

Pedestrian & Bicycle Demand Estimation Tool

Phase II Project Update

METROPOLITAN COUNCIL

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Contents

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Slide	#
Background	2
Regional Foundation Module	5
Scenario Module	9
Tool Application Development	12
Next Steps	13

What's this project doing?



This project is developing:

- **A region-wide model** that estimates current and future pedestrian and bicycle usage at the segment and intersection level.
- **A simple scenario model** that estimates how an investment affects usage in a specific project area.
- **A mapping tool** to display these estimates and allow interaction with the scenario module.
- Validation and calibration of the tool's results.
- Recommendations for Regional Solicitation and ongoing maintenance of the tool.

How is this project structured?

Contractor develops modeling method.
Nearly complete; Met Council testing contractor final product.

Met Council develops prototype interactive web tool.
In progress

Contractor validates model and tool, provides recommendations
Next step

In Contract Scope

Ongoing Activities

Met Council publishes tool, integrates into regional processes

Met Council maintains and updates tool and model as needed



How does the model work?

It’s five flows working together.

Regional Foundation Module

- Three modules to provide volumes, existing and future, with no infrastructure change.
  - Origin-destination model
  - Pedestrian direct-demand model
  - Strava activity floor
- Blending module to combine estimates

Scenario Module

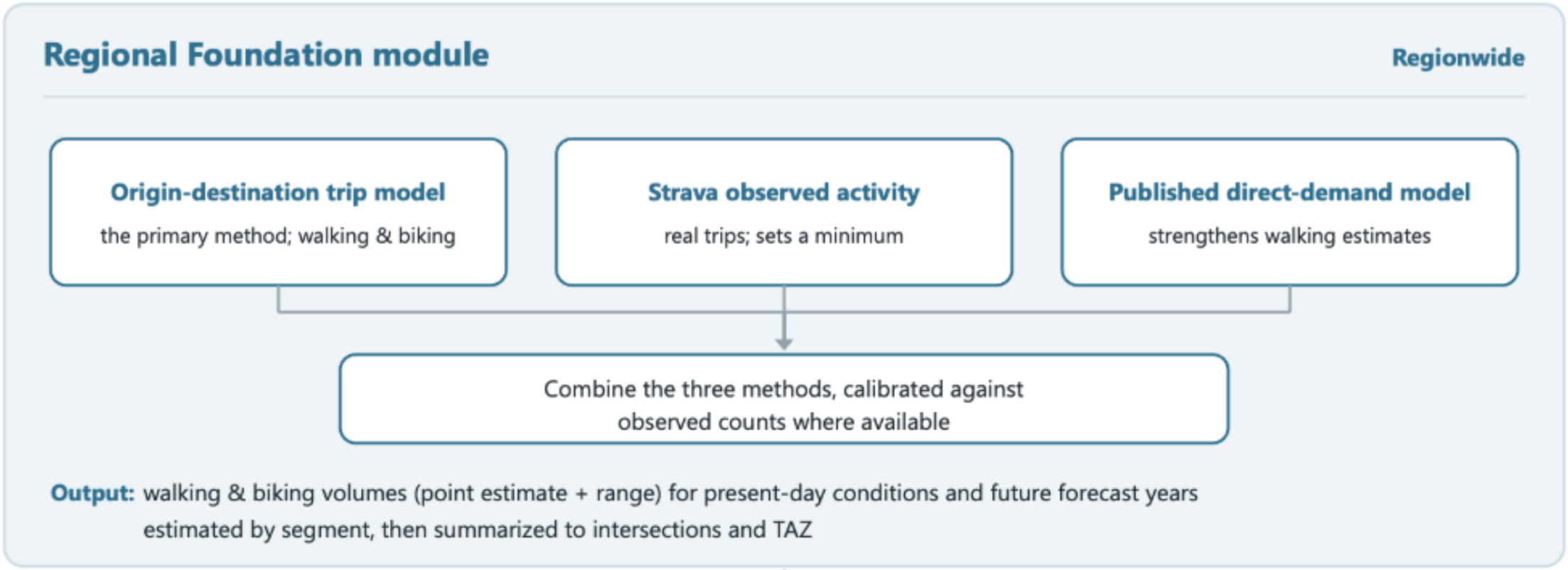
- Provides estimated usage if the level of traffic stress were to change
  - Based on NCHRP 1149 behavior change multipliers
- Can be calibrated with user-input site counts
- Provides estimated trips by mode, season, and purpose under treatment scenario







Regional Foundation Module



Regional Foundation Module:

Origin-Destination Module



Estimates current and future usage before investment.

- Estimates area-to-area trips, then distributes across the network.
- Based on inputs like:
  - Real, observed trip data from sources like StreetLight Insight and the Travel Behavior Inventory
  - Infrastructure location and characteristic data from MnDOT, Met Council, and OpenStreetMap
  - Sociodemographic data like the Met Council's regional forecasts for population, housing, and jobs and U.S. Census Bureau data
- Calibration and sensitivity testing will occur in Phase III
- Re-run when significant regional system or data changes occur:
  - Delivery of 1-2 years of Regional Solicitation projects
  - Transportation Policy Plan updates
  - New location services data availability

Regional Foundation Module:

Pedestrian Direct-Demand & Strava



Direct-demand module strengthens pedestrian estimates.

Considers data sources such as:

- Infrastructure data like traffic volumes, speed, signals, intersection density
- Demographic data like auto ownership, employment, age
- Transit system like presence of fixed-guideway transit stops

Strava Metro is only used in limited circumstances.

- These are not used as an Origin-Destination module input.
- Serves as an activity floor. If we know ***n*** trips occurred in Strava Metro, but the Origin-Destination or Direct Demand modules are returning ***n-20*** trips, blending step will use ***n*** trips.

Regional Foundation Module:

Blending Estimates

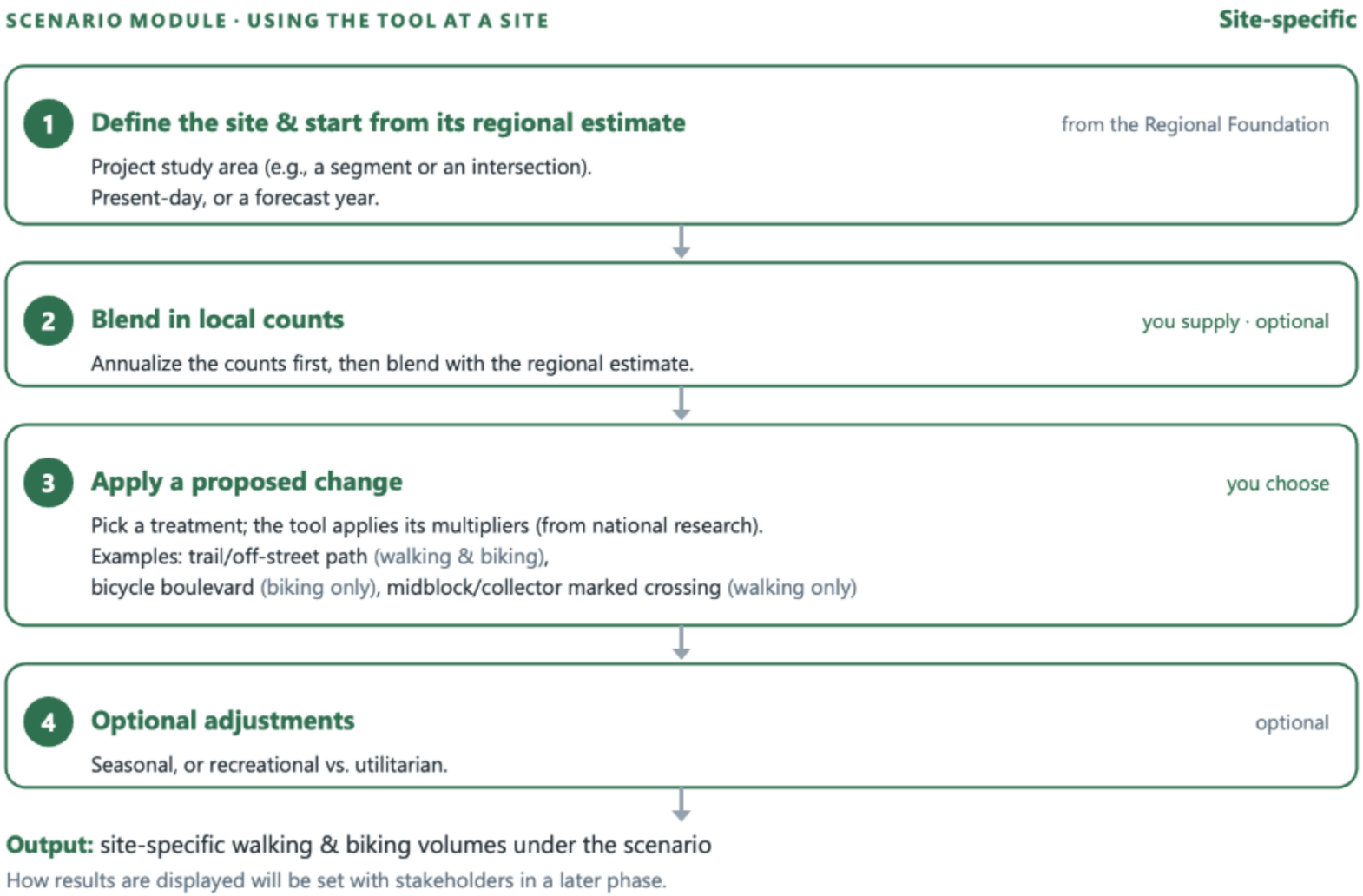
Blending Bicycle Estimates

- Uses the Origin-Destination (OD) model result by default.
- If an OD model result is missing or lower than the amount observed in Strava Metro, the Strava Metro value is used (activity floor).

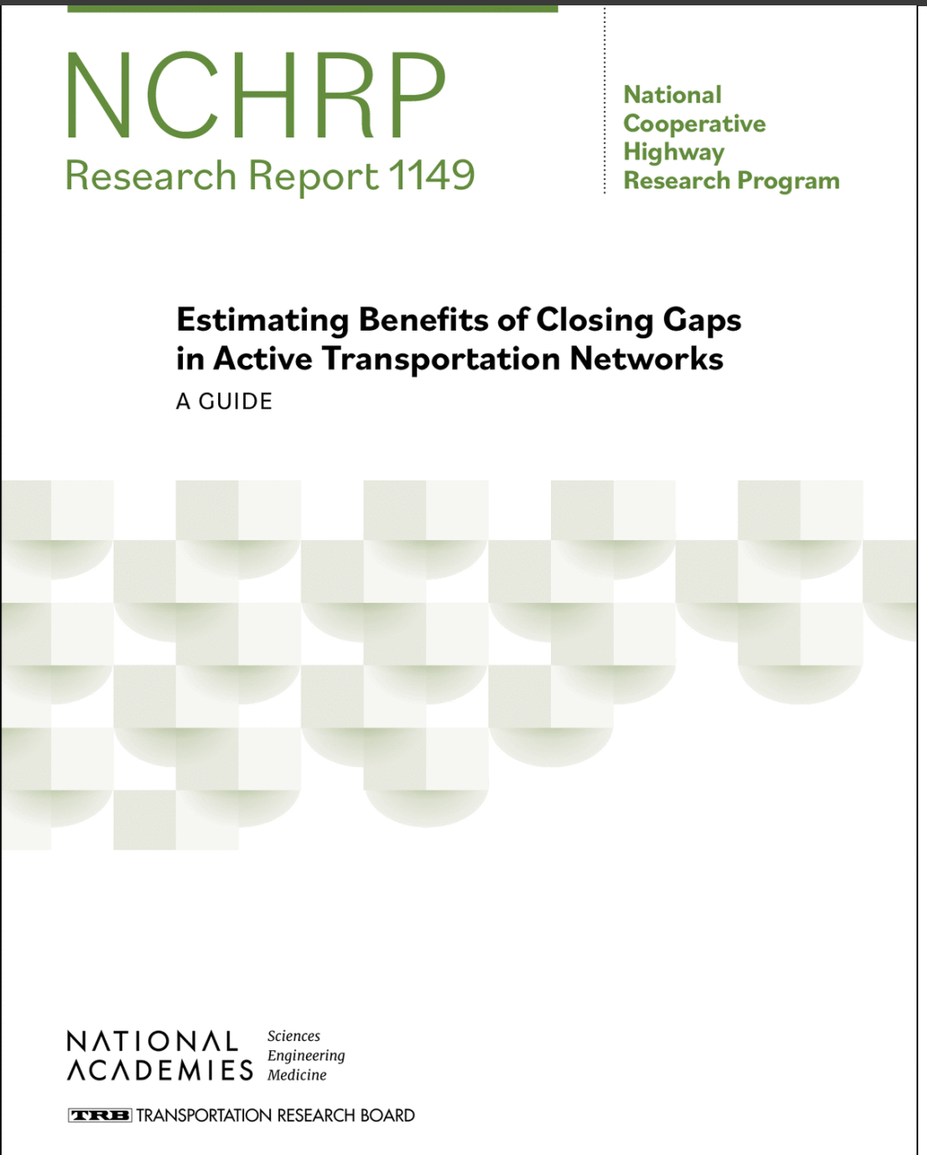
Blending Pedestrian Estimates

- Allocates intersection-level Direct Demand (DD) module estimates of pedestrian activity to segments based on proportional flow of volumes routed in the OD module.
    - Similar to bicycles, where OD results are missing, the activity floor value is used.
    - Where both estimates are missing, a spatial smoothing technique is applied to ensure lack of model result does not return a false zero volume estimate.
- Certain network features (e.g., not functionally classified roads, freeways) are excluded from the DD step where methods are not applicable; blending step follows same procedure as bicycles in these circumstances.

Scenario Module



Scenario Module Inputs



Scenario module is based on NCHRP 1149

- Researched-backed calculation that considers:
  - Type of facility proposed
  - Degree of improvement relative to existing conditions, measured via Level of Traffic Stress
  - Travel shift from other existing routes
- Applies to both new and improved facilities
  - Estimates change for sites with existing activity
  - Applies a context-transfer method to estimate activity at new sites with little or no existing activity or data

Scenario Module Outputs

Core Outputs

- Annual average daily bicycle trips (AADBT)
- Annual average daily pedestrian trips (AADPT)

Additional Outputs

- Season-specific splits
- Trip purpose splits
- Number and % change in trips between present-day, forecast-years, and scenario

Disclose Uncertainty

- Display uncertainty estimate alongside results
- Can be updated with local counts

Tool Development

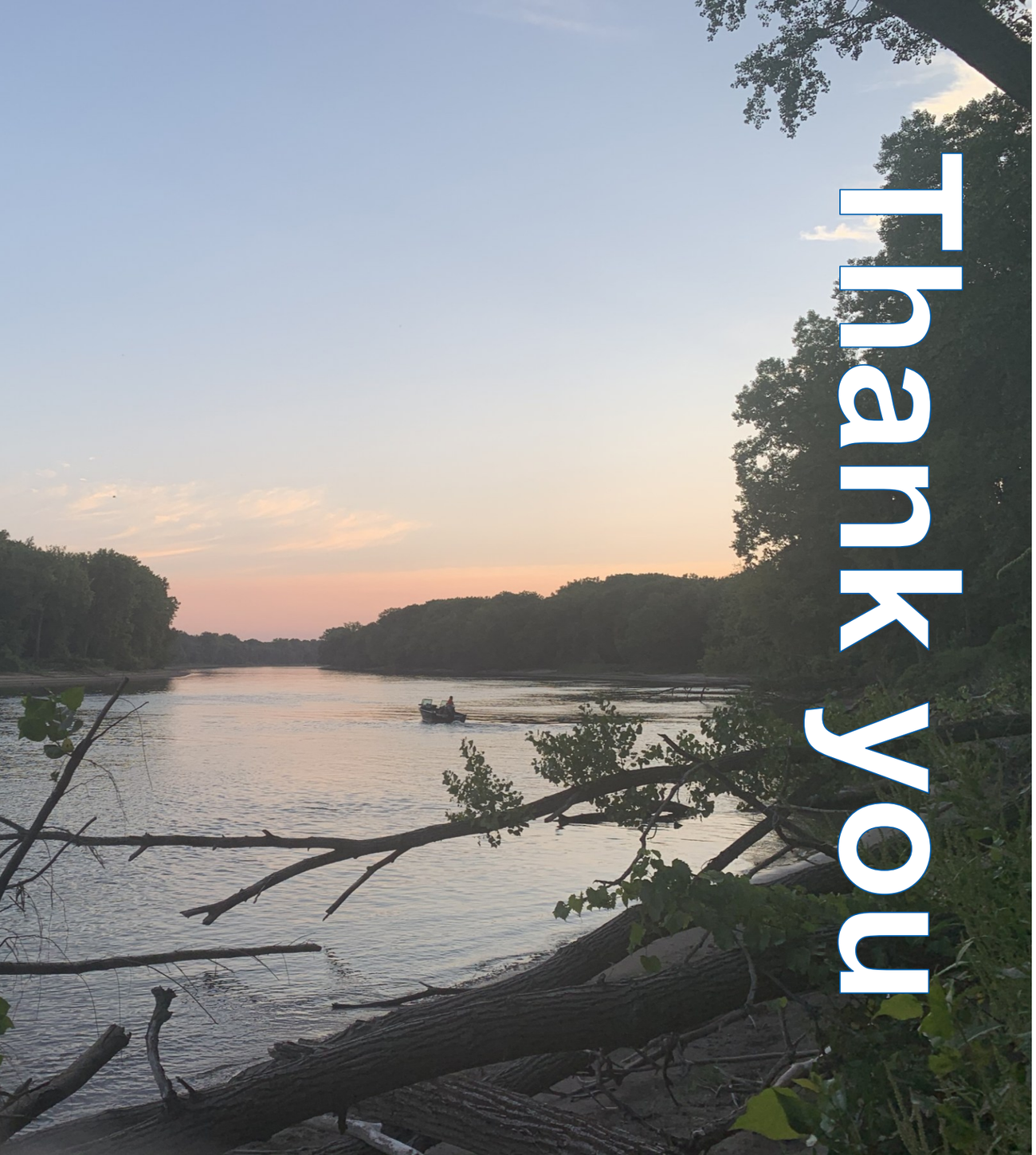
Where are we now?

- We are developing requirements for the application:
    - Project planning with Met Council Information Services (IS). The application is a joint development effort between IS and Transportation Planning
    - Resolving software/infrastructure questions around how the scenario module will function and what platform it will be hosted on.
- We are ideating user interface design. How would you use this tool:
    - For comprehensive planning?
    - For capital project planning?
    - For grant applications?

What's next?

Eagerly await a very cool prototype!

- When the prototype tool is functional, the contractor will start Phase III work targeting fall 2027 completion:
  - Re-engage with the stakeholder group and other stakeholders
  - Validate model and tool results
  - Develop recommendations for Regional Solicitation, tool maintenance, and future improvements
- Publish first iteration of the final product
  - Dependent on user feedback and validation
- Make future improvements
  - Rerun Regional Foundation model on infrequent, as-needed basis
  - Workplan future features



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