

CREATING MULTIPLE PURPOSE WETLANDS TO ENHANCE
LIVESTOCK GRAZING DISTRIBUTION, RANGE CONDITION
AND WATERFOWL PRODUCTION IN WESTERN SOUTH DAKOTA

K.J. Forman¹
M.J. Hogan³

C.R. Madsen²

ABSTRACT

Creating multiple purpose wetlands on large unfragmented tracts of western grasslands affords a unique opportunity to serve both ranching and wildlife interests by simultaneously enhancing livestock performance, range condition, and waterfowl production. While surface water developments on western grasslands have long been recognized as an effective technique for improving grazing distribution, more recent data suggest that such developments also have high potential for waterfowl production. Dabbling duck productivity rates per surface acre of water in these systems are often 2-4 times higher than in more traditional habitats of the Prairie Pothole Region where waterfowl managers have traditionally focused their efforts. Throughout the Prairie Pothole Region dabbling duck recruitment appears to be severely limited by the combined influences of nesting habitat fragmentation and artificially high predator densities supported by anthropogenic landscape changes. Conversely, western grasslands are characterized by relatively large tracts of nesting cover, low density predator communities, and as a result, high duck productivity when adequate surface water is available.

Recognizing the multiple benefits of created wetlands, beginning in 1992 the U.S. Fish and Wildlife Service initiated a unique statewide partnership in South Dakota to create multiple purpose wetlands on private and tribal grasslands. Emphasis was placed on creating multiple purpose wetlands on large unfragmented tracts of grassland, including for the first time, sites outside of the traditional Prairie Pothole Region. Primary partners in this program include the North American Wetlands Conservation Council, Ducks Unlimited

¹Biological Technician, U.S. Fish and Wildlife Service, Brookings Wildlife Habitat Office, P.O. Box 247, Brookings, SD 57006.

²Private Lands Coordinator, U.S. Fish and Wildlife Service, Brookings Wildlife Habitat Office, P.O. Box 247, Brookings, SD 57006.

³Refuge Operations Specialist, U.S. Fish and Wildlife Service, Brookings Wildlife Habitat Office, P.O. Box 247, Brookings, SD 57006.

Incorporated, Native American Tribes, the South Dakota Association of Conservation Districts, the South Dakota Department of Game, Fish and Parks, county Conservation Districts and individual landowners. Through this partnership over 450 wetlands have been created, with 30% occurring on western grasslands outside of the Prairie Pothole Region.

As expected, tangible benefits noted from wetlands created through this partnership include improved grazing distribution and livestock performance, enhanced range condition and localized increases in waterfowl production. More importantly, as a result of this program many participating landowners have expressed a renewed enthusiasm for the intangible benefits of wildlife conservation. Interest in this program continues to grow providing an example of a true working partnership between agriculture and wildlife.

SURFACE WATER DEVELOPMENTS ON WESTERN GRASSLANDS: AN OLD TOOL FOR RANCHERS, A NEW OPPORTUNITY FOR DUCKS

Benefits to ranchers

Ranchers across the arid mixed-grass prairies have long utilized surface water developments for livestock watering needs. Bue et al. (1964) estimated that 260,000 such developments for livestock watering have been constructed in North Dakota, South Dakota, Montana and western Minnesota. Eng et al. (1979) described the three most common designs of livestock surface water developments: (1) pit reservoirs that are steep sided rectangular excavations, (2) retention reservoirs which are created by building earthen dams across natural waterways, and (3) pit-retention reservoirs which are a combination of pit and retention reservoir designs. All three designs are constructed to intercept groundwater runoff from the immediate watershed. In general, the retention and pit-retention designs are most commonly used in the western United States. In South Dakota, Ruwaldt et al. (1979) estimated there are over 88,000 retention and pit-retention reservoirs with over 80% occurring in the western portion of the state.

While surface water developments are often an essential prerequisite for any livestock production on arid grasslands, they also facilitate improved range condition and enhanced livestock performance. Holecheck et al. (1989) generally noted that inadequate water distribution is the primary cause of poor

livestock distribution and range utilization. Specifically, Valentine (1947) documented on a New Mexico range that forage production was most severely reduced within .8 km of watering sites. Poor distribution of water can also lead to reduced livestock performance. Holechek et al. (1989) generally noted that increased travel distance between available forage and water can influence livestock productivity. The importance of travel on cattle energy budgets was illustrated by Havstad and Malechek (1982) who showed that free ranging cattle expended 46% more energy than did cattle fed in stalls. With these factors in mind, it is readily apparent why ranchers across the western United States continue to view surface water developments as an essential tool for proper range management and optimal livestock performance.

Benefits to ducks

While ranching interests have long understood the utility of surface water developments for range management and livestock production, more recently waterfowl managers have noted that if located in the right landscapes these same developments may also present a very unique and much needed opportunity to enhance duck production. The opportunities for duck production on western surface water developments are best illustrated by current biological explanations for the severely limited duck production noted in more easterly breeding areas.

One hypothesis for declines in duck populations is that throughout much of the Prairie Pothole Region, which historically accounted for 50% of continental duck production (Smith et al. 1964), the combined influences of nesting habitat fragmentation and high predator densities, primarily mammals, are suppressing recruitment rates below levels suggested for population maintenance. Recent investigations of nest success, a primary determinant of recruitment rates (Cowardin and Johnson 1979), support this contention. Many studies in the Prairie Pothole Region are currently reporting Mayfield (1961) nest success rates below the 15% population maintenance threshold suggested by Cowardin et al. (1985) for mallards *Anas platyrhynchos* in central North Dakota. For example, Klett et al. (1988) summarized data from 1966-1984 for more than 15,000 nests found throughout the Prairie Pothole Region of North Dakota, South Dakota and Minnesota to calculate nest success for 50 unique combinations of species, year, and region. Nest success in 40 of the 50 data

combinations was below levels suggested for population maintenance and mammalian predation was the primary cause of nest failure in all habitats studied. More recent studies across the Prairie Pothole Region continue to document predation as a proximate cause of low nest success. Fleskes and Klass (1991) documented 11.9% nest success on an Iowa study area and attributed mammalian predation to 82% of the nest failures. Sargeant et al. (1995) noted a 5.6% average nest success and attributed 96% of nest failures to predation on 12 study areas in North Dakota and Minnesota. Greenwood et al. (1987) estimated an average mallard nest success of 12.0% and attributed nearly 75% of nest failures to predation during 1982-1985 on 17 studies in Alberta, Saskatchewan, and Manitoba.

Working under the premise that fragmented nesting habitat and high predator densities suppress nest success and recruitment, certain waterfowl managers and researchers have begun to focus attention on regions where these suggested factors of decline are less prevalent. The mixed-grass prairies of western North Dakota, western South Dakota and eastern Montana exhibit many of the landscape scale features suggested for high nest success and recruitment. This region is characterized by large unfragmented blocks of nesting cover and relatively low predator densities. Although wetland densities in this region are very low relative to the Prairie Pothole Region, when adequate surface water is available, breeding pair densities and overall duck productivity rates per individual wetland can be high. Ball et al. (1995) used breeding pair/brood ratios to infer a dabbling duck nest success of 45-60% on large tracts of grassland across north-central Montana. This level of productivity is approximately 2-4 times higher than in most duck populations recently studied throughout the Prairie Pothole Region

Cowardin et al. (1995) forwarded two distinct techniques for waterfowl managers to enhance dabbling duck production; managers can either (1) attempt to raise recruitment rates in landscapes where they are inadequate to maintain stable populations or (2) increase carrying capacity and attract additional breeding pairs to landscapes that have high recruitment rates. Creating wetlands to attract additional breeding pairs to the mixed-grass prairies of western North Dakota, western South Dakota, and eastern Montana appears to constitute an encouraging opportunity for waterfowl managers to implement the latter technique.

A SOUTH DAKOTA CASE HISTORY: BRING TOGETHER
RANCHING AND WILDLIFE INTERESTS FOR WETLAND CREATIONS

It is apparent that ranchers and waterfowl managers have a mutual interest in securing funding mechanisms for surface water developments on western grasslands. Ranchers need livestock water and waterfowl managers need a workable technique to enhance duck production. Recognizing a unique opportunity to forge a working alliance between agricultural and wildlife interests the U.S. Fish and Wildlife Service (USFWS) through it's Partners For Wildlife Program initiated a new program in 1992 for the creation of multiple purpose wetlands on private and tribal lands across South Dakota.

From it's inception this partnership was designed to serve both ranching and wildlife needs. To facilitate duck production while simultaneously improving livestock grazing distribution and range condition, wetlands were selectively created in large tracts of grassland, including sites in the western portion of the state. Within South Dakota, this represented the first significant endeavor of the USFWS Partners For Wildlife program outside of the Prairie Pothole Region. Wetland creations were usually designed as retention or pit-retention reservoirs (Eng et al. 1979) and selectively located on the landscape to provide an optimum combination of deeper water (3-5m) that is needed for livestock watering purposes and shallower water (<.5m) that provides emergent wetland vegetation for waterfowl habitat.

A defining characteristic of this program is an extremely broad and diverse base of partners comprised of private, local, county, state, federal and tribal entities. Primary partners joining the USFWS in this ongoing program include the North American Wetlands Conservation Council, the South Dakota Department of Game, Fish and Parks, Ducks Unlimited Inc., the South Dakota Association of Conservation Districts, the U.S. Department of Agriculture Natural Resource Conservation Service, the Federal Emergency Management Agency, 50 county Conservation Districts, the Yankton, Crow Creek, Lower Brule, Cheyenne River, and Sisseton-Whapeton Sioux Tribes, Wildlife Forever, the Izaak Walton League, the Delta Waterfowl Foundation, the South Dakota Division of Resource Conservation and Forestry, local water development districts, and most importantly over 300 private landowners.

CURRENT ACCOMPLISHMENTS AND FUTURE GOALS

The multiple purpose wetland creation program has allowed the USFWS to expand it's wetland conservation efforts throughout South Dakota and to capitalize on potentially high duck recruitment in large grasslands throughout the western portion of the state. During 1992-1996 over 450 multiple purpose wetlands have been created with 30% occurring in the western portion of the state outside of the Prairie Pothole Region where the USFWS has traditionally focused wetland conservation efforts.

Popularity of the wetland creation program among South Dakota landowners continues to rapidly grow with the level of interest exceeding funding levels in many portions of the state. Within South Dakota the USFWS Partners For Wildlife Program continues to work among all existing partners to secure additional funds. Currently, the USFWS Partners For Wildlife program has initiated similar partnership for multiple purpose wetland creations in North Dakota and Montana. The North American Waterfowl Management Plan (NAWMP), an international plan devoted to the recovery of North American waterfowl populations has recognized the unique biological opportunities of wetland creations on the mixed-grass prairies outside of the Prairie Pothole Region. The NAWMP has designated portions of western South Dakota, western North Dakota, and eastern Montana as the "Northern Great Plains" Waterfowl Habitat Area of Major Concern (NAWMP 1994). This designation may provide additional opportunities to secure future funding for wetland creations across this region.

While improved range management and waterfowl production were initial goals of the South Dakota multiple purpose wetland creation partnership, other less tangible benefits will likely make a larger lasting impact on resource conservation in South Dakota. As a result of this program, agricultural and wildlife interests that historically operated independently from each other have now joined in a uniquely productive partnership to effectively address land and water conservation matters of mutual concern. The South Dakota multiple purpose wetland creation project provides an example of a true working partnership between agriculture and wildlife.

REFERENCES

- BALL, I.J., R.L. ENG, and S.K. BALL. 1995. Population density and productivity of ducks on large grassland tracts in northcentral Montana. *Wildl. Soc. Bull.* 23:767-773.
- BUE, I.G., H.G. UHLING, and D.J. SMITH. 1964. Stock ponds and dug-outs. Pages 391-380 in J.P. Linduska (Ed.) *Waterfowl Tomorrow.*, U.S. Fish and Wildl. Serv., Washington, D.C. 770pp.
- COWARDIN, L.M., and D.H. JOHNSON. 1979. Mathematics and mallard management. *J. Wildl. Manage.* 43:18-35.
- , D.S. GILMER, and C.W. SHAFFER. 1985. Mallard recruitment in the agricultural environment of North Dakota. *Wildl. Monogr.* 92. 37pp.
- , T.L. SHAFFER and K.M. KRAFT. 1995. How much habitat management is needed to meet mallard production objectives ? *Wildl. Soc. Bull.* 23:48-55.
- ENG, R.L., J.D. JONES, and F.M. GJERSING. 1979. Construction and management of stockponds for waterfowl. U.S. Bur. Land Manage. Tech. Note TN-327.
- FLESKES, J.P., and E.E. KLAAS. 1991. Dabbling duck recruitment in relation to habitat and predators at Union Slough National Wildlife Refuge, Iowa. U.S. Fish and Wildl. Serv., Fish and Wildl. Tech. Rep. 32. 19pp.
- GREENWOOD, R.J., A.B. SARGEANT, D.H. JOHNSON, L.M. COWARDIN, and T.L. SHAFFER. 1987. Mallard nest success and recruitment in prairie Canada. *Trans. N. Am. Wildl. Nat. Resour. Conf.* 52:298-309.
- HAVSTAD, K.M., and J.C. MALECHEK. 1982. Energy expenditure by heifers grazing crested wheatgrass of diminishing availability. *J. Range Manage.* 35:447-451.
- HOLECHEK, J.L., R.D. PIEPER, and C.H. HERBEL. 1989. *Range Management.* Prentice Hall Inc. Englewood Cliffs, N.J. 501pp.

- KLETT, A.T., T.L. SHAFFER, and D.H. JOHNSON. 1988. Duck nest success in the Praire Pothole Region. J. Wildl. Manage. 52:431-440.
- MAYFIELD, H. 1961. Nesting success calculated from exposure. Wilson Bull. 73:255-291.
- NAWMP. 1994. Update to the North American Waterfowl Management Plan. U.S. Fish and Wildlife Serv. 30pp.
- RUWALDT, J.J., L.D. FLAKE, and J.M. GATES. 1979: Waterfowl pair use of natural and man-made wetlands in South Dakota. J. Wildl. Manage. 43:375-383.
- SARGEANT, A.B., M.A. SOVADA, and T.L. SHAFFER. 1995. Seasonal predator removal relative to hatch rate of duck nests in waterfowl production areas. Wildl. Soc. Bull. 23:507-513.
- SMITH, A.G., J.H. STOUDET, and J.B. GOLLOP. 1964. Pages 39-50 Waterfowl Tommorow. J.P. Linduska, (Ed.) U.S. Fish and Wildl. Serv., Washington, D.C. 770pp.
- VALENTINE, K.A. 1947. Distance from water as a factor in grazing capacity of rangeland. J. For. 10:749-754.