

Dartmouth Flood Observatory

Flood Analysis Report 2003-068

Event:	DFO-2003-068, U.S. Eastern Montana	Previous Events:	Antecedent Conditions: Rapid warming and snowmelt beginning March 14.
Duration:	March 17-21, 2003, 5 days	News Notes:	Significant flooding in and around the town of Reserve from the Antelope and Big Muddy Creeks.
Cause:	13, Ice Jams with rapid warming, snowmelt, and rain.	Locations:	From news sources: Eastern Montana – Yellowstone River, Antelope and Big Muddy Creeks From DFO remote sensing: Big Muddy Creek
Region Affected:	30,710 sq. km	Watershed:	428,600 sq. km; Upper Missouri River and tributaries.
Severity:	1, large	GIS vectors:	20030791810Montana068M2.18
Magnitude:	9.5		

Causation categories are: 1, thunderstorm; 2, precipitation band; 3, squall line; 4, stationary front; 5, mesoscale convective complex; 6, convective cloud cluster; 7, tropical cyclone; 8, extra-tropical cyclone; 9, stationary synoptic front; 10, ITCZ wave disturbance; 11, snowmelt; 12, rain and snowmelt; 13, ice jam or ice break-up; 14, dam break; 15, avalanche.

Severity classes: 1, large, 20%-5% exceedance probability – and/or significant damage to structures or agriculture; 2, very large, 5%-1%; 3, extreme, <1%.

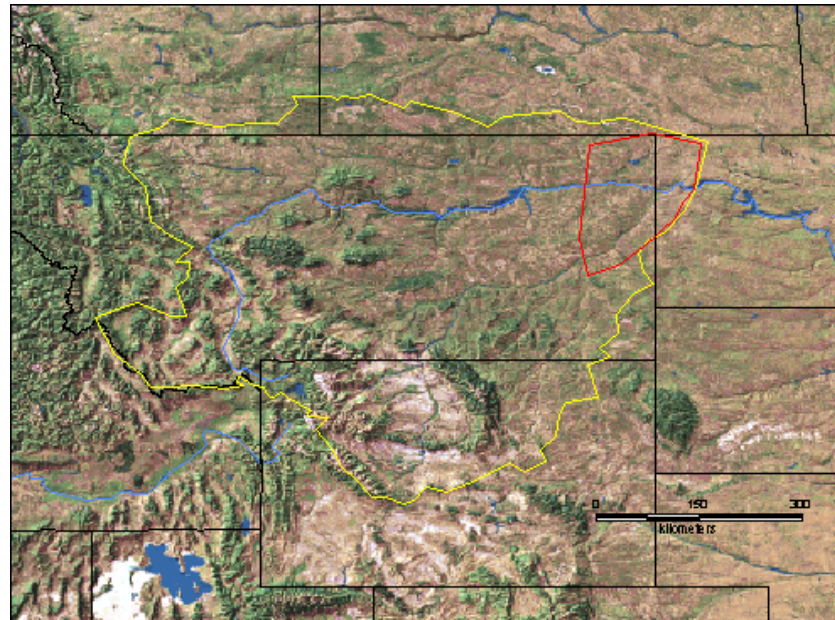
Flood Magnitude: {Natural Log duration (days)} x {severity class} x {sq rt region affected (sq. km)} x .01.

Duration, region affected, and intensity are estimates from news and government reports.

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Figure 1. Location of contributing watershed (yellow line) and area affected by flooding (red line)



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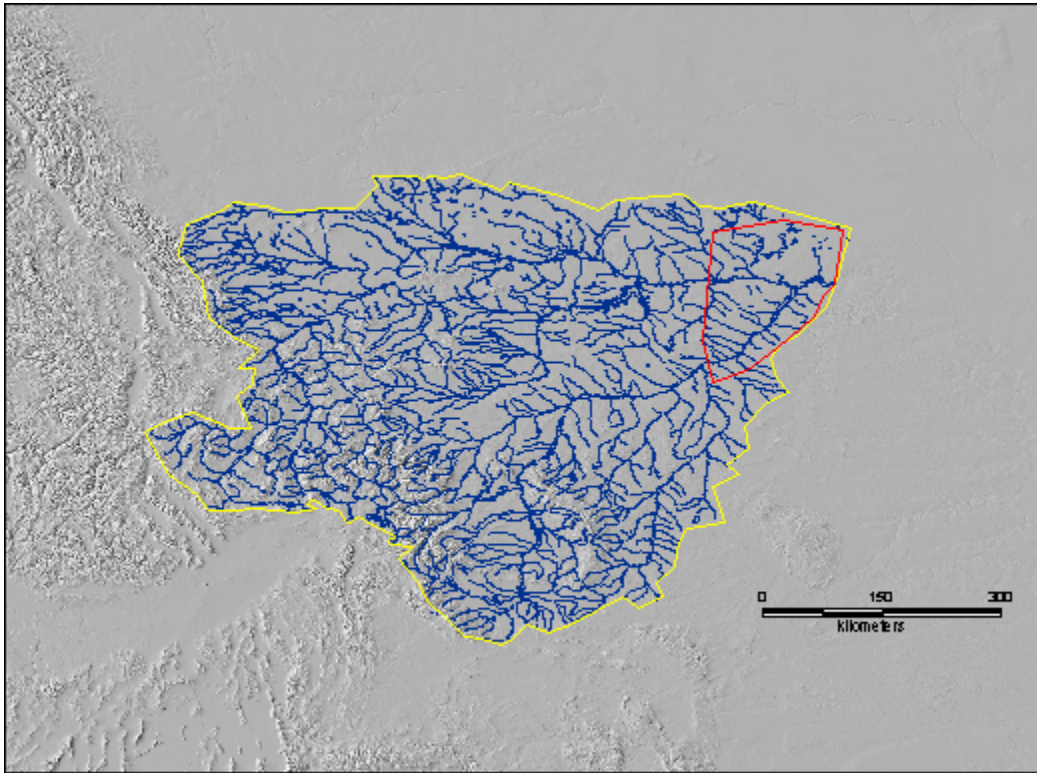









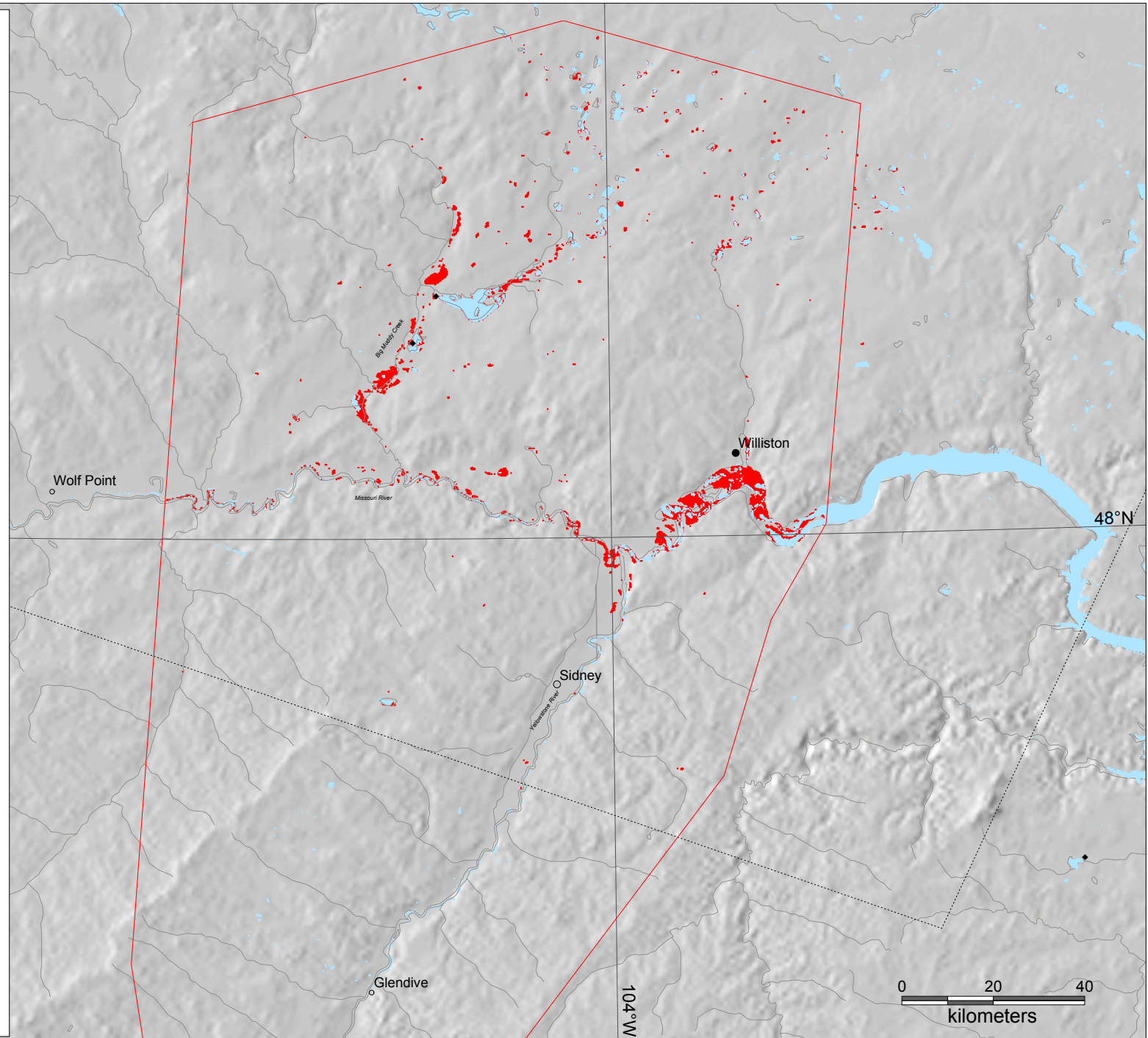
Figure 2. Flood-generating watershed for this flood event.

DFO event # 2003-068

- Area affected 
- MODIS flood inundation limit
March 20, 2003 
- MODIS data cloud free area
March 20, 2003 
- MODIS reference water 
- USGS Gaging station 
- Dam 
- Main city 

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Lat/Long; WGS 84
Graticule: 2 degrees



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Figure 4. MODIS data showing inundated areas on March 20, 2003 overlaid on ASTER data from February 6, 2002.