Scenario Planning for Addressing Uncertainty: Anticipate & Adapt

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A Lincoln Institute of Land Policy & Sonoran Institute Joint Venture

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Shaping the Future of the West

LINCOLN INSTITUTE OF LAND POLICY

What if? Rapid Growth Rebounds Quickly

- Demand trumps all
- Smaller public sector --- are we ready?
- Fiscal impacts
- Implications for our communities

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What if? Middle East War

- Oil supplies go down, gas prices go up
- Public lands open for drilling
- What about our communities?

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What if? Climate Clobbers the Colorado

- Water shortages: winners and losers
- Extreme Weather: droughts, floods, fires
- What about our communities?

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The Last Five Years:

Did You Imagine it Would Be This Bad?

- Real estate crash
- Global recession

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Looking Ahead: What Do We Know?

- Not much, for sure (uncertainty)
- Things could get a whole lot better, or a whole lot worse (variability)
- We have to consider a number of factors, many of which we cannot control (complexity)

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Uncertainty
Change is Inevitable

Changes in our communities are inevitable

but not always predictable

??????????

How can we anticipate change

and plan for it

Uncertainty
Change is Inevitable

Can We Distinguish

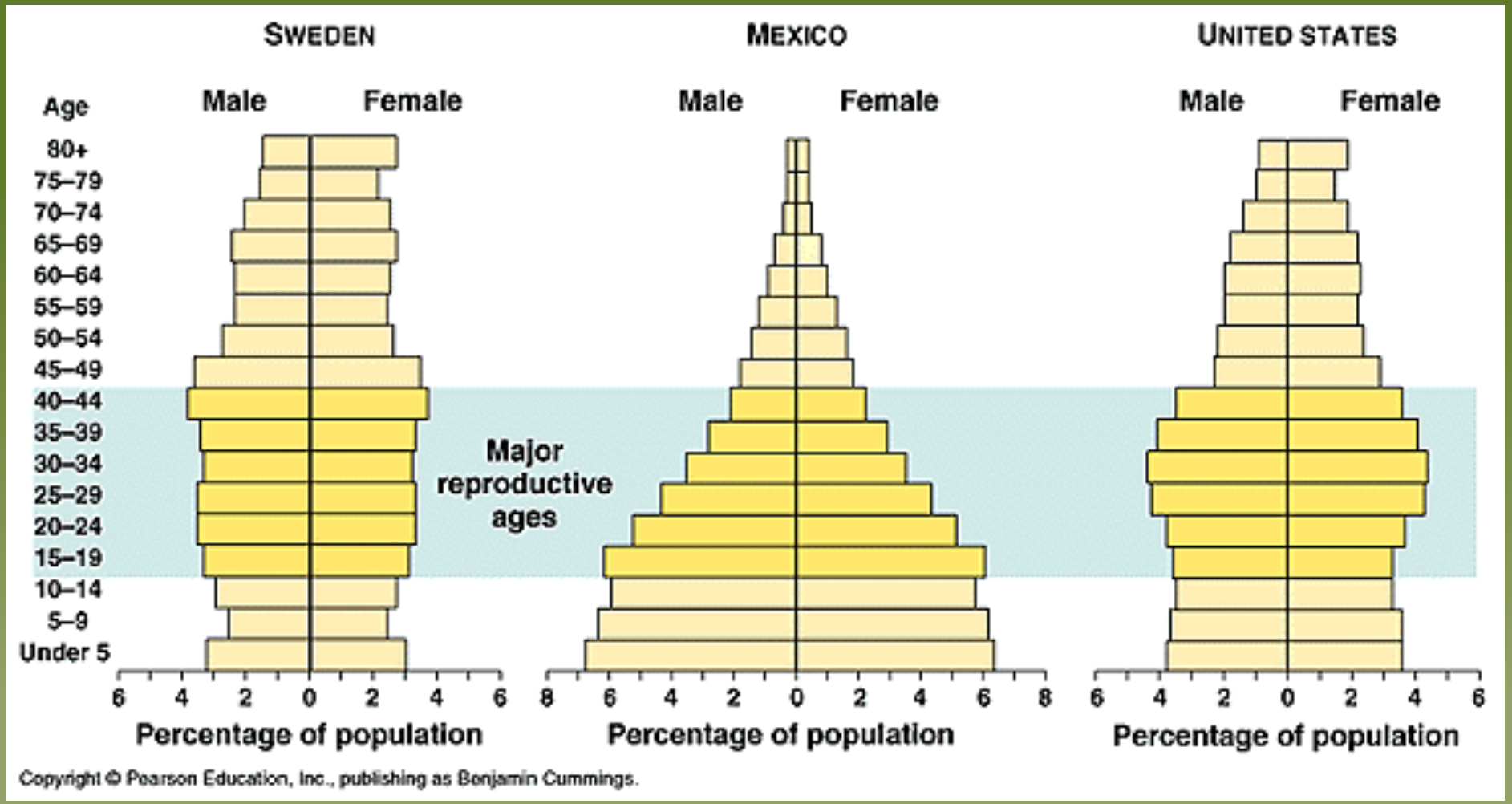
- Predictable variability & trends
- Unpredictable – but certain emergencies
- Uncertain long-term phenomena

Uncertainty
Change is Inevitable

We Need to Distinguish between

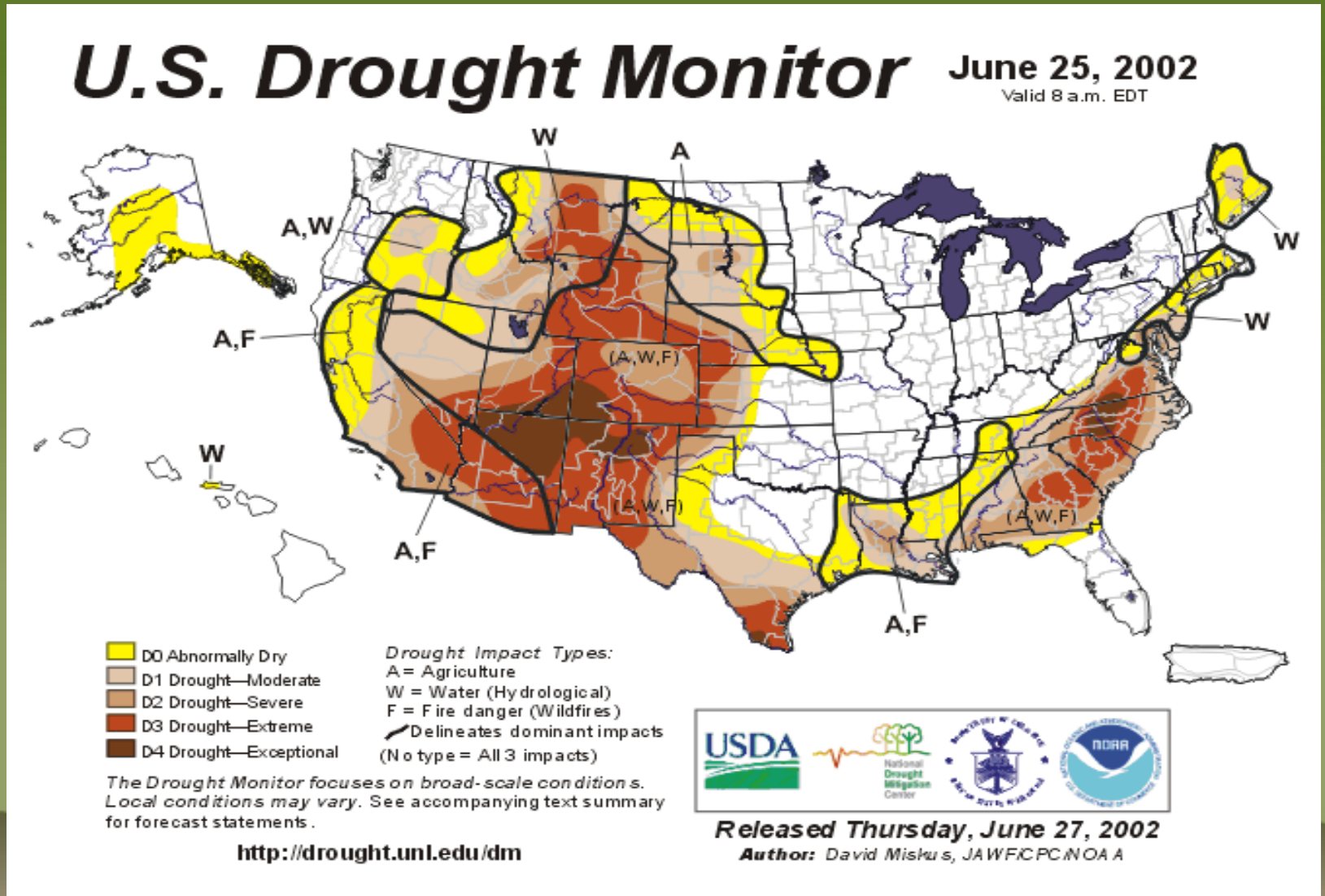
- Predictable variability & trends
  - Normal variability around an average
  - climate cycles, pop growth, etc.
- Unpredictable – but certain emergencies
  - Random events that can be anticipated and prepared for though timing is unknown
  - Floods – droughts
- Uncertain long-term phenomena
  - Truly uncertain, dynamics not understood
  - Global climate change ??
  - Black swan events

1. Predictable variability

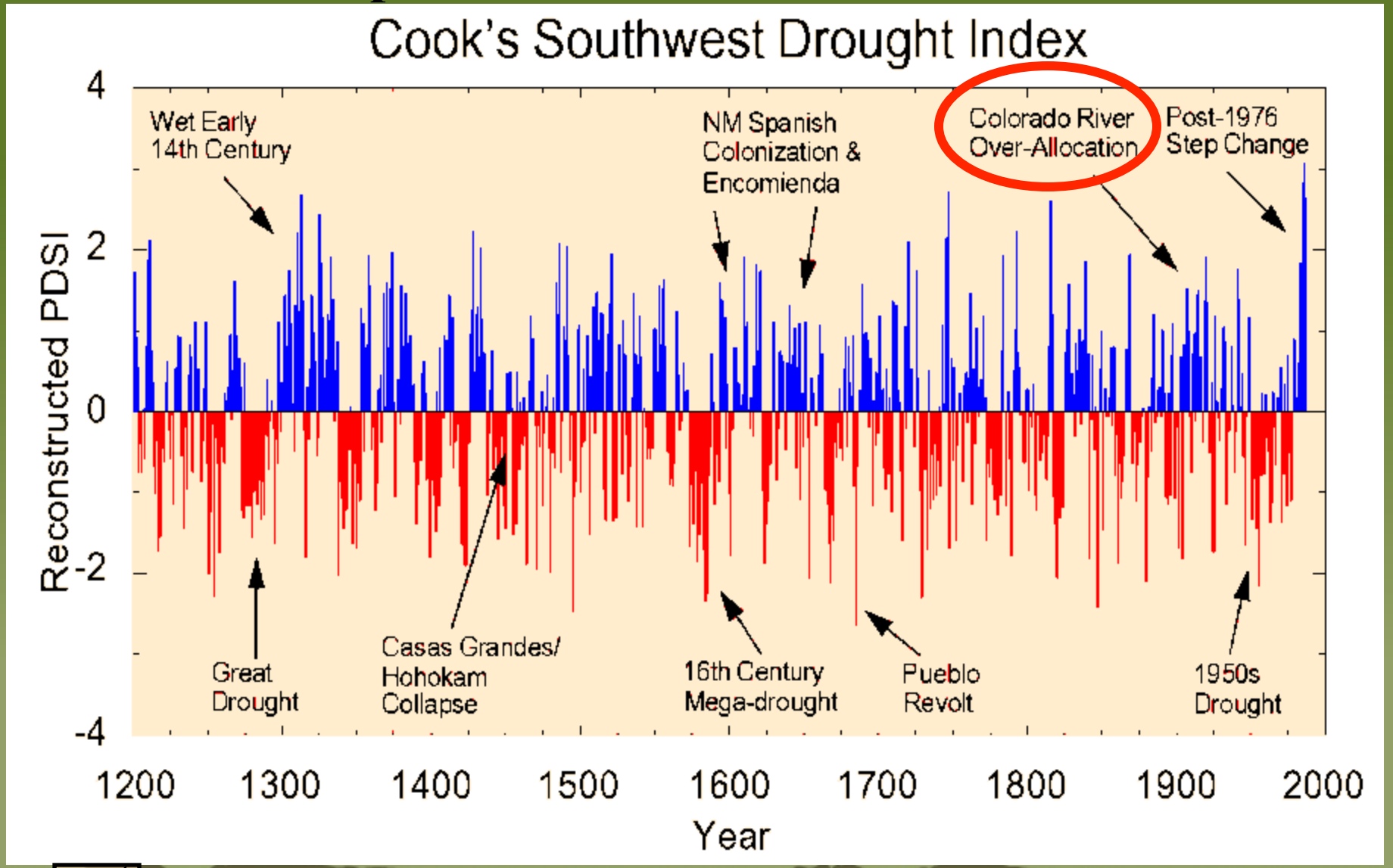


Change is inevitable

1. Predictable events: El Nino/La Nina



2. Rare events are not predictable, but ….
can be anticipated

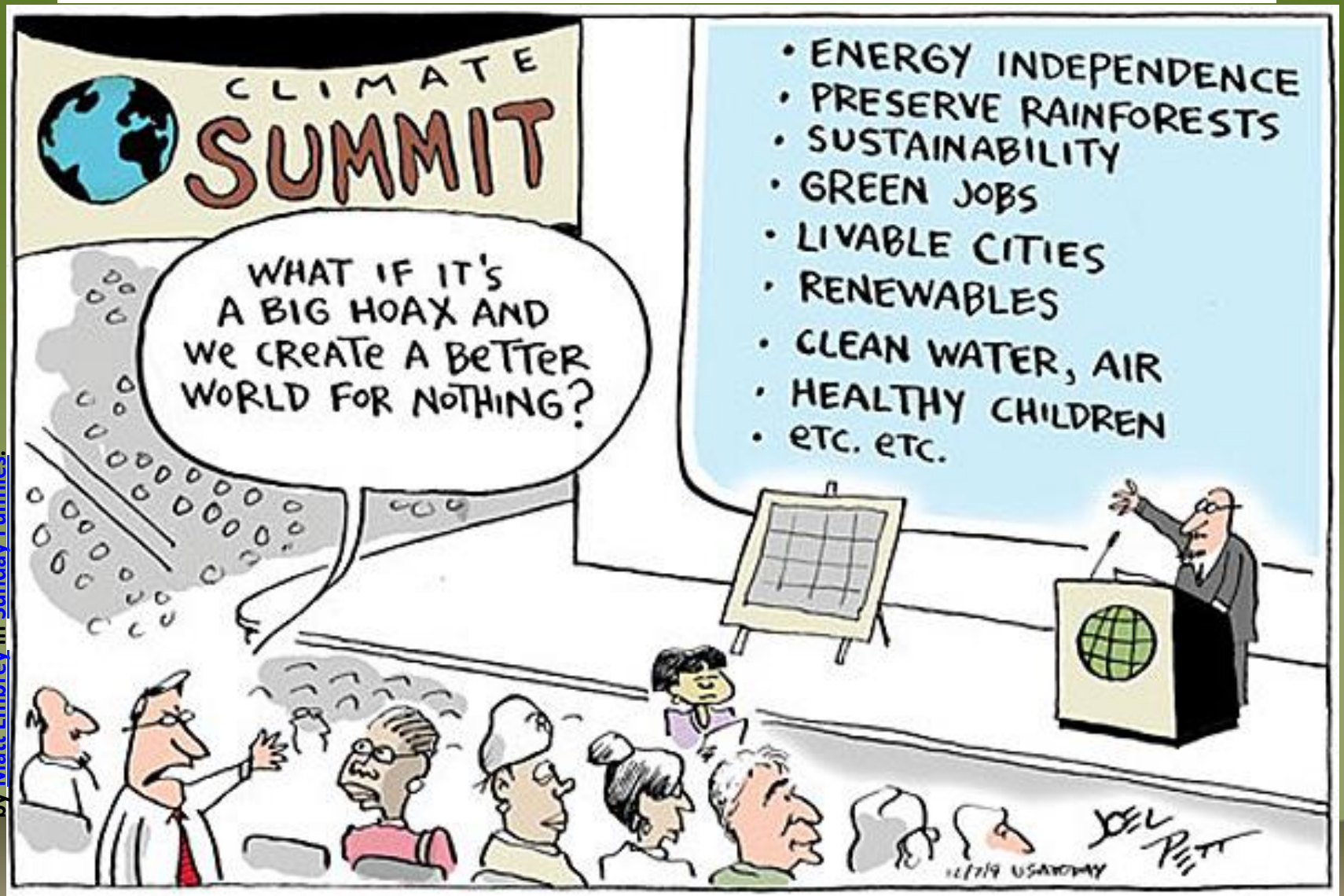


Significant cultural events

3. Truly Uncertain – perhaps long-term phenom

Change is inevitable

3. Uncertain, long-term change



December 13th, 2009
by Matt Embrey in Sunday Funnies.

Uncertainty – Key Factors/Drivers

- Biophysical factors
  Natural resources, hydrologic & climate processes
- Built environment & Land use factors
  Buildings, infrastructure, technology, urban pattern
- Governance & Institutional factors
- Human Behavior
  Consumption levels, travel patterns, etc.
- Economic Factors
  Population, household income, employment rates
- Feedback Mechanisms and Interrelationships

Discussion Topics

- Maybe something to get audience to think about examples (relevant to their issues/ interests/work) of the types of uncertainty discussed above ?
- Premise – uncertainty increasing --- agree / disagree -- discuss. What does this mean for you, your work, your community, your profession

What Are Our Drivers of Change

A few identified by our staff

	External	Internal
Primary	• Population growth • Economy • Climate change and variability • Technology	• Cultural perspectives on water use • Economy
Secondary	• Energy demand • Renewable energy	• Political situation • Regulatory environment

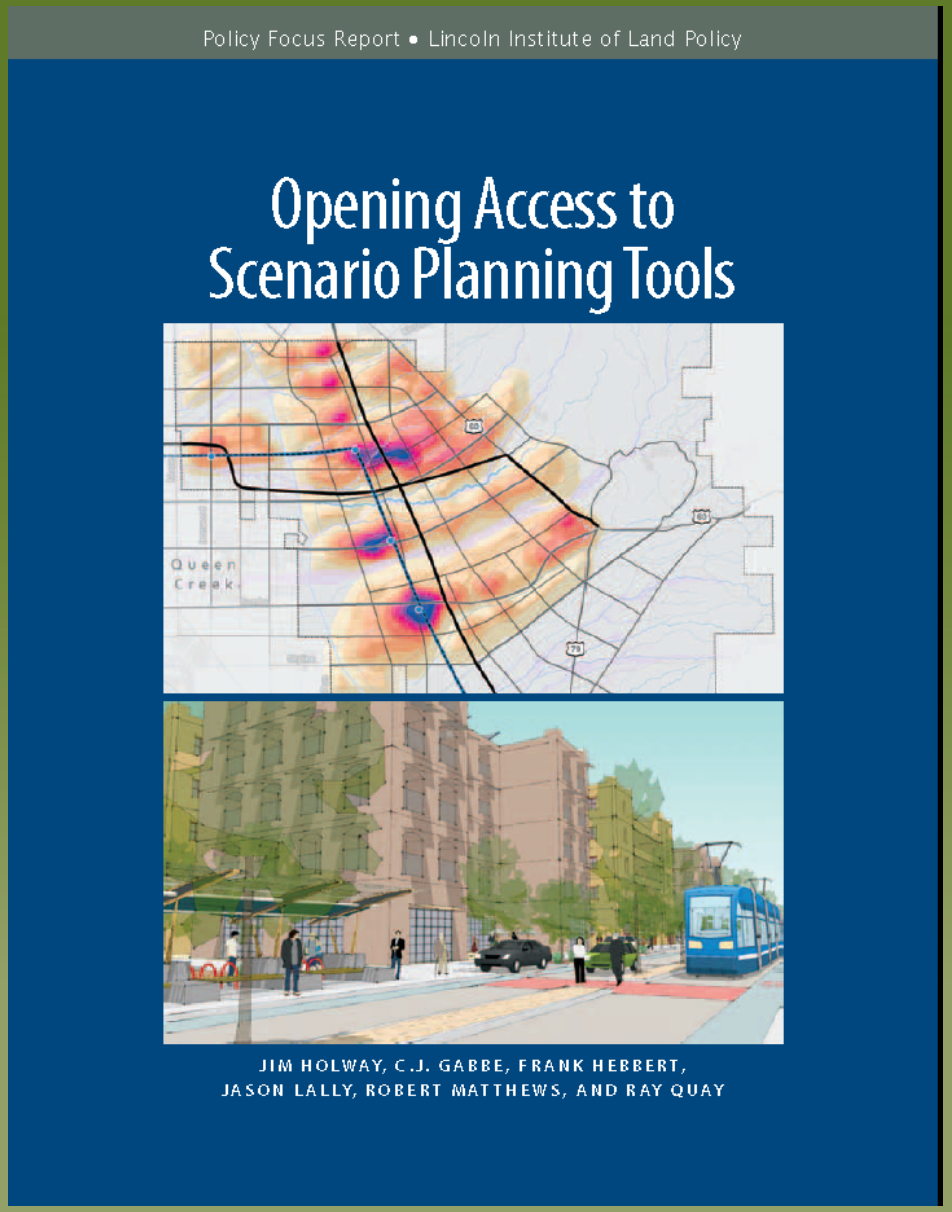
Discussion Topics

- What are the key drivers you have to worry about in your job
- What is determined by forces outside your community (exogeneous)
- What components can your community --- or even your work impact (endogenous)

??????????

Why Do Scenario Planning

- Increasing Complexity, Uncertainty, Interdependence
- Need to Anticipate & Shape our Future
- Look to Longer Time Horizons – 50 year plans
- Broader & More Effective Participation to overcome….
  - Divergent cultural & ideological values
  - Inability to make decisions – invest in our future
- "Normative" vs. "Exploratory" approaches
- Evolve towards "Anticipatory Governance"



- Scenario Planning's Potential
- Scenario Planning Practice
- Scenario Planning Tools
- Challenges to Using SP Tools
- Opportunities to Expand Use of SPT
- Recommendations for Action

Advancing Scenario Planning Tools

Challenges

- Skepticism & Lack of Awareness
- Complexity & High Cost
- Difficult to Obtain/Use Data
- Lack Interoperability across Tools
- Need Foresight & Anticipation

Opportunities

- Encouraging Acceptance of SP & Tools
- Reducing Complexity & Cost
- Opening Access to Data
- Enhancing Interoperability across Tools
- Advancing Foresight & Anticipation
- Creating an Open Environment for Collaboration

Advancing Scenario Planning Tools
Recommendations for Action

- Create an Online Platform to Foster Collaboration
- Develop A Curriculum on Scenario Planning
- Establish Model to Integrate SP into Planning
- Illustrate Uses of Scenario Planning Tools
- Establish Data Standards to Improve Info Sharing
- Initiate Model Collaborative Projects
- Advance Concepts of Anticipatory Governance

Scenario Planning Case Study

Sun Corridor & Superstition Vistas

Sun Corridor & Superstition Vistas

Why Superstition Vistas

- **Sustainability Vision** & Plan for Unique Land
- Catalyze Megaregion Dialogue
- Inform & Motivate State Trust Land Reform
- **Advance Sustainability Design and Science**
- **Develop & Apply Visioning Tools** Throughout Intermountain West


Tonto
National
Forest
Sierra Ancha
Theodore
Roosevelt
Lake
MESA
Apache Junction
HWY 60
CAP Canal
HWY 60
HWY 79

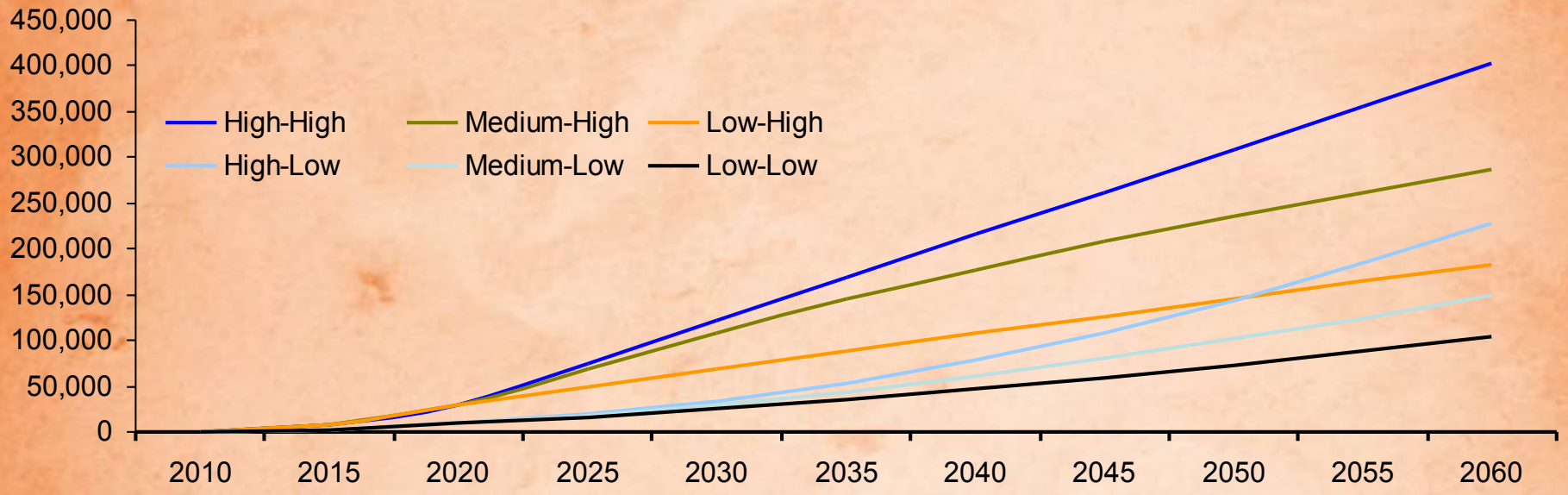
Source: EDAW

Superstition Vistas Scenario Report

A Sustainable Community For The 21st Century

SUPERSTITION VISTAS POPULATION PROJECTIONS RANGE FROM 261,000 TO OVER 1 MILLION

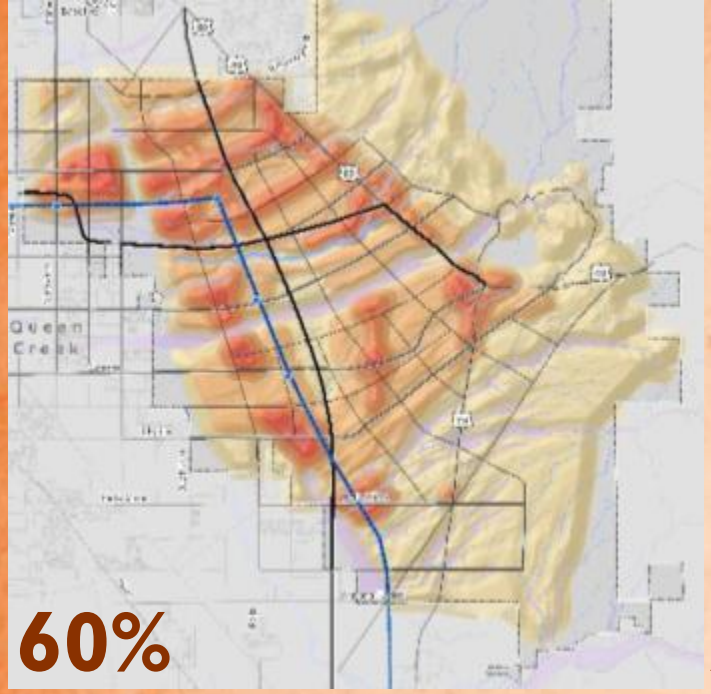
Superstition Vistas Cumulative Households by 2060



Superstition Vistas Average Annual Household Growth 2010-2060

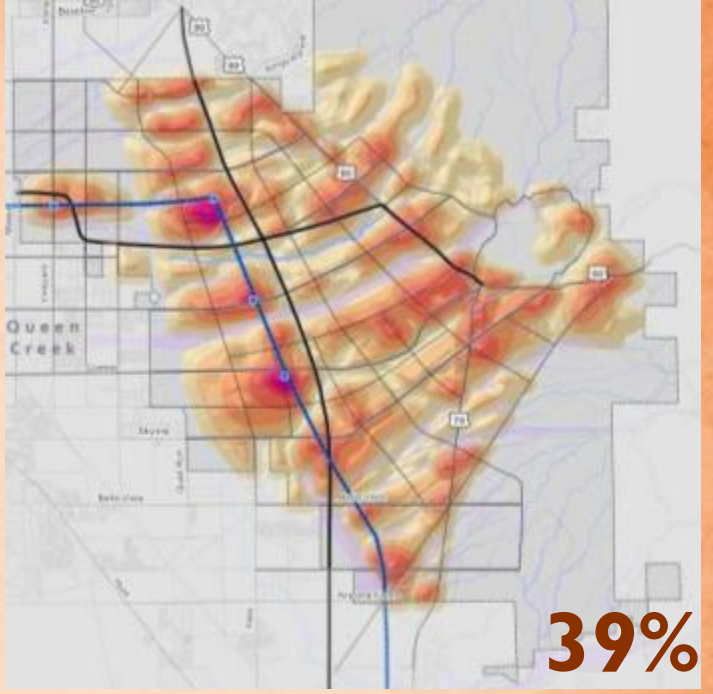
LOW-LOW	LOW-HIGH	MEDIUM-LOW	MEDIUM-HIGH	HIGH-LOW	HIGH-HIGH
2,000	3,700	2,800	5,700	4,000	8,000

Scenario Comparison (% developed)



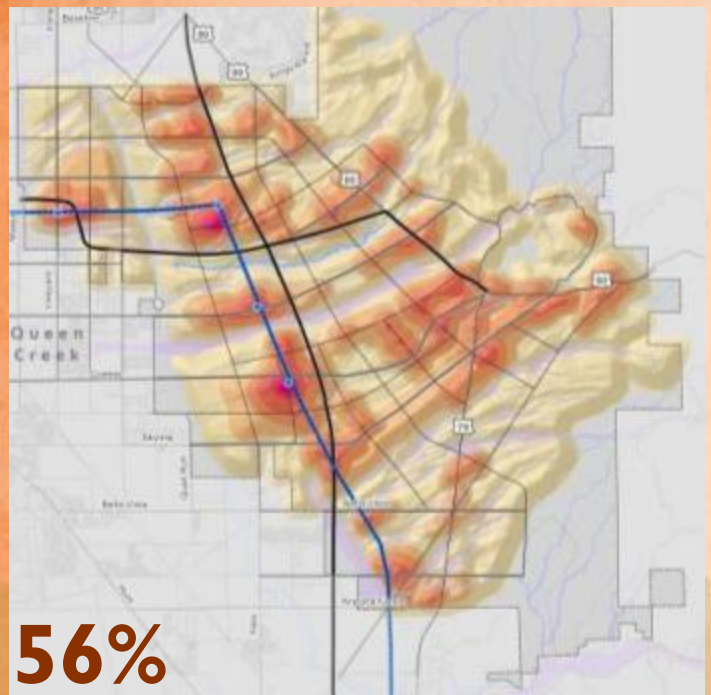
60%

A



C

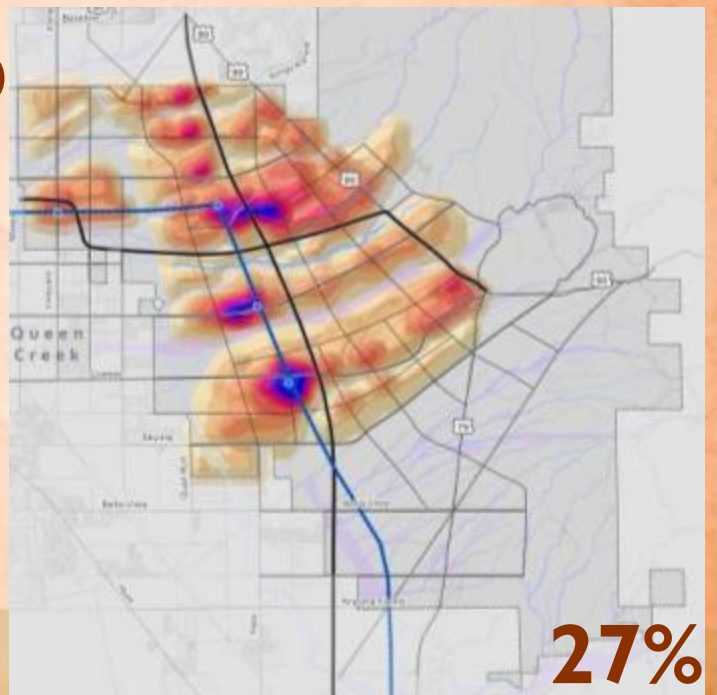
39%



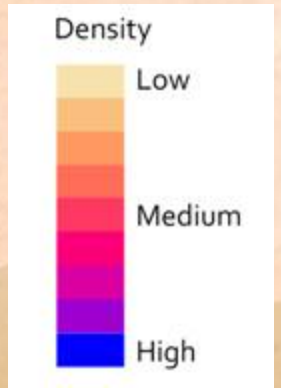
56%

B

D



27%



Scenario A

Shown with the transportation network and existing surrounding plans

CO2 PRODUCTION BY SOURCE
(MILLION TONS - "BASELINE")

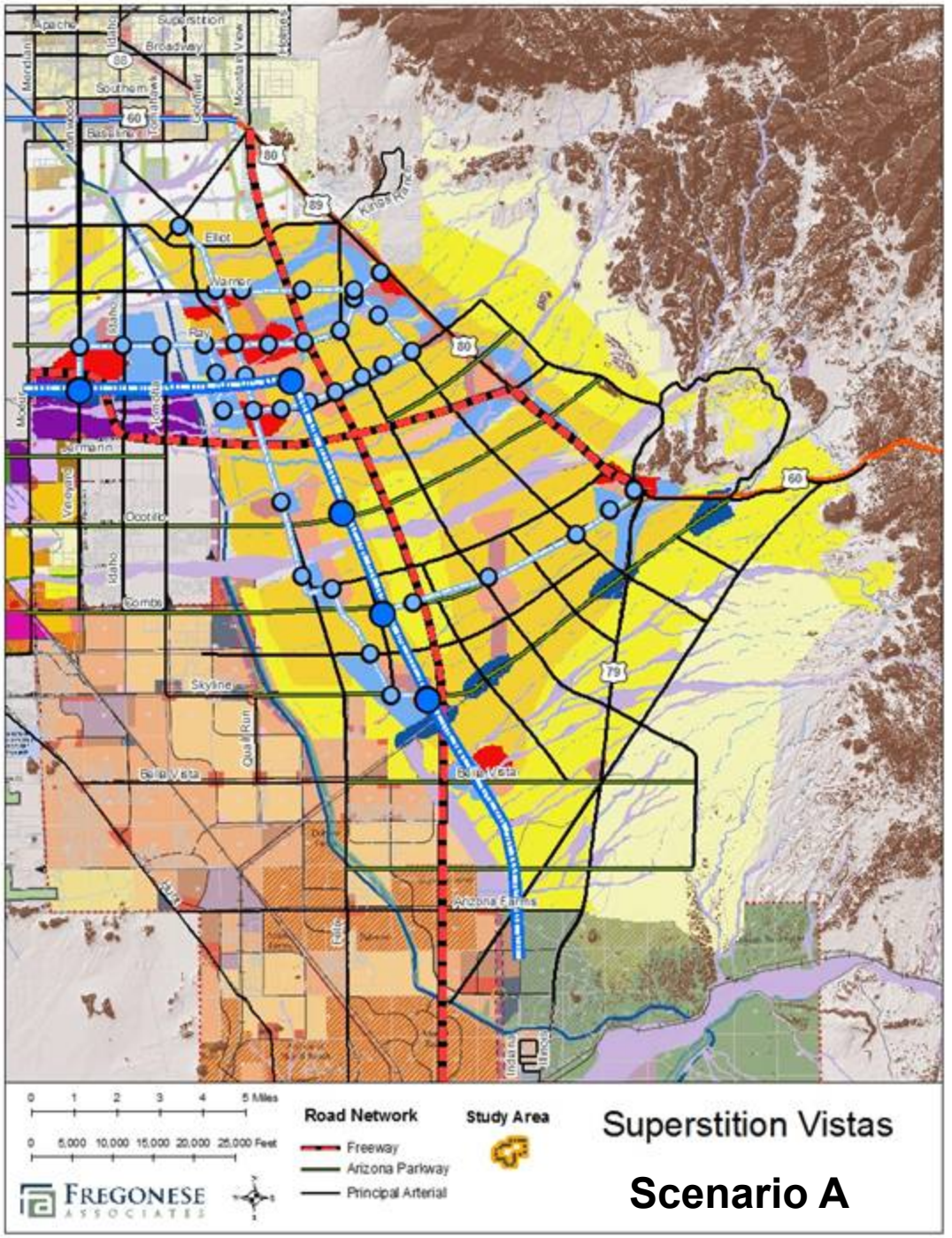
Transportation	2.6
Buildings	6.8
TOTAL	9.4

HOUSING MIX

- Multi-Family - 12%
- Townhouse - 12%
- Single Family - 76%

SCENARIO STATISTICS

People	1 million
Jobs	403,000
Land consumed by development	196 sq. mi.
Percentage of homes 1/2 mile from transit service	11%
Acres of open space per 1,000 people	61
Average time spent in the car per day	1 hour
Transit trips per day	58,500



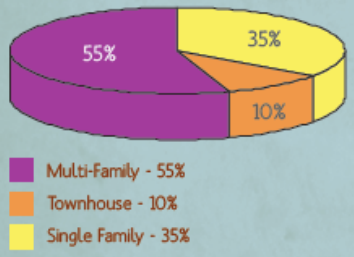
Scenario D

Shown with the transportation network and existing surrounding plans

CARBON PRODUCTION BY SOURCE
(MILLION TONS - "BASELINE")

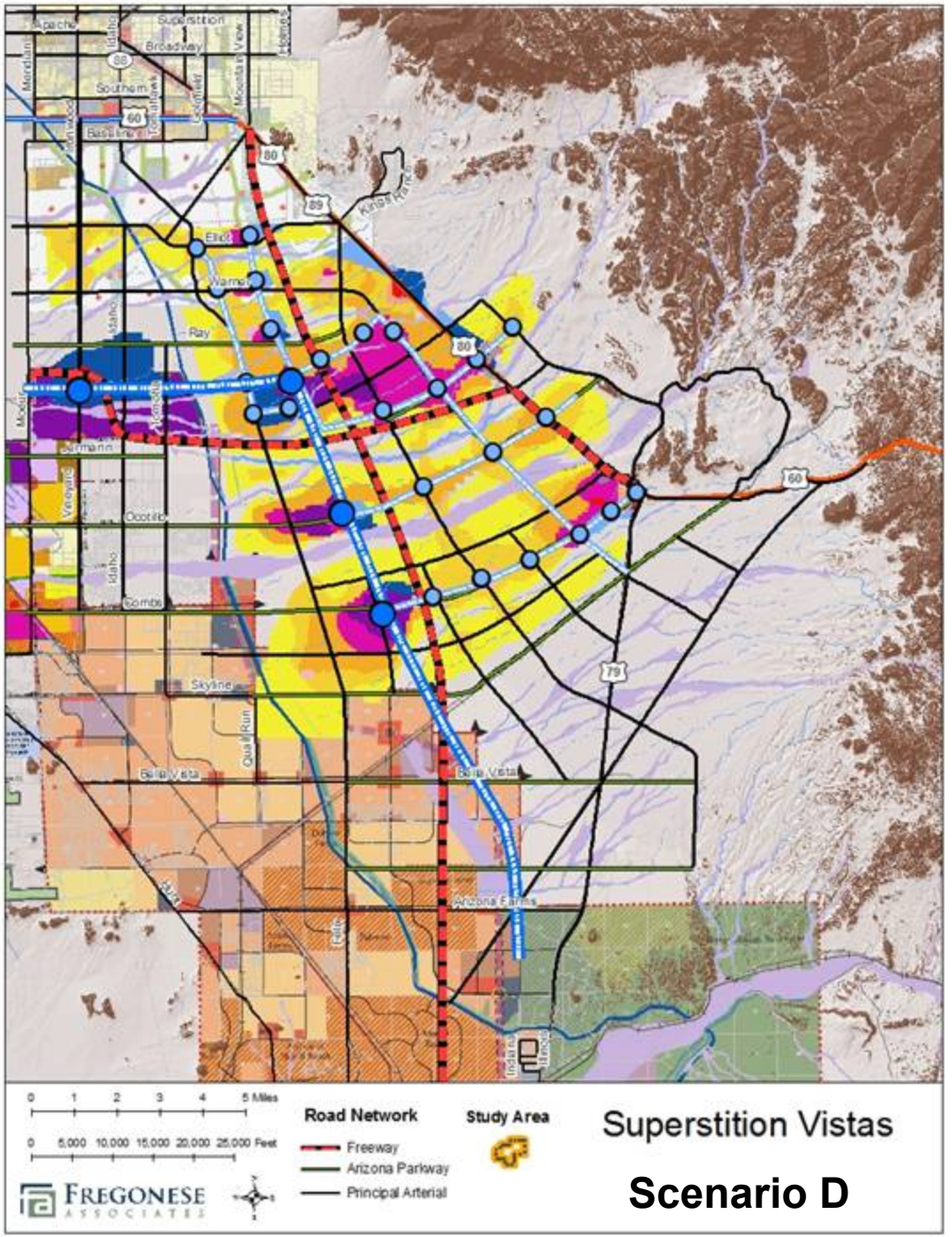
Transportation	1.4
Buildings	3.9
TOTAL	5.3

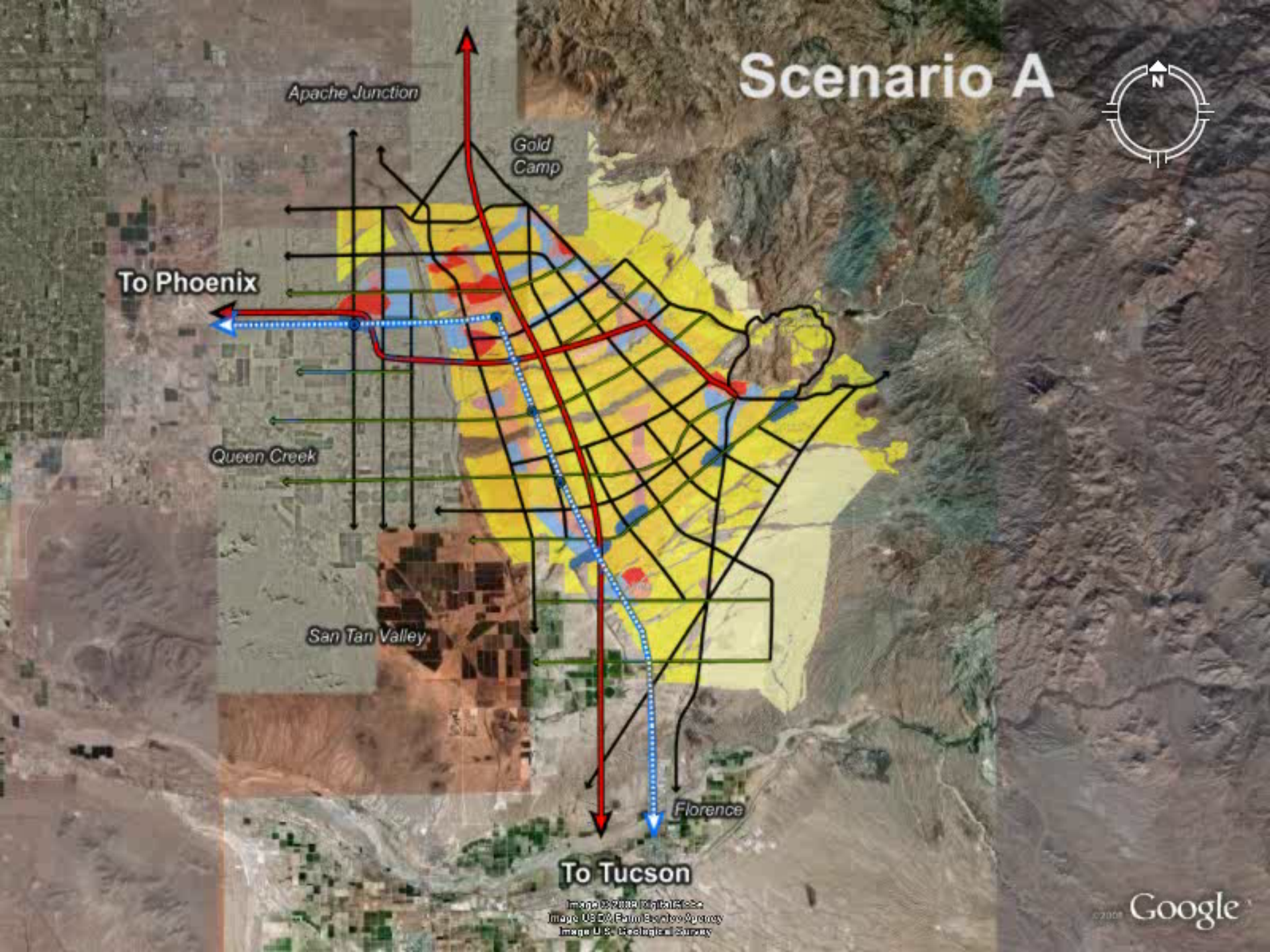
HOUSING MIX

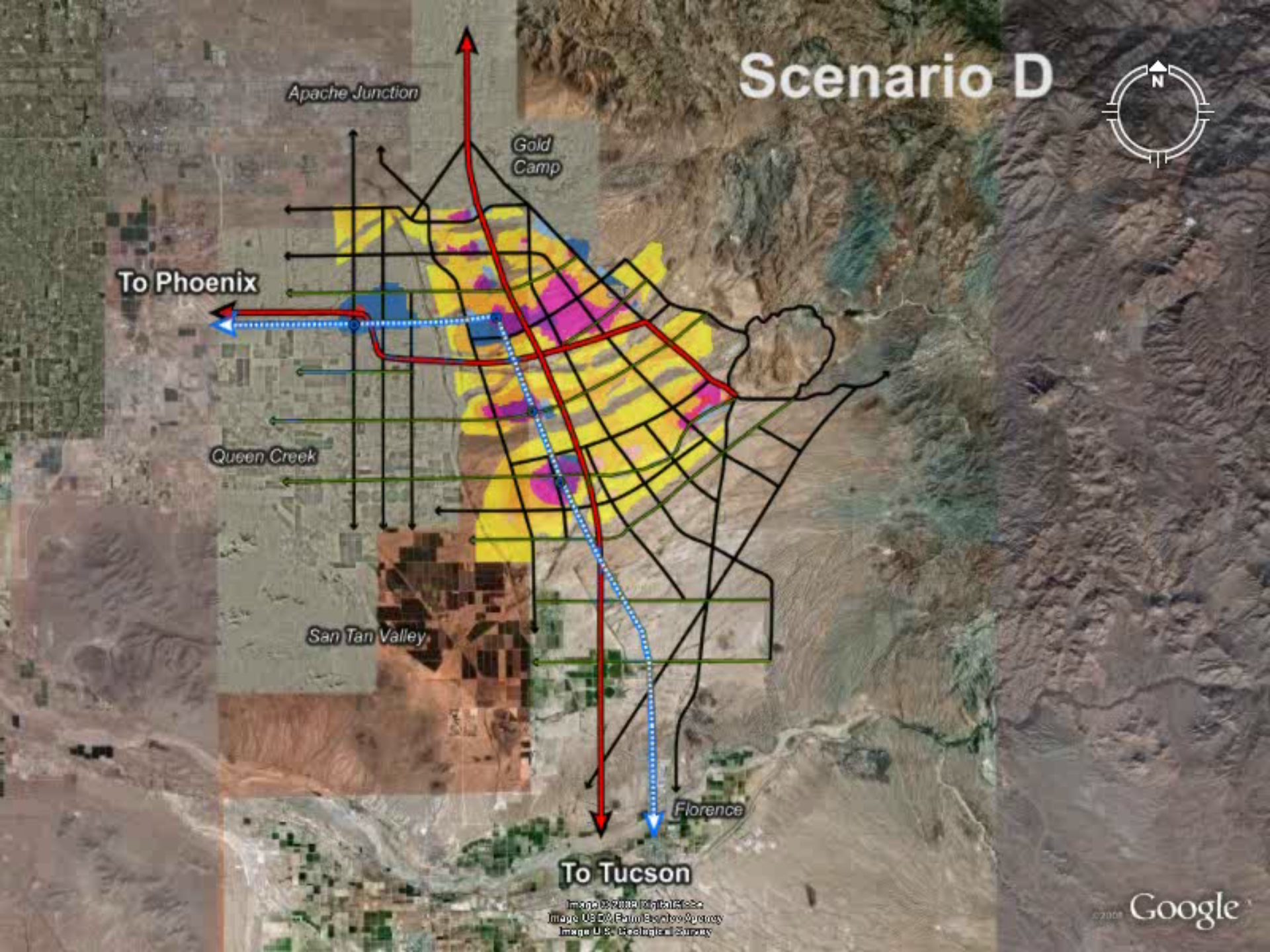


SCENARIO STATISTICS

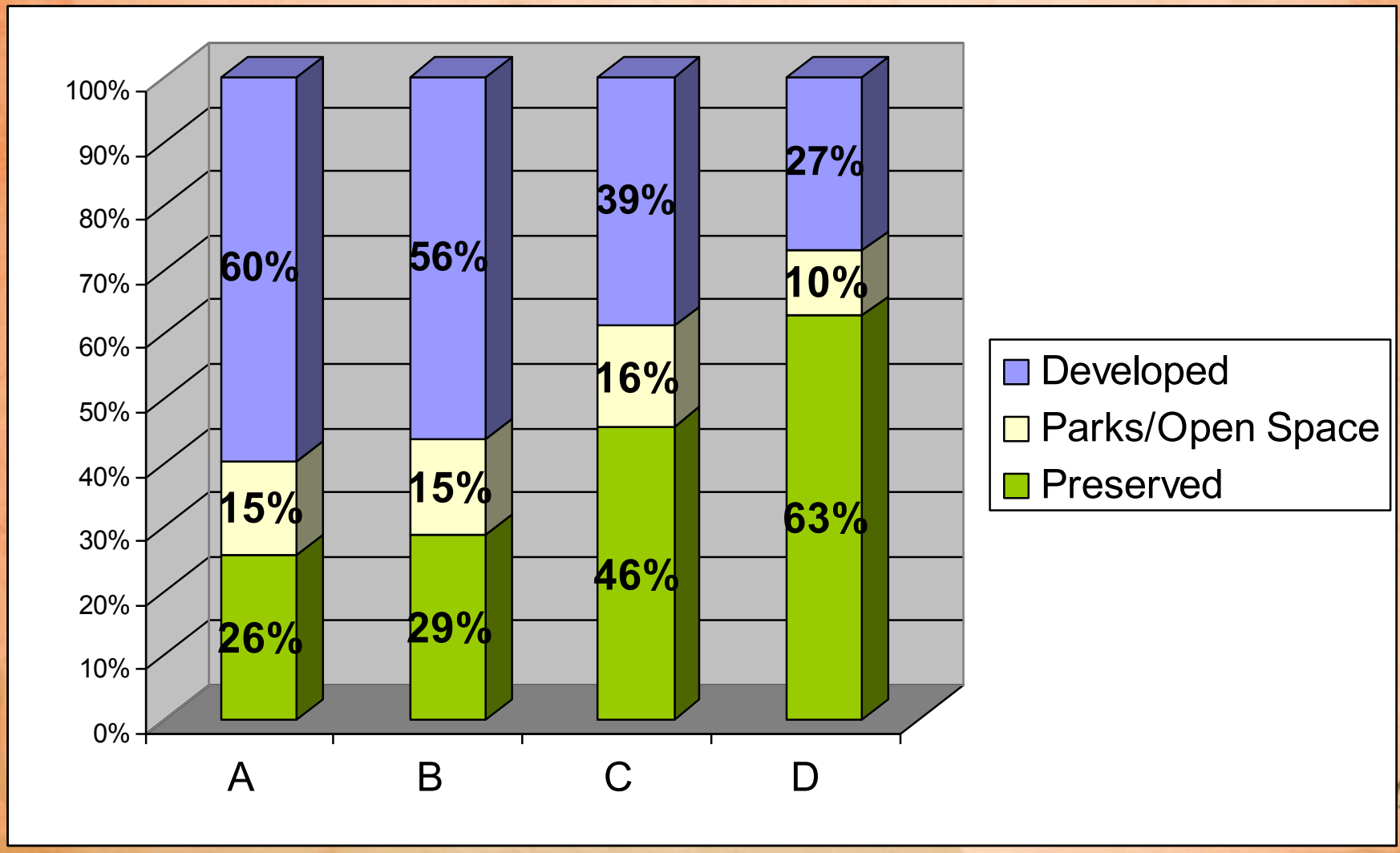
People	1 million
Jobs	531,000
Land consumed by development	98 sq. mi.
Percentage of homes 1/2 mile from transit service	34%
Acres of open space per 1,000 people	108
Average time spent in the car per day	18 mins.
Transit trips per day	395,200




Scenario A
N
Apache Junction
Gold Camp
To Phoenix
Queen Creek
San Tan Valley
Florence
To Tucson
Google


Scenario D
N
Apache Junction
Gold Camp
To Phoenix
Queen Creek
San Tan Valley
Florence
To Tucson
Google

Development Footprint



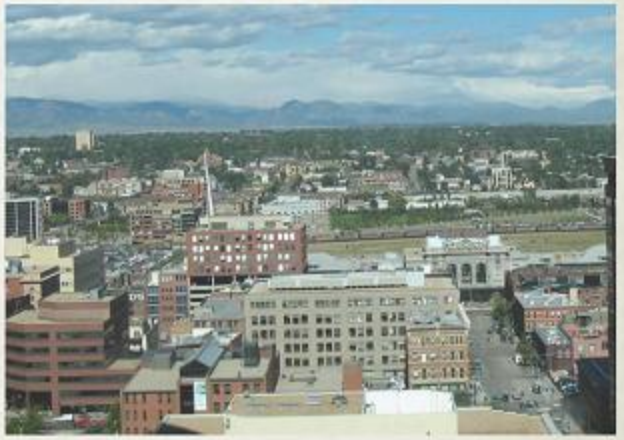
Comparable Cities

POPULATION DENSITY

The following chart shows each scenario's density compared to other U.S. cities.

	people/sq. mi.
NEW YORK, NY	26,916
SAN FRANCISCO, CA	16,709
CHICAGO, IL	12,751
SCENARIO D	**10,553**
MIAMI, FL	10,497
SANTA MONICA, CA	10,179
REDONDO BEACH, CA	10,065
SCENARIO C	**7,557**
SAN JOSE, CA	7,053
PASADENA, CA	5,926
SCENARIO B	**5,754**
DENVER, CO	5,718
VENTURA, CA	5,573
SCENARIO A	**5,564**
PROVO, UT	5,517
TEMPE, AZ	4,737
PORTLAND, OR	4,665
PHOENIX, AZ	4,377
HOUSTON, TX	3,912
TUCSON, AZ	2,473

Scenario A resembles the overall urban density of Provo, Utah, pictured above.

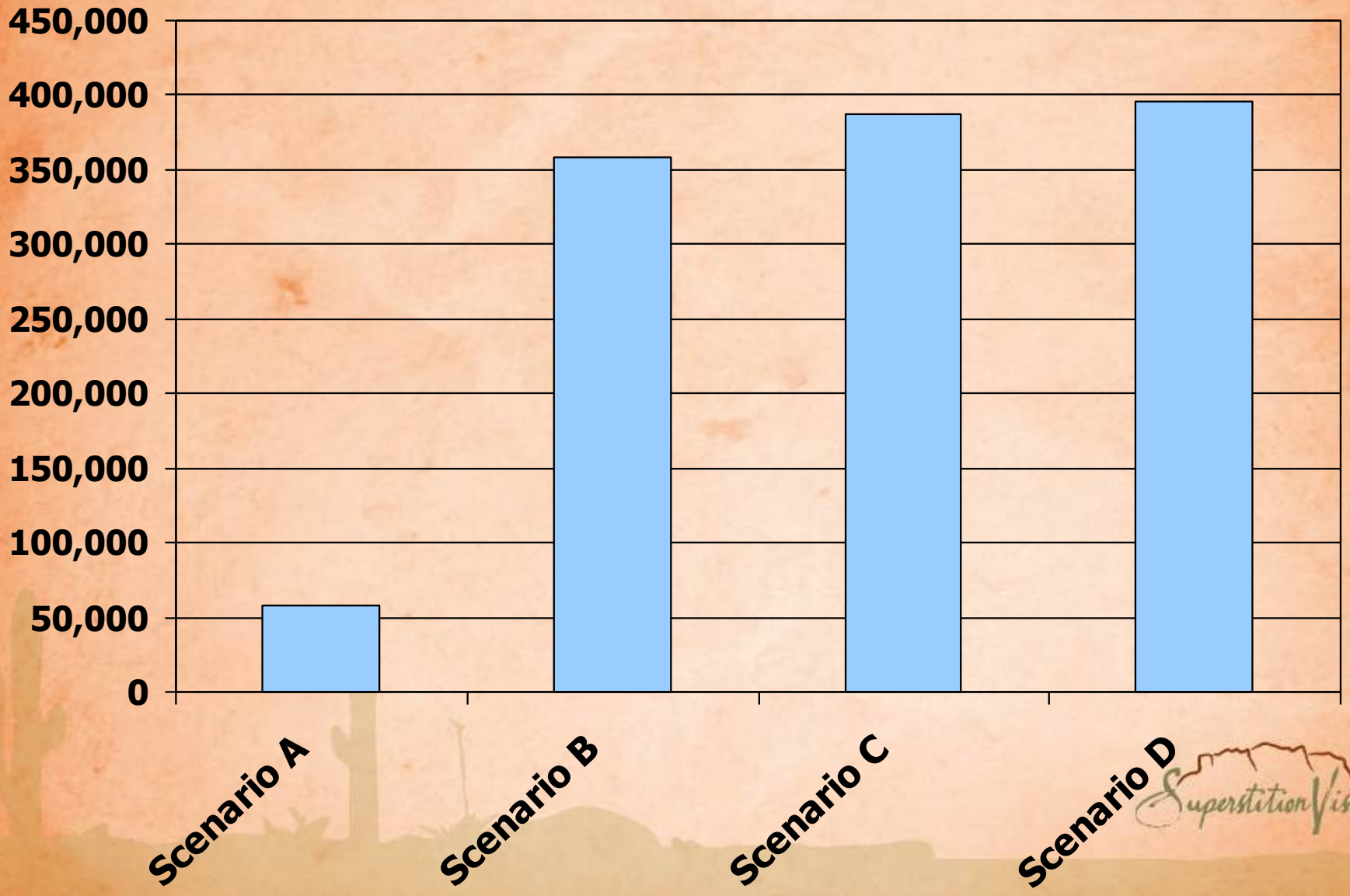


Scenario B resembles the overall urban density of Denver, Colorado, pictured above.

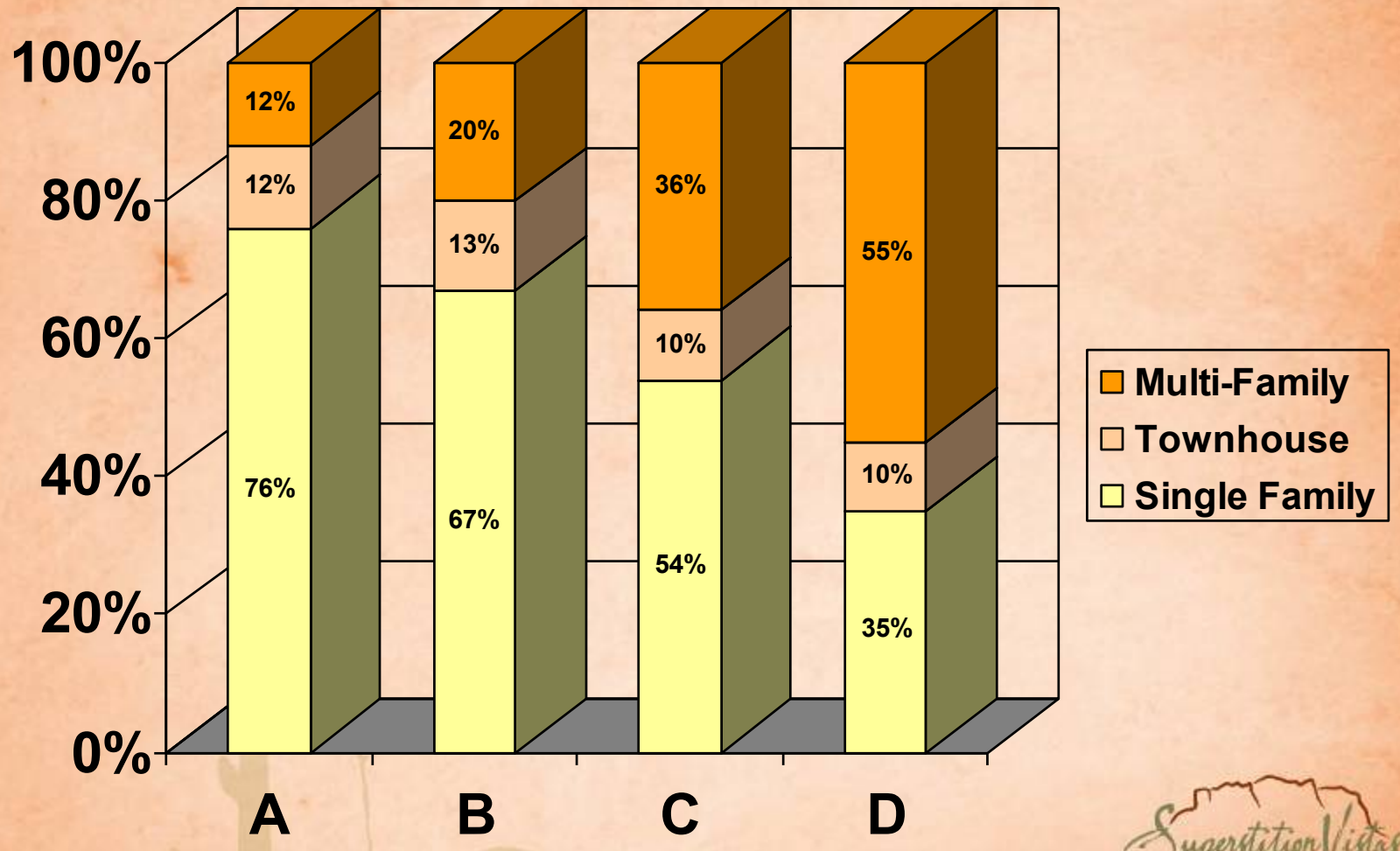
Scenario C resembles the overall urban density of San Jose, California, pictured above.

Scenario D resembles the overall urban density of Miami, Florida, pictured above.

Daily Transit Ridership



Housing Mix Comparison



Superstition Vistas

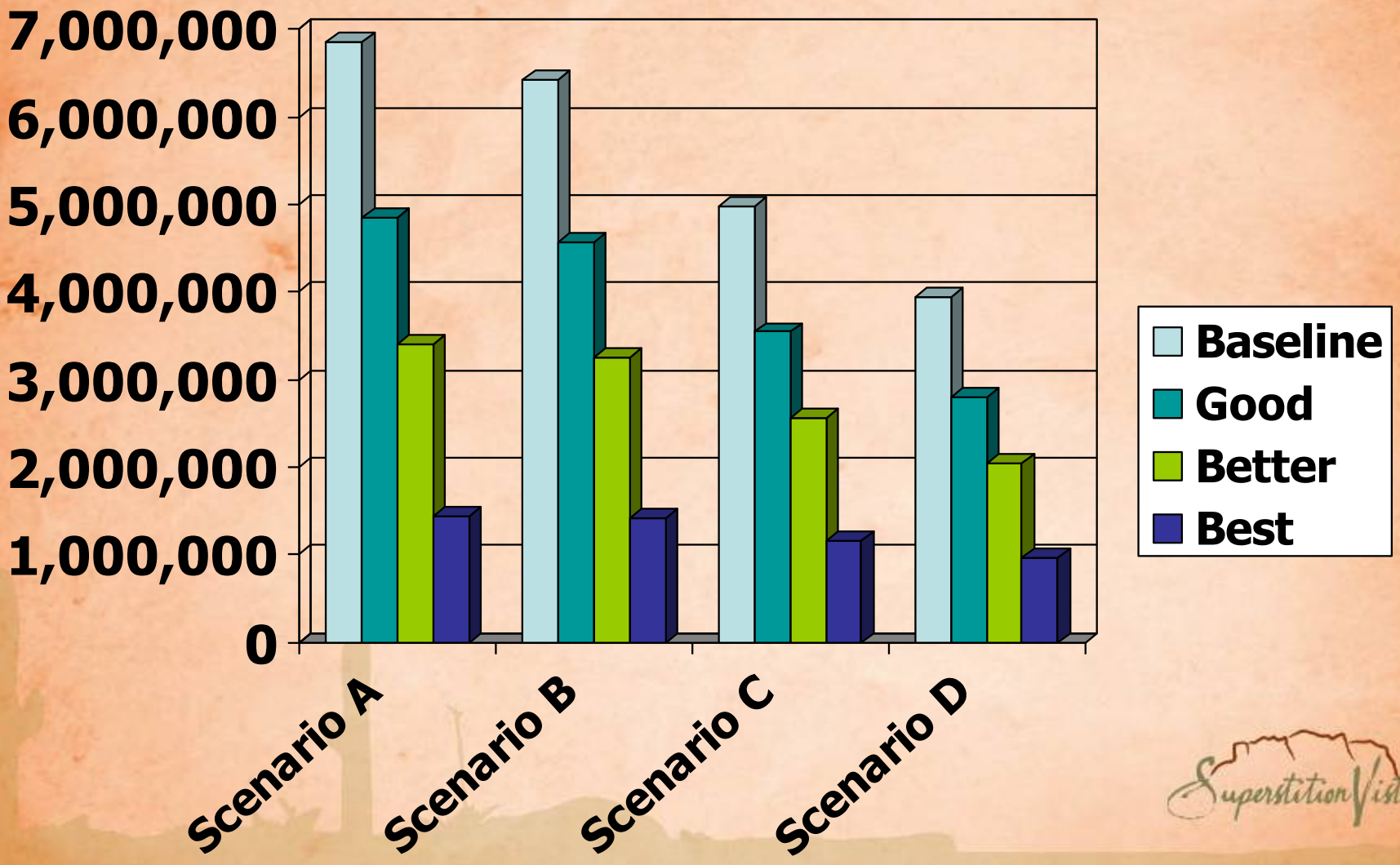
12 Prototype Buildings

Building Energy & Water Use

- 12 Prototype buildings
- Inputs: heating/cooling/insulation programs, photovoltaic electricity generation, plumbing fixtures, landscaping
- 4 versions of efficiency developed for each of 12 buildings

Superstition Vistas

Building Emissions (CO2)

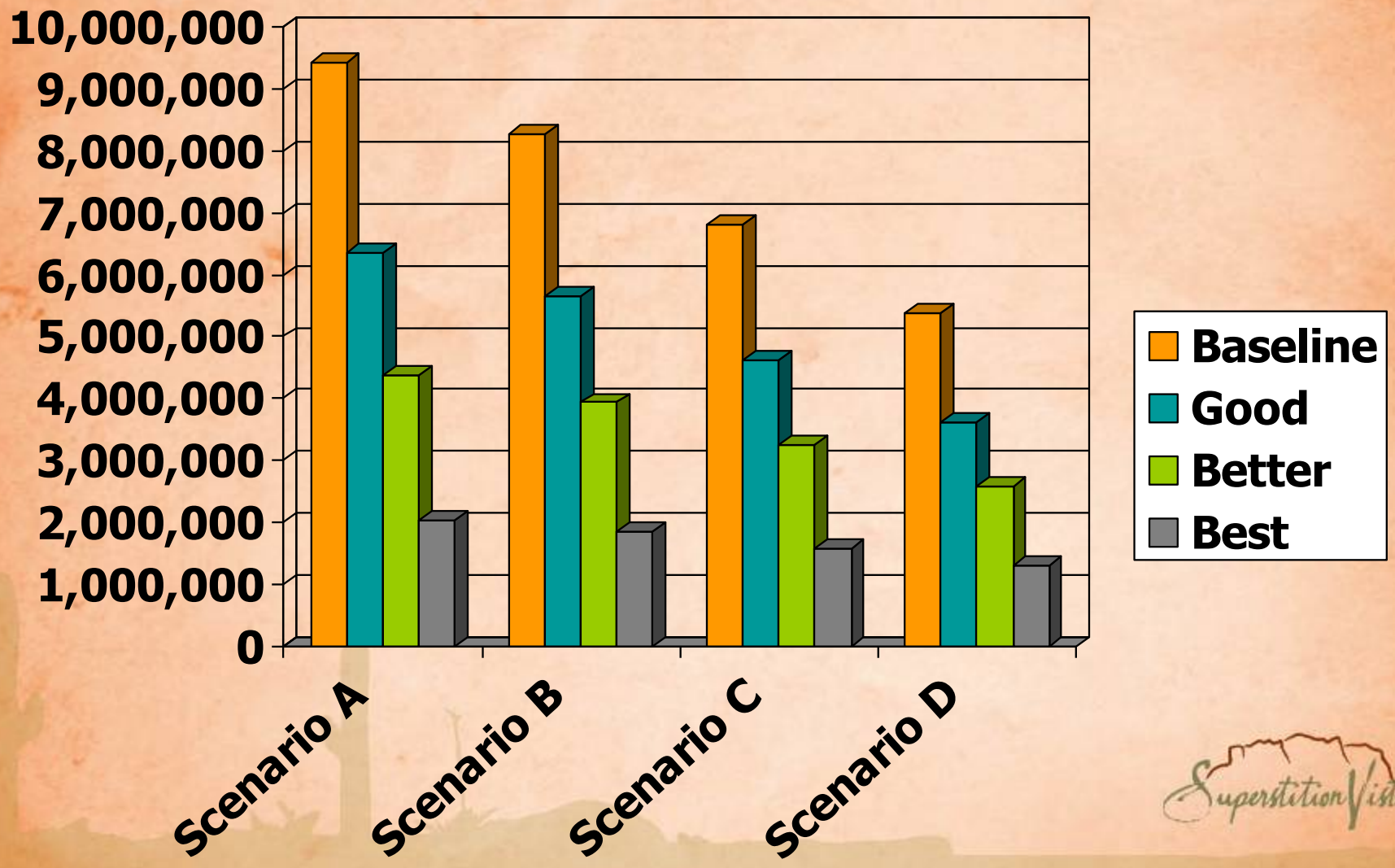


Incremental Cost per Pound of CO2 Usage

Residential building types have least cost for most CO2 reduction

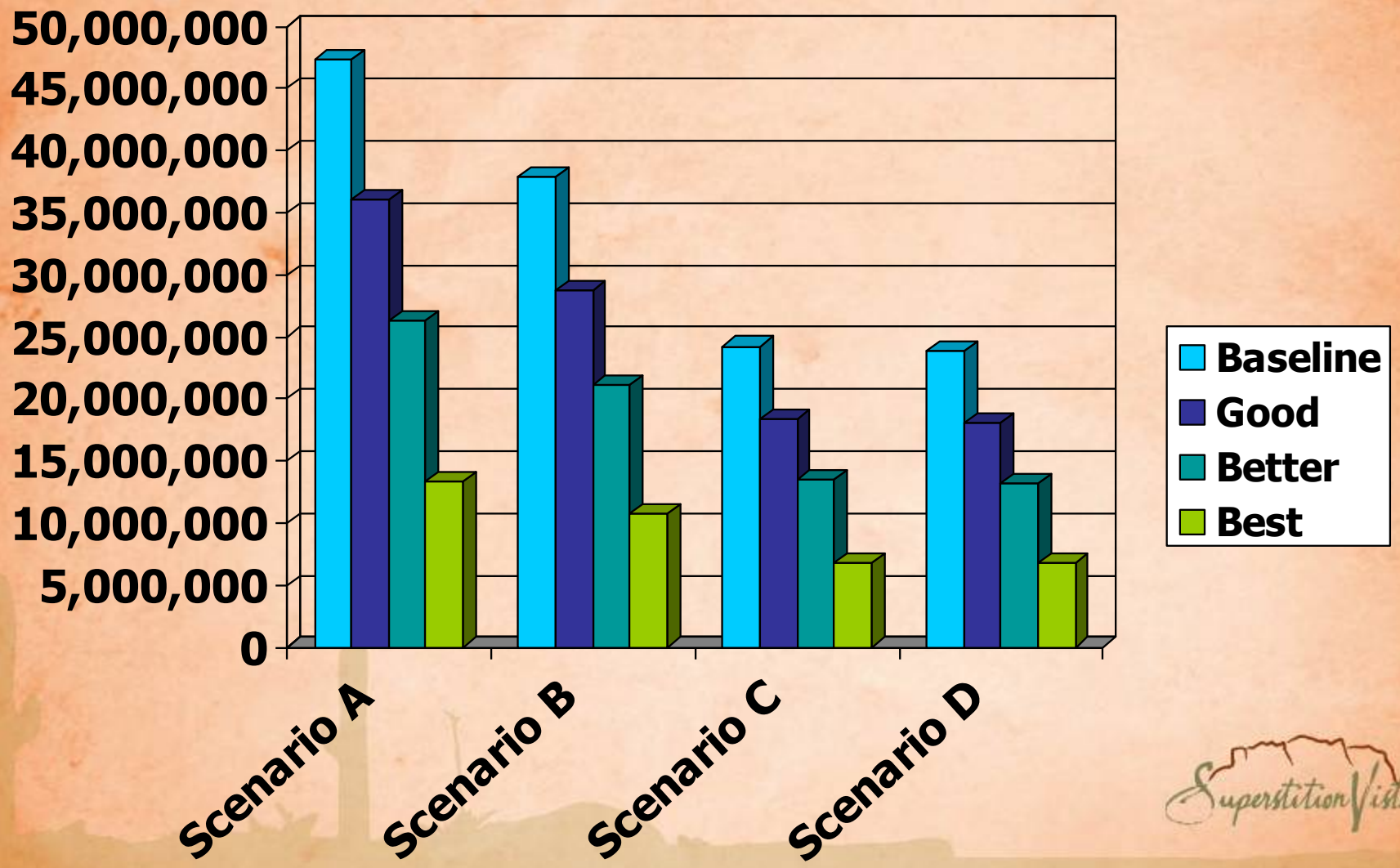
Total Carbon Footprint

(Building and Transportation Emissions) CO2 tons/yr



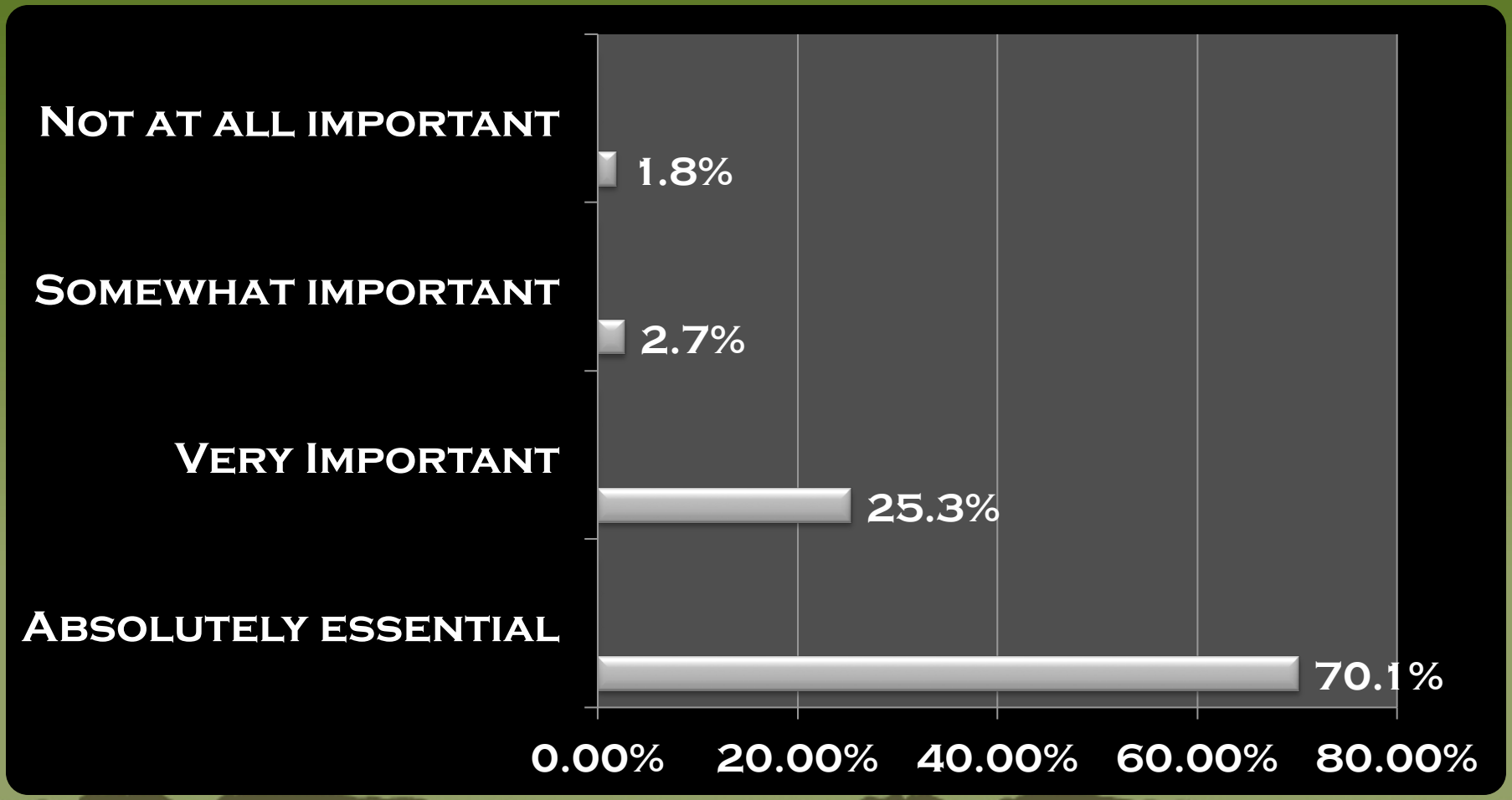
Landscaping Water Demand

With Rainwater Capture (gallons/day)

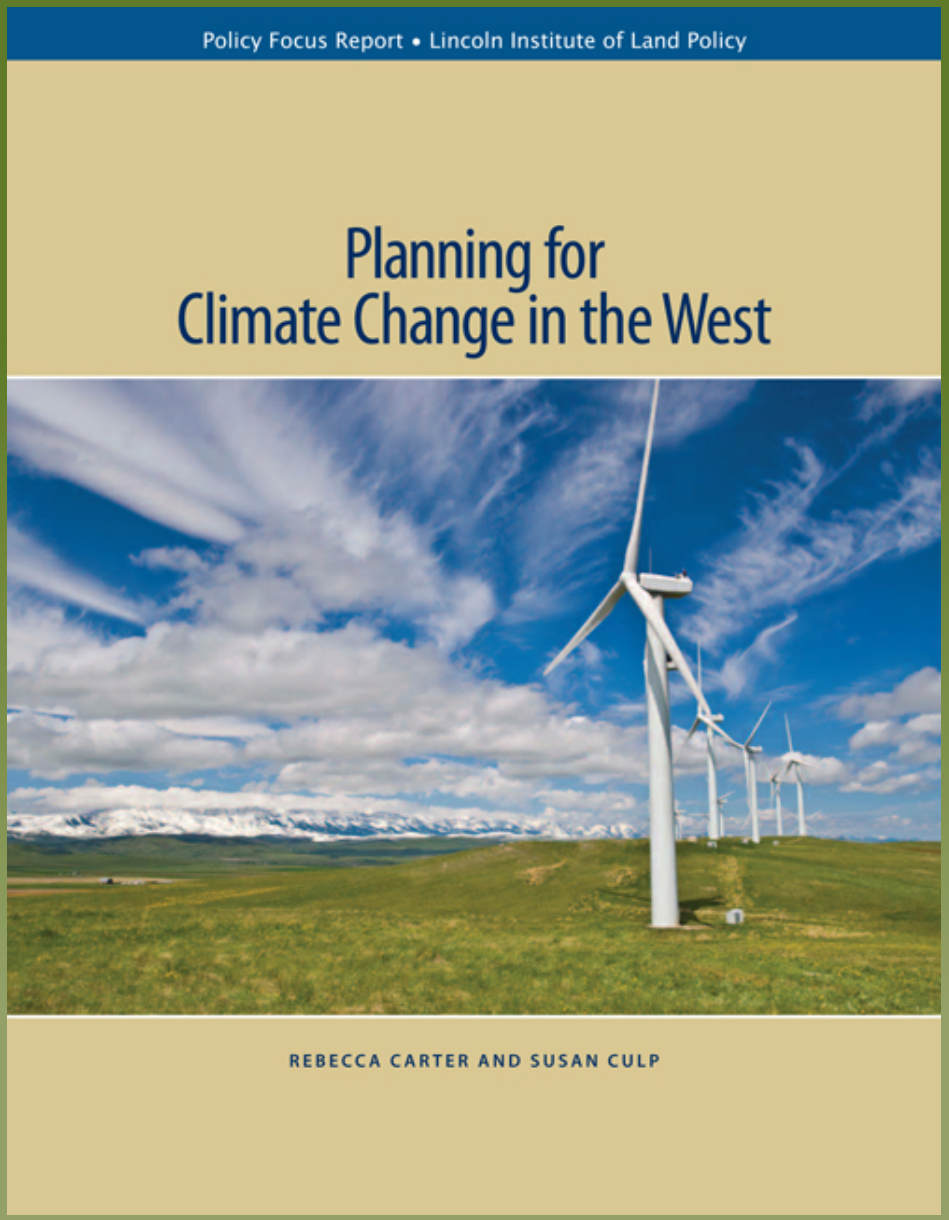


Superstition Vistas

We've invested a lot in thinking about the future of Arizona. How important do you think this kind of planning and visioning is for the future of the state?



- Case studies and Resources
  - Focus on western communities
  - Climate Resiliency section
- Planning in the West Webinars
  - Urban Heat Island
  - Drought
  - Wildfire
  - Food Planning Policy



Lessons Learned
Planning for Climate Change

- Economic, Quality of Life, even Sustainability Co-Benefits
  - Use Economic Benefits & Rational for Policy Efforts
  - Renewable Energy / Energy Efficiency Options – Jobs, Cost Savings ..
  - Mitigate Potential Economic Impact of Climate Disruptions
  - Build these factors into scenario planning efforts …. Pursuing policies that can be demonstrated beneficial even without climate change
- Need Locally Specific Information on Impacts
  - If Science not there …. Scenarios with range of impacts
- Community Engagement& Support Critical
- Need Politically Acceptable Way to Raise Issues
- Illustrating Impact of Small-Scale Local Efforts
  - Mitigation - On greenhouse gas emissions
  - Adaptation – On areas of impact – water, fire, heat island, public health

Major Sustainability Challenges -- University & Professional -- Contributions

Capacity Building

Acting on Knowledge

Developing New Knowledge

Major Sustainability Challenges -- Univ / Prof Contributions --

Capacity Building

- **Utilizing sustainability and growth management techniques that are commonly practiced….but the communities where the growth is occurring**
  - are overwhelmed
  - lack the competence and resources to manage the challenge
- **Building the capacity of these communities is where we can have the most direct and immediate impact on sustainability.**

Major Sustainability Challenges -- Univ / Prof Contributions --

Acting on Knowledge

- **Doing better by applying what we already know .. but lack**
  - the will
  - the political consensus
  - the ability to coordinate across boundaries

  …… necessary to move forward.
- **We can make significant sustainability gains by**
  - bringing current knowledge into practice
  - facilitating the development of critical new policies
  - serving as a neutral convener of decision makers

Major Sustainability Challenges -- University Contributions --

Developing New Knowledge

- Traditional strength of Universities
- Identifying the key questions to drive both applied and basic sustainability research.

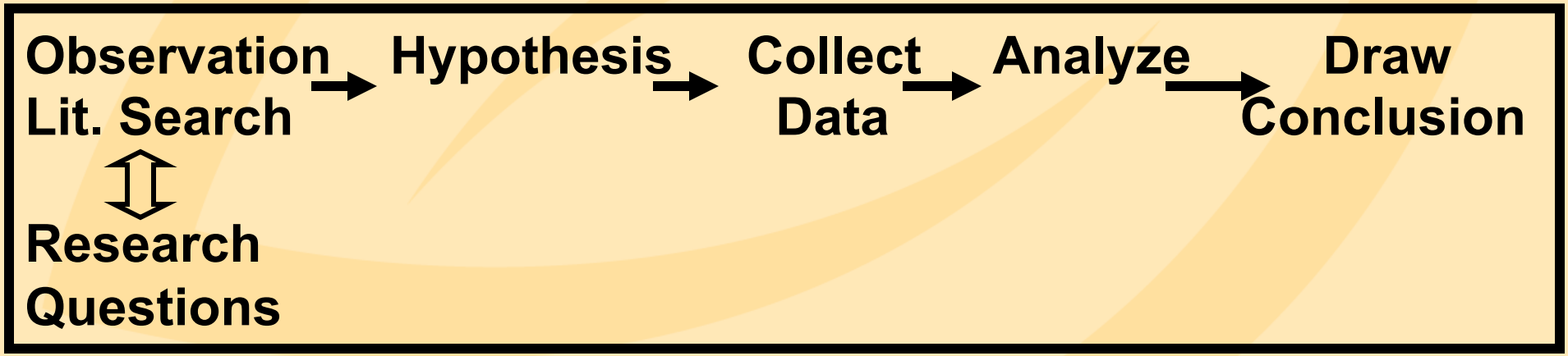
Major Sustainability Challenges -- University Contributions --

What Will It Take

- Reward structure / incentives for faculty to engage in applied efforts
- Investment in connectors – partnership builders
- Continuing to build on New American University concepts such as leveraging place, transforming society, use inspired research, social embeddedness

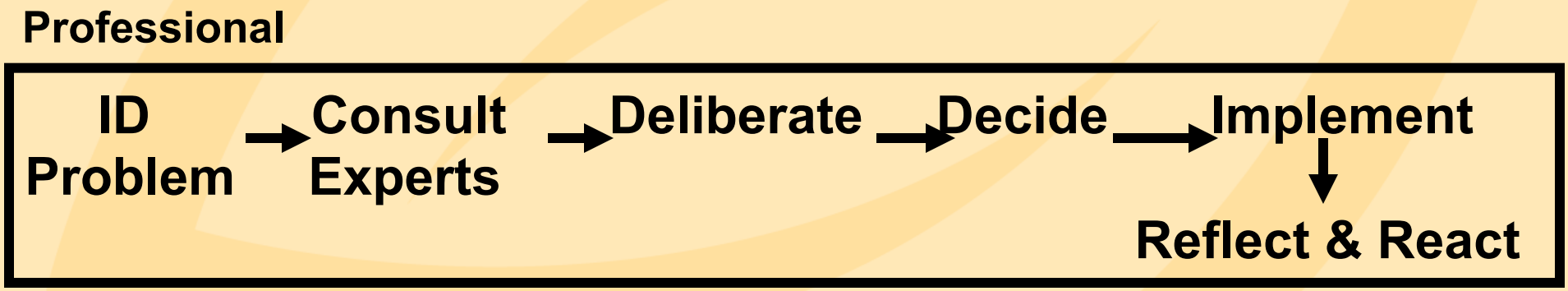
Sustainability Knowledge and Action

Researchers Approach



Sustainability Knowledge and Action

Reflective Practitioners Approach



Sustainability Knowledge and Action

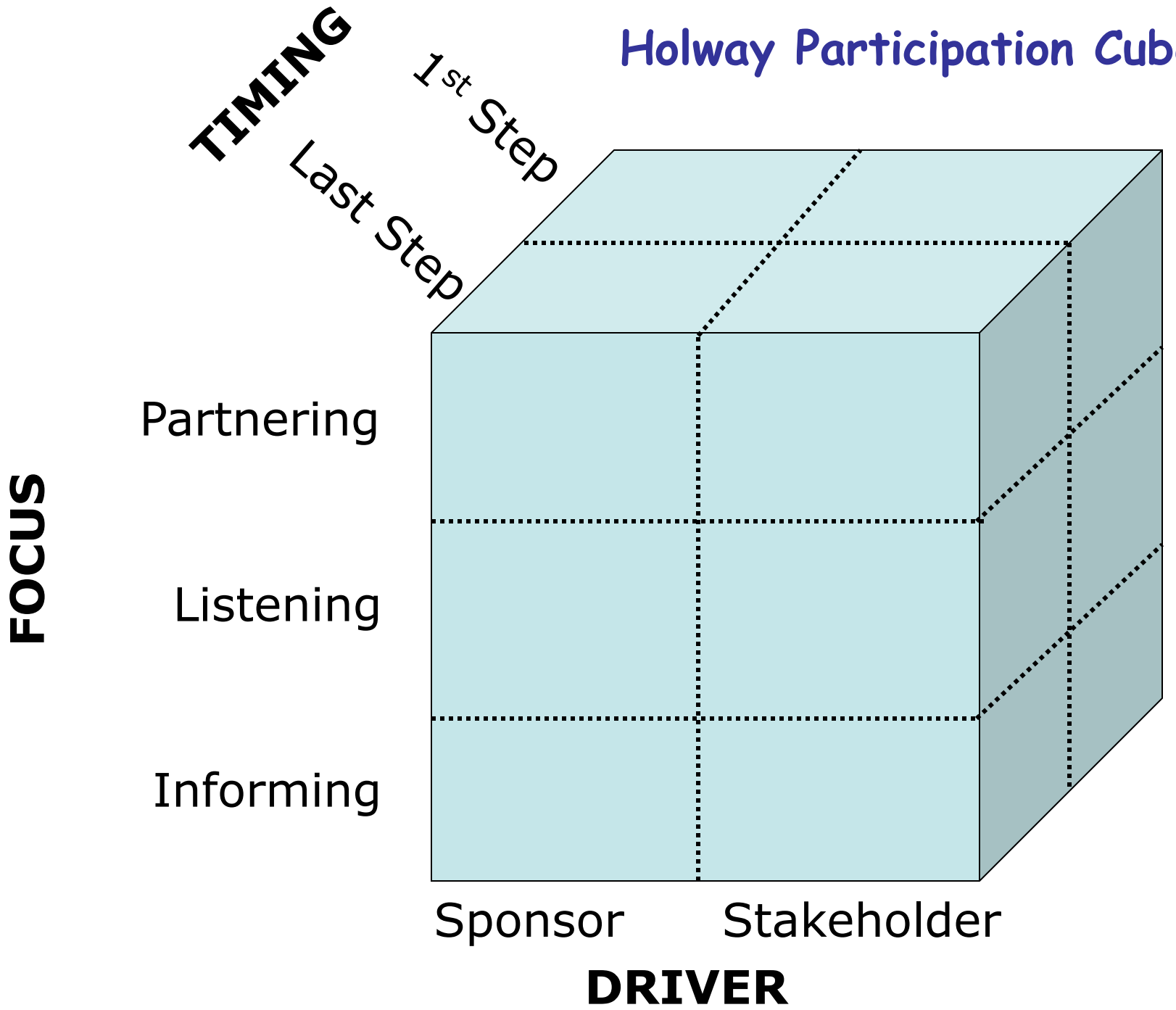
Researchers & Reflective Practitioners

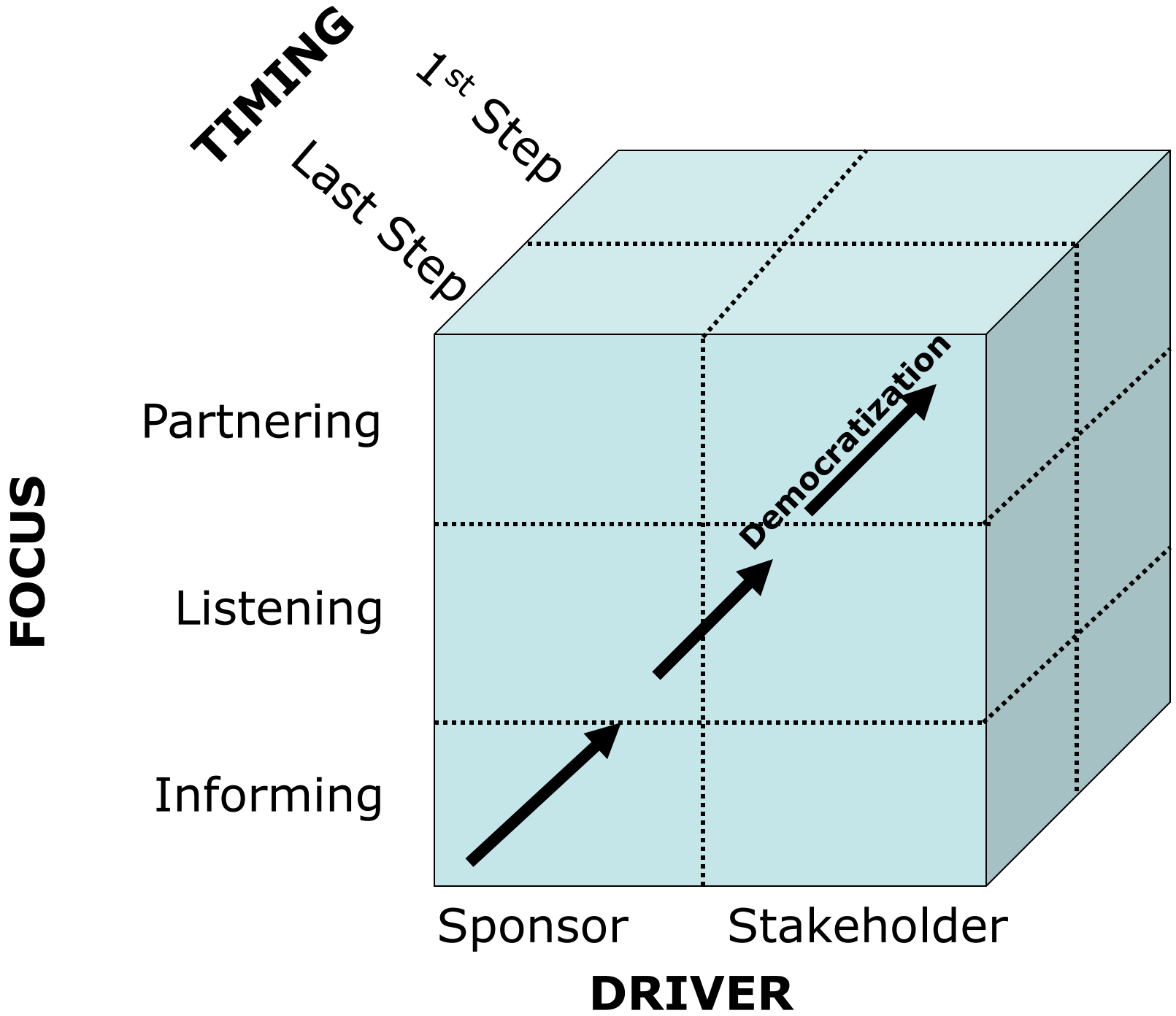
How do these different methods of building knowledge compare?

Is one better than the other?

How well do we combine them?

Holway Participation Cube




TIMING
1st Step
Last Step
FOCUS
Partnering
Listening
Informing
Democratization
Sponsor
Stakeholder
DRIVER

Holway Participation Cube

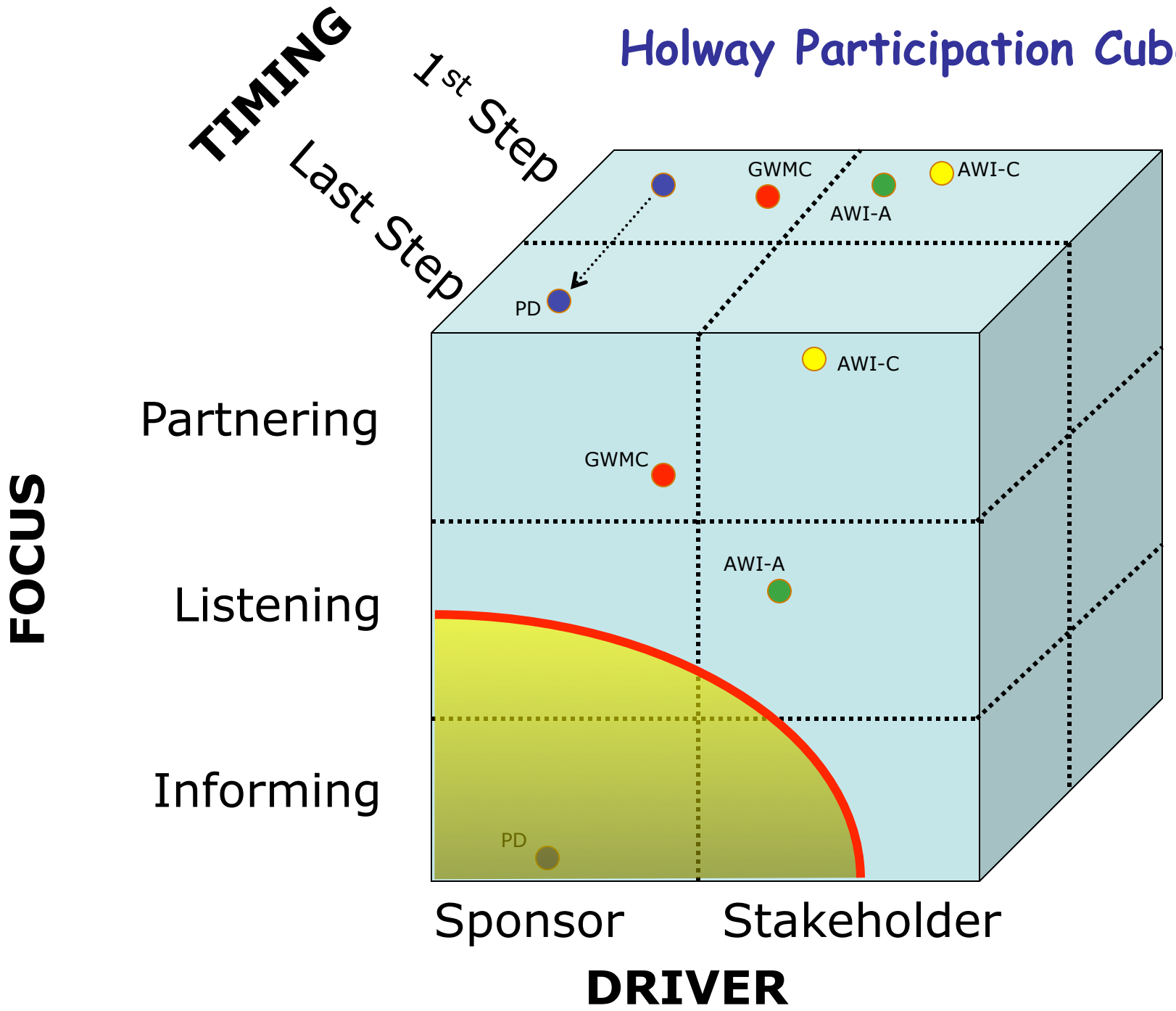
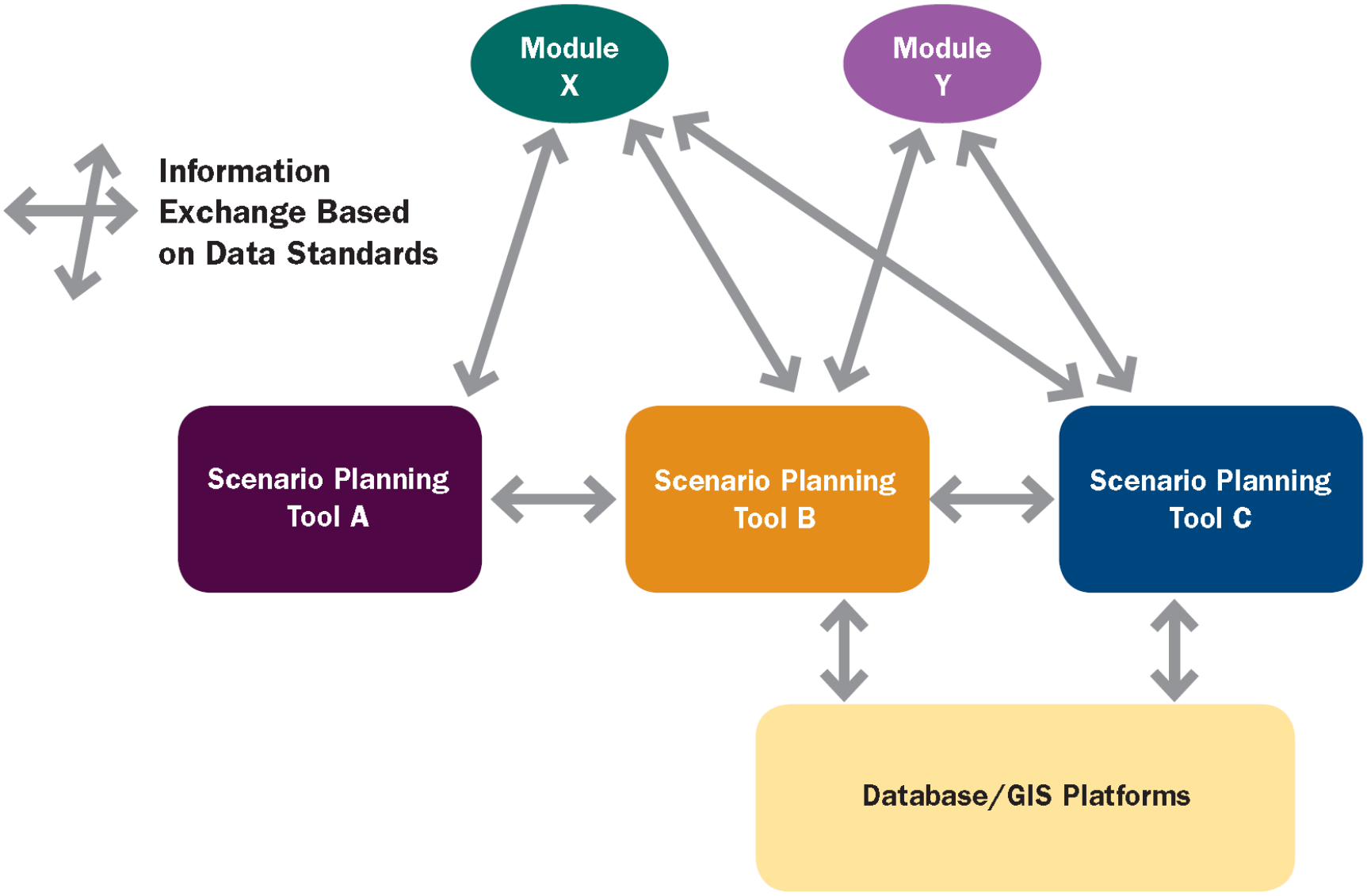


FIGURE 14

Information Exchanges among Planning Tools, Application Modules, and Database/GIS Platforms



Designing For Resiliency – Key Steps

- ID Major Issues & Areas of Concern
- ID Current Status of Key Sustainability Factors
- Examine Alternative Future Trends
- ID Critical Thresholds
- ID Events to which System is most Vulnerable
- Design for Adaptability
  - Anticipate specific threats
  - Increase general adaptability
    - Conduct Long Range Scenario Planning
    - Build a Diverse Portfolio
    - Secure Backup Supplies
    - Rely on a Variety of Management Approaches
    - Build Flexible Coordination & Severable Interconnections
    - Build & Test Response Plans
    - Establish Feedback Mechanisms
    - Build Adaptive Management Capacity
    - Anticipate and Exploit Opportunities
    - Ensure Transparency & Open Processes
  - Consider Public Policy Mechanisms (Role of regulations)
- Secure Political Support

Designing For Adaptability
Resilience & Sustainability – How Improve?

- Anticipate specific threats
- Increase general adaptability
  - Conduct Long Range Scenario Planning
  - Build a Diverse Portfolio
  - Secure Backup Supplies
  - Rely on Variety of Mgmt Approaches
  - Build Flexible Coordination & Severable Interconnections
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