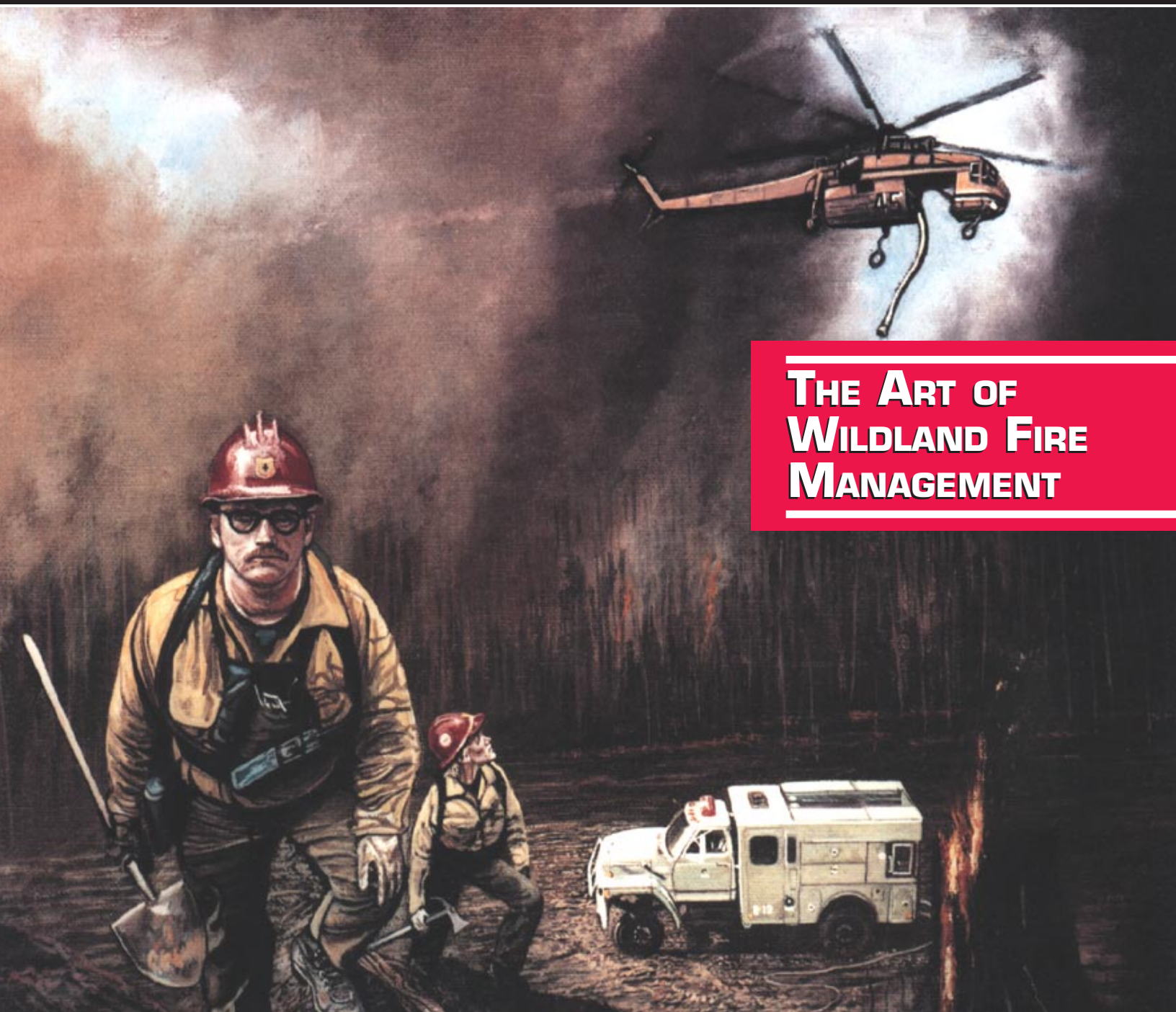


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THE ART OF WILDLAND FIRE MANAGEMENT



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THE CONSUMPTION STRATEGY: INCREASING SAFETY DURING MOPUP



Tom Leuschen and Ken Frederick

For many years, the wildland fire community has known that mopping up a fire can be just as dangerous as containing and controlling it. Unfortunately, we have not always done the best job in mitigating the hazards that firefighters are exposed to during this important phase of fire suppression.

A new approach is now available for assessing the need for, and accomplishing, mopup on wildland fires. Known as the consumption strategy, the new approach departs from traditional thinking by using the natural tendency of a fire to burn itself out by consuming its fuel. The consumption strategy realistically compares the risks and consequences associated with an escaped fire to the risks and consequences associated with the hazards firefighters typically face during mopup, which tend to be related to gravity (falling snags, rolling materials, and tripping and falling). The strategy is designed to improve firefighter safety while still suppressing a fire.

The consumption strategy is planned during containment and implemented during control or

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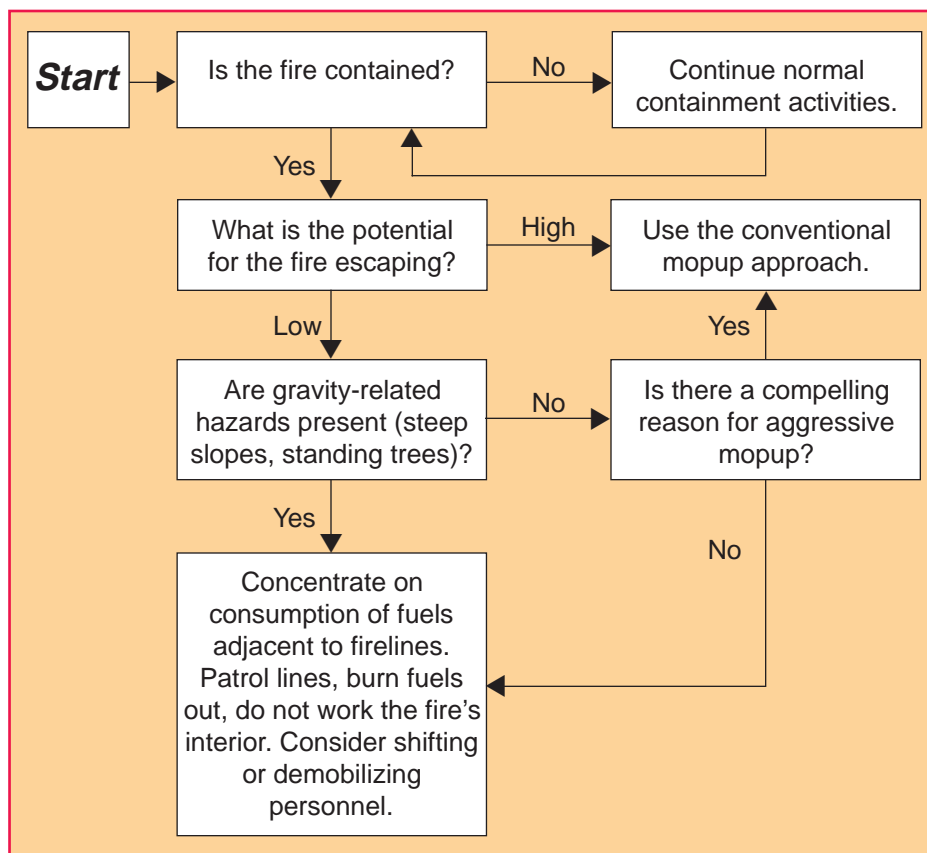


Figure 1—Consumption strategy decision tree, for application separately to each section of the fire.

mopup. It includes these steps (fig. 1):

1. Mopup strategy and standards flow from a determination made about the fire’s potential to escape across firelines after it is declared contained.
2. Sections of the fire that show a high potential for escape receive the normal mopup treatment.
3. Sections of the fire that do not show a high potential for escape and that contain significant gravity-related hazards are not considered for lengthy operational assignments that could place crews in harm’s way.
4. Sections of the fire avoided due to gravity-related hazards are still patrolled or otherwise monitored. “Patrolling” means that crews or scouts hike along firelines in the avoided areas (staying alert for falling or rolling material) to check for escapes of the fire across firelines but not to extinguish flames or embers within the firelines.

- Operational assignments in avoided areas can include, in addition to patrolling, tasks such as blacklining (burning fuels adjacent to firelines), flush-cutting stubs (reducing the woody stubs sticking up from the ground on firelines), trimming tree branches immediately inside the lines, and gridding (searching systematically along gridlines) for spot fires well outside of the lines. Firelines can be strengthened, as long as crews maintain good lookouts and do not linger in dangerous spots.

Origins of the Consumption Strategy

The consumption strategy originated in response to a near tragedy during the 1997 fire season. The season was relatively quiet in eastern Washington. In fact, the only project fire on the Wenatchee National Forest was the Gold Creek Fire on the Naches Ranger District in August 1997, which burned about 480 acres (190 ha) of ponderosa pine and Douglas-fir near Cliffdell, WA. During mopup on the incident, a Washington Department of Natural Resources crewmember was struck and seriously injured by a snag being felled by a sawyer. Ironically, the accident occurred when areas inside the fireline were being “snagged” for firefighter safety.

Tom Leuschen, the fire and fuels specialist for Washington’s Okanogan National Forest, was on the Gold Creek Fire as a fire behavior analyst. “It occurred to me,” Leuschen recalled, “that we were asking the firefighters to work in hazardous areas to do mopup when there was minimal risk of the fire escaping.” By the third day of the Gold Creek Fire,

The consumption strategy for mopup exploits a fire’s natural tendency to consume its fuels and burn itself out.

Leuschen had hiked the perimeter of the fire and determined that the blaze posed little threat of escaping. However, the operations and plans sections of the type 2 team managing the fire were still trying to control the fire according to standards agreed to by the local line officer and the incident management team—and that included risky mopup work inside the black.

After the accident, Leuschen and the district ranger walked out to the lines with the incident commander, safety officer, and operations section chief to take a sober look at the work. Although discussion continued to focus on how firefighters could work safely inside the lines, Leuschen questioned whether firefighters needed to work inside the black at all. Areas where firefighters had completed several shifts of mopup showed little difference in the kinds and amounts of smoldering debris from similar areas where no mopup had occurred. Residual interior smokes were not a threat to the lines. Furthermore, a large percentage of the fire perimeter consisted of sections where the fire had backed downhill; in order to escape in these areas, the fire would have to jump the lines and aggressively spread downhill, a highly unlikely eventuality. “As a result of our observations,” Leuschen said, “we recommended a change in mopup standards to the line officer.” The group had learned a lesson: performing mopup where it wasn’t really needed had nearly cost a life.

The Gold Creek incident made it increasingly obvious that we need a strategy for assessing risk to reduce firefighters’ exposure to hazards during mopup. Since the South Canyon tragedy in 1994, risk assessment has focused primarily on avoiding fire entrapments. In recent years, the wildland fire community has paid more attention to mitigating risk during containment and control (constructing and securing firelines) than during mopup. We need to rethink what mopup is. Are we out there trying to physically put out every flame and ember, or are we trying to prevent the fire from escaping control lines while those flames and embers burn out? Depending on the situation, we currently do both; but we should remember to distinguish between the two and to choose the approach that best protects our crews.

Managers’ perceptions of the risks to firefighters must change with changes in a given fire. At a certain point in a fire, the primary danger facing firefighters is no longer the fire itself, but rather falling or rolling objects (fig. 2). As the fire nears containment, entrapment risk decreases but gravity-related risk increases. Trees, both live and dead, with fire in their bases become increasingly unstable; stumps roll as they lose the old, dry roots that have held them on the slope; and firefighter fatigue accumulates, reducing energy and alertness and causing more tripping and falling on steep terrain.

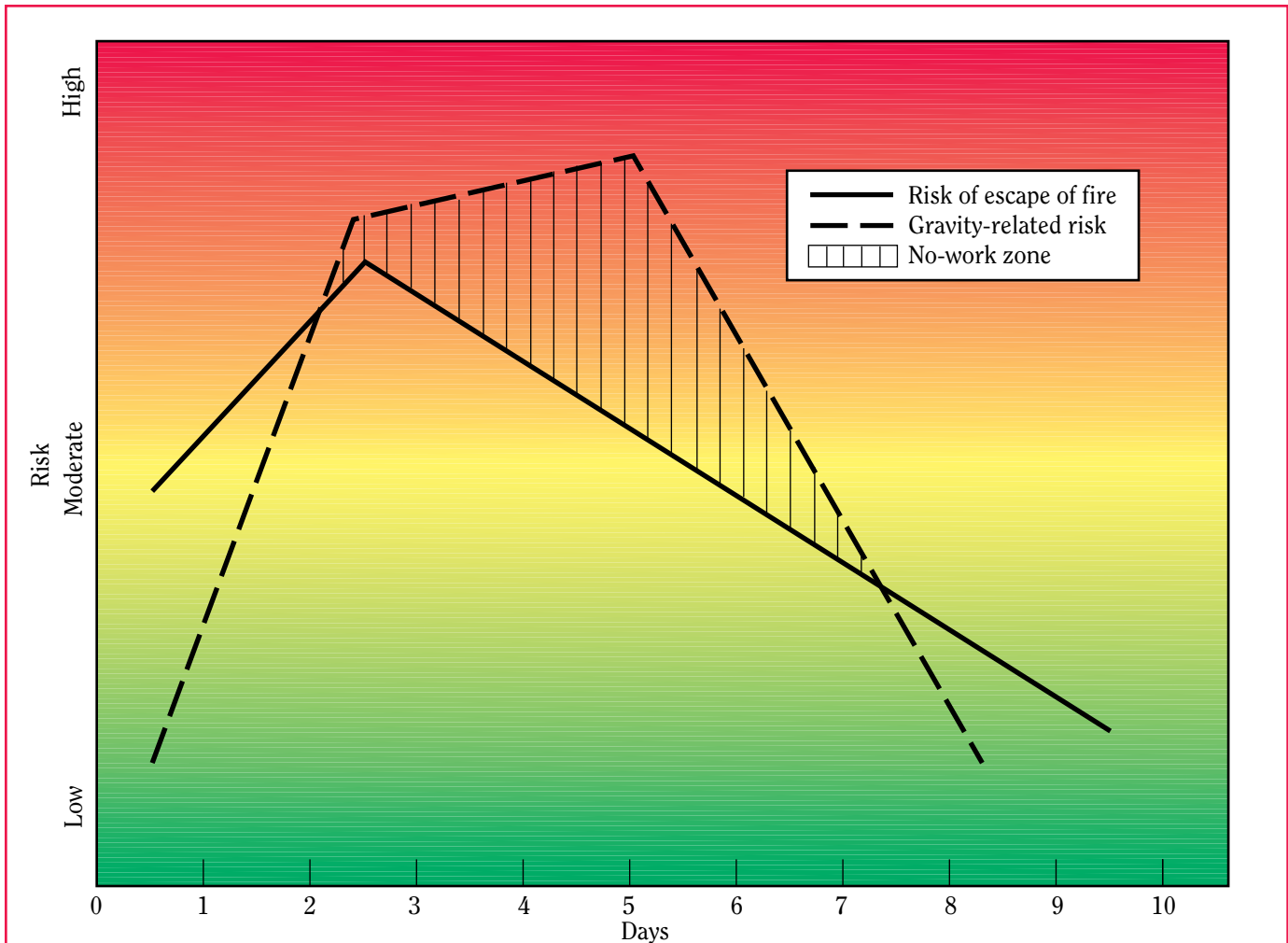


Figure 2—Consumption strategy risk assessment on a fire in coniferous forest that is contained after 3 days. As the fire nears containment, gravity-related risks (such as falling trees, slippery slopes, and rolling rocks and stumps) exceed risks from an escaped fire. In sections of the fire where gravity-related risks exceed the risk of fire escape (the no-work zone), mopup should be avoided.

Entrapment during mopup obviously remains a serious risk that overhead and crews must never forget. However, we must elevate our awareness of the risks to firefighters from gravity-related hazards during mopup.

Operational Success

In August 1998, the 8,500-acre (3,400-ha) North 25 Fire on the Wenatchee National Forest's Chelan Ranger District in Washington provided the first opportunity to implement the consumption strategy. A number of factors coincided to make testing possible under actual field conditions. First, Tom Leuschen was detailed to the

district as the fire management officer for the summer. Second, the Central Washington Area Incident Command Team, the same team that had handled the Gold Creek Fire, was assigned to manage the North 25 Fire when it escaped initial attack. With the Gold Creek experience still fresh in their minds, the team's leaders were willing to consider a new approach. Third, District Ranger Al Murphy and Forest Supervisor Sonny O'Neal were both willing to accept the possibility of a longer lasting or larger fire if the consumption strategy were implemented. Finally, the North 25 Fire had the topographical and fuel

conditions necessary for applying the new approach (fig. 3).

Implementing the consumption strategy on the North 25 Fire offered several immediate benefits:

1. Reduced risk of firefighter injury due to falling and rolling materials on steep, rocky slopes.
2. Reduced need for resources and labor. Because much of the North 25 Fire's perimeter was inaccessible by road, conventional mopup was likely to involve lots of crews, long hoselays, and significant helicopter use.

The consumption strategy saves labor and reduces costs, freeing resources for use on other incidents.

3. Reduced cost. Assisted by the consumption of available fuels, mopup would cost less than traditional, labor-intensive mopup.
4. Reduced spread of noxious weeds, particularly the diffuse knapweed (*Centaurea diffusa*). Ranger Murphy saw that tilling less soil would reduce the amount of prepared seedbed for weed propagation. “The North 25 Fire burned on both sides of one of the busiest roads on this district,” he said. “The less ground we dig up, the more we prevent weeds from spreading outside of the road corridor.”

The incident management team carefully briefed all operational personnel on why and how the new mopup standards were to be implemented on the fire. Even after several briefings, however, some crews still had trouble accepting the idea of merely patrolling firelines for 3 to 5 days while allowing the fire to consume fuels just inside the lines. “This approach is a cultural shift in how we manage fires,” said Incident Commander Jim Furlong. “We are used to being aggressive in extinguishing fires, so being patient like this feels a little unnatural.” Some crews modified their line patrol

assignments by scavenging a 20-foot (6.2-m) strip of ground just inside the lines for fuel and then constructing and burning numerous small handpiles. The result was a cleanly burned and very secure blackline.

According to Furlong, many crews understood that the incident management team was looking out for firefighter safety in using the consumption strategy. “The crews that picked up on what we were doing were the hotshot crews,” Furlong noted. “I had a number of superintendents come up to me and thank us for using this approach.” Twenty-two interagency hotshot crews from the Pacific Northwest and California were on the North 25 Fire.

The consumption strategy succeeded. About a quarter of the fire perimeter was never considered for direct attack, let alone mopup, because it was on an extremely steep, rock-strewn slope overlooking Lake Chelan (fig. 4). Around the remainder of the fire, the operations section chiefs opted for intensive mopup on only 22 percent of the firelines, based on the prevalence of unburned fuels next to the lines. For 3 to 5 days, more than 7 miles (11.2 km) of the 9.5 miles (15.2 km) of accessible perimeter were allowed to smolder under the watchful eyes of daily patrols. There were no accidents during mopup and no significant escapes. Because almost no hose was laid and operations were much less labor intensive than under the conventional mopup approach, seven crews could be freed right away for fire assignments elsewhere.



Figure 3—A helitanker drops water on an inaccessible spot fire, part of the North 25 Fire, Chelan Ranger District, Wenatchee National Forest, WA, in August 1998. The steep terrain and poor accessibility of the site called for applying the consumption strategy, which succeeded in controlling the fire while minimizing the risks to firefighters from gravity-related hazards such as falling snags and rolling logs. Photo: Paige Houston, USDA Forest Service, Okanogan National Forest, Tonasket Ranger District, Tonasket, WA, 1998.

Lessons Learned

Several lessons can be learned from our experience with the consumption strategy on the North 25 Fire:

- Firefighters should mop up in areas of high gravity-related hazard only when necessary. Too often we approach mopup based on tradition and habit. Especially in an age of increasingly large fires across the West, the same safety mindset should prevail for mopup as for line construction. Sometimes it might be safer and more sensible to be vigilantly patient for a few days while a fire consumes its fuels than to aggressively put it out.
- Line officers and fire managers on project fires should reflect upon what might be a false sense of insecurity regarding how thoroughly a fire should be extinguished before the local administrative unit reassumes responsibility for the fire. Line officers should consider accepting more risk of fire escape in exchange for less risk to firefighter safety. The risk of escape is often only marginally higher under the consumption strategy.

- Fire behavior analysts should measure the potential for escape on each section of line as it is completed. Each section must also be evaluated for gravity-related hazards. These data must then be presented to the line officer for determining mopup standards.
- Although perceiving mopup as putting out the fire is often appropriate, sometimes a more reasonable interpretation of mopup is making sure the fire does not cross control lines. Making this subtle distinction will help fire managers and firefighters avoid the potentially high costs of doing what the fire

will likely do by itself—given just a little time.

Safety must always be our first priority in suppressing wildland fires. Applied correctly, the consumption strategy offers a safer, more cost-effective means of achieving the same objective—wildland fire suppression. For more information on the consumption strategy, contact Ken Frederick, Information Assistant, Chelan Ranger District, Wenatchee National Forest, 428 W. Woodin Ave, Chelan, WA 98816, 509-682-2576 (voice), 509-682-9004 (fax), kfrederick/r6pnw_wenatchee@fs.fed.us (e-mail). ■



Figure 4—The North 25 Fire burns deep in Box Canyon on the south shore of Lake Chelan, Chelan Ranger District, Wenatchee National Forest, WA, in August 1998. About a quarter of the fire perimeter was never considered for direct attack, let alone mopup, because it was on an extremely steep, rock-strewn slope overlooking the lake. The consumption strategy is well suited for consideration on such sites. Photo: Paige Houston, USDA Forest Service, Okanogan National Forest, Tonasket Ranger District, Tonasket, WA, 1998.