

Big Black Mesa Wildlife Water Development Plan

The goal of the plan is establishing reliable sources of permanent water for wildlife on the Prescott National Forest lands on Big Black Mesa. This 100 square-mile limestone mesa and its adjacent grasslands are located in Game Management Unit (GMU) 19B, about 20 miles north of Prescott, Arizona. Habitat varies from pinyon-juniper woodlands on the majority of the mesa to high desert grasslands at lower elevations. Big Black Mesa (BBM) is bordered by private and Arizona State Trust Lands to the north, west and south but are contiguous with PNF lands to the east, being delineated by State Route 89. This area has permanent public access on established roads.

AGFD water developments, earthen livestock tanks, natural seeps and potholes provide wildlife water sources across the mesa and its adjacent grassland (Figure 1). Presently, only the AGFD developments and 2 seeps are reliable water sources for wildlife. With the exception of 2 developments, the AGFD waters were constructed in 1950-60's and have not been enhanced to accommodate changes in wildlife populations or climatic precipitation pattern. Although maintained, their metal and concrete water collection aprons, storage vaults, walk-in drinkers and fences have exceeded their life expectancy. Although functional, they often only meet summer-peak demands by supplemental water hauling.

Since their construction, the demand and availability of water on BBM has changed, especially in the past 20 years. Formerly reliable year-round earthen tanks are now seasonally dry, e.g. Upper and Lower Limestone tanks that were stocked with game fish in the 1980s. With the possible exception of Springfield tank, all other earthen tanks were dry in the summer of 2009. Although the 2 seeps (springs) were viable, their location and size limited their overall value to wildlife. The 6 AGFD developments were the only permanent water sources for wildlife within this area.

In contrast to decreasing alternative water availability and the developments' aging condition, elk utilization has increased the demands on their capacity to collect and store water. Resident and seasonal elk from the adjacent GMU 8 often exceed the present developments' storage capacities. This has resulted in continue monitoring and hauling water to some AGFD developments.

Objective

The objective of this plan is the redevelopment of 4 existing AGFD water developments and the construction of 1 new water development on Big Black Mesa to meet the present and future needs of wildlife. This landscape approach will address wildlife water concerns for the entire publicly-owned lands on the mesa.

In addition to the BBM plan, the environmental assessment of a 5th AGFD water development (Drake # 1; WC #335) is being completed by the PNF. Located 3 miles east of the mesa in adjacent GMU 8, its proximity to the BBM will enhance the cost efficiency of the NEPA process. The WC #335 redevelopment will be submitted in a separate grant process.

Of the 7 developments shown in Figure 1, Fritsche (built in 1999) and White Hills (redeveloped in 2008) have sufficient water collection and storage capacity. WC #336 was abandoned after a 2002 PNF boundary survey revealed it located on private property. The remaining 4 existing structures are proposed to be redeveloped to the new standard as well as the new construction at a site on the east side of the mesa.

The description and location of the new and 4 existing water catchments in this plan are presented in the following prioritized order. Prioritization was based on distance to permanent water, wildlife use/water use and history of supplemental water hauling.

1. New Proposed Wildlife Water (temp. name "Cordes") on East BBM (Fig.2)

Development Type: New design described in Plans and Cost Section

Capacity: 11,500 gallons Year of Construction: 2010?

Land Ownership: USFS-PNF Responsibility: AGFD

Biome: pinyon-juniper woodland Annual Rain: 12.5 Inches

Elevation: 4785 Feet

GPS Coordinates:

WGS 84

N 35° 0.828"

W 112° 24.779"

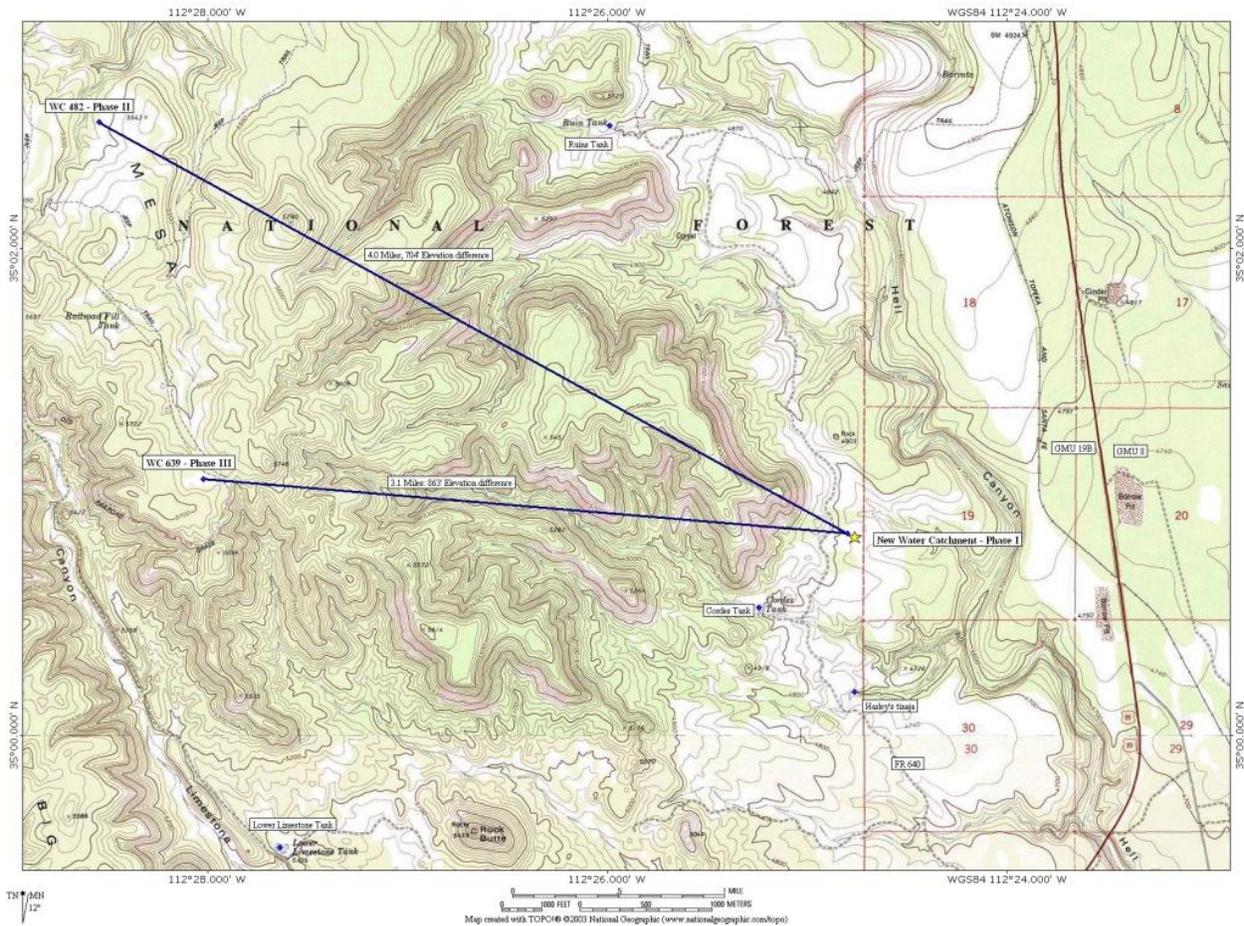
Legal Description: NE ¼ of SE ¼ of Section 24, T19N, R2W

Species use: Mule deer, elk, javelina, quail, predators/furbearers, Nongame birds

Mountain Range/Wilderness: Big Black Mesa

Accessibility: 4WD truck

Figure 2. New Water Development on east Big Black Mesa (general location)



2. WC #640: Drake #6 (Figure 3)

Development Type: Corrugated apron, with concrete storage/drinker; 4-wire fence

Capacity: 2,500 gallons

Year of Construction: 1963

Land Ownership: USFS-PNF

Responsibility: AGFD

Biome: Pinyon-juniper woodland

Annual Rain: 12.5 Inches

Elevation: 5,850 Feet

GPS Coordinates:

NAD 27 CONUS

UTM 12

WGS 84

E 0359359

N 35° 03.305"

W 3880039

W 112° 32.575"

Legal Description: SE ¼ of SE ¼ of Section 2, T19N, R3W

Species use: Mule deer, elk, javelina, quail, predators/furbearers, Nongame birds

Mountain Range/Wilderness: Big Black Mesa

Accessibility: 4WD truck

This water is located at the old-growth and secondary juniper woodlands interface. This supplies water to the mesa's western portions, including isolated limestone points. Historically, this catchment has the highest wildlife use of all developments on BBM.

This catchment has received increase elk use, especially bulls, over the past 5 years. This has caused increased damage to parameter and apron barbed-wire fences as well as the apron sheeting. Fence damage permitted trespass livestock to utilize the water source. With the recent renewal of the livestock lease, increased cattle uses of the area will occur, thus fencing must be adequate.

Over the past several years, water hauling has been necessary to maintain this catchment. The hauling was often done by the Wildlife Manager with 150-gallon container because of the road access to this remote location.

Figure 3. Water Catchment #640, Drake #6. Note the crumbling condition of apron's concrete supports as representative of its age.



3. WC #482: Drake #3 (Figure 4)

Development Type: Concrete apron/storage/drinker; 4-wire fence

Capacity: 2,000 gallons

Year of Construction: 1957

Land Ownership: USFS-PNF

Responsibility: AGFD

Biome: Juniper woodland

Annual Rain: 12.5 Inches

Elevation: 5,490 Feet

GPS Coordinates:

NAD 27 CONUS UTM 12 WGS 84

E 0365470 N 35° 02.522

W 3878496 W 112° 28.543

Legal Description: SW ¼ of SE ¼ of Section 9, T19N, R2W

Species use: Mule deer, javelina, quail, elk, predators/furbearers, Nongame birds

Mountain Range/Wilderness: Big Black Mesa

Accessibility: 4WD truck especially during wet conditions

This catchment is located in juniper secondary-growth woodland on the northeastern portion of the mesa. It has continuous use by mule deer, elk and javelina. The occurrence of elk has increased in the past 5 years but not to the extent at WC 640.

Although still functional, the most noticeable deterioration of its age is the crumbling concrete trough. The storage vault has not had leakage although the cracked concrete apron has functioned well since patching in ~1990. The fence frequently needs minor repairs and post installation.

Water has been hauled several times during the past several years by the Wildlife Manager. The access road had several 4WD crossings.

Figure 4. Water Catchment # 482, Drake #3.



4. WC #483: Drake #4

Development Type: Concrete apron/storage/drinker; 4-wire fence

Capacity: 2,000 gallon

Year of Construction: 1957

Land Ownership: USFS-PNF

Responsibility: AGFD

Biome: Grassland/scrub

Annual Rain: 12.5 Inches

Elevation: 4,840 Feet

GPS Coordinates:

NAD 27 CONUS UTM 12

WGS 84

E 0361540

N 34° 58.597"

W 3871302

W 112° 31.056"

Legal Description: SE ¼ of NW ¼ of Section 6, T18, R2W

Species use: Mule deer, javelina, quail, pronghorn, predators/furbearers, Nongame

Mountain Range/Wilderness: grassland/ bench adjacent Big Black Mesa

Accessibility: 2 WD truck

This catchment is located in the grassland-juniper woodland interface on the mesa's southern slope. It is situated between habitats of mountain mahogany-cliffrose scrub and the Big Chino Valley grassland. This results in pronghorn, mule deer and javelina as well as quail and dove use. No repeated elk occurrence has been noted at this site. As with all waters, utilization by nongame species is dependent upon habitat but is generally high.

Although in good condition for its age, this catchment is typically the first that needs water hauling each year. This inability to maintain water may result of a higher evaporation rate (lower elevation and southern exposure) and/or smaller storage capacity. The stable winter water levels suggests no leakage of the storage vault.

Figure 4. Water Catchment # 483, Drake #4. Note smaller size and grassland/juniper habitat.



5. WC #639: Drake #5 (Figure 5)

Development Type: Corrugated apron, with concrete storage/drinker; 4-wire fence

Capacity: 2,500 gallons

Year of Construction: 1963

Land Ownership: USFS-PNF

Responsibility: AGFD

Biome: Pinyon-juniper woodland

Annual Rain: 12.5 Inches

Elevation: 5,650 Feet

GPS Coordinates:

NAD 27 CONUS	UTM 12	WGS 84
E 0366220		N 35° 01.050"
W 3875771		W 112° 28.035"

Legal Description: SE ¼ of NE ¼ of Section 21, T19N, R2W

Species use: Mule deer, javelina, elk, quail, predators/furbearers, Nongame birds

Mountain Range/Wilderness: Big Black Mesa

Accessibility: 4WD truck

This catchment is located in the top central-eastern portion of BBM. Its proximity to the eastern escarpment and Limestone canyon creates an ideal location. It is found in pinyon-juniper old-growth woodland. It has good continued use by mule deer, elk, javelina and quail as well as nongame birds, especially pinyon jays.

The metal water collection apron was rebuilt in 1991 after wind damage. The outside parameter fence forms a multi-acre enclosure but is showing deterioration. Some of the concrete blocks on the apron and storage vault are crumbling. Overall, this is the most dependable of the older water catchments on the mesa. To date, water has not been hauled to this remote site, possibly the result of lower evaporation at this protected site and less elk usage. As a result, this catchment has the lowest redevelopment priority in this plan.

Figure 5. Water Catchment # 639, Drake #5.



WC #335: Drake #1 (no photograph)

This water catchment is not included in the BBM plan. It is listed only for reference on 6-site NEPA package completed by Prescott National Forest. This old water will be redeveloped on a future grant proposal submitted by the GMU 8 Wildlife Manager.

Development Type: Concrete apron/storage/drinker; 4-wire fence
Capacity: 1,000 Gallons Year of Construction: 1953
Land Ownership: USFS-PNF Responsibility: AGFD
Biome: grassland Annual Rain: 12.5 Inches
Elevation: 4,737 Feet
GPS Coordinates:
 WGS 84
 W 35° 01.336"
 N 112° 20.626"

Legal Description: NE1/4 of NE1/4 of Section 15, T19N, R1W

Species use: pronghorn, mule deer, elk, javelina, quail, predators/furbearers, Nongame birds

Mountain Range/Wilderness: Wagon Tire Flat - Drake

Accessibility: 2WD truck in most seasonal conditions

Proposed Development Plans and Cost

All redevelopments will be within their existing boundary fence. The existing fence, collection apron, walk-in trough and storage tank will be removed and transport off the PNF for disposal, unless noted in the following plan.

The new development will be located in the general location shown in Figure 3. The specific site will be selected to avoid environmental and cultural concerns.

Development plans and cost for WC # 335, 482, 639, 640 and the new proposed development are:

- 2 – 18’ dia. Ring tanks \$ 19,845.00
- 3’ X 4’ Walk-in trough \$ 3,270.00
- 24’ X 72’ Apron \$ 5,245.00
- Pipe rail fence (existing size) \$ 4,500.00
- Elk Fence (around apron) \$ 3,500.00
- Misc. materials and plumbing \$ 1,000.00

- Total Materials \$ 37,360.00

This would have a capacity of approximately 11,500 gallons. Once full, this design would provide water for a full year without any additional precipitation.

Development plans and cost for WC # 483 as follows:

- 1-18’ dia. Ring tanks \$ 9,925.00
- 3’ X 4’ Walk-in trough \$ 3,270.00
- 24’ X 54’ Apron \$ 3,935.00
- Pipe rail fence (existing size) \$ 4,500.00
- Misc. materials and plumbing \$ 1,000.00

- Total Materials \$ 22,630.00

Development # 483 could use a single 18’ tank for a capacity of 6,000 gallons or 2 – 16’ tanks for a capacity of 9,400 gallons with a tank cost of \$ 15,620.00. Since elk have not been utilizing this grassland site, the smaller capacity is feasible and the elk fence cost omitted.

Construction cost of labor and engineering is approximately \$20,000.00 per water development, as estimated by AGFD Development Branch.

The PNF will complete NEPA compliance by a projected May 2010 date. A project cost of \$10,000.00 for the 6 sites is estimates, thus \$1,700.00 per site is projected for cost-share funding.