



Nature-Based Solutions Workshop for Hazard Mitigation

August 25, 2021

Office of Disaster Assistance and Petroleum Management and
Office of the Governor



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Welcome

Greetings and Talofa,

It is my pleasure to welcome you to American Samoa's first Nature-Based Solutions Workshop for Hazard Mitigation. We are glad you are here, and we are excited to share this unique opportunity for you to learn more about an important and emerging area of practice for hazard mitigation: *Nature-Based Solutions*.

Although the term has many meanings, FEMA defines nature-based solutions as “*sustainable planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to build more resilient communities.*” As mentioned in my workshop invitation message, FEMA and other federal agencies have prioritized the use of nature-based solutions when awarding grant funding for hazard mitigation. With an unprecedented amount of federal hazard mitigation funding now available for FY-2021, today's topic is both extremely relevant and very timely for American Samoa.

With the support of our Hazard Mitigation Council, American Samoa has been very successful in securing pre- and post-disaster hazard mitigation funding for over twenty years. We are eager to continue leveraging this support for implementing our highest priority projects as outlined in our Territorial Hazard Mitigation Plan. As such, the use of nature-based solutions has also been integrated into our own process for identifying and prioritizing proposed mitigation projects.

Today's workshop is an important part of a larger effort to continue building and enhancing the Territory's capacity and capability to improve our resilience to natural hazards and climate change. As outlined in this handout, we have assembled a truly exemplary panel of speakers who are familiar with American Samoa and bring deep knowledge for today's agenda. We are confident the workshop will increase your understanding of how to use nature-based solutions for hazard mitigation, and we look forward to hearing your thoughts and ideas as well!

Thank you for your support and participation.

Sincerely,
Lima Fiatoa, State Hazard Mitigation Officer



<i>Welcome</i>	2
<i>Agenda</i>	4
<i>Speaker Biographies</i>	5
Kelley Anderson Tagarino.....	5
Dr. Michael W. Beck.....	5
Dr. Todd S. Bridges.....	6
Dr. Victoria Keener.....	6
Jocelyn Madison-Kelly.....	7
Jessica Podosky.....	7
Dr. Borja G. Reguero.....	8
Dr. Christopher Shuler.....	8
<i>Speaker Contact Information</i>	9
<i>Attendees</i>	11
Hosts.....	11
Speakers.....	11
On Zoom.....	11
In the Room Attendees.....	12
<i>Nature-Based Solutions Resources</i>	15
American Samoa Specific Resources.....	15
EPA Resources.....	16
Environmental Law Institute Resources.....	17
FEMA Resources.....	17
NOAA Resources.....	18
U.S. Army Corps of Engineers, Engineer Research Development.....	19
U.S.G.S. Resources.....	19
Other Resources.....	20



Agenda

Click on the title of each presentation to view slides including Mentimeter poll results.

Or click [HERE](#) for a recording of the entire workshop.

8:45 am – 9:00 am	Opening Remarks and Expected Outcomes
	Salo Ale, Lieutenant Governor
	Lima Fiatoa, State Hazard Mitigation Officer, Office of Disaster and Petroleum Management and Jamie Caplan, Principal, Jamie Caplan Consulting LLC
9:00 am – 9:30 am	Engineering with Nature Introduction
	Dr. Todd S. Bridges, Senior Research Scientist for Environmental Science, U.S. Army Corps of Engineers, U.S. Army Engineer Research and Development Center (ERDC)
9:30 am – 9:50 am	Pacific Islands Regional Climate Assessment (PIRCA) Report and NBS in American Samoa
	Dr. Victoria Keener, Senior Research Fellow at the East-West Center and Dr. Christopher Shuler, Researcher, Hydrology and Coastal Groundwater Research Group, University of Hawaii
9:50 am – 10:15 am	Engineering with Nature: Opportunities and Challenges in American Samoa
	Jessica Podoski, Coastal Engineering Subject Matter Expert & O&M Technical Manager, US Army Corps of Engineers, Honolulu District, Civil Works Technical Branch
10:15 am – 10:35 am	American Samoa Living Shoreline Project
	Kelley Anderson Tagarino, Extension Specialist for American Samoa, Aquaculture & Marine Science, University of Hawaii Sea Grant College Program, American Samoa Community College
10:35 am – 11:00 am	Building Resilience with Mangrove and Reef Natural Coastal Defenses
	Dr. Michael W. Beck, Professor & AXA Chair in Coastal Resilience, & Dr. Borja G. Reguero, Associate Research Professor, Institute of Marine Sciences & Coastal and Policy Program University of California Santa Cruz, Fellow with the Natural Capital Project
11:00 am – 11:15 am	FEMA’s BRIC Program Overview and Notice of Funding Opportunities
	Jocelyn Madison-Kelly, Grants Management Specialist, FEMA RIX
11:15 am – 11:30 am	Next Steps and Additional Resources
	Jamie Caplan and Lima Fiatoa

Speaker Biographies

Kelley Anderson Tagarino

Extension Specialist for American Samoa, Aquaculture & Marine Science, University of Hawaii Sea Grant College Program, American Samoa Community College

Kelley Anderson Tagarino is an extension agent for the University of Hawai'i Sea Grant College Program (UH Sea Grant) and is based in American Samoa (AS) at the American Samoa Community College (ASCC). As the only Sea Grant Extension agent in AS, Kelley works in a number of different areas, focusing on supporting sustainable seafood in AS, supporting the Marine Science Program at the ASCC, and maintaining the PacIOOS instrument package that includes sensors for measuring the conductivity, temperature and depth of seawater located in Pago Pago Harbor. Kelley has lived in AS since 2009 and began working with UH Sea Grant in 2013.

Previously Kelley was the Marine Science Coordinator for the ASCC where she directed the Marine Science Program as well as the Marine Option (MOP) program and taught Introduction to Oceanography and the associated lab, Introduction to Marine Biology and the associated lab, Natural Marine Resources, the three MOP courses, and Marine Science Special Projects.



Dr. Michael W. Beck

Professor & AXA Chair in Coastal Resilience, University of California Santa Cruz



Dr. Michael W. Beck is the AXA Chair in Coastal Resilience, Research Professor in the Institute of Marine Sciences, and Adjunct Professor in Ocean Sciences at the University of California Santa Cruz. Mike aims to reduce risks to people, property, and nature in his work across science, policy and practice. Mike works with governments, businesses, and conservation groups to bring clear tools and results to decision-makers. Mike served for 20 years as Lead Marine Scientist at The Nature Conservancy. Mike has advised government agencies in the US, Germany, UK, EU, Philippines, Jamaica, and Grenada among others. He has collaborated with many global agencies and companies including the World Bank, AXA XL, Munich Re, Swiss Re,

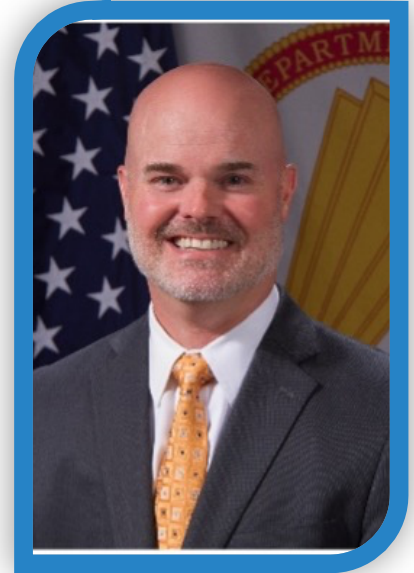
Lloyd's of London, Risk Management Solutions, and Jacobs. Mike has authored more than 80 peer-reviewed scientific papers and numerous Op-eds in the NY Times, The Hill, The

Conversation, and the Miami Herald. He has been a Fulbright Fellow and Pew Marine Conservation Fellow. You can find more on his work at <https://coastalresilience.ucsc.edu/>.

Dr. Todd S. Bridges

Senior Research Scientist for Environmental Science, U.S. Army Corps of Engineers, U.S. Army Engineer Research and Development Center (ERDC)

Dr. Todd S. Bridges is the U.S. Army's Senior Research Scientist (ST) for Environmental Science. He leads a number of research, development and environmental initiatives for the U.S. Army and U.S. Army Corps of Engineers in the areas of sustainable infrastructure, risk and decision analysis methods, and sediment assessment and management. Dr. Bridges is the National Lead for the USACE Engineering with Nature® initiative, which includes a network of research projects, field demonstrations, and communication activities to promote sustainable, resilient infrastructure systems. He leads efforts for USACE on the use of Natural and Nature-Based Features (NNBF) to support flood risk management, including an international collaboration to develop guidelines on the use of NNBF for coastal and fluvial systems.



Dr. Victoria Keener

Senior Research Fellow, East-West Center



Dr. Victoria Keener is a Senior Research Fellow at the East-West Center, the Co-Lead Principal Investigator of the NOAA Pacific Regional Integrated Sciences & Assessments (www.PacificRISA.org) program, and is the Lead Author of the Hawaii and Pacific Islands chapter of the 4th US National Climate Assessment. Dr. Keener also serves as the Chair of the City & County of Honolulu Climate Change Commission, which provides science-based recommendations to the Mayor and City Council. She earned a PhD in Agricultural & Biological Engineering from the University of Florida, specializing in regional and applied hydro-climatology. Dr. Keener leads an interdisciplinary research team of social and physical scientists that aims to reduce Pacific Islands' vulnerability to climate change by translating research into

actionable knowledge and working with a variety of stakeholders at the local, state, and regional level. Projects include producing downscaled climate and hydrological projections to estimate

future water availability; assessing stakeholders' decision-support needs; impacts of climate and health on migration; and ecosystem service valuation and modeling.

Jocelyn Madison-Kelly

Grants Management Specialist, FEMA Region IX

Hazard Mitigation Grants Specialist for FEMA Region IX, and also serves as the Tribal Liaison, and regional BRIC co-lead. I have been in this position for about 2 years now, joining from the California Governor's Office of Emergency Services where I also worked as a Hazard Mitigation Grants Manager. I live in Roseville, CA a little suburb outside of Sacramento, and spend my free time drawing, reading, and playing with my 12-year-old daughter, Juliahna, and 9-month-old Husky puppy, David Bowie.



Jessica Podosky

Coastal Engineering Subject Matter Expert & O&M Technical Manager, US Army Corps of Engineers, Honolulu District, Civil Works Technical Branch



Jessica received a Bachelor of Science degree from the University of Florida in Civil Engineering. While completing her degree she worked for the government of Martin County, Florida focusing on coastal projects and inlet management. She received a Master of Engineering degree from the University of Florida in Coastal Engineering, researching crenulate bay formation and prediction. Employed by the US Army Corps of Engineers since 2001, she has worked in both the Portland District (2.5 years) and the Honolulu District (16 years) as a coastal engineer. In 2019, she took on the position of Coastal Engineering Subject Matter Expert and O&M Technical Manager for the Honolulu District.

Dr. Borja G. Reguero

Associate Research Professor, Institute of Marine Sciences & Coastal and Policy Program University of California Santa Cruz, Fellow with the Natural Capital Project

Dr. Borja G. Reguero is a researcher at the University of California-Santa Cruz, and a Fellow with The Nature Conservancy's Global Oceans Team. He is a civil engineer with a PhD in coastal and marine engineering from the University of Cantabria's Environmental Institute of Hydraulics. His research focuses on climate risks in coastal areas, with a special focus on the impacts of climate change and ecosystem-based adaptation. He has consulted for several international organizations, including the Inter-American Development Bank and the World Bank, where his work has informed policy through science and applied knowledge. His current areas of interest are disaster risk reduction and risk management in coastal areas; re-engineering of ecosystems for coastal protection, particularly coral reefs; and the economics associated with climate adaptation and the economy of nature.

**Dr. Christopher Shuler**

Researcher, Hydrology and Coastal Groundwater Research Group, University of Hawaii



Christopher Shuler is currently an affiliate researcher at the Water Resources Research Center at the University of Hawaii at Manoa. He holds a PhD in Geology and Geophysics specializing in hydrology from University of Hawaii at Manoa, a B.S. in Environmental Science from the University of Oregon as well as a post-baccalaureate certification in Environmental Education from the University of Minnesota-Duluth. Christopher's current research is focused on ground and surface water resources in Hawaii and the American Samoa. His interests include numerical groundwater modeling, geo-chemical and isotopic aqueous chemistry, environmental water quality, and water sustainability studies. Christopher is an avid naturalist, outdoors person, and enjoys working in the field in both

terrestrial and oceanic environments.

Speaker Contact Information

Lima Fiatoa

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Dr. Todd S. Bridges

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Attendees

Hosts

- Lima Fiatoa, ODAPM
- Jamie Caplan, Jamie Caplan Consulting
- Darrin Punchard, Punchard Consulting (Jamie Caplan Consulting Team)

Speakers

- Dr. Todd S. Bridges, Senior Research Scientist for Environmental Science, U.S. Army Corps of Engineers, U.S. Army Engineer Research and Development Center (ERDC)
- Dr. Victoria Keener, Senior Research Fellow at the East-West Center
- Dr. Christopher Shuler, Researcher, Hydrology and Coastal Groundwater Research Group, University of Hawaii
- Jessica Podosky, USACE Honolulu District
- Dr. Michael W. Beck, Professor & AXA Chair in Coastal Resilience
- Borja Reguero, Associate Research Professor, Institute of Marine Sciences & Coastal and Policy Program University of California Santa Cruz, Fellow with the Natural Capital Project
- Jocelyn Madison-Kelly, FEMA Region 9, Mitigation

On Zoom

- David Kulberg, CFM, FEMA Reservist, AS resident
- Michael Hornick FEMA R9 MT RAB, Building Science/NFIP/NEHRP
- Curt Storlazzi, Research Geologist, USGS Pacific Coastal and Marine Science Center
- John Nielsen, Economist, USACE. Sacramento District
- Harrison Togia; Civil & Environmental Engineering + Geology Geophysics at the University of Hawaii at Manoa, in conjunction with HDOT and the NDPTC
- JoAnn Scordino, FEMA Region 9, Mitigation Community Planner
- Kate Kilduff, Risk Analysis for Mitigation at FEMA Region 9
- John Goertz, USACE Coastal Engineer, LA District
- Lori Schultz, USACE Sacramento H&H
- Adam Welchel, The Nature Conservancy
- Ben Reder, USACE Honolulu District
- Kate Kilduff, FEMA Region 9
- Ellie Covington, US Army Corps of Engineers
- Caroline Cunningham, Stantec
- Christina Hurley, Stantec



In the Room Attendees

* Already registered on ~~8/20/2021~~

HAZARD MITIGATION 3-DAY WORKSHOP

Sign-In Sheet

~~DAY 3: Benefit Cost Analysis~~
DAY 2: NATURE BASE SOLUTION TRAINING

Date: 8/25/2021
Time: 8:45 am

	NAME	TITLE	OFFICE/AGENCY	EMAIL	PHONE	INITIAL
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8/25/2021

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8/25/2021

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47	May Sumalo					
48	Delaney Tito					
49	Sandra Uta		DOC			SU
50	Elsie Lesa					EL
51	Andia Samuelu		DOC			AS
52	Falesina Voisif.	Director	DPW			FV
53	Jessie Suesue	Program Manager	ASCC	j.suesue@amsamoa.edu		JS
54						

Nature-Based Solutions Resources

American Samoa Specific Resources

A Resilient Future for Coastal Communities, Federal Policy Recommendations from Solutions in Practice, October 2020

<https://www.eesi.org/papers/view/a-resilient-future-for-coastal-communities>

American Samoa's Coral Reef Advisory Group (CRAG)

CRAG is a collaboration of seven local agencies: the Department of Marine and Wildlife Resources (DMWR), the Department of Commerce (DOC)'s Coastal Zone Management Program (AS-CMP), the National Marine Sanctuary of American Samoa (NMSAS), the American Samoa Environmental Protection Agency (EPA), the American Samoa Community College (ASCC), the National Park of American Samoa (NPSA), and the US Fish and Wildlife Service's (FWS) Rose Atoll National Wildlife Refuge and Marine National Monument.

<https://www.crag.as>

Piggery Runoff Solutions

<https://www.ridgetoreefs.org/american-samoa-piggeries-project-home-page->

Protecting American Samoa's Coral Reefs One Rain Garden at a Time

<https://coralreef.noaa.gov/aboutcrp/news/featuredstories/nov15/raingarden.html>

American Samoa Watershed Assessment – Review Plan, March 2021, U.S. Army Corps of Engineers

https://www.poh.usace.army.mil/Portals/10/docs/projectreviewplans/AmericanSamoa%20Watershed%20Assessment%20Review%20Plan%2016APR21.pdf?ver=cy51KzVJSbEA_eBsx9DHWw%3D%3D

Climate Change in American Samoa, Report for the Pacific Islands, Regional Climate Assessment (PIRCA)

<https://www.eastwestcenter.org/system/tdf/private/climate-change-in-american-samoa-pirca-2021-low-res.pdf?file=1&type=node&id=40286>

Climate Related Vulnerability Assessment for Transportation Infrastructure, March 2020 Appendices, Climate Related Vulnerability Assessment for Transportation Infrastructure, March 2020

Fact Sheet by Jessica H. Podoski, P.E. U.S. Army Corps of Engineers

<https://journals.tdl.org/icce/index.php/icce/article/view/10142/9428>

Environmental and Energy Study Institute (EESI)

Fact Sheet: Federal Resources for Nature-Based Solutions to Climate Change, February 2020

<https://www.eesi.org/papers/view/fact-sheet-federal-resources-for-nature-based-solutions-to-climate-change>

Fact Sheet: Nature as Resilient Infrastructure: An Overview of Nature-Based Solutions, September 2019

<https://www.eesi.org/papers/view/fact-sheet-nature-as-resilient-infrastructure-an-overview-of-nature-based-solutions>

Fourth National Climate Assessment, Chapter 27: Hawai'i and U.S. – Affiliated Pacific Islands

<https://nca2018.globalchange.gov/chapter/27/>

Hawaii and Pacific Islands King Tides Project

<http://www.pacioos.hawaii.edu/king-tides/map.html>

Promoting the Use of Green Stormwater Infrastructure in American Samoa, Regulatory and Programmatic Recommendations, April 2019

https://www.ncei.noaa.gov/data/oceans/coris/library/NOAA/CRCP/NOS/OCM/Projects/198/NA15NOS4820038/HorsleyWittenGroup2019_Green_Infrastructure_Report.pdf

The Value of U.S. Coral Reefs for Risk Reduction, Facts for American Samoa Report Summary

<https://www.usgs.gov/media/images/value-us-coral-reefs-risk-reduction-american-samoa>

Full Report and Article

https://www.usgs.gov/centers/pcmsc/science/value-us-coral-reefs-risk-reduction?qt-science_center_objects=0#qt-science_center_objects

EPA Resources

Green Infrastructure

<https://www.epa.gov/green-infrastructure>

<https://www.epa.gov/green-infrastructure/what-green-infrastructure>

Greening America's Communities

<https://www.epa.gov/smartgrowth/greening-americas-communities>

Lessons Learned on Integrating Water Quality and Nature-based Approaches into Hazard Mitigation Plans

<https://www.epa.gov/watershedacademy/lessons-learned-integrating-water-quality-and-nature-based-approaches-hazard>

Flood Resilience Checklist

<https://www.epa.gov/smartgrowth/flood-resilience-checklist>

Including Watershed Planning and Green Infrastructure into State Hazard Mitigation Plans

https://www.epa.gov/sites/production/files/2019-04/documents/final4_good_reasons_for_shmos_to_inc_gi_into_shmps_-_508.pdf

Environmental Law Institute Resources

Nature-Based Mitigation Goals and Actions in State and Tribal Hazard Mitigation Plans, April 2021

<https://www.eli.org/research-report/nature-based-mitigation-goals-and-actions-state-and-tribal-hazard-mitigation-plans>

FEMA Resources

Building Community Resilience with Nature-Based Solutions: A Guide for Local Communities

<http://www.fema.gov/nature-based-solutions-guide>

The Nature Conservancy Guide to FEMA mitigation funding gives a lot of examples of what might be considered “nature-based” for different hazards and includes case studies

<https://www.nature.org/content/dam/tnc/nature/en/documents/Promoting-Nature-Based-Hazard-Mitigation-Through-FEMA-Mitigation-Grants-05-10-2021-LR.pdf>

FEMA Training

FEMA is also offering a series of webinars that may interest folks you. Below is the full schedule. Recordings of past webinars will be available. Details regarding each webinar may be found on the this link:

<https://www.fema.gov/grants/mitigation/2021-building-resilient-infrastructure-and-communities-and-flood-mitigation-assistance-programs>

Training Date	Name of Training
28-Jul-21	Climate Change, Future Conditions, and Nature-based Solutions
Aug. 4, 2021	Fiscal Year 2020 Data and Trends
Aug. 11, 2021	Notice of Funding Opportunity for 2021 Hazard Mitigation Assistance Grants -Webinar #1
Aug. 18, 2021	Where Equity Fits into Design and Community Resilience
Aug. 24, 2021	Severe Repetitive Loss/Repetitive Loss Mitigation Priorities
Aug. 26, 2021	Notice of Funding Opportunity for 2021 Hazard Mitigation Assistance Grants -Webinar #2
Sept. 1, 2021	Hazard Mitigation Assistance Grants Application Pitfalls – Webinar #1
Sept. 8, 2021	Fiscal Year 2021 NOFO Notice of Funding Opportunity Technical and Qualitative Criteria
Sept. 13, 2021	Notice of Funding Opportunity for 2021 Hazard Mitigation Assistance Grants for Tribal applicants - NOFO Webinar #3 – Tribal
Sept. 20, 2021	Hazard Mitigation Assistance Grants Application Pitfalls – Webinar #2
Oct. 13, 2021	Federal Agency Roundtable and Partnerships

NOAA Resources

Climate Resilience Toolkit

<https://toolkit.climate.gov>

Coastal Flood Exposure Mapper

<https://coast.noaa.gov/floodexposure>

Coastal Resilience Evaluation and Siting Tool

<https://resilientcoasts.org>

Digital Coast

<https://coast.noaa.gov/digitalcoast>

Digital Coast Natural Infrastructure Resources

<https://coast.noaa.gov/digitalcoast/topics/green-infrastructure.html>

Living Shorelines Resources Webpage

<https://www.habitatblueprint.noaa.gov/living-shorelines>

National Centers for Environmental Information

<https://www.ncei.noaa.gov>

National Estuarine Research Reserve System

<https://coast.noaa.gov/nerrs>

Natural Infrastructure Fast Facts

<https://coast.noaa.gov/states/fast-facts/natural-infrastructure.html>

NOAA Green Infrastructure Effectiveness Database

<https://coast.noaa.gov/digitalcoast/training/gi-database.html>

NOAA Nature-Based Solutions for Coastal Hazards Training

<https://coast.noaa.gov/digitalcoast/training/green.html>

NOAA Sea Grant

<https://seagrant.noaa.gov>

NOAA training on coastal projects.

[Nature-Based Solutions for Coastal Hazards: The Basics \(noaa.gov\)](#)

Regional Integrated Science and Assessment Programs

<https://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA>

Sea Level Rise Viewer

<https://coast.noaa.gov/slr>

Sea Level Trends

<https://tidesandcurrents.noaa.gov/sltrends/sltrends.html>

State Coastal Management Program

<https://coast.noaa.gov/czm>

State of High Tide Flooding and Annual Outlook

https://tidesandcurrents.noaa.gov/HighTideFlooding_AnnualOutlook.html

The Climate Explorer

<https://crt-climate-explorer.nemac.org>

American Samoa Climate Explorer Charts

https://crt-climate-explorer.nemac.org/cards_home/?area-id=american_samoa&area-label=American+Samoa&lat=-14.552944&lon=-170.874588

U.S. Army Corps of Engineers, Engineer Research Development

Engineering with Nature

<https://ewn.el.erdc.dren.mil/index.html>

Engineer Research Development (ERDC)

<https://www.erdc.usace.army.mil>

Fact Sheet: Engineering with Nature CSTORM Modeling Toolkit

https://ewn.el.erdc.dren.mil/projects/factsheets/20-06_FactSheet_Trtinger_EWN_CSTORM_Modeling_Toolkit.pdf

U.S.G.S. Resources

American Samoa Coral Reefs and Coastal Hazard Risk Reduction

<https://www.usgs.gov/media/images/american-samoa-coral-reefs-and-coastal-hazard-risk-reduction>

The Value of US Coral Reefs for Flood Risk Reduction, B.G. Reguero, Curt D. Storlazzi, Ann Gibbs, James B. Shope, Nature Sustainability, April 2021.

https://www.researchgate.net/publication/350894698_The_value_of_US_coral_reefs_for_flood_risk_reduction

Other Resources

American Association of State Climatologists

<https://stateclimate.org>

Coastal Resilience Mapping Portal

<https://maps.coastalresilience.org>

Engineering with Nature an Atlas

<https://ewn.el.erdc.dren.mil/atlas.html>

Floodplain Buyouts: An Action Guide for Local Governments on How to Maximize Community Benefits, Habitat Connectivity, and Resilience

<https://www.eli.org/sites/default/files/eli-pubs/actionguide-web.pdf>

Floodplain Prioritization Tool

<https://freshwaternet.org/innovative-tools/floodplain-prioritization-tool/>

Fourth National Climate Assessment

<https://nca2018.globalchange.gov>

Green Infrastructure Toolkit

<https://www.georgetownclimate.org/adaptation/toolkits/green-infrastructure-toolkit/introduction.html>

Naturally Resilient Communities

<http://nrcsolutions.org>

Op-Ed: How to Save Beaches and Coastlines from Climate Change Disasters, Michael W. Beck, Los Angeles Times, April 11, 2021

<https://www.latimes.com/opinion/story/2021-04-11/reefs-wetlands-mangrove-coastline-defense-restoration>

Planning for Infrastructure Resilience

<https://www.planning.org/publications/report/9192800>

