

Appendix G – Minimum Impact Suppression Tactics (MIST) Guidelines Implementation

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Keep this question in mind: What creates the greater impact, the fire suppression effort or the fire?

Safety

- Apply principles of LCES to all planned actions.
- Constantly review and apply the 18 Watchout Situations and 10 Standard Firefighting Orders.
- Be particularly cautious with:
 - Burning snags allowed to burn.
 - Burning or partially burned live and dead trees.
 - Unburned fuel between you and the fire.

Escape Routes and Safety Zones

- In any situation, the best escape routes and safety zones are those that already exist. Identifying natural openings, existing roads, and trails and taking advantage of safe black will always be a preferred tactic compatible with MIST. If safety zones must be created, follow guidelines similar to those for helispot construction.
- Constructed escape routes and safety zones in heavier fuels will have a greater impact and will be more time-consuming, labor-intensive, and ultimately less safe.

General Considerations

- Consider the potential for introduction of noxious weeds and mitigate by removing weed seed from vehicles, personal gear, cargo nets, etc. Equipment should be washed down prior to leaving the incident in order to prevent the spread of noxious weeds.
- Consider impacts on riparian areas when setting up water handling operations.
 - Use longer draft hoses to place pumps out of sensitive riparian areas.
 - Plan travel routes for filling bladder bags to avoid sensitive riparian areas.
- Ensure adequate spill containment at fuel transfer sites and pump locations. Stage spill containment kits at the incident.
- Select tactics, tools, and equipment that least affect the environment.
 - Give serious consideration to use of water or foam as a firelining tactic.
 - Use alternative mechanized equipment such as motor patrols, disks, rubber-tired skidders, etc., when available and appropriate rather than dozers when constructing mechanical line.

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When constructed fire line is necessary, use only the width and depth to prevent the fires spread.

- Allow fire to burn to natural barriers and existing roads and trails.
- Monitor and patrol fire lines to ensure continued effectiveness.

Ground Fuels

- Use cold-trail, wet line, or combination when appropriate. If constructed fire line is necessary, use minimum width and depth to stop fire spread.
- Consider the use of fire line explosives (FLE) for line construction and snag falling to create more natural-appearing fire lines and stumps.
- Burn out and use low-impact tools like swatters and gunny sacks.
- Minimize bucking to establish fire line: preferably move or roll downed material out of the intended constructed fire line area. If moving or rolling out is not possible, or the downed log/bole is already on fire, build line around it and let the material be consumed.

Aerial Fuels – Brush, Trees, and Snags

- Adjacent to fire line: limb only enough to prevent additional fire spread.
- Inside fire line: remove or limb only those fuels that would have potential to spread fire outside the fire line.
- Cut brush or small trees necessary for fire line construction flush to the ground.
- Trees, burned trees, and snags:
 - Minimize cutting of trees, burned trees, and snags.
 - Do not cut live trees unless it is determined they will cause fire spread across the fire line or seriously endanger workers.
 - Cut stumps flush with the ground.
 - Scrape around tree bases near fire line if hot and likely to cause fire spread.
 - Identify hazard trees with flagging, glowsticks, or a lookout.
- When using indirect attack:
 - Do not fall snags on the intended unburned side of the constructed fire line unless they are an obvious safety hazard to crews.
 - Fall only those snags on the intended burn-out side of the line that would reach the fire line should they burn and fall over.

Mop-Up Phase

- Consider using “hot-spot” detection devices along perimeter (aerial or handheld).
- Use extensive cold-trailing to detect hot areas.
- Cold-trail charred logs near fire line: do minimal scraping or tool scarring. Restrict spading to hot areas near fire line.
- Minimize bucking of logs to check for hot spots or extinguish fire, preferably roll the logs and extinguish the fire.
- When ground is cool return logs to original position after checking.
- Refrain from piling: burned/partially burned fuels that were moved should be arranged in natural positions as much as possible.
- Consider allowing larger logs near the fire line to burn out instead of bucking into manageable lengths. Use a lever, etc., to move large logs.
- Use gravity socks in stream sources and/or combination of water blivets and fold-a-tanks to minimize impacts on streams.
- Personnel should avoid using rehabilitated fire lines as travel corridors whenever possible because of potential soil compaction and possible detrimental impacts on rehabilitation work.
- Avoid use of nonnative materials for sediment traps in streams.
- Aerial fuels (brush, small trees, and limbs): remove or limb only those fuels that if ignited have potential to spread fire outside the fire line.
- Burning trees and snags:
 - Be particularly cautious when working near snags. (Ensure adequate safety measures are communicated.)
 - The first consideration is to allow a burning tree/snag to burn itself out or down.
 - Identify hazard trees with flagging, glowsticks, or a lookout.
 - If there is a serious threat of spreading firebrands, extinguish with water or dirt.
 - Consider felling by blasting, if available.

Aviation Management

Minimize the impacts of air operations by incorporating MIST in conjunction with standard aviation risk assessment processes.

- Possible aviation-related impacts include:

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- Damage to soils and vegetation resulting from heavy vehicle traffic, noxious weed transport, and/or extensive modification of landing sites.
- Impacts on soil, fish, and wildlife habitat and water quality from hazardous material spills.
- Chemical contamination from use of retardant and foam agents.
- Biological contamination to water sources; e.g., whirling disease.
- Safety and noise issues associated with operations in proximity to populated areas, livestock interests, wildland urban interface, and incident camps and staging areas.
- Helispot Planning
 - When planning for helispots, determine the primary function of each helispot; e.g., crew transport or logistical support.
 - Consider using long-line remote hook in lieu of constructing a helispot.
 - Consult Resource Advisors in the selection and construction of helispots during incident planning.
 - Estimate the amount and type of use a helispot will receive and adapt features as needed.
 - Balance aircraft size and efficiency against the impacts of helispot construction.
 - Use natural openings as much as possible. If tree felling is necessary, avoid high visitor-use locations unless the modifications can be rehabilitated. Fall, buck, and limb only what is necessary to achieve a safe and practical operating space.

Retardant, Foam, and Water Bucket Use

- Assess risks to sensitive watersheds from chemical retardants and foam. Communicate specific drop zones to air attack and pilots, including areas to be avoided.
- Fire managers should weigh use of retardant with the probability of success by unsupported ground force. Retardant may be considered for sensitive areas when benefits will exceed the overall impact. This decision must take into account values at risk and consequences of expanded fire response and impact on the land.
- Consider biological and/or chemical contamination impacts when transporting water.
- Limited water sources expended during aerial suppression efforts should be replaced. Consult Resource Advisors prior to extended water use beyond initial attack.

Logistics, Camp Sites, and Personal Conduct

- Consider impacts on present and future visitors.
- Provide portable toilets at areas where crews are staged.
- Good campsites are found, not made. If existing campsites are not available, select campsites not likely to be observed by visitors.

- Select impact-resistant sites such as rocky or sandy soil, or openings within heavy timber. Avoid camping in meadows and along streams or shores.
- When there is a small group, try to disperse use. In the case of larger camps, concentrate, mitigate, and rehabilitate.
- Coordinate the layout of the camp components carefully from the start. Help to define cooking, sleeping, latrine, and water supplies areas.
- Prepare bedding and campfire sites with minimal disturbance to vegetation and ground.
- Personal Sanitation:
 - Designate a common area for personnel to wash up. Provide fresh water and biodegradable soap.
 - Do not introduce soap, shampoo, or other chemicals into waterways.
 - Dispose of wastewater at least 200 feet from water sources.
 - Toilet sites should be located a minimum of 200 feet from water sources. Holes should be dug 6 to 8 inches deep.
 - If more than one crew is camped at a site, strongly consider portable toilets and remove waste.
- Store food so that it is not accessible to wildlife, away from camp and in animal-resistant containers.
- Do not let garbage and food scraps accumulate in camp.
- Monitor travel routes for damage and mitigate by:
 - Dispersing on alternate routes; or
 - Concentrating travel on one route and rehabilitating at end of use.
- If a campfire is built, leave no trace of it and avoid using rock rings. Use dead and down wood for the fire and scatter any unused firewood. Do not burn plastics or metal.
 - Consider using a fire pan or “mound fire” in sensitive areas.
- Use “scrim” (porous ground cloth) to protect high-traffic areas from trampling.

Restoration and Rehabilitation

- Fire lines:
 - After fire spread has stopped and lines are secured, fill in deep and wide fire lines and cup trenches and obliterate any berms. The berm material should be spread back into the fire line or recontoured to the fire line.
 - Be careful not to reignite or spread hot material hidden in berms across the fire line.

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- Restore drainages by removing fill or dams, reestablish crossings, and return to natural configuration.
- Use waterbars only when necessary to prevent erosion or use woody material to act as sediment dams. Waterbars should only be used on steep slopes and only when necessary. General guidelines for waterbar spacing are listed in the table below. However, it is important to note that improper construction and inappropriate placement of waterbars can create excessive erosion.
- Ensure stumps are cut flush with ground.
- Camouflage cut stumps by flush-cutting, chopping, covering, or using FLE to create more natural-appearing stumps.
- Any trees or large size brush cut during fire line construction should be scattered to appear natural.
- Discourage the use of newly created fire lines and trails by blocking with brush, limbs, poles, and logs in a natural-appearing arrangement.

Maximum Waterbar Spacing General Guidelines	
Percent Grade	Maximum Spacing (Feet)
< 9	400
10 – 15	200
15 – 25	100
25 +	50

- Camps:
 - Restore campsite to natural conditions.
 - Scatter fireplace rocks and charcoal from fire, cover fire ring with soil, and blend area with natural cover.
- Pack out all garbage and dispose of in an approved facility.
- General:
 - Remove all signs of human activity.
 - Remove all flagging.
 - Restore helicopter landing sites.
 - Fill in and cover latrine sites.
- Walk through adjacent undisturbed areas and take a look at your rehabilitation efforts to determine your success at returning the area to as natural a state as possible.