Introduction

The Forecast Component Data Base (FCDB) includes parametric, carryover and Rating Curve files.

The parametric files contain information about the Operations that are used by Segments and the organization of the Segments.

The carryover file contains the state variables for each Segment for various dates.

The Rating Curve file contains Rating Curves definitions and other forecast point related information.

Access Routines

The routines used to access the FCDB include:

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<tr>
<th>Routine</th>
<th>Function</th>
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<tr>
<td>FCDATE</td>
<td>Fill common block FCSEGC with the carryover dates for the specified Segment</td>
</tr>
<tr>
<td>FCOBBL</td>
<td>Sort arrays of internal Julian dates and times into ascending order</td>
</tr>
<tr>
<td>FCORDR</td>
<td>Set Segment computational order for the specified Segments organization (i.e., either single Segment, Forecast Group or Carryover Group)</td>
</tr>
<tr>
<td>FGETCO</td>
<td>Get carryover for the specified Segment and date</td>
</tr>
<tr>
<td>FGETRC</td>
<td>Fill Rating Curve definition common block with definition of the specified Rating Curve</td>
</tr>
<tr>
<td>FGETSG</td>
<td>Fill Segment definition common block and read parametric information for specified Segment</td>
</tr>
<tr>
<td>FIDFLT</td>
<td>Initialize user default values in common blocks</td>
</tr>
<tr>
<td>FOPCDE</td>
<td>Convert Operation identifier to Operation number</td>
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<tr>
<td>FOPCDX</td>
<td>Convert Operation number to Operation identifier</td>
</tr>
<tr>
<td>FSERCH</td>
<td>Find one or all Operations of a given type in a Segment parameter array</td>
</tr>
<tr>
<td>INSTRT</td>
<td>Initialize control values in common blocks</td>
</tr>
</tbody>
</table>
Convert month, day and year into a Julian date and time

1/ See Section IX.3.7B for a detailed description.

2/ See Section IX.3.3B for a detailed description.

3/ See Section IX.3.0B for a detailed description.

These routines can be used to read the parametric data for a Segment and carryover can be read for a Segment for any one of the available saved dates of carryover for that Segment. The contents of the parameter and carryover arrays are described in Chapter VIII.2. The contents the section of the parameter and carryover arrays for each Operation is described in Chapter VIII.3.

A Rating Curve definition is put in the common block FRATNG.

Access Notes

See Section IX.5.1 for general access information.

Several routines must be called before any of the FCDB files can be accessed. These routines initialize variables in common blocks with default values read from different Hydrologic Command Language (HCL) and Forecast Component files. The routines are:

- HLDCBS
- INSTRRT
- FIDFLT

They should be called in the order listed. The routines INSTRRT and FIDFLT require no arguments. One of the two arguments required for HLDCBS is an HCL Function name. The name needed for the FCDB access is 'FCEXEC'.

Routine HLDCBS is described in Section IX.3.0B. Routines INSTRRT and FIDFLT are described in Section IX.3.7B.

In each of the following access examples it is assumed that the initialization routines HLDCBS, INSTRRT and FIDFLT have been called.

The contents of common blocks are described in Section IX.3.3C.

Example 1:

The following subroutine calls are used if the parameters for a particular Operation type for the Segments in any type of Segment grouping (either a single Segment, a Forecast Group or a Carryover Group) are to be read and located in the parameter array:

```
CALL FOPCDE - Operation number obtained for the Operation
```
identifier

CALL FCORDR - computational order of the requested Segment grouping set in common block FCRUNC - the number of Segments ordered is stored in the variable NSEGEX in FCRUNC

A loop through the NSEGEX Segments is then set up with the following calls made for each Segment:

CALL FGETSG - parameters for the Segment are read into the parameter array

CALL FSERCH - location of the first Operation of the requested type in the parameter array is obtained based on the Operation type number - subsequent occurrences of this Operation type can be found with additional calls to FSERCH as indicated by output from the previous call - if the name of the specific Operation to be located is known only a single call to FSERCH is needed

Example 2:

The following subroutine calls are used if the carryover for a particular Operation type for the Segments in any type of Segment grouping (either a single Segment, a Forecast Group or a Carryover Group) for a particular date is to be read and located in the carryover array:

CALL FOPCDE - Operation number is obtained from the Operation identifier

CALL JULDA - convert the desired date of carryover from format of month, day and year to internal Julian date and hour

CALL FCORDR - computational order of the requested Segment grouping is stored in common FCRUNC - the number of Segments ordered is stored the variable NSEGEX in FCRUNC

Loop through the NSEGEX Segments with the following calls made for each Segment:

CALL FGETSG - parameters for the Segment are read into the parameter array

CALL FGETCO - carryover array is filled for the requested date (in Julian format) for the current Segment - the identifier needed as an argument in the call is found in common block FCSEGN

CALL FSERCH - location in the parameter array for the Operation type is obtained based on the Operation type number
(and Operation name if known) - the location of carryover in the carryover array for the Operation type is in the first part of the parameter array - see Section VIII.2 for description of contents of the parameter array.

Example 3:

The following subroutine calls are used if the carryover for a particular Operation type for the most recent date of carryover for the Segments in any type of Segment grouping (either a single Segment, a Forecast Group or a Carryover Group) is to be read and located in the carryover array:

- **CALL FOPCDE** - Operation number is obtained from the Operation identifier
- **CALL FCORDR** - computational order of the requested Segment grouping is stored in common block FCRUNC - the number of Segments ordered is stored the variable NSEGEX in FCRUNC
- **CALL FGETSG** - common block FCSEGN is filled using the record location for the first of the ordered Segments (the parameter array does not need to be filled)
- **CALL FCDATE** - list of carryover dates available for the first Segment is read and stored in common block FCSEGC - the identifier needed as an argument is the one held in FCSEGN - the dates and hours must be transferred from the arrays in FCSEGC to local arrays before the dates are ordered to find the most recent date
- **CALL FCOBBL** - Julian dates and hours of carryover are put in ascending order - only the available dates of carryover (NSLOTS in common block FCCGD) should be sorted - the most recent date is position NSLOTS in the sorted list of carryover dates and hours

Loop through the NSEGEX Segments with the following calls made for each Segment:

- **CALL FGETSG** - parameters for the Segment are read into the parameter array
- **CALL FGETCO** - carryover for the most recent date for the Segment is read - the Segment identifier needed as an argument in the call is the one stored in FCSEGN
- **CALL FSERCH** - location in the parameter array for the Operation is obtained based on the Operation number (and the Operation name if known) - the location of carryover in the carryover array for the Operation type is in the first part of the parameter array
Example 4:

The following subroutine call is needed if a Rating Curve is to be read. If successfully read, the Rating Curve definition is in the common block FRATNG.

    CALL FGETRC - Rating Curve is read for the specified Rating Curve

Example

The following example shows how to:

- find carryover for Segments that have a specified Operation
- find most recent carryover for Segments that have specified Operation
- get a Rating Curve definition

C

PROGRAM MAIN
C
CHARACTER*8 OPID,ORID,SEGID,OPNAM,RCID
CHARACTER*8 MSGTYP
C
PARAMETER (LWORK=1000)
DIMENSION WORK(LWORK)
PARAMETER (LCO=10)
DIMENSION ICODA(LCO),ICOHR(LCO)
C
INCLUDE 'uiox'
INCLUDE 'upagex'
INCLUDE 'common/fcrunc'
INCLUDE 'common/fcsegm'
INCLUDE 'common/fccgd'
INCLUDE 'common/fcsegc'
INCLUDE 'common/fc'
INCLUDED 'common/fp'
INCLUDE 'common/fc'
INCLUDE 'common/fts'
INCLUDE 'common/fratng'
C
C
C  OPEN INPUT/OUTPUT FILES
CALL UPRIMO
C
C  GET USER IDENTIFIER
CALL HGTUSR (PUSRID,ISTAT)
C
C  PRINT USER IDENTIFIER
WRITE (LP,*) 'USER = ',PUSRID
C
CALL INSTRT
C
C  GET DEFAULT HCL VALUES
CALL HLDCBS ('FCEXEC ',ISTAT)
IF (ISTAT.GT.0) THEN
    WRITE (LP,10) 'HYDROLOGIC COMMAND LANGUAGE'
10    FORMAT ('0**ERROR** READING ',A,' DATA BASE CONTROL RECORDS.')</n    GO TO 70
ENDIF
C
C  GET HCL AND USER DEFAULT VALUES
CALL FIDFLT
FIND CARRYOVER FOR SEGMENTS THAT HAVE SPECIFIED OPERATION

WRITE (LP,*)

GET OPERATION NUMBER FOR OPERATION NAME
OPID='SAC-SMA'
CALL FOPCDE (OPID,NUMOP)
WRITE (LP,*) 'FOPCDE CALLED : OPID=',OPID,' NUMOP=',NUMOP

SET CARRYOVER DATE
CALL FCTZC (ITZ,IDSAV,CODE)
IMO=03
IDA=30
IYR=93
IHR=12
CALL JULDA (JDAY,INTHR,IMO,IDA,IYR,IHR,ITZ,IDSAV,CODE)

GET SEGMENTS IN CARRYOVER GROUP
IDTYPE=1
ORID='TEXORADO'
CALL FCORDR (IDTYPE,ORID,ISTAT,WORK,LWORK)
WRITE (LP,*) 'FCORDR CALLED : ORID=',ORID,' ISTAT=',ISTAT,
*NSEGEX=',NSEGEX
IF (ISTAT.EQ.0) THEN
IF (NSEGEX.GT.0) THEN
PROCESS EACH SEGMENT
DO 30 I=1,NSEGEX
GET SEGMENT DEFINITION
IREC=IRSGEX(I)
IOPT=1
NOPARM=0
CALL FGETSG (SEGID,IREC,MP,P,MT,T,MTS,TS,IOPT,NOPARM,
*ISTAT)
WRITE (LP,*) 'FGETSG CALLED : ISTAT=',ISTAT,
'SEGID=',SEGID
GET CARRYOVER
IHR=0
MSGTYP='ERROR'
CALL FGETCO (SEGID,JDAY,IHR,C,MC,MSGTYP,ISTAT)
WRITE (LP,*) 'FGETCO CALLED : JDAY=',JDAY,
'*ISTAT=',ISTAT
CHECK IF OPERATION NUMBER FOUND
OPNAM=''
LOC=1
20 CALL FSERCH (NUMOP,OPNAM,LOC,P,MP)
WRITE (LP,*) 'FSERCH CALLED : NUMOP=',NUMOP,
'*LOC=',LOC,' OPNAM=',OPNAM
IF (LOC.GT.0) GO TO 20
CHECK IF OPERATION NUMBER AND NAME ROUND
OPNAM='BLASE'
LOC=0
CALL FSERCH (NUMOP,OPNAM,LOC,P,MP)
WRITE (LP,*) 'FSERCH CALLED : NUMOP=',NUMOP,
'*OPNAM=',OPNAM,' LOC=',LOC
IF (LOC.GT.0) THEN
GET LOCATION OF CARRYOVER IN C ARRAY
LOCC=P(LOC)+6
WRITE (LP,*) 'LOCC=',LOCC
ENDIF
CONTINUE
30 CONTINUE
ENDIF

FIND MOST RECENT CARRYOVER FOR SEGMENTS THAT HAVE SPECIFIED OPERATION
WRITE (LP,*)

C
C GET OPERATION NUMBER FOR OPERATION NAME
OPID='SAC-SMA'
CALL FOPCDE (OPID,NUMOP)
WRITE (LP,*)'FOPCDE CALLED : OPID=',OPID,' NUMOP=',NUMOP

C GET SEGMENTS IN CARRYOVER GROUP
IDTYPE=1
ORID='TEXORADO'
CALL FCORDR (IDTYPE,ORID,ISTAT,WORK,LWORK)
WRITE (LP,*)'FCORDR CALLED : ORID=',ORID,' ISTAT=',ISTAT,
  ' NSEGEX=',NSEGEX
IF (ISTAT.EQ.0) THEN
  IF (NSEGEX.GT.0) THEN
    C        GET SEGMENT DEFINITION FOR FIRST SEGMENT - DO NOT FILL
    IREC=IRSGEX(1)
    IOPT=1
    NOPARM=1
    CALL FGETSG (SEGID,IREC,MP,P,MT,T,MTS,TS,IOPT,NOPARM,
                 ISTAT)
    WRITE (LP,*)'FGETSG CALLED : ISTAT=',ISTAT,
                 ' SEGID=',SEGID
    C        GET CARRYOVER DATES
    IOBS=0
    CALL FCDATE (SEGID,IOBS)
    WRITE (LP,*)'FCDATE CALLED : SEGID=',SEGID,
                 ' IOBS=',IOBS
    DO 40 I=1,NSLOTS
         ICODA(I)=ICDAYC(I)
         ICOHR(I)=ICHRC(I)
     40      CONTINUE
    C        SORT DATES WITH MOST RECENT LAST
    CALL FCOBBL (ICODA,ICOHR,NSLOTS)
    WRITE (LP,*)'FCOBBL CALLED : NSLOTS=',NSLOTS
    C        PROCESS EACH SEGMENT
    DO 60 I=1,NSEGEX
    C           GET SEGMENT DEFINITION
    IREC=IRSGEX(I)
    IOPT=1
    NOPARM=0
    CALL FGETSG (SEGID,IREC,MP,P,MT,T,MTS,TS,IOPT,NOPARM,
                 ISTAT)
    WRITE (LP,*)'FGETSG CALLED : ISTAT=',ISTAT,
                 ' SEGID=',SEGID
    C           GET CARRYOVER
    JDAY=ICODA(NSLOTS)
    IHR=0
    MSGTYP='ERROR'
    CALL FGETCO (SEGID,JDAY,IHR,C,MC,MSGTYP,ISTAT)
    WRITE (LP,*)'FGETCO CALLED : JDAY=',JDAY,
                 ' ISTAT=',ISTAT,
                 ' MSGTYP=',MSGTYP
    C           CHECK IF OPERATION NUMBER FOUND
    OPNAM=''
    LOCP=1
    CALL FSERCH (NUMOP,OPNAM,LOCP,P,MP)
    WRITE (LP,*)'FSERCH CALLED : NUMOP=',NUMOP,
                ' LOCP=',LOCP,' OPNAM=',OPNAM
    IF (LOCP.GT.0) GO TO 50
C CHECK IF OPERATION NUMBER AND NAME ROUND
  OPNAM='BLASE'
  LOCP=0
  CALL FSERCH (NUMOP,OPNAM,LOCP,P,MP)
  WRITE (LP,*)'FSERCH CALLED : NUMOP=',NUMOP,
               ' LOCP=',LOCP,' OPNAM=',OPNAM
  IF (LOCP.GT.0) THEN
C GET LOCATION OF CARRYOVER IN C ARRAY
  LOCC=P(LOCP)+6
WRITE (LP,*), 'LOCC=', LOCC
ENDIF
   CONTINUE
ENDIF
ENDIF

C
C - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
C
C GET RATING CURVE DEFINITION
C
WRITE (LP,*)
C
RCID='ROSSE'
CALL FGETRC (RCID, ISTAT)
WRITE (LP,*), 'FGETRC CALLED : RCID=', RCID, ', ISTAT=', ISTAT
IF (ISTAT.EQ.0) THEN
   WRITE (LP,'(A,5A4,A,5A4)'), 'RIVERN=', RIVERN, ', RIVSTA=', RIVSTA
ENDIF
C
C - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
C
C CLOSE FILES
CALL UCLOSL
C
70  WRITE (LP,*)
WRITE (LP,*), '- PROCESSING COMPLETED -'
C
STOP
C
END