Preparing for El Niño

WELCOME!

Master Gardeners—Who We Are

- Part of the UCCE system
- 80 hours of training
- Required Continuing Education each year to recertify
- Volunteers

Master Gardeners—What We Do

- Provide scientifically-based research to home gardeners
- Workshops
- Help Desk
- Farmers Markets
- Weekly Column and Facebook
- Demonstration Garden

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More that we do!

- Tomato Sale
- Community Events
- Speakers
- Garden Tour
- Tree Book
- Month-by-Month Garden Book
- Train future MGs

Find us @

- http://ucanr.edu/sites/ucmgnapa/
- or search for us:

  UC Master Gardeners of Napa County

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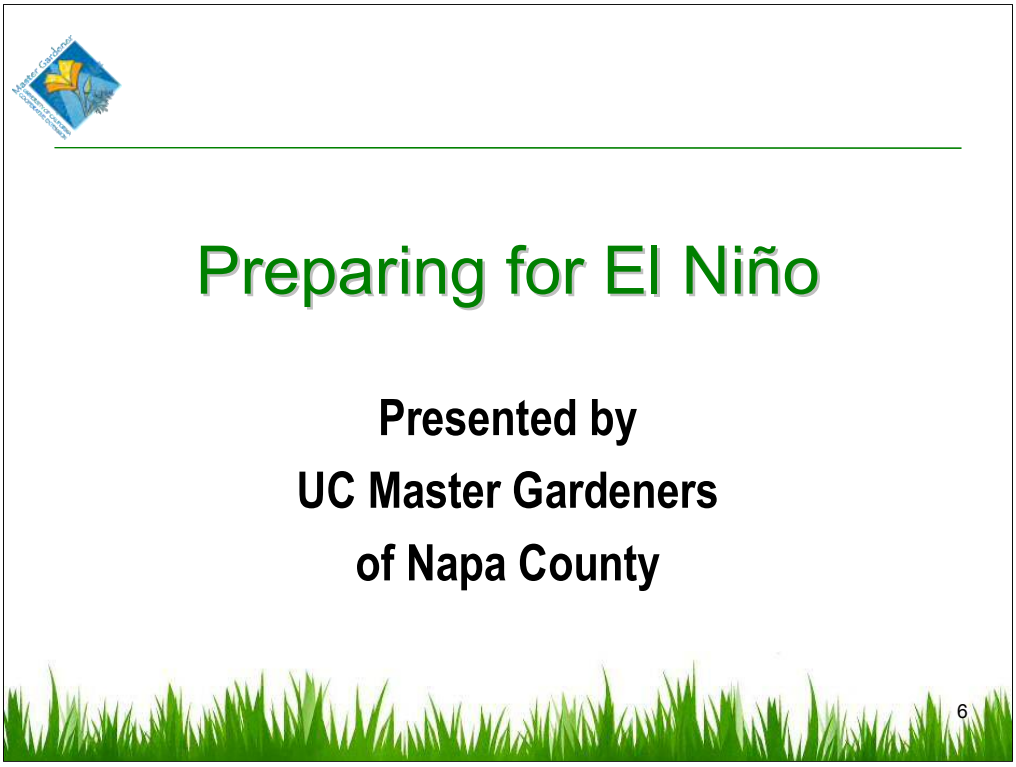
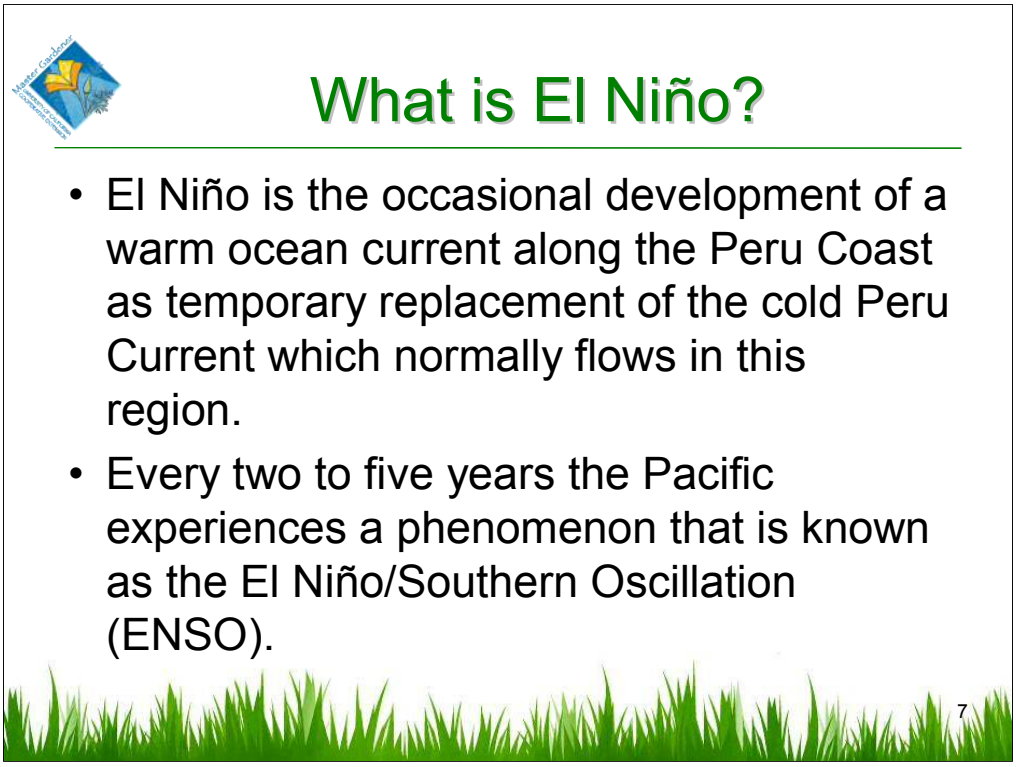


Good morning, and welcome!

Our continuing ed program today is Preparing for El Nino—and if you saw David Layland's article in the paper on Saturday, you'll know that that is some of what's ahead today—and as you might guess, there is more!

I get to be the MG who tells some of the El Nino backstory before we get into that really good preparation information from David, and Lynda.



What IS El Nino?

What have YOU heard about it?

The short version is on the slide. Pause.

(EL NINO IS THE OCCASIONAL DEVELOPMENT OF A WARM OCEAN CURRENT ALONG

THE PERU COAST and IT OCCURS EVERY TWO TO FIVE YEARS.)

The name came from Peruvian fishermen who noticed changes in the ocean temperature and fish population—the ocean became warmer, and the fishing became harder. More detail on that in a moment.

Where did the name come from?

- **El Niño** was originally recognized by fisherman off the coast of South America as the appearance of unusually warm water in the Pacific ocean, occurring near the beginning of the year.

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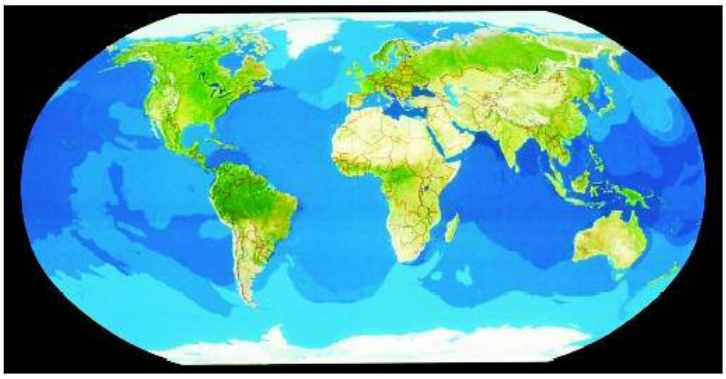
El Niño means The Little Boy or Christ child in Spanish. This name was used for the tendency of the phenomenon to arrive around Christmas.

I want to mention a few significant El Ninos and draw parallels to today's developing events. The importance of being prepared, in light of previous devastation due to rain and flooding from El Nino's follows.

The most recent catastrophic El Nino's have been in 1982-83 and 1997-98. Some of us may recall the Napa River flooded in 1986 also, but that is not considered an El Nino event.

Foundation of El Niño



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First, let's talk about the ocean, because it is the foundation of both El Nino and La Nina. I'll get back to La Nina in a minute.

In normal years the cold, deep currents flowing from Antarctica up the west coast of South America are allowed to upwell, bringing essential nutrients that would otherwise lie at the bottom. Phytoplankton living near the surface depend upon these nutrients for survival. In turn, fish and mammals depend upon phytoplankton as the very foundation of the marine food chain.

It is not clear what causes the ocean to warm---whether it is a random fluctuation or a normal variation or the result of global climate changes.

The warm surface waters of an El Nino prevent this upwelling, effectively starving the phytoplankton population there and those animals higher up the food chain that depend upon it. Fishermen in Peru and Ecuador generally suffer heavy losses in their anchovy and sardine industries during an El Nino. An example of the devastating effect of the 1982-83 El Nino was at Christmas Island (an Australian territory in the Indian Ocean, south of Java and Sumatra). During the 1982-83 El Nino, sea birds abandoned their young and flew out over a wide expanse of ocean in a desperate search for food. Along the coast of Peru during that same time period, 25 percent of the adult fur seal and sea lion populations starved to death, and all of the pups in both populations died. Remember, phytoplankton were not available to support the fish that are part of the seals food chain. Similar losses were experienced in many fish and marine mammal populations.

Sea Lions

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Fast forward to today for a minute……..and haven't we had similar unusual starvation reports recently involving seals and sea lions?

The Marine Mammal Center in Sausalito has rescued 1500 animals this year up to August, 1200 of them sea lions, most of them starving pups.

Atacama Desert in Chile

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The Atacama Desert in Chile, known as the driest place on Earth, is awash with color after a year's worth of extreme rainfall.

In an average year, this desert is a very dry place. Arica, Chile, in the northern Atacama holds the world record for the longest dry streak, having gone 173 months without a drop of rain in the early 20th century. In another Atacama neighbor to the south of Arica, the average annual rainfall in the city of Antofagasta is just 0.07 inches.

But strong El Niño years can be a rainy boom for the region, located just to the east of the warmest ocean water on the globe. In March, heavy thunderstorms brought 0.96 inches of rain in one day to parts of the Atacama Desert. This doesn't seem like that much, but it was a huge rainfall event for the desert — over 14 years of rain in one day. The torrent caused the typically dry Copiapo River to swell far beyond its banks. Flooding killed at least nine people that day.

As El Niño strengthens, so does the rainfall increases across South America. As areas of low pressure swing east into the Andes Mountains, the usually warm waters off the coast provide more than enough water vapor to fuel extreme rainfall events.

Back to 1982-83---Meanwhile, while the Peruvian seal population was starving, about 100 inches of rainfall fell in Ecuador and northern Peru—ordinarily a desert region. Vegetation thrived and the region grew lush with grasslands and lakes, attracting swarms of grasshoppers and, subsequently, birds and frogs that fed on the grasshoppers.

Many fish that had migrated upstream during the coastal flooding became trapped in the drying lakes. The incidence of malaria rose due to thriving mosquito populations.

Now let's review some facts about the 1997-98 El Nino.

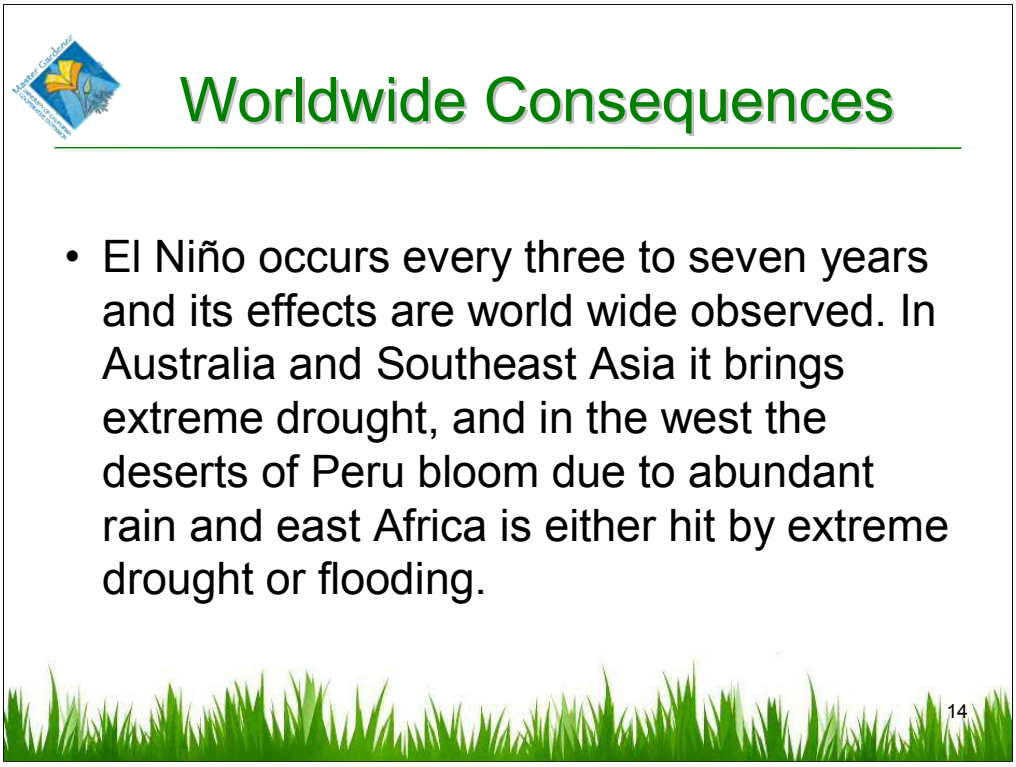
It started in October 1997 in Mexico, when a hurricane fueled by El Nino slammed into Acapulco, causing massive flooding and hundreds of deaths.

•In December, in the course of just 24 hours, more than 7 inches fell in parts of south Orange County. Mobile home parks flooded. Mudslides destroyed hillside homes. Major roads were made impassable by debris.

•El Nino-fueled rains began striking Los Angeles in January.

•Here, the City of Napa received 41 inches of rain that season. In early February 1998, vineyards and much of downtown Napa were flooded. And there was another flood in March!

The most recent incarnation of El Nino locally was New Year's Eve 2005, when the Napa River and its tributaries from Calistoga to American Canyon overflowed their banks. In the same 24 hour period, Mt Veeder had 9 inches of rain, Yountville 7.8, and Napa 5.2 inches.



El Nino's effects are not limited to the tropical regions off the western coasts of Peru and Ecuador.

Its effects are felt all over the world, where the disruption of normal local weather patterns can have tragic and/or profound economic consequences.

For instance, a severe El Nino will enhance the jet stream over the western Pacific and shift it eastward, leading to stronger winter storms over California and the southern United States, with accompanying floods and landslides. In contrast, El Nino can also cause severe droughts over Australia, Indonesia, and parts of southern Asia.

While El Nino is known to lower the probability of hurricanes in the Atlantic, it increases the chances of cyclones and typhoons in the Pacific. Think of Mexico just a few days ago.

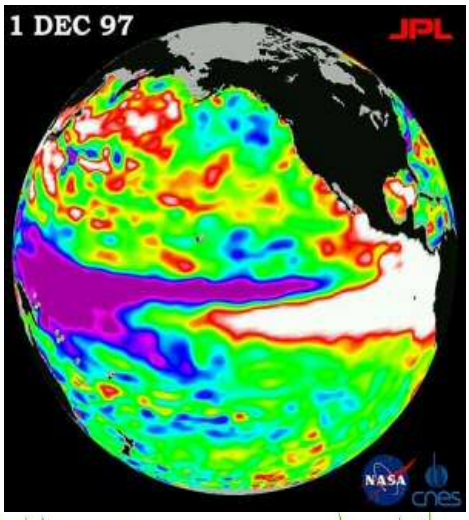
Worldwide, El Nino causes--–

•Rise in surface pressure over the Indian Ocean. Indonesia. and Australia

•Fall in air pressure over Tahiti and the rest of the central and eastern Pacific Ocean Trade winds in the south Pacific weaken or head east

•Warm air rises near Peru, causing rain in the northern Peruvian deserts

1997



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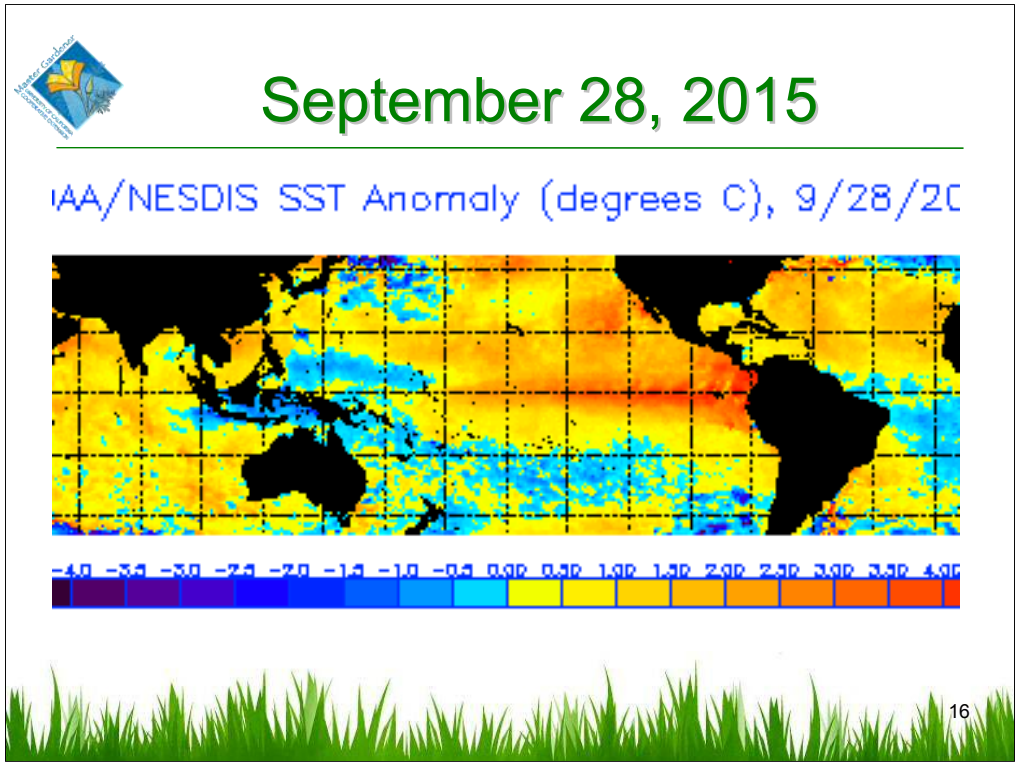
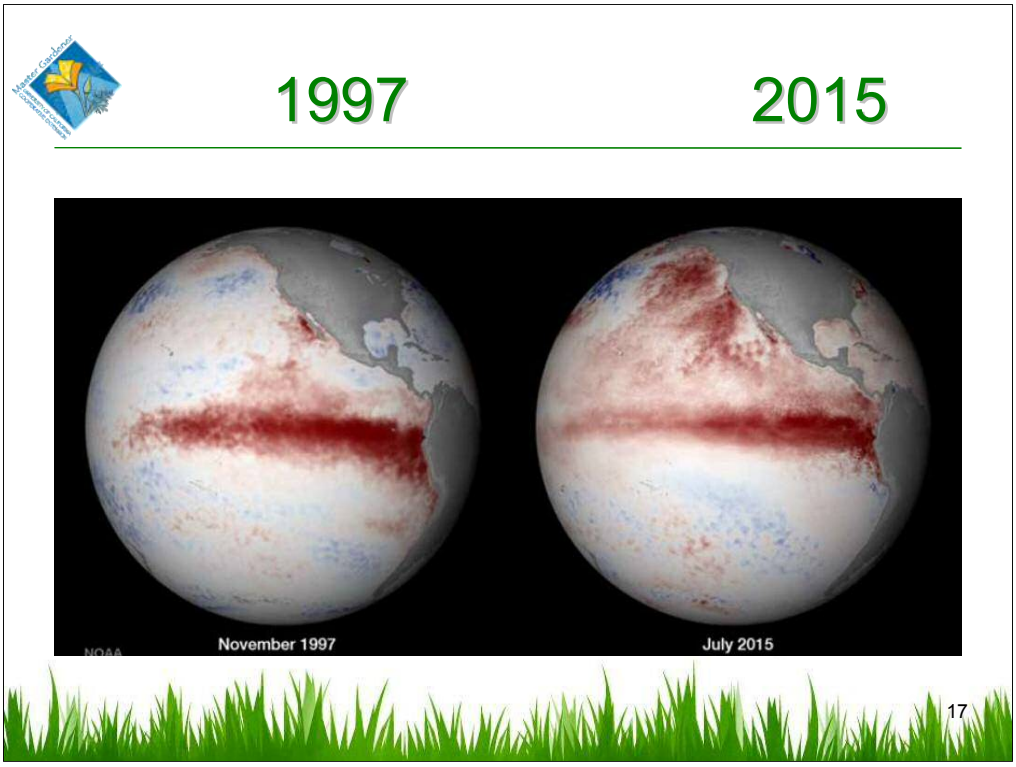
Using 1997-98 as the benchmark, let's move forward to the current day.

The latest analyses from the National Oceanic and Atmospheric Administration and from NASA confirm that El Nino is strengthening and it looks a lot like the strong event that occurred in 1997-98. Observations of sea surface heights and temperatures, as well as wind patterns, show surface waters warming significantly in the tropical Eastern Pacific.



"Whether El Nino gets slightly stronger or a little weaker is not statistically significant now. This baby is too big to fail," said Bill Patzert, a climatologist at NASA's Jet Propulsion Laboratory. October sea level anomalies show that 2015 is as big or bigger in heat content than 1997. "Over North America, this winter will definitely not be normal. However, the climatic events of the past decade make 'normal' difficult to define."



The graphics above show a comparison of sea surface temps in the Pacific Ocean as observed at the beginning of October in 1997 and 2015.

NOAA Buoys

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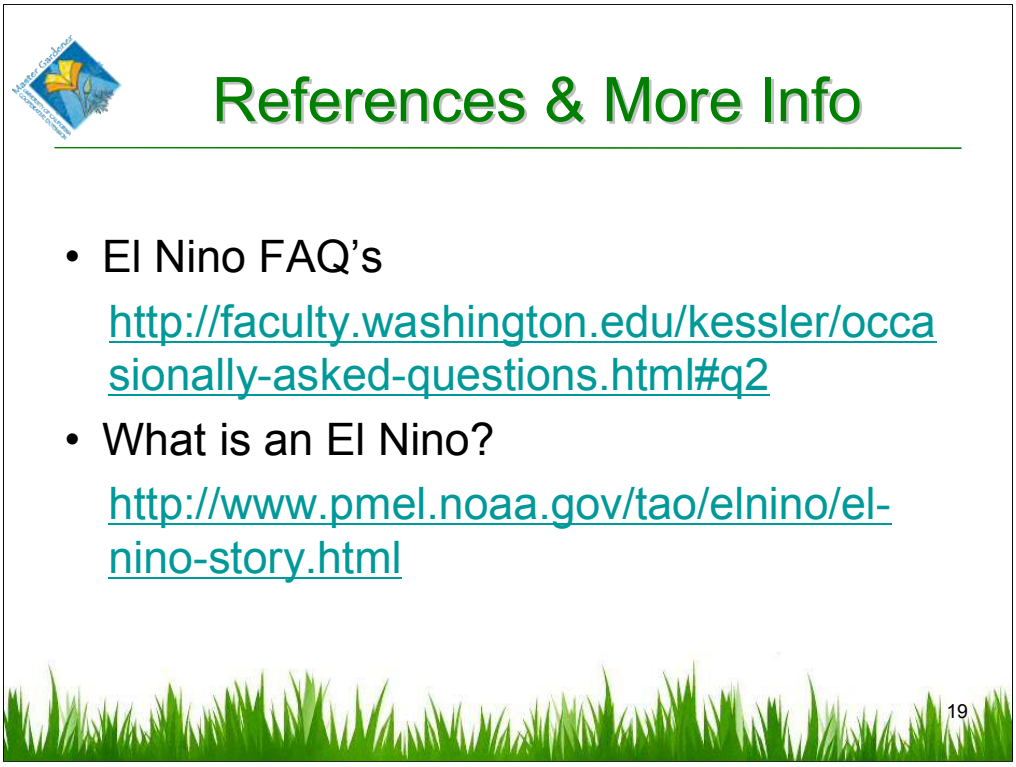
We know about changes in sea temperature, wind strength, and patterns from hundreds of buoys similar to this one planted all over the eastern and western Pacific ocean.

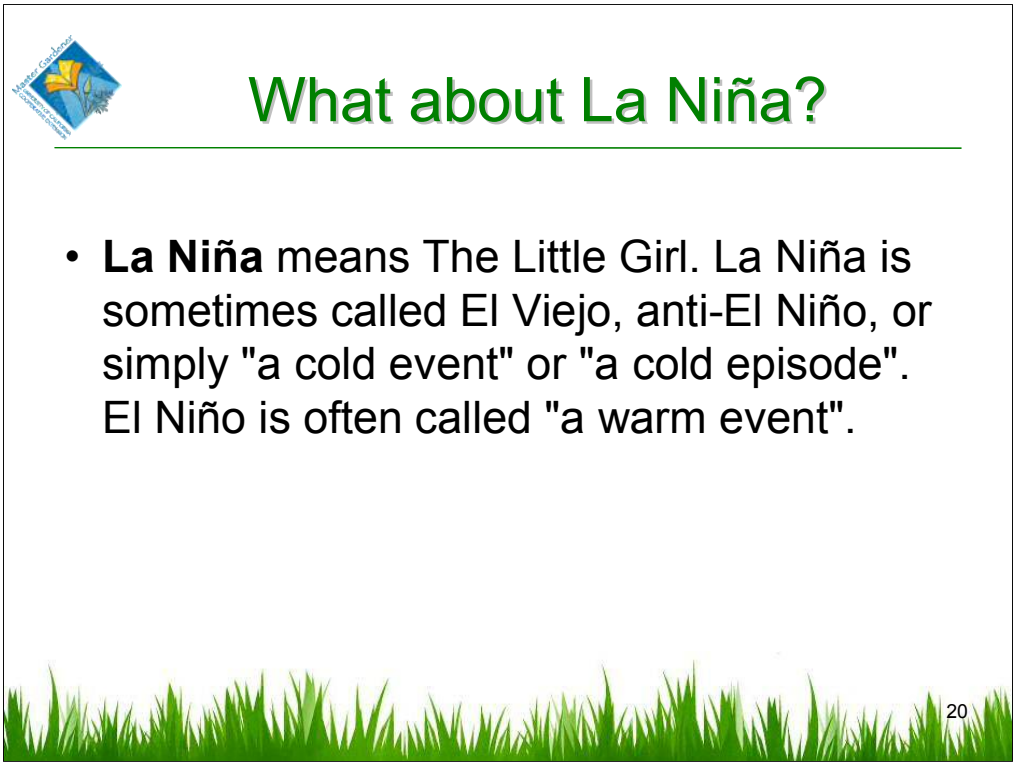
In its October monthly update, scientists at NOAA's Climate Prediction Center stated:

"All multi-model averages predict a peak in late fall/early winter. The forecaster consensus unanimously favors a strong El Nino...Overall, there is an approximately 95 percent chance that El Nino will continue through Northern Hemisphere winter 2015-16."



There are any number of websites providing up-to-the-minute information about the coming El Nino.

Spend some time looking at NASA and NOAA pages for some great pictures and much more in-depth data.



Finally, What About La Nina?

The cold counterpart to El Nino is La Nina.

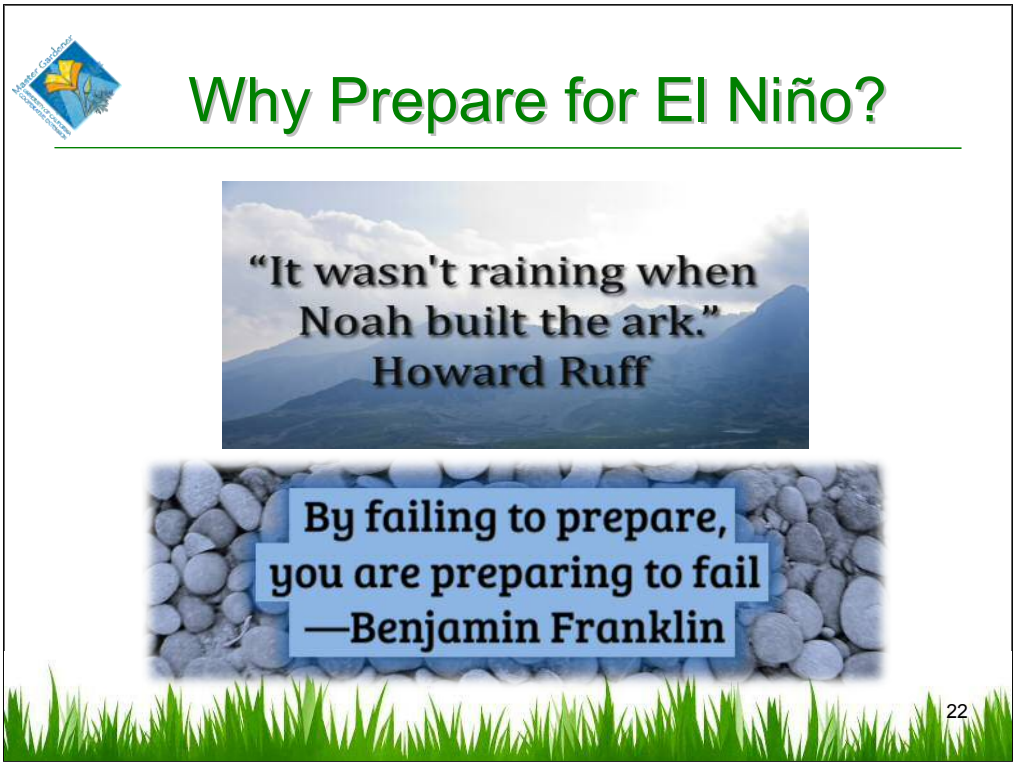
Sometimes, but not always, El Nino conditions give way to the other extreme.

That's mostly a subject for another day.

Suffice it to say, changes in global atmospheric circulation patterns accompany La Nina and are responsible for weather extremes around the world that are typically opposite to those associated with El Nino.

Let's be prepared for rain, plenty of water, and possible flooding.

I turn to my colleagues to help all of us get prepared!



Howard J. Ruff is financial adviser and writer of the pro-hard money investing newsletter *The Ruff Times*.

Remembering the Last El Niño

Why the Cinedome smelled a bit musty.

Rain…..too much of a good thing

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Failing to Prepare for El Niño

Why didn't I check the storm drain ***before*** it started raining?????

Note to self: next time get sandbags ***before*** it starts to rain.

Failing to Prepare for El Niño

Napa water taxi.

Is that the roof of our car over there?

What to do in Your Garden

Remove Debris from Summer Garden

- Remove remaining plants, fruits and veggies and add to compost pile.
- Do a final weeding.
- The goal is to remove a breeding ground for insect pests and fungal diseases.
- Do it now…..much harder to do after rains begin

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Spread Mulch

- Should be at least 2” thick
- Will protect soil from erosion
- Garden will be ready for planting when spring arrives

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Check Garden Drainage

Planting beds should slope away from house, garage and any other structures.

Complete Fall Pruning

Might not get done until spring if you don't do it now

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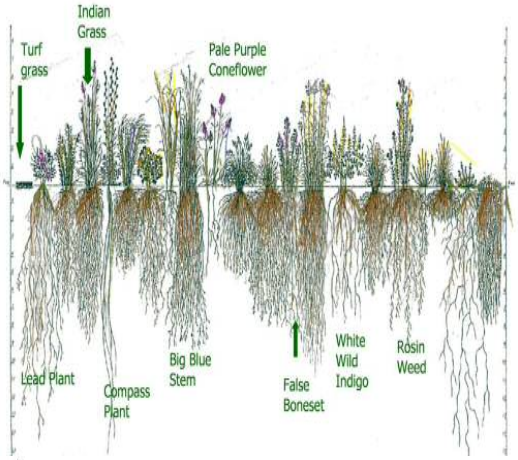
Erosion control - plant native plants



Look for natives that are:

- Drought-tolerant
- Firewise
- Long roots
- Root quickly

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Erosion control – plant cover crops

- Reduces runoff
- Increases water infiltration
- Roots can go 3’ to 7’ deep
- Can be annual or perennial

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More about cover crops (aka “green manure”)

- Reduces soil-borne diseases and nematodes
- Attracts beneficial insects
- Controls weeds
- Reduces muddy areas
- Increases earthworms and beneficial microorganisms

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Protect young trees, shrubs and tender plants

- Move pots to higher ground
- Create a barrier around young trees and shrubs

Observe water drainage and address any standing water

Swales, French drains and rain gardens coming up later

Check for slime molds (aka “dog vomit”)

- Not dangerous, Just unsightly.
- Remove by picking up with a shovel, deposit in a plastic bag and place in garbage.
- NEVER spray with hose. Will cause it to spread.

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Treat for snails and slugs

Slugs and snails shrivel and die when you put salt on them

Ducks and chickens ♥ snails and slugs

Raised beds

- Here's hoping your cool season veggie garden is in a raised bed.
- Soil in raised beds is above ground level and should survive flooding.
- If you have unplanted raised beds consider planting a cover crop (green manure) to prevent erosion and improve soil quality.

Last but not least…..

Turn Off Your Irrigation!

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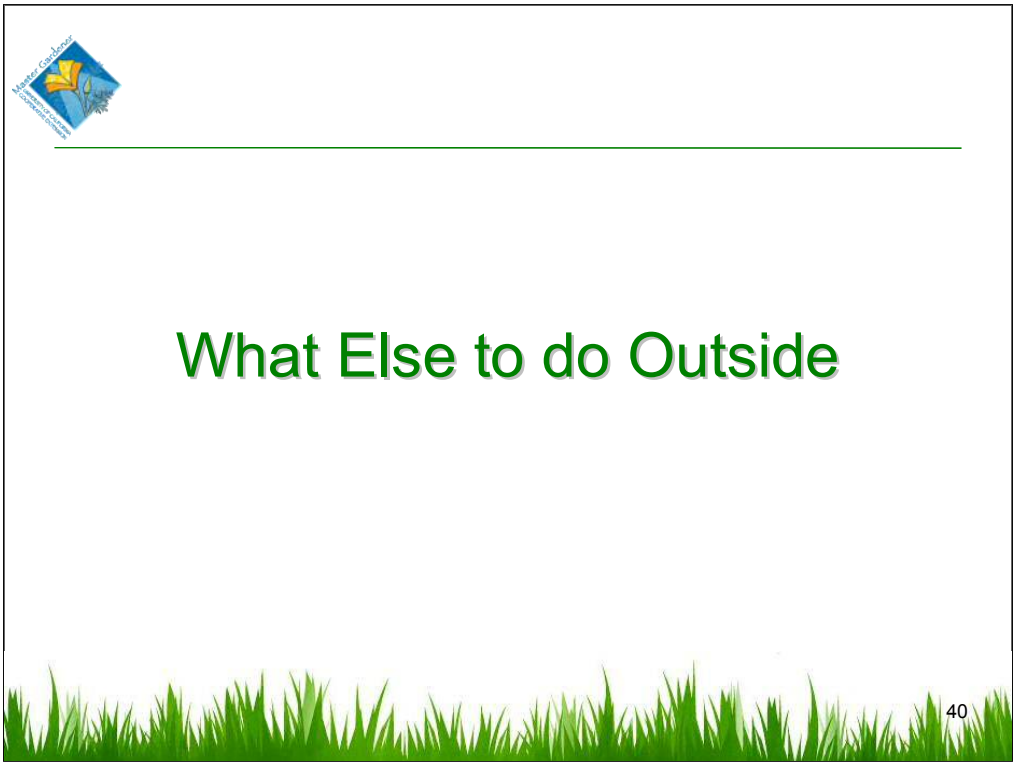


Do you know where the excess water will flow through your property?

-Who can remember after so long without rain?

-Walk your property look for gullies and/or areas in the soil with gravel trails. This means the water has washed out the topsoil and left

behind the gravel.

-Quick but temporary solution: Place bricks/rocks or some kind of obstruction into the flow in a random pattern to force the water to slow and give it some time to soak in as much as possible.

Dry Swale Rain Garden

The creation of a Dry Swale or a Rain Garden in these areas is a good permanent solution.

-Dry Swale-mostly rocks w/some plantings

-Rain Garden-mostly plants w/some rocks and a gravel basin

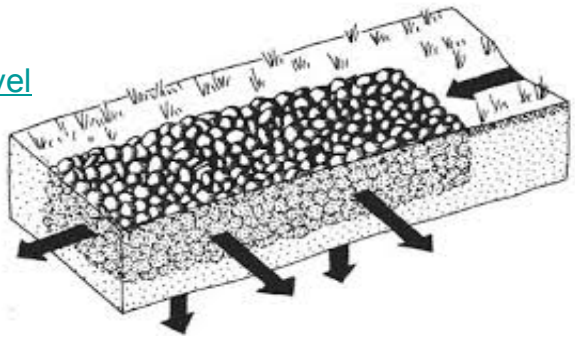
Purpose: To slow and contain runoff; filter pollutants via percolation through rocks and plant roots; returns water to aquifer much refreshed

Check list to look for optimum location:

- **-10 ft from building foundation**
- **-full or partial sun**
- **-near water outflow location**
- **-away from septic; underground pipes & tree roots**
- **-Not a water feature; will temporarily hold as much as 1 in. of water at a time**
- **-Use weighty mulch or rocks in basin to avoid the water carrying away the product.**
- **-Design should complement your existing landscape and be aware of existing landscape's water requirements as the existing plantings might not like having extended periods of wet roots.**
- **-Should be able to hold 20-30 percent of "drainage area" ie: 600 sq. ft. drainage area = 120 sq. ft. or a 10'x12' retention area (garden).**
- **-Plants should be native or drought resistant. Plants on berm will have different water requirements than those in basin as the basin plantings will be flooded periodically and in the non-rain periods water will be in short supply to all plantings.**
- **-Look for a natural declivity or create one in the desired area.**

French Drain

is a trench filled with gravel or rock or containing a perforated pipe that redirects surface water and groundwater away from an area.

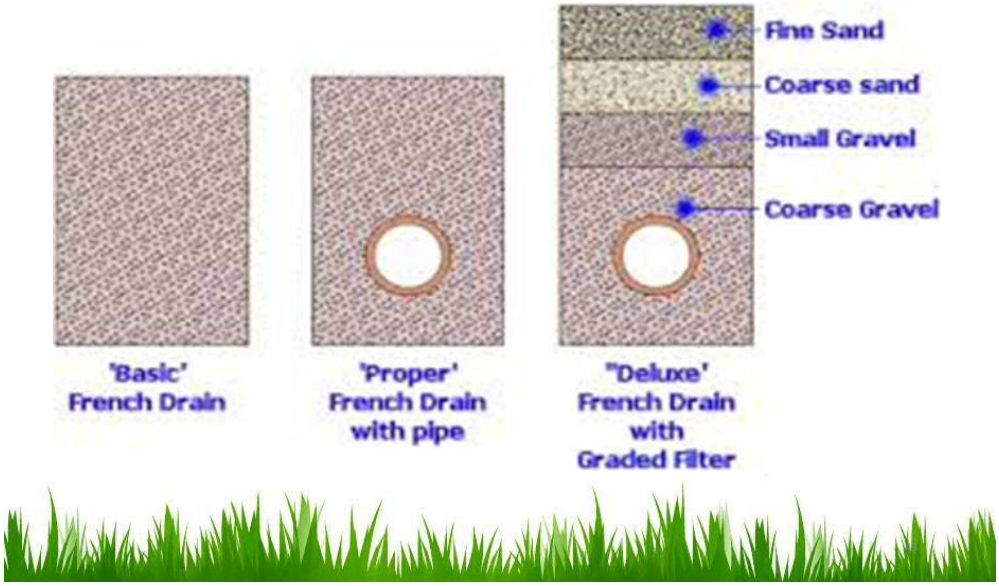


If it is too labor intensive or not practical to create a basin in desired location.

A “French Drain” also known as “rubble” or “rock drain” could be a solution.

-also directs flow of water from an area and contains the water to purify via slow percolation through the rocks back into aquifer.

Different Types of French Drains



More than one kind of French Drain:

The one described today is a “basic French Drain” the picture on your left.

The other two have perforated pipes amid the gravel. The far right one has different densities of gravel for better percolation quality.

-Rule of Thumb: 1-3 percent downslope or for every 10 ft of drain there is a gradual 3-4 inch decline.

Area Before Erosion Control

The chosen location for ‘French Drain”.

(use pointer) Notice the telltale silt runoff across the sidewalk and the filling in around the cobbles by the silt which then continued on into the street & storm drain.

(DEMO HERE)

(explain compacted soil vs gravel. Pour water (small splash should do the trick) onto compacted soil & have folks observe runoff, (should be very muddy) then pour small splash of water onto gravel and have folks observe how water immediately goes into gravel and the flow is contained.)

Digging the Trench

1’x2’ trench dug around 12’x15’ area

Finished Product

1/3 of trench filled with gravel and topped with cobbles.

A 1’ x 2’ deep trench was dug around the 12’x15’ area.

Probably overkill but effective.

⅓ Trench filled w/gravel & remainder w/cobbles to match existing landscape.

A succulent garden was added to the remaining mounded area w/water conservation in mind.

One rain storm since creation French Drain and seems to be working.

True test when El Nino hits.

Secure Anything That Can Blow or Float Away

Propane Tank

Outdoor Furniture

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An unanchored propane tank can float.

Firewood should be secured to avoid floating away.

Bring Important Items Inside or Move to Higher Ground *Before* it Rains

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In addition to family members and dogs also bring inside bikes, grills, furniture and anything else of value.

Protect Your Pets

A caring dog owner

Baxter, Bodie & Maxwell. All of them will not fit on my back.

48

Make sure they have a safe, secure and dry place to be before it starts to rain.

Protect Your Pets

- Cats are not known for their swimming ability so make sure they have a safe, secure and dry place to wait out El Nino.

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Just like your dogs make sure they have a safe, secure and dry place to be before it starts to rain.

And remember dogs will forgive you if they get wet…..cats will not.

Protect Your Feathered Friends

- If your chicken coop is in a low lying area consider building a platform to keep them high and dry.

50

Chickens can't swim.

Remember the old saying "mad as a wet hen."

Mad wet hens do not lay eggs!

Protect Your Animals

- Unless you have surfing goats it's best to make sure your animals are high and dry and safe from rising water.

Clear Seasonal Creeks

A flood waiting to happen

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This is the seasonal creek that runs through my property.

It hasn't been cleaned in 4+ years so much has accumulated that can cause water to backup.

Clean Gutters & Downspouts

- 1st make sure you have adequate medical and life insurance coverage.
- Check gutters before the 1st rain and then immediately after.
- Make sure downspouts are directing water away from your home.

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Maybe not the best way to clean your gutters.

Cleanout gutters before it rains and then to be safe check them again after the first rain.

Make sure downspouts are directing water away from the foundation.

Inspect Your Roof

- Check for loose shingles
- Check metal flashing to make sure it is directing water *off* the roof and not into your home

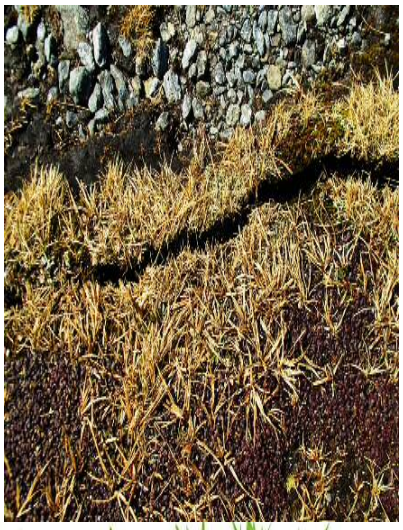
54

Check for loose shingles.

Most leaks occur at metal flashing connecting points. Use your hose to make sure the flashing is directing water off the roof and into gutters.

Note that all roof inspectors have perfectly coiffed hair and wear a white jacket.

Check Slopes for Cracking



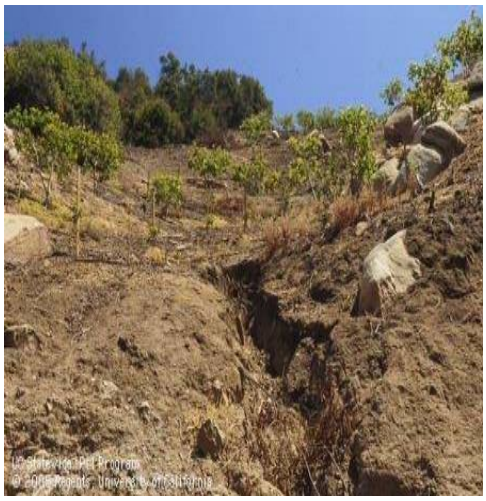
- Cracking is found most often is soils high in clay.
- Can be a sign slope movement.
- Heavy rains will exacerbate problem not now but when soil dries.
- The cure for cracking is to add compost and lots of it.
- Don't stop until cracks stop appearing.
- If problem persists have soil tested or better yet, talk to a geotechnical engineer.

55

Large cracks form in soils that are high in clay. The clay particles act just like a sponge – they swell as they soak up water, and they shrink as they dry out. During a dry spell, the shrinkage can be so significant that large cracks can form. In severe cases, these soils (called "expansive soils") can undermine the foundations of buildings because they swell and shrink so much.

Clay soil can be tricky because once it dries out in the heat, it can become hard as a rock – that's why they make bricks and pottery out of this stuff! Simply adding water doesn't solve the problem – you need to amend the soil in order to correct the texture. Before adding anything to your soil, you first need to have your soil tested. Take samples to your local agricultural extension service, or purchase a soil test kit that you can send to a lab, in order to determine the exact makeup of your soil.

Check Slopes for Gullying



- Can worsen if not treated.
- 1st step is to divert water away from the gully.
- Temporary solution - straw wattles and straw bales.
- Long-term solution - engage a geotechnical engineer.

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A gully is a landform created by running water, eroding sharply into soil, typically on a hillside. Gullies resemble large ditches or small valleys, but are metres to tens of metres in depth and width. When the gully formation is in process, the water flow rate can be substantial, which causes the significant deep cutting action into soil.

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Protect Slopes

- Straw is a temporary solution.
- Straw wattles can be used to stop the flow of water down hill.

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Straw should be pegged in by using a shovel to push it into the ground.

Bare Ground

- Prevent a quagmire from developing.
- Straw, cover crops, and straw wattles can be used.

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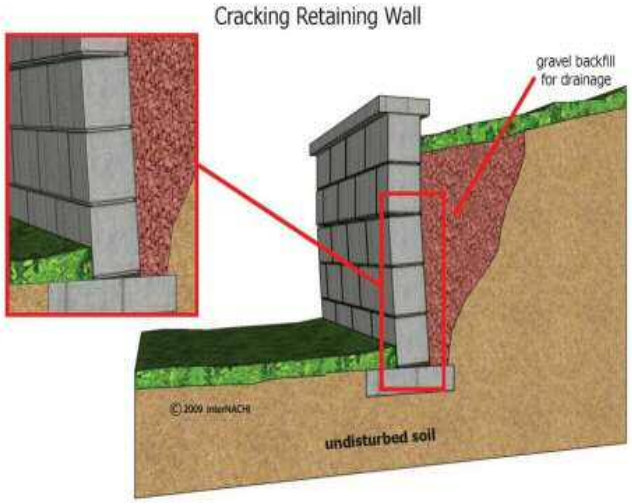
If you didn't get around to installing the new shed, hot tub or kids play area then you need to do something to prevent this area from becoming a quagmire.

Check Storm Drains

Don't let *THIS*.....turn into *THIS*

Check Retaining Walls



As a temporary measure a cracking retaining wall can be braced.

60

If necessary brace your retaining wall

Inspect Your Landscape Trees

- Stand back and look at the whole tree both before and after storms.
- *Do not climb trees to inspect*.
- If closer inspection is required then consult an arborist or tree service.

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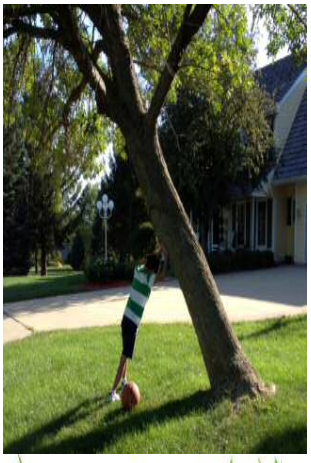
Any split in the wood is hazardous.

Inspect Your Landscape Trees

Leaning



Multiple Trunks

Weakly Attached Branches

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A leaning tree may require bracing or removal.

Trees with multiple trunks should be checked to ensure the area where the trunks meet has not weakened.

Weakly attached branches should be removed before they can fall on something.

Inspect Your Landscape Trees

Cavities & Decay

Trunk & Branch Cracks

Dead or Broken Branches

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The location and size of cavities and decay determine hazard seriousness.

Be concerned if cracks extend into the wood.

Plan to remove dead branches when possible. Broken branches should be removed as soon as possible.

If You Didn't Inspect Your Landscape Trees…..

- Your homeowners insurance may not cover damage caused by a falling tree or tree limb if the tree was not healthy to begin with.

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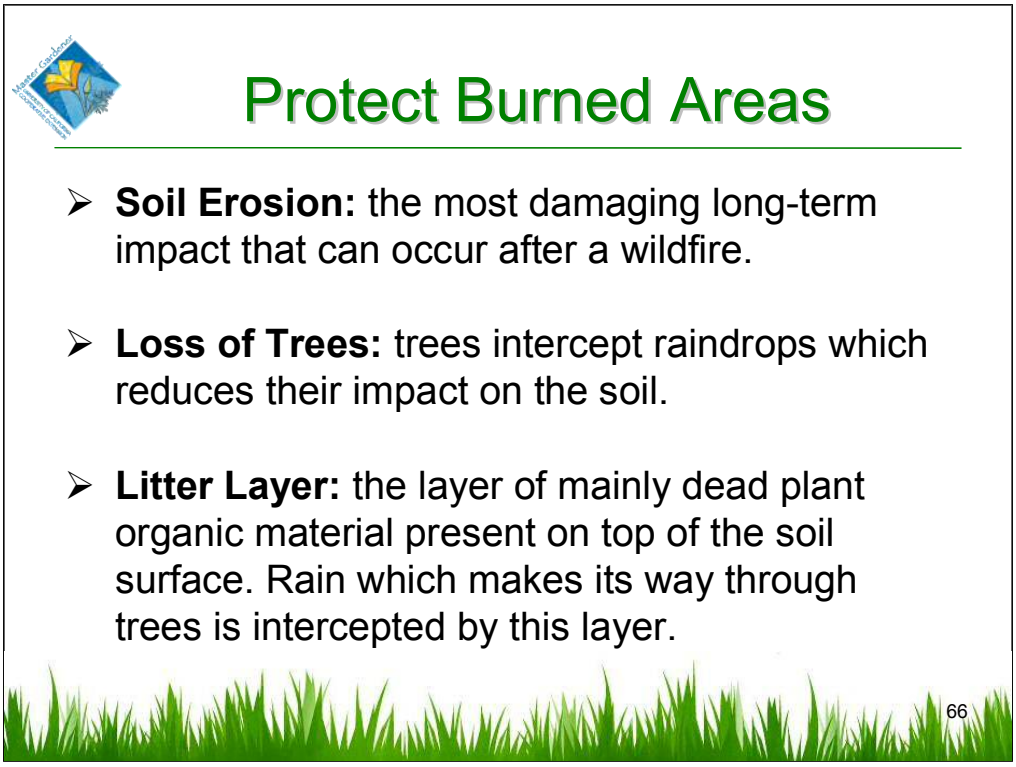
If your tree suffered any of the 6 problems you inspected for and you did nothing then coverage may be denied.

Failure to correct could result in your insurance claim being denied

Protecting Burned Areas



Here's what I've learned.

The most damaging long-term resource impact that can occur after wildfire is soil erosion.

Erosion robs land of its soil and its ability to grow vigorous plants and trees. A healthy forest functions to keep soil in place on the land. The forest canopy intercepts raindrops and reduces their impact on the soil. Rain which makes it through the canopy is intercepted by the litter layer which covers the forest floor. Together, the canopy and litter layer protect the soil by keeping the rain from detaching soil particles. Without this protection, detached soil particles can wash down denuded slopes, entering stream channels and reducing water quality and altering or degrading aquatic habitat.

Protect Burned Areas

- **Hydrophobic Soils:** Wildfires burn dead and living vegetation that accumulates on the surface of the soil. This burning produces volatile hydrophobic substances which can penetrate the soil up to a depth of six inches. When these substances penetrate the cool soil, they condense and coat the soil particles making the soil hydrophobic (water repellent).

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Protect Burned Areas

- **Hydrophobic Soils - Treatment:**
  - Raking or hoeing will break up the hydrophobic layer to allow rain waters to penetrate the soil surface.
  - A soil wetting product (surfactant) can be applied to break up the hydrophobic substances coating soil particles.

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Soil wetting products can be purchased at lawn and garden stores or golf course supply store.

Protect Burned Areas

Slash spreading is a good use for downed tree limbs and branches.
•If cut small enough and in contact with the soil they will help disperse water flow.

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Slash is debris resulting from such natural events as wind, fire, or snow breakage; or such human activities as road construction, logging, pruning, thinning, or brush cutting. It includes logs, chunks, bark, branches, stumps, and broken under-story trees or brush.

Protect Burned Areas

Mulching with straw reduces rainfall impact.

- Cost – approx. $8 for a bale.
- Easy to spread by hand.
- Removal not required.
- Can also be used to protect seeded area.

Protect Burned Areas

Seeding with a native grass or cover crop that will sprout quickly and put down roots can work well for slopes as well as flat areas.

Protect Burned Areas

Log barriers can be used to slow water flow.

- Cost – none.
- Can be labor intensive depending on size.

Protect Burned Areas

Straw wattles can be used for slope erosion control.

- Cost – approx. $160 for 25 feet.
- Durability – up to 1 year.
- Biodegradable and weed free.

Protect Burned Areas

Silt fences can be used to retain the soil until revegetation and permanent soil stabilization begin.

- Cost – approx. $35 for 100'x3'.
- Perforated to allow water to move through.
- Easy to install and remove.

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Silt fences should be used to protect streams and creeks from silt.

Protect Burned Areas

Straw Bales can be used to act as a dam to collect sediment and slow the velocity of water traveling down a slope.

- Use is generally not recommended except for very small areas.

Protect Burned Areas

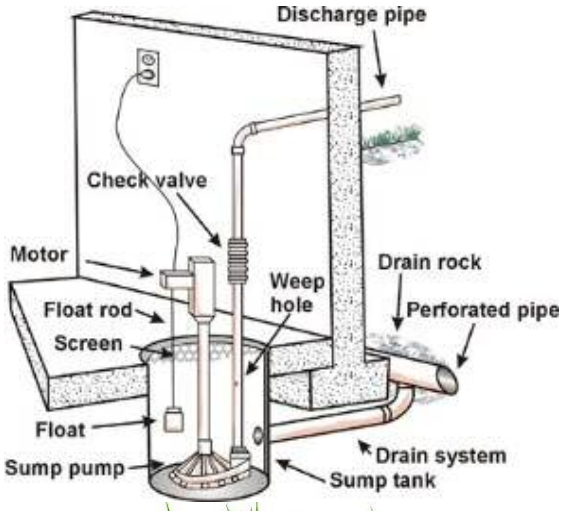
Sand bags can be used to slow water flow.

- Cost – none if provided by city/county.
- Limited durability.
- Can be labor intensive.
- Require removal and disposal.

What to do Inside

Sump Pump

- Older than 15 years – replace.
- Displayed erratic behavior – replace.
- Valves missing on the discharge line – replace.
- Should have a high water alarm.
- Battery backup should be installed in case of power outage. Consider a generator.
- Vent hole in the discharge pipe should be clear.



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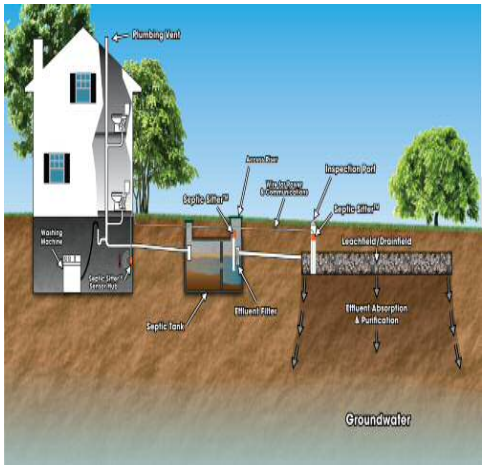
Septic System
Before & After



- For DYI, open tank cover:
  - How does it smell?
  - Where is the liquid level?
  - Is the scum layer below the opening?
- For people like me:
  - Call a professional ¢¢¢
  - Consider having tank pumped $$$

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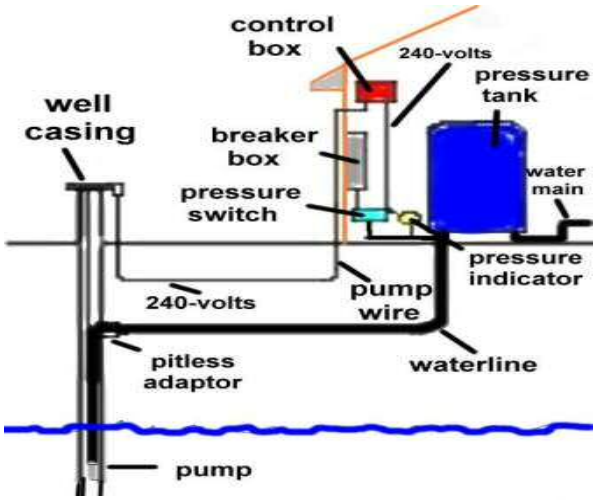
Mold

Electrical

Well



If your well becomes flooded it will need to be disinfected.

Take Photos

Disaster Preparedness Kit

Basic items your household may need in the event of an *emergency*.

Pesticides, Herbicides & Fertilizers

Make sure all of these products are securely stored and can't find their way into rainwater.

References & Still More Info

- Slow it. Spread it. Sink it - A Practical Guide to Beneficial Storm Water Management
  www.countyof**napa**.org/WorkArea/DownloadAsset.aspx?id
- Caring for Creeks
  http://www.countyofnapa.org/Pages/DepartmentContent.aspx?id=4294969022
- Napa Watershed Information, Projects, Planning and Maps
  http://www.napawatersheds.org/
- NOAA is a source of timely and authoritative scientific data and information about climate
  https://www.climate.gov/
- ***Flood Smart*** provides flood insurance, flood zone maps, floodplain maps and information to help protect your home from flooding & elevated water tables.
  https://www.floodsmart.gov/floodsmart/
- Pet Disaster Kits
  http://www.countyofnapa.org/Pages/DepartmentContent.aspx?id=4294970574

Questions?

Thank you---

And tell a friend!

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