Matthew J. Gonser, AICP
Extension Agent, Community Planning and Design
University of Hawai‘i Sea Grant College Program

U.S. Senate Committee on Energy and Natural Resources
2016 October 18

Aloha and good morning. Thank you to the Committee for scheduling this hearing and allowing us to speak on the subject of integrated water management and efforts to improve Hawaii's water landscape. An additional thank you to my fellow speakers for your important contributions on the subject. Lastly, I thank Dr. Darren Lerner, the Director of the University of Hawai‘i (UH) Sea Grant College Program (Hawai‘i Sea Grant), Interim Director of the UH Water Resources Research Center (WRRC), and the University Director of the Pacific Islands Climate Science Center (PI-CSC), for affording me this opportunity to speak and represent the Hawai‘i Sea Grant program.

Water Resources Development Act of 2016 (WRDA 2016[1])

To begin my testimony, I would like to first thank the Senate for passing S.2848, the Water Resources Development Act of 2016. There are critical reauthorizations, modifications, and additions designated in that bill, specifically those in Title VII Subtitle B and C, relating to clean water infrastructure and innovative financing, respectively. We are also grateful to you, Senator Hirono, for highlighting areas that are important for Hawai‘i, such as, making it easier for the federal government to enter into public-private partnerships for water infrastructure projects (e.g., with the U.S. Army Corps of Engineers for the Ala Wai Flood Mitigation Project) and directing the Environmental Protection Agency to promote green stormwater infrastructure[2] projects, which use natural features to reduce stormwater runoff.

Though not directly related to this bill, we are grateful for the continued support of the critical research produced from the National Academy of Sciences that address the integrated water discussion we are having today. As an example, I would like to highlight one 2016 product, *Using Graywater and Stormwater to Enhance Local Water Supplies: An Assessment of Risks, Costs, and Benefits*.[3] This is the type of exemplary research stakeholders continue to rely upon, which we then further translate to inform decision making at the local level.

Urban and Built Environment

In that same vein, I am pleased to offer an additional perspective today, an urban or built environment framework for the discussion. As you are aware Senator Hirono, Hawai‘i has a history of water quality and quantity challenges. In the last two years alone, heavy summer rains from both named and unnamed storms resulted in significant disruptions and damages, brown water advisories, and temporary beach closures due to sewage spills at multiple locations. Though we are a coastal state, we also have pockets of populations that are conspicuously riverine, which highlights the islands' ridge and valley topography. This showcases the local

[1] S.2848 – 114th Congress (2015-2016): Water Resources Development Act of 2016
[2] Stormwater infrastructure is comprised of the system of landscapes (open spaces, urban trees and upland forests), curbs, pipes, and streams that transport rainfall runoff from mauka to makai, or from the mountains to the sea.
[3] National Academies of Sciences, Engineering, and Medicine. 2016. *Using Graywater and Stormwater to Enhance Local Water Supplies: An Assessment of Risks, Costs, and Benefits*. Washington, DC: The National Academies Press. doi: 10.17226/21866.

connection and understanding of environmental systems expressed as "mauka to makai," or from the mountain to the sea.

In my work as an extension agent and member of the faculty with the Hawai'i Sea Grant, and in close partnership with WRRC and PI-CSC, stakeholders, government partners, and community members have expressed strong local interest in receiving additional support, guidance, and concentrated attention on the topics of community greening, green infrastructure, and flood risk reduction and resilience. We can be challenged by what local planners, designers, and policy makers cite as Hawai'i's particular geographies (e.g., short and steep watersheds and "flashy" systems, distinct soils, and high water tables), unique climate patterns, and limited land availability for certain landscape practices for green infrastructure and flood resilience strategies. The spectrum of rural to urban community patterns adds additional complexity to how we effectively engage in different communities and deliver applicable resources. The sustainable communities-related challenges of environmental planning, ahupua'a and watershed management, and flood mitigation are integrated with other considerations, such as tradeoffs of land uses, and open space and agricultural land needs; (re)development and affordable housing needs; and, complete streets, clean and affordable transportation, and public health and active transportation.

Hawai'i's ocean users lament the time following medium to heavy rains across the islands and subsequent brown water advisories recommending against recreating for a day or two. These advisories are primarily the consequence of rainwater runoff, or stormwater. Stormwater runoff is the result of rainwater flowing over compact ground and other impervious surfaces into streams, ponds, storm drains, and the sea[4], and has been cited as the number one source of pollution in the state of Hawai'i. In Hawai'i, storm sewer pipes are separate from waste sewer pipes, and as a result, anything (water or otherwise) that enters the stormwater drainage system flows – untreated – directly to a stream or the ocean impacting water quality and nearshore environments. The U.S. Environmental Protection Agency (EPA) approaches stormwater management with a watershed and landscape infiltration philosophy of "slow it down, spread it out, and soak it in."[5]

Practices and techniques to manage and utilize these water resources before it enters the storm sewer system include low impact development (LID) and green stormwater infrastructure (GSI) practices, rainwater catchment, and a multitude of building and plumbing techniques for water capture, recycling, and reuse. Hawai'i has not kept current with adoption of new versions of building or plumbing codes, which would more readily permit and/or require such water conservation and efficiency practices.

In addition to the regulation of stormwater management at the parcel and building scale (e.g., infiltration, green/blue roofs, cisterns/rain barrels, rainwater and gray water reuse), there are opportunities for interventions within the public right-of-way (ROW) (e.g., biofiltration, street trees, flow through planters, and permeable surfaces that can provide multiple benefits, including aesthetics, urban ecological systems, and enhanced environmental conditions for walking and bicycling. These strategies are more and more becoming required by regulations and plans. This highlights the integrated management and resource needs, connecting agencies such as the National Academy of Building Sciences, Federal Highways Administration, Department of

[4] Arnold, C. and Gibbons, J. 1996. Impervious surface coverage, *Journal of the American Planning Association*, 62(2): 243-58.

[5] http://www.epa.gov/owow/nps/lid/videofactsheet.pdf

Housing and Urban Development, and other professional organizations with national memberships in the design and planning fields.

This past August, with the support of an award from the National Sea Grant College Program Office, Hawai‘i Sea Grant and WRRC organized and hosted a day-long summit to discuss how to advance practice and policy for green and livable communities, with a specific focus on water quality (i.e., polluted runoff control) and quantity management (e.g., catchment, recharge or reuse, flooding, and drought). We extend our gratitude to the additional program sponsors, and to Hawai‘i State Senator, Mike Gabbard for joining us that day and providing opening remarks on the legislature's leadership on the subject. I regret that the event conflicted with Hawai‘i State Representative Ryan Yamane's schedule, but thank him for his consideration at the time and input.

In addition to many local experts, other invited guests included experts from the City of Seattle Office of Sustainability & Environment and Seattle Public Utilities, the Center for Watershed Protection in Maryland, the Boston office of The Trust for Public Land, the U.S. Water Alliance and Smart Growth America both in Washington D.C., and the Horsley Witten Group in Massachusetts. This is an example of the types of partnerships we are discussing today and a demonstration of the need to leverage and share resources nationwide as we all work toward cleaner waters, water security, and green and thriving communities.

U.S. Army Corps of Engineers and the Ala Wai Watershed

A case study in the challenges we are discussing today is the Ala Wai Watershed. The state, City and County of Honolulu, and the U.S. Army Corps of Engineers (USACE) have been engaged in efforts to study and model the Ala Wai Watershed, which includes Makiki, Mānoa, and Pālolo valleys and their respective neighborhoods down to the ocean. These efforts have included investigating flood mitigation and other ecosystem enhancements, which, at present, sits as a draft feasibility study and integrated environmental impact statement for an Ala Wai Flood Mitigation Project.

Though that flood mitigation project has been ongoing for nearly two decades, there is renewed interest in this feasibility study co-sponsored by the USACE and the state. Unfortunately, though the original scope was to address multiple purposes, including water quality issues and ecosystem restoration, these components are no longer within the scope of the federal sponsorship – any secondary objectives must be carried forward by a non-federal sponsor (e.g., the state and/or a public private partnership (P3)). Stakeholders continue to note the importance of ecosystem restoration in the Ala Wai Watershed and believe the flood mitigation project represents a framework from which key opportunities can be sought to improve ecological and community health of the watershed.

Following a disaster mitigation summit in early 2015, stakeholders agreed upon main goals to move forward the various desires in the watershed. Stakeholders convened as the Ala Wai Waterhsed Partnership (AWWP), a multi-sector partnership that coordinates stakeholders across the public, private, academic, nongovernmental, community and philanthropic sectors with a joint interest in the Ala Wai Watershed. Hawai‘i Sea Grant is a partnering member, providing technical expertise, facilitation support, and coordination efforts. The AWWP is committed to increasing communication with key community groups, engaging the private sector, and developing and implementing innovative financing and regional planning solutions.

Partners encourage the Congress' continued support of the USACE in the Ala Wai through necessary appropriations and authorizations, and urges using the full suite of tools provided

through WRDA. With interests in a holistic systems approach to solving issues in the Ala Wai Watershed through Waikīkī, there are visions for ecosystem restoration in the upland forests, streams and nearshore environments; water quality improvements in the streams, the Ala Wai Canal, and Māmala Bay; flood mitigation and risk transfer through watershed management, building and plumbing codes, and parametric insurance opportunities to shift the risk off the public sector and to engage the global capital market; and, to enable and stand up a coordinating entity to implement these visions.

Later this week the stakeholders and partners will expand because of additional interests of the Polynesian Voyaging Society in having a local focus area and beginning efforts for long-term impact in anticipation of the return of the Hōkūleʻa and continued efforts of Mālama Honua.

U.S. Forest Service and Urban and Community Forestry Programs

I currently sit on the advisory council for the state Department of Land and Natural Resources (DLNR) Kaulunani Urban and Community Forestry Program. This program focuses on improving the health and viability of trees in Hawaiʻi communities through educational programs; financial support in the form of cost-share grants; technical training; Arbor Day promotions and public/private partnerships. Funding for this program comes from the State and Private Forestry Branch of the USDA Forest Service. The work Kaulunani is engaged in supports and is additive to the forestry and watershed management information provided by Administrator Smith and Chair Trae Menard, but with an emphasis in our urban and town centers. Additionally, there is a nascent cross-sector coalition working to increase our urban canopy statewide, to meet both near-term environmental goals and long-term climate adaptation goals. The work of DLNR, the Watershed Partnerships, and Kaulunani are critical for a future green Hawaiʻi and the programs appreciate Congress' continued support.

Trees are possibly the most conspicuous piece of environmental infrastructure, and one that accrues benefits and becomes more valuable over time. Trees are long-term investments with significantly underappreciated returns on investment. The heat mitigation and stormwater management benefits of a healthy urban forest can pay dividends on cooling and runoff management costs, while also working to address other community environmental and social justice disparities.

A recent study from Illinois demonstrated trees' ability to reduced runoff and discharge when co-located in a bioswale. The trees' transpiration accounted for nearly half to three quarters of the water inputs from precipitation and irrigation. [6] The co-benefits of trees for water management, heat mitigation, carbon sequestration, urban habitat, and social and emotional benefits of nearby nature warrant additional attention and resources.

Federal Partnerships, Innovations, and Technical Assistance

Communities statewide have benefited from various technical assistance opportunities offered through EPA's Office of Sustainable Communities. I am also aware of other support communities in Hawaiʻi have obtained through similar technical assistance programs offered from the Federal Transit Administration (FTA) and the National Oceanic and Atmospheric Administration (NOAA). Just last week Hawaiʻi Sea Grant in partnership with the City and County of Honolulu, submitted an application to the EPA to gain support towards flood resilience along our streams and the coast. If awarded, this small, but critical investment into the

[6] Scharenbroch, B.C., J. Morgenroth, and B. Maule. 2015. Tree Species Suitability to Bioswales and Impact on the Urban Water Budget, Journal of Environmental Quality. 45(1): 199-206. doi: 10.2134/jeq2015.01.0060

EPA's research and services will be further leveraged and extended through Hawai'i Sea Grant's statewide extension network in partnership with WRRC and PI-CSC to provide significant returns on the EPA's Building Blocks for Sustainable Communities Program. The service of an organizations such as Sea Grant within NOAA, and WRRC and PI-CSC within the U.S. Geological Survey (USGS), continue to serve important research, extension and education outlets for the vast and developing green infrastructure and climate and water resilience resources developed by the EPA and others. Such activities only further federal resources, which is consistent with interagency partnerships and a 2011 Memorandum of Agreement between the EPA and NOAA, for example. This particular partnership identifies a strong Sea Grant role in delivering products, services, and research results to local community decision makers to meet the partnership's potential to serve state and local governments.

As you know, Senator, Hawai'i is a small, but able community with deep interest in being leaders of sustainability and a model for other island and continental communities. The pursuit of these competitive funding and technical assistance opportunities to bring resources to bear for our communities is demonstrative of this fact. Recognizing the increasingly competitive funding environment, state, county, and non-governmental partners are diligently working to increase capacity to be successful when opportunities arise. We thank you for your continued support of these federal partnerships, of which the HUD-DOT-EPA Partnership for Sustainable Communities is necessary in helping to educate on the interconnected systems that impact our water resources, health and livability, and environmental quality.

It seems natural that other agencies could join in such partnerships to meet shared goals. It would be encouraging to see the Federal Emergency Management Agency (FEMA), USGS and NOAA, even more directly connected as described herein. There will also perhaps be an emerging importance of the Economic Development Agency in a changing climate and economy, as we look to bridge innovation across federal regions.

Lastly, I would like to highlight FEMA's National Flood Insurance Program (NFIP) Community Rating System (CRS), as important incentive-based programs that provides a framework for integrated water management. Though only two of Hawai'i's four counties are current CRS participants[7], there is interest from the other two counties in pursuing participation for the direct benefit to NFIP policy holders, but more importantly, for the utility of the guiding framework and menu of activities offered to mitigate flood risk, conserve and better manage our lands, manage stormwater runoff, and educate communities on existing and future hazards.

Closing Thank You

We thank the committee for its willingness to conduct this field hearing and work on these critical issues. Thank you Senator Hirono for the opportunity to speak today, and, with respect to today's subject, we thank you for your continued support of the University of Hawai'i and its Sea Grant College Program, Water Resources Research Center and Pacific Islands Climate Science Center.

[7] As a result of their classification level of 8 residents of both the Counties of Maui and Hawai'i receive 10% discounts on insurance premiums for structures located in a Special Flood Hazard Area (SFHA) and 5% discounts on insurance premiums for structures located outside of a SFHA.