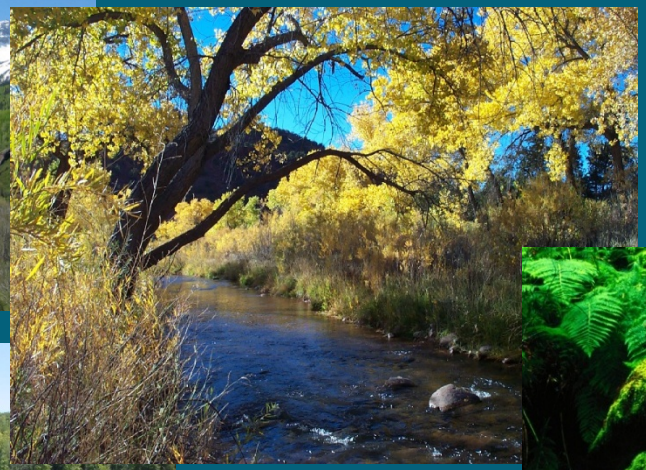
US Forest Service's Watershed Condition Framework



November 5, 2015

Mike Eberle, USFS

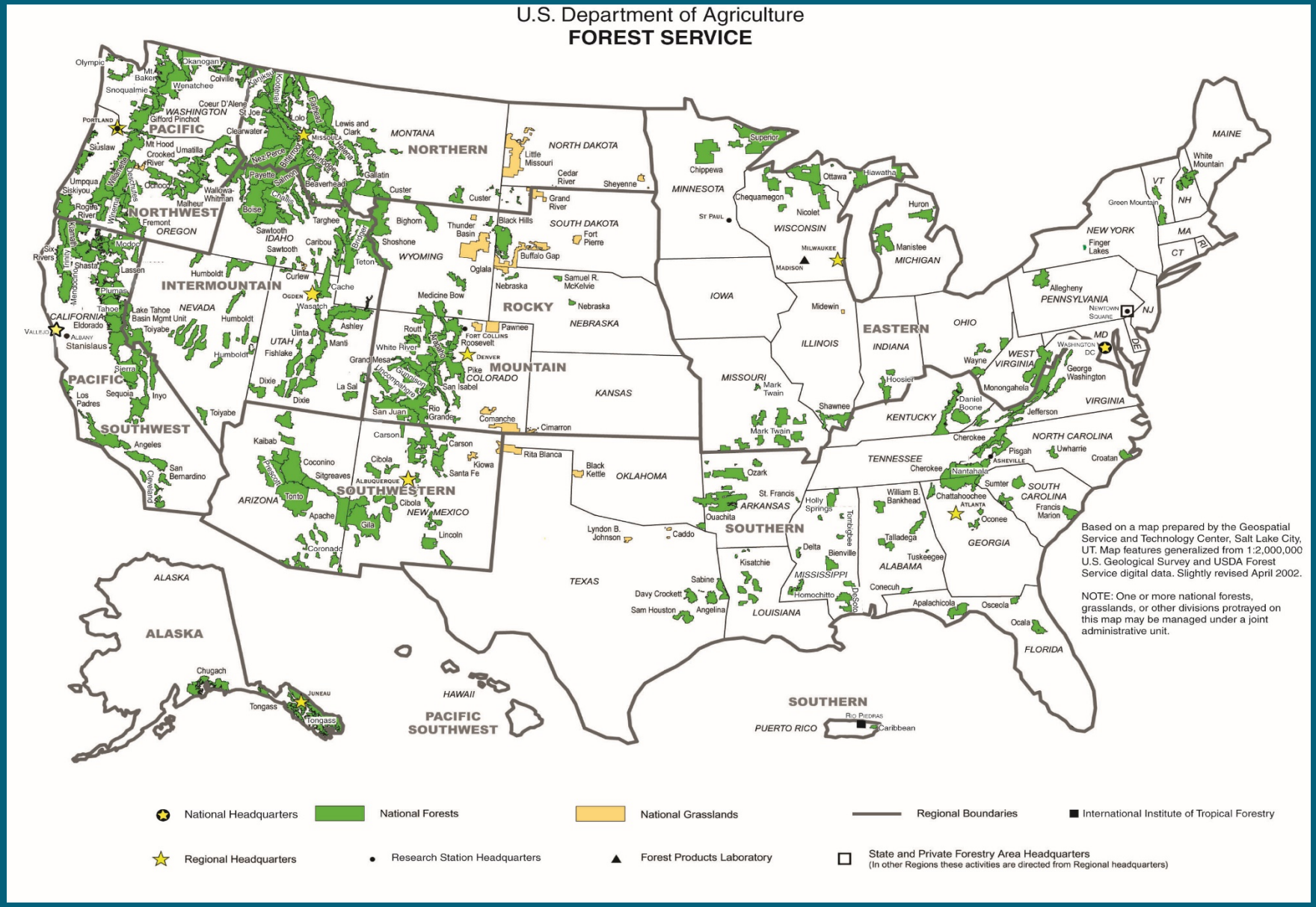
Today's Agenda

- Background information
- Introduction of the *Watershed Condition Framework (WCF)*
- *Use of GIS data & tools in the WCF*

Forest Service Mission

The mission of the Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations

Where are your National Forests and Grasslands?



http://www.fs.fed.us/locatormap/

The Forest Service ... at a Glance

- 193 million acres of forests and grasslands (about the size of Texas), about 8.5% of the total land area in the US
- 9 geographic/administrative regions
- 155 national forests and 20 grasslands
- 44 States, Puerto Rico, and the Virgin Islands

http://www.fs.fed.us/

The Forest Service and Water… Fast Facts

- Forest Service lands are the largest single source of water in U.S., with 18% from National Forests
- Forests in the U.S. provide drinking water to over 180 million people
- Waters on National Forests provide habitat for over 140 threatened and endangered aquatic and amphibian species
- About 15 million users/year fish for recreation on FS-managed lands, including over 220,000 miles of streams and over 2.3 million acres of lakes, ponds, and reservoirs.

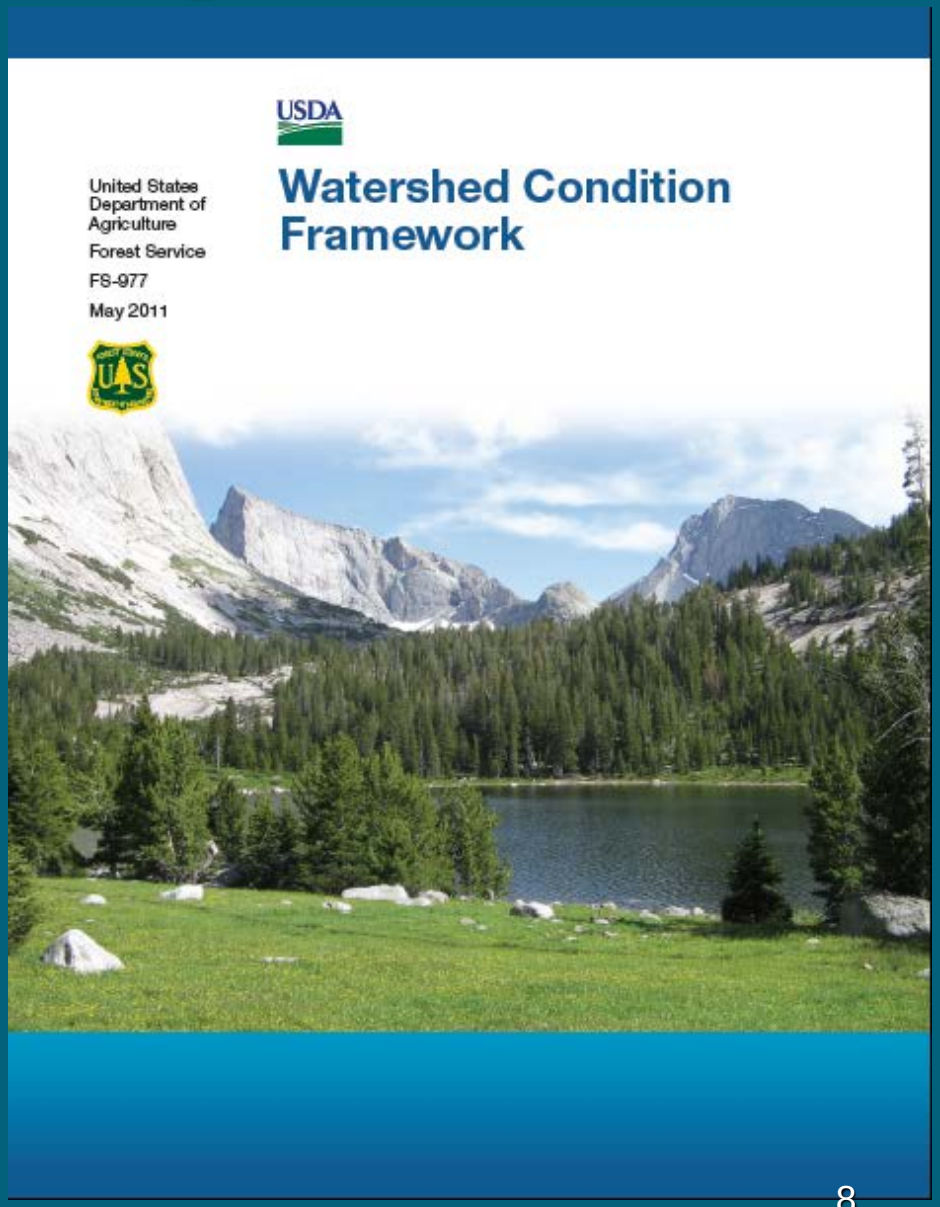
Current Focus of the Chief

Forest Service Chief, Tom Tidwell, is dedicated to:

- The improvement of water resources,
- Development of climate change resiliency,
- Creation of jobs that will sustain communities, and
- Restoration and enhancement of landscapes.

Today's Topic

The Watershed Condition Framework (WCF)



Watershed Condition Framework Background

Watershed Restoration was not new to FS, but…

- Many restoration activities were being completed, but we could not prove that watershed health was improved.
- What did the FS have to show for tax-payer money spent?
- Needed to develop an approach that showed how well we did what we said we were going to do.
- The Watershed Condition Framework allowed us to document watershed condition improved by measuring our outcomes.

Forest Service Approach

- A comprehensive approach to restoring watersheds that includes aquatic and upland resources

  --water, fisheries, soils, forestry, fire, etc.

- An approach for showing improvement to watershed condition at Forest, Regional, and National scales

  --shows outcome of our actions

  --shows that we are making a difference with our restoration management activities

Watershed Condition Framework

STEP A
CLASSIFY
Watershed Condition

STEP B
PRIORITIZE
Watersheds for Restoration

STEP C
DEVELOP
Watershed Restoration Action Plans

STEP D
IMPLEMENT
Integrated Projects

STEP E
TRACK
Restoration Accomplishments

STEP F
VERIFY & MONITOR
Watershed Condition

Watershed Condition Framework

STEP A

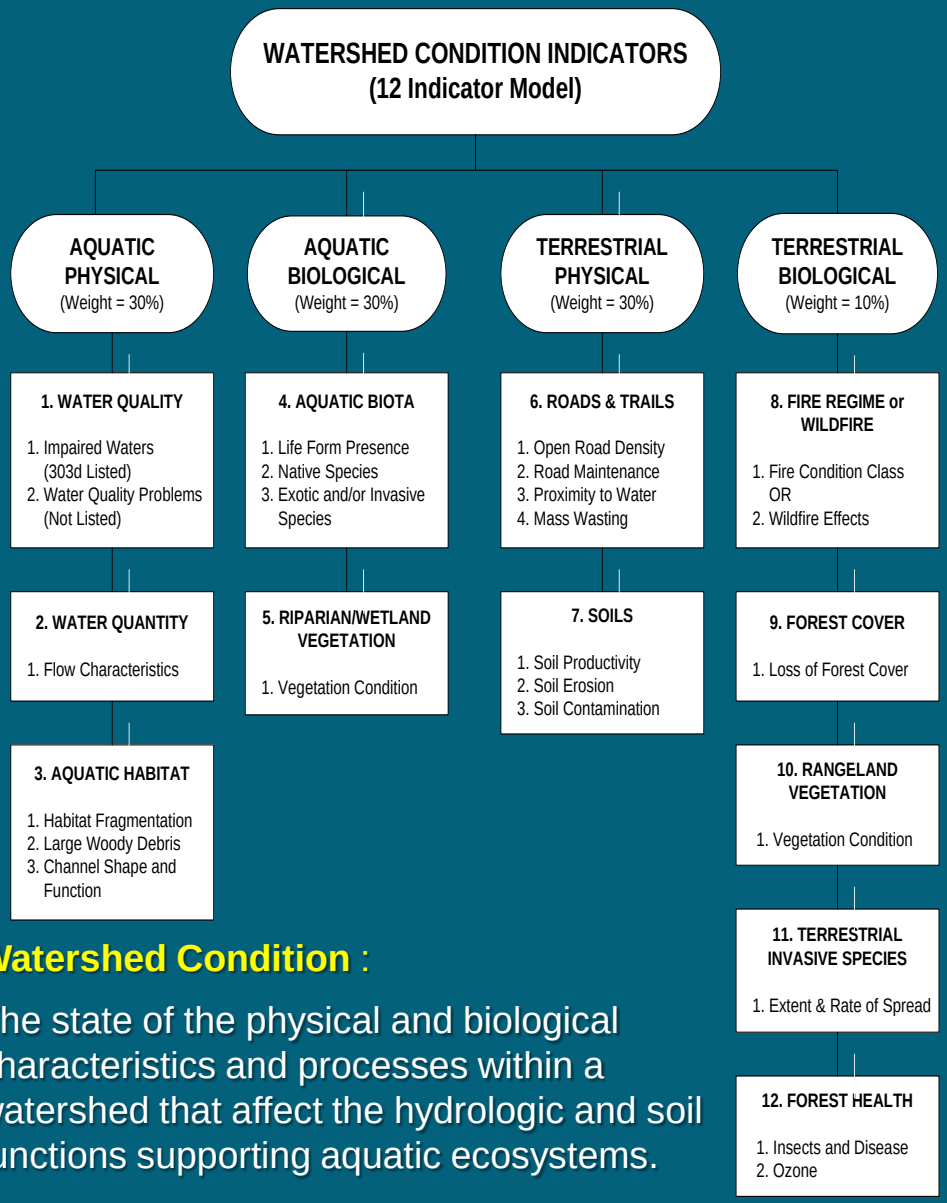
Classify Watershed Condition

What is the condition of the watersheds on our National Forests?

1. Evaluation of watershed condition by local units
2. Relies on professional judgment of Forest Service interdisciplinary teams, comprised of hydrologists, fish biologists, wildlife biologists, soil scientists, foresters, ecologists, fire staff, range management specialists, engineers, and others.
3. Use local data, GIS data layers, and national databases to the extent available

Rapid Assessment to achieve National Baseline

Watershed Condition Indicators

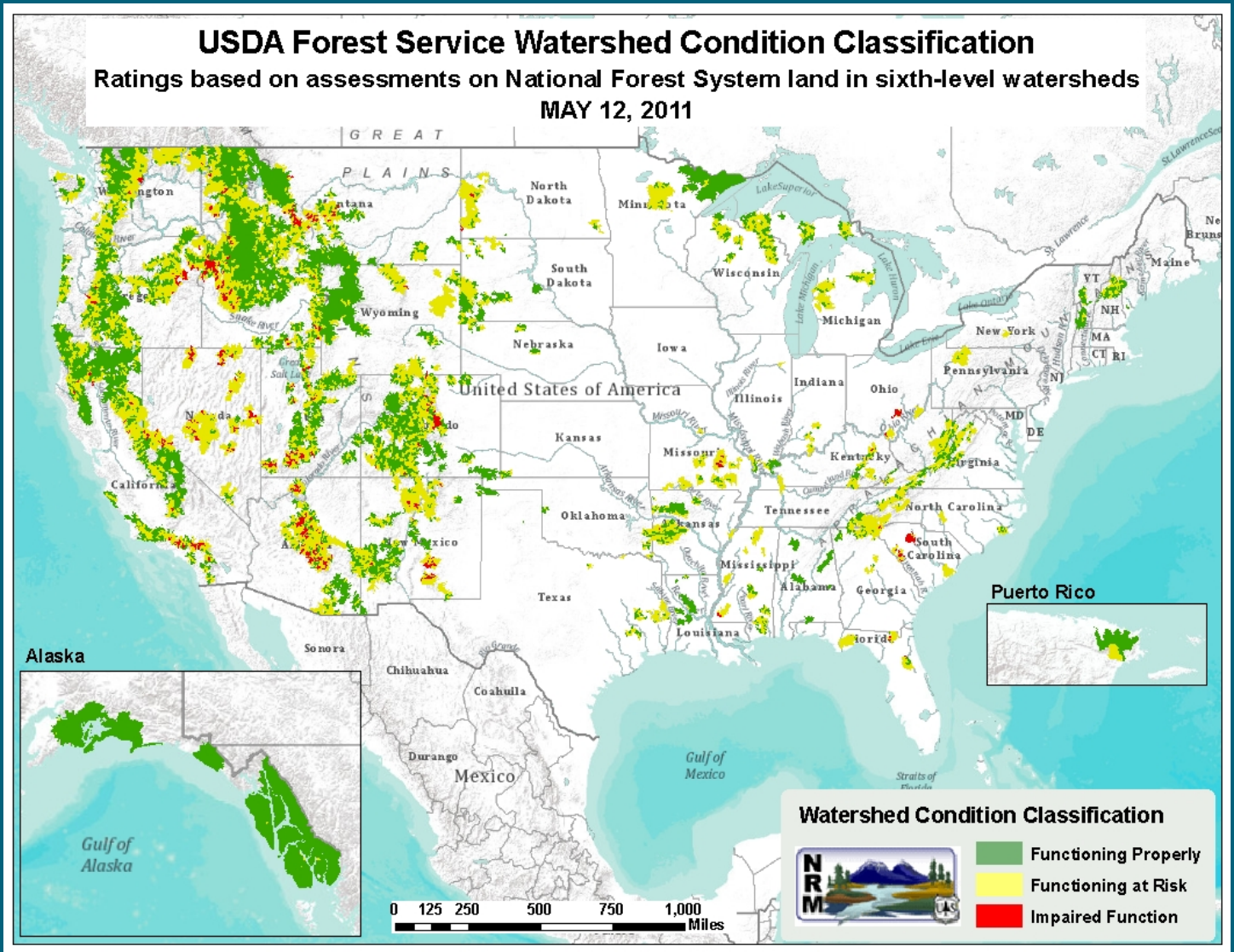


Watershed Condition :

The state of the physical and biological characteristics and processes within a watershed that affect the hydrologic and soil functions supporting aquatic ecosystems.

1. Water Quality
2. Water Quantity
3. Aquatic Habitat
4. Aquatic Biota
5. Riparian/Wetland Vegetation
6. Roads and Trails
7. Soils
8. Fire Regime or Wildfire
9. Forest Cover
10. Rangeland Vegetation
11. Terrestrial Invasive Species
12. Forest Health

Map of Condition Class National Forest System Watersheds



http://www.fs.fed.us/publications/watershed/

National Watershed Condition Class (WCC) Results – NFS Watersheds

March 2011

Class 1- Functioning Properly	7,882	52%
Class 2- Functioning at Risk	6,751	45%
Class 3- Impaired Function	431	3%
Total watersheds	**15,064**	

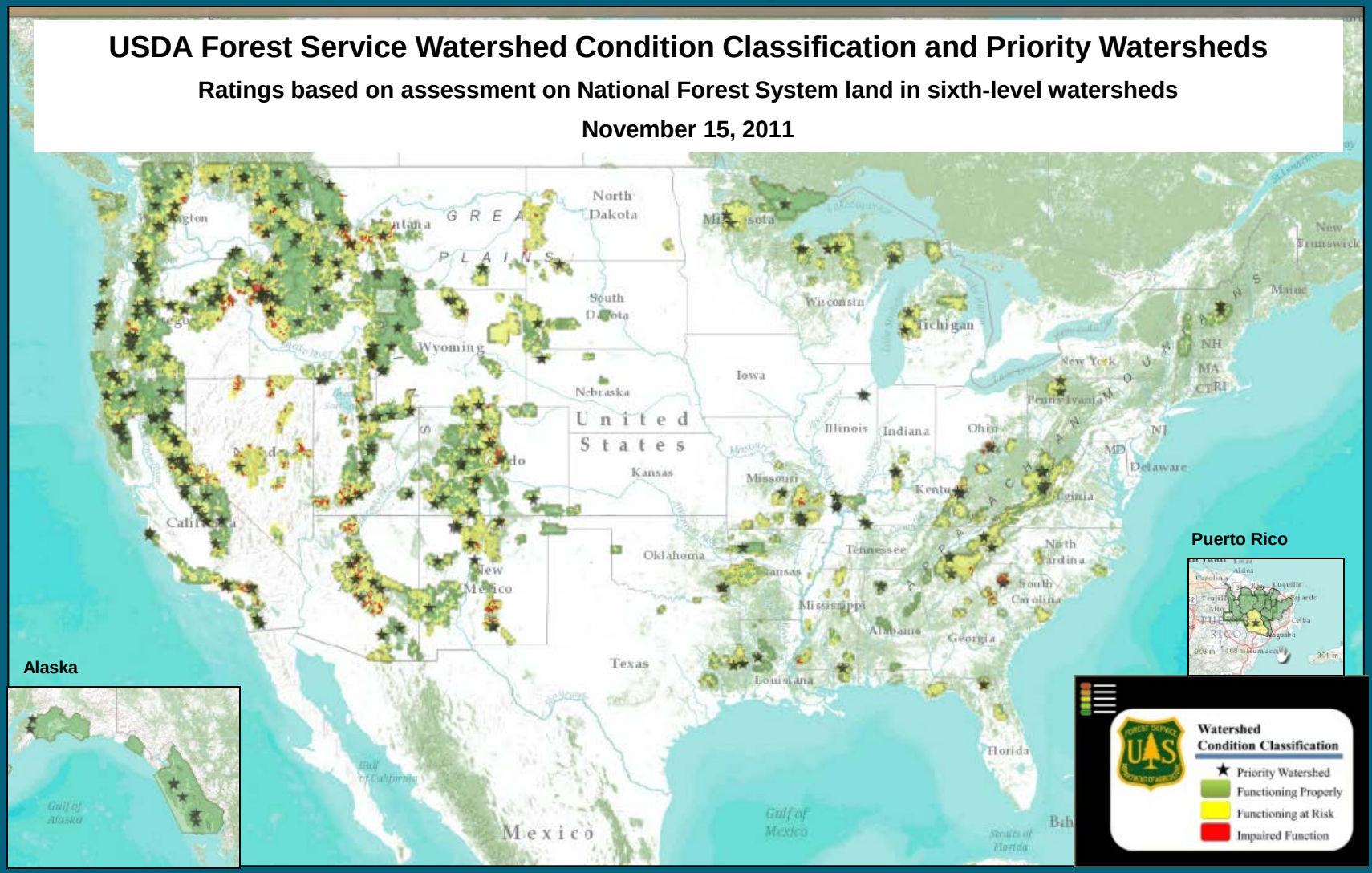
STEP B

Prioritize Watersheds for Restoration

Identify priority watersheds for restoration

- Selection criteria:
  - Active collaboration and partnership opportunities
  - Ecological, social, economic considerations
  - Reflecting outside Agency efforts and partnership opportunities
- Completed at the Forest or Grassland level using an interdisciplinary team

Interactive Map of Condition Class and Designated Priority Watersheds



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STEP C

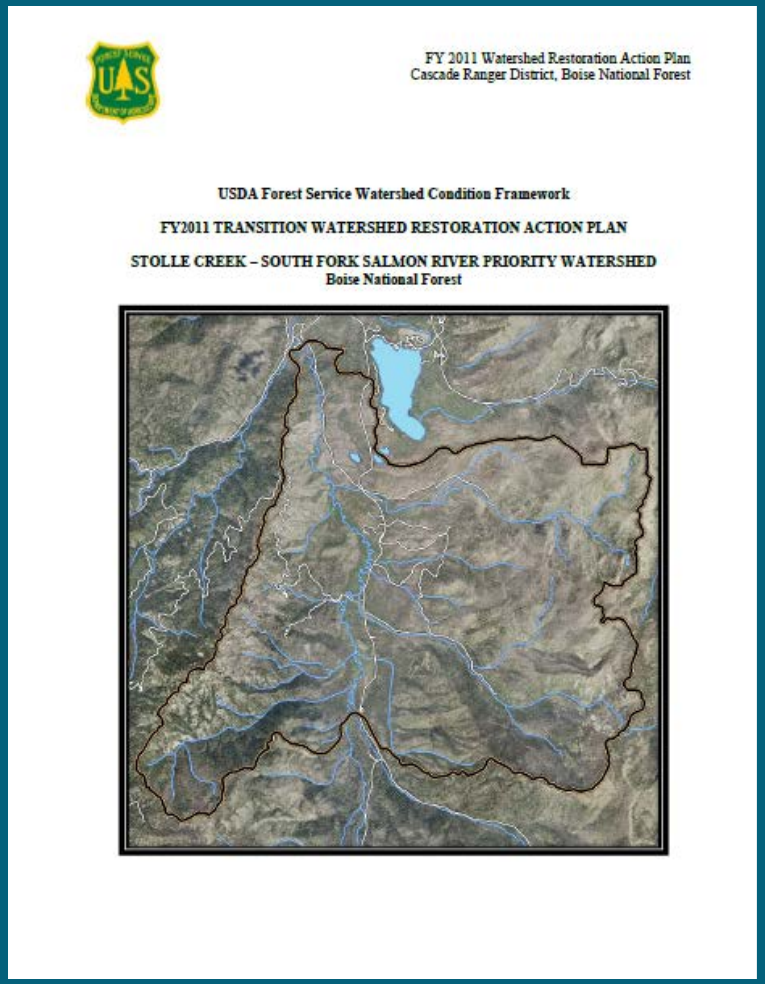
Develop Watershed Action Plans

Why do you need a plan? What goes into a plan?

Develop action plans for priority watersheds

- Collaboratively engage with potential partners
- Field assessment to document specific problems
- Identify essential projects that address the problems
- Implementation schedule

Watershed Restoration Action Plans (WRAPs)



FY 2011 Watershed Restoration Action Plan
Cascade Ranger District, Boise National Forest

USDA Forest Service Watershed Condition Framework

FY2011 TRANSITION WATERSHED RESTORATION ACTION PLAN

STOLLE CREEK – SOUTH FORK SALMON RIVER PRIORITY WATERSHED
Boise National Forest

Information contained in WRAPs:

- List of Active Partners
- Key Watershed Issues
- Important Ecological Values within watershed
- Description of Essential Projects
- Estimate of Project Costs

STEP D

Implement Integrated Projects

Implementation

- May take 1-6 years or longer

  Planning, project design, NEPA, implementation

A watershed is considered to have moved to an improved condition class when all of the essential projects identified in a Watershed Restoration Action Plan are completed.

STEP E

Track Restoration Accomplishments

Tracking

- Essential project completion in priority watersheds
- Change in condition class due to other reasons (major disturbances, other agency's actions, etc.)
- Agency is beginning to look at Outcomes as well as Outputs:
  - ✓ Outputs still recorded for traditional accomplishment reporting.
  - ✓ Outcomes to be tracked for accountability.

STEP F

Monitor and Verification

Monitoring

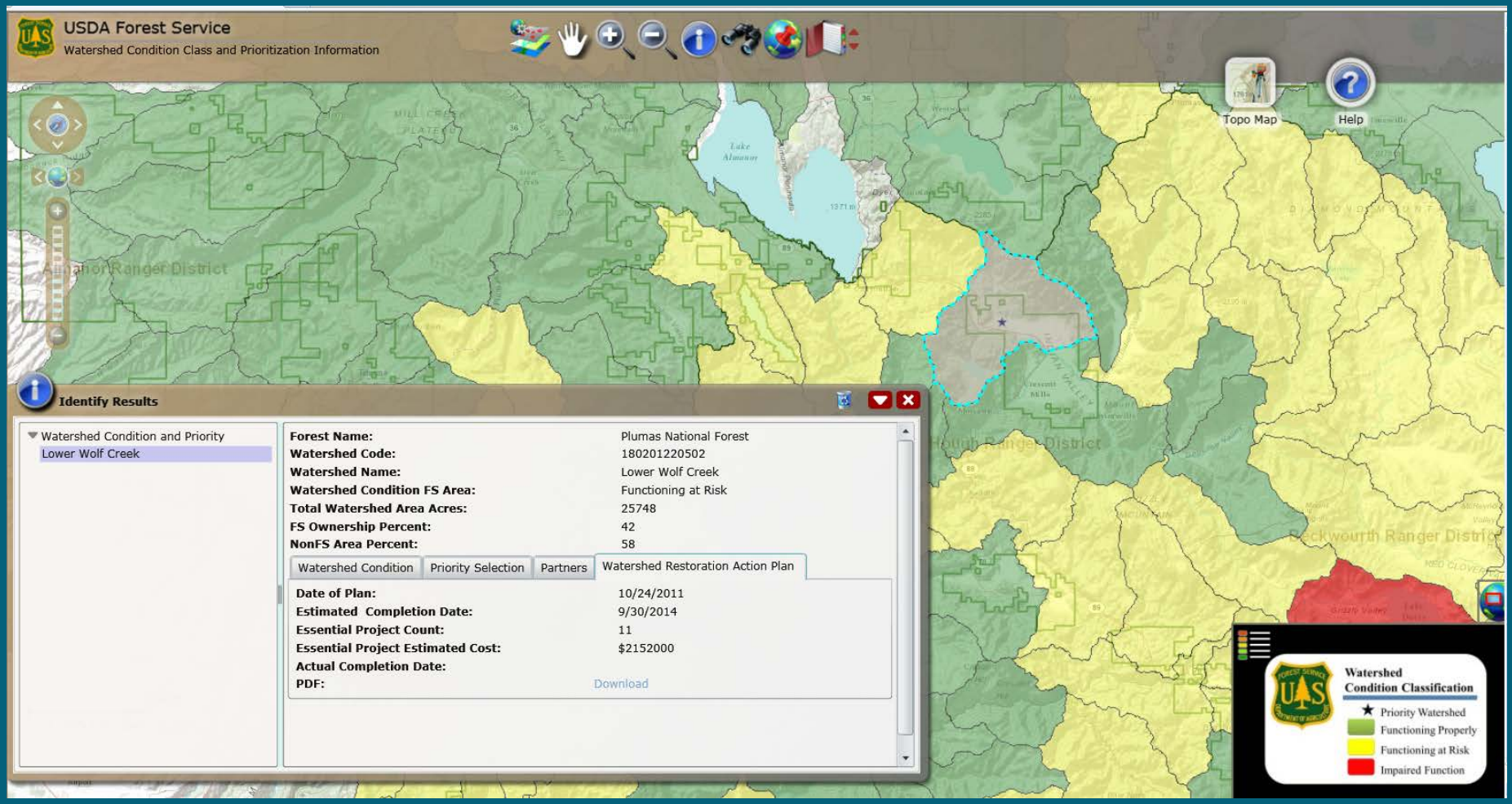
- Did we do what we said we were going to do?
- Did it have the effect we thought it would?

Interactive Map of Condition Class and Designated Priority Watersheds

http://www.fs.fed.us/publications/watershed/

- Overall condition classification ranking and the ranking of its 12 watershed condition indicators.
- Location of Priority Watersheds
- Downloadable copies of the watershed restoration action plans (WRAPs).
- Information on selection criteria, list of active partners, and estimated costs.
- Increases the public's awareness of their local watershed conditions and the role they can play in improving them.
- Shapefile available for GIS analysis.

Interactive Map of Condition Class, Designated Priority Watersheds, and Watershed Data (including WRAPs)



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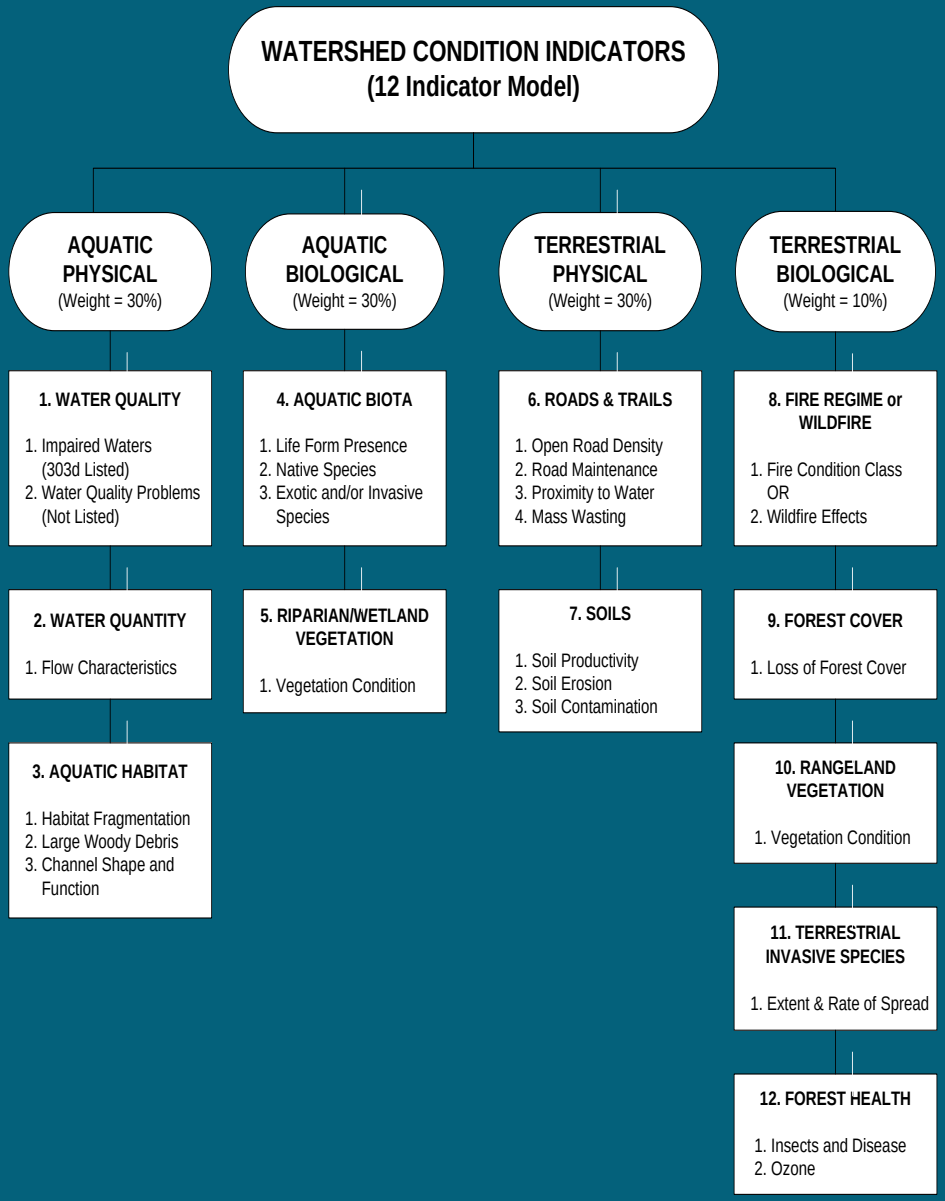
Watershed Condition Indicators



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Watershed Condition Indicators

General Description

Aquatic Physical Indicators	
1. Water Quality	**This indicator addresses the expressed alteration of physical, chemical, and biological components of water quality.**
2. Water Quantity	**This indicator addresses changes to the natural flow regime with respect to the magnitude, duration, or timing of the natural streamflow hydrograph.**
3. Aquatic Habitat	**This indicator addresses aquatic habitat condition with respect to habitat fragmentation, large woody debris, and channel shape and function.**
Aquatic Biological Indicators	
4. Aquatic Biota	**This indicator addresses the distribution, structure, and density of native and introduced aquatic fauna.**
5. Riparian/Wetland Vegetation	**This indicator addresses the function and condition of riparian vegetation along streams, water bodies, and wetlands.**
Terrestrial Physical Indicators	
6. Roads and Trails	**This indicator addresses changes to the hydrologic and sediment regimes because of the density, location, distribution, and maintenance of the road and trail network.**
7. Soils	**This indicator addresses alteration to natural soil condition, including productivity, erosion, and chemical contamination.**

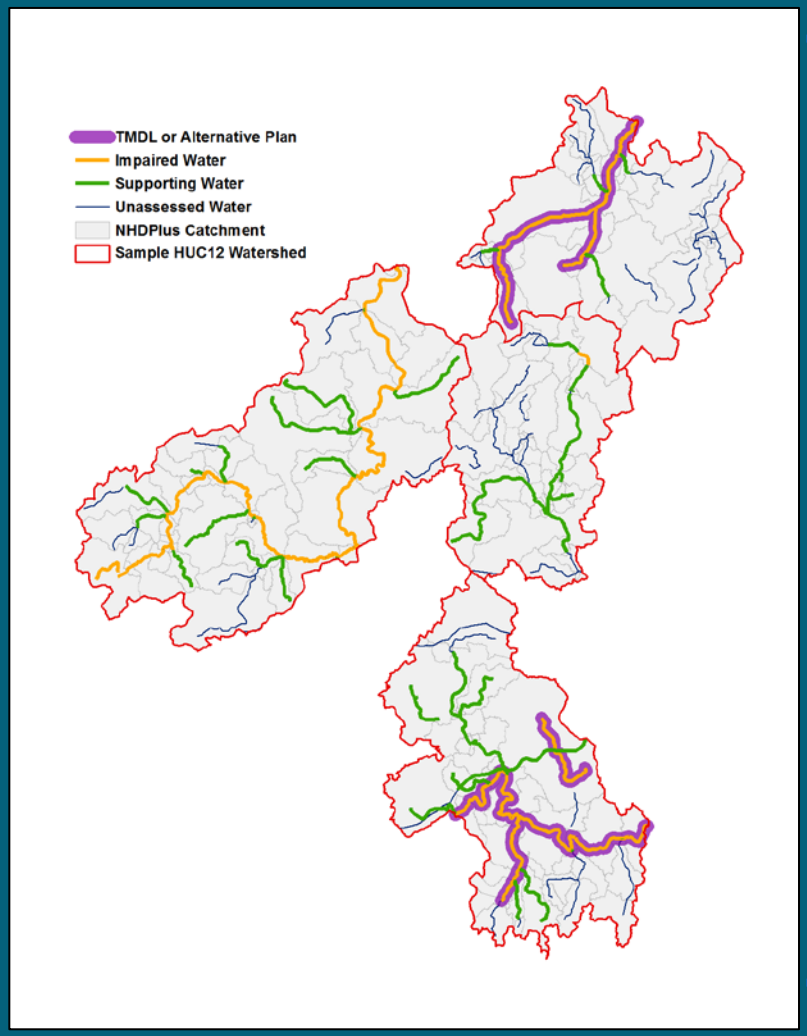
Watershed Condition Indicators

Water Quality

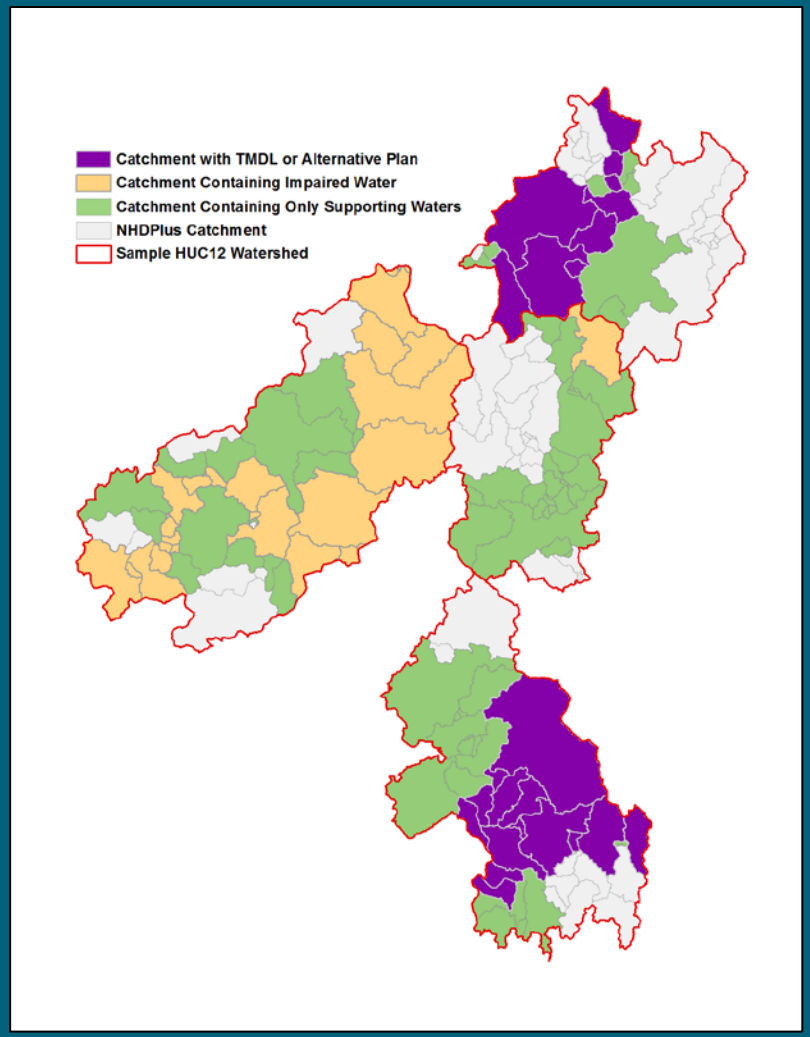
Water Quality Condition Indicator	Minimal to no impairment to beneficial uses of the water bodies in the watershed.	Minor impairment to beneficial uses of the water bodies in the watershed.	Significant impairment to beneficial uses of the water bodies in the watershed.
Attributes	**Good (1) Functioning Properly**	**Fair (2) Functioning at Risk**	**Poor (3) Impaired Function**
Impaired waters (303(d) listed)	No State-listed impaired or threatened water bodies.	Less than 10 percent of the stream miles or lake area are listed on the 303(d) or 305(b) lists and are not supporting beneficial uses.	More than 10 percent of the stream miles or lake areas are water quality limited and are not fully supporting beneficial uses as identified by a State water quality agency integrated report (303(d) & 305(b)).
Water quality problems (not listed)	The watershed has minor or no water quality problems.	The watershed has moderate water quality problems.	The watershed has extensive water quality problems.
	For example, no documented evidence of excessive sediment, nutrients, chemical pollution or other water quality issues above natural or background levels; no consumption advisories or contamination from abandoned or active mines; little or no evidence of acidification, toxicity, or eutrophication because of atmospheric deposition (see "Additional Guidance" related to mines and atmospheric deposition).	For example, consumption advisories in localized areas; minor contamination from active or abandoned mines; localized incidence of accelerated sediment, nutrients, chemicals, or infrequent, documented incidents of contamination of public drinking water sources. Moderate evidence of acidification, eutrophication, or toxicity because of atmospheric deposition (see "Additional Guidance" elated to mines and atmospheric deposition).	For example, consumption advisories over extended areas; excessive sediment, nutrients, chemicals; extensive contamination from active or abandoned mines; or frequent incidents of contamination of public drinking water sources. Strong evidence of acidification, eutrophication, or toxicity because of atmospheric deposition (see "Additional Guidance" related to mines and atmospheric deposition).

Mapping State GIS Data to the Catchments

Receive GIS data from States



Translate to Catchments



Information from U.S. EPA

Watershed Condition Indicators
GIS-Based Data & Tools

- Many sources
  - USGS: Science in Your Watershed
  - EPA: WATERS, Surf Your Watershed
  - TerrainWorks (NetMap)
- Data availability varies
  - Data Rich vs Data Poor areas

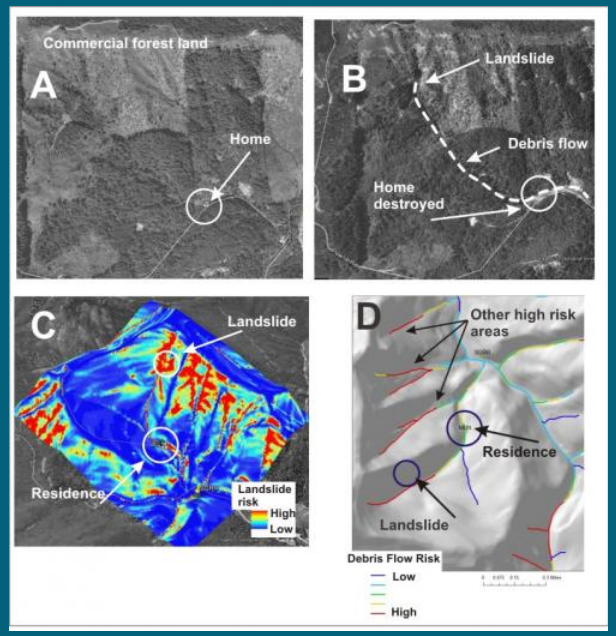
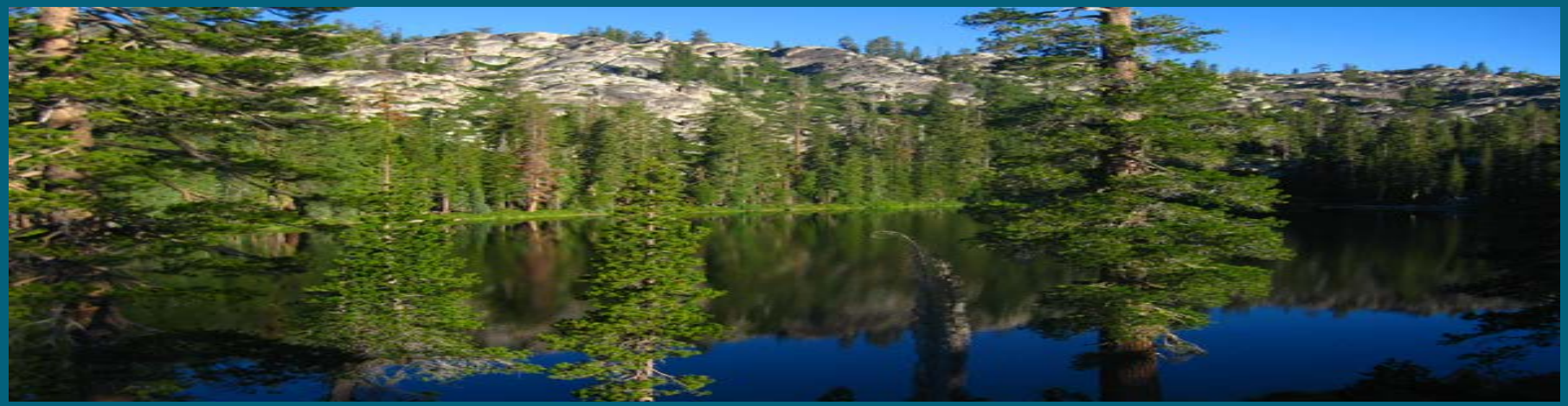


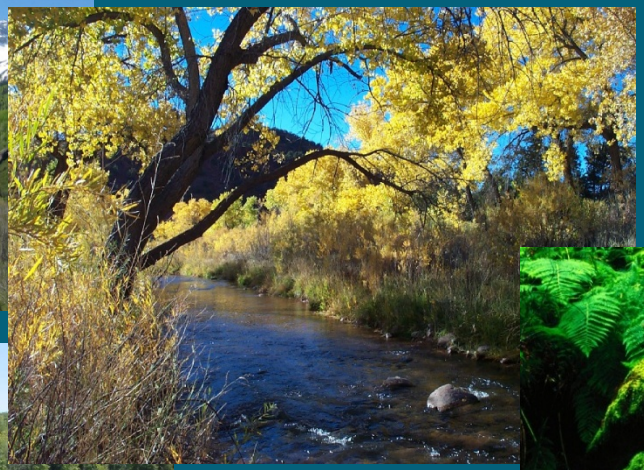
Image: http://www.terrainworks.com/partnerships

Summary of WCF

- For the first time, we have a nationwide tool to systematically implement watershed restoration.
- Active collaborative partnerships are essential to the success of WCF. (Communication tools are key!)
- WCF is not perfect – it will improve over time.



Looking to the Future

- Determine how the terrestrial aspect of watershed restoration will be incorporated into WCF
- Continue implementation and improvement of the WCF Program
- Reassessment of certain watersheds

Questions and Discussion