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MEMORANDUM

To: Manager, Salt Lake City

From: Regional Engineer, Region 6

Subject: Analysis of Wetland Areas Affected by Closed Basin Project

We have reviewed the following information on the Closed Basin Project, as requested by Vern Helbig in the Colorado Field Office of Ecological Services:

(a) Wetland Inventory Maps

(b) 1979 High Water Table Maps

(c) USGS predictive water table drawdown maps

(d) WPRS Infiltration test data for 1979 and 1980

(e) Numerous letters of correspondance and data transmittal between WPRS and Fish and Wildlife Service

The Project could have several impacts on wetlands, some of which are quantifiable and others not. The more easily identified impacts are those related to the conveyance channel construction and direct effects of pumping.

A. Direct Impacts

Table 1 below shows the number of acres affected by the project conveyance channel, due to interruption of surface inflow and road construction adjacent to the channel. WPRS has stated that their observations in the San Luis Valley show that most wetland areas are filled by overland surface flows during snowmelts or thunderstorms (excluding those filled by uncontrolled artesian wells). Literature studies seem to support this contention. The project channel will intercept this overland flow .

The channel is not expected to change local natural overland flows in Stage 1-2 of the project area since overland flows are very rare there. Stage 1-2 wetlands are generally replenished by direct precipitation. In stages 3-5, the affected area was taken to be all wetlands within 1000 feet of the channel, and which were located to the south-southwest of the channel. Direction of flow is important since overland flows in stages 3-5 generally come from the north-northeast direction.

The road construction adjacent to the wetlands was estimated to affect less than 100 acres, based on a 20' road width. Only direct displacement of wetland acreage was considered here.

Table 2 shows the areas in stages 1-5 that could be potentially impacted by project pumping. These areas were delineated from the 1979 water table maps as having groundwater with 2½ feet of the ground surface. They were then further delineated as having significant drawdown under project pumping conditions. A third and final delineation was made to be sure that wetlands impacted by the conveyance channel were not counted again under pumping impacts.

TABLE 1

SUMMARY OF WETLAND AREAS AFFECTED BY THE CONVEYANCE CHANNEL

WETLAND TYPE		IMPACTED ACRES
PSSEMW	=	4009 acres
PEMY	=	346 acres
PSSEMY	=	390 acres
POWY	=	5 acres
PEMFLY	=	46 acres
PEMFLW	=	119 acres
PEMW	=	6 acres
	SUBTOTAL	4920 acres

Total Affected Area equals approximately 5000 acres.

Additional acres affected by road construction equals less than 100 acres.

TABLE 2

SUMMARY OF WETLAND AREAS POTENTIALLY AFFECTED BY PROJECT PUMPING

WETLAND TYPE		POTENTIALLY IMPACTED ACRES
PFLY	=	7 acres
PSSEMW	=	5081 acres
PEMY	=	1649 acres
PSSFLW	=	2 acres
PUBY	=	2 acres
PEMW	=	107 acres
PSSEMY	=	1036 acres
PEMPLY	=	975 acres
PEMFLW	=	176 acres
PEMKY	=	327 acres
L2FLY	=	55 acres
PSSFLY	=	199 acres
	TOTAL	9616 acres

Analysis of 1979 and 1980 infiltration test data is shown in Table 3. The wetlands tested in 1980 were not identified by type, so it was assumed that they were seasonal.

TABLE 3

RESULTS OF INFILTRATION TESTS

TYPE	TEST #	YEAR	INFILTRATION RATE FT./DAY
Seasonal	2	1979	.22
Seasonal	3B	1979	.10
Seasonal	4A	1979	1.00
Seasonal	10B	1979	0
Seasonal	16A	1979	.02
Seasonal	17B	1979	.14
Seasonal	21A	1979	.10
Seasonal	22A	1979	.05
Seasonal	AW-1	1980	0
Seasonal	AW-2	1980	.0004
Seasonal	AW-3	1980	.0002
Seasonal	AW-4	1980	.0002
Seasonal	AW-5	1980	.0002
Seasonal	AW-6	1980	.0002
Seasonal	AW-7	1980	.0004
Seasonal	AW-8	1980	.0046
Seasonal	AW-9	1980	.0018
Seasonal	AW-10	1980	.008
Seasonal	AW-12	1980	.0004

TABLE 3, cont'd.

RESULTS OF INFILTRATION TESTS

TYPE	TEST #	YEAR	INFILTRATION RATE FT./DAY
Ephemeral	3A	1979	.20
Ephemeral	7A	1979	.40
Ephemeral	7B	1979	.10
Ephemeral	9A	1979	.30
Ephemeral	17C	1979	1.20
Ephemeral	18	1979	.14
Ephemeral	22B	1979	.09
Ephemeral	24	1979	.10
Semi-Permanent	4B	1979	.032
Semi-Permanent	10A	1979	.04
Semi-Permanent	10D	1979	.80
Semi-Permanent	15A	1979	2.30
Semi-Permanent	17A	1979	.20
Semi-Permanent	26A	1979	.46
Semi-Permanent	31B	1979	.04

From this test data and personal observations made by hydrologist John Boudreaux and others, it appears that infiltration rates in the Closed Basin Area may often be affected more by soil types and frequency of inundation, than by ground water table elevations. Still it is reasonable to assume that wetlands with initially high infiltration rates could experience even higher rates of infiltration losses when those wetlands are subject to water table drawdown.

If the data in Table 3 is assumed to be representative of the Closed Basin Area then it would appear that high infiltration rates are more likely to occur in ephemeral and semi-permanent wetlands than in seasonal wetlands. If an infiltration rate of .25 ft. per day is assumed to be the differentiation between high and low infiltration, then the following approximations can be made:

a. Only 5% to 10% of seasonal wetlands have high infiltration rates.

b. Only 30% to 40% of ephemeral wetlands have high infiltration rates.

c. Only 40% to 50% of semi-permanent to permanent wetlands have high infiltration rates.

These ratios may be applied to the data from Table 2 to determine how many acres of each wetland type that would be affected by project pumping. The impacts, of course, will be related to decreased holding time of water in the wetlands.

B. Indirect Impacts

A whole series of indirect impacts could be expected, mainly as a result of decreased plant vigor when ground-water tables are drawn down. The following items illustrate this thought:

a. Increased wind erosion of soils, which could lead to more sediment deposition in wetland depressions.

b. Reduced biomass in the wetlands as vegetation species lose their vigor and maybe even die off.

c. Reduced overland (surface) runoff into wetlands. As the area becomes "drier" due to pumping of the aquifer, more moisture will tend to seep into the ground, so surface runoff could be reduced. Since most of the wetlands are filled by surface runoff, this would be a detrimental effect.

Please let us know if we may be of further assistance.

Original signed by
KENNETH C. ROZAS

cc: Vern Helbig, Colorado Field Office of Ecological Services
ARD, Environment

EN:JBoudreaux:mk:12/22/80