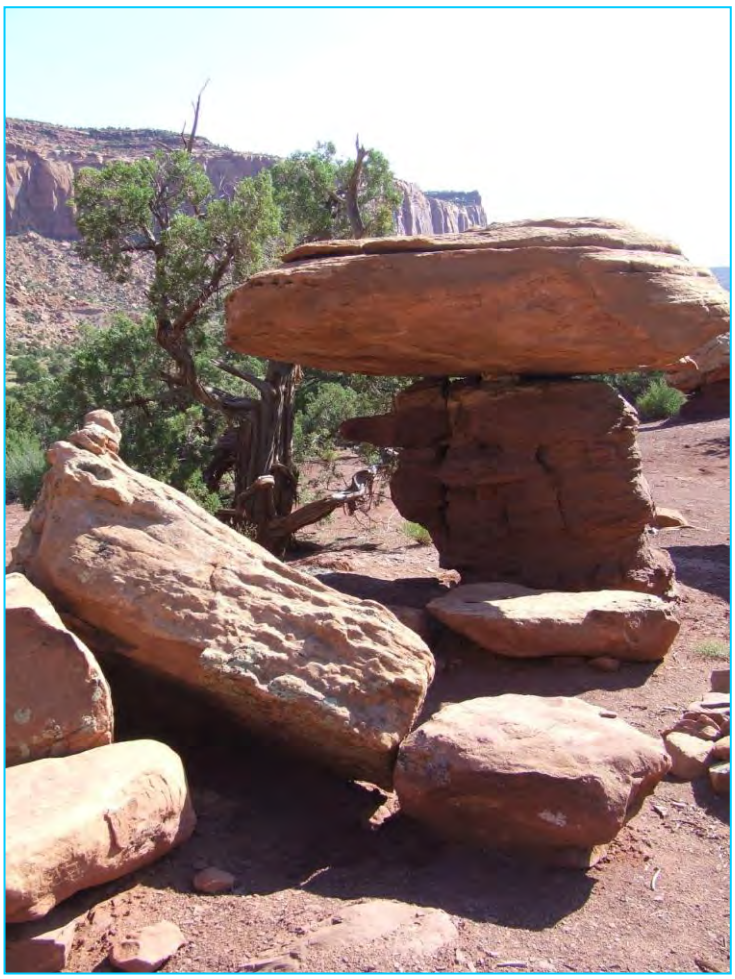
SOUTHEASTERN UTAH INTERAGENCY FIRE ZONE

2009 Pilot & Aviation Users Guide



Welcome to the Southeastern Utah Interagency Fire Zone! The intent of this packet is to provide information needed by pilots who are new to Southeastern Utah. This packet of information is aimed primarily at Helicopter, Air Attack/Lead Plane, and SEAT Pilots. However, it may be useful to other resources as well. The Southeastern Utah Interagency Fire Zone consists of the Manti-La Sal National Forest, the Moab, Price and Monticello BLM, Utah State Lands and BIA lands. We hope this packet will help to make your visit a safer, more productive and more pleasant experience.

Thanks and fly safe!!

CONTENTS

AVIATION SAFETY EMPHASIS

Air Safety is something we take very seriously in South Eastern Utah. We will not knowingly condone or tolerate unsafe procedures or equipment. A safe air operation requires a joint effort by everyone involved. We respect your authority as a pilot and the ultimate responsibility for passenger and flight safety is yours. If you observe things you do not feel are safe, PLEASE notify the Unit Aviation Officer, Helibase Manager or Moab Interagency Fire Center (MIFC) immediately. Every effort will be made to remedy the situation promptly.

AVIATION KEY CONTACTS

POSITION	NAME	PHONE NUMBER	
		Work	Cell
Manti-La Sal NF Aviation Officer	Colt Mortenson	(435)636-3502	650-4795
Manti-La Sal NF Deputy Aviation Officer	Mickey Smith-Kause	(435)636-3369	260-2086
Moab BLM District Aviation Officer	Mike Worthington	(435)259-1883	259-9632
MIFC Center Manager	Karen Feary	(435)259-1851	220-1086
MIFC Assistant Center Manager	Von Gruber	(435)259-1852	260-2122
Helitack Foreman / Base Manager	Mike Worthington	(435)259-1883	259-9632
Assistant Helitack Foreman	John Schaffer	(435)259-1882	259-9627
Region 4 Helicopter Ops Specialist	Brent Campbell	(801)721-4504	(801)622-7072
BLM State Aviation Manager	Camron Dingman	(801)539-4241	(801)550-9857

DAILY OPERATIONS / ALL AIRCRAFT

FLIGHT WEATHER BRIEFING / NOTAMS / TFR's

Pilots will obtain a daily flight weather brief from FAA. The pilot is responsible to check for NOTAMS and TFR's for the local area as well as any potential fire areas. A good source for this information is the BLM web page http://airspace.blm.gov/mapping/blm/index.cfm. Because flight conditions and restrictions can change daily and hourly it may be necessary to check the information more than once a day.

FLIGHT PLANNING

All pilots are expected to file a flight plan with MIFC, to include the following information: Aircraft tail #, Pilot and Passengers names, Route, Destination, and expected times of departure and arrival. When flying off district all aircraft will file an FAA flight plan and complete a written flight plan using an accepted planning method, as well as coordinate with MIFC on flight following plans.

FLIGHT FOLLOWING PROCEDURES

For all flights on District, Moab Interagency Fire Center will be notified of each landing, takeoff and course deviation with position reports made every 15 minutes in flight, this may be accomplished by AFF. This is critical! Communication can be very spotty in the canyons the Book Cliffs and on the back sides of the mountain ranges. If you encounter problems talking to MIFC discontinue the flight immediately until communication can be re-established. One suggestion for operations during fire incidents in remote country is to set up a human repeater on a high point to assure good communications with MIFC.

There is no excuse for late check-ins. Stop what you are doing and find a location which allows you to let dispatch know that you are safe, 15 minute check-ins are required if you are not on AFF. Be as accurate with your location as possible. An aircraft can travel a long distance in 15 minutes and a search will begin from the last known location of the aircraft. This could mean that the search is many miles off from where your aircraft actually went down. When giving your location be sure to give **both** a **Latitude / Longitude**

and a **landmark** (if you know one, look at the map!). It is important that dispatch, other aircraft and resources on the ground know your aircrafts location and to understand where you are going. It is difficult for a ground resource to know where the aircraft is when you only give a Latitude and Longitude, but a land mark as simple as —we are on the east side of the La Sal's heading north" gives the person on the ground a better mental picture of your location.

FLIGHT ROUTES

When flying in the Moab area, please **AVOID** flying over the city of Moab and Spanish Valley. The public in and around Moab are very sensitive to the noise created by our aircraft. Typical flight routes are to the north of the valley in the Mill creek drainage or to the south of the valley in the —Behind the Rocks" area. When working out of the helibase approach and depart the valley from the south near Ken's Lake.

When flying over the National parks please maintain an altitude of at least 1000' while the recommended 2000' AGL is even better.

ALTIMETER SETTING

While operating in the Moab Fire District all aircraft pilots will make a concerted effort to find out the actual altimeter setting from the nearest airport for each days operational period. If aircraft are working over an incident for multiple days and are not able to accurately establish the altimeter setting then an altimeter setting of 29.92 will be used by all aircraft on the incident.

DAYLIGHT HOURS

We want all aircraft back no later than ½ hour after sunset. The only exceptions would be for multi-engine aircraft such as a jump ship returning to a lighted airport. We will not dispatch air tankers early in the morning or late in the evening unless we are sure they will have good light for drop runs over the fire. Sunrise-Sunset tables are available from either the Moab Helibase or MIFC for planning purposes.

MAINTENANCE/SERVICING

Please inform the Moab Interagency Fire Center manager several days in advance of upcoming maintenance including 50 and 100 hr. inspections so that arrangements can be made for replacement aircraft.

FLIGHT-DUTY TIME

Please inform the Helibase Manager or fixed wing manager, well in advance of any flight or duty limitations as well as your days off schedule.

PILOT AVAILABILITY

Moab Interagency Fire Center dispatch needs to know where you are, and how to contact you in case of a dispatch or change of plans. Please be sure you give them the name and room number of your lodging. When you go for lunch, please tell them which restaurant you will be at, etc. It is your responsibility to ensure that they know how and where to contact you. A portable radio or pager may be available for your use.

ACCIDENT/INCIDENT REPORTS

Our accident/incident reporting system is valuable in promoting aviation safety. The SAFECOM report is not intended to single out any one person with blame. By sharing information about things that have happened here, we may help prevent them from happening to someone else. Please report any accident or

incident that occurs while you are in the Southeastern Utah Interagency Fire Zone to an aviation officer, helibase manager or MIFC.

HAZARDOUS FLYING CONDITIONS

We know that mountain flying in the heat of summertime is hazardous at best. There are certain times because of winds, turbulence, down drafts, and other environmental problems in which we really need to shut down our aviation operations until conditions improve. Pilots are usually the first ones to become aware of these types of conditions. PLEASE, do not be hesitant to suggest we shut things down until conditions improve. Let other aircraft and dispatch know of conditions in your area, it may keep someone else from having an accident.

USER PRESSURE AND SAYING NO!

We are aware of the subtle pressures users may put on a pilot, ~~"l~~and there, because the other pilot did yesterday," or ~~"j~~ust one more pass around the fire before you head in for fuel," etc. We have tried to make people on this district aware of that problem, but in the heat of battle, it is still going to happen. Someone is going to ask you to do something you do not feel good about doing. PLEASE, feel free to question it, express your concern, or just say no to the request! We prefer everyone would use this rule of thumb: **IF IN DOUBT, DON'T DO IT!** We guarantee the Southeastern Utah Interagency Fire Zone will support your position 100%. We want everyone to fly safe!!

FLIGHT HAZARDS

The Moab Fire District has a flight hazard map, copies are posted at the Moab Interagency Fire Center (MIFC), and the Moab Helibase. You should review the hazard map prior to any mission within this Fire District. For general information, the major flight hazards on the Southeastern Utah Interagency Fire Zone are:

MILITARY LOW LEVEL TRAINING ROUTES/RESTRICTED AREAS – Moab Fire District does have one Military Restricted Area to the northwest of the Canyonlands airport and a Military Training Route (MTR) within the district boundary. All flight operations in one of these areas must be approved before entering the area. De-confliction is handled by Moab Interagency Fire Center (MIFC) but should always be CONFIRMED by the pilot prior to each flight within the MTR.

WIRES AND POWER LINES - Major drainages may have wires, cables and power lines. All pilots should be briefed on flight hazards and should check the Flight Hazard Map prior to all missions. **Pilots should be aware that not all hazards have been identified** on the maps and so appropriate caution should be taken during all flights. Pilots and managers may assist by identifying unknown hazards and by personally briefing relief crews of known hazards.

MOUNTAINOUS FLYING - Flying conditions in mountainous areas are always hazardous, clear calm weather can change rapidly. All aircraft should avoid flying through squall lines when possible and be alert for sudden down drafts and wind shears.

VFR FLIGHT RULES – All flights should be conducted following the FAA VFR flight rules which state visibility must be 3 miles and the ceiling a minimum of 1000 feet.

OPERATING IN CANYON COUNTRY-Due to the high flight activity within the canyons by general aviation and the use of the remote airstrips by local aviation vendors these areas are a high risk area to operate within. Whenever fire operations must work in canyon bottoms a higher degree of attention should be taken to see and avoid other aviators.

When operating out of the bottom of a canyon with poor communication a repeater will be set up on the rim above the canyon. This may be a human repeater. The purpose is to establish reliable radio

communication with Moab Interagency Fire Center (MIFC) from a ground contact. This allows for communication with MIFC. If the helicopter had an accident while taking off or landing without the repeater no one would be able to communicate with the outside to call for help. The human repeater will also serve as a lookout for the Helispot / Helibase / Airstrip by reporting any aircraft activity in the vicinity which may not be detectable from the bottom of the canyon. Pilots will call in the blind on the local Unicom frequency 122.8 before taking off from the bottom of the canyon stating their intentions. The pilot, manager and all passengers will maintain a high level of alertness when operating in the confines of the canyon country.

BOUNDARY FLIGHTS – Additional caution should be taken when flying to a smoke near the Colorado border as they often are sending aviation resources to the same smoke, until it is confirmed which side of the border the fire is on. The same caution should be taken on the north and western boundaries of the fire zone.

FIRE TRAFFIC AREA

Fire Traffic Area (FTA) is the **Required** method for flight operations over an incident. The FTA plan contains three levels of vertical and lateral separation for aircraft working over an incident. All aircraft must follow the designated rules for entering and working within the airspace over the incident

Vertical Levels of Separation

- All Helicopters will operate at 500‘ AGL and below
- Airtankers and Lead Planes will work at 1000‘ AGL during tactical operations this is called the Air Tactical Maneuvering Area
- Air Tanker orbit area is at 1500‘ AGL
- Air Attack / ASM will operate at 2500‘ AGL minimum

Lateral Separation

- 12 Nautical Mile radius – Initial Contact / Communication / request permission to enter
- 7 Nautical Mile radius – NOCOM ring, must establish communication with fire before proceeding any further.
- 5 Nautical Mile radius – Must be at appropriate altitude and communication has been established with Air Attack.

If Communication has not been established by the 7 NM ring the aircraft must hold outside the ring until contact has been made. There are two acceptable methods, the quadrant method or circle outside the 7 NM ring flying counter clockwise. The pilot may choose the method and must announce intentions on air to air or on the guard frequency.

Chain of command on the incident

- Incident Commander is ultimately in command of the incident
- Air Attack – acts as air traffic controller and as the link between the air resources and the ground forces / Incident Commander.
- Lead Plane or Lead Plane coordinator – The lead plane may assume air traffic control and/or Air Attack duties in the absence of Air Attack.
- HELCO – Helicopter coordinator may assume air traffic control and/or Air Attack duties in the absence of Air Attack.

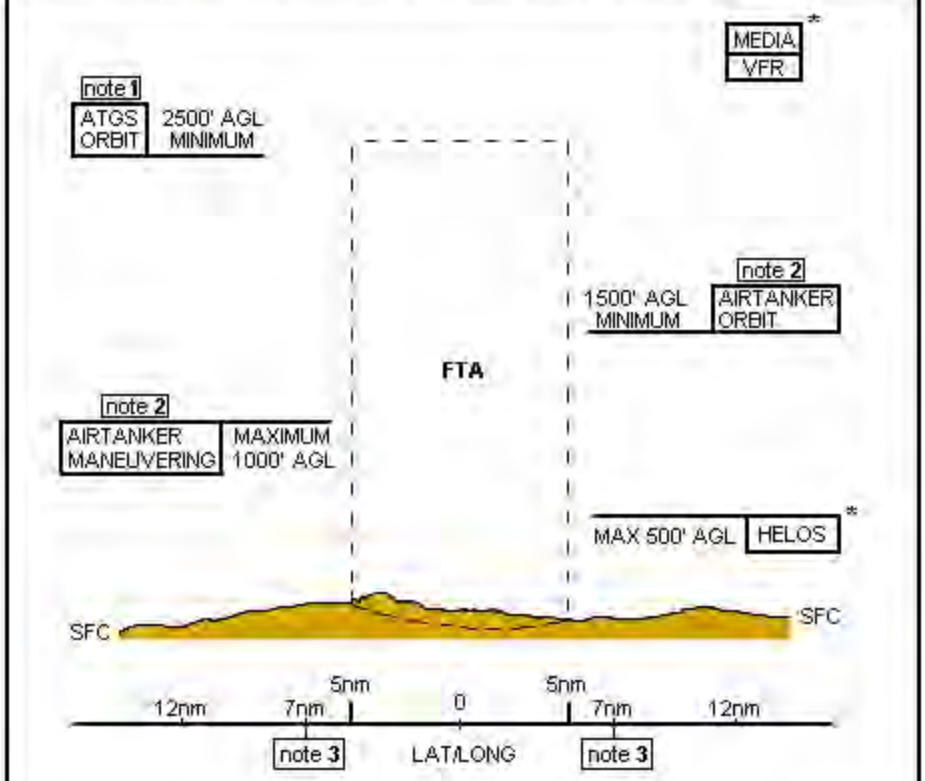
FIRE TRAFFIC AREA (FTA) 31 MAR 06 FTA

INITIAL RADIO CONTACT: 12nm on Assigned Air Tactical Frequency.

CLEARANCE IS REQUIRED TO ENTER FTA

NO RADIO CONTACT: Hold a minimum of 7nm from the incident.

NOTE: Airtanker Maneuvering altitude determines minimum Airtanker and ATGS Orbit altitudes. Assigned altitudes may be higher and will be stated as **MSL.**



note **1**	1000' min. separation between ATGS orbit and Airtanker orbit altitude.
note **2**	500' min. separation between Airtanker Orbit and Maneuvering altitude.
note **3**	On arrival reduce speed to cross 7nm at assigned altitude and 150 KIAS or less.

* **HELOS** – Fly assigned altitudes and routes.

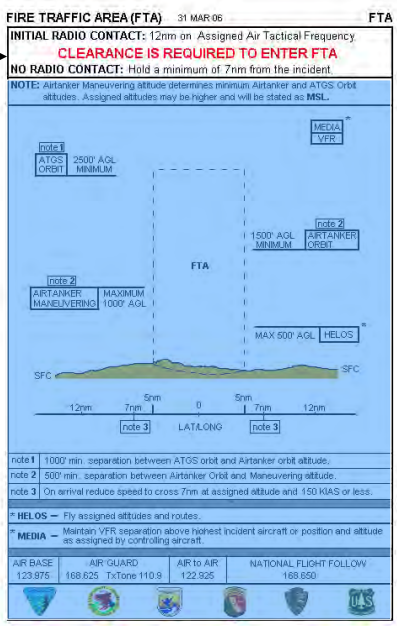
* **MEDIA** – Maintain VFR separation above highest incident aircraft or position and altitude as assigned by controlling aircraft.

AIR BASE	AIR GUARD	AIR to AIR	NATIONAL FLIGHT FOLLOW
123.975	168.625 TxTone 110.9	122.925	168.650

COMMUNICATIONS

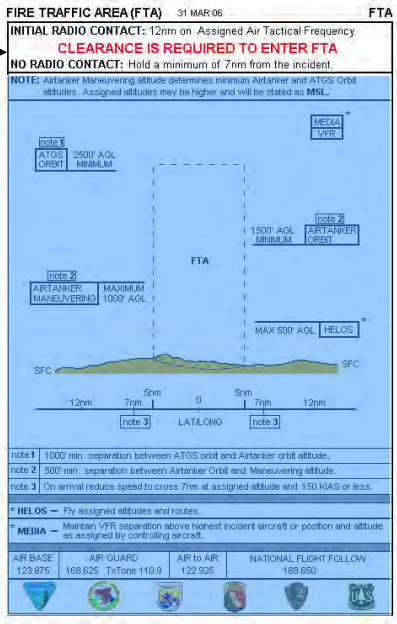
INITIAL RADIO CONTACT INFORMATION SHOULD INCLUDE YOUR CALL SIGN, DISTANCE, DIRECTION AND TIME FROM THE FIRE. AFTER RECEIVING A CLEARANCE INTO THE FTA, PILOTS SHOULD PLAN TO ARRIVE AT 7nm FROM THE FIRE AT THEIR ASSIGNED ALTITUDE AND AT 150 KIAS* (OR LESS WHEN APPLICABLE).

*LARGE AIRTANKERS MAY NEED TO OPERATE AT HIGHER AIRSPEEDS. CAPTAINS OF SUCH AIRCRAFT SHALL ADVISE THE CONTROLLING AIRCRAFT OF ENTRY SPEEDS EXCEEDING 150 KIAS.



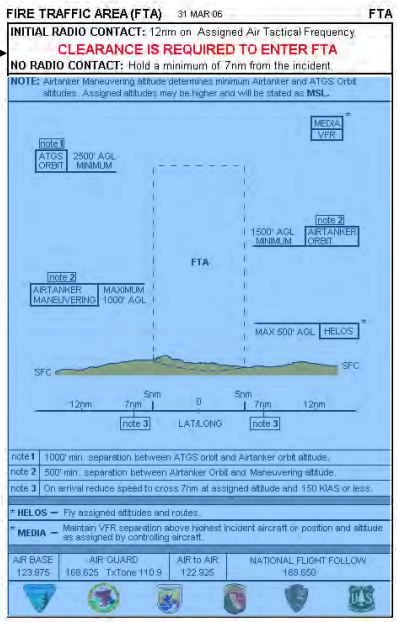
COMMUNICATIONS

INITIAL RADIO CONTACT SHOULD BE INITIATED BY 12nm FROM THE FIRE IN ORDER TO RECEIVE A CLEARANCE INTO THE FTA PRIOR TO 7nm. MONITORING THE AIR TACTICAL FREQUENCY WHILE ENROUTE WILL ALLOW YOU TO DETERMINE THE APPROPRIATE TIME TO ESTABLISH RADIO CONTACT WITH THE CONTROLLING AIRCRAFT. ESTABLISHING COMMUNICATIONS EARLIER RATHER THAN LATER WILL OFTEN IMPROVE EFFICIENCY OVER THE FIRE. REMEMBER A CLEARANCE IS REQUIRED TO ENTER THE FTA.



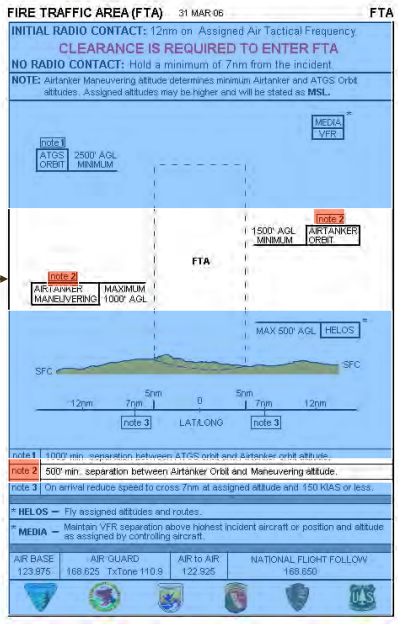
COMMUNICATIONS

IF RADIO CONTACT CAN NOT BE ESTABLISHED, PILOTS SHOULD MAINTAIN VFR,HOLD ON THE 7nm ARC FROM THE FIRE, WITH LEFT TURN ORBITS AROUND THE FIRE.



Note 2:

500’ minimum separation between Airtanker Orbit and Airtanker Maneuvering altitude.



NOTES

3 C'S

- COMMUNICATIONS- ESTABLISHED.
- CLEARANCE- RECEIVED AND UNDERSTOOD.
- COMPLY- COMPLY WITH THE CLEARANCE. IF YOU CAN NOT, REMAIN CLEAR OF THE FTA UNTIL YOU RECEIVE AN AMENDED CLEARANCE WITH WHICH YOU CAN COMPLY.

HELICOPTER OPERATIONS

MOAB HELIBASE OPERATIONS

All operations at the helibase will follow the procedures described in the Moab Helibase Operations Plan. Aircraft will radio intentions on the local Unicom frequency 122.8 for all flights in and out of the helibase due to the proximity of the private airstrip just northwest of the helibase.

FLIGHT ALTITUDES

All tactical operations should be conducted at the highest AGL possible while still being able to effectively accomplish the mission.

All non-tactical helicopter flight operations should be conducted at a minimum 500‘ AGL. During point to point flights of distances greater than 5 miles, flight altitudes should be 1000‘ AGL minimum. Please respect the concerns of the locals and tourists by flying at the recommended altitudes over the National Parks and avoid the Moab Valley altogether.

LOAD CALCULATION PROCEDURES

Load calculations will be completed by the pilot of each helicopter first thing in the morning for the given temperature and elevation. A new load calc will be completed each time the temperature changes +/- 5 degrees celcius and for each 1000‘ of elevation change. If necessary an additional load calc will be completed while enroute to a fire if the previous calculations do not cover the new destination. See the section on Landing at Unimproved Helispots for further load calc. direction.

LANDING AT UNIMPROVED HELISPOTS

When landing at an unimproved landing site for the first time a high level recon should be conducted over the intended landing site then descending to do a low level recon before landing.

The first load taken into an unknown or unimproved landing site will be the Load Calculated as Out of Ground Effect payload (HOGE) for the intended elevation. This weight determined from the load calc should be calculated WITHOUT entering area B (Critical Wind Azimuth) on the chart due to the highly unpredictable winds in the canyon terrain.

Altitude and temperature should be considered when setting up to land. If it appears the landing site is Out of Ground Effect (HOGE) and the weight of the payload is too heavy or marginal then the pilot and manager should locate an alternate landing site which is In Ground Effect (HIGE), the crew will then off load the appropriate amount of weight to allow a safe landing at the intended HOGE helispot and shuttle the rest of the gear or passengers to the helispot. **Better Safe than Sorry!!**

WILDERNESS AREAS

All flight operations in or around the wilderness areas must have prior approval from MIFC for the intended mission.

FUELING OPERATIONS

- All fueling operations will follow approved procedures as stated in the NFPA Manual 407 and as your contract states under Aircraft Fuel Servicing.
- No smoking signs are clearly posted that prohibit smoking within 50' of the aircraft.
- Fire extinguishers are provided at each pad and need to be staffed during refueling.

BUCKET & TANK OPERATIONS

During bucket operations all personnel should stay clear of the drop area. Pilots will avoid flying over people, vehicles and structures at all times. If this is not possible a flight path must be established to lessen the risk to personnel and vehicles on the ground.
Example: setting up road guards to keep vehicles and personnel from stopping or standing in the flight path.

A dip site manager is required whenever the bucket operations are conducted at a remote water site, especially if communications are poor at the dip site. Dip site managers must have good communication with dispatch in case an emergency occurs.

After dipping out of water sources that may be exposed by whirling disease, snails, etc. before continuing onto other water sources that contain fish, all water handling equipment must be decontaminated before use in another water source area. Check with dispatch, Resource Advisors, Wildlife Biologists in area for Area‘s of concerns.

PREVENTING SPREAD OF AQUATIC INVASIVE ORGANISMS

Intermountain Region Interim guidance for 2008 and on: Fire Operations

The following interim guidelines were developed for fire personnel to help them avoid the spread of aquatic invasive species. The aquatic invasive species considered here were selected based on their current significance in the intermountain area and do not include fish. Because of the large expanses which fire crews travel, the potential to serve as vectors for invasive species is significant. These guidelines are intended for use during the 2007 fire season and will be refined and revised over time.

The table (*Aquatic Invasive Species of Concern in the Intermountain Region and Methods of Control*) outlines specific disinfection treatments for each species and the sources of information. The table serves as a reference. Included are specific recommendations for fire operations broken down by organism. For additional information, the Appendix provides background and technical information for the recommended chemicals, including supply sources for chemicals and use of swimming pool products. The attached Excel spreadsheet, *Technical Chemical Information for Disinfecting Aquatic Invasive Species,* gives details and calculates dilutions and relative costs of various products. See the MSDS_all attachment for chemical safety and disposal precautions.

Below are seven guidelines that distill the information in the table and generalize the recommendations to all species:

Operational Guidelines for decontamination proceedures

(1) Obtain maps of where aquatic invasive organisms occur in watersheds where the operation will take place. GIS coverages of individual species for most areas are accessible to biologists, resource advisors, and fire personnel. These GIS coverages are contained in a personal geodatabase (–Invasives Database"—7.2 mb) available for download at http://www.fs.fed.us/r4/workshop/. You can never be certain that invasives are NOT present, but at least you will know ahead of time where they ARE present.

(2) Avoid entering waterbodies or contacting mud and aquatic plants. Avoid transferring water between drainages or between unconnected waters within the same drainage.

(3) Avoid sucking organic and bottom material into water intakes when drafting from streams or ponds.

(4) External equipment surfaces:

> (a) Prior to leaving the project site (or, if equipment has been obtained from a source where sanitizing history is unknown), power wash all accessible surfaces with clean water (and ideally, soap, as in a car wash), and completely remove all mud and organics. Weed washers are effective, and can be used to do double duty. This will greatly reduce the likelihood that any target aquatic invasives are present, and chemical treatment of external surfaces is not recommended. However, New Zealand mudsnails may insert themselves in small crevices and resist flushing. Unless vehicles are driving through streams or helicopter buckets scrape up bottom sediments, snails are unlikely to get on external surfaces.
>
> (b) Thoroughly drying equipment is an easy and effective sanitizing method for all the organisms. However, required drying times vary considerably with the species (see Table) and may not be practical for a quick turnaround. Drying may be practical, however, after the incident.

(5) Water tenders, engines, and other equipment with internal tanks:

> Intake hoses, pumps, and tanks can be contaminated with infected water or through sucking the organisms (in particular, NZ mudsnails) up from the stream/pond bottom.
>
> Disinfect tanks after the incident, and also disinfect tanks before use if equipment has an unknown sanitizing history. First, flush tanks and hoses with clean water and drain to an upland location. Flushing will reduce the concentration of organisms and lower the risk of infection. A rinse with 5% solution of *Quat128*® (6.4 oz per gal) or its equivalent (see Table and Appendix) will destroy most if not all target invasive organisms. The solution must be in contact with the surface being sanitized for at least 10 minutes.
>
> Two types of chemicals are shown in the Table. Both can be effective. Liquid bleach (such as Clorox) is readily available in supermarkets but evaporates quickly and damages gaskets and canvas gear. Quaternary ammonium compounds (brand names *Quat 128*® [or ‗Waxie'] and

Sparquat 256®) need to be ordered from a supplier (see Appendix) but solutions are safe for gear and remain effective for at least a day if not overly diluted or muddied. In addition, both bleach and quaternary ammonium compounds are available in bulk as swimming pool chemicals at reduced cost. See Appendix for details.

(6) Cleaning and sanitizing equipment as described above will be necessary before use as well as after use if equipment has been obtained from a source where sanitizing history is unknown. While operational quality control is beyond the scope of this interim guidance, some sort of equipment check-in system where sanitizing could be documented and guaranteed with certification or tagging would be extremely valuable.

(7) Do not dump treated water into any stream or lake, or on areas where it can migrate into any water body. It would be best to offload treated water to sanitary sewers if possible. All of these chemicals can cause permanent eye damage and skin burns. Check the MSDS‘s for precautions.

AQUATIC INVASIVE SPECIES OF CONCERN IN INTERMOUNTAIN REGION AND METHODS OF CONTROL					
	Sources	**Wash and remove organics (e.g. mud)**	**Temperature**	**Drying**	**Bleach (e.g. Clorox®) 6% sodium hypochlorite (NaClO)**
Whirling Disease	C.Wilson; E. Wagner UDWR Hedrick UCDavis Wagner 2002	Yes	90 °C (195 °F);10 min	Be dry for 24 h, in sunlight best	For 10 min: 1% bleach solution (500 ppm NaClO) ▪Liquid oz Clorox per gallon water = 1.1 ▪Tbsp liquid Clorox per gallon water =2.2 ▪Gallons Clorox per 100 gallons water = 0.9
New Zealand Mudsnails	M. Vinson, USU G. Schisler, CDOW Hosea&Findlayson 2005 Richards et al 2004	Yes	46°C (120°F); 5 min -3°C (27 °F); 1 hr	Be dry for 48 hr, in sunlight best	Not effective
Chytrid Fungus	K. Hatch, BYU (Johnson et al 03)	Yes	60°C (140°F);5 min	Be dry for 3 hr, in sunlight best	For 30 sec: 20% bleach solution (>1% NaClO) ▪Liquid oz Clorox per gallon water = 22 ▪Gallons Clorox per 100 gallons water =17 OR For 10 min: 7% bleach solution (0.4% NaClO) ▪Liquid oz Clorox per gallon water = 9 ▪Gallons Clorox per 100 gallons water = 7
Zebra/ Quagga Mussels	J. Herod, FWS; Cope et al. 2003	Yes, pressure wash flushes veligers	≥140°F water	3-5 days, in sunlight best	Gear rinsed with 0.5% bleach solution (250 ppm NaClO) ▪Liquid oz Clorox per gallon water = 0.6 ▪Tbsp liquid Clorox per gallon water =1.1 ▪Gallons Clorox per 100 gallons water =0.5
Didymo	L. Elwell, FFF S. Spaulding, USGS Kilroy et al. 2006	Yes	60°C (140°F); 1 min	Be dry for 48 h, in sunlight best	For 1 min: 2% bleach solution (800 ppm NaClO) ▪Liquid oz Clorox per gallon water =1.8 ▪Tbsp liquid Clorox per gallon water =3.6 ▪Gallons Clorox per 100 gallons water = 1.4
Eurasian Watermilfoil	Smith&Barko 1990 Madsen&Smith 1997	Yes	NA	NA	NA

<table>
<tr><th colspan="2">AQUATIC INVASIVE SPECIES OF CONCERN IN INTERMOUNTAIN REGION AND METHODS OF CONTROL</th></tr>
<tr><td></td><td>Quaternary ammonium compounds

(e.g. alkyl dimethyl benzylammonium chloride [ADBAC]; diecyl dimethyl ammonium chloride [DDAC])</td></tr>
<tr><td>Whirling Disease</td><td>For 10-15 minutes:
(1500ppm quat compounds)

Quat128® solution (7.7% quat compounds)
Low Risk
4.4%
Quat128

▪Liquid oz Quat128 per gallon water = 6.1
▪Gallons Quat 128 per 100 gallons water = 4.8
Unknown Level of Risk
2%Quat128
▪Liquid oz Quat128 per gallon water
= 2.4
▪Gallons Quat 128 per 100 gallons water = 1.9
OR
Sparquat 256® solution (12.5% quat compounds)
Low Risk

3% Sparquat

▪Liquid oz Sparquat256 per gallon water =4.1oz/gal
▪Gallons Sparquat256 per 100 gallons water = 3.2
Unknown Level of Risk
1.2% Sparquat

▪Liquid oz Sparquat256 per gallon water =1.7oz/gal
▪Gallons Sparquat256 per 100 gallons water = 1.3</td></tr>
<tr><td>New Zealand Mudsnails</td><td>For 10 min:

4.6% Quat128® solution
▪Liquid oz Quat128 per gallon water = 6.4
▪Gallons Quat 128 per 100 gallons water = 5

OR
3.1 % Sparquat256 ® solution

▪Liquid oz Sparquat256 per gallon water = 4.3
▪Gallons Sparquat256 per 100 gallons water = 3.4</td></tr>
<tr><td>Chytrid Fungus</td><td>For 30 sec:

.015% Quat128® solution
▪Liquid oz Quat128 per gallon water =0.02
▪ml Quat128 per gallon water= 0.6
▪tsp Quat128 per gallon water= 1/8
▪Cups Quat 128 per 100 gallons water = ⅓
▪Tbsp Quat128 per 100 gallons water = 4</td></tr>
<tr><td>Zebra/Quagga Mussels</td><td>No data, but likely effective</td></tr>
<tr><td>Didymo</td><td>No data, but likely effective</td></tr>
<tr><td>Eurasian Watermilfoil</td><td>NA</td></tr>
</table>

Recommendations	
Whirling Disease	The principle vector for spread of whirling disease is contaminated fish parts and not typically through fire activities. Avoiding and removal of organics (the spores reside in mud), power washing, and flushing will greatly reduce or eliminate spores on external gear surfaces. However, wet internal tanks and hoses should be decontaminated with a quaternary ammonium compound, such as *Quat128*. _Low risk‘ concentrations of quat compounds are backed by research. _Unknown level of risk‘ dilutions are **likely** effective, but not yet proven. While 6.1 oz per gal (low risk) is required for whirling disease, a slightly higher concentration (6.4oz/gal) would also knock out NZ mudsnails.
NZ Mudsnails	NZ mudsnails are resistant to treatment, and may insert themselves in small crevices and resist flushing. However, unless vehicles are driving through streams, or buckets scrape bottom sediments, they are unlikely to get snails on external surfaces. Avoiding organics, power washing, flushing, and drying gear in the sun for 48 hours (if possible) will reduce risk. Wet internal tanks and hoses should be decontaminated with a quaternary ammonium compound, such as *Quat128* at a concentration of 6.4oz/gal. This concentration will also kill whirling disease spores and chytrid fungus.
Chytrid Fungus	Avoiding organics, power washing, flushing, and letting equipment dry in the sun for 3 hours (if possible) will reduce risk of transfer on external surfaces. However, wet internal tanks and hoses should be decontaminated with a quaternary ammonium compound, such as *Quat128*. While only 1/8 tsp per gal is required for chytrid, a higher concentration (6.4oz/gal) would also knock out whirling disease and /or NZ mudsnails.
Zebra/ Quagga Mussels	Fire activities are unlikely to come into contact with adult mussels. However, it is possible that water used for activities or surfaces of gear may be contaminated with the microscopic veliger stage. Pressure washing and strong flushing of tanks and hoses should be sufficient to injure and remove these organisms.
Didymo	Didymo is a native diatom that erupts into high densities in special habitats, such as tailwaters below dams. Avoiding contaminated water sources and organics, power washing, and flushing would likely reduce risk of transfer on fire equipment to acceptable levels. For waders, routine protocols for chytrid or whirling disease may apply for this species.
Eurasian Watermilfoil	Watermilfoil propagates from broken stems. Avoiding organics, power washing, and flushing to ensure the removal of all plant parts will prevent transport on external and internal gear.

REFERENCES: Contact Aviation Manager for More information.

ABOUT THE SOURCES OF INFORMATION USED IN THIS GUIDANCE

The methodologies and decontaminants recommended in this guidance derive from primary data sources, either peer-reviewed and published original studies, research studies that are in press or review, or in some cases, personal communication with researchers from established institutions who are currently working with a particular invasive species. Sources of information for each species are listed in the Methods of Control table (pg 3) and under References. Information was not borrowed or passed on from other protocols without first tracing it to its source of origin and assuring its validity.

USING CHLORINE BLEACH

Important note: Mixing any chlorine-containing compounds (including any form of household bleach or dry form of chlorine) with any ammonia-containing compounds (including fire retardant mixes or residues) can lead to extreme health and safety hazards, including the release of chlorine gas.

Liquid bleaches, such as household bleach, are a 5—8% solution of sodium hypochlorite, a stabilized form of chlorine. Bleaches can be very corrosive to fabrics, plastics, rubber, and metal, and disinfectant properties will dissipate quickly when exposed to air.

Dry bleach products

Many dry forms of chlorine are available that would offer advantages for transport and storage. Products such as DryTec or CCH are granular 68% calcium hypochlorite (Arch Chemicals, Inc., manufacturer of both products, 800-478-5727). Granular calcium hypochlorite (68%) can also be ordered from GSA (NSN No. KE0472). The sanitizing active agent in liquid chlorine bleach is the chlorine (Cl^-) produced when dry

bleach is added to water. The accompanying Technical Chemical Information spreadsheet shows how much dry calcium hypochlorite to mix per gallon of water to
Do NOT use any pools chemicals that contain something called ―trichlor", which is very commonly used as a swimming pool chlorinator. It is trichloro-s-triazinetrione, which includes cyanuric acid to extend its photostability. Following the recent retardant-sodium ferrocyanide decisions, a great deal of caution would be advised before recommending any compounds containing any form of cyanide-containing compound, regardless of its expected safety.

Similarly, do not use chemicals containing ―dichlor", or dichloro-s-triazinetrione, another member of the chlorinated iso-cyanurate family that is very commonly used in swimming pools. Caution is advised for the same reason as trichlor.

USING QUATERNARY AMMONIUM COMPOUNDS

Quaternary ammonium compounds, or _quats', are common disinfectants with an array of uses, from killing algae in swimming pools to sanitizing workout equipment at the gym. They are relatively nontoxic and do not damage fabric, metals, or gaskets. Solutions of quat compounds retain their effectiveness over days and can be reused if not excessively diluted. These compounds exist as a family with various ratios of carbon to nitrogen and chlorine. There are hundreds, but much of research for their effectiveness against aquatic invasive species has focused so far on one of the alkyl dimethyl benzylammonium chlorides, abbreviated as ADBAC, the active ingredient in Formula 409®. Formula 409® was selected to test against whirling disease and New Zealand mudsnails because it was thought to be easy to obtain for anglers, but this household product is not practical for land management use. However, ADBAC, along with other quaternary ammonium compounds, also occurs in Quat 128®, Sparquat 256®, Bioguard Algicide®, and other commercial disinfectants.
Another quaternary ammonium compound, diecyl dimethyl ammonium chloride, or DDAC, was tested against chytrid fungus and found to be effective (see below). DDAC also occurs in Quat 128®, Sparquat 256®, and Bioguard Algicide®.

Whirling disease and quaternary ammonium compounds

The effectiveness of quaternary ammonium compounds against whirling disease spores is based on research (in review) by Ronald Hedrick of University of California—Davis. He tested the active ingredient in Formula 409® (ADBAC), and found it to efficiently kill spores in 10 minutes at a concentration of 1500 ppm. The commercial quaternary ammonium products recommended in this guidance contain ADBAC as well as other quaternary compounds which may be quite good at killing spores but that have not been tested. Hedrick (pers. comm.) assumes that the other compounds would function similarly with respect to damaging the spores and thus provide an additive effect in a mixed formulation such as Quat 128®, but because his testing was limited specifically to ADBAC, there is currently no proof that the other compounds would have the same effects as ADBAC. *Consequently, two concentrations of quaternary ammonium products are given in this guidance for whirling disease.* One (―low risk") is conservative and based only on the amount of ADBAC in the product. The other concentration (―unknown level of risk"), which is less than half the concentration of the first, assumes that all the quaternary ammonium compounds in Quat 128® or Sparquat 256® are equally effective; however, this assumption has not yet been tested.

Chytrid fungus and quaternary ammonium compounds
The quaternary ammonium compound used as the active ingredient against chytrid fungus was a different one than was tested for whirling disease. For chytrid, Johnson et al. (2003) used DDAC. Both DDAC and the compound tested for whirling disease and New Zealand mudsnails, ADBAC, occur together in Quat 128® and Sparquat 256® (Sparquat has some other quat compounds as well). Consequently, the technical information and calculations for chytrid fungus are derived from DDAC and are shown separately on the spreadsheet.

Using swimming pool algicides in place of Quat 128® or Sparquat 256®
Swimming pool chemicals used to kill algae and that have the proper quaternary ammonium compounds as their active ingredients may be substituted for Quat or Sparquat at almost HALF the cost. One example of a pool chemical is BioGuard Algicide28-40® , which is 40% ADBAC, the same active ingredient found in Quat and Sparquat but at a much higher concentration. Dilution formulas for BioGuard Algicide28-40® are calculated for you on the accompanying Excel spreadsheet. If you are looking at other brands of quaternary ammonium products and want to calculate concentrations, type in the % of the active ingredient in the yellow cell under Bioguard, and the spreadsheet will automatically recalculate the dilutions and costs. Bioguard products (BioLab Inc) are available from local pool vendors and are listed at **http://www.bioguard.com/msds.cfm** .

As the concentration of ADBAC increases, so do the occupational health and safety hazards (irreversible eye damage, skin burns, respiratory irritation) and importance of adhering to personal protective equipment requirements when handling the concentrated product. Check the MSDS's.

CHEMICAL SUPPLY SOURCES
Most of the recommended chemicals are available through GSA. See the General Services Administration website, and search with the product's NSN number:
https://www.gsaadvantage.gov

Liquid household bleach
Grocery stores, prices and strength vary

Calcium Hypochlorite, Technical—68%
Arch Chemical
GSA (NSN No. KE0472) =$112 per 100lbs

Quat 128® (Waxie)
Waxie's Enterprises Inc.
GSA (NSN No. 170304) =$36 per case (4 gal)

Sparquat 256®
Spartan Chemical Company
GSA (NSN No. 102504) Sparquat 256 = $52 per case (4 gal)

BioGuard Algicide28-40®
Bioguard products (BioLab Inc) are available from local pool vendors and are listed at
http://www.bioguard.com/msds.cfm
Price quote from Dolphin Pools, Salt Lake City (801-277-8700, Paul) = $5-6 per quart

LOCAL FACILITIES AND SERVICES

BLM FACILITIES

The BLM has three separate office locations in Moab. The **Moab Field office** is located downtown at 82 E. Dogwood. The **Moab Interagency Fire Center Dispatch** is located at 885 S. Sand Flats Rd and the **Moab Interagency Fire Operations** building is located in Spanish Valley 4 miles south of the downtown area on highway 191. Please see the attached map for specific locations.

Price BLM has an office at 125 South 600 West, across from K-Mart.

Monticello BLM is located at 435 North Main Street in Monticello.

FOREST SERVICE FACILITIES

The Manti-La Sal National Forest, **Moab Ranger District** office is located downtown at 62 E. 100 North, next to the post office in Moab.

The Forest Service fire resources work out of the **Moab Interagency Fire Operations** building on highway 191 and at the **Moab Interagency Fire Center Dispatch**. See the attached map for Moab locations.

The Manti-La Sal National Forest, **Monticello Ranger District** is located a 496 E. Central, Monticello. The **Manti La-Sal National Forest Supervisors Office/ Price Ranger District** is located across the street from the BLM office at 599 Price River Drive, Price.

MEDICAL FACILITIES

In Moab, Allen Memorial Hospital is a fully staffed hospital with a helipad and an ambulance service. All aircraft medivacs are coordinated through the Moab Interagency Fire Center (MIFC). Only prearranged helicopter landings will be allowed at the hospital at 38º36.15 lat 109º35.16 long. Notify Dispatch as to your intentions and contact the hospital on the HEAR frequency (155.340).

In Price they have Castle View Hospital located on the west side of Price at 39º 36 11 lat. 110º 48.37 long.

Monticello has San Juan hospital located at 37º 54.07 lat. 109º 20.39 long. It is a small hospital for minor medical emergencies.

Manti-La Sal National Forest Aviation Management Plan						**2008**
EMERGENCY MEDICAL SERVICES						
PROCEDURES						
Call **Moab Interagency Dispatch Center** (MIFC) at (435) 259-1850 for Assistance in obtaining EMS services. They will act as a ground contact in relaying status of injured to facility. If no answer, then call **911** direct; Radio frequencies vary by area, and are typically monitored by County Sheriff Dispatching;						
Life Flight Air Ambulance						
SERVICE	LOCATION	PHONE	AIRCRAFT	RADIO	Lat/Long	REMARKS
Life Flight	LDS Hospital Salt Lake	800-321-1911 800-321-	Agusta 109K (H) Bell 407 (H)	RX 461.075 TX		Night flight capable, Rotor and Fixed Wing

	City, UT	1234		466.075 Tone 172.0		
Air Med	University Hospital; Salt Lake City, UT	800-453-0120 801-581-2500 801-581-6236 (Main Office)	1) Bell 222 (H) 2) MU-2 (F)	RX / TX 123.025	40º46.34 111º50.24	Night flight capable, Rotor and Fixed Wing They also have Utah St. Wd in their radios.
Classic Life Guard	Page, AZ	800-444-9223 928-645-2950 (Main Office)		RX / TX 151.515 Rx 463.625 Tx 468.625 Tone 110.9	36º 55.0 111º 27.00	Helipad on-site
Saint Mary's Life Flight	Saint Mary's Hospital. Grand Junction, CO	800-332-4923 970-244-920 970-244-2273		RX 462.950 TX 467.950 Tone 26.0	37º 05.42 108º 33.74	Helipad on-site

Area Burn Center

FACILITY	LOCATION	PHONE	LAT. / LONG.	RADIO	REMARKS
University of Utah	Salt Lake City, UT.	801-581-2700 801-581-2500 801-453-0120	40° 49.30 111° 50.06 40º46.34 111º50.24	RX / TX 123.025	Helipad on-site, Same as Air Med Trauma & Burn
UMC Hospital of Las Vegas, Nevada	Las Vegas, NV	702-383-2211 (ER) 702-383-3969 or 3961 (Trauma) 702-383-2000 Helipad 1-702-383-1810	36º 09.6 115º09.98	131.675 Rx 462.950 Tx 467.950 PL Tone 192.8	Helipad on site. No Rotor Wing aircraft @ Hospital. Trauma & Burn

Local Medical Facilities

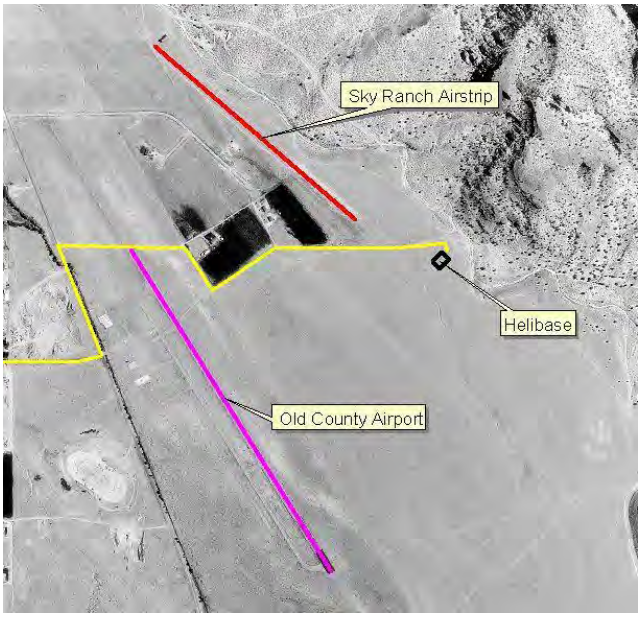
FACILITY	LOCATION	PHONE	LAT. / LONG.	RADIO	REMARKS
Allen Memorial Hospital	719W 400 N Moab, UT	435-259-7191 Grand Co. Dispatch 435-259-8115	38° 36.15 109° 35.16	RX / TX 155.340	Helipad. Must have prearranged landings only
Castle View Hospital	1303 N. Main Cedar City, UT	435-868-5000 435-868-5251 ER Iron County Dispatch 435-586-9445	37º42.022 113º04.054	RX / TX 155.340	No helipad. Use parking lot. Helipad on site
Saint Mary's Hospital. Grand Junction, CO		800-332-4923 970-244-920 970-244-2273	37º 05.42 108º 33.74	RX 462.950 TX 467.950 Tone 26.0	Helipad on-site
Monticello Clinic					

Area Medical Facilities in Utah

FACILITY	LOCATION	PHONE	LAT. / LONG.	RADIO	REMARKS
Utah Valley Regional Medical Center	1034 N., 500 W.; Provo, UT	801-357-7002 801-357-7001	40° 14.15 111° 40.01	RX / TX 155.505	Helipad on-site
University Hospital	50 N. Medical Dr.; Salt Lake City, UT	801-581-2991 801-453-0120	40° 46.01 111° 50.19	RX / TX 155.505	Helipad on-site
LDS Hospital	8 th Ave. & C St.; Salt Lake City, UT	801-408-1181	40° 46.06 111° 52.07	RX / TX 155.505	Helipad on-site
Uinta Basin Medical Center	250 W., 300 N.; Roosevelt, UT	435-722-5601 435-722-4691	40° 18.15 109° 59.43	RX / TX 155.340 Rx 155.055 Tx 153.815 Tone 186.2	Helipad on-site
Ashley Valley Medical Center	151 W., 200 N.; Vernal, UT	435-789-6636 435-789-3342	40° 27.00 109° 32.00	RX / TX 155.505	Helipad on-site
Gunnison Valley Hospital	64 E., 100 N.; Gunnison, UT	435-528-7246	39° 09.23 111° 48.50	RX / TX 155.340	Helipad on-site
Central Valley Hospital	1100 S. Medical Dr Nephi, UT	801-623-1242 1-435-623-3000	39° 43.00 111° 49.42	RX / TX 155.340	No helipad. Use parking lot.
Sanpete Valley Hospital	110 S. Medical Dr: Mt. Pleasant, UT	1-435-462-2441	39 31.51 111.27.44	RX/TX 155.340	Helipad on-site

MOAB HELIBASE

Moab helibase is located in San Juan County 10 miles southeast of downtown Moab. The base sits at the south east end of the Sky ranch private airstrip at 38° 29.41N latitude and 109° 26.37 W longitude. All helicopters should monitor and announce intentions on the local unicom frequency 122.80 when taking off or landing at the helibase. The base consists of an aircraft hanger and landing pad.



Drive south of Moab on highway 191 to the Ken's Lake / La Sal Mountain Loop road and turn left. Go to the first intersection; take a left on Spanish Valley Road to the first road on the right (about 1/4 of a mile) Allen St. Turn right; follow the road around the old airstrip to the fork, go right to the helibase. The hanger is the large tan building with the red roof. **(follow the yellow line on map to the helibase)**

ADJACENT HELIBASES

1. **Richfield District**
   Richfield Helibase is located adjacent to the runway at the Richfield airport, 118 nautical miles West of Moab. A type III helicopter and helitack crew are based there. Lat. 38º44.50 and Long. 112º 05.71.

2. **Mesa Verde National Park**
   Mesa Verde's Chapin Helibase is located 96 nautical miles southeast of Moab. A type III helicopter with helitack crew is based there.
   Lat. 37º10.0 Long. 108º29.0

3. **Rifle Helitack**
   This BLM helicopter is located at the Garfield County Regional Airport, on the west end of the ramp. It is a Type III with a 9 person crew.
   Lat. 39º31.35 Long. 107º43.37

AIRPORT INFORMATION /AVIATION GAS/JET FUEL OUTLETS

1. **Bluff Airport** (66V)
   Paved airstrip and outhouse. Runway 3/21. Lat 37º15.00 Long. 109º38.04. Unicom: 122.9
   Elevation: 4476. Unattended, no facilities.

2. **Blanding Airport** (BDG)
   Municipal airport requires purchase of fuel from the airport to land and use their facilities.
   Blanding has Jet A and AV gas and is located at 37º34.98 N latitude and 109º28.00 W longitude.
   Elevation: 5865 feet.

3. **Moab, Canyonlands Airport** (CYN)
   Runways are 3/21 (7100 x 75 with a displaced threshold), 100LL and Jet A available on field. Local Unicom 122.8, ASOS 118.525. Left hand pattern should be flown. This is important from a safety stand point. Federal or firefighting aircraft that cut someone out of the pattern or are discourteous in any way, cause us public relations problems. Please be sensitive to this! Canyonlands Airport is located at 38º45.30 N latitude and 109º45.28 W longitude. Elevation: 4553 feet.

4. **Green River Airport** (U34)
   Paved runway with Jet A and 100LL, limited facilities. Unicom 122.8 Green River airport is located at 38º57.68 N latitude and 110º13.64 W longitude. Elevation: 4225 feet.

5. **Monticello/San Juan Airport** (U43)
   Paved runway with limited facilities. Jet A and 100LL fuel available by cardlock system. Monticello airport is located at 37º56.23 N latitude and 109º20.79 longitude. Elevation 6998.

6. **Huntington Airport** (69V)
   Paved runway with limited facilities and fuel. Elevation: 5909 feet.

7. **Price Airport** (PUC)
   Price airport is a full service airport. Unicom 122.8 Jet A and Av gas available. The airport is located at 39º36.84 N latitude and 110º45.09 W longitude. Elevation: 5953 feet.
8. **Sky Ranch Airstrip**
   Private airstrip located just southeast of Moab (south end of Spanish valley near Ken‘s Lake. No Facilities or fuel, gravel strip. Elevation 5,000 feet.

9. **Grand Junction** (GJT)
   GJ is a full service, towered airport. Jet A and Av gas are available. GJ airport is located at 39º07.35 latitude and 108º31.60 longitude. Elevation: 4845 feet

10. **Cortez** (CEZ)
    Cortez is a full service airport. Jet A and AV gas are available. Cortez airport is located at 37º18.18 N latitude and 108º37.68 W longitude. Elevation: 5914 feet.

TRANSPORTATION / RENTAL CARS

Moab Interagency Fire Center may be able to arrange for you to be picked up or dropped off at your motel. Canyonlands airport is located 22 miles north of Moab so a vehicle must be pre-arranged to get to Moab.

Rental cars are available at the Canyonlands Airport and at the Moab Valley Inn in Moab.

APPENDIX

HOTEL / MOTEL INFORMATION

MOAB AREA

MOTELS

Best Western Greenwell
259-6151
Ramada Inn
259-7141
Confort Suites
259-5252
La Quinta
259-6012
Moab Valley Inn
259-4419
Kokopelli Lodge
259-7615

RESTAURANTS

Poplar Place
259-6018
Moab Brewery
259-6333
Zax Pizza
259-6555
Pasta Jay‘s
259-2900
Smitty‘s
259-4848
Szechuan Restaurant
259-8984

BLANDING AREA

Four Corners Inn
678-3257
Comfort Inn
678-3271
Gateway Motel
678-2278

Elk Ridge Restaurant
678-3670
Old Tymer Restaurant
678-2122
Homestead Steak House
678-3456

MONTICELLO AREA

Days Inn
587-2458
National 9
587-2251
Super 8
587-2489

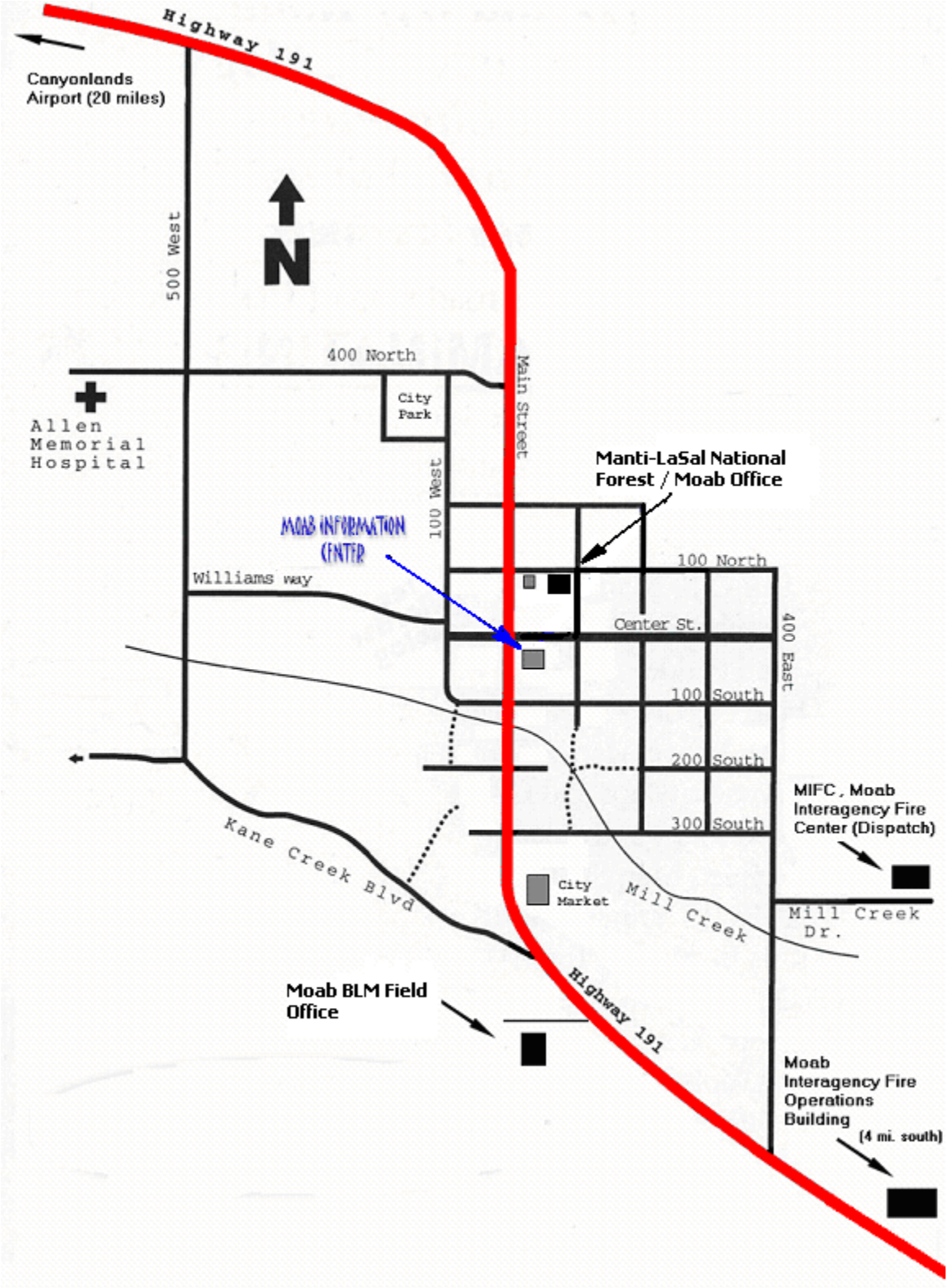
Lamplight
587-2170
K & A Chuckwagon
587-3468

PRICE AREA

Best Western Carriage House
637-5660
Holiday Inn
637-8880
National 9
637-7000
Super 8
637-8088

China City
637-8211
Greek Streak
637-1930
Marie‘s
637-5500
Rosie‘s Deli and Bakery
637-6743

MOAB CITY MAP



Radio Frequency Information

Bruin Point is what we refer to as the **Price BLM** frequencies
Bald Mesa is what we refer to as the **Moab BLM** frequencies
Abajo Peak is what we refer to as the **Monticello BLM** frequency

Divide Ridge is a Vernal BLM repeater that we do not normally use but can be used when working up on top of the Book Cliffs.

USFS Repeater Locations