



Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
WATER HARVESTING CATCHMENT

CODE 636

(no)

DEFINITION

A facility for collecting and storing water from an area that has been treated to increase precipitation runoff.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Provide water for livestock
- Provide water for fish and wildlife
- Provide water for other conservation purposes where additional water is needed

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to resource conservation systems where the collection and storage of precipitation runoff can be used as a supplemental water source and provide a conservation benefit.

It applies to the collection and storage of runoff from areas such as watersheds, impervious surfaces, high tunnels, and other temporary structures. For the collection of runoff from new or existing traditional roofed structures, refer to NRCS Conservation Practice Standard (CPS) Roof Runoff Structure (Code 558).

CRITERIA

General Criteria Applicable to All Purposes

The collection and storage of precipitation runoff is regulated by state and local laws in some areas. Refer to local and state regulations prior to proceeding with this practice.

A water harvesting system consists of a catchment area and a storage facility. Design the catchment area to provide the necessary quantity of water for the intended purpose and the storage facility to hold the required amount of water between expected precipitation events.

Catchment

Estimate the size of the catchment area that will provide the necessary quantity of water based on the following equation:

$$A = 0.2 \times U/P$$

Where—

A = catchment area in square yards

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at <https://www.nrcs.usda.gov/> and type FOTG in the search field.

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NRCS, NHCP
September 2020R

U = annual water requirement in gallons

P = average annual precipitation in inches

Select catchment areas that have low existing permeability, such as exposed bedrock, paved areas, or low permeability soils. If such areas are not available, treatment of the catchment area will be necessary. Methods include: removing vegetation, reshaping and compacting the existing soils, or adding impermeable soils; soil dispersants, bentonite clay, synthetic membranes, or paving to the catchment area. Refer to NRCS CPSs Pond Sealing or Lining, Compacted Soil (Code 520), Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner (Code 521), or Pond Sealing or Lining, Concrete (Code 522) for additional guidance on soil sealing.

Design diversions or curbs to either divert runoff to the catchment area or divert undesired runoff away from the catchment area. Refer to NRCS CPS Diversion (Code 362) for the design of diversions. Include provisions to bypass large storm flows around or through the catchment area and storage facility to prevent damage to the water harvesting system. The catchment and storage system must be able to pass the 10-year 24-hour storm without significant damage.

Design a sediment trap between the catchment area and the storage facility that allows runoff to pond and sediment to settle out before it enters the storage facility. Base the size and efficiency of the sediment trap on the quality of water that is needed.

Storage Facility

Design storage facilities with an adequate size and durability to store water for the intended purpose. Examples of storage facilities include earthen basins, concrete, steel, plastic or wooden tanks and rubber bladders. Where applicable use NRCS design procedures for the design of storage facilities or industry standards where there are no NRCS standards.

For earthen basins, refer to NRCS CPS Pond (Code 378) for design requirements.

Install tanks on a firm, level foundation that will not settle differentially. Examples of suitable foundation materials are bedrock, concrete, compacted gravel and stable, well compacted soils. Where necessary, prepare the foundation by removal and disposal of materials that are not adequate to support the design loads.

For vertical storage tanks with a tank height greater than the tank diameter, analyze the potential for overturning and include appropriate anchoring requirements. For buried tanks, ensure that they can withstand all earth and vehicle loads anticipated at the site.

All storage facilities must have an overflow channel or pipe to carry excess flow away from the facility for safe disposal without excessive erosion.

CONSIDERATIONS

When planning this practice, consider—

- Water harvesting may have an adverse impact on the water quantity and quality of downstream areas. This could include both surface and ground water. Consider the impacts on wildlife and human uses and how impacts can be mitigated.
- In arid areas, storage facilities may need to be covered to reduce water loss from evaporation. Covering of storage facilities will also improve the water quality in the storage.
- For storage facilities that are uncovered and have vertical or very steep sides, include animal escape ramps to prevent drowning of small animals and subsequent contamination of the stored water.
- Water yield from catchment areas can be improved by removal of vegetation and smoothing of the catchment area. The use of soil sterilants will retard the regrowth of vegetation but may result in

water quality concerns in the captured water. Choose products that will have the least impact on collected water.

- Fencing may be necessary to protect the catchment area from damage by livestock, wildlife, or other onfarm activities. Refer to NRCS CPS Fencing (Code 382) for the design of appropriate fencing.
- Storage tanks, such as above-ground polyethylene tanks, may require additional design criteria to meet State or local building codes and permit requirements.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for water harvesting catchments that describe the requirements for installing the practice to achieve its intended purpose. As a minimum, include the following:

- A plan view map showing the location of the harvesting catchment in relationship to other structures or natural features.
- Detail drawings of the catchment and appurtenances, such as piping, inlet and outlet connections, mounting, foundations, and other structural components.
- Written specifications that describe the site-specific details of installation.

OPERATION AND MAINTENANCE

Provide an operation and maintenance plan specific to the type of installed water harvesting catchment to the landowner. Include specific instructions for operating and maintaining facilities to ensure the water harvesting catchment functions properly as designed. As a minimum, address the following:

- Periodic inspection, cleaning and repair of the catchment area and storage facility, particularly after storm events and before periods of heavy use.
- Periodic cleaning of the sediment trap.
- Inspection and repair of erosion at inflow and outflow areas.
- Control of vegetation and other damages, such as rodent burrows, to the catchment area.
- Provisions for draining during cold weather or plans for cold weather operation.
- Where appropriate inspection and maintenance of fencing.

REFERENCES

Frasier, G.W. and L.E. Myers. 1983. USDA Agricultural Research Service (ARS). Agriculture Handbook No. 600, Handbook of Water Harvesting. Washington, D.C.