

# Heppner office monitors erosion

The Heppner office of the Soil Conservation Service is monitoring water erosion on several farms in Morrow County. Specifically of interest is the value of crop residue for protection against water erosion. Farms with significantly contrasting amounts of residue have been selected for this study. Preliminary site work has concentrated on measuring initial residue cover and on making field observations. Our documentation includes the presence or absence of structural conservation practices and measuring Universal Soil Loss Equation parameters. In addition, farmer's records of tillage operations, fertilizer and herbicides applied, seeding and yield are being recorded. This information will be used in a crop budget computer program to estimate and display the shortrun annual onsite costs of farming. These costs can then be related to soil conservation practices. For example, maintaining additional residue cover may decrease equipment costs, but increase herbicide costs. This changes the cost per acre of producing grain. The computer program estimates these costs and can derive the cost per ton reduction of soil erosion, depending on the conservation practice(s) selected.

Currently, the selected monitoring sites are being observed for erosion and photographic records of erosion events are being kept. Residue cover near 300 lbs. per acre has not shown to provide adequate protection against water erosion. At least 1,000 lbs. per acre of crop residue is recommended at seeding time. Every tillage operation reduces residue cover and destroys soil structure. A pulverized soil with low residue cover is obviously conducive to erosion. Observations so far indicate that this type of soil condition tends to freeze very densely. This is probably strongly influenced by a lack of pore space and by the limited residue incorporated in the top few inches of the soil. Furthermore, this soil thaws slowly, leaving a layer of saturated soil on top of dense, impenetrable frozen soil below. Snow melt and/or rain on top of this soil quickly puddles drill furrows. Obviously, up-and-down slope farming encourages runoff in this situation.

In contrast, a soil with residue exceeding 1,000 lbs.

per acre at or near the soil surface has several advantages over the low residue condition described. Soils with higher residue cover have usually been tilled fewer times and this suggests less soil compaction, better infiltration and moisture holding capacity, and more effective ground insulation. Residue tends to improve soil tilth and create a mellow soil condition. Soils with high residue at or near the surface may tend to freeze less densely, and consequently thaw more rapidly with warm temperatures. As a

## Irrigation study initiated

As a result of the Morrow SWCD Natural Resource Conservation Program and the federal Resource Conservation Act, irrigation water management was identified as an area of need in Morrow County.

The problems originally identified in the irrigation area were inadequate distribution systems, ground water overdraft, over irrigation, limited stream-flows, high water tables and a general lack of information on farm efficiencies which is often 50 percent or lower (many times 30 percent) compared to an ideal 70-80 percent.

## Runoff & soil data collected on Turner land

Runoff and soil erosion data is being collected in Morrow County on land farmed by Ken Turner in the Stingle Canyon area, five miles northeast of Heppner. It is one of six sites installed in northeastern Oregon and is part of the ongoing agricultural research program being conducted cooperatively by OSU and USDA-ARS at the Agricultural Experiment Station based in Pendleton. This specific project is in its third year of operation.

In two complete erosion seasons, 23 runoff and soil loss events have been observed. Fifteen of the 23 events (65 percent) involved frozen soils, 14 (61 percent) involved snowmelt and 12 events involved both Frozen soils, snowmelt, and high dewpoint temperatures have been the three key factors involved in large soil loss events. Rain or snow accelerated the loss when the other factors were present. This specific combination of climatic variables interacts with various soil related factors in producing runoff events. Data suggests that

result, moisture from snow melt or rainfall readily penetrates instead of puddling on the surface.

The next phase of our erosion monitoring will be to measure residue and soil moisture as spring tillage begins. We are interested to see the impact various reductions in residue have on soil moisture conservation. Hopefully, higher residue cover will show a significant improvement in moisture conservation, higher yields and reduced erosion.

crease the potential for soil erosion.

Further research is needed to document the effects of surface residue, canopy cover, surface roughness and tillage practices on soil erosion losses. Also documentation of the incidence and severity of soil frost is needed and the role residue management plays in this process.

## Knapweed, from page 1

Banvel. This recommended rate has proved effective in large scale application also. Banvel by itself is not effective. Tordon is too expensive unless multi-year residual effect occurs, but more study needs to be done concerning residual effect. Also, studies

sprayed with the recommended spray rate would require re-spraying the following year.

Timing of spraying is critical. The best time for spraying is when the first plants are in the bud stage. Only plants growing at the time of spray application, for instance in the spring, will be killed. Fall growing plants will not be effected. Cost of flying on the spray and the chemicals in 1981 was \$5.50 per acre.

If an infestation is spotted on your ranch, spraying would be advisable to prevent further spreading of the weed. Before knapweed does become a problem on your range, pay close attention to roadsides, disturbed areas and range encroachment of

To overcome some of these problems, the Soil Conservation Service has directed a special emphasis program into this area. The objective of the project is to increase onfarm efficiencies. This can be done by developing water management plans which account for system capabilities, soil water capacities, soil intake rates, crop needs, including allowable moisture stresses and rooting depths during various growth stages.

Coupled with economic considerations, the program will ultimately assist irrigators in making the best decision with the resources available.

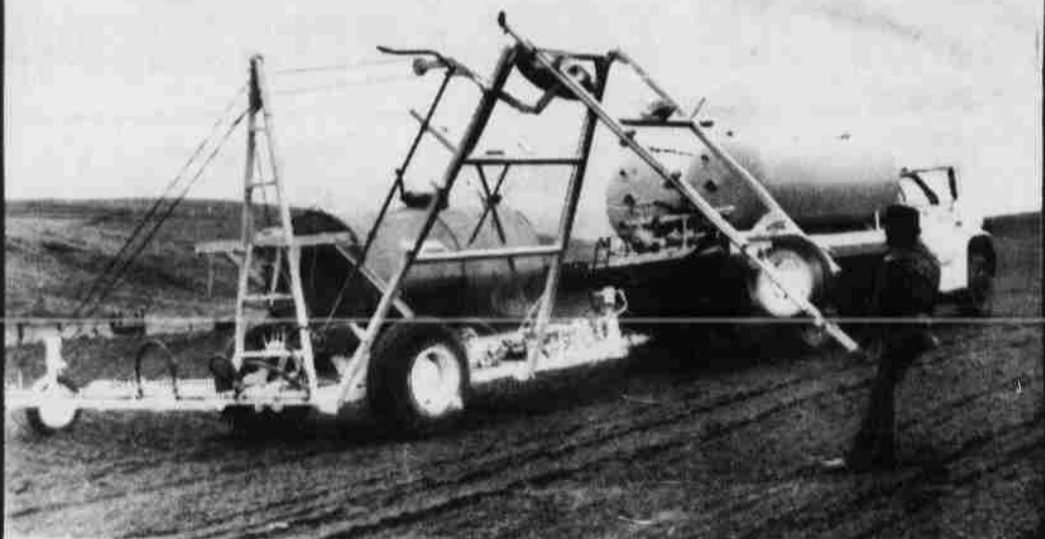
excessive soil compaction, resulting from seeding or reseeded when the soil moisture content is high, greatly increases the potential for large soil losses. Alternatively, high contents of surface residues and rough surface configurations greatly de-

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