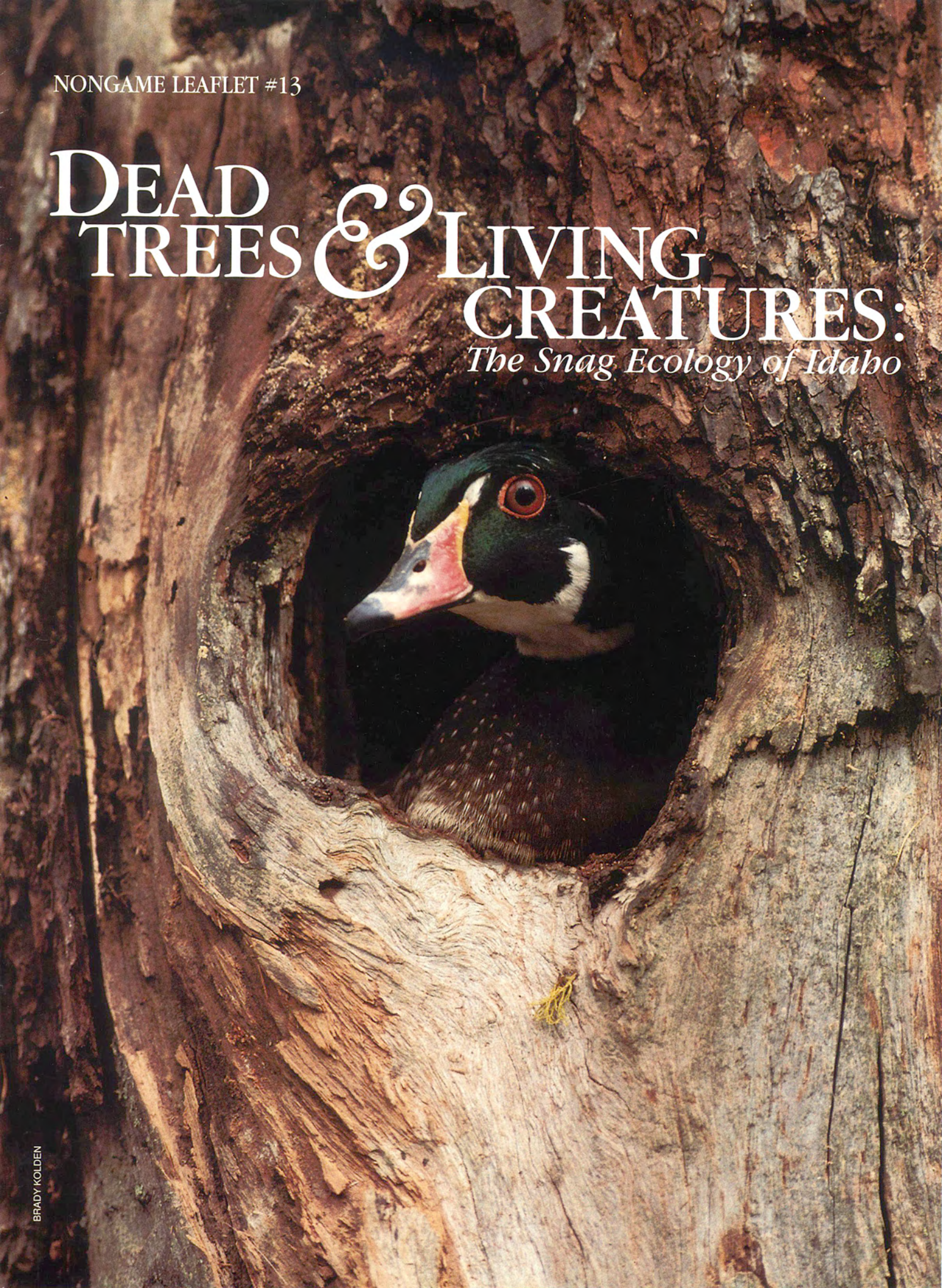
NONGAME LEAFLET #13

DEAD TREES & LIVING CREATURES:

The Snag Ecology of Idaho



BRADY KOLDEN

WHO NEEDS SNAGS?

Building a nest outside a cavity isn't an option for mountain bluebirds. Like other cavity nesters, they can't construct a cup nest of twigs, so they must find a cavity or man-made nest box to breed.

(Cover) Wood ducks get their name from nesting in tree holes, called cavities. As soon as the ducklings hatch, they jump from their nest, 10 feet or more above ground. Most survive, thanks to their light weight and flexible bones.

"Snag habitat and cavity nesters are as necessary to the forest as the trees."

–Jerry W. Davis, 1983

It's hard to overemphasize the value of logs and snags to wildlife and to a forest. Downed logs and dead or partly dead standing trees, called snags, support a complex system of life.

An amazingly diverse wildlife community depends on dead or dying trees. In Idaho, about 50 species of birds and 25 species of mammals nest or shelter in snags; they're listed on page 20. Fungi, plants and invertebrates such as spiders and insects also use snags. These same snags eventually become downed logs and debris, taking on new value for many more of wildlife and plant species, for watershed protection and for soils.

A tree becomes a snag from the moment disease or damage produces a dead portion. It functions differently from a live tree from that point until it falls and eventually decays beyond recognition to become part of the soil.

The threats to a strong living tree are many: fire, wind storms, heavy ice and snow, other trees falling on it, starvation, lightning, chemical pollution, climate change, top-heaviness, consumption by mammals, insect infestations, fungi and rusts, flooding and drought.

Often, a tree dies due to multiple causes. For example, when a wind storm blows off a large branch, airborne spores of fungi can find their way past the normally protective bark. Essential oils released through the wound attract wood-boring insects. They tunnel through the inner bark, lay their eggs and their emerging larvae devour more bark. The fungus may cause heart rot or make the tree lose its needles and starve.

Fortunately for wildlife, some trees do die and become snags and logs.

LANCE BEENY

PHILIP LAING

Sites to Raise Young

The best-known use of snags is as nesting sites for birds. Some birds, known as primary cavity excavators, take advantage of the decay in trees to create holes for nesting. These holes or others, perhaps made by branches falling off, later become homes to other animals that require cavities but cannot excavate.

Primary excavators include the woodpeckers and nuthatches. Bluebirds, chickadees, wrens, owls, bats, squirrels, pine martens and other species use existing holes. Birds such as osprey nest on the broken tops of snags instead of inside cavities. Mammals like bears and skunks make dens in or under logs.

Some species of birds that rely on snags are major predators on two forest insects, the western spruce budworm and Douglas-fir tussock moth. These birds include the flammulated owl, house wren, northern flicker, Vaux's swift, pileated woodpecker, red-breasted nuthatch, white-headed woodpecker, and the black-capped, chestnut-backed and mountain chickadees.

Other Functions of Snags and Logs

Snags and logs provide more than places to nest and raise young. They are important sources of food for many species of animals, plants and fungi. Often the system works as a "food chain." For example, insects infest snags and logs. They in turn become food for birds and mammals, which become the prey of goshawks, snakes, fishers and other predators. Some insect-eaters leave Idaho when their food runs short in winter. They are called "Neotropical migrants," since they migrate to New World tropical climes.

Some animals store food in snag crevices or cavities. Snags also serve as open hunting and feeding perches for raptors or flycatching birds. Animals use logs for travel paths or as places to tear apart their food before eating it (biologists call them "plucking posts").

Snags and logs are communication centers for birds, most notably as drumming posts for woodpeckers or drumming sites for ruffed grouse. The exposed perches of snags also make birds more conspicuous as they proclaim the boundaries of their territories or attempt to attract a mate.

Logs and snags provide resting or roosting areas. Insects, birds and mammals roost on limbs, under bark and in cavities or crevices. These roosting sites are crucial to them for surviving the cold of winter or night, or for escaping the heat of summer.

From Duff to Duff

One of the most important functions of snags is as future logs. For years, decomposing logs serve the forest community in many ways as they slowly release their nutrients into the soil and streams. They end their existence as organic matter called duff, from which

MICHAEL LUQUE

(Above) This fallen tree is a "nurse log." In decomposing, it releases nutrients for the next generation of fir trees, as well as for liverwort and sphagnum moss, which wildlife eat. (Right) Seldom seen, the elusive fisher preys on porcupines and small mammals that live in downed timber. The Idaho Department of Fish and Game restored fishers to the state by releasing 39 from Canada in 1962 and 1963.

JEFFREY RICH NATURE PHOTOGRAPHY

new plants take nourishment.

Logs on the forest floor retard runoff, store water and reduce the amount of sediment that enters streams. They are important as growing sites for new trees, forbs, fungi, mosses and liverworts.

Newly fallen trees attract a wide variety of insects such as weevils, beetles and ants. As these insects chew connecting tunnels throughout a log, they introduce fungi and bacteria that speed up its decomposition. The tunnels open up the log for other creatures, too, such as spiders and parasitic wasps.

When a tree falls, its uprooting mixes soil nutrients. Snags that fall into streams slow the water's flow, provide cover for fish and reduce channel erosion.

Threats to Snags

Unfortunately, not everyone recognizes the importance of snags in a forest. Some snags become firewood. Others are cut for safety reasons during logging operations. Those that aren't cut may blow down once the surrounding forest is cleared or thinned. Burning after logging, usually to reduce fuel loads, often destroys snags. Live trees that are infected with heart rot or insects are perceived as a threat to the surrounding forest and are therefore removed.

However, tree death is a natural occurrence in forests. Hundreds of animal and plant species depend on dying trees, just as they have since forests first grew on the earth.

"...the impact of the individual tree gradually fades as it is decomposed... but the woody structure may remain for centuries and influence habitat conditions for millenia."

—BioScience, 1987

BRADY & CAREY KOLDEN

Raccoons (above) and lynx (left) use large tree hollows and den in downed snags and deadfalls.

Snag users

We don't have enough space to describe all the species that need snags and logs in Idaho's forests for food, nesting or roosting at least part of the year, but here are some interesting ones.

Northern Flicker

This is the most frequently seen of all the woodpecker species in Idaho. It is easily identified by its large size, the red underside of its wings and tail, white patch on its rump and loud "cak cak cak cak" call. Its name comes from another call, "flicka flicka flicka," common early in the breeding season.

The flicker is found in nearly every habitat below timberline that offers nest sites and open ground for foraging. While snags are its most common nesting sites, it also will use poles and posts, banks, haystacks, boxes and even people's houses. It takes about 12 days for a pair to excavate a nest site.

The flicker and the larger pileated woodpecker are particularly important primary cavity excavators because of the number of other species that use their abandoned holes for nests or roosts. Flickers and pileated woodpeckers eat ants more than any other North American birds.

Black-backed Woodpecker

The black-backed woodpecker is one of two species of woodpeckers with three toes. Its coal-black back provides camouflage when it is foraging in burned forests. This species takes advantage of periodic burns in coniferous forests, colonizing them within the first few years in greater numbers than occur in unburned forests. These woodpeckers stay in the burned forest for two to five years, or until the bark has fallen off most of the dead trees.

To feed, black-backed woodpeckers scale the bark off burned or insect-infested trees and eat the wood-boring beetles and ants beneath. This helps the surrounding forest by reducing the number of insects that could attack trees next to the burn.

Lewis' Woodpecker

This is the only bird species named after Meriwether Lewis during Lewis and Clark's exploration of the West. The Lewis' woodpecker has a black back, but its most noticeable features are its rosy belly and red face. It is the only woodpecker that regularly perches on wires.

Although this species nests in cavities, it mainly forages by hawking (flying out from a perch to catch flying insects). It also finds pine seeds, fruit and nuts, which it stores in crevices. Lewis' woodpeckers nest in large-

diameter snags in open areas such as ponderosa pine stands, cottonwoods and burned habitats.

While many species of woodpeckers are year-round residents, Lewis' woodpeckers and the two sapsuckers are Neotropical migrants. A few remain in southern Idaho through the winter, but most fly south to northwestern Mexico.

Red-naped Sapsucker

Named in part for the red on the nape of its neck, this bird also has beautiful yellow sides. The species is the western counterpart to the yellow-bellied sapsucker.

Its other name comes from its eating habits. Red-naped sapsuckers drill lines of holes, called sap wells, in bark. They eat both the sap and the insects that visit the sap, and also the fruit, berries and cambium of trees. Sapsuckers defend their sap wells from other species. Hummingbirds, juvenile warblers, kinglets, chipmunks and mice feed at sap wells also, making the sapsucker an important part of the forest community.

Red-naped sapsuckers prefer to nest in live deciduous trees such as birch, aspen and cottonwood, but they also nest in coniferous forests. They often return to the same tree, but not the same cavity, year after year. The Williamson's sapsucker also uses snags.

Nuthatches

Red-breasted, white-breasted and pygmy nuthatches all excavate their own nest cavities. Amazingly, given their small size, they use larger snags than many woodpeckers. They usually enter a rotten branch or stump, but occasionally take over a deserted woodpecker hole. In winter, pygmy nuthatches roost in large groups within a cavity.

Nuthatches are year-round Idaho residents, eating insects and, in the winter, conifer seeds. When seeds are sparse, they move south seeking food. In winter, they are often found in mixed-species feeding flocks. Pairs use their characteristic "yank-yank-yank" call to keep track of each other.

Red-breasted nuthatches are primarily a coniferous forest species. White-breasted nuthatches are found more often in deciduous forests, and pygmy nuthatches are found in ponderosa pine forests.

Common Merganser

Surprisingly, this common duck of mountain rivers and lakes is a cavity nester.

It nests in snags and in earthen banks or rock crevices, under shrubs and in root hollows. Where suitable nest sites are unavailable, nest-dumping will occur. This survival mechanism can leave hens with huge clutches—sometimes more than a dozen eggs—from different females.

Mainly dining on fish, mergansers also eat amphibians, crustaceans, mollusks and aquatic insects. With long, serrated beaks and streamlined bodies, they're efficient aquatic predators.

Other waterfowl species that nest in snags include wood ducks, common and Barrow's goldeneyes, buffleheads and hooded mergansers.

American Kestrel

This tiny falcon is the only Idaho hawk that regularly nests in tree cavities, although it also nests in cliff crevices. In Idaho, kestrels occur from low deserts to high mountain meadows.

Kestrels are mainly insect eaters, but also prey on small vertebrates such as small mammals, snakes, lizards and even other birds. They hover in one place over fields to search for prey. They also perch while hunting and are the only Idaho raptor that regularly perches on phone or electrical wires.

The American kestrel is the most colorful raptor. Males are blue-gray with a rusty colored back and tail and females are rust-colored overall. Both have striking, masklike facial markings.

Although kestrels are Neotropical migrants, many remain in Idaho during the winter, defending their territories and food sources.

Flammulated Owl

This owl is just six to seven inches long, about the size of a bluebird. Because it eats insects, spiders and

DAN & CINDY HARTMAN

centipedes, it migrates to the southern United States and northern tropics for winter. Flammulated owls capture flying insects in and around trees while in flight. They also pluck insects from branches, trunks and the ground.

Flammulated owls in Idaho are found in mature ponderosa pine forests and in Douglas-fir and mixed conifer forests. They use abandoned woodpecker holes, especially those excavated by flickers, apparently returning year after year to the same area.

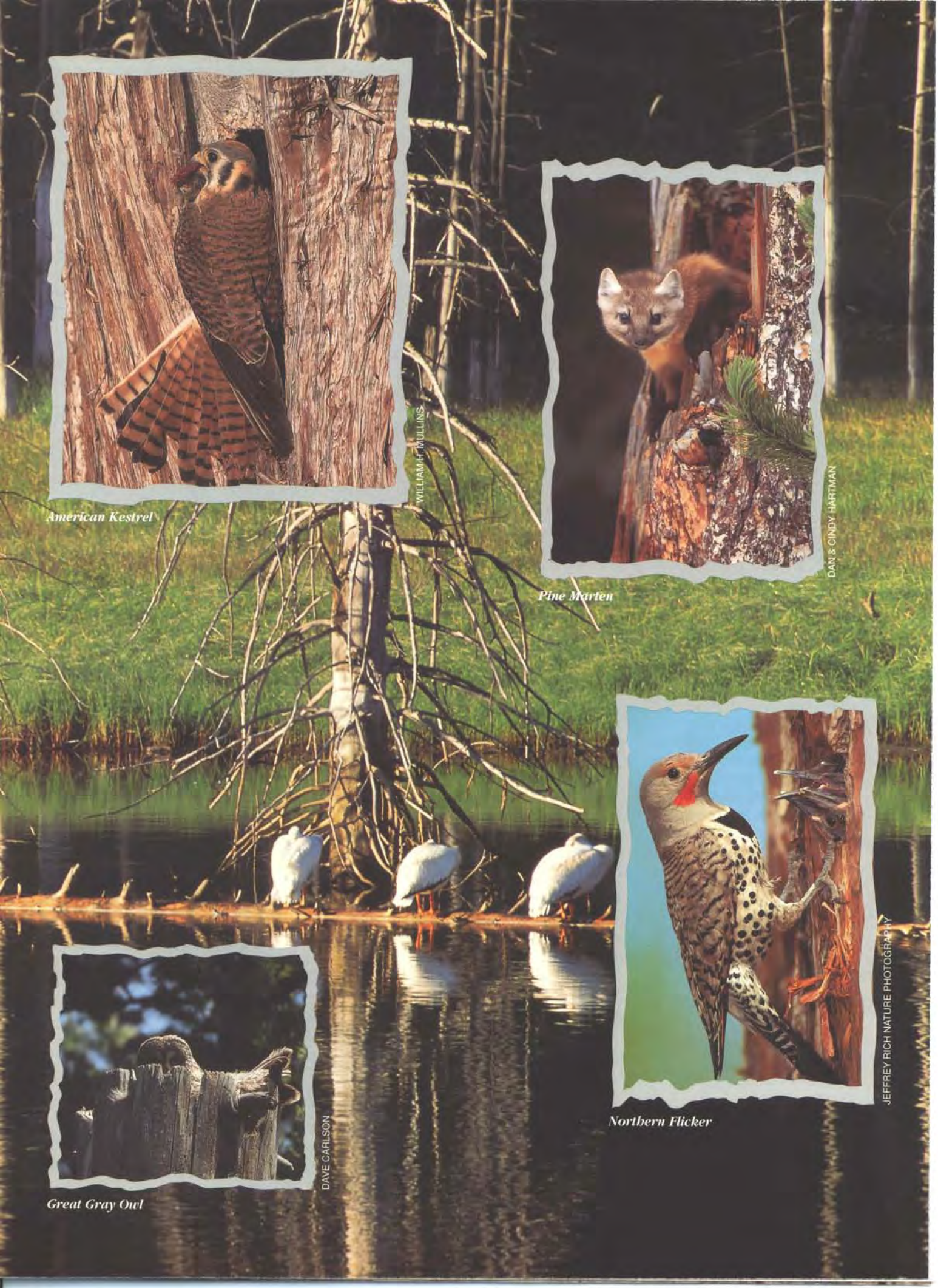
Other owls that nest in or on snags are the barn owl, western screech-owl, northern pygmy-owl, barred owl, great gray owl, boreal owl and northern saw-whet owl. All these owls prey on either insects or small mammals and are important to maintaining balanced communities.

Vaux's Swift

If you've never seen this little swift, you haven't looked up enough. This twittering flyer spends most of its time on the wing, feeding on flying insects and apparently even courting, drinking,

WILLIAM H. MULLINS

(Top) Even after forest fires, dead trees benefit wildlife. Atop this scorched snag, great gray owlets are safe from predators. (Right) Some cavity nesters, like tree swallows, will use nest boxes. These short-term solutions for areas lacking snags can help declining bird populations, but boxes can't replace snags. For instance, boxes may be hotter in summer and colder in winter than natural refuges. Providing a long-term supply of snags is a better management strategy.



American Kestrel

WILLIAM H. MULLINS

Pine Marten

DAN & CINDY HARTMAN

Northern Flicker

JEFFREY RICH NATURE PHOTOGRAPHY

Great Gray Owl

DAVE CARLSON

"Fortunately for wildlife, some trees do die and become snags and logs."

COLLEEN SWEENEY

Hairy Woodpecker

JAY & CINDY HARTMAN

Northern Flying Squirrel

IDFG FILE MARK COLLIE

Long-Toed Salamander

W. STEVE SHERMAN

bathing and copulating in flight. It forages above the forest canopy, in grasslands and other open areas, and over water.

A pair of Vaux's swifts attaches its nest to the inside wall of a large, hollow tree. They collect twigs or conifer needles in flight and glue them together and to the wall with sticky saliva. They usually build their nest in the same place they hatched and return year after year. Flocks numbering hundreds, sometimes thousands, of birds use large snags before and during migration to central Mexico and Venezuela. Nonbreeders that roost in groups also use large snags.

Because it needs large-diameter hollow trees, this species requires old-growth forest habitat.

Tree Swallow

This iridescent swallow nests in open country and woodland edges, usually near and sometimes right over water. While other species of swallows nest in holes in banks or mud nests, the tree and violet-green swallows prefer cavities in trees. Although not found in big colonies like those of cliff swallows, tree swallows often nest in loose colonies and readily use nest boxes.

Tree swallows feed mostly by catching insects on the wing but they will also glean foliage or feed on the ground, eating insects, spiders and fruit. Their long, pointed wings give them tremendous maneuverability in the air.

As with most Idaho insect eaters, the tree swallow is a Neotropical migrant, wintering south to Honduras, Nicaragua and central Costa Rica.

Black-capped Chickadee

Its scientific name, *Parus atricapillus*, means "The titmouse with black hair on its head." This bird and its closely related cousins—the mountain, boreal and chestnut-backed chickadees and the plain titmouse—nest in snags. Black-capped chickadees nest in cavities in living or dead deciduous and sometimes coniferous trees. They may excavate their own cavities or enlarge existing ones. The female has a secret protective behavior. If disturbed on the nest, she makes an explosive, snakelike hiss.

Chickadees often hang upside-down from twigs, pine cones and feeders to get food. They eat insects, conifer seeds, fruit, and spiders and their eggs.

All chickadees are winter residents. Because of the energy demands on these tiny birds, they feed almost continually to survive. If you hear a chickadee in winter, look for other species nearby; they forage and roost in flocks of up to 12, including mixed-species flocks.

THERE'S LIFE IN DEAD TREES!
Here's how you can help protect it.

When gathering firewood:

- Leave trees with broken tops, trunk holes, visible nests or "wildlife tree" signs.
- Take special care when birds are nesting.
- Remember fallen trees make homes for all kinds of wildlife.
- Tell friends why snags are valuable. Often people remove dead trees because they don't know wild animals need them.
- The larger (15-inch diameter or more) and taller, the better snags are for wildlife. Ponderosa pine, western larch, Douglas fir and deciduous trees are the most valuable.

JON LEVASSEUR

In your own backyard:

- If you think a dead tree poses an immediate threat to your house or property, consider topping it off, leaving a 10- or 15-foot snag.
- Use fallen trees and stumps in landscaping and gardens.
- Where snags are scarce, provide nest boxes to encourage cavity nesters.

Winter Wren

This bird sings one of the forest's most beautiful songs, seemingly far too big for such a small bird. Found in older, dense coniferous forests, and always near a stream, winter wrens nest in a variety of locations, including old woodpecker holes in snags or live trees. They also nest in or under stumps, or amid roots of upturned trees.

Winter wrens eat insects and spiders. They may immerse their entire heads to capture aquatic insects. In winter, they also turn to juniper or cedar berries. Along the West Coast, this is a resident species. Idaho birds usually are migratory, wintering elsewhere in the country. However, winter birders occasionally are delighted to see resident birds around the state's waterways.

The related house wren uses snags more frequently than the winter wren, and readily accepts nest boxes. Although its song is also sweet, it would lose in a contest.

Mountain Bluebird

A flash of indigo! It's hard to find someone so hardened they can't appreciate this bird as it flies across a road to alight on a fence line. Both Idaho bluebirds, the mountain and the western, are strictly cavity nesters. The mountain bluebird often successfully defends its nest hole against competing swallows, house sparrows and house wrens.

Mountain bluebirds generally live in open country, including open coniferous and deciduous forests and meadows. They are especially abundant in recently burned forests. They often hunt insects by hovering above the ground or hawking from a low perch.

Both bluebirds are Neotropical migrants, wintering south to central Mexico. Breeding Bird Surveys show populations increased significantly from 1968 to 1994 in the Columbia River Basin and western United States. They have been assisted by individuals and groups placing bird boxes and sponsoring bluebird trails.

As our state bird, the mountain bluebird has graced Idaho license plates since 1993.

Pine Marten

This sleek, dark member of the weasel family is about the size of a small house cat, except longer. It's found in a variety of forested habitats, but more often in mature conifer or mixed forest

IDAHO SPECIES THAT USE SNAGS

for breeding, roosting, for food, or as a food storage site

BIRDS	Breed	Feed	Roost
WOOD DUCK	X	X	X
COMMON GOLDENEYE	X		
BARROW'S GOLDENEYE	X		
BUFFLEHEAD	X		
HOODED MERGANSER	X		
COMMON MERGANSER	X		
TURKEY VULTURE	X		X
OSPREY	X		X
BALD EAGLE			X
AMERICAN KESTREL	X		
BARN OWL	X	X	
FLAMMULATED OWL	X	X	X
WESTERN SCREECH-OWL	X		X
GREAT HORNED OWL	X		X
NORTHERN PYGMY-OWL	X	X	X
BARRED OWL	X	X	
GREAT GRAY OWL	X		
BOREAL OWL	X		
NORTHERN SAW-WHET OWL	X		X
BELTED KINGFISHER	X		
VAUX'S SWIFT	X		X
LEWIS' WOODPECKER	X	X	X
RED-NAPED SAPSUCKER	X		X
WILLIAMSON'S SAPSUCKER	X		X
DOWNY WOODPECKER	X	X	X
HAIRY WOODPECKER	X	X	X
WHITE-HEADED WOODPECKER	X	X	X
THREE-TOED WOODPECKER	X	X	X
BLACK-BACKED WOODPECKER	X	X	X
NORTHERN FLICKER	X	X	X
PILEATED WOODPECKER	X	X	X
ASH-THROATED FLYCATCHER	X		
CORDILLERAN FLYCATCHER	X		
TREE SWALLOW	X		
VIOLET-GREEN SWALLOW	X		
BLACK-CAPPED CHICKADEE	X	X	X
MOUNTAIN CHICKADEE	X	X	X
BOREAL CHICKADEE	X	X	X
CHESTNUT-BACKED CHICKADEE	X	X	X
PLAIN TITMOUSE	X		X
RED-BREASTED NUTHATCH	X		X
WHITE-BREASTED NUTHATCH	X		X
PYGMY NUTHATCH	X		X
BROWN CREEPER	X	X	X
HOUSE WREN	X		
WINTER WREN	X		
WESTERN BLUEBIRD	X		X
MOUNTAIN BLUEBIRD	X		X
COMMON GRACKLE	X		
EUROPEAN STARLING	X		X
HOUSE SPARROW	X		X
HOUSE FINCH	X		

MAMMALS	Breed	Feed	Roost
OPOSSUM	X		X
CALIFORNIA MYOTIS	X		X
LONG-EARED MYOTIS	X		X
LITTLE BROWN MYOTIS	X		X
LONG-LEGGED MYOTIS	X		X
YUMA MYOTIS	X		X
SILVER-HAIRED BAT	X		X
BIG BROWN BAT	X		X
TOWNSEND'S BIG-EARED BAT	X		X
PALLID BAT	X		X
YELLOW PINE CHIPMUNK	X		
EASTERN FOX SQUIRREL	X	X	X
RED SQUIRREL	X		X
NORTHERN FLYING SQUIRREL	X		X
WHITE-FOOTED MOUSE	X		X
DEER MOUSE	X		X
BUSHY-TAILED WOODRAT	X		X
PORCUPINE			X
BLACK BEAR	X		X
RACCOON	X		X
MARTEN	X		X
FISHER	X		X
SHORT-TAILED WEASEL	X		
LONG-TAILED WEASEL	X		X
SPOTTED SKUNK	X		X
LYNX	X		X

DIANA LEVASSEUR

Sap wells (photo on page 28) drilled by sapsuckers (right) for sap and the insects it attracts also provide feeding sites for other species of birds, chipmunks and mice.

stands. In winter, martens are associated with old-growth forests.

Pine martens den in hollow trees at a considerable height above the ground, or on or under the ground in rock piles, hollow logs, tree roots or beneath snow. Large, dead trees with woodpecker holes are important den sites.

Small mammals, birds, insects, fruits and carrion make up the pine marten's diet. Various species of mice and voles, especially the log-loving red-backed vole, are staple foods in all seasons, but are most important in winter. Pine martens hunt them by tunneling down near fallen logs or tree stumps that project above the snow's surface, providing access through the crust.

midnight. (See "Idaho's Bats, Nongame Leaflet #12", *Idaho Wildlife*, Summer '96)

The little brown myotis hibernates in winter, emerging in April or May. Winter concentrations may include tens of thousands of individuals, while most summer colonies range from 50 to 2,500 bats.

Many species of small mammals, such as mice, are prolific breeders, having several litters of multiple young a year. Bats are different. A pair of little brown myotis produces only one young a year.

Northern Flying Squirrel

Big dark eyes stare out of a tree cavity. These eyes, which belong to the northern flying squirrel, are adapted to night vision. This nocturnal creature is most active in the two hours after sunset and the two hours before sunrise.

The flying squirrel doesn't actually fly, but climbs a tree and launches itself to glide through the air. A furred fold of skin extends from its wrist to its ankle. The broad tail adds to the gliding surface.

Northern flying squirrels usually live in conifer forests or, less often, in mixed conifer/deciduous forests. They like cool, moist woodlands with an abundance of standing and downed snags; they are more common than most people think. They build nests inside tree cavities or abandoned woodpecker holes, or construct nests of twigs, bark, roots and grass outside cavities or inside masses of moss or "witches' brooms."

Flying squirrels eat a variety of food available in the forest: nuts, conifer seeds, buds, catkins, wild fruits, insects, tree sap, fungi and lichen. Fungus is most common around large, decomposing logs.

PHILIP LAING

"Tree death is a natural occurrence in forests."

Little Brown Myotis

The little brown myotis is probably the most common bat in North America and in Idaho, but it's not the only bat that needs snags (see the chart on page 20 for eight more). Besides snags, the little brown myotis uses caves and human-made structures for resting and maternity sites. Other bats and a tiny bird called the brown creeper roost or nest under loose bark on trunks of snags.

Bats are well-known insectivores; a single little brown myotis can devour 600 of our nemesis, the mosquito, in just one hour. They forage in woodlands near water during the first two to three hours after sunset and again after

JACK WILLIAMS

As insects chew into dead trees to lay eggs and nurse young, they bring in mycorrhizal fungus and their tunnels expose the log's fiber to air, helping it decompose.

Raccoon

The raccoon is probably one of the most recognizable wild animals because of its striped tail and mask. Raccoons' alertness, curiosity and intelligence are celebrated in Native American folklore and settlers' stories.

Raccoons use hollow trees in both winter and summer, preferring them for winter sleep and hot-weather resting sites. Tree dens may be in any hollow limb or trunk of sufficient size. Where hollow trees are scarce, they will use ground burrows dug by foxes, marmots, skunks and badgers. They also live in rock crevices and caves, drains, abandoned buildings and brush piles. Females generally give birth to their litters in a hollow tree.

Raccoons eat both plant and animal matter and are opportunistic feeders. Plants (fruits and nuts) generally outweigh meat in their diet. The most important animal food is crayfish, then insects. Raccoons also efficiently prey on birds' eggs and nestlings.

Fisher

Between 1800 and 1940, fisher populations declined or were extirpated in most of the United States and Canada due to over-trapping and habitat destruction by logging. Some populations began recovering after the Idaho Department of Fish and Game reintroduced fishers at several Central Idaho sites in 1962 and 1963.

This elusive member of the weasel family uses mature and old-growth mixed or coniferous forests, avoiding openings. In Idaho, fishers usually live near streams or rivers. They winter where little snow accumulates, which is usually in an older forest that offers dense overhead cover.

This true carnivore eats a variety of mammals including snowshoe hares, squirrels, mice, shrews and hares, and also carrion. It is one of the few predators that will take on a porcupine.

Female fishers raise their young alone in protected den sites. Natal and maternal dens are in cavities in living or dead trees and in logs. They use one to three dens a year, moving their young if disturbed. For resting sites, they use logs, snags and live trees with hollows.

Idaho Giant Salamander

The Idaho giant salamander is the largest salamander in the Pacific Northwest. Adults grow to more than 12 inches from snout to tail. They live under rocks and logs in humid forests, near mountain streams, or on rocky shores of mountain lakes. After females lay a clutch of 135 to 200 eggs, they guard them for 11 months until they hatch, then for a few more weeks until the larvae leave the nest. The larvae feed on a variety of aquatic insects and small fish, tadpoles or other larval salamanders. Giant salamander larvae in turn are prey of fish, herons, mink, raccoons and otters. Adults eat terrestrial insects, small snakes, shrews, mice and salamanders.

A relative, the long-toed salamander, also uses logs.

Rubber Boa

People sometimes confuse the head of the smooth-skinned rubber boa with its tail. This snake lives under rocks and logs in woodlands, forests, shrublands, meadows, grassy areas, and wet and sandy edges of rocky streams. In Idaho, rubber boas live in both desert foothills and heavily forested mountains.

Rubber boas mostly eat mice and shrews, killing them by constriction. They also may prey on lizards, snakes and small birds, hunting at twilight or at night.

Rubber boas are very tame, but ward off predators and curious humans by releasing a potent musk from anal glands.

Some other reptiles that use logs are the sagebrush lizard, painted turtle and ringneck snake.

Southern Red-backed Vole

It's hard to believe that something named "southern" lives in Idaho, but we are south compared to much of the vole's range in Canada. This small mammal prefers cool, moist forests—deciduous, coniferous or mixed—especially areas with large amounts of ground cover. The best habitat is a mature conifer forest with mossy logs and tree roots.

This little nocturnal animal is an important prey for mustelids such as pine marten and weasels, canids such as foxes and coyotes, and raptors. Red-backed voles are active year-round, traveling under snow all winter. Their important role for the plants in the forest is to disperse spores of mycorrhizal fungi and nitrogen-fixing bacteria, which help seedlings grow. Red-backed voles feed on vegetation, seeds, nuts and some insects. In much of the West, their summer diet is almost entirely fungi.

Carpenter Ant

This large ant colonizes logs, snags and living trees that have dead wood. In early spring, winged males and females disperse from the old nest and mate. The females then either replace older queens in established colonies, or each finds a suitable cavity of her own to start a new colony. Her first larvae become her first workers, who then feed the queen, care for the eggs and larvae, and cut galleries throughout the wood to hold the expanding colony.

Some carpenter ants feed on honeydew produced by aphids. Others prey on insects, some of which, like the Douglas-fir tussock moth and western spruce budworm, defoliate trees.

Carpenter ants are the most important food source for the pileated woodpecker, which in turn is one of the most important primary excavators.

COLLEEN SWEENEY

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(Above) This snag's holes were drilled by a hungry pileated woodpecker searching for insects, probably carpenter ants (right). More than 60 percent of snag-dependent species eat insects that damage healthy trees, a fact "Sammy Snag" teaches in an interagency program called Animal Inn.

Preserving Snags—Managing Dead Trees for Living Creatures

To manage for the large variety of species that use snags and logs requires managing for a variety of snags. The most important characteristics for cavity nesters are snag size (diameter and height) and the number of snags.

When deciding which snags to leave in a forest, first find the ones wildlife use by noting nesting cavities or signs of feeding or roosting. After all, the animals know better than we do what they like.

Usually, the larger the snag, the better, because more species can use it. Larger diameter snags remain standing longer than smaller ones. They also offer more surface area for foraging, so animals don't need to move around as much. Large-diameter snags later become large-diameter logs on the forest floor. Logs greater than 15 inches in diameter at the large end are particularly important to pileated woodpeckers.

The minimum snag size to aim for depends on the type of tree. Generally, a snag that measures at least 15 inches in diameter at breast height is most valuable. Some species, such as the pileated woodpecker, Vaux's swift and black bear, use much larger snags, from an average 27-inch diameter at breast height for the swift to more than 40 inches for the black bear. Although some species will use smaller snags, they will readily use larger ones, too, while species that require larger snags may not switch to smaller ones. The rule of thumb is to retain the largest snags available. However, since black-backed

woodpeckers only use 12" or smaller diameter trees, it's important to retain medium-diameter trees, too.

Managing for a diversity of snag diameters will result in a diversity of snag heights. It is best to manage for taller snags, because they become shorter with time and create a natural diversity of heights. Taller snags will result in longer logs, creating a variety of diameters to meet the needs of a variety of users. Tall stumps, at least 6 feet tall, should also be left for foraging.

A snag's decay stage is important, too. Some wildlife species like soft snags, others prefer hard ones with bark still attached. Try to retain a variety of decay stages. All soft snags that don't pose a safety hazard should be retained because they are used by the widest variety of organisms. However, soft snags fall sooner than hard snags, so it's also important to retain hard ones, especially because they will become the soft snags of the future.

The snag's species is important, too. Ponderosa pine, western larch, Douglas-fir and deciduous trees like aspen and cottonwood are most valuable. The best guideline is to leave a variety of species.

How many snags to leave is the question of the day. Most biologists feel "the more, the better." In the past, they recommended about one snag per acre to accommodate nesting by woodpeckers and secondary cavity users. However, that estimate did not recognize how many functions snags served, including their use for food and their value as future logs. Today, biologists aim for snag densities closer to what would occur naturally. (See "Save a tree for wildlife," IW, May/June 1986)

Snag distribution is also important. Snags should be retained in clumps whenever possible because cavity users tend to prefer clumps to scattered individuals. However, that doesn't mean clumping snags on a corner of an otherwise bare 100-acre patch. Forests should be managed to retain snags throughout the landscape so at least every 10 acres has snags for wildlife.

Who Needs Snags?

Our forests need snags. Their value goes beyond nest sites for birds. Dead or dying wood plays key roles in preserving both the living and nonliving components of an ecosystem—plants, animals, soil and water.

Who needs snags? We do.

FOR FURTHER READING

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