Letter From the Desk of David Challinor
October 2002

After a two-year search in New England, my son and I bought a 400-acre forest in the Berkshires of western Massachusetts. Our goal is to manage the forest as a long-term investment to benefit future generations of my son's family. The purchase was also made to take advantage of what I learned at the Yale Forestry School, acquired as a consulting forester and practiced eventually as the Smithsonian's Assistant Secretary responsible for about 30,000 acres of forest land owned or managed by the Institution. This month's letter is about managing forests to achieve specific goals. Establishing goals is necessary to create a management plan, but they must be broad and flexible because of the dynamic quality of forests.

To turn first to the Smithsonian forests, none of the Smithsonian's four major forests is commercially logged; instead, they are generally left intact for research, to provide watershed protection, and to serve as buffer zones. Their legal status also varies.

1. Barro Colorado Nature Monument consists of the island (six square miles) of the same name and four adjacent mainland peninsulas. The total area is about 20,000 acres, all owned by the Republic of Panama and managed under license by the Smithsonian. Goal: long-term research on forest dynamics and watershed protection for the Panama Canal.
2. Mt. Hopkins, Arizona. About 4,000 acres surrounding the Whipple Observatory on Mt. Hopkins' summit are managed by the Smithsonian under license from the U.S. Forest Service. Goal: control both automobile traffic and the resultant dust and the light pollution that might affect astronomical observations.
3. Conservation Research Center (CRC), Front Royal, Virginia. About 4,300 acres are owned by the Federal government and managed by the Smithsonian's National Zoo. Goal: research and animal breeding.
4. Smithsonian Environmental Research Center (SERC), Edgewater, Maryland. This 3,600-acre forested tract is owned and operated by the Institution. Goal: long-term environmental research.

Parts of these Institutional forests have been cleared or selectively cut for various experiments: on one of the peninsulas in Panama, a few acres were cleared and planted to study the rate of succession in swidden (slash and burn) agriculture. But, as a matter of policy, they are left to grow as naturally as possible. Such management practice can cause fire risks from fuel build up, but as far as I know, there has been no major wildfire on any of the four Smithsonian forests. Relatively small patches of Smithsonian forests in Maryland and Virginia have been ice-damaged, and a few forested acres on Barro Colorado Island were flattened by windthrow several decades ago. All the canopies soon

recovered, but such natural damage is normal. Apart from direct human interference, forest trees grow and die from various causes, but the forest itself generally maintains a dynamic equilibrium to sustain its canopy cover, even though tree species' composition may change.

The Challinor forest is managed quite differently from the Smithsonian ones. As background, Massachusetts and most other New England states encourage sound forestry (sustainable) practice by keeping forest property tax low on managed forests. To qualify for this tax abatement, property owners prepare an inventory of their forest and send it, along with a management plan, to the State Forester. The plan should outline the harvesting sequence for each forest block and estimate how many board feet are expected to be removed with each cutting. Our plan was approved by the State Forester, so the property taxes on our forest, now 500-acres, are only $125/year. However, when the forest is logged, the owner is taxed by the local taxing authority on the value of logs removed. If the forest owner has an approved management plan, but harvests no timber as scheduled in the plan, the tax break vanishes and the property is then taxed at the much higher residential rate.

In mid-August, I visited our current logging operation. The 200-acre block being harvested had not been cut in at least 25 years and needed to be thinned badly. The weather had been dry and the stems were moving apace from the logging area to the log deck a mile away on the town road from where they would be trucked to the saw mill. If the weather held, the logging contract would be finished by September's end. The trees to be cut were paint-marked last November 2001 at breast height and stump level, with care taken to leave straight, large-crowned seed trees of black cherry (*Prunus serotina*), yellow birch (*Betula lutea*), red oak (*Quercus rubra*) and hard (sugar) maple (*Acer saccharum*). These are the four most valuable hardwood species and will be harvested later; scattered hemlock, white pine, beech and ash were also marked.

Gaining access to the area to be cut was a hurdle for us. After considerable negotiation, we got permission to clear a mile-long track through the Beartown State Forest, which lies between the town road and our forest. When logging is finished this fall, the access track will be graded and seeded so that within three or four years only a skilled woodsman would be able to trace it.

Contemporary hardwood logging in New England is now highly mechanized. A full logging crew consists of only four or five men, including one to drive the huge, wide, chain-tired vehicle that hauls the logs to the roadside log deck. This vehicle travels only about five miles per hour but does not need a flat graded surface through the woods. It carries a load of 15 to 18 16' logs, averaging 14" in diameter, which are handled with an attached small crane and grapple hook. While this vehicle is hauling logs, another large machine extends two "arms" that grab a tree (up to about 14" in diameter breast high) to be cut. The operator extends a power saw and cuts the tree at its base. The arms flip the

tree parallel to the ground and another set of saws removes the branches up to where (if a single stemmed tree) the trunk diameter has tapered to about 5". The top, with its branches still attached, is left along with all the severed branches on the forest floor. A third machine, the buncher, assembles the cut stems to be picked up by the transporter for its next load.

To the layman, the forest appears a mess after logging, but there are important reasons for leaving tops and severed branches. Once the canopy is thinned, more sunlight reaches the forest floor and the seedlings and saplings heretofore starved for sunlight rapidly increase their growth rate. The newly available light also triggers rapid germination of light-demanding cherry, birch, and ash seeds. These new seedlings and sprouts growing from cut stumps become the major winter browse for forest-dwelling deer and the burgeoning local moose population. The management plan envisions leaving enough slash and cut tops on the forest floor so that new seedlings can grow through them once their leaves have dried and dropped during the winter. The slash, however, before decomposing can pose a risk of fuel buildup for wildfire if the weather becomes too dry, but this risk is much greater in the West than in New England, so we take the gamble by leaving the slash to decompose. This decision pays off when the slash protects enough growing stems from being browsed.

Forest management is thus set by goals. In the northeast where most forest land consists of small parcels (100 to a few thousand acres), predominantly held privately, the owner's individual operational decisions seldom have much economic or political consequence. Thus, the Smithsonian-managed forests in Virginia and Maryland can continue to be used for research without impinging on the management options of its neighboring forest owners. Occasionally, joint action by neighbors is necessary to control potentially dangerous threats, such as closing forests to camping when the fire index is high, or making a concerted effort to control the size of a deer herd when the risk of Lyme disease becomes too great. This happened when SERC, with permission and cooperation from Maryland, had a controlled deer harvest after almost a quarter of its staff contracted the disease.

Although reducing over-populations of deer often provokes powerful political reaction in the northeast, the repercussion is mild compared to that generated by the Forest Service's control burn policy for the huge national forests. Ultimate policy there is determined by political power rather than by scientific analysis. Our western forests are so large and have been struck by fire, windthrow, various pathogens and insect damage for so long that whatever management attempts we make can be thwarted by natural events quite beyond human control.

Fortunately, growing trees are adaptable and, quite apart from man's efforts, have developed all kinds of marvelous defenses against their adversaries. Damaged forests recover, but humans with their short life span (compared to trees) are understandably impatient and unwilling to wait for long years to pass before all traces of such catastrophic fires as Oregon's Tillamook burn are gone. Resilience is the principal characteristic of forests, and what appears to us now as a forest's unacceptable appearance will not even be noticed by our grandchildren standing someday in exactly the same spot.

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