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Farm Water Quality Planning

A Water Quality and
Technical Assistance Program
for California Agriculture

<http://waterquality.ucanr.org>

This REFERENCE SHEET is part of the **Farm Water Quality Planning (FWQP)** series, developed for a short course that provides training for growers of irrigated crops who are interested in implementing water quality protection practices. The short course teaches the basic concepts of watersheds, nonpoint source pollution (NPS), self-assessment techniques, and evaluation techniques. Management goals and practices are presented for a variety of cropping systems.



Reference:

Developing a Farm Map

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Maps play a useful role in the development and presentation of a farm plan. Much of the farm inventory can be shown on maps. Maps can graphically show the natural and cultural features present on the farm and their spatial relationships.

To develop a farm map, begin with a base map. Aerial, topographic, GIS, or even hand-drawn maps can serve as base maps. Aerial maps show features such as roads, fences, waterways, and vegetation. A common way to add information to a GIS base map is to add transparent layers that show additional features not shown on the base map. GIS is a computer system capable of assembling, storing, manipulating, and displaying geographical information in layers. Following is a list of farm inventory information that can be included in various maps and overlays:

BASE MAP

Begin by including an information block showing the name and location of the farm, names of the owner and manager, name of the person who developed the map, date of map preparation, and map scale.

A map legend should be included to explain symbols and color schemes used on the map. Conventional map symbols used by USDA Natural Resources Conservation Service are shown in [Figure 1](#).

Property, field, and block boundaries may be shown on the base map or as an overlay.

OVERLAYS

- The *Boundary Overlay* shows property lines, fence lines, roads, and other features at the discretion of the mapmaker.
- The *Hydrology and Natural Feature Overlay* shows streams, rivers, lakes marshes, estuaries, wetlands, and other water bodies on or adjacent to your farm. This overlay may also include other important natural features such as ridge tops, cliffs, valleys, wildlife habitats or refuges, and other natural features.
- A *Cultural Features Overlay* may include roads, homes, farm headquarters, barns, equipment storage buildings, pesticide storage sheds, irrigation and drainage structures, and any other desired feature.
- A *Planting Overlay* with field number, crop type, acreages, and irrigation set-up information is extremely valuable.
- *Soils Overlays* are helpful for replanting and redevelopment decisions.
- *Monitoring Overlays* show the location of monitoring points used to document conditions and projects on the farm or ranch.
- *Planning Overlays* may be developed to show the locations of planned treatments, cultivation practices, irrigation applications, and future redevelopment.

BOUNDARIES, MARKS

Watershed boundary	
Farm or ranch boundary	
Field or land-use boundary	

Soil boundary	
Field number	
Field acreage	320 ac.

WORKS AND STRUCTURES

Road	
Railroad	
Bridge	
Ford	
Farmstead	
Corral	
Fence	
Power-transmission line (label if underground)	

Telephone or telegraph line (label if underground)	
Pipeline (label)	
Pipe riser	
Pump	
Trough	
Tank (label)	
Water tank (label)	
Special purpose plantings (label)	

HYDROGRAPHIC FEATURES

Streams	
Perennial	
Intermittent	
Drainage ditch	
Drainage	
Gully	
Drop structure	
Flume or syphon	
Irrigation ditch	
Levee or dike	
Without road	
With road	
Pickup ditch	
Small reservoir or stock pond	
Spring development	
Spring and trough	
Streambank protection	

Slide or slip (tips point upslope)	
Intermittent lake or pond	
Intermittent streams	
Lake or pond	
Perennial streams	
Spring	
Swamp or marsh (large areas)	
Swamp or marsh (small isolated areas)	
Canal (label)	
Check dam or gully plug	
Closed or tile drain	
Dam and reservoir	
Diversion	
Well, artesian	
Well, irrigation	

Figure 1. Conventional mapping symbols for conservation plan maps. (SOURCE: Conventional Mapping Symbols for Conservation Plan Maps USDA-SCS Portland, Oregon. 1965. Publication # M-3534)

DEVELOPING OVERLAYS

Overlays are easy to develop for hardcopy maps. Sheets of acetate or other transparent material are placed over the base map. Tick marks are placed on the overlay, marking the corners or other locations on the base map so that the overlay can always be returned to its proper geographic location. It is helpful to tape the base map and overlay to your work surface. Be sure to use tape that will come off easily without damaging the overlay or map. Once the overlay sheet is “geo-located” you are ready to start drawing features on the overlay. Initially, you may want to use erasable ink pens so that you can easily correct any errors. Once you are satisfied with the overlay, you can redo it using permanent ink.

You can also use computers to make maps and incorporate overlay information. With the use of Global Positioning Systems (GPS) and GIS software, computers can do the overlay work described above. Private consulting firms that have GPS and GIS technology can provide these services for the individual grower.

ESTIMATING AREA

You may need to estimate the area in a block, several blocks, or your entire farm. A common means of estimating area is to use an acreage-calculating dot grid. To use a dot grid, first you determine the number of dots in a known area (for example, 25 dots = 5 acres). Then you count the dots in an area of unknown size and use the number of dots to calculate the number of acres. If you know the scale of your map, you can also use the tables that often accompany dot grids.

REFERENCE

George, M. R. 1996. Rangeland watershed program water quality planning guide No. 3: Developing a ranch map. Davis: University of California, Department of Agronomy and Range Science.

FOR MORE INFORMATION

You'll find detailed information on many aspects of field crop production and resource conservation in these titles and in other publications, slide sets, CD-ROMs, and videos from UC ANR:

Nutrients and Water Quality, slide set 90/104

Protecting Groundwater Quality in Citrus Production, publication 21521

Sediments and Water Quality, slide set 91/102

To order these products, visit our online catalog at <http://anrcatalog.ucdavis.edu>. You can also place orders by mail, phone, or FAX, or request a printed catalog of publications, slide sets, CD-ROMs, and videos from

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