



WATERSHED MANAGEMENT

Session L, 1:30 to 3:10

WATERSHED MANAGEMENT

The Past Perspective:

Water is the Common Enemy

- No Advanced Notice
- Severe Flooding
- Major Loss of Life

An Evolved Perspective:

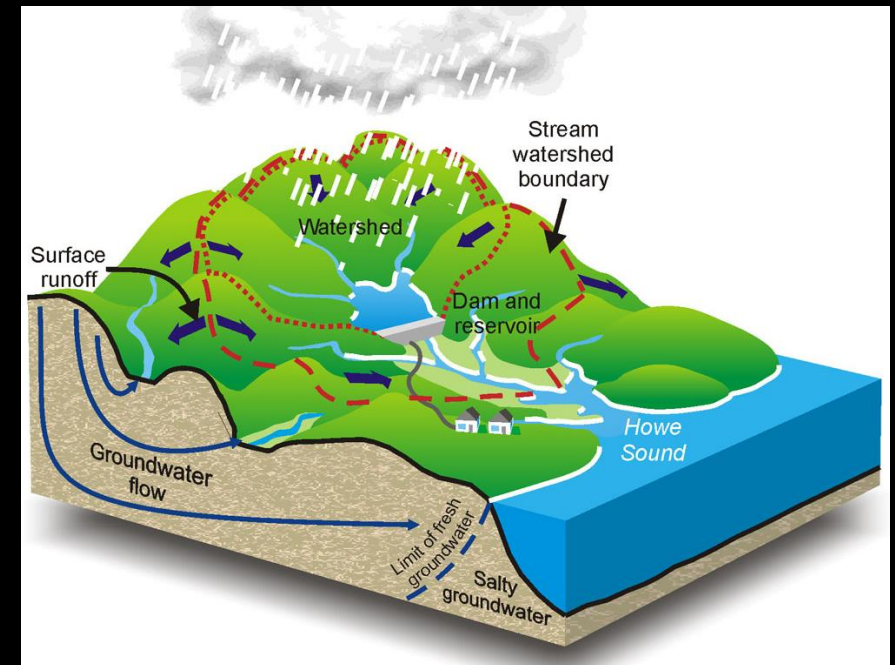
Watershed Management should always be Comprehensive, Evolutionary and sometimes Revolutionary

- Water Supply Adequacy
- Water Quality
- Regulatory Compliance
- Aesthetics

wa•ter•shed (noun) - An area or region drained by a river, river system, lake, sinkhole, estuary or other marine waters.

Synonyms

- *Divide*
- *Drainage*
- *Hydrographic Unit*



WATERSHED

Airshed

Pollutant Zone

Springshed

Groundwater Basin

Ecological Region

Habitat Region

Soils Unit

Land Use

Drainage Basin

“What” It Is Depends On “Who” You Are

- Different Users
- Different Characteristics
- Different Focus
- Different Goals
- Different Priorities

man • age • ment (verb) - The process of dealing with or controlling things, processes, people or outcomes.

Synonyms

- administration
- direction
- conduct
- leadership



MANAGEMENT

Air Quality

Fish & Wildlife

Water Quality

Consumptive Use

Groundwater Recharge

Land Development

Erosion/Sediment Control

Local Drainage

Flood Control

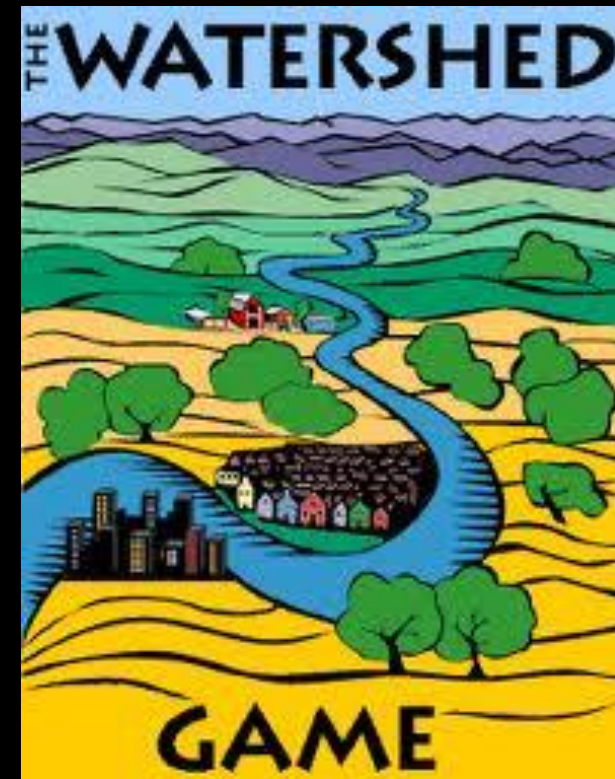
The “How” Depends On the “Why” You’re Doing It

- Different Drivers
- Different Endpoints
- Different Regulatory Tools
- Different Enforcement Means
- Different Success Measurements

THE WHY?

Water Facts

- We all depend on water for survival
- Water is a scarce resource – *even in Florida*
- The freshwater supply is finite:
Only one percent of all the water on Earth is freshwater
- We've already used up the cheap water
- New water is expensive



WATERSHED MANAGEMENT

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Geosyntech Consultants, Inc., Lake Mary

Ann Redmond, C.E.P.

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Consulting Water Resources Engineer, Tampa

WATERSHED MANAGEMENT

What Does It Really Mean?

Stephen R. Lienhart, P.E

Consulting Water Resources Engineer, Tampa

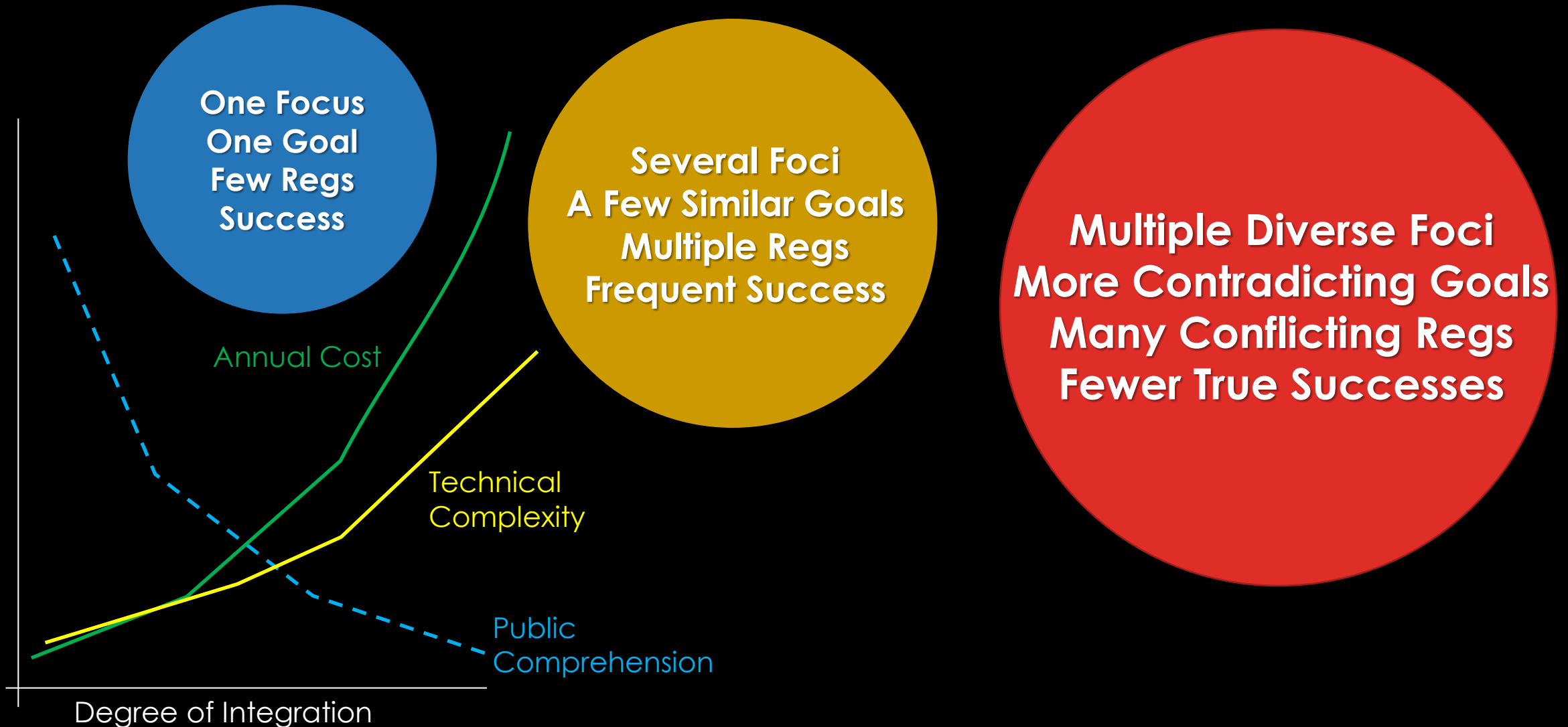


Stephen R. Lienhart, PE
Consulting Engineer
Water Resources

WATERSHED MANAGERS' DILEMMA



PROGRAM INTEGRATION



3 BAD CONCEPTS

Need to Change

- Unsound Past Practices
- Ditch to Daylight
- Ignore It – It'll Go Away

Not Politically Correct

- I've Got Mine
- Nobody Cares About Latecomers
- Not in My Backyard
- My Runoff Doesn't Hurt Anybody or Anything

Unproven Economics

- Cheapest Solution is the Best Choice
- Better Services and Lower Taxes
- Why Should I Pay for Something Free



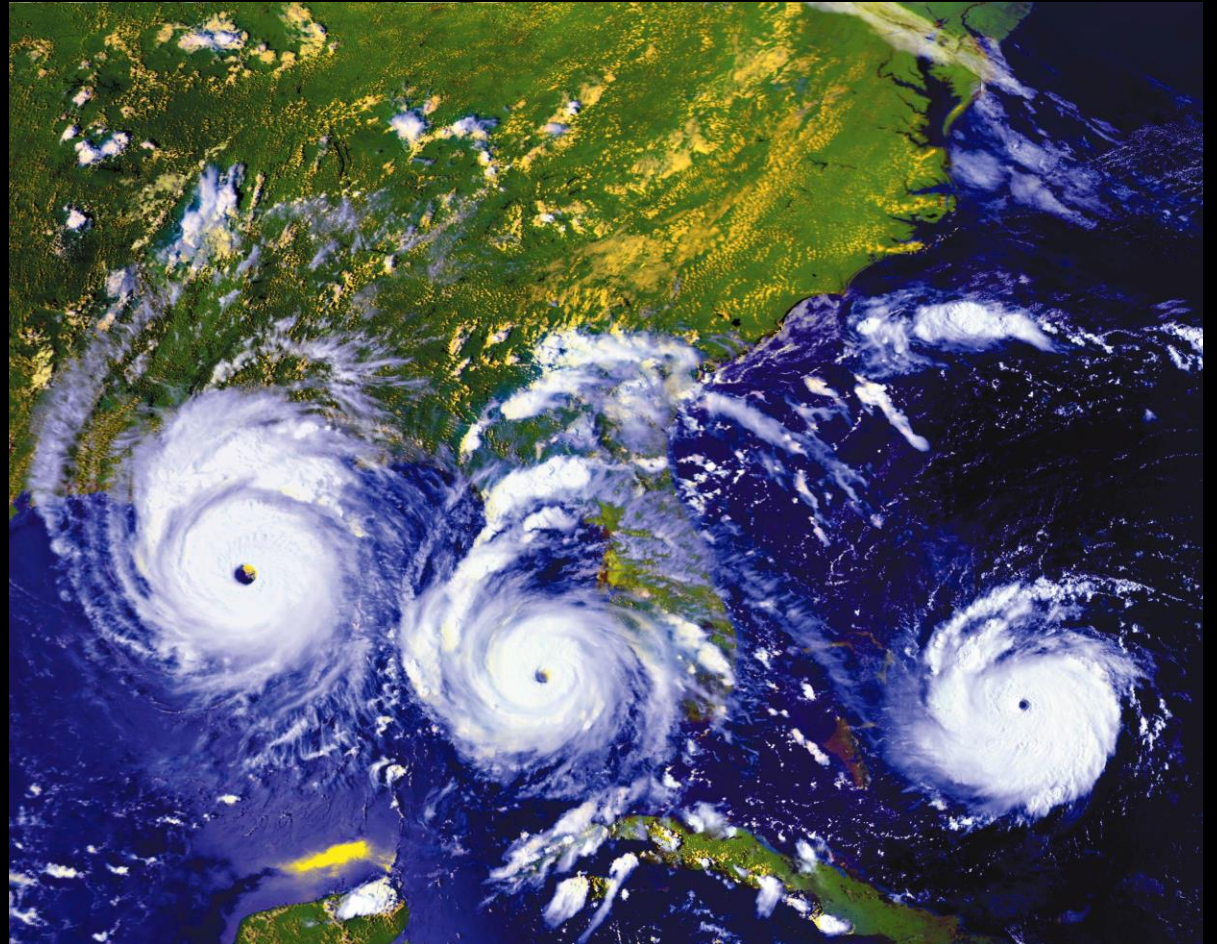
PROACTIVE WATERSHED MANAGEMENT

- Turf Replanting
- Buffering
- Wetland Rehydration
- Reestablishment Grading
- Stream Bank Restoration
- Focused Recharge Efforts
- Retrofitting
- LID Practices
- Water Quality BMPs
- Public Education



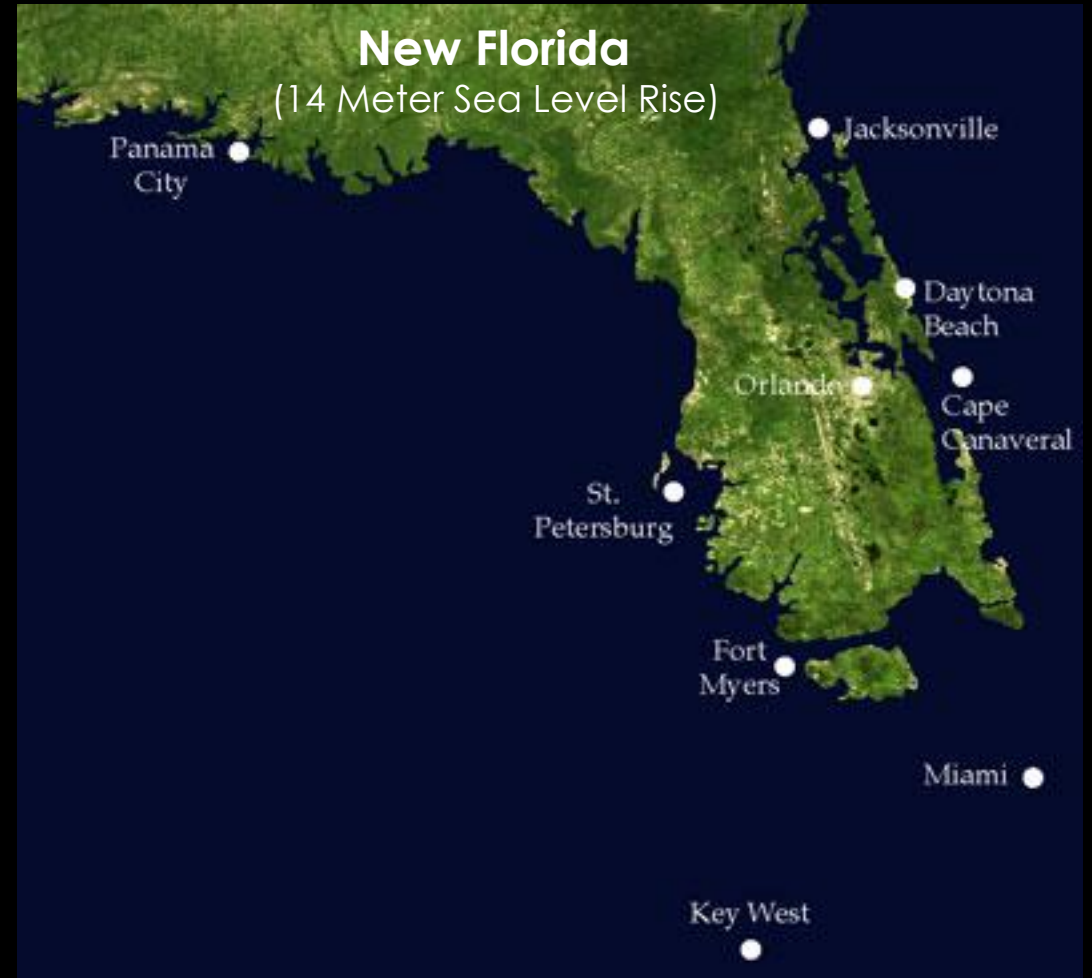
GLOBAL WARMING

- **Higher Summer Temperatures**
 - Increased Irrigation Needs
 - Higher E-T Rates
 - More Fires
- **Rainfall Changes**
 - More or Less Rainfall
 - Seasonal Distribution Changes
 - Changes in Rainfall Patterns
 - More/Larger Hurricanes
- **New NOAA Rainfall Studies**
 - Less Annual Rainfall
 - Smaller 100-Year Storm Values
- **More Uncertainty**



GLOBAL WARMING

- **Ice Shelf Melt**
- **Sea Level Rise**
 - Not an Urban Myth
 - Observed Data
 - Cyclic Trends
 - How Much and When
 - Coastal Impacts
 - Saline Intrusion
 - Degradation of Water Supplies
 - Twachtmann Perspective
- **Development of New Criteria**
 - New Design Storms
 - New Standing Tide Levels
 - New Floodplains



WATERSHED MANAGEMENT EVOLUTIONARY TRENDS

- **Revaluation of Water Resources**

- Water is Like Gold and Oil
- Finite Quantity
- Essential to Life
- Alternatives are Very Costly

- **Working Against the Tides**

- Construction of Dikes and Levies
- Pumping to Achieve Inland Drainage
- Use of Saline Groundwater Intrusion Barriers
- Abandonment of Low Coastal Areas



WATERSHED MANAGEMENT EVOLUTIONARY TRENDS

- **Gradual/Massive New Changes In Florida**
 - Vertical Development on Remaining Uplands
 - Relocation of Wellfields
 - Abandonment/Reconstruction of Power Plants
 - Relocation/Construction of Interstate Highways
 - Protection of Upland Agricultural Areas
 - Engineering Solutions for Existing Wetlands





MOVING TOWARD THE FUTURE OF WATERSHED MANAGEMENT

15 Strategy Elements for a Successful Action Plan
and a Few Sound Suggestions

MOVING TOWARD THE FUTURE OF WATERSHED MANAGEMENT

What Should the Future Look Like?

1. Assess the Real Problems

- ✓ Indications from Valid Science
- ✓ Potential Impacts
- ✓ Timing
- ✓ Availability of Viable Solutions

2. Develop a Realistic Plan

- ✓ Work with All Stakeholders
- ✓ Establish Goals and Priorities
- ✓ Coordinate with Others
- ✓ Educate Representatives
- ✓ Develop Consensus
- ✓ Inform the Public



MOVING TOWARD THE FUTURE OF WATERSHED MANAGEMENT

What Should the Future Look Like

3. Ask the Public and the Politicians

- ✓ Public Meetings
- ✓ Surveys
- ✓ Resolve the Differences

4. Identify What the Community Really Wants

- ✓ Adequate Clean Water
- ✓ Green and Blue Spaces
- ✓ And What Else ???

5. Big Picture Concepts

- ✓ Understand Watershed Processes
- ✓ Integrate Water Management Plans
- ✓ Plan for Multiple Benefits



MOVING TOWARD THE FUTURE OF WATERSHED MANAGEMENT

How Do We Get There?

6. Make Informed Management Decisions

- ✓ Base Decisions on Real Science and Current Data
- ✓ Assess Carefully What You Know as Facts
- ✓ Understand What B.A.D. Can and Can't Tell Us

7. Common Sense is Useful

- ✓ Parse Out Unproven Management Myths
- ✓ Think It Through and Validate Assumptions
- ✓ Factor In the Culture of Your Organization



MOVING TOWARD THE FUTURE OF WATERSHED MANAGEMENT

How Do We Get There?

8. Always Remember Rumsfeld's Advice

"There's what we know . . . and what we don't know.

And in the area of what we don't know, there's what we know we don't know, and what we don't know we don't know."



MOVING TOWARD THE FUTURE OF WATERSHED MANAGEMENT

How Do We Get There?

9. Plan the Work

- ✓ Identify Future Costs
- ✓ Calculate Benefit-Cost Ratios
- ✓ Set a Reasonable Schedule
- ✓ Improve Staff Capabilities
- ✓ Rent Expertise

10. Work the Plan

- ✓ Begin with Low Cost-High Return Activities
- ✓ Monitor Progress and Costs
- ✓ Use Adaptive Management Techniques
- ✓ Develop/Distribute Annual Progress Reports

11. Keep Working the Plan



MOVING TOWARD THE FUTURE OF WATERSHED MANAGEMENT

How Do We Get There?

12. Continue/Enhance Existing Programs

- ✓ Planning/Engineering
- ✓ CIP Projects and Investments
- ✓ Annual O&M Activities
- ✓ Local Regulation and Enforcement
- ✓ Regulatory Compliance
- ✓ Better Design Standards and Practices
- ✓ Selective Land Acquisition
- ✓ Improve Programmatic Coordination
- ✓ Technological Collaboration

13. Maintain/Increase Funding



MOVING TOWARD THE FUTURE OF WATERSHED MANAGEMENT

How Do We Get There?

14. Sea Level Adaption

- ✓ Consider the Netherlands
- ✓ Pumping to Achieve inland drainage
- ✓ Dikes and Levies

15. Smart Management Actions

- ✓ High Value Management Actions
- ✓ Laser-Focused CIP Projects
- ✓ Non-Structural BMPs
- ✓ Prevention vs. Remediation Strategies



MY SUGGESTIONS . . .



- Listen Carefully and Be Open-Minded
- Identify Watershed Problem Areas
- Look at the Whole Problem
- Pay Attention to Groundwater Impacts



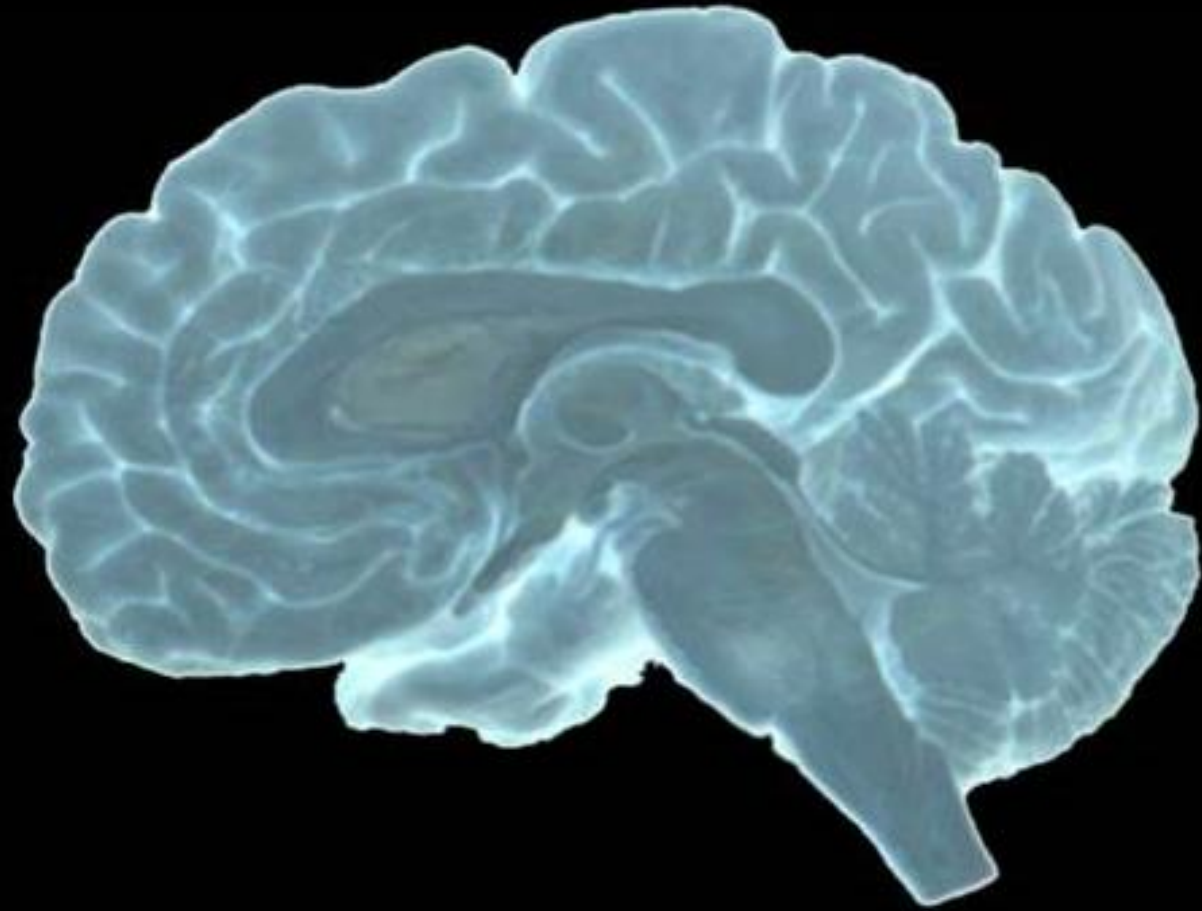
- Work with Mother Nature
- Pick Earth-Friendly Alternatives
- Focus on Issues You Can Address Today
- Take Many Small Steps



- Collect Local Watershed Data
- Review Scientific Studies Carefully
- Use and Understand Your Own Data



- Monitor and Report Your Progress
- Use Your Resources Prudently
- Don't Be Afraid to Change Course
- **Make Progress Every Day**



ANY FINAL
QUESTIONS?

