Covid-19’s Impact on Travel and System Performance

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Durham-Chapel Hill-Carrboro MPO

December 2nd, 2020
Overview

- Study Area – DCHC MPO (Durham, Orange, and northern Chatham counties)
- Data Sources: StreetLight Data, HERE Data, NPMRDS Data (RITIS), National Transit Database (NTD)
- Traffic Volume and VMT Changes
- Congestion Changes
- Trip by Purpose and Mode
- Trip Length Frequency
Traffic Volume Changes

• Locations
  • 10 Locations on Interstate
  • 21 Locations on US and NC Highways

• Periods
  • 2019 AWDT (Normal Condition)
  • Phase 0 – Mar. 1 to May 7, 2020 (Early Stage)
  • Phase 1 – May 8 to May 21, 2020
  • Phase 2 – May 22 to Sep. 3, 2020
  • Phase 2.5 – Sep. 4 to Oct. 1, 2020
  • Phase 3 – Oct. 2 to Oct 23, 2020

• Data Source
  • StreetLight Data
Traffic Volume Changes

- Overall
  - 33% of traffic volume decreased in the Phase 0
  - Slightly increased in Phase 1
  - Roughly 86% of traffic volume on the network from the Phase 2 to current

![Traffic Volume Change Graph](image-url)
Traffic Volume Changes by Location

- **2019**
- **Phase 0**
- **Phase 1**
- **Phase 2**
- **Phase 2.5**
- **Phase 3**

### Locations
- **0320000174 (I-40)**
- **0320000138 (I-85)**
- **032000020 (NC 147)**
- **0320000176 (NC 55)**
- **0320000064 (NC 98)**
- **0320000113 (US 15-501 BUS)**
- **0320000098 (US 70 BUS/NC 98)**

### Stages
- **Phase 0**: Initial phase
- **Phase 1**: First phase
- **Phase 2**: Second phase
- **Phase 2.5**: Third phase
- **Phase 3**: Final phase

### Traffic Volume Changes
- Graph shows traffic volume changes over different phases and locations.
Daily VMT Change in DCHC Area

Average Daily VMT

- Source: Streetlight Data
- Calibration: Single factor OD approach
- 47% Decrease in April 2020
- 19% Decrease in August 2020
Daily VMT Changes – Durham and Orange & Chatham

Durham County

Orange & Chatham in DCHC
Congestion Changes

- Interstate Level of Travel Time Reliability – Annual Changes
  - 81.5 -> 100.0%

* Total 9 months (Jan.-Sep) data were available for 2020 LOTTR estimation.
** Data Source: NPMRDS through RITIS
Congestion Changes

- Interstate Level of Travel Time Reliability – Monthly Changes

<table>
<thead>
<tr>
<th>Month</th>
<th>2019 LOTTR (%)</th>
<th>2020 LOTTR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>87.4</td>
<td>85.5</td>
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<tr>
<td>February</td>
<td>86.0</td>
<td>90.7</td>
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<tr>
<td>March</td>
<td>83.2</td>
<td>100.0</td>
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<tr>
<td>April</td>
<td>83.4</td>
<td>100.0</td>
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<tr>
<td>May</td>
<td>82.6</td>
<td>100.0</td>
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<tr>
<td>June</td>
<td>80.0</td>
<td>100.0</td>
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<tr>
<td>July</td>
<td>86.6</td>
<td>100.0</td>
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<tr>
<td>August</td>
<td>78.7</td>
<td>100.0</td>
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<tr>
<td>September</td>
<td>84.4</td>
<td>100.0</td>
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<tr>
<td>October</td>
<td>79.9</td>
<td></td>
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<tr>
<td>November</td>
<td>79.2</td>
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<tr>
<td>December</td>
<td>87.4</td>
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</tbody>
</table>
Congestion Changes

- Non-Interstate NHS Level of Travel Time Reliability – Annual Changes
  - 81.3% (2019) -> 95.6% (2020)

* Total 9 months (Jan.-Sep) data were available for 2020 LOTTR estimation.
** Data Source: NPMRDS through RITIS.
Congestion Changes

- Non-Interstitial NHS Level of Travel Time Reliability – Monthly Changes

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<tr>
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<td>83.3</td>
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Non-Interstitial NHS Travel Time Reliability

2019 vs 2020
Congestion Changes

• Travel Speed Changes by Facility (I-40)

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>Phase 0</th>
<th>Phase 1</th>
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<tbody>
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<td>Westbound</td>
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<td>Eastbound</td>
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* Data Source: HERE data through RITIS
### Congestion Changes

- **Travel Speed Changes by Facility (US 15-501)**

#### Southbound

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
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#### Northbound

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<thead>
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**Legend:**
- Speed (mph)
  - 0 - 10: Red
  - 10 - 20: Orange
  - 20 - 30: Yellow
  - 30 - 40: Green
  - 40 - 50: Blue
Congestion Changes

- Travel Speed Changes by Facility (US-501)
Congestion Changes

- Travel Speed Changes by Facility (NC-55)

<table>
<thead>
<tr>
<th>Year</th>
<th>Phase 0</th>
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<th>Phase 2</th>
<th>Phase 2.5</th>
<th>Phase 3</th>
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<tr>
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<td>30 MPH</td>
<td>35 MPH</td>
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[Diagram showing speed changes for Westbound and Eastbound traffic.]
Congestion Changes

- Travel Speed Changes by Facility (NC-98)
**Congestion Changes**

- **Travel Speed Changes by Facility (NC-147)**

**Southbound**

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**Northbound**

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Trip Index by Trip Purpose, 2020

- Key Dates:
  - First US Case: January 20th
  - First North Carolina Case: March 3rd
  - NC Stay-at-Home order enacted March 30th

- Individuals altered behaviors before government mandates

- Durham's 2020 Trip Rate relative to 2019:
  - February: -7.3%
  - March 1st – March 15th: -10.2%
  - March 16th – March 31st: -49.9%
Trip Index by Trip Purpose DCHC Region
Trip Length Frequency

- Decline across all length categories from first to second quarter. Gradual increase seen in third quarter.
- Trips lasting 10-20 and 20-30 minutes recovered slowest, as school shutdowns and lockdowns may have limited short-term trips.
- Longer trips demonstrate ‘stickiness’ by end of third quarter.
Mode Choice: Motorized vs Non-Motorized Person Trips

- Increase in total pedestrian trips compared to total automobile trips

- Spike in April 2020, 70% of total trips were non-motorized, compared to 40% in April 2019

- Increase in non-motorized trips attributed to pedestrian instead of bike trips

* Data represents unlinked trips
Mode Choice: Pedestrian Trips

- Trips increased 24% relative to 2019
- April 41% higher in 2020 compared to April 2019
  - March to June: 33%

*Data represents unlinked trips*
Mode Choice: Bike Trips

- Over nine month period, trips increased 12%.
- Summer months, June to August, Bike trips increased 23% from 2019.
- Supply struggled to meet surging demand.

* Data represents unlinked trips.
Average Daily Bus Ridership

- Data Source: National Transit Database (NTD)
- GoDurham has a 56% decrease in May
- Chapel Hill Transit has a 98% decrease in April while Gotriangle has a 47% decrease
Average Daily Bus Ridership - 2

**Chapel Hill Transit**
- 2019
- 2020

**GoTriangle**
- 2019
- 2020
Summary

- Average Travel Speed increased compared to 2019 while VMT decreased
  - Significant increase on the Interstates

- Lower class roadways show similar travel time/speed with 2019.
  - Interrupted Facility
  - Access Points

- Best congestion condition in Phase 0 and Phase 1; slightly congestion level increased from Phase 2

- Trip frequency reacted to COVID before government shutdowns in North Carolina

- HBW and NHB trips saw greatest decline and slowest recovery across the region

- Pedestrian trips increased significantly, with gains in Bike trips; meanwhile transit ridership fell across the region, notably in Chapel Hill