# Matching NOAA's Policy Priorities to Opportunities for Investment

## Using Observing System Portfolio Analysis for NOAA's Emerging Technologies for Observations Workshop

By Joseph Conran, David Helms, Aaron Pratt, Louis Cantrell, Justin Goldstein, Sabrina Taijeron, Brant Priest

Contact: joseph.conran@noaa.gov

## Objective

Identify high-impact opportunities for investment to inform NOAA's Emerging Technologies for Observation Workshop (ETW) Request for Information (RFI) using NOAA's observing system architecture portfolio and the NOAA Observing System Integrated Analysis (NOSIA) value-tree model

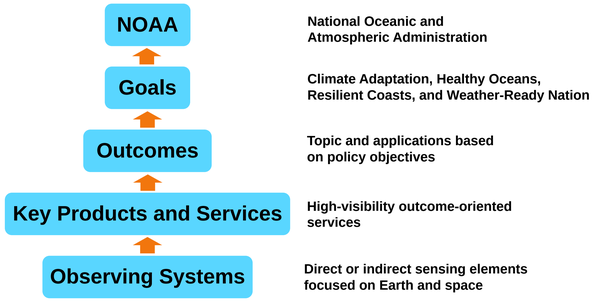
## Background

- **Emerging Technologies for Observations Workshop**
  - ETW 2019 will take place March 19-20 at NCWCP and will feature workshop presentations and technical posters highlighting projects funded by NOAA and external stakeholders,
- **Weather Research and Forecasting Innovation Act of 2017**
  - Emphasis on research that will improve short, mesoscale, and long-term forecasts for extreme weather
- **NOAA's Leadership on the Blue Economy**
  - Science-based use of ocean resources to provide jobs, economic growth, and encourage healthy oceans and coastal ecosystems
  - NOAA seeks to increase current economic contribution to the US EEZ in five sectors: **Seafood Production and Competitiveness, Maritime Commerce, Ocean Resource Mapping, Tourism and Recreation, and Coastal Risk Reduction**

## NOAA's Observing System Portfolio

- The Technology, Planning, and Integration for Observation (TPIO) division supports the NOAA Observing Systems Council (NOSC)
- Core method of analysis uses the NOAA Observing System Integrated Analysis (NOSIA) model which consists of:
  - Value-tree model with user satisfaction scores and weights
  - Observing system catalog on platforms, costs, sensors, etc.
  - System independent user requirements

## NOAA's Value Tree Model




## Methodology

**Step 1** — Outline objectives in Weather Act and Blue Economy Documents

**Step 2** — Map Key objectives to NOAA outcomes groups

**Step 3** — Use value-tree analysis to assess gaps in outcomes by observing needs

**Step 4** — Rank observing capabilities by individual blue economy sector and weather act

**Step 5** — Connect Observing Capabilities to Environment Parameters (Information Needs)

**Step 6** — Coordinate with NOSC and decision-makers to identify ETW RFI topics

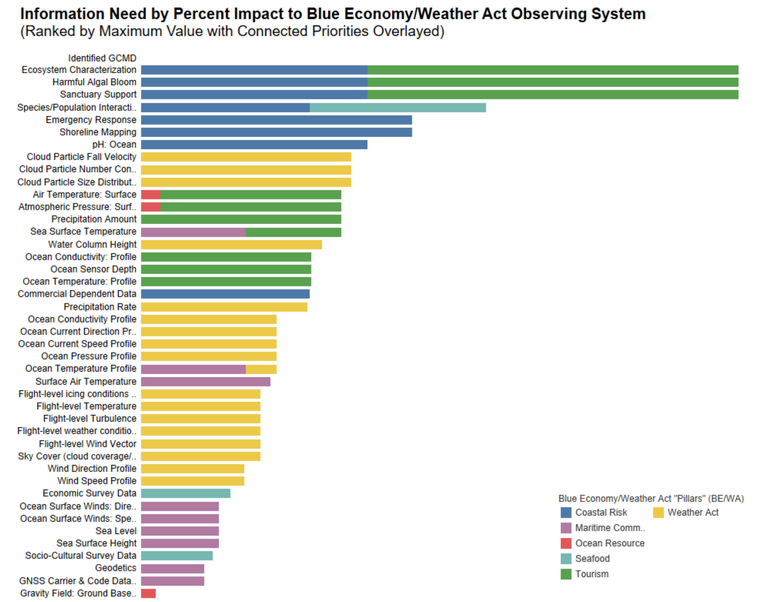
## Value-tree Impact Analysis

1. Identify products by outcome groups relevant to Weather Act and blue economy objectives
2. Calculate percent impact on outcome group if all child products fully meet user observation requirements
   - 857 products against 236 outcomes
3. Reduce dimensionality by finding the maximum value for each product on the individual blue economy or weather act objective
4. Connect each product to the environmental parameter it observes using NASA's Global Change Master Directory (GCMD) ontology
5. Rank and graph overall information needs and by sector

## Example Opportunities by Objective

| Weather or Blue Economy Sector | Observing System | Outcome | Key Product Group | Weather Act or Blue Economy Objective |
|---|---|---|---|---|
| Seafood Production | Natl_Observer_Program | Protected Species Monitoring | US National Bycatch Reports | Bycatch Research and Reduction |
| Ocean Resource Mapping | NWLON | Marine Transportation | Real-time Environmental Information | Ocean and Coastal Mapping |
| Maritime Commerce | Ships_of_Opportunity | Weather Science and Stewardship | Monitoring Understanding Marine Weather | Marine Weather Forecasts |
| Tourism & Recreation | NMFS_ROV_AUV_Glider | Ocean Habitat Monitoring | Permitting (Authorization To Take Marine Mammals) | National Estuarine Research Reserve System |
| Coastal Risk Reduction | Natl_Observer_Program | Protected Species Monitoring | GPRA Reporting To Congress On Protected Resources | Restore and Protect Nature-based Infrastructure |
| Weather Innovation Act | NSSL_Field_Sys(Cloud) | Weather Science and Stewardship | Severe and Hazardous Weather Understanding | Improve High Impact Forecasts |

## Overall Ranked Information Needs




## Identified Topics for ETW RFI

1. Disaster Preparation, Response, and Recovery
   - Geospatial Mapping
   - Storm Intensity Reports
   - Port and Shipping Approaches Mapping
2. Ecosystem Monitoring, Assessments, and Prediction
   - Ocean Ecosystem Characterization
   - Water Quality Mapping
3. Extreme Rainfall, Flash Flood, and Flood Predictions
   - Extreme Precipitation
   - Flooding and Flash Floods
4. Enhanced Data Synthesis

## Further Information

**Emerging Technologies for Observations Workshop**
https://nosc.noaa.gov/emerging-tech-workshop.php

**NOAA Technology, Planning, and Integration for Observation**
https://nosc.noaa.gov/tpio/

**Weather Research and Forecasting Innovation Act of 2017**
https://www.congress.gov/bill/115th-congress/house-bill/353

**NOAA's Leadership on the Blue Economy**
https://oceanservice.noaa.gov/economy/

TPIO Technology, Planning and Integration for Observation
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

with support from RIVERSIDE global science solutions