

## CAPS Landscape Metrics – November 2011

This appendix describes the landscape metrics available in CAPS. These metrics are weighted and combined separately for each community, using the community model listed in Appendix F.

Metric name	Grid name	Description
<b><i>Stressor Metrics</i></b>		
<b>Development &amp; roads</b>		
Habitat loss	habloss	Measures the intensity of habitat loss caused by all forms of development in the neighborhood surrounding the focal cell, based on a logistic function of Euclidean distance.  <i>Data source:</i> landcover
Watershed habitat loss	whabloss	Measures the intensity of habitat loss caused by all forms of development in the neighborhood upstream from the focal cell, based on the aquatic distance from the focal cell using on a time-of-flow model.  <i>Data source:</i> landcover, streams, flow direction, watershed resistance
Wetland buffer insults	insults	Measures the amount of impervious surface in the immediate vicinity of a wetland (within 30.5 m).  <i>Data source:</i> DEP wetland polygons, raw imperviousness grid
Road traffic	traffic	Measures the intensity of road traffic (based on measured road traffic rates) in the neighborhood surrounding the focal cell, based on a logistic function of distance.  <i>Data source:</i> landcover, traffic rates
Mowing & plowing	mowplow	Measures the intensity of agriculture in the neighborhood surrounding the focal cell, based on a logistic function of distance. This metric is a surrogate for mowing/plowing rates (which are a direct source of animal mortality).  <i>Data source:</i> landcover

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Microclimate alterations	edges	<p>Measures the adverse effects of induced (human-created) edges on the integrity of patch interiors; that is, factors that negatively intrude on the patch from its surroundings. The edge effects metric is based on the “worst” edge effect among all adverse edges in the neighborhood surrounding the focal cell, where each adverse edge is evaluated using a “depth-of-edge” function in which the “effect” is scaled using a logistic function of distance.</p> <p><i>Data source:</i> landcover</p>
<b>Pollution</b>		
Road salt	salt	<p>Measures the intensity of road salt application in the watershed above an aquatic focal cell weighted by road class and the modeled “influence value” for each cell, which is the aquatic distance from the focal cell based on a time-of-flow model. This metric is a surrogate for road salt application rates.</p> <p><i>Data source:</i> landcover, streams, flow direction, watershed resistance</p>
Road sediment	sediment	<p>Measures the intensity of road sediment production in the watershed above an aquatic focal cell weighted by road class (i.e., size, substrate, gradient) and the modeled “influence value” for each cell, which is the aquatic distance from the focal cell based on a time-of-flow model. This metric is a surrogate for road sediment production rates.</p> <p><i>Data source:</i> landcover, streams, flow direction, watershed resistance</p>

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Nutrient enrichment	nutrients	<p>Measures the intensity of fertilizer application in the neighborhood surrounding the focal cell, based either on a logistic function of Euclidean distance or on the aquatic distance from the focal cell based on a time-of-flow model to development classes (primarily agriculture and residential land uses). This metric is a surrogate for fertilizer application rate.</p> <p><i>Data source:</i> landcover, streams, flow direction, watershed resistance</p>
<b>Biotic alterations</b>		
Domestic predators	cats	<p>Measures the intensity of development associated with sources of domestic predators (e.g., cats) in the neighborhood surrounding the focal cell, based on a logistic function of distance to development classes. This metric is a surrogate for domestic predator abundance measured directly in the field.</p> <p><i>Data source:</i> landcover</p>
Edge predators	edgepred	<p>Measures the intensity of development associated with sources of human commensal mesopredators (e.g., raccoons, skunks) in the neighborhood surrounding the focal cell, based on a logistic function of distance to development classes. This metric is a surrogate for mesopredator abundance measured directly in the field.</p> <p><i>Data source:</i> landcover</p>
Invasive plants	badplants	<p>Measures the intensity of development associated with sources of non-native invasive plants in the neighborhood surrounding the focal cell, based on a logistic function of distance to development classes. This metric is a surrogate for non-native invasive plant abundance measured directly in the field.</p> <p><i>Data source:</i> landcover</p>

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Invasive earthworms	worms	<p>Measures the intensity of development associated with sources of non-native invasive earthworms in the neighborhood surrounding the focal cell, based on a logistic function of distance to development classes. This metric is a surrogate for non-native invasive earthworm abundance measured directly in the field.</p> <p><i>Data source:</i> landcover</p>
<b>Hydrological alterations</b>		
Imperviousness	imperv	<p>Measures the intensity of impervious surface in the watershed above the focal cell, based on imperviousness and the modeled “influence value” for each cell, which is the aquatic distance from the focal cell based on a time-of-flow model.</p> <p><i>Data source:</i> landcover, streams, flow direction, watershed resistance, percent imperviousness</p>
Dams	damint	<p>Measures the number of dams in the watershed above an aquatic focal cell weighted by dam size and the modeled “influence value” for each cell, which is the aquatic distance from the focal cell based on a time-of-flow model.</p> <p><i>Data source:</i> landcover, streams, flow direction, watershed resistance, dams</p>
<b>Coastal metrics</b>		
Salt marsh ditching	ditches	<p>Measures the magnitude of temporal loss of open water habitat (i.e., loss of open water habitat during mid to low tides) around the focal cell due to ditching, based on a standard kernel density estimate of nearby drainage ditches.</p> <p><i>Data source:</i> landcover, photo-interpreted salt marsh ditches</p>

<b>Metric name</b>	<b>Grid name</b>	<b>Description</b>
Coastal structures	jetties	<p>Measures the proximity of the focal cell to up-gradient manmade jetty/groin, based on a logistic function of distance to nearest up-gradient jetty/groin; applied only to certain land cover types (e.g., beaches, intertidal flats).</p> <p><i>Data source:</i> landcover, field-checked and photo-interpreted coastal structures</p>
Beach pedestrians	beachped	<p>Measures the intensity of beach pedestrian traffic at the focal cell, based on a standard kernel density of pedestrians.</p> <p><i>Data source:</i> landcover, public beaches, photo-interpreted beach parking lots</p>
Beach ORVs	beachORVs	<p>Measures the intensity of beach ORV traffic based on proximity of focal cell to ORV beaches.</p> <p><i>Data source:</i> landcover, beach ORV parking areas</p>
Tidal restrictions	tr	<p>Measures the magnitude of alteration to the tidal hydrology of the focal cell due to tidal restrictions.</p> <p><i>Data source:</i> landcover, tides settings variable, tide range, estimated tidal restriction points (road/stream and railroad/stream crossings), flow direction.</p>
<b><i>Integrity Metrics</i></b>		
Connectedness	connect	<p>Measures the disruption of habitat connectivity caused by all forms of development between each focal cell and surrounding cells as well as the “resistance” of the surrounding undeveloped landscape, as well as the similarity of surroundings. A hypothetical organism in a highly connected cell can reach a large area of ecologically similar cells with minimal crossing of “hostile” cells. This metric uses a least-cost path algorithm to determine the area that can reach each focal cell, incorporating each cell’s similarity to the focal cell.</p> <p><i>Data source:</i> landcover, ecological settings variables</p>

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Aquatic connectedness	aqconnect	An aquatic version of the connectedness metric, measuring connectivity along streams and rivers. Aquatic connectedness includes the resistance from culverts, bridges and dams for organisms that are primarily aquatic.  <i>Data source:</i> landcover, streams, ecological settings variables
Similarity	sim	Measures the amount of similarity between the ecological setting at the focal cell and those of neighboring cells, weighted by a logistic function of distance. Similarity is based on the ecological distance between the focal cell and each neighboring cell, where ecological distance is a multivariate distance across all ecological setting variables.  <i>Data source:</i> landcover, ecological settings variables

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