ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT

REMOTE SENSING REPORT
SAN FRANCISCO BAY AREA

VOLUME 1

APRIL-JULY 1972

NATIONAL FIELD INVESTIGATIONS CENTER-DENVER
DENVER, COLORADO
AND
REGION IX, SAN FRANCISCO, CALIFORNIA

APRIL 1973

ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF ENFORCEMENT

REMOTE SENSING REPORT

SAN FRANCISCO BAY AREA

APRIL - JULY, 1972

National Field Investigations Center - Denver

April 1972

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REMOTE SENSING REPORT

SAN FRANCISCO BAY AREA

APRIL - JULY 1972

I. INTRODUCTION

An aerial remote sensing program, requested by Region IX, was carried out in the San Francisco Bay Area in April and July 1972. The general area is shown in Figure 1. During the planning phase of the mission the Bay area was divided into four sections and labeled A, B, C and D, as outlined in Figure 1.

II. MISSION PURPOSE

The purpose of this aerial reconnaissance program was to fulfill the following objectives:

a) Provide location and description of industrial discharges during day and night-time periods. This effort was designed to provide information for the waste source survey performed by NFIC-Denver.

b) Document the presence of and dispersion patterns for the Bay area municipal sewage treatment plant (STP) discharges during day and night-time periods.

c) Document the flow patterns of Bay waters in the following areas:

   (1) Carquinez Bridge near the mouth of the Carquinez Strait.

   (2) Bay Bridge between San Francisco and Oakland.

   (3) Golden Gate Strait.

FIGURE I

LOCATION MAP

SAN FRANCISCO BAY

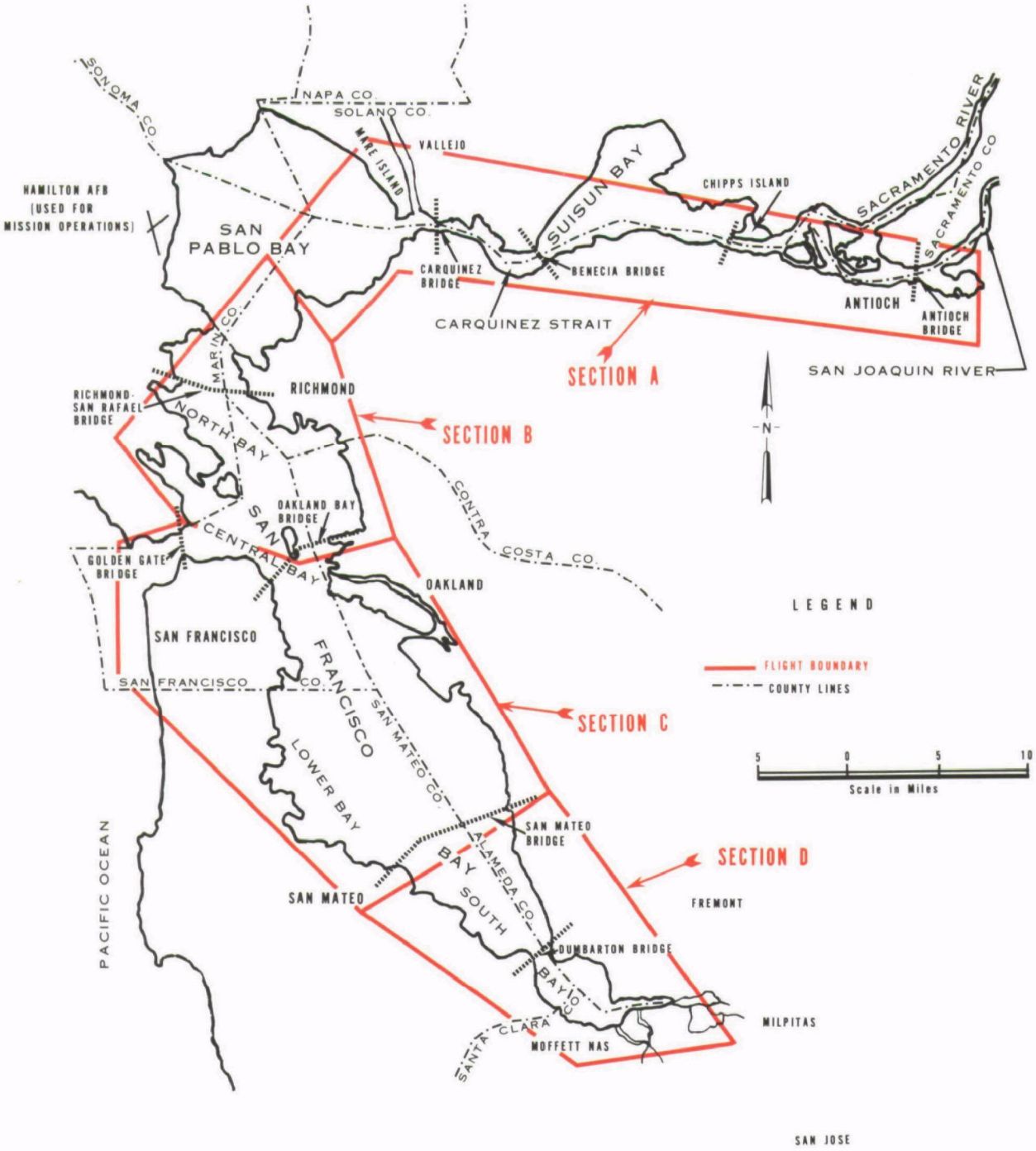


Figure 1. Location Map San Francisco Bay Area

III. BACKGROUND INFORMATION

The San Francisco Bay Area is the receiving water for approximately 250 discrete sources of municipal and industrial waste discharges. Approximately 150 of the waste sources are located in close proximity to San Francisco, San Pablo, and Suisun Bays. The total volume of wastewater discharged by these 150 sources averaged 3.1 million cubic meters per day [mcmd] (820 million gallons per day [mgd]) in 1971. Municipal sources contribute nearly 58 percent [1.854 mcmd] (490 mgd) of the total wastewater volume.

The major sources of industrial wastes are oil refineries, petrochemical and chemical manufacturing plants, pulp/paper mills, and food processing plants. These industries are located primarily along the southern shore of Suisun and San Pablo Bays between the cities of Antioch and Richmond, California.

There are 52 municipal sources that discharge an average of more than 0.5 mgd of wastewater each. The three largest are:

a) City of San Jose - 314 thousand cubic meters per day [kcmd] (83 mgd).

b) East Bay M.U.D. - 299 kcmd (79 mgd).

c) City of San Francisco - 242 kcmd (64 mgd) (North Point Plant).

These three sources comprise approximately 28 percent of the total wastewater volume.

Federal installations discharge nearly 83.3 kcmd (22 mgd) of domestic and industrial wastes into the Bay area.

IV. PHYSICAL DESCRIPTION OF THE BAY AREA

San Francisco Bay is a distinctive geographical feature in the Northern California area; unusual hills, striking in appearance, lie

on the outer periphery of the Bay area. It covers approximately 1,127 square kilometers (435 square miles). San Francisco Bay ranges from 4.8 to 19.3 kilometers (3 to 12 miles) in width and is about 80 kilometers (50 miles) in length.

Westernmost of the numerous large metropolitan areas in the City of San Francisco, situated on a land mass immediately south of the strait, Golden Gate, that is the Bay connection with the Pacific Ocean. The cities of Richmond, Oakland, and Berkeley are east of San Francisco across the Bay from Golden Gate. To the northewast are Martinez, Vallejo, Pittsburg, and Antioch. South of the San Francisco area lie the cities of San Mateo, Burlingame, Redwood City, San Jose, Hayward, San Leandro, and Palo Alto. North of the area are Rodeo, San Rafael, Walnut Creek, Napa, Petaluma, and Antioch.

The periphery of the Bay is characterized by flatlands and tidal marshland. Approximately 80 percent of this marshland has been "reclaimed," chiefly for agricultural use and salt ponds. A great amount of these lands, or shoreline, has a flat slope. As a result, the area between mean high and low water is relatively large which totals 166 square kilometers (64 square miles). Another result of the effect of this flat-slope topography is the shallow depth of the Bay. Average depths are about 6.1 meters (20 feet). Immediately east of the Golden Gate, which is only two miles wide, the average depth of the Bay increases to 13.1 meters (43 feet), with a maximum depth of 40 meters (130 feet). The Carquinez Strait maintains a maximum depth of 27.5 meters (90 feet).

V. AIRCRAFT SENSOR CONFIGURATION/DATA

Four high performance aircraft were used to carry out each of the two remote sensing missions. The sensors, carried on-board each of these aircraft, were three cameras and an infrared line scanner OIRLS). The cameras on each aircraft were KS-87B Aerial Framing Cameras equipped with 152 mm (6 inch) focal length lens assemblies. They were mounted in the aircraft in their respective vertical positions as shown in Figure 2.

The framing cameras were up loaded with different film and optical filter combinations as follows:

a) Camera Station 1. Kodak SØ-397 Aerographic Ektachrome Film with a Wratten HF-3/HF-5 gelatin optical filter combination. This film is 127 mm (5 inches) wide providing a true color transparency measuring approximately 114 mm x 114 mm (4.5"x4.5"). The filter combination prohibits ultra-violet light from reaching the film eliminating the effects of atmospheric haze.

b) Camera Station 2. Kodak 2403 Tri-X Aerographic Film (127 mm wide) with a Wratten 47A gelatin optical filter. This film filter combination provides a black-white negative having been exposed to near ultraviolet and deep blue optical energy. This sensor was primarily used for the detection of oil slicks.

c) Camera Station 3. Kodak 2443 Aerochrome Infrared Film with a Wratten 16 gelatin optical filter. This film is also 127 mm wide (5 inches) resulting in color transparencies measuring approximately 114 mm x 114 mm.

LEGEND

1 KS-87 FRAMING CAMERAS

2 INFRARED LINE SCANNER

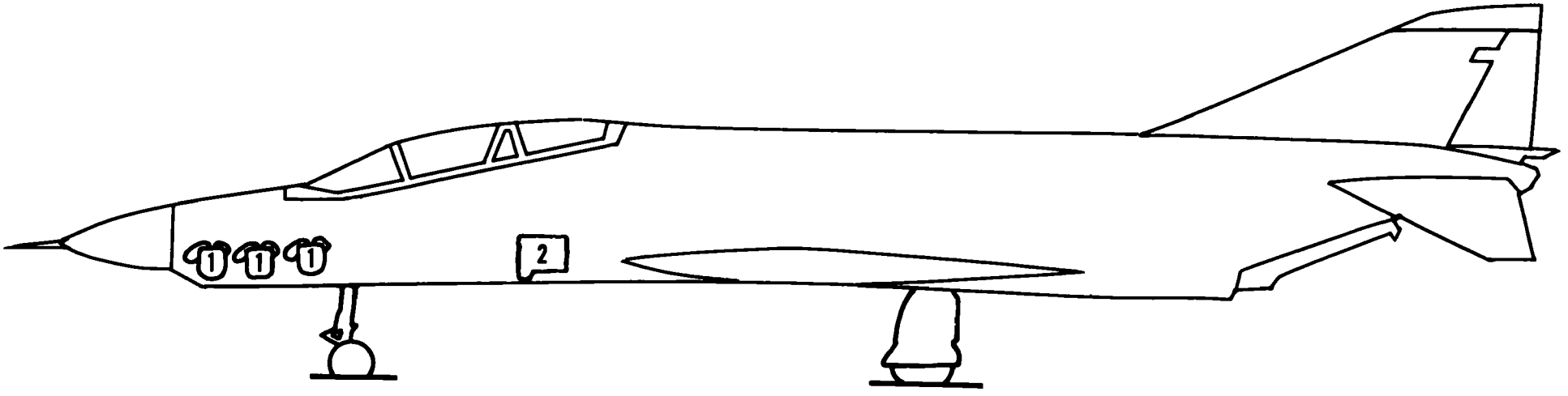


Figure 2. Aircraft Sensor Locations

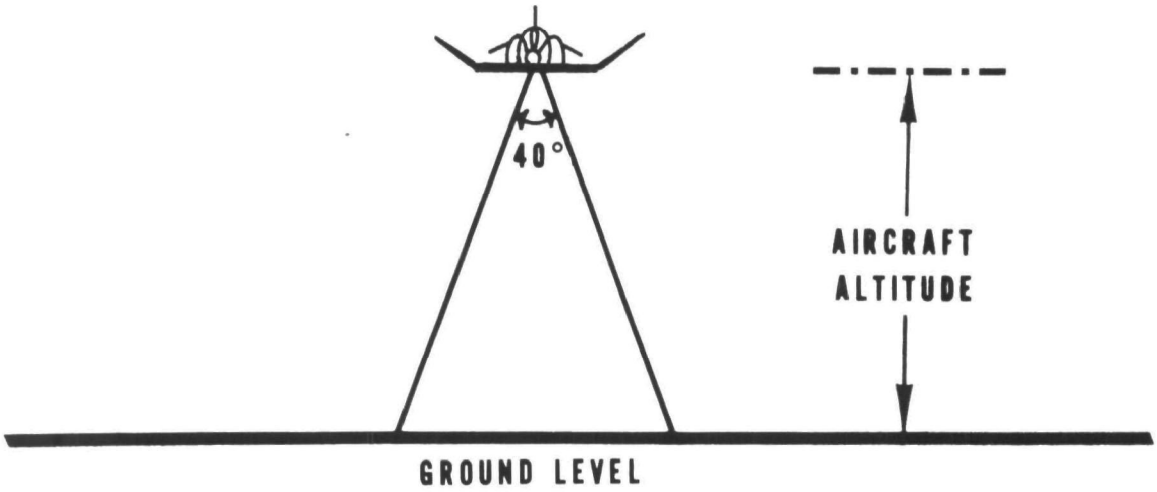
The Wratten 16 filter (deep orange in color) transmits a portion of the visible optical spectrum, i.e., deep green, yellow, orange, red, along with the near infrared energy from 7.0 to 1.0 microns. This film presents a modified color or false color rendition in the processed transparency unlike the more familiar true-color films. It has an emulsion layer that is sensitive to the near infrared in addition to the red and green layers, whereas the true-color ektachrome films have red, green, and blue sensitive layers. (Every color in the visible optical spectrum is formed in the true color film by various combinations of red, green and blue dyes similar to the red, green and blue dots on the front of a color television picture tube.) The modified or false color rendition comes into play when the exposed image on the infrared film is processed.

In the finished transparency, the scene objects (trees, plants) producing infrared exposure, appear red in color, while red and green objects produce green and blue images, respectively. The most important asset of this film is its capability of recording the presence of various levels of chlorophyll in plant growth. The leaves on a healthy tree will record as a bright red image rather than the usual green. Degraded foliage will approach a brownish red color. The orange filter is used to keep all blue light from reaching the film which would cause an unbalance in the normal red, green, blue color balance.

The spectral sensitivity data for each film and the optical filter transmittance curves are shown in Appendix A.

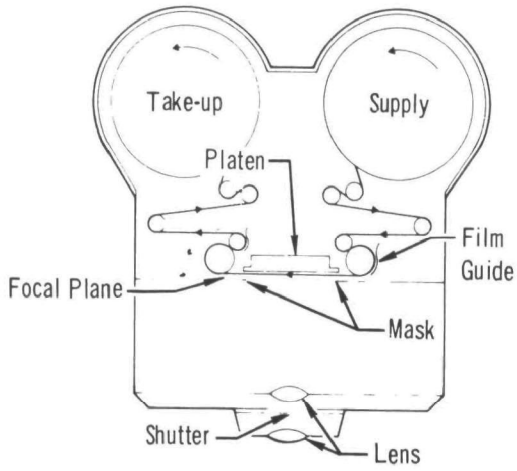
Information regarding the development process for each type of film is provided in Appendix B.

The viewing angle of the KS-87 B framing cameras was 41° centered about the aircraft's nadir as shown below:



Viewing Angle of a Framing Camera Configured with a 6-inch Focal Length.

A diagram of a typical framing camera is provided below:

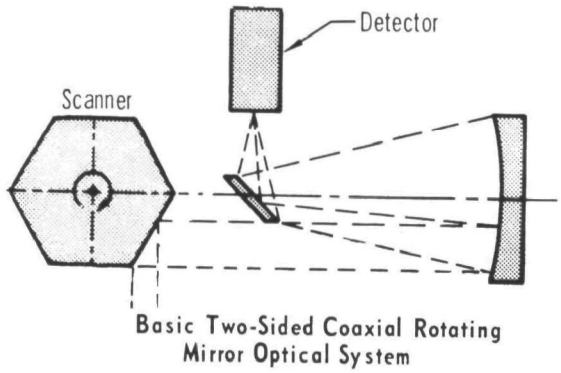


Film Advances Frame by Frame

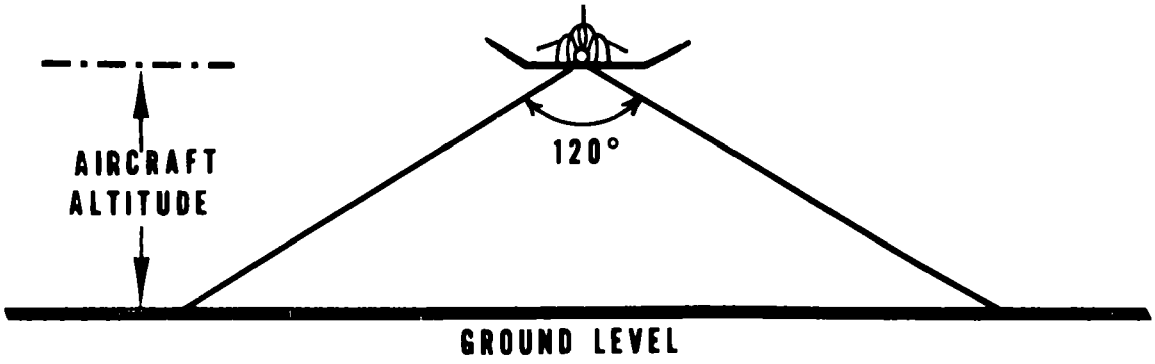
Framing Camera

An infrared line scanner (IRLS), which records a thermal map of an imaged area, completed the array of airborne sensors used on this mission. The IRLS uses an infrared detector in an electroptic system to record on film the amount of infrared energy detected in the imaged area. The effective focal length of the IRLS is 1.15 inches and the field of view is 120° perpendicular to the line of flight.

The three basic units in an infrared reconnaissance set are scanner optics, a detector, and a recording unit. The scanner collects the infrared emissions from the ground and reflects them to a parabolic mirror. The parabolic mirror focuses the infrared emissions onto the detector. The detector converts the infrared energy collected by the scanner into an electrical signal. In the recording unit the electrical signal is converted to visible light through a cathode ray tube which is then recorded on ordinary black and white film. The diagrams below depict the optical collection system and the lateral field of view of the IRLS, respectively.



IRLS Optical Collection System



Field-of-View of the IRLS

Appendix C contains information pertinent to aerial sensors in respect to focal length, angle of view, and the effects of focal length and altitude on scale and ground coverage.

VI. FLIGHT PARAMETER DATA

The flight parameter data specifies the particular values of the following aerial reconnaissance variables:

a) date of flight(s)

b) time of flight

c) direction-of-flight of each aircraft (target area)

d) air speed of flight (knots)

e) aircraft altitude above ground level (AGL)

f) sensors to be used.

The values of these parameters are given in Table VI-1.

TABLE VI-1

FLIGHT PARAMETER DATA

Date of Flight		April 1972 26	April 1972 27	July 1972 25	July 1972 26	July 1972 27
Time of Flight		1000-1200 1400-1600	1000-1200	1330-1600	0330-0430 1330-1500	0130-0230 1400-1530
Air Speed		350± 25 knots			350± 25 knots	
Altitude AGL (Feet)	Day	3000'±50' 8000' 18000'	3000'±50' 8000'	3000'±50' 7500'	3000'±50'	3000"±50'
	Night	--	--	1500'	--	1500'
Target Area*	Day	A,B,C,D	A,B,C,D	A,B,C,D	Parts of A,B,C,D	16 targets
	Night	--	--	--	16 targets	16 targets
Sensors	Day	All	All	All	All	All
	Night	--	--	IRLS	--	IRLS

*Sections A,B,C,D are shown in Figure 1. The 16 targets will be defined in another Section of this report.

The airspeed and low altitude flight restrictions were imposed by the FAA Oakland Bay TRACON Center because of the heavy commercial and general aviation traffic in the Bay area. The jet aircraft approach and departure patterns for the airports in this area, are shown in Figure 3.

FREQ 351.8

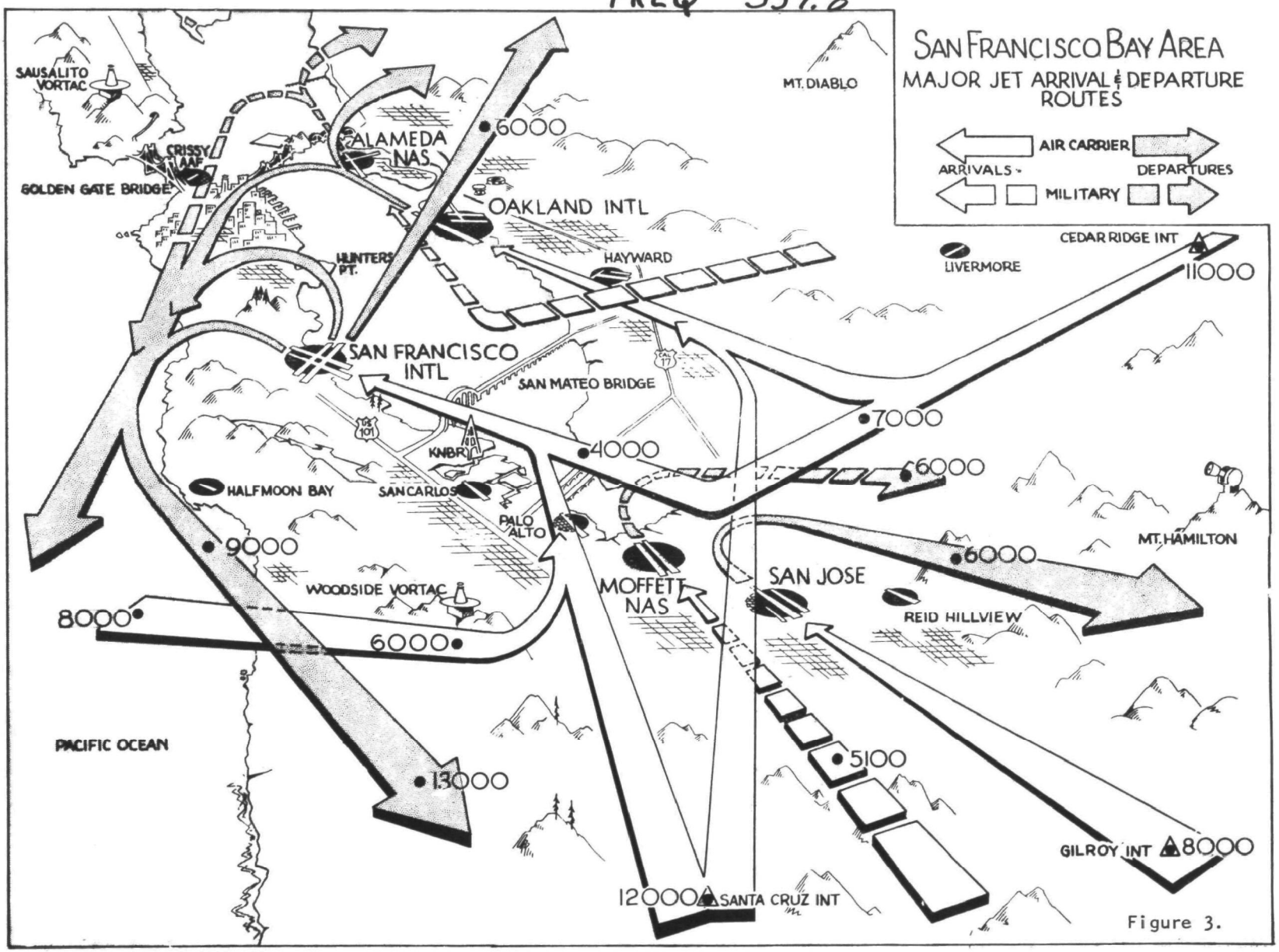


Figure 3.

VII. WEATHER INFORMATION[1]

Complete weather information for April 1972 and July 1972 is provided for the following locations in the Bay area:

a) San Francisco International Airport

b) San Francisco Federal Building

c) Oakland International Airport

d) San Jose.

These data, included as the next fourteen pages, gives temperature, wind speed and direction and precipitation values for each 24-hour period. For locations a) through c), weather information for 3-hour intervals is provided.

LOCAL CLIMATOLOGICAL DATA

U S DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ENVIRONMENTAL DATA SERVICE

SAN FRANCISCO, CALIFORNIA
INTERNATIONAL AIRPORT
APRIL 1972

Latitude 37° 37 N Longitude 122 23' W Elevation (ground) 8 ft Standard time used PACIFIC WBAN #23234

Date	Temperature °F: Maximum	Minimum	Average	Departure from normal	Average dew point	Degree days Base 65°: Heating	Cooling	Weather types on dates of occurrence (1 Fog, 2 Heavy fog x, 3 Thunderstorm, 4 Ice pellets, 5 Hail, 6 Glaze, 7 Duststorm, 8 Smoke Haze, 9 Blowing snow)	Snow ice pellets or ice on ground at 04AM In	Precipitation: Water equivalent In	Snow ice pellets In	Avg station pressure In Elev 18 feet msl	Wind: Resultant direction	Resultant speed m p h	Average speed m p h	Fastest mile: Speed m p h	Direction	Sunshine: Hours and tenths	Percent of possible	Sky cover Tenths: Sunrise to sunset	Midnight to midnight	Date
1	2	3	4	5	6	7A	7B	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	65	51	58	3	46	7	0		0	T	0	30.11	30	9.0	9.8	17	29			7	7	1
2	66	49	58	3	52	7	0	1	0	0	0	30.06	29	5.4	9.8	21	30			7	7	2
3	66	48	57	2	51	8	0	1	0	0	0	29.98	31	7.5	9.2	17	30			9	9	3
4	67	54	61	6	51	4	0		0	T	0	29.94	17	5.3	9.5	21	17			10	10	4
5	63	54	59	4	52	6	0	1	0	.19	0	29.87	17	12.5	13.4	29	18			10	10	5
6	63	48	56	1	49	9	0	1	0	.05	0	30.11	26	7.2	8.6	17	28			6	5	6
7	63	44	54	-1	44	11	0		0	0	0	30.18	28	9.9	11.4	21	28			9	6	7
8	62	47	55	0	45	10	0		0	0	0	30.18	30	8.6	10.6	22	28			9	8	8
9	58	47	53	-3	40	12	0		0	0	0	30.07	29	15.5	15.5	21	28			10	9	9
10	60	48	54	-2	41	11	0		0	0	0	30.00	28	7.4	8.5	14	29			8	8	10
11	59	47	53	-3	46	12	0	1	0	.52	0	29.93	20	7.1	12.2	23	21			9	8	11
12	57	46	52	-4	46	13	0	1	0	.26	0	30.01	23	8.3	14.8	23	18			10	8	12
13	58	39*	49*	-7	37	16	0		0	0	0	30.09	30	10.5	11.9	22	28			0	0	13
14	66	41	54	-2	40	11	0		0	0	0	30.06	30	7.6	9.1	20	28			0	0	14
15	69	45	57	1	47	8	0		0	0	0	30.05	31	9.0	10.1	20	29			6	4	15
16	58	47	53	-3	44	12	0		0	0	0	30.07	27	14.2	14.7	28	28			7	4	16
17	61	45	53	-3	39	12	0		0	0	0	30.01	28	13.4	13.5	30	28			5	3	17
18	63	43	53	-3	30	12	0		0	0	0	29.97	30	13.4	14.4	24	28			0	0	18
19	66	47	57	0	31	8	0		0	0	0	30.08	32	11.8	14.1	22	29			0	0	19
20	60	41	51	-6	43	14	0		0	0	0	30.22	28	11.0	12.1	20	25			1	3	20
21	64	49	57	0	45	8	0		0	0	0	30.21	27	12.4	13.4	21	27			2	3	21
22	67	43	55	-2	45	10	0		0	0	0	30.05	28	10.6	12.1	20	28			8	5	22
23	64	44	54	-3	42	11	0	1	0	.05	0	30.04	23	6.5	9.4	21	20			4	6	23
24	61	49	55	-2	46	10	0		0	.13	0	30.13	28	12.2	13.7	22	28			2	3	24
25	63	47	55	-2	42	10	0		0	0	0	30.14	28	10.0	11.2	22	29			4	3	25
26	78	46	62	5	40	3	0		0	0	0	29.97	28	4.0	5.9	18	29			0	0	26
27	79*	51	65*	8	45	0	0		0	0	0	29.97	28	9.1	10.9	28	27			2	1	27
28	59	47	53	-4	40	12	0		0	0	0	30.12	28	21.8	22.0	32	29			0	1	28
29	64	47	56	-1	35	9	0		0	0	0	30.12	29	11.0	12.1	22	28			1	1	29
30	73	44	59	2	39	6	0		0	0	0	30.07	30	8.0	9.2	20	29			0	0	30
	Sum	Sum				Total	Total			Total	Total	For the month						Total	%	Sum	Sum	
	1922	1398				282	0	Number of days		1.20	0	30.06	28	8.5	11.8	32	29		for	146	132	
	Avg	Avg	Avg	Dep	Avg	Dep	Dep	Precipitation ≥ .01 inch	6	Dep						Date	28		Possible	month	Avg	Avg	
	64.1	46.6	55.4	-0.3	43	3				-0.10										4.9	4.4	

Number of days: Maximum Temp ≥ 90°‡	≤ 32°	Minimum Temp ≤ 32°	≤ 0°	Season to date: Total Dep	Total Dep	Snow, ice pellets ≥ 1.0 inch	0
0	0	0	0	244		Thunderstorms	0
						Heavy fog X	0
						Clear 12 Partly cloudy 8 Cloudy 10	

Greatest in 24 hours and dates: Precipitation	Snow ice pellets	Greatest depth on ground of snow ice pellets or ice and date
.52 11	0	0

HOURLY PRECIPITATION (Water equivalent in inches)

Date	A M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	P M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	Date
1	T	T	T																						1
2																									2
3																									3
4															T										4
5						T									T					T			T		5
6	.02	.01	T	T	.01	.01		.03	.03	.01	T	.04	.02	T	T							T	T	.06	6
7																									7
8																									8
9																									9
10																									10
11	T	.03	.07	.06	T	.01	.01	T	.26	T	.02			T	.01		T	T	.05	T					11
12						T	T	.02	.04	.02	.01	T		.01	.14	T	T	.01	T	T	.01				12
13																									13
14																									14
15																									15
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20																									20
21																									21
22																									22
23																									23
24	.01	.05	.03	.04																		T	.04	.01	24
25																									25
26																									26
27																									27
28																									28
29																									29
30																									30

* Extreme temperatures for the month May be the last of more than one occurrence
– Below zero temperature or negative departure from normal
‡ ≤ 70° at Alaskan stations
← Also on an earlier date or dates
\ Heavy fog restricts visibility to ¼ mile or less
T In the Hourly Precipitation table and in columns 9 10 and 11 indicates an amount too small to measure

The season for degree days begins with July for heating and with January for cooling
Data in columns 6 12 13 14 and 15 are based on 8 observations per day at 3-hour intervals
Wind directions are those from which the wind blows Resultant wind is the vector sum of wind directions and speeds divided by the number of observations Figures for directions are tens of degrees from true North i e 09 = East 18 = South 27 = West 36 = North and 00 = Calm When directions are in tens of degrees in Col 17 entries in Col 16 are fastest observed 1 minute speeds If the / appears in Col 17 speeds are gusts
Any errors detected will be corrected and changes in summary data will be annotated in the annual summary

Subscription Price Local Climatological Data $1.00 per year including annual summary if published Single copy 10 cents for monthly summary, 15 cents for annual summary. Checks or money orders should be made payable and remittances and correspondence should be sent to the Superintendent of Documents, U. S. Government Printing Office, Washington, D C. 20402.

I certify that this is an official publication of the National Oceanic and Atmospheric Administration, and is compiled from records on file at the National Climatic Center, Asheville, North Carolina 28801.

William H. Haggard
Director, National Climatic Center

SUMMARY BY HOURS

Hour Local time	AVERAGES: Sky cover tenths	Station pressure In	Temperature: Air °F	Wet bulb °F	Dew Pt °F	Relative humidity %	Wind speed m p h	Resultant wind: Direction	Speed m p h
01	4	30.06	50	47	44	79	8.6	27	5.9
04	4	30.05	49	46	43	80	7.5	27	4.3
07	5	30.07	51	47	42	74	7.1	29	3.7
10	5	30.09	58	51	42	59	10.6	32	4.4
13	6	30.07	62	52	42	51	14.8	28	12.1
16	4	30.04	59	51	43	57	18.0	28	15.8
19	5	30.04	53	49	44	71	15.6	28	14.3
22	4	30.06	52	48	44	75	11.9	28	9.5

OBSERVATIONS AT 3-HOUR INTERVALS

HOUR	SKY COVER Tenths	CEILING Hnds. of ft	VISIBILITY WHOLE MILES	VISIBILITY Tens UNIT	WEATHER	TEMPERATURE AIR °F	TEMPERATURE WET BULB °F	TEMPERATURE DEW PT. °F	REL HUM %	WIND DIR	WIND SPEED Knots
DAY 01											
01	10	100	12		R	51	49	47	86	32	4
04	10	100	12			51	49	47	86	18	3
07	10	100	10			52	49	47	83	30	9
10	10	130	12			56	49	43	62	29	10
13	9	130	20			62	52	43	50	32	10
16	8	130	30			61	53	45	56	29	14
19	1	UNL	15			54	50	47	77	30	9
22	7	7	15			53	52	51	93	29	9
DAY 02											
01	10	7	12			53	52	51	93	21	8
04	10	7	12			53	51	50	90	21	4
07	10	7	6		F	53	52	51	93	17	5
10	10	7	8			56	54	53	90	08	6
13	8	UNL	12			63	57	53	70	08	4
16	1	UNL	20			59	56	53	81	28	17
19	1	UNL	7			53	52	51	93	29	14
22	8	UNL	7			52	51	50	93	30	10
DAY 03											
01	10	4	7			50	49	49	96	30	6
04	10	6	10			52	51	50	93	26	4
07	10	250	7			49	48	48	96	30	6
10	3	UNL	7			57	54	51	80	08	6
13	10	250	12			65	58	52	63	31	14
16	10	250	30			58	54	50	75	31	14
19	10	250	15			56	54	52	87	32	6
22	10	150	15			55	53	52	90	30	8
DAY 04											
01	10	150	15			55	53	51	86	13	5
04	10	12	15			55	53	52	90	10	5
07	10	150	15			54	52	51	90	31	6
10	10	200	8			60	57	54	81	02	4
13	10	150	12			66	59	53	63	20	13
16	10	70	30			66	56	48	52	13	7
19	10	70	15			64	55	47	54	21	14
22	10	65	15			62	55	49	63	16	12
DAY 05											
01	10	150	15			62	55	50	65	16	11
04	10	130	15			62	55	50	65	18	13
07	10	130	50			60	54	49	67	11	7
10	10	120	30		R	59	56	53	81	17	12
13	10	17	7		R	58	56	54	87	17	12
16	10	18	30			58	56	54	87	17	14
19	10	24	15			56	54	52	87	20	13
22	10	24	15		Rk	56	54	52	87	18	11
DAY 06											
01	10	10	7		R	54	53	53	96	21	7
04	10	25	12			54	53	52	93	18	5
07	10	30	8			53	52	51	93	31	3
10	10	100	15			58	54	51	78	28	9
13	10	45	30			57	53	49	75	27	10
16	10	UNL	50			60	51	42	52	26	12
19	10	UNL	15			54	50	47	77	26	8
22	10	UNL	15			51	49	47	86	30	6
DAY 07											
01	0	UNL	15			49	45	41	74	23	4
04	0	UNL	15			48	45	42	80	25	6
07	10	UNL	12			49	46	44	83	29	5
10	10	UNL	10			58	52	47	67	02	6
13	10	UNL	30			62	52	42	48	28	14
16	10	UNL	30			58	53	48	70	28	18
19	6	UNL	15			52	48	44	74	27	12
22	0	UNL	15			51	47	42	71	26	16
DAY 08											
01	3	UNL	15			49	46	43	80	29	6
04	4	UNL	15			49	47	45	86	29	6
07	5	UNL	9			51	48	46	83	07	2
10	10	UNL	12			56	51	46	69	07	6
13	10	UNL	20			62	53	45	54	30	16
16	10	250	15			57	52	48	72	29	14
19	10	UNL	15			53	50	47	80	28	10
22	8	250	15			51	47	42	71	29	14
DAY 09											
01	5	UNL	15			50	45	40	69	29	11
04	10	UNL	15			49	43	40	71	29	13
07	10	UNL	25			50	45	39	66	29	13
10	10	UNL	50			55	48	38	49	30	14
13	10	250	50			57	49	40	53	29	15
16	10	250	30			56	49	41	57	29	16
19	10	250	15			51	46	40	66	28	16
22	10	UNL	15			50	48	41	71	29	10
DAY 10											
01	4	UNL	15			49	46	42	77	28	9
04	3	UNL	15			48	45	42	80	26	6
07	10	180	20			50	45	40	69	27	6
10	3	UNL	30			57	48	38	49	30	5
13	9	UNL	30			59	50	40	50	30	8
16	10	250	30			59	50	40	50	29	11
19	9	250	15			52	48	44	74	30	10
22	9	100	15			52	46	39	61	17	4
DAY 11											
01	10	80	15		R	52	47	42	69	12	6
04	10	30	12		R	49	47	46	89	14	10
07	10	23	12			51	49	48	90	13	13
10	5	UNL	10			56	53	50	80	20	15
13	10	24	20			56	51	46	69	25	14
16	8	19	30			55	50	45	69	27	11
19	10	30	12		Rk	50	48	46	86	26	7
22	5	UNL	15			49	47	45	86	18	7
DAY 12											
01	1	UNL	15			47	45	44	89	17	9
04	10	25	15			49	46	43	80	12	7
07	10	30	12		RW	49	46	44	83	18	10
10	10	16	4		RWF	51	50	49	93	18	18
13	10	21	20			57	54	51	80	22	14
16	10	15	10		RW	53	51	49	86	27	15
19	10	38	15			51	48	45	80	29	13
22	5	UNL	15			48	44	39	71	30	17
DAY 13											
01	0	UNL	15			44	40	36	74	31	9
04	0	UNL	15			41	38	33	73	33	9
07	0	UNL	30			45	39	31	58	35	6
10	2	UNL	30			53	45	35	51	36	8
13	0	UNL	50			57	47	37	47	28	11
16	0	UNL	50			57	48	38	49	28	19
19	0	UNL	30			51	47	42	71	28	12
22	0	UNL	15			51	47	43	74	29	9
DAY 14											
01	0	UNL	15			49	46	43	80	28	3
04	0	UNL	15			45	41	37	74	25	3
07	0	UNL	50			52	48	44	74	01	5
10	0	UNL	50			60	48	35	39	36	9
13	0	UNL	50			64	52	40	42	28	11
16	0	UNL	50			65	51	37	36	30	15
19	0	UNL	50			58	47	34	41	29	11
22	0	UNL	15			52	49	46	80	29	6
DAY 15											
01	0	UNL	12			50	48	47	89	29	7
04	0	UNL	12			47	43	38	71	29	6
07	0	UNL	10			50	47	45	83	30	3
10	0	UNL	10			60	54	49	67	04	6
13	0	UNL	30			67	58	50	55	30	10
16	0	UNL	20			65	57	51	61	31	15
19	0	UNL	20			53	50	48	83	30	16
22	0	UNL	12			51	49	47	86	30	7
DAY 16											
01	0	UNL	12			50	48	46	86	28	8
04	0	UNL	12			48	46	45	89	31	3
07	9	250	8			51	49	47	86	27	5
10	9	250	10			50	51	46	69	28	16
13	8	UNL	15			57	50	43	60	28	22
16	1	UNL	12			54	48	41	62	25	22
19	1	UNL	9			51	46	41	69	27	15
22	0	UNL	12			50	46	42	74	29	11
DAY 17											
01	0	UNL	12			48	44	40	74	26	10
04	0	UNL	12			47	44	40	77	28	8
07	7	UNL	12			48	44	40	74	29	8
10	8	UNL	12			55	48	40	57	28	6
13	6	UNL	30			58	48	38	48	28	18
16	0	UNL	30			56	48	39	53	27	18
19	0	UNL	10			49	44	38	66	28	15
22	0	UNL	15			48	43	38	68	28	13
DAY 18											
01	0	UNL	15			46	42	38	74	28	9
04	0	UNL	15			45	41	37	74	29	8
07	0	UNL	50			30	38	19	29	31	9
10	0	UNL	50			57	42	18	22	35	14
13	0	UNL	50			59	44	23	25	29	16
16	0	UNL	50			60	46	28	30	29	20
19	0	UNL	15			52	46	39	61	29	14
22	0	UNL	15			51	45	39	64	29	10
DAY 19											
01	0	UNL	15			52	42	28	40	33	8
04	0	UNL	15			49	40	26	41	36	8
07	0	UNL	50			54	42	26	34	35	10
10	0	UNL	50			60	45	27	28	35	14
13	0	UNL	50			65	48	26	23	35	10
16	0	UNL	30			61	47	30	31	29	19
19	0	UNL	15			51	46	41	69	27	16
22	0	UNL	15			48	45	42	80	30	7
DAY 20											
01	0	UNL	15			47	45	42	83	29	6
04	0	UNL	15			44	42	40	86	21	6
07	0	UNL	8			49	46	43	80	24	3
10	0	UNL	10			56	50	44	64	31	11
13	5	UNL	10			59	51	44	58	30	17
16	0	UNL	12			56	50	44	64	28	15
19	6	9	8			49	46	43	80	27	13
22	10	12	15			51	47	44	77	28	13
DAY 21											
01	10	12	15			50	47	45	83	26	9
04	10	13	15			49	47	45	86	24	7
07	8	UNL	9			51	48	45	80	28	13
10	0	UNL	10			58	52	46	65	34	7
13	0	UNL	12			62	54	46	56	27	12
16	0	UNL	15			60	53	47	62	25	15
19	0	UNL	12			53	49	45	74	27	18
22	0	UNL	15			51	47	43	74	27	12
DAY 22											
01	0	UNL	15			48	46	44	86	27	15
04	0	UNL	15			48	46	44	86	29	8
07	0	UNL	9			49	46	44	83	00	0
10	10	250	10			58	52	46	65	07	5
13	10	UNL	12			67	56	47	49	29	12
16	10	200	15			60	52	44	56	28	16
19	7	UNL	15			51	47	43	74	28	16
22	0	UNL	15			49	46	44	83	26	12
DAY 23											
01	4	UNL	15			48	46	43	83	26	4
04	7	UNL	15			46	44	42	86	28	6
07	5	UNL	12			49	45	40	71	00	0
10	1	UNL	15			58	51	44	60	32	10
13	6	250	30			64	50	35	34	23	11
16	3	UNL	30			59	50	42	54	20	12
19	10	UNL	30			55	49	44	67	22	14
22	10	33	15		R	55	51	48	77	16	8
DAY 24											
01	10	23	12		R	53	52	51	93	18	7
04	6	40	12			51	50	49	93	29	10
07	0	UNL	15			51	49	47	86	29	5
10	1	UNL	30			58	51	45	62	29	12
13	2	UNL	30			60	53	46	60	27	12
16	3	UNL	30			59	51	44	58	30	14
19	0	UNL	15			53	49	45	74	29	17
22	0	UNL	15			51	47	43	74	29	18
DAY 25											
01	0	UNL	15			49	45	41	74	28	7
04	0	UNL	15			47	45	42	83	27	6
07	2	UNL	30			51	47	42	71	30	4
10	1	UNL	30			57	49	42	57	04	5
13	9	UNL	30			62	51	41	46	28	13
16	4	UNL	30			60	50	41	50	29	18
19	8	UNL	15			53	48	44	72	27	17
22	2	UNL	12			51	48	45	80	28	8
DAY 26											
01	0	UNL	12			50	47	43	77	00	0
04	0	UNL	15			47	43	42	83	00	0
07	0	UNL	30			55	50	46	72	00	0
10	0	UNL	30			69	55	42	38	14	4
13	0	UNL	30			75	55	37	25	05	3
16	0	UNL	30			71	54	37	29	29	15
19	0	UNL	30			65	50	35	33	29	14
22	0	UNL	15			61	49	36	39	25	5
DAY 27											
01	0	UNL	15			38	49	39	49	00	0
04	0	UNL	15			35	48	41	59	00	0
07	0	UNL	15			38	31	44	60	00	0
10	0	UNL	7			68	57	48	51	04	6
13	0	UNL	15			74	58	44	36	30	17
16	0	UNL	12			59	54	49	70	29	15
19	0	UNL	15			51	49	47	86	26	20
22	0	UNL	15			51	48	45	80	26	18
DAY 28											
01	1	UNL	15			51	48	46	83	27	22
04	5	UNL	15			48	46	44	86	28	19
07	0	UNL	10			51	47	42	71	29	15
10	0	UNL	20			57	47	36	46	29	18
13	0	UNL	30			57	47	37	47	29	24
16	0	UNL	20			55	48	38	49	29	23
19	0	UNL	15			50	44	38	64	28	18
22	0	UNL	15			49	44	38	66	29	12
DAY 29											
01	0	UNL	15			48	44	39	71	28	7
04	0	UNL	15			48	43	38	68	27	7
07	0	UNL	50			49	40	28	44	29	4
10	0	UNL	50			58	43	23	26	35	12
13	0	UNL	50			63	48	32	31	29	12
16	0	UNL	50			59	49	38	42	27	17
19	0	UNL	20			54	47	40	59	29	15
22	0	UNL	15			52	47	42	69	29	10
DAY 30											
01	0	UNL	15			49	46	42	77	29	7
04	0	UNL	15			46	42	38	74	29	2
07	0	UNL	10			54	48	43	67	15	2
10	0	UNL	12			63	51	36	34	03	4
13	0	UNL	50			72	54	36	27	31	10
16	0	UNL	50			65	51	36	34	29	17
19	0	UNL	50			59	49	38	46	29	14
22	0	UNL	15			52	48	43	72	29	8

NOTES

CEILING COLUMN—

UNL indicates an unlimited ceiling

WEATHER COLUMN—

T	Tornado
Q	Squall
R	Rain
RW	Rain showers
ZR	Freezing rain
L	Drizzle
ZL	Freezing drizzle
S	Snow
SP	Snow pellets
IC	Ice crystals
SW	Snow showers
SG	Snow grains
IP	Ice pellets
A	Hail
F	Fog
IF	Ice fog
GF	Ground fog
BD	Blowing dust
BN	Blowing sand
BS	Blowing snow
BY	Blowing spray
K	Smoke
H	Haze
D	Dust

WIND COLUMNS—

Directions are those from which the wind blows indicated in tens of degrees from true North i e 09 for East 18 for South 27 for West Entry of 00 in the direction column indicates calm

Speed is expressed in knots multiply by 1 15 to convert to miles per hour

ADDITIONAL DATA

Other observational data contained in records on file can be furnished at cost via microfilm, microfiche, or paper copies of the original records Inquiries as to availability and costs should be addressed to Director, National Climatic Center, Federal Building, Asheville, North Carolina 28801

STATION SAN FRANCISCO CALIF YEAR & MONTH 72 04

U S DEPARTMENT OF COMMERCE
NATIONAL CLIMATIC CENTER
FEDERAL BUILDING
ASHEVILLE, N C 28801

LOCAL CLIMATOLOGICAL DATA

U.S DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ENVIRONMENTAL DATA SERVICE

SAN FRANCISCO, CALIFORNIA
FEDERAL OFFICE BLDG.
APRIL 1972

Latitude 37 47 N Longitude 122 25' W Elevation (ground) 52 ft Standard time used PACIFIC WBAN #23272

Date	Temperature °F: Maximum	Minimum	Average	Departure from normal	Average dew point	Degree days Base 65°: Heating	Cooling	Weather types on dates of occurrence (1 Fog, 2 Heavy fog ✕, 3 Thunderstorm, 4 Ice pellets, 5 Hail, 6 Glaze, 7 Duststorm, 8 Smoke Haze, 0 Blowing snow)	Snow ice pellets or ice on ground at 08AM In	Precipitation: Water equivalent In	Snow ice pellets In	Avg station pressure In — Elev 155 feet msl	Wind: Resultant direction	Resultant speed m p h	Average speed m p h	Fastest mile: Speed m p h	Direction	Sunshine: Hours and tenths	Percent of possible	Sky cover Tenths: Sunrise to sunset	Midnight to midnight	Date
1	63	51	57	2		8	0		0	0	0					17	W	8.3	66			1
2	68	50	59	4		6	0		0	0	0					18	W	6.4	50			2
3	64	49	57	1		8	0		0	0	0					18	W	7.6	60			3
4	67	54	61	5		4	0		0	T	0					15	SW	4.6	36			4
5	64	54	59	3		6	0		0	.06	0					22	SE	2.6	20			5
6	61	52	57	1		8	0		0	0	0					19	W	10.4	81			6
7	61	50	56	0		9	0		0	0	0					20	W	12.3	96			7
8	58	50	54	-2		11	0		0	0	0					18	W	11.8	91			8
9	54	48	51	-5		14	0		0	0	0					22	NW	12.9	99			9
10	60	49	55	-1		10	0		0	0	0					17	W	10.9	84			10
11	57	50	54	-2		11	0		0	.30	0					24	SW	7.6	58			11
12	56	46	51	-5		14	0		0	.44	0					26	SW	1.7	13			12
13	57	45*	51	-5		14	0		0	0	0					21	W	13.1	100			13
14	64	50	57	1		8	0		0	0	0					17	W	13.1	100			14
15	68	50	59	3		6	0		0	0	0					18	SW	12.8	97			15
16	56	49	53	-3		12	0		0	0	0					23	W	12.3	93			16
17	59	48	54	-2		11	0		0	0	0					22	W	13.3	100			17
18	64	46	55	-1		10	0		0	0	0					19	N	13.3	100			18
19	63	48	56	0		9	0		0	0	0					22	W	13.3	100			19
20	55	47	51*	-5		14	0		0	0	0					24	SW	11.6	87			20
21	62	47	55	-1		10	0		0	0	0					17	SW	13.4	100			21
22	63	48	56	0		9	0		0	0	0					20	W	13.5	100			22
23	56	47	52	-4		13	0		0	.16	0					18	SW	12.7	95			23
24	58	50	54	-2		11	0		0	.11	0					23	W	13.5	100			24
25	59	50	55	-1		10	0		0	0	0					20	W	13.6	100			25
26	75*	53	64*	8		1	0		0	0	0					17	W	13.6	100			26
27	73	50	62	6		3	0		0	0	0					33	W	13.0	96			27
28	56	48	52	-4		13	0		0	0	0					23	W	13.7	100			28
29	61	48	55	-1		10	0		0	0	0					16	W	13.7	100			29
30	69	51	60	4		5	0		0	0	0					20	W	13.7	100			30
	Sum	Sum				Total	Total			Total	Total	For the month						Total	%	Sum	Sum	
	1851	1478				278	0	Number of days		1.07	0					33	W	334.3	for			
	Avg	Avg	Avg	Dep	Avg	Dep	Dep	Precipitation		Dep						Date	27	Possible	month	Avg	Avg	
	61.7	49.3	55.5	-0.2		-1		≥ 01 inch	5	-0.37								395.5	85			
						Season to date		Snow, ice pellets														
	Number of days					Total	Total	≥ 1.0 inch	0	Greatest in 24 hours and dates								Greatest depth on ground of snow, ice pellets or ice and date				
	Maximum Temp		Minimum Temp			2799	3	Thunderstorms		Precipitation		Snow ice pellets										
	≥ 90° ‡	≤ 32°	≤ 32°	≤ 0°		Dep	Dep	Heavy fog X		.45	11-12	0						0				
	0	0	0	0		217		Clear	Partly cloudy	Cloudy												

HOURLY PRECIPITATION (Water equivalent in inches) —TRACE AMOUNT ENTRIES MAY BE INCOMPLETE.

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

* Extreme temperatures for the month May be the last of more than one occurrence
– Below zero temperature or negative departure from normal
‡ ≥ 70° at Alaskan stations
+ Also on an earlier date or dates
✕ Heavy fog restricts visibility to ¼ mile or less
T In the Hourly Precipitation table and in columns 9 10 and 11 indicates an amount too small to measure

The season for degree days begins with July for heating and with January for cooling
Data in columns 6 12 13 14 and 15 are based on 8 observations per day at 3-hour intervals
Wind directions are those from which the wind blows Resultant wind is the vector sum of wind directions and speeds divided by the number of observations Figures for directions are tens of degrees from true North i e 09 = East 18 = South 27 = West 36 = North and 00 = Calm When directions are in tens of degrees in Col 17 entries in Col 16 are fastest observed 1-minute speeds If the / appears in Col 17 speeds are gusts
Any errors detected will be corrected and changes in summary data will be annotated in the annual summary

Subscription Price Local Climatological Data $1.00 per year including annual summary if published. Single copy 10 cents for monthly summary, 15 cents for annual summary. Checks or money orders should be made payable and remittances and correspondence should be sent to the Superintendent of Documents, U. S. Government Printing Office, Washington, D C. 20402.

I certify that this is an official publication of the National Oceanic and Atmospheric Administration, and is compiled from records on file at the National Climatic Center, Asheville, North Carolina 28801.

William H. Haggard
Director, National Climatic Center

SUMMARY BY HOURS

Hour Local time	AVERAGES: Sky cover tenths	Station pressure In.	Temperature: Air °F	Wet bulb °F	Dew Pt °F	Relative humidity %	Wind speed m p h	Resultant wind: Direction	Speed m p h

LOCAL CLIMATOLOGICAL DATA

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ENVIRONMENTAL DATA SERVICE

OAKLAND, CALIFORNIA
INTERNATIONAL AIRPORT
APRIL 1972

Latitude 37 44 N Longitude 122 ° 12 ' W Elevation (ground) 6 ft Standard time used PACIFIC WBAN #23230

Date	Temperature °F: Maximum	Minimum	Average	Departure from normal	Average dew point	Degree days Base 65°: Heating	Cooling	Weather types on dates of occurrence (1 Fog, 2 Heavy fog x, 3 Thunderstorm, 4 Ice pellets, 5 Hail, 6 Glaze, 7 Duststorm, 8 Smoke, Haze, 9 Blowing snow)	Snow ice pellets or ice on ground at 04AM In	Precipitation: Water equivalent In	Snow ice pellets In	Avg station pressure In	Wind: Resultant direction	Resultant speed m p h	Average speed m p h	Fastest mile: Speed m p h	Direction	Sunshine: Hours and tenths	Percent of possible	Sky cover Tenths: Sunrise to sunset	Midnight to midnight	Date
	2	3	4	5	6	7A	7B	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	62	53	58	3	48	7	0		0	T	0	30.13	29	3.9	6.3	14	28			7	8	1
2	64	53	59	4	54	6	0	1	0	T	0	30.07	28	6.0	7.8	14	30			6	8	2
3	64	52	58	3	53	7	0	1 8	0	0	0	30.00	30	4.8	7.9	13	29			9	10	3
4	67	54	61	6	54	4	0		0	T	0	29.95	28	1.4	5.5	16	18			10	10	4
5	65	57	61	6	53	4	0	1	0	.25	0	29.88	16	12.8	14.1	26	16			9	9	5
6	62	50	56	0	50	9	0		0	.09	0	30.12	26	6.8	9.5	17	28			5	5	6
7	63	47	55	-1	45	10	0		0	0	0	30.19	28	7.3	8.9	20	26			8	4	7
8	62	49	56	0	45	9	0		0	0	0	30.19	28	8.9	11.9	18	29			9	7	8
9	59	46	53	-3	40	12	0		0	0	0	30.08	29	10.8	12.7	20	27			9	8	9
10	61	51	56	0	43	9	0		0	T	0	30.00	27	7.8	9.1	17	27			8	8	10
11	58	52	55	-1	47	10	0		0	.29	0	29.96	18	8.5	16.0	25	23			9	9	11
12	58	47	53	-3	46	12	0		0	.12	0	30.02	23	9.6	16.7	22	22			10	8	12
13	59	43*	51*	-5	38	14	0		0	0	0	30.10	31	11.8	13.4	18	30			0	0	13
14	66	46	56	-1	44	9	0		0	0	0	30.07	30	7.0	8.5	16	27			0	0	14
15	70	47	59	2	47	6	0		0	0	0	30.06	31	5.1	8.6	14	32			7	5	15
16	61	51	56	-1	48	9	0		0	0	0	30.08	25	7.9	10.1	21	25			6	5	16
17	61	45	53	-4	42	12	0		0	0	0	30.02	30	7.2	9.5	20	27			5	3	17
18	68	45	57	0	28	8	0		0	0	0	29.97	34	14.0	14.7	29	35			0	0	18
19	68	48	58	1	35	7	0		0	0	0	30.08	81	10.6	11.8	22	35			0	0	19
20	60	47	54	-3	46	11	0		0	0	0	30.24	27	9.7	10.5	18	31			2	3	20
21	63	51	57	0	49	8	0		0	0	0	30.22	24	8.6	8.8	16	27			2	3	21
22	67	48	58	0	47	7	0		0	0	0	30.06	28	6.8	8.2	13	26			7	4	22
23	62	47	55	-3	45	10	0		0	T	0	30.05	24	8.4	10.1	23	23			4	5	23
24	61	51	56	-2	48	9	0		0	.21	0	30.15	27	10.1	12.7	21	27			1	2	24
25	64	47	56	-2	44	9	0		0	0	0	30.14	29	7.4	9.4	18	26			3	2	25
26	74	49	62	4	50	3	0		0	0	0	29.99	28	3.1	5.9	13	31			0	0	26
27	74*	53	64*	6	49	1	0		0	0	0	29.98	27	7.4	10.6	20	27			1	1	27
28	62	49	56	-2	43	9	0		0	0	0	30.12	29	12.6	13.2	17	28			0	0	28
29	66	46	56	-2	37	9	0		0	0	0	30.13	31	11.1	12.5	17	29			1	0	29
30	71	47	59	1	46	6	0		0	0	0	30.07	28	3.6	7.2	15	30			0	0	30

	Sum	Sum				Total	Total		Total	Total	For the month					Total	%	Sum	Sum
	1922	1471				246	0	Number of days	.96	0	30.07	28	6.3	10.6	29	35	for	138	127
	Avg	Avg	Avg	Dep	Avg	Dep	Dep	Precipitation	Dep						Date	18	Possible	month	Avg	Avg
	64.1	49.0	56.6	0.0	45	-9		≥ .01 inch 5	-0.42										6.6	4.2

Season to date	Total	Total	Snow, ice pellets
	2698	3	≥ 1.0 inch 0

Number of days				Thunderstorms 0	Greatest in 24 hours and dates			Greatest depth on ground of snow, ice pellets or ice and date
Maximum Temp		Minimum Temp		Heavy fog X 0	Precipitation		Snow ice pellets	
≤ 90° ‡	≥ 32°	≤ 32°	≤ 0°	Clear 13 Partly cloudy 8 Cloudy 9	.34	5- 6	0	0
0	0	0	0					

Dep	Dep
98	

HOURLY PRECIPITATION (Water equivalent in inches)

Date	A M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	P M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	Date
1		T	T																						1
2								T	T																2
3																									3
4	T															T									4
5								T	.03	T	T	T	.06	.02	T										5
6	.03	.03	T	.01		.02																		.14	6
7																									7
8																									8
9																									9
10																									10
11	T	.01	.01	.03	.01	T	T	T	.12	.06	.04	T	T					T	T	.01	T		T	T	11
12						T	T	.01	.01	.01		T	T	T	.06	.03	T	T							12
13																									13
14																									14
15																									15
16																									16
17																									17
18																									18
19																									19
20																									20
21																									21
22																									22
23																									23
24	.06	.06	.09	T																				T	24
25																									25
26																									26
27																									27
28																									28
29																									29
30																									30

* Extreme temperatures for the month May be the last of more than one occurrence
– Below zero temperature or negative departure from normal
‡ ≥ 70° at Alaskan stations
\+ Also on an earlier date or dates
X Heavy fog restricts visibility to ¼ mile or less
T In the Hourly Precipitation table and in columns 9 10 and 11 indicates an amount too small to measure

The season for degree days begins with July for heating and with January for cooling
Data in columns 6 12 13 14 and 15 are based on 8 observations per day at 3 hour intervals
Wind directions are those from which the wind blows Resultant wind is the vector sum of wind directions and speeds divided by the number of observations Figures for directions are tens of degrees from true North i e 09 = East 18 = South 27 = West 36 = North and 00 = Calm When directions are in tens of degrees in Col 17 entries in Col 16 are fastest observed 1-minute speeds If the / appears in Col 17 speeds are gusts
Any errors detected will be corrected and changes in summary data will be annotated in the annual summary

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I certify that this is an official publication of the National Oceanic and Atmospheric Administration, and is compiled from records on file at the National Climatic Center, Asheville, North Carolina 28801.

William H. Haggard
Director, National Climatic Center

SUMMARY BY HOURS

Hour Local time	AVERAGES: Sky cover Tenths	Station pressure In.	Temperature: Air °F	Wet bulb °F	Dew Pt °F	Relative humidity %	Wind speed m p h	Resultant wind: Direction	Speed m p h
01	4	30.07	53	49	45	76	9.2	29	3.5
04	4	30.06	51	48	45	80	7.8	30	.9
07	5	30.08	53	48	44	74	8.2	30	2.0
10	5	30.10	58	51	45	63	9.7	25	3.6
13	5	30.08	62	53	45	56	12.0	27	9.9
16	4	30.05	62	54	46	60	14.9	28	12.8
19	4	30.04	58	52	47	68	11.7	28	10.2
22	3	30.07	53	51	46	73	9.7	30	6.6

OBSERVATIONS AT 3-HOUR INTERVALS

HOUR	SKY COVER Tenths	CEILING Hnds of ft	VIS IBILITY WHOLE MILES	VIS IBILITY Fract. MILE	WEATHER	TEMPERATURE AIR °F	TEMPERATURE WET BULB °F	TEMPERATURE DEW PT. °F	REL HUM %	WIND DIR	WIND SPEED Knots
DAY 01											
01	10	100	10			54	51	49	83	01	4
04	10	100	10			54	51	49	83	13	5
07	10	60	12			55	52	49	80	04	3
10	10	120	12			57	52	47	69	28	7
13	10	120	15			60	52	44	56	28	4
16	7	100	20			62	53	45	54	29	7
19	2	UNL	20			58	54	50	75	29	8
22	1	UNL	15			56	53	50	80	28	6
DAY 02											
01	10	5	12			55	54	53	93	29	8
04	10	5	12			54	53	53	96	34	5
07	10	4	4		R	54	53	53	96	24	3
10	40	9	5		R	59	56	54	84	17	4
13	10	UNL	12			62	57	54	75	24	7
16	2	UNL	15			61	58	55	81	27	8
19	2	UNL	15			57	55	54	90	30	10
22	10	3	6		R	54	53	53	96	31	9
DAY 03											
01	10	3	6		R	53	52	51	93	29	8
04	10	3	5		R	54	53	52	93	11	7
07	10	7	5		R	54	53	53	96	33	4
10	10	10	5		KH	57	55	53	87	18	4
13	9	250	10			63	57	52	70	28	8
16	10	250	20			60	57	54	81	30	10
19	10	200	15			57	55	53	87	31	8
22	10	120	15			57	55	53	87	32	6
DAY 04											
01	10	14	12			57	55	53	87	30	5
04	10	13	15			58	56	54	87	00	0
07	10	11	15			58	56	54	87	34	5
10	10	170	9			62	59	57	84	24	4
13	10	140	10			64	59	55	73	26	6
16	10	80	20			66	59	53	63	10	7
19	10	70	15			63	57	53	70	36	5
22	10	100	15			63	56	51	65	19	6
DAY 05											
01	10	60	15			64	58	54	70	15	14
04	10	50	15			64	58	53	68	16	10
07	10	90	20			63	57	53	70	15	16
10	10	50	12		R	61	56	53	75	16	17
13	10	25	6		R	59	56	54	84	18	14
16	10	25	20			60	57	54	81	11	7
19	10	110	20			60	57	54	81	21	11
22	10	20	15			60	56	52	75	19	9
DAY 06											
01	10	11	6		R	57	55	53	87	17	10
04	10	28	12			57	55	53	87	24	4
07	10	60	12			57	55	53	87	24	6
10						59	55	52	78	28	6
13	7	50	30			60	55	51	72	28	11
16	2	UNL	35			60	52	44	56	27	12
19	0	UNL	30			57	51	46	67	26	12
22	0	UNL	15			54	50	46	75	01	5
DAY 07											
01	0	UNL	15			50	47	45	83	09	5
04	0	UNL	15			47	45	44	89	00	0
07	0	UNL	15			51	48	45	80	00	0
10	9	UNL	12			58	53	48	70	29	8
13	10	UNL	15			62	54	47	58	29	11
16	10	UNL	25			61	52	44	54	26	17
19	2	UNL	20			56	50	45	67	27	11
22	0	UNL	15			54	49	45	72	29	10
DAY 08											
01	0	UNL	15			53	47	40	62	30	11
04	0	UNL	15			52	48	45	77	29	10
07	0	UNL	12			52	48	45	77	10	4
10	0	UNL	12			56	51	46	69	18	7
13	10	UNL	12			59	53	47	65	24	6
16	10	UNL	12			60	54	49	67	27	15
19	10	250	15			57	52	47	69	27	15
22	10	250	15			55	49	43	64	31	13
DAY 09											
01	7	UNL	15			52	45	36	53	33	13
04	0	UNL	15			48	43	37	66	34	9
07	0	UNL	25			50	43	35	57	33	10
10	10	UNL	35			54	46	37	53	22	4
13	10	UNL	35			58	49	40	51	27	9
16	10	250	30			57	50	44	62	27	17
19	10	250	25			54	49	44	69	28	14
22	10	250	15			53	48	43	69	28	12
DAY 10											
01	7	UNL	15			52	48	44	74	27	15
04	7	250	15			51	47	43	74	27	10
07	9	250	20			52	48	43	72	26	7
10	7	UNL	25			56	49	43	62	17	8
13	8	UNL	35			58	50	41	53	30	9
16	10	250	30			61	52	43	52	27	7
19	7	250	25			55	50	45	69	28	7
22	10	90	15			55	50	45	69	30	5
DAY 11											
01	10	50	15		R	54	49	45	72	10	9
04	10	30	12		R	53	49	45	74	13	19
07	10	25	12		RW	53	50	47	80	14	17
10	9	38	15		RW	55	51	48	77	18	18
13	4	UNL	20			58	54	50	75	25	15
16	10	35	20			56	52	48	75	27	14
19	9	50	25			54	50	47	77	27	10
22	10	60	15			53	49	46	77	18	9
DAY 12											
01	5	UNL	15			53	49	45	74	19	9
04	8	34	15			53	48	44	72	16	14
07	10	30	10		RW	53	49	45	74	18	14
10	10	25	15			53	50	47	80	19	19
13	10	30	15			57	52	50	78	23	13
16	10	15	6		RW	54	52	50	86	28	16
19	10	17	12			53	49	46	77	29	16
22	1	UNL	15			50	45	39	66	32	15
DAY 13											
01	0	UNL	15			48	42	35	61	32	14
04	0	UNL	15			44	40	35	71	36	11
07	0	UNL	30			45	41	35	68	35	12
10	2	UNL	40			53	45	36	53	29	9
13	9	UNL	40			59	48	37	44	30	15
16	0	UNL	40			59	50	42	54	28	15
19	0	UNL	40			56	49	43	62	29	10
22	0	UNL	15			52	47	42	69	34	7
DAY 14											
01	0	UNL	15			51	47	43	74	33	10
04	0	UNL	15			49	45	40	71	04	4
07	0	UNL	40			50	45	40	69	36	3
10	0	UNL	40			61	51	41	48	29	8
13	0	UNL	40			64	54	44	48	28	10
16	0	UNL	40			65	54	45	49	28	13
19	0	UNL	40			60	53	47	62	26	8
22	0	UNL	15			55	51	48	77	31	9
DAY 15											
01	0	UNL	12			52	50	48	86	32	5
04	0	UNL	10			50	48	46	86	10	4
07	0	UNL	15			52	48	45	77	08	4
10	0	UNL	15			61	54	47	60	23	8
13	0	UNL	30			70	58	43	38	27	6
16	0	UNL	20			65	58	53	63	29	11
19	0	UNL	20			59	53	48	67	32	12
22	0	UNL	15			53	51	49	86	34	10
DAY 16											
01	5	UNL	12			52	50	49	90	30	6
04	10	11	12			52	50	48	86	27	4
07	10	11	12			53	51	49	86	23	8
10	10	UNL	12			58	53	49	72	24	7
13	6	UNL	15			60	54	49	67	25	13
16	2	UNL	15			59	53	47	65	26	16
19	1	UNL	12			55	50	46	72	24	10
22	0	UNL	12			53	49	46	77	09	6
DAY 17											
01	0	UNL	15			50	48	46	86	06	4
04	0	UNL	15			47	45	44	89	00	0
07	0	UNL	15			49	44	38	66	01	5
10	9	UNL	15			58	49	39	49	29	8
13	6	UNL	20			61	52	43	52	28	14
16	4	UNL	20			60	52	44	56	27	13
19	0	UNL	12			56	49	42	60	27	9
22	0	UNL	12			51	45	39	64	34	11
DAY 18											
01	0	UNL	15			48	44	39	71	35	5
04	0	UNL	15			45	41	37	74	34	6
07	0	UNL	40			50	40	27	41	34	11
10	0	UNL	35			59	42	17	19	34	18
13	0	UNL	35			66	45	14	13	01	18
16	0	UNL	35			67	46	15	13	35	22
19	0	UNL	35			60	51	42	52	30	10
22	0	UNL	15			56	47	36	47	34	12
DAY 19											
01	0	UNL	15			52	44	34	50	32	9
04	0	UNL	40			48	42	35	61	32	5
07	0	UNL	40			53	41	25	34	34	10
10	0	UNL	40			62	46	24	23	35	11
13	0	UNL	40			65	50	34	32	29	13
16	0	UNL	30			63	51	38	40	29	16
19	0	UNL	30			58	49	40	51	29	11
22	0	UNL	15			52	49	46	80	27	7
DAY 20											
01	0	UNL	15			51	48	46	83	23	9
04	0	UNL	12			50	47	45	83	25	10
07	1	UNL	10			50	47	45	83	25	8
10	0	UNL	12			55	50	46	72	28	5
13	7	UNL	12			58	52	47	67	29	10
16	0	UNL	10			57	52	47	69	29	12
19	0	UNL	8			52	49	46	80	29	9
22	8	13	12			52	49	47	83	25	10
DAY 21											
01	10	11	12			51	49	47	86	24	10
04	10	11	12			51	49	47	86	23	6
07	10	13	12			51	49	47	86	23	7
10	1	UNL	15			56	52	48	75	22	6
13	0	UNL	15			61	54	49	65	24	9
16	0	UNL	15			63	56	50	63	26	11
19	0	UNL	15			58	54	51	78	25	12
22	0	UNL	15			57	53	50	78	00	0
DAY 22											
01	0	UNL	15			53	50	48	83	29	5
04	0	UNL	15			50	47	45	83	08	4
07	0	UNL	10			51	49	47	86	24	6
10	10	UNL	10			56	51	47	72	26	4
13	7	UNL	10			66	56	48	52	29	8
16	10	250	15			63	55	48	58	29	10
19	8	UNL	15			56	51	47	72	27	10
22	0	UNL	15			51	49	47	86	28	10
DAY 23											
01	5	UNL	15			51	48	46	83	24	5
04	3	250	15			50	47	45	83	28	8
07	3	UNL	25			50	47	44	80	31	5
10	2	UNL	20			55	49	44	67	29	5
13	4	UNL	25			62	53	44	52	28	9
16	2	UNL	30			60	52	45	58	23	17
19	8	240	20			58	52	46	65	20	8
22	10	43	15			58	53	49	72	22	16
DAY 24											
01	10	15	10		R	55	53	51	86	18	10
04	10	10	10			54	53	52	93	28	10
07	1	UNL	25			52	49	47	83	32	9
10	1	UNL	30			57	52	47	69	23	6
13	2	UNL	30			61	54	48	63	26	14
16	2	UNL	30			60	53	47	62	27	18
19	0	UNL	30			56	50	45	67	30	13
22	0	UNL	15			53	48	44	72	30	8
DAY 25											
01	0	UNL	15			51	47	42	71	34	5
04	0	UNL	15			47	44	40	77	34	7
07	1	UNL	30			51	46	41	69	01	7
10	2	UNL	20			58	50	43	58	29	9
13	6	UNL	20			63	53	43	48	29	12
16	0	UNL	25			62	53	45	54	27	14
19	4	UNL	20			58	53	48	70	25	11
22	0	UNL	15			57	52	48	72	00	0
DAY 26											
01	0	UNL	15			53	50	48	83	00	0
04	0	UNL	12			50	48	46	86	04	4
07	0	UNL	30			57	52	48	72	17	3
10	0	UNL	25			64	58	53	68	24	6
13	0	UNL	30			69	59	51	53	23	7
16	0	UNL	20			70	61	55	59	26	8
19	0	UNL	15			67	55	45	45	34	8
22	0	UNL	15			62	55	50	65	32	5
DAY 27											
01	0	UNL	15			60	53	47	62	13	8
04	0	UNL	15			55	50	45	69	06	4
07	0	UNL	20			60	53	47	62	00	0
10	0	UNL	15			65	57	50	59	28	7
13	0	UNL	12			72	60	52	50	29	9
16	0	UNL	15			63	57	52	68	27	17
19	0	UNL	15			54	52	50	86	26	16
22	0	UNL	15			54	51	49	83	27	13
DAY 28											
01	0	UNL	15			55	51	47	75	27	12
04	2	UNL	15			52	50	48	86	29	8
07	0	UNL	15			53	49	46	77	29	10
10	0	UNL	25			58	50	42	55	26	10
13	0	UNL	25			60	50	41	50	28	15
16	0	UNL	20			61	52	43	52	29	12
19	0	UNL	20			57	49	41	55	29	11
22	0	UNL	15			54	46	37	53	32	14
DAY 29											
01	0	UNL	15			50	42	33	52	35	11
04	0	UNL	15			47	41	33	58	35	10
07	0	UNL	40			49	42	33	56	34	12
10	0	UNL	40			58	45	30	35	30	15
13	0	UNL	40			64	49	32	30	30	16
16	0	UNL	40			63	53	44	50	28	14
19	0	UNL	30			61	53	46	58	28	7
22	0	UNL	12			57	52	47	69	31	8
DAY 30											
01	0	UNL	15			53	49	45	74	00	0
04	0	UNL	15			51	47	44	77	13	8
07	0	UNL	40			55	49	44	67	12	4
10	0	UNL	30			61	54	47	60	27	7
13	0	UNL	30			71	55	41	34	30	10
16	0	UNL	35			68	57	49	51	28	11
19	0	UNL	35			65	54	44	47	32	5
22	0	UNL	15			60	55	50	70	29	5

NOTES

CEILING COLUMN—

UNL indicates an unlimited ceiling

WEATHER COLUMN—

T	Tornado
TH	Thunderstorm
Q	Squall
R	Rain
RW	Rain showers
ZR	Freezing rain
L	Drizzle
ZL	Freezing drizzle
S	Snow
SP	Snow pellets
IC	Ice crystals
SW	Snow showers
SG	Snow grains
IP	Ice pellets
A	Hail
F	Fog
H	Ice fog
GF	Ground fog
BD	Blowing dust
BN	Blowing sand
BS	Blowing snow
BY	Blowing spray
K	Smoke
H	Haze
D	Dust

WIND COLUMNS—

Directions are those from which the wind blows indicated in tens of degrees from true North i.e. 09 for East, 18 for South, 27 for West. Entry of 00 in the direction column indicates calm

Speed is expressed in knots multiply by 1.15 to convert to miles per hour

ADDITIONAL DATA

Other observational data contained in records on file can be furnished at cost via microfilm, microfiche, or paper copies of the original records. Inquiries as to availability and costs should be addressed to: Director, National Climatic Center, Federal Building, Asheville, North Carolina 28801

STATION OAKLAND CALIFORNIA YEAR & MONTH 72 04

U S DEPARTMENT OF COMMERCE
NATIONAL CLIMATIC CENTER
FEDERAL BUILDING
ASHEVILLE, N C 28801

SAN JOSE WEATHER STATION
DEPARTMENT OF CIVIL DEFENSE - CITY OF SAN JOSE
MONTHLY METEOROLOGICAL SUMMARY
120th MERIDIAN TIME
SAN JOSE, CALIFORNIA (CO-OPERATIVE STATION OF THE NATIONAL WEATHER SERVICE) APRIL 1972

LATITUDE 37° 20' N. LONGITUDE 12° 53' W. ELEVATION (GROUND) 67 ft. PACIFIC STANDARD TIME USED

DATE	TEMPERATURES (F) EXTREMES MAXIMUM	EXTREMES MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	DEGREE DAYS - BASE 65°	ATMOSPHERIC PRESSURE AT 4 00 PM PST	MOISTURE DEWPOINT AT 4 00 PM PST	RELATIVE HUMIDITY AT 4 00 PM PST	PRECIPITATION (INCHES AND HUNDREDTHS) MIDNIGHT TO MIDNIGHT	WIND DAILY PREVAILING WIND DIRECTION	AVERAGE SPEED	FASTEST MILE DIRECTION	FASTEST MILE SPEED (MPH)
1	67	53	60	- 4	5	30.03	45	45	T	NW	4.7	NW	14
2	71	50	61	+ 4	4	29.96	58	67	.00	NW	4.8	NW	13
3	75	54	65	+ 8	0	29.90	54	58	.00	NW	5.0	NW	16
4	74	55	65	+ 8	0	29.86	47	44	T	SW	6.1	SW	20
5	70	57	64	+ 7	1	29.98	54	83	.09	S	7 0	SE	13
6	65	52	59	+ 2	6	30.12	41	43	.05	NW	5.8	N	13
7	66	39	53	- 4	12	30.10	43	47	T	NW	6.5	NW	16
8	66	41	54	- 3	11	30.14	43	47	.00	NW	7.1	NW	16
9	64	42	53	- 4	12	29.98	39	46	.00	NW	6.8	NW	16
10	66	46	56	- 1	9	29.88	46	51	.00	S	4.7	NW	13
11	64	49	57	0	8	29.96	46	59	.09	SE	7.3	SE	15
12	60	47	54	- 4	11	29.94	53	88	.11	S	7.3	W	16
13	62	39	51	- 7	14	30.04	39	44	.00	NW	7.7	W	16
14	72	40	56	- 2	9	29.99	43	37	.00	NW	5.6	N	15
15	78	45	62	+ 4	3	29.99	54	50	.00	NW	5.0	N	12
16	75	48	62	+ 4	3	30.00	48	63	.00	N	5.0	N	20
17	67	41	54	- 4	11	29.94	36	37	.00	NW	6.8	N	17
18	66	40	53	- 5	12	29.90	27	24	.00	NW	9.8	NW	20
19	68	46	57	- 1	8	30.04	28	22	.00	N	8.2	N	16
20	68	38	53	- 5	12	30.16	29	52	.00	NW	5.6	NW	16
21	70	42	56	- 2	9	30.13	52	58	.00	NW	5 8	N	16
22	75	44	60	+ 1	5	29.94	50	51	.00	NW	5.4	NW	13
23	71	44	58	- 1	7	29.96	42	38	.00	N	5.3	N	13
24	68	50	59	0	6	30.12	51	64	.17	NW	9.9	NW	20
25	69	45	57	- 2	8	30.05	42	38	.00	NW	7.5	NW	16
26	82	45	64	+ 5	1	29.86	42	25	.00	NW	5.2	NW	12
27	86	50	68	+ 9	0	29.90	48	34	.00	N	6.3	NW	20
28	80	49	65	+ 5	0	30.08	30	40	.00	NW	8.9	NW	18
29	69	45	57	- 3	8	30 03	37	32	.00	NW	9.2	NW	17
30	78	44	61	+ 1	4	29.97	41	28	.00	NW	5.7	NW	16
SUM/MEAN	70	46	58	0	(199)	30.00	44	47	(.51)	NW	6.5	SW	20
NORMALS	69	47	58	---	(216)	30.03	--	54	(1.05)	NW	6.6	--	--

ALL DATA EXCEPT ASTERISK (*) ARE FOR THE 24-HOUR PERIOD ENDING AT 4 00 PM PST - - - - - ( ) INDICATES SUM TOTAL

ATMOSPHERIC PRESSURE

HIGHEST . . . . . 30.16, DATE 20
LOWEST . . . . . 29.86, DATE 4*

TEMPERATURE

HIGHEST . . . . . 85, DATE 27
LOWEST . . . . . 38, DATE 20
GREATEST DAILY RANGE . 37, DATE 26
LOWEST DAILY RANGE . . 13, DATE 5*

HEATING DEGREE DAYS (BASE 65°)

TOTAL THIS MONTH 199
DEPARTURE FROM NORMAL . . . - 17
SEASONAL TOTAL SINCE JULY 1 2488
SEASONAL DEPARTURE FROM NORMAL +223

RAINFALL

GREATEST FALL THIS MONTH IN - - -

5 MINUTES . . .	.05,	DATE 5
10 MINUTES	.06,	DATE 5
15 MINUTES . . .	.06,	DATE 5
30 MINUTES	.07,	DATE 5
1 HOUR	.09,	DATE 24
2 HOURS	.11,	DATE 24
24 HOURS	.17,	DATE 24

SEASONAL TOTAL ON APRIL 30, 1971
SINCE JULY 1, 1971,
THIS YEAR . . 6.24
LAST YEAR . . 14.72
DEFICIENCY OR EXCESS THIS MONTH AS COMPARED WITH NORMAL . . . -.55
ACCUMULATED EXCESS OR DEFICIENCY ON APRIL 30, 1972 SINCE JULY 1, 1971 . . . . . -6.26

WIND

TOTAL MOVEMENT (MILES) . . 4689
AVERAGE HOURLY VELOCITY . 6.5
PREVAILING DIRECTION . . . NW
FASTEST MILE THIS MONTH 20
DIRECTION SW, DATE 4*

PRECIPITATION

DAYS WITH - - - - - - - - -

.01 INCH OR MORE OF RAIN	5
.10 INCH OR MORE OF RAIN	2
.25 INCH OR MORE OF RAIN	0

MISCELLANEOUS PHENOMENA

DAYS WITH - - - - - - - - -

FOG	0
THUNDERSTORMS	0

COMPARATIVE DATA FOR THIS MONTH FROM THE RECORDS OF PREVIOUS YEARS

TEMPERATURES

HIGHEST THIS MONTH - 92, DATE 24, 1966
LOWEST THIS MONTH - 30, DATE 7, 1908

PRECIPITATION

GREATEST FALL THIS MONTH - -

5 MINUTES .	.18, DATE	9, 1941
10 MINUTES . . .	.24, DATE	4, 1941
15 MINUTES . . .	.29, DATE	4, 1941
30 MINUTES . . .	.35, DATE	4, 1941
1 HOUR . . .	.41, DATE	3, 1935
2 HOURS	.56 DATE	3, 1935
24 HOURS . . .	1.34, DATE	4, 1941

WIND

AVERAGE HOURLY VELOCITY (MILES) 6.6
PREVAILING DIRECTION NW
MAXIMUM VELOCITY RECORDED FOR THIS MONTH SINCE 1908 - 36 MPH - NW - DATE 8, 1944
GREATEST AVERAGE VELOCITY FOR WHOLE MONTH - 8.8 - DATE 1921.

MEAN TEMPERATURE (T) TOTAL RAINFALL (R)

	T	R		T	R		T	R
1920	55	.92	1937	56	.74	1954	61	.39
1921	55	.40	1938	56	1.12	1955	53	1.12
1922	53	.32	1939	59	.45	1956	57	1.01
1923	56	1.52	1940	59	47	1957	59	.94
1924	58	.38	1941	57	3.20	1958	58	3.68
1925	57	1.55	1942	57	2.79	1959	62	.60
1926	62	2.88	1943	58	1.13	1960	59	.80
1927	56	1.03	1944	55	.90	1961	60	.76
1928	56	.96	1945	58	.22	1962	61	.10
1929	54	92	1946	58	.01	1963	55	3.08
1930	59	.76	1947	61	.51	1964	60	.10
1931	60	40	1948	56	3.19	1965	58	1.93
1932	56	.20	1949	59	T	1966	63	.37
1933	56	.15	1950	59	75	1967	50	3.89
1934	60	.34	1951	57	.53	1968	59	.57
1935	58	3.38	1952	58	1.26	1969	57	1.70
1936	59	.88	1953	56	.75	1970	55	.21
						1971	56	1.24
						1972	58	.51

PRECIPITATION

AVERAGE NUMEER OF DAYS THIS MONTH
WITH .01 INCH OR MORE OF RAIN 5
WITH .25 INCH OR MORE OF RAIN 2

GREATEST NUMBER OF DAYS THIS MONTH WITH 01 INCH OR MORE OF RAIN ---- 18 --- DATE - 1967

AVERAGE WEATHER TO BE EXPECTED IN MAY

DAILY SUNSHINE . . . 9.2 HOURS
DAYS CLEAR 16
CLOUDY 5
PARTLY CLOUDY 10
RAINFALL 43
AVERAGE DAYS WITH RAIN .01 INCH OR MORE 3
HOURLY WIND VELOCITY 6.8
PREVAILING WIND DIRECTION NW
AVERAGE MAXIMUM TEMPERATURE 73
AVERAGE MINIMUM TEMPERATURE 50

T INDICATES TRACE *AND OTHER DATES ( ) INDICATES ESTIMATED OR NOT AVAILABLE

LOCAL CLIMATOLOGICAL DATA

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ENVIRONMENTAL DATA SERVICE

SAN FRANCISCO, CALIFORNIA
INTERNATIONAL AIRPORT
JULY 1972

Latitude 37° 37 N Longitude 122° 23' W Elevation (ground) 8 ft Standard time used PACIFIC WBAN #23234

Date	Temperature °F: Maximum	Minimum	Average	Departure from normal	Average dew point	Degree days Base 65°: Heating	Cooling	Weather types on dates of occurrence (1 Fog, 2 Heavy fog x, 3 Thunderstorm, 4 Ice pellets, 5 Hail, 6 Glaze, 7 Duststorm, 8 Smoke, Haze, 9 Blowing snow)	Snow ice pellets or ice on ground at 04AM In	Precipitation: Water equivalent In	Snow ice pellets In	Avg station pressure In (Elev 18 feet msl)	Wind: Resultant direction	Resultant speed m p h	Average speed m p h	Fastest mile: Speed m p h	Direction	Sunshine: Hours and tenths	Percent of possible	Sky cover Tenths: Sunrise to sunset	Midnight to midnight	Date
1	78	56	67	5	55	0	2	8	0	0	0	29.82	22	.4	7.3	10	33			6	5	1
2	71	57	64	2	53	1	0		0	0	0	29.89	23	7.0	7.9	16	22			3	3	2
3	69	57	63	1	52	2	0		0	0	0	29.99	25	9.4	10.2	16	30			5	5	3
4	69	56	63	1	51	2	0		0	0	0	30.03	29	10.8	11.1	18	30			6	7	4
5	67	55	61	-1	50	4	0		0	0	0	30.02	28	12.5	12.8	18	28			3	5	5
6	63	54	59	-3	51	6	0		0	0	0	30.03	26	12.1	12.5	25	27			7	8	6
7	64	53	59*	-3	51	6	0		0	0	0	30.02	28	12.7	12.9	21	28			8	7	7
8	70	52*	61	-1	51	4	0		0	0	0	30.02	29	14.4	14.8	25	28			4	4	8
9	67	54	61	-1	48	4	0		0	0	0	30.00	28	15.7	16.1	24	28			0	2	9
10	67	54	61	-1	50	4	0		0	0	0	29.97	28	13.3	14.0	23	29			0	0	10
11	81	55	68	6	54	0	3		0	0	0	29.96	31	8.4	10.1	23	29			0	0	11
12	86	55	71	9	54	0	6		0	0	0	29.95	30	10.3	11.2	22	30			0	0	12
13	97	59	78	15	55	0	13		0	0	0	29.87	29	7.9	9.4	18	30			0	0	13
14	98*	60	79*	16	54	0	14		0	0	0	29.74	30	8.4	9.4	20	30			0	0	14
15	80	59	70	7	56	0	5		0	0	0	29.76	32	5.4	8.1	14	29			0	0	15
16	75	59	67	4	57	0	2		0	0	0	29.85	23	5.3	7.2	17	20			0	0	16
17	75	60	68	5	57	0	3		0	0	0	29.93	23	9.6	10.2	17	24			2	2	17
18	69	59	64	1	55	1	0		0	T	0	29.96	26	11.3	11.9	18	27			6	7	18
19	67	56	62	-1	52	3	0		0	T	0	29.90	25	10.1	10.5	17	24			9	9	19
20	69	57	63	0	54	2	0		0	T	0	29.87	22	10.1	10.4	16	22			9	10	20
21	70	58	64	1	53	1	0		0	0	0	29.98	24	7.6	9.2	16	28			7	6	21
22	67	56	62	-1	52	3	0		0	0	0	30.00	28	10.9	11.2	20	27			7	5	22
23	68	57	63	0	52	2	0		0	0	0	29.97	28	11.5	11.7	20	26			8	9	23
24	67	56	62	-2	52	3	0		0	0	0	29.94	27	13.9	14.4	22	27			4	5	24
25	68	56	62	-2	52	3	0		0	0	0	29.95	28	14.1	14.4	23	28			2	4	25
26	70	56	63	-1	52	2	0		0	0	0	29.99	29	9.9	11.4	20	30			3	4	26
27	78	54	66	2	54	0	1		0	0	0	29.97	30	10.4	11.5	25	28			0	0	27
28	70	54	62	-2	53	3	0		0	0	0	29.94	30	14.3	14.4	22	30			3	4	28
29	67	54	61	-3	53	4	0		0	T	0	29.92	30	12.1	12.8	22	30			5	5	29
30	68	57	63	-1	54	2	0		0	0	0	29.99	28	13.7	14.1	23	27			3	6	30
31	70	56	63	-1	53	2	0		0	0	0	30.07	29	14.2	14.7	23	30			3	4	31
	Sum 2245	Sum 1741				Total 64	Total 49	Number of days		Total T	Total 0	For the month 29.94	28	9.8	11.5	25	28	Total	% for month	Sum 113	Sum 126	
	Avg 72.4	Avg 56.2	Avg 64.3	Dep 1.6	Avg 53	Dep -17	Dep	Precipitation ≥ .01 inch 0		Dep -0.01						Date	27+	Possible		Avg 3.6	Avg 4.1	
						Season to date		Snow, ice pellets ≥ 1.0 inch 0														
	Number of days: Maximum Temp ≤ 90°‡ 2	Maximum Temp ≥ 32° 0	Minimum Temp ≥ 32° 0	Minimum Temp ≤ 0° 0		Total 64	Total 71	Thunderstorms 0		Greatest in 24 hours and dates: Precipitation T	Snow, ice pellets 29+ 0					Greatest depth on ground of snow, ice pellets or ice and date: 0						
						Dep -17	Dep	Heavy fog X 0														
								Clear 17 Partly cloudy 10 Cloudy 4														

HOURLY PRECIPITATION (Water equivalent in inches)

Date	A M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	P M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	Date
1																									1
2																									2
3																									3
4																									4
5																									5
6																									6
7																									7
8																									8
9																									9
10																									10
11																									11
12																									12
13																									13
14																									14
15																									15
16																									16
17																									17
18																							T	T	18
19						T	T														T	T			19
20						T	T																		20
21																									21
22																									22
23																									23
24																									24
25																									25
26																									26
27																									27
28																									28
29								T	T																29
30																									30
31																									31

* Extreme temperatures for the month May be the last of more than one occurrence
– Below zero temperature or negative departure from normal
‡ 70° at Alaskan stations
+ Also on an earlier date or dates
X Heavy fog restricts visibility to ¼ mile or less
T In the Hourly Precipitation table and in columns 9 10 and 11 indicates an amount too small to measure

The season for degree days begins with July for heating and with January for cooling
Data in columns 6 12 13 14 and 15 are based on 8 observations per day at 3-hour intervals
Wind directions are those from which the wind blows Resultant wind is the vector sum of wind directions and speeds divided by the number of observations Figures for directions are tens of degrees from true North i e 09 = East 18 = South 27 = West 36 = North and 00 = Calm When directions are in tens of degrees in Col 17 entries in Col 16 are fastest observed 1 minute speeds If the / appears in Col 17 speeds are gusts
Any errors detected will be corrected and changes in summary data will be annotated in the annual summary

Subscription Price Local Climatological Data $1.00 per year including annual summary if published. Single copy 10 cents for monthly summary, 15 cents for annual summary. Checks or money orders should be made payable and remittances and correspondence should be sent to the Superintendent of Documents, U. S. Government Printing Office, Washington, D C. 20402.

I certify that this is an official publication of the National Oceanic and Atmospheric Administration, and is compiled from records on file at the National Climatic Center, Asheville, North Carolina 28801.

William H. Haggard
Director, National Climatic Center

SUMMARY BY HOURS

Hour Local time	AVERAGES: Sky cover Tenths	Station pressure In.	Temperature: Air °F	Wet bulb °F	Dew Pt °F	Relative humidity %	Wind speed m p h	Resultant wind: Direction	Speed m p h
01	5	29.94	58	55	53	83	9.1	27	8.1
04	6	29.93	57	54	52	84	7.8	27	7.1
07	6	29.96	59	56	53	79	6.8	27	5.2
10	4	29.97	66	59	54	67	9.8	29	6.1
13	2	29.96	70	60	54	58	15.9	28	13.4
16	2	29.93	68	59	53	60	17.3	28	15.3
19	3	29.93	62	57	53	73	14.3	28	13.0
22	3	29.95	59	55	53	81	11.2	27	10.4

OBSERVATIONS AT 3-HOUR INTERVALS

HOUR	SKY COVER Tenths	CEILING Hnds of ft	VISIBILITY Whole Miles	VISIBILITY Hnds Mile	WEATHER	TEMPERATURE AIR °F	TEMPERATURE WET BULB °F	TEMPERATURE DEW PT °F	REL HUM %	WIND DIR	WIND SPEED Knots
DAY 01											
01	5	UNL	10			59	56	53	81	29	8
04	6	UNL	10			56	54	53	90	29	6
07	8	UNL	7			60	57	54	81	09	2
10	9	UNL	7			66	61	57	73	04	7
13	0	UNL	12			73	63	57	57	04	6
16	8	UNL	15			74	64	57	55	12	8
19	5	UNL	15			66	59	54	65	20	9
22	2	UNL	15			60	57	54	81	21	5
DAY 02											
01	3	UNL	15			59	56	53	81	20	8
04	3	UNL	15			57	54	52	83	32	4
07	5	UNL	10			59	55	52	78	22	4
10	0	UNL	12			66	59	53	63	22	6
13	3	UNL	12			69	60	54	59	23	12
16	1	UNL	20			68	59	53	59	22	11
19	0	UNL	15			61	56	53	75	26	6
22	1	UNL	15			59	56	53	81	23	4
DAY 03											
01	10	19	15			59	55	52	78	22	9
04	10	19	15			58	55	52	81	26	5
07	10	19	10			60	56	52	75	22	6
10	10	20	10			64	58	53	68	22	6
13	2	UNL	12			67	59	53	61	28	12
16	1	UNL	20			66	58	52	61	26	13
19	0	UNL	20			61	56	52	72	27	11
22	0	UNL	15			58	55	52	81	25	9
DAY 04											
01	0	20	15			57	54	51	80	27	5
04	10	14	15			57	54	51	80	27	8
07	10	14	15			57	54	51	80	26	7
10	0	UNL	15			64	57	51	63	30	8
13	5	UNL	15			68	58	51	55	29	13
16	3	UNL	20			65	57	51	61	29	15
19	8	250	20			59	55	51	75	29	12
22	9	250	15			57	53	50	78	30	9
DAY 05											
01	4	UNL	15			55	52	49	80	28	7
04	10	15	15			56	53	50	80	25	9
07	10	15	15			56	52	49	78	26	8
10	2	UNL	15			63	56	50	63	29	10
13	0	UNL	20			66	57	50	57	29	14
16	0	UNL	30			63	56	50	63	28	16
19	0	UNL	30			58	54	50	75	28	13
22	7	12	15			56	53	51	83	28	12
DAY 06											
01	10	8	15			56	54	52	87	25	6
04	10	6	15			55	53	52	90	21	6
07	10	8	8			55	53	52	90	26	6
10	10	9	9			56	54	52	87	27	10
13	9	12	10			60	56	52	75	27	14
16	3	UNL	12			60	55	51	72	27	20
19	1	UNL	12			56	53	50	80	26	16
22	7	12	12			56	53	50	80	27	9
DAY 07											
01	10	12	15			56	53	51	83	26	10
04	3	UNL	15			54	52	51	90	27	5
07	7	11	8			56	53	50	80	30	5
10	8	UNL	8			60	55	50	70	29	12
13	10	UNL	20			61	55	51	70	27	16
16	7	UNL	30			61	55	51	70	28	17
19	7	UNL	30			58	54	50	75	28	18
22	5	UNL	15			56	53	50	80	28	7
DAY 08											
01	5	UNL	15			55	53	51	86	27	6
04	5	UNL	15			52	50	48	90	29	5
07	9	UNL	10			58	54	50	75	30	10
10	5	UNL	30			64	56	50	61	31	13
13	2	UNL	50			68	59	53	59	29	18
16	0	UNL	50			65	59	54	68	28	20
19	4	UNL	50			61	57	54	78	28	14
22	3	UNL	15			57	53	50	78	27	17
DAY 09											
01	6	UNL	15			56	52	49	78	28	14
04	7	UNL	15			55	52	49	80	28	15
07	7	UNL	10			58	54	50	75	31	8
10	0	UNL	12			64	56	49	58	29	12
13	0	UNL	25			66	56	48	52	28	18
16	0	UNL	50			64	55	48	56	26	20
19	0	UNL	50			60	53	47	62	28	15
22	0	UNL	15			57	52	47	69	27	10
DAY 10											
01	0	UNL	15			56	52	48	75	28	12
04	0	UNL	15			55	51	48	77	29	10
07	0	UNL	9			58	54	50	75	29	10
10	0	UNL	10			66	57	50	57	30	12
13	0	UNL	15			65	57	51	61	30	19
16	0	UNL	25			64	57	51	63	28	16
19	1	UNL	15			59	55	52	78	26	15
22	0	UNL	15			57	54	52	83	23	5
DAY 11											
01	0	UNL	15			56	53	51	83	30	3
04	0	UNL	15			55	53	51	86	30	6
07	0	UNL	10			60	56	52	75	02	3
10	0	UNL	10			66	61	57	73	07	6
13	0	UNL	10			75	64	56	52	31	13
16	0	UNL	20			73	62	54	53	30	13
19	0	UNL	30			63	58	54	73	30	14
22	0	UNL	15			59	56	53	81	30	10
DAY 12											
01	0	UNL	15			58	55	53	84	29	7
04	0	UNL	15			56	54	53	90	29	7
07	0	UNL	10			63	58	54	78	30	4
10	0	UNL	8			74	64	57	55	03	6
13	0	UNL	15			80	65	56	44	30	13
16	0	UNL	30			76	63	55	48	30	18
19	0	UNL	30			69	60	54	59	30	15
22	0	UNL	15			62	57	53	73	29	8
DAY 13											
01	0	UNL	15			61	56	53	75	28	7
04	0	UNL	15			60	56	53	78	29	4
07	0	UNL	9			67	61	56	68	28	3
10	0	UNL	8			81	68	60	49	06	6
13	0	UNL	12			92	70	57	31	29	13
16	0	UNL	30			96	69	52	23	29	12
19	0	UNL	30			78	63	53	42	30	10
22	0	UNL	15			65	59	54	68	29	10
DAY 14											
01	0	UNL	15			63	58	54	73	29	7
04	0	UNL	15			61	56	53	75	30	5
07	0	UNL	8			69	60	54	59	00	0
10	0	UNL	8			86	67	55	35	03	6
13	0	UNL	15			98	72	59	27	30	11
16	0	UNL	30			95	69	53	24	29	13
19	0	UNL	30			72	61	54	53	31	12
22	0	UNL	15			63	57	53	70	29	11
DAY 15											
01	0	UNL	12			60	57	54	81	29	12
04	0	UNL	12			60	57	54	81	30	8
07	0	UNL	7			63	59	55	70	00	0
10	0	UNL	7			72	63	58	62	02	7
13	0	UNL	10			76	63	58	54	05	8
16	0	UNL	12			76	64	56	50	24	5
19	0	UNL	12			67	61	57	70	32	8
22	0	UNL	12			60	58	56	87	30	8
DAY 16											
01	0	UNL	12			60	58	56	87	30	6
04	0	UNL	12			60	58	56	87	27	3
07	0	UNL	10			64	59	56	75	00	0
10	0	UNL	12			73	63	57	57	33	5
13	0	UNL	20			73	63	57	57	20	11
16	0	UNL	25			72	63	57	59	22	12
19	0	UNL	25			67	61	56	68	20	7
22	0	UNL	15			63	59	57	81	24	6
DAY 17											
01	1	UNL	15			62	59	57	84	22	5
04	3	UNL	15			60	58	57	90	22	7
07	8	17	10			62	59	57	84	21	6
10	2	UNL	12			69	62	57	66	20	8
13	0	UNL	15			74	64	58	58	20	11
16	0	UNL	15			71	63	57	61	24	14
19	0	UNL	15			64	60	57	78	25	10
22	1	UNL	15			62	58	55	78	25	10
DAY 18											
01	4	UNL	15			61	58	55	81	24	10
04	9	15	15			61	58	55	81	24	8
07	10	14	10			62	58	55	78	24	7
10	10	14	12			62	58	56	81	29	10
13	0	UNL	20			67	61	56	68	28	15
16	1	UNL	25			66	59	54	65	27	15
19	8	19	25			61	57	54	78	25	10
22	9	15	15			60	57	54	81	24	8
DAY 19											
01	8	13	15			58	56	54	87	23	6
04	10	12	15			57	55	54	90	26	7
07	10	16	12			58	54	51	78	24	8
10	10	17	12			59	55	51	75	25	10
13	6	20	20			64	57	51	63	27	11
16	8	23	30			63	57	52	68	23	10
19	10	15	20			60	56	53	78	25	11
22	10	23	15			59	55	52	78	27	10
DAY 20											
01	7	10	15			59	55	52	78	22	7
04	10	18	15			58	55	53	84	22	5
07	10	25	12			58	56	55	90	20	6
10	10	26	30			62	57	53	73	21	9
13	6	28	30			67	59	54	63	22	14
16	9	23	30			65	59	54	68	21	9
19	10	32	15			62	58	55	78	24	11
22	10	32	15			61	58	55	81	23	11
DAY 21											
01	10	17	15			60	57	55	84	19	5
04	10	18	15			60	57	54	81	22	5
07	10	28	10			60	57	54	81	20	4
10	10	29	12			65	59	54	68	19	8
13	10	40	20			67	59	53	61	23	12
16	0	UNL	20			67	59	53	61	28	14
19	0	UNL	20			62	56	52	70	27	8
22	0	UNL	15			59	55	52	78	27	8
DAY 22											
01	0	UNL	15			58	54	51	78	25	5
04	0	UNL	15			57	54	51	80	26	7
07	10	10	9			60	56	53	78	30	8
10	9	19	10			64	57	52	65	28	8
13	6	UNL	15			66	58	52	61	29	15
16	3	UNL	15			64	58	53	68	27	17
19	9	17	12			60	56	53	78	28	10
22	0	UNL	15			57	54	52	83	27	8
DAY 23											
01	8	16	15			58	55	52	81	26	6
04	10	16	15			58	55	52	81	29	5
07	10	17	15			59	55	51	78	29	7
10	9	21	15			61	56	52	72	27	8
13	5	UNL	20			66	58	52	61	28	15
16	3	UNL	15			65	58	53	65	28	17
19	10	15	12			60	56	52	75	28	12
22	10	15	15			59	55	52	78	27	11
DAY 24											
01	10	16	15			59	55	52	78	29	8
04	10	16	15			58	54	51	78	29	9
07	10	16	15			58	55	52	81	26	12
10	10	12	9			58	55	52	84	27	10
13	0	UNL	15			65	58	52	62	29	16
16	0	UNL	30			64	57	52	65	27	15
19	0	UNL	30			62	56	52	70	31	14
22	0	UNL	15			58	55	52	84	30	10
DAY 25											
01	8	14	15			57	54	52	83	26	11
04	9	13	15			57	54	52	83	27	9
07	7	15	15			58	55	52	81	29	9
10	1	UNL	15			64	57	52	65	27	7
13	0	UNL	15			66	58	52	61	29	16
16	0	UNL	30			64	57	52	65	28	18
19	0	UNL	30			59	56	53	81	27	16
22	10	12	15			57	54	52	83	27	14
DAY 26											
01	10	12	15			56	53	51	83	26	10
04	10	15	15			57	54	51	80	26	7
07	10	15	15			58	54	51	78	20	6
10	0	UNL	15			65	58	52	63	33	3
13	0	UNL	20			70	60	53	55	31	14
16	0	UNL	20			64	57	52	65	30	17
19	0	UNL	20			61	56	53	75	28	12
22	0	UNL	15			57	55	53	87	30	10
DAY 27											
01	0	UNL	15			56	54	53	90	29	6
04	0	UNL	15			55	53	52	90	29	5
07	0	UNL	9			58	55	53	84	32	3
10	0	UNL	7			69	62	57	66	06	5
13	0	UNL	12			76	63	55	48	30	15
16	0	UNL	30			70	60	53	55	30	22
19	0	UNL	30			62	56	52	70	31	14
22	0	UNL	15			58	55	53	84	30	10
DAY 28											
01	0	UNL	15			56	54	53	90	29	10
04	8	UNL	15			55	53	52	90	30	8
07	0	UNL	9			58	55	53	84	31	9
10	3	UNL	12			62	57	53	73	30	14
13	1	UNL	15			69	60	53	57	30	16
16	0	UNL	15			64	58	53	68	30	18
19	9	UNL	10			57	55	53	87	30	14
22	7	UNL	10			55	54	53	93	30	11
DAY 29											
01	10	UNL	10			54	53	52	93	29	9
04	10	250	10			54	53	52	93	25	6
07	10	120	10			56	54	53	90	24	4
10	9	120	10			62	57	54	75	32	10
13	0	UNL	25			65	58	53	65	31	15
16	0	UNL	30			64	58	53	68	29	17
19	7	200	20			59	56	54	84	30	16
22	0	UNL	12			57	55	54	90	30	12
DAY 30											
01	0	UNL	15			57	55	54	90	28	8
04	0	UNL	15			57	55	54	90	26	6
07	0	UNL	15			58	56	54	87	29	7
10	0	UNL	25			63	58	54	73	29	11
13	0	UNL	25			67	59	54	68	29	15
16	0	UNL	25			66	59	53	65	30	20
19	2	UNL	20			60	56	53	78	27	18
22	0	UNL	12			59	56	54	84	27	13
DAY 31											
01	10	10	15			59	57	55	87	27	13
04	10	8	15			58	56	54	87	27	10
07	10	8	10			56	54	53	90	29	10
10	1	UNL	8			62	57	53	73	29	12
13	0	UNL	20			64	58	53	68	30	18
16	0	UNL	30			67	59	53	61	31	14
19	0	UNL	20			61	55	51	70	31	12
22	0	UNL	12			57	54	52	83	28	13

NOTES

CEILING COLUMN—

UNL indicates an unlimited ceiling

WEATHER COLUMN—

*	Tornado
T	Thunderstorm
Q	Squall
R	Rain
RW	Rain showers
ZR	Freezing rain
L	Drizzle
ZL	Freezing drizzle
S	Snow
SP	Snow pellets
IC	Ice crystals
SW	Snow showers
SG	Snow grains
IP	Ice pellets
A	Hail
F	Fog
IF	Ice fog
GF	Ground fog
BD	Blowing dust
BN	Blowing sand
BS	Blowing snow
BY	Blowing spray
K	Smoke
H	Haze
D	Dust

WIND COLUMNS—

Directions are those from which the wind blows indicated in tens of degrees from true North, i e, 09 for East 18 for South 27 for West Entry of 00 in the direction column indicates calm

Speed is expressed in knots multiply by 1 15 to convert to miles per hour

ADDITIONAL DATA

Other observational data contained in records on file can be furnished at cost via microfilm, microfiche, or paper copies of the original records Inquiries as to availability and costs should be addressed to Director, National Climatic Center, Federal Building, Asheville, North Carolina 28801.

STATION SAN FRANCISCO CALIF YEAR & MONTH 72 07

U S DEPARTMENT OF COMMERCE
NATIONAL CLIMATIC CENTER
FEDERAL BUILDING
ASHEVILLE, N C 28801

LOCAL CLIMATOLOGICAL DATA

U S DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ENVIRONMENTAL DATA SERVICE

SAN FRANCISCO, CALIFORNIA
FEDERAL OFFICE BLDG.
JULY 1972

Latitude 37° 47' N Longitude 122° 25' W Elevation (ground) 52 ft Standard time used PACIFIC WBAN #23272

Date	Temperature °F: Maximum	Minimum	Average	Departure from normal	Average dew point	Degree days Base 65°: Heating	Cooling	Weather types on dates of occurrence (1 Fog, 2 Heavy fog x, 3 Thunderstorm, 4 Ice pellets, 5 Hail, 6 Glaze, 7 Duststorm, 8 Smoke Haze, 9 Blowing snow)	Snow ice pellets or ice on ground at 08AM In	Precipitation: Water equivalent In	Snow ice pellets In	Avg station pressure In - - - Elev 155 feet msl	Wind: Resultant direction	Resultant speed m p h	Average speed m p h	Fastest mile: Speed m p h	Direction	Sunshine: Hours and tenths	Percent of possible	Sky cover Tenths: Sunrise to sunset	Midnight to midnight	Date
1	64	54	59	1		6	0		0	0	0					26	SW	12.4	84			1
2	63	56	60	2		5	0		0	0	0					23	SW	11.6	79			2
3	63	57	60	2		5	0		0	0	0					21	W	10.2	69			3
4	62	54	58	0		7	0		0	0	0					22	W	12.1	82			4
5	63	54	59	0		6	0		0	0	0					20	W	10.2	69			5
6	61	54	58	-1		7	0		0	0	0					22	W	8.4	57			6
7	61	53	57	-2		8	0		0	0	0					23	W	10.6	72			7
8	66	53	60	1		5	0		0	0	0					26	W	13.6	92			8
9	65	54	60	1		5	0		0	0	0					26	W	14.0	95			9
10	65	54	60	1		5	0		0	0	0					20	SW	14.0	96			10
11	70	55	63	4		2	0		0	0	0					23	W	14.0	96			11
12	77	56	67	8		0	2		0	0	0					24	W	14.6	100			12
13	88	60	74	15		0	9		0	0	0					19	W	14.6	100			13
14	92*	59	76*	17		0	11		0	0	0					21	W	14.6	100			14
15	63	57	60	1		5	0		0	0	0					24	W	11.8	81			15
16	66	57	62	3		3	0		0	0	0					22	SW	12.5	86			16
17	63	58	61	2		4	0		0	0	0					16	W	8.9	61			17
18	66	56	61	2		4	0		0	T	0					18	W	8.0	55			18
19	63	55	59	0		6	0		0	.01	0					16	SW	7.7	53			19
20	65	57	61	2		4	0		0	T	0					17	SW	9.1	63			20
21	66	58	62	3		3	0		0	0	0					15	W	9.4	66			21
22	63	57	60	0		5	0		0	0	0					20	W	12.6	88			22
23	62	57	60	0		5	0		0	0	0					23	W	8.0	56			23
24	64	56	60	0		5	0		0	0	0					21	W	9.3	65			24
25	64	55	60	0		5	0		0	0	0					24	W	11.1	78			25
26	63	55	59	-1		6	0		0	0	0					22	SW	11.0	77			26
27	71	55	63	3		2	0		0	0	0					26	W	14.2	100			27
28	62	53	58	-2		7	0		0	0	0					26	W	10.3	73			28
29	61	53*	57*	-3		8	0		0	0	0					23	W	10.3	73			29
30	64	56	60	0		5	0		0	0	0					23	W	10.2	72			30
31	62	55	59	-1		6	0		0	0	0					23	SW	11.1	79			31
	Sum 2048	Sum 1723				Total 144	Total 22			Total .01	Total 0	For the month				26	W	Total 350.4	% for	Sum	Sum	
	Avg 66.1	Avg 55.6	Avg 60.9	Dep 2.1	Avg	Dep -48	Dep									Date 28+		Possible 448.9	month 78	Avg	Avg	

Number of days				Season to date	
Maximum Temp		Minimum Temp		Total	Total
≤ 90°‡	≥ 32°	≥ 32°	≤ 0°	Dep	Dep
1	0	0	0	-48	

Number of days	
Precipitation ≥ .01 inch	1
Snow, ice pellets ≥ 1.0 inch	0
Thunderstorms	
Heavy fog	X
Clear	Partly cloudy	Cloudy

Greatest in 24 hours and dates			
Precipitation		Snow ice pellets	
.01	19	0	

Greatest depth on ground of snow, ice pellets or ice and date
0

HOURLY PRECIPITATION (Water equivalent in inches) - Entry of Trace amounts may be incomplete.

Date	A M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	P M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	Date
1																									1
2																									2
3																									3
4																									4
5																									5
6																									6
7																									7
8																									8
9																									9
10																									10
11																									11
12																									12
13																									13
14																									14
15																									15
16																									16
17																									17
18																			T	T	T	T	T	T	18
19				T	.21	T	T																		19
20					T	T																			20
21																									21
22																									22
23																									23
24																									24
25																									25
26																									26
27																									27
28																									28
29																									29
30																									30
31																									31

* Extreme temperatures for the month May be the last of more than one occurrence
\- Below zero temperature or negative departure from normal
‡ ≤ 70° at Alaskan stations
\+ Also on an earlier date or dates
X Heavy fog restricts visibility to ¼ mile or less
T In the Hourly Precipitation table and in columns 9 10 and 11 indicates an amount too small to measure

The season for degree days begins with July for heating and with January for cooling
Data in columns 6, 12, 13 14 and 15 are based on 8 observations per day at 3 hour intervals
Wind directions are those from which the wind blows Resultant wind is the vector sum of wind directions and speeds divided by the number of observations Figures for directions are tens of degrees from true North i e 09 = East 18 = South 27 = West 36 = North and 00 = Calm When directions are in tens of degrees in Col 17 entries in Col 16 are fastest observed 1-minute speeds If the / appears in Col 17 speeds are gusts
Any errors detected will be corrected and changes in summary data will be annotated in the annual summary

Subscription Price Local Climatological Data $1.00 per year including annual summary if published. Single copy 10 cents for monthly summary, 15 cents for annual summary. Checks or money orders should be made payable and remittances and correspondence should be sent to the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

I certify that this is an official publication of the National Oceanic and Atmospheric Administration, and is compiled from records on file at the National Climatic Center, Asheville, North Carolina 28801.

William H. Haggard
Director, National Climatic Center

SUMMARY BY HOURS

Hour Local time	Sky cover Tenths	AVERAGES: Station pressure In.	Temperature: Air °F	Wet bulb °F	Dew Pt °F	Relative % humidity	Wind speed m p h	Resultant wind: Direction	Speed m p h

USCOMM — NOAA — ASHEVILLE

LOCAL CLIMATOLOGICAL DATA

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ENVIRONMENTAL DATA SERVICE

OAKLAND, CALIFORNIA
INTERNATIONAL AIRPORT
JULY 1972

Latitude 37° 44' N Longitude 122° 12' W Elevation (ground) 6 ft Standard time used PACIFIC WBAN #23230

Date	Temperature °F: Maximum	Minimum	Average	Departure from normal	Average dew point	Degree days Base 65°: Heating	Cooling	Weather types on dates of occurrence: 1 Fog, 2 Heavy fog x, 3 Thunderstorm, 4 Ice pellets, 5 Hail, 6 Glaze, 7 Duststorm, 8 Smoke, Haze, 9 Blowing snow	Snow ice pellets or ice on ground at 04AM In	Precipitation: Water equivalent In	Snow ice pellets In	Avg station pressure In	Wind: Resultant direction	Resultant speed m p h	Average speed m p h	Fastest mile: Speed m p h	Direction	Sunshine: Hours and tenths	Percent of possible	Sky cover Tenths: Sunrise to sunset	Midnight to midnight	Date
1	75	57	66	2	56	0	1		0	0	0	29.83	32	10.7	11.5	20	31			6	4	1
2	72	60	66	2	56	0	1		0	0	0	29.89	30	9.0	10.1	17	31			6	6	2
3	68	60	64	0	55	1	0		0	0	0	30.00	29	9.4	9.6	14	28			5	5	3
4	69	59	64	0	54	1	0		0	0	0	30.03	29	10.3	10.6	14	28			6	6	4
5	68	58	63	-2	53	2	0		0	0	0	30.03	29	11.1	11.4	15	28			4	6	5
6	63	57	60*	-5	54	5	0		0	T	0	30.04	26	9.9	10.2	16	27			8	8	6
7	65	57	61	-4	54	4	0		0	0	0	30.03	27	9.4	9.9	14	28			9	8	7
8	70	55	63	-2	55	2	0		0	0	0	30.03	28	5.9	8.2	16	28			3	4	8
9	68	57	63	-2	54	2	0		0	0	0	30.01	26	9.7	10.4	20	26			0	1	9
10	67	57	62	-3	54	3	0		0	0	0	29.97	28	7.0	8.6	14	27			0	1	10
11	79	57	68	3	57	0	3		0	0	0	29.97	29	6.4	7.8	15	30			0	0	11
12	83	60	72	7	59	0	7		0	0	0	29.96	30	7.9	8.3	16	30			0	0	12
13	94	63	79	14	60	0	14		0	0	0	29.87	30	7.1	7.8	15	31			1	0	13
14	99*	65	82*	17	60	0	17		0	0	0	29.73	30	7.3	7.6	14	31			0	0	14
15	76	61	69	4	58	0	4		0	0	0	29.77	33	12.2	12.7	20	33			0	2	15
16	74	61	68	3	59	0	3		0	0	0	29.86	30	8.4	9.2	14	31			2	4	16
17	70	62	66	1	60	0	1		0	0	0	29.95	30	11.4	12.4	20	31			5	7	17
18	68	61	65	0	58	0	0		0	T	0	29.97	28	12.7	12.9	18	26			6	8	18
19	64	59	62	-3	55	3	0		0	T	0	29.90	27	12.9	13.1	16	24			9	9	19
20	64	60	62	-3	56	3	0		0	T	0	29.88	24	11.2	11.4	15	25			10	10	20
21	68	61	65	0	56	0	0		0	T	0	29.99	26	8.6	9.5	14	28			6	5	21
22	66	60	63	-2	55	2	0		0	0	0	30.01	27	10.7	10.8	16	27			6	5	22
23	66	60	63	-1	54	2	0		0	0	0	29.97	28	10.0	10.1	17	27			7	8	23
24	67	59	63	-1	55	2	0		0	T	0	29.95	27	10.1	10.5	14	28			5	5	24
25	66	58	62	-2	55	3	0		0	0	0	29.96	27	10.8	11.2	17	27			3	5	25
26	68	58	63	-1	54	2	0		0	0	0	30.00	29	8.4	9.6	14	30			3	4	26
27	75	55*	65	1	57	0	0	-	0	0	0	29.98	30	5.7	7.3	16	31			0	0	27
28	69	57	63	-1	56	2	0		0	0	0	29.95	30	10.0	10.6	15	29			3	4	28
29	67	57	62	-2	56	3	0		0	T	0	29.93	30	10.3	11.9	16	31			5	6	29
30	67	59	63	-1	56	2	0		0	0	0	30.00	28	9.6	9.8	16	31			4	6	30
31	66	58	62	-2	56	3	0		0	0	0	30.09	27	10.0	10.2	16	29			4	4	31
	Sum 2201	Sum 1828				Total 47	Total 51	Number of days		Total T	Total 0	For the month 29.95	28	8.9	10.2	20	31	Total	% for	Sum 126	Sum 141	
	Avg 71.0	Avg 59.0	Avg 65.0	Dep 0.7	Avg 56	Dep -6		Precipitation ≥ .01 inch 0		Dep 0.00						Date	17+	Possible	month	Avg 6.1	Avg 4.5	

Season to date: Snow, ice pellets ≥ 1.0 inch 0; Thunderstorms 0; Heavy fog X 0; Clear 13; Partly cloudy 14; Cloudy 4

Number of days: Maximum Temp ≤ 90° ‡	Maximum Temp ≥ 32°	Minimum Temp ≥ 32°	Minimum Temp ≥ 0°	Season to date Total	Total
2	0	0	0	Dep -6	Dep
				47	80

Greatest in 24 hours and dates: Precipitation T; Snow, ice pellets 29+; Greatest depth on ground of snow, ice pellets or ice and date: 0; Ice pellets 0

HOURLY PRECIPITATION (Water equivalent in inches)

Date	A M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	P M Hour ending at: 1	2	3	4	5	6	7	8	9	10	11	12	Date
1																									1
2																									2
3																									3
4																									4
5																									5
6										T	T														6
7																									7
8																									8
9																									9
10																									10
11																									11
12																									12
13																									13
14																									14
15																									15
16																									16
17																									17
18																				T	T	T	T		18
19	T	T				T	T																		19
20																									20
21						T																			21
22																									22
23																									23
24										T	T														24
25																									25
26																									26
27																									27
28																									28
29							T																		29
30																									30
31																									31

* Extreme temperatures for the month May be the last of more than one occurrence
– Below zero temperature or negative departure from normal
‡ ≤ 70° at Alaskan stations
\+ Also on an earlier date or dates
X Heavy fog restricts visibility to ¼ mile or less
T In the Hourly Precipitation table and in columns 9 10 and 11 indicates an amount too small to measure

The season for degree days begins with July for heating and with January for cooling
Data in columns 6 12 13 14 and 15 are based on 8 observations per day at 3-hour intervals
Wind directions are those from which the wind blows Resultant wind is the vector sum of wind directions and speeds divided by the number of observations Figures for directions are tens of degrees from true North ie 09 = East 18 = South 27 = West 36 = North and 00 = Calm When directions are in tens of degrees in Col 17 entries in Col 16 are fastest observed 1-minute speeds If the / appears in Col 17 speeds are gusts
Any errors detected will be corrected and changes in summary data will be annotated in the annual summary

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I certify that this is an official publication of the National Oceanic and Atmospheric Administration, and is compiled from records on file at the National Climatic Center, Asheville, North Carolina 28801.

William H. Haggard
Director, National Climatic Center

SUMMARY BY HOURS

Hour Local Time	AVERAGES: Sky cover Tenths	Station pressure In	Temperature: Air °F	Wet bulb °F	Dew Pt °F	Relative humidity %	Wind speed m p h	Resultant wind: Direction	Speed m p h
01	6	29.94	61	58	56	84	9.3	28	8.2
04	7	29.94	60	57	55	85	8.4	29	6.1
07	7	29.97	61	58	55	83	6.6	29	4.7
10	5	29.98	64	60	56	75	8.2	27	7.4
13	3	29.97	70	62	56	64	12.2	29	11.4
16	1	29.94	69	62	56	65	13.6	29	12.9
19	3	29.93	64	60	56	76	12.5	29	11.6
22	4	29.96	61	58	56	83	10.5	28	9.5

OBSERVATIONS AT 3-HOUR INTERVALS

HOUR	SKY COVER Tenths	CEILING Hnds of ft	VISIBILITY Whole Miles	VISIBILITY Tenths Mile	WEATHER	TEMPERATURE AIR °F	TEMPERATURE WET BULB °F	TEMPERATURE DEW PT °F	REL HUM %	WIND DIR	WIND SPEED Knots
DAY 01											
01	3	UNL	9			60	57	55	84	33	7
04	4	UNL	9			58	56	55	90	33	10
07	10	UNL	7			60	57	55	84	35	8
10	7	UNL	8			67	61	57	70	28	8
13	6	UNL	12			72	63	57	59	31	16
16	2	UNL	12			71	63	58	64	30	11
19	2	UNL	10			65	60	57	75	34	14
22	0	UNL	12			61	59	57	87	35	6
DAY 02											
01	2	UNL	12			61	58	56	84	30	6
04	10	18	12			61	58	56	84	01	7
07	10	17	12			61	58	56	84	27	7
10	3	UNL	12			65	59	55	70	28	5
13	6	UNL	14			71	62	56	59	31	15
16	3	UNL	14			69	61	56	63	30	12
19	3	UNL	14			64	59	56	75	28	11
22	4	UNL	12			61	58	56	84	27	7
DAY 03											
01	10	12	12			61	58	56	84	28	8
04	10	15	12			61	58	55	81	28	7
07	10	16	16			61	58	55	81	30	5
10	8	21	10			64	59	53	78	32	7
13	2	UNL	10			66	60	53	68	30	10
16	0	UNL	15			67	60	53	66	29	10
19	0	UNL	15			62	58	53	78	29	10
22	1	UNL	15			61	58	55	81	28	10
DAY 04											
01	7	17	15			60	57	55	84	30	9
04	10	15	15			60	57	54	81	27	8
07	10	16	15			59	56	53	81	32	7
10	2	UNL	15			63	58	54	73	27	6
13	3	UNL	25			69	60	54	59	30	12
16	5	UNL	25			67	59	54	63	28	11
19	8	250	20			61	57	54	78	29	11
22	9	UNL	15			59	56	54	84	30	10
DAY 05											
01	9	15	15			59	56	54	84	29	7
04	10	16	15			58	55	53	84	28	10
07	10	15	15			58	55	52	81	30	7
10	10	21	15			61	56	52	72	29	7
13	0	UNL	20			66	58	52	61	31	11
16	0	UNL	30			65	58	53	65	30	13
19	0	UNL	20			60	57	54	81	28	13
22	9	15	15			59	56	54	84	28	11
DAY 06											
01	10	9	15			58	56	55	90	25	8
04	10	9	15			57	55	54	90	25	9
07	10	9	9			57	55	54	90	28	5
10	10	8	9		L	58	56	54	87	25	10
13	10	13	10			60	57	55	84	28	7
16	2	UNL	10			63	58	54	73	28	12
19	3	UNL	10			60	57	54	81	27	10
22	7	14	12			58	55	53	84	26	10
DAY 07											
01	10	14	12			58	55	53	84	27	10
04	10	11	12			57	55	53	87	24	8
07	10	11	9			57	55	53	87	23	7
10	10	16	10			60	56	53	78	27	8
13	10	UNL	20			63	58	54	73	29	9
16	6	UNL	20			64	59	55	73	27	8
19	7	UNL	20			61	57	54	78	29	9
22	6	UNL	15			58	56	54	87	27	10
DAY 08											
01	4	UNL	15			58	56	54	87	00	0
04	10	UNL	15			56	54	53	90	05	5
07	6	UNL	30			60	57	54	81	04	3
10	2	UNL	30			64	58	53	68	23	6
13	0	UNL	40			70	62	57	64	27	11
16	0	UNL	40			68	63	59	73	29	12
19	7	UNL	30			64	60	57	78	28	10
22	6	UNL	15			60	57	55	84	26	10
DAY 09											
01	6	UNL	15			59	56	54	84	25	7
04	10	UNL	15			57	54	52	83	33	6
07	10	UNL	15			61	57	54	78	00	0
10	0	UNL	15			65	59	55	70	27	6
13	0	UNL	25			68	60	54	61	27	15
16	0	UNL	25			67	59	54	63	26	17
19	0	UNL	25			64	58	53	68	26	12
22	0	UNL	15			61	58	52	72	24	9
DAY 10											
01	0	UNL	15			60	56	52	75	27	6
04	0	UNL	15			58	54	51	78	35	4
07	0	UNL	15			60	56	53	78	12	4
10	0	UNL	15			65	59	54	68	26	7
13	0	UNL	15			66	59	54	65	27	10
16	0	UNL	15			66	60	55	68	28	11
19	2	UNL	15			62	58	55	78	28	10
22	4	UNL	12			60	57	55	84	27	8
DAY 11											
01	0	UNL	15			60	57	55	84	25	9
04	0	UNL	15			58	55	53	84	03	3
07	0	UNL	10			62	58	56	81	00	0
10	0	UNL	9			67	62	58	73	23	6
13	0	UNL	12			75	65	58	56	30	10
16	0	UNL	15			74	64	58	58	30	11
19	0	UNL	15			69	62	58	68	30	9
22	0	UNL	15			63	60	58	84	31	6
DAY 12											
01	0	UNL	12			62	59	57	81	31	7
04	0	UNL	12			61	58	56	84	34	5
07	0	UNL	9			65	61	58	78	31	3
10	0	UNL	7			72	64	59	64	26	5
13	0	UNL	9			83	68	60	46	30	10
16	0	UNL	15			78	67	60	54	30	13
19	0	UNL	20			73	65	60	64	31	11
22	0	UNL	15			66	61	58	76	27	4
DAY 13											
01	0	UNL	15			65	61	58	78	33	5
04	0	UNL	15			64	60	58	81	01	4
07	3	UNL	15			70	64	60	71	27	3
10	0	UNL	7			76	68	62	64	27	7
13	0	UNL	10			93	71	59	32	30	10
16	0	UNL	20			91	70	58	33	30	10
19	0	UNL	30			79	68	62	56	30	10
22	0	UNL	15			71	65	61	71	30	5
DAY 14											
01	0	UNL	15			68	64	61	78	29	6
04	0	UNL	15			66	62	60	81	33	5
07	0	UNL	15			71	64	60	68	30	3
10	0	UNL	10			80	70	64	58	27	6
13	0	UNL	10			97	74	62	31	31	10
16	0	UNL	20			91	69	56	31	32	10
19	0	UNL	20			81	67	59	47	29	6
22	0	UNL	15			70	63	59	68	30	7
DAY 15											
01	0	UNL	12			64	60	57	78	32	10
04	0	UNL	12			62	58	56	81	32	10
07	3	UNL	10			63	59	56	78	36	7
10	0	UNL	8			71	64	60	68	30	8
13	0	UNL	12			73	64	58	59	34	12
16	0	UNL	10			72	64	59	64	32	15
19	0	UNL	9			65	61	59	81	34	16
22	0	UNL	10			62	60	59	90	34	10
DAY 16											
01	10	6	10			62	60	59	90	32	8
04	10	9	10			62	60	58	87	33	8
07	10	12	15			62	60	58	87	34	6
10	9	UNL	15			68	63	59	73	23	3
13	9	UNL	20			74	65	59	60	29	9
16	0	UNL	20			73	66	61	66	30	10
19	0	UNL	20			69	63	59	71	31	10
22	0	UNL	15			65	62	60	84	28	10
DAY 17											
01	10	14	12			64	62	60	87	27	7
04	10	9	12			63	61	59	87	30	11
07	10	8	10			62	60	59	90	36	5
10	9	15	10			68	63	60	76	34	8
13	9	UNL	12			70	64	61	73	30	14
16	0	UNL	12			67	63	60	78	31	17
19	2	UNL	11			65	61	59	81	29	12
22	0	UNL	15			63	61	59	87	28	12
DAY 18											
01	10	15	12			63	60	58	84	26	10
04	10	15	12			63	60	58	84	27	12
07	10	14	12			62	60	58	87	28	11
10	10	15	12			63	60	58	84	29	9
13	0	UNL	20			67	62	58	73	29	9
16	0	UNL	20			68	62	58	71	28	12
19	0	UNL	20			63	57	57	81	26	15
22	0	UNL	15			61	59	57	87	28	12
DAY 19											
01	10	11	10		L	60	58	57	90	27	9
04	10	14	12			60	58	57	90	26	11
07	10	20	15			59	56	54	84	27	11
10	10	18	15			61	57	54	78	27	11
13	8	23	15			63	57	53	70	27	12
16	7	28	20			64	58	54	70	27	13
19	10	25	15			61	58	55	81	28	12
22	10	16	15			61	58	55	81	25	12
DAY 20											
01	10	22	15			61	57	54	78	25	10
04	10	23	15			60	57	55	84	22	6
07	10	28	15			60	58	56	87	24	9
10	10	17	20			62	58	56	81	23	11
13	8	29	30			64	59	56	75	23	10
16	7	34	30			64	59	56	75	23	13
19	10	35	20			63	59	57	81	24	10
22	10	25	15			63	59	57	81	24	10
DAY 21											
01	10	24	15			63	59	57	81	23	10
04	10	28	15			63	59	57	81	24	8
07	10	19	12			61	59	58	90	22	5
10	10	35	15			63	59	57	81	28	7
13	7	28	20			66	60	56	70	25	8
16	7	28	20			68	61	56	66	29	9
19	10	25	15			64	59	55	73	28	12
22	10	16	15			62	57	54	75	29	7
DAY 22											
01	0	UNL	12			61	57	54	78	28	6
04	2	UNL	12			60	57	54	81	28	8
07	10	18	12			61	58	55	81	28	8
10	9	22	12			61	57	54	78	27	6
13	6	UNL	12			66	60	55	68	27	11
16	3	UNL	10			66	60	56	70	27	14
19	3	UNL	9			61	58	56	84	27	12
22	7	19	12			60	57	55	84	28	10
DAY 23											
01	10	16	10			60	57	55	84	28	8
04	10	16	12			60	57	54	81	28	5
07	10	19	15			60	56	53	78	29	6
10	9	19	15			60	57	54	81	27	8
13	6	UNL	20			64	58	54	70	27	10
16	0	UNL	12			65	59	55	70	29	9
19	3	UNL	9			61	58	55	81	27	12
22	9	19	9			60	57	54	81	28	12
DAY 24											
01	10	16	10			60	57	54	81	28	12
04	10	15	15			60	57	54	81	27	7
07	10	15	13			60	57	54	81	27	8
10	10	9	8		L	59	57	55	87	23	5
13	0	UNL	15			64	59	55	73	28	6
16	0	UNL	20			66	60	55	68	29	12
19	0	UNL	25			62	58	55	78	28	12
22	0	UNL	15			60	57	55	84	25	11
DAY 25											
01	6	19	12			59	57	55	87	25	10
04	10	14	12			59	57	55	87	27	5
07	10	16	12			59	56	54	84	25	8
10	2	UNL	12			62	58	55	78	28	7
13	0	UNL	13			65	59	55	70	30	11
16	0	UNL	15			66	60	55	68	28	12
19	0	UNL	15			62	58	55	78	30	10
22	8	12	15			60	57	55	84	26	12
DAY 26											
01	10	14	15			58	56	54	87	26	9
04	10	13	15			58	55	53	84	24	9
07	10	17	15			59	56	53	81	27	8
10	7	21	15			61	56	53	75	28	5
13	0	UNL	15			67	60	55	66	33	10
16	0	UNL	15			66	60	56	70	31	11
19	0	UNL	15			63	58	55	75	30	10
22	0	UNL	15			59	57	55	87	31	5
DAY 27											
01	0	UNL	15			58	56	55	90	26	4
04	0	UNL	15			57	55	54	90	08	4
07	0	UNL	10			60	58	56	87	00	0
10	0	UNL	10			64	61	59	84	25	6
13	0	UNL	12			73	64	58	59	29	9
16	0	UNL	15			74	64	58	58	29	11
19	0	UNL	15			67	61	58	68	30	10
22	0	UNL	15			62	58	56	81	29	7
DAY 28											
01	0	UNL	15			60	58	56	87	32	12
04	0	UNL	12			58	56	55	90	32	9
07	4	UNL	8			58	56	56	87	34	7
10	4	UNL	12			62	58	55	78	28	9
13	2	UNL	15			68	61	56	66	30	9
16	1	UNL	15			66	61	57	73	30	12
19	3	UNL	15			61	58	56	84	27	8
22	8	9	10			58	56	55	90	29	8
DAY 29											
01	10	5	7			57	56	55	93	31	11
04	10	6	10			58	56	55	90	25	7
07	10	9	10			58	56	55	90	19	5
10	7	120	15			63	59	56	78	31	11
13	1	UNL	20			66	60	56	70	31	12
16	0	UNL	20			66	60	56	70	28	13
19	0	UNL	20			63	59	56	78	29	10
22	0	UNL	15			60	58	56	87	32	14
DAY 30											
01	0	UNL	15			60	58	56	87	28	9
04	0	UNL	15			60	58	56	87	26	8
07	0	UNL	15			60	58	56	87	27	5
10	0	UNL	15			62	58	56	81	28	6
13	0	UNL	15			66	60	56	70	29	11
16	0	UNL	15			67	61	57	70	29	10
19	0	UNL	15			62	58	56	81	29	10
22	0	UNL	15			61	58	56	84	28	9
DAY 31											
01	10	11	10			61	58	56	84	26	10
04	10	9	10			60	58	57	90	26	8
07	10	8	9			60	58	56	87	30	7
10	10	12	9			61	58	56	84	27	7
13	0	UNL	15			64	59	56	73	27	11
16	0	UNL	20			66	60	56	70	28	12
19	0	UNL	15			62	58	56	81	27	8
22	0	UNL	12			60	57	55	84	26	8

NOTES

CEILING COLUMN—

UNL indicates an unlimited ceiling

WEATHER COLUMN—

*	Tornado
T	Thunderstorm
Q	Squall
R	Rain
RW	Rain showers
ZR	Freezing rain
L	Drizzle
ZL	Freezing drizzle
S	Snow
SP	Snow pellets
IC	Ice crystals
SW	Snow showers
SG	Snow grains
IP	Ice pellets
A	Hail
F	Fog
IF	Ice fog
GF	Ground fog
BD	Blowing dust
BN	Blowing sand
BS	Blowing snow
BY	Blowing spray
K	Smoke
H	Haze
D	Dust

WIND COLUMNS—

Directions are those from which the wind blows indicated in tens of degrees from true North i e, 09 for East 18 for South 27 for West Entry of 00 in the direction column indicates calm

Speed is expressed in knots multiply by 1 15 to convert to miles per hour

ADDITIONAL DATA

Other observational data contained in records on file can be furnished at cost via microfilm, microfiche, or paper copies of the original records Inquiries as to availability and costs should be addressed to Director, National Climatic Center, Federal Building, Asheville, North Carolina 28801

STATION OAKLAND CALIFORNIA YEAR & MONTH 72 07

U S DEPARTMENT OF COMMERCE
NATIONAL CLIMATIC CENTER
FEDERAL BUILDING
ASHEVILLE, N C 28801

SAN JOSE WEATHER STATION
DEPARTMENT OF CIVIL DEFENSE - CITY OF SAN JOSE
MONTHLY METEOROLOGICAL SUMMARY
120th MERIDIAN TIME

SAN JOSE, CALIFORNIA (CO-OPERATIVE STATION OF THE NATIONAL WEATHER SERVICE) July 1972

ATITUDE 37° 20' N. LONGITUDE 12° 53' W. ELEVATION (GROUND) 67 ft. PACIFIC STANDARD TIME USED

DATE	TEMPERATURES (F) EXTREMES MAXIMUM	EXTREMES MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	DEGREE DAYS - BASE 65°	ATMOSPHERIC PRESSURE AT 4 00 PM PST	MOISTURE DEWPOINT AT 4 00 PM PST	RELATIVE HUMIDITY AT 4 00 PM PST	PRECIPITATION (INCHES AND HUNDREDTHS) MIDNIGHT TO MIDNIGHT	WIND DAILY PREVAILING WIND DIRECTION	AVERAGE SPEED	FASTEST MILE DIRECTION	FASTEST MILE SPEED (MPH)
1	97	58	78	+11	0	29.77	60	48	.00	S	6.3	NW	11
2	82	57	70	+ 3	0	29.84	59	50	.00	NW	6.7	NW	12
3	79	60	70	+ 3	0	29.95	59	55	.00	NW	6.0	N	13
4	78	60	69	+ 1	0	29.98	55	53	.00	N	5.6	NW	13
5	76	58	67	- 1	0	29.97	58	58	.00	N	5.9	N	12
6	74	57	66	- 2	0	29.99	54	60	.00	N	6.5	NW	13
7	77	51	64	- 4	1	29.99	59	55	.00	NW	5.8	NW	11
8	82	54	68	0	0	29.98	58	52	.00	N	6.8	N	16
9	79	57	68	0	0	29.98	48	35	.00	NW	6.7	NW	16
10	81	56	69	+ 1	0	29.92	56	54	.00	NW	6.1	NW	13
11	91	55	73	+ 5	0	29.90	60	38	.00	NW	4.7	NW	11
12	98	61	80	+12	0	29.90	62	32	.00	NW	4.5	NW	11
13	103	65	84	+16	0	29.77	61	27	.00	NW	5.0	NW	16
14	108	68	88	+20	0	29.66	61	24	.00	NW	4.5	NW	13
15	105	63	84	+16	0	29.75	62	46	.00	NW	5.9	NW	11
16	85	61	73	+ 5	0	29.80	45	43	.00	S	8.2	SW	16
17	83	61	72	+ 4	0	29.89	64	63	.00	NW	6.6	NW	14
18	80	60	70	+ 2	0	29.88	59	55	.00	NW	7.2	N	16
19	76	61	69	+ 1	0	29.83	52	52	.00	N	7.4	NW	16
20	75	60	68	0	0	29.85	56	57	.00	S	7.7	SW	18
21	76	62	69	+ 1	0	29.94	57	54	.00	SW	7.6	NW	17
22	76	55	66	- 3	0	29.95	56	54	.00	N	5.8	NW	13
23	74	58	66	- 3	0	29.90	58	61	.00	NW	6.4	NW	13
24	75	59	67	- 2	0	29.88	56	54	.00	N	7.0	NW	15
25	77	54	66	- 3	0	29.90	57	54	.00	N	6.7	NW	15
26	80	56	68	- 1	0	29.93	57	31	.00	NW	4.3	NW	13
27	90	53	72	+ 3	0	29.90	57	35	.00	NW	4.8	NW	13
28	88	57	73	+ 4	0	29.85	63	55	.00	NW	5.5	NW	13
29	82	58	70	+ 1	0	29.83	59	50	.00	NW	6.2	NW	11
30	79	60	70	+ 1	0	29.94	60	59	.00	NW	6.2	NW	13
31	80	59	70	+ 1	0	30.03	59	50	.00	NW	5.6	NW	11
SUM/MEAN	83	59	71	+ 3	(1)	29.89	58	49	.00	NW	6.1	SW	18
NORMALS	81	55	68	---	(12)	29.93	--	50	T	NW	6.2		

ATMOSPHERIC PRESSURE

HIGHEST . . . . . 30.03, DATE 31
LOWEST . . . . . 29.66, DATE 14

TEMPERATURE

HIGHEST . . . . . 108, DATE 14
LOWEST . . . . . 51, DATE 7
GREATEST DAILY RANGE . 42, DATE 15
LOWEST DAILY RANGE . . 14, DATE 21

HEATING DEGREE DAYS (BASE 65°)

TOTAL THIS MONTH 1
DEPARTURE FROM NORMAL . . . . . -11
SEASONAL TOTAL SINCE JULY 1 . . 1
SEASONAL DEPARTURE FROM NORMAL -11

RAINFALL

GREATEST FALL THIS MONTH IN - - -
5 MINUTES . . . . . .00, DATE 00
10 MINUTES . . . . . .00, DATE 00
15 MINUTES . . . . . .00, DATE 00
30 MINUTES . . . . . .00, DATE 00
1 HOUR . . . . . .00, DATE 00
2 HOURS . . . . . .00, DATE 00
24 HOURS . . . . . .00, DATE 00

SEASONAL TOTAL ON JULY 31, 1972
SINCE JULY 1, 1972,
YEAR TOTAL 00
LAST YEAR TOTAL .00

DEFICIENCY OR EXCESS THIS MONTH AS
COMPARED WITH NORMAL . . . . . - T

ACCUMULATED EXCESS OR DEFICIENCY ON
JULY 31, 1972 SINCE JULY 1, 1972 - T

WIND

TOTAL MOVEMENT IN MILES . . 4561
AVERAGE HOURLY VELOCITY . . 6.1
PREVAILING DIRECTION . . . NW
FASTEST MILE THIS MONTH . . 18
DIRECTION NW, DATE 20

PRECIPITATION

DAYS WITH - - - - - -
.01 INCH OR MORE OF RAIN . . . 0
.10 INCH OR MORE OF RAIN . . . 0
.25 INCH OR MORE OF RAIN . . . 0

MISCELLANEOUS PHENOMENA

DAYS WITH - - - - - - - -
FOG 0
THUNDERSTORMS 0
HAIL 0

COMPARATIVE DATA FOR THIS MONTH FROM THE RECORDS OF PREVIOUS YEARS

TEMPERATURES

HIGHEST THIS MONTH - 106,DATE 3, 1931
LOWEST THIS MONTH - 43,DATE 4, 1909
NEW HIGH RECORD - 108,DATE 14, 1972

PRECIPITATION

GREATEST FALL THIS MONTH IN - - - -
5 MINUTES 02,DATE 22, 1913
10 MINUTES 02,DATE 22, 1913
15 MINUTES 03,DATE 30, 1966
30 MINUTES 04,DATE 22, 1913
1 HOUR 07,DATE 30, 1966
2 HOURS 10,DATE 30, 1966
24 HOURS 21,DATE 30, 1966

WIND

AVERAGE HOURLY VELOCITY (MILES) 6.2
PREVAILING DIRECTION . . . . . NW
MAXIMUM VELOCITY RECORDED FOR THIS MONTH SINCE 1908, 30 MPH
DIRECTION SW, DATE 9, 1932
GREATEST AVERAGE VELOCITY FOR WHOLE MONTH - 8.0 MPH - YEAR 1924.

MEAN TEMPERATURE (T) & TOTAL RAINFALL (R)

	T	R		T	R		T	R
1920	64	T	1938	68	T	1956	68	.00
1921	67	.00	1939	67	T	1957	70	T
1922	68	T	1940	63	.00	1958	69	T
1923	65	.00	1941	70	.00	1959	70	.00
1924	65	.00	1942	69	T	1960	69	.02
1925	69	.02	1943	68	.00	1961	71	T
1926	69	.00	1944	66	T	1962	67	.00
1927	67	T	1945	69	.00	1963	67	.00
1928	66	.00	1946	68	T	1964	67	T
1929	67	.00	1947	65	.00	1965	68	T
1930	66	.00	1948	68	.00	1966	67	.21
1931	71	.00	1949	67	.01	1967	71	.00
1932	66	.00	1950	69	T	1968	68	T
1933	68	.00	1951	67	.00	1969	70	.00
1934	66	.00	1952	69	.04	1970	70	.00
1935	67	T	1953	69	.00	1971	69	T
1936	70	.03	1954	69	.00	1972	71	.00
1937	69	.00	1955	66	T			

PRECIPITATION

AVERAGE NUMBER OF DAYS THIS MONTH WITH - - -
.01 INCH OR MORE OF RAIN 0
.25 INCH OR MORE OF RAIN 0

GREATEST NUMBER OF DAYS THIS MONTH WITH - - -
.01 INCH OR MORE OF RAIN 2
YEAR - 1913 & 1936

AVERAGE WEATHER TO BE EXPECTED AUGUST

DAILY SUNSHINE . . . . . 11 HOURS
DAYS CLEAR 24
PARTLY CLOUDAY 6
CLOUDAY 2
RAINFALL 03
HOURLY WIND VELOCITY . . 6.0
PREVAILIND WIND DIRECTION NW
AVERAGE MAXIMUM TEMPERATURE 80
MINIMUM TEMPERATURE 55

T INDICATES TRACE • AND OTHER DATES ( ) INDICATES ESTIMATED OR NOT AVAILABLE

VIII. TIDE DATA[2]

The phase data of the tide for each of the two missions, are presented in Table VIII-1. These values are referenced to the Golden Gate in San Francisco as shown in Figure 1.

TABLE VIII-1

SAN FRANCISCO (GOLDEN GATE), CALIFORNIA, 1972

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

	APRIL					JULY				
DAY	TIME H.M.	HT. FT.	DAY	TIME H.M.	HT. FT.	DAY	TIME H.M.	HT. FT.	DAY	TIME H.M.	HT. FT.
1	0024	5.2	16	0021	6.3	1	0135	5.0	16	0308	4.3
SA	0655	0.1	SU	0723	-1.4	SA	0824	-0.2	SU	0902	1.1
	1354	4.2		1429	4.6		1536	5.2		1605	5.4
	1833	2.3		1855	2.6		2104	2.4		2232	1.8
2	0047	5.2	17	0108	6.1	2	0234	4.5	17	0420	3.8
SU	0736	0.1	M	0819	-1.3	SU	0903	0.3	M	0944	1.7
	1443	4.0		1537	4.4		1610	5.4		16.45	5.4
	1904	2.6		1952	2.9		2213	1.9		2335	1.4
3	0113	5.1	18	0203	5.8	3	0354	4.0	18	0546	3.5
M	0824	0.1	TU	0925	-1.0	M	0946	0.9	TU	1027	2.2
	1543	3.8		1647	4.4		1650	5.7		1726	5.4
	1937	2.9		2106	3.1		2327	1.2			
4	0151	5.0	19	0306	5.4	4	0522	3.7	19	0042	1.0
TU	0921	0.2	W	1029	-0.6	TU	1034	1.6	W	0717	3.5
	1654	3.7		1750	4.5		1731	6.0		1115	2.7
	2032	3.1		2236	3.0					1809	5.5
5	0237	4.9	20	0420	5.0	5	0035	0.5	20	0136	0.6
W	1017	0.2	TH	1134	-0.3	W	0702	3.6	TH	0833	3.7
	1803	3.8		1849	4.6		1133	2.2		1219	3.0
	2141	3.3					1816	6.2		1858	5.6
6	0334	4.8	21	0004	2.7	6	0137	-0.2	21	0223	0.2
TH	1124	0.2	F	0543	4.7	TH	0831	3.8	F	0936	3.9
	1906	4.0		1233	0.0		1234	2.6		1308	3.2
	2309	3.2		1938	4.9		1908	6.5		1946	5.7
7	0449	4.7	22	0119	2.2	7	0235	-0.8	22	0310	-0.1
F	1220	0.1	SA	0659	4.5	F	0941	4.1	SA	1023	4.1
	1947	4.3		1326	0.3		1333	2.9		1404	3.2
				2019	5.1		2006	6.7		2032	5.8

TABLE VIII-1
(Cont)
SAN FRANCISCO (GOLDEN GATE), CALIFORNIA, 1972

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

APRIL						JULY					
DAY	TIME H.M.	HT. FT.	DAY	TIME H.M.	HT. FT.	DAY	TIME H.M.	HT. FT.	DAY	TIME H.M.	HT. FT.
8	0025	2.9	23	0215	1.7	8	0329	-1.3	23	0347	-0.4
SA	0613	4.7	SU	0809	4.4	SA	1040	4.4	SU	1102	4.3
	1311	0.0		1409	0.6		1437	3.0		1451	3.2
	2022	4.6		2055	5.3		2057	6.8		2110	6.0
9	0128	2.3	24	0303	1.1	9	0418	-1.6	24	0424	-0.6
SU	0727	4.8	M	0910	4.4	SU	1127	4.7	M	1135	4.5
	1357	0.0		1449	1.0		1538	3.0		1540	3.1
	2054	4.9		2.26	5.4		2151	6.8		2153	6.1
10	0223	1.6	25	0344	0.6	10	0506	-1.6	25	0459	-0.8
M	0831	4.9	TU	1005	4.4	M	1214	4.9	TU	1210	4.7
	1443	0.2		1524	1.4		1629	2.9		1623	3.0
	2125	5.3		2153	5.5		2246	6.7		2234	6.1
11	0312	0.8	26	0421	0.2	11	0552	-1.5	26	0533	-0.8
TU	0933	5.0	W	1052	4.4	TU	1256	5.0	W	1239	4.8
	1524	0.5		1554	1.8		1727	2.8		1706	2.8
	2155	5.6		2222	5.5		2335	6.4		2311	6.0
12	0401	0.0	27	0455	-0.1	12	0635	-1.2	27	0606	-0.7
W	1030	5.1	TH	1142	4.4	W	1336	5.2	TH	1307	5.0
	1601	0.9		1623	2.1		1821	2.7		1752	2.5
	2224	6.0		2246	5.5					2356	5.8
13	0450	-0.7	28	0525	-0.3	13	0024	6.0	28	0638	-0.4
TH	1130	5.0	F	1225	4.3	TH	0712	-0.8	F	1335	5.2
	1641	1.3		1656	2.4		1413	5.3		1847	2.2
	2302	6.2		2309	5.4		1918	2.5			
14	0539	-1.2	29	0600	-0.4	14	0115	5.4	29	0043	5.4
F	1230	4.9	SA	1306	4.3	F	0750	-0.2	SA	0713	0.0
	1723	1.8		1727	2.7		1453	5.3		1409	5.4
	2339	6.3		2338	5.4		2021	2.3		1941	1.9
15	0627	-1.4	30	0635	-0.5	15	0210	4.8	30	0139	5.0
SA	1327	4.8	SU	1354	4.2	SA	0827	0.4	SU	0749	0.5
	1806	2.2		1800	2.9		1530	5.4		1439	5.6
				2359	5.3		2124	2.1		2045	1.5
									31	0245	4.4
									M	0830	1.1
										1516	5.8
										2153	1.1

The tidal phase differences at other numerous locations in the Bay area are given in Table VIII-2. To determine the time of high water or low water at any station listed in this table there is given in the columns headed "Differences, Time" the hours and minutes to be added to or subtracted from the time of high or low water at some reference station. A plus (+) sign indicates that the tide at the subordinate station is later than at the reference station and the difference is added, a minus (-) sign that it is earlier and is subtracted. For height differences, a plus (+) sign indicates that the difference is added to the height at the reference station and a minus (-) sign that it is subtracted.

TABLE VIII-2

TIDAL DIFFERENCES

PLACE	POSITION				DIFFERENCES					RANGES		Mean Tide Level
	Lat.		Long.		Time			Height		Mean	Diurnal	
					High water		Low water	High water	Low water			
San Francisco Bay	°	′	°	′	h.	m.	h. m.	feet	feet	feet	feet	feet
	N		W		Time meridian, 120°W							
Bonita Cove, Golden Gate	37	49	122	32	-0	24	-0 06	+0.1	0.0	4.1	5.8	3.1
SAN FRANCISCO (Golden Gate)	37	48	122	28	Daily predictions					4.0	5.7	3.1
Alcatraz Island	37	50	122	25	+0	10	+0 12	+0.1	0.0	4.1	5.8	3.1
San Francisco, North Point	37	49	122	25	+0	15	+0 22	+0.1	0.0	4.1	5.8	3.1
Rincon Point	37	47	122	23	+0	20	+0 36	+0.4	0.0	4.4	6.1	3.3
Yerba Buena Island	37	49	122	22	+0	23	+0 32	+0.3	0.0	4.3	6.0	3.2
Oakland Pier	37	48	122	20	+0	29	+0 42	+0.3	0.0	4.3	6.0	3.2
Alameda	37	46	122	18	+0	35	+0 42	+0.7	0.0	4.7	6.4	3.5
Oakland Harbor, Grove Street	37	48	122	17	+0	29	+0 36	+0.5	0.0	4.5	6.2	3.3
Oakland Harbor, Park Street Bridge	37	46	122	14	+0	40	+0 44	+0.6	0.0	4.6	6.3	3.4
Bay Farm Island Bridge	37	45	122	14	+0	41	+0 52	+0.8	0.0	4.8	6.5	3.5
Oakland Airport	37	44	122	12	+0	40	+0 40	+0.8	0.0	4.8	6.5	3.5
Potrero Point	37	46	122	23	+0	29	+0 40	+0.6	0.0	4.6	6.3	3.4
Point Avisadero, Hunters Point	37	44	122	21	+0	30	+0 43	+0.9	0.0	4.9	6.6	3.5
Roberts Landing, 1.3 miles west of	37	40	122	12	+0	48	+1 22	+1.5	+0.1	5.4	7.2	3.9
Point San Bruno	37	39	122	23	+0	34	+1 04	+1.2	+0.1	5.1	6.9	3.7
Coyote Point	37	36	122	19	+0	37	+1 04	+1.5	0.0	5.5	7.2	3.9
San Mateo Bridge	37	35	122	15	+0	39	+1 14	+1.9	+0.1	5.8	7.6	4.1
Coyote Hill Slough entrance	37	34	122	08	+0	54	+1 26	+2.1	+0.1	6.0	7.8	4.2
Redwood Creek entrance (inside)	37	31	122	12	+1	02	+1 32	+2.2	+0.1	6.1	7.9	4.2

TABLE VIII-2
(Cont.)
TIDAL DIFFERENCES

PLACE	POSITION				DIFFERENCES				RANGES		Mean Tidal Level
	Lat.		Long.		Time				Height				
					High water		Low water		High water	Low water	Mean	Diurnal	
San Francisco Bay (Cont)	°	′	°	′	h.	m.	h.	m.	feet	feet	feet	feet	feet
	N		W		Time meridian, 120°W								
Smith Slough	37	30	122	14	+1	11	+1	52	+2.2	0.0	6.2	7.9	4.2
Dumbarton Highway Bridge	37	30	122	07	+0	48	+1	27	+2.7	+0.1	6.6	8.4	4.5
Palo Alto Yacht Harbor	37	27	122	06	+0	52	+1	48	+2.9	+0.1	6.8	8.6	4.6
Calaveras Point, west of	37	28	122	04	+1	01	+1	43	+2.9	+0.1	6.8	8.5	4.6
Mud Slough Railroad bridge	37	28	121	58	+1	04	+2	06	+3.5	+0.1	7.4	9.1	4.9
Alviso (bridge), Alviso Slough	37	26	121	59	+1	20	+2	18	+3.3	+0.1	7.2	9.0	4.8
Guadalupe Slough	37	26	122	02	+1	05	+2	12	+3.5	+0.1	7.4	9.1	4.9
Sausalito	37	51	122	29	+0	09	+0	13	-0.2	0.0	3.8	5.5	3.0
Angel Island (west side)	37	52	122	27	+0	09	+0	15	-0.1	0.0	3.9	5.6	3.0
Angel Island (east side)	37	52	122	25	+0	22	+0	33	0.0	0.0	4.0	5.7	3.1
Point Chauncey	37	53	122	27	+0	24	+0	28	0.0	0.0	4.0	5.7	3.1
Berkeley	37	52	122	18	+0	17	+0	32	+0.2	0.0	4.2	5.9	3.2
Point Isabel	37	54	122	19	+0	19	+0	27	+0.2	0.0	4.2	5.9	3.2
Richmond	37	55	122	21	+0	21	+0	29	+0.1	0.0	4.1	5.8	3.1
Point Richmond	37	56	122	24	+0	36	+0	40	+0.2	0.0	4.2	5.9	3.2
Point Orient	37	57	122	26	+0	47	+0	54	+0.1	0.0	4.1	5.8	3.1
Point San Quentin	37	57	122	29	+0	46	+0	58	0.0	0.0	4.0	5.7	3.1
San Pablo Bay													
McNear	37	59	122	27	+1	05	+1	07	+0.1	0.0	4.1	5.7	3.1
Pinole Point	38	01	122	22	+1	19	+1	32	+0.4	0.0	4.4	6.0	3.3
Hercules	38	01	122	18	+1	26	+1	53	+0.4	0.0	4.4	6.0	3.3
Petaluma River entrance	38	07	122	30	+1	15	+2	15	+0.5	0.0	4.5	6.1	3.3
Lakeville, Petaluma River	38	12	122	33	+1	47	+2	28	+0.8	-0.1	4.9	6.4	3.4
Upper drawbridge, Petaluma River	38	14	122	37	+1	54	+2	43	+1.0	-0.1	5.1	6.6	3.5
Sonoma Creek entrance	38	09	122	24	+1	30	+2	21	+0.4	-0.2	4.6	6.0	3.2

TABLE VIII-2
(Cont)
TIDAL DIFFERENCES

PLACE	POSITION				DIFFERENCES						RANGES		Mean Tidal Level
	Lat.		Long.		Time				Height		Mean	Diurnal	
					High water		Low water		High water	Low water			
Carquinez Strait	°	′	°	′	h.	m.	h.	m.	feet	feet	feet	feet	feet
	N		W		Time meridian, 120°W								
Selby	38	03	122	15	+1	25	+1	58	+0.7	0.0	4.7	6.3	3.4
Mare Island Strait entrance	38	04	122	15	+1	41	+2	03	+0.2	-0.1	4.3	5.8	3.1
Vallejo, Mare Island Strait	38	06	122	16	+1	41	+2	04	+0.4	-0.1	4.5	6.0	3.2
Napa, Napa River	38	18	122	17	+2	12	+2	46	+1.5	0.0	5.5	7.1	3.8
Crockett	38	03	122	13	+1	53	+2	15	+0.2	-0.1	4.3	5.8	3.1
Benicia, Army Point	38	03	122	08	+1	57	+2	23	+0.3	0.0	4.3	5.9	3.2
Suisun Point	38	02	122	07	+2	08	+2	34	+0.2	-0.1	4.3	5.8	3.2
Suisun Bay													
Port Chicago	38	04	122	02	+2	30	+3	14	-0.2	-0.1	3.9	5.4	2.9
Pittsburg, New York Slough	38	02	121	53	+3	23	+4	13	-1.1	-0.4	3.3	4.4	2.3
Point Buckler	38	06	122	01	+2	36	+3	18	-0.2	-0.3	4.1	5.5	2.8
Suisun Slough entrance	38	07	122	04	+2	45	+3	27	-0.3	-0.3	4.0	5.3	2.8
Suisun, Suisun Slough	38	14	122	02	+3	28	+4	15	+0.9	-0.1	5.0	6.4	3.5
Meins Landing, Montezuma Slough	38	08	121	54	+3	29	+4	11	0.0	-0.3	4.3	5.6	2.9
San Joaquin River													
Antioch	38	01	121	49	+3	56	+4	42	*0.74	*0.55	3.1	4.2	2.2
Threemile Slough entrance	38	05	121	41	+4	50	+5	48	*0.61	*0.45	2.6	3.6	1.8
Sacramento River													
Collinsville	48	04	121	51	+3	41	+4	32	*0.75	*0.55	3.2	4.3	2.2
Threemile Slough entrance†	38	06	121	42	+4	01	+4	56	*0.81	*0.55	3.5	4.6	2.3

*Ratio
†Data apply only during low level stress.

IX. RESULTS OF THE REMOTE SENSING DATA INTERPRETATIONS

The San Francisco Bay Area was divided into four sections and labeled A, B, C, and D. These sections were covered by the reconnaissance aircraft during the daylight hours on April 26, 27, 1972 and July 25, 26, 27, 1972. Two late night missions were flown on July 26, 27, 1972 over sixteen select targets. These targets are the eight major municipal waste sources and the eight major industrial waste sources in the Bay area. They are identified below and their respective locations are shown in Figure 4.

Major Municipal Waste Sources

1. East Bay MUD.
2. City of San Jose.
3. City of San Francisco North Point Plant.
4. City of San Francisco Southeast Plant.
5. Central Contra Costa SD.
6. City of San Mateo.
7. San Pablo SD.
8. City of South San Francisco.

Major Industrial Waste Sources

9. Standard Oil Company
10. Union Oil Company.
11. Fibreboard Corporation-Kraft Mill.
12. C & H Sugar Company.
13. Shell Oil Company.

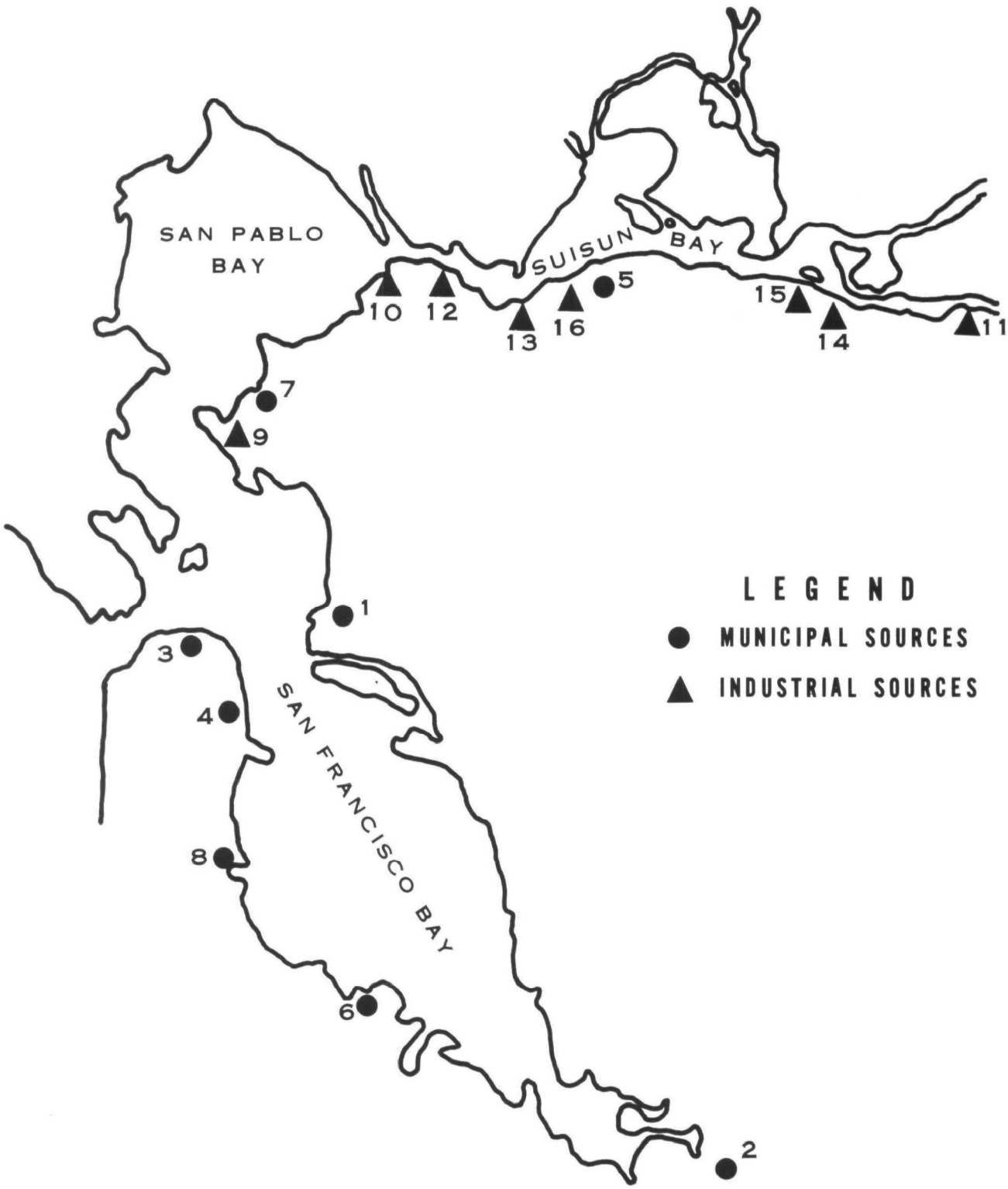

Figure 4. Locations of the Sixteen Major Waste Sources in the Bay Area

14. Dow Chemical Company.

15. U.S. Steel Corporation.

16. Phillips Petroleum Company.

Each waste discharge/significant indication is discussed in outline form in the next four sub-sections of this report. The location of each indication is depicted on the appropriate USGS 7.5 minute map by red numbers. These numbers correspond to the paragraph numbers found in the text or body of this report. The indications recorded during the April, July (daytime) and July nighttime missions are identified as such. If one of the above dates is not included for a particular location (such as July night), then no indication was recorded during flight.

San Francisco Bay Area - Section A

This section covers the area from Pinole Point, in San Pablo Bay, eastward through Suisun Bay to a point along the San Joaquin River approximately 3.2 kilometers (2 miles east) of the City of Antioch. This area is shown in Figure 5. The location of this section is shown in Figure 1.

NOTE: Indication numbers A-1 through A-10 appear on Figure 6, the Mare Island map.

A-1 April - The thermal imagery recorded a large thermal plume around the tip of Pinole Point that extended eastward for approximately 2.14 kilometers (7,000 feet). It is shown in Figure 7. Source of the thermal outflow was not detected in either the thermal or optical reconnaissance data.

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A-8 April - An effluent of warm water was being discharged through a concrete structure (4.6 meters wide and extending 9.2 meters out into the water) from a series of ditches originating within the Union Oil Company. This is shown in Figure 8. This discharge produced no apparent discoloration in the receiving Bay waters.

July - An identical indication was recorded. The thermal map is shown in Figure 10.

"July Night" - A large thermal plume was generated by this point of discharge. It is shown in Figure 9.

A-9 April - This discharge was active at the time of flight. It produced no discoloration in the Bay waters. The thermal map, Figure 8, indicates that the water temperature of this effluent was somewhat cooler than that of A-8. This is shown by the small tear-drop shaped thermal field in Figure 8. This was recorded at a point in time approximately one hour prior to the crest of low-high tide. Figure 8 shows that the thermal field was being carried toward the Davis Point dock.

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July - The outfall was active at the time of flight. The temperature of the discharge was nearly equal to that of the Bay waters in this immediate area. No thermal plume from this outfall is seen in Figure 10.

"July Night" - This outfall was discharging hot water at the time of this night mission as shown in Figure 9. It was recorded approximately 0.5 hours after the crest of high-high tide in this area.

A-10 April - This outfall, reportedly within the Union Oil Company facility, was discharging warm water at the time of flight. This is shown by the arrow on the far right-hand side in Figure 8. A smaller tear-drop phenomenon, than that discussed above, was recorded in this immediate area.

July - The outfall was also active during this mission. The temperature of the effluent was close to that of the receiving Bay waters.

"July Night" - This outfall was discharging hot water at the time of flight. The thermal discharges, labeled A-8, A-9, and A-10, combined to form a large thermal field that extended 305 meters (1,000 feet) out into the Bay and 915 meters (3,000 feet) northward to the pier at Davis Point.

Again, high-high tide had crested 0.5 hours prior to the recording of the thermal map in Figure 9. The influx of water into this area carried the thermal field northward or toward the bottom of the page.

NOTE: Indication numbers A-11 through A-22 appear on Figure 11, the Benicia map.

A-11 April - Characteristics of a subsurface discharge were recorded at this location. It produced no apparent discoloration in the receiving water.

July - Same indication as April.

A-12 April - A ditch carrying a reddish-brown wastewater, was discharging into the Carquinez Strait at the time of flight. This ditch, approximately 6.1 meters (20 feet) wide, exited from under the railway tracks on the southern side of the C&H Sugar Company facility and emptied into the Strait along the eastern side of the Carquinez Bridge as shown in Figure 11. The source(s) of the discharge could not be determined.

July - Identical indication was recorded.

"July Night" - This ditch was discharging warm water at the time of flight. This is shown in Figure 9.

A-13 April - At this particular location within the C & H Sugar Company, two subsurface discharges were active.

July - Water level characteristics at the time of flight indicated the presence of the above mentioned active outfalls and possibly a third in the immediate area.

"July Night" - The two outfalls were discharging a hot effluent at the time of flight. They are shown in Figure 9. The effluents were creating a thermal plume 92 meters (300 feet) in a length parallel to shore.

A-14 "July Night" - Evidence of a warm discharge was recorded at this location. Inspection of the daytime optical imagery provided nothing to confirm the presence of an outfall. There were several buildings south of this area across the railway tracks.

A-15 April - An orange-brown substance was being discharged through a small open ditch into the Strait.

July - No discharge present.

A-16 April - There was a moderate discharge from a small shoreline indentation into Carquinez Strait with no subsequent discoloration in the receiving waters. An STP was located in this immediate vicinity.

July - Identical indication recorded.

"July Night" - The discharge was warm at this time of flight as shown in Figure 12.

A-17 April - A possible discharge was located in this area. No significant discoloration was seen in this area.

July - Same indication as April.

"July Night" - This waterway was quite warm as seen in Figure 12.

A-18 April - An inactive outfall was observed at this location.

July - Identical indication.

A-19 "July Night" - A small thermal field or plume was detected in this area (Figure 12) suggesting a possible discharge. It extended approximately 12 meters out from shore.

A-20 "July Night" - A small warm outflow was recorded in this area, as shown in Figure 12. The source(s) could not be ascertained. The resultant thermal plume extended nearly 15 meters (50 feet) out from shore.

A-21 April - An active outfall was creating a dark gray plume. The discoloration could be traced back to an aeration pond.

July - The outfall was also active. A black substance was floating on the water in the area of this outfall.

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A-22 "July Night" - A small warm thermal plume originating at this point, had moved west along the shore for 15 meters (50 feet) where it had cooled to the ambient temperature of the Strait waters.

NOTE: Indication numbers A-23 through A-35 appear on Figure 13 the Port Chicago map.

A-23 April - This waterway was yellow-brown in color at the time of flight. There was no visible plume or extended dispersion pattern in Carquinez Strait.

July - Same indication as April.

A-24 April - A green-brown substance was entering the Strait from this ditch. There was no appreciable plume in the receiving water.

July - Identical indication.

A-25 April - The discharge from this waterway into Suisun Bay was a gray-brown color. A moderate sized plume was generated in the Bay and flowed in a southwesterly direction for 200 meters (650 feet) before it dispersed sufficiently to lose its identity.

"July Night" - This discharge was warm as indicated in Figure 12.

A-26 April - A gray-brown discharge from this ditch entered Suisun Bay creating a small plume that moved in a southwest direction dissipating within 75 meters (245 feet).

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"July Night" - The discharge from this ditch was imaged as being cooler than the ambient waters of Suisun Bay.

A-27 April - The water in Pacheco Creek was a reddish-brown color and did not create a plume as it entered Suisun Bay.

July - Same indication as April.

A-28 April - An above-surface outfall was recorded at this location. There was no discharge at the time of flight.

July - Identical indication.

A-29 "July Night" - Two outfalls, reportedly from the Phillips Petroleum Company facility, were discharging hot effluents at the time of flight. They are shown in Figure 14. An enlarged view is in Figure 15.

A-30 "July Night" - Two discharges were entering Grayson Creek from the STP as shown in Figure 16. This Figure overlaps the bottom of Figure 14.

A-31 April - An inactive outfall was recorded at this point.

July - Same indication as April.

A-32 April - The color of the water in this area of Suisun Bay was gray-green at the time of flight.

July - No significant discoloration in this area.

"July Night" - The waterway from this point upstream to the ponds were quite warm as shown on Figure 14.

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A-33 April - Exceptionally turbid water was entering the Bay from these ditches.

A-34 April - There was a surface outfall at this location. It was not discharging at the time of flight.

July - The outfall was not discharging.

A-35 April - The water in Hastings and Belloma Sloughs was reddish-brown in color. There was no measureable plume in the Bay from these sloughs.

Note: Indication numbers A-36 through A-40 appear on Figure 17, the Honker Bay map.

A-36 April - There was a dike across the mouth of this geometric-shaped ditch network. There was a yellow-green substance in a ditch connecting the ponds immediately east to the network. No discoloration was recorded in this network.

"July Night" - This network was imaged as being quite warm, shown in Figure 18.

A-37 April - There was a dark brown outflow from this ditch. There was no measureable plume or dispersion pattern in the Bay.

July - Same indication.

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A-38 April - The outflow from these waterways was yellow-brown in color and was high in turbidity. No measureable plumes were observed in the Bay waters.

July - Same indication.

A-39 April - Two submerged outfalls were discharging under pressure. There appeared to be no discoloration in the receiving waters.

A-40 April - A submerged outfall was discharging a dark brown effluent which appeared to be a poorly treated outflow from the adjacent STP.

"July Night" - A warm discharge was causing a moderate sized thermal plume as shown in Figure 18.

Note: Indication numbers A-41 through A-57 appear on Figure 19, the Antioch North map.

A-41 July - An active outfall was detected here. There was no discoloration or plume in the receiving water.

A-42 April - An outfall just located immediately above the water surface was discharging a reddish-brown colored water. Sun reflection from the capillary wave action in this area prevented the detection of any plume.

July - The outfall was active and the plume extended out into the slough 76 meters (250 feet) and 183 meters (600 feet) down stream.

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"July Night" - This outfall was discharging at the time of flight resulting in a small thermal plume. This is shown in Figure 20.

A-43 April - A dark gray-brown substance was being discharged into the slough through a ditch originating within the U.S. Steel Corporation complex. There was no significant discoloration in the receiving water.

July - Same indication.

"July Night" - The thermal imagery recorded a hot discharge from the ditch as shown in Figure 20.

A-44 July - An active outfall was discharging a gray-brown effluent into the pond. There appeared to be no discharge from the pond into the New York Slough.

A-45 "July Night" - The pond, mentioned in A-44, was discharging into the slough at the time of flight. The water in the pond and in the effluent were quite warm. The point of discharge is shown in Figure 20.

A-46 April - A large pipe was extending from the bank down to the water. It was not discharging at the time of flight.

July - Same indication as April.

A-47 July - At this location there was a small plume gray-brown in color. The probable source is a pond behind the ditch.

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A-48 April - There was a small amount of a yellow-brown outflow from this waterway.

July - Still a small flow but the color was reddish-brown.

A-49 April - The water in this boat repair area was quite turbid.

July - Same indication as April.

A-50 April - There was a yellow-brown outflow from this waterway. The small plume generated was dissipated rapidly in the San Joaquin River.

July - There was no outflow.

A-51 April - There was a large volume of a turbid gray-yellow being discharged into the river. A measureable plume was not generated.

July - Thirty meters (100 feet) inland from the bank of the river, an above-surface outfall was discharging a large volume of a reddish-brown wastewater into the waterway.

"July Night" - The waterway imaged as being hot. The water was moving into the river and then in an easterly direction. The plume extended approximately 15 meters (50 feet) out into the river. This is shown in Figure 21.

A-52 "July Night" - A hot discharge was recorded at this location. There was no activity detected in the daytime optical imagery. This is shown in Figure 21.

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"July Night" - A large hot plume was generated as shown in Figure 23. It extended nearly 275 meters (900 feet) eastward along shore with respect to the discharge point. This is shown in Figure 23.

A-57 April - An active outfall from the eastern end of the Contra Costa electric power plant.

July - Same indication. Plume is shown in Figures 22 and 24. Figure 24 was recorded one day after Figure 22.

"July Night" - A large hot plume was generated, as shown in Figure 23. It extended along the eastern shore for nearly 1,070 meters (3,500 feet).

NOTE: Indication number A-58 appears on Figure 25, the Jersey Island 7.5 minute map.

A-58 July - A discharge conduit leading from three ponds was discharging at this point. There was no visible discoloration.

"July Night" - The thermal imagery, Figure 23, show the three ponds in this area as being warm. A discharge conduit or ditch is easily seen carrying the warm effluent from the western most pond to the river.

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San Francisco Bay Area - Section B

Section B extends from Pinole Point southward along the eastern shores of San Pablo Bay and San Francisco Bay to a point approximately 0.8 kilometers (0.5 miles) south of the San Francisco-Oakland Bay Bridge. This is shown in Figure 1 and Figure 26.

NOTE: Indication number B-1 appears on Figure 27, the Richmond map.

B-1 April - No discernable indication recorded.

July - A small volume of greenish water was flowing through a ditch into San Pablo Bay from an industrial area in Rheem. The ditch contained large surface mats of algae in its lower reaches.

NOTE: Indication numbers B-2 through B-8 appear on Figure 28, the San Quentin map.

B-2 April - The water flowing into San Pablo Bay from San Pablo Creek was grayish brown in color.

July - No discoloration was recorded. The temperature of the Creek waters was somewhat cooler than the Bay waters.

B-3 April - Moderate volume discharge through the ditch from San Pablo S.D. Sewage Treatment Plant. No discoloration of Bay waters by the effluent was recorded. The effluent was not septic at time of flight.

July - Effluent characteristics unchanged.

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"July Night" - The STP effluent was somewhat warmer than the Bay waters, as shown in Figure 29.

B-4 April - A large volume of wastewater was being discharged from two adjacent locations within the Standard Oil of California facility. These are the main outfalls of the facility. The wastewater was grayish brown in color and warmer than the receiving Bay waters. The amount of dissolved oxygen was low.

July - The large volume of discharged wastewater was present during this mission but displayed a grayish green color in addition to being warmer than the receiving water. The amount of dissolved oxygen in the wastewater was low.

"July Night" - The outfall was quite warm and covered a portion of the mud flat area. This is shown in Figure 29.

B-5 April - The three positions shown in Figure 28 are used, for the most part, as overflow discharge locations. Location "a" is a partially open ditch that originates within the refining operational area. It was not discharging at the time of flight. Location "b" is a partially open ditch that connects three holding ponds to the Bay. It was discharging a small volume of a dark-brown substance at the time of

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flight. Location "c" is also a partially open ditch that connects the outflow of an API separator with the Bay. No flow was recorded during this mission. There was a significant amount of surface algae growth in the mud flats in the immediate vicinity of the outfall.

July - Locations "a" and "b" were discharging small volumes of wastewater. No apparent discoloration in the receiving water was observed. Location "c", likewise, had algae growth in the adjacent mud area.

B-6 April - No outfall indication.

July - A yellowish brown substance was being discharged from a submerged outfall as indicated.

B-7 April - A pipe entered the water from the base of the Standard Oil dock. No discharge was recorded.

July - No discharge recorded.

B-8 April - A submerged outfall, discharging a dark grayish brown substance, was located between the two access ramps of the Standard Oil dock. The area was surrounded by a portable surface skimmer. It was containing nearly all of the effluent.

July - The outfall was not discharging.

NOTE: Indication numbers B-9 through B-21 appear on Figure 27, the Richmond map.

B-9 April - A small effluent, positioned immediately above water level, was recorded. It produced no discoloration in the canal waters.

July - No outfall indication.

B-10 April - An outfall was discharging a small amount of gray substance. The outfall position was immediately below the water's surface.

July - No discharge was recorded.

B-11 April - A red pipe, 0.46 meters (1.5 feet) in diameter, entered the water. No discharge was noted.

July - No discharge was recorded.

B-12 April - No discharge was recorded.

July - Water was being discharged into the Channel. It produced no discoloration in the receiving water.

B-13 April - A pipe, 0.92 meters (3 feet) in diameter, connected a circular holding pond with the Richmond Inner Harbor. The pond contained a dark, nearly black, wastewater. No discharge was recorded.

July - No discharge was recorded. There was a seepage area detected adjacent to the circular pond in the location labeled as seepage in Figure 30. At the time of this mission, the seepage was not reaching the waterway projecting northward from the Harbor.

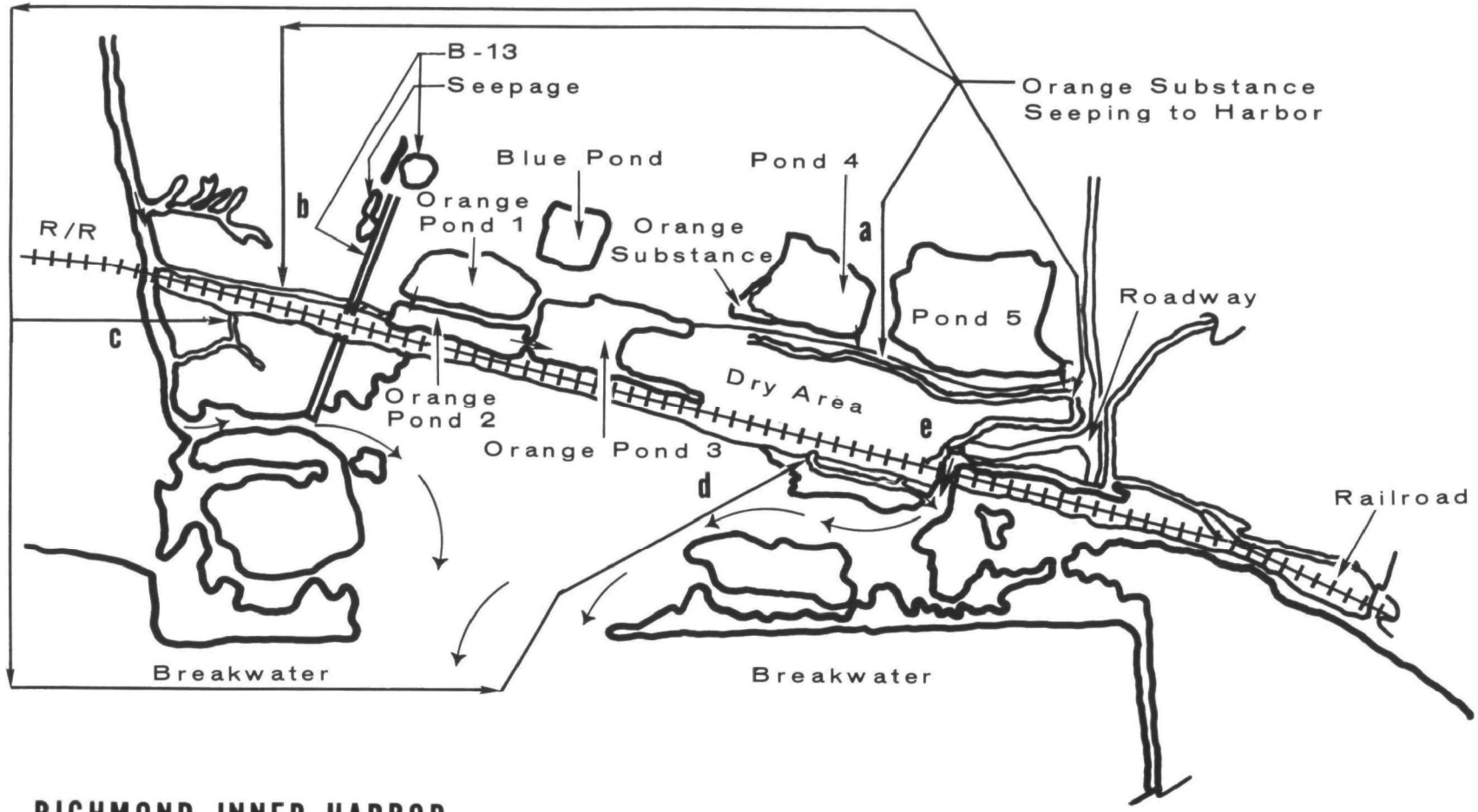

Figure 30. Sketch of Locations B-13 and B-14

B-14 April - There were a group of five ponds located adjacent to the shore of the Richmond Inner Harbor as shown in Figure 30. Ponds 1, 2, and 3 contained a bright orange liquid substance. This waste was leaching to the Harbor in the four areas of the figure identified as a, b, c, and d. The wastewater was discharged into pond 1. It then flowed to pond 2 and subsequently to pond 3 as indicated by the respective arrows. The orange seepage is entering the small "c" waterway from under the railroad bed. Ponds 4 and 5 were also discharging to the rectangular shaped drainage ditch. The wastewater entered the Harbor through point "e." Pond 4 had an orange patch on its left side. This in turn was seeping to the upper end of the rectangular ditch.

July - Seepage to Harbor was also present.

B-15 April - No discharge from the Stege S.D. sewage treatment plant was detected.

July - No discharge confirmed.

Information received from EPA, Region IX, indicates that the effluent from this plant was re-routed to the East Bay MUD in January 1971.

B-16 April - The water flowing from Cerrito Creek into San Francisco Bay was slightly yellow-brown in color. It dispersed quickly in the adjacent mud flats.

July - The water from this creek was even more yellow-brown and quite turbid. It, likewise, dispersed quickly.

B-17 April - No discharge recorded.

July - A discharge was present at the time of flight. Its location is sketched in Figure 31. The landfill has changed significantly from that shown in Figure 27. The outfall produced only minor discoloration in the water.

B-18 April - A reddish-brown discoloration was recorded in the water at this location. The source of this effect could not be identified. There was a medium sized building situated near shore as indicated by the * on Figure 27.

July - The reddish-brown effect was again present. At this time of flight, there was chlorophyllic growth in the water and along shore as indicated by the parentheses.

B-19 April - One long and one short dike containing a dark grayish-brown water were discharging to the mud

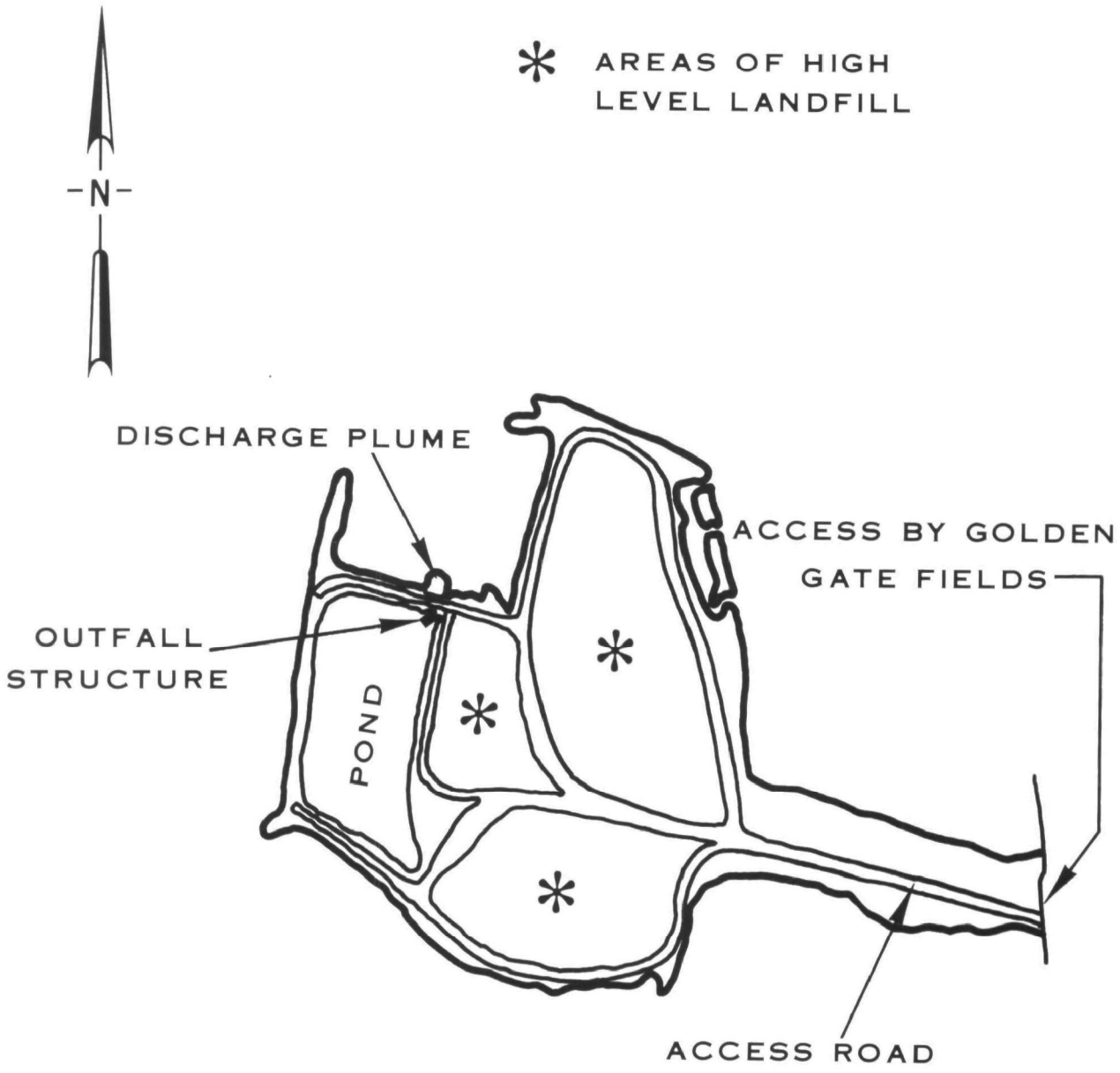

Figure 31. Sketch of Location B-17

flats through subsurface structures located by the red arrows. The origin of the long ditch, parallel to the freeway, appears to be the Golden Gate Fields stable area.

July - Same indication as April.

B-20 April - A large concrete culvert was recorded at this position. It appeared to be a storm drain.

July - Same indication as April.

B-21 April - A reddish-brown substance was being discharged from a concrete structure located by the arrow on the map. Small amounts of oil was collecting along shore and on the water in this triangular area. The source could not be determined.

July - The reddish-brown substance was again present. There was no trace of oil in this area.

Note: Indication numbers B-22 through B-27 appear on Figure 32, the Oakland West map.

B-22 April - The water in the immediate area of the concrete culvert structure was yellow-gray in color. The source could not be determined.

July - Identical indication was recorded.

B-23 April - Water from a small ditch was being discharged from the street into the mud flats with no discoloration. Two buildings and a Holiday Inn were located directly across the street.

July - Identical indication was recorded.

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B-24 April - A grayish green substance was being discharged through the rather large open conduit into the Bay. The source appeared to be within the buildings as indicated in Figure 33.

July - Again, this discharge was present. The wastewater displayed an even more intense green color during this mission. Its color characteristics suggest an organic waste.

B-25 April - A gray substance was present in the small ditch, as indicated in Figure 33, at the time of flight. The flow rate was quite small. The receiving water in the rectangular area, adjacent to Interstate 80, was grayish green in color. There was a discharge structure in the upper end of this area, which appeared to be a storm drain.

July - Identical indication was recorded.

B-26 April - A brownish-yellow substance was being discharged into the Oakland Outer Harbor at the point indicated by the arrow in Figure 32. The plume extended approximately 15 meters (50 feet) into the Harbor from the dock.

July - No indication was present at the time of flight.

B-27 April - A plume, caused by the submerged outfall from the East Bay MUD STP, was clearly visible at the time of flight. It is shown in Figure 34.

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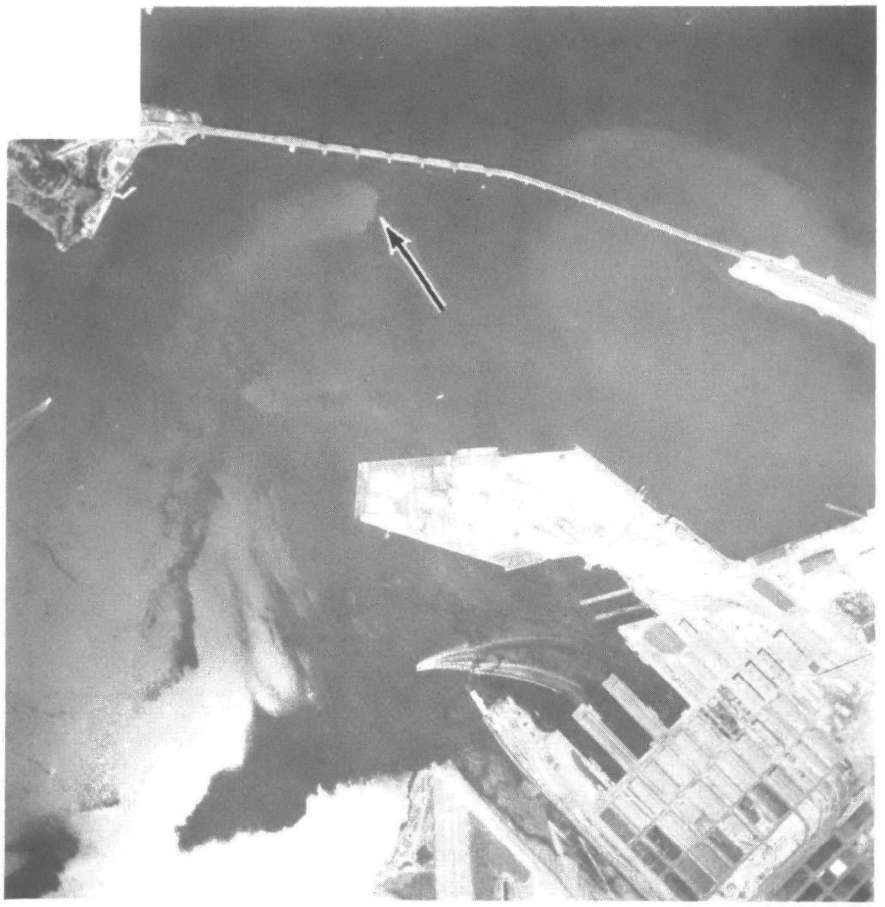

Figure 34. Photograph of Plume from East Bay M.U.D. Discharge (High Altitude)

July - A nearly identical indication was recorded during this flight as shown in Figure 35.

"July Night" - The thermal map of this area showed no temperature difference at the water surface during this mission.

B-28 April - The San Quentin STP was discharging at this location. It produced a gray-brown discoloration on the receiving waters.

July - No visible discoloration recorded.

B-29 April - An outfall from the quarry was discharging a gray-green substance at the time of flight. It formed only a small plume.

July - Target was not covered.

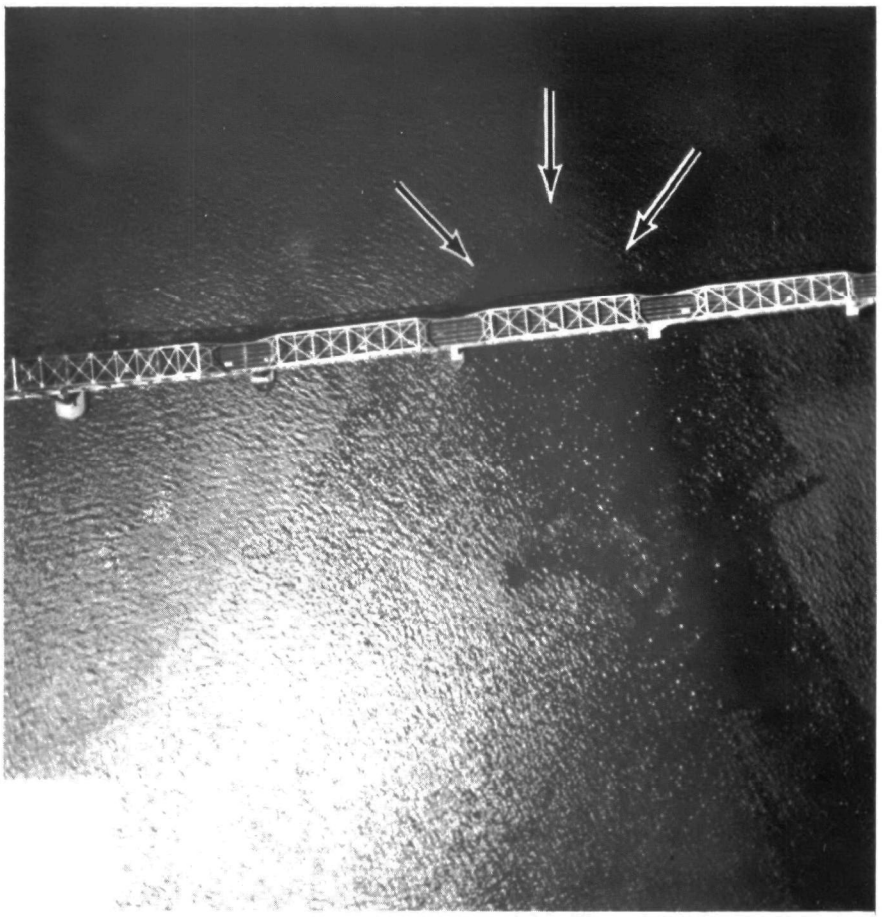

Figure 35. Photograph of Plane from East Bay M.U.D. Discharge (Low Altitude)