"Top 10" Achievements:

1) **IOOS Strategic Plan (IWGOO) (2008)**

Description: The IWGOO Strategic Plan is a five-year strategic plan developed by the Interagency Working Group on Ocean Observations (IWGOO) that describes the vision and direction of the Integrated Ocean Observing System (IOOS). The plan builds on the IOOS development plan, addendum, and its predecessor documents for the U.S. IOOS incorporates that work by reference. This plan characterizes the areas of highest priority for the U.S. contribution to the Global Earth Observation System of Systems (GEOSS) over the next five years. Upon adoption of this strategic plan, an implementation plan with roles and responsibilities for these actions will be developed to describe the details of the way forward, and will be led by the IWGOO.

Outcomes: The Strategic Plan articulates the benefits of IOOS, provided specific examples of where IOOS derives value, provides a definition and vision for IOOS, establishes goals and outcomes under the five IOOS subsystems, and outlines the organizational structure.

2) **Established Criteria for RICE Certification (2012)**

Description: Within the 2009 ICOOS Act, the IOOC was required to develop contract certification standards and compliance procedures for all non-Federal assets, including regional information coordination entities, to establish eligibility for integration into IOOS and to ensure compliance with all applicable standards and protocols established, and ensure that regional observations are integrated into IOOS on a sustained basis. Upon passing certification criteria, qualifying organizations become certified Regional Information Coordination Entities (RICEs) under the authority of ICOOS Act. The ICOOS Act directs NOAA to certify and integrate RICEs into IOOS. Integration into the System formally establishes the role of the RICE in the U.S. IOOS and ensures that the data collected and distributed by the RICE are managed according to the best practices, as identified by NOAA.

Outcomes: The IOOC successfully developed the criteria for IOOS RICE certification. The IOOC researched other models for governance and management certification, considered historical IOOS documents such as the System Development Plan (2006) and the Regional Association Maturity Index (2010), along with other previously developed, but not adopted or implemented, regional certification criteria. This helped shape IOOC deliberations and clarified not only what was being certified, but also what was required for certification.

3) **IOOS Summit & Recommendations (2012)**

Description: The IOOS Summit was held in November 2012 to assess progress over the previous decade since the initial workshop designing IOOS requirements, and develop plans for the next decade of observations of the ocean, coast and Great Lakes. In order to improve the response of the U.S. IOOS program to the broad scientific and societal needs for ocean observations/ information over the following decade, the Summit addressed the IOOS requirements list, priorities and processes, the coordination and information delivery across regional national and global boundaries, as well as new technologies and opportunities.

Outcomes: In addition to successfully convening a large swath of the IOOS community, the 2012 summit resulted in a U.S. IOOS Summit Report: A New Decade for the Integrated Ocean Observing Program, which included the IOOS Summit 2012 Declaration speaking to the broad consensus reached by those gathered. Sections of the report include a summary of past progress, a vision for IOOS capabilities by 2022, as well as needed improvements in diverse user engagement, system design and processes, and integration across the overall program. In addition, twenty-five major recommendations arose from the presentations and discussion at the Summit around a set of themes for U.S. IOOS planning and implementation over the next 10 years.

4) **Transition to Task Team Approach (2013)**

Description: The IOOC adopted a new approach to address community needs and government mandates related to ocean observing. Task Teams are composed of federal subject matter experts from three or more agencies and are required to develop a budget and timeline for deliverables. This advance planning enables groups to successfully accomplish a set of objectives in a timely manner with staff and resources provided by the IOOC.

Outcomes: This approach has proven extremely successful for the IOOC. It has allowed increased understanding in addressing important scientific and technological challenges by harnessing the knowledge of multiple agency representatives and helped transition individual agency efforts to operational community driven activities. The IOOC task teams have addressed topics ranging from modeling, underwater glider technologies, integration of biological observations and animal telemetry efforts, observing metrics, and societal indicators. Specific accomplishments and successes of task teams are listed separately in this document.

5) **BIO Task Team adds 11 new biological variables to IOOS Core Variables (2015)**

Description of BIO-TT: The IOOC Biological Integration and Observation Task Team (BIO-TT) was established in 2013 and sunset in 2015. Its primary goals were to improve the availability of observations on the five previously identified IOOS core biological variables (*core biological variables: phytoplankton species, zooplankton species, zooplankton abundance, fish species and*

fish abundance), as well as to identify and prioritize additional cross-cutting federal agency biological and ecosystem observation needs.

Outcome: In addition to two reports (Biological and Ecosystem Observations within United States Waters I: A Survey of Federal Agencies and Biological and Ecosystem Observations within United States Waters II: A Workshop Report to Inform Priorities for the United States Integrated Ocean Observing System), a major outcome of the BIO-TT was the addition of cross-cutting biological and ecosystem observation variables identified by the group to the list of IOOS core variables. This was achieved through a survey of federal agency aquatic biological and ecosystem priority data needs, and hosting an expert workshop to review those variables that the task team had prioritized. The 11 variable that were ultimately recommended and adopted to support the existing core biological variables included *phytoplankton abundance, species and abundance of corals, invertebrates, marine mammals, microbes (including microbial activity), sea birds, sea turtles, and submerged aquatic vegetation, biological vital rates, nekton diet, and sound,* and accompanying implementation strategies.

6) U.S. Glider Community - Workshops and UG2 User Group from Concept to Reality (2017)

Description of Glider TT: The Glider Task Team was established in July 2015 and was sunset in July 2017. The primary goals of the IOOC Glider Task Team were to enable increased engagement with the glider community and to advance the coordinated use of glider observing systems to meet global, national, and regional sub-surface observing requirements. To meet these goals, the Glider Task Team collaborated with the IOOS Program Office, the Regional Associations, and other federal interagency working groups identified to gather information and develop a strategy with recommended actions for increased collaboration and engagement. This strategy included surveying the glider community for observing gaps that could be met with gliders, identifying activities that could benefit from interagency coordination, and hosting an expert workshop to review these findings, among others.

Outcomes: Major achievements of the Glider Task Team included hosting/supporting both the 2017 U.S. Underwater Glider Workshop at the INFINITY Science Center in Mississippi to review glider observing gaps and activities from the initial community surveys, and the 8th EGO Meeting and International Glider Workshop in May 2019, to enhance international collaboration through community dialogue, exchanges of information, sharing of experiences, and development of best practices to support the glider community. Following the recommendations in the workshop report from the 2017 workshop, a small subset of the Glider Task Team established the initial form of the Underwater Glider User Group (UG2) with the overarching mission to create a community that facilitates sharing and cooperation with regards to gliders and glider sensor technology, logistical and operational challenges, data handling, and opportunities and needs for gliders going forward. The UG2 continues to successfully operate, reaching the broader glider

community, and its continued expansion is supported by representatives from the IOOS Program Office and the sunset Glider Task Team.

7) Animal Telemetry Network Task Team and Implementation Plan (2016)

Description: In 2014, a NOAA technical memo: Meeting Our Nation's Needs For Biological And Environmental Monitoring: Strategic Plan and Recommendations for an Animal Telemetry Network (ATN) through U.S. IOOS was released with specific recommendations on how the U.S. IOOS can integrate animal telemetry efforts into a system to deliver critical information on biological resources and ecosystem functions, as well as oceanographic data that will complement and enhance existing observing capability. In response to this report, the first IOOC Animal Telemetry Network Task Team was established with the goals of distributing and socializing these recommendations, developing an ATN Implementation plan, and hosting the 3rd ATN Steering Committee Workshop. Following the first task team, two other related task teams were established: the ATN Workshop Task Team, and the ATN Implementation Task Team. All three task teams were sunset by 2016.

Outcome: The ATN Task Team published the ATN Implementation Plan 2016 – 2021 which was approved by the NSTC and released in December 2016. Through the work of the ATN Implementation Task Team, the ATN has become a fully integrated project under the U.S. IOOS, with its own steering committee and data assembly center, and provides a mechanism to facilitate and empower an alliance among Federal, industry, academic, state, local, tribal, and non-Federal organizations to coordinate aquatic animal telemetry infrastructure and operations.

8) IOOS Modeling Task Team (2017)

Description: The IOOS Modeling Task Team was established in April 2014 to address the challenges and recommendations from the IOOS Modeling and Analysis Workshop (2008). The major goal was to develop a strategy to advance the modeling component of IOOS which was called for during the National Ocean Policy Implementation Plan. The task team was sunset in May 2018.

Outcome: The task team members developed a strategy, *Advancing coastal ocean modelling, analysis, and prediction for the US Integrated Ocean Observing System*, which provided specific technical input for the IOOC, the U.S. IOOS Program Office, and the IOOS Association for advancing IOOS modeling capabilities for the following 5-8 years.

9) OceanObs'19 and Living Action Plan (2019)

Description: The IOOC agencies were major sponsors of the OceanObs'19 conference. OceanObs'19, part of a decadal conference series, was meant to convene the ocean observing community from scientists to end users. This community-driven conference sought to improve

response to scientific and societal needs of a fit-for-purpose integrated ocean observing system, for better understanding the environment of the Earth, monitoring climate, and informing adaptation strategies as well as the sustainable use of ocean resources. Pre-conference, input in the form of submitted Community White Papers helped shape strategy development throughout the conference and for the UN Decade of Ocean Science. OceanObs'19's conference objectives were to improve the governance of a global ocean observing system, including advocacy, funding, and alignment with best practices, focusing on Information, Interoperability, Innovation, and Integration.

Outcome: A major outcome of OceanObs'19 is the Living Action Plan. The Living Action Plan is an adaptive strategy which will continue to develop over the next decade. Using the Recommendation Synthesis developed from the discussions, presentations, and outcomes of the conference, the OceanObs'19 team assembled a *plan of action*, outlining a variety of actionable tasks that include, but are not limited to, the creation of working groups, engagement of key stakeholders, effective communication, and capacity development. This *living* strategy is how the community involved in OceanObs'19 will hold itself accountable, and ensure that proposed tasks are accomplished over the years, and communicated broadly. The Living Action Plan also acts as a tool that members of the vast ocean observing community can use to submit information for new groups, projects, and events. This tool and the recommendations from the conference has already resulted in ocean observing programs endorsed by the UN Decade for Ocean Science for Sustainable Development (e.g. Observing Air-Sea Interactions Strategy (OASIS)).

10) Developing Metrics for Ocean Observing Systems (2021)

Description: Established in 2018 and set to sunset in May 2021, the Metrics for Ocean Observing System (MOOS) Task Team was created to develop a set of ocean observing metrics with a clear audience, that are measurable and repeatable indicators, and develop a process for agencies to contribute to those metrics.

Outcome: The task team successfully developed a suite of pilot metrics under three ocean observing themes, sea level rise, ocean acidification, and harmful algal blooms, to demonstrate how this process might look for other observing areas. The report Measuring the Performance of Ocean Observing Systems: Pilot metrics for sea level rise, ocean acidification, and harmful algal blooms suggested that the IOOS enterprise, either through the Program Office, IOOC, contractors, or some combination thereof, should invest in collecting high-quality, repeatable metrics. It also produced specific guidelines to move beyond the pilot project and make metrics a robust, interagency effort with tangible impacts and recommendations for program managers and policy makers. The task team expanded the initial report with a second study which tested the repeatability of the existing pilot metrics, added additional metrics under a fourth theme, Hurricane Observations and Forecasting. The Measuring the Performance of Ocean Observing Systems: Pilot Metrics 2021 report also collected feedback on the process and provided

recommendations as to how to ensure that impactful, cross-agency metrics become a sustained and valued component of U.S. ocean observing efforts.