Pagami Creek Fire Entrapments — Facilitated Learning Analysis

US Forest Service Eastern Region, Superior National Forest, Minnesota

Incident Date 12 September 2011

Executive Summary

Concise Factual Narrative

The Boundary Waters Canoe Area Wilderness (BWCAW) is a 1.1 million-acre network of lakes and rivers in northern Minnesota. On a given day, there are visitors spread throughout the area.

The Pagami Creek Fire was a natural ignition fire in the BWCAW reported on 18 August 2011. Objectives focused on keeping the fire from moving outside the wilderness and threatening human developments.

Over the first few weeks, the fire grew from a small, smoldering lightning strike to just over 100 acres. As the fire grew, the unit brought in additional resources including Incident Management Teams, taking actions to keep the fire from threatening communities outside the wilderness, and used Public Safety crews to notify recreating public well before the fire might threaten their safety. Again and again, the near-term forecast for rain was postponed, and fire conditions worsened.

On 9 September 2011, the Forest issued closure orders for dispersed camping sites thought to be a day or more ahead of potential fire spread. On 10 September, the fire grew faster than expected, leading to emergency evacuations. Field personnel considered the day a close call. The Forest aggressively expanded its closure area, and on 11 September, 95 visitors were moved from lakes ahead of the fire.

Morning of 12 September, the Forest expanded its closure area again. Several miles ahead of the fire, Public Safety crews were assigned to restrict traffic, close campsites, and order recreating public to leave the area. Shortly before noon, eight forest personnel were fleeing from fire. Two abandoned their canoe and sought refuge in the lake, sharing a single fire shelter. Four others deployed fire shelters on a small island. Two others were picked up by floatplane, just as the approaching fire changed course. All survived without major injury.

Management Take-Away Lessons

- Fire shelter training is working: several people replayed the training video in their heads and took calm, timely action while preparing to deploy shelters.
- Improve real-time communication between management and field personnel, to recognize early signs the situation is changing or the plan is not working.
- Field-going personnel (eg. Public Safety, BAER teams, researchers, district personnel) report to Operations section during an Incident.
- Ensure perimeters are known by all personnel assigned to field operations.
- Increase use of infrared and aerial mapping of fire perimeter.
- Increase use of aircraft and motorized equipment to conduct closures more efficiently.
- Improve detection, classification, and communication of high-level atmospheric instability.
- Investigate technology to provide IC/Agency Administrator with real time location of all field operations personnel
- For more, see **Lessons Learned Bullets** on p. 21.

Approach and Scope

The purpose of this report is to facilitate learning. This report gives on-the-ground perspectives of key events. Lessons Learned Bullets are insights from participants. Discussion and Analysis modules set the stage for dialog on fire safety improvement.

This report focuses on the fire entrapments occurring on Monday, 12 September 2011. The Regional Forester delegated a team to review this incident and share the story through a Facilitated Learning Analysis. The team decided to increase the scope of this report to include the close calls that occurred on Saturday, 10 September 2011.

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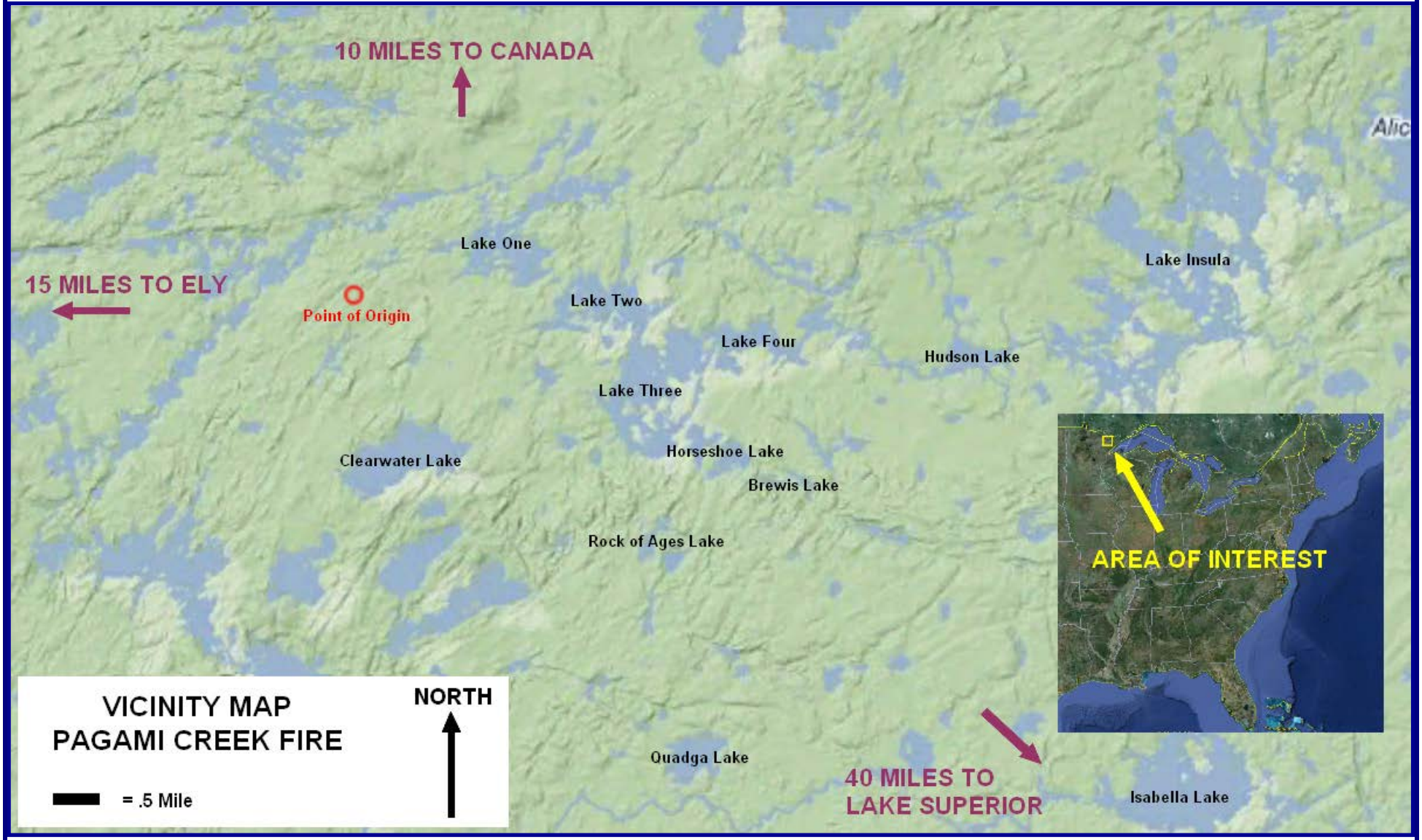


Vicinity Map

Story of the Entrapments: Monday, 12 September 2011

About the Story

The story depicts events from perspectives of people involved, some of their assessments, expectations and doubts. The judgments you read in the text are not from the review team; they are from people on scene. Try to put yourself into the situations you're reading, to learn from their experience.

The tone is conversational and attempts to stay as close as possible to the original voices. Some quotes are approximate but not exact.

All personal names are fictitious and gender neutral.

Background Information

The Boundary Waters Canoe Area Wilderness (BWCAW) is a 1.1 million acre network of lakes and rivers in northern Minnesota, managed by the Superior National Forest. During the summer, Wilderness Rangers patrol the area by canoe and do much of the front-line work of public interface, campsite maintenance, and permit enforcement. During fires, the Forest utilizes them in a Public Safety function. The purpose is to manage public access and movement in the vicinity of the fire. Fires typically spread gradually, and the Forest seeks to reduce residual risk by keeping the public a day or more ahead of worst-case potential fire spread.

This story starts on the morning of 12 September 2011. The Pagami Creek Fire has been burning about three weeks. Four, two-person Public Safety teams are on Lake Insula; their job is to direct the visiting public out of the area and expand the clearance radius ahead of the Fire.

12 September — Monday on the Lakes

Monday Morning, Public Safety teams in the field get their assignments for the day: hold traffic at the Hudson-Insula Portage, and advise public to move out of the southern end of the Lake. Soon their assignment is updated: clear and close Sites 1-28 and 30, and get everyone north of "the Rock." Two, two-person teams will stay at the portage at the southwest end of the lake to stop people from exiting that way. Two more teams are to paddle around the Lake, look for public, close campsites, and order anyone they find to head out north of "The Rock".

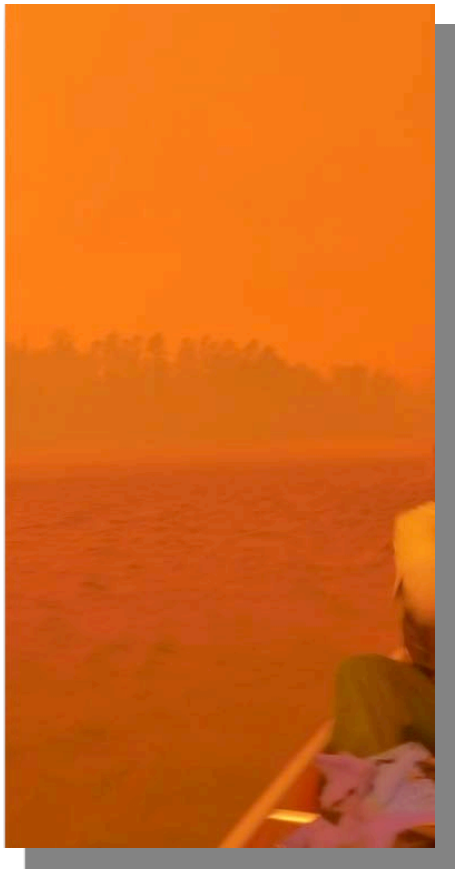
After a slow morning, Alex and Avery meet Les and Lynn at the Hudson-Insula Portage (at the southwest corner of Lake Insula) around 1130. They talk about Saturday's close call and decide to talk to supervisors and turn something in to document Saturday's situation when they get back to town.

While they reflect and discuss Saturday's close call, the smoke and wind increase, and sounds increase to the southwest. Could be the fire, but they doubt it—the fire is miles away; they're *at least* a day or two from it. The radio traffic this morning was about activity on the west and south ends of the fire, nothing in their direction. The wind is gusting to about 15 mph. Maybe that's what they hear—just the wind in the trees? Then it fades.

Hudson to Insula Portage. Arrow points to Insula Landing.

Les and Lynn head over to the Hudson side of the Portage to get their canoe — if they have to leave in a hurry at some point today, they'll need it on Insula.

Alex goes to the high spot on the Portage for a better vantage point. This high spot is the best chance to hit the repeater; but almost impossible east of here. Alex tries to radio Air Attack to get information on the fire, but can't reach him.

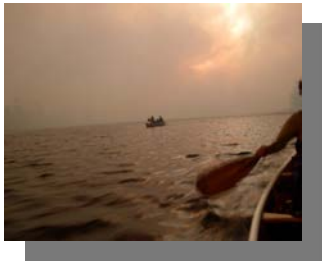


Just past the narrow choke point

The noise, smoke and wind build, and Alex's realizes what is happening. He reaches Quinn (Division Trainee on the nearest staffed division, several miles to the west), and asks if there are any aircraft available to get eyes on them. Alex says, "We can't see the fire, but we can hear it." Quinn says he's unsure how far the fire has moved. He'll work on getting aircraft up and will radio Alex back.

Les and Lynn tell Alex they've decided to paddle west to break camp before bringing their canoe over to Insula. He tells them, "That's no longer an option; you need to get that boat and run."

They rush to the Insula Landing, and launch at 1216, heading to "bigger waters, and to get away from the smoke." Alex radios Quinn to say he senses the fire's making a run to the east, and they're "about to get slammed." Quinn says, "Get somewhere safe."



Starting to get dark

They're paddling, and at first they're just trying to get out past a narrow choke point about half a mile from the Landing, thinking the water there should be open enough for a safety zone.* But once they arrive, they aren't sure they'll be all right when the fire hits. They're trying to gauge what it's capable of... If they can paddle to the other side of the lake, get around campsite 18 and head north, they should be safe. If they find a clear patch of land along the way, they'll beach instead.

Alex wonders if they should check a campsite for public, but Les says there's no time. They're racing southeast as hard as they can, trying to get to where they can turn north. Until they make that turn, they're running parallel to the fire front slamming the shore. If they turn too early, they'll get stuck. Lynn knows the lake, so she steers from the back seat of the lead canoe.

The wind is gusting and they feel a wave of heat on their backs as they pass campsite 5. The sky gets dark fast, and soon it's pitch black, with glimpses of red smoky sky. It gets so dark they put on headlamps. The noise from the fire is unbelievable, and bats are flying around above them.

They're paddling hard, and it's a struggle to keep the canoes stable in the mixed up gusts and waves.† Les and Lynn paddle on their knees; they're getting water over the bow and might be close to swamping. They want solid land but everything has trees and thick fuel; even the islands. They think about just

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* **If they can't make it past the choke point:** Leaving the landing, Alex thinks if this fire cranks and they get caught in those first narrows, they're toast. If they get caught in the bays, they might find a deployment site...maybe. But past campsite 2 and that last choke point (about a half-mile from the landing)—the water's open enough to be a safety zone: "My heart's racing and I'm trying to make decisions, and the decision I'm making is get out of here."

† **Why maneuvering is such a struggle**: Canoes tend to turn crossways to the wind and waves—then they tip and take on water. So it's a constant struggle to keep the canoes straight: "In water this violent, you don't want to be in a boat. It's just a rodeo out there." Their physical fitness and technical skill play a significant role in their survival.

ditching their canoes, but they want to get to safety up north. Ditching is a terrible option, the last resort. [‡]

Alex, Les and Lynn keep trying to radio the other two Public Safety teams on the lake. They are all lost in the smoke. The roar of the fire is really loud. Over the radio; Jess says her and Jamie are somewhere east of them. She has her boots off, and she and Jamie are about to go in the water. Jess says it's the best option. Jess and Jamie don't know the lake as well and it's too smoky to read a map. The fire is moving quickly. That's all Alex, Avery, Les and Lynn hear from Jess.

Alex, Avery, Les and Lynn feel a wave of heat from the shore. Lynn turns her headlamp backward, so Alex and Avery can follow. It gets really smoky and dark they can't see the front of their canoes. Firebrands shower down.

Now they turn and paddle north. The wind and embers are at their back, and it feels like the fire is trying to spit them out. The waves and tailwind are aligned, and driving them forward. They've never gone this fast in a canoe before—they're surfing. If they hit a little reef or something in the water, it will shred their canoes.

The two canoe teams have been trying to get ahead of the fire, but it's not working. They realize they can't make it to the point at the north end of the lake, "the Rock'. They can't find a place to land and deploy shelters. They're not sure what to do; just keep paddling and ride it out on the water. Keeping the boat upright is a struggle. Alex stops paddling to untie his boots and ditch in the lake. A boot comes off, from the front seat, Avery yells "PADDLE!" They've lost sight of Lynn's light. Alex and Avery paddle hard to catch up.

[‡] **Why ditching is a terrible option:** If they ditch, some of the concerns are: They're going to get pushed around by waves and strong winds. They'll have to swim or tread water and try to stay far from the burning shore, in thick smoke and embers—how long will that last? How cold is the water, will they get hypothermic? Where are they going to end up? If there's a strong enough in-draft, they'll get pushed back toward the flame front, and they won't be able to outswim it. Even if they survive, their canoes will be blown away and probably destroyed, and they will lose their radios and food, stranded in the wilderness with no way to communicate: "Ditching is not the most cheerful option."

Les and Lynn spot a tiny flat island with no trees on it. "We need to go there." They paddle to try to get close, but it comes in and out of view. They'll have to ditch, if they can't beach at that island. They keep going and it feels like they must have passed it. Then the smoke thins and in the haze, there it is. They beach. Solid ground.

Alex and Avery catch sight of them landing, and paddle for the island. The tip of their canoe crunches in the gravel as they beach. "Bomber! This is great! We'll be fine here." It's about an eighth of an acre. Seems far enough away from surrounding fuels, and is mostly bedrock; the other islands are covered with trees. The struggle's over.

We're good here; right? This is a safety zone. Will it get too hot? Alex, Avery, Les and Lynn ponder these thoughts. The lake was supposed to be safe, and that didn't work. The fire front will be even with them in minutes, they can

Lower arrow shows path of travel to the deployment island. Upper arrow shows Jess and Jamie's path of travel toward the rock outcropping. View is from the northwest.

hear the roar.

Alex says, "Okay, let's get the fire shelters ready."[§] But wonders if they should use them. If they do, people are going to make a big deal of it, "like, oh s### they had a *DEPLOYMENT*!" Avery's shelter is already out; he's shaking it open and crawling inside. Alex says to just get them *ready*. Avery says they shouldn't wait to deploy in 60mph winds. They pick spots to deploy, move the canoes so they aren't directly upwind, and grab gloves, water, radios and other PPE, talking the whole time as they remember details from the shelter training video. They contact Air Attack and tell him they have a good spot.

Deploying shelters, 1345

Alex is wondering whether shelters are really *necessary*. The wind picks up, and with the smoke it's pitch black again and showering "millions of firebrands covering everything." Their eyes are burning; it's difficult to breathe, and they are getting pelted with firebrands—they don't know if the column is going to collapse down upon them. At 1315, Alex says, "Okay, get in." They're relieved once the decision is made. It's done, and there's nothing left to question. It's safer inside; they can finally breathe.

They periodically stay in touch[**] with Air Attack. They are reassured, knowing he's there above the fire, keeping track of them. They tell him they're in a good spot but have deployed shelters to shield from fire brands, and they ask him to look for the other two Public Safety teams. They talk and joke with each other and periodically stick their hands out to test the air, then peek out to see conditions and it looks like Star Wars. Embers pelt their shelters with what seems like 40-50 mph winds and the fire slicks off the shore and starts island hopping; soon it's all around them.

At 1420, they emerge from their shelters. The fire front has passed, and all around them, everything is scorched black or still burning. They are glad for their little island—the only place that didn't burn.

They try calling the other Public Safety teams on the lake. Robin and Ryan radio back to say they are further north; the fire hasn't gotten to them yet; they haven't deployed shelters, but have a good spot in case they need to. Alex asks

[§] There are multiple perspectives on the island about using shelters and the level of urgency. While Alex is thinking about whether shelters are necessary, others have no doubt that they are. After the shelter deployment, Alex thinks they could have survived the heat itself without fire shelters, but they were necessary for the intense smoke and embers. For more on this see the Discussion module "*Were the shelter deployments necessary?" (p.* 34)

[**] Radio communications are difficult under the shelter. Alex finds he can keep the radio outside the shelter and use his extenda-mic. This works alright, but for some reason communications are broken even though Air Attack is not far from them.

them to describe their spot and the surrounding fuels. He wants to make sure it really is good—sounds like it is.

View from the deployment island, looking north at 1543.

We'll shift perspectives. Here's Robin and Ryan's story: That morning, Robin and Ryan attend briefing in ICP, then are flown onto Lake Insula by floatplane. While in the air, Robin doesn't see much fire activity, but notices the fire has grown quite a bit from a couple days ago. They are dropped off around 1020, and meet Jess and Jamie about 1045. The four of them talk about Saturday's close call, divide up the day's assignments, and then split up. The wind is starting to pick up, and smoke is starting to settle onto the lake as Robin and Ryan paddle several miles, closing campsites for about an hour. Near campsite 11, they get a view of the south shore. The smoke gets thicker and they can hear the fire roaring. They start paddling north, but it gets hard to maneuver in the big waves. When they get about even with the Rock, they can't out-paddle the head-wind. So, at about 1315, they beach in a boggy area and find what seems like a good deployment site. Now, it's a little after 1400. They're on the edge of the column. The fire front spans the horizon to the south, and is heading their way. A floatplane pilot radios, "I think I can get in there and land, if you guys can get out on the water. That water's rough, but I've got an opening in the smoke, so if I can find you, I can probably get in there and pick you up." They tell the pilot they don't think they can get away from shore because of the waves. Paddling looks less safe than staying put. Then somehow the water seems to calm a bit, and the wind shifts—now the column's moving east and there's a clearing in the smoke. The pilot urges them again to paddle out. "Looks safe to me." "Let's go." They jump into the canoe and paddle hard for the center of the bay. The plane skims onto the water, bouncing heavily on big waves. They paddle over, kick away the canoe with their gear, and take off, planning to search for public until the pilot needs to refuel.

Shifting perspectives back to the island: Alex, Avery, Les and Lynn hear Robin and the pilot talking over the radio; they're shocked he could land in the smoke, wind and ocean-like waves. Is that even doable?

They know Robin and Ryan are accounted for and hopefully safe, but what about Jess and Jamie? They're not answering the radio. They're probably out in the water. Somewhere. How do we find them? But the waves are still too choppy, and it's too windy to risk paddling around, too smoky to see anything.

At about 1440, there's a thunderstorm. Hail pelts the island. They drape their shelters over themselves to help shield, and Les passes around chocolate. After the hail, there's some calm: the wind eases and the smoke thins a bit. Around 1500, all four shout into the haze, in the direction they think Jess and Jamie might be.

Hail storm soon after the deployments

Shifting perspectives to Jess and Jamie: That morning, at the 0700 radio briefing, Jess and Jamie's assignment is to advise public to leave the

southern end of Insula and head up north past “the Rock”. Jess thinks about the emergency closures late on Saturday. She doesn’t want a repeat. She calls the Public Safety Coordinator Dylan, and strongly advises they fully close campsites 1-11 and order people to leave. He calls back a few minutes later, saying to close and clear sites 1-28 and 30, and get everyone north of “the Rock”.

Jess and Jamie start at the southwest end of the lake, sending public north, and closing campsites. Around 1045hrs, they meet Robin and Ryan, who had just flown in. The group discusses Saturday’s close call then head out for the day’s work. Soon the wind starts picking up, and smoke settles in on the Lake. They keep moving. The sky gets darker, and they hear a roar in the distance.

Jess and Jamie close campsite 7 and paddle toward campsite 8. Campsite 8 is at the end of a long narrow bay at the southern edge of the Lake. Something is not right, Jess is uneasy about paddling all the way in to close the campsite. There’s probably nobody at that campsite. They’ll close site 8 real quick and then head north and break for lunch. As they reach the tip of the point to turn south, Jess decides “No this is not worth it, the fire is moving in. We need to get out of here.”

She turns the canoe toward the middle of the lake,[††] and tells Jamie to paddle fast. The smoke gets thicker, They start preparing for the possibility of the fire over-running them. They get their shelters out, and Jess radios the other teams that they are going in the water and warns the other crews of the approaching fire. They think they hear someone yelling. They yell back, but through the smoke they can’t make out where anyone is. Its really dark and hey can’t see much and they aren’t sure which direction they are heading.

[††] After the 1999 blowdown storm, fire people on the Forest were saying the best safety zone would be to jump in the lake, turn the canoe around and use it as refuge. Jess doesn’t think hiding under the canoe seems like a good idea, it seems better to just whip out a fire shelter—“a canoe would not be safe in big waves—it would catch wind and go flying and probably take you places you didn’t want to go.”

As they paddle, Jess scans the shore for deployment zones, but can’t find any, so they head for the center of the lake.

The fire’s coming. It’s pitch black. Jess pulls off her rubber boots, and shouts over the wind to Jamie, “It’s time to go in!” Jamie: “You mean, now?” They slip into the cold water. The canoe swings around and hits Jess in the head. She goes underwater. Jamie is strong and she shoves the canoe away; it disappears with their gear. Their shelters are partly unfolded. They are treading water and working to get their shelters open but in the wind and waves, it’s hard to get them open all the way. They decide to let a shelter go and share one.

They’re drifting north, holding on to each other with one hand, trying to hold the shelter down with the other. But the waves are chaotic, and hard to time, and under the shelter they can’t see them coming. The shelter keeps almost wrapping around their heads. With each breath, they don’t know when it’s going to hit them in the face and block their airway. They struggle to keep their heads above water, and Jamie’s life jacket is riding up and choking her. The water is cold, and the waves are big, and they think they are going to drown.

Within minutes, it’s suddenly hard to breathe. They hesitate to lift the shelter: will the air outside sear our lungs? They need breathable air; they open it a crack. It’s black outside, except for huge sparks of flying fire like someone’s shooting machine guns at them.

Inside the shelter, it goes from pitch black to bright orange, over and over. They think they’re going to die, and it feels like they’ve been in the water forever. They lift the shelter for air and see a shoreline engulfed in huge flames, and the waves are pushing them toward it. They try to kick out into open water. But they’re tired from being tossed around.

Barely, through the haze, they think they see some rocks. They kick over and struggle against the waves to get hand- and foot- holds onto the rocks, while hanging on to the shelter and each other. Jess is shivering uncontrollably, and her leg is spasming painfully, and she can’t stop it flapping around. The fire is picking up.

They stay close under the shelter trying to keep warm. Once the fire front has passed, they get up out of the water and use the shelter to shield from flying embers. They stay on this rocky tip of land away from vegetation but the cedars behind them in case they start to burn. They try to figure out how long they were in the water—it must have been 45 minutes or so.

They take turns standing in the hot, dry wind, huddling together with the shelter. Then there's rain, and thunder, lightning and hail, and they cover themselves with the shelter but they still get soaked and pelted by hail. At this point they think what other disaster could possibly happen?

Afterwards. They hear yelling through the haze. It's Les, Lynn, Avery and Alex on an island about 200 yards away. They come over to pick up Jess and Jamie and search for their floating gear.

Air Attack gives them updates and there's radio traffic about trying to fly them out. A pilot is circling overhead. Without consulting the others, Alex calls air attack and tells them they are safe and they'll spend the night out on the Lake. Alex asks Air Attack to go look for public who may be out ahead of the fire. ‡‡

The rocks Jess and Jamie floated to

The six of them meet back at the island. Jess and Jamie get warm dry clothes and food. They understand that they will be spending the night out on the lake because Air Attack was searching for public and weather conditions are too risky to land. Although disappointed, they make the best of it and spend the night on the Lake. Later many of them feel good about the opportunity to share their experiences together on the Lake, with each other, before going back to the District.

Where Next?

You've just read perspectives from teams entrapped on Monday, 12 Sept 2012. What do you want to do next?

- Continue reading and get perspectives from ICP.
- Or go to the Discussion Modules, "Were the Shelter Deployments Necessary?" (p. 32), "Knowing What the Fire's Doing," (p. 24), and "Lakes as Safety Zones," (p. 31).
- Or go to Lessons Learned Bullets, (p. 21).

‡‡ Alex thinks wind, smoke, and waves would make it dangerous to try to land to pick them up. What if the pilot crashed trying to land, or trying to take off? Why risk that, if they already have a safe spot and plenty of food? And, it's almost sunset—if the pilot has any legal flight time left, it would be better to search for public who might still be ahead of the fire.

12 September — Monday at the Incident Command Post

Now we'll look at Monday's events from perspectives at ICP, dozens of miles west of Lake Insula. We'll start with a little background from the last few days.

Since Saturday, Dylan has been coordinating the Public Safety program. Saturday fire moved further and faster than expected. By evening, leaders were scrambling to widen the closure area beyond the original plan. But **Sunday** was a good day: more Public Safety teams were brought in along with mechanized canoes and aircraft, and they were able to clear lakes for several miles in advance of the fire, getting as far east as Lake Insula. The fire was moving, but the latest intel maps showed it was still 'inside the circle.' **Sunday night**, Dylan, the IC, and the Ranger made a plan for Monday: They were going to expand the clearance radius around the fire: Go big, make the circle bigger. Public Safety teams will move even further east. The plan is they'll progress into Lake Insula, advise public to leave the southern end of the lake, and hold traffic on the Hudson-Insula Portage.

Monday morning: After the operational briefing, Dylan radios assignments to the Public Safety teams in the field. A team radios back suggesting they entirely close the southern campsites and order people out, rather than advising them to leave. Just then, the Incident Commander catches Dylan in the parking lot, tells him about updated weather and fire, and draws a line on the map with his finger: everyone needs to get north of this line. Dylan draws a line with a pencil, confirming everyone needs to get north of *that* line. He radios his field teams with the updated assignment: sweep and close campsites 1-28 & 30 and get everyone north of "the Rock". It's now about 0825.

Dylan feels good—with all the work they did yesterday and the new closure area today, it seems like the public is being contacted well ahead of the fire. They're right where they need to be, they'll have plenty of time to do what needs to get done. The fire is still miles from Insula—it might reach the southern end of the lake by tonight or tomorrow night. Personnel on the lake have a lot of work to do, but it's going to be manageable: "We're getting ahead, doing what we need to do, and we have the people in place to do it." He begins coordinating insertion of a fourth team on Lake Insula. He'll have them flown in with extra food and maps for the public who won't be able to exit to the west.

Moments before the IC's discussion with Dylan—The Fire Behavior Analyst brought the IC an updated spot weather forecast for increased temperature, lower relative humidity and higher wind and instability, which could result in greater fire intensity than predicted. The IC asks where the fire might be by the end of the day. The Fire Behavior Analyst says it could run four to five miles, and points to a spot on a map just a mile south of Lake Insula. The IC doubles that number to create a new clearance distance and goes out to catch Dylan in the parking lot.[§§]

In the air above the fire, Air Attack is up, as well as other aircraft, and at 0900, they see only drift smoke over Lake Insula. There's some fire activity, but nothing threatening personnel on Insula. Air Attack is over the fire until 1140, when he is diverted to new fires start on the Forest.

Late morning, Wilderness Office, Dylan is with two other Wilderness personnel. They start getting nervous and they're not sure why. Within minutes, they actually see the column from the office. Someone walks in and says, "That's a big column out there." Air Attack over the radio says something like, "Excuse my French, but that's one hell of a fire."

Dylan's stomach starts to sink, and he starts for the Communications trailer.[***] Someone's running toward him, message in hand. He knows things aren't right, and his stomach sinks more. The person from the Communications trailer gives

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[§§] Among local fire personnel, a common expectation is, as long as you're near a lake, you have a safety zone. Historically, this has been true. Look again at the map—would *you* doubt the lake would be a good safety zone? See Discussion Module "Lakes as Safety Zones?" (p. 33).

[***] Dylan's portable radio doesn't reliably pick up CommandNet traffic in ICP or the wilderness office. To try to mitigate this, Dylan's routine the last two days is to head over to the boat landing by the Repeater. He gets better Command coverage there and can monitor TAC, too. He's been heading over there in the afternoons. While he's in ICP, communication with field personnel generally involves either heading over to the Communications trailer, or someone from the Communications trailer has to relay messages to him. For more on this, see Discussion Module, "Communications—Radio Issues" (p. 30).

him a message from Quinn (Division Trainee several miles west of Insula), saying he needs to reach his teams on Insula. He is also informed about scraps of overheard radio traffic: Quinn is trying to get aircraft for people on Insula, something about Public Safety crews on the lake and the fire moving east, and something from Alex about "I can't see it, but I can hear it coming."

Dylan's reaction: Holy crap. This is not good, and we don't know what's going on. They head to the Communications trailer to try to reach someone, but nobody's answering. At some point he has some contact with Robin, who sounds like he's out of breath struggling and paddling, saying something about he's on the southeast side of the Lake. Dylan tries to reach Air Attack to let him know what's going on and find out what he knows and see if he can help. But it's hard to get through to anyone. They know there's trouble, but they don't have any answers, and can't contact anyone on the radio. Dylan and the two others from the Wilderness office leave the Communications trailer. They're quiet, phased a moment, and one of them says, "We gotta' take care of this. Because no one's going to do it for us."

People around the Forest are catching bits and pieces of radio traffic and trying to help the Public Safety teams on Lake Insula, trying to contact aircraft, but they are frustrated because there's nothing they can do. Things are escalating everywhere.

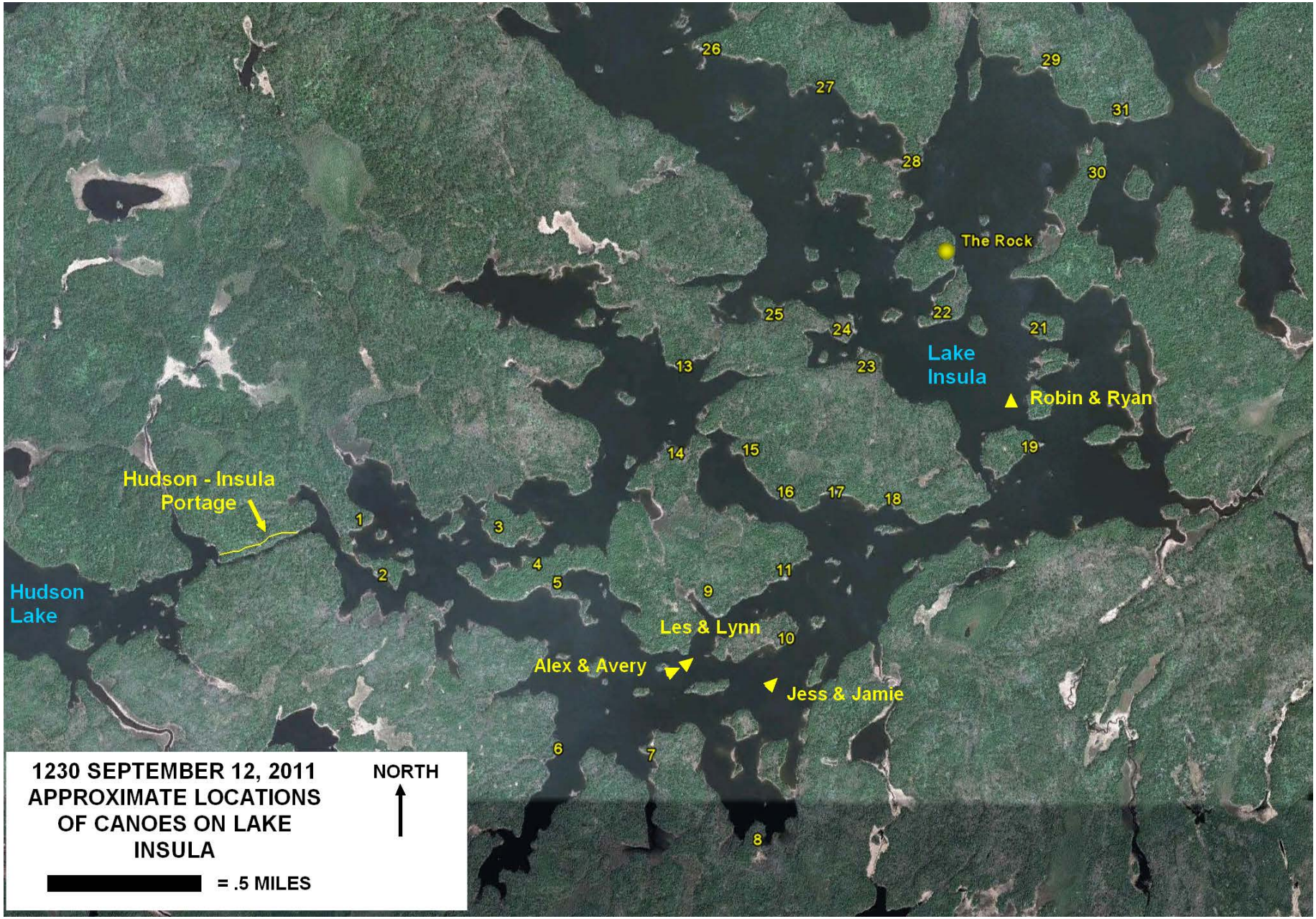
The fire is ripping east, and it's tearing into areas not anticipated in worst-case scenarios. Dylan knows there are Public Safety personnel from another district on lakes east of the fire, and he is trying to ensure they reach safety. The fire's heading into another county. It's going outside the wilderness, and threatening road systems and private land. How do we alert the public and get them to safety? How many are out there? And how far is this fire going? Forest Leaders, the Incident Management Team, the Sheriff, and Public Safety coordinators are racing to ensure the safety of Forest personnel, evacuate new areas, and alert locals. The Sheriff tears out of the parking lot, and there's urgent activity throughout ICP. It's a blur. A chaotic blur of not knowing who's where and not being able to reach people and the ones you do reach are in the middle of their own emergency and don't know what's going on, don't know what the fire's doing or else can't believe it. Dylan phones someone who couldn't believe at first that the fire could be headed their way so fast. At some point, a report reaches ICP that people are seeing flames all the way out at Sawbill Lake—that's 16 miles from where they thought the fire's edge was this morning. Not believable. Maybe it's a spot fire, or maybe somebody's misreporting.

By midafternoon, all Dylan knows is two of his eight people on Insula are unaccounted for. Not until late afternoon does he know all eight are accounted for. He hears rumors of shelter deployments later that day, but nothing certain.

Air Attack and the IC: Air Attack arrives in ICP around 1505 to inform the IC of what happened on the lake today: based on what he heard, it sounded like two personnel deployed fire shelters to shield from firebrands. As new information continues to come in to the IC and Forest leaders, it's still not clear exactly what happened. The IC and Forest fire managers ask about having the teams flown in from the lake. But, it's still not safe to fly those people on the Lake told Air Attack several times they had an awesome spot and were planning to spend the night there. One pilot says: "If it was a life or death situation, I would try. But the crew had communicated with Air Attack they would be OK staying overnight." The plan is now to have the personnel on the island flown in first thing the next morning. The IC asks the Safety Officer to meet the public safety personnel as they return from the fire. Soon after, the IC ordered a Critical Incident Stress Debriefing Specialist to meet with them. The Forest starts notifying the Regional Office.

Meanwhile, rumors are circulating around the Forest. Nobody's sure yet what really happened.

Monday 12 September 2011: Approximate locations of Public Safety teams on Lake Insula at 1230. Canoes are represented by the small green triangles.



Story of the Close Calls: Saturday, 10 September 2011

Note to reader: We're now going to go back a few days and look at events prior to the entrapments.

9 September — Friday

Fire conditions are growing more severe. The Forest issues a closure order. Around this time, incident personnel are reaching their 14 day time limit and starting to go on mandatory days off. The IMT is getting ready to transfer command on Friday evening. Several team members will stay on and swap roles—the intent is to maintain continuity during a potential increase in fire activity.

The incoming Public Safety Coordinator, Dylan, arrives late this week and shadows the outgoing Public Safety Coordinator. They talk about changing fire behavior and plan how to implement the several square miles of new closures, plotting where to insert public safety teams and how many additional personnel are needed. Saturday, Dylan steps into the role of Public Safety Coordinator.

10 September — Saturday at ICP

The focus is to implement the new closure order: Public Safety personnel and fire operational personnel will coordinate to clear and close the Pow Wow Trail (an 8 mile loop southeast of the fire), as well as several lakes directly south of the fire. North of the fire, they are to close six campsites on Lakes Two and Three; otherwise those lakes will be left open: public will be strongly encouraged to leave that day or the next—at the latest—but not forced out. The expectation is that fire could reach this chain of lakes eventually, but won't come close to the south shore today.

After morning briefing, the IC and Public Safety Coordinator brief personnel camping out on the lakes with updated assignments via radio. Dylan coordinates the insertion of new Public Safety personnel. After that, it's a quiet morning. Around noon, Dylan goes to a meeting at ICP to hear updates, then he heads up the road to a boat landing near Repeater Hill to see what the fire's doing. He sees smoke blowing to the south. He finds he can pick up tactical channel traffic from here, so he stays to monitor how things are going for his personnel on the lakes. He also finds he can pick up traffic on the Command repeater on his handheld radio—something he's had a problem with in ICP. Over the course of the afternoon, one of his teams calls about a hiking group they met on the Pow Wow Trail. The hiking group wants permission to stay until tomorrow morning. Dylan calls Ops, who says this would be all right as long as they're out first thing Sunday.

Later that afternoon, a Safety Officer paddles in from the fire, arriving at the landing by Repeater Hill. He asks Dylan if he's aware there are still public out on the lakes north of the fire. Dylan thinks this is an odd thing to say: the day's mission was to "strongly encourage" people to leave, not to force them out.

He heads back to ICP for the evening planning meeting, and the IC asks him if there are still public on Lakes Two and Three. Dylan says "I think so." The IC tells him to "fix it." Now Dylan is really confused—he thinks to himself, "okay, that wasn't in the original mission, but I'll roll with it. I'll fix it." He plans to talk to the IC about this later and figure out where the confusion stems from, but right now there's no time to dwell. He turns around and gets to work. At 1732, he radios one of the teams in the field asking if all public are clear of Lakes Two and Three. The answer is no. He directs them to talk to people on the lakes again, tell them to get out of there, and close the campsites.

Shortly after this, the IC tells Dylan they need to get that hiking group out tonight. Dylan starts arranging this—which involves finding additional personnel from the district and flying them out to escort the group to a better spot. They will then camp together and be ready for extraction by floatplane in the morning. As he's setting this up, a message comes in about public on Brewis and Horseshoe lakes, and he works on getting aircraft to sweep those lakes.

The IC, District Ranger, and Outgoing IC take a reconnaissance flight between 1910 and 2000. They see increased fire activity, but can't

tell exactly how far the fire has moved.[†††] They also sweep lakes to confirm they're clear of campers.

That night, Dylan meets with the Ranger, IC, and Acting Zone FMO. They make a new plan for Sunday: aggressively expand the closure area and make sure there are no public on Lakes Two, Three and Four (northeast of the fire). They'll also clear and close Isabella and lakes south of the fire. Just force everyone out. They will use motorized canoes and aircraft; they'll bring in additional Public Safety ground personnel, as well as a dedicated aerial observer. Fire operational personnel will be directly involved with the Public Safety teams—helping track and move public off the lakes. The plan is clear—no jargon—just get everyone off the lakes. Make it orderly, but get them out.[‡‡‡]

Dylan felt like they were scrambling all day. Not quite *behind*, but not quite far enough ahead. But with the plan for Sunday the public using the area should all be notified.

10 September — Saturday On the Lakes

Saturday afternoon, as Sid and Sage help clear and close the Pow Wow Trail, they meet a group of campers who ask if they can stay until tomorrow morning. Seems all right to them—the fire's not supposed to get anywhere near the trail today. Sid radios Dylan and gets permission for the hiking group to stay the night, as long as they leave first thing in the morning. Sid and Sage help the group make a plan, and then they continue sweeping the Trail.

By 1606, Sid and Sage have swept their section of Trail and are heading back to their canoe on Lake Three. At 1658, they stop at Rock of Ages Lake for a break. The canopy is open enough that they see the column to the west. It's not a typical column—it's wide, and twisting slightly, and they can't see anything above it. They don't know how many times they've seen that before. And the winds are blowing toward them.

It's still a couple miles' hike north to their canoe and Lake Three. They're thinking it's not too late to divert south to Quadga, and get flown out in the morning. But, what are the chances? Then again, they can't really see what's going on, and aren't close enough to get much traffic on command. They check in with Pagami Communications to give their location, and that they're heading north. They expect that if it was a bad idea to continue north, someone would say so. Pagami Communications copies their location. They think about calling Air Attack to ask him to keep eyes on them, or calling Quinn (Division Trainee from the nearest division) to ask about the fire.[§§§]Lake three is not that far, and they judge they can make it back to their canoe with a couple hours to spare. With the thick timber, they're mostly in the blind once they leave Rock of Ages Lake. They hike hard, and as they go, they're reassessing every 10 minutes or so, getting an occasional view through the trees, wondering "Are we still good? Can we *tell* if we're still good?" They still don't think they're going to be immediately threatened, but they also think "But this is stupid, I should have someone with their eyes on this."

At some point, they try calling Quinn but can't reach him, or anyone else: "We are on our own now." Sage notices the wind has shifted: it's now pulling toward the column—an in-draft.

[†††] See Discussion Module, "Knowing What the Fire's Doing" (p. 26) for local context on why it's difficult to determine the fire's exact perimeter.

[‡‡‡] With the unfolding activity, Dylan and the IC don't revisit their earlier confusion—it gets lost in the shuffle. By Saturday, evening, though, the issue is passed. They have a new plan and it's clear what needs to get done.

[§§§] When Sid thinks about this later, he says, "Now in hindsight I realize if I had [called Air Attack]—it would have been a really good thing. I felt silly because I'm one person. I just got there. And they had their hands busy already with a lot of stuff that's going on. Also, Public Safety personnel are not who would call for air resources. It would be so out in left field; it's not a standard op for us. [I was thinking] "This is probably nothing: I got this, the fire is way out there. I'm fine." [And I was saying to myself] "You're okay, don't second-guess yourself because you're nervous. You're gonna get yourself all worked up, call Air Attack on the radio—and you can see, off on the fire, everybody looking at the radio, thinking, "What? What is a Public Safety person doing talking to Air Attack?" That's not how it works. Public Safety doesn't do that, we're not that up close and personal to the fire. If I did call, I'd have to go through a whole thing of getting him on the same page of, "who the hell is this guy?" I'm thinking in my head, you know, air attack is gonna get over here and go, 'Yeah, it's like 50 million miles away, you guys.'"

They reach their canoe on Lake Three, and can now see the fire and what it's actually doing: It's not far, and it's running east with group torching along the south side of the Lake.

Pow Wow Trail

Sid and Sage have been in radio contact with a second public safety team, Dana and Devon, who are hiking a different section of the Pow Wow Tail, and are also headed for Lake Three, and can't see the fire. Sid tells them, "Keep a good clip on. Not emergency, but not dilly-dally." Sid and Sage run back on the Trail to recheck a campsite.

Around 1830, the teams meet at Lake Three, and Dana says there are still people camping back on Brewis Lake. Sid estimates they have a half hour till the fire gets here. They make a decision to get the campers out to Lake Three. They call for aircraft to sweep the area for public, and Quinn (the nearby Division Trainee) redirects a helicopter to start searching until a floatplane arrives.

Sid and Devon paddle out into the lake as lookouts as Dana and Sage head back in to evacuate the public camping on Brewis. One camper says he'll go, after he finishes filtering water. "No, you need to go now!" As lookout, Sid sees embers raining over the portage. He's tells Dana he has 10-15 minutes, or else he'll be stuck. By 1900, Dana and Sage get back with the campers. By 1930, as they're paddling away, there's a shower of embers and they see fire blanketing the area they just left.

They're angry about communications and lookouts, and that fire was running into areas that hadn't been officially closed yet. They paddle back to their campsites, talking about how 'fire was nipping at their heels,' and they radio Les and Lynn, another Public Safety team on the lake. They radio Quinn with their concerns. They also know Les and Lynn are camping by Quinn and will talk to him about the day's events.

Now we'll shift perspectives to Les and Lynn: Since morning, that same day, Les and Lynn have been closing campsites and strongly advising (but not ordering) reluctant campers to leave—according to plan. At 1732 Dylan radios with new instructions: order people to leave, and close all the campsites on Lakes Two and Three. They're frustrated having to paddle around the entire lake again—they expect it will take another two hours to find and tell everyone that it is now an emergency and they have to leave immediately. Quinn sends over personnel to help pull latrines from the campsites. Les and Lynn paddle to check campsite 7 and make sure public is clear before the fire gets there. But as they turn the corner, they find the campsite is already burning. They make radio contact with the teams who just finished on the Pow Wow Trail—no one expected this kind of fire behavior. At 1824, they call Pagami Communications

and tell them there may be campers on Horseshoe and Brewis Lakes. Minutes later they radio again, saying they "may need to evacuate Horseshoe and Brewis Lakes." They're telling Pagami Communications these messages are important, and asking that these messages get relayed to Dylan. For some reason the relays aren't happening. They stay in contact with the other two Public Safety teams, angry about how things went today: Problems with communications and lookouts, and the fire is burning into these areas with public here. Les and Lynn paddle to their campsite and talk to Quinn about their concerns.

Photo taken from Les and Lynn's Canoe near site 7, 1813.

11 September — Sunday, Clearing Lakes

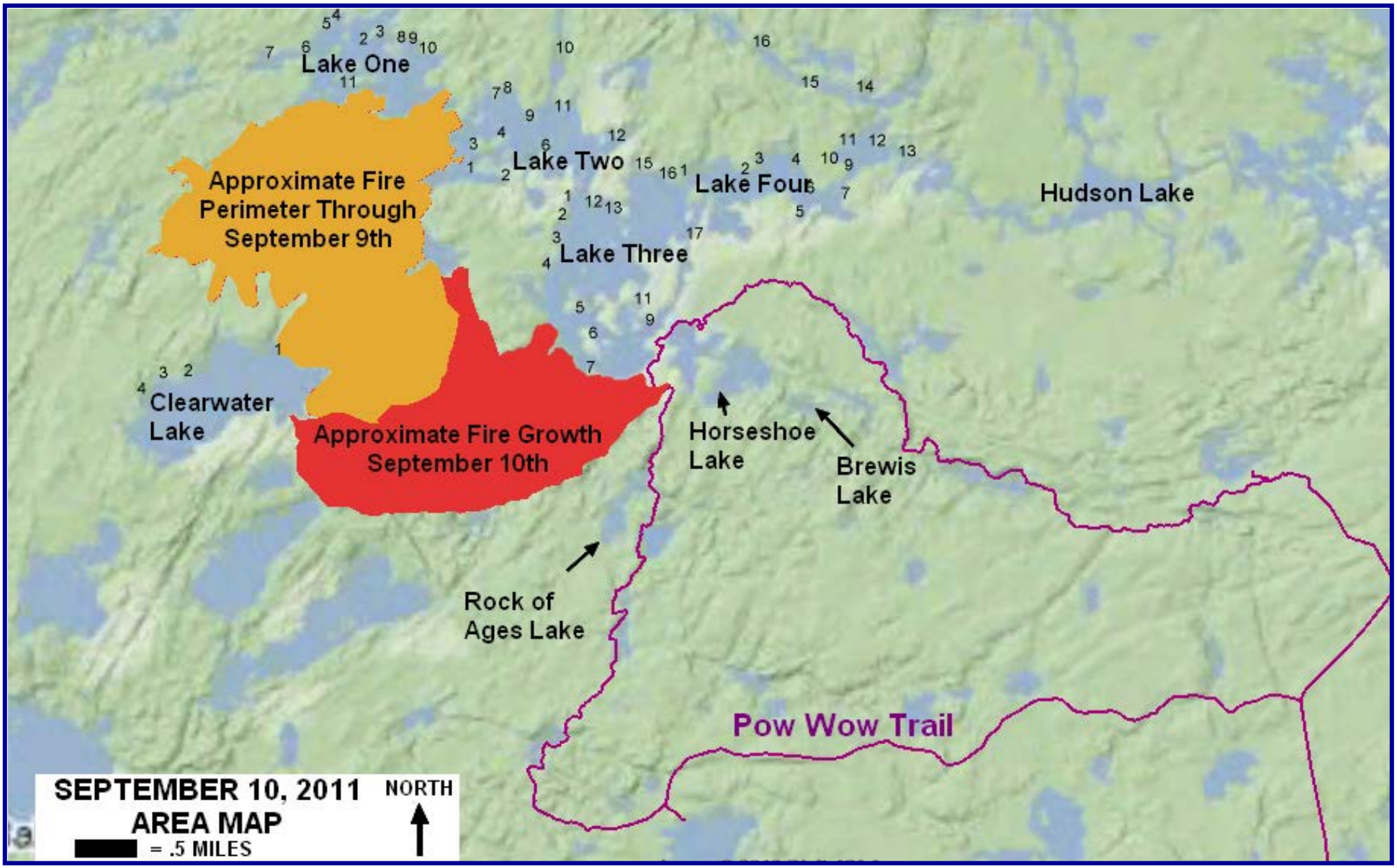
People on the fire are busy all day implementing the plan from Saturday night, as well as additional closure orders issued during the day. They pull latrines, post signs, tow canoes, row dozens of miles, and help visitors portage their gear between lakes. As they paddle from one site to another, Public Safety personnel take names of everyone they come in contact with, and call these names to a Public Safety crew stationed at the One-Two portage; they keep a list and cross off names as people move out. Public Safety teams check in more frequently with Dylan, and Quinn. They're working to keep better communications after what happened yesterday. But radio communications are still burdensome, coverage is spotty, and messages sometimes require complicated relays from sender to receiver.

By the end of the day, field personnel feel good about what they accomplished. They moved about 95 people out of the new closure areas. The wind was out of the north all day, so they didn't have smoke in their faces, and as far as they are concerned, the fire didn't really do anything all day; and they didn't have much time to dwell on yesterday's close call. Plus, moving all these people out feels like a solution to a big part of yesterday's problem.

Quinn gathers the fire has moved southeast, but isn't sure exactly how far—he thinks it's about at Quadga Lake. The fire is unstaffed in that direction, there are miles of wilderness to the south and east, and the identified values at risk are up north.

Back in ICP, Dylan thinks today was good. He had a lot of Public teams out-- he had teams on lakes south of the fire, in addition to the personnel clearing Lakes Two, Three, and Four. They got a lot of area closed, and it all went smoothly, "It felt like a very successful day from the public safety side of things."

For managers: today's additional closures increased the buffer ahead of the fire. By the end of the day, they feel good about the increased safety margin, and the flexibility it gives them. Using motorized equipment made things go much more efficiently. Sunday night, they make a plan to keep expanding the clearance circle. Rain is predicted for tomorrow, so the fire should be slower.



September 10, 2011, Area Map

Lessons Learned Bullets

Direct Lessons from Field Personnel

- Fire shelter training is working (*Note: Several interviewees said they replayed the training video in their heads as they prepared to deploy shelters.*).
- When you have self-doubt … not sure about the emergent nature of the situation, go with your instincts, and let people know how you feel.
- Be aware, maintain LCES (Lookouts, Communication, Escape Routes, and Safety Zones), and don't trust—be prepared to take care of yourself.
- Articulate and assert the problem.
- Declare an Emergency, be more forceful and ask to clear the frequency for emergency traffic.
- Know where the fire is at all times. Don't assume others know where it is.
- Clear and concise language on the radio—we were banished from the ForestNet because dispatch didn't know we had an emergency—we were not direct.
- Conditions can change quickly and without warning, putting public safety folks in hazardous situations. We need to have the mindset that we are full-fledged firefighters and part of the fire fighting efforts. I think that this would help us maintain more vigilance about having lookouts and communications.
- It's critical for a crew to have a combination of fire and wilderness (e.g. canoeing, navigation) experience. Two newly red-carded FFT2's, or two inexperienced wilderness travelers would have been in trouble. I think that this mixing of skills was done well in this case, which worked in our favor. But it's worth making the point that this should continue to be done intentionally in the future.

Direct Lessons from Administrators

Thoughts on Planning Closures:

"Does it make sense to keep adjusting closure every day and trying to stay a day ahead? I think under normal circumstances that's fine. [But it] didn't really hit me till things got hectic—do we have the capacity to literally stay ahead of this? I don't think I factored into my thinking how much time it would literally take to do these area closures. How many people are doing this? When is the signing going to get done? How long will it take to move the last person out, including our people? That didn't start hitting me till the 11th or 12th—you know, do we have the capacity to stay ahead of this thing? I started factoring in how long it would take us to implement, not just determining the closure perimeter based on anticipated fire behavior.

"That's one of my biggest lessons learned. That's something I'll factor in next time we do an area closure: How many is it going to take to implement that order? How long will it take to move the last person out, including our people?"

Lakes as Safety Zones

Radiant heat – need to be more than 4-5 times flame ***height*** distant

Crownfire – about 100 ft flame heights

Need to be about 400-500 feet from shore

Tornadic fire whirls; horizontal roll vortices

May move across water (while retaining heat) up to several hundred feet

During-Incident Reviews

Hold weekly calls with line officers during fire season, daily during a fire event, as appropriate.

Organization

Public Safety personnel assigned to the field will report to an Operations person (e.g. DIVS) and will be listed on an ICS 204 Assignment List.

Previously, Public Safety personnel reported to a Recreation Wilderness Manager and field operations were independent of the Operations Section. This situation led to incomplete situation awareness for some Public Safety personnel with respect to fire location, fire behavior, and other threats to their safety.

The public safety operations were getting their direction from two sources, the line officers via the wilderness manager, and from the incident personnel (i.e. DivT and air attack), and line officers/agency administrators had not stayed informed of the situation regarding personnel doing public service functions as the fire situation changed, both on Saturday and again on Monday.

Communications-Social interaction

Improve discipline in communications:

- **Ensure field ops deliver intelligence to ICP and Agency Administrators**
- **Ensure ICP and Agency Administrators deliver clear instructions to field ops**
- **Recognize that good communications requires continual vigilance**

Some situation information known to field personnel was not passed on to/received by ICP/District managers; some direction and situation information known to ICP/District managers was not passed on to/received by field personnel. Forest management recognizes the shortcomings of important information transfer and will stress the importance of good communication in pre-season workshops and meetings, and leader's intent during incidents.

Communications-Radio system

Continue working on system enhancements to provide adequate communications on all wildfires

Although the Forest Net provides sufficient radio coverage across the Forest, the Command repeater was not sufficient.

Annually provide employees radio training and review proper protocols in cases of emergency that allow them to use the Forest Net for immediate attention.

Improvise systems when radio system doesn't reach planned work locations

- **Human repeaters**
- **Aviation repeaters**
- **Change work location**
- **Others?**

Improve Geospatial Intelligence

- **Location of the fire**
- **Location of all assigned personnel (firefighters as well as public safety personnel)**
- **Locations of the public in proximity to the fire and any current and potential closure areas**

Increased use of infrared and helicopter/beaver mapping of fire perimeter – daily or more frequently. Ensure perimeters are known by all personnel assigned to field operations. Investigate technology that will provide IC/Agency Administrator with real time location of all field operations personnel

Wilderness Values – Minimum Tool

- **Square stern canoes**
- **Increased use of aircraft**

Our assessment of minimum tool in the future will be influenced by the experiences of Pagami Creek. Square stern canoes with motors will be used more readily to provide for the safety of our personnel assigned to field operations. Use of Beavers will occur more readily when moving the public out of an area to be closed.

Public Safety

Closures – timeliness and aerial extent

The size and timeliness of area closures will be influenced by Pagami Creek – meaning they will occur sooner and be larger.

Other Considerations

Fire Behavior

Improve forecasts for

- Instability – greater use of radiosondes and other devices
- NWS/USFS Research work on better classification of instability – must go beyond the five Haines Index values (September 12th was well above the average Haines 6)

Continue working with National Weather Service to ensure they highlight instability in forecasts and provide information beyond Haines Index when levels are extreme

- NWS/FS Research work on better predicting extreme instability – 1-2 days in advance

Develop thresholds for interaction of:

- **Fuel**
- **Wind**
- **Drought code**
- **Instability**

The tremendous rates of spread were the result of a historically rare combination of factors. We don't know if that combination will be rare in the future, but we would like to better understand thresholds for combinations of factors that support extreme fire behavior. There is ongoing work with Missoula Fire Lab and National Weather Service to enhance the ability to predict extreme instability and to better characterize it in relation to fuel, wind, and drought code.

Awareness of weather and fire behavior

- **Drought code**
- **Frontal passage**
- **Instability**

Increased use of IMETs for long term wildfires (even on relatively small fires). Need to work on finetuning our understanding of thresholds for the combinations of drought code, instability and winds for all of our fuel types/conditions.

Discussion and Analysis

Fire behavior was the critical factor in the Pagami Creek entrapments. The fire moved in ways that were not only unexpected, but totally unprecedented for generations of firefighters and land managers in the area. Fire intensity stretched the operation and created problems where the system was functional—even successful—under normal conditions.

The purpose of the D&A is to help build an understanding of *how* those situations evolved, and to stimulate questions and dialog. This kind of learning can help you recognize potential problems earlier. It can also help you find ways to make your organization more resilient.

Look at yourself and your organization—think about what's functional and solid *now*, but might rip or fall apart if you're stretched. Then, how could those little problems combine in a crisis? It may be too complex to figure out completely—you can't calculate all the answers. So the point is to look at a real world example of how this can happen. As you build an understanding of their situation, you can look at your own organization differently and ask new questions, and see risks and opportunities you didn't before.

Discussion questions:

Take a look at your own performance and organization:

- Where could vulnerabilities appear when you are stretched and surprised?
- Where do you have opportunities to improve resilience?

Fire Prediction

Monday's fire intensity could not be predicted—or even estimated—using current prediction tools. A local Fire Behavior expert said:

> As far as characterizing what that risk was: I could not imagine any conditions that would have allowed the fire to get as far as it did, until after we saw how far it went. Neither could Fire Behavior Analysts who had been in the area for years.

These events have already brought about specific changes to prediction systems; more are under development (see Lessons Learned Bullets). These events also say something broader about models and predictions. From a local line officer:

> Your model—and your trust in the model—is based on your experience with it. Even if you do have a lot of experience with it, you still need to remain skeptical, because you have not had experience with it under a full range of conditions. Even if you *have* had that, it's history, and models may not track well as conditions change into something you haven't seen before.
>
> The model may work well under normal conditions, but may not work well in outlier conditions. Things may change logarithmically or trigonometrically, rather than arithmetically, based on some factor. And you don't know.
>
> We do know this: We're seeing more extreme weather in different parts of the country and our models have not been tested under these new conditions.

Discussion questions:

- Talk about a time fire behavior surprised you—when your model said one thing, and the fire did something different.
- How do you prepare for events you can't predict?

Knowing What the Fire's Doing

Knowledge in the Field

Some field personnel said they lost track of the fire and weren't even paying attention to it.

Let's look at this. Were they really "not paying attention to the fire?" Or would it be more precise to say: they *were* paying attention and updating their situation awareness. They were doing that as much as they thought the situation called for—based on their current knowledge and expectations.

Field personnel knew the fire was over there, somewhere. It was supposed to be a day or more away. It wasn't supposed to threaten them. The radio traffic they heard Monday morning was about fire activity that seemingly had nothing to do with them. Also, many believed they had one foot in a safety zone as long as they were near a lake. And they assumed if the fire made a big move, *somebody* would see it clearly and early and think of them, and be able to get word to them.

By the time the fire really started moving in their direction, their eyes in the sky had been sent to new starts elsewhere. And suddenly, everyone else on the fire had their hands full. The fire changed faster than they could make sense of it or get out of its way.

Put yourself in the situation—How often do you *need* to think about the fire and update your knowledge? Who really *worries* about fire behavior in the morning? For weeks, every time this fire moved, it was afternoon or evening, which is when entrapments almost always occur.

Yet, field personnel point out their situation awareness could improve by knowing what's on the fire perimeter maps back at ICP.

Knowledge in ICP

The perimeter maps were imprecise: Maps depend on incoming reports. The incoming data is always imperfect and incomplete—not everything gets reported from the field, and "there's always something you don't know." The information is never truly current, either: by the time reports come in, the fire has already changed. So, like field personnel, Fire Mangers also had a level of uncertainty about the fire's exact perimeter. Even when they knew the fire was moving, they didn't know how fast or how far.

Local conditions impede precise fire knowledge: Some readers are used to mountains with great lookout spots, so the idea of not knowing the fire's exact edge might seem foreign. But this area is flat. The vegetation is thick. In some places, it's overgrown and impossible to hike through. So you don't typically hike the fire's edge; you scout from the lakes. When you're on a lake you're always *below* the fire. The fire burns in the understory, so you look at the smoke and estimate where the fire could be. If you look down from the air, smoke and trees can hide the fire's edge, so your estimate could be well ahead of the fire, or well behind it. These conditions combine to limit how precise perimeter maps can be.

So: incoming information was incomplete; maps were based on that information; managers made decisions based on those maps, and field personnel didn't know what the maps were showing. So everyone had incomplete intel, but the intel they had wasn't communicated fully.

What About Lookouts?

What about lookouts? The purpose of a lookout is to recognize change ahead of time and alert you, so you can get to safety. The kinds of lookout you need depends upon the complexity of the situation:

Individual Lookouts:

In many situations, an individual lookout is what you need—someone who can see the relevant part of the fire, and can tell when the fire changes and people need to move. In these situations, an individual lookout can see what's important. They're usually looking for clearly defined indicators. Those indicators are usually immediate, specific, and visible, and you can usually define them ahead of time (eg. if it spots over the line, or the relative humidity changes). There's generally a limited set of things to focus on.

Multiple Lookouts:

In more complicated situations, you need a more complicated setup: you may need to post several lookouts. They may need to keep up communications with one another to piece together what the fire is doing. The indicators are more complicated, and so are the possible hazards. And the lookouts are watching things over a wider scale (eg. the inversion starting to break, fire or wind shifts in another canyon or ridge). No single person can see everything, but as a group they can see what matters.

Complex Lookout Systems:

In other situations, we use what we might call "complex lookout systems." These systems integrate multiple kinds of intel from multiple sources and

analysts. This could include weather forecasts, aerial observations, on-the-ground reports, and so on. It is not possible to see enough in real-time, so they have to rely on predictions, readings and reports. And those things all involve humans making interpretations. With a complex lookout system, managers make decisions about where it's safe to put people over the next few days.

Were there lookouts on the Pagami Creek Fire, or not? At first glance, it might seem like a simple "no." But that could miss the point. Was it possible to place a simple lookout in any real way? On which ridgetop? What about aircraft?

The purpose of a lookout is to recognize change ahead of time and alert you, so you can get to safety in time. On this fire, there was a whole system in place for that. Here's the key: that system was based on what they expected the fire could do. When the fire went well beyond that, their system had gaps.

Here is what the Pagami Fire seems to say about complex lookout systems:

- Complex lookout systems require you to integrate and interpret information from many sources. But all that information is incomplete. And by the time you get the information, it's already old.
- Aviation resources can become unavailable at key times.
- Under normal conditions, your complex lookout system will feel more than adequate. So anything you do to make it more robust—those measures can seem like wasted capacity, most of the time.
- When you are stretched, you find cracks and vulnerabilities you didn't see before, and that you may not have guessed.
- There's a chance fire can change faster than your system.

Discussion Questions

- How do you assess what mix of lookouts you need?

ICS and The Public Safety Program

A local adaptation to local conditions

The Forest's Public Safety program is a local innovation to handle a unique local situation: 1.1 Million acres of popular wilderness, on a given day there may be 5,000-10,000 visitors in parties no larger than 9, with visitors spread out through the area. There is usually a small fire smoldering somewhere, and they usually stay small, but sometimes grow gradually.

A Public Safety Coordinator works with Forest leaders and the IMT as they establish and adjust their clearance radius, intending to keep public a day or more away from worst-case potential fire spread. The Public Safety Coordinator then implements the plan and all that goes with it. It's about thinking ahead, and keeping the public safe while inconveniencing them as little as necessary, and managing so this is all orderly and doesn't create panic. Strategizing this and coordinating logistics is part of the Public Safety Coordinator's job, as is supervising the teams in the field.

The Public Safety program gives the Forest the agility to adjust closures day by day, in anticipation of changing fire behavior. For years, the Forest has used this program to keep public out of harm's way, while still allowing access to the BWCAW. Under normal conditions, the program works well. But on the 12th, it was stretched severely and unexpected problems appeared.

Problems when the system was stretched

1-Lags in Implementation

There is always a lag from the first signs of change to an organization's reaction. Under normal conditions, these inevitable lags were not a problem, but in this case, the fire changed more quickly than the system could fully adapt. Plus, when the fire really started moving, several factors combined to increase communication lags. This is a critical point: The very moments when margins narrow, that's when communication is most urgent AND that's also when it's toughest.

On top of that, increasing demands stretch capacity, which can increase the lag between order and implementation. Here is key lesson from a local line officer:

> *Does it make sense to keep adjusting closures every day and trying to stay a day ahead? I think under normal circumstances that's fine. [But it] didn't really hit me till things got hectic—do we have the capacity to literally stay ahead of this? I don't think I factored into my thinking how much time it would literally take to do these area closures. How many people are doing this? When is the signing going to get done? How long will it take to move the last person out, including our people?*

That didn't start hitting me till the 11th or 12th—you know, do we have the capacity to stay ahead of this thing?

I started factoring in how long it would take us to implement, not just determining the closure perimeter based on anticipated fire behavior. That's one of my biggest lessons learned. That's something I'll factor in next time we do an area closure: How many is it going to take to implement that order? How long will it take to move the last person out, including our people?

2-Relationship between the Public Safety program and ICS

There were ambiguities in the formal relationship between the Public Safety program and the Incident Command System. They were not assigned to Operations—they were a Forest program that coordinated with the Incident Commander. So who exactly on the IMT is responsible for communications and oversight of Public Safety throughout the day—is it Ops, the IC, Forest leaders? If something changes with the fire, who is responsible for letting Public Safety know about it and making sure they fully understand the implications? Who is tracking the location of Public Safety personnel in relation to the fire, how often? In general, it wasn't any single person's job on the IMT to do this. Under normal conditions, this was not a problem. The communication routines were sufficient. But this became a vulnerability when the system was stretched.

Language added ambiguity, too. In this report, we've referred to the "Public Safety Program," and the "Public Safety Coordinator." We used these terms to minimize confusion. During the fire, these were actually called the "Public Safety Group" and the "Public Safety Group Supervisor." They used ICS-like terms to *help* integrate Public Safety and ICS. But there were unintended consequences. In some cases, fire personnel naturally assumed that the "PS Group" and "PSGS" would function like any other fire operational Group or Group Supervisor they were used to working with. They saw "PSGS" on the IAP and had no doubt they shared a language and operational culture. So when fire personnel called with updates—the literal information was conveyed, but Public Safety personnel didn't necessarily assimilate all the implications. What was the Public Safety Coordinator's primary job? He was brought in to help manage public access in the wilderness, well ahead of the fire—he didn't have extensive background with working with ICS on rapidly changing wildland fires.

The ambiguous relationship between ICS and Public Safety also became problematic in the field. Public Safety field personnel talked about their independent attitude (partly a result of Wilderness Rangers' normal work routines). They're on a fire, but they don't really consider themselves "on a fire." They don't see themselves as part of Fire Operations—they're Forest employees working with the public well ahead of a fire. They commonly wore Forest Service uniforms instead of yellow fire shirts—the purpose was to have more credibility with the public. But they think that *not* wearing yellows reinforced a sense of distance from the fire. It was not normal for them to establish and maintain communications with fire operational personnel in the field. This worked well enough, until they were really stretched. As one Public Safety field person put it:

> We [Public Safety] think of ourselves as different [from Fire], because we do a totally different job. We protect Forest resources—which are the campsites—and we make sure the public doesn't go where they're not supposed to.

But after Saturday's close call, mindsets changed: "I want back into the ICS where I have communications. This isn't working for me." He also said:

> This whole Public Safety system—it works, it works really well. Under any other circumstances, I would commend them on this system. There was a problem behind it. But that problem can only occur when there's a perfect set of bad coincidences that form a perfect storm, during a fire like this one. No one thought the Forest was capable of producing a fire of this intensity. This program functioned successfully for many years until all of a sudden there's this catastrophic fire. So all of a sudden there's a problem with this Public Safety system.

The Lessons Learned Bullets offer two key steps the Forest has identified to help tighten the relationship between Public Safety and ICS. First is to assign Public Safety to Operations. Second is to assign a fire operational person with greater wildland experience in a supervisory role (eg. Division Supervisor/DIVS). Note the drawbacks of the second option: It wouldn't be enough to plug in just any DIVS-qualified individual with fire experience. Whoever is supervising public safety would need local wilderness knowledge, too. But how many people have that hybrid of experience? So then, if you have two people assigned to manage public safety, that could seem like wasted capacity under normal conditions.

Discussion Questions

- What are some other examples of groups or organizations that operate on fires, but are somewhat independent of the incident command system? Eg. BAER teams, Researchers, who else?
- How do you manage the dilemma from the end of the section: When you're stretched, you need people with different kinds of experience. Not everyone has all the experience you need. You could assign multiple people. But under normal conditions, that would seem like excess capacity.

Communications—Radio Issues

Northern Minnesota is flat. Even with the Forest's efforts to improve repeater coverage in the wilderness over the last several years, there are inevitably spots with poor coverage.

Gaps are a typical issue on rapidly growing fires. This wasn't much of a problem for the first several weeks of this fire. Up until the fire pushed beyond expectations, radio infrastructure may not have really seemed like a *real problem*. These troubles either weren't happening, or they weren't urgent—there were all kinds of tolerances and workarounds. Then, when the system was stretched, vulnerabilities appeared. But they weren't evident to everyone. The system still seemed functional enough from the perspective of Dispatch, Forest Leadership, and the Communications Unit.

Here is a little more detail on how the situation evolved: For the first three weeks of the fire, there was pretty good coverage—the fire was smaller and people weren't travelling as far from the repeaters. Operations were lower tempo, so if you were out of communications for a while...it might not have felt like big deal. Also, if personnel occasionally used the Forest repeater, that may not have been a big deal, either. So repeaters may not have seemed like much of an issue. And when it *became* an issue, people used workarounds and adjusted. For example, the Public Safety Coordinator's afternoon routine was to head out to repeater hill, where he could hear traffic on command.

Once the fire started *moving*, things changed. Suddenly it's urgent to communicate; people *need* to talk on the radio. Traffic on CommandNet is heavier. Personnel are getting further from the command repeater, so it's harder to hit. ForestNet might work better, but the Forest is getting new fire starts, so dispatch needs that channel clear.

As field personnel began to see problems with CommandNet coverage, they did not say it directly—not as a problem that needed fixing. They try to work around it by using ForestNet, because sometimes it works where CommandNet doesn't. But Dispatch needs to keep ForestNet clear for new fires on the Forest. Dispatch doesn't see why personnel on the Pagami Fire would use ForestNet when they have their own channel, so they call Pagami Communications to confirm that CommandNet coverage is adequate. Pagami Communications says "yes," which was true, as far as they knew at that time. So Dispatch tells Pagami fire personnel to stay off ForestNet. Public Safety personnel find these "chidings" frustrating. The reminders come at the worst times, again and again. At first, field personnel reduce their use of the only channel that works for them, just when they need to communicate the most. Eventually, they announce they *need* to use ForestNet and they ignore Dispatch. Then, as they move further east on Monday afternoon, they can't hit the ForestNet repeater.

Communications—Social Aspects

One issue participants identified again and again: Communication across levels of the organization—both upward and downward. Let's look at some of the conditions that affected what people were saying and when. Here are some key themes that participants shared:

1-Avoiding language that might come off as too direct or extreme. For example, Forest leaders reflect they sometimes avoided saying "evacuation," when that's what they had in mind. And field personnel avoided calling their situation an "emergency," when that's what they had.

2-Urgency can seem implied or obvious, so it isn't stated explicitly. This can happen in the field, when your surroundings are so vivid. And it can happen in ICP, when you are surrounded by a stream of fresh updates and predictions and reports. The situation can seem so *clear* to the speaker, based on *his* context, that he avoids stating the obvious. Yet the hearer's context could be very different. He might hear and understand the literal information, without grasping the full urgency.

3-Miscommunications can occur just when the situation is most demanding. And that's just when it's time to *act.* So there's little opportunity to recognize problems and clear things up. The Public Safety Coordinator gives this example from Saturday:

It didn't feel right when IC said "Fix it." Why didn't I pause and say "Wait a moment, I need clarification here?" But...it's the moment, things are flying along. So I'm still confused, but I roll with it, I turn around and—start fixing it.

4-Expectation that if something's important, someone else would have already seen it and said something about it.

5-The problem seems like it's being addressed, so it doesn't seem necessary to make an issue of it. Then the problem resurfaces later.

6-People were spread out and remote, so radio is their primary means of communication. Some kinds of communication only seem to happen face-to-face. A field person pointed out how some issues "require in depth discussion, not sound bytes—you can't talk about anything in depth over the command repeater." Leaders pointed this out, too:

Under a normal fire organization, they would have face-to-face contact, briefing and debriefing, and constant contact throughout the day. We had folks very independent, with loose organizational links to operations, without the ability to deliver or accept information face-to-face.

7-The sense that it's not in my authority, or not my place, to say that. One of the Public Safety personnel was thinking about problems he saw Saturday:

In the back of my head I knew, this was not how this was supposed to work. But there was self-induced pressure, I'm new here. I'm a small guy. I'm just a seasonal. I'm not [a line officer].

Leaders can experience some of the same constraints:

At the time, culturally...I always thought the word "evacuation" was outside the scope of authority of a Forest Service line officer. It's the Sheriff's word. That's why I said "This is a closure order, we need to implement it immediately." I didn't say, "Evacuate," I said, "Get everyone out of there, now." And the sheriff said, "Okay, we're going to evacuate these homes." And I said, "Yes." I did not feel comfortable using the term "evacuate" myself.

8-The problem may not seem clear-cut when you're in the middle of it. Sure, "if you see something, say something." But what about when you're not *sure* what you're seeing, or what it means, or whether it really matters?

For an illustration of some of these themes, look at the communication around Saturday's close calls:

During the Facilitated Dialog after the entrapments, the FLA team presented the group with details from Saturday's close calls. At that time, leaders were shocked by what they learned. And they were shocked they hadn't heard about it earlier. But field personnel were themselves shocked that leaders said they *didn't* know about these events.

Let's look at this: Leaders knew they had a problem Saturday: they needed to widen their closure area. They knew that, and they ordered much more aggressive closures. But they did not know the vivid details of individual experiences in the field—the feeling of watching a twisting column that's closer than it's supposed to be (Sid and Sage), seeing fire burn a campsite they were headed to (Les and Lynn), watching embers blow across an escape route (Dana and Devon). How would leaders have learned these details?

Now look at the folks in the field—in some ways, they thought the core issue was that closures needed to be more aggressive, that felt like a deeper cause of the problems they saw on Saturday. Then, Sunday, they see that leaders *are* ordering more aggressive closures, and the fire is doing...whatever, but not bothering them. This could feel like a solution to the problem. Talking about the more personal details is something that—well, how and why would you do that? And with whom—when you're camped out on a lake somewhere? And why would it be urgent to communicate that, if you're headed back soon and you'll be able to actually sit down and have a conversation? What would be the appropriate venue? Morning briefing? When? Then Monday's entrapments happened. Then the FLA team arrived. Then there was a big discussion and leaders couldn't believe their ears when they heard what people experienced in the field on Saturday.

Discussion Questions:

- When were you shocked to learn about a problem in your organization? Why didn't you know earlier?

- Think about a time when you avoided or delayed sharing information? Why was that?
- Have you ever shared something that you thought might be important, but then later you wish you didn't bring it up? Or wish you had waited for a better time?

Learning about Learning

Learning from Saturday

This report focuses on learning from these events. Let's now take a look at how people may have been learning *during* them. You may have noticed that people adjusted their performance between Saturday's close call and Monday's entrapments. Whether these adjustments were conscious and deliberate, they can be seen as a kind of adaptive learning. Here are some key examples of how people perform differently on Monday:

In the field:

- When they're concerned about fire behavior, they don't delay calling aircraft and adjoining forces.
- When they see that the plan from ICP does not make sense in the field, they call back and suggest a more aggressive plan.
- When they think they *might* be threatened by fire, Public Safety personnel on the portage head for their nearest safety zone. Once they're out in the water, they don't turn back to check campsites. Compare this to Saturday, when Public Safety personnel accepted slightly higher-risk options (eg. continuing to Lake Three rather than diverting to Quadga, running back in to check campsites after reaching the lake). When they accepted these risks on Saturday, they assumed they would have enough time to be successful, (and they did). Still, they approach risk differently on Monday.
- Consider how suddenly each team made their decision to pull the trigger and run for safety on Monday. Prior to each team's decision to run, each had just been in face-to-face conversations about Saturday. How do you think this may have affected their awareness and decision-making?

Forest Leaders and the IC

- Seeing themselves behind the power curve on Saturday, managers adjust their approach to closures. First, they order more aggressive closures. Second, their mindset toward urgent closures changes to: "when it's time to close, it's time to close, and we'll let the paperwork catch up." Contrast to earlier, when there was some waiting for formal closure orders to get fully signed and processed before implementing them.

- In reaction to Saturday's events, management is more aggressive and organized in their efforts to move public out of their clearance area: they use aircraft, mechanized canoes, additional public safety personnel, and an organized tracking system. On Sunday, field personnel moved almost a hundred people out of lakes around the fire. Monday could have been very different had Public Safety not moved all these people the day before. By the end of Sunday, they thought they had a good buffer in place. As it turns out, the fire ran right through their buffer. But having that buffer likely reduced the consequences for employees and the public.

- When the IC learns Monday morning that the fire could get as far as a mile south of Insula, he expands the clearance area by several miles, ordering everyone north of the Rock.

Learning about Learning:

So what's the point? The point is, people were adjusting and adapting after events on Saturday. This reduced the consequences of Monday's run, even if they could not avert consequences entirely.

Look at *how* they were adapting. Field personnel learned through talking to other field personnel about Saturday. This was an informal process of reviewing and discussing and sharing stories. These stories and discussions then influence how they handle events on Monday.

There's another deeper point: Notice *where* they were learning. Notice that for the most part, these conversations and adaptations stayed at their own level: people were learning from their own experience and from their peers. There's not much collaborative learning between levels. This was a common observation by interviewees. Public safety personnel in the field learned from Saturday's events, but their perspective didn't get shared with supervisors or managers. Managers and supervisors were adapting, too, but it was based on their own perspectives. So everyone's adapting, yet some key information did not get across levels.

We've already looked at a number of reasons for this, the big one is they had less than 48 hours between Saturday and Monday. But the key point is, there were gaps between perspectives and learning *between* levels. More than that, people underestimated the gaps. This has to do with a natural human tendency: we can assume that what's obvious to me now must be known to everyone: I know, so you know. How often do we doubt or question that?

Here is a big opportunity for safety improvement: consider how learning could be amplified by more communication across levels. What are the barriers to that in your organization?

Lakes as Safety Zones?

Most firefighters would look at a map of the area and see almost any lake as a reliable safety zone. This is a key to understanding how people may have perceived the risk of their situation—both in planning and in the field. Here's how one firefighter described his thinking prior to the entrapments:

> We are in a water-based forest. It's not like in other places where *sometimes* you call a pond a safety zone. Here the water is always our safety zone. If things get dicey, jump in the lake. This is the first time it's ever happened. That speaks to our fire intensity up here.

Look at the map of Lake Insula, if you were working on that lake—or sending people onto that lake—wouldn't you assume there's a huge, reliable safety zone, *right there*.

But this has never been tested under extreme conditions: this is the first known deep water shelter deployment. Here is a consolidated excerpt from a firefighter sharing what he learned about relying on bodies of water for refuge under extreme fire behavior:

> It's really surprising to me—everybody and their dog has called a body of water their safety zone, but I would bet very few of them have actually thought how that would play out. We go "Water, oh, good!" Well that's true, but what else does it mean? It's such a good safety zone in the back of your head, but you don't think about the specifics.
>
> First of all, if you're using the lake as a SAFETY ZONE:

How far from shore would you need to go to be safe from heat, and how far out can you go and still touch bottom? You'll have to go far enough where you can't touch bottom. So what are you going to do, swim? How long can you swim for? How far away can you really get? How long is it going to last? Am I going to have to swim the whole time—while I'm choking on smoke and embers? How long can someone last without a flotation device?

What about the winds? If the fire is really cranking, it's gonna have in-drafts, so you'll move where the wind moves you, and there's not a lot you can do about that. Sometimes you get pushed faster than you can swim. So now you're getting sucked back into the flaming front. It's not like on land where you can stay put.

Then, how cold is the water? Can you stay in there and be okay for 45 minutes, or will the water be so cold you can't be in for more than 20 minutes? It's gonna last ½ hour to a full hour.

If you use a lake or pond as a DEPLOYMENT SITE: Turns out, it's not easy to open a fire shelter while you're in the water, even with a life jacket. It's hard to get it open because your arms are only 12 inches over the water, plus the shelter is wet.

And once it's open, the fire shelter is sticking to you like a wet sheath, and it's hitting you over and over again in the waves and wind gusts.

And it makes a seal against the water. So you're running out of oxygen after what...20-30 minutes? That's assuming you got it open all the way and it's full of air to begin with.

Back to the wind: once you open a shelter, now you have a sail, so the wind will affect you harder than you can swim. So being sucked back in toward the fire is just exacerbated.

Were the Shelter Deployments Necessary? Why That's The Wrong Question

Were the deployments on the island really *necessary*? In other words, could they have survived without fire shelters? This is the wrong question.

Go to the moment when they have to act: they've just come upon this island (by sheer luck); they can't paddle any further and were just a moment from having to ditch in dangerously cold and turbulent water. They can see the fire moving their way, and it's already done things they didn't know fire was capable of—things they've never seen before. And they've just learned they can't count on a lake as their safety zone. And they don't know how bad things could get.

So right now, they're on the island, they have to make a decision—at this moment, what's their best move for handling risk? Would you suggest they:

a. Jump back in canoes and take their chances on the water and maybe have to ditch later?
b. Sit on the island and just see how bad it gets?
c. Or use a tool they have available to improve their safety margin—to create another barrier between them and an uncertain fire environment that's changing rapidly.

If you think it makes sense to deploy fire shelters, then do you think they should: wait till things get *really really* bad and they're absolutely sure they *need* shelters, then deploy at the very last second? Or would it be better to get things in order and deploy before the situation is more out of control?

When shelters were first introduced, there was concern that they might lead to greater risk-taking.. So in order to fight that thinking, we all took the approach that fire shelters should be used as a "last resort for survival," and only if you are sure you're out of options and you really need it. And if you *do* use it, that means you've already seriously messed up. So we all created a stigma around using fire shelters—and we did it partly because we wanted to discourage people from taking careless risk.

But today we hear stories where people delay deploying shelters even though they thought they needed to. They wanted to wait until they were 100% sure. In some ways, delaying can be beneficial—these situations are usually uncertain, maybe you'll find a better option if you wait. On the other hand, by the time you're absolutely certain that you absolutely *need* it, it might be too late. There's really no way to get this right. The point is that the decision to deploy is just that, it's a decision.

The social stigma adds so much weight to the act of deploying your fire shelter, and with the second-guessing after the fact, we're making it harder for firefighters to keep calm, think clearly and act decisively in crucial moments. A similar pattern was seen among pilots who would delay ejecting until it was too late, because they were trying to regain control of the aircraft.

Here's a suggestion for how we could re-think fire shelters: Rather than thinking of them as

- a "last resort" when you're out of options, something you avoid using at all costs,
- that you only use when you're sure you absolutely need to, and
- when you do deploy your shelter it means you've definitely messed up.

Instead we could think of a fire shelter this way:

- It's a tool.
- The decision to deploy is just that—a decision.
- And when you make that decision, the "right move" might not be totally clear to you.
- And second-guessing after you make a decision like this, when you did what you believed the situation called for—that benefits no one.

Group discussion questions:

- Do you agree that there is a social stigma around deploying a fire shelter?
- In what ways does this stigma make us better?
- In what ways does this stigma get in the way?
- Have you ever delayed using some safety measure, because it might not be necessary, or because you were thinking about how other people would second-guess your action after the fact?
- Put yourself in a situation where you have to make a tough decision, et. do I deploy now, or not, or wait? How do you know when it's time to keep looking for options, and when it's time to pull the trigger?

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