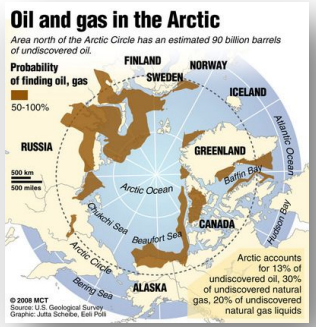
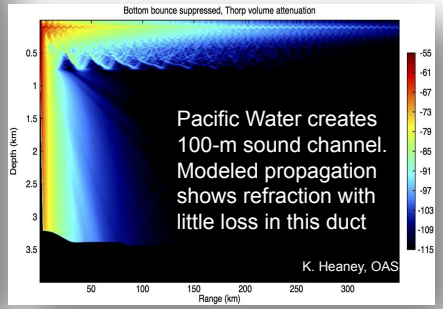
Toward an Arctic Ocean Regional Alliance (ArORA)

Craig Lee (APL-UW, USA), Anna Nikolopoulos (UiT, Norway) and the Arctic Ocean Regional Alliance (ArORA)Task Team



Sound Channel Allows Long-Range Propagation in Beaufort Sea



Economics

Industry

Northern Communities

National Security

Climate

Ecosystem Change

Why now?

- Increased awareness of the Arctic Ocean's role in the climate system.
- Severe climate impacts on Arctic communities.
- Accelerating human activity.
- Many existing nationally-resourced short-term (3-5 yr) efforts, but difficult to coordinate, build and sustain long-term observing.
- Sustained international structure for pan-Arctic coordination needed to address challenges, foster collaboration through internationally-agreed upon plans.
- UN Decade of Ocean Science and endorsement from G7 Future of Seas and Oceans Initiative.

The Global Ocean Observing System

- Develop global ocean observing system to deliver information for Climate, Forecast and Warning, Ocean Health (global to local).
- Led by Intergovernmental Oceanographic Commission (IOC) of UNESCO, co-sponsored by World Meteorological Organization (WMO), United Nations Environmental Programme (UNEP) and Internation Science Council (ISC).
- Coordination, advocacy and support for community of international, regional and national ocean observing programs, governments, UN agencies, research organizations and individual scientists.
- Elements of GOOS – Expert Panels, Networks, Regional Alliances.

Examples of global Networks under or affiliated with GOOS

GO-SHIP

ANIBOS

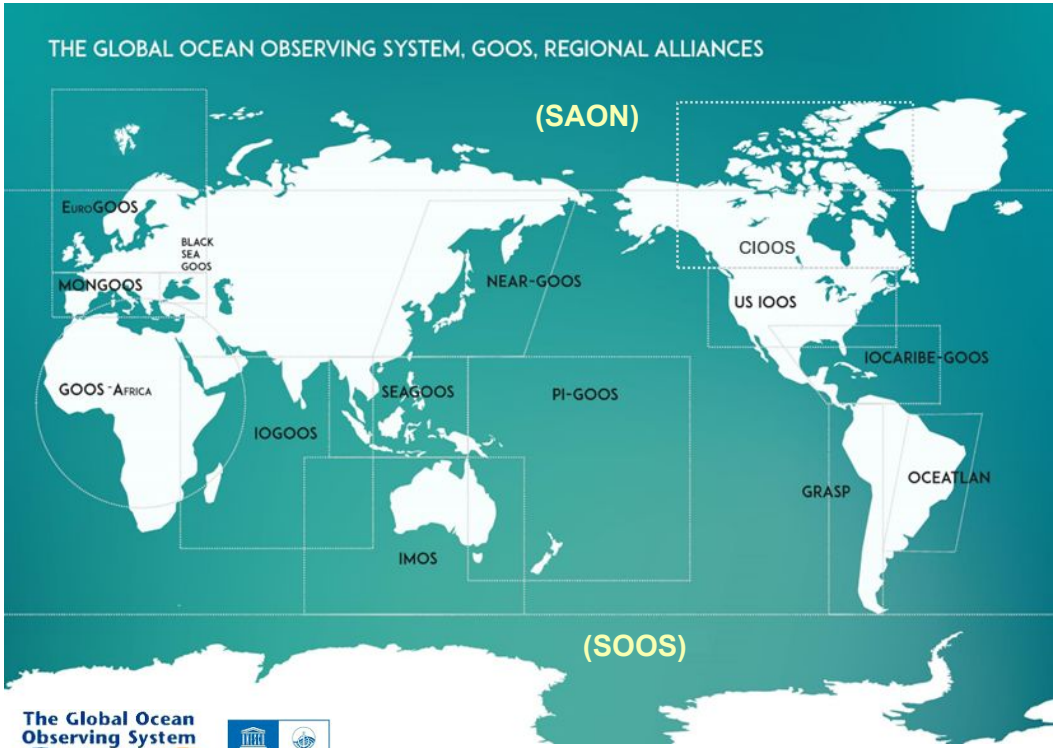
OceanSITES

Argo

GOA-ON
Global Ocean Acidification Observing Network

GOOS Regional Alliances (GRA)

- Integrate national needs into regional systems – Regional Alliances.
- Coalitions of nations and/or institutions working within GOOS framework, focused on local priorities and organized around ocean basins or coastal environments.
- 14 GRAs, plus Southern Ocean Observing System (SOOS) and SAON.
- Can be organized around a region, shared issues and needs.
- Each is unique – tailored to regional priorities/needs, resources and culture.



Governing Council *last updated: August 2024*

- Northwestern US.
- Partnership – industry, tribes, government (local – federal), NGOs, academia.
- Coordination and observations.
- Deliver data and products to support broad range of rightsholder and stakeholder activity.

1. Ocean Inquiry Project
2. OR Dept of Land Conservation & Development
3. Surfrider Foundation
4. The Boeing Company
5. Oregon State University
6. Oregon Sea Grant
7. Puget Sound Partnership
8. University of Washington
9. Washington Sea Grant
10. WET Labs, Inc.
11. Oregon Health and Science University
12. Quileute Indian Tribe
13. OR Dept of Geology and Mineral Industries
14. Humboldt State University
15. Marine Exchange of Puget Sound
16. WA Dept of Ecology
17. Pacific Northwest National Laboratory
18. Port of Newport
19. Puget Sound Harbor Safety Committee
20. Sound Ocean Systems, Inc.
21. Council of American Master Mariners
22. Pacific Northwest Salmon Center
23. Northwest Indian Fisheries Commission
24. Sea-Bird Scientific
25. Western Association of Marine Laboratories
26. Leidos
27. OR Dept of Fish and Wildlife
28. King County Dept Natural Resources & Parks
29. Quinault Indian Nation
30. Western Resources and Applications
31. OR Dept of State Lands
32. Columbia River Crab Fishermen's Association
33. Port of Neah Bay
34. Northwest Research Associates
35. Pacific Ocean Shelf Tracking Project
36. WA Dept of Fish and Wildlife
37. Northwest Aquatic and Marine Educators
38. Seattle Aquarium
39. NOAA Northwest Fisheries Science Center
40. Port Gamble S'Klallam Tribe
41. The Nature Conservancy
42. Portland State University
43. NOAA Olympic Coast National Marine Sanctuary
44. University of Victoria
45. University of Oregon
46. Port Townsend Marine Science Center
47. Intellicheck-Mobilisa
48. NortekUSA
49. Grays Harbor Historical Seaport
50. Pacific Coast Shellfish Growers Association
51. US Army Corps Engineers
52. Olympic National Park
53. Oak Harbor Middle School
54. Vancouver Island University
55. Ocean Networks Canada
56. Lower Columbia Estuary Partnership
57. Western Washington University
58. Raincoast GeoResearch
59. WA Dept of Health
60. NOAA PMEL
61. Hakai Institute
62. Salish Sea Expeditions
63. Long Live the Kings
64. Rockland Scientific
65. Northwest Indian College
66. Pacific Shellfish Institute
67. Weatherflow
68. Oceans Blue Corp
69. Columbia River Inter-Tribal Fish Commission
70. World Ocean Council
71. Ocean Aero
72. RBR Ltd
73. Scoot Science
74. Astraeus Ocean Systems
75. Tini Scientific
76. MRV Systems
77. BeadedStream
78. Washington Maritime Blue

KEY: Tribal | Industry | NGO | Academia/Research | Federal/State/Local Government

Pacific Island Regional Association

Governance

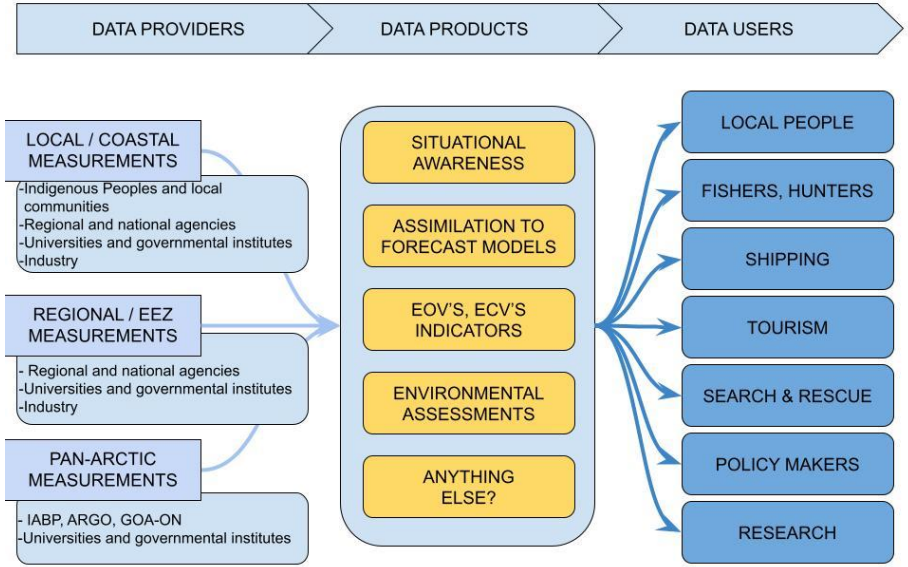
Advisory Committee of donors and partners from across the Pacific region.

Goals

- Provide and improve seasonal predictions of weather and climate, and their impact on Pacific Island Communities.
- Provide base data for longer term predictions of weather and climate influenced by climate change.
- Raise awareness and use of the ocean observing system in the Pacific Ocean.
- Coordinate between other ocean and climate projects in the Pacific Ocean.
- Facilitate support of the ocean observing system and associated deployments from Pacific Island Countries and Territories.

Rationale and Function for the ArORA

- Formal representation of the Arctic within GOOS.
- Sustained Arctic observing efforts would benefit from a stable, overarching framework to enable international coordination and collaboration.
- Connect existing efforts with Global Ocean Observing Systems (e.g. GOOS, POGO, GEO Blue Planet) to leverage existing structures and resources.
- Encourage Global Ocean Observing Systems to extend coverage into Arctic.



- Fundamental engagement with rightsholders and stakeholders – observing system conceptualization, design and implementation – align activities with needs.
- Strengthen Arctic representation in international bodies, planning and advocacy in international and national forums.

Path to an ArORA Plan

- Arctic Science Summit Week 2023 Roundtable: Need enhanced pan-Arctic coordination.
  - *SWOT analysis of GRA effort – identified many compelling opportunities.*
  - ***Establish Task Team to develop ArORA implementation plan**.*
- Two years invested expanding Task Team membership, seeking Indigenous and local voices. Deferred proposal development during this period.
- G7 Future of Seas and Oceans (FSOI) prioritized Arctic Ocean observing, and formation of an Arctic GRA (or similar) as a vehicle for coordination and focusing national support.
- Official designation of Task Team by SAON and GOOS.
- Arctic Science Summit Week 2024 panel discussions on Arctic ocean observing.
  - *Global context and large-scale regional initiatives*
  - *The rights, needs, and contributions of Arctic communities*
- Arctic Science Summit Week 2025 panel and break-out discussions.
  - *Functions and benefits, Different needs of each community/party, Missing voices, Envisioned first steps, Role of ArORA in IPY-5*
- Writing began late spring 2025.
- February 2026 - Release draft plan for public review.


ArORA
Arctic Ocean Regional Alliance
Indigenous Peoples
Ongoing Observing Initiatives
GOOS
SAON
SUSTAINING ARCTIC OBSERVING NETWORKS
Agencies
Research and Academia
Science Coordination Organisations
Coastal Communities and Municipalities
Private Sector
Policy Makers
Funders
Observing and Monitoring

ArORA Objectives

- Coordinate national and regional efforts into a pan-Arctic framework
  - Aligning agendas
  - Identify synergies
  - Reduce duplication
  - Help implement strategic initiatives such as the ICARP IV recommendations.
- Enhance alignment between user needs and observing systems by improving rightsholder/stakeholder involvement at all stages.
- Maintain and grow Arctic observing capacity by supporting community-led and community-based observing, and through support for early career ocean professionals, in collaboration with APECS and the ECOPs program.
- Integrate Indigenous leadership and knowledge systems
- Advance knowledge sharing and data stewardship
- Describe and facilitate a core sustained Arctic Ocean observing system.
- Support extensions of existing global ocean observing systems to the Arctic.

ArORA's First Years – Near-term Tasks (1-2 years)

- Maintain an annual meeting at ASSW
- Support Indigenous- and community-led observing networks – partner for workshops to promote knowledge exchange
- Advance inclusion of Arctic-specific elements in ocean observing best practices and methodologies
- Identify needs and gaps for 'matchmaking' capabilities to link users and providers of ocean information
- Initiate 'data flow mapping' framework for crowd-sourced living inventory of Arctic Ocean observing efforts

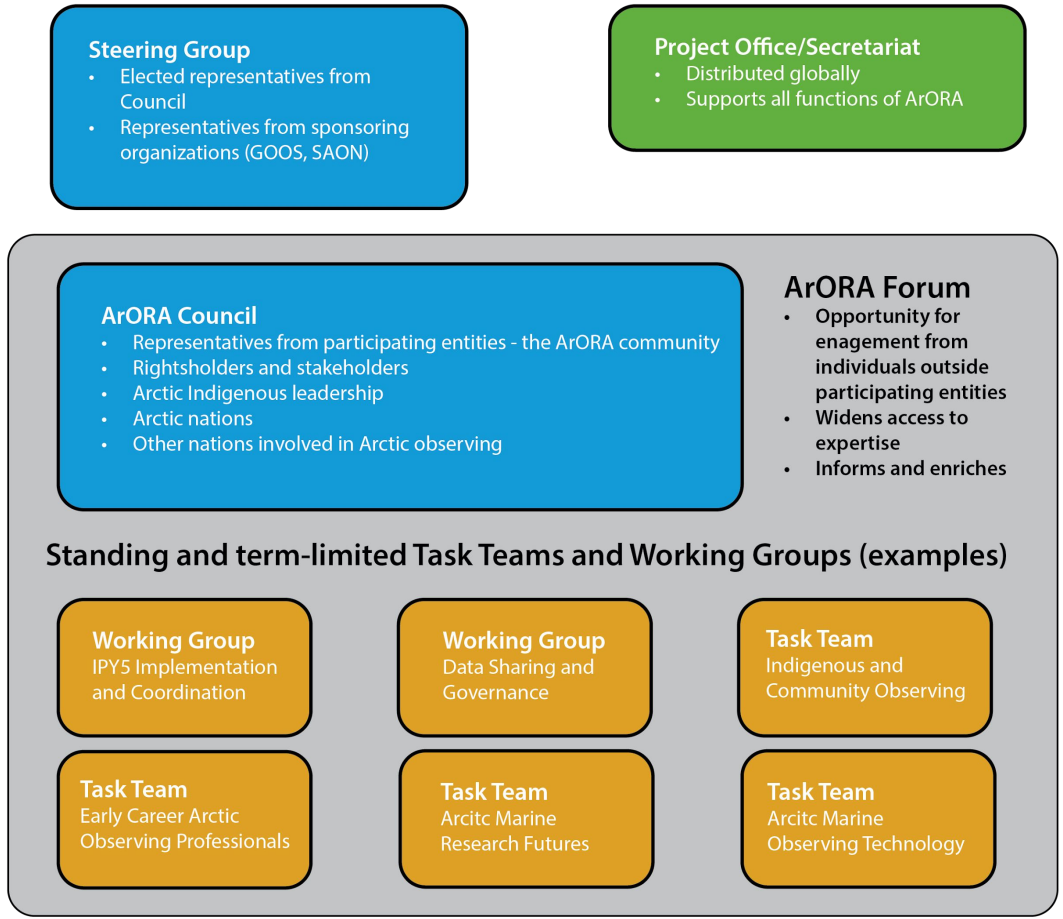
ArORA's First Years – Medium-term (2-5 years)

- Develop plans for a sustained core Arctic Ocean observing system
- Engage stakeholders to identify needs from local to global scales
- Promote adherence to Inuit Circumpolar protocols for equitable and ethical engagement
- Support training, workshops, and other opportunities for early career ocean professionals and Indigenous knowledge holders.
- Maintain and promote best practices and methodologies for Arctic Ocean observing
- Support implementation planning for the International Polar Year, IPY-5 (2032-2033)

ArORA Governance – Shared Principals

- **Open Data Policy and Data Stewardship:** Respect for data sovereignty. Where possible, free and open exchange of data and information, in accordance with international frameworks.
- **Co-Production of Knowledge:** Commitment to integrate Indigenous knowledge and community-based observations with western science. Partnership in the design, implementation, and interpretation of the observing system.
- **Sustained Operation:** Long-term observations. Seek mechanisms to secure sustained, predictable funding.
- **Interoperability:** Common standards for instrumentation, data formats, and metadata to easy integration and allow interoperability.
- **Scalability:** Scale organization as needs and activities change over time.

ArORA Governance – Proposed Structure



How to Contribute to the Design Process

- Website: https://goosocean.org/arora-task-team/
- Join the Task Team – open to all!
  Self-nominate by contacting Craig or Anna.
- Public comment period for draft plan (Feb 2026).
- Workshop at Arctic Science Summit Week 2026 (Aarhus)

The Arctic Ocean Regional Alliance Task Team

Co-Chairs: Craig Lee (University of Washington, United States), Anna Nikolopoulos (UiT, Norway)

Steering Group: David Allen (NOAA, USA), Maia Hoeberechts (ONC, Canada), Michael Karcher (AWI, Germany), Molly McCammon (AOOS, United States), Maribeth Murray (AINA, Canada), Jeremy Wilkinson (BAS, United Kingdom), Eun Jin Yang (KOPRI, Republic of Korea)

Members: Nicoletta Ademollo (CNR-ISP, Italy), Maurizio Azzaro (CNR-ISP, Italy), Manuel Bensi (OGS, Italy), Dominique Berod (WMO, Int), Agnieszka Besczynska-Moeller (IOPAN, Poland), Maria Teresa Bezem (UiB, Norway), Melissa Chierci (IMR, Norway), Cathy Coon (Department of Interior, United States), Brad deYoung (CIOOS, Canada), Parnuna Egede Dahl (Oceans North, Greenland), Agneta Fransson (NPI, Norway), Hannah-Marie Garcia (Tribal Government of St Paul Island), Maria Grigoratou (EPB, Int), Jari Haapala (FMI, Finland), Emma Heslop (GOOS, Int), Maria Hood (MOi, France), Monika Kedra (IOPAN, Poland), Jing Li (GOOS, Int), Takashi Kikuchi (JAMSTEC, Japan), Vidar Lien (IMR, Norway), Inga Lips (EuroGOOS, Belgium), Joseph Nolan (SeaScape Belgium, Belgium), Steffen Olsen (DMI, Denmark), Ben Rabe (AWI, Germany), Nicholas Roden (NIVA, Norway), Hanne Sagen (NERSC, Norway), Stein Sandven (NERSC, Norway), Haliehana M. Stepetin (Ted Stevens Center for Arctic Security Studies, USA), Toste Tanhua (GEOMAR, Germany), Melinda Webster (CliC, Int)

Open to new members…

ArORA Community

- Research and Academia
- Indigenous and Tribal Peoples
- Coastal communities and Municipalities
- National Agencies
- Industry and Private Sector
- Non-Governmental Organizations
- Policy- and Decision-makers
- Coordination bodies
- Funding entities