# El Paso MPO
# Multimodal Web Tool
## Web–based Application to Visualize Performance of Regional Multimodal Corridors


**El Paso Metropolitan Planning Organization**
Sonia Perez, Transportation Planner

**University of Texas at El Paso**
Marketa Vavrova, Post-Doctoral Researcher
Sebastian Gonzalez, Graduate Research Assistant (CS)

# Presentation Outline

1. Introduction
    - 1.1 Context and Background
    - 1.2 Motivation
    - 1.3 Approach
2. Multimodal Performance Measures
3. Data Sources
4. Data Analysis
5. Web Tool Modules
6. Next Steps
7. Lessons Learned

# 1.1 Context and Background


1. Introduction
- **Context**
- Motivation
- Approach

2. Performance Measures

3. Data

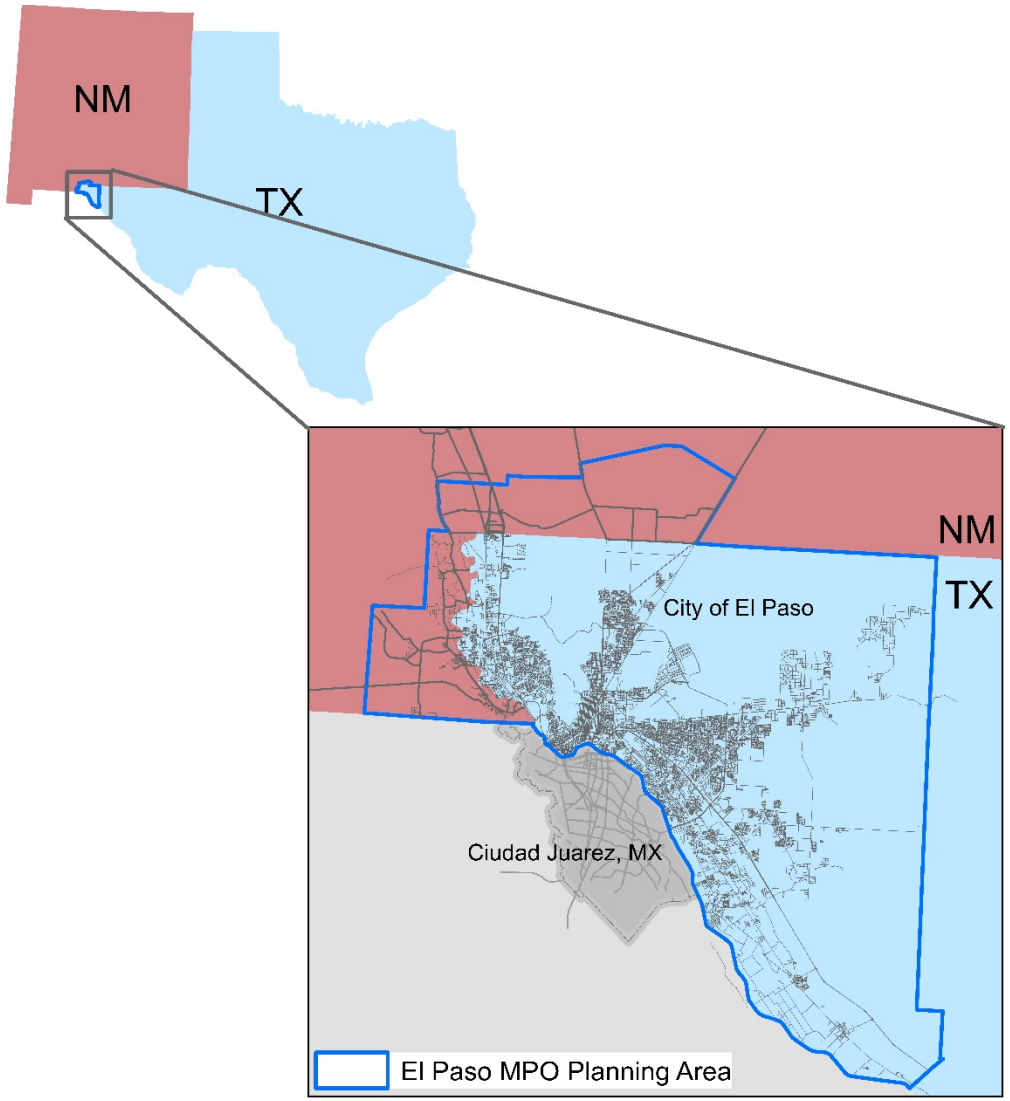
4. Analysis

5. Web Tool

6. Next Steps

7. Lessons


- El Paso MPO (EPMPO)
  - bi-state: TX, NM
  - bi-national: USA, Mexico
- Population
  - El Paso, TX: 830,000
  - Ciudad Juarez, Mexico: 1.3 million
  - Annual northbound crossings:
    - Passenger Cars: 13,073,997
    - Pedestrians: 7,222,224

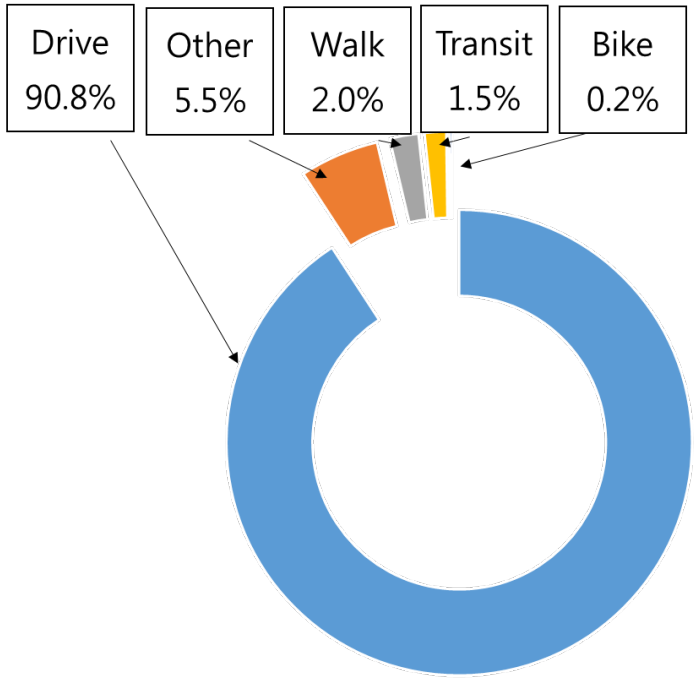


# 1.1 Context and Background (cont'd)


1. Introduction
- **Context**
- Motivation
- Approach

2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons

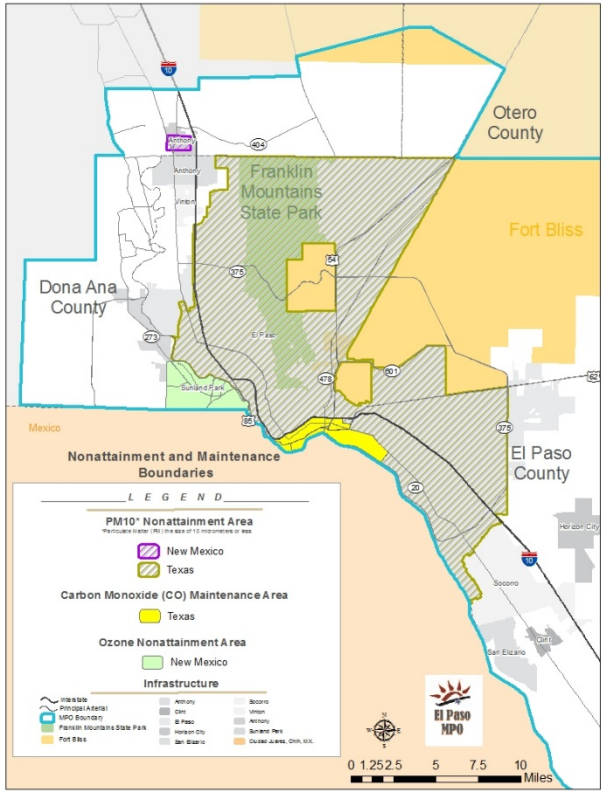

## Modeshare




Source: American Community Survey 2017

## Air Quality

- CO maintenance
- $O_3$ marginal non-attainment
- $PM_{10}$ non-attainment



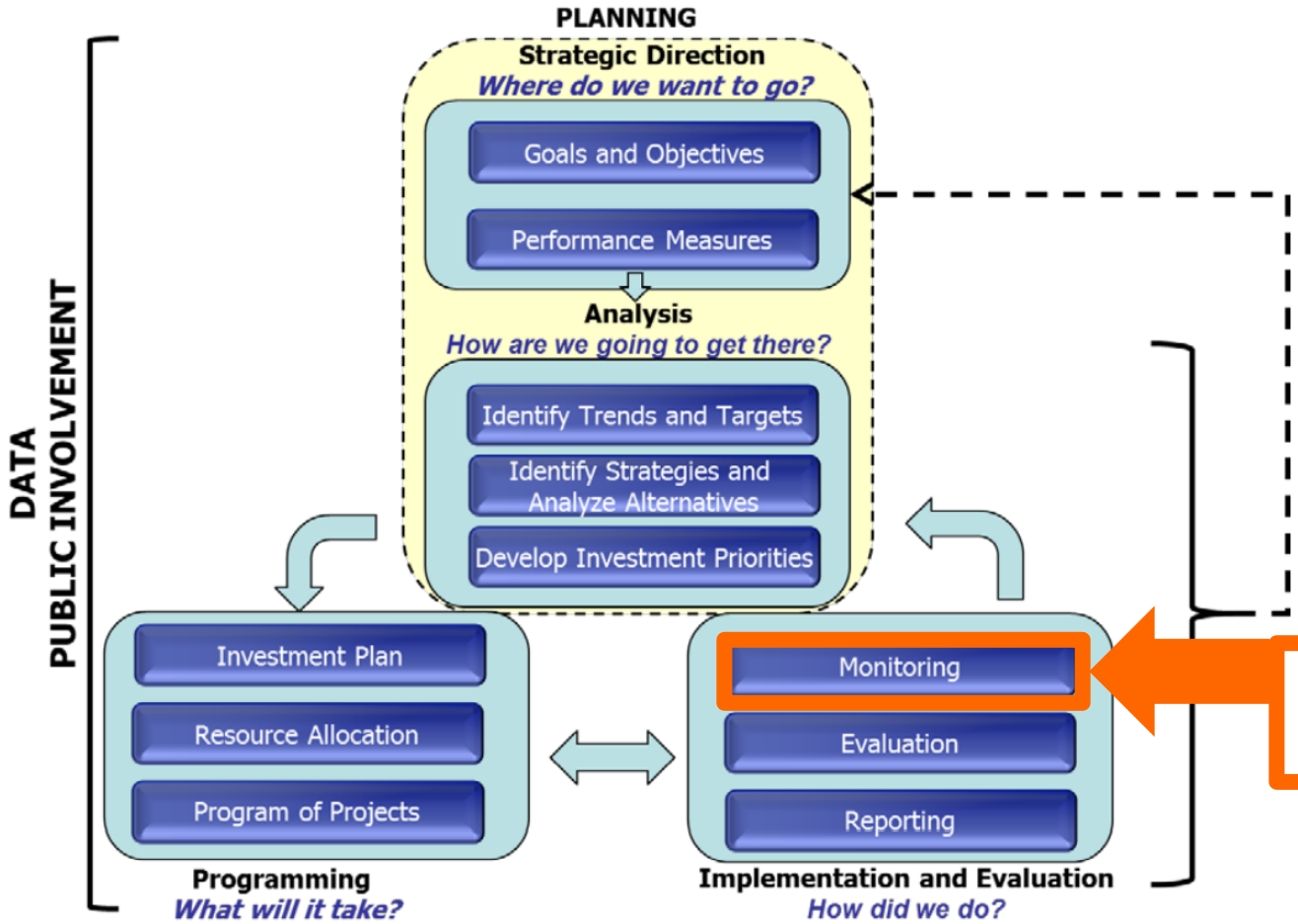

## Safety

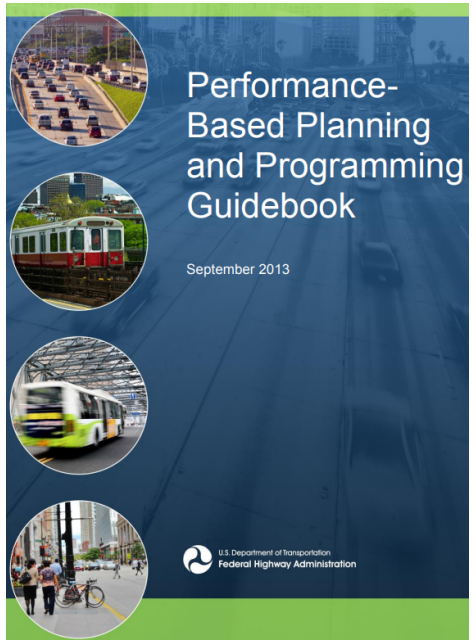
- TxDOT: zero traffic fatalities by 2050
- El Paso County (2018): 91 fatalities, 41% pedestrian

# 1.2 Motivation


1. Introduction
   - Context
   - **Motivation**
   - Approach
2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons


## ➢ Framework for Performance-Driven Planning and Programming




**Web–based Application to Visualize Performance of Regional Multimodal Corridors**

- **Current performance**
- **Historical performance**

*FHWA (2013): Performance-Based Planning and Programming Guide*

# 1.3 Approach


1. Introduction
- Context
- Motivation
- **Approach**

2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons


➢ **Goal:**

- To track transportation performance over time.
- To support identification of gaps in infrastructure across transportation modes.
- To inform planning and programming decisions.
- To be a resource for local planning partners and general public.

Is pavement condition improving?

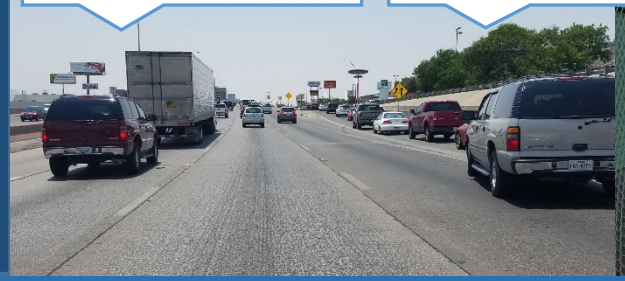
Are travel times getting longer?

Has transit ridership been increasing?

Have all planned bikeways been built?

Is air quality improving?

Have fatal crashes decreased?

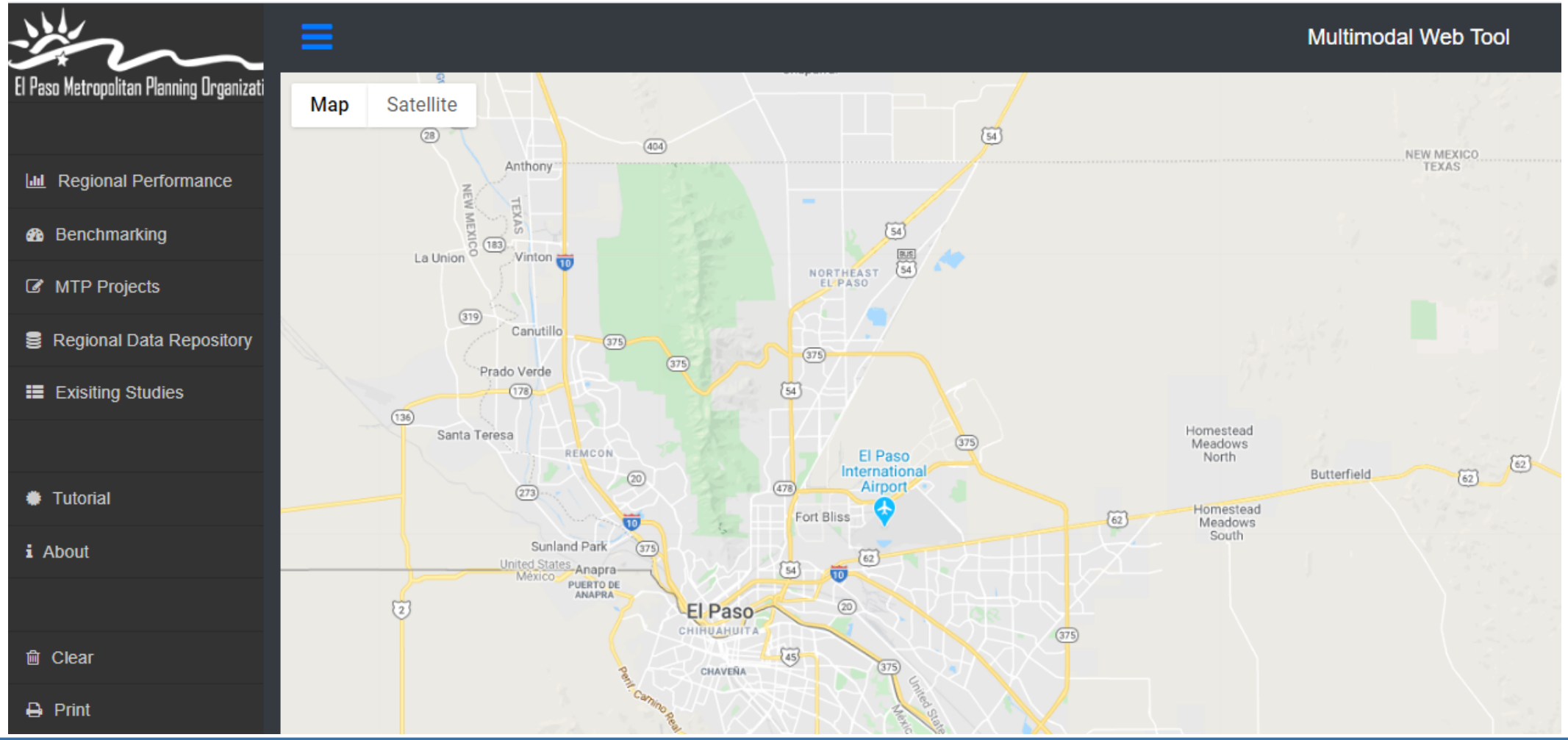


# 1.3 Approach (cont'd)


1. Introduction
- Context
- Motivation
- **Approach**

2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons


- Develop a **Multimodal Web Tool**



# 1.3 Approach (cont'd)


1. Introduction
- Context
- Motivation
- **Approach**

2. Performance Measures

3. Data

4. Analysis

5. Web Tool

6. Next Steps

7. Lessons


- Collaboration between El Paso MPO and University of Texas at El Paso (UTEP)
  - Project started in 9/2018, v.1 completed 1/2020
  - Builds on previous efforts:
    - 2016-2017 Review of multimodal performance measures
    - 2017-2018 Pilot web application for one corridor
  - UTEP research team includes undergraduate and graduate students (civil engineering, computer science) guided by staff researchers
  - MPO staff oversees and provides feedback

# 1.3 Approach (cont'd)


1. Introduction
- Context
- Motivation
- **Approach**

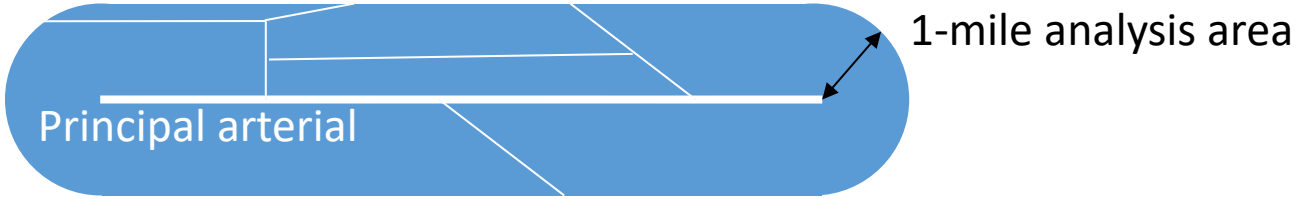
2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons


- Select **Multimodal Performance Measures** for

  Driving, Transit, Freight, Walking, Biking

- **Gather** Data from National, State, Local Sources
- **Analyze** Data
- Identify **Multimodal Corridors**

**Corridor** =



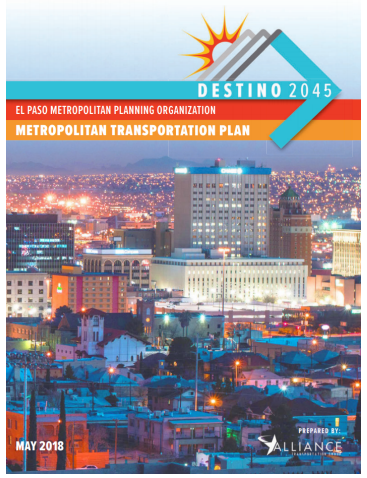

- Visualize Data in **Web Tool**

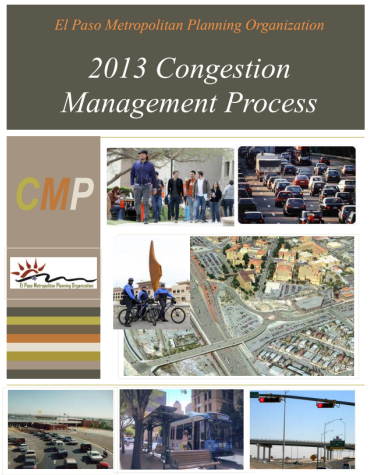
# 2. Multimodal Performance Measures


1. Introduction
2. **Performance Measures**
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons


Where we looked for performance measures:

- **Metropolitan Transportation Plan** (EPMPO 2018)
- **Congestion Management Process** (EPMPO 2013)
- **National Performance Measures** (FHWA 2017)



Identified
**44 performance measures**
from existing plans

Identified
**21 performance measures**
from National Performance Measures

# 2. Multimodal Performance Measures (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons


**44 performance measures** from existing plans

**21 performance measures** from National Performance Measures

**26 performance measures** included in the Multimodal Web Tool

| MTP Community Ranking | Multimodal Web Tool |
|---|---|
| 1. Improve safety | 4 performance measures for **safety** |
| 2. Improve quality of life | 10 performance measures for **accessibility**<br>2 performance measures for **infrastructure condition** |
| 3. Protect environment | 3 performance measures for **environment** |
| 4. Reduce congestion | 3 performance measures for **reliability**<br>4 performance measures for **modeshare** |

# 2. Multimodal Performance Measures (cont'd)


1. Introduction
2. **Performance Measures**
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons


| Category | Driving | Freight | Transit | Walking | Biking | Performance Measures for El Paso MPO Multimodal Web Tool | |
|---|---|---|---|---|---|---|---|
| Modeshare | ✓ | | | | | 1. Single occupancy vehicle (SOV) travel | *1* * |
| | | | ✓ | ✓ | ✓ | 2. Workers commuting by transit/walking/biking | *2* |
| | | | ✓ | | | 3. Transit ridership | *2* |
| | | | | ✓ | ✓ | 4. Walking/biking trips recorded by activity apps | *2* |
| Accessibility | | | ✓ | | | 5. Jobs within ½ mile of high-quality rapid transit | *3* |
| | | | | | ✓ | 6. Jobs within ½ mile of bikeways | *2* |
| | | | ✓ | | | 7. Key destinations within ½ mile of high-quality rapid transit | *3* |
| | | | | | ✓ | 8. Key destinations within ½ mile of bikeways | *2* |
| | | | ✓ | | | 9. Population within ½ mile of high-quality rapid transit | *3* |
| | | | | | ✓ | 10. Population within ½ mile of bikeways | *2* |
| | | | | ✓ | | 11. Sidewalks per corridor mile | *4* |
| | | | | | ✓ | 12. Bikeway network buildout | *4* * |
| | ✓ | ✓ | | ✓ | | 13. Border northbound crossings | *4* |
| | ✓ | ✓ | | ✓ | | 14. Border northbound wait times | *4* |
| Environment | ✓ | | | | | 15. Ozone | *1* * |
| | ✓ | | | | | 16. Carbon monoxide | *1* * |
| | ✓ | | | | | 17. Particulate matter | *1* * |
| Safety | ✓ | ✓ | | ✓ | ✓ | 18. Traffic fatalities | *1* * |
| | ✓ | ✓ | | ✓ | ✓ | 19. Traffic serious injuries | *1* * |
| | | | | ✓ | ✓ | 20. Crashes between motorized vehicles and pedestrians/bicyclists nearby bus stops | *2* |
| | ✓ | | | ✓ | ✓ | 21. Projects that include safety enhancements located near crash hotspots | *3* |
| Reliability | ✓ | | | | | 22. Traffic crashes on the CMP Network | *4* |
| | ✓ | ✓ | | | | 23. Traffic detectors, CCTV, and DMS coverage | *4* |
| | ✓ | ✓ | ✓ | | | 24. Travel time index | *4* * |
| Infrastructure Condition | ✓ | ✓ | ✓ | | | 25. Pavements in poor condition | *1* * |
| | ✓ | ✓ | ✓ | | | 26. Bridges in poor condition | *1* * |
| **PMs per mode** | **14** | **8** | **8** | **9** | **10** | *Performance Measure identified from: 1 National TPM, 2 Peer practice, 3 MTP, 4 CMP, *modified from original* | |

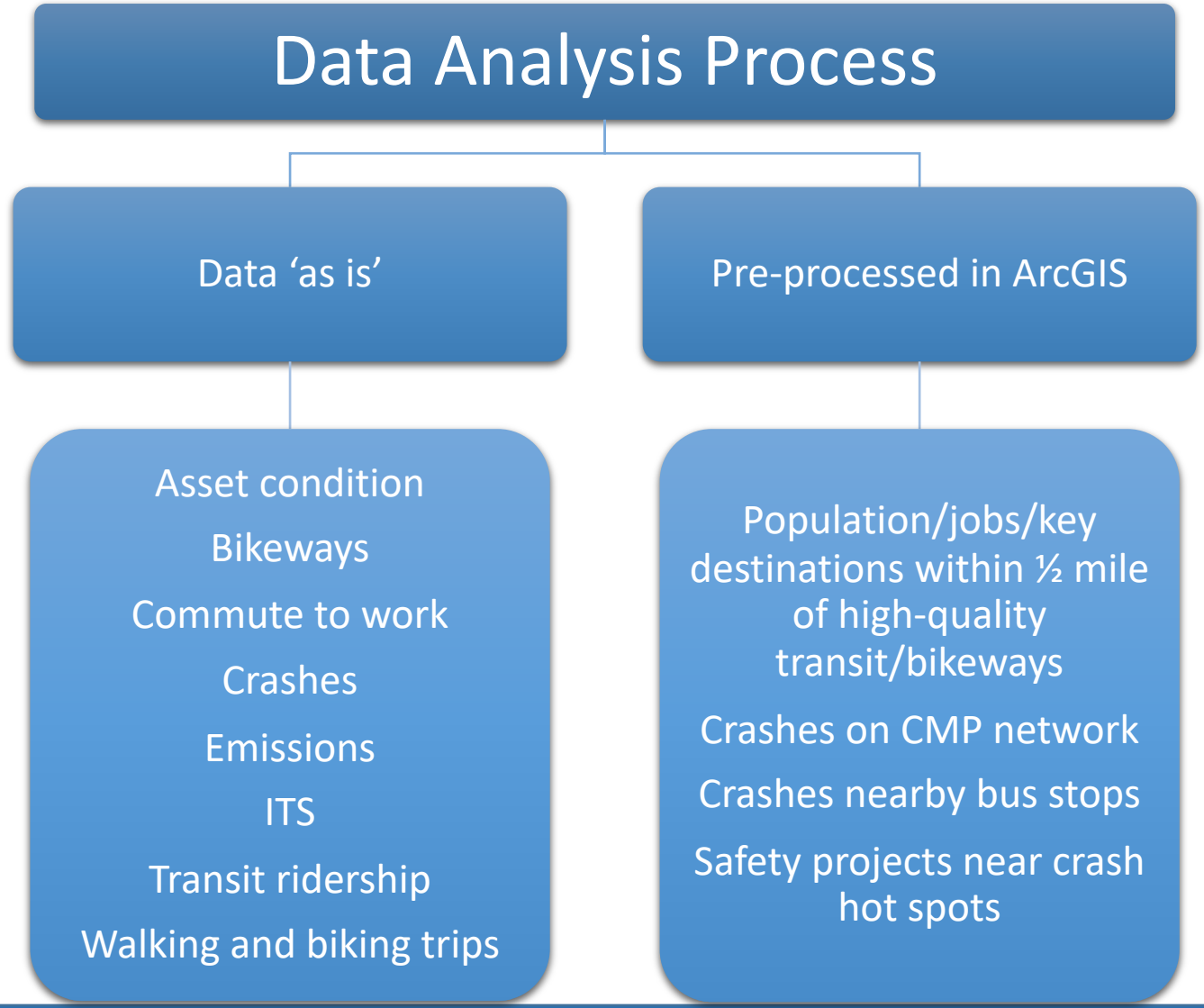
# 3. Data Sources

1. Introduction
2. Performance Measures
**3. Data**
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons

- National
  - Travel times (NPMRDS)
  - Commute to work, population, jobs (U.S. Census)
  - Pavement condition (HPMS)
- State
  - Crashes: fatalities, serious injuries (TxDOT and NMDOT crash databases)
  - Emissions: ozone, carbon monoxide, particulate matter (NM Environment Department, TX Commission on Environmental Quality)
  - Active transportation: walking and biking trips (Strava Metro via TxDOT)
  - Intelligent Transportation Systems: traffic detectors, CCTV, and DMS (TxDOT District)
  - Bridges and culverts: condition (TxDOT, NMDOT)
- Local
  - Ridership, bus stop locations (transit providers)
  - Presence of sidewalks and bikeways, northbound crossings and wait times (municipalities)
  - Planned and existing trails (health foundation, municipalities)
  - Projects enhancing safety, Congestion Management Process (CMP) network (MPO)

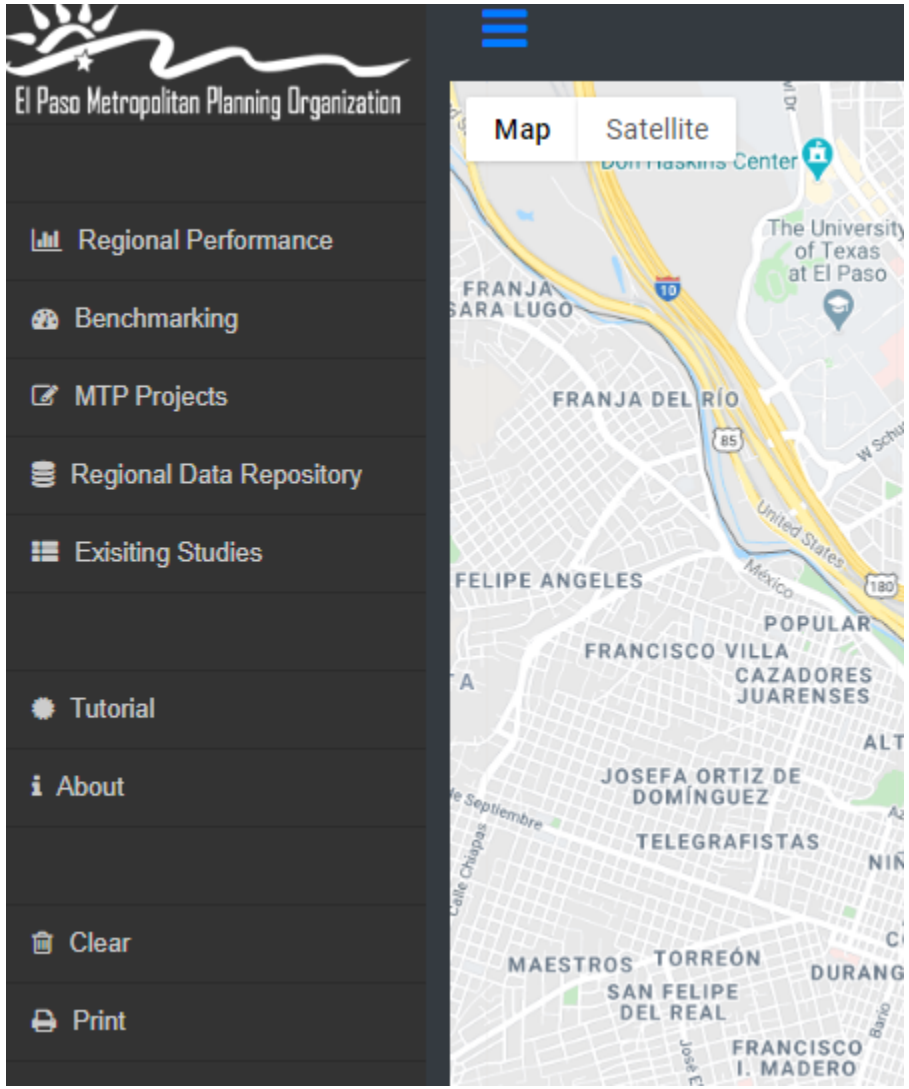
# 4. Data Analysis


1. Introduction
2. Performance Measures
3. Data
**4. Analysis**
5. Web Tool
6. Next Steps
7. Lessons

# 5. Web Tool

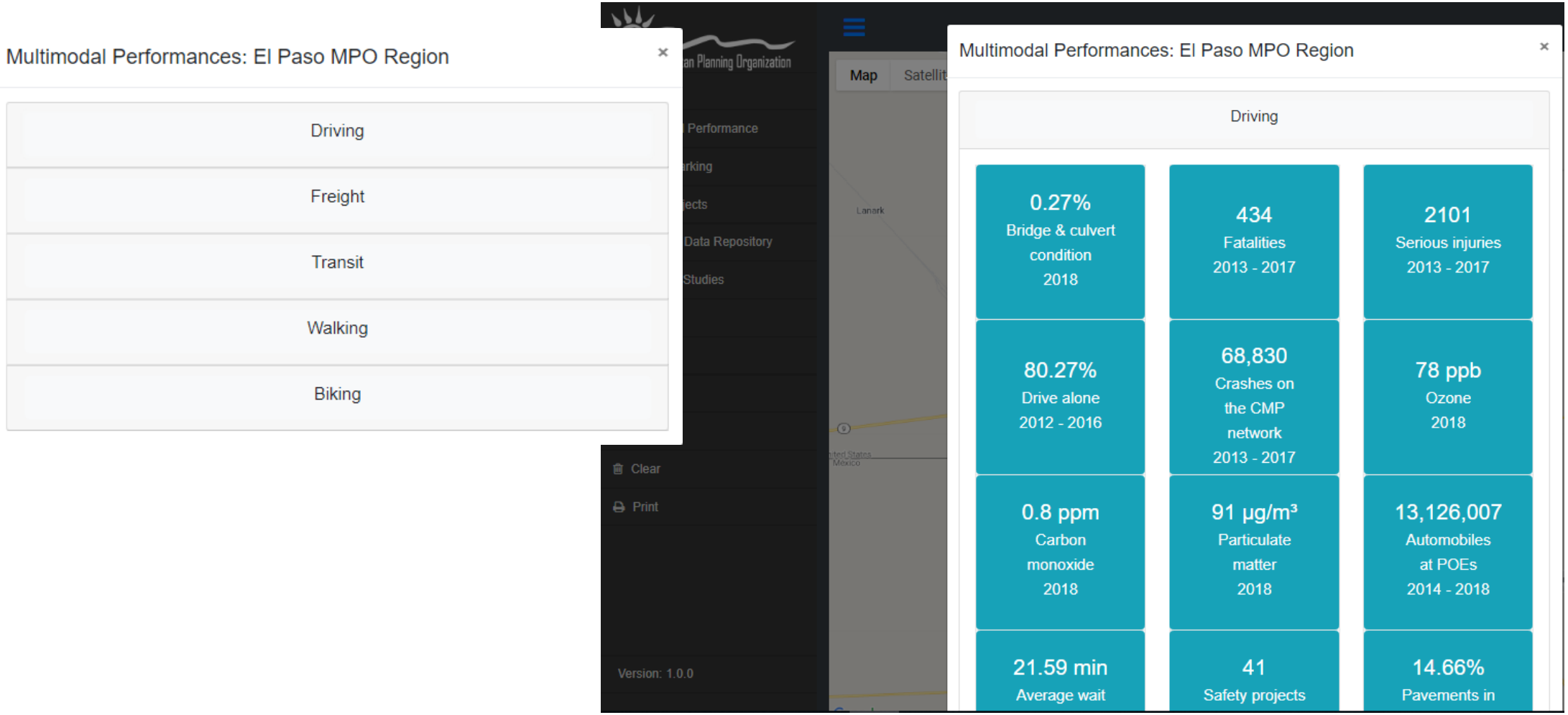

1. Introduction
2. Performance Measures
3. Data
4. Analysis
**5. Web Tool**
6. Next Steps
7. Lessons

# 5. Web Tool (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
**5. Web Tool**
6. Next Steps
7. Lessons

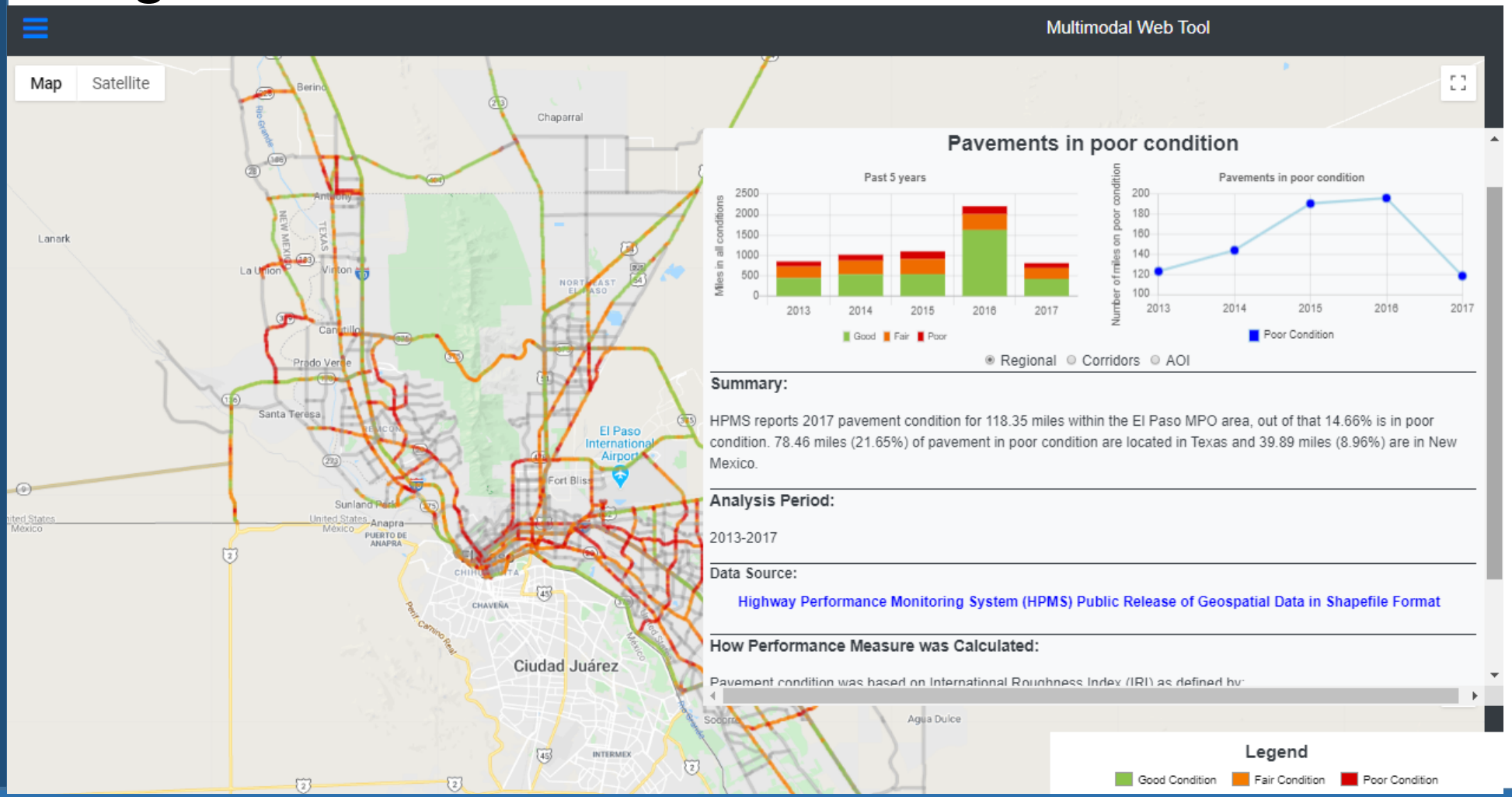

- Multimodal Performance Overview



# 5. Web Tool (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons

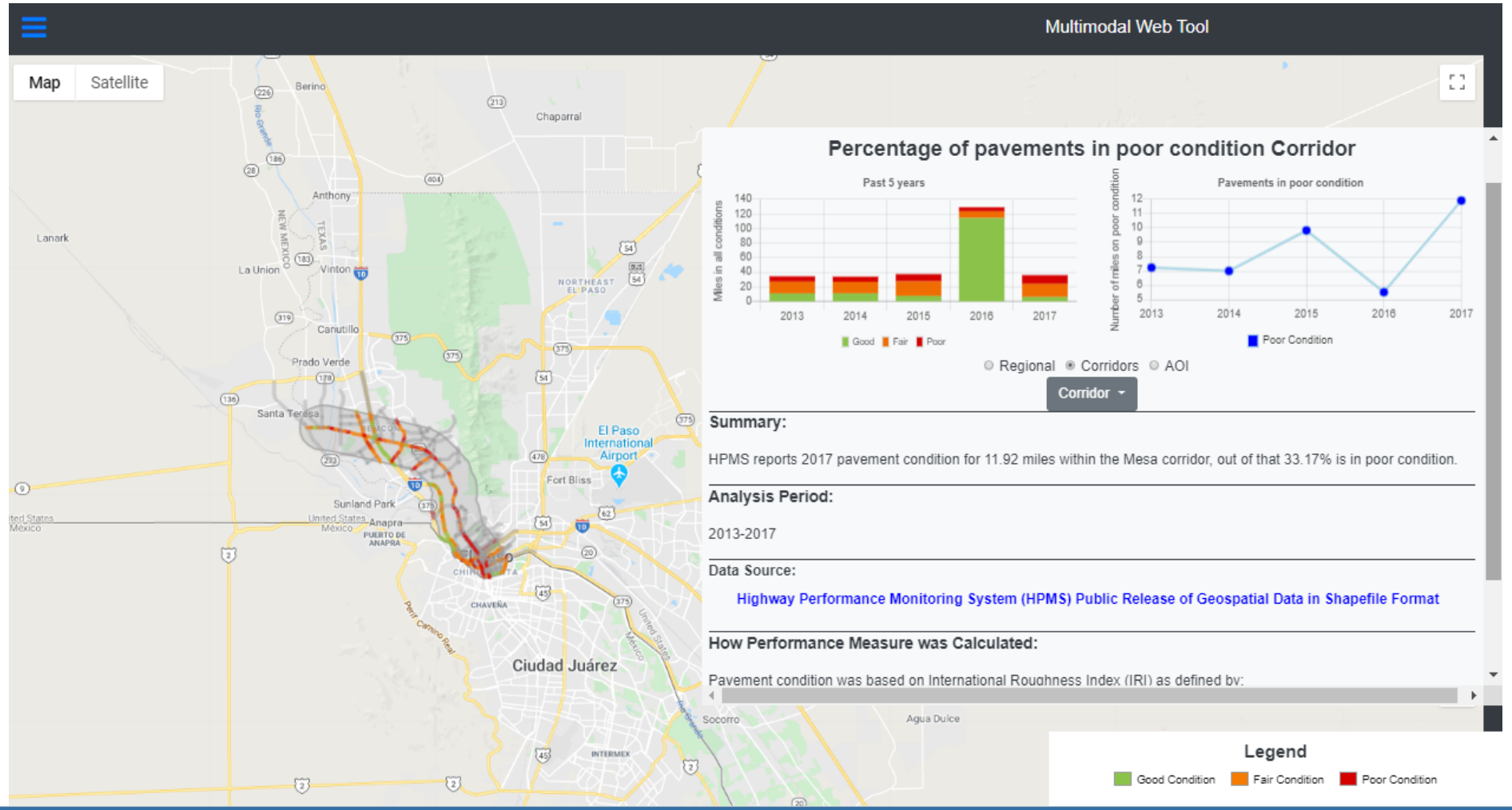

- Regional Performance



# 5. Web Tool (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons

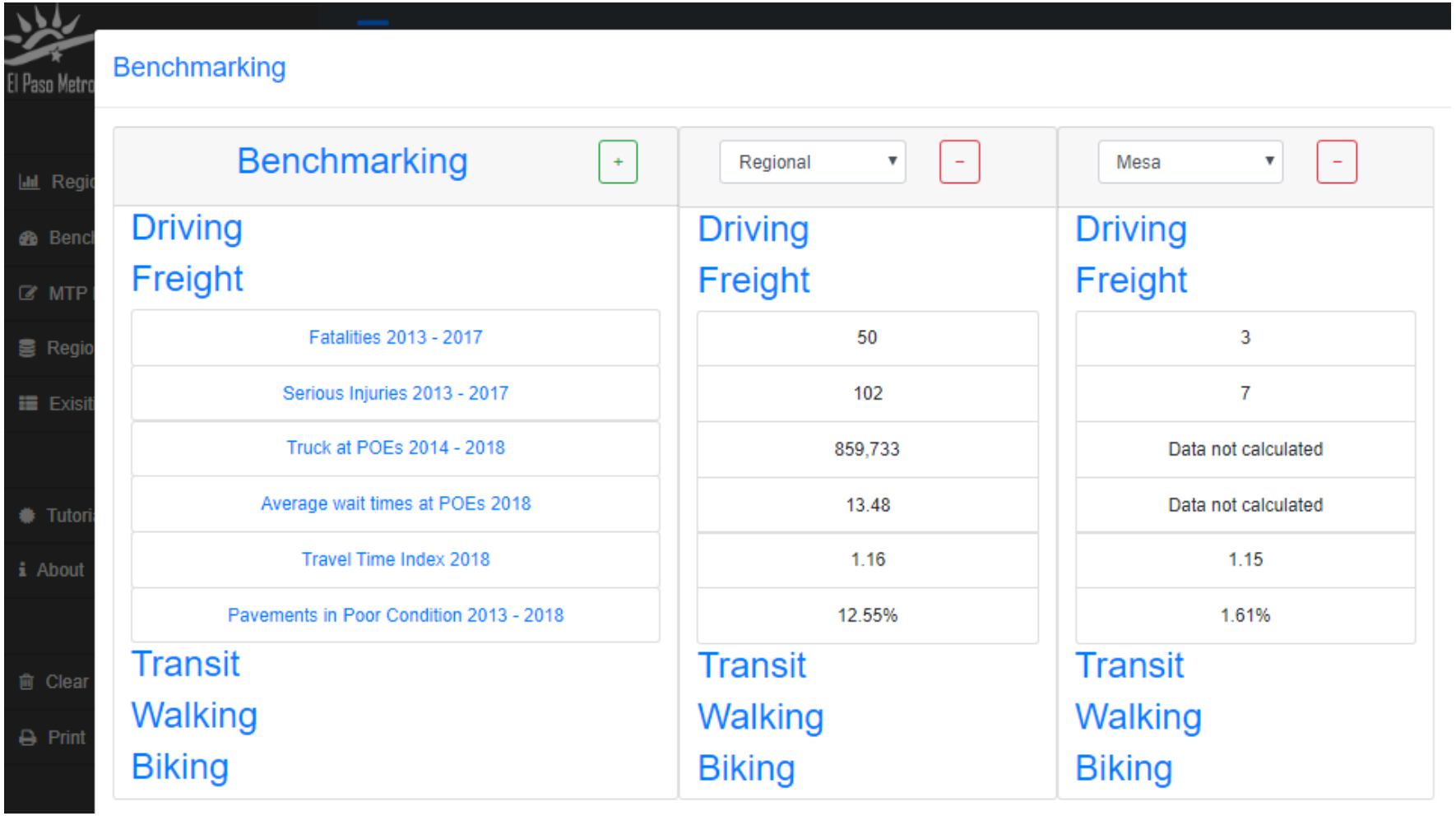

- Corridor Performance



# 5. Web Tool (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
**5. Web Tool**
6. Next Steps
7. Lessons

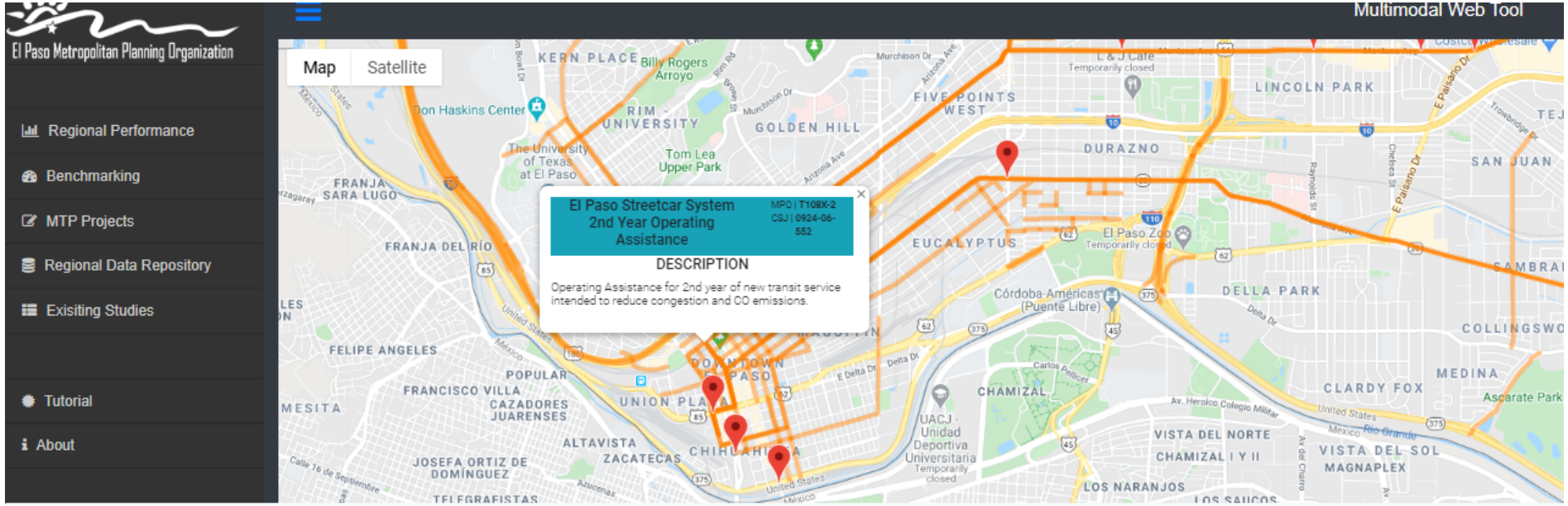

- Benchmarking



# 5. Web Tool (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
**5. Web Tool**
6. Next Steps
7. Lessons


- MTP Projects Overview




MTP Projects

Locate

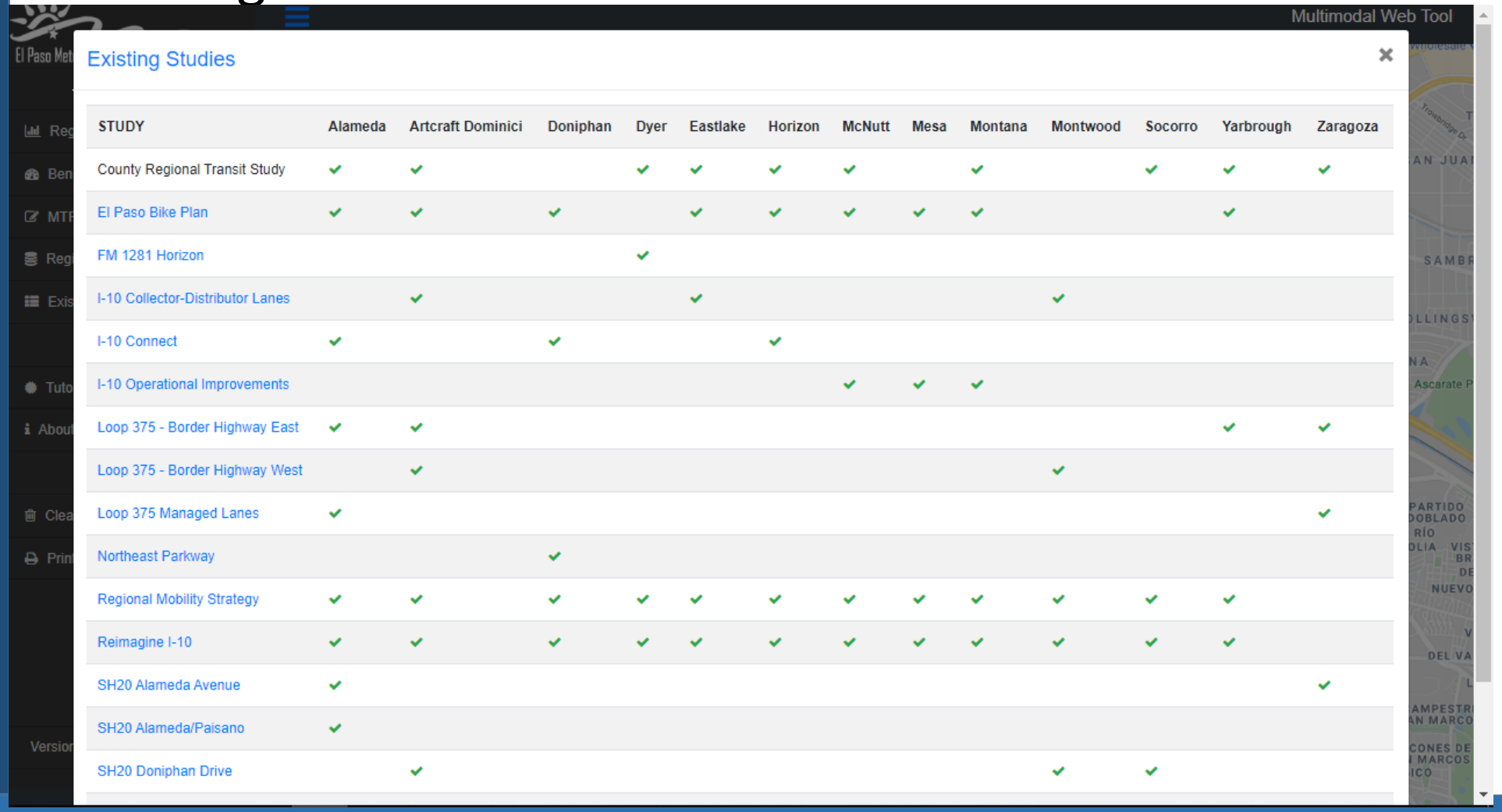
Search:

| Project ID | CSJ | Project Name | Project Mode | Functional Class | CMP Strategy | From | To | City Area | Network Year | Total Project Cost | Sponsor | YOE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A433X-CAP | 0924-06-563 | Arterial 1 (1682 Blvd.) | Added Capacity | Minor Arterial | Road Capacity | Future Border Highway East | IH-10 | East | 2020 | $4,832,941 | Socorro | 2019 |
| P410X-15A | 0924-06-534 | Pellicano Dr Widening/Build | Added Capacity | Proposed Minor Arterial | Road Capacity | Joe Battle (Loop 375) | Berryville St | East | 2020 | $27,576,800 | County EP | 2020 |

# 5. Web Tool (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
**5. Web Tool**
6. Next Steps
7. Lessons


- Existing Studies Overview

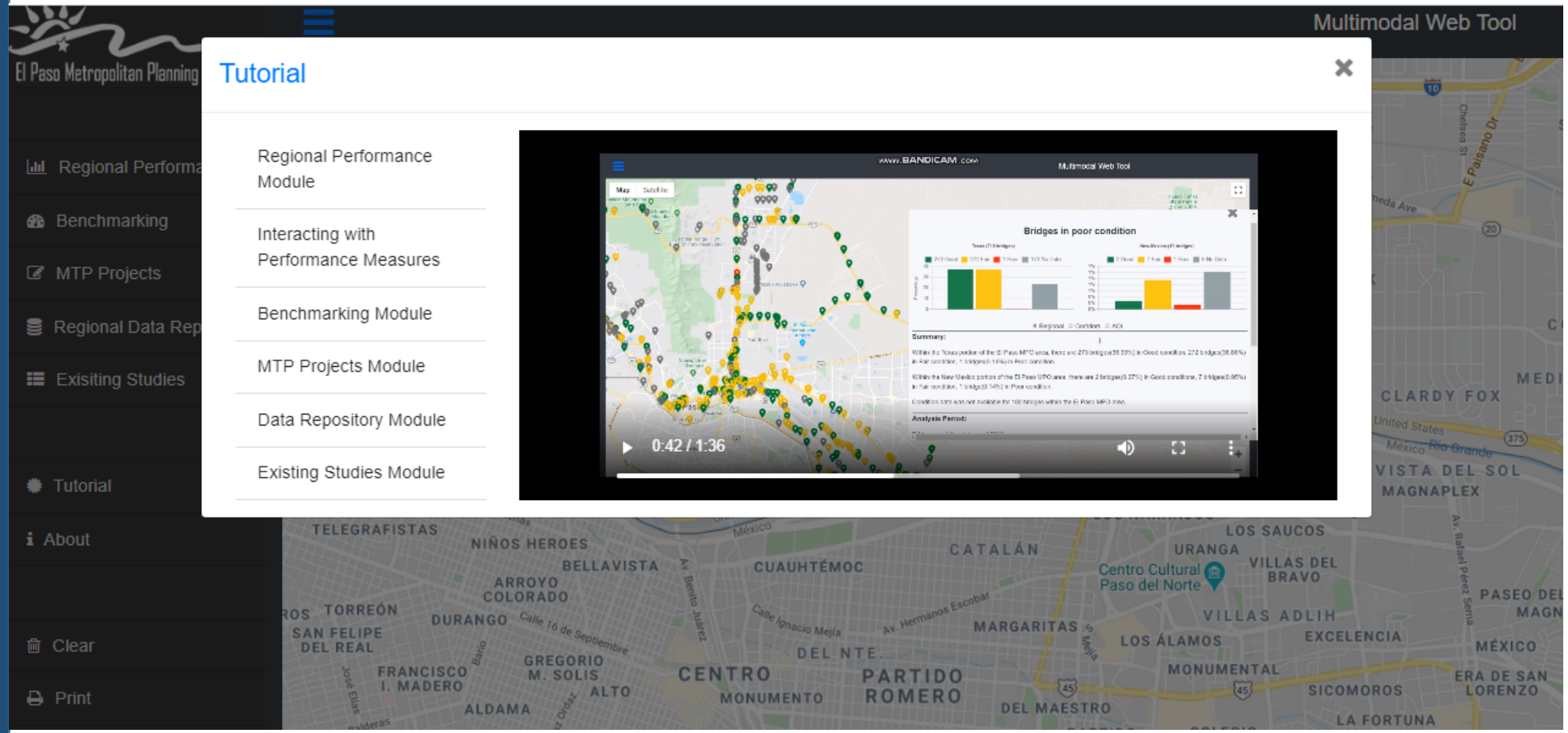



| STUDY | Alameda | Artcraft Dominici | Doniphan | Dyer | Eastlake | Horizon | McNutt | Mesa | Montana | Montwood | Socorro | Yarbrough | Zaragoza |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| County Regional Transit Study | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| El Paso Bike Plan | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| FM 1281 Horizon | | | | ✓ | | | | | | | | | |
| I-10 Collector-Distributor Lanes | | ✓ | | | ✓ | | | | | ✓ | | | |
| I-10 Connect | ✓ | | ✓ | | | ✓ | | | | | | | |
| I-10 Operational Improvements | | | | | | | ✓ | ✓ | ✓ | | | | |
| Loop 375 - Border Highway East | ✓ | ✓ | | | | | | | | | | ✓ | ✓ |
| Loop 375 - Border Highway West | | ✓ | | | | | | | | ✓ | | | |
| Loop 375 Managed Lanes | ✓ | | | | | | | | | | | | ✓ |
| Northeast Parkway | | | ✓ | | | | | | | | | | |
| Regional Mobility Strategy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Reimagine I-10 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| SH20 Alameda Avenue | ✓ | | | | | | | | | | | | ✓ |
| SH20 Alameda/Paisano | ✓ | | | | | | | | | | | | |
| SH20 Doniphan Drive | | ✓ | | | | | | | | ✓ | ✓ | | |

# 5. Web Tool (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
7. Lessons


- Tutorial



# 5. Web Tool (cont'd)


1. Introduction
2. Performance Measures
3. Data
4. Analysis
**5. Web Tool**
6. Next Steps
7. Lessons


- Tools Used

# 6. Next Steps

1. Introduction
2. Performance Measures
3. Data
4. Analysis
5. Web Tool
**6. Next Steps**
7. Lessons

Short-term:

- Launch in May 2020
- Incorporate the Web Tool into planning&programming process
  - Training for MPO board members and planning partners
- Gather feedback and opportunities for improvement

Long-term:

- Revise performance measures
- Tailor to suit planning and programming needs
- Add newly available data in predetermined intervals

# 7. Lessons Learned

1. Introduction
2. Performance Measures
3. Data
4. Analysis
5. Web Tool
6. Next Steps
**7. Lessons**

- Work with what is available
- Inter-agency relationships are important
- Identify opportunities for improvement
- Attainable complexity

# Thank you.

Sonia Perez, CNU-A sperez@elpasompo.org
Marketa Vavrova, Ph.D., EIT mvavrova@utep.edu
Sebastian Gonzalez, sgonzalez53@miners.utep.edu