Trails in Northeast Ohio: Concepts, Challenges, & Technology

Anthony M. Joy
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Counting

• Cars
• People
• Bikes
• Other
  • Horses
  • Dogs
Counters

• 130 + counters
  • Largely automobile
• Various analog and digital counters
• Manual counting
• Bluetooth
• Cellular
Counters

- 130 + counters
  - Largely automobile
- Various analog and digital counters
- Manual counting
- Bluetooth
- Cellular
For each reservation, monthly attendance =

Inductive loop traffic counters and/or meter boxes are installed in the locations listed on the next slides; as well as, the weights assigned to each counter, based on the volume seen at each location. Many meters have weights that vary throughout the year, while some have one consistent weight. Visual observations are ongoing in an effort to keep these weights as up to date as possible.
Types of Sensors

• K Hill Traffic Counters

The K-Hill Model GMH Air Module Counter is a portable self contained six digit electromechanical cumulative counter with turnback feature, enclosed in an aluminum weatherproof housing. This counter counts 1.2 half count per axle or one count per automobile. It operates from pneumatic road tube which activates the air module to advance the counter. This counter has the capability to increase or decrease sensitivity or delay to perform for your application. This is the latest in K-Hill's solid state electronics - supplied with two six volt batteries, built in battery tester, and on/off switch. Dimensions are 6”x 7”x 5” - weight 12 lbs. Counter comes complete with a vandal proof lock and carrying handle, necessary installation parts and an easy to follow instructions, less road tube. (Must be ordered separately)
Types of Sensors

- K Hill Traffic Counters
- Trafx Counters
Types of Sensors

- K Hill Traffic Counters
- Trafx Counters
- Eco Counters
Types of Sensors

- K Hill Traffic Counters
- Trafx Counters
- Eco Counters
- Terabee
- Built In Cloud Reporting
- Manual Reporting (Research – Marketing)

<table>
<thead>
<tr>
<th>Location</th>
<th>Average Battery</th>
<th>Setup Date</th>
<th>Last Data Date</th>
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<tbody>
<tr>
<td>RRNC-FortHill</td>
<td>12 month(s)</td>
<td>09/24/2016</td>
<td>05/21/2016</td>
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<td>RRNC-NatureCntrTrails</td>
<td>3 month(s)</td>
<td>10/25/2016</td>
<td>05/21/2016</td>
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Reporting

- Built In Cloud Reporting
- Manual Reporting (Research – Marketing)

Key Figures

- Total Traffic for the Period Analyzed: 141,853
- Daily Average: 619
  - Weekdays: 470 / Weekend days: 995
- Monthly Average: 18,854
- Busiest Day of the Week: Sunday
- Busiest Days of the Period Analyzed:
  1. Sunday, March 18, 2018 (2,472)
  2. Sunday, August 27, 2017 (2,246)
  3. Sunday, August 13, 2017 (2,166)

- Distribution by Direction:
  - IN: 47%
  - OUT: 53%
### Reporting

- Biking Report
- Infrared Sensors

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<th>Month</th>
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<th>Bedford</th>
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<td>211</td>
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<td>December</td>
<td>593</td>
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<td>April</td>
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<td>284</td>
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<td>May</td>
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<tr>
<td>2018</td>
<td>February</td>
<td>87</td>
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<td>21</td>
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</tbody>
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Information on Trails

• Fitness Applications
• Map My Run
• Strava:
  • Ohio Department of Transportation
• CM Mobile Applications (future versions)
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Why do we need trails?
Forest Bathing

- Shinrin-yoku
  - Forest Bathing, 1982
- 3 day hike leads to NK (natural killer) cell increase (THIS IS GOOD!) – work to contain viral infections
- Caused by phytoncide (substance emitted by plants and trees) & lower cortisol
- Increases self-esteem, social connection, lowers stress and anxiety
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Your zip code can affect your life expectancy
If you travel less than ten miles from Cleveland’s northeastern neighborhoods to more affluent eastern outer-ring suburbs, life expectancy can differ by as much as 12 years.

SOURCES: Virginia Commonwealth University; Robert Wood Johnson Foundation
Current Research

• Cleveland Metroparks Health Research Study
  • MetroHealth

• Two groups, four different days
  • Once a week for an hour for 10 weeks
  • Control group in an urban setting

• Measurements
  • Fitbits
  • Blood Pressure
  • Cortisol
  • Air Quality

TIME TO EXPLORE
Cleveland Metroparks
Current Research

• Focus Groups (research in progress) – trail selection based on gender, etc.

• All studies are research based – IRB (Institutional Review Board) involving human subjects

• Studies will be published
Other Types of Technology/Sensors

• Cameras
Other Types of Technology/Sensors

- Cameras
- Air Quality
Other Types of Technology/Sensors

• Cameras
• Air Quality
• IoT Sensors
  • Water Monitoring
  • Pavement Monitoring
  • Sound Monitoring
  • Gas/Spray paint Monitoring
Virtual/Augmented Reality

- Virtual Reality: Wear a headset and walk/view the trails or areas that you do not have or can’t access (drone fly overs, etc.)
- Augmented Reality: Headset NOT required but is possible – hologram or artifacts over the real life image you see
Virtual/Augmented Reality Trail Tours

- ADA
- Planning & Design (bridge)
- Seasonal Changes
- Hospitals (UH Siedman Cancer Institute)

TIME TO EXPLORE
Cleveland Metroparks
Summary - Trail Technology

Trying to answer
• Why are trails important?
• When did visitors utilize the trail(s)?
• Where did they visit?
  Where should we build?
• How should we build?
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