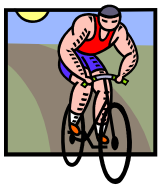
"Colorado's Statewide Bicycle and Pedestrian Travel Monitoring Program"



DOT
DEPARTMENT OF TRANSPORTATION

FHWA's TMIP Webinar
March 8, 2011

1. The Problem
2. How the Problem Relates to Everyone?
3. The Solution

The Problem

Gaps between Transportation and Health

Lack of Information and
What to do with the Information once collected

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

Why is bicycling and walking data important?

- Same reasons as for other modes
  - Support policy decisions/changes
  - Plan for cost-effective investments
  - Design safe facilities and infrastructure
  - Measure performance and progress toward goals
- "What gets measured, gets done"
- "If you're not counted, you don't count"

*Slide provided by Shawn Turner, PE, Texas Transportation Institute (TTI)

4

Challenges

- "The forgotten modes"
- Typically lower priority, fewer resources
- Typically small numbers, high variability
- Typically on city streets, not major highways
- Difficult to automatically count/measure
- Scale of facilities

*Slide provided by Shawn Turner, PE, Texas Transportation Institute (TTI)

5

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

The Solution
Bicycle and Pedestrian Data

- **Data Driven Decision Making** for Planning projects
  - 2035 Plan update, 2040 Plan, etc.
  - Integration of Multiple Multi-Modal Data Sources
    - Transit, Bike/Pedestrian etc.
- Support Grant Proposals for Project Improvements funding
  - Grand Junction - Tiger Grant
  - Durango - Tiger Grant


Bicycle and Pedestrian Data
Part of the Solution

- Air Quality Performance Measures
  - Motorized Traffic VMT (vehicle miles traveled) Reduction
  - **Increase** Non-Motorized VMT
- Share information to measure the quality of life
  - Livability and Live Well Communities
- Support Joint Project Improvements or New Development of Projects with City/County Partners
  - CDOT Roadway Connectivity - State Maintained Roads and Trails That Need to Accommodate Bike/Pedestrians

Colorado's Bicycle and Pedestrian Travel Monitoring 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)
DOT 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)

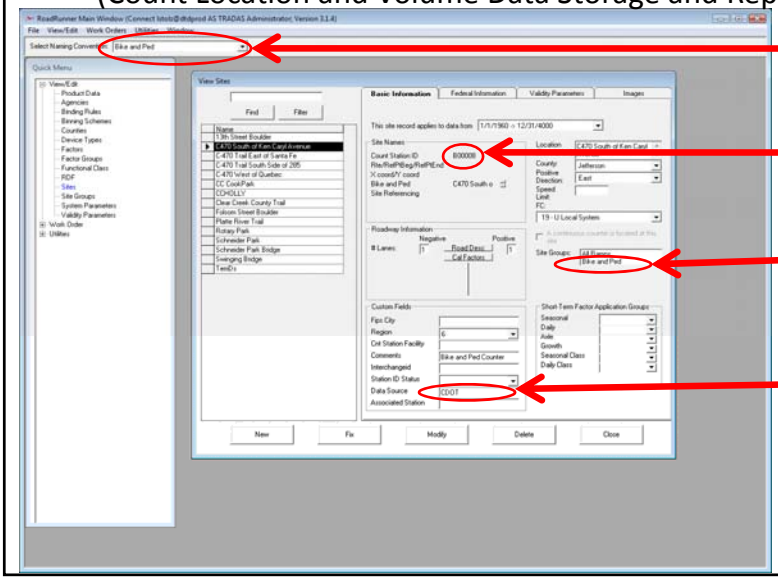
How do we accomplish making informed decisions about bicycles and pedestrians?

"Data Driven Decision Making"

- 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

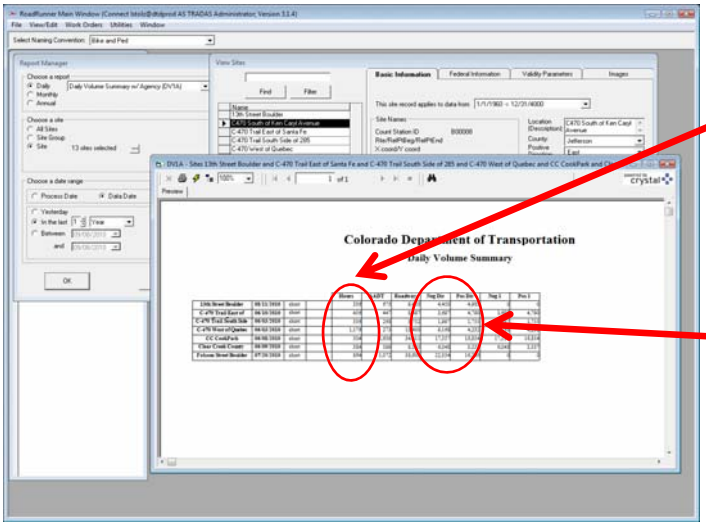
TRADAS, the Bike/Pedestrian Data Warehouse

(Count Location and Volume Data Storage and Reporting)



Data Sharing and Reporting

- Data Sources provide Data
- Data is loaded into the Statewide Data Warehouse (TRADAS)
- Reports Distributed

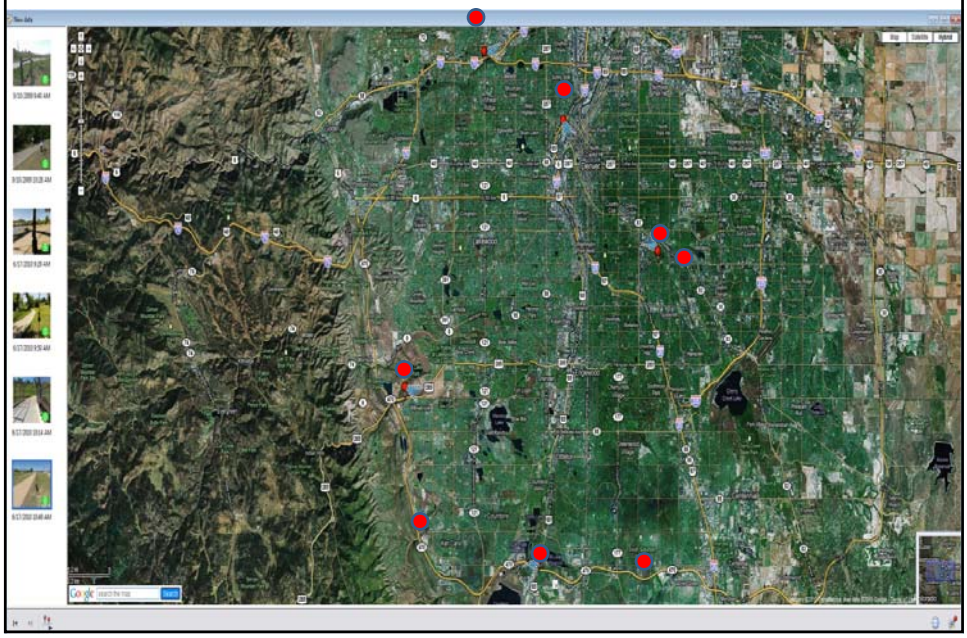


How was bicycle and pedestrian data collected in the past?

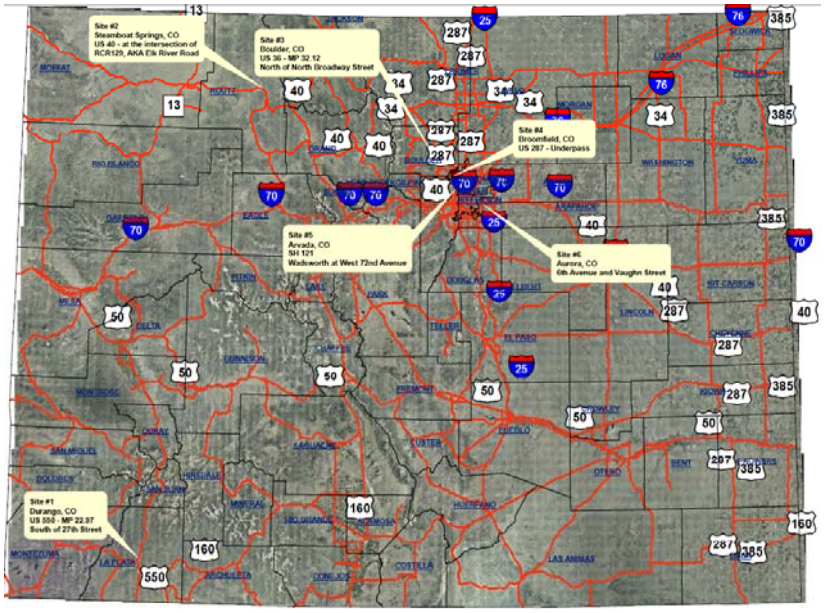
What did CDOT find? Eco-Counters

- www.eco-counter.com

Short-duration Counting Locations



Continuous Counting Locations

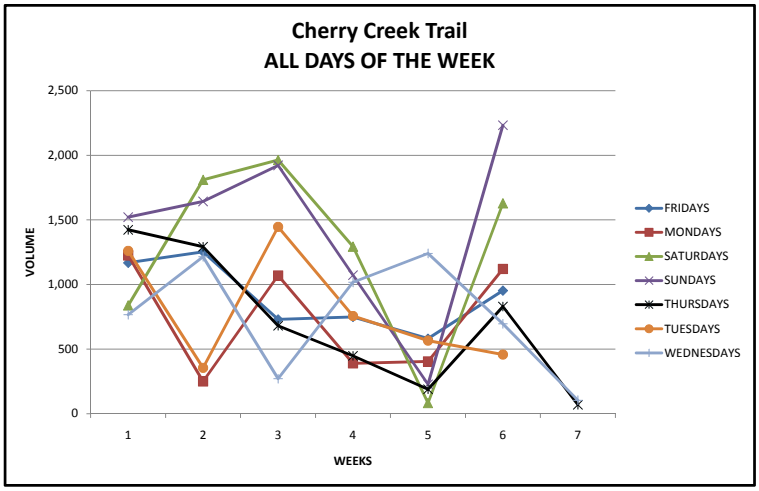


Continuous Count Installation

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?

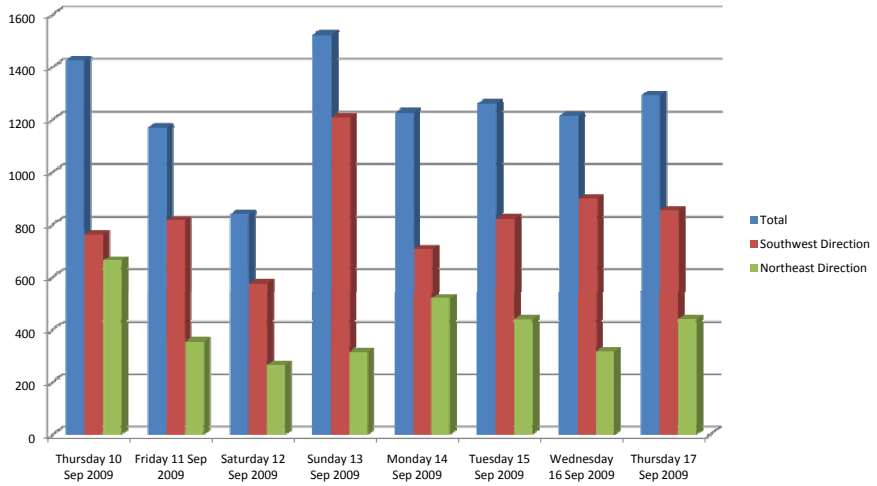


Hard to see patterns with all days of the week displayed?

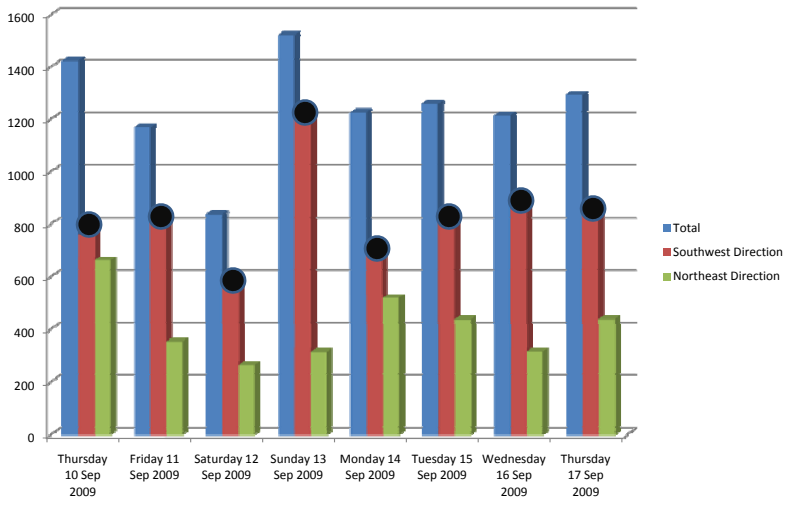
DATA AVAILABLE

Date	Hour	CCHolly	CCHolly IN	CCHolly OUT
Wednesday 09 Sep 2009	12:00:00 AM	0	0	0
Wednesday 09 Sep 2009	1:00:00 AM	0	0	0
Wednesday 09 Sep 2009	2:00:00 AM	0	0	0
Wednesday 09 Sep 2009	3:00:00 AM	0	0	0
Wednesday 09 Sep 2009	4:00:00 AM	0	0	0
Wednesday 09 Sep 2009	5:00:00 AM	0	0	0
Wednesday 09 Sep 2009	6:00:00 AM	0	0	0
Wednesday 09 Sep 2009	7:00:00 AM	0	0	0
Wednesday 09 Sep 2009	8:00:00 AM	0	0	0
Wednesday 09 Sep 2009	9:00:00 AM	0	0	0
Wednesday 09 Sep 2009	10:00:00 AM	0	0	0
Wednesday 09 Sep 2009	11:00:00 AM	42	20	22
Wednesday 09 Sep 2009	12:00:00 PM	86	38	48
Wednesday 09 Sep 2009	1:00:00 PM	67	36	31
Wednesday 09 Sep 2009	2:00:00 PM	82	50	32
Wednesday 09 Sep 2009	3:00:00 PM	64	59	5
Wednesday 09 Sep 2009	4:00:00 PM	86	65	21
Wednesday 09 Sep 2009	5:00:00 PM	114	69	45
Wednesday 09 Sep 2009	6:00:00 PM	106	27	79
Wednesday 09 Sep 2009	7:00:00 PM	82	30	52
Wednesday 09 Sep 2009	8:00:00 PM	17	11	6
Wednesday 09 Sep 2009	9:00:00 PM	15	7	8
Wednesday 09 Sep 2009	10:00:00 PM	3	2	1
Wednesday 09 Sep 2009	11:00:00 PM	2	0	2
Thursday 10 Sep 2009	12:00:00 AM	4	2	2
Thursday 10 Sep 2009	1:00:00 AM	0	0	0
Thursday 10 Sep 2009	2:00:00 AM	2	1	1
Thursday 10 Sep 2009	3:00:00 AM	0	0	0
Thursday 10 Sep 2009	4:00:00 AM	3	2	1
Thursday 10 Sep 2009	5:00:00 AM	13	5	8
Thursday 10 Sep 2009	6:00:00 AM	58	30	28
Thursday 10 Sep 2009	7:00:00 AM	111	45	66
Thursday 10 Sep 2009	8:00:00 AM	87	21	66
Thursday 10 Sep 2009	9:00:00 AM	88	24	64
Thursday 10 Sep 2009	10:00:00 AM	98	27	71
Thursday 10 Sep 2009	11:00:00 AM	94	28	66

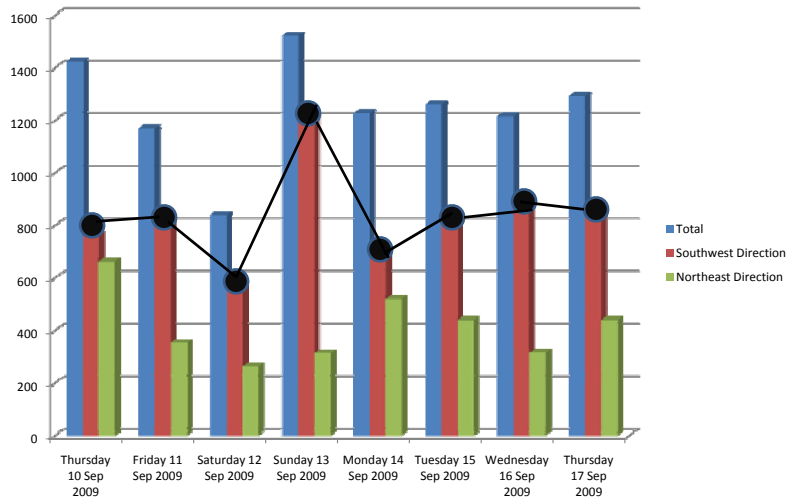
Cherry Creek Trail
Bicycle and Pedestrian Data



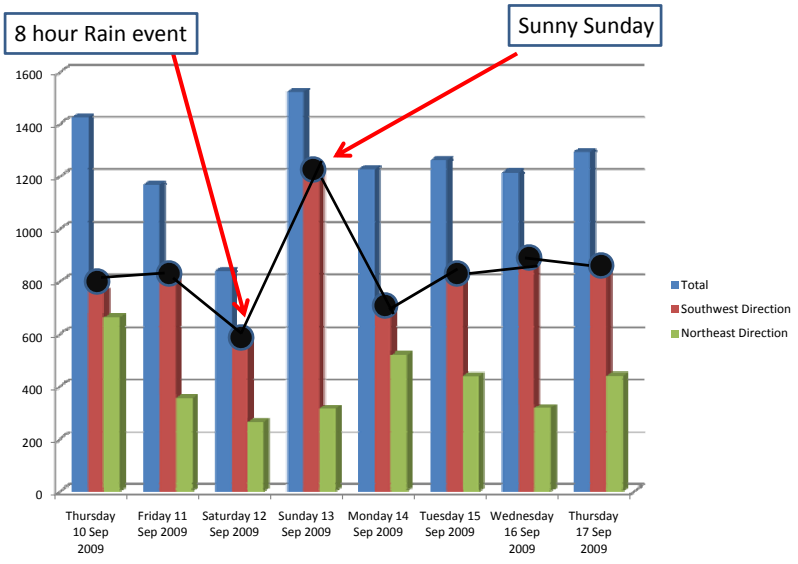
Cherry Creek Trail
Bicycle and Pedestrian Data



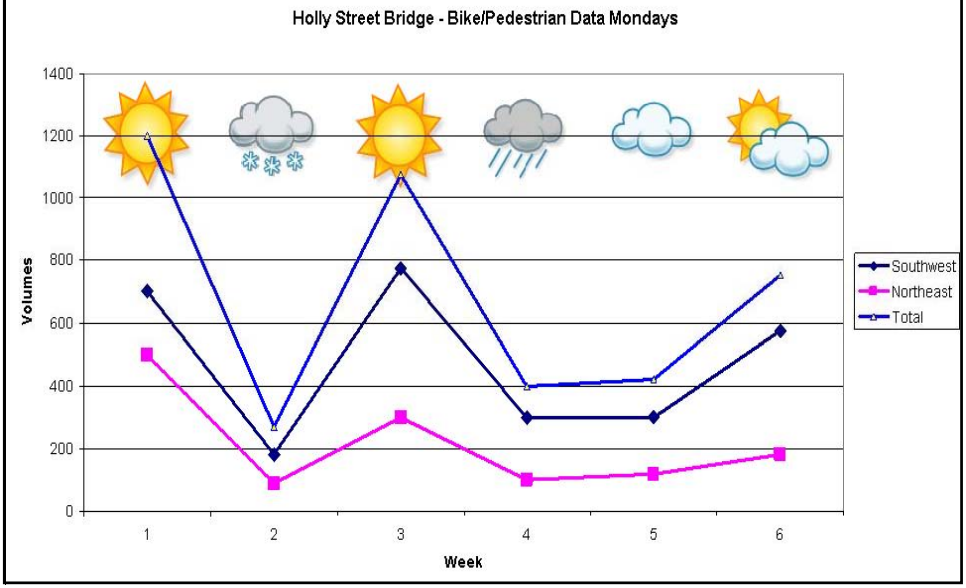
Cherry Creek Trail Bicycle and Pedestrian Day of the Week Data



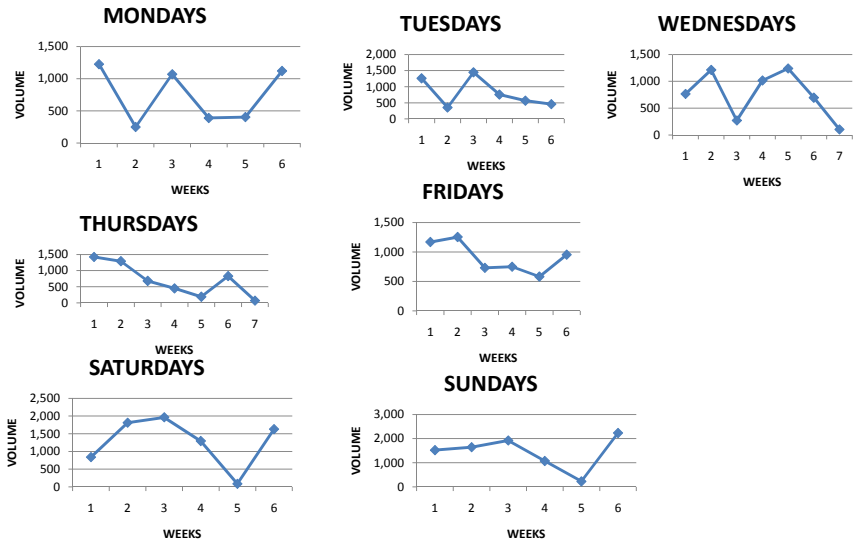
Cherry Creek Trail Bicycle and Pedestrian Day of the Week Data



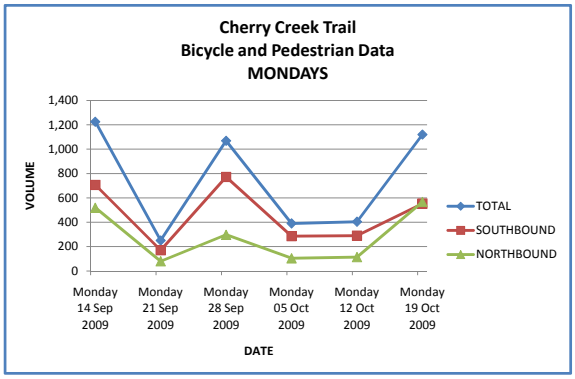
Various Ways to Display Bicycle and Pedestrian Data



As You Begin to Analyze the Data it Starts to Reveal Distinct Patterns…

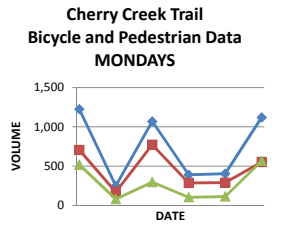


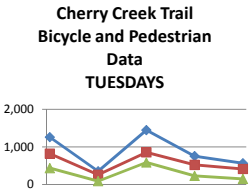
What Does the Data Tell Us? These Distinct Data Patterns Begin to Tell a Story…

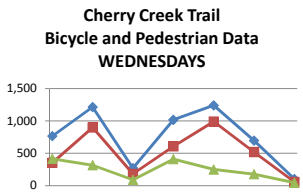


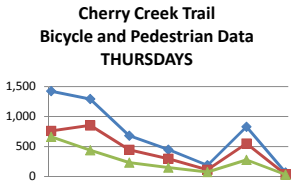
- Directional Data Shows…More Southbound Traffic every Monday
- Traffic Volume Range ~580 to 1250
- Weather Has an Effect on Traffic
- Seasonal Pattern Detected with an Overall September to October Drop in Traffic

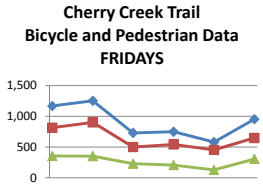
The Story Begins to Answer Policy Questions so Informed Decisions Can Be Made…

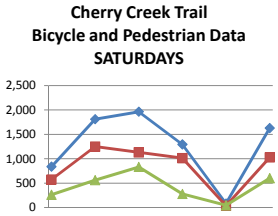






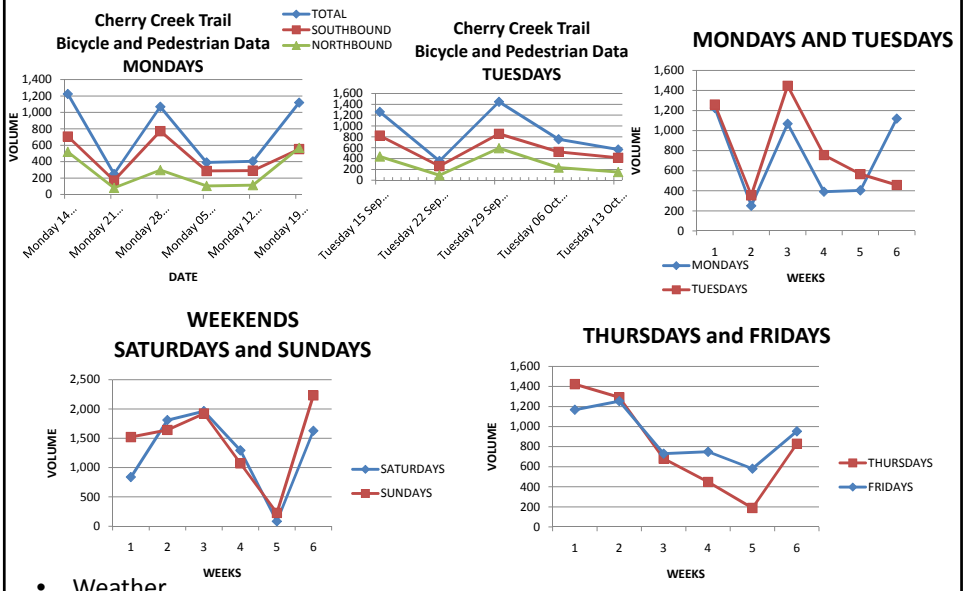






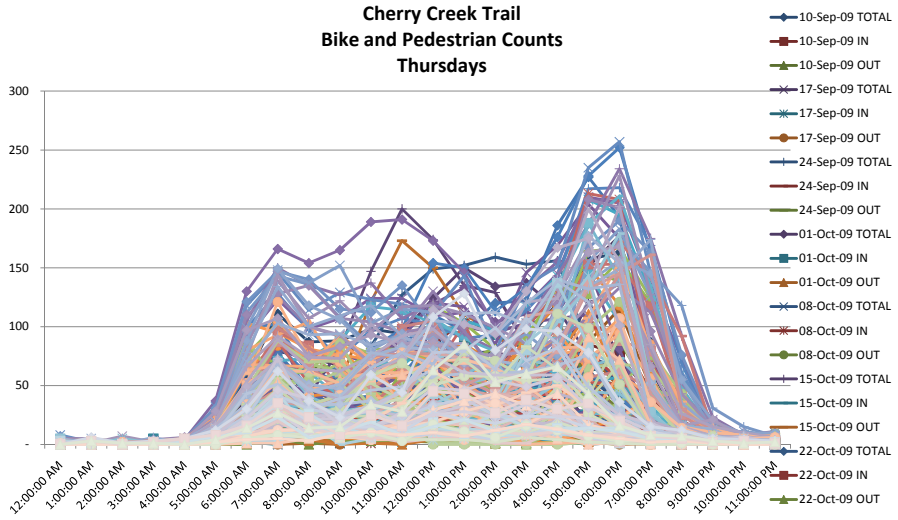
- More southbound Traffic Everyday of the Week …
- Now Funding Allocations can be Directed to Usage to Justify Improvements…

These Distinct Data Patterns Begin to Tell a Story..

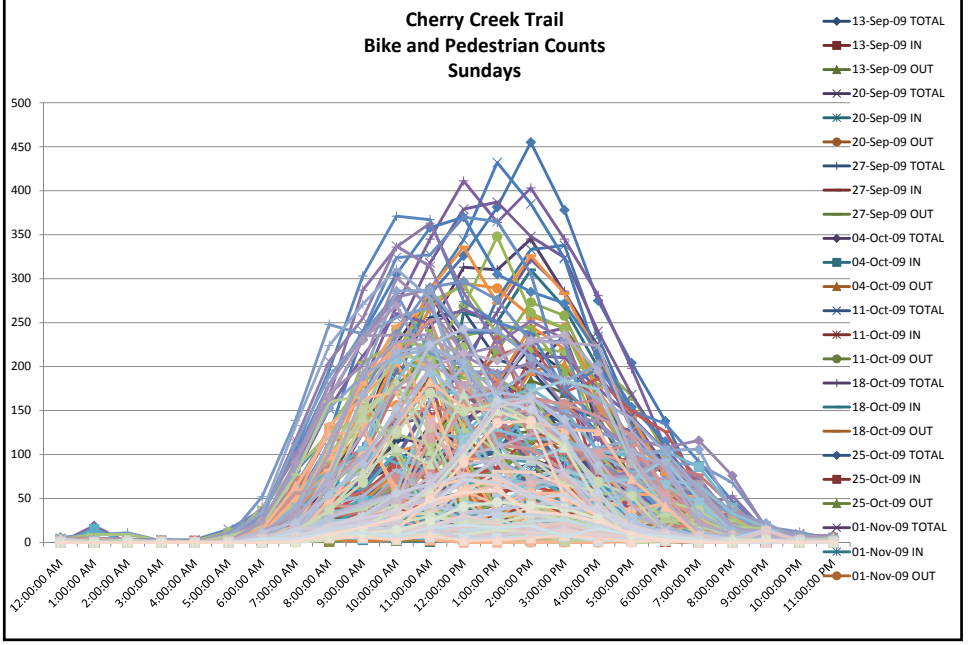


- Weather
- More South-bounders

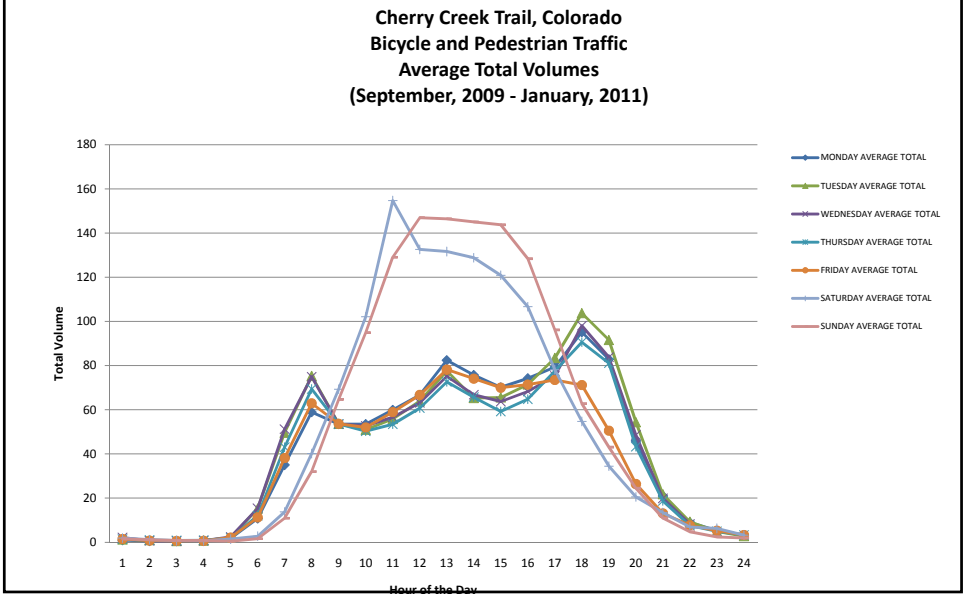
Begin to Look for Patterns…Create Graph of every Thursday Since September, 2009



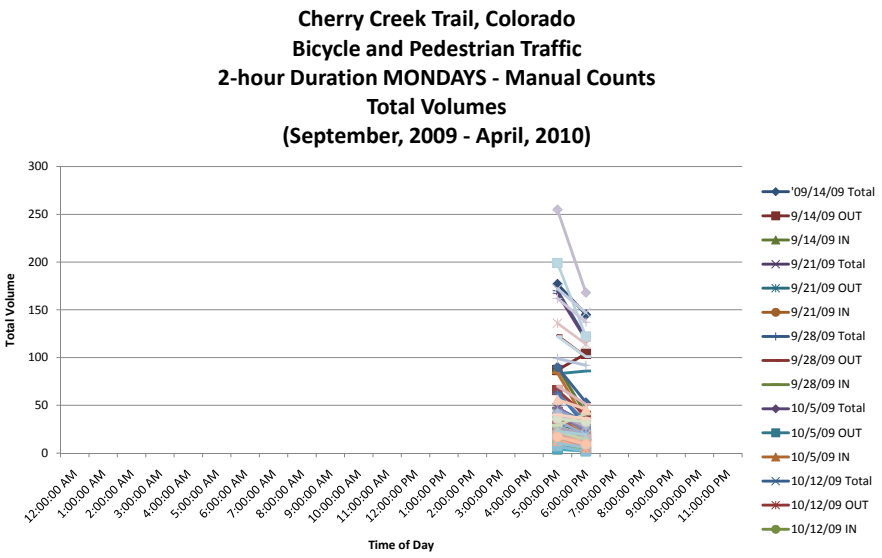
Sundays show a very different Pattern…



Commuter versus Recreational Travel Patterns begin to emerge…



What Kind of Data is Available – 2 Hour Manual Counts? CDOT Data Prior to 2009?



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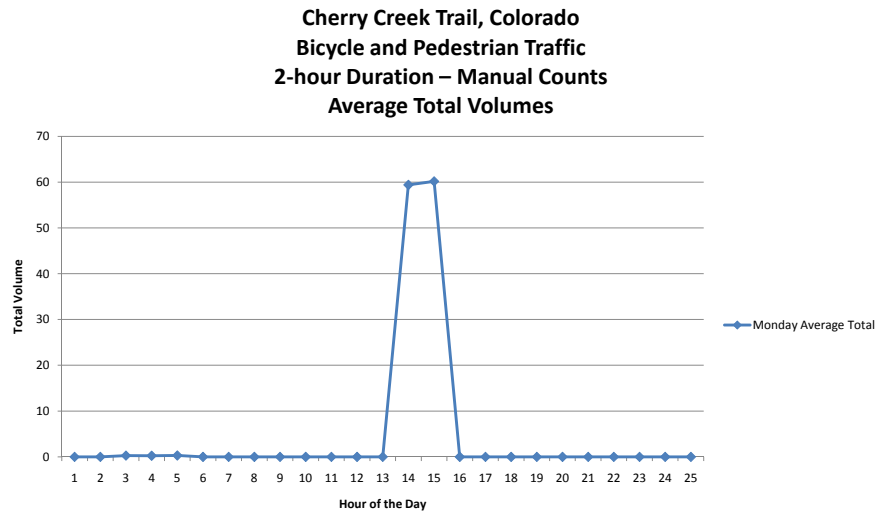
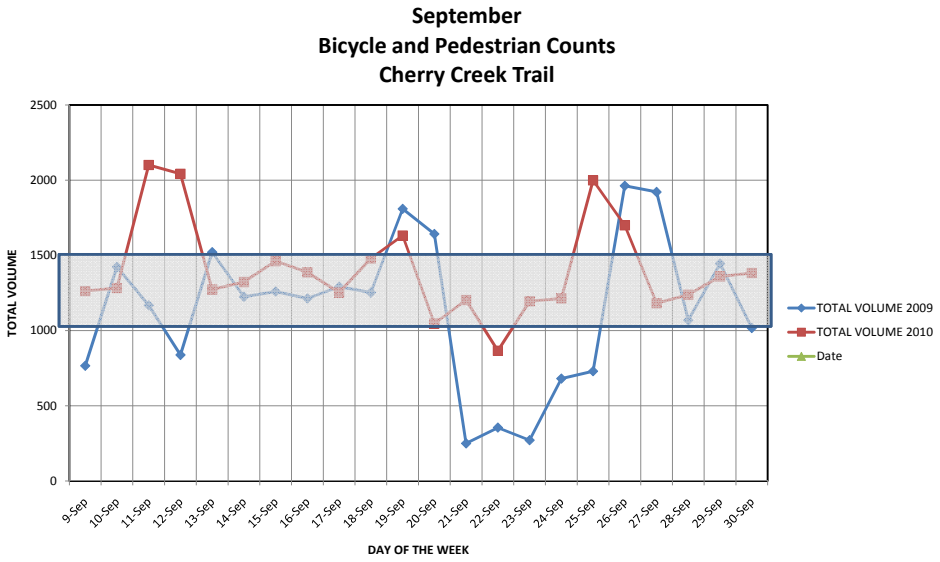
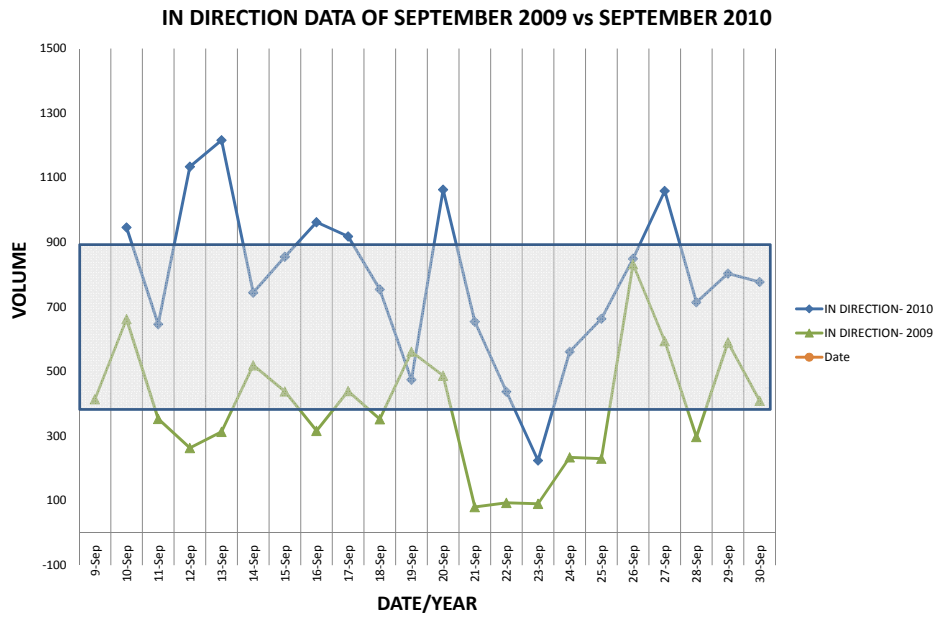


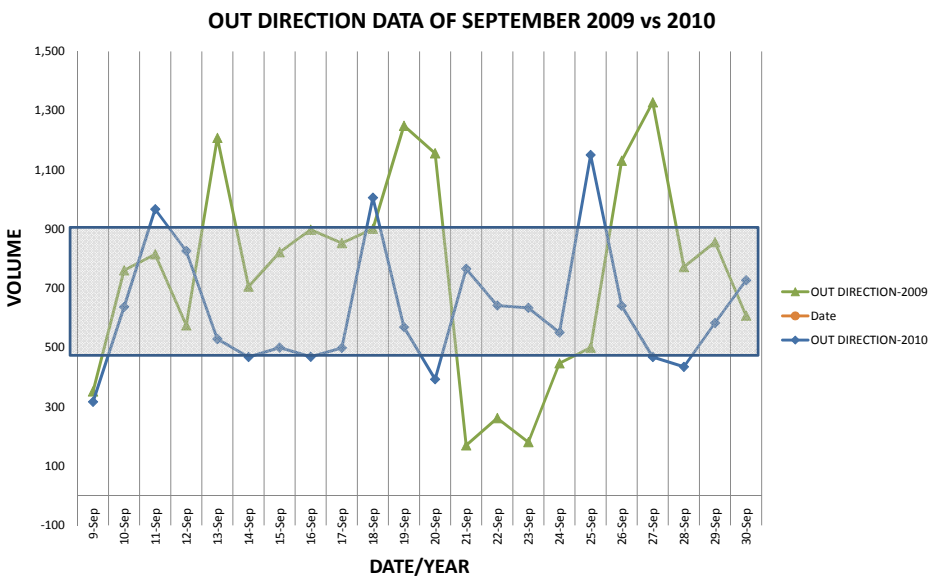
Turning Data into Meaningful Planning Information



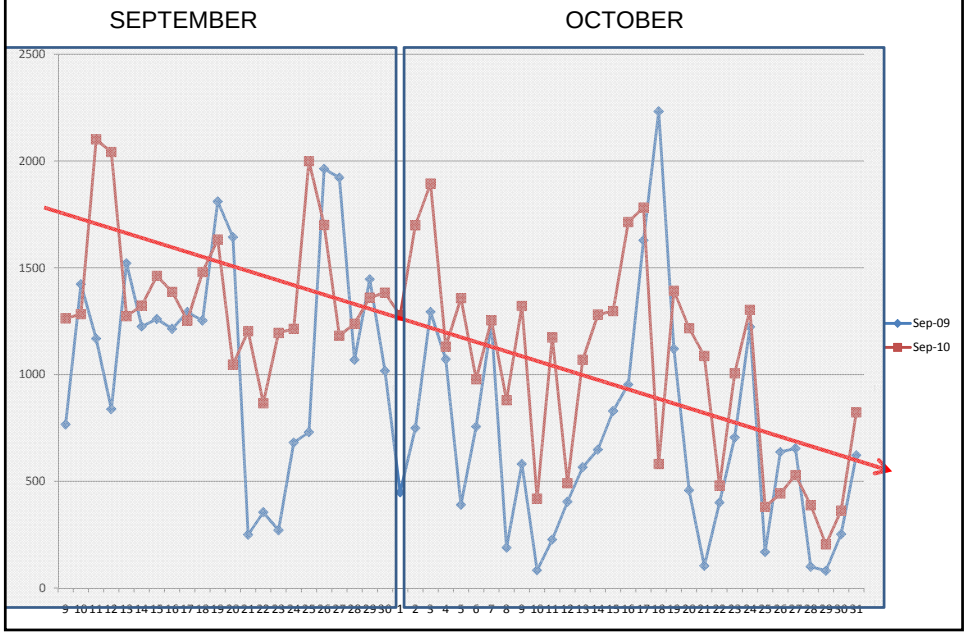
IN Directional Data Range ~(400 – 800)



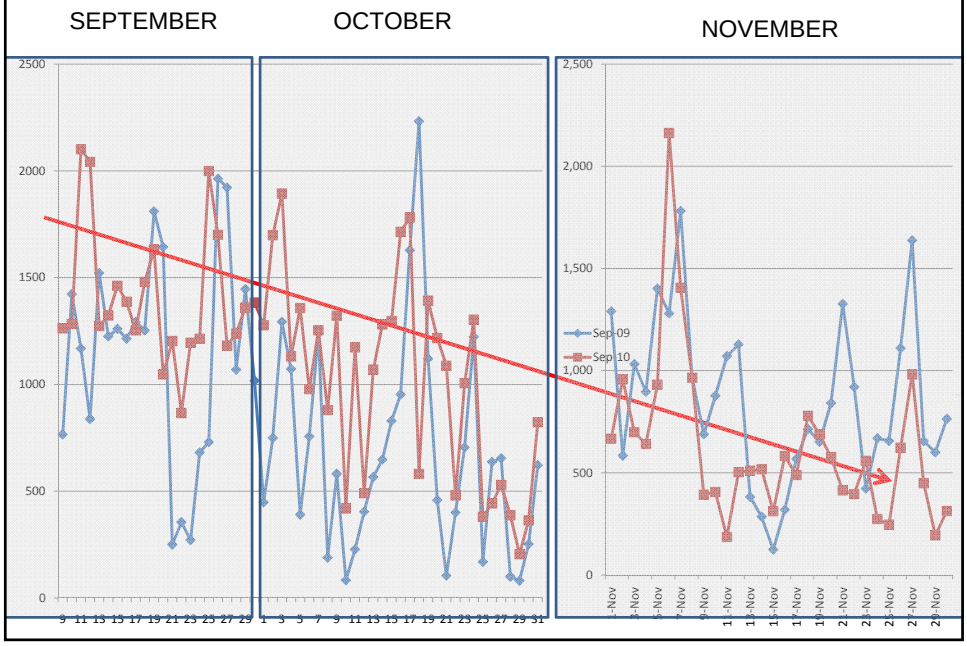
OUT Directional Data Range ~(500 – 900)



Seasonal Patterns

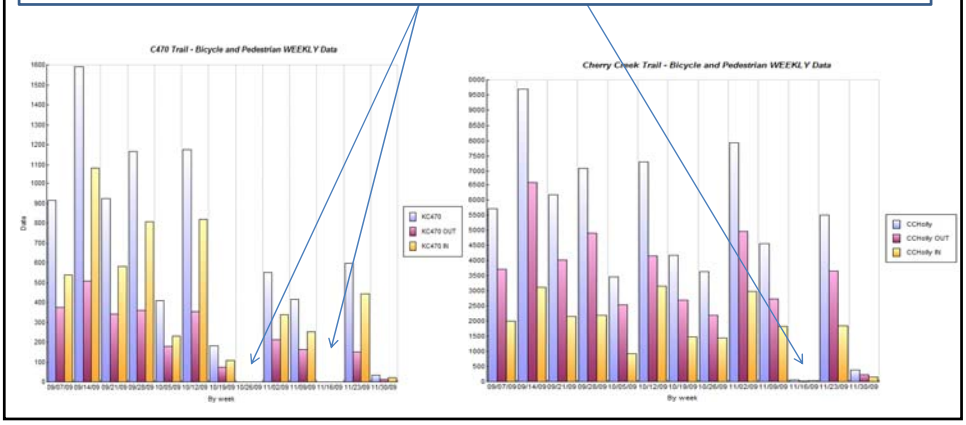


Seasonal Patterns



Compare Trail Data for the Same Weeks?

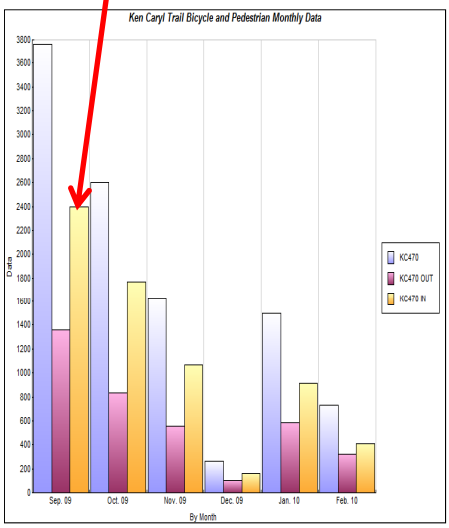
- Same Weeks, One Trail is Maintained, the Other is Not…?
- Weather Affects One Trail More Than the Other?
- Is Directionality Consistent at Both Trails?

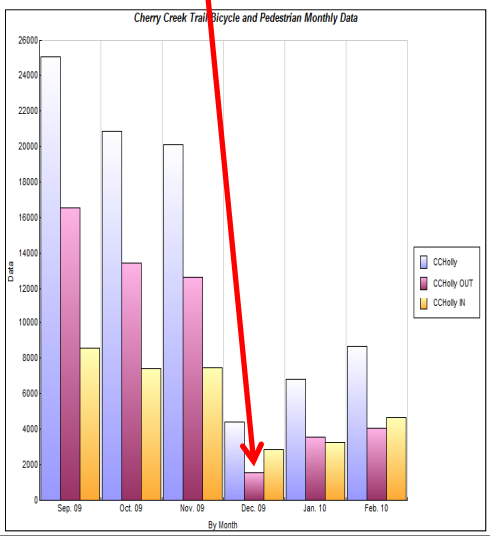


Compare Data for the Same Months?

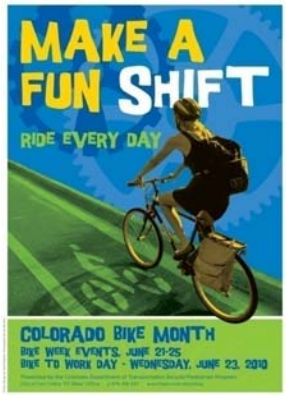
Every Month One Direction is Higher!

Southbound Lower in December Only!



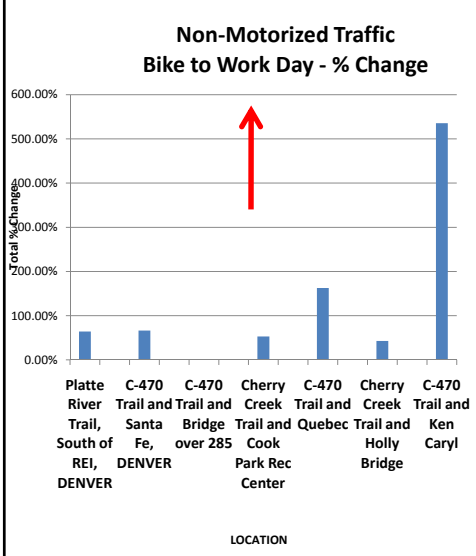


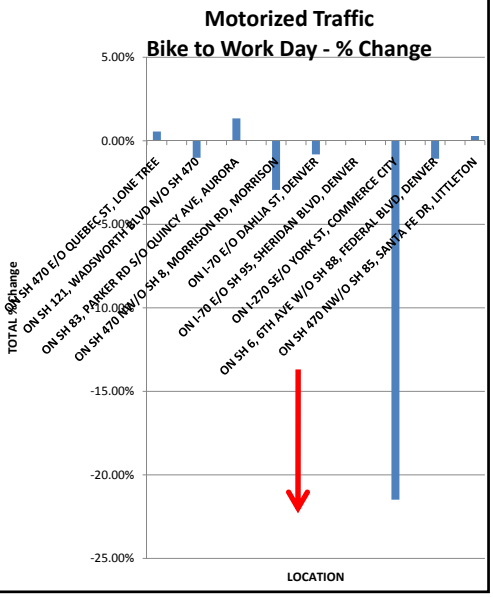
Traffic Data – Site/Date Specific Analysis



What happens when we compare motorized to non-motorized data?

% Traffic Change
Motorized versus Non-Motorized





What Does the Data Tell Us?

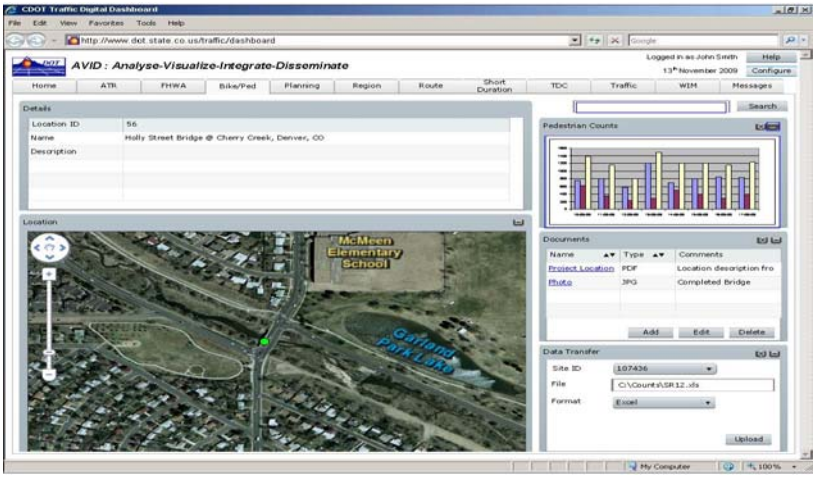
- 6 Working Sites (Non-Motorized Traffic Volume Sites)
  - All increased in traffic volume by 42% or more
- 8 Working Sites (Motorized Traffic Volume Sites)
  - 5 out of 8 sites decreased -0.82% to 21.49%
- At the Continuous Count locations in Denver Metro area, we saw a reduction in motorized traffic by **-0.35 to -2.93** percent.

If you increase <u>Non-Motorized</u> traffic, the <u>Motorized</u> traffic volumes will likely decrease.

CDOT is Creating a Bike/Pedestrian **Data Portal** to Access the Data Warehouse

(Distribution/Sharing Portal)

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

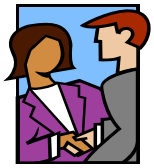


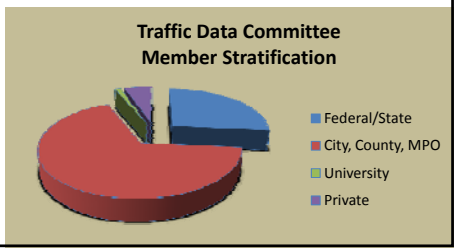
Where To Go From Here?

- 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.

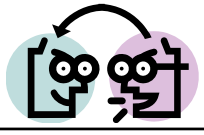




Develop Bicycle and Pedestrian Data and Equipment Specifications

Provide Technical Assistance to Partners

- **Develop Data Hardware Requirements**
  - Equipment Specifications
- **Develop Data Software and Format Requirements**
  - Require Directional Data
  - Require Hourly Data
  - Require Classification Data
    - Bicycle Data and Pedestrian Data



National Travel Monitoring Activities…

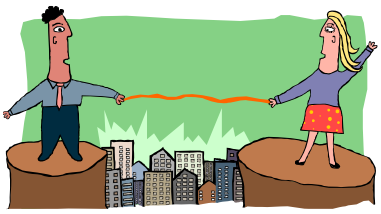
- TMG Chapters and Guidance
- Performance Measures
- Reporting

Final Thoughts…

Reduce the Communication Gap between Transportation and Health

Fund Projects with Bike/Pedestrian Counting Equipment

Transportation Data



Health Data

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