

Landscape-Level Changes

A. Joel Frandsen¹

Abstract—Since European settlement, Utah's vegetative landscapes have changed. Like other arid states, these wildland systems were depleted and altered. Certain steps were taken through private, community, and finally public efforts, such as establishment of Forest Reserves (National Forests), to stop the slide. Conservation and management actions were taken to restore, rehabilitate and manage these landscapes. Utah has numerous examples where the productive capability of the land has been restored. Unfortunately, in this environmental era, we are again in a downward ecological spiral, and the productivity of these landscapes towards desired objectives is not being met. The action needed to stop this trend is not getting the attention to stabilize and correct the problem. The Healthy Forests Initiative and the Healthy Forests Restoration Act provide some positive steps in this direction, and the knowledge and technology are available and can be expanded upon. The challenge is: can we muster the will and support to reverse the downward spiral?

Keywords: landscape-level changes; vegetation Management; forest health; invasive species; conservation; restoration; rehabilitation.

Introduction

Utah has as much land diversity as any state, ranging from alpine forests to developed, metropolitan areas, from white salt flats to redrock canyons. With the exception of water, which is scarce in this second-driest state in the nation, the State is rich in natural resources, and home to a great diversity of user groups.

Utah is facing significant environmental issues; however, much of our effort is spent on the wrong issues, while other problems are overtaking us. For instance, millions of hours and tons of media effort have been spent on the Bureau of Land Management (BLM) "wilderness issue," but there are bigger problems that remain unaddressed. Natural resource managers and policymakers need to redirect their efforts to the bigger picture.

Certain groups seem to be driving the natural resource agenda, and our resources have been deteriorating. The absence of proper management and lack of necessary tools have tied the hands of natural resource managers; the resulting condition of our lands is obvious to the trained professional.

Utah's wide variety of landscapes and cover types, combined with a complicated land ownership pattern, makes it much more complex and difficult to get coordinated action on natural resource management problems. What one neighbor does affects the others.

Utah's Conservation History

Utah's early pioneers, with their unfamiliarity with dry climates, lacked understanding regarding management of the local natural resources. They came from the east, where precipitation was greater and soils and vegetation responded

In: Gottfried, Gerald J.; Shaw, John D.; Ford, Paulette L., compilers. 2008. Ecology, management, and restoration of piñon-juniper and ponderosa pine ecosystems: combined proceedings of the 2005 St. George, Utah and 2006 Albuquerque, New Mexico workshops. Proceedings RMRS-P-51. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

¹ Utah Division of Forestry, Fire and State Lands, Salt Lake City, UT.

faster. Early day logging and livestock grazing resulted in negative impacts to Utah's forest and rangelands, but after 40 to 50 years, citizens petitioned for Forest Reserves (National Forest) and a conservation effort came forth.

Great strides in land restoration and conservation have taken place on National Forest, BLM, and private lands to mitigate the problems caused by early abuse. Examples of these successful mitigation projects are documented in publications such as "Vegetation Changes on the Manti-La Sal National Forest" (USDA Forest Service 1993). These comparative photographic studies from the early to late 1900s demonstrate that resource managers have the knowledge and experience needed to manage vegetation towards our desired objectives.

Landscape-Level Changes: Utah's Forest Lands

Despite the "environmental era" we live in, landscape-level changes are occurring in our forestlands, rangelands, wetlands, and other open spaces. The condition of Utah's forests is bleak. Insects and disease are ravaging Utah's forests, making them even more susceptible to wildfire. When infestations started, the Forest Service (Dixie National Forest) proposed to remove infested trees, therefore removing the bugs. Their projects were appealed and litigated, delaying their ability to respond to the infestations; the result is wide-spread devastation (fig. 1). Spruce beetle has caused the most noticeable forest die-off in the state since the late 1980s, especially in central and southern Utah; thousands of acres of dead or dying trees are apparent on Cedar Mountain alone, in Southwest Utah. According to data obtained from Forest Health Protection annual insect aerial surveys, spruce beetle has caused up to sixty percent mortality on approximately 278,000 acres over three of Utah's National Forests in the last 10 to 15 years. (fig. 2).



Figure 1—Tree mortality, Mirror Lake Highway, Utah

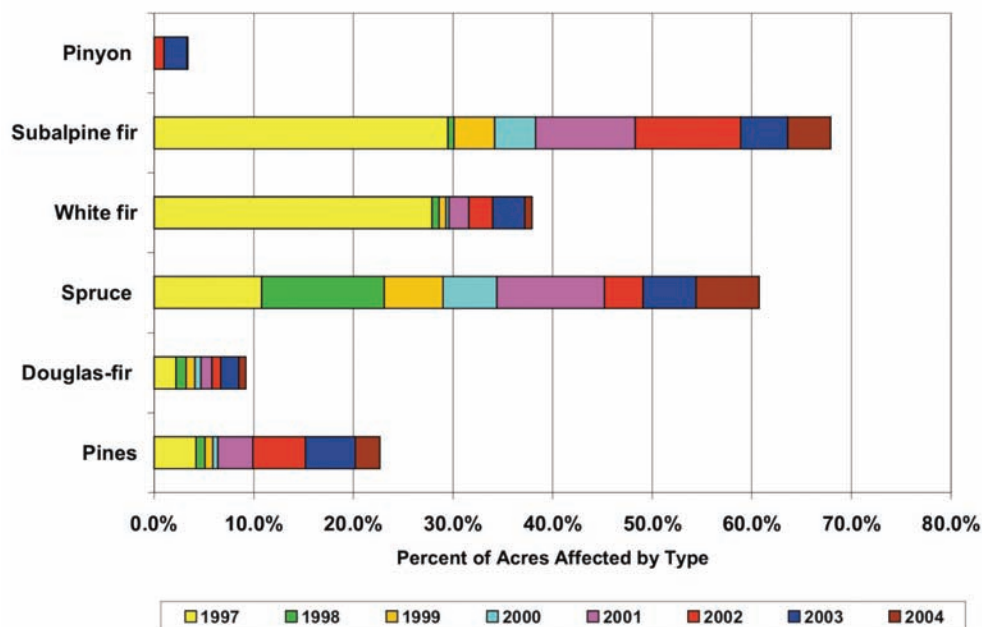


Figure 2—Bark beetle-induced mortality by species or species group in Utah, 1997-2004.

Evergreen Magazine recently reported, “Time is Running Out” for our forests. Petersen (2003) quotes from W.W. Covington’s testimony before the congressional Committee on Resources, Subcommittee on Forests and Forest Health, in Flagstaff, Arizona, March 3, 2003:

“The greatest threat to the sustainability, diversity and social viability of the forests and communities of the West is our failure to restore forest health in the frequent fire forests of the West. Simply installing fuel breaks around our cities and rural developments and forsaking the wildlands would be an abdication of our responsibility to future generations.”

“Attention cannot be narrowly focused on a ring around the developed areas. Such actions will fail to address one of the most contentious issues of our time, the protection of endangered species. Severe wildfires in frequent fire forests of the West are the greatest single threat to critical habitat for many of these vulnerable species because they are not adapted to stand-replacing fires.”

The absence of fire and other disturbance, including logging, has resulted in the overcrowding of our forests. The monster fires of 2002 – Hayman, Rodeo-Chediski, Biscuit – each burned hundreds of thousands of acres; Utah had its own monster fire – the Rattle Complex – in Southeast Utah, which burned around 100,000 acres in 2002. The 2003 fires in Montana and California were just as devastating.

Our forests across the nation are growing much more product than is being used, building a storehouse of energy. For example, in the revised forest plan for one of the National Forests in Utah, the annual allowable sale quantity (ASQ) for sawtimber is listed at 2 MMBF (million board feet). The net annual growth of sawtimber trees on non-reserved timberland in this national forest is approximately 53 MMBF of all species and 49 MMBF for just softwoods (O’Brien 1999). This indicates a planned harvest level of only four percent of the net annual growth for the forest. Ninety-six percent of the net annual growth is adding additional fuel to the forest each year. This added fuel accumulation (a storehouse of energy) is setting the stage for future catastrophic monster fires.

Another issue in the West is the decline of aspen. There used to be almost nine million acres of aspen; now there are less than four million acres. Utah has lost nearly sixty percent of its native aspen. Colorado has lost fifty percent of its native aspen, and Arizona has lost ninety-six percent. (USDA Forest Service 2000) This is primarily due to the absence of proper management in the face of natural succession, and the absence of productive wildfire in the ecosystem.

Landscape-Level Changes: Utah's Rangelands

There has been an increase of pinyon juniper and a decrease of sagebrush in many areas throughout the state. In some areas, what used to be a sea of sagebrush has become a sea of pinyon-juniper. The loss of sagebrush means loss of habitat for the Greater Sage-Grouse, listed as a sensitive species in Utah, and other species.

In many areas, sagebrush is being replaced by cheatgrass. A Bureau of Land Management report estimates that cheatgrass invades 4,000 acres a day throughout the Great Basin area. The report describes cheatgrass as a volatile fuel that carries fire quickly, and is especially adept at taking over disturbed areas, resulting in a downward ecological spiral. (Bureau of Land Management 2001) Other undesirable invasive species are coming in behind cheatgrass, such as squarrose knapweed, diffuse knapweed, Russian knapweed, medusahead rye, and Scotch thistle.

Invasive, exotic pests have been referred to as “biological pollutants,” which “threaten our crops, our forests, and perhaps our very existence...Once biological pollutants are imported, they grow, adapt, and spread on their own unless people take direct, vigorous, and often costly actions to stop them.” (Britton 2004) Left to nature, invasive species out-compete the desirable species.

The USDA Forest Service has identified invasive species as one of the four threats to the nation's forests and grasslands. According to the Forest Service website, “of 2,000 nonnative plants found in the United States, 400 are invasive species. The U.S. spends \$13 billion per year to prevent and contain the spread of invasives. For all invasives combined, the price tag is \$138 billion per year in total economic damages and associated control costs. In addition to nonnative plants, 70 million acres of forest in all ownerships (public and private landholdings) are at risk from 26 different insects and diseases.” “With the globalization of commerce and foreign travel to and from the U.S., the number of new invasive species from abroad is growing...” although, sometimes these species spread within the United States itself. Invasive species are disrupting native ecosystems and draining the nation's resources.

The Western Forestry Leadership Coalition issued its own policy statement on invasive species in 2003 that states, “The continued introduction and accelerated spread of invasive species are some of the greatest natural resources concerns in the West – prevention and control are critical.”

There are numerous examples in southern Utah where desirable seed was planted by mechanical means, with good success. We can also utilize desirable exotic species to counter the undesirable invasives; one example is *Kochia prostrata*, an exotic that is fire tolerant and good for fall and winter forage use. These desirable species have been instrumental as fuel breaks and in stopping fast-moving cheatgrass fires.

The secret to stopping cheatgrass takeover is mechanical treatment. The main thing preventing mechanical treatment – and allowing cheatgrass and other invasive species to flourish – is that the treated area would then not qualify as “wilderness.” But those who defend “wilderness” against mechanical treatment,

citing threats to biodiversity, will soon see that there is no biodiversity in the cheatgrass wilderness.

Landscape-Level Changes: Utah's Riparian Areas

Riparian and wetland areas are also at risk of invasive species. The Southwestern Willow Flycatcher, a species federally listed as endangered, has lost its primary habitat due to the infestation of tamarisk or salt cedar, which out-competes and replaces the native willow species. Tamarisk proliferates in most waterways in Utah, monopolizing one of Utah's most valuable resources – water.

Purple loosestrife is another invasive species flourishing in Utah; this species has a wide range of habitats. Of most concern in Utah is the plant's proliferation in waterways, where it forms dense, homogeneous stands that pose a severe threat to waterfowl habitat.

Landscape-Level Changes: Utah's Open Spaces

The West is also losing its open spaces to urban encroachment (fig. 3). More and more people are building in the “wildland-urban interface,” putting their lives and property at risk of wildfire. Utah has hundreds of these wildland-urban interface communities, occupying around 137,000 acres throughout the state.

Not only are these communities creating additional challenges for wildland firefighters, but the encroachment of this development into the wildlands is decreasing the percentage of available agricultural land in the state. Because of this loss, as former Commissioner of Agriculture Cary Peterson has noted, Utah is becoming increasingly dependent on food imported from other states. As it has often been said, “Asphalt is the land's last crop.”



Figure 3—Urban encroachment, Snyderville, Utah

Taking Action

While everyone is busy debating “wilderness areas,” landscape-level changes are occurring and ecological health is at risk. Fortunately, we are making some policy inroads that can help us address our problems, through the Healthy Forests Restoration Act and changes in National Environmental Policy Act (NEPA) requirements. The Healthy Forests Restoration Act provides for expedited hazardous fuel treatments, biomass grants, watershed forestry assistance, insect and disease applied research, the Healthy Forests Reserve Program, and enhanced forest inventory and monitoring authorities.

Another helpful measure is the Good Neighbor Authority, which was authorized by Congress for Utah through an amendment to the Knutson-Vandenberg Act; Colorado has similar authority. This authority provides for the State Forester of Utah to accomplish restoration work on Utah’s National Forests by mutual consent and agreement. The state acts as agent for the Forest Service, using the state’s purchasing authorities and contractual procedures, while NEPA responsibilities reside with the federal agency. Projects may include treatment of insect infested trees, reduction of hazardous fuels, and other activities to restore or improve forest, rangeland, and watershed health including fish and wildlife habitat.

How can we stop our downward ecological spiral? – through vegetation management. To use a poker analogy, “we have to play the cards we’re dealt.” We can’t do much about precipitation, aspect, soil, or landform/slope, but vegetation management is our “ace in the hole.” Depending on how we play that card, we can win or lose the game. What are the stakes in this game? – healthy ecosystems.

We know the outcome when ground cover falls below the site conservation threshold – increased erosion. We know how the degree of site protection impacts changes in plant communities. Resource managers have the knowledge, expertise, and now, available technology to manage vegetation to meet our desired objectives. Figure 4 represents computer-generated simulations taken from a landowner’s Forest Stewardship Plan, which demonstrate how a forester can utilize his knowledge and available technology to project treatments that will meet landowner objectives.

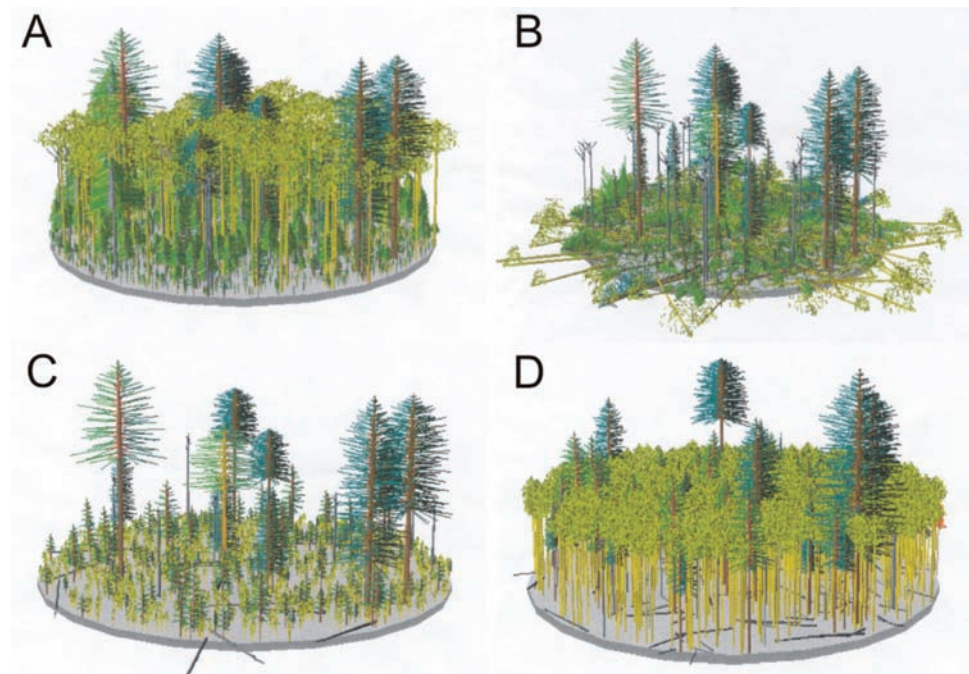


Figure 4—Stand Visualization. A) year 2000 (inventory), B) year 2000 (post-cut, C) year 2010, D) year 2100.

Conclusion / Management Implications

Just like fire, correcting the real problems in our environment will require an ongoing, persistent process of prevention, detection, suppression, rehabilitation/restoration, and monitoring (fig. 5). In a report on Forest Health in Utah (Utah Division of Forestry, Fire, and State Lands 2003), several recommendations were made to address some of these problems:

1. The report recommended addressing National Environmental Policy Act (NEPA) guidelines and internal review processes to allow for emergency action to address insect and disease infestations and noxious weed invasions. While some changes have occurred, they need to go further for emergency action. Increased flexibility is needed to allow appropriate and timely action to deal with forest health (and other) threats.
2. Land managers need the opportunity to make up-front investments for healthy ecosystems, which will result in reduced expenditures in suppression (such as fire suppression). Examples include green strips and prepared fuel breaks that could resist the invasion of cheatgrass and slow the progression of wildfire.
3. Management direction on federal forest lands should provide for the harvest or management of an amount closer to present net annual growth, possibly 50 to 75 percent in non-reserved areas. This could reduce the accumulation of biomass while contributing to rural economies and sustaining local forest-based businesses, without which we would lose the expertise and equipment needed to accomplish forest management.
4. Private landowners, county weed boards, and land management agencies need to take aggressive action for prevention and suppression of noxious and invasive weeds through proper management of vegetation for healthy ecosystems. Vacant fields and abandoned properties are ripe for takeover.

The question then is, do we have the will to reverse these landscape-level changes? It won't happen unless natural resource professionals have their hands freed so the proper application of vegetation management techniques can take place.

*Just like fire,
correcting the problems will require...*

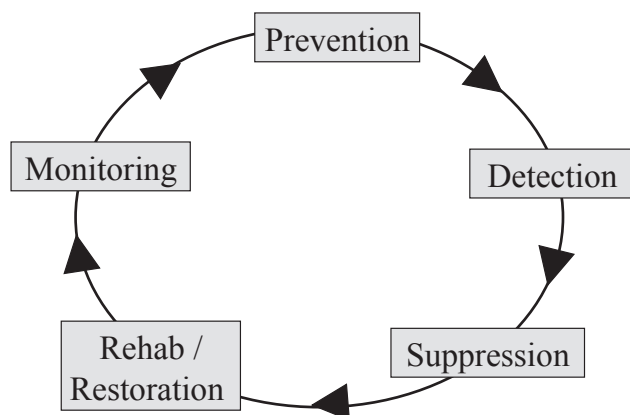


Figure 5—Land management cycle.

References Cited

- Britton, Kerry O. 2004. *Biological Pollution*. St. Paul, MN: APS Press. 113 p.
- Bureau of Land Management. 2001. *The Great Basin Restoration Initiative*. 33 p. [Online] [http://www.blm.gov/pgdata/etc/medialib/blm/nifc/gbri/documents.Par.98895.File.dat/gbri_progress_9-01.pdf]
- O'Brien, Renee A. 1999. *Comprehensive inventory of Utah's forest resources, 1993*. USDA Forest Service Rocky Mountain Research Station. RMRS-RB-1. 105 p.
- Petersen, J. 2003. Time is running out for Southwest forests. *Evergreen Magazine* (May 2003).
- Utah Division of Forestry, Fire and State Lands. 2003. *Forest Health in Utah*. Salt Lake City: Utah Department of Natural Resources. 15 p. [Online] <http://www.ffsl.utah.gov/foresthealth/fhgov4a.pdf>
- USDA Forest Service. [2004, July 8 – last update]. *Four Threats – Key Messages: Invasive Species*. [Online]. <http://www.fs.fed.us/projects/four-threats> [September 30, 2005].
- USDA Forest Service. 2000. *Fading Gold: The Decline of Aspen in the West*. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- USDA Forest Service. 1993. *Manti-La Sal National Forest. Vegetation changes on the Manti-La Sal National Forest: A photographic study using comparative photographs from 1902-1992*. USDA Forest Service, Intermountain Region, Price, UT. 128 p.
- Western Forestry Leadership Coalition. 2003. *Policy Statement: The Threat and Impact of Invasive Species in the West: Strategies for Successful Control and Prevention*. [Online]. http://www.wflccenter.org/pressandpolicy/policy_statements_resolutions.php [September 30, 2005].