

# Water Harvesting Traditions in the Desert Southwest

*Water harvesting and conserving techniques were used by native Americans for centuries to produce abundant harvests in the deserts of the southwestern United States and northern Mexico. These systems hold vital lessons for modern inhabitants here and in arid and semiarid areas around the world.*

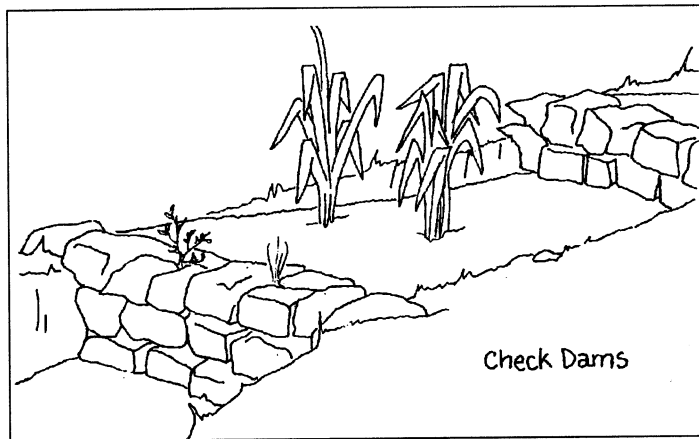
By Joel Glanzberg

Illustrations by Roxanne Swentzell

Before the advent of modern irrigation technology, peoples of the American southwest relied upon an array of water harvesting and conserving techniques to grow their food. Not only are these techniques still appropriate, but their use, scale, and at times failures have much to teach us. Several of the systems used by the traditional people are described and illustrated below.

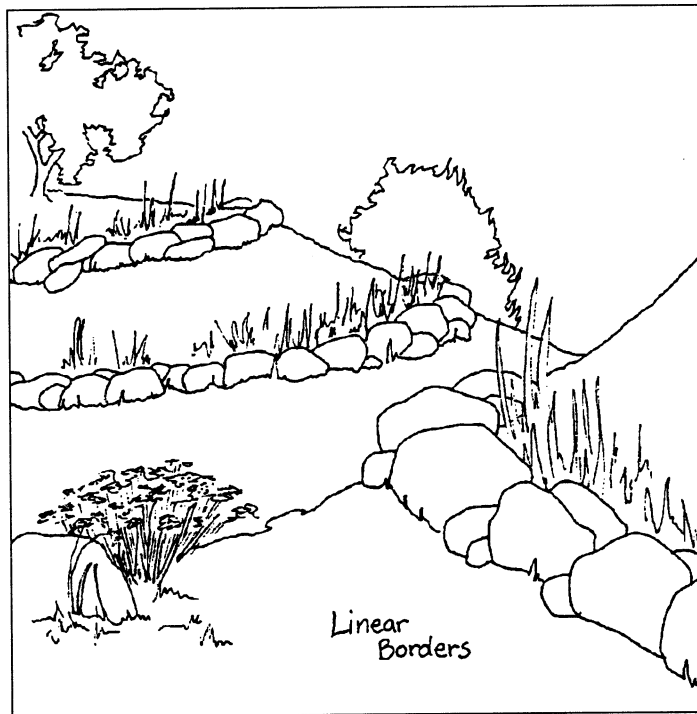
## Check Dams

Check dams are built across drainages that flow only periodically. They are constructed of rock and can range in size from small to large. These rock dams catch soil and water, and were often built higher as more soil accumulated behind them. They provided an excellent way to fertilize soil and stabilize drainages, and were used for all kinds of crops. There are good examples in Colorado, Utah, and New Mexico at Mesa Verde and Hovenweep National Parks and numerous small dams in the upper Rio Grande and Chama drainages and throughout the Pajarito Plateau.



## Terraces or Linear Borders

Terraces themselves were sometimes built, but check dams and low lines of stone across slopes of hills were more common. At Point of the Pines in Arizona, hilltop pueblos were surrounded by concentric rings of rocks gathered from the entire hillside and laid along contour lines across the slopes. Soil washing down the bare hillsides caught behind the stone walls, accumulating up to 16 inches deep. This loose soil would have been highly fertile and water absorbing.



developed a way of thinking about Bermuda that works for me. Bermuda seems to be a pioneer plant which, when given moisture, thrives in disturbed soils. Conventional garden cultivation creates an ideal environment for Bermuda. Like most pioneers, this grass excels at resisting aggressive attempts to eradicate it; indeed, it seems to convert aggressive energy aimed toward it into energy which benefits it, in a kind of plant aikido.

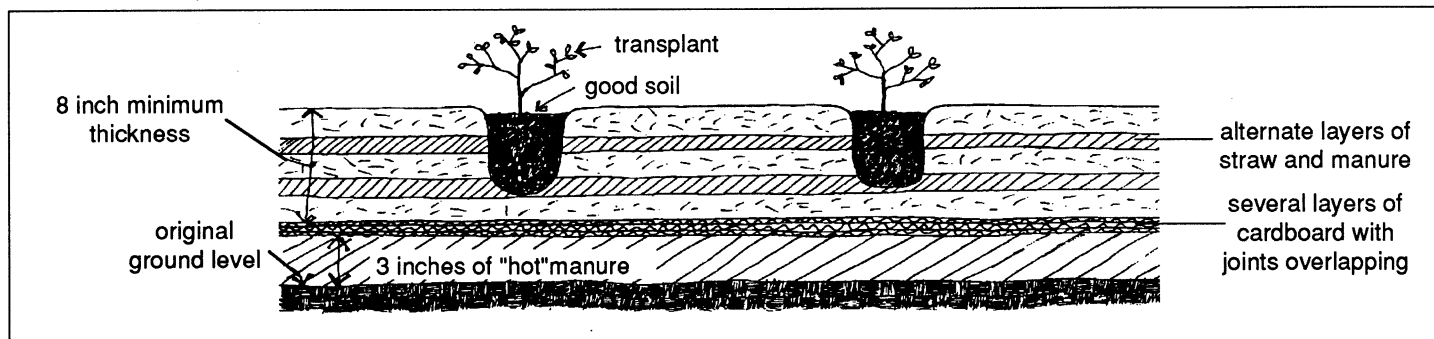
Total eradication of Bermuda from an entire yard may not be feasible or even desirable. Eradicating Bermuda would require using biocides—a permaculturally unacceptable solution—or extensive manipulation of the soil. Comprehensive screening of the soil to a depth of 3 feet could potentially remove all roots, but soil layers would be mixed and soil microorganisms and earthworm populations disrupted. As an alternative, I've found it useful to evaluate Bermuda's effects in different zones of the system and experiment with strategies for each. Here's what works for me.

**Zone 1, Salad Garden:** Bermuda wreaks the most havoc in the area where small, closely spaced plants are grown, both because it crowds out these plants, and because pulling it out is very disruptive to the root systems of closely growing plants. I restrict my salad greens to a 4- by 6-foot straw bale cold frame (see PDJ No. 18) in fall, winter and spring, and to containers in the summer. These small, intensively planted areas produce all the salad greens my family can eat. Both the cold frame and the containers can be inexpensive. The cold frame can be made out of recycled materials, and the containers can be made of cardboard boxes reinforced with packing tape, an idea from Tucsonan Dan Dorsey's garden.

Restricting the salad garden to a small, intensively planted area makes exclusion of Bermuda much more feasible—either by keeping a thick mulch down at all times or by initially screening the soil. I find that sheet mulch creates a nitrogen-rich humus that is ideal for greens, but has the drawback of encouraging sow bug populations, something I've had to work out coping strategies for (see sidebar). Container gardening eliminates the Bermuda problem completely, while allowing the gardener to take advantage of the most beneficial microclimates in different seasons.

**Zones 2-3, Main Crop Gardens:** Bermuda seems to be less problematic in the main crop garden area. Main crop vegetables—such as tomatoes, corn, squash, and cucumbers—are spaced relatively far apart. A thick sheet mulch, renewed at the beginning of the season, will suppress most Bermuda grass. When Bermuda does appear it is not as destructive as in the salad garden because of the amount of space between plants. In winter, when Bermuda is dormant, the rich soil from the sheet mulch in the main crop area may be planted to leguminous cover crops such as peas and fava beans. The sheet mulch should be thin enough by fall to minimize sow bug problems; if not, a small-seeded cover crop may be an alternative.

Sheet mulch technique to exclude Bermuda grass



**Zones 2-4, Perennial Gardens:** In a forest-like garden of layered canopies, Bermuda grass is shaded out—its vigor is diminished and it will not thrive as an understory plant. To further reduce its vigor, water can be restricted from Bermuda by watering perennial plants with drip irrigation or “deep pipe” irrigation (see PDJ No. 9). Positioning annual gardens at the edge of a tree canopy helps prevent the annual beds from being surrounded and engulfed by a sea of healthy Bermuda.

While I believe it's possible to live harmoniously with Bermuda, I confess I'm delighted at no longer having to deal with it since moving out of Tucson. It takes additional energy, both in labor and planning, to co-exist with Bermuda, something to consider when choosing a site for a permaculture system.

## COPING WITH SOW BUGS

By VICKI MARVICK

I'm amused when I read in gardening books that sow bugs don't eat living plants, only dead and decaying organic material. The sow bugs in my sheet mulched gardens haven't read this, and eat whatever they please. Shortly after beginning to mulch heavily, I investigated the mysterious loss of bean seedlings with a flashlight at night. Sow bugs were swarming over the emerging seedlings, eating them completely. Rather than give up the luscious black soil created by sheet mulch, I've found ways to deal with the sow bugs. Here's what works for me—at least most of the time.

- **Plant thickly and thin later.** This seems to be the best solution for peas and beans. Sow bugs seem to go first for the lone seedling while ignoring large clumps of seedlings, or, if they do chow down on the clump, there's a better chance that some will survive.

- **Use transplants whenever possible.** Plants under 2-3 inches tall seem to be perceived as food by my sow bugs, but they leave the larger seedlings alone.

- **Delay renewing a heavy mulch** and pull back any mulch remnants from the previous season if you must seed directly. Mulch heavily when the plants are big enough for sow bugs to ignore.

- **Use season extenders as a sow bug barrier.** I like to use wall-of-water mini-greenhouses (vertical plastic tubes arranged in a cylinder, filled with water, and placed around a plant) to extend my warm weather gardening season. I leave bare soil within the wall-of-water and find that sow bugs leave the seedlings inside alone. I leave the wall-of-water on until the plant inside is quite large, which has the added benefit of protecting the young seedling or transplant from sun scald and wind damage. When I take the protection off, I pull thick mulch up around the plant. This works well for peppers, eggplant, tomatoes, and squash.