



Technical Memorandum #5.1: Current Practices

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Project #: 17453.005

To: Jovi Anderson, Robin Lewis, Nick Arnis; City of Bend

From: Ashleigh Griffin and Kelly Laustsen

Project: Bend Transportation Planning Strategy – Task 5: Multimodal Traffic Count Program

Subject: Technical Memorandum #5.1: Current Practices

This memorandum provides a summary of the current multimodal count programs that are operated within the City of Bend. The summary of current practices is intended to assist the City in planning and implementing a multimodal count program. By understanding the current practices within the City, including what type of data is collected regularly by various agencies, how the data is used, and how the data is stored, the City can better plan a system that builds upon existing activities and incorporates data from these activities. In addition, the City can learn from the positive and negative experiences agencies have had with various data collection technologies and methodologies.

The current practices are summarized by agency, with a summary of implications for the City of Bend's new program at the conclusion of the document.

- City of Bend Count Programs;
- Bend Park and Recreation District (BPRD) Count Program;
- Deschutes County Count Program;
- Oregon Department of Transportation (ODOT) Count Programs; and
- Conclusion.

CITY OF BEND COUNT PROGRAMS

The City of Bend had a more robust vehicular count program in place prior to 2008. Today, most regular pedestrian and bicycle counts are conducted with the help of volunteers; vehicle counts are not conducted on a regular schedule. This section summarizes the past and current count programs operated by the City of Bend.

Past Counting Programs

Prior to 2008, the City operated two on-going count programs: tube counts and plate counts. The two programs are summarized below.

Tube Counts

The tube counts program was operated prior to 2008 and used specific locations around the City to assess growth. These locations included major routes, arterials and collectors, and some locations in-between. Counts were repeated every three years when possible. The City was divided into thirds, and each year data was collected at one group of locations. The data was collected by an external company rather than City staff.

Counts were conducted between Tuesday and Thursday using tubes that collected vehicle counts and classification. No bicycle or pedestrian counts were collected.

Data was entered into an Access database manually and then added to the GeoBlade system. The data was useful to assess changes over time and provided vehicle speed information to City staff.

Plate Counters

In addition to the regular vehicle counts conducted with tubes, the City also had plate counters that were used primarily to respond to citizen service requests on local streets. These were small, 4" by 6", NuMetrics Hi-Star plates that counted volume by lane. City staff and crews installed these as requested.

The data from the plates produced a PDF report that was then manually entered into the Access database and then to GIS. The manual data input was a tedious process for staff.

Overall this program was ineffective because random locations were conducted based on citizen requests. Plates were also occasionally stolen or caused citizen concerns. In addition, staff was not always available to install the plates. The program ended prior to 2009 because it was inefficient to keep up with the technology and changes.

Other Counts

In addition to the two regular programs, the City also had techs periodically collect turning movement counts. These were stored in a Traffix program.

Current Counting Programs

Currently, the City operates a volunteer-based pedestrian and bicycle count program. There is no current vehicle count program. The City relies on data from other sources to supplement their data and conducts counts on an as-needed basis.

Pedestrian and Bicycle Count Program

The current pedestrian and bicycle count program relies on volunteers to collect the data as no staff resources are available for conducting these counts. The program began about two years ago, and counts are conducted at each of the 24 locations four times per year, pending sufficient volunteers.

The count locations were selected by a committee when the program began. The bridge locations are a top priority. Typically, approximately 75 percent of the locations are covered by volunteers, who select the location they would like to count when they sign up. However, if some of the important locations, such as bridges, are not covered by volunteers, City staff may ask volunteers to change locations to cover the most critical locations.

Volunteers record the number of pedestrians and bicyclists at their location during a two-hour period from 3:30 to 5:30 p.m. on a weekday and/or noon to 2:00 p.m. on a Saturday. No additional demographic data is collected. Although there is no in-person training, volunteers are provided with a training presentation, consent form, and information on how to collect data from National Bicycle and Pedestrian Documentation Project (NBPD) project.

Data is manually entered and saved in Google Earth. The count locations are stored in a GIS file, but none of the count data is currently tied to these locations.

Other Data Sources

The City receives additional data from other sources, as summarized below. Deschutes County, ODOT, and BPRD programs are summarized in more detail in later sections of this memorandum.

- Project based data, such as data collected for corridor studies or roadway projects, is available for some projects completed in 2009 or later. The City does not have a large amount of other data, and the data available is in a variety of formats. Quality Counts typically collects this data.
- ODOT provides automated traffic recording (ATR) counts at five locations on state facilities (four within the City). Data is provided to the City/MPO monthly in PDF form.
- ODOT also provides 48-hour counts to the City each year. ODOT conducts these counts on a rotating cycle every three years.
- Counts are conducted every five years to update the MPO travel demand model. The most recent data was collected in 2013. ADT counts are collected at a variety of locations to complete these updates. Data from these counts is available on the City's GeoBlade website.
- Quality Counts has some historical data available online which may be available for purchase by the City.
- Bend Park and Recreation District (BPRD) provides the City with data from their trail counters on an annual basis.
- Some data is obtained from traffic impact analyses (TIAs) that are submitted to the City. However, very little data is actually stored from these studies. There is no system in place for obtaining data from TIAs or requiring data in a certain format. Currently, TIAs are uploaded as PDFs, which makes input of data time consuming. Excel versions of counts would enable easier data uploading.
- The City's police department has speed signs that collect speed and volume data, as illustrated in Figure 1. The signs are portable and easy to move and are placed based on citizen requests.

Data from these signs is primarily available from local streets at random times. However, no calibration has been done to check the data. Data is provided quarterly.

- Having a way to normalize or calibrate the data would allow the data to be more useful. It may be useful for noting traffic calming needs and other issues.

TRAFFIC SURVEY - SPEEDWATCH - May/June/July 2015											
BY LOCATION											
Date	Area	Vol.	Start Time	Stop Time	Posted Speed	Total Vehicles	# Vehicles			Comments	Percent > +11
							+5 to 10	+10 to 15	+15		
5/4/2015	NE 18th/Sky View SZ	TA	13:25	13:45	20	60	10	3	6	Both Directions (43)	15.00%
5/14/2015	NE 18th/Sky View SZ	TA	11:19	11:34	20	41	5	6	3	Both Directions (45)	21.95%
5/4/2015	NE 27th/MVHS SZ	TA	12:34	12:54	20	326	34	15	3	Both Directions (36)	5.52%
5/14/2015	NE 27th/MVHS SZ	TA	10:40	10:55	20	221	22	9	1	Both Directions (36)	4.52%
5/4/2015	NE Egypt/Lava Ridge ES	TA	13:48	14:08	25	19	1	0	0	Both Directions	0.00%
5/14/2015	NE Egypt/Lava View	TA	11:40	11:55	25	16	4	1	0	Both Directions	6.25%
6/10/2015	NE Jones & Thompson	CN	11:36	11:50	25	76	5	1	0	Both Directions	1.32%
5/20/2015	NE Neff/Pilot Butte SZ	CN	11:56	12:13	20	342	8	6	1	Both Directions	2.05%
5/4/2015	NE Burrall/Aspen Ridge	TA	13:08	13:28	25	177	52	18	0	Both Directions	10.17%

Figure 1. Sample Data from Speed Signs

Current and Future Data Applications

The City has several current applications for the data it collects and several additional needs that the new count program should address. In order to make the data most useful, the City needs a structure for collecting, storing, and using the data. GeoBlade currently houses much of the data available, but most of this data was collected prior to 2009. Volume data is the second highest item extracted by GeoBlade users. The more current data available on GeoBlade (after 2009) is primarily from the MPO model update, the ODOT counts, the volunteer based pedestrian and bicycle counts, and a few TIA counts.

The City’s current applications for the data include:

- Responding to citizen services requests;
- Calculating crash rates for use in the safety program;
- Responding to requests for data from developers; and
- Completing grant applications, such as grants for bike and walk friendly communities, new crossings, etc.

The City’s desired future data includes:

- Data for multi-lane roads and crossings where enhanced pedestrian crossings are being considered;
- Understanding the percentage of trucks on freight routes;
- Understanding volumes on all bridges;
- Summarizing growth trends by mode as different systems are enhanced. Before and after data would be helpful for grant reporting; and

- Identifying peak hours from counts throughout the day to help with developing more robust Transportation Demand Management (TDM) programs, maximizing existing system capacity by spreading trips, and moving towards peak hour shifting.

The City hopes to use the future count program and data for the following applications:

- Growth management department planning projects;
- Pavement preservation work and prioritization;
- Transportation System Plan (TSP) update;
- Targeted police enforcement; and
- Project specific support.

BEND PARK AND RECREATION DISTRICT COUNT PROGRAM

The Bend Park and Recreation District (BPRD) maintains and operates parks and trails throughout the City of Bend. BPRD runs a count program to track the number of users on some of the trails. The count program began in 2012 and relies on automated counters.

BPRD does not regularly collect or store vehicle count data. In the past (over ten years ago), the district owned tube counters which were used to count the number of vehicles using various parking lots. However, this practice is no longer in place.

Pedestrian and Bicycle Count Program and Technology

BPRD uses TRAFx infrared trail counters to collect data. The counters are battery powered and typically changed about once per year. When selecting a technology to purchase for their counts, BPRD selected TRAFx due to the good references, ease of self-installation, and lower cost of TRAFx compared to alternatives. The purchase price initially was around \$1,700, which included the software that accompanied the technology. TRAFx came with a two year license for the software and updates. Additional counters were purchased for approximately \$500 each. To obtain data from the counters, a user must manually download the data from the counter at the site; the counters do not automatically upload data to the cloud or other storage system. BPRD typically downloads the data about every two months.

Count Locations

When BPRD began the count program, they moved the counters around to various trails, leaving them on each trail for one to two weeks during the summer, resulting in counts for approximately 15 sites each year.

Currently, BPRD owns seven counters. Six are placed in permanent locations where they will stay for at least one year. Some of these are mounted in bollards or other hidden locations. One portable counter is kept in a weather tight powerbox and moved around as needed.

Locations are selected based on usage data from old counts. Locations with the highest volumes are prioritized for counting. Only BPRD trails are counted; trails that fall within other jurisdictions are not counted. *Attachment A shows the locations of BPRD trail counts.*

Challenges and Considerations

The district has encountered some challenges and considerations that are relevant to the City of Bend's program development. These are summarized below:

- The TRAFx counters that BPRD uses work in all types of weather.
- Vandalism and cut locks have been an issue. Even when the counters are hidden in bollards, they have experienced some vandalism. Theft has not occurred.
- The placement of the counters is important, particularly the height. If the counters are too low, they may pick up dogs, but if they are too high, they may miss children. The counters also must be placed at locations on trails where they are most likely to get an accurate count of the data the user is hoping to capture. For example, counts at the pedestrian path at Colorado Avenue were used to estimate the number of people floating the river.
- The counters do not distinguish between pedestrians, bicyclists, dogs, and wildlife such as deer. Therefore, they cannot be used to provide a mode split.
- No demographic data is recorded.
- The counters require manual calibration as well as manual downloading at the site. Checks of the counters have found that the TRAFx counts are close but slightly lower than the true numbers.

Data Format and Usage

Data from the TRAFx counters is processed using the software that accompanies the counters and stored in a spreadsheet format. The software comes with a mapping program that can generate reports from the data. The data is shared with the MPO in a spreadsheet format as illustrated in Figure 2. Data is also shared with others who express interest or request the data. *The full spreadsheet summarizing the data is provided in Attachment A.*

Data is used for a variety of purposes, as summarized below:

- Police use it to track activity during nighttime hours;
- Maintenance staff rely on the data to understand usage trends and where increased maintenance efforts are needed;
- Event planners use the data to identify preferred trails for events such as races;

- Budgeting relies on the data for prioritizing improvements; and
- Other programs such as the stewardship program and signage programs rely on the data for occasional use.

BPRD Automated Trail Counter Program														
Year	Map	Location	Start Date	End Date	Total	Days	Daily AVG	24-Hr Peak	Peak Day	Peak Hr	Peak Time	Facility	Surface	Comments
BPRD Automated Trail Counter Program														
Year	Map	Location	Start Date	End Date	Total	Days	Daily AVG	24-Hr Peak	Peak Day	Peak Hr	Peak Time	Facility	Surface	Comments
1		DRT East @ Pioneer Park in wooded area	5/13/2014	5/18/2014	2,201	6	367	452	Tuesday			Trail	natural	mobile counter
			5/16/2012	5/21/2012	733	6	122	158	Saturday	17	2pm	Trail	paver	Sunny 63-86
2		DRT (east side downstream of S. Canyon Bridge gate)	5/16/2012	5/21/2012	2,296	6	383	449	Sunday	38	12pm	Trail	gravel	Sunny 63-86
3		First St. Rapids DRT West		Apr 2015	12,521		417		Sunday		4pm	Trail	gravel	fixed counter
				Mar 2015	12,660		408		Sunday		4pm	Trail	gravel	fixed counter
				Feb 2015	9,473		338		Sunday		4pm	Trail	gravel	fixed counter
				Jan 2015	N/A				Sunday		4pm	Trail	gravel	fixed counter

Figure 2: Example of BPRD Trail Count Data

DESCHUTES COUNTY COUNT PROGRAM

Deschutes County collects vehicle traffic volumes on County roads each year. No pedestrian or bicycle counts are regularly conducted by the County. The County count program began in the late 1990s. The County owns eleven tube counters and uses these to conduct the counts themselves. Intersection counts are not part of the regular program; intersection counts are only conducted as requested or if a significant project is planned for the area.

The recurrence frequency of counts for each road varies based on the traffic volume of the road, as summarized below:

- Roads with more than 5,000 ADT are counted every year;
- Roads with 3,000 – 5,000 ADT are counted every other year;
- Roads with 1,000 to 3,000 ADT are counted every third year; and
- Roads with less than 1,000 ADT are counted every fourth year.

If scheduled counts are unable to be completed during the scheduled year, they are combined with the following year’s scheduled counts.

Raw data from the counters is stored on the County’s Network Server. The analyzed data, which provides the ADT number, is kept in a database program created by the County. This spreadsheet type format is linked to an internal GIS program as well. The tube counters collect speed data, but the speed data is not currently stored. No additional data is stored from other projects or traffic impact studies.

The count data is shared with the public on the County Road Department’s website, as illustrated in Figure 3. The current data information is available in spreadsheet as well as PDF format and generally includes nine years of data. The data is used for the pavement management program, neighborhood requests, crash rate calculations, and other project and planning level needs that arise.

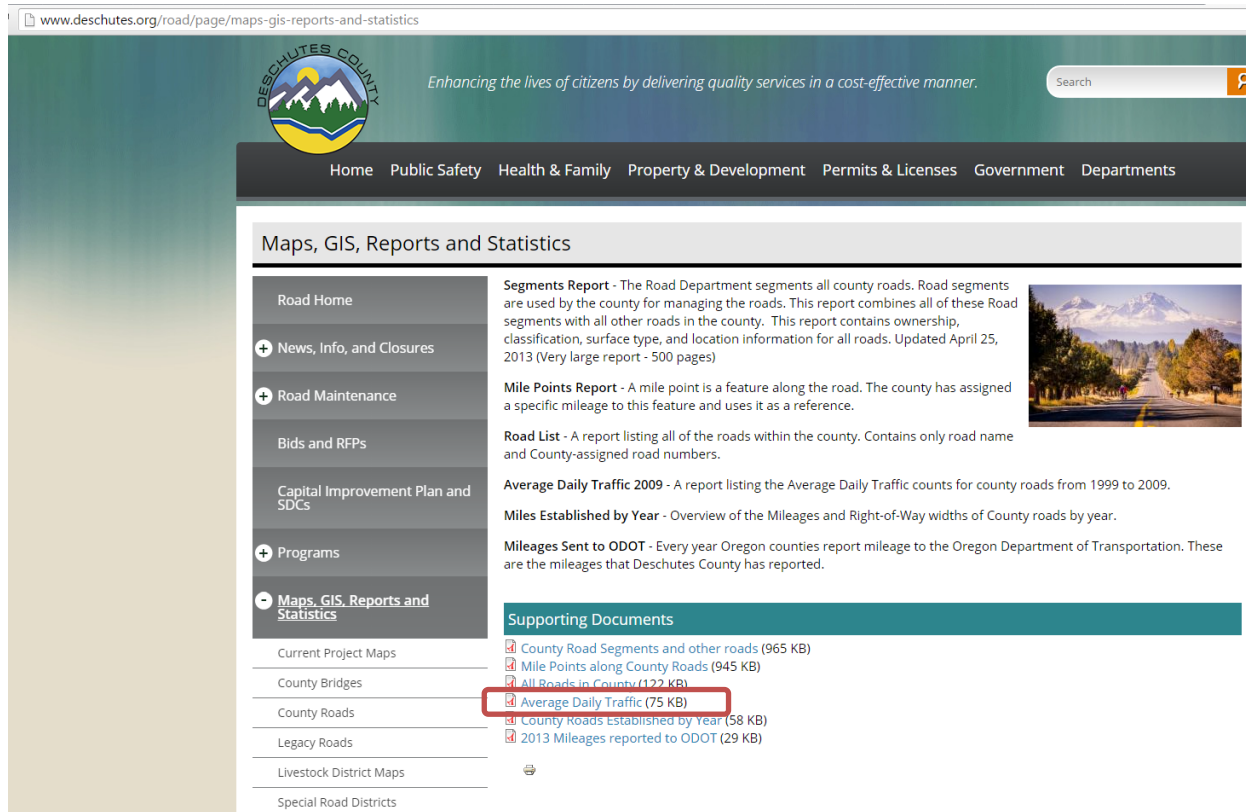


Figure 3. Deschutes County Road Department Website

OREGON DEPARTMENT OF TRANSPORTATION COUNT PROGRAMS

The Oregon Department of Transportation (ODOT) operates two regular count programs: the coverage count program and the highway performance monitoring system (HPMS). Both of these programs collect vehicle counts. Although ODOT owns four bike counters, there is currently not a robust counting program in place for pedestrians and bicyclists.

Coverage Count Program

The coverage count program is the program that ODOT uses to collect counts on the state highway system. The goal of this program is to conduct enough counts that they have adequate volumes to represent all ranges of the highway system. ODOT splits the highways into sections with various ranges of AADT (for example, 2,500 – 5,000 ADT) and collects data on these sections on a three year cycle. Counts are done on sections with consistent traffic within the segment (where traffic volumes are not changing). Counts are typically done in the spring and fall, when minimal seasonal adjustments are needed. ODOT attempts to count the same locations over time when possible for use in developing historic trends. These coverage counts are conducted with pneumatic tubes and are typically 48-hour counts. When locations do not permit tubes to be used safely, videos are used to conduct the counts.

In addition to the rotating counts conducted on three-year cycles, ODOT also maintains continuous counting stations. Counts at these locations are conducted with inductive loops. There are approximately five locations in Bend. These continuous counting locations are used to provide seasonal factors for sites. Some of these sites can determine weight and the number of axles on a vehicle. However, the equipment does not hold up as well in some highway compositions.

The ultimate goal of the coverage counting program is to have data that represents data for the year and for use in comparing sites. Depending on when counts are taken, factors are applied to adjust the count based on the day of the week, month of the year, axle overcount factors, and growth factors since counts are conducted only once every three years. If two adjacent sections start to show similar traffic volumes multiple years in a row, ODOT may consider dropping one site and extending the range of that section. ODOT recognizes that history is important for many analyses and provides comparable data whenever possible.

Highway Performance Monitoring System (HPMS)

The second major count program is the Highway Performance Monitoring System (HPMS), which includes counts on roads of all jurisdictions. These are used to show stewardship for federal funds. Counts must be done every three years. The majority of these counts are conducted during the summer months.

These counts are also used by the MPO to calculate vehicle miles traveled (VMT) for the whole system. Therefore, they must have enough counts to estimate VMT on roads of all functional classifications; many non-state, local roads are counted through this program.

On higher volume routes, segments for counts are broken where the volumes change by more than 10 percent. On lower volumes routes, they are often broken where volumes change by smaller percentages.

Other ODOT Counting Efforts

Although the Coverage Count Program and the HPMS make up the largest count programs that ODOT runs, data is collected through smaller efforts as well.

- The rail group asked the counting group to coordinate data collection for each rail crossing for use in safety analysis. ODOT uses what they can from the local jurisdictions and supplements it with additional counts. Rail crossing counts are conducted on a six-year cycle.
- Special counts are conducted by ODOT staff for specific projects or planning efforts. Video is used for turning movement and pedestrian/bicycle counts.

Data Processing and Storage

ODOT's count data is initially processed by the vendor software for each technology. The local, region-based counting group does an initial review of the data to make sure the data appears to be correct before Salem staff load the data into ODOT's primary count database. For example, zero data for several hours in a row may indicate a parked car, or one to two days of drastically different volumes from other days may indicate the need to collect new data.

ODOT's current count database is the Traffic Count Management System (TCM) which was developed by PTV in 2008. This software provides graphical presentation of the counts. It also provides the past history of counts, which ODOT uses to make sure the data makes sense. The program applies the seasonal, axle, and growth factors to the counts. ODOT staff finish processing the data in Excel to produce AADTs for publication and comparing sites.

PTV has stopped supporting the TCM software. ODOT is currently in the process of completing demos with other commercial software packages to find a replacement for the TCM. The process of selecting a new service may take several years, depending on how long it takes to secure funding. The current options being considered are:

- MS2 (produced by Midwestern Software Solutions, LLC): This company has more experience with local jurisdictions and state DOTs compared to some of the others.
- Jackalope (produced by High Desert Traffic): This company has good experience with state DOTs.
- Transmetric: This company is breaking into the US market. They have more foreign experience and started in Australia.
- Drakewell: This company is based in the United Kingdom and has more experience with European and Middle East markets.
- In-house development: ODOT is also considering building its own system in-house. WashDOT has successfully built an in-house system; ODOT will review WashDOT's experiences in making a decision.

Data Applications

ODOT count data is regularly used by the planning groups and for specific projects within ODOT. The planning department relies on the data for forecasts and projections. The projects often rely on special counts, including turning movement counts, rather than the regular cyclical counts from the two main programs. In addition, traffic counts are used for economic purposes to evaluate general trends in volumes.

Data Sharing

Count data can be obtained from anyone and is often requested for a variety of reasons. Local jurisdictions like to see their data to identify trends for the area. Realtors and citizens often request

counts; realtors use data to advertise commercial sites. Figure 4 illustrates data provided by ODOT to the MPO.

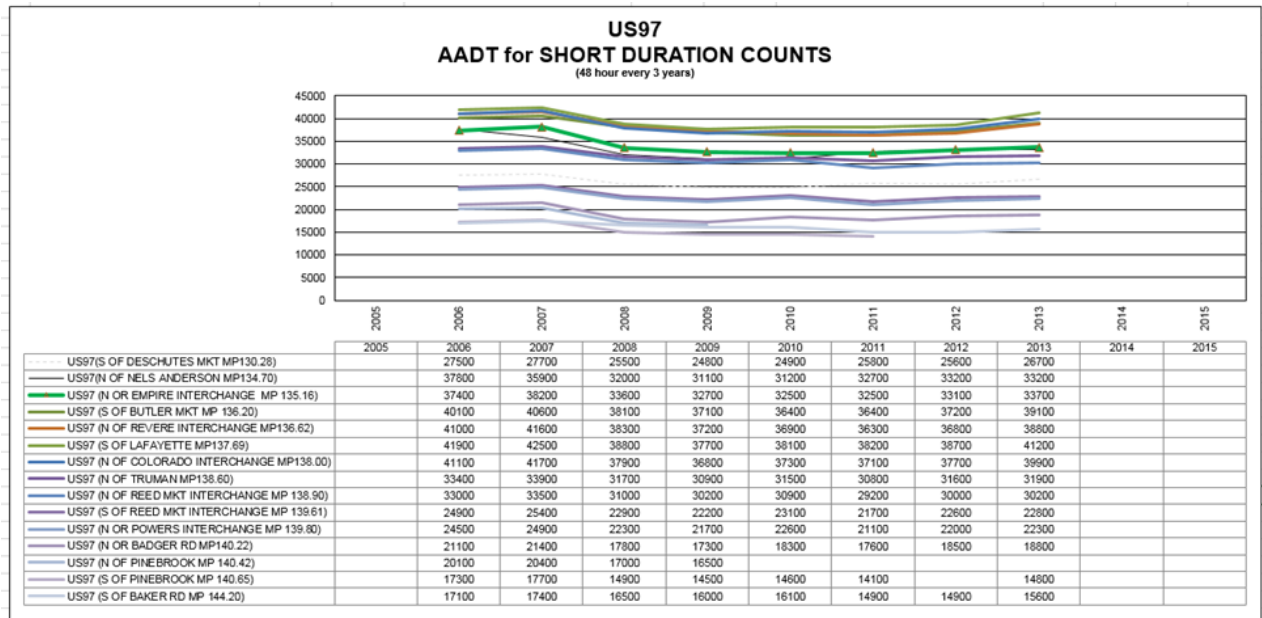


Figure 4. Example of AADT Data ODOT Provides to MPO

Summary statistics for the counts can be obtained from ODOT’s TransGIS website, illustrated in Figure 5. TransGIS traffic data provides the user with AADT information and vehicle classification information. More in-depth data and raw data is often requested; ODOT shares time series or intersection reports as requested.

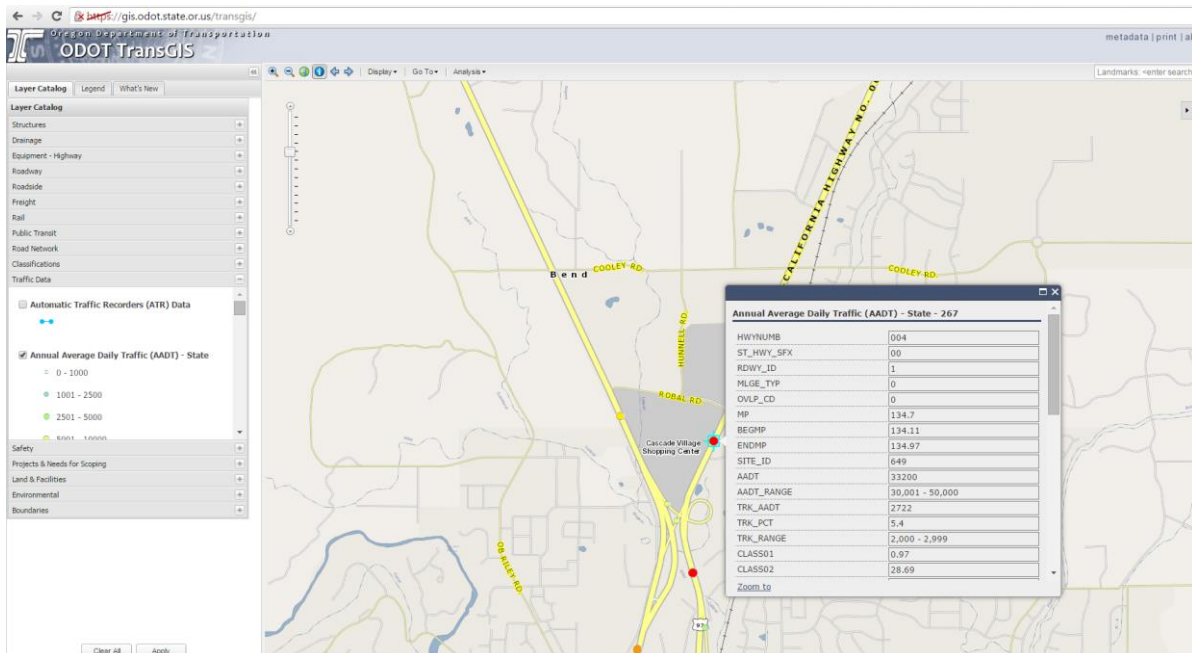


Figure 5. ODOT’s TransGIS Website

ODOT does not store much data from traffic impact analyses (TIAs) in the TCM. ODOT does attempt to save data from projects when counts of at least 16 hours in duration are collected because the 16-hour or longer counts have a wide variety of uses for a variety of people. In contrast, peak hour counts have limited use. ODOT staff prefer when data is provided in Excel format; PDF format requires manual entry into the system.

Pedestrian and Bicycle Counts

Pedestrian and bicycle counts are not regularly conducted by ODOT. Although the majority of counts are done manually or with video, which is then reduced by staff watching the videos, ODOT owns four bicycle counters and uses them on ODOT facilities. ODOT relies on other agencies that collect pedestrian and bicycle data to review seasonal variations.

The four bicycle counters that ODOT uses are produced by two different companies:

- On the I-205 bicycle path, loops that were installed in the 1980s are still used today. ODOT previously had a bike counting program that included between seven and nine counters around the state. These counters were diamond loops in the path combined with a regular counter on the side of the path. The counter on the I-205 path is the last counter remaining from this program.
- On the US 101 coastal route, ODOT uses one counter near Bandon and one counter near the US 26 interchange. These counters are Eco-Counter loops in the shoulders.
- Another Eco-Counter bike counter is located in the Gorge.

ODOT has found that all of the counters undercount slightly. As bicycle technology changes, there is less metal on the frames, which leads to some undercounting. ODOT conducts field verification of the bicycle sites occasionally. The I-205 counter reported about 20 percent undercounting.

Data is downloaded from the Eco-Counter sites manually. Staff must travel to the site to collect the data and upload it. The I-205 counter has a standard modem and can be collected from staff in the office.

ODOT is testing Eco-Counter's modem service on the north coast. The modem service automatically collects the data each day. However, one of the Eco-Counters was placed in a location where the cellular service is not strong enough for the automatic data upload to function properly. The cell phone used to check service availability was 4G, but the Eco Counter is 3G.

Within Bend, ODOT has also assisted the City with pedestrian and bicycle counts using video to supplement the volunteer count program.

Counts from Signals

Traffic signals around the City of Bend may be able to provide some count information, although the accuracy and reliability of the data should be a consideration in its use. The Oregon Department of Transportation collects vehicle volume data from traffic signals. The 2070 signal controllers are able to collect volume. The older 1070 controllers are also capable of collecting volume, but the software no longer functions. ODOT has plans to upgrade the few remaining 1070 controllers in Bend to 2070 controllers by 2016.

Although the 2070 controllers are able to collect volume data, the data has not proven to be accurate. ODOT is working on a study with Northern Arizona University and Portland State University to compare video detection, loops, and other types of detection for both vehicles and bicycles. Most of the signals use video detection because the in-pavement loops do not hold up well with the high volume of studded tires used in Bend. Although the research is still in progress, it has shown that video detection tends to undercount when the signal is not saturated. However, when the signal is saturated, the video detection tends to lump vehicles together. ODOT has also attempted to use bike detection zones with videos, but these have been triggered by vehicles and therefore are not yet reliable.

ODOT is currently testing an Iteris camera at the intersection of US 20/Robal Road. Preliminary results have indicated that the differentiation between vehicles and bicyclists needs improvement. The video does not detect a bicycle if it does anything that travel straight forward using the bicycle lane. For example, if the bicycle moves into a travel lane, it is not counted. In addition, the camera tends to count a group of bicycles as one bicycle.

ODOT has a permanent installation of pedestrian detection cameras in Biggs Junction. However, these have not proven to be accurate. The video sometimes puts in false calls and will also drop the call if the pedestrian moves in the wrong direction.

ODOT collects push button actuation information from signals, but they have no information about the total number of pedestrians using the crossing based on this information. Data is available in terms of the number of actuations per hour. ODOT has not done any studies to determine what the average group size is at signalized crossing or any other calibration efforts to make the number of actuations per hour reliable as a source of count data.

Although the video detection technology is not ready for full implementation yet, it is a popular topic with current research in the field focusing on how to improve the detection and differentiation performance. ODOT ultimately hopes that they will be able to optimize signal timing based on the presence of bicyclists at the intersection. Once the detection and differentiation performance of video systems is improved, these systems may provide valuable count information for the City of Bend.

GOALS FOR THE CITY OF BEND COUNT PROGRAM

Based on the review of current practices within the City, County, BPRD, and ODOT, the City of Bend has developed the following goals for the development of the new count program.

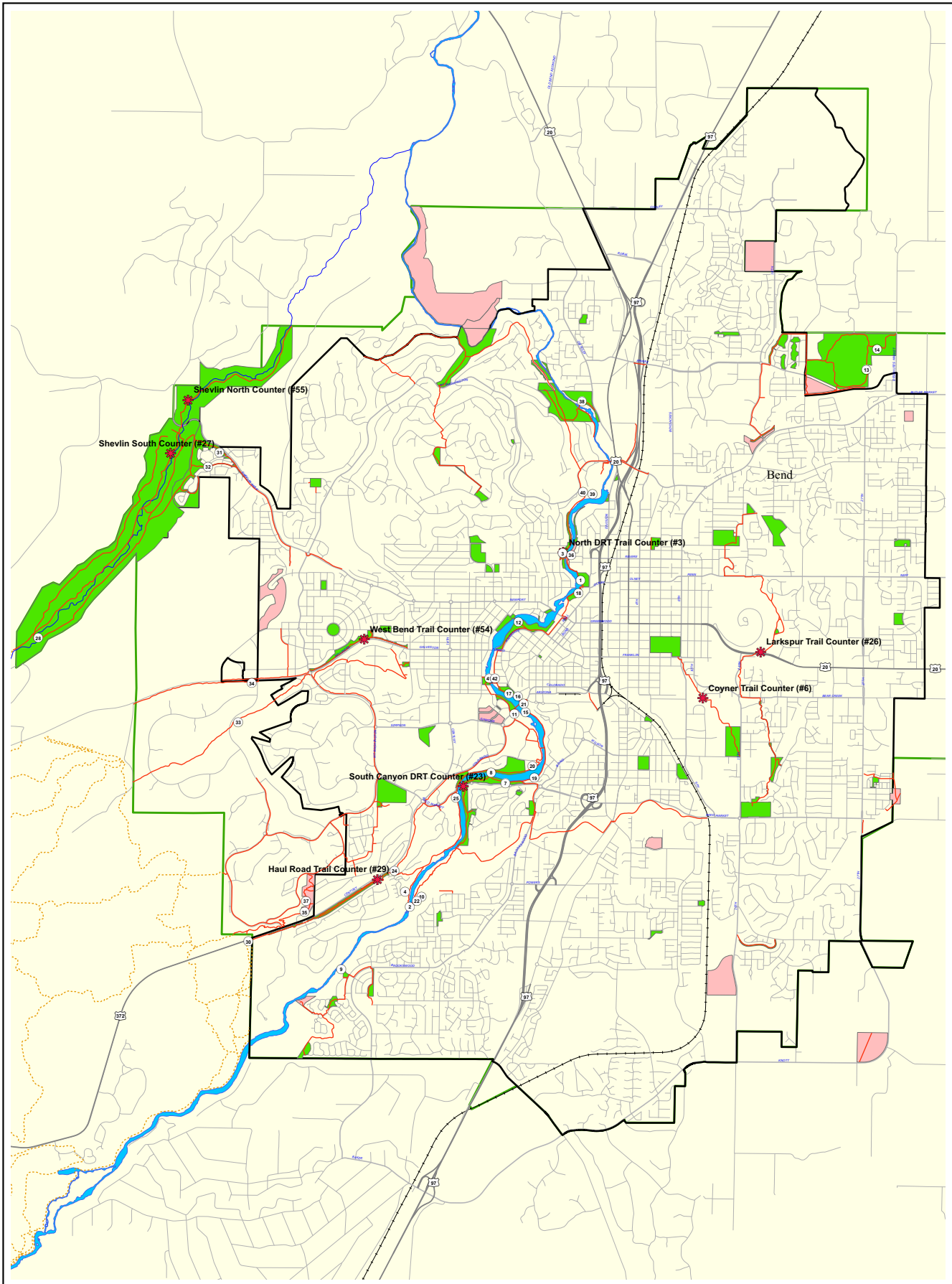
- The count program should be easy to implement with minimal staff time required for maintenance or data manipulation. Data should be accessible without a field visit.
- The data should provide mode split information.
- Locations for data collection should be selected to allow for corridor trend analysis as well as regional analysis.
- Locations for data collection should supplement locations where ODOT, Deschutes County, and BPRD already collect regular data.
- Locations for data collection should be developed systematically rather than randomly in response to requests.
- The storage system for the counts should allow for incorporating data from other agencies as well as other projects such as TIAS.
- The storage program should provide some flexibility to allow for future changes to incorporate new data, such as demographics.

REFERENCES









- Jovi Anderson, Bend MPO
- Robin Lewis, City of Bend
- Chris Doty, Deschutes County
- Steve Jorgensen, Bend Park and Recreation District
- Sasha Sulia, Bend Park and Recreation District
- Don Crownover, Oregon Department of Transportation
- Paul Tiller, Oregon Department of Transportation
- Dave Hirsch, Oregon Department of Transportation

ATTACHMENTS

Attachment A: BPRD Trail Count Locations and Data



Legend

-  BPRD Fixed Trail Counter Location
-  Historic Shevlin Railway Route
- Public Trails**
-  Existing Trail
-  USFS Trails
-  Developed Park
-  Undeveloped Park
-  Urban Growth Boundary
-  Park District Boundary

Trail Count Locations



Not to Scale

play for life

Map Date: 10-8-15



BPRD Automated Trail Counter Program														
Year	Map	Location	Start Date	End Date	Total	Days	Daily AVG	24-Hr Peak	Peak Day	Peak Hr	Peak Time	Facility	Surface	Comments
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				Feb 2015	9,473		338		Sunday		4pm	Trail	gravel	fixed counter
				Jan 2015	N/A				Sunday		4pm	Trail	gravel	fixed counter
				Dec 2014	8,069		261		Sunday		4pm	Trail	gravel	fixed counter
				Nov 2014	8,119		270		Sunday		4pm	Trail	gravel	fixed counter
				Oct 2014	9,992		322		Sunday		4pm	Trail	gravel	fixed counter
				Sept 2014	11,334		378		Sunday		4pm	Trail	gravel	fixed counter
				Aug 2014	13,797		445		Sunday		4pm	Trail	gravel	fixed counter
				Jul 2014	N/A				Sunday		4pm	Trail	gravel	fixed counter
			5/23/2012	6/5/2012	3,797	14	271	355	Monday	25	9am	Trail	natural	mobile counter
	4	DRT (west side approaching the S. Canyon footbridge)	5/23/2012	6/5/2012	5,605	14	400	683	Sunday	45	10am	Bridge	gravel	Rain 5/24-5/25
	5	Larkspur Trail@Pilot Butte State Park	6/7/2012	6/12/2012	555	6	93	99	Fri/Sat	14	12pm	Trail	AC	mobile counter
	6	Coyner Trail near Bear Creek School		Mar 2015					Thursday		3pm	Trail	AC	fixed counter
				Feb 2015	2,563		92		Thursday		3pm	Trail	AC	fixed counter
				Jan 2015	2,764		89		Thursday		3pm	Trail	AC	fixed counter
				Dec 2014					Thursday		3pm	Trail	AC	fixed counter
				Nov 2014	1,898		63		Thursday		3pm	Trail	AC	fixed counter
				Oct 2014	3,872		125		Thursday		3pm	Trail	AC	fixed counter
				Sept 2014	4,346		145		Thursday		3pm	Trail	AC	fixed counter
				Aug 2014	2,889		93		Thursday		3pm	Trail	AC	fixed counter
				Jul 2014	2,869		93		Thursday		3pm	Trail	AC	fixed counter
			5/20/2014	5/26/2014	822	7	117	182	Friday			Trail	AC	mobile counter
			6/7/2012	6/12/2012	601	6	100	146	Friday	21	12pm	Trail	AC	mobile counter
	7	DRT (Farewell Bend Park @ boat launch)	6/16/2012	6/24/2012	5,141	9	571	1,277	Tuesday	61	5pm	Trail	paver	mobile counter
	8	DRT (Riverbend Park @ footbridge west end)	7/12/2014	7/16/2014	6,096	5	1,219	1,445	Tuesday			Bridge	wood	mobile counter
			6/16/2012	6/24/2012	7,379	9	820	1,056	Thursday	73	10am	Bridge	wood	End of School
	9	COID Trail near intake	6/27/2012	7/2/2012	482	6	80	116	Sunday	10	9am	Trail	gravel	mobile counter
	10	COID Trail connector to S. Canyon Br.	6/27/2012	7/2/2012	638	6	106	150	Sunday	11	9am	Trail	gravel	mobile counter
	11	DRT @ Colorado Dam take-out/portage location	7/12/2014	7/16/2014	5,942	5	1,188	1,795	Saturday			Portage	chip	mobile counter
			6/29/2013	6/30/2013	3,094	2	1,547	1,709	Sunday	265	4pm	Portage	chip	mobile counter
			7/4/2012	7/10/2012	10,246	7	1,464	2,556	Saturday	294	3pm	Portage	chip	mobile counter
	12	Drake Park Bridge (footbridge east)	7/1/2013	7/4/2013	6,552	3	496	5,561	Thursday	1,031	11am	Bridge	paver	AVG excludes 4th of July
			5/4/2013	5/8/2013	5,641	5	1,128	1,488	Saturday	122	6pm	Bridge	wood	mobile counter
			7/4/2012	7/10/2012	15,499	7	1,429	6,924	Wednesday	217	11am	Bridge	wood	AVG excludes 4th of July
	13	Pine Nursery Loop Trail (SE of kiosk)	7/11/2012	7/26/2012	825	13	63	100	Monday	8	9am	Trail	AC	mobile counter
	14	Pine Nursery Off Leash Area (E of entry gate)	7/11/2012	7/26/2012	1,271	13	98	140	Monday	19	8am	Trail	AC	mobile counter
	15	DRT @ Colorado Undercrossing (unimproved)	8/2/2012	8/14/2012	3,566	13	274	374	Saturday	29	3pm	Trail	natural	mobile counter
	16	DRT @ Carlon (Bill Smith Path)	8/2/2012	8/14/2012	7,105	13	547	670	Wednesday	44	9am	Trail	AC	mobile counter
	17	DRT @ Miller's Landing (south fence opening)	8/16/2012	8/21/2012	1,281	6	214	250	Friday	20	10am	Trail	AC	mobile counter
	18	DRT @ Portland (south approach)	8/16/2012	8/21/2012	490	6	82	172	Friday	17	12pm	Trail	paver	mobile counter
	19	DRT @ Riverbend Off-Leash Water Access	9/8/2012	10/3/2012	6,247	26	120	479	Saturday	30	1pm	Trail	AC	divided by 2 for daily AVG
	20	DRT @ Riverbend Off-Leash Area	9/8/2012	10/3/2012	10,313	26	397	685	Saturday	46	12pm	Trail	AC	mobile counter
	21	Colorado Bridge (east end)	5/6/2014	5/11/2014	10,912	6	1,819	3,736	Wednesday			Bridge	AC	mobile counter
			6/29/2013	7/2/2013	1,514	4	379	458	Sunday	45	3pm	Bridge	AC	re-mounted higher to exclu
			5/3/2013	5/7/2013	7,587	5	1,517	2,786	Friday	167	12pm	Bridge	AC	ounted low enough to regi
	22	DRT (east side at gate north of S. Canyon Bridge)	7/17/2014	8/27/2014	29,658	42	706	976	Saturday			Trail	gravel	mobile counter
			5/18/2013	5/27/2013	4,706	10	419	932	Saturday	70	12pm	Trail	gravel	419 is AVG w/o PPP (914 c
	23	DRT (east side upstream of Healy Bridge)		Apr 2015	18,897		629		Sunday		4pm	Trail	natural	fixed counter
				Mar 2015	19,263		621		Sunday		4pm	Trail	natural	fixed counter
				Feb 2015	11,255		402		Sunday		4pm	Trail	natural	fixed counter
				Jan 2015					Sunday		4pm	Trail	natural	fixed counter
				Dec 2014	6,633		216		Sunday		4pm	Trail	natural	fixed counter
				Nov 2014	7,378		246		Sunday		4pm	Trail	natural	fixed counter
				Oct 2014	12,666		409		Sunday		4pm	Trail	natural	fixed counter
				Sept 2014	16,432		548		Sunday		4pm	Trail	natural	fixed counter
				Aug 2014	21,645		698		Sunday		4pm	Trail	natural	fixed counter
				Jul 2014	21,910		706		Sunday		4pm	Trail	natural	fixed counter
			9/21/2013	9/22/2013	2,067	10	207	276	Monday	23	11am	Trail	natural	mobile counter

		5/10/2013	5/14/2013	2,819	5	564	752	Sunday	48	10am	Trail	natural	mobile counter
24	DRT (west side access at Mt. Bach Village)	5/18/2013	5/27/2013	1,607	10	161	277	Sunday	16	10am	Trail	gravel	mobile counter
25	DRT (west side upstream of Healy Bridge)	9/21/2013	9/22/2013	2,821	10	282	453	Saturday	33	10am	Trail	natural	mobile counter
		5/10/2013	5/14/2013	2,922	5	584	642	Saturday	58	9am	Trail	natural	mobile counter
26	Larkspur Trail @ US 20 Tunnel		Apr 2015	5,086		169		Monday		1pm	Trail	AC	fixed counter
			Mar 2015	4,862		156		Monday		1pm	Trail	AC	fixed counter
			Feb 2015	3,509		125		Monday		1pm	Trail	AC	fixed counter
			Jan 2015	3,667		118		Monday		1pm	Trail	AC	fixed counter
			Dec 2014	2,280		74		Monday		1pm	Trail	AC	fixed counter
			Nov 2014	2,677		89		Monday		1pm	Trail	AC	fixed counter
			Oct 2014	4,168		134		Monday		1pm	Trail	AC	fixed counter
			Sept 2014					Monday		1pm	Trail	AC	fixed counter
			Aug 2014					Monday		1pm	Trail	AC	fixed counter
			Jul 2014					Monday		1pm	Trail	AC	fixed counter
		5/20/2014	5/26/2014	1,498	7	214	264	Tuesday			Trail	AC	mobile counter
		7/4/2013	7/4/2013	174	1	174	174	Wednesday	12	10am	Trail	AC	mobile counter
		5/8/2013	5/8/2013	226	1	226	226	Wednesday	50	9am	Trail	AC	mobile counter
27	Shevlin Tumalo Creek Trail South		Apr 2015	4,492		149		Sunday		1pm	Trail	natural	fixed counter
			Mar 2015	4,566		147		Sunday		1pm	Trail	natural	fixed counter
			Feb 2015	3,778		135		Sunday		1pm	Trail	natural	fixed counter
			Jan 2015					Sunday		1pm	Trail	natural	fixed counter
			Dec 2014					Sunday		1pm	Trail	natural	fixed counter
			Nov 2014	3,310		110		Sunday		1pm	Trail	natural	fixed counter
			Oct 2014	5,454		176		Sunday		1pm	Trail	natural	fixed counter
			Sept 2014	4,495		150		Sunday		1pm	Trail	natural	fixed counter
			Aug 2014	6,404		207		Sunday		1pm	Trail	natural	fixed counter
			Jul 2014	7,197		232		Sunday		1pm	Trail	natural	fixed counter
		6/12/2014	6/22/2013	1,509	11	137	243	Wednesday			Trail	natural	mobile counter
		6/8/2013	6/21/2013	2,523	14	180	292	Tuesday	20	10am	Trail	natural	mobile counter
28	Fremont Meadow Bridge	6/8/2013	6/21/2013	1,324	14	95	194	Sunday	9	12pm	Bridge	natural	mobile counter
29	Haul Road Trail (west of Mammoth Dr.)		Apr 2015	2,703		90		Saturday		9am	Trail	gravel	fixed counter
			Mar 2015	2,712		88		Saturday		9am	Trail	gravel	fixed counter
			Feb 2015	1,877		67		Saturday		9am	Trail	gravel	fixed counter
			Jan 2015	1,844		58		Saturday		9am	Trail	gravel	fixed counter
			Dec 2014	1,398		45		Saturday		9am	Trail	gravel	fixed counter
			Nov 2014	1,420		47		Saturday		9am	Trail	gravel	fixed counter
			Oct 2014	1,913		62		Saturday		9am	Trail	gravel	fixed counter
			Sept 2014	2,391		80		Saturday		9am	Trail	gravel	fixed counter
			Aug 2014	3,563		115		Saturday		9am	Trail	gravel	fixed counter
			Jul 2014	3,590		116		Saturday		9am	Trail	gravel	fixed counter
		7/16/2014	8/27/2014	4,956	43	115	243	Saturday			Trail	gravel	mobile counter
		7/13/2013	7/18/2013	290	6	48	67	Saturday	11	11am	Trail	gravel	mobile counter
						78							
30	Haul Road Trail @ USFS	7/13/2013	7/18/2013	1,350	6	225	523	Thursday	65	11am	Trail	natural	mobile counter
31	Shevlin Park (Commons trailhead)	7/20/2013	7/28/2013	725	9	81	115	Sunday	22	8am	Trail	natural	mobile counter
32	Three Pines Trail @ Shevlin Commons	7/20/2013	7/28/2013	425	9	47	69	Sunday	15	10am	Trail	AC	mobile counter
33	Cascade Highlands Trail (east of Skyline Ranch)	5/20/2014	6/10/2014	1,295	22	59	182	Friday			Trail	natural	mobile counter
		7/30/2013	8/6/2013	153	8	19	27	Thursday	4	8am	Trail	natural	mobile counter
34	West Bend Trail (west of Skyline Ranch)	5/20/2014	6/1/2014	2,171	13	167	264	Tuesday			Trail	natural	mobile counter
		7/30/2013	8/6/2013	1,281	8	160	259	Saturday	15	2pm	Trail	natural	mobile counter
35	Alpine Trail (trail proper below rimrock)	8/9/2013	8/12/2013	20	4	5	12	Saturday	5	7pm	Trail	natural	mobile counter
36	First St. Rapids Bridge (west side)	8/16/2013	8/20/2013	888	5	178	247	Sunday	54	1pm	Bridge	gravel	mobile counter
37	Alpine Trail (west of Alpine Park towards Tetherow)	8/9/2013	8/12/2013	92	4	23	28	Saturday	7	1pm	Trail	natural	mobile counter
38	Sawyer Bridge (west side)	8/16/2013	8/20/2013	984	5	197	213	Tuesday	28	9-10am	Bridge	natural	mobile counter
39	DRT at base of hill accessing River's Edge GC	8/29/2013	9/5/2013	274	8	34	46	Sunday	16	9am	Trail	gravel	mobile counter
40	DRT at middle of hill accessing Mt. Washington	8/29/2013	9/5/2013	790	8	99	146	Monday	40	8am	Trail	natural	mobile counter
41	Gilchrist footbridge (east)	9/7/2013	9/16/2013	2,001	10	200	350	Saturday	58	9am	Bridge	natural	mobile counter
42	DRT on Riverfront Sidewalk @ Gilchrist	9/7/2013	9/16/2013	840	10	84	169	Saturday	40	9am	Sidewalk	AC	mobile counter
43	Coyner Trail @ Burnside	7/16/2014	8/27/2014	3,997	43	93	149	Thursday			Trail	AC	mobile counter
44	Coyner Trail @ Burnside & 10th	5/20/2014	5/26/2014	822	7	117	182	Friday			Trail	AC	mobile counter
45	DRT @ Archie Briggs	4/29/2014	5/4/2014	673	6	112	189	Saturday			Trail	AC	mobile counter
46	DRT @ Northcliff	5/20/2014	6/10/2014	3,726	22	169	264	Tuesday			Trail	AC	mobile counter
47	DRT North?	8/16/2014	8/27/2014	5,341	12	445	508	Monday			Trail	gravel	mobile counter

48	DRT Sawyer Uplands Connector	5/13/2014	5/18/2014	317	6	53	73	Saturday		Trail	gravel	mobile counter
49	Pine Nursery Disc Golf Course	5/6/2014	5/11/2014	294	6	49	67	Tuesday		Trail	AC	mobile counter
50	Shevlin Park (Tumalo Creek North)	7/18/2014	8/27/2014	1,910	41	47	86	Saturday		Trail	natural	mobile counter
51	Shevlin Park (Tumalo Creek South)	7/18/2014	8/27/2014	8,846	41	216	318	Saturday		Trail	natural	mobile counter
52	Shevlin Park (Upper Footbridge)	6/12/2014	6/22/2014	828	11	75	145	Thursday		Bridge	natural	mobile counter
53	West Bend Trail	8/16/2014	8/27/2014	1,738	12	145	195	Saturday		Trail	natural	mobile counter
54	West Bend Trail (north side)		Apr 2015	5,106		170		Saturday	3pm	Trail	AC	fixed counter
			Mar 2015	4,660		150		Saturday	3pm	Trail	AC	fixed counter
			Feb 2015	3,646		130		Saturday	3pm	Trail	AC	fixed counter
			Jan 2015					Saturday	3pm	Trail	AC	fixed counter
			Dec 2014	2,166		71		Saturday	3pm	Trail	AC	fixed counter
			Nov 2014	2,885		96		Saturday	3pm	Trail	AC	fixed counter
			Oct 2014	4,058		131		Saturday	3pm	Trail	AC	fixed counter
			Sept 2014	4,617		154		Saturday	3pm	Trail	AC	fixed counter
			Aug 2014	4,489		114		Saturday	3pm	Trail	AC	fixed counter
			Jul 2014					Saturday	3pm	Trail	AC	fixed counter
55	Shevlin Tumalo Creek Trail North		Apr 2015	962		32		Sunday	10am	Trail	natural	fixed counter
			Mar 2015	1,216		39		Sunday	10am	Trail	natural	fixed counter
			Feb 2015					Sunday	10am	Trail	natural	fixed counter
			Jan 2015					Sunday	10am	Trail	natural	fixed counter
			Dec 2014					Sunday	10am	Trail	natural	fixed counter
			Nov 2014	402		13		Sunday	10am	Trail	natural	fixed counter
			Oct 2014	937		30		Sunday	10am	Trail	natural	fixed counter
			Sept 2014	1,320		44		Sunday	10am	Trail	natural	fixed counter
			Aug 2014	1,578		51		Sunday	10am	Trail	natural	fixed counter
			Jul 2014	1,165		38		Sunday	10am	Trail	natural	fixed counter