7th Annual NOAA/NGI Hypoxia Research Coordination Workshop – Building the Cooperative Hypoxia Assessment and Monitoring Program (CHAMP)

January 9th and 10th, 2018

Meeting Location
Mississippi State University Science and Technology Center
1021 Balch Blvd
Stennis Space Center, MS 39529

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Hotel Accommodations
Holiday Inn Slidell
372 Voters Road, Slidell, La 70461
Phone 985-639-0890; Fax 985-639-0896
Group Code: Hypoxia 2018 or click **link**

Evening Social
Copeland's of New Orleans
www.copelandsofneworleans.com
1337 Gause Blvd, Slidell, LA 70458
(985) 643-0001

CHAMP Workshop Purpose

The 6th Annual NOAA/NGI Hypoxia Research Coordination Workshop, "Establishing a Cooperative Hypoxic Zone Monitoring Program" and the follow-up workshop proceedings paper led to the establishment of eight workgroups to develop the Cooperative Hypoxia Assessment and Monitoring Program (CHAMP). The workgroups encompass regional, topical, and management focuses that intersect with, and would benefit from a multi-partner, sustainable Gulf of Mexico hypoxia monitoring program. Broken out into the following areas, the workgroups include: Fisheries (1); the states of Louisiana (2), Mississippi/Alabama (3), and Texas (4); Autonomous Vehicles (5); Hypoxia Task Force (6); Oil/Gas and Ocean Acidification (7); and RESTORE Act (8). Detailed descriptions of workgroup goals, actvities, and accomplishments are found at the end of the agenda.

The purpose of the 7th Annual Workshop is to assess progress of these workgroups toward building the CHAMP program, and further advance strategic planning to meet remaining CHAMP programmatic and financial goals and objectives.

Workshop Objectives

1. Revisit original CHAMP requirements and determine the current state of the monitoring program based on progress since the original workshop.

2. Assess the remaining programmatic gaps and determine short- and long-term priorities in filling these based on identified management and stakeholder needs.

3. Identify potential partners and leveraging strategies for sustained operational support for current and future requirements.

4. Determine pathways for socializing the CHAMP program with stakeholders in order to better leverage and extend participation and support across multiple groups.

Inputs

- Revised Tables 2 and 3 (Monitoring Matrix) from the 2016 workshop proceedings paper updating system requirements based on workgroup activities since the last workshop. See pages 13-18 below.

- Workgroup Pages of current and planned activities by the eight workgroups that comprise the current CHAMP program. Starts on page 6 below.

Expected Output

- A workshop report identifying current monitoring components and key actions for obtaining longer-term support and demonstrating importance of new monitoring components. This would take the form of a CHAMP update document to append to the original high-level CHAMP white paper.

- Updated monitoring matrix highlighting key components of the CHAMP program, their management value, and data, infrastructure and funding needs within the context of current and future requirements.

- Initial development of an outreach plan and a suite of outreach documents to promote the importance of the CHAMP program to various stakeholder groups.

AGENDA

Day 1 Tuesday, 9 January 2018	
8:00 a.m. to 9:00 a.m.	**Registration**
9:00 a.m. to 9:15 a.m.	**Opening Remarks** • Welcome – *Steve Ashby (NGI)* (5 min) • Around the Room Introductions - *Everyone* • Workshop Overview – *Alan Lewitus (NOAA)* (10 min)
9:15 a.m. to 9:30 a.m.	**Context for Workshop** – *Alan Lewitus (NOAA)* (15 min)
9:30 a.m. to 10:00 a.m.	**CHAMP Overview** – *Trevor Meckle y (NOAA*) (20 min + 10 min discussion)
10:00 a.m. to 10:40 a.m.	**Workgroup Report Outs** • **Fisheries Monitoring Workgroup –** *Chris Brown (NOAA)* (20 min) • **Louisiana Coastal Monitoring Workgroup –** *Dubravko Justić (LSU)* (20 min)
10:40 a.m. to 11:00 a.m.	**Break**
11:00 a.m. to Noon	**Workgroup Report Outs (continued)** • **States of Mississippi and Alabama Monitoring Workgroup –** *Steve Ashby (NGI)* (20 min) • **State of Texas Monitoring Workgroup –** *Steve DiMarco (TAMU)* (20 min) • **Autonomous Vehicles Monitoring Workgroup –** *Steve DiMarco (TAMU)* (20 min)
Noon to 1:00 p.m.	**Lunch**

1:00 p.m. to 2:00 p.m.	**Workgroup Report Outs (continued)** • **Hypoxia Task Force Monitoring Workgroup –** *Katie Flahive (EPA)* (20 min) • **Oil and Gas/Ocean Acidification Monitoring Workgroup –** *Barb Kirkpatrick (GCOOS)* (20 min) • **RESTORE Act Monitoring Workgroup –** *Steve Giordano (NOAA)* (20 min)
2:00 p.m. to 2:40 p.m.	**Working Session – 1: Data Management** – *Lead by Kirsten Larsen (NCEI), Facilitated by Angela Sallis* (40 min) • Ensure data value is being maximized through availability and usability.
2:40 p.m. to 3:00 p.m.	**Break and Group Photograph**
3:00 p.m. to 4:50 p.m.	**Working Session – 2: Revising the CHAMP Implementation plan** – *Facilitated by Angela Sallis* • Determine the current state of the monitoring program based on requirements met by workgroups – revising matrix for Implementation Plan (Tables 2 and 3 from 2016 workshop report) (55 min) • Assess the remaining programmatic gaps and determine short- and long-term priorities in filling these based on management needs (55 min)
4:50 p.m. to 5:00 p.m.	**Preview of Day 2**
6:00 p.m. to 7:30 p.m.	**Evening Social at Copeland's of New Orleans, Slidell, LA** Copeland's of New Orleans www.copelandsofneworleans.com 1337 Gause Blvd, Slidell, LA 70458 (985) 643-0001

Day 2 Wednesday, 10 January 2018	
9:00 a.m. to 9:15 a.m.	**Review of Day 1**
9:15 a.m. to 10:15 a.m.	**Working Session – 3: Identifying mechanisms and partners for sustaining monitoring requirements**– *Lead by Alan Lewitus if needed, Facilitated by Angela Sallis* (60 min) • Identify potential partners and leveraging strategies for sustained support for current and future requirements (60 min)
10:15 a.m. to 10:30 a.m.	**Break**
10:30 a.m. to 11:30 a.m.	**Working Session – 4: Ways to socialize the CHAMP effort *with potential funders***– *Lead by Alan Lewitus and David Scheurer (NOAA), Facilitated by Angela Sallis* • 2 Page CHAMP Primer • Publication to socialize program
11:30 a.m. to 11:45 a.m.	**Closeout of main meeting** –*Steve Ashby (NGI)* • Review Action Items and next steps for implementation.
noon to 1:00 p.m.	**Steering Committee Lunch – local cafeteria**
1:00 p.m. to 2:30 p.m.	**Steering Committee discussion of next steps**

Participant List (19 in person)

1. Becky Allee (NOAA NOS/OCM)
2. Steve Ashby (NGI)
3. Chris Brown (NOAA NESDIS)
4. Kevin Craig (NOAA NMFS) – *May Remotely attend*
5. Steve DiMarco (TAMU)
6. Brian Dzwonkowski (DISL)
7. Katie Flahive (EPA Water) – *Remotely attending*
8. Angelina Freeman (LA CPRA) – *Can not attend*
9. Steve Giordano (NOAA NMFS)
10. Stephan Howden (USM)
11. Jonathan Jackson (NGI)
12. Lauren Jackson (NGI)
13. Dubravko Justic (LSU)
14. Barb Kirpatrick (GCOOS)
15. Kirsten Larsen (NOAA NCEI)
16. Alan Lewitus (NOAA NCCOS)
17. Kathy Martinolich (NGI)
18. Trevor Meckley (NOAA NCCOS)
19. Nancy Rabalais (LSU/LUMCON)
20. Angela Sallis (NCEI)
21. David Scheurer (NOAA NCCOS)
22. Danny Wiegand (EPA Gulf Program)

Workgroup Updates

Fisheries Monitoring Workgroup

Leads – Kevin Craig (NOAA/SEFSC), Christopher Brown (NOAA/NESDIS)
Members – Doug Daigle (Lower Mississippi River Sub-basin Committee, HTF), Chris Gledhill (NOAA/NMFS), Rick Hart (NOAA/NMFS), Dubravko Justic (LSU), Kirsten Larsen (NOAA/NCEI), John Lehrter (DISL), Julie Anderson Lively (LSU), Shannon Martin (NOAA/NMFS), Jeff Rester (Gulf States Marine Fisheries Commission), David Hilmer (NOAA/NOS), Trevor Meckley (NOAA/NOS), Dave Hilmer (NOAA/NOS)

Workgroup Purpose: The Fisheries Monitoring Workgroup has two goals that together aim to broaden understanding of the effects of hypoxia on key fisheries, for the purpose of quantifiably predicting hypoxia impacts and managing fisheries accordingly.

The goals are to:

- integrate fisheries surveys into the Cooperative Hypoxia Monitoring Program by leveraging and expanding upon current monitoring activities and compiling available data;
- serve as a management advisory group (Management Committee) for two Northern Gulf of Mexico Ecosystems and Hypoxia Assessment Program (NGOMEX) projects, to help ensure the effectiveness of project tools and outputs towards fisheries management applications.

Successes – Several fisheries surveys IDed for integration into CHAMP.

Current Activities

- Identified all federal fisheries surveys that include DO and include in a report to the Cooperative Hypoxia Monitoring Program.
    - Chris Gledhill sent the FMW a May 2017 summary compilation report, *NOAA Fisheries Independent Surveys on NOAA Ships*, that was prepared for the SEFSC Survey Assessment Workshop on 20-23 June 2017. In addition to the SEAMAP Groundfish Survey (p. 15), that is already an operational component of the Cooperative Hypoxia Monitoring Program, the following surveys collect DO and can be integrated as part of the Program:
    - SEFSC Shark/Snapper/Grouper Bottom Longline (p. 4)
    - SEAMAP Ichthyoplankton Survey for the fall (p. 7), spring (p. 9), and winter (p. 11)
    - Pelagic Acoustic Survey (p. 21)
    - U.S. Gulf of Mexico Marine Mammal and Seabird Assessment for the summer (p. 31) and winter (p. 33)
    - U.S. Atlantic Marine Mammal and Seabird Assessment for the summer (p. 35) and winter (p. 37)
- Identifying state fisheries surveys whose outputs could be integrated into Hypoxia Monitoring Program; include focus on LA state fisheries monitoring program
    - Kirsten Larsen sent a link to Hypoxia Watch that includes a summary of the LDWF nearshore monitoring component of the SEAMAP Groundfish Survey, and DO data and maps from their surveys in 2013 and 2015.

- Exploring the possibility of adding DO to key fisheries surveys – assess what it would take and who to contact
- Meet with SEDAR or other fisheries data or assessment workshops targeting menhaden, red snapper, or brown shrimp.

State of Louisiana Coastal Monitoring Workgroup

Leads – Angelina Freeman (LA CPRA), Dubravko Justić (LSU)
Members – Amanda Vincent (LDEQ), Ehab Meselhe (TWIG), Robert Twilley (LA SG), Barb Kleiss (USACE), Kevin Craig (NOAA NMFS), Greg Steyer (USGS), Rex Caffey (LA SG), Nancy Rabalais (LSU/LUMCON), Brad Spicer (LDAF),
Mark Schnexnayder (LDWF)

Workgroup Purpose: Develop a cooperative and sustainable nutrient monitoring program in Louisiana state coastal waters to complement Gulf-wide nutrient monitoring efforts.

The goals are to:

- Determine data needs/gaps for hypoxia monitoring in Louisiana coastal waters;
- Develop proposals to address data needs/gaps that leverage existing data collection efforts and complement monitoring efforts in other Gulf states
    - Identify requirements for a monitoring transect extending from nearshore to the core of the hypoxic zone that captures nutrient transformations, water quality changes, and resulting hypoxia dynamics to assess the effects of river diversions on nutrient delivery to the Gulf and dynamics of hypoxia;
- Identify and secure funding for implementation of identified needs
    - Identify mechanisms and opportunities to support the monitoring transect

Successes

- Identified a critical data need for nutrient monitoring in state waters
- Developed a proposal to address the urgent need to establish a monitoring transect extending from Barataria Pass to the inner shelf
    - Necessary to establish baseline conditions and monitor far-field effects of proposed diversions
- Awarded a $50K Gulf of Mexico Alliance Grant that funds a portion of the monitoring transect

Current Activities

- Working to fund the full transect monitoring proposal ($300K yr/15 years)
- Submitted a project idea *Water Quality Offshore Monitoring Transect* to the Natural Resource Damage Assessment Open Ocean call for project ideas (5/15/2017, LCMW subgroup)
- Identifying potential funding sources and developing a plan secure funding for the full transect monitoring proposal

States of Mississippi and Alabama Workgroup

Leads – Steve Ashby (NGI), Stephan Howden (USM), Brian Dzwonkowski (DISL)
Members – Renee Collini (DISL), Mark Ornelas (AL DEM), Hunter King (DISL), Scott Milroy (USM), Angelina Freeman (LA CPRA), Lael Butler (EPA Gulf Program), Rick Raynie (LA CPRA), Doug Upton (MISS DEQ), John Lopez (Lake Pontchartrain Basin Foundation), Doug Daigle (LMRSBC), Joie Horn (AL DEM), Kim Caviness-Reardon (MSDEQ), Clark Gerken (AL DEM), Troy Pierce (EPA Gulf Program), Trevor Meckley (NOAA), Alan Lewitus (NOAA)

Workgroup Purpose: To identify monitoring that the states of Mississippi and Alabama are doing now and how it can be improved upon, expanded, or otherwise leveraged to support federal and nearby state monitoring for hypoxia and other stressors.

The goals are to:

- Compile coastal monitoring efforts for MS and AL and identify mechanisms to fill gaps in DO and pH monitoring capabilities;
- Coordinate MS/AL monitoring activities and identify opportunities to transition these to a sustainable cooperative monitoring program.
- Attain additional funding to aggregate existing datasets and determine historical temporal and spatial extent of hypoxia in the Mississippi Bight.
- Provide easy access to visualizations of hypoxia conditions in the MS Bight for researchers and decision makers.

Successes – To be discussed at meeting

Current Activities

- Developed a proposal to support the compilation of existing data and to develop visualizations.
    - Submitted to Gulf of Mexico Alliance
    - Discuss recent proposal results
- Consider including panhandle of FL.
- Evaluating implications for science by team members
    - Discuss recent findings (i.e., Dzwonkowski et al. in review)
    - Full DO picture (May-Oct 2017) for MS Sound by Scott Milroy discussion.
- Consider additional sources for support.

State of Texas Workgroup

Lead – Steve DiMarco (TAMU),
Members – Hussain Abdullah (TAMUCC), Hui Lui (TAMU-Galveston), John Breier (UT), Trevor Meckley (NOAA), Alan Lewitus (NOAA)

Workgroup Purpose: To identify monitoring that the State of Texas is doing now and can be improved upon, expanded, or otherwise leveraged to support federal and nearby state monitoring of hypoxia and related stressors that benefit CHAMP products.

The goals are to:

- Identify requirements for a monitoring strategy to determine source of nutrients leading to hypoxia in Texas.
- Identify mechanisms and opportunities to support monitoring off of the Texas coast that helps differentiate between the MARB and Texas Coast hypoxia influenced zones.

This is a recently formed group, and the upcoming activities, and any successes will be outlined at the meeting.

Autonomous Vehicle Workgroup

Lead – Steve DiMarco (TAMU),
Members – Andrew Ziegwied (AUVGlobal), Stephen Howden (USM), John Breier (UT), Trevor Meckley (NOAA), Dave Hilmer (NOAA)

Workgroup Purpose: To identify the autonomous vehicle monitoring needs and funding opportunities for the Cooperative Hypoxia Monitoring Program.

This is a recently formed group, and the purpose, upcoming activities, and any successes will be outlined at the meeting.

Hypoxia Task Force Workgroup

Lead – Katie Flahive (EPA), Danny Wiegand (EPA Gulf Program)
Members – Doug Daigle (LMRSBC), Trevor Meckley (NOAA), Alan Lewitus (NOAA)

Workgroup Purpose: Maintain current monitoring and expand it to understand the role that nutrient reductions (N and P) other drivers have in reducing the size of the hypoxic zone towards its defined goals. There is also a desire to find ways to achieve additional monitoring activities to meet the data needs for advanced modeling that more holistically describes the system (i.e.,

support 3-D time variable models), and explains the impact of hypoxia on living resources, habitats, and people in a quantifiable way.

The goals are to:

- ID programmatic tools (strategic plans, budget projections, EFR budget, etc.) for improving upon and sustaining current efforts for hypoxia monitoring within agencies
- ID opportunities to forge new, or strengthen existing partnerships in a manner that will lead to long-term commitments to hypoxia monitoring program (e.g. interagency work groups, administration ocean plans).
- On implementation calls, report out HTF progress in modeling and monitoring activities;
- At HTF Coordinating Committee calls, report out progress of Implementation Team.
- Ensure that the monitoring data needed to identify management progress for hypoxia is available.

Successes

- Nutrient Loading Monitoring Support (indefinitely?, USGS)
- Hypoxia Annual Cruise Support (FY18&FY19, NOAA)
- Hypoxia Zone Size Modeling Commitment (FY18, NOAA)
- Discharge Monitoring (indefinitely?, USGS)

Current Activities

- Keeping the Hypoxia Task Force and HTF Coordinating Committee updated on CHAMP activities.
- Updating CHAMP members on HTF needs and opportunities.
- Working towards an SOP for the annual hypoxia cruise (Nancy Rabalais/NOAA)

Oil/Gas Industry and Ocean Acidification

Lead – Barb Kirkpatrick (GCOOS), Nancy Rabalais (LSU/LUMCON), Steve DiMarco (TAMU)
Members – Dwight Gledhill (NOAA OAR), Jen Vreeland (NOAA NOS), Stephan Howden (USM), Trevor Meckley (NOAA), Alan Lewitus (NOAA)

Workgroup Purpose: To identify interest from the Oil/Gas industry to leverage monitoring on platforms and to identify intersections between all groups interested in monitoring ocean acidification parameters that benefit hypoxia monitoring.

The goals are to:

- Report out on and drive progress towards leveraging more bottom oxygen monitoring associated with shared goals of OA and the Oil/Gas Industry.

Successes

- Moved OAP Buoy from outside of the MARB influenced hypoxic zone to inside zone.

Current Activities

- Sharing status of OAP buoy
    - The data are up on the PMEL site: https://www.pmel.noaa.gov/co2/story/Coastal+LA
    - The pH sensor is not functioning or data are not shared
- Get sustained bottom D.O. measurements from adjacent platform (CSI-6)
- Determine additional initiates
- Determine opportunities to utilize DiMarco oxygen sensors
- LA Buoy Replacement?
- Proposing requirement of DO and pH on Oil & Gas platforms

RESTORE Act Workgroup -

Leads – Steve Giordano (NOAA NMFS), Becky Allee (NOAA NOS/OCM)
Members –Trevor Meckley (NOAA), Alan Lewitus (NOAA)

Workgroup Purpose: Identify opportunities for leveraging RESTORE Act monitoring plans and funded monitoring activities in the implementation of the Cooperative Hypoxia Monitoring Program.

The goals are to:

- Ensure monitoring data supported by RESTORE that collects oxygen data, has data made available to CHAMP members.
- Identify ways RESTORE can support oxygen monitoring objectives of CHAMP.

Current Activities

- Determine funded research that is relevant to CHAMP: Relevant NOAA RESTORE Science Program FY17 Funded Projects

Current Monitoring Matrix – be prepared to help update and fill this out. Is there a better format for CHAMP?

Table 2. Monitoring system requirement options to meet data needs for Management Product 1 (annual mid-summer hypoxic zone areal extent). Codes: S = Ship Survey; D = Data Management.

SHIP SHELF-WIDE SURVEY **Management Product 1: Annual mid-summer hypoxic zone areal extent – metric for Hypoxia Task Force Coastal Goal.**				
Code	**System Requirement**	**Collaborators**	**Estimated Annual Cost**	**Funding Status**
S-1	Mid-summer shelf-wide ship survey west of Mississippi Delta	LUMCON; LSU; NOAA; NGI	$205K using contract (OMAO) vessel	Supported: $205K by NOAA NCCOS for FY18 Needed: $205K for FY19 and beyond
D-1	Maintain a data portal to make data accessible & to facilitate exchange (data management)	GCOOS; NCEI	$35K for 3 months FTE (GCOOS)	Supported by NOAA IOOS to GCOOS through FY20
			$35K for 3 months FTE (NCEI)	Supported: NOAA NCEI ongoing
D-2	Dissemination of data and findings to research and management communities (communication)	LUMCON; LSU; GCOOS	$35K for 3 months FTE for GCOOS	Supported by NOAA IOOS to GCOOS through FY20
			$35K for 3 months FTE LSU/LUMCON	Supported by LSU/LUMCON in FY18? Needed: FY19 and beyond

Table 3. Monitoring system requirement options to meet data needs of Management Products 2-5. Codes for #: N = Nutrient Loading Estimates; S = Ship Surveys; O = Fixed Observing Systems; G = Gliders; D = Data Management.

EMPIRICAL MODEL SUPPORT **Management Product 2: Guidance on nutrient reduction requirements to meet the Hypoxia Task Force Coastal Goal.**				
#	**System Requirement**	**Collaborators**	**Estimated Annual Cost**	**Funding Status**
N-1	Annual and Spring P and N loading estimates from Miss/Atchafalaya River Basin	USGS: Miss R at St. Francisville; Atch R at Melville); LSU: Miss R at Baton Rouge	$20K (USGS)	Supported: USGS ongoing
			$65K (LSU)	Supported: by LSU in FY18? or Needed: in FY18? and beyond
N-2	Nutrient monitoring to support P and N load estimations (discrete sampling and real-time nitrate monitoring) from Miss/Atchafalaya River basin	USGS: Discrete sampling - Miss R at St. Francisville; Atch R at Melville; Real-time nitrate – Miss R at Baton Rouge; Atch R at Morgan City	$220K (USGS)	Supported: USGS ongoing
N-3	Daily discharge monitoring	USACE: Discharge for Miss R at Tarbert Landing (01100), and Atch R at Simmesport (03045)	$80K (USACE)	Supported: USACE ongoing

DETERMINISTIC MODEL SUPPORT **Management Product 3: 3D time variable model characterization of Hypoxic Zone spatial and temporal dynamics** **Management Product 4**: **Hypoxia impacts on living resources and habitats** **Management Product 5: Scenario forecasts that include interactive ecosystem stressors**				
#	**System Requirement**	**Collaborators**	**Estimated Annual Cost**	**Funding Status**
Characterization of hypoxia east of Mississippi Delta (Mississippi Sound and Mobile Bay)				
	Ship surveys			
	Observing systems			
	Gliders			
	Mid-summer shelf-wide survey east of Miss Delta	USM; LUMCON; LSU	$50K	Needed
	Monthly shelf-wide ship surveys east of Miss Delta	USM; DISL; LUMCON; LSU	$50/survey X 11 surveys = $550K	Needed

	Maintain observation system east of Miss Delta at end of USM transect: USM 3M01	GCOOS; USM	Year 1: $50K to outfit with DO sensor Year 2 and beyond: $125K to maintain	Needed
Characterization of hypoxia west of Mississippi Delta and south of Louisiana				
	Monthly cross-shelf transects C and F	LUMCON; LSU	$80K/survey X 11 surveys = $880K	Needed
	Monthly cross-shelf transect from Barataria Pass to hypoxic zone core (CSI-9)	Louisiana CPRA; LSU		
	Maintain observation system west of Miss Delta: CSI-9	GCOOS; LUMCON	Year 1: $100K for new probes and sondes (surface and bottom); Year 2 and beyond: $125K/yr to maintain	Needed
	Maintain AOP observation system west of Miss Delta: CSI-6	NOAA OAR/OAP	xxx	
	Maintain observation system west of Miss Delta: CSI-6	GCOOS; LUMCON	Year 1: $100K for new probes and sondes (surface and bottom);	Needed

			Year 2 and beyond: $125K/yr to maintain	
	Maintain observation system south of Atchafalaya: **C**	GCOOS; TAMU	$125K	Needed
Characterization of hypoxia along Texas coast				
	Ship survey(?)			
	Maintain observation system west of Miss Delta at western part of shelf-wide grid: G	GCOOS; TAMU	$125K	Needed
	Glider(?)			
Cross-regional and natural resource impacts monitoring				
	SEAMAP groundfish survey mapping hypoxia from June through mid-July	NMFS; LDWF	$190K	Supported: NOAA NMFS ongoing
	SEFSC Shark/Snapper/Grouper Bottom Longline Survey	NMFS		
	SEAMAP Ichthyoplankton Survey for the fall, spring, and winter	NMFS		

	Pelagic Acoustic Survey	NMFS		
	U.S. Gulf of Mexico Marine Mammal and Seabird Assessment for the summer and winter	NMFS		
	U.S. Atlantic Marine Mammal and Seabird Assessment for the summer and winter	NMFS		
	Deploy gliders; "Area" approach of Glider Implementation Plan: 4 cross-shelf areas from June through Aug, with 10-day runs per area (2 underwater autonomous vehicles ["gliders"] & 1 autonomous surface vehicle [ASV] needed per area)	Ongoing Pilot Study: TAMU	Initial equipment investment = $1.44M based on $960K for 8 gliders ($120K each) + $480K ($120K each) for 4 ASVs Deployment costs: $705K based on $8K/day for ship, $12K/day for personnel, $1K/day/glider, and $2.5K/day/ASV	Supported: NOAA NGOMEX funding of Pilot Study in FY17 Needed: Year 1: $2.145M = $1.44M for equipment + $705K for deployment Year 2 and beyond: $705K for deployment
	Maintain a data portal to make data accessible and to facilitate exchange (data management), and disseminate data and findings to research and management communities (communication)	GCOOS; NCEI (including Hypoxia Watch); LSU/LUMCON	$125K for GCOOS FTE	Supported: by IOOS to GCOOS from FY16 to FY20
			$125K for NCEI FTE	Supported: NOAA NCEI ongoing
			$125K for LSU/LUMCON FTE	Supported by LSU/LUMCON in FY17 Needed: FY18 and beyond