



WEST VIRGINIA WATERSHED ASSESSMENT PILOT PROJECT

Gauley River ©Kent Mason

Technical Advisory Team Meeting 06.13.2011

Presentation Outline

- Project Introduction
- Proposed and Potential Methodology
- Review of Data
- Examples of Possible Metrics
- Analysis Tools
- Intended Outcomes

Will pause for brief Q & A session after each section

Questions to Consider

- Will the outlined methodology capture the information necessary to achieve the proposed objectives, outcomes and outputs for the project?
- What information, if any, is missing?
- What data needs and limitations can you foresee?
- Are there specific technical or scientific issues that will need to be addressed in the assessments?
- Are you aware of other projects that might contribute to, or provide information for, this process?

Project Introduction

1. Objectives
2. Process
3. Study Area

Project Objectives

- Design and test a **watershed assessment process**, which includes analysis of cumulative watershed effects.
- **Establish priorities** for protection and restoration of aquatic resources and evaluate/rank areas within watersheds accordingly.
- Provide relevant information, strategies/actions, and a **decision support tool** to assist partners, stakeholders and regulatory staff with decisions affecting aquatic resources.

Project Process

- Define watershed assessment methodology
- **Conduct technical advisory team meeting**
- Complete watershed characterization
- Conduct expert workshop one
- Complete consolidated analysis
- Conduct expert workshop two
- Complete draft watershed assessments
- Conduct decision maker/end user workshop
- Complete final watershed assessments

Project Study Area

- Five WV HUC8 Watersheds

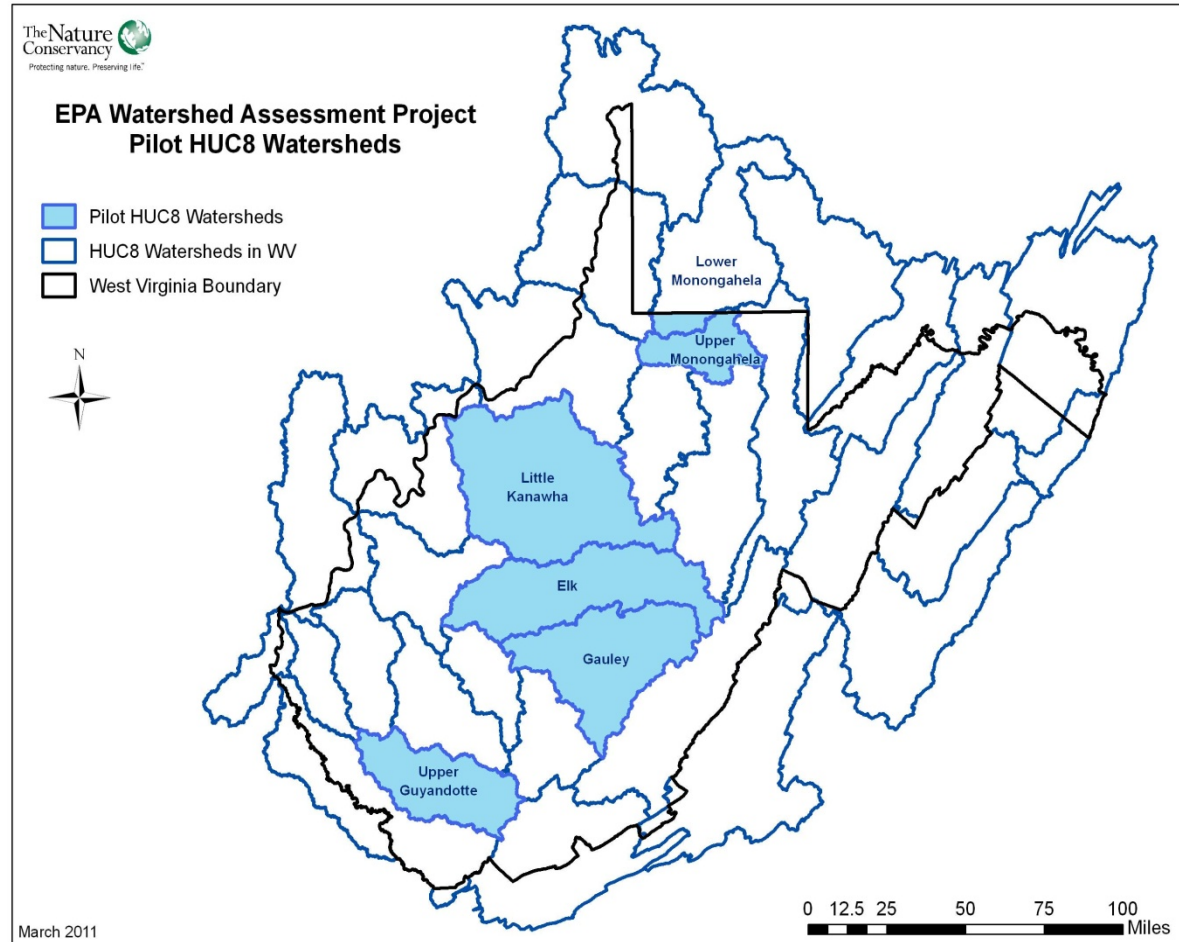
Monongahela
(Upper and
portion of
Lower in WV)

Elk

Gauley

Little Kanawha

Upper Guyandotte



Methodology

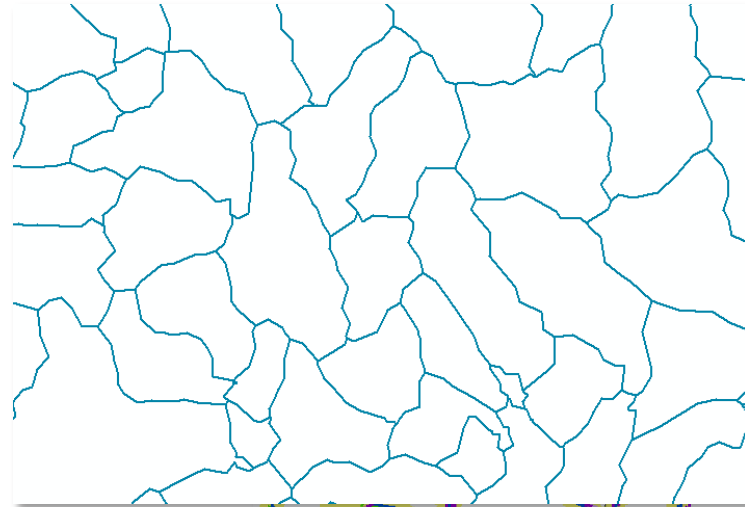
1. Watershed Characterization
2. Priority Models
3. Consolidated Analysis

Watershed Characterization

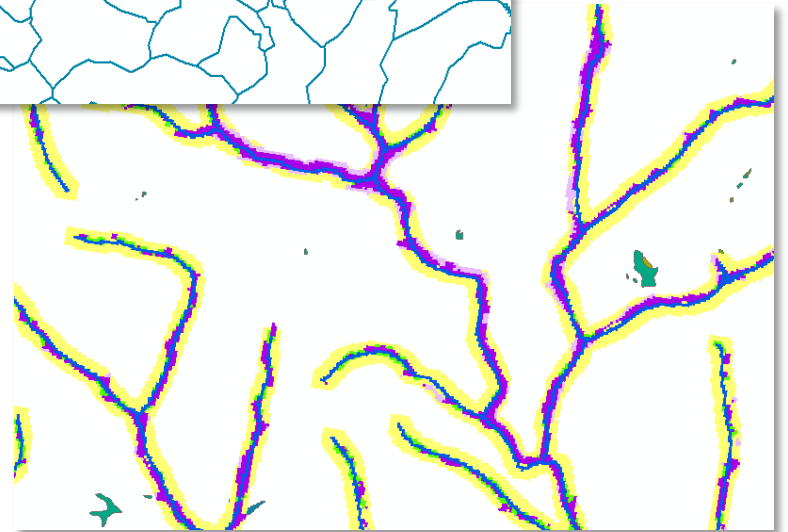
- Baseline analysis to compile, process and format datasets for use in Priority Models
- Intended to identify current watershed **Condition/Function** as well as existing **Threats** (ecological risk assessment)

Watershed Characterization

- Planning Units:
Modified NHDPlus
catchments



- Landscape types:
Stream/Riparian
Wetlands
Uplands



Proposed Methodology

- METRICS:
normalized on 0
(worst) to 1
(best)scale
- METRICS aggregated
to determine INDEX
scores
- INDEX aggregated to
determined
CATEGORY scores
- INDEX and
CATEGORY scores
will be used in
Priority Models to
rank protection and
restoration sites and
activities
- Produces planning
units ranked
relatively within a
watershed

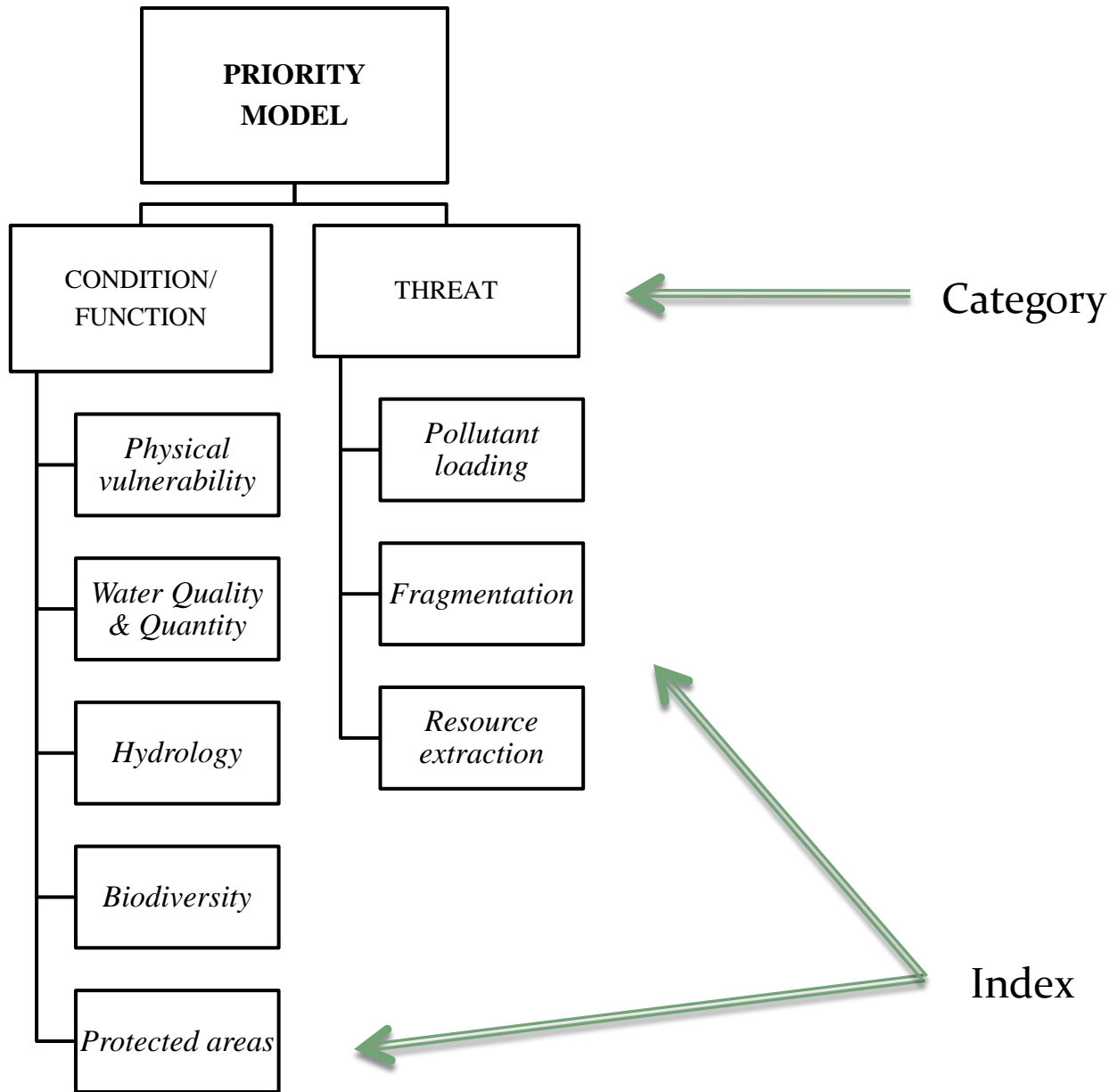
Categories/Indices

CONDITION/
FUNCTION

- Hydrology
- Water quality & quantity
- Biodiversity
- Protected lands
- Physical vulnerability

THREAT

- Resource extraction
- Pollutant loading
- Fragmentation



Priority Models

PROTECTION

- Stream/Riparian
- Wetlands
- Uplands

RESTORATION

- Stream/Riparian
- Wetlands
- Uplands

(Metrics will be individually defined for each Priority Model)

Potential Methodology

- Second phase detailed analysis of **target areas** and strategies/actions within each planning unit
- Develop **non-relative index** of watershed condition and threat based on pre-defined quality scale (e.g. 1-4 scale where 1= poor, 2=fair, 3= good, 4= excellent)

Consolidated Analysis

□ **Cumulative Watershed Effects**

Land use changes

Landscape losses

Ecosystem function/
service degradation

Cumulative impacts/
stresses

□ **Historical and Future Conditions**

Trends analysis (water use, permitting, population growth, climate change, etc.)

Future scenarios analysis (within targeted areas and for proposed strategies/actions)



Little Kanawha River near Elizabeth, WV ©www.wvexp.com

FEEDBACK/QUESTIONS?

Data

- Federal
- State
- Organization

Datasets

FEDERAL

- ❑ NHDPlus catchments and stream network
- ❑ NWI **wetlands**
- ❑ NLCD 2006 **land use/land cover**
- ❑ USDA SSURGO **soils**
- ❑ NPDES sites
- ❑ Digital **elevation** models
- ❑ **Streamflow** data (USGS)
- ❑ Infrastructure (roads, railroads)

Datasets

STATE

- ❑ **Impaired streams:** 303(d); TMDL; AMD
- ❑ Water quality monitoring data (WAB)
- ❑ WV Stream Condition Index
- ❑ Oil/gas **wells** locations (WVDEP/WVGES)
- ❑ All **mining** activity (WVDEP/WVGES)
- ❑ Mineral operations
- ❑ Solid waste facilities
- ❑ Geologic units
- ❑ Publicly owned lands
- ❑ Rare species

Datasets

ORGANIZATION

The Nature
Conservancy

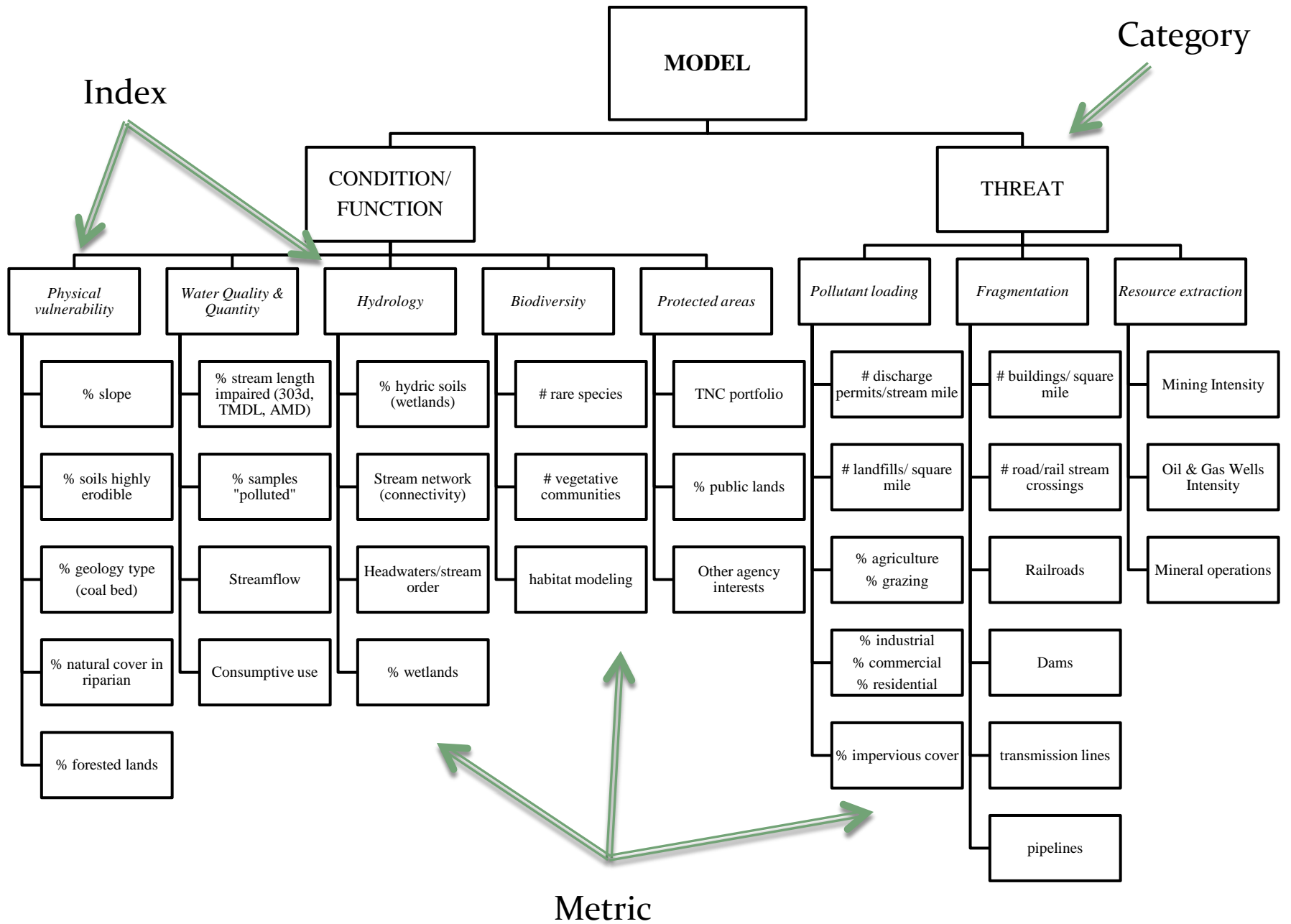
Others

- **Active River Areas**
 - Aquatic & terrestrial portfolios
 - Forest blocks
 - Local connectivity
 - Current density
-
- Energy transmission lines

Metrics

Examples of Possible Metrics

- *Physical vulnerability*: % slope; % soils highly erodible; % geology type (coal bed)
- *Water quality*: % stream length impaired; % sample sites not meeting water quality criteria
- *Hydrologic*: % hydric soils; % wetlands; % riparian floodplain
- *Biodiversity*: # rare species; # vegetative communities
- *Protected areas*: % public lands; % secured lands; % agency priority areas
- *Resource extraction*: # oil & gas wells/sq mi; % area mined
- *Pollutant loading*: # discharge permits/ stream mile; # landfills/sq mi; % agriculture; % impervious cover
- *Fragmentation*: # road/rail stream crossings; # dams/stream mi





Monongahela River at Fairmont, WV ©www.city-data.com

FEEDBACK/QUESTIONS?

Tools

Potential Tools for Analysis

Preliminary
tools being
considered

- Riparian Prioritization Tools by Dr. Matthew Baker
- Maxent
- NOAA's N-SPECT
- EPA's BASINS; AGWA
- Protected Areas Tool
(Includes Environmental Risk Surface, Relative Biodiversity Index, Marxan tools)
- WFMIS Watershed Management Priority Indices



Mountaintop removal mining in southern WV ©www.upi.com

FEEDBACK/QUESTIONS?

Outcomes

1. Intended Results
2. Project Outputs

Intended Results

- Develop a watershed assessment methodology that can be implemented in the remaining WV watersheds
- Rank areas of high conservation value
- Rank restoration needs, opportunities and probabilities of success
- Develop strategies/actions to address issues identified during assessment process
- Develop metrics to measure success/ improvement
- Suggest protocols for monitoring and assessment of aquatic resources as an adaptive feedback loop for resource management
- Identify data gaps & data needs

Project Outputs

- **Five watershed assessment reports**

Will include specific priorities and strategies, as well as detailed methodology, references and lessons learned

- **Interactive web mapping application**

A spatial decision support tool to assist stakeholders in identifying target areas, strategies and actions



Elk River at Birch Run, WV ©www.over-land.com

FEEDBACK/QUESTIONS?