

Putting It All Together



Developing an Integrated Approach
to Water Resource Management in Indian Country

What are your water quality goals?



Where are you now? Where do you want to go?

- Defining your watershed goals
 - Swimming (primary contact)
 - Boating (secondary contact)
 - Fishing (secondary contact)
 - Fish habitat (aquatic life support)
 - Water supply (drinking, ag, industrial, etc.)
 - Cultural uses



How will we know when we get there??

Analyze the Data

- Types of Data Analysis
 - Summary Statistics
 - Spatial Analysis
 - Temporal Analysis
 - Stressor Identification
- Use a combination of techniques
- Consider geographic variations
- Revisit stakeholder concerns



Examples of Sources You Might Miss Without a Watershed Tour

- Streambank erosion
- Straight pipes
- Livestock (near or with access to streams)
- Wildlife (e.g., waterfowl populations on lakes and open streams)
- Illegal dumping

Identify stressors and sources

- Identify specific causes & sources of water quality impairments or threats
 - Examples: metals from abandoned mine lands, sediment & high flows from urban runoff, habitat loss from channelization, etc.
- Develop goals (narrative or numeric) for sources requiring controls
 - Examples: # of feedlots needing upgrades plus rough average of cattle per lot; number of mine sites needing treatment with estimates and general profiles of flows, etc.
 - Can “bundle” stressors and/or sources

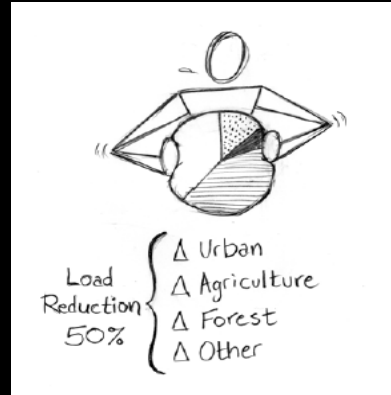


Identify the NPS management measures needed

- Management measures or BMPs should be linked to (or otherwise address) stressors and sources
 - Benefits or estimated pollutant removal rates (or general effectiveness) should be included
 - Can be based on narrative benefits, typical ranges, percentage removed/treated, estimates, etc.
- Specify or map areas where BMPs will be used or installed
 - Examples: all abandoned mine sites with dry weather flows; all streambanks along upper reaches; livestock facilities on Willow Run; etc.

Proposed management measures

- **Pollutant reductions desired**
 - Estimate, describe, or quantify
 - Metrics selected should make sense!
- **BMP types proposed**
 - What will lessen your inputs?
 - Applicable to your situation?
- **Reductions from BMPs**
 - How can you assess BMP impacts?
 - Use literature or actual values
- **BMP installation sites**
 - Which sites will hit the source(s)?
 - Are there critical areas to focus on?

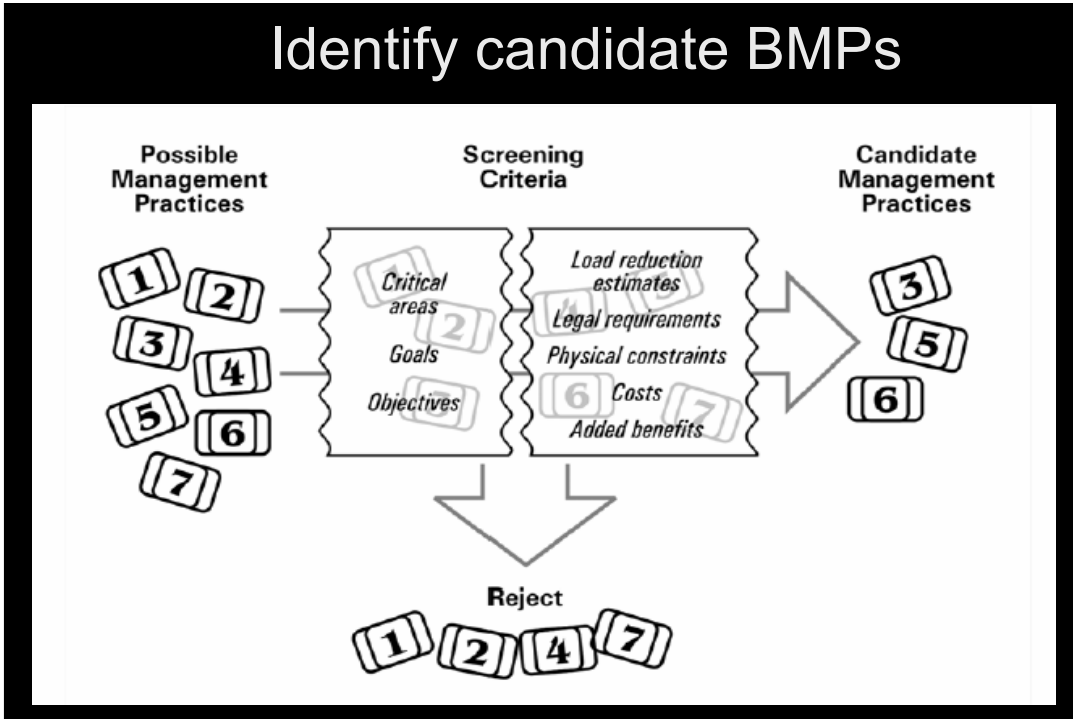


Selecting the most appropriate BMPs

- **Look at what's worked and what hasn't**
 - Research effectiveness
 - Consider costs/benefits
 - Property ownership/site access
- **Look for added benefits**
- **Use a combination of techniques**
- **Focus efforts on critical areas; use more or better BMPs there**
- **Be creative**



Identify candidate BMPs



Prioritizing/targeting BMPs

- **Importance of waterbody**
 - Drinking water source, recreational resource
- **Magnitude of impairment(s)**
 - Level of effort needed; public interest/attention
- **Existing inputs (stressors/sources)**
 - Magnitude, spatial variation, clustering
- **Ability of BMPs to reduce inputs**
 - Sure thing, or a shot in the dark?
- **Feasibility of implementation**
 - Willing partners? Public support?
- **Additional benefits**
 - Recreational enhancements, demonstration

