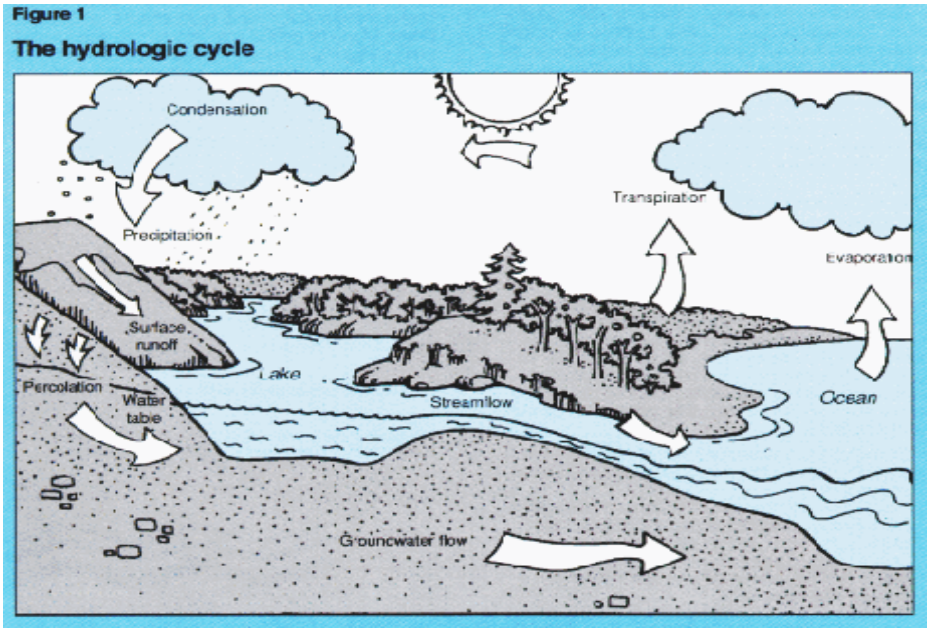
Water Quality and You

A Special Educational Series created for the Cow Creek Watershed residents, landowners, and Stakeholders, funded by the David and Lucille Packard Foundation for the Western Shasta Resource Conservation District.

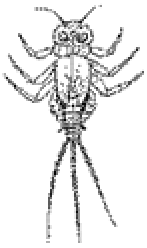


What's inside?

The Hydrologic Cycle *~ represents the circulation of the Earth's waters from the ocean to atmosphere to land and back to ocean. The cycle can be thought of as a huge water pump powered by solar radiation (energy from the sun) and gravity. The hydrologic cycle is a global system, and every molecule of water on Earth is part of the cycle.*

Have You Seen These Creatures?

Mayflies **Stoneflies** **Caddisflies** **midges** **Aquatic Earthworms**





Since streams have sometimes been used as conduits to carry waste away from cities or factories, water quality standards help to prevent streams from becoming harmed by toxic chemicals or disease organisms such as bacteria. These standards are typically based on protecting drinking water quality for human consumption. However, monitoring of water quality problems requires not only an evaluation of human health risks, but of the biological health of a stream as well. Biological health is not always obvious, so practical field techniques are needed to assess the well-being of streams. A bioassessment is one way to fill this need by providing direct measures of the types of life inhabiting streams. Simple techniques using aquatic insects and other invertebrates can be indicators of whether a stream is sustaining a viable habitat and living up to its potential. Species such as Mayflies, Stoneflies, and Caddisflies are very sensitive to low water quality, so a plentiful supply generally indicates good water quality. Midges and aquatic earthworms can live just about anywhere, so large populations of these species is not a good sign.

Getting to Know Your Neighborhood Creeks

The Cow Creek watershed encompasses approximately 430 square miles and drains the base and foothills of Mt. Lassen in a southwest direction into the Sacramento River. The basin area is roughly bordered by Highway 299 to the north, Highway 44 to the south, and Highway 89 to the east. Cow Creek is a dendritic (tree like) stream system and can be divided into five main sub-watersheds: Little Cow Creek, Oak Run Creek, Clover Creek, Old Cow Creek and South Cow Creek.

According to area maps and historical naming convention the Main Stem of Cow Creek begins at the confluence of South Cow and Old Cow Creeks. From there it flows west for seven miles where it joins with Clover Creek, and then in another mile joins with Oak Run Creek. The Main Stem of Cow Creek and Little Cow Creek converge further downstream, at the Highway 44 bridge crossing. The Main Stem of Cow Creek continues south for approximately 7.5 miles where it empties into the Sacramento River, 23 miles downstream of Shasta Dam and 4 miles east of the city of Anderson.

Little Cow Creek (also known as North Cow Creek) drains a 148 square mile basin. The headwaters (Cedar Creek, North Fork, and Mill Creek) originate at an elevation of roughly 5,900 feet on the west slopes of Tolladay Peak, Snow Mtn. And Clover Mtn. Little Cow Creek flows for 36 miles southwesterly along Hwy 299 and then southerly along Deschutes Rd. before it joins with the Main Stem Cow Creek at Hwy 44.

Oak Run Creek, the smallest of the five main tributaries, drains a 42 square mile basin and originates at approximately 3,200 feet elevation. Oak Run Creek flows 23.5 miles southwesterly, past the town of Oak Run and along Oak Run Road, to its confluence with the Main Stem of Cow Creek in Palo Cedro.

Clover Creek drains a 54 square mile basin and originates at approximately 5,500 feet elevation of the south slope of Clover Mountain. Clover creek flows 27.5 miles from the headwaters to its confluence with the Main Stem of Cow Creek.

Old Cow Creek drains an 80 square mile basin and originates at 6,500 feet elevation in the Latour Demonstration State Forest. Old Cow Creek flows 32 miles and conjoins with Hunt Creek, Glendenning Creek (east of Whitmore), Canyon Creek and Coal Gulch before its confluence with South Cow Creek three miles east of Millville.

South Cow Creek drains a 78 square mile basin and originates at 5,800 feet elevation in the Latour Demonstration State Forest. South Cow Creek flows 28.5 miles to its confluence with Old Cow Creek near Hwy 44. Its larger tributary streams include Atkins Creek, Beal Creek, Hamp Creek, and Mill Creek.

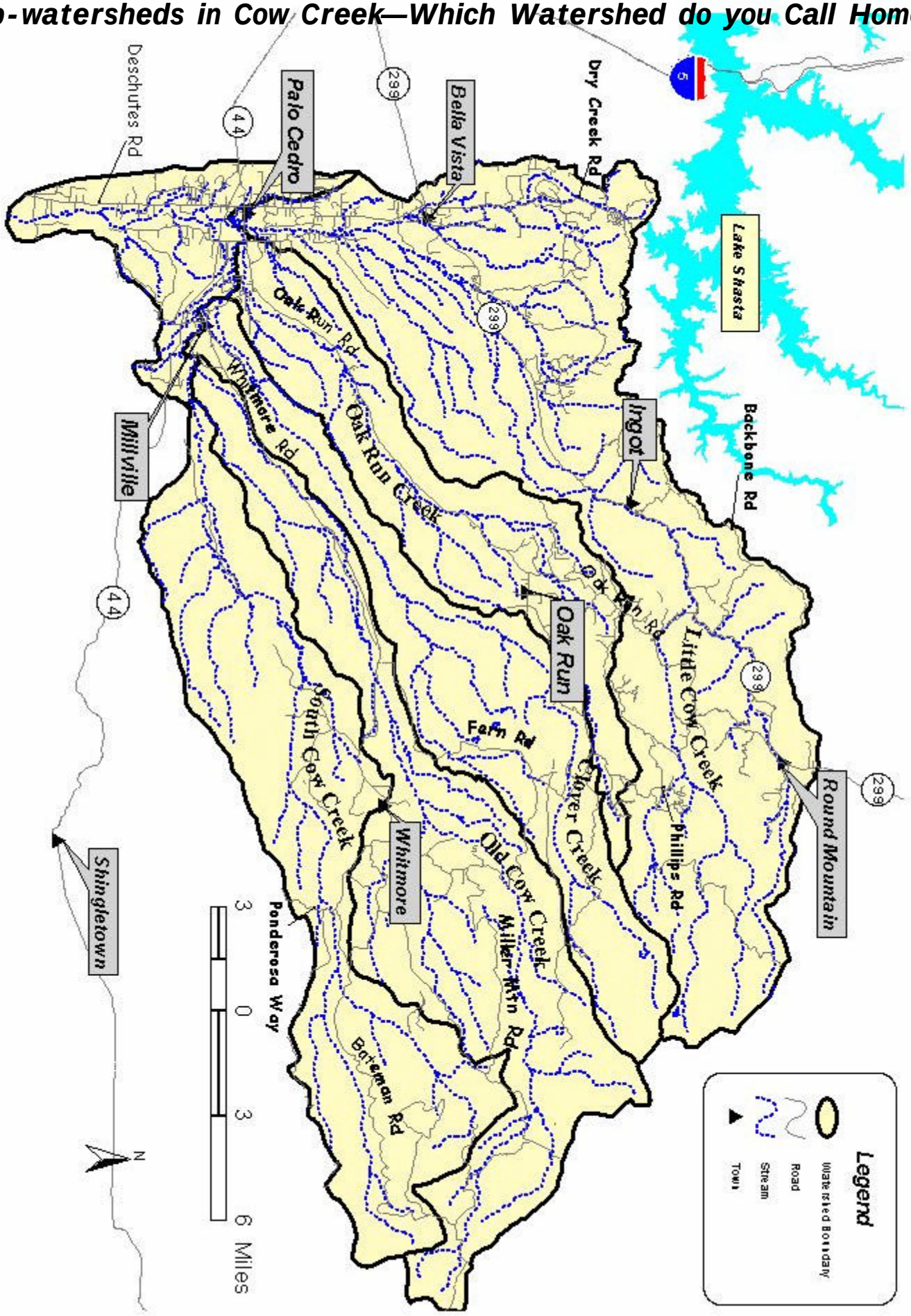
On a Scale of 1—10...

1 ——————————————— 10

How Well Do You Treat Your Watershed?

Your actions at home directly affecting the quality of water in your watershed. On a scale of one to ten, how well do you treat your watershed? Did you know that water from storm drains flow directly into local creeks and streams? Even in Cities! Could you change your actions to minimize your impact on your watershed? A list of suggested actions are found on page 6. Information on reducing your impact on your environment is available in many locations. Feel free to contact the Western Shasta RCD for more information on where to look.

Sub-watersheds in Cow Creek—Which Watershed do you Call Home?



Why are Macroinvertebrates used as Water Quality Indicators?

- ***Aquatic macroinvertebrates differ in their sensitivity to water pollution.***

Some aquatic macroinvertebrates cannot survive in polluted water, while others survive or even thrive. In a healthy stream, the macroinvertebrate community will include a variety of pollution-sensitive macroinvertebrates, such as Mayflies, Stoneflies, and Caddisflies. In an unhealthy stream, there may be only a few types of macroinvertebrates present, like midges and aquatic earthworms who are less sensitive.

- ***Aquatic insects are an important part of the aquatic food chain in and around a body of water.***

In most streams, the energy stored by plants is available to animal life either in the form of leaves that fall in the water or algae that grows on the stream bottom. The algae and leaves are eaten by macroinvertebrates. The macroinvertebrates are a source of energy for larger animals such as fish, which in turn, are a source of energy for other animals, and even humans.

- ***Macroinvertebrates provide information about the quality of a stream over long periods of time.***

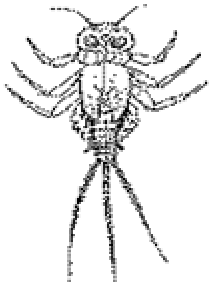
It may be difficult to identify stream pollution with water analysis such as pH and dissolved oxygen, which will only provide information at the time of sampling. Even the presence of fish may not reveal if there is a pollution problem, because fish can move to avoid polluted water and then return when conditions improve. However, most aquatic macroinvertebrates cannot move away to avoid pollution. A macroinvertebrate sample may provide information about pollution that one may not notice at the time of sample collection. Generally, macroinvertebrates live in streams for years, so if during your bioassessment you find all juvenile invertebrates, you may begin to wonder what happened to the older creatures.

- ***Aquatic macroinvertebrates are relatively easy to collect.***

Useful data on aquatic macroinvertebrate is easy to collect without expensive equipment. The data obtained by taking a macroinvertebrate survey is a preliminary tool to determine if more analysis of the water quality is necessary.

CLEAN WATER INDICATORS ~ What and Where to Look

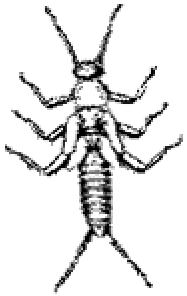
Mayfly



Mayfly Facts:

- They are usually 5-10 millimeters in size (less than 1/3 of an inch).
- They develop in streams over a period of two weeks to two years.
- Mayflies can be found living on exposed rocks in fast current or buried in soft stream beds.
- Large numbers of flying adults may emerge from stream at the same time.

Stonefly Larva



Stonefly Facts:

- They are usually 10-20 millimeters in size (generally less than an inch).
- Stoneflies are found in cool, clean streams with high levels of dissolved oxygen.
- They develop in the stream for a period of three months to three years.
- Stoneflies are either predators or feed on fungi and bacteria from rotting leaves.

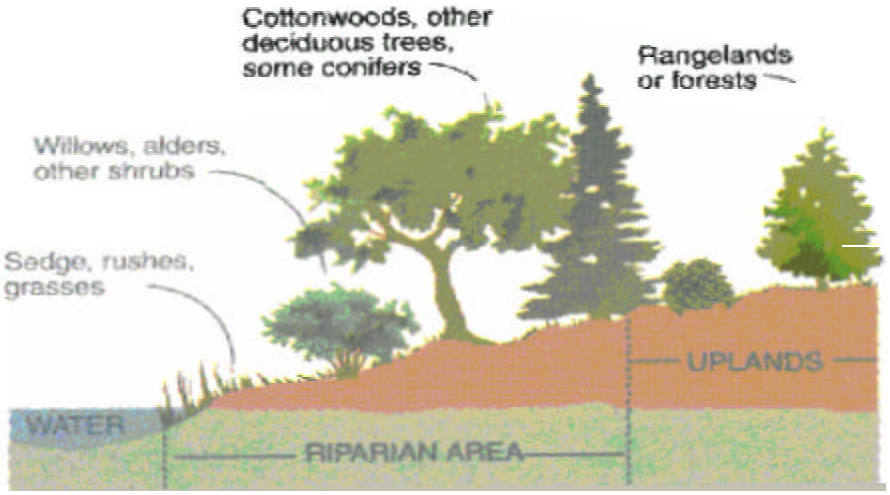
Caddisfly Larva

Caddisfly Facts:

- Some Caddisflies make houses or cases for themselves out of different materials such as rocks, sand, gravel, twigs or leaves using a glue-like substance secreted from their back end.
- Some spin webs to trap food from flowing water.
- They are usually 5-10 millimeters in size (less than 1/3 of an inch).
- Although most species are very sensitive to pollution, some are pollution tolerant.

What is a Riparian Area?

Riparian areas should be "green zones" of water-loving vegetation along streams, rivers, lakes, reservoirs, and springs. Riparian zones protect water quality, can help reduce water temperature, maintain stream function, and provide important fish and wildlife habitat. If managed properly, riparian areas can provide benefits to people, such as, shade and swimming holes.



Cross Sectional Diagram of a Healthy Riparian Habitat

Reasons Why Riparian Habitats are So Important:

- The roots of riparian vegetation **stabilize creek banks**, protecting the soil from the erosive energy of raindrops and high water flows.
- Streamside vegetation **improves water quality** by serving as a natural trap to retain sediments during high flows.
- Woody streamside cover shades the water, which help **reduce stream temperatures** during the summer months, a real benefit to cold-water fish.
- Riparian vegetation **increases the infiltration rate of rainwater**, getting water into the ground where it can be utilized rather than running off as overland flow that can erode soil.
- Vegetation along streams **provide critical habitat** for many species of fish and wildlife.

DON'T PEEK! READ LAST ~ ANSWERS TO QUIZ ON BACK PAGE!

ANSWERS TO WATERSHED I.Q. QUIZ (from page 8)

1. An average driveway car wash uses how many gallons of water?

D. 116 ~ *It is estimated that an average driveway car wash uses 116 gallons of water. That's a lot of water… and a lot of soap, sediment and chemicals (oils, grease, brake lining dust, rust, and trace amounts of benzene) washed right down the storm drain and straight into the local river.*

2. How much water does a commercial car wash use?

C. 60% less than a simple home wash ~ *Most commercial car washes use 60% LESS water in the entire washing process than a simple home wash, JUST TO RINSE off a car! Special pressure nozzles mix 50% air in with the water to create pressure without volume. Not only do commercial car washes save water, but the soap, dirt and chemicals that are washed off are collected and typically sent through a regular sewer system to be treated rather than released into the storm drain and into the local river.*

3. Which is the best place to wash your car?

A. At a commercial car wash ~ *Washing your car in the yard would be the next best option, because the soil would filter out most of the soap and grime, although too many chemicals and too much soap could kill the lawn.*

4. How many Americans prefer to wash their cars at home?

B. 45% ~ *A 1999 survey found that 45% of Americans wash cars in their driveways, and 75% of all cars are washed at home at least one or more times a year. Consider the soap that drains into your watershed and its effect on fish. All detergents contain a surfactant that rinses off easily with water. Surfactants can cause severe damage to fish gills as well as destroy the external mucus layer that protect fish from bacteria and parasites. Organic chemicals, such as pesticides and phenols, are then more easily absorbed by fish. Basically, not too good for fish.*

Homeowner Tips Towards Better Water Quality!

What you don't know can hurt the environment. When rain falls or snow melts, the seemingly negligible amounts of chemicals and other pollutants around your home and property get picked up and carried away to the nearest creek. Multiply the runoff from your property by the thousands of people living in your watershed and the problem becomes apparent. The ramifications include polluted drinking water, beach closings, and endangered fish and wildlife.

So what can you do to help protect the creeks in your watershed from unnecessary pollution? The following are specific tips, organized by categories, to help you become part of the solution rather than part of the water pollution problem.

In the Lawn and Garden:

- ***Think ahead in your garden:***
  ~ Select plants with low water requirements, and minimal need for fertilizers, and pesticides. Using fewer chemicals, this decreases the possibilities that irrigation, rain or snow melt will transfer the chemicals into the creeks in your watershed.
  ~ Another way to reduce the amount of chemicals added to your lawn or garden is to compost. Composting is a valuable soil conditioner which gradually releases nutrients to your lawn and garden. Using compost will decrease the amount of commercial fertilizer needed. In addition, compost retains moisture in the soil and thus helps conserve water.

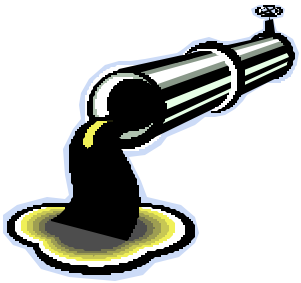
- ***Techniques for improving infiltration and reducing runoff.***
  When water infiltrates, soil and plants act as a filter, which retain pollutants from flowing into local water ways. When water is unable to infiltrate, it is considered "runoff", which flows directly into a creek or storm drain which is then deposited into the nearest stream. Runoff can also cause erosion problems, which will affect water quality.
  ~ Plant grass swales in low areas in the lawn to capture pollutants and sediments before they get to the creek;
  ~ Create porous walkways and patios (use stone, brick, gravel,) instead of using impervious cement;
  ~ If you already have cement, install gravel trenches around it to collect the water runoff and filter it;
  ~ Keep storm gutters and drains clean of leaves and yard trimmings, decomposing vegetative matter leaches nutrients and can clog storm systems and result in flooding.

- ***When you need to fertilize:***
  ~ Test the soil before applying fertilizers. Over- fertilization is a common problem, and the excess often leaches into groundwater or is carried away into creeks.
  ~ Use slow- release fertilizers on areas where the potential for water contamination is high, such as sandy soils, steep slopes, compacted soils, and verges of water bodies.
  ~ Select the proper season to apply fertilizers: Incorrect timing may encourage weeds or stress grasses.
  ~ Do not apply pesticides or fertilizers before or during a rain storm due to the strong likelihood of runoff.
  ~ Calibrate your applicator before applying pesticides or fertilizers. As equipment ages, annual adjustments may be needed.

- ***When you get professional help:***
  ~ If you elect to use a professional lawn care service, select a company that employs trained technicians and follows practices designed to minimize the use of fertilizers and pesticides.

Is your Septic System contributing to problems in your watershed?

Improperly maintained septic systems can contaminate groundwater and surface water with nutrients and pathogens. By following these recommendations, you can help ensure that your system protects water quality.



- **Pump out septic systems regularly**.
  Pumping out every three to five years is recommended for a three-bedroom house with a 1,000-gallon tank; smaller tanks should be pumped more frequently.
- **Do not use septic system additives**.
  There is no scientific evidence that biological and chemical additives aid or accelerate decomposition in septic tanks; some additives may in fact be detrimental to the septic system or contaminate ground water.
- **Avoid or reduce the use of garbage disposals**.
  Garbage disposals contribute unnecessary solids to septic system and can also increase the frequency a tank needs to be pumped.

Are you Aware? It is illegal to dispose of hazardous waste in the trash. Dumped hazardous materials can be a huge water contamination problem. When dealing with hazardous chemicals, please follow the following tips:

1. **Always read the product label and follow directions.**
   Do not mix chemicals together. Mixing may cause combustion or explosion.
2. **Keep products in their original containers.**
   Use a permanent marker to label damaged or missing labels.
3. **Properly store or transport all hazardous materials.**
   Keep hazardous materials away from children and animals.
   Transport hazardous materials in sturdy containers (no more than 5 gallons or 50 pounds).
   Put these materials in the truck or pickup bed, not in the passenger compartment.
4. **Buy only what you need.**
   Share leftovers with friends or neighbors. Some pesticides deteriorate over time and can become more toxic.
5. **Ask before you buy any pesticides or toxic materials.**
   A professional exterminator, gardener, or arborist will be more than happy to help.
   Shasta County Environmental Health is another good source for information.

USED OIL FACTS

Oil never goes bad—it just gets dirty

Did you know?

* Used motor oil can contain toxic substances such as benzene, lead, zinc, and cadmium.
* The oil from a single oil change (1 gallon) can ruin the taste of a million gallons of drinking water, enough water for 50 people for one year.
* Automotive oil accounts for more than 40% of the total oil pollution of the nation's harbors and waterways.
* Of the over 1.3 billion gallons of oil used in industrial and lubricating each year in the U.S., less than 60% is recycled.
* 1 in 4 households have a Do-It– Yourself (DIY) oil changer.
* If the oil generated by all DIY oil changers in America were collected and re-refined, it would provide enough motor oil for 50 million cars each year. This would reduce our dependence on imported oil, help reduce the trade deficit, and provide jobs.
* 90% of the used oil filters generated by DIY's are not recycled.
* Recycling 1 ton of used oil filters recovers 1,700 pounds of steel and up to 60 gallons of used oil.

- Information courtesy of City of Redding Household Hazardous Waste Department

Test your Watershed I.Q.

1. An average driveway car wash uses how many gallons of water?

A. 26
B. 56
C. 96
D. 116

2. How much water does a commercial car wash use?

A. The same as a simple home wash.
B. 60% more water than a simple home wash
C. 60% less than a simple home wash.
D. none of the above.

3. Which is the best place to wash your car?

A. At a commercial car wash.
B. In the street (after you have blocked the storm drain).
C. In the yard.
D. At a community fundraiser.

4. How many Americans prefer to wash their cars at home?

A. 25%
B. 45%
C. 65%
D. 85%

ANSWERS ON PAGE 5

WATER USE FUN FACTS

How much water do we use in a day?

Taking a shower or bath ~	15 - 30 gallons
Watering the Lawn ~	180 gallons
Washing the dishes ~	15 - 60 gallons
Washing clothes ~	30 gallons
Flushing the toilet ~	4 - 7 gallons
Brushing your teeth ~	1 gallon
Drinking ~	1/2 gallon

When this water leaves your home, remember it eventually goes to another user. Be careful of what you contribute to the water.

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

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The mission of the Western Shasta Resource Conservation District is to collaborate with willing landowners, government agencies, and other organizations to facilitate the conservation or restoration of Western Shasta County's natural resources.