Form No. 144

FEDERAL-STATE COOPERATIVE SNOW COVER SURVEYS

FEDERAL, STATE AND PRIVATE AGENCIES

SURVEY NOTES

Jan. 27 1950 - Mar. 17 1950

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.[1] 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).[2]

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 downward 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.[3]

(*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 the 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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[1]Or paraffin.

[2]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.

[3]A complete core is evidenced when length of core compared to snow depth is approximately the same throughout a course.

A1

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Colorado

Drainage Basin Tarryall River

Snow Course Tarryall Ranger Station

Party Jas. Edwards and Wade Cannon

Date Friday June 27, 1952

*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	25.5 -0.5	23.7	54.5	67	12.5		Needles not
	2	32.5 31.3 8	28.8 30+	11 11	64.8 64.8	10.3 10.3		
	3	34.5 -0.5	32 -0.5	54	66.2	12.2		
	4	36.4 36.5	32 33	54.5	68 68.2	13.5 13.7		Crystals coarse 4
	5	35	34	54.5	67.2	12.7		First crust 6.5
	6	33.5 -1	33.3 -1	11	65.6	11.1		Crust 7-crust not.
	7	35.7 -.5	34.3 -.5	54.5	66.2	11.7		

*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 samping 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. Comp. by ..... Checked by .....

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Truckee Ranger Station

Party J. E. Church and Willie Carson

Date Friday, Jan. 27, 1950.

*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	28	28	54.5	63.2	8.7		
Total	256.2					92.9		
Av.	32.0					11.61	36.3	New snow 7
New Snow		7.3	Cc	54.5	55.8	1.3	19.2	
Balance		27.0	26.8	54.5	64.9	10.4	38.5	
Frozen		8.5	Cc	54.5	57.8	3.3	38.8	} Balance
Balance		19.0	19.0	54.5	61.0	6.5	34.9	
		-.4	-.4					

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin Truckee River

Snow Course Truckee Ranger Station

Party .....

Date March 31, 1933

*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
— At No 2 Pass —								
Snow Cover —								
Top		22	21.2	54.5	58	3.5	15.9	
		22	20	4	57.4	2.9	13.2	
Balance		24.5	28.5	54.5	63.3	8.8	29.8	
Total computed		51.5				12.3	23.9	

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State ..... Montana
Drainage Basin .....
Snow Course ..... Tamarack Ranger Station
Party .....
Date ..... Monday Feb 6, 1950

*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
		— Tanks —						Tare
No 1				2.0		2.9	0.9 = 0.09	
No 2				2.0		7.9	5.9 = 0.59	

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†Always start measurements for samping 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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FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Truckee Ranger Station

Party J.S. Church

Date Monday Feb. 6, 1950

*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	33	32	54.5	65.8	11.3		Hon 11.5
	2	36	34	"	68	13.5		Hon 12
	8	-.8	-.8					
		35.8	33.5	"	67.9	13.4		
	3	41.5	35.8	"	69.2	14.7		N.S. 15
		-.5	-.5					
		42	30		65.4			
		42	35.5		70.2	15.7		[illegible]
	4	42.5	41	54.5	70.6	16.1		
	5	44	37.5	"	70.8	16.3		N.S 13.5
	6	40.5	37	"	67.8	13.3		NS 15
	5	41.5	39	"	68.8	14.3		
	7	41	39.5	"	70.0	15.5		NS 15
	8	37.5	35.8	"	67	12.5		NS 14

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

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State ..... California .....

Drainage Basin ..... Truckee River .....

Snow Course ..... Truckee River Ranger Station .....

Party ..... J. E. Church .....

Date ..... Monday Feb. 6, 1950 .....

*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
Total	8	316.7				115.2		
Av.		39.6				14.4	36.4	
		Test Shaft						
Near Pan No. 5 (to south)								
Top		11.7	cc	54.5	57.6	3.1	26.5	5/6 } 32.5
Balance		32.7	31		65.6	11.1	33.9	1/6 }
Bottom		14.5	13.5	"	59.1	4.6	31.7	Moist
Heavy dye button surface.								

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

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

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin .....

Snow Course .....

Party .....

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
		January 27, 1950						
		32.0				11.6	36.3	New Snow 7 in
		February 6, 1950						
		39.6				14.40 / 2.79 in	36.3	New Snow 14 in
2 Sam								
		Precip. Jan 27 - Feb 6 - 4.72 in						
		Melting since Jan 31						0.59 in

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

Frog last night

State California

Drainage Basin Truckee River

Snow Course Truckee Ranger Station

Party J. E. Church (Clyde Arrington)

Date February 26, 1950

*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	24 -1.5	24 -1.5	54.5	65	10.5		Water dripping
	2	29 -1.7	38½ -1.7	55	67.5	12.5		Some moist
	3	36	35	54.5	69½	15.3		Dry
	4	35.5 -.3	35.3 -.3	54.5	70	15.5		
	5	38.5 -.7	36.8 -.7	54.5	71	16.5		
	6	33 -.3	33 -.3	55	68	13		Loose wet
	7	33.5	32.5	54.5	68.9	14.4		
	8	26 -1.5	26 -1.5	54.5	65	10.5		
Total		249.5				108.2		
Aver		31.2				13.5	43.3%	

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State ....

Drainage Basin ....

Snow Course ....

Party ....

Date Feb. 26, 1950

*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
		Special			Sampling			
East of Pan 1.								
	20 ft. from pan	(a)						
		36	32	54.5	68.9	14.4		
		35	32	"	68.4	13.9		Dry on the bottom. Wet
		(b)						
10 ft farther		37	35.5	54.5	69.8	15.3		White
					av.	14.8		The rock at stake
Between the		4 + 5 (5N)						12 in E of stake
		33	29	54.5	68.4	13.9		Gray wet
3 ft N. out of melt hole		37.7	36.7	"	71.0	16.5		

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State ....

Drainage Basin ....

Snow Course .... # ....

Party ....

Date ...... Feb. 26, 1950 ......

*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 Movements

Between Nos. 4 + 5 at top

In center of dye 100 to 30% at bottom

3 Ft down slope - Traces thruout

4½ F Doubtful

6 Ft White

8 Ft White

South of Course opp. above *

In dye 50 to 10% thruout bottom

2 Ft downslope Bottom 3 in.

3 Ft White, purple 50% **

* Old red core thrown on snow

** No, not purple - Water grey

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COOPERATIVE SNOW SURVEYS

State ....

Drainage Basin ....

Snow Course ....

Party .... #

Date ....Feb. 26, 1950..

*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
		Heavy Dg-a Ey Pan No 1						
1 Ft N. of stake				30% at strata				
20th Track 10%* (to bottom)								
+26 at 8 in crust								
3 Ft N.		White						
1 Ft S (downhill from stake)								
		30% top to 75% in bottom foot						
2 Ft		5% trace in bottom foot						
3 Ft		White						
* above bottom. 2 meas.								

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State ....

Drainage Basin ....

Snow Course Special – with Drip Tanks

Party J. E. Church

Date Tues. March 7, 1950

*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
E of Tank No. 1 – 25 Ft (b)								
New Snow		4.5	cc	54.5	55.4	0.9	20%	Wet
Remainder		36	34.5	54.5	71.5	17.0	47.9	cores
		-.5	-.5					at
Total		40.0				17.9	44.8	bottom
[illegible] (b)		39	37.8	54.5	71	16.5	43.1	↓
		-.7	-.7					
E of								
East of Tank No 2. – Between Course Nos 4 + 5								
		33	31	54.5	69.8	15.3	46%	New snow 3 in
		Drove thru top crust						average
East Tank No. 1 10 Ft stick [illegible]								5 in [illegible]
(a) (15 ft)?		32.7	28.5	54.5	67.0	12.5		
		-.3	-.3					Red dye

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(b) [illegible] 34.5 69.5 15.0 43.2% 3[illegible]

No. .... of 35 sheets. Comp. by .... Checked by ....

-.3 -.3 Av. 15.25

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin .....

Snow Course .....

Party .....

Date March 7, 1950

*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	32 -1	30 -1	54.5	62.5	8.0		Mud
	2	31.5 -1.9	29.5 -1.9	54.5	67.5	13.0		New 2" snow 5"
		Drove twice in center						
		Need sharper teeth.						
	3	34 -1	32 -1	11	69.2	14.7		New snow 5"
		Drove twice.						
	4	36	35.5	54.5	69.5	15.0		New snow 4½"
	5	35.5 -.5	33.7 -.5	54.5	71	16.5		N.S. 3½"
		Drove once.						
Av.		30.9				13.5	43.7%	

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2-5 33.4 14.9 44.6%

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Truckee Ranger Station

Party J. E. Church

Date Thursday March 16, 1950

*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
			Snow Course					
	2	29.5 -.2	28 -.2	54.5	67.6	13.1		New 4.5
	3	33.7 -.6	32.0 -.6	54.5	70.0	15.5		" 4.5
	4	35.0 -.7	35.7 -.7	"	71.0	16.5		" 4.0 Bottom of core not packed.
Note.- Core longer because of expansion of ice shavings?								
No 3 assumed to be 34.5.								
	5	32.3	32.5	"	69.6	15.1		" 4.5 Moist crushes
New Snow	4	4.5	cc	54.0	55.5	1.5	33.3%	
Old "	"	32.0 -.3	31.5 -.3	54.0	68.0	14.0	44.2	Moist duff

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32.2 15.0 46.6%

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin .....

Snow Course Spaniah at Dirt Tank

Party .....

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
From Tank No. 1								
15 ft East		34.5	33.5	54.0	69.0	15.0		Duff mostly
		-1.0	-1.0					Core ends in wet ice
	Dyk at bottom							
10 ft further		38	38	54.0	71.5	17.5		Ice Button
		-1.0	-1.0			16.75		
From Tank No. 2								
SE		31.5	31.5	54	69	15.0		Now 3"
Toward No. 5		-.9	-.8					Flooded
		Core moist packed						wet

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .... - Dye - ....
Drainage Basin ....
Snow Course ....
Party ....
Date .... March 16 ....

*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
No (2)	NE	D. 24.5		No Trace -				Crust
6 ft from stake								and windy
3 ft			29.5	No Trace				"
3 ft	NE	32 in.		Dye	4 in			Downhill
1 ft	SE	30 in			4 in			
		Both only to the ice						
6 ft	NE	32 in.	Trace of dye on crust					
9 ft		24.5	Crusts weaken				No Trace	

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin .....

Snow Course .....

Party .....

Date ..... March 17

*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
Pan No 1.								
(a)		35,0	32	54,5	69,0	14,5		306
		-1,5	-1,5					
(b)		38,2	36,5	"	70,6	16,1		
av.		-,3	-,3			15,3		
Pan No 2								
(a)		32,0	31,5	"	69,3	15,0		Core Course wet
Top snow		5,5	cc	"	55,0	0,5		
	3	4,2	cc	"	55,5	1,0	25%	
		The next wet snow.						
		Then coarse wet crystals						

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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State ....

Drainage Basin ....

Snow Course ....

Party ....

Date ....March 17....

*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 Stations							
No.(2)	1 Ft SE.		Dye only to crust					
	Uphill 6 in from above					White		
Replanted dye beneath crust in clear ice crystals as large as rock salt,								
No.(1)	Crust weak (?)							
17 in N	29 in D.		Traces of dye to 20 in					
	25*		Dye 75 to 100 % to bottom					
Below	1½ ft [illegible]	29	No dye					
"	3 ft	29	No dye					

* Only 6 in away but [illegible] center of dye

*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 samping 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....................

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State ....

Drainage Basin ....

Snow Course ....

Party ....

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
No (1)	Continued							
	Dye was placed on surface							
		32"	Dye 5-6% or less to bottom					
4 meas at 6 in. intervals within radius of 1½ ft carries dye [illegible]								
at 2 ft dye in lenses [illegible] on crusts								
at 2½ ft snow white								
	at angle of 45°							

*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 samping 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........................