futureearth coasts

STRATEGY FOR RESEARCH

2018-2028

Supporting transformation to a sustainable and resilient future for society and nature on the coast

PHOTO CREDIT: Barry O'Dwyer

IN THIS DOCUMENT

FUTURE EARTH COASTS

Who are Future Earth Coasts?

Future Earth Coasts is a global network of coastal scientists and practitioners from all disciplines of the natural and social sciences, engineering, law and the humanities, who are dedicated to the sustainable development of our coastal zones. An International Project Office (IPO) advised by a Steering Committee coordinates the project to produce outputs that contribute towards strengthening the science-policy-society nexus to identify options for securing sustainable coastal futures in the new epoch called the Anthropocene. Regionally Engagement Partners further facilitate a globally distributed network of activities and engagement.

Connecting with Future Earth Coasts provides an opportunity to contribute inputs that add value and extend the utility of research from diverse disciplines to explore and understand the drivers and social-environmental impacts of global environmental change in coastal zones. Our activities assist researchers to connect with society, policy experts, practitioners, implementing bodies, the media, coastal resource user groups and other sectors that can contribute to and help to apply research to solve complex coastal challenges.

This document outlines an organisation to shape the research that will contribute to a new Our Coastal Futures initiative that addresses global sustainability challenges for the World's coasts. This initiative will enable and facilitate partnerships with a shared interest in implementing initiatives internationally, such as the UNs SDGs, Sendai Framework and Paris Agreement, regionally, such as the Regional Seas Programme (UNEP & others) and LMEs (IOC/UNESCO), and at national or smaller scales.

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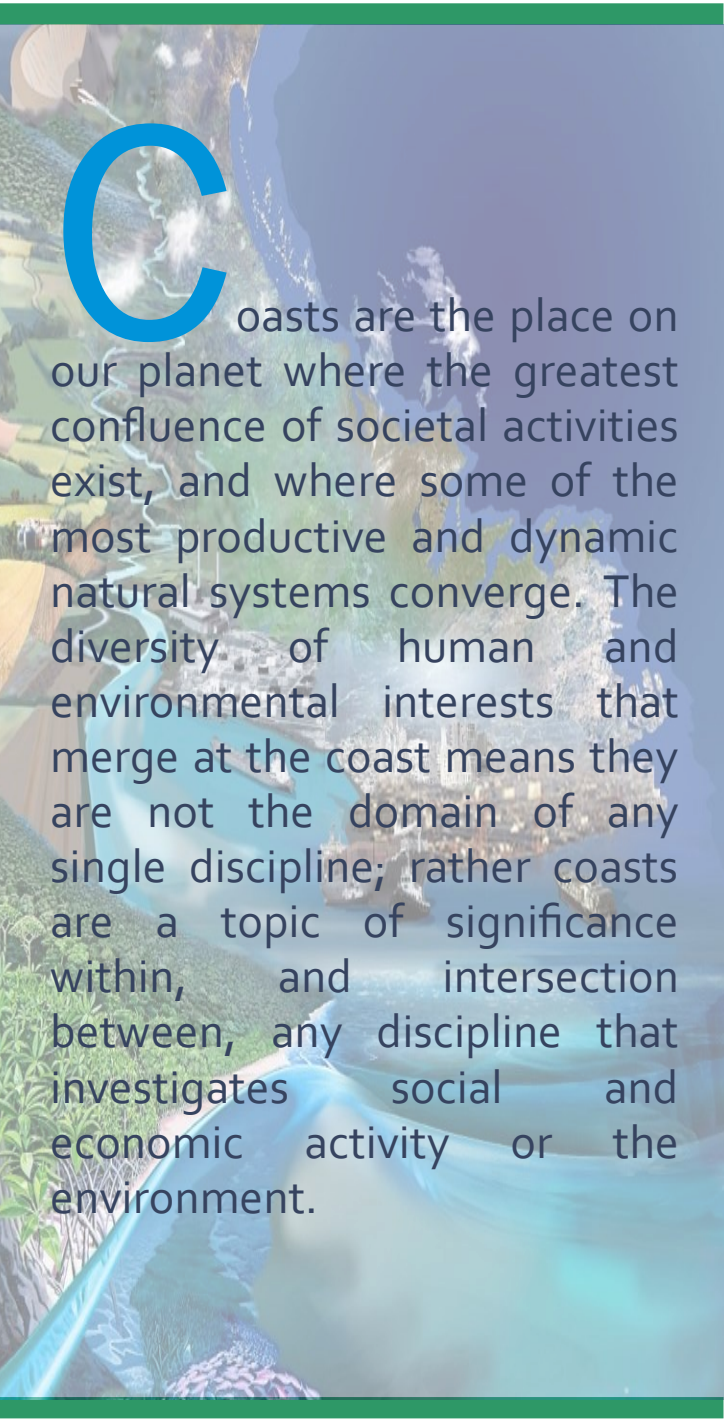
land-ocean interactions in the coastal zone

Future Earth Coasts is a global research project of Future Earth, a platform for translating sustainability knowledge into action that includes United Nations agencies, intergovernmental bodies and other organisations such as the International Council for Science.

www.futureearthcoasts.org

futureearth

research for global sustainability



Coasts are the place on our planet where the greatest confluence of societal activities exist, and where some of the most productive and dynamic natural systems converge. The diversity of human and environmental interests that merge at the coast means they are not the domain of any single discipline; rather coasts are a topic of significance within, and intersection between, any discipline that investigates social and economic activity or the environment.

Why is a future strategy for coastal research required?

Natural processes constantly change the bio-physical characteristics of coastal zones. These changes can be small or large in magnitude, persistent or fleeting and can lead to minor alterations to ecosystems or drive systems into new ecosystem states. Alterations to ecosystem states alters availability of resources and space for human use. More than any other geographic space, coasts are the place where the greatest confluence of societal activities exist benefiting from where some of the most productive and dynamic natural systems converge providing essential ecosystem services. Coasts provide wealth, jobs and economic opportunity for development, as well as a host of socio-cultural benefits to society. However, since the industrial revolution, the pace and magnitude of development and change has accelerated and is increasingly driven not by natural processes, but by human activity. Humans have become the dominant drivers of change in social-ecological systems. Today coasts are arguably the most transformed social-ecological systems on earth, characterised by pervasive unsustainable practices. Much of the world's coast represents a ribbon of exposure to natural hazards, climate driven changes and sea-level rise that already negatively affect natural ecosystems and human communities.

There is an urgent need for better understanding of human-environment interactions in coastal regions in order to improve forecasts of change and impacts, as well as appropriate responses. It is important to delve into root causes and drivers of choices that lead to unsustainable outcomes and maladaptive practices, and to deepen understanding about the limits, barriers and opportunities to transitioning towards coastal sustainability in the face of change, turbulence and surprise. This space of enquiry is the domain that Future Earth Coasts occupies providing a platform that connects the research community, and other multiple knowledge holders, with the multiplicity of users of knowledge whose actions, decisions and policies shape the coastal realm. Increased communication and collaboration amongst these multiple coastal stakeholders/actors will facilitate integration between research, policy and practice.

Shaping and contributing to coastal research

Ever since the 1992 Rio Summit there has been recognition that the world needs internationally coordinated research to solve the planet's most pressing challenges: No one nation can do it alone because these challenges are at a scale where they are breaching planetary boundaries, crossing national and regional borders and transcending the confines of traditional disciplines.

More than ever, natural sciences are needed to provide ecological system understanding, and social sciences are needed to provide social system knowledge and together how these points of reference inform societal choices and practices in the face of global change and uncertainty. However, perhaps of even greater importance is the design and implementation of 'socio-ecological' thinking and actions that recognize the land-sea interface and all who live there are part of coupled systems that need to be understood and managed in an holistic and integrated manner. Future Earth Coasts provides an opportunity to contribute towards building and connecting knowledge, exploring new development paths, and finding new ways to accelerate transitions to sustainable development at the coast through:

Co-design & co-production of knowledge – develops engagement strategies that bring together societal partners to build a common understanding about the coast and of future prospects to co-design questions that frame societal needs and actionable research and co-produce knowledge to achieve sustainability at the coast.

Chart a course to a new type of science – to develop a new engaged, action-oriented approach to coastal research that provides a forum to undertake innovative disciplinary research and co-design, coordinate and implement transdisciplinary research to identify, inform and facilitate sustainability pathways for the world's coastal zones.

Provide accessible and relevant products – that add value to research outputs that support synthesis and assessment efforts to align with policy and societal needs.

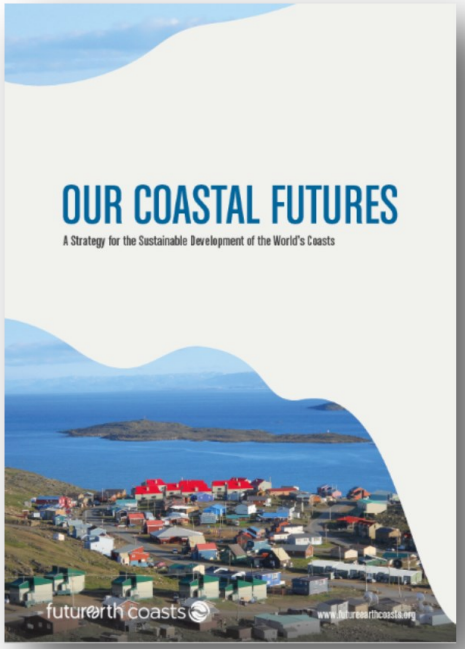
Capacity building – by drawing upon the experience and expertise of coastal specialists and practitioners from around the world and building partnerships to inform and advance sustainable development at the coast through networking, capacity development and mentoring.

Co-design & co-production of knowledge

Chart a course to a new type of science

Provide accessible and relevant products

Capacity building



The Future Earth Coasts approach

In order to provide a focus and approach that will foster collaboration across diverse disciplines and sectors and unlock regionally appropriate opportunities for the sustainable development of coastal zones FEC is developing, with partners across the research and practitioner communities, an initiative – 'Our Coastal Futures' – that identifies regionally appropriate opportunities for the sustainable development of coastal zones. Through this initiative, Future Earth Coasts provides an independent forum for regional coastal stakeholders to transform the way coasts are managed. This is outlined in the publication **OUR COASTAL FUTURES**: A Strategy for the Sustainable Development of the World's Coasts.

There is increasing awareness that monitoring the status of environmental and societal components of coastal systems will not deliver the knowledge for transformations to more sustainable pathways of coastal use. Our Coastal Futures provides a framework that supports processes of assessment that evaluate across disciplines and sectors to promotes a transdisciplinary approach that characterizes trends, and identify alternate scenarios options that lead to pathways of change in practice and society-environment interactions. This process differs from previous coastal and ocean assessments that focus primarily on the current state of the environment and background trends.

Our outputs will focus on building capacity to design future scenarios that identify solution pathways to inform decisions on complex societal issues, and translating knowledge that supports transitions to sustainable development at the coast by:

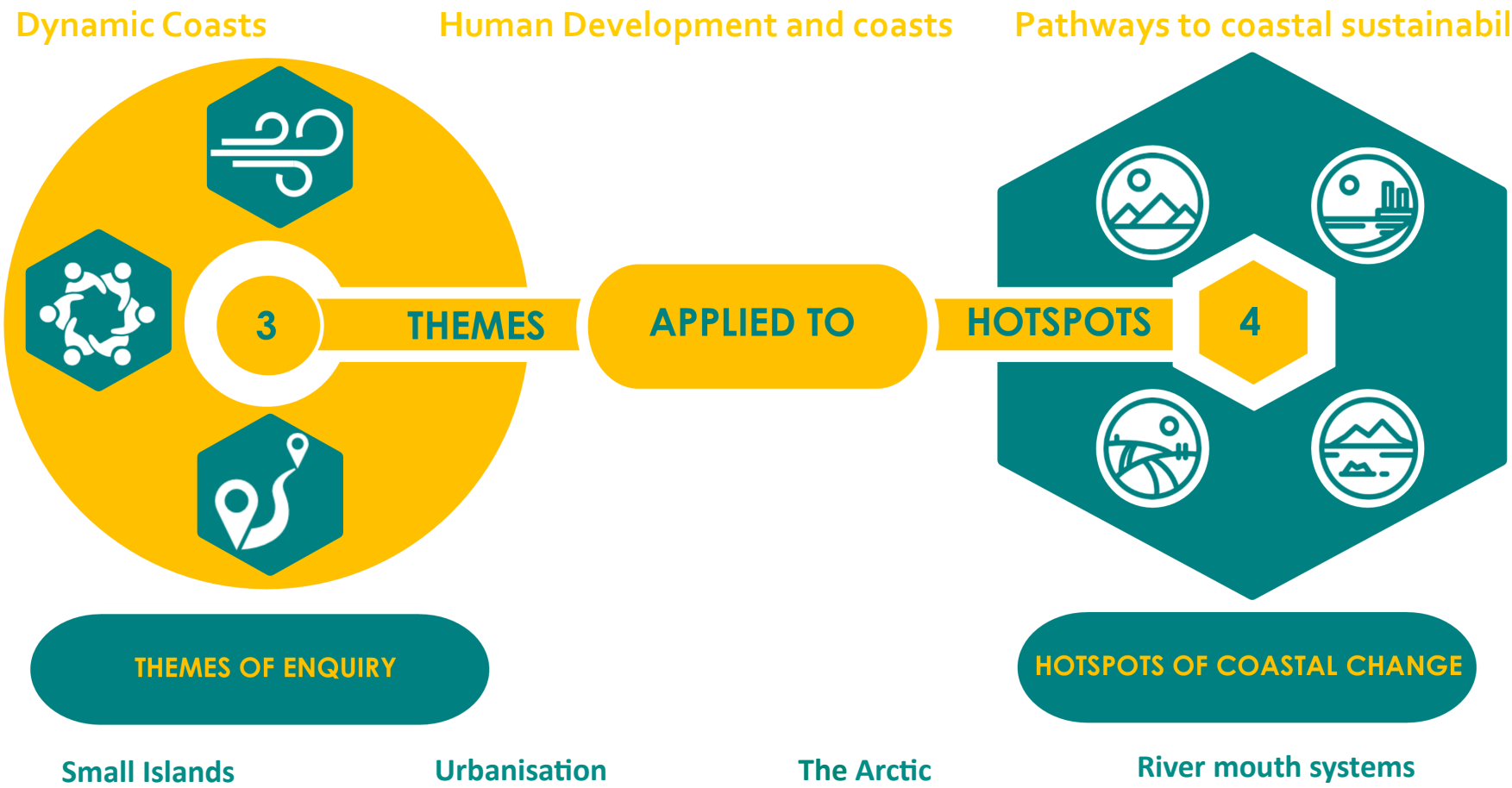
Facilitating open and inclusive platforms for observing and monitoring the status, trends and thresholds of coastal change.

Identifying tools and methodologies that promote processes of assessment and evaluation that lead to transformative sustainable pathways for well-being and development.

Evolving innovative means of communication that illustrate global environmental change.

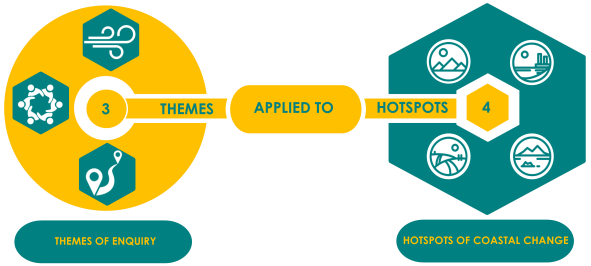
How is Future Earth Coasts structured?

Future Earth Coasts will work with its networks and community partners by focusing on three **Themes** of enquiry. Furthermore, FEC has identified critical features of coastal systems [**Hotspots**] that are particularly vulnerable to coastal change and critical to the sustainability of coastal socio-ecological systems:



The three themes are strongly inter-related and complementary. They are closely aligned with the Future Earth thematic areas, which will help to strengthen linkages and coherency with the overarching Future Earth research framework.

3 THEMES



4 HOTSPOTS

Understanding ***Dynamic Coasts*** - What are the trajectories of change to the environment and societies at the coast and how do natural processes and human activities interact? What are the limits and thresholds of change to ecosystem function and services?

Human Development and coasts - What are the consequences of 'business as usual' practices at the coast – which are sustainable and which are not? What are the implications to human wellbeing from coastal change, and how might human activities harness and shape nature?


PHOTO CREDIT: Don Forbes

Identifying plausible ***Pathways to coastal sustainability*** to avoid unwanted futures. What are the alternatives and what changes in practices are required to transition from un-desirable to desirable trajectories? How can society be empowered to prioritise actions towards sustainability?

Small Islands are vulnerable to global and climate change including extreme events, sea-level rise and the risk of inundation, population pressure and issues of decreased ecological diversity e.g. in coral reefs, mangroves. Vulnerable human communities on islands require transformational approaches to deal with a diminishing and degrading terrestrial and marine resource base.

Urbanisation is a process shaping human well-being and ecological integrity today, with a concentration of issues often found in coastal megacities. This topic is acquiring new urgency with rapid migration to coastal megacities and urban areas.


PHOTO CREDIT: Bruce Glavovic

The Arctic is experiencing rapid loss of ice and permafrost is thawing, accelerating coastal erosion, damaging infrastructure, and inhibiting access to food, with negative impacts on traditional lifestyles, health and wellbeing. Vulnerable Arctic coastal communities need transformative strategies and enhanced capacity to adapt and transition to safer futures.

River mouth systems such as deltas and estuaries, and lagoons, are at risk from climate change and sea-level rise, damming of rivers, seawater intrusion, groundwater and other fluid extraction, acidification of estuaries and intensifying anthropogenic activity, which increases the fluxes of nutrients and contaminants with negative impacts on the wellbeing of ecosystems and human health.

How will Future Earth Coasts operate?

Working groups provide a forum for building knowledge, synthesis and assessment that encompasses science and local and indigenous knowledge's that outlines the current situation and business-as-usual scenario to inform an approach that:

Enables regional stakeholders and institutions to develop a common understanding of their coasts and future prospects;

Co-designs robust strategies to chart desired coastal futures; and

Co-produces innovative coastal sustainability initiatives and pathways to achieve these desired outcomes, and realise the Sustainable Development Goals.

Working Groups underpin each Theme of enquiry to provide a forum to better understand the interplay of coastal natural and social dynamics and options for sustainable pathways of development. Addressing challenges at the world's coasts requires all disciplines of sciences, humanities and arts to find new ways to work together with society to provide solutions that will support transformations to global sustainability. Success also means deep engagement with leaders in policy, business, civil society and more to both inform the questions of research enquiry and find novel means for communicating the outcomes of research. **Working Groups will oversee three complementary arrangements that enable participation in the Future Earth Coasts project:**

Themed research activities that provide generate knowledge outputs that contribute to the Our Coastal Futures initiative and understanding of coastal social-ecological systems. Their membership will consist of a combination of affiliated individual researchers, research project teams and other experts;

Networks for communities interested in specific features or issues of coastal zones related to one or more of the Hotspots of coastal change or Thematic areas of enquiry; and

Activities in support of capacity building, including early career researchers, to strengthen organisational capacities, systems level capacities and the capacities of individual scientists in conducting solutions-oriented and transdisciplinary research to improve coastal sustainability planning and decision-making.

WORKING GROUPS

1 DYNAMIC COASTS

This WG will focus on synthesizing existing understanding of the changing state of coasts in terms of risks and future trends.

2 HUMAN DEVELOPMENT AND COASTS

This WG will focus on enhancing understanding of impacts, risks and injustices of current development practices and offer alternative approaches and mechanisms for reducing risk, building resilience and promoting social justice and accountable governance systems at various scales.

3 PATHWAYS TO COASTAL SUSTAINABILITY

This WG will focus on understanding how society, and its institutions, can be empowered to make decisions that resolve conflicting interests and turn coastal sustainability knowledge into practical action.

OUR COASTAL FUTURES

The three working groups help shape **Our Coastal Futures** to identify regionally appropriate opportunities for the sustainable development of coastal zones.

Working Groups facilitate and enable exchange of knowledge between researchers, managers and other stakeholders concerning the impact of change on coastal governance and management. They will develop methodologies to co-produce knowledge products that synthesis available information, and develop capacity to identify pathways of transformations to more sustainable practices.

DYNAMIC COASTS

1

Coastal systems and regional seas are constantly changing as a result of biophysical and socio-economic activities. This WG will focus on synthesizing existing understanding of the changing state of coasts in terms of risks and future trends and could address aspects of:

Building on the LOICZ sediment model by adding the ecosystem, geomorphology and governance dimension.

Developing typologies of coastal vulnerability and resilience at various spatial and temporal scales.

Application of ecosystem models for assessing impact of anthropogenic activities on coastal biodiversity and resultant future changes in ecosystem productivity in hotspots.

Identifying and assessing links and feedbacks between social and ecological systems in the coastal zone.

HUMAN DEVELOPMENT AND THE COASTS

2

Coastal development practices, unsustainable resource use and risks associated with change affect human well-being and threaten vulnerable coastal communities. This WG will synthesize impacts of coastal change to understand interactions between vulnerabilities at the local, regional and global scale and could address aspects of:

Understanding impacts and risks associated with "business as usual" approaches.

Building resilience of fragile coastal communities.

Breaking cycles of risk creation at the coast.

Advancing societal justice for sustainable coastal futures.

Governance of urban-rural transitions.

PHOTO CREDIT: Bruce Glavovic

3 PATHWAYS TO COASTAL SUSTAINABILITY

Work with strategic partners to enable stakeholders to identify and choose credible, relevant and legitimate coastal sustainability pathways for their region. Work will include understanding barriers and enablers for transitioning to coastal sustainability, and identifying practical processes to identify and institutionalize transitions to alternative futures. The underlying aim is to understand how society, and its institutions, can be empowered to make decisions that resolve conflicting interests and turn coastal sustainability knowledge into practical action. The Working Group could among other things address:

PHOTO CREDIT: Don Forbes

Synthesize the current state of knowledge and produce a body of literature targeted towards relevant government, civil society and scientific audiences.

Develop and apply methodologies for governance baseline assessments for global comparative analyses of decision making processes in the coastal zone.

Investigate barriers and enablers for making the transition to coastal sustainability, and catalogue bright spots and dark spots of decision making at the coast.

Identify the strengths and weaknesses of alternative 'futures' / horizon-scanning / scenario-based methods for mapping plausible coastal futures to reduce coastal vulnerability and risk, and build resilience and sustainability.

The Ocean Acidification Africa Network

Future Earth Coasts enables and manages the OA-AFRICA NETWORK, which is a pan-African network to coordinate and promote ocean acidification awareness and research.

It provides a platform for sharing ideas, designing collaborative research programmes, troubleshooting challenges, and facilitate international collaboration and support. The network is made up of scientists interested in conducting research on ocean acidification monitoring and observation in Africa as part of the wider Global Ocean Acidification Observing Network. The network has carried out four workshops with over 100 scientists, graduate students, technicians, and managers.

OA-Africa.net

The Lagoons for Life Network

Through linking with international experts, stakeholders, researchers and scientists, the Lagoons for Life network aims to co-design lagoon management strategies that address current and future issues in coastal lagoon ecosystems and their ecosystem services. Improving our understanding of how lagoons respond to change at local, regional and global scales is necessary to sustainably manage these ecosystems, and the ecosystem services they provide, and assess the socio-environmental implications of future development. The network recognises that there are data and knowledge gap in the systematic study of coastal lagoons that requires integration of environmental, social and economic datasets from multiple sources.

lagoonsforlife.com

Circum-Arctic Coastal Communities KnOwledge Network

CACCON is a pan-Arctic network of communities and knowledge hubs sharing knowledge and processes that lead to transformative pathways to realize ideal futures. In partnership with other Arctic knowledge networks and programs, including the Exchange for Local Observations and Knowledge of the Arctic (ELOKA) and Arctic-COAST, it promotes consensus and collaboration to advance local knowledge availability and accessibility for adaptation planning and sustainable development in Arctic coastal communities and regions. CACCON is established as a distributed network of local (community or regional) knowledge centres exchanging information, including data, technical capacity, adaptation strategies, or other types of Indigenous and peer community knowledge in the circumpolar north.

caccon.org

Future Earth Coasts

PLATFORMS FOR COLLABORATION

NETWORKS

Who should participate?

Individual researchers, organisations, or research projects are invited to affiliate their activities and participate and contribute outputs to Working Groups that develops pathways to sustainable futures for coastal societies at regional and other spatial scales. Future Earth Coasts provides a knowledge platform and forum that is relevant to major global sustainability challenges at the coast, that include:

- Sustaining the supply of ecosystem services and resources, and managing synergies and trade-offs among them, by understanding how change is shaped by environmental and societal processes.
- Building knowledge about the impacts of climate change and adaptation responses for coastal peoples and ecosystems.
- Identifying models of governance that are responsive, flexible and accountable.
- Identifying and shaping innovations that combine urban and rural environments with resource usage that are robust to change.
- Increasing the resilience of coastal systems through identification of thresholds and risk associated with change.
- Encouraging sustainable patterns of space and resource usage that promote well-being and identify sustainable development pathways and related changes in human behaviour.

Joining Future Earth Coasts brings benefits that include:

⇒ Representation in a global research platform with 25 years of experience contributing to addressing the challenges posed by global environmental change;

⇒ Building strategic collaborations with networks of communities of interest working on coastal issues;

⇒ Contributing to and influencing the activities of Working Groups focussed on the transformation of disciplinary/sectoral knowledge to addressing global challenges at the coast;

⇒ Providing access to a global database of individuals and organisations from knowledge providers (academic and research) and users of knowledge (e.g. policy makers, UN bodies);

⇒ Joining consortia targeting funding opportunities assisted and mediated by the International Project Office of Future Earth Coasts;

⇒ Contributing to capacity building and exchange activity;

⇒ Hosting of project and network platforms on the Future Earth Coasts database and website.

More information and background to the Future Earth Coasts project, and our existing Networks and Communities can be found on our website – www.futureearthcoasts.org – where you can also join our community.

Background to Future Earth Coasts

Since 1993, Future Earth Coasts (formerly Land-Ocean Interactions in the Coastal Zone (LOICZ) 1993-2015) has advanced understanding of change to the World's coastal zones by exploring the drivers and socio -environmental impacts of global environmental change. The project initiates themes of activity that contribute towards a strategy for the Sustainable Development of the World's Coasts , and which is delivered by a world-wide network of researchers, from all disciplines and sectors. Members of the network contribute their research towards goals of integrated multi- and inter- disciplinary methods to analyse the environmental and social interactions and feedbacks governing coastal system status and change.

Since its inception in 1993, the goals of LOICZ, and now Future Earth Coasts, have evolved as the challenges of global environmental change research and its purpose have also evolved. As LOICZ, the project opted to take a less travelled path within the domain of coastal research, where interdisciplinarity and the science–policy interface are essential features of a holistic paradigm for the scientific study of coasts. Building on its strengths of quantifying material fluxes and the role of coastal and shelf ecosystems in their biogeochemical transformations (1993-2004), LOICZ, for its second phase (2003-2013), developed a scientific agenda that tightly coupled the social-ecological systems as they interactively influence the biogeochemistry of carbon, nutrients and sediments along the catchment–coast continuum. In addition, it brought to centre stage the vulnerabilities of both humans and ecosystems – given the anthropogenically altered and changing state of the coast, and the mechanisms for mitigating these through defining sustainable future scenarios.

Now with the transition to Future Earth, there is a paradigm shift emerging. The new vision is to support transformation to a sustainable and resilient future for society and nature on the coast, by facilitating innovative, integrated and solutions-oriented science. Realising this vision takes Future Earth Coasts into a third generation: to be at the forefront of co-designing, co-producing and co-implementing knowledge for identifying options for coastal resilience and pathways towards sustainability through the utility of research and in partnership with policy and societal stakeholders.

Future Earth Coasts is first and foremost a platform to integrate communities of science and society to co-design methodologies and approaches for the co-production of knowledge that will lead to more sustainable practices of use and development of the world's coastal zones. The principle role of Future Earth Coasts is to provide, enable and facilitate a portal and platform to harness the knowledge and understanding of research and practitioner communities to facilitate and stimulate an exchange between research, policymaking and practice. Activities by Future Earth Coasts add-value and additional benefit to on-going research, and the development of new research, of individual scientists, research groups and institutions.

Citation: **OUR COASTAL FUTURES**: Strategy for Research , Future Earth Coasts. Our Coastal Futures Series No. 2. MaREI, Cork , 16pp. ISSN: Pending

The Future Earth Coasts **OUR COASTAL FUTURES** Series is published and distributed free of charge to all interested in global change research in coastal areas.

PHOTO CREDIT: Hester Whyte

Future Earth Coasts is a core project of Future Earth with its International Project Office based at MaREI | Centre for Marine and Renewable Energy, Environmental Research Institute , University College Cork . MaREI is the marine and renewable energy research, development and innovation centre supported by Science Foundation Ireland and partially funded through Science Foundation Ireland. It combines the expertise of a wide range of research groups and industry partners , with the shared mission of solving the main scientific, technical and socio-economic challenges across the marine and renewable energy sectors.

MaREI Centre for Marine and Renewable Energy

Environmental Research Institute

UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

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