

# COLORADO DAM SITE INVENTORY



Colorado Water Conservation Board  
Department of Natural Resources

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# CONTENTS

Executive Summary .....	iii
1.0 Introduction .....	1
1.1 Basis of the Inventory .....	1
1.2 Method of Compilation .....	2
1.3 Type of Information .....	2
1.4 Acknowledgements .....	3
1.5 Codes .....	3
1.6 Abbreviations .....	4
1.7 Organization .....	4

## Appendices

Appendix A, List of References

Appendix B, List of Dam Sites Sorted by Major River Basin

Appendix C, List of Dam Sites Sorted by Holt Number (Rank)

Appendix D, List of Dam Sites Threatened by Development

Appendix E, Alphabetical List of Dam Sites

Appendix F, Information Retrieval System Details



## **Executive Summary**

Over 700 potential new reservoir sites and potential enlargement of existing reservoirs, representing approximately 48 million acre-feet of potential storage, are identified in the inventory. Storage water rights for approximately 20 million acre-feet (only 41-percent of identified capacity) have been adjudicated statewide.

Some potential reservoir sites may include several conditional decrees for the same dam site. Existing reservoirs may include one or more undeveloped conditional water right for the same dam site. Duplicate entries may exist where additional information was available from a different source.

A summary of potential reservoir capacity and adjudicated conditional storage water rights for each major river basin in the state is shown in the following table and graphs.

# COLORADO DAM SITE INVENTORY

## 1.0 Introduction

In 1986, passage of House Bill No. 1011 added a new subsection (4) (a) to section 37-60-115, Colorado Revised Statutes, relating to water studies conducted by the Colorado Water Conservation Board (CWCB).

The CWCB was directed to compile an inventory of potential dam and reservoir sites within the state of Colorado having a capacity of twenty thousand acre-feet or more, or such other sites that the board deems important. The initial inventory was to be made available to the General Assembly by October 1, 1987, and updated periodically and maintained by the Board thereafter.

The Board was further directed to utilize the inventory to *“identify potential dam and reservoir sites, the development of which may be stopped because of on-going land uses which are encroaching upon needed lands or because of other circumstances.”* The Board is required to apprise the General Assembly of the dam and reservoir sites so identified in its annual report required by section 37-60-122, CRS.

## 1.1 Basis of the Inventory

The inventory is based on a review of the state engineer's water rights tabulation and a review of all publicly available published information. Original engineering work or field investigations were not performed by the Board for the inventory.

The CWCB conducted a review of the literature for all published water resource development studies and reports. Over 35 studies were reviewed for information. In addition, several Water Conservancy Districts, Division Engineers, and consulting engineers were contacted for their input. As a result of this effort, over 350 potential dam and reservoir sites with capacities greater than or equal to 20,000 acre-feet were identified.

The CWCB also reviewed the State Engineer's Reservoir Water Rights Tabulations. Reservoir sites with conditional decrees equal to or greater than 5,000 acre feet are included in the inventory.

## **1.2 Method of Compilation**

The inventory has been compiled and will be maintained on a computerized information retrieval system which is compatible with the water data bank maintained by the State Engineer. Details of the system are included in the Appendix.

## **1.3 Type of Information**

The following information concerning potential dam and reservoir sites within the state of Colorado is included in the inventory:

- The name of the dam and reservoir site;
- The location of the dam site by major river basin, water division, county, stream, section, township, range, and principal meridian;
- Basic data about the potential dam including elevation and height, if such data is readily available;
- An estimate of the reservoir's total capacity, if available;
- The conditional water rights decreed to the site, if any, date of adjudication, and Holt Number as an indication of its basin rank;
- The potential uses of the water supply which would be developed; and
- A citation to the reference material and sources used to compile the information.

## 1.4 Acknowledgements

The inventory was originally prepared by the Colorado Water Conservation Board under the direct supervision of David W. Walker, Deputy Director. The following CWCB staff members contributed to the preparation of the inventory:

Fred Dalbert	Research of published reports
William P. Stanton	Database management
Gloria Lung	Data entry

Special thanks are given to Will Burt of the State Engineer's office for providing valuable advice and basic data from the water rights data bank.

## 1.5 Codes

The following codes are used in the inventory:

### Potential Uses

1 Irrigation	4 Industrial	7 Fire
2 Municipal	5 Recreation	8 Domestic
3 Commercial	6 Fishery	9 Stock
		0 Other

### Adjudication Type

1 Original	5 Transfer From
2 Supplemental	6 Abandonment
3 Conditional	7 Alternate Point
4 Transfer To	8 Conditional to Absolute

### Holt Number

Sorting on this field provides a convenient and efficient way to rank the water rights records in order of priority.

## 1.6 Abbreviations

The following abbreviations are frequently used in the inventory:

Adj.	Adjudication
af	Acre-Feet
Div.	Division
PM	Principal Meridian
Res	Reservoir
Sec	Section
Str. No.	Stream Number
Twn	Township
WD	Water District

Note: Where the Dam Site Name is capitalized in the inventory, the information came from the State Engineer's water right files.

## 1.7 Organization

The inventory is first sorted by major river basin, then by water division, by county, and finally alphabetically by site name. The area of the state covered by each water division is summarized below. Note that the North Platte River basin (Jackson County), which is included in Water Division 6, is physically in the Missouri (Platte) major river basin.

Division	River Basins	Major Basin
-----	-----	-----
1	South Platte	Missouri (Platte)
2	Arkansas	Arkansas
3	Rio Grande	Rio Grande
4	Gunnison	Colorado
5	Colorado main stem	Colorado
6	Yampa-White-North Platte	Colorado
7	San Miguel-Dolores- Animas-San Juan	Colorado







## **Appendix A**

### **List of References**

## **Appendix B**

### **List of Dam Sites Sorted by Major River Basin**

**Arkansas**

**Colorado**

**Missouri (Platte)**

**Rio Grande**

## **Appendix C**

### **List of Dam Sites Sorted by Holt Number (Rank)**

## **Appendix D**

### **List of Potential Dam Sites Threatened by Development**

(In Preparation)

## **Appendix E**

### **Alphabetical List of Dam Sites**

## APPENDIX F - Information Retrieval System Details

The following paragraphs are directed to users who intend to install the inventory on their own personal computer. Copies of the files on a high density floppy disk may be obtained at nominal cost from the CWCB.

### Files

The database management system software used to create and maintain the inventory is dBASE III PLUS developed by Ashton-Tate. The following dBASE III PLUS files have been created for users of the the inventory:

File Name -----	Comments -----
DAMSITES.prg ADDSITES.prg	Program file to print out the reports Program file to add new data
DAMSITES.dbf STREAMSA.dbf	Database file containing information from all sources Abridged Database file containing information about stream names
DAMSITES.vue	View file to relate the STREAMS and DAMSITES database files
DAMSITES.ndx HOLTNO.ndx SITEDELE.ndx SITEXREF.ndx STREAMSA.ndx	Index file to organize the data in DAMSITES.dbf by basin, division, county and stream Index file to organize the data in DAMSITES.dbf by Holt Number and division Index file to organize the data in DAMSITES.dbf by deleted sites Index file to organize the data in DAMSITES.dbf by site name Index file to organize the data in STREAMS.dbf by water district and stream number
DAMSITES.frm HOLTNO.frm SITEDELE.frm SITEXREF.frm	Form file to create headings and print a list of sites by drainage basin Form file to create headings and print a list of sites by Holt Number Form file to create headings and print a list of sites which may be discontinued Form file to create headings and print a list of sites in alphabetical order
DAMSITES.fmt DAMSITES.scr DAMSITES.txt	Format file for the screen for data entry or viewing Screen file for the screen for data entry or viewing Text file for the screen for data entry or viewing
DAMS_WP.doc	Documentation file you are reading now



A list of the known sites from the CWCB literature search was prepared and entered into a computer database file named WCBSITES.dbf.

The State Engineer provided the CWCB with seven database files in the form RESRTSn.dbf, where "n" is a number indicating the respective water division. These files contained a considerable amount of water rights information (over 12,500 records).

The RESRTSn.dbf files furnished by the State Engineer were screened to sort out all the reservoir sites with any kind of conditional decree and a storage volume greater than or equal to 1,000 acre-feet. This resulted in seven relatively smaller files with file names in the form DWRSITEn.dbf. Further analysis, as shown in the following table, indicated successively fewer reservoir structures with conditional water rights greater than 5000, 10000, and 20000 acre-feet.

#### ANALYSIS OF DATA FURNISHED BY DWR

DWR File	Number of Records	Number of conditionally decreed reservoir structures with water rights (acre-feet) as shown below				
		>1000	>5000	>10000	>20000	
RESRTS1.dbf	4410	197	91	68	42	
RESRTS2.dbf	1195		35	24	10	7
RESRTS3.dbf	218	5	3	2	1	
RESRTS4.dbf	2186		87	49	35	26
RESRTS5.dbf	2012		145	88	63	42
RESRTS6.dbf	1759		120	93	75	61
RESRTS7.dbf	638		54	32	23	16
Totals	12518	643	380	276	195	

The seven DWRSITEn.dbf files were then combined into one large file named DWRSITES.dbf. This file has the same structure as the DWRSITEn.dbf files.

Obviously, a particular reservoir site may have one or more conditional decrees. Taken individually, each decree might very easily be less than 20,000 acre-feet, but taken as a whole, the collective sum may exceed the cut-off criteria. However, each significant reservoir site would probably have at least one decree

greater than 5,000 acre-feet. Therefore, only reservoir sites with conditional decrees equal to or greater than 5,000 acre-feet are included in the DWRSITES.dbf file.

Finally, the information in WCBSITES.dbf and DWRSITES.dbf was subsequently combined into one database file named DAMSITES.dbf. Using a view file, the DAMSITES and STREAMSA database files were related on the common fields of div, wd, and wrstrno so the final product includes stream names. In the 1990 revisions, stream names were manually added to the DAMSITES. dbf database eliminating the need to relate the two files.

## File Structures

The structure of each of the various dBase III PLUS database files, with comments on the meaning of the respective fields in each file, are as follows:

Structure for database: WCBSITES.dbf and DAMSITES.dbf  
 Number of data records: 792  
 Date of last update: 04/30/90

Field	Field Name	Type	Width	Dec	Comments
1	BASIN	Character	20		Major Drainage Basin
2	DIV	Character	1		Water Division
3	WD	Character	2		Water District Number
4	WRNAME	Character	25		Decreed Name
5	CTY	Numeric	2		*County Number
6	COUNTY	Character	20		County Name
7	WRSTRNO	Character	3		*Stream Number
8	STRNAME	Character	30		Stream Name
9	SEC	Numeric	2		Section Number
10	TS	Character	4		Township in format nnhd
11	RNG	Character	5		Range in format nnnhd
12	PM	Character	1		Principal Meridian
13	ELEV	Numeric	5		Elevation of the dam
14	HEIGHT	Numeric	4		Height of the dam
15	LENGTH	Numeric	5		Length of the dam
16	CAPACITY	Numeric	8		Total capacity of the reservoir
17	PURPOSES	Character	20		
18	VOLIRRIG	Numeric	8		Volume of Irrigation water
19	VOLMANDI	Numeric	8		Volume of M & I water
20	VOLFLOOD	Numeric	8		Volume of flood control pool
21	VOLPOWER	Numeric	8		Volume of power water
22	IRRIG	Logical	1		
23	MANDI	Logical	1		
24	FLOOD	Logical	1		
25	POWER	Logical	1		
26	DCRAMT	Numeric	12	4	Decreed Amount
27	DCRUNITS	Character	1		Units of Decreed Amount
28	ADJTYPE	Character	3		*Adjudication type codes
29	USETYPE	Character	10		*Use type codes
30	ADJDATE	Character	10		Adjudication Date
31	PADJDATE	Character	10		Previous Adjudication Date
32	APRODATE	Character	10		Appropriation Date
33	HNUMBER	Numeric	15	5	*Holt Number
34	USER	Character	30		Name of water user, if available
35	COMMENT	Character	136		Comments
36	STATUS	Character	20		Update Status (internal use)
37	REFERENCE	Character	136		Reference
			---		
Total =			583		

Note: \* indicates additional documentation follows

Structure for database: DWRSITEn.dbf and DWRSITES.dbf  
 Number of data records: 380  
 Date of last update : 12/03/87

Field	Field Name	Type	Width	Dec	Comments
1	WD	Character	2		Water District Number
2	ID	Character	5		Structure ID, if assigned
3	SEQNO	Character	5		for internal use
4	WRNAME	Character	24		Decreed Name
5	WRSTRNO	Numeric	3		*Stream Number
6	CTY	Numeric	2		*County Number
7	Q10	Character	2		10-acre qtr-qtr-section
8	Q40	Character	2		40-acre qtr-qtr-section
9	Q160	Character	2		160-acre qtr-section
10	SEC	Numeric	2		Section number
11	TS	Character	4		Township in format nnhd
12	RNG	Character	5		Range in format nnnhd
13	PM	Character	1		Principal Meridian
14	ALTERID	Numeric	7		Alternate or associated ID
15	STRTYPE	Character	10		*Structure type codes
16	USETYPE	Character	10		*Use type codes
17	ADJTYPE	Character	3		*Adjudication type codes
18	ADJDATE	Character	10		Adjudication Date
19	PADJDATE	Character	10		Previous Adj Date
20	APRODATE	Character	10		Appropriation Date
21	ORDNO	Numeric	2		Order within adj/apro date
22	PRIORNO	Character	9		Court-assigned priority #
23	HNUMBER	Numeric	11	5	*Holt Number
24	DCRAMT	Numeric	12	4	Decreed Amount
25	DCRUNITS	Character	1		Units of Decreed Amount
26	PLANS	Character	1		Code if in Plan for Augment.
27	CANO	Character	9		Court Case Number
28	ABNAMT	Numeric	12	4	Proposed 1984 Abandonment amount
29	COMMENT	Character	65		Comments
30	UPDATE	Date	8		Date of last update
31	STATUS	Character	1		Update Status
			Total =	251	

Note: \* indicates additional documentation follows

The STREAMSA.dbf is an abridged version of a STREAMS.dbf file provided by the state engineer. STREAMS is a complete dump of the streams records from the CSU WDB database, containing DIV, WD, STRNO, and STRNAME fields. In the abridged version, the database is condensed by permanently deleting and packing out STRNO=0 records and STRNAME=blank records, and the STRNO field name is changed to WRSTRNO to exactly match its corresponding field name in DWRSITES.dbf. The database is indexed on DIV+WD+WRSTRNO.

Structure for database: STREAMSA.dbf  
 Number of data records: 5284  
 Date of last update : 12/05/87

Field	Field Name	Type	Width	Comments
1	DIV	Character	1	Water Division
2	WD	Character	2	Water District Number
3	WRSTRNO	Character	3	Stream Number
4	STRNAME	Character	24	Stream Name
			Total =	31

The following is a list of commands in file DAMSITES.prg used to print out the reports:

```
*---- PROGRAM TO PRINT OUT ALL THE DATA -----  
set path to c:\dbase  
clear  
  
set device to print  
@0,0 say chr(15)  
set device to screen  
  
set view to c:damsites.vue  
  
index on basin+div+county+upper(wrname) to c:damsites.ndx  
report form c:damsites.frm to print  
  
index on hnumber to c:holtno.ndx  
report form c:holtno.frm for hnumber > 0 to print  
  
index on wrname+basin+div+county to c:sitexref.ndx  
report form c:sitexref.frm to print  
  
close databases  
*-----
```

The following is a list of commands in file ADDSITES.prg used to add new data:

```
*---- PROGRAM TO ADD NEW SITES TO THE DATABASE -----  
set path to c:\dbase  
clear  
use c:damsites.dbf  
index on basin+div+county+strname to c:damsites.ndx  
set format to c:damsites.fmt  
append  
*-----
```

## Codes

The following codes are used in the database files for the inventory:

### Structure Type

- |             |          |                |
|-------------|----------|----------------|
| 1 Ditch     | 4 Spring | 7 Pipeline     |
| 2 Well      | 5 Seeps  | 8 Surface Pump |
| 3 Reservoir | 6 Mine   | 9 Power Plant  |
|             |          | 0 Other        |

### Use Type

- |              |              |            |
|--------------|--------------|------------|
| 1 Irrigation | 4 Industrial | 7 Fire     |
| 2 Municipal  | 5 Recreation | 8 Domestic |
| 3 Commercial | 6 Fishery    | 9 Stock    |
|              |              | 0 Other    |

### Adjudication Type

- |                |                           |
|----------------|---------------------------|
| 1 Original     | 5 Transfer From           |
| 2 Supplemental | 6 Abandonment             |
| 3 Conditional  | 7 Alternate Point         |
| 4 Transfer To  | 8 Conditional to Absolute |

### County Codes

- |                |               |               |
|----------------|---------------|---------------|
| 1 Adams        | 22 Fremont    | 43 Montrose   |
| 2 Alamosa      | 23 Garfield   | 44 Morgan     |
| 3 Arapahoe     | 24 Gilpin     | 45 Otero      |
| 4 Archuleta    | 25 Grand      | 46 Ouray      |
| 5 Baca         | 26 Gunnison   | 47 Park       |
| 6 Bent         | 27 Hinsdale   | 48 Phillips   |
| 7 Boulder      | 28 Huerfano   | 49 Pitkin     |
| 8 Chaffee      | 29 Jackson    | 50 Prowers    |
| 9 Cheyenne     | 30 Jefferson  | 51 Pueblo     |
| 10 Clear Creek | 31 Kiowa      | 52 Rio Blanco |
| 11 Conejos     | 32 Kit Carson | 53 Rio Grande |
| 12 Costilla    | 33 Lake       | 54 Routt      |
| 13 Crowley     | 34 La Plata   | 55 Saguache   |
| 14 Custer      | 35 Larimer    | 56 San Juan   |
| 15 Delta       | 36 Las Animas | 57 San Miguel |
| 16 Denver      | 37 Lincoln    | 58 Sedgwick   |
| 17 Dolores     | 38 Logan      | 59 Summit     |
| 18 Douglas     | 39 Mesa       | 60 Teller     |
| 19 Eagle       | 40 Mineral    | 61 Washington |
| 20 Elbert      | 41 Moffat     | 62 Weld       |
| 21 El Paso     | 42 Montezuma  | 63 Yuma       |

## **Holt Number**

The Office of the State Engineer has assigned a unique number to each decree in the water rights database called the Holt Number. Sorting on this field provides a convenient and efficient way to rank the water rights records in order of priority, without having to go through all the date field gyrations.