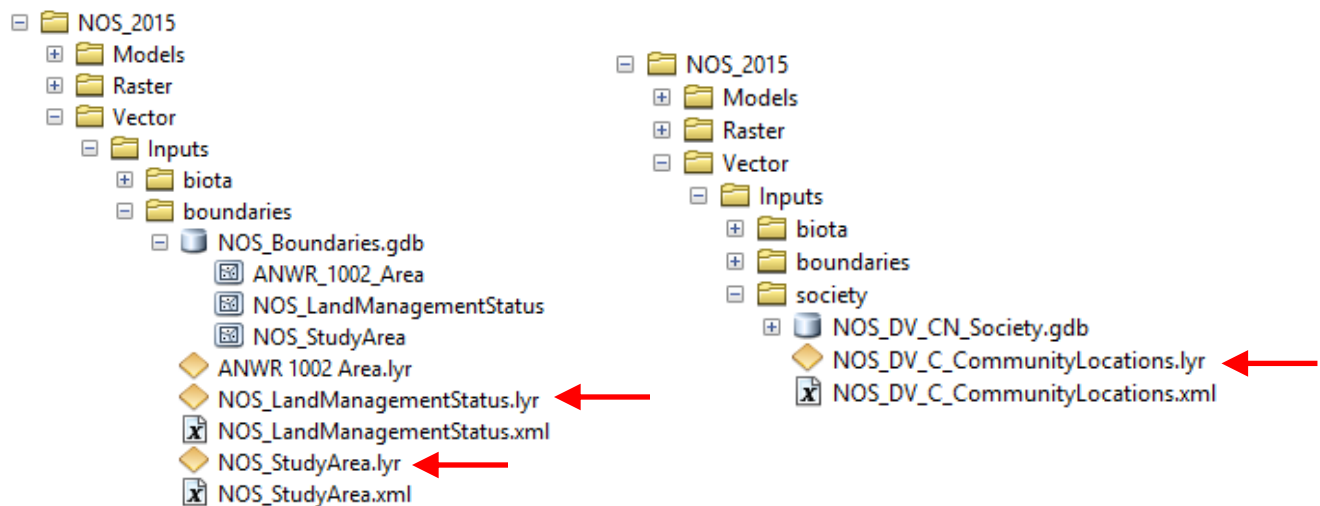
In this hypothetical planning exercise, there is reason to believe that development of oil infrastructure within the 1002 area of the Arctic National Wildlife Refuge (ANWR) will occur by 2040. The 1002 area overlaps with the northwestern corner of the Porcupine Caribou Herd calving range. The Porcupine Caribou Herd numbered 218,000 individuals as of 2017. The loss in calving habitat caused by oil infrastructure development may result in habitat fragmentation or restricted movement corridors. A new High Development Scenario (2040) Landscape Condition raster can be created to help analyze impacts of human infrastructure development on caribou habitat.

## Goals

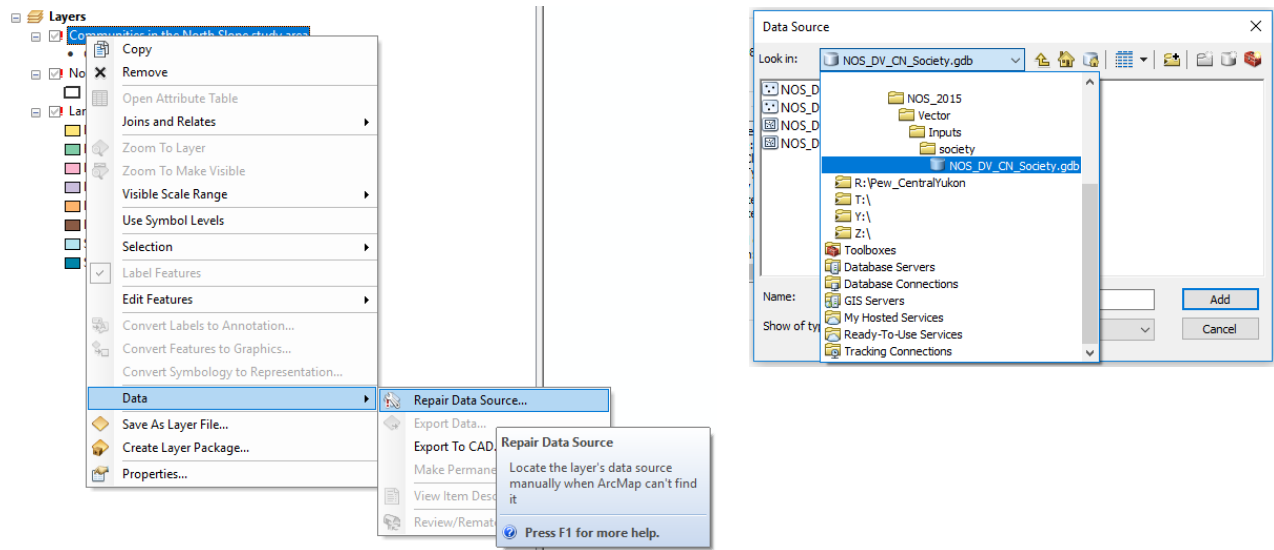
- Set up the Caribou version of the Landscape Condition Model
- Modify the Caribou version of the long-term future Landscape Condition Model
- Add layer symbology to new output
- Compare landscape condition for the Porcupine herd with land management boundaries
- Establish new area of interest
- Extract LCM to the new area of interest

## Part A: Set Up the Landscape Condition Model

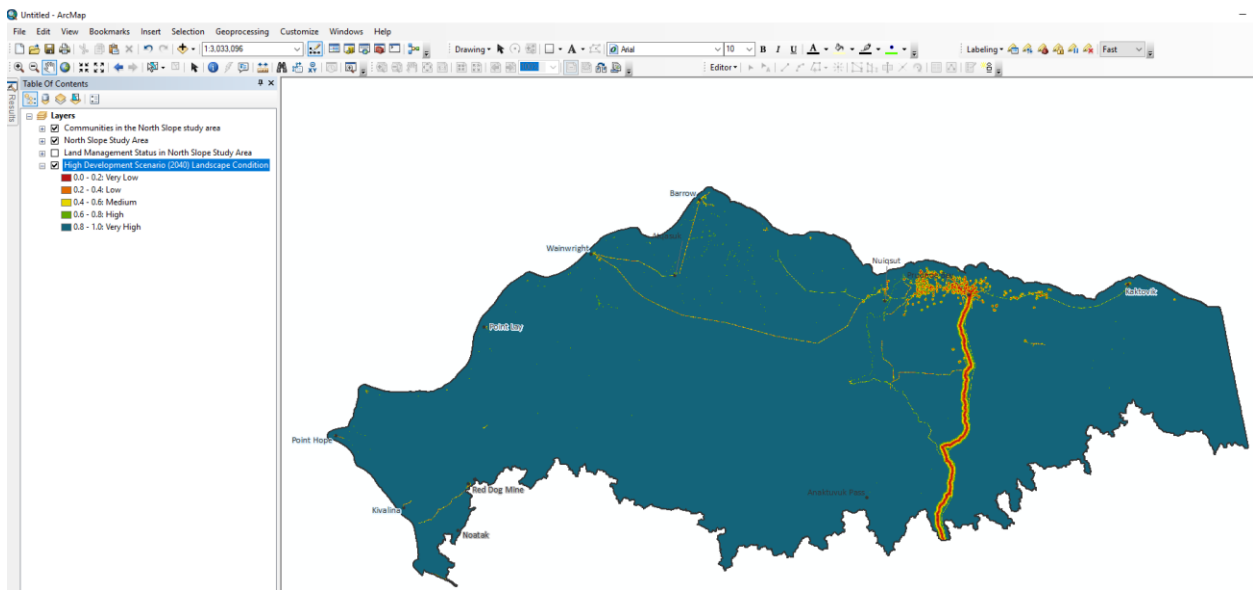
- Set up a simple basemap by selecting the Vector\Inputs folder and adding the following layers:
  - study area boundary layer (NOS\_StudyArea.lyr)
  - community locations layer (NOS\_DV\_C\_CommunityLocations.lyr)
  - land management status layer (NOS\_LandManagementStatus.lyr)



## 2. Repair data sources.



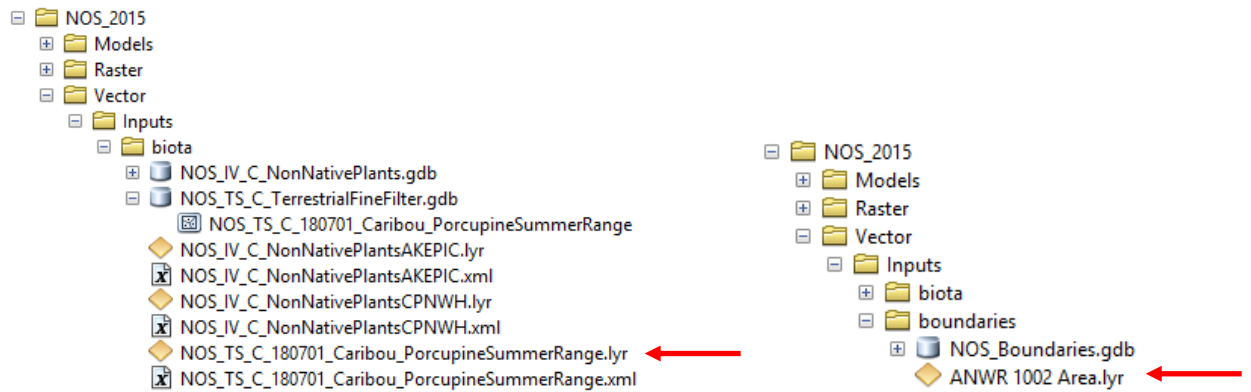
## 3. Add the layer for the high development scenario (2040) landscape condition. Set the data source to NOS\_TS\_L\_Caribou\_HighLandscapeCondition.img.



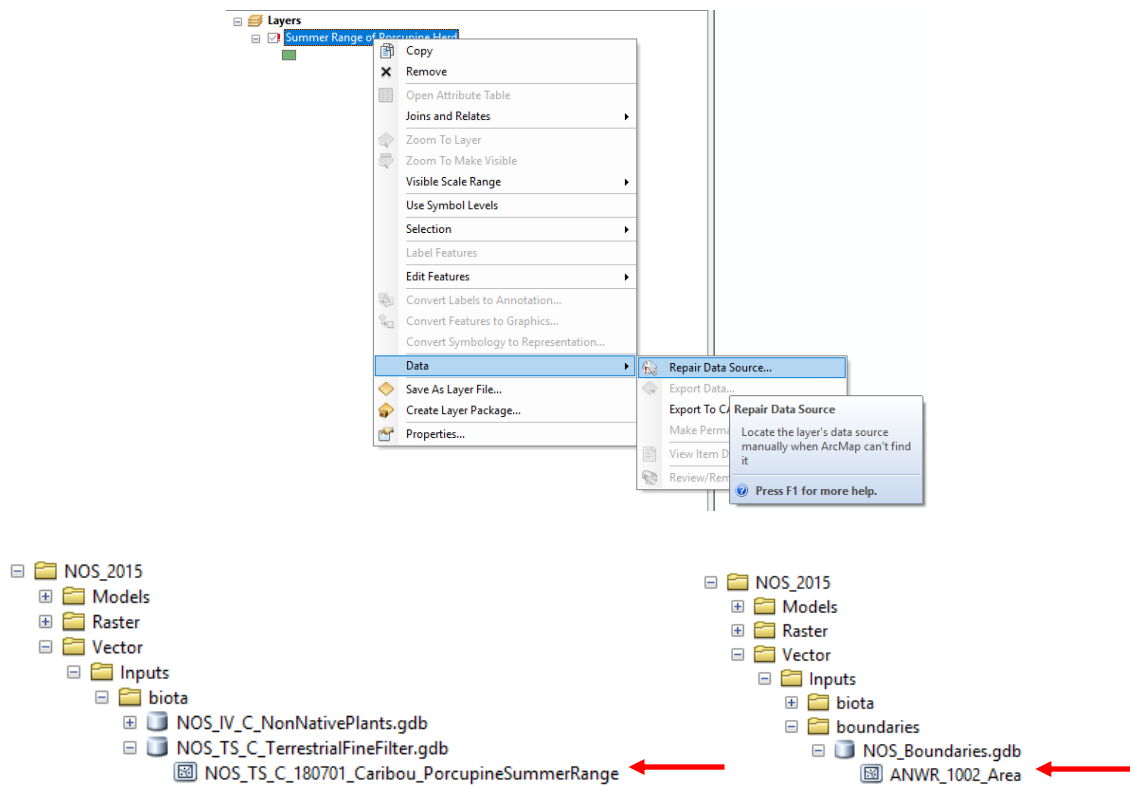
## Part B: Establish New Area of Interest

The new Area of Interest (AOI) will be comprised of the intersection of the Porcupine Caribou Herd summer range and the 1002 area of ANWR.

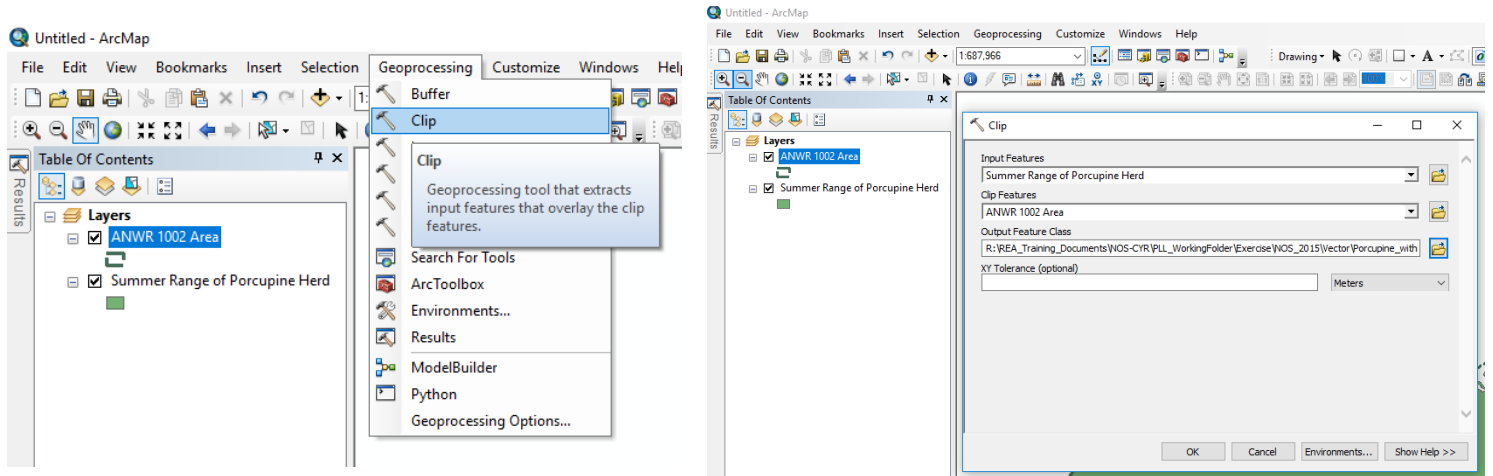
1. Add the Porcupine caribou calving range layer (NOS\_TS\_C\_180701\_Caribou\_PorcupineCalvingRange.lyr) and the 1002 area of ANWR (ANWR\_1002\_Area.shp).



2. Repair data source by linking the layer with the Porcupine caribou herd calving range and ANWR 1002 area.

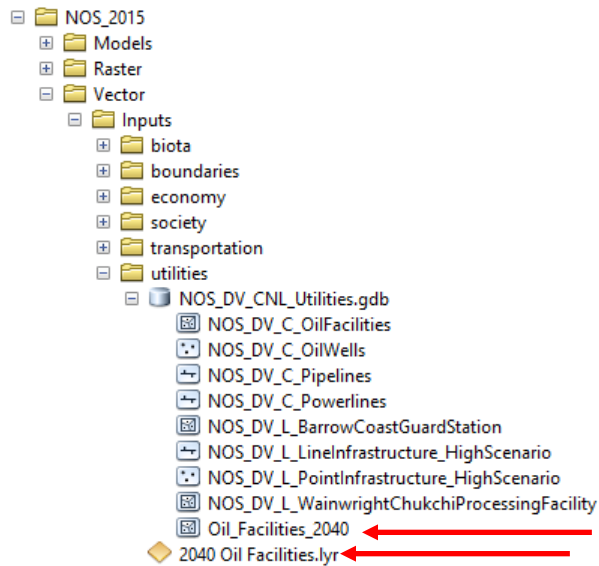


3. Clip the Porcupine caribou herd calving range to the ANWR 1002 area and save as AreaOfInterest.shp.

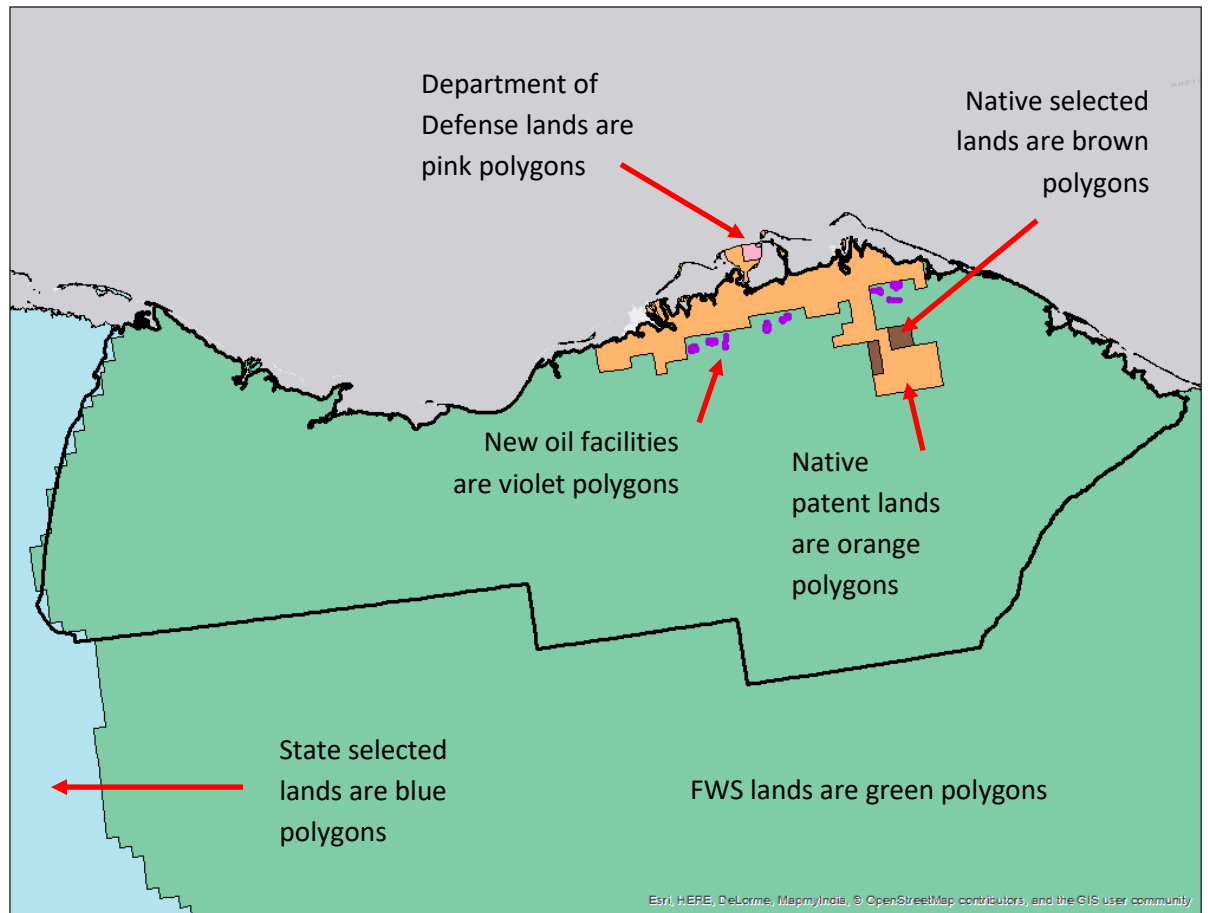


## Part C: Modify the Landscape Condition Model

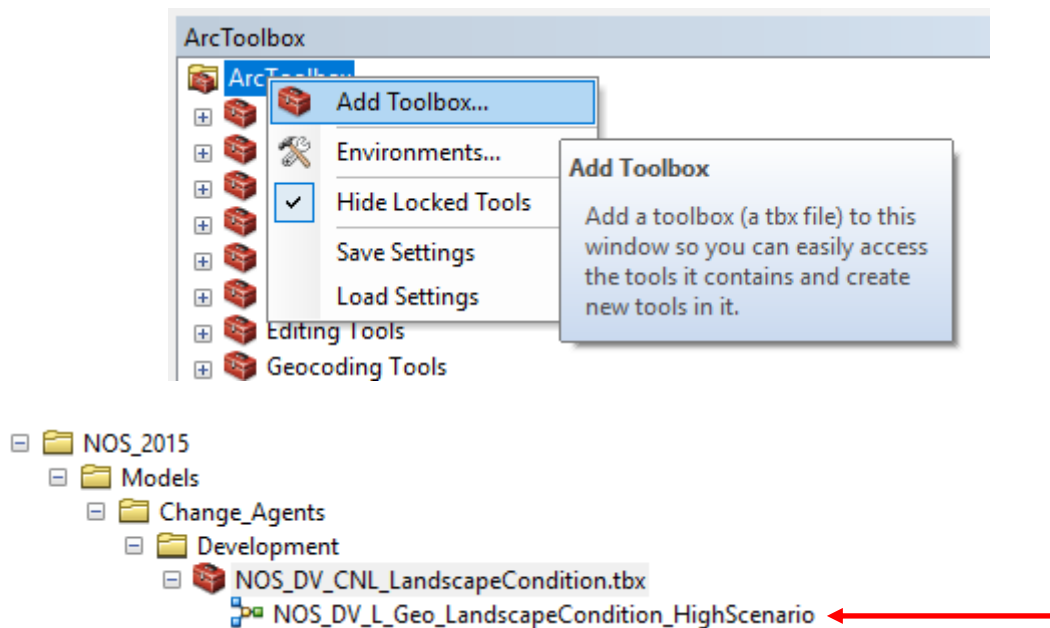
1. Add the new 2040 oil facilities (2040 Oil Facilities.lyr) layer and repair data source.



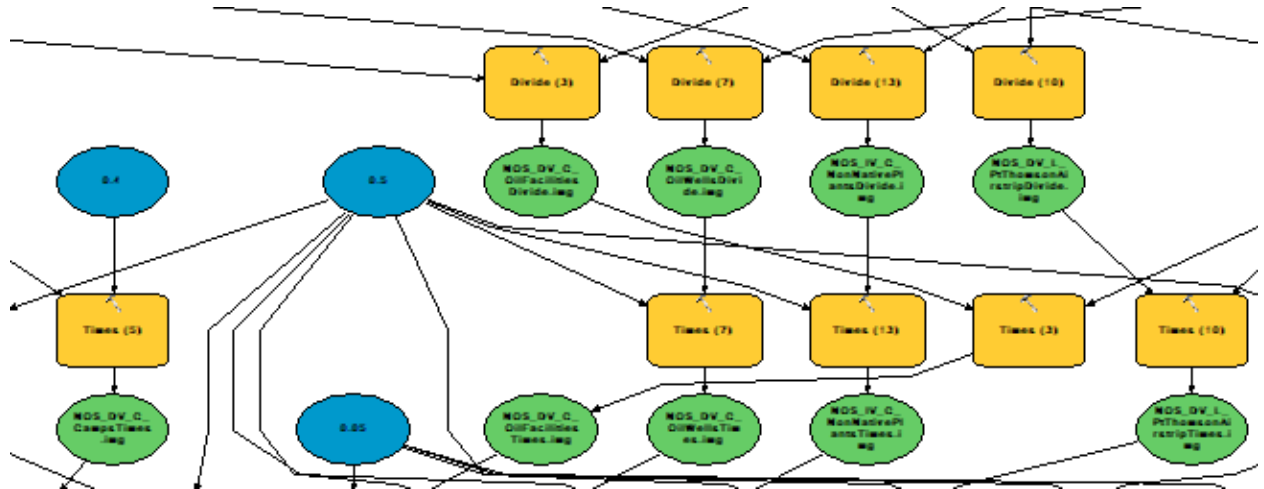
2. Compare hypothetical oil infrastructure to land status.



3. Add the Terrestrial Fine Filter CEs Toolbox to the ArcToolbox window.

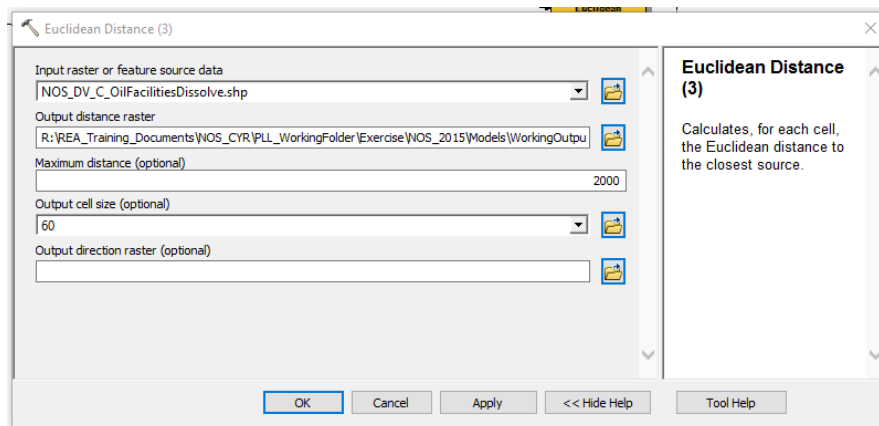


- Open the caribou landscape condition model 2040 high scenario to examine the steps for modifying the LCM.

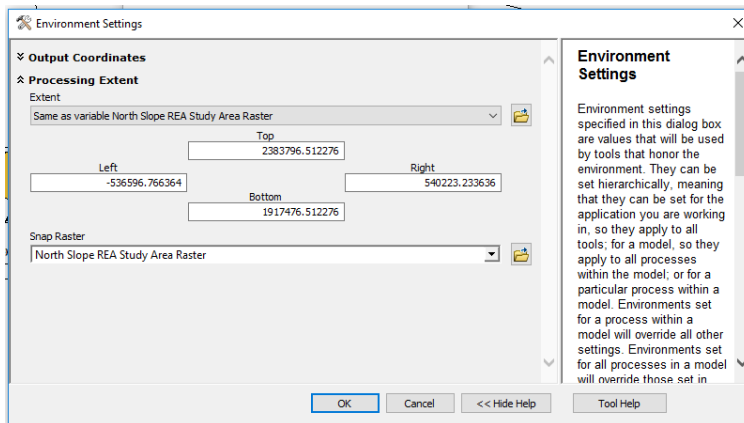


Find the Oil Facilities and Wainwright Chukchi Sea data. Follow the model path to the final output. Write the values associated with these steps down. This same process will be applied to the new set of infrastructure to create new LCM values.

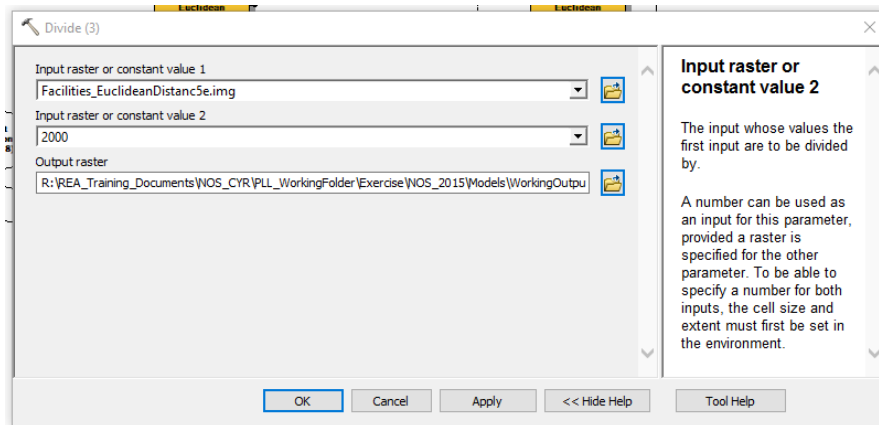
- Euclidean Distance: Input = NOS\_DV\_C\_OilFacilitiesDissolve, Maximum distance = 2000, Output cell size = 60



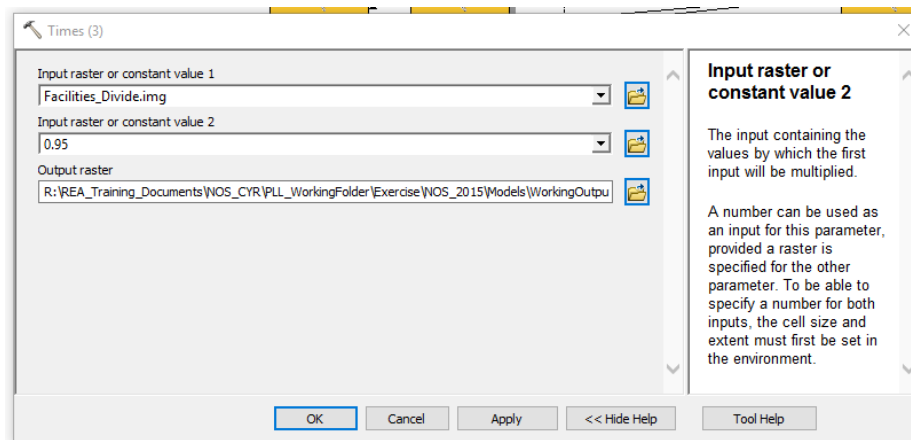
Processing Extent = Same as variable North Slope REA Study Area Raster, Snap Raster = North Slope REA Study Area Raster



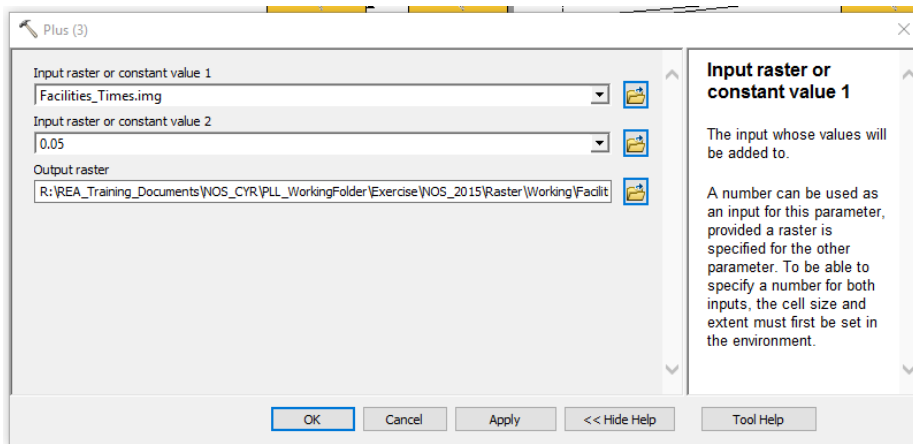
6. Divide: Input raster or constant value 1 = last output, input raster or constant value 2 = 2000



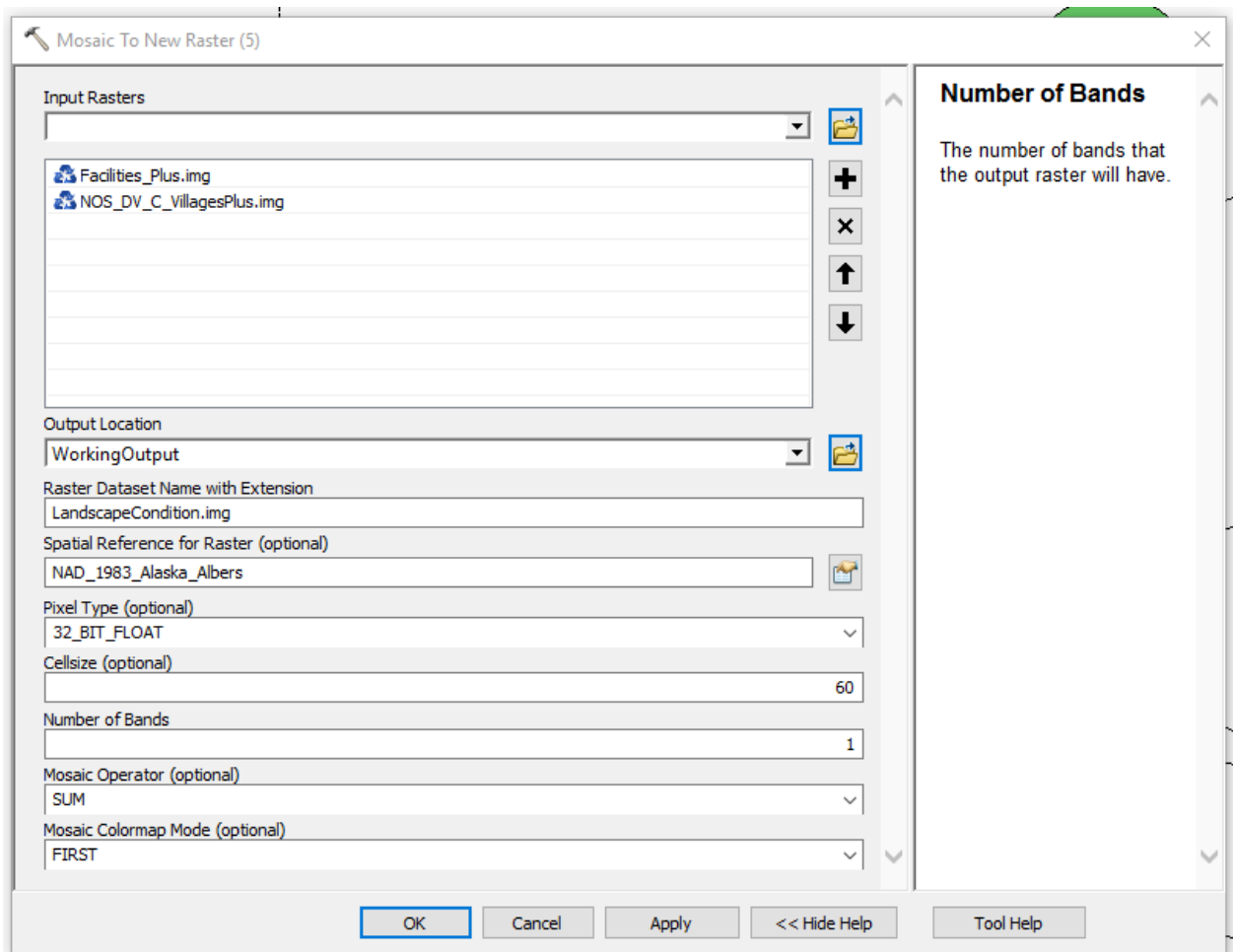
7. Times: Input raster of constant value 1 = last output, input raster or constant value 2 = 0.95



8. Plus: Input raster or constant value 1 = last output, input raster or constant value 2 = 0.05



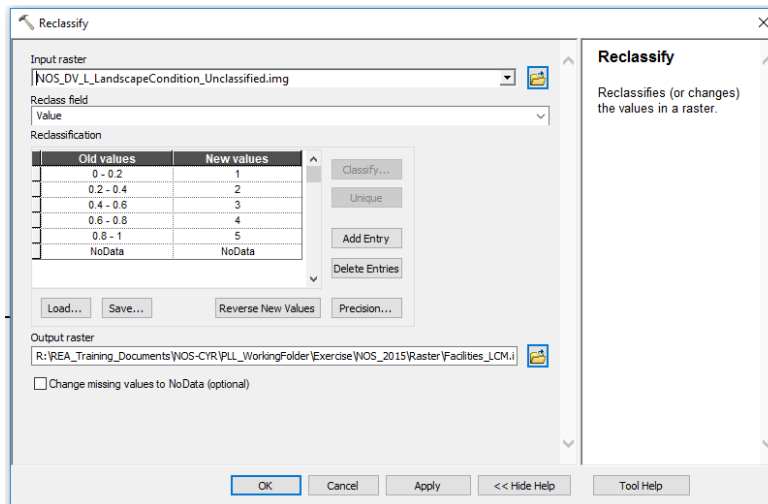
9. First Mosaic to New Raster: Spatial Reference for Raster = NAD\_1983\_Alaska\_Albers, Pixel Type = 32\_BIT\_FLOAT, Cell Size = 60, Number of bands = 1, Mosaic Operator = MINIMUM, Mosaic Colormap Mode = FIRST



Snap Raster = North Slope REA Study Area Raster

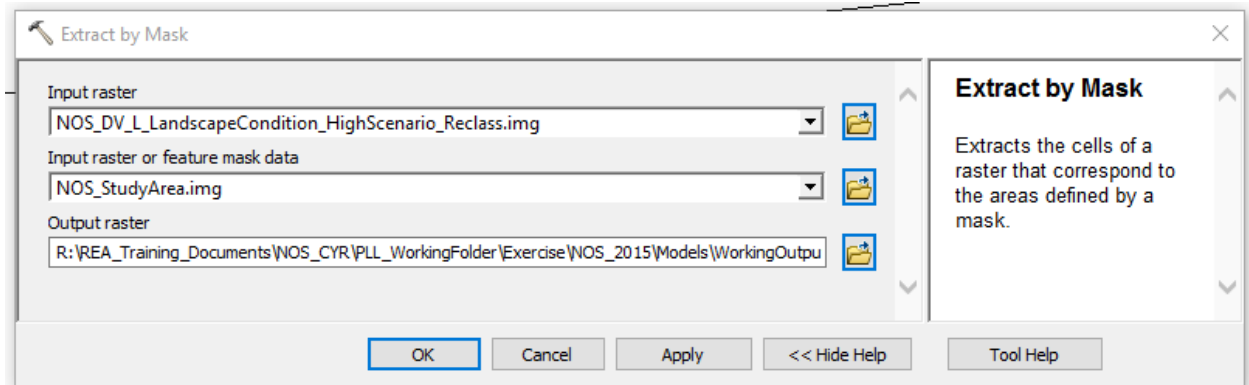
10. Second Mosaic to New Raster: Spatial Reference for Raster = NAD\_1983\_Alaska\_Albers, Pixel Type = 32\_BIT\_FLOAT, Cell Size = 60, Number of bands = 1, Mosaic Operator = MINIMUM, Mosaic Colormap Mode = FIRST  
Snap Raster = North Slope REA Study Area Raster

11. Reclassify (last output):  $0.0 - 0.2 = 1$ ,  $0.2 - 0.4 = 2$ ,  $0.4 - 0.6 = 3$ ,  $0.6 - 0.8 = 4$ ,  $0.8 - 1.0 = 5$



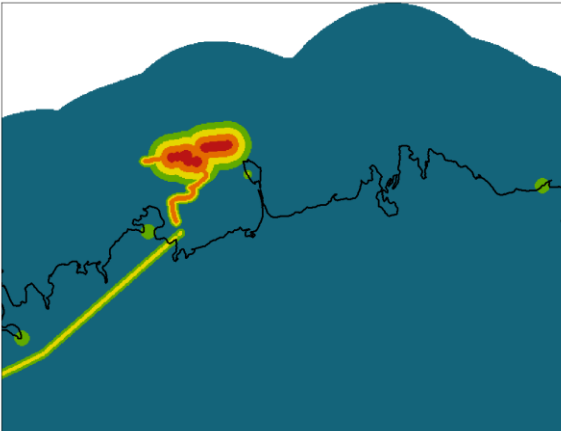
Snap Raster = North Slope REA Study Area Raster

12. Extract by Mask: Input raster or feature mask data = North Slope REA Study Area Raster

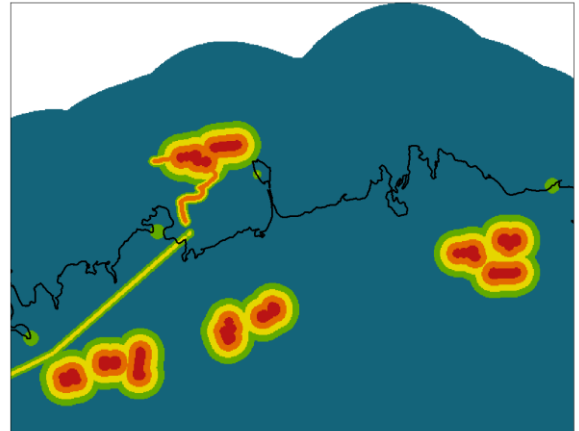


Snap Raster = North Slope REA Study Area Raster

Original High Development Scenario (2040) LCM

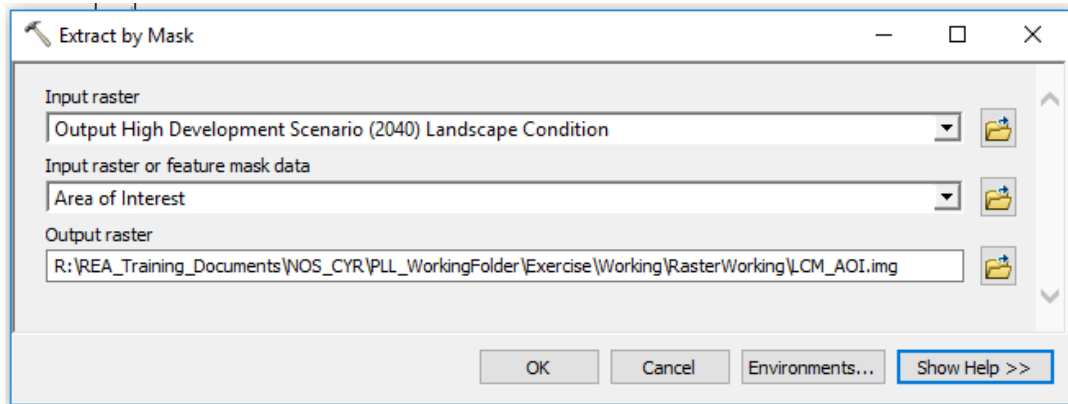


New High Development Scenario (2040) LCM with oil facilities



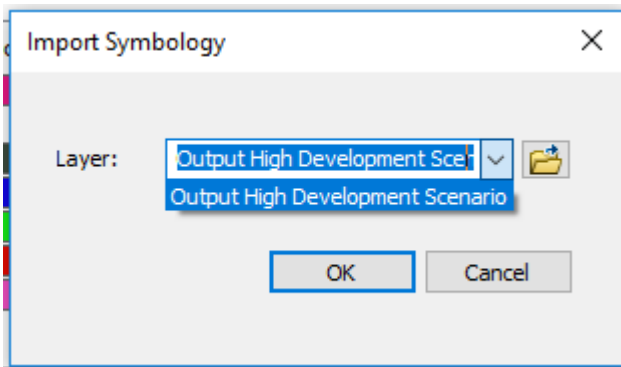
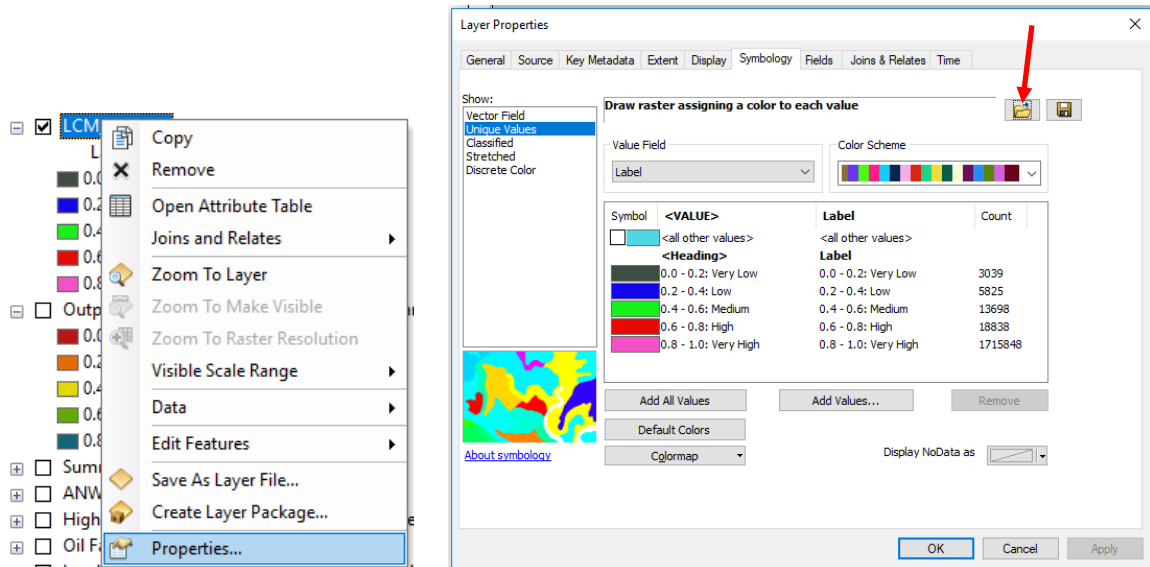
## Part D: Extract LCM to the New Area of Interest

1. Extract by mask with the input raster as Output High Development Scenario (2040) Landscape Condition (NOS\_DV\_L\_LandscapeCondition\_HighScenario.img) and the AOI as the mask layer.



Snap Raster = Output High Development Scenario (2040) Landscape Condition, Cell Size = Minimum of inputs

2. Symbolize the new AOI LCM raster to match the modified output LCM. Access the layer properties and import symbology from the output raster.



3. Set Very High condition to transparent and compare the impacted area on FWS vs. native patent lands within the AOI. [Clip land status to AOI optional.]

