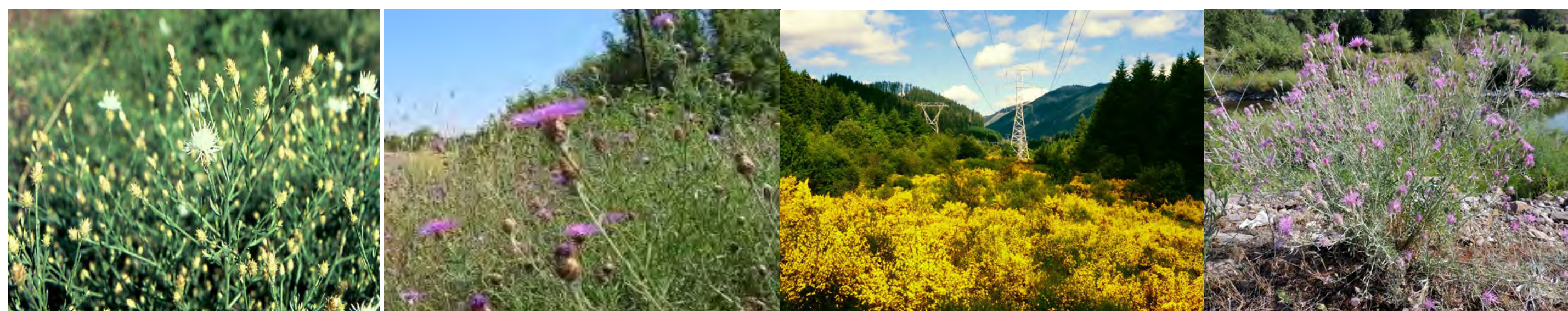


Weed Distribution in Hood River County by Land Managing Agency



Portland State University, Geography Department GIS II Spring 2016

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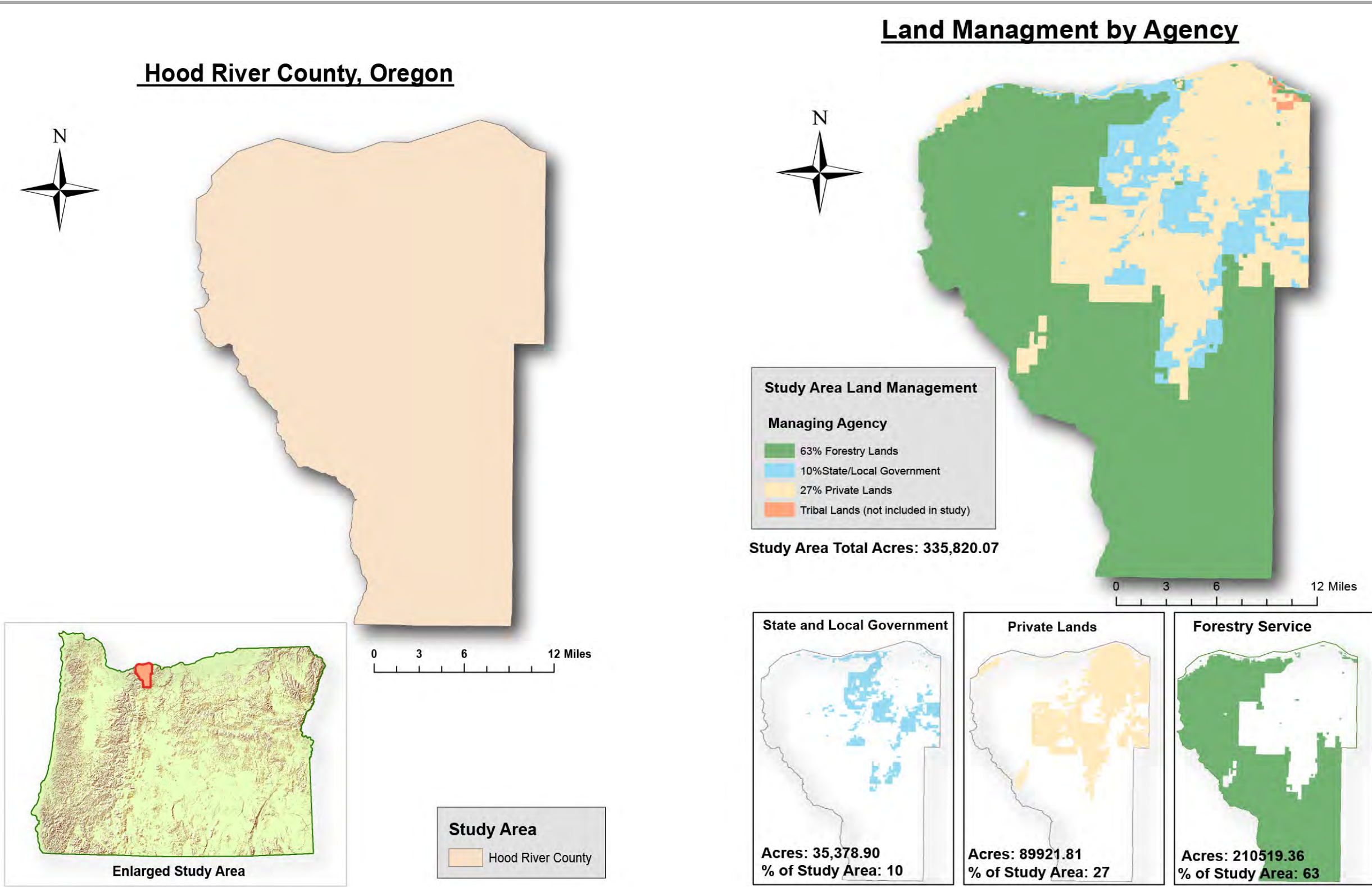


Above, from Left to Right: Diffuse Knapweed, Meadow Knapweed, Scotch Broom, Spotted Knapweed

Background

In 1999 President Clinton signed executive order 13112 to address the threat of invasive species in the United States (Buckley 1999). Invasive species are defined by the United States National Invasive Species Council as, “A species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.”

President Obama signed legislation in 2009 expanding wilderness areas within Hood River County, in doing so he ensured that untouched lands would not be logged or used for other resources. Invasive species threaten to upset the natural and sometimes fragile balance of many ecosystems, including those found within these wilderness areas.



Introduction

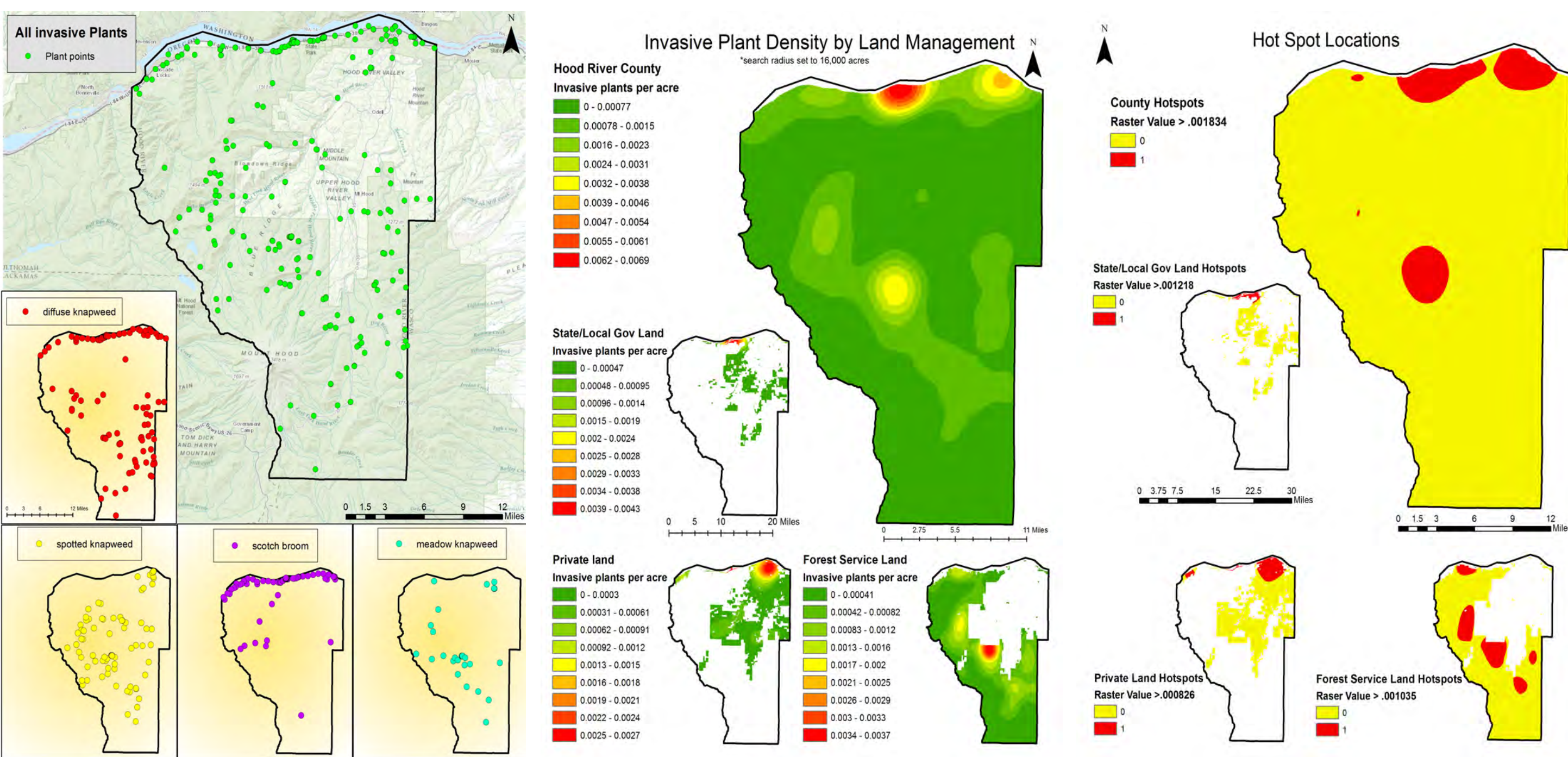
It is estimated that there are nearly 5000 invasive plant species throughout the United States. According to the Oregon Department of Agriculture approximately 220 to 230 invasive plants and noxious weed species have been observed in Oregon alone. As of 2013 there have been reports of 66 species of invasive plants on land within Hood River County. The majority of these plants are terrestrial and their spread threatens to disrupt the ecosystems balance and natural succession.

This study looks at the distribution of three species of Knapweed that have been detected in the county as well as Scotch Broom. The study seeks to identify if there is a correlation between the agency responsible for the land's management and the incidence of weeds. We also wish to examine if the Wilderness designation of lands has had a positive effect when it comes to preventing the introduction and spread of these invasive plant species.

Methodology & Analysis

Datasets were created for the four species of invasive plants we wished to analyze. Point layers for Scotch Broom, Diffuse, Spotted, and Meadow Knapweed were then created using 2013 data from Oregon Department of Agriculture's online Weed Mapper. A point layer was also created for all the plant species combined. A land cover data set for the study area was then created by clipping the Oregon Department of Forestry's 2011 Public Land Ownership data to the study area. The land was then categorized by the managing agency and a polygon layer was created for the total area managed by Forestry Service, Private owners and State/Local Government (Tribal lands were not included in the study area). Map intersect overlays were then created for all the plant species for each managing agency. Kernel Density analysis was then run for the total study area and again for each subarea by agency.

The kernel density tool was processed using a raster cell size of 100 feet and a search radius of 16000 and the output set to acres. The density outputs were then used to create a hotspot layer using the con tool. Raster cell values around the areas that areas of higher density were selected to create the layer; all cells with values higher than the selected values were assigned the value of 1 and all values lower than the selected values were assigned the values of 0.



Literature Cited/Sources

Oregon Weed Mapper online, 2013
Oregon Department of Forestry's 2011 Public Land Ownership data
Bureau of Land Management, Oregon Counties data, 2007
J.W. Bulkeley. 1999. Executive Order 13112 Invasive Species. Proceedings from the 26th Annual Water Resources Planning and Management Conference - Preparing for the 21st Century, American Society of Civil Engineers. Arizona: Tempe.
Exec. Order No. 13112, 3 C.F.R. 4 (1999). Print.

Results

(All values are plants per acre based on a 16,000 acre study area)

Density Analysis:

County density: High density- .0062 - .0069 Low density- 0 -.00077
Forestry Land Density: High density- .0034-.0037 Low density- 0-.00041
Private Land Density: High density- .0025-.0027 Low density- 0 -.003
State/Local Gov. Land Density: High density- .0039 -.0043 Low density- 0 -.00047

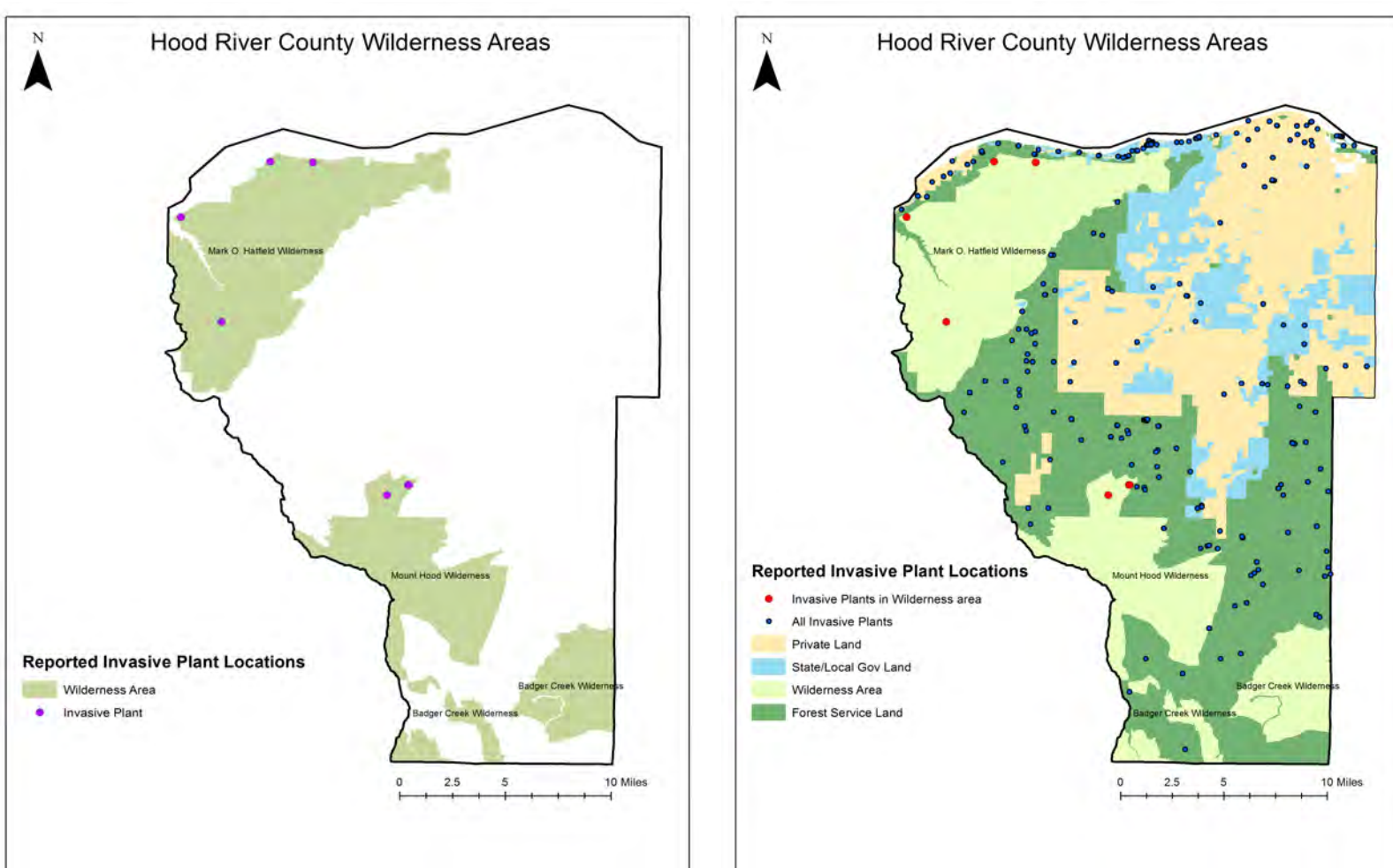
Hot Spot analysis :

All values that are assigned 1 to designate hot spots based on a selected high raster value to indicate areas of higher density and where higher density is likely to occur. All areas of lower density are assigned the value of 0 indicating low density and low likely hood of a high density hot spot arising.

Results showed that while all three managing agencies had reported the presence of the invasive weed species, lands managed by the state and local governments had the highest incidence. These lands accounted for only 10% of the total study area yet 26% of the total reported weeds. This was followed by lands managed by the Forestry Department, and lastly Privately managed lands.

All four invasive species showed a higher incidence in populated areas as well as in areas with major transportation corridors .

Within Hood River County there are three designated wilderness areas encompassing a total of 88,316.89 acres. Within these areas there were only 9 reported incidences of the weeds being studied occurring.



Conclusion

While the results from this analysis pointed to a correlation between the managing Agency and the incidence of the four invasive weeds, there were several factors that were not taken into account during the study. Some of these factors include; the size and number of roads located within each subarea, and the reporting criteria for each agency, and the way in which the land is being used. These factors need be considered before drawing any definitive conclusions.

The wilderness designation does appear to have a strong positive affect when it comes to the prevention of the spread of these particu-

Literature Cited/Sources

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Khuroo, Anzar A., Ewald Weber, A.h. Malik, Zafar A. Reshi, and G.h. Dar. "Altitudinal Distribution Patterns of the Native and Alien Woody Flora in Kashmir Himalaya, India." *Environmental Research* 111.7 (2011): 967-77. Web.
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.