Feasibility of a Statewide Travel Demand Model

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Department of Civil Engineering
Fargo, ND 58105

Minnesota Modeling Group MeetingnPresentation

To: Minnesota Modeling Group

At: Room 2, Arden Hills Training Center
Minnesota Department of Transportation
Shoreview, MN

November 14, 2007
10:10 to 11:00 a.m.

Presenter

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Outline of Presentation

1. Survey Results
2. Challenges
3. Recommended Action Plan

Survey Results

Survey Results

1. Five different perspectives
2. Surveys Sent Out by email—August 10; reminders on Aug 20, Aug 30, Sept 10, Sept 17
3. Surveys Received—a cross-section of a) Departments in Mn/DOT
   b) MPOs in Minnesota
   c) RDCs in Minnesota
   d) Other State DOTs
   e) NARC/Other MPO members

Update – Survey Results—Mn/DOT

Responders

- District 1
- Transportation Data Analysis (TDA)
- Office of Freight and Commercial Vehicle Operations (OFCVO)
- Metro District
- Office of Investment Management (OIM)

Update – Survey Results—Mn/DOT

Table S1.1 Value of STM – Perspective of Mn/DOT Professionals

STM Value	Count	Min	Max	Average
II. Given the definition above, how valuable is development of a statewide travel model (STM)? Please use a scale of 0 (no value) to 5 (very valuable).	4	1	5	3.25

Update – Survey Results—Mn/DOT

The current regression approach to forecasting AADTs on both Mn/DOT and local highways does not provide any origin-destination information. As Mn/DOT incorporates Intersection Control Evaluations and Traffic Impact Studies, the importance of getting future traffic volumes (especially on the local system) is important.

In development performance measures for the Statewide plan, future AADT is a very important element in identifying future needs. The AADT has previously been used as an indicator for widening shoulders, expanding from 2 to 4 lanes, and installing cable median barrier.

Update – Survey Results—Mn/DOT

There are too many variables and changing conditions over time to develop a reasonably accurate and useful statewide travel model. MPO travel models serve the urbanized areas well and planning level traffic forecasts are adequate for Greater Minnesota planning and project programming needs. There possibly may be some value related to freight movements, but the feasibility and value of modeling is questioned due to constantly changing markets and conditions.

Update – Survey Results—Mn/DOT

III. Level of Involvement	Count	Min	Max	Average
Statewide Transportation Planning and Studies	5	3	5	3.6
Highway Access Management and Traffic Impact Studies	5	2	5	3.4
Long Range Transportation Plan (LRTP)	4	0	5	3.25
Corridor Planning and Studies	5	2	4	2.8
Regional Transportation Planning and Studies	5	0	4	2.8
Development of Statewide or Regional Performance Measures	5	0	4	2.8
Statewide Transportation Improvement Plan (STIP)	5	1	5	2.6

Update – Survey Results—Mn/DOT

III. Importance of Planning Activity	Count	Min	Max	Average
Long Range Transportation Plan (LRTP)	3	5	5	5
Regional Transportation Planning and Studies	4	4	5	4.5
Transportation Improvement Plan (TIP)	4	3	5	4.3
Statewide Transportation Planning and Studies	5	3	5	4.2
Corridor Planning and Studies	5	3	5	4
Funding and Programming – Project Prioritization and Programming (based on benefits and needs analysis)	4	3	5	4
Statewide Transportation Improvement Plan (STIP)	4	2	5	3.8
Evaluate Impact of Network Changes—Capacity Increases—additional lanes, roadway improvements, new road	4	3	5	3.8
Development of Statewide or Regional Performance Measures	5	2	5	3.4
Special Generators Analysis (airports, intermodal transfer centers, trade centers, ethanol plants, elevators, etc.)	4	2	5	3.3
Pavement Life studies—roadway wear, timing of rehabilitation	3	2	4	3.3
Truck Size and Weight studies; Spring Load restrictions	4	2	4	3.3
Modal shift studies	3	3	4	3.3
Highway Access Management and Traffic Impact Studies	5	3	4	3.2
Bypass Studies	4	2	4	3
Evaluate River Crossings and Bridges (emphasis on state lines)	3	2	4	3
Freight Planning	4	1	5	3
Safety Planning and Analysis	4	1	4	3

Update – Survey Results—Mn/DOT

III. Adequacy of Travel Demand Information	Count	Min	Max	Average
Long Range Transportation Plan (LRTP)	3	2	5	3.7
Transportation Improvement Plan (TIP)	4	2	5	3.3
Project level traffic forecasting for Benefit-Cost Analysis	4	2	4	3.3
Land Use Planning	3	2	4	3.3
Corridor Planning and Studies	5	2	4	3
Statewide Transportation Improvement Plan (STIP)	4	2	5	3
Evaluate River Crossings and Bridges (emphasis on state lines)	3	2	4	3
ITS Planning—location of VMS/DMS, ATIS, etc	2	3	3	3

Update – Survey Results—Mn/DOT

III. Adequacy of Travel Demand Information	Count	Min	Max	Average
Regional Transportation Planning and Studies	4	1	4	2.8
Bypass Studies	4	2	3	2.8
Funding and Programming -- Project Prioritization and Programming (based on benefits and needs analysis)	4	2	4	2.8
Evaluate Impact of Network Changes—Capacity Increases—additional lanes, roadway improvements, new road	4	1	4	2.8
Interchange Justification Reports (non-MPO areas)	4	1	4	2.8
Safety Planning and Analysis	4	2	4	2.8
Traffic Diversion for Construction; Detour Analysis and evaluation	4	2	3	2.5
Passenger Rail Planning	2	1	4	2.5

Update – Survey Results—Mn/DOT

III. Adequacy of Travel Demand Information	Count	Min	Max	Average
Highway Access Management and Traffic Impact Studies	5	1	4	2.4
Emergency Planning--Traffic Diversion and Evacuation	3	1	3	2.3
Special Generators Analysis (airports, intermodal transfer centers, trade centers, ethanol plants, elevators, etc.)	4	2	3	2.3
Pavement Life studies—roadway wear, timing of rehabilitation	3	0	4	2.3
Truck Size and Weight studies; Spring Load restrictions	4	0	4	2.3
Modal shift studies	3	2	3	2.3
Statewide Transportation Planning and Studies	5	1	4	2.2

Update – Survey Results—Mn/DOT

III. Adequacy of Travel Demand Information	Count	Min	Max	Average
Major Corridor Analysis (multi-county or multistate)	3	1	3	2
Funding and Programming -- evaluate funding scenarios (gas tax rates, etc.)	4	1	4	2
Transit alternative analysis	2	1	3	2
Freight Planning	4	1	3	2
Recreational Travel/Tourism Planning	3	1	3	2
Development of Statewide or Regional Performance Measures	5	1	4	2
Intermodal Connector Studies	4	1	2	1.8
Intercity Bus Planning	2	1	2	1.5
Weigh station location	4	0	3	1.5
Analyzing Impact of Trade Agreements	2	1	1	1

Update – Survey Results—Mn/DOT

Travel Demand Measures

- AADT
- VMT
- Ton-Mile
- Vehicle Ownership

Mn/DOT's TDA Office plays a key role.

Update – Survey Results—Mn/DOT

V. Data Sources		Count	Percent
Travel Behavior	American Travel Survey (ATS)	1	20
	Census journey-to-work data	1	20
	Public-use Microdata samples (PUMS)	0	0
	AMTRAK	0	0
	FAA sample ticket data	0	0
	Intercity bus service	0	0
	NCHRP Report 365—Travel Estimation Techniques for Urban Planning	2	40
	NCHRP Report 187--Quick Response Urban Travel Estimation Techniques and Transferable Parameters	1	20
	ITE Trip Generation Rate	4	80
	Census Transportation Planning Package (CTPP)	1	20
	National Household Travel Survey (NHTS)	1	20
	National Household Travel Survey (NHTS) - add on	1	20
	Tourism Survey	0	0
	Roadside Survey	2	40
	GPS-based Survey	0	0
	Own house Household Survey	0	0
	Own on-board bus survey	0	0
	Own on-board rail survey	0	0

Update – Survey Results—Mn/DOT

V. Data Sources		Count	Percent
Employment	County Business Survey	1	20
	MPO databases	2	40
	Employment/establishment survey	0	0
	Commercial vendor	0	0
	Census Transportation Planning Package (CTPP)	1	20
Economic Forecasts	Input-Output Model Data	0	0
	Regional Economic Model data	1	20
	Bureau of Economic Analysis	0	0
	State Agency Forecast	2	40
	Commercial Vendor	1	20

Update – Survey Results—Mn/DOT

V. Data Sources		Count	Percent
Household Socioeconomic Data	**Census Transportation Planning Package (CTPP)**	1	20
	Commercial Vendor	0	0
Network	MPO Networks	3	60
	State Road Inventory or Management System	3	60
	Bus published information	1	20
	TIGER	0	0
	National Highway Planning Network (NHPN)	0	0
	Freight Analysis Framework (FAF) from FHWA	1	20
	NTAD from BTS	0	0
Traffic Data	Highway Performance Monitoring System (HPMS)	2	40
	In house Counts	3	60
	In house travel times	2	40
	In house speeds	1	20
	Counts, speeds, or travel times from other agency	3	60

Update – Survey Results—Mn/DOT

VI. STM Analyses/Scenarios of Importance	Count	Min	Max	Average
Traffic Forecasting (Automobile and Truck)	5	2	5	4
Highway Scenario Analyses –(evaluate network changes—added lanes, improved roads, new roads, traffic diversions, traffic loadings on highways, impact of spring load restrictions, etc)	5	1	5	3.4
Truck Flow Analysis	5	2	4	3.2
MPO External and Through Trip Analysis	5	1	5	3

Update – Survey Results—Mn/DOT

VI. STM Analyses/Scenarios of Importance	Count	Min	Max	Average
Policy Analyses (e.g. in the area of finance, transportation funding scenarios, and program (project) prioritization using estimates of VMT and VHT)	5	1	4	2.8
Special Generator Analysis (e.g. airports, ethanol plants, tourist attractions, intermodal transfer centers)	5	2	5	2.8
Geographic Level of Analyses (longer distance trips and should be used to supplement the urbanized area travel demand models. For urbanized area studies, the STM should provide external-external and external-internal trips for the MPO models. For statewide corridors such as I-94, the STM model should be the basis of the analysis outside of the urban areas, with the capability of the results being integrated with the urban area models, where appropriate)	5	2	3	2.4
Intercity recreational travel analysis	5	1	5	2.4

Update – Survey Results—Mn/DOT

VI. STM Analyses/Scenarios of Importance	Count	Min	Max	Average
Safety Analysis (e.g. analyze and track crash information or relate functional class to crash rates)	5	0	5	2.2
Routing Analysis	5	1	3	2.2
Rural Location Analysis—(e.g. River Crossings and Bridges (especially at the state line) or Rural Interchange Justification Reports (non-MPO areas))	5	1	3	2
Commodity/Freight Flow Analysis (non-modal)	5	0	3	1.6
Statewide Rail Freight Analysis	5	0	3	1.4
Air and Rail Passenger Movements	5	0	2	1
Inter and Intrastate Bus Analysis	5	0	2	0.8
Non-motorized Analysis	5	0	1	0.6

Update – Survey Results—Mn/DOT

VII. Coordination Issues and Challenges -- Importance	Count	Min	Max	Average
Interface the Statewide Model with the MPO Models	5	1	5	3.6
The Statewide Model should be Geographic Information System (GIS) – based (compatible with existing data sets)	5	1	5	3.4
Coordinate the Statewide Model External Stations with the MPO External stations (location and traffic forecast).	5	1	4	3
Coordinate between the Statewide and the MPO Socio-Economic Forecasts – establish and use Statewide Forecast Controls for the Statewide Model	5	1	4	3
Coordinate and work with RDCs	5	1	4	2.4
Coordinate Model information with neighboring States	5	1	4	2.4
Coordinate the format of the Statewide and MPO model report formats	5	1	5	2.2

Update – Survey Results—Mn/DOT

VIII. Barriers to Development	Count	Min	Max	Average
Data challenges—data not available, data not adequate, data collection will be costly	5	4	5	4.6
Modeling challenges—too complex to model and consistency, calibration, validation, and accuracy issues difficult to deal with	5	3	5	4
Lack of expertise and staff to build and maintain the model	5	3	4	3.8
Not well understood—value and use of model not clearly understood by decision makers	5	2	4	3.2
Perceived as redundant (regional and MPO models and trendline forecast are sufficient)	5	2	5	3
Funding limited or not available	5	1	4	2.6
No Champion (No one to pursue the development aggressively and communicate its value)	5	1	4	2
Coordination issues and challenges difficult to deal with	5	1	4	2
Perceived as controversial (multiple forecasts will provide more controversy than solution)	5	1	4	1.8

Update – Survey Results—Other DOTs

1. Responders

Arizona, Delaware, Georgia, Idaho, Kansas, Kentucky, Maryland, Maine, North Dakota, Ohio, Oregon, Rhode Island, South Dakota, Tennessee, Texas, Virginia, Wisconsin, Wyoming

STM – Value

Mn/DOT

STM Value	Count	Min	Max	Average
II. Given the definition above, how valuable is development of a statewide travel model (STM)? Please use a scale of 0 (no value) to 5 (very valuable).	4	1	5	3.25

Other State DOT

States having STM	States Developing STM	States planning on developing STM	States with No Plans on Developing a STM
Delaware Kentucky Maine Ohio Oregon Rhode Island Tennessee Texas Virginia Wisconsin	Kansas	Georgia Maryland South Dakota (b) Wyoming(c)	Arizona Idaho(a) North Dakota South Dakota(b)

STM Value	Have STM	Developing STM	Planning on Developing STM	No Plans
II. Given the definition above, how valuable is development of a statewide travel model (STM)? Please use a scale of 0 (no value) to 5 (very valuable).	4.0	3.0	4.0	1.0

Update – Survey Results—Mn/MPOs

1. Responders

1. La Crosse Area Planning Committee
2. Rochester-Olmsted Council of Governments
3. St Cloud Area Planning Organization
4. Metropolitan Council of the Twin Cities
5. Duluth-Superior Metropolitan Interstate Council

Update – Survey Results—Mn/MPOs

Table S1.1 Value of STM – Perspective of Mn/DOT Professionals

STM Value	Count	Min	Max	Average
II. Given the definition above, how valuable is development of a statewide travel model (STM)? Please use a scale of 0 (no value) to 5 (very valuable).	4	1	5	3.25

Table S3.1 Value of STM – Perspective of Minnesota MPOs

STM Value	Count	Min	Max	Average
II. Given the definition above, how valuable is development of a statewide travel model (STM)? Please use a scale of 0 (no value) to 5 (very valuable).	5	4	5	4.2

Update – Survey Results—Mn/MPOs

Mn/DOT

III. Importance of Planning Activity	Count	Min	Max	Average
Long Range Transportation Plan (LRTP)	3	5	5	5
Regional Transportation Planning and Studies	4	4	5	4.5
Transportation Improvement Plan (TIP)	4	3	5	4.3
Statewide Transportation Planning and Studies	5	3	5	4.2
Corridor Planning and Studies	5	3	5	4
Funding and Programming -- Project Prioritization and Programming (based on benefits and needs analysis)	4	3	5	4

MN MPOs

III. Importance of Planning Activity	Count	Min	Max	Average
Transportation Improvement Plan (TIP)	5	5	5	5
Long Range Transportation Plan (LRTP)	5	5	5	5
Evaluate Impact of Network Changes—Capacity increases—additional lanes, roadway improvements, new road	5	5	5	5
Corridor Planning and Studies	5	4	5	4.8
Funding and Programming -- Project Prioritization and Programming (based on benefits and needs analysis)	5	4	5	4.6
Regional Transportation Planning and Studies	5	3	5	4.4
Evaluate River Crossings and Bridges (emphasis on state lines)	5	3	5	4.4
Land Use Planning	5	3	5	4.4
Funding and Programming -- evaluate funding scenarios (gas tax rates, etc.)	5	2	5	4.2
Highway Access Management and Traffic Impact Studies	5	3	5	4

Update – Survey Results—Mn/MPOs

MN MPOs

III. Adequacy of Travel Demand Information	Count	Min	Max	Average
Evaluate Impact of Network Changes—Capacity Increases—additional lanes, roadway improvements, new road	5	4	5	4.2
Transportation Improvement Plan (TIP)	5	3	5	4
Long Range Transportation Plan (LRTP)	5	3	5	4
Corridor Planning and Studies	5	3	5	3.6
Funding and Programming -- Project Prioritization and Programming (based on benefits and needs analysis)	5	2	5	3.6

Mn/DOT

III. Adequacy of Travel Demand Information	Count	Min	Max	Average
Long Range Transportation Plan (LRTP)	3	2	5	3.7
Transportation Improvement Plan (TIP)	4	2	5	3.3
Project level traffic forecasting for Benefit-Cost Analysis	4	2	4	3.3
Land Use Planning	3	2	4	3.3
Corridor Planning and Studies	5	2	4	3
Statewide Transportation Improvement Plan (STIP)	4	2	5	3
Evaluate River Crossings and Bridges (emphasis on state lines)	3	2	4	3
ITS Planning—location of VMS/DMS, ATIS, etc	2	3	3	3

Update – Survey Results—Mn/MPOs

Mn/DOT

III. Adequacy of Travel Demand Information	Count	Min	Max	Average
Major Corridor Analysis (multi-county or multistate)	3	1	3	2
Funding and Programming -- evaluate funding scenarios (gas tax rates, etc.)	4	1	4	2
Transit alternative analysis	2	1	3	2
Freight Planning	4	1	3	2
Recreational Travel/Tourism Planning	3	1	3	2
Development of Statewide or Regional Performance Measures	5	1	4	2
Intermodal Connector Studies	4	1	2	1.8
Intercity Bus Planning	2	1	2	1.5
Weigh station location	4	0	3	1.5
Analyzing Impact of Trade Agreements	2	1	1	1

MN MPOs

III. Adequacy of Travel Demand Information	Count	Min	Max	Average
Statewide Transportation Planning and Studies	5	0	4	2.2
Development of Statewide or Regional Performance Measures	5	1	4	2.2
Interchange Justification Reports (non-MPO areas)	4	0	4	2
Safety Planning and Analysis	5	0	4	1.8
Traffic Diversion for Construction; Detour Analysis and evaluation	5	0	4	1.6
Freight Planning	5	1	2	1.4
Intermodal Connector Studies	5	0	3	1.4
Emergency Planning--Traffic Diversion and Evacuation	4	0	4	1.25
Transit alternative analysis	5	0	3	1.2
Special Generators Analysis (airports, intermodal transfer centers, trade centers, ethanol plants, elevators, etc.)	5	0	3	1.2
Modal shift studies	5	0	3	1.2

Update – Survey Results—Mn/MPOs

Mn/DOT

VI. STM Analyses/Scenarios of Importance	Count	Min	Max	Average
Traffic Forecasting (Automobile and Truck)	5	2	5	4
Highway Scenario Analyses --(evaluate network changes—added lanes, improved roads, new roads, traffic diversions, traffic loadings on highways, impact of spring load restrictions, etc)	5	1	5	3.4
Truck Flow Analysis	5	2	4	3.2
MPO External and Through Trip Analysis	5	1	5	3

MN MPOs

VI. STM Analyses/Scenarios Importance	Count	Min	Max	Average
MPO External and Through Trip Analysis	5	5	5	5
Geographic Level of Analyses (longer distance trips and should be used to supplement the urbanized area travel demand models. For urbanized area studies, the STM should provide external-external and external-internal trips for the MPO models. For statewide corridors such as I-94, the STM model should be the basis of the analysis outside of the urban areas, with the capability of the results being integrated with the urban area models, where appropriate)	5	3	5	4.4
Traffic Forecasting (Automobile and Truck)	5	3	5	4.4
Highway Scenario Analyses --(evaluate network changes—added lanes, improved roads, new roads, traffic diversions, traffic loadings on highways, impact of spring load restrictions, etc)	5	3	5	4
Truck Flow Analysis	5	2	5	4
Commodity/Freight Flow Analysis (non-modal)	5	2	5	3.6

Update – Survey Results—Mn/MPOs

Mn/DOT

VII. Coordination Issues and Challenges -- Importance	Average
Interface the Statewide Model with the MPO Models	3.6
The Statewide Model should be Geographic Information System (GIS) – based (compatible with existing data sets)	3.4
Coordinate the Statewide Model External Stations with the MPO External stations (location and traffic forecast).	3
Coordinate between the Statewide and the MPO Socio-Economic Forecasts – establish and use Statewide Forecast Controls for the Statewide Model	3
Coordinate and work with RDCs	2.4
Coordinate Model information with neighboring States	2.4
Coordinate the format of the Statewide and MPO model report formats	2.2

MN MPOs

VII. Coordination Issues and Challenges -- Importance	Average
Coordinate the Statewide Model External Stations with the MPO External stations (location and traffic forecast).	4.8
The Statewide Model should be Geographic Information System (GIS) – based (compatible with existing data sets)	4.6
Coordinate between the Statewide and the MPO Socio-Economic Forecasts – establish and use Statewide Forecast Controls for the Statewide Model	3.6
Interface the Statewide Model with the MPO Models	3.2
Coordinate and work with RDCs	3.2
Coordinate Model information with neighboring States	3
Coordinate the format of the Statewide and MPO model report formats	2.4

Update – Survey Results—Mn/MPOs

Mn/DOT

VIII. Barriers to Development	Average
Data challenges—data not available, data not adequate, data collection will be costly	4.6
Modeling challenges—too complex to model and consistency, calibration, validation, and accuracy issues difficult to deal with	4
Lack of expertise and staff to build and maintain the model	3.8
Not well understood—value and use of model not clearly understood by decision makers	3.2
Perceived as redundant (regional and MPO models and trendline forecast are sufficient)	3
Funding limited or not available	2.6
No Champion (No one to pursue the development aggressively and communicate its value)	2
Coordination issues and challenges difficult to deal with	2
Perceived as controversial (multiple forecasts will provide more controversy than solution)	1.8

MN MPOs

VIII. Barriers to Development	Average
Funding limited or not available	4.8
Data challenges—data not available, data not adequate, data collection will be costly	4.4
Lack of expertise and staff to build and maintain the model	3.8
Coordination issues and challenges difficult to deal with	3.8
Not well understood—value and use of model not clearly understood by decision makers	3.6
No Champion (No one to pursue the development aggressively and communicate its value)	3.6
Perceived as redundant (regional and MPO models and trendline forecast are sufficient)	3.2
Modeling challenges—too complex to model and consistency, calibration, validation, and accuracy issues difficult to deal with	2.8
Perceived as controversial (multiple forecasts will provide more controversy than solution)	2.8

Update – Survey Results—Mn/MPOs

	Metro	St. Cloud	LAPC	Rochester	Duluth
Area covered jurisdiction	2977	350	About 300	650	150
Area covered in model	10879	350	About 115	Approximately 50 sq. mile	150
Population in the jurisdiction	2821779 (2006 Estimate)	126,750	About 110,000	Approx 110,000 in modeling area;	150,000
Number of TAZ	1632	261	About 330	442 (600)	639

Update – Survey Results—Mn/MPOs

Table S3.9 Modeling Goals and Needs – Periods of Analysis

	Peak hour	Peak period	24 hour ADT	Other time period (Off-Peak)
Turn movements	St. Cloud Rochester (a)		LAPC St. Cloud Rochester (e)	
Link volumes *	Metro St. Cloud Rochester (c)	Metro	Metro, LAPC (?) St. Cloud Duluth	Metro
Corridor volumes	Metro St. Cloud Rochester(a)	Metro	Metro, LAPC (?) St. Cloud Rochester (e) Duluth	Metro
Broad regional movements	Metro St. Cloud	Metro Rochester(b)	Metro, LAPC (?) St. Cloud Rochester (e) Duluth	Metro
Transit demand	Rochester (d)	Metro	Metro Rochester (d)	Metro

(a) Needed for many project development activities/ currently derive using model data in a manual process
(b) Very limited need
(c) Not currently modeled
(d) Generated outside of traffic model
(e) Current model provides this

Update – Survey Results—Mn/MPOs

Additional or Newer Data are Needed				
	High Priority	Medium Priority	Low Priority	Data are Adequate
External Station Survey	Metro Rochester Duluth (1)	LAPC	St. Cloud	
Household Travel Survey	Metro St. Cloud	LAPC Rochester Duluth		
National Travel Survey		LAPC	Metro St. Cloud	Rochester Duluth
Trip Generation Rates	Metro	St. Cloud Rochester Duluth	LAPC Duluth(2)	LAPC Duluth
Land Use Base Year Data	St. Cloud		Metro Duluth (2)	LAPC Rochester
Land Use Future Data	LAPC St. Cloud Duluth (3)		Metro	Rochester

Update – Survey Results—Mn/MPOs

Additional or Newer Data are Needed				
	High Priority	Medium Priority	Low Priority	Data are Adequate
Employment Base Year	Metro St. Cloud Duluth (4)		Rochester	
Employment Future Year	Metro, LAPC St. Cloud	Duluth		Rochester
Population Base Year	Metro St. Cloud			LAPC Rochester Duluth (5)
Population Future Year	Metro, LAPC St. Cloud	Duluth		Rochester
Household Demographics and Income Base Year	Metro		Rochester	LAPC St. Cloud Duluth (6)
Household Demographics and Income Future Year	Metro, LAPC		Rochester	St. Cloud Duluth (7)

Update – Survey Results—Mn/MPOs

Additional or Newer Data are Needed				
	High Priority	Medium Priority	Low Priority	Data are Adequate
To Enhance Your Existing Modeling Efforts				
Detailed data of all types for operations modeling		Rochester	Metro, LAPC St. Cloud Duluth	
Data for determining the effects of higher fuel prices		Metro, LAPC	St. Cloud Rochester Duluth (8)	
Impacts of Congestion	Metro, LAPC St. Cloud	Rochester Duluth (9)		
Air Quality Analysis	Metro	St. Cloud	Rochester Duluth	LAPC

Update – Survey Results—Mn/MPOs

Additional or Newer Data are Needed				
	High Priority	Medium Priority	Low Priority	Data are Adequate
To Enhance Your Existing Modeling Efforts				
Modeling for Transit	Metro	Duluth	LAPC St. Cloud Rochester	
Data to support another form of travel demand modeling (activity, tour, etc.)	Metro		St. Cloud Rochester	LAPC
Modeling Large Trucks	Metro	Rochester Duluth	LAPC St. Cloud	
Modeling Commercial Vehicle Traffic (home delivery, contractors, home health, etc.)		Metro Rochester Duluth	LAPC St. Cloud	

Update – Survey Results—Mn/MPOs

	Number of External Stations	Date(s) of last calibration	Type of survey used or source of data about externally oriented trips (EX-EX, EX-IN, IN-EX)	Trip Purposes included in the external travel model	Date of Last Survey
Metro	35	2004	mixture of road side intercept and license plate video capture/mailout	HBW, HBO, NHB	2000
St. Cloud	32	2005	External O–D Study from Jan 1998	HBO HBW NHB	Jan 1998
LAPC	External station counts are derived from a Wisconsin State Traffic Model. About 10	2005	Origin-Destination Survey		2003

Update – Survey Results—Mn/MPOs

	Number of External Stations	Date(s) of last calibration	Type of survey used or source of data about externally oriented trips (EX-EX, EX-IN, IN-EX)	Trip Purposes included in the external travel model	Date of Last Survey
Rochester	26	The E-E component was last "calibrated" in the early 1990's from the perspective that this is when the data was collected that was utilized to build an E-E trip table.	Roadside interview on TH52; Avenue of the Americas study	Roadside interview on TH52; Avenue of the Americas study Note 1	Last travel survey looking at external travel was around 1990
Duluth		June 2005	WisDOT External Station Origin/Destination Survey. For the MN side used small urban estimating technique from NCHRP #365.	External trips are not split by purpose. (i.e. they are treated as their own purpose)	WI - 2004

Update – Survey Results—Mn/RDCs

1. Responders

Region 9 Development Commission

Upper Minnesota Valley Regional Development Commission

Update – Survey Results—Mn/RDCs

The RDC's have not done traffic analysis or modeling to date. The survey is not relative to RDC planning activities, however we are interested in this type of information if/when collected. Please keep this organization informed with any new developments relative to the transportation industry.

We (as well as many others) frequently use the traffic data that is provided by MnDOT and are thankful for it. We do however feel that rather than applying a standard 10% HCADT figure on the county and county State aid system that more accurate information needs to be employed. A recent freight study conducted in MnDOT District 7 illustrated the great variances in traffic movement on non-state roadways and that using a standard calculation is not appropriate.

Update – Survey Results—NARC Members

1. Responders

Benton-Franklin Council of Governments, Washington
Indian River County MPO, Florida
The Mid-Ohio Regional Planning Commission
Southeast Michigan Council of Governments
Bi-State MPO, Arkansas
Miami Valley Regional Planning Commission
Pioneer Valley Planning Commission, Massachusetts

COMPARATIVE ANALYSIS

STM – Value

STM Value	Count	Min	Max	Average
II. Given the definition above, how valuable is development of a statewide travel model (STM)? Please use a scale of 0 (no value) to 5 (very valuable).	5	4	5	4.2

MN MPOs

STM Value	Count	Min	Max	Average
II. Given the definition above, how valuable is development of a statewide travel model (STM)? Please use a scale of 0 (no value) to 5 (very valuable).	4	2	3	2.5

NARC Members

STM – Value

	Other State DOTs		NARC Members	
III. Value of STM	Count	Average	Count	Average
Corridor Planning and Studies	9	2.9	3	2.3
Regional Transportation Planning and Studies	10	3.3	3	1.7
Statewide Transportation Planning and Studies	10	3.3	3	3.0
Statewide Transportation Improvement Plan (STIP)	8	2.2	3	2.7
Transportation Improvement Plan (TIP)	8	2.3	3	1.3
Long Range Transportation Plan (LRTP)	9	2.7	3	1.3
Bypass Studies	9	2.4	3	3.0
Evaluate River Crossings and Bridges (emphasis on state lines)	9	2.9	2	1.0
Major Corridor Analysis (multi-county or multistate)	9	2.9	3	2.0
Funding and Programming -- evaluate funding scenarios (gas tax rates, etc.)	9	1.6	3	0.7
Funding and Programming -- Project Prioritization and Programming (based on benefits and needs analysis)	8	1.9	3	1.0
Evaluate Impact of Network Changes—Capacity Increases—additional lanes, roadway improvements, new road	9	3.0	3	2.3

STM – Value

	Other State DOTs		NARC Members	
III. Value of STM	Count	Average	Count	Average
Interchange Justification Reports (non-MPO areas)	6	1.2	3	1.0
Highway Access Management and Traffic Impact Studies	8	1.4	3	1.7
Emergency Planning--Traffic Diversion and Evacuation	8	2.4	3	2.7
Traffic Diversion for Construction; Detour Analysis and evaluation	8	2.1	3	1.7
Project level traffic forecasting for Benefit-Cost Analysis	9	1.6	3	0.7
Intercity Bus Planning	5	0.6	3	0.3
Transit alternative analysis	6	1.2	3	0.3
Passenger Rail Planning	8	1.9	3	0.0
Freight Planning	8	2.3	3	1.7
Special Generators Analysis (airports, intermodal transfer centers, trade centers, ethanol plants, elevators, etc.)	9	1.4	3	0.3

STM – Value

	Other State DOTs		NARC Members	
III. Value of STM	Count	Average	Count	Average
Land Use Planning	8	1.8	3	0.3
Recreational Travel/Tourism Planning	7	1.1	3	0.0
ITS Planning—location of VMS/DMS, ATIS, etc	6	0.2	3	0.0
Intermodal Connector Studies	7	0.9	3	0.7
Development of Statewide or Regional Performance Measures	9	2.2	3	0.3
Weigh station location	7	0.9	3	1.0
Pavement Life studies—roadway wear, timing of rehabilitation	7	0.6	3	0.0
Truck Size and Weight studies; Spring Load restrictions	6	0.3	3	0.7
Safety Planning and Analysis	7	1.0	3	1.0
Analyzing Impact of Trade Agreements	7	0.6	3	0.0
Modal shift studies	9	2.0	3	0.7
Non-motorized studies	6	0.3	3	0.0
Others (write in) Public-Private Partnerships/ Toll analysis	1	4.0		

Adequacy of Travel Demand Information

Adequacy of Travel Demand Information – Perspective of Mn/DOT and Other State DOTs

	Mn/DOT	Other State DOT			
III. Importance of Planning Activity		Have STM	Developing STM	Planning on Developing STM	No Plans
Corridor Planning and Studies	3	3.3	3.0	3.5	2.3
Regional Transportation Planning and Studies	2.8	3.3	2.0	2.7	3.0
Statewide Transportation Planning and Studies	3	3.6	2.5	2.3	2.3
Statewide Transportation Improvement Plan (STIP)	3	2.9	2.5	3.3	3.0
Transportation Improvement Plan (TIP)	3.3	3.4	3.0	3.3	3.3
Long Range Transportation Plan (LRTP)	3.7	3.4	2.5	3.0	2.3
Bypass Studies	2.8	2.8	2.0	3.0	3.0
Evaluate River Crossings and Bridges (emphasis on state lines)	3	2.5	1.0	2.7	0.5
Major Corridor Analysis (multi-county or multistate)	2	3.0	1.5	2.7	3.0
Evaluate Impact of Network Changes—Capacity Increases—additional lanes, roadway improvements, new road	2.8	3.6	2.0	3.0	2.7

Level of importance: 0 (not important) to 5 (highly important)

Adequacy of Travel Demand Information

Adequacy of Travel Demand Information – Perspective of Mn/DOT and Other State DOTs

	Mn/DOT	Other State DOT			
III. Importance of Planning Activity		Have STM	Developing STM	Planning on Developing STM	No Plans
Interchange Justification Reports (non-MPO areas)	2.8	1.2	1.5	3.0	2.5
Highway Access Management and Traffic Impact Studies	2.4	1.5	1.5	3.3	3.0
Emergency Planning--Traffic Diversion and Evacuation	2.3	2.0	1.5	1.0	2.5
Traffic Diversion for Construction; Detour Analysis and evaluation	2.5	2.1	3.5	2.7	2.5
Freight Planning	2	1.7	0.5	2.5	2.3
Special Generators Analysis (airports, intermodal transfer centers, trade centers, ethanol plants, elevators, etc.)	2.3	1.3	1.5	2.3	2.7
Intermodal Connector Studies	1.8	1.0	1.5	2.3	2.3
Development of Statewide or Regional Performance Measures	2	2.5	1.5	3.3	3.0
Modal shift studies	2.3	2.1	1.0	1.0	2.5

Level of importance: 0 (not important) to 5 (highly important)

STM – Needs/Scenarios

VI. STM Analyses/Scenarios Importance	Mn/DOT	MN MPOs	NARC Members	Other State DOTs			
				Have STM	Developing STM	Planning on Developing STM	No Plans
Traffic Forecasting (Automobile and Truck)	4	4.4	4.4	3.7	4.0	4.8	3.7
Highway Scenario Analyses –(evaluate network changes—added lanes, improved roads, new roads, traffic diversions, traffic loadings on highways, impact of spring load restrictions, etc)	3.4	4	3.8	3.5	4.0	4.3	2.3
Truck Flow Analysis	3.2	4	4.4	3.2	3.5	4.0	1.7
MPO External and Through Trip Analysis	3	5	5	2.7	4.0	4.3	2.3
Policy Analyses (e.g. in the area of finance, transportation funding scenarios, and program (project) prioritization using estimates of VMT and VHT)	2.8	2.8	4.2	2.1	3.5	4.3	4.0
Special Generator Analysis (e.g. airports, ethanol plants, tourist attractions, intermodal transfer centers)	2.8	2.2	3.4	1.0	1.0	4.0	4.7
Geographic Level of Analyses (longer distance trips and should be used to supplement the urbanized area travel demand models. For urbanized area studies, the STM should provide external-external and external-internal trips for the MPO models. For statewide corridors such as I-94, the STM model should be the basis of the analysis outside of the urban areas, with the capability of the results being integrated with the urban area models, where appropriate)	2.4	4.4	4.0	4.0	4.0	4.0	5.0
Intercity recreational travel analysis	2.4	2.2	2.8	3.0	4.0	3.8	4.0

STM – Needs/Scenarios

VI. STM Analyses/Scenarios Importance	Mn/DOT	MN MPOs	NARC Members	Other State DOTs			
				Have STM	Developing STM	Planning on Developing STM	No Plans
Safety Analysis (e.g. analyze and track crash information or relate functional class to crash rates)	2.2	3.2	4.0	1.5	1.5	3.0	4.3
Routing Analysis	2.2	3.2		2.0	1.5	3.3	3.0
Rural Location Analysis—(e.g. River Crossings and Bridges (especially at the state line) or Rural Interchange Justification Reports (non-MPO areas))	2	2.4	4.2	3.0	3.0	3.3	4.3
Commodity/Freight Flow Analysis (non-modal)	1.6	3.6	4.0	1.9	3.5	3.0	3.7
Statewide Rail Freight Analysis	1.4	3	4.2	0.9	1.5	2.5	1.3
Air and Rail Passenger Movements	1	2.2	3.4	1.4	1.5	2.5	0.7
Inter and Intrastate Bus Analysis	0.8	2.4	3.8	0.6	0.5	2.8	3.0
Non-motorized Analysis	0.6	1.8	1.6	1.0	1.5	2.8	2.7

STM – Needs/Scenarios

VI. STM Analyses/Scenarios Importance	Mn/DOT	MN MPOs	NARC Members	Other State DOTs			
				Have STM	Developing STM	Planning on Developing STM	No Plans
Evacuation Scenario Planning & Analysis				5.0			
Build/No Build Analysis (Identification of "New Road" Users)				5.0			
Others (write in) Revenue Estimation & Scenario Analysis (Using Toll/Mode Choice Model)				4.0			
Traffic Impact Studies (TIS) – Provide Select Link Analysis Results to Developer's Consultants for Site Trip Distribution of DRI				4.0			
Land Use				4.0			
Economic				3.7	4.0	4.8	3.7

MODELING ISSUES AND CHALLENGES

Modeling Issues and Challenges

1. TAZ Delineation—Urbanized, Urban, rural, out of state
2. Trip Purposes—HBW, NHB, HBO
3. Modes to Model—Highway, Rail, Air, Water
4. Persons and Freight Modeling need to treated separately
5. Freight—commodity versus truck flows
6. Transit Modeling—within model or external
7. Sequential Demand Models—3-step or 4-step

Task 6 –Modeling Challenges

8. Disaggregate models—aggregate in sense they predict the total or aggregate flows between the O-D pair by mode, route, and stratification and are usually calibrated on aggregated data in the form of trip tables
9. Interfacing with MPO models
10. Calibration and Validations
11. Modeling Challenges will depend on scale of modeling pursued.

Task 6 –Modeling Challenges

12. Evolutionary Approach—start with simple base network and just highway and focus on areas where immediate gains can be made—Rochester, Duluth and Metro areas --and concentrate on just automobile and truck forecasting

DATA ISSUES AND CHALLENGES

Data Issues and Challenges

1. The movement of people and goods in the state by mode of transportation
2. The characteristics of freight and passenger transportation facilities, network and services in the state.
3. The population and economy of the state by geographic area.

Data Issues and Challenges

1. Development Factors—land use, population, employment
2. Economic Factors—GNP/GDP, inflation, personal income etc
3. Social Factors—future lifestyle, aging of population, lesiure time
4. Economic Factors--regulations
5. Transportation—facilities (location and characteristics) and services

Data Issues and Challenges

6. Techniques for data collection—home interview--mail /telphone surveys, urban cordons, multiple screenline surveys, travel information for public transportation—airline surveys, train surveys; commodity flow data

Data Issues and Challenges

1. What data we have? – gather from survey and documentation and web sources
2. What data we need for what? – develop matrix
3. Data Sources? – what is out there?
4. Data Formats? What inventories?
5. Data Aggregation? – is it at TAZ level we want?
6. Data Consistency? Over time and geography
7. Data Collection? –quantitative, qualitative
8. Data Accuracy?
9. Data for calibration and validation?

RESOURCE NEEDS AND CHALLENGES

Resource Needs and Challenges

1. Time Issues
2. Staffing Issues
3. Training Issues
4. Cost Issues
5. Computing Infrastructure Issues
6. Institutional Arrangements
7. Public-Private Partnerships

Resource Challenges

1. Funding Sources
2. In House Expertise and Time
3. Use of Consultants and Universities
4. Initial Data Collection Costs
5. Recurring Data Maintenance Costs
6. Calibration Costs
7. Validation Costs
8. Training Costs
9. Cooperation with MPOs and Other Agencies—Input data

Recommended Action Plan

Task 10 – Recommended Action Plan

Strategy 1 – Educate Stakeholders about STM; Prioritize Needs and purpose of modeling

Strategy 2 – Delineate TAZ and External Stations

Strategy 3 – Assessment of Data Sources, Availability, Familiarity, and Gaps

Strategy 4 – Develop or Build Base Network

Task 10 – Recommended Action Plan

Strategy 5 – Assessing and Refining Existing Modeling Efforts

Strategy 6 – Develop or Acquire New Data Sources

Strategy 7 – Enhancing Regional Models

Strategy 8 – Develop a Basic Statewide Model

Task 10 – Recommended Action Plan

Strategy 9 – Identify Stable Funding Sources for Development

Strategy 10 – Interface Base STM with Regional/MPO Model

Strategy 11 – Identify Institutional Considerations

Task 10 – Recommended Action Plan

Strategy 12 – Identify incremental development of STM
Strategy 13 – Develop guidelines to assess the accuracy and benefit of STM
Strategy 14 – Develop plan for updating data and models for STM

Recommended Action Plan

Recommended Strategy – Near Term -- 1 Year
Among the near term strategies are:
Strategy 1 – Educate Stakeholders about STM and Prioritize Needs
Strategy 2 – Assessment of Existing Data Sources, Availability, and Familiarity
Strategy 3 -- Delineate TAZ
Strategy 4 – Build Network with existing data and identify gaps
Strategy 8 – Conceptual Design of STM
Strategy 9 – Initial funding for STM Development
Strategy 11 – Identify Champion/Group/Consultants
Resource Commitment : up to $ 100,000

Recommended Action Plan

Recommended Strategy – Medium Term – 2 to 4 Years
Among medium term strategies are:
Strategy 5 – Assessing and Refining Existing Modeling Efforts
Strategy 6 – Develop or Acquire New Data Sources
Strategy 7 – Enhancing Regional Models
Strategy 8 – Develop Base Case STM Model for Passenger Movements and Commodity/Truck Flow
Strategy 9 – Identify stable funding sources
Strategy 10 – Interface with Regional and MPO models and Trendline forecasts
Strategy 11 – Identify Institutional Considerations
Resource: Up to 500,000

Recommended Action Plan

Recommended Strategy – Long Term – 4 to 6 years
Among long term strategies are:
Strategy 9 – Strategies for innovatively pooling of funds to enhance funds and their stability
Strategy 10 – Cooperative Agreements with MPOs
Strategy 12 – Incremental Development of STM
Strategy 13 – Develop guidelines to assess the consistency, accuracy and benefit of STM
Strategy 14 – Develop plan for updating data, TAZ, and models for STM
Resource: Up to Million Dollars