ANNUAL WATER MANAGEMENT PLAN 1983-1984

ARAPAHO NATIONAL WILDLIFE REFUGE
WALDEN, COLORADO

I. GENERAL

Four main sources of water are used at Arapaho National Wildlife Refuge to provide irrigation, maintain pond levels and sustain riparian vegetation for wildlife. These four sources include the Illinois River, Spring Creek, Antelope Creek and Potter Creek. Fourteen different structures divert water out of the Illinois River into more than 70 miles of primary delivery ditches. This water provides over 50 ponds with more than 528 surface acres of water during a normal year. It is also used to flood irrigate nearly 8,000 acres of meadow to maintain and perpetuate quality waterfowl nesting habitat.

Despite a record minimum amount of precipitation during the month of January, followed by below normal precipitation in February, 1983 turned out to be the wettest year on record. Precipitation for the year totalled 16.45 inches, nearly 7 inches above normal. During March and April, a total of 24.2 inches of snow fell in Walden with even higher amounts falling in the surrounding mountains. A snow survey conducted by the Soil Conservation Service in the Illinois River drainage at the end of April revealed the water content to be 157% of the 15 year average.

The Illinois River began to overflow its banks in late May, flooding much of the adjacent meadow habitat. The high water levels in the river continued well into July. Despite the abundance of water, distribution of the water was difficult as water overflowed many control structures for nearly two months. Several water control structures were impossible to reach while others remained frozen in, despite the flood waters on the river.

River flows finally settled down to normal by late July. Timely summer rains maintained adequate river flows and provided sufficient water to maintain good water levels in all of the refuge ponds until fall freezeup.

II. PURPOSE AND METHODS

Approximately 8,000 acres of meadow are scheduled for flood irrigation each year to stimulate and perpetuate quality waterfowl breeding and nesting habitat. Ideally, we would like to be able to periodically (every 3 or 4 days) turn on and off irrigation water over the course of a month or two in the spring. With this type of irrigation system, the number of waterfowl nests destroyed or abandoned due to constant flood irrigation as is currently used, could be reduced. Unfortunately, such a system would be extremely expensive and would require a major rehabilitation of the current irrigation distribution system.

Numerous small ponds and impoundments totalling over 500 surface acres scattered throughout the refuge are filled, maintained and freshened each year with water diverted from the Illinois River, Spring Creek, Antelope Creek and Potter Creek. Most of the ponds or impoundments are filled by one of two different methods. Water can be either sent directly to the pond in a ditch or creek, or the pond can be slowly filled by picking up excess irrigation water that has flowed over a portion of a meadow.

It is extremely important that the impoundments, ponds, old river oxbows and level contour dikes have open water as soon as possible in the spring to attract and hold migrating waterfowl. To assist in providing this open water, the Case Reservoir #1, #2 and #3 are managed as follows:

1. Water levels will be maintained as high as possible through the summer months until freezeup.

2. As soon as waterfowl begin arriving in the spring, water will be released from the frozen over reservoirs to create open water on other impoundments downstream.

3. The reservoirs will then be refilled as soon as possible and maintained at optimum levels until freezeup.

This management practice will enable us to divert early water to these reservoirs which are the only refuge impoundments currently having water storage rights.

III. 1983 WATER USAGE - 1984 PROPOSED USE

Water usage is determined primarily by periodically reading and recording water flows through Parshall flumes located just downstream from the various diversion structures of each ditch system. (See attached map for location of current measuring devices.) In instances where measuring devices have not been installed or where and when regular monitoring is not possible, estimates are made relative to the known water use in other ditch systems.

The table below reflects the amount of water diverted into the various ditch systems serving Arapaho National Wildlife Refuge in 1983. Some individual diversions are estimates only either because of a lack of measuring devices or because of the flood waters in the spring of 1983 where some ditches were overflowing.

Ditch Name	Measuring Flume	Acre Feet Diverted
Home #1	Yes	1,075
Dryer	Yes	1,019
North Park #6	Yes	910
Everhard & Baldwin	Yes	2,439
Hubbard #1	Yes	789
Ward #1	Yes	4,251
Hill & Crouter	No	200
Hubbard #2	Yes	3,993
Oklahoma #1	Yes	4,004
Ward #2	No	400
Boyce Bros	Yes	2,642
Oklahoma #2	Yes	911
Ish & Baldwin	No	121
Ward #3	Yes	1,357
Midland (Ross)	No	510
Midland (Hackley)	Yes	3,264
Potter #2	No	29
Antelope	No	400
Riddle	No	230
Hubbard #4	No	Included in Hubbard #2
Hubbard #3	No	Included in Hubbard #2
Hubbard-Caudle Ext.	No	Included in Hubbard #2
		28,544

Actual water use is difficult to plan in advance because it is dependent on the amount of water available in the Illinois River and other drainages. Although the snow pack outlook may look excellent at the end of March (Water Management Plan preparation time), the outlook can change drastically a month later. 1983 was an excellent water year and refuge needs were met. The outlook for 1984 is good based on the March 1, 1984 streamflow forecast by the Soil Conservation Service. The Service predicts an average water supply for the Illinois River during the spring and summer seasons. As of March 1, 1984 the water content of the snow on Park View, which is a major watershed of the Illinois River, stood at 9.1 inches compared to the 20 year average of 7.8 inches. For 1984 we will plan on diverting at least 30,000 acre feet of water if it is available.

One or the other of the following two plans will be implemented when water abundance differs drastically from the proposed water diversions outlined in the current year's plan:

Plan A - Extremely Wet Water Year

1. Marginal meadow areas not normally irrigated will be irrigated to provide additional improved wildlife habitat.

2. Additional water will be circulated through impoundments keeping them fresh which will aid in the production of emergent and subemergent vegetation for wildlife food and cover.

3. Water will be run longer in the season keeping impoundments relatively full at freezeup. This will help ensure that at least some water will be available the following spring even if it is a dry year.

4. By running the water longer, many small wetlands depressions in the meadows can be maintained as brood-rearing habitat, thus preventing concentrations of broods on a few ponds where they are more susceptible to predation and disease outbreaks such as botulism.

Plan B - Extremely Dry Water Year

1. Fill as many ponds as possible to capacity and maintain to provide territorial water for breeding and nesting pairs and cover for broods and moulters.

2. Irrigate refuge meadows adjacent to permanent bodies of water.

3. Irrigate refuge meadows further removed from permanent water bodies as available water permits.

IV. COMMENTS AND PROBLEMS

The following work was accomplished in 1983:

1. Cleaned out ditch and installed new "screwgate" water control structure in Reservoir #2.

2. Repaired several washouts and installed ditch takeouts in the Midland, Hubbard #2, Oklahoma #1 and Hubbard-Caudle Extension ditch systems.

3. Removed, repaired and reinstalled "screwgate" water control structure in Reservoir #1.

4. Installed new ditch check in the Ward #1 irrigation ditch to improve irrigation of meadows on Willford tract.

5. The Fish and Wildlife Service protested two water diversion proposals by private interests during the year. One proposal involved a point of diversion change of 75 cfs on the McFarlane Ditch while the other proposal involved a conversion from conditional to absolute decree on a 135 cfs appropriation in the Midland Ditch.

6. In 1983, the Fish and Wildlife Service made application for water storage rights in Muskrat Pond which is to be constructed in 1984. Application was also made for an absolute decree on water storage rights in Case Reservoir #3.

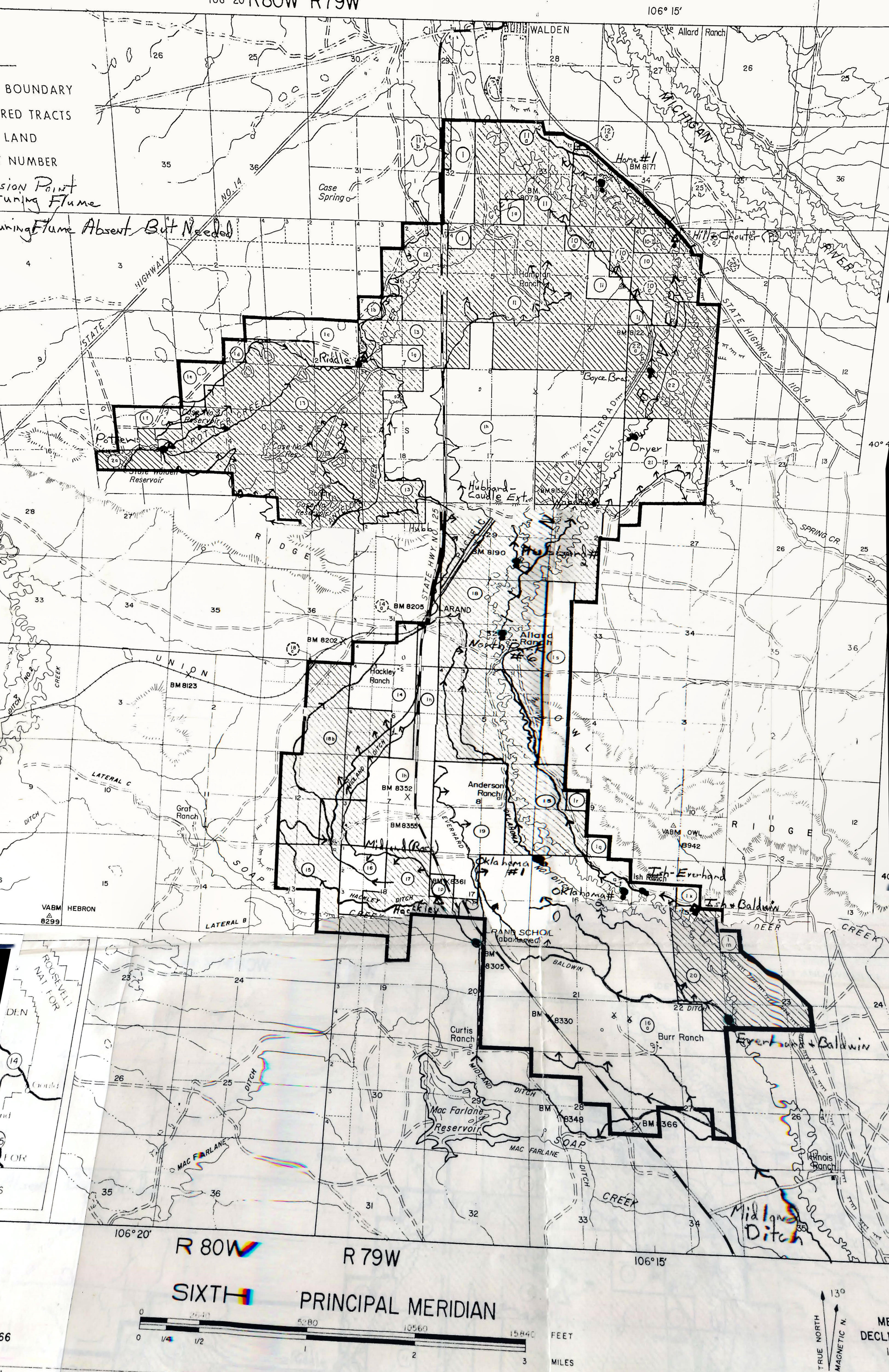
7. The actual location of the Hill and Crouter diversion has been unclear for several years. Hill and Crouter diversion water has been delivered by local water commissioners and others at a point on the former Brocker tract that is not described as the legal diversion point. The described diversion point is on the other side of the Illinois River and upstream approximately one mile. The local water commissioner and the refuge manager have attempted to locate the legally described diversion point in the field but have been unsuccessful. The Fish and Wildlife Service has filed for diversion point location change with the District Water Court.

The following work is needed and will be accomplished when funds, manpower and time permit:

1. Measuring flumes need to be installed in the Hill & Crouter, Ward #2, Ish & Baldwin, Midland (Ross), Potter #2, Antelope, Riddle, Hubbard #4, Hubbard #3 and the Hubbard-Caudle Extension ditch systems. We are also looking into the possible purchase of two Clausen Weir Rules to assist in obtaining better records of water use each year.

2. The location of the Ward #2 diversion point remains somewhat of a mystery. We will need to spend some time in the field this spring and/or summer to try and locate the ditch system.

3. Parshall flumes in the Hubbard #1 and the Home #1 ditch systems need to be reset.

ARAPAHO NATIONAL WILDLIFE REFUGE

JACKSON COUNTY, COLORADO