United States Department of the Interior

FISH AND WILDLIFE SERVICE
Region 2

Final Report
Island Lake Escaped Prescribed Burn

INTRODUCTION

On February 6th, 2004, a Regional Level Review was conducted of the Island Lake escaped prescribed burn, conducted at Imperial National Wildlife Refuge, north of Yuma, Arizona, along the lower Colorado River. The prescribed burn had crossed the refuge boundary, during the ignition phase of the burn on February 4th, 2004, into another jurisdiction without the approval of an interagency agreement, and was declared an escaped wildfire. Due to this, a regional level review is required, as outlined in the US Fish and Wildlife Service Fire Management Handbook (FMH), section 3.6.2.

The review commenced on February 6th, 2004, at 07:30, at the Yuma District Office of the Bureau of Land Management, in Yuma, Arizona. Review team members included Jeff Whitney, Ken Edwards, and Mike Davis. Per FMH 3.6.2, fire review report outline, the following information is included:

Review Team Member: Title: Agency/Home Unit: Fire Qualifications: Business Phone #
Jeff Whitney: Regional Fire Mgt Coordinator: US F&WS-R2: ICT1: (505) 248-6474
Ken Edwards: Refuge Manager: US F&WS-Imperial NWR: FFT2: (928) 783-3371
Mike Davis: Fire Mgt Officer: US F&WS-NM Dist: FBAN, ICT3, RXB1, DIVS:(505) 835-0040

After obtaining applicable information at the Yuma Field Office, an on-site visit to the incident was conducted, with review team members Jeff Whitney, Ken Edwards, Mike Davis; and incident personnel in attendance.

An initial review findings was presented the evening of February 6th, 2004.

SUMMARY NARRATIVE

The Island Lake Prescribed Burn on the Imperial National Wildlife Refuge planned for the reduction of hazardous fuels along the Colorado River, while improving critical habitat for several neotropical migratory bird species and other species, including the endangered Yuma Clapper Rail and the California Black Rail. The proposed burn unit encompassed approximately 630 acres along the Colorado River, comprised of cattails (8-10 feet high), phragmites (8-10 feet

high on top of 10-15 foot ridges of litter), and phragmites with scattered salt cedar (8-10 feet high). The unit was recognized as having abnormally high fuel loadings, with no known fire occurrence in approximately 30 years.

All of the planning and documentation was complete and appropriately reviewed and approved. Preparation for the burn was completed according to that planning, including the Go/No Go document.

Ignition was planned for February 4th, 2004. The ignition phase of the burn was intended to last no more than 60-90 minutes. Spot weather forecasts were obtained the evening prior to ignition, early the day of ignition, and early in the afternoon just after the burn had crossed refuge boundaries (see weather section for times and dates). Prior to the initial test fire, it was determined that all of the prerequisites had been met, ignition could be conducted within the burn plan parameters, and the decision to go ahead with the burn was made (see appendix B, chronology, for a more detailed sequence of events).

With resources in place, a test fire was conducted on a small island in the river at approximately 09:45. The fire behavior and smoke dispersion requirements were met, and the decision was made to light the west and east flanks at approximately 10:00. The Colorado River formed the south flank and sparsely vegetated uplands formed the north flank (see attached map).

Smoke columns and fire behavior from the west and east flank ignitions were within planned parameters, and at 10:20, the unit was reconnoitered by helicopter. At 10:30, the east flank was widened with aerial ignition. Ash fall remained within planned parameters, smoke columns were within planned parameters, humidity was relatively high, and at 10:40, the remaining portion of the unit was aerially ignited, with two simultaneous passes, first west along the river's edge, then east some distance interior (approximately mid-unit, about 100 yards inland from the first pass).

At approximately 10:45, unpredicted strong surface winds were noted in the vicinity of the river. Though the column on the west flank remained intact, strong gusty winds surfaced on the river, with smoke critically reducing visibility of patrol by boat. Burning boat-sized mats of floating vegetation, along with burning embers, most likely spotted across the river to the south side during this period. At 10:50, ignition was halted. At 11:05 a possible spot across the river was reported, and confirmed at 11:10. Holding forces were not able to immediately locate and control the spot, due to thick smoke concentrations, and at 11:15, the Burn Boss declared the burn escaped and an unwanted wildland fire. Per the approved Prescribed Burn Plan, the Holding Specialist transitioned to the Incident Commander (ICT3). The spot or spots quickly spread along the south side of the river (in similar fuel types as those found on the burn unit) on the lands of Picacho State Recreation Area, in California. Assignments and efforts were directed to control of the escape and protecting structures.

Burn-out, holding, and the protection of occupied structures proved successful, and at 14:02, the escape was contained. One historic structure was affected. The Refuge Manager is working with Picacho SRA on evaluation, remediation, and restoration needs or requests. No accidents or injuries occurred. The escape was estimated at around 200 acres.

PREPAREDNESS

The Island Lake Prescribed Burn followed well-conceived planning and preparation.

A Prescribed Fire Plan for the Island Lake burn was prepared on January 20, 2004, and approved on January 22, 2004 (appendix A). The review and approval processes were correctly implemented, per F&WS Fire Management Handbook (FMH), chapter 1.4, and contained all required plan components as outlined in FMH 1.4 and the Interagency Standards for Fire and Aviation Operations, 2004 (the 'Redbook'), chapter 18.

A signed Prescribed Fire Complexity Rating System Guide Worksheet was completed (appendix G), and resulted in a rating of moderate for the burn. Awareness of potential spotting across the river and possible consequences were articulated. Mitigation measures were identified and incorporated in the Burn Plan.

Two points from these documents should be mentioned. 1) Since there is no standard fuel model for these fuels, a standard fuel model 3 was used in the fire behavior analysis. This is the appropriate choice for a standard fuel model, given existing fuels, but, as seen during ignition, this fuel model underestimates fire behavior characteristics. Later in this report recommendations are made to develop a new fuel model to more accurately depict fire behavior in these fuels.

2) Spotting potential across the river was noted as a potential factor, and measures are proposed to mitigate that potential (that is, patrol by fire boat to catch any spotting), However, low river flow, sand bars, and more importantly, thick smoke during the escape prevented the level of patrol needed. This point too will be discussed later in this report.

Smoke analysis was performed (appendix H), as well as fire behavior predictions (BehavePlus runs, appendix I), job hazard analyses (appendix J), an assignment list (appendix K) and an IAP (Incident Action Plan) for burn day briefing (appendix L), as mentioned in the burn plan.
A request for an Intra-Service Section 7 was initiated January 24, 2004 (appendix C), and concurrence was received January 29, 2004 (appendix D).

News releases were issued January 30, 2004 (appendix E), and a copy of an article from The Sun, dated February 5, 2004, is included (appendix F). A local newscast also had a piece on the burn.

A 'Go/No-GO' checklist (appendix M) was completed and signed the morning of the burn prior to ignition at 08:30 (see Chronology, appendix B).

Again, the preparation, documentation, and approval processes were thorough and complete.

WEATHER

The Burn Plan states that " a spot weather forecast for the Island Lake Unit will be requested from the Las Vegas NWS office 24 hours prior to the burn, the morning of the burn, and 24

hours after the burn. The burn boss will be responsible for ensuring that this weather forecast is acquired. Weather will be taken 1 hour before the burn and 15 minutes thereafter by a designated weather observer until the burn boss decides it is no longer necessary."

It appears that the efforts of burn personnel to obtain forecasted weather and monitor on-site conditions were more than adequate and their actions did not contribute to the escaped burn.

Three spot weather forecasts were requested and obtained during the incident. On-site observations were made at 11:30 the day prior to ignition (2/3/04), Yuma Dispatch completed the request at 14:00, and a spot weather forecast was completed by the NWS at 15:24 (appendix N). Burn personnel received that forecast at 16:00. That same forecast was reissued early the next day, due to earlier transmission problems with some of the data (appendix O).

On-site observations for a second spot weather forecast were made the morning of the burn, at 06:30, relayed from McCray (weather observer) to Yuma Dispatch at 06:39, requested by Yuma Dispatch at 07:01, completed by NWS at 07:47 (appendix P), and relayed by Yuma Dispatch to burn personnel via radio at 09:10 (appendix Q).

The third spot weather forecast was made during the time the burn transitioned to an escaped wildland fire. Observations for the request were made on-site at 10:55, during the time that high surface winds were noted. The observations were transmitted to Yuma Dispatch at 11:07. Yuma requested the spot weather forecast at 12:15, NWS completed the forecast at 12:43 (appendix R), and Yuma Dispatch transmitted the forecast to the burn via radio at 12:48.

On-site weather observations were taken in the boat ramp vicinity, directly across the river from the burn. Observations the day of the burn were made at 06:30, 09:35, 10:05, 10:33, and 10:55 (appendix S).

Additionally, burn personnel placed a portable weather station on the Picacho SRA side of the river, on a mid-slope spur ridge, near the park's structures. No printed copy of that data was available during the review, but the pertinent data was noted and is included here:

TIME	TEMP	RELATIVE HUMIDITY	WIND SPEED	MAX WIND SPEED	DIRECTION	FST	FSM
0900	50	61	1.7	3.9	225	47.8	8.1
1000	55.4	53	2.7	10.3	233	59.2	8.4
1100	59.7	38	9.9	30.7	289	59.0	8.4

1200	62.1	33	5.7	18.5	305	62.8	8.5

The Squaw Lake RAWS weather station (#45801) is located approximately 10 miles southeast of the burn location. Copies of the hourly observations from that station, along with the NFDRS forecasted values, and ERC and 100-hour fuel moisture seasonal trends are included as appendix T.

WEATHER DISCUSSION

Since the anomalous surface wind event that precipitated the spotting is of critical importance, a separate discussion of the weather is warranted.

It appears that the wind event was not forecasted and was a localized event. Efforts to obtain forecasted weather and on-site observations were excellent.

Prior to the main aerial ignition, only a slight breeze was felt by on-ground personnel. Weather taken at 10:05 and 10:33 noted eye-level winds at 1.5 and 0 mph. The morning spot weather forecast, received by burn personnel at 09:10, forecasted 20-foot winds as light and variable in the morning, becoming northwest 10 to 20 mph. Burn personnel felt that ignition would be completed before any winds rose. It does not appear that the winds were the result of column collapse, per burn personnel. Also, there was no shearing of smoke columns, as columns were noted as being 10,000-15,000 feet high.

The Squaw Lake RAWS station, 10 miles to the southeast, recorded only light winds during that same time frame. The forecasted NFDRS values for Squaw Lake called for a moderate day (BI).

The wind event coincided with the main aerial ignition. Eye-level wind observations during the event noted gusts near 25 mph, and the portable weather station recorded gusts near 31 mph.

It was also noted that the column on the west flank had a counter-clockwise spin. White caps on the river were going west/east, while the smoke was surfacing perpendicularly across the river. While these winds surfaced mid-burn across the river, the columns on the west and east flanks remained intact.

The orientation of the burn in the river bottom, along with the surrounding topography likely had a contributing effect. A large prominent ridge protrudes south to the river on the west side of the burn, and likely influenced the west-flank column's rotation. West of that ridge, some distance from the burn, is a wide valley bottom.

The Colorado River valley certainly influences air movement. Outside of the valley, air movement is much less constrained.

Convective forces generated by the main aerial ignition, and further constrained and manipulated by valley topography and column drafts were likely contributors to this event.

POST-ESCAPE ACTIONS

Potential spotting across the river was reported at 11:05 and confirmed by ground forces at 11:10. At 11:15, the spot was estimated at 5-20 acres in size, and the Burn Boss declared the burn escaped and an unwanted wildland fire. Dave Daniels, holding specialist, was assigned as the IC for suppression actions.

At 11:30, helicopter bucket-work began protection of the historic structure, but was limited due to smoke. The occupied structures were not immediately threatened and resources were in place. Also at 11:30, Ken Edwards notified the US Fish and Wildlife Regional Office, Tom Baca, Acting Chief, NWRS, and Jeff Whitney, US Fish and Wildlife Service, Region 2, Regional Fire Management Coordinator, of the escape.

The organization transitioned quickly from the prescribed burn to suppression actions. The east flank of the escape was caught at 12:30. At 12:40, the decision to burn out around the occupied structures was made, with support from Picacho SRA management. At 13:00, burn out was begun, protection of those structures was successful, and at 14:02, the escaped was contained at around 200 acres.

At 16:00, Picacho Park management met with suppression forces and decided to employ efforts to protect the historic structure with ground forces.

The burn boss conducted an After Action Review(AAR) (appendix U) at 18:30, and at 19:15, day resources were released.

The next day, Thursday February 5th, resources were briefed at the Yuma Field Office at 06:00. Damages to the historic structure were identified at 08:00.

An Incident Status Summary (ICS-209) (appendix V), was approved and sent to Central West Zone Dispatch at 08:55.

The Burn Boss and Park Superintendent flew the area at 13:00, and at 18:00, the escape was declared controlled.

The Regional Level Review began at 07:30 on Friday, February 6th, and an initial review finding was issued that evening (appendix W).

The Refuge Manager will continue to work with Picacho SRA personnel on evaluation, remediation, and restoration efforts.

The Burn Boss compiled a “lessons learned from Island Lake” (appendix X).

FINDINGS

The Island Lake Prescribed Burn had the appropriate planning, review, and approval to conduct the burn. All the documentation exhibited a thorough, professional, and thoughtful approach.

All of the guidelines, prescriptions, and preparations were met. Burn personnel were well-qualified for the burn.

Aerial ignition of the interior of the area, coupled with topography and orientation of the burn, led to the escape across the river. The logic and thought processes of those conducting the operations were sound and professional. Events and conditions leading up to the escape would not have predicted such an occurrence.

RECOMMENDATIONS

Contributing factors identified during the review process and evaluations by review team members and burn personnel have resulted in several recommendations to improve future operations:

- Include a greater area in the MMA when planning for a burn under these conditions and in these fuels. Formalize that planning by having a MOU in place with other jurisdictions.
- Develop fuel models that more accurately predict fire behavior for these fuels. Utilize this experience and further refinements in predicting fire behavior, and incorporate that information in burn plans.
- The need for slower ignition is indicated when working with these fuels and in this topography.
- During low water flow, resources (particularly fire boats) did not have the anticipated freedom of movement, due to sand bars. Plan on this as part of contingency thinking.
- Smoke on the river adversely effected holding efforts. Smoke also reduced the effectiveness of helicopter bucket work. Reliance on the resources should be planned accordingly.
- Fully address contingency planning during the briefing process. Utilize and follow a briefing checklist.
- Continue to utilize an interagency approach with project operations. The skills and contributions of those agencies proved invaluable.
- Having the active participation of the Refuge Manager and Park Superintendent gave the operations a tremendous advantage. Encourage and foster that continued participation.
- Work with dispatch personnel to speed delivery of spot weather forecasts.
- Burn overhead should keep accurate logs of all events. That information becomes important when determining what happened and why and what we should do in the future.
- Communications during operations is critical. Determine any dead spots and mitigate with repeaters or human repeaters. Utilize head-sets for Fire Boat Captains.
- Resources did not realize potential damage was being done to the historic structure. Keep a continued presence when needed.
- Train and certify more motorboat operators. Consider swift water rescue training for personnel.

This final review has found no factors or issues which would preclude the continued implementation of the fuels program on the Lower Colorado River.

_____

Jeff Whitney Date
Review Team Leader

_____

Ken Edwards Date
Review Team Member

_____

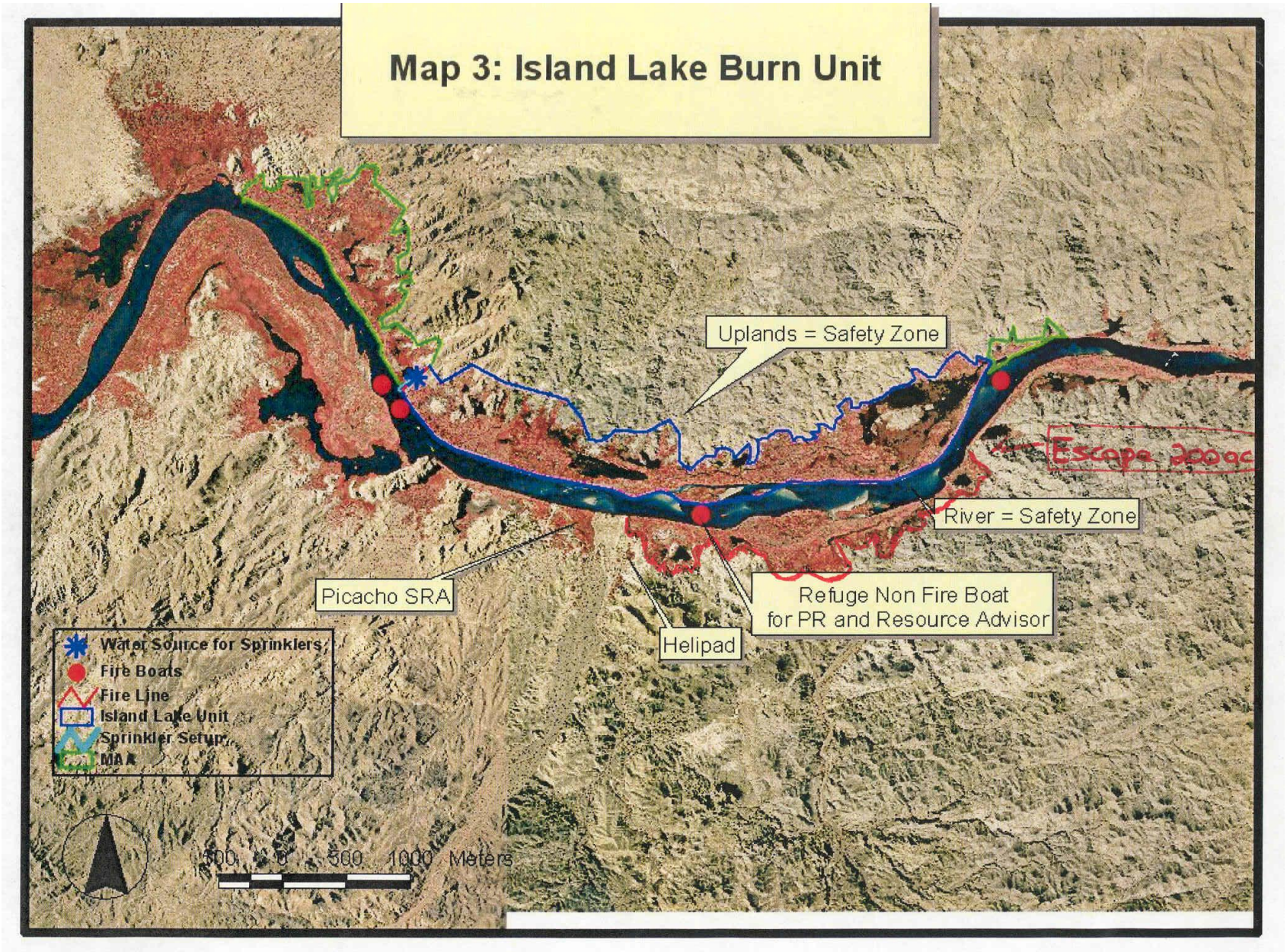
Mike Davis Date
Review Team Member

_____

Lester Tisino Date
Fire Management Officer

_____

Curtis Heaton Date
Burn Boss


Map 3: Island Lake Burn Unit
Uplands = Safety Zone
Escape Route
River = Safety Zone
Picacho SRA
Refuge Non Fire Boat
for PR and Resource Advisor
Helipad
Water Source for Sprinklers
Fire Boats
Fire Line
Island Lake Unit
Sprinkler Setup
MA
500 0 500 1000 Meters