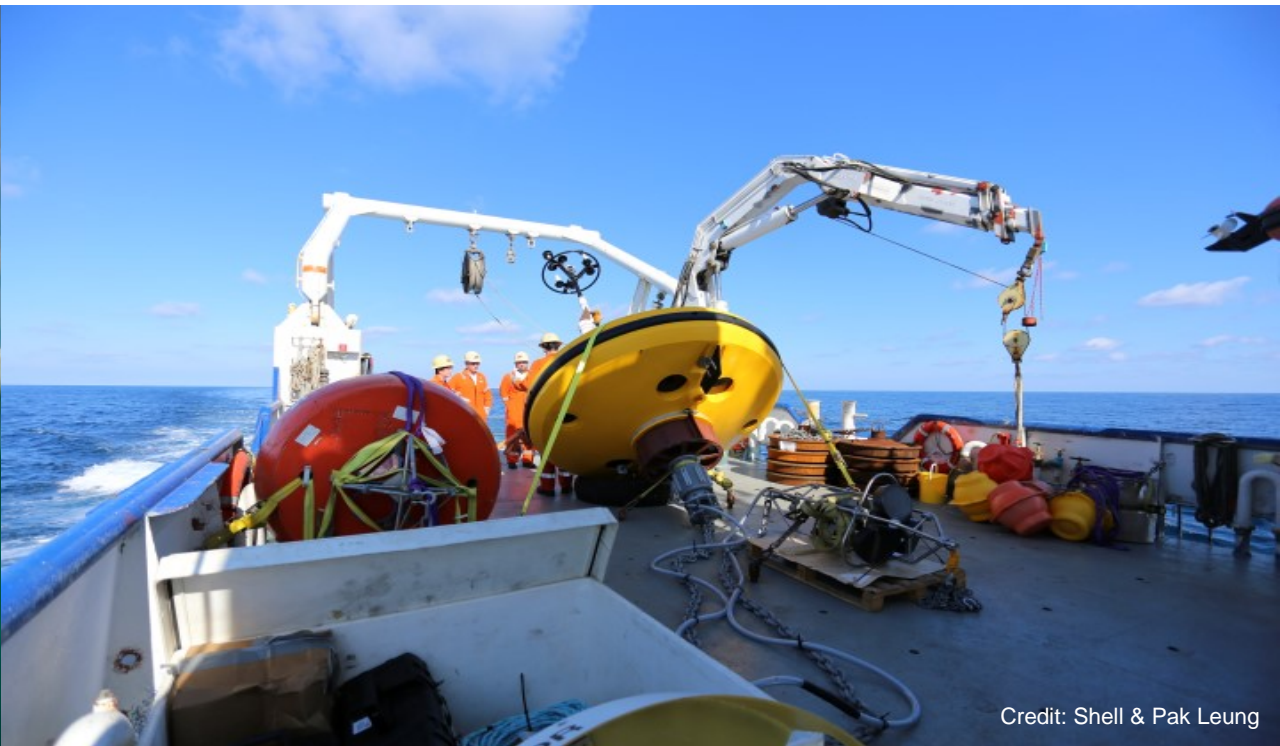




# The Role and the Future of Public-Private Collaborations in Gulf-wide Monitoring

Dr. Ruth Perry

Marine Scientist & Regulatory Policy Specialist



Credit: Shell & Pak Leung

# Definitions & Cautionary Note

Reserves: Our use of the term “reserves” in this presentation means SEC proved oil and gas reserves.

Resources: Our use of the term “resources” in this presentation includes quantities of oil and gas not yet classified as SEC proved oil and gas reserves. Resources are consistent with the Society of Petroleum Engineers (SPE) 2P + 2C definitions.

Discovered and prospective resources: Our use of the term “discovered and prospective resources” are consistent with SPE 2P + 2C + 2U definitions.

Organic: Our use of the term Organic includes SEC proved oil and gas reserves excluding changes resulting from acquisitions, divestments and year-average pricing impact.

Shales: Our use of the term ‘shales’ refers to tight, shale and coal bed methane oil and gas acreage.

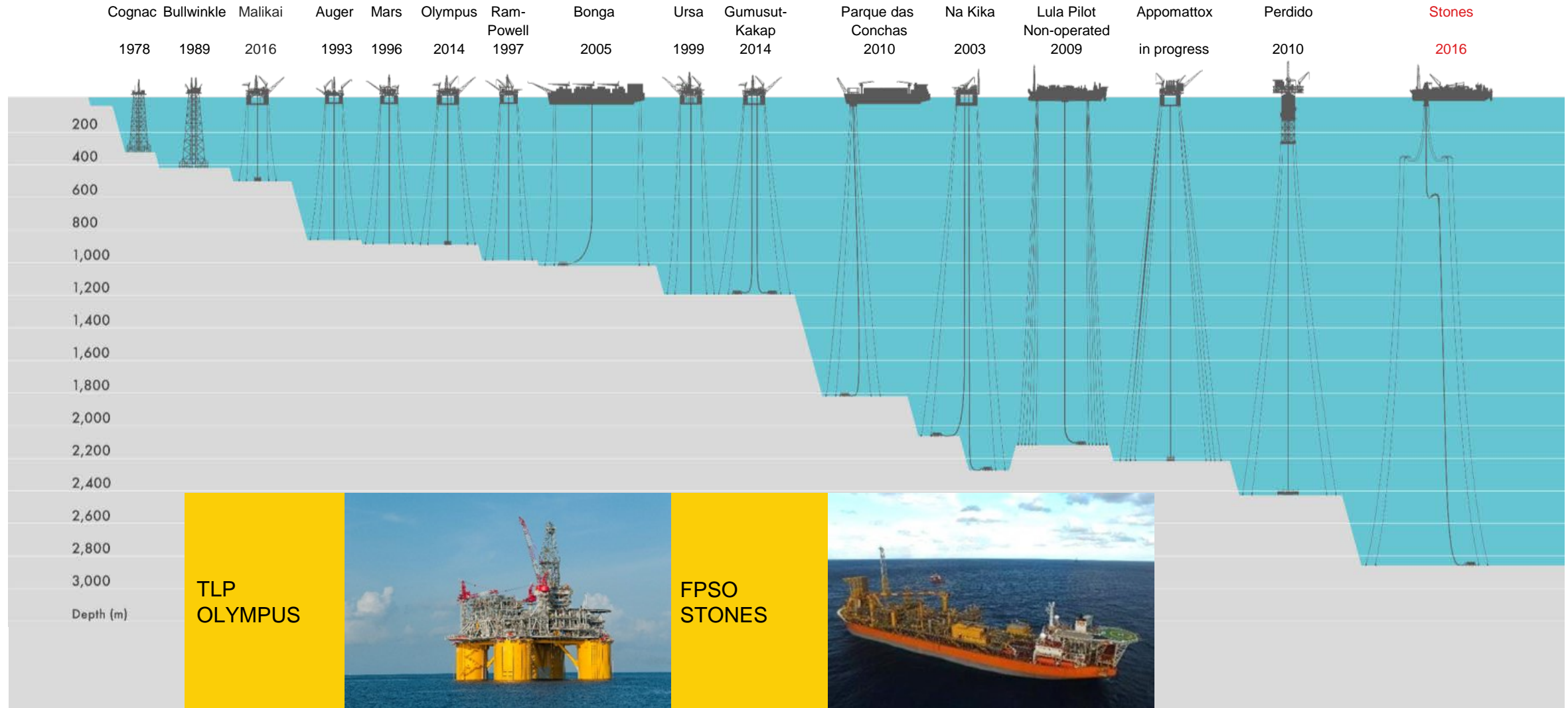
Underlying operating cost is defined as operating cost less identified items. A reconciliation can be found in the quarterly results announcement.

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate legal entities. In this presentation “Shell”, “Shell group” and “Royal Dutch Shell” are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general. Likewise, the words “we”, “us” and “our” are also used to refer to subsidiaries in general or to those who work for them. These expressions are also used where no useful purpose is served by identifying the particular company or companies. “Subsidiaries”, “Shell subsidiaries” and “Shell companies” as used in this presentation refer to companies over which Royal Dutch Shell plc either directly or indirectly has control. Entities and unincorporated arrangements over which Shell has joint control are generally referred to “joint ventures” and “joint operations” respectively. Entities over which Shell has significant influence but neither control nor joint control are referred to as “associates”. The term “Shell interest” is used for convenience to indicate the direct and/or indirect ownership interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest.

This presentation contains forward-looking statements concerning the financial condition, results of operations and businesses of Royal Dutch Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management’s current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Royal Dutch Shell to market risks and statements expressing management’s expectations, beliefs, estimates, forecasts, projections and assumptions. These forward-looking statements are identified by their use of terms and phrases such as “anticipate”, “believe”, “could”, “estimate”, “expect”, “goals”, “intend”, “may”, “objectives”, “outlook”, “plan”, “probably”, “project”, “risks”, “schedule”, “seek”, “should”, “target”, “will” and similar terms and phrases. There are a number of factors that could affect the future operations of Royal Dutch Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this [report], including (without limitation): (a) price fluctuations in crude oil and natural gas; (b) changes in demand for Shell’s products; (c) currency fluctuations; (d) drilling and production results; (e) reserves estimates; (f) loss of market share and industry competition; (g) environmental and physical risks; (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions; (i) the risk of doing business in developing countries and countries subject to international sanctions; (j) legislative, fiscal and regulatory developments including regulatory measures addressing climate change; (k) economic and financial market conditions in various countries and regions; (l) political risks, including the risks of expropriation and renegotiation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs; and (m) changes in trading conditions. No assurance is provided that future dividend payments will match or exceed previous dividend payments. All forward-looking statements contained in this presentation are expressly qualified in their entirety by the cautionary statements contained or referred to in this section.

Readers should not place undue reliance on forward-looking statements. Additional risk factors that may affect future results are contained in Royal Dutch Shell’s 20-F for the year ended December 31, 2016 (available at [www.shell.com/investor](http://www.shell.com/investor) and [www.sec.gov](http://www.sec.gov)). These risk factors also expressly qualify all forward looking statements contained in this presentation and should be considered by the reader. Each forward-looking statement speaks only as of the date of this presentation, [August 2, 2017]. Neither Royal Dutch Shell plc nor any of its subsidiaries undertake any obligation to publicly update or revise any forward-looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward-looking statements contained in this presentation. This presentation may contain references to Shell’s website. These references are for the readers’ convenience only. Shell is not incorporating by reference any information posted on [www.shell.com](http://www.shell.com). We may have used certain terms, such as resources, in this presentation that United States Securities and Exchange Commission (SEC) strictly prohibits us from including in our filings with the SEC. U.S. Investors are urged to consider closely the disclosure in our Form 20-F, File No 1-32575, available on the SEC website [www.sec.gov](http://www.sec.gov).

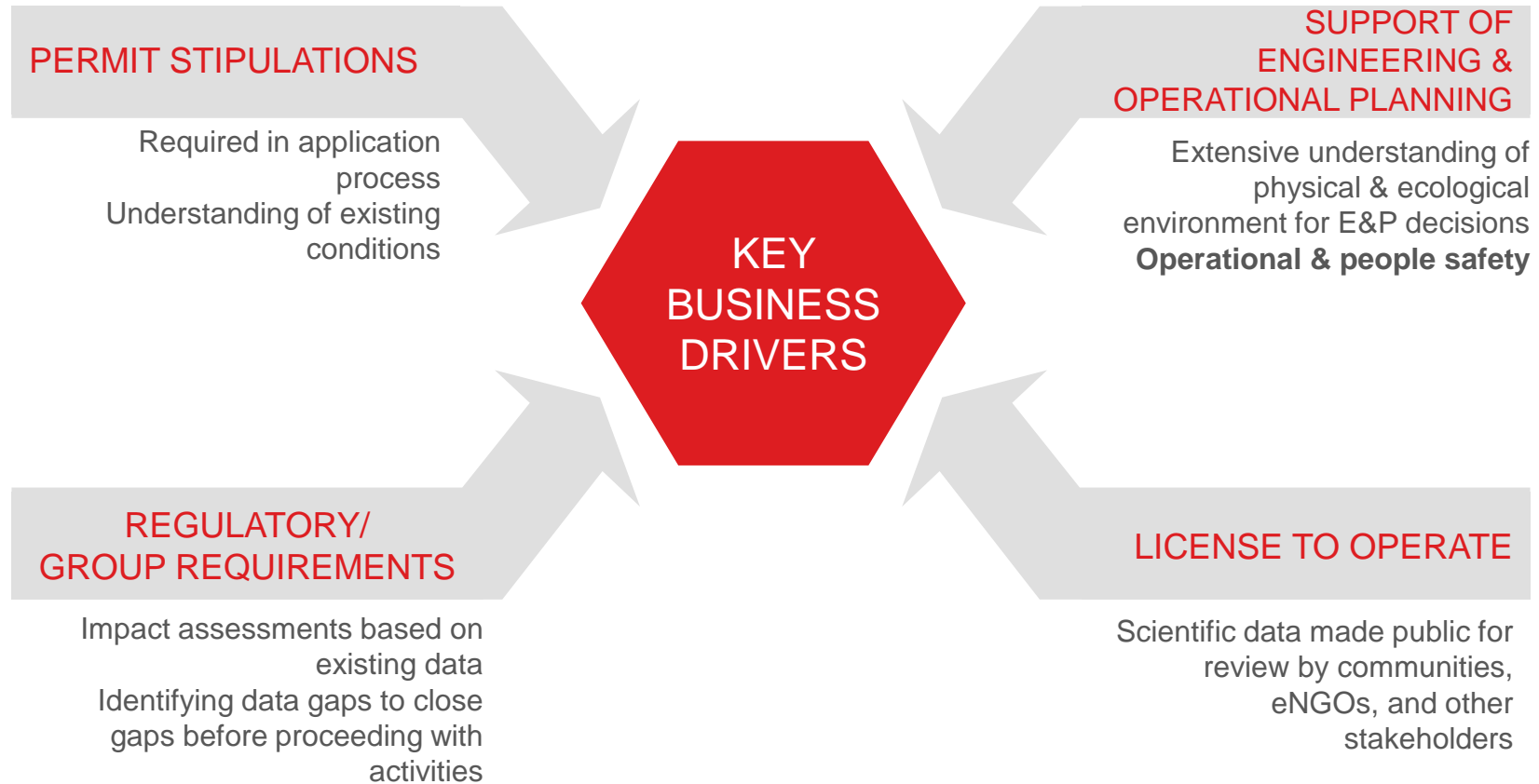
# Shell's Deepwater Evolution



# Shell's Gulf of Mexico Regional Footprint



# Shell Drivers for Implementing Environmental Monitoring



Never complacent, always improving  
Can achieve business needs & add value through public-private collaborations

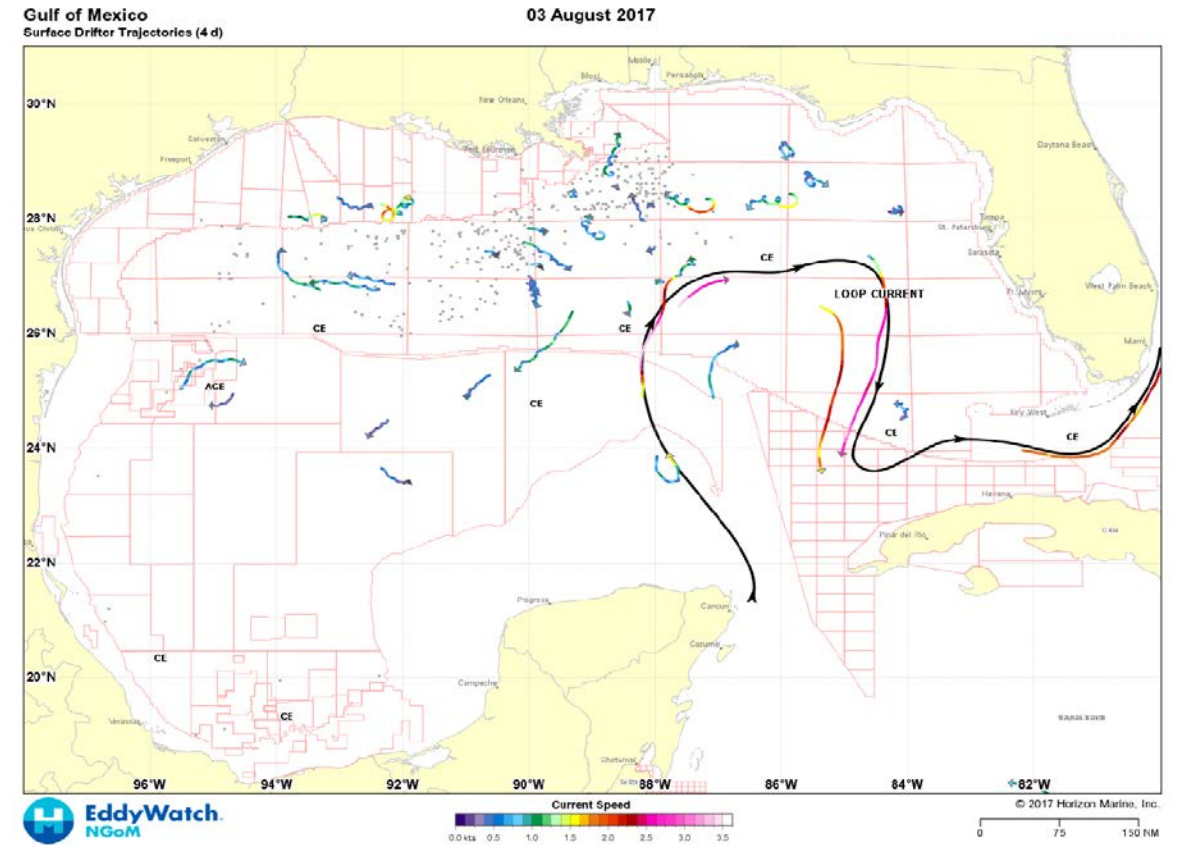
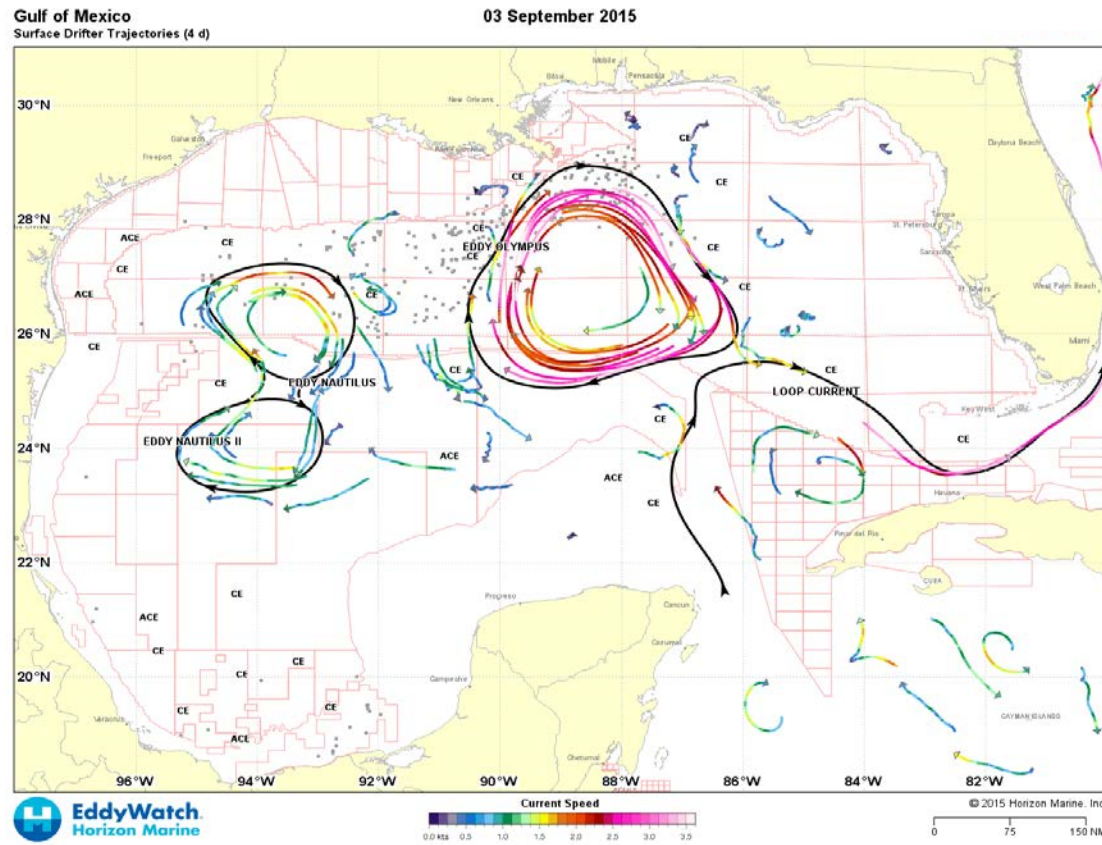


CO-EXISTING WITH THE ENVIRONMENT  
UNDERSTANDING &  
RESPECTING

# And the Gulf is a Dynamic Environment

2015

2017

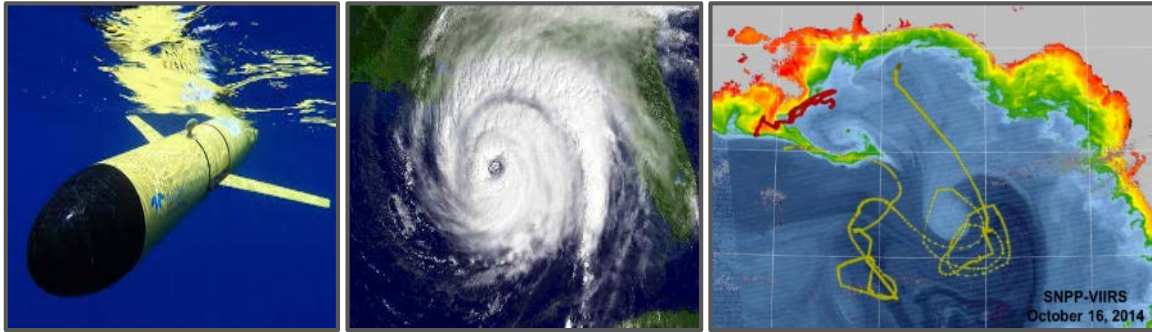


Figures courtesy of Horizon Marine, Inc.

# How Shell is Collaborating to Monitor the Gulf of Mexico

## Advancing ocean technology & capability

### Using autonomous vehicles to improve hurricane forecasting



## Exploring & monitoring the deep GOM

### Using industry ROVs to study deep sea biodiversity



## Providing offshore data to GOM communities

### Working with NOAA to share real-time ocean data



## Supporting the next generation

### Sponsoring educational outreach, research, & competitions



Source: NOAA, Teledyne Webb Research, Louisiana State University, University of Southern Mississippi, Consortium for Ocean



# Offshore collaborators are Gulf-wide and cross all sectors

## STATE



## GOVERNMENT



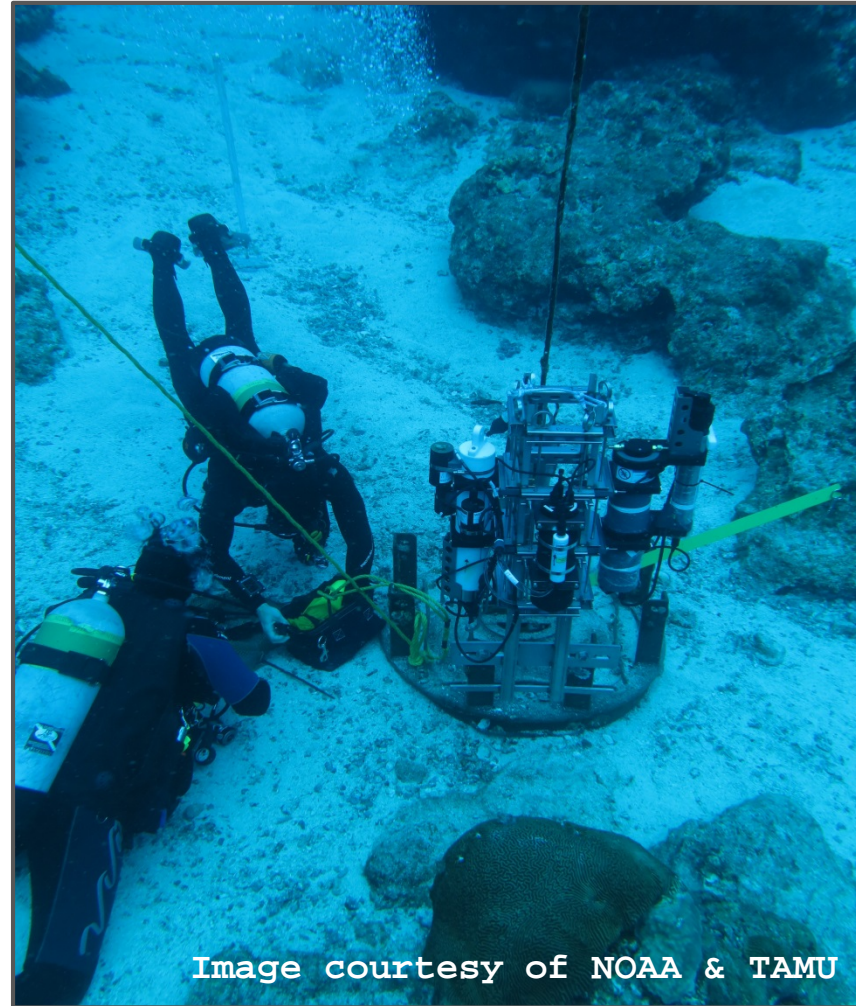
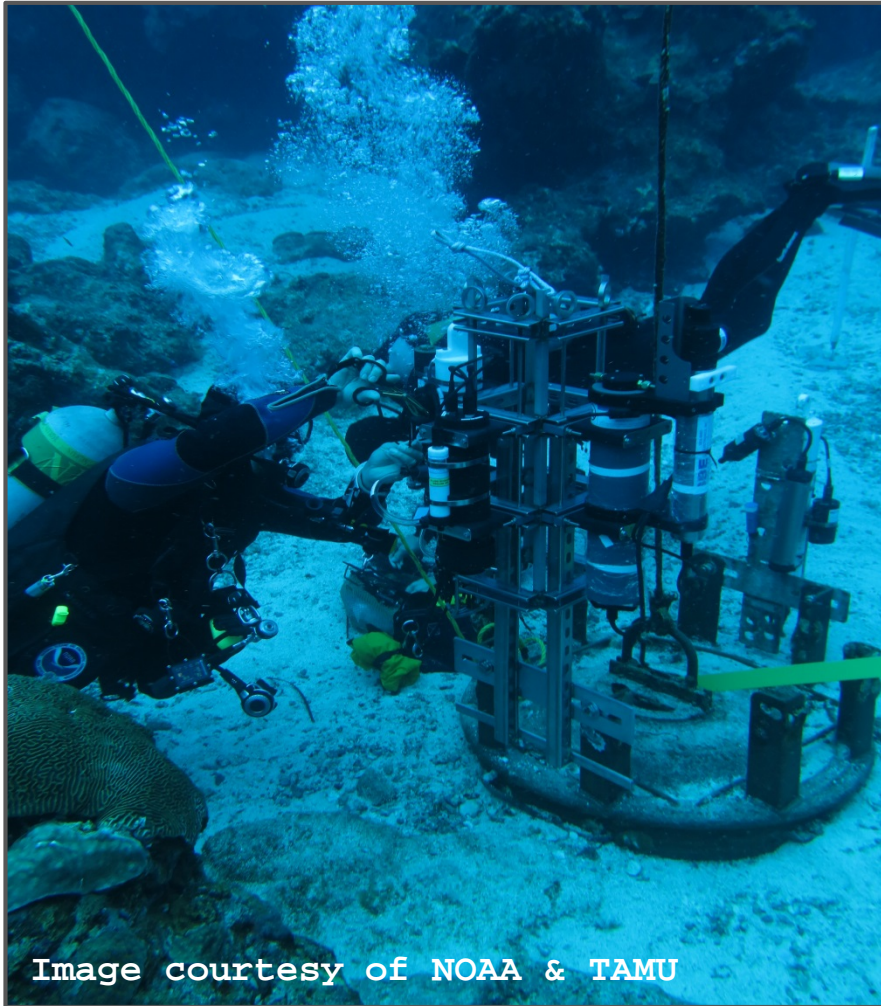
## ACADEMIC



## PUBLIC & PRIVATE



# Monitoring the Flower Garden Banks

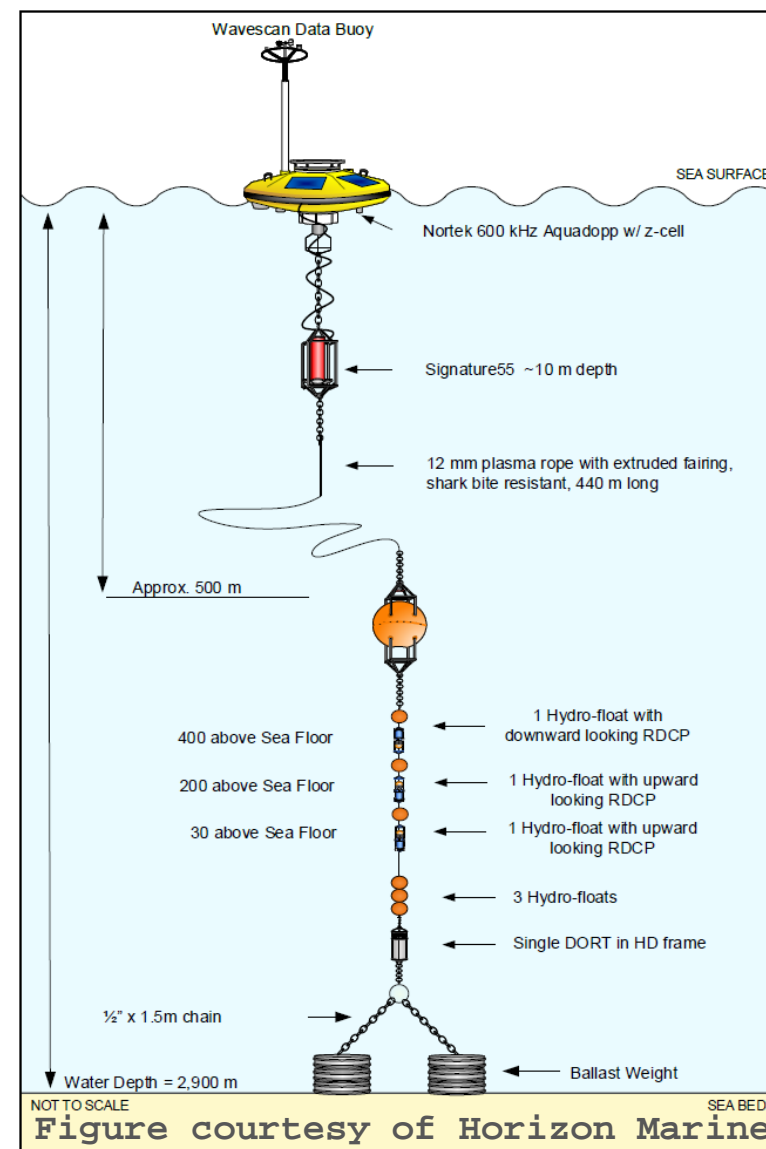




# The Newest Collaboration – Stones Metocean Observing Station

# Stones Metocean Observing Station

- Monitoring ocean currents is important to safe operations & is required by the U.S. government (BSEE NTL 2009-G02)
  - Continuous real-time monitoring from 30 – 1000m
- Shell's first standalone and deepest mooring
- Designed to collect data for lifetime of Stones FPSO
- Current data collected includes:
  - Wind
  - Waves
  - Ocean currents (down to 1000m)
- The data supports operations & is sent to NOAA ([http://www.ndbc.noaa.gov/station\\_page.php?station=42395](http://www.ndbc.noaa.gov/station_page.php?station=42395))



## Building the Collaboration for the Stones Metocean Mooring

- Start by expanding existing ocean observations collaborations
  - Shell is currently working with University of Southern Mississippi, NOAA, Horizon Marine Inc. and NAVO to deploy and operate gliders to monitor the Loop Current
  - Opportunity to include Texas A&M University and to involve other future collaborators
- Academic institutions provide additional sensors, research capacity, and the next generation of scientists and metocean engineers
  - Added current meters and thermistors to measure full water column
  - Student opportunity to learn marine operations and take deep sea water samples during service visit
- Shell and Fugro provide access to the mooring and location twice a year
- All collaborators are working together to transform Stones metocean mooring into a **deep Gulf of Mexico sentinel observatory**



## Benefits of Collaborating

- Connect people, science, technology, and resources to improve accessibility to broader Gulf of Mexico
- Effective mechanism to sustain long-term observations & establish sentinel sites
- Shift to integration and synthesis across disciplines
- Broaden data collection and dissemination
- Shape future policy and decision-making of ocean uses and resources



Credit: NOAA



# The Future of Monitoring Collaborations

## ■ **Transformative**

- Fill gaps, establish baselines, synthesize data, sustain observations
- Expand coastal and shelf monitoring into the blue and deep waters of the Gulf of Mexico
- Shift from a localized approach to a regional Gulf-wide approach
- Integrate and synthesize existing observing and data platforms and uptake these into decision-making

## ■ **Innovative**

- Incorporate new technology in observing (shift to autonomy)
- New approaches to traditional observing campaigns and common phenomena (e.g. Loop Current)
- Link disciplines and data to shift into new dimension (4-D) of monitoring

