

## FEDERAL-STATE COOPERATIVE SNOW COVER SURVEYS

FEDERAL, STATE AND PRIVATE AGENCIES

*March 6 - 10, 1946*  
SURVEY NOTES

Snow Surveying is completely explained in Miscellaneous Publication No. 380,  
United States Department of Agriculture.

### Brief Directions and Suggestions for Snow Cover Sampling

(1) The usefulness of snow cover surveying depends primarily on the care and honesty of the men actually doing the field work.

(2) The work of the snow cover surveyor is often laborious, especially in stormy weather, and men willing to undertake such work can usually be depended upon to do their best and record the results faithfully.

### DIRECTIONS FOR USING THE SNOW SAMPLER

#### A. Care of Sampler:

(1) In transporting sampler, extreme care should be used to guard it against injury; it can be easily dented.

(2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.

(3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac.<sup>2</sup> This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.

(4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.

(5) Keep the cutter sharp and the orifice true to its original diameter (1½ inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the improved Utah Aluminum Tube is used).<sup>3</sup>

#### B. Measuring for Samples:

Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Note any irregular spacing between samples. Care should be used in spacing by tape measurements, so that the samples taken different years on the same course will be at the same spots.

(1) Plunging the tube should be avoided. In driving, a steady down-thrust is preferable to twisting, because with the latter a small amount of snow enters the slots. However, a minimum amount of twisting aids in the driving and also facilitates the quick cutting of the thinner crusts. Plunging should be entirely unnecessary. In case the sampler sticks or freezes down, a light twist will usually release it.

(2) The presence of temperatures below 32 degrees F. in the snow, while the temperature of the air is above freezing, often causes the snow to adhere firmly to the orifice of the cutter after a depth of from 10 to 12 feet has been reached. This difficulty can be met in three ways.

(a) Withdraw the sampler when cutter becomes clogged and clean cutter and tube thoroughly. Push the tube rapidly through the snow without stopping until bottom is reached but do not plunge tube. Repeat until a complete core is obtained.<sup>4</sup>

(b) If snow sampling is being done in the forest, keep the sampler as much as possible to keep it cold.

(c) The best method of all is to sample when the temperature of the air is above freezing, or late in the season when the temperature of the snow has risen to 32 degrees F. At these times the snow is soft and the sampler will slide through rapidly.

In some cases, where not too far from a night's lodging, time can be saved by taking the samples in the morning or evening instead of during the warm part of the day.

#### C. Weighing the Sample.

Before taking the sample, place the empty sample tube in the cradle hanging from the scales. If the Mt. Rose scale is used, turn the pointer back to zero. If the standard tubular scale is used, record the weight empty in proper column in field book. When the sample has been taken, place the sampler in the cradle and record the weight for tube and core. For the Mt. Rose scale this reading equals the water content of the snow core. For the standard tubular scale the water content is given by the difference between the reading empty and the reading for tube and core. The zero setting in the case of the Mt. Rose scale, and the "empty" reading for the standard tubular scale should be checked at frequent intervals (not more than 5 measurements).

If dirt is picked up by the cutter it should be cleaned out with knife before weighing the sample, and proper deduction made before recording length of core or depth of snow.

#### D. Recording:

The snow cover survey sheets are made in pads of two sizes, the smaller being white and the larger pink. Only the white waterproof pads are to be used for field notes. The larger pink pads are to be used to make copies from the white field sheets as soon as possible after each survey. Instructions regarding the disposition of the pink copy sheets will be issued for each State and where necessary for each drainage basin, since the needs will require some variation in this respect.

Appropriate covers are to be provided for protection of field notes. Sketch maps showing points of observation are pasted to the inside of the covers.

Use pencil only for recording field measurements. Fill in complete description of course, party, date, etc.

If the depth of core is very much less than the depth of snow, the reason should be determined and noted under "Remarks." In case of doubt regarding the core, determine the density (water content divided by depth gives density) and compare with that of other adjacent measurements about which there is no doubt. "Remarks" should include special items as to the character of snow, nature and condition of soil or other bottom reached by the cutter, whether wet, dry, frozen, etc.

Any extended remarks as to weather conditions at the time of survey or shortly before the survey, unusual difficulties encountered, etc., may be placed on the back of the sheet, as one side only is to be used in recording the snow measurements.

<sup>10</sup>Or paraffin.

<sup>11</sup>If the cutter is broken or badly worn, send first tube section with cutter attached to your regional snow survey office for repair or replacement.

<sup>12</sup>A complete core is evidenced when length of core compared to snow depth is approximately the same throughout a course.

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State California  
Drainage Basin S. yuba  
Snow Course Dogman Summit  
Party J.J. + JFC  
Date March 6/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
								J.J. Found clearing track at head of course.
								- Thermometer -
								Dug out by J.J. 65 in - Whale of job.
								D. 6.5      22° F.      Water on Tube.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
No.....of.....sheets.      Comp. by.....Checked by.....

This report was prepared by the  
 U.S. Geological Survey, Department of the Interior  
 under the direction of the Chief Geologist, and  
 under the immediate supervision of the District  
 Geologist, in accordance with the provisions of  
 the Act of March 3, 1899, (30 Stat. 1037),  
 and the Act of August 1, 1917, (40 Stat. 769).

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin S. Yuba  
 Snow Course Dobner Summit  
 Party J.D. + J.W.C.  
 Date March 6/46

*Description or Number of Course	†Sam- ple Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
Releases #13+14 to check effect of double driving (Phil Conzill) later protected incase of pp summit (3 feet)								
	13	114.5	98	69				Releases.
		-1.5	-	-				net under
	13	94	83	68	112	94		
		-5	-5					Soil net Ore sampler.
	14	84	77	69	99	30		Soil moist
		-2.5	-2.5					
Balance of special meas. beyond 1-14.								
	15	62	45.5	69	92	23		Moist earth.
	15 <sup>a</sup>	87	78.5	69	107.5	36.5		
	15 <sup>b</sup>	89.5	80	69	105	36		Snow moist crusts
		-2.2	-2.2					

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

This report was prepared by the U.S. Geological Survey  
 under the direction of the Chief Hydrographer and  
 under the immediate supervision of the Chief of the  
 Hydrographic Survey, and is published by authority of  
 the Secretary of the Interior, U.S. Department of  
 the Interior, Washington, D.C.

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COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin S. Yuba  
 Snow Course Danner Summit  
 Party J. J. + J. E. C.  
 Date March 6/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	16	89	83.5	69	106.37			Moist snow
	-1	-1	-1					
	17	97	86	69	111.42			
	17 <sup>a</sup>	99	96	69	115.46			Large water crystals core crushes
	18	102	101	69	114.45			Warm, in middle layer No sticking.
	18 <sup>a</sup>	106	100	69				
	In same hole							
	108.5	104.5	69	118.5	119.5			2 in gray snow bit moist, yet hard
	-3	-3						
	Any accretion?							

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

COOPERATIVE SNOW SURVEYS  
 FEDERAL BUREAU OF SURVEYING  
 UNITED STATES DEPARTMENT OF AGRICULTURE  
 WASHINGTON, D. C.

No. of Courses	Sample No.	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of Tube and Core	Water Content	Density	Remarks

DATE *March 6, 1946*  
 STATE *California*  
 DRAINAGE BASIN *S. Yuba*  
 SNOW COURSE *Palmer Summit*  
 PARTY *J. J. & J. S.*  
 DATE *March 6, 1946*

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State *California*  
 Drainage Basin *S. Yuba*  
 Snow Course *Palmer Summit*  
 Party *J. J. & J. S.*  
 Date *March 6, 1946*

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
	<i>19</i>	<i>90</i>	<i>83.5</i>	<i>69</i>	<i>102</i>	<i>33</i>		
	<i>19</i>	<i>95</i>	<i>86.5</i>	<i>69</i>	<i>110</i>	<i>41</i>		
	<i>-3</i>	<i>-3</i>						

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

COOPERATIVE SNOW SURVEYS  
 FEDERAL BUREAU OF SURVEY  
 U. S. DEPARTMENT OF AGRICULTURE  
 WASHINGTON, D. C.

- 3 -  
 110 AT  
 103 3

No. of samples	Depth of snow	Depth of core	Length of core	Weight of empty tube	Weight of tube and core	Water content	Density per cent	Remarks
1	23	1						
1	10	1						

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin S. Yuba  
 Snow Course D. J. J. Summit  
 Party J. J. + J. E. C.  
 Date March 6/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
		- Dye -						
In snow			Dec. 31 -					
			New snow		23 <sup>in</sup>			
			Penetration		1 <sup>in</sup>			Has frozen New
			March 1 -					
			Penetration		10 <sup>in</sup>			
			but 2 <sup>in</sup> top depression due to irregularity of red					
			Feb 1 -					
			New snow		10 <sup>in</sup>			Dye frozen in snow Purple + red.
			Penetration		1 <sup>in</sup>			

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

and...  
 for...  
 snow...  
 to...  
 of...  
 to...

*[Faint handwritten notes and sketches on a grid background]*

No. of Samples	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of Tube and Core	Water Content	Density	Remarks
1	15						
1	15						
1	15						
1	15						

COOPERATIVE SNOW SURVEYS  
FEDERAL AND STATE

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

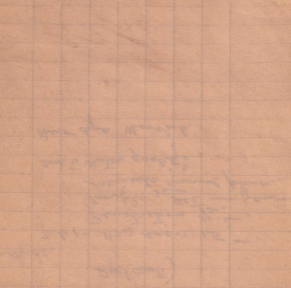
State California  
 Drainage Basin S. Yuba  
 Snow Course Dorner Summit  
 Party J.P. + J.C.  
 Date March 6/16

*Description of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
Includes								Dye (cont.)
								Feb 1 - New snow 15 in.
								Penetration 1/2 in.
								Sample, but in few moments turned glass.
								one to Water quality?
								New dye March 6.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
 No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_



This notebook is intended for use in the field for recording data on snow courses. It is designed to be used in the field and should be carried in a waterproof container. The notebook is divided into two parts: a top part for recording data on snow courses and a bottom part for recording data on snow samples. The top part is divided into columns for recording the following information: Date, Location, Course No., Depth of Snow, Length of Core, Weight of Empty Tube, Weight of Tube and Core, Water Content, Density, and Remarks. The bottom part is divided into columns for recording the following information: Sample No., Depth of Sample, Length of Sample, Weight of Sample, and Remarks. The notebook is designed to be used in the field and should be carried in a waterproof container.



Date	Location	Course No.	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of Tube and Core	Water Content	Density	Remarks
1946	Sierra Nevada	1	74	65	69	103.53	5		Bottom 2 inches water frozen
1947	Sierra Nevada	2	71	57	69	98	29		Wat snow crystals
1948	Sierra Nevada	3	78	70	69	104	35		Dirt 1/2 inch litter
1949	Sierra Nevada	4	79	70	69	108	39		-1.2 -1.2
		5	74	65.5	69	105	36		unchanged
		5 <sup>a</sup>	73	64	69	106	37		Soil
		6	75.5	66	69	105	36		Soil
		6 <sup>a</sup>	79	73	69	107	38		Soil only moist
									-1.7 -1.7

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin S. Yuba  
 Snow Course Soda Springs No. 1  
 Party J. J. & J. C. H.  
 Date March 6/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	74	65	69	103.53	5		Bottom 2 inches water frozen
	2	71	57	69	98	29		Wat snow crystals
	3	78	70	69	104	35		Dirt 1/2 inch litter
	4	79	70	69	108	39		-1.2 -1.2
	5	74	65.5	69	105	36		unchanged
	5 <sup>a</sup>	73	64	69	106	37		Soil
	6	75.5	66	69	105	36		Soil
	6 <sup>a</sup>	79	73	69	107	38		Soil only moist
								-1.7 -1.7

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

U.S. DEPARTMENT OF AGRICULTURE  
 FOREST SERVICE  
 COOPERATIVE SNOW SURVEYS  
 FORM NO. 1  
 (REVISED 1943)

*[Faint handwritten notes and bleed-through from the reverse side of the page.]*

Name of sampler: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Name of place: \_\_\_\_\_  
 Name of party: \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
 RECORD AND SLIP

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Kuyuba  
 Snow Course Soda Flats No. 1  
 Party J. J. + J. J.  
 Date March 6/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks †
	7	95	67	69	105	36		Some hard brng core crushed
		-1.3	-1.3					
	8	73	65	69	101	31		
	8 <sup>a</sup>	83	72	69	105	36		Moist soil + soil crushed
		-3.3	-3.3					
	9	72	49	69	96	29		
	9 <sup>a</sup>	79.5	69	69	102.5	33.5		
	9 <sup>b</sup>	84	61	69	102	33		
	9 <sup>c</sup>	87	76	69	107	38		
		-3	-3					
	10	85	66	69	108	39		Soil 3 in. fairly moist Mostly crushed
	10 <sup>a</sup>	86.5	79.5	69	109	40		
		-1.5	-1.5					

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

This notebook should be used to record  
 all data obtained by any method of snow sampling, in particular  
 that of the special snow sampler, and the results of the  
 analysis of the samples. The notebook should be used to  
 record the date, time, place, and name of the sampler,  
 the number of the course, the number of the sample,  
 the depth of the snow, the length of the core,  
 the weight of the tube and core, the water content,  
 and the density of the snow.

No. of Sample	Number of Course	Depth of Snow	Length of Core	Type of Tube	Weight of Tube and Core	Water Content	Density	Remarks
11	89	70.5	69	105	36			Grass, sandy soil
		-1.5	-1.5					
12	84.5	79	69	103	34			Crushed or results
		-2.2	-2.2					
13	85	60	69	107	38			
		-1	-1					
13 <sup>a</sup>	89	77	69	108.5	39.5			
		-1	-1					
3)	10413				472			
	80.1				363			Dens, 453 70

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

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 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin S. Yuba  
 Snow Course Soda Springs No. 1  
 Party J. J. + J. C.  
 Date March 6, 1946

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	11	89	70.5	69	105	36		Grass, sandy soil
		-1.5	-1.5					
	12	84.5	79	69	103	34		Crushed or results
		-2.2	-2.2					
	13	85	60	69	107	38		
		-1	-1					
	13 <sup>a</sup>	89	77	69	108.5	39.5		
		-1	-1					
	3)	10413				472		
		80.1				363		Dens, 453 70

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

This notebook should be used for recording data from snow surveys. It should be filled out for each snow course and for each sample. The snow course should be described in the upper part of the page and the data for each sample should be recorded in the table below.

No. of course or sample	Sample No.	Depth of snow in inches	Length of core in inches	Weight of empty tube	Weight of tube and core	Water content in inches	Density per cent	Remarks
1746								
1747								
2000	Course							
2001	Sample							
2002	Sample							

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin S. Yuba  
 Snow Course Solar Spgs. Pasture  
 Party JG + JED  
 Date March 6/46

*Description or Number of Course	†Sample Number	Depth of Snow in Inches	Length of Core in Inches	Weight of Empty Tube	Weight of tube and Core	Water Content in Inches	Density Per Cent	Remarks
Mdnb/46	3	15	Dye					
(1) March 5			Penetration			8 1/2 in		Brilliant red
(2) Feb 25			"			36 in		10% at surface
(3) Jan 25								
						20 in		
						23 in		Red
(4) Jan 31								
						23 in		
						20 in		

JG suggests transparent tubes to read dye depths thru.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.



COOPERATIVE SNOW SURVEYS

Form No. 1

(Revised 1954)

No. of Courses or Number of Courses: \_\_\_\_\_  
 Sample No. \_\_\_\_\_  
 Depth of Snow \_\_\_\_\_  
 Length of Core \_\_\_\_\_  
 Weight of Empty Tube \_\_\_\_\_  
 Weight of Tube and Core \_\_\_\_\_  
 Water Content \_\_\_\_\_  
 Density Per Cent \_\_\_\_\_  
 Remarks: \_\_\_\_\_

COOPERATIVE SNOW SURVEYS

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State: \_\_\_\_\_  
 Drainage Basin: \_\_\_\_\_  
 Snow Course: Soda Sp.  
 Party: Quartz  
 Date: \_\_\_\_\_

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
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Notes

Glycerin hole. Circulation gear? The sampler is driven by side pressure, creating a film of moisture that freezes.

Salt snow. Bob Scott said that autos will actually flock with salt!

Take records for Jackson.

Phil Conzill re Furman that test at Donner Pass shows accumulation by redrifting in same holes.

Took Bus to Reno Wednesday, returned Friday morning.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Containing \_\_\_\_\_ of \_\_\_\_\_  
 This notebook is intended for recording data of snow courses  
 around the perimeter of the course and to record the location  
 of the snow courses and to record the location of the snow  
 No. 1, of \_\_\_\_\_ of \_\_\_\_\_  
 This notebook is intended for recording data of snow courses

*[Faint handwritten notes and diagrams, possibly a sketch map of the snow course layout.]*

Name of course or number of course: \_\_\_\_\_  
 Sample No.: \_\_\_\_\_  
 Date of snow course: \_\_\_\_\_  
 Name of person: \_\_\_\_\_  
 State: \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

State: California  
 Drainage Basin: Sagehen Spgs. Pasture  
 Snow Course: Special cross-section  
 Party: W. J. S. C. by trade to determine variation in density  
 Date: March 8/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
1	13	12	100	104.8	104.8	4.8	36.9	
2	7	3 1/2	98.5	100	100	1.5	21.4	{ Top of section 1 in. ice
3	8	4.3	99	101	101	2	25	
4	20.5	20.5	99	108	108	9	43.9	
5	9.5	9.5	98	102.8	102.8	4.9		{ Top of section is ice consists in thick
6	8	8	98	102	102	4		
7	11	10.5	98	103	103	5		
		77	67.3			31.1		
		78	67	68	103	35	44.4	

\*Show number of description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by Survey again smilling crusts. Checked by \_\_\_\_\_

and a. (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (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) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

2 57 22 58 192 77 1 1911  
 2 8 2 85 11 2 22  
 5 3 2 82 10 2 22  
 1 13 5 10 10 2 22

of course & number of description  
 number of sample  
 depth of snow in inches  
 length of core in inches  
 weight of empty tube  
 weight of tube and core  
 water content in percent  
 density per cent

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Tulare  
 Snow Course Tulare R.S.  
 Party J.P. + J.C.  
 Date March 9/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
								- Tank -
								10:50am D. 1.40 <sup>in</sup> (0.4)
								Ralph Trap. Mr. So assistant. Sun down (at 4:30pm) at 4:50pm Moon, 4:30pm. and 10 am. at first.
								Dyna (in shade) has penetrated to bottom. So all have penetrated " (in sun) Penetrated
								- Density -
								(g) In shade 28 24.5 52 64.5 12.5 44?
								(h) In sun 39 34.5 52 68 16

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
 No.....of.....sheets. Comp. by.....Checked by.....



COOPERATIVE SNOW SURVEYS  
FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS  
FEDERAL AND STATE

Date: March 9/46  
 State: California  
 Drainage Basin: Tuacac  
 Snow Course: Tuacac R. S.  
 Party: J. J. + J. J.  
 Date: March 9/46

COOPERATIVE SNOW SURVEYS  
FEDERAL AND STATE

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State: California  
 Drainage Basin: Tuacac  
 Snow Course: Tuacac R. S.  
 Party: J. J. + J. J.  
 Date: March 9/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
								- Temp. -
								Max. Mch 8 55.5°F
								Min. " 9 17°F
								Humid. Mch 9 - 100%
								Pres. 72%
								- Dye penetrations -
								Depth - Rapid penetration -
								(See J's notes)
								* 2 in sun - 6 in in half hour -
								- crust -
								In shade 4 in -
								Soft snow in sun over crust 4 in

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

COOPERATIVE SNOW SURVEYS

FEDERAL AND STATE

State California  
 Drainage Basin Tulare  
 Snow Course Tulare R.S.  
 Party J.J. + J.C.  
 Date March 9, 1946

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Tulare  
 Snow Course Tulare R.S.  
 Party J.J. + J.C.  
 Date March 9, 1946

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
<del>X</del>								Site for new Drip Tower in snow?
								Suggested: E. of N. of Thorne Shelter Ralph Trapp will observe best spot.
								1 pm. Dye Penetration
								(a) 11 am to 1 pm 26 in. In sun, but now shade Dye on surface, not covered
								(b) 11:35 to 1 pm (90 min). In sun but top of dye covered by 2 in. of white snow. Penetration 16 in.

Tough H-T-60°E  
 Altimeter 20%

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

The following information should be furnished for each snow course:  
 1. Name of the course, including the name of the place and the name of the person who established the course.  
 2. Location of the course, including the name of the place and the name of the person who established the course.  
 3. Date of establishment of the course.  
 4. Name of the person who established the course.  
 5. Name of the person who is in charge of the course.  
 6. Name of the person who is in charge of the course.  
 7. Name of the person who is in charge of the course.  
 8. Name of the person who is in charge of the course.  
 9. Name of the person who is in charge of the course.  
 10. Name of the person who is in charge of the course.

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 6. Name of the person who is in charge of the course.  
 7. Name of the person who is in charge of the course.  
 8. Name of the person who is in charge of the course.  
 9. Name of the person who is in charge of the course.  
 10. Name of the person who is in charge of the course.

No. Course or Sample Description	Number of Samples	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
1345								
1346								
1347								
1348								
1349								

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

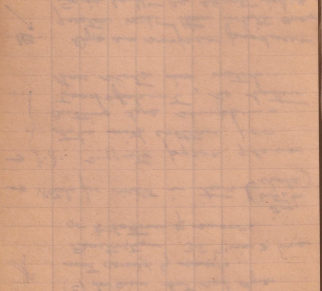
State California  
 Drainage Basin Tuolumne  
 Snow Course Tuolumne R.S.  
 Party J.J. + J.E.T.  
 Date March 9/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
								(c) In snow but red dye not covered by snow. Penetration 35" in 2 hrs or to bottom of snow.
								→ Watch for melt in shade (but in shade) <sup>it is</sup>
								→ J.J. suggests pyrex glass tube with cutter for cutting dye samples - transparent, so better than slots in metal.
								13. Dye on surface produces greater melt than white snow. So is fairly as exact index

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

and ...  
 for ...  
 the ...  
 the ...  
 the ...  
 the ...  
 the ...



No. Course or Sample Description	Number of Samples	Depth of Snow in Inches	Length of Core in Inches	Type of Tube or Method	Core Size in Inches	Water Content in %	Core Wet Weight	Remarks
1010	3	30	12	...	...	...	...	...
1012	3	30	12	...	...	...	...	...
2000	3	30	12	...	...	...	...	...
1011	3	30	12	...	...	...	...	...

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Tuolumne  
 Snow Course Tuolumne R.S.  
 Party J.P. and J.E.C.  
 Date March 9/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
<u>Tests</u>								
								Dirt on snow, but dye under 2 in. of snow with dirt on surface. Dye will provide the color index for dirt.
								Temperatures
								Snow 30 in. deep
								(a) In sun and shade 32° - 0.2°F
								(b) In shade 32°
								Both set on bottom
								(c) In shade 32°

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
 No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

No. \_\_\_\_\_ Date \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

*[Faint, mostly illegible handwritten notes and sketches on a grid background.]*

of course or number of observations \_\_\_\_\_  
 Date by \_\_\_\_\_  
 Date of year \_\_\_\_\_  
 Date of collection \_\_\_\_\_  
 Date of use \_\_\_\_\_  
 Date of analysis \_\_\_\_\_  
 Date of report \_\_\_\_\_  
 Date of publication \_\_\_\_\_

СОЮБЕРКАЛІАБ СНОВ СУКАВАБ  
 БЕДЕРКАТ УМД БЛІВІЕ

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Tamrock  
 Snow Course Rancho Lake  
 Party J.J. and J.S.C.  
 Date March 9/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
								- 1245 -
Feb 26 <sup>(a)</sup>		55 in						Penetration to bottom. Cap 8 in deep #
Mar 1 <sup>(b)</sup>		56 in						Penetration within 1/2 to 2 in. of bottom. Cap 8 in
Jan 25								Covered by white snow. To bottom. Both in afternoon sun. Cores bright red after exposure to sun. Query - How much melt from dye opaqueness?
								→
								Density at Dye Planting
	1	56	45	52.5	77.245			
	1 <sup>a</sup>	58	49	52	75.8	23.5		
								- 115 - 2

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

This notebook is to be used for recording data from snow courses. It should be filled out as soon as possible after each snow course is run. The data should be recorded in the spaces provided. The name of the snow course should be written in the space provided. The date and time of the snow course should also be recorded. The name of the person who ran the snow course should be recorded. The name of the person who checked the data should be recorded. The name of the person who prepared the report should be recorded. The name of the person who reviewed the report should be recorded. The name of the person who approved the report should be recorded. The name of the person who distributed the report should be recorded. The name of the person who filed the report should be recorded. The name of the person who retrieved the report should be recorded. The name of the person who destroyed the report should be recorded.

10-20-40-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100  
 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100

Date \_\_\_\_\_  
 Location \_\_\_\_\_  
 Name of Course \_\_\_\_\_  
 Name of Person \_\_\_\_\_  
 Name of Person \_\_\_\_\_  
 Name of Person \_\_\_\_\_

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Truckee  
 Snow Course Danner Lake  
 Party J.P. and J.S.C.  
 Date March 9 / 46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
- Photo -								
No. 2 of drip tank ←								
- Temp. of Snow -								
Both set with bottom of tube		30 in						
beneath surface of snow		(a) In sun		32°F				
		(b) In shade		32°F				
		(c) Sail waist and soft sand						
Air + sun temp. uncomfortably warm.								
2:30 pm		New Dye		and part covered				
		In thick shade		Part increased by white snow.				
		In sun		Covered by white snow.				

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 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. 1 of 10 sheets of this series  
 U.S. GEOLOGICAL SURVEY  
 WASHINGTON, D. C.  
 1946

Date: March 9/46  
 Locality: Truckee  
 Snow Course: Panther Pass  
 Party: G. J. + J. S. C.  
 Diameter of tube: 1.5

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State: California  
 Drainage Basin: Truckee  
 Snow Course: Panther Pass  
 Party: G. J. + J. S. C.  
 Date: March 9/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
4 from cool breeze	Drip Taws				2.14			Rain stopped?
	1st				2.10			
	" 5				2.15			[See over]
- 10pc -								
March 5 (Depression 5 1/2')								
	1.					26"		
						1/2 in		
	2.	1st	15 in.					(1 in thick)
		2nd	20"					(Very faint 1/2 in)
	3.	Same as No. 2						
	4.	1st	6 in.					(Bright 1 in)
		2nd	14 in					(Very slight read 1/2 in)

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

*Driftland at Truckee P.S.*

March 2 1.4<sup>in</sup>  
 " 6 1.3  
 " 9 1.3, 1.35, 1.4  
 Taken by Billy.

Date \_\_\_\_\_  
 Locality \_\_\_\_\_  
 Snow Course \_\_\_\_\_  
 District \_\_\_\_\_  
 State \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Siyuba  
 Snow Course Dunsmuir Pass  
 Party J.J. + B.C.  
 Date March 9, 1916

*Description or Number of Course	†Sam- ple Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
Feb 27. 11		under 3 3/4 in new snow						Penetration 6 in. Brilliant. (Close to orig. dip) Snow moist packs.
	(2)							Penetration 11 in. Not so brilliant
	(3)							" 10 in. Color faint (faded from orig. dye)
Temp. seems higher or snow moister than before. Any frost now in snow? Tag sampler in early morning -								

New dye - General

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.



No. of sheets \_\_\_\_\_ of \_\_\_\_\_

The following sheets should be prepared in duplicate  
 for studies in which the description and spacing of points is more  
 than 100 ft. apart and the course and points are shown  
 on a map. The description of the course and points should  
 be given in the following order: 1. Name of the course, 2. Direction  
 of the course, 3. Description of the points, 4. Spacing of the points.

337-5

No. of Course or Sub-course	Sample No.	Depth of Snow in Inches	Length of Core in Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content in Inches	Density Per Cent	Remarks
-----------------------------	------------	-------------------------	--------------------------	----------------------	-------------------------	-------------------------	------------------	---------

DATE \_\_\_\_\_

TIME \_\_\_\_\_

SNOW COURSE \_\_\_\_\_

DRAINAGE BASIN \_\_\_\_\_

PARTY \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State California

Drainage Basin S. Yuba

Snow Course Soda Springs - Pasture

Party J. J. [unclear]

Date March 9/46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
March 9 - 5:30 pm								Effect of surface eye
Mar. 8 - 6 pm on top								(in sun) Penetrated 52 in. in 24 hrs
"								eye in hole 1 ft deep (in shade) penetrated 25 in 24 hrs.
Mar. 5 - 9 pm on surface								in high humidity. Penetrated 54 in by Mar 8 and 60 in by 5 pm tonight. Now 12 in from ground.
Feb 25								Now under 2 in. white snow
76 in								Penetrated 23 in at 51 pm

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

[Over]

# 7  
 In warmer weather, the opaque surface dye causes an unnatural and artificial melting of the snow with excess of melt water which by its bulk penetrates deeper than the natural melt water.

and indicates a melting rate quite exaggerated and disturbing. The natural snow melt has yet penetrated only 2 feet as compared with the artificial of 5 feet.

The snow covered dye is far safer as an index.

COOPERATIVE SNOW SURVEYS

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin S. Yuba  
 Snow Course Parsons Pass  
 Party J. J. and J. H. C.  
 Date Sunday March 10, 1946

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	7	219	216	185.98	113	51.1	= 18 1/4	

Total depth 256 in. (at mass. Mar. 5)

→ No chipping - If teeth had been sharper, probably J. J. could have forced sampler to the bottom.

Temp. at bottom 32°F.  
 Tube covered with flecks of wet snow but tube was warm and melted down very slowly.  
 Core: Part dry crushed. Moist resisted crushing.

Top of snow moist. Dye red.  
 Temp. of surface 35° approx,  
 humid. 80-100%.  
 Scudding clouds.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

Manches - Sampling -

No. 7.

W. E. Day

96.5 97.5 190 230 40 41.5

Corr. 96.5 97.5 185 230(?) 45? 46.6\*

But if in the wind 190 was  
5<sup>in</sup> too high, should not 230<sup>in</sup>.  
also be 5<sup>in</sup> too high?

Met observer from Bear and  
promised to come up soon.

Called Truckee R.S.

Shovel has been picked up.

Shells

Klysten can be heated, and  
rubbed thin on skin, and  
probably in samples

\* Sample the first (upper)  
10 feet again in calm.

COLETTALIA SNOW SOKALAS  
LEBERT VED SLIVE

- Precip. Feby -

	in
Feb 2	0.03
3	1.10
4	.22
6	.29
7	.37
11	.28
15	.02
20	.40
21	.78
22	.03
24	.21
27	.71
28	.06
	<u>4.50</u>

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

## FEDERAL-STATE COOPERATIVE SNOW COVER SURVEYS

FEDERAL, STATE AND PRIVATE AGENCIES

### SURVEY NOTES

Snow Surveying is completely explained in Miscellaneous Publication No. 130,  
United States Department of Agriculture.

#### Brief Directions and Suggestions for Snow Cover Sampling

- (1) The usefulness of snow cover surveying depends primarily on the care and honesty of the men actually doing the field work.
- (2) The work of the snow cover surveyor is often laborious, especially in stormy weather, and men willing to undertake such work can usually be depended upon to do their best and record the results faithfully.

#### DIRECTIONS FOR USING THE SNOW SAMPLER

##### A. Care of Sampler:

- (1) In transporting sampler, extreme care should be used to guard it against injury; it can be easily dented.
- (2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.
- (3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac.<sup>2</sup> This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.
- (4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.
- (5) Keep the cutter sharp and the orifice true to its original diameter (1½ inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the improved Utah Aluminum Tube is used).<sup>2</sup>

##### B. Measuring for Samples:

Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Note any irregular spacing between samples. Care should be used in spacing by tape measurements, so that the samples taken different years on the same course will be at the same spots.

(1) Plunging the tube should be avoided. In driving, a steady down-thrust is preferable to twisting, because with the latter a small amount of snow enters the slots. However, a minimum amount of twisting aids in the driving and also facilitates the quick cutting of the thinner crusts. Plunging should be entirely unnecessary. In case the sampler sticks or freezes down, a light twist will usually release it.

(2) The presence of temperatures below 32 degrees F. in the snow, while the temperature of the air is above freezing, often causes the snow to adhere firmly to the orifice of the cutter after a depth of from 10 to 12 feet has been reached. This difficulty can be met in three ways.

(a) Withdraw the sampler when cutter becomes clogged and clean cutter and tube thoroughly. Push the tube rapidly through the snow without stopping until bottom is reached but do not plunge tube. Repeat until a complete core is obtained.<sup>2</sup>

(b) In case sampling is being done in the forest, keep the sampler in the shade as much as possible to keep it cold.

(c) The best method of all is to sample when the temperature of the air is at or below freezing, or late in the season when the temperature of the deep snow has risen to 32 degrees F. At these times sampling is easy and rapid.

In some cases, where not too far from a night's lodging, time can be saved by taking the samples in the morning or evening instead of during the warm part of the day.

#### C. Weighing the Sample.

Before taking the sample, place the empty sample tube in the cradle hanging from the scales. If the Mt. Rose scale is used, turn the pointer back to zero. If the standard tubular scale is used, record the weight empty in proper column in field book. When the sample has been taken, place the sampler in the cradle and record the weight for tube and core. For the Mt. Rose scale this reading equals the water content of the snow core. For the standard tubular scale the water content is given by the difference between the reading empty and the reading for tube and core. The zero setting in the case of the Mt. Rose scale, and the "empty" reading for the standard tubular scale should be checked at frequent intervals (not more than 5 measurements).

If dirt is picked up by the cutter it should be cleaned out with knife before weighing the sample, and proper deduction made before recording length of core or depth of snow.

#### D. Recording:

The snow cover survey sheets are made in pads of two sizes, the smaller being white and the larger pink. Only the white waterproof pads are to be used for field notes. The larger pink pads are to be used to make copies from the white field sheets as soon as possible after each survey. Instructions regarding the disposition of the pink copy sheets will be issued for each State and where necessary for each drainage basin, since the needs will require some variation in this respect.

Appropriate covers are to be provided for protection of field notes. Sketch maps showing points of observation are pasted to the inside of the covers.

Use pencil only for recording field measurements. Fill in complete description of course, party, date, etc.

If the depth of core is very much less than the depth of snow, the reason should be determined and noted under "Remarks." In case of doubt regarding the core, determine the density (water content divided by depth gives density) and compare with that of other adjacent measurements about which there is no doubt. "Remarks" should include special items as to the character of snow, nature and condition of soil or other bottom reached by the cutter, whether wet, dry, frozen, etc.

Any extended remarks as to weather conditions at the time of survey or shortly before the survey, unusual difficulties encountered, etc., may be placed on the back of the sheet, as one side only is to be used in recording the snow measurements.

<sup>1</sup>Or paraffin.

<sup>2</sup>If the cutter is broken or badly worn, send first tube section with cutter attached to your regional snow survey office for repair or replacement.

<sup>3</sup>A complete core is evidenced when length of core compared to snow depth is approximately the same throughout a course.

Faint, illegible text at the top of the page, possibly bleed-through from the reverse side or very light handwriting.

**FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS**

State .....  
Drainage Basin .....  
Snow Course .....  
Party .....  
Date .....

*Description or Number of Course	†Sam- ple Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
<i>Sample Junction Pass - Upper 10 FT.</i>								
<i>Visit Observatory on Pass</i>								
<i>To Kiski</i>								

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
No. .... of ..... sheets. Comp. by ..... Checked by .....

This form is to be filled out by the observer at the time of the survey. It should be filled out for each sample taken. The information given here will be used in the preparation of the final report.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Name of Observer: \_\_\_\_\_  
 Name of Station: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Name of Party: \_\_\_\_\_

**COOPERATIVE SNOW SURVEYS**  
**RECORD AND SLIP**

**FEDERAL AND STATE**  
**COOPERATIVE SNOW SURVEYS**

State: California  
 Drainage Basin: Truckee River  
 Snow Course: Truckee Ranger Station  
 Party: J. Johnson - R. Johnson  
 Date: 4-11-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	29	22	52	62	10		
	1a	32	21	52	61	9		
	2	27	24	52	62	10		
	3	32.5	27	52	65	13		
	4	27	25.5	52	63	11		
	5	28	18.5	52	60	8		-2.5
	6	26	21.5	52	60	10		
	7	27	25.5	52	63.5	11.5		
	8	21	17.5	52	59.5	7.5		
	212.5					81.0		
	256					10.1		Dens
								38.0%

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE  
 WASHINGTON, D. C.

No. of Courses of Sample Distribution	Distance between Courses in Feet	Depth of Snow in Feet	Length of Core in Feet	Wt. of Empty Tube	Wt. of Core	Water Content in Feet	Density Per Cent	Remarks
1	59	53	52	79				
1a	61	52	52	79	7		-1	
2	60	46	52	76	24			
3	63	56	52	79	27			
3a	63 1/2	55	52	77.5				
4	53	48	52	75	23		-0.05	
5	62	55	52	78				
5a	62	57	52	79	27			
6	67	61	52	82	30			
7	60	44	52	65	13		-0.05	

COOPERATIVE SNOW SURVEYS  
FEDERAL AND STATE

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State Calif.  
 Drainage Basin Truchee River  
 Snow Course Donner Lake  
 Party J. Hansen + E. Johansen  
 Date 4-11-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	59	53	52	79			
	1a	61	52	52	79	7		-1
	2	60	46	52	76	24		
	3	63	56	52	79	27		
	3a	63 1/2	55	52	77.5			
	4	53	48	52	75	23		-0.05
	5	62	55	52	78			
	5a	62	57	52	79	27		
	6	67	61	52	82	30		
	7	60	44	52	65	13		-0.05

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.



This is a form for recording snow survey data. It includes fields for State, Drainage Basin, Snow Course, Party, and Date. Below these fields is a table for recording sample data, and a section for calculations and remarks.

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Truckee River  
 Snow Course Donner Lake  
 Party J. Johnson & E. Johnson  
 Date 4-11-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	8	70	62	52	81	29		
	9	59.5	56	52	76	24	-1.5	
	10	58	48	52	77	25	-1"	
	11	55	47	52	75	23		
	12	51	44	52	76	24		
	12	71.5				276		
		59.6				230		38.6%

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

This form is to be filled out by the observer at the time of the snow survey. It should be filled out for each course and for each sample. The observer should fill in the date, time, and location of the survey. He should also fill in the number of the course and the number of the sample. The observer should also fill in the depth of the snow, the length of the core, the weight of the empty tube, the weight of the tube and core, the water content, and the density. The observer should also fill in the remarks.

No. of Course or Sample	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of Tube and Core	Water Content	Density Per Cent	Remarks
1	40	36	52	69	17		
1a	40	35	52	68			
1b	40	29	52	63			
2	39	37	52	73	21		
2a	40	35.5	52	72			
3	70.5	68	52	84			
3a	71.5	69.5	52	86	34		
4	95	88	52	102	50		
5	43.5	35	52	69			
5a	43.5	39.5	52	73	21		
6	26	24	52	65			
6a	92	77	52	96	44		

Date \_\_\_\_\_  
 Location \_\_\_\_\_  
 Snow Course \_\_\_\_\_  
 Party \_\_\_\_\_  
 Date \_\_\_\_\_

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Sycamore River  
 Snow Course Donner Summit  
 Party J. Johansen + E. Johansen  
 Date 4-11-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	40	36	52	69	17		
	1a	40	35	52	68			
	1b	40	29	52	63			
	2	39	37	52	73	21		
	2a	40	35.5	52	72			
	3	70.5	68	52	84			
	3a	71.5	69.5	52	86	34		
	4	95	88	52	102	50		
	5	43.5	35	52	69			
	5a	43.5	39.5	52	73	21		
	6	26	24	52	65			
92	6a	92	77	52	96	44		

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

This account should be made up by the  
 user of the instrument and should be kept in his  
 files for reference. It should be filled out  
 from the data obtained from the instrument  
 and from the notes made at the time of use.  
 U. S. G. S. "Major Course" or "N 5° E," etc.  
 from number of observation as given on sketch map, i.e., "Course

Description of Course or Number of Course	Sample No.	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of tube and Core	Water Content	Density Per Cent	Remarks
1	69	61	52	82				
1a	72	62.5	52	83.5				
1b	80.5	73	52	88	36	-1		
2	88	74.5	52	94	42	-1		
3	82	69	52	90				
3a	83	71	52	94	42	-05		
4	82	71.5	52	93				
4a	83	78	52	96	44	-05		
5	77.5	69.5	52	91	39			
5a	78	63	52	87				

Date: 4-11-46  
 State: California  
 Drainage Basin: Santa Ynez River  
 Snow Course: Soda Springs  
 Party: J. Johnson & B. Johnson  
 Date: 4-11-46

СОДЕРЖАНИЕ СНОГОВОГО  
 РАБОЧЕГО ЛИСТА

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State: California  
 Drainage Basin: Santa Ynez River  
 Snow Course: Soda Springs  
 Party: J. Johnson & B. Johnson  
 Date: 4-11-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	69	61	52	82			
	1a	72	62.5	52	83.5			
	1b	80.5	73	52	88	36	-1	
	2	88	74.5	52	94	42	-1	
	3	82	69	52	90			
	3a	83	71	52	94	42	-05	
	4	82	71.5	52	93			
	4a	83	78	52	96	44	-05	
	5	77.5	69.5	52	91	39		
	5a	78	63	52	87			

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. 1 of 1 sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

NO. 1 of 2 sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_  
 This notebook is intended for use in recording data from snow courses.  
 It is designed for use in recording data from snow courses.  
 It is designed for use in recording data from snow courses.  
 It is designed for use in recording data from snow courses.  
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 It is designed for use in recording data from snow courses.

No. of Courses or Number of Observations	Number of Tubes	Depth of Snow at Top	Length of Core Length	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
1	2	85	70	52	91	39	-05	
2	2	83	72	52	90			
3	2	87	77	52	93	41	-2	
4	2	83	67	52	90			
5	2	85	70.5	52	91	39	-1	
6	2	91	84	52	100			
7	2	94	85	52	100.5	38	-1	
8	2	87.5	82	52	98	46	-1.5	
9	2	91.5	79.5	52	94.5	42.5	-2	
10	2	84	79.5	52	92	40	-05	

Date 4-11-46  
 Locality Soda Springs  
 Drainage Basin Soda Springs  
 District Soda Springs  
 State California

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Soda Springs River  
 Snow Course Soda Springs  
 Party J. Johansen & E. Johansen  
 Date 4-11-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	6	85	70	52	91	39	-05	
	7	83	72	52	90			
	7a	87	77	52	93	41	-2	
	8	83	67	52	90			
	8a	85	70.5	52	91	39	-1	
	9	91	84	52	100			
	9a	94	85	52	100.5	38	-1	
	10	87.5	82	52	98	46	-1.5	
	11	91.5	79.5	52	94.5	42.5	-2	
	12	84	79.5	52	92	40	-05	

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. 2 of 2 sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

No. 1 of 2 sheets of 100 sheets in a book  
 U.S. GEOLOGICAL SURVEY  
 WATER RESOURCES DIVISION  
 WASHINGTON, D.C. 20540

12	89	82.5	52	91	89	3.5	
13	90	76	52	92.5			
19a	91	67.5	52	85.5			
13b	91	83	52	107.5	50.5	-1.25	
13) 1107.5				549.8			
/ 85.2				/ 42.3		49.6%	

Year \_\_\_\_\_  
 Station \_\_\_\_\_  
 Snow Course \_\_\_\_\_  
 Party \_\_\_\_\_  
 Date \_\_\_\_\_

СОДЕРЖАНИЕ СНОЖНОГО ПОКАЗАТЕЛЯ  
 РЕКРЕАТИВНОГО ИЛИ

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin San Joaquin River  
 Snow Course Santa Barbara  
 Party J. Fraumeni & E. Fraumeni  
 Date 4-11-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	12a	89	82.5	52	91		-3.5	
	13	90	76	52	92.5			
	19a	91	67.5	52	85.5			
	13b	91	83	52	107.5	50.5	-1.25	
	13) 1107.5				549.8			
	/ 85.2				/ 42.3		49.6%	

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

This notebook should be used for recording data from snow surveys. It should be used in the following manner: 1. The course should be marked on a sketch map and the spacing between samples should be indicated. 2. The snow course should be marked on a sketch map and the spacing between samples should be indicated. 3. The snow course should be marked on a sketch map and the spacing between samples should be indicated.


Date \_\_\_\_\_  
 State \_\_\_\_\_  
 Drainage Basin \_\_\_\_\_  
 Snow Course \_\_\_\_\_  
 Party \_\_\_\_\_  
 Date \_\_\_\_\_

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin San Diego River  
 Snow Course Inchpines Ranger Station  
 Party J. Johansen & E. Johansen  
 Date 4-15-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	18	14	52	56			
	1a	24	22	52	62.5	10.5		-1.05
	2	20	19	52	59	7		
	3	24	24	52	63	11		-1
	4	18	15	52	58.5	6.5		-0.05
	5	10	6.5	52	58	6		
	5a	10	8	52	57			-2
	6	13	10	52	56	4		
	7	17	14	52	59	7		
	8	8	6	52	55	3		

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. 1 of 2 sheets. Course No. 1  
 Date of Survey 4-15-46  
 Name of Surveyor J. J. Hansen + E. Johansen

1	54	48.5	52	78				
2	53	50	52	80	28			
3	53	47	52	78	26			
4	60	52.5	52	79	27			-0.25
5	41	39	52	72	20			
6	55	39.5	52	71				
7	59	33	52	64				
8	54	52	52	79	27			
9	61	52	52	78	26			-0.25
10	54	50	52	75	35			-0.05

Date \_\_\_\_\_  
 Name \_\_\_\_\_  
 Snow Course \_\_\_\_\_  
 Drainage Basin \_\_\_\_\_  
 State \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Truckee River  
 Snow Course Danner Lake  
 Party J. J. Hansen + E. Johansen  
 Date 4-15-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	54.5	48.5	52	78			
	1a	53	50	52	80	28		
	2	53	47	52	78	26		
	3	60	52.5	52	79	27		-0.25
	4	41	39	52	72	20		
	5	55	39.5	52	71			
	5a	54.5	33	52	64			
	5b	54	52	52	79	27		
	6	61	52	52	78	26		-0.25
	7	54	50	52	75	35		-0.05

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. 1 of "Major Course," or "N 5° E," etc.  
 Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

8	64	54	52	81	29	-1
9	51.5	46	52	75	23	-1
10	52.5	46	52	74	22	-0.5
11	51	47.5	52	76	24	
12	44.5	42.5	52	73	21	-1

Date: \_\_\_\_\_  
 Party: \_\_\_\_\_  
 State: \_\_\_\_\_  
 Drainage Basin: \_\_\_\_\_  
 Snow Course: \_\_\_\_\_  
 Date: \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin San Joaquin River  
 Snow Course Donner Pass  
 Party J. J. Hansen & J. J. Hansen  
 Date 4-15-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	8	64	54	52	81	29	-1	
	9	51.5	46	52	75	23	-1	
	10	52.5	46	52	74	22	-0.5	
	11	51	47.5	52	76	24		
	12	44.5	42.5	52	73	21	-1	
	12	63.5			12	296.5		
		53.3				247	46.3%	

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. 2 of 2 sheets. Comp. by J. J. Hansen Checked by J. J. Hansen



No. of sheets used in this survey  
 Date of survey  
 Name of observer  
 Name of station  
 Name of course  
 Name of drainage basin  
 Name of State  
 Name of country

157 5492  
 10 27 47 27 34 35  
 11 27 47 27 34 35  
 12 27 47 27 34 35  
 13 27 47 27 34 35  
 14 27 47 27 34 35

No. Course or Drainage Basin	Sample No.	Depth of Snow (Inches)	Length of Core (Inches)	Weight of Empty Tube	Weight of Tube and Core	Water Content (Inches)	Density Per Cent	Remarks
------------------------------	------------	------------------------	-------------------------	----------------------	-------------------------	------------------------	------------------	---------

Date \_\_\_\_\_  
 State \_\_\_\_\_  
 Drainage Basin \_\_\_\_\_  
 Name of course \_\_\_\_\_  
 Name of party \_\_\_\_\_  
 Date \_\_\_\_\_

СОЮЗНАЯ СЛОВА СЕРВЕС  
 ФЕДЕРАТИВНО СЪЮЗ

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin Santa Ana River  
 Snow Course Santa Ana Spring  
 Party J. J. Hansen & J. J. Hansen  
 Date 4-17-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	52	41.5	52	73			
	1a	61.5	53	52	83	31		
	2	70	58	52	88	36		
	3	67	58	52	86	34		
	4	66.5	59	52	89			water running
	4a	67	65.5	52	94	42		
	5	60.5	58	52	87	35		
	5a	61	56	52	86			
	6	67.5	56	52	89.5	36.5		
	6a	70	56	52	88			

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets

Date \_\_\_\_\_

Name of Party \_\_\_\_\_

Name of Location \_\_\_\_\_

Name of Course \_\_\_\_\_

1	70	60	52	88			
7a	70	57	52	89	37		
8	70.5	59	52	85			-4
8a	70	58	52	85	33		
9	73	58	52	88			
9a	76	69	52	92	40		
10	72	67	52	91			
10a	73	65	52	91			
10b	74	66	52	94	42		
11	77	58	52	84			
11a	78	60	52	97	35		

Name \_\_\_\_\_

Date \_\_\_\_\_

Name of Course \_\_\_\_\_

Name of Location \_\_\_\_\_

Name of Party \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
RECORD AND SLIP

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin San Joaquin Delta River

Snow Course Soda Springs

Party J. Johnson & J. Johnson

Date 4-17-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	7	70	60	52	88			
	7a	70	57	52	89	37		
	8	70.5	59	52	85			-4
	8a	70	58	52	85	33		
	9	73	58	52	88			
	9a	76	69	52	92	40		
	10	72	67	52	91			
	10a	73	65	52	91			
	10b	74	66	52	94	42		
	11	77	58	52	84			
	11a	78	60	52	97	35		

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

The weight of snow in the sample is to be determined by weighing it in a tared container in which it has been placed. The weight of the container is to be determined by weighing it in the same manner before and after the snow is placed in it. The weight of the snow is to be determined by subtracting the weight of the container from the weight of the container plus the snow. The weight of the snow is to be determined by subtracting the weight of the container from the weight of the container plus the snow.

11	28	67	52	96
12	28	67	52	96
13	28	67	52	96
14	28	67	52	96
15	28	67	52	96
16	28	67	52	96
17	28	67	52	96
18	28	67	52	96
19	28	67	52	96
20	28	67	52	96

Date: \_\_\_\_\_  
 State: \_\_\_\_\_  
 Drainage Basin: \_\_\_\_\_  
 Snow Course: \_\_\_\_\_  
 Party: \_\_\_\_\_  
 Date: \_\_\_\_\_

COOPERATIVE SNOW SURVEYS  
**FEDERAL AND STATE**  
**COOPERATIVE SNOW SURVEYS**

State: California  
 Drainage Basin: So. Fork Guba River  
 Snow Course: Soda Springs  
 Party: J. J. Janssen - S. J. Janssen  
 Date: 4-17-48

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	12	46	67	52	96		-4	
	12a	70.5	68	52	96.5	45	-05	
	13	71	66.5	52	93	41	-05	
	13	90.3			13) 479			
			69.5			36.7	52.8%	

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. of \_\_\_\_\_ County of \_\_\_\_\_  
 The \_\_\_\_\_  
 No. 1, of \_\_\_\_\_ of \_\_\_\_\_  
 \_\_\_\_\_

Case No. 393  
 12/22/46  
 13 21 18 23 25 29  
 12 20 22 25 28

No. Course or Description	Sample No.	Depth of Snow in Depth	Length of Core in Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content in %	Density Per Cent
---------------------------	------------	------------------------	--------------------------	----------------------	-------------------------	--------------------	------------------

Date \_\_\_\_\_  
 Locality \_\_\_\_\_  
 Snow Course \_\_\_\_\_  
 District \_\_\_\_\_  
 State \_\_\_\_\_

COOPERATIVE SNOW SURVEYS

**FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin So. Fork Yuba River  
 Snow Course Danner Summit  
 Party J. Johnson & S. Johnson  
 Date 4-17-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent
	1	26.5	19	52	60	8	
	1a	25.5	16	52	60		
	1x	25	15	52	59		
	2	21	19.5	52	61.5		
	2a	23	18	52	62	10	
	3	61	49	52	79		
	3a	59	56.5	52	81	29	

No. 1 of 1 sheets      Date 4-17-46

COOPERATIVE SNOW SURVEYS  
FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS  
FEDERAL AND STATE

Description of Course	Sample No.	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of tube and Core	Water Content	Density Per Cent	Remarks
	1	36	35	52	77.5	32		
	2	72	65	52	87	32		
	3	108	107.5	52	107	32		
	4	144	126	37	109	32		
	5	194	168	69	170			

State: \_\_\_\_\_

Drainage Basin: \_\_\_\_\_

Snow Course: Samples on Cornice D.S.

Party: Johansen & Johansen

Date: 4-17-46

**COOPERATIVE SNOW SURVEYS**  
**FEDERAL AND STATE**  
**COOPERATIVE SNOW SURVEYS**

State: \_\_\_\_\_

Drainage Basin: \_\_\_\_\_

Snow Course: Samples on Cornice D.S.

Party: Johansen & Johansen

Date: 4-17-46

*Description of Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	36	35	52	77.5		32	
	2	72	65	52	87		32	
	3	108	107.5	52	107		32	
	4	144	126	37	109		32	
	5	194	168	69	170			

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets.      Comp. by \_\_\_\_\_      Checked by \_\_\_\_\_

The following information should be filled in by the observer at the time of the survey. The snow depth should be measured at the time of the survey. The snow depth should be measured at the time of the survey. The snow depth should be measured at the time of the survey.

1	10	9.5	52	57	5		
2	8.5	8.5	52	56	5		
3	17.5	17	52	61.5	9.5		
4	59	58	52	85			
4a	60	59	52	86.5	9.5		
5	no snow				0		
6	54.5	53.5	52	80	28		
6)	150.5			6)	82		
7a	50	25.1			13.7		54.6%

Date: 4-23-46  
 Locality: Donkey Summit  
 Course: Donkey Summit  
 Party: J. J. ... + E. ...  
 Date: 4-23-46

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State: California  
 Drainage Basin: San Gabriel River  
 Snow Course: Donkey Summit  
 Party: J. J. ... + E. ...  
 Date: 4-23-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	10	9.5	52	57	5		
	2	8.5	8.5	52	56	5		
	3	17.5	17	52	61.5	9.5		
	4	59	58	52	85			
	4a	60	59	52	86.5	9.5		
	5	no snow				0		
	6	54.5	53.5	52	80	28		
	6)	150.5			6)	82		
	7a	50	25.1			13.7		54.6%

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ Date \_\_\_\_\_  
 State \_\_\_\_\_  
 Drainage Basin \_\_\_\_\_  
 Snow Course \_\_\_\_\_  
 Party \_\_\_\_\_  
 Date \_\_\_\_\_

СОБЪЕКТИВНАЕ СНОУ СУРВЕЈАС  
 FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin So. Fork, Lyndon River  
 Snow Course Soda Springs  
 Party J. Johnson & E. Johnson  
 Date 4-23-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	39.5	39.5	52	75	23		
	2	46.5	45.5	52	83	31		
	3	46.5	45	52	81	29		
	4	48.5	41.5	52	81	29		
	5	41.5	39	52	77	25		
	6	44	42	52	81			
	6a	46	46	52	83	31		-2
	7	48	46	52	81	29		
	7a	50	47	52	79			

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

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20	45	25	28	31
18	45	25	28	31
15	45	25	28	31
12	45	25	28	31
10	45	25	28	31
8	45	25	28	31
6	45	25	28	31
4	45	25	28	31
2	45	25	28	31

Date: \_\_\_\_\_  
 State: \_\_\_\_\_  
 Snow Course: \_\_\_\_\_  
 Party: \_\_\_\_\_  
 Date: \_\_\_\_\_

COOPERATIVE SNOW SURVEYS

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State: California  
 Drainage Basin: San John Lyda River  
 Snow Course: Soda Springs  
 Party: J. Phansen & E. Phansen  
 Date: 4-23-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	8	49	47	52	80	28		-3.5
	9	56	52	52	83	31		
	9a	56	50	52	83			
	10	54	50.5	52	82	30		
	11	56	49	52	81	29		-1.5
	12	49	48.5	52	79	29		-1
	13	52	50.5	52	81	29		-1
	13)	632.5			13)	37)		
		48.7				28.3		58.1%

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.



March 1946

## FEDERAL-STATE COOPERATIVE SNOW COVER SURVEYS

FEDERAL, STATE AND PRIVATE AGENCIES

### SURVEY NOTES

Snow Surveying is completely explained in Miscellaneous Publication No. 380, United States Department of Agriculture.

#### Brief Directions and Suggestions for Snow Cover Sampling

(1) The usefulness of snow cover surveying depends primarily on the care and honesty of the men actually doing the field work.

(2) The work of the snow cover surveyor is often laborious, especially in stormy weather, and men willing to undertake such work can usually be depended upon to do their best and record the results faithfully.

#### DIRECTIONS FOR USING THE SNOW SAMPLER

##### A. Care of Sampler:

(1) In transporting sampler, extreme care should be used to guard it against injury; it can be easily dented.

(2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.

(3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac.<sup>2</sup> This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.

(4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.

(5) Keep the cutter sharp and the orifice true to its original diameter ( $1\frac{1}{4}$  inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the improved Utah Aluminum Tube is used).<sup>2</sup>

##### B. Measuring for Samples:

Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Note any irregular spacing between samples. Care should be used in spacing by tape measurements, so that the samples taken different years on the same course will be at the same spots.

(1) Plunging the tube should be avoided. In driving, a steady down-thrust is preferable to twisting, because with the latter a small amount of snow enters the slots. However, a minimum amount of twisting aids in the driving and also facilitates the quick cutting of the thinner crusts. Plunging should be entirely unnecessary. In case the sampler sticks or freezes down, a light twist will usually release it.

(2) The presence of temperatures below 32 degrees F. in the snow, while the temperature of the air is above freezing, often causes the snow to adhere firmly to the orifice of the cutter after a depth of from 10 to 12 feet has been reached. This difficulty can be met in three ways.

(a) Withdraw the sampler when cutter becomes clogged and clean cutter and tube thoroughly. Push the tube rapidly through the snow without stopping until bottom is reached but do not plunge tube. Repeat until a complete core is obtained.<sup>2</sup>

(b) In case sampling is being done in the forest, keep the sampler in the shade as much as possible to keep it cold.

(c) The best method of all is to sample when the temperature of the air is at or below freezing, or late in the season when the temperature of the deep snow has risen to 32 degrees F. sampling is easy and rapid.

In some cases, where not too far from a night's lodging, time can be saved by taking the samples in the morning or evening instead of during the warm part of the day.

#### C. Weighing the Sample.

Before taking the sample, place the empty sample tube in the cradle hanging from the scales. If the Mt. Rose scale is used, turn the pointer back to zero. If the standard tubular scale is used, record the weight empty in proper column in field book. When the sample has been taken, place the sampler in the cradle and record the weight for tube and core. For the Mt. Rose scale this reading equals the water content of the snow core. For the standard tubular scale the water content is given by the difference between the reading empty and the reading for tube and core. The zero setting in the case of the Mt. Rose scale, and the "empty" reading for the standard tubular scale should be checked at frequent intervals (not more than 5 measurements).

If dirt is picked up by the cutter it should be cleaned out with knife before weighing the sample, and proper deduction made before recording length of core or depth of snow.

#### D. Recording:

The snow cover survey sheets are made in pads of two sizes, the smaller being white and the larger pink. Only the white waterproof pads are to be used for field notes. The larger pink pads are to be used to make copies from the white field sheets as soon as possible after each survey. Instructions regarding the disposition of the pink copy sheets will be issued for each State and where necessary for each drainage basin, since the needs will require some variation in this respect.

Appropriate covers are to be provided for protection of field notes. Sketch maps showing points of observation are pasted to the inside of the covers.

Use pencil only for recording field measurements. Fill in complete description of course, party, date, etc.

If the depth of core is very much less than the depth of snow, the reason should be determined and noted under "Remarks." In case of doubt regarding the core, determine the density (water content divided by depth gives density) and compare with that of other adjacent measurements about which there is no doubt. "Remarks" should include special items as to the character of snow, nature and condition of soil or other bottom reached by the cutter, whether wet, dry, frozen, etc.

Any extended remarks as to weather conditions at the time of survey or shortly before the survey, unusual difficulties encountered, etc., may be placed on the back of the sheet, as one side only is to be used in recording the snow measurements.

**FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS**

State Calif  
 Drainage Basin Truckee River  
 Snow Course Truckee Ranger Station  
 Party John Johansen E Johansen  
 Date 3-28-46

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
1	1	34	30	52	64	12	-1"	
	2	34½	30	52	65	13	-1"	
	3	36	30	52	66	14	-2"	
	4	35	27	52	65	13	-1"	
	5	25½	24	52	62	10	-1"	
	6	31	26	52	63.5	11.5		
	7	31.5	25	52	65	13	-	
	8	25.5	16	52	61	9		
		31.6	26.1			11.9	Dens. 38.4	
		31.0	25.4					

This form is to be filled out by the observer and should be filled out as soon as possible after the snow has been sampled. The observer should fill in the number of samples taken, the depth of snow, the length of the core, the weight of the empty tube, the weight of the tube and core, the water content, and the density. The observer should also fill in the date, the name of the party, and the name of the drainage basin. The observer should also fill in the name of the snow course and the name of the party. The observer should also fill in the name of the state and the name of the drainage basin. The observer should also fill in the name of the snow course and the name of the party. The observer should also fill in the name of the state and the name of the drainage basin.

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State Calif  
 Drainage Basin S. Yuba  
 Snow Course Soda Springs #1 - Pasture  
 Party John Taha, Gene and E. Hanson  
 Date April 1, 1946

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
1	1	103.5	87	52	91	39		
	2	102	93	52	93	46		-0.5
	3	102.5	92.5	52	90.5	40.5		-1.05
	4	103.5	94	52	96	44		
	5	94	83	52	92.5	40.5		
	6	96.5	80.5	52	92	40		
	7	103	89.5	52	93	41		
	8	105	94	52	94.5	42.5		-1.05
	9	105.5	97.5	52	95	43		
	10	107.5	97	52	97	45		
	11	106	94	52	97	45		-2.5
	12	104	86	52	90	38		-1
	13	107	98	52	89	37		
		103.2			411.7			Density 47

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5" E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
 No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

This is a record of the snow survey made on the Donner Pass, California, on the 4th of April, 1946. The snow was sampled at various points along the course and the results are given in the table below. The snow was found to be of a good quality and the results are of value for the study of the snow problem in California.

1035

Description of Course	Sample No.	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of tube and Core	Water Content	Density Per Cent	Remarks

COOPERATIVE SNOW SURVEYS  
 FEDERAL AND STATE

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State Calif  
 Drainage Basin S. Yuba  
 Snow Course Donner Pass  
 Party J. V. Jansen & E. J. Jansen  
 Date 4-1-46 see prev.

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	65	49.5	52	68.7	16.7		
	2	64.5	52.5	52	70	19		
	3	91.5	82	52	84			
	3 <sup>a</sup>	96.5	90	52	88.5	36.5		
	4	108.8	103		102	54		New snow 22.5"
	5	61.5	51	52	73	21		
	6	106	93 <sup>5</sup>	52	96	44		
	7	232	222	187	92			beal net D. 45.3% 105

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

UNITED STATES GEOLOGICAL SURVEY  
 WATER RESOURCES DIVISION  
 FEDERAL AND STATE COOPERATIVE SNOW SURVEYS

Date	Location	Name of Course	Number of Samples	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of tube and Core	Water Content	Density	Remarks
------	----------	----------------	-------------------	---------------	----------------	----------------------	-------------------------	---------------	---------	---------

Name of Course or Description: \_\_\_\_\_  
 Number of Samples: \_\_\_\_\_  
 Name of Course: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Location: \_\_\_\_\_  
 Name of Party: \_\_\_\_\_

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

**FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin Tuckee  
 Snow Course Douglas Lake  
 Party J. J. J. and J. E. C.  
 Date 4/1/11

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	77	57.5	52	79	27		
	2	78	69	52	80	28		
	2 <sup>a</sup>	78.5	64	52	81	29		
		-1.5	-1.5					
	3	77.5	61	52	79.5	27.5		
	4	67	62	52	71	19		
	4 <sup>a</sup>	72	57	52	76	24		
	5							
	5	75	58	52	80	28		
	6	81	48.5	52	73	21		
	6 <sup>a</sup>	81	63	52	78	26		

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

This is a record of the snow course measurements made on the snow course No. 1, at the site of the snow course, on the date of the measurement, and the results of the measurements. The snow course is a series of points, spaced at intervals of 100 feet, along a line, and the measurements are made at each point. The measurements are made by measuring the depth of the snow, the length of the core, the weight of the empty tube, the weight of the tube and core, the water content, and the density. The results of the measurements are given in the table below.

Course No.	Sample No.	Depth of Snow (Inches)	Length of Core (Inches)	Weight of Empty Tube (Gms)	Weight of Tube and Core (Gms)	Water Content (Inches)	Density (Per Cent)	Remarks
75.8	7	75	49	52	72	20		
	7a	74 -4	64 -4	52	77	25		
	8	80 -1	69.5 -1	52	80	28		
	9	73	64	52	75	23		
75.8	10	72	64	52	76	24		26.2 <sup>4</sup>
	11	71 -3	63 -3	52	76	24		
	12	66.5 -6	50.5 -6	52	75	23		
74.6						25.7		Dens. 34.5%

COOBERVILLE SNOW COURSES  
 RECORD AND SUMMARY

FEDERAL AND STATE  
 COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin Tulare  
 Snow Course Dansert Lake  
 Party JJ  
 Date \_\_\_\_\_

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	7	75	49	52	72	20		
	7a	74 -4	64 -4	52	77	25		
	8	80 -1	69.5 -1	52	80	28		
	9	73	64	52	75	23		
75.8	10	72	64	52	76	24		26.2 <sup>4</sup>
	11	71 -3	63 -3	52	76	24		
	12	66.5 -6	50.5 -6	52	75	23		
74.6						25.7		Dens. 34.5%

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
 †Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

UNITED STATES GEOLOGICAL SURVEY  
WATER RESOURCES DIVISION  
WASHINGTON, D. C. 20506  
Form No. 10-A (Rev. 1-2-52)

No. of Samples	Section No.	Depth of Sample	Section No. of Sample	Time of Day	Time of Year	Time of Month	Time of Day	Time of Year
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COOPERATIVE SNOW SURVEYS  
INDEX AND STYLE

Dr. Church: -

As it is getting  
late I will copy these  
notes & have them in  
the mail for you in  
the A.M. I will send  
them to Soda Springs  
Hotel. You will get here  
tomorrow afternoon. Thanks  
for my copy. Best

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
No.....of.....sheets. Comp. by.....Checked by.....



No. \_\_\_\_\_ of \_\_\_\_\_ County, Pa. \_\_\_\_\_

No. \_\_\_\_\_ of \_\_\_\_\_ County, Pa. \_\_\_\_\_

and including the following persons and property:

for analysis or purposes of determining the quality of water from the \_\_\_\_\_ of the \_\_\_\_\_ and \_\_\_\_\_ the \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

No. of Course or Location	Distance	Number of Samples	Depth of Course	Time of Day	Time of Year	Season	Wind	Remarks
1774								
1774								
2000								
1774								
2000								

COOPERATIVE LABORATORY SERVICE  
 FEDERAL AND STATE  
 COOPERATIVE SNOW MEASUREMENT

For Blair Eddy

Side Spgs # 1 //  
 Donner Pass

Take them with you. We have the originals.

*[Signature]*

Needed

Side Spgs # 2 } 7  
 Summit  
 Summit Valley

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

March 1946.

1946

Mar. 14-25

Thursday, March 14/96.

Came on 9:15 pm bus yesterday.  
Slept much.

Few waker clouds.

Today clear. Snow dry  
and drifting.

Made thermo couple near  
of snow on porch pillar.  
Lying splendidly but wire  
broke.

Johanne is observing dye and  
drip towers carefully.

Stevens W and Eng's Yaggs  
capped - 6 in spring.

Vertical cans have snow  
only on leeward side within.  
Pasture cans unaffected,  
but snow on shoulder of No. 8  
and on sloping roof of Q.

1<sup>st</sup> wet snowshoes  
stolen from Johnnie's car  
at Donner Lake!

9:45 am In Office

Check 69.3

fals, 25 = 37.5 + 32 = 69.5

9 to 11 am Temp. 23-26° <sup>obs. 4200 ft.</sup> wind 12 mi/h <sup>SE</sup>  
On Hotel Porch Humid 88-60%

1. Cap of snow on pillars

Shade 1" deep	-6.1	23.8
leeward In surface	-6.6	22.1
1" away	-5.6	23.6
2" "	-5.6	23.6
8" "	-9	27.5
Sun		26.3
leeward 1" deep	-3.4	26.9
on surface	-2.0	29
1" away	-3.5	27.8
depends on wind		26.3
2" "	-4 to -4.6	26
8" "	-4 to -4.6	25.3
		26

Seat of canvas chair

1. Just out of touch of canvas  
 $\frac{1}{16}$ " film of snow ~~1~~ <sup>53.5</sup>  
Sparse anystals +3 36.5  
but oscillates +1 to  
Wire broken

12:10 pm

Pasture

14 FT current 25°

11 FT " 25

Wind 12 hrs

Storeroom

Last storm 6.41 - 3.95 =

2.46 in

3 Days

11 -  $\frac{1}{2}$  snow (met)

12 - rained

13 - second new hand

Caught 2 pm bus for Reno.  
Dr. Simpson soldered  
brass wires -

Purchased 8 packs  
of loose sheets for J's  
tripart.

-

Temp. by TC on sides  
of snow on pillar.  
Scale of galvanometer #

March 14/46

Photos 3 and 4  
Snow caps (Pasture, Hotel)

March 15 Friday.

Came up on 9:15 bus  
last night. Slept till  
arrived at Soda Spgs.

Yes, a cap also formed  
at Frig on separate  
tower.

Photod by Gardel.

# Caps on pancake pillar  
to study

Yesterday in afternoon  
sun exposed side  
weathered greatly.  
Compare morning and  
afternoon insolation.

Need -

3 saucers calomel ch

Support for thermo-couples.

Salt anemeter.

Sacto can -

Erect thermo shelters at Pass & Lake (Down)

Fuchsine dye

Mittens etc for snow.

Max blue pencils

Send patch for green papers.

Pasture

10-10/30 am

\*

H-T's etc

14 FT <sup>H-T</sup> 28° Min 29°

11 FT H-T 28° Check 29°  
T 28°

Overcast, light breeze, humid high, bit of snowing?

7 FT H-T 30 - Check 29°  
T 26.5°+ (Core. +2.5°)

T Jr 28°+

12:30 am

14 FT

H-T 29 Check 30°  
Min (current) 28.2°

\* Thermocouple Expts. 11 total  
Temp: 29-35°F | Wind NW 6 mi; humid  
Sln. 25 = 69.5° 1 = 1.5 96%  
check 69.4

Overcast to slight Translucence  
3 = 36.5°F

White snow 26 = 69.5°F surface\*  
1 to 6.5 = 33.5 - 41.8°F

Translucent sun,

\* Wires visible beneath outer  
layer of new flakes,  
(a) 1 in deep 1.6 = 34.4°F

slightly dusty snow.

In surface, Shade 4 = 38°F

translucent sun to semi-

bright 5 to 10.5 = 39.5 - 47.8

1 in deep. overcast 0 = 32°F

### Tiny Pines

In overcast

1. In frozen crystals being dislodged 0 32°F
2. In snow load 0 32
3. In green needles 0 32

In sun

translucent to full

1-9 33.5-45.5

later under full overcast

fall to 4. 38°



Fri. - Mch 7-15 - 3 in.  
(12 N. to 4 pm)

4 pm, Pillar of Snow

1 in } Same as yesterday \*  
deep } Lee NE side +1° 33.5°F  
W. Windward side -0.5° 31.2°F

2 in snow

Lee -0.5 31.2°F  
Windward -1.0 30.5

1 in }  
faint snow } Lee -0.9 30.6  
Windward -0.9 30.6

8 in }  
Lee 0 32  
Windward -0.8 30.8

\* Hotel H-T 32 to 30°F  
Site, Min. 31°F

Fully overcast, at 5 pm  
Water on top of snow - 5 pm

Stevens 55 -  
Mch 1-14 7, 3.85 in

Dancer Lake has two  
holes and a lane in  
the ice. Ice is white  
with snow.

A father and two children  
(boy and girl) passing  
over on a bare slab.  
"No snow in West  
Virginia than in  
Dancer Pass" - Keith

13. after recent storm  
ice was found in  
the gages changed  
approx. March 1.  
How low was temp?

Lee side is in shadow but very  
bright. Ice is very full of  
snow.

March 14, 1946

Temp. around Cap of Snow  
to study relative melting.

Weather 9-11 a.m.

Clouds 0, Temp 25-26°F, Wind SE 12 mi. <sup>hrly.</sup> 5  
Humid 88-60 %.

On Soda Springs Hotel, <sup>main</sup> Rear Porch

1. Cap of Snow on Pillar

Shade to leeward

1 in. deep . . .	22.8°F
on surface	22.1
1 in. away	23.6
2 in. away	23.6
8 in. "	27.5

Sun to windward

1 in. deep . . .	26.9
on surface	29.0
1 in. away	27.5-26.3, depending on wind.
2 in. "	26.0-25.8 " " "
8 in. "	26.0 fluctuates

2. Sect. of Canvas Chair

Just out of touch of canvas  
 $\frac{1}{16}$  in. film of snow 33.5°F

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MARCH 1 - 6, 1946.

*Denver Snow Project*

CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

(31) 528 m  
(30) 19 - m  
1946

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## CALIFORNIA COOPERATIVE SNOW SURVEYS

## Directions and Suggestions for Snow Sampling

(1) The usefulness of snow cover surveying depends primarily on the care and honesty of the men actually doing the field work.

(2) The work of the snow cover surveyor is often laborious, especially in stormy weather, and men willing to undertake such work can usually be depended upon to do their best and record the results faithfully.

## Directions for Using the Snow Sampler

## A. Care of Sampler:

(1) In transporting sampler, extreme care should be used to guard it against injury; it can be easily dented.

(2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.

(3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac. This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.

(4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.

(5) Keep the cutter sharp and the orifice true to its original diameter (1½ inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the Improved Utah Aluminum Tube is used). To replace a damaged or worn cutter, heat the tube only sufficiently to melt the solder that holds the old cutter and then sweat the new cutter into place.

## B. Measuring for Samples:

Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Note any irregular spacing between samples. Care should be used in spacing by tape measurements, so that the samples taken different years on the same course will be at the same spots.

(1) Plunging the tube should be avoided. In driving, a steady down-thrust is preferable to twisting, because with the latter a small amount of snow enters the slots. However, a minimum amount of twisting aids in the driving and also facilitates the quick cutting of the thinner crusts. Plunging should be entirely unnecessary. In case the sampler sticks or freezes down, a light twist will usually release it.

(2) The presence of temperatures below 32 degrees F. in the snow, while the temperature of the air is above freezing, often causes the snow to adhere firmly to the orifice of the cutter after a depth of from 10 to 12 feet has been reached. This difficulty can be met in three ways.

(a) Withdraw the sampler when cutter becomes clogged and clean cutter and tube thoroughly. Push the tube rapidly through the snow without stopping until bottom is reached but do not plunge tube. Repeat until a complete core is obtained. *A complete core is one whose length is not less than 90 per cent of the depth of the snow.*

(b) In case sampling is being done in the forest, keep the sampler in the shade as much as possible to keep it cold.

(c) The best method of all is to sample when the temperature of the air is at or below freezing, or late in the season when the temperature of the deep snow has risen to 32 degrees F. At these times sampling is easy and rapid.

In some cases, where not too far from a night's lodging, time can be saved by taking the samples in the morning or evening instead of during the warm part of the day.

**C. Weighing the Sample:**

Before taking the sample, place the empty sample tube in the cradle hanging from the scales. If the Mt. Rose scale is used, turn the pointer back to zero. If the standard tubular scale is used, record the weight empty in proper column in field book. When the sample has been taken, place the sampler in the cradle and record the weight for tube and core. For the Mt. Rose scale this reading equals the water content of the snow core. For the standard tubular scale the water content is given by the difference between the reading empty and the reading for tube and core. The zero setting in the case of the Mt. Rose scale, and the "empty" reading for the standard tubular scale should be checked at frequent intervals (not more than 5 measurements).

If dirt is picked up by the cutter it should be cleaned out with knife before weighing the sample, and proper deduction made before recording length of core or depth of snow.

**D. Recording:**

The snow cover survey sheets are made in pads of two sizes, the smaller being white and the larger pink. Only the white waterproof pads are to be used for field notes. The larger pink pads are to be used to make copies from the white field sheets as soon as possible after each survey. Instructions regarding the disposition of the pink copy sheets will be issued for each State and where necessary for each drainage basin, since the needs will require some variation in this respect.

Appropriate covers are to be provided for protection of field notes. Sketch maps showing points of observation are pasted to the inside of the covers.

Use pencil only for recording field measurements. Fill in complete description of course, party, date, etc.

If the depth of core is very much less than the depth of snow, the reason should be determined and noted under "Remarks." In case of doubt regarding the core, determine the density (water content divided by depth gives density) and compare with that of other adjacent measurements about which there is no doubt. "Remarks" should include special items as to the character of snow, nature and condition of soil or other bottom reached by the cutter, whether wet, dry, frozen, etc.

Any extended remarks as to weather conditions at the time of survey or shortly before the survey, unusual difficulties encountered, etc., may be placed on the back of the sheet, as one side only is to be used in recording the snow measurements.

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin: Sacramento  
Snow Course: S. Yuba  
Party: \_\_\_\_\_  
Date: March 1, 1960

Station 74628  
E 1276 W 1260

* Description of Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
None - Resetting H-T <sup>o</sup> and T <sup>o</sup>								
Temp in snow								
Snow thermog -								
		Check			32.8° F		(15 in) -	
					32°		(6 in)	
None - setting -								
2 1/2" to top -								
No. 6 - Noon 32.2° F								
1:30pm 32°								
9:30pm								
	Max				-0.6° F	Revel	30.8° F)	
	Min				52.5° F	"	36°	

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

\*\*Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

Dye -

Planted Feb 25

Paris Feb 27 on left hand

Same 1/2 m. Snow.

Planted Jan 25.

Dpth beneath new snow 20 in

Penetration 1/2 in. purple.

Sampling - Troubled

11 am -

Sampler clogged.

Bottom snow moist crush packed

Temp. above 32(?)

Flooms of wet snow adhered to walls. Bottom packed in tube. Even riding wrench could not penetrate beyond 70 in

At 1 pm. Slightly warmer

Sampler penetrated without

trouble. Course soon finished

Sampler evidently jammed up before being down

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin S. Yuba

Snow Course Summit (Kist)

Party Blaine Eddy, Navis, J. E. D.

Date March 1/46 3 pm

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
Dyes planted in (a) sun (b) shade								
(a) In sun - 5 1/2 x 7 in pipe penetration.								
(b) Dye supply exhausted.								
No. 4	D. 100					33%		
	6 D. 99							
Sampler requires heating up in sun every 4 or 5 mins. To avoid chipping - Shove wax?								
No 13 - Drove twice in same hole -								
	99	94				45		
Core near bottom - Resists crushing								

\* Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

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No. 14 - 2 drives

very fine snow  
hard uncompressible

No. 12 -

Bottom solid - Resists

crushing - Soil moist  
eye on core - green with affected  
by air temp. Top snow moist 5-7%

Dye - In sun.

Feb 1 - In moist beneath

15 in snow. Penetration 3/4 in  
moist

(4) In shade

Not found.

No new dye planted,

lost today

1. Cutters at 70 in Pasture

1. Then at 60 in. Buried snow into  
hole!

Clearing track along course  
or trail

Lake Norden started

spilling last Sat. night

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin Trucipes

Snow Course Dennis Lake

Party J.S. and J.J.

Date March 1/4

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
Drain Tank					0.145			
Dye					5:15 pm			
			(60 in)					
Feb 26 - Snow								By sign 12 in
								Bottom
		2 1/4	4 1/2	3 1/2	1 1/2			
		1/4						
Jan 25 (54.5 in)								
New snow								9 in 1/2
								Penetration 2 1/2
								Scoop 10 in to stratum 2 1/2 in

\* Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

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Zigzag  $9\frac{1}{2}$  in to faint top 10%  
 Shatter 6 in.  
 Stopped 1 in from bottom.  
 Limited day - 250 in.  
 New snout 9 in  
 Penetrations 28 in to bottom  
 Core compressed 1 ft.  
 New dye planted March 1

SNOW SURVEY NOTES  
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CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

Drainage Basin Tulare  
 Snow Course Banner Lake  
 Party JAC and JJJ  
 Date \_\_\_\_\_

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	61 -5	58 -5	83	105.3	22.3		Surface of snow yellow blue green
	2	58.5	53	83	105.5	22.5		Coarse crystals Core crushed 90% Easy sampling - fine cells, snow cells
	3	59 -2	49 -2	83	106	23.0		
	4	54.5 -7	52 -7	83	112	29.0		Mainly crushed
	5	67.0 -5	60 -5	83	104.5			Crystals blue
	5 <sup>a</sup>	68 -5	65 -5	83	106	23.0		

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 \*\*Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
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CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin Tuolumne  
Snow Course Danner Pass  
Party J. S. C. and J. P.  
Date March 1, 1946

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
	6	55	57.5	83	108	25.0		
	7	53	54	83	98	5.0		
	7a	60	57	83	105	22.0		
		-17	-17					
	8	65	50	83	103	20.0		Course crystals
	9	65	47	83	101	18.0		under trees ice
			42.5					snow core
	10	58	48	83	101	18.0		down
		-1	-1					
	11	55	41.5	83	99.5	16.5		under living?

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin Tulare  
Snow Course Danner Lake  
Party J. E. ...  
Date March 1, 1964

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
	12	56	52	83	103	20.9		
								Core course friable, lighter than other samples, only 3" moist packed
		7	10.9			259.3		
Arg.		59.2				21.6	36.5%	Moist
								Snow core shows green Temp. 32°F Crumbles - Old moist from some snow crumbles

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 \*\* Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
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Large grid area for sketch map or notes, mostly blank.

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES  
Drainage Basin S. Yuba  
Snow Course Soda Slough #1  
Party Blaine Eddy, A. Hunt  
Date March 1, 1961

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
								Course by dualuminum sampler
								Cutter lost on P4&E sampler. New cutter. Soldering did not hold Treaded sampler - Dual. stuck often. Trace of moist and frozen snow in tube. Slow till noon. Much cleaning. After lunch sampling done quickly. Evidently air and sun warmed, so sampler resisted the cold snow. Study change in temp. of snow.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
\*\*Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.  
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No. of Samples	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of Tube and Core	Water Content	Density Per Cent	Remarks
10	2.10	D	2.10	(= 2.10 on scale)!			

CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

Drainage Basin S. Yuba  
 Snow Course Ranney Pass  
 Party J. S. and J. H.  
 Date March 2/46

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
	10	2.10	D	2.10	(= 2.10 on scale)!			
								Why? Must pump. Can only 3/4 full.
								Top pipe covered 3 ft by snow (drift) Base of cross bars only 12 ft up.
								N.B. - Contents unfrozen.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

\*\*Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

Drainage Basin S. Yuba  
 Snow Course Daniel Pass  
 Party JSC and JG  
 Date March 2/46

*Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
			- Dye -					
								Sticks all gone, except last ones Feb 27/46
								W. on surface - but penetration 1 1/2 - 2 in. (3 days) strong wind. Total 5 in.
								Serious case but not cold. Need thermal shelter.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

\*\*Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. .... of ..... sheets. Comp. by ..... Checked by .....

DATE \_\_\_\_\_

TIME \_\_\_\_\_

LOCATION \_\_\_\_\_

NAME \_\_\_\_\_

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

Drainage Basin S. Yuba

Snow Course Ranney Pass

Party JAC and JH

Date March 2/46

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
	7	129	113			54		Snow so clogged
		78	75					Slushy but melts out quickly
		128	120					clogged
		165	150					"
								Temp.
	3 FT							30°F - Putting it back and increasing circulation = 31°F
	9 FT							30°F - Dregs of water frozen on glass tubes

\* Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

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No. \_\_\_\_\_ of \_\_\_\_\_ sheets. Comp. by \_\_\_\_\_ Checked by \_\_\_\_\_

No. \_\_\_\_\_ Date \_\_\_\_\_  
 State of California  
 Department of Public Works  
 Division of Water Resources  
 California Cooperative Snow Surveys  
 Snow Survey Notes

No.	Date	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks

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**CALIFORNIA COOPERATIVE SNOW SURVEYS**  
**SNOW SURVEY NOTES**

Drainage Basin Tulare  
 Snow Course Tulare R5  
 Party J.J. and J.S.C. and H.L. Snider  
 Date March 2/46

*Description or Number of Course	**Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
<u>Jan 25/46</u>	<u>49</u>							<u>New snow 8 1/2</u> <u>Penetration 15"</u> <u>Top 1/2 in crust ice</u> <u>Purple</u>
<u>Dec 29/45</u>	<u>45</u>							<u>Penetration to bottom</u> <u>Bottom 4 in purple</u> <u>Crust</u>
<u>Dec 29</u>	<u>41-45</u>							<u>0</u> <u>New snow 12"</u> <u>Penetration at least to 1 in</u> <u>from bottom. Top 1 in of dust</u> <u>90% Rest 20% - Crystals</u>

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New eye  
Blotch  
 coarse - crust  
 eye semi-arc...



THIS MANUAL SHOULD BE KEPT IN THE  
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No. of Courses	Sample No.	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	32	28	65	71	6		
	1a	34	28	65	77	12		
	2	38	30	65	80	15		
	3	41	36	65	80	15		
	4	45	39.5	65	80	15		
		-2	-2					
	5	42.5	40	65	81	16		Dests. not removed
	5 <sup>a</sup>	42	35	65	79	14		
		-1	-1					
	6	37	29	65	77	12		
		37	34	65	79	13		
			-1					

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

Drainage Basin Tuolumne  
 Snow Course Tuolumne P.S.  
 Party J. J. [unclear] and H. S. [unclear]  
 Date March 2/46

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

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THIS FORM IS TO BE USED FOR RECORDING THE RESULTS OF SNOW SURVEYS MADE IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THE MANUAL OF SNOW SURVEYS, PUBLISHED BY THE DIVISION OF WATER RESOURCES, DEPARTMENT OF PUBLIC WORKS, STATE OF CALIFORNIA.

No. of Samples	Course No.	Depth of Snow	Length of Core	Weight of Empty Tube	Weight of Tube and Core	Water Content	Density Per Cent	Remarks
7	39	30	65	78.5	13.5			
7 <sup>a</sup>	41	38	65	80.5	15.5			
	-1.3	-1.3						
8	34	28	65	77	12			
	-1	-1						
	306.7			111.5		36.3% Dens		
	38.3		Soil		merely moist.			
				117.5				
				13.9				
			Jan 31	11.6				
			Jan	2.3				
			Feb precip.	2.96				
				Less	0.66			

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 CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

Drainage Basin..... Tanana  
 Snow Course..... Tanana R. S.  
 Party..... J. J. S. C. H. S.  
 Date..... Feb 2, 1946

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
	7	39	30	65	78.5	13.5		
	7 <sup>a</sup>	41	38	65	80.5	15.5		
		-1.3	-1.3					
	8	34	28	65	77	12		
		-1	-1					
		306.7			111.5		36.3% Dens	
avg		38.3		Soil		merely moist.		
					117.5			
Sail only moist.					13.9			
				Jan 31	11.6			
				Jan	2.3			
				Feb precip.	2.96			
					Less	0.66		

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

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Eng. 0.66?

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**SNOW SURVEY NOTES**  
 СЪГЛАСИВЪИ СООПЪРЪВЪИВЪИ СНОВЪИ ИЗМЪРЪВЪИ  
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**CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES**

Drainage Basin Tamuckee  
 Snow Course Tamuckee R. S.  
 Party J. J. [unclear] H. S.  
 Date March 2, 1946

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
		- Tank -						
								Feb. 27-28 Rain 0.45 in.
								21-22 " T Snow followed up by rain 0.45
								March 2 - D. 0.14 (= 1.4%)
" February was driest month since '33, coldest since '33 - Salt Run								
								Jan 4 2.2 Feb 20 2.58 Packed to 1.40
								6 2.2
								7 2.21 " 23 1.40
								11 2.3 " 25 1.40
								16 2.3 " 26 1.40
								24 2.35 " 27 1.40
								Feb 4 2.30 March 2 1.40

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No. \_\_\_\_\_ of \_\_\_\_\_ Course No. \_\_\_\_\_

THE FOLLOWING INFORMATION IS FOR THE USE OF THE SURVEYOR AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

NO. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 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, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

Drainage Basin Tanichuan  
 Snow Course Tanichuan P.S.  
 Party J. J., J. B. C. H. D. S.  
 Date March 3, 1946

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
								Temp. —
		20 <sup>in</sup>				32°F		In sun
		20				30.15°		In shade
		6 <sup>in</sup>				32.5		in ground (w/upper hole)

Front left tree collapsed, need new caving. Promised to buy one.

Battery of Triple Register  
 E (mid) 1275, W (mid) 1275

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*Triple charger pulled*

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CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin S. Julia  
 Snow Course D. ...  
 Party J.J. + J.S.C.  
 Date March 5/46

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
4:20 pm		Drift Part			215 (2.15)!			
		Pale 12" -			12 from fall			
				187, 185				
	96.5	97.5	140	230	45	46.6		
	123	33.7	"	209	19	41.5		
	208	95	"	240	50			
	232	37	"	210	20			
	258	33.5	"	210	20			57.8%
	258				144			Core moist but too compact
				174				to compress
								67.4%!
Temp.	8 1/2	FT				29.5	F	
						32°		Tube moist, no frozen flakes.
		21 FT + 1 in						
								Melting? beautiful.

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\* But if in mind 190" is 5" too high should not water C also 4 5" too high

*[Faint, illegible handwritten notes]*

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**CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES**

Drainage Basin... S. Yuba  
 Snow Course... Donnell Pass  
 Party... J.P. + J.H.  
 Date... March 5/46

* Description or Number of Course	** Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of Tube and Core	Water Content Inches	Density Per Cent	Remarks
								- Age -
								Feb 27/46 Penetration 4 <sup>1</sup> / <sub>4</sub>
								7 <sup>1</sup> / <sub>4</sub>
								6 <sup>1</sup> / <sub>4</sub>
								Mar 5 new planting on surface.
								Age on surface green
								Beneath red, but turning slowly green. *
								Red quickly descended 152 in. into snow.
								Need color camera.

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 \* As one left due to spread on snow was turning red. Proceed to 8:15 in Pasture 2