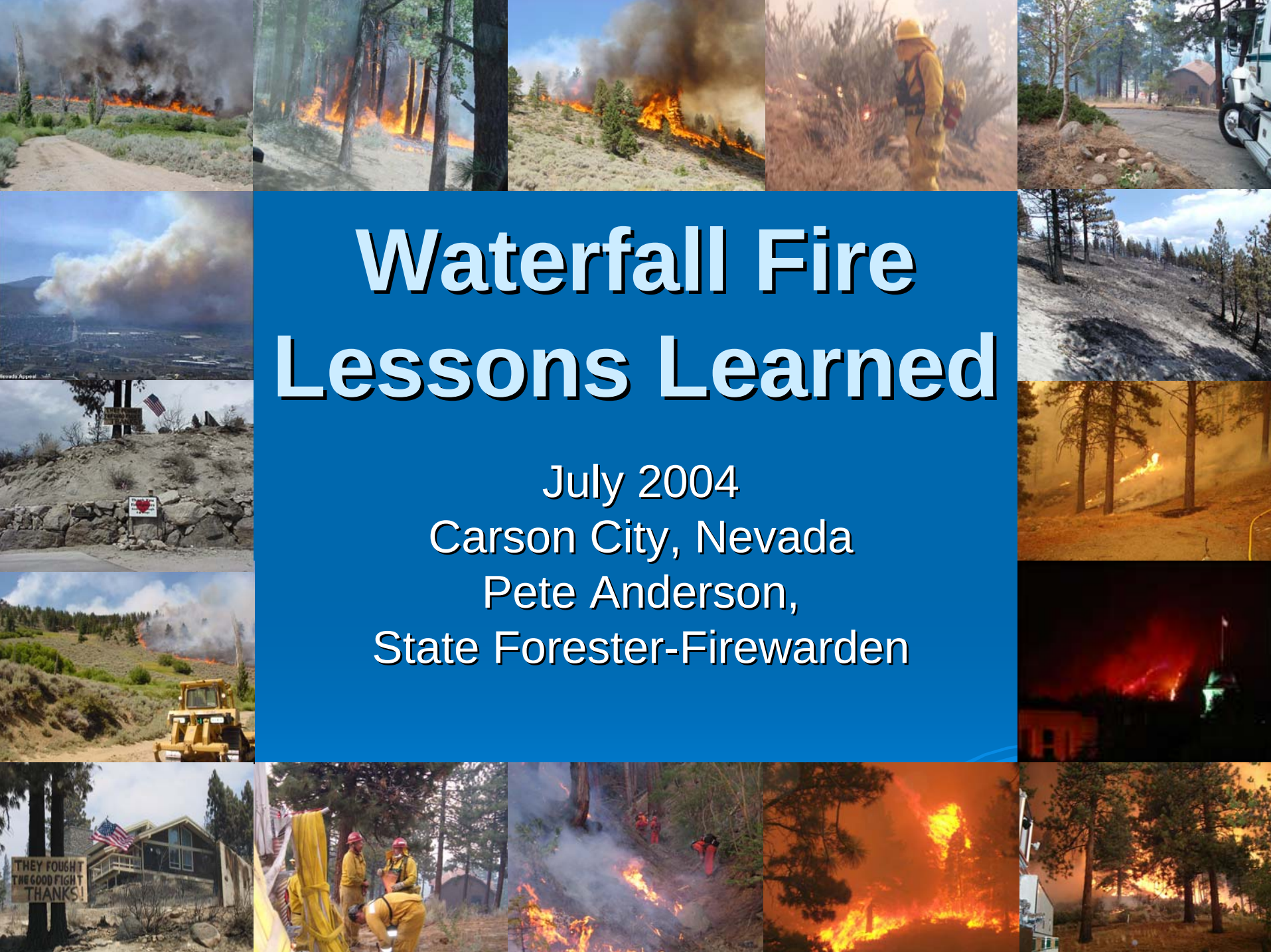
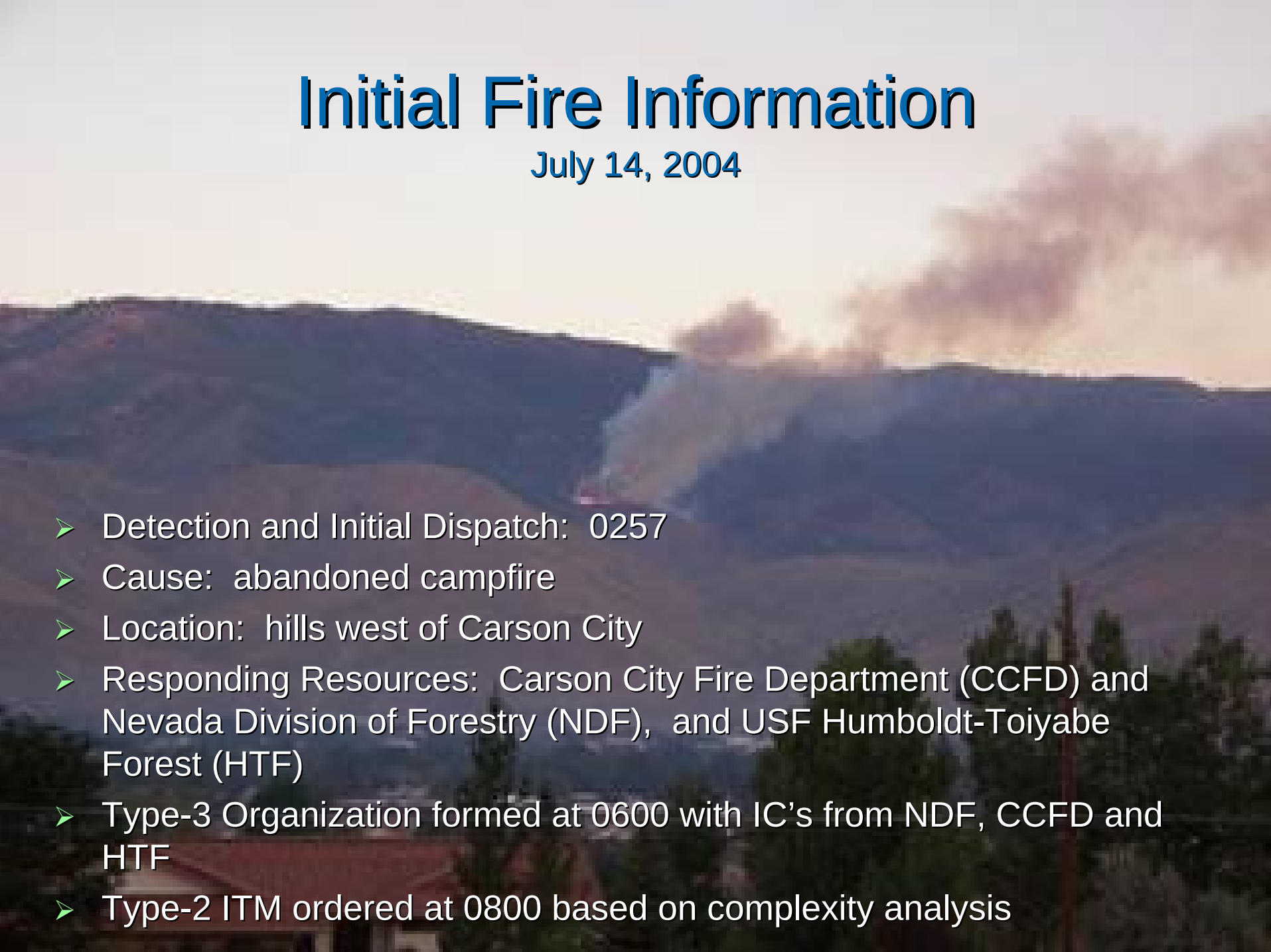


Waterfall Fire Lessons Learned

July 2004
Carson City, Nevada
Pete Anderson,
State Forester-Firewarden

Initial Fire Information

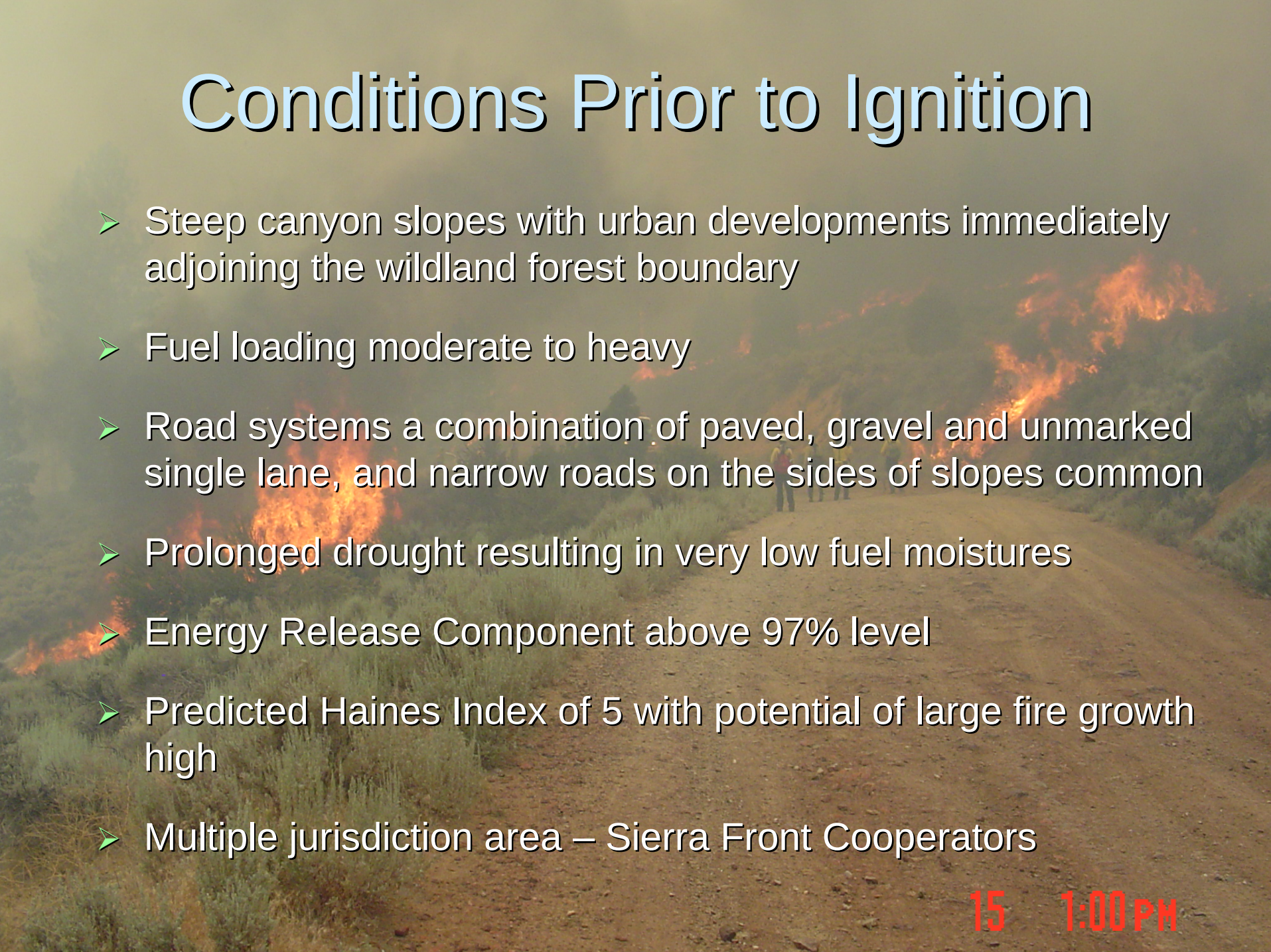
July 14, 2004



- Detection and Initial Dispatch: 0257
- Cause: abandoned campfire
- Location: hills west of Carson City
- Responding Resources: Carson City Fire Department (CCFD) and Nevada Division of Forestry (NDF), and USF Humboldt-Toiyabe Forest (HTF)
- Type-3 Organization formed at 0600 with IC's from NDF, CCFD and HTF
- Type-2 ITM ordered at 0800 based on complexity analysis

Conditions Prior to Ignition

- Steep canyon slopes with urban developments immediately adjoining the wildland forest boundary
- Fuel loading moderate to heavy
- Road systems a combination of paved, gravel and unmarked single lane, and narrow roads on the sides of slopes common
- Prolonged drought resulting in very low fuel moistures
- Energy Release Component above 97% level
- Predicted Haines Index of 5 with potential of large fire growth high
- Multiple jurisdiction area – Sierra Front Cooperators



The Sierra Front Wildfire Cooperators

Director Agencies

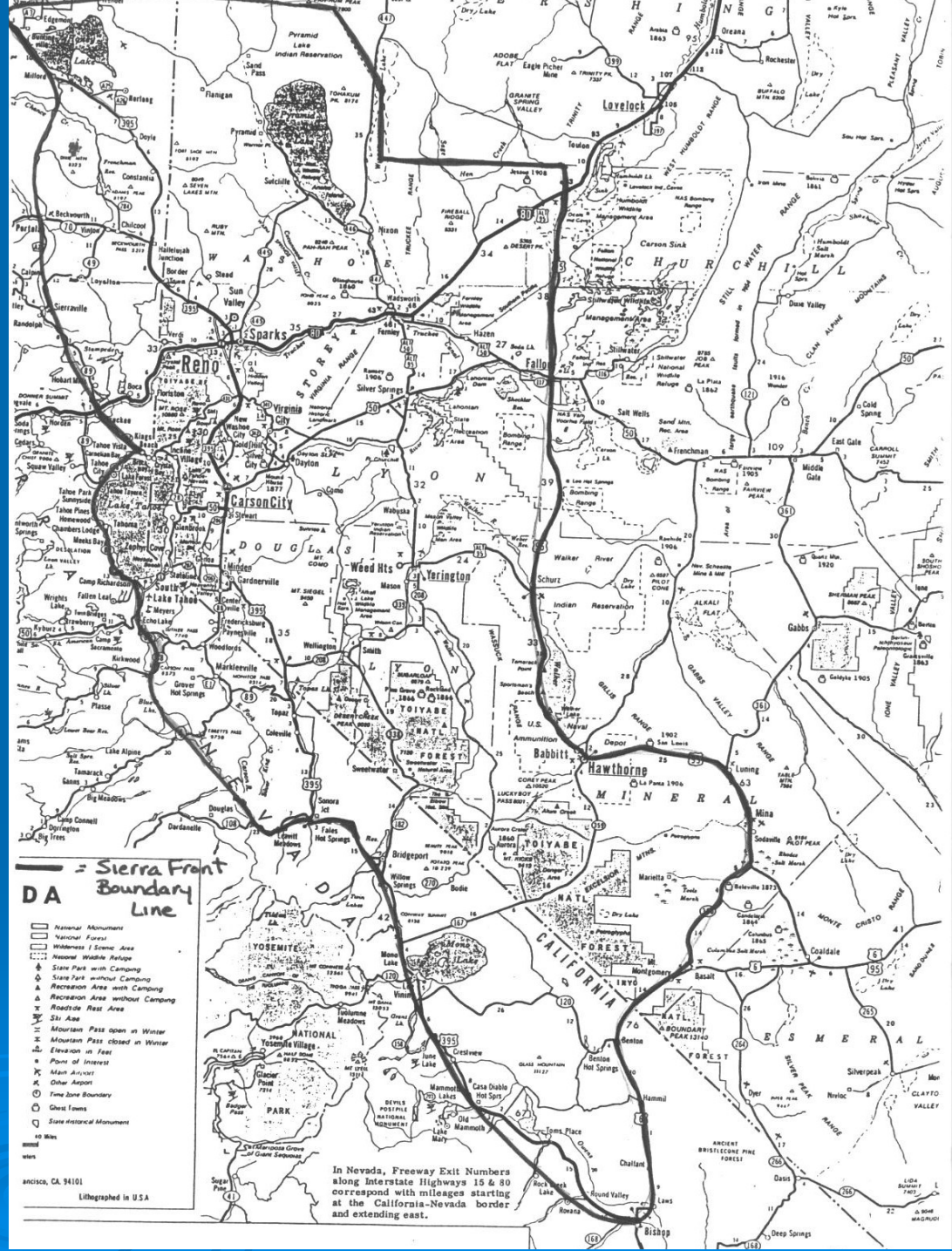
- Bureau of Indian Affairs, Western Nevada Agency
- Bureau of Land Management, Carson City District and Bakersfield District
- California Department of Forestry
- Carson City Fire Department
- Central Lyon County Fire Protection District
- East Fork Fire Protection District
- Mammoth Lakes Fire Protection District
- Nevada Division of Forestry
- North Lake Tahoe Fire Protection District
- North Tahoe Fire Protection District
- Reno Fire Department
- Storey County Fire Department
- Tahoe Douglas Fire Protection District
- U.S. Forest Service, Humboldt-Toiyabe National Forest, Inyo National Forest, Tahoe National Forest, Lake Tahoe Basin Management Unit

Associate and Cooperating Agencies

- Donner Summit Fire Department
- Lake Valley Fire Protection District
- Meeks Bay Fire Protection District
- Fallon Naval Air Station Fire Department
- Nevada State Fire Marshal's Office
- Northstar Fire Department
- Sierra Pacific Power Company
- South Lake Tahoe Fire Department
- Smith Valley Fire Protection District
- Sparks Fire Department
- Squaw Valley Fire Department
- Truckee Fire Protection District
- Yerington/Mason Valley Fire Protections District
- University Of Nevada Cooperative Extension
- Nevada Division of Emergency Management
- California Office of Emergency Services
- Camino Dispatch Center
- Owens Valley Dispatch Center
- Sierra Front Dispatch Center
- Grass Valley Dispatch Center
- National Weather Service

THE · SIERRA · FRONT ·
WILDFIRE COOPERATORS
· CA · NV ·

Geographic Area of Jurisdiction



Fire Facts

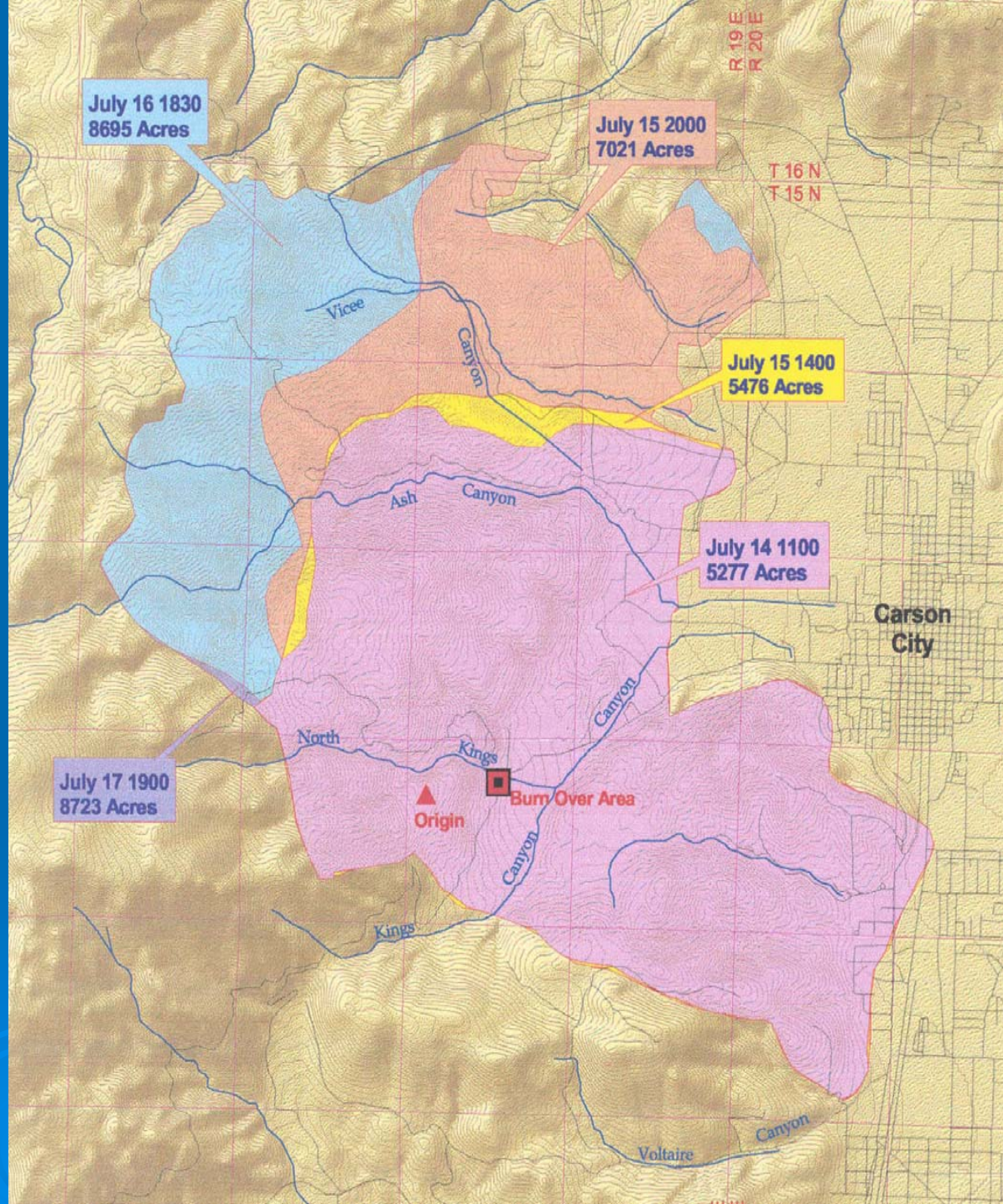
8,700 Acres Burned

- *2,782 Humboldt Toiyabe*
- *2,507 Carson City*
- *2,495 Private Land*
- *710 State of Nevada*
- *206 Tribal Land*

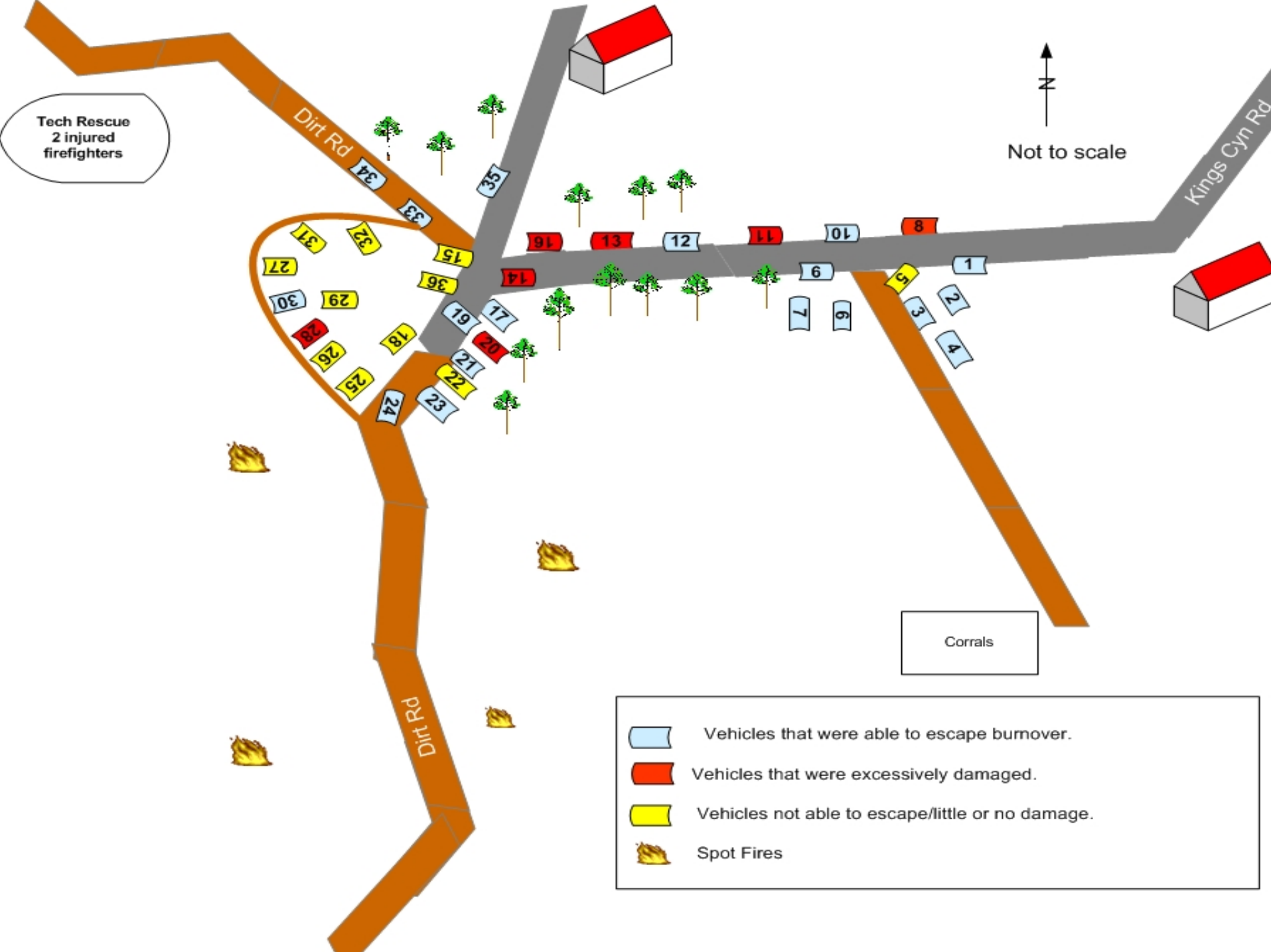
100% Containment: July 20, 2004

Waterfall Fire Progression

July 14th – 17th 2004




Staging Area 2 Prior to Burn Over
B101
15 8:25 AM

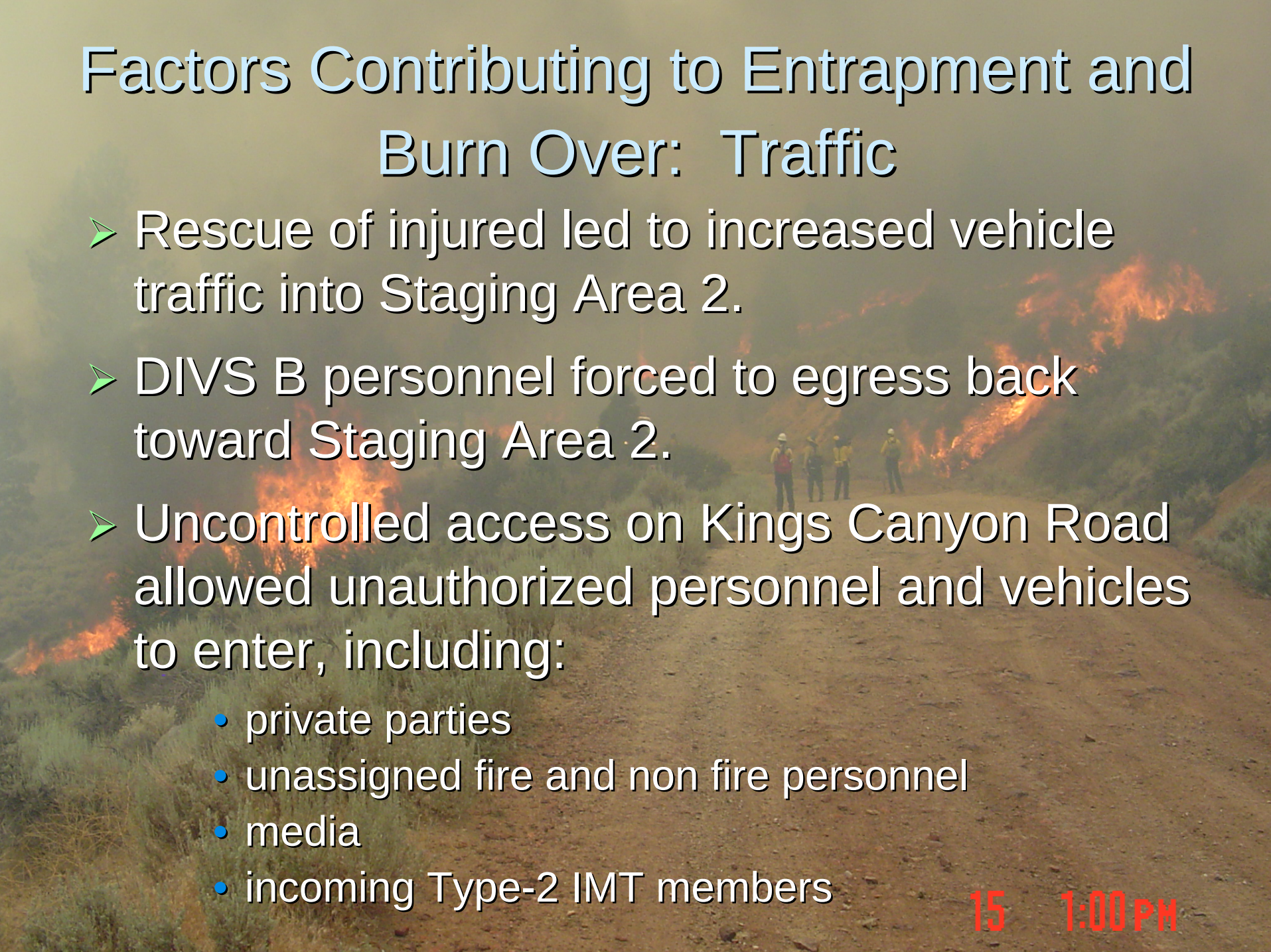

Tech Rescue
2 injured
firefighters
Dirt Rd
Kings Cyn Rd
N
Not to scale
Corrals
Dirt Rd
Vehicles that were able to escape burnover.
Vehicles that were excessively damaged.
Vehicles not able to escape/little or no damage.
Spot Fires

Factors Contributing to Entrapment and Burn Over: Injuries and Medical Evacuation

- At 1105 hand crew reported 2 potentially serious injuries from falling rocks.
- Technical rescue was required resulting in diversion of tactical suppression resources.
- EMS personnel and equipment were dispatched from CCFD.
- Response led to increased radio traffic and increased vehicle traffic into Staging Area 2.

Factors Contributing to Entrapment and Burn Over: Traffic

- Rescue of injured led to increased vehicle traffic into Staging Area 2.
- DIVS B personnel forced to egress back toward Staging Area 2.
- Uncontrolled access on Kings Canyon Road allowed unauthorized personnel and vehicles to enter, including:
  - private parties
  - unassigned fire and non fire personnel
  - media
  - incoming Type-2 IMT members



Factors Contributing to Entrapment and Burn Over: Fire Weather and Conditions

July 14, 2004, 1230 – 1300

- Main fire spotted over Kings Canyon road.
- Spot fires grew immediately beyond control.
- Additional spotting and down canyon winds spread fire to the east.
- North end of fire blew up with high intensity, developing a significant column resulting in in-drafting.
- Down canyon winds caused the south end of the fire to spread north and east burning through Staging Area 2.

Entrapment and Burn Over Summary

July 14, 2004, 1315

- Burn over lasted approximately 2-5 minutes.
- Entrapment and burn over of 21 personnel and 18 vehicles.
- 2 persons received first and second degree burns (firefighter and news reporter).
- 3 vehicles destroyed.
- Several additional vehicles received minor to severe damage.

Staging Area 2 After Burn Over


CARSON CITY FIRE DEPT

Burn Over Investigation

- Multi-agency investigation team formed.
- Investigation team comprised of diverse cadre with inter-agency representation and expertise.
- Team members were from BLM, NDF, USDA FS, Central Lyon County Fire District, Clark County Fire Department, and Reno Fire Department.
- Reviewed participating agency policies and guidelines.
- Interviewed over seventy people.
- Made several site visits.
- Reviewed written and photographic documentation.
- Grouped findings into 10 categories.

Board of Review

- Five-members from multiple jurisdictions
- Chaired by Eldorado Forest Supervisor John Berry
- Nevada State Forester Pete Anderson
- Carson City Fire Chief Lou Buckley
- Humboldt-Toiyabe Deputy Forest Supervisor Ed Monnig
- Forest Service Wildland Fire Safety Manager Steve Holdsambeck

Burn Over Investigation Findings

1. Environmental and fire behavior
2. Multi-jurisdictional incident management
3. Communications
4. Firefighter and Public Safety
5. Transitions
6. Roles and Responsibilities
7. Operations and tactical decision making
8. Entrapment
9. Management
10. Policy

1. Environmental and Fire Behavior

- Very low fuel moistures as a result of prolonged drought.
- Energy Release Components above 97%.
- Potential of large fire growth high with predicted Haines Index of 5.
- Fire activity (intensity, spotting, and rates of spread) increased dramatically starting about 1200.
- Blow-up on north end of fire and subsequent in-drafting contributed to south end of fire spreading northeast and the burn over at Staging Area 2.

2. Multi-jurisdictional Incident Management

- NDF was assumed to be the jurisdictional agency.
- Unified Command was established at initial attack with IC from both NDF and CCFD.
- Agency Administrators concurred with the objectives and plan for managing the fire.
- Command and Operations personnel recognized a high potential for significant downhill fire spread.
- Trigger points for initiating disengagement and egress from area were not identified or communicated, and responsibilities were not assigned.
- Staging Area 1 established at Carson Middle School to receive incoming resources, with staging area manager assigned.

3. Communications

- Communications plan was developed with assignment of five radio frequencies including command, two tactical frequencies, air to ground, and air to air.
- Poor radio discipline and/or not using assigned radio frequencies resulted in tremendous radio traffic on both command and tactical frequencies.
- Radio traffic congestion resulted in many overhead personnel reverting to home unit (unassigned) frequencies and cell phones for much of their communications, resulting in critical conversations not being available for all personnel who had a “need to know” creating more confusion regarding fire status and firefighting actions.

4. Firefighter and Public Safety

- Check-in procedures did not provide complete accounting of all personnel the fire area.
- Quality of briefings varied widely.
- Assigned and unassigned personnel in fire area without wearing PPE.
- Uncontrolled access into Kings Canyon resulted in private parties, unassigned fire and non-fire management personnel, the media and incoming Type 2 IMT members in Staging Area 2 .
- Command and operations personnel observed heavy congestion at Staging Area 2 but took no effective action.
- 2 firefighters on hand crew received potentially serious injuries from falling rocks.
- Helicopter bucket operations were diverted to cooling fire perimeter near the rescue operations.
- Trigger points for disengagement and egress were not identified or commonly understood, no contingency plan in place when expected events happened.

5. Transitions

- At 0600 command and general staff structure changed with arrival of a replacement IC from NDF and an additional IC from the HTF.
- Change resulted in three ICs working in Unified Command representing NDF, HTF, and CCFD.
- Lead IC role not clearly assigned or understood.
- Type 2 IMT on scene At 1200:
  - One unified IC provided an initial briefing to the incoming.
  - One Unified IC was not aware of this briefing.
  - Other Unified IC departed for the fire line as OSC (T) on the Type 2 IMT, assuming the Type 2 IMT was taking over management of the fire at 1200.
  - Transition to the Type 2 IMT occurred at 1600.
  - Decision to transition to the Type 2 IMT at 1600 was not positively communicated to the Type 3 ICs.
- Failure to communicate led to erroneous assumptions and at least one IC disengaging as a commander.

6. Roles and Responsibilities

- Numerous changes in personnel filling positions, Many of these changes were not announced to superiors or subordinates.
- Changes were not relayed effectively to management at Staging Area 1 for use in briefing incoming firefighting.
- Confusion about names of the ICs and who was in charge at OSC and DIVS levels.
- Responsibility for management of Staging Area 2 and traffic on Kings Canyon Road was not fully understood or accepted by the DIVS.
- Some unassigned “free-lancing” fire management supervisors entered fire area and started giving tactical direction and assignments to resources without knowledge or approval of operations overhead.
- These actions created confusion among firefighters about who was in charge and may have contributed to untimely delays for disengagement.

7. Operational & Tactical Decision Making

- Air Tactical Group Supervisor arrived at 0619 and immediately ordered airtanker and helicopter resources.
- First Single Engine Airtanker (SEAT) was enroute to fire at 0656.
- Crews constructing direct handline with aerial support could not get anchor points established on north end of fire at Division A/B break.
- The ICs and OSC recognized the potential for heavy congestion of people and vehicles at Staging Area 2 and agreed to limit access to only resources that had a tactical assignment.
- Their actions to implement this decision were ineffective.
- Direct attack with hand crews was ineffective without aerial support, primarily from helicopters with water buckets.

8. Entrapment

- Personnel at Staging Area 2 were not advised about buildup of fire activity south of their location nor the fire front spreading toward them.
- Improperly parked vehicles at Staging Area 2, vehicles without operators present, and congested two way vehicle traffic on Kings Canyon Rd. led to entrapment and burn over.
- Operator of a Central Lyon Co. engine stopped his egress at exit of Staging Area 2 to allow a news media vehicle heading up the road to turn around and exit area.
- A pine tree adjacent to road crowned out and ignited front of engine. Operator received burns and abandoned his vehicle. This event blocked any additional vehicles egress from Staging Area 2.
- One entrapped engine with a remote controlled water nozzle was able to apply water to other vehicles during burn over.
- Neither Unified ICs nor Agency Administrators were advised of the burn over and entrapment in a timely manner.

9. Management

- ICs, Agency Administrators, and fire managers lacked a common understanding of transitions from Type 3 to Type 2 IMTs.
- No common understanding of how Unified Command functions or roles and responsibilities of each IC on Type 3 incidents.
- Local agencies lacked a single common interagency operating plan for managing Type 3 fires burning on multiple jurisdictions.
- Assigned Type 3 Incident Information Officer did not understand Nevada State Law regarding media access to the fire line.
- Fire management did not close areas around fire to public prior to the entrapment.

10. Policy

- During the time period of initial and extended attack through the burn over at Staging Area 2, most fire suppression policies and procedures of the responsible agencies were followed. However, in some cases either action or inaction by firefighters resulted in policy and/or procedural non-compliance.
- Fire Orders that were violated or not mitigated.
  - Maintain prompt communications with your forces, your supervisor, and adjoining forces.
  - Give clear instructions and insure they are understood.
  - Maintain control of your forces at all times.
  - 10 Fight fire aggressively, having provided for safety first.
- Watch Outs that were violated or not mitigated.
  - No communication link with crewmembers or supervisor.
  - Constructing line without safe anchor point.

Lessons Learned: Incident Management

1. IC is IC until relieved of command.
2. The IC needs to be clearly identified to all personnel and transitions in command announced on command net.
3. The IC does not necessarily need to change because of change of jurisdiction.
4. Fill necessary ICS functions as incident expands.
5. Unified Command only has 1 IC in charge.
6. Avoid complacency after ordering IMT.

Lessons Learned: Communications

1. Keep to assigned frequencies.
2. Use Radio discipline to minimize radio traffic.
3. Use assigned frequencies:
    a) Operation talk to Divisions on command net
    b) Divisions talk to fire resources on tactical
    c) Prioritize appropriate channel
4. Use cell phones for logistics only, not operations.
5. Ensure critical communications are heard by all personnel.
6. Maintain communication link with crew members and supervisor.

Lessons Learned: Firefighter Safety

1. Have sufficient number of Safety Officers.
2. Everyone is responsible for safety.
3. Expect incidents within incidents during wildland urban interface fires.
4. Develop “May Day” procedures like those used at structural fires.
5. Establish safe anchor point before constructing lines.
6. Remember the BASICS.

Lessons Learned: Staging Areas

1. Identify Staging Area with signs and vests.
2. Assign STAM.
3. Safe areas, do not locate Staging Areas where there are ongoing operations and possibility of being overrun.
4. Leaves keys in ignitions.
5. Follow direction.
6. Build a traffic plan, including proper parking.
7. Don’t confuse “Drop Points” with “Staging Areas.”

Lessons Learned: Media Expectations

1. Meet with media at the beginning of season to define expectations.
2. Control media through pre-season training and education.
3. Provide escorts for all media personnel.
4. Have a way to identify media people from other personnel.
5. Incident Public Information Officers need to understand the law regarding media access to the fireline.
6. Have adequate number of PIO's.

Lessons Learned: Entrapment Avoidance

1. Firefighters should test their entrapment reaction skills through drills and training.
2. Watch for early indicators of problem fire behavior and adjust tactics accordingly.
3. Identify trigger points/time tags to evacuate to safety zones.
4. If there is enough time after entrapment, use the time to plan for a deployment.
5. Park vehicles correctly at all times.
6. Provide traffic control to avoid unassigned and unauthorized vehicles in restricted areas.

Lessons Learned: Agency Administration

1. Agency administrators should decide on a command structure within an area.
2. Expectations of IC should be defined by agency administration.
3. Agency administration in contact with in-coming IMT ICs' is essential.
4. Local agencies need to have a single common interagency operating plan for managing Type 3 fires burning on multiple jurisdictions.

Lessons Learned: Accountability

1. All personnel arriving or departing from the incident need to be accounted for.
2. Check-in procedures must be established.
3. Briefings must be provided in accordance with the Incident Response Pocket Guide (IRPG).
4. Maintain control of your forces at all times.


Fire-Burned Area


Fire-Burned Area


Fire-Burned Area