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BUILDING LOCAL COMMUNITY RESILIENCE FOR SUSTAINABLE DEVELOPMENT
IN INTERNATIONAL WATERSHEDS SUCH AS THE DRINI AND DRINA RIVER WATERSHEDS

Using Watershed Stewardship to Build Sustainability and Resilience

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Zlatibor, Serbia, 14 June, 2017

Session Objectives

Build Understanding of how Stewardship of Water Resources can help Local Communities Develop Sustainably and Become more Resilient

Discuss how Monitoring can Engage Communities and Increase Environmental Awareness

Explore how Monitoring Efforts can Improve Local Management of Water Resources

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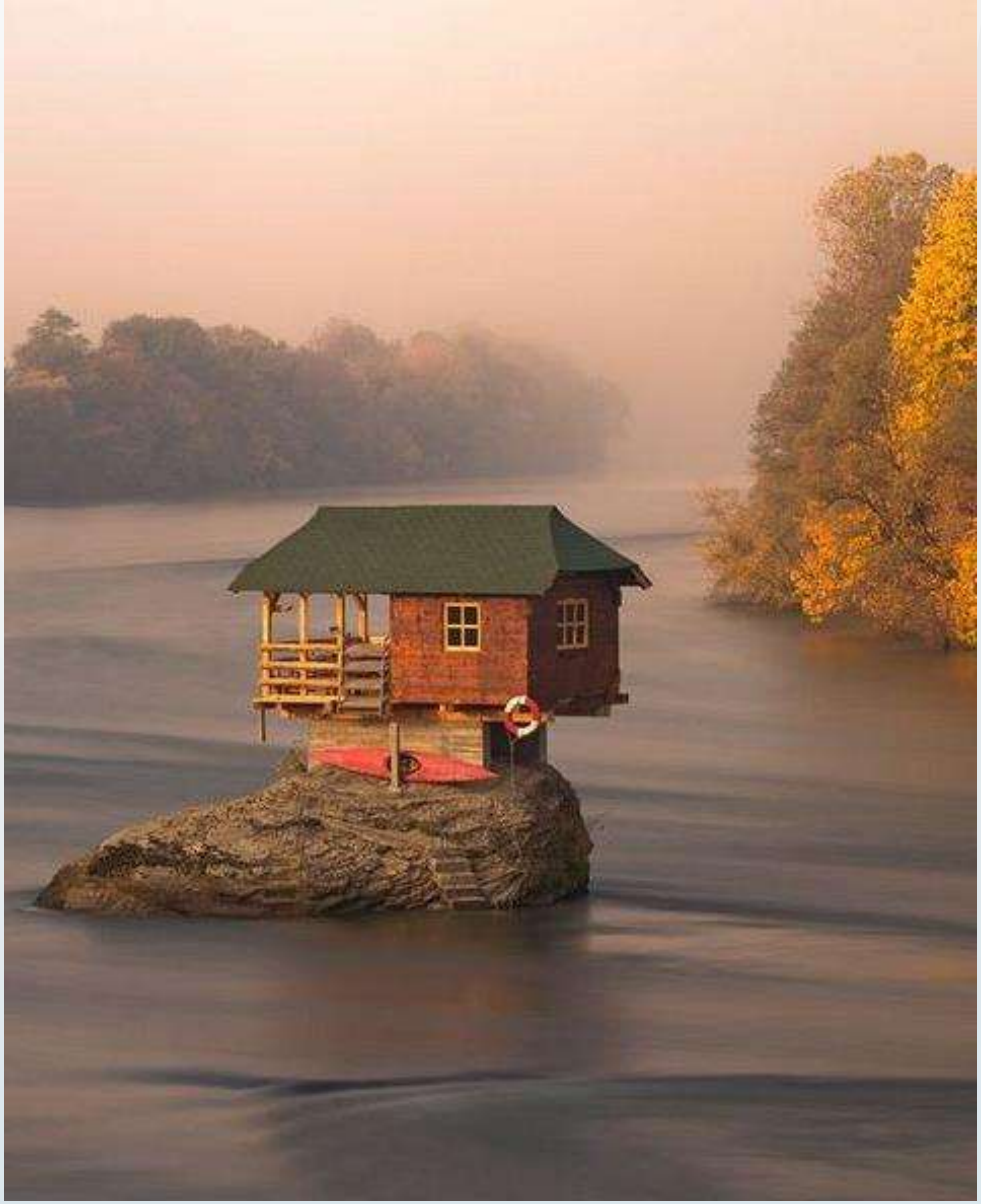
Improving Stewardship to Build Sustainability and Resilience

Watershed Stewardship

Be it Big or Small, We all Live in a Watershed

The streams that wind their way through our lands and the wetlands nestled in our neighborhoods serve as indicators of the health of our natural environment. By assessing the health of a waterbody, we are in fact making an assessment of the health of the land on which we live.



Being a Steward

Stewardship is about taking care of something that we do not own.

Watershed stewards protect and enhance freshwater resources for people and nature.

Healthy Sustainable Watersheds

Watersheds Supply:

- Environmental Benefits
- Economic Benefits
- Health Benefits

More than $450 billion in food and fiber, manufactured goods and tourism depends on clean water and healthy watersheds (US EPA, 202)

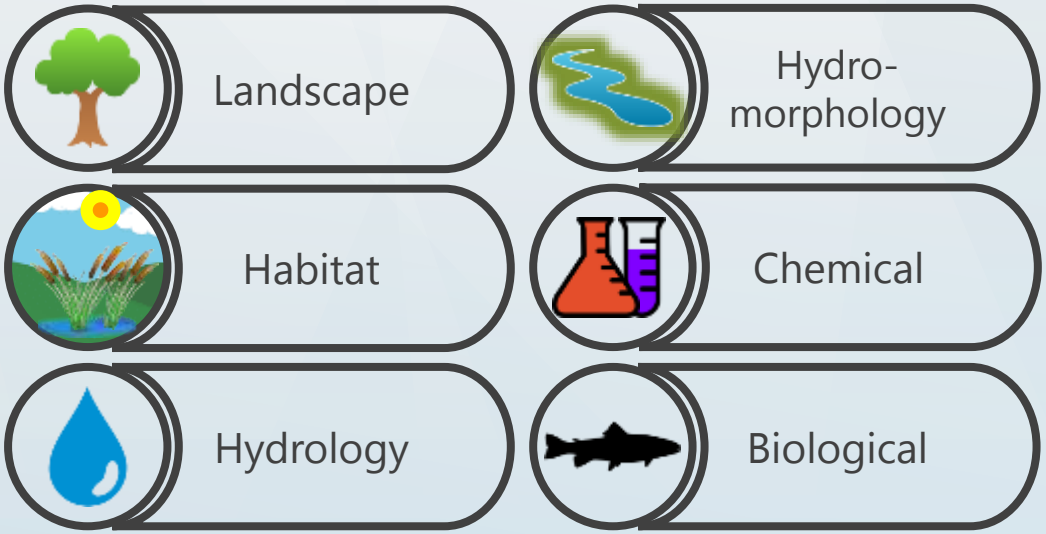
Healthy Watersheds are Resilient

They Support:

- Good Water Quality
- Sufficient Habitat for Birds Fish, Animals and People
- Dynamic Hydro-Morphologic Processes
- A Functioning Riparian Zone that Connects Habitats and Maintains Natural Flow

Provides Greater Benefits

Have a Larger Capacity to Cope and Adapt



Watershed Resilience at Multiple Scales

Local Flooding

Regional Flooding

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Role for Local Management?

Livestock Management?

Cover Crops?

Pipe too Narrow?

Riparian Buffers?

Waste Management?

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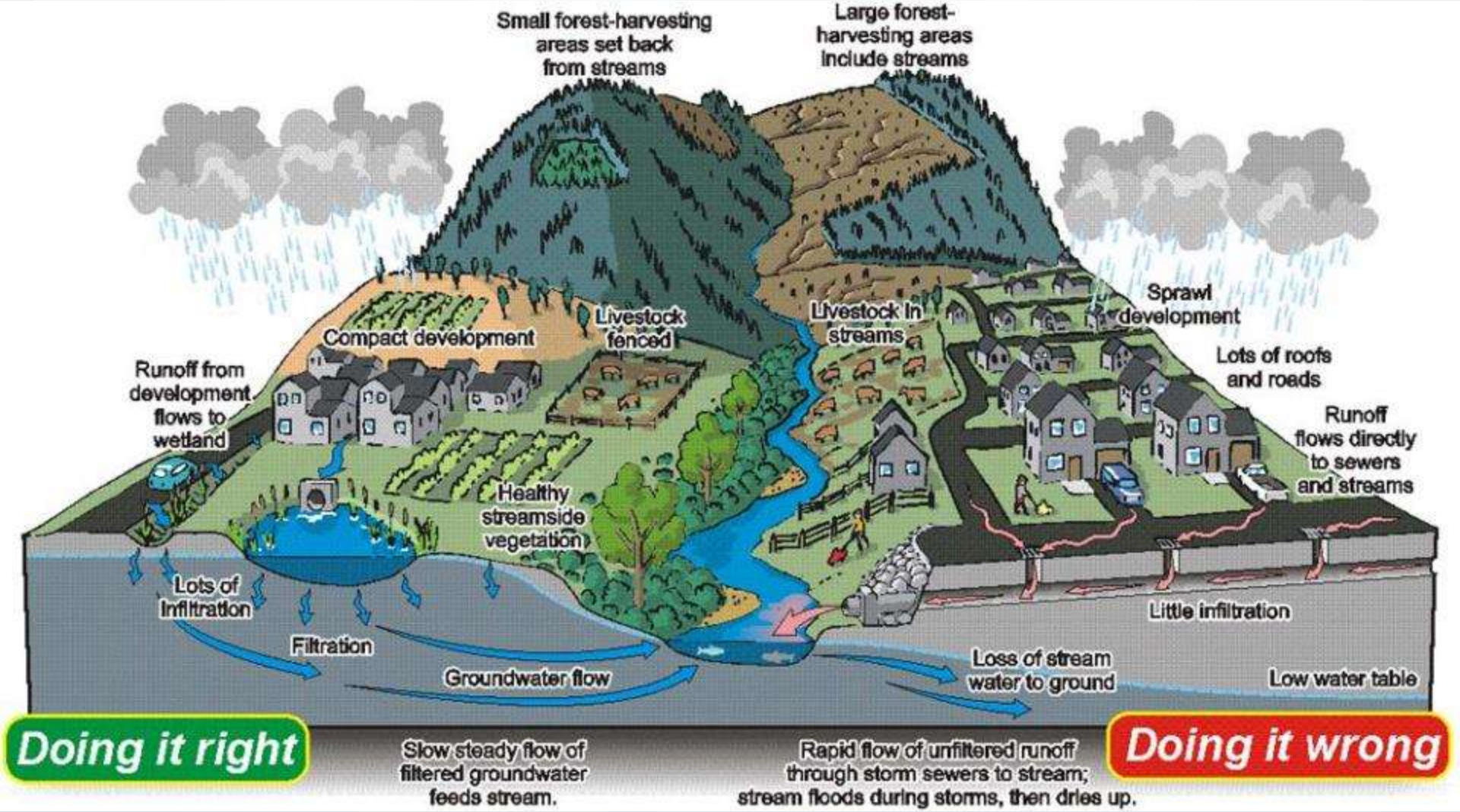

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Watershed Mapping Exercise 1

Think of a Local Stream in your Community

Make a Diagram of the Stream and the Surrounding Catchment; Noting Important Features:

- **What services does the system provide?**
- **What are some good aspects?**
- **What are some threats or stressors facing the system?**

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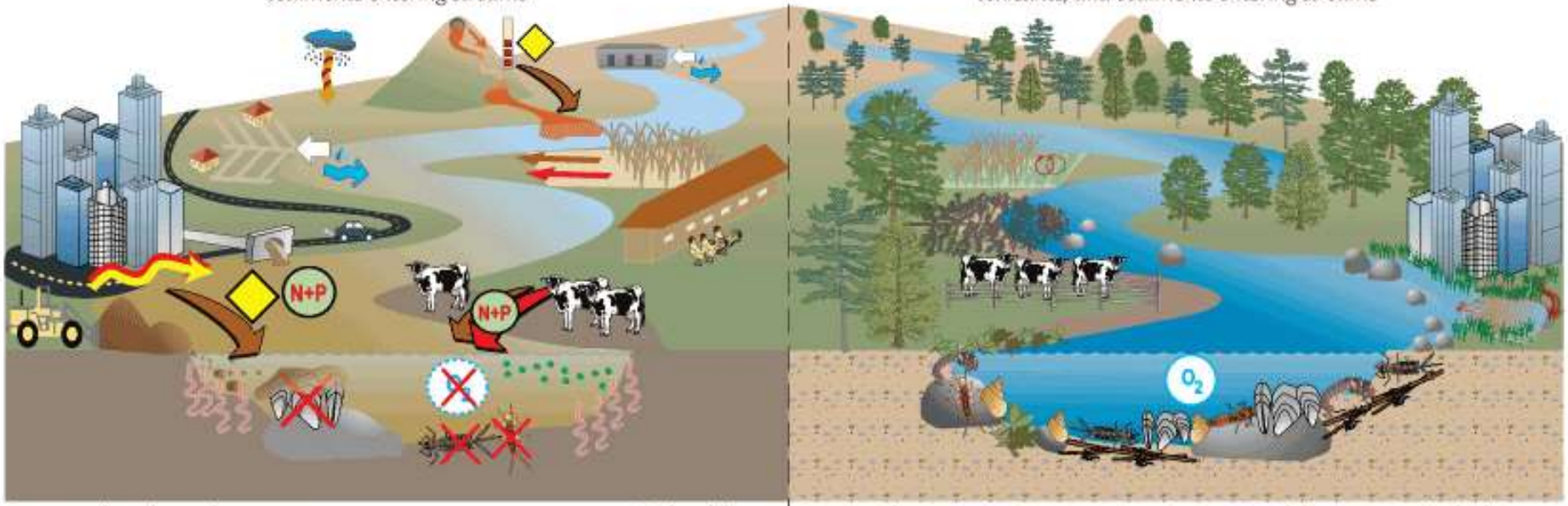
Unhealthy Streams:

Land-based activities can increase nutrients, toxicants, and sediments entering streams

Healthy Streams:

Well-managed land-based activities will reduce the amount of nutrients, toxicants, and sediments entering streams



Factors that degrade streams:

Toxic acid mine drainage and sediments

Stormwater runoff from roads, buildings, and parking lots

Smothering from sediment disruption

Nutrient and sediment runoff from livestock operations

Nitrogen from air pollution and fields without cover crops

Altered water flow and habitat from development and dams

Unhealthy streams include:

Low oxygen and algal blooms

Bloodworms

Loss of bottom-dwellers

Factors that protect streams:

Stormwater retention pond and riparian buffers

Cover crops / Best Management Practices

Fenced livestock

Shady streambanks

Healthy streams include:

Debris

Sufficient oxygen

Rocky stream bottom

Bottom-dwellers

Freshwater mussels

Caddisfly larvae

Mayfly larvae

Snails

Stonefly larvae

Dragonfly larvae

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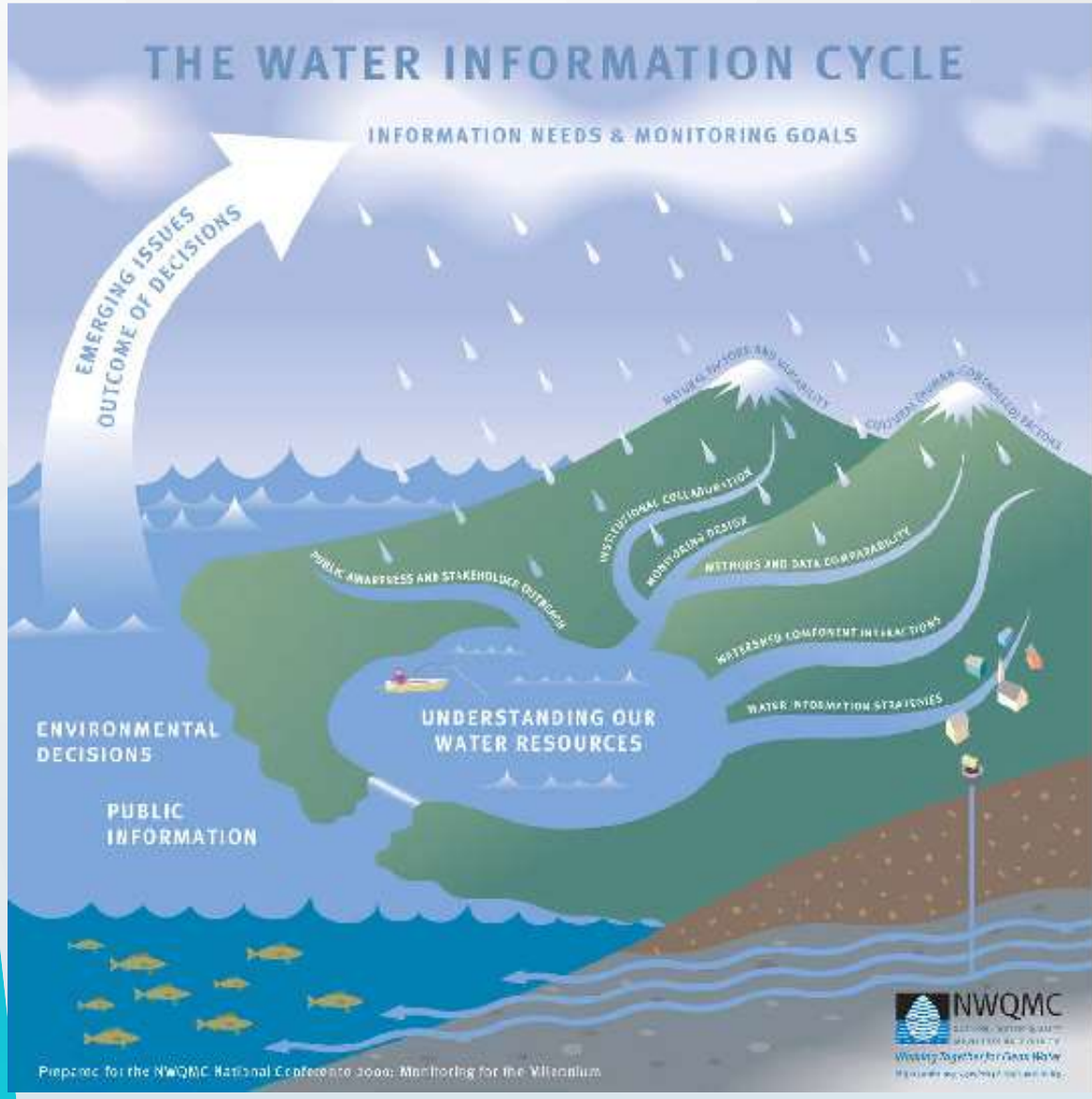
Monitoring and Environmental Awareness

The Water Information Cycle

Understanding of Resources is Built From:

- Public Awareness
- Institutional Collaboration
- Monitoring and Data Gathering
- Whole Watershed View
- Communication Strategies

Understanding then Informs Environmental Decision Making



Monitoring and Assessment

Monitoring:

Collection of data to determine the ecological status of a water body and observe changes over time.

Assessment:

Translation of data into relevant information to support decision-making and local action.

What Makes a Healthy Stream

Aquatic Zone

- Stream Channel
- Water / Sediment Balance

Riparian Zone

- Land and Water Meet

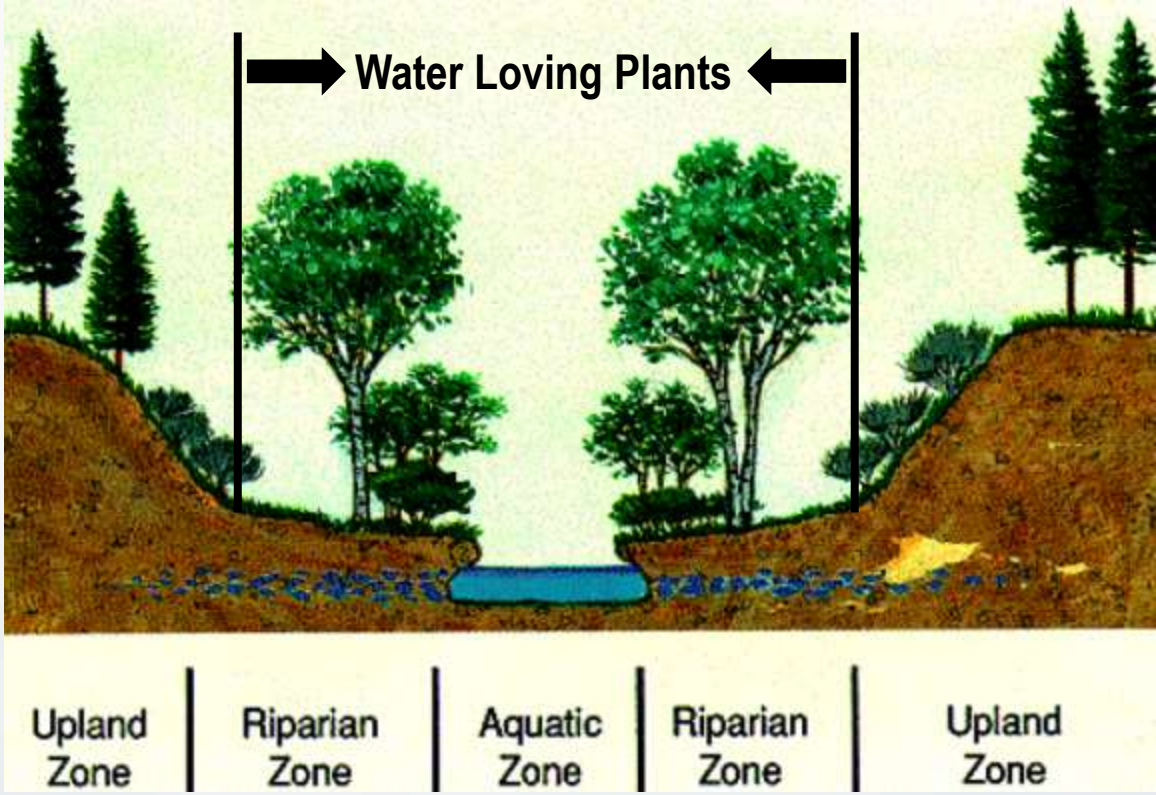
Upland Zone

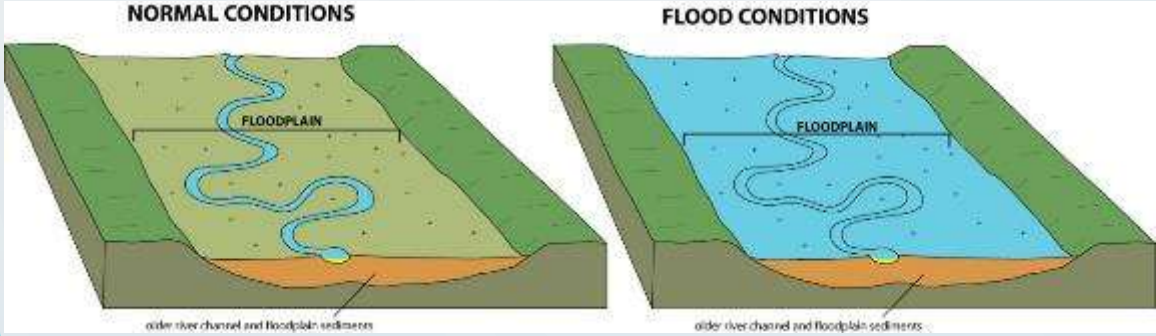
- Largest Area of Watershed

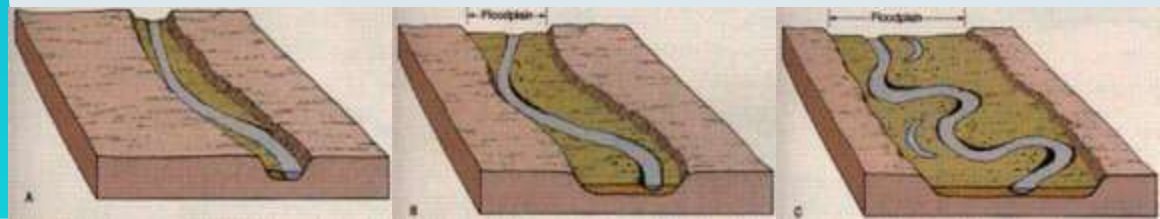
Floodplain

- Rivers Need Room

Streams are collection points. Their condition reflects the entire watershed







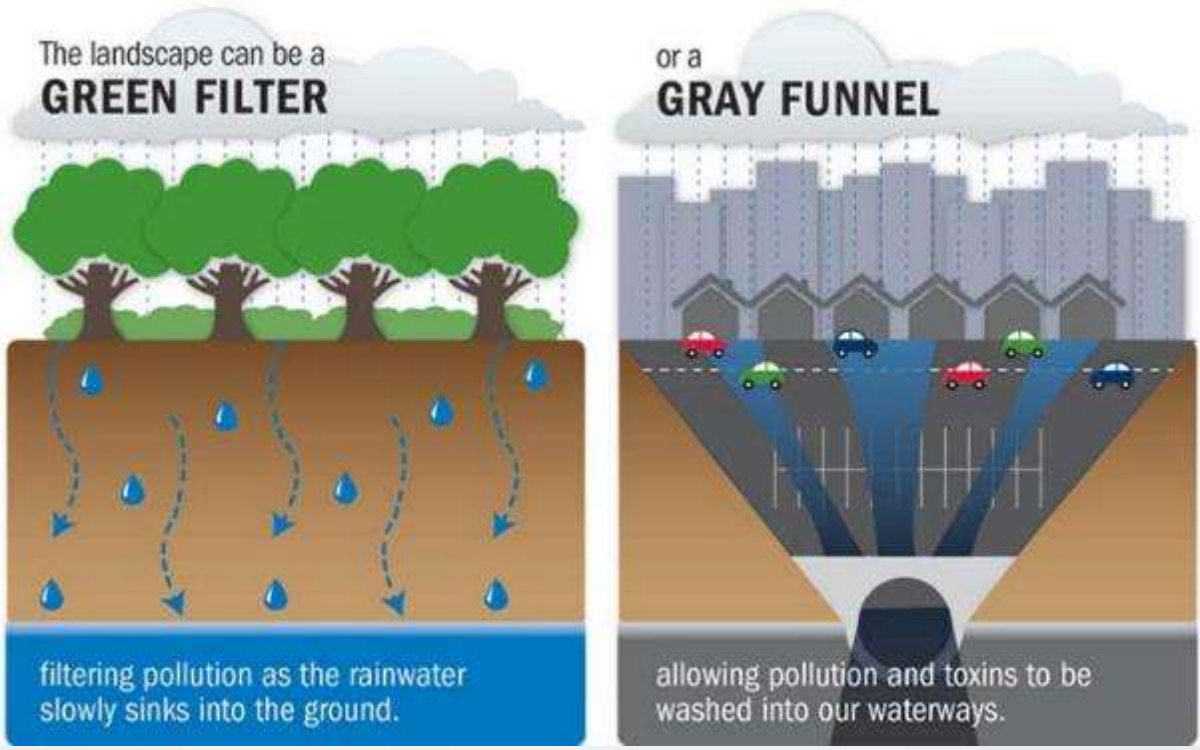
Watershed Modification

Development in Watershed alters normal hydrology

Concentrates volume and velocity of runoff causing higher peak flows

- Can worsen
- Flooding
- Erosion / Sedimentation
- Pollution

Environmental, Economic, and Health Impacts



Impacts on Streams

Excessive Volume and Velocity of Water erodes stream bed

- Incision
- Channel Evolution

Declining Water Quality

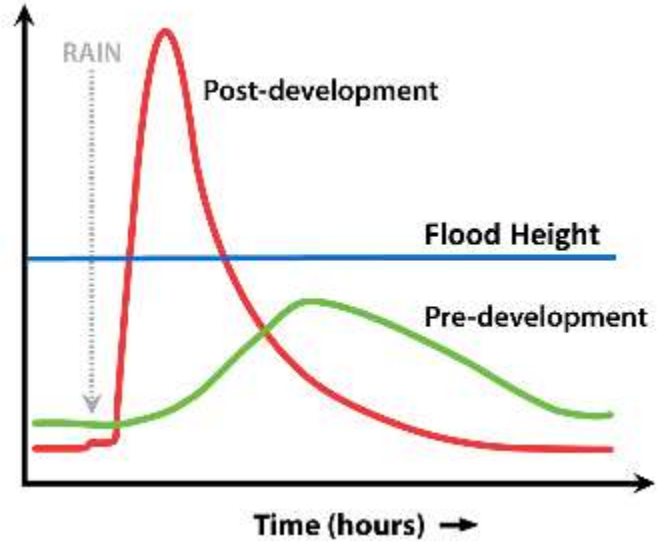
Less Aquatic Life

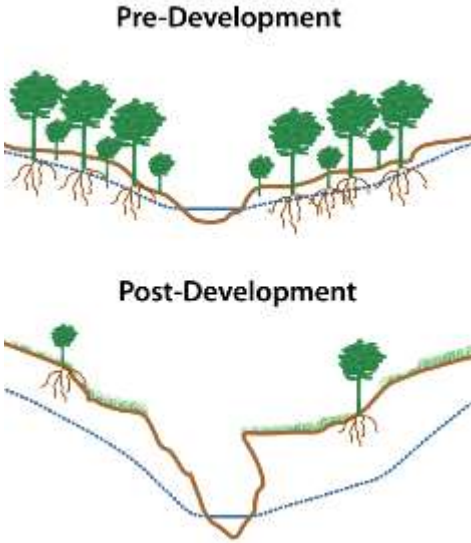
Reduction in Biodiversity

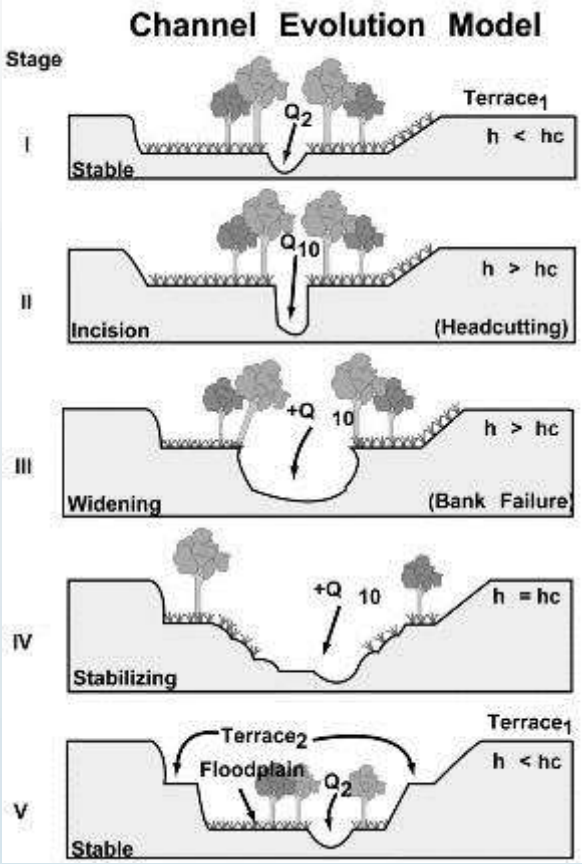
Poor Ecological Status

Loss of Ecosystem Services

Reduced Flood Control







Need for Public Participation

"In getting our waters clean, the role of citizens and citizens' groups will be crucial."

We All use Water and are therefore all Stakeholders in Water Management

More Participation Supports

- Ownership of Solutions
- Transparency in Decision Making
- Compliance and Enforcement

Community Meeting
regarding the
Mā'ili'ili Watershed Management Plan

This community meeting is part of the Mā'ili'ili Watershed Management Plan, which addresses land-based nonpoint source pollution and identifies solutions to restore and protect water quality and aquatic resources in the watershed. Solutions include specific priority projects for implementation in the fields of agriculture, land management and community watershed restoration. Funding for the implementation is available through a settlement agreement and through federal grants under section 319(h) of the Clean Water Act. The purpose of this meeting is to inform the community about existing data and identified solutions and to receive community input.

We encourage interested individuals to attend and share their mana'o.

Thursday, June 12, 2014
7:00 - 8:30 p.m.
Ka'aha'aina Cafe @
Wai'anae Coast Comprehensive Health Center
86-260 Farrington Highway

Refreshments will be served from 6:30 p.m.

For more information, please contact:
Tina Speed, Environmental Planner
Phone: 808-536-6999 ext. 4
E-mail: tina@townscapeinc.com
TOWNSCAPE, INC.
Environmental & Community Planning

Public Engagement

Builds Trust

Enhances Sense of Place

"Awareness leads to appreciation; appreciation leads to action; action leads to achieving water quality goals"

Information gathered by volunteers is especially useful in finding and reducing local non-point sources

Adaptive Management

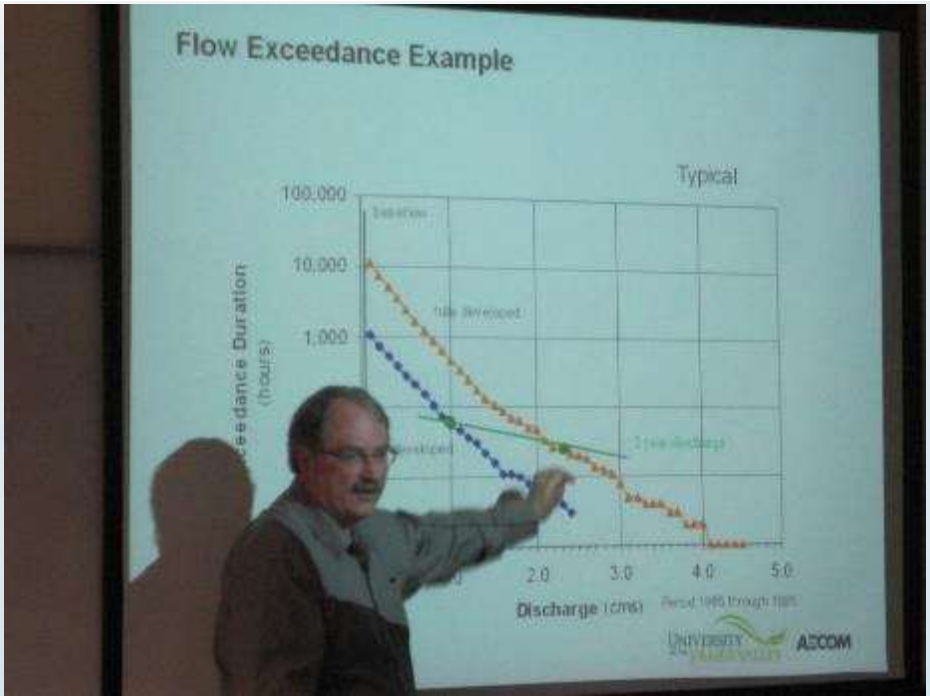
On-going Process

Repeated Monitoring Improves Planning

- Can be Frequent
  - Monthly Bacterial Sampling
- Or Infrequent
  - Hydro-morphology once every 6 years

Public Should be Involved at Every Stage

Monitoring a Starting Point



Watershed Mapping Exercise 2

Thinking of the Same Local Stream in your Community

What management issues or challenges which could affect stream health or watershed resilience are the public aware of?

Which are they not aware of?

What sources of data are needed?
How could that data be obtained?

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Using Monitoring to Improve Local Management of Water Resources

Visual Monitoring

Quick and Reliable

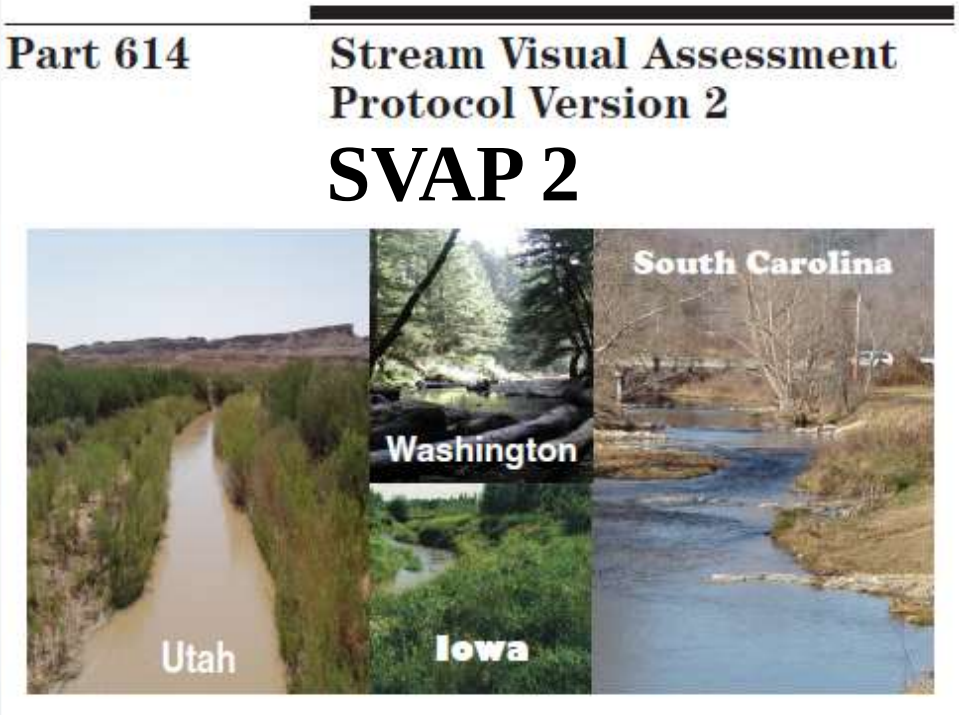
Adaptable

Basic Equipment

Entry Level Assessment

A "First Look" at Physical, Chemical, and Biological Conditions:

- Identify Stressors
- Guide Additional Monitoring
- Monitor Trends
- Assist with Planning



Common Signs of Problems

Bank Instability

Point Source Runoff

Eutrophication

Aggradation

Riparian Degradation

Alteration / Bank Hardening

A Guide to Likely Stressors and Potential Solutions

Follow up to Identify Causes

Post Visual Assessment Follow Up

Additional Monitoring to

- To Track Trends over Time
- Gather Additional Data on Issues of Concern
  - Biological
  - Chemical

Alter Management

- Enforce Existing Rules
- Start with No Regret Solutions
- Work with Partners

Storm Drain Marking

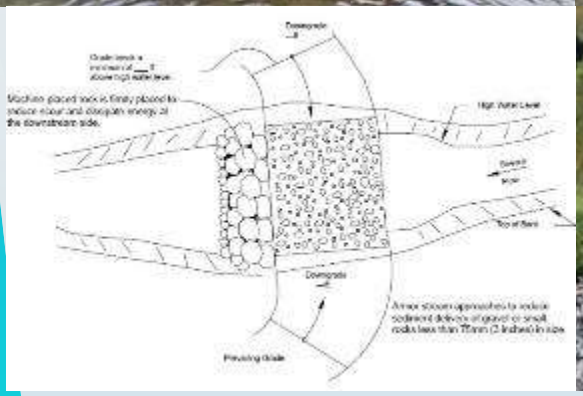
- Volunteers Mark Storm Drains in Defined Area
- Builds Watershed Awareness
- Encourages Public to Practice Good Stewardship and Follow Regulations
- Engages Wider Audience
- Few Materials Required
- Can Be Creative

Improving Road Crossings

Volunteers Survey Road Crossings for Impacts

Improvements Prioritized Based on Benefits

- Restore Natural Flow
- Prevent Ponding
- Improve Drainage
- Reconnects Habitat
- Restores Fish Passage
- Reduces Erosion



Culvert Mapping

Takshanuk Watershed Council. Haines, Alaska

"Benefit the natural ecology, economy and quality of life valued by all residents through restoration, education, research, and community involvement."

Used to Prioritize Improvements

Lutak 7.5 Mile Culvert Survey

Takshanuk Watershed Council

New Lutak 1.6 culvert replaced in 2011

Old culverts at the time of the survey

Project Summary:

Lutak 7.5 was surveyed in 2008 and was classified as "red". In 2011 the Lutak road was upgraded and all the culverts were replaced. Lutak 7.5 is now considered "green". An upstream habitat survey was not performed because of the culvert replacement and that the gradient of the habitat above the culvert is 8%.

learn more

TWC website

Lutak Culverts 1.6, 2.1, 5.9, 7.5

Overview map of survey

Landowner Stewardship

Engage Landowners to Improve Practices on their Own Property

Follow Best Management Practices

Win-Win, Provides Benefit to Landowner and Watershed

Examples

- Riparian Buffers
- Cover Crops
- Livestock Fencing

Watershed Mapping Exercise 3

Thinking of the Same Local Stream in your Community

How could monitoring impact local actions?

What actions or management changes are possible now?

What actions would be a priority for the future?

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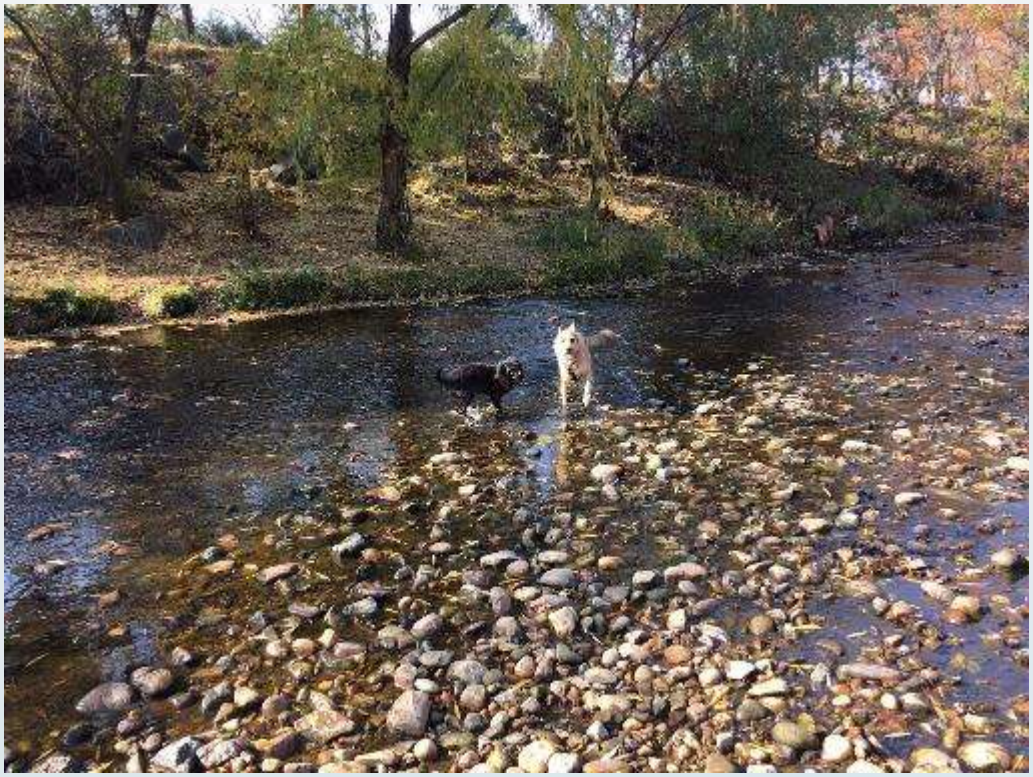
Thank You for Listening!

Questions?



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