



Pacific
Northwest
Research
Station

Science Update

THE KENAI EXPERIENCE: COMMUNITIES AND FOREST HEALTH



Tom Iraci

IN SUMMARY

Over the last 15 years, spruce bark beetles have killed huge numbers of spruce trees, the dominant conifer across south-central Alaska. From 80 to 90 percent of the trees are dead in large areas on the Kenai Peninsula. The consequences of the spruce bark beetle outbreak will continue for years.

The USDA Forest Service Pacific Northwest (PNW) Research Station, along with partners, had scientists working on many aspects of the spruce bark beetle outbreak, including new control methods, wood product opportunities, and spruce regeneration. As the spruce bark beetle outbreak spread, forest managers tackling the problem worked hard to involve the public, yet they found conflicting community responses. These responses frustrated forest managers who felt they had reached

out to communities, and forest managers' decisions and actions frustrated local community residents.

Clearly these questions needed study—understanding how communities respond to forest health issues and how managers can most productively work with communities. A social scientist from PNW Research Station studied Kenai communities to find some answers.

The findings suggest that to address large-scale forest health problems, it is vital to understand the complexity of social systems as well as the complexity of ecosystems. The Kenai Peninsula experience is an important story to tell with implications for handling forest health problems in other places. The story is told inside.

What happened to the forests on the Kenai Peninsula?

The Kenai Peninsula lies south of Anchorage, with Prince William Sound to the east and Cook Inlet to the west. This gigantic peninsula is 5.2 million acres of spruce forests, rugged mountains, glaciers, fjords, salmon, grizzly bears, and moose, with scattered small towns, homesteads, and rustic resorts. The Kenai and Russian Rivers support the biggest recreational fishery in Alaska, with runs of king, silver, sockeye, and pink salmon. Much of the peninsula is easily accessible via Seward Highway, Alaska state ferries, cruise ships, or commercial planes.

A flight from Anchorage to Homer gives a grand view over much of the peninsula. Flying over the marshy northern peninsula, a person sees, at first, scattered dead trees in the spruce forests. Flying over the central peninsula, the observer sees patches of orange-brown dead trees, then bigger patches. Across the southern peninsula the observer flies over extensive swaths of dead trees, mile after mile. Communities on the southwest end of the peninsula are surrounded by open areas left after dead trees were taken out, and cabins once surrounded by spruce forests are now in the center of grasslands. A first-time visitor is almost speechless, except to ask: *What happened to the forests?*

The trees were killed by spruce bark beetles, in the worst beetle outbreak in Alaskan history. The spruce bark beetle, native to south-central Alaska, bores into trees and lays its eggs in the inner bark. Spruce bark beetles typically attack trees stressed or killed by windstorms or fires, breed in these trees, and attack nearby healthy trees. Beetle outbreaks are normal parts of the disturbance regime in south-central Alaska (see sidebar page 5), and outbreaks of various sizes have been



The spruce bark beetle outbreak has infested millions of acres across south-central Alaska, with the Kenai Peninsula at the center of the outbreak.

recorded over the past century. The outbreak of the last 15 years, however, has been of unprecedented size and intensity.

The statistics are bleak.

- About 1.9 million acres of the Kenai Peninsula are forested. The spruce bark beetles mainly attacked white and lutz and sometimes Sitka spruce, the peninsula's most widespread conifers.
- Spruce bark beetle mortality has been extensive on about 804,500 acres, according to the Spruce Bark Beetle Mitigation Program. From 80 to 90 percent of the trees are dead on many of those acres, an area larger than the state of Rhode Island.
- Across the larger region of south-central Alaska, spruce bark beetles have infested about 4 million acres of forest land. Other severely infested areas are the Copper River drainage to the east across Prince William Sound, and forests to the west across Cook Inlet.

The spruce bark beetle outbreak is now collapsing in many areas because most of the spruce trees are dead. But a few areas, such as Seldovia on the very tip of the peninsula, are just now getting hit. Across the forests already devastated, the consequences of the spruce bark beetle outbreak will continue for years.

Purpose of PNW Science Update

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Valerie Rapp, writer and editor
vrapp@fs.fed.us

Send change of address information to
pnw_pnwpubs@fs.fed.us



Tom Iraci

Beetle-killed trees fueled wildfires, and scorched trees were highly vulnerable to spruce bark beetle attack.

Key Findings

- Communities on the Kenai Peninsula showed considerable variability in their responses to the spruce bark beetle outbreak. They showed substantial differences in how they perceived the range and degree of impacts and risks, what they wanted from forest managers, and what actions they took as a community.
- Interactional capacity—the general level of community involvement and participation—was the most significant and consistent factor associated with community action in response to the Kenai Peninsula spruce bark beetle outbreak. Conflict did not stop communities from taking action; communities did not need consensus to begin taking action.
- The absence of local response to forest health issues did not necessarily mean that people in a community did not see any risks. It may have meant that the community lacked the capacity to mobilize collective resources in its own interests.
- Risk perception about the spruce bark beetle outbreak fell into two categories: immediate threats to personal property and safety, and broader threats to community and ecological well-being. Broader concerns about well-being were more likely to motivate people to act than immediate threats to safety and property. Forest managers, however, tended to assume that people would be more motivated by the immediate threats to safety and property.
- Community characteristics can be described by using a set of indicators from the three categories of environmental, demographic, and cultural characteristics. This information may illuminate areas where forest managers and local residents agree and areas of potential conflict before resources and time are spent on a particular course of action.

Who manages Kenai forests and what did they do about the spruce bark beetle outbreak?

Kenai forests have many owners: private, borough, state, federal, and tribal. (An Alaskan borough has governmental responsibilities comparable to those of a county.) The USDA Forest Service and Alaska Division of Forestry have some responsibilities to help all forest landowners with forest health problems such as the spruce bark beetle outbreak.

In the USDA Forest Service, the State and Private Forestry branch is responsible for the protection of forest health. They are charged to respond rapidly to forest health threats; to develop prevention, suppression, and restoration strategies; and to provide expert advice on the management of forest insects and diseases. The State and Private Forestry staff work through nonregulatory partnerships and often provide technical and financial assistance to landowners.

Initial responses to the spruce bark beetle outbreak were small scale and local. Some landowners cut dead and infested trees (although others did not), utilities cleared hazard trees near power lines, and highway departments removed hazard trees near roads.

As the spruce bark beetle outbreak spread, people realized that it was not collapsing after flaring up in one locality, as other 20th-century outbreaks had. The spreading outbreak crossed all property lines, and all forest landowners would have to be involved to stop it. Rising fire risk, along with power outages and road blockages caused by dead trees falling over, affected everyone, landowner or not. Any effective response to the spruce bark beetle outbreak needed to involve everybody.

In 1998, Congress directed the USDA Forest Service to set up a multiparty task force, charged with developing an action plan to manage the spruce bark beetle infestations in Alaska and rehabilitate the infested areas. The Kenai Peninsula Borough was designated to be the lead agency on the task force.

The Kenai Peninsula Spruce Bark Beetle Task Force began work in spring 1998 and made public safety and fire protection its top two priorities. On June 30, 1998, the task force was disbanded after presenting its report to Congress. The Kenai Peninsula Borough established the Spruce Bark Beetle Mitigation Program (SBBMP) in 1999 and charged it with implementing the task force report recommendations.

Early projects were a wildfire hazard assessment, identification of fire escape routes, creation of community safe areas, and a land cover map. The SBBMP developed FireWise Community Mitigation Plans, contracted hazard tree removal along utility corridors and in high-use public areas, and provided training and technical expertise to local fire departments



Courtney Flint

The Kenai action plan included a wildfire safety goal to create defensible space “from the back door out” around homes and buildings on private land.

and emergency responders. The National Fire Plan and congressional appropriations contributed funds for this work. As emergency needs were met, the SBBMP developed long-term recommendations and started reforestation and rehabilitation programs.

The forests around Cooper Landing, a small town in the Chugach Mountains, were among the first areas heavily hit by the beetle outbreak. Forest managers know that one way to control beetle outbreak is to cut and remove heavily infested trees promptly before the beetles multiply and migrate to surrounding trees. The harvest of dead and dying trees can also reduce fuel loads for wildfire, recover any commercial value from the wood (offsetting costs of the work), and clear the ground so reforestation can begin. With these facts in mind, Chugach National Forest managers and State and Private Forestry staff proposed a program of timber harvest, prescribed burning, and reforestation for the forests around Cooper Landing. Local residents generally supported the program and worked with forest managers on getting it done.

Beetle infestation then flared up on Chugach National Forest lands around the town of Moose Pass, a few miles northeast of Cooper Landing. Forest managers began a similar program to control the outbreak. But a prescribed fire burned out of control and threatened homes, and other events politicized feelings. At that point, angry local residents strongly opposed the way the beetle outbreak was being managed.

As the beetle outbreak spread, forest managers ran into conflicting community responses across the Kenai Peninsula. Some communities wanted the dead and dying trees removed, but other communities wanted the trees left. Some communities said forest managers hadn’t done enough, and others said managers had done too much already. Forest managers had worked



Courtney Flint

One Moose Pass resident said, “It’s not the beetles, it’s the government’s response to the beetles that has opened our eyes.”

hard to involve the public, and managers were increasingly frustrated by these conflicting responses. At the same time, local residents were unhappy with the forest managers. What was going on?

“This was a question that social science is particularly well-suited to investigate,” says Courtney Flint, social scientist for PNW Research Station. “I found that the Kenai Peninsula experience was an important story to tell with implications for future forest health problems well beyond the Kenai.”

Why did Kenai communities react so differently to the spruce bark beetle outbreak?

Forest managers needed to understand the relations between local communities and a large-scale forest health problem. To find out, Flint selected six Kenai Peninsula communities to study: Anchor Point, Cooper Landing, Homer, Moose Pass, Ninilchik, and Seldovia (see map).

We know that forest ecosystems have rich natural variability. We should expect variability in human communities too.

One reason the communities reacted so differently is simply that they are different. “The presence of heterogeneity across communities on the Kenai Peninsula or anywhere else should not come as a surprise,” Flint comments. “Our understanding of forest ecosystems is rooted in an appreciation of natural variability. Yet forest management and policy are sometimes rooted in one-dimensional interpretations of human communities.”

The six Kenai communities studied have economic, cultural, and historical differences. Cooper Landing and Moose Pass are inland mountain communities situated within or near the Chugach National Forest. Cooper Landing, a long-time recreation-based community, is evolving into a retirement community with an aging population. Moose Pass residents are on average younger than Cooper Landing residents, and they are employed in recreational businesses or by the Forest Service or railroad.

Homer, Anchor Point, Ninilchik, and Seldovia are coastal communities on the Kenai Peninsula. Homer is the largest of the six communities studied, with 8,920 people, and it has a fairly diverse economy of tourism, fishing, art, marine research, and many other enterprises. Until recently Homer had a major wood-chip port facility for processing and exporting beetle-killed trees. Anchor Point's economy is based on commercial and sport fishing as well as timber extraction, and the town's 1,979 residents are typically more conservative politically than residents of nearby Homer.



Courtesy Flint

So many trees died in some watersheds that water yield changed, and average rainstorms resulted in bigger-than-average floods.

Disturbance Ecology

Disturbances, or disruptions of ecosystems, are a big part of forest dynamics. Fire is the best-known forest disturbance, but insect outbreaks, windstorms, hurricanes, floods, landslides, droughts, and diseases are just a few of the other disturbances that change forests. People cause some disturbances, such as logging, and play a part in others such as the introduction of exotic species or the management of fire.

Disturbances come in all sizes, shapes, and intensities, and they affect the chances of other disturbances; for example, drought may cause a beetle outbreak, and dead trees may become fuel for wildfire. Disturbance regimes are the characteristic combinations of type, frequency, intensity, and size of disturbances typical for different ecosystems.

Over the past century, the most obvious disturbances in Kenai Peninsula spruce forests have been spruce beetle outbreaks, windstorms, and fires. Spruce bark beetles typically attack trees stressed or killed by windstorms or fires, breed in these trees, and attack nearby healthy

trees. A spruce bark beetle population may kill many trees before the beetle numbers drop owing to either a lack of new trees to infest or climatic changes that reduce beetle reproduction.

Disturbances, especially large ones, affect every part of the ecosystem. On the Kenai Peninsula, possible effects of the beetle outbreak on other resources include:

- **Watersheds.** The amount and timing of water yield can change enough to affect streamflows; water quality may change. Dead trees pile up in streams and loss of forest cover may lead to erosion. These changes can affect salmon habitat—and the Kenai Peninsula has some of the most productive wild salmon fisheries in the world.
- **Wildlife habitat.** Forest habitats for many species of wildlife are dramatically changed. Woodpeckers feast on the beetles, and some other wildlife species may benefit from the open, grassy areas. But many songbirds and mammals lose the deep forest habitat they need.
- **Fire hazard.** The heavy fuel loads of the dead trees enable fires to spread quickly and burn intensely; bluejoint reedgrass adds to the flashy fuel load in late fall and early spring.
- **Forest regeneration.** Bluejoint reedgrass and fireweed thrive in the sunny openings left by dead spruce. The bluejoint reedgrass in particular forms dense mats that can smother young seedlings; the grass competes with surviving seedlings for soil moisture and nutrients. Grasslands can persist for decades.
- **Social and economic values.** The loss of the spruce forests affects people in many ways, as described in the rest of this *Science Update*.

Forest managers expect some level of disturbances in a forest, and they understand that these disturbances create diversity and complexity in ecosystems. Managers are likely to see a disturbance as a problem, however, if it kills large numbers of trees or otherwise threatens the long-term “expectations of society for producing resources and values from the system” (Ross et al. 2001).



Tom Iraci

Along Greentimber Road outside Anchor Point, most green trees now are seedlings planted to replace the mature spruce that died.

Ninilchik and Seldovia have active Alaska Native Associations and Corporations playing significant roles in forest management, although Native Alaskans are minority populations in both towns. Ninilchik's economy is based on tourism, especially charter and sport fishing, along with commercial fishing and logging. Seldovia is accessible only by boat or plane. It has a rich history based largely on commercial fishing, and the town has shifted reluctantly toward a more tourist-based economy.

The forests around the six towns also have differences. Forests around Cooper Landing and Moose Pass are a mix of spruce, other conifers, birch, and aspen and were not devastated by the spruce bark beetles. Southern Kenai forests are heavily dominated by spruce, 90 percent of which were killed by spruce bark beetles, dramatically changing the landscape around Homer, Anchor Point, and Ninilchik. Across the Kachemak Bay from Homer, spruce bark beetle activity was increasing around Seldovia in 2003, long after the peak of the outbreak had passed in other areas.

No wonder, then, that towns reacted so differently to the beetle outbreak. Although Anchor Point and Homer had similar heavy loss of their forests, their reactions were quite different. "In Anchor Point, people wanted the dead trees logged, the wood used, and the land reforested," Flint says. "This was the one thing everybody in town agreed on."

"But in Homer," Flint continues, "there was considerable conflict over forest issues. Some people said they grieved the death of these trees but saw it as natural. These people were against logging the dead trees and wanted to allow natural regrowth."

Although the two towns had different ideas about what to do, both communities were able to act in response to the spruce bark beetle outbreak. In all the communities studied, Flint



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A Homer resident said the spruce forest used to be like a "hobbit forest with mushrooms and thick moss and dripping towering majestic spruce." Bluejoint reedgrass now dominates openings where the spruce trees died.

found that a community's capacity to take action was not associated with pro- or antilogging opinions or any particular point of view. Also, conflict did not stop communities from taking action, and communities did not need consensus to begin taking action. A Cooper Landing resident told Flint, "You have to have controversy to get people to show up at meetings."

Conflict did not stop communities from taking action, and communities did not need consensus to begin taking action.

What mattered was the general level of community involvement and participation, known as interactional capacity. On the Kenai Peninsula, Flint found that the single most consistent and significant factor influencing community action in response to the spruce bark beetle outbreak was this interactional capacity. She explains, "Communities in which people are actively engaged in local affairs and issues are more likely to mobilize collective resources in a particular time of need. Community action doesn't emerge out of nowhere."

"Community action leads to more community action," Flint comments. Conversely, a lack of action did not necessarily mean that people in a community did not see any risks in the dying trees. People in some communities might be equally concerned, but the community did not have the capacity to work on an issue.

Which forest health issues motivated communities to act?

People in the Kenai communities recognized a wide range of effects, good and bad, from the spruce bark beetle outbreak. "These changes were not only observed," Flint comments,

Additional Research Related to the Spruce Bark Beetle Outbreak

The PNW Research Station and the Alaska Region of the USDA Forest Service are working together on research, development, and applications related to the spruce bark beetle outbreak and other forest health issues in south-central Alaska. Some of these projects are described briefly below; see “Resources on the Web” to find information on all projects.

- **Salvage logging and fuel loads.** New fuel load inventories showed that on the Kenai Peninsula, fuel had increased significantly since 1987 in all forests, regardless of type. Research forester Bethany Schulz also found that salvage logging not conducted in a manner specifically to reduce fuels resulted in increased amounts of small fuels, compared to the fuel loads in beetle-killed stands with no salvage logging.
- **Wood product opportunities for beetle-killed spruce.** Research forest products technologist Eini Lowell found that spruce tree defects unrelated to the spruce bark beetle outbreak, such as heart rot, played a significant role in suitability for high-value wood products; the presence and amount of existing defect differed among geographic locations. Any potential the beetle-killed spruce had for high-value products such as lumber and veneer declined rapidly after the trees died. Beetle damage did not affect the quality of wood pulp from the white spruce, but pulp yield was not tested. The dead spruce have high potential for use in log homes in places where the manufacturing infrastructure exists and market conditions are favorable.
- **Timber industry trends on the Kenai Peninsula.** The Alaska Wood Utilization Research and Development Center, a team within PNW Research Station, reports that large volumes of beetle-killed spruce were harvested on the Kenai Peninsula from 1994 to 2004. Most harvested material was exported through the port at Homer and used for both solid wood products and chips. However, both the timber and chip industries on the peninsula have declined considerably in the early 21st century. Forest products technologist Dave Nicholls and others investigated the feasibility of using low-value dead spruce on the Kenai Peninsula in wood-fired heating systems for buildings. Nicholls found that small, wood-fired heating systems are economically and technically feasible, and could be supplied with either beetle-killed wood or sawmill residues. The team is studying the use of wood residues for community heating and also for the manufacture of wood-plastic composite materials.
- **White spruce regeneration.** In many beetle-kill areas, white spruce natural regeneration has been poor because

seed sources have been eliminated. Research forester Andrew Youngblood found that the most important deterrent to successful establishment of planted white spruce on the Kenai Peninsula was competing vegetation, especially grasses and tall shrubs. If no planting is done, the native bluejoint reedgrass will likely dominate some areas for years. Youngblood’s research showed that when white spruce seedlings are planted, they survive best if planted immediately after overstory trees are removed and before the competing plant cover becomes dense. Managers have site preparation options that result in different plant communities and seedling growth rates.

- **Genetic resistance to spruce bark beetles.** Even in the worst beetle-kill areas on the southern Kenai Peninsula, a few mature spruce survived, surrounded by dead trees. Research ecologist Trish Wurtz is using satellite imagery to locate and catalog these hardy survivors so they can be preserved during fuel-reduction work. Seedlings grown from the seed of some survivors have been outplanted in a research plantation, and Wurtz is evaluating their cell chemistry and production of natural resins for resistance traits. If scientists can identify genetically based traits that enable some trees to fend off or survive a spruce bark beetle attack, beetle-resistant seedlings could be grown for planting stock.
- **Natural biological controls.** Pheromones are natural chemical signals emitted by beetles (and other insects). The antiaggregation pheromone 3-methyl-2-cyclohexen-1-one (MCH) signals other spruce bark beetles that a tree is full of beetles and to stay away. Research entomologist Edward Holsten is testing the use of MCH dispensers placed in trees to repel spruce bark beetles and possibly protect individual trees. A different pheromone, which attracts spruce bark beetles, can be used to bait beetle traps.



Tom Iraci

Local residents keenly felt the changes in their quality of life, including loss of identity, privacy, and scenic qualities, owing to the spruce bark beetle outbreak.



Tom Iraci

Visiting forester listens to story of how homes were narrowly saved when wildfire started in beetle-killed trees on the outskirts of Homer.

“they were keenly felt by residents who live, work, and recreate in Kenai Peninsula forests.”

Risk perception about the spruce bark beetle outbreak fell into two categories: immediate threats to personal safety and property, and broader threats to community and ecological well-being. The immediate threats included fire risk from dead trees and cured bluejoint reedgrass; hazard from trees falling on power lines, roads, and buildings; and recreation hazards.

Broader threats to community and ecological well-being included changes in the quality of life and overall landscape changes that caused an identity crisis for many residents. Kenai residents understood well the connections between the spruce bark beetle outbreak and flooding, erosion, and changes in wildlife and fish habitat. Some saw the expanded timber and chip export industry, with its new jobs, as positive, but many were concerned because the logging boom was unsustainable, bound to collapse as the supply of dead trees was exhausted. Most residents regretted the loss of privacy and aesthetic values as grassland replaced forests, although, Flint comments, “Local realtors coined the term ‘emergent view’ as the dead trees were cleared.”

In public meetings, forest managers emphasized the fire risk and other immediate threats, thinking that those threats were most likely to motivate people to get involved. Through interviews and surveys, however, Flint found that broader concerns about well-being were more likely to motivate people to act than immediate threats to safety and property. “Although local residents were seriously concerned about fire and other immediate risks,” Flint says, “what motivated them to participate in collective actions were broader environmental and community values.”



Courtney Flint

Harvested dead spruce were used for high-value products when possible, and chipped for pulp otherwise.

Communities and Forest Health Issues Beyond the Kenai Peninsula

Kenai Peninsula communities have already cleared many dead trees and started reforesting the ground. In late 2004, the SBBMP completed writing the “All Lands/All Hands Action Plan,” an interagency strategy with a 5-year action plan for all the issues raised by the spruce bark beetle outbreak. The SBBMP is now implementing the plan.

The experience on the Kenai Peninsula has implications for people facing forest health problems in other places. All forests are dynamic—a large fire may burn through a pine forest, or sudden oak death can attack oak woodlands. Disturbances influence other events and combine with each other to change forests in complicated ways. Some of these events are considered forest health problems because of their magnitude, severity, damage to forests, risks to people and communities, or conflicts with other forest uses, values, and benefits.

One widespread forest health problem in the United States is the high risk of catastrophic wildfire, owing to heavy fuel loads in forests. Managers often emphasize the wildfire threat to homes when they encourage people in local communities to get involved. The experience on the Kenai Peninsula, however, suggests that people have broader perceptions of risk and are more likely to be motivated by broader threats to community and ecological well-being.

Managers’ emphasis on wildfire risk may exclude discussion of other critically important risks. Flint comments, “An exclusive focus on the more acute threats to personal property and safety is likely to miss other risks perceived by local residents, and these other risks are the ones that galvanize local action.”

Strategies for Working with Communities on Forest Health Problems

Forest managers have legal responsibilities to protect forest health, prevent or manage forest health problems, and restore affected forests. Strategies that don't fit local communities will be opposed, however, slowing down or even blocking effective action.

The experience on the Kenai Peninsula suggests four strategies for working with diverse communities on forest health problems that affect wide areas.

- 1. Understand variations in communities.** Use a set of indicators to understand characteristics of and differences among communities in a region. Several community types or clusters of traits may emerge—information that is critical for working with these communities. Management strategies are tailored to fit specific forests and often should be tailored to fit specific communities.
- 2. Listen.** Sound forest management decisions depend on inclusion of community perceptions and local knowledge into risk assessments. Community responses can either help or hinder agency strategies. The art of listening, cultivated early in the decision-making process, supports collaboration with local communities.
- 3. Accept controversy.** Conflict often motivates local participation. Discussion of controversial issues

makes it more likely that critical issues will be addressed early on instead of emerging as road-blocks later. A consensus-oriented process may fail to address controversial issues.

- 4. Use diverse strategies to work with communities.** Managers use many strategies and tools in managing forests; their community collaboration toolbox should also have an assortment of tools for different community needs.
 - Identify traits such as communities' abilities to take action on local needs.
 - Build relationships with key local people, local groups, and networks, and work with them.
 - Foster the development of local groups and networks in communities lacking these resources. Use alternative methods for reaching people.
 - Encourage communities that have the capacity to mobilize local resources for projects such as neighborhood tree-clearing for defensible space and reforestation.
 - Pay attention to local communities that are unable to draw attention to their concerns or to mobilize resources for community action; these communities may have critical needs.



Tom Iraci



Tom Iraci

Kenai residents were concerned about the immediate threats to safety and property, but it was the broader threats to community and ecological well-being that motivated them to act collectively.

The techniques that Flint used to understand Kenai communities—collection of existing data, such as census figures, followed by surveys and interviews—can be adapted and used by managers anywhere. An understanding of community conditions and characteristics may illuminate areas where forest managers and local residents agree and areas of potential conflict before resources and time are spent on a particular course of action. The information can be used to sort out the similarities and differences across a set of communities.

Although data are useful, Flint recognizes their limitations. “There is no replacement for being in a community and listening to people to get a sense of real issues, conditions, and processes,” she comments. “People who live, work, and recreate in forests have intimate, everyday connections with their forests. Local ecological knowledge is often higher than assumed by forest managers.”

Community characteristics can be described by using a set of indicators from the three categories of environmental, demographic, and cultural characteristics:

Environment. These indicators describe the natural setting and such characteristics as land cover, topography, climate, and watershed dynamics.

Demography. These indicators describe population and housing characteristics, land use patterns, jurisdictional relationships, and economic structure.

Culture. These indicators describe attitudes, experiences, traditions, and perceptions of community populations.



Tom Iraci

Social scientist Courtney Flint discusses Kenai community responses to the spruce bark beetle outbreak with visiting scientists and managers.

The diversity and complexity of forests are what makes them unique and beautiful. Just a few of the North American forest types are the southern loblolly pines, eastern hardwoods, California redwoods, western ponderosa pines, Pacific Northwest Douglas-firs, and the Alaskan spruce forests. Within the general types, each watershed has unique qualities. Working with complexity is central to ecosystem management.

Strategies that don't fit local communities will be opposed, slowing down or even blocking effective action.

Human communities are as diverse and complex as forests. Communities and the people in them all have unique histories and qualities. Working with the complexity of communities is also central to ecosystem management. Diversity and complexity are challenging but they are exactly what gives forests and communities their beauty and makes meeting the challenge worth it.

Contacts

Courtney Flint, cgf110@psu.edu, Human and Natural Resources Interactions Program, PNW Research Station.

Richard Haynes, rhaynes@fs.fed.us, Human and Natural Resources Interactions Program, PNW Research Station.

For Further Reading

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Resources on the Web

U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. <http://www.fs.fed.us/pnw>. This site accesses electronic information about all PNW Station research. (1 April 2005).

Spruce Bark Beetle Mitigation Program. This site has up-to-date information about the spruce bark beetle outbreak and actions taken. <http://www.borough.kenai.ak.us/spruce-beetle>. (1 April 2005).



Tom Iraci

People who live, work, and play in forests every day find that forest health problems—and the management solutions—affect their lives in many ways.

Credits:

Communications and Applications Director — Cynthia L. Miner

Writer and managing editor — Valerie Rapp

Art director — Frank Vanni

Layout — Jenny Beranek

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The USDA Forest Service celebrates its 100th anniversary on July 1, 2005. The PNW Research Station is proud to take part in the centennial through participation in the Smithsonian's 39th-annual Folklife Festival and as a host of a national Forest Service retirees' reunion. For more information about the centennial and the New Century of Service, go to <http://www.fs.fed.us/centennial>.

Smithsonian Folklife Festival, featuring the USDA Forest Service

June 23–July 4, 2005

Washington, DC

For more information: <http://folklife.si.edu/festival/2005/index.html>

Forest Service Retirees Reunion

September 4-9, 2005

Portland, Oregon

For more information: <http://oldsmokeys.org>

