

City of McKinney

Texas AgriLife Urban Solutions Center

Protecting McKinney's Water Resources

Current Watershed Program

- **Storm Water Phase II compliance – meeting or exceeding all requirements**
- **NRCS Dam Rehabilitation / acquisition of Federal grants**
- **Strengthened Storm Water Ordinance with respect to erosion control, storm water quality, and storm water quantity to be consistent with iSWM.**
- **Surface Drainage Utility System Fee to pay for improvements**

Current Watershed Program

- Healthy Creeks and Lakes Program
 - Channel Rehabilitation
 - Sediment removal
- Dry weather outfall monitoring
- Storm Water Concerns Investigation Program
- Increased erosion control enforcement
- Year-round water restrictions
- Waterless medians
- Environmental Education Outreach
 - McKinney Green Gardens and Associated Water Conservation Programs
 - ET Controller/Rain Sensor Program
 - Classroom Lessons (for MISD elementary schools)
 - City Website and TV Marketing (pending DOE grant)

Urban Solutions Watershed Proposal

- Use SWAT modeling to identify what and where the primary water quality and quantity issues are within the watershed.
 - Erosion
 - Sedimentation
 - Flooding
 - Stream Degradation
- Identify effective measures to address problems.
 - Stream Stabilization (using natural material for in-stream treatments, “green” bank stabilization)
 - Green Infrastructure (pervious paving, rain gardens, bio filters, etc.)
 - Floodplain Protection

SWAT

Soil and Water Assessment Tool

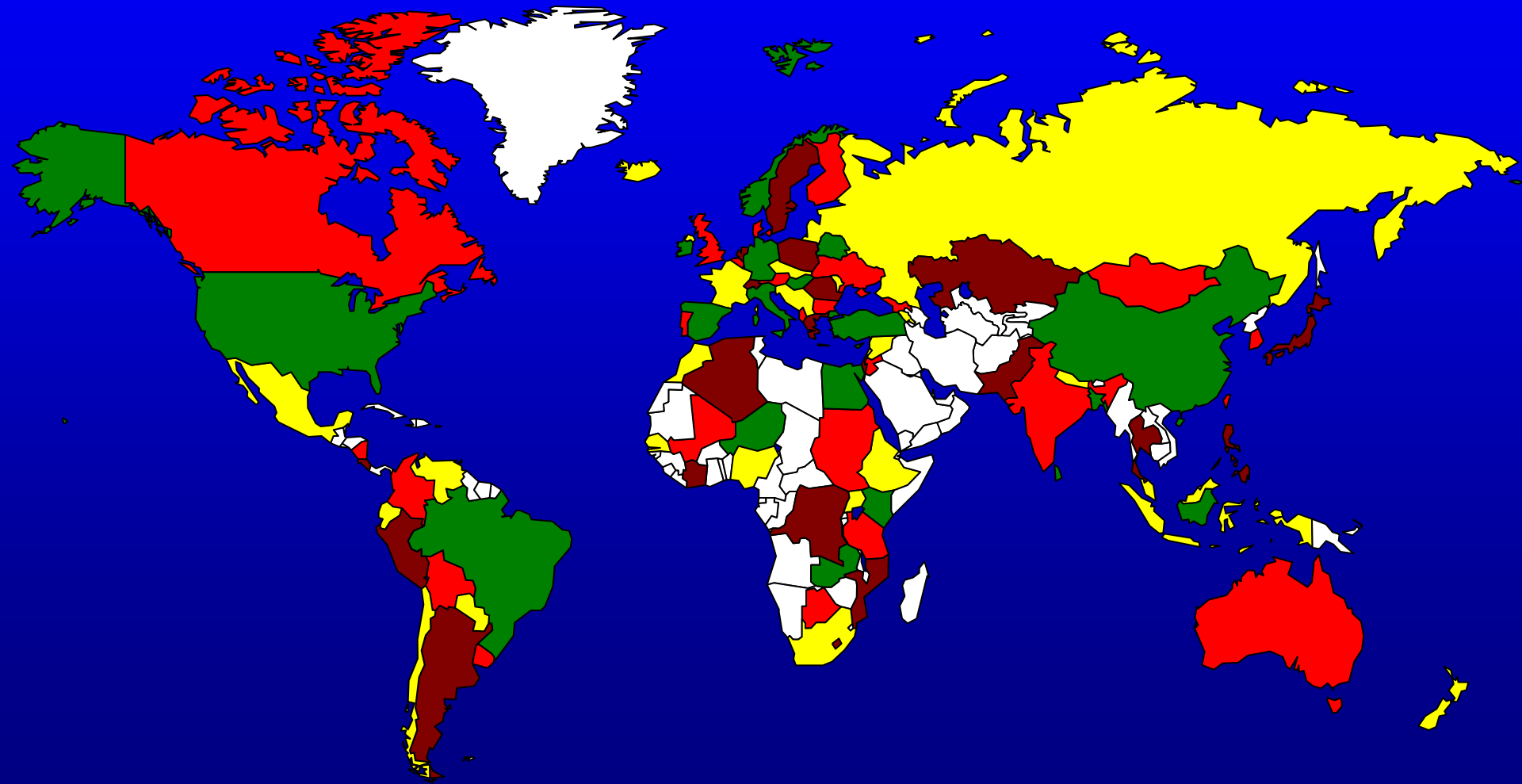




Background

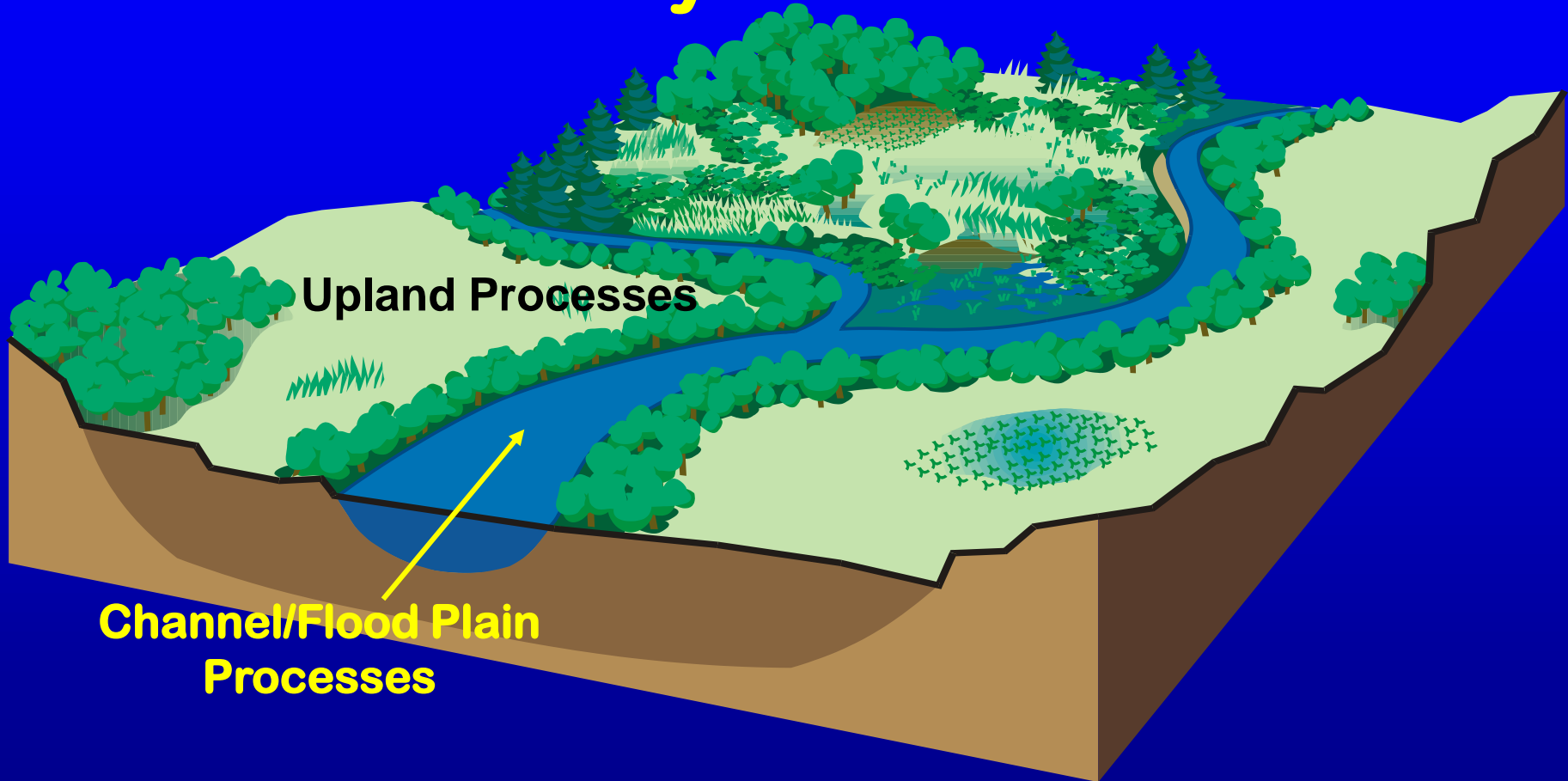
- SWAT is a product of over 30 years of USDA model development
- Partnership – Texas A&M, ARS, EPA, NRCS
Developing models, GIS, databases, applications
- Widely used to develop regulatory standards related to water quality, water supply, and air quality

SWAT Global Users





SWAT Watershed System



Upland Processes

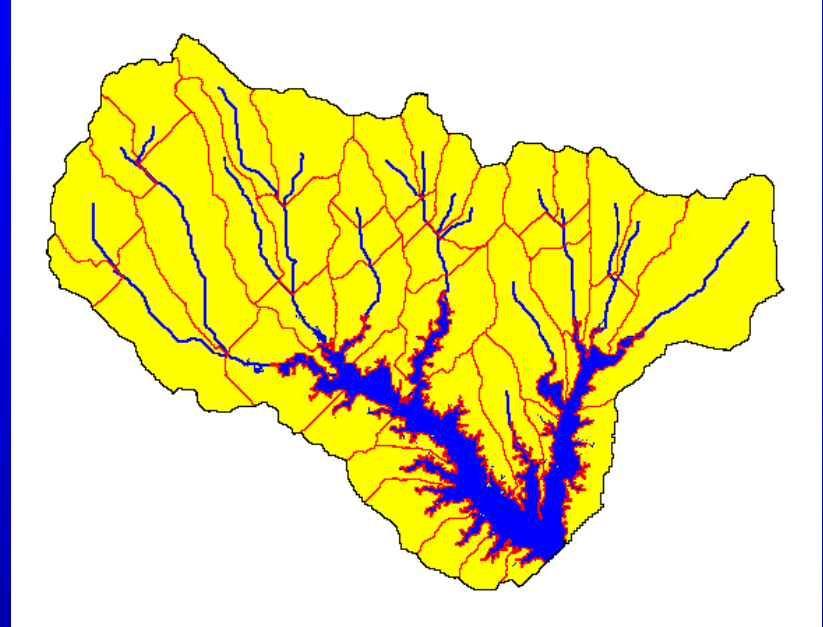
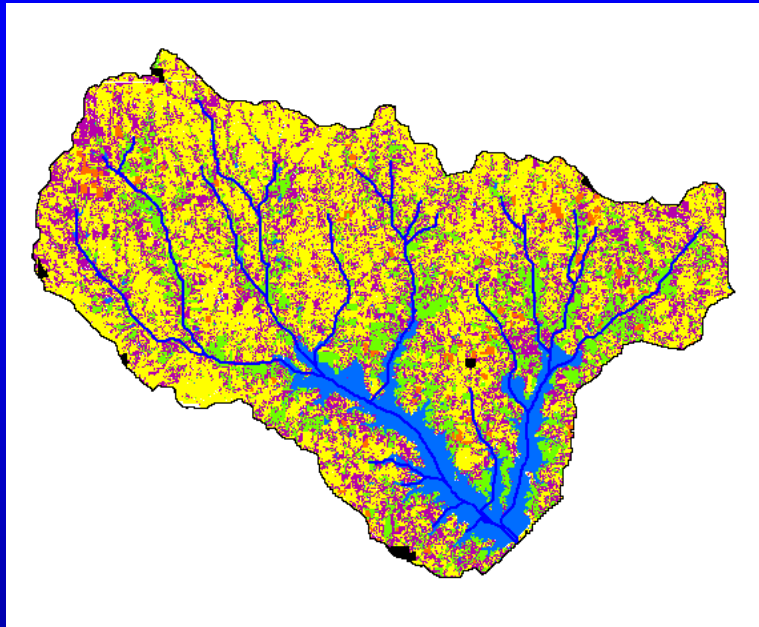
Channel/Flood Plain
Processes



Upland Processes

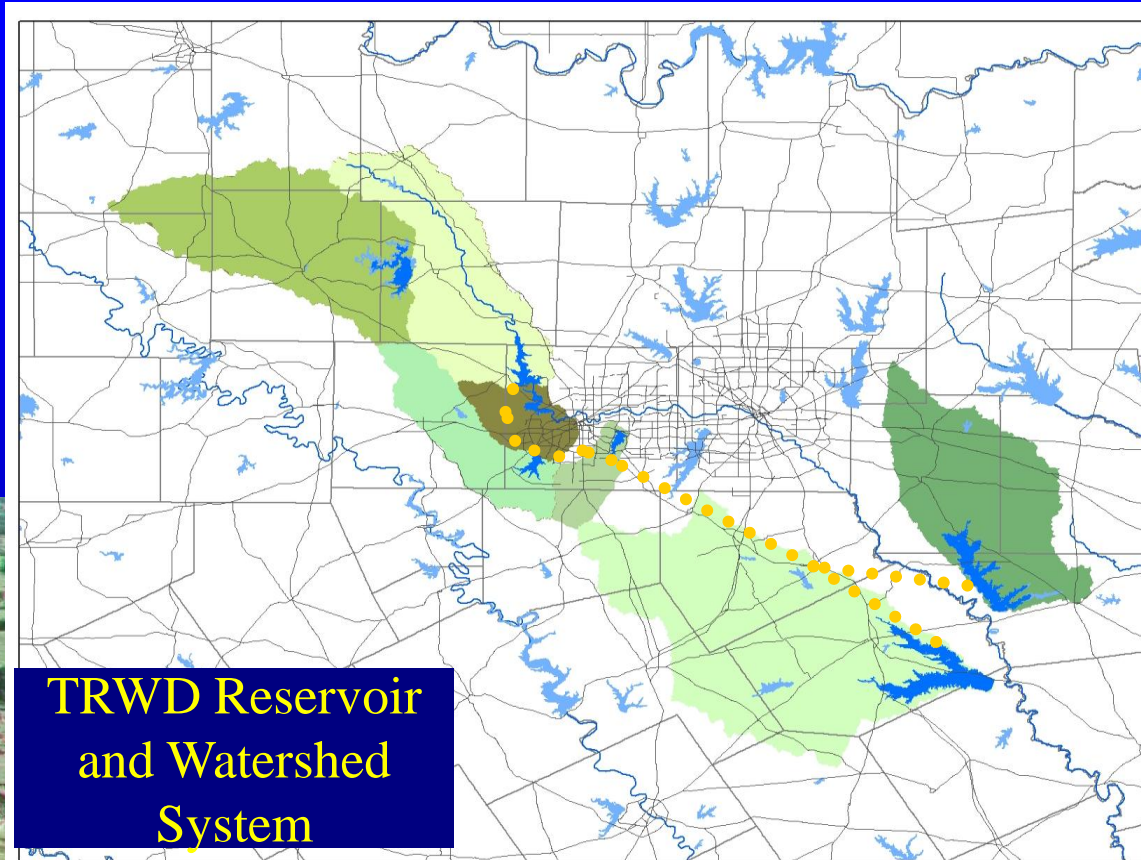
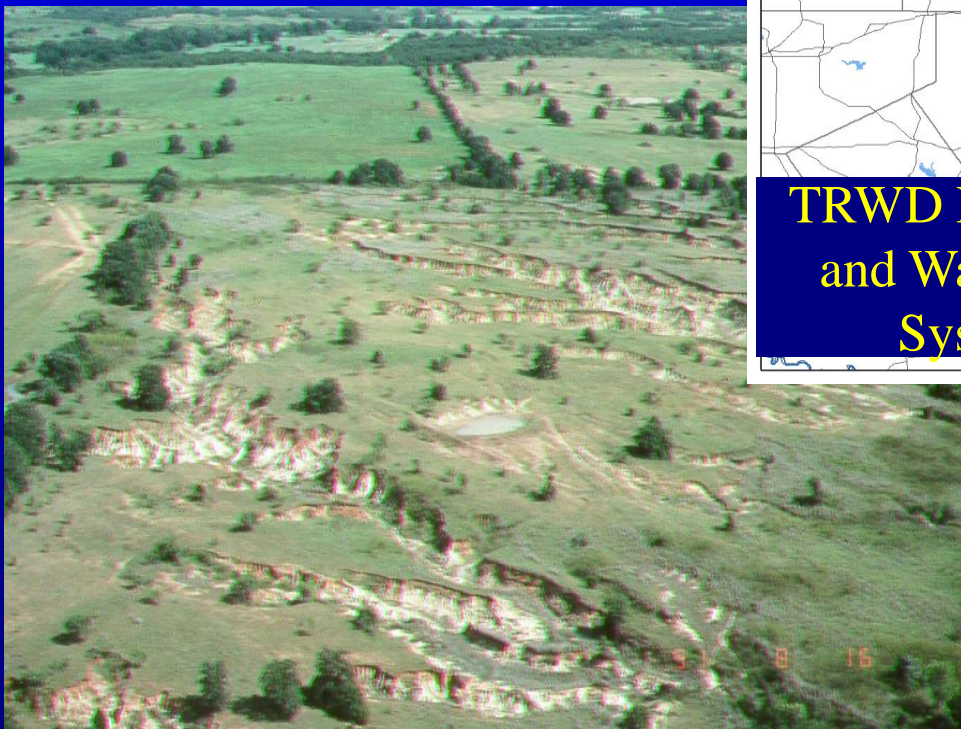
- Weather
- Hydrology
- Sedimentation
- Plant Growth
- Nutrient Cycling
- Pesticide Dynamics
- Management
- Bacteria

Example Configuration



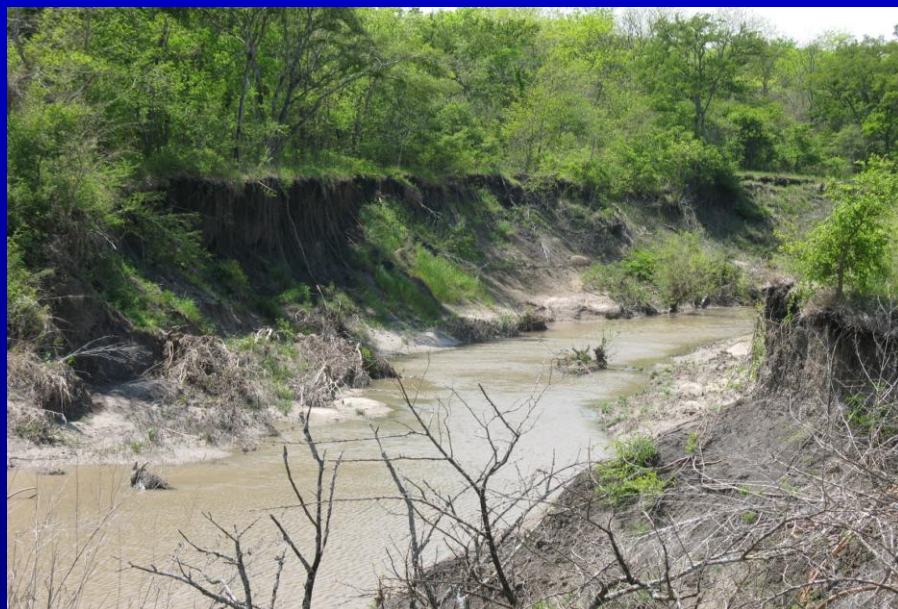
- Subwatersheds
- Hydrologic Response Units
- Output from other Models
- Point Sources - Treatment Plants

Applications



TRWD Reservoir
and Watershed
System

Addressing Erosion/Sedimentation



Evaluate and Demonstrate

- Porous Pavement
- Landscape Irrigation
- Tree Planting
- Rainwater Harvesting
- Construction Area Controls
- Ponds and Runoff Detention
- Stream Channel Repair

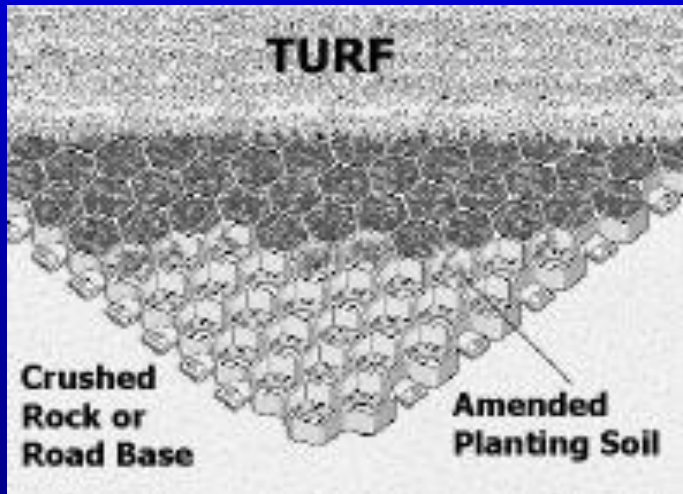
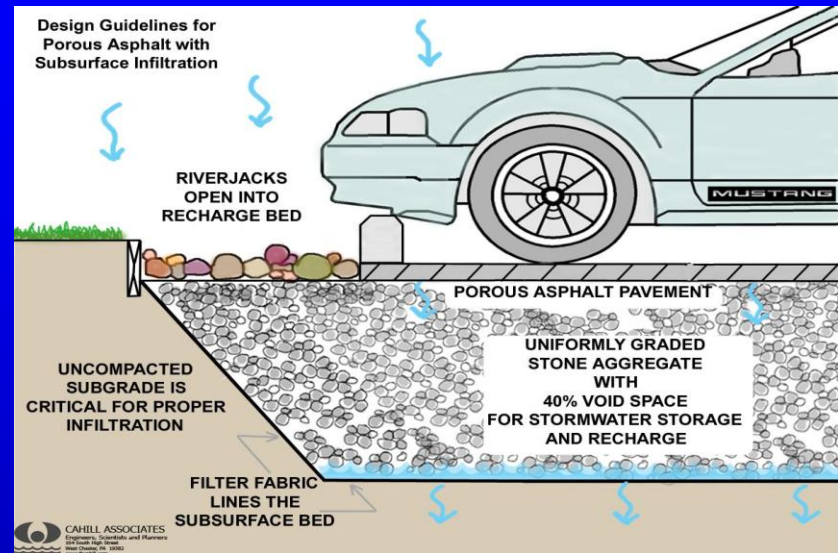
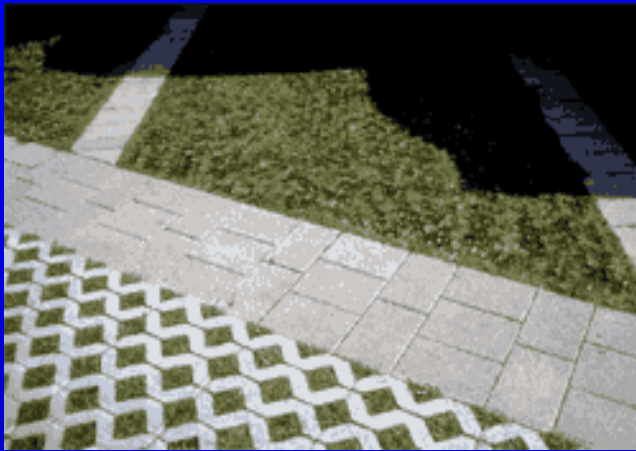
Stormwater Management Practices: Detention Ponds



Stormwater Management Practices: Urban Tree Canopy



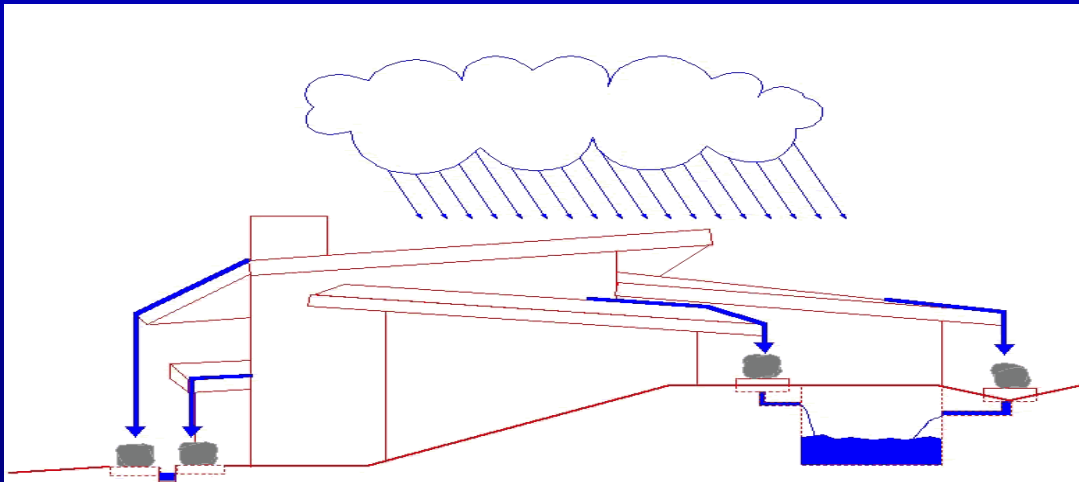
Stormwater Management Practices: Porous Pavement



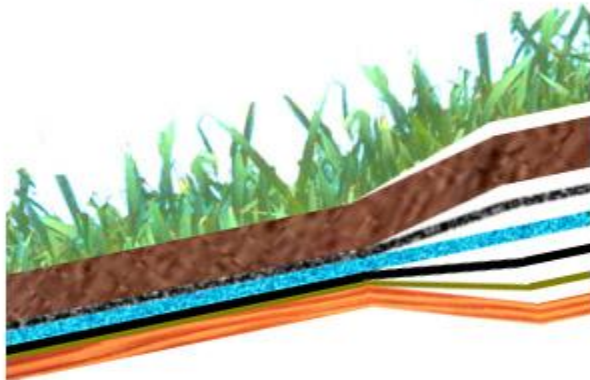
Stormwater Management Practices: Rain Gardens



Stormwater Management Practices: Rainwater Harvesting



Stormwater Management Practices: Green Roof



PLANT LAYER

SOIL MIX LAYER

SOIL FILTER FABRIC

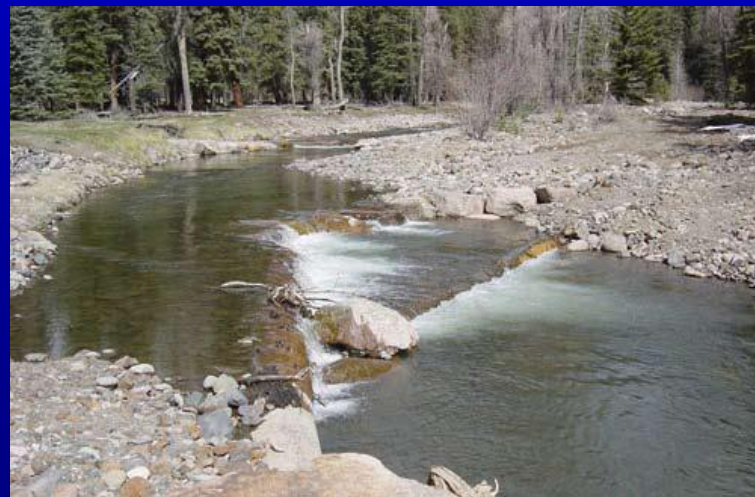
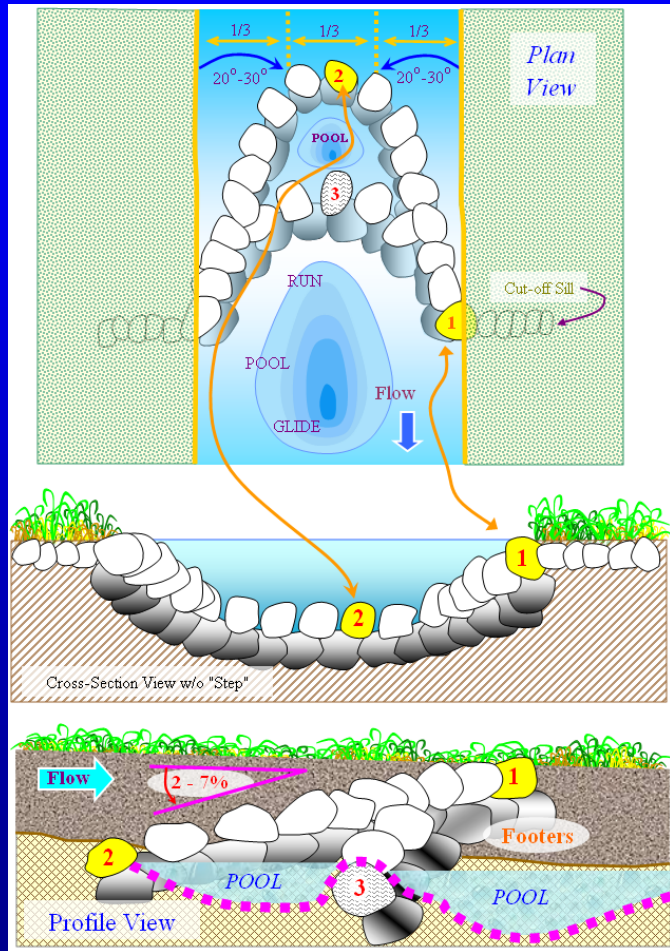
DRAIN MAT

WATERPROOF MEMBRANE

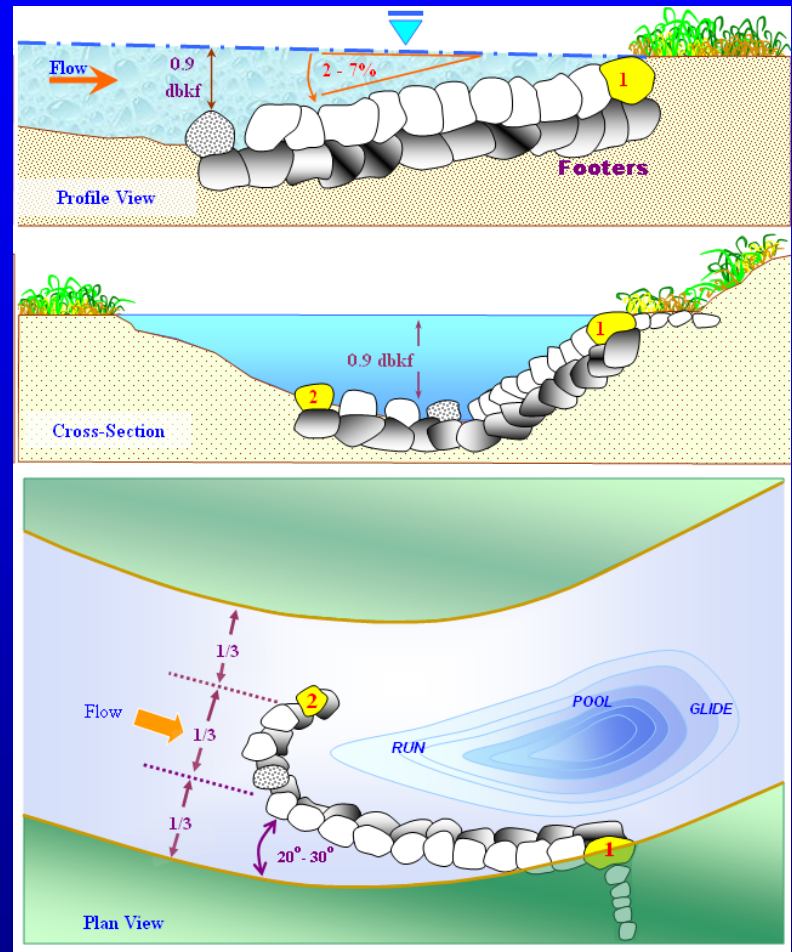
SUB MEMBRANE LAYER

ROOF DECK

Channel Repair Practices



Channel Repair Practices: J Hook



Cost Benefit Analysis

- Estimate a Cost Benefit Analysis for the proposed solutions for each identified concern.
- Prioritize based on most effective economic solutions.
- Based on these findings, develop a watershed Management Protection Plan for McKinney.
- Utilize existing Public Works Stream Team to construct structures.
- Utilize SWAT Modeling to assess current and future urban watershed conditions for planning and development purposes.
- Use findings to support grant applications related to watershed protection, improvement of water quality, and water efficiency.

Thank You!

