When Does Congestion Matter to a Park Visitor?: Translating Park Roadways’ Level of Service to Impacts on the Visitor Experience

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Jake Jorgenson - RRC Associates, Boulder, CO
Mandi Roberts - Otak Inc., Redmond, WA
Level of Service (LOS) on major Yellowstone NP links – August 2016

<table>
<thead>
<tr>
<th>LEVEL OF SERVICE</th>
<th>DESCRIPTION</th>
<th>PERCENT TIME SPENT FOLLOWING</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Speed would be controlled primarily by roadway conditions. A small amount of platooning would be expected.</td>
<td>&lt; 40.0</td>
</tr>
<tr>
<td>B</td>
<td>The degree of platooning becomes noticeable. Some speed reductions are present.</td>
<td>40.0 to 55.0</td>
</tr>
<tr>
<td>C</td>
<td>Most vehicles are traveling in platoons. Speeds are noticeably curtailed.</td>
<td>55.0 to 70.0</td>
</tr>
<tr>
<td>D</td>
<td>Platooning increases significantly. Passing demand is high, but passing capacity approaches zero. A high percentage of vehicles are now traveling in platoons.</td>
<td>70.0 to 85.0</td>
</tr>
<tr>
<td>E</td>
<td>Demand is approaching capacity. Passing is virtually impossible. Speeds are seriously curtailed. The lower limit of this LOS represents capacity.</td>
<td>&gt; 85.0</td>
</tr>
<tr>
<td>F</td>
<td>Whenever demand flow in one or both directions exceeds the capacity of the segment. Operating conditions are unstable, and heavy congestion exists.</td>
<td></td>
</tr>
</tbody>
</table>


Source: OTAK (2017) Transportation & Vehicle Mobility Study
Yellowstone Summer Visitor Use Patterns, Preferences, Expectations, & Values

- In the moment collection of the visitor experience
- Travel & visitation patterns
Developing a GPS-Based Truck Freight Performance Measure Platform

WA-RD 748.1
(TNW 2010-02)

Edward D. McCormack
Xiaolei Ma
Charles Klocow
Anthony Currarel
Duane Wright

April 2010

Development of a Freight Benefit/Cost Methodology for Project Planning

WA-RD 815.1

Jeremy Sage
Ken Casavant
Anne Goodchild
Ed McCormick
Zun Wang
B. Starr McMullen
Daniel Holder

June 2013
How frustrated are you with the amount of time you have spent in traffic congestion behind other vehicles?

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Speed (mph)</th>
<th>Average Speed (mph)</th>
<th>Frustration (Average)</th>
<th>Very Frustrated (5)</th>
<th>Frustrated (4)</th>
<th>Moderately Frustrated (3)</th>
<th>Slightly Frustrated (2)</th>
<th>Not at all Frustrated (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom 25% of Travelers</td>
<td>&lt;31</td>
<td>24.0</td>
<td>1.5</td>
<td>3%</td>
<td>4%</td>
<td>6%</td>
<td>14%</td>
<td>73%</td>
</tr>
<tr>
<td>26th-50th% of Travelers</td>
<td>31-38</td>
<td>34.8</td>
<td>1.31</td>
<td>0%</td>
<td>2%</td>
<td>8%</td>
<td>11%</td>
<td>79%</td>
</tr>
<tr>
<td>51st-75th % of Travelers</td>
<td>39-42</td>
<td>39.0</td>
<td>1.39</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>22%</td>
<td>69%</td>
</tr>
<tr>
<td>Top 25% of Travelers</td>
<td>&gt;42</td>
<td>44.6</td>
<td>1.55</td>
<td>1%</td>
<td>3%</td>
<td>8%</td>
<td>26%</td>
<td>62%</td>
</tr>
</tbody>
</table>
Other than weather conditions, how would you rate your experience right now?

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Speed (mph)</th>
<th>Average Speed (mph)</th>
<th>Experience (Average)</th>
<th>Excellent (5)</th>
<th>Good (4)</th>
<th>Fair (3)</th>
<th>Poor (2)</th>
<th>Very Poor (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom 25% of Travelers</td>
<td>&lt;31</td>
<td>24.0</td>
<td>4.31</td>
<td>49%</td>
<td>47%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>26th-50th% of Travelers</td>
<td>31-38</td>
<td>34.8</td>
<td>4.37</td>
<td>59%</td>
<td>33%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>51st-75th % of Travelers</td>
<td>39-42</td>
<td>39.0</td>
<td>4.39</td>
<td>56%</td>
<td>35%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Top 25% of Travelers</td>
<td>&gt;42</td>
<td>44.6</td>
<td>4.18</td>
<td>38%</td>
<td>47%</td>
<td>13%</td>
<td>1%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Avenues for Future Use of Data

- Expand analysis to each Roadway Geofence;
- Expectations and experience;
- Reliability and travel time;
- Smaller scale segments, and I.D. bottlenecks;
- Incorporate attribute importance metrics;
  - e.g. see wildlife, get away from crowds, etc.
- Time of day, and length of time in park;
- Direction of travel;
- Circling/waiting for parking;
- Length of stop per parking area.
Avenues for Future Use of Data
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