



## **ROCKY MOUNTAIN COORDINATING GROUP**

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**Bureau of Indian Affairs** (Southwest, Rocky Mountain and Great Plains Regions)  
**Bureau of Land Management** (Colorado and Wyoming)  
**Fish and Wildlife Service** (Mountain-Prairie Region)  
**Forest Service** (Rocky Mountain Region)  
**National Park Service** (Intermountain and Midwest Regions)  
**State Agencies in Colorado, Wyoming, South Dakota, Nebraska and Kansas**

July 27, 2012

To: All Incidents and Units in the Rocky Mountain Geographic Area

From: Coordinator, Rocky Mountain Area Multi-Agency Coordinating Group

Subject: **Heat Related Illness Management Considerations**

Issue: The Geographic Area (GA) is in the midst of a very busy fire season. Heat-related illness (HRI) has been the most common safety related issue reported in the GA over the last month. **Repeat occurrences of HRI cases on incidents within the GA serves as a warning signal that preventative measures and mitigations being used may be inadequate.** Many locations in the GA have reported temperatures over 100 degrees F in the last two weeks, with some locations in Nebraska and Kansas exceeding 108 degrees F. These conditions could continue for several more weeks. Heat-related illness is likely to continue as an issue given this situation and it is important that leadership pay attention and manage this issue. Failure to properly address HRI can have fatal results.

Definition: Heat-related illnesses can occur in activities like firefighting when the metabolic heat production from muscle activity and/or heat acquisition from the environment are greater than the ability of the body to dissipate heat. This can result in the inability of the body to maintain core body temperature within a safe range (close to 98.6 degrees F). The general term used for heat illnesses is hyperthermia. The three most common forms of hyperthermia are heat cramps, heat exhaustion, and heat stroke.

In the past the typical approach to mitigating high ambient temperatures in wildland firefighting has been to push proper hydration. While maintaining proper hydration is very important, hydration alone will not prevent HRI. Cases of firefighter heat exhaustion and fatal heat stroke have occurred on wildland fires in recent years despite adequate fluid intake. In addition to proper hydration, managing exertion and work rate is critical in HRI prevention, along with acclimatization, rest, and proper nutrition.

Please consider the following recommendations to reduce the incidence of HRI in the Rocky Mountain Geographic Area:

- Instruct firefighters and command staff that hydration alone will not prevent HRI.
- Monitor use of energy and sports drinks to ensure they are not being used as a replacement for proper water consumption.

- Utilize available guidelines, such as the two examples provided, to measure when heat stress criteria are exceeded. The Wet Bulb Globe Temperature Index (WBGT) and the Missoula Technology and Development Center (MTDC) Heat Stress Chart, can be used to measure when heat stress criteria are exceeded. The WBGT Index (Figure 1) is a validated, simple, quick, inexpensive, and widely used index that accounts for all four components of environmental heat: air temperature, humidity, air movement, and radiant heat. Use of this index will require converting degrees F to degrees C. The MTDC Chart (Figure 2) is a simple guide that combines temperature and relative humidity and can be used quickly.
- Unless operations are critical based on high values at risk such as public safety, consider suspending physically demanding firefighting operations when criteria are exceeded according to guidelines developed by the U.S. Army/Air Force and the American College of Sports Medicine. To be consistent with these guidelines, consider this suspension when the WBGT is above 32.0 according to the attached index.
- If suspension of operations is not an option, require hourly work/recovery cycles when heat stress criteria are exceeded, particularly when high values at risk are not immediately threatened. For example, when the WBGT exceeds 32.0, the guidelines would recommend resting for at least 45 minutes for every 15 minutes of work.
- When heat stress criteria are exceeded, consider using a bimodal operational shift or two work shifts, to minimize exposure during the hottest part of the day. A description of a bimodal operational shift can be found in the Pike IHC paper sent out last year following their experience in Texas.

### Estimating Wet Bulb Globe Temperature from Temperature and Relative Humidity

		Wet Bulb Globe Temperature (WBGT) from Temperature and Relative Humidity																															
		Temperature (°C)																															
		20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
Relative Humidity (%)	0	15	16	16	17	18	18	19	19	20	20	21	22	22	23	23	24	24	25	25	26	26	27	27	28	28	29	29	30	31	31	32	32
	5	16	16	17	18	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	27	28	29	29	30	31	31	32	33	33	34	35	
	10	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29	30	30	31	32	32	33	34	35	36	36	37	
	15	17	17	18	19	19	20	21	21	22	23	23	24	25	26	26	27	28	29	29	30	31	32	33	33	34	35	36	37	38	39		
	20	17	18	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	31	32	32	33	34	35	36	37	38	39				
	25	18	18	19	20	20	21	22	23	24	24	25	26	27	28	28	29	30	31	32	33	34	35	36	37	38	39						
	30	18	19	20	20	21	22	23	23	24	25	26	27	28	29	29	30	31	32	33	34	35	36	37	39								
	35	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39									
	40	19	20	21	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39										
	45	19	20	21	22	23	24	25	26	27	27	28	29	30	32	33	34	35	36	37	38												
	50	20	21	22	23	23	24	25	26	27	28	29	30	31	33	34	35	36	37	38													
	55	20	21	22	23	24	25	26	27	28	29	30	31	32	34	35	36	37	38														
	60	21	22	23	24	25	26	27	28	29	30	31	32	33	35	36	37	38															
	65	21	22	23	24	25	26	27	28	29	31	32	33	34	36	37	38																
	70	22	23	24	25	26	27	28	29	30	31	33	34	35	36	38	39																
	75	22	23	24	25	26	27	29	30	31	32	33	35	36	37	39																	
80	23	24	25	26	27	28	29	30	32	33	34	36	37	38																			
85	23	24	25	26	28	29	30	31	32	34	35	37	38	39																			
90	24	25	26	27	28	29	31	32	33	35	36	37	39																				
95	24	25	26	27	29	30	31	33	34	35	37	38																					
100	24	26	27	28	29	31	32	33	35	36	38	39																					

Note: This table is compiled from an approximate formula which only depends on temperature and humidity. The formula is valid for full sunshine and a light wind

Figure 1

## Missoula Technology and Development Center Heat Stress Chart

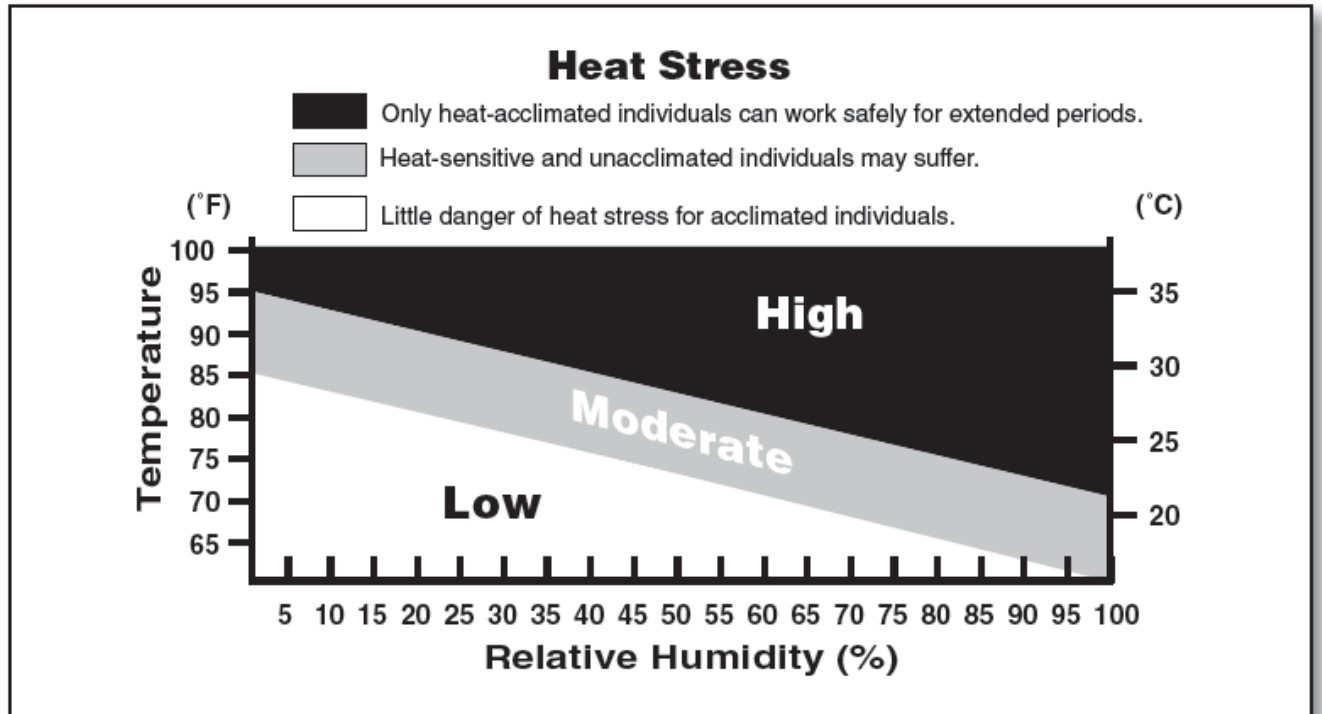


Figure 2

Questions may be addressed by Rocky Mountain Area Multi-Agency Coordinating (MAC) Group at 303-445-4329.

Sincerely,

/s/ Alan W. Cox

Alan Cox  
Rocky Mountain Area MAC Group Coordinator

CC: RMCG Representatives  
RM IMTs  
RMCG Operations Committee