DEMONSTRATION OF ADDITIONALITY OF WRC PROJECTS

ADD-AM

Document Prepared by Restore America's Estuaries and Silvestrum Climate Associates

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1. SOURCES

This module is based on the following methodologies:

- VM0033 *Methodology for Tidal Wetland and Seagrass Restoration, v1.0*
- VM0007 *REDD+ Methodology Framework (REDD+ MF), v1.6*.

2. SUMMARY DESCRIPTION OF THE MODULE

This module provides a determination, based on an activity method, of additionality for tidal wetland restoration and conservation of intact wetland project activities that meet the applicability conditions set out in Section 4 below.

3. DEFINITIONS

Definitions are set out in VCS document *Program Definitions*, and methodology *REDD+ MF*. This module does not set out any further definitions.

4. APPLICABILITY CONDITIONS

This module is applicable to tidal wetland restoration and conservation (WRC) project activities globally.

Project activities restoring tidal wetlands (RWE) may include any of the following, or combinations of the following:

- Creating, restoring and/or managing hydrological conditions (e.g., removing tidal barriers, improving hydrological connectivity, restoring tidal flow to wetlands or lowering water levels on impounded wetlands)
- Altering sediment supply (e.g., beneficial use of dredge material or diverting river sediments to sediment-starved areas)
- Changing salinity characteristics (e.g., restoring tidal flow to tidally-restricted areas)
- Improving water quality (e.g., reducing nutrient loads leading to improved water clarity to expand seagrass meadows, recovering tidal and other hydrologic flushing and exchange, or reducing nutrient residence time)
- (Re-)introducing native plant communities (e.g., reseeding or replanting)
- Improving management practice(s) (e.g., removing invasive species, reduced grazing)

Project activities conserving tidal wetlands (CIW) may include, any of the following, or combinations of the following:

- Protecting at-risk wetlands (e.g., establishing conservation easements, establishing community supported management agreements, establishing protective government regulations, and preventing disruption of water and/ or sediment supply to wetland areas)
- Improving water management on drained wetlands
- Maintaining or improving water quality for seagrass meadows
- Recharging sediment to avoid drowning of coastal wetlands
- Creating accommodation space for wetlands migrating with sea level rise

RWE and CIW projects may be combined as well.

5. PROCEDURES

Step 1: Regulatory surplus

The project proponent must demonstrate regulatory surplus in accordance with the rules and requirements regarding regulatory surplus set out in the latest version of the *VCS Standard*.

Step 2: Positive list

The applicability conditions of this methodology represent the positive list. The project must demonstrate that it meets all of the applicability conditions listed in Section 4 above, and in so doing, it is deemed as complying with the positive list.

The positive list was established using the activity penetration option (Option A in the *VCS Standard*). Projects which meet the applicability conditions are deemed additional.

Justification for the activity method is provided in Appendix A.

6. REFERENCES

N/A

APPENDIX A: POSITIVE LIST JUSTIFICATION

A. Tidal Wetland Restoration Activities

Tidal Wetland Restoration Activities in the United States

VM0033 Methodology for Tidal Wetland and Seagrass Restoration established a positive list for activities meeting the applicability conditions. All such activities remain on the positive list and are deemed additional.

Tidal Wetland Restoration Activities not in the United States

The level of restoration in the U.S. was determined to be 2.74% (or lower) in VM0033. As one of the most developed nations, with the most robust national and state level programs for tidal wetland restoration in the world, the U.S. has the highest activity level for tidal wetland restoration. Accordingly, the level of tidal wetland restoration for the rest of the world is conservatively assumed to be below 2.74%. No global data set exists to determine the level of tidal wetland restoration activities, and this conclusion relies on expert judgement (see below).

All tidal wetland restoration outside of the U.S. meeting the applicability conditions in Section 4 above, and the regulatory surplus requirements, is therefore on the positive list as well.

B. Tidal Wetland Conservation Activities

Summary

Geospatial data were used to determine the extent of tidal wetlands which fall into coastal and marine protected areas and were analyzed to determine what percentage of tidal wetland areas are being conserved. The results of this analysis indicate that 3.64% of tidal wetlands is currently being conserved.

Many tidal wetlands are being converted for activities such as aquaculture, agriculture, wood harvesting, industry, and urban development (Murray *et al*., 2011; Pendleton *et al*., 2012). The rate of loss of tidal wetlands is estimated to be the highest of any ecosystem. Estimated losses are a cumulative 25-50% of total area of each type of tidal wetland habitat (mangrove, tidal marsh, seagrass) within the last 50-100 years (Mcleod *et al*., 2011); a 50% loss of tidal wetlands and 30% loss of seagrasses (Barbier *et al*., 2011); and a 50% loss of the historical global coverage of mangroves in the past 50 years (Pendleton *et al*., 2012). Tidal wetland losses are ongoing, with estimated losses of 0.5%-3% annually: 1-2% for tidal marshes, 0.4–2.6% for seagrasses, and 0.7-3% for mangroves (Pendleton *et al*., 2012). Given current conversion rates, it is projected that in the next 100 years, 30-40% of tidal marshes and seagrasses and 100% of mangroves could potentially be lost (Pendleton *et al*., 2012).

Analysis

Tidal wetland conservation activities globally are at a low level of penetration relative to their maximum adoption potential. Specifically, the activity penetration level of such activities is conservatively calculated to be 3.6% (or lower), as demonstrated below. This level is below the 5% threshold specified in the *VCS Standard*. Therefore, tidal wetland conservation projects meeting the applicability conditions of this module are deemed additional.

Activity penetration is given as:

APy = OAy / MAPy

Where:

APy Activity penetration of the project activity in year *y* (percentage)

OAy Observed adoption of the project activity in year *y*

MAPy Maximum adoption potential of the project activity in year *y*

For tidal wetland conservation, these terms are further defined as follows:

OAy Geospatial data from United Nations Environment Programme's World Conservation Monitoring Centre (UNEP-WCMC) for world-protected areas

MAPy Geospatial data from UNEP-WCMC for mangrove, salt marsh, and seagrass ecosystems

The geospatial data from UNEP-WCMC is the most commonly used data in many global blue carbon studies (Murray *et al*., 2011; Pendleton *et al*., 2012; Atwood *et al*., 2015).

MAPy **Calculation**

The mangrove dataset from the UNEP-WCMC shows the global distribution of mangrove forests. This dataset was prepared by the United States Geological Survey (USGS) with the temporal range from 1997 to 2000, and published in 2011 (Giri *et al*., 2011). This dataset was prepared by classifying satellite imagery of the earth using Global Land Survey (GLS) data and Landsat archives (Giri *et al*., 2011). About 1,000 Landsat scenes were interpreted using both supervised and unsupervised digital image classification techniques (Giri *et al*., 2011). These datasets mostly consist of small polygons along the coastline. For each mangrove ecosystem location, there is information on the country of mangrove location, surface area in squared kilometers, and surface area in square miles (Giri *et al*., 2011).

The seagrass dataset was compiled by the UNEP-WCMC in collaboration with Dr. Fred Short, a researcher from the University of New Hampshire. This dataset ranges from 1934-2004, was published in 2005 and has been updated since then (UNEP-WCMC and Short, 2005). The polygon data are relatively comparable to other blue carbon ecosystem data. The point data only indicates the presence of seagrass, but not the aerial extent covered or a specific site of seagrass. This underrepresentation of data is most likely due to the challenges and costs of mapping submerged habitats such as seagrass meadows. During analysis, it was difficult to combine the point data with polygon data and calculate total blue carbon area. Therefore, point data were not utilized in this analysis, yielding a conservative approach to calculating activity penetration because it underestimates the total area of seagrass habitat globally.

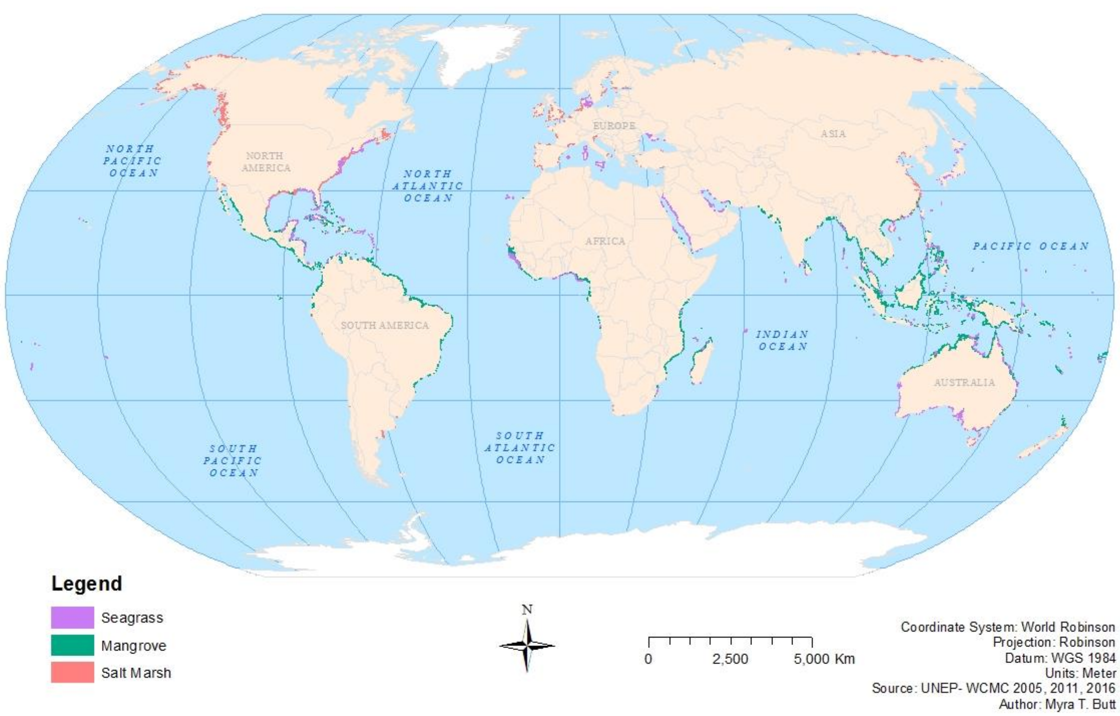
The saltmarsh dataset has not been published yet, but these are the most recent available data. This dataset is being prepared for a peer-review journal publication by researchers at the UNEP-WCMC and was acquired through special licensing permission. This dataset was collected via remote sensing techniques.

Table 1: *MAPy* – Global Extent of Tidal Wetland Habitats

MAPy	Estimate of Global Extent (km^2)
Mangrove	145,500
Seagrass	365,155
Salt Marsh	143,172
Total	653,827

The *MAPy* for tidal wetland conservation is 653,827 km^2.

Figure 1: Global Extent of Tidal Wetland Habitats (Butt, 2016)



OAy Calculation

The protected areas dataset from the UNEP-WCMC shows the global distribution of the world's protected areas. The World Database on Protected Areas (WDPA) is a joint project with UNEP and the International Union for Conservation of Nature (IUCN). The data are compiled and managed by the UNEP-WCMC along with governments and nongovernmental organizations (NGO), and constitute the most comprehensive global database for terrestrial and marine protected areas (UNEP-WCMC, 2015).

This dataset provides spatial data with a well-documented associated attribute data table that is well formatted, since all data provided must meet the WDPA data standards. Coastal and marine protected areas were used for this analysis. Furthermore, the analysis includes IUCN management categories Ia, Ib, and II (strict nature reserves, wilderness areas, and national parks), consistent with research demonstrating that these management approaches are effective at preventing habitat loss (Miteva et al., 2015) while other management categories do not correlate to effective habitat conservation. (Juffe-Bignoli et al., 2014).

As with the seagrass dataset, this dataset also contains both point and polygon data. Sites reported as points have no digitized boundaries, because this information was not submitted by the data providers and thus the actual extent of the protected area is unknown. Therefore, protected area point data were not used in this study, consistent with the above approach for determining seagrass habitat extent.

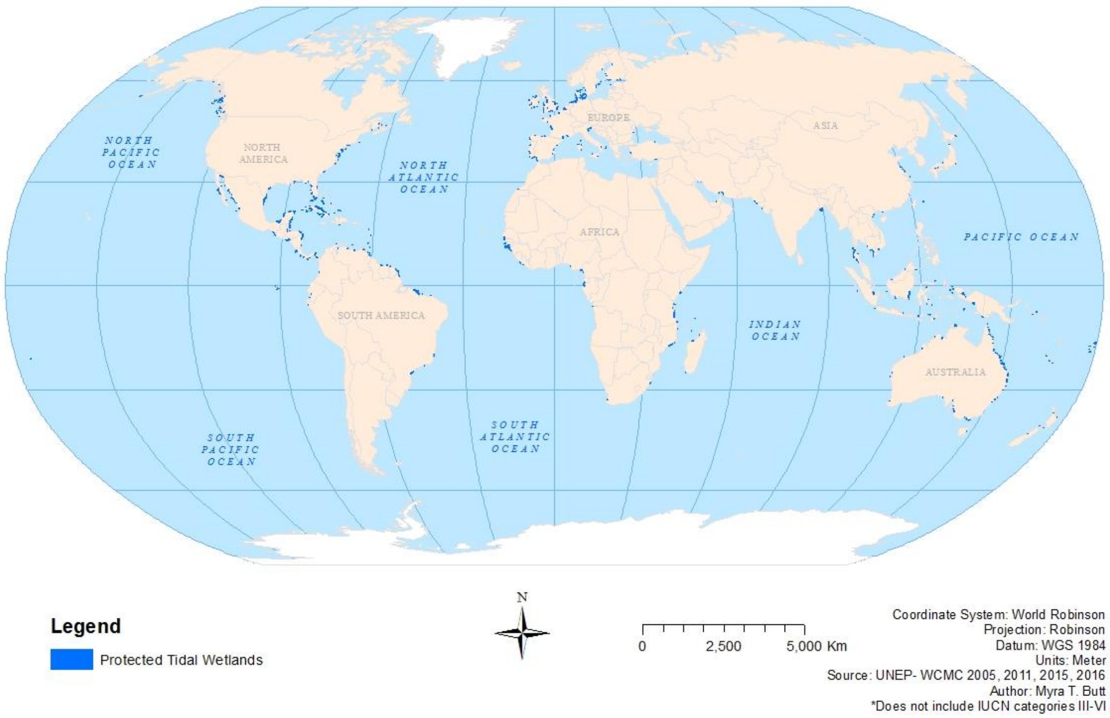
Not all areas in management categories Ia, Ib, and II are being effectively conserved. Some 22% of these protected areas are soundly managed, and this percentage is applied to the overlapping tidal wetland and protected areas (Leverington *et al*., 2010). Coastal areas are more difficult to manage due to issues with enforcement. Many marine protected areas do not belong to individual countries and lack functional boundaries; therefore, the legal frameworks for marine protected areas often founder (Boersma and Parrish, 1999). A great deal of marine protected area is found along coastlines near shipping lanes and human centers of activity, also making the strict management of these areas more difficult (Boersma and Parrish, 1999). The 22% adjustment is therefore a conservative estimate, since the Leverington *et al*. (2010) analysis included non-coastal as well as coastal areas.

Table 2: *OAy* – Global Extent of Protected/Conserved Tidal Wetland Habitats

OAy	Reported Protected (km^2)		Effectively Protected (km^2)
Mangrove	34,849		7,667
Seagrass	57,753		12,706
Salt Marsh	15,665		3,446
Total	108,267		23,819

The *OAy* for tidal wetland conservation globally is 23,819 km^2.

Figure 2: Global Extent of Protected/Conserved Tidal Wetland Habitats (Butt, 2016)



<u>*APy* Calculation</u>

$APy = OAy / MAPy$

APy = 23,819/653,827

APy = 3.6%

<u>Further Discussion</u>

The geospatial software, ArcGIS 10.3.1, was used to view data, calculate geographic area, and produce maps of each blue carbon ecosystem for this analysis. Each blue carbon ecosystem dataset was intersected with coastal and marine protected areas to determine the areas that fell within protected boundaries. It is important to note that the raw data was often repaired while processing due to errors in the geometry of the raw datasets. Next, the geometric area was calculated for the protected ecosystems and total protected area was summed.

References

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Murray, B.C., Pendleton, L., Jenkins, W.A., and Sifleet, S. 2011. *Green Payments for Blue Carbon*. Nicholas Institute for Environmental Policy Solutions, Durham, North Carolina.

Pendleton, L., Donato, D. C., Murray, B. C., Crooks, S., Jenkins, W. A., Sifleet, S., Craft, C., Fourqurean, J.W., Kauffman, J.B., Marba, N., Megonigal, P., Pidgeon, E., Herr, D., Gordon, D. and Baldera, A. 2012. Estimating Global "Blue Carbon" Emissions from Conversion and Degradation of Vegetated Coastal Ecosystems. *PLoS ONE* 7(9).

UNEP-WCMC and Short, F.T. 2005. Global Distribution of Seagrasses (version 3). Third update to the data layer used in Green and Short (2003), superseding version 2. Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: http://data.unep-wcmc.org/datasets/7

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Verified Carbon Standard. 2015. VM0033 Methodology for Tidal Wetland and Seagrass Restoration, v1.0. Contributing authors: Emmer, I., Needelman, B., Emmett-Mattox, S., Crooks, S., Megonigal, P., Myers, D., Oreska, M., McGlathery, K. and Shoch, D. Developed by Restore America's Estuaries and Silvestrum. Verified Carbon Standard, Washington, DC.

Protected Blue Carbon Procedure (Butt, 2016)

Preparing marine and coastal protected area data:

- Download the protected areas data
- Select for coastal and marine protected areas
- Create new layer for selection.
- In this new layer, select for not IUCN category III, IV, V, VI
- Export new layer
- Run data repair
- Save new layer.

Calculating areas:

- Download all ecosystem datasets from UNEP WCMC
- For all the datasets, make sure the projection of the data is the same (I would select open street map first then export to that data frame)
- Run a data repair on each dataset multiple times until there are no more errors

First calculate the total area of blue carbon:

- In the repaired raw data file create a new field for the geometry area
- Set its parameters as share kilometers and double.
- Sum the area in the field
- Add up all the geometry areas for each of the ecosystems to get the total blue carbon area.

Protected blue carbon area:

- Run an intersect for each ecosystem data layer with the protected area layer
- Run a dissolve with the new intersected data layer (optional)
- Create a new field of x_coord or the x coordinated.
- Run a delete identical on the x coordinate field
- Create a new field of geo_area using kilometers squared and select double (if it is not already there)
- Sum geo_ area. This provides the protected area for that ecosystem.

* Note for some reason this procedure did not work for salt marsh. In this case, I divided the salt marsh data into 4 smaller datasets and followed the above procedures.

Expert Judgment

(Email dated January 22, 2017)

Dear Steve,

See below as promised the requested statement. Let me know in case you need anything else. Kindly note that I will be out in the field without email access till the 30th of this month.

EXPERT OPINION TIDAL WETLAND RESTORATION

From my experience as an ecologist with > 10 years of experience in coastal wetland restoration in different parts of the world (see enclosed CV), I support Restore america's estuaries' hypothesis that the percentage of (converted or degraded) tidal wetlands (as per the definition adopted) that has been under active and succesfull restoration lies well under the 5% tresholds. Unfortunately there are no complete data sets that, at a global level, measure the total extent of global tidal wetland loss, nor are there complete inventories that map out total coverage of restoration. Nonetheless the following considerations lead me to support the stated assumption:

- In countries where I have direct work experience (>20) ongoing tidal wetland losses are higher than the total number of hectares under restoration, as can be deduced from both anecdotal and science-ased evindences. An exeption are mangroves in Western Africa. Their total acreage has been increasing, following a rapid decline due to the 1980s droughts. However, this increase is not due to restoration, but rather natural regrowth following increased freshwater availability.
- While total investments in mangrove restoration have been relatively high (hundreds of thousands of hectares against multi-million hectare losses), research shows that long term succes of these interventions has been low. A review in the Phillipines reported failure rates of around 80%, due to inappropriate planting techniques. It is likely that similar rates apply elsewhere.
- Restoration efforts for other wetland types (seagrasses, salt-marsh environments, mud-coast systems, estuaries) have been very limited to date in developing countries. There are no indications that such measures will autonomously increase in the near-term. Investments in restoration of coastal wetlands in Europe have increased in recent years. However when asessed against historic losses these are unlikely to reach beyond the 2.7% treshold, also given that regulations and policies for conservation and restoration (e.g. mitigation requirements under Natura 2000) seem relatively similar to those in the US.

Wetlands International works towards establishing a sound knowledge-based that helps tracking this information. Working closely with organisations such as the Ramsar convention on wetlands, Jaxa, ESA, WCMC and others we are working towards establishing a geospatial data management system, that seeks to track changes in global wetland coverage and map the extent and succes of global restoration practice.

You might seek to ackquire further inputs from the following authorities:

- Ecosystem Return Foundation, an organisation promoting large-scale ecosystem restoration globally (contact Director Willem Ferwerda or one of his staff);
- Members of the IUCN mangrove expert group (specific expertise on mangroves);
- Members of the Ramsar Scientifc and Technical Review Panel.

With kind regards,

Pieter van Eijk

From: Steve Emmett-Mattox [mailto:SEM@estuaries.org]

Sent: vrijdag 13 januari 2017 20:20

To: Eijk, Pieter van <Pieter.vanEijk@wetlands.org>

Cc: Igino Emmer <igino.emmer@silvestrum.com>

Subject: tidal wetland/seagrass restoration 'additionality'

Importance: High

Hi Pieter,

It was excellent to make your acquaintance today and discuss the ‘additionality’ of tidal wetland and seagrass restoration activities globally.

As we discussed, we are seeking an expert opinion on our hypothesis stated below.

We’d be very grateful for a response in the next week, as well as a copy of your C.V. (in our experience, the VCS reviewers want to see the most extensive version).

In VM0033, Tidal Wetland and Seagrass Restoration Methodology, Restore America’s Estuaries applied a standardized approach to demonstrate the additionality of all tidal wetland restoration in the United States. Our definition of tidal wetlands includes all tidally influenced marshes, such as salt marsh and mangroves, and also includes seagrass beds. Our analysis in VM0033 showed that the adoption level of restoration in the US is 2.7%, which is below the 5% threshold set by the VCS. This places ‘tidal wetland restoration’ on the VCS ‘positive list’, and subsequently all new tidal wetland restoration in the US is additional. The adoption level is defined generally as ‘how much restoration has occurred compared to how much could occur’, or the actual as a percentage of the possible.

We’d now like to extend the positive list to include tidal wetland (again, broad definition) restoration anywhere in the world. It is our opinion that if the U.S., one of the most developed nations in the world, with a history of wetland destruction and a recent and at times intense focus on habitat restoration, is below the 5% threshold, that it is also true that the rest of the world will have an adoption level of less than 5% (and in fact, the rest of the world will have a level lower than the US level of 2.7%). In other words, there is no chance that the rest of the world is ahead of the U.S. in terms of the level of restoration that has occurred so far.

Based on our initial conversation, it sounds like you can confirm this hypothesis. If this remains the case, could you please prepare a statement that includes your rationale for this opinion? Please also comment on the (un)availability of data sets sufficient to calculate the level of adoption of restoration globally. You might wish to include information you have available on the loss of these various ecosystems over time (how much has been lost), the success of various restoration actions (e.g. the mangrove study we discussed) and anything else that supports your expert opinion.

If it would serve as a useful reference, the full analysis for the US is available in the methodology (VM0033) as an Appendix. Let me know if you would like an electronic copy.

I welcome any questions you may have, and Thank You for your assistance – it is very much appreciated!

Cheers,
Steve Emmett-Mattox

CV Pieter van Eijk (MSc) **July 2015**

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6706 EE Wageningen
The Netherlands
Telephone: +31 (0)6 16 73 69 90
e-mail: Pieter.vaneijk@wetlands.org
Date of birth: 2 August 1981
Gender: Male

Profile
Conservationist, dedicated to the conservation of wetland ecosystems for people and nature. Specialised in Ecosystem-based Disaster Risk Reduction and climate adaptation, with extensive experience in integrated water resources and coastal zone management. Focusing on mangroves, peatlands and river systems.

Education
2003-2005 MSc Biology, specialisation ecology
- Nature conservation and plant ecology group, Wageningen University (NL).
- Community and conservation ecology group, Groningen University (NL).
  Graduated at Wageningen University in 2005.

2000-2003 BSc Biology, specialisation ecology
Wageningen University (NL). Graduated in 2003.

1993-2000 Secondary education
Gymnasium Felisenum, Velsen (NL). Graduated in 2000.

Relevant work experience
June 2013 – Current Programme Head Climate Adaptation and Disaster Risk Reduction – Wetlands International
- Organisational respresentation and strategy development:
a. As member of the management team contribute to development of Wetlands International's strategic intent, and lead the development of related sub-strategies on delta's and coasts and on resilience.
b. Lead on partnership development with private sector innovation programme "Building with Nature", involving key players in the dredging industry and the hydrologic engineering sector.

c. Establish innovative partnerships around resilience with development NGOs (e.g. Red Cross, Care), private sector organizations (e.g. Shell, Boskalis) and multilateral agencies (e.g. UNEP).
d. Represent Wetlands international in Ecoshape/Building with Nature consortium.

- Strategic coordination of programmatic work on climate adaptation and disaster risk reduction:
a. Overseeing the implementation of risk reduction climate change adaptation projects in > 10 countries in Asia, Africa and Latin America, and evaluating the outcome of former projects.
b. Providing guidance to policy and capacity building activities related to nature- and community-based adaptation.
c. Developing project proposals on climate change adaptation and DRR.
d. Coordinating the development of technical baselines on ecosystem functioning and climate change adaptation.
e. Piloting and evaluating innovative financial mechanisms for ensuring community involvement in climate change adaptation.
f. Provide day to day guidance to a team of 4 staff in headquarters in the resilience team, and more indirectly support >20 people in the Wetlands International office network.

- Lead development and resourcing of strategic programmes within Wetlands International:
a. Build a portfolio of mangrove projects in South-east Asia and Africa (>7.000.000 Euro raised)
b. Development of Partners for Resilience programme, a collaborative risk reduction programme between humanitarian and environmental NGOs (36.000.000 Euro raised; member of 6 person core programme development team).
c. Coordinate development of a portfolio of Building with Nature related interventions, including in Indonesia, the Phillipines, Panama and Argentina.
d. Development of smaller wetlands conservation focusing on amongst others risk reduction, biodiversity conservation (1.700.000 Euro raised).

Sept 2006 – May 2013 (Sr.) technical officer wetlands and livelihoods programme – Wetlands International

- Project manager coastal resilience projects: managing a portfolio of projects in Indonesia, Thailand and West Africa targeted at creating coastal resilience through restoration of ecosystems and diversification of income generating activities.

- Technical advisor innovative financial mechanisms:
a. Piloting and promoting innovative micro-finance based introments as tools for reconciling sustainable development and environmental conservation: monitoring and evaluation of pilot projects; transferring experiences among projects; introducing the concept to governments, NGOs and the corporate sector; developing training materials; project development.
b. Reviewing emerging financing approaches and their potential application in conservation-development initiatives.

Aug 2010 – Current Board member of the Transpetrol foundation (Chair from Jan '14)

- Revision of grant making strategy
- Review and approval of project proposals
- Oversight of the foundation's operations

April – Sep 2006 Independent consultant

- Development of a report on the interactions between flood risk management and nature conservation in trans-boundary wetlands in Europe. Commissioner: Wetlands International.
- Preparation of awareness materials on climate change mitigation and adaptation in tropical peat swamp forests. Commissioner: Wetlands International.

- Biodiversity assessments on industrial complexes and building locations in the Netherlands. Providing advice on integrating nature conservation with urban planning. Commissioner: Staro forest and nature conservation.

June 2003 – Dec 2005 MSc Research projects

- Groningen University / Smithsonian Tropical Research Institution: "The impact of poaching on seed dispersal, survival and seedling recruitment in a tropical palm species. Interactions among Agoutis, Bruchid beetles and the palm Astrocaryum standleyanum in a Panamanian rainforest.
- ALTERRA Green world research/ Wageningen University: "Regeneration of fire degraded peatswamp forest in Berbak National Park, Sumatra – Interactions between ecology, hydrology and socio-economics".

Miscellaneous activities

1993-present Participant in various long-term bird surveys

- Banding birds for the Dutch bird ringing centre; collecting data for a study on avian influenza.
- Bird migration counts along the Dutch coast & breeding bird inventories.
- Participation in the voluntarily meadow bird protection scheme.
- Tanzania wetland and waterbird survey: waterbird inventory for AEWA (African Eurasian Waterbird Agreement) in Serengeti National Park and wetlands in the Riftvalley, Tanzania.

1993-2003 Member of the excursion committees of the Wageningen Biology faculty (2001-2003) and NJN, the Dutch young naturalists association (1993-1998)

- Organization of excursions, field trips and lectures with on ecology and conservation.

Computer skills
Word, Excel, PowerPoint, SPSS.

Overseas experience
Extensive experience of working in tropical coastal areas, including the Phillipines, Indonesia, Thailand, India, Bangladesh, China, Kenya, Tanzania, Senegal, Panama, Guatemala

Languages
Dutch (mother tongue), English (fluent), Spanish (reasonable), German (reasonable), French (reasonable), Bahasa Indonesia (beginner).

Interests
Birding, nature in general, hiking and traveling.

Selected Publications

Wesenbeeck, B.K. van, Balke T., Eijk P. van Tonneijck, F. Siry, H.Y., Rudianto, M.E. & Winterwerp J.C., 2015. Aquaculture induced erosion of tropical coastlines throws coastal communities back into poverty. Ocean & Coastal Management 116, pp. 466-469.

Spalding, M., McIvor, A. Tonneijck, F. Tol, S. & van Eijk,. P., 2014. Mangroves for coastal defense. Guidelines for coastal managers and policy makers. Wetlands International and The Nature Conservancy. 42 p.

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