



SIMPLY THE FACTS

On

Animal Waste

and

Water Monitoring

(For Landowners, Farmers, & General Public)



A compilation of fact sheets on water quality monitoring by:

USDA Natural Resources Conservation Service
University of California Cooperative Extension
AmeriCorps

Water Quality Fact Sheets

This packet contains a series of water quality fact sheets concerning animal waste in surface waters. The fact sheets were designed to provide a clear and simple description of water monitoring tests performed by the California Department of Fish and Game, and the Regional Water Quality Control Board.

If you would like additional copies, please contact the Natural Resources Conservation Service in Petaluma at (707)794-1242.

Topics Covered

- ◆ Total Ammonia
- ◆ Unionized Ammonia
- ◆ pH
- ◆ Conductivity
- ◆ DO (Dissolved Oxygen)
- ◆ Monitoring Sites
- ◆ BOD (Biochemical Oxygen Demand)
- ◆ Water Quality Variables: Overview
- ◆ Ammonia Test Kit: Directions
- ◆ Water Testing: Techniques
- ◆ Ammonia, pH, Temperature: Tables

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, marital or familial status. (Not all prohibited bases apply to all programs). Persons with disabilities who require alternative means for communication of program information (Braille, large print, audio tape, etc.) should contact the USDA Office at (202) 720-5881 (voice) or (202) 720-7808 (TDD).

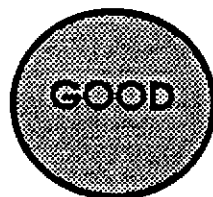
To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C., 20250, or call (202) 690-1538 (voice) or (202) 720-1127 (TDD). USDA is an equal opportunity employer.

SIMPLY THE FACTS on pH



DEFINITION pH is the measure of acid or alkaline characteristics and is measured on a scale of 0-14. A pH of 7.0 is neutral and ideal for water conditions. Readings that fall below 7.0 identify acidic conditions while readings above 7.0 identify alkaline conditions. The pH directly affects the amount of unionized ammonia in water. An increase in pH values above 7.0 combined with high water temperatures will result in higher levels of unionized ammonia which are deadly to fish. Shifts in pH levels can be contributed to a number of agricultural practices such as animal waste and silage, and should be kept away from streams. Changes in pH can also result from natural conditions such as algal growth.

WATER MONITORING • pH



- 6.5 - 8.5
- Neutral
 - Ideal water condition



- 5.0 <-> 6.5 and 8.5 <-> 10
- Readings closest to 7.0 are ideal
 - Evaluate waste management



- 0 <-> 5.0 and 10 <-> 14
- Acid and alkaline conditions
 - Identify sources of pH change
 - Immediate action necessary!

POSSIBLE SOURCES Runoff from enclosed confined facilities (i.e., loafing barn). Runoff from silage storage areas. Runoff from open confined areas (i.e., corrals, feed-lots). Runoff from manure storage areas. Facilities waste water. Runoff from over-fertilization. Runoff from overstocked pastures. Animals in the creek.

Date	Station	Reading



AmeriCorps &
United States Department of Agriculture
Natural Resources Conservation Service
(formerly Soil Conservation Service)

1301 Redwood Way, Ste 170
Petaluma, CA 94954
(707) 794-1242

For Water Quality information contact:
Natural Resources Conservation Service
Regional Water Quality Control Board
California Department of Fish & Game
UC Cooperative Extension

6/95

SIMPLY THE FACTS on Conductivity

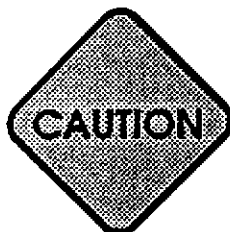


DEFINITION Electrical conductivity is one way to determine the salinity in soil and water. Salinity is the concentration of dissolved salts found in soil and water. An electric conductivity meter is used to determine salt content and is recorded in umhos/cm. High soil salinity interferes with plant water uptake resulting in reduced plant growth and germination. In excessive amounts, salts running off into nearby waters such as streams, ponds, and lakes can become toxic to freshwater aquatic plants and fish. Animal wastes as well as some agricultural products may have a high salt content and can be a problem when over-applied to the land. One should expect to find high salinity readings present in streams with tidal influences. If your property is located near an estuary, contact the Regional Water Quality Control Board to determine ideal salinity levels.

WATER MONITORING • Conductivity



Below 500 umhos/cm
• Management practices are sufficient



Between 500 - 1000 umhos/cm
• Evaluate waste management system



Above 1000 umhos/cm
• Identify possible sources
• Immediate action necessary!

SALINITY SOURCES Poor subsurface drainage. Irrigated crops. Runoff from enclosed confined facilities (i.e., loafing barn). Runoff from silage storage areas. Runoff from open confined areas (i.e., corals, feedlots). Runoff from manure storage areas. Facilities wastewater. Runoff from over-fertilization. Runoff from overstocked pastures. Animals in the creek. Tidal influence.

Date	Station	Reading



AmeriCorps &
United States Department of Agriculture
Natural Resources Conservation Service
(formerly Soil Conservation Service)

1301 Redwood Way, Ste 170
Petatuma, CA 94954
(707) 794-1242

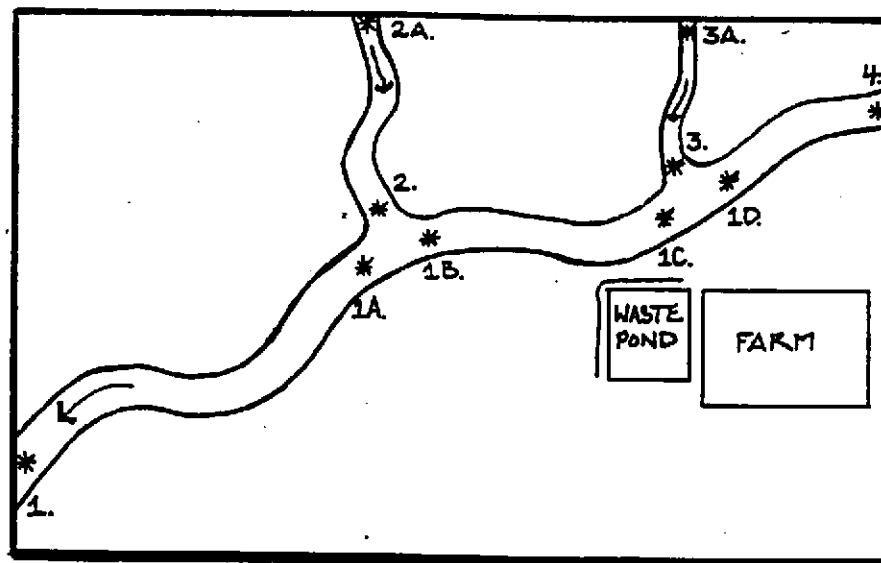
For Water Quality information contact:
Natural Resources Conservation Service
Regional Water Quality Control Board
California Department of Fish & Game
UC Cooperative Extension 6/95

SIMPLY THE FACTS on Monitoring Sites



To select water monitoring sites for a farm or ranch:

1. Obtain current aerial photography or a map of the property. Label the map in a numeric system to denote the best locations for possible monitoring sites (example below). Start by choosing sites on property lines (i.e., sites 1, 2A, 3A, 4). This will determine the water quality entering and leaving your property.
2. Pick sites located at the downstream end of tributaries to determine the water quality entering the main channel of a creek (i.e., sites 2 and 3). This way, you can identify possible sources of nutrient loading simply by backtracking upstream from those sites (to sites 2A and 3A). While backtracking, if you receive a clean/non-polluted sample, you can pinpoint the pollution source.
3. Once you have identified a source of pollution, keep a record of your results and note problem sites. Record any observations concerning water quality and riparian habitat. These observations include date, time, weather conditions, water color, odor (if any), vegetation, the presence of wildlife, and general conditions. Also record your water sampling data such as temperature, pH, ammonia, flow, turbidity, conductivity, DO, etc.
4. The best time to sample is in the morning when the water is coolest. It is also best to sample in the rain or just after a rain to locate problem areas. Consistency in sampling is important to evaluate results over a period of time and to make corrections as needed.



AmeriCorps &
United States Department of Agriculture
Natural Resources Conservation Service
(formerly Soil Conservation Service)

1301 Redwood Way, Ste 170
Petaluma, CA 94954
(707) 794-1242

For Water Quality information contact:
Natural Resources Conservation Service
Regional Water Quality Control Board
California Department of Fish & Game
UC Cooperative Extension

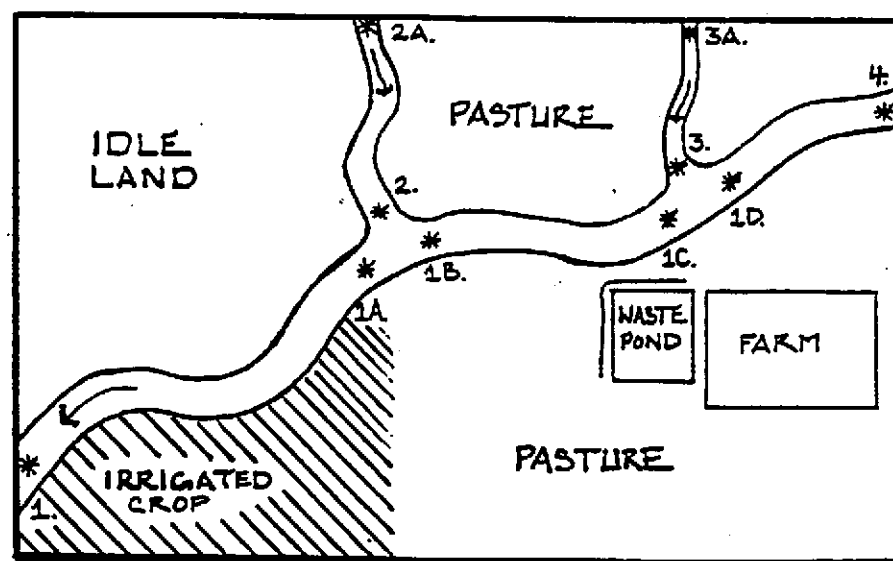
6/95

WATER MONITORING EXAMPLES

- ▼ A high nutrient reading was found at monitoring stations #1 and #1A. All other stations were sampled with low readings.
 - Conclusion: Nutrient source most likely is runoff from irrigated crop.

- ▼ A High turbidity (suspended sediment) level is recorded entering the property at station #4. At station #1 leaving the property a low turbidity level is recorded.
 - Conclusion: Sediment is being deposited between Station #1 and #4 in the stream channel.

- ▼ Station #2A and #2 have high nutrient levels recorded. A moderate nutrient reading was recorded at station #1A. Station #1B has a low nutrient level.
 - Conclusion: Tributary #2 has a high nutrient level entering the creek. Reading at station #1A has been diluted but a problem has still been diagnosed.



AmeriCorps &
United States Department of Agriculture
Natural Resources Conservation Service
(formerly Soil Conservation Service)

1301 Redwood Way, Ste 170
Petaluma, CA 94954
(707) 794-1242

For Water Quality information contact:
Natural Resources Conservation Service
Regional Water Quality Control Board
California Department of Fish & Game
UC Cooperative Extension 6/95

Thank You

The Natural Resources Conservation Service would like to say thank you to local farmers, landowners, contributing agencies, and AmeriCorps members for their participation in local water quality efforts.



"The CHP doesn't accept the excuse that you didn't know how fast you were going. The water cops and the public won't accept any excuses either. A producers' best protection is full knowledge of their individual situation. Then action can be taken or not taken as needed - and most importantly on your own terms and schedule. Get busted, and someone else will be setting the rules. Testing is easy and cheap."

Paul Martin, Dairy Farmer
Director, Southern Sonoma County
Resource Conservation District

"We have worked hard on the water quality committee organizing and using the tools that are available to us. However, there are still improvements to be made if we are to stay in business as dairy farmers. With hard work hopefully we can improve conditions for the dairy farmers while improving water quality, and protecting fish and wildlife habitat."

Joey Mendoza, Dairy Farmer
Marin-Sonoma Animal Waste Committee

"Monitoring water quality provides very valuable feedback. Operating without it is like driving with one's eyes closed."

Rick Bennett, Environmental Science Advisor
University of California Cooperative Extension

"The continued survival of local fish and wildlife resources is dependent upon our success in limiting the release of deleterious constituents from animal wastes into local creeks and streams. Death of aquatic life takes just a few minutes, but the effects are long term. Everyone needs to do their part."

Mike Rugg, Water Quality Biologist
California Dept. of Fish & Game

"We prefer to implement effective water quality management in partnership with agricultural landowners through voluntary compliance with water quality laws. Implementation of a voluntary monitoring program will provide an assessment of water quality, help identify any problems, and will measure the success of implemented corrective actions.

The health and welfare of people and food producing animals is dependent on good water quality. Good water quality is also critical for the aquatic life, birds, and mammals that depend on our waterways for habitat and food. Please join us and help improve and protect water quality in your watershed. Your commitment to this partnership is appreciated."

Dennis Salisbury, Environmental Specialist
Regional Water Quality Control Board