NATIONAL WETLANDS INVENTORY

MAP REPORT

BR-RIO GRANDE

NEW MEXICO

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I. INTRODUCTION

The United States Fish and Wildlife Service's National Wetlands Inventory (NWI) is producing maps showing the location and classification of wetlands and deepwater habitats of the United States. Classification of Wetlands and Deepwater Habitats of the United States by Cowardin et al. (1979) is the document used by the NWI to define and classify wetlands. Photo-interpretation conventions, hydric soils lists and wetland plant lists are also used to implement the Cowardin classification system.

The Arizona Department of Environmental Quality and the Arizona Riparian Council initiated a program to have Riparian Habitats mapped with wetlands. Arizona Riparian Mapping Conventions, by Messenkopf (1988), provides the definitions of, and classification system used. Photointerpretation conventions and riparian plant lists are used to implement this classification system.

The purpose of this map report it to: (1) provide information on the production of NWI maps, including narrative on imagery and interpretation; (2) provide a descriptive crosswalk from NWI wetland codes on the map to common terminology and to representative plant species found on specific geography, climate, and wetland communities.

II. FIELD RECONNAISSANCE

Field reconnaissance is a necessary procedure in order to accurately interpret aerial photography. Photographic signatures are correlated to the wetland habitat in the field. Collateral information including vegetative communities, soil types and topographic setting are further evaluated to aid in the photointerpretation process. This information is evaluated for seasonality and conditions existing at the time of photography and at ground truthing.

Project Area

This mapping effort was commissioned by the U.S. Bureau of Reclamation and differs from most NWI mapping projects in that it does not cover full 1:100k mapping units but rather is a "shotgun scatter" of 7.5' quadrangles. The project area is located within two specific areas; the Maxwell Wildlife Refuge and the Mid Rio-Grande River Basin and covers the following USGS 7.5' topographic quadrangles listed by 1:100k map unit:

Raton NE	Eagle Tail Mountain
	Koehler
	Saltpeter Mountain
	Colfax
	Maxwell
	Loco Arroyo
	Klowa
Raton SE	Springer Lake
	French
	Abbott NW
Tularosa NW	Fort Craig
	Paraje Well
Tularosa NE	Harriet Ranch
	San Marcial
	Little San Pascual Mountain
	Pope
Tularosa SW	Lava
	Romero Canyon
	Black Bluffs
	Elephant Butte
	Williamsburg
Las Cruces NW	Caballo
	Garfield
	Arroyo Cuervo
	Hatch
	Rincon
	Sierra Alta
Las Cruces NE	Summerford Mountain
	Seldon Canyon
	Thornwell
	Seldon Canyon NE
Las Cruces SE	Leasburg
	Dona Ana
	Las Cruces
	Black Mesa
	San Miguel
	La Mesa
	Anthony

Field Personnel

Curtis Carley - U.S. Fish and Wildlife Service
Kathleen Granger - Geonex North American Operations, Inc.

Field Dates

March 17 - 23, 1992

Aerial Photography

Data Source (100%)

Type: NHAP Color Infra-red High Altitude
Scale: 1:58,000

Raton NE:	8/28/81, 6/13/81, 10/5/82
Raton SE:	6/13/81
Tularosa NW:	6/13/83
Tularosa NE:	5/26/84
Tularosa SW:	5/20/82, 5/31/82, 6/13/83
Las Cruces NW:	5/20/82, 5/31/82, 6/13/83
Las Cruces NE:	5/26/84
Las Cruces SE:	5/26/84, 6/9/84

Percent Coverage: All 38 USGS quadrangles were covered by the NHAP photography.

Imagery

Some of the emulsion of the NHAP color infra-red photography is of high quality, however, some of it is very dark cyan color and inconsistent with the higher quality photography. Flight lines numbers are 369, 235 and 211. Because of this it was very difficult to photointerpret.

Collateral Data

United States Geological Survey (USGS) Topographic Quadrangles
Cowardin, et al. Classification of Wetlands and Deepwater Habitats of the United States.
U.S. Fish and Wildlife Service. National List of Plant Species That Occur in Wetlands: Southwest (Region 7).
Bailey, R.G., 1980. Description of the Ecoregions of the United States
Jaeger, Edmund C., Stanford University Press, 1941. Desert Wild Flowers.
Cooper, David J., EPA Region VIII, 1989. A Handbook of Wetland Plants of the Rocky Mountain Region.
Elmore, Francis, H., Southwest Parks and Monuments Assoication, 1976. Flowers, Shrubs and Trees of the Southwest.
U.S. Fish and Wildlife Service. National List of Plant Species That Occur in Wetlands: New Mexico.

III. PHYSICAL DESCRIPTION OF THE PROJECT AREA

According to Bailey, Description of the Ecoregions of the United States (1980), the study area starts at the lower end of the Rocky Mountain Forest Province in northern New Mexico, through the Ponderosa Pine-Douglas Fir Forest Section, and moves south into the Colorado Plateau Province through the Grama-Galleta Steppe and Juniper-Pinyon Woodland Mosaic Section and finally ends in the Chihuahuan Desert Province through the Grama Tobosa and the Tarbush-Creosote Bush Sections.

Geography

The Rocky Mountain Forest Province consists of rugged glaciated mountains having moderate to considerable relief. Elevations range from local relief being 3,000 feet to 7,000 feet and as high as 14,000 feet in the high range areas. Several sections have intermontane depressional areas with floors less than 6,000 feet moving into the Colorado Plateau Province Tablelands where moderate to considerable relief is encountered. Elevations range from 500 feet in the local relief areas to 7,000 feet at the plateau tops. Stream valleys are narrow, widely spaced and deeply entrenched. (Entering the Chihuahuan Desert Province desert is encountered.) Practically the only permanent streams are a few large rivers that originate in humid provinces. The area has undulating plains with elevations near 4,000 feet from which somewhat isolated mountains rise 2,000 to 5,000 feet. Washes, dry most of the year, fill with water following spring snow melts and rains. Basins with no outlet drain into shallow playa lakes that dry up during rainless periods. Small whirlwinds constantly play over these dry playas when they are heated by the summer sun. Extensive dunes of silica sand cover parts of the province. In scattered areas small beds and isolated buttes of blackish lava occur.

Climate

The climate varies considerably through the study area due to the changes in elevation and geography. At the northern end of the work area the climate is semiarid with cold winters which include rain and snow. The average annual temperature is 35°F to 45°F, reaching 50°F in the lower valleys.

The central region is characterized by cold winters, with some rain. Summer days are hot and nights are cool with summer thundershowers contributing to the average annual precipitation of about 20 inches.

In the lower region the climate is distinctly arid with extremely dry spring and early summers. During July the summer rains usually begin and continue through October, these being torrential storms. Average annual temperatures range from 50°F to 65°F. Summers are long and hot. Winters are short with brief periods when temperatures fall below freezing.

Vegetation

Rocky Mountain Forest
Dominance of ponderosa pine and Douglas-fir with understory of grass mixed with sagebrush, also found at the lower altitudes are several kinds of scrub oak.

Colorado Plateau Province
Lowest zone covered by arid grasslands, along with xeric shrubs and sagebrush. Further south several kinds of cacti and yucca are common. Also along some of the permanent streams cottonwoods grow. In woodland zone pinyon pine and juniper, various shrubs and grasses.

Chihuahuan Desert Province
Thorny shrubs, dominance of mesquite. Cottonwoods and along rivers and streams creosote bush, ceniza shrub and ocotillo.

Soils

The soil orders in the study area vary according to the vegetation zones. In the northern area the soils range from Mollisols and Alfisols in the montane zone to Aridisols in the foothill zone. In the central region Entisols occur along the floodplains of major streams. Aridisols occupy the plateau tops, older terraces, and alluvial fans.

In the southern most portion of the study area the soils are primarily Aridisols but some Entisols are also present.

IV. DESCRIPTION OF WETLAND HABITATS IN PROJECT AREA

Riverine

The major perennial drainage in this study area is the Colorado River which is classified, according to Cowardin, as upper perennial, unconsolidated bottom, permanently flooded (R3UBH). Riverine bars are classified as R3USC or R3USA depending on signature.

A number of smaller upper perennial and intermittent drainages are found within the study area feeding into the Colorado River. Classification is based on photo signature, data from the Arizona Water Resources Data and local sources such as BLM personnel. Intermittent streams are classified as intermittent, streambed R4SB_. These intermittent streams can be flooded temporarily (R4SBA), seasonally (R4SBC) or intermittently (R4SBJ). The excavated modifier "x" and the artificially flooded modifier "k" is used with irrigation ditches (R4SBkCx), the "x" modifier is used by it's self on streams that have been diverted and channelized by man (R4SBCx).

Lacustrine

Reservoirs and impoundments greater than 20 acres are classified as limnetic, unconsolidated bottom permanently flooded (L1UBHh). Any exposed shoreline will be classified as littoral, unconsolidated shore, seasonally or temporarily flooded (L2USC/Ah). Persistent emergents associated with these reservoirs are classified under the palustrine system. All wetlands and deepwater habitats associated with reservoirs are classified using the impounded modifier (h).

Dry basins, in excess of 20 acres, are classified as unconsolidated shore, seasonally, temporarily or intermittently flooded (L2USC/A/J).

Palustrine

Palustrine wetlands are found along streams and rivers in flood plains and oxbows, in fields, in and around impounded areas, and in drainages.

The palustrine wetland vegetation consists of temporarily flooded emergent (PEM1A), seasonally flooded emergent (PEM1C), areas of temporarily flooded scrub-shrub (PSS1/2A) and temporarily flooded forested (PFO1A). Seasonally flooded scrub-shrub (PSS1/2C) and forested (PFO1C), were also observed along major drainages. Also occasionally observed were mountain springs which create saturated emergent (PEM1B) and saturated shrub - scrub (PSS1B) wetlands. Wetlands classified with the saturated (B) water regime are located only on slopes. Impoundments and excavated areas such as borrow pits or mining pits, less than 20 acres in size, are classified in the palustrine system as unconsolidated bottom, semipermanently flooded (PUBFh/x) and unconsolidated shore, seasonally, temporarily, or intermittently flooded (PUSC/A/Jh/x) according to their photo signature. Dry basins and unvegetated shore areas are classified unconsolidated shore, seasonally or temporarily flooded (PUSC/A). The impounded (h) and excavated (x) modifiers will be applied where appropriate. Vegetation observed in these wetland habitats were grouped according to class and water regime. Table I lists plant species that were identified on check sites and represent only a fraction of all wetland plant species occurring in the study area.

Estuarine and Marine Systems are not present in the study area.

Table 1. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
R3UB (H)	Riverine, upper perennial, unconsolidated bottom	Mountain streams, major drainage areas	Unconsolidated bottom
R3US (A,C)	Riverine, upper perennial, unconsolidated shore	Mud, sand, or gravel bars	Unconsolidated shore
R4SB (J,A,C)	Riverine, intermittent, streambed	Small streams, creeks, or irrigation ditches	Streambed
L1UB (H)	Lacustrine, limnetic, unconsolidated bottom	Deepwater lakes or damned river channel	Unconsolidated bottom
L2US (J,A,C)	Lacustrine, littoral, unconsolidated shore	Dry lake beds	Unconsolidated shore
PUB (F)	Palustrine, unconsolidated bottom	Open water, settling ponds	Unconsolidated bottom
PAB (F)	Palustrine, aquatic bed	Deep basins, impoundments, sewage treatment	Aquatic bed (duckweed)

Table I. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PEM1 (A,C,F)	Palustrine, emergent	Basins, depressions, marshes, meadows, springs, seeps, oxbows, or drainage areas	Carex spp. (sedge) Distichlis spicata (inland saltgrass) Eleocharis palustris (spikerush) Hordeum jubatum (foxtail barley) Juncus spp. (rush) Phragmites communis (phragmites) Rumex spp. (dock) Scirpus acutus (hardstem bulrush) Scirpus americanus (common threesquare) Scirpus fluviatialis (river bulrush) Typha spp. (cattail)

Table 1. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PSS1 (A,C)	Palustrine, scrub-shrub	Willow thicket, river banks, oxbows, or drainage areas	Baccharis glutinosa (Emory's false willow) Baccharis sarothroides (desert broom) Salix spp. (willow) Populus fremontii (cottonwood)
PSS2 (A,C)	Palustrine, scrub-shrub	River banks, oxbows, or drainage areas	Tamarix spp. (salt cedar)
PFO1 (A,C)	Palustrine, forested	Cottonwood, river banks, oxbows, floodplains, drainage areas or associated with seeps on a slope	Populus fremontii (cottonwood) Salix spp. (willow)
PUS (A,C)	Palustrine, unconsolidated shore	Salt flats	Unconsolidated shore

TABLE II
OBSERVED WETLAND VEGETATION
(grouped by wetland class)

Palustrine Temporary Emergents: PEMA

Distichlis spicata	inland saltgrass
Hordeum jubatum	foxtail barley
Phragmites communis	phragmites

Palustrine Seasonal Emergents: PEMC

Eleocharis spp.	spikerush
Rumex spp.	dock
Juncus spp.	rush
Scirpus americanus	American threesquare
Carex spp.	sedge

Palustrine Semipermanent Emergents: PEMF

Typha spp.	cattail
Scirpus acutus	hardstem bulrush
Scirpus fluviatialis	river bulrush

Palustrine Semipermanent Aquatic Bed: PABF

Lemna minor	duckweed

Palustrine Temporary Scrub-shrub: PSSA

Baccharis glutinosa	Emory's false willow
Baccharis sarothroides	Desert broom
Populus fremontii	cottonwood
Salix spp.	willow
Tamarix spp.	salt cedar

Palustrine Seasonal Scrub-shrub: PSSC

Salix spp.	willow

Palustrine Temporary Forested: PFOA

Populus fremontii	cottonwood
Salix spp.	willow

Palustrine Seasonal Forested: PFOC

Salix spp.	willow

V. WATER REGIME DESCRIPTION

(J) Intermittently Flooded - Substrate is usually exposed, but surface water present for variable periods without detectable seasonal periodicity. Weeks or months or even years may intervene between periods of inundation. The dominant plant communities under this regime may change as soil moisture conditions change. Some areas exhibiting this regime do not fall within our definition of wetland because they do not have hydric soils or support hydrophytes.

(A) Temporarily flooded - Surface water present for brief periods during growing season but water table usually lies well below soil surface. Plants that grow both in uplands and wetlands are characteristic of this water regime.

(B) Saturated - The substrate is saturated to the surface for extended periods during the growing season but surface water is seldom present.

(C) Seasonally Flooded - Surface water is present for extended periods especially early in the growing season but is absent by the end of the growing season in most years. When surface water is absent, the water table is often near the land surface.

(F) Semipermanently Flooded - Surface water persists throughout the growing season in most years. When surface water is absent the water table is usually at or very neat the land's surface.

(H) Permanently Flooded - Water covers the land surface throughout the year in all years.

VI. DESCRIPTION OF RIPARIAN HABITATS IN THE PROJECT AREA

Introduction

Riparian habitats are ecosystems associated with water bodies such as streams, lakes or wetlands, or are dependent upon the existence of perennial, intermittent or ephemeral surface or subsurface water drainage. Classification and delineation of riparian habitats is based primarily on the presence of at least a 30% coverage by riparian vegetation species. Characteristics that are considered when delineating a riparian site are a distinct qualitative and quantitative change in the vegetation between a wetland and the upland. Other characteristics considered are slope, presence or absence of alluvial material and present and historic hydrologic features.

Table II lists riparian vegetation.

Riparian Classification System

The riparian classification system used is as follows:

Rp - Riparian

- FO - Forested
- SS - Scrub - Shrub
  - CW - Cottonwood - Willow
  - MB - Mixed Broadleaf
  - SC - Salt Cedar
  - MQ - Mesquite
  - JU - Juniper

Riparian Forested

Riparian forested habitat classification is base on the presence of accepted tree species in excess of 20 feet in height and occurring at populations sufficient to give a 30% aerial coverage. These habitats are found along streams and rivers on the upper edge of floodplains, around natural ponds and impounded areas and in smaller drainages.

Riparian Scrub - Shrub

Riparian scrub - shrub (less than twenty feet in height) habitats occur in locations similar to that described for riparian forested. Classification is based on the presence of listed vegetation.

TABLE II
OBSERVED RIPARIAN VEGETATION
(grouped by riparian class)

Riparian Forested, Cottonwood - Willow : RpFOCW

Populus fremontii	cottonwood
Salix gooddingii	goodding willow
Salix spp.	willow

Riparian Forested, Salt Cedar : RpFOSC

Tamarix aphylla	athel tamarisk

Riparian Shrub - Scrub, Cottonwood - Willow : RpSSCW

Populus fremontii	cottonwood
Salix gooddingii	goodding willow
Salix spp.	willow

Riparian Shrub - Scrub, Mixed Broadleaf : RpSSMB

Baccharis glutinosa	Emory's false willow
Baccharis sarothroides	desert broom
Salix spp.	willow

Riparian Shrub - Scrub, Salt Cedar : RpSSSC

Tamarix spp.	salt cedar

Riparian Shrub - Scrub, Mesquite : RpSSMQ

Phosopis spp.	mesquite

VII. MAP PREPARATION

Wetland delineation and classification is in accordance with Cowardin et al (1979). Further wetland mapping guidance is provided by NWI photographic and cartographic conventions in concert with National consistency. Riparian delineation and classification is in accordance with convention established by US Fish and Wildlife Service and Geonex, inc. personnel, in cooperation with the Arizona Riparian Council. Delineations are produced through stereoscopic interpretation of 1:58,000 scale color infrared photography. The majority of the photography was taken during the spring of 1982 and 1983.

Field checks of areas within were made prior to the actual delineation of wetlands and riparian habitats. Field check sites were selected to clarify varying signatures found on the photography. These photographic signatures were then identified in the field using vegetation types and soil types, as well as additional input from field personnel.

Collateral data included USGS topographic maps USGS water resources data, vegetation, climate and ecoregional information.

The user of the map is cautioned that, due to the limitation of mapping primarily through aerial photointerpretation, a small percentage of wetlands and riparian habitats may be unidentified. Since the photography was taken during a particular time and season, there may be discrepancies between the maps and current field conditions. Changes in landscape which occurred after the photography was taken would result in such discrepancies.

Aerial photointerpretation and drafting were completed by Geonex, Inc., St. Petersburg, Florida with quality control conducted by USFWS.

VIII. SPECIAL MAPPING PROBLEMS

Unfortunately there were several problems encountered when correlating photosignatures and field observation. In particular, the areas of the Fort Craig and San Marcial quads.

After the date of the photography there were four major flood events occurring in 1985, 1987, 1988 and 1989. Mike McAfee of Elephant Butte Dam (BR) gave us collateral information to help with the interpretation of the photography. The high water during those periods caused much damage to vegetation as well as to the river channel and conveyance channel. In fact, the levy along the river broke in 1985 and to this day BR is still in the process of repairing it. Because of this event the entire area at the north end of the reservoir used as spillway was flooded consecutively causing change in vegetation growth and dispersement. This caused difficulty when comparing the photography when out in the field. The photos for this area are #351-34, 351-36. Also, see the appropriate checksite sheets.

The other area of great difficulty was the far north end of Caballo reservoir at the delta area where the Rio Grande flows into the lake. At this particular location we encountered an unusual amount of dead vegetation due to the previous flood events mentioned. On the photography the vegetation is alive, but some of it appears to be stressed. As witnessed in the field, there was extensive damage to the vegetation at the north end of Caballo reservoir in the delta area, the adjacent oxbow and embankment areas. The extent of the dead vegetation continued all along the banks of the reservoir almost to the southern most end, near the dam. For further information see photo's #211-49, 211-51, and 211-53, also the accompanying checksite sheets.

IX. MAP ACQUISITION

To discuss any questions concerning these maps or to place a map order, please contact:

Regional Wetland Coordinator
U.S. Fish and Wildlife Service - Region 2

To order maps call 1-800-USA-MAPS.

Maps are identified by the name of the corresponding USGS 1:24,000 scale topographic quadrangle name. Topographic map indices are available from the USGS.

X. COLLATERAL INFORMATION

The collateral information was received from Mary Wagner and Mike McAfee, operations Director, Elephant butte Reservoir and Caballo Reservoir, Bureau of Reclamation. Information was also received from Burt Cortez and Ray Sanchez, Bureau of Reclamation, Chief of Water Operations, El Paso, Texas.

According to information received from these sources, there is an elevation accuracy difference between BR and USGS. BR numbers are 43.3 feet lower than USGS topo elevations due to inaccuracy when the dams were built. This was accounted for when mapping the photography according to the topos.

For further information:

BR - Elephant Butte Reservoir (Mike McAfee)
(505-894-6661)

BR - Regional Office, El Paso, Texas (Ray Sanchez)
(915-534-6321)

Elephant Butte Dam/Reservoir

Date of Photography	BR Poole Elevation
5-31-82	4359.01 feet
6-13-83	4376.75 feet
field date 3-20-92	4398.74 feet
spillway elevation	4407.00 feet
minimum poole elevation	4281.00 feet
maximum poole elevation	same as spillway

Caballo Dam/Reservoir

Date of Photography	BR Poole Elevation
5-20-82	4147.43 feet
field date 3-20-92	4138.57 feet
spillway elevation	4182.00 feet
minimum poole elevation	4136.00 feet
maximum poole elevation	4136.00 feet

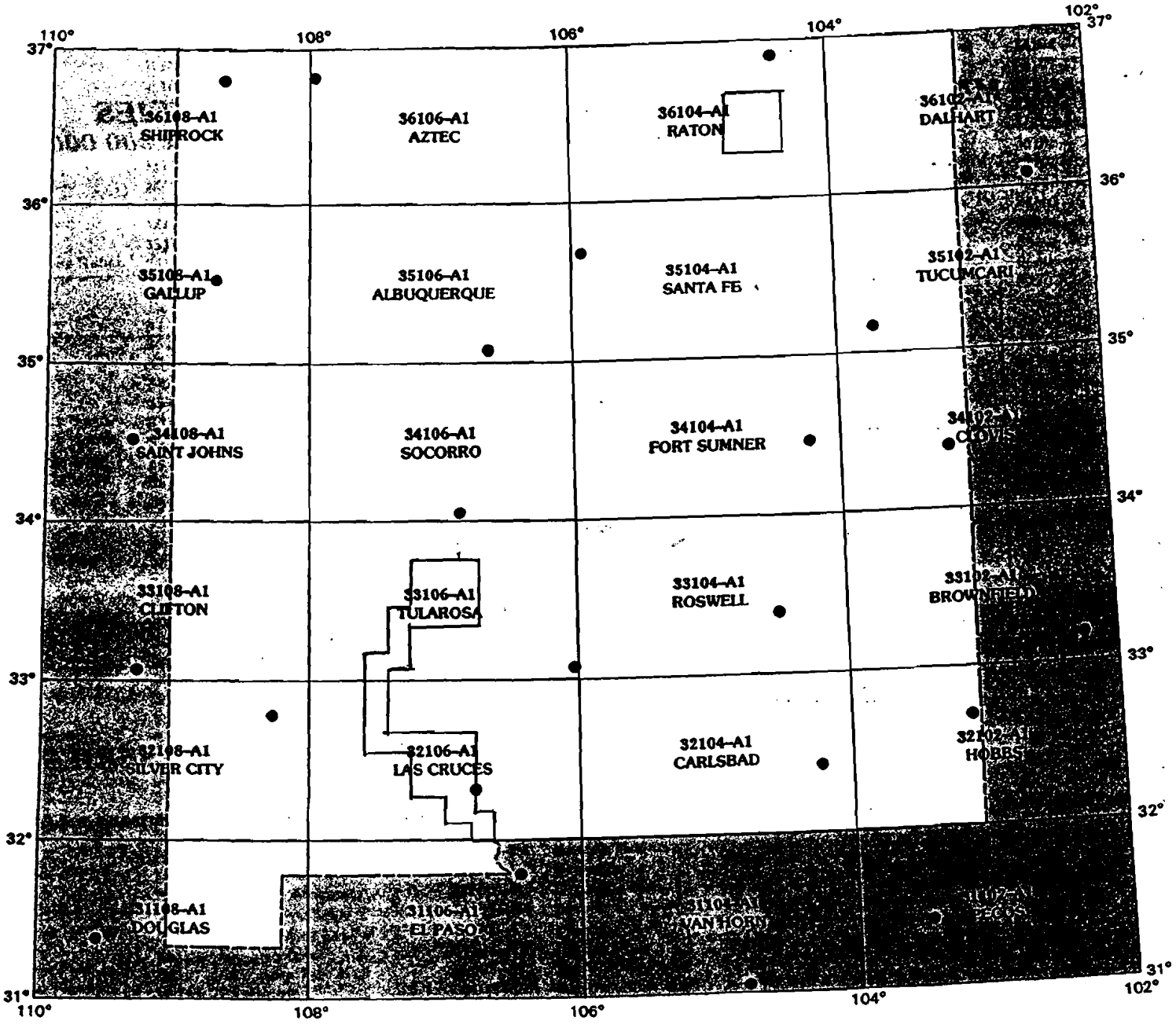
Four major flood events occurred after the dates of photography, 1985, 1987, 1988 and 1989. Controlled spills were conducted by BR at both dams.

According to Mike McAfee of BR, there is always some water flowing below the Reservoir Dams in order to meet the water requirements for the tri-state agreement. Also in the same areas below the dams there are hot springs or flowing wells which contribute to the river flow levels. Below Caballo Reservoir there are a number of siphons and diversion dams which remove water from the river for massive irrigation purposes, and excess water is put back into the river in many places further south from irrigation drainages. This area extends south through El Paso area along the Mexican border. This manipulation was taken into account when labeling the natural river bed from the northern most diversion dam, Percha, on south.

Due to the extent of water pulled off and drained back into the Rio Grande south of Percha diversion dam, it was determined through collateral information from Bureau of Reclamation and discussion with Curtis Carley from the Region 2 office, that this portion of the river south to the end of the work area will be called R4SBFx. this does tie with the current draft and final maps for this area. Any area north of Percha diversion dam on the river will be called R2UBH.

NM-brgrd.rpt
KG/drs.nwi

1 X 2 DEGREE SERIES
1:250 000 SCALE



See CATALOG OF PUBLISHED MAPS for dates, prices, and Map Order Forms