WATER SEARCH WITH DOGS

by
Marian Hardy
Mid-Atlantic D.O.G.S.

In searches on land we have found that not just one search resource holds all the answers, to solve the mystery of where the victim is located. The skills and experience of many types of resources are needed. Most times it is the coordinated effort of the search that finds the victim, not a single person's or one group's "superior skill". For instance, in the past 20 years in the MidAtlantic States of the USA, the various land search resources have been not only been working together on searches more and more, but the various groups have been training together periodically in order to better understand and coordinate their respective skills.

In water searches, no one resource holds all the answers either. There are, however, some added complications. A water search is a three dimensional problem being conducted under adverse conditions for the searchers. There are depth, current, snags, temperature, and various states of "blindness" for either the diver or the dragging crews.

The tools and techniques available to searchers to find someone under water are increasing in type and in numbers. For instance, there are in addition to the dragging tongs, new techniques have been developed and employed by the public service divers and the swift water rescue people. There are dog teams trained to detect human scent coming from under water. There are under water TV cameras and sonar hooked up to recorders to make visual records of an under water search area and there are the LORAN-C and the Geographic Positioning System (GPS) to preserve a position in open or relatively open water so that you can relocate the area to search.

My objectives today are to present the capabilities of search dog teams, to give you some incite as to what to look for in a water search dog team and to suggest strategies for using these teams.

For those of you who are learning about water search with dogs - a little background.

In the early '80s, the interest in using Search and Rescue (SAR) dogs to detect victims under water began to spread across the United States. A few SAR dog units and individuals had already become aware that their dogs were alerting on victims under water, but the concept was neither widely accepted, understood, nor practiced.

One problem was that people did not believe that dogs could find someone under water. After all, "everyone knows" that if you are a bad guy, the best way to give the police dog the slip is to walk through water! The other part of the problem was that, when a dog detects a submerged victim, it is an "indirect find" - someone else still had to physically locate and recover the body. That recovery might not happen until a later date - either by diving or dragging, or the body might surface by itself In any case, the relationship of the dog's alert to the ultimate recovery was overlooked - and the myth perpetuated.

A few of us concerned about the use of dogs in water search developed the NATIONAL WATER SEARCH REPORT in 1984 (Appendix A), as a mechanism to systematically collect

data about water searches throughout the SAR dog community. You will note that the report is interested in three time frames - the incident, the search (with dogs) and the recovery.

The objective was, and still is, to document the fact that dogs have been responsible for detecting drowned victims and to identify some basic rules-of-thumb that might help dog handlers and water searchers identify the most likely areas to be searched in certain circumstances - but more about that later.

In 1988, a compilation and analysis of the National Water Search Reports was published and a review of subsequent reports has upheld the initial analysis.

The 1988 Study was based on 122 water search reports sent to the National Association for Search and Rescue (NASAR) from SAR dog units around the country. Twenty-six different SAR dog units were involved, sometimes cooperating in multi-dog unit searches. Of the 130 victims involved, 84 were found by dogs, 24 were recovered out of the area searched and 22 have not yet been recovered, to my knowledge. Of the 22 victims not recovered or found, the dogs alerted on 9 of them, but the divers or draggers could not be followed up. The location was too hazardous to the divers, too deep (150 feet or more) or, in the case of flooded valleys, the remaining trees, buildings and bridges underwater were not suitable for either dragging or diving. The bottom line is that dogs can detect a person under water.

Now I would like to discuss how it works, how you can deploy dogs, the types of water that can be searched, the SAR dog team's limitations, and give you some documented examples of SAR dog teams and divers working together to detect and locate drowned victims.

HOW IT WORKS

Although a lot of; scientific work has been done on scent, little is still actually known about the true mechanism as it relates to the olfactory ability of the dog. This is especially true in the detection of a drowned victim.

One thing we do know is - that it works!

For those who would like an explanation, we have a theory which is based on some reasonable assumptions about what scent is and based on two laws of chemistry - the Law of Diffusion and the Phenomenon of Evaporation.

A person gives off scent all the time - whether they are on the surface or under water, under ground or under rubble. We are all like "Pig Pen" in the comics with a little cloud of dust (or scent) around us all the time.

If we assume that scent is composed of both the soluble and insoluble solids, liquids and gases associated with the human body, then the Law of Diffusion tells us that these soluble solids, liquids and gases will disperse in the surrounding water much like table salt.

As these "scent" molecules from a body diffuse into the water, some will reach the surface, where evaporation takes place. Once in the gaseous state, dogs can easily detect the scent on

air currents. There is also some evidence that dogs have the ability to actually taste scent in the water.

Those insoluble molecules lighter than the surrounding water will also rise to the surface and float. These insolubles provide scent to our dogs, too.

This is only a simple explanation, but from observation in the field, we know that human associated scent comes to the surface or out of the water and is detected by the dogs.

You might wonder how long a body can produce scent sufficient for a dog to detect. Nobody knows exactly, but we have one documented case of a dog detecting a body under water in the Kern River, in California, after 192 days. According to the report, 'the body was so tightly wedged up into a cavern in the rocks, that it had to be pried free. The diver noted that, since the body wasn't on the bottom, he might have missed it, had it not been for the dog's alert." During the same search, the dog alerted on human bones which, according to the pathologist, had been in the river for not more than a year. In my opinion, I don't think 192 days or a year is the limit.

HOW DOGS CAN BE DEPLOYED

Usually the dogs work

- from boats or
- from the shore,
- But they can also work while swimming in the water.

In a boat, the dog and handler work from a position usually in the bow. When the dog detects the victim's scent, she alerts or signals the handler by dropping her nose to the water, or she may become frustrated and anxious, bite at the water, dig at the bottom of the boat, whine, bark or may try to jump into the water to reach the source of the scent. As the boat takes the dog out of the scent cone, the dog follows the scent to the back of the boat, if possible, or will just relax as if nothing had happened.

My last dog, PC, after detecting human scent from the water would usually look around the boat for a paddle, oar or something to reward herself, she liked sticks.

Rechecking the area with the same dog or another and observing their behavior will confirm an alert. It is generally thought that from search to search, the depth, the temperature (air and water), the length of time of submersion, the experience of the dog and handler, the presence of current (surface and otherwise), the weather, the presence of thermoclines, and more all have an effect on the intensity of the dog's alert. The dog will alert in some fashion to the presence of human scent. It is up to the handler to read and interpret that alert - which may be subtle and which may take more than one pass of the area.

If working a shoreline, when the dog detects human scent, she will probably enter the water and swim to the point where the scent is coming from the water. The dog may even swim back to shore to get

the handler in a "refind" - meaning "come with me and see what I've found". Usually the handler does not comply.

The scent that rises from the victim to the surface is first acted upon by the currents in the water and then, if atmospheric conditions are right, the scent evaporates and the air currents take over and a dog can detect the scent from shore or in a boat. You can see why it is important for the handler, the divers and the local fishermen to communicate and together work out the problem of where to look for the victim in terms of the various water currents and wind vectors. The answers are not necessarily obvious.

- As an example, the handler should be aware that what you see at the surface, current wise is not necessarily the same under the surface. A recent search in West Virginia is a case in point. A young man had slipped off one of the cross-river ledges about 15 feet from the shore opposite the National Park at Harpers Ferry. The location of the point last seen (PLS) was well identified by witnesses. In the late afternoon, two dogs alerted mildly at the PLS, but one dog, while returning to the Park side, alerted strongly into the water just off the Park shore and about 30 yards down stream from the incident. The river is about 200 yards wide.

  The next morning dive teams started a systematic search from the PLS down stream. Later in the day, while the dive teams were still working, dragging teams found the young man's body just down of the dog's strong alerts on the Park side of the river. Divers said that the bottom current was very strong. In addition there must have been a very strong crosscurrent to carry the body across the river and a short distance downstream.

TYPES OF WATER

There are different considerations with respect to each type of water, so they were categorized and grouped during the analysis for the final report in 1988 (Reference 1).

Lakes and ponds can often be covered from the shoreline. If the body of water is large enough, small boats can be used to grid the area. Any alerts can be marked with a buoy of some kind, triangulated with respect to shore features or located with a GPS waypoint so that divers will have a reference point from which to start their underwater search operations.

Our analysis found (Appendix B), that the rate of success using dogs is at least 84 % in the lake, pond or reservoir situations. You will also note that 68 % of the victims found were recovered by divers (or in some cases by dragging operations) from the bottom. One "live" find in the study was a person up to his shoulders in a lake when the dog air scented him from shore. The victim was stuck in the mud. I might add that, had he been stuck in the mud in a tidal pool or in fast current, he probably wouldn't have survived.

Although the following examples happened after the study, they are particularly interesting because cold water and ice were involved.

- A couple of years ago, we were requested to assist in searching for a man, in

Montgomery County, Maryland, who was last seen in the park area in a large apartment complex. He was reported as high on drugs. In addition to land areas, we checked out the 5 ponds in the park. Even though there was a layer of ice on the pond (about 1-1/2 inches thick), two dogs independently alerted at the water's edge in two different places (because of changing wind directions); it was possible to triangulate a position where the man should be found.

A week later, when the ice melted, the pond was investigated by divers and the man was found in the area predicted by the dogs.

- In another incident, the Sheriff's Department in Galax, Virginia was investigating a probable murder/robbery - a man, his rifle collection, and the remains of his marijuana crop (grown under lights in his barn) were all missing. All there was left were bloodstains on the front porch of his farmhouse.

  On the basis of a telephone tip the Sheriff requested our help to search the water above Buck Dam on the New River, an area more than 30 miles from the crime scene. Two dog teams were sent and search operations started in the morning.

  There was skim ice near the shore and both dogs displayed continued interest almost immediately, even before the search began. Within an hour, one of the teams in a boat radioed that they had the victim in hand. He was weighted down with cement blocks, but the handler was able to reach far enough under the surface and grab his collar. The dive teams then searched the area nearby and recovered four guns.

Flooded quarries should be searched from a boat - the sides of the quarry are most often too high, steep or hazardous for a search from shore. Quarries are also usually deep and the water is very cold, which may put divers in jeopardy, especially if they are sports divers and not trained or equipped for deep underwater search and recovery.

- An example of a flooded quarry search took place near Front Royal, VA. The sheriff thought that a young man might have drowned in a flooded quarry, 80 feet deep, with submerged caves. Then again, he might have been playing a joke on his friends.

  A dog alerted near the entrance to the cave and at the waterline inside the cave, down wind of the entrance. Although the divers found nothing, we suggested that the sheriff run a large motorboat around - like stirring a bathtub - and the body might rise.

  The sheriff did so the next day and the young man's body surfaced at the entrance where the dog had alerted. Unfortunately the young man had not been playing a joke.

Rivers, streams and creeks can also be searched from the shores or from boats.

One of the "rules of thumb" developed from the review of the NATIONAL WATER SEARCH REPORTS, is related to rivers, streams and creeks in flood. The water conditions at the time of the drowning or incident may well suggest the most likely places to look.

Generally, the local river and rescue people say that the victims are "always found within a mile downstream of the PLS" - it could be 1/2 mile or 3/4 mile, or what ever is appropriate for the particular body of water. It has been our experience and that of other dog units across the country that this is true even in a stream or river with normally fast current. Rivers and streams seem to have their own patterns.

However, the rules are different when dealing with a river or stream in "torrential flood," particularly when the water is rising. Under these conditions, even a mild-mannered little stream can carry a pickup truck 150 yards downstream, as has happened in Virginia three times in the past few years. In a flood situation when substantial non-buoyant weights such as boulders and trucks are carried by the water flow, a victim doesn't have the weight to overcome the horizontal force of the water flow and sinks to the bottom. We have found that the victim may be carried at or just under the surface of the water until something stops it - which may even be 23 miles down stream as happened in one incident we had in Virginia. In such cases the best places to search are in the area of those features which will change the direction of travel of something being carried by the torrential current.

For instance -

- At the junction of a fast flowing stream with do fast flowing river - the victim might be deposited on or in the sand bar formed there. This happened due to floods on the South Branch of the Potomac River in West Virginia and the on the New River in Grab Virginia.
- At a place where a confined river in flood suddenly spreads out over many, may arses of low land, thus dissipating the holes force of the torrent- A recent flood near Fredericksburg, Virginia and the West Virginia floods demonstrated this action.
- The victim's travel might be stopped dower of any vertical eddy or hydraulic - such as a dam, waterfalls or a hole in the water. The bodies of victims of a New River flood in Virginia and the Youghiogheny River were found just below dams.
- The victim might be stopped by a “strainer” formed by downed trees the riverbed. Strainers caught victims during the flooding of the Sturgeon River in Michigan, the Buskill River in Pennsylvania and the Iowa River in Iowa.

In catastrophic flooding, such as occurred in Puerto Rico, West Virginia and Texas in the late `80s, the forest and fences on either side of the river formed strainers where we found vehicles and houses as well as people. In West Virginia many of the thousands of farm animals and turkeys found there were from other counties many miles up stream.

When looking at the statistics for flooded rivers and streams generated by the water search analysis, at least 42 % of the victims are found outside the area searched by dogs or others. Forty-two percent compared to 16 % (normal flow rivers) and 14 % (lakes) may be significant. The "finds" in the flooded river situations were downstream 23, 40, 10, 13, 12, 17, 2, 3/4, and 1/2 miles, respectively.

A lot of territory to search.

- In early summer of 1987, there was a torrential flood of the Guadalupe River near Comfort, Texas. A school bus transporting young people from a camp back to town stalled in the rising water while trying to cross the low bridge over the river. Some youngsters were able to escape uphill to dry land before the bus was swept away. A number did not escape and were swept away. The event was well covered on TV and a movie was also made. To my knowledge, nine victims were recovered but there is still one young man (who is credited with having saved a number of the survivors) who has not been recovered.

  The father of the missing victim asked a philanthropist for financial help to find his son, and about a month later, I was asked to join and oversee the search with dogs. I requested that topo maps for the river be obtained and the locations of each found victim be plotted and annotated along with the name, sex, height, weight, and description of where found, if possible.

  The point of bringing up this incident is that there were so many victims and they were found over a distance of 13 river miles from the incident as noted on this drawing. The distances traveled ranged from .3 to 13 miles. The bodies were found caught in a fence, at a bridge pier, in a wire snag, at the base of a concrete pillar, on an island, in two sand deposits, and in a small debris pile. The closest victim was dropped from a helicopter during a rescue attempt.

  To my knowledge, the young man has not been found. Shortly after we started on a reconnaissance run of the river from the point of the incident, my dog alerted in an eddy behind a large cypress tree in the water. The boatman said that was where they had found the young man's trousers (that he had used as a rope to extend to other kids going by in the water) and they would check it out the next day. They said there had been a lot of gravel deposited there and there were some wires, too. To my knowledge the spot was never searched again because of legal considerations.

One thing to remember in water searches as well as land searches is that, if you can determine where the victim isn't, you have positive information -- as a result, diving or dragging operations will not have to be conducted in those areas cleared by dog teams. The areas cleared by dogs can be significant when you are dealing with many miles of river or hundreds of acres of a lake or reservoir.

In the past couple of years, we have had some finds on land that were water related and water search experience (and common sense) was helpful.

> In CHARLES COUNTY, MD, the authorities suspected a robbery/murder had been committed - they even had a suspect -- but no body. A few weeks later after getting a tip from an informant, the Sheriffs Dept. asked for our assistance.

The dog's initial alert was toward the water passing through a semi-clogged conduit under the dirt road in the area to be searched. This focused our attention on the pond from whence the water was flowing. Our dogs made the find between the edge of the

pond and an active dumping area for crab shells.

The dogs had been curious and sniffing around the base of the thick, tall growth of weeds along the road beside the pond. Their behavior was odd. First they would sniff the base of the weeds, then go to the edge of the pond and sniff the water. After repeating this behavior a couple of times, I beat down the weeds for them - about 15 feet off the road was the body of the victim.

> In CHESTERFIELD CO., VA, a little 10-year-old girl went missing in October. An extensive search was conducted at the time - with no results. In April, the following year, we were asked to search an area previously searched by others for a possible buried victim. The report was that a dog had alerted into a pond associated with the area of interest, but dragging found nothing.

We checked the pond and my dog alerted strongly in a limited but general area where the land sloped to the water. The water contained lots of tree roots but was too shallow to hide a body - only a few inches deep. Meanwhile, my colleague was near by doing a systematic, disciplined grid search of the hillside leading to the pond, when she made the find. The body was buried a foot underground. Apparently the scent, hike water, was flowing down hill and collecting in the root filled water.

By the way, a trial of the suspect was conducted and he was convicted.

LIMITATIONS

When people ask about the dog's limitations, it is important to reiterate that the dogs are only one aspect of the search, rescue and/or recovery of victims when non direct finds take place, such as in collapsed buildings, avalanches and mud slides. Water searches are no different.

In water search, the dogs are "human scent detectors" and can only detect where the scent is emerging from the water. The subsequent location and recovery of the victim is accomplished using other skills and equipment.

There is evidence that, if the air temperature is colder than the water, such as an air temperature of 35 degrees F. or below, the rate of evaporation as well as wind force and barometric pressure effect the scent emerging from the water. Although the scent pools at the surface of the water, it does not get airborne. In such a circumstance, the dog may pick up the scent only at the water's surface while swimming.

- A case in point was-the search for a 7-year-old boy, in Illinois, who had fallen through the ice in mid-December. The search was joined by three dog teams in mid March. While waiting for the boats to be launched, one handler walked the bank to get an idea of what was happening with the water during the incident. While walking back to the point last seen (PLS), the handler threw a stick into the water for her dog to retrieve

(and to search while in the water). The first two times the dog came back with the stick. The third time (each at a different location) the dog let the stick go and alerted up stream by casting back forth in a small area about 10 feet off the bank.

All three dog teams independently tried unsuccessfully to detect scent in that area from a boat. Although a number of miles of river were searched, the only scent clues were the swimming alert and the agitated behavior of the dogs each time the down wind shore was approached for a hundred or so yards downstream of the swimming alert.

A few days later in the rain an attempt was made to investigate the area with a long pole. The only result was the remark that the pole had hit something that didn't feel like the sand, stumps and other debris in the area. Then later when the weather had cleared the air temperature was in the 40s, a dog air scented the body just after leaving the PLS in a boat. The boy's body was recovered at the bend in the river a quarter of a mile or so down stream, where the prevailing wind had pushed it, sometime during the three-day period.

Extreme temperatures whether hot or cold are certainly limiting factors. Another potential limitation we have to recognize is the presence of methane gas - which is frequently found in swampy areas, outdoor toilets, and waste disposal facilities. Methane gas is associated with cadaver material and can mislead or confuse the dogs unless they have been exposed to similar situations in training.

WHERE TO FIND SEARCH DOGS

The SAR dogs are a relatively scarce resource - not only in the United States, but also in the world. There are over 200 established SAR dog units in the U.S. Information is on the NASAR website (www.nasar.org) not only for dog units but for other SAR resources, too. The Directory gives the 24-hour emergency phone number and an information source for each known unit in the country as well as the environments in which they work and their communications systems.

I mention the SAR Dog Directory because I maintained the NATIONAL SAR DOG DIRECTORY for NASAR for 15 years and can talk about what we do in the U.S. Probably no matter where you are, the concept is the same. If you have the responsibility for body recovery or search in general and want to use SAR dogs, information like that in the NATIONAL SAR DOG DIRECTORY will help identify your nearest SAR resources.

Most importantly, find out through preplanning what specific kills those organizations near you have to offer. Ask them for a demonstration and a briefing about their specific training, experience, and equipment. Ask for a copy of their standards, call out procedures and their availability.

When you request a water search team, you should expect to get a team that is trained to search in the water environment. Because some handlers may elect not to participate in a swift water search because of the special skills required, if that environment is a factor, it is best to discuss the matter beforehand.

Further as a potential user of Water Search Dog teams, you might be interested in some of their

logistics and what to expect when calling them to a mission or to work on a case. I will speak in terms of my unit, Mid-Atlantic D.O.G.S., because I know the answers there, but I would expect other volunteer units to operate in a similar manner.

The Mid-Atlantic D.O.G.S. program includes training in both flat and swift water environments. In addition to dog training, safety and self-rescue skills, equipment, knowledge of river hazards, search strategies and lots of on-the-water practice is emphasized.

For perspective, our members are all volunteers who have regular employment in many fields and range from senior executives in the federal government to self-employed individuals. All of them have made arrangements with their employers (or selves) to take off work to join searches, when the need arises. The time taken is their vacation leave or, if self-employed, their business may be temporarily closed. Upon entering this service, each handler assumes the responsibility of paying. for his own training and mission expenses. We feel that because of the urgency of the victim's need -- a life may be at stake -- our response can not be limited by lack of funding - so we just do it!

There are some considerations, however. Our handlers will leave work anytime for a potential live victim or when the search is time-critical. In order to maintain this high level of response and commitment, we suggest that searches for bodies be done on weekends when possible, There are, however, a few of us -- retired types -- who can and do respond anytime and anywhere.

Mid-Atlantic D.O.G.S. and most other Dog Units do not have their own boat to respond to water searches. The main reason is that the organization responsible for a particular search has their own water craft resources and they are on scene usually before we arrive. There are a number of types of boat that dogs can work from, such as inflatables, canoes and bass boats. The basic attributes are that the dog and handler can work from the bow and the height of the gunwales above the water is a minimum so that the dog's nose can be close to the water. In large bodies of water such as the Great Lakes or the Chesapeake Bay, the larger craft with 3 or 4 foot freeboard have been used, but "conditions" must be just right. Even there, smaller craft with a low freeboard are recommended to maximize the probability of success.

Appendix A
National Water Search Report

The Incident -

Show PLS, location of containment techniques, location of clues, and areas of water recovery activities(#)on copy of too map or diagram.

Date:_____Time:_____ Weather: Clear___; Stormy____ Other ____
PLS:_____

Type of incident: boating____ swimming ___; storm related___; other___

Type of water: lake/pond _____ marsh/swamp ____ tidal water ___ quarry ____
creek/stream ___ ; river ____; Other _____

Normal flow____ ; in flood_ ___ rising stage_____ receding stage_____
High tide_____; low tide_____; slack_____; current strong____; other_____

Bottom characteristics: mud/muck____; snags____ rocky/ledges_____;
sand/gravel_____ ; other_____
Water temperature: _____
Clues found: shoe(s)_____; hat_____; clothing_____; other_____
Containment techniques: Monitor downstream dams_____ , water falls____"holes"___
Set cross stream/river traps_____ Other_____
Recovery attempts#: divers___ ; dragline____; sonar_____other_____

Previous drowning history of area:_____

The Search -
Show location of alerts and clues found on copy of topo map or diagram.
Unit Name:_____
Date(s):_____ ; Time:_____; Weather: Clear___; Stormy_____;other_____
Water temperature:_____; Thermocline(s)? :_____ Depth(s)_____
Air temperature:_____ Estimated wind force:_____ (Beaufort Scale)

Dog alerts and wind direction:
alert#1, bearing _____; alert#2, bearing_____; (continue on back).
Dog alerted: from boat_____; from shore_____; swimming_____; other_____
Alerts on clothing: yes____; no_____ Clothing found on surface ____;
on bottom_____; on snag_____; other_____
Follow up recovery activities: divers_____, dragline_____ other_____
Distance searched from PLS: by shore_____ by boat_____

The Find -

Show where body found on copy of topo map or diagram.

Date:_____; Time:_____; Weather: Clear_____; Stormy____; other____
Location:_____ Distance from PLS_____
Body found: on surface____; floating between surface and bottom ____;
Snagged____; on bottom____ depth____
Found by: divers_____ dragline_____; other_____

Distance of alert to location of body_____

Prepared by:_____ Date:_____

Enclose: Copy of annotated topo map or diagram
Send to: NASAR, c/o Marian Hardy 4 Orchard Way N. Rockville, MD 208.54

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The Search -
Show location of alerts and clues found on copy of topo map or diagram.
Unit Name:_____
Date(s):_____ ; Time:_____; Weather: Clear___; Stormy_____;other_____
Water temperature:_____; Thermocline(s)? :_____ Depth(s)_____
Air temperature:_____ Estimated wind force:_____ (Beaufort Scale)

Dog alerts and wind direction:
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on bottom_____; on snag_____; other_____
Follow up recovery activities: divers_____, dragline_____ other_____
Distance searched from PLS: by shore_____ by boat_____

Prepared by:_____ Date:_____

The Search -
Show location of alerts and clues found on copy of topo map or diagram.
Unit Name:_____
Date(s):_____ ; Time:_____; Weather: Clear___; Stormy_____;other_____
Water temperature:_____; Thermocline(s)? :_____ Depth(s)_____
Air temperature:_____ Estimated wind force:_____ (Beaufort Scale)

Dog alerts and wind direction:
alert#1, bearing _____; alert#2, bearing_____; (continue on back).
Dog alerted: from boat_____; from shore_____; swimming_____; other_____
Alerts on clothing: yes____; no_____ Clothing found on surface ____;
on bottom_____; on snag_____; other_____
Follow up recovery activities: divers_____, dragline_____ other_____
Distance searched from PLS: by shore_____ by boat_____

Prepared by:_____ Date:_____

Appendix B

WATER SEARCH FACT SHEET

Marian Hardy
Mid-Atlantic D.O.G.S., Inc.

This Fact Sheet (1988) is based on 122 water search reports sent to the National Association for Search and Rescue (NASAR) from the Search and Rescue (SAR) dog units around the country. Twenty-six different SAR dog units - from Maine to California and from Washington to Georgia as well as one in Canada - were involved. Of the 130 victims involved, 84 were found by dogs, 24 were recovered out of the area searched and 22 have not yet been recovered. Also of the 22 victims not recovered or found, the dog alerts in 9 instances could not be followed up by divers or draggers because the location was too hazardous to the divers, too deep (150 feet) or, in the case of flooded valleys, the remaining trees, buildings and bridges underwater were not suitable for dragging.

In order to analyze the data collected, and the elements of information were tabulated from the information sources against seven water types. The results are detailed in Figure A.

You will note in Fig. A that the rate of success using dogs is at least 84% in the lake, pond, reservoir situations. You will also note that 68% of the victims found were recovered by divers (or in some cases by dragging operations) from the bottom.

When looking at the statistics for flooded rivers and streams, at least 42% of the victims are found outside the area searched by dogs or others. Forty-two percent compared to 16% (normal flow rivers) and 14% (lakes) may be significant. The "finds" in the flooded river situations were at 23, 40, 10, 13, 12, 17, 3/4 and 1 /2 miles, respectively.

One thing to remember in any search is that, if you can determine where the victim isn't, you have positive information. This is particularly true in water search specifically, your divers will not have to search those areas cleared by dog teams. Areas cleared can be significant when you are dealing with many miles of river or hundreds of acres of lakes or reservoirs.

A Bibliography of all articles written on the subject of water search with dogs is available from the NASAR Bookstore as are the articles themselves. The next iteration of the study should be available in early 1992. For further information or contributions to the study, please contact:

Marian Hardy, 4 Orchard Way North, Rockville, MD 20854 (301) 762-7217.

		Rivers, Creeks, Streams Normal Flow	Lakes, Ponds, Resirviors Contained	Rivers, Creeks, Streams Flooded	Catastrophic Floods	Flooded Valley	Tidal Areas	Other, Floating Bog, Marsh, Quarry	Totals
Searches		59	27	16	4	5	8	3	122
Units Involved		20	14	9	4	2	5	2	26
Victims		64	29	19	2+?	5	8	3	130
Found by dogs		44	21	6	2+?	1	7	3	84
Found out of Search Area		10	4	8	?		1	0	24
Not Found		10	4	5	?	3	0	0	22
Found:	On the bottom	27	17	9			3	1	57
	Floating	26	7	5			5	1	44
	Other	2	Alive					Alive	6
Max Days between incident and dog search		192	26	48		30	2	48	-
Maximum depth found		60’	75’	41’		80-150’	10’	80’	-
Worked with divers		20	21	3		2	2	1	52
Distance from PLS	Max distance	8 miles	500yrds	40 miles			4.5 miles		-
	Number of reports	26	16	8			4		-
	Average distance	1.1 miles	50 yrds	13.3 miles			1.3 miles		-
Success rate by dogs (at least)		82%	84%	55%		25%	100%	100%	79%
Recovered by divers		50%	68%	64%		-	38%	33%	53%
Found outside of area		16%	14%	42%		20%	13%	-	18%

M. Hardy, May 1988

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