NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
SOUTH DAKOTA SUPPLEMENTS ITALICIZED

WILDLIFE WATERING FACILITY

(no.)
CODE 648

DEFINITION

Develop, improve, or modify watering places and systems for wildlife.

PURPOSE

To provide adequate drinking water during critical periods for wildlife.

To create or expand suitable habitat for wildlife.

To improve water quality and accessibility for wildlife.

CONDITIONS WHERE THIS PRACTICE APPLIES

In areas where new, additional, or improved watering places are needed to increase the range, distribution, improve the habitat of, or attract wildlife by meeting their water requirements.

Where lack of adequate water has been identified as the limiting habitat component.

Water developments are of little or no benefit to wildlife without adequate habitat, especially cover. If the planned habitat quality will not meet the minimum quality criteria in Section III of the South Dakota Technical Guide, then drinking water is not limiting and this practice does not apply.

CRITERIA

General Criteria Applicable to All Purposes

Because each facility is unique to species, habitat, topography, and climate; watering facilities must be planned and installed according to a plan and adapted to the specific site.

Facilities will be designed to protect the soil resource from erosion

Facilities shall be sized to accommodate the expected consumptive rates of target and non-target species*, as indicated in Table 1*.

The facility *will* provide permanent, accessible, dependable *water of* suitable quality *during* the critical period.

The distribution and spacing of facilities shall be based on the home range, territory size, and distribution of the target species.

Facilities shall be fenced to prevent damage by livestock where potential for damage exists.

Ramps shall be installed in open water troughs and tanks when *needed to allow* access *for target species* and escape *for non-target species, where danger from drowning exists*.

Design shall include appropriate safety features to minimize the hazards of the facility.

Management measures shall be provided to control noxious weeds.

Facilities shall be designed and installed in compliance with all *local,* state, and federal laws including water rights and permits.

Disturbed areas shall be vegetated according to a revegetation plan using native plant materials.

The facility will be designed to withstand freezing or must be annually winterized.

Facilities will be inspected annually to assure proper functioning.

Criteria for the Principal Types of Wildlife Watering Facilities

Spring and seep developments. Refer to Spring Development (574) standard.

Tanks and troughs supplied by a pipeline or well. Refer to Trough or Tank (614), Pipeline (516), and Well (642) standards.

Float or vacuum valve controlled drinking basins may be installed in new or existing facilities to address wildlife needs.

Excavated or embankment ponds. Refer to Pond (378) standard.

Guzzlers and rain traps are permanent wildlife watering facilities composed of a storage tank filled by rainwater. Storage tanks are usually fully or partially buried below ground. Water collection aprons are often used to supply adequate water quantities. The work consists of excavating, shaping and placing earth materials for the placement of aprons, tanks, and other required components.

Materials

Water Collection Apron. *The apron can be constructed of asphalt, concrete, soil, cement, butyl rubber, plastic, fiberglass, or metal.*

Storage Tank. *Tanks can be made of concrete, prefabricated plastic or fiberglass, or metal. Tanks previously used for other purposes will be thoroughly cleaned before use.*

Access and Escape Ramps. *Wildlife access can be directly to the storage tank or water can be piped to a separate watering basin. Facilities will include access and escape ramps for small wildlife. Ramps may be made from any durable material that provides stable nonslip footing. Acceptable access ramp materials may include compacted earth, gravel, expanded sheet metal, concrete, rock, wood, plastic, or fiberglass. Access ramps should be 2:1 or flatter. Escape ramp materials may include expanded sheet metal, concrete, rock, wood, plastic, or fiberglass. Escape ramps will have a 2.5:1 slope or flatter.*

Watering Basin or Trough. *A basin or trough supplied with water from a storage tank should be equipped with a suitable vacuum or float valve. Troughs or basins can be made of concrete, prefabricated plastic, fiberglass, or metal.*

Water Storage Design

*Water storage capacity will be based on local precipitation records and the monthly water consumption of the wildlife anticipated to use the facility. The minimum storage capacity will be 200 gallons. Needed storage is determined by multiplying the water storage factor times the monthly consumption (S = sf * C). Where S = the water storage capacity needed in gallons, sf = the water storage factor from Figure 648-1, and C = the monthly water consumption in gallons.*

Water Collection Apron Design

*The size of the water collection apron is determined by dividing the water collection apron factor by the efficiency of the apron material and taking the result times the monthly consumption A = (af/e) * C. Where A = the water collection apron needed in square feet, af = the water collection apron factor from Figure 648-1, E = the efficiency of the apron material, and C = the monthly water consumption in gallons.*

Efficiency and life spans of apron materials are (Kie, et al. 1996):

Steel - 98%, 25 years
Butyl rubber - 98%, 15 - 20 years
Asphalt paving - 95%, 15 years
Liquid asphalt soilwater - 90%, 5 years
Asphalt roofing - 86-92%, 8 years
Plastic covered with 1 inch of gravel - 66-87%, 8-15 years

Other materials are estimated as:

Aluminum - 98%, 20 years
Fiberglass - 98%, 10 years
Plastic - 98%, 10 years
Concrete - 95%, 25 years
Soil cement - 80%, 5-10 years

Example Design

For a tract in eastern Meade County, total daily water consumption is calculated to be 22 gallons per day. Therefore, total monthly consumption is 660 gallons (22 gallons/day times 30 days/month). The landowner wishes to install one or more guzzlers using collection aprons made from steel roofing material. How much storage and how large a collection apron will be needed?

From Figure 1, the water storage factor for eastern Meade County is 1.6. Multiplying 1.6 times 660, we find that 1,056 gallons of storage are needed.

From Figure 648-1, the water collection apron factor for eastern Meade County is 1.7. Dividing 1.7 by the efficiency of 98% for steel, we get 1.73.

Multiplying 1.73 times 660, we calculate that 1,142 square feet of water collection apron is needed.

The needed wildlife water could be provided with one storage tank ten feet in diameter and two feet deep (approximately 1,100 gallons) and a steel collection apron measuring 34 feet by 34 feet. It could also be satisfied with four storage tanks eight feet in diameter and one foot deep (approximately 365 gallons), each having a steel collection apron measuring 17 by 17 feet (approximately 285 square feet).

CONSIDERATIONS

General Considerations

Consider the *following items in planning the wildlife watering facility.*

Effects on the target *wildlife* species and the ecosystem *due to* concentrated grazing, predation, hunting, etc.

Adaptation of existing water sources.

Protection from non-target species, including livestock.

Encroachment by invasive species, noxious weeds, or brush.

Consider the accessibility of the site for installation and maintenance.

Consider any effects upon natural springs and associated unique flora and fauna.

Effects of freezing.

Period of planned use (summer versus winter ranges).

Consider the aesthetics of the installation. *Troughs, tanks, or other structures should be located such that they do not detract from the natural viewscape.*

In special situations, a permanent watering facility may be supplied by hauling water. Regular, dependable delivery must be stressed. Locating such facilities near an access road is advisable.

Water Quantity Considerations

The water budget, including volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

Consider the effects on downstream flows or groundwater that could affect other water users or associated aquatic sites *including associated aquatic or wetland sites*.

Heavy equipment and soil compaction impacts during construction to the water bearing and surrounding zones.

Water Quality Considerations

Potential water quality degradation from nonpoint-source pollutants including sediment and livestock waste.

Consider the effects on wetlands or other aquatic sites.

Consider the existence and maintenance of suitable water quality for the target species.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use. *The following items shall be the minimum documentation requirements for an applied practice:*

Location
Targeted species
Type of facility developed

OPERATION AND MAINTENANCE

The operation and maintenance plan shall include the following:

Facilities shall be checked *at least biannually* to insure proper function. *More frequent inspections during periods of drought or heat stress may be warranted.*

Damaged tanks, collection aprons, pipes, and appurtenances will be repaired.

Remove accumulated sediment and debris as needed.

Inspect the area adjacent to the facility *for erosion damage and treat as needed.*

Facilities not designed to withstand or operate during freezing weather shall be winterized prior to winter conditions.

Periodically monitor water quality to insure acceptable water quality. *Flush or clean tanks* as needed.

Clear or manage vegetation that obstructs wildlife access to water.

REFERENCES

Kie, J. G., V. C. Bleich, A. L. Medina, J. D. Yoakum, and J. W. Thomas. 1996. Managing rangelands for wildlife. Chapter 27, in Research and Management Techniques for Wildlife and Habitats, Ed. T. A. Bookhout. Pub. The Wildlife Society. 740 pp.

Soil Conservation Service, USDA. 1956, revised 1971. National Engineering Handbook, Section 4, Hydrology, Chapter 20, Watershed Yield.

WILDLIFE WATERING FACILITY (648)

Table 1. Water Requirements for Specific Wildlife Species

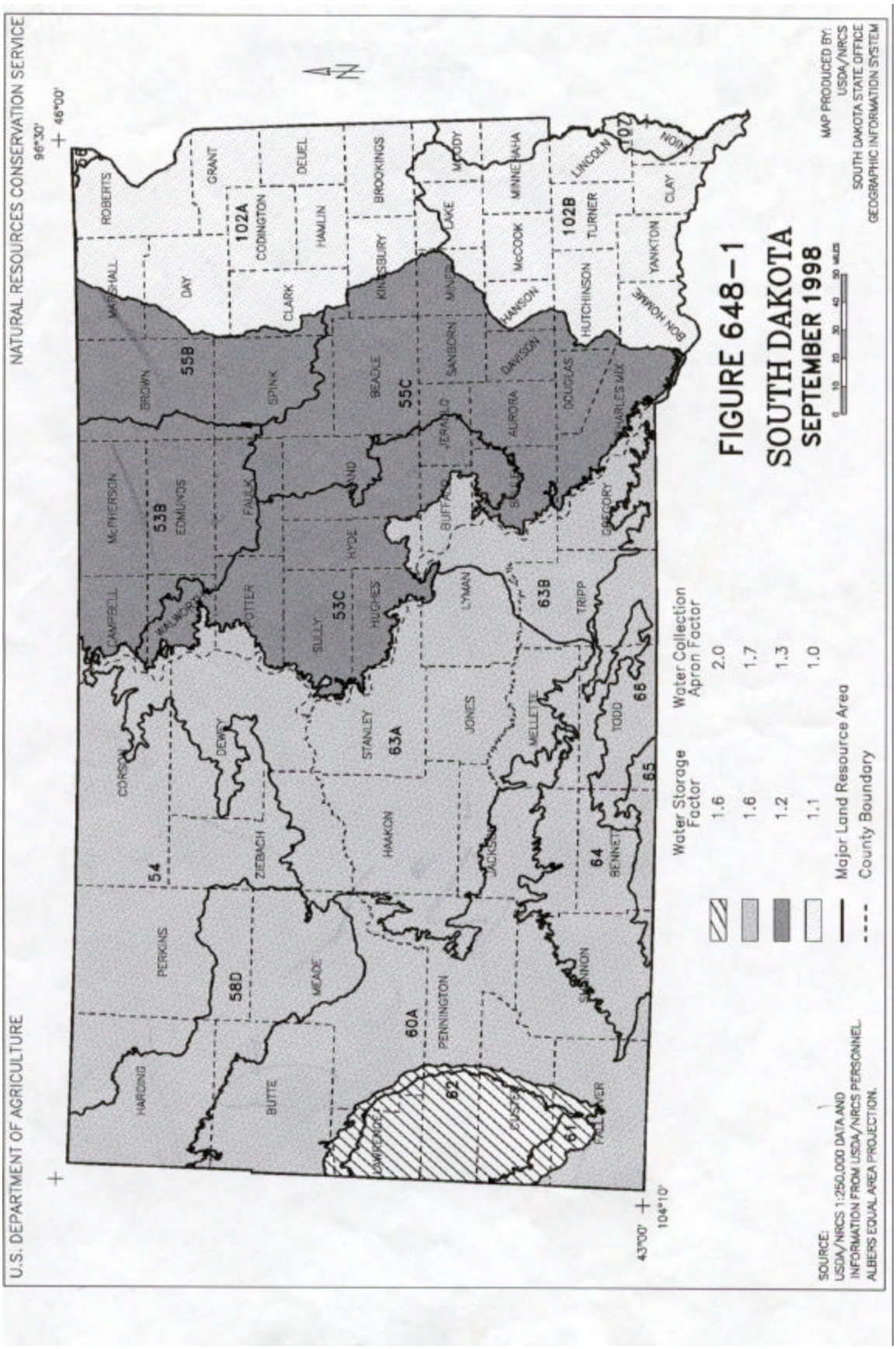
South Dakota Planning Considerations for Specific Wildlife Species

Wildlife Species	***Suggested Optimum Spacing (Miles)***	***Daily Water Consumption Requirements (Gallons)***
**Elk*	*1.0*	*5 - 8 per animal*
**Deer*	*0.5*	*1 - 2 per animal*
**Antelope*	*1.0*	*1 - 2 per animal*
Sharp-Tailed Grouse	*1.0*	*2 - 5 per facility*
Greater Prairie Chicken	*1.0*	*2 - 5 per facility*
**Turkey*	*0.5*	*6 - 9 per facility*
**Ring-necked Pheasant*	*0.5*	*2 - 5 per facility*
**Mourning Dove*	*0.5*	*2 - 5 per facility*
Bobwhite Quail	*0.25*	*2 - 5 per facility*
Gray (Hungarian) Partridge	*0.25*	*2 - 5 per facility*
**Songbirds*	*0.25*	*1 - 2 per facility*
Waterfowl	*NA*	
Shorebirds	*NA*	

**Species that are known to benefit from water developments provided cover is adequate and water is scarce or unavailable.*

Example: A tract of land in Meade County has no permanent water within a one-mile radius. The landowner wants to provide water to support deer and pheasants. The landowner and NRCS representative anticipate that the surrounding habitat could support ten deer and one flock of pheasants. It is also likely that mourning doves and various songbird species will be nontarget water users. The local biologist was consulted and concurred that the landowner's wildlife objective was reasonable. Daily water consumption requirements were calculated using the table above as follows:

10 deer X 1.5 gallons	*= 15*
Pheasants	*= 3*
Doves	*= 3*
Songbirds	*= 1*
Total Daily Consumption	*= 22 gallons per day*


U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
FIGURE 648–1
SOUTH DAKOTA
SEPTEMBER 1998
Water Storage Factor
Water Collection Apron Factor
1.6 2.0
1.6 1.7
1.2 1.3
1.1 1.0
Major Land Resource Area
County Boundary
SOURCE:
USDA/NRCS 1:250,000 DATA AND INFORMATION FROM USDA/NRCS PERSONNEL.
ALBERS EQUAL AREA PROJECTION.
MAP PRODUCED BY:
USDA/NRCS
SOUTH DAKOTA STATE OFFICE
GEOGRAPHIC INFORMATION SYSTEM
46°00'
96°30'
43°00'
104°10'
N
ROBERTS
GRANT
DEUEL
HAMLIN
CODINGTON
CLARK
MARSHALL
DAY
BROWN
SPINK
BEADLE
KINGSBURY
BROOKINGS
MOODY
MINNEHAHA
LINCOLN
McCOOK
HANSON
TURNER
HUTCHINSON
BON HOMME
YANKTON
CLAY
UNION
MCPHERSON
EDMUNDS
FAULK
HYDE
SANBORN
JERAULD
AURORA
DAVISON
DOUGLAS
CHARLES MIX
CAMPBELL
WALWORTH
POTTER
SULLY
HUGHES
BUFFALO
LYMAN
TRIPP
GREGORY
CORSON
DEWEY
ZIEBACH
STANLEY
JONES
MELLETTE
TODD
CARSON
HARDING
PERKINS
MEADE
BUTTE
LAWRENCE
PENNINGTON
JACKSON
SHANNON
BENNETT
MELLETTE
TODD
54
58D
60A
62
61
63A
64
65
66
53B
53C
55B
55C
102A
102B
107
63B