



SURVIVAL PAPER #SP94-5

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WATER

By Jim Boorman of Freliance Systems

Sources of drinking water are almost as limitless as your imagination but may require more sophisticated retrieval methods than you are capable of now or would be in a disaster situation.

You can dig a dandy well with nothing more than a pick, a shovel, and a bucket on a rope, but if the nearest water is over a hundred feet straight down, then you might as well have no tools at all because digging a deep well is extremely dangerous, if not downright deadly, and a hundred-foot well nearly impossible. You also want to avoid digging several dozen wells all over the place trying to locate water because, although you get some great experience digging wells, you still won't find water if it is not there to be found.

It is true that most of this country is undershot with aquifers of one type or another, but there are still huge areas that have little or no effective groundwater. Sure you can get several gallons a day most anyplace but that is not enough to support any endeavor except merely staying alive. You will need and want much more.

How can you tell, without becoming a hydrologist, where to find water? The best way, for a layman, is to hire a professional well drilling company to do the work for you. But lacking the money to do the job (or, in a long-term survival scenario, lacking the company), you could fall back on the second-best method, that of conducting a water survey.

Doing your own water survey is not easy and, in fact, can become quite complex. It is a job that you do not want to put off until an emergency arises because that will more than likely be too late. Do it now, in an area that you will most likely find yourself in during an emergency (or for your new or planned homestead) while you still have the time to do the complete and thorough job that is required. Doing a water survey of prospective areas now may very well keep you from selling your new homestead or retreat at a loss later when it is discovered that there is a marked inadequacy in the local water supply.

How much is enough? If you can provide enough water to fight an established fire in your home or out buildings, then you will be able to supply all the water that you will normally need for living and the remainder of your retreat or homestead plus a healthy surplus for storage. In outlying and remote areas or areas of individual water supply systems, your water supply will be relied upon completely (or nearly so) to provide the water to fight a fire. You will want to have enough available.

The National Fire Protection Association recommends that if your well is to be relied upon for fire protection without supplemental storage, it should be able to demonstrate, by a pumping test, that it can output a minimum of 8 to 10 gallons per minute continuously for a period of two hours during the driest time of the year. If this rate cannot be achieved, then the supplemental storage must be added to take up the slack. Remember that this is a minimum requirement and to be on the safe side (especially for emergencies such as drought, grass fires, and forest fires) an output of twice that amount should be your goal. If your safety goal is 20 gallons per minute and your well can only output 10 gallons per minute, then you must provide a supplemental storage facility to hold a minimum of 10 gallons per minute for 2

hours or 1,200 gallons. That is a tank roughly six feet deep and twenty feet in diameter (a two-week survival supply for a family of five or a two-day supply for that same family at normal-usage rates).

Obviously, you will not be able to supply these needs by squeezing cactus, therefore you will need to find an available surface water source or construct a well in a proper location. Finding that location can be a real problem, though, so you must make a map of water indicators or a "Water Survey" map.

You may use a simple road map of your area and later transpose this information onto a topographical map, but I recommend that all work be done on the topographical map to begin with as locations can be made much easier and more accurately.

Begin by first marking the boundaries of your retreat or property (if you are still looking for the proper location, then this would be your last step). Next, mark all known surface water such as lakes, streams, ponds, marshes, and so forth as well as a high water points and dry creek or pond beds as these may indicate water sources during the wet season and may indicate shallow water tables close by.

This is a good time to compare a U.S. Geological Survey map of known consolidated and unconsolidated aquifers to your water map. Mark down aquifer boundaries and ideally locate your retreat within the boundaries of an unconsolidated aquifer as this will mean a higher volume of water available and a faster replenishment rate.

Your next plot will be a survey of existing wells in your area. Be sure to mark the depth at which they were drilled, the depth at which water was first hit, and their yield rate. Check with your local fire departments to determine areas of low yield wells and poor endurance.

Any natural springs or artesian springs or wells should also be plotted. Be sure to note the artesian head (or how high the water spouts or sits above the apparent water line).

When you have finished this phase, you will be able to fairly accurately predict how close to the surface the water table lies at just about any point in your area. The water table is not level but will tend to follow the main features of the terrain though at various depths.

Even though the water table will tend to correspond to the land's surface, the flow direction of that ground water will not. The flow of local rivers and streams are also not good indicators of ground water flow direction. Without an in-depth study of hydrology and special equipment and procedures, flow direction can not be predicted with great accuracy but even ground water flows downhill; you can assume rather safely that it will flow downhill along the major lay of the land (i.e., from mountain to valley but not necessarily from ridge top to ravine).

You should try to establish general flow direction as it will be an important factor when you begin to plot contaminant sources later on in this project. This should be relatively easy to ascertain with a topographical map.

You may now begin the present water-quality phase of your survey by adding to your present map the known water quality test results from all of the existing sources that you have already marked down. If test results indicate bad water, then also note why it is bad and to what extent it is contaminated. There may be only one small area or a large portion of your area that is highly contaminated with arsenic, for example, and after all of the water sources with arsenic contamination have been noted, you will see a well-defined area developed on your map. You can rest assured that any new water source (a spring, well, or surface water source) in this area will also be contaminated and that you will have to locate outside this area to escape this pollution.

Your last phase is actually two parts. First, plot every possible source of contamination in your entire area. Plot such items as waste disposal sites, industrial sites, farms, gas stations, major routes, cities, towns, sewage treatment facilities, hospitals, construction sites, cross-country pipelines and pumping stations, storage banks, airports, rail lines and yards, power stations, nuclear facilities, mining operations, etc., etc.

You may, or may not, experience contamination from these sites. But if the location uses or stores liquid wastes or chemicals or water-soluble wastes, then you can safely assume that you do have contamination into the soil and if the contamination reaches your ground water then it, too, will become polluted and the contaminant plume will flow downstream eventually contaminating every water supply in its path.

The second part of the last phase will be to determine the existing contaminant levels in your raw water and whether or not these levels are naturally tolerable to man over a long period. The majority of these contaminants should be removed with normal treatment methods but in a disaster scenario, you must assume that your water contains full-strength contamination.

Next, you must assume a disaster that is intense enough to cause extreme damage to all of the facilities that you have plotted up to this point. Petroleum and chemical storage tanks are ruptured, pipelines are broken, and so forth.

(Other sources of contamination may be commercial airlines flight paths over your area – for crash purposes, military operations areas, cities, towns, and industrial or mining sites upstream but not actually in your area.)

Your pollution levels are now vastly increased. Previously tolerable levels are now dangerous and dangerous levels now become deadly.

Try to plot the resultant plume of contaminants before, during, and after a disaster occurs. Try to adjust for prevailing wind conditions (which will change with the seasons) which may carry contamination to otherwise safe water sources.

By now you will have a well-defined (if a little cluttered) picture of dangerous water zones. You should, if at all possible, try to locate within safe water zones or at least in very lightly-contaminated zones no matter how effective your treatment methods are. There is no sense in pressing your luck!

During a disaster, many normally stable conditions will change. Your carefully-surveyed water sources may be contaminated to a high degree or you may not be able to find a source of good water that can be treated without a great deal of trouble. In this case, you should give some thought to recycling what good water you do have to increase your water supply and stretch your survival as long as possible.