

# Chesapeake Hypoxia Analysis & Modeling Program (CHAMP):

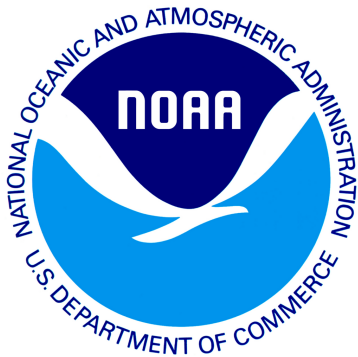
Predicting impacts of climate change on the success of management actions in reducing Chesapeake Bay hypoxia.

## CHAMP PIs:

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## CHAMP MTAG:

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# CHAMP goals

## Develop a Chesapeake Bay scenario-forecast modeling system to:

- Isolate future impacts on Chesapeake hypoxia of climate change from those due to anthropogenic nutrient inputs
- Determine whether the WIPs/TMDLs will successfully reduce hypoxia (and meet WQS) under future climate conditions

# CHAMP models

## Use multiple models in Chesapeake scenario-forecast modeling system:

- Multiple climate scenarios (**PSU: Najjar/Herrmann**)  
Downscaling (MACA vs. BCSD; 20+ GCMs)  
Emission scenario (RCP 4.5 vs. 8.5)
- Three watershed models:
  - CBP WSMp6 (**CBP: Shenk/Bhatt**)
  - DLEM (**Auburn: Tian/Yao**)
  - Sparrow (**USGS: Ator**)
- Two estuarine models:
  - CBP WQSTM (**CBP: Linker/Tian**)
  - ChesROMS-ECB (**VIMS: Friedrichs/St-Laurent/Hinson**)
- Oyster population model (**ODU: Hofmann**)  
To examine impact of hypoxia on living resources

} Up to six model combinations

# CHAMP simulations

## Four types of watershed+estuarine simulations:

- Realistic hindcasts (1985-2014; 1991-2000)
- Future simulations (2021-2030; 2046-2055)
- Factorial future simulations
  - climate change vs. land use/population change
- Decision support: alternative management scenarios

## Forcing fields for Future Simulations:

For an “apples to apples comparison” all model combinations must use same future forcing fields:

- Temperature, Precipitation, Winds, Humidity (**Najjar**)
- Future Atmospheric Deposition (**Bash**)
- Population/Land use Change (**Claggett**)

# CHAMP Overview

- ✧ Opportunity for academic research to impact management decisions
  - ✧ Opportunity for MTAG to suggest management-oriented (hypoxia focused) research questions that need addressing
- STAC climate change workshop (September 2018)
- Short-term recommendation: Sea Level Rise
  - Medium-term recommendation: Retrospective estuarine model comparison (1985-2014)