ROYAL CANADIAN ARMY CADETS

SILVER STAR

INSTRUCTIONAL GUIDE

SECTION 2

EO M324.02 – COLLECT DRINKING WATER

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1 and 3 to give background information and introduce the cadets to methods of collecting water.

Demonstration was chosen for TP 2 as it allows the instructor to explain and demonstrate collecting water while providing an opportunity for the cadets to practice the skill under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to collect water using precipitation, dew or plant condensation.

IMPORTANCE

It is important for the cadets to understand the importance of collecting water in a survival situation, as thirst is one of the seven enemies of survival. As fresh water may not be readily available, cadets will have to use other sources to find water.

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Teaching point 1 **Identify Methods of Finding Water**

Time: 5 min Method: Interactive Lecture



This TP is designed to give cadets an introduction to different methods of finding water.

Water is the one thing that almost everyone takes for granted. People are used to turning on the tap and having an endless supply of water. Until water shortages or drought occur it is scarcely thought about. Water is universally important and should be respected. It is essential to life and all life contain it.

In survival situations, it is important to conserve potable water and seek a freshwater source.



Potable Water. Water of higher quality, suitable for drinking.

OBSERVING INSECTS, AMPHIBIANS, MAMMALS, AND BIRDS

When in a survival situation, observing the behavior of mammals is the best indicator of the location of water.

Insects

Insects are good indicators of water. If bees are present, water is usually within several kilometres of your location. Bees fly a maximum of 6.5 km (4 miles) from their nests or hives. They do not have regular watering times, but drink when thirsty.

Ants are dependant on water. An ant nest will often be close to a source of water. A column of ants marching up a tree is likely going to a small reservoir of trapped water.

Most flies keep within 90 m (100 yards) of water. If mosquitoes and flies are swarming, there is most likely a good source of water close by.

Amphibians

Amphibians are not an indicator of water. They collect dew and draw moisture from prey.

Mammals

Most mammals require water regularly. Grazing mammals are usually close to water. Converging game trails often lead to water; follow them downhill.

Birds

Grain eaters, such as finches and pigeons are never far from water. They drink at dawn and dusk. When they fly straight and low, they are heading for water. When they return from water they fly from tree to tree, resting frequently. By plotting their direction, water can be found.

Water birds can travel long distances without stopping to feed or drink; they do not necessarily indicate water nearby.

Hawks, eagles and other birds of prey draw water from their victims and cannot be taken as a sign that water is nearby.

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SEARCHING FOR PLANTS

Watch for green leaf plants and trees that require a lot of water. These plants include cattails, bulrush, elderberries, and reeds. Trees include cottonwood, poplars, greasewood and willows. This type of growth indicates a high water table. These plants may be located on a dry river bed. To get to the water, dig into the ground 30–60 cm (1–2 feet) and water will accumulate in this pit.

An alternate place to search for water is at the base of a cliff where there is vegetation.

SEARCHING IN VALLEY BOTTOMS

Look in valley bottoms where water will naturally drain. If there are no obvious streams or pools, look for patches of green vegetation and dig there. There may be water just below the surface, which will collect in the hole. Digging in gullies and dry streambeds may reveal a spring beneath the surface, especially in gravel areas. In mountain valleys, look for water trapped in crevices.



Pools or streams with no vegetation growing are likely to be polluted by a high concentration of minerals or chemicals that have been leached from the bedrock or close to the surface.

Any water collected from pools should be boiled prior to drinking.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What type of birds do not necessarily indicate that there is water nearby?

Q2. What are the best indicators of water?

Q3. What types of plants should you look for when seeking a water source?

ANTICIPATED ANSWERS

A1. Water birds can travel long distances without stopping to feed or drink so they do not necessarily indicate water nearby. Hawks, eagles and other birds of prey get water from their victims and cannot be taken as a sign that local water is nearby.

A2. Mammals.

A3. Look for green leaf plants and trees that require a lot of water. These plants include cattails, bulrush, elderberries, and reeds. Trees include cottonwood, poplars, greasewood, and willows.

Teaching point 2 **Explain and Demonstrate Methods of Collecting Water**

Time: 15 min Method: Demonstration



As each method is identified, explain and demonstrate it to the cadets.

Collecting water can be difficult and it is important to take into consideration the time of year and the weather when looking for and collecting water.

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DIGGING WELLS

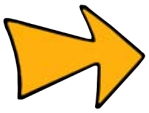
Wells are dug in hopes of finding a reliable and ample supply of water. If a well is being dug in a survival situation, it must be done when the survivor has lots of strength and stamina.

Wells cannot be dug much deeper than the water table because it will continuously fill with water. In a dry season, when the water table falls, the well depth can be increased.



Water Table. The upper limit of groundwater that occurs naturally.

An example of a simple well is the soil moisture pit.



Soil Moisture Pit

(1) Dig a pit 2 m x 2 m deep x 1 m (6.5 feet x 6.5 feet x 3.2 feet).

(2) Take an empty water bottle and cut the top off.

(3) Make a small hole in the centre of the plastic for the bottle.

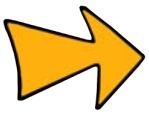
(4) Cover the the pit with a sheet of plastic wrap.

(5) Place a small rock on the plastic wrap over the water bottle.

(6) Let the sun do its job.

The water bottle will fill at least once a day, which is enough to keep you alive. This method will most likely not work in cooler weather.

COLLECTING PRECIPITATION



Precipitation can be in the form of rain, snow, hail, sleet, dew and frost.

Rainwater collected in clean containers or in plants is usually safe for drinking. However, purify water from lakes, ponds, swamps, springs, or streams, especially water found near populated areas or in the tropics.

Acid rain, or polluted rain can pollute soil, but generally all rain is drinkable.

Use as many containers as possible. Plastic, wood, bark and holes dug in clay can be used to catch water.

COLLECTING DEW

Although dew does not provide a large quantity of water, it is still a good source of water. Dew accumulates on grass, leaves, rocks and equipment at dawn and dusk. This is also when dew should be collected before potential freezing or evaporation.

Heavy dew can provide water. Tie rags or tufts of fine grass around your ankles and walk through dew-covered grass before sunrise. As the rags or grass tufts absorb the dew, wring the water into a container. Repeat the process until you have a supply of water or until the dew is gone. Australian natives sometimes mop up as much as a litre an hour this way.

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COLLECTING CONDENSATION



Condensation. The process of water vapour in the air turning into liquid. Drops on the outside of a cold glass are condensed water. Condensation is the opposite of evaporation.

Vegetation Bags

A vegetation bag is quite simply a container to collect condensation from vegetation. A section of shrubs, bushes and trees are covered in a vegetation bag and the condensation from the sun is collected within the bag.

To construct a vegetation bag, one will need a clear plastic bag and an ample supply of healthy, non-poisonous vegetation. A 1- to 2-m (4- to 6- foot) section of surgical tubing is also helpful.

1. Open the plastic bag and fill it with air.

2. Fill the bag one half to three quarters full with lush green vegetation. Be careful not to puncture the bag.

3. Place a small rock or similar item into the bag. If you have surgical tubing, slide one end inside and toward the bottom of the bag. Tie the other end with an overhand knot.

4. Tie off the bag as close to the opening as possible.

5. Place the bag on a sunny slope so that the opening is slightly higher than the bag's lowest point.

6. Position the rock and surgical tubing at the lowest point in the bag.

7. For best results, change the vegetation every two to three days.

8. If using surgical tubing, simply untie the knot and drink the water that has condensed in the bag. If no tubing is used, loosen the tie and drain off available liquid. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the vegetation.

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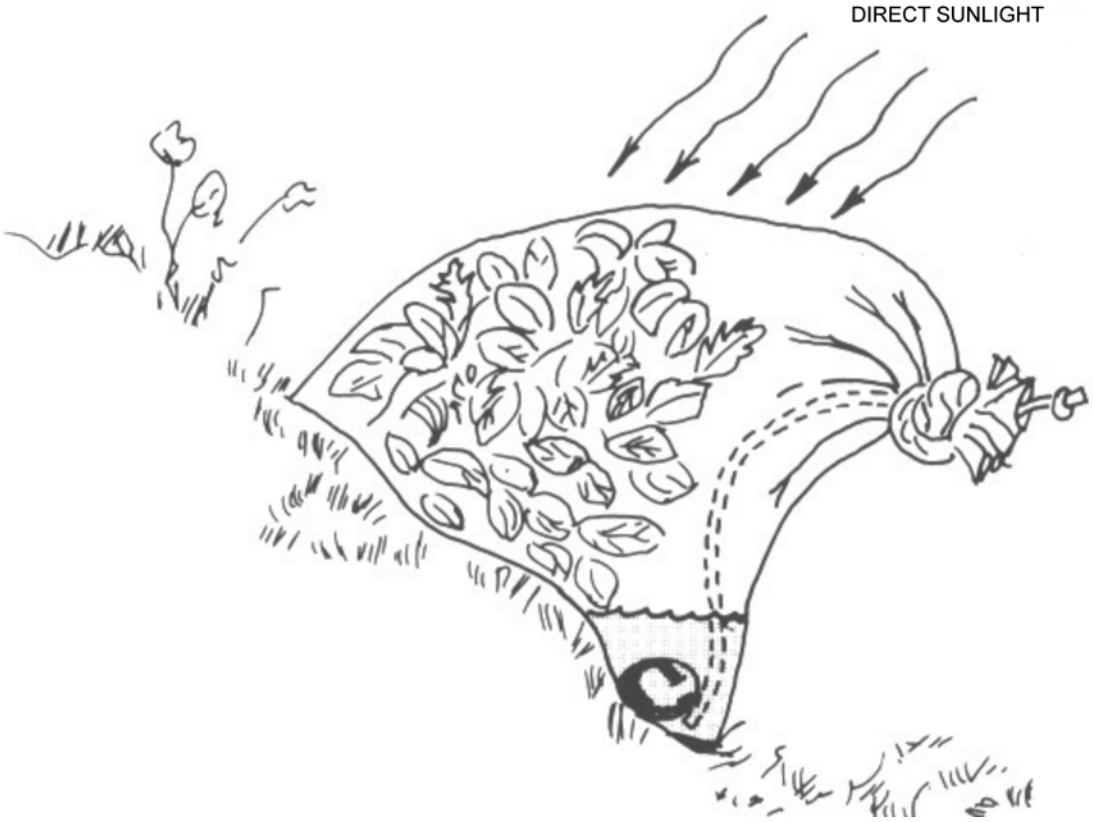

G. Davenport, Wilderness Survival (2nd ed), Stackpole Books (p. 144)

Figure 1 Vegetation Bag

Transpiration Bags

Transpiration. Process by which water absorbed by plants, usually through the roots, is evaporated into the atmosphere from the plant surface, such as leaf pores.

A transpiration bag is better than a vegetation bag because the same vegetation can be reused allowing time for it to rejuvenate. Water transpiration bags are beneficial because, they yield more, are easier to assemble, and often have a better taste.

To construct a transpiration bag, one will need a clear plastic bag and a non-poisonous bush or tree.

A 1- to 2-m (4- to 6- foot) section of surgical tubing is also helpful.

1. Open the plastic bag and fill it with air.

2. Place the bag over the lush leafy vegetation of a tree or bush, being careful not to puncture the bag. Be sure the bag is on the side of the tree or bush with the greatest exposure to the sun.

3. Place a small rock or similar item into the bag's lowest point, and if you have surgical tubing, place one end at the bottom of the bag next to the rock.

4. Tie the other end of the tubing with an overhand knot.

5. Tie off the bag as close to the opening as possible.

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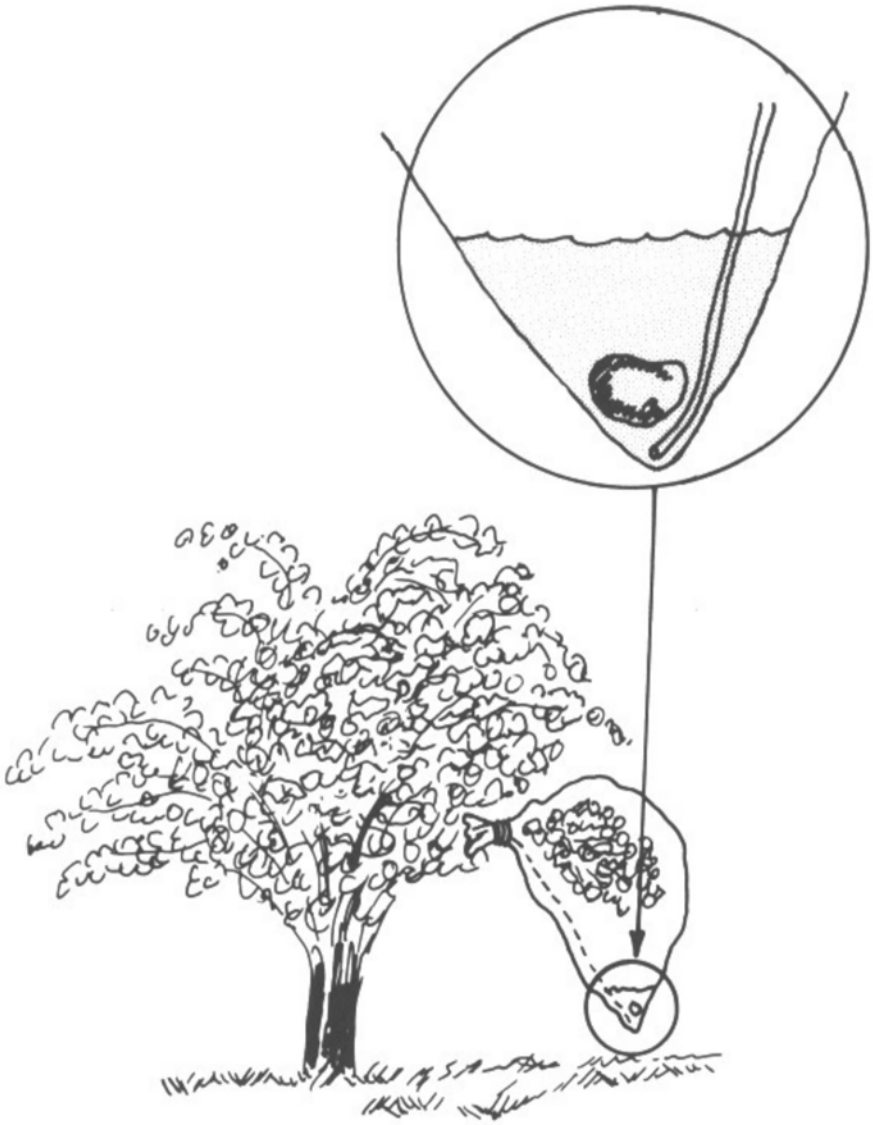
6. Change the bag's location every two to three days to ensure optimal outcome and to allow the previous site to rejuvenate so it might be used again later.

7. If using surgical tubing, simply untie the knot and drink the water that has condensed in the bag. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the tree or bush.



G. Davenport, Wilderness Survival (2nd ed), Stackpole Books (p. 144)

Figure 2 Transpiration Bag

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. How does the water table affect well depth?

Q2. How is dew collected?

Q3. What are the benefits of a transpiration bag?

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ANTICIPATED ANSWERS

A1. Wells cannot be dug much deeper than the water table.

A2. Dew is collected by tying rags or tufts of long grass to your ankles and walking through dew-covered grass before sunrise.

A3. Transpiration bags are beneficial because they have a high yield, are easier to assemble, and often have a better taste.

Teaching point 3 **Explain Methods of Transporting Water**

Time: 5 min Method: Interactive Lecture



This TP is designed to introduce the cadets to the different methods of collecting water in a survival situation.

Water in a survival situation may require transportation from one location to another. If possible, having or finding a water container which can hold a minimum of one litre with a wide-mouth opening is ideal.

Improvised water containers are sometimes necessary. Anything sturdy can hold water.

STORAGE CASE

Any container, including the case that holds a survival kit can be used. The storage case for matches, bags that contain food, and metal cases can hold water.

CONDOM

Condoms are great for water storage provided they are non-lubricated and non-spermicidal. In addition, a condom will have to be placed in a scarf or other forming structure to give it extra strength.

PONCHO

A poncho is made of a great material to transport water and is already watertight. The poncho can be folded, bent and rolled into shapes to collect and carry water. Create a bowl from the poncho by securing the corners to tree limbs.

NATURAL CONTAINER

Natural containers such as hollowed-out wood pieces are excellent for storing water. The wood in the container will give strength and stability for larger quantities of water. Large leaves can be folded and held in the hand for smaller quantities of water.

PLASTIC BAG

Plastic bags are a useful piece of equipment in survival situations. A large plastic bag such as a large polythene bag about 200 cm by 60 cm (7 feet by 2 feet) can be used in many ways, particularly to collect large amounts of water.

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CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What are different ways to transport water?

Q2. What is the benefit of using a poncho for transporting water?

Q3. What are examples of natural containers?

ANTICIPATED ANSWERS

A1. Transporting water can be done using a storage case, condom, poncho, natural container and plastic bag.

A2. A poncho is beneficial to transport water as it is already watertight.

A3. Natural containers are hollowed-out wood pieces and large leaves.

END OF LESSON CONFIRMATION

QUESTIONS

Q1. What is potable water?

Q2. What is the water table?

Q3. How is a transpiration bag constructed?

ANTICIPATED ANSWERS

A1. Potable water is water of higher quality which is suitable for drinking.

A2. The water table is the upper limit of groundwater that occurs naturally.

A3. To construct a transpiration bag:

(1) Open the plastic bag and fill it with air.

(2) Place the bag over the lush leafy vegetation of a tree or bush, being careful not to puncture the bag. Be sure the bag is on the side of the tree or bush with the greatest exposure to the sun.

(3) Place a small rock or similar item into the bag's lowest point, and if you have surgical tubing, place one end at the bottom of the bag next to the rock.

(4) Tie the other end of the tubing with an overhand knot.

(5) Tie off the bag as close to the opening as possible.

(6) Change the bag's location every two to three days to ensure optimal outcome and to allow the previous site to rejuvenate so it might be used again later.

(7) If using surgical tubing, simply untie the knot and drink the water that has condensed in the bag. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the tree or bush.

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CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-703/PG-001, Chapter 3, Annex B, Appendix 6 (324 EC-02).

CLOSING STATEMENT

Collecting water may mean the difference between survival and death. Knowing how and where to collect water will assist the cadets in combating the enemies of survival and keep them healthy and hydrated during the experience.

INSTRUCTOR NOTES/REMARKS

Cadets will be required to collect water during the bivouac FTX.

REFERENCES

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C3-150 (ISBN 978-0-8117-3292-5) Davenport, G. (2006). *Wilderness Survival* (2nd ed.). Mechanicsburg, PA: Stackpole Books.

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