# GREEN BAY
## Ecosystem Modeling

**Restoring the health of Green Bay ecosystem under a changing climate:** Modeling land use, management, and future outcomes

## KEY COMPONENTS

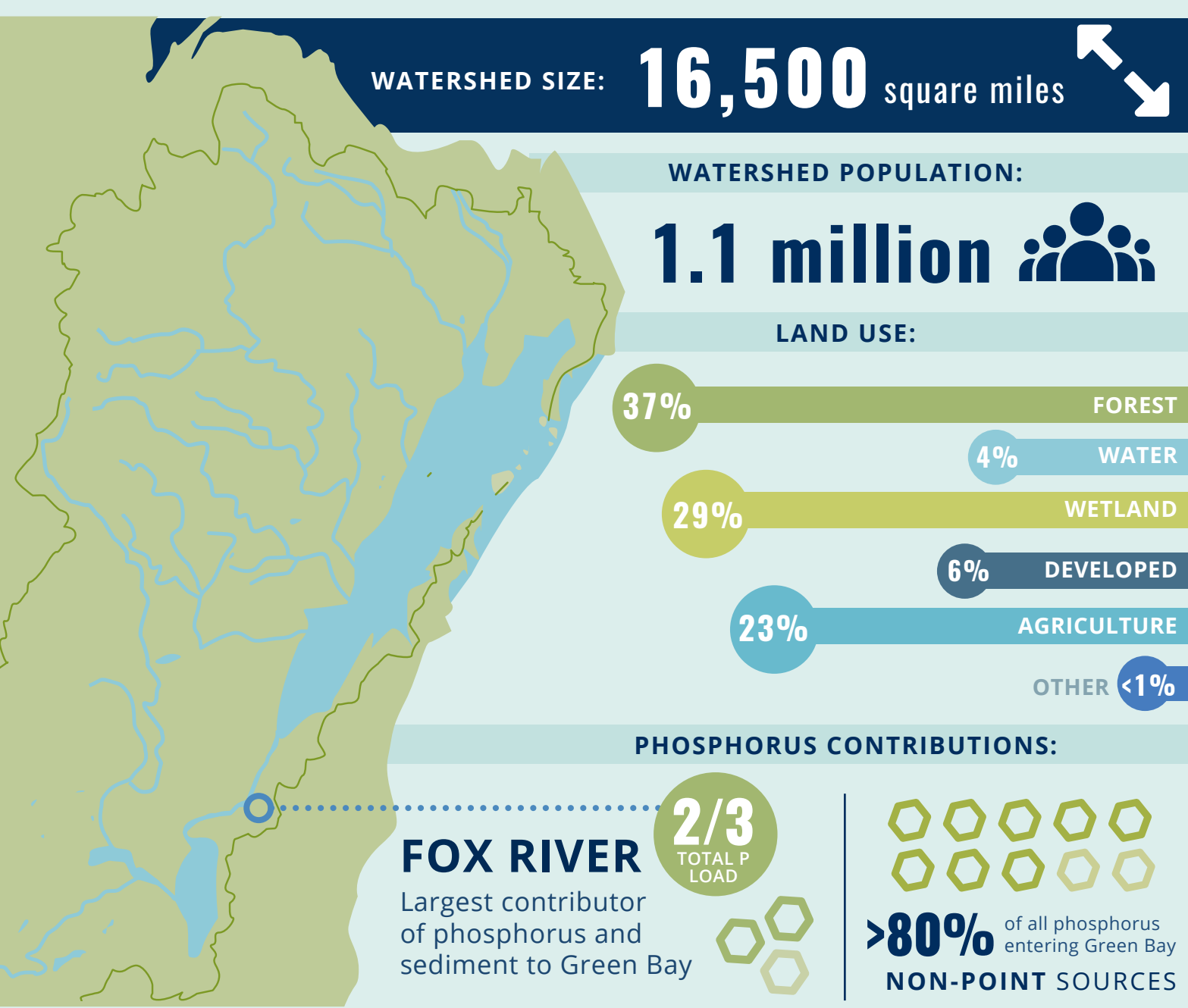CONSERVATION ACTIVITIES ⟩⟩ ⟩⟩ BETTER WATER QUALITY

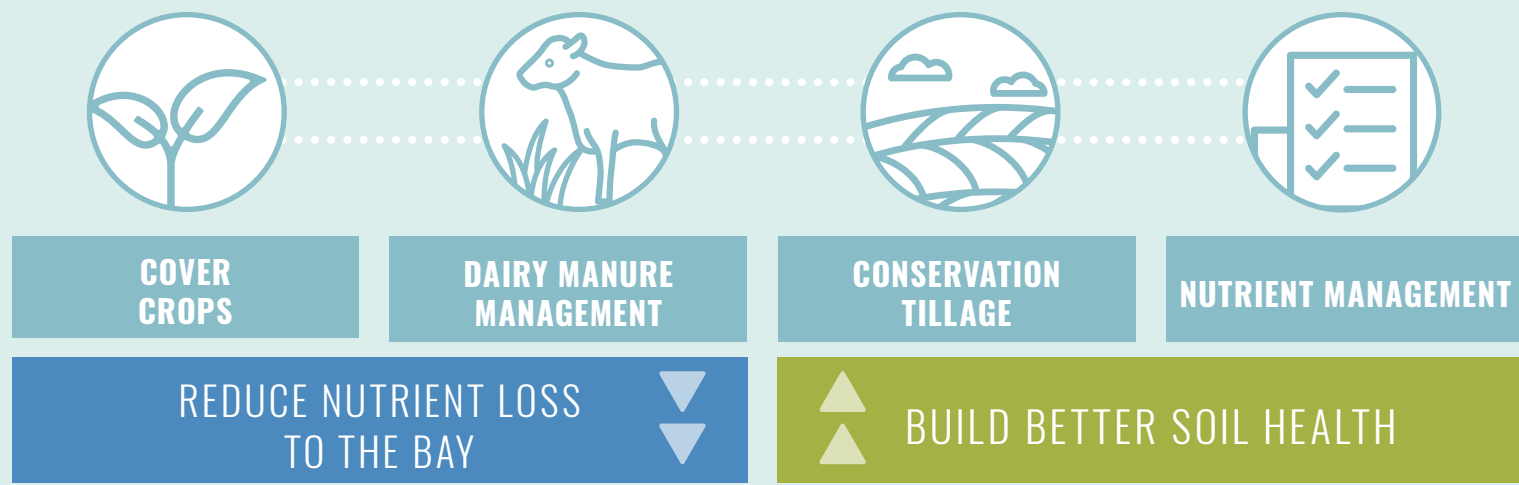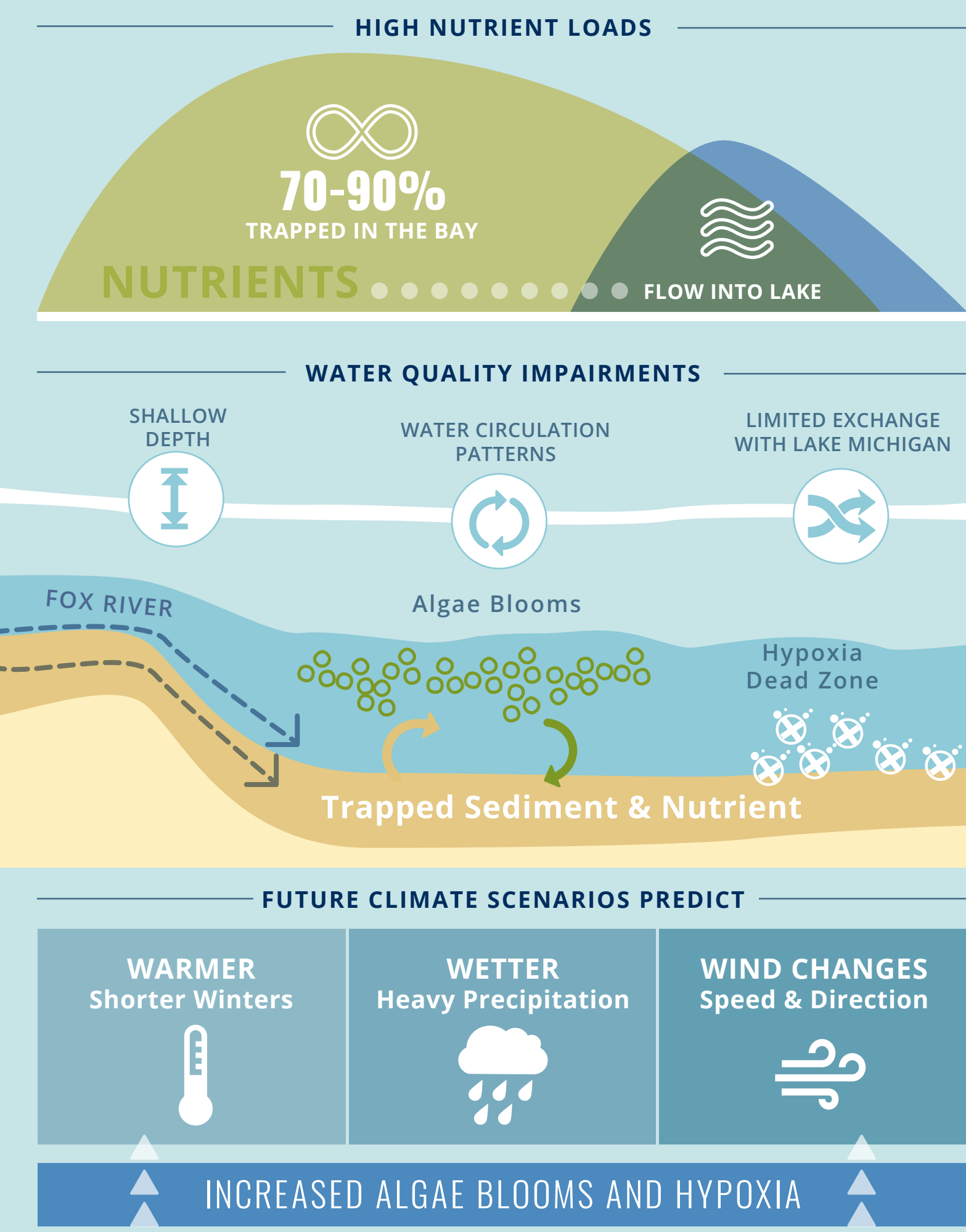| DECREASED SEDIMENT/ NUTRIENT INPUTS | SMALLER ALGAE BLOOMS | HIGHER DO LEVELS | FEWER DAYS OF HYPOXIA |
|---|---|---|---|

## THE WATERSHED

WATERSHED SIZE: **16,500** square miles

WATERSHED POPULATION:
## 1.1 million

### LAND USE:

- **37%** FOREST
- **4%** WATER
- **29%** WETLAND
- **6%** DEVELOPED
- **23%** AGRICULTURE
- OTHER **<1%**

### PHOSPHORUS CONTRIBUTIONS:

**FOX RIVER**
Largest contributor of phosphorus and sediment to Green Bay

**2/3** TOTAL P LOAD

**>80%** of all phosphorus entering Green Bay **NON-POINT** SOURCES

### LAND MANAGEMENT MOVING TOWARDS

COVER CROPS · DAIRY MANURE MANAGEMENT · CONSERVATION TILLAGE · NUTRIENT MANAGEMENT

REDUCE NUTRIENT LOSS TO THE BAY

BUILD BETTER SOIL HEALTH

## THE BAY

### HIGH NUTRIENT LOADS

**70-90%** TRAPPED IN THE BAY

NUTRIENTS ·········· FLOW INTO LAKE

### WATER QUALITY IMPAIRMENTS

SHALLOW DEPTH · WATER CIRCULATION PATTERNS · LIMITED EXCHANGE WITH LAKE MICHIGAN

FOX RIVER

Algae Blooms

Hypoxia Dead Zone

**Trapped Sediment & Nutrient**

### FUTURE CLIMATE SCENARIOS PREDICT

| WARMER Shorter Winters | WETTER Heavy Precipitation | WIND CHANGES Speed & Direction |
|---|---|---|

### INCREASED ALGAE BLOOMS AND HYPOXIA

## ADAPTIVE MANAGEMENT

### MANAGEMENT ANALYSIS TOOL (MAT)

Regional Climate Models

**WATERSHED MODELING** · **HYDRODYNAMIC MODELING** · **BIOGEOCHEMICAL MODELING**

CONTINUE MONITORING

Inform and evaluate land management decisions under current – and future – conditions

INCORPORATE NEW DATA
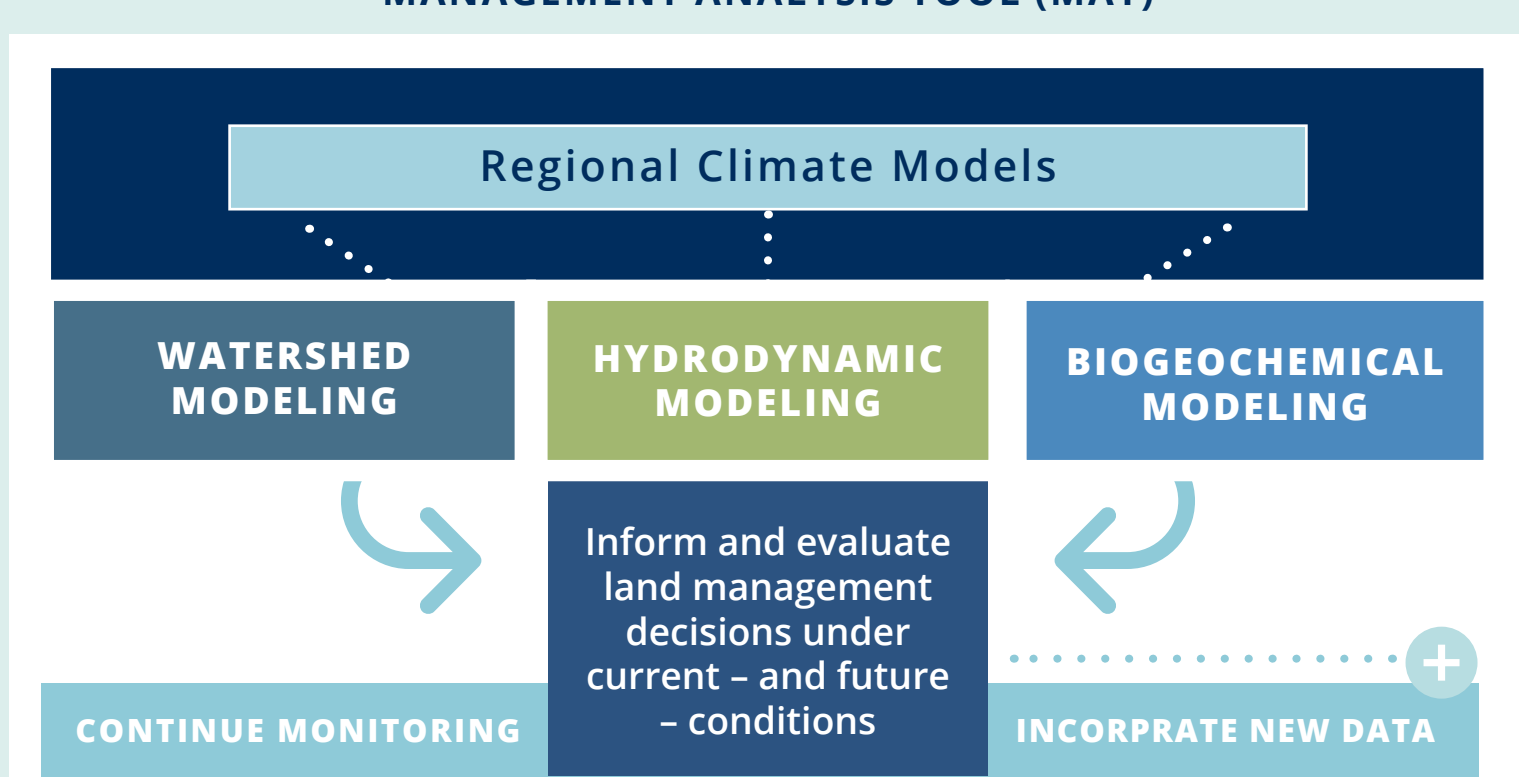
### MAT CAPABILITIES

Will investments in better land management be effective to restore Green Bay under a changing climate?

| | | | | |
|---|---|---|---|---|
| **MEASURE** | How Green Bay might respond | IF WE | Keep nutrients and sediments on farm fields and out of waterways. |
| **DEMONSTRATE** | Where in the watershed placement of these practices might be most effective | SO WE CAN | Quantify how much implementation is needed. |
| **EXPLORE** | Potential impacts of climate change on Green Bay | WHEN WE | Run models with projected future values for daily temperature and precipitation. |
| **INCORPORATE** | New monitoring data to illustrate progress toward Green Bay water quality goals | SO WE CAN | Improve models and adapt management activities. |

TO LEARN MORE ABOUT OUR WORK IN GREEN BAY, VISIT US AT **http://fyi.uwex.edu/gbem/**