



Date: May 6, 2009
To: Core 4 / Reserves Steering Committee
From: Core 4 Technical Team
Re: Identification of Natural Hazards Within Reserves Study Area

Background & Overall Analysis Approach

The purpose of the Urban and Rural Reserves project is to designate appropriate land for each reserve type by addressing the factors listed in Oregon Administrative Rule 660 Section 27. The set of rural reserve factors that must be considered range from determining whether land is potentially subject to urbanization to whether it is sustainable for long-term agricultural or forestry operations to whether it should be protected due to important landscape and natural resource features.

This memo addresses the rural reserve factor regarding natural hazards. It describes the methodology used to identify and compile the information that was used to develop a set of natural hazard maps. These maps can be used to help inform the Core 4 and Reserves Steering Committee in their deliberations about placement of urban and rural reserves. This information is intended to primarily address the following rural reserve factor in the state rule:

RR-3: When selecting land for designation as rural reserves intended to protect important natural landscape features, consider those areas identified in Metro's "Natural Landscape Features Inventory" and other pertinent information, and base the decision on consideration of whether the lands proposed for designation:

RR-3b: Are subject to natural disasters or hazards, such as floodplains, steep slopes and areas subject to landslides.

RR-3b is one of eight elements that must be considered under RR-3. The other elements, such as consideration of fish and wildlife habitat, protection of streams, wetland and riparian areas and provision for separation between cities, have been addressed as part of previous studies or will be addressed during the Phase 3 analysis of candidate reserve areas. In addition to addressing RR-3b directly, the natural hazard information should also be used to help in the identification of urban reserves and/or their edges.

This memo and associated maps identify four natural hazards as mapped by the Oregon Department of Geology and Mineral Industries (DOGAMI), the Oregon Department of Forestry and the United States Geological Survey. It does not include the identification of all steep slopes in the study area. The three counties have taken into consideration steep slopes and their adopted hazard maps in their analyses of candidate urban and rural reserves.

Natural Hazard Identification & Mapping

Based on data from several agencies and with the help of DOGAMI staff, Metro identified and mapped four natural hazard layers within the Reserves Study Area. The four layers include wildfire, flood, earthquake and landslide hazards.¹ Three maps show the individual hazards of floodplain, landslide and wildfire with the study area (see Attachments 1, 2 and 3). A fourth map, shown on an April 2008 USGS fact sheet, indicates the seismic risk for the entire country (Attachment 4). The map titled Natural Hazards Composite Map shows the results of layering these four components (Attachment 5).

The Natural Hazards Composite Map reflects a simple model that was created to indicate the presence and number of the hazards for any given location. No assumptions were made by Metro of the relative importance of each of the hazards. Please see Attachment 6 (Natural Hazards Model) of this memo for a more detailed explanation of the model and process used to identify and map the four natural hazards.

Caveats

Caveats should be noted regarding the earthquake, landslide and wildfire components.

Earthquake Layer – The entire Reserves Study Area falls within one seismic hazard zone identified by the USGS. For this reason, the earthquake component received a score of 1 for the entire study area. Secondly, a relative earthquake hazard map was created by Clackamas County using data developed by DOGAMI (see Attachment 7). The data is broken out into three separate hazard elements (see Attachment 6 appendix). This results in a different level of earthquake information for the non-UGB area of Clackamas County than is available for the non-UGB areas of Multnomah and Washington counties.

Landslide Layer – The landslide data for this analysis is from a 2002 study by DOGAMI that used topographic maps, with some field testing, based on aerial photography to assess the hazard potential. This layer is not based on LIDAR data, a much-improved source for assessing potential hazards due to landslides. While the raw LIDAR data is available for the study area, it has not yet been interpreted to better assess landslide susceptibility.² According to DOGAMI staff, the landslide hazard will very likely increase as the distance from the existing UGB increases toward areas with steeper slopes.

While the Natural Hazards Model only indicates the presence of the various risk hazards and does not reflect judgments on which hazard is more important, it should be noted that there is far more risk of there being a 100% loss of a structure from a landslide event than from a flood event.

Wildfires Layer – It must be noted that this layer, from the Oregon Department of Forestry, represents hazard ratings for wildfire risk to communities. This information is derived from data assessing the risk to forest resources and is used in assisting local government to develop Community Wildfire Protection Plans. This information may apply to both rural and urban reserve areas. If an area currently outside the UGB were to be designated as an urban reserve and someday urbanized, then the extent to which wildfire risk would be reduced will depend on wildfire protection planning that is included into urban development.

Natural Hazard Mapping Results

The Natural Hazards Composite Map identifies the locations of the four hazards throughout the study area. As noted above, the earthquake layer consists of one value, which is reflected in the relative hazard index risk on the composite map.

¹ As confirmed by DOGAMI staff, the presence of steep slopes alone is not considered a natural hazard. Other site-specific conditions relating to underlying geology and soil stability determine whether an area associated with steep slopes is considered hazardous or not.

² LIDAR-based landslide maps are available for some areas within the existing UGB including portions of Oregon City (DOGAMI IMS-26) and unincorporated Washington County (DOGAMI IMS-27).

The entire series of maps is important for at least identifying the location and number of hazards at any given location and, thus, helping decision-makers to better account for such areas of risk. Based on the hazard mapping, some general observations and caveats can be made:

1. There are extensive floodplain areas throughout much of the study area in Washington County.
2. More data occurrences for landslides are shown immediately south and east of Oregon City due to use of LIDAR data in these areas. This does not necessarily mean that these areas are much more susceptible to landslides than other parts of the study area.
3. There are very few high risk hazard areas, i.e. areas where all four hazards are present. Most of these areas occur along steeper-sloped portions of some of the rivers.
4. The moderate risk hazard areas are mostly confined to riparian corridors.
5. The vast majority of the study area is rated as a low risk based on the number of hazards occurring in any one location.

Attachments:

1. Floodplain Hazard Map
2. Landslide Hazard Map
3. Wildfire Hazard Map
4. 2008 United States National Seismic Hazard Maps
5. Natural Hazards Composite Map
6. Natural Hazards Model
7. Relative Earthquake Hazards Map in Clackamas County