

Appendix 2. State scenario workshop outputs

New England Landscape Futures Project Scenarios

Outcomes of 6 State Scenario Building Workshops

The Scenarios, Services and Society Research Coordination Network

12/30/2015

Report prepared by Katie Theoharides

Summary

From September to November 2015 over 120 individuals from across New England participated in six scenario building workshops through the New England Landscape Futures Project. Hosted by the Scenarios, Services and Society Research Coordination Network and partners in each New England state, the workshops led participants familiar with the region through a series of steps to develop four possible but divergent scenarios. Participants represented a variety of sectors including conservation, forestry, state and local resource agencies, academia, community planning, development, real estate, recreation, tourism, and economic development. These workshops are part of a process to help stakeholders and scientists explore the consequences of possible future landscape changes for people and nature, and to support the development of more robust management actions, policies and plans to deal with a range of future conditions.

The approach to scenario building used in these workshops was based on the Global Business Network scenario building method that employs a 2X2 matrix to help structure the scenario narratives, as well as significant input from stakeholders involved in the Scenario to Solutions workshop in the fall of 2014. The process was designed to most efficiently use stakeholders' time while allowing participants to work collaboratively in small groups to develop 4 possible scenarios to compare to recent trends over the next 50 years. The steps in the process balanced creativity with more analytic thinking: from imagining the landscape 50 years into the future from a favorite mountaintop we moved to identifying important drivers of landscape change in each state, ranking and organizing these drivers based on uncertainty and impact, creating and selecting a scenario matrix, and finally, to inhabiting one of the resulting scenarios by imagining what that future might look like and specifically describing the consequences of that scenario in terms of forest conversion, agriculture, timber harvest, and conservation. We assumed that climate change was occurring in each scenario.

This report summarizes the workshop outcomes, including the scenario matrix, bulleted descriptions of the 4 scenarios built by participants in each state, and the consequences of these scenarios for future land cover. The state-level outputs captured here are currently being summarized and collapsed into four scenarios for the entire New England landscape. Scientists in the S3 RCN are now working to model the different scenarios and to quantify the impact of these scenarios on ecosystem services. We will check in again with workshop participants to explain the simulation process and to solicit feedback on the translation approach. Working with partners, we will then apply the results to conservation and land use challenges by supporting strategic conservation and climate adaptation planning, policy development, fundraising, public outreach campaigns, and other efforts.

Vermont Scenario Workshop Summary
September 25, 2015
Vermont Technical College, Randolph, Vermont

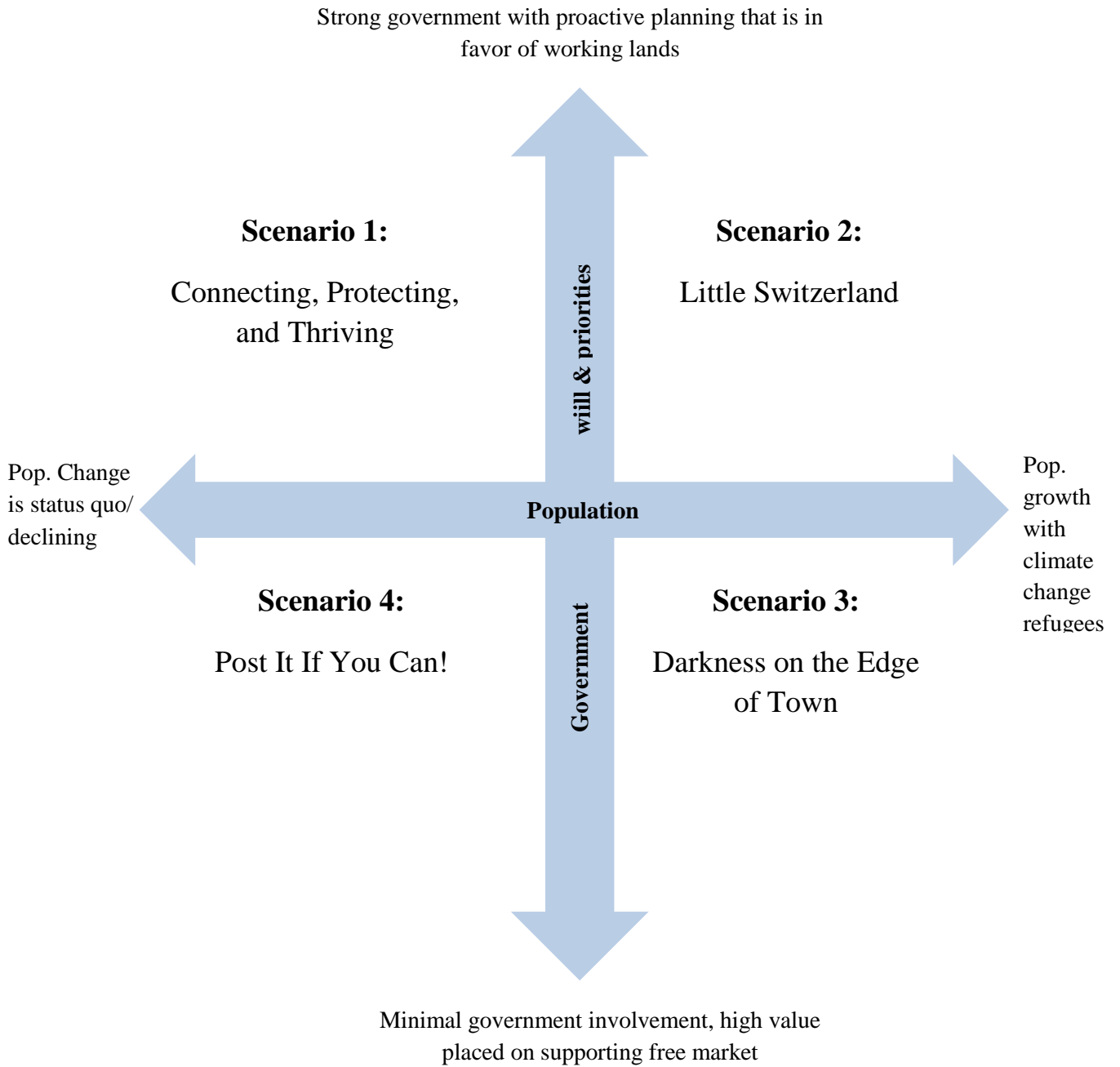


Fig. A2.1. Vermont scenario matrix

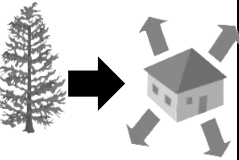



Scenario 1. Connecting, Protecting, and Thriving (CPT)

Drivers: strong government with proactive planning that is in favor of working lands and population is status quo/declining

Storyline:

- Forest cover (75%); intact forest blocks with connectivity; forested riparian corridors; maintained ecological integrity and resiliency
- Rebuild state budgets via capitalizing on modern economy (modern communications and transportation)
- Encourage low-impact businesses including incentives towards working lands enterprises (WLEB); local needs supported by local production (local wood for local good); VT is a leader in export of value-added products
- Fond of permanent protection of ecologically sensitive lands to create a network of working lands and forest reserves
- Fund pre-disaster mitigation; incentivize the protection of flood plains; less agriculture n river valleys, more forested floodplains; fewer dams
- More public resources for local planning efforts
- Government inventory of undeveloped land to connect to diversified ag and forestry
- Energy policy incentives, home-based energy systems; technology improvements preclude the need for industrial scale projects
- Education regarding buying local
- Increase in public values around the value of natural resources and the natural resources economy; traditional uses such as logging, hunting, fishing, etc., are valued and continue to be an important part of the economy
- School curriculums include significant time outside interacting with nature
- More restrictive guidelines for energy siting
- Good planning and (proactive) and government incentives dictates concentrated development in villages and towns and cities, leaving forests intact
- Fastest broadband exists in towns, cities, villages
- Fewer cars, less single occupancy vehicles, bike path networks, and public transit (buses???)
- Transportation infrastructure designed to provide connectivity for fish and wildlife
- Vermont is a leader in the country economically, environmentally, and aesthetically and maintains its brand

Table A2.1. Scenario 1: Connecting, Protecting, and Thriving (CPT)

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	Reduction or stable loss due to human population growth is static and use of existing available housing	Infill in cities and towns and immediate periphery	High density walkable downtowns, bike paths, a mix of affordable and senior housing	<ul style="list-style-type: none"> • Status quo population • Effective planning • Infill growth – concentration in cities • Intergenerational transfers will allow for increase purchase of conservation easements (funds will be available) • Amore younger folks want to live in more urban areas
Forest to Agriculture 	Greatly reduced to eventually no conversion	Around existing ag areas, not along riparian areas or floodplain forests	Diversified, smaller scale	<ul style="list-style-type: none"> • Reduction in large scale dairy • Reduction in price support subsidies • Greater resource (water) protection standards • Diversification of ag industry • International farmland access
Timber Harvesting 	Increase to 10-15% of land base harvested/decade	Private and public lands	Biomass High quality timber Value-added Increase in uneven-aged management Certification required	<ul style="list-style-type: none"> • More government oversight in practice to ensure quality of stewardship • More government subsidies/incentives to the industry • Maintaining VT brand will improve the saleability of VT producers
Conservation 	50% of land conserved by 2060	Easements on private lands Town forests	Core unfragmented forests & connected lands Key ecologically important lands	<ul style="list-style-type: none"> • Effective for disaster mitigation • Improve landscape resilience for climate change • More funding for easement purchases reducing pressure to draw value from land through development • Value shift on part of residents to support land conservation

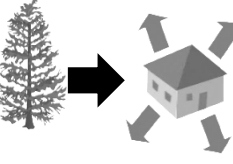
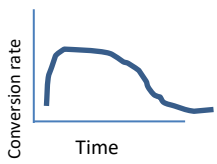

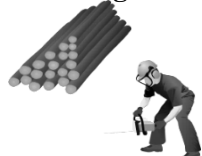

Scenario 2. Little Switzerland

Drivers: strong government with proactive planning that is in favor of working lands and population growth with climate change refugees

Storyline:

- Dense, compact downtowns and growth centers
- Large un-fragmented forests
- More existing open land utilized for farming and more farms are intensively managed
- People settle in densely but there is still some forest loss around existing settlements
- Infill development
- Energy is smaller scale generation, individual wind towers favored but not exclusively (group agnostic about this); smaller solar arrays but not exclusively, more biomass energy, more energy conservation
- More public transportation and safe biking – fewer vehicle miles traveled (per person?)
- Road network is reallocated for public transportation and biking, roads moved out of riparian areas
- Strong land use planning – Act 500+

Table A2.2. Scenario 2: Little Switzerland

Land use	How Much?	Where?	What kind?	Why?
<p>Forest to Development</p> 	<p>More initially and decreasing through time. Maybe rates of conversion similar to now when averaged over 50 yrs.</p> 	<p>Adjacent to already developed areas Not in riparian areas, on good ag soils, or ecologically important areas</p>	<p>Residential – mostly compact housing Commercial – to support larger population Very little energy b/c it is mixed with developed land</p>	<p>Large influx of people but strict regs. about where they settle</p>
<p>Forest to Agriculture</p> 	<p>Minimal</p>	<p>Little bits scattered around</p>	<p>Limited land Associated with homestead scale agriculture</p>	<p>New ag uses currently open areas Existing ag land is used more intensively</p>
<p>Timber Harvesting</p> 	<p>100% of annual growth on managed timberlands</p>	<p>Most of state's forestland is managed timberland (maybe 90%) or ~60% of state land base</p>	<p>Cutting a lot of "energy wood" to increase the proportion of high value timber</p>	<p>Need for energy wood, building materials, and more valuable wood drive a lot more logging – carefully planned</p>
<p>Conservation</p> 	<p>~1/2 of land is protected from development</p>	<p>Everywhere outside designated growth zones</p>	<p>Mostly working land easements At least 10% ecological reserves</p>	<p>States and towns aggressively protect resource lands thru conservation easements, public ownership, etc.</p>

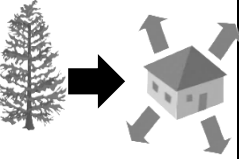



Scenario 3: Darkness on the Edge of Town

Drivers: minimal government involvement, high value placed on supporting free market and population growth with climate change refugees

Storyline:

- Rapid development across the landscape; sprawl with single family development; large developments in urban areas
- Increase in population could be a positive for downtowns
- Less public land; no new conservation; land sold off for development
- Developers “pay as you go” structure; infrastructure is privatized
- Increase in students in; better finances for schools (not necessarily better schools)
- Skewed towards large consolidated farms/forestry (high demand for food/energy); loss of small ownerships
- Parcelized land patterns leading to fragmented/converted forest
- Energy production from fracked natural gas “status quo”
- Visit nature online/travel for recreation due to lack of public access

Table A2.3. Scenario 3: Darkness on the Edge of Town

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	10x current rate	Adjacent to transportation corridors Radiating out from urban center Rural sprawl Slope <20%	Single family and multi-unit housing, P.U.D.	An increase in the population with little government oversight and planning leads to an increase in forest conversion to development, cheaper in the rural landscape
Forest to Agriculture 	50% increase over annual current loss (300 acres /year)	Where prime ag soils exist	Large scale farming	An increase in large consolidation of farms with some conversion needed to support the growing population
Timber Harvesting 	Less land area (4% per decade) Increase in amount of board feet	Everywhere where there is access	Biomass unregulated forestry, highgrading	An increase in the population leads to parcelization and lack of access to forests, as well as disconnected public which does not support forestry
Conservation 	None/year first 25 years Second 25 years actually sell off 1000 acres conserved land per year	Everywhere	If conservation occurs at all it is privately conserved but selling off of public lands, still makes a net loss	An increase in population has led to a halt in conservation and actually a selling of land

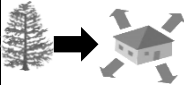
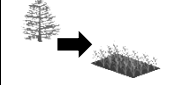

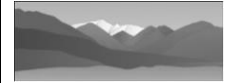
Scenario 4: Post It If You Can

Drivers: minimal government involvement, high value placed on supporting free market and population change is status quo/declining

Storyline:

- Population distribution – higher stratification between those w/ resources and w/o resources; education/no education
- Scattered development, rural sprawl
- Mix of kingdom lots and development lots
- Landownership more driven by those with means; higher property values in areas closer to valued amenities; decreasing ownership/increasing rental
- Energy production could be more fossil fuel-based from outside VT; more ridgeline energy development; biomass plants; purchased isolation
- Whatever makes money
- Food production is less local, fewer and larger farms, alternative – more support for local production; GMOs are universal; new crops
- Transportation is car-centric; fewer public transit options; poor infrastructure/crumbling; short-sighted planning; more private airstrips
- Less land use policy, if you can afford it – you can do it approach to land use planning
- Public lands that remain are overused, under-maintained, commercialized, over-priced
- Natural disturbance has flooding but no land use regulations to help
- Resources like water become a commodity, water quality is degraded

Table A2.4. Scenario 4: Post It If You Can

Lad use	How Much?	Where?	What kind?	Why?
Forest to Development 	10% conversion from forest to development	Areas with more amenities/services (i.e., Chittenden County)	Residential development Kingdom lots	<ul style="list-style-type: none"> • High-end residential development • Higher end property ownership → some rural sprawl but concentrated in pocket areas close to amenities and services
Forest to Agriculture 	Increase of >1% of forest to ag	Not in currently developed areas, prime ag soi locations, level terrain	GMO crops and all kinds of monoculture, vineyard	<ul style="list-style-type: none"> • Due to wetter circumstances (i.e., increase precip rate/events) there could be an increase in agriculture in VT
Timber Harvesting 	Patchwork across the state – very intense to none at all (state parks being none at all) Could increase by 16-24%	Private land Areas bought up by high buyers	Unregulated timber harvesting for biomass	<ul style="list-style-type: none"> • No regulations or UVA requirements • Unregulated climate increase biomass and clearcutting or highgrading • No current use program
Conservation 	Loss of 80%	Statewide but some watershed protection	N/A	<ul style="list-style-type: none"> • Loss of conserved land overall • Public lands sold for profit/public interest

Massachusetts Scenario Workshop Summary
October 5, 2015
Division of Fisheries and Wildlife Headquarters, Westborough, MA

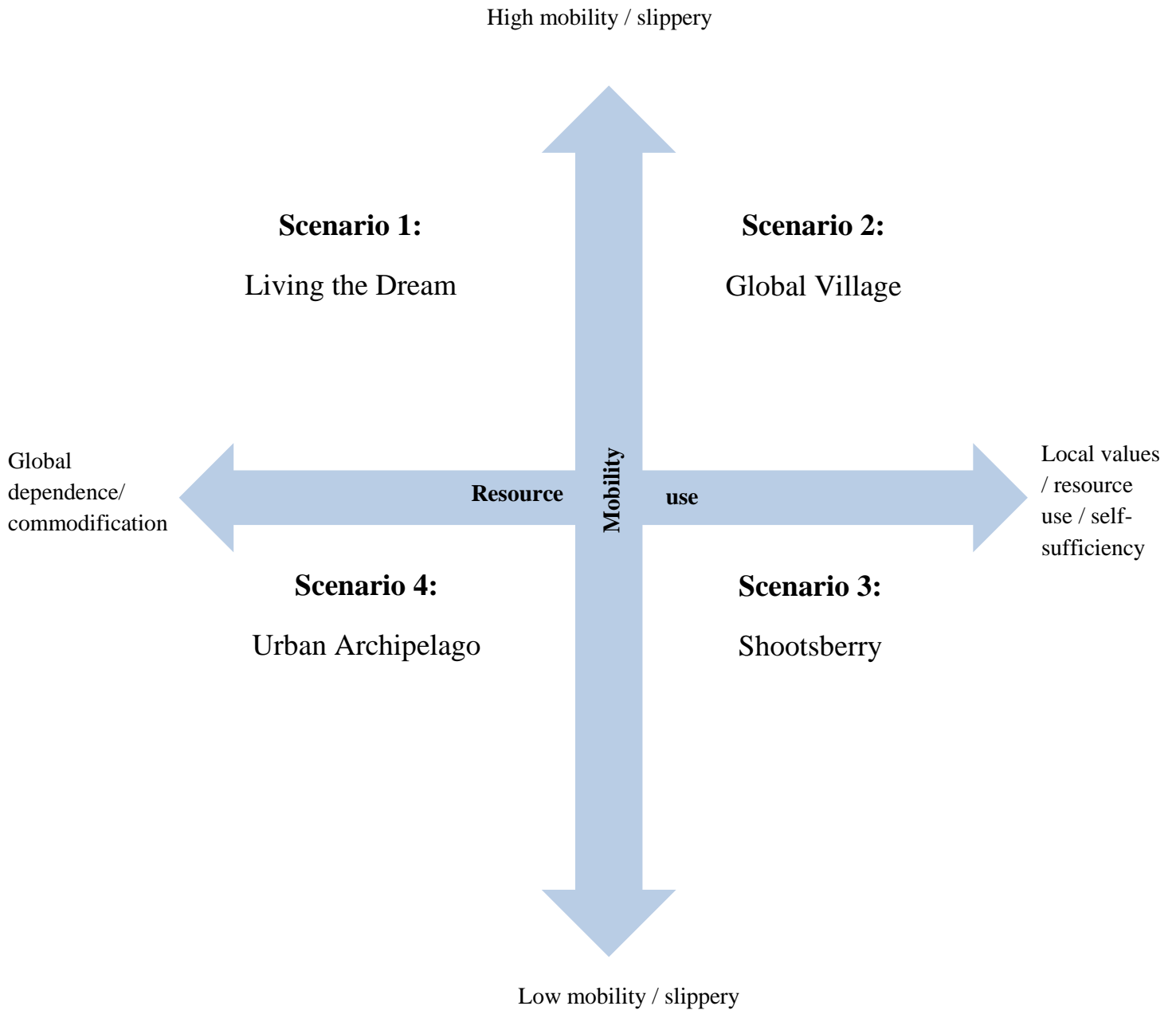


Fig. A2.2. Massachusetts scenario matrix

Scenario 1: Living the Dream (in Massachusetts)

Drivers: global dependence/commodification and high mobility/slippery

Storyline:

- Saw not just MA alone, but considered that these drivers and impacts would also move into/be linked to the broader NE region; they decided 'high mobility' focus on transportation
- Envisioned that people could live and work anywhere. This would put pressure on land. With business as usual there would be more pressure to develop forests around transportation nodes. (If there were the right incentives, transferable development rights (TDRs), carbon tax could flip that around.)
- Heavy inland pressure into the interior of Massachusetts.
- The slipper mobility changes the politics, Boston is less important. Boston under sea level rise, extreme weather, providing some incentives for the politics to change.
- Cheap commodities available globally leading to the proliferation of WalMarts and other big box stores
- However, the potential potential exists for the region to model how shifts in economies globally and advance fair trade regimes
- Tension and redistribution of population would drive up property values in Western MA, but also possible influence of ecosystem service and carbon markets. Reshuffling population, but not a given that any one future land use would come from that.
- Mobility making it more clear that this is a region. Regional economy.

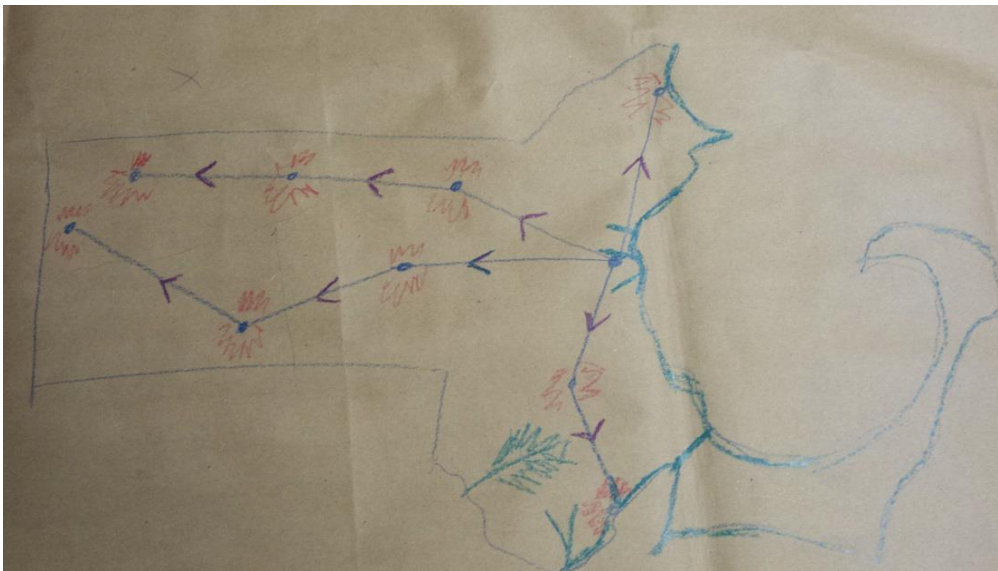
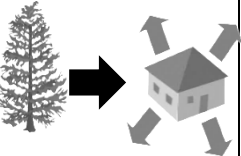

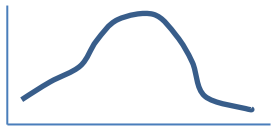



Table A2.5. Scenario 1: Living the Dream

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	Increase 8,000 – 10,000 acres/year	Around transportation nodes (i.e., small cities), some more diffuse (home offices) because some transportation improvement will be road based this will lend to more diffuse sprawling development	Housing and commercial, more housing, some alternative energy – e.g., wind and solar	Transportation improvements and lower travel times, fuel, diffuse growth
Forest to Agriculture	No change Continued slow loss of agriculture land to forest succession	Rural areas of MA		Local cant's compete on cost – no increase, possible decreased demand for local produce
Timber Harvesting  	Boom – bust Increase harvesting at first, trending down toward end of 50 years	Central and western MA – some in NE and SE	Fueled by market	Global markets initially fuel increased overseas demand, little regulation over, over time prices decline --- also increased development into smaller parcels over time lowest feasibility of harvest – land available for harvest
Conservation 	Rate will state same as present for forest 25 years, then rate will decline to some degree	Central, west, and SE MA	State, local, NGO fee acquisition	As landscape is developed and new pop centers energize willingness to pay will go up. However availability of suitable parcels (opportunity) will go down. Observed climate change may increase political will; willing to act over time

Scenario 2: Global Village

Drivers: locally centered and globally connected

Storyline:

- Local dependence/resource use and high mobility/slippery
- Facilitators note: there is some tension on drivers and endpoints in this scenario. The craft paper shows questions about policy interventions. One way to resolve this might be to think about change over time. Could there be more sprawl and development and less efficient use of resources at the beginning of the time period but the impacts eventually incentive policy shifts to prevent “loving the landscape to death”?
- Transportation and high speed rail lead to increased population in western Mass
- More people moving around in a rapid way
- Exurban growth
- Loved to death
- New people coming in all the time, disruptive to maintaining community feel
- Policies follow – put people into landscape smartly? Smart growth?
- Have it all – people and protected lands
- working landscapes to produce local resources
- Local: recreation, forest and ag products, ecosystem services, critters
- Also value local landscape: want protection and conservation
- Policy needs and landowners incentives so people don't get their 2 acres anymore
 - Housing/spacing
 - Milltowns
 - Zoning regs or easements
 - Tax incentives
- Strong value of local products and goods in a very mobile world. This valuing of local things isn't just locally valued. More people coming into our area, but policies and incentives adjust to protect forest.
- Working landscapes
- Farmland (pasture, hayfields)
- Physical mobility can bring in invasive species
- Burning a lot of energy but more efficiently
- Local energy production - virtually all infrastructure would be solar roofs; residential and commercial solar; hi-tech battery storage

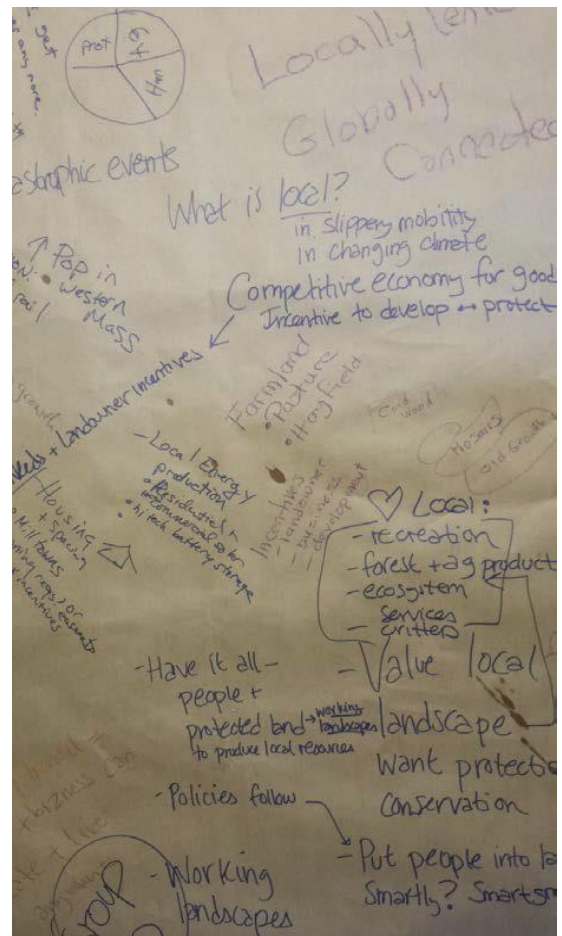
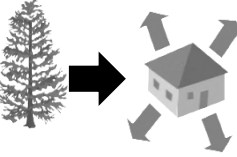

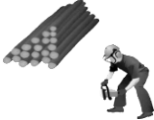



Table A2.6. Scenario 2: Global Village

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	2750/year	Increase in western MA	Urban and cluster but some sprawl	Incentives for redevelopment in existing urban areas Forest development minimized Affluent – develop wisely East transportation brings more people to Western MA
Forest to Agriculture 	Double the 2002-2012 rate of new farming, actual doubling of farmland from 6% to 12%	Pasture in hilltowns New farms scatter across landscape not only next to existing agriculture	20% of farmland is cropland 80% pasture Regional Farm Vision is played out in Mass	Value of local foods moves us to increase ag. Small farm renaissance, forest more productive
Timber Harvesting 	We refer to MA scenarios green infrastructure and expect that to be 50%+ of growth	Everywhere except preserves. Eastern MA moves back into forestry	More managed forest moving to harvests to 20-40% of stand removals. Goof forestry - productive	Value local energy & local products
Conservation 	Ag 6% goes to 12% Move to 50% of landscape in protected forests, plus wetlands, non-working landscapes = wildlands	Priority ecological lands protected in addition to working lands. Wherever new farmland is created. Corridors for climate change in Western MA, conservation ? in eastern MA	Easements used generally to protect working farms and forests New reserves designated on public lands, some additional new lands become wildland reserves	New focus on local production in ag and forest. Need to protect new ag land and up protection of local forests

Scenario 3: Shootsberry 2060 AKA “Pub Life”

Drivers: local dependence/resource use and low mobility/sticky --like our culture but can't go too far

Storyline:

PROS:

- Energy produced locally – solar, wind, water (dams)
- Efficient, woodlots used efficiently
- Highly efficient houses
- Electric cars
- The need for food is very important and leads to more coordinated effort to use the best soils for production -- intensive production, backyard, schoolyard on good soils – open lands
- Backyards, schoolyards, more development in village centers, coming together in communities, pub life (knowing land), a lot of our work is centered around producing for daily needs but also medical needs
- Village centers increase

CONS:

- Trapped and vulnerable – trans = work
- Space conflicts/shortages/no grid
- Energy use more controversial around how we use landscapes for solar and wind
- More landscape fragmentation
- More energy shortage
- More food limitations and malnutrition
- More cabin fever, more of a fortress mentality
- Worries about long term care and vulnerability of the community at large
- Less income growth potential

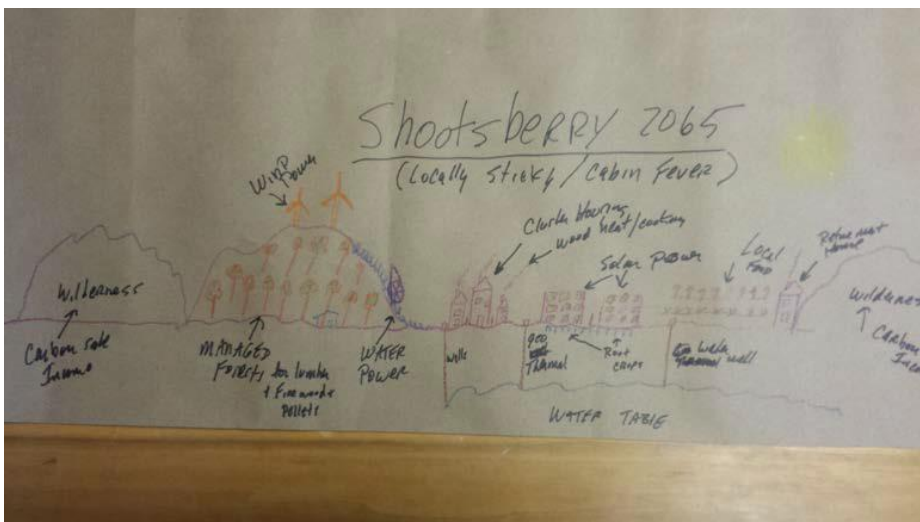
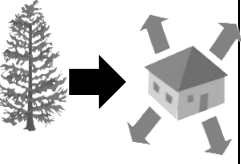
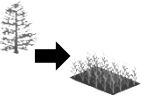

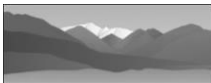


Table A2.7. Scenario 3: Shootsberry

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	Less than current	Poorest soils, near infrastructure	Cluster co-housing, some multi-family necessary, apartments, farmsteads	Forests more valuable for harvest/mgmt., population is stable but less mobile
Forest to Agriculture 	Much more	Appropriate soils/sites for type of ag As residential accessory use	Away from energy intense – see “New England Food Vision” Suitable for year-round consumption Barter and trade	Food supply & security
Timber Harvesting 	More than current	Best forest soils avoid conflict with ag	Sustainable advanced silviculture	Replace most import/export with local market
Conservation 	More to ensure lands are available	Best for forestry, ag, water	Incentives, planning, land use regulations	\$ to landowners in exchange for conservation land in public interes

Scenario 4: Urban Archipelago

Drivers: global dependence/commodification and low mobility/sticky

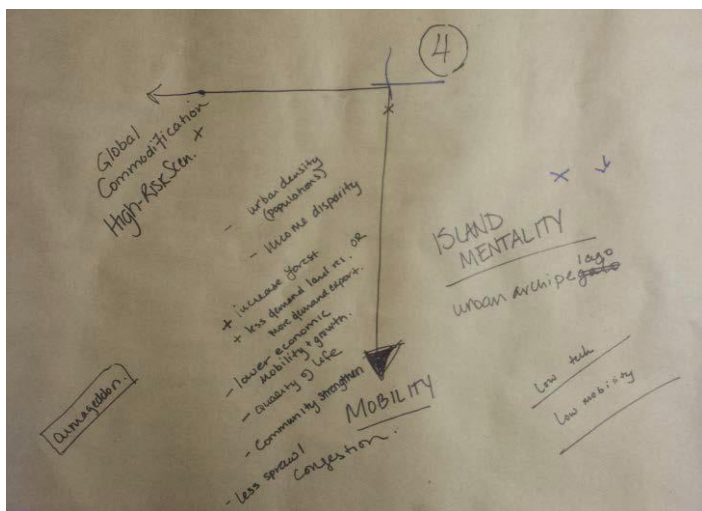
Storyline:

PROS:

- Shift to people living more in urban areas, harder to get around
- Better for forest (increase in forest cover)
- Less demand for forest products, global commodities would be so cheap that many forests would be unused
- Strengthening of community because there is less ability to leave where you live. Strong community. Compared it to early settlers who lived in isolated way. Had to sell best goods to export
- Less sprawl and congestion

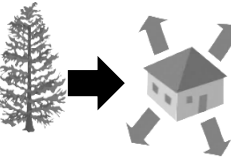
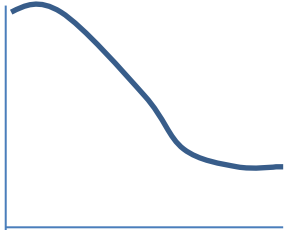



CONS:

- Lower economic growth and mobility
- Lower quality of life: only people with lots of money □ more access to cars and internet. Big income disparity and mobility disparity
- Quality of life = low. No option to change the quality of life by working hard
- People are less able to pull themselves up by their bootstraps. Hard to change life by working hard
- Retirement community (Shutesbury – where would you rather be)?
- Island culture – cannot leave, have to buy in:
 - Japan
 - Marthas Vineyard
 - Hawaii
 - Aruba



Purgatory:
A Retirement Community
- Shutesbury → where would we rather be? Global Com + Mobile ↑
- Japan - What is best for local forests?
- MV -
- Hawaii -
- Aruba -
Island culture - cannot leave here to buy in

Table A2.8. Scenario 4: Urban Archipelago

Land use	How Much?	Where?	What kind?	Why?
<p>Forest to Development</p> 	<p>Would slow over time</p> <p>Start at 16,000 acres per year, decline to 5,000</p> 	<p>Dense areas will become denser.</p> <p>Areas that are already urban will increase density</p>	<p>Residential – people moving to urban areas.</p> <p>Mixed use.</p>	<p>More press in urban forests – more development</p>
<p>Forest to Agriculture</p> 	<p>Increase forest to farmland on smaller scale; possibly also lose farmland acres</p>	<p>Rural</p>	<p>Small scale</p>	<p>No market for local goods</p>
<p>Timber Harvesting</p> 	<p>Less timber locally</p> <p>More competition from global markets and less local forestry</p>	<p>Family owned businesses – rural landscape</p>	<p>Local, fuel local use, firewood</p>	<p>Expensive to ship</p>
<p>Conservation</p> 	<p>Smaller parcels</p> <p>More land conservation would continue but pace might slow</p>	<p>Rural</p>	<p>Smaller scale</p>	<p>Less opportunity and need for stewardship</p>

Maine Scenario Workshop Summary
October 16, 2015
New England Environmental Finance Center, University of Southern Maine

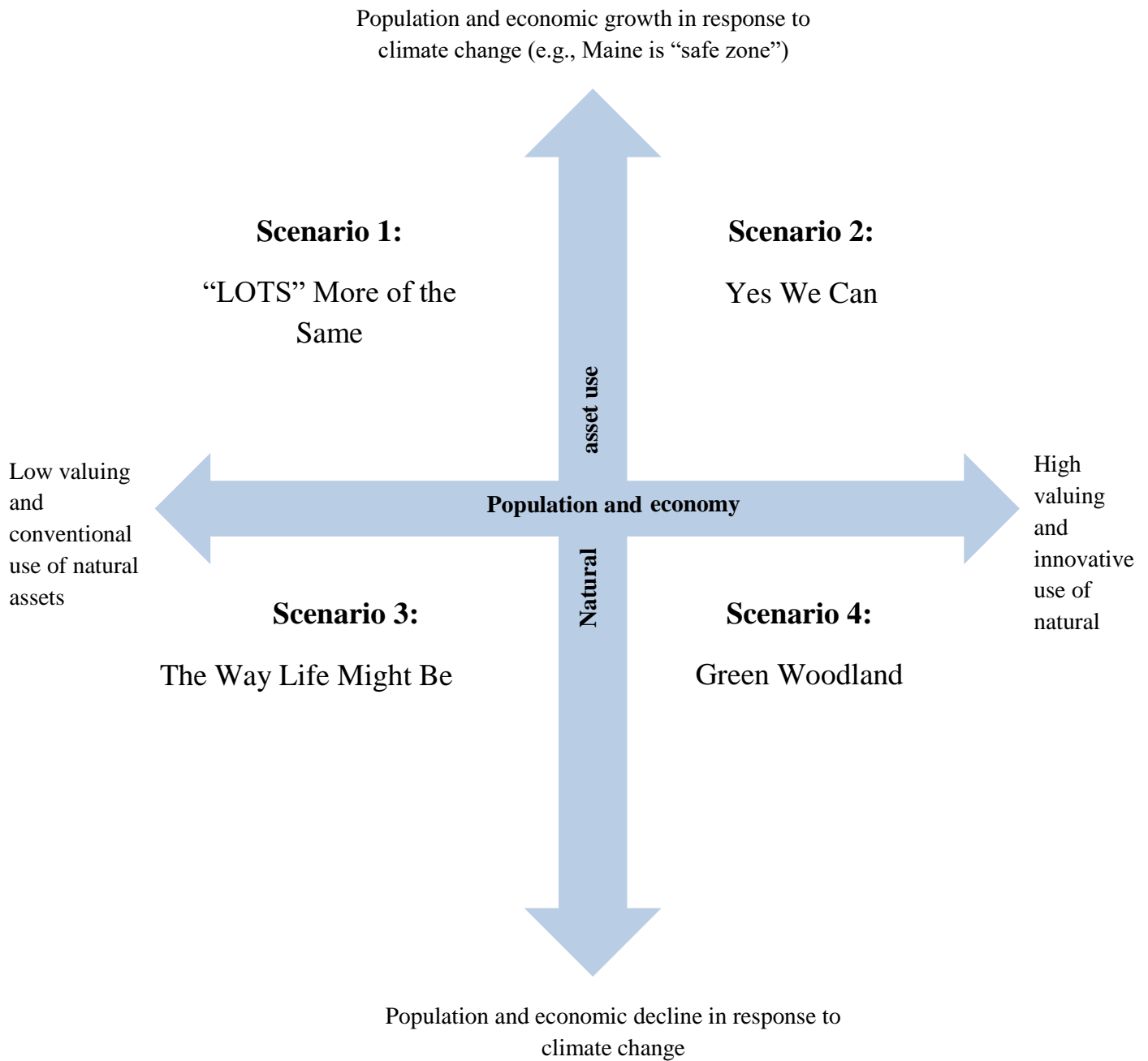


Fig. A2.3. Maine scenario matrix

Scenario 1. “LOTS” More of the Same

Drivers: population and economic growth in response to climate change, combined with low valuing and conventional use of natural assets

Storyline:

- Growth in population, associated growth in economic opportunity
- Conventional natural resource use
- Assuming what we have already, but more of it
- Because there are more people, more people are in the way of natural disasters.
- We would see development sprawl (“lots”), particularly around existing population centers and lakes, with suburban growth nearby (places that have experienced sprawl in the past)
- Likely a higher standard of living, because more economic opportunity

PROS:

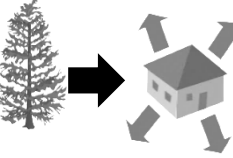
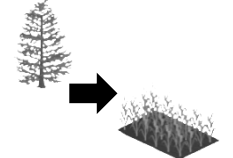


- A younger, more diverse population
- Higher standard of living may lead to bigger houses (?)
- Better health care
- More education opportunities
- Continued local food production

CONS:

- Increase in impervious surfaces, and increase in extraction of natural innovation (water, wood harvesting)
- A need for more roads, and vehicles for catering for to growing population
- More land ownership fragmentation → smaller parcels
- More degraded environment:
 - Loss of biodiversity
 - Reduced air, water quality
 - Negative effects on fisheries
 - More pressure on local agricultural lands
- More tourism, but changed recreational opportunities (less wild now)
- More energy and utility development / water & sewer infrastructure
- More vector borne disease
- Less trust and feeling safe outside
- ? of rural communities and related institutions & services / still have 2 Maines

* Note: couldn't decide what the economic growth driver would be. The stated assumption from the drivers discussion is that Maine's status as a climate change “safe zone” – brings refugee and people who want to relocate there, would also attract businesses, investment, etc.

Table A2.9. Scenario 1: “LOTS” More of the Same

Land use	How Much?	Where?	What kind?	Why?
<p>Forest to Development</p> 	<p>In 50 years on average, about 2000 acres/year is lost from forest to development.</p>	<p>Most (75%) of forest conversion is adjacent to existing community centers, roads, networks & lakes. More development in southern counties.</p>	<p>Mostly residential, mostly small lot development with some rural 2-acre lot development in southern Maine</p>	<p>The conversion is a result of the high influx of in-migration related to the desirability of the environment as a place to live and recreate and need for housing, some seasonal homes, about a 30% increase in population</p>
<p>Forest to Agriculture</p> 	<p>Slight increase in agriculture – 450 new farms in 50 years, 1-2% increase in land area</p>	<p>Near other small agriculture as well as near population centers</p>	<p>Small-scale farms; row crops</p>	<p>Continued interest in local farms & foods</p>
<p>Timber Harvesting</p> 	<p>Reduced timber harvesting in southern part of state; potential increase in northern areas; resulting in approx. 500,000 acres/year</p>	<p>Mostly northern Maine, slightly reduced in southern areas</p>	<p>Same conventional practices</p>	<p>Corporate forestland owners remain predominant in Maine’s north woods; small woodlot owners feel pressure to cut & sell for development</p>
<p>Conservation</p> 	<p>The total amount of conservation land each year stays about the same or increase slightly (though one respondent said “decrease”)</p>	<p>Out from population centers; fewer large tracts to protect; smaller parcels protected; new models of conservation emerge to target fast-growing areas; southern Maine & western Maine</p>	<p>Trails, waterfront access (small parcels out from population centers) in southern Maine</p> <p>Target climate change – fewer larger projects have this focus and they are in northern Maine</p>	<p>Continued support for land conservation locally; more experience to protect land</p> <p>Reduced willingness of northern corporate landowners to sell easements; where there is conservation there is a focus on more train connectors through state/towns for people to use</p>

Scenario 2: Yes We Can (We can do it all!)

Drivers: this scenario was defined by high population, and increase valuing and innovative use of natural resources

Storyline:

PROS:

- High economic equity
- Social sustainability would increase
- Increased higher education background, people that can work anywhere (artists, tech, PhDs)
- Hubs of concentrated growth
- Off grid living can be anywhere
- Innovation – can live anywhere, so real potential for off the grid anywhere, and/or work wherever (debate on this)
- Urban farming, locavore, framing techniques more effective
- Innovation/biofuels change community but low population

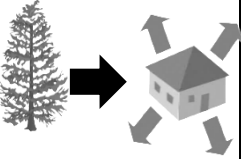


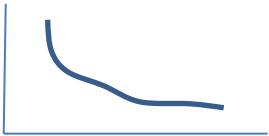

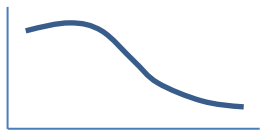
CONS:

(most of these seem to be associated with the inner sphere of this quadrant where there would be high population and less innovation)

- If we have a higher population and – could have more sprawl, develop more, costs more money to live here
- Resource extraction increase more probable
- We would have work force living issues
- Global immigration pressures
- Decreased environmental experiences, as the interest and connection to tech increases, and potential to increase the environment will decrease
- Exacerbated seasonality

(Note: this group broke the scenario into quadrants within it. In the discussion, they were encouraged to focus on the outer poles of the drivers)

Table A2.10. Scenario 2: Yes We Can

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	More than current 1,500 to 2,000 acres/year	Southern/coastal Maine Suburbs	Hubs of concentrated growth – off-grid living can happen anywhere; lakes and rivers attractive Concentrated, some suburban sprawl	Innovation supports higher economic equity, higher education background, more diverse population of people who can live anywhere because of connectedness
Forest to Agriculture 	Similar rates or increasing 1000 acres/year	Some existing farmland will be converted from existing old field; also urban farming	Locavore movement and urban farming	Locavore and sustainability movement inspires more farming and more urban farming
Timber Harvesting 	300,000 acres/year 	More in south, less in north	Biomass harvesting increases as seen as a renewable green source of energy; technologies evolve to make energy use more efficient so that total harvesting decreases over time	
Conservation 	Up to 3x conserved land 	Mostly northern Maine		

Scenario 3: The Way Life Might Be

Drivers: population and economic decline in response to climate change, combined with low valuing and conventional use of natural assets

Storyline:

- Low valuing and conventional use of natural assets
- Population and economic decline
- Maine becomes sacrifice zone/strategic forest reserve for the nation

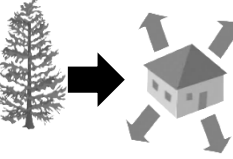



PROS:

- Still demand for seasonal camps - that is still a part of the future they see

CONS:

- No local advocacy or stakeholder groups
- Forest crop and energy production is prioritized
- Loss of market for wood and hard to find workers for extraction jobs
- Human footprint dark spot is bigger
- Plantation and mono-cropping common / greenhouse farming
- Broken/aging infrastructure – no investment in transportation; road abandonment
- Deterioration of natural resource regulation to drive economic growth
- Population continue along coast and aggregated land ownership
- Private funding of public infrastructure
- Loss of traditional crops
- Factory fishing
- Increase volume in forests and change in wildlife/species composition
- Abandoned buildings – attractive nuisance
- No clean-up of environmental issues
- Bunch of old farts
- No proactive mitigation or adaptation to climate change
- If current trajectory continues, lose some of the small towns that depend on the mill economy
- Continued loss of people who have good jobs because economic opportunities won't be there
- Increasing extraction of water (?)

Table A2.11. The Way Life Might Be

Land change	How Much?	Where?	What kind?	Why?
<p>Forest to Development</p> 	<ul style="list-style-type: none"> • 20% in southern Maine • 0% in North • Continue or declining by 10% • Decrease in North and West • Increase in southern coast 	<ul style="list-style-type: none"> • Coastal southern Maine by rec areas; on the “new” coast created by climate change • In cities and urban areas • North - none 	<ul style="list-style-type: none"> • Mostly for housing and not much for commercial • Cluster • Urban areas, condos, seasonal homes 	<p>Lack of economic opportunity in the North Coastline change Continued modest economic slowdown</p>
<p>Forest to Agriculture</p> 	<ul style="list-style-type: none"> • 0% to a couple of acres per year • Could be limited possibility of fast-growing trees such as acacia 	<ul style="list-style-type: none"> • Urban farming • Mostly on converted ag land 	<ul style="list-style-type: none"> • Organic veg production in southern Maine • Monocrops to feed other states and animals 	<p>Plenty abandoned hayfields Drivers are too weak for huge increases</p>
<p>Timber Harvesting</p> 	<ul style="list-style-type: none"> • Continue at same rate to decline by 10%/year 	<p>Mostly in northern Maine Some western Maine</p>	<p>Mostly selection forestry with some plantation forestry, shift to softwood wood products under climate change</p>	<p>Continued interest by wealthy for long-term investment</p>
<p>Conservation</p> 	<ul style="list-style-type: none"> • Continue at same rate with a decline over time by 50% as opportunities in north dry up and land values in south increase 	<p>Statewide with largest acquisitions in Northern Maine</p>	<p>Land trusts conserving land in south under fee and easement; voluntary easements in the North</p>	<p>Lack of state and federal money and increase in land values in southern Maine leads to greatest opportunities in Northern Maine; under reserve model there is increasing opportunity for carbon easements</p>

Scenario 4: Green Woodland

Drivers: population and economic decline in response to climate change, combined with high valuing and innovative use of natural assets

Storyline:

- Population and economic decline (empty place), innovate impact use
- Woodland – chose this name after the town of Woodland, Maine which has a very new tissue plant but population is still declining.
- Theme – greater efficiency
- Population decline in rural areas accelerates
- Modest ag expansion
- No forest loss – perhaps expand into rural residential areas





PROS:

- Some of the pros are that land use is stabilized, not losing forest, so maintain ecosystem services
- Innovation advances makes the region highly competitive in global markets
- Innovation also leads to lower footprint per unit of product (greater efficiency)

CONS:

- Local economic opportunity declines
- Less opportunity for social mobility because of capitalization costs of businesses
- Societal decline, loss of rural communities/heritage
- Businesses concentrate because of capital costs
- More intensive land use, younger forests
- Over-reliance on natural resources
- Fundamental to that model is that less and less labor is needed over time (labor is replaced by technology)
- As a result it is a less attractive place to live -- people (kids) less and less likely to have opportunities over time – which puts communities, social basis at risk
- This undermines economic basis, as don't have a quality labor base to draw upon to maintain that innovative basis
- Economic (in)equality might become more of an issue
- There is a lot of forest but it is likely a younger forest

Table A2.12. Scenario 4: Green Woodland

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	0-400 acres/year (more forest, less development)	In metro and regional centers and to some extent along major arteries	Residential, retail, and commercial subdivision	Continued concentration of population in urban/regional areas and around communication/transportation corridors better and concentrated services, less economic opportunities in rural areas
Forest to Agriculture 	0 to 1000 acres/year	Valleys, former ag lands Aroostock County, in valleys	Pastureland and some row crops Specialty ag products Could be intensively managed using technology in all phases of production	Conversion of “fallow” (former ag) land to current farming Some woodland owners converts to ag for \$ Market for specialty ag Landownerships could be concentrated in fewer owners who have access to capital-intensive production systems based on technology
Timber Harvesting 	600,000 acres/year	Northern and eastern Maine	Fiber and wood for value-added products ((furniture making for example) Movement toward shorter rotations and more highly managed woodlands with increased technology for harvest/processing	Increased global market for fiber. Innovation for manufacture of value-added and specialty products. Demand for wood fiber grows but production becomes capital and technology intensive.
Conservation 	Fewer large parcels (a Nat Park being the exception) More local smaller places ~20,000 acres/year Rate may increase to 2025 and then decrease to 2060	Smaller parcels in central and southern Maine A few larger parcels in No. Maine (National Park)	Local places of interest Places of special ecological and habitat significance Waterways and shorelines	Lower pop.; more need of ecosystem services and the innovation to market these services to other faster-growing places in the NE. However, government support may dry up and decline by 2060 due to low pop. That may be countered by interest in the conservation of ecosystem services by interests outside the state.

Connecticut Scenario Workshop Summary
October 22, 2015
Global Institute of Sustainable Forestry,
Yale School of Forestry and Environmental Studies

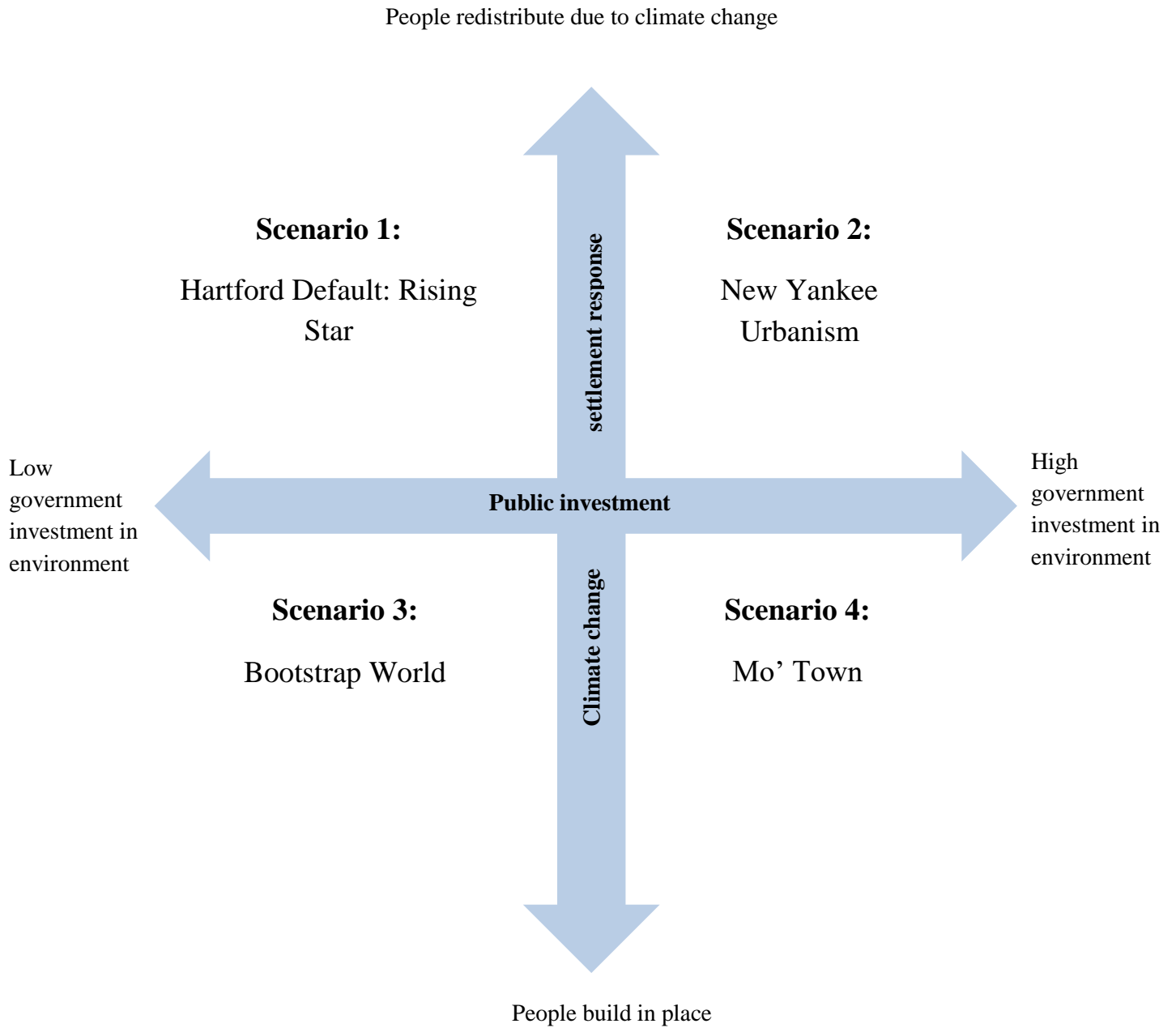


Fig. A2.4. Connecticut scenario matrix

Scenario 1. Hartford Default Rising Star

Drivers: low government investment in environment, people redistribute due to climate change

Storyline:

- Decrease in government spending on the environment coupled with an increase in migration due to climate change.
- There is inland migration from coastal areas of CT and an influx of climate migrants from other parts of the world due to climate change because the state will likely not face the same detrimental effects of climate change as desert and tropical regions.
- Major east coast current metro centers (New York City and Boston) face inundation and decline
- Disrupted transportation corridors along shore I-91 metro north corridor shifts population and increases privatization on N-S I 91.

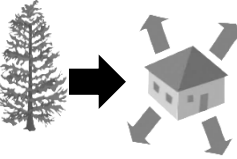
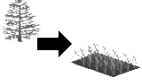
PROS:



- Less fear of cities and more movement to Hartford and Springfield from other urban areas
- Hartford and Springfield become financial hubs
- More local culture
- More locally grown food to support population
- Conventional energy strategy + energy conservation

CONS:

- More food ghettos
- Energy = more burning of wood, trash – increased air pollution
- Climate change would result in human health issues
- Increased residential development and fragmentation – rising property values
- Fragmentation leaves few tracts of land to support profitable forestry
- Off the grid sprawl enabled by private solar – spectrum would increase in intensity due to pop. influx from NY/ Boston
- Loss of open space because of increases in land value from population influx
- More agriculture in once open spaces
- Economic segregation likely to continue
- Increased demand for land and lower government investment in conservation leads to a decline in land conservation

Table A2.13. Scenario 1: Hartford Default Rising Star

Land use	How Much?	Where?	What kind?	Why?
<p>Forest to Development</p> 	<p>15-20% increase in annual rate of development from current trend</p>	<p>This development will occur most notably along the central corridor of the state and north of New Haven and within and surrounding Hartford. However, the urban sprawl will have rippling effects in the more open western and eastern parts of the state with unprotected forests becoming largely perforated with residential development. Also development will continue to occur along the coast but inland. As the sea level rises significantly both in CT and in surrounding states, the development along the coast will begin to exhibit a notable decline.</p>	<p>This development will be predominantly residential but also include commercial buildings. As migrants shift away from areas affected by climate change there will be continued development in higher elevation regions to escape flooding and sea level rise. Coastal and lowland areas will become “climate ghettos” where underserved populations will experience “climate injustices” from exposure to the negative effects of climate change.</p>	<p>Since migration from coastal areas of CT to inland regions will likely occur due to climate change there will be increased pressures for residential development in the state. Also climate migrants from around the U.S. and the world may be driven to more temperate climatic regions like CT. This will happen because the state will likely not face the same detrimental effects of climate change as desert and tropical regions.</p>
<p>Forest to Agriculture</p> 	<p>5% increase in annual rate of forest conversion to agriculture from current trend</p>	<p>Small farms will continue to appear relatively ubiquitously across the state. However, the Western and Eastern parts of the state will likely see the greatest increase in small farms to supply demands for locally grown food.</p> <p>Large farm fields in the CT River floodplain may be affected by climate change induced flooding or conversion to development. Even with this loss of ag land, we still see the total acreage in ag production increasing including urban and suburban ag.</p>	<p>The agriculture will not likely be industrial scale agriculture. Most agriculture efforts will be carried out through small scale operations of 25 acres or less. Most farming will be for locally grown produce however some livestock farming will also occur.</p>	<p>Pressures to provide locally grown food will help to drive a slight increase in CT agriculture however these new operations will likely be small in scale. Also pressures to feed an increasing population in the state and across the earth will also contribute to a slight increase in agriculture in the state.</p>

<p>Timber Harvesting</p> 	<p>Rate of timber harvesting per year has no significant increase or decrease.</p>	<p>NW of CT will still have notable forest tracts such as Great Mountain forest that can be harvested for timber. The large remaining forest tracts that were preserved many years ago will continue to be harvested of timber. No notable expansion of timber harvesting operations will likely occur in the state.</p>	<p>Timber will be used for a variety of products such as paper, wood products, Christmas trees, and firewood. Large timber industries will likely continue to prefer states with larger tracts of land in the northernmost state of the United States.</p>	<p>Since almost all large forest tracts have been fragmented there are very few tracts left that can be profitably harvested in CT. A few remaining large tracts will continue to be harvested. The value of land for development will continue to increase making development a more profitable action for landowners.</p>
<p>Conservation</p> 	<p>Decline 5% in annual 1 acres conserved from current trend</p>	<p>This development will occur most notably along the central corridor of the state and north of New Haven and within and surrounding Hartford. However, the urban sprawl will have rippling effects in the more open western and eastern parts of the state with unprotected forests becoming largely perforated with residential development. Also development will continue to occur along the coast but inland. As the sea level rises significantly both in CT and in surrounding states, the development along the coast will begin to exhibit a notable decline.</p>	<p>Conservation will occur on parcels of significantly decreased size. As larger tracts continue to be divided amongst property owners and the population of CT continues to increase due to climate refugees and inland migration from coastal communities the difficulties associated with preserving contiguous tracts will increase.</p>	<p>CT lands will continue to exhibit fragmenting “hard” development that will make conservation of large parcels increasingly difficult. Also real estate in Connecticut in the inland regions will become increasingly valuable due to its proximity to NYC and Boston. Additionally coastal communities in CT will migrate inland due to sea level rise causing increased pressure on developing the more inland areas of CT. Declining government expenditures in open space protection results in significant reductions in numbers of conserved acres per year.</p>

Scenario 2: New Yankee Urbanism

Drivers: high government investment in environment and people redistribute due to climate change

Storyline:

- People redistribute due to climate change and there is high government investment in the environment (including environmental systems)
- There is redistribution from drought stricken west and coastal areas as well as flood prone riverine areas
- This leads to increase in population in the state and an increase in density in urban areas.
- With government investment there are vibrant urban centers and focus on smart growth with a remaining tree canopy wherever possible
- As a result, the increased population is accommodated in large but not total part by infill development.
- There is also as much conservation of open land as possible.

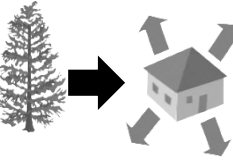
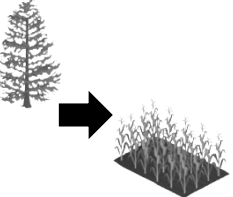
PROS:



- Diverse, vibrant urban centers
- Less pressure on inner-lands → buying or protecting open space easier
- Development would move out of floodplains leaving all of those areas to be reclaimed as open space and for ecosystem services
- Increase in ag expectations given the increased population and growing interest in greater self-reliance
- Adequate resources to invest in forest health
- Interest in increasing renewable energy, including biomass
- Public resources supports increased investment in conservation for climate adaptation and mitigation (conserve flood plains, sequester carbon) and support recreational use

CONS:

- Have to produce more food if people from the west move here.
- Where would the ag. go?
- Fewer opportunities for living south (of something)? Not sure what this means/
- Potential for gentrification
- Potential for loss of connection with nature
- (Community design could limit these negative impacts)

Table A2.14. Scenario 2: New Yankee Urbanism

Land change	How Much?	Where?	What kind?	Why?
<p>Forest to Development</p> 	<p>No net loss in forest cover overall and a net gain is possible...</p> <p>25% of suburban forests is lost to high-density development</p> <p>floodplains are recovered and 50% converted back to forest</p> <p>50% of brownfields are restored as forests</p> <p>Urban tree cover is increased</p>			<p>High gov't investment in conservation emphasizes smart growth, which includes the addition of trees where possible, especially in already developed areas, where urban forests have a long way to go before their potential is reached.</p> <p>Some suburban forests are sacrificed to increase housing density to take pressure off hinterlands.</p>
<p>Forest to Agriculture</p> 	<p>50% increase in total agriculture, coming from suburban, exurban forests</p> <p>50% of Floodplains converted to sustainable agriculture</p> <p>Some exurban forests are converted to pasture agriculture.</p> <p>Big increase in urban/suburban ag (this statement does not relate to forest conversion except that it is a reason why we did not dedicate more forested land to ag in what we foresee could</p>		<p>...for high quality veggies</p> <p>...for hardier crops, silage, and pasture for dairy farms</p>	<p>More mouths to feed in CT from climate redistribution</p> <p>Increased regional self-reliance for sustainability purposes</p>

	be similar to the “regional self-reliance” scenario)			
<p>Timber Harvesting</p> 	<p>2x today’s harvest rate</p> <p>Focus on sustainable working forests</p>	<p>...across the entire state, but mostly from hinterlands</p>	<p>Timber and Non-timber forest products</p>	<p>Use revenue to put back into environment/conservation</p> <p>Forest management to improve forest health and diversity</p> <p>Increased focus on alternative energy compatible with sustainable biomass energy production.</p>
<p>Conservation</p> 	<p>Protect all state significant and highest productivity agricultural soils.</p> <p>Protect 75% of intact forests (i.e., any patch of forest currently greater than 50 acres)</p> <p>Protect all floodplains and riparian zones, including reclaiming them (see other conversions for more info).</p>	<p>Big focus would probably be Northwest hills and the Last Green Valley Service area, as well as along all river corridors (CT River, Thames, etc.)</p>	<p>Use agricultural easements to take highest and best use (HBU) pressure off productive ag lands.</p> <p>Use working forest easements to take HBU pressure off rural forest</p> <p>Purchase or use easements on floodplains/riparian areas and combine with recreational initiatives, and habitat corridor restoration.</p>	<p>...for healthy development of soil</p> <p>...for watershed health, climate change and flood mitigation</p> <p>...for a climate resilient landscape, human health, biodiversity protection, recreational usage</p>

Scenario 3: Bootstrap World

Drivers: low government investment in environment and people build in place

Storyline:

- Staying in place as staying in CT as the climate changes
- Lot of shifts at local and state levels – waterfront properties → less valuable, hilltops more so
- Coastal areas are less valuable, inland areas more valuable
- Wealth redistribution results in population redistribution (poorer in areas prone to flooding and impact)
- Midland areas become more valuable for local agriculture - Demand for local produce increases as supply of produce from CA and the southwest decreases due to drought conditions.
- Tension between places to live and food supply
- There's a huge difference between rich and poor
- Increased demand for biofuel as cost of traditional sources of energy and heat rises
- Climate change infrastructure – deep water ports, etc. would be protected in some way
- Any of limited investment would be in grey infrastructure to protect against sea level rise, but not much money to do so.

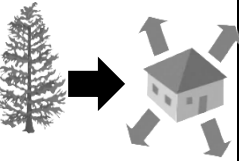
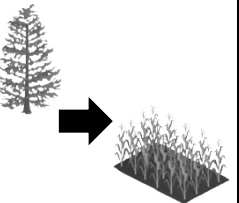


PROS:

- More of a community focus based on need.
- Nonprofit corporation partnerships.
- Corporations would start stepping up more into public sector with little to no government investors – need educated and healthy workers that have places to live!
- New development is related to migration away from the coastal corridor – both commercial and residential
- Cluster development (open space or conservation development) becomes more accepted in rural communities not due to regulation as much as necessity

CONS:

- Economic inequity is significant
- Without gov't investments and not looking at the long term, local community focuses inward, resulting in short-term perspectives and planning
- Quality of life decreases, infrastructure fails, waste water treatment fails
- What happens with public lands?
- As government shrinks investments in open space will decline
- What happens to privately conserved lands?

Table A2.15. Scenario 3: Bootstrap World

Land change	How Much?	Where?	What kind?	Why?
Forest to Development 	About the same as current	Undeveloped areas north of i-95 Corridor – fill in of suburban, large lot residential areas. Inland cities (Hartford, Waterbury, Norwich, New Britain)	Small single family homes (no more McMansions). Multi-family dwellings. Cluster development (open space development, conservation development). Co-housing.	<ul style="list-style-type: none"> • New development is related to migration away from the coastal corridor – both commercial and residential. • Cluster development (open space or conservation development) becomes more accepted in rural communities. • As density increases municipal zoning begins to shift to smaller lot sizes.
Forest to Agriculture 	~ 0 new acres	Dairy, tobacco and fallow ag lands convert to truck farms (diversified vegetable and fruit crops).	Diversified vegetable/fruit crops.	<ul style="list-style-type: none"> • Demand for local produce increases as supply of produce from CA and the southwest decreases due to drought conditions. • As food prices increase agriculture becomes more economically viable in state although energy prices continue to limit profitability. • Increase in diverse crop farms (truck farms), decrease in dairy and tobacco. So conversion is dairy and tobacco to truck farms. • More food produced in greenhouses using biofuel for energy.
Timber Harvesting 	18,000 acres/year	Primarily Northeast corner of state and Water Company lands (MDC and RWA).	Chordwood High Value Timber	Increased demand for biofuel as cost of traditional sources of energy and heat rises Timber value increases as forest matures – private owners look to extract \$\$ from holdings
Conservation 	250 acres/year	Very local and opportunistic, mostly in wealthy communities that have a more robust tax base – e.g. Fairfield county		<ul style="list-style-type: none"> • State of CT will soon reach its goal of conserving 21% of its land mass (state is currently at around 18%) • As government shrinks investments in open space will decline • As state and municipal budgets are squeezed they will seek additional tax revenues by doing away with tax incentives for conservation

Scenario 4: Mo' Town

Drivers: people build in place (for CC response) and high government investment in the environment

Storyline:

- In a case where CT not suffering as hard from major catastrophies driven by climate change → Gov't funding more money
- More people going into CT are not going to relocate.
- There is some forced migration from western U.S.
- In this scenario we can see sea large tide gates, sea walls, hardened infrastructure, spending \$\$\$ to resist sea level rise and climate change and related issues
- Would need good infrastructure
- With lots of \$ we could see big push in energy and tech innovation
- Big cheap energy advancements.
- Odd solutions like gigantic greenhouses to support ag needs, fast transportation and major city system
- Would see very large city centers, taller buildings, more rural areas and opportunities for open areas
- Investments in cities bring people in

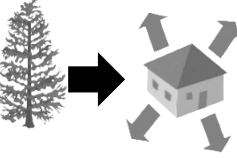
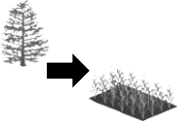


CONS:

- Run risk of high poverty
- Social stratification
- Increase in taxes and public debt! How are you going to deal with that.
- Dependency on complicated technological systems with potential for failures

PROS:

- Huge gains in energy, tech, open space
- Government investments will protect citizens from sea level change
- Government investment supports increased land acquisition for open space
- Subsidies for food production

Table A2.16. Scenario 4: Mo' Town

Land change	How Much?	Where?	What kind?	Why?
Forest to Development 	Less than current trends. ~1000-2000 acre/year?	Primarily on the fringes of developed urban centers, leveraging existing transportation and other infrastructure.	High intensity where existing infrastructure exists. Residential and commercial will occur together. The suburban sprawl will slow down. New development will occur on the fringe of urban centers, offsetting loss of coastal lands to sea-level rise.	Given a scenario where emphasis of development occurs in already developed areas and building up metropolitan centers and moving away from suburbs, one would suspect a decrease in overall development trends into forested areas. We also agreed that we suspect a decreased population with an increased senior population.
Forest to Agriculture 	150 acres/ year	Rural areas.	Greenhouse productions could be more likely given improved access to energy resources.	Existing forests in CT do not have high quality soils. However given cheaper access to energy and Government investment, access to fertilizer and improved farming methods could incentivize farming in the region. A small increase in existing trends is suspected.
Timber Harvesting 	30,000 acres a year.	Northeast and Northwest CT?	?	CT will continue to have high quality woods, and current forestry is not tapping into the full potential of sustainable timber harvesting.
Conservation 	5000 acres per year	Rural, vacant residential properties.	Depending on how the government distributes the money, this could be federal state, municipal or some other owned land. Although in our initial example we imagined federal owned open space, purchasing once was residential properties.	Land value will decrease in rural areas as a result of the centralized urban development. Home foreclosures during an economic downturn would also allow for more land grabs. The government investment will also provide incentives for people to live in these population hubs.

Rhode Island Scenario Workshop Summary
November 4, 2015
November 4, 2015 Whispering Pines Conference Center

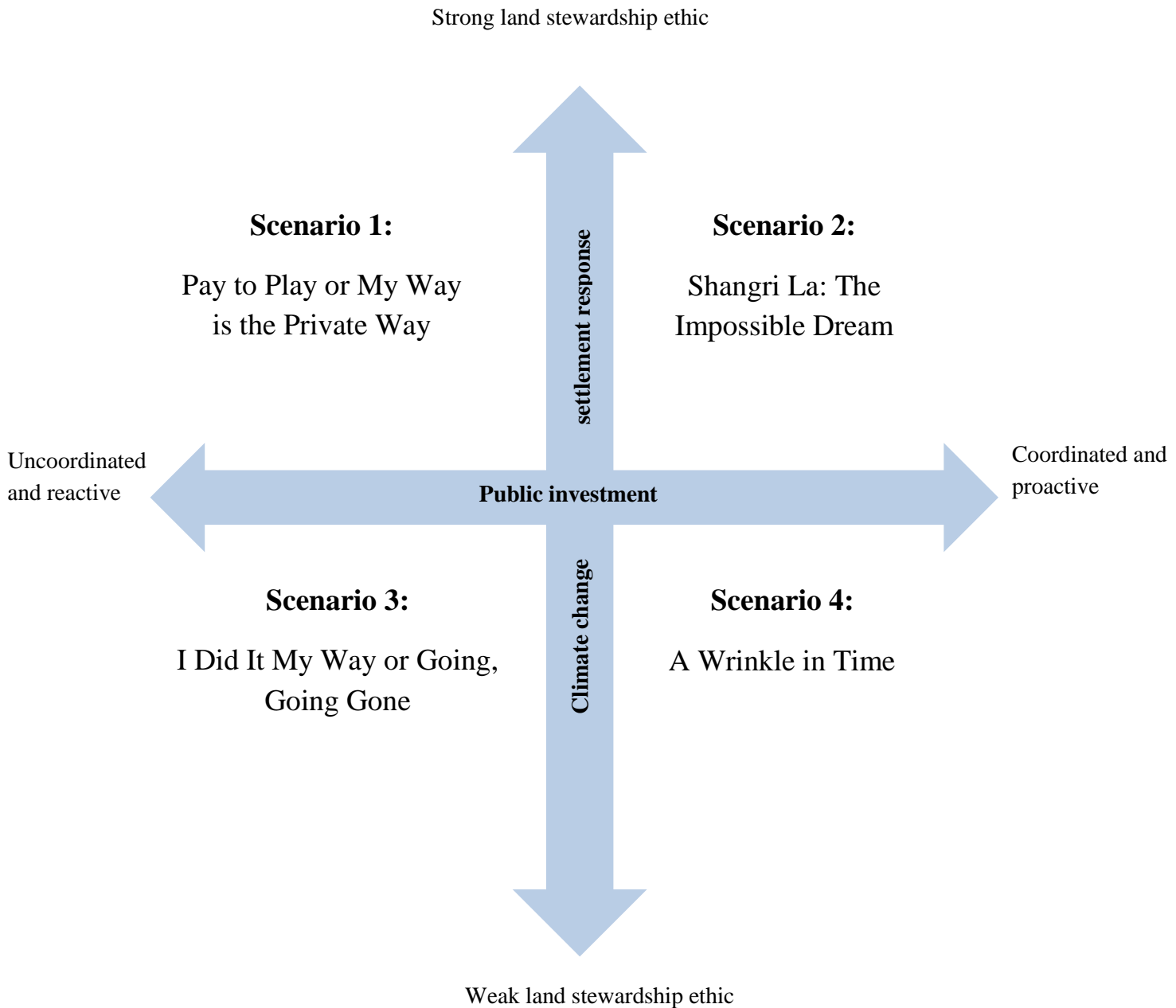


Fig. A2.5. Rhode Island scenario matrix

Scenario 1: ‘Pay to play’ or ‘My way is the private way’

Drivers: strong land stewardship ethic, uncoordinated government

Storyline:

- Privately funded innovation without government support is a feature of this approach. fshoots
-
- Strong, very engaged NGOs,
- Ecosystem services become the framework for land conservation.
- Zero investment in transportation, but people’s cars would become more efficient, etc.
- By 2060, all land in the state would either be conserved or developed, and would now be in a process of a reclaiming land for more development.
- Awareness and engagement was high, which was an outcome, due to work by private and public non-profit, working at having people understanding the benefits – engagement people from a young age, etc. That would be how we got to the point of having a strong stewardship ethic.
- The state population is stable. Lots of outside the state landowners, and visitors.
- No coordinated response to climate change. Somewhat of a free for all.

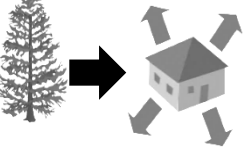
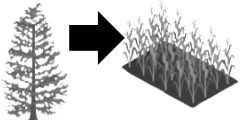

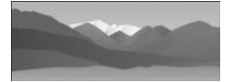

PROS:

- Lots of value-based partnerships generated as a result of lack of government involvement, so groups around RI have incentives to work together.
- Strong land-stewardship ethic, but only 5-10% of population has access to land
- High engagement in local economy by private citizens
- High energy costs may drive efficient transportation and energy sectors
- The conditions foster a ‘creative’ economy – forces working on it rather than largely STEM economy that is, for example, already developed in Boston.
- Public perception for conservation land is good, but not a lot of public access.
-

CONS:

- Lack of socio-economic diversity and most disproportionate impacts to disenfranchised.
- Lack of access to protected land, most land is privately protected
- More income disparity
- No coordinated public response to climate change. Private landowners left to deal on their own with their own property, problems etc. Lots of climate change losers.
- High energy costs
- Under-utilized and underfunded public land and spaces
- More sprawl, more McMansions in the woods, pressure to develop more remote area.

Table A2.17. Scenario 1: Pay to Play

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	Similar trend to what has been occurring	Desirable rural location → coastal, scenic viewsheds	McMansions in the woods	McMansions in the woods, limited control to direct growth = sprawl Increased residential development in desirable rural areas (remote)
Forest to Agriculture 	Very little Similar to current trend	Suburban ring -Not in rural or urban areas → in these areas ag will increase through other means	-Mostly redevelopment of urban areas into farmland -Reclamation of fallow land Some reclamation of young forests <ul style="list-style-type: none"> • Gentlemen farming • Value-added farm enterprises 	Increase local food economy, but trend to redevelop or reclaim residential or urban or fallow ag land.
Timber Harvesting 	A lot → 5Xs current rate	-Private managed lands (for biomass and forest health) -Public lands in an unmanaged fashion (for biomass)	-Increased harvest for biomass -Increased forest management on private lands (but not state land) -Potential energy poaching on public land, increased pests and decreased forest health	-Increased energy pricing -Increased land stewardship /forest management on private land
Conservation 	<p>Total number of acres protected</p>  <p>Pace is steady until no available land left to protect (interest increases, funds decrease).</p>	-Unmanaged public lands more affluent communities -Coastal, rural, urban areas	-Primarily private conservation easements -Increased fire risk on conserved lands	Strong engaged private land trusts and NGOs drive conservation.

Group B: ‘Shangri la - the impossible dream’

Drivers: strong land stewardship ethic, (LSE) and very coordinated government structure.

Storyline

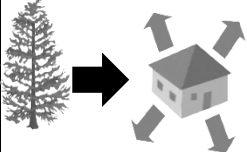
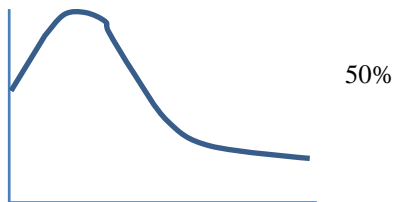
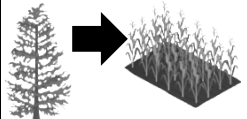
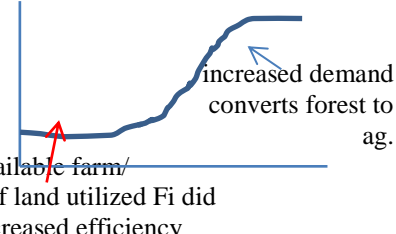


- This is a pretty good combination, assuming that the government isn’t all controlling – and is coordinated in the right way.
- Stable population growth, because of government incentives and polices concerning smart growth
- Housing that was available and affordable, but the whole cultural composition of our population would be diverse, with a lot of people living in the urban and village centers, due to the smart growth polices of coordinated government’s polices – resulting in a good balance of conserved land and protected natural resources, as well as working forest and farm landscapes, and village centers.
- Plenty of farms and farm lots. And because of this strong land stewardship ethic, population is well educated and engaged and there is strong demand for local produce – so that 50% of consumption comes from local growth
- Coordinated energy structure due to government policies: a lot of the energy is in renewable resources.
- There has been adequate funding of the stewardship and environmental agencies to protect and enforce the environment laws, that the engaged and informed public with strong stewardship ethic leads to support of private land, and lots of volunteers that go out and battle invasive plants, support need to control deer population, etc.
- Lot of outdoor recreation opportunities while still protecting the quality of the water, etc.
- Strong coordinated government that also knows when to step out of the way of strong, engaged citizens. Government does what needs to be done and does not control everything but facilitates things.
- Climate change- coordinated government is able to rise to this challenge, steer development away from the coast, respond proactively, etc.
-

PROS: All pros!

CONS:

- If the government does overstep and becomes too strong, too proactive at that scale, there could be some negative results including pushback from well-educated public that doesn’t want so much government
- If this scenario is too desirable, people want to come in (immigrate) all the time
- Another comment from a different group – may be a bit like Scandinavia? (High cost of living, people wanting to move there.....)

Table A2.18. Scenario 2: Shangri la: the impossible dream

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	Average/year = 50% of current rate 	Around town centers in clusters	Infill re-development Residential Senior-care and housing Energy development	Smart-growth and steered development into population centers
Forest to Agriculture 	10% increase 	New plots and expanded existing farms near towns. State and NGO lands leased to farmers.	Pasture/Hay River bottom land to row crops Orchards	Locavores drive increase in local food production.
Timber Harvesting 	increase of harvests 2% → 5% over time 5% of acreage/year thinning	Suburban and rural <ul style="list-style-type: none"> • private landowners • state lands • Land trusts 	Sustainable harvest due to increased stewardship Some high grading occurs <ul style="list-style-type: none"> • increase in White Pine • Decline in oak Increase in Black Birch and Red Maple	Increase demand for local wood products Increase value of the timber Gov't incentives to improve forest health and carbon sequestration Gov't tax policies
Conservation 	Some increase in protection once increase in funding occurs	High value cropland in and around Bay Expansion of existing management areas	Conservation easements for agriculture land Expansion of state management areas	Increased land prices, competition for uses. Increased government incentives

Group 3: 'I did it my way' (Going, Going, Gone)

Drivers: uncoordinated government, weak land stewardship ethic

Storyline:

- Self-interest rules, there are many roads and also ghost towns
- State agencies disappeared due to lack of funding
- Unless there is concern about water quality, there's no land conservation. People do not see natural resources as valuable. Sand and gravel are major resource industry.
- A 2060 land use map that is 20% open space, 50% residential, 5% industry (sand, gravel - but 30%) of the economy, and 25% retail
- Where folks do not see natural resources as valuable and do not recognize these are critical part of the economy
- 'Road state' – changed the license plate from 'Ocean state'
- The mall of New England constructed in 2050. Charleston is still green, but much smaller due to sea level rise, Exeter is completely built out.
- Each municipality is doing its own thing. There are 39 different forest and water control boards. And there are no land use controls
- Absolutely no local food production, bring in food on great roads from CT
- AAA pays for 3 comfort stations local highways because drivers are not using I-95 because of the toll
-

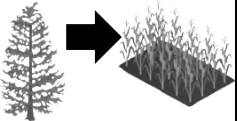

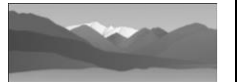
PROS:

- Really good roads and bridges, which is something we've been lacking. More tax revenue for bigger municipal government.
- Strong industry in sand and gravel.
- Providing cheaper energy but depleting our resources.
- Sand and gravel are a major part of the economy

CONS:

- No local food production
- Increased disparity in income. Land ownership, only in a few private individuals
- Absentee ownership – lots of land owned from people overseas.
- Natural resource depletion

Table A2.19. Scenario 3: I Did It My Way

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	1,200-1,800/year (3 times recent trends)	Outside current urban growth boundaries	Low density sprawl and commercial development	No incentives for conservation (tax, other) drive forest conversion to more developed land uses. Expansion of urban services boundaries.
Forest to Agriculture 	1,000 acres in 10 years (90% reduction)	Concentration into larger farms away from urban core	Expansion of existing farms, urban farms and garden plots	Lack of stewardship ethic diminishes importance of local food supply and agriculture. Land ethic encourages land consumption not for long term-sustainability.
Timber Harvesting 	7% per year	Suburban and rural towns	hi-grading	Short-term economic impact by loss of forest through conversion to more developed land use
Conservation 	Less than 200 acres/year	Small parcels located adjacent to other conservation areas	Focused on water supply protection conserved to protect recreation/scenery in wealthy communities.	Lack of government coordination and incentives Developed land uses considered more economically beneficial There is interest in conserving water quality.

Scenario 4: A Wrinkle in Time

Drivers: weak land stewardship ethic, strong, coordinated government

Storyline:

- Cookie cutter houses, kids all going in for dinner at the same time, etc.
- No one wants to use the land or recreate in open space
- Government tries to provide for material needs for the people at the lowest cost
- Village focused development and Smart Growth – promotes nucleated living patterns because cheaper for the government to provide clustered services, e.g. cheaper to run buses, etc.
- Promotion and incentives for small business – government listen to their analysts, which means that jobs are promoted at the small business level (rather than aim for getting the Toyota factory once every 30 years)
- There is government interest in ecosystem services as more cost effective than replacing them with engineered systems. Government’s analysts on this – good analysts and they would be listened to
- The conservation lands would look like the Providence Water Supply Board. Wouldn’t need to fence it or put signs because no one wants to go to the woods.
- No one cares about the woods except the government, and only as long as providing clean water and storm/flood protection, etc. (e.g. a bit of vulnerability because if the accounting changed, then
- Would not conserve rare species – because no rare species that are economically valuable (so disappearance of rare species).
- Energy costs, - the group couldn’t decide on how exactly it would play out for energy production. Might be that energy decides that hydro-energy imported from Canada might be the way to go, or might be technology for local generation energy has improved, so then incentivize it, etc. It was clear that energy costs were high, the scenario would be reinforced, and it would be incentivized to cluster, and use little energy. And if low energy costs, the government doesn’t much care if people are out in the sticks/rural areas, drive SUVs to work etc.
- As there was a powerful government, in contrast there would be a few and not very powerful NGOs.

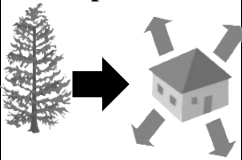
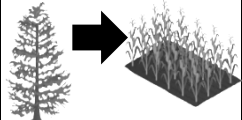


PROS:

- Would have beneficial conservation effects through interest in conserving ecosystem services
- Coordinated government response leads to smart growth, energy efficiency, strong local economies

CONS::

- No trails, or signage, etc. on conservation lands
- Conservation lands would be at risk, because their value is determined only by the ‘economic’ equation, and no other value attached (so could be vulnerable in that sense)
- People wouldn’t care to go outside. Instead looking at IPADs, or do other activities on actor-turf

Table A2.20. Scenario 4: A Wrinkle in Time

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	< 19% of current rate	Fringe of existing development and fringe of agriculture.	Compact mixed use	Smart growth
Forest to Agriculture 	Significant increase over current rate accelerating for 20 years then trailing off	Around existing agriculture	Conversion of forest land to pasture	Small business benefits of local agriculture continues
Timber Harvesting 	Increase of less than 10% over present rate	In present forests	All types	Encourage small business but may be limited market for timber
Conservation 	Rate of conservation slows by 2/3rds	Around assets that provide ecosystem services	Little land being protected in perpetuity for habitat instead being set aside for ecosystem services	

New Hampshire Island Scenario Workshop Summary
November 16, 2015
Robert S. Pierce Laboratory, Hubbard Brook

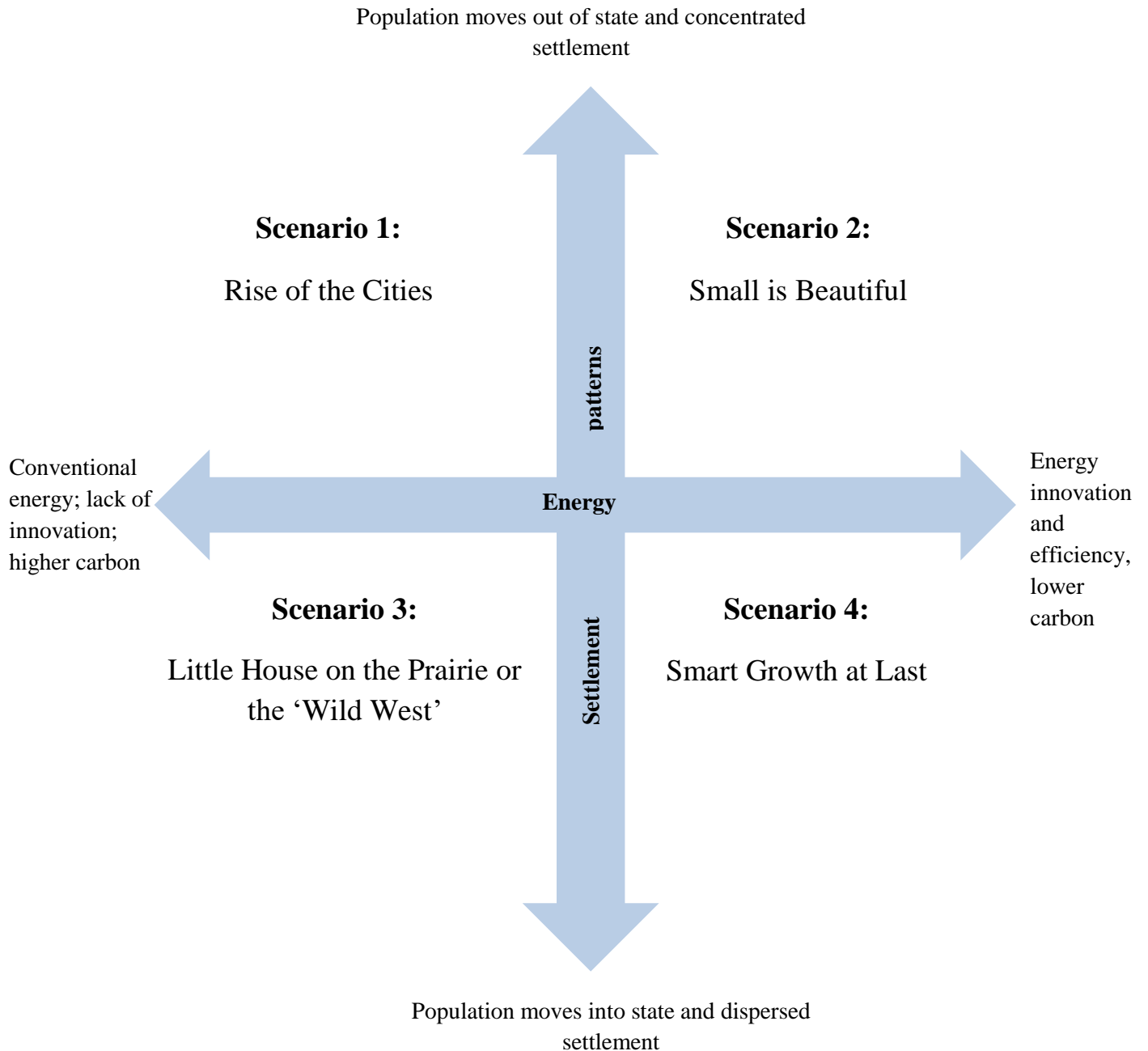


Fig. A2.6. New Hampshire scenario matrix

Scenario 1: Rise of the Cities

Drivers: conventional energy, higher carbon, loss of population and concentrated settlement patterns.

Storyline:

- Rise of the cities – high carbon, urbanizing, net loss of population
- Get there by continuing what we are already doing, we get older, move to urban areas with better services. Kids do too because there are no jobs in the rural areas.
- Don't change energy policies and don't actively manage the future
- No economic development
- Forests remain mostly forested. Loss of population in Northern part of state. Derelict towns due to population loss
- Because high carbon future, increase infrastructure, so cities now exist without the resources to address them (?)
- Potentially land becomes cheaper, which could make it a bit easier for land conservation, but kind of like what's happening in Burlington
- A wild card in terms of impact of climate, because if there are severe climate impacts, then people moving in, could be conflict.
- Economic gradient – poor rural areas and more affluent cities
- Possible expansion of second homes
- Continued current forest management practices and lower diversity of forest species due to CC.

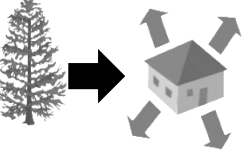
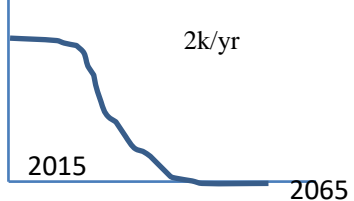
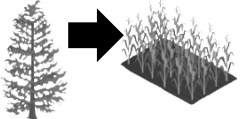


PROS:

- Southern New Hampshire could be a nice place to live with more vibrant city and town centers
- Potentially more local agriculture in southern portion of the state
- Forests remain forested
- Less pressure on resources

CONS:

- High disparity between economies of northern and southern NH
- Increased income inequality
- No active management of the future
- More pressure on infrastructure in cities
- Ghost towns in North
- Displacement of populations by severe climate change events
- Movement into urban towns which tend to be near water could present problems with climate change
- Increased forest disturbance from forest pests and climate change

Table A2.21. Scenario 1: Rise of the Cites

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	Lower than recent trends. Net loss = 0 acres/year 	1. Loss of forest around cities south of White Mountain National Forest. 2. Gain of forest in rural areas.	Residential; high density patch expansions around cities.	-People leaving rural areas and development concentrates in cities. -Forest loss around cities balanced by forest gains in rural areas.
Forest to Agriculture 	Near term Increase in rate of conversion followed by decline and stabilization at 12% if state in 2060	Prime ag. Soils, gentle slope in rural areas in vicinity of urban areas south of White Mountain National Forest	Cropland on undeveloped prime soils; remaining pasture	High energy costs makes food transport more expensive; longer growing seasons, local food movement, climate change impacts to major agricultural regimes.
Timber Harvesting 	Increase to 75K/Year in 2060	Continuation on current managed lands; increase from family forests south of White Mountain National Forest		-Increased demand for wood -increased cost of transport from outside region due to energy costs -rural poverty/economic need -demand for firewood because of high energy costs -sale of family forests to timber interests
Conservation 	Increased rate of conservation over next 25 years, then decline until 42% if state is conserved in 2060	Larger family forests; commercial lands in Coos County	Mostly easement; public and NGO fee purchase of high value lands (continuation of current pattern)	-Larger family forest owners (both conservation ethic and financial incentives) -Cheaper land due to rural poverty -urban populations desiring natural amenities

Scenario 2: 'Small is Beautiful'

Drivers: declining, concentrated population, innovative and efficient energy

Storyline:

- Declining population, low carbon energy footprint
- Young people have been moving out of the state to find good jobs, more vibrant culture, etc.
- Remaining population moves back to village centers and population concentrates.
- Economy declines, only rich, well-educated can afford to remain, young have moved
- Community solar farms around the landscape.
- New farms are built to be energy independent.
- Ring of ag land around developed core – back to village concept
- Seeing less cars and more reliance on transportation hubs.
- In villages, more sidewalks and trails to avoid car use.
- Affluent population, can rely more on local food, which leads to supporting local agricultural land.
- Another perspective – counter to the above, there is some possibility that young might actually find jobs, there may actually be opportunities with the new energy
- More seasonal population, possibly more second homes.

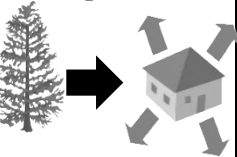
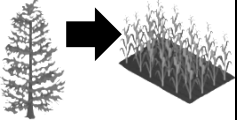


PROS:

- Energy efficiency and independence
- More reliance on transportation hubs
- More village development and more sidewalks and trails to avoid car use
- Support for local agriculture and much of ag. land is under permanent protection
- State remains an outdoor recreation destination
- Health benefits

CONS:

- Economy declines
- Taxes high to support services for small core population
- Diversity low
- Healthier population

Table A2.22. Scenario 2: Small is Beautiful

	How Much?	Where?	What kind?	Why?
Forest to Development 	Limited and possibly no net loss of forested landscape		Impact on urban shade trees Landscape impact unknown	Decreased and dispersed population and clustering in cities
Forest to Agriculture 	10% conversion of forests to agriculture	Close to population centers	Conversion to small parcel agricultural	More local food interest and dependence
Timber Harvesting 	55% of the harvestable acres	Developed areas Agricultural conversion Northern Forest	Low intensity, sustainable forestry	Primarily for local markets; lumber firewood, pellets, biomass
Conservation 	25% of New Hampshire would be conserved	Ag soils around water resources	Conservation easements	-More land available and cheaper as it is vacated. - Increasing demand for outdoor recreation. -Land conserved for legacy.

Scenario 3: “Smart Growth at Last”

Drivers: population moving in, dispersed settlement patterns, energy innovation

Storyline:

- Every acre is being used in some fashion (this drives the need and interest in smart growth)
- Follows the idea of ‘dispersed clustering’ – population/settlement patterns dense in places where there is a town, but these town centers are far apart and there is a large development imprint on the landscape
- Perhaps because of population growth and development people recognize the value of the landscape and try to cluster growth where possible
- Landscape looks like New Hampshire in the 1800’s. Land use is fairly scattered, more farmlands to grow more fuels, on good soils.
- There are migration pressures from Southwest United States, and areas drying up, and pressure from coastal regions with sea level rise.
- Development builds outwards from the town centers
- Transportation maybe shifting towards tele-commuting with more innovative transportation patterns generally
- Energy could be produced on rooftops, wind etc.
- Some uncertainty about social equity – who can afford living in these places. Some in the group not sure about distribution of economic classes
- The entire landscape is put to use

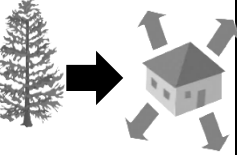
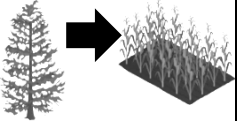

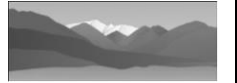
PROS:

- Recognition of the need for smarter, planned town centers and clustered growth
- Forest land is valued in this innovated future, and to deal with it, there would be the clustered smart growth to avoid misuse/opportunity costs.
- Maybe climate pressures are being alleviated by shift to local food sources, less transportation, etc.
- Wildlands valued and used for carbon storage, wildlife, etc.

CONS:

- Much of the landscape is used for housing, forestry or farmland
- Significant pressures on natural resources
- Increased patchiness in landscape for food production and development
- Possible social equity issues and greater disparity between rich and poor across the landscape
- Possible conflicts around increasing demands for resources and sustainable use.

Table A2.23. Scenario 3: Smart Growth at Last

Land use	How Much?	Where?	What kind?	Why?
Forest to Development 	4,5000-5,000/year (assumes 1,807 is accurate for last 15)	State-wide Adjacent to existing centers	But denser on each converted acre	Population growth (in-migration)
Forest to Agriculture 	2,000 acres/year	Distributed statewide	-prime soils where applicable -more marginal soils where justified by markets, etc. upslope	Growing more food locally (both by choice and necessity)
Timber Harvesting 	75,000 acres/year	Statewide	-Lots of initial low-grade for biomass -thinning for saw timber (for long-lived products and carbon sequestration)	-More local wood production -Sequester carbon -Housing more people
Conservation 	15,000 acres/year	Statewide	Targeted to purposes under why	<ul style="list-style-type: none"> • permanent green infrastructure for • food and fiber • carbon sequestration • water quality and quantity • biodiversity • storm water mitigation • recreation

Scenario 4: “Little House on the Prairie” or “The Wild West”

Drivers: population moving in and dispersed, conventional energy and higher carbon

Storyline:

- Looks a lot like today, but a more extreme trend in that direction
- The wealthy folks who are able to live here have stayed
- Everything is fragmented, making it depend on where you are in the state what is going on. There are some nice village centers in the south of the state. The North is very poor.
- As real estate prices collapse, then people live in poverty, and extract whatever they can (eking out a living, maybe gardens, etc.?) from the landscape
- Still have to be increasing the carbon production, so the group had a question
- Question the group had: not sure if these can co-exist. (E.g. carbon prices go up, so can't afford to live there. Or the weather changes, and washes out the roads
- Little to no investment in transportation.
- What would civic engagement look like? Would wealthy populations just keep to themselves, or there is the possibility that they are more civically minded.
- Different looking forest both because of forest management practices or because of the climate
- Infrastructure is dispersed, which brings up the issue of sustainability and whether you can keep it going.
- Kept thinking that would self-regulate. E.g. if a high carbon price future, how could people afford to live? People who can't live there, end up clearing their whole wood lot just to survive. While people who can afford, can drive anywhere.
- What happens to forest management and timber harvest under this scenario?

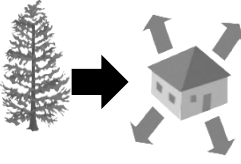
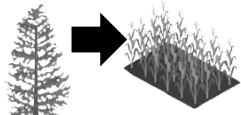


PROS:

- Some possibility of self-regulation at some point in the scenario to try to fix energy situation.
-

CONS:

- Public land access goes out the window.
- Poor land use practices

Table A2.24. Scenario 4: Little House on the Prairie

Land use	How Much?	Where?	What kind?	Why?
<p>Forest to Development</p> 	<p>10,000 acres per year</p>	<p>lots of 10-40 or 100 acres being broken into bits following roads.</p> <p>Also more lots being broken up in areas with “good schools,” etc.</p>		<p>All the population growth is disbursed</p>
<p>Forest to Agriculture</p> 	<p>10,000 acres per year</p>	<p>Some on best soils (“real farmers” Some in backyards of newly fragmented lots</p>	<p>Associated with residential</p>	<p>-abject poverty - increasing self sufficiency -wealthy hobby farmers</p>
<p>Timber Harvesting</p> 	<p>20,000 acres + increase in short term (liquidation associated with subdivision)</p>	<p>Settlement patterns</p>	<p>To supply energy, diversion to subdivision</p>	<p>One time, then eventually harvest rate falls b/c tracts are not of manageable size (may take 30-50 years to see this tail off)</p>
<p>Conservation</p> 	<p>Decrease to 50% of current rate</p>		<p>Public access preservation of resource attractions</p>	<p>b/c less land is intact + worthy of conservation; generational because transition in ownership is over because government funding is constrained by other needs (energy/climate related)</p>