

## SURVEY OF US AVALANCHE CENTERS

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**ABSTRACT:** In the fall of 2009 I became interested in when offices are staffed by forecasters at the various centers and what time of day products are issued. In other words are the hours inhumane at all the centers? How much do product issuance times vary between the centers? I decided to survey the various centers regarding this and a few other topics. Later I learned of a similar survey compiled by Knox Williams in 1998. So I added some questions to my survey in order to update his work. My survey turned out to have more questions than I originally imagined; but later I thought of more questions I could have asked.

So the results of this survey include various topics such as administration, pay, forecast area size, budget, hours of operation, weather stations, weather and avalanche product information, dissemination methods, product issuance days and times, avalanche education, and length of seasonal employment. I hope the results are informative and useful to any interested persons.

I would like to emphasize that I did not undertake this survey in order to show any particular results. Rather the work was undertaken out of interest in similarities and differences between the various centers.

### 1. INTRODUCTION

The survey was emailed to the US Avalanche Centers shown on the Westwide Avalanche Network home page ([www.avalanche.org](http://www.avalanche.org)). This paper presents partial results due to the 8 page limit for the ISSW 2010 Proceedings. Further or full results may be published later such as in the Avalanche Review or may be obtained by contacting the corresponding author. An occasional comparison may be made to the earlier work of Williams (1998).

### 2. RESULTS

The partial results will be summarized in this section and readers are welcome to draw their own conclusions.

#### 2.1 *Sources*

Sources of information are listed in Table 1. There are now about twice as many avalanche centers in the US as indicated in Williams (1998).

#### 2.2 *Mid winter staff and pay/grade*

Staffing ranges from volunteers or a couple to a

few paid staff up to the 8 to 15 paid staff at Utah and Colorado respectively as shown in Table 2. Of the 7 centers listed by Williams (1998) 4 centers had an increase in staff (Colorado, Utah, Bridger-Teton, Sierra), 2 stayed the same (Central Idaho/Sawtooth, Gallatin) and 1 center had a decrease (Northwest). Pay is mostly in the federal GS7 to GS9 range with annual pay up to \$60,000 to \$80,000 or GS12 at the Colorado, Southeast Alaska and Northwest Centers.

#### 2.3 *Forecast area size and elevations*

Forecast area sizes shown in Table 3 range widely from the 2 km<sup>2</sup> at Mt Washington to the 120,000 km<sup>2</sup> in Colorado. Of the centers listed by Williams (1998) the only significant change indicated in forecast area size occurred when the forecast area in Colorado doubled. The smallest forecast elevation range is also at Mt Washington (difference of 1550 feet). The forecast elevation ranges at the rest of the centers are from 3500 feet to 8600 feet. Not surprisingly the lowest elevations are at the Alaska centers, and the Northwest and Mt Washington Centers. The higher elevations covered are in the interior and at the southern centers.

#### 2.4 *Approximate budget*

Most of the centers make do with less than \$100,000. Four centers fall into the \$100,000 to \$332,000 range and Colorado with the largest staff has a budget of \$825,000 (Table 4). Direct and in-kind contributions to the budgets are primarily

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governmental, especially USFS, but there are also contributions from Friends groups, ski areas, small towns and a couple of universities. Two centers get contributions from their state DOT programs (Colorado, Northwest).

### 2.5 Weather forecasts

Most of the centers issue a weather forecast; about half of them daily around 7 am (Table 5). Forecasts are mostly made out to 1 or 2 days. Three centers (Colorado, Northwest, Utah) are located in National Weather Service (NWS) offices and the NWS issues products specifically for three other centers (Bridger-Teton, Glacier Country, Payette). Only Colorado indicated that they run an in-office model which is an orographic precipitation model.

### 2.6 Avalanche forecasts

About half the centers issue avalanche forecasts daily and the others 1 to 4 days a week (Table 6). The majority issue the avalanche forecast in the morning around 7 am and use a 1 day range. The predominant forecast technique is conventional; this was also the case in Williams (1998). See that paper for a definition of conventional forecasting technique. The Mt Shasta and Sawtooth Centers noted some worthwhile variations in their forecasting technique. The Cordova Center issues on an as needed basis; the Kachina Peaks Center hosts an information sharing system; and the Wallowa Center offers weekly summaries. Only Bridger-Teton and Eastern Sierra Centers indicated that a model is used; a nearest neighbors and occasionally a nearest neighbor for Mammoth Mountain ski area respectively.

### 3. Hindsight

Other questions I could have asked might have been: How long has your center been in operation? How long is your forecast season? Or I could have asked about amounts of office time, field time, or perhaps time devoted to administration, education or other tasks.

### 4. References

Williams, Knox, 1998. An Overview of Avalanche Forecasting in North America. ISSW 1998 Proceedings, 161-169.

Table 1. Sources of Information

Contact	Center	Email	Phone
Bob Comey	Bridger-Teton National Forest Avalanche Center	comey@wyom.net	307-690- 4527
Carl Skustad	Chugach National Forest Avalanche Information Center	cskustad@fs.fed.us	907-754- 2346
Ethan Greene	Colorado Avalanche Information Center	ethan.greene@state.co.us	303-204- 6027
Steve "hoots" Witsoe	Cordova Avalanche Center	hoots@ctcak.net	907-424- 4668
Sue Burak	Eastern Sierra Avalanche Center	sb@snowhydrology.com	760-935- 4129
Doug Chabot	Gallatin National Forest Avalanche Center	dchabot@fs.fed.us	406-587- 6984
Stan Bones	Glacier Country Avalanche Center	sbones@fs.fed.us	406-758- 5284
Kevin Davis	Idaho Panhandle Avalanche Center	kevingdavis@fs.fed.us	208-265- 6686
BJ Boyle	Kachina Peaks Avalanche Center	bj.boyle@kachinapeaks.org	928-814- 6006
Eric White	Mount Shasta Avalanche Center	ewhite@fs.fed.us	530-926- 9617
Christopher Joosen	Mount Washington Avalanche Center	cjoosen@fs.fed.us	603-466- 2713 x215
Mark Moore	Northwest Weather and Avalanche Center	mark.moore@noaa.gov	206-526- 6164
John Groom	Payette Avalanche Center	jgroom@fs.fed.us	208-315- 2988
Janet Kellam	Sawtooth National Forest Avalanche Center	jkellam@fs.fed.us	208-622- 0095
Brandon Schwartz	Sierra Avalanche Center	Brandon@sierraavalanchecenter.org	530-414- 4505
Tom Mattice	Southeast Alaska Avalanche Center	Tom_Mattice@ci.juneau.ak.us	907-586- 0419
Bruce Tremper	Utah Avalanche Center	bruce@utahavalanchecenter.org	801-231- 4744
Keith Stebbings	Wallowa Avalanche Center	director@wallowaavalanchecenter.org	603-340- 5381
Steve Karkanen	West Central Montana Avalanche Center	skarkanen@fs.fed.us	406-329- 3752

Table 2. Mid Winter Staff and Pay/Grade

Center	Staff Level	Pay Grades or Pay
Bridger-Teton	4 FT, 2 PT	2 GS-9, 4 GS-8
Chugach	3 FT, 1 PT, 1 FT intern	1 GS-9, 1 GS-7, 1 GS-6
Colorado	14 FT, 1 PT	Physical Scientist/Research Scientists 1-5, about \$60k-\$80k not including benefits
Cordova	1 FT, 1 PT	FT \$4,000/month, PT \$1,000/month
Eastern Sierra	1 FT, 1 120 hour OT employee.	FT is GS-8
Gallatin	3 FT	1 GS-9 permanent seasonal, 1 GS-7 permanent seasonal, 1 GS-7 temporary seasonal
Glacier Country	2 PT (approx. 3 days/week each)	1 GS-10, 1 GS-9
Idaho Panhandle	7 PT	2 GS-9, 4 GS-7, 1 GS-5
Kachina Peaks	All volunteer based staff.	
Mount Shasta	2	1 GS-7, 1 GS-6
Mount Washington	4 FT	1 GS-11, 2 GS-8, 1 GS-7
Northwest	3 FT	3 GS-12, all are professional meteorologists
Payette	2 FT	1 permanent year round GS-7, 1 winter seasonal GS-6
Sawtooth	3 FT	1 GS-9 (Director and Forecaster) Permanent 13/13, 1 GS-8 (Lead Forecaster) Term 13/13, 1 GS-8 (Forecaster) 1039 Seasonal approx. 4 ½ months
Sierra	2 FT staff, 2 PT field observers	Forecasters are GS-8, Observers are contracted at \$130/day.
Southeast Alaska	1 FT, 1 PT seasonal, office assistant as needed	FT \$65,000/year, PT seasonal at \$14 per hour.
Utah	8 FT	1 Director GS-9, 7 Forecasters GS-8
Wallowa	2 volunteers	
West Central Montana	1 FT Director/Forecaster, 1 PT Forecaster/educator, 6 PT observers	Director is GS-9 permanent FT, Forecaster/educator is \$30 per hr, PT observers are GS-7 to GS-11. Observers are paid from contributed dollars (home unit programs cover their salary to collect snow data once a week).

FT = Full Time, PT = Part Time, OT = Overtime, some respondents chose to offer permanent and seasonal information.

Table 3. Forecast Area Size and Elevations

Center	Forecast Area	Size	Elevation Range (feet)
Bridger-Teton	Western Wyoming	5,000 mi <sup>2</sup> (13,000 km <sup>2</sup> )	5,500 - 10,500
Chugach	Kenai and Chugach	233,590 acres (945 km <sup>2</sup> )	0 - 6,000
Colorado	Colorado Rocky Mountains	120,000 km <sup>2</sup>	7,000 - 14,440
Cordova	SE Chugach Mountains	3,000 km <sup>2</sup>	0 - 4,000
Eastern Sierra	Eastern Sierra Nevada		7,000 - 13,000
Gallatin	Bridger, Gallatin, Madison, Henry, Washburn Ranges, and the area outside Cooke City, MT	10,000 km <sup>2</sup>	7,000 - 11,000
Glacier Country	NW Montana, seven mtn ranges	5,000 mi <sup>2</sup> (13,000 km <sup>2</sup> )	3,000-7,500*
Idaho Panhandle	Selkirk, Cabinet, Bitterroot, St. Joe		3,000 – 7,600
Kachina Peaks	Kachina Peaks Wilderness	15000 acres (61 km <sup>2</sup> )	9000 - 12600
Mount Shasta	Mt. Shasta and Castle Crags to Mt. Eddy	1000 km <sup>2</sup>	5400 - 14,000
Mount Washington	A portion of the Presidential Range in the White Mountains	2 km <sup>2</sup> - a high use area with ratings for 16 snowfields and gullies.	3850 – 5400
Northwest	Olympics, Washington Cascades, Mt Hood	50,000 km <sup>2</sup>	3000 - 7000*
Payette	West Central Mountains	300,000 acres (1214 km <sup>2</sup> )	5000 – 9000
Sawtooth	Pioneer, Smokey, Boulder, Sawtooth, White Cloud, Ranges, foothills of the Wood River Valley	4,000 km <sup>2</sup>	5,000 - 10,000
Sierra	Central Sierra Nevada Mountains	4000 km <sup>2</sup>	6,000 - 10,700
Southeast Alaska	Southeast Alaska Coast Range.	20 mi <sup>2</sup> (52 km <sup>2</sup> )	0 - 4,000
Utah	Wasatch Range, Bear River Range, Manti Skyline, La Sal Mountains	12,500 km <sup>2</sup>	5,000 - 12,000
Wallowa	Wallowa Mountains of NE Oregon	350,00 acres (1,400 km <sup>2</sup> )	6500 – 10000
West Central Montana	Bitterroot, Rattlesnake, south Mission, south Swan Mountains.	25,000 km <sup>2</sup>	5000 ft – 9000

\*Higher mountains exist.

Table 4. Approximate Budget

Center	Annual Budget	Financial Contributors	In-kind Contributors
Bridger-Teton	250	USFS 75, Friends 100	Jackson Hole Mountain Resort 75
Chugach	50	USFS 38	Friends 12
Colorado	825	USFS 20, Ski Industry 30, CDOT 400, other city and county and private donations	NWS 100, CDOT 100, CGS 100, USFS 10, Town of Breckenridge 10
Cordova	30	City of Cordova	
Eastern Sierra	32	USFS, Mono County.	
Gallatin	130	USFS 84, Montana FW&P 22, Gallatin County SAR 4, Friends 19	40
Glacier Country	28	USFS 20, Montana Dept of Fish, Wildlife, Parks 6, Friends 2	NWS 5, Volunteers 8
Idaho Panhandle	30	USFS 25, Idaho Parks and Recreation 5	
Kachina Peaks	3 - 5	No financial support from other agencies.	USFS and volunteers administer permit system to enter Wilderness in Winter
Mount Shasta	50	USFS 40, Friends 10	NWS 20
Mount Washington	100	USFS 100, Friends 1	Mount Washington Volunteer Ski Patrol 38
Northwest	332	USFS 105, NPS 17, State Parks and Recreation 88, DOT 45, Ski Areas 25, Friends 5, private 47	NWS 70, also USFS, NPS, DOT, Ski Areas
Payette	50	USFS 26, Idaho Department of Parks and Recreation 5, RAC 18, City of McCall 1-2, Friends 1-2	Idaho Dept of Parks and Recreation snowmobiles, USFS vehicle
Sawtooth	117	USFS 49, BLM 5, Idaho Dept Parks & Recreation 5, Friends 50	USFS 8, Sun Valley Company 5, NWS, SNOTEL special ftp site
Sierra	70	USFS 25, Friends 38	USFS 7
Southeast Alaska	100	City and Borough funds its own forecast	NWS and University of Alaska Southeast 10
Utah	280	Friends 100, Utah State Parks 82, USFS 63, Utah Public Safety 25, Salt Lake County 23, United Fire Authority 15	NWS 20
Wallowa	4	Community and Sponsors 2, SAR 1, Donors 1 - 2	
West Central Montana	31	USFS 5, MT FWP 16, Friends 10	USFS 44, NOAA 15, U of M 5, other 3

Figures in dollars in nearest thousands.

Table 5. Weather Forecasts

Center	Issuance Days	Issuance Times	Range	Comments
Bridger-Teton	2 daily	200, 1400	8 hours, 48 hours resp.	NWS runs model in Riverton, WY specifically for us.
Chugach				
Colorado	3 daily	600, 1300, 1400	36 hours (3 12 hr periods)	NWS AWIPS access. We collaborate to run MM5.
Cordova	1-3/week	800	1-3 days	w/in avi forecast
Eastern Sierra	3/week	700	1 day winter, 1-2 days spring	
Gallatin	Daily	730	24 hours	
Glacier Country				NWS 1 day forecast issued 1430 daily.
Idaho Panhandle				
Kachina Peaks				
Mount Shasta	3/week (every advisory)	700	Specific for 1 day and general for next 4 days	Also indicated NCEP, Cansac MM5, Nexlab, CPC, Cal/Nev River Forecast Center sources.
Mount Washington				
Northwest	Daily	700	2 day detailed, 3-5 day extended	NWS AWIPS access.
Payette				NWS produces spot forecast for us
Sawtooth	Daily	730	1 day with outlook	Also indicated NWS Pocatello and Boise information is used.
Sierra	Daily	7am	2 day	Also indicated Penn State, Unisys, NCAR, U of WA model data is used.
Southeast Alaska	Daily	7am	24 hours	We do not produce but we share NWS data.
Utah	2 daily	700, 1200	24 hours with summary extended	NWS AWIPS access.
Wallowa				
West Central Montana				

All centers that indicated a weather forecast also indicated NWS and Internet sources. Only Colorado indicated that they run an in-office model which is an orographic precipitation model. Colorado, Northwest, and Utah have NWS AWIPS computer access as they are co-located with NWS offices. Many centers issue their weather forecast with the avalanche forecast.

Table 6. Avalanche Forecasts

Center	Issuance Days	Issuance Times	Range	Forecasting Technique	Comments
Bridger-Teton	Daily	700, 1800	700 1 day, 1800 next day.	conventional	Tested immediately via expl., obs
Chugach	Daily	700	1 day	conventional	
Colorado	Daily	730	24 hours	conventional	
Cordova	1-3/week	800	1-3 days	conventional	As needed
Eastern Sierra	3/week	700	1 day winter, 1-2 day spring	conventional	
Gallatin	Daily	730	24 hours	conventional	
Glacier Country	Tue, Fri	700	1 day	conventional	
Idaho Panhandle	Fri	730	24 hour hazard rating and Sat, Sun outlook	conventional	
Kachina Peaks					Information sharing.
Mount Shasta	3/week	700	1 day plus 4 day trend on Sunday	conventional plus charts by Stetham from ISSW 2008.	
Mount Washington	Daily	800	1 day with discussion of tomorrow	conventional	
Northwest	Daily	1200	2-3 day	conventional	
Payette	Mon, Wed, Fri, Sat	730	24 hours	conventional	
Sawtooth	Daily	730		forecaster and team information sharing	
Sierra	Daily	700	1 day	conventional	
Southeast Alaska	Daily	700	24 hours.	conventional	
Utah	Daily Wasatch, 3/week other areas.	700	2 or more days.	conventional	
Wallowa	Fri	600			Weekly summaries
West Central Montana	Mon, Fri as needed	700	2 day with hazard rating first 12 hours.	conventional	

Only Bridger-Teton and Eastern Sierra Centers indicated that a model is used; a nearest neighbors and occasionally a nearest neighbor for Mammoth Mountain ski area respectively.



**APPENDIX I: Tables not included in the ISSW proceedings**

Table A1: Administration

	Managing Agency	Central Office	Other Offices
Bridger-Teton	USFS	Jackson Hole Resort, Teton Village, WY	
Chugach	USFS	Girdwood AK	Moose Pass AK
Colorado	Colorado Department of Natural Resources, Colorado Geological Survey	NWS, Boulder, CO	Main office + 7 =8 total
Cordova	City of Cordova and Cordova Electric Cooperative	Cordova, AK	
Eastern Sierra	USFS	Mammoth Lakes, CA	
Gallatin	USFS	Bozeman, MT	
Glacier Country	USFS	Kalispell, MT	
Idaho Panhandle	USFS	Sandpoint, ID	5 other offices exist in North Idaho where the public can get information.
Kachina Peaks	Board of Directors at KPAC	Flagstaff, AZ	
Mount Shasta	USFS	Mt. Shasta, CA	
Mount Washington	USFS	Gorham NH	Mid-mountain Cabin/Snow Ranger Quarters
Northwest	USFS	Seattle, WA	
Payette	USFS	McCall, Idaho	
Sawtooth	USFS	Ketchum, Idaho	
Sierra	USFS	Truckee, CA	
Southeast Alaska	City of Juneau	Juneau, Alaska	
Utah	USFS	NWS, Salt Lake City, UT	Logan, western Uinta Mountains, Manti Skyline, Moab
Wallowa	Board of Directors of WAC	Joseph, OR	
West Central Montana	USFS	Missoula, Montana	

Table A2: Days and Hours of Winter Office Staffing

	Days	Hours	Comments
Bridger-Teton	Daily	500 - 1700	
Chugach	Daily	800 -1200	Advisories are updated from forecasters home from 500 to 800.
Colorado	Daily	400 - 1500	
Cordova			On-call
Eastern Sierra			Varies depending on weather/field work schedule.
Gallatin			As needed
Glacier Country	Tue, Fri	400 - 800	Mon, Thu field 8 hours +
Idaho Panhandle	Mon-Fri	700 – 1600	
Kachina Peaks			No office, information shared at <a href="http://kachinapeaks.org">kachinapeaks.org</a> anytime.
Mount Shasta	Wed - Sun	500 - 1330	Or longer.
Mount Washington	Daily	600 - 1500	
Northwest	Daily	300 - 1500	
Payette	Mon, Wed, Fri, Sat	500-800	
Sawtooth	Daily	500 – 800, 1600 - 1700	Otherwise the forecaster is in the field, teaching classes or working in the office.
Sierra	Daily	500 – 730, 1300 - 1400	In field 730 - 1300
Southeast Alaska	Daily	530 - 700	Field time follows shortly thereafter most days.
Utah	Daily for the Wasatch Range. About 3 days/ week satellite areas.	Wasatch Range 300-400 to about noon each day.	More work is being done from home such as updating critical data as it comes in.
Wallowa	Thu	800 – 1800	
West Central Montana	Mon - Fri	900 - 1730	

Chart intended to indicate office hours only and not field hours.

Table A3: Weather Stations

	Number of Manual Weather Stations	Number of Automated Stations	Other Weather Stations
Bridger-Teton	11	16	3 SNOTEL, 1 WYDOT, 1 Yellowstone National Park, and 1 other
Chugach		3	NRCS, AK railroad, Alyeska Resort, AKDOT 8 more stations
Colorado	600	12	MADIS, which includes SNOTEL, RAWS, FAA, CDOT
Cordova			SNOTEL and NWS at the airport.
Eastern Sierra	3		CDEC (California Data Exchange Center), Mesowest RAWS, SNOTEL
Gallatin	2	2	SNOTEL, Bridger Bowl, Big Sky, Moonlight Basin, Yellowstone Club Ski areas.
Glacier Country			10 SNOTEL
Idaho Panhandle			SNOTEL, RAWS, Schweitzer ski area, Silver Mt ski area, Lookout Pass ski area
Kachina Peaks			Arizona Snowbowl Ski area.
Mount Shasta	1 at my house	4 which are ours and 2 we share with Calif. DWR	NWS, Calif. DWR
Mount Washington	2		Mount Washington Observatory, 1 automated site at Hermit Lake (3800ft). We also use 6 of their temperature sensors spread out from 1600 to 5300ft.
Northwest	10	44	SNOTEL, NWS
Payette	2	2	NRCS, Mesowest, RAWS
Sawtooth	1	4	SNOTEL, BLM RAWS
Sierra			NWS, SNOTEL, Private Ski Area
Southeast Alaska	2	1	Several SNOTEL and NWS sites.
Utah	12 ski areas, 3 UDOT	4. NWS maintain them as much as possible	SNOTEL, MesoWest
Wallowa	2		SNOTEL, RAWS, local
West Central Montana	1		1 RAWS, 8 SNOTEL

Table A4: Snow and Avalanche Data

	Field Stability Tests by Staff	Logging of Field Data by Staff	Less Common Sources of Data
Bridger-Teton	Explosive testing, ski cuts	Local database (36 seasons).	Real time WYDOT Teton Pass infrasonic avalanche sensor.
Chugach	SCT, ECT	Hand, SnowPilot	
Colorado	CT, ECT, RB, PST	Own field reports, SnowPilot.	Anything we can get. Webcams.
Cordova	SS, CT, ECT	Avert	
Eastern Sierra	CT, RB, SB, ECT, PST	Hand (AIARE book), occasional SnowPilot.	Manual weather station observers.
Gallatin	ECT, CT	SnowPilot	
Glacier Country	SS, CT, SB, ECT	Hand	
Idaho Panhandle	SS, CT, RB, ECT	Hand (SEAR book), Snowpro in office.	Trained observers submit pit data.
Kachina Peaks	ECT, SS, CT	A couple programs are used to post to website.	Ski area weather posted after weather events.
Mount Shasta	CT, RB, ECT	Snowpro	
Mount Washington	CT, ECT, RB	Hand	
Northwest	SS, CT, tilt test. Ski travel tests.	Hand	
Payette	CT, ECT, PST, tilt tests, cornice drops, ski/sled cuts.	Hand, Snowpro, photos in PowerPoint	Travel and “feeling” based on experience.
Sawtooth	CT, RB less since ECT. Hand shears, ski cuts, cornice drops.	Visualog, SnowPilot, our own Pro Obs web system.	
Sierra	ECT, PST, CT, slope cuts, cornice drops, hand pits, probing	Hand, SnowPilot, video, photos	
Southeast Alaska	SS, CT, ECT, PST, SB, RB, AK Block, depends on layer.	Hand and visual logging.	Local companies. Juneau Mountain Rescue, SEADOG Rescue Team.
Utah	CT, ECT, tilt test, test slopes, cornice drops.	PowerPoint profiles, observations, photos, videos on our website.	Small army of volunteer observers. Hoards of “volunteer testers”.
Wallowa	Hand shear, SS, CT, ECT. Fewer RB, PST. Ski cuts, cornice drops.	Hand (Rite-in-Rain). Publication SnowPilot, PowerPoint.	WAC Observers Network.
West Central Montana	CT, RB ECT, SS	Hand, SnowPilot	

Common sources of data included phone and email from partners/volunteers/public, Center and public Internet forums, USFS and NPS personnel, ski patrols, and guides or commercial groups.

Table A5: Dissemination

	Public Calls	Website Visits (unique daily or indicated)	Other Dissemination	Comments
Bridger-Teton	23,294	Over one million	Email, newspaper, radio, other websites	
Chugach	no count	42,000	email	
Colorado	No idea	March daily average hits 199,965.	Email, radio, TV, Twitter.	7 hotlines
Cordova		unknown	email	Forecast on City of Cordova and AAIC websites.
Eastern Sierra	175-225		email	Friends maintains website
Gallatin	9,540	122,000	Email (2,440/day) or 289,000/year.	
Glacier Country	No count	43,000	Each advisory sent via 336 emails	
Idaho Panhandle	no count	about 6,000 hits per season	200+ email list. Radio, newspaper, TV.	Working on advisory on local NOAA website.
Kachina Peaks		Daily visits vary with weather.		Occasional press release
Mount Shasta	No count	80,000	Email, Facebook	Estimate 15,000 calls
Mount Washington	1- hotline, no count	180,000	TV, print media, occasional press release	Likely Twitter next season
Northwest	7700	6.3 million	Email, Twitter	
Payette	No count	5036	Email, TV, NWS. Radio during High.	
Sawtooth	1,300	Advisory 39,230 All pages 116,184	Radio 750AM daily, FaceBook, Twitter	E-mail 57,240
Sierra	8,000	156,000 visits, 320,000 page views	Email, Facebook, Radio, sporadic TV	
Southeast Alaska		City sites don't track	Radio, TV and email.	
Utah	30,000	2.7 million unique page views, 600,000 unique visits	Email, Twitter	
Wallowa		2800		
West Central Montana	no count	48,000	RSS feeds, email, radio	

It is hard to compare types and numbers of website visits.

Table A6: Avalanche Control

	Control by Staff	Comments
Bridger-Teton		Staff on payroll of resort for avalanche hazard reduction work
Chugach		
Colorado	Yes	
Cordova		
Eastern Sierra		
Gallatin		
Glacier Country		
Idaho Panhandle		
Kachina Peaks		Not through avalanche center however most staff at KPAC are Pro Patrollers and do avalanche control work at the ski area as part of their job duties
Mount Shasta		
Mount Washington		
Northwest		
Payette		No, but permanent FT is Blaster Certified
Sawtooth		
Sierra		
Southeast Alaska		
Utah		
Wallowa		
West Central Montana		

Table A7: Avalanche Education

	Highest Level	Total Persons	Comments
Bridger-Teton	And beyond	1,227	
Chugach	Awareness	2,000	
Colorado	3	5,463	
Cordova	1	80	
Eastern Sierra	Awareness	450	
Gallatin	Awareness	4,900	
Glacier Country	1	200	
Idaho Panhandle	Awareness	500	
Kachina Peaks	4 Avalanche awareness sessions and 3 level 1 workshops	200 plus	
Mount Shasta	Awareness & Transceiver clinics	450	
Mount Washington			Involvement in all levels of commercial run courses (approx 25) The AC does not host a course.
Northwest	Awareness	506	
Payette	Multiple Awareness & Basic Classes throughout the season.	350+	
Sawtooth	Awareness, various rescue trainings, and Introductory programs	Over 750	
Sierra			
Southeast Alaska	Awareness mostly with some level 1 and II Training.	300	
Utah	1	13,000	
Wallowa	Awareness	161	
West Central Montana	1	2000+	

Table A8: Length of Seasonal Employment

	Length of Seasonal Employment	Types of Summer Season Employment
Bridger-Teton	1 year round FT, 1 FT 6 months and PT 6 months, 2 FT 6 months, 2 PT 6 months	Geologist – Consultant, Fire fighting – GIS specialist, NPS - rescue ranger (Jenny Lake Team – Grand Teton National Park), Fishing Guide
Chugach	5-6 months	USFS, Recreation Foresters same unit
Colorado	6-12 months	Many things ☺
Cordova	6 months	Hydrology, Fisheries, Mr Mom!
Eastern Sierra	one 6 month position	Hydrology/geochemist consultant and graduate student
Gallatin	8 months	Mountain guiding, engineering.
Glacier Country	5 months	2 FT USFS working PT in the avalanche program late Nov into April. One a timber sale administrator, the other an engineer
Idaho Panhandle	Director averages about 30 days per winter. 6 people average 10 days per winter.	Timber/silviculture, hydrology, fire fighter, recreation
Kachina Peaks	Year round involvement by BOD	River Guides, Outdoor Educators, Mountain Guiding
Mount Shasta	1 FT and one seasonal	USFS Climbing Rangers
Mount Washington	3 year round with other summer duties, 1 7 month	Safety Manager, Trails Manager, Backcountry and Wilderness Manager.
Northwest	1 10 month, 2 9 month	USFS fire research, USFS RAWS weather station maintenance, personal growth
Payette	FT year round, seasonal October-April 1	FT manages USFS trail system during summer months, seasonal runs a raft guiding business
Sawtooth	Director 7 months, 1 6 month, 1 4 to 5 month seasonal depending on annual funding	River Guiding, Mountain Guiding, Catering
Sierra	2 6 month positions	NPS Climbing Ranger, Wilderness Medicine Instructor/Mountain Guide
Southeast Alaska	1 year round, 1 5 month	Commercial Fishing, Tour Guiding, Mountain Guiding.
Utah	Director, 8 months/year, 7 forecasters 6 months/year	Climbing ranger, mountain guide, firefighting, USFS work
Wallowa	5 months	
West Central Montana	December - March	Wildland firefighting



Table A9: Volunteer Organization

	Name of Volunteer Organization	Comments
Bridger-Teton	Avalanche Forecast Support Organization	
Chugach	Friends of CNFAIC	
Colorado	Friends of the CAIC	
Cordova	Alaska Avalanche Information Center	
Eastern Sierra	Friends of the Eastern Sierra Avalanche Center	
Gallatin	Friends of the Gallatin National Forest Avalanche Center.	
Glacier Country	Glacier Country Avalanche Center, Inc.	
Idaho Panhandle		Working on partnership for 2011.
Kachina Peaks	Non Profit 501c managed by Board of Directors at KPAC	Also Coconino County Search and Rescue
Mount Shasta	Friends of the Mt. Shasta Avalanche Center	
Mount Washington	Mount Washington Volunteer Ski Patrol and the Friends of Tuckerman Ravine	
Northwest	Friends of the NW Weather and Avalanche Center	
Payette	Friends of the Payette Avalanche Center (501c3)	
Sawtooth	Friends of SNFAC	
Sierra	Sierra Avalanche Center	
Southeast Alaska		
Utah	Friends of the Utah Avalanche Center	
Wallowa	Wallowa Avalanche Center	WAC is both – the dissemination center and the 501c3 fund raising organization
West Central Montana	West Central Montana Avalanche Foundation	

Table A10: Comments

	Comments
Bridger-Teton	
Chugach	
Colorado	Season length would be a good addition. Daily from Nov 1 through April 30. 3x a week in May. Updates as needed June – Oct.
Cordova	Our avalanche program is very young. My job is contracted through the city with the state splitting the cost. I also have a contract with our electric coop concerning their hydroelectric facility. Our primary concern has been the highway and the hydroelectric facility, though a backcountry forecast has evolved out of this.
Eastern Sierra	
Gallatin	
Glacier Country	Garth, thanks - - - - Stan Bones
Idaho Panhandle	Thanks for the opportunity to comment. Please keep me on the mailing list to receive any survey stats or information that is produced from this questionnaire. Thanks, Kevin Davis
Kachina Peaks	The mission of the Kachina Peaks Avalanche Center is to provide support for and to engage in avalanche education, safety, training and information exchange specific to the San Francisco Peaks in Northern Arizona. We have just finished our 5 <sup>th</sup> year as a nonprofit avalanche center and have gained public support from the community and other agencies during this time. Our primary method is to share information. The USFS has not been able to give us the support as a forecasting center due to the lack of personnel and budget. The goal for this project is to eventually become a forecasting center with support from all involved agencies including USFS, County, State, NOAA, Flagstaff City, Arizona Snowbowl Ski area and other interested parties. The Kachina Peaks Wilderness is one of the most accessible and busiest backcountry use areas in the Southwest.
Mount Shasta	
Mount Washington	We can have upwards of 3500 people in 1 backcountry bowl on a busy spring Saturday. Therefore we provide micro-scale gully by gully forecasts and verify these ratings in person. Based on the very small forecast areas we do not use modeling although we continue to build a data set through record keeping. We are in the field interacting with visitors everyday and often act as something similar to climbing rangers. We don't spend much time staffing the office, but are out maintaining rescue caches, facilities, a snowcat, snowmobiles, etc. 2 main responsibilities Avalanche forecasting/education and Search and Rescue for a total of \$200,604.
Northwest	
Payette	
Sawtooth	Our seasonal 1039 position is our safety valve if Friends funding decreases. We can start them later, end earlier or drop hours below 40/wk early and late in the season.

	Our use of general info instead of daily advisories early/late season also gives us the ability to provide pertinent information for the public but not spend the money of a full daily advisory in field time and office time. We are still working but on all the auxiliary programs and office work required to keep the center running.
Sierra	
Southeast Alaska	
Utah	
Wallowa	
West Central Montana	<p>Our program is basically supported through contributed dollars. My full time job is in fire management on the Forest but my supervisors allow me to do avalanche work part of which is funded. This is also the case with our FS observers. The University of MT has contributed 1 day per week of one of their employees to collect snow data as well. 2010 is the first year the Forest gave the Center operating dollars so the future of our program looks good as long as we continue to receive grant money from the Recreation Trails Program that MT FWP administers. Without the grant monies and support of our friends group we would be dead in the water.</p> <p>Feel free to contact me if you have more questions. Steve.</p>