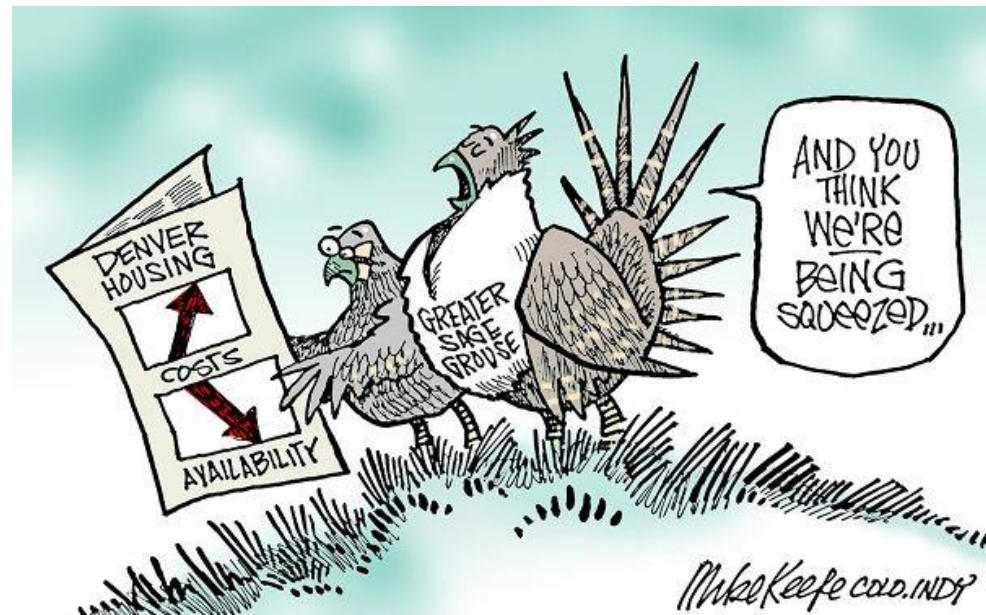


Assessment of Wet Habitat or Mesic Areas For Sage-Grouse Brood Rearing Sites

including development and land ownership

Originally presented at Northwest
District REA Workshop: Silt, CO in
November, 2016

More analyses and more questions for
the CO SO in February, 2017





Background

- Sage-grouse (SG) inhabit semi-arid sagebrush but need herbaceous cover for their chicks
- ★ In July-September broods are moved to riparian systems, wetlands, and irrigated alfalfa
- Longer travel distances increase risk of predation and nutritional stress



Donnelly et al. 2016*

- Qu: How does the distribution and condition of mesic resources affect the spatial distribution of sage-grouse across SE Oregon, NE California, and NW Nevada?
- Evaluated sage-grouse distribution based on variation in mesic resources
- Evaluated land ownership to inform guidelines for SG conservation strategy using mapped resources

**Donnelly et al. 2016. Public Land and Private Waters: scarce mesic resources structure land tenure and sage-grouse distribution. Ecosphere 7(1).*



Mesic Habitats

Donnelly et al (2016) define mesic habitats as wetlands and riparian areas

- High biological productivity provides food and cover for wildlife including sage-grouse
- Currently half of mesic habitat areas in the contiguous US are lost to development



Mesic Habitats Methods

Donnelly et al (2016) defined GIS data for mesic habitats:

- Used data from Landsat 4-5, late summer 1984-2011
- Calculated NDVI to determine areas of peak productivity
- Overlaid with NAIP and compared to NWI to “groundtruth”
- Does not (yet) cover Colorado
- Slides 15-16 describe our process to create areas of mesic habitat using LandFire EVT and NWI for this project



Donnelly et al. 2016 findings

- 85% of leks are clustered within 6 miles of mesic resources
- Highest densities of birds within 1.8 miles of mesic
- Location of mesic resources drives upland lek locations



More Donnelly et al. 2016 findings

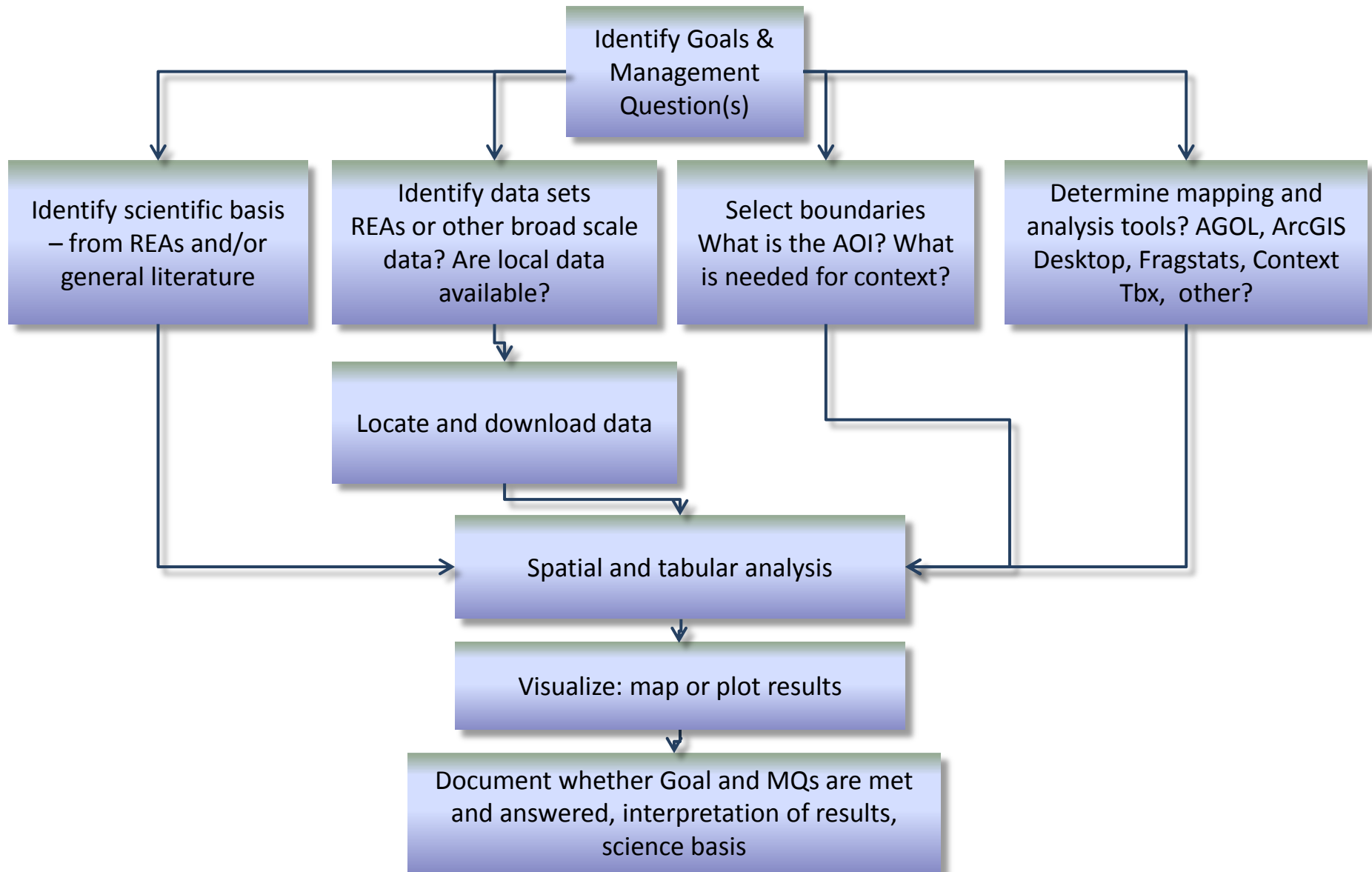
- Larger sage-grouse populations live around the best sites where more chicks survive
- While less than 2% of western landscapes are mesic or wet areas, 81% of them are on private lands
 - partnerships with private land owners are critical

What about Northwest Colorado?

- What is the Proximity, Density, Size, and Connectivity of mesic resources to leks in NW Colorado?
- How does land ownership relate to the spatial configuration of NW CO GrSG breeding bird density (BBD)?
- How does development across the landscape relate to mesic resources?



Broad Scale Analysis Road Map



Identify Goals & Management Question(s)

(1 of 3)

Goals:

- Quantify the spatial configuration of mesic areas in NW CO - proximity, density, size, and connectivity
- Calculate the percent land ownership type for mesic areas
- Calculate the areal impact of development

Identify Goals & Management Question(s)

(2 of 3)

MQs

1. Where are the highest densities of SG breeding areas?
2. Where are the mesic areas?
3. Are breeding areas close to mesic areas? Are they connected within the guidelines of the Donnelly paper (1.8 – 6 miles)?

Identify Goals & Management Question(s)

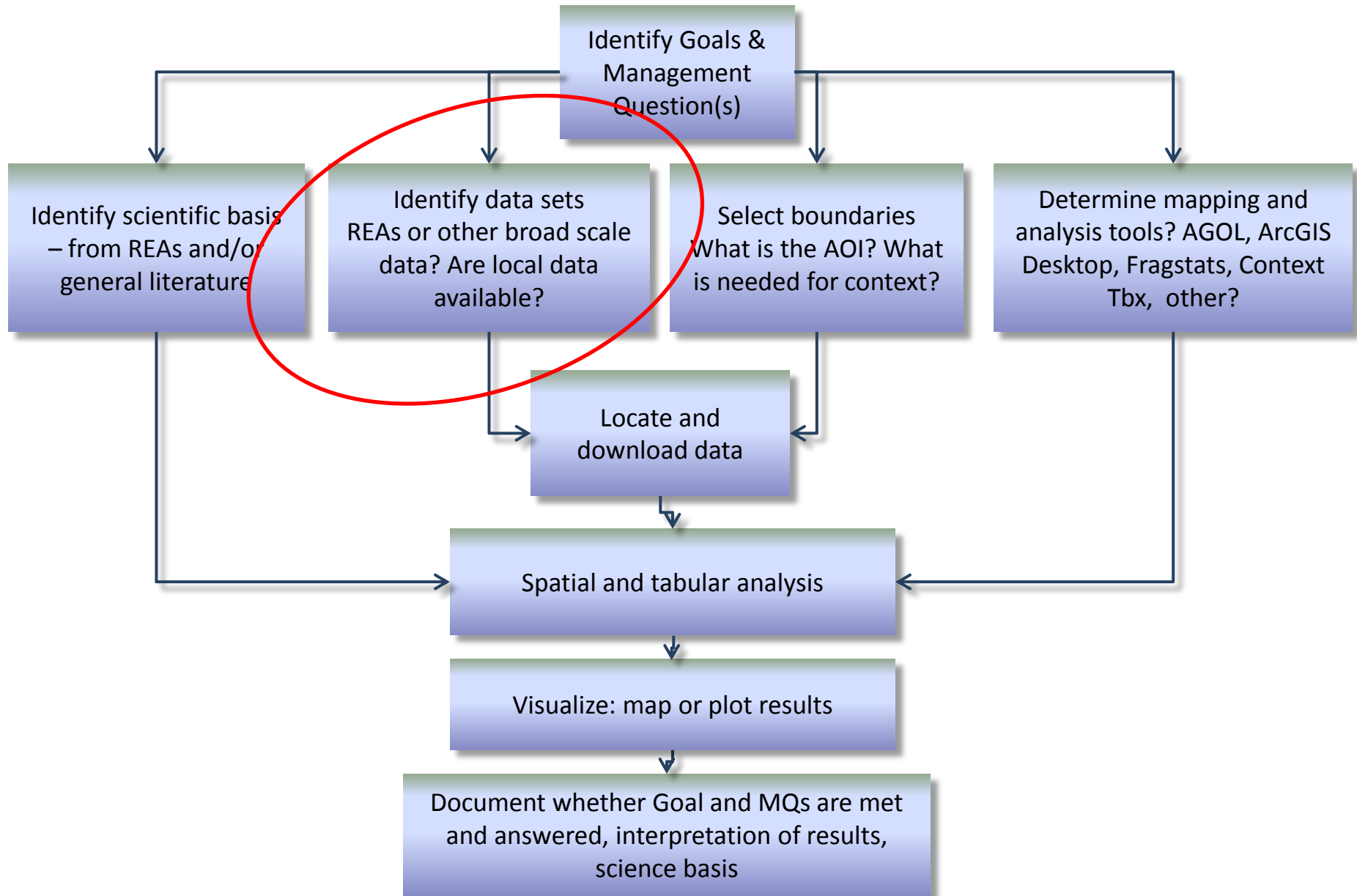
(3 of 3)

MQs

4. What are the land ownership types for each mesic resource type?
5. Calculate how much of SG breeding areas are impacted by development?
6. What percent of mesic resource area is on private land? And impacted by development?

There are many other questions that could be asked
– what questions might this group want to ask?

Broad Scale Analysis Road Map

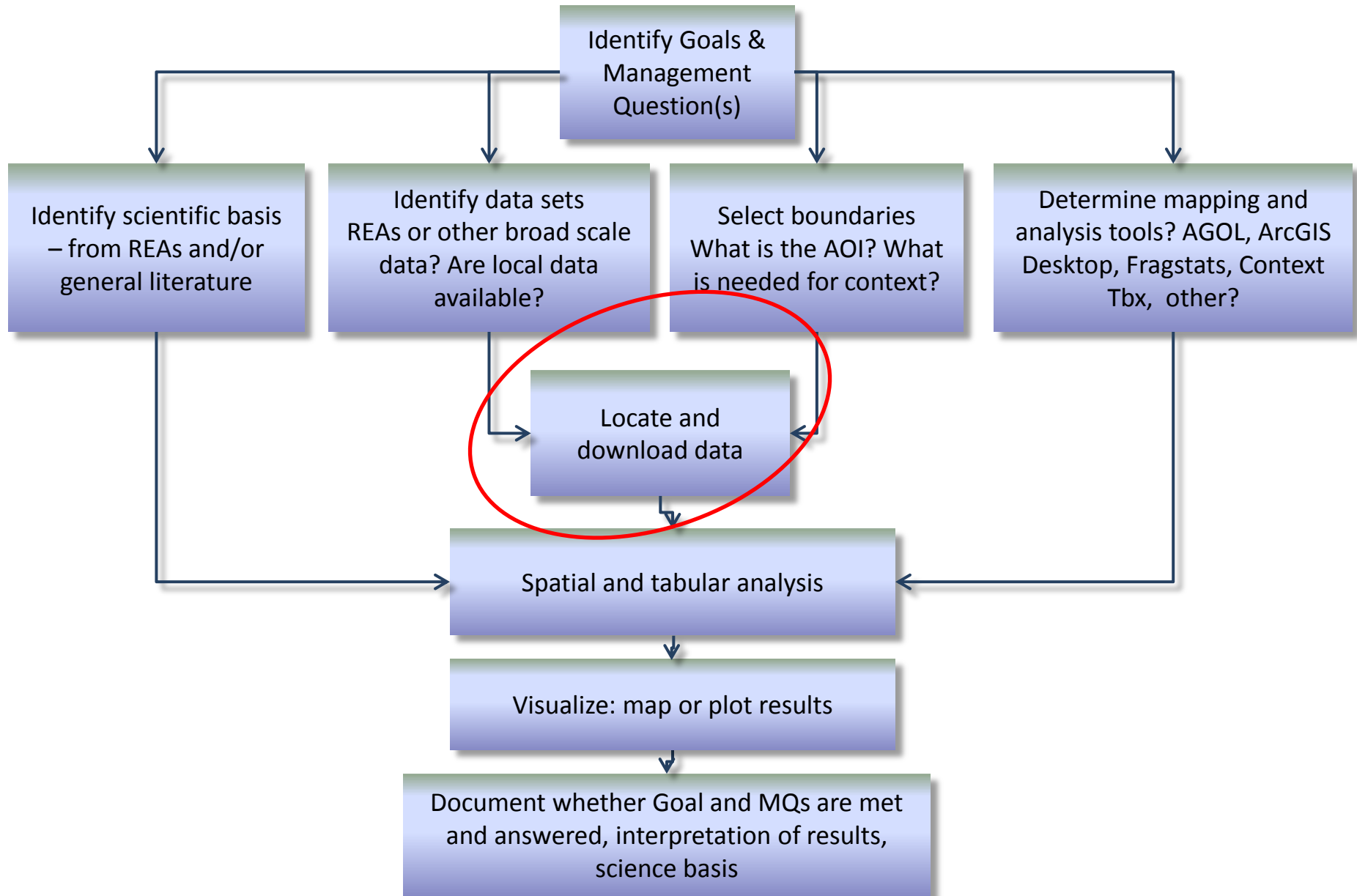


Identify data sets: REAs or other broad scale data? Are local data available/useful?

- Sage-Grouse habitat
 - BBD boundaries (BLM NOC; Doherty, 2010)
 - Occupied habitat, Historic Distribution, Potential Current Nesting Habitat (COP 2010)
 - Distribution (COP 2014)
 - Preliminary Priority Habitat & Preliminary General Habitat
- Land Cover
 - Riparian, wet meadows, irrigated agriculture (LandFire)
 - Wetlands (FWS NWI)
- Boundaries
 - Land ownership (BLM SMA)
 - NW District Office
- Development (USGS)



Broad Scale Analysis Road Map





U.S. Fish & Wildlife Service

National Wetlands Inventory

- Download NWI data for CO, UT, WY
- Selected only Freshwater Emergent Wetlands
 - Herbaceous marsh, fen, swale and wet meadow
- Ignore other types: Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Other, Riverine
- Merge data for different states and clip to boundaries



LandFire 1.3.0 (2012)

- Selected Class - Herbaceous – Grassland, Riparian
- Sort through fields:

These:

Rocky Mountain Subalpine-Montane Mesic Meadow
Rocky Mountain Wetland-Herbaceous
Western Great Plains Depressional Wetland Systems
Western Cool Temperate Row Crop - Close Grown Crop
Western Cool Temperate Row Crop
Western Cool Temperate Close Grown Crop
Western Warm Temperate Row Crop
Western Warm Temperate Close Grown Crop

Not These:

Western Great Plains Floodplain Herbaceous
Western Great Plains Floodplain Shrubland
Agriculture-Cultivated Crops and Irrigated Agriculture

Identify data sets: REAs or other broad scale data? Are local data available/useful?

- Worked with SO to determine ecological systems (ES) suitability for SG
 - ES for wetlands listed by CO Wetlands Information Center
 - Cross-walked to LandFire as needed
- Merge LandFire data with NWI Freshwater Emergent Wetlands
- This is the mesic resources data set
 - should this be further refined?

Download BLM SMA and USGS Surface Disturbance



BLM National Data

The BLM creates and maintains a variety of corporate and programmatic datasets that are collect referred to as BLM National Data. These data help support BLM's mission to manage and conserve the p lands for the use and enjoyment of present and future generations under our mandate of multiple-use sustained yield.

Examples of BLM National Data include: Administrative Units (BLM state, district and field office boundar National Monuments and Conservation Areas, and Surface Management Agency. Most of BLM's National are available to the public and many of them can be found in this data portal (more coming soon!). f complete list of data sets that are currently available on this portal, including data update schedules, [here](#).

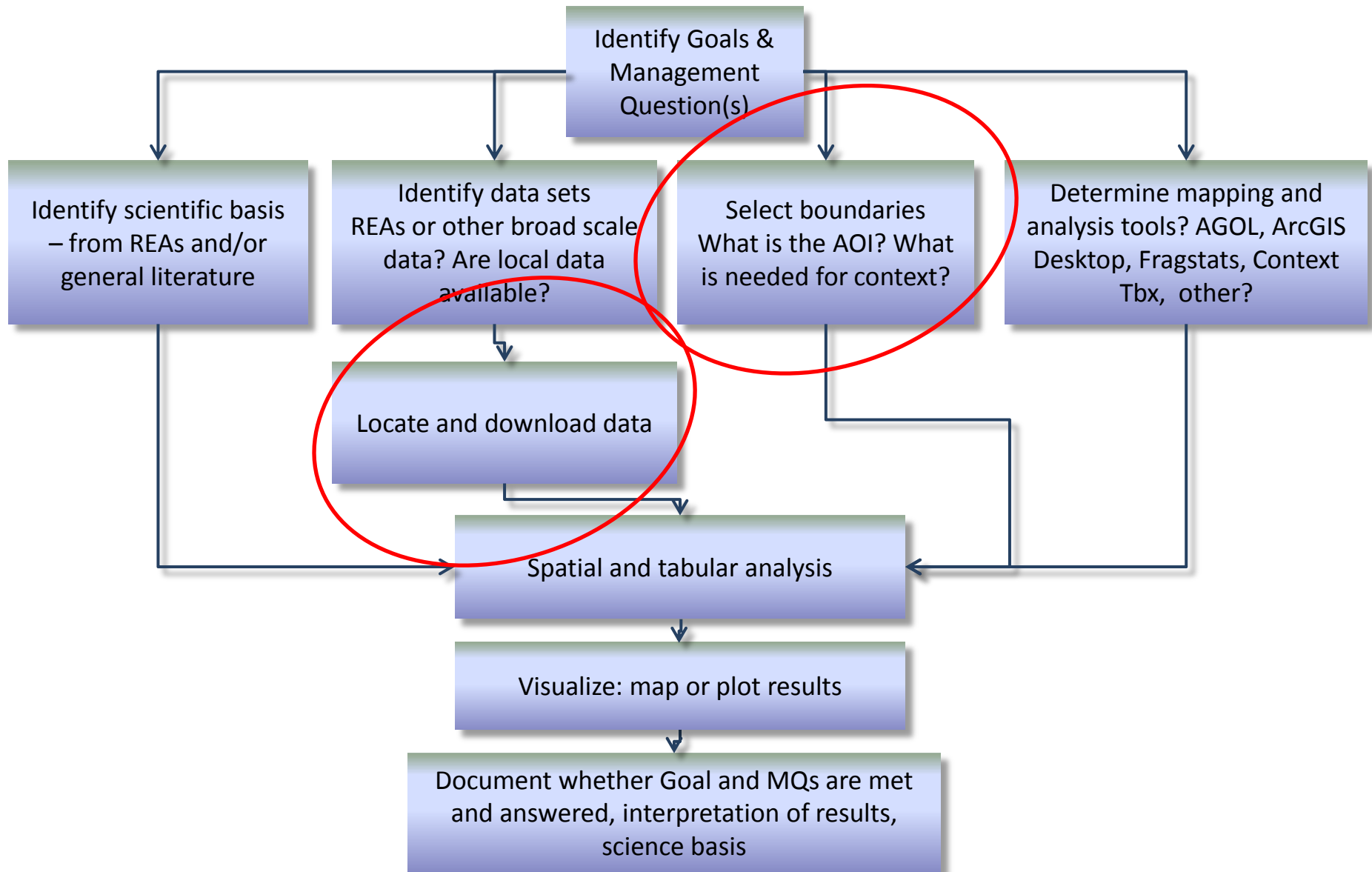
Use the Map Viewer below to explore BLM National Data or click on the hyperlinks in the Resources above to download data, documents and static (printable) maps or to view dynamic map service: individual data sets. You can also search by keywords using the Search Box.



Surface Disturbance Footprint from Development
for the Western United States



Broad Scale Analysis Road Map

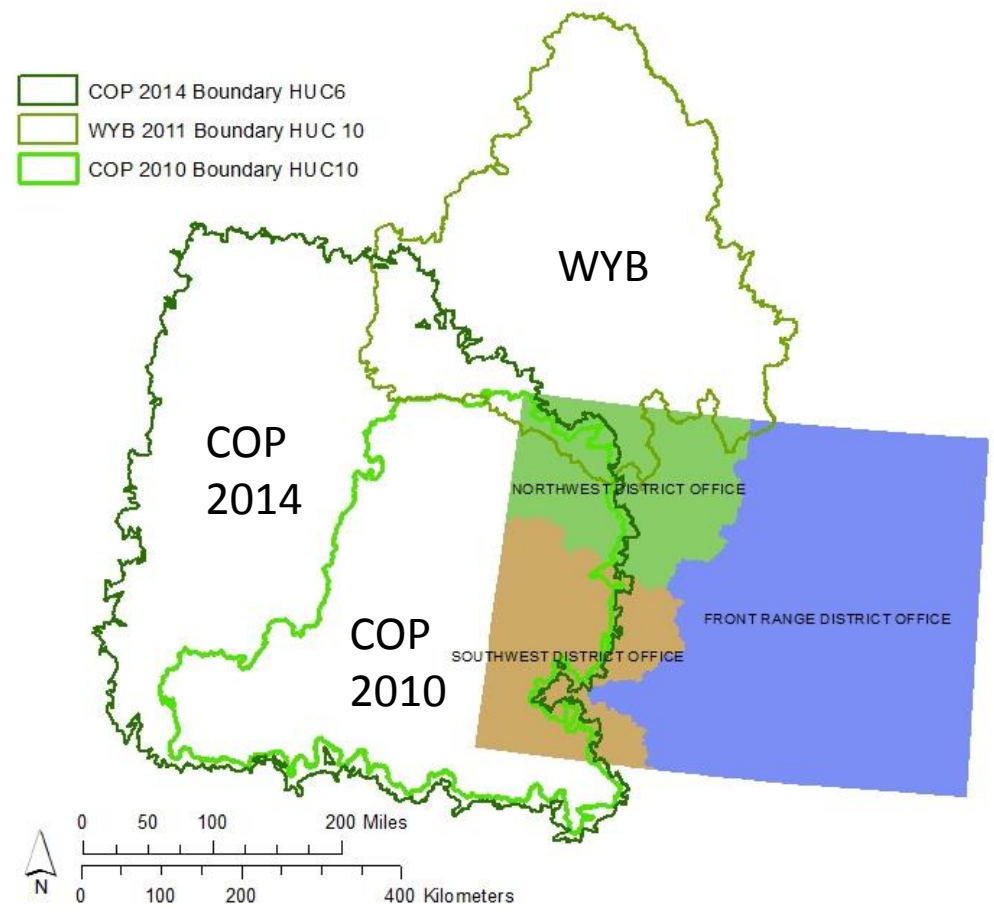


Select boundaries: What is the AOI? What is needed for context?

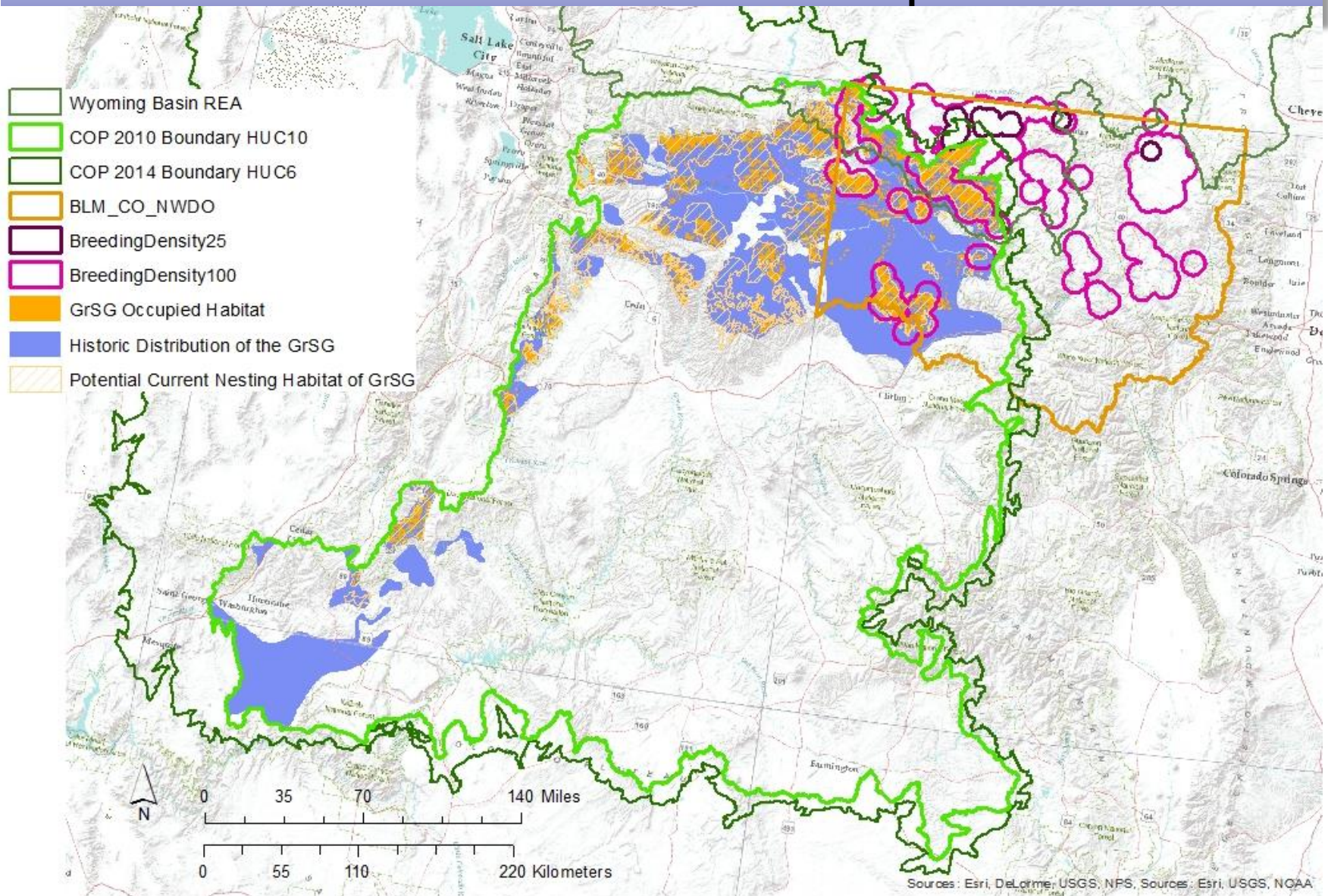
- REA boundaries
- DOs, HUCs
- SG habitat, mesic resources
- Land ownership, protected areas

★ It's a good idea to union all the boundaries that you think you might need and download data based on that largest boundary because projects can

evolve...

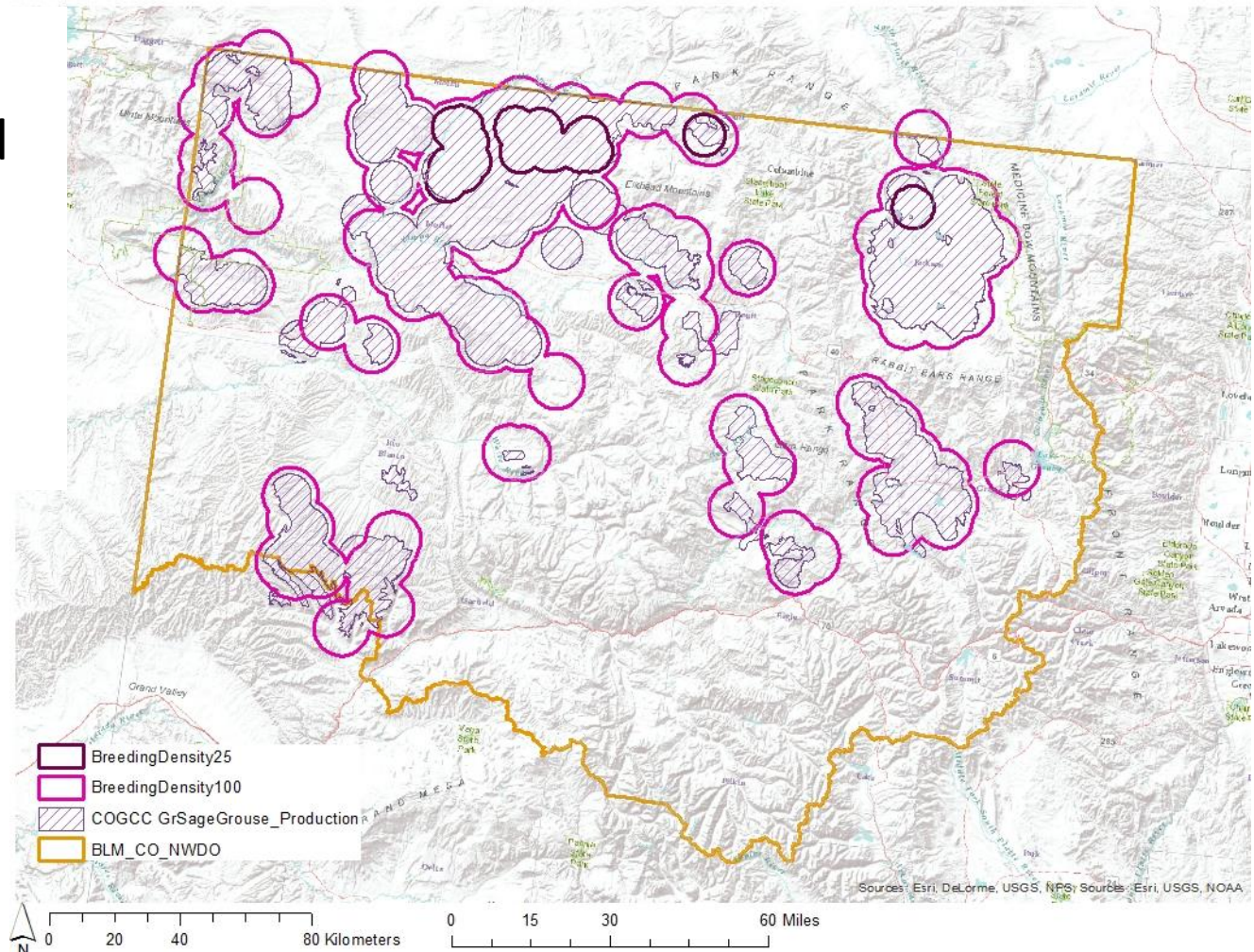


Select boundaries: What is the AOI? What is needed for context? What is practical?!

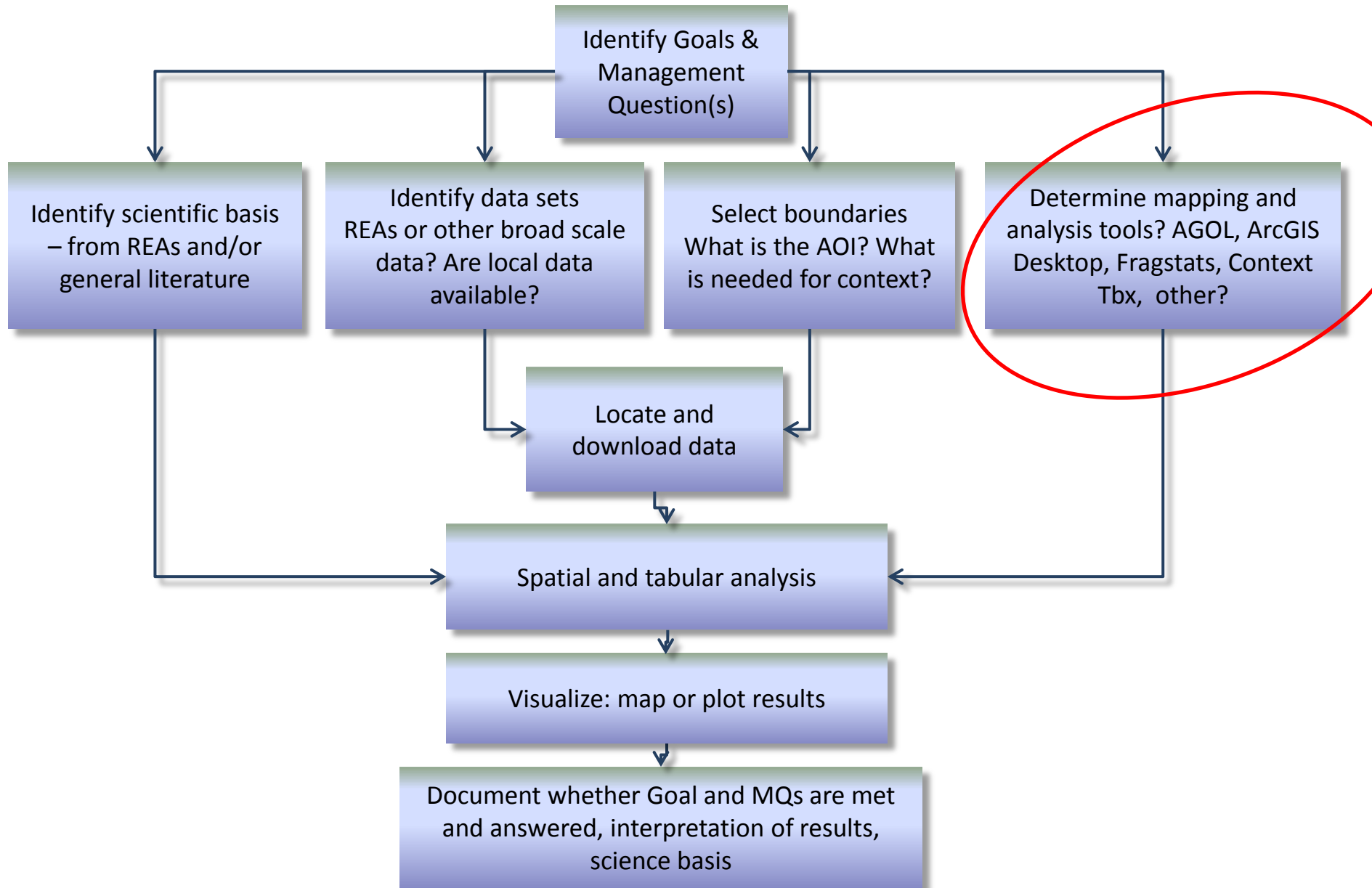


Select boundaries

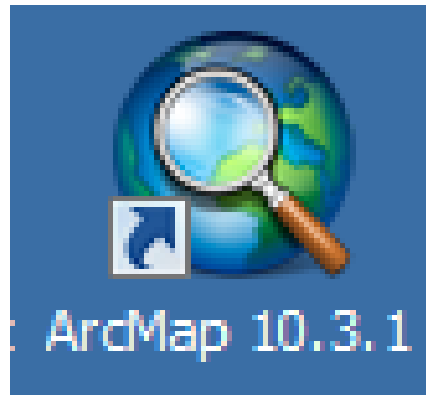
1. NWDO
2. Breeding Bird Densities
 - 25%
 - 100%
3. Potential Current Nesting?



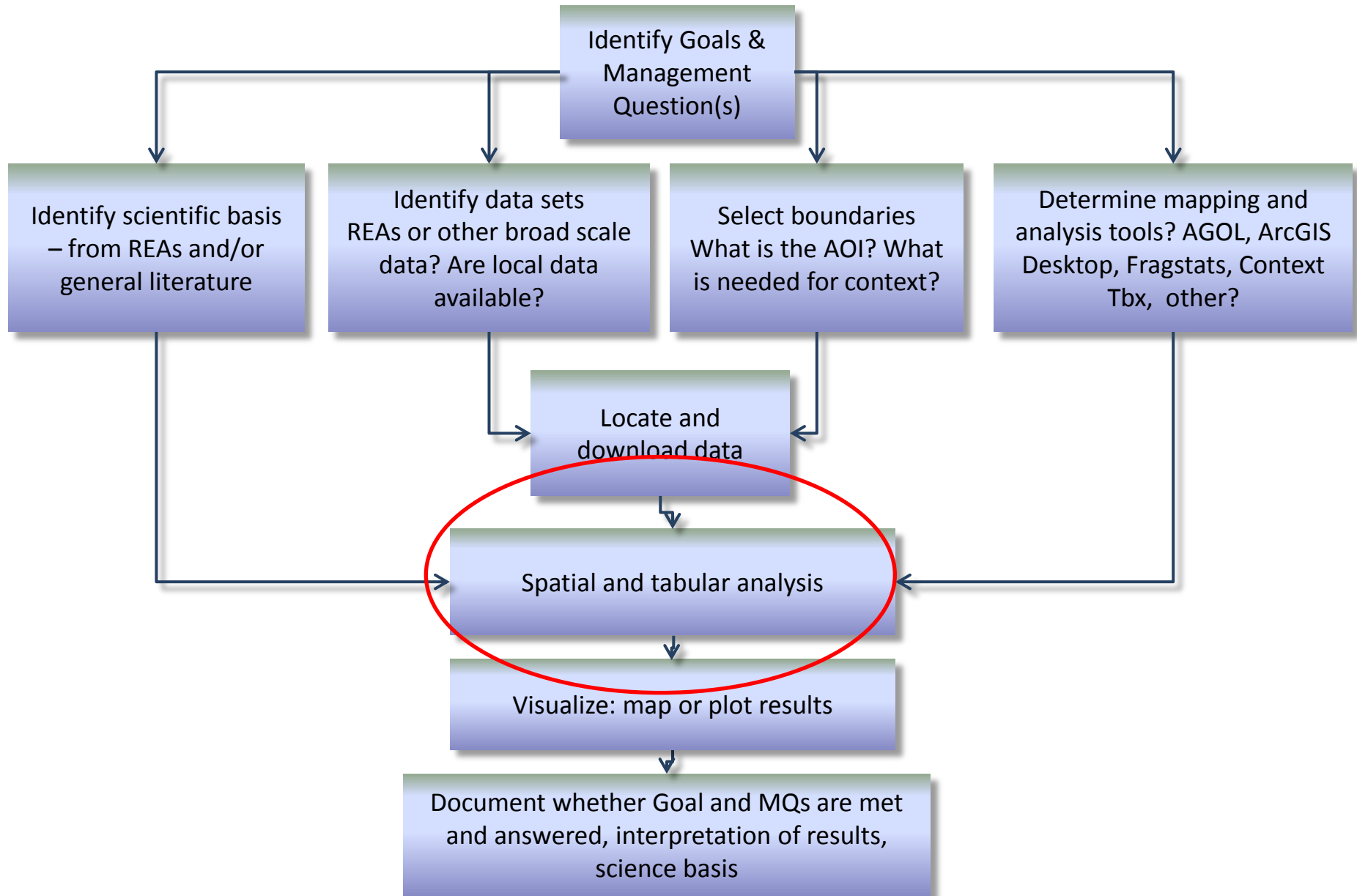
Broad Scale Analysis Road Map



Determine download, mapping, and analysis tools: AGOL, ArcGIS Desktop, Fragstats, Context Tbx, other?



Broad Scale Analysis Road Map



Spatial and tabular analysis for MQs

LandFire
NWI

Select the
correct
attributes

Rasterize and
merge (Con
statement)

Mesic
Resources
data set

Sage-grouse:
BBD25,
BBD100,
Potential
Breeding Areas

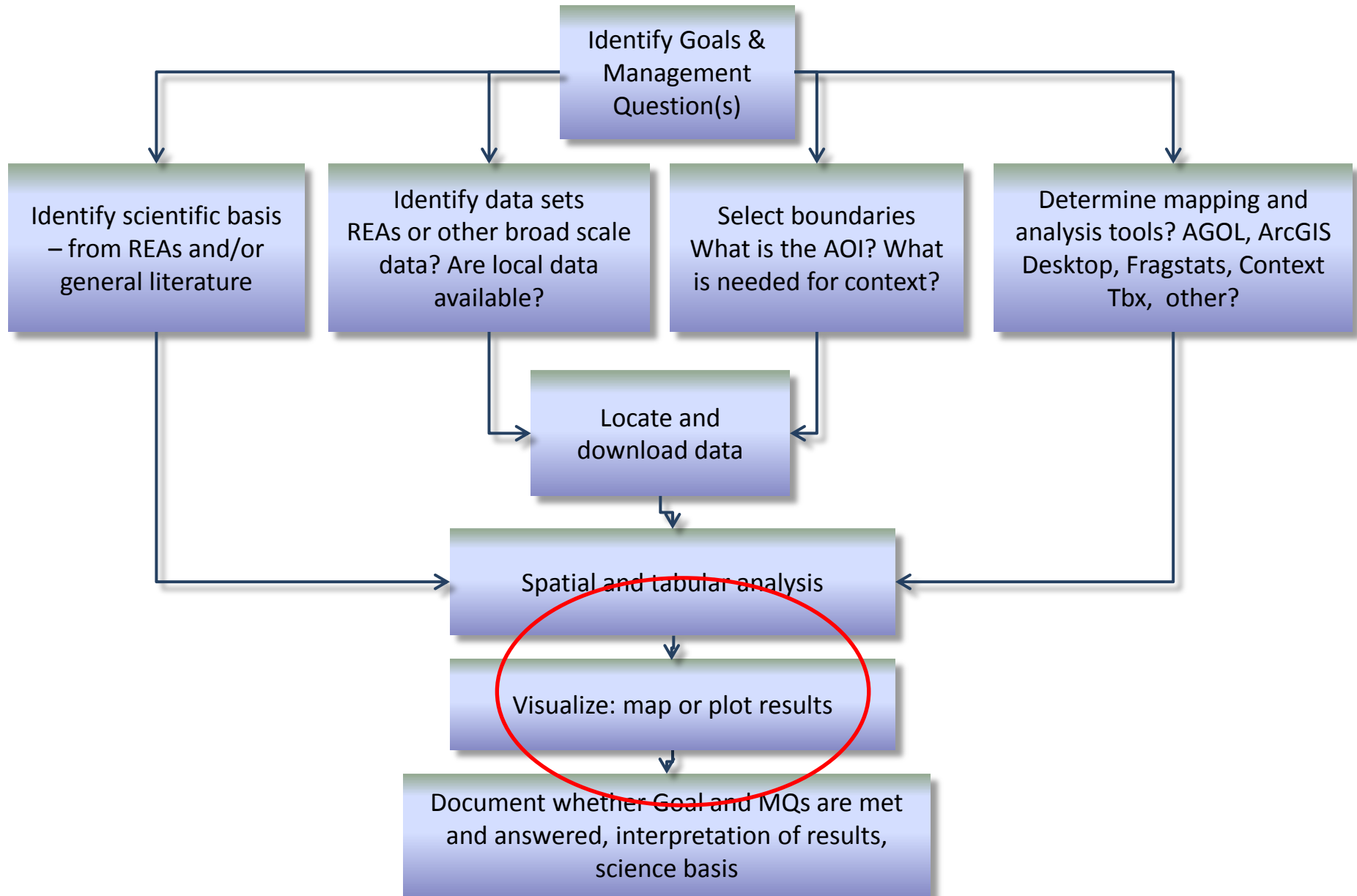
Run Context Toolbox
to summarize

REA Boundaries
WYB, COP2010,
COP2014

Under
Construction
(sorry!)

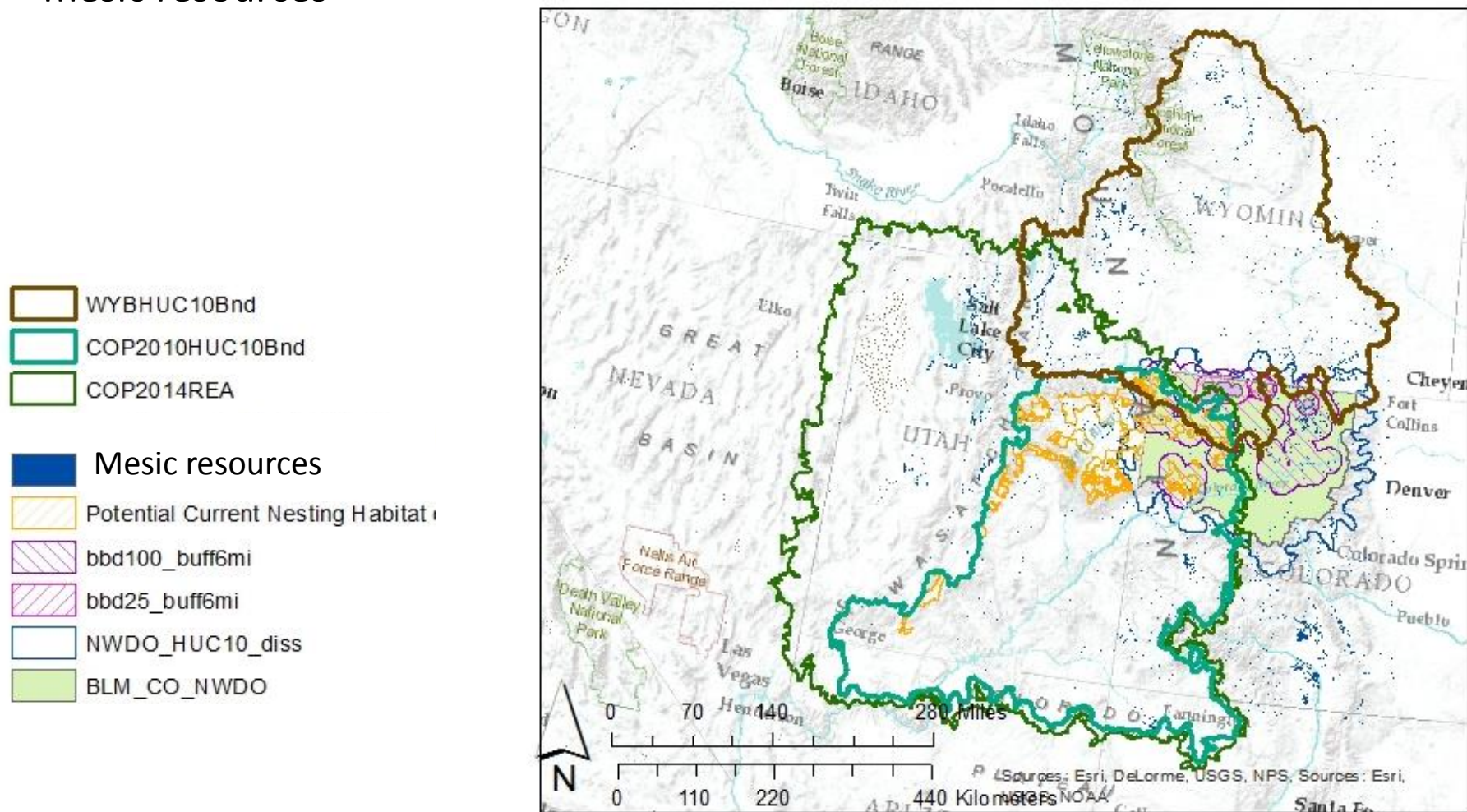


Broad Scale Analysis Road Map



Visualize: map or plot results

REA boundaries, sage-grouse breeding bird densities: 25% and 100% of the known breeding population, the NW District Office surrounded by HUC10s and mesic resources



Visualize: map or plot results

- Zoom in to NWDO
- Sparse mesic resources

WETLAND_TY

Freshwater Emergent Wetland



Mesic resources



NWDO_HUC10_diss



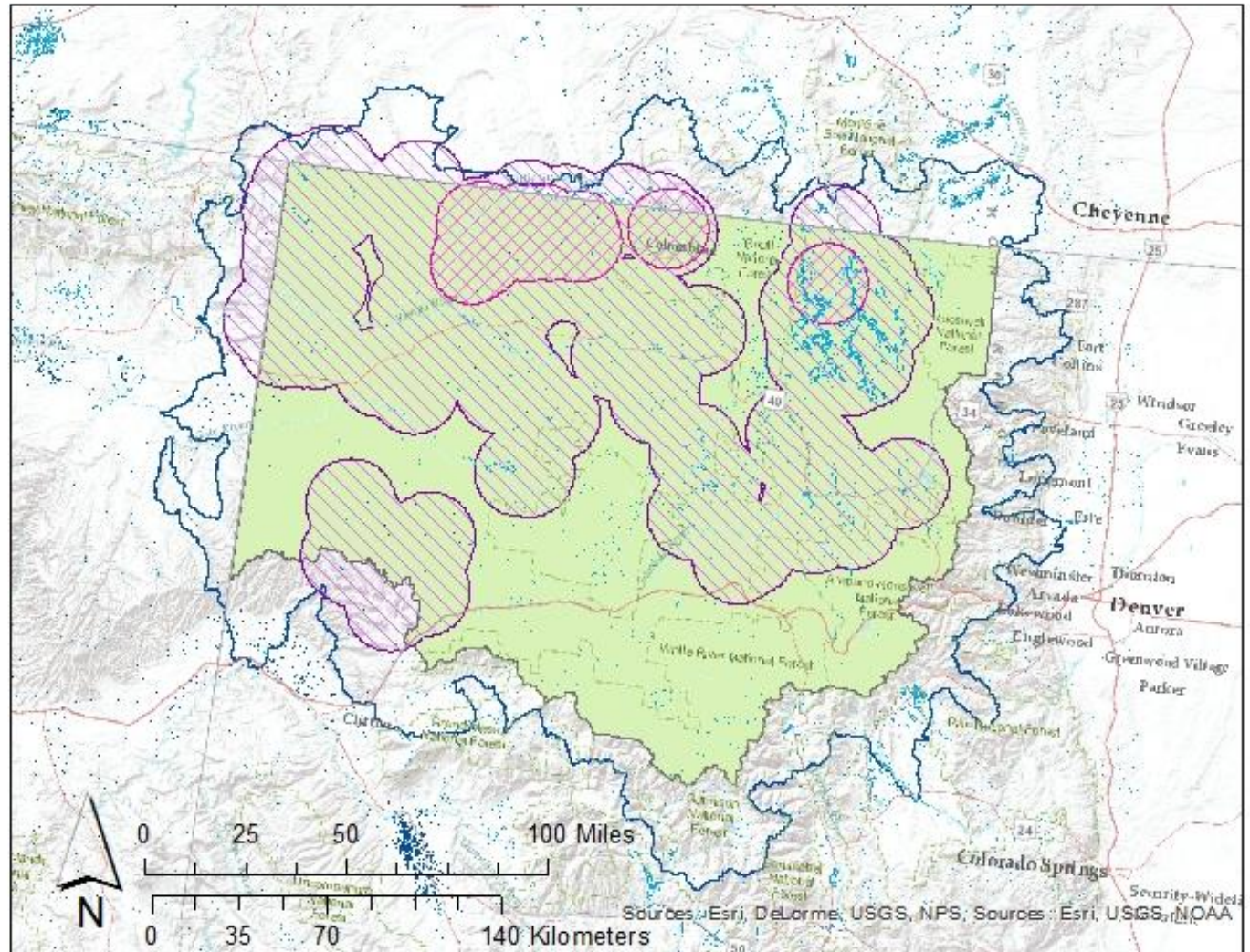
BLM_CO_NWDO



bbd100_buff6mi

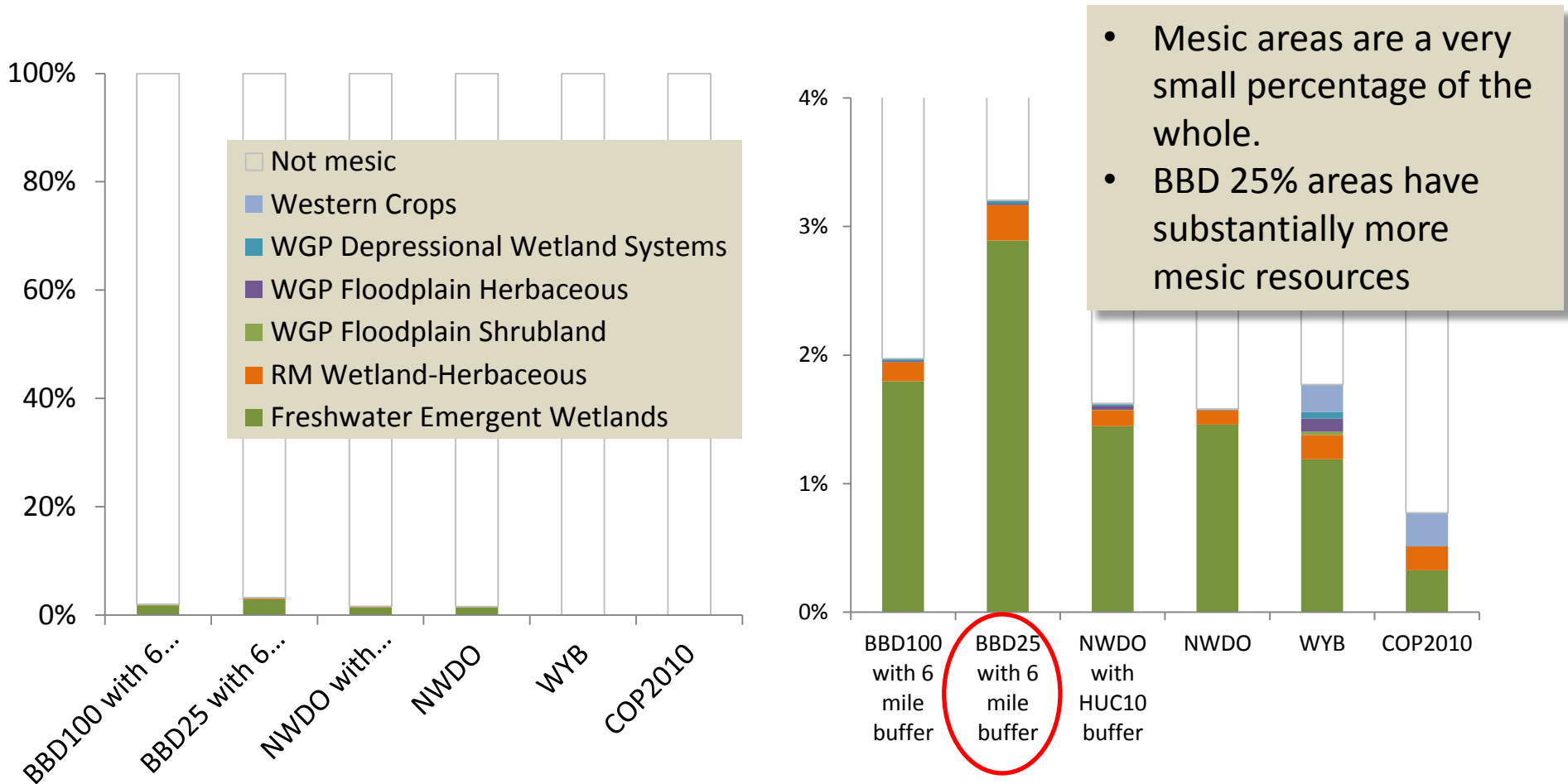


bbd25_buff6mi

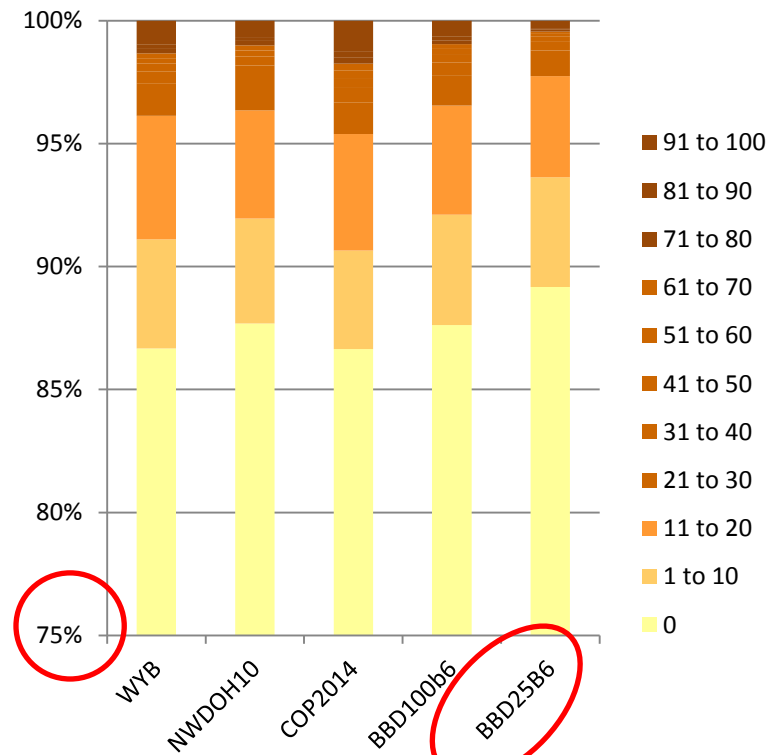


Visualize: map or plot results

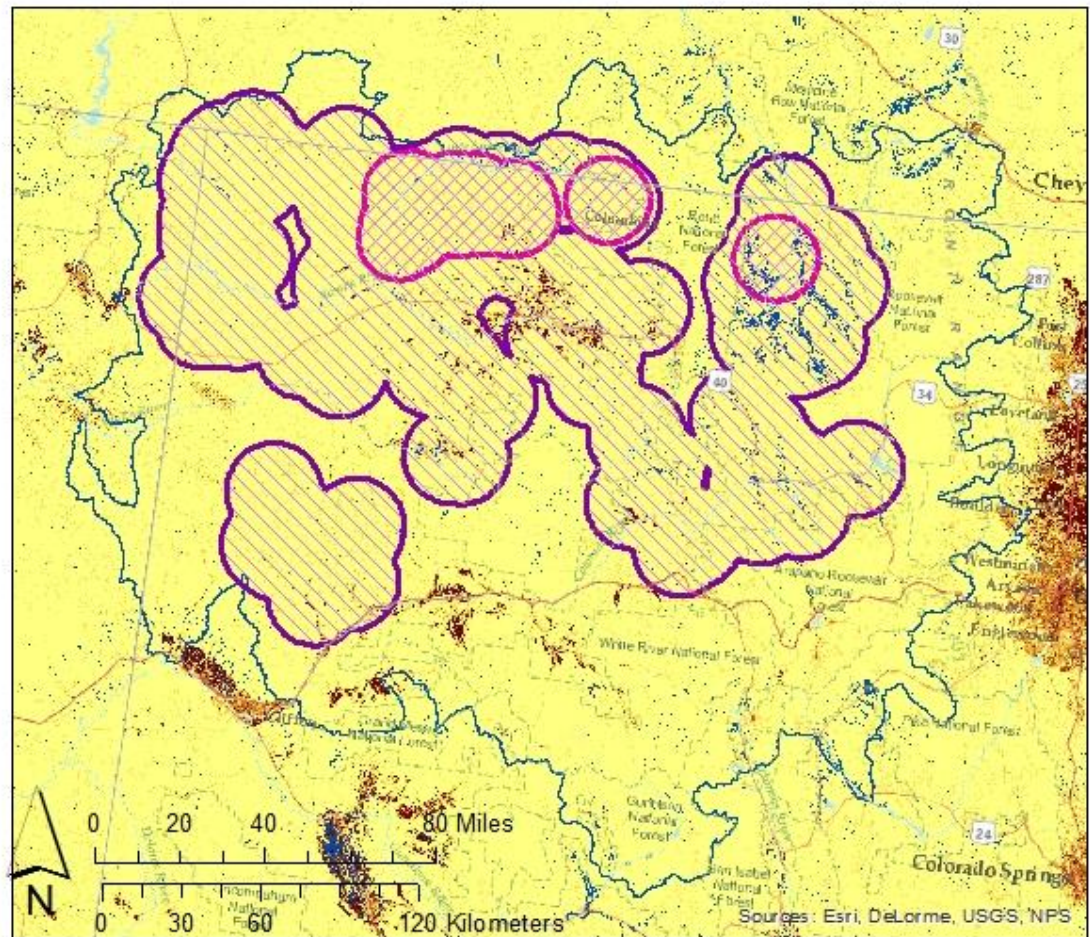
Percent area of mesic resources in sage-grouse BBD 25% and 100%, the NW District Office surrounded by HUC10s, and WYB and COP2010 REAs



Visualize: map or plot results

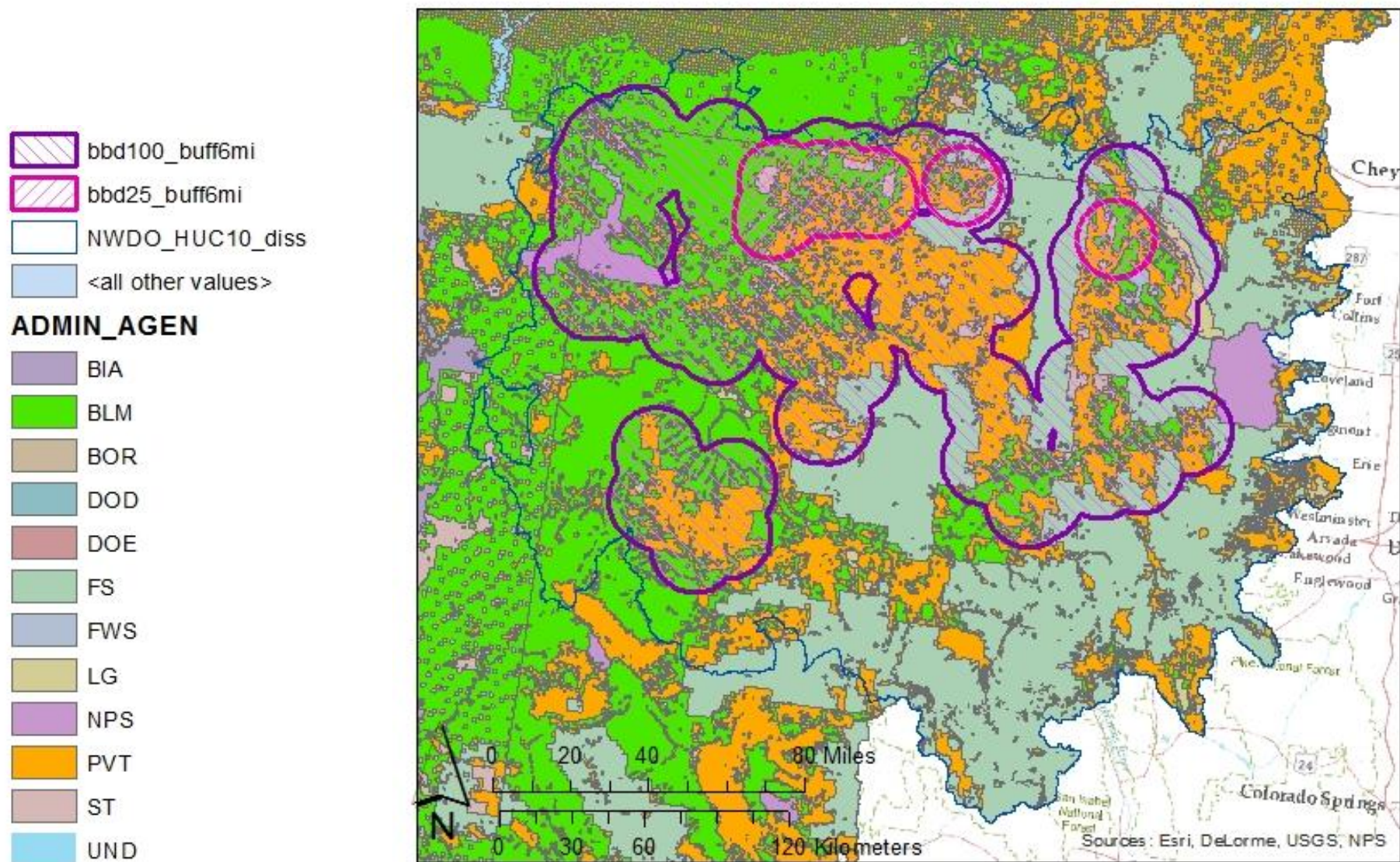


Percent Area Developed
Low (yellow) → High (brown)
Plotted in classes of 10% (except 0%)



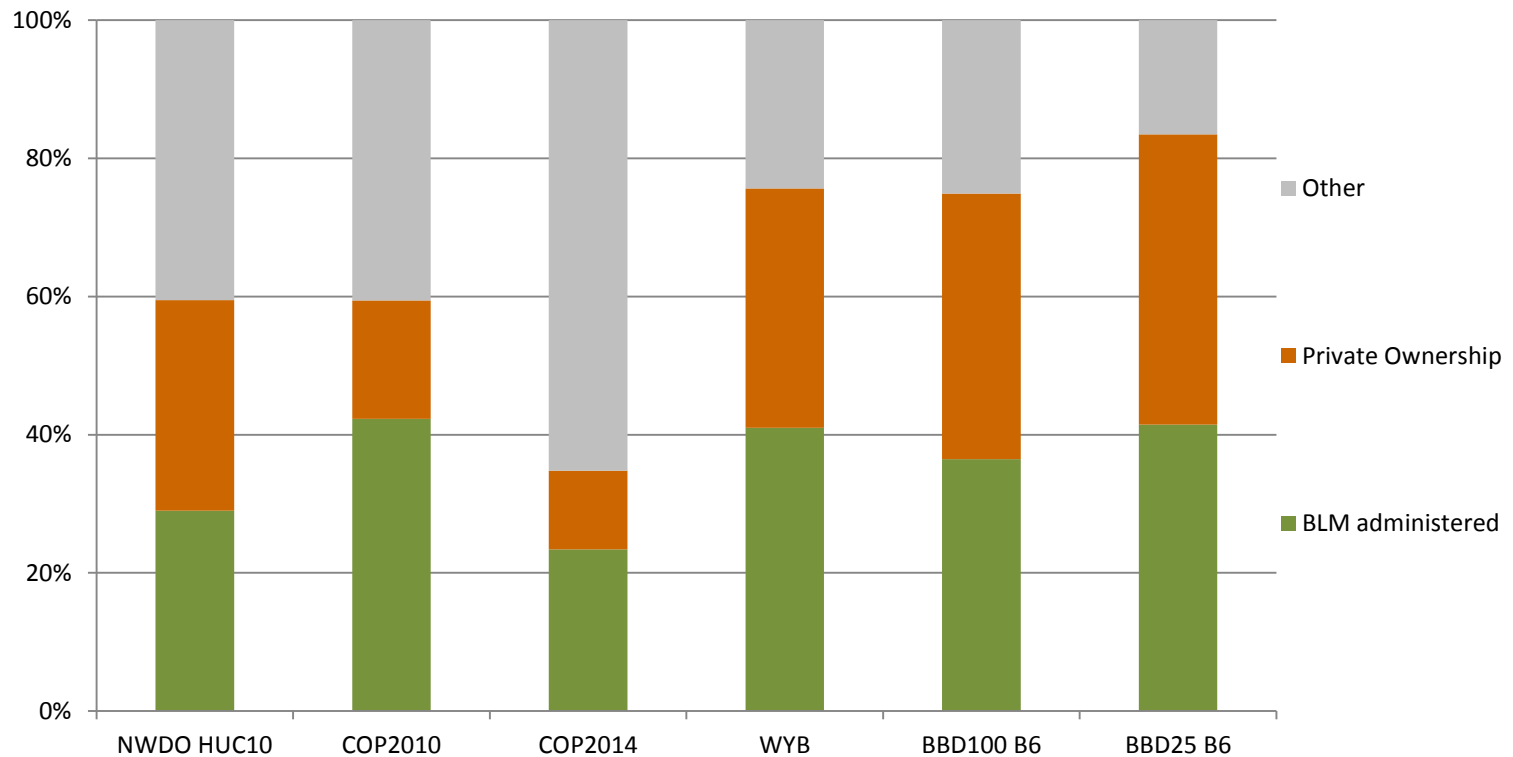
Visualize: map or plot results

Sage-grouse BBD and Land Ownership



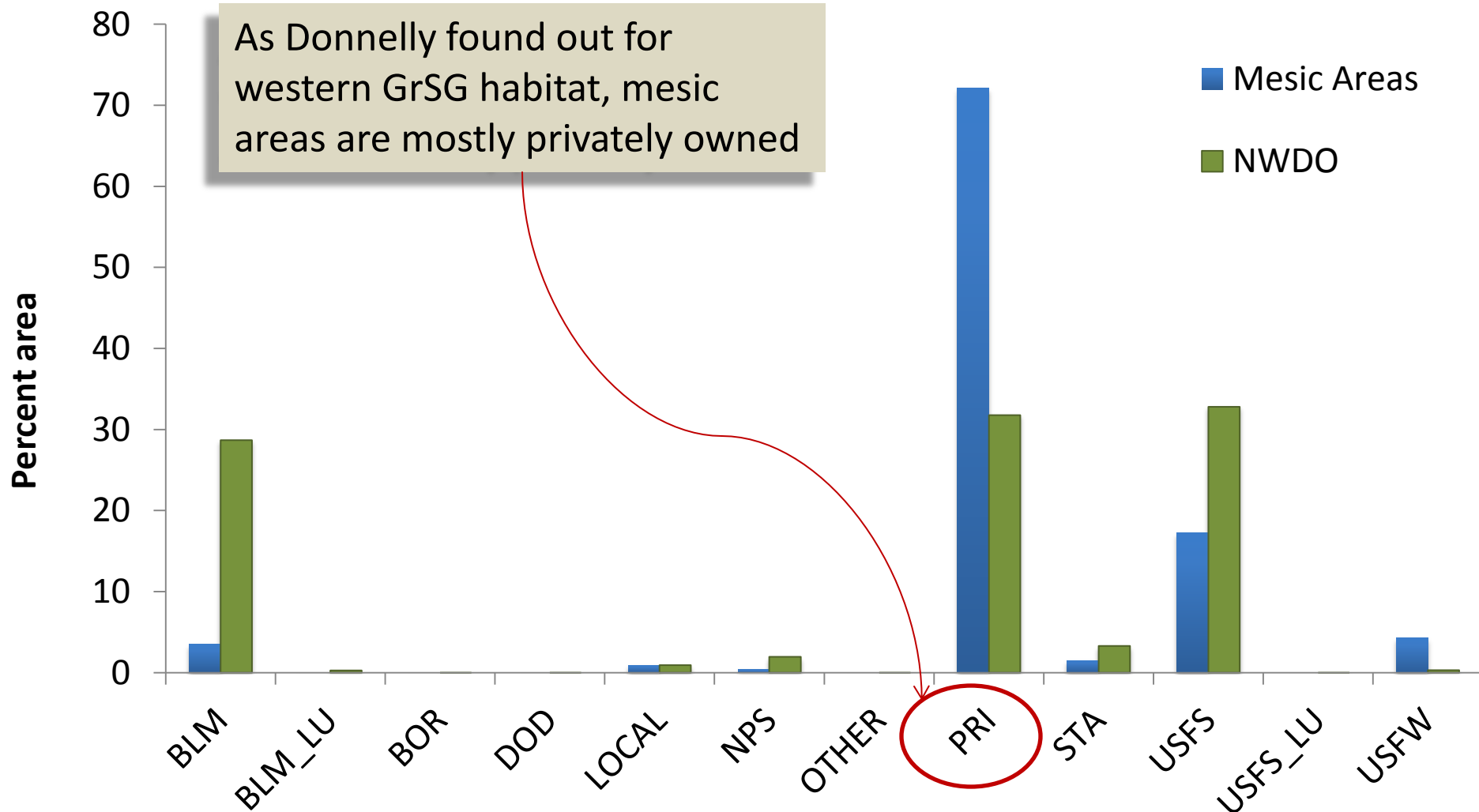
Visualize: map or plot results

Percent land that is Privately Owned or BLM Administered



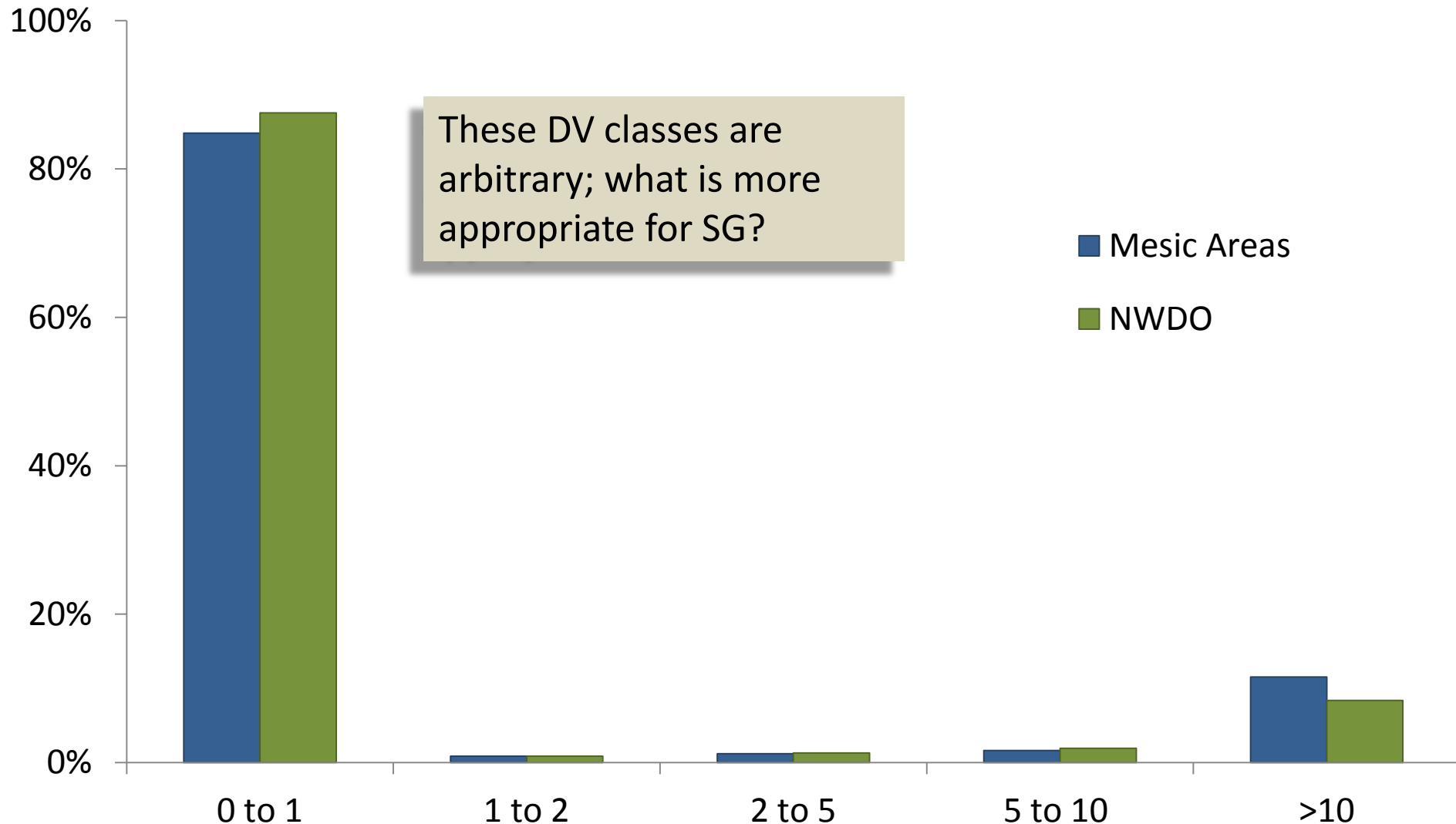
Visualize: map or plot results

Percent land ownership in the NW District of Colorado

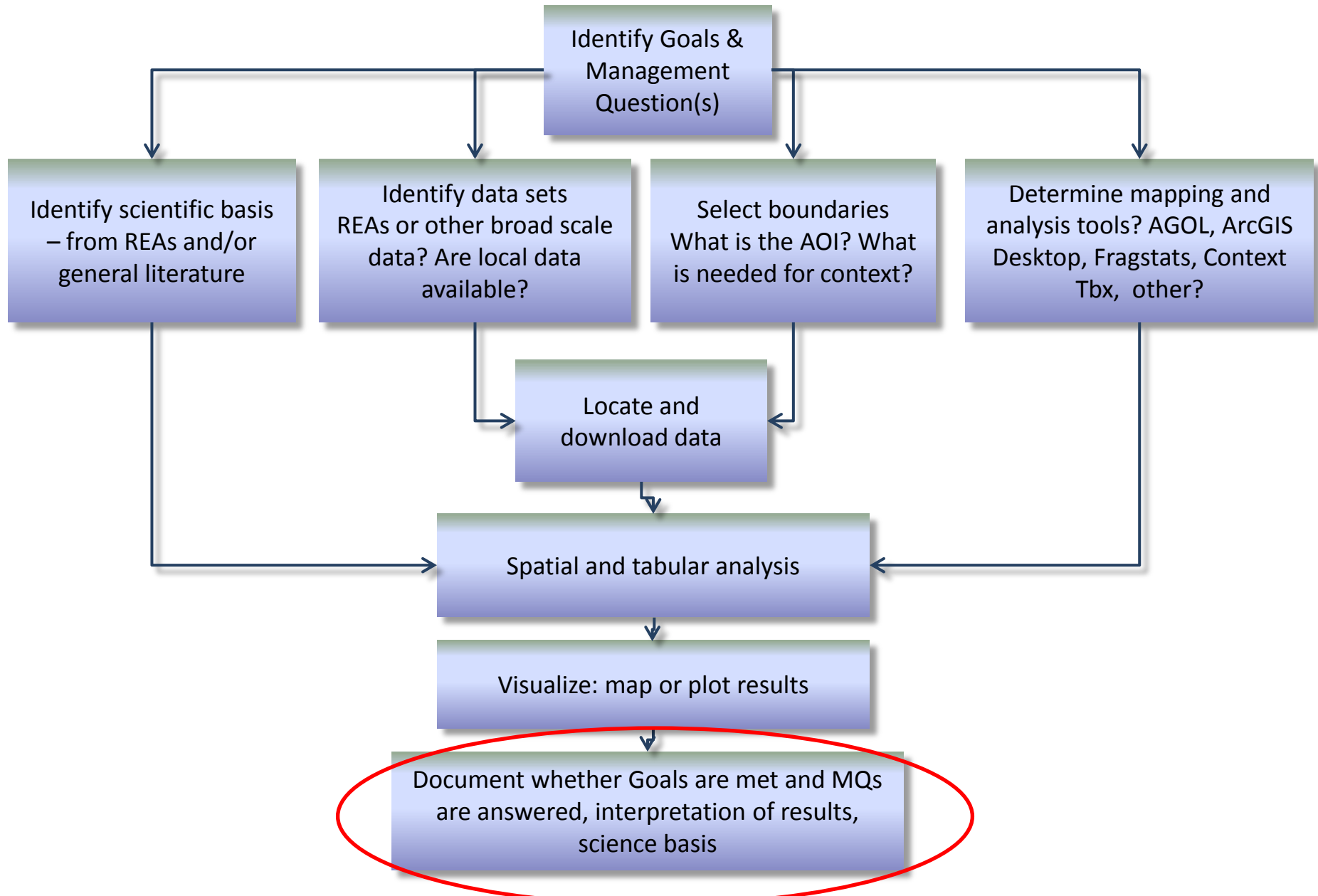


Visualize: map or plot results

Percent development in the NW District of Colorado



Broad Scale Analysis Road Map



Document whether Goals are met and MQs are answered, interpretation of results, science basis

- Revisit the MQs:

- ✓ Where are the highest densities of SG breeding areas?
- ✓ Where are the mesic areas?
- ✓ Are breeding areas close to mesic areas? Are they connected within the guidelines of the Donnelly paper (1.8 – 6 miles)?
- ✓ Who owns or manages mesic areas?
 - ✓ What percent of mesic habitat is privately owned?
- ✓ Calculate how much of SG breeding areas are impacted by development?
- ✓ What percent of mesic habitat is impacted by development?

What other questions need to be asked?

What about climate change impacting vegetation and productivity?

Document whether Goal are met and MQs are answered, interpretation of results, science basis

- Keep documentation (like lab notes) of all sources, processes, thoughts along the way.
- Remember to note if the process changed, was a dead end, was not useful and why
- Did the analyses meet your expectations?
- Did the analyses meet the Goal and answer the MQs?
- How do you interpret the analyses?

That's all for now folks

- But WAIT!
- Some analysis questions remain...
- What are they?
- How can the NOC help?

