Most Common Problems:

Cut Slope Failure
Landslide/Debris Flow
Fill Slope Failure
Roadbed Erosion/Failure
Road Ditch Erosion
Roadside Erosion
Road Affected by Stream Related Issues
Road Flooding or Water Ponding on Road
Road Washout

Most Common Causes:

Too Few Cross Drains
Undersized or Damaged Culverts / Undersized Road side Ditches
Lack of Inlet and Outlet Control
Too Much Off-Site Drainage Coming from Homes, Driveways, etc.
An inch of rainfall falling on a 100’ x 16’ wide roadway =1000 gal.; ¼ mile = 13,000 gal+
Lack of Protective Vegetation
Improper Road Design and/or Location
Improper Construction, Base Materials and Improper Treatment of Drainage
Improper Treatment of Problems by Property Owners.
Do not fix problems without fully understanding the cause of the problem.
Streambank Erosion
Geologically Unstable Slopes and Erosive Soil Types
Un-supported Cut Slopes, Un-compacted Fill Slopes
Damage by Vehicles, including Construction Activities
No Back-up Defenses
Lack of Regular and Necessary Maintenance

Early Warning Signs

Cracks, Alligating, Pot Holes
Subsidence, Dips, and Depressions
Gopher and Ground Squirrel Burrows and Tunnels
Over-steepened and/or un-vegetated Road Cuts
Loose, Un-compacted and/or un-vegetated Fill Slopes
Presence of Water-Loving Vegetation
Water on the Road Surface, Springs, and Seeps
Land Use Changes Causing More Water Draining to Road.
Erosion at Culvert Outlets

Most Common Mis-Fixes:

Filling Eroded Roadside Ditches with Broken Concrete Rubble or Rock
Filling Roadside Gullies with Brush, Broken Concrete and Kitchen Sinks
Constructing Undersized “V”-Shape Roadside Ditches
Covering Slope Failures with Plastic
Use of Improper Size of Road Rock or Road Base Materials for Repairs
Not addressing problems when they are small

**Best Practices, Solutions & Strategies (Cures):**

Reduce Amount of Water Draining Toward Road. See Handout
Oversize road drainage facilities
Install velocity dissipaters and/or outlet extensions at all culvert outlets
Provide inlet control in heavy “trash” drainage areas. Debris barriers, etc.
Repair or replace damaged culverts & other drainage facilities (don’t let fail)
Install secondary, back-up defenses such as critical dips, larger culverts down the road, etc.
Surface steep portions of unpaved roads
Out-slope roads whenever possible or when major road re-grading needs to be done anyway
Fill cracks and seal before problems get worse
Compact fill slope soil and re-vegetate. Retain if necessary
Post speed limit and private road signs to limit use and slow traffic.
Keep all bare soil and slopes vegetated with appropriate plant materials.
Preserve existing native vegetative cover.

**Take Home Points:**

Operation and Maintenance – It’s everyone’s responsibility.
   Develop an O&M road plan. Reduce amount of runoff coming from homes & driveways
Get Professional advice and a road assessment
Avoid quick fixes.
   Quick fixes can give a false sense of security & can make problems worse or cause new problems
Nip small problems in the bud. Don’t wait for the obvious failures.
Prevent problems from occurring in the first place. Treat the source(s) first.
Structural practices should be professionally designed and have a back-up
Keep all bare and disturbed soil and slopes vegetated.
Work with licensed/experienced contractors
Oversize everything, especially if you don’t plan on getting any engineering
Work with your neighbors, Form a Road Association, appoint a road manager and
Stop pouring more money into the same pot hole.

**For More Information Contact:**

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USDA Natural Resources Conservation Service: 831-359-1297;
www.ca.usda.nrcs.gov

Resource Conservation District of Santa Cruz County at 831-464-2950; or visit the
RCD on-line at: www.rcdsantacruz.org. Note: A Private Road Maintenance Guide is available on this web site.