Challenges to an Avalanche Center in a Time of Seasonal Climate Variability: A Case Study of the Kachina Peaks Avalanche Center, Inc.

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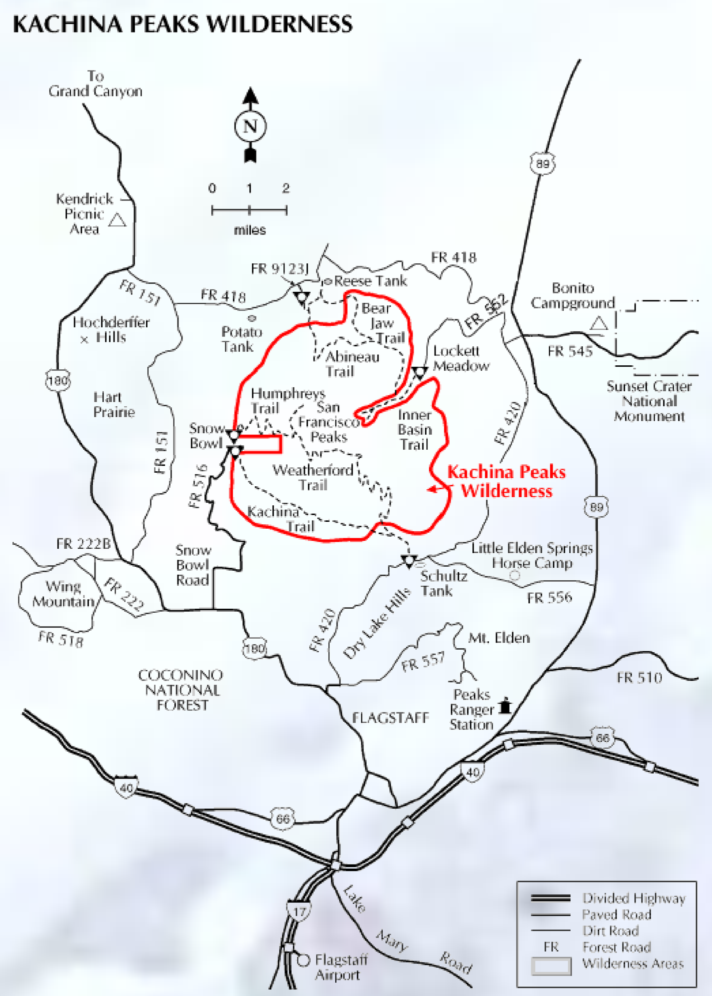
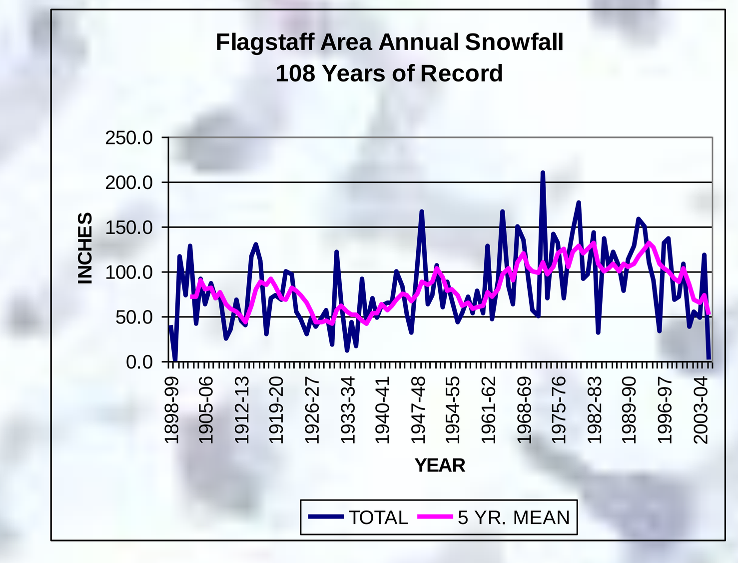
The Environment:



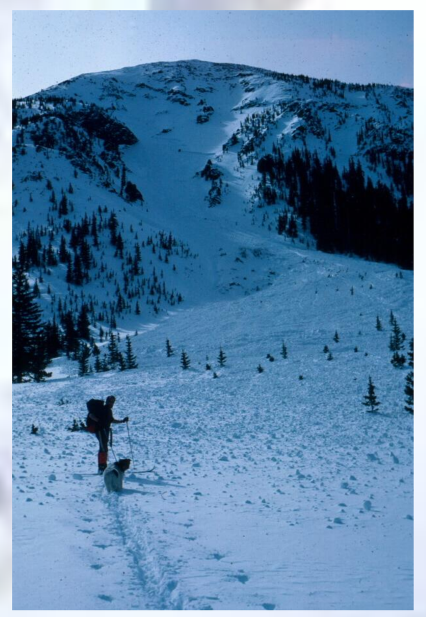
Rebound zones in "Aubineau Canyon"

- *Isolated and exposed topography*
- *Prime avalanche terrain*
- *A "radiation" snow climate*
- *El Nino-enhanced precipitation*
- *Large annual snowfall variability*
- *Multiple & unique storm tracks*
- *Variable snowpack stratigraphy*

Vegetation debris in "Aubineau Canyon"



Hangfire in "Telemark"



Thrusting in snow debris below "Telemark"

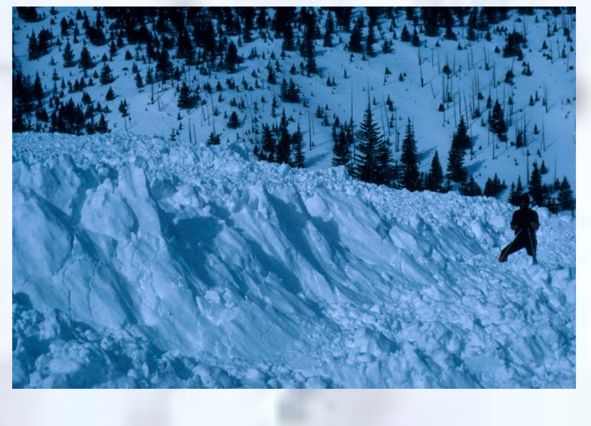


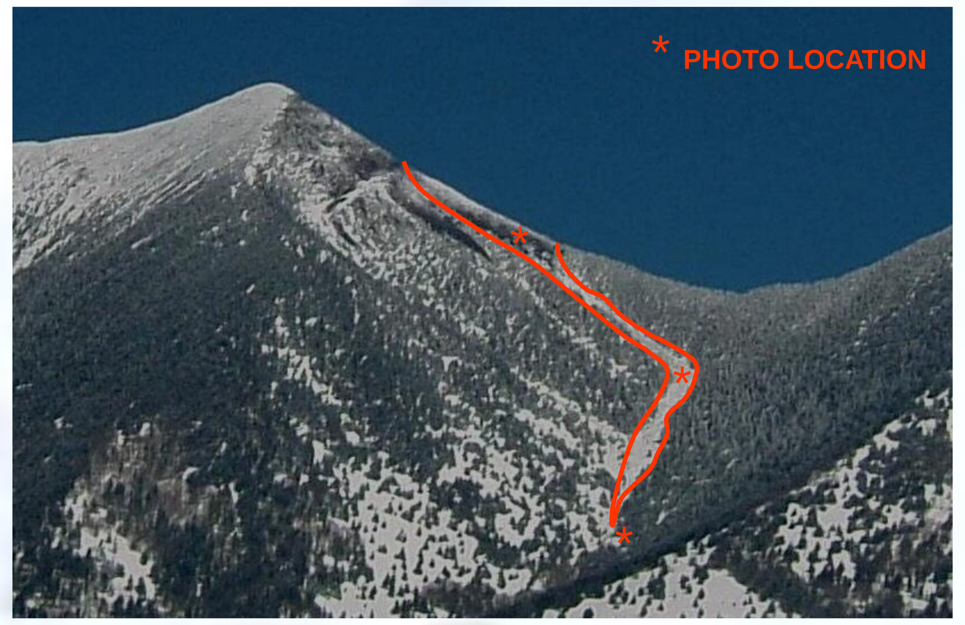
Table 1. Seasonal snowfall totals at Snow Bowl Ski Resort compared to ENSO (+/-) conditions

Season	Total snowfall (cm)	Above/below avg. (cm)*	ENSO (+/-)
1988-89	431	- 229	La Niña
1989-90	610	- 50	Normal
1990-91	592	- 68	Normal
1991-92	914	+ 254	El Niño
1992-93	1168	+ 508	El Niño
1993-94	559	- 101	Normal
1994-95	658	- 2	El Niño
1995-96	287	- 373	La Niña
1996-97	686	+ 26	Normal
1997-98	838	+ 178	El Niño
1998-99	381	- 279	La Niña
1999-00	457	- 203	La Niña
2000-01	495	- 165	Normal
2001-02	221	- 439	Normal
2002-03	523	- 137	El Niño
2003-04	411	- 249	Normal
2004-05	1168	+ 508	El Niño
2005-06	338	- 322	La Niña

* Based on average snowfall of 660 cm/year

The Users:

Location and extent of the fatal 1995 "Monte Vista" Avalanche



Mountain tragedy

Avalanche kills student

By STEPHANIE INNES
Sun Staff Reporter

A freak accident Monday on the San Francisco Peaks killed a Northern Arizona University student who was snowboarding.

Richard Nurczynski of Charlotte, Vermont, was pronounced dead at Flagstaff Medical Center at 9:32 Monday night after being buried in an avalanche that afternoon. The 21-year-old had spent nearly five hours trapped in the snow.

Doctors this morning listed the cause of death as multiple injuries and severe hypothermia. An autopsy will be performed by the Coconino County Medical Examiner's Office and further investigation will be conducted by the Coconino County Sheriff's Department.

While the San Francisco Peaks are known for having avalanches, Capt. Sam Whitted of the Coconino County Sheriff's Department said the accident was extremely unusual.

"In my tenure I can't remember when we have had to use ski rangers to get someone from an avalanche," said Whitted, who has been with the department for 18 years. "It's a terrible situation."

Whitted added that the sheriff's department strongly discourages anyone from skiing or snowboarding out-of-bounds, which is what Nurczynski and a friend, 21-year-old Isaac M. Page, were doing.

Officials say the two were snowboarding about half a mile from the Arizona Snowbowl in the Freemont Saddle area.

The two were snowboarding on the south face of the mountain, east of Snowbowl Road, when the avalanche occurred, said sheriff's Deputy Scott Feagan, who was on the scene last night.

Whitted said avalanches on the Peaks are caused by a cornice of snow hanging over the edge of the mountain. Sunshine will loosen the mass and release rushes of snow.

Feagan said Nurczynski was behind his friend when the avalanche hit. Page spotted the tumbling snow and was able to hang onto a tree to save himself.

Page dug his friend out so he could breathe and then gave his jacket to him and snowboarded out of the area. He spotted a cross-country skier, Flagstaff resident Gary Lester, who helped him alert authorities about the accident, officials said.

The accident appears to have occurred at about 3 p.m., and rescuers were on the scene shortly after being notified at 4:22 p.m.

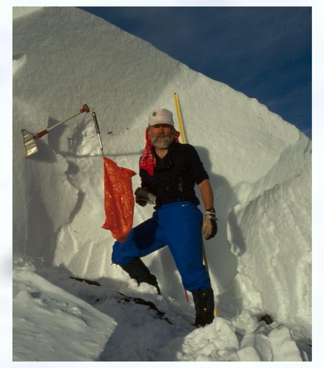
The sky was still light when rescuers left a base camp, set up 2 1/2 miles from the bottom of Snowbowl Road. By the time the six snowmobiles, a Snowcat and five ski rangers returned from the rescue at about 8:30 p.m., it was pitch black outside.

Temperatures were also dropping, and Nurczynski was at 10,800 feet elevation — or two-thirds of the way up the mountain — in a rugged area. Rescuers also feared another avalanche.

Whitted said one ski ranger was air-lifted above Nurczynski and then skied down to him. Four other rangers skied to him from the bottom. They placed him on a toboggan, took him to a Snowcat, and then the Snowcat brought him to the Department of Public Safety helicopter, which was waiting in a nearby clearing.

The DPS helicopter took the victim to FMC. Paramedics on the scene had said Nurczynski was hypothermic and in serious condition with life-threatening injuries when they found him.

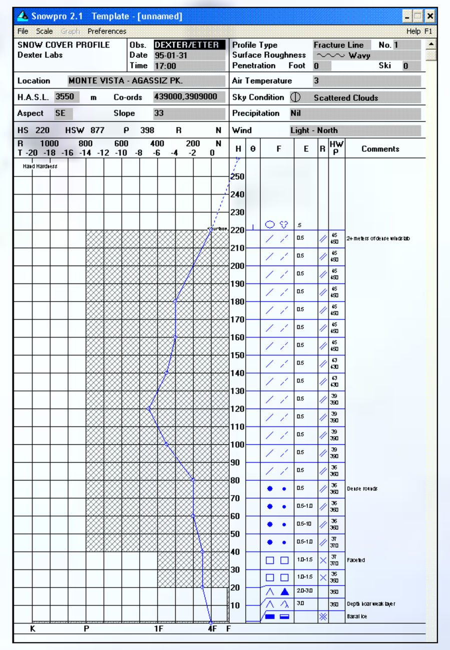
J.R. Murray, general manager of Arizona Snowbowl, said the spot where the two were snowboarding was not inside the ski area. He said signs at the top of the mountain tell people that anyone who chooses to ski outside marked areas does so at their own risk.



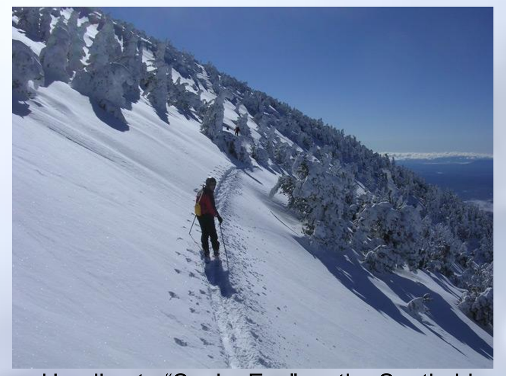
Fracture line photo and profile at 11,800'

Rick's snowboard was ripped from his feet

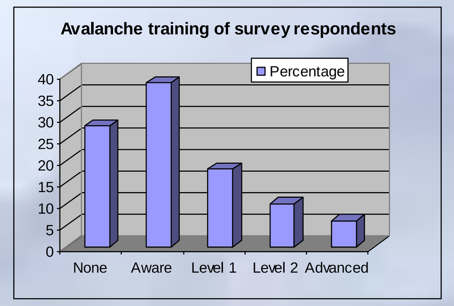
Toe of runout and associated debris at 10,200'

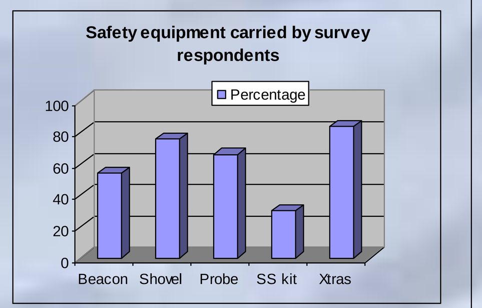


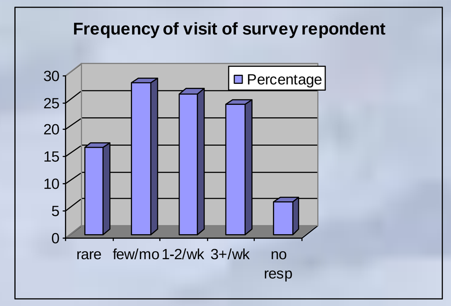
- *The 1995 Monte Vista Path fatality*
- *Mixed user awareness levels*
- *Low % with avalanche schooling*
- *Interest varies with snowfall*
- *Users survey*

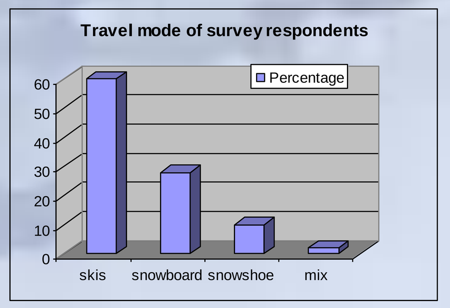


Heading to "Snake Eye" on the Southside

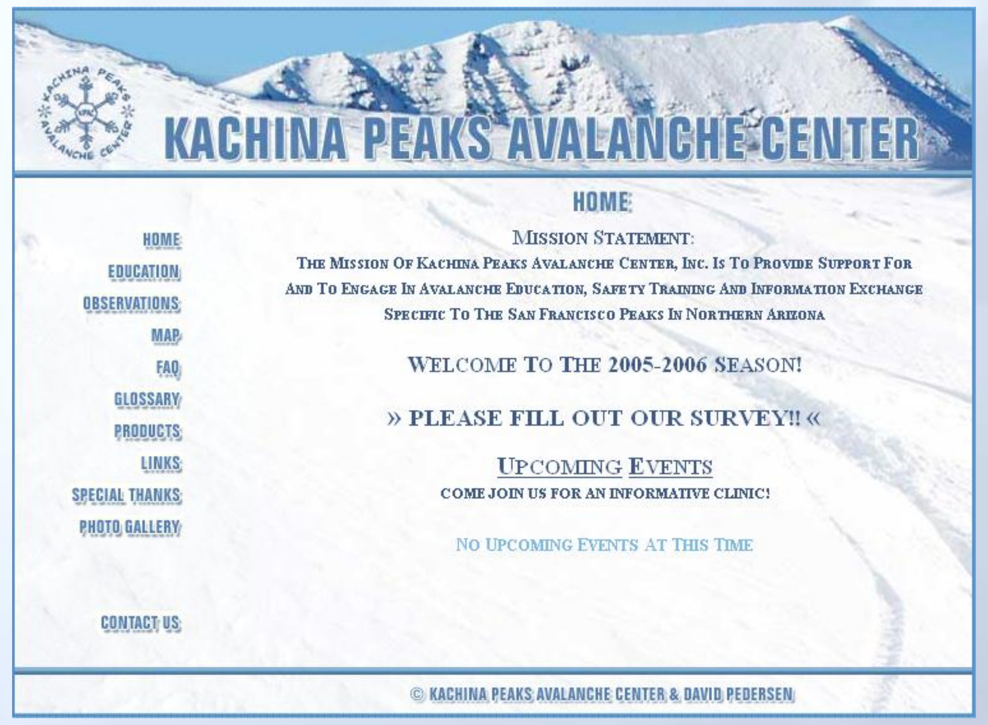


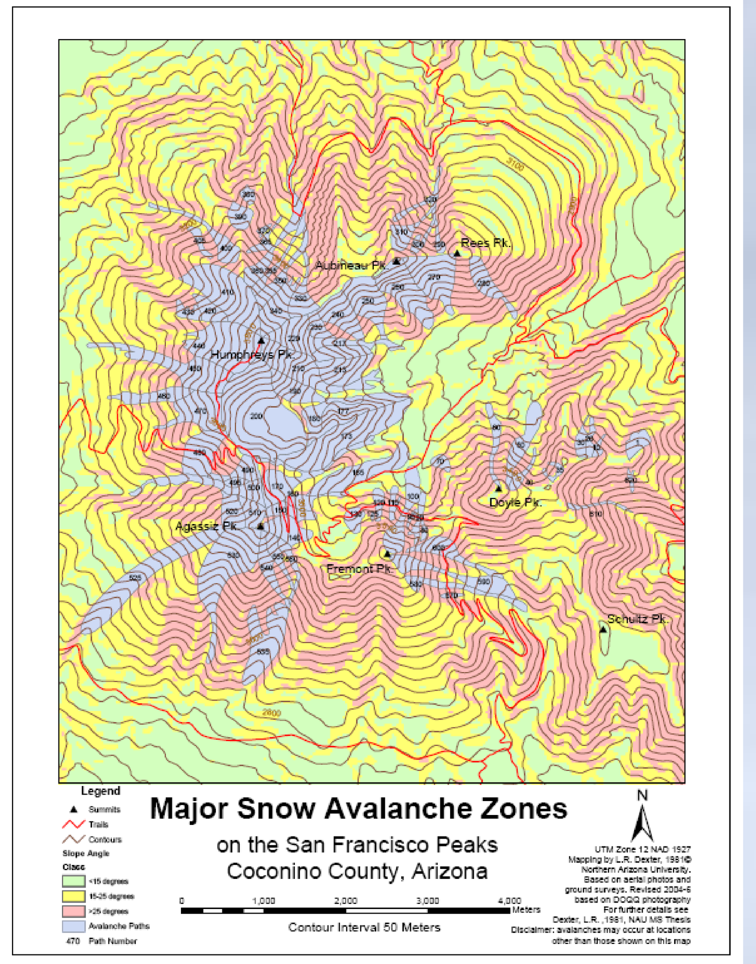






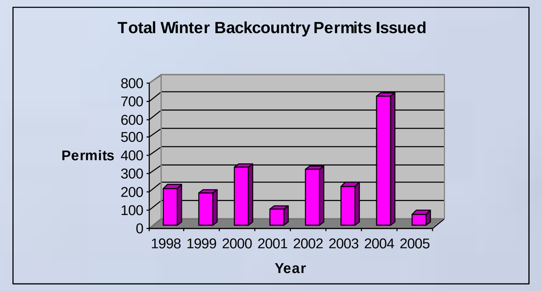
The Solutions:

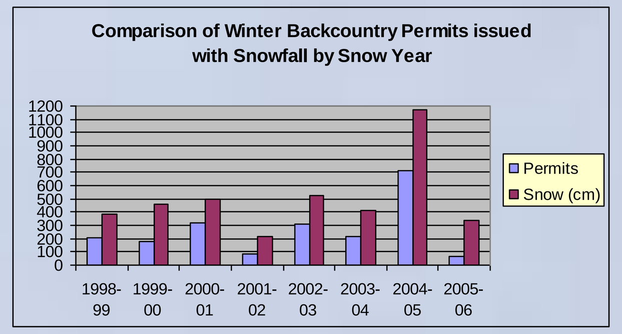




- *501c3 corporation status*
- *Committed B.O.D.*
- *Minimal paid staff at first*
- *Train high caliber volunteers*
- *Avalanche zone mapping*
- *Placard at Snow Bowl*
- *Community-based web site*
- *Local avalanche clinics*
- *USFS backcountry permit system*
- *Cultivate professional relationships*
- *Cultivate community support*
- *Seek out grants*
- *Develop plans for active forecasting*
- *Keep up a sense of humor!*

Backcountry warning sign at the Snow Bowl





www.kachinapeaks.org