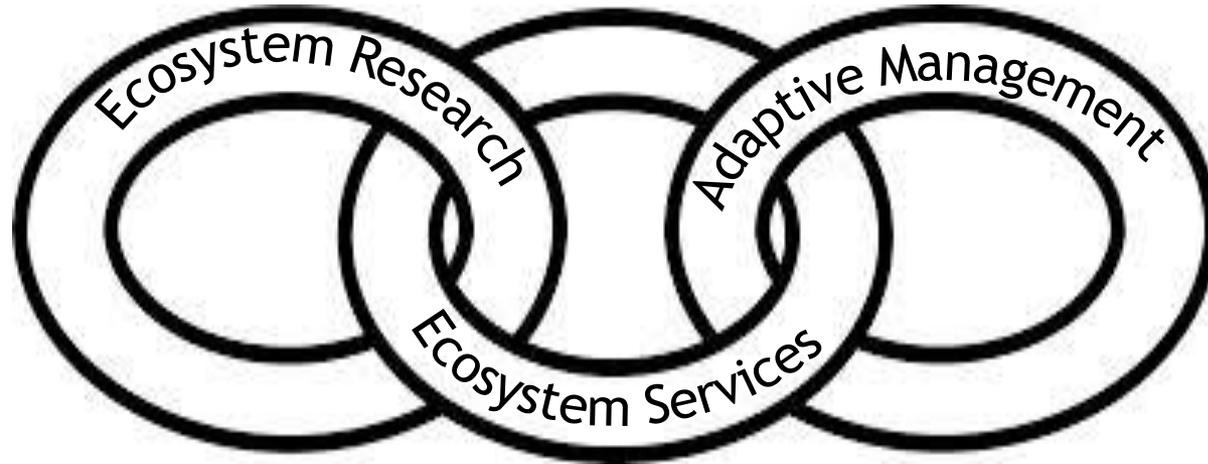


# Linking Ecosystem Research, Services, and Management



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# NOAA Ecosystem Research Strategy



Improve understanding of **ecosystem processes and dynamics** that support and sustain **ecosystem services** that are key to meeting NOAA's mandates and mission



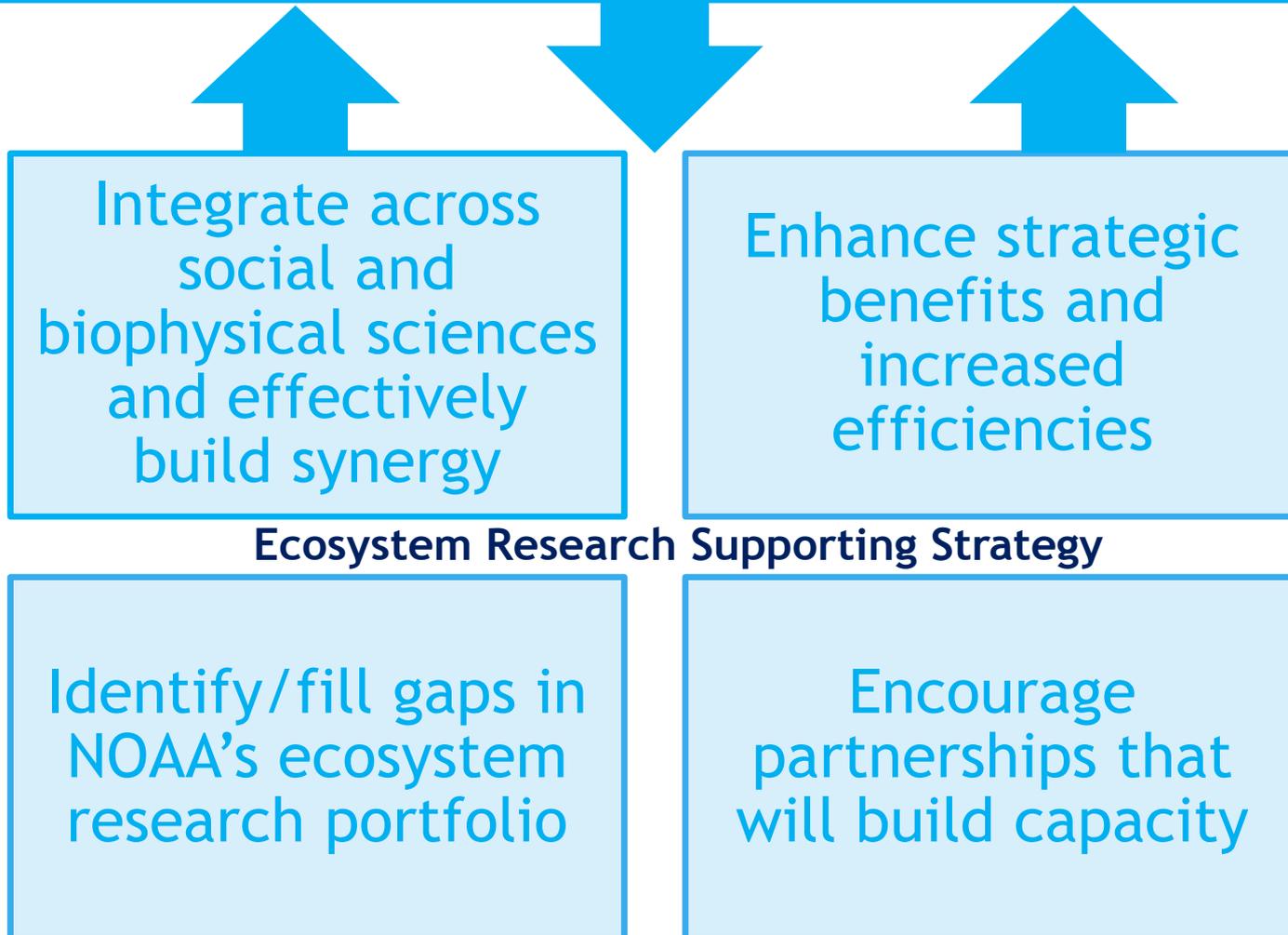
# Ecosystem Research Framework

Determine the **priority research topics** and questions that are relevant to NOAA's mission and can provide a multi-scale understanding of:

- a) How the ecosystem functions;
- b) Human and natural activities that affect ecosystem functioning;
- c) "Production" of ecosystem services and the linkages between them;
- d) The links between how an ecosystem functions, human and natural activities, and
- e) The effects of management strategies on ecosystem services and the trade-offs associated with supporting specific services.

# Workshop Goal

Strengthening communication and coordination between physical, biological, and socioeconomic modelers of Gulf of Mexico hypoxia and Mississippi River diversions, and the users and stakeholders





# “Production” of ecosystem services and the linkages between them

- **Key Questions**

1. What are the direct and/or indirect impacts of hypoxia on a particular species, and what resulting consequential ES emerge because of these impacts?
2. How can these ES be further enhanced?
3. Define quantifiable ecosystem-related and/or fisheries metrics and goals to evaluate success (non-monetary values).

- **Gaps**

1. Current and future impacts of hypoxia on species are not yet clearly understood.
2. Data: hypoxia monitoring system is lacking sustained funding.



# Links between how an ecosystem functions and human/natural activities

- **Key Questions**

1. What are the impacts of doing nothing (i.e. no change in current state of nutrient loading) on humans? What are the impacts on humans under different scenarios?
2. What are the economic effects of hypoxia (eg. price increase on large shrimp)? What are the economic effects of diversion?

- **Gaps**

1. Need for reduced load scenarios.
2. Consider indirect impacts.
3. Need to focus on smaller timescales (monthly, seasonally, annually) and varying spatial scales.



# Effects of management strategies on ecosystem services and trade-offs

- **Key Questions**

1. What are the tradeoffs under varying diversions and hypoxia management scenarios to functional groups?
2. Evaluate alternative operations and mitigation strategies (before and after project implementation).

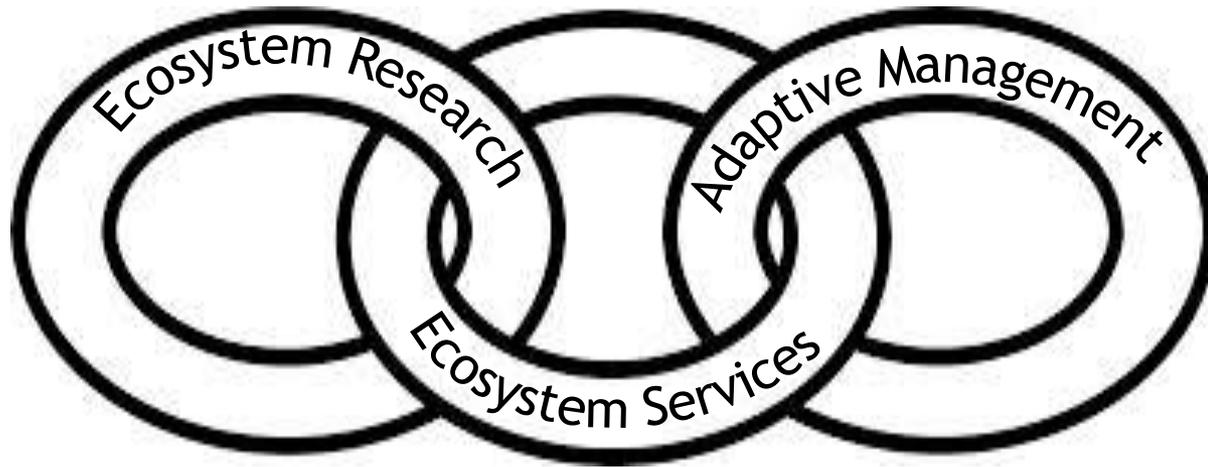
- **Gaps**

1. Need for improved communication of uncertainty (external).
2. Need for improved communication within the research community (internal).
3. Tools for understanding tradeoffs are needed.



# Summary

Facilitating connections and strengthening linkages to advance modeling and measurements of **biophysical and human elements** to improve our understanding of **ecosystem processes and dynamics** that support and sustain **ecosystem services** that are key to meeting NOAA's mandates and mission



**NOAA Ecosystem Research Committee**