
Hill Ponds for Landowner and Wildlife Benefits

Jeanette Wrynski, Yolo County RCD

Ponds constructed in low hills are easily recognized as having aesthetic value. They can also collect and store storm runoff from small watersheds and provide watering sites for domestic livestock and wildlife. They can provide wintering or pair water for waterfowl and, if properly vegetated, nesting sites as well. There are a host of other wetland species that can benefit from constructed ponds. Installing one involves a few key steps which, if done properly, will provide benefits for generations.

Site Selection

In choosing a location for a hillside pond, the general topography must be considered, especially whether or not the land contours will provide a suitable shape and a variety of water depths for vegetation. The size (acreage) of the drainage/watershed will directly affect the size of the dam needed to form the pond and there must be an appropriate pair of high spots between which to construct the dam. Rainfall records for the area can help in calculating the amount of runoff water that the pond could be expected to carry.

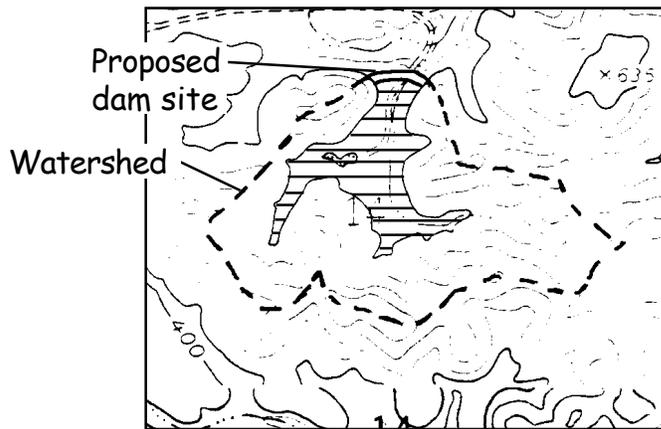
The vegetation in and surrounding a proposed pond site may not necessarily affect your ability to construct the pond, but can sometimes give indications of the soil types. A hill pond constructed on highly permeable soil will be unable to hold water, but can provide groundwater recharge. A pond intended for livestock watering would best be constructed on relatively impermeable soil so as to hold water into the dry season. Small ponds may dry up by June, but shallow ponds warm up sooner, growing important invertebrate food for nesting waterfowl. Reviewing a local soil survey or simply being familiar

with your own soil types could make the difference between success and failure for a new pond.

Water Rights

The successful completion of a pond project will depend upon securing water rights. The State of California **requires** that a water rights permit be obtained prior to constructing and storing water in ponds or reservoirs. The State Water Resources Control Board, Division of Water Rights (916.657.2170) will send you a packet that includes information and application forms. There are three categories of water right applications that could apply to hill pond projects: 1) the Stock Pond program; 2) Small Domestic Registration; and 3) Appropriative Water Rights.

The Stock Pond Registration program was primarily for livestock watering reservoirs constructed prior to January 1, 1969 with a maximum storage capacity of 10 acre-ft. The deadline to submit applications for Stock Pond Registration was December 31, 1997



Small Domestic Registrations cost \$100.00. Water stored under the Small Domestic Registration program (maximum storage capacity of 10 acre-ft.) is primarily for household domestic use on the property but may also include water for irrigating up to 1½ acres of lawn and garden, domestic stock, aesthetic and recreational uses.

Appropriative Water Rights, which are not limited by a 10 acre-ft. maximum, are the water rights most likely needed for typical hill ponds. The cost for this type of water right can exceed \$1,000 and may take several years to obtain, so one must plan ahead. These permits must receive environmental clearance from the state. Contact your local Natural Resources Conservation Service (NRCS) or RCD office for assistance with completing the paperwork for the individual permits.

Technical Assistance and Cost Sharing

Several public and private agencies can provide support to those wishing to construct a pond with multiple benefits that include wildlife. Support could include anything from surveying and pond design by an engineer, a site visit to discuss placement, configuration, habitat, slopes and vegetation, or cost-share programs that pay for varying portions of construction. Organizations providing this support include your local Resource Conservation District, California Waterfowl Association, Ducks Unlimited, the USDA Natural Resources Conservation Service, the US Fish and Wildlife Service, and California Department of Fish and Game, as well as local native plant suppliers and construction companies. Any of these organizations can provide more detailed information about their respective support programs. Please see our lists of local vendors and cost-share sources located at the end of this book.

Construction

The first step toward construction, once a proper site has been selected, is to survey the site and set stakes for the equipment operators. Soil disturbance directly under the dam site and excavation of the keyway (a trench across the dam-site that is below the existing ground level) are important steps for getting good soil contact and preventing seepage under the dam (see drawing 1, “core trench”). During the dam construction, each layer of soil pushed up should be compacted with an implement such as a sheep’s-foot roller, but good compaction can’t be accomplished unless the fill soil is moist. Careful attention to dam slopes, bank slopes and pond contours will give the best result in terms of function and bank stability. Typical slopes would be 2:1 (2 feet of run for each 1 foot rise in height) on the dry side and 3:1 on the wet side to reduce erosion. These features will allow good growth of the emergent wetland vegetation that provides good wildlife habitat. Most ponds require both a pipe spillway (drawing 1, left) and an emergency overflow with gradual slopes to prevent erosion during overflow events. A simple earthen overflow could suffice for a small pond in an ideal location. Engineers at the NRCS can help with design criteria.

Vegetation

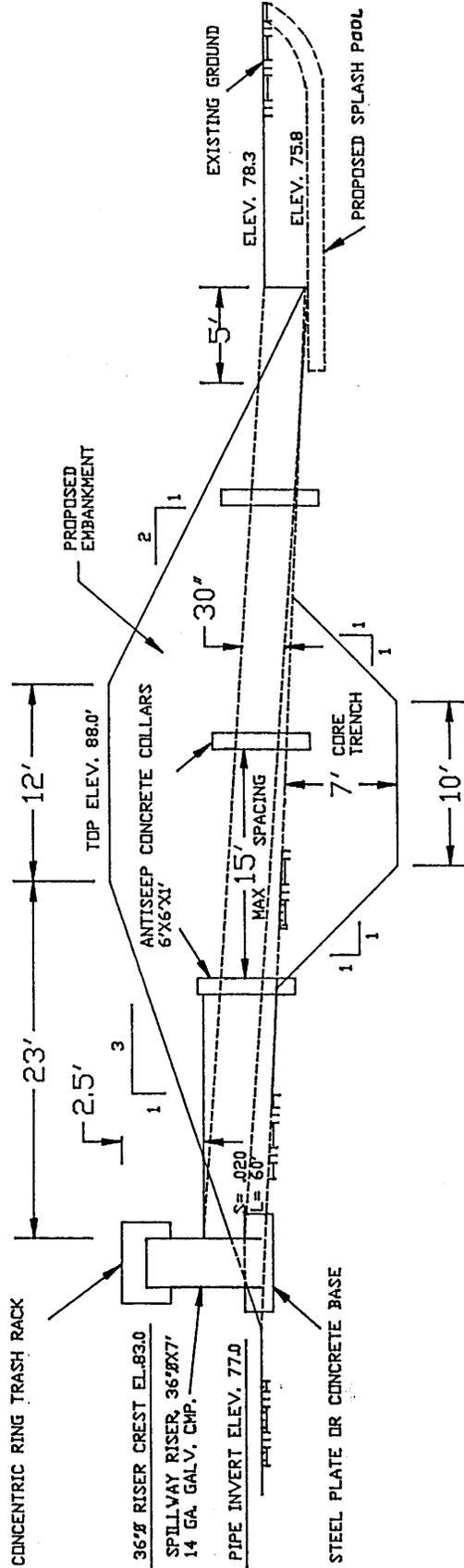
A pond site can be planted with a large variety of trees, shrubs, forbs and grasses for aesthetic value, biodiversity and soil stabilization. Attention need only be paid to matching the plants’ living requirements (especially its water needs) to conditions around the pond. Islands constructed within the pond can provide special opportunities to create safe, well-vegetated resting places for wildlife. Plants like Swamp timothy can be important food sources and water-loving plants like Spikerush and Cattail are important emergent vegetation for nesting or brood habitat. Ideally, the right combination of plants can be selected to be self-sustaining for minimal maintenance costs. A Resource Conservation District, public or private conservation organization, or native plant nursery can provide helpful input on plant selection.

Maintenance

Most ponds, if constructed according to design criteria, should be maintenance-free. Initially, when the pond is new, the levee (dam) could settle and earthen spillways could erode, so repairs may be needed. If the pond regularly catches silt or has excessive unwanted plant growth, occasional cleaning may be necessary. If erosion above the pond is expected, a silt-trap could be important to include in the pond design to reduce the need for dredging of the pond itself.

Hillside ponds can provide a series of benefits to landowners and non-landowners alike. Numerous water catchments above the valley floor can slow down storm flows, provide food and water sources for livestock and wildlife, and improve the overall appearance of the local landscape.

EXAMPLE OF LARGE DAM:
 10 ACRE SURFACE AREA RESERVOIR
 25 ACRE-FOOT STORAGE ON 100 ACRE WATERSHED

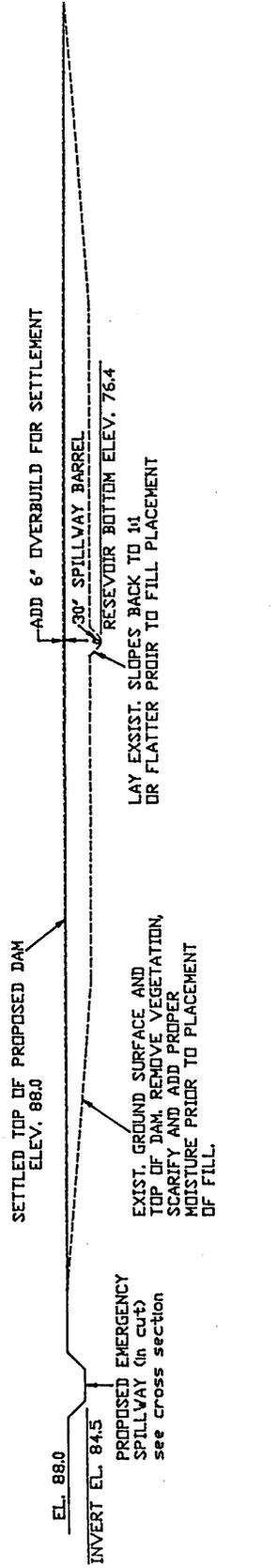


GENERAL DAM STRUCTURES
 CROSS-SECTION

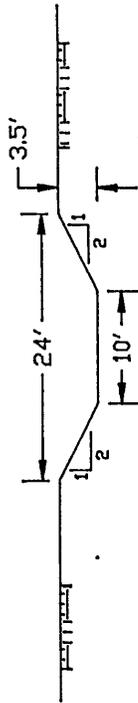
US DEPARTMENT OF AGRICULTURE
 NATURAL RESOURCES CONSERVATION SERVICE

DRAWING 1

PROFILE ON AXIS OF DAM



CROSS SECTION OF EMERGENCY SPILLWAY



GENERAL DAM STRUCTURES CROSS SECTION OF EMERGENCY SPILLWAY PROFILE ON AXIS OF DAM
US DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE