Scenario Planning

LITE

Guidance for Scenario Planning

TRB

The National Academies of SCIENCES ENGINEERING MEDICINE

Objective and Outline

Guidance for Scenario Planning

Scenario Planning is important because:

- Organizations have found that a rapidly-changing future frustrates point-to-point forecasting techniques
- It helps transportation agencies plan for futures that are uncertain and establish signposts where plans can be reconsidered
- It provides a framework for the evaluation of different types of risk and risk response

Guidance for Scenario Planning

Objective and Outline

- This guidance is specifically intended to help small-to-medium-sized organizations
  - » Pass down lessons from larger organizations
  - » Disseminate best practices through the industry

Guidance for Scenario Planning

Objective and Outline

This presentation will:

- Introduce the theory and terminology of Scenario Planning
- Walk through the process of developing a Scenario Planning study:
  - Defining a question
  - Identifying variables
  - Envisioning scenarios
  - Achieving objectives
- Introduce tools that assist Scenario Planning
  - Communication and engagement tools
  - Modeling tools

Theory of Scenario Planning

Continuum

Theory

First, define a **continuum** – the "x axis" of our plot

The continuum is the "independent variable." What you are testing for on the y axis will change as you move from left to right.

One example of a continuum is time. Another, less concrete example is a sequence of decisions.

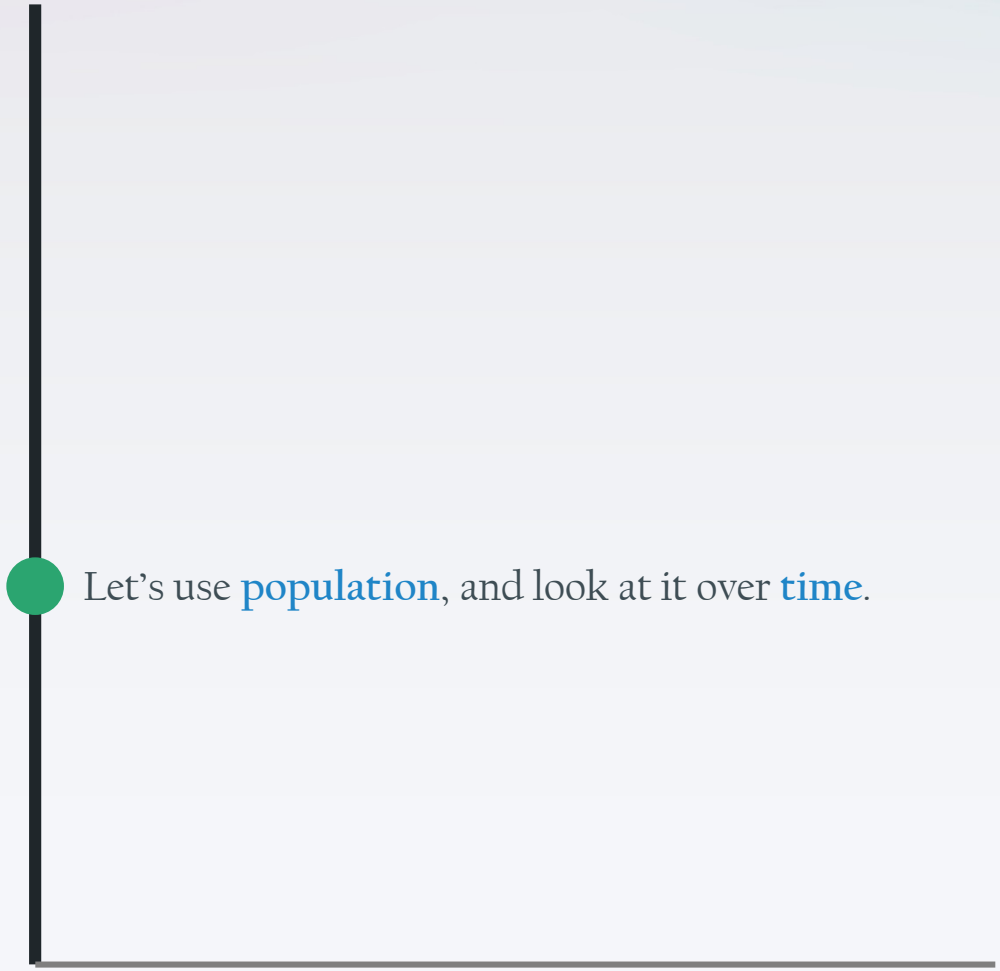
Variables

Theory

Next, let's define a **variable** – the "y axis" of our plot

Variables can be actors, factors, or sectors:

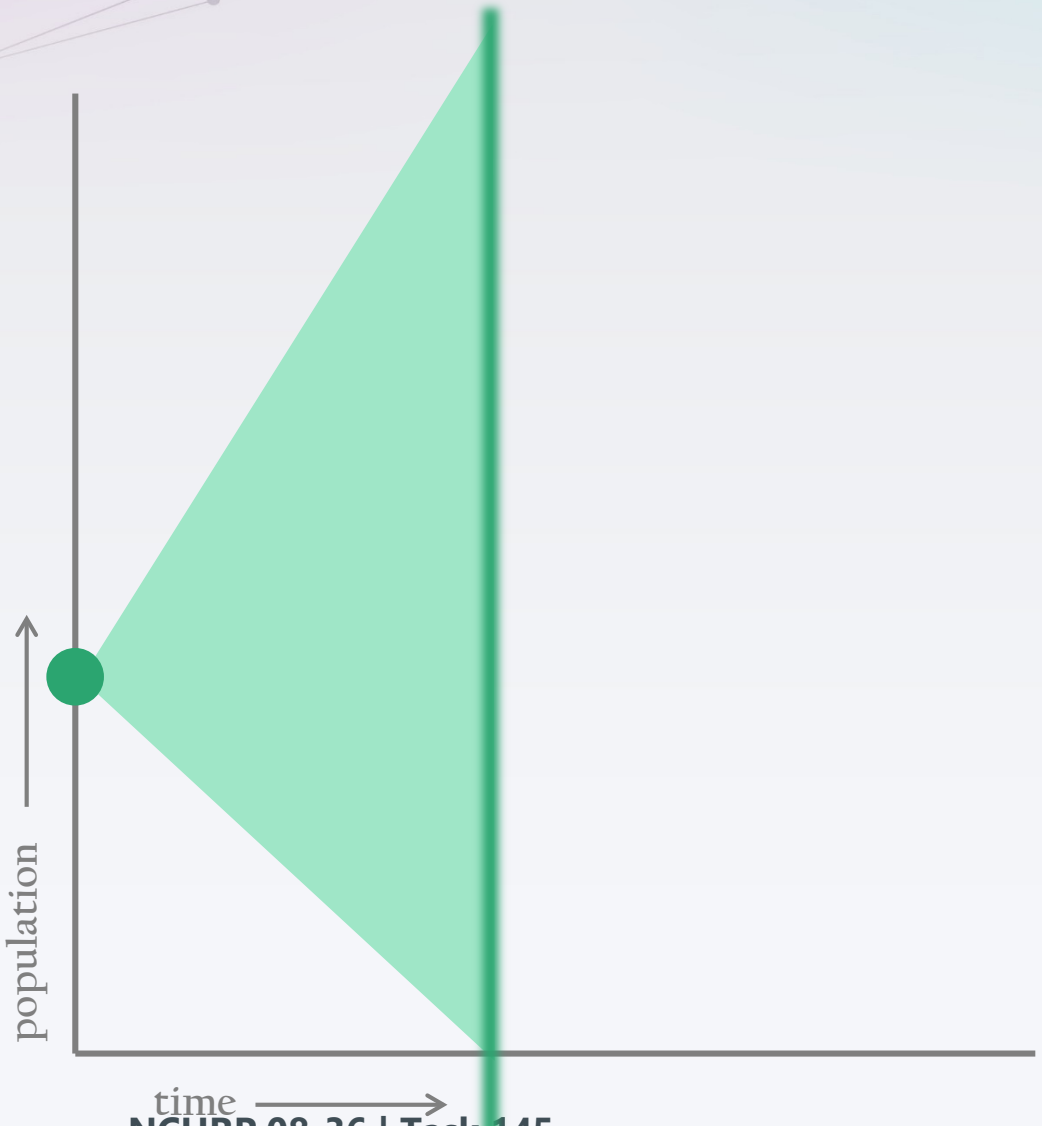
- Actors are people or organizations whose actions impact the future
- Factors are concepts, constructs, or characteristics
- Sectors are the arenas where actors and factors interact



Trends

Theory

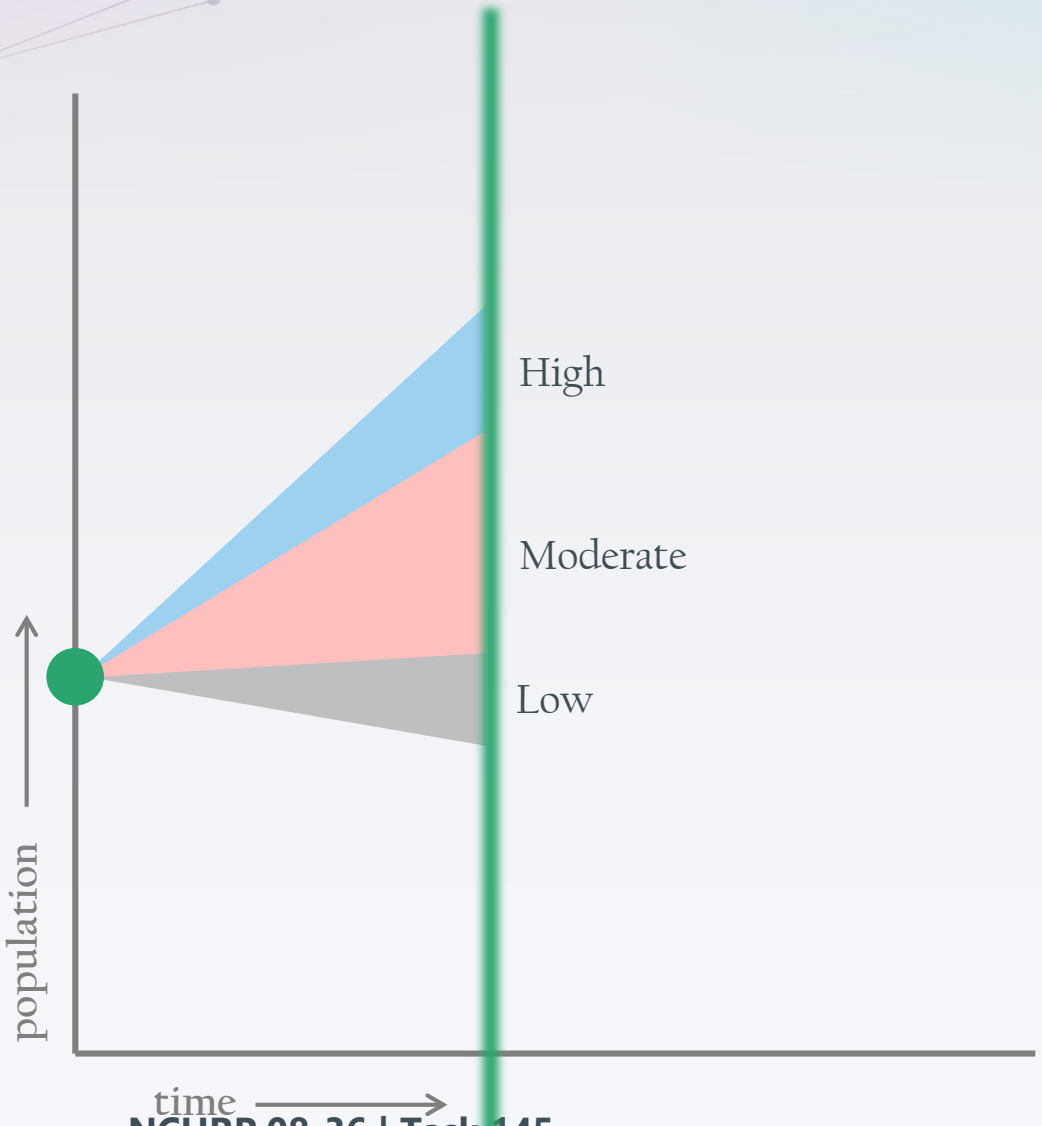
Anything that happens between today and a horizon, or between horizons, is a **trend**.



Trends

Theory

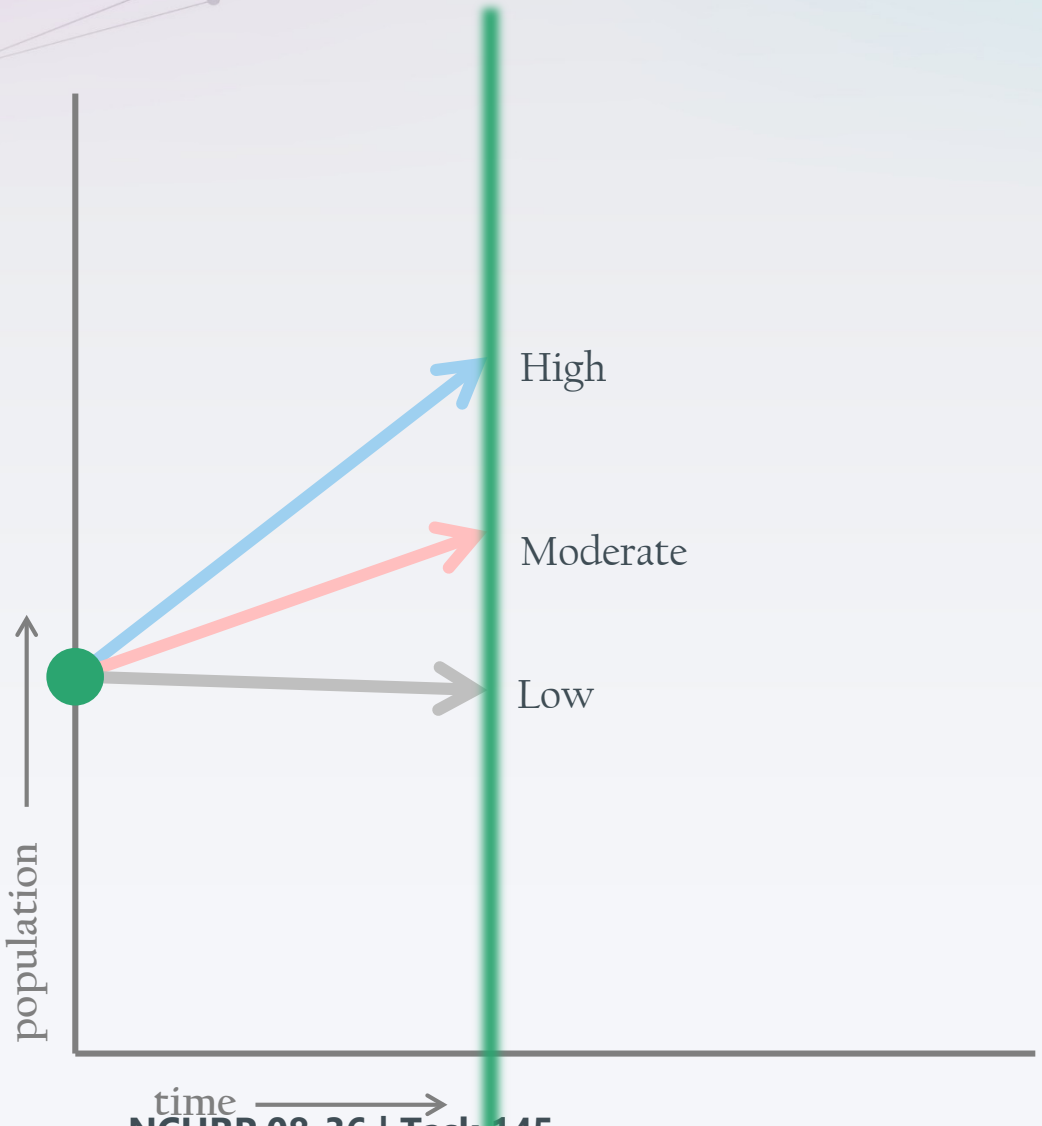
Your trends might be **intuitive**…



Trends

Theory

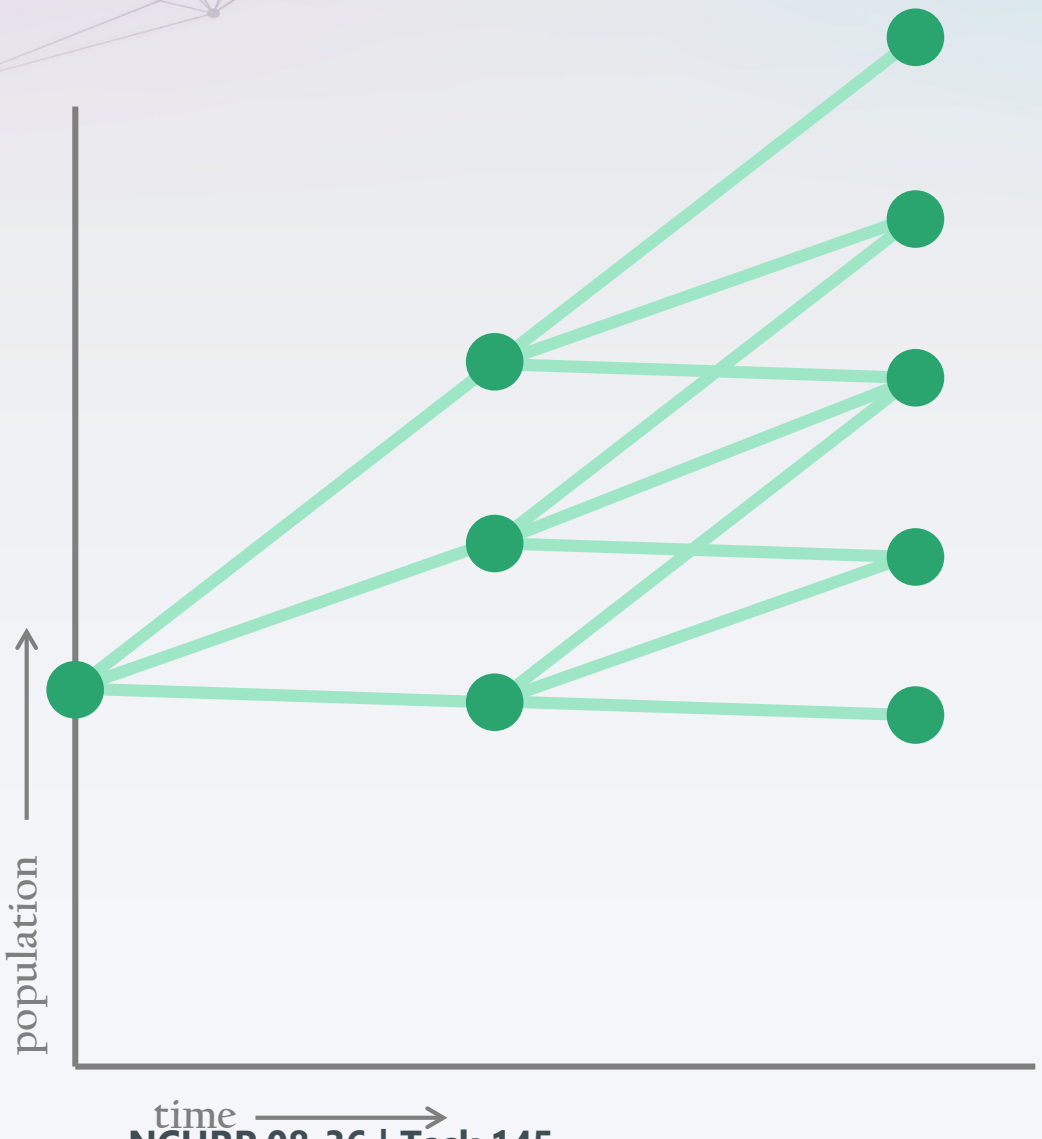
Or they could be **formal** – informed by data or defined by you



Outcomes

Theory

As the continuum progresses, you may end up with discrete **outcomes**.

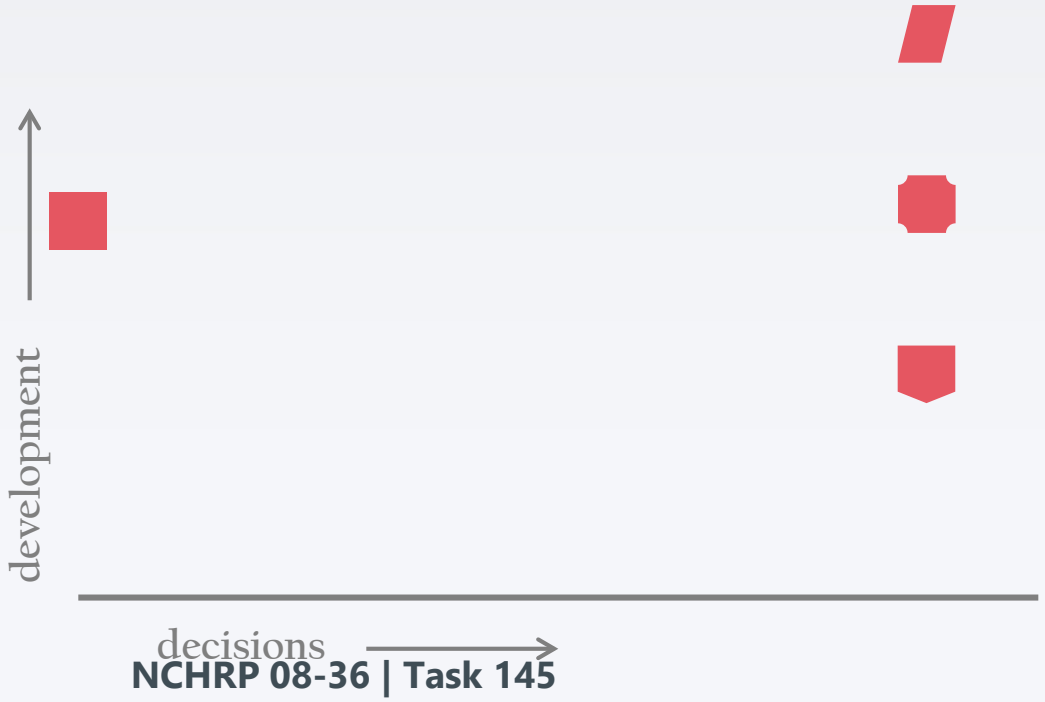


Decisions

Theory

Alternatively, maybe you know the outcomes but need to describe how you get there…

For example, you want to evaluate several potential policy decisions.



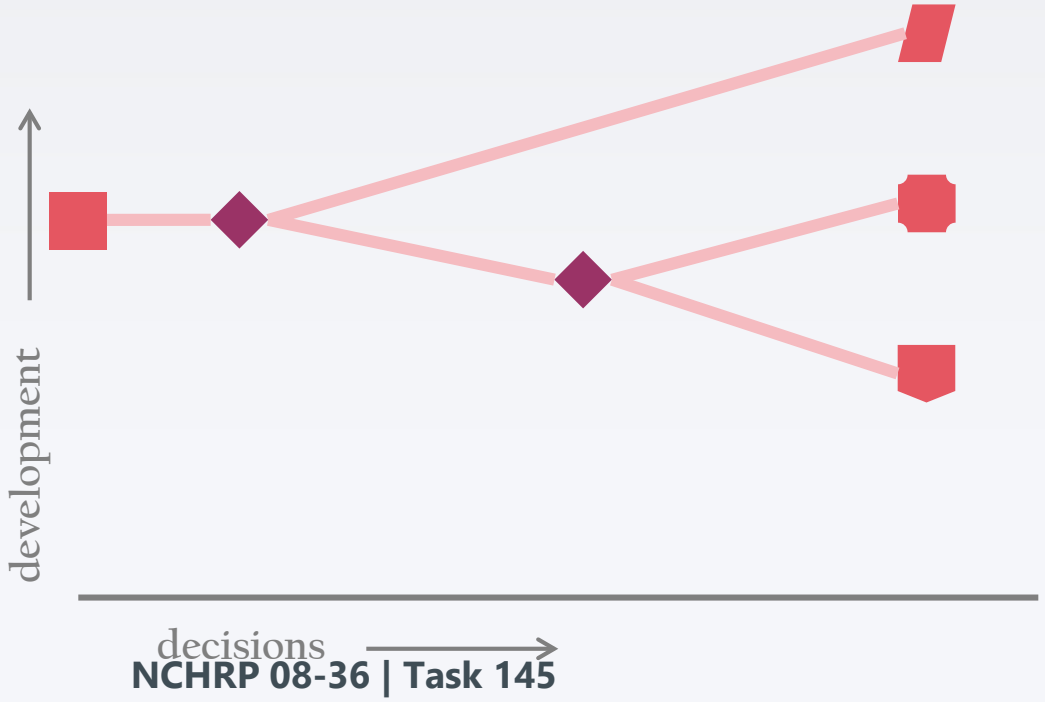
Decisions

Theory

You can establish **decision points**:

In this example, the first decision leads to a certain outcome if things go one way, but to two potential outcomes in the other.

That's a second decision point.



Scenarios

Theory

Your decisions may be based on trends. Let's combine our two variables together.

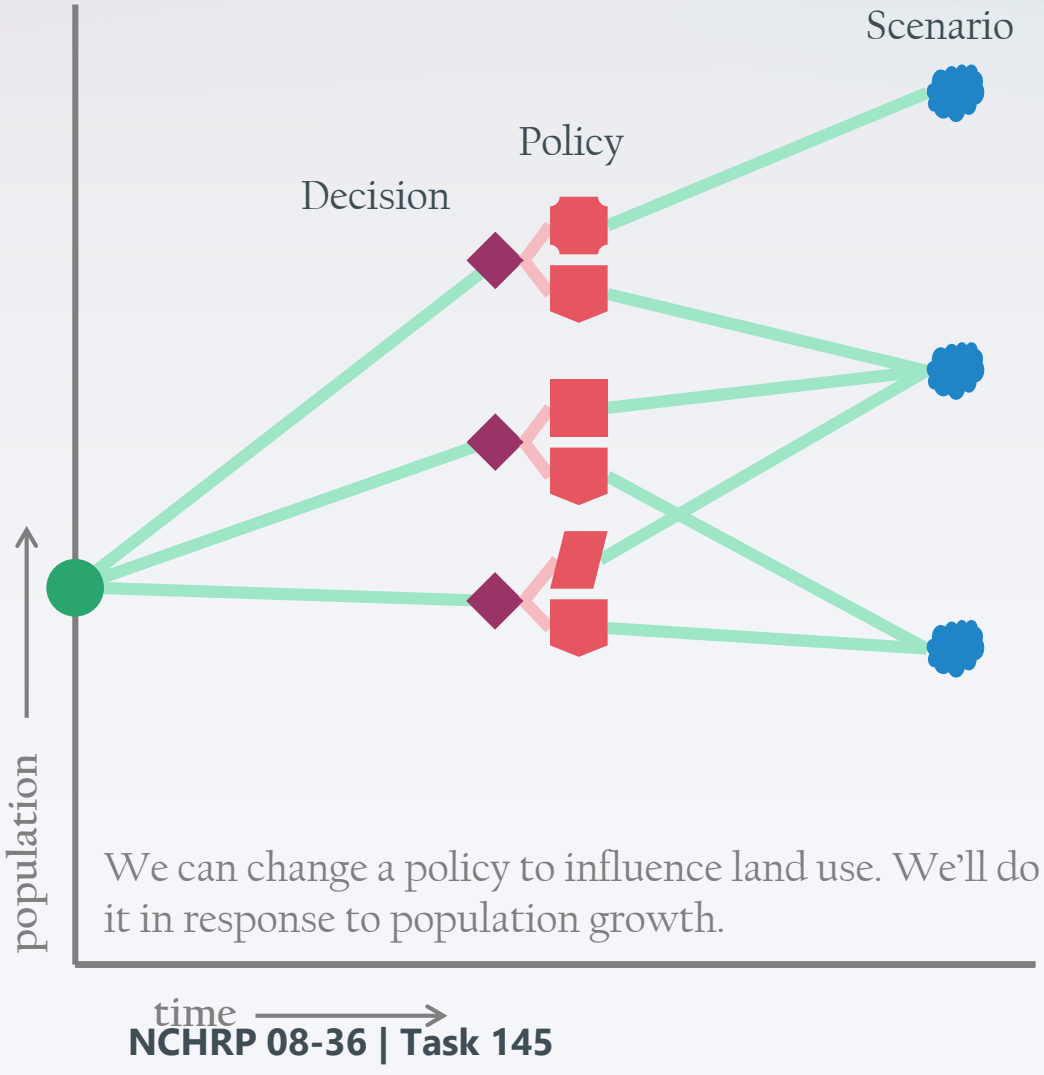
Your policies impact population growth.

When we reach our second horizon, we have combinations of policy and population outcomes.

These are **scenarios**.

Of course, there can be many variables and they can all interact to produce scenarios together.

Alternatively, you can define a subset of scenarios based on variables independently.



We can change a policy to influence land use. We'll do it in response to population growth.

Normative

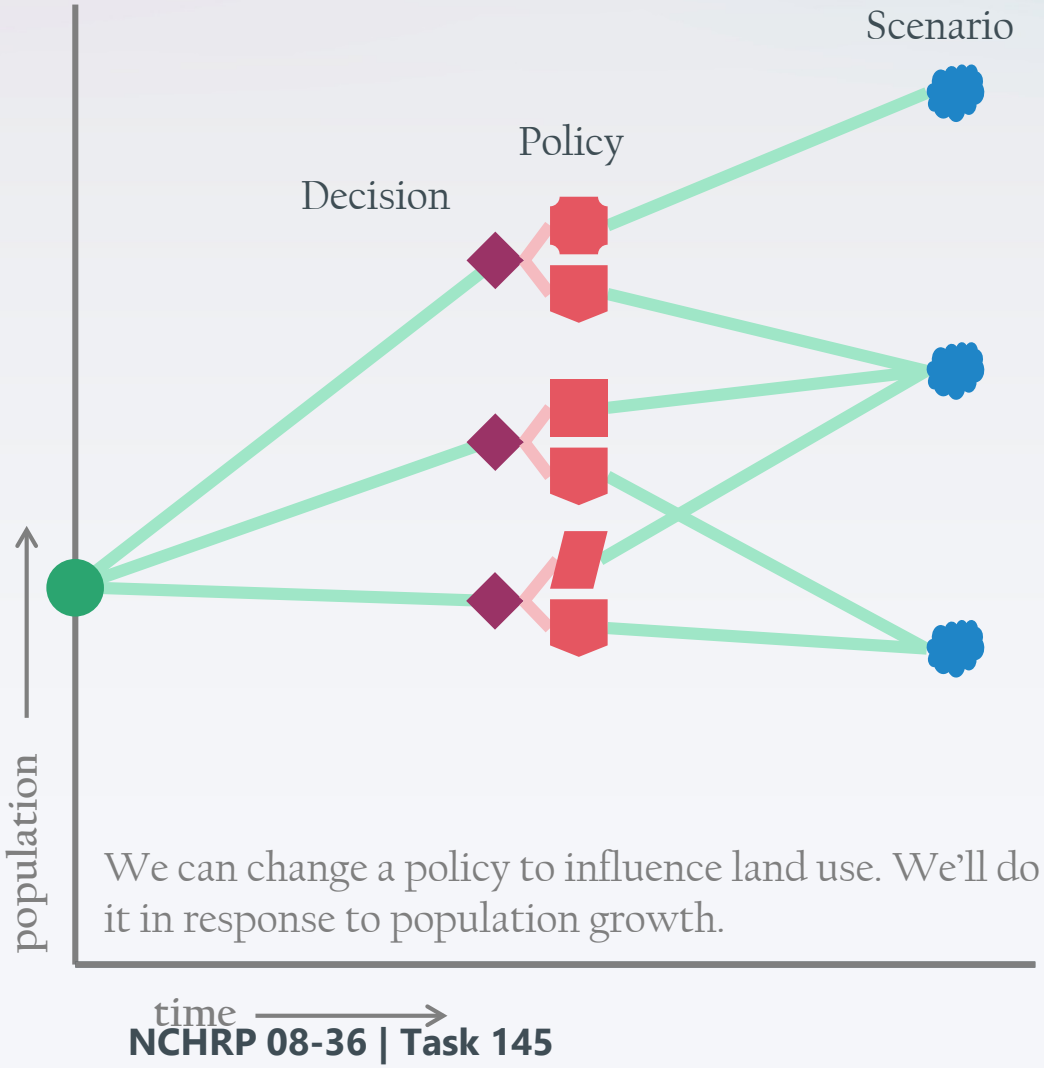
Theory

Let's look at our decisions here...

Since we know what will happen when we decide a certain way, we can choose which scenario we want.

Thus, our policies (or investments) are determined by what we think is good.

This is called **normative** planning.



We can change a policy to influence land use. We'll do it in response to population growth.

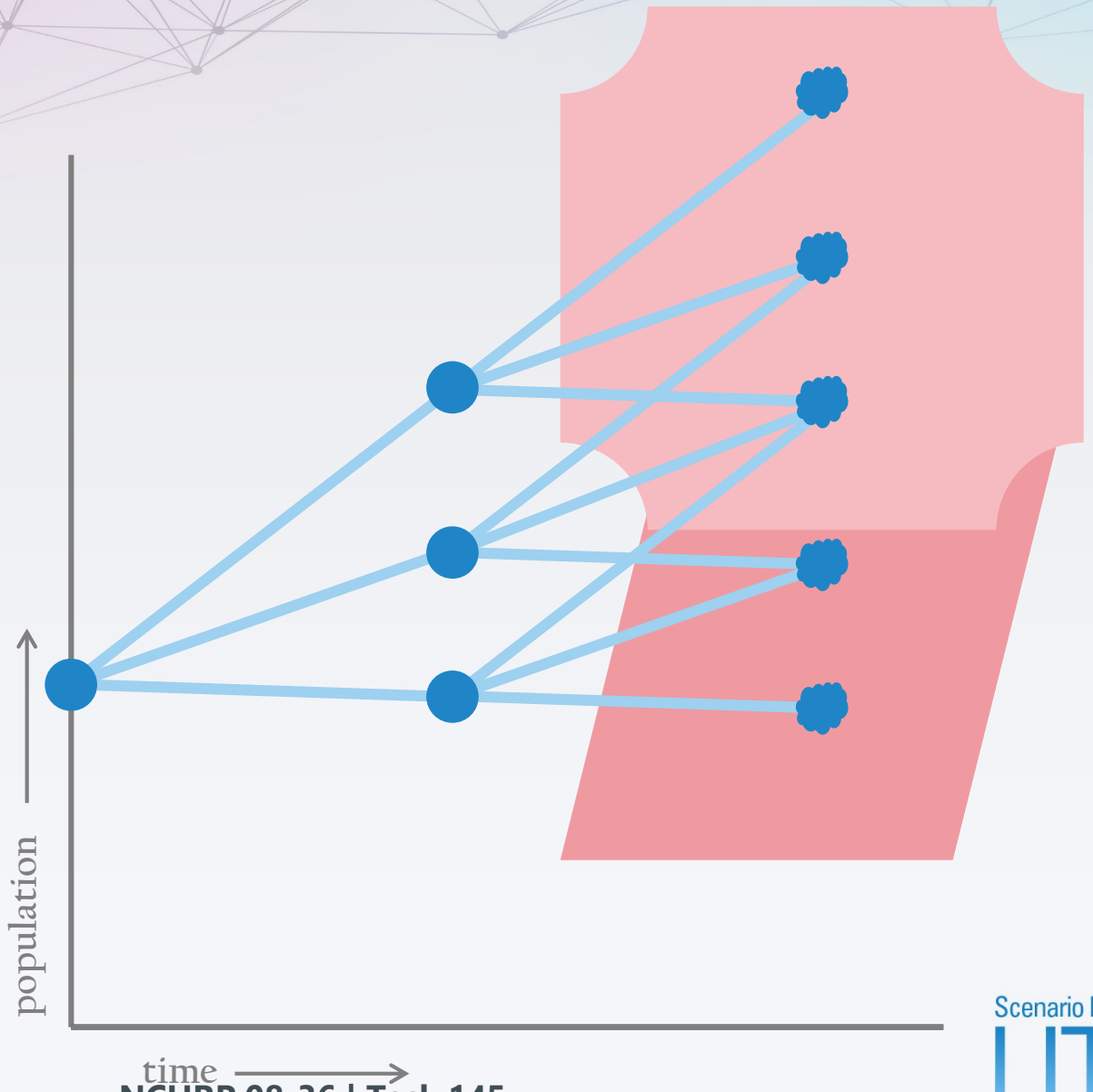
Explorative

Theory

But what if several scenarios are equally possible?

We select policies that will work for as many plausible futures as possible.

That's called **explorative** planning.

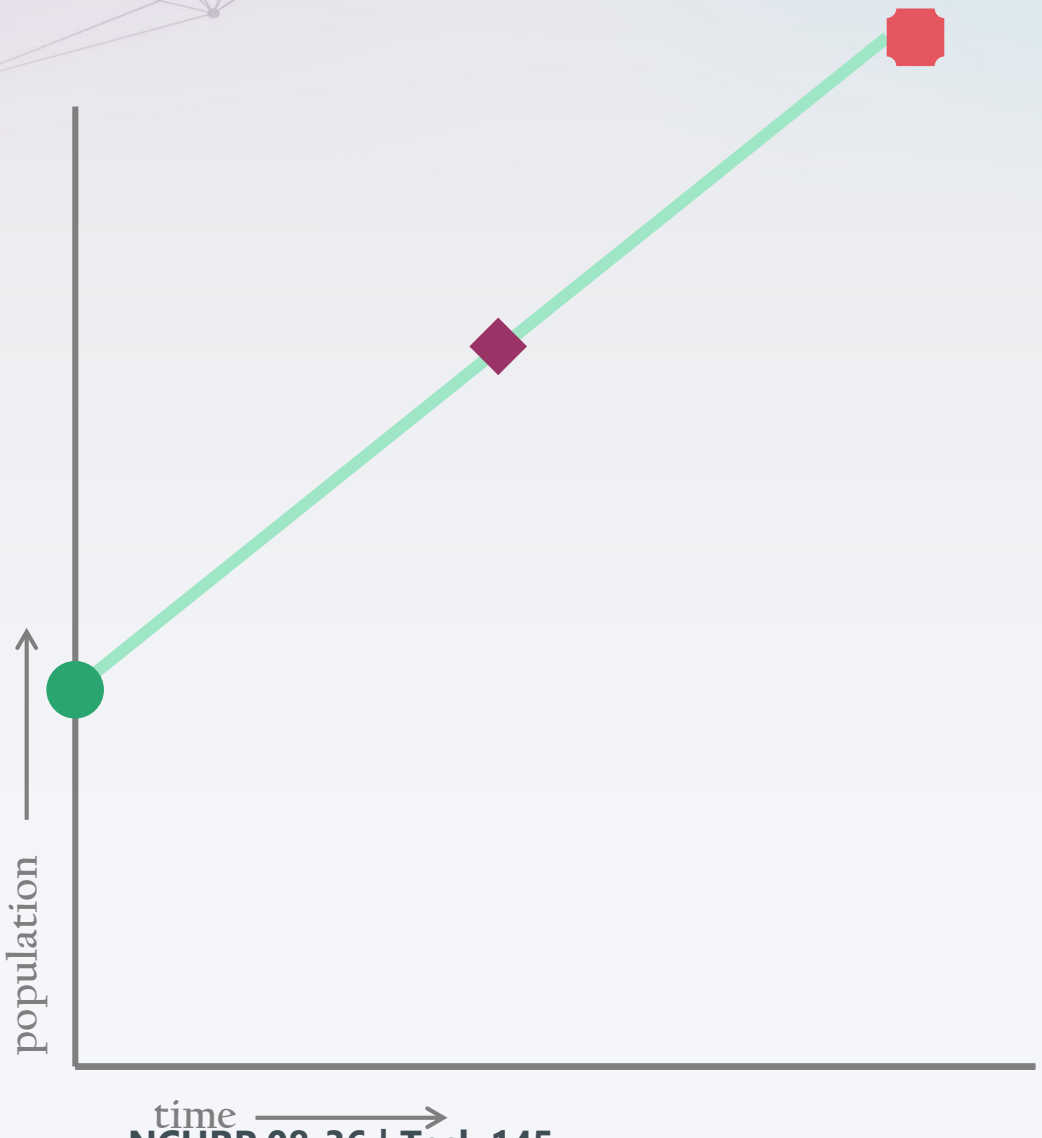


Predictive

And if we know what's going to happen and we need to be ready for it...

Theory

That's **predictive** planning.



Advice for Scenario Planning

Defining a Question

Advice

- A question is defined by:
  - A subject ("our region" or "our transit system")
  - A timeframe/horizon ("by 2050")
  - An objective ("in order to prioritize investments")
- Questions can be…
  - Predictive | What do we think is going to happen?
  - Normative | How can we make something desirable happen?
  - Explorative | What could possibly happen?
- In practice, you will combine these
  - Fully predictive may seem to lack imagination
  - Fully normative may seem biased
  - Fully explorative may seem wasteful

Identifying Variables

Commonly-cited variables adapted from NCHRP 750: *Foresight Series*

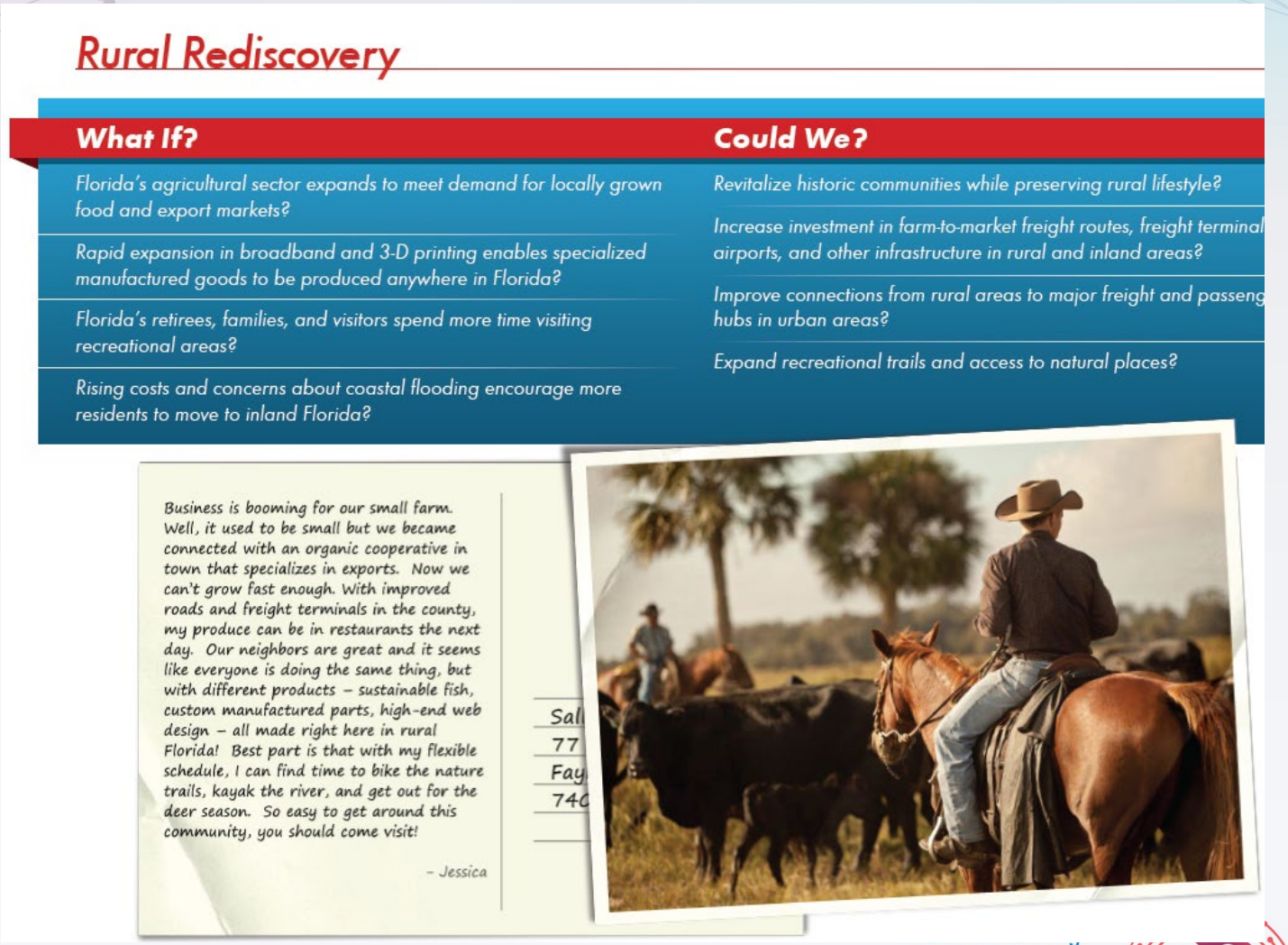
Advice

- **Economics**
  - Income, unemployment, GDP, inequality
  - Global and local trade levels, shipping, supply chains
  - Domestic manufacturing, online retailing
- **Environment and Land Use**
  - Water scarcity, sea level rise, fires
  - Emissions and air quality
  - Development rates and open/rural land preservation
- **Technology**
  - Printed fabrication/micromanufacture
  - Automation in manufacturing and transportation
- **Transportation**
  - Transportation network companies - TNCs (Uber/Lyft), mobility as-a-service
  - Mode choice
- **Demographics**
  - Aging population
  - Growth rate, inward/outward migration, labor force participation

Envisioning Scenarios

Advice

- Scenarios are defined by trends
  - » The current trend accelerates
  - » The current trend maintains
  - » The current trend plateaus, decelerates, or reverses
- Scenarios can be based on
  - » A single variable, trend, or event
  - » Multiple variables interacting
  - » Land use patterns
  - » Finances



Rural Rediscovery

What If?	Could We?
Florida's agricultural sector expands to meet demand for locally grown food and export markets?	Revitalize historic communities while preserving rural lifestyle?
Rapid expansion in broadband and 3-D printing enables specialized manufactured goods to be produced anywhere in Florida?	Increase investment in farm-to-market freight routes, freight terminal airports, and other infrastructure in rural and inland areas?
Florida's retirees, families, and visitors spend more time visiting recreational areas?	Improve connections from rural areas to major freight and passeng hubs in urban areas?
Rising costs and concerns about coastal flooding encourage more residents to move to inland Florida?	Expand recreational trails and access to natural places?

Business is booming for our small farm. Well, it used to be small but we became connected with an organic cooperative in town that specializes in exports. Now we can't grow fast enough. With improved roads and freight terminals in the county, my produce can be in restaurants the next day. Our neighbors are great and it seems like everyone is doing the same thing, but with different products – sustainable fish, custom manufactured parts, high-end web design – all made right here in rural Florida! Best part is that with my flexible schedule, I can find time to bike the nature trails, kayak the river, and get out for the deer season. So easy to get around this community, you should come visit!

– Jessica

Sal
77
Fay
740

Florida Department of Transportation

Achieving Objectives

Advice

- What is your study meant to *inform?*
  - What practices can we change?
  - What rules can we make?
  - What efforts can we empower?
  - What investments can we make?
  - What should our community prepare for in their lives?

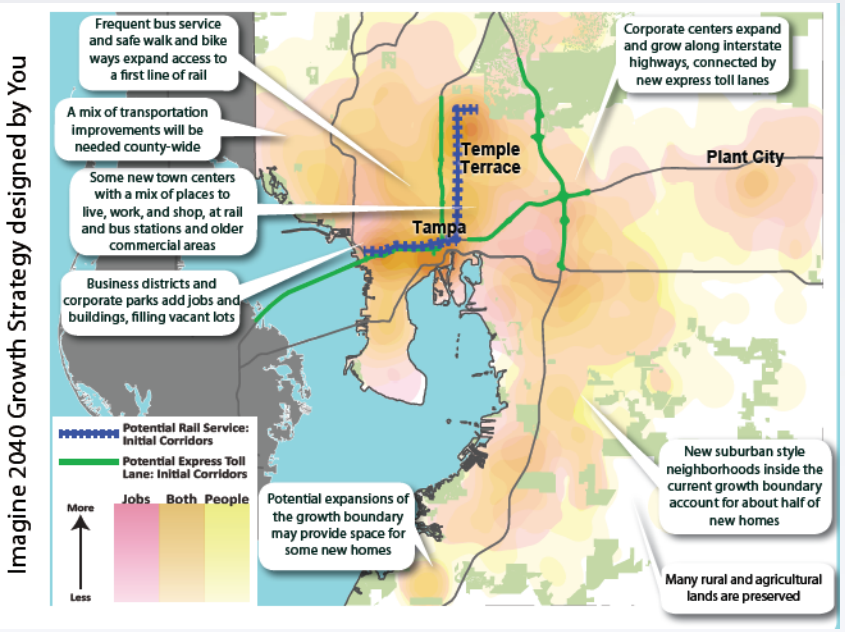
- How you select recommended actions depends on philosophy
  - Predictive | Future is certain, so actions address impacts
  - Normative | Future is desirable, so actions make it more likely
  - Explorative | Actions address as many futures as possible

- Prioritize what is helpful, not what is wanted most
  - Seek help from advisors and input from engaged stakeholders

Tools for Scenario Planning

Communication Tools

Tools



Hillsborough MPO

- The most effective tool is in-person engagement
  - Attend fairs, block parties, other local gatherings
  - Markers, posters, post-it notes, other low-tech feedback gathering tools
  - Advisory committees of subject-matter and local history experts, other luminaries
- Many types of software tools
  - Survey (Google Forms, SurveyMonkey)
  - Mapping (Google Maps, ArcGIS Online)
  - Project website (Squarespace, Wix)
  - Blogging, livestreaming, podcasting
  - Packages (MetroQuest, Bang the Table, Public Input)

Modeling Tools

Tools

- For small agencies, consider the following:
  - Take advantage of the cyclical process of long-range planning, starting small and building with each round
  - Partnerships with State agencies (DOTs, large MPOs) who already own models and pooled fund/effort with peer agencies can spread modeling capabilities without breaking the budget

- Modeling tools may include:
  - Land use models
    - CommunityViz
    - CorPlan
    - EnvisonTommorow
    - SPARC/INDEX
    - Urbanfootprint
  - Travel demand models
    - Cube
    - Emme
    - TransCAD
    - Visum
  - Econometric models (REMI TransSight, TREDIS)
  - Federal models (FHWA, EPA, CDC tools)

Takeaways

Rules-of-Thumb

Your Mind is (Mostly) Free

» Scenario Planning is mostly about imagining the future collaboratively with others in your organization and in your community. **What do you think could happen, and what would that mean for your region?** Imagining doesn't cost a dime.

Start the Conversation

» Every community, no matter how big or small, is full of smart folks. Public outreach and advisory committees can be very inexpensive and very high-value – not only can they reveal public preferences and beliefs you may not have anticipated, they also lend your effort credibility, integrity, and approachability in the eyes of your public and stakeholders.

Take Your Time and Ask for Help

» Your region, state, and country are full of potential partners that can pool resources or share their advantages with you. Also, Long-term planning is cyclical, and you don't need to get all the way there the first time. If you don't have the staff time to spend all at once, do one step for this LRTP and make a plan for what you'll tackle next time.