MOSAIC
Value and Cost Informed Planning

State Smart Transportation Initiative

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Matthew Garrett

Oregon DOT Director

Erik Havig

Oregon DOT Planning Section Manager

Mosaic overview

Director's perspective

ODOT's project goals

- Strive to meet the legislative intent with Mosaic:

"Least cost planning means a process of comparing direct and indirect costs of demand and supply options to meet transportation goals, policies or both, where the intent of the process is to identify the most cost-effective mix of options"

- Enable fair comparison of different kinds of transportation solutions against common goals to determine impacts and find cost-effective options to make progress toward goals

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Mosaic development project

- Started with a discussion paper with case studies of related projects
- Answered Mosaic framing questions with stakeholders
  - E.g. focus on planning level first (not projects)
  - Selected nine categories of transportation impacts related to OTP goals to evaluate
- Mosaic User Guide and Tool developed and tested
  - Web-based User Guide and other references
  - Spreadsheet based analysis tool

Who's been involved?

- Oregon Transportation Commission
- STIP Stakeholder Committee
  - A diverse group of transportation stakeholders
- Work Group
  - Affected ODOT and MPO staff
- Technical Teams
  - Indicators: experts for each analysis category
  - Tool: small diverse team with varied experience
  - Test: varied potential future users of Mosaic

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
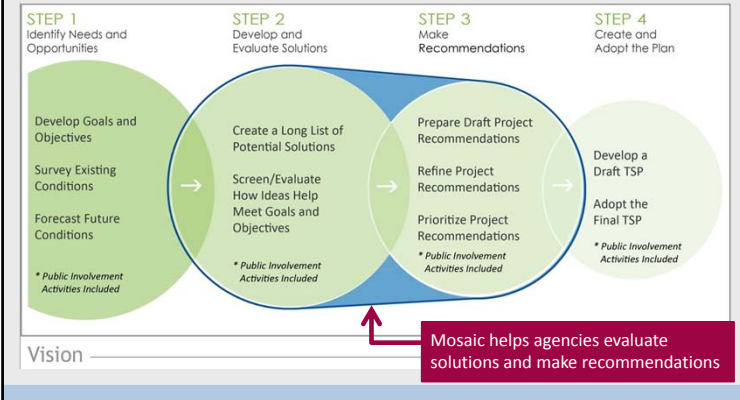
How does using Mosaic help us improve?

- 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

How Mosaic fits into the planning process

STEP 1
Identify Needs and Opportunities

STEP 2
Develop and Evaluate Solutions

STEP 3
Make Recommendations

STEP 4
Create and Adopt the Plan

Develop Goals and Objectives

Survey Existing Conditions

Forecast Future Conditions

* Public Involvement Activities Included

Create a Long List of Potential Solutions

Screen/Evaluate How Ideas Help Meet Goals and Objectives

* Public Involvement Activities Included

Prepare Draft Project Recommendations

Refine Project Recommendations

Prioritize Project Recommendations

* Public Involvement Activities Included

Develop a Draft TSP

Adopt the Final TSP

* Public Involvement Activities Included

Vision

Mosaic helps agencies evaluate solutions and make recommendations

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Summary: how Mosaic fits

Planning Activity

- Develop Evaluation Framework
- Develop and Refine Possible Solutions

Mosaic Role

- Identifies required data
- Offers indicators
- Offers comparisons of possible investment bundles against goals and indicators
- Programs Guide helps identify other possible transportation solutions

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Summary: how Mosaic fits

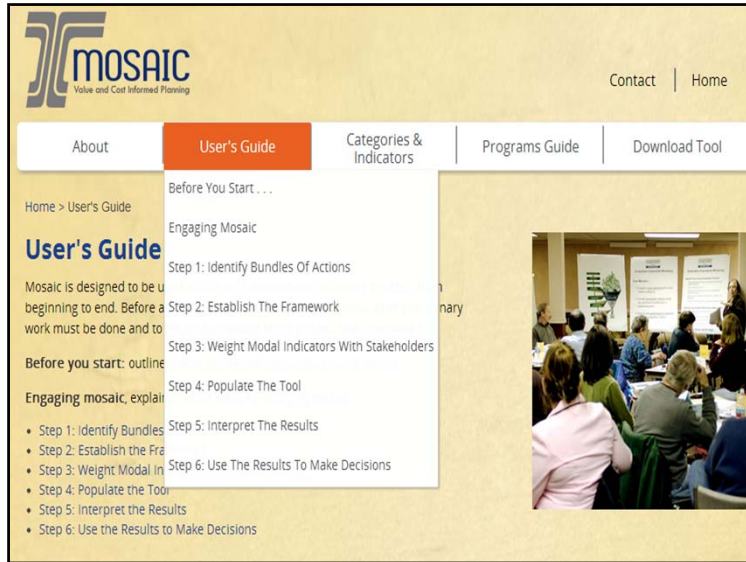**Planning Activity**

- Evaluate Solutions

Mosaic Role

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

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Two ways to measure value

Decision

Value measured in dollars

Value informed by stakeholders

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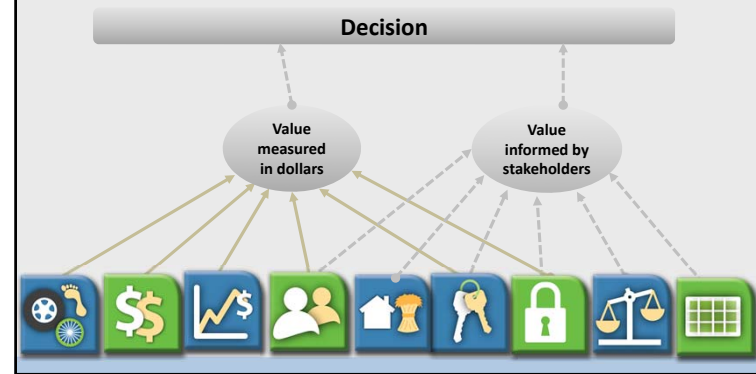
What's included in the User's Guide & website

- Explains recommended process for using Mosaic
- Explains each category and indicator
- Explains how to input information into Mosaic
- Provides references and links
  - To ODOT's related project site
  - Mosaic tool documentation explaining each indicator's calculations in detail
  - Programs Guide

What's included in the Programs Guide

- Twenty programs that are considered to be beneficial and are generally recommended for implementation
- The named programs have sufficient and relevant benefit or cost information
- Helps and advises users that choose to incorporate these programs into their bundles:

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

The Mosaic tool is an Excel workbook
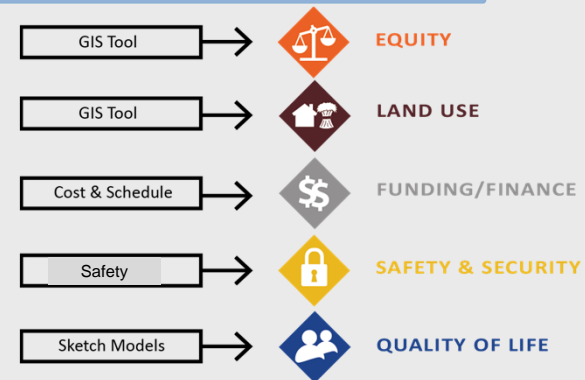

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Mosaic analysis tool includes

- About 40 linked spreadsheets in a workbook
- Macros to perform calculations automatically
- Recommended value and acceptable range of values for some parameters users can specify
- References in the workbook and others online
- Built-in ability to test sensitivities: how results may vary based on changes in common assumptions
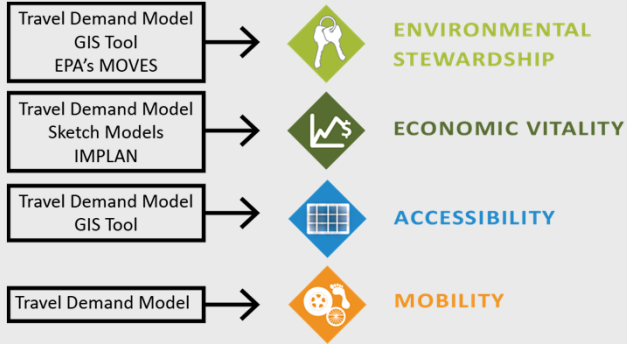
Mosaic tool user inputs

- **Bundles**
  - Groups of possible transportation projects and programs
- **Indicators**
  - Decide between dollars, quantitative, qualitative
- **Parameters**
  - Decide whether to use recommended values or test others
- **Weights**
  - Weight quantitative and qualitative indicators with stakeholders
- **Other data**

## Data sources for Mosaic indicators

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Data sources for Mosaic indicators (cont.)

Travel Demand Model
GIS Tool
EPA's MOVES → **ENVIRONMENTAL STEWARDSHIP**

Travel Demand Model
Sketch Models
IMPLAN → **ECONOMIC VITALITY**

Travel Demand Model
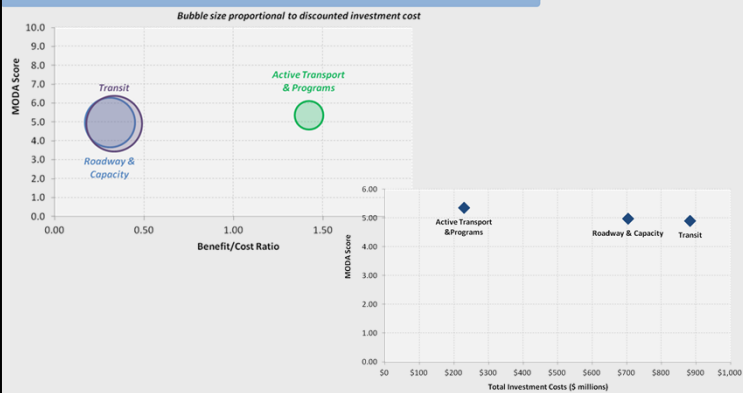GIS Tool → **ACCESSIBILITY**

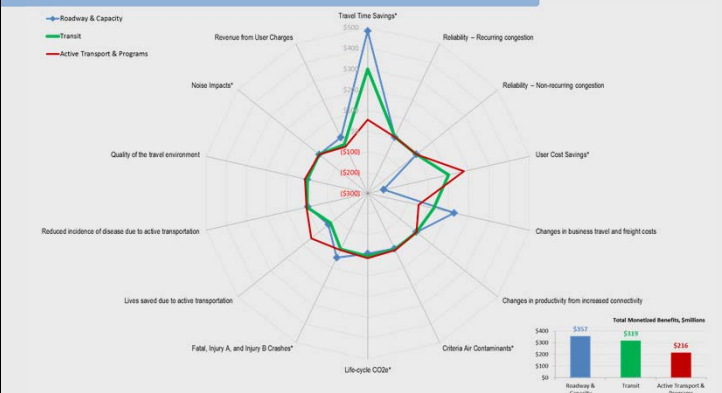Travel Demand Model → **MOBILITY**

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Mosaic tool outputs

- Tables: record of parameters and assumptions
- Charts: variety of charts to compare costs, MODA (weighted value) scores, and benefit-cost scores
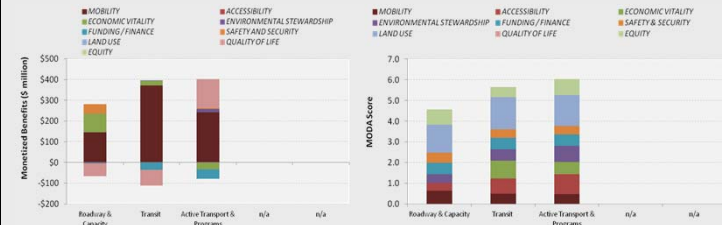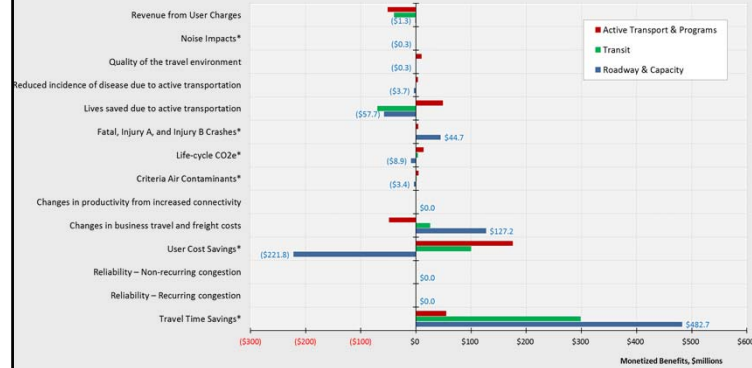
Mosaic outputs: more MODA chart options

Mosaic outputs: monetized chart option

Mosaic outputs: monetized chart option

Testing and review goals

- Step through process of using Mosaic with stakeholders
- Learn Mosaic strengths and weaknesses
- Learn what resources are needed to use Mosaic
- Learn Mosaic's most appropriate uses
- Learn recommendations of other experts reviewing the Mosaic tool
- Adjust the tool and User Guide to reflect lessons learned

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What we've learned: weighting

- Stakeholder values are important and should be made explicit
- Stakeholders should weight the importance of their values at least once during the process, and definitely weight them after results are available
- Users value flexibility when weighting indicators
  - Whether to weight all indicators or just non-monetized indicators
  - Whether to weight categories or indicators first

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What we've learned: results

- Graphical display is essential to understanding; different people will prefer different displays
- The measured values of *each* indicator within a category must be clearly displayed
- The *reasons behind* the measured values must be clearly explained
- The comparison of monetized results to non-monetized results is essential; it leads to a deeper understanding of value
- Some results are surprising and challenging

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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

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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 the layers of data available in the study area
4. The ability to estimate planning-level costs of transportation improvements

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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

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Summary

- Mosaic is designed to measure as much as possible in dollars, though you can choose quantitative or qualitative measurement
- A lot of the data Mosaic uses is likely to be developed for a plan anyway; Mosaic helps structure that process
- Mosaic will help you evaluate scenarios developed in a transportation planning process
- You will need to consider all the information Mosaic can provide and determine what is best for your community

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Questions and discussion

Mosaic project contacts:
Erik Havig, Planning Section Manager
erik.m.havig@odot.state.or.us

Lucia Ramirez, Principal Planner
lucia.l.ramirez@odot.state.or.us

Mosaic website:
www.oregonmosaic.org

ODOT project history website:
http://www.oregon.gov/ODOT/TD/TP/pages/lcp.aspx

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