NATURAL RESOURCES CONSERVATION SERVICE

WATERING FACILITY – WILDLIFE (NUMBER)

CODE 614

MONTANA CONSERVATION PRACTICE SPECIFICATION

SCOPE: The work shall consist of excavation, shaping, and placing earth materials for dam, pit, pond, or dugout construction and construction and placement of aprons, tanks, and other required components of a wildlife watering facility. Construction details and vegetative plantings shall be as specified and shown on drawings.

MATERIALS AND TYPES OF FACILITIES

Rain Traps (guzzlers). A guzzler is a permanent watering facility consisting of a storage tank, filled by rainwater, from a collecting apron made of sheet metal, fiberglass, concrete, or other suitable materials. Birds and small mammals enter the storage tank through an opening and access the water via a short ramp. Larger guzzlers can be designed for big game animals and livestock. There are two primary types of guzzlers: (1) pre-constructed, commercial models made from fiberglass or (2) various custom designs.

Apron for water collection. Rainfall is collected on an apron, which directs water into the storage tank. The apron is commonly constructed as an elevated metal or fiberglass roof above the storage tank, although other materials such as asphalt-surfaced cement or butyl rubber are also used.

Tank. Tanks for guzzlers can be made of concrete, fiberglass, metal, or other suitable material. Tanks previously used for other purposes should be thoroughly cleaned and then inspected and certified for use by an NRCS technician. See Field Office Technical Guide (FOTG), Section IV–Practice Standards and Specifications, Watering Facility (Code 614).

Piped water. Water flow to the basin is usually controlled by a float valve.

Wildlife Access. Wildlife can access water directly from the storage tank or water that has been piped to a separate watering basin. Wildlife watering devices should provide access for juvenile birds and other small wildlife.

NOTE: Always use escape ramps on tanks that have open water, so small animals will not get trapped.

Temporary guzzlers can be constructed by modifying barrels and filling them with water hauled to the site; i.e., a 55 gallon steel drum is connected by a pipe to a small basin at ground level. Water flow is regulated by atmospheric pressure or by a float valve.

Spring developments, which supply water to ground level wildlife watering tanks, provide a very dependable source of drinking water. See FOTG, Section IV–Practice Standards and Specifications, Spring Development (Code 574) and Watering Facility (Code 614).

Buried pipelines transport water from a well source or storage tank to wildlife watering tanks. See FOTG, Section IV–Practice Standards and Specifications, Pipeline (Code 516) and Watering Facility (Code 614).

Dugouts, pits and dams supplied by surface runoff, stream diversion or spring flow. See applicable NRCS engineering standards and specifications.

Specification MT614-2

SPECIFICATIONS

Wildlife watering facilities will be planned to supplement existing habitat conditions and to meet water requirements of the target wildlife species being managed. The need for wildlife water will be based on a habitat assessment using the NRCS Wildlife Habitat Appraisal Guides or other suitable method. Wildlife watering facilities may be considered if:

- the range of the target wildlife species might be extended by providing additional water;
- population densities of the target species can be increased, at least in part, due to water development;
- new habitat can be created for the target wildlife species;
- crop depredation can be reduced or eliminated by providing needed habitat elements elsewhere;
- adequate food and cover will be present for the target wildlife species following development of wildlife watering facilities.

NOTE: Wildlife water developments could potentially cause problems for wildlife and landowners. These include the spread of disease as animals are concentrated near water, crop depredation, habitat degradation, and increased predation. Consider obtaining input from NRCS biologists prior to implementation of this practice.

Wildlife watering facilities will be designed to provide permanent water during identified periods of shortage for the target species.

Dugouts, ponds, pits, spring developments, guzzlers, etc., will meet the appropriate standards and specifications from the Field Office Technical Guide.

Wildlife watering facilities will be located in or adjacent to suitable cover for the target wildlife species and placed to avoid damage from flooding and siltation, and, to minimize evaporative loss and excessive warming of water.

Wildlife watering facilities will be protected from damage by livestock and/or big game animals.

Facilities will be designed to provide water at the approximate ground level – no greater than 20 inches above the ground for big game. All facilities with deep water or steep sides will have small animal escape ramps installed.

Wildlife watering facilities will be designed to complete the habitat requirements of the target wildlife species. Design considerations will include spacing of water points and daily/seasonal water requirements of the animals.

Water collection aprons for guzzlers will be placed to minimize turbulence (and resulting damage) from high winds.

Specifications for construction and installation of wildlife watering facilities are detailed in the enclosed job sheet.

DESIGN CRITERIA

Wildlife Watering Facility Spacing Criteria. The target wildlife species' cruising radius is the general rule for spacing of wildlife watering facilities following identification of feeding, nesting, and roosting habitat. The following are estimates of the distance that selected wildlife species will travel to water; and, therefore, are the suggested spacing guidelines for each species:

SPECIES	DISTANCE SPECIES WILL TRAVEL TO WATER	
	OPTIMUM (MILES)	MAXIMUM (MILES)
Pronghorn	2	3
Mule deer	0.5	3
Elk	0.75	3
Chukar	0.5	1
Pheasant	0.5	1
Wild Turkey	1	2
Sage grouse	1	?
Mourning dove	3	5
Songbirds	0.25	0.5

Determining Storage Needs. Determine water storage needs for the number and species of animals expected to use the facility (see TABLE A). In the plan, document the water storage requirement.

Storage Tank Sizes:

- For small animals–i.e., birds, small mammals:
  Provide 100 gallons of storage for every 0.6 gallons/day required at peak demand.
- For large animals–i.e., pronghorn, deer, elk:
  Provide a minimum of 100 gallons storage for every 0.75 gallons/day required at peak demand.

TABLE A. Wildlife Water Requirements

Pronghorn	1-2 gallons/animal/day
Mule deer	1-2 gallons/animal/day
Elk	5-8 gallons/animal/day
Chukar	750 gallons/covey/year
Pheasant	2-5 gallons/flock/day (Available Year Long)
Wild turkey	7 gallons/100 head/day
Mourning dove	2-5 gallons/flock/day
Songbirds	1-2 gallons/flock/day

NOTE: Snow generally meets wildlife water requirements during winter. Mourning doves and many other songbirds migrate south during winter. For these species, guzzlers will meet water requirements from March to the end of October.

Water Collection Apron Size.

NOTE: The slope of the collecting apron should be a minimum of two percent and no steeper than five percent. Be sure to allow ample clearance between the bottom of the apron and the access ramp to permit unimpeded passage by the watering animals.

The size of the water-collecting apron is determined by the average annual rainfall and the tank storage capacity. Use the following formulas to calculate the required square feet of collecting surface:

Small Animals

$$\text{AREA (sq. ft.)}^* = \frac{\text{TANK (gal.)} \times 1.6}{\text{AVERAGE ANNUAL PRECIPITATION (in.)}}$$

Large Animals

$$\text{AREA (sq. ft.)}^* = \frac{\text{TANK (gal.)} \times 2.83}{\text{AVERAGE ANNUAL PRECIPITATION (in.)}}$$

* Apron area equations are based on use of steel roofing (90% capture efficiency). If other material is used, then adjust roof area according to ratio of capture efficiencies (0.98/selected material efficiency). See TABLE B.

EXAMPLE A: Procedure for determining guzzler water storage requirements and water collection apron size for small animal guzzlers:

Given: Water 1 flock of 20 pheasants

AVERAGE PRECIPITATION = 10 in./year

1. From TABLE A: 2–5 gal./ day required (USE 3 GALLONS).
2. Small animal formula: 3 gal./ day / 0.6 x 100 = 500 gal. storage.
3. Collection Surface: AREA (sq. ft.) = 500 gal. x 1.6 / 10 in. = 80 sq. ft.

EXAMPLE B: Procedure for determining guzzler water storage requirements and water collection apron size for large animal guzzlers:

Given: Water 7 mule deer

AVERAGE PRECIPITATION = 10 in./year

1. From TABLE A: 2 gal./ day each x 7 deer = 14 gal./ day required.
2. Large animal formula: 14 gal./ day / 0.75 x 100 = 1,867 gal. storage. [USE A COMMERCIALLY AVAILABLE 2,000 GAL. TANK]
3. Collection Surface: AREA (sq. ft.) = 2,000 gal. x 2.83 / 10 in. = 566 sq. ft.

TABLE B. Water Collector Efficiency.

APRON MATERIAL	EFFICIENCY PERCENT %	LIFE SPAN YEARS
Steel	98	25
Asphalt Roofing	86–92	8
Plastic Covered w/ 1-inch of Gravel	66–87	8–15
Butyl Rubber	98	15–20
Asphalt Paving	95	15

Protection. All livestock should be excluded from wildlife watering facilities by fencing, unless the development is for livestock and modified separately for wildlife use. Aboveground facilities should be camouflaged or screened to reduce damage from vandalism if necessary.

All wildlife-watering facilities shall be designed to prevent damage from freeze/thaw events.

Environmental Concerns. Visual impacts of metal or concrete collecting aprons can be reduced by the use of paints or dyes to reduce contrast. Vegetative plantings can be used to screen the facility in addition to providing food and/or cover for desired wildlife species.

Design Criteria for Wildlife Escape Ramps

Many animals, including birds, bats, and other small mammals, drown in livestock water tanks unless there is an obvious escape route. All such tanks will have wildlife escape ramps installed with the following exceptions:

- Ritchie style waterers used in corrals
- Covered fiberglass "frost-free" tanks where there is only an open water area of 3 square feet or less
- Covered stock tanks with small drinking ports
- Thermal sink type drinkers with small drinking areas.

Escape ramps must flare from each edge to contact the sides of the tank so that trapped animals are forced to make contact with the ramp as they swim around the perimeter of the tank. Ramps must reach the bottom or very close to the bottom of the tank. See the attached “Wildlife Escape Ramp Design” for a suggested approach to ramp construction. Also see Montana Biology Technical Note MT-47 for an alternative design and discussion of important wildlife considerations associated with livestock watering facilities.

For round tanks greater than 10 feet in diameter, and for rectangular tanks, install one escape ramp for every 30 feet of tank perimeter.

Escape ramp design considerations:

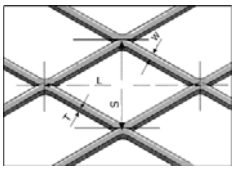
- Most bat species need an unobstructed water surface of 10 feet long by 2.5 feet wide. Whenever possible, use tanks having at least a 10-foot diameter or length.
- Avoid placing fences or cross braces over the water whenever possible. If a fence across the tank is necessary, place it off-center to maximize the length of unobstructed water on one side of the fence. If feasible, locate cross-bracing under the rim of the tank.
- Orient the long axis of rectangular tanks with the prevailing wind direction if possible to maximize the “swoop” distance for bats.
- When livestock are absent from the pasture, leave the tank completely full of water or completely empty. Low water levels in tanks create a hazard for bats.
- Access ramps to the tank are not recommended. These ramps attract many wildlife species which could drown in the tank if the escape ramp is not functional.

MAINTENANCE

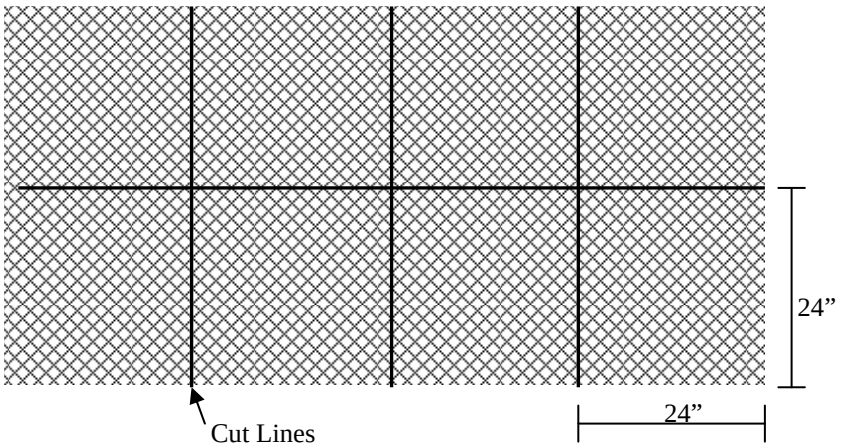
Guzzlers will be checked during early spring at a minimum. Debris will be removed from the tank. Fiberglass mat and epoxy resin can be used to patch holes in fiberglass tanks. Holes or cracks in the collecting apron should be repaired. Vegetation around the opening of the entrance ramp should be cut back so that the ramp opening is visible. The tank should be at least two-thirds full at the start of the water season (March/April). Manual filling to achieve this level may be required.

Specification MT614-6

MATERIALS: 10 -14 gauge, flattened or regular, expanded metal. Recommend flattened expanded metal ¾" - #9.



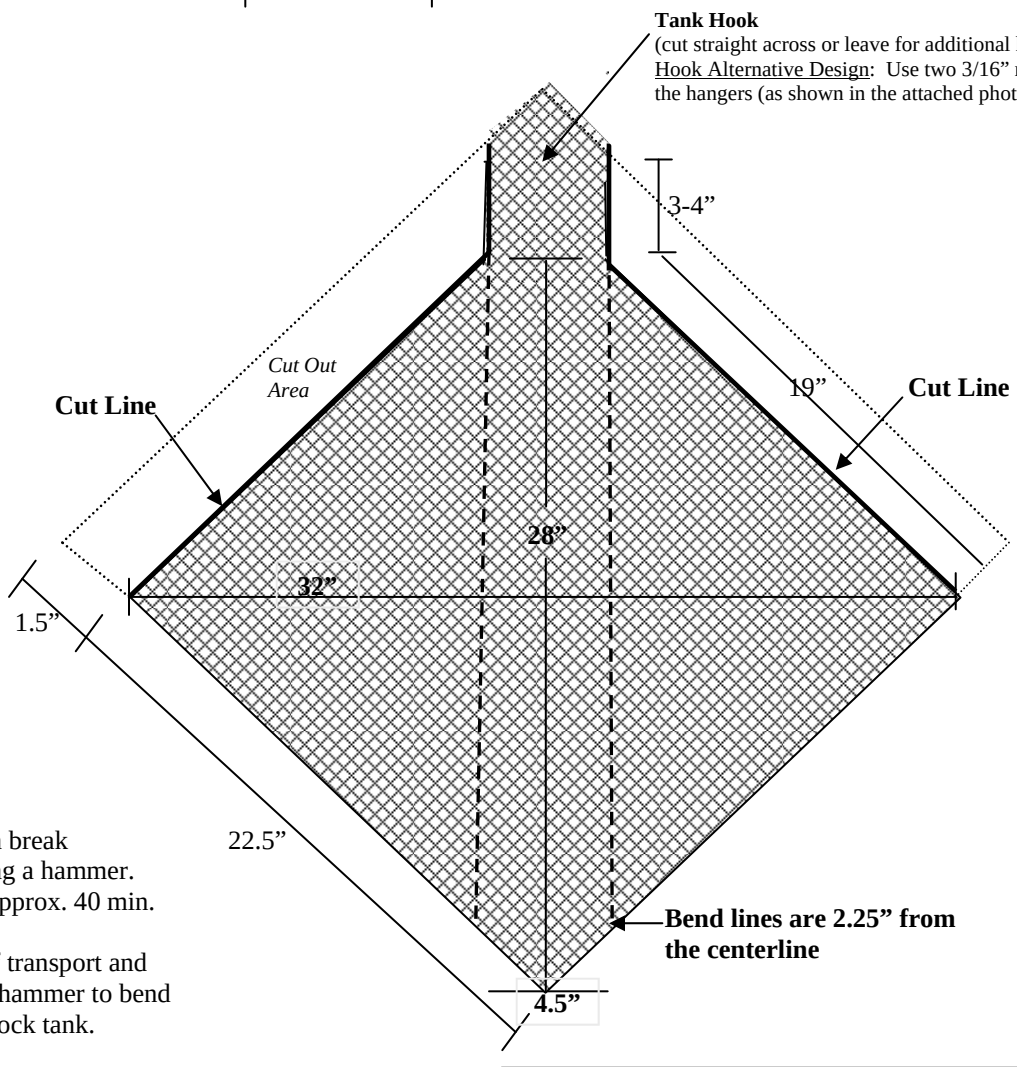
4'x 8' Panel of Expanded Metal (yields 8 tank ladders)



1. Torch cut eight 24" x 24" squares. Total cutting length is 20'. Time: Approx. ½ hour.

2. Make a template of the cutout areas and mark the cut lines with permanent marker or soapstone.

3. Torch cut the cut lines. Total cutting length is 46" per ladder. Time: Approx. 40 minutes (8 ladders).



4. Mark the bend lines. Use a tin break or bend over a metal edge using a hammer. Bend at a 45˚ angle. Time: Approx. 40 min.

5. Leave the hook flat for ease of transport and storage. At installation, use a hammer to bend the hook over the rim of the stock tank.

6. Paint with a rust resistant, **non-toxic** neutral color. Two coats. Time: Approx. 40 min.

Cost to Fabricate Eight Ladders
Cost estimate for materials $45-60 (as of 11/06)
Labor estimate is 2.5 hours

NRCS, MT
February 2013

PURPOSE: Provides an approved design for wildlife escape ladders in watering facilities.

Because many species of wildlife drown in watering facilities, NRCS Standard, Watering Facility (Code 614), requires installation of a wildlife escape ladder in these facilities. This attached design was developed by Rocky Mountain Bird Observatory (RMBO) and may be used to meet the standard requirements. The design was revised by NRCS to provide dimensions for ease of fabrication.

The key design component is to provide a ramp with "holes", which touches the sides of the stock tank. This makes it easier for the trapped animal to find the ramp. Designs that do not provide this, result in the trapped animal swimming along the perimeter of the tank, passing underneath the ramp, until exhausted and eventually drowning.

The design is somewhat diamond shaped; the front ramp is 4.5 inches wide and 28 inches long, and will touch the bottom of a 24-inch deep stock tank. The wings are bent down to a 45˚ angle, and designed to touch the vertical wall of the stock tank. The top hook can be bent around the rim of the stock tank (metal or tire tank). No drilling is required.