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Rainwater Basin Joint Venture Nebraska Landcover Dataset & NWI Index Guide

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Landcover & NWI Index Summary Method

Identifying the type, amount, and distribution of habitat throughout the landscape is a fundamental component in landscape ecology. In the conservation sciences, quantifying the availability and distribution of habitat within the habitat matrix provides insight on how to advance conservation success through targeted management strategies. Therefore an effective and efficient method of quantifying habitat over vast landscapes is necessary to provide adequate tools for conservation practitioners.

A moving window analysis, or focal statistics, is a means of quantifying habitat within a defined area through the use of a landcover dataset or an alternative raster representing a specific habitat classification. Regardless of the data source, the area of various habitat types within a specified distance is summarized in identical manners. Here we describe a moving window analysis using two alternative dataset types, the Rainwater Basin Joint Venture Landcover dataset and the National Wetland Inventory dataset (NWI). In the case of NWI, the vector data are first converted to a raster format for summary. A moving window analysis is conducted by summing (or averaging) all of the pixel values in the surrounding landscape (defined by the user) and recording the output value to the centroid (center raster cell) of the landscape (Figure 1). The process is repeated one cell over until the entire grid has been analyzed. To set the radius of the moving window (landscape dimensions), the number of pixels either left, right, up or down from the center pixel is multiplied by the cell size. The moving window radius in the example is

approximately 200 m (7 pixels x 30m = 210 ≈ 200m; Figure 1). The moving window adds up the number of pixels within the circular window that belong to a specific habitat class, usually classified in binary form (1s = habitat, 0 = otherwise). In the example, the center pixel is assigned a value of 6 for rural development in the output layer; for wetlands the center pixel would be assigned a value of 10, and for cropland the center pixel would have a value of 54. Then, the window shifts to the right and summarizes the surrounding area around the next pixel. The whole process continues until every pixel in the raster layer has been summarized. In the case of 30m raster cells, area is calculated by multiplying the number of pixels by 900 square meters (30m x 30m). The raster output can be assigned to a vector area, such as wetland outlines or farm tracts, by assigning the maximum or average pixel value that occurs within the polygon. Since the calculated area includes the area within the polygon including the central pixel, the polygon area is subtracted so that only surrounding features are calculated. Another option is to evaluate the output as a percentage of the landscape so that the values are consistent regardless of moving window scale. The output pixels are divided by the total pixels within the circular window to obtain the percentages of the surrounding landscape classes at each scale. In the example, the total number of pixels within the circular window is 149, so rural developed is 4%, wetland is 7%, and cropland is 36% for the center pixel in the corresponding output layers.

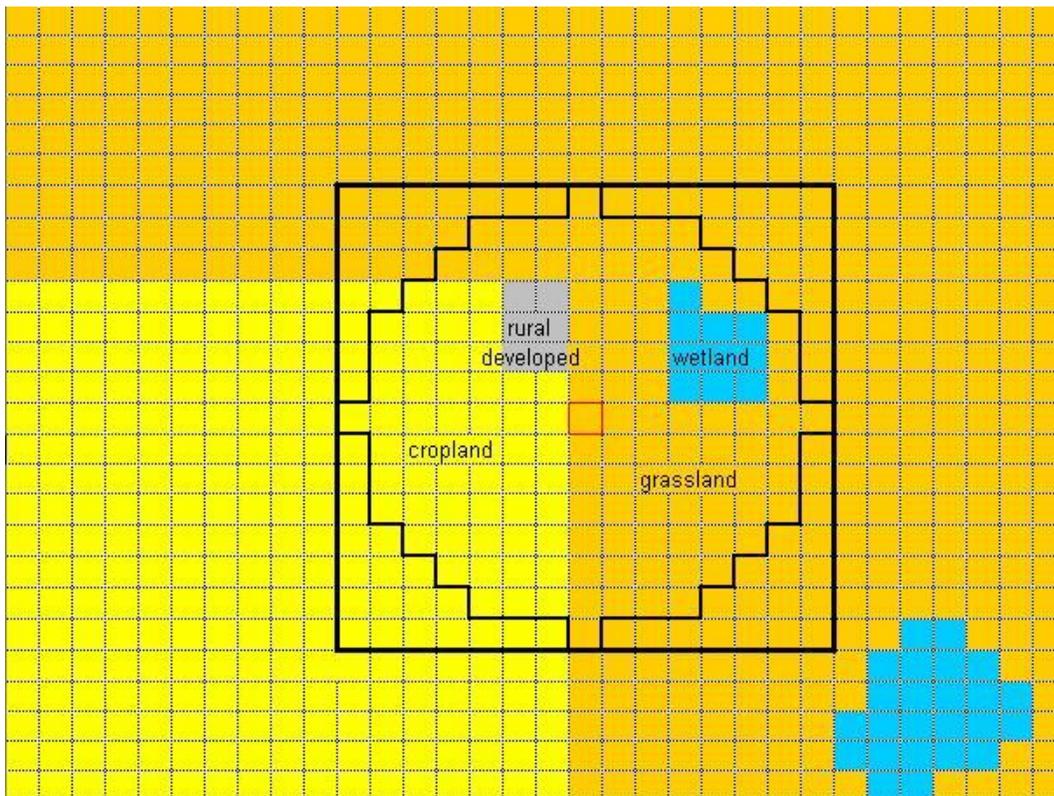


Figure 1. An example of a focal summary moving window application on a theoretical landcover dataset

Landcover Classes by Habitat Index

In each habitat index layer, landcover classes are grouped together by similar habitat types. The most commonly used base indices are:

Cropland (pcrop) = General Cropland(38), Alfalfa(201), Corn(202), Fallow(203), Sorghum(206), Soybean(207), Sunflower(208), Wheat(209), Other(211)

Developed (pdevelp) = Other Roads(41), Rural Developed(42), Four-Lane Roads(44), Urban/Suburban(46)

Grasslands (pgrass) = CRP-grass(31), CRP(39), Mixedgrass(71), Sandhills Grasslands(73), Tallgrass(77), Sand Sage(87), Wetmeadow(247)

Wetlands (pwtlnd) = Reservoirs/Lakes/Ponds(1), Playas(12), Sandhill Wetlands(13), Rainwater Basin(14), Other Wetlands(15), CRP-wetlands(34), CRP-playa(35), Canal(48), Sandhill Lake(101), Lagoon(102), Pit(103), Reservoir(104), Stock Pond(106), Farmed Playa(121), Buffered Playa(122), Farmed Rainwater Basin(141), Early Successional Rainwater Basin(142), Late Successional Rainwater Basin(143), Emergent Marsh(152), Saline Marsh (153), River Channel(244), Unvegetated Sandbar(245), Warmwater Slough(246), Wetmeadow(247), Floodplain Marsh(248)

Woodlands (powlnd) = CRP-upland trees(32), CRP-riparian trees(33), Eastern Red Cedar(59), Ponderosa Pine-many trees(60), Upland Woodland(61), Ponderosa Pine(63), Juniper(66), Ponderosa Pine-few trees/grass understory(69), Riparian Canopy(241), Exotic Riparian Shrubland(242), Native Riparian Shrubland(243)

Other indexes that are used in species models include, but are not necessarily limited to:

CRP (pcrpgrass) = CRP-grass(31), CRP(39)

Grass without Wetmeadow (pgrass0mdw) = CRP-grass(31), CRP(39), Mixedgrass(71), Sandhills Grasslands(73), Tallgrass(77), Sand Sage(87)

Wetlands without Wetmeadow (pwtlnd0wtmdw) = Reservoirs/Lakes/Ponds(1), Playas(12), Sandhill Wetlands(13), Rainwater Basin(14), Other Wetlands(15), CRP-wetlands(34), CRP-playa(35), Canal(48), Sandhill Lake(101), Lagoon(102), Pit(103), Reservoir(104), Stock Pond(106), Farmed Playa(121), Buffered Playa(122), Farmed Rainwater Basin(141), Early Successional Rainwater Basin(142), Late Successional Rainwater Basin(143), Emergent Marsh(152), Saline Marsh (153), River Channel(244), Unvegetated Sandbar(245), Warmwater Slough(246), Floodplain Marsh(248)

Wetmeadow (pwtmdw) = Wetmeadow(247)

NWI Class Habitat Indexes

The five base National Wetland Inventory classes used in species modeling are:

Sandhill Lakes = Non-reservoir wetlands within the sandhills of L1 or L2 systems

Semi-Permanent = Unmodified Palustrine system with an F, G or H water regime

Seasonal = Unmodified Palustrine system with C or H water regime

Temporary = Unmodified Palustrine system with an A, B or J water regime

Forested = Entire wetland possesses an FO-forested or SS-shrub/scrub class (likely only useful when calculating total wetlands)

These are additional indexes that may be used for certain species:

Sandhill Lakes and Semi-Permanent

Seasonal and Temporary

Riverine – Unmodified Riverine Systems