Scenic Resources Evaluation

for the City of The Dalles, OR:

UGB Expansion Assessment

Submitted to: Winterbrook Planning and

the City of The Dalles, OR.

By: Ecotrust

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Introduction

The following pages represent a report on the evaluation of scenic impacts related to urban growth boundary (UGB) expansion alternatives for the city of The Dalles, Oregon. The methodology was presented by Ecotrust as a deliverable associated with the scope of work specific to the scenic resources evaluation required by the Columbia River Gorge Commission. What follows is a reconnaissance level report summarizing methods and results of the study, as well as GIS overlay maps, tables and graphs to be included with the natural and cultural resource evaluation undertaken by Winterbrook Planning. Appendix A includes a more detailed description of the methodology used in this report.

Background

In 2006-07, the City prepared residential and employment studies and a buildable lands inventory which demonstrated that 20-year land needs could not be met within the existing UGB. The Dalles UGB was established in 1982, was originally intended to accommodate 20 year growth demands, and has not been substantially amended for almost 40 years.

In coordination with DLCD and CRGC staff, the City prepared a UGB Alternatives Analysis consistent with Goal 14, ORS 197.298 priorities, and the Urban Growth Boundary administrative rule (OAR Chapter 16, Division 24). The Dalles applied the buildable lands methodology used inside the UGB to four study areas on the Oregon side of the Columbia River to determine the capacity of each study area to meet identified land needs. The City avoided high value orchard and wheat land north and northeast of the existing UGB in its UGB proposal. The City analyzed public facilities costs for serving alternative growth areas. Based on this analysis, the City tentatively adopted an ordinance that directed growth to adjacent rural exception areas and "Hidden Valley" – and area with relatively poor agricultural soils that has relatively low visibility from key

viewing areas in the Columbia River Gorge. The tentatively adopted UGB is referred to as the "Tentative UGB" in the remainder of this report.

Although DLCD staff found the City's work to be consistent with applicable Statewide Planning Goals, the CRGC staff recommended that additional work be conducted to address CRGNSAA requirements. The City worked with DLCD and CRGC staff to prepare a grant request to provide the requested information necessary to allow for a comparative analysis of natural, cultural and scenic resources within the Tentative UGB.

In 2010, the City retained Winterbrook Planning to prepare a series of studies to address CRGC concerns. Winterbrook contracted with Ecotrust to evaluate scenic resources within the Tentative UGB which constitute the Study Area for this report. The Scenic Resources Evaluation should be reviewed with companion studies addressing Natural Resources (Winterbrook Planning, May 2011) and Cultural Resources (Willamette CRA, May 2011). The purpose of these three studies is to assist the City, Wasco County, DLCD and the Columbia River Gorge Commission in evaluating the relative effects of alternative urban growth area expansion options.

The three studies share a common study area, which includes land that *potentiall*y could be added to The Dalles Urban Growth Boundary (UGB) to meet 20-year population and employment growth needs. The Study Area extends about a quarter mile north from the existing UGB where high value orchard lands predominate. The Study Area also extends further to the east and west into non-irrigated lands along the Columbia River (see map 1).

Methodology

Ecotrust developed a spatially explicit model that identified the visual sensitivity of all locations within the study area in order to quantify the visual impacts of UGB expansion within (a) the tentatively adopted UGB (Tentative UGB); and (b) the entire Study Area. The quantification of visual impacts was derived from a ranking of areas based on 1) weighted visibility as seen from Key Viewing Areas (KVAs); 2) visual diversity and; 3) ability to absorb development as specified by the Columbia River Gorge Commission.[1]

This scenic resources evaluation describes and maps the relative visibility of land within the proposed urban area boundary with respect to KVAs as described in the Management Plan. The following KVAs were used for the analysis:

- Historic Columbia River Highway
- I-84
- SR 14
- The Columbia River

Using ArcGIS ArcINFO (v10x) software, Ecotrust compiled a 10 meter digital elevation model (DEM) from multiple sources[2]. The DEM essentially divides the study area into a series of grid cells - 10 x 10 meters - with each cell representing a specific spot elevation of above sea level. Ecotrust then modified the DEM in order to account for the allowed height of structures (30 feet) to be built within the Tentative UGB areas. This modification was done by adding 30 feet of elevation to each cell that falls within the Tentative UGB areas. The modification also allowed for a quantified comparison with the unmodified DEM. This was done in order to account for any adjacent areas to the Study Area that would be visually impeded due to a 30 foot structure blocking the observers view.

[1] Urban areas boundary revisions handbook, February 11th, 1992. The Columbia River Gorge Commission.

[2] 10 meter DEMs for Oregon will be obtained from Oregon Geospatial Enterprise Office and Washington DEMs will be compiled from the Geomorphological Research Group at University Washington.

The visibility of each cell center for the Study was then determined by comparing the altitude angle to the cell center with the altitude angle to the local horizon for every given observation point along the KVAs. We then computed the local horizon by considering the intervening terrain between the point of observation and the current cell center. If the point was above the local horizon, it was considered visible. Because the KVAs are linear features, we determined the unique observation points by creating points along each linear feature with a spacing of 500 feet. In total, this came to 298 unique observation points.

Ecotrust then computed the weighted visibility for every cell by summing all visible observation points weighted by a perceived surface area weighted index (*PSA*) which represents the proportion of the three dimensional field of view of each observation point that the observed point occupies.

The PSA is a function of the planimetric distance between the observation point and the observed point and the angle of the surface of the observed point relative to the observation point. Therefore, as the difference between the slope aspect of the observed point and the direction to the observation point increase, the proportional weighting of this factor decreases.

For example, in figure 1, the perceived field of view is adjusted based on the proportional perceived surface angle. This is done for each unique observation point, with the final Global PSA (GPSA) being the sum of each SI for every observation point.

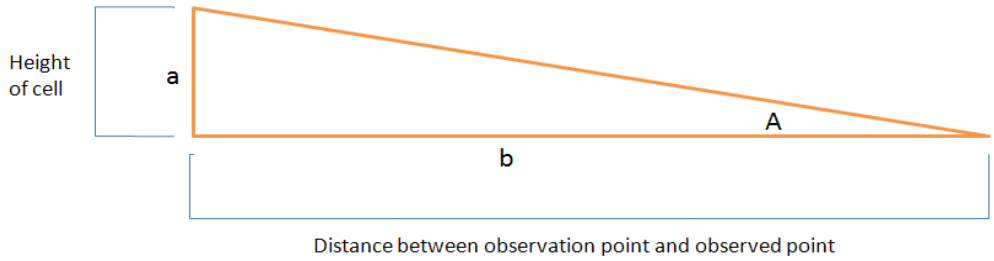


Figure 1. The resulting values where then categorized into five distinct classes as shown on Map 2.These areas were then subcategorized based on their coincidence with visual diversity and the ability for a given area to absorb development. This was derived by overlaying the results in the GIS with data showing visual landscape diversity and the ability to absorb development as specified by the Columbia River Gorge Commission and the Forest Service.[3.] We then tabulated the results of the analysis in order to determine the area of overlap for each class type.

Comparative Analysis and Results

Global PSA Evaluation

Ecotrust first considered the Global PSA Class for the Tentative UGB and the remainder of the Study Area. Table 1 shows that a total of 42% of the Tentative UGB cannot be seen or can "minimally" be seen from KVAs, while 43% of the remainder of the Study Area cannot been seen or has a "minimal" classification. In contrast, 11% of the Tentative UGB is highly visible from KVAs, while 12% of the remainder of the study area is highly visible. Considering Low and Moderate visibility rankings, 47% of the land within the Tentative UGB has a Low or Moderate PSA Class, while 46% of the remainder of the Study Area is classified as having a Low or Moderate PSA ranking (see map 2).

[3] Landscape diversity and visual absorption capability data were obtained from the Columbia River Gorge Commission. The data was created by the US Forest Service for the original FS Visual assessment.

Area Studied	Global PSA Class	Acreage	Percent
Study Area	Not Seen	1,798	37%
Study Area	Minimal	287	6%
Study Area	Low	1,008	21%
Study Area	Moderate	1,217	25%
Study Area	High	579	12%
Tentative UGB	Not Seen	902	35%
Tentative UGB	Minimal	184	7%
Tentative UGB	Low	445	17%
Tentative UGB	Moderate	792	30%
Tentative UGB	High	284	11%

Table 1. Global PSA class acreage comparison between the Study Area and Tentative UGB.

Evaluation of Forest Service Visual Classifications

Ecotrust next evaluated Visual Absorption Capability and Landscape Diversity as defined by the US Forest Service in its original Visual Assessment for the entire Columbia River Gorge National Scenic Area. As defined in the "Visual Management System of the Forest Service, USDA" [4], Landscape Diversity[5] classes are obtained by classifying the landscape

[4] Bacon, Warren R. 1979. The visual management system of the Forest Service, USDA. In: Elsner, Gary H., and Richard C. Smardon, technical coordinators. 1979. Proceedings of our national landscape: a conference on applied techniques for analysis and management of the visual resource [Incline Village, Nev., April 23-25, 1979]. Gen. Tech. Rep. PSW-GTR-35. Berkeley, CA. Pacific Southwest Forest and Range Exp. Stn., Forest Service, U.S. Department of Agriculture: p. 660-665.

into different degrees of variety. This is done in order to determine which landscapes have a higher versus lower importance from the standpoint of scenic quality. The classification is based on the "premise that all landscapes have some value, but those with the most variety or diversity has the greatest potential for high scenic value". Therefore areas with a classification of "High" are considered to have the most potential for high scenic value, while areas classed as "Low" do not. Visual Absorption Capability (VAC) classes are defined as the measure of "the land's capability to absorb change without significantly affecting visual character". The Forest Service primarily analyzed slope and vegetation to determine the specific ranking of VAC within the Columbia River Gorge. Therefore, areas located on flat terrain with vegetation for visual screening would be are classified as having "High" VAC, such that it is highly able to absorb change, while the opposite would be true of an area classified as "Minimal".[6]

For the Visual Absorption Capability classification, Table 2 shows that a total of 85% of the Study area is classed as either Low or Minimal (see map 3). This is in contrast to the Tentative UGB which has 63% of the area classified as Low or Minimal. Considering the High and Moderate classes, the Study area has 1% classified as High and 11% as Moderate, with the remaining 3% classed as Not Seen. While the Tentative UGB has 12

[5] In the original text, Landscape Diversity was referenced as "Variety Classes". Due to a lack of metadata for the data obtained by the CRCG, in February 2011 Ecotrust contacted the Forest Service and confirmed that Variety Classes and Landscape Diversity are interchangeable.

[6] Anderson, Lee; Mosier, Jerry; Chandler, Geoffrey 1979. Visual Absorption Capability. In: Elsner, Gary H., and Richard C. Smardon, technical coordinators. 1979. Proceedings of our national landscape: a conference on applied techniques for analysis and management of the visual resource [Incline Village, Nev., April 23-25, 1979]. Gen. Tech. Rep. PSW-GTR-35. Berkeley, CA. Pacific Southwest Forest and Range Exp. Stn., Forest Service, U.S. Department of Agriculture: p. 164-171.

acres or 0% in the High VAC class, and 3% classed as Moderate. Finally, the remaining 33% are classed as either Not Seen or No data[7].

Area Studied	Visual Absorption Capability Class	Acreage	Percent
Study Area	Not Seen	142	3%
Study Area	High	36	1%
Study Area	Moderate	554	11%
Study Area	Low	2,338	48%
Study Area	Minimal	1,822	37%
Tentative UGB	No data	845	32%
Tentative UGB	Not Seen	25	1%
Tentative UGB	High	12	0%
Tentative UGB	Moderate	78	3%
Tentative UGB	Low	872	33%
Tentative UGB	Minimal	778	30%

Table 2. Visual Absorption Capability class acreage comparison between the Study Area and Tentative UGB.

Table 3 shows a comparison of the Landscape Diversity Classification between the Study Area and the Tentative UGB. As seen in Table 3, 3% of the Study area is Not Seen, while

[7] Industrial lands located in the far east of the Tentative UGB expansion area were not analyzed by the Forest Service for either Landscape Diversity or Visual Absorption Capability, and therefore appear as "No data" in tables 2 and 3.

2,021 acres or 41% of lands within the Study Area were determined to be Common. Of the remaining lands 24% fall within the Distinctive class, while 32% or 1,544 acres are classified as Outstanding. In comparison, the Tentative UGB has 33% of lands classed as either Not Seen or having No data (see map 4).

Area Studied	Landscape Diversity Class	Acreage	Percent
Study Area	Not Seen	138	3%
Study Area	Common	2,021	41%
Study Area	Distinctive	1,189	24%
Study Area	Outstanding	1,544	32%
Tentative UGB	No data	845	32%
Tentative UGB	Not Seen	25	1%
Tentative UGB	Common	754	29%
Tentative UGB	Distinctive	805	31%
Tentative UGB	Outstanding	181	7%

Table 3. Landscape Diversity class acreage comparison between the Study Area and Tentative UGB.

Overlaps Among PSA and Forest Service Visual Classifications

Ecotrust then looked at acreage overlaps between Global PSA, Visual Absorption Capability (VAC), and Landscape Diversity classes in the Tentative UGB and the remainder of the Study Area. This was done in order to determine areas of overlap that suggest the greatest potential for visibility sensitivity. As noted above, (VAC) classes measure "the land's capability to absorb change without significantly affecting visual character", such that a value of "Minimal" is considered to have a minimal ability to

absorb change. As also mentioned before, Landscape Diversity ranks areas with the most visual variety and therefore that has the greatest potential for high scenic value. If an area is ranked with Outstanding Landscape Diversity, it is therefore considered to have the highest potential for scenic value. Finally, if an area has a Global PSA class of High it refers to an area that is highly visible from the Key Viewing Areas, and therefore landscape alterations would most likely be visible. Consequently, areas that have a VAC class of Minimal, a Landscape Diversity class of Outstanding and a Global PSA class of High will have the greatest scenic impact if landscape alteration occurs. Alternatively, areas that cannot be seen at all (i.e. Global PSA class of Not seen), have a Low VAC class and a Landscape Diversity class of Common would obviously not be affected since first and foremost they would not be seen, second are highly capable of absorbing landscape alterations, and have little scenic value. Therefore, in order to account for these variations in potential visual impacts Ecotrust analyzed areas where there was overlap between VAC, Landscape Diversity, and Global PSA classes with the following results.

First, Ecotrust analyzed overlap of PSA classes with VAC. Within the Study area, Ecotrust found that 351 acres, or 7% of the area, had a VAC class of Minimal and a PSA class of High. Compared to 645 acres, or 13%, that has a PSA class of Moderate and a VAC class of Minimal. There is 6% or 303 acres that fall within either a Global PSA class of Minimal or Low, and a VAC class of Minimal. Finally, the remaining 519 acres or 11% have a PSA class of Not seen and a VAC class of Minimal. This is contrast to 7 acres or 0% of the lands fall within a PSA of Not seen and have a VAC class of High. The remaining 29 acres fall within either a PSA class of Moderate or High, and have a VAC of High. Within the Tentative UGB, Ecotrust determined that 150 acres or 6% of the area was classed as a PSA of High, as well as a VAC of Minimal. There are 259 acres or 10% of the area with a PSA class of Moderate and VAC of Minimal. In contrast, there are 171 acres or 7% that have a PSA class of either Low or Minimal with a VAC class of Minimal as well. The remaining 195 acres, or 8% of the area cannot be seen and have a Minimal VAC class.

The overlap of lands with a High VAC class and PSA was extremely small, with only 11 acres or 0% falling in a VAC class of High (see map 3).

Ecotrust then examined the acreage of overlap between PSA Class and Landscape Diversity. Within the Landscape Diversity class of Outstanding, 64 acres or 3%of the area within the Tentative UGB was found to be either highly or moderately visible within the PSA classes. This is in contrast to 400 acres or 8% of the remaining Study area having a Landscape Diversity class of Outstanding, and is highly or moderately visible. Of the remaining lands that fall within the Outstanding class, 1,144 acres or 23% have a PSA class of Low, Minimal or Not seen. Lands classed as Common for Landscape Diversity cover an area of 2,018 acres or 40% of the remaining Study area. In comparison, 749 acres or 29% of the Tentative UGB are classed as Common. Of those 749 acres, 98 acres have a PSA class of high, and are therefore highly visible (see map 4).

Finally, Ecotrust overlaid all three data sets within the Tentative UGB with the following results Within the Tentative UGB areas the results showed that 11.37 acres were categorized with a PSA of “high” or “moderate” value, visual absorption capability of “minimal” value, and a landscape diversity of “outstanding” value. The most significant overlap for areas within the Tentative UGB that could be visually effected occurred with a PSA class of High or Moderate, visual absorption capability of Minimal, and a Distinctive landscape diversity ranking (see map 4). This area accounted for 185.56 acres.

This is contrasted by the remaining Study area which showed that there were 103.09 acres that were highly or moderately visible in the PSA, were minimally able to absorb visual impacts in the VAC class, and have outstanding landscape diversity. Again, the most significant overlap occurred where areas could be visually affected occurred with a PSA class of High or Moderate, Visual Absorption Capability of Minimal, and a landscape diversity of Distinctive. This area covers 357.26 acres (see map 5).

Effect of Hypothetical 30-Foot Structure within Tentative UGB

Finally, in order to account for adjacent areas to the Tentative UGB that would potentially be visually impeded due to a 30 foot structure blocking the observers view, Ecotrust quantified the differences between the unmodified DEM and modified UGB DEM. A calculation was conducted in order to identify locations where there was an increase in the "not seen" class acreages. This was accomplished by calculating the "not seen" acreage of the original DEM and the modified UGB DEM. We then overlaid the results and subtracted the class differences. The final output showed that the original DEM's "not seen" acreage total came to 3,622.86, while the UGB DEM's "not seen" acreage was 3,871.32. Thus, there was a loss of view of an additional 248.46 acres within the study boundary due to the increase of 30 feet of potential building heights throughout the Tentative UGB (see map 6.)

Field Validation

In order to validate the results of this study we conducted a photo survey in the field. This work was undertaken in May, 2011. In all, 136 photos were taken using a camera equipped with GPS (see map). Ecotrust took photos along the following KVAs:

- Historic Columbia River Highway
- I-84
- SR 14

To account for changes in the view, photos were taken from each direction along each KVA. We then used the GIS to hyperlink the field photos into a GIS data layer (i.e. shapefile) and associated with the lat/long of each location and direction each photo was taken from. The photos were then reviewed and compared with the analysis. Upon careful review of all photos and the results of the analysis, we determined that the photo survey was consistent with the final model results.

Overall Conclusions

This report details visibility impacts in order to assist the City, Wasco County, DLCD and the Columbia River Gorge Commission evaluate the relative effects of alternative urban growth area expansion options. In order to do this, a quantification of visual impacts was derived from a ranking of areas based on a weighted visibility (PSA) as seen from Key Viewing Areas (KVAs), visual diversity and the ability to absorb development. The results were then contrasted between the Tentative UGB and the remaining Study area. From this work it was determined that approximately half of the Tentative UGB (42%) and Study area (43%) can either not be seen or are minimally seen from the KVA's. In contrast there is 11% that is highly visible in the Tentative UGB, and 12% within the remainder of the Study area. When analyzing the Visual Absorption Capability data, it was confirmed that most of the Study area (85%) is considered to have low or minimal ability to absorb development. While the Tentative UGB area is less (63%) it is still a high percentage. This is in stark contrast to Landscape Diversity where 41% of the Study area and 32% of the Tentative UGB are classified as common, and therefore have low visual appeal. Due to the contrast between Landscape Diversity and Visual Absorption Capability, the final overlay analysis results showed that only a small fraction of the overall land would be significantly impacted as seen in map 5. The most significant areas where overlap occurred were classified with a PSA class of High or Moderate, visual absorption capability of Minimal, and a landscape diversity of Distinctive. This accounted for 185.56 acres of the entire 2,593 acres of the Tentative UGB. While the remaining Study area had only 103.09 acres that were highly or moderately visible in the PSA, were minimally able to absorb visual impacts in the VAC class, and have outstanding landscape diversity. The overall acreage increased when adjacent areas that would be visually impeded due to a 30 foot structure blocking the observers view were accounted for. The analysis determined that there was a loss of view of an additional 248.46 acres within the study boundary due to the increase of 30 feet of potential building heights throughout the Tentative UGB. In conclusion, while there is

much variation between the specifics of PSA's, visibility absorption capability, and landscape diversity, the final results of this analysis make it clear that when the data are considered collectively, only a small fraction of the Study area is significantly visually impacted.

Appendix A

Ecotrust followed methods presented by O'Sullivan and Turner (2001)[8] and Yang et.al (2007)[9], to develop a spatially explicit model that identifies the visual sensitivity of all locations within the study.

Refraction and the curvature of the earth were considered in the model by using the following formula:

$$Z_c = Z_s - (N / D) + 0.13 * (N / D) \quad 1.$$

Where:

Z_c = the perceived elevation for any given cell once curvature and refraction are accounted for;

Z_s = the original elevation for any given cell;

N = the planimetric distance between the observation point and the observed point;

D = the diameter of the Earth = 12,740,000 meters.

The third term accounts for the refraction of visible light. The combined correction is therefore:

$$Z_c = Z_s - 0.87 * (N / D) \quad 2.$$

[8] O'Sullivan, D and Turner, Alasdair.2001,"Visibility Graphs and Landscape Visibility Analysis", International Journal of Geographical Information Science,15-3,pp 221-237.

[9] Perry Pei-Ju Yang & Simon Yunuar Putra & Wenjing Li, 2007. "Viewsphere: a GIS-based 3D visibility analysis for urban design evaluation," Environment and Planning B: Planning and Design, Pion Ltd, London, vol. 34(6), pages 971-992, November.

The perceived surface area (PSA) weighting was calculated in the model by using the following expression:

$$psa = \sum_{o=1}^{n} SI \qquad 3.$$

Where:

S = the proportional perceived surface angle of the observed point relative to the observation point (o);

I = the proportion of the perceived field of view from observation point (o) that the observed point occupies (in two dimensions);

S is derived by determining the perceived surface area based on the planer angle of the observed point relative to the observation point. This planer angle relative to the observation point is the product of the relative aspect difference (A) between the direction to the observation point (o) and the observed point (p) and the proportional slope angle of the observed point (Z_p).

$$S = A_{op}Z_p \qquad 4.$$

Such that the perceived surface area (S) will equal one when the slope aspect of the observed point is exactly the same as the direction to the observation point and the slope angle equals 90°.

Because the difference between the slope aspect of the observed point (a_p) and the direction to the observation point (d_o) increases, the proportional weighting of this factor decreases. Since differences greater than 90° are unobservable the proportion is a factor of 90°. Because of the cyclic nature of slope aspect, the proportional aspect weighting A_{op} is conditional on the maximum difference of 180°:

$$A_{op} = \begin{cases} 1 - (|d_o - a_p| / 90) & (d_o - a_p > 180), \\ 1 - (|d_o - a_p - 180| / 90) & (d_o - a_p > 180) \end{cases}$$ 5.

Where:

d = the compass direction from the observed point to the observation point (o);

a = the aspect of the observed point (p)

The proportional slope angle (Z) then is merely a proportion of the maximum possible slope angle of 90°:

$$Z_p = s_p – 90 / 90$$ *6.*

Where:

s = the slope angle of the observed point (p);

I is derived by determining the area occupied by the observed point relative to the vertical field of view (90°) and the horizontal field of view (180°) :

$$I = A*B$$ 7.

Where:

A= ATAN(H/Dop) / 90

B=ATAN(H/Dop) / 180

H = elevation of cell

Dop = planimetric distance to cell from observation point

For example, in figure 1; let a = the height of the cell and b = the planimetric distance between the observation point and the observed point. Suppose a = 10 and b = 120.3. Then tan A = a/b = 10/120.3 = .0831. The arctangent of .0831 is 4.75, so the angle A is 4.75° which represents 4.75 / 90 or 5.3% of the vertical field of view. Considering the cell size is square (10 x 10 meters), the proportional area occupied in the horizontal field

of view is then merely 4.75 / 180 or 2.64% and the total perceived area occupied is 5.3% * 2.64% or 0.14% of the total field of view.

Because each GPSA cell therefore represents the proportion of the three dimensional field of view of each observation point that the observed point occupies, the values are inherently small ranging from 0-1. This meant the data output did not fit a lthe resulting GPSA was normalized using the natural logarithm in order to fit a normal distribution curve (table 1).

The resulting values where then categorized into distinct classes using the Jenks natural breaks classification method which uses a calculation that creates class breaks inherent within the data by maximizing the differences between classes (see table 2). This is done by seeking to minimize each class's average deviation from the class mean, while maximizing each class's deviation from the means of the other groups. In other words, the method seeks to reduce the variance within classes and maximize the variance between classes.

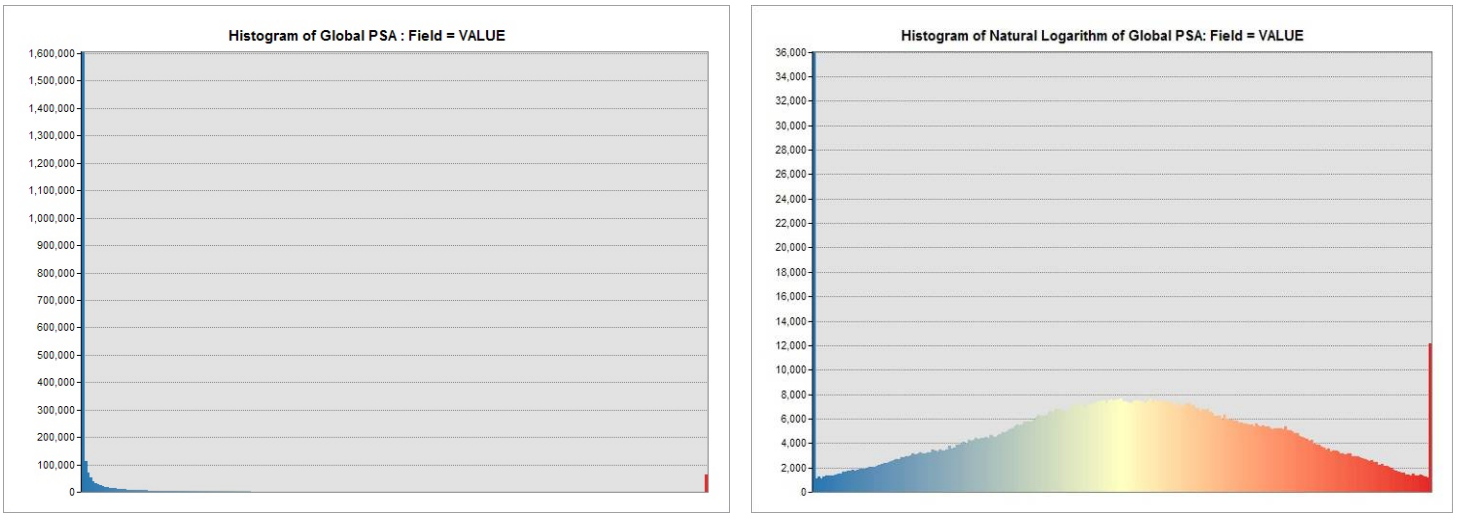


Table 1. Histogram comparison of raw GPSA data and normalized data.

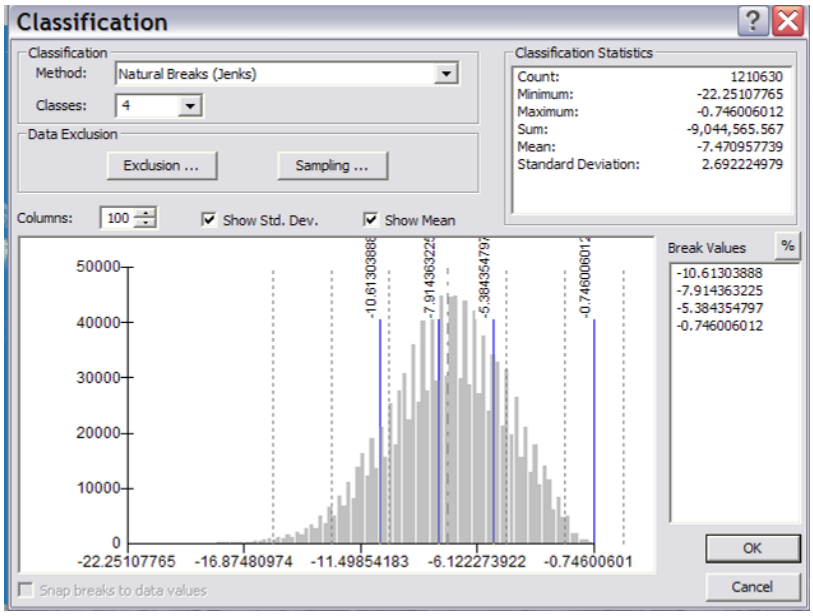


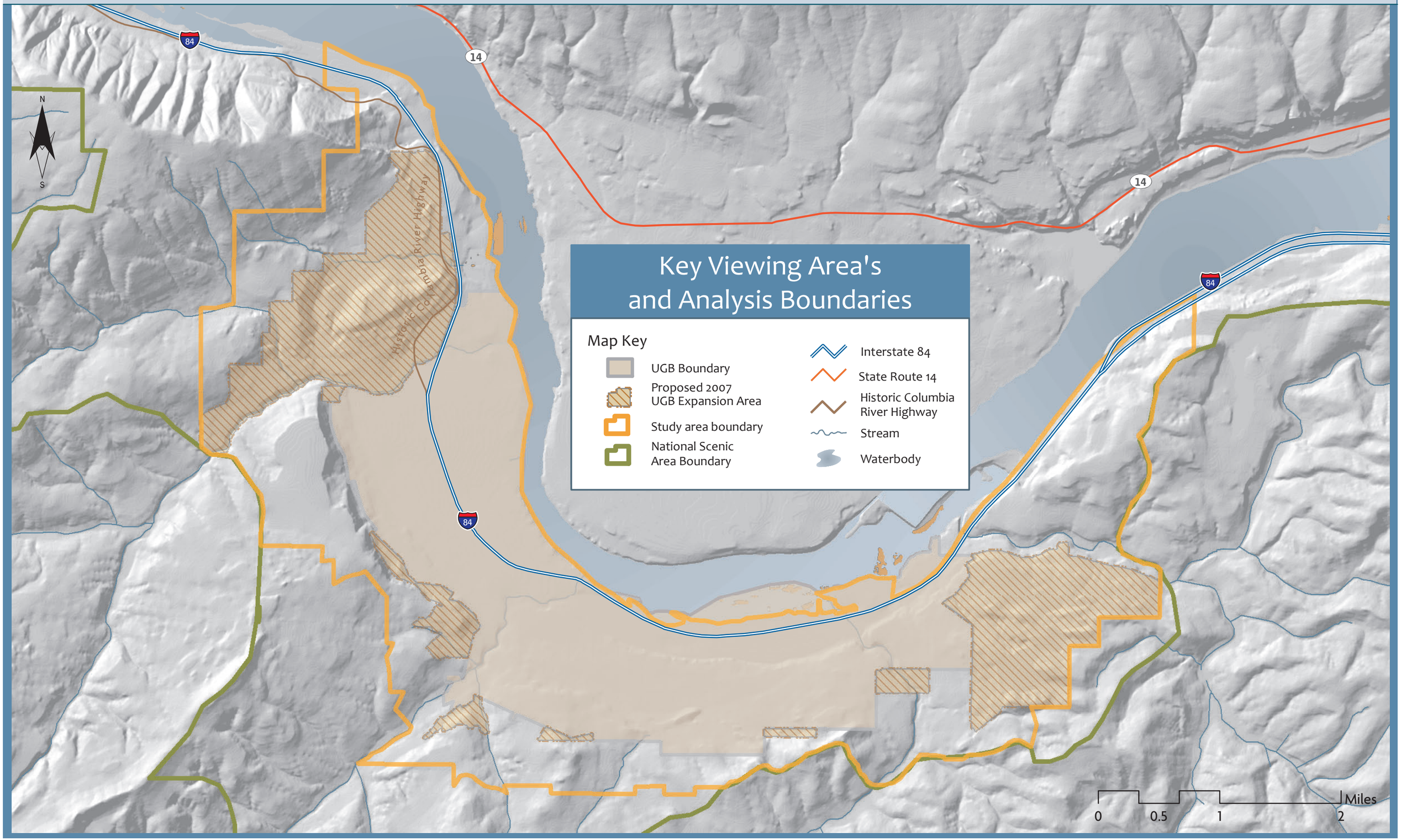
Table 2. Histogram showing class breaks for the normalized data.

The resulting categories have the following value ranges (see map 1):

0 =(not seen)

- 1 = -22.25107765 - -10.61303888 (minimal)
- 2 = -10.61303887 - -7.914363225 (low)
- 3 = -7.914363224 - -5.384354797 (moderate)
- 4 = -5.384354796 - -0.746006012 (high)

Map 1. The Dalles Scenic Resource Inventory



Map 2. The Dalles Scenic Resource Inventory

Visual Sensitivity from Key Viewing Areas

Visual Sensitivity Classes

- Not Seen
- Minimal
- Low
- Moderate
- High

Key Viewing Areas

- Interstate 84
- State Route 14
- Columbia River Historic Highway

Map Key

- UGB Boundary
- Proposed 2007 UGB Expansion Area
- Study area boundary
- National Scenic Area Boundary
- Stream
- Waterbody

N

S

Historic Columbia River Highway

84

14

0 0.5 1 2 Miles

Map 3. The Dalles Scenic Resource Inventory

Global Perceived Surface Area and Visual Absorption Capability

Visual Absorption Capability Class

- Minimal
- Low
- Moderate
- High

Global Perceived Surface Area Classes

- Not Seen
- Minimal
- Low
- Moderate
- High

Map Key

- UGB Boundary
- Proposed 2007 UGB Expansion Area
- Study area boundary
- National Scenic Area Boundary
- Interstate 84
- State Route 14
- Historic Columbia River Highway

N

S

84

14

Miles

0 0.25 0.5 1 1.5 2

Map 4. The Dalles Scenic Resource Inventory

Global Perceived Surface Area and Landscape Diversity

Landscape Diversity Class

- Outstanding
- Distinctive
- Common

Global Perceived Surface Area Classes

- Not Seen
- Minimal
- Low
- Moderate
- High

Map Key

- UGB Boundary
- Proposed 2007 UGB Expansion Area
- Study area boundary
- National Scenic Area Boundary
- Interstate 84
- State Route 14
- Historic Columbia River Highway

N

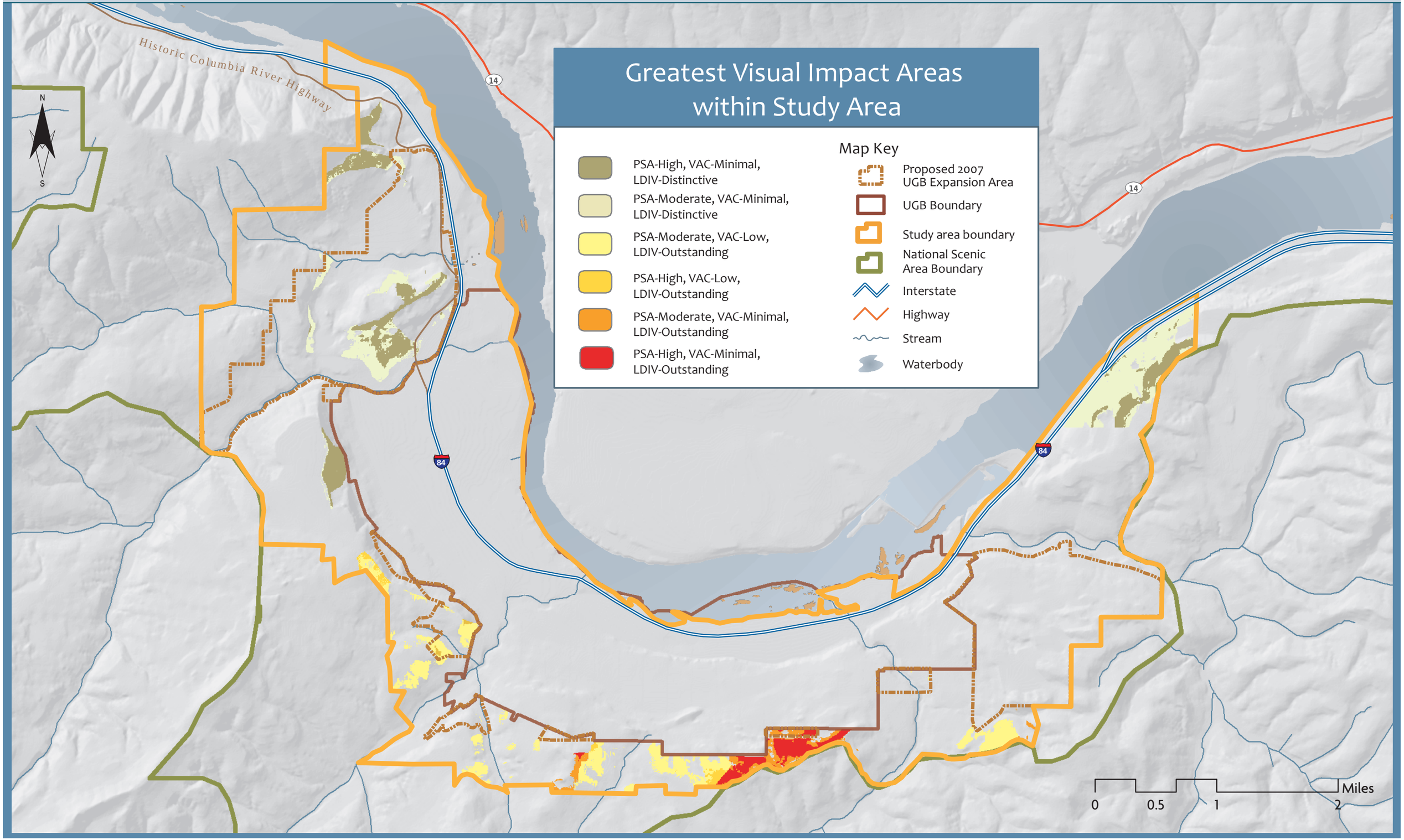
S

84

14

0 0.25 0.5 1 1.5 2 Miles

Map 5. The Dalles Scenic Resource Inventory



Map 6. The Dalles Scenic Resource Inventory

Elevation model modified to account for UGB expansion area with 30 foot addition.

Original elevation data with no modification to account for UGB expansion area with 30 foot addition.

30

Example of potential area that be blocked if 30 foot structures were built within the entire UGB expansion area.

Same area visible in unaltered DEM.

This map shows the potential change in Viewshed Sensitivity classes due to added buildable height of structures (30 feet) within the UGB expansion alternatives.

0 0.5 1 Miles