

# Climate Action, Resilience, and Environment Committee on 2022-08-03 9:00 AM

Meeting Time: 08-03-22 09:00

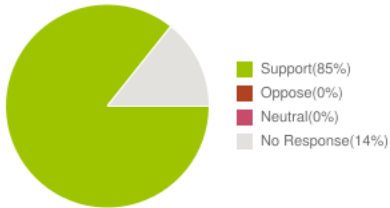
## eComments Report

Meetings	Meeting Time	Agenda Items	Comments	Support	Oppose	Neutral
Climate Action, Resilience, and Environment Committee on 2022-08-03 9:00 AM	08-03-22 09:00	2	7	6	0	0

### Sentiments for All Meetings

The following graphs display sentiments for comments that have location data. Only locations of users who have commented will be shown.

#### Overall Sentiment



# Climate Action, Resilience, and Environment Committee on 2022-08-03 9:00 AM

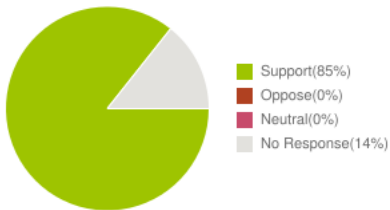
08-03-22 09:00

Agenda Name	Comments	Support	Oppose	Neutral
A G E N D A	1	0	0	0
CARE-55 CC 21-358 BILL 91 (2022), RELATING TO WETLANDS RESTORATION AND PROTECTION (CARE-55)	6	6	0	0

## Sentiments for All Agenda Items

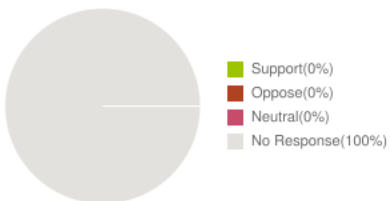
The following graphs display sentiments for comments that have location data. Only locations of users who have commented will be shown.

### Overall Sentiment



### Agenda Item: eComments for A G E N D A

### Overall Sentiment



## Robin Knox

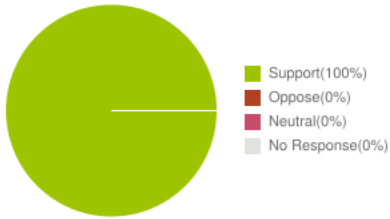
Location:

Submitted At: 9:54am 08-03-22

My original submittal on this date was comments on bill 91, these revised comments are based on the AFS version

### Agenda Item: eComments for CARE-55 CC 21-358 BILL 91 (2022), RELATING TO WETLANDS RESTORATION AND PROTECTION (CARE-55)

## Overall Sentiment



### **Robin Knox**

Location:

Submitted At: 9:07am 08-03-22

Please see attached for Comments

### **Guest User**

Location:

Submitted At: 5:50am 08-03-22

I support BILL 91 (2022), RELATING TO WETLANDS RESTORATION AND PROTECTION (CARE-55)  
Please vote to pass this bill to protect the Maui County wetlands.

Mahalo

### **Guest User**

Location:

Submitted At: 10:44pm 08-02-22

Aloha, my name is Brandi Corpuz. I am a homeowner, educator and community advocate from the wetlands of Kihei. I am also the Executive Director of Rooted Kekahi Me Ka Aina. I would like to provide testimony in support of this wetlands bill 91 (2022)

I have lived in Kihei for over 20 years and I have experienced the devastating effects of flooding, land erosion and diversions of our natural waterways. We need this wetlands bill to help stop several projects proposed on our wetlands and to protect what little bit of wetland resources we have left in Maui County.

In December 2021 we were able to see what happens when you try to wipe out a wetlands system from existence. Mother nature, especially wetland waterways will go where they want to go. Kihei had 30 plus inches of mud and debris in all lower lying areas of South Maui. This mud still remains in many areas of Kihei, even months later. Our community members suffer the most because we have no control over what is being done in our wetlands and can not predict mother nature.

This Council just recently stopped the Waipuilani Hale project due to flooding issues and to conserve the wetlands. However, there are other projects such as the Wailani Project that is still moving forward and is being built on top of our Waipuilani Gulch. There is also another project being built on Kulanihakoi wetlands.

These projects are being built on our wetland gulches, streams and springs. They do not benefit our environment, our community or the future of Maui.

No matter what their intentions for these projects are, destroying our wetlands will have dire effects on all of us who call Kihei our home. These projects would not be moving forward if there were already protections in place for our precious resources.

Wetland bill 91 (2022) can help to protect our wetlands from distinction if we stop it now. Please support these protective measures for us and all future generations.

Our wetlands affect everything from flooding, erosion, traffic, our ocean, our watershed and our way of life.

Wetlands are our natural protectors. Please help us protect our Wetlands in Kihei and all of Maui County.

Sincerely, Brandi Corpuz  
Rooted Kekahi Me Ka Aina  
808-357-9170

### **Guest User**

Location:

Submitted At: 8:47am 08-02-22

Aloha Council committee members,

I strongly support Bill 91. I am a public interest attorney with many clients on Maui who commit their personal funds, time, and other resources to protect wetlands for the rest of Maui's community. I am commenting in my personal capacity because I am inspired by their commitment and care for Maui. This law would help protect and restore wetlands and all of the ecological, cultural, and economic benefits associated with them.

Yours,  
Bianca Isaki

### **Robert Aldrich**

Location:

Submitted At: 4:39pm 08-01-22

I strongly support Bill 91 re. the preservation, protection & restoration of Maui County wetlands.

One of the most important services that wetlands provide is the inherent capacity to avoid, minimize, or mitigate the impacts of climate change by sequestering large quantities of carbon from the atmosphere, which may have been accumulating for hundreds to thousands of years. The loss or degradation of a wetland means not only the demise of that carbon sink, but also that the carbon stored in that wetland will be released.

What are some of the functions of wetlands?

- purify water by filtering pollutants & nutrients,
- protect beaches against erosion,
- recharge aquifers, and
- support habitat for endangered species.
- provide flood alleviation, which helps protect lives and property.
- A one-acre wetland can store one million gallons of storm water. In ahupuaa, where wetlands have been lost, flood peaks can increase by as much as 80 percent.

Too many wetlands in Maui County have been destroyed to make way for structures, yet more wetlands are being planned for development. We have a wetland emergency. They need to be protected and restored. In my professional opinion, they are more precious than development, market values or commercial profits.

Maui County not only needs to approve an ordinance to protect & restore all wetlands, but also adopt its own wetland definitions and framework because:

1. The State of Hawaii does not have a management plan or a statute to restore & protect wetlands.
2. The Clean Water Act (CWA) has been gutted by changing political climates.
3. Many of our wetlands do not qualify as Waters of the U.S. (WOTUS) per the criteria set by the U.S. Army Corps of Engineers.
4. Federal case laws (Rapanos v United States, and others) opened the door for the county to regulate wetlands where the wetland has no continuous surface connection to a permanent navigable waterway.
5. The CWA does not have primacy over states re. wetlands - 33 USC section 1251 (b) & (g) recognizes the rights of states to plan the restoration and preservation of land and water resources.

Additionally, fishing is a huge part of the history, culture, and personal lives of the people of Maui. In general, wetlands provide an essential link in the life cycle of 75 percent of the fish and shellfish commercially harvested in the U.S., and up to 90 percent of the recreational fish catch. Wetlands provide a consistent food supply, shelter, and nursery grounds for both marine and freshwater species.

The wetland preservation bill should establish ahupuaa-based protection of wetlands that connect to the watersheds or natural stormwater infrastructure (NSI). Surface water, ground water, floodplains, wetlands, and other features do not function as separate and isolated components of the watershed, but rather as a single,

integrated natural system. Disruption of any one part of this system can have long-term and far-reaching consequences on the functioning of the entire system, as we have seen from the recent floods. The need to protect wetlands should not be weakened for development in wetlands or natural stormwater infrastructure (NSI). Preserving wetlands and NSI are more important than any housing or commercial developments - which can be built somewhere else.  
Mahalo for considering my testimony  
Robert Aldrich

**CARE Committee**

Location:  
Submitted At: 1:48pm 08-01-22

Testimony received by CARE Committee.

Comments on wetlands bill 91

Support overlay instead of zoning district

Recommend the following amendments

Section 2

Section 19.04.040 definitions – add the word Biological to definition of protective buffer

Such that third line of the definition reads “...to avoid significant negative biological, physical, or chemical impacts to...”

Section 3

19.[47]57.030 B. 3. Add native species such that the last line reads, “...existing native, rare, threatened, or endangered species.”

19.[47]57.030 B. 7 add the word groundwater such that the second line reads, ...a reduction in the flow of groundwater or watercourses due to destruction of wetlands.”

19.[47]57.030 B. 9 add the word native such that the third line reads, “...as to increase the potential for survival of native, rare and endangered flora and fauna.”

19.[47]57.030 B – Add an item 13. The report should include “ Areas that formerly had wetlands characteristics or functions but have been altered or degraded by channelization, filling, draining, dredging, grading, grubbing, deep ripping, groundwater pumping, hardening of surfaces, or introduction of non-native or aggressive-invasive plant and animal species”

19.[47]57.070A Add opportunity for public review and comment on the map. Delete word abundant and insert presence instead.

Pg 7 19.[47]57.070 C. Add time frame for change to zoning initiation;

## CARE Committee

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**From:** County Clerk  
**Sent:** Monday, August 1, 2022 7:52 AM  
**To:** CARE Committee  
**Subject:** FW: Testimony in support of Bill 91 (2022) CARE Committee Meeting August 3rd, 2022

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**From:** David Dorn <daviddorn808@gmail.com>  
**Sent:** Sunday, July 31, 2022 2:02 PM  
**To:** County Clerk <County.Clerk@mauicounty.us>  
**Cc:** Kelly King <Kelly.King@mauicounty.us>; Alice L. Lee <Alice.Lee@mauicounty.us>; Keani N. Rawlins <Keani.Rawlins@mauicounty.us>; Yukilei Sugimura <Yukilei.Sugimura@mauicounty.us>; Mike J. Molina <Mike.Molina@mauicounty.us>; Tasha A. Kama <Tasha.Kama@mauicounty.us>; Shane M. Sinenci <Shane.Sinenci@mauicounty.us>; Gabe Johnson <Gabe.Johnson@mauicounty.us>; Tamara A. Paltin <Tamara.Paltin@mauicounty.us>  
**Subject:** Testimony in support of Bill 91 (2022) CARE Committee Meeting August 3rd, 2022

RE: BILL 91 (2022), RELATING TO WETLANDS RESTORATION AND PROTECTION (CARE-55)

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### Testimony in support of Bill 91 (2022)

Hello, CARE Committee members,  
my name is David Dorn, and I support Bill 91,

Protection of Wetlands and natural drainage infrastructure is essential for the County to maintain its current drainage system, and to maintain the current drainage conditions, and protect its current drainage services. And the protection of existing wetlands is essential for the County to realize its plans and goals for future drainage improvements.

Maui County Drainage Maps designate and name many areas as wetlands: Most of these named wetlands in the drainage plans are not designated as wetlands by the Army Corps of Engineers or in other databases. However, these named and mapped wetlands provide important drainage services. The current drainage conditions rely on wetlands and private lands to provide connectivity for downslope stormwater flows as well as provide stormwater storage and stormwater infiltration.

The KDMP 2016, mentions many wetlands as part of the existing natural drainage systems, but it does not specifically mention any protection for these wetlands. Examples include, "a second makai detention basin located mauka of Meadowlands Subdivision Phase II. The overflow from the second makai detention basin is eventually discharged to the wetland area between Liloa Drive and South Kihei Road ". (source, KDMP2019.pdf page 67/388)

The County will have to make large investments in infrastructure, Example, in South Maui alone the 2016 Kihei Drainage Master Plan estimated that 133 million dollars (\$185 million in today's dollars) need to be spent on drainage infrastructure, including substantial land buy-backs in order to carry out necessary drainage plans and mitigation measures. This will become increasingly impossible or will

be prohibitively expensive if the county has to buy back land after it has been developed. (KDMP 2016)

Protecting essential watershed lands such as wetlands is an important first step in creating an overall drainage management infrastructure plan. Wetlands are in fact heavily relied upon in the County's future drainage plans. Many instances of this are included in the KDMP2019, however, most of these wetlands are privately owned and are not protected from development. The loss of more existing wetlands will make the County's drainage plans unachievable and obsolete.

Wetlands in floodplains are also the best and most economical form of green infrastructure for stormwater management. This is in keeping with modern trends in Watershed and flood management. "Floodplains store water during floods, reducing flood levels downstream, which reduces flood damage".

(source, floodplain\_wetlands\_initiative\_jul2015.pdf).

The best flood control management practices incorporate natural areas and is integral to the drainage and management of watersheds. And wetlands and flood plains are utilized in many cases as alternatives to heavily engineered, hardened, gray (concrete) infrastructure. Wetlands and green infrastructure are often used in conjunction with existing hard drainage infrastructure systems. For Example, Wetlands, gulches, and streams are part of the Ecological Drainage Plan as proposed in the Ecological Alternatives Analysis by Amanda Cording.

Wetlands are part of a mauka to makai watershed system of streams, gulches, floodways, and in many cases, groundwater flow paths that are integral to the landscape. Gulches and riparian areas such as stream banks must be restored to mitigate the sediments entering the streams, and stormwater and affecting nearshore waters. (SMWP 2019)

Wetlands are like lifeboats:

Wetlands not only protect flora and fauna, but they are also critical to the function of the watershed, and act like the kidneys of the water cycle.

[www.mauicounty.gov/ArchiveCenter/ViewFile/Item/28946](http://www.mauicounty.gov/ArchiveCenter/ViewFile/Item/28946)

Wetlands are an essential component of a healthy watershed: Wetlands are an essential component of a healthy watershed because they act as intermediaries for stormwater and act to store, restrain, retain, and attenuate floodwater, and have a large capacity to capture floodwater and filter out many of the contaminants before they reach the ocean. Helen Raine of Pacific Birds said, "One of the things they can do is to help purify our water. During major rain events like we see in Hawai'i, a wetland can trap and allow pollutants and toxins to settle before they reach the ocean. In the same way they can help us control sediment and store flood water."

Wetlands also capture large quantities of stormwater before it can flood into neighborhoods. As Jason Vercelli of the DLNR Division of Forestry and Wildlife (DOFAW) put it, "If you can protect, restore, and re-create wetland areas, you'll end up with a big sponge."

Wetland losses are cumulative: Maui has experienced a dramatic loss of wetlands in the last half century or so. For example, Kihei lost 50 percent of its wetlands between 1965 and 2003. "Thus, between 1965 and 2003 Kihei lost over 50% of its wetlands (Erickson & Shade 2004)". "Wetlands challenges in Kihei are cumulative. Most of the more than 15 wetland-fill permit requests from 1989 to 2003 were for small lots of less than one hectare. The wetlands were fragmented". (source, Hawai'i Wetland Field Guide, page 45)



Wetlands will become even more essential with climate change as flooding will become more severe and frequent. Wetlands will become vital as climate change could alter habitats and affect the distribution of species. (<https://governor.hawaii.gov/newsroom/dlnr-news-release-hawaiis-wetlands-play-key-role-in-mitigating-climate-change-impacts/>)

Watershed conditions will continue to degrade with overgrazing by cattle in the catchment areas, and the destruction of soils and plants by feral cattle, goats, and other ungulates such as pigs and deer. According to the SMWP Report, “The open grazing lands in the Watershed are now mainly used by livestock (cattle sheep and goats) and Wild game (deer and pigs) and are covered with no native grasses, trees, shrubs, kiawe, and some native trees and shrubs. More than half of the lands in the SMWP are grazed by a combination of domestic and feral animals, including cattle, deer, pigs, goats, sheep, and elk. Much of the grazing acreage is rough and prone to drought and grazing management is necessary in order to maintain the health of the Watershed”. (source, SMWP FINAL REPORT.pdf)

Increased development throughout the watershed will also increase urban runoff: An increase in impervious surfaces produces more stormwater and roads become conveyances for stormwater. (sources, SMWP, and [epa.gov](http://epa.gov))

Wetlands are also cultural focal points and frequently are the sites of traditional practices from agricultural, aquaculture, religious practices (mo’o/water spirit worship), and historical settlements, including royal estates. According to Scott Fisher, “Spiritual Places: Wahi Pana – Wetlands were often thought of as the domain of mo’o, or dragons” (source, fisher\_wetlandsrestorationinahawaiianculturalcontext\_opt.pdf)

Army Corps of Engineers (ACE) delineations of wetlands fall short of protecting wetlands. An ACE wetland designation does not protect a wetland, it only designates it. The next step for a developer is to obtain a drainage permit by submitting an engineering plan to deal with the hydrology in order to develop it. Many developers see wetlands as merely engineering and construction challenges and do not recognize their vital services and ecological benefits. We cannot rely on the ACE designations to protect our wetlands.

The Army Corps of Engineers' mission is to develop waterways and wetlands: “The U.S. Army Corps of Engineers is a worldwide organization that provides engineering services and construction support for a wide variety of military and civil projects.” (source, [www.nae.usace.army.mil/](http://www.nae.usace.army.mil/))

Developers and landowners are incentivized to degrade and destroy wetlands: Developers and landowners do not want their land to meet ACE wetlands definitions. They can make more money developing it as a commercial or residential property. So they are economically incentivized to disguise and/or deliberately degrade their properties so that they do not meet the ACE wetland standards. They do this in several ways; by dewatering using ditches or pumping groundwater, or altering plant life by removal of native vegetation (often in the name of fire hazard reduction). Or by grubbing and grading the soil and altering the landform and topography. For Example, We recently saw developer “Savio” illegally destroy native vegetation in the riparian zone of the Kulanihako Stream Wetland in Kihei. And we have also seen developer Savio illegally grading in Waipuilani Gulch for his Wailani Village project. (source, [gokihei.org/environment/violation-in-north-kihei](http://gokihei.org/environment/violation-in-north-kihei))

As a result of deliberate and unintentional abuse many of our remaining urban wetlands have suffered some degree of degradation, damage, and alteration. However, this does not diminish their importance or their underpinning hydrology. Even wetlands in a degraded state can still provide essential wetland functions, and degraded wetlands can also be restored to various degrees to

maximize their beneficial services. “Restoring the appropriate natural structure [of a wetland] can bring back beneficial functions”

(source, [epa.gov/wetlands/principles-wetland-restoration](https://www.epa.gov/wetlands/principles-wetland-restoration))

Passive restoration of Wetlands: Generally a damaged wetland will tend to heal itself if left unmolested over time. The EPA also recommends passive restoration, whereby removing the causes of degradation and allowing natural processes to help the wetland to recover over time.

([www.epa.gov/wetlands/principles-wetland-restoration](https://www.epa.gov/wetlands/principles-wetland-restoration))

Hawaii's wetlands are unique and can fall outside the generalized guidelines/criteria that the ACE uses. There are better methods available for wetland determination and delineation such as those proposed in the EPA/HDLNR-sponsored study by Erickson and Puttock, which is described in their comprehensive field guide, titled “Hawai'i Wetland Field Guide” (Terrell A. Erickson, Christopher F. Puttock).

The State Definition of Wetlands is less restrictive than the ACE definition, and call for just one of three criteria to be met: “State Definition of Wetlands Although wetlands are not explicitly included in the definition of state waters in the Hawaii Water Code, Hawaii’s surface water quality standards do apply to wetlands. The water quality standards define “wetlands” as, “land that is transitional between terrestrial and aquatic ecosystems where the water table is usually at or near the surface or the land is covered by shallow water. A wetland shall have one or more of the following attributes: (1) at least periodically the land supports predominantly hydrophytic vegetation; (2) the substratum is predominantly undrained hydric soil; or (3) the substratum is nonsoil (gravel or rocks) and is at least periodically saturated with water or covered by shallow water”. (source:

[hawaii\\_state\\_wetland\\_program\\_summary\\_083115.pdf](#))

Maui County Flood Plain Manager (CFM):

According to Diego Sanchez, the Maui County CFM (County Floodplain Manager) their job is to Issue “... Flood Plain Permits, and “... After the fact permits, in A Zones and AE Floodways”. (source, [waihalana.hawaii.gov/](https://www.waihalana.hawaii.gov/)), But the CFM will not recommend or protect any wetland or take proactive steps to reduce flooding. Their job description/mission is simply to review and approve development plans to ensure that the individual floodwater requirements are met. This does not protect our neighborhoods or environment on the flood plain from the larger flooding issues.

Department of Public Works:

The Department of public works is responsible for many of the engineering projects like bridges and roadways, however, they do not have an inclination or requirement to protect wetlands or green infrastructure in our current drainage plan. They are a project-based organization and do not have the initiative or budget, to protect wetlands or to integrate them into drainage infrastructure. Unless specifically directed to by the county in an official drainage plan, and given an appropriate budget. The DPW is also responsible for ensuring that individual landowners maintain their drainage ways, and privately-owned gulches, which they fail to do effectively.

Wetlands as Green Infrastructure solutions: “... the county contracted Amanda Cording, an ecological designer and community watershed management adviser from EcoSolutions LLC, to provide an environmentally friendly alternative. With an emphasis on removing pollutants with low-impact development and green stormwater infrastructure, the updated proposed plan was released in 2020”.

“Total project costs for Kulanihakoi Gulch are estimated at \$6.5 million, much less than the original \$57 million needed for the Kihei Drainage Master Plan, which proposed a diversion at Waipuilani Gulch that was not popular with the community”. (source, [www.mauinews.com/news/local-news/2022/01/plan-seeks-more-natural-solutions-to-flood-risks/](https://www.mauinews.com/news/local-news/2022/01/plan-seeks-more-natural-solutions-to-flood-risks/))

This Bill provides important protections for our Unique Wetlands:

This bill can provide protections for Maui's wetlands, where other institutions can not. We cannot rely on the status quo, or the inappropriate designations of the ACE, to do this. We need this bill to help protect our essential and unique Maui wetlands so that they can continue to protect us, by serving as drainage infrastructure, flood mitigators, biological sanctuaries, cultural resources, and climate change mitigators.

Regards,  
David Dorn

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#### REFERENCES:

*Erickson, Terrell A., and C. F. Puttock. Hawai'i Wetland Field Guide: An Ecological and Identification Guide to Wetlands and Wetland Plants of the Hawaiian Islands. U.S. Environmental Protection Agency, 2006.*

*"The U.S. Army Corps of Engineers is a worldwide organization that provides engineering services and construction support for a wide variety of military and civil projects."* <https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Forms/WorkInWaterway2014.pdf>

*"..as Jason Vercelli of the DLNR Division of Forestry and Wildlife (DOFAW) put it, "If you can protect, restore, and re-create wetland areas, you'll end up with a big sponge."* <https://governor.hawaii.gov/newsroom/dlnr-news-release-hawaiis-wetlands-play-key-role-in-mitigating-climate-change-impacts/>

*"Helen Raine of Pacific Birds said, "One of the things they can do is to help purify our water. During major rain events like we see in Hawai'i, a wetland can trap and allow pollutants and toxins to settle before they reach the ocean. In the same way they can help us control sediment and store flood water."* <https://governor.hawaii.gov/newsroom/dlnr-news-release-hawaiis-wetlands-play-key-role-in-mitigating-climate-change-impacts/>

*"The Engineering program provides engineering and inspection services to plan, design and construct highway, drainage and bridge replacement projects for the County of Maui. The program implements drainage and traffic master plans for the County, performs survey and land acquisition functions, and reviews subdivision and construction plans"*. <https://www.mauicounty.gov/556/Engineering-Division>

*"Many native Hawaiian plant and animal species have evolved to live in Hawaii's unique wetlands. scenic landscapes that hold cultural and historical significance"*. <https://dlnr.hawaii.gov/wildlife/files/2020/08/WetlandPoster.pdf>

*"Hawaii's unique hydrological conditions—heavy rainfall, porous volcanic soil, and steep terrain—create wetlands that are different from those found in any.."* [https://www.nawm.org/pdf lib/state\\_summaries/hawaii\\_state\\_wetland\\_program\\_summary\\_083115.pdf](https://www.nawm.org/pdf/lib/state_summaries/hawaii_state_wetland_program_summary_083115.pdf)

*State definition of wetlands: "State Definition of Wetlands Although wetlands are not explicitly included in the definition of state waters in the Hawaii Water Code, Hawaii's surface water quality standards do apply to wetlands. The water quality standards define "wetlands" as: "land that is transitional between terrestrial and aquatic ecosystems where the water table is usually at or near the surface or the land is covered by shallow water. A wetland shall have one or more of the following attributes: (1) at least periodically the land supports predominantly hydrophytic vegetation; (2) the substratum is predominantly undrained hydric soil; or (3) the substratum is nonsoil (gravel or rocks) and is at least periodically saturated with water or covered by shallow water"*. [https://www.nawm.org/pdf lib/state\\_summaries/hawaii\\_state\\_wetland\\_program\\_summary\\_083115.pdf](https://www.nawm.org/pdf/lib/state_summaries/hawaii_state_wetland_program_summary_083115.pdf)

*Congratulations to the Maui County Floodplain Administrator on becoming a Certified Floodplain Manager (CFM): <https://waihialana.hawaii.gov/2019/12/04/congratulations-to-the-maui-county-floodplain-administrator-on-becoming-a-certified-floodplain-manager-cfm/>*

*“Third possible alternative is to construct a new outlet from the existing wetland area (TMK 3-9-07: 07) to the parcel (TMK: 3-9-07: 05) makai of Uluniu Road with a new culvert under Uluniu Road. A new drainage system would connect the two wetland areas (TMK: 39-46: 17 and 3-9-07: 07) and allow runoff to cross under South Kihei Road. A feasibility study is required. The proposed Uluniu roadway drainage system will reduce the local flooding on Uluniu Road. Implementation of a new outlet will help to mitigate the flooding problems at South Kihei Road. However, due to lack of data, permitting issues, and environmental assessment, further study is required to assess the feasibility of the new outlet alternative (third alternative)”. Source, Kihei-DMP-Pre-Final-Report-Complete-11-04-16.pdf (page 67/388)*

*Floodplain Wetlands: “Floodplains store water during floods, reducing flood levels downstream, which reduce flood damage”. “The Floodplain Wetlands Initiative is an innovative approach to flood control and floodplain management.” [https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/FactSheets/archived-fact-sheets/floodplain\\_wetlands\\_initiative\\_jul2015.pdf](https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/FactSheets/archived-fact-sheets/floodplain_wetlands_initiative_jul2015.pdf)*

*Restoring Floodplain Elements: “Floodplains, and the wetlands and waterways that make them up, provide a host of natural functions that may mitigate erosion, reduce flooding, revitalize local habitats, and reduce local water pollution”. <https://nrcsolutions.org/restoring-floodplains/>*

*Quality vs. Quantity of Wetlands: For every 1 acre of wetland you lose it could take 3 acres of wetland mitigation to replace: According to Erickson and Puttock (Erickson, Terrell A., and C. F. Puttock. Hawai'i Wetland Field Guide), Regarding “how much is enough”, “... it could require “3 hectares of mitigation for one hectare of wetland loss”. [a ratio of 3:1] “...Due to the temporal lag in Wetland function”.*

*“Over seven percent of the total area of the United States is subject to the one percent chance flood from riverine or coastal sources”. “These same flood-prone sites provide natural resource functions such as floodwater storage, water supply and quality maintenance, fish and wildlife habitat, wetlands and natural forest flora, natural and agricultural products, and recreation opportunities.” Thomas, F.H. (1995). Principles of Floodplain Management. In: Gardiner, J., Starosolszky, Ö., Yevjevich, V. (eds) Defence from Floods and Floodplain Management. NATO ASI Series, vol 299. Springer, Dordrecht. [https://doi.org/10.1007/978-94-011-0401-2\\_16](https://doi.org/10.1007/978-94-011-0401-2_16)*

*“Conserving wetlands means we are supporting some of the rarest (and coolest!) birds in the world”. “These habitats are also culturally significant. Hawaiian farmers have enhanced wetlands to provide kalo (taro), fish, and materials for mats and other items. These traditional community practices can also be beneficial for birds and other wildlife.” <https://pacificbirds.org/our-priorities/hawai%CA%BBi-wetlands/>*

*Wetlands Restoration in a Hawaiian Cultural Context Scott Fisher, Ph.D. Maui Coastal Land Trust: “Spiritual Places: Wahi Pana – Wetlands were often thought of as the domain of mo’o, or dragons”. [https://www.hawaiiconservation.org/wp-content/uploads//fisher\\_wetlandsrestorationinahawaiianculturalcontext\\_opt.pdf](https://www.hawaiiconservation.org/wp-content/uploads//fisher_wetlandsrestorationinahawaiianculturalcontext_opt.pdf)*

*VIOLATION IN NORTH KIHEI: “... we now have confirmation from county that the work was being performed without the required permits as the county has posted violation notices for the three Kulanihakoi gulch properties. We suspect the same type of illegal activity is going on at the Waipuilani site, at the mauka end of Ho'onani”. <https://gokihei.org/environment/violation-in-north-kihei>*

*Project aims to restore gulch, buffer runoff - Organizers expand efforts to bring back vegetation in Keokea Gulch: “Many areas in South Maui are prone to flooding during heavy rainfall and without watershed*

management and repairs, sediment and debris can flow straight down the mountain and into the ocean, said Katie Woodbury, an ecologist with Maui Environmental Consulting.”

<https://www.mauinews.com/news/local-news/2022/07/project-aims-to-restore-gulch-buffer-runoff/>

*Urbanization - Stormwater Runoff* - “Impervious surfaces associated with urbanization reduce infiltration and increase surface runoff, altering the pathways by which water (and any associated contaminants) reach urban streams”. Effective impervious area (EIA): “Many studies have found that EIA (also known as drainage connection or directly connected impervious area) is a better predictor of ecosystem alteration in urban streams”. <https://www.epa.gov/caddis-vol2/urbanization-stormwater-runoff>

*Plan seeks more natural solutions to flood risks: Stabilized dunes, green flood walls among the proposals in Kihei plan.* “Reduced wetland areas due to development in South Maui, drought and degraded watersheds and intense storms are creating a “formula for disaster” and leading to “mud floods” that pollute the ocean as they did in a recent storm, a local water quality expert said”.

<https://www.mauinews.com/news/local-news/2022/01/plan-seeks-more-natural-solutions-to-flood-risks/>

**KIHEI DRAINAGE MASTER PLAN ECOLOGICAL ALTERNATIVES ANALYSIS FINALLY**

**RELEASED:** <https://gokihei.org/environment/kihei-drainage-master-plan-ecological-alternatives-analysis-finally-released>

“Use passive restoration, when appropriate. Before actively altering a restoration site, determine whether passive restoration (i.e., simply reducing or eliminating the sources of degradation and allowing recovery time) will be enough to allow the site to naturally regenerate”. <https://www.epa.gov/wetlands/principles-wetland-restoration>

“Restore natural function. Structure and function are closely linked in river corridors, lakes, wetlands, estuaries and other aquatic resources. Reestablishing the appropriate natural structure can bring back beneficial functions. For example, restoring the bottom elevation in a wetland can be critical for reestablishing the hydrological regime, natural disturbance cycles and nutrient fluxes. In order to maximize the benefits of the restoration project, it is essential to identify what functions should be present and make missing or impaired functions priorities in the restoration”. <https://www.epa.gov/wetlands/principles-wetland-restoration>

“How do wetlands help reduce climate change? Wetlands can play an important role in our approach to climate change adaptation, through capturing and storing carbon to reduce atmospheric greenhouse gases, and providing resilience to hazards such as flooding, storm surge and coastal inundation.” <https://www.ryeny.gov/home/showpublisheddocument/11824/637181615048170000>

*Wetland restoration and protection plays an important role in ecosystem health and watershed dynamics:* “Among their valuable services, wetlands recycle nutrients, filter certain pollutants, recharge groundwater, and provide habitat for fish and wildlife. Additionally, wetlands reduce peak flows and flood damage, store water, protect erodible shorelines, and provide recreational opportunities and amenities”. (Source, <https://www.epa.gov/wetlands/incorporating-wetland-restoration-and-protection-planning-documents>)

*Watershed management and repairs are essential:* According to Katie Woodbury, an ecologist with Maui Environmental Consulting, “Many areas in South Maui are prone to flooding during heavy rainfall and without watershed management and repairs, sediment and debris can flow straight down the mountain and into the ocean”. (Source, <https://www.mauinews.com/news/local-news/2022/07/project-aims-to-restore-gulch-buffer-runoff/>)