Demonstration of Potential Grazing Impact to Water Quality in the Western United States

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Healthy Communities and Ecosystems

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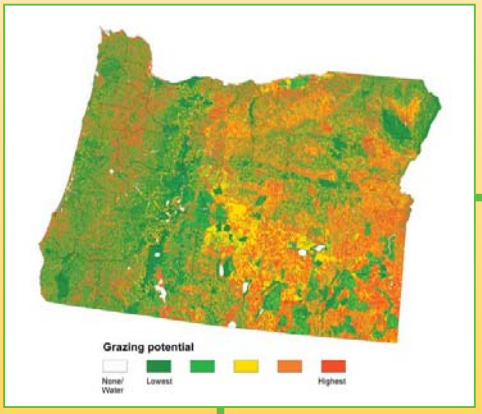
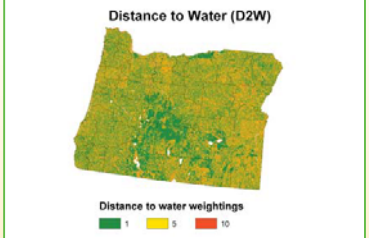
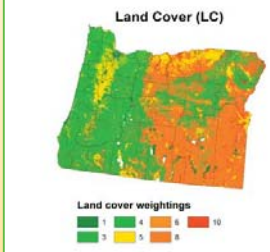
Grazing is a widespread stressor on ecosystems in the western United States. As part of the U.S. EPA's Western Environmental Monitoring and Assessment Program (EMAP), the potential for grazing impacts to surface water quality was modeled using commonly available data in a Geographic Information System (GIS).

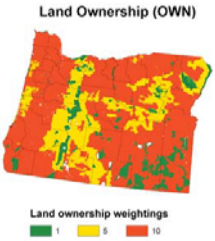
The model was based on five inputs. Land cover and distance-to-water represented availability of forage and water. Federal land ownership reflected possible restrictions on grazing. Topographic Position Index (TPI; landform classifier) and percent slope were used as measures of grazing suitability. The model used 30 meter grid cells for input, analysis, and output. Input grid values were scaled from 0 (not grazeable) to 10 (most likely to be grazed). The model operated by multiplying each of the input grids together, resulting in values between 0 and 100,000 for each cell. The areas with the highest potential for adverse water quality impacts due to grazing were flat, non-protected, grasslands within 90 meters of a water source.

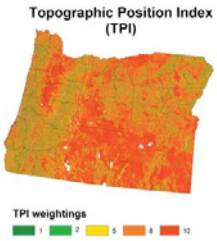
LC x D2W x OWN x SLP x TPI =











Weight	Land Cover
0	Water, ice, mines
1	Urban, bare rock
3	Orchards, herbaceous wetlands
4	Forest
5	Transitional, agriculture
6	Woody wetlands
8	Shrublands
10	Grasslands

Weight	Distance to water
1	<= 90 meters
5	90 to 400 meters
10	> 400 meters

Weight	TPI
1	Mountain tops
3	Upland drainages, flat ridge tops, midslope drainage divides
5	Midslope incised drainages, hilltops
7	Broad open slopes, valleys
10	Broad, flat areas

Weight	Percent Slope
1	> 90
2	60 - 90
3	50 - 60
4	40 - 50
8	30 - 40
10	< 30

Land ownership has more than 60 owner classes. They are snot shown due to space constraints.

Using Science to Make a Difference