Fisheries and Environment Canada
Pêches et Environnement Canada

Supplying Data to Users

W.J. Ozga

TECHNICAL BULLETIN NO. 111
(Résumé en français)

INLAND WATERS DIRECTORATE,
WATER RESOURCES BRANCH,
OTTAWA, CANADA, 1979.

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Cat. No. En 36-503/111

ISBN 0-662-10341-6

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ABSTRACT

This publication contains a description of the various types of streamflow, water level, and sediment data that are available and how they can be requested.

RÉSUMÉ

Cet ouvrage contient une description des différents genres de données disponibles sur l'écoulement, les niveaux d'eau et les sédiments ainsi que la marche à suivre pour les obtenir.

1. INTRODUCTION

This publication was prepared by Mr. W.J. Ozga, Head, Data Control Section, Ottawa, to provide users with a description of the various types of streamflow, water level and sediment data that are available and how these data can be requested.

Basic data are collected and computed by personnel at the Regional Offices of the Water Survey of Canada at Vancouver, Calgary, Regina, Winnipeg, Guelph, Montreal and Halifax, using national standards; data contributed by various organizations are also compiled by the Regional Offices. These data are sent to Ottawa on forms, punched cards or magnetic tape for storage and retrieval, using the CDC CYBER 74 computer at the Department of Energy, Mines and Resources, Ottawa.

Automated procedures are used to produce various data publications and listings which are described herein. These data can also be supplied on punched cards or magnetic tape for computer processing by users.

This is the first edition of this type of publication and supersedes previous similar booklets titled "Description of Card and Tape Formats for Supplying Data to Users", and will be updated as new procedures are developed or other types of data become available.

2 PROCEDURE FOR REQUESTING DATA

Users can be supplied with data in published form on a regular basis by requesting to be placed on our mailing list for specific publications as listed in Section 3 herein. Data for individual stations or more up-to-date or related unpublished data as described in Section 4 are also available from the Regional Chiefs whose addresses and telephone numbers are given in Section 2.1.

Data are also available from Ottawa in computer-compatible form in various formats as described herein. The user is asked to provide his own magnetic tape. The following should be specified when requesting data:

(a) list of station numbers and names or the province or region for which data are being requested,
(b) type of data, e.g. daily discharges, monthly means, etc,
(c) whether on magnetic tape or punched cards,
(d) format number, e.g. 67-002, 68-025, etc,
(e) number of tracks, i.e. 7 or 9, BCD or EBCDIC, even or odd parity,
(f) tape density, e.g. 800 or 1600 bpi, and
(g) blocking factor - for card images on tape only.

Data can also be supplied by Ottawa on tape as line images (same as the printouts in the data publications), so that users can produce any number of printouts, using their own computers.

It is recommended that data be supplied in EBCDIC (odd parity) on an unlabelled, 9-track, 1600 bpi magnetic tape, in card format, with a blocking factor of 40.

Card formats will probably be retained for some time, whereas the master file tape format, e.g. 75-600, is subject to major changes without notice as improved data handling techniques are developed.

Computer programs for data processing, e.g. EDIT and UPDATE programs, cannot be supplied mainly because of computer incompatibility.

A "period of record" summary and a partial dump of each tape will also be supplied.

2.1 Addresses and Telephone Numbers

Basic streamflow, water level or sediment data are available upon application to the Director, Water Resources Branch, Environment Canada, Ottawa, Ontario, K1A 0E7, or by telephone to the Data Control Section, Ottawa (area code 819-997-2098) or to the Sediment Survey Section (area code 819-997-1185). Data are also available from the following Regional Offices:

Regional Chief,
Water Survey of Canada,
Water Resources Branch,
Department of the Environment,
502-1001 West Pender Street,
Vancouver, British Columbia.
V6E 2M9
(604 666-3606)

Regional Chief,
Water Survey of Canada,
Water REsources Branch,
Department of the Environment,
Clennan Square,
110 - 11th Avenue S.W.,
Calgary, Alberta.
T2R 0B8
(403 231-5301)

Regional Chief,
Water Survey of Canada,
Water Resources Branch,
Department of the Environment,
G.M.C. Building,
1102 - 8th Avenue,
Regina, Saskatchewan.
S4R 1C9
(306 569-5340)

Regional Chief,
Water Survey of Canada,
Water Resources Branch,
Department of the Environment,
521 Federal Building,
269 Main Street,
Winnipeg, Manitoba.
R3C 1B2
(204 949-2434)

Regional Chief,
Water Survey of Canada,
Water Resources Branch,
Department of the Environment,
Federal Building,
75 Farquhar Street,
Guelph, Ontario.
N1H 3N4
(519 821-0110)

Regional Chief,
Water Survey of Canada,
Water Resources Branch,
Department of the Environment,
5th Floor, Gulf Building,
6009 Quinpool Road,
P.O. Box 365,
Halifax, Nova Scotia.
B3J 2P8
(902 426-5776)

Quebec Regional Engineer,
Water Survey of Canada,
Water Resources Branch,
Department of the Environment,
1021 Pierre Dupuy Street,
Longueuil, Quebec.
J4K 1A1
(514 283-4190)

3. LIST OF DATA PUBLICATIONS

Following is a brief description of the seven types of data publications produced regularly by the Water Survey of Canada as well as the publication frequency.

Surface Water Data Reference Index

This inventory is published annually and contains descriptive information for all gauging stations operated during the history of the Water Survey of Canada in one publication. Some 5500 stations are listed, 2700 active (2200 streamflow and 500 "water levels only") and 2800 discontinued (2200 streamflow and 600 "water levels only"), including international gauging stations and contributed data, but not including stations operated by the province of Quebec. The stations are listed by province or territory, in an upstream to downstream order for each basin; they are also listed in a station number index and an alphabetical index. The following information is given for each station: station number and name, drainage area, gauge location (latitude and longitude), period of record available (including type of gauge and operation schedule) and coded remarks such as identifying international gauging stations, stations where sediment data and water quality data are collected, whether regulated or natural flow, if a systematic review of records was conducted, etc. This publication is usually distributed in January of the year following the one for which data were collected, e.g. the 1978 publication was distributed in January 1979. Each edition supersedes all previous editions since it includes any corrections or additions to the network.

Coloured maps showing the location of both active and discontinued streamflow and "water level only" stations were included as a Hydrometric Map Supplement to the 1977 edition. Another up-dated series of maps will probably be produced in about five years, although computer-plotted or "black and white" maps or selected coloured maps to a different scale, may be available in the interim.

Surface Water Data

Daily streamflow and water level data have been published annually or biennially on a regular basis since about 1908 in a variety of formats in over 230 publications. Most of the publications prior to 1964 inclusive, and even a few subsequent to this, are now out-of-print but are available for use at the various Regional Offices or at libraries of various organizations.

Daily discharge and daily water level data for rivers and lakes are now published annually in eight volumes by province, except for the Atlantic Provinces which are included in one publication and the Yukon and Northwest Territories, which make up another. Daily water levels are not published for stations where streamflow data are collected but are available upon application to the appropriate Regional Chief. The stations are listed alphabetically and on a calendar-year basis with data for two stations on one page.

Surface Water Data publications are printed and distributed to users within six to eight months of the end of the year to which the data apply. The data in the 1979 series, to be distributed in 1980, will be published in metric units only.

Historical Streamflow Summary

This publication contains a summary of monthly and annual mean discharges, and annual extremes and total discharges for the period of record for all stations where streamflow data have been collected during the history of the Water Survey of Canada, including data contributed by other agencies but not including data for stations operated by the province of Quebec.

These summaries are published every three years in eight volumes as for the Surface Water Data publications. The latest series, containing data to 1976 (in English units) was distributed between March and June 1978. The next series to be published will contain data to 1979 in metric units only and should be distributed in late 1980. Each edition supersedes all previous editions since it includes any corrections or additions made since the previous publication.

Historical Water Levels Summary

This publication contains a summary of monthly and annual mean water levels and annual extremes for the period of record for all stations on lakes or reservoirs where water level data have been collected during the history of the Water Survey of Canada; it also contains summaries of water level data for stations on rivers where "water levels only" were collected or for certain stations on rivers where streamflow data are collected but the historical water level information is considered to be of sufficient demand to warrant inclusion in this publication (daily water levels for stations where streamflow data are collected are not published in the annual Surface Water Data publications).

These summaries were published for the first time in 1978 and included data to 1976 in eight volumes as for the annual Surface Water Data publications and will be published every three years. The next series will contain data to 1979 in metric units only and should be distributed in late 1980. Each edition supersedes all previous editions since it includes any corrections or additions since the previous publication.

Sediment Data Reference Index

This inventory is published every two years and contains descriptive information for sediment staions operated during the history of the Water Survey of Canada in one publication. Some 373 stations are listed, 236 active and 137 discontinued. The stations are listed alphabetically, by province or territory (a station number index is also included). The following information is given for each station: station number and name, drainage area, gauge location (latitude and longitude), period of record available of suspended sediment, bedload and bed material and coded remarks such as identifying international gauging stations or whether the flow is regulated or natural.

The 1976 Index was distributed in June 1978. The 1978 edition will be published entirely in metric units and should be distributed in 1980. Each edition supersedes all previous editions since it includes any corrections or additions to the network.

Sediment Data for Canadian Rivers

Sediment data, which include daily suspended sediment concentration and load, particle size distribution, and bedload, have been published annually or biennially since 1961 by the Water Survey of Canada for data from 1947 to date.

These data are now published annually in one volume for Canada, with stations listed alphabetically by province or territory on a calendar-year basis.

The 1976 publication was distributed in June 1978 and the 1977 publication will probably be distributed in June 1979. The 1978 publication, to be distributed in 1980, will be published entirely in metric units.

Historical Sediment Data Summary

This publication contains a summary of monthly and annual mean suspended sediment load, annual extremes of suspended sediment concentration and load and annual total load for the period of record for all stations for which data have been collected during the history of the Water Survey of Canada.

These summaries are published every two years in one volume for Canada with stations listed alphabetically by province or territory and data presented on a calendar-year basis.

The 1976 publication was distributed in June 1978. The 1978 edition will be published entirely in metric units and will be distributed in 1980. Each edition supersedes all previous editions since it includes any corrections or additions since the previous publication.

3.1 Mailing List

A mailing list is maintained by the Editorial and Publications Section of the Inland Waters Directorate. Users may request to be placed on this list to obtain any of the following publications free-of-charge as they become available:

Tab
No.
1 - General Notification
2 - All Surface Water Data publications
3 - Surface Water Data publication for Atlantic Provinces
4 - Surface Water Data publication for Quebec
5 - Surface Water Data publication for Ontario
6 - Surface Water Data publication for Manitoba
7 - Surface Water Data publication for Saskatchewan
8 - Surface Water Data publication for Alberta
9 - Surface Water Data publication for British Columbia
10 - Surface Water Data publication for Yukon and Northwest Territories
11 - Sediment Data for Canadian Rivers
- Sediment Data Reference Index
- Historical Sediment Data Summary
13 - Water Resources Review
14 - Runoff Conditions in Canada
17 - Surface Water Data Reference Index

General Notification cards are sent to all names on the mailing list. These cards refer only to text publications (Scientific Series, Technical Bulletin Series, Report Series, and miscellaneous text publications including public information brochures). Publications in these series are mailed out in response to returned cards only. Data publications are mailed automatically to names on Tabs 2 to 11 and Tab 17, and to users of Water Resources Review (Tab 13) and Runoff Conditions in Canada (Tab 14) no pre-notification is involved.

Names on the mailing list for any of the annual Surface Water Data publications (Tabs 2 to 10) will automatically receive the corresponding Historical Streamflow Summary and Historical Water Levels Summary publications.

Similarly, names on the mailing list for the annual Sediment Data for Canadian Rivers publication (Tab 11) will automatically receive the other two Sediment Data publications.

The Water Resources Review (Tab 13) is a monthly bulletin published by the United States Geological Survey, Department of the Interior, and contains a synopsis of the streamflow and water levels at selected stations across the U.S.A. and also a forecast of runoff for the next month. Canada supplies data to Washington for this publication. The bulletin titled Runoff Conditions in Canada (Tab 14) is published monthly by the Water Resources Branch, Ottawa, and contains coloured graphs showing the variability of runoff at 17 selected stations across Canada.

Users may also request to be supplied with more than one copy of a particular publication (for their own internal distribution).

Requests to be placed on the mailing list for notification of text publications or for copies of any of the data publications should be sent to the Director, Water Resources Branch, Environment Canada, Ottawa, Ontario, K1A 0E7.

4. TYPES OF RELATED DATA

This section refers to the availability of various types of "basic" data collected by the Water Survey of Canada and does not include analyses of data such as flood frequencies, duration curves or water supply, or special studies or surveys such as natural flow determination, time-of-travel or forecasting, which are undertaken as specific requests or under formal agreements.

This section also does not describe the various other activities which form another part of the functions of the WSC, such as glacier surveys, snow surveys, geomorphological studies, reservoir surveys and co-operation with other agencies for the collection of water quality data, groundwater data or data for "Tides and water Levels" stations.

The data publications listed and described in Section 3 are the end result of the WSC streamflow, water level and sediment data collection surveys. Various types of field survey data are obtained and used in the interpretation and computation of the data in these publications and these are described below.

4.1 Streamflow and water level data

Several discharge measurement are obtained annually at each streamflow gauging station to establish the stage-discharge relation and to determine if any adjustments are required to account for ice effect or shifting conditions due to weeds or channel changes. Various parameters are measured:

(a) depth of water for at least 20 points to obtain the cross-sectional area of a river,
(b) velocity of water in each vertical where the depth is measured,
(c) temperature of air and water at the time of the measurement, or
(d) thickness of ice in the cross-section.

Two types of water level records are obtained at the field installation:

(a) continuous graphical charts using a water-stage recorder, or
(b) individual water level readings, usually once or twice daily, by an observer living near the gauging station.

The following hydrometric data are computed, either manually or by computer programs, from the basic field observations:

(a) daily water levels and daily discharges,
(b) instantaneous water levels and/or discharges at selected time intervals (usually hourly); although these may be extracted manually from graphical charts, they are also available automatically if these charts have been digitized,
(c) annual maximum instantaneous water levels and/or discharges, or
(d) daily discharges are used to give tabulations of annual maximum and minimum daily discharges, monthly and annual means in cfs and total acre-feet, and long-term means; these are obtained using computer programs.

4.2 Sediment Data

Sediment data are also presently obtained at some 240 locations across Canada where streamflow data are collected. Additional field work consists of the collection of samples of suspended sediment and bedload, using various techniques described in sediment operational manuals. These samples undergo a number of laboratory analyses such as sediment concentration and particle size analysis and the results are given in the data publications listed in Section 3. Some of these data could also be supplied in computer-compatible form if desired.

5. REVISIONS

A number of corrections or revisions have been made to previously published data. Many of these were required because of typographical or computational errors which were exposed when daily discharges were stored on magnetic tape and monthly means were re-calculated by computer. Other errors were discovered or different interpretations of basic data were made during the systematic review of historical streamflow data presently underway, for example, these revisions may have been justified because a more reliable stage-discharge relationship had been developed.

Revisions to daily discharges or daily water levels are not published at present. However, those stations where a systematic review has been conducted are identified in the Surface Water Data Reference Index publication. The Historical Streamflow Summary publications contain revisions to monthly and annual mean discharges, and annual extremes of discharge. Detailed information on revisions to historical data is available from the appropriate Regional Chief.

6. TAPE FORMAT 75-600 (DAILY DISCHARGES)

This is the master file containing historical daily discharge data on magnetic tape. The format and contents of this file will change from time to time as new or improved procedures are developed. However, a copy of this file will be supplied to users upon request on the understanding that the format may change without notice, and that data processing programs cannot be supplied. In fact, the format of this file is now different from the one described in the previous edition and will probably be changed again during metric conversion in 1980.

The tapes are written in EBCDIC (odd parity) on 9-track at a density of 1600 bpi. Each logical record contains 300 characters and the block size is 4500 characters or 15 records. The letter "b" in all record descriptions represents a blank. All records except the "Padding" records (75-405) have a 6-digit sequence number in positions 295-300. The records are numbered sequentially starting at 1 for the "Tape Header" record (75-401).

This file actually contains five record formats which are described below.

6.1 Tape Header Record (Format 75-401)

There is only one per reel and it is always the first record on the tape.

Position(s)	Length	Description
1-12	12	"000HD00000bb"
13-16	4	"bbb1"
17-24	8	blank
25-32	8	"FILEbEMR"
33-44	12	file number, e.g. "-WSC-0401-b1"
45-52	8	"bbSERIAL"
53-54	2	blank
55-58	4	always "9999"
59-61	3	blank
62-67	6	name of the program that created the tape e.g. "UPDFLO"
68	1	blank
69-79	11	date on which the tape was written, e.g. "JANb31b1967" for January 31, 1967
80-81	2	blank
82-99	18	range of station numbers, e.g. "01AE003bTÓb01MN124"
100-288	189	blank
289-294	6	date on which the tape was written, e.g. "670131" for January 31, 1967
295-300	6	"bbbbb1", record sequence number.

6.2 Data Record (Tape Format 75-501)

This tape format contains one month of daily discharges per record. The monthly total discharge and the first day of occurrence of both the minimum and maximum daily discharges for that month are also stored.

Position(s)	Length	Description
1	1	Region code, e.g. "3" for Calgary
2-8	7	station number, e.g. 01AB003
9-11	3	year, e.g. "965" for 1965
12-13	2	month, e.g. "10" for October or "b7" for July
14-15	2	type of data, e.g. "b1" for daily discharges in cfs
16	1	status code, contains 1 (used internally)
17	1	month code, a digit 1-8
18	1	valid extreme code for incomplete years or incomplete standard periods
19-24	6	blank (not used at this time)
25-272	248	31 8-digit fields for daily figures and codes
273-284	12	monthly total in cfs-days
285-286	2	date on which the minimum daily discharge first occurred
287-288	2	date on which the maximum daily discharge first occurred
289-294	6	date on which the record was last updated
295-300	6	record sequence number.

The MONTH Code (Position 17) is as follows:
1, 2, 3, 4 for an incomplete month of 28, 29, 30, 31 days respectively
5, 6, 7, 8 for a complete month of 28, 29, 30, 31 days respectively.

The VALID EXTREME Code (Position 18) applies to stations where daily discharge records have been obtained for part of the year or part of the standard period and is as follows:

B if both the maximum and minimum for the year (or standard period) are valid
H if only the maximum is valid
L if only the minimum is valid.

The DAILY figures and codes (Positions 25-272) are as follows:

char. 1-6: daily discharges in cfs, right justified with leading blanks; the decimal point, if present, is stored as a character
char. 7 : figure code
char. 8 : symbol code.

The FIGURE code is as follows:

1 for no data
2 for a figure with no decimal (applies to "0" also)
3 for a figure with one decimal place
4 for a figure with two decimal places
7 for a figure with no decimal in units of "10 cfs" (used for discharges of 1,000,000 cfs and higher).

The SYMBOL code is as follows:

1 or 2 for no symbol
3 for A (Manual Gauge)
4 for B (Ice Conditions)
5 for E (Estimated).

The MONTHLY TOTAL (Positions 273-284) is stored in Fortran F-type format as F12.3, with leading blanks. The decimal point is always stored in position 281.

The DATE (Positions 289-294) on which the record was last updated is as follows: year-month-day, e.g. "650205" for February 5, 1965.

6.3 End-of-Data Record (Tape Format 75-404)

There is only one per reel and it follows the last "Data" record (75-501).

Position(s)	Length	Description
1-12	12	"999ZZ9999999"
13-288	276	blank
289-294	6	date on which the tape was written, e.g. "670125" for January 25, 1967
295-300	6	record sequence number.

6.4 Tape Trailer Record (Format 75-403)

There is only one per reel. This record follows the "End-of-Data" record.

Position(s)	Length	Description
1-12	12	"000TR00000bb"
13-16	4	"bbb9"
17-288	272	blank
289-294	6	date on which the tape was written, e.g. "670131" for January 31, 1967
295-300	6	record sequence number.

6.5 Padding Record (Tape Format 75-405)

These records follow the "Tape Trailer" record (75-403) and are used if it is necessary to pad the last tape block to a total of 4500 characters (15 records).

Position(s)	Length	Description
1-12	12	"999ZZ9999999"
13-288	276	blank
289-300	12	"999999999999".

7. CARD FORMAT 67-002 (DAILY DISCHARGES OR WATER LEVELS)

Daily discharge or daily water level data can be supplied in card format 67-002 either on punched cards or magnetic tape. When these data are requested on magnetic tape, the tapes are usually written in EBCDIC (odd parity) on 9-track at a density of 1600 bpi. They do not contain tape labels. The first record on tape is the first "Data" record (card image) and the last "Data" record (card image) is followed by an 80-character "End-of-Data" record containing 9's in all 80 columns except columns 4-5 which are Z's and by "Padding" records (if necessary) also containing 9's in all columns except columns 4-5 which are Z's. The last tape block is followed by an end-of-file mark. Unless otherwise specified the data will be supplied as unblocked card images on tape. When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way unless requested; the sequence of the cards cannot be guaranteed.

7.1 Format Description

Column(s)

1	code for type of data and units: 1 - daily discharges in cfs 3 - daily discharges in 1000 cfs 4 - daily water levels in hundredths of feet 5 - daily water levels in tenths of feet
2-8	station number, e.g. 08AA023
9-11	year, e.g. "968" for 1968
12-13	month, e.g. "b7" for July
14	code for time interval: 1 - daily figures from day 1 to day 10 2 - daily figures from day 11 to day 20 3 - daily figures from day 21 to day 31
15-80	ten or eleven 6-digit data fields; refer to 7.1.1 and 7.2.

7.1.1 Description of Data Fields

Each data field has six positions. Discharges are punched right justified with a decimal point if necessary. Water levels are punched right justified without a decimal point, which is implied according to the code in column 1. A negative value is entered with a minus sign just to the left of the number, e.g. -12.3 or -0.01. The date shown on the card applies to the first data field (columns 15-20). The successive fields are for consecutive days depending on the interval (column 14) used. The value "-99999" is entered whenever a figure is missing in a field that would normally contain a figure.

7.2 Daily Figures

Three cards per month are required. The first card (1 in column 14) contains 10 days from day 1 to 10; columns 75-78 are not used for discharges but columns 76-78 contain the datum code for water levels; the number of days in the month, e.g. "30" for November, is punched in columns 79-80. The second card (2 in column 14) contains 10 days from day 11 to 20; columns 75-80 are not used. The third card (3 in column 14) contains 11 days from day 21 to 31; the figure "-11111" is punched in the appropriate field for days that do not apply to the month in question, e.g. 30 and 31 for February 1968.

8. CARD FORMAT 68-025 (DAILY DISCHARGES)

Data can be supplied in card format 68-025 either on punched cards or magnetic tape. This format provides the same numeric data as format 67-002 as described in Section 7. The only difference is that the following symbols are included where applicable: A for Manual Gauge; B for Ice Conditions; E for Estimated. Therefore, the same card and tape descriptions and limitations apply to both formats 67-002 and 68-025, except as outlined below.

8.1 Format Description

Column(s)

1	code for type of data and units: 1 - daily discharges in cfs 3 - daily discharges in 1000 cfs
2-8	station number, e.g. 08AA023
9-11	year, e.g. "968" for 1968
12-13	month, e.g. "b7" for July
14	code for time interval: 1 - daily figures from day 1 to day 8 2 - daily figures from day 9 to day 16 3 - daily figures from day 17 to day 24 4 - daily figures from day 25 to day 31
15-16	number of days in the month, i.e. 28, 29, 30 or 31
17-80	eight 8-digit data fields; refer to 8.1.1 and 8.2.

8.1.1 Description of Data Fields

Each data field has eight positions as follows:

Positions 1-6 contain the daily discharges which are punched right justified with a decimal point if necessary. A negative value is entered with a minus sign just to the left of the number, e.g. -12.3 or -0.01.

Position 7 contains a "figure code" as follows:
- 1 for no data
- 2 for a discharge with no decimal point
- 3 for a discharge with 1 decimal place
- 4 for a discharge with 2 decimal places.

Position 8 contains a "symbol code" as follows:

1 or 2 for no symbol	4 for B (Ice Conditions)
3 for A (Manual Gauge)	5 for E (Estimated)

The date shown on the card applies to the first data field (columns 17-24). The successive fields are for consecutive days. The value "-99999" is entered whenever a figure is missing in a field that would normally contain a figure. The positions 7 and 8 each contain a "1" (one).

8.2 Daily Figures

Four cards per month are required. Whenever days 29, 30 or 31 are not applicable to the month in question, e.g. day 31 for November, positions 1-6 of the fields in question contain "-11111" and positions 7 and 8 each contain a "1" (one).

9. CARD FORMAT 76-113 (ANNUAL MAXIMUM AND MINIMUM DAILY MEAN DISCHARGES OR WATER LEVELS)

Annual maximum and minimum daily mean discharge and water level data can be supplied in card format 76-113 either on punched cards or magnetic tape. When these data are requested on magnetic tape, the tapes are usually written in EBCDIC (odd parity) on 9-track at a density of 1600 bpi. They do not contain tape labels. The first record on tape is the first "Data" record (card image). The last "Data" record is followed by an end-of-file mark without an "End-of-Data" record or a "Padding" record. Unless otherwise specified the data will be supplied as unblocked card images on tape. When data are requested on cards they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way unless requested; the sequence of the cards cannot be guaranteed.

9.1 Format Description

Column(s)	
1	code for type of data and units: 1 - discharge in cfs 4 - water level in feet, to two decimal places 5 - water level in feet, to one decimal place
2	blank
3-9	station number, e.g. 05AB003
10	blank
11-14	year, e.g. 1959
15-16	month in which maximum occurred, e.g. "06" for June
17-18	day, e.g. 02 or 27
19-26	annual maximum daily mean, right justified with decimal point if necessary
27	symbol: A for manual gauge B for ice conditions E for estimated
28-29	month in which minimum occurred, e.g. "10" for October
30-31	day, e.g. 07 or 31
32-39	annual minimum daily mean, right justified with decimal point if necessary
40	symbol: A for manual gauge B for ice conditions E for estimated
41-71	same as columns 10 to 40
72-76	blank
77-80	standard period (from HYDEX); columns 77-78 contain the month "from", e.g. "03" for March and columns 79-80 contain the month "to", e.g. "10" for October.

9.1.1 Description of Data Fields

Each data field has eight positions. The discharges or water levels are punched right justified with a decimal point if necessary. A negative value is entered with a minus sign just to the left of the number, e.g. -12.3 or -0.01. The maximum and minimum daily values are also given for incomplete years if considered valid for the entire year (or standard period) even though some daily values are missing. When two or more values are the same within a year, the date of first

occurrence is given. Two years of data for a station can be placed on one card or card image. If there is only one year to be written, the second maximum and minimum daily values (columns 41-71) would be blank.

9.2 Annual Maximum and Minimum Daily Mean Figures

Two years of annual daily mean extremes for a station can be entered on one card. The code 1 is entered in column 1 to indicate discharge data in cfs. The code 4 or 5 is entered in column 1 to indicate water level data in feet with two decimal places (4) or one decimal place (5). Columns 3-9 contain the station number for which the annual daily mean extremes were retrieved. The month and day in columns 15-18 and in columns 46-49 refer to the day and month that the annual maximum daily mean occurred. Columns 19-26 and 50-57 contain the annual maximum daily mean value. Columns 27 and 58 contain the symbol, if present, for the maximum value. COlumns 28-31 and 59-62 contain the day and month that the annual minimum daily mean occurred. Columns 32-39 and 63-70 contain the minimum daily mean value. Columns 40 and 71 contain the symbol, if present, for the minimum value. Columns 77-80 may contain the standard period from the HYDEX file. Columns 77-78 contain the "from" month and columns 79-80 contain the "to" month. These columns may be blank if no standard period is given on the HYDEX file.

10. CARD FORMAT 72-101 (ANNUAL MAXIMUM INSTANTANEOUS DISCHARGES OR WATER LEVELS)

Annual maximum instantaneous discharge or water level data can be supplied in card format 72-101 either on punched cards or magnetic tape. When these data are requested on magnetic tape, the tapes are usually written in EBCDIC (odd parity) on 9-track at a density of 1600 bpi. They do not contain tape labels. The first record on tape is the first "Data" record (card image). The last "Data" record is followed by an end-of-file mark without an "End-of-Data" record or a "Padding" record. Unless otherwise specified the data will be supplied as unblocked card images on tape. When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way unless requested; the sequence of the cards cannot be guaranteed.

10.1 Format Description

Column(s)

1	code for type of data and units: 1 - discharge in cfs 2 - water level in feet
2	blank
3-9	station number, e.g. 04AA001
10	blank
11-14	year, e.g. 1959
15-16	month, e.g. "03" for March
17-18	day, e.g. 02 or 27
19-22	time of day, using the 24-hour clock, e.g. "0323" for 3:23 a.m.
23-25	time zone, e.g. "EST" for Eastern Standard Time
26-32	maximum instantaneous discharge or water level right justified, with a decimal point if necessary
33	blank
34-56	same as columns 11 to 33 above
57-79	same as columns 11 to 33 above
80	blank.

10.1.1 Description of Data Fields

Each data field has twenty two positions. The first fifteen positions contain the time and date of occurrence and the discharge or water level is punched in the next seven positions, right justified, with a decimal point if necessary. The successive fields are for the next available figure and may not be the following year if a figure is not available for that year.

10.2 Annual Maximum Instantaneous Figures

Three instantaneous discharges are punched per card together with their respective year, month, day, time of day, and time zone. Only the years with data available are punched. All the cards or card images for any one station will each have three instantaneous discharges except possibly the last one, which may have only one or two. The code 1 is entered in column 1 to indicate if the unit is cfs and the code 2 is entered if the unit is feet.

11. CARD FORMAT 72-102 (MONTHLY AND ANNUAL MEAN DISCHARGES)

Monthly and annual mean discharge data can be supplied in card format 72-102 either on punched cards or magnetic tape. When these data are requested on magnetic tape, the tapes are usually written in EBCDIC (odd parity) on 9-track at a density of 1600 bpi. They do not contain tape labels. The first record on tape is the first "Data" record (card image). The last "Data" record is followed by an end-of-file mark without an "End-of-Data" record or a "Padding" record. Unless otherwise specified the data will be supplied as unblocked card images on tape. When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way unless requested; the sequence of the cards cannot be guaranteed.

11.1 Format Description

Column(s)

1	code for type of data and units: 1 - mean discharges in cfs
2-8	station number, e.g. 08AA023
9-11	year, e.g. "968" for 1968
12-13	month, e.g. "b7" for July
14	code for time interval: 4 - monthly figures
15-50	six 6-digit data fields (used for monthly figures only)
51-80	refer to 11.1.1 and 11.2.

11.1.1 Description of Data Fields

Each data field has six positions. Discharges are punched right justified with a decimal point if necessary. A negative value is entered with a minus sign just to the left of the number, e.g. -12.3 or -0.01. The month shown on the card applies to the first data field (columns 15-20). The successive fields are for consecutive months. The value "-99999" is entered whenever a figure is missing in a field that would normally contain a figure.

11.2 Monthly and Annual Mean Figures

Monthly mean discharges for each year are entered on two cards. The code 1 is entered in column 1 to indicate that the unit is cfs and the code 4 is entered in column 14 to indicate monthly means. The mean discharge for the year or for a selected period within the year, e.g. March to October, is also given. On the first card, column 13 contains the digit 1 to indicate that the first data field refers to January. Columns 15-50 contain six 6-digit data fields. Columns 51-76 are blank. Columns 77-78 contain the beginning month for the year or selected period. Columns 79-80 contain the ending month. On the second card, column 13 contains the digit 7 to indicate that the first data field refers to July. Columns 15-50 contain six 6-digit data fields. Columns 51-74 are blank. Columns 75-80 contain the mean for the year or selected period, right justified.

12. CARD FORMAT 72-100 (DAILY SUSPENDED SEDIMENT CONCENTRATION)

Daily suspended sediment concentration data can be supplied in card format 72-100 either on punched cards or magnetic tape. When these data are requested on magnetic tape, the tapes are usually written in EBCDIC (odd parity) on 9-track at a density of 1600 bpi. They do not contain tape labels. The first record on tape is the first "Data" record (card image) and the last "Data" record (card image) is followed by an 80-character "End-of-Data" record containing 9's in all 80 columns except columns 4-5 which are Z's and by "Padding" records (if necessary) also containing 9's in all columns except columns 4-5 which are Z's. The last tape block is followed by an end-of-file mark. Unless otherwise specified the data will be supplied as unblocked card images on tape. When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way unless requested; the sequence of the cards cannot be guaranteed.

12.1 Format Description

Column(s)	
1	code for type of data and units: 7 - daily mean suspended sediment concentration in mg/L
2-8	station number, e.g. 08AA023
9-11	year, e.g. "968" for 1968
12-13	month, e.g. "b7" for July
14	code for time interval: 1 - daily figures from day 1 to day 10 2 - daily figures from day 11 to day 20 3 - daily figures from day 21 to day 31
15-80	ten or eleven 6-digit data fields; refer to 12.1.1 and 12.2.

12.1.1 Description of Data Fields

Each data field has six positions. The first five positions contain daily suspended sediment concentration data right justified with no decimal point; the sixth position contains a symbol: E - estimated; S - sample(s) collected this day; blank for no symbol. The date shown on the card applies to the first data field (columns 15-20). The successive fields are for consecutive days. The value "-99999" is entered whenever data are missing.

12.2 Daily Figures

Three cards per month are required. The first card (1 in column 14) contains 10 days from day 1 to 10; columns 75-78 are not used; the number of days in the month, e.g. "30 for November, is punched in columns 79-80. The second card (2 in column 14) contains 10 days from day 11 to 20; columns 75-80 are not used. The third card (3 in column 14) contains 11 days from day 21 to 31; the figure "-11111" is punched in the appropriate field for days that do not apply to the month in question, e.g. 30 and 31 for February 1968.

13. CARD FORMAT 76-026 (WATER TEMPERATURES)

Water temperature data can be supplied in card format 76-026 either on punched cards or magnetic tape. The user should be aware that the water temperatures stored on this file are instantaneous observations taken at the time of a sediment or streamflow measurement and that this file is far from complete since it contains only a small part of the water temperatures obtained by the Water Survey of Canada during its history. This file was developed primarily for use in the preparation of Sediment Data publications. When these data are requested on magnetic tape, the tapes are usually written in EBCDIC (odd parity) on 9-track at a density of 1600 bpi. They do not contain tape labels. The first record on tape is the first "Data" record (card image) and the last "Data" record (card image) is followed by an 80-character "End-of-Data" record containing 9's in all 80 columns except columns 4-5 which are Z's and by "Padding" records (if necessary) also containing 9's in all columns except columns 4-5 which are Z's. The last tape block is followed by an end-of-file mark. Unless otherwise specified the data will be supplied as unblocked card images on tape. When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way unless requested; the sequence of the cards cannot be guaranteed.

13.1 Format Description

Column(s)	
1	code for type of data: C - water temperatures in tenths of degrees Celsius
2-8	station number, e.g. 08AA023
9-11	year, e.g. "968" for 1968
12-13	month, e.g. "b7" for July
14	code for time interval: 1 - water temperatures from day 1 to day 15 2 - water temperatures from day 16 to day 31
15-16	blank
17-80	sixteen 4-digit data fields; refer to 13.1.1 and 13.2.

13.1.1 Description of Data Fields

Each data field has four positions. The first three positions contain the water temperature figure in tenths of degrees, right justified, with no decimal point; the fourth position contains a symbol identifying the source of data (S for Sediment Survey Data, H for Hydrometric Survey Data). The first data field is in columns 17-20. The successive fields are for consecutive days. The value '-99' is entered whenever data for any day are missing.

13.2 Daily Figures

Two cards per month are required. The first card (1 in column 14) contains 15 days from day 1 to day 15; columns 77-78 are not used; the number of days in the month is punched in columns 79-80. The second card (2 in column 15) contains 16 days from day 16 to day 31; the figure '-11' is punched in the appropriate field for days that do not apply to the month in question, e.g. 30 and 31 for February 1968.