DISCUSSION OF AGGREGATION OF CELLS WHEN MAPPING THE BUFFALO-SKEDADDLE POPULATION MANAGEMENT UNIT

Background:

The original vegetation map that provided the base information used to develop the "R" Value map was a Thematic Map that used a satellite scene to gather the vegetation data.

Satellite scenes are developed using raster (information within cells) data. The cells were 25 meters on a side. Twenty five meters on a side = 625 square meters, which when converted = 0.15 acres per cell.

When the vegetation map was built using a Geographical Information System software package named IMAGE the cells could be made larger or smaller. Somewhere in the process the cells were made smaller – down to 0.07 acres each, or 283.2802 square meters, or 17 meters on a side. This conversion resulted in the first "R" Value map having 22,000,000 cells. What this means is if we had a special, very expensive, plotter you could look at the original "R" Value map with a hand lens (magnifying glass) and see a collage of infinitesimal sized different colored spots. **Each of these tiny spots has a value of RO, R1, R2, R3, X3, R4, X4, Water, or Not Applicable tied to it.**

Two things make using this type of map impractical.

> First: When working within the realm of 1,644,019 acres we do not work at a 0.07 acre scale.
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> Secondly: With 22,000,000 cells attempting to run a computer conversion from an IMAGE product to an ARC INFO product for the Nevada Division of Wildlife, with polygons (*an area enclosed by three or more lines*) locks up our computer, and results in a product that makes little if any sense because all the polygons would be points on a map with no discernable acreage.

How this problem is fixed is for the GIS Administrator, and the Resource Specialist to get together and determine what level of resolution (*the fineness of detail that can be distinguished in an image – for our purposes the fineness of detail practical for managing habitat with in a 1,644,019 acre area*) will work for our needs.

The way resolution is achieved is through aggregation (*the act of having the computer determine a total with reference to its constituent parts*).

Karen Holmstrom began by instructing the computer to break the map into 5 acre grids, and determine the value of each of the 71- 0.07 acre cells within a 5 acre

grid. Than the computer was instructed to determine which value had the highest percentage of occurrence within the grid, and change the grid value to be consistent with majority value. The computer did this for 328,804 – 5 acre grids in the map. If the dominate value within the grid was R4 the entire 5 acre grid became R4. The minority cell values were merged into the majority value. For example: if 80% of the grid was made up of cells with the value of R4, while 20% of the cells had value of RO. The acres of R4 would increase from 4 to 5, and the acres of RO value would go down by 1 acre.

We determined this level of resolution was still too cluttered, and that we do not really work at 5 acre levels unless it is springs or leks which are specific points on a map.

Karen than did a run using 10 acre grids. The result was still too cluttered.

We than settled on using 40 acres grids for mapping which is closer to how resource specialists view terrestrial upland management within a large area. We now have a more workable 41,100 cells forming the new map. Using a 40 acre grid does, however, cause some visible shift in mapped values but is still within a reasonable distribution of habitat. Results from the 40 acre aggregation have been put into a polygon format to make the map more aesthetically pleasing, and allow for more accurate acreage figures.

A possible sticking point for all this is Karen Holmstrom contacted Steve Bird in Winnemucca to see what resolution they used. They apparently used 100 acre to 150 acre resolution. This is too much for Eagle Lake. Ralph Phenix (NDOW can make whatever resolution size decision is best for his display needs for the Nevada side from the maps Eagle Lake and Winnemucca send him.

Illustration 1. An Example of "R" Values Within a 16 X 16 cell ≈ 40 acre grid @ 0.15 acres per cell.

R1	R2	R2	R3	R0	R1	R1	R1	R1	R3	R3	R3	R2	R1	R1	R1
R1	R1	R1	R1	R1	R1	R1	R1	R1	R1	R3	R3	R3	R1	R1	R1
R1	R1	R1	R1	R1	R1	R1	R1	R1	R0	R0	R0	R0	R0	R0	R0
R1	R1	R1	R1	R1	R1	R1	R1	R1	R0	R0	R0	R0	R0	R0	R0
R1	R1	R1	R1	R1	R1	R1	R1	R3	R3	R3	R3	R3	R3	R3	R3
R1	R1	R1	R1	R1	R1	R1	R3	R3	R3	R3	R3	R3	R3	R3	R3
R1	R1	R1	R1	R1	R1	R3	R3	R3	R3	R3	R3	R3	R3	R3	R3
R1	R1	R1	R1	R1	R1	R3	R3	R3	R3	R3	R3	R3	R3	R3	R3
R1	R1	R1	R1	R1	R1	R3	R3	R3	R3	R3	R3	R3	R3	R3	R3
X3	X3	X3	X3	X3	R1	R1	R3	R3	R3	R3	R3	R3	R3	R3	R3
X3	X3	X3	X3	X3	R1	R1	R1	R3	R3	R3	R3	R3	R3	R3	R3
X3	X3	X3	X3	X3	X3	R1	R1	R1	R1	R1	R1	R1	R1	R1	R1
X3	X3	X3	X3	X3	X3	X3	X3	X3	R0	R0	R0	R0	R0	R0	R0
X3	X3	X3	X3	X3	X3	X3	X3	X3	R0	R0	R0	R0	R0	R0	R0
X3	X3	X3	X3	X3	X3	X3	X3	X3	R0	R0	R0	R0	R0	R0	R0
X3	X3	X3	X3	X3	X3	X3	X3	X3	R0	R0	X3	R0	R0	R0	R0

Tally: **R0 represented in 41 cells = 6.15 acres**
R1 represented in 87 cells = 13.05 acres
R2 represented in 3 cells = 0.45 acres
R3 represented in 72 cells = 10.8 acres
X3 represented in 53 cells = 7.95 acres
Total = ≈ 40 acres

Note: The larger, smoother lines within the grid are an example of what the polygon commend does to cell or grid data.

Because value R1 has the greatest percentage of cells, and acres within the ≈ 40 acre grid the entire 40 acre grid takes on the value of R1. This means the following acre change from the original map.

R0 from 6.15 acres to 0 = - 6.15 acres
R1 from 13.05 acres to 40 = + 26.95 acres
R2 from 0.45 acres to 0 = - 0.45 acres
R3 from 10.8 acres to 0 = - 10.8 acres
X3 from 7.95 acres to 0 = - 7.95 acres