downed World War II aircraft. **Insert**

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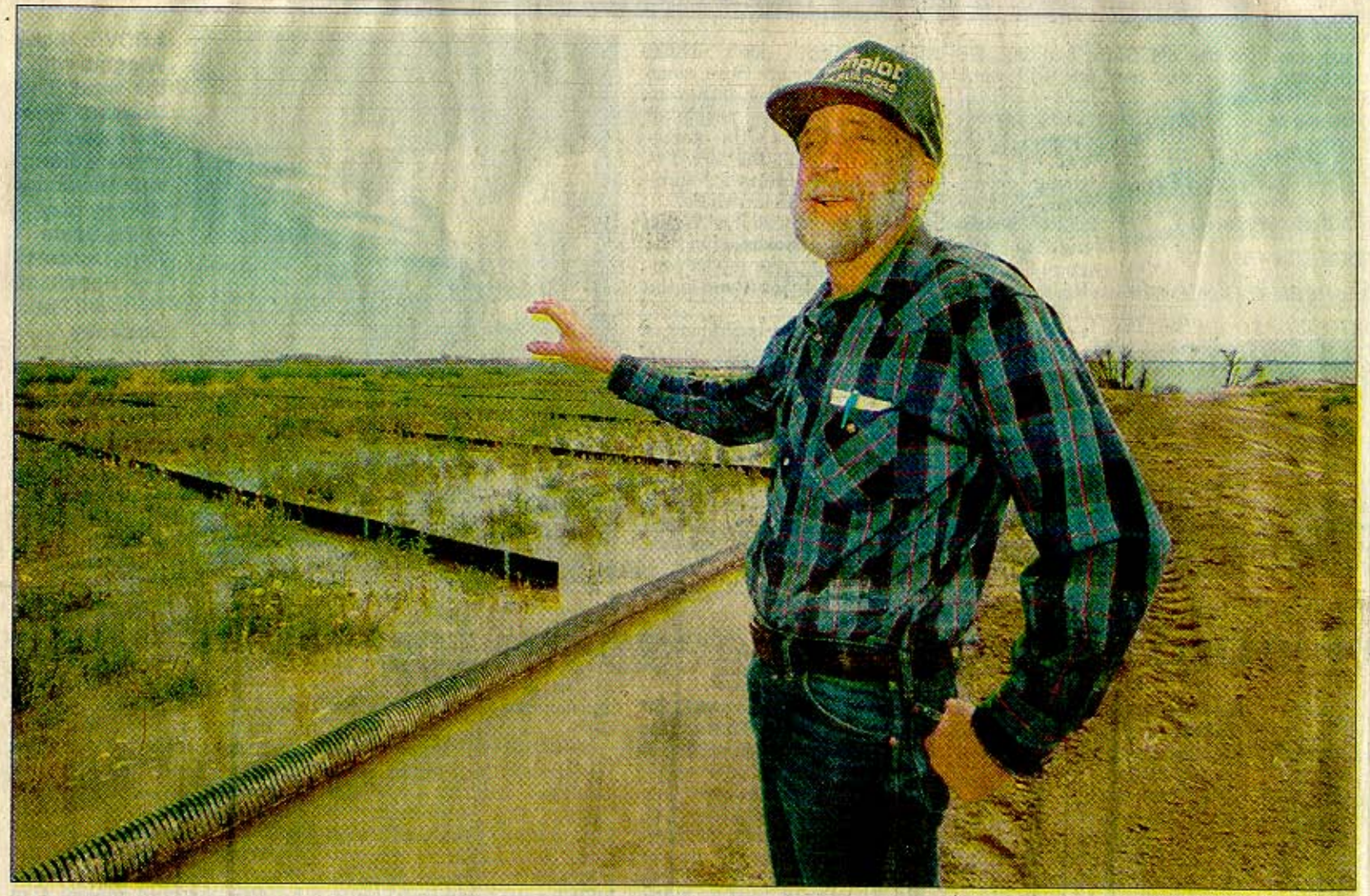
Farmland meets wetland



Journal photos by Doug Lindley

Farmer Neil Poulson stands near one of the waste water ponds that he made on his farm to test biological and construction

Wetland Plants

Wetland plants are able to filter contaminants out of polluted water. Together, with other natural filters, like sand and certain types of bacteria, wetland plants can turn polluted agricultural runoff into clean water ready for discharge into rivers, streams and lakes. Some important wetland plants include:

Nebraska Sedge

"The most amazing thing about this plant is the root system," said Chris Hoag, a wetland plant biologist. The roots extend six to eight feet below ground, often attaining densities up to 115 feet of roots per cubic inch of soil. Leaves range in color from green to blue. Flowers May to August and provides food for waterfowl, upland game birds, muskrats, geese, small mammals and livestock and other grazers.

Baltic Rush

Adapted to live in a drier environment, Baltic rush can survive water tables more then nine feet below the surface. This plant attains root densities of 90 feet per cubic inch. It also provides food for a variety of animals, but its appeal as food peaks in spring and declines as summer progresses.

Common Threesquare

A medium-sized, upright perennial, this plant reaches heights of six to 40 inches. Its seeds and roots provide food for muskrats,

Journal photos by Doug Lindley

Farmer Neil Poulson stands near one of the waste water ponds that he made on his farm to test biological and construction techniques for handling waste water from his fields in the South Pleasant Valley area.

One farmer home tests irrigation innovations

By Anne Minard
Journal Staff Writer

From Neil Poulson's home, you can see a horizon lined with mountains through haystacks and grain bins.

His looks like many farms in southeast Idaho. But Poulson's farm is different. Under the constant vigilance of the still-snow-capped Bannock Peak, he's growing bulrush and cattails next to alfalfa and wheat seed.

On a road that barely passes for a dirt path, one can parallel a ditch irrigation system to traverse 160 acres of fields in various stages of growth. The road also leads to a pollution-minimizing wetland project that — if it works — could dramatically change the face of irrigated farming in Idaho and all over the arid West.

The system Poulson and his friends and partners are developing would prevent contaminated runoff from entering and polluting waterways.

Since he graduated from the University of Idaho in 1963, the agronomy (with engineering) major has farmed. He's also contracted to do scientific research projects on his property.

But it wasn't until the day Poulson and his neighbor Chris Hoag, a wetland plant ecologist with the United States Department of Agriculture, were relaxing near a gully leading to the American Falls Reservoir that they were struck with a novel idea.

"We were sitting on a ditch bank and Chris says, 'You know? That would be a great place for a wetland,'" Poulson says.

That was in 1991. The upstart wetland ran out of funding within a few years. But in 1995, Poulson renewed his interest and the pro-

See **WETLAND**, A5 ▶

Farmer Neil Poulson uses heavy earthmoving machinery to make waste water ponds.

Photo courtesy Neil Poulson

TOUR THE WETLAND

Neil Poulson and Chris Hoag frequently take interested parties on summertime tours of the Fairview Wetland. For more information, contact the project Internet site at www.isu.edu/departments/wetland. (Poulson warns that the site, along with the wetland, is still under construction.)

water tables more then nine feet below the surface. This plant attains root densities of 90 feet per cubic inch. It also provides food for a variety of animals, but its appeal as food peaks in spring and declines as summer progresses.

Common Threesquare

A medium-sized, upright perennial, this plant reaches heights of six to 40 inches. Its seeds and roots provide food for muskrats, geese and other waterfowl. Grazers will use early growth, but appeal as food and production of edible shoots is low.

Hardstem Bulrush

Normally found in water 12 to 18 inches deep, this adaptable plant can withstand temporary depths of up to eight feet. Tall and stout, it can grow to be nine feet tall. Its seeds and roots feed waterfowl, upland game birds, songbirds, beaver and muskrats.

Cattails

A very common perennial that can reach six-foot heights. It flowers June through August with easily recognized brown spikes that frequently adorn marshes and pond edges.

Source: Interagency Riparian Wetland Project

Journal graphic by Eric Laing

Wetland

▶ Continued from A1

ject took off.

He designed and engineered the aptly named Fairview Wetland, and then set to work with his own farm machinery to dig the ponds. Hoag provided the biological expertise from a long-time career in wetland creation.

Poulson's neighbor-style approach to gathering funds earned partnerships with the university, Simplot Soilbuilders, the federal Bureau of Reclamation, the Idaho Wheat Commission and others to construct and research the wetland. Poulson also works closely with researchers at Idaho State University, where he's become an affiliate faculty member and is taking graduate classes in environmental engineering.

The project is nearly in full swing. It starts with a sedimentation pond, which collects sand and silt. Such ponds are a must, Poulson says, for any conservation-minded farmer, and they aren't uncommon in Idaho.

From there, the project gets more original.

The water next moves through a pipe to the primary filter, a shallow, meadow-like bed containing eight sections of specialized wetland plants. The water is only an inch or two deep and flows through in a way similar to the way water would move over a pasture, Poulson says. The plants — sedges and rushes — help to remove nitrogen, fine sediments and some phosphate.

Journal photos by Doug Lindley

A spray rig delivers a load on Poulson's field near the waste water ponds. The ponds are used to eliminate chemicals from field runoff.

The water then flows through shallow wetlands. About a foot deep, this phase hosts cattails and bulrushes to remove more nutrients and fine sediment. It remains to be seen, Poulson says, whether both the primary filter and the shallow wetlands will be necessary on all farms, or whether one or the other will best serve different types of farms.

Next is a pond averaging about five feet in depth. Most of the vegetation will be floating, such as the small, tough duckweed. Hoag plans to also construct floating mechanical rafts to house other types of plants. "Chris has high hopes that part will remove phosphate from the water," Poulson says.

A final filter will finish the job with a mixture of plants and water depths to mimic a natural system, Poulson says.

Though most grow naturally in southern Idaho, Hoag chose plants that can live as far away as Oregon, Nevada, Utah and northern California. The idea is that the wetland could be implemented throughout the region.

Chris Hoag, a USDA national resource conservationist, checks some of the flora planted to help clean up farm waste water.

Poulson expects the experimental part of the project will be fun. He'll practice "sloppy farming techniques," he says, allowing chemicals to spill on some sections of the farm to monitor their progress through the wetland. He'll also allow his small cattle herd to trample some parts of his drainage system.

"That's all part of the research," he says.

Poulson and Hoag hope the technology could be applied to both agricultural and dairy farms.

Once the project is complete he wetland could become state-of-the-art for farming.

That means it could end up a requirement, under federal and state regulations, for many industries that mandate "Best Management Practices," the best available means of protecting the environment.

Poulson and Hoag have spent in the ballpark of $100 million in grants and labor to get the project started. They anticipate that once all the bugs are worked out, they'll have several sets of plans to meet the needs of different farms.

The USDA established a patent for the wetland in advance of its completion. That means there won't be any royalties for its creators — and the public will have free access to the technology.

Poulson puts the potential cost for an individual farm to build a wetland at $10,000 to $20,000. But if it's successful, cost-share programs and grants will be likely to defray expenses.

Anne Minard covers science and the environment for the Journal. She can be reached at 239-3168 or by e-mail at aminard@journalnet.com.