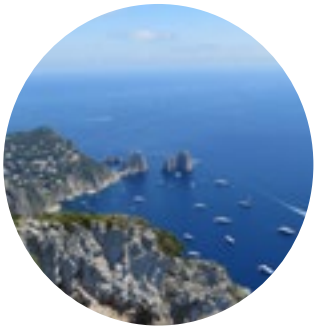

Coastal Resilience Collaborative

Delft, Netherlands
May 6-8, 2015

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Summary of Events

Wednesday, May 6th -UNESCO-IHE, Delft

- Arthur Mynett introduced UNESCO-IHE, the largest international graduate water education facility in the world.
- Chris Zevenberg spoke about coastal resilience programs in the Netherlands, adaptive delta management, building with nature, managed failure, and resilience pathways for mid-size cities worldwide. He also introduced us to the Polder model, and the Delta commissions (1.0 and 2.0).
- Section Breakouts:
    - **Solution Needers- wicked problems**
        - Focus on solutions not causes
        - DPSIR – interdependent items
            - Drivers, Pressures, Systems, Interventions, Response
    - **Solution Suppliers (private sector)**
        - Why are we here
            - Capacity building
            - Short and long term solutions
            - To Discover motivations and solutions
        - What should CRC be
            - Learning platform, we are collectively stronger, drive solutions together

May 7th – Province Zeeland

The group toured the Watersnood Museum which illustrates the impacts of the 1953 flood that stunned the Dutch and spurred much planning, reconstruction, and rethinking of the safety situation. We also visiting a dike reconstruction led by Rijkswaterstaat, toured the Oostersheldt Storm Surge Barrier, and watched 3d models of the impact of potential floods in the province.

The Dutch have long thought about coastal resilience through the lens of safety in terms preparing for a 1 in 10,000 year event. Sea level rise changes the predictions and forces reconstruction and reinforcement of existing protection measures. Ecological aspects are also beginning to be considered, which led to the opening of one of the blocked sea arms with the Oostersheld barrier which allows the sea and the river to meet. Finally, the Dutch are considering ways to build with nature to increase resiliency.

May 8th – Deltares

Deltares is a foundation that does research and provides advice to government and works jointly with universities on water management. They have a staff of 800 and a turnover of 110 million euros. Deltares's work is divided into five themes: flood risk, availability of fresh water, water quality, delta infrastructure, advice and adaptation, and integrated sustainable delta development.

The group discussed CRC, what it should look like, and what the added value might be. The details and results of this discussion are explained below.

Founding Sponsors

Participants: leadership tier

Thomas Armstrong, MRG

Dr. Thomas Armstrong is the President of the Madison River Group, LLC (MRG) which launched on January 1st, 2015. Prior to MRG, Dr. Armstrong served within the White House Office of Science and Technology Policy as the Executive Director of the United States Global Change Research Program (USGCRP); a 13 agency Federal Program with a $2.5B annual budget. During his tenure, Tom also served as the U.S. Head of Delegation to the International Panel on Climate Change (IPCC) Fifth Assessment Report and helped lead the U.S. government's technical and policy-level reviews of numerous IPCC reports.

Shannon Cunniff, EDF

Shannon Cunniff is the Deputy Director of the Environmental Defense Fund's Water Program. Her areas of expertise include ecosystems, rivers and deltas, natural infrastructure, and climate resilience. Shannon focuses on improving strategic and tactical effectiveness of EDF's Water Program team. She is also heading development of EDF's natural infrastructure program. Shannon has held senior environmental positions in several federal agencies addressing water resources management.

Kirk Hatfield, University of Florida

Dr. Kirk Hatfield is the Director of the Engineering School of Sustainable Infrastructure and Environment at the University of Florida, the Director of the Florida Water Resources Research Center, and a Professor in the Department of Civil and Coastal Engineering. Dr. Hatfield received his BS and MS degrees from the University of Iowa and his PhD degree from the University of Massachusetts in Amherst. Following graduation, he joined the University of Florida, Department of Civil Engineering in 1987.

Noreen Clancy, Rand Corporation

Noreen Clancy has been conducting policy research and program assessments at RAND since 1998. Her prime areas of interest relate to energy and environment issues and the financial services sector, including financial decision making. She recently studied the effects of Hurricane Sandy on New York City, specifically the risks of flooding as reflected in the expanded flood maps, the rising cost of flood insurance and the resilience of the city to respond to future events. Prior to joining RAND, Clancy worked at the National Oceanic and Atmospheric Administration and the Council on Environmental Quality.

Jay Martin, Ohio State University

Dr. Martin, Associate Professor in the Department of Food, Agricultural and Biological Engineering (FABE) at Ohio State, is an ecological engineer with expertise in both hydrology and ecosystem modeling. His research focuses on interactions between watersheds and downstream ecosystems. Prior to his project investigating connections between water quality in Maumee Bay and the upstream watershed, he completed similar projects in the Sandusky Watershed and Mississippi Delta/Gulf of Mexico. His other areas of research include natural systems for water treatment, small-scale bioenergy production and analyzing ecosystem sustainability.

Claudia Avendano, California Coastal Commission

Claudia doctoral candidate for Public Policy Planning and Development with a specialization in Coastal Land-use in response to sea level rise. Her previous experience includes US Army Corps of Engineers and Scripps Institute of Oceanography. Her specialties include spatial planning in California, land coastal plan updates for sea level rise, and coastal policy.

Joaquin Vallejo, Scripps Oceanographic

Joaquin is a MPIA Candidate at the School of International Relations and Pacific Studies. Before pursuing this degree he worked as at the British Embassy in Quito, Ecuador. He is a bilingual international relations professional with experience in international climate change negotiations, political and economic reporting, and public relations.

Arthur Mynett, IAHR

Arthur Mynett is a professor of hydraulic engineering and the head of Water Science and Engineering Department at UNESCO-IHE Institute for Water Education. Arthur has long been contributing to IAHR in various capacities. He was actively involved in specialist working groups and served for over a decade as secretary and chairman of the IAHR-IWA-IAHS Joint Committee on Hydroinformatics. He stimulated cross-links within IAHR as well as with other associations outside. He served as Division Chair and has been elected on Council since 2005.

Chris Zevenbergen UNESCO-IHE

Chris Zevenbergen is professor at the Water Engineering Department of UNESCO-IHE and at Tu Delft, The Netherlands. He chairs the Flood Resilience Chair Group of UNESCO-IHE. He is also strategic advisor of the Executive Board of the Dura Vermeer Group NV and Member of the Board of the Public Private Innovation Platform Clean Tech Delta (CTD), The Netherlands. He worked as a researcher on various environmental issues related to the building industry, such as environmental impact assessments, product development, emission modeling, testing procedures, building codes and guidelines in the 1980s followed by 20 years international research and consultancy in environmental engineering and water management of urban systems. In the past 15 years he has accumulated extensive national and international experience with integrated approaches to manage floods in urban environment.

Gulizar Ozyurt, Middle East Tech University

Gulizar is an assistant professor of civil engineering at Middle East Technical University in Ankara, Turkey. She specializes in coastal engineering, research and modeling. She has many years of experience in coastal research and modeling.

Whit Remer, ASCE

Whit Remer is the Senior Manager of Federal Relations at the American Society of Civil Engineers. Before undertaking this role, Whit worked at the Environmental Defense Fund as a Senior Policy Analyst and an Attorney.

Sas Terpstra, TG Consultant

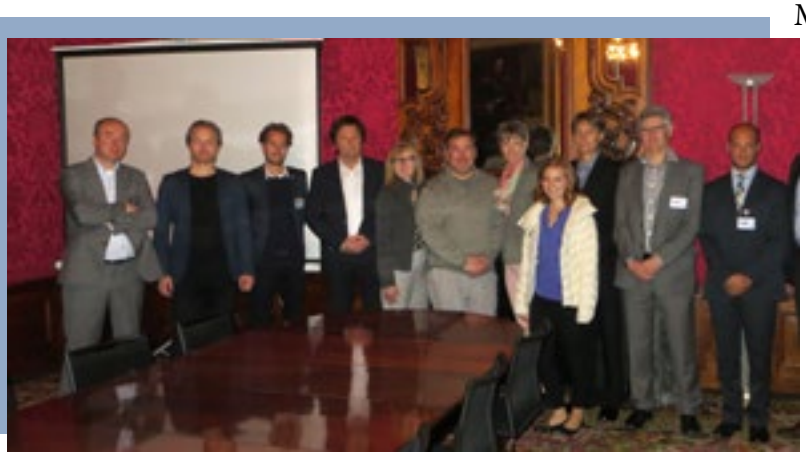
Sas Terpstra is a strategy and management consultant at Twynstra Gudde. He believes in the strength of collaboration because cooperation creates more social benefits and stimulates respect especially when dealing with diverse interests. Sas focuses on strategic water issues and linking process and content while monitoring the organization and environment.

Joost De Haan, Delfland Water Authority

Joost is the digital coordinator for Delfland Water Authority as well as the innovation manager. Recently, he has been working on developing the pilot of the topsector water project called "Digitale Delta" on water and IT in regional water management in order to establish unlimited access to water data through an app-store for water applications and open data alignment.

Pim Nijssen, TG consultant

Pim is a consultant at Twynstra Gudde, a leading independent firm of management consultants and managers. He focuses on collaboration, and his mission is to create balance, and an atmosphere of trust by focusing on a) choosing core issues and keeping them simple, b) working with colleagues in a spirit of trust in both each other and in the solution where the c) atmosphere is relaxed, with a little humor in the right place and time!



Stan Bronson, Florida Earth Foundation

Stan is the executive director of the Florida Earth Foundation, a public-private partnership of over 120 agencies, universities, industries and not-for-profits, whose mission is to "put people together through education, outreach and facilitation to ensure the environmental integrity of Florida and quality of life." Coming from a ranching family who supplied the land for Walt Disney World in the 1960's, Stan's love of the land has always been an inspiration throughout his career.

Jaclyn Brass, Intern

Jaclyn is an intern for the Florida Earth Foundation. She is currently studying environmental law at the University of Colorado, and has a background in public relations and sustainability.

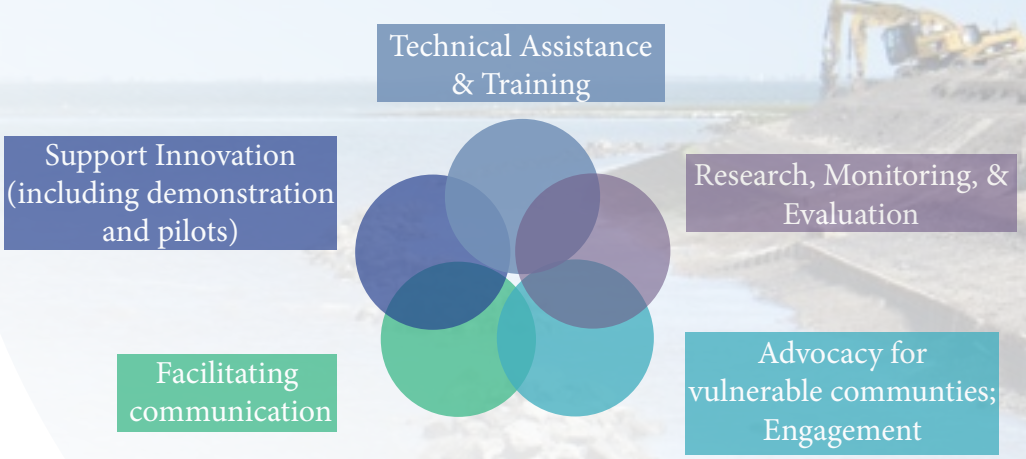
Ian Heijn, Atkins Global

Ian Heijne is responsible for the River & Coastal Business for Atkins in the UK and internationally. This business operates across the UK providing technical and engineering advice on coastal environment, maritime and coastal engineering, hydraulic structures (barrages, weirs etc.), flood defense and flood risk management. International projects include: Maritime (the Ayla Oasis in Aqaba), Flood Risk Management (Trinidad Watershed Management Plan), Barrage Refurbishment (Sennar Dam, Sudan) and Policy (IMPMED). Ian is further engaged in defining and promoting coastal resilience approaches through integration with Atkins extensive ecosystem restoration and green infrastructure capabilities.

What is the CRC?

The Coastal Resilience Collaborative is a global knowledge sharing platform that aims to connect the solution needers with the solution suppliers. It is a multi-lateral, science-based, knowledge-sharing, capacity-building collaborative focused on coastal resilience, adaptation, and managed failure. The object of the CRC is to find and assemble knowledge to accelerate the decision making process.

The role of CRC:



Discover knowledge from and enhance the feedback loop between:

- Universities
- Consultancies
- NGOs
- Governments

Add value by:

- Creating synergy
- Dissemination
- Organization
- Presentation
- Credibility, visibility, accessibility
- Helping people become comfortable with using information
- Integration, validation, accessing – to reduce risk
- Quantifying risk reduction
- Recognizing multiple lines of defense and solutions
- Avoiding the desire to harden methods, techniques
- Flexibility
- Gathering lessons learned and best practices

What CRC is NOT:

- CRC is not a lobbying organization
- CRC is not a research organization
- Reinventing the wheel

Lasting questions

- Does CRC serve a monitoring function?
- Does CRC act a as a warehouse or knowledge-storing organization?
- Where should it be housed?

Mission, Vision & Pillars

Mission:

To influence decision makers, encourage efficiency, and facilitate action in the field of coastal resilience by sharing knowledge of best practices and lessons learned

The Coastal Resilience Collaborative connects leaders and provides gateways to solutions to accelerate the creation of resilient coastal communities

Vision:

By 2025 medium-sized cities have begun implementing solutions that improve their resiliency to sea level rise and coastal storms in a manner that improves their quality of life, economic strength, and natural capital

Pillars of CRC:

1 Global Exchange:

Facilitating the exchange of best practices and lessons learned in coastal resilience between stakeholders.

2 Resilience Innovation Mapping:

Creating a branded published report that identifies and analyzes innovations in coastal resilience.

3 Identification of Innovators:

Finding new leading innovators with relevant solutions for coastal resilience challenges.

4 CRC Globalizer:

support those innovations and innovators in scaling up coastal resilience solutions and strategies

LOGIC Model

Needs and Assets	Desired Results	Indicators	Activities	Resources
Needs: *Because of increased vulnerability due to more frequent and intense of coastal events, needs include:* • Significant infrastructure and economic investment in the coastal zone • New funding options for resilience projects • Lower cost resilient solutions • Solutions that solve mutlitple society goals • increased access to growing body of scientific and technical informaton relevant to resilience decision making • Medium sized cities will face climate change consequences faster because they lack the necessary resiience and resources that big cities have (http://www.populationassociation.org/wp-content/uploads/APC-Climate-Change-Fact-Sheet6.pdf) • Integration and evaluation of the growing body of coastal resilience activity Assets: • Vast network of contacts and member organizations • Perspectives of private sector, government, NGO's and academia • The CRC leadership represent multiple disciplines relevant to resilience and financing • Access to UNESCO-IHE students and professors (thought leaders and future influential world-wide) • Many organizations exist that are interested in promoting coastal resilience • tools exist that already help • Pool of potential funders • International recognition	Short term: Long term:		Potetntial tactics: • outreach presentation • 10 hot spot focus • conference • published report • short courses	Have: • partnerships with IAHR and IHE • Large group of member organizations • participation from academia, NGO's private sector and governmental organizations • potential funders Need: • Staff • professional services • a "home"

Landscape Analysis

National or International in Scope

- The Nature Conservancy Coastal Resilience Network: Addressing increasing threats due to sea level rise and storms by bringing science and action together where nature is part of the solution to reduce risk.
    - Assess Risk/Vulnerability: Assess risk and vulnerability to coastal hazards including current and future storms and sea level rise scenarios.
    - Identify Solutions: Identify where nature-based and other solutions can be used for reducing risk.
    - Take Action: Take Action to help communities develop and implement nature-based solutions to increase coastal resilience.
    - Measure Effectiveness: Measure Effectiveness to ensure that our efforts to reduce risk through restoration and adaptation are successful.
- Coastal Resilience Network is composed of: TNC, Natural Capital Project, ASFPM (see separate listing below), AZAVEA {Azavea specializes in the creation of geographic web and mobile software, as well as geospatial analysis services to enhance decision-making.}, University of Southern Mississippi, and CISR - Mapping
- Association of State Floodplain Managers: "…To promote education, policies, and activities that mitigate current and future losses, costs, and human suffering caused by flooding, and to protect the natural and beneficial functions of floodplains - all without causing adverse impacts."
- US Global Climate Research Project: "Assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change."
- National Wildlife Federation - working with Corps on coastal resilience and Climate Change (e.g., on Corps' SAGE project).
- Pew Charitable Trust – considering taking up a coastal resiliency initiative – unknown focus
- Georgetown climate – Georgetown Climate Center's **Adaptation Clearinghouse** has a resource database and online community that seeks to assist state policymakers, resource managers, academics, and others who are working to help communities adapt to climate change. Has an Adaptation Tool Kit that explores 18 different land-use tools that can be used to preemptively respond to the threats posed by sea-level rise to both public and private coastal development and infrastructure, and strives to assist governments in determining which tools to employ to meet their unique socio-economic and political contexts.
- Restore America's Estuaries - Have looked at economic value of recreation of coasts/estuaries
- Institute for Sustainable Infrastructure - Focus is primarily on sustainability of infrastructure (materials/design akin to Green Buildings Council LEED Certification), but chartered by major A&E firms.
- **IMCORE** - Innovative Management for Europe's Changing Coastal Resource.
- National Climate Change Adaptation Research Facility – (Australia)
- ICLEI - builds and serves a worldwide movement of local governments to achieve tangible improvements in global sustainability, with a specific focus on environmental conditions through cumulative local actions: Connecting leaders, accelerating action, and gateways to solutions
- American Society of Adaptation Professionals – no mission statement! Connects individuals and can create groups to focus on issues. Doesn't seem to be getting traction – needs leadership for groups.
- UNEP/PEDRR (Partnership for Environment and Disaster Risk Reduction)- a global partnership of 14 organizations that promotes ecosystems management as the key strategy to reduce disaster risk, increase local resilience and adapt to a changing climate. As a global Thematic Platform of the International Strategy for Disaster Reduction
    - (ISDR) system, PEDRR works to accelerate implementation of the Hyogo Framework for Action 2005-

2015: Building resilience of nations and communities to disasters.

- Institute for Sustainable Infrastructure - to develop and maintain a sustainability rating system for civil infrastructure.
- Institute for Sustainable Communities - Gives passionate, committed people the tools and skills they need to inspire active citizenship, protect the environment, and take on climate change.
- Smarter Safer Coalition is a national (US) coalition that is made up of a diverse chorus of voices united in favor of environmentally responsible, fiscally sound approaches to natural catastrophe policy that promote public safety. Coalition members strongly support reform of the National Flood Insurance Program. Runs a Risk Mitigation Leadership forum.
- Conservation International
- www.IWA-network.org -The International Water Association (IWA) is an organisation that brings together people from across the water profession to deliver equitable and sustainable water solutions for our world.
- R!SE - The R!SE initiative is an ambitious global response to a daunting global challenge, a new way of collaborating, to unlock the potential for public and private sector actors who are ready and willing to make a step forward and take leadership on disaster risk reduction. The overall goal of the initiative is to make all investments risk-sensitive
- The Delta Alliance -Delta Alliance is an international knowledge-driven network organization with the mission of improving the resilience of the world's deltas. With increasing pressure from population growth, industrialization and a changing climate, it is more important than ever that these valuable and vulnerable locations increase their resilience to changing conditions. Delta Alliance brings people together who live and work in deltas. They can benefit from each other's experience and expertise and as such contribute to an increased resilience of their delta region, with the help for instance of network wings.

Regional/State Centered

- Alliance for Regional Climate Change Adaptation - Members are sharing information and intelligence among regions on best practices and lessons learned. We are identifying each region's most innovative and successful strategies and then determining how they could be adapted to another region's particular needs, as well as inform development of new regional partnerships. This will reduce reinventing of the adaptation "wheel" while preserving regional identity and context. The four California regions are working collectively with state and federal agencies to create a formal partnership that will make the most efficient use of our limited resources and streamline state and regional adaptation assistance to local governments. We see initial opportunities for on-the-ground state/regional joint initiatives on climate adaptation research, funding, training, and communications, with the great potential to create a long-term partnership around policies and programs that will benefit all Californians.
- South Florida Regional Climate Change Compact - The Compact represents a new form of regional climate governance designed to allow local governments to set the agenda for adaptation while providing an efficient means for state and federal agencies to engage with technical assistance and support. The Compact calls for the Counties to work cooperatively to:
    - Develop annual Legislative Programs and jointly advocate for state and federal policies and funding
    - Dedicate staff time and resources to create a Southeast Florida Regional Climate Action Plan to include mitigation and adaptation strategies
    - Meet annually in Regional Climate Summits to mark progress and identify emerging issues.