

“Colorado’s Statewide Bicycle and Pedestrian Count Project and Program”



NATMEC

Improving Traffic Data Collection, Analysis, and Use

1. The Problem
2. How the problem relates to everyone?
3. The Solution

The Problem

Gap between Transportation and Health

- Communication/Coordination
- Data and Information
- Policy/Procedural
- Lack of Statistical/Standard Methods

How the problem relates to everyone?

- Air Quality – Hydrocarbons
- Physical Activity – Obesity
 - 2/3rds of Americans are overweight or obese
 - Health Risk Factors: type 2 diabetes, coronary heart disease, high LDL “bad” cholesterol, stroke, hypertension, osteoarthritis, etc.
- Available Modes of Transportation
 - No Bicycle and Pedestrian Accommodations
 - No Bicycle, No Transit, etc.
 - No Map, No Directions, No Awareness



Colorado's Program "Part of the Solution"



- History of Data Collection Program
- Why is bicycle and pedestrian data important?
- Inventory of Existing data
- Automated Counting Equipment
- What does the data tell us?
- Where to go from here?





HISTORY



Statewide Bicycle and Pedestrian Data Collection Program

- CDOT develops Bicycle and Pedestrian Program (1970's)
- CDOT develops first Bicycle and Pedestrian Policy (1977)
- CDOT federally mandated - Bicycle and Pedestrian position (1990's)
- Manual bicycle counts only (prior to 2009)
 - 2-hour duration
 - Randomly collected
 - Geographic coverage – spotty at best
- CDOT attends National Bike and Pedestrian Webinar (June, 2009)
- CDOT evaluates automated counting technology (June/Aug, 2009)
- CDOT creates pilot project testing equipment (September, 2009)
- CDOT participates in National Bicycle and pedestrian project (September-October, 2009)





HISTORY – Continued



CDOT updates Bike Policy (2009)

CDOT develops Procedural Directive (2010)

CDOT establishes formal Bike/Ped Counting Program (2010)

CDOT purchases equipment

- 6 Counters (May, 2010)

- Future Purchasing of 6-20 counters through teaming arrangements (2010)

CDOT creates partnership program (May, 2010)

Kaiser Grant – Live Well Communities

- City, County, and other Agency Participation Interest established

- CDOT creates Equipment Application for Loaner Program

CDOT working on Design Manual Chapter (2010-2011)

CDOT working to create Bike/Ped Data Warehouse

Colorado Agencies collect statewide Bike/Ped Data (ongoing)

Why collect bicycle and pedestrian data?

- Bridge the Gap between Health and Transportation
- For funding
- To accommodate other modes of transportation
- To address air quality standards
- To make informed program decisions



How do we accomplish making informed decisions about bicycles and pedestrians?

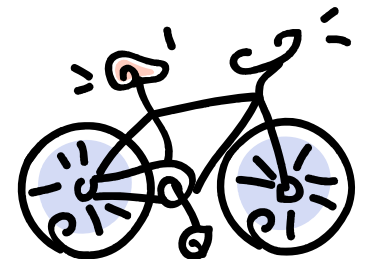
- Establish existing system usage
 - Without data must guess
 - Having data is the key to making informed decisions
- Provide usage information to others
 - Maintenance
 - Planning
 - Other Agencies



Existing Data Inventory

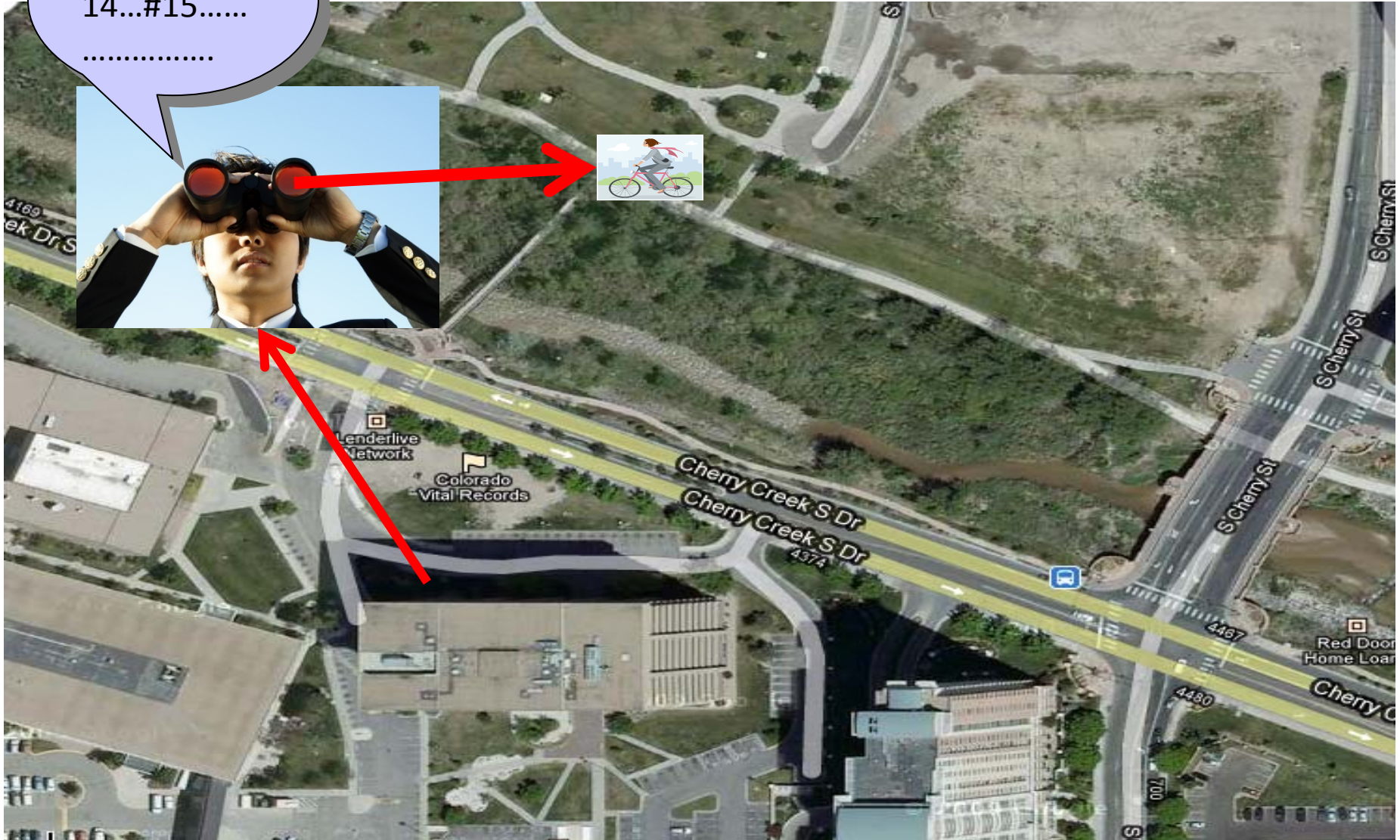
- Current data search
 - Some hourly count data
 - 2-hours in duration
 - manually collected
- Are there other statewide data sources?
 - City of Boulder
 - City of Denver
 - Etc.

Existing Inventory revealed a need to evaluate data processing, storing, and analysis of data to find automated counting, processing...**is there a better way...?**



How was bicycle and pedestrian data collected in the past?

#12...#13...#
14...#15.....
.....



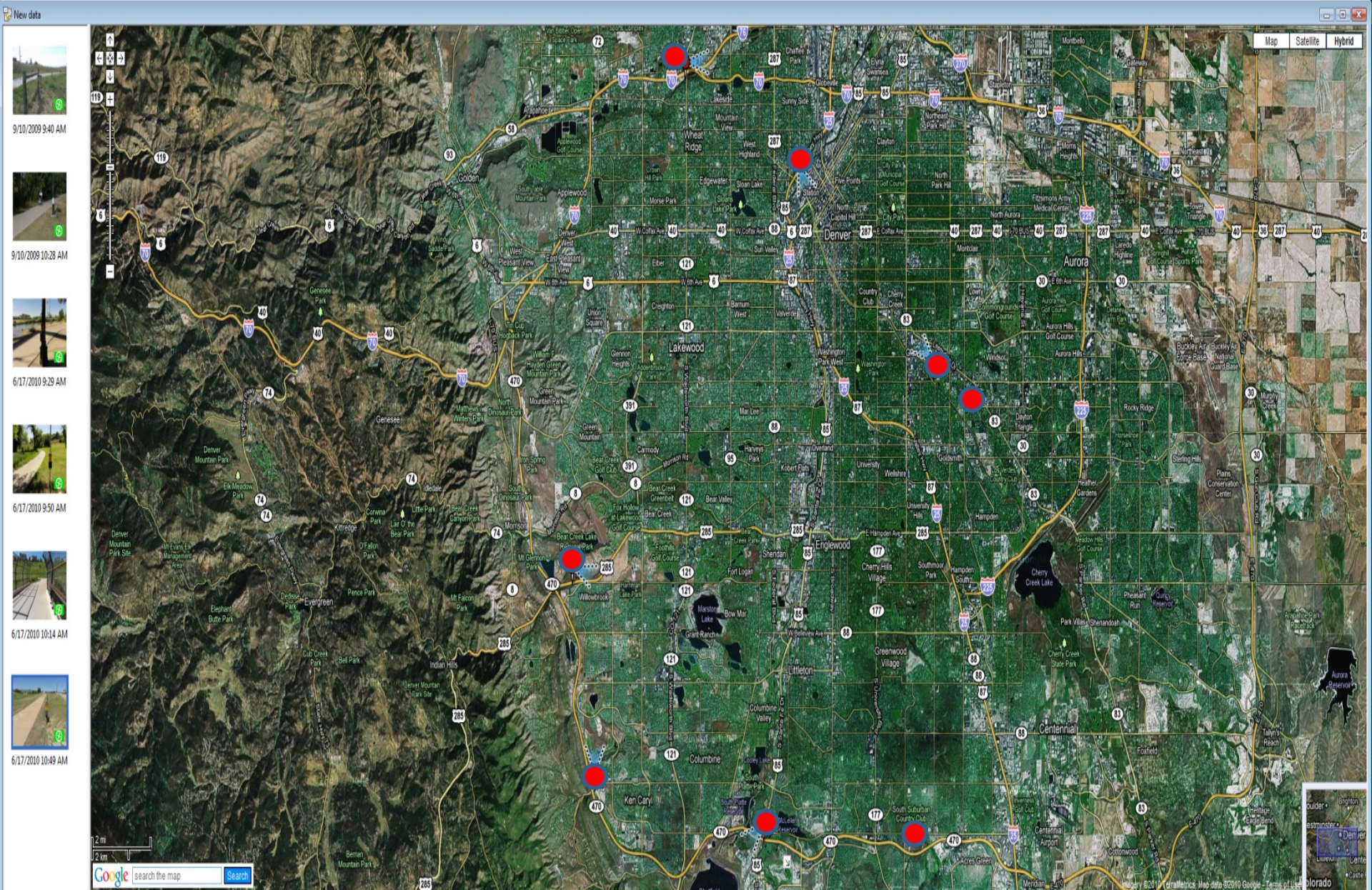
What did CDOT find? Eco-Counters



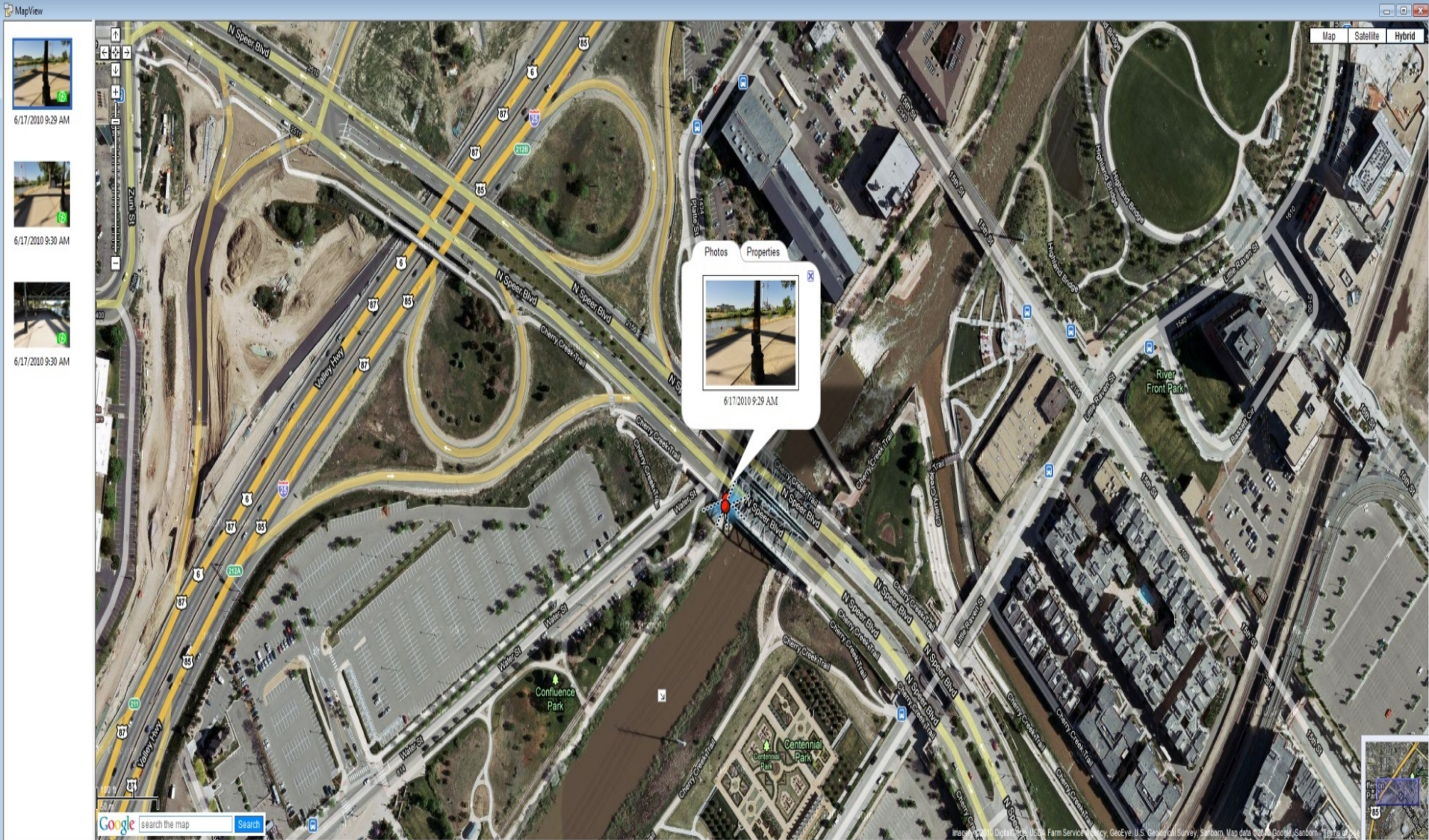
- www.eco-counter.com



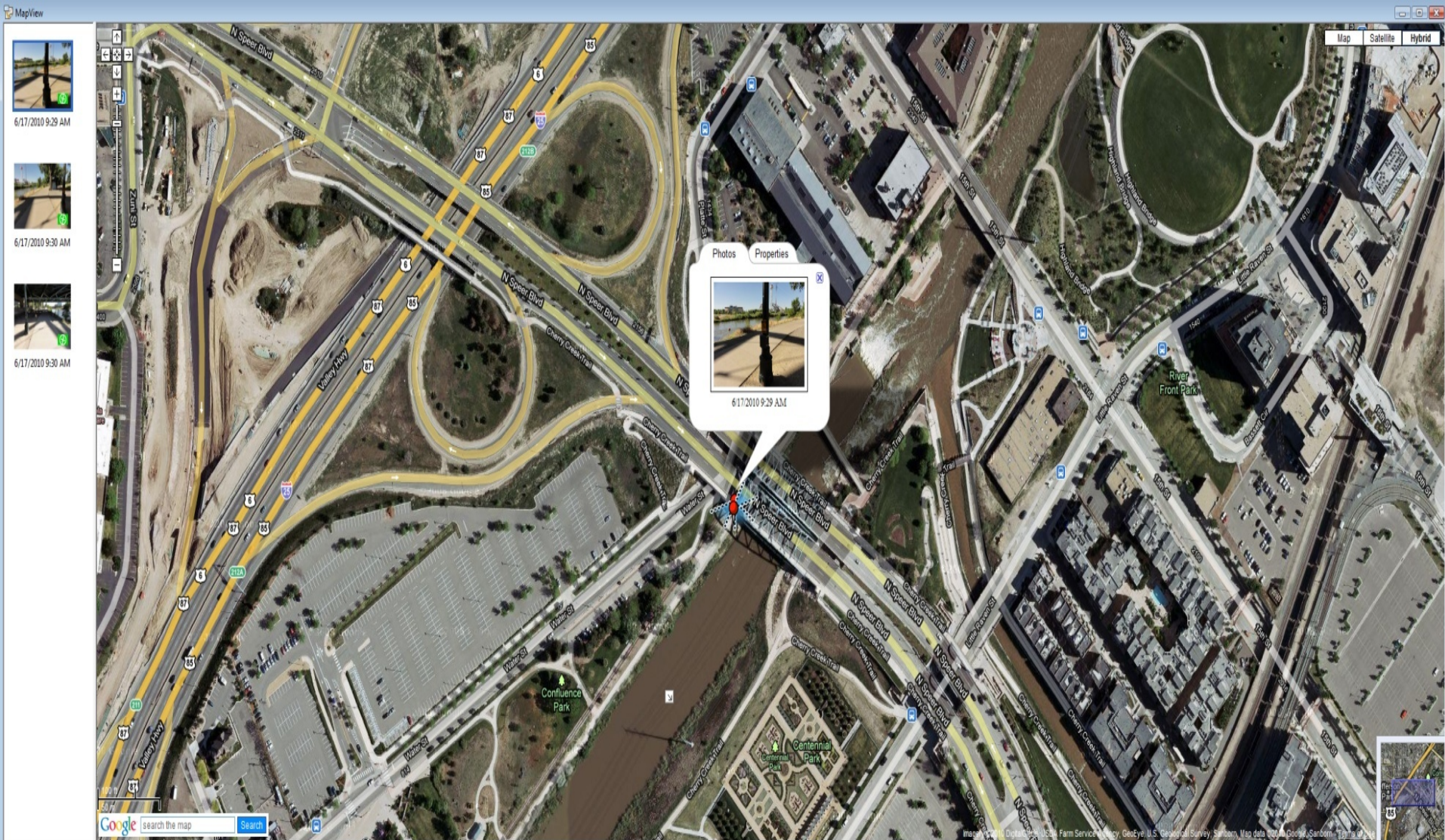
Counting Locations



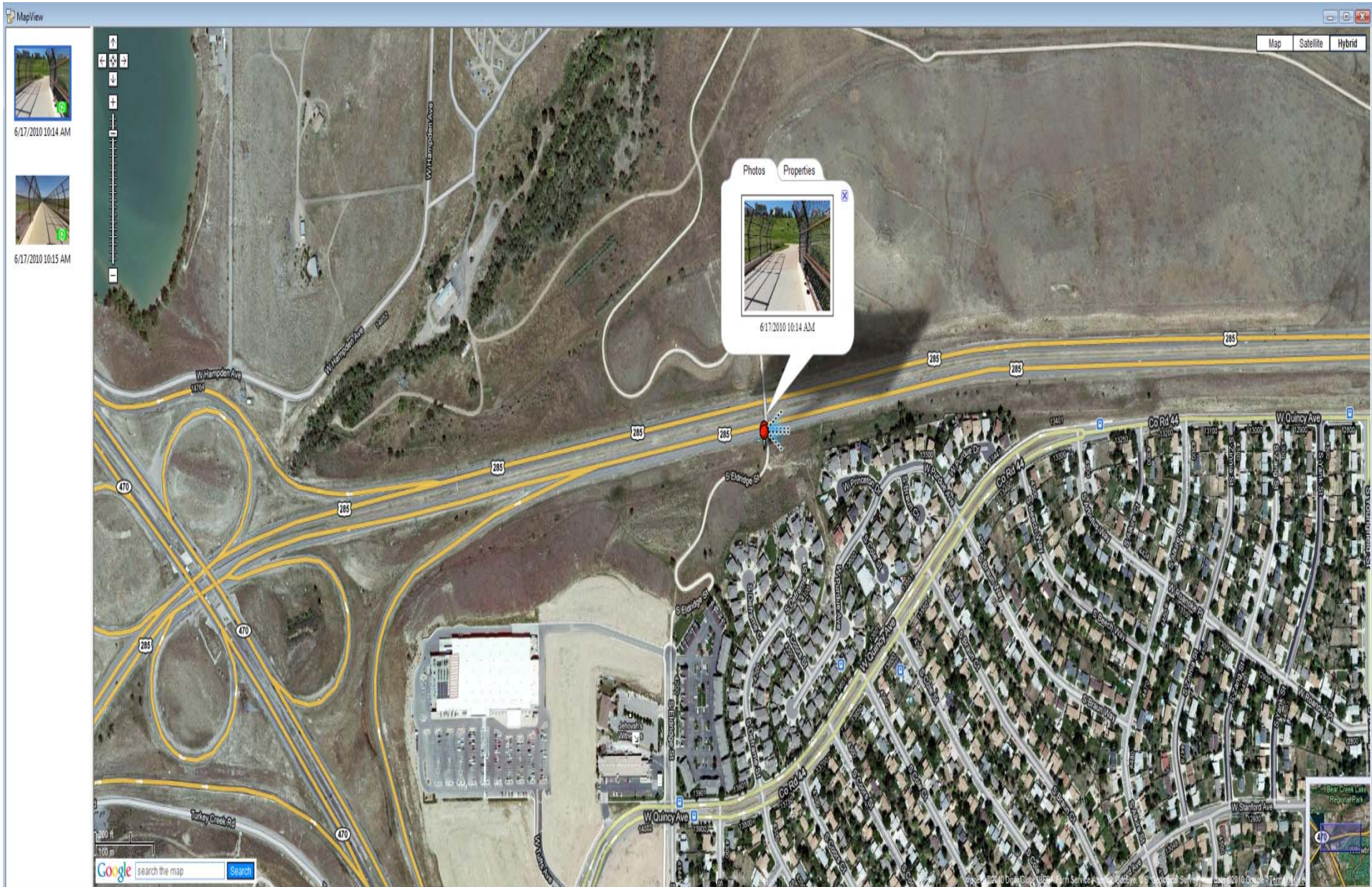
South of REI on Platte River Trail



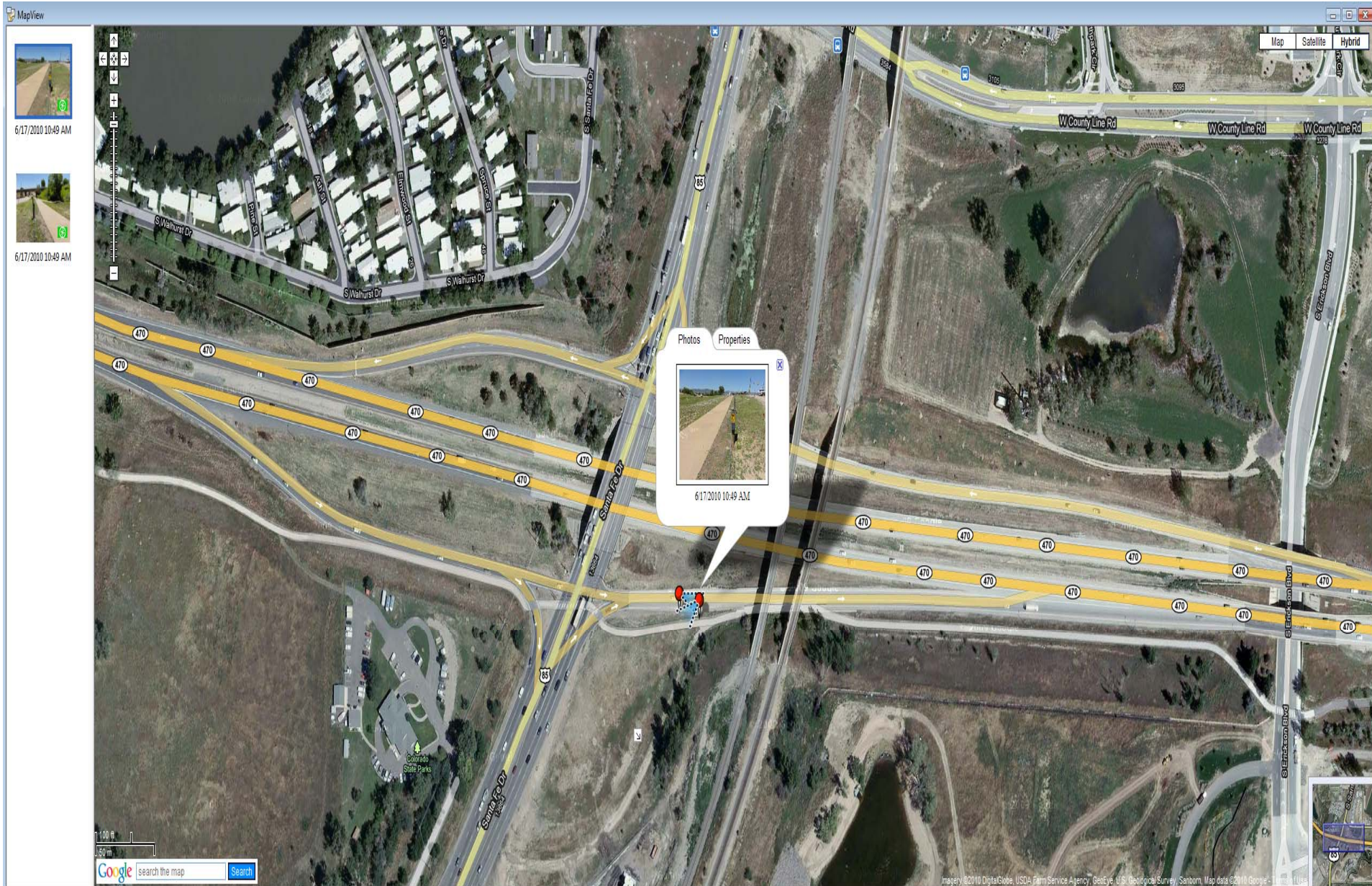
Clear of Creek Trail – South of I-70 on Wadsworth



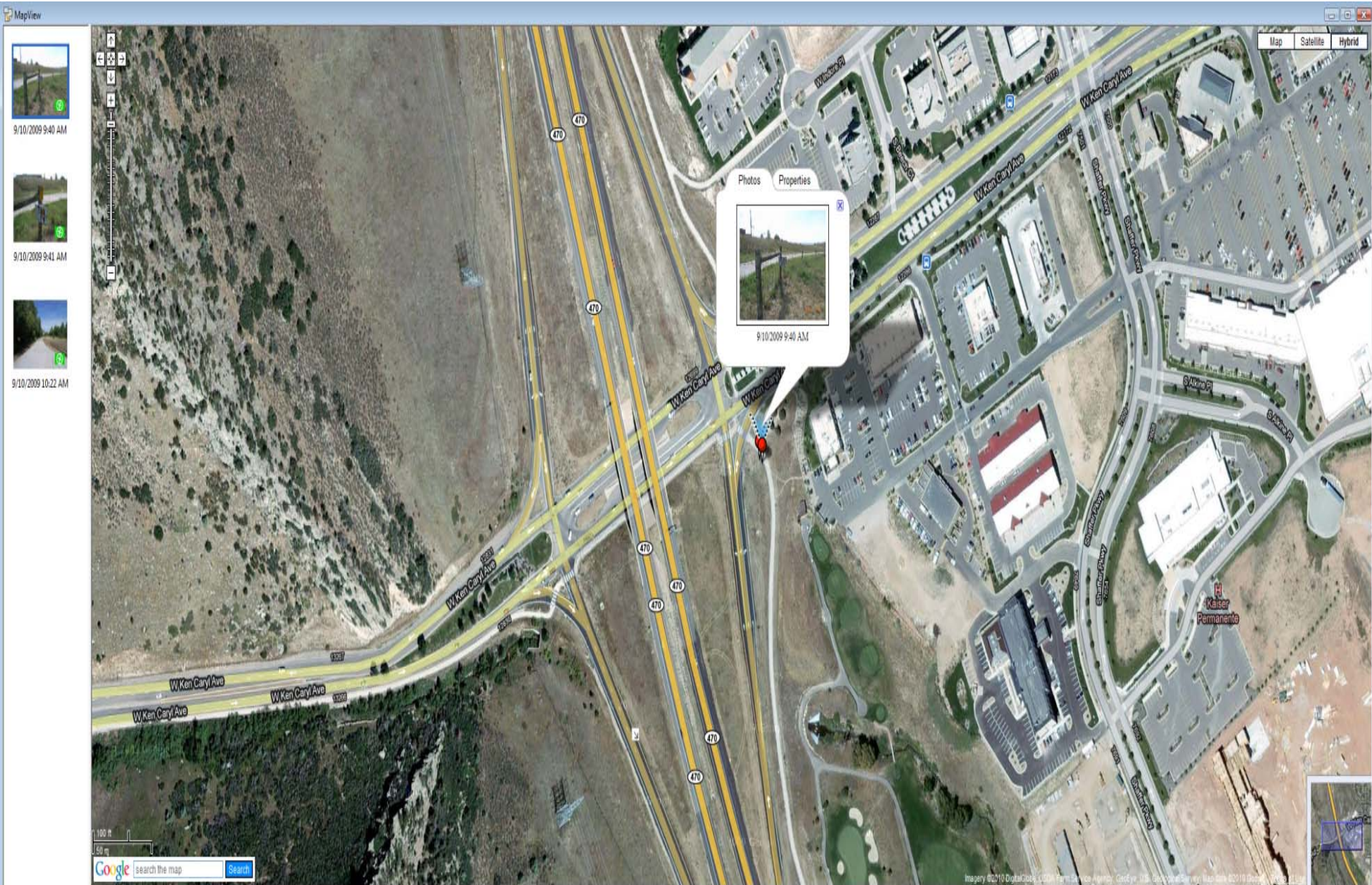
C-470 Trail South of 285



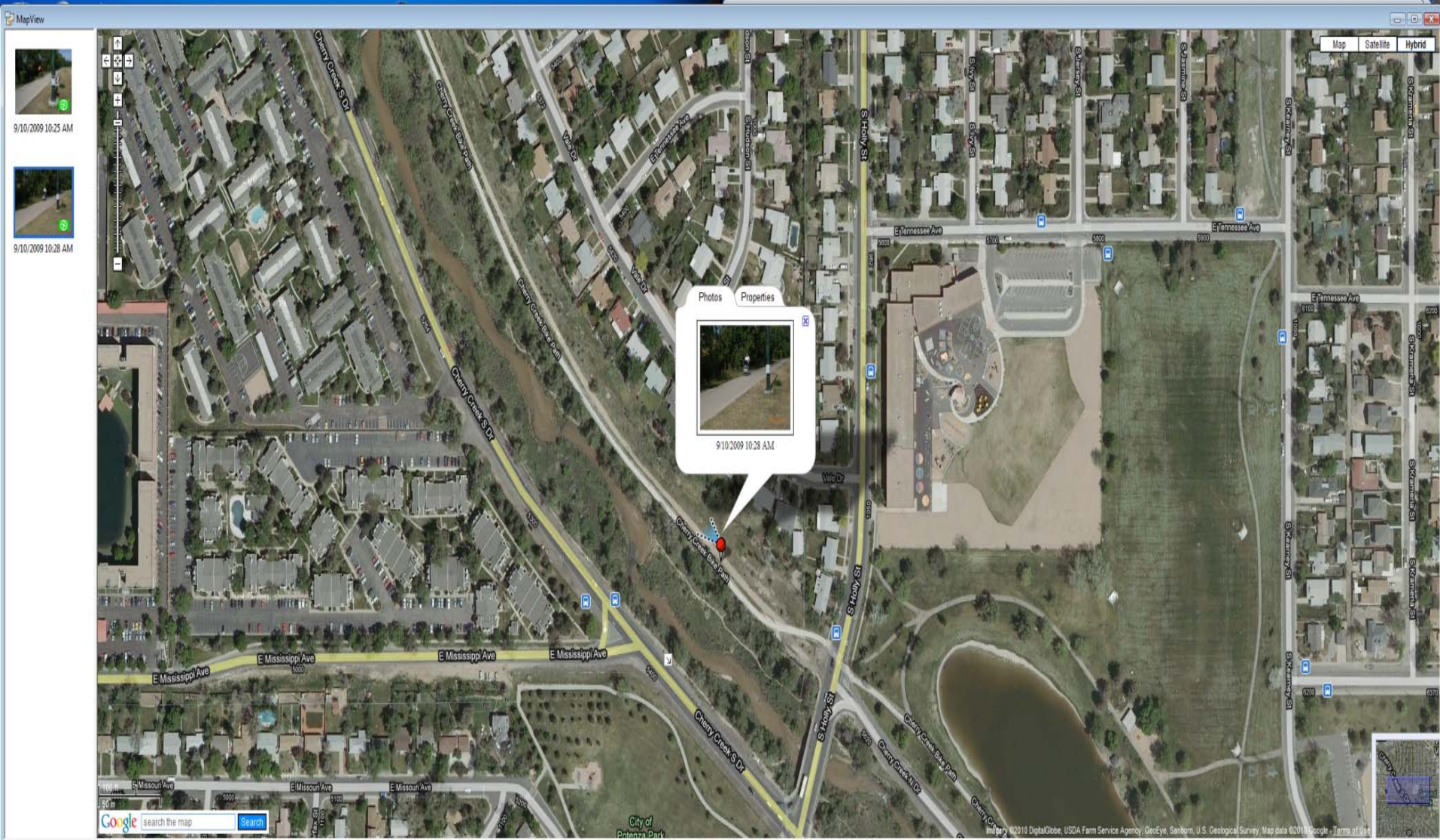
C-470 Trail East of Santa Fe



C-470 Trail South of Ken Caryl



Cherry Creek Trail Northwest of Holly Street Bridge

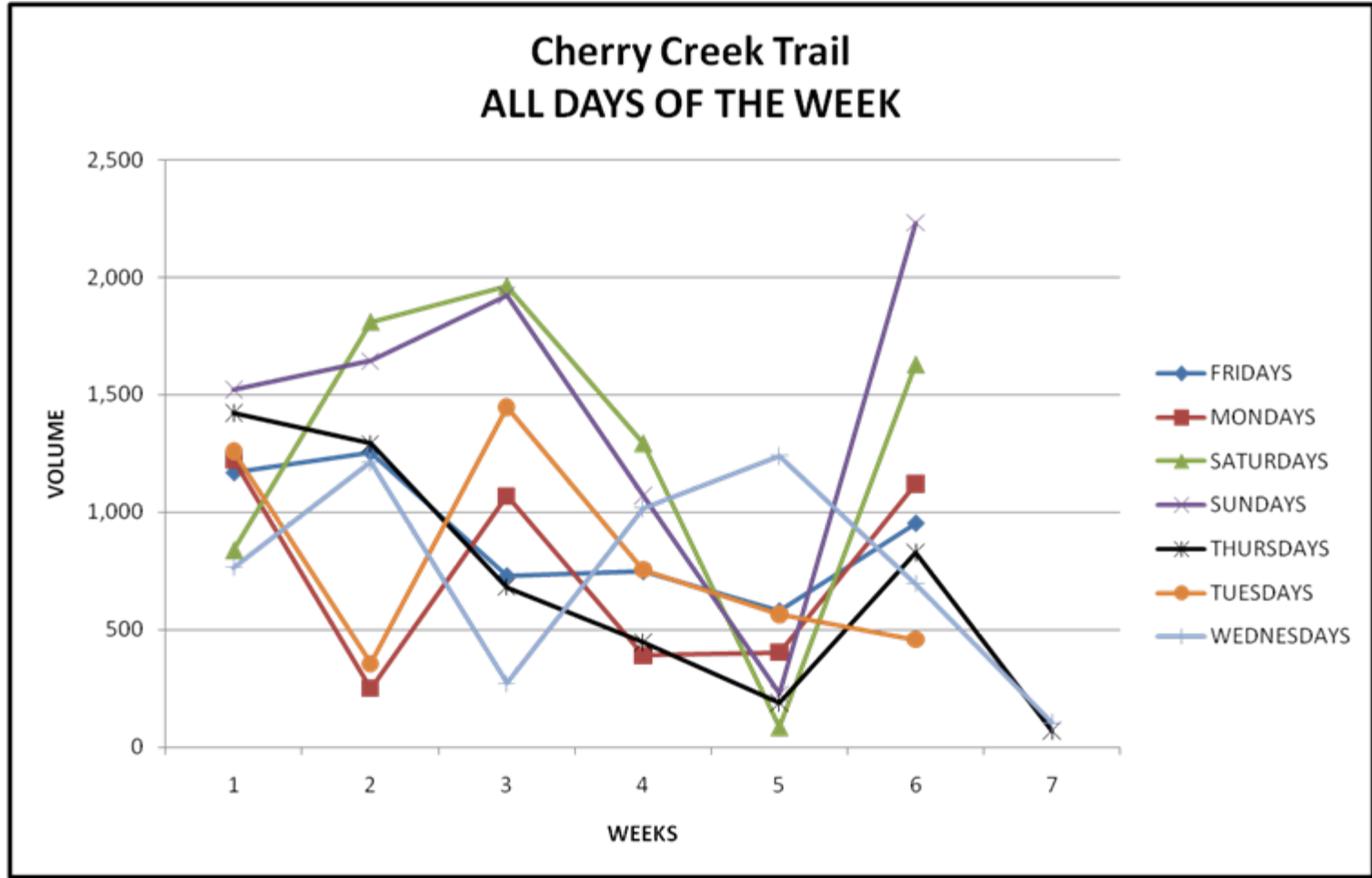


How to analyze bicycle and pedestrian data?

- Behavioral Patterns?
 - Weather patterns
 - Commuter patterns
 - Morning and evening (2) peaks indicating commute to work patterns
 - Weekend (1) one peak indicating recreational usage
 - Day of the Week patterns
 - Monday looks different than Wednesday looks different than Friday
 - Weekday versus weekend
 - Seasonal patterns
 - Drop in overall usage between seasons
 - Other patterns?

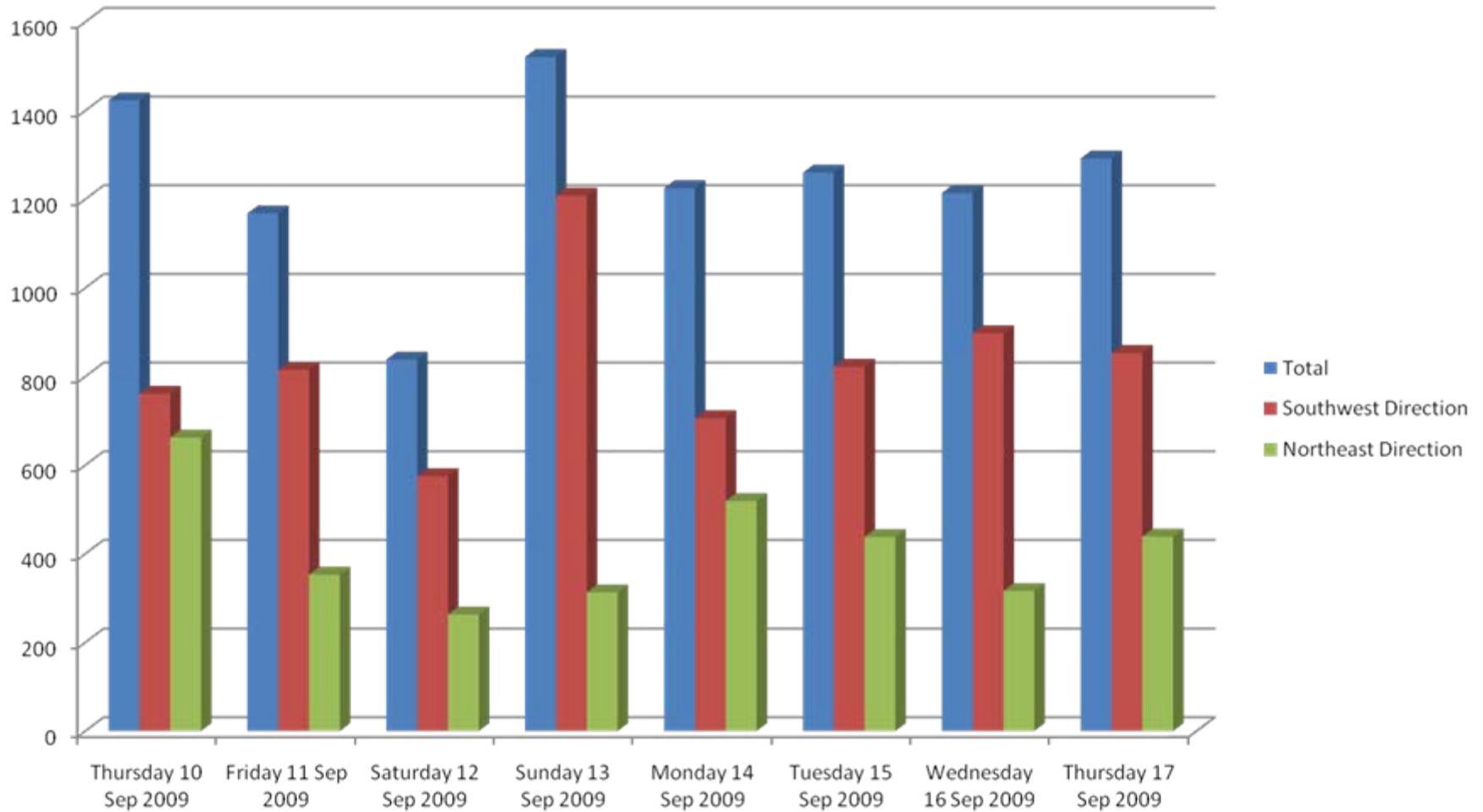


What does the data tell us?

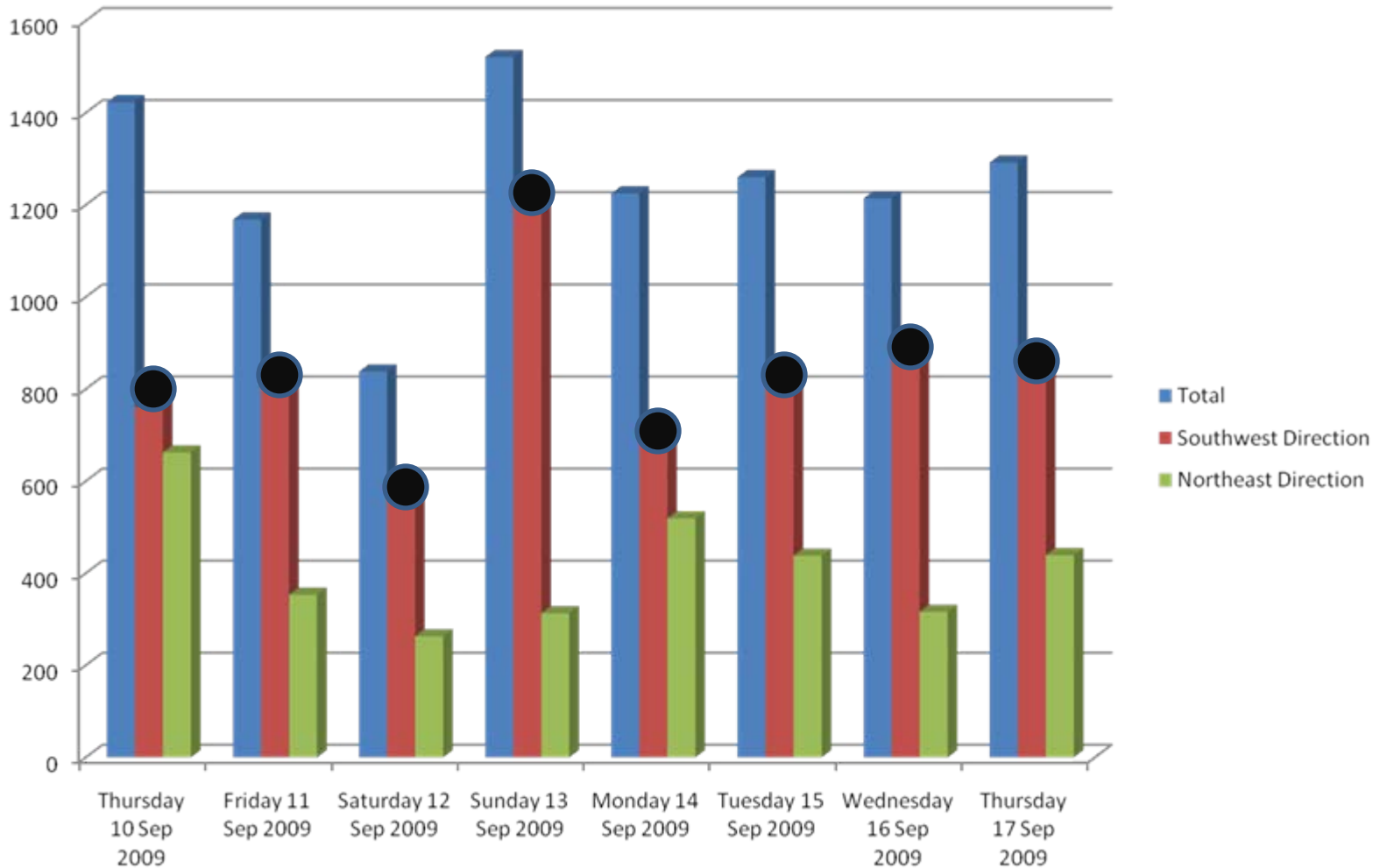


Hard to see patterns with all days of the week displayed?

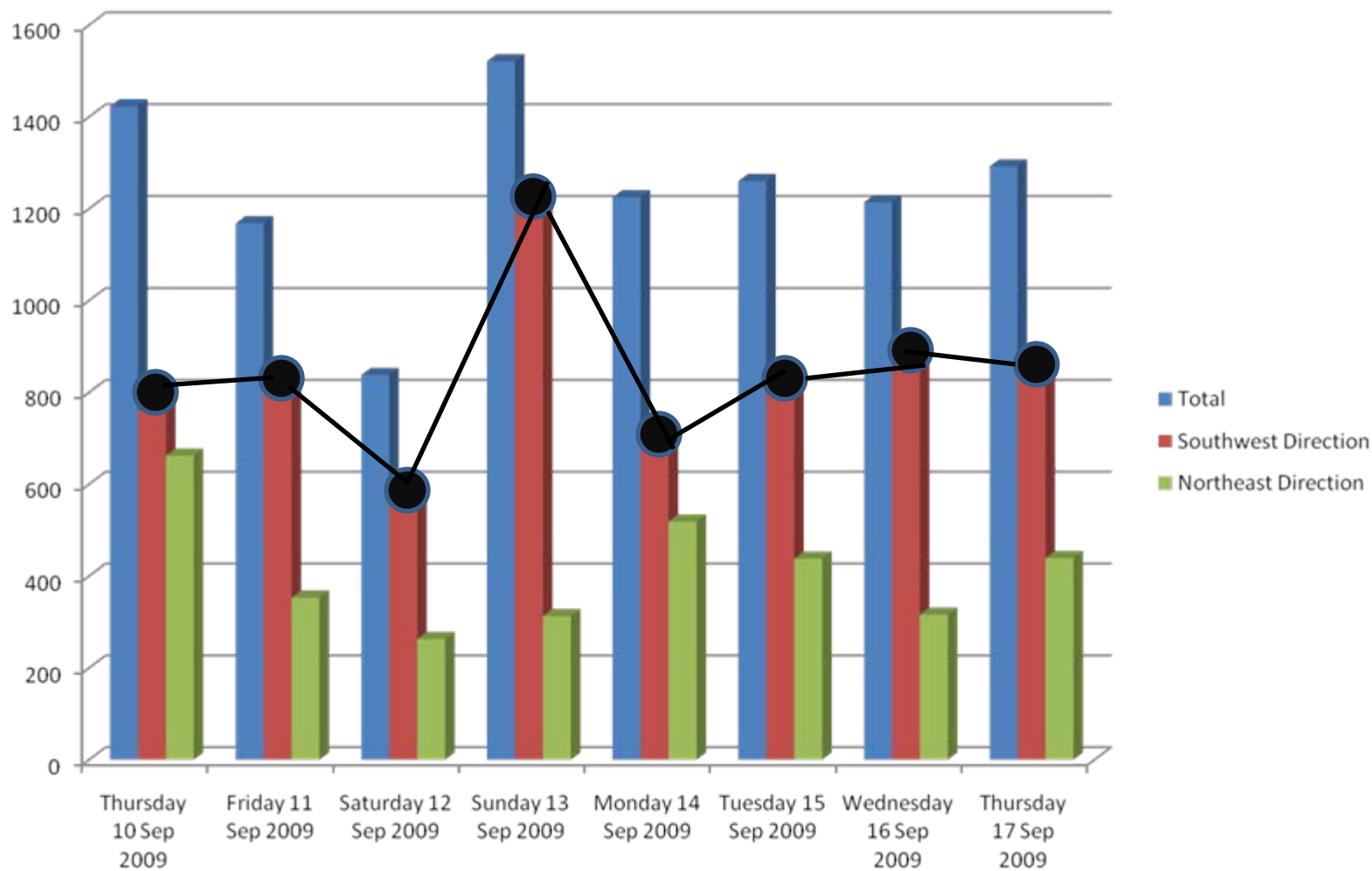
Cherry Creek Trail Bicycle and Pedestrian Data



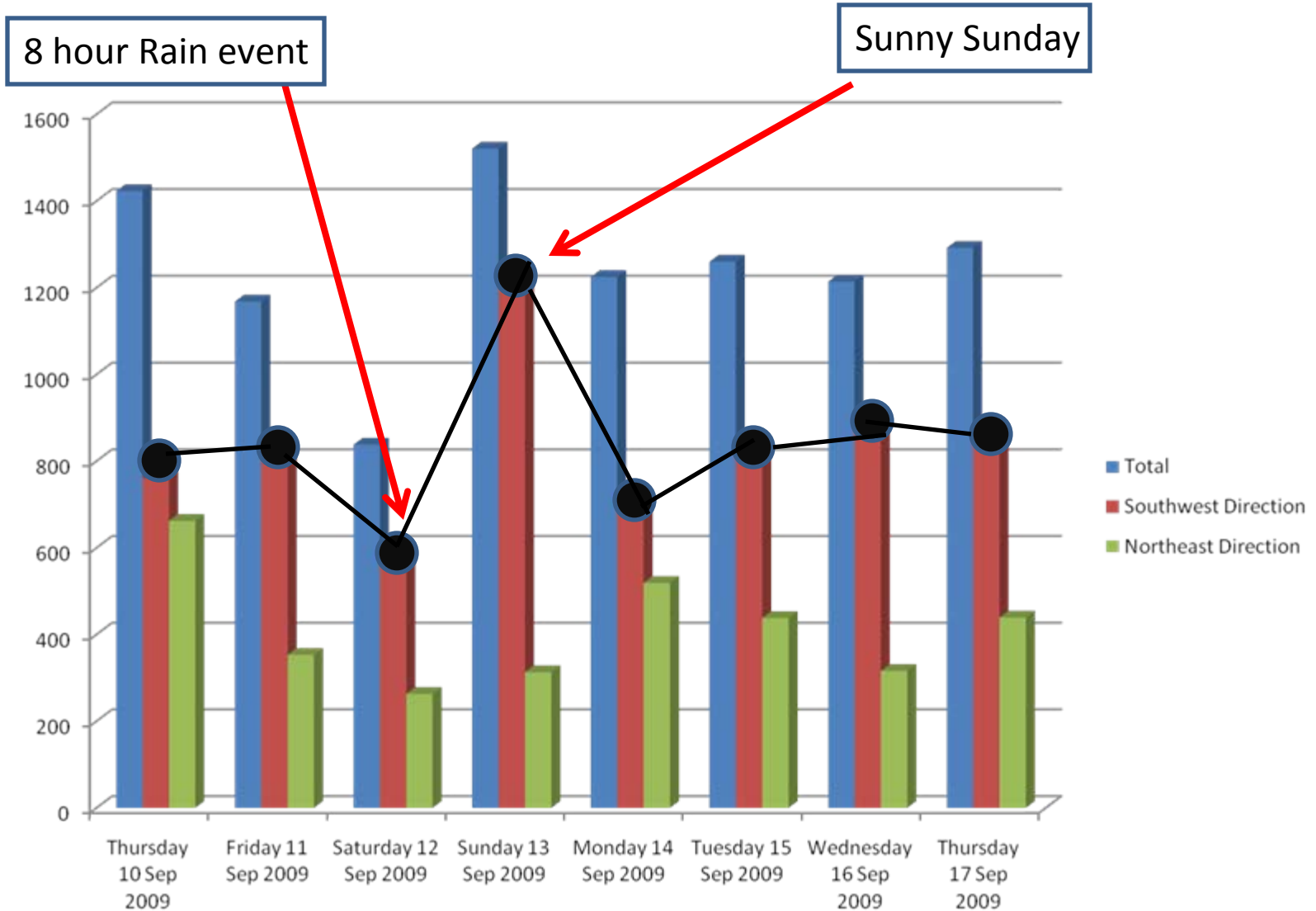
Cherry Creek Trail Bicycle and Pedestrian Data



Cherry Creek Trail Bicycle and Pedestrian Day of the Week Data

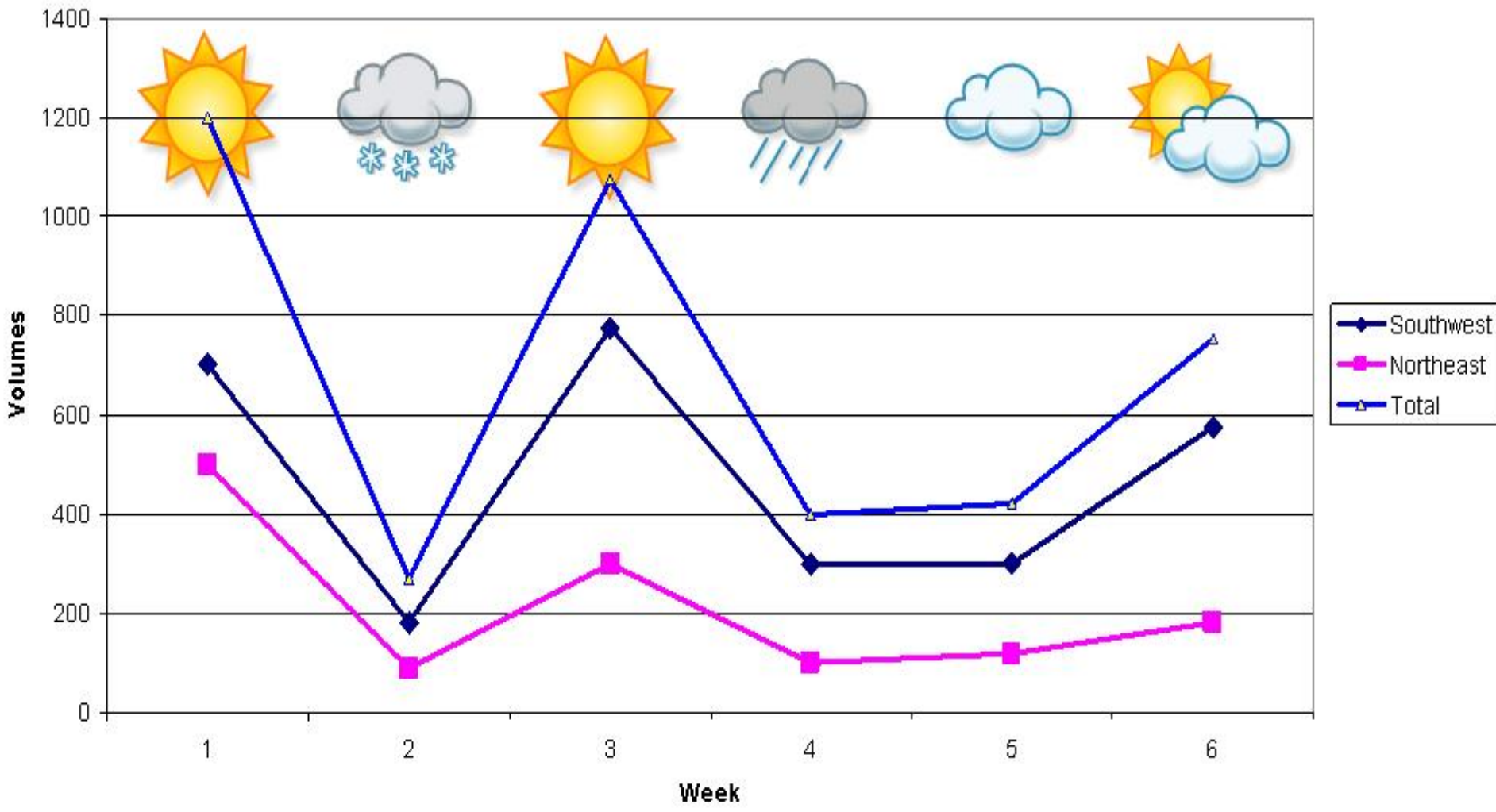


Cherry Creek Trail Bicycle and Pedestrian Day of the Week Data



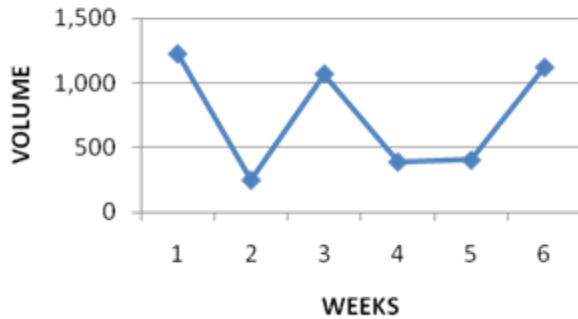
Various ways to display bicycle and pedestrian data

Holly Street Bridge - Bike/Pedestrian Data Mondays

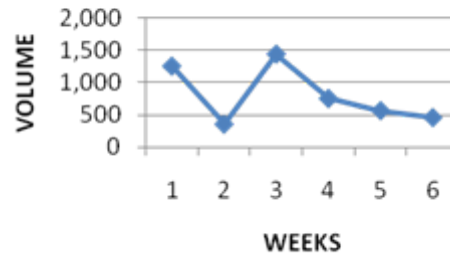


As you begin to analyze the data it starts to reveal distinct patterns...

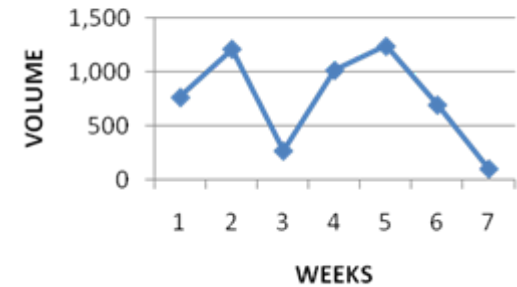
MONDAYS



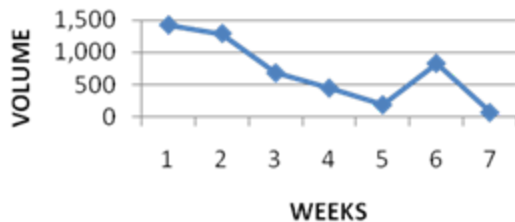
TUESDAYS



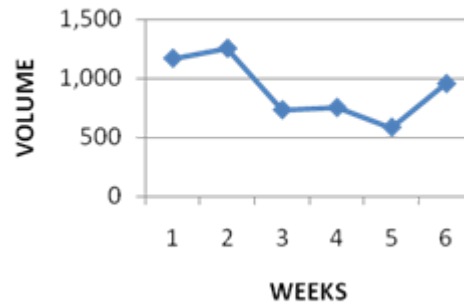
WEDNESDAYS



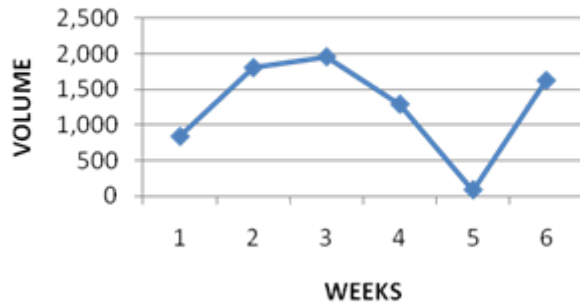
THURSDAYS



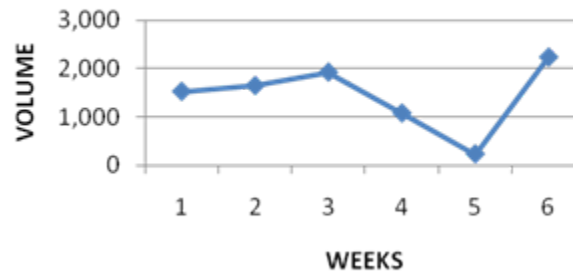
FRIDAYS



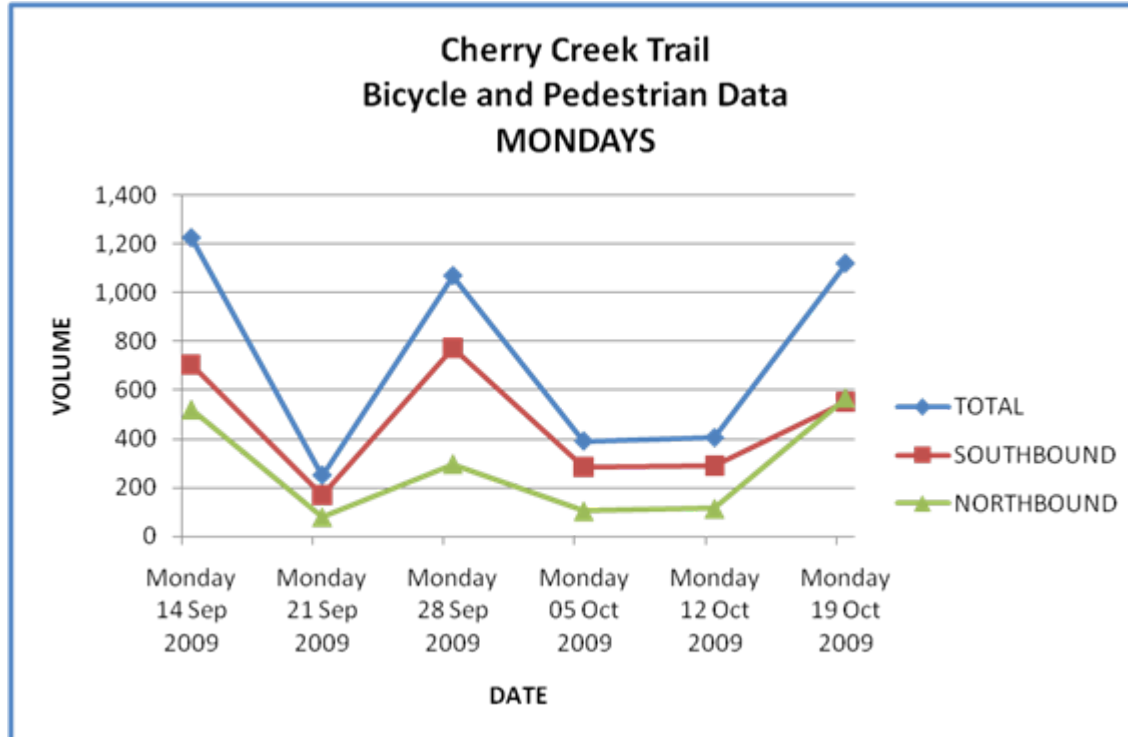
SATURDAYS



SUNDAYS



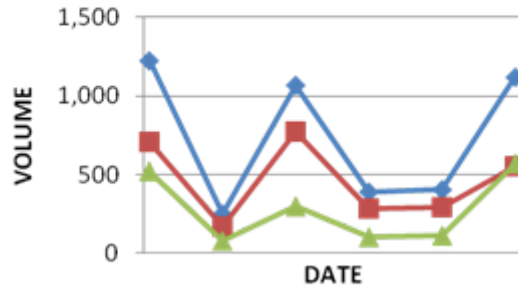
What does the data tell us? These distinct data patterns begin to tell a story...



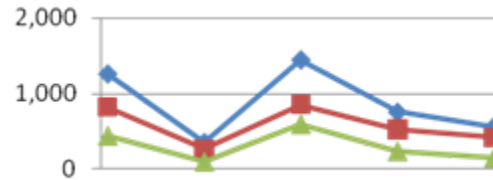
- Directional Data shows...more Southbound Traffic every Monday
- Traffic Volume Range ~580 to 1250
- Weather has an effect on Traffic
- Seasonal Pattern detected with an overall September to October Drop in Traffic

The story begins to answer policy questions so informed decisions can be made...

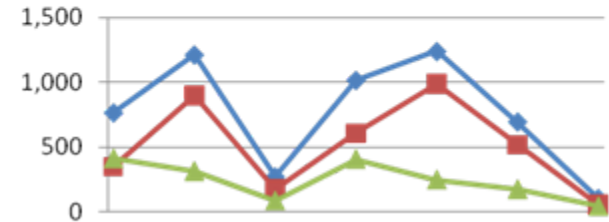
Cherry Creek Trail
Bicycle and Pedestrian Data
MONDAYS



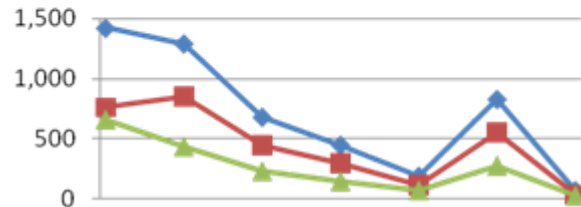
Cherry Creek Trail
Bicycle and Pedestrian
Data
TUESDAYS



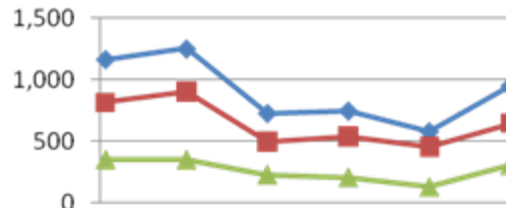
Cherry Creek Trail
Bicycle and Pedestrian Data
WEDNESDAYS



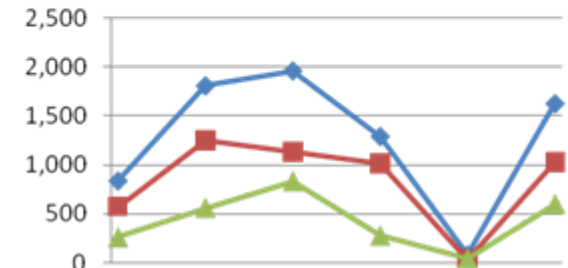
Cherry Creek Trail
Bicycle and Pedestrian Data
THURSDAYS



Cherry Creek Trail
Bicycle and Pedestrian Data
FRIDAYS



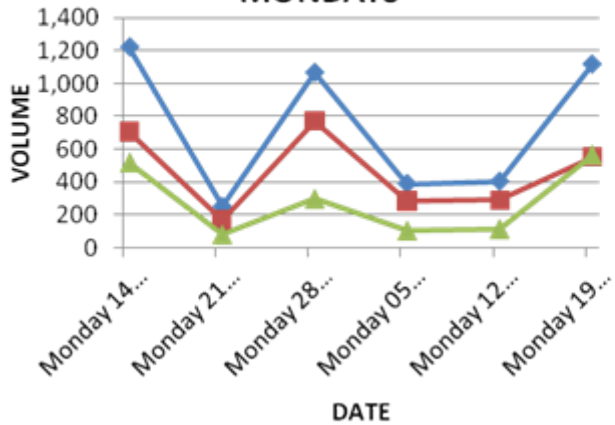
Cherry Creek Trail
Bicycle and Pedestrian Data
SATURDAYS



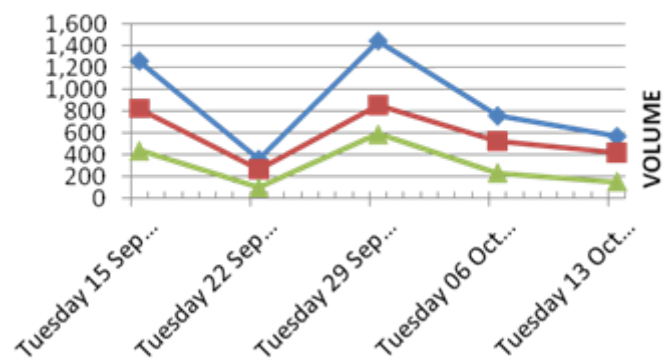
- More southbound Traffic Everyday of the week ...
- Now funding allocations can be directed to usage by using data to justify improvements...

These distinct data patterns begin to tell a story...

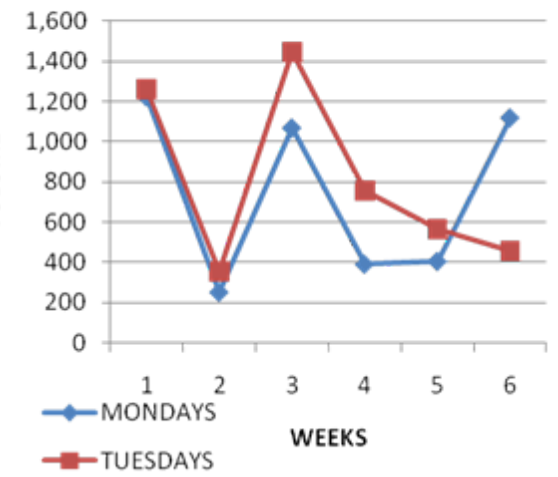
**Cherry Creek Trail
Bicycle and Pedestrian Data
MONDAYS**



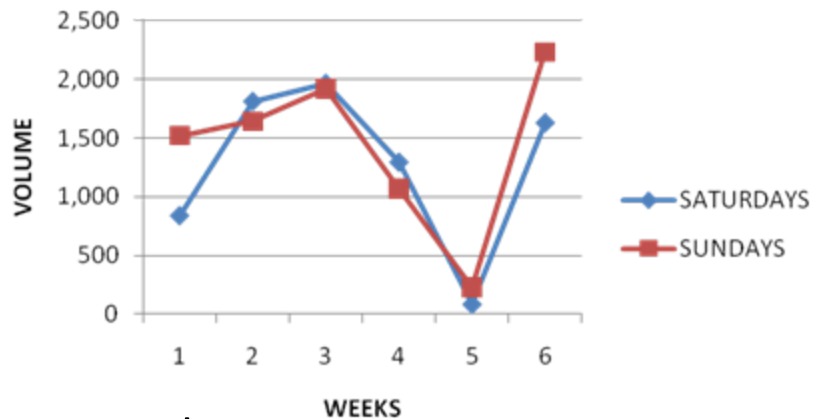
**Cherry Creek Trail
Bicycle and Pedestrian Data
TUESDAYS**



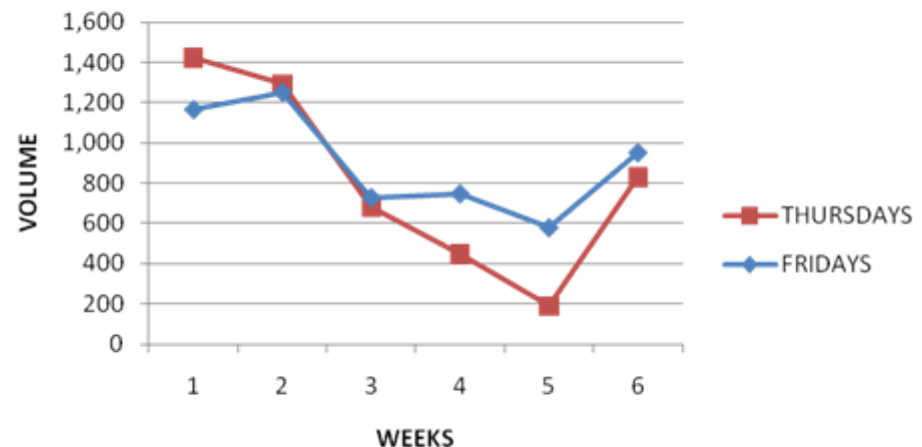
MONDAYS AND TUESDAYS



**WEEKENDS
SATURDAYS and SUNDAYS**



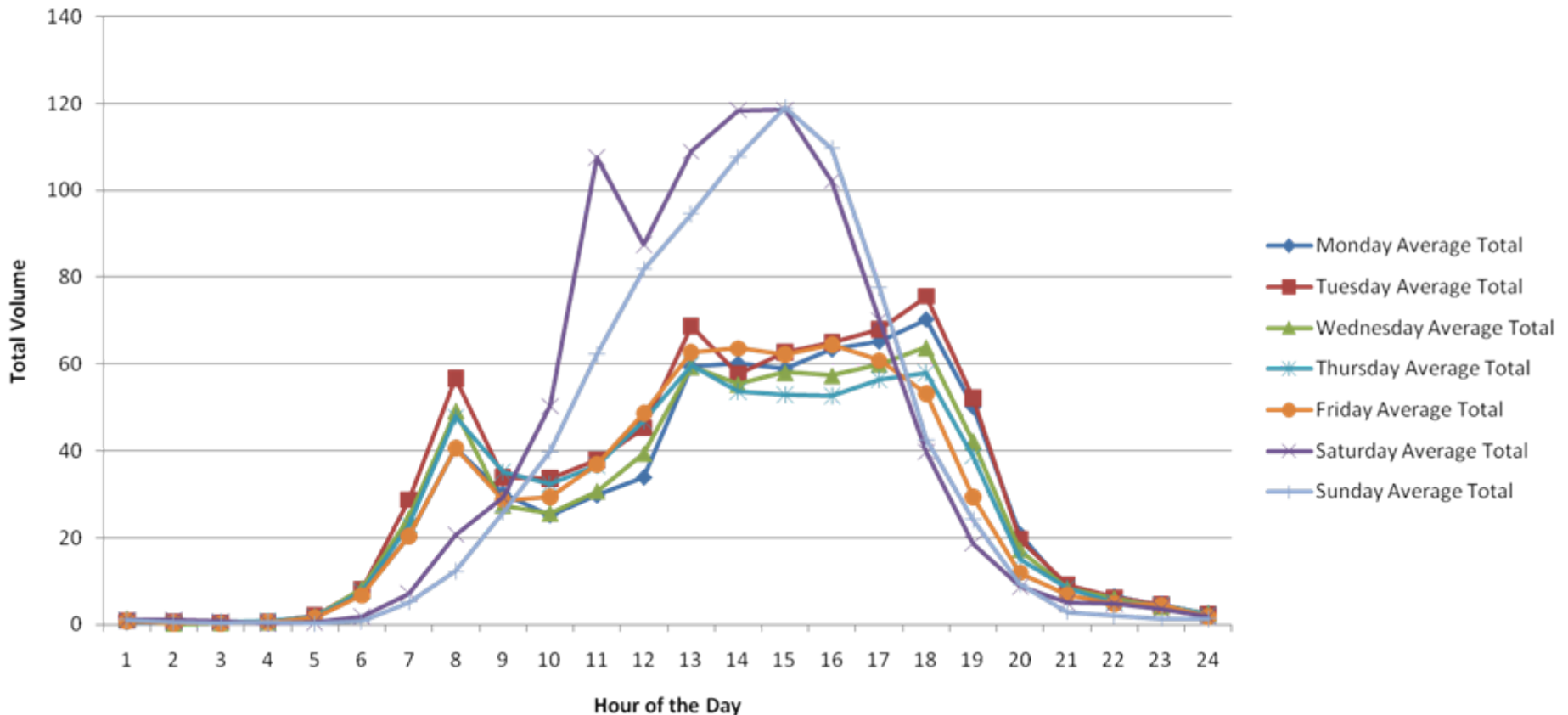
THURSDAYS and FRIDAYS



- Weather
- More South-bounders

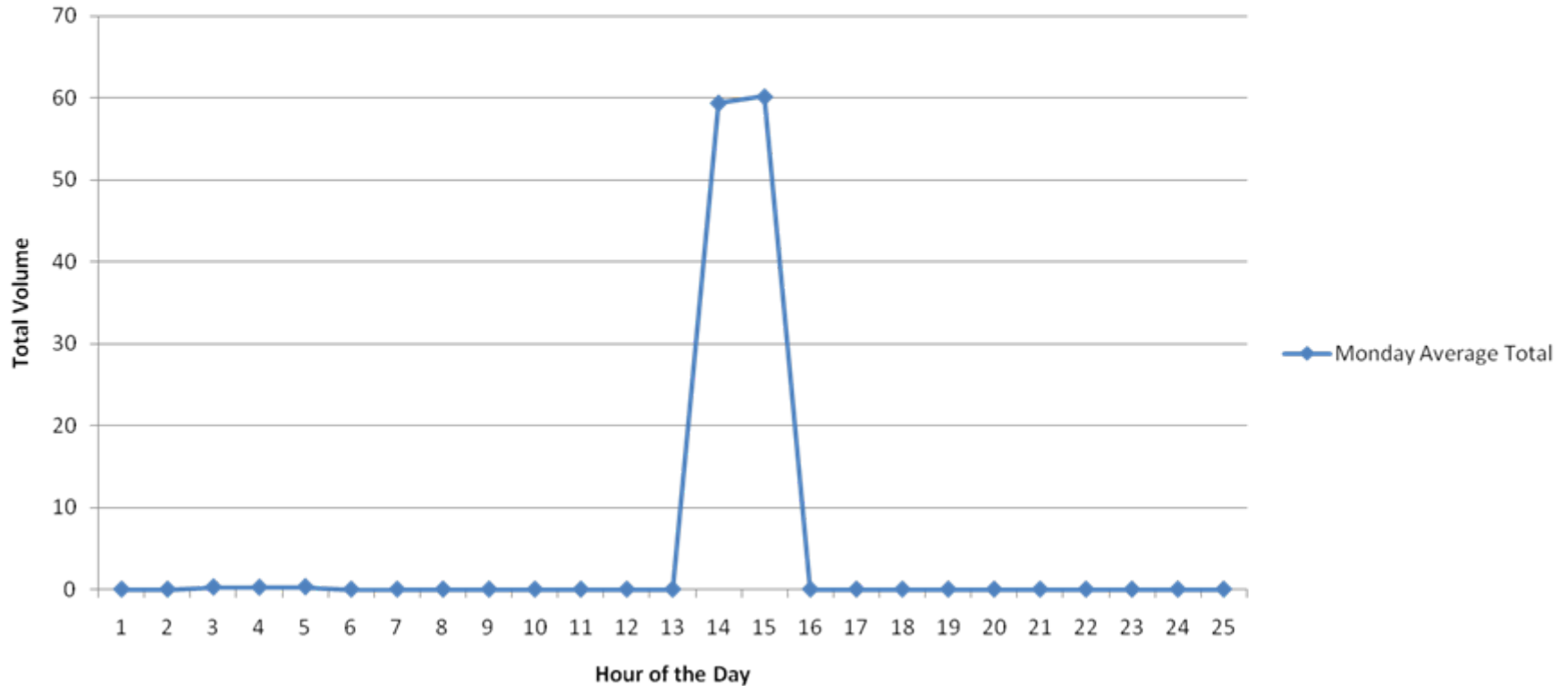
Recreational versus Commuter Travel Patterns begin to emerge...

Cherry Creek Trail, Colorado
Bicycle and Pedestrian Traffic
Average Total Volumes
(September, 2009 – April, 2010)



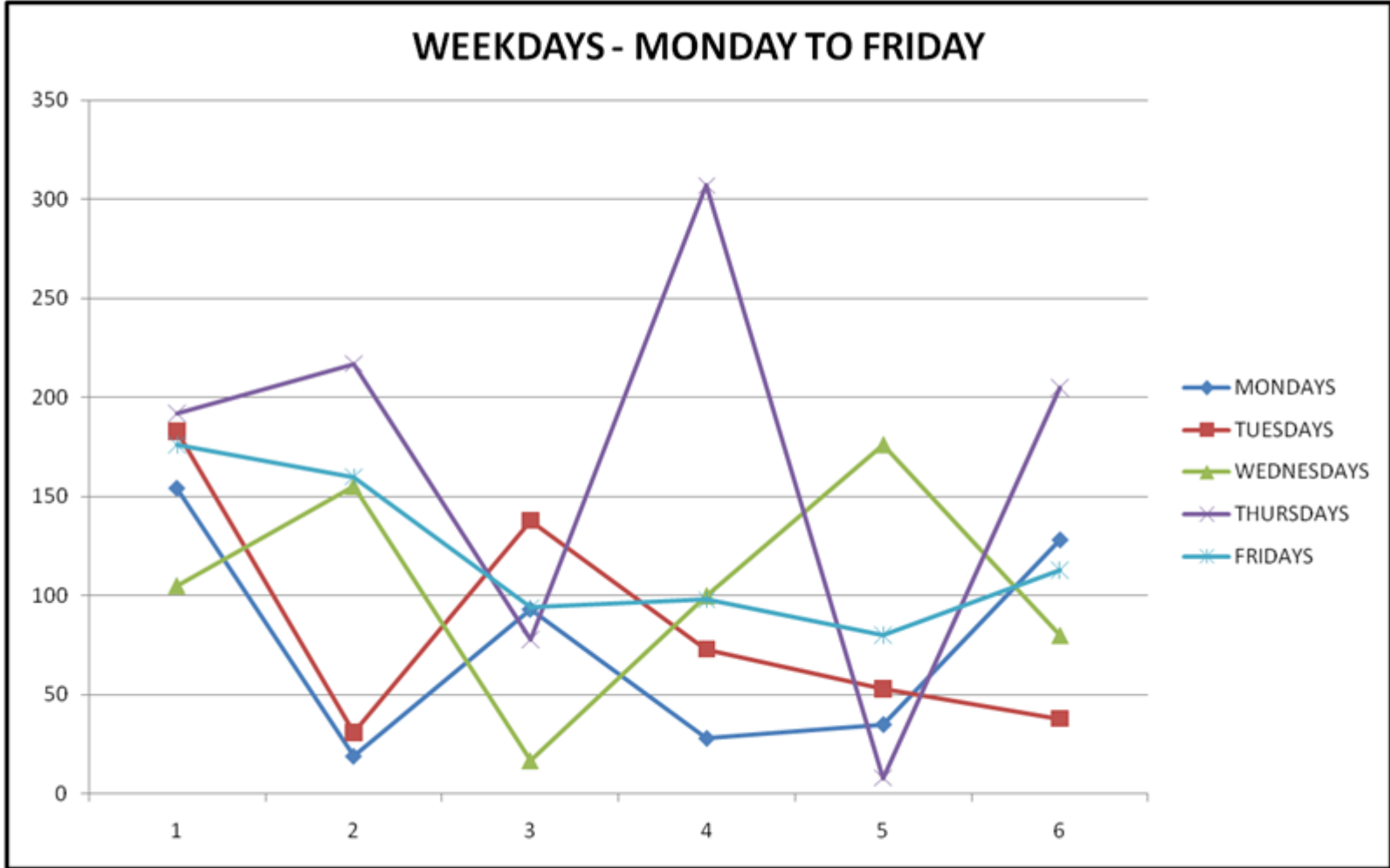
What kind of Data is available for – 2 hour Manual Counts? CDOT data prior to 2009?

**Cherry Creek Trail, Colorado
Bicycle and Pedestrian Traffic
2-hour Duration – Manual Counts
Average Total Volumes**



What else does the data tell us?

C-470 Trail Data

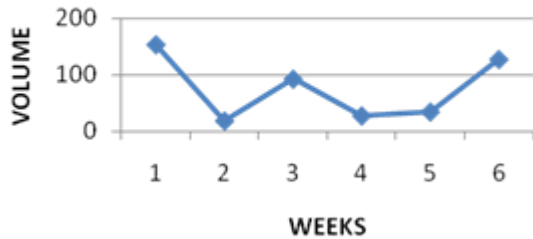


Hard to see patterns with all days of the week displayed?

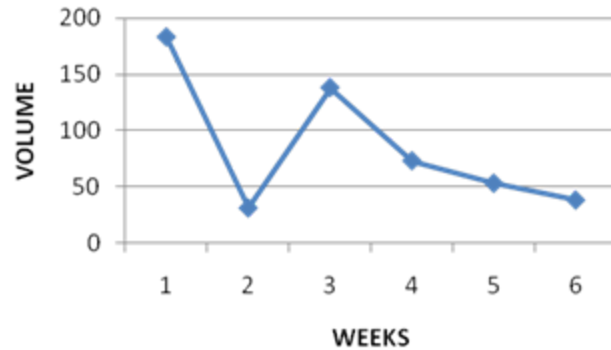
C-470 Trail

Day of the Week Comparisons

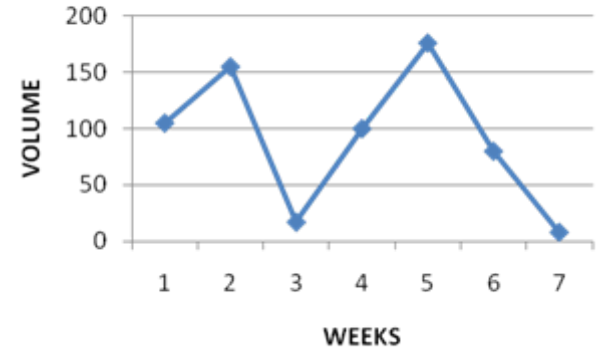
MONDAYS



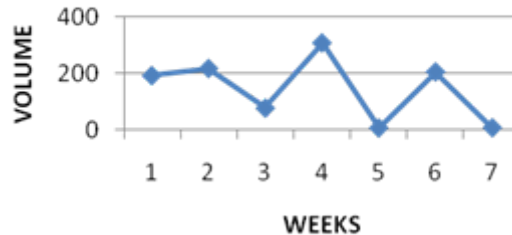
TUESDAYS



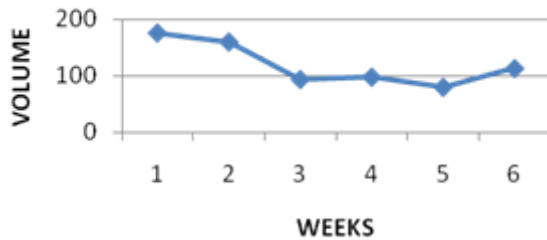
WEDNESDAYS



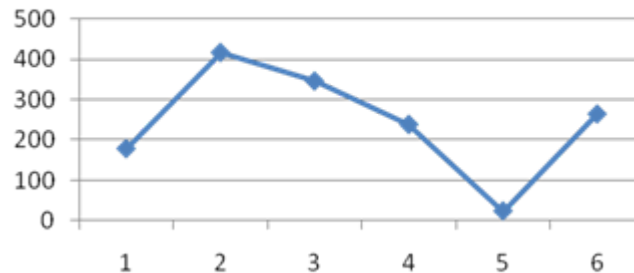
THURSDAYS



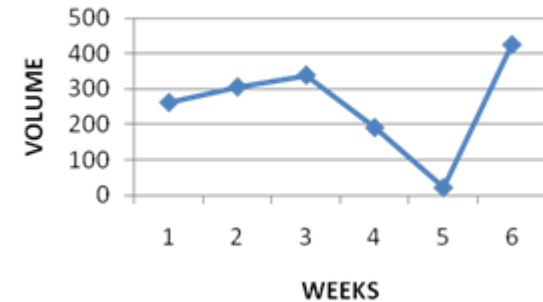
FRIDAYS



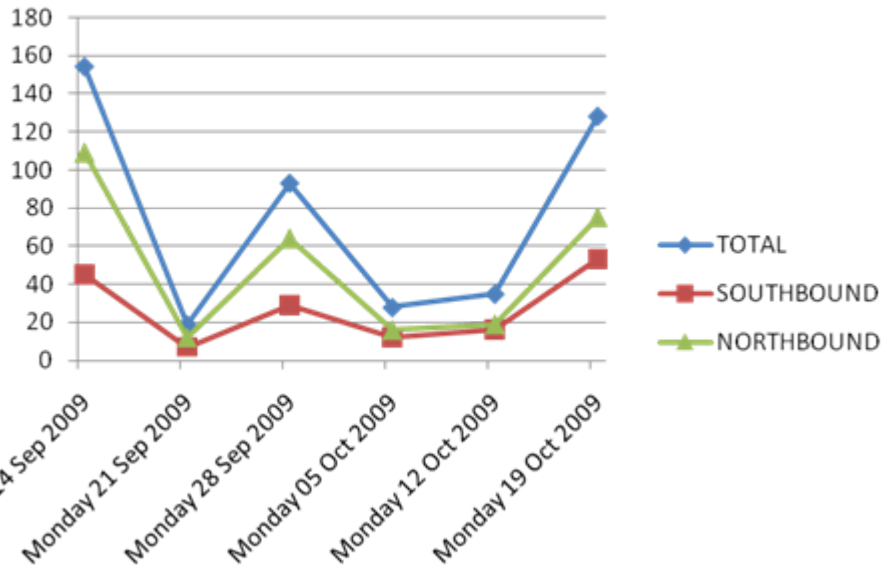
SATURDAYS



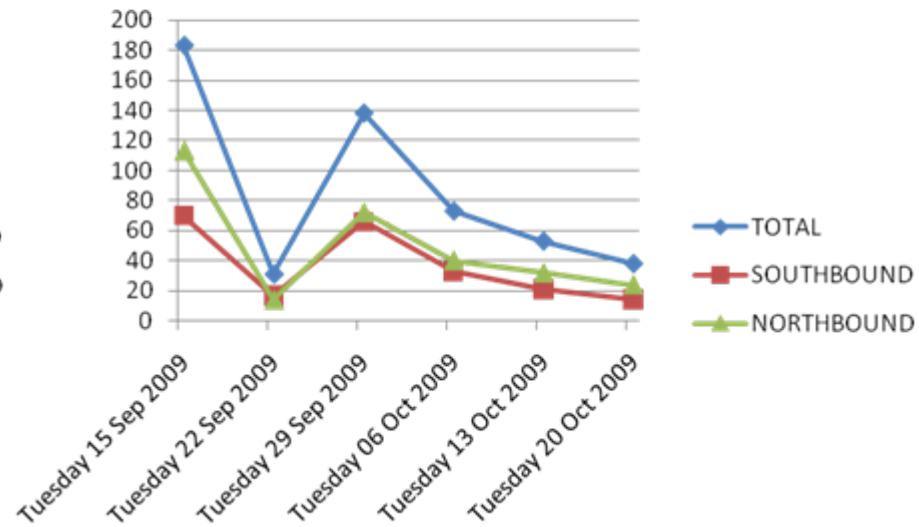
SUNDAYS



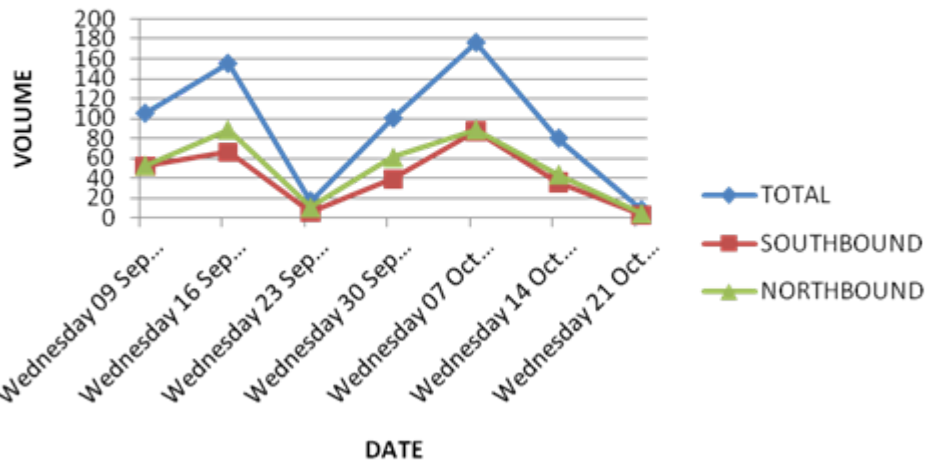
C-470 Trail
Bicycle and Pedestrian Data MONDAYS



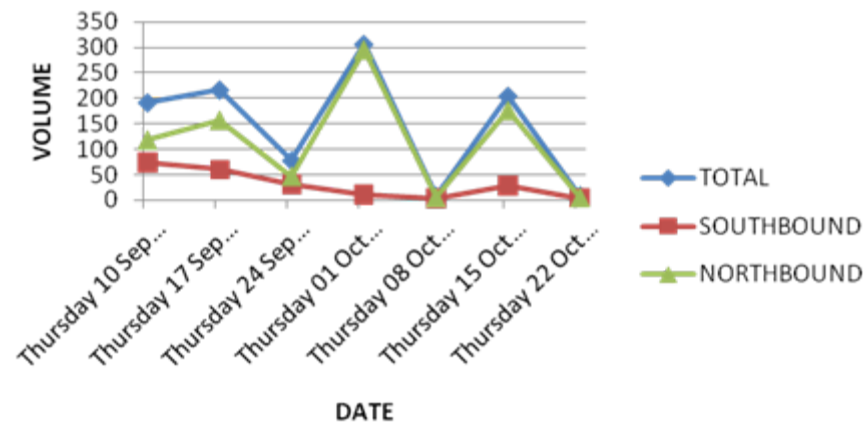
C-470 Trail
Bicycle and Pedestrian Data TUESDAYS



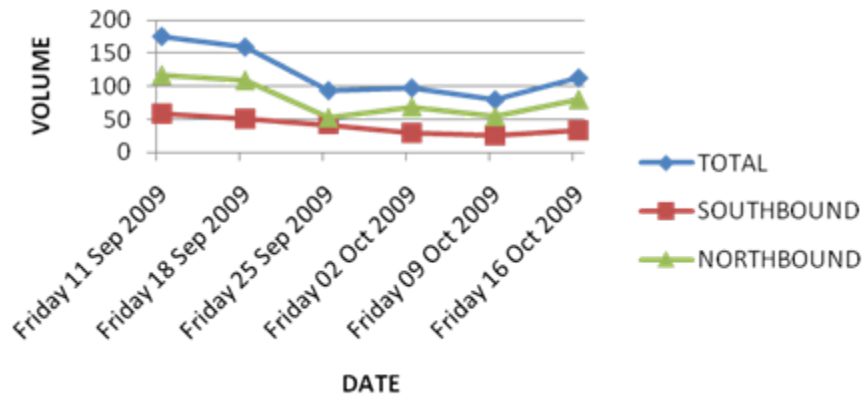
C-470
Bicycle and Pedestrian Data WEDNESDAYS



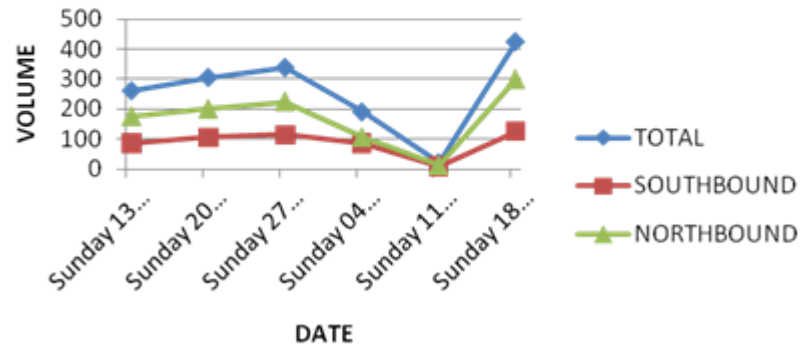
C-470 Trail
Bicycle and Pedestrian Data THURSDAYS



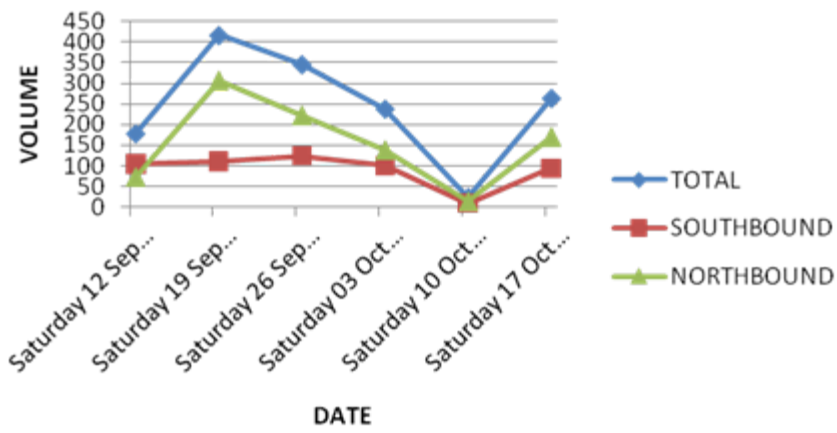
C-470 Trail Bicycle and Pedestrian Data FRIDAYS



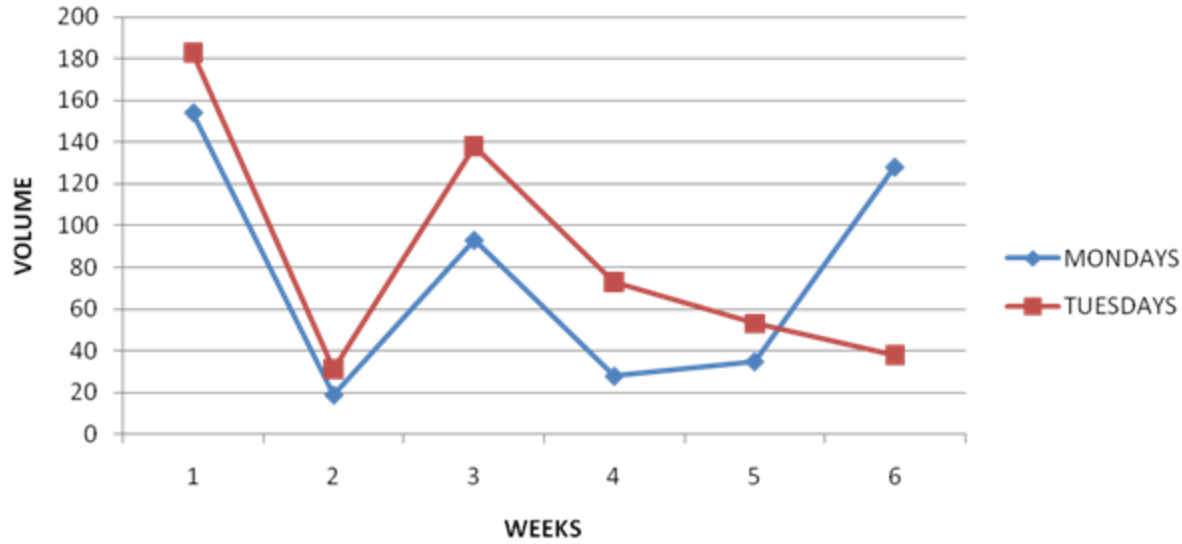
C-470 Trail Bicycle and Pedestrian Data SUNDAYS



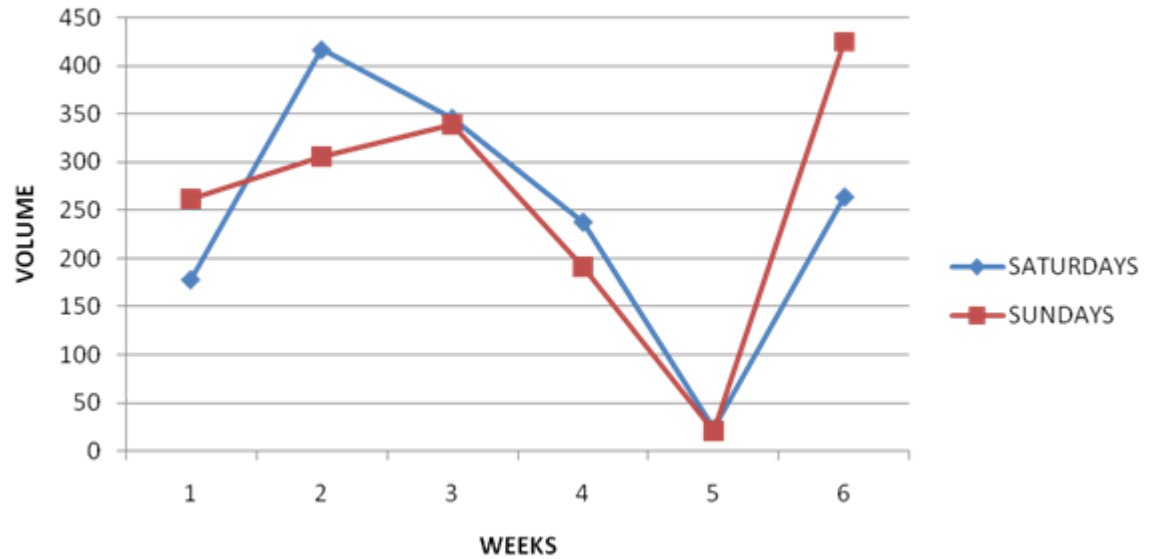
C-470 Trail Bicycle and Pedestrian Data SATURDAYS



MONDAYS AND TUESDAYS



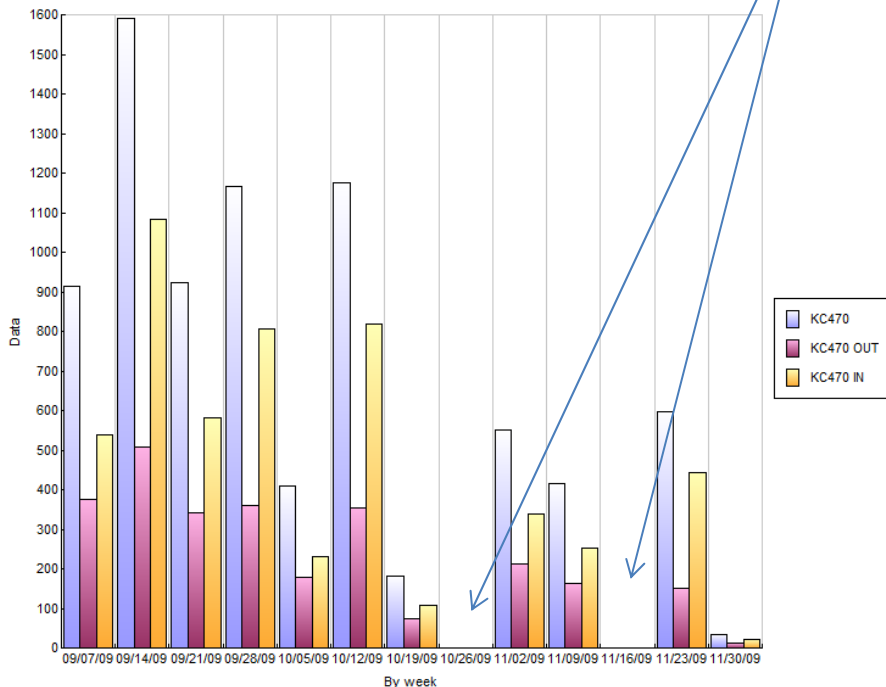
SATURDAYS AND SUNDAYS



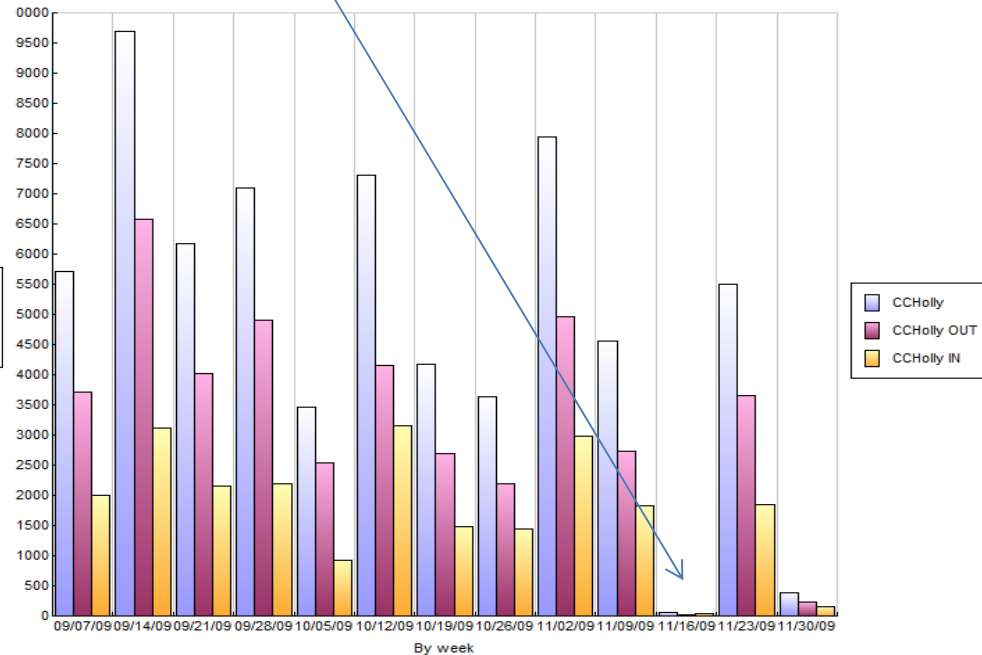
Compare trail data for the same weeks?

- Same weeks, one trail is maintained, the other is not...?
- Weather affects one trail more than the other?
- Is Directionality consistent at both trails?

C470 Trail - Bicycle and Pedestrian WEEKLY Data

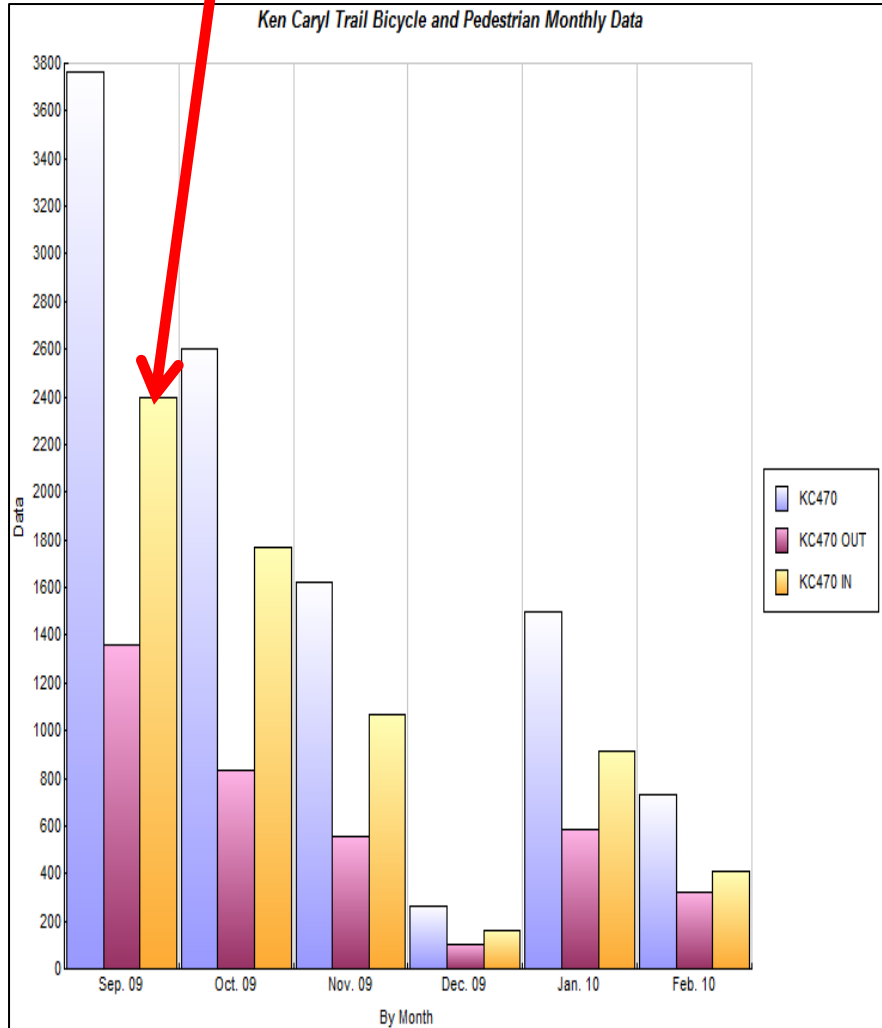


Cherry Creek Trail - Bicycle and Pedestrian WEEKLY Data

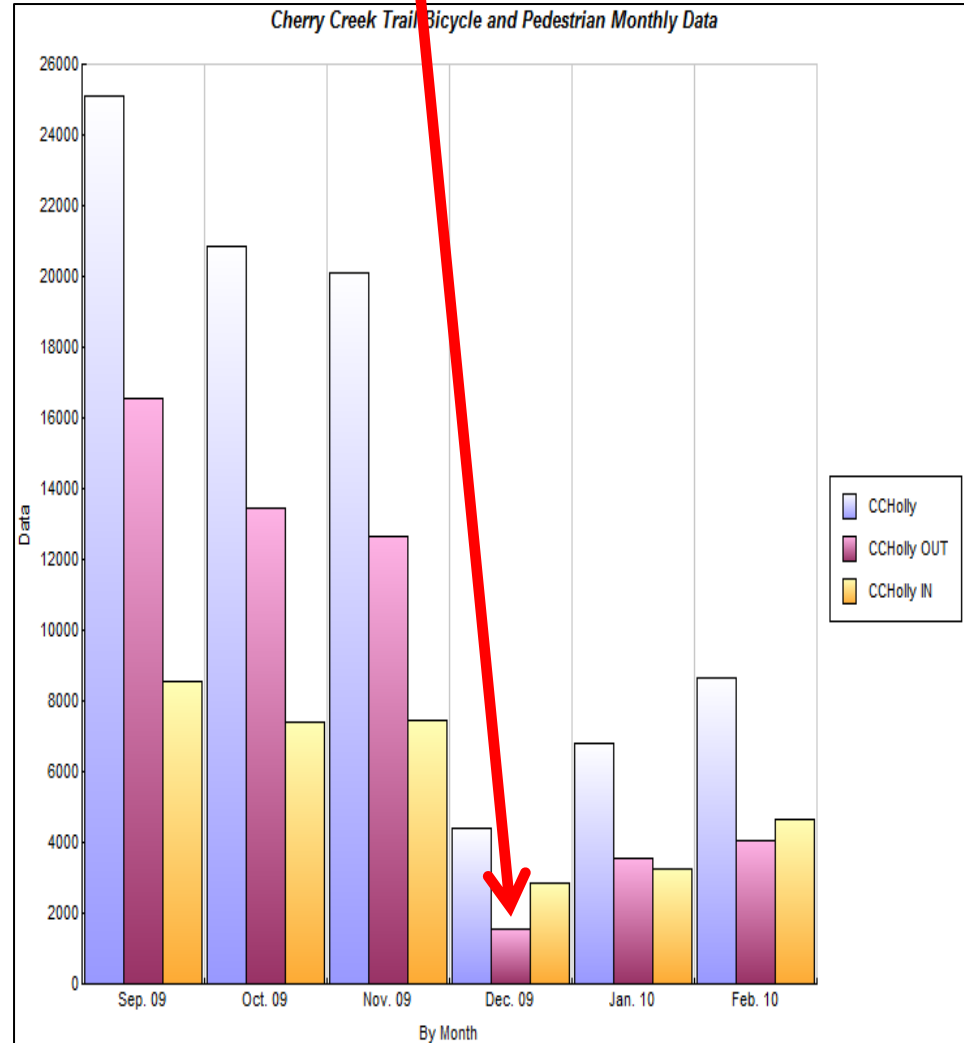


Compare data for the same Months?

Every month one direction is higher!



Southbound Lower in December only!



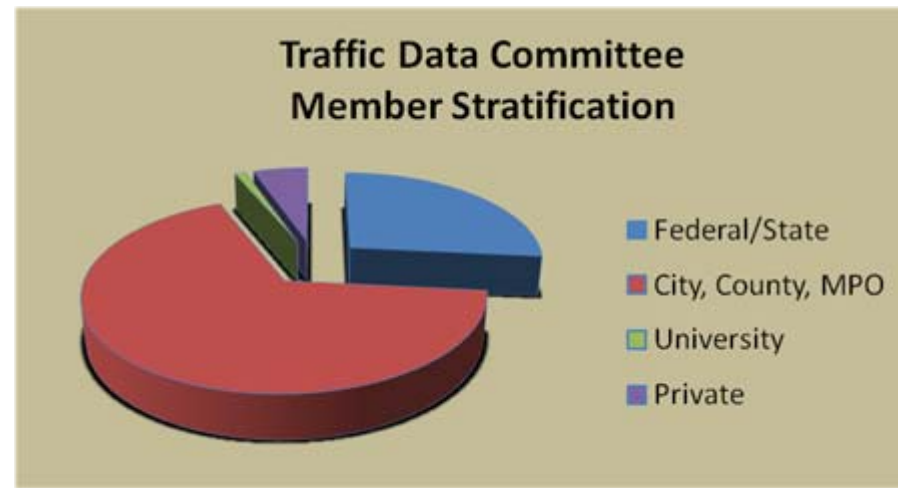
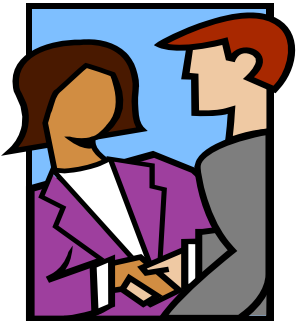
Where to go from here?

- Continue to establish program funding for equipment, counting, processing, publishing
- Establish data management program tools
 - Create Statewide Fully-Integrated Data Warehouse
 - Provide access to data
- Dedicate **resources** to install, collect, process data
- Create partnerships with other Agencies...
 - Looking to City, County, Metropolitan Planning Organization (MPO) to collect and share data



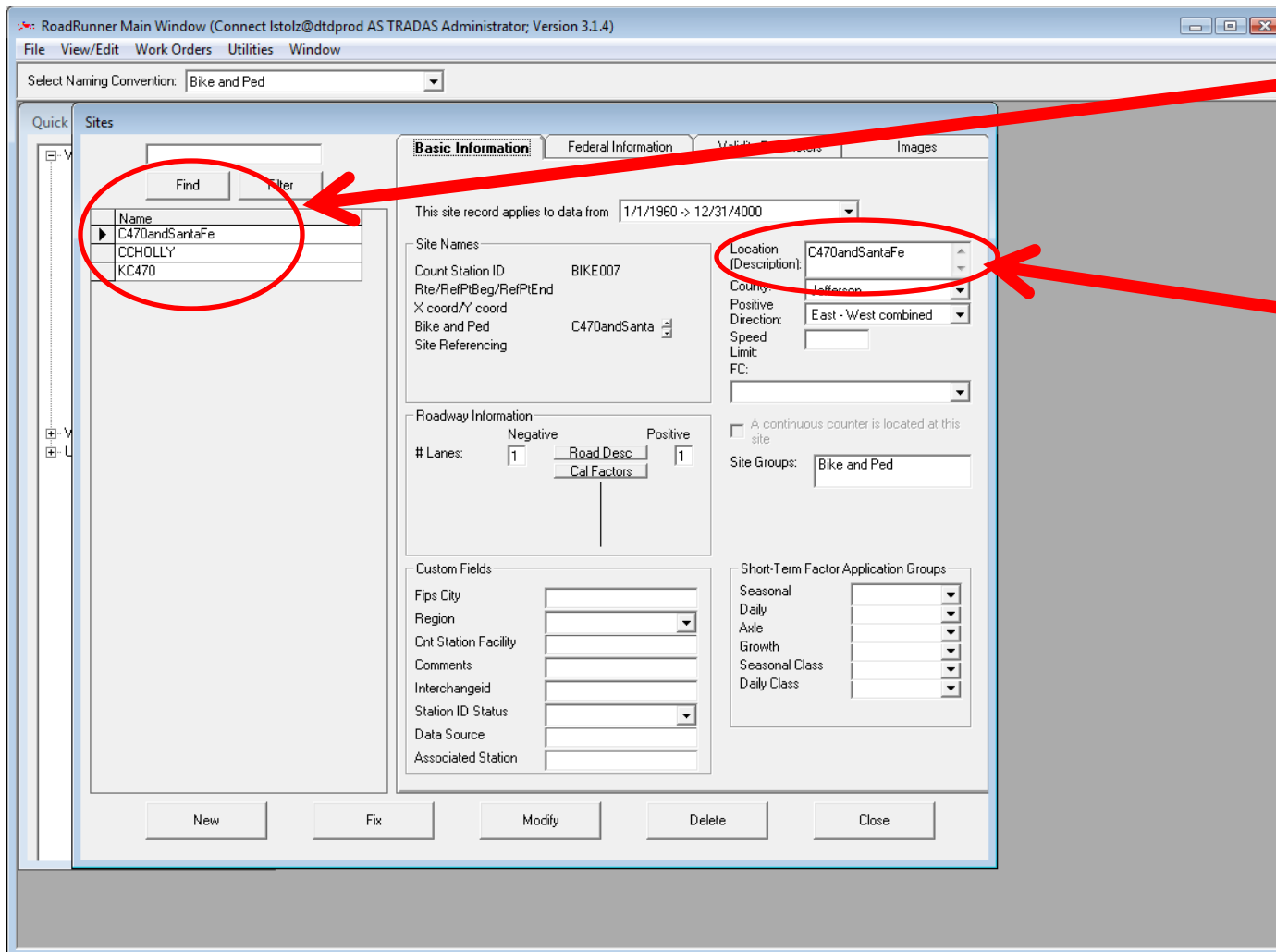
Traffic Data Committee Partners

- Already established Committee of 200 members
- Using e-Newsletter, Committee Meetings, etc. to advertise Bicycle and Pedestrian program
- Working with some of the same Agency contacts or different staff from the same Agency in Parks, Public Works, etc.



CDOT has created a Bike/Pedestrian Data Warehouse

(Count Location and Volume Data Storage – TRADAS System)



Site Name

Site Location

CDOT is Creating a Bike/Pedestrian Data Portal to access the Data Warehouse (Distribution/Sharing Portal)

Link: <http://ags.camsys.com/wireframes/cdotdashboard.htm>

The screenshot shows the CDOT Traffic Digital Dashboard web application. The browser address bar displays <http://www.dot.state.co.us/traffic/dashboard>. The page header includes the CDOT logo and the slogan "AVID: Analyze-Visualize-Integrate-Disseminate". The user is logged in as John Smith on 13th November 2009. The dashboard features a navigation menu with tabs for Home, ATR, FHWA, Bike/Ped, Planning, Region, Route, Short Duration, TDC, Traffic, WIM, and Messages. The main content area is divided into several sections:

- Details:** A table showing location information for Location ID 56, Name "Holly Street Bridge @ Cherry Creek, Denver, CO", and a blank Description field.
- Location:** A satellite map view of the location, highlighting "McMeen Elementary School" and "Garland Park Lake".
- Pedestrian Counts:** A bar chart showing pedestrian counts over time, with the y-axis ranging from 0 to 1600 and the x-axis showing dates from 10-09-09 to 11-09-09.
- Documents:** A table listing documents with columns for Name, Type, and Comments. The table contains two entries: "Project Location" (PDF) and "Photo" (JPG).
- Data Transfer:** A section for uploading data, with fields for Site ID (107436), File (C:\Count\s\SR12.xls), and Format (Excel), and an "Upload" button.

Contact Information

Elizabeth Stolz, Traffic Analysis Unit Manager

Colorado Department of Transportation

4201 East Arkansas Avenue

Denver, CO 80222

303-757-9495

Elizabeth.stolz@dot.state.co.us