

**Appendix 1.** Hypothetical socioeconomic scenarios for the year 2100 presented to the workshop participants. Scenarios narratives are based on Thorn, Wake, Grimm, et al. (*unpublished manuscript*).

## **1. Backyard Amenities Scenario**

*Economic Growth and Population:* In this scenario, development is driven by a combination of high population increase, relatively weak regulatory environment, and robust economic growth. Economic growth follows the path of least resistance. The added value of new businesses and jobs is siphoned away by the costs of the development pattern that continually demands new buildings and the expansion of infrastructure needed to reach and service them. Growth focuses on the service industry. Regionally, growth is concentrated in the southern half of the state.

*Policies and Behavior:* Public opinion shifts towards supporting expansive land development with jobs that create a short-term boost for the economy. Fewer *federal* and *state* public funds are available for land protection and more are directed toward initiatives and efforts in support of development of land for residential and commercial use. *State* agencies are left with a smaller number of less comprehensive statutes and regulations to implement or enforce. Landowners receive tax breaks and other financial incentives to make existing forested and agricultural land available for industrial parks and residential subdivisions.

*Transportation:* The significant increase in population leads to an increase in cars and trucks on the road. There is also an increase in the number of roads and the width of major highways (NH Routes 16 and 101; Interstates 89, 93, and 95); some intermediate road become four lane highways (e.g., NH Routes 13, 28, 9/202, 125, 11, 4). Overall, there is an increase in impervious surfaces.

*Water and Sewer Development:* The expansive and dispersed development pattern makes investments in public water and sewer infrastructure impractical and unaffordable. Wells and septic systems associated with individual buildings expand across the state with little to no regulatory agency capacity to monitor and enforce water quality standards. Runoff from increased impervious surfaces flows directly into the state's water bodies.

*Biomass and Hydroelectric Energy:* Rapid conversion of forest land for residential, commercial, and industrial development leads to liquidation harvests in developed regions (primarily the southern half of the state); part expansion of biomass for thermal energy and large scale (albeit

low-efficiency) electricity production. Small scale hydro-electric stations remain difficult to permit as there is no focused state-wide energy plan.

*Developed Land.* Increased population is accommodated primarily in single-family homes on large lots built outside of urban cores where land costs are lower and municipal services are lacking. To facilitate development, new roads are built, opening additional fringe land for future development. Residential zoning changes when 50% of a municipality is filled with development, such that one acre of land must be conserved for every acre that is developed. When 62% of a municipality is developed, residential zoning changes again such that three acres of land must be conserved for every acre that is developed.

Undeveloped land is also converted to be allocated for the services and industrial sectors. Most of the expansion is seen in the services sector and occurs primarily in and around those areas where an increase in residential housing is anticipated. Some of the growth also occurs in existing urban centres. Land allocation for the industrial sector is modest and is concentrated around existing industrial sites. Commercial and Industrial zoning policies exist and are similar to residential zoning policies.

*Conserved Land and Wetlands.* The strong pressure to develop combined with local resistance to private conservation results in a significant reduction in the rate at which land is conserved. In areas with high development pressure, marginal wetlands are drained, and construction occurs along the shores of waterways in floodplains and zones previously designated as riparian buffers. However, within municipalities, as forest and open space are filled, local pressure to set aside conserved areas results in cluster zoning. Conserved areas are generally managed for recreation and aesthetic values. Well-groomed trails are prioritized above habitat, carbon sequestration, and other ecosystem services.

## **2. Community Amenities Scenario**

*Economic Growth and Population:* In this scenario, development is driven by moderate to high population increase and a strong regulatory environment. Economic growth takes place within urban cores and village centers, primarily in areas already served by existing infrastructure. Investments in education and workforce development raise the skill levels of the workforce, which in turn attracts new high technology and specialized manufacturing industries. Growth within existing population centers is relatively uniform statewide. Depending on how the market evolves, however, there may also be accelerated economic inequality under this scenario as

homes in urban centers become ever more expensive and out of reach of all but the extremely wealthy.

*Policies and Behavior.* In response to the effects of climate change, public attitudes shift toward valuing the collective needs of the state over the particular desires and needs of local communities. Environmental public awareness increases the general understanding of the value of ecosystem services and support of relevant regulations. Environmental regulatory frameworks support statewide land protection and smart growth development, and discourage sprawl and uncontrolled development. State agencies are funded to plan, implement, and enforce the new regulations.

Policies at both *state* and *local* levels support conservation and management of land and forests for their multiple uses and ecosystem services. Tools such as tax incentives and matching funds programs support private landowners' efforts to conserve land for forests and agriculture under stewardship or other management plans. Similar policies and programs support growth of markets that support the development of renewable resource products, including those obtained from conserved lands. Local conservation of water resources is incentivized through tax breaks and other financial tools to ensure protection of watersheds. Universal buffer regulations protect all wetlands and surface waters across the state. Performance zoning, which focuses not on a parcel's use but its performance and how it relates, interacts with, and impacts, surrounding areas, replaces district zoning, encouraging smart, clustered development.

Taking advantage of financial incentives business and industry moves from suburbs and sensitive areas to renovated spaces in city and town centers. Policies encourage construction of higher residential dwelling densities, and clustered, mixed-use, or re-use types of development with a broad range of housing choices. Residential subdivisions and high-rise buildings are regulated to promote green site design and infrastructure, alternative storm water management, and livable, walkable communities.

*Transportation:* Substantial public funds are allocated to building and maintaining public and non-motorized transportation between and within population centers. Due to increased investment in pedestrian and bicycle infrastructure there is an increase in bike lanes and pedestrian walkways. The number of roads does not increase; however the maintenance of existing transportation infrastructure becomes a priority. Overall, there is a small increase in impervious surfaces

*Water and Sewer Development:* Concentrated redevelopment creates opportunities and incentives to invest in public water and sewer infrastructure. The opportunities come from the cost savings generated from fewer miles of pipes and the incentives come from having an increased number of paying users. Sewage managed by centralized facilities is converted to fertilizer for export or use within the state. Sustainable management of surface water runoff through low impact development techniques is the norm across the state.

*Biomass and Hydroelectric Energy:* Only sustainable harvest of biomass occurs in the state to meet the growing demand for heating, as well as co-generation facilities. Hydroelectric energy increases in the form of run-of-river generators, even as dams are removed to enhance habitat for fish and to improve flood management. The site evaluation committee sets aside large tracks of land (including conserved land) for renewable energy projects (wind, solar, geothermal, and wave).

*Developed Lands.* No additional land is developed beyond what is already developed. Instead, urban cores and village centers are redeveloped to accommodate expanding populations. Population densities in NH's cities and villages increase, but so do the economic, social, and cultural vitality of town centers. More people would be able to walk to buy a gallon of milk and a cup of coffee and visit with friends and neighbors. Redevelopment may take various forms. One way to increase density is to transition to smaller lot sizes for houses, or allow more than one house to be built on existing one- and two-acre lots. Increasing density attracts aging seniors and young professionals to urban cores and village centers. Depending on shifting markets, rural housing may either become more or less expensive, as the cultural shift toward urbanism is balanced against the lack of supply of new housing in remote locations.

*Changes in Conserved Land and Wetlands:* There is an expansion of conserved areas and additional protection for all wetlands.