G. The Gonzales don d' dileh Gonzales West
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RECONNAISSANCE OF IRRIGATED AREAS ALONG THE PECOS RIVER BETWEEN

SAN JOSE AND PUERTO DE LUNA

During the period January 26 to 29, 1959, Messrs. Earl Sorensen and Ed Gonzales inspected several community ditches between San Jose and Puerto de Luna. Local representatives, usually community ditch committee members, were contacted and the more important structures along the ditches were observed. Types of crops grown and the adequacy of irrigation facilities were discussed. A brief resume of each ditch and the problems connected therewith is given below. The ditch names given in brackets are those used in the PRJI report.

SAN MIGUEL COUNTY

San Jose dam and the ditches, El Llano de la Presa East [El Llano de la Acequia] and Acequia de el Agua Caliente West [Acequia del Agua Caliente]. The San Jose dam (photo no. 1), located upstream from U. S. Highway 85, is about 12 feet in height and constructed of wood cribbing. Both El Llano de la Presa Acequia and Acequia de el Agua Caliente head at the San Jose dam. During a large flood in the fall of 1957, the dam was washed away and could not, because of sustained flood flows, be restored until August of 1958. At the present time the dam is about 4 feet below the flow line of the canals and must be raised before the coming irrigation season. Large floods always cause severe erosion in the center of the dam, thus requiring periodic restoration. If these floods occur during the irrigation season, water is not available for irrigation and sometimes crops are lost. Water was not available until late 1958; consequently spring planting burned out before water became available in September.
El Llano de la Presa Acequia irrigates approximately 129 acres on the west side of the Pecos River in the vicinity of San Jose. Messrs. Ramon G. Ortiz and Luciano Tapia, committee members of this acequia, were contacted and furnished information regarding their own ditch, the Acequia de el Agua Caliente, and Ancon de Sarrancio Ditch. Below the San Jose diversion dam, El Llano de la Presa Acequia traverses about 400 yards around a narrow canyon wall, and within a few feet of the river. The capacity of the ditch is restricted at this point and will not carry enough water to adequately irrigate the lands. The river is rapidly eroding the bank in this reach and will shortly destroy the canal above it. Restoration would then require a metal flume or excavation in rock. South of U. S. Highway 85, the acequia crosses a large arroyo through a metal pipe flume (photo no. 2); this structure needs complete rehabilitation and is presently broken at the intake end. Some 80 acres of land are irrigated below the flume.

The Acequia del Agua Caliente irrigates approximately 112 acres. This acequia has adequate capacity to serve the lands under it, and is generally in good condition. As noted above, shortages occur when the diversion dam is partially or totally destroyed. The acequia crosses Sebadillo Arroyo at grade and is frequently destroyed by summer flash floods. Lands below this point are cut off from water until the grade crossing is repaired.

El Ancon dam and the ditch Ancon de Serasino East [Ancon de Sarracino Ditch]. The present diversion for this ditch is about 150 feet downstream from the old Pecos River highway bridge near San Jose (photo no. 3) and about 130 acres of land are served by the ditch. The dam is constructed of rock and brush with a few piles driven on the
downstream side. The dam was destroyed in 1856 and the ditch was extended upstream to connect with the Acequia de Agua Caliente. After the upper diversion dam was destroyed in 1957, the lower diversion dam was rebuilt. The existing dam is unstable and subject to partial destruction during periods of high water. The ditch crosses numerous arroyos at grade, and at these points is subject to washouts and silting.

There is no shortage of water in the river in the vicinity of San Jose; however, water supply to the lands by the present irrigation systems is not dependable. The committee members estimate crop yields could be increased at least 50 percent if adequate irrigation systems existed.

Ribera dam and the ditches Ribera Ditch East and the San Miguel Ditch West. The diversion dam for these ditches is a rock and brush structure located just north of the Santa Fe Railroad. The ditches serve approximately 260 acres. The dam was destroyed in the fall of 1957 and restored the following year. Secundino Bustamente, the ditch foreman, stated that an existing 24-inch culvert for the Ribera ditch under the Santa Fe Railroad tracks, approximately 500 yards from the diversion, is the main problem. The culvert is easily plugged with brush, weeds, and silt and requires considerable labor to clean. This happens often during the irrigation season and water is cut off until the pipe is cleaned. There are a few other places subject to wash-outs and silting from arroyo floods. The ditches are generally large enough to serve the lands under them. The lower end of the Ribera ditch has a 10-inch siphon arroyo
crossing. The Ribera ditch has been interconnected with Los Trigos
Community Ditch at times when Los Trigos diversion was destroyed;
however, the siphon is not large enough to serve the Los Trigos system.
Mr. Bustamente also discussed Los Trigos and Quintana ditches.

The Los Trigos dam and the ditches Los Trigos Ditch East [Los
Trigos Community Ditch] and the Quintana Ditch West [Quintana Ditch].
Los Trigos ditch derives water from a brush and rock diversion dam
(photo no. 4) similar to those already described. Los Trigos ditch
serves 150 acres and Quintana ditch serves 15 acres. The dam was
destroyed in 1957 and is subject to partial destruction after each
large flow in the river. The right abutment is presently severely
eroded at the downstream toe (photo no. 5). The dam lies in a rather
broad flood plain, with the right abutment overtopped during every
rise in the river. The Quintana ditch, which heads at the right abutment,
has been repeatedly destroyed during these rises. Los Trigos ditch is
washed out and silting occurs from side arroyo flows. Yields are about
50 percent of what they might be, if the diversion and irrigation system
were reconstructed.

El Pueblo dam and the ditch West Pueblo West (sometimes known as
Garambuyo) [Pueblo Community Ditch] and the Gonzales dam and the ditch
Gonzales West [Gonzales Ditch]. These ditches derive water from separate
brush and rock diversion dams and irrigate the lands on the west side of
the river, opposite those of Los Trigos and La Fragua ditches. Cruz
Ortiz, a committee member of Pueblo ditch, stated the dams are partially
destroyed every year, usually in July and August, and deprive lands of 
water when it is most needed. The ditches need cleaning and enlarging, 
and protection from side inflow. Yields are diminished by an estimated 
50 percent. One hundred and thirty-three acres are irrigated by Pueblo 
ditch and 90 acres by the Gonzales ditch.

The La Fragua dam and the ditches La Fragua East [La Fragua 
Community Ditch] and Puertocito [Puertocito Community Ditch]. Deonicio 
Bustamente, ditch foreman, stated that La Fragua diversion dam was rebuilt 
in 1937 and has been very stable since then. The river has been trained 
to flow over rock on the left side (photo no. 6) and a concrete headworks 
is located in the left abutment (photo no. 7). Puertocito ditch is a 
continuation of La Fragua ditch, commencing near the village of Sena. 
The acequia is in good condition with metal flumes utilized to cross 
arroyos. There is adequate capacity to serve the 285 acres of irrigated 
land.

The Villanueva dam and the ditches South Villanueva East 
[Villanueva Community Ditch] and North Villanueva West [North Villanueva 
Community Ditch]. Messrs. Fortunato Gallegos, a land owner on the south 
Villanueva ditch and foreman of the north Villanueva ditch, and Pedro V. 
Gallegos, committee member of the north Villanueva ditch, furnished 
the following information. The diversion dam, consisting of rock and 
brush, is used to divert water into both ditches (photo no. 8). The 
headgate for the north ditch is located about 100 feet upstream from 
the left abutment (photo no. 9). The headworks for the south ditch
consists of a rubble masonry wall and a slide gate located in the right abutment. The wall is badly cracked (photo no. 10), and is presently in danger of failing. The dam failed in 1957, and is partially destroyed by every flood.

The ditch on the south side is too small for the amount of land it serves. Downstream from the diversion dam the ditch is restricted for about 300 yards, and needs cleaning and widening throughout.

The north ditch is constructed in a sandy soil for several hundred yards below the dam. The right bank is narrow and is constantly broken from choking and sloughing (photo no. 11). One and one-half miles below the diversion, the ditch traverses approximately 100 yards around a steep bank below the road (photos nos. 12 and 13). The river is close to the bank in this location and threatens to wash the ditch away. Saturation causes the right side of the ditch to fail and many breaks occur. Immediately above, flows from an arroyo cross the road and enter the ditch, resulting in further wash-outs and silting. There is a similar condition about 1/2 mile downstream from this point.

At the present time approximately one-half of the irrigated land on both sides of the river is not farmed because of the lack of water. Lands that are farmed suffer water shortage during every season. People are moving away from the village to find a better livelihood. Yields are estimated to be less than one-fourth of what the area could produce if adequately irrigated. There is generally an adequate supply of water in the river, but it cannot be made available to the lands because of the inadequate diversion and distribution systems. The North Villanueva Ditch irrigates 205 acres and the South Villanueva ditch irrigates 302 acres.
The El Cerrito dam and the ditch El Cerrito West [El Cerrito Community Ditch]. Baustin Torres, a farmer in El Cerrito, stated that conditions in his area are similar to those in Villanueva. The diversion dam is temporary in nature and the ditch is badly silted. Replacing the dam and cleaning the ditch during the summer months requires an average of 30 days of work each year, resulting in a critical water shortage during the growing season. Sixty-five acres are under irrigation.

GUADALUPE COUNTY

Upper Anton Chico [Tecolotito Community, Upper Anton Chico and Lower Anton Chico Community Ditches]. The Tecolotito, Upper Anton Chico, and Lower Anton Chico communities are irrigated by the same acequia. The above names identify the ditch in those reaches adjacent to the areas irrigated. The diversion dam for the acequia is constructed of rubble masonry and is in excellent condition (photo no. 14). Headworks for the ditch are located in the right abutment, and consist of metal slide gates to control flow into the canal with a sluiceway located immediately below the canal intake (photo nos. 15 and 16). Adequate capacity exists in the acequia to serve the Tecolotito and Anton Chico areas. The canal is well maintained and structures are in good condition. About 313 acres are irrigated.

The East Anton Chico [Hormigoso Community Ditch] and Dilia [Bado de Juan Pais Community Ditch]. These ditches share a common conveyance channel from the diversion dam, located near Tecolotito, to a point near Anton Chico. C. A. Sullivan, a member of the Bado de Juan Pais Ditch committee, stated that the ditches are generally adequate in capacity.
Structures are in a good state of repair and the ditches are cleaned each spring with a dozer. He further stated that the diversion dam has caused trouble for several years. At the diversion dam (photo no. 17), a bluff extending to the river's edge near the left abutment deflects the river to the right side. This results in deposition of silt in front of the headworks (located on the left side) during rises in the river, a problem which is further aggravated because of lack of a sluiceway through the dam. Suggestions have been made to remove the bluff and straighten the river; however, Mr. Sullivan believes this dangerous because the left abutment is constructed on fill and is not anchored securely (see photo no. 18). Mr. Sullivan suggests a sluiceway be constructed through the left side of the dam to see if silt can be removed by this method before training the river.

The present method of operating the diversion dam is to raise the height of the dam by sandbagging and to cut a channel through the silt with hand labor. Flash floods destroy the sand bags and redeposits more silt, resulting in loss of water at the headgate. The process is then repeated. Loss of water at the diversion dam during critical periods results in an estimated decrease of 25 percent in crop yields. Approximately 2,967 acres are irrigated by both ditches.

East Puerto de Luna Ditch. The diversion for this ditch is located about 3 miles downstream from Santa Rosa and consists of a rock-cribbed structure across the Pecos River. The structure (photo nos. 19 and 20) was repaired under the supervision of the State Engineer Office
in 1954 and is further described in the 21st Biennial Report of the State Engineer (p.39,114). At this writing, part of the rock is washed away in the right side of the structure. Diversion is maintained by rebuilding this part of the dam with brush. High water inundates the intake canal (photo no. 21) and cleaning and rebuilding are required after each flood. Below the intake structure the canal is close to the river's edge and has been washed away several times.

Ray Chavez, landowner and former ditch commissioner, discussed problems of the area and was present during the inspection tour of East Puerto de Luna Ditch. The ditch was cleaned with a dragline about eight years ago, but since that time has resilted and become choked with weeds and brush (photo nos. 22 and 23). There are several large arroyos where the ditch crosses at grade or through a flume. Structures, where present, are badly eroded and need repair and rip rap protection. Grade crossings need siphons or flumes to prevent washouts and silting. Sluiceways to the river are provided at intervals in the ditch (photo no. 24) but are largely ineffective because of their poor condition. A large arroyo is diverted over a siphon in the ditch about 2 miles below the diversion. The siphon was constructed without headwalls or trash rack (photo no. 25) and is often submerged and plugged. Trash carried in the canal plugs the siphon, causing water to break the ditch bank and flood the surrounding area. This had happened the day before photo no. 25 was taken.
Though adequate flows are available in the Pecos River, an estimated 50-percent crop loss is incurred because of the inadequate distribution system. The ditch irrigates about 327 acres.

West Puerto de Luna Ditch. R. A. Sanchez, a committee member, discussed problems encountered and was present during the inspection. The west ditch diverts water from the Rio Agua Negra and irrigates about 356 acres of land. The right side of the diversion structure (photo nos. 26 and 27) is located on rock, but the left side (photo no. 28) overhangs the former river channel. To adequately protect the left side, the embankment should be raised and jetties or steel jacks installed to a point 150 yards upstream from the left abutment. Part of the dam is eroded in the center (photo no. 29) and needs repairing.

The ditch enters a deep cut (12 feet deep with \(\frac{4}{1}\) side slopes and 3-foot bottom) just below the diversion point and continues thus for about 800 feet. This restricts the capacity to about one-half the amount required to irrigate adequately the lands below. About one mile downstream, the ditch traverses a sharp bluff and is further restricted. All arroyo crossings are at grade, subjecting the ditch to silting and washouts at these points. The ditch has never been machine-cleaned and is presently very narrow and silted (photo no. 30).

Near Puerto de Luna a small reservoir was constructed to store overnight and surplus-flows. Lands below this point are irrigated from the reservoir. The reservoir is almost entirely silted and needs cleaning.
Because of the above situations, yields in this area are estimated at 40 percent of what they might be. Adequate water is available in the Rio Agua Negra to irrigate all of the lands under the ditch.

**Baca, Swamp, Casaus, Ortega, La Bandie and Giddings Ditches.** (not included in House Bill 112). These ditches are located south of Santa Rosa and above the lands of the Puerto de Luna area. The majority of the ditches are under a single ownership. Sources of water are the numerous lakes, springs, and swamp areas in this vicinity and none are direct diversions from the Pecos River. With the exception of Baca Ditch, adequate facilities are available to irrigate the lands. Ben C. Baca, who irrigates about 55 acres, stated the diversion used by him is in danger of failing. This diversion consists of a rock structure about 5 feet high and 150 feet long. The center has been undermined, from lack of rip rap protection, and needs reconstruction. The ditch is diverted through an 18-inch culvert without a headgate.

**SUMMARY**

With few exceptions, the irrigated areas between San Jose and Puerto de Luna are suffering from water shortages. This does not result from a lack of water at the diversion points, but rather from inadequate diversion and distribution facilities. The problems encountered are common to all of the systems, being temporary diversion structures, overgrown and silted ditches, poor arroyo crossings, and badly eroded structures. Another problem not discussed above is the prevalence of beavers in the area, who construct dams across the ditches and cause
numerous breaks in the acequia banks. The area is well adapted to most crops grown in New Mexico, but yields are decreased from 25 to 75 percent depending upon when the water shortages occur.

Operation and maintenance on all ditch systems is under supervision of ditch commissioners. Maintenance is almost entirely by hand labor and by services performed by the land owners under the ditch. The trend is for the younger men to seek employment elsewhere and because of the decreasing population sustained by irrigation in the area, the older people who remain are finding it more and more difficult to keep the systems operable. On most systems consolidation of ownership is not taking place and irrigated area and land production are both decreasing. The shortage of manpower reflects in the amount of maintenance accomplished each year and in case of emergencies this shortage slows up repairs; consequently, crop losses may be severe. Also the systems are not generally able to finance contract work. Generally the diversion dams are, to the extent that their location and type of construction permit, kept operative during times of low flows. Flood flows can and very often do cause major damage that requires considerable effort to repair, often causing severe water shortages with attendant crop losses. Maintenance on most of the systems is not keeping pace with project deterioration.

In San Miguel there are 9 diversion dams, all of brush and rock construction, and 12 ditches serving rights totaling 1876 acres. In Guadalupe County there are 4 diversion dams and 5 ditches serving rights totaling 3963 acres.
CONCLUSIONS

The obvious need of these areas is complete rehabilitation of diversions, canals, and canal structures. Such rehabilitation would probably cost in the neighborhood of two million dollars. Some systems would have economic feasibility, others would not because of the small areas served. Probably most of the systems would not have ability to repay construction loans.

House Bill 112 proposes to spend $50,000 in San Miguel County and $50,000 in Guadalupe County with the proviso that in Guadalupe County not more than $10,000 shall be spent in connection with any one of the reservoirs or dams named in the bill (and 5 are named). The bill carries the emergency clause and does not limit expenditures by fiscal years. The bill carries the directive "The construction and repairs herein authorized shall include repairs for flood damage."

Except for repair or rehabilitation on the East Anton Chico and Dilia diversion dam in Guadalupe County all work on the remaining dams would be of questionable lasting benefit because such work would not last through high flood flows. There are structures on the ditches which could be replaced or rehabilitated, new structures which could be built, and ditches which could in places be rehabilitated or relocated all of which would have a long period of usefulness with minimum maintenance. Such permanent type rehabilitation and construction would lessen overall maintenance and in themselves would be economical in the sense that they would return benefits to the irrigators in excess of their costs, provided that in the future the systems were kept operative.
On the other hand the money proposed to be appropriated by H.B. 112 could be used for emergency repairs when and where needed. Such a program would undoubtedly be of benefit to the irrigators but the probable benefit of most work done would only continue for a few years. This would be especially true if most of the money were spent on the existing temporary-type diversion dams, however, a more logical method of approaching the problem appears to be a minimum of repair to the diversions until such time as permanent structures can be built. More lasting benefit would accrue to the area by constructing as many permanent structures as possible and reserving a minimum of funds for emergency repairs.

If this bill is enacted into law the program should be operated only as a cooperative effort between the State Engineer Office and the local people. It is suggested that State funds should be used only for technical assistance, purchase or rental of equipment, and purchase of material. When practicable the necessary labor should be furnished by the local interests. By this procedure the total amount of work accomplished dollarwise would be approximately doubled.

BUREAU OF RECLAMATION PLANNING

The Bureau of Reclamation is in the process of completing the Pecos River Basin study. They have made a reconnaissance study of each of the irrigated areas along the Pecos River with the thought of
proposing further investigations of projects which appear feasible.

Upon an examination of this data by personnel of this office it
appears that the only project in San Miguel and Guadalupe Counties
that might have a favorable benefit-cost ratio would be the San Jose-
Villanueva area. The plan as envisioned to date would be the construction
of a permanent diversion dam with the elimination of 7 or 8 temporary
diversion structures, consolidation of the ditches where possible, and
rehabilitation of the ditch system including permanent installation
of flumes, syphons, drips, etc.

Repayment capacity has been estimated to be as much as $1.00 /ac.
in this area. The fact that a very limited repayment is possible will
no doubt delay or eliminate project development.
Looking upstream at diversion dam for El Llano de la Presa Acequia and Acequia del Agua Caliente
Photo No. 1

Flume in the El Llano de la Presa Acequia south of San Jose
Photo No. 2
Diversion dam for Ancon de Sarricino Ditch
(Looking downstream)
Photo No. 3

Diversion dam for Los Trigos Community Ditch
(looking towards left abutment)
Photo No. 4
Right abutment of Los Trigos diversion dam
Photo No. 5

Looking upstream at La Fragua diversion dam
Photo No. 6
Headworks structure for La Fragua Community Ditch
Photo No. 7

Looking upstream at diversion for Villanueva and North Villanueva ditches
Photo No. 8
Wooden canal headgate used for North Villanueva ditch

Photo No. 9

Break in headwall in right side of Villanueva diversion dam

Photo No. 10
Break in North Villanueva ditch which resulted from ice choking the canal

Photo No. 11

Looking upstream at North Villanueva ditch as it traverses a steep bank. Canal about 20 feet above river

Photo No. 12
Looking upstream at North Villanueva ditch as it traverses a steep bank. Canal about 20 feet above river

Photo No. 13

Left side of Tecolotito diversion dam

Photo No. 14
Sluiceway in right abutment of Tecoletito diversion dam

Photo No. 15

Sluiceway in right abutment of Tecoletito diversion dam

Photo No. 16
Looking upstream at diversion dam for Hermigoso and Bado de Juan Pais Ditches
Photo No. 17

Left abutment of Hermigoso and Bado de Juan Pais diversion dam
Photo No. 18
Looking upstream at East Puerto de Luna diversion dam

Photo No. 19

Looking across at right abutment of East Puerto de Luna diversion dam

Photo No. 20
Headworks structure for East Puerto de Luna Ditch

Photo No. 21

Typical overgrown section in East Puerto de Luna Ditch

Photo No. 22
Typical overgrown section in East Puerto de Luna Ditch

Photo No. 23

Typical sluiceway in East Puerto de Luna Ditch

Photo No. 24
Arroyo siphon-crossing in East Puerto de Luna Ditch

Photo No. 25

Looking downstream at headworks and right abutment of West Puerto de Luna diversion

Photo No. 26
Rock outcrop in right abutment of West Puerto de Luna diversion
Photo No. 27

Left side of West Puerto de Luna diversion
Photo No. 28
Break in wall of West Puerto de Luna diversion dam
Photo No. 29

Typical ditch section and wasteway in West Puerto de Luna Ditch
Photo No. 30