

Introduction

The purpose of the review was to evaluate the actions taken to manage the wildfire, present findings, and offer constructive recommendations.

The U.S. Fish and Wildlife Service (Service) Fire Management Policy requires review of all wildland fires. Wildland fire reviews are conducted at the refuge, regional, or national level. The purpose of a review is to examine some or all of the operations on a specific wildland fire.

The 24 Command Fire was a multi-agency, multi-jurisdictional incident that involved significant national media coverage, congressional interest, and a substantial loss of property and natural resources. The Service's Region 1 Director requested a national level review of the fire. An interagency review team was created to accomplish this review. (See inside cover for the list of Interagency Fire Team members.)

Scope and Purpose of Review

The focus of this review was the 24 Command Fire. The purpose of the review was to evaluate the actions taken to manage the wildfire, present findings, and offer constructive recommendations.

This review did not include evaluation of tactical decisions and strategies used. It addresses only those actions

taken on Service-managed lands and not actions that occurred on Hanford-managed lands or lands under the jurisdiction of adjoining municipalities.

Specifically, the team was asked to evaluate the following focus areas:

- Safety
- Initial Attack
- Extended Attack
- Resource Ordering/Dispatch Operations
- Interagency Coordination and Cooperation
- Training/Qualifications
- Engine Burn Over/Fire Entrapment Investigation
- Wildland Fire Situation Analysis/Delegation of Authority/Agency Administrator Briefing
- Fire Management Plan

Review Process

The review was conducted from July 24 to 28, 2000 at the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge (referred to as Monument throughout this report) in Richland, Washington.

July 24: Team members began with initial briefings.

July 25: Team members gave an overview presentation to representatives from the regional office, refuge, and fire management staffs from adjacent refuges.

July 25 - 27: Team members conducted interviews, reviewed records, researched literature, and began writing sections of the report.

July 28: Team members presented the preliminary draft report findings and recommendations in a close-out session to the Interagency Cooperators, which included agency officials and fire management personnel.

The findings and recommendations presented in this report are the result of many personal and telephone interviews, literature searches, and reviews of records and statements that were made in reference to the 24 Command Fire.



Tri City Herald

A rare view of the fire plume as it diminishes.

Overview

A period of warm, dry weather accelerated the onset of the fire season in the area bordering the fire site.

The interactions of fire and its environment influence assessments of fire behavior. The safety and effectiveness of wildfire suppression usually depend on the ability to make sound judgements regarding what the fire can and will do. Such judgements are often required of firefighters on the fire line, as well as the fire incident management organization. These judgements, and the resulting decisions, affect whether management objectives are met and can result in reasonable or excessive suppression costs, low or high accident rates, and reasonable or high losses of resources.

Fire Management Program

In June 1997 the U.S. Fish and Wildlife Service (Service), under contract with the Department of Energy (DOE), assumed management of the Arid Lands Ecology Reserve (ALE), which is just a portion of the newly designated Hanford Reach National Monument (Monument). In June 2000 the Service assumed management responsibility for the entire Monument, encompassing approximately 200,000 acres.

As outlined in the agreement, the Service and DOE share responsibility for coordination of fire protection and emergency preparedness for the ALE. In September 1998 the Service entered into a cooperative agreement with the Hanford Fire Department (HFD), a contractor through DynCorp for DOE, to provide fire protection and wildfire suppression for Service- managed lands located within the boundaries of ALE.

The Service Fire Management Officer (FMO) assigned to the area has oversight for the entire Monument and five other national wildlife refuges in the area. The Monument does not currently have fire resources or equipment. The complete fire management organization for the other refuges in the area consists of a Prescribed Fire Specialist and engine crew stationed at Umatilla National Wildlife Refuge (NWR), and two engine crews stationed at Columbia

NWR. The project leaders at each of these stations respectively supervise their fire engine crews.

The Fire Environment

Weather

A period of warm, dry weather accelerated the onset of the fire season in the area bordering the fire site. The east slopes of the Cascades and the Columbia Basin in Washington were especially dry for the third consecutive month. Annual precipitation levels were only 75 to 85 percent of normal. The Palmer Drought Index indicated that the Columbia Basin had been experiencing a moderate drought for the past few months. Conditions were dryer than normal.

For the two weeks prior to the fire, the weather in the vicinity had been hot and dry, with afternoon high temperatures consistently in the 90s and humidity typically in the low-to-mid teens. Afternoon winds were generally from the west and eye level (six feet off of the ground) winds of 10 m.p.h. were common. The general wind patterns were influenced by the local terrain.

Topography

The terrain in the fire area is generally flat, although the southwest side is dominated by Rattlesnake Mountain. The ridgetop is about 3,500 feet in elevation, or about 3,000 feet above the valley floor. The Yakima River Valley, a predominately east-west drainage, lies south of Rattlesnake Mountain. The Columbia River Valley is located northeast of the fire area. These two river valleys help channel the afternoon winds from west to east.

Fuels

The fire area was largely cured cheat grass (approximately 80 percent of the fuel bed), with discrete, five-to-seven foot high patches of mature big sagebrush (approximately 20 percent of the fuel bed). There were also single plants or small clumps of rabbit brush and small sage throughout the fire area.



Dave Pitkin/USFWS

The Monuments grasslands before the fire.

Fine fuel moisture was about two percent. This means that the moisture level in grasses, needles, etc. was very low, producing conditions where they could readily ignite and be rapidly consumed by a fire. Live fuel moisture was about 100 percent. This means that moisture within the vegetation was low enough to allow it to be burned by the fire.

The fuel bed was essentially continuous throughout the fire area. There were about 15 miles of uninterrupted fuel between the fire origin and the Yakima River. The only existing barriers to the fire spread were the rivers and irrigated lands.

The Energy Release Component data from nearby Juniper Dunes Remote Automated Weather Station was 22 for a fuel model T (sagebrush and grass), which was the 10 year high. This means that a fire involving this fuel on this day would burn as intensely as possible. The Burning Index (BI) was 89, which means flame lengths of nine feet should be expected. These values contributed to a “very high” fire danger rating for the day. There was a 90 to 100 percent probability of ignition, or the chance that a fire would occur given an ignition source. (See ERC chart in Appendix.)

Fire Behavior Chronology

Tuesday, June 27, 2000 (afternoon):

A fatal car crash ignited the dry grassland and sagebrush area along State Highway 24 in the Hanford Reach National Monument (Monument) managed by the Service. The fire spread with the prevailing winds, which were approximately six to ten miles per hour, mostly from the northwest to southeast. Rates of spread were observed to be 60 - 80 chains per hour (3,960 - 5280 ft./hr.), with flame lengths of five to 20 feet. The fire reached the toe of Rattlesnake Mountain, where the slope caused it to spread southward, and uphill.

Tuesday, June 27 (evening):

The same fire behavior continued throughout the evening and into the next morning. A spot forecast completed at 2120 hours indicated a northeast wind of six to 10 m.p.h. in the fire area.

Wednesday, June 28 (0500):

The fire was estimated to be 20,000 acres in size as of 0500. Much smoke remained in the valley bottom in the early morning. The fire continued to grow throughout the day.

Winds were generally light in the morning hours, allowing the fire to continue up slope along Rattlesnake Ridge. Winds began to increase during the afternoon, becoming more northwesterly at three to eight m.p.h. They were not consistent during this period, ebbing and flowing until they became more firmly established at 1845 hours.

Dave Pitkin/USFWS



The Monuments' continuous shrub and grass, pictured before the fire, allowed for rapid spread of the fire.

Heidi Brunckal/USFWS



The fire produced a mosaic burn in some of the sage and cheat grass habitat.

Wednesday, June 28 (1700):

At 1700 the fire noticeably increased. Flame lengths were 15 to 20 feet and rates of spread, 100 - 200 chains per hour (6600 - 13,200 ft/hr). For comparison, medium dozer production rates in this fuel type are estimated to be 125 - 145 chains per hour (8250-9570 ft/hr) for mostly flat ground. Horizontal roll vortices (fire whirls) were reported and were parallel, rather than perpendicular, to the ground. This horizontal travel could allow the fire to cross established fire lines. The horizontal fire whirls, as well as the more common vertical fire whirls, contributed to the fire's spread more than the wind.

By 1800 hours the fire became "plume-dominated." This means that the power of the fire became stronger than the power of the wind, creating huge updrafts that essentially allowed

it to create its own weather. At approximately this time, the fire encountered a concentration of heavier sagebrush fuels.

These phenomena were reported by several personnel on scene. Many reported a fire with "multiple fronts" or "fire whirls a thousand feet or more high." The plume was estimated to be about 15,000 feet high. It developed a small, fire-generated cumulus cloud on the top, which is a sign of instability.

A plume-dominated fire is very unpredictable; it can spread in many directions simultaneously and often produce fire whirls and roll vortices around its perimeter. This type of fire is quite difficult to control and poses a high risk to firefighter safety.

Wednesday, June 28 (1930):

The plume diminished at about 1930 hours as stronger, northwesterly winds developed first, at the northern end and by 2030, at the southern end. A spot forecast completed at 2205 hours indicated a northwest wind of 15 to 22 m.p.h, with gusts to 30 m.p.h. near the fire through midnight, then gradually decreasing to eight to 13 m.p.h. from the west through the rest of the night. At this time the fire was once again driven nearly exclusively by the wind, which persisted until midnight. Winds diminished somewhat from after midnight, into the early morning hours of July 29, permitting suppression actions to become more effective.

The fire was estimated at 40,000 acres in size on June 28 at 1630. It grew the most on June 28, from 1800 to midnight. By midnight it had increased to 151,000 acres.

Thursday, June 29:

Forecasted high winds did not develop on June 29, which significantly assisted in checking the fire's spread. The fire was estimated at 192,000 acres as of 1800; later, with better mapping and a more stable fire perimeter, the estimate was revised to 163,000 acres. No additional fire spread of significance occurred after this time. (See Fire Spread Map showing day by day progression in Appendix.)

Nicole Nelson/Benton County Fire District No.1



The plume-dominated fire became a spectacular force of its own.

Nicole Nelson/Benton County Fire District No.1



The plume gradually diminished, but not without first creating spot fires ahead of the main fire.

Dave Gonzales/USFWWS



Paramedics arrive at the scene of the fatal accident that started the fire.

Dave Gonzales/USFWWS



A firefighter makes a report on his handheld radio at the accident scene.

David Gonzales/USFWWS



Hanford Fire Department takes action on the fire at the scene of the accident.

Incident Management Chronology

As a fire increases in complexity, incident management teams are assigned based on the team’s level of qualifications and experience. A local Type 4 team normally makes the initial response. Additional teams may be requested, culminating with a National Type 1 team, which includes the most highly trained and experienced firefighters throughout the nation.

Tuesday, June 27 (1325):

Initial Attack

Hanford Fire Department (HFD) responded to the initial call of an explosion/vehicle accident with a fire engine and ambulance. An HFD Fire Captain, who served as the initial attack Type 4 Incident Commander (ICT4), noticed the smoke column beginning to grow while he was enroute. He knew the fuels in that vicinity included six-foot tall sagebrush and requested two brush engines and a tender.

When the call came in, a HFD Battalion Chief happened to be in the area and proceeded toward the fire. He called Hanford dispatch and requested heavy equipment be placed on standby and moved to the Yakima Barricade. He also requested that Hanford dispatch notify the Service of the incident. Helicopter support was also requested from the nearby U.S. Army Yakima Training Center. This request was later denied because the Training Center lands were not threatened.

When the HFD Fire Captain arrived on scene, he observed the fire burning on both the north and south sides of the highway. It was windy and he requested two additional brush units to respond, giving a total of four units. Suppression resources were assigned to perform a direct attack strategy, which involves suppressing the fire directly on the flaming edge.

Initial attack resource efforts and capabilities were exceeded on the south side (which is toward a major portion of the Monument) because the fire burned at high rates of spread, through the grass and sagebrush, with flame lengths of four-to-10 feet.

After the second brush unit was on scene, the HFD Battalion Chief arrived and took over command from the HFD Fire Captain. The Fire Captain reverted to an operational role and phoned Central Washington Interagency Coordination Center (CWICC) and ordered two airtankers. He was told one was already in the air. Additional ground units were also ordered and in less than one hour, all HFD resources were committed (six pumper tenders, four grass units, and one tender).

Tuesday, June 27 (1400):

At approximately 1400 a two-person engine crew (grass unit) was entrapped by the fire after their wildland fire engine stalled while scouting ahead of the fire. The vehicle was burned over by the approaching fire and the crew members escaped by running through the flaming front. There were no injuries.

At 1430 an HFD Fire Chief arrived on scene and took over as Incident Commander (ICT4).

Two strike teams of engines were also ordered from the Tri-County area, which includes Benton, Franklin, and Walla Walla counties. Communications continued to be a problem and a Safety Officer was used to relay information from the west side of the fire back to the Operations contact and Incident Command Post (ICP) by the Yakima Barricade.

At the scene of the vehicle accident, a private citizen approached a paramedic from the HFD, who had been on the scene for 20 to 40 minutes, and said he had some heavy equipment staged up the road a distance.

The paramedic explained the Service’s “light hand on the land” policy to the citizen. (Please note: Service fire safety policy does not allow untrained and unqualified individuals to participate in wildland fire suppression without prior fire training and adequate radio communications.) The individual became agitated and left the scene. The paramedic did not see the equipment and could not verify if it was a bulldozer or front-end loader.

Dave Pitkin/USFWS



A view of Snively Canyon during late spring before the fire.

Kari K. Brown



A view of Snively Canyon after the fire.

David Gonzales/USFWS



The fire spread north of Snively Canyon onto flat terrain.

The Deputy Refuge Project Leader, Wildlife Biologist, and Refuge Operations Specialist went to the fire, meeting with the HFD Incident Commander at the Yakima Barricade. At this point, the Deputy Refuge Project Leader was functioning as the Resource Advisor. The Wildlife Biologist and Refuge Operations Specialist proceeded to check roads in the Monument that could be used to conduct burn-out operations.

Tuesday, June 27 (1545-1645):

At approximately 1545 the Service's Engine 102 arrived from Columbia Basin National Wildlife Refuge. The crew did not have the HFD radio frequency and HFD did not have their frequency, so communication was a problem. Engine 102 was assigned to "Division C," the division's only resources.

After an hour and a half, Engine 102 pulled off Division C and went to the staging area at the Yakima Barricade. There, they joined the Service's Engine 801 (which arrived on the fire at approximately 1700), a Hanford pumper/tender, and a grass unit with a HFD Leader, and proceeded to the Roberts Ranch in Division B. Upon arriving at the Roberts Ranch, they reported flame lengths of six-to-eight feet. Communications were an on going problem; crews on Service engines 102 and 801 were given hand-held radios, which had the HFD radio frequency.

At approximately 1630 -1645 hours a Type 3 Incident Commander (ICT3), although not serving in that capacity at this time, went to the fire and spoke with the current ICT4 about going to a Type 3 organization. The Operations contact also suggested to the ICT4 that he order a Type 3 team to manage the fire.

The fire was approximately 3,000 acres by late afternoon as the fire reached the toe of Rattlesnake Mountain, where the slope caused the fire to spread southward, and uphill.

Tuesday, June 27, 2000 (1815):

Extended Attack Transition

An order was placed for the local Tri-County Type 3 Incident Management Team (IMT), consisting of the Command and General Staff

positions, or "short team" configuration. Team members arrived separately throughout the evening at the incident.

At about 1930 the Deputy Refuge Project Leader and operations personnel took a reconnaissance flight of the fire. After the flight, Deputy Refuge Project Leader gave approval to continue to use bulldozers, except in the Rattlesnake Springs area, where he had concerns regarding cultural resources. An order was placed for four Type 1 crews, eight Type 2 crews, two Type 2 helicopters, seven Division Supervisors, three Branch Directors, and Strike Team Leaders to go with the crews.

At 2100 hours the Deputy Refuge Project Leader, Operations personnel, and Resource Advisors had a discussion regarding options, including whether to order a Type 2 team. The Deputy Refuge Project Leader and Resource Advisors prepared a Wildland Fire Situation Analysis (WFSA), with help from the ICT3 and Operations. The Deputy Refuge Project Leader was unfamiliar with the WFSA, Delegation of Authority, and Incident Complexity Rating process, so the ICT3 also wrote a Delegation of Authority for the Deputy Refuge Project Leader to sign that would give authority to manage the incident to the ICT3.

Wednesday, June 28, (0001 to 0600):

The Type 3 team assumed responsibility for the incident beginning Wednesday, June 28, and the ICT4 who was replaced served as Agency Representative for HFD. An Incident Action Plan was developed for the operational period of 0001 - 0600 on June 28. Burnout operations and firebreak improvements were conducted along the south end of the fire. The fire continued to burn actively throughout the night.

An order was placed for a Type 2 IMT at 0430 on Wednesday, June 28. The plan was for the Type 2 IMT to arrive at noon on June 28, shadow the Type 3 organization, and take over at 1800 hours. This did not happen, as the majority of the team did not arrive until 1800. There was confusion as to when the team needed to be in place.

Wednesday, June 28 (0500):

At 0500 the fire was estimated to be 20,000 acres in size. At the 0600 briefing, it was decided that the Operations Section Chief for the Type 2 team would serve as the Division Supervisor for the Snively Canyon suppression effort. The plan was to hold the fire at Snively Canyon; however, the lack of resources proved to be a challenge. The initial attack Operations Section Chief (OPS) and the resources assigned to him were moved over to help hold the fire at Snively Canyon.

At 1130 the operational contact also recommended that the Benton County Emergency Operation Center (EOC) prepare a contingency plan and get engines ready to depart in the event they could not hold the fire in Snively Canyon. Apparently there was some confusion, as the EOC thought the IMT on the fire was handling this aspect when in fact, they were not.

At 1200 the HFD Agency Representative requested return of all HFD resources to the staging area as it appeared the fire would not be contained in Snively Canyon. If the fire crossed Highway 240, the threat would be to the Hanford Central Site.

At approximately 1500, the fire escaped containment efforts in Snively Canyon and at 1530, it jumped Highway 240 onto the Hanford

Central Site. Flame lengths of 20-to-30 feet were reported, along with spot fires up to a mile in front of the fire.

The command structure was changed from a unified command to a joint command with HFD assuming sole responsibility of the Hanford Central Site. Once the fire jumped the road, the already taxed communication system used for the incident became overloaded. The fire suppression effort was being operated using just one frequency. The operational contact was unable to reach the ICP by radio, so he drove to Yakima Barricade and told personnel involved in a planning meeting that the fire was seven to 10 miles from town.

Wednesday, June 28(1700):

At 1700 the fire noticeably increased. Flame lengths were in excess of 30 feet and rates of spread were 100 - 200 chains per hour (6,600 - 13,200 ft./hr.). By 1800 hours the fire became "plume dominated."

At 1800 hours the Type 2 IMT took command of the fire. The Type 2 Incident Commander (ICT2) received a verbal Delegation of Authority from the Deputy Refuge Project Leader. The delegation was the same one used for the Type 3 IMT. This was followed up with a written delegation, signed by the Service's Regional Refuge Supervisor in Portland, Oregon.

It was evident to the ICT2 that the Type 3 IMT was overstretched, with the fire burning on three fronts. He felt there was no need to update the WFSA because the Monument lands were already burnt. HFD crews, along with heavy equipment from DynCorp (a private contractor) began cutting firebreaks along Highway 240 to protect the facilities on the Hanford Central Site.

A road grader located near the site's 200W Area was caught in the fire when it became stuck and the operator was forced to abandon it. A Hanford crew extinguished the fire on the grader, which was mainly confined to the tires and some wiring.

At this time the fire, which had a four-mile flaming front and had burnt more than 100,000 acres in the previous four hours, moved into Benton City; there, it destroyed

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Retardant is dropped at Rattlesnake Ridge to prevent the fire's spread.

Thomas Skinner/USFWS



Spot fires were reported up to a mile in front of the fire.

several residences and outbuildings, along with numerous power poles along Highway 240. According to the ICT2, there were “quite a few” resources (people and equipment) moving to Richland/Benton County in front of this flaming front; but there were also two strike teams of engines that were unable to get ahead of the flaming front to assist in structure protection. The fire behavior was phenomenal, according to the ICT2.

Wednesday, June 28 (1930):
The plume diminished at about 1930, as stronger northwesterly winds developed first at the northern end and by 2030, at the southern end. At this time the fire was, once again, driven nearly exclusively by the wind.

At approximately 2015 hours on June 28, the Service’s Regional Office in Portland, Oregon requested a National Type 1 IMT. The Type 1 IMT arrived, but did not take command of the fire; instead, it provided support to the Type 2 IMT.

Winds diminished somewhat after midnight, into the early morning hours of June 29, permitting the fire suppression actions to become more effective.

The fire grew the most on June 28, from 1800 to midnight. It was estimated at 40,000 acres in size on June 28, at 1630, and had increased to 151,000 acres on June 29.

The Type 1 IMT met with the local Multi-Agency Coordinating Group (MAC Group) that had been established at the Benton County EOC.

A new Delegation of Authority was prepared and signed at 2220 hours on June 29 by the participating Tri-County agencies, which transferred incident command to a unified command. The Type 1 IMT provided liaison between the local MAC Group and the personnel involved with the incident.

Thursday, June 29:
On June 29 the forecasted high winds did not develop, which significantly assisted in checking the fire’s spread. Crews, helicopters, and airtankers were used to reinforce the fireline throughout the day.

Over the course of the next couple of days, crews continued to burn out all remaining pockets of fuel and patrolled the fire area, looking for hot spots.

Saturday, July 1, 2000:
The Unified Command and local MAC group prepared a transition plan and the fire was returned to the respective agencies, effective at 1800 hours.

Sunday, July 2, 2000:
Cooperators held a Combined Team close out briefing to discuss management of the fire.

Dave Gonzales/USFWS



An air tanker drop.

Kari K. Brown



A wind-driven fire produces a predictable burn pattern.