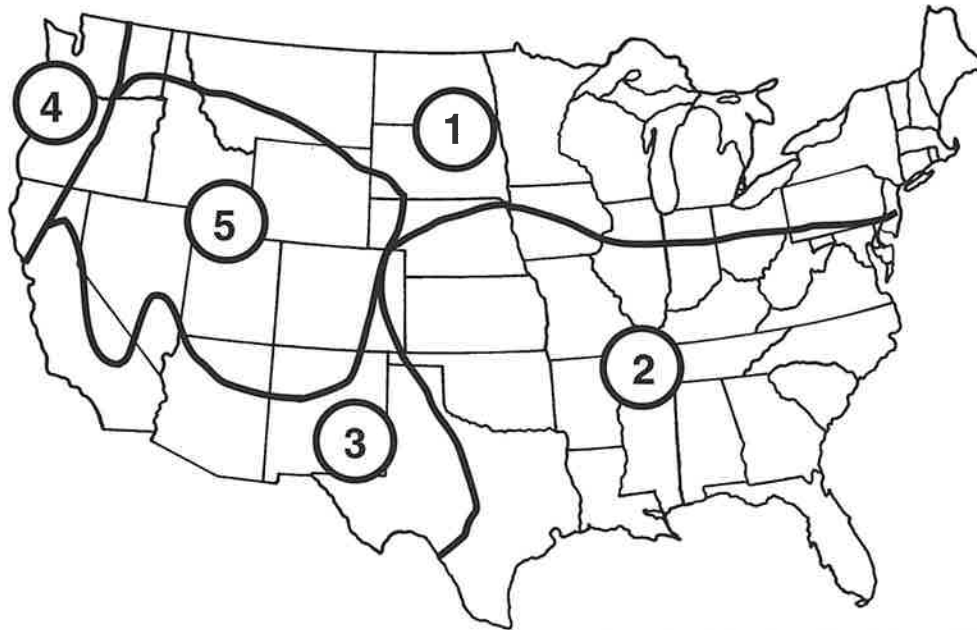


### Regional Cooling Solutions



Based on: "Mind Your Climate" an article in the July/August 1982 issue of *New Shelter*. See Bibliography.

#### **Zone 1 - Temperate**

The temperate zone is characterized by four distinct seasons. Many areas have cold winters and hot summers. Hot spells tend to be brief. Northern and western regions have daily temperature swings of 20° to 40° F, making night time ventilation to remove heat a practical option.

#### **Solutions for Temperate Regions**

Temperate areas are the easiest to cool with low-cost methods. Move summer air with ceiling fans and oscillating fans. Stop solar heat gain with trees, shrubs, vines, and interior and exterior window shading. Ventilate whenever outdoor air is comfortable to remove solar gains and internal gains. Use whole-house fans in humid areas and evaporative coolers in drier areas instead of air conditioning. Air leakage control is important for air conditioned homes located in areas subject to spells of hot and humid weather.

#### **Zone 2 - Hot and Humid**

Heat and humidity dominate summer weather in this climate zone. Days are hot and humid, and nights are warm and often even more humid.

#### **Solutions for Hot, Humid Regions**

Reduce both air leakage and solar gain to minimize air conditioning costs. Limit indoor sources of moisture and take action to solve drainage problems outdoors to reduce dampness. Cover the ground in crawl spaces with plastic to reduce high humidity under the home. Move air inside the home with fans whenever cooling is needed. Perform regular maintenance on air conditioning equipment. Ventilate whenever outdoor air is comfortable (generally, when air temperatures are less than 80° F accompanied by relative humidity below 65 percent).

### **Zone 3 - Hot and Dry**

Air temperatures can exceed 100° during heat waves in this region. Relative humidity is very low—usually less than 40 percent during the summer. The main cooling problem in this region is solar gain.

#### ***Solutions for Hot and Dry Regions***

Use window shading devices to block at least 75 percent of solar heat. Choose light colors for roofs and walls. Use evaporative cooling instead of air conditioning if you have a choice, and use fans to circulate air indoors. Consider replacing central air conditioning with standard or two-stage evaporative cooling if air conditioning costs are high. Try to limit cooking and other heat-producing activities indoors during heat waves.

### **Zone 4 - Cool and Humid**

Summer temperatures average in the 70°s, although temperatures can climb into the 90°s for brief periods. Relative humidities range from 40% to 100% and can present a cooling problem during warmer weather.

#### ***Solutions for Cool, Humid Regions***

Shading and ventilation should provide adequate comfort most of the time. Increase air movement with fans during hot, humid weather. Limit indoor sources of moisture and take action to solve drainage problems outdoors to reduce dampness. Reduce high humidity under the home by covering the ground in crawl spaces with plastic.

### **Zone 5 - Dry and Mountainous**

The large difference in elevations produces a wide difference in summer temperatures and the higher regions are cooler. Most populous areas in this region are below 5,000 feet and have relatively short summers that are hot and dry. Many areas of this region are windy.

#### ***Solutions for Dry, Mountainous Regions***

Shade the south and west windows. Maximize the area of window opening during cool periods of the day to provide natural ventilation. Ventilate during the night, using fans if necessary, to remove heat. Evaporative coolers should be able to handle 100% of cooling needs in areas where ventilation is not adequate to provide acceptable comfort.

## Appendix E

### Heat Ailments

#### Heat Cramps

Heat cramps are the least serious heat ailment and can usually be treated by the sufferer. People who do physical work or who exercise in the heat may experience heat cramps at the end of the day.

##### **Symptoms**

- Pale, cool, and moist skin
- Weakness and nausea
- Fast pulse (sometimes)
- Heavy sweating
- Tingling in arms and legs
- Dull pain in abdomen
- Painful muscle cramps in arms, legs, or stomach

##### **What To Do**

1. Get out of the sun and heat.
2. Drink cool fluids with one teaspoon of salt dissolved in each quart of fluid.
3. Avoid strenuous activity for at least 12 hours.

#### Heat Exhaustion

Heat exhaustion takes at least a few hours to develop. It results from water and salt loss due to sweating in the heat. In most cases, sufferers remain conscious and can help themselves. Sometimes, however, the sufferer passes out and needs outside assistance.

##### **Heat Exhaustion Symptoms**

- Cool, moist skin
- Normal or lower-than-normal temperature
- Rapid, weak pulse
- Headache, nausea, fatigue, giddiness, loss of appetite, vomiting, or diarrhea
- Thirst
- Fainting or faint feeling
- Muscle cramps (sometimes)

##### **What To Do**

If you are conscious:

1. Get out of the heat and sun.
2. Place your feet up and your head down.
3. Drink cool fluids with one teaspoon of salt dissolved in each quart of liquid.
4. Take oral temperature every half hour. Call for help if temperature rises above 104° F.
5. Rest for 1 to 3 days.



If you find the sufferer unconscious:

1. Follow steps 1 and 2. Do not try to give an unconscious sufferer fluids.
2. Call for medical help.
3. Take body temperature, if possible.

### Heat Stroke

Heat stroke is not as common as the other two heat ailments but it is more dangerous. Often, it is a result of an person's inability to perspire. The symptoms of heat stroke appear rapidly, especially the high body temperature, which can cause severe damage if not controlled. Since the sufferers may become unconscious or confused, they may be unable to help themselves and must have outside help.

#### **Heat Stroke Symptoms**

- Hot, dry, reddened skin
- Temperature of 104° to 106° F, sometimes higher
- Rapid pulse
- Headache
- Confused, agitated, or peculiar behavior
- Dizziness, fainting, or unconsciousness
- Abdominal pains or diarrhea
- Staggering or loss of balance

#### **What To Do**

1. Cool the sufferer.
2. Call an ambulance or get medical help.
3. If you can, take sufferer's temperature every half hour until it cools to 102° F.
4. When body temperature decreases to 102° F, cover the patient with a thin blanket or sheet to prevent chilling.

### People at Greater Risk of Heat Ailments

- People with chronic diseases such as: diabetes, hardening of the arteries, heart disease, kidney disease, stroke, high blood pressure, respiratory ailments
- Overweight people
- Infants
- Athletes or military personnel in strenuous training
- Alcoholics
- People with circulatory problems
- People taking medication for various conditions such as: heart problems, ulcers, high blood pressure, tension, nausea or vomiting, Parkinson's disease
- People taking antihistamines, tranquilizers, laxatives, or sleep-inducers
- People who lose large amounts of water because they have the flu (diarrhea or vomiting) or because they have been working hard in intense heat and sweating heavily
- People with a fever caused by the flu or immunization shots
- People who can't sweat properly due to cystic fibrosis or other problems

## Appendix E

### Avoiding Heat Ailments

#### ***Get used to the sun gradually.***

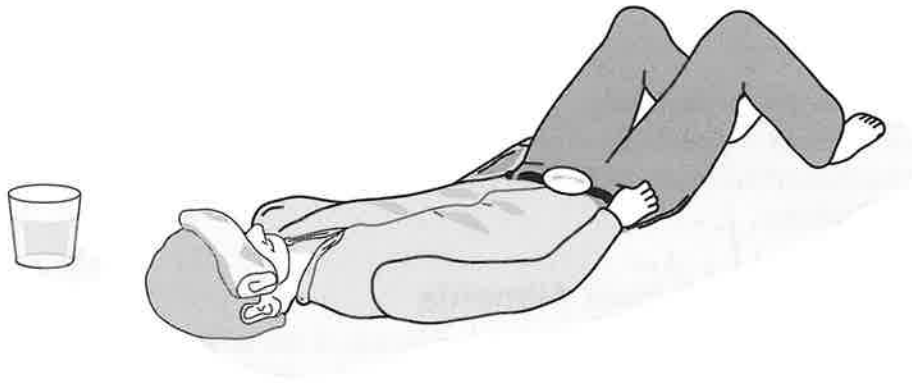
During the first hot spell of the year, don't work too long or hard in the sun. Gradually increase the amount of time in the sun each day.

#### ***Keep cool—avoid the heat and direct sun as much as possible.***

- Limit activity during the most intense heat (10 a.m. to 2 p.m.).
- Take 5 to 10 minute breaks every half hour if you are working in the heat.
- Try to stay in the shade when you are outdoors.
- Wear lightweight, loose-fitting clothing.
- Wear a wide-brimmed hat in the sun.

#### ***Prepare yourself for the heat.***

- Drink more fluids such as water, iced tea, vegetable juice. Avoid alcoholic beverages.
- Eat some salty food (unless you are on a low-salt diet).
- Watch for the warning signs of heat ailments when the temperature goes above 90° F such as nausea, dizziness, tiredness, fever, and flushed dry skin.
- Keep in touch with friends and relatives if you live alone.



Appendix E is based on a brochure titled, "Hyper-Thermia," published by the National Center for Appropriate Technology 1981. Reprinted with permission.