ROUTING SLIP — DIVISION OF WILDLIFE REFUGES — DATE: June 1, 1948

____ MR. SALYER	____	SECTION OF HABITAT IMPROVEMENT:	
____ ~~MR. KRUHMS~~	WK 8/2	~~Mr. Griffith~~	REG 6-3
____ ~~MR. DUMONT~~	PAD 6-25	~~Dr. Bond~~n	WSB 6-28
____ MISS BAUM	____	~~Miss Cook~~	Swc 6-8
____ SECTION OF OPERATIONS:		✓ SECTION OF LAND MANAGEMENT:	
~~Mr. Ball~~	J.G.B.	Mr. ~~Kent~~	JK
Mr. Regan	7/13/48	~~Mr. Ackerknecht~~	
____	____	____	____
____ SECTION OF STRUCTURES:		____ STENOGRAPHERS:	
~~Mr. Taylor~~	8/16	____	____
Mr. Johnston	____	____	____

REMARKS: HAILSTONE) HALFBREED) LAKE MASON) LAMESTEER) NATIONAL WILDLIFE REFUGES (Fr. Pack Comment)

NARRATIVE REPORT

JANUARY--APRIL 1948

Return to: ____

344

A N N U A L S U M M A R Y

HAILSTONE N.W. REFUGE
HALFBREED N.W. REFUGE
LAKE MASON N.W. REFUGE
LAMESTEER N.W. REFUGE

May 1947 - April 1948

Lack of snow and subsequent low runoff resulted in all easement water areas, except Lamesteer, further declining in size. Prospects are that Lake Mason and possible Halfbreed will dry up this year.

About the same conditions existed last year, but all areas contained water.

Because of low water both waterfowl use and production on these areas is lowered. Total production for all easement areas amounted to approximately 1,700 ducks and 90 coots.

Altho water was low, fall use of the areas by southbound migrants was heavy. All areas are producing abundant food for waterfowl.

Upland birds are few and far between on all easement areas. In general, the areas are waterfowl areas and do not furnish attractions to upland birds.

Antelope around the Lake Mason area are doing very well and each year shows an increase.

The population of skunks on both Lake Mason and Hailstone have declined and no longer are a menance to waterfowl nesting on the areas.

Low water has caused muskrats to disappear from all areas except Lamesteer.

Fish in Miller Lake are now extinct and a request has been made to introduce warm water species. Lamesteer is producing fair catches of bullheads for sportsmen. Observations indicate a good population of warm water fish is developing in Hailstone.

This year, with adequate help, we were able to get the easements back into good shape.

Headgates for irrigation were installed in the Miller Lake canal near the tree plot.

The Miller Lake ruble flume was replaced with an eight inch pipe.

The Miller Lake well house was painted.

The Halfbreed spillway crest wall repairs were completed.

Further repairs were made to the Lamesteer spillway.

Water gages were built for all areas and a flash board box for storage of the Lake Mason Canal headgate was provided.

Thomas C. Horn

Thomas C. Horn, Refuge Manager

Approved Regional Office

I N D E X

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HAILSTONE NATIONAL WILDLIFE REFUGE
HALFBREED NATIONAL WILDLIFE REFUGE
LAKE MASON NATIONAL WILDLIFE REFUGE
LAMESTEER NATIONAL WILDLIFE REFUGE
REFUGE NARRATIVE REPORT
JANUARY - APRIL
1948

I GENERAL

A. Weather Conditions.

Overall, the winter was more mild than average. Snowfall was light and at no time was the country white. Detailed weather reports are at the back of this report.

B. Water Conditions.

These changed very little from last period. Runoff was negligable. At the end of the period levels were:

Hailstone	90" below spill
Halfbreed	60" below spill
Lake Mason	60" below spill
Miller Lake	40" below spill
Lamesteer	at spill

On March 22 Lamesteer, the only area that spilled, was discharging about three and one-half inches of water over the weir crest. Evidence indicated that spill had been about twelve inches a day or two before.

Estimated water areas are:

Hailstone	60 acres
Halfbreed	200 acres
Lake Mason	50 acres

C. Fires.

None.

II WILDLIFE

A. Migratory Birds.

Reduction in the size of most water areas from lack of runoff has resulted in lower overall waterfowl usage.

HAILSTONE.

Overall use on this area this year was about one-third of that last year. The reduced size of the water area is probably responsible. Details on species are on NR form 1 attached.

HALFBREED.

Overall use on this area this year was more than double that last year. This area apparently produces a wider variety of more desirable food plants than Hailstone. It usually carries the highest population of feeding waterfowl.

LAKE MASON.

This water area has declined to about fifty acres. Water in Willow Creek ceased to flow at a point two miles above the lake on April 23, 1948.

This year's estimated waterfowl usage of the area was only about sixty per cent of last year's. Lower water levels may have been responsible.

MILLER LAKE.

Overall use on this unit this year is approximately double that of last year.

Each area listed above was visited twice this period. The first near the end of March. Each area was about one-half covered with ice at that time. The other trip was on April 22, and 23. On this trip Hailstone and Halfbreed were censused on foot and by truck, and Lake Mason and Miller Lake by air. The latter was our first experience by air. It is a very effective, fast means of making a waterfowl census.

LAMESTEER.

Only one visit was made to this area on March 22. Except for narrow open shoreline, ice covered the area. Mr. Ford who made the inspection found three shovellers and two mallards present. It was reported that about a week prior fourteen Canada geese had visited the area.

WATERFOWL SUMMARY.

This year's flight of mallards and pintails, particularly pintails, was much greater than last year. Overall waterfowl usage of the easement areas was eighty-nine per cent of what it was last year.

2. Food & Cover.

This for all areas is abundant, the season considered. Each area is now a prolific producer of aquatics and stubble fields are near all refuges for use by mallards.

B. Upland Game Birds.

None observed on any area thru this period.

C. Big Game Animals.

Antelope were split up and scattered at the time of inspection of these areas. One buck was observed on the Miller Lake unit.

2. Food & Cover.

Conditions for antelope are good.

D. Fur Animals, Predators, Rodents, and Others.

As previously advised, the skunk population on Lake Mason has fallen off extensively because of better hayland management by Mr. Ayers the new owner. The skunk population on Hailstone has evidently fallen off too, as fewer signs are now observed.

No coyotes were observed on any area.

E. Predaceous Birds.

None were observed on any area.

F. Fish.

None detailed information to be reported after seine checks of Lamesteer and Hailstone. Unless some runoff is received thru June in Hailstone, we may loose our fish population here because of freezing this coming winter.

III REFUGE DEVELOPMENT & MAINTENANCE

A. Physical Development.

Thru the winter water gages for each easement area were constructed and will be placed this spring.

A storage box for the Miller Lake Canal was built and will be placed there on the next trip over the easements.

The Miller Lake Canal was cleaned on the March 30 inspection.

VII OTHER ITEMS

Arrangements were completed for planting Canadian geese on Miller Lake and Lake Mason this year. There will be raised by Bowdoin Refuge and cared for during winter months by the Tri-County Sportsmens Association of Roundup. Dr. Vedova, State Fish & Game Department Commissioner of Roundup, will have direction of the winter care of the geese.

Mess

Submitted on May 18, 1948

Thomas C. Horn

Thomas C. Horn, Refuge Manager

May 24, 1948

Approved Regional Office

Robert P. Boone

Acting Reg. Director

NR FORMS AS FOLLOWS ARE NOT APPLICABLE TO THESE AREAS:

NR-1A - Lamesteer, no observations.

NR-2 - No upland birds observed on any area.

WATERFOWL

Refuge Hailstone Months of January 1, to April 30 1948

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan									
II. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
III. Ducks:									
Mallard	50	3/30	70	4/22					350
Black duck									
Gadwall									
Baldpate	40	3/30	40	4/22					200
Pintail	50	3/30	50	3/30					250
Green-winged teal									
Blue-winged teal									
Cinnamon teal									
Shoveller	34	4/22							170
Wood duck									
Redhead	17	4/26	17	4/26					85
Ring-necked duck									
Canvas-back	28	4/22	28	4/22					140
Scaup			8	4/22					40
Golden-eye	60	3/30							300
Buffle-head									
Ruddy duck	7	4/26							35
IV. Coot:	12	4/22							

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese _____

Ducks _____

Coots _____

Total waterfowl usage during period 1570

Peak waterfowl numbers 315

Areas used by concentrations _____

Principal nesting areas this season _____

Reported by Thomas C. Horn

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentration: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.

(5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

2338

WATERFOWL

Refuge Halfbreed Months of January 1, to April 30, 1948

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan	1 cygnet	4/22							
II. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
III. Ducks:									
Mallard	800	3/30	800	3/30					1500
Black duck									
Gadwall	70	4/26	70	4/26					350
Baldpate	55	4/22	55	4/22					275
Pintail	1600	3/30	1600	3/30					4000
Green-winged teal	92	4/26	92	4/26					450
Blue-winged teal	20	4/22	20	4/22					100
Cinnamon teal									
Shoveller	45	4/22	45	4/22					225
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back	30	4/22	30	4/22					150
Scaup	90	4/22	90	4/22					450
Golden-eye									
Buffle-head									
Ruddy duck									
IV. Coot:									

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese _____

Ducks _____

Coots _____

Total waterfowl usage during period 11,500

Peak waterfowl numbers 2,400

Areas used by concentrations ~~Entire area~~

Principal nesting areas this season _____

Reported by ~~Thomas G. Horn~~

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentration: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.

(5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

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2338

WATERFOWL

Refuge Lake Mason Months of January 1, to April 30 1948

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan									
II. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
III. Ducks:									
Mallard	1500	3/31	1500	3/31					6000
Black duck									
Gadwall									
Baldpate	260	4/23	260	4/23					1000
Pintail	3000	3/31	3000	3/31					7500
Green-winged teal									
Blue-winged teal									
Cinnamon teal									
Shoveller	90	4/23	90	4/23					400
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back	10	4/23	10	4/23					50
Scaup	50	4/23							250
Golden-eye									
Buffle-head									
Ruddy duck									
IV. Coot:	6	4/23	6	4/23					50

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese _____

Ducks _____

Coots _____

Total waterfowl usage during period 15,250

Peak waterfowl numbers 4,500

Areas used by concentrations Entire area

Principal nesting areas this season _____

Reported by Thomas C. Horn

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentration: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.

(5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

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2338

WATERFOWL

Refuge Miller Lake Months of January 1, to April 30 1948

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan									
II. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
III. Ducks:									
Mallard	210	3/31	210	3/31					800
Black duck									
Gadwall									
Baldpate	40	3/31	40	4/23					150
Pintail	490	3/31	490	3/31					1500
Green-winged teal									
Blue-winged teal									
Cinnamon teal									
Shoveller									
Wood duck									
Redhead	26	3/31	26	3/31					100
Ring-necked duck									
Canvas-back	22	3/31	22	3/31					90
Scaup	14	3/31	30	4/23					80
Golden-eye	18	3/31	18	3/31					80
Buffle-head									
Ruddy duck	20	3/31	20	3/31					40
IV. Coot:	40	4/23	40	4/23					90

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese _____

Ducks _____

Coots _____

Total waterfowl usage during period 2930

Peak waterfowl numbers 820

Areas used by concentrations Entire area

Principal nesting areas this season _____

Reported by Thomas C. Horn

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentration: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.

(5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

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2338

WATERFOWL

Refuge Lamesteer Months of January 1, to April 30, 194 8

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan									
II. Geese:									
Canada goose	14	3/15							
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
III. Ducks:									
Mallard	3	3/22							
Black duck									
Gadwall									
Baldpate									
Pintail									
Green-winged teal									
Blue-winged teal									
Cinnamon teal									
Shoveller	2	3/22							
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup									
Golden-eye									
Buffle-head									
Ruddy duck									
IV. Coot:									

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese _____

Ducks _____

Coots _____

Total waterfowl usage during period 500

Peak waterfowl numbers _____

Areas used by concentrations Entire area

Principal nesting areas this season _____

Reported by Thomas C. Horn

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentration: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.

(5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

2338

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Hailstone Months of January 1, to April 30, 1948

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Cormorant	1	4/22								10
II. Shorebirds, Gulls and Terns:										
California Gull	1	3/30	15	4/22						75
Avocet			4	4/22						20
Willet			2	4/22						10

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove	1	4/22								10
White-winged dove										
IV. Predaceous Birds:										
Golden eagle										
Duck hawk										
Horned owl										
Magpie										
Raven										
Crow										

Reported by Thomas C. Horn

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Halfbreed Months of ~~April~~ January to April 30, 1948

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
II. Shorebirds, Gulls and Terns:										
Avocet	16	4/22								50

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove										
White-winged dove										
IV. Predaceous Birds:										
Golden eagle										
Duck hawk										
Horned owl										
Magpie										
Raven										
Crow										

Reported by Thomas C. Horn

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Lake Mason Months of January 1, to April 30 1948

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
White Pelicans	17	4/23	17	4/23						45
II. Shorebirds, Gulls and Terns:										
California Gulls	18	4/23	18	4/23						90

(over)

(1)	(2)		(3)		(4)		(5)		(6)
III. Doves and Pigeons:									
Mourning dove									
White-winged dove									
IV. Predaceous Birds:									
Golden eagle									
Duck hawk									
Horned owl									
Magpie									
Raven									
Crow									

Reported by Thomas C. Horn

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Miller Lake Months of January 1, to April 30 1948

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
II. Shorebirds, Gulls and Terns:										
California Gull	6	4/23								

(over)

(1)	(2)		(3)		(4)		(5)		(6)
III. Doves and Pigeons:									
Mourning dove									
White-winged dove									
IV. Predaceous Birds:									
Golden eagle									
Duck hawk									
Horned owl									
Magpie									
Raven									
Crow									

Reported by Thomas C. Horn,

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

Form NR-4

SMALL MAMMALS

Refuge Hailstone Lake Mason Halfbreed Lamesteer April 30, 1948

(1) Species	(2) Density		(3) Removals					(4) Disposition of Fur							(5)
									Share Trapping						Total Population
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control	For Re-stocking	For Research	Permit Number	Trappers' Share	Refuge Share	Total Refuge Furs Shipped	Refuge Income	Furs Donated	Furs Destroyed	
HAILSTONE															
Skunks															30
LAKE MASON															
Skunks															25
LAMESTEER															
Muskrats															6

REMARKS: Coyotes are on and off all areas.

Only populated areas, and species present shown. None on other areas

1615

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i.e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan. "List of North American Recent Mammals" by G. S. Miller, Jr., a very good reference, is now out of print, although a revision is scheduled for publication in the near future.)

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.) Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year. Also show any removals not falling under heading listed.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market and the total income to the refuge by species, including share-trapped furs and furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

3-1756
Form NR-6
(April 1946)

FISH

Refuge Hailstone Lake Mason Halfbreed Lamesteer Year 194 8

Species	Relative Abundance	Sport Fishing		Commercial Fishing		Restocking		Number removed for Restocking
		Man days Fishing	Number Taken	No. of Permits	Pounds Taken	Number Stocked	Area Stocked	
HAILSTONE								
Unknown	Unknown	(Result of prior planting to be checked this summer.)						
LAMESTEER								
Bullheads	abundant	none	none	(Closed Season)				
NO FISH IN ANY OTHER EASEMENT AREA.								

REMARKS:

WB FORM 1030

U. S. DEPARTMENT OF COMMERCE, WEATHER BUREAU

MONTHLY CLIMATOLOGICAL SUMMARY

With Comparative Data

STATION Billings, Montana (Municipal Airport), MONTH April, 1948

Phone 5431; 105 th Meridian Time; Lat. 45° 48' N, Long. 108° 32' W; Elevation 3570 ft.

DATE	TEMPERATURE °F Maximum	Minimum	Mean	Departure from normal	Degree days base 65°	PRECIPITATION Total (inches)	Snowfall (inches) (unmelted)	Depth of snow on the ground 7:30 P.M.	WIND Prevailing direction	(*) Highest velocity	Direction	WEATHER Percent of possible sunshine	Average cloudiness scale 0 to 10
1	47	28	38	- 2	27	0.01	T	0	E	15	SE	56	7
2	67	26	46	+ 5	19	0	0	0	S	25	S	79	9
3	64	36	50	+ 9	15	T	0	0	SW	28	NW	44	8
4	48	31	40	- 2	25	T	T	0	NE	16	NE	63	8
5	49	34	42	0	23	0	0	0	SW	23	NW	57	7
6	54	30	42	0	23	T	T	0	SE	37	NW	33	9
7	39	21	30	-13	35	.01	0.4	T	NW	25	N	47	8
8	55	19	37	- 6	28	0	0	0	N	13	NE	86	7
9	64	30	47	+ 3	18	0	0	0	SW	18	W	68	7
10	51	34	42	- 2	23	.11	T	0	N,SW	28	NW	19	9
11	44	29	36	- 8	29	.01	T	T	W	29	W	30	9
12	50	28	39	- 6	26	T	T	0	NW	21	NW	82	5
13	60	32	46	+ 1	19	T	0	0	SW	27	NW	72	9
14	66	34	50	+ 4	15	T	0	0	SW	25	W	72	9
15	71	46	58	+12	7	.01	0	0	SW	31	NW	67	7
16	74	42	58	+12	7	0	0	0	SW	14	W	54	9
17	73	47	60	+13	5	T	0	0	SW	38	N	37	8
18	51	43	47	0	18	.40	0	0	NW	17	NW	0	10
19	60	40	50	+ 3	15	.01	0	0	NW	17	NW	59	7
20	68	39	54	+ 6	11	0	0	0	SW	17	SW	100	5
21	75	40	58	+10	7	0	0	0	SW	22	SW	82	7
22	73	46	60	+12	5	.13	0	0	NW	30	NW	46	9
23	60	41	50	+ 1	15	T	0	0	NW	28	N	54	7
24	61	42	52	+ 3	13	0	0	0	NW	22	NW	54	6
25	52	40	46	- 3	19	.05	T	0	NW	26	NW	17	9
26	53	33	43	- 7	22	0	0	0	W	26	NW	60	4
27	58	31	44	- 6	21	0	0	0	NE	18	NE	70	8
28	77	37	57	+ 6	8	0	0	0	N,E,SW	24	SE	75	7
29	84	48	66	+15	0	0	0	0	S	35	S	81	3
30	63	41	52	+ 1	13	T	0	0	W	24	W	68	4
31													
MEAN	60.4	35.6	48.0	+2.0	511	0.74	0.4	------	SW	38	N	58	7.4
Normal	-	-	46.0	-------	555	-	-	-------	-	April 17		-	-

(*) For 5-minute period.

PRESSURE	Mean		Highest		Date	Lowest		Date
Station	26.179 in.	886.6 mb.	26.555 in.	899.4 mb.	7	25.730 in.	871.3 mb.	29
Sea Level	29.84 in.	1010.5 mb.	30.37 in.	1028.4 mb.	7	29.23 in.	989.8 mb.	29

TEMPERATURE:—Mean this month last year 45.6. This month since 1935: warmest 52.8 in 1946; coldest 41.2 in 1945.
Highest 84 date 29; lowest 19 date 8. This month since 1935: highest 92 date 29, 1939; lowest -5 date 2, 1936.
Average daily departure since Jan. 1, +0.7 Degree days: since July 1, 6724, normal 6792; since Sept. 1, 6710, normal 6664.
Number of days: —Max. 100° or above 0; 90° or above 0; —Min. 32° or below 10; 0° or below 0; —10° or below 0.
Normal number: —Max. 100° or above -; 90° or above -; —Min. 32° or below -; 0° or below -; —10° or below -.

PRECIPITATION:—Departure -. Total since Jan. 1 2.34, Dep. -; total since July 1 7.0, Dep. -.
Total this month last year 1.24. This month since 1935: wettest 3.16 in 1940, driest 0.10 in 1944.

Greatest this month in:
5 min. .03 date 22
10 min. .05 date 22
15 min. .08 date 22
20 min. .09 date 22
30 min. .11 date 22
1 hr. .12 date 22
2 hr. .12 date 22, 18
24 hr. .41 date 18-19

Greatest this month since 1935 in:
5 min. .06 date 21, 1945
10 min. .09 date 21, 1945
15 min. - date -, -
20 min. .13 date 21, 1945
30 min. .16 date 21, 1945
1 hr. .17 date 21, 1945
2 hr. .28 date 17, 1941
24 hr. 1.42 date 16-17, 1941

SNOWFALL:—Total since July 1, 36.0, Dep. -.
Greatest monthly, this month since 1935 18.0 in 1939;
least monthly this month since 1935 0.0 in 1943.
Greatest in 24 hrs. 0.4, date 7;
this month since 1935 16.6 date 17-18, 1941.
Greatest any single storm - date -;
this month since -, - date -, -.
Greatest on ground 0.4, date 7;
this month since 1935, 17.5 date 18, 1941.

Number of days with precipitation: trace 9; 0.01 inch or more 9; 0.25 inch or more 1; 1 inch or more 0; 2 inches or more 0.
Normal number of days with precipitation: trace -; 0.01 inch or more -; 0.25 inch or more -; 1 inch or more -; 2 inches or more -.
Greatest number of days this month since 1939 with precipitation: 0.01 inch or more, 15 in 1940; least number 4 in 1944-46

CHARACTER OF DAY:—Number of days clear 1; partly cloudy 14; cloudy 15 Normal number clear 4; partly cloudy 9; cloudy 17
SUNSHINE:—Total hours this month 235.2. Total hours possible on 1st 12.8; on 16th 13.6; on last day 14.3; this month 406.6.
MISCELLANEOUS PHENOMENA (DATES):—Hail -; Sleet -; Glaze -.
Fog: Light 12, 18; Moderate 12; Heavy 12, 18.
Frost: Light -; Heavy -; Killing #7, 8, 9, 11, 12, 27
Thunderstorms 17, 22, 25 Duststorms - Tornadoes - Hurricanes -

a. City Office. b. Airport. c. Total. d. Monthly. e. Sunrise to sunset: 0 to 3, clear; 4 to 7, partly cloudy; 8 to 10, cloudy. f. other dates. g. Light fog, visibility 6 miles to 3,300 ft.; moderate, 3,299 to 1,550 ft.; heavy, 1,549 ft. to 0. h. Frosts not recorded in autumn after first "killing," except in Florida and along immediate coast of the Gulf of Mexico. T indicates a trace of precipitation.

No frost observed, but temperatures of 32.0 or lower recorded on these dates.

L. T. Pierce, Meteorologist.
Official in Charge, Weather Bureau.

STATION Billings, Montana, MONTH April, 1948

PSYCHROMETRIC DATA taken at Municipal Airport

Date	5:30 a.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	11:30 a.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	5:30 p.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	11:30 p.m. MST Dry	Wet	Dew Pt.	Rel. Hum.
1	28.8	28.3	28	94	37.3	34.2	30	75	45.6	38.2	29	51	31.4	29.6	27	81
2	29.8	28.0	25	81	49.8	41.8	33	52	65.4	47.4	28	24	52.2	41.2	28	38
3	46.7	37.7	26	43	58.6	45.6	32	36	53.4	43.0	31	42	38.2	34.2	29	68
4	35.2	31.7	27	70	38.8	34.1	28	64	48.4	38.1	25	38	38.4	33.1	26	59
5	36.8	31.9	25	60	47.0	36.0	20	32	47.1	37.0	23	37	39.2	33.1	25	55
6	33.2	29.5	24	65	45.1	36.8	26	45	52.3	38.8	20	26	33.0	30.9	28	80
7	26.2	24.2	21	77	33.4	31.0	28	78	36.2	31.0	23	56	25.1	23.7	21	82
8	19.3	18.9	18	94	42.5	34.9	24	48	53.4	39.2	19	24	41.0	33.0	21	42
9	33.1	29.0	23	62	58.5	43.7	26	28	61.1	45.0	27	26	49.6	40.8	31	47
10	38.2	36.7	35	87	43.7	40.2	36	75	38.0	36.1	34	84	36.5	32.2	26	64
11	30.0	27.1	22	69	43.7	33.7	18	33	37.5	33.8	29	70	30.0	30.0	30	100
12	29.4	28.8	28	94	39.1	32.7	24	51	49.2	37.2	21	31	39.0	33.0	25	54
13	37.2	30.6	20	46	54.9	40.2	20	23	56.0	40.0	17	20	43.0	36.0	27	51
14	35.8	32.3	28	72	56.7	44.0	30	56	62.0	47.0	31	31	55.0	44.0	32	41
15	53.8	43.1	31	41	68.1	51.3	36	28 31	64.2	51.0	40	41	47.4	42.6	38	69
16	42.1	38.9	35	77	61.2	50.4	41	48	73.0	53.4	37	27	58.8	45.6	31	35
17	51.0	42.0	32	47	62.0	50.3	40	45	59.4	50.1	42	53	49.2	44.1	39	68
18	47.0	43.5	40	80	45.8	45.0	44	94	46.3	44.0	42	85	43.2	42.8	42	96
19	41.0	39.0	37	84	53.9	45.0	36	51	59.9	46.3	32	33	49.3	42.4	35	58
20	40.0	37.5	35	86	62.7	49.6	38	40	66.8	48.6	30	25	52.8	44.0	35	50
21	43.0	39.0	34	71	65.6	50.2	36	33	68.7	51.8	37	31	61.2	48.7	37	40
22	49.6	43.6	38	63	65.0	52.3	42	43	67.2	52.7	41	39	48.9	45.6	43	78
23	43.4	40.1	36	76	54.8	44.9	35	46	59.2	47.0	35	40	50.3	40.4	28	42
24	43.6	37.6	30	58	53.0	42.8	31	43	59.1	43.9	26	27	49.6	40.2	29	44
25	43.4	39.7	36	74	52.0	43.0	33	49	44.0	41.2	38	80	40.8	35.0	27	56
26	34.8	29.2	20	51	45.4	35.0	20	33	50.1	37.1	18	26	38.3	34.7	30	71
27	31.2	30.0	29	88	47.4	40.1	32	54	58.0	46.8	36	44	45.1	39.2	32	60
28	39.0	36.1	32	77	57.9	47.9	39	49	77.3	56.7	41	27	65.8	55.0	47	51
29	52.0	47.0	43	70	74.7	57.2	45	34	72.7	54.1	39	30	54.0	41.1	25	31
30	44.0	35.0	22	40	58.1	42.6	23	24	57.2	43.4	27	31	46.4	38.0	27	46
31																
MEAN	38.6	34.5	29	70	52.6	42.6	32	47	56.3	44.0	31	40	45.1	38.5	31	59
Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WIND:—Number of hours this month below 10 mi. 361 ; 10 mi. and over 359 ; 15 mi. and over 146 ; 20 mi. and over 40 ; 25 mi. and over 11 ; 30 mi. and over 1 ; 40 mi. and over 0 .

This Month:—Dir.	N	NE	E	SE	S	SW	W	NW	Dl	Month
Aver. Hrly. Vel.	9.7	10.8	9.2	7.0	8.0	9.4	12.9	13.3	0.0	10.4
Percent of Time	14	10	10	5	10	22	12	17	0	100

Maximum velocity this month since 1939, 56 miles from NW on 30 in 1947.

CEILING AND VISIBILITY FREQUENCIES (Based on hourly record observations) at Municipal Airport

Visibility (miles)	Ceiling (feet) 0	100-200	300-400	500-900	1000-1900	2000-2900	3000-4900	5000-9500	Over 9500	Total
0 to ⅛										
⅛ to ⅜										
½ to ¾		1								1
1 to 2½					3					3
3 to 5				2	2	2	2	1		9
7 to 15					4	7	3	3		17
20 to 30					3	11	17	31	88	150
35 or more						4	17	109	410	540
Total		1		2	12	24	39	144	498	720

Frequencies for larger classes can be derived by addition, i.e., "Under 500 feet" from sum of 0, 100-200 and 300-400 classes; "7 miles or more" from sum of classes 7 to 35 miles or more inclusive.

FROST DATA:—Average date of last killing frost in spring May 16 ; first in autumn September 24 .
Latest date of last killing frost in spring June 23, 1903 ; earliest in autumn August 25, 1910 .
Average growing season 132 days; longest 168 days in 1937 ; shortest 66 days in 1903 .

GENERAL SUMMARY:— The weather during April could not be considered remarkable in any way. Temperatures ranged from a high of 84 on the 29th to a minimum of 19 above on the 8th. The mean monthly temperature of 48.0 is 2.0 degrees above the April normal. Only 0.74 inch of precipitation was recorded. This was 0.26 inch below the April normal, computed over a period of 13 years. Thunderstorms occurred on the 17th, 22d, and the 25th. Some small hail fell during the thunderstorm of the 25th.

STATION Billings, Montana, MONTH April, 1948

HOURLY TEMPERATURES FOR Municipal Airport

Readings made 20 minutes past the hour

Date	A.M. 1	2	3	4	5	6	7	8	9	10	11	12	P.M. 1	2	3	4	5	6	7	8	9	10	11	12	Date
1	31	32	31	30	29	31	32	31	32	33	37	40	41	45	45	47	46	42	40	38	38	35	31	31	1
2	31	29	30	30	30	28	30	35	43	47	50	56	59	62	61	67	65	62	59	57	55	53	52	47	2
3	50	47	44	48	47	43	46	47	52	55	59	61	60	61	62	61	53	46	44	44	41	39	38	35	3
4	36	36	36	35	35	33	32	33	35	37	39	42	45	47	48	48	48	46	42	41	40	39	38	38	4
5	37	37	38	40	37	36	36	42	46	48	47	47	49	48	47	48	47	46	44	43	43	39	39	37	5
6	36	35	34	32	33	32	34	36	38	43	45	51	53	54	52	51	52	43	40	39	38	34	33	32	6
7	29	28	26	25	26	26	26	27	30	34	33	34	36	38	38	37	36	34	32	30	28	26	25	21	7
8	21	21	20	20	19	20	23	26	33	38	42	49	50	52	54	53	53	50	45	43	41	42	41	39	8
9	36	37	35	32	33	33	33	41	47	53	58	61	63	62	63	62	61	58	54	53	52	51	50	51	9
10	44	43	42	40	38	37	36	36	38	41	44	44	42	44	40	37	38	39	38	36	35	36	36	36	10
11	36	35	37	35	30	31	34	38	43	44	44	42	42	40	39	40	38	37	34	33	32	30	30	30	11
12	32	30	30	30	29	30	32	34	36	38	39	45	46	48	47	49	49	48	45	44	42	40	39	38	12
13	36	34	37	38	37	38	37	40	51	54	55	58	60	58	52	55	56	55	54	50	47	46	43	41	13
14	41	39	39	35	36	35	39	43	51	54	57	61	63	64	64	63	62	59	58	58	56	55	55	53	14
15	52	52	50	53	54	52	58	62	65	67	68	69	71	69	68	68	64	62	60	57	53	49	47	47	15
16	46	44	43	42	42	43	42	43	48	54	61	69	72	72	73	74	73	69	67	65	63	60	59	55	16
17	53	51	48	54	51	51	51	52	58	62	62	67	71	73	71	71	59	56	55	54	52	50	49	50	17
18	50	48	48	48	47	46	45	45	46	46	46	47	46	45	46	46	46	45	45	44	44	45	43	43	18
19	43	43	42	41	41	41	43	46	51	52	54	56	58	58	59	59	60	58	55	52	50	48	49	45	19
20	43	42	42	40	40	42	43	49	54	59	63	65	64	67	67	67	67	66	63	60	56	55	53	51	20
21	50	48	47	45	43	42	44	49	56	61	66	70	73	74	74	70	69	66	65	62	63	62	61	57	21
22	55	53	52	53	50	50	53	54	58	63	65	68	70	72	69	69	67	60	59	51	50	51	49	48	22
23	48	47	46	45	43	42	47	48	51	53	55	56	58	58	59	58	59	56	55	55	52	51	50	48	23
24	46	46	47	44	44	42	45	47	50	52	53	56	58	60	60	60	59	57	56	55	54	51	50	49	24
25	48	46	44	44	43	43	45	47	50	50	52	48	50	48	49	42	44	44	44	42	40	41	41	40	25
26	39	39	37	36	35	36	38	41	43	46	45	48	50	52	52	51	50	48	46	43	40	38	38	36	26
27	35	33	33	32	31	32	34	37	41	45	47	51	53	56	57	58	58	57	55	51	47	45	45	44	27
28	43	42	41	41	39	40	43	45	51	55	58	62	66	69	76	77	77	75	70	67	66	63	66	63	28
29	60	59	54	54	52	52	56	58	63	68	75	79	84	84	82	77	73	67	62	59	57	55	54	51	29
30	50	48	48	45	44	43	46	50	54	57	58	58	62	60	60	59	57	52	52	50	47	46	46	45	30
31																									31

MEAN TEMPERATURE AND TOTAL PRECIPITATION THIS MONTH IN

Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.
1851			1876			1901			1926		
1852			1877			1902			1927		
1853			1878			1903			1928		
1854			1879			1904			1929		
1855			1880			1905			1930		
1856			1881			1906			1931		
1857			1882			1907			1932		
1858			1883			1908			1933		
1859			1884			1909			1934		
1860			1885			1910			1935	42	0.97
1861			1886			1911			1936	45	0.78
1862			1887			1912			1937	47	0.72
1863			1888			1913			1938	48	0.50
1864			1889			1914			1939	48	0.83
1865			1890			1915			1940	42	3.16
1866			1891			1916			1941	45	2.00
1867			1892			1917			1942	49	1.28
1868			1893			1918			1943	52	0.49
1869			1894			1919			1944	49	0.10
1870			1895			1920			1945	41	0.64
1871			1896			1921			1946	53	0.28
1872			1897			1922			1947	46	1.24
1873			1898			1923			1948	48	0.74
1874			1899			1924			1949		
1875			1900			1925			1950		

Note:—The warmest, coldest, driest, and wettest months are underscored.

STATION Billings, Montana MONTH April, 1948

HOURLY PRECIPITATION (Inches) FOR

Date	A. M. 12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	P. M. 12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	Total	Date
1			T	T	T	T	T	T	T	T	.01														0.01	1
2																									0	2
3														T											T	3
4					T	T	T	T																	T	4
5																									0	5
6																								T	T	6
7	T	T	T	T	.01	T	T	T	T	T	T	T	T	T	T										.01	7
8																									0	8
9																									0	9
10				T	.02	.01	.04	T	T			T			.02	.02	T								.11	10
11												T	T		T	T	T	T	T	T	.01	T	T		.01	11
12		T	T																						T	12
13															T	T									T	13
14																				T	T				T	14
15														T	T	T	T	T	T	T	.01	T	T		.01	15
16																									0	16
17																	T	T							T	17
18	T	T		T	T		.01	.06	.02	.02	.02	.03	.01	.04	.06	.03	T	T	T	T	.01	.02	.03	.04	.40	18
19	.01	T																							.01	19
20																									0	20
21																									0	21
22															T	T			.12	T	T		.01	T	.13	22
23	T																			T	T				T	23
24																									0	24
25						T	T					.03	.01	T	T	T	.01	T	T						.05	25
26																									0	26
27																									0	27
28																									0	28
29																									0	29
30																		T	T						T	30
31																										31

"T" indicates a trace, or amount too small to measure.

Monthly Total 0.74

WB FORM 1030

U. S. DEPARTMENT OF COMMERCE, WEATHER BUREAU

MONTHLY CLIMATOLOGICAL SUMMARY

With Comparative Data

STATION Billings, Montana (Municipal Airport), MONTH March, 1948

Phone 5431; 105 th Meridian Time; Lat. 45° 48' N, Long. 108° 32' W; Elevation 3570 ft.

DATE	TEMPERATURE °F MAXIMUM	MINIMUM	MEAN	DEPARTURE FROM NORMAL	DEGREE DAYS BASE 65°	PRECIPITATION TOTAL (INCHES)	SNOWFALL (INCHES) (UNMELTED)	DEPTH OF SNOW ON THE GROUND 5:30 P. M.	WIND PREVAILING DIRECTION	(*) HIGHEST VELOCITY	DIRECTION	WEATHER PERCENT OF POSSIBLE SUNSHINE	AVERAGE CLOUDINESS SCALE 0 TO 10
1	44	15	30	+ 2	35	0.00	0.0	T	SW	17	SW	98	5
2	40	12	26	- 2	39	.01	0.7	0	N	33	N	77	9
3	16	4	10	-19	55	.06	2.2	2.8	N	18	N	42	9
4	28	0	14	-15	51	0	0	1.8	SW	10	SW	100	1
5	38	11	24	- 6	41	0	0	T	SE,S,SW	10	W	100	0
6	34	18	26	- 4	39	.03	0.7	T	NE	13	NE	9	9
7	31	16	24	- 6	41	.02	0.4	1.0	E	17	NE	39	9
8	21	3	12	-19	53	.11	0.9	1.9	NE	23	NE	27	9
9	9	- 5	2	-29	63	.06	1.0	3.0	NE	15	NE	57	9
10	12	-15	- 2	-34	67	0	0	3.0	SW	26	SW	100	0
11	32	4	18	-14	47	0	0	1.2	SW	29	SW	100	1
12	47	23	35	+ 3	30	0	0	T	SW	23	SW	100	8
13	55	32	44	+11	21	0	0	T	SW	20	SW	62	9
14	54	29	42	+ 9	23	.04	0.4	T	E	26	N	60	10
15	35	25	30	- 4	35	.08	0.7	0.7	N	19	N	39	9
16	45	20	32	- 2	33	.01	0.3	T	SW	16	SW	65	7
17	41	24	32	- 2	33	T	T	T	N	14	NE	51	7
18	50	28	39	+ 4	26	0	0	0	SW	27	NW	57	8
19	35	28	32	- 3	33	.02	0.2	T	N	31	NW	1	9
20	38	24	31	- 5	34	.07	1.0	T	NW	25	NW	63	7
21	48	20	34	- 2	31	0	0	0	SW	26	SW	77	8
22	59	38	48	+12	17	0	0	0	SW	40	SW	82	8
23	52	31	42	+ 5	23	0	0	0	NE	19	NE	64	9
24	51	28	40	+ 3	25	T	T	0	NE	23	NE	42	9
25	35	21	28	-10	37	.27	3.0	2.0	NE	18	NE	0	10
26	34	21	28	-10	37	.01	0.5	1.0	NE	9	NE	54	8
27	54	23	38	0	27	0	0	T	SW	26	SW	98	4
28	59	35	47	+ 8	18	0	0	0	SW	31	W	21	8
29	61	32	46	+ 7	19	T	0	0	SW	31	W	76	7
30	44	27	36	- 4	29	T	T	0	N	28	NW	75	7
31	45	23	34	- 6	31	T	0	0	SW	30	W	10	9
MEAN	40.2	19.2	29.7	-4.3	1093	0.79	42.0	------	SW	[d] 40	[d] SW	59	7.2
Normal	-	-	34.0	------	923	-	-	------	-	March 22		-	-

(*) Fastest mile period.

PRESSURE	Mean		Highest		Date	Lowest		Date
Station	26.199 in.	887.2 mb.	26.713 in.	904.5 mb.	3	25.700 in.	870.3 mb.	29
Sea Level	29.95 in.	1014.2 mb.	30.64 in.	1037.6 mb.	4	29.28 in.	991.5 mb.	29

TEMPERATURE:—Mean this month last year 29.2. This month since 1935: warmest 42.0 in 1946; coldest 25.4 in 1943.
Highest 61 date 29; lowest -15 date 10. This month since 1935 highest 75 date 29, 1943; lowest -16 date 5, 1945.
Average daily departure since Jan. 1: 0.3. Degree days: since July 1, 6213, normal 6237; since Sept. 1, 6199, normal 6109.
Number of days: —Max. 100° or above 0; 90° or above 0; —Min. 32° or below 29; 0° or below 3; —10° or below 1.
Normal number: —Max. 100° or above -; 90° or above -; —Min. 32° or below -; 0° or below -; —10° or below -.

PRECIPITATION:—Departure -. Total since Jan. 1 1.60, Dep. -; total since July 1 6.26, Dep. -.
Total this month last year 1.08. This month since 1935: wettest 1.95 in 1938, driest 0.13 in 1936.

Greatest this month in:		Greatest this month since 1941 in:		SNOWFALL:—Total since July 1, 35.6, Dep. -	
5 min. -	date -	5 min. .03	date 23, 1945	Greatest monthly, this month since 1935, 27.6 in 1935;	
10 min. -	date -	10 min. .05	date 23, 1945	least monthly this month since 1935, 1.1 in 1940	
15 min. -	date -	15 min. -	date -, -	Greatest in 24 hrs. 3.5, date 25-26;	
20 min. -	date -	20 min. .09	date 23, 1945	this month since 1939 7.0 date 14, 1944	
30 min. -	date -	30 min. .13	date 23, 1945	Greatest any single storm - date -;	
1 hr. -	date -	1 hr. .22	date 23, 1945	this month since -, - date -, -	
2 hr. -	date -	2 hr. .31	date 23, 1945	Greatest on ground 3.5, date 26;	
24 hr. 0.28	date 25-26	24 hr. .83	date 13-14, 1943	this month since 1939, 9.6 date 15, 1943	

Number of days with precipitation: trace 5; 0.01 inch or more 13; 0.25 inch or more 1; 1 inch or more 0; 2 inches or more 0.
Normal number of days with precipitation: trace -; 0.01 inch or more -; 0.25 inch or more -; 1 inch or more -; 2 inches or more -.
Greatest number of days this month since 1939 with precipitation: 0.01 inch or more, 13 in 1948; least number 6 in 1942, 1946.

CHARACTER OF DAY:—Number of days clear 4; partly cloudy 7; cloudy 20 Normal number clear 4; partly cloudy 9; cloudy 18
SUNSHINE:—Total hours this month 219.3. Total hours possible on 1st 11.1; on 16th 11.9; on last day 12.8; this month 369.7.
MISCELLANEOUS PHENOMENA (DATES):—Hail -; Sleet -; Glaze 25
Fog: Light 1, 7, 8, 9, 16, 17, 20, 25; Moderate 7, 16; Heavy 1, 7, 16
Frost: Light -; Heavy -; Killing[h] -
Thunderstorms -. Duststorms -. Tornadoes -. Hurricanes -

[a]. City Office. [b]. Airport. [c]. Total. [d]. Monthly. [e]. Sunrise to sunset: 0 to 3, clear; 4 to 7, partly cloudy; 8 to 10, cloudy. [f]. other dates. [g]. Light fog, visibility 6 miles to 3,300 ft.; moderate, 3,299 to 1,650 ft.; heavy, 1,649 ft. to 0. [h]Frosts not recorded in autumn after first "killing," except in Florida and along immediate coast of the Gulf of Mexico. T indicates a trace of precipitation.

L. T. Pierce, Meteorologist
Official In Charge, Weather Bureau.

MEV:m

STATION Billings, Montana MONTH March, 1948

PSYCHROMETRIC DATA taken at Municipal Airport

Date	5:30 a.m. MST				11:30 a.m. MST				5:30 p.m. MST				11:30 p.m. MST			
	Dry	Wet	Dew Pt.	Rel. Hum.	Dry	Wet	Dew Pt.	Rel. Hum.	Dry	Wet	Dew Pt.	Rel. Hum.	Dry	Wet	Dew Pt.	Rel. Hum.
1	16.0	16.0	16	100	36.6	31.9	25	61	43.0	35.4	25	47	31.5	27.9	22	64
2	29.0	26.5	22	73	34.8	30.8	25	65	24.0	22.0	18	75	14.5	14.0	13	91
3	8.3	8.1	7	96	12.9	12.3	11	89	13.5	13.0	12	91	7.8	7.6	7	96
4	1.9	1.8	1	97	11.6	10.7	8	82	26.4	24.3	21	76	14.9	13.9	11	82
5	12.5	12.0	10	91	25.0	22.5	18	70	36.5	33.0	28	71	23.0	22.0	20	87
6	18.6	18.0	17	91	30.0	26.5	20	64	33.2	32.1	31	90	27.1	26.5	26	93
7	21.8	21.0	19	89	27.0	25.0	22	78	26.8	25.3	23	83	21.3	21.0	20	94
8	12.9	12.9	13	100	11.0	11.0	11	100	11.6	10.7	8	83	3.2	3.1	3	97
9	2.0	1.8	1	94	5.2	5.0	4	94	4.5	4.2	3	93	-5.2	-5.3	-6	96
10	-14.5	-14.7	-17	89	-1.4	-1.5	-2	96	11.4	8.9	-1	52	5.9	4.1	-5	57
11	6.5	5.0	- 2	79	23.0	18.9	8	48	31.3	25.0	12	39	26.9	21.8	9	43
12	25.9	21.4	11	48	37.8	31.9	23	53	43.8	34.0	19	34	37.4	30.9	21	48
13	38.8	31.2	19	42	47.9	38.0	25	39	50.0	39.8	27	40	39.7	33.7	25	55
14	36.6	31.9	25	61	44.9	36.8	26	46	48.0	40.0	31	50	32.0	31.0	30	90
15	28.8	28.5	28	96	31.7	31.7	32	100	33.1	30.9	28	80	27.3	26.1	24	86
16	21.4	21.2	21	97	37.0	33.0	28	67	43.4	34.9	23	42	29.7	27.8	25	80
17	24.9	24.7	24	97	28.8	28.6	28	97	40.8	35.5	29	61	35.2	31.9	28	73
18	30.7	27.7	23	69	43.0	35.9	27	51	46.0	37.0	25	42	35.2	31.0	25	63
19	31.1	28.0	23	70	30.1	28.1	25	79	30.7	29.2	27	85	30.2	29.1	28	91
20	27.0	26.4	26	94	32.6	27.8	21	55	34.0	27.0	13	38	26.4	23.0	16	60
21	21.4	19.9	17	79	39.9	32.1	20	42	45.8	36.8	25	42	39.6	33.4	25	54
22	40.7	34.0	25	51	53.7	41.7	27	35	56.8	41.0	20	22	42.4	37.1	30	60
23	33.2	31.0	28	79	44.8	37.8	29	53	51.8	42.1	31	44	38.6	35.0	30	72
24	29.0	28.2	27	91	35.1	32.0	28	73	46.9	40.8	34	61	33.1	32.0	30	82
25	30.2	29.1	28	91	28.2	27.6	27	93	24.6	24.4	24	98	21.8	21.6	21	97
26	21.8	21.1	20	92	31.0	28.9	26	79	34.0	32.0	30	82	28.5	27.5	26	90
27	25.1	25.0	25	99	43.2	36.1	27	51	53.3	41.1	26	32	43.3	34.8	23	42
28	38.0	31.2	21	47	48.1	38.2	25	39	56.5	43.0	27	31	37.8	34.7	31	75
29	37.0	32.0	25	59	58.2	44.0	28	31	55.2	42.2	27	32	43.6	37.2	29	56
30	32.4	30.0	27	77	35.1	28.2	15	40	36.7	29.9	19	44	25.9	23.9	20	75
31	24.9	22.0	16	65	38.3	33.7	27	63	45.3	38.2	30	54	32.3	30.1	27	78
MEAN	23.0	21.1	18	81	32.3	27.9	21	66	36.7	30.8	22	58	27.4	24.8	20	75
Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WIND:—Number of hours this month below 10 mi. 363; 10 mi. and over 381; 15 mi. and over 264; 20 mi. and over 111; 25 mi. and over 30; 30 mi. and over 5; 40 mi. and over 0.

This Month:—Dir.	N	NE	E	SE	S	SW	W	NW	Dl	Month
Aver. Hrly. Vel.	11.3	10.9	7.0	4.6	5.3	13.5	15.8	14.7	1.0	11.5
Percent of Time	14	18	9	3	6	38	5	7	0	100

Maximum velocity this month since 1939, 54 miles from NW on 6th in 1942.

CEILING AND VISIBILITY FREQUENCIES (Based on hourly record observations) at Municipal Airport:—

Visibility (miles)	Ceiling (feet) 0	100-200	300-400	500-900	1000-1900	2000-2900	3000-4900	5000-9500	Over 9500	Total
0 to ¼	4								1	5
⅜ to ⅝										0
½ to ¾			1	1	1					3
1 to 2½			1	14	14	3	1		1	34
3 to 6		2	1	15	17	17	10		7	69
7 to 15		1	1	6	11	1	7	3	18	48
20 to 30			1	3	12	10	24	27	232	309
35 or more						1	10	26	239	276
Total	4	3	5	39	55	32	52	56	498	744

Frequencies for larger classes can be derived by addition, i.e., "Under 500 feet" from sum of 0, 100-200 and 300-400 classes; "7 miles or more" from sum of classes 7 to 35 miles or more inclusive.

FROST DATA:—Average date of last killing frost in spring May 16; first in autumn September 24.
Latest date of last killing frost in spring June 23, 1903; earliest in autumn August 25, 1910.
Average growing season 132 days; longest 168 days in 1937; shortest 66 days in 1903.

GENERAL SUMMARY:— March was a month of numerous light showers well scattered throughout the month. 0.79 inch of precipitation was recorded. This is 0.20 inch below the March average, computed over a period of 13 years.

A total of 12.0 inches of snow fell during the month, but the ground was bare on the 31st. Only a trace of snow was visible as the month began.

Temperatures ranged from a maximum of 61 on the 29th to a minimum of 15 below zero on the 10th. The monthly mean temperature of 29.7 was 4.3 degrees below the normal mean temperature for March.

STATION Billings, Montana, MONTH March, 1948

HOURLY TEMPERATURES FOR Municipal Airport

Readings made 20 minutes past the hour

Date	A.M. 1	2	3	4	5	6	7	8	9	10	11	12	P.M. 1	2	3	4	5	6	7	8	9	10	11	12	Date
1	20	20	20	17	16	15	16	20	25	32	37	41	42	43	43	43	43	39	37	35	32	32	32	31	1
2	32	32	32	29	29	27	25	29	30	34	35	39	40	36	30	26	24	20	18	17	16	16	14	13	2
3	12	11	10	10	8	8	10	9	11	12	13	15	16	16	14	14	14	10	10	9	8	8	8	6	3
4	4	3	4	3	2	1	2	2	4	8	12	16	21	23	25	28	26	21	19	19	17	17	15	14	4
5	13	12	13	12	12	12	12	15	17	21	25	29	33	35	38	36	36	30	28	27	26	24	23	22	5
6	21	21	20	21	19	18	19	20	20	25	30	31	33	34	34	33	33	32	30	29	27	26	27	26	6
7	24	24	23	24	22	19	18	19	21	23	27	30	31	30	30	29	27	25	24	24	23	22	21	19	7
8	20	16	14	13	13	11	9	9	9	11	11	12	13	12	13	14	12	9	8	8	6	5	3	3	8
9	3	4	4	3	2	0	-1	0	3	4	5	7	8	9	8	6	4	3	2	1	-3	-4	-5	-4	9
10	-7	-9	-10	-13	-14	-13	-13	-13	-8	-5	-1	4	9	11	12	12	11	8	4	6	7	6	6	6	10
11	5	5	6	7	6	8	9	11	16	20	23	26	28	31	32	32	31	28	26	26	26	27	27	26	11
12	26	25	26	25	26	25	25	27	33	37	38	43	46	47	46	45	44	40	38	38	38	38	37	37	12
13	36	36	38	38	39	38	33	36	44	47	48	52	54	54	54	54	50	48	46	45	43	40	40	38	13
14	36	37	39	35	37	33	31	37	41	43	45	48	52	52	52	50	48	47	45	43	38	34	32	31	14
15	30	30	29	29	29	29	29	30	31	32	32	32	32	34	34	34	33	31	29	29	27	26	27	25	15
16	24	24	24	22	21	21	23	24	28	34	37	40	41	45	45	44	43	34	35	33	32	31	30	29	16
17	27	26	25	25	25	25	26	25	26	27	29	31	36	37	40	40	41	39	37	36	33	34	35	33	17
18	33	33	35	32	31	31	28	36	37	42	43	45	46	48	48	48	46	43	43	40	39	39	35	34	18
19	35	33	33	32	31	32	33	33	34	30	30	30	30	30	32	31	31	30	30	29	30	30	30	31	19
20	33	30	29	27	27	27	27	28	30	32	33	34	36	38	38	37	34	32	31	30	30	28	26	26	20
21	26	25	23	24	21	25	24	29	37	40	40	43	43	45	46	47	46	40	40	39	39	39	40	40	21
22	40	40	40	40	41	43	43	47	49	52	54	55	56	57	58	56	57	51	49	46	45	44	42	39	22
23	37	37	36	34	33	33	34	36	39	43	45	48	50	52	52	50	52	48	45	44	42	41	39	35	23
24	33	31	28	29	29	29	29	30	29	33	35	41	46	48	50	49	47	41	39	37	34	34	33	33	24
25	34	31	31	30	30	29	28	28	28	29	28	29	28	27	26	25	25	24	24	24	24	22	22	22	25
26	22	22	22	22	22	22	24	24	26	28	31	32	32	32	33	33	34	32	31	30	28	29	28	28	26
27	27	27	26	27	25	24	28	32	37	42	43	47	50	51	53	54	53	50	48	48	44	44	43	40	27
28	37	38	38	37	38	38	40	42	43	46	48	53	54	55	58	57	56	53	50	47	40	36	38	36	28
29	35	39	36	35	37	38	41	42	49	55	58	59	60	59	58	57	55	51	50	49	48	45	44	43	29
30	39	36	34	33	32	32	32	32	33	35	35	35	38	40	37	38	37	34	29	28	27	26	26	27	30
31	24	25	25	24	25	25	27	30	34	37	38	43	45	44	42	45	45	42	40	40	39	37	32	32	31

MEAN TEMPERATURE AND TOTAL PRECIPITATION THIS MONTH IN

Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.
1851			1876			1901			1926		
1852			1877			1902			1927		
1853			1878			1903			1928		
1854			1879			1904			1929		
1855			1880			1905			1930		
1856			1881			1906			1931		
1857			1882			1907			1932		
1858			1883			1908			1933		
1859			1884			1909			1934		
1860			1885			1910			1935	33	1.73
1861			1886			1911			1936	36	0.13
1862			1887			1912			1937	35	0.76
1863			1888			1913			1938	37	1.95
1864			1889			1914			1939	36	0.91
1865			1890			1915			1940	39	0.60
1866			1891			1916			1941	35	0.63
1867			1892			1917			1942	36	0.98
1868			1893			1918			1943	25	1.80
1869			1894			1919			1944	29	0.33
1870			1895			1920			1945	38	0.65
1871			1896			1921			1946	42	1.35
1872			1897			1922			1947	29	1.08
1873			1898			1923			1948	30	0.79
1874			1899			1924			1949		
1875			1900			1925			1950		

Note:—The warmest, coldest, driest, and wettest months are underscored.

STATION Billings, Montana MONTH March, 19 48

HOURLY PRECIPITATION (Inches) FOR Municipal Airport

Date	A. M.												P. M.												Total	Date
	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12		
1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0.00	1
2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T.	.T.	.T.	.01	.01	2
3	.01	.01	.01	.01	.T.	.T.	.T.	.01	.T.	.T.	.01	.T.	.T.	.T.	.T.	.T.	.T.	.T.	....	....	....	.T.	....	.T.	.06	3 #
4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	4
5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	5
6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.01	.01	.01	.T.	.03	6 #
7	.T.	.T.	.T.	....	.01	....	....	....	.T.	.T.	.T.	....	....	....	....	....	....	.T.	.T.	.T.	.T.	.T.	.01	.T.	.02	7 #
8	.01	.01	.01	.01	.01	.T.	.01	.T.	.01	.01	.01	.T.	.T.	.T.	.T.	.T.	.01	.T.	.T.	.T.	.T.	.T.	.01	....	.11	8 #
9	.T.	.T.	.T.	.01	.01	.T.	.01	.T.	.01	.T.	.01	.T.	.T.	.T.	.T.	.T.	.01	.T.	.T.	.T.	.T.	.T.	....	....	.06	9 #
10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	10
11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	11
12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	12
13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	13
14	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.T.	.T.	.T.	.T.	.04	.04	14
15	.01	.01	.T.	.01	.01	.02	.01	.01	.T.	.T.	.T.	.T.	.T.	.T.	....	....	....	....	....	....	....	....	....	....	.08	15
16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.T.	.01	....	....	....	....	.01	16
17	....	....	....	....	....	.T.	.T.	.T.	.T.	.T.	.T.	.T.	....	....	....	....	....	....	....	....	....	....	....	....	T	17
18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	18
19	....	....	....	....	....	....	....	....	.T.	.T.	.T.	.T.	.T.	.01	.01	.T.	.T.	....	....	....	....	.T.	.T.	.T.	.02	19 #
20	.T.	.T.	.01	.04	.02	.T.	.T.	.T.	.T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.07	20 #
21	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	21
22	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	22
23	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	23
24	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.T.	.T.	T	24
25	....	....	....	....	.T.	.T.	.T.	.T.	.T.	.T.	.T.	.T.	.01	.02	.04	.03	.02	.03	.03	.03	.03	.02	.01	....	.27	25 #
26	....	.T.	.T.	.T.	.01	.T.	.T.	.T.	.T.	....	....	....	....	....	....	.T.	....	....	....	....	....	....	....	....	.01	26 #
27	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	27
28	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.00	28
29	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.T.	.T.	....	....	....	....	....	T	29
30	....	....	....	....	....	.T.	.T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	30
31	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.T.	.T.	....	....	....	....	....	....	....	T	31

"T" indicates a trace, or amount too small to measure. # Hourly amounts of precipitation on these days by estimation.

Monthly Total....0.79

DEPARTMENT OF THE INTERIOR
RECEIVED
APR 8 - 1948
FORT PECK GAME RANGE
FISH AND WILDLIFE SERVICE

WB FORM 1030

U. S. DEPARTMENT OF COMMERCE, WEATHER BUREAU

MONTHLY CLIMATOLOGICAL SUMMARY

With Comparative Data

STATION Billings, Montana (Municipal Airport), MONTH February, 1948

Phone 5431; 105 th Meridian Time; Lat. 45 °. 48 'N, Long. 108 °. 32 'W; Elevation 3570 ft.

DATE	TEMPERATURE °F MAXIMUM	MINIMUM	MEAN	DEPARTURE FROM NORMAL	DEGREE DAYS BASE 65°	PRECIPITATION TOTAL (INCHES)	SNOWFALL (INCHES) (UNMELTED)	DEPTH OF SNOW ON THE GROUND 7:30 P. M.	WIND PREVAILING DIRECTION	(*) HIGHEST VELOCITY	DIRECTION	WEATHER PERCENT OF POSSIBLE SUNSHINE	AVERAGE CLOUDINESS SCALE 0 TO 10
1	24	11	18	- 4	47	0.02	0.4	T	NE	20	NE	0	10
2	14	7	10	-12	55	T	0.5	0.1	NE	15	NE	18	9
3	21	0	10	-12	55	T	T	0.9	SW	26	SW	100	1
4	24	7	16	- 6	49	0.01	0.1	0.9	SW	24	N	0	10
5	8	- 2	3	-19	62	0.01	0.1	1.1	NE	16	NE	0	9
6	16	- 5	6	-16	59	0	0	1.0	SW	20	SW	100	2
7	20	- 7	6	-17	59	0	0	1.0	SW	20	SW	96	5
8	36	15	26	+ 3	39	0	0	0.6	SW	24	SW	40	8
9	29	- 4	12	-11	53	.04	0.3	0.8	NE	28	NE	1	10
10	6	- 6	0	-23	65	.01	0.2	1.0	W	22	NE	63	7
11	10	- 8	1	-22	64	0	0	1.0	SW	30	SW	100	0
12	32	1	16	- 7	49	0	0	0.8	SW	33	SW	77	4
13	46	15	30	+ 6	35	0	0	T	SW	24	SW	62	8
14	45	17	31	+ 7	34	0	0	T	SW	23	SW	9	9
15	53	36	44	+20	21	0	0	T	SW	34	N	73	6
16	48	34	41	+17	24	0	0	0	SW	18	W	4	9
17	63	40	52	+28	13	0	0	0	SW	30	SW	59	8
18	58	8	33	+ 8	32	T	T	0	SW	41	NW	61	7
19	16	0	8	-17	57	.03	0.3	0.2	E	13	E	0	9
20	31	7	19	- 6	46	T	T	0.1	S	13	SW	82	7
21	42	20	31	+ 5	34	0	0	T	SW	18	SW	9	9
22	41	32	36	+10	29	.18	T	0	SW	33	NW	0	9
23	34	18	26	0	39	.02	0.4	T	N	27	N	20	9
24	37	12	24	- 2	41	0	0	T	SW	25	SW	88	4
25	50	30	40	+13	25	0	0	0	SW	20	SW	52	8
26	52	36	44	+17	21	.03	0	0	S	28	NW	1	9
27	38	24	31	+ 4	34	T	T	0	NW	33	NW	49	8
28	31	14	22	- 6	43	T	T	T	E	19	NW	37	7
29	37	14	26	- 2	39	T	T	T	SW	15	NE	73	6
30													
31													
MEAN	33.2	12.6	22.9	-1.3	[c]1223	[c]0.35	[c]2.3	------	SW	[d]41	[d]NW	44	7.1
Normal	-	-	24.2	------	1102	-	-	------	-	Feb. 18		-	-

(*) for 5-minute period.

PRESSURE	Mean		Highest		Date	Lowest		Date
Station	26.287 in.	890.3 mb.	26.760 in.	906.2 mb.	11	25.800 in.	873.7 mb.	22
Sea Level	30.08 in.	1018.6 mb.	30.76 in.	1041.7 mb.	11	29.43 in.	996.6 mb.	18

TEMPERATURE:—Mean this month last year 24.4. This month since 1934: warmest 36.1 in 1935; coldest 2.6 in 1936.
Highest 63 date 17; lowest -8 date 11. This month since 1934 highest 64 date 20, 1935; lowest -38 date 15, 1936.
Average daily departure since Jan. 1, +2.6 Degree days: since July 1, 5120 normal 5314; since Sept. 1, 5106, normal 5078.
Number of days: —Max. 100° or above 0; 90° or above 0; —Min. 32° or below 25; 0° or below 8; —10° or below 0.
Normal number: —Max. 100° or above -; 90° or above -; —Min. 32° or below -; 0° or below -; —10° or below -.

PRECIPITATION:—Departure -. Total since Jan. 1 0.81, Dep. -; total since July 1 5.47, Dep. -.
Total this month last year 0.66. This month since 1934: wettest 1.04 in 1936, driest 0.19 in 1946.

Greatest this month in:
5 min. - date -.
10 min. - date -.
15 min. .04 date 22.
20 min. - date -.
30 min. .06 date 22.
1 hr. .06 date 22.
2 hr. .11 date 22.
24 hr. .16 date 22.

Greatest this month since 1941, in:
5 min. .01 date 9, 1942.
10 min. .02 date 9, 1942.
15 min. - date -, -.
20 min. .03 date 9, 1942.
30 min. .06 date 22, 1948.
1 hr. .10 date 9, 1942.
2 hr. .18 date 9, 1942.
24 hr. .47 date 23, 1947.

SNOWFALL:—Total since July 1, 23.6, Dep. -.
Greatest monthly, this month since 1934, 20.8 in 1936;
least monthly this month since 1934 2.3 in 1938.
Greatest in 24 hrs. 0.7, date 1-2 and 1948.
this month since 1938, 9.0 date 9, 1944.
Greatest any single storm - date -;
this month since -, - date -, -.
Greatest on ground 1.1, date 5, 6;
this month since 1938, 9.0 date 9, 1944.

Number of days with precipitation: trace 7; 0.01 inch or more 9; 0.25 inch or more 0; 1 inch or more 0; 2 inches or more 0.
Normal number of days with precipitation: trace -; 0.01 inch or more -; 0.25 inch or more -; 1 inch or more -; 2 inches or more -.
Greatest number of days this month since 1934 with precipitation: 0.01 inch or more, 14 in 1940; least number 3 in 1946.

CHARACTER OF DAY:—Number of days clear 3; partly cloudy 9; cloudy 17. Normal number clear 4; partly cloudy 9; cloudy 16.
SUNSHINE:—Total hours this month 132.1. Total hours possible on 1st 9.7; on 16th 10.4; on last day 11.1; this month 301.4.
MISCELLANEOUS PHENOMENA (DATES):—Hail -; Sleet -; Glaze -.
Fog: Light 9, 14; Moderate -; Heavy 14.
Frost: Light -; Heavy -; Killing[h] -.
Thunderstorms -. Duststorms -. Tornadoes -. Hurricanes -.

[a] City Office. [b] Airport. [c] Total. [d] Monthly. [e] Sunrise to sunset: 0 to 3, clear; 4 to 7, partly cloudy; 8 to 10, cloudy. [f] other dates. [g] Light fog, visibility 6 miles to 3,300 ft.; moderate, 3,299 to 1,650 ft.; heavy, 1,649 ft. to 0. [h] Frosts not recorded in autumn after first "killing," except in Florida and along immediate coast of the Gulf of Mexico. T Indicates a trace of precipitation.

MLV:in

L. T. Pierce, Meteorologist

Official in Charge, Weather Bureau.

STATION Billings, Montana, MONTH February, 1948

PSYCHROMETRIC DATA taken at Municipal Airport

Date	5:30 a.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	11:30 a.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	5:30 p.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	11:30 p.m. MST Dry	Wet	Dew Pt.	Rel. Hum.
1	21.1	19.2	15	74	22.1	19.8	15	71	19.3	18.0	15	81	20.0	18.0	13	72
2	7.6	6.9	4	85	10.0	9.2	6	83	13.3	12.0	8	76	13.0	12.0	9	81
3	1.8	1.6	1	94	12.0	10.9	7	80	19.0	16.5	10	63	9.0	8.4	6	87
4	14.8	13.0	7	69	22.4	19.9	14	67	17.8	16.3	13	78	12.4	11.0	6	74
5	3.8	3.5	2	92	4.9	4.2	1	82	5.0	4.1	0	77	8.0	7.5	6	88
6	-4.2	-4.2	-4	100	4.9	3.9	-1	75	14.9	11.9	1	50	-2.0	-2.0	-2	100
7	-4.0	-4.2	-5	93	7.2	5.9	0	70	18.5	16.0	9	63	3.9	2.9	-2	75
8	22.0	18.5	9	54	26.3	22.8	15	59	32.2	27.2	18	52	15.9	13.8	7	66
9	11.0	10.5	9	90	5.9	5.3	3	85	0.4	0.3	0	98	27.8	24.2	17	60
10	-4.0	-4.0	-4	100	-1.1	-1.5	-4	87	5.0	4.7	3	92	-2.0	-2.2	-3	95
11	-6.6	-6.6	-7	100	2.8	1.9	-3	75	6.9	5.6	0	70	-1.0	-1.5	-4	84
12	5.3	4.0	-2	69	13.6	10.9	1	52	20.8	17.8	10	59	3.0	2.0	-3	72
13	17.8	15.9	11	71	34.8	30.7	25	64	43.4	36.7	29	54	22.0	19.0	12	60
14	20.0	20.0	20	100	40.9	34.6	27	56	40.5	34.9	28	59	28.8	26.9	24	80
15	38.1	32.3	24	54	50.2	40.0	28	40	42.9	38.7	34	70	36.9	31.9	25	60
16	41.7	33.7	22	43	43.5	36.0	26	49	48.1	38.0	25	38	41.6	34.9	26	52
17	47.9	39.8	30	50	56.0	45.2	34	44	55.6	44.7	33	43	45.7	37.8	28	49
18	45.6	38.9	31	56	56.0	47.0	39	53	43.6	39.2	34	68	46.9	39.9	32	55
19	3.2	2.9	2	92	10.8	9.6	5	76	15.3	14.8	14	92	8.9	8.1	5	83
20	10.7	10.4	9	93	17.0	15.3	11	73	31.0	28.0	23	70	10.2	9.9	9	94
21	26.4	24.1	20	74	35.6	31.8	27	68	41.8	36.0	29	58	23.5	22.5	21	88
22	36.2	31.8	26	63	37.7	34.0	29	71	38.6	37.2	36	89	36.5	31.0	23	54
23	26.8	26.0	25	91	24.9	23.2	21	83	31.5	28.5	24	70	34.5	33.5	32	92
24	13.1	12.8	12	94	29.4	26.8	23	74	35.0	30.0	22	56	19.0	18.0	16	85
25	32.8	28.8	22	63	39.8	34.0	26	56	46.0	38.9	30	53	32.2	28.0	21	60
26	40.8	34.9	27	56	50.1	42.7	35	55	48.7	43.6	38	68	36.1	32.8	28	72
27	31.3	27.9	22	66	34.8	29.6	21	54	33.2	30.0	25	69	37.2	36.6	36	95
28	17.0	15.7	12	79	24.2	22.0	18	73	28.1	25.0	19	65	26.0	23.2	18	67
29	15.0	14.0	11	83	27.7	24.9	20	69	33.0	30.2	26	73	23.9	22.1	19	79
30																
31																
MEAN	18.4	16.1	12	78	25.7	22.1	16	67	28.6	25.0	19	67	21.3	19.0	15	75
Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WIND:—Number of hours this month below 10 mi. 257, 10 mi. and over 439; 15 mi. and over 261; 20 mi. and over 78; 25 mi. and over 32; 30 mi. and over 2; 40 mi. and over 0.

This Month:— Dir.	N	NE	E	SE	S	SW	W	NW	Dl	Month
Aver. Hrly. Vel.	10.7	11.6	8.7	5.4	6.2	14.4	10.7	15.9	1.0	12.4
Percent of Time	9	14	7	2	7	50	5	6	0	100

Maximum velocity this month since 1939, 49 miles from NW on 5 in 1947.

CEILING AND VISIBILITY FREQUENCIES (Based on hourly record observations) at Municipal Airport:—

Visibility (miles)	Ceiling (feet) 0	100-200	300-400	500-900	1000-1900	2000-2900	3000-4900	5000-9500	Over 9500	Total
0 to ⅛										
⅛ to ⅜										
½ to ¾				1				1		2
1 to 2½				5	8	3				16
3 to 6				2	13	6	7	7	2	37
7 to 15	1				16	12	13	7	5	54
20 to 30				3	11	13	20	59	217	323
35 or more					5	3	14	36	206	264
Total	1	0	0	11	53	37	54	110	430	696

Frequencies for larger classes can be derived by addition, i.e., "Under 500 feet" from sum of 0, 100-200 and 300-400 classes; "7 miles or more" from sum of classes 7 to 35 miles or more inclusive.

FROST DATA:—Average date of last killing frost in spring May 15; first in autumn September 24
Latest date of last killing frost in spring June 23, 1903; earliest in autumn August 25, 1910
Average growing season 132 days; longest 168 days in 1937; shortest 66 days in 1903.

GENERAL SUMMARY:— February was marked by two periods of large temperature departures from daily normals. The first 12 days of the month were very cold with daily mean temperatures averaging 12.2 degrees below normal. Warm, pleasant weather characterized the period from the 13th through the 27th, and the above normal temperatures of the latter period almost offset the minus departures of the first 12 days. The mean temperature for the month was 1.3 degrees below normal. Precipitation during February was quite light and scattered throughout the month. The total of 0.65 inch is 0.17 inch less than the monthly average computed for a period of 13 years.

Local residents were treated to an unusual atmospheric display on the 10th, which consisted of a combination of a brilliant parhela, sun pillar and a 46 degree circumzenithal arc.

STATION Billings, Montana, MONTH February, 19 48

HOURLY TEMPERATURES FOR Municipal Airport

Readings made 20 minutes past the hour

Date	A.M. 1	2	3	4	5	6	7	8	9	10	11	12	P.M. 1	2	3	4	5	6	7	8	9	10	11	12	Date
1	19	19	19	20	21	18	18	19	22	22	22	21	22	21	21	20	19	18	16	15	14	12	13	11	1
2	12	11	11	9	8	8	7	7	7	8	10	12	12	12	13	14	13	12	12	12	12	9	9	8	2
3	7	7	6	3	2	2	2	4	8	11	12	16	18	19	20	19	19	17	16	15	14	13	12	12	3
4	14	14	14	15	15	17	18	18	22	23	22	22	22	21	23	18	18	14	12	12	10	9	8	7	4
5	7	6	6	5	4	3	4	3	3	5	5	5	6	6	5	6	5	4	1	1	0	-2	-2	-2	5
6	-2	-2	-4	-4	-4	-3	-2	-3	-1	2	5	8	12	12	15	16	15	13	10	9	6	3	4	3	6
7	0	-1	-1	-3	-4	-4	-2	-4	1	4	7	12	18	17	19	19	18	16	15	15	16	16	16	18	7
8	17	17	20	21	22	20	20	21	21	23	26	32	34	36	35	33	32	30	30	29	30	28	28	29	8
9	29	29	17	12	11	8	6	4	4	4	6	6	4	4	3	1	0	-1	-2	-2	-2	-3	-2	-4	9
10	-4	-5	-4	-5	-4	-6	-6	-4	-3	-2	-1	2	2	2	4	5	5	-1	0	-1	-3	-1	-1	-5	10
11	-6	-5	-6	-5	-7	-7	-6	-5	-3	-1	3	7	10	10	10	7	7	3	2	1	2	2	3	4	11
12	4	4	5	5	5	6	5	6	8	11	14	16	20	20	22	21	21	18	23	20	30	24	22	20	12
13	33	27	19	16	18	17	21	18	22	30	35	44	44	46	45	44	43	40	38	36	31	28	29	27	13
14	24	23	23	23	20	19	18	23	33	39	41	44	43	42	42	41	40	39	39	38	38	38	37	39	14
15	38	39	40	39	38	38	39	39	42	48	50	51	52	53	43	41	43	40	39	38	38	43	42	38	15
16	37	38	40	39	42	41	41	39	40	43	44	45	46	46	48	48	48	45	43	46	46	46	46	45	16
17	49	52	50	50	48	50	51	49	49	51	56	56	61	63	61	59	56	52	48	48	48	47	47	46	17
18	48	47	44	46	46	46	46	44	51	55	56	58	56	55	45	46	44	40	22	17	14	11	9	8	18
19	7	6	6	3	3	2	3	4	7	9	11	13	14	14	14	14	15	16	13	10	10	10	10	10	19
20	11	13	10	11	11	10	11	11	17	16	17	20	22	25	28	29	31	29	27	26	28	28	24	25	20
21	23	24	24	25	26	26	26	28	31	34	36	42	41	40	41	41	42	40	39	40	38	37	36	34	21
22	35	35	38	38	36	36	37	40	38	35	38	41	38	37	38	38	39	36	34	33	34	34	34	34	22
23	34	31	28	27	27	27	26	25	25	25	25	27	27	28	30	31	32	27	24	22	20	20	19	18	23
24	16	15	13	13	13	17	17	23	26	28	29	33	34	35	36	36	35	33	32	32	32	33	32	32	24
25	34	33	32	32	33	34	32	34	35	39	40	47	49	50	48	47	46	44	41	40	40	39	36	41	25
26	43	40	38	40	41	42	38	40	41	47	50	51	52	52	51	50	49	46	46	43	38	37	37	37	26
27	36	35	30	34	31	32	32	31	33	35	35	36	38	35	36	35	33	29	28	27	26	27	26	25	27
28	23	22	19	17	17	18	18	18	20	22	24	24	28	28	29	29	28	26	24	23	23	23	24	21	28
29	20	19	18	16	15	16	16	19	22	24	28	32	34	32	37	34	33	29	27	26	25	25	24	21	29
30																									30
31																									31

MEAN TEMPERATURE AND TOTAL PRECIPITATION THIS MONTH IN

Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.
1851			1876			1901			1926		
1852			1877			1902			1927		
1853			1878			1903			1928		
1854			1879			1904			1929		
1855			1880			1905			1930		
1856			1881			1906			1931		
1857			1882			1907			1932		
1858			1883			1908			1933		
1859			1884			1909			1934		
1860			1885			1910			1935	36	0.23
1861			1886			1911			1936	3	1.04
1862			1887			1912			1937	21	0.56
1863			1888			1913			1938	25	0.20
1864			1889			1914			1939	18	0.35
1865			1890			1915			1940	27	0.74
1866			1891			1916			1941	30	0.20
1867			1892			1917			1942	22	0.75
1868			1893			1918			1943	33	0.99
1869			1894			1919			1944	25	0.57
1870			1895			1920			1945	27	0.32
1871			1896			1921			1946	31	0.19
1872			1897			1922			1947	24	0.66
1873			1898			1923			1948	23	0.35
1874			1899			1924			1949		
1875			1900			1925			1950		

Note: The warmest, coldest, driest, and wettest months are underscored.

STATION Billings, Montana MONTH February 1948

HOURLY PRECIPITATION (Inches) FOR Municipal Airport

Date	A.M. 12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	P.M. 12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	Total	Date
1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.01	....	.01	....	0.02	1
2	..T.	....	....	....	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	T	2
3	....	..T.	..T.	..T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	3
4	....	....	....	....	....	....	....	....	....	....	..T.	..T.	..T.	....	..T.	..T.	..T.	..T.	..T.	..T.	..T.	.01	..T.	..T.	.01	4
5	..T.	..T.	..T.	..T.	.01	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	....	....	....	..T.	..T.	..T.	....	....	.01	5
6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	6
7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	7
8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	8
9	....	....	....	....	..T.	..T.	..T.	..T.	..T.	..T.	.01	..T.	.01	..T.	.01	..T.	.01	..T.	..T.	..T.	..T.	..T.	..T.	..T.	.04	9
10	..T.	..T.	..T.	..T.	.01	..T.	..T.	..T.	..T.	..T.	..T.	..T.	....	....	....	....	....	....	....	....	....	....	....	....	.01	10
11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	11
12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	12
13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	13
14	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	14
15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	15
16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	16
17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	17
18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..T.	..T.	..T.	....	....	....	....	....	....	..T.	T	18
19	.T.	....	....	....	....	....	....	....	....	....	....	....	..T.	..T.	.01	.01	..T.	..T.	..T.	.01	....	....	....	....	.03	19
20	....	....	..T.	....	....	....	..T.	..T.	..T.	..T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	20
21	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	21
22	....	....	....	....	....	....	....	....	....	..T.	..T.	..T.	.01	.02	..T.	.01	..T.	.01	.03	.08	.02	..T.	....	....	.18	22
23	....	....	....	..T.	..T.	..T.	.01	..T.	..T.	..T.	.01	..T.	..T.	....	..T.	..T.	....	....	....	....	....	....	....	....	.02	23
24	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	24
25	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	25
26	....	....	....	....	....	....	....	....	....	....	....	....	....	..T.	..T.	..T.	..T.	..T.	..T.	..T.	..T.	.02	..T.	.01	.03	26
27	..T.	..T.	..T.	..T.	..T.	..T.	..T.	....	....	....	....	....	....	....	..T.	..T.	....	....	..T.	..T.	....	....	....	....	T	27
28	....	....	....	....	....	....	....	....	..T.	..T.	..T.	..T.	..T.	....	....	....	....	....	....	....	....	....	....	....	T	28
29	....	....	....	....	....	....	....	....	....	....	....	....	....	..T.	..T.	....	....	....	....	....	....	....	....	....	T	29
30																										30
31																										31

"T" indicates a trace, or amount too small to measure.

Monthly Total..... 0.35

DEPARTMENT OF THE INTERIOR
RECEIVED
MAR 8 - 1948
FORT PECK GAME RANGE
FISH AND WILDLIFE SERVICE

WB FORM 1030

U. S. DEPARTMENT OF COMMERCE, WEATHER BUREAU

MONTHLY CLIMATOLOGICAL SUMMARY

With Comparative Data

STATION Billings, Montana (Municipal Airport), MONTH January, 1948

Phone 5431; 105th Meridian Time; Lat. 45° 48′N, Long. 108° 32′W; Elevation 3570 ft.

DATE	TEMPERATURE °F MAXIMUM	MINIMUM	MEAN	DEPARTURE FROM NORMAL	DEGREE DAYS BASE 65°	PRECIPITATION TOTAL (INCHES)	SNOWFALL (INCHES) (UNMELTED)	DEPTH OF SNOW ON THE GROUND 7:30 P.M.	WIND PREVAILING DIRECTION	(*) HIGHEST VELOCITY	DIRECTION	WEATHER PERCENT OF POSSIBLE SUNSHINE	AVERAGE CLOUDINESS SCALE 0 TO 10
1	41	22	32	+ 8	33	0	0	0	SW	27	SW	54	5
2	50	34	42	+19	23	T	0	0	SW	26	NW	49	6
3	40	24	32	+ 9	33	T	T	0	W	44	NW	83	2
4	49	25	37	+14	28	.03	T	0	SW	35	NW	4	9
5	40	27	34	+11	31	0	0	0	S,SW	13	NW	26	6
6	56	34	45	+22	20	0	0	0	SW	27	SW	25	9
7	60	40	50	+27	15	.12	0	0	SW	27	NW	4	9
8	48	30	39	+16	26	T	0	0	NW	24	NW	71	3
9	40	24	32	+ 9	33	0	0	0	SW	10	SW	100	1
10	41	22	32	+ 9	33	T	T	0	SW	40	NW	13	9
11	36	23	30	+ 7	35	T	T	0	W	36	W	38	6
12	29	16	22	- 1	43	.03	0.6	0.4	W,NW	24	NW	55	6
13	41	14	28	+ 6	37	0	0	T	SW	26	SW	56	7
14	54	27	40	+18	25	0	0	0	SW	38	NW	50	7
15	32	10	21	- 1	44	T	T	T	NE	31	N	1	8
16	23	5	14	- 8	51	T	T	T	SW	18	SW	7	9
17	35	20	28	+ 6	37	T	T	T	SW	28	N	0	9
18	32	18	25	+ 3	40	T	T	T	SW	27	N	86	2
19	46	19	32	+10	33	0	0	0	SW	32	W	30	9
20	46	23	34	+12	31	0	0	0	SW	24	NW	31	9
21	52	36	44	+22	21	0	0	0	W	43	NW	20	9
22	46	31	38	+16	27	.08	T	0	N	34	NW	0	9
23	35	27	31	+ 9	34	.06	0.6	0.2	SW	17	N	0	10
24	28	18	23	+ 1	42	.06	0.5	1.0	NE	12	NE	0	10
25	21	- 1	10	-12	55	.08	1.6	2.6	N,NE	21	N	5	9
26	6	-11	- 2	-24	67	T	T	2.6	SW	19	SW	83	5
27	17	- 7	5	-17	60	0	0	2.5	SW	32	SW	89	3
28	27	14	20	- 2	45	0	0	2.0	SW	28	SW	2	9
29	34	14	24	+ 2	41	0	0	0.8	SW	23	SW	100	1
30	40	17	28	+ 6	37	0	0	0.4	SW	24	NW	75	7
31	33	18	26	+ 4	39	0	0	T	SW	17	SW	100	2
MEAN	38.0	19.8	28.9	+6.5	[c]1119	[c]0.46	[c]3.3	------	SW	[d] 44	[d] NW	41	6.6
Normal	-	-	22.4	------	1310	-	-	------	-	Jan. 3rd		-	-

(*) for 5-minute period.

PRESSURE	Mean		Highest		Date	Lowest		Date
Station	26.360 in.	892.7 mb.	26.820 in.	908.2 mb.	26	25.838 in.	875.0 mb.	2
Sea Level	30.14 in.	1020.7 mb.	30.84 in.	1044.4 mb.	26	29.47 in.	998.0 mb.	2

TEMPERATURE:—Mean this month last year 26.5. This month since 1934: warmest 33.1 in 1939; coldest 6.0 in 1937.
Highest 60 date 7; lowest -11 date 26. This month since 1934 highest 61 date 19, 1944 lowest -30 date 7, 1937.
Average daily departure since Jan. 1, +6.5. Degree days: since July 1, 3897, normal 4212; since Sept. 1, 3883, normal 3976.
Number of days: —Max. 100° or above 0; 90° or above 0; —Min. 32° or below 27; 0° or below 3; —10° or below 1.
Normal number: —Max. 100° or above -; 90° or above -; —Min. 32° or below -; 0° or below -; —10° or below -.

PRECIPITATION:—Departure -. Total since Jan. 1 0.46, Dep. -; total since July 1 5.12, Dep. -.
Total this month last year 0.15. This month since 1934: wettest 1.54 in 1943, driest 0.04 in 1941.

Greatest this month in:
5 min. - date -.
10 min. - date -.
15 min. .04 date 7.
20 min. - date -.
30 min. .06 date 7.
1 hr. .08 date 7.
2 hr. .10 date 7.
24 hr. .12 date 7, 23-24

Greatest this month since 1941 in:
5 min. .02 date 1, 1943.
10 min. .03 date 1, 1943.
15 min. - date -, -.
20 min. .05 date 1, 1943.
30 min. .07 date 1, 1943.
1 hr. .11 date 1, 1943.
2 hr. .16 date 1, 1943.
24 hr. .60 date 1-2, 1943.

SNOWFALL:—Total since July 1, 21.3, Dep. -.
Greatest monthly, this month since 1934 13.4 in 1943;
least monthly this month since 1934 0.9 in 1938.
Greatest in 24 hrs. 1.6, date 25;
this month since 1938, 5.1 date 1, 1943.
Greatest any single storm - date -;
this month since -, - date -, -.
Greatest on ground 2.6, date 25, 26, 27;
this month since 1938, 9.3 date 1, 1945.

Number of days with precipitation: trace 10; 0.01 inch or more 7; 0.25 inch or more 0; 1 inch or more 0; 2 inches or more 0.
Normal number of days with precipitation: trace -; 0.01 inch or more -; 0.25 inch or more -; 1 inch or more -; 2 inches or more -.
Greatest number of days this month since 1934 with precipitation: 0.01 inch or more, 13 in 1940; least number 3 in 1941.

CHARACTER OF DAY:—Number of days clear 7; partly cloudy 9; cloudy 15. Normal number clear 5; partly cloudy 11; cloudy 15.
SUNSHINE:—Total hours this month 115.3. Total hours possible on 1st 8.8; on 16th 9.1; on last day 9.7; this month 283.6.
MISCELLANEOUS PHENOMENA (DATES):—Hail -; Sleet -; Glaze -.
Fog: Light 12, 23, 24, 25; Moderate 23, 24; Heavy 23, 24.
Frost: Light -; Heavy -; Killing[h] -.
Thunderstorms -. Duststorms -. Tornadoes -. Hurricanes -.

[a]. City Office. [b]. Airport. [c]. Total. [d]. Monthly. [e]. Sunrise to sunset: 0 to 3, clear; 4 to 7, partly cloudy; 8 to 10, cloudy. [f]. other dates, [g]. Light fog, visibility 6 miles to 3,300 ft.; moderate, 3,299 to 1,650 ft.; heavy, 1,649 ft. to 0. [h]Frosts not recorded in autumn after first "killing," except in Florida and along immediate coast of the Gulf of Mexico. T indicates a trace of precipitation.

L. T. Pierce, Meteorologist.

STATION Billings, Montana, MONTH January, 1948.

PSYCHROMETRIC DATA taken at Municipal Airport

Date	5:30 a.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	11:30 a.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	5:30 p.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	11:30 p.m. MST Dry	Wet	Dew Pt.	Rel. Hum.
1	24.8	20.8	11	51	34.0	27.0	13	38	34.7	29.1	20	51	35.8	29.8	20	49
2	39.1	32.0	21	46	45.2	37.3	27	47	46.1	37.3	26	43	36.9	33.6	29	73
3	37.0	33.7	29	73	39.0	32.2	22	47	35.3	30.0	22	54	25.4	21.0	10	48
4	32.4	26.2	14	42	39.4	32.1	21	45	40.8	37.5	34	75	37.0	30.9	22	50
5	29.2	25.4	18	60	33.7	29.6	23	62	35.3	31.0	25	63	32.0	29.0	25	71
6	42.6	35.8	27	52	51.7	42.2	31	45	49.0	40.0	29	45	48.0	40.2	31	52
7	51.6	42.8	33	49	51.8	43.4	34	51	54.0	44.9	36	50	40.0	40.0	40	100
8	39.8	36.0	31	71	41.7	37.2	32	67	38.0	33.5	27	64	34.7	29.2	20	52
9	30.0	26.2	20	61	32.3	29.1	24	69	35.9	31.8	26	65	26.9	25.2	22	80
10	25.0	23.0	19	76	31.2	27.7	21	61	38.0	32.3	24	54	35.4	31.1	25	63
11	31.5	24.5	8	32	35.8	27.8	12	33	31.9	27.7	21	60	24.2	23.1	21	86
12	20.0	19.5	18	92	21.5	20.7	19	89	24.8	21.9	16	65	23.2	19.0	8	47
13	16.3	14.0	7	63	24.9	21.6	14	59	37.4	32.7	26	62	27.0	22.8	14	54
14	31.2	29.1	26	79	43.1	34.3	22	40	46.2	35.3	19	31	34.8	28.2	16	43
15	27.4	26.9	26	94	26.7	23.3	16	61	24.3	20.9	13	58	11.6	11.0	9	88
16	8.9	8.6	8	95	12.0	11.0	8	80	21.3	19.0	14	68	20.0	17.8	12	69
17	22.4	19.3	12	60	26.0	23.0	17	65	34.2	31.1	27	72	26.9	25.0	22	78
18	20.9	19.7	17	83	26.0	22.5	15	59	27.1	21.4	7	37	19.1	16.4	9	61
19	23.1	18.8	7	46	32.0	26.0	14	42	40.0	33.0	23	48	27.0	23.0	15	55
20	26.8	22.8	14	54	33.8	28.8	20	53	41.2	34.0	24	48	34.0	30.0	24	64
21	40.5	33.0	22	43	49.6	39.8	28	42	49.0	40.8	31	49	47.1	39.0	29	48
22	36.9	35.5	34	88	36.6	35.0	38	87	37.0	32.9	27	65	33.2	31.6	30	87
23	31.8	29.0	25	73	31.8	31.6	31	98	29.9	29.6	29	96	27.4	27.2	27	98
24	27.1	27.1	27	100	23.8	23.8	24	100	19.6	19.0	18	92	20.0	19.8	20	99
25	19.0	19.0	19	100	17.3	16.3	14	85	10.0	8.9	5	77	3.9	3.4	2	90
26	-7.0	-7.2	-9	91	-3.0	-3.0	-3	100	4.9	3.9	-1	75	-0.9	-1.2	-3	90
27	-4.2	-4.4	-6	93	3.2	2.5	-1	81	10.2	8.7	3	69	15.3	12.7	4	57
28	17.4	13.9	2	46	20.3	17.3	9	58	25.1	21.1	12	52	20.0	16.8	8	55
29	16.3	14.0	7	60	27.1	23.5	16	59	29.6	25.8	19	60	21.3	18.9	13	68
30	18.3	16.3	11	70	27.8	24.1	17	60	36.1	30.7	23	55	28.9	24.8	17	56
31	23.0	19.8	12	59	24.2	22.0	18	72	30.3	26.0	18	56	20.0	18.0	13	72
MEAN	25.8	22.6	16	68	30.3	26.1	19	63	32.8	28.1	21	60	27.0	23.8	18	68
Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WIND:—Number of hours this month below 10 mi. 218; 10 mi. and over 526; 15 mi. and over 354; 20 mi. and over 155; 25 mi. and over 58; 30 mi. and over 10; 40 mi. and over 0.

This Month:—Dir.	N	NE	E	SE	S	SW	W	NW	Dl	Month
Aver. Hrly. Vel.	12.5	9.2	0	5.3	4.3	14.5	16.9	17.9	1.0	14.1
Percent of Time	9	5	0	0	6	53	13	14	0	100

Maximum velocity this month since 1939 50 miles from NW on 13 in 1945.

CEILING AND VISIBILITY FREQUENCIES (Based on hourly record observations) at Municipal Airport

Visibility (miles)	Ceiling (feet) 0	100-200	300-400	500-900	1000-1900	2000-2900	3000-4900	5000-9500	Over 9500	Total
0 to ⅛	7									7
⅛ to ⅜	1									1
½ to ¾		1								1
1 to 2½			3	3	9		2			17
3 to 6		1	2	1	8					12
7 to 15			2	1	9	5	3	2	4	26
20 to 30					8	16	21	65	104	214
35 or more						2	2	50	412	466
Total	8	2	7	5	34	23	28	117	520	744

Frequencies for larger classes can be derived by addition, i.e., "Under 500 feet" from sum of 0, 100-200 and 300-400 classes; "7 miles or more" from sum of classes 7 to 35 miles or more inclusive.

FROST DATA:—Average date of last killing frost in spring May 15; first in autumn September 24

Latest date of last killing frost in spring June 23 1903; earliest in autumn August 25, 1910

Average growing season 132 days; longest 168 days in 1937; shortest 66 days in 1903

GENERAL SUMMARY:— Sunshine during the month of January was only 41 per cent of the total possible, but the month could nevertheless be described as warm and pleasant. No unusually high or low temperatures were recorded. The minimum of -11 registered the 26th is the lowest temperature recorded since February 27, 1947, when -13 occurred. The maximum of 60 degrees was recorded on the 7th. The monthly mean temperature of 28.9 is 6.5 degrees above the January normal.

Precipitation amounted to 0.46 inch, about 0.08 above the January average. Some precipitation fell on 17 days of the month, but amounts exceeding a trace were recorded on the 4th, 7th, 12th, 22nd, 23rd, 24th and 25th only.

Light blowing dust permeated the atmosphere for a brief period on the 21st. No damage from the strong winds of this date was reported.

A faint Aurora was observed the evening of January 2nd.

STATION Billings, Montana, MONTH January, 1948

HOURLY TEMPERATURES FOR Municipal Airport

Readings made 20 minutes past the hour

Date	A.M. 1	2	3	4	5	6	7	8	9	10	11	12	P.M. 1	2	3	4	5	6	7	8	9	10	11	12	Date
1	22	24	24	25	25	28	28	28	33	35	34	36	40	40	40	37	35	34	34	35	36	36	36	36	1
2	37	38	38	38	39	39	38	38	38	41	45	48	48	50	49	46	46	41	40	37	37	38	37	33	2
3	35	35	38	34	37	36	38	36	37	38	39	39	40	40	39	37	35	34	32	31	31	28	25	26	3
4	26	27	31	34	32	29	31	28	34	36	39	45	48	49	35	39	41	40	39	38	38	38	37	35	4
5	33	33	32	28	29	30	30	29	29	32	34	36	36	37	40	36	35	33	33	32	33	32	32	34	5
6	39	42	40	41	43	45	44	43	46	46	52	50	53	54	51	49	49	48	46	49	47	48	48	51	6
7	50	52	51	52	52	52	51	51	52	53	52	58	56	56	55	55	54	53	48	45	43	41	40	42	7
8	42	41	41	40	40	38	39	38	37	38	42	45	47	47	45	41	38	38	36	34	34	34	35	32	8
9	31	30	30	30	30	27	25	29	28	28	32	37	39	40	40	38	36	35	33	31	31	27	27	29	9
10	26	24	25	26	25	26	27	26	28	30	31	35	37	38	41	40	38	38	38	38	37	38	35	35	10
11	34	34	33	32	32	31	32	32	33	34	36	36	35	35	33	33	32	28	27	27	27	25	24	23	11
12	24	22	20	19	20	16	16	17	18	20	22	26	28	28	29	28	25	25	23	24	24	24	23	23	12
13	24	19	19	16	16	16	15	16	20	22	25	31	40	40	40	40	37	37	31	28	27	27	27	29	13
14	29	28	29	31	31	31	31	32	35	38	43	44	52	54	52	49	46	43	43	41	40	36	35	32	14
15	32	32	29	29	27	26	27	26	25	26	27	29	29	29	29	26	24	22	19	17	13	10	12	10	15
16	8	11	8	10	9	8	8	6	7	9	12	16	21	21	22	22	21	21	21	21	21	20	20	20	16
17	21	21	21	22	22	24	23	24	25	26	26	27	29	32	35	35	34	34	33	32	31	27	27	23	17
18	22	21	20	21	21	22	22	20	22	22	26	29	30	31	32	30	27	21	20	18	18	19	19	20	18
19	20	21	22	23	23	24	25	25	27	30	32	44	44	46	44	42	40	39	30	29	27	30	27	24	19
20	25	28	24	25	27	30	28	28	29	31	34	37	45	46	44	42	41	38	36	37	37	35	34	37	20
21	37	39	40	39	40	42	42	42	45	48	50	51	51	52	50	50	49	49	50	50	51	48	47	45	21
22	44	45	41	38	37	34	34	34	35	36	37	38	38	39	39	38	37	36	34	33	33	32	33	34	22
23	34	32	32	32	32	34	34	32	32	32	32	32	32	32	31	30	30	29	29	29	28	28	27	28	23
24	28	27	27	27	27	26	25	24	25	25	24	23	23	23	23	22	20	19	19	20	19	20	20	20	24
25	21	20	20	20	19	17	18	17	18	17	17	15	16	14	11	10	10	8	7	6	6	5	4	0	25
26	-4	-2	-8	-7	-7	-10	-10	-8	-8	-6	-3	0	3	5	6	5	5	4	3	3	4	-1	-1	-2	26
27	-4	-7	-5	-4	-4	-2	-2	-1	0	2	3	7	9	10	11	11	10	12	12	14	15	15	15	17	27
28	16	16	17	16	17	17	15	16	17	19	20	23	25	25	27	26	25	22	22	21	21	19	20	16	28
29	16	14	20	20	16	18	19	19	22	26	27	31	32	33	34	32	30	27	26	27	25	22	21	22	29
30	20	19	20	18	18	19	18	18	22	26	28	32	39	37	38	37	36	34	33	31	30	32	29	27	30
31	25	25	22	20	23	18	18	19	21	22	24	30	32	32	33	32	30	26	25	24	22	21	20	19	31

MEAN TEMPERATURE AND TOTAL PRECIPITATION THIS MONTH IN

Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.
1851			1876			1901			1926		
1852			1877			1902			1927		
1853			1878			1903			1928		
1854			1879			1904			1929		
1855			1880			1905			1930		
1856			1881			1906			1931		
1857			1882			1907			1932		
1858			1883			1908			1933		
1859			1884			1909			1934		
1860			1885			1910			1935	24	0.16
1861			1886			1911			1936	24	0.40
1862			1887			1912			1937	6	0.40
1863			1888			1913			1938	32	0.06
1864			1889			1914			1939	33	0.39
1865			1890			1915			1940	14	0.68
1866			1891			1916			1941	30	0.04
1867			1892			1917			1942	26	0.40
1868			1893			1918			1943	14	1.54
1869			1894			1919			1944	31	0.31
1870			1895			1920			1945	27	0.26
1871			1896			1921			1946	31	0.14
1872			1897			1922			1947	26	0.15
1873			1898			1923			1948	29	0.46
1874			1899			1924			1949		
1875			1900			1925			1950		

Note:—The warmest, coldest, driest, and wettest months are underscored.

STATION Billings, Montana MONTH January, 1948

HOURLY PRECIPITATION (Inches) FOR

Date	A.M. 12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	P.M. 12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	Total	Date
1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	1
2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	T	....	....	....	....	....	T	2
3	....	....	....	....	....	T	T	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	3
4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	T	.03	T	....	....	....	....	....	....	.03	4
5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	5
6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	6
7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	.07	.03	.02	.12	7
8	T	T	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	8
9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	9
10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	T	T	....	....	T	10
11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	T	T	....	....	T	11
12	T	T	....	....	T	.01	.01	.01	T	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.03	12
13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	13
14	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	14
15	....	....	T	T	T	T	....	....	....	....	....	....	....	T	T	....	....	....	....	....	....	....	T	T	T	15
16	T	T	T	T	T	T	T	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	16
17	....	....	....	....	....	....	T	T	T	T	T	T	T	....	T	T	....	....	T	T	....	T	T	T	T	17
18	T	....	....	T	T	....	T	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	18
19	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	19
20	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	20
21	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	21
22	T	T	....	....	T	T	.01	.01	.03	.03	T	....	....	....	....	T	T	....	....	....	....	....	....	....	.08	22
23	....	....	....	....	....	T	T	T	T	T	T	T	T	.01	T	T	.01	T	T	.01	.01	.01	.01	T	.06	23
24	.02	.02	.01	T	T	T	T	.01	T	T	T	T	T	T	....	....	....	....	....	T	T	T	T	T	.06	24
25	.02	.01	.01	.01	T	.01	.01	.01	T	....	T	T	T	T	....	....	....	....	....	....	....	....	....	....	.08	25
26	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	T	T	T	T	T	....	....	....	T	26
27	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	27
28	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	28
29	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	29
30	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	30
31	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	31

"T" indicates a trace, or amount too small to measure.

Monthly Total..... 0.46

DEPARTMENT OF THE INTERIOR
RECEIVED
FEB 8 - 1948
FORT PECK GAME RANGE
FISH AND WILDLIFE SERVICE

WB FORM 1030

U. S. DEPARTMENT OF COMMERCE, WEATHER BUREAU

MONTHLY CLIMATOLOGICAL SUMMARY

With Comparative Data

STATION Billings, Montana (Municipal Airport), MONTH December, 1947

Phone 5431; 105 th Meridian Time; Lat. 45° 48' N, Long. 108° 32' W; Elevation 3570 ft.

DATE	TEMPERATURE °F MAXIMUM	MINIMUM	MEAN	DEPARTURE FROM NORMAL	DEGREE DAYS BASE 65°	PRECIPITATION TOTAL (INCHES)	SNOWFALL (INCHES) (UNMELTED)	DEPTH OF SNOW ON THE GROUND 7:30 P.M.	WIND PREVAILING DIRECTION	HIGHEST VELOCITY (*)	DIRECTION	WEATHER PERCENT OF POSSIBLE SUNSHINE	*AVERAGE CLOUDINESS SCALE 0 TO 10
1	41	28	34	+ 4	31	0.67	4.4	0.2	SW	22	N	0	9
2	30	19	24	- 5	41	T	0.1	3.0	S	26	N	69	6
3	26	12	19	-10	46	0	0	3.0	N	9	N	72	5
4	22	8	15	-14	50	T	T	2.9	SW	8	SW	0	9
5	34	14	24	- 4	41	0	0	2.8	SW	22	SW	100	1
6	28	13	20	- 8	45	.07	0.7	3.5	SW	11	SW	41	8
7	22	6	14	-14	51	0	0	3.5	SW	15	SW	81	3
8	20	6	13	-15	52	T	T	3.5	SW	20	SW	46	7
9	29	16	22	- 5	43	T	T	3.5	SW	19	SW	42	7
10	29	15	22	- 5	43	T	T	3.5	SW	17	SW	87	4
11	31	15	23	- 4	42	T	T	3.2	SW	21	NW	0	9
12	31	18	24	- 3	41	0	0	2.5	SW	29	SW	84	3
13	44	31	38	+12	27	0	0	1.4	SW	31	SW	0	9
14	40	25	32	+ 6	33	0	0	0.8	W	42	NW	20	7
15	32	23	28	+ 2	37	.06	3.0	0.5	SW	26	NW	6	9
16	32	22	27	+ 1	38	T	T	3.5	SW	28	SW	89	2
17	43	30	36	+10	29	0	0	1.0	SW	28	SW	50	8
18	45	24	34	+ 8	31	0	0	0.3	SW	24	W	86	8
19	43	29	36	+11	29	0	0	T	SW	24	NW	77	2
20	38	24	31	+ 6	34	0	0	T	SW	15	SW	46	9
21	36	20	28	+ 3	37	0	0	T	SW	17	SW	0	9
22	44	26	35	+10	30	0	0	T	SW	19	NW	77	3
23	40	24	32	+ 7	33	0	0	T	SW	21	SW	44	6
24	48	31	40	+15	25	0	0	T	SW	20	SW	35	9
25	46	32	39	+15	26	0	0	T	SW	26	SW	29	9
26	48	38	43	+19	22	0	0	T	SW	24	SW	0	9
27	50	36	43	+19	22	0	0	0	SW	21	SW	27	9
28	49	31	40	+16	25	T	T	0	SW	21	NW	13	9
29	35	14	24	0	41	.01	T	T	NW	19	NE	30	5
30	17	5	11	-13	54	T	0.1	0.1	NE	17	NE	14	9
31	29	6	18	- 6	47	0	0	T	SW	26	SW	100	2
MEAN	35.5	20.7	28.1	+1.9	1146	[c]0.81	[c]8.3	------	SW	[d] 42	[d] NW	44	6.6
Normal	-	-	26.2	------	1215	-	-	------	-	Dec. 14		-	-

(*) for 5-minute period.

PRESSURE	Mean		Highest		Date	Lowest		Date
Station	26.300 in.	890.6 mb.	26.840 in.	908.9 mb.	24	25.902 in.	887.1 mb.	13
Sea Level	30.06 in.	1018.0 mb.	30.65 in.	1037.9 mb.	24	29.57 in.	1001.4 mb.	13

TEMPERATURE:—Mean this month last year 29.4. This month since 1934: warmest 37.6 in 1939; coldest 23.6 in 1945.
Highest 50 date 27; lowest 5 date 30. This month since 1934 highest 69 date 5, 1939 lowest -17 date 23, 1944.
Average daily departure since Jan. 1, -0.1 Degree days: since July 1, 2778, normal 2902; since Sept. 1, 2764, normal 2857.
Number of days: —Max. 100° or above 0; 90° or above 0; —Min. 32° or below 29; 0° or below 0; —10° or below 0.
Normal number: —Max. 100° or above -; 90° or above -; —Min. 32° or below -; 0° or below -; —10° or below -.

PRECIPITATION:—Departure -. Total since Jan. 1 12.72, Dep. -; total since July 1 4.66, Dep. -
Total this month last year 0.93. This month since 1934: wettest 1.17 in 1944, driest 0.06 in 1940.

Greatest this month in:
5 min. - date -.
10 min. - date -.
15 min. - date -.
20 min. - date -.
30 min. - date -.
1 hr. .18 date 1.
2 hr. .26 date 1.
24 hr. .67 date 1.

Greatest this month since 1941, in:
5 min. .01 date 30, 1941
10 min. .01 date 30, 1941
15 min. - date -, -
20 min. .08 date 19, 1944
30 min. .09 date 19, 1944
1 hr. .18 date 1, 1947
2 hr. .26 date 1, 1947
24 hr. .67 date 1, 1947

SNOWFALL:—Total since July 1, 18.0, Dep. -
Greatest monthly, this month since 1934, 18.2 in 1944;
least monthly this month since 1934, T in 1938.
Greatest in 24 hrs. 4.5, date 1-2;
this month since 1939, 6.0 date 31, 1944.
Greatest any single storm 4.5 date 1-2;
this month since -, - date -, -.
Greatest on ground 3.6, date 2nd;
this month since 1939, 11.5 date 13, 1946.

Number of days with precipitation: trace 9; 0.01 inch or more 4; 0.25 inch or more 1; 1 inch or more 0; 2 inches or more 0.
Normal number of days with precipitation: trace -; 0.01 inch or more -; 0.25 inch or more -; 1 inch or more -; 2 inches or more -.
Greatest number of days this month since 1935 with precipitation: 0.01 inch or more, 10 in 1941; least number 1 in 1943.

CHARACTER OF DAY:—Number of days clear 7; partly cloudy 8; cloudy 16. Normal number clear 5; partly cloudy 10; cloudy 16.
SUNSHINE:—Total hours this month 120. Total hours possible on 1st 9.0; on 16th 8.7; on last day 8.7; this month 271.2.
MISCELLANEOUS PHENOMENA (DATES):—Hail -; Sleet -; Glaze 4
Fog: Light 1, 2, 3, 4, 6, 7, 8, 16; Moderate 1, 3, 4, 6, 8, 16; Heavy 1, 3, 4, 6, 7, 8.
Frost: Light -; Heavy -; Killing[h] -
Thunderstorms -. Duststorms -. Tornadoes -. Hurricanes -.

[c]. City Office. [b]. Airport. [c]. Total. [d]. Monthly. [e]. Sunrise to sunset: 0 to 3, clear; 4 to 7, partly cloudy; 8 to 10, cloudy. [f]. other dates. [g]. Light fog, visibility 6 miles to 3,300 ft.; moderate, 3,299 to 1,650 ft.; heavy, 1,649 ft. to 0. [h]Frosts not recorded in autumn after first "killing," except in Florida and along immediate coast of the Gulf of Mexico. T indicates a trace of precipitation.

L. T. Pierce, Meteorologist.

MEV:m

Official in Charge, Weather Bureau.

STATION Billings, Montana, MONTH December, 19 47

PSYCHROMETRIC DATA taken at Municipal Airport

Date	5:30 a.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	11:30 a.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	5:30 p.m. MST Dry	Wet	Dew Pt.	Rel. Hum.	11:30 p.m. MST Dry	Wet	Dew Pt.	Rel. Hum.
1	37.5	33.5	28	67	36.2	33.9	31	81	32.4	32.3	32	99	29.4	29.3	29	99
2	29.0	27.0	24	79	26.9	25.9	24	88	24.1	22.9	21	86	20.4	19.7	18	90
3	17.0	16.0	14	85	20.2	18.8	16	80	21.9	20.9	19	87	14.2	13.8	13	92
4	13.8	12.7	9	81	16.5	16.4	16	99	21.8	21.0	19	89	18.3	17.2	15	84
5	20.8	20.2	19	91	26.8	25.0	22	80	33.1	29.2	23	63	24.9	22.8	19	75
6	26.8	24.9	22	80	26.5	26.5	26	100	23.9	22.9	22	91	18.6	17.9	16	90
7	7.0	6.6	5	89	15.0	14.0	11	83	20.9	19.2	15	77	10.0	9.1	6	81
8	10.1	9.9	9	91	15.0	14.0	11	83	18.7	16.8	12	72	18.9	17.8	15	88
9	19.8	18.7	16	84	23.6	21.0	15	67	27.1	24.9	21	75	23.6	21.8	18	77
10	21.0	18.8	14	70	21.8	18.5	10	56	24.8	21.6	15	61	17.4	15.2	9	66
11	22.4	19.8	14	66	27.0	23.2	15	57	28.2	25.9	22	75	24.5	22.9	20	80
12	21.2	19.6	16	78	26.3	24.1	20	74	28.0	24.9	19	66	31.4	27.0	19	56
13	33.1	28.1	20	54	37.1	31.8	24	56	38.0	33.0	26	60	40.0	34.0	26	55
14	37.9	30.8	20	44	35.0	30.6	24	61	31.8	27.0	18	53	28.0	24.0	16	56
15	27.1	24.5	20	71	29.4	28.1	26	86	31.0	27.5	22	65	28.0	27.0	26	89
16	25.3	24.2	22	87	23.9	21.9	18	75	28.0	25.0	20	67	31.8	27.0	18	53
17	34.8	29.2	20	51	40.1	33.0	23	47	42.0	36.0	28	57	41.0	35.0	27	56
18	30.6	27.7	23	70	33.4	29.8	24	66	42.1	36.1	28	57	39.5	34.0	27	58
19	34.3	30.4	25	66	38.7	34.9	30	70	37.9	31.9	23	52	31.8	28.7	24	70
20	28.8	25.9	21	69	31.7	28.3	23	67	34.8	30.6	25	65	31.8	28.8	24	70
21	26.0	24.0	20	76	29.4	27.0	23	74	34.4	31.3	27	72	31.9	29.0	25	73
22	30.2	27.0	22	67	32.7	29.7	25	57	38.1	34.0	26	59	29.6	28.5	27	88
23	26.8	24.8	21	77	33.9	29.9	24	64	36.4	31.9	26	64	33.1	29.8	25	69
24	34.0	30.0	24	64	40.3	34.7	27	58	41.8	36.7	30	63	34.4	30.8	26	68
25	35.0	32.0	28	74	41.4	36.7	31	67	40.6	35.9	30	64	40.0	35.0	28	62
26	38.7	33.9	28	63	42.5	36.3	28	56	41.7	35.6	27	54	40.1	34.0	26	55
27	43.2	35.9	26	49	44.1	36.7	27	49	47.9	38.9	28	45	38.9	33.0	25	55
28	39.6	33.1	24	51	42.0	36.0	28	57	48.6	39.3	28	44	35.0	34.1	33	92
29	31.3	30.8	30	95	31.0	27.0	20	60	26.4	25.0	23	84	17.2	16.1	13	82
30	8.4	7.3	3	76	10.0	9.0	5	79	10.4	9.9	8	90	6.7	5.8	2	79
31	13.3	12.1	8	78	21.5	18.5	11	60	23.2	20.1	13	61	21.9	19.0	12	62
MEAN	26.6	23.9	19	72	29.7	26.5	21	70	31.6	28.0	22	68	27.5	24.8	20	73
Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WIND:—Number of hours this month below 10 mi. 251; 10 mi. and over 493; 15 mi. and over 254; 20 mi. and over 95; 25 mi. and over 14; 30 mi. and over 1; 40 mi. and over 0.

This Month:—Dir.	N	NE	E	SE	S	SW	W	NW	DI	Month
Aver. Hrly. Vel.	8.1	8.8	6.2	6.1	5.7	13.3	14.4	12.8	0.0	12.3
Percent of Time	6	4	1	1	6	70	7	5	0	100

Maximum velocity this month since 1939, 52 miles from NW on 5 in 1940.

CEILING AND VISIBILITY FREQUENCIES (Based on hourly record observations) at Municipal Airport

Visibility (miles)	Ceiling (feet) 0	100-200	300-400	500-900	1000-1900	2000-2900	3000-4900	5000-9500	Over 9500	Total
0 to ⅛	18	1	2						1	22
3/16 to ⅜		2	2						1	5
½ to ¾		3	1							4
1 to 2½		2	1	4					2	9
3 to 6		3		8	7	3	1	1		23
7 to 15	1	1			9	12	5	4	9	41
20 to 30				4	8	12	12	56	116	208
35 or more					2		4	37	389	432
Total	19	12	6	16	26	27	22	98	518	744

Frequencies for larger classes can be derived by addition, i.e., "Under 500 feet" from sum of 0, 100-200 and 300-400 classes; "7 miles or more" from sum of classes 7 to 35 miles or more inclusive.

FROST DATA:—Average date of last killing frost in spring May 15; first in autumn September 24.
Latest date of last killing frost in spring June 23, 1903; earliest in autumn August 25, 1910.
Average growing season 132 days; longest 168 days in 1937; shortest 66 days in 1903.

GENERAL SUMMARY:— December, 1947, was for the most part a pleasant month as far as the weather was concerned. The first 12 days were characterized by below normal temperatures and numerous periods of light snow. The period December 13-28th was unusually warm and dry with mean daily temperatures averaging 10 degrees above the seasonal normal.

A total of 0.81 inch of precipitation was recorded during the month, with 0.67 inch falling on the 1st. This is the greatest 24-hour amount ever recorded at the Airport since records were begun in 1934.

MFV :m

STATION Billings, Montana, MONTH December, 1947

HOURLY TEMPERATURES FOR Municipal Airport

Readings made 20 minutes past the hour

Date	A.M. 1	2	3	4	5	6	7	8	9	10	11	12	P.M. 1	2	3	4	5	6	7	8	9	10	11	12	Date
1	38	36	38	35	38	36	36	37	35	36	36	41	40	38	39	36	32	32	32	32	31	30	29	27	1
2	27	27	27	29	29	28	28	26	26	26	27	27	27	28	27	25	24	23	23	23	22	22	20	19	2
3	19	18	17	17	17	16	17	18	21	19	20	23	25	25	26	24	22	20	18	17	12	16	14	12	3
4	12	11	12	12	14	10	13	13	14	15	16	18	21	21	22	22	22	22	22	21	20	18	18	18	4
5	19	18	20	20	21	21	20	21	23	25	27	29	31	33	31	33	33	30	29	28	29	27	25	23	5
6	22	23	24	22	27	25	26	26	26	26	26	27	28	28	28	26	24	23	22	20	20	17	19	12	6
7	15	16	10	7	7	9	7	7	10	14	15	16	20	21	22	21	21	17	17	15	13	11	10	9	7
8	10	8	9	11	10	11	12	13	14	15	15	16	18	20	20	19	19	18	17	17	18	19	19	20	8
9	20	22	21	20	20	19	20	20	21	23	24	26	26	27	27	28	27	25	25	24	24	24	24	22	9
10	22	23	21	22	21	20	18	17	18	21	22	23	25	28	29	26	25	23	23	21	17	17	17	17	10
11	19	18	22	20	22	24	25	24	26	27	27	31	30	31	30	30	28	28	27	27	26	24	24	24	11
12	25	24	24	22	21	21	21	19	23	25	26	29	30	30	30	29	28	29	30	30	30	31	31	31	12
13	32	32	32	32	33	32	33	34	36	37	37	37	37	38	40	39	38	38	39	42	40	41	40	39	13
14	40	36	35	38	38	34	34	33	33	33	35	36	36	35	35	33	32	30	29	26	27	27	28	30	14
15	30	29	29	27	27	25	27	27	29	28	29	31	31	30	31	31	31	30	27	27	27	27	28	27	15
16	26	25	25	25	25	28	25	25	25	24	24	27	29	30	30	29	28	29	29	31	32	32	32	32	16
17	33	34	35	35	35	35	35	35	38	39	40	41	41	43	43	42	42	41	40	40	39	41	41	35	17
18	35	32	33	27	31	32	30	29	30	31	33	40	43	43	45	44	42	40	40	40	42	40	40	40	18
19	40	39	38	35	34	32	30	34	34	39	39	40	43	43	42	40	38	35	35	37	35	32	32	30	19
20	29	26	29	28	29	27	30	29	26	29	32	35	38	36	37	36	35	32	31	32	31	32	32	29	20
21	28	28	28	25	26	25	24	24	24	29	29	31	33	34	35	34	34	36	35	34	33	31	32	31	21
22	29	28	31	30	30	28	30	29	29	33	33	36	39	41	42	40	38	37	35	35	33	30	30	30	22
23	27	27	27	28	27	28	27	28	29	33	34	40	40	40	39	36	36	36	35	35	34	33	33	33	23
24	33	33	35	33	34	34	35	36	35	36	40	42	43	46	44	45	42	41	39	37	37	36	34	33	24
25	33	35	33	36	35	34	36	36	37	38	41	44	45	44	43	40	41	39	39	41	40	40	40	40	25
26	40	40	40	38	39	42	44	45	43	43	42	44	45	47	44	42	42	43	42	42	41	41	40	41	26
27	38	39	39	37	43	39	43	40	38	43	44	48	49	49	50	49	48	44	44	43	42	41	39	36	27
28	35	34	36	33	40	38	43	38	39	41	42	44	43	47	44	47	49	46	43	42	39	37	35	34	28
29	34	33	33	33	31	32	31	30	28	30	31	32	32	34	32	28	26	26	26	24	22	19	17	14	29
30	13	10	10	10	8	7	7	7	8	8	10	11	14	14	17	12	10	9	8	8	7	7	7	6	30
31	6	6	8	11	13	14	15	15	16	20	22	26	28	29	29	26	23	22	21	22	22	22	22	23	31

MEAN TEMPERATURE AND TOTAL PRECIPITATION THIS MONTH IN

Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.	Year	Temp.	Precip.
1851			1876			1901			1925		
1852			1877			1902			1927		
1853			1878			1903			1928		
1854			1879			1904			1929		
1855			1880			1905			1930		
1856			1881			1906			1931		
1857			1882			1907			1932		
1858			1883			1908			1933		
1859			1884			1909			1934	31	0.28
1860			1885			1910			1935	32	0.71
1861			1886			1911			1936	28	0.26
1862			1887			1912			1937	27	0.59
1863			1888			1913			1938	31	0.07
1864			1889			1914			1939	38	0.12
1865			1890			1915			1940	33	0.06
1866			1891			1916			1941	28	1.13
1867			1892			1917			1942	30	0.12
1868			1893			1918			1943	32	0.07
1869			1894			1919			1944	27	1.17
1870			1895			1920			1945	24	0.66
1871			1896			1921			1946	29	0.93
1872			1897			1922			1947	26	0.81
1873			1898			1923			1948		
1874			1899			1924			1949		
1875			1900			1925			1950		

Note:—The warmest, coldest, driest, and wettest months are underscored.

MEV:m

STATION Billings, Montana MONTH December, 1947

HOURLY PRECIPITATION (Inches) FOR Municipal Airport

Date	A.M. 12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	P.M. 12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	Total	Date
1	T	T	T					T	T			T	T	T	T	.18	.08	.08	.08	.16	.02	.02	.02	.03	0.67	1
2	T	T						T	T	T	T														T	2
3																									0	3
4								T	T	T	T	T	T	T	T	T									T	4
5																									0	5
6			T	T	T	T	.02	.01	.01	.01	.02	T	T	T											.07	6
7																									0	7
8		T	T	T	T	T	T	T		T	T										T	T	T	T	T	8
9																							T	T	T	9
10		T	T																						T	10
11		T	T	T	T	T				T					T	T									T	11
12																									0	12
13																									0	13
14																									0	14
15			T									T	T						T	.04	.01	.01	T	T	.06	15
16	T																								T	16
17																									0	17
18																									0	18
19																									0	19
20																									0	20
21																									0	21
22																									0	22
23																									0	23
24																									0	24
25																									0	25
26																									0	26
27																									0	27
28																							T	T	T	28
29	T	T	T	T	.01	T														T	T				.01	29
30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T						T	30
31																									0	31

"T" indicates a trace, or amount too small to measure.

Monthly Total..... 0.81

MEV:m

Sheet 1

U. S. DEPARTMENT OF COMMERCE
WEATHER BUREAU

Annual Meteorological Summary for Billings, Montana, Year 1947

MONTH	TEMPERATURE °F								RELATIVE HUMIDITY (percent)			
	Mean Maximum	Mean Minimum	Mean Monthly	EXTREMES Highest	Date	Lowest	Date	Number of Degree Days (base 65)	5:30 a.m. MST	11:30 a.m. MST	5:30 p.m. MST	11:30 p.m. MST
Jan.	35.8	17.2	26.5	53	23	-12	31	1195	69	66	65	67
Feb.	35.5	13.1	24.3	60	5	-13	27	1140	78	70	64	73
Mar.	38.5	19.9	29.2	64	22	- 8	1	1112	87	76	72	85
Apr.	56.5	34.5	45.5	77	28	20	7	586	78	54	54	72
May	67.7	44.2	56.0	87	2	27	28	276	69	46	44	61
June	70.5	48.4	59.4	87	19	42	29	179	85	58	54	77
July	90.2	59.5	74.8	103	28	48	1	0	65	45	34	50
Aug.	86.8	56.7	71.8	100	8	47	11	14	69	46	39	55
Sept.	70.9	47.7	59.3	93	2	41	19	214	71	55	50	62
Oct.	64.8	41.0	52.9	82	19	27	25	379	77	64	57	70
Nov.	38.0	23.8	30.9	68	1	4	22	1025	79	73	70	75
Dec.	35.5	20.7	28.1	50	27	5	30	1146	72	70	68	74
Year	57.6	35.6	46.6	103	July 28	-13	Feb. 27	7266	75	60	56	68

MONTH	PRECIPITATION (inches)						SUNSHINE		WIND (corrected to true velocity)				
	Total	Greatest in 24 Hours	Date	Snowfall (unmelted) Total	Greatest in 24 hours	Date	Number of hours	Percent of possible	Average hourly Velocity	Prevailing Direction	Highest (#) Velocity	Direction	Date
Jan.	0.15	0.09	13	5.6	4.2	13	117	41	13.9	SW	43	NW	24
Feb.	0.66	0.47	23	14.2	8.5	23	164	57	11.3	SW	49	NW	5
Mar.	1.08	0.45	22-23	11.7	3.6	23	222	60	9.8	SW	34	NW	30
Apr.	1.24	0.39	3-4	3.9	2.7	3-4	285	70	12.2	SW	56	NW	30
May	1.09	0.85	10-11	0	0	-	283	61	10.6	SW	42	NW	21
June	3.84	1.58	9-10	0	0	-	266	57	9.2	SW	42	NW	26
July	0.27	0.13	24	0	0	-	384	81	9.1	SW	57	N	18
Aug.	1.04	0.39	10	0	0	-	334	76	9.9	SW	51	NW	12
Sept.	1.39	0.47	10	T	T	19	235	62	11.2	SW	45	NW	15
Oct.	0.52	0.18	21	0.4	0.4	22	226	67	10.6	SW	43	NW	3
Nov.	0.63	0.30	8	9.3	4.0	8	105	37	11.3	SW	32	NW	7
Dec.	0.81	0.67	1	8.3	4.5	1-2	120	44	12.3	SW	42	NW	14
Year	12.72	1.58	June 9-10	53.4	8.5	Feb. 23	2741	61	10.9	SW	57	N	July 18

Latitude: 45° 48' Longitude: 108° 32' Station Elevation: 3570 ft.

(#)for 5-minute period.

Sheet 2

U. S. DEPARTMENT OF COMMERCE
WEATHER BUREAU

Annual Meteorological Summary for Billings, Montana, Year 1947.—Contd.

MONTH	Average cloudiness (Scale 0-10)	NUMBER OF DAYS: Winds, 32 m.p.h. and over	Clear	Partly Cloudy	Cloudy	Precipitation, 0.01 inch or or more	Snow, 0.01 inch or more (Melted)	Thunderstorms	# Fog, dense	# Fog, light	TEMPERATURE Maximum: 32° or below	Maximum: 90° or above	Minimum: 32° or below	Minimum: 0° or below
Jan.	7.5	3	2	11	18	3	4	0	0	2	12	0	25	6
Feb.	6.6	6	8	5	15	6	6	0	0	2	13	0	25	8
Mar.	7.6	1	2	8	21	12	8	0	7	8	9	0	26	5
Apr.	7.5	7	2	9	19	13	3	2	2	6	1	0	12	0
May	6.8	3	2	18	11	7	0	3	2	2	0	0	1	0
June	7.0	6	4	12	14	14	0	8	1	3	0	0	0	0
July	4.0	6	14	13	4	4	0	7	0	0	0	17	0	0
Aug.	4.0	12	16	12	3	8	0	10	0	0	0	13	0	0
Sept.	6.0	4	6	12	12	9	0	0	4	4	0	2	0	0
Oct.	6.2	3	7	13	11	7	1	0	2	2	0	0	4	0
Nov.	7.4	1	3	8	19	11	12	0	3	8	11	0	25	0
Dec.	6.6	1	7	8	16	4	5	0	6	8	14	0	29	0
Year	6.4	53	73	129	163	98	39	30	27	45	60	32	147	19

not including ground fog.

Comparative Data and Extremes, Billings, Montana (Municipal Airport)

(Averages from all available records, including the year 1947)

MONTH	TEMPERATURE: Mean Maximum	Mean Minimum	Mean Monthly	EXTREMES: Highest	Date	Lowest	Date	Number of Degree Days (base 65)	RELATIVE HUMIDITY (percent): 5:30 a.m.	11:30 a.m.	5:30 p.m.	11:30 p.m.
Length of Record Yrs.	13	13	13	13	-	13	-	Normal	9	9	9	9
Jan.	34.0	14.9	24.4	61	1944	-30	1937	1310	71	65	62	70
Feb.	34.9	14.7	24.8	64	1935	-38	1936	1102	77	69	64	75
Mar.	45.1	24.3	34.7	75	1943	-16	1945	923	76	62	55	71
Apr.	58.6	34.6	46.6	92	1939	- 5	1936	555	73	51	45	65
May	68.6	43.9	56.3	96	1936	26	1943	315	74	47	42	63
June	75.0	50.8	62.9	102	1936	32	1943	106	80	54	49	71
July	88.5	59.4	73.9	106	1937	47	1945	14	67	42	33	53
Aug.	85.3	56.4	70.9	104	1940	40	1939	31	63	41	33	49
Sept.	74.0	47.7	60.9	98	1940	29	1941	223	69	51	43	59
Oct.	62.3	38.8	50.5	86	1943	4	1935	530	71	54	48	62
Nov.	44.5	25.9	35.2	69	1939	- 7	1946	889	73	64	61	69
Dec.	38.8	20.7	29.8	69	1939	-17	1944	1215	73	65	63	71
Year	59.1	36.0	47.6	106	July 1937	-38	Feb. 1936	7213	72	55	50	65

Sheet 3

U. S. DEPARTMENT OF COMMERCE
WEATHER BUREAU

Comparative Data and Extremes, Billings, Montana, —Contd.

(Average from all available records, including the year 1947.)

MONTH	PRECIPITATION (inches) Total	Greatest in 24 hours	Date	Snowfall (unmelted) Total	Greatest in 24 hours	Date	SUNSHINE Number of hours	Percent of possible	WIND (corrected to true velocity) Average hourly velocity	Prevailing Direction	Highest Velocity	Direction	Date
Length of Record Yrs.	13	13	-	13	9	-	8	8	8	8	8	8	-
Jan.	0.38	0.60	1943	5.7	5.1	1943	137	48	13.1	SW	50	NW	1945
Feb.	0.52	0.47	1947	9.6	9.0	1944	145	50	11.8	SW	49	NW	1947
Mar.	0.99	0.97	1946	9.3	8.0	1946	182	49	11.8	SW	54	NW	1942
Apr.	1.00	1.42	1941	4.5	16.6	1941	230	56	11.4	SW	56	NW	1947
May	1.85	1.73	1942	0.4	5.5	1943	282	61	10.7	SW	49	N	1941
June	3.42	2.78	1937	T	T	1943	294	62	10.5	SW	49	W	1942
July	0.89	0.70	1935	0.0	0.0	-	372	78	9.5	SW	61	NW	1940
Aug.	0.78	0.64	1944	0.0	0.0	-	325	74	9.8	SW	51	NW	1947
Sept.	1.46	1.81	1941	0.5	6.0	1941	233	62	10.3	SW	47	NW	1946
Oct.	1.12	1.98	1937	1.4	5.0	1946	212	63	10.9	SW	50	NW	1942
Nov.	0.67	0.64	1938	6.7	4.5	1942	123	43	11.4	SW	49	NW	1942
Dec.	0.52	0.67	1947	6.8	6.3	1946	121	45	12.3	SW	52	NW	1940
Year	13.60	2.78	June 1937	44.9	16.6	1941 April	2656	58	11.1	SW	61	NW	1940 July

MONTH	Average cloudiness (Scale 0-10)	NUMBER OF DAYS Winds, 32 m.p.h. or over	Clear	Partly cloudy	Cloudy	Precipitation 0.01 inch or more	Snow, 0.01 inch or more (Melted)	Thunderstorms	# Fog, dense	# Fog, light	Temperature Maximum 32° or below	Maximum 90° or above	Minimum 32° or below	Minimum 0° or below
Length of Record Yrs.	8	8	8	8	8	13	13	8	4	4	13	13	13	13
Jan.	6.8	3	5	11	15	6	6	0	1	2	11	0	29	6
Feb.	6.8	3	4	9	15	7	7	0	2	4	11	0	26	5
Mar.	7.3	4	4	9	18	8	6	*	4	6	5	0	24	2
Apr.	7.2	5	3	9	18	9	3	1	2	3	1	*	10	*
May	6.6	5	4	14	13	9	1	5	1	2	0	1	2	0
June	6.4	6	5	12	13	12	0	8	2	4	0	3	0	0
July	4.4	6	13	14	4	7	0	10	0	0	0	14	0	0
Aug.	4.2	6	14	11	6	6	0	6	*	*	0	11	0	0
Sept.	5.6	4	9	11	10	7	*	2	2	3	0	2	1	0
Oct.	5.6	3	9	11	11	6	2	*	3	4	*	0	7	0
Nov.	6.8	3	5	9	16	6	6	0	4	8	5	0	22	1
Dec.	6.7	2	6	9	16	6	5	0	2	5	8	0	26	2
Year	6.2	50	81	129	155	89	36	32	23	41	41	31	147	16

* less than 1 day. # not including ground fog.

MONTHLY AND ANNUAL MEAN TEMPERATURES - Billings, Montana (Municipal Airport)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1935	24.0	36.1	33.1	41.7	52.3	64.2	75.7	71.6	63.4	48.3	32.7	32.3	48.0
1936	24.1	2.6	36.0	45.0	64.6	70.2	81.0	72.6	62.0	50.6	37.3	28.2	47.8
1937	6.0	21.2	34.6	47.4	60.4	64.5	76.0	73.8	64.3	52.1	35.8	26.7	46.9
1938	31.6	24.8	37.4	47.7	54.1	66.6	71.8	71.0	67.2	51.6	33.6	31.0	49.0
1939	33.1	18.2	36.4	48.0	58.9	59.6	73.6	69.4	60.4	49.2	42.6	37.6	48.9
1940	14.3	26.8	38.8	42.4	59.9	66.6	74.6	73.2	66.2	53.2	29.0	32.6	48.1
1941	29.8	30.0	35.4	45.2	59.3	64.5	72.9	70.8	54.0	46.0	39.8	28.3	48.0
1942	25.8	22.2	35.7	48.8	51.7	60.4	72.2	68.4	58.8	50.8	34.9	30.2	46.7
1943	13.6	32.6	25.4	51.8	51.2	60.4	72.4	71.3	60.2	53.2	39.6	32.0	47.0
1944	30.8	25.4	29.2	48.6	59.2	59.3	69.4	67.8	59.3	54.2	35.2	26.8	47.1
1945	27.3	26.7	37.6	41.2	51.8	58.1	72.7	70.9	57.1	51.9	34.8	23.6	46.1
1946	30.8	31.2	42.0	52.8	52.2	63.5	73.7	68.8	58.9	42.6	31.8	29.4	48.1
1947	26.5	24.3	29.2	45.5	56.0	59.4	74.8	71.8	59.3	52.9	30.9	28.1	46.6
Average	24.4	24.8	34.7	46.6	56.3	62.9	73.9	70.9	60.9	50.5	35.2	29.8	47.6

MONTHLY PRECIPITATION (Municipal Airport)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1935	0.16	0.23	1.73	0.97	2.78	0.80	1.90	0.47	0.29	0.59	0.51	0.71	11.14
1936	0.40	1.04	0.13	0.78	1.07	1.80	0.96	0.47	1.32	0.41	0.56	0.26	9.20
1937	0.40	0.56	0.76	0.72	0.53	4.93	0.67	0.18	1.83	2.45	0.75	0.59	14.37
1938	0.06	0.20	1.95	0.50	4.09	5.23	2.07	1.07	0.56	1.74	1.15	0.07	18.69
1939	0.39	0.35	0.91	0.83	1.75	5.31	0.11	0.76	0.22	0.92	0.05	0.12	11.72
1940	0.68	0.74	0.60	3.16	0.84	2.49	0.53	0.13	1.09	2.47	0.71	0.06	13.50
1941	0.04	0.20	0.63	2.00	2.00	3.09	1.17	1.11	4.99	1.24	1.20	1.13	18.80
1942	0.40	0.75	0.98	1.28	4.93	2.30	0.56	1.07	1.66	1.20	1.09	0.12	16.34
1943	1.54	0.99	1.80	0.49	1.24	3.28	0.48	0.68	0.55	0.29	0.51	0.07	11.92
1944	0.31	0.57	0.33	0.10	0.73	7.64	1.29	0.97	2.01	0.03	0.29	1.17	15.44
1945	0.26	0.32	0.65	0.64	1.86	2.21	0.68	1.18	1.33	0.50	0.57	0.66	10.86
1946	0.14	0.19	1.35	0.28	1.09	1.49	0.91	0.95	1.68	2.14	0.65	0.93	11.80
1947	0.15	0.66	1.08	1.24	1.09	3.84	0.27	1.04	1.39	0.52	0.63	0.81	12.72
Average	0.38	0.52	0.99	1.00	1.85	3.42	0.89	0.78	1.46	1.12	0.67	0.52	13.60

FROST DATA (1894 to 1947, inclusive)
(Observations made at Cooperative Station, City of Billings, Montana)

SPRING

1947, date of last killing frost. . . . . May 28
Average date of last killing frost. . . . . May 15
Latest date of last killing frost . . . . . June 23, 1903

FALL

1947, date of first killing frost . . . . . Oct. 25
Average date of first killing frost . . . . . Sept. 24
Earliest date of first killing frost. . . . . August 25, 1910

GROWING SEASON

1947, length of . . . . . 150 days
Average length of . . . . . 132 "
Longest . . . . . in 1937 168 "
Shortest. . . . . in 1903 66 "