


Oregon Mosaic Project Outcomes: Presentation and Discussion

October 29, 2014

Agenda



- Project Overview
 - Mosaic Project Products
 - Mosaic Testing Outcomes and Lessons
 - Mosaic Outcomes Discussion
 - Next Steps
- 

ODOT's Mosaic project goals

- Enable fair comparison of different kinds of transportation solutions, including both projects and programs
- Compare them against common goals such as those in the OTP to determine impacts
- Include monetary measurement where possible
- Allow for non-monetary measurement where needed
- Help find cost-effective options to progress toward goals
- Enable better informed decisions in transportation planning
- Improve transparency of transportation decisions

SSC's Mosaic project goals

- Make Mosaic so can be useful throughout the state
- Make Mosaic flexible to reflect different priorities around the state
- Generally use available data and tools, rather than requiring new data or new analysis tools
- Do not make it a new black box
- Ensure the data supporting Mosaic outputs is readily available and preserved

Mosaic attributes

- As often as possible, measures costs and benefits of investments and actions
- Uses quantitative and qualitative evidence
- Estimates impacts on both travelers and on society at large
- Accounts for environmental, social and economic effects
- Measures value
- Accounts for risk and uncertainty

Mosaic: what it is, what it does

- A web-based resource for use in *transportation planning* to assist decision-making
- An effective way to evaluate the social, environmental and financial costs and benefits of transportation plans
- A method that is scalable based on a jurisdiction's transportation staff, available data and particular needs
- Establishes a common set of measures to evaluate options and assist selection of the best actions and investments
- Allows communities to weight non-monetized indicators, reflecting their values in Mosaic analysis

How does using Mosaic help us improve?

- Mosaic lets us compare transportation impacts we can measure in dollars to impacts that we measure in other ways
- Decision-makers can see the components of value in different bundles of actions and investments
- The results allow decision-makers to discuss the tradeoffs between bundles of actions more explicitly
- Mosaic provides a clear, traceable and transparent record of the evaluation process, analysis and decision making
- *Mosaic helps decision makers make more informed decisions*

What Mosaic does not do

- *Mosaic results do not specify decisions*
- Mosaic is a decision assistance process and tool for use in large scale transportation planning, not for project alternative analysis
 - A plan scale is needed to fairly evaluate direct and indirect impacts of different transportation solutions
- While there are indicators representing other fields (e.g. health, environment) Mosaic is for transportation analysis
- Mosaic puts a lot of different information together on shared scales; it is intended as a gauge, not to be precise



Mosaic: Oregon's Value and Cost Informed Transportation Planning Method & Tool





Information available to you



Information available to you

On the web

- Mosaic Overview Information
- Mosaic User Guide
- Mosaic Tool
- Indicator Information Sheets
- Programs Guide

What's included in the Programs Guide

- [Bicycle and Pedestrian Programs](#)
- [Land Use Programs](#)
- [Operations/ Intelligent Transportation System \(ITS\) Programs](#)
- [Pricing Programs](#)
- [Transit Programs](#)
- [Travel Demand Management Programs](#)

The Mosaic Workbook

1

SPECIFY OPTIONS & DEFINE BUNDLES

- 1.a [Specify study area and period of analysis](#)
- 1.b [Name and describe bundles](#)
- 1.c [Add programmatic actions](#)
- 1.d [Select which indicators will be monetized](#)

2

ENTER COST & SCHEDULE DATA

- 2.a [Enter life-cycle investment cost data](#)
- 2.b [Enter estimates of operating revenue](#)
- 2.c [Review estimation of Funding & Finance indicators](#)

3

LOAD OR ENTER TRAVEL & GEOGRAPHIC DATA

- 3.a [Select and load travel data tables](#)
- 3.b* [Review intermediate travel data calculations](#)
- 3.c [Enter other input data](#)

4

DETERMINE WEIGHTS FOR MODA

- 4.a [Define weights at the indicator level](#)
- 4.b* [Review weights at the category level](#)

5

SELECT MONETIZATION & OTHER ASSUMPTIONS

- 5.a [Review and edit model parameters](#)
- 5.b* [Review time-varying assumptions](#)
- 5.c* [Review supporting data and references](#)

6

ENTER MORE DATA & REVIEW CALCULATIONS

- 6.a [Mobility](#)
- 6.b [Accessibility](#)
- 6.c [Safety & Security](#)
- 6.d [Environment](#)
- 6.e [Economic Vitality](#)
- 6.f [Land Use](#)
- 6.g [Quality of Life](#)
- 6.h [Equity](#)

7

RUN ANALYSIS & PRODUCE RESULTS

- 7.a [Conduct sensitivity testing with the control panel](#)
- 7.b* [Conduct extensive tests on model parameters](#)
- 7.c* [Conduct extensive tests on MODA weights](#)

8

REVIEW & PRINT OR EXPORT RESULTS

- 8.a [Review consequences table](#)
- 8.b [Review output charts](#)
- 8.c [Review and print summary output sheets](#)
- 8.d [Make a backup copy of the tool!](#)



What we learned from the test and the peer review



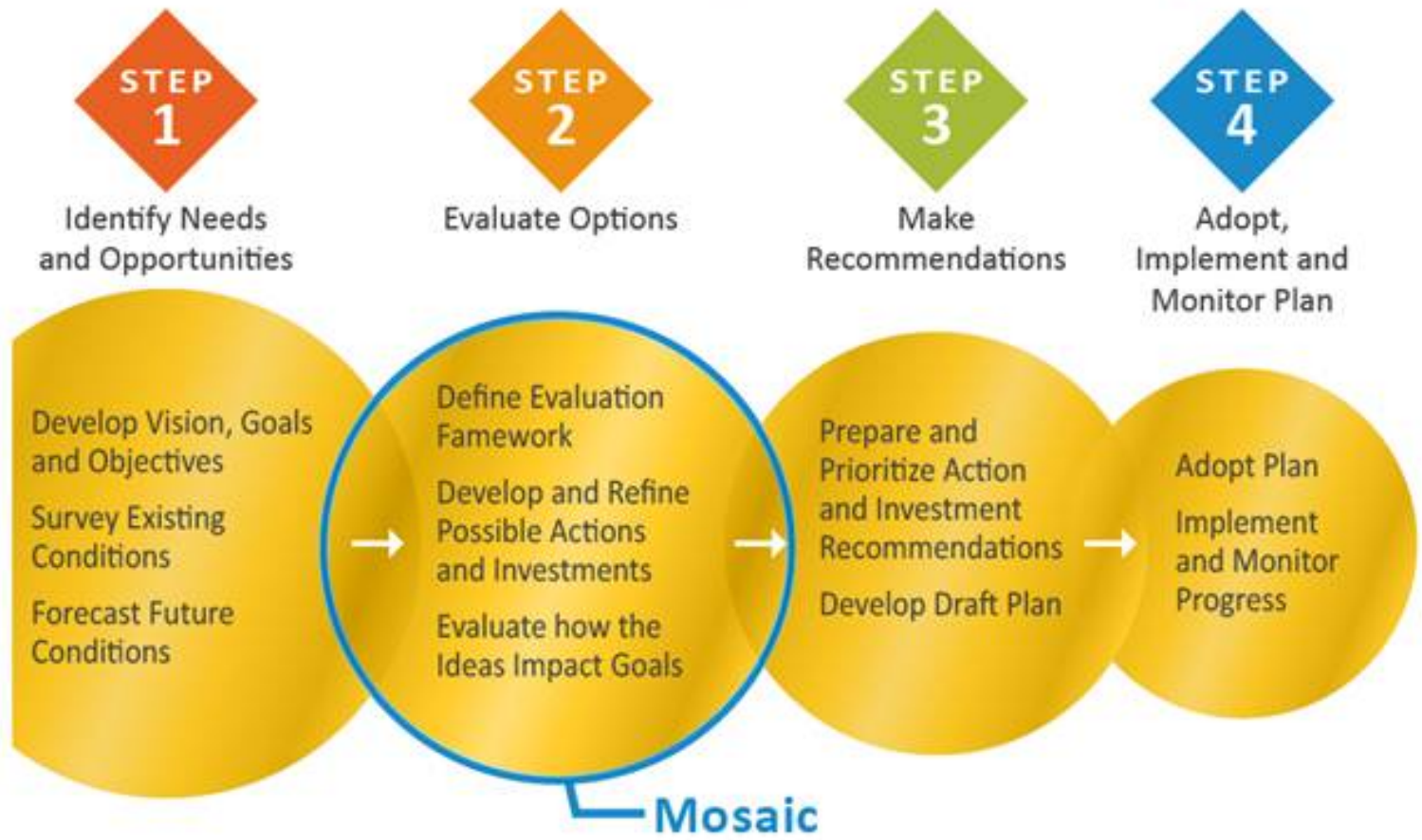
What we've learned overall



After over a year of testing, staff and peer reviewers agree that Mosaic represents an advancement in the state of the art. In the next steps the key question will be how Mosaic advances the state of the practice.

Mosaic helps evaluate and refine options

How Mosaic Nests Within the Typical Oregon Planning Process



How Mosaic Fits



Planning Activity

- Define Evaluation Framework
- Refine bundles of possible actions and investments to achieve vision

Mosaic Role

- Offers researched set of categories and indicators
- Identifies required data
- Compares possible investment bundles against indicators and one another
- Programs Guide helps identify other possible actions

How Mosaic Fits



Planning Activity

- **Evaluate** actions and investments bundles

Mosaic Role

- Calculates monetized and non-monetized impacts
- Accounts for environmental, social and economic effects
- Measures **value**
- Highlights tradeoffs
- Accounts for risk and uncertainty

Applications that yield best results



- Jurisdictions with network travel demand models
- Planning applications where stakeholders want to evaluate multiple, distinctive “bundles” (a.k.a., scenarios, visions, investment packages or strategies)
- Jurisdictions willing to measure value in both monetary and non-monetary ways, in order to derive fullest value from the Mosaic process and tool.



Expertise required

1. A broad understanding of travel behavior and how it responds to changes in networks, policies and programs
2. For those places where travel models exist, the ability to use existing models to generate travel forecasts.
3. Familiarity with Geographic Information System (GIS) software and with the layers of data available in the study area
4. The ability to estimate costs of transportation improvements at a level of detail sufficient for system planning



Expertise required

5. Familiarity with socio-economic data (e.g., population, household, employment) commonly used in transportation planning
6. Familiarity with the terminology of travel behavior, spatial data and economic analysis
7. Experience in using Excel-based analytic tools.

Above all, a desire to increase the value we receive from transportation investments.



Expertise required

- Staff will likely need training or assistance with the details of using the analysis tool and ensuring an effective process for using Mosaic in planning.
- First time Mosaic users will need access to others who can offer technical assistance, answer questions, and support data development.

Step 1: Identify Bundles of Actions



- In the test, we designed bundles to test the reliability of specific indicator calculation methods. Bundles were not designed to show what projects and programs were needed or desired.
- Using modal bundles created some confusion – multimodal bundles are likely for actual Mosaic applications, but the bundles should be as distinct as possible.

Lessons Learned: Programs Guide

- The literature is not extensive on the costs and impacts of many of the demand management programs.
- Future users will be advised to seek and use professional judgment to identify appropriate inputs to Mosaic. If used, the estimates of impacts should be expressed as a range, to incorporate the effects of uncertainty.

Lessons Learned: Study Area

- Planners need to determine whether through travel is substantial enough to be included in the analysis and/or to be affected by programs or investments being studied.
- The study area definition should be large enough to capture the vast majority of affected travel behavior, but not so large that differences are difficult to measure.

Step 2: Learn the Framework



- Users need a clear understanding of each indicator and how it is measured.

A set of short definitions has been developed.

- The large number of indicators in Mosaic can make weighting unwieldy.

Users should plan one to two meetings for this purpose.

Step 3: The Weighting Process



- Weighting is done by stakeholders
- Stakeholders reach agreement on how to “spend” 100 points among the categories that are not fully monetized



- Economic Vitality
- Accessibility
- Funding/Finance
- Environmental Stewardship
- Quality of Life
- Mobility
- Equity
- Safety and Security
- Land Use

Lessons Learned: MODA and weighting

- Stakeholder values are important. They should be made explicit at the beginning of a planning process (before initiating use of Mosaic).
- MODA weighting should take place after enough data have been developed to define indicator “endpoint” values.
- Later in the process stakeholders should review weights and adjust them in light of previously articulated values and preferences.
- Trained and skilled facilitation of weighting is essential.

Step 4: Populate the Tool



To realize the full potential of Mosaic, the following are required:

- A travel forecasting model.
- Geographic information system (GIS) data such as
 - Social and demographic data
 - Land use
 - Transportation networks
 - Environmental and cultural features

Step 4: Populate the Tool

Without access to a travel model...

- Many more impacts are evaluated qualitatively.
- Fewer impacts are measured in dollars.
- Data such as the following still are required:
 - Demographic and land use data
 - Transportation networks, needs and opportunities
 - Environmental and cultural features

Lessons Learned: Travel Modeling

- The Portland region has developed several enhancements to its models to forecast bicycle and pedestrian travel and freight (commercial vehicle) movement.
- Other regions may not have equivalent tools available, nor will all places have a transit mode choice model. For these reasons the Mosaic tool includes several sketch tools.

Step 5: Interpret the Results



Mosaic is designed to inform decision makers; Mosaic results do not dictate decisions.

Lessons learned: Decision Making

- Mosaic cannot “make a decision” for its users. Instead, it reveals sources of value in bundles of transportation investments and actions.
- Future staff must make clear that the level of detail at which Mosaic analyzes investments is most appropriate for bundles of investments, rather than individual projects.

Lessons learned: Decision Making

- Some results may be surprising, and may challenge assumptions or preferences. Mosaic allows for discussion of these results in the context of data showing benefits and costs.

Lessons Learned: Sketch models

- In the short period of time since Mosaic was first developed, new methods for calculating several indicators already have been published. These may affect use of the sketch models included in Mosaic.
- It is appropriate to acknowledge the uncertainty associated with all estimation techniques including sketch models.

Lessons Learned: Indicators

- *Graphical display* is essential to understanding tool outputs and bundle comparisons.
- The measured values of *each indicator* within a category must be clearly displayed and identified.
- The *reasons* behind the measured values must be clearly explained.
- The comparison of monetized results to non-monetized results (one of Mosaic's distinguishing features) helps users gain a deeper understanding of "value."

Lessons Learned: Indicators (cont'd)

- A few indicators could not be estimated as proposed. Mosaic proved flexible, through the use of qualitative methods and the introduction of new sketch tools. We can expect these situations to occur in the future.

Lessons Learned: Sensitivity Testing

- The tool now identifies parameters that have the greatest impact on bundle benefits. This function is available for use in future pilot tests.
- Currently, the tool offers a range of values for these parameters based on published guidance and research; users can change the default value to any within the range.



Summary & Closing Comments



What we've learned: It's about value



Mosaic reveals value

- Measured in \$
- Not measurable in \$
- Helps reveal the sources of value
- Is based on best science available
- Can be updated as science requires
- Is based on stakeholders stated preferences

What we've learned (cont'd)



- Complexity
 - We thought it might be simpler but...
- Flexibility
 - Mosaic's process can be scaled to fit available data and resources
 - There are many opportunities for user-specified inputs
 - Mosaic bundles can include many kinds of projects, programs, and other investments
- Discussion is a vital part of the process
 - Users must anticipate extra time for learning and evaluation

What we've learned (cont'd)



- Mosaic informs but does not dictate decisions
 - Mosaic provides new and varied information
 - Decision makers will still need to use and rely on staff
- Decision-makers must and will still have influence
 - over what is considered—bundles, assumptions
 - over all key decisions
- Mosaic is a compass, not a GPS
 - Users should acknowledge uncertainty around the value of key parameters and certain inputs
 - Mosaic will record all key inputs and assumptions

What we've learned overall



After over a year of testing, staff and peer reviewers agree that Mosaic represents an advancement in the state of the art. In this next phase the key question will be how Mosaic advances the state of the practice.

Questions and Discussion

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