Protecting Water Quality: Implementing LID at UNR
Polluted runoff:
The stormwater challenge

- Water washing over the land picks up contaminants

- This water and the contaminants it carries end up in our waterways – with no treatment!
What causes polluted runoff?

- I do!
- You do!
- We all do!
- Polluted runoff is the cumulative result of our everyday personal actions and our local land use policies.
What’s in the polluted runoff?
Nutrients: Nitrogen, phosphorus, etc.

Sources: animal and yard wastes, fertilizers, septic systems, auto emissions, car washing
Pathogens: disease-causing agents

Sources: failing septic systems, leaking sewer lines, animal waste, marine sanitation devices
Sediment: dislodged soil particles

Sources: road sand, construction sites, agricultural fields, disturbed areas
Toxic Chemicals

Sources: industrial, commercial, household and agricultural chemicals; auto emissions
Debris (a.k.a. junk or trash)

Sources: illegal dumping, street litter
Thermal Stress: hot water

Sources: runoff from heat-absorbing impervious surfaces, removal of streamside vegetation, shallow water impoundments, decreased base flow
Water runs off both pavement and compacted soils, carrying accumulated pollutants and decreasing infiltration and recharge.
Impervious surfaces:
Materials such as concrete, asphalt, roofing, and compacted soil that prevent percolation of runoff into the ground.
Indicate intensive land uses that cause pollution
Inhibit recharge of groundwater
Prevent natural processing of pollutants by soil and plants
Provide a surface for accumulation of pollutants
Provide an express route for pollutants to waterways
There are many forms of impervious cover in the urban landscape.
Conventional storm drainage: Stormwater is not treated prior to entering the Truckee River.
Regulatory Requirements: NPDES Phase I stormwater permit Reno, Sparks & Washoe County

Requires construction site best management practices to avoid scenes such as this, as well as other elements
One solution: Low Impact Development (LID)

LID seeks to mimic natural hydrologic functions by using site design techniques to store, infiltrate, evaporate, and detain runoff.
Puget Sound Action Team

Key Elements of LID

Conservation
- Preserves native trees, vegetation and soils
- Maintains natural drainage patterns

Small Scale Controls
- Mimics natural hydrology and processes

Directing Runoff to Natural Areas
- Encourages infiltration and recharge of streams, wetlands and aquifers

Customized Site Design
- Ensures each site helps protect the entire watershed

Maintenance Pollution Prevention and Education
- Reduces pollutant loads and increases efficiency and longevity
- Educates and involves the public
LID Practices: Bioretention areas and rain gardens collect and infiltrate water
Cabelas Verdi Parking Lot: Bioretention in action!

C. Conway, Kennedy/Jenks

01/04/2008
Landscape buffers for lawns capture sprinkler over-spray
Vegetated swales slow the flow and allow infiltration and pollutant processing.
Grassy swale in Carson City

09/30/2005

09/30/2005

09/30/2005

09/30/2005
Residential roof drainage

Residential roof water is relatively clean, and can be easily taken out of the storm water loop.

Redirect down spouts to pervious areas, rain gardens, or rain barrels
Alternatives to impervious pavement
How pervious pavement works to reduce nonpoint source pollution

Sediment and oil washed off by rain

Sediment trapped in bedding layer, upper geotextile (if present), subbase and lower geotextile

Oil biodegrades within pavement
LID at the JOE: Permeable Pavers
Project Features:

- Infiltration of stormwater through a grassy swale
- Porous paver patio
- Eliminated need for three catch basins
Putting LID into practice on campus

Pavers were installed in the circular area in front of the Joe Crowley Student Union.
The pavers allow infiltration of stormwater. Runoff is directed to the lawn, where further infiltration and pollutant processing can occur.
The slopes to the north of the building are protected from erosion by mulch and straw wattles.
“Green” Benefits

- Stormwater is infiltrated on-site
- Storm water pollutants are processed naturally by filtration and soil microbes
- Fewer storm drains were required, reducing construction costs
- Truckee River water quality is protected
Project Sponsors

- Academy for the Environment
- Joe Crowley Student Union
- Kennedy/Jenks Consulting
- NEMO Nevada
- Students and Educators for Environmental Development and Sustainability
- Truckee River Fund
- University of Nevada Cooperative Extension
- University of Nevada Environmental Health and Safety
- University of Nevada Facilities Management