

Use of CBP TMDL Modeling Tools for non-TMDL Outcomes

Gary Shenk – CBPO

GIT Chairs meeting

12/1/2021

Types of Models

- Prediction
 - Temporal
 - Spatial
- Research
- Scenarios



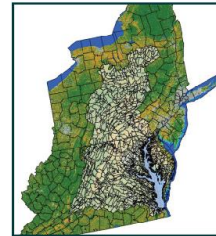
If we change what we do on the landscape...

...how will that change nitrogen, phosphorus, and sediment?

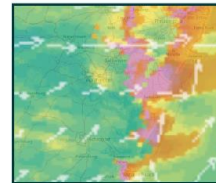
...and what will be the oxygen in the Bay?

Data and Model Inputs

Pollution Control Data
Land Use Data
Point Sources Data
Septic Data
U.S. Census Data
Agricultural Data



Land Use Change Model



Airshed Model

Precipitation Data
Meteorological Data
Elevation Data
Soil Data

Phase 6 Watershed Model/CAST

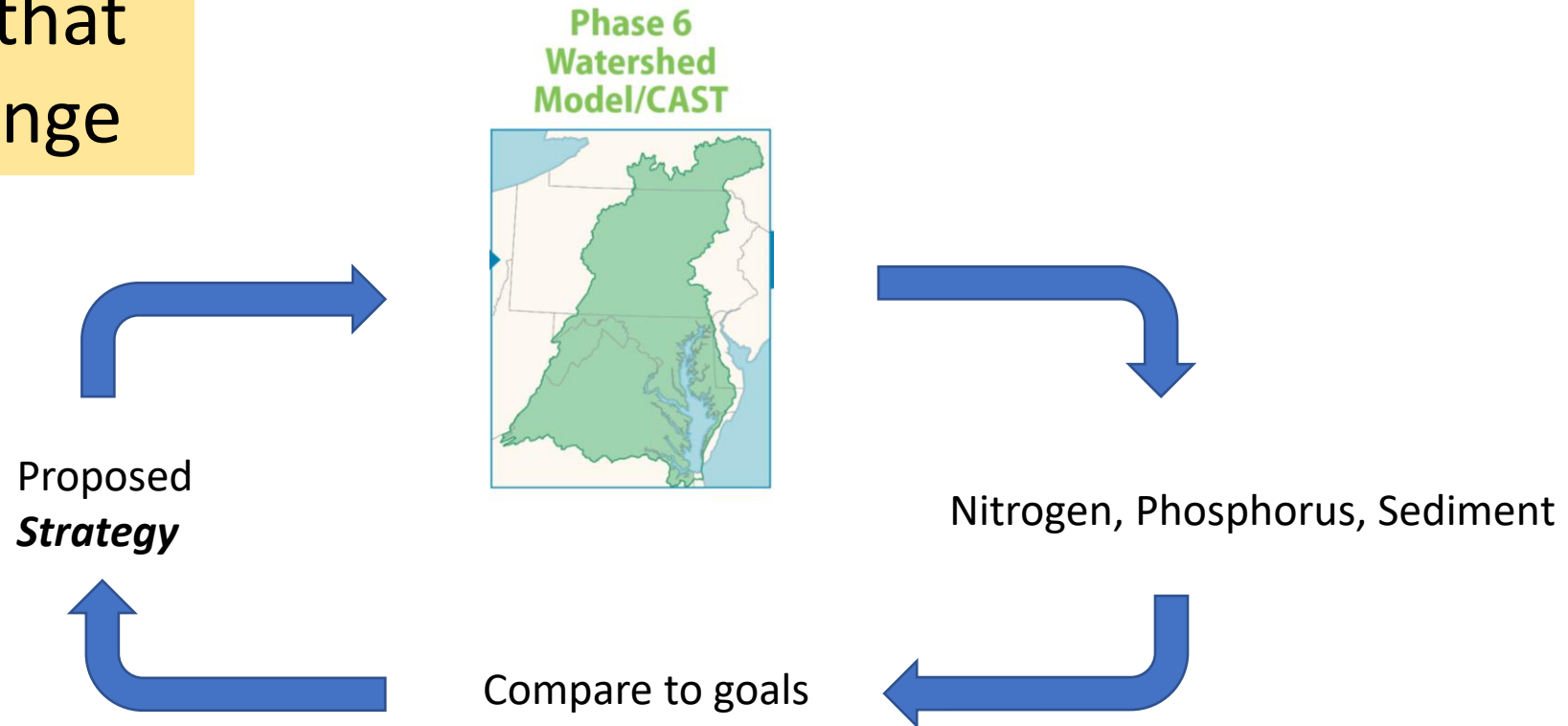


Estuary Model



General Use Case of CAST

Organization that
can make change



Change on the ground

State agencies
Environment
Agriculture

Phase 6
Watershed
Model/CAST



Proposed
WIP

Nitrogen, Phosphorus, Sediment

Compare to State goal

A screenshot of the Chesapeake Progress website. The header features the Chesapeake Progress logo. Below the header, there are three tabs: 'Abundant Life', 'Clean Water', and 'Conserved Lands'. The 'Clean Water' tab is selected. Under this tab, there is a section titled 'WATER QUALITY GOAL >' which lists three outcomes: '2017 Watershed Implementation Plans (WIPs) Outcome', '2025 Watershed Implementation Plans (WIPs) Outcome', and 'Water Quality Standards Attainment and Monitoring Outcome'. On the left side of the screenshot, the text 'CHESAPEAKE Helping federal, state, and local governments...' is visible.

CHESAPEAKE
PROGRESS

Abundant Life Clean Water Conserved Lands

WATER QUALITY GOAL >

- 2017 Watershed Implementation Plans (WIPs) Outcome
- 2025 Watershed Implementation Plans (WIPs) Outcome
- Water Quality Standards Attainment and Monitoring Outcome

CHESAPEAKE
Helping federal, state, and local governments...

Other GITs, Goals, and Outcomes

Organization that
can make ***Water
Quality*** change

Proposed
Water Quality Strategy

Phase 6
Watershed
Model/CAST



Compare to goals

Strategy 1

Consideration of your outcome in
water quality organizations'
decisions

Healthy Watersheds

Make water quality implementors
aware of their plans on your
outcome

Nitrogen, Phosphorus, Sediment

Loss of Healthy Watersheds

Land Conservation in Healthy Watersheds

Other GITs, Goals, and Outcomes

Organization that
can make change
for **your outcome**

Strategy 2

Direct use of CAST by
implementors of your goal

Phase 6
Watershed
Model/CAST



Habitat GIT

A local government could look at the
effects of imperviousness or tree canopy
EPA could look at sulfate deposition

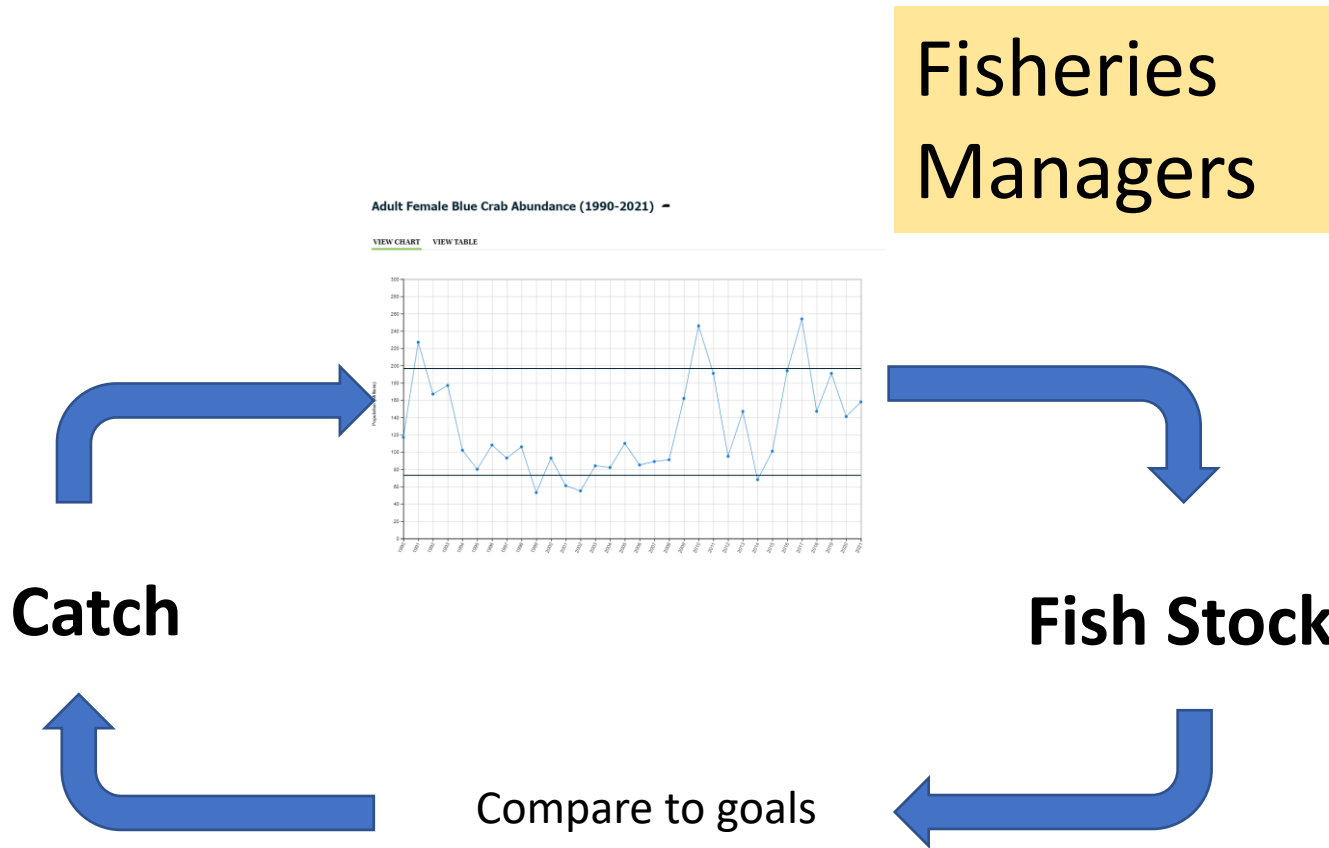
Proposed
Strategy for **your outcome**
Impervious, tree canopy, sulfate deposition

BIBI – stream health

Nitrogen, Phosphorus, Sediment

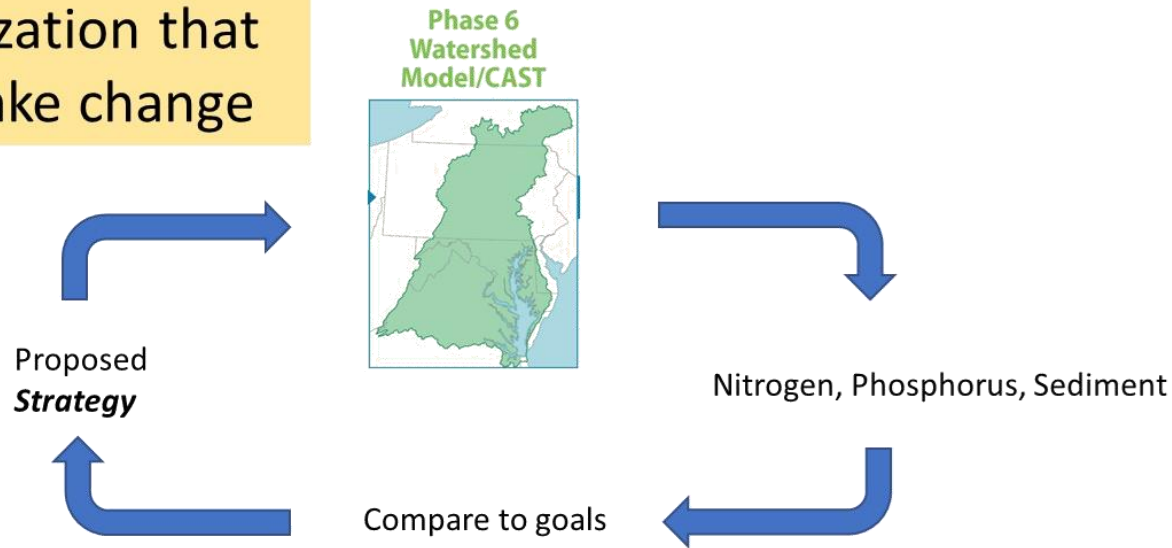
Compare to goals

Other GITs, Goals, and Outcomes



Other GITs, Goals, and Outcomes

Organization that
can make change



Strategy 3

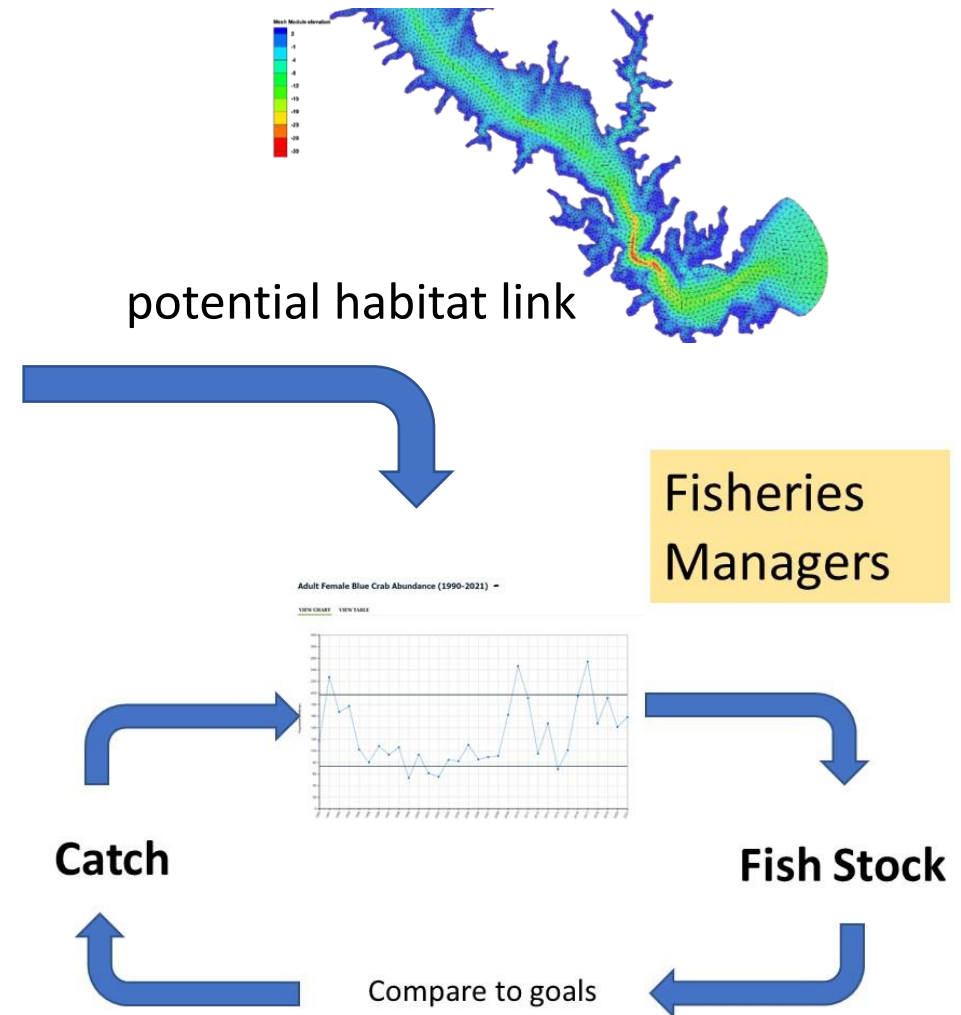
Completely separate model

Fisheries GIT

Long history of model use

CAST not suited for fisheries questions

...but could land management strategies
decrease natural mortality in fish models?





Factor Tracking

Best Management Practices (BMPs)

These graphs are intended to provide a broad representation of change over time using data provided by the seven jurisdictions that have watersheds that drain to the Bay. The jurisdictions include New York, Pennsylvania, West Virginia, Maryland, Delaware, Virginia, and Washington, D.C.

BMPs by Sector

View the amount of best management practices (BMPs) implemented by sector (i.e., Agriculture, Resource, and Urban/Suburban Practices). Select states and a range of years from 1985 through the present. Specify the unit in which the BMPs are measured. You may also choose specific BMPs if desired. In this case, the bar will stack the BMPs rather than the sectors.

BMPs by BMP Groups

View the amount of best management practices (BMPs) implemented by BMP groups. Select states and a range of years from 1985 through the present. Specify the sector and unit in which the BMPs are measured.

BMPs by Sector

BMPs by BMP Group

State (CBWS Only)

Delaware, District of Columbia, M

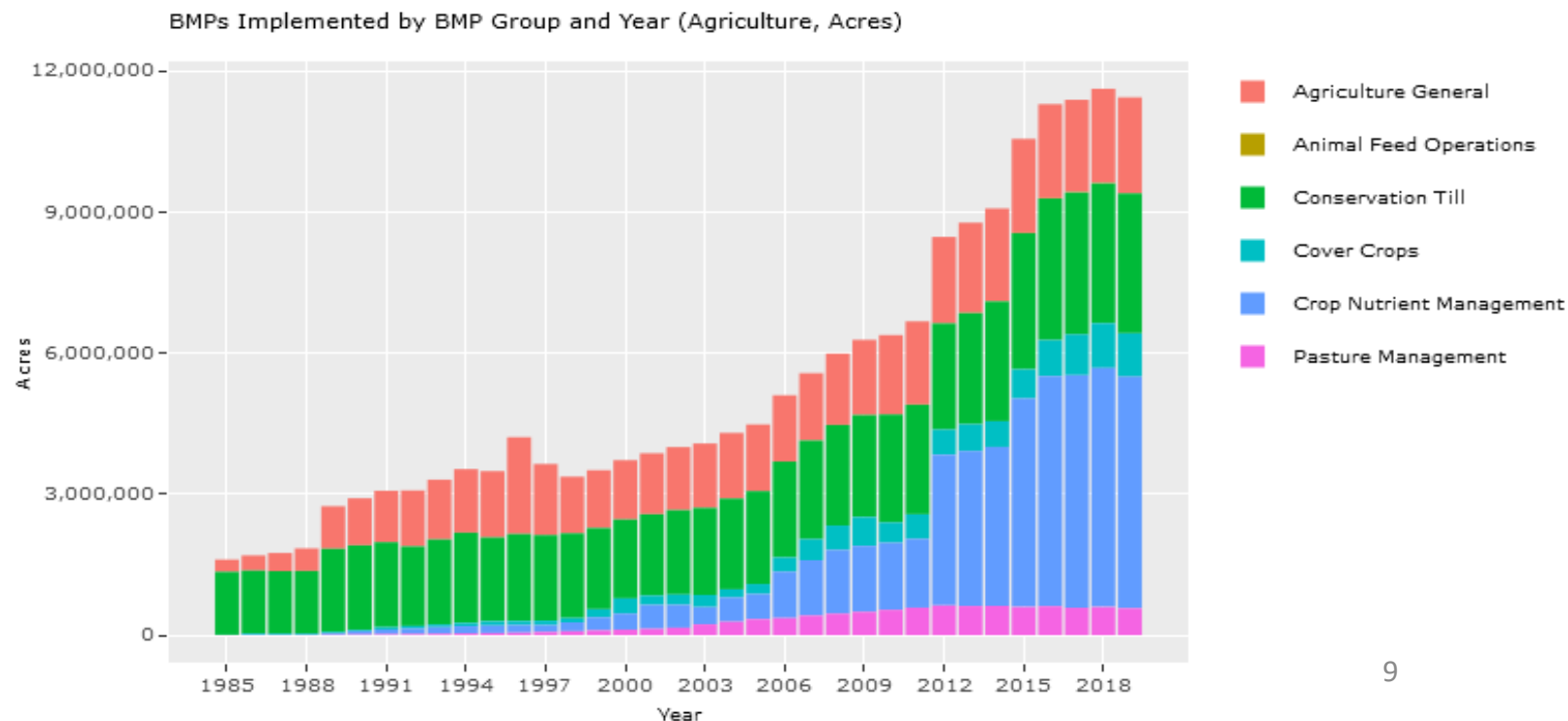
Years

1985 2019

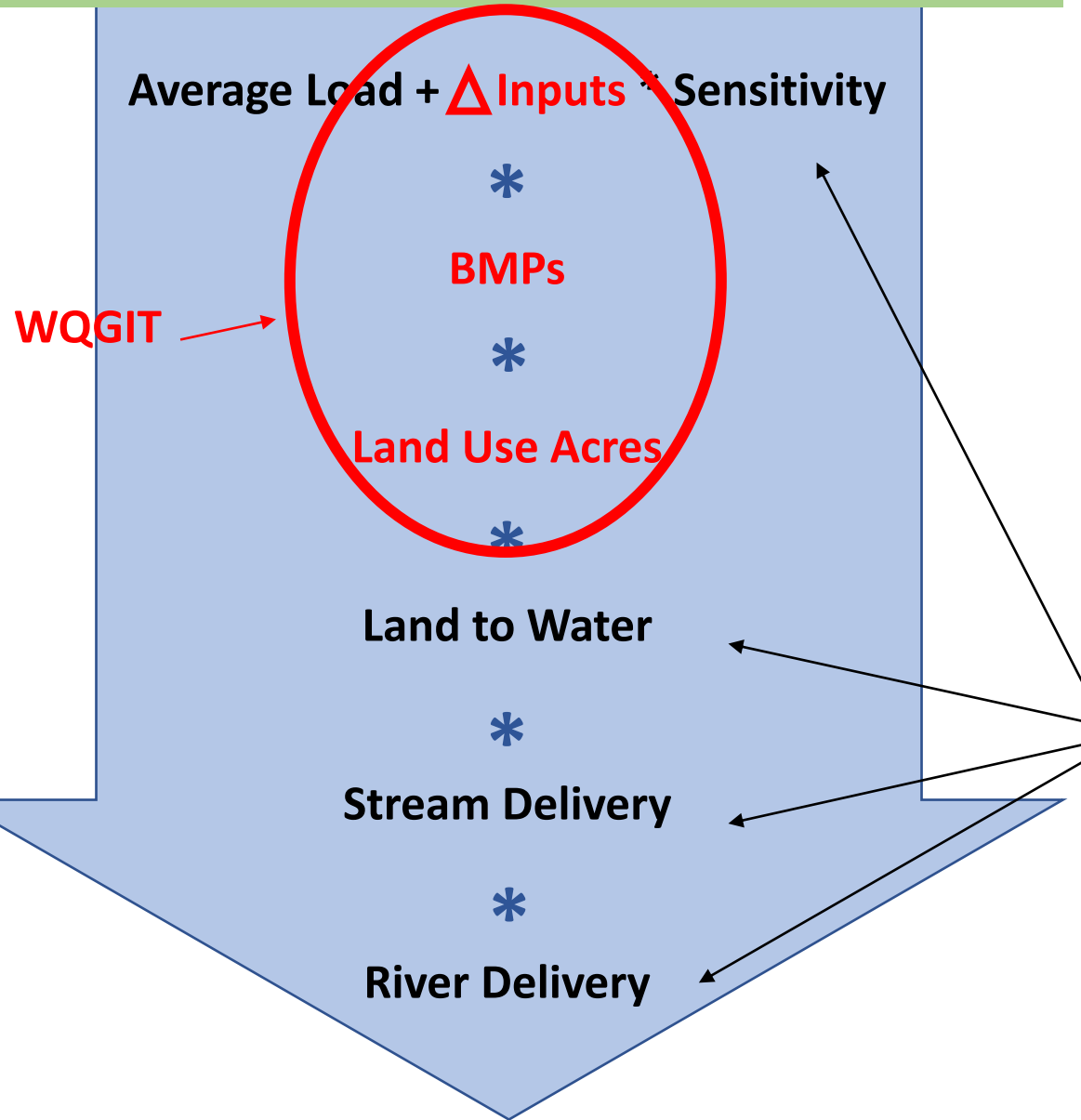
BMP Sector

Agriculture, Acres

Generate the graph



P6/7 CAST Model Structure



Development and maintenance of a decision tool requires extensive participation by the modelers and the stakeholders

CBPO Modelers

Discussion Questions

- Who are your implementors?
 - policy-makers (legislators)
 - program managers (agencies)
 - practice implementers/funders (local governments, planners, and NGOs)
 - Others?
- Would they use a version CAST that spoke to their outcomes?
- Do you want water quality implementors to consider your outcome?
- Do you know the factors affecting your outcome?
- Are the factors already in CAST?