The GEMS Project

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The GEMS Project

Gulf of Mexico **E**cosystem Services Logic **M**odels & **S**ocio-economic Indicators

Linking project impacts to economic, health, and wellbeing benefits for people

TEXAS A&M UNIVERSITY CORPUS CHRISTI | HARTE RESEARCH INSTITUTE FOR GULF OF MEXICO STUDIES

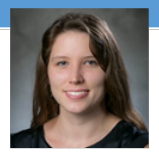
Duke NICHOLAS INSTITUTE
National Ecosystem Services PARTNERSHIP

The Nature Conservancy

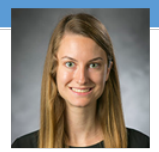
BRIDGECOLLABORATIVE

Project team

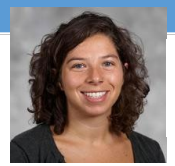
Lydia Olander - Duke University, Nicholas Institute for Environmental Policy Solutions; National Ecosystem Services Partnership



Sara Mason



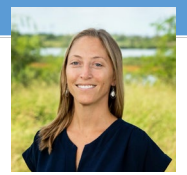
Katie Warnell



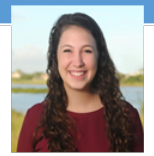
Rachel Karasik

David Yoskowitz - Harte Research Institute for Gulf of Mexico Studies – Texas A&M University Corpus Christi

Katya Wowk



Christine Hale



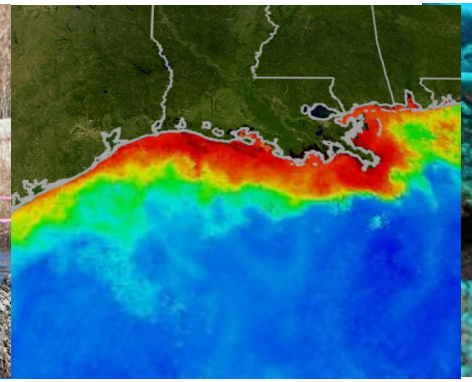
Kara Coffey

Christine Shepard and Heather Tallis - The Nature Conservancy

Challenge we want to address

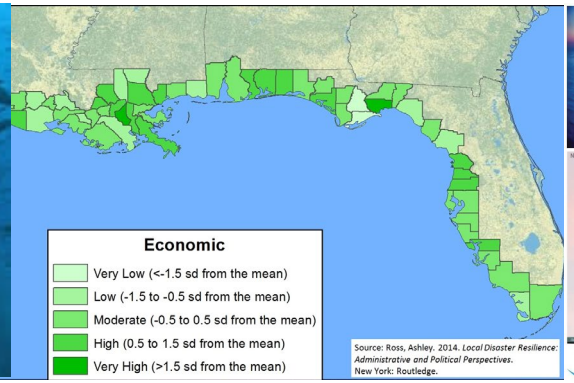
Billions of dollars will be spent on restoration of Gulf ecosystems, but there is no shared platform to guide assessment and reporting of restoration progress and effectiveness for the broad set of environmental, social, and economic goals shared by the many institutions working in the Gulf.

HABITAT RESTORATION



WATER QUALITY IMPROVEMENT

MARINE RESOURCE PROTECTION



COMMUNITY RESILIENCE

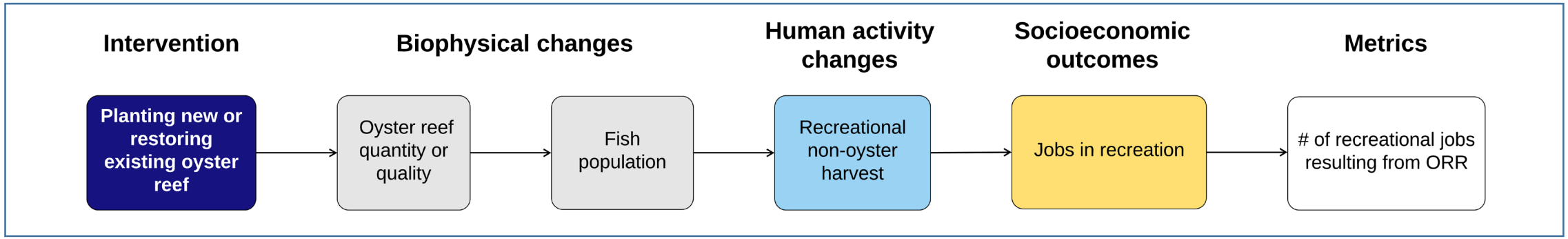
ECONOMIC REVITALIZATION

Goals

1. Help streamline and simplify application and reporting processes that encompass social and economic goals (community resilience & economic revitalization)
2. Simplify and improve reporting of project progress toward these goals
3. Create resources for project developers and funders to incorporate social and economic outcomes and metrics

Approach

Develop a set of **evidence-based common logic models** that follow through to social and economic outcomes, and a tractable set of **socio-economic metrics** that are relevant across projects, programs, and locations that can facilitate effective project planning, evaluation, and comparison.



This will allow funders and project planners/mangers to:

1. Compare restoration approaches across a broader suite of shared goals
2. Identify uncertainties and gaps in knowledge about social and economic outcomes
3. Track performance toward social and economic goals

Phase 1: Oyster reef restoration

Oyster Reef Restoration techniques

Cultch plant to create a structurally simple, subtidal, **intensively harvested reef**

Placement of large, durable structures to create a structurally complex, subtidal, **intensively harvested reef**

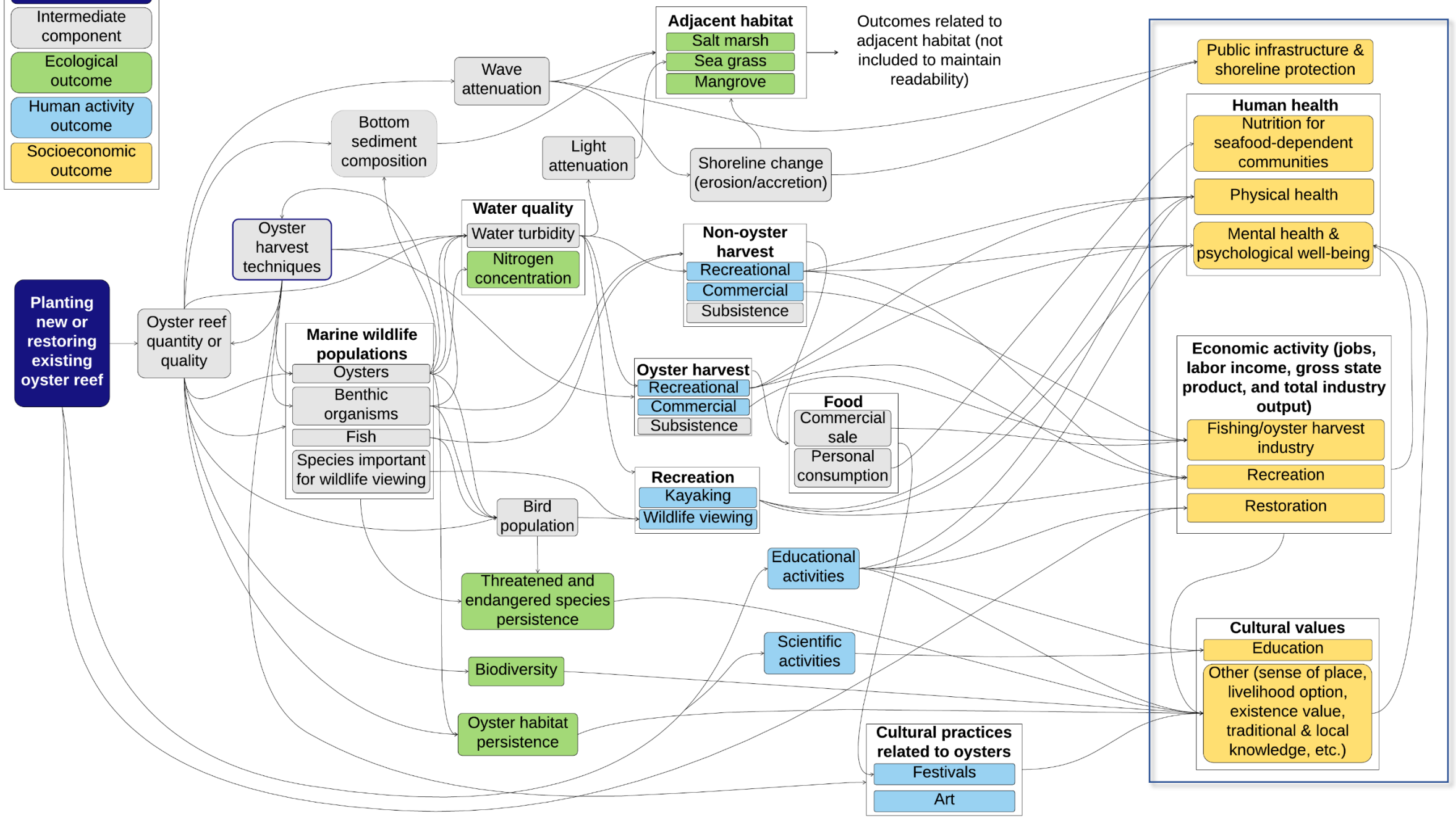
Placement of large, durable structures to create a structurally complex, subtidal, **<u>not</u> intensively harvested reef**

Placement of large, durable structures to create a structurally complex, intertidal, **<u>not</u> intensively harvested reef**

Protection or enhancement of existing reef

Oyster aquaculture

Ecosystem Service Logic Model (ESLM) for Oyster Reef Restoration
General model



Local workshop participants

- Oyster restoration experts
- Restoration practitioners
- Recreational fishermen
- Coastal managers
- Fisheries biologists
- Tourism
- Community members
- Extension agents
- Economic development
- Environmental justice
- Environmental health

Charlotte Harbor, FL

Back Bay of Biloxi, MS

Mobile Bay, AL

Galveston Bay, TX

Chandeleur- Breton Sounds, LA

Evidence library

What:

- Summary of the available evidence for all the pathways from ORR to outcomes
- Assess the **strength of evidence** for each pathway, what **other factors** can influence the relationship between ORR and outcomes, and how **predictable** the relationships are.

Why:

- Confirm that selected outcomes are tightly tied to ORR
- Identify which pathways are the most important in generating these outcomes
- Highlight key gaps in our understanding of the outcomes from ORR in the Gulf of Mexico – to guide research and monitoring (Goal 2)

Other perspectives

Targeted outreach calls to groups we weren’t able to reach at the local workshops to discuss ORR outcomes and who is affected.

- Commercial fishing
- Recreational fishing
- Development, tourism, restoration workforce, local business
- Local government
- Tribal representatives and outreach organizations
- Community resilience organizations
- Academic experts on health, economics, sociology, and environmental justice

Steps for metric selection

1. Identify relevant metrics through workshop engagements and literature review
2. Assess metrics that meet key **criteria** (SMARTs)
3. Evaluate the **feasibility** of implementing metrics
4. **Rank / prioritize** metrics

1 Key resources for literature review

1) The Ocean Conservancy's Charting the Gulf report (a compilation of nearly 700 past and existing long-term monitoring efforts in the Gulf)
2) The Restore Science project "Inventory of the Gulf of Mexico Ecosystem Indicators Using an Ecological Resilience Framework" (Goodin et al. 2017)
3) Monitoring Well-being and Changing Environmental Conditions in Coastal Communities (Dillard et al. 2013)
4) RESTORE Council Monitoring and Assessment Program's Review of existing monitoring efforts in the Gulf of Mexico
5) GOMRI project to identify health metrics (lead by Paul Sandifer and Bert Singer)
6) Report prepared for NFWF titled 'Developing Socio-economic metrics to measure DOI Hurricane Sandy Project and Program Outcomes' (Abt Associates 2015)
7) Coast Wide and Basin Wide Monitoring Plans for Louisiana's System Wide Assessment and Monitoring Program Version III (Hijuelos and Hemmerling 2016)
8) Effective Monitoring to Evaluate Ecological Restoration in the Gulf of Mexico (2017)
9) Approaches for Ecosystem Service Valuation for the Gulf of Mexico After the Deep Water Horizon Oil Spill Interim Report (NRC 2012)
10) NOAA Technical Memorandum on Socioeconomic Benefits of Habitat Restoration (2017)

Metrics matrix

	Tier 1 – important to measure and feasible; required	Tier 2 – Nice to have, but harder to measure; not required
Project scale	easy	More difficult
County or regional scale		

Socioeconomic outcomes

- Jobs
- Economic Activity
- Human Health
- Cultural Values
- Resilience
- Public Infrastructure Protection

	Tier 1 – important to measure and feasible; required	Tier 2 – Nice to have, but harder to measure; not required
Project scale	Aquaculture Jobs (FTE/2yr) Restoration Jobs (FTE/2yr)	Recreational fishing jobs supported (# guides visiting restoration sites/yr)
County or regional scale	Commercial Fishing Jobs (modeled #/yr) Commercial Oyster Harvest Jobs (modeled #/yr)	*Recreational fishing jobs (modeled #/yr)*

Socioeconomic outcomes

Jobs

	Tier 1 – important to measure and feasible; required	Tier 2 – Nice to have, but harder to measure; not required
Project scale	Restoration $ added to economy (expenditures/2yr)	Recreational fishing $ added to economy due to ORR (# recreational fishing trips * avg expenditure/yr)
County or regional scale	Commercial oyster and oyster related fish $ entering economy Restoration related $ entering economy	*Recreational related fishing $ entering economy*

Socioeconomic outcomes

Economic Activity

	Tier 1 – important to measure and feasible; required	Tier 2 – Nice to have, but harder to measure; not required
Project scale	Miles of public infrastructure with reduced erosion from ORR (identified by project or based on change in erosion rate relative to pre-project rate each yr)	
County or regional scale		

Socioeconomic outcomes

Public Infrastructure Protection

Metrics gaps

Health, Cultural Values, and Resilience metrics are more difficult.

Health – Exploring national surveys and potential to link to under development Gulf-wide health survey and metrics

Cultural – locally determined during project planning and integrated into monitoring.

Resilience – Thinking about social cohesion, income diversity, etc… difficult to link to restoration actions. Things like infrastructure and property damage maybe be more important for restoration that affects flooding

Phase 2: more restoration approaches

Restoration Approaches for Phase 2

Habitat restoration (significant overlap with ORR)	• Beach restoration • Mangrove restoration • Salt marsh restoration • Seagrass restoration • Living shoreline creation
Recreation enhancement	• Boat ramps (building and restoring) • Fishing pier installation • Trails and boardwalks (building and restoring)
Water quality enhancement	• Storm water management infrastructure installation ○ Gray and green • Septic to sewer conversion • Wastewater treatment plant upgrades

Example additional metric categories for phase 2

Category	Possible phase 2 metrics
Jobs	Jobs in tourism and recreation
Economic activity	Tourism revenue (related to beach recreation) Avoided loss of revenue due to reduced HABs (from fishery closures, beach closures, fish kills)
Human health	Avoided healthcare costs from: • Algal toxin-related illnesses (respiratory and skin effects, seafood poisoning) • Water-borne pathogens
Coastal protection	Avoided damage from flooding Amount of private property with reduced erosion due to restoration
Cost changes	Drinking water treatment costs (through wastewater treatment reducing saltwater intrusion)
Miscellaneous	Value of coastal carbon sequestration Access to recreational opportunities Property value (related to proximity to desirable resources and/or flood risk) (e.g.,beach restoration)

Products

- Restoration practitioner guides
- Funder guide

Products – Restoration project developer users' guide

Oyster reef restoration (under development)

Additional restoration approaches (by end of 2020)

- Resource/tool with general evidence backed logic models (theories of change) that can be adapted by project developers to build a model specific to their project to include in proposals
  - Shows strongly linked and significant social and economic impacts of their proposed projects.
  - Helps them identify what social and economic outcomes they may want to monitor and report upon.
- Matrix of social and economic metrics from which they could select monitoring and reporting suggestions for their proposal.

Products – Restoration funder users' guide

At end of our project (late 2020)

Includes all restoration approaches covered in project.

- Evidence backed logic models (theories of change) that show how different restoration techniques can result in different social and economic outcomes.
  - Can ask project developers to document their project theory of change (tools for doing so will be provided in developers guide).
  - Can help funders rank projects based on the # or diversity of different social and economic outcomes projects provide and the estimated scale of those outcomes
  - Can help funders identify which social and economic outcomes should be included in project monitoring and reporting
- Matrix of social and economic metrics that could be required or suggested by funders for projects that they fund.

Products

- Restoration practitioner guides
- Funder guide
- Online and published project information (accessible now)
  - nicholasinstitute.duke.edu/focal-areas/gems
- Online toolkit to easily access models and metrics (accessible but still under construction)

Online resource

PROJECT

Ecosystem Services Toolkit for Natural Resource Management

https://nicholasinstitute.duke.edu/project/application-of-ecosystem-services-for-natural-resource-management/coastal

Outcomes

1) Funders (RESTORE, NFWF, States) use new resources to
   - Guide funding calls – better matching socio-economic goals to restoration techniques funded
   - Guide required monitoring – to better capture socio-economic outcomes

2) Restoration practitioner
   - Help tell the story of restoration projects – shows linkage to social and economic outcomes
   - Identify new metrics that can help them capture socio-economic benefits of projects.

Thank you!

Want to learn more?
nicholasinstitute.duke.edu/focal-areas/gems

Or contact us
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