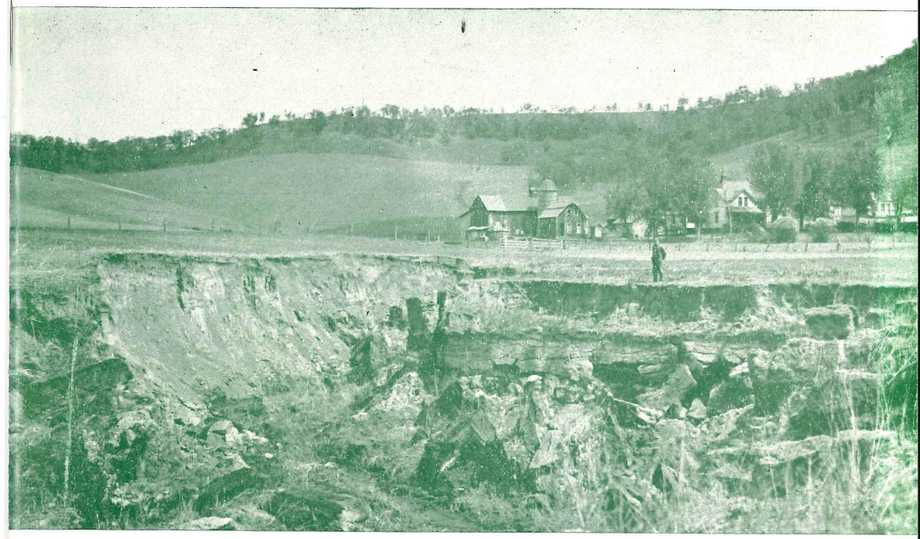
August, 1963
Reprinted August, 1964

A Brief History of

SOIL EROSION CONTROL IN WISCONSIN



State Soil and Water Conservation Committee in cooperation with the University of Wisconsin Extension Service, College of Agriculture, Madison, Wisconsin

CONTENTS

5000-16

Professor O. R. Zeasman

Professor O. R. Zeasman, "Zeas," as he is affectionately known, was born in Kiev, in Ukraine. He spent his second birthday on the ocean with his parents enroute to America where the family became citizens. He grew up in eastern Marathon County where he received his early education. He then studied at Wayland Academy in Beaver Dam, Wisconsin, and the University of Wisconsin where he earned his B.S. degree in 1914. He went to work for the University in August of that year as a specialist in land drainage and helped farmers put in tile drainage systems.

He pioneered the erosion control work of the state beginning in 1922 for which he has gained great distinction throughout the middle west and the nation. His gully control projects attracted national attention, beginning in Buffalo County where gullies 20 to 50 feet deep had ruined much land and undermined farm buildings. During the ensuing years this work spread to many other counties in western Wisconsin and other parts of the state. He introduced the "diversion" terrace and the practice is widely used today.

Professor Zeasman became a joint Soil Conservation Service and University of Wisconsin Extension Soil Conservationist in 1936 and held that position until his retirement. He provided leadership to all the 71 soil and water conservation districts in Wisconsin in developing their programs of work, and assisting them in meeting the varied problems of soil conservation. He was a true pioneer in convincing farmers of the need for conservation farming. He introduced many unique demonstration methods, including air tours for farmers so they could get an aerial view of erosion damages and the control practices which were being employed.

Professor Zeasman was generally known as "Mr. Soil Conservation in Wisconsin" during his many years of distinguished soil conservation leadership, and was an understanding friend and intimate personal counsellor of many farm families who felt greatly indebted to him for his reliable assistance.

The early history of erosion control work presented here was prepared by O. R. Zeasman. Accomplishments of the State Soil and Water Conservation Committee beginning on page 32 is largely the work of I. O. Hembre, Asso. Prof. of Soils and Executive Secretary of the State Soil and Water Conservation Committee.

The farm is now in the third generation of Kramers who have adhered to the practice consistently. The strip crop pattern laid out there is the same as planned originally but with narrower strips. The first author of this history recalls seeing a similar strip cropping pattern on another farm on the south side of Mormon Coulee about 1920-— probably a copy of the Kramer system.

These examples prompted the use of strip cropping for steep slopes in the plan for Coon Valley later submitted to Washington. Proof of its effectiveness on the Kramer farm was revealed by a study that SCS soil surveyors made in 1948. This original strip cropped field had about 5 inches more topsoil than nearly similar fields where only rotations had been depended on to halt run-off and protect the soil.

Two presidents of the University, both geologists, warned about the damage by soil erosion. They were T. C. Chamberlain, President 1887-92; and C. R. Van Hise, President 1902-18. In many public addresses and publications, they called attention to erosion damage and the need for sound land conservation. Generally their words met deaf ears – largely because this was an era when there seemed to be lots of virgin or nearly virgin land.

Early College of Agriculture Work

The first specific recommendation to control damage from wind erosion was made by F. H. King, first chairman of the Soils Department. After observing wind erosion in the Plainfield sand area of central Wisconsin, Professor King recommended tree shelter-belts on the north and west sides of fields and cropping the fields to alternate strips of dense growing and open crops, the most effective practices in use today. Wisconsin Agricultural Experiment Station Bulletin No. 42, *"Destructive Effects of Winds on Sandy Soils and Light Sandy Loams," with Methods of Protection,* published in October 1894, records this early recommendation.

Another early contribution effort was Wisconsin Bulletin No. 272, *"Keep our Hillsides from Washing,"* by Professor A. R. Whitson and T. J. Dunnewald in 1916. These men were inspired to writing by damage they noted when making soil surveys. They emphasized damage by erosion – loss of plant food and gullied fields. They also mentioned some of the special practices and field management changes that would solve the erosion problem. But no noticeable evidence of adoption of such practices was ever found in the state, except for grass waterways in draws. Yet obviously many farms in the state had such waterways before 1916.

Farmers use tough, permanent sod to protect draws. In plowing across such waterways, the ends of furrows are staggered to prevent gullies at the edges.

Flumes Help Stop Gullies

An early worker on methods of gully control was Gottleib Muhleisen of Alma, Wisconsin. On his farm in the Mill Creek watershed he placed sheet metal flumes in the heads of gullies to stop their advance into fields. Confidence in his devices led him to organize The National Soil Conservation Company and build a rather substantial building in Alma for fabricating products he designed. The major device was the flat bottomed sheet metal flume that intercepted run-off water above the gully head and carried it beyond the gully lip where it fell into the bottom of the gully. The basic principle of this device was sound – that of preventing further advances of the gully head. Later we will discuss the success or limitations of these structures.

Zeasman Starts Erosion Control Work

As extension specialist in Wisconsin in the field of land drainage I was pushed into the erosion control field in June of 1922. Sidney Murat, county agent in Buffalo County, had talked to me at several county agent conferences about the severe gully erosion in the Beef River Valley. Finally Frank J. Davey, State Highway maintenance engineer at the La Crosse division, discussed with Professor E. R. Jones, Chairman of the Agricultural Engineering Department, the

In post glacial times, enormous quantities of loess were deposited on the broad ridges, and to a less extent on the slopes. This loess bed is often more than 30 feet deep near the Mississippi and thinner as the distance increases eastward. The soil formed on this loess blanket is excellent. Yet this soil is very susceptible to erosion.

Another striking feature of the area is the extensive river terraces along many sections of the streams. These had their origin when the late Wisconsin glacier was melting, and are therefore geologically young. Well-borings in the Mississippi gorge reveal that the pre-glacial river had cut down to a depth of about 200 feet below the present flood plain.

Large quantities of gravel, sand and fine soil materials were brought down by the tributaries that had their origins in the melting ice front. So the gorge of the master stream and the lower ends of the tributaries were filled about 100 feet above the present flood plain. As the streams cut down into this friable alluvial material — benches of level soil material — river terraces with sharp scarps were left at the sides of the valleys.

Very high massive terraces are seen along the Chippewa River above Eau Claire. In the northern part of the area, the profile of the lower terrace sections are frequently composed of layers of sand and gravel. In the southern part of the area along the shorter tributaries that did not extend into the melting front, the entire terraces are frequently composed of fine grained soil material laid down in layers.

The soil of these level river terraces generally make up the best land of the locality. An illustration is the West Salem prairie. Run-off from the ridge land flows over these level plains. As it drops off the steep scarps of the terrace faces, the energy of the falling water cuts enormous gullies back into the good level terrace land. The steep land of the sides of the valleys and the gullies in the river terraces furnished the sites for the early erosion control work in Wisconsin.

Observations made in the bottoms of the gullies, in this first inspection in Buffalo County, often showed that the top soil and part of the subsoil was silt loam with the lower parts sand and even gravel in layers, evidence of deposit by flowing water. In the bottoms of some of these deep gullies we found check dams a few feet high. A few consisted of bundles of brush; more were of woven wire fencing on posts. A few were designed by the National Soil Conservation Company — steel rods driven into the ground and held in line at the upper ends by angle irons and bolts. These and the woven wire fence dams depended for their effectiveness on trapping floating grass, weeds, and brush. This in turn caused deposit of sediment. Their obvious limitations were short life, small capacity

for storing sediment, and the low heads which made them misfits in the bottom of deep gullies.

Zeasman Becomes an Expert

My embarrassment, referred to earlier, was the sight of hand bills on the second day. They really put me "behind the eight ball." The context of the hand bills was: "Come and Hear an Expert on Stopping Ditches," Gilmanton High School, June 13, 1922, and Bernett's Hall at Tell, June 14, 1922. We had good crowds at both places. Embarrassment? I had not seen gullies before that week, and knew nothing about effective control practices. Here I was booked as an expert.

Another part of the dilemma was that I had to keep to myself the opinions I had formed of the limitations of the efforts at control that I had inspected. I decided to give them an analysis as to how and why this damage was taking place, and praise them for their interest in having made and willingness to make further efforts at control. As they were in the corn cultivation season and haying time was close, I offered to look at any jobs they might want to do later and come back in the fall with plans for solution. Two farmers made firm commitments and a few others expressed interest. Naturally, I was confident the literature would cover the field so completely that I could become an "over-night expert."

The immediate job planned and started during the balance of the week was one for which dainage experience was an asset. This was where Highway No. 37 crossed Mill Creek, where the flood plain is over 500 feet wide. The stream channel had been near the middle of this plain where a 10-foot stone arch (built when this was a town road) carried it under the road. The sediment brought down by the stream had built up such a high debris cone that the stream was diverted from the stone arch bridge to the south side of the flood plain.

To accommodate this new stream location the highway department built a 24-foot span concrete bridge with concrete end walls. But unfortunately the new bridge deck was so low that the opening was completely filled with sediment and the stream was flowing over the road near by. We diverted the stream back to the old arch by blasting a channel and directing the stream to it by logs and brush anchored at proper angles. In this location the stream had a more uniform gradient.

The stream stayed there until the Alma dam construction in 1933 required a higher grade, and it seemed desirable to relocate the road about 100 feet to the east. A few years after the creek was changed back to the rock arch, the highway department cut down the concrete end walls and the sediment brought down by Mill Creek soon buried the concrete bridge completely.

Conclusions from observation made on this trip were:

(1) Some of the control efforts such as the low temporary dams in the deep gullies were misdirected effort.

(2) The conditions required structures with high heads for gully control and storage of sediment to keep it off the valley roads.

(3) From an examination of several of the Muhleisen flumes I felt that they were sound in principle but that they had some inherent limitations (corroborated by more extensive observations later). (a) Frequently the gully had advanced so far that conditions were unstable below the lip of the main gully where the flume was located. (b) Farmers wanted to save money by holding down the length of the flume – this often caused leakage at the inlet and undermining at the outlet. (c) The concrete toe wall at the intake lacked mass enough to insure water tightness, and failures occurred because of leakage at this critical point. (d) The portion of the flume extending out into the gully was supported on posts generally so unstable that the flume vibrated sufficiently to spring a leak at the intake to cause failure. (e) The size of flumes was determined by guess and were sometimes too small. (f) The earth dikes to convey the water into the head of the flume were not massive enough to avoid failure.

These limitations were largely due to the effort to save money and to inadequate design. I was only getting an initiation and had to be very reserved and diplomatic with my criticisms. Yet I had a feeling of confidence that there would be adequate solutions in bulletins of Experiment Stations and the U.S.D.A.

Useful Literature Scarce

Search in the Agricultural Library was rewarding in the field of terracing but extremely meager regarding control of gullies. On terracing there were two very good bulletins by C. E. Ramser of the U.S.D.A. – *"Prevention of Erosion on Farm Lands by Terracing"* – U.S.D.A. Bulletin No. 512, published in 1917; *"Terracing Farm Lands"* – U.S.D.A. Farmers Bulletin No. 997, published in 1918.

This Farmers Bulletin had a sketch and brief description of a gully control dam, Adams Dam, named after the originator, J. A. Adams, a farmer of Johnson County, Missouri, that promised to be useful to our needs in the deep gullies. I used the basic material in these two publications, modified according to the situations in the two farm requests. Working through the county agent's office, we spent a week making the installations that fall.

The first was a modified terrace, later named diversion terrace, on the Orville Jost farm. Jost's problem was run-off water that flowed down a draw between the house and barn. He had often had to wade through deep water in travel between these buildings. The

Diversion terrace on the Orville Jost farm, fall of 1922.

source of the run-off was a bluff of about 10 acres with about 20 acres of field sloping mostly toward the west. There was a well-sodded draw about 10 feet deep, a sort of a naturally stabilized gully about 500 feet north of the house. It seemed adapted to serve as an outlet for terraces if the water were carried from the field elevation down the steep bank to the sodded bottom by a Muhleisen flume.

But Mr. Jost did not want to terrace the entire field. Contrary to recommendations in the terracing bulletins, I located a single terrace far down the slope where it intercepted run-off from the bluff and from over half the field area. The terrace was given a variable gradient from about 2 feet per hundred feet near the outlet to 6 inches per hundred feet near the upper end. It was about 800 feet long. Earth was moved only from the uphill side by county patrol grader. The cross section was about 50 percent larger than recommended for standard terraces. The lower end was kept permanently in sod. Mr. Muhleisen installed a flume that we supported for its entire length on the earth slope to prevent vibration. At later dates I designed and built a few more terraces at the foot of bluffs to protect the fields below. Eventually we gave this modified type of terrace the name "diversion" terrace.

When I saw this terrace in 1956 it was still doing the job for which it was designed, although some sediment had been deposited in the terrace channel. I saw the project again in 1962. At that time major repairs were required. The outlet flume had rusted out, starting a gully up the terrace channel. The channel was largely filled

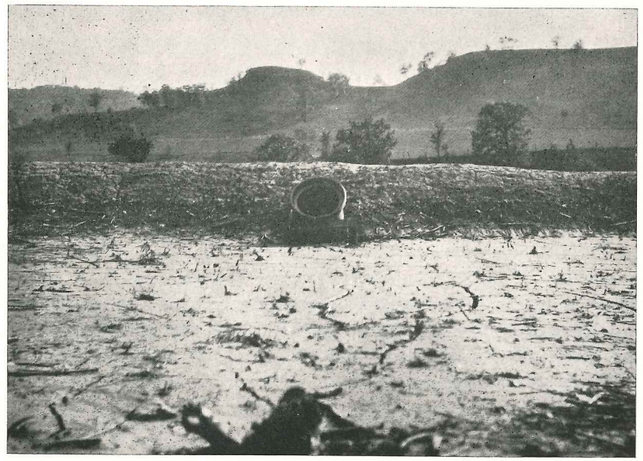
by sediment and needed cleaning by crowding it toward the uphill side to keep the lower slope flat. These repairs can be considered minor maintenance after 40 years service.

The second job installed in the fall of 1922 was a structure patterned after the Adams dam principle noted in Farmers Bulletin No. 997. It was on the Kindschi farm later purchased by Raymond Accola, a prominent Beef River Valley farmer. Sediment from a gully cutting into his field was filling a spring used for the household water supply. Highway No. 37 passed between the spring and gully outlet and was periodically buried by sediment from the same source.

We installed the dam cooperatively. The highway people furnished corrugated culvert pipe with an elbow fabricated by Mr. Muhleisen, highway equipment was used for placing the earth fill, and the farmer furnished some of the labor. As time was not available to build the dam to the total necessary height, we planned to raise it by stages. This structure gave good service for several years. The highway patrolman who was responsible for raising the head as the sediment basin became filled, raised the intake pipe ahead of the fill, a fatal mistake. Natural result — failure.

First Large Structure — Vollmer Dam

The largest single drop inlet dam built as a cooperative project in Wisconsin before the advent of the CCC camps was constructed on



Early "Adams dam", later renamed drop inlet. Inlet pipe and earth over horizontal section in middle ground. Old portion in foreground is filled with sediment.

the Arnold Vollmer farm located on Highway No. 37 about 10 miles north of Alma. Run-off from a watershed of about 225 acres had cut a large gully. When we began construction in May 1928, Arnold's father, George, told us that this gully had advanced 1000 feet during a single storm in 1922. This storm caught George Vollmer in the back field. On his way home the team had to swim the new gully with the wagon floating where the field was only minutes earlier.

The debris pile at the outlet of the gully had buried Highway No. 37 repeatedly. A survey in 1929 revealed that this cone was about 14 feet thick near the road crossing and averaged over 6 feet deep over a 40-acre area. Much of the finer soil material had gone down the river.

Vollmer and I had repeatedly discussed the desirability of building a dam to control this gully and he agreed to do the work if there was a way to finance materials. So I appeared before the County Board in the 1928 spring session and obtained an appropriation of $350 for cost of cement, aggregate, steel for conduit and lumber for forms. Vollmer furnished the labor for placing the concrete and about 3000 cubic yards of earth fill.

The first section with a 12-foot head was completely filled with sediment by a single storm. The conduit was raised another step but Vollmer failed to tamp the fill next to the conduit, so the next storm brought partial failure. This was repaired and properly tamped by myself. It has given perfect service ever since. The head has been raised to nearly 30 feet. The main gully is now filled by sediment, largely from the neighbor's farm, and the highway is protected.

During construction this dam furnished an observation that led to the inclusion of the back-board at the drop-inlet intake. As this dam was built in stages we had to support the advancing fill at the intake by posts and plank. Observation of run-off revealed less turbulence at the intake than where risers were open on all sides. The back-board at the intake increases the capacity, protects the fill from the intake eddy and allows a shorter barrel. This fact was confirmed by 1933 tests and added to the usefulness of this type of structure.

In 1932 on the Vollmer farm I staked and helped build a large diversion terrace located at about the junction of the field area and the bluff above. It protected the field by trapping the water from the bluff and discharging it into the grass waterway that emptied into the draw over a quarter mile above the dam.

Oleas Oberlein, highway commissioner in Jackson County, recognized the value of the drop-inlet dam and built a number of them that served highway maintenance and protected fields.

Erosion Control Work Expands

Work Protested as Unauthorized

About 3 weeks of my time was devoted to this extension work in 1922. From 2 to 3 times as much was spent each year for the next 6 years, most of it building gully control dams and terraces. This was included regularly in annual reports.

In 1927 K. L. Hatch, Associate Director of Extension, wanted to know why so much time was being boot-legged from the approved project in land drainage, for erosion control work when presumably no erosion problem could exist under our diversified agriculture. I took him on a field trip where he could view the problem and the work done. This led him to support the work enthusiastically. He wrote in defense of it on May 10, 1938, to director C. W. Warburton, federal director of extension, who had questioned the time spent for erosion control from the approved drainage project. The work was continued on a modest scale and limited largely to Buffalo, Trempealeau and Jackson counties.

Additional Help Came

In 1929 the Lake States Forest Experiment Station, located on the Minnesota College of Agriculture campus, was allotted $10,000 to use in erosion studies in cooperation with any one or more of the 5 states in which they operated. The cooperative agreement between the Lake States Forest Experiment Station and the Wisconsin College of Agriculture, signed June 4, 1929 by Raphael Zon and Dean H. L. Russell for the two organizations, was entitled "*Memorandum of Understanding re; Cooperative Study of Soil Erosion Problems in Wisconsin.*"

This special study covered about 8 months to March 1, 1930. Leaders were listed as Raphael Zon and C. G. Bates, Federal Lake States Station; O. R. Zeasman, A. R. Whitson and E. R. Jones, University of Wisconsin; and K. A. Ableiter, Wisconsin Geological and Natural History Survey.

Division of field work was along general lines: C. G. Bates made climatological observations and measurements of soil losses from different crop covers. K. A. Ableiter made estimates of soil losses with emphasis on gullies, from different types of watersheds. O. R. Zeasman built gully control structures cooperatively with farmers. Since the Agricultural College contribution was a material amount, the erosion control work was given the status of a project, "Soil Improvement, 8 C" and two-thirds or more of my entire time was devoted to this project until retirement in 1956.

Gullies Shock Dean H. L. Russell

Dean H. L. Russell in 1929 wanted reasons for the many new requisitions brought to his attention. I invited him on an inspection trip to give him a birds-eye view of the problem we faced in our work. I showed him around La Crosse, Buffalo and Jackson counties. As a stage for our final stop, after observations for two days, I selected a high knob on the McPeak farm north of Cataract in Monroe county.

More drama was enacted here than I had anticipated. Dean Russell faced west – destructive gullies; then he faced north – gully one-half mile long, 20 to 40 feet deep; then he faced east – more gullied land. Then he wiped the perspiration off his forehead, turned to me and said, "Zeas, if you had come into my office and told me we had anything like this in the fair state of Wisconsin, I would have called you a darned liar and thrown you out!" My answer, "to avoid using your energy for that purpose, I invited you on this trip!" From that day forward, Dean Russell was an enthusiastic booster for the project and furnished the power that later secured the appropriation for the farm on which the Erosion Experiment Station was located

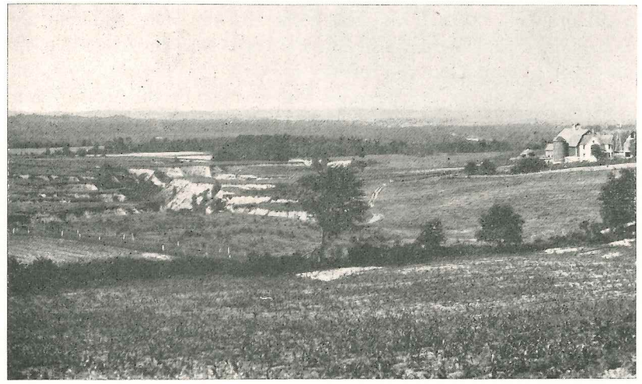
Developments in Gully Control

For the three summer months of 1929, H. D. Bruhn, then a student in the College of Agriculture, was engaged to help me with the construction work. During this season about 2 dozen drop inlet dams were built in Buffalo, Trempealeau, Jackson and Crawford counties. The $1,000 of U.S. Funds for materials was met on a 50-50 basis by the farmers.

With one exception these were built in gullies with watersheds of 70 acres or less. The conduit material used was sewer pipe and corrugated culvert pipe. All of these dams gave satisfactory service for a number of years. They were regularly inspected and minor repairs made as necessary. No systematic inspection has been given them since 1934, however.

The largest drop-inlet dam using corrugated culvert pipe, built late in the fall of 1929, is located on the William Sommerville farm, now occupied by a son, located about 3 miles east of North Bend. This gully, about 24 feet deep, had advanced through river terrace soil from the Black River, through a neighbor's farm to the southline of the Sommerville farm. Sommerville and his two sons had made valiant but unsuccessful efforts to stop its advance. Late that fall I aided them with the installation of a drop inlet with a 48 inch corrugated culvert pipe for a conduit. A back board to prevent eddying at the intake was added in 1933 by the North Bend CCC Camp. The dam has given satisfactory service to 1962, when it was rebuilt by the Soil Conservation Service.

One of the interesting studies Ableiter made in 1929 was on the McDonald farm located 2 miles east of North Bend on the south side of Highway No. 54. This was obviously the most horribly destructive gully in the locality. Up to 1914 William Sommerville's brother owned the farm. At that time the town road located near the south rim of the terrace was cut by the gully eating into the terrace. The town board relocated the road up on the hillside from where the picture was taken in 1929. Then Sommerville said, "If the town can't stop that ditch, I can't." He offered the farm for sale. It brought $27,000 in short order, and that was in 1914 before the war inflation.



This gully destroyed 50 acres of level river terrace land in 15 years.

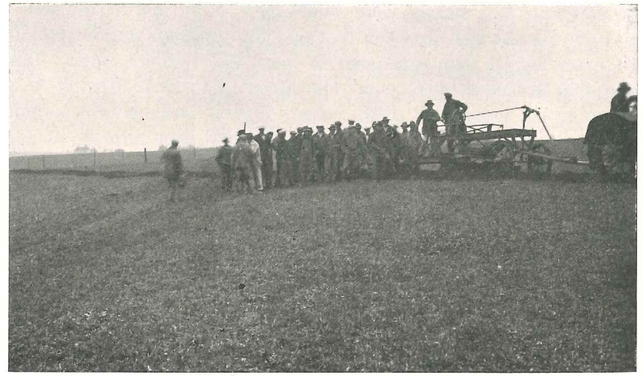
All the gully visible in the picture developed in that 15-year period, 1914-29. In the next half dozen years only a few torrential rains fell on that farm and the gully changed little. In about 1927 the farm brought $12,000 in trade for some western land, which represented $1,000 depreciation per year.

The topographic crew under Ableiter's supervision surveyed this gully in 1929. It ranged from 30 to over 50 feet deep. The soil was fine grained material for about 25 feet, with streaks of sand included at lower levels. A survey line run around the tips of the branches of the gully included about 50 acres of the level river terrace prairie land, the heart of the farm. The ugliness of this gully is hidden by brush now, but that does not restore it as an area of productive land.

By the end of 1932, about 50 gully control dams had been built in the counties mentioned with the addition of La Crosse, Grant, Lafayette and Walworth counties. Many lessons learned in these early demonstrations proved invaluable in planning the CCC work

of 1933-34. One of these was the need to have a stable gradient in the gully down-stream from the structure. Another important lesson was that reinforced concrete was ideal material for conduits particularly when labor was plentiful. The reduced eddy at the Vollmer dam suggested the back board. Wisconsin can claim leadership in the early development of the drop inlet dam, and adaptation to sites of other structures useful in control of gullies.

After 1930 terracing to control sheet erosion increased. The activity was greatest in Crawford, Grant and Iowa counties, but some were located as far north as Pepin County and as far east as Waukesha. In all, I must have staked and helped construct terraces on about 200 farms.



Farmers gather for discussion at beginning of terrace demonstration, Grant County, 1931.

New Help from Erosion Experiment Stations

Organized research work in soil erosion was extremely scarce and inadequate in this early period. In 1917, the Missouri Experiment Station, under the direction of Professors Duley and Miller, set up the first reasonably complete plots to study soil and water losses under different conditions and practices. Six years' results were reported in Research Bulletin No. 63 of the Missouri Station published in 1923. Within a few years after this startling publication appeared, three other southern states set up experiments to evaluate erosion damage.

In 1928, in U.S.D.A. Circular No. 33, "*Soil Erosion a National Menace*," H. H. Bennett and W. R. Chapline told about heavy destruction they saw as a soil surveyor and inspector of grazing lands, respectively.

Most notable increase in erosion experiment stations was provided by the 70th Congress in 1929. It appropriated $150,000 to set up 10 erosion experiment stations cooperatively with states. The first seven were in the South. Interest created in Wisconsin by the early extension work and the 1929 reports in Research Bulletin No. 99 made the time ripe for the location of a station in the driftless area of southwestern Wisconsin, with small portions in the three adjoining states.

At the American Society of Agricultural Engineers meeting in St. Louis in December 1929, I discussed the need for a station in the Upper Mississippi Valley with A. Lewis Jones and C. E. Ramser who were in charge of the engineering work on the cooperative stations. I argued that northern states also had a serious problem – but no stations. If a station were established in the north rim, interpolation for the belt between that and the southern stations would be more logical than exterpolation from the southern states. The fact that prospects were good was reported to Dean Russell in a letter dated January 3, 1930. Dean Russell immediately recommended to the Regents of the University that they request an appropriation to purchase a farm for this purpose. The legislature of 1931 acted favorably on Governor Phillip LaFollette's recommendation and appropriated the sum of $10,000 for purchase of a farm.

The committee for selection of this farm consisted of Noble Clark, Associate Director of the Experiment Station; A. R. Whitson, Chairman, Soils Department; E. R. Jones, Chairman, Agricultural Engineering Department; and myself, Extension Specialist. During the summer of 1931, this committee selected the 160 acre farm on Grandad Bluff that continued in use as the Upper Mississippi Erosion Experiment Station for 30 years. Observations during this hunt for a farm served a very useful secondary purpose. It intensified and stimulated Professor Whitson's interest in the problem, and aroused a deep interest in Director Clark and Professor Jones. This was a very fortunate circumstance as will be noted in more detail under discussion about the Civilian Conservation Corps.

Information obtained on the La Crosse Experiment Station, beginning in 1932, has promoted soil conservation work in the state. Results emphasized the fact that 3 to 5 of the more intense rains per season cause 90 to 95% of the soil loss. Obviously, damage from these worst storms must be controlled if any dent is to be made on the problem. Different crop covers varied in their ability to absorb portions of this excess rainfall. Usually, dense meadow crops held 75%, corn 25%, and grain seeded to meadow crop varied widely between these extremes depending on advance of the growing season. Soil losses formed a close parallel. Intertillage of corn promoted soil loss. In the early part of the grain growing season following corn, soil and water losses were high. Such information is important for strip crop patterns, grass waterways and the need for terraces. Besides its reports, the station also served as a focal point for public tours and technical workshops.

CCC Contributes to Erosion Control

The advent of the Civilian Conservation Corps brought the big increase in erosion control work in the summer of 1933. Wisconsin had an important behind-the-scenes role in shaping the basic legislation. The original bill – S 598* was introduced by Senator Robinson of Arkansas on behalf of Senator Wagner of New York on March 21, 1933. This first bill was in considerable detail in 8 sections but had been drawn rather hastily. It provided that some unexpended balances be used to employ youths and unemployed veterans of World War I on forestry conservation work. The bill was referred to the committee on Education and Labor, of which Senator Walsh of Massachusetts was chairman. It was desirable to report the bill out in the form of a substitute. Included in this was a Wisconsin suggestion of dramatic origin that resulted in an important contribution to soil conservation in the entire nation.

When Professor E. R. Jones was shaving on Sunday morning, March 26, 1933, he had a sudden inspiration. "Why not dedicate the work of some of these unemployed boys to the cause of soil conservation?" His one conclusion was "Soil conservation is sound enough to merit a porition of this help." He telephoned his idea to Dean Chris L. Christensen, who endorsed it heartily. Dean Christensen relayed the idea to Governor Schmedemann who in turn called Senator Robert M. LaFollette, Jr., at Washington. Senator LaFollette presented the suggestion that erosion control work be included in the legislation to the committee on education and labor. The committee reacted favorably and the substitute bill recommended for passage contained a provision for work on soil erosion control. The final bill was in very general terms and delegated sweeping authority to the President to set up and administer the work of the Civilian Conservation Corps.

The best summary of the provisions* was given by Senator Borah of Idaho, as follows: "To provide for hiring unemployed citizens of the United States in the construction, maintenance, and carrying on of public works in connection with the forestation of lands, federal

---

*Introduction of the bill creating the CCC is recorded on page 650 of Vol. 77, Part 1 of Congressional Record, Special Session 73rd Congress.

---

*Page 914 of Vol. 77, Part 1 of Congressional Record, Special Session 73rd Congress.

or state, suitable for timber production, the prevention of forest fires, floods, and soil erosion, plant pests and diseases, construction, maintenance, or repair of paths, trails and fire lanes in the national parks and forests."

It passed the Senate with four amendments on March 28. On March 30 the House of Representatives reported it back to the Senate, who concurred in the amendments. The President signed the bill the next day, March 31, 1933.

CCC Camps in Wisconsin

Then came the problem of ironing out broad administrative questions. First Wisconsin camps were divided into three nearly equal divisions, one-third to be used in state parks, one-third in state forests, and one-third in erosion control. The Wisconsin organization used 9 camps in 1933 and 8 camps in 1934 for work in erosion control. The 9th camp was allocated to the Coon Valley project in 1934.

The State Conservation Department was assigned to run the camps. But Adjutant General Ralph Immel and R. B. Goodman of the Commission felt they could not effectively administer more than the park and forestry camps. Governor Schmedemann then persuated Director Noble Clark to serve for the spring and summer as administrator of the soil erosion camps. Clark named E. R. Jones as field director and myself as assistant director.

Administrator Clark had to handle complex fiscal problems in a new field. One was to get executive rulings whereby public funds could be expended on private lands whereon erosion problems largely existed. Another illustration of the magnitude of his problem was to get forestry camp people at Washington to learn that tools, equipment, and supplies for erosion control camps should differ from those used in forestry.

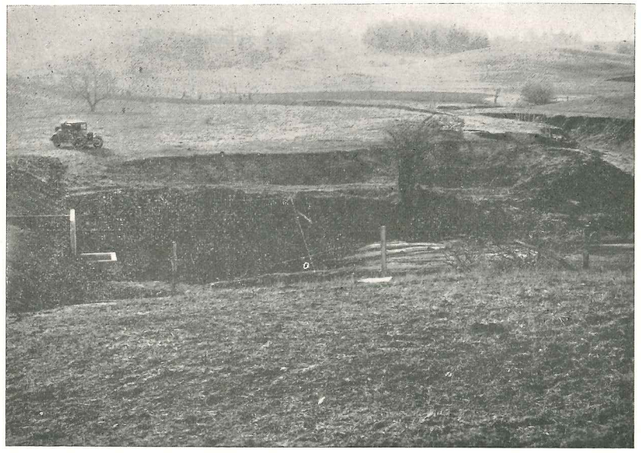
Field experiences gained in my 10 years of extension work were of great value in planning the field operations. Jones and I decided on the location of the camps and that a unit of 200 men would be advantageous. We advised that work at each unit be organized and run by a camp superintendent and 8 civil and agricultural engineers. This force was recruited largely from unemployed engineers and the June graduating class.

This force started work about June 10, 1933. A few of the better technically trained and skilled men made model tests of the hydraulic behavior of structures that had been used in the extension project in the field. This was done for purposes of better design. The tests were supervised by Professor L. H. Kessler of the Hydraulics Department and reported in Research Bulletin No. 122, *"Erosion Control Structures – Drop Inlets and Spillways."* This and a handbook for design and construction guided camp engineers. Other engineers

and camp superintendents not employed with the experiments got a week of training in construction near Mr. Horeb and Barneveld under my direction.

The rush was underway. Work had to be found at once, but not enough high type jobs were readily available. Many farmers were skeptical. They wanted to know how effective the gully control dams would be. This problem was soon replaced by the reverse – find time enough to take care of requests. Another early problem was holding some of the more imaginative engineers down to sound principles.

Our supervisors on the Federal level (forestry) had little experience to draw upon. Orders for reinforced concrete materials brought forth a new force of inspectors who were largely men with forestry training but had a confused idea of land use and gully control remedies. Trees planted in gullies were expected to stop erosion. Another idea was that woven wire, brush and log dams would hold long enough for vegetation to take over. This idea bypassed the deep gullies. Such ineffective methods had been completely discredited in Wisconsin. For the most part we convinced the inspectors that conditions in the river terraces required the methods we were recommending.



CCC drop inlet dam. Earth dam is below concrete inlet at extreme left. Gully above dam will eventually fill with soil lost from the watershed even if good erosion control practices are used.

was recognized at the state level at time of construction, but Washington inspectors insisted that some masonry structures be built because the ratio of labor to materials was more favorable.

From this inspection we found that farmers fail to appreciate the need for minor maintenance that would avoid extensive repairs or costly failures. The structures were therefore "make work" orphans. This is a forceful illustration that gully control dams do not differ from other man-made structures. Even the best designs may need some maintenance repairs. Moderate timely repairs prevent costly losses.

New Developments Speed Control

Permanent Gully Control Structures

In the part time extension work for over a decade ending in 1932, we expanded use of grass waterways and began using diversion terraces to prevent gullies in small watersheds. Pioneer work on permanent gully control structures was carried on as outlined. The model tests reported in Research Bulletin No. 122 introduced refinements. Confidence was thus inspired for the 2 years of CCC work that followed.

As an illustration we developed the Adams dam, once pronounced a failure in Missouri, into a useful structure now called drop-inlet, for controlling deep gullies. By increasing length of barrel and width of fill these structures can frequently be very useful as farm roads. Wisconsin can justly and proudly claim leadership in the development of the gully control structures. They have an important place in the complete plan of erosion control.

The drop-inlet and three other type of structures we built with CCC help are now generally used by the Federal Soil Conservation service. When the extensive SCS organization became convinced that gully control structures were an essential part of a complete and effective control plan on many farms of the driftless area, they made tests that resulted in usfeul modifications of the drop-inlet dam. Gully control structures are expensive but they do prevent serious losses.

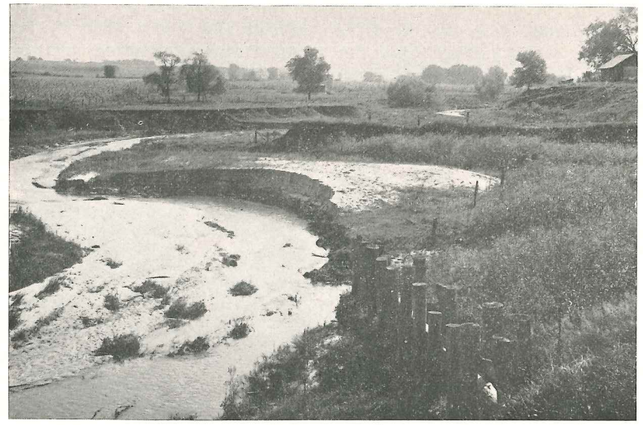
Pile Wing Dams Hold Stream Banks

Incidental to erosion control on farms, stream bank erosion came into sharp relief when farm buildings and roads in valleys were threatened with destruction. Such locations were naturally on the outer bends of meanders. The destructive advance of floods at the outer banks cuts away the heterogenous material. In flowing water this material gets sorted – the coarser material is deposited at the nearest inner bend, increasing that meander. The finer material is carried farther down stream and deposited where the gradient is flatter.

A stream meander was beginning to undermine bridge abutment. The string of piles ended the threat.

Structures which deflect the stream force away from the bank and slow up the velocity encourage deposit of the coarser material and reduce meanders. This was often cheaper than protecting the bank by rip-rap or sheet piling. From this observation evolved the pile wing dam.

We spaced the piles 2 to 3 feet apart and protected the bank at point of intersection with a willow brush mat. These wing dams functioned as planned. The piling slowed down the water saturated with sediment, depositing much material just below the porous wing dam. A series of wings were generally necessary, commonly ex-



Note deposit induced by this pile wing dam. The next storm cut away the deposit edge. The deflector protected farm buildings and state highway No. 54 beyond buildings at extreme right.

tending to about 1/3 of the width of the stream. From trial and error and observations, we developed rules of spacing. In large streams we sometimes built timber cribs filled with rock. They are effective deflectors but do not function so well in causing deposition of suspended and rolling load.

Work in Spencer Soil Area

Organization of soil conservation districts in central Wisconsin revealed lack of conservation information on the flat, undulating or gently rolling silt laoms of central to northern Wisconsin, originally known as the Spencer soil area. Dominant soil problems were low lime and plant food content, especially potassium, and deficient internal drainage. These facts had been noted on the Marshfield Branch Experiment Station and elsewhere. Tile drainage on the Marshfield Station, installed about 1910, gave disappointing results because of the peculiar subsoil.

Farmers in this area resisted field operations on the contuor because of drainage problems. They were deeply convinced that up and down hill cultivation was necessary for good surface drainage. Also, farmers generally did not recognize the critical need for lime, liberal fertilizer applications, and the potential profits.

This overall problem was explored in a general way in 1943. Professor Emil Truog, Chairman of the Soils Department, led those who proposed heavy applications of lime and fertilizers. I insisted that terraces and land leveling between terraces together would improve the surface drainage. Conditions required comparing working land up and down hill versus contour operations in their effect on drainage, measured by yields. During the winter 1943-44, the College of Agriculture, State Soil Conservation Committee, and the Clark County Farm located at Owen, agreed to secure answers to these problems.

In 1944, a committee of R. J. Muckenhirn, M. L. Jackson and myself selected sites for the various tests on the Clark County Farm. Muckenhirn and Jackson designed and installed the fertilizer plots. O. J. Attoe and A. E. Peterson did follow-up work. These plots proved that light applications of lime and fertilizers are only slightly effective; and moderately heavy applications are very profitable. Time will be required to answer the question of optimum amounts.

I laid out the terraces for testing effect on drainage, and the up and down hill versus contour cultivation plots. To date, increased crop yields prove that terraces improve drainage because they reduce the distance of overland flow. Results from the comparison of up and down hill versus contour operation are not consistent, but over the 10-year period slightly favor the contour treatment. These plots have influenced the spread of soil conservation work in this important soil area.

Recent Agricultural Extension Activities

Evolutionary changes have taken place in ways used to convert farmers to soil conservation farming. The first 10 years of work beginning in 1922 were definitely pioneer demonstrations. The second stage was direct government aid or subsidy that increased participation.

Now in general, the soil conservation districts, through SCS and other cooperating agencies, give the technical aid available to help the farmer make his conservation plan. A memorandum of understanding between the local district and the U.S.D.A. provides that the SCS will help make farm conservation plans that include all phases of land management. The Cooperative Extension Service retains the responsibility of informing farmers of the need of conservation farming and of the function that the SCS performs in helping farmers plan conservation farming. The Agricultural Stabilization and Conservation Service provides for cost-sharing in applying certain practices.

Under this agreement, I was named cooperative agent with the SCS as Extension Soil Conservationist. I served in this capacity until retirement in 1956. In the first few years, mass education methods did not bring enough requests for farm plans to keep the technicians occupied. Then I developed what I term the "problem demonstration." In this demonstration we show virgin soil profile in a woodlot, permanent pasture, or other available place. We show the make-up of virgin soil, the importance of the liberal organic matter as a

A stop with participants in a problem demonstration.

source of available plant food, and the making of good water holding capacity and superior soil condition. Soil of the adjoining field on similar slope and type is then examined for contrasts. Erosion control practices are then discussed and illustrated. Emphasis is placed on "whys and wherefores," and advantages of conservation farming. These demonstations are the most effective in percentage of "takes to exposures" of any method we have ever used. They are now being used generally in Wisconsin, particularly in youth education.

Air tours are another outstanding way to display soil erosion. From 1000 feet altitude the problem can be well observed, so air trips also rate high in "takes to exposures". Fritz Wolf of the State Aeronautics Division assisted greatly by arranging for planes and airport facilities. County agents secured participants. At the site of the tour I told how to get most for their $3.00, 50-mile trip.

Summary of Soil Conservation Air Tours 1951-55 Inclusive

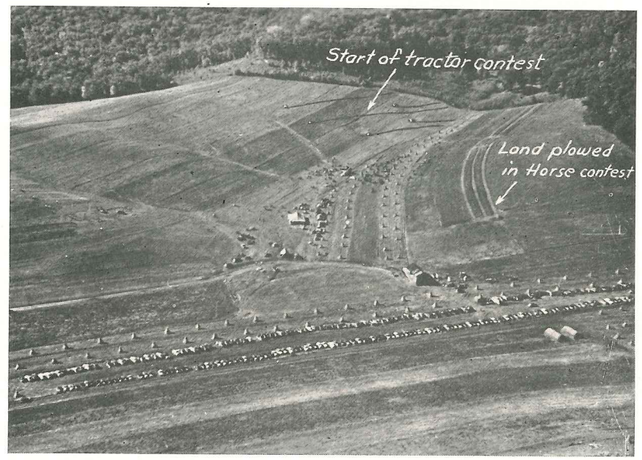
Year	No. of Tours Held	Estimated Attendance (Airport Briefing)	Number Participants
1950	1 (Test Tour)	60	46
1951	13	1,445	1,076
1952	27	1,950	1,554
1953	17	1,400	1,135
1954	10	750	571
1955	11	800	640
TOTALS	79	6,405	5,022

In July 1945-48, A. J. Wojta worked as Assistant Extension Soil Conservationist. His activities partly paralled mine. Largely he organized and carried out the machinery features at field days. From July 1948 to July 1953, Wojta did research in farm machinery for soil conservation. In July 1953, Wojta resumed work first as assistant and then as Extension Soil Conservationist where he served well until his untimely death in 1960.

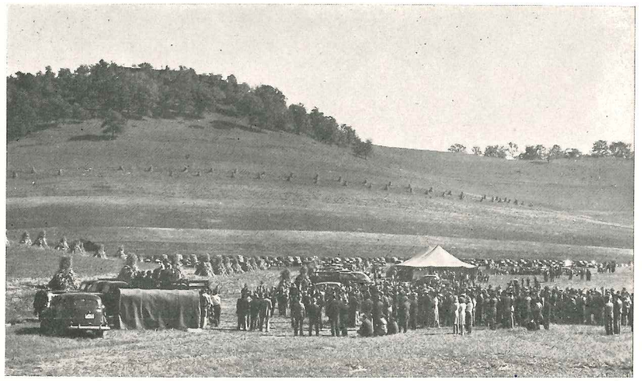
To improve farm machinery handling on terraces on the Spencer soils, Mr. Wojta introduced broad V-shaped, across-the-slope channels in place of the channel and ridge combination of the standard terrace. Such channels require less maintenance than ordinary terraces. By thus breaking up long slopes and leveling the land between them, a system of these channels improves drainage and also protects the soil against erosion. The waste from the channels is used to fill depressions. On January 30, 1961 L. R. Massie took over as successor to A. J. Wojta.

Field Demonstrations

In 1941 we promoted a contour plowing contest and invited interested states to participate so that this might be considered a national contest. Organization for the final event was as follows: Four elimination contests were held at Eau Claire, Alma, Viroqua and Mt. Horeb. The two highest-scoring contestants were selected to be Wisconsin's representatives at the event advertised as open to



Aerial view of first national contour plowing contest.



Headquarters of first national contour plowing contest.

Field days stage a spectacle of machinery operation and attract large crowds. Properly planned and operated, they demonstrate improved practices. Several types of field days have been used to promote soil conservation.

Feature demonstrations in 1946-47 were regional grassland field days attended by an estimated 100,000 people. They took up improved methods of harvesting and preserving meadow crops. They emphasized the role of forages in soil conservation. They also advocated using methods that insure good quality.

F. V. Burcalow served as general chairman of the committee for these field days. A. J. Wojta was chairman of the Field Day Committee responsible for staging the machinery demonstrations. Many other extension specialists and agricultural college personnel contributed. The emphasis of the grassland program was on quality of forage.

The field days have developed into annual events and are named Wisconsin Farm Progress Days. They feature timely developments in the broad field, but generally some phase of soil conservation.

Coon Valley Project

In October of 1933, Congress appropriated $5,000,000 to be administered by the Department of Interior for soil erosion control work. Dr. H. H. Bennett was transferred from the Department of Agriculture to the Interior Department to head the administration. Bennett drafted the superintendents and other members of the technical staffs of the cooperative erosion experiment stations including the station near La Crosse. These men directed this work.

Under this policy, Bennett wired R. H. Davis, superintendent of the La Crosse Erosion Experiment Station, to ask Wisconsin College of Agriculture for ideas as to how this money could be used wisely. Noble Clark, Associate Director of Research, E. R. Jones, Chairman of Agricultural Engineering Department, Aldo Leopold, Chairman Wildlife Department, and myself formulated the plan for watershed projects which finally evolved in the Coon Valley project.

This report was the most complete received in Washington from any state. It appeared most practical to Bennett. He asked R. H. Davis to bring the men responsible for it to his office in Washington, there to write up the project in detail. Professors Clark and Leopold accompanied Davis to Washington and with Bennett wrote up the *"Tentative Program for the Control of Erosion on the Watershed of Coon Creek in Southwest Wisconsin, Upper Mississippi Valley Region."*

As a token of appreciation, Bennett designated Coon Valley as Project No. 1 in the United States although other applications had

come to him earlier. The following points from this tentative project were the basis of work in the Coon Creek Watershed.

"It is proposed on each sample area:

"(1) to map the farm, and draw up plans for reorganization of the lay-out with each acre devoted to crops it can produce without causing serious soil loss;

"(2) adjust land-use practices in accord with existing facilities for utilizing the products, such as livestock, without disturbing unduly the local economic mechanism.

"(3) to install certain improvements such as dams, strip cropping, terracing, and planting trees and other vegetation.

"(4) to erect fences to protect areas devoted to forests and pasture, to conform to the new lay-out.

"(5) to contract with the owner for putting into use specified erosion control practices, which he agreed to maintain for five years in return for compensating aid offered by the Government.

"Jobs 1, 2 and 5 would be accomplished by specialists operating under a Regional Director.

"Jobs 3 and 4 require labor, transportation and materials, and are a proper Public Works Project. By assigning several C.C.C. Camps to the work the cash cost of the plan could be reduced.

"This plan will (a) control erosion; (b) minimize the flood hazards; (c) reduce the acreage of crop land in line with the A.A.A. program; (d) increase game cover and food; (e) increase the acreage and quality of timber.

It is recognized that fundamental changes in land use must be made. Present methods have been largely responsible for the present destructive erosion. Erosion took place here before the farming began, but was not as destructive when compared with the present situation. The plan for the Coon Creek watershed was generally followed in the other Upper Mississippi Valley projects.

The following quotation from the project report after 5 years of operation is a fair evaluation of accomplishments by this method of Government assistance.

"On January 1, 1939, 351 of the 800 farms in the project were under active agreements, 67 being cancelled with a change of ownership. Of these 351 cooperators, 255 were classed as good and 96 as poor.

"The increased alfalfa production resulted in more valuable feed materials from the same or smaller acreage. From 1933 to 1939 the acreage of erosion-resistant crops was increased from 42.4% to 56.6% of the total cropland. The semi-erosion resisting acreage was decreased from 41.4% to 25.4% while the percentage of clean-tilled was unchanged."

The Wisconsin Soil Conservation Committee has employed a staff to carry out its responsibilities as an agency of state government charged with specific responsibilities under Chapter 92 of the Wisconsin statutes and the acts leading to this and amendments thereto.

The Present Staff

The present staff of the committee includes:

R. M. DeMuth is an Administrative Assistant, serving since December 27, 1937.

N. O. Stephenson was the first fieldman employed by the committee. He was employed April 1, 1940 as an Erosion Control Agent. His title is now Conservation Education Specialist, serving 24 counties in northern Wisconsin with headquarters at Washburn.

Record of Membership of State Committee

Name of Member	Period of Service: Date Begun	Date Ended	Years Service	Special Duties	Successor to	How Terminated
Prof. Noble Clark	7/3/37	9/6/50	13	Chairman 12/14/37 12/14/37		Other duties Expanded
Prof. Warren Clark	7/3/37	7/19/52	15	Chairman		Retired from Staff
George Nygaard	12/14/37	7/23/60	23			Retired
Paul Weis	12/14/37	8/1/49	12			Other appointment
Mamre H. Ward	9/13/39	11/21/50	11	Chairman	New	Elected to State Assembly
Orrie Shiffer	8/10/49	8/29/58	9		P. Weis	Died
Prof. R. Muckenhirn	10/24/50	Continuing			N. Clark	
Harry Schuyler	4/6/51	3/1/60	9		M. Ward	Retired
Prof. H. L. Ahlgren	9/29/52	Continuing		Chairman	W. Clark	
Foster Patch	12/11/57	Continuing			New	
Lester Voigt	7/1/57	Continuing			New	
Watford Seguin	9/29/58	9/1/61	3		O. Shiffer	Retired
Perry Overlien	1/12/60	9/1/61	1½		H. Schuyler	Resigned
Stewart Huber	7/25/60	Continuing			G. Nygaard	
Byron Berg	7/26/61	Continuing			P. Overlien	
Carroll Carhart	7/26/61	Continuing			W. Seguin	

E. O. Baker was employed as an Erosion Control Agent with the committee on July 1, 1941. He is presently employed as a Conservation Education Specialist, serving 23 counties in southwest Wisconsin with headquarters at Eau Claire.

D. W. Niendorf was employed as an Erosion Control Agent on April 27, 1942. He is presently serving the committee as Conservation Education Specialist in the southeast area of the state with headquarters at Manitowoc. He serves 24 counties in this area.

I. O. Hembre was appointed by the State Committee as a Conservation Education Leader on December 1, 1947. He was elected Executive Secretary of the committee on February 6, 1954. On September 22, 1961, the committee named him Project Leader in Soil and Water Conservation to direct and coordinate the educational services of the State Committee staff.

G. J. Barber was employed by the State Committee as a Watershed Engineer on March 1, 1962, to assist in the watershed development programs sponsored by the State Committee.

Other staff members have been employed by the committee to render needed services for varied periods of time.

Districts Organized

Under the 1937 law the following watershed districts were organized in two years. They automatically became included within county districts when the 1939 law became operative.

Beaver Creek (Trempealeau County) – October 8, 1938
Central Crawford (Crawford County) – October 19, 1938
Bostwick Valley (La Crosse County) – January 21, 1939
Upper Pigeon Creek (Trempealeau & Jackson counties) – January 18, 1939
Viola (Vernon & Richland counties) – January 21, 1939
Buffalo County No. 1 (Buffalo County) – February 20, 1939
Coon Creek (Monroe, Vernon & Richland counties) – April 10, 1939
Kinnickinnic (Pierce & St. Croix counties) – June 17, 1939
Pepin County – June 20, 1939
Dunn County – August 23, 1939

Following the enactment of the 1939 revised act, County Soil Conservation Districts were quickly developed in Wisconsin. In 1939, 5 districts were organized. The first one recorded by the State Soil Conservation Committee was La Crosse County on August 17, 1939, quickly folowed by Vernon, Crawford, St. Croix and Pepin.

In 1940 the following counties were organized: Trempealeau, Eau Claire, Buffalo, Jackson, Grant, Iowa, Dunn, Pierce, Dane, Monroe, Richland, Barron and Waushara; 1941 – Sauk, Polk, Chippewa, Clark, Marathon, Dodge and Wood; 1942 – Green, Juneau,

Fortunately in Wisconsin the Coon Valley Demonstration project, and the leadership in Wisconsin which had pioneered this outstanding endeavor, had much to give in helping to establish the pioneering districts. Many local people had personally seen soil and water conservation practices at work. The pioneer work of Professor O. R. Zeasman, and his personal devotion to this program gave Wisconsin a good background for the district program.

Some of the accomplishments of the period include:

1. The organization of 48 county soil and water conservation districts, with approved programs of work developed in cooperation with cooperating agencies and the assignment of technical assistance to them by the Federal Soil Conservation Service.

2. Progress in establishing the concept that soil erosion is not limited to steep hills, although it is more spectacular there. Gully erosion is destroying level river terrace land. Different plans are needed as solutions for different situations. A survey sponsored by the State Committee in cooperation with the Wisconsin Experiment Station in 1941 indicated that more than 7,000,000 acres of Wisconsin land already had lost one plow depth of top soil or more.

3. Demonstrations and research have indicated that soil conservation can pay dividends promptly to the man who employs it. It's benefits are immediate and not only for posterity.

4. The district programs demonstrate that soil conservation means water conservation, and that best use of all natural resources are considered in a farm conservation plan.

5. Wisconsin's leadership in being one of the first states to conduct contour plowing contests.

6. A recognition that the schools can play an important part in getting public acceptance of the soil and water conservation program, and in recruiting farmers to cooperate with their county soil conservation district.

1947-1954

The second period extends from 1947 through 1954. The program of conservation work in the districts, and the minutes of the State Soil Conservation Committee reveal that this is a period of eight years devoted largely to expanding, enriching, and speeding up the local soil conservation district programs.

This period marks the development of a State Association of Soil Conservation District Supervisors, with a program stimulating district supervisors to give major attention to the problems and activities of their districts, in close cooperation with the State Committee and its cooperating agencies, giving added vigor and vitality to the local district program.

This eight year period highlights the following educational activities and programs:

1. The State Committee is represented on the State Conservation Education Curriculum Committee sponsored by the State Department of Public Instruction.

2. County conservation teaching institutes are sponsored by the State Committee and cooperating agencies through county superintendent of schools offices.

3. County Soil and Water Conservation Districts with cooperating agencies promote county-wide conservation educational programs.

4. The State Soil and Water Conservation Committee in cooperation with the State Department of Public Instruction and cooperating agencies promote two-day teacher conservation education institutes in the 23 county colleges of the state.

5. Wisconsin hosts the National Contour Plowing Contest at Augusta in Eau Claire County in 1953.

6. In the summer of 1951 thirteen air tours are held in cooperation with 14 soil conservation districts under the leadership of O. R. Zeasman.

7. World War II Veteran Training programs in vocational agriculture include soil conservation in their courses. State Committee staff and cooperating agency personnel cooperate in conducting these classes.

8. Most of Wisconsin's counties have sponsored grassland programs and field days emphasizing soil conservation.

1955-1963

1955 marks the beginning of the third period with emphasis on watershed development and total resource planning. The minutes of the State Committee reveal:

(1) Plans for research on the "Red Clay-Kewaunee soils" of northeast Wisconsin.
(2) Introduction of legislation designating the State Soil and Water Conservation Committee to have supervisory responsibility over programs provided by P. L. 566, 83rd Congress.
(3) Planning area supervisor workshops on watershed development and related resource use programs.
(4) State Committee participating in the Upper Mississippi Area meeting of the National Association of Soil Conservation Districts in Madison August 28-29, 1955.
(5) Application for planning assistance under P. L. 566 received from the Mill Creek Watershed in Richland County, and the Cross Plains-Black Earth Watershed in Dane County.

(6) "Task Forces" representing cooperating agencies are appointed to review watershed applications for planning under P. L. 566 and report their findings to the State Committee.

This is the beginning of a period of intense interest and much participation on the part of Soil and Water Conservation Districts in Wisconsin in total resource development and conservation.

Watershed Development – Public Law 566

Seventeen counties have been greatly involved in the 83rd Congress Public Law 566 Watershed Protection and Flood Prevention program. The interest and support of local people in watershed development, and the dedication of soil and water conservation district supervisors to this program, supported by an excellent teamwork of cooperating agencies, is a great compliment to the success of the soil and water conservation district program of work in the state.

The following 33 watershed applications, with nearly 2,000,000 acres, have been approved and are in various stages of development.

1. Mill Creek Watershed, Richland County – 39,096 acres
2. Lost Creek Watershed, Pepin County – 5,189 acres
3. Alma-Mill Creek Watershed, Buffalo County – 10,957 acres
4. Coon Creek Watershed, La Crosse, Monroe & Vernon Counties – 92,589 acres
5. Bogus Creek Watershed, Pepin County – 7,576 acres
6. Bad Axe Watershed, Vernon County – 132,000 acres
7. South Nelson Watershed, Buffalo County – 9,406 acres
8. Bay City Watershed, Pierce County – 5,826 acres
9. Trout Run Watershed, Jackson County – 11,273 acres
10. Twin Parks Watershed, Iowa County – 78,620 acres
11. West Fork of Kickapoo Watershed, Monroe & Vernon Counties – 64,170 acres
12. Garden Valley Watershed (Rose Valley) Buffalo County – 18,494 acres
13. Plum Creek Watershed, Pierce & Pepin Counties – 88,500 acres
14. Black Earth-Cross Plains Watershed, Dane County – 30,365 acres
15. Blackhawk-Kickapoo Watershed, Crawford & Vernon Counties – 67,571 acres
16. State Road-Ebner Coulee Watershed, La Crosse County – 4,330 acres
17. Glen Hills Watershed, Dunn and St. Croix Counties – 22,800 acres
18. Plain-Honey Creek Watershed, Sauk County – 45,500 acres
19. Shake Hollow Watershed, Jackson – 60,100 acres
20. Knights Creek Watershed, Dunn County – 23,850 acres

21. Crooked Creek Watershed, Grant County – 11,750 acres
22. Tri-Creek Watershed, Monroe County – 28,900 acres
23. Upper Kickapoo Watershed, Monroe County – 40,771 acres
24. Bear Creek Watershed, Buffalo & Pepin Counties – 38,500 acres
25. Diamond Valley-Hay Creek, Eau Claire County – 11,131 acres
26. Knapp's Creek Watershed, Crawford & Richland Counties – 89,284 acres
27. Misha Mokwa Watershed, Buffalo County – 47,405 acres
28. Otter Creek Watershed, Iowa County – 135,800 acres
29. Sherman Creek Watershed, Eau Claire County – 16,367 acres
30. Willow Creek Watershed, Richland & Sauk Counties – 55,800 acres
31. Sanders Creek Watershed, Grant County – 11,289 acres
32. Kickapoo Chief Watershed, Monroe & Vernon Counties – 93,442 acres
33. Pine River Watershed, Richland & Vernon Counties – 148,889 acres

The total acreage included in these projects is 1,547,540 acres and 18 counties are participating. This good beginning in the total job of watershed management for southwest Wisconsin will help to put this land under good soil and water conservation practices.

The State Soil and Water Conservation Committee has supervisory responsibility over this program. The Federal Soil Conservation Service provides the leadership in the technical services. Through a Six-Agency Watershed Agreement, excellent cooperation and participation has been received from all state and federal conservation agencies. To date the following has been accomplished in 12 watersheds which are nearing completion. The cost sharing revealed here is very interesting.

Public Law 566 Watersheds

Name & Size	Location (Co. SWCD)	Estimated Federal installation costs	Estimated Local District Costs		
			Installation & Construction	Land Treatment	Total Local Costs
1. Lost Creek 5,189 ac.	Pepin	$111,448	$14,075	$4,595	$18,670
2. Mill Creek 39,096 ac.	Richland	216,597	30,390	40,882	71,272
3. Coon Creek 92,589 ac.	La Crosse Monroe Vernon	682,001	26,116	278,794	304,910
4. Alma-Mill Creek 10,957 ac.	Buffalo	199,713	3,300	55,808	59,108
5. Bogus Creek 7,576 ac.	Pepin	89,656	3,000	46,995	49,995

6. Bad Axe 132,000 ac.	Vernon	761,552	65,129	307,116	372,245
7. Bay City 5,826 ac.	Pierce	170,773	13,355	27,470	40,825
8. South Nelson 9,406 ac.	Buffalo	103,607	1,050	49,422	50,472
9. Trout Run 11,273 ac.	Jackson	165,750	2,475	44,754	47,229
10. Twin Parks 78,620 ac.	Iowa	376,008	198,668	208,408	407,076
11. W. Fork Kickapoo 64,170 ac.	Monroe Vernon	106,229	102,264	84,594	186,858
12. Garden Valley (Rose) 18,494 ac.	Buffalo	58,300	900	87,552	88,452

Total federal Cost $3,041,094 Total Local Cost $1,679,112

You will note the Federal government under the Small Watershed Act (PL 566) has allocated $3,041,094 to the first 12 projects in Wisconsin. The County Soil and Water Conservation Districts have supported these projects to the extent of $1,697,112. Local Soil and Water Conservation Districts assume the responsibility for maintaining and operating these watershed installations. The State Committee and its staff has provided educational, supervisory and planning leadership in this program in cooperation with other agencies.

The State Soil and Water Conservation Committee has supervision over the allocation of funds provided under Sec. 20.750 (41) of Chapter 427, Laws of 1961, "Wisconsin Recreation Act," for the creation of lakes in Public Law 566 projects. Under this program the committee has received $90,000 biennially and has approved such projects in the Coon Creek Watershed of La Crosse, Vernon and Monroe counties; the Bad Axe Watershed of Vernon county; and the Twin Parks Watershed in Iowa county.

In December 1961 the committee approved a memorandum of understanding between itself and the State Superintendent of Public Instruction, Angus Rothwell, making the technical services of the committee field staff available to elementary and secondary school administrators, supervisors and teachers in the development of the conservation education program offered in the schools, with an expression of appreciation to the state superintendent for this opportunity to assist in the advancement of conservation education in the schools of the state.

In December 1962 the committee received an application for assistance from the Little St. Germain Lake Watershed in the Vilas County Soil and Water Conservation District suggesting that the Little St. Germain Lake Watershed be made a pilot project for special study of the management of the lake watershed and its inter-

related natural resource problems. The application was referred to a task force of cooperating agencies for review and recommendations.

In December 1962 the committee approved the cooperation of the committee through the participation of its field staff in the Southeastern Regional Planning Commission, the Wolf River Basin Regional Planning Commission, the Northwest Regional Planning Commission, the Brown County-Green Bay Planning Commission, and the Fox River Valley Regional Planning Commission.

Soil and Water Conservation Needs

The soil and water conservation needs inventory for Wisconsin was developed as a part of the National Inventory of Soil and Water Conservation Needs established by the Secretary of Agriculture.

The inventory was supervised by a State Conservation Needs Committee and developed on a county basis in cooperation with the local soil and water conservation district supervisors and their cooperating agencies.

The Soil Conservation Service was designated by the Department of Agriculture to provide the leadership in making the inventory.

The inventory is expected to provide an appropriate guide for each county's soil and water conservation activities.

The following table provides an estimate of expected land use in Wisconsin by 1975 and the land use shifts which will take place.

Land Group	1958 Acreage	1975 Acreage
1. Cropland	12,470,822	12,016,147
2. Pasture and Range	3,211,607	2,791,968
3. Forest and Woodland	13,917,421	13,944,629
4. Other Land	2,011,083	2,014,387
Net change in land use		843,802
Total	31,610,933	31,610,933

Accomplishments on the Land for this period December 7, 1937 to December 31, 1962 shows the following:

71 districts covering 35,017,600 acres including 131,215 farms

District Cooperator 41,041

Basic Conservation Plans 27,670

Soil Surveys .....15,052,499 acres

Contour Strip Cropping	1,069,013	acres
Terraces	3,885	miles
Diversions	2,370	miles
Land Smoothing	14,369	acres
Tile Drains	6,520	miles
Pasture and Hayland Renovation	349,815	avfes
Tree Planting	151,251	acres
Windbreaks	4,496	acres
Wildlife Wetland Development	18,006	acres
Grade Stabilization Structures	2,330	
Farm Ponds	1,861	
Hedgerow Planting	711	miles
Pilot Watershed Floodwater Retarding Structures	2	
PL 566 Projects:		
Work Plans	11	
Flood Retarding Structures	15	
Grade Stabilization Structures	10	
Channel Improvements	1	

Wisconsin has made good progress in its soil and water conservation program in its 25 years of district operation. But in reality the job has just begun. With satellites bringing us weather information from around the world and men venturing into outer space, it is difficult for many Americans to think that our future depends on a wise and sustaining use of our natural resources.

Our goal is to see that everyone understands that when the land is adequately protected and well-managed, the results are fewer floods, less damage to agricultural land and towns, reduced costs of highway construction and maintenance, and less siltation of creeks, lakes and rivers.

We are all concerned – the man in the city as well as the man on the land. Today four out of 10 jobs off the farm are related to the agricultural use of land. The conservation of natural resources helps insure adequate food and clothing at reasonable prices. It means business to the merchant and raw materials to the manufacturer.

Publicity Helps Control Soil Erosion

All general information methods, including field demonstrations of practices with cooperating educational and technical agencies have been used to disseminate information on erosion control. These include farmers meetings, news articles, radio, TV, mimeographed material and formal publications. These have helped develop the public's appreciation of the seriousness of the forces and problems involved. More formal presentation was by the widely-distributed bulletins and circulars listed below, many of which are permanently out of print.

Number and Name	*Authors*	*Date of Publication*
Bulletin No. 42, *Destructive effects of Winds on Sandy Soils and Light Sandy Loams, with Methods of Protection*	F. H. King	October 1894
Bulletin No. 272 – *Keep our Hillsides From Washing*	A. R. Whitson & T. J. Dunnewald	August 1916
Research Bulletin No. 99 – *Soil Erosion A Local and National Problem*	C. G. Bates & O. R. Zeasman	August 1930
Circular No. 249 – *Control Soil Erosion by Crops, Terraces and Dams*	O. R. Zeasman	December 1931
Research Bulletin No. 122 – *Erosion Control Structures – Drop Inlets and Spillways*	L. H. Kessler	June 1934
Circular No. 290 – *Soil Conservation Districts*	Coll. of Agric. & State Soil Cons. Comm.	August 1938
Special Bulletin – *Soil Erosion Survey of Wisconsin*	R. J. Muckenhirn O. R. Zeasman	February 1941
Circular No. 317 – *Strip Cropping to Control Erosion*	O. R. Zeasman	March 1941
Circular No. 320 – *Grass Waterways Control and Prevent Gullies*	O. R. Zeasman	August 1941
Circular No. 360 – *We Can All Help Save Our Soil*	O. R. Zeasman & J. W. Clark	June 1945
Why Should I be Interested in Soil Conservation?		May 1947
Wisconsin Soil Erosion Problems and Solutions	H. B. Atkinson & Orville Hays	June 1951 revised June 1954
Circular No. 613 – *Let's Stop Soil Erosion*	O. R. Zeasman L. R. Massie & A. E. Peterson	May 1962
Soil Erosion in Wisconsin	Noble Clark	Article in 1940 Wis. Blue Book
Special Bulletin – *Soil Conservation (A Teacher's Guide)*	I. O. Hembre	June 1949
Special Circular – *A Tour Guide (Soil Conservation Stations)*	R. E. Taylor O. E. Hays	June 1951
Special Bulletin – *Soil Conservation Builds Food Producing Power*	B. F. Rusy	Dec. 1952
Circular No. 375 – *Plants Link Soil and People*	H. L. Ahlgren J. W. Clark	June 1960
Special Leaflet – *Planning & Developing Community Watershed in Wis.*	State Soil Cons. Comm & Coll. of Agric.	June 1961

Special Bulletin — *How Good is Your Land*	I. O. Hembre D. C. Aebischer F. D. Hole M. T. Beatty	April 1961
Special Bulletin — *Legislation for Soil Cons. Dist. Supervisors*	C. Howard J. Beuscher	July 1960
Special Bulletin — *Land Planning Principles For Land Use in Wis.*	State Soil Cons. Comm & Coll. of Agric.	April 1962
Special Leaflet — *Wisconsin Watershed Development*	State Soil & Water Cons. Comm.	June 1962
Special Circular — *Putting Soil and Water Conservation to Work*	I. O. Hembre	October 1962