

ECO REPORT

WINTER, 2002-2003

A Progress Report from a Partnership in Landscape
Level Ecosystem Management

The Case for Research: How It Makes a Difference to Managers

**Janie Canton-Thompson, Technology Transfer Specialist and
EcoReport Editor, RMRS, Economic Aspects of Forest
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"It goes back to relationships between managers and the research community if we're going to make progress at all," stated Kathy McAllister, Deputy Regional Forester for the Northern Region. Recently, I interviewed McAllister about interaction between researchers and managers. Does that interaction make a difference? She began by telling me about her great working relationship with the North Central Research Station, while Supervisor of the Superior National Forest. A few years later she joined the Northern Region leadership team, only to discover an equally flourishing relationship among Northern Region managers, Rocky Mountain Research Station (RMRS) researchers, and The University of Montana.

Relationships are what make their collaboration successful. As partners, they jointly contribute resources to solve management predicaments. BEMRP is a perfect example. "That group is looking at issues, thinking about solutions, and trying them out on the ground....People see value in the work. It's a relationship issue—Forest Service and University scientists understanding what managers' problems are and helping find solutions to issues that, in many cases, apply any place in the Region. That

relationship is, I think, right where it needs to be. I don't have to be engaged in it every day to keep it going."

Collaboration is not without challenges. Completion of peer reviewed research projects may take years, but managers

need questions answered weekly, even daily. Timely access to scientific resources keeps managers current with best science. "[Researchers] recognize we need as much information as we can get as quickly as possible, and they're willing to give us [good findings as soon as they become available.] We need to be understanding. It's important for researchers to have time to perfect their research and managers to

have information to draw conclusions and create policy."

By law, managers must use the best available science for decisions. "We can't afford not to take advantage of the most current information, and we can't afford to not understand it as it was put together and meant to be understood." What about research not yet available in peer reviewed publications? Environmental Impact Statements may take years to complete, during which new scientific

knowledge accumulates. McAllister likes to handle this challenge by calling researchers for immediate advice, allowing long-term research projects to continue and ultimately verify interim conclusions. Nevertheless, science is just one piece of managers' puzzle.

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Kathy McAllister (r) and Sandra Evenson during a general management review of the Lewis and Clark National Forest. Photo courtesy of USDA Forest Service.



Kathy McAllister, Deputy Regional Forester for the Northern Region, USDA Forest Service. Photo courtesy of Forest Service.

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The Rocky Mountain Research Station Strategic Framework

Marcia Patton-Mallory, Station Director
RMRS, Fort Collins, CO

We of the Rocky Mountain Research Station have completed our Strategic Framework (a long-range plan) for the next decade. During the past 2 years we listened to our stakeholders and discerned where we can make the most significant contributions to natural resource management in the Interior West. In addition to updating our mission and vision, we have stated our values and identified six focus areas to guide decisions about program priorities.

Our **mission** is to develop and deliver scientific knowledge and technology that will help people sustain our forests, rangelands, and grasslands. Our **vision** is that our science and technology will provide society with options to achieve sustainable use and appreciation of forests and rangelands. Our **values** include: *Quality Science* that is objective, unbiased, credible, and independent; *Quality Service* that is responsive, timely, relevant, and customer-focused; and *Quality Relationships* with partners and employees.

Five program focus areas will guide our decisions about future research and development programs:



Marcia Patton-Mallory, Station Director
for the Rocky Mountain Research Station.
Photo courtesy of USDA Forest Service.

- **Changing Ecosystems:** Productivity, Risks, and Uncertainties

- **Conflicting Values:** Effects on Natural Resource Use and Management

- **Wildland Fire:** Responsibilities, Risks, and Benefits

- **Healthy Environments:** Water Quality, Water Quantity, and Clean Air

- **Wildlife and Fish Habitats:** Restoration and Maintenance

A sixth focus area will be **Communication with our Stakeholders**. We will build on existing strengths and explore new ways of transferring our science and technology, with special emphasis on electronic media.

Need for high quality science to inform decision makers in the Interior West has never been greater. The Rocky Mountain Research Station will continue to play a key role in addressing these issues through growing partnerships and collaborative efforts with universities, other federal agency researchers, and natural resource management agencies. The complete text of our Strategic Framework is available at www.fs.fed.us/rm/main/strategic_plan.html.



Ecosystem Management Means Partnership

Furthering the goals of this project requires
public participation in decision making.

Would you like to become a partner? For more information, please contact

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Visit the Bitterroot Ecosystem Management Research Project on the Internet!

www.fs.fed.us/rm/ecopartner

Montana Ecosystem Management Learning Center Program Efforts in the Bitterroot

Janie Canton-Thompson, Technology Transfer Specialist and EcoReport Editor, RMRS, Economic Aspects of Forest Management on Public Lands, Missoula, MT

Remember when you were in school, and you sometimes desperately wished your classroom was outdoors? Many organizations are making that wish a reality, establishing Learning Sites—natural outdoor classrooms for students of all ages—in locations throughout central and western Montana. Supporting the concept, representatives of BEMRP participated in the Montana Ecosystem Management Learning Center Program's (MEMLCP) summer meeting. Held June 28-29, 2002, on the Bitterroot National Forest, the meeting highlighted activities occurring on MEMLCP's 12 affiliated Learning Sites. These sites offer a fascinating story of ecosystem management practices in a variety of ecosystems on public, state, and private lands. Learning Sites are a vital part of a growing effort to provide conservation education to all comers. MEMLCP members actively cooperate with other natural resource, conservation, and environmental education programs at local, state, and national levels.

Attendees participated in two field trips that showcased learning sites, one established and one proposed. Peter Kolb, The University of Montana School of Forestry Adjunct Professor and Montana State University Extension Forester, together with assistance from Brooke Thompson, retired Bitterroot Forest Fire Management Officer, is expanding and/or developing these sites with partial funding from BEMRP.

Initially, participants journeyed through Lick Creek Demonstration/Research Forest, a part of the Bitterroot National Forest. Established in 1992, this area has hosted a wealth of biophysical research that is being applied to management of lower elevation ponderosa pine/Douglas-fir forest types. Proposed new attractions for Lick Creek include Lick Creek Campground Nature Trail and Lick Creek

Ecosystem Management/Research Trail. The existing Lick Creek Auto Tour is also being updated and expanded. The objective of this Learning Site is for visitors to experience a fascinating story of the interaction between natural processes and human management and research, well documented for nearly a century in this forest ecosystem. Lick Creek also portrays the natural history and gradual transition between ponderosa pine and Douglas-fir forest types. Effects of management goals designed to sustain old-growth ponderosa pine versus natural Douglas-fir encroachment in the absence of wildfires are readily evident.

Attendees visited a second proposed site, the Laird Creek Forest Wildfire Learning Site, which covers forest types similar to Lick Creek but with a recent wildfire twist. This site may include interpretive trails and an auto tour through portions of the Laird Creek and Bear Creek drainages, parts of which burned severely in the Bitterroot wildfires of 2000. Visitors will view and learn about different types of erosion and erosion control practices; mosaic burn patterns produced by fire; human interaction with natural processes; effects associated with a wide range of wildfire severity; fire behavior factors like slope, aspect, fuel, and wind; and impacts of forest management practices on wildfire behavior, as well as gain a historical perspective on the Bitterroot Valley.

Both the Lick Creek and Wildfire Learning Sites promise to provide visitors with information and dramatic visual examples of how natural processes like fire, wind, decay, insects, and disease shape forest ecosystems. Visitors will learn how forest managers take into account the incredible complexity of forest ecosystems to practice good stewardship of our natural resources. They will be shown how management, informed by research such as that sponsored by BEMRP, strives to ensure benefits accrue to society and keep all aspects of the ecosystem intact.



Greg Jones (r), BEMRP Program Leader, and Carolyn Durgin, MEMLCP Coordinator, at Lick Creek Demonstration / Research Forest, Bitterroot National Forest.



MEMLCP field trip, Laird Creek, Bitterroot National Forest.



MEMLCP field trip near Medicine Point, Bitterroot National Forest. This area burned heavily in the year 2000 fires.

Photos by Janie Canton-Thompson.

The Logic Behind Forest Management

Janie Canton-Thompson, Technology Transfer Specialist and EcoReport Editor, RMRS, Economic Aspects of Forest Management on Public Lands, Missoula, MT

Smoky skies from extensive wildfires, hillsides of crowded spindly trees, insect infestations, choking ground fuels—these kinds of forest health issues are currently affecting many U.S. national forests. Not only that, but they have become a priority of the President and have captured the attention of many Americans who, like all of us, have values and perceptions that color their sense of management options.

Forests often become unhealthy when tree densities increase beyond critical thresholds. Invader species and those requiring fewer nutrients and/or less water tend to have a competitive advantage. Individual trees, starved for water and nutrients, become less resistant to natural disturbances like fire, insects, and disease, which eventually kill many weakened trees. Dead and dying trees, together with undergrowth (vegetation beneath the forest canopy), combine to provide excellent kindling and ladder fuels for wildfires, allowing them to intensify and burn large expanses of the landscape. While cycles of birth, growth, decline, and rebirth occur naturally in forest ecosystems, human activities may escalate or retard them. The question becomes not whether our forests will experience cycles of overpopulation, decadence, and decline, but rather what role values and other human factors play—or should play—in this process. These cycles can affect human communities in different ways, some of which are very disruptive.

Responding to several years of extensive wildfires—and their effects on our human, economic, and natural resources—the President issued a Forest Health Initiative in summer 2002. Deteriorating forest health, caused by natural cycles like weather patterns and human activities like fire suppression, has placed forest restoration among our top national concerns. One means to improve forest health and reduce wildfire impact severity is purposeful disturbance, or what we may call active forest management. Let us look at the logic behind active forest management (like fuel treatments to reduce forest flammability) by attempting to answer some questions. For whom, how, when, where, and why should we manage national forests?

As human beings, we interpret everything in terms of value systems. The desired type of management (disturbance) or its absence is a function of a person's value system, informed by the understanding of how ecosystems work. Some believe we ought to manage forests to improve biophysical components and processes. Others desire forest management to

sustain a supply of goods, services, and opportunities. Still others want forests managed to permit natural processes to proceed with little or no human intervention. In all cases, the paramount objective in management is to meet needs and desires of people. Left to its own devices, nature takes care of itself everywhere and at all times through built-in responses to natural processes and disturbances. Disturbances like fire, weather events, earthquakes, volcanoes, insects, and disease, filtered through human value systems, may appear catastrophic. However, nature, abhorring a vacuum and uncaring about time, implements its version of recovery that may take centuries, or even millennia, to realize. Things happen in natural systems regardless of whether humans

intervene. In terms of some human values, failure to actively intervene sometimes places a natural system at greater risk for dysfunction than does active management.

Ecosystems will function in the absence of

humans. Insects, disease, and fire will all serve to alter forest ecosystems when the time is right. While ecosystems do not require a human component to manage them, humans have chosen to do so for millennia because they care about them and highly value the products they furnish—wood fiber, recreation, wildlife habitat, water, havens of rest, and spiritual renewal. The list is endless. Clearly, humans manage forests because they want to perpetuate certain values derived from them, and these values are often issues of conflict and subject to change, frequently on short notice.

Given that we manage forest ecosystems for the “good” of human beings, let us ask some tough questions relative to national forests. Can we do the wrong thing for the right reason? Can we do the right thing for the wrong reason? How much information do we need before we dare act? What do we risk by delaying action? What if we are doing the best we can, using the best information we have, and we still adversely affect or lose some species? Nature itself loses some species through a variety of circumstances. While we could ask many more tough questions, it is important to consider answers to these questions before we form expectations of forest managers.

Consider the nature of human disturbance, or management. Management of ecosystems is by nature an iterative process because it involves feedback and correction. Results are not perfect the first time we implement management (and some might argue “never perfect” because the “target” moves over time). Over time, we gain knowledge and refine management activities to better achieve our goals for forest ecosystems. Most agree that management works best when we do not lose any pieces of the system by our activities.

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The Logic Behind Forest ... (from page 4)

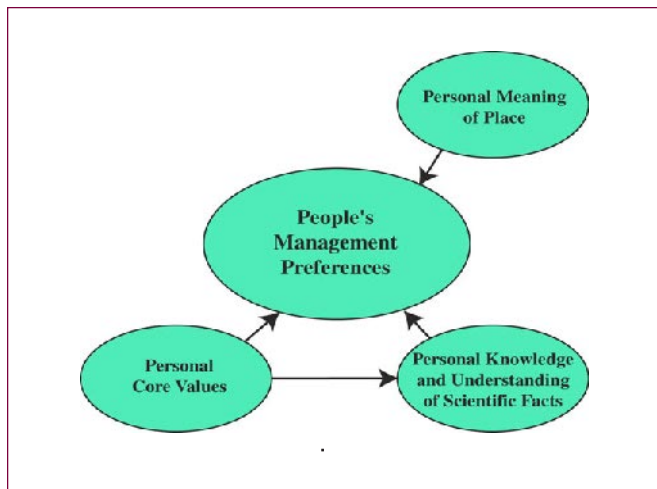


Figure 1. People's core values, knowledge and understanding of scientific facts, and identification with particular places influence their management preferences for forest landscapes.

With these thoughts in mind, consider again fire severity and extent during the last few years. Nature does not care; it works with what it has. Humans care. Think about the thinning initiative proposed by the President to improve forest health. Other management activities may also foster forest health, including no-thinning, burning, no-burning, weed spraying, no-spraying, and no action at all. All these activities have their place in attempts to manage forest ecosystems for human values. All work, more or less effectively, in some places in some parts of some ecosystems at some periods of time. When applying management activities, we need to keep in mind that ultimately we are stewarding an ecosystem to provide humans with more and better ways to realize their values, which are often contradictory. Managers can offer all values to all people but not in all forests, in all places, or at all times. There are trade-offs, and few of us will get everything we want. Only when we agree on this, can managers begin to satisfy our diverse values as they plan and implement management activities. Above all, remember that when we take humans out of the equation, there is no reason to manage at all.



The Case for Research ... (from page 1)

Sometimes it supports several different management actions, leading to trade-off analyses with factors like biophysical variables, societal demands, available staffing, and executive/legislative mandates.

Solid relationships enable Forest Service research to make a huge difference to Forest managers, according to McAllister. For example, Missoula's RMRS Wildlife Research Work Unit helped the Northern Region diffuse a lynx management-related controversy. "They were very good about giving us sound objective science that we could base our policy calls on." Likewise, Northern Region fire management officers and fire ecologists "have no qualms about reaching out to the Fire Lab. If those relationships weren't there we'd be in a terrible place. Line officers take [research] and weigh it with lots of other information to make policy calls," added McAllister. "We in NFS probably don't appreciate research as much as we should until we get into a crisis situation and need answers right now. Then we go there and get answers we have confidence in."

Vast wildernesses, lynx, whitebark pine, and grizzly bears—"We have some of the last best places and special plants and animals in the Northern Region. All the issues we deal with are connected, so if we don't continue to ask questions and seek answers we're not going to get any better at doing what we do." For instance, lynx conservation includes snowshoe hare habitat improvement. But, improvement of hare habitat may adversely affect whitebark pine and, in turn, grizzly bears and Clark's nutcrackers. The Region also has opportunities to reintroduce prescribed fire in places without much risk to human populations, a luxury unavailable to more urban-based Regions. However, returning fire to these

ecosystems may enable exotic weed invasion. Herbicide application for weed control has potential undesirable side effects on animals. "That's a huge responsibility for public land managers, and we need good solid research. That's going to help the public have confidence that we're not creating bigger problems than we already have."

All Forest Service managers grapple with social issues. Managers may have the best science possible, but people may not believe it. People may embrace the science but dislike its answers. "What it gets down to is how much management intervention will satisfy the public and how do we determine that? That's always the big question. What I might view as acceptable somebody else will say is way too much, or not enough."

McAllister believes her agency could benefit from more social science research. "Questions we have to answer today are as tied to people as they are to anything else. It doesn't feel like we spend the proportionate amount of money on social research that we do on biological research....We all get a say in how we'd like public land to be managed. It's not just what science says we should do about it."

"We—researchers and managers— need to be able to call upon each other for help getting our jobs done. That means a District Ranger needs to be willing to help a scientist place an experiment and help monitor and provide information. And, that means scientists need to be able to take time to answer today's questions with some amount of reliability so we can keep making the best management decisions." Relationships are the glue that holds the process together.

The Case For Thinning: One Size Doesn't Fit All

An Interview with Kevin Ryan

Janie Canton-Thompson, Technology Transfer Specialist and EcoReport Editor, RMRS, Economic Aspects of Forest Management on Public Lands, Missoula, MT

Research indicates that thinning some forest types typically improves their health and, together with treatment of resultant slash, reduces fire risk. Recently, Kevin Ryan, a Project Leader at Missoula's Fire Sciences Lab and a well-known fire science expert, clarified why one size does not fit all when it comes to thinning.

As stand density increases, trees experience stress, becoming susceptible to a variety of problems. When forests are thinned, competition for light, water, and nutrients is less, enabling residual trees to grow better, strengthen their defense chemistry, and better resist insect and disease attack. Thinning also "modifies stand structure, including distribution and

amount of burnable biomass, reducing fire intensity under severe weather conditions."

Foresters define thinning as "removing select trees to improve the forest structure." In pre-commercial thinning, removed material, or slash, is left to decompose, treated by burning, or mechanically removed for disposal. Commercial thinning provides a product for sale. Foresters view logging as only one of several forest thinning methods. The nature of the thinning needs to be tailored to the individual forest.

Mechanical thinning utilizes chainsaws or other equipment to process trees, and can achieve very specific stand structure and composition. One may also thin through prescribed fire, depending on forest structure, weather, and topography, but usually with less precise results. Successful thinning with fire depends on a large range in tree resistance to fire injury,

influenced by tree features like size, bark, and crown characteristics. When the range is narrow, fire alone is less successful because it is less selective of trees that survive. Although possible under certain circumstances, it is often not practical to burn the huge area needing treatment on the handful of days each year when conditions are "just" right. "So we have to do other manipulations like mechanical thinning to get the prescription window wide enough to have a feasible fuels treatment program. The alternative is to wait for the next crown fire."

The dominant reason to thin for fire hazard purposes is to reduce the likelihood of crown fires in ecosystems not adapted to this type of burning, and where recovery will be slow, if ever. "When crown fires occur, there is a blizzard of embers, which typically causes spotting well ahead of the main fire front. There is rapid fire growth, and little ability to take effective fire suppression." If humans do not thin forests, nature will do it by wildfires or other natural processes.

"You always affect fire potential if you thin." Slash usually needs to be treated to avoid exacerbating fire problems. "Lop and scatter" entails cutting slash into small pieces, which decompose faster, and evenly scattering them around the forest floor. Crushing slash with mechanical equipment also reduces severe fire potential. However, neither lop and scatter nor crushing reduces fire potential as much as removing thinned material by burning or other means.

Because the forest floor is exposed to more sun and wind, the microenvironment of

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An old-growth ponderosa pine stand near Missoula, MT, pre-thinning (a) and post-thinning (b). Photos by Mick Harrington.

Case for Thinning . . . (from page 6)

thinned forests is different from un-thinned forests. This typically results in more burnable days—“when it’s warm enough, dry enough, and windy enough for fire to burn.” Proper slash treatment in a thinned forest is critical to reduce susceptibility to crown fire, and to make wildfires more manageable and less damaging when they ignite during severe weather events.

Wildfires in thinned forests with light fuels typically stay on the ground rather than becoming crown fires. Surface fires allow firefighters more suppression latitude. “That’s the payoff in thinning—creating stand structures that won’t support crown fires except under extreme conditions. When you have a crown fire you get out of the way. Of course, there’s an old cowboy saw: ‘There never was a horse that couldn’t be rode, and there never was a cowboy that couldn’t be thrown.’ Even with perfect thinning and fuels treatment, with a bad burning day a fire may just blow right through treated stands. And the cowboy just got thrown!!!”

A comprehensive research project examining ecosystem responses to several thinning methods is currently being conducted at 13 sites across the U.S., including Lubrecht Forest in Montana. However, the probability is low that a wildfire will actually ignite in any of these sites. The best way to learn whether thinning is effective in reducing crown fire potential would be to run a fire through each study area once treatment is complete. “Not many forest managers are going to be real excited about having that experiment conducted on their forest even though I believe that to validate our assumptions, it needs to be done. There are also those who want the study replicated in their back yard or they won’t believe it.”

Ryan proposes modeling to test thinning effectiveness. “It allows us to conduct experiments in a computer, rigorously testing the logic to determine if the outcomes make sense before we put treatments on the ground.” Researchers are working on “a defensible process for managers—which models to use for what.” Ryan thinks we eventually need a development and technology transfer plan that takes the best available science and engineers effective solutions to managers’ problems.

“I accept the basic premise that a manager has an obligation to manage.” However, some people do not believe we have the science necessary to be effective, and opinions differ on what ecological goals should be. Obviously, we will never have all the answers. “Science is open-ended, always expanding like the universe. Can you get to the end of the

universe and would you know when you got there? Research is risky by nature. If I know the answer, it’s not research. But managers need answers to manage. So, to provide the best available science, we must include a caveat: ‘This answer may work only—or work best—in certain situations.’ If one believes doing nothing is better than doing something, science can’t refute that. It’s a value.”

“If I could leave one thought, it is that we have to be very careful not to make a few simple rules about thinning and move on. Professional managers must have latitude to use judgment and allow science to continually improve that judgment. If you codify anything into law, there’s no more judgment, and it doesn’t matter what science comes up with. Managers need the best available science for adaptive management. Careful monitoring and evaluation means we’ll do better and better. If that isn’t a fundamental cornerstone of human experience I don’t know what is!” Clearly, one size does not fit all cases, whether it is forest management, science, or human values.

Photos by Mick Harrington.



Thinning by fire in a Montana ponderosa pine/Douglas-fir stand.



Mechanical thinning in a Montana ponderosa pine/Douglas-fir stand.

Why Manage Fire Recovery in the Bitterroot National Forest?

Sue Heald, Forest Planner
Bitterroot National Forest, Hamilton, MT

Rocky Mountain ecosystems evolved in the presence of fire, and are adapted to this awe-inspiring force of nature. In most cases, ecosystems recover naturally from changes that fire initiates. So why did the Bitterroot National Forest choose to manage some aspects of fire recovery, rather than letting nature do the job? The answer ties to the interrelationship between the forest and people who live on the landscape. In the immediate aftermath of the fires, the Bitterroot Forest held many public meetings and commissioned a survey of local residents to understand how the public preferred to have the forest managed following the fires. The public clearly expressed a desire to see active management of recovery rather than leaving it entirely to nature. This influenced the Forest in deciding the balance between managing fire recovery and letting recovery occur without a human hand. The decision was to manage recovery on approximately 15 percent of the burned area.

The Bitterroot fires of 2000 burned with uncharacteristic high severity in much of the ponderosa pine type because of fuel build-up following decades of fire suppression. Stand-replacing fires burned overstory ponderosa pines over large areas, destroying the source of seeds needed for natural regeneration. In portions of the burns without seed sources, we prescribed planting to ensure ponderosas returned to the sites. At higher elevations, many large stands of immature lodgepole pine burned, leaving areas with inadequate seed sources to promote regeneration. We also prescribed planting for these sites.

Another aspect of the Forest's recovery effort involved dealing with effects of roads on newly burned lands. The fires removed vegetation from roads and skid trails that in some cases had been effectively rehabilitated by vegetation growth following past harvest activities. This created the likelihood of increased sediment movement and erosion. In addition, absence of live vegetation meant increased run-off, especially the first couple of years after the fires. To handle increased run-off, we enlarged hundreds of culverts throughout the burned area road system, which will improve fish passage and prevent culvert blowouts that could deposit large amounts of sediment in streams, detrimentally affecting fish species such as cutthroat and bull trout. More than 150 miles of roads are slated either for obliteration or placement in storage, with the intent of further reducing sediment production. While fish have doubtless evolved to handle sediment pulses associated with large fire events, roads represent a condition with which fish did not evolve.

Fire recovery also involved reducing fuels on 43,702 acres of the burned area. This will prevent excessive fuel build-up

Photos courtesy of the Bitterroot National Forest.



Winter view of a burned area on the Bitterroot Forest that has undergone fuel reduction.



A new fish passage culvert on the burned area of the Bitterroot Forest.



Excavator obliterating a road in the burned area of the Bitterroot Forest by reestablishing contours.

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Research and Management Coordination on the Bitterroot National Forest

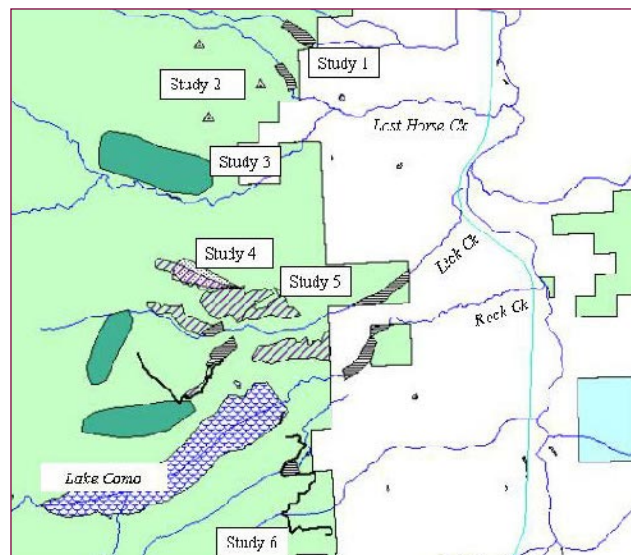
Sharon Ritter, Research/Management Coordinator, Bitterroot National Forest and Bitterroot Ecosystem Management Research Project (BEMRP), Hamilton, MT

Nestled into a sentence in the Winter 2000-01 EcoReport is a curious phrase, “boundary spanner.” An image comes to mind of a bridge between two countries. In a way, that is what I am, a bridge between researchers and land managers.

My job as Research/Management Coordinator on the Bitterroot National Forest started in 2001. The Forest and BEMRP established my position because of increased interest and funding for conducting research on the Forest, especially in areas burned in 2000. While the Forest has long been a focus of research, we suddenly had 60 field research projects. This meant we would get some great, local information, but there was the potential for problems: safety, damage to resources, and Forest activities or studies affecting other studies.

Starting in 2001, the Forest required researchers to have Special Use Permits, and provide maps of study sites. This allowed us to review study plans for ground-disturbing activities that might affect sensitive plants or archeological sites, and also look for over-lapping research plots. An example of one problem that surfaced was when a researcher played tapes of bird songs to see if this affected nesting densities of other species. Another researcher had bird count transects that overlapped the first researcher’s plots, and the results could be affected. The maps also came in useful when Forest employees came across study markers in the field and wanted to know whose they were. They finally had a person they could ask.

Another conflict was the presence of three research sites



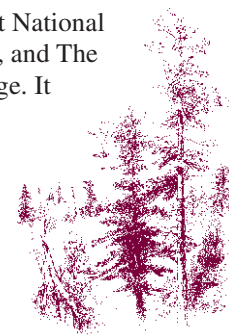
Six research study sites near Lake Como on the Bitterroot Forest. In addition, this area has active forest management and recreational use. Graphic courtesy of the Bitterroot National Forest.

in areas we plan to treat for knapweed and other noxious weeds. We are working to delay treatments there for a few years until researchers’ fieldwork is done.

Safety was a big concern because of area closures due to helicopter logging, logging trucks coming out of the burned area, and millions of burned trees ready to drop limbs or fall over at any time. In May 2002, we held a safety briefing for researchers working in the burned area, and covered radio use, necessity for hard hats, and how to identify hazard trees and avoid flash floods.

Another big part of this position is getting research results to people who need them—our public land managers and the public. I gathered research papers from current and past studies, arranged field tours with researchers and Forest resource specialists, set up a 1-day conference in Hamilton, helped set up a forum about noxious weeds, created a research display, suggested articles to newspapers, put a list of research projects on our website, and connected local groups with speakers.

BEMRP, represented by the Bitterroot National Forest, Rocky Mountain Research Station, and The University of Montana, also acts as a bridge. It creates opportunities for researchers and managers to share ideas, needs, information, and opportunities. Both BEMRP and my position are unique in this area, and provide a good model for other partnerships. Building bridges between researchers and land managers promotes healthy forest ecosystems.



Why Manage Fire Recovery . . . (from page 8)

adjacent to private property in the wildland/urban interface, and break up fuel continuity, allowing future fires to be controlled with less risk to firefighter safety. We also focused tree removal on areas prescribed for planting, so damage to young trees caused by falling burned trees would be minimized. Because of the expense of tree planting, managers and the public wanted to protect that investment.

From the effects of altered fire regimes, to roads, private property protection, and public values, the way people are interconnected with Bitterroot Forest lands affected why and where the Forest managed fire recovery. People will have an opportunity to experience and compare the results of managed and natural recovery processes, which will influence their opinions on appropriate reactions to future fires. Our goal is to handle fire recovery in a way that best meets the needs of all components of the forest ecosystem, including humans.

New Forest Supervisor at the Helm

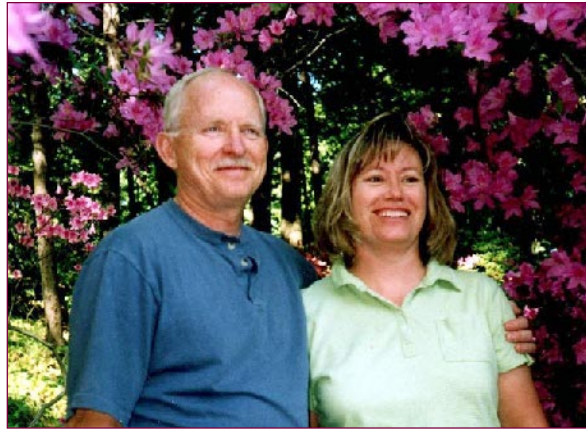
**Janie Canton-Thompson,
Technology Transfer Specialist and
EcoReport Editor, RMRS, Economic
Aspects of Forest Management on
Public Lands, Missoula, MT**

Forest Service researchers have a champion in Dave Bull, recently appointed Supervisor of the Bitterroot National Forest. Dave moved frequently growing up, and wherever the family went he was drawn to trees. His family often vacationed in New Mexico's national forests. "I can remember seeing those guys driving by in green trucks and thinking, 'How do you get one of those jobs?'"

Following high school, Dave enrolled in pre-veterinary medicine at University of Texas, eventually transferring to the University of Idaho to pursue a forestry degree.

During college, Bull served on Forest Service fire and timber crews. When offered a permanent Fire Control Technician position at the Boise Interagency Fire Center, Dave abandoned graduate school plans. From Boise, he accepted assignments on the Ashley National Forest in Utah, eventually serving in both timber and fire management on two different districts. Here, he became acquainted with the Forest Service research organization, working jointly to combat a mountain pine beetle epidemic. Next came a job as sale preparation forester on the New Meadows District in Idaho's Payette National Forest. While there, Dave attended the Forest Engineering Institute at Oregon State University. Moving on to Krassel Ranger District as timber, recreation, watershed, wildlife, and fisheries staff officer, he took broad training in forest ecological relationships, and earned the title of "certified silviculturist." Again, he worked with researchers, this time facilitating a paired watershed study. When McCall and Krassel Districts consolidated, Dave became timber management assistant and participated in fire salvage work, facing issues similar to those now on the Bitterroot. On the Payette, he worked with research entomologists, applying guidelines to stem a spruce bark beetle epidemic. Next stop was Hahn's Peak District, Routt National Forest, Colorado, as a timber, recreation, fire, range, and lands staff officer where he cooperated with Colorado's Division of Wildlife to institute a prescribed fire program in oak brush.

In 1990, Bull joined the Supervisor's staff on the Caribou Forest in Idaho, but soon was back on the Ashley, as Flaming Gorge District Ranger. Here, he collaborated with Forest Service Research social scientists to develop a strategy for marketing services and opportunities. "We're a public land management agency with an obligation to manage in the public interest. The way we are able to acquire that information is through research. It's something I strongly support." In 1999,



Dave and Robin Bull. Dave is the new Forest Supervisor of the Bitterroot National Forest. Photo courtesy of the Bull family.

Dave became a legislative affairs specialist in the Washington Office. Here he worked with Office of Management and Budget, General Accounting Office, top Congressional staff, and Congressional Committees to provide information for decisions or legislation.

The Bitterroot National Forest welcomed Bull as its 14th Forest Supervisor in July 2002. "This part of Montana has always been high on my list of places to live and work in." He previously worked with Bitterroot Forest staff while in Washington, helping to resolve issues resulting from the fires of

2000. "I feel privileged to have this opportunity to work with the employees and residents of western Montana. I want to be a good land steward of the Bitterroot National Forest."

When it comes to job qualifications, Bull has plenty. Among them are great breadth of forest management experience, an ability to listen, and skill at synthesizing information. "I like lots of information to make decisions. One thing I'm hoping employees bring me is good, factual information and research to help me make decisions." He exhibits an open communication style and appreciates human interaction. "I enjoy discussing issues with people. I know there are many sides to issues, and I'm interested in hearing them. What I've seen here is a tremendous work ethic and people very involved in their communities. I think the Forest Service is a positive force in any community, especially in rural areas. The Forest has a wonderful reputation of sharing. It's a very open, trusting workforce, a great place to work."

Bull appreciates the warm welcome he has received on the Bitterroot. "I feel like I've been included right from the get-go working with communities on [Forest] issues. It's been very rewarding in the few months I've been here." He marvels at the well-developed collaborative groups. "The kinds of energy folks spend helping us resolve issues on the Forest has been overwhelming. That's a tremendous opportunity for us to do activities and [manage fire recovery] that build on recommendations they provide. This is a great [research] laboratory to help with issues surrounding large fires and recovery." A challenging issue concerns the Forest workforce, now geared toward fire recovery work but without sufficient funding to support that work.

BEMRP and other RMRS research are second to none in Bull's mind. "It's an astounding example of cooperation—the number of projects and range of interest they represent. It would probably take the whole National Forest System to equal what we've got on the Bitterroot, based on what I've seen. I've always had an interest in applied research like I've seen in action here. I hope we can continue to provide

(continued on page 13)

Watershed Councils: Voluntary Shepherds of Montana Watersheds

Janie Canton-Thompson, Technology Transfer Specialist and EcoReport Editor, RMRS, Economic Aspects of Forest Management on Public Lands, Missoula, MT

"It dawned on me that trees know what to do; it's really people that are the issue," commented Jim Burchfield, Director of the Bolle Center for People and Forests at The University of Montana. Fostered by rich experiences in the academic world, Peace Corps, and Forest Service (where he worked in silviculture, policy analysis, and social science), Burchfield's quest is understanding relationships between people and forests. Specifically, he wants to know why people participate in voluntary advisory organizations devoted to land stewardship.

Burchfield recently completed BEMRP-sponsored research on Montana's watershed councils. These are local voluntary groups composed of government officials and private citizens who collaborate to resolve watershed issues. Burchfield's familiarity with the Bitterroot Water Forum initially motivated his study. Incorporating citizens' knowledge and interests into addressing common watershed problems like riparian management, wildlife habitat, water quality, and water allocation, the Forum serves as a model for future natural resource voluntary advisory bodies.

Burchfield had several purposes for his research. First, he wanted to understand the councils' effectiveness. Were they meeting expectations and having "on-the-ground" benefits to natural resources? Next, why do people volunteer time and energy to participate? Finally, what factors contribute to success, and what barriers hinder effectiveness?

In a two-phase study, Burchfield combined qualitative (in-depth informal interviews) and quantitative (survey) methodology with a literature review to produce his findings. Both interviewees and survey respondents thought watershed councils have positive effects on multiple natural resource characteristics (riparian vegetation, water quality, and so forth). Council participants felt they receive three personal benefits that extend beyond improving the natural resource: 1) acquaintance with agency representatives responsible for watershed management, 2) better understanding of major watershed problems, and 3) getting to know other watershed landowners.

Participants mentioned several factors contributing to council success. Council leaders, or watershed coordinators, helped most. "This is the most important person. They bring the resources together. Their energies and knowledge are vital." Local knowledge and experience ranked second. "Having local residents in their group leads people to realize they can make accomplishments." A third factor was access to quality information—science, rules and regulations—and grant money. "They learn the rules, and what opportunities there are for funding to do this work. The watershed coordinator is a doorway to this information that can help people solve problems."

Burchfield expressed surprise that finances and process issues like level of formalization, group charter, and operating procedures ranked relatively low among success factors,



Students participate in a Know Your Watershed workshop in Montana's Bitterroot Valley. Photo by Marilyn Finley.



Field trip with the Tri-State Water Quality Council on Threemile Creek in Montana's Bitterroot Valley. Photo by Josette Hackett.

although not for all participants. The chief barrier was inability to include all stakeholders.

Unwillingness to participate is a barrier common to all voluntary organizations and collaborative groups. When people count the cost of participation, some cannot afford it because of competing demands. Second, some simply do not want to participate. "They don't view this as the best avenue to get what they want, and don't want any kind of collective response to what goes on."

Diversity of participants within watershed councils offers an opportunity for cross-boundary work and accomplishment of common objectives across ownerships. Participants learn how ecosystems function, obtain high quality information, and

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The Road to Vegetation Classification and Mapping Standards

Robert D. Pfister, Emeritus Research Professor, The University of Montana, School of Forestry, Missoula, MT

Vegetation classification and mapping are an integral part of landscape assessment and planning. Several approaches to identifying uniform pieces of landscapes (patches, stands, or polygons) and assigning “vegetation type” labels to them are in widespread use. BEMRP has funded continuing research to help standardize some major descriptors of vegetation—floristic (pertaining to plant species and their distribution) composition, density, stage of succession, and vertical canopy structure—as part of an “Ecosystem Diversity Framework” described in the Winter 2000-01 EcoReport and 1999 BEMRP Symposium Proceedings. Although the conceptual framework is well accepted, the road to standardized methods of classification and mapping is slow traveling.

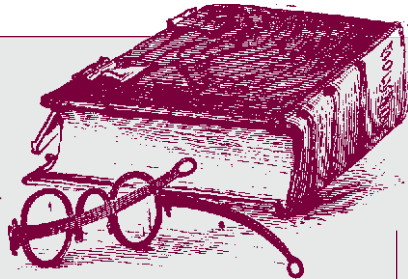
The Federal Government Data Committee (FGDC) undertook the first large-scale attempt to standardize classification and mapping standards for 18 agencies. The

FGDC Vegetation Subcommittee established a “National Vegetation Classification System” (NVCS), published in the 1997 Federal Register. NVCS provides standards for the upper five levels of a physiognomic (general growth form and appearance) hierarchy and recommends two lower floristic levels—Association (a recurring plant community with definitive characteristics and specific attributes) and Alliance (a grouping of Associations) (fig. 1). Next, the Subcommittee asked the Ecological Society of America (ESA) Vegetation Classification Panel to develop standards for Alliance and Association. The Panel has been working on that effort, providing revised drafts on an annual basis. Because Alliances and Associations are not fully developed at this time, it is difficult to use them operationally for vegetation classification and mapping necessary in planning ecosystem management at multiple scales.

Pilot studies conducted by the Northern Region and current mid-scale vegetation mapping efforts have

(continued on page 13)

BOOK CORNER



Ronald H. Wakimoto, Professor, The University of Montana, School of Forestry, Missoula, MT

For the past 30 years I have overheard fire managers saying, “If the public only understood the fire problem in the West they would do things differently.” While our scientific investigations about fire in the forest have continued, public attitude concerning wildland fire seems to have more to do with “Smokey Bear” than all this past research. *Flames in Our Forest* was clearly written to provide both the concerned citizen and professional forester with fire-related history, ecology, and management strategies. The book is a non-technical account of fire in lower elevation, fire-prone forests of the West. For me, the keys to the book’s relevance and credibility are its readability and its wonderful mix of current scientific literature and experiences and reflections of a well-respected scientist.

Stephen Arno, a retired Rocky Mountain Research Station Fire Sciences Lab researcher, and Steven Allison-Bunnell, a science writer, begin the book by giving a brief story of their lives and how they developed a perspective about fire that led to their coming together to write this book. Together, they weave a story of wide-scale forest changes, accompanying fire behavior changes, and society’s responses to such changes over time. Fire as nature’s creative force is presented in

Book Corner: A Review of *Flames in Our Forest*

chapters concerning tree, shrub, and wildlife adaptations to fire.

The authors lay out a convincing case that “one size doesn’t fit all” by presenting examples of different forest types and different roles of fire on the landscape. Environmental concerns about fire’s impact on soil, water, and air are addressed with examples, personal observations, and conclusions from scientific studies. Fire history, a subject Arno is renowned for, reinforces the past role of fire in the forest, with examples of credible science applied to reconstruct the “Old Forests” of the West. Using this reconstruction, the authors lead the reader to logical social responses to the current biophysical setting. A brief history of the struggle of the “light burners,” urban interface fuel management issues, and forest restoration is also offered. Throughout, the authors use historical facts and settings, their own value statements, and scientific literature to increase the reader’s knowledge and understanding of social issues that limit and constrain current fire management programs on public lands.

Flames in Our Forest will make an interesting and informative addition to anyone’s library. It will enlighten, entertain, and inform any reader with sage thoughts about flames in our forest.

Arno, Stephen F.; Allison-Bunnell, Steven. 2002. *Flames in Our Forest*. Washington D.C.: Island Press. 245 p. ISBN: 559638826.

Watershed Council . . . (from page 11)



Jim Burchfield on the bank of the Missouri River. Photo by Neil Moisey.

improve stewardship of public and private components of these systems.

Although not an answer to all problems at all times, on focused areas, councils do make a positive difference. "Our conclusion is that watershed councils have a role in resource management issues. Contributions may be modest, but are positive and can be significant in building trust and advancing complex, integrated ecosystem-scale programs. They have periods of energy and activity, and quiet periods where they don't really do much." This trait typifies voluntary groups and could be the subject of future research.

This research is unique because it attempts to

understand council participants themselves, rather than just leadership. Burchfield became acquainted with many people involved in watershed councils, and believes he was successful in promoting credibility and trust among all. He also helped the Montana Watershed Coordinating Council (a clearing house and service organization for Montana watershed councils) update its membership database.

"Don't give up on these voluntary organizations. They might seem low level, very informal but they have a role. People find them important enough to use their time and stay engaged. Citizens care about the land! Forest managers need to devote adequate time and remain engaged with these groups. The cost to not participate might be higher than the cost of participating. It's the changing nature of public land managers' jobs to have relationships with people who reside in the area. Relationships take time; they take constant nurturing."

New Forest Supervisor . . . (from page 10)

opportunities for researchers, and technology transfer." He is really enthusiastic about BEMRP's new research agenda. "A landscape scale project is exciting to me. I would hope we can integrate several different facets into the project, including the social sciences."

When he is not engrossed in his new job, Bull is busy enjoying his family and taking in the Bitterroot Valley's recreation opportunities. His family includes his wife, Robin (a Hamilton elementary school teacher), and four daughters, two of whom are still at home. Nevertheless, when it comes to the Forest Service, Dave "bleeds green." "Being a career civil servant, I'm here to serve and help the public reach the goals and objectives they have. Making a difference, being able to live in a place like this, and working with some great people—that's my definition of success!"

Road to Vegetation . . . (from page 12)

— Physiognomic Classification —

Class – e.g., Closed Forest

Subclass – e.g., Evergreen

Group – e.g., Temperate and Subpolar Evergreen

Subgroup – e.g., Natural/Seminal

Formation – e.g., Rounded Crown

— Floristic Criteria —

Alliance – e.g., *Pinus ponderosa*

Association –

e.g., *Pinus ponderosa/Symphoricarpos albus*

Figure 1. From *Vegetation Classification Standard*, published in June, 1997.

demonstrated the need to develop standard criteria for stand type classification. In 1998, The University of Montana, Rocky Mountain Research Station, and Northern Region developed a draft manuscript with proposed standards.

As Forest Service ecologists, especially in the Northern Region, tried to work with NVCS and ESA's evolving Alliance and Association standards it became apparent the Forest Service needed to develop its own additional standards to meet business requirements. In August 2002, the agency sent out a USDA Forest Service National Draft Vegetation Classification and Mapping Technical Guide for review; it is currently being revised. Cooperative, exploratory efforts of BEMRP and the Northern Region have made major contributions to this national effort.

In fall 2002, the Northern Region Vegetation Council hosted an excellent workshop and field exercise/discussion to review several vegetation classification variables and alternative standards for classification. Continued evaluation and testing of the USDA National Guide and Regional methods are planned for the coming year.

Publication of test results and continued collaboration will help move us toward formal operational standards for vegetation classification and mapping that are efficient, reasonably accurate, and most appropriate for specific information needs.

EcoReport

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Impacts of Treatments on Life Functions of Second-Growth Ponderosa Pine

Janie Canton-Thompson, Technology Transfer Specialist and EcoReport Editor, RMRS, Economic Aspects of Forest Management on Public Lands, Missoula, MT

“It’s always been exciting to try to understand not only the beauty of trees on an aesthetic and spiritual level, but also from a scientific perspective. What do they do with water and nutrients? How do they use light? It’s fascinating to think about the complexities inside this living organism.” Captivated by water, Greg Peters wants to understand how it contributes to tree growth and functioning. University of Montana Professor Anna Sala’s tree physiology studies piqued his interest, leading him to select her as his thesis advisor and secure project funding through BEMRP.

Peters proposed to examine stands within a second-growth ponderosa pine forest to discover how trees in treated and untreated sites were performing long-term, and explore how different management treatments were impacting pine physiology. “We knew



Greg Peters with a Sentry 200 Troxler used to measure volumetric percent soil water content.

Photos by Greg Peters.



Inserting probe in a PVC pipe enables correct measurement.



Lorna McIntyre assembling telescoping pruners for foliage harvest at Lick Creek Demonstration/Research Forest, Bitterroot National Forest.

fire historically played an important role in ponderosa forests, but didn’t know whether trees really care about fire, or if they just like having fewer neighbors? Does fire help or hurt trees?”

Lick Creek Demonstration/Research Forest, within the Bitterroot National Forest, was a perfect study site, with comparable stands of 1) untreated (control), 2) thinned-only, 3) thinned and spring-burned, and 4) thinned and fall-burned second-growth ponderosa pine. Treatments were done as part of the first BEMRP study between 1992 and 1994. Peters’ project, an exploratory case study, examined tree physiology by measuring soil water volume, soil nitrogen compounds, tree water potential, and tree photosynthesis.

During summer of 2001, Peters regularly inserted a probe into 72 pipes, driven into the ground across his study site, and measured soil water volume at three soil depths. He found no differences among control, thinned, thinned and spring-burned, and thinned and fall-burned stands.

The more soil nitrogen available, the better trees photosynthesize. Peters collected soil samples across his site and analyzed the presence of important nitrogen compounds. Although his findings were not striking he discovered greater soil ammonium in treated stands and slightly lower nitrate concentration in burned units.

Water potential measurements assess tension on tree water columns. Too much tension (created by insufficient water supply) on water columns causes trees to close stomata (pores) and cease photosynthesis, stymieing growth and health maintenance processes. During summer mornings, Peters sampled foliage (needles) at mid-canopy on each tree’s south side to ensure measurement consistency and obtain actively photosynthesizing foliage. Although all stands contained similar soil water volumes, trees in control stands (those receiving no treatments) experienced greater water stress because they competed with more neighbors for water. Needle bundle analysis indicated control stand trees had lower photosynthesis rates. Peters found no significant difference in water potential or photosynthesis rates among trees within treated stands.

Peters indicates stand density is the key explanatory variable in his study. “Trees prefer fewer neighbors,” so lower density improves tree water status and allows them to photosynthesize longer during the day. “The research suggests, in stands of this type, thinning treatments benefited second-growth pine in the long-term, but burning added in either spring or fall produced no long-term benefit or detriment to their health. This was perhaps most important—stands were thinned, then fire was added, and 8 or 9 years later, we found no evidence that fire hurt the trees. It suggests it’s not detrimental to add fire to restoration thinning.” Managers can thin for restoration and use fire under specific conditions to achieve broader ecosystem benefits beyond tree performance.

Peters’ research is unique because he studied physiology of second-growth ponderosa pine instead of focusing on old-growth stands, and found encouragement for restoring historical conditions to such stands. Examining tree physiology about 10 years after treatments, his study offered a better assessment of long-term health and performance of treated stands. Peters’ thesis, completed in December 2002, is available in The University of Montana library.

Effects of Exotic Plant Invasion and Associated Biological Control Agents on Deer Mouse Populations

Dean E. Pearson and Yvette K. Ortega, Wildlife Biologists, RMRS, Wildlife Ecology in Rocky Mountain Landscapes, Missoula, MT

Exotic plant invasions threaten native ecosystems around the world, but invasive plants are a particular problem in arid habitats that characterize much of the western United States. In the Rocky Mountains, ecosystem management goals directed at restoring fire-adapted forests are challenged by invasive plants, which proliferate in the wake of disturbances (including prescribed fire and thinning) caused by management activities. For ecosystem management to be successful, it is critical that we understand the impacts of exotic plant invasions and associated control strategies on native plants and animals. Several collaborative studies between the Wildlife Ecology Unit of the Rocky Mountain Research Station and BEMRP are examining effects of exotic weeds on native plants and animals and effectiveness of weed control measures conducted in conjunction with restoration efforts in fire-adapted systems. Here, we present preliminary findings from research examining effects of weed invasions and introduced biological control agents on populations of the deer mouse (*Peromyscus maniculatus*), a dominant native small mammal.

Spotted knapweed (*Centaurea maculosa*) is one of the most aggressive and widespread invasive species in western Montana. Although herbicides are effective in reducing spotted knapweed over small areas, they are neither cost-effective nor feasible over vast acreages. To address this problem, a biological control program was initiated in the

early 1970s to control spotted knapweed by introducing Eurasian insects known to feed on spotted knapweed in its native range. Biocontrols have been remarkably successful reducing some range weeds like St. John's wort (*Hypericum perforatum*) in California, but have not yet succeeded in controlling spotted knapweed. As a result, some biocontrols have become superabundant and now provide a food resource for native animals.

Our research indicates the native deer mouse quickly discovered that exotic gall flies, *Urophora affinis* and *U. quadrifasciata*, introduced for spotted knapweed control, provide an excellent food resource during long, harsh winters. Deer mice have become aggressive predators of gall fly larvae that overwinter in knapweed seedheads and are capable of consuming hundreds of larvae per mouse per day. This food resource, which did not exist in North America 30 years ago, now makes up 85 percent of deer mouse winter diet. Furthermore, recent results show that gall flies subsidize deer mouse populations during winter so that deer mice are two to three times more abundant in knapweed-invaded grasslands than in native grasslands. Elevating populations of a generalist rodent like the deer mouse has potentially significant implications for native plants and animals, and even humans, because deer mice are voracious predators of native seeds and insects, and are the primary carrier of the deadly Sin Nombre Hantavirus. Therefore, elevating deer mouse populations could cause declines in important plants and insects already negatively affected by knapweed invasion, and could increase the prevalence of Hantavirus. We are currently examining these and other related hypotheses.



Deer mouse being bled (safe and sound) to test for Hantavirus. Photo by Dean Pearson.



Deer mouse foraging for gall fly larvae on a spotted knapweed plant. Photo by Milo Burcham.

The Connection Between Wilderness Dams and Life in the Bitterroot Valley

Alan Watson, Research Social Scientist, RMRS, Aldo Leopold Wilderness Research Institute, Missoula, MT

The Bitterroot River flows past the towering Bitterroot Mountains (which form the heart of Montana's Northern Rockies). Most of the Bitterroot Range is protected as wilderness, a source of much of the water flowing through the otherwise arid Bitterroot Valley environment. Quality of life in the Bitterroot Valley is high, and deeply connected to water resources and naturalness of the mountain landscape.

Prosperity of some economic sectors, aesthetic beauty, and sense of place all seem to depend upon water and other natural resources within the Bitterroot National Forest.

Among the highest priority objectives for this year's research on the Bitterroot National Forest are to 1) "Develop a basic understanding of the processes and patterns that were historically present in riparian areas and forest types at all elevations and how human



An interdisciplinary team from the Bitterroot Forest visits the Canyon Creek Dam. Photo courtesy of Bitterroot



Members of Mill Creek Irrigation District visit Mill Creek Dam. Photo courtesy of Bitterroot National Forest.

activities have affected patterns and processes in these forest types" and 2) "Understand public values and how they change over time relative to...past and present human activities affecting resource management (such as construction and management of roads and dams)." Using these objectives, BEMRP has formed an interdisciplinary science team to study hydrologic and human connectivity associated with wilderness dams.

Most past wilderness research focused on providing wilderness management information necessary to meet the definition of wilderness contained within Section 2(c) of the U.S. Wilderness Act (Public Law 88-577). There has been little research to guide implementation of Section 4(d), which deals with

special provisions. This section of the Act supplies general direction on pre-existing legal exceptions such as use of aircraft or motorboats; prospecting for minerals, water, or other resources; maintenance of impoundments and transmission lines; grazing of livestock; and permitting commercial services. When legislation establishes protection for public lands under the authority of the Wilderness Act, incorporating these special provision guidelines is often quite controversial.

Kari Gunderson, an interdisciplinary resource management scientist employed by Rocky Mountain Research Station to support BEMRP research, has initiated a project to 1) develop a historical account of the installation and maintenance of dams that exist within wilderness boundaries, 2) provide educational opportunities to BEMRP members about factors influencing hydrologic connection across forest types, 3) develop understanding of the role of water resources in Bitterroot Valley quality of life, and 4) increase knowledge about local residents' awareness of the role wilderness dams and water resources play in the area, their attitudes toward dam maintenance, and their comprehension of the relationship between quality of life and natural resource attributes of local ecosystems.

Very little is known about local residents' knowledge of the connection among these dams, the values they associate with wilderness, and the quality of life they enjoy. Obtaining this knowledge could aid managers in making and explaining decisions to various publics involved in review of management actions on the Bitterroot National Forest.

New Publication Available

Robert D. Pfister, Emeritus Research Professor, The University of Montana, School of Forestry, Missoula, MT

Ecosystem Management: Adaptive, Community-Based Conservation, a new book from Island Press, was developed as an outgrowth of 7 years of U.S. Fish and Wildlife Service training courses, entitled "An Ecosystem Approach to Conservation." Its authors emphasize "application of the sciences of ecology and conservation biology to real-world problems." Designed as a textbook for upper-level and graduate student classes, the book has an accompanying instructors' guide. Based on its introduction and review of illustrative case studies, I feel this book provides a good general background for all involved in the complex process of implementing Ecosystem Management (Cloth \$40; instructors' manual (paper) \$20).

Meffe, Gary K.; Nielsen, Larry A.; Knight, Richard L.; Schenborn, Dennis A. 2002. *Ecosystem Management: Adaptive, Community-Based Conservation*. Washington, Covelo, London: Island Press. 313 p. ISBN 1-55963-824-9.

Vegetation Science Research in the Bitterroot: “So What?”—The Applicability of Research

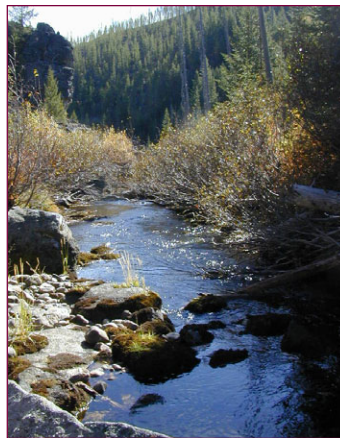
Elaine Kennedy Sutherland, Research Biologist and Project Leader, RMRS, Ecology and Management of Northern Rocky Mountain Forests, Missoula, MT

Most fire specialists attribute occurrence of large, severe wildfires to exceptionally warm, dry weather and high accumulation of forest fuels. Some evidence indicates fuels management could reduce the probability of severe fire. Mick Harrington and Duncan Lutes of the Rocky Mountain Research Station's Fire Lab will document the effectiveness of fuels reduction on Sheafman Creek. In the watershed serving a small community adjacent to the Bitterroot Forest, they are evaluating surface, ground, and aerial fuels before and after thinning and fire treatments on a site with high potential for severe, high-intensity fire. Using these data, they will model wildfire behavior and determine treatment effectiveness. This is one example of how vegetation research sponsored by BEMRP is providing vital information to the Bitterroot National Forest. This research is conducted in partnership with the Forest, Rocky Mountain Research Station, and The University of Montana (UM).

Poor condition of trees in dense ponderosa pine and western larch forests contributes to fire risk, and insect infestation or disease potential. Improvement of forest health via mechanical thinning and prescribed fire is a national priority. Anna Sala and Ragan M. Callaway of UM are continuing their Snowbowl old-growth research on the Lolo National Forest, evaluating how understory thinning and various burning treatments affect tree condition. Their research indicates the condition of old ponderosa pine and western larch trees benefits from thinning because more water and nitrogen are available (fire treatments had no detectable effect). Similar work is underway to understand how thinning and burning treatments affect seed production. This type of evidence is necessary to determine appropriate management of old stands.

When it comes to protection of fish habitat, providing

management buffers in sensitive areas is appropriate—but how wide should buffers be in different parts of mountain streams, and how might that width change with different management activities? To understand the relationship between disturbance processes and riparian and stream habitats, Elaine Kennedy Sutherland, Michael K. Young, Ethan Mace, and Emily K. Heyerdahl of the Rocky Mountain Research Station are comparing 13 biophysically similar drainages on the Bitterroot and Lolo National Forests. They are relating disturbance histories to riparian and upland forest structure, woody debris loading, and stream characteristics. Ultimately, this information can be used to determine where and what kind of management activities are appropriate in mountain streams. Applied research projects such as these are the key to good management decisions.



Martin Creek, a tributary of the East Fork of the Bitterroot River. Snags, large woody debris (along the creek bank), and seral shrubs resulted from a fire in the 1960s.



Measuring stream depth on the Bitterroot National Forest.
Photos by Ethan Mace.



“What Do You Mean By That?”

Do you ever wonder about meanings of terms used in ecosystem management? If so, visit BEMRP's glossary at www.fs.fed.us/rm/ecopartner. Note that some terms' definitions change over time as new information and policies develop. Periodically, we revise our web glossary page to reflect these changes. If you desire to suggest new terms for our glossary, feel free to do so. In this column, as in previous years, we feature more terms from our web's glossary page.

BIOPHYSICAL - Relating to biological and physical components of an ecosystem.

CANOPY - The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.

CANOPY CLOSURE - A synonym for “crown cover.”

CANOPY COVER - The proportion of ground or water covered by a vertical projection of the outermost perimeter of the natural spread of foliage or plants, including small openings within the

canopy. Note that total canopy coverage may exceed 100 percent because of layering of different vegetative strata such as grass, shrubs, and trees.

CROWN - The part of a tree or woody plant bearing live branches and foliage.

CROWN COVER - The ground area covered by the crowns of trees or woody vegetation. It is delimited by the vertical projection of crown perimeters and commonly expressed as a percent of total ground area. Crown cover measures the extent to which the crowns of trees are nearing general contact with each other.



The “Spotlight”...highlighting researchers at work:

Alan Watson

**“I Approach Work As A Calling,
Not A Career”**

**Janie Canton-Thompson,
Technology Transfer
Specialist and EcoReport
Editor, RMRS, Economic
Aspects of Forest
Management on Public
Lands, Missoula, MT**

Alan Watson, Research Social Scientist at the Aldo Leopold Wilderness Research Institute in Missoula, was born to study relationships between humans and nature. He was raised on a Kansas farm where his father bequeathed him only a saddle and his spurs. His Native American mother instilled in him deep cultural ties to freedom, exploration, and nature. Despite his rural upbringing he experienced no early relationship to public lands or wilderness for they were absent where he lived. After high school, he opted to become a military intelligence analyst, trained as a Thai linguist, and found time to manage an Arabian horse farm on the side.

After the military, Alan went to Northern Virginia Community College, then Virginia Tech, completing a B.S., M.S., and Ph.D. in forestry. During college, he prepared himself for future work with public lands. Alan valued training in both social and biological sciences to better understand humans’ relationships to their natural environment, most specifically wilderness. Completing his doctoral work, he accepted a faculty position at Georgia Southern University but —after much soul searching—Alan followed his heart and became the only Research Social Scientist with the Forest Service Wilderness Management Research Unit in Missoula (now Aldo Leopold Wilderness Research Institute). The Institute is responsible for nationwide wilderness research for the Forest Service, Park Service, Bureau of Land Management, and Fish and Wildlife Service. “This is the center of the wilderness universe, not just in the U.S. but internationally. I first heard about Missoula in the context of wilderness. It’s a



Alan Watson was born to study relationships between people and nature. Wilderness, South Africa. Photo by Maretha Shroyer.

good place to study and think about wilderness.”

Alan studies the human dimension of wilderness all over the world, with ongoing studies in Alaska, Canada’s Eastern Arctic, Finland, and South Africa. He is a Fulbright Scholar, and helped found the International Journal of Wilderness, currently serving as its executive editor for science. Additionally, he chaired the science section of the World Wilderness Congress in both India and South Africa.

Despite his many responsibilities, he places BEMRP among his top priorities and has hired an assistant to devote full time to BEMRP. “Wilderness is very much an interdisciplinary

resource. I intend to bring a world perspective and broad resources to benefit BEMRP and the Bitterroot community.”

Defining wilderness values broadly, internationally, and cross culturally is Alan’s consuming interest. In South Africa, he is applying a “mega-reserve” concept, looking at large conservation areas, including people and their natural environment. In the U.S., he is studying trust, commitment, social responsibility, and public purpose in relationships with public lands. Alan wants to know 1) how we should differentiate public from private lands, 2) what our social responsibility is across cultures and future generations, and 3) for whose values public lands should be managed. “So it’s relationships in a variety of ways — relationship to place, relationship to activities, and how things like recreation fees and the way we manage fuels are going to influence those relationships—in contrast to a focus on transactions. Relationships to public lands need to be explained in terms of stakeholding in places, and management agencies need place-based planning methods. We’re not nearly as interested in measuring customer satisfaction as understanding long-term relationships between the public and public lands.”

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Spotlight ... (from page 18)

Alan continued, “I have a personal motivation to understand my own relationship with the environment. I’m constantly struggling to articulate values that I or other people attach to nature. I greatly value diversity. My personal reward is learning constantly. I went to college not to be something but learn what I could be. My primary group of peer reviewers is future generations. The pinnacle of science is not just writing things I already know, but becoming what I’ve written. That’s really exciting.”

Alan’s challenge is to bring social science to the “front end” of ecosystem management. Alan believes strongly in “kincentric ecology,” suggesting: “Humans and non-humans through generations of co-existence have affected each other from whatever starting point you want to imagine. We can’t remove humans.” Thus, he is building a holistic, dynamic model that looks at vegetation, landform, wildlife, and humans relationally. As knowledge and society change over time, values and decisions relative to environment change. Human values, including relationship to place, need to be considered at the front end of projects rather than as responses to already proposed actions. Alan is excited about BEMRP’s commitment to a multidiscipline, landscape level project, which includes human relationships with the landscape at the beginning.

One might think Alan is all work and no play. Not so. Alan, his wife, Cletius (a practicing horticulturist), and three children live on an isolated 80-acre tract of land, which they have in a Forest Stewardship program, managing for watershed protection, wildlife, and timber. “I have a radiophone; when you call me the horn honks. My phone’s in the truck.” Interestingly, they have “a cabin” in downtown Missoula that they call “Hellgate House.” “Whenever we want to get away from it all—the woodstove and the snow plow and the

I have a personal motivation to understand my own relationship with the environment.

generator and all those things—we go to town.” Finally, the Watsons are a licensed foster care family for the Casey Family Program. Clearly, service is a way of life as Alan serves people and natural resources, both on and off the job.

When asked about his future, Alan replied: “I love my job. I can’t imagine doing anything else. I’m the only person in the world with this job. What I love about it is that I’m constantly

influenced by other people and things I read. I’m constantly becoming somebody new. I’m going to be somebody new next year, and I can’t wait to see who I am. I approach work

as a calling, not a career. And it’s broad. It’s international. It’s dealing with future generations. It’s dealing with community. I’m so lucky.”



*Horses in meadow, Bass Canyon, Selway-Bitterroot Wilderness.
Photo by Janie Canton-Thompson.*

Who We Are ... (from page 20)

replication and measurement of physical, ecological, and social effects. The first step will be an integrated analysis of the 471,000-acre Bitterroot Front to identify effective locations for this project, and possibly other vegetation-treatment projects for future consideration by the Bitterroot National Forest. Numerous models exist for analyzing different aspects of the fuel treatment-scheduling problem, but vary in geographic and time scales and differ in data needs. Currently, little information is available on how to combine these diverse models to best address the issues. BEMRP’s research/management landscape project will evaluate the strengths of various models in addressing Bitterroot Front landscape issues, and design an analytical approach for resolving them.

Who We Are, Where We Have Been, and Where We Are Going

Greg Jones, Research Forester and BEMRP Program Leader, RMRS, Economic Aspects of Forest Management on Public Lands, Missoula

BEMRP is now in year 10! It seems like only a year or two ago when Clint Carlson and others wrote the proposal that developed into BEMRP. Being the 10th year, it is only appropriate to take stock of who we are, review accomplishments, and discuss what lies ahead.

BEMRP, a multi-disciplinary partnership, conducts applied research on a variety of topics, including vegetation management, landscape analysis models and techniques, wildlife ecology, human issues, and fire effects in support of ecosystem management. It comprises five Rocky Mountain Research Station (RMRS) work units located in Missoula (Aldo Leopold Wilderness Research Institute, Ecology, Economics, Fire Effects, and Wildlife), and the Bitterroot National Forest, Northern Region, and The University of Montana. RMRS provides funding directly to BEMRP, but partners also contribute personnel time and resources. The partnership has published more than 125 scientific papers, sponsored four professional workshops, produced a professional symposium reporting results from BEMRP's first 5 years, hosted many field trips, and provided numerous

presentations to scientific, professional, and lay audiences. Interactions between managers and researchers have contributed greatly to the relevancy of both the research undertaken and efforts to present results.

The year 2000 fires in the Bitterroot watershed changed the research/management landscape, perhaps as dramatically as it changed the forest landscape! The following year, researchers from many government entities, universities, and other organizations established 60 studies on the Bitterroot Forest and surrounding area. Only a fraction of these studies were undertaken by BEMRP. A critical need for coordination among this diverse set of researchers and land managers became apparent. BEMRP and the Forest responded by establishing a jointly funded research/management coordinator position, now held by Sherry Ritter. Sherry's very capable work has significantly increased the effectiveness of BEMRP technology transfer efforts, as well as provided coordination among researchers, and between them and Bitterroot Forest managers.

In the next 5 years, the partnership plans to return to its roots. We will undertake one or more integrated landscape-scale ecosystem management/research project(s) involving multiple green tree fuel/forest restoration treatments with

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ECO-Report

Bitterroot Ecosystem Management
Research Project
USDA Forest Service
Rocky Mountain Research Station
P.O. Box 8089
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Greg Jones, BEMRP Program Leader, on the Missoula Forestry Sciences Lab campus. Photo by Kurt Krueger.