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The Future: Implications for Forestry Research and Education

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It was an honor to be asked to speak to you today on my perspectives on the future that will serve as the **backdrop** for using and managing this country's forests and their associated resources. I will leave it to the rest of you and your deliberations over the next day and a half to explore more completely the implications for forestry education and research.

Though flattered by the invitation, I admit to asking myself, "Why am I here?" Was I asked because I, perhaps, have given more speeches on this subject than anyone else, (attesting to my age not by brilliance) or at least more than anyone else who is as available on the cheap? But, Why me? In the past I have often called it wrong. In the late 60's I, along with many others, wrote of the coming decline in the workweek and a concomitant increase in leisure time due to efficiencies created by cybernetics. **WRONG!** In the late 70's early 80"s, as part of the RPA process, we predicted that, because of high energy costs, both spouses working, and

fewer children per family, houses would be smaller and apartment living would grow—again **WRONG!** To salve my own ego, I will take credit for getting it right occasionally—the role of women in the work place and how that would affect the Forest Service, society's changing attitudes about forestry, and unfortunately the advent of small scale terrorism. And to further justify my errors, I wasn't alone in making mistakes. No matter how elaborate the model or wise the forecaster, estimates of change are always partially wrong.

Even, the knowledge that all forecasts are partially wrong is little comfort to me. Ray Kurtzweil, a person experienced in exploring technological change, claims that the rate of technological innovation in the 21st Century will be a thousand times what it was in the 20th. Okay, assume he is partially wrong and it is only 750 times as great. This kind of change is beyond my imagination.

The point of this already too long introduction isn't self-deprecation or even humility, it is to emphasize that while you may not be able to predict the future in precise detail, you can prepare for it. Or as one sage warned, "A bend in the road is not the end of the road…unless you fail to make the turn." (Anonymous). The turn, however, isn't necessarily easy. I can relate to E.B. White saying, "I wake up every morning determined to change the

world and have one hell of a good time. Sometimes this makes planning the day a little difficult." Okay, enough excuses, let's move ahead and explore this future.

What is a useful time frame when we think of the future? I have chosen 15 to 25 years in the future. I pick this time frame for two reasons. First, some years ago the US Forest Service studied the forestry research process in order to convince Congress that the benefits of research far outweighed the costs. During that study it was determined that on average the time from the inception of a researchable idea to the implementation of research results ranged from 15 to 25 years. With similar reasoning in designing education programs, we should keep in mind that next years freshman class may spend 4 to 8 years on their formal college education followed by 10 years or so in an apprentice-type position. They will hit their stride as decision-makers 16 years or so years from now. Thus, in selecting research topics or designing curricula, it is useless to think of time periods shorter than 15 years, and folly beyond 25 years. Beyond 25 years the potential of "trend shattering" replacing "trend bending" events becomes more probable making speculation less certain than the flip of a coin. Perhaps I am also motivated by the recognition that it is actuarially reasonable to believe I will not have to answer for more mistakes if I choose a period 25 years hence.

There is so much one should cover, but I will limit myself to considering five:

- Globalization
- Population and global carrying capacity
- Consumption and leisure patterns
- Environmental concerns and affronts
- The societal mind-set

I pick these five not because they are new to you. Everyone here is familiar with them. I want to add an exclamation mark to them. They are not in any order of priority, because they are so interconnected that priorities make no sense.

Globalization

I start with globalization, because it is perhaps the most all encompassing (geographically, socially or economically) of the trends selected. While the term has crept into our everyday speech, I contend that most people, including politicians, agency administrators at the highest levels and the press simply **don't get it**. Most of the discussion regarding globalization is protectionist in hopes of keeping jobs in the United States, opportunistic in hopes of generating markets for US products, or critical in the transferring of environmental or social problems between national

boundaries. Many, depending into which of these camps you fall, simply promote turning the spigot of trade up or down. As important as these viewpoints may be they miss the point as to how all encompassing the impacts of globalization are. Just as strengthening levies may have reduced the impacts of Katrina on New Orleans; it would not have reduced the size of the hurricane. Similarly, we may be able to ameliorate some of the local negative impacts of globalization, but we won't stop this hurricane. What's the evidence?

If we rank the world economies from largest to smallest, e.g. United States, Japan, Germany, etc, by the time you get to number 23 you come to General Motors, which is bigger than Denmark. Mitsubishi is bigger than Israel, and Wal-Mart is bigger than Poland. Therefore, economic and political power is not limited to nation states alone, and it is in the interest of the corporate sector to increase global markets and to search for the cheapest locations to produce their goods and services, AND THEY WILL. Okay so that's the logic of where global muscle might be flexed, but what is the evidence that this power is earth shaping? Much of the common discussion on globalization focuses on made ***over there*** as opposed to made **here**. However, my Toyota Tacoma was assembled in the United States. But that is not unusual. It is the norm. One half of the parts of all products

produced in the United States come from other countries. Similarly, do US firms move abroad to simply save money on products they will sell at home? "According to the U.S. Commerce Department, 90% of the output from U.S.-owned offshore factories is sold to foreign consumers"[1], not to U.S. consumers.

But globalization is more than international trade. The Houston Aeros and the Huston Rockets home stadium is the Toyota Center. So what do we mean by "foreign" as in foreign made? If my Toyotas is a foreign vehicle, is the Houston Rockets, with stars like Dikembe Mutombo and Yao Ming who happen to play in the Toyota Center, a domestic basketball team? So what is foreign made—where the natural resources originate, where the parts are manufactured, where the assembly plant is located, where the corporate headquarters is located, or where the investors live?

But this is only the beginning. The ubiquity of information shared through a wireless communication network, computer chips that are so small we can't see them with the naked eye and so cheap that the package that contains the hardware is more costly than the hardware itself, most inventory stored in transit rather than warehouses, the increase commonality of English as a language of commerce, and the potential economic

[1] Friedman, Thomas L. 2005. The World Is Flat: A Brief History of the Twenty-First Century

advantages here and abroad mean that in the future that I see we need to focus on acceptance, accommodation, and improving the individual and communal fit to an economically united and politically divided world not trying to control the "category five" all-encompassing, multidirectional hurricane called globalization.

What are the educational implications for a country in which some of our best students are geographically ignorant, and the forest research community laments the movement of resources and capital abroad rather than focusing on regaining a comparative advantage in forest product and services markets in a world where the global economy will have expanded so that a surgeon in one country will perform surgery in another country by means of a successor to the daVinci robotic surgical system, where small-scale businesses have become more cost effective than large ones and where the information society has placed the individual at the center of innovation, not large corporations, and where the center of power has moved from nation-states, to corporations, to what is beyond my imagination?

Population and Carrying Capacity

If the global economy has become THE economy and the borders between nations have blurred then the fact that there will be 30% more of us

in the next quarter century cannot be ignored, because, the "us" is a global "us" not an American "us". Over a third of this population growth will occur in 5 countries: China, India, Brazil, Indonesia and Mexico. Population growth alone, however, tells us little about the demand for forest resources. If you combine changes in population with an estimate of economic growth you come closer to an answer. I have updated the numbers in a 1989 calculation by Gus Speth,

"Speth (1989) calculates that it took all of human history to grow the $600 billion global economy of 1900. Today the economy grows this amount every two years. Unchecked today's $47 trillion global economy may be five times bigger only one generation of so hence.[2]

Can the world support a population and economic increase of this size? Many have attempted to evaluate the globe's carrying capacity. I'm intrigued that, over time, the number of estimates of the carrying capacity has increased and so have the range of answers. Either we are getting much dumber or there is reason that the degree of uncertainty is growing. The recent estimates range from a low of 4 billion to an optimistic extreme 25 times that size.

[2] This was adapted from Goodland, Robert, 1992. The Case that the World Has Reached Limits in Population, Technology, and Lifestyle: The Transition to Sustainability. Edited by Robert Goodland, Herman E Daly, and Salah El Serafy. Island Press, Washington, DC

Why the disparity in these estimates. Let me give just one simple example of the difficulty in measuring the supply of and demand on resources. I have been exploring an array of sources trying to understand the petroleum situation. A composite of this information suggests something like, at current use rates and one set of estimates about known and estimated reserves we have adequate petroleum to last 60 years. But estimating reserves is tricky. If we quadruple the estimate of yet unverified reserves, we can stretch oil consumption to 120 years. However, if we increase the rate of consumption by 5% a year and we use the more optimistic assumption about oil reserves, we have enough for about 39 years. A different analytical approach points to the peak in oil production coming in this decade. If one uses a similar analysis for other raw materials, and adds a further sophistication of examining the earth's ability to absorb waste, the variation in global carrying capacity is not surprising.

In my opinion, the estimate of global carrying capacity that is best documented and therefore has received rather detailed public scrutiny is the ***ecological footprint*** developed by William Reese and refined by Mathis Wackernagel. Their estimates indicate that we began to exceed the earth's long term carrying capacity by the late 1970's, and that today it takes about 1 year and two months for the earth to replenish what we consume in one

year. Are they accurate? I don't know. Would I ignore them if I were examining the role of renewable resources, especially the role of forests in the future? Absolutely not! We haven't yet begun to adequately appreciate either the necessity or the potential of renewable resources. Sure, there is current research on improving species selection and growth of trees for biomass or improved methods of burning or gasification. But this is too limiting. This marvelous renewable source of fiber, sugars, and polymers should be explored as one of the most exciting chemical feed stocks that could be made available on a continuous basis.

Consumption and Leisure Patterns

While 30 years ago I was incorrectly suggesting a decline in the work week and an increase in leisure time, if one looks at two different books by Juliet Schor, one dealing with leisure patterns and one dealing with consumption behavior and a rather tongue-in-cheek book by Lynne Truss entitled *Talk to the Hand*, you get an insight into my errors. What Schor and Truss have in common are their quite different approaches to explaining the consequence to society of individuals attempting to "keep up with the Joneses". Truss, the journalist who also wrote *Eats, Shoots and Leaves*, writing about the decline in books about manners, "Old-fashioned

manners books have an implicit message: People better than you know how to behave. Just follow these rules and with a bit of good luck your true origins may pass undetected. It is no accident that the word "etiquette" derives from the same source as "ticket". It is no accident, either, that adherence to "manners" has broken down just as **money** (emphasis added) and celebrity have largely replaced birth as the measure of social status." Schor, the scholar, in response to the question, "Why are Americans over spenders", answers, "Unlike earlier times, when we took our (spending) cues from people with similar incomes, lifestyle aspirations today are far more likely to come from the lifestyles of the upper middle class and the wealthy." Juliet Schor goes on to explain how under-priced goods from Asia and South America have reinforced the accumulation of "stuff" as a measure of our success. Time will not allow me to recite her statistics on the numbers of toys we purchase per child each year, or our propensity to fill our closets with cloths which can hardly be worn because there are not enough days in the year.

While keeping up with the Joneses is nothing new, I would argue that there is a significant difference from the recent past. When U.S. consumption patterns were driven by its great middle class, a significant social problem was caused by ***poverty***, i.e. the few who weren't part of the

middle class. I contend that today our problem stems from ***prosperity***. The bell curve of income distribution is sagging with more rich and more poor people. So now 80 % of society is trying to emulate the top 20% by going into debt, comparable in motivation to those of lower birthright sharpening their manners to emulate the so-called polite society.

This portends a bleak picture of success and status, i.e. quality of life, being measured almost wholly by the amount and conspicuousness of our consumption, thus requiring more work and reducing the time available for leisure. But even amongst the "haves" in the United States, leisure is crammed into well-planned packages of 4-or-so days duration. This is reinforced by corporate-Americas desire to cut costs through outsourcing or hiring part-time employees who do not earn health benefits, retirement, or paid vacations. Therefore, leisure in the form of a casual cup of coffee or a beer in an open-air café shared with a friend is relegated to the notion of "goofing-off", a pejorative term. We, the individual and the corporation, have lost any sense of value to the employee or the employer of rest and relaxation. This is an obvious contrast to France where they close the country for the month of August. No wonder the language we hear at the rim of the Grand Canyon is less often English and more often Chinese or French. What does this portend for forest recreation in the future? Perhaps

it increases due to the realization that we all can't afford to go to Cancun. Or, maybe, forest recreation as we knew it in the past simply declines. Or, will virtual outdoor recreation surpass the real thing because it is cheaper, faster, and no bugs or inclement weather? Or will we need an outlet for recreation that affords some risk, even though in most of our pursuits we sue when risk turns hostile?

Affronts to the Environment

If I were to choose the resource and environmental concern that is of greatest concern to me over the next couple of decades, I would focus on water quantity and quality. But I am reminded of a quote from Daniel Boorstin,

That "the greatest obstacle to discovery is not ignorance—it is the illusion of knowledge." With this in mind, I immediately thought of provocative comments made by Gus Speth at the 100th Anniversary celebration of the Forest Service a year ago where he claimed the biggest threat to the forests of the future was global climate change. He pleaded for the forestry community to give this the attention that it deserved. Clearly this is a concern riddled with uncertainty and in which there may be illusions of knowledge. Speth pointed out:

1. Early estimates of climate change indicated that it would be gradual, however, it may be too rapid for adaptation of existing ecosystems.
2. Models of ecological impact of climate change do not consider barriers to migration such as roads, cities, etc. Therefore, the ecological consequences may be greater than anticipated.
3. It is unlikely that one ecosystem will be replaced by another intact ecosystem, or at least not one we would recognize.
4. Though previous models assumed a gradual climate change, like turning a dimmer switch. More recent models suggest a switch as a better metaphor.
5. Hotter and dryer climates—more fires of greater severity
6. There is growing evidence of more frequent and more severe weather events. What will be the impact on forests, or how might forests mitigate severe weather events?
7. Might milder winters reduce some of the checks on insect and disease infestations?

Once again, I find the linkage between globalization, economic growth, consumption patterns and climate change inextricably linked. In this instance, some of the most powerful influences driving globalization are

contributing to greenhouse gas accumulations and are thwarting political responses to reducing emissions. Both the uncertainty around global warming and the illusions of knowledge suggest this subject as critical to both research and graduate education.

Societal Mind-Set

I venture into discussion of social attitudes with timidity. I am concerned where some of today's attitudes may lead us. Concerned that my negative evaluation of many attitudes are simply the ruminations of a liberal who may be turning into a "conservative old fart", and concerned that this may lead to a pessimism about the future that isn't warranted or an optimism that is simply wrong. Looking 20-25 years into the future of technology is easy—most of the changes are on a drawing board already. Forecasting political change is less easy; but the wheels of change are slow, the clues abundant, and historical antecedents that give some confidence in the forecasts. Guessing the future of prevailing societal attitudes is the most difficult. What is it about current attitudes that bother me?

- A fundamentalism, whether religious, environmental, or individualistic that justifies socially unacceptable means aimed

at attaining socially acceptable ends. This is a major impediment to civility.

- The body politic supporting policies that give preferential treatment to the wealthy, because maybe I will be there some day and will benefit from the largess. This is a major impediment to a healthier income distribution.
- Acceptance of irrational debt whether by government or individuals. This is a major impediment to an economically sound future.
- Virtual reality substituting for the real thing. This is a major impediment to the discovery of joy in our day-to-day pursuits.
- Failure of society to recoil at the performance of our high school students compared with their peers internationally. This is major impediment to maintaining both an individual and collective competitive edge in the global community.

I am optimistic about changes in these attitudes, not because of a confidence in the inherent goodness in all of us (my Calvinist beliefs in the total depravity of man stand in the way) but the historical evidence in the resilience of the human spirit when confronted with depressions, war, or family tragedy. So, I am comfortable in

suggesting that 20 years from now we will have amongst the best educations systems because we wanted the best for our children, that experiences and relationships will surpass consumption as a measure of quality of life, that we will have started to work our way out of government debt because there was a will to capitalize on our comparative advantage in the global market. That there will be a closer knit, more collaborative global community because it will be in the self-interest of the individual software developer in one country, to collaborate with an entrepreneur in another, who sells a service to a corporation in still another, who sells a product to consumers in ten other countries, that feel a responsibility to contribute to the weather caused calamity in still another, that is the birth place of the next software developer.

I will conclude with a comment on one of the Emails from Terry Bates that included a recommended reading of the first chapter of Thomas Freidman's *The World is Flat: A Brief History of the 21st Century*. I could immediately see the hand of Don Dehayes, a fan of Thomas Friedman. While Terri's email suggested reading chapter one, I want to jump to the last chapter. Let me quote,

"There has never been a time in history when the character of human imagination wasn't important, but writing this book tells me that it has never been *more* important than now, because…so many of the inputs and tools of collaboration are becoming commodities available to everyone. They are all out there for anyone to grasp. There is one thing, though, that has not and can never be commoditized—and that is imagination."

A few pages later Friedman writes,

"Analysts have always tended to measure a society by classical economic and social statistics: its deficit-to-GDP ratio, or its unemployment rate, or the rate of literacy among its adult women. Such statistics are important and revealing. But there is another statistic, much harder to measure, that I think is even more important and revealing. Does your society have more memories than dreams or more dreams than memories?

By Dreams I mean the positive, life affirming variety.

Lest the points I have been trying to make got lost in the garbled verbiage or verbal garbage, let me summarize.

Lesson:

1. You cannot predict the future precise in every detail, but you can know enough about it to be useful, and perhaps you can influence it. Without the latter, influencing it, looking at the future is an empty exercise.
2. More important that any single trend is the confluence between trends.
3. Some trends are so grand that we may miss the significance to our lives, our businesses, our agencies, e.g. globalization
4. "The greatest obstacle to discovery…is the illusion of knowledge." (Daniel Boorstin)
5. Some trends are so important that though they lie beyond the purview of my profession I better get involved, e.g. changing income distribution in the U.S.
6. To bring us full circle to #1 above, you can't influence the future with memories only with dreams.