Recent Timeline of Coral Reef Management in Hawaii

Disclaimer

The purpose of this timeline is to present a simplifying visualization of the events that may have influenced the development of capacity to manage coral reefs in Florida over time.

By its nature, it is incomplete. For example, the start date is somewhat arbitrary and therefore does not include events relating to coral reef management that have occurred prior. Furthermore, it is intended as a living document that we hope will continue to evolve and improve as past events are added, existing events are reinterpreted and future events included. While the primary intended use of this was to help inform a coral reef capacity needs assessment we conducted in 2012, we believe the visualization of events can be used in the future to improve a collective understanding of coral reef management.

agement,

serve other educational purposes, and illustrate the importance of investing in capacity to manage oral reefs into the future.

We value your input to the timeline and encourage you to contact us at info@sustainametrix.com with any suggestions you might have to improve it.

Recording of catch and effort data on fishing Data recording effort began in 1966.

CR Related Research & Monitorin

CR Related Outreach & Workshops

CR Related Programs

CR Related Management 8

1970 - 1980 Cooperative Quadripartite Program NWHI fishery investigations involving National Marine Fisheries Service, US Fish and Wildlife Service, Hawaii Division of Aquatic Resources, and the University of Hawaii

Five-year cooperative research program to identify NWHI marine resources The National Marine Fisheries Service, U.S. Fish and Wildlife Service, State of Hawai'i, and University of Hawai`i began a five-year cooperative research program to identify NWHI marine resources

> Crustaceans Fisheries Management Plan The Crustaceans FMP was approved in 1983. Initial provisions of the FMP, which was initially named "Spiny Lob-ster Fisheries of the Western Pacific Region," went into effect March 9, 1983 (48 FR 5560, 7 February 1983).







The Western Pacific Regional Fishery Management Council established the Precious Coral Fishery Management Plan (FMP) The Fishery Management Plan (FMP) for the precious corals fisheries of the western Pacific region was implement-ed in September 1983. It established the plan's management unit species and management area, as well as classifying several known beds.

Hanauma Bay, Hawaii's first Marine Protected Area Hanauma Bay is a 101-acre, horseshoe-shaped bay near the southeast MPA established by the Hawaii State Div sion of Fish and Game. The Marine Man

aged Program for the State of Hawaii was

created at the same time.

CR Related Laws & Regulations

Hawaii became the 50th US state Statehood brought certain political advantages as well as new access to federal funds

> 1961 State Land Use Law created First in the country to do state land use. In 1961, the Hawaii State Legislature determined that a lack of adequate controls had caused the development of Hawaii's limited and valuable land for short-term gain for the few while resulting in longterm loss to the income and growth potential of the State's economy.

Hunting of sea turtles in Hawaii Turtles received protection in 1978, following decades of commercial exploitation that caused their population to plummet, and the failure of a Hawaii state law passed in 1974 to reverse the decline. Efforts to de-list Green Turtles from the endangered species list and resume hunting them are underway.

Kawaihae Harbor built During the harbor excavation, the coral reef that had been a danger to ships was cut and scraped. The materials dredged from the reef were used to create a landfill upon which port facilities were built.

1959

Tsunami in Hilo On May 23, 1960, a tsunami destroyed much of downtown Hilo. Sixty-one people lost their lives and about 540 homes and businesses were Result of a '100 year storm' that brought torrential rainfall to the destroyed or severely damaged.

Major freshwater kill of corals in Kane'ohe Bay, O'ahu

adjacent watershed.

Clean Water Act

1972

Coincidentally, The Water Quality Program for O'ahu with Special Emphasis on Waste Disposal, which was completed and concluded that the design of water control structures and wastewater treatment should be directed toward the conservation of corals and other indigenous aquatic organisms, the protection of the aesthetic qualities of the water environment, and the protection of the various recreational uses of the waters.

> Hawaii State Planning Act created The state's original coastal zone management legislation, enacted in 1977, established several priorities which were reiterated in Hawaii's 1978 State Planning Act.

1978

Pineapple Farming waned, particularly on Oʻahu Decline due to labor costs and foreign competition.

> Hurricane Iwa received heavy wind damage.

The Clean Water Act was passed in 1972.



1995 - 2000 Review of Coral Reefs around American Flag Pacific Islands The review assesses the need and feasibility of establishing a coral reef fishery management plan for the Western Pacific Region

LORAN, a marine navigation system station on Kure Atoll, was

Outreach, Education and Research efforts start at Maui's 'Ahihi-Kina'u Natural Area Reserve This fragile ecosystem is now closed due until 2014 to tourists due to heavy damage by hikers, as well as the discovery of unexploded ordinance.

1997 - 1998 CRAMP developed The Hawaii Coral Reef Assessment and Monitoring Program (CRAMP) developed. Result of a series of workshops with man-agers and reef scientists held that year in Hawaii to address major problems facing Hawaii's reefs.

> Hawaii's State of the Reefs Report 1998, DLNR published This was the first comprehensive compilation of all the status and trends of Hawaii's Coral Reefs. It was patterned after similar efforts in the GBR in Australia and become the basis for the subsequent State of the Reefs Reports that were published by NOAA wit

> > hapters on every jurisdiction.

Hawaii Coral Reef Monitoring Workshop held in Honolulu Organized by DAR in conjunction with the East-West Center. Identified need for a coherent, integrated monitoring program for Hawaii using standard methods appropriate for their situation.

> West Hawaii Aquariur initiated Partnership between DAR, HCRI, from UH Hilo and WSU Vancouve permanent fish monitoring sites that times/year

> HCRI MOA establishe tween UH and DLNR Will created a new one- year law fell enforcement of Hawaii's laws

Hawaii Ocean Resources Management Plan evaluated University group contracted by the state planning office to conduct an evaluative assessment of the Hawaii Ocean Resources Manage-

ment Plan

The Fishery Management Plan (FMP) for Bottomfish and Seamount Groundfish Fisheries in the Western Pacific Region became effective on August 27, 1986 (51 FR 27413). A limited access system was established for the Ho'omalu Zone, with nontransferable permits and landing require-ments for permit renewal and for new entry into the fishery

NHWI Ho'omalu Zone bottomfish limited entry program

Hawaii's first Ocean Resources Management Plan developed The ORMP, first adopted in 1994 and subsequently updated in 1998 and 2006, is a statewide plan that promotes an integrated approach to managing Hawaii's marine and coastal zone resources. A great deal of public participation went into its development.

closed

Bottomfish and Seamount Groundfish FMP The Bottomfish and Seamount Groundfish Fishery Management plan regulates fishing for bottomfish and seamount groundfish species in the waters of the western Pacific region.

> Pelagic Fishery Management Plan The Pelagics Fishery Management Plan regulates fishing for pelagic species in the waters of the western Pacific

> > It stresses the importance of watershed management, and outlines the cost and contents of a comprehensive management plan for the 50,000 acres of forest and watershed vegetation occupying the summit and slopes of the West Maui Mountains on the island of Maui.

West Maui Mountain Watershed Partnership

State and private landowners form the West Maui Mountain Watershed Partnership.

West Hawaii Regional Fisheries Managem Result of Act 306 - Actual effect is establishment of network of marine few small existing reserves) prohibit aquarium fishing in 35% of W Haw

Midway Atoll National Wildlife Refuge created Midway became an "overlay" refuge in 1988, while still under the primary jurisdiction of the Navy. With the closure of Naval Air Facility Midway Island in 1993, there began a transition from bullets to birds, a change in mission from national defense to wildlife conservation.

> State waters added to the Hawaiian Islands Humpback Whale National Marine Sanctuary On June 5, 1997, over four years after the Hawaiian Islands Humpback Whale National Marine Sanctuary w nated the nation's 12th marine sanctuary, Hawai`i Governor Benjamin Cayetano formally approved of the sa in state waters

Na Ala Hele Trail Program established Established in 1988 in response to public concern about the loss of public access to certain trails and the threat to

Humpback whale sanctuary created

The Humpback Whale sanctuary was created by a Congressional act to protect the humpback whale and its marine habitat in Hawaii. Habitat includes corals and associated substrate

Wasterwater injection wells practices scrutinized Concerns grow over wastewater injection practices following major summer cladophora (green filamentous algae) blooms. Began the West Maui watershed planning process.

Hawaii established Hawaii Revised Statutes § 188-22.6

Allowing for the designation of CBSFAs. Established for the purpose of reaffirming and protecting fishing practices customarily and traditionally exercised for purposes of native Hawaiian subsistence, culture, and religion.

> 1991 Hawaii EIS Law reviewed

UH Environmental Center conducted a major review of the Hawaii EIS Law, including public meetings. Subsequent reviews have been conducted in recent years.

Humpback whale protection

Hawaiian Islands Humpback Whale National Marine Sanctuary (sanctuary) established by Congress

Hurricane Iniki Strongest hurricane to hit Hawaii in a century, and followed on the heels of Hurricane Andrew's devastation of Florida and Louisiana.

1992 - Present Fibropapiloma tumors in turtles Greater incidence of fibro-papiloma tumors in green sea turtles - assumed to be caused by LBSP Midway Atoll control transferred Full jurisdiction and control of Midway Atoll is transferred from the U.S. Navy to the U.S. Department of Interior, U.S. Fish and Wildlife Service

Stony Coral protections ony coral and live rock rules were esta o prevent intentional take/break o

City and county of Honolulu settlement with HI DOH Resulted in Mamala Bay study and Kailua Bay Advisory Council Agreement

damage of any stony coral

Sanctuary Compact

Sanctuary Compact Agreement signed State of Hawaii and NOAA, established formal co-management of the Sanctuary. It clarifies the State's continuing authority and jurisdiction over its State waters, submerged lands, and other resources within the Sanctuary.

First large-scale bleaching event in

Hawaii The first large-scale coral bleaching event in Hawaii occurred Contributed to the demise of Bay predominantly in Kaneohe Bay in 1996.

In 1997-98, mass bleaching occurred on reefs throughout the world due to increased sea surface temperatures associated with an El Nino event where an estimated 16% of the world's coral reaf wore lost (Wilkinson et al. 1998) reefs were lost (Wilkinson et al., 1998).

Maui's Pioneer A large troop ves-Mill (in West Maui) sel struck a patch stopped operations reef in Kane'ohe thousands of acres of former underway

susceptible to dust storms and storm runoff events

1999

The south shore of Kauai was particularly hard hit by wave action with very severe damage around Poipu. The Waianae coast of Oʻahu also had stretches of severe surf damage. In fact, all islands reported some surf damage along their southwest facing shores. Wind damage was widespread on Kauai and there were pockets on Oʻahu that also historic trails from development pressure.

2000 HCRI Coral Reef Assessment and Monitoring Program (CRA Report (See report for details on activities and plans) 2000 2000 NOWRAMP NOWRAMP expedition was launched as a multi-agence tutional partnership that brought together the best field	RAMP) Final	03 Oast Watch started at Miloli'i Frained public monitors of coral reefs 2004 Additi ditions Northwa and Mon addition	204 Additional NOWRAMP expe- itions Northwestern Hawaiian Islands Reef Assessment and Monitoring Program (NOWRAMP) conducted additional expeditions to the NWHI to continue collecting data about the NWHI a	2005 Main Hawaiian Island Survey Co al Reef Cruises (MHIRAMP) be- gan MHI survey cruises funded by NOAA CRCP held in 2005, 2006, 2008, 2010, and next planned for 2013. Now established in triennial cycle. Reef fish survey componer efforts supplemented by additional reef fish cruises in 2012 and early 2013, funded by NMFS 2005 Malama Kai Foundation receives permission to install moorings Letter of permission received from US Army Corps to install 15 additional day use moorings statewide. This includes five moorings each off Kauai, Maui, and Kona Coast of Hawaii. 2005 Mooring buoy installation manu- als Hawaii DMB System Installation and Maintenance Pro- cedures Manual developed by Malama Kai Foundation	Pro- 2006-2007 PIMPAC conducted Managemer	F C 2 1 2 1		- Adopt a Sign also started is distributed through the Makai Watch Program. 2009 Hawaii DMB Manual Hawaii DMB System Background, Site Selection Criteria, In lished by Malama Kai Foundation. The manual outlines stat as installation and maintenance procedures 2009 DLNR-DOBOR submits application ditional day use moorings statewid	Monitoring of coral reefs of the Main Hawaiian Islands When compared with the results of current reef monitoring, these long-term data sets have allowed for the identification and quantification of alarming trends at nearly all monitored reefs. Many sites have experienced a complete collapse of the coral community, as live coral cover dropped dramatically and reefs became dominated by invasive algae. a, Installation, and Maintenance Procedures Manual pub- statewide standards for day-use mooring materials, as well ion to US Army Corps for 52 ad- vide	Total Economic Value for Protecting and Restoring Hawaiian Coral Reef Ecosystems The goal of the study was to estimate the total value – including	ng approach across multiple agencies, organiza- West Maui. at 33.57 billion ated total economic value the American people on. express its preferences and values for protection iian Islands. In this study, total economic value to protect the coral reef ecosystem for future oral reef or consuming fish supported by coral 2012 2012 2012 CORAL begins working with hotel Inte intended audience is management, engineering and la 2012 Standardization of M nent	
nd forts			20 0 1 20 20 P	lands Humpback Whale National Marine Sanctuary; late 2005 - 2009 Project S.E.ALink	^{pub-} Support Attendees included a community member from Hooker gram unched on Maui, coordinated primarily by the Hawaiian Is-	ookena and a state NARS employee		Letter of permission received from US Army Corps in 2010 2009 Coral Reef Monitoring Data Portal Resource for citizen science and community-based manager 2009 - 2010 Maui Wide Study investigating colo dead zones Showed that patterns and causes of coral decline are site spec	al launched agement clony scale dynamics for Porites	 both direct use and passive use values – for the U.S. population. (see results in April 2013 2011 Participatory mapping workshop for the Mapping Project The Coastal Use Mapping Project is designed to fill a critical informat significant human uses of the nearshore ocean area in the Honolua – You and the Mapping Project is designed to fill a critical informat significant human uses of the nearshore ocean area in the Honolua – You and the Mapping Project is designed to fill a critical informat significant human uses of the nearshore ocean area in the Honolua – You and the Mapping Project is designed to fill a critical informat significant human uses of the nearshore ocean area in the Honolua – You and the Honol	Funded by Castle Foundation and Content of C	
for uarium Project HCRI, and researchers fancouver. Established 23 g sites that are surveyed 4-6 blished be- DLNR ar law fellowship to enhance	meeting in Puerto Rico Mana	Anagement Workshop Workshop included scientists, fishers and managers from state and federal agencies Build an importa lifestyle coordin	Lack of Awareness LAS was created and the Hawaii Living Reef Program launched Build and increase general public awareness of the importance of the coral reef ecosystem to Hawaii's lifestyle, teach and encourage positive behaviors, and coordinate similar coral outreach efforts 20 5 20 5 20 5 20 5 20 5 20 5 20 5 20	as the 'eyes and ears' for the state's Division of Conservat 2005 State Mauka-Makai Watch Progr Partnership between DLNR and local community NGO as the 'eyes and ears' for the State's Division of Conserva 2005 Coral Reef Alliance began work i	tary standards for marine tourism Iaunched GOS. Makai Watch volunteers in communities statewide serve ervation and Resource Enforcement officials (DOCARE) Ogram launched GOS. Makai Watch volunteers in communities statewide serve ervation and Resource Enforcement officials (DOCARE) Chan Hawaii courage citizen participation in reef monitoring, and sponsored			2009	Wastewater pollution mapping Publication of report from Meghan Dailer in algal tissue used to map where wastewater is entering the ocean (funded by HCRI) Image: Shed shed by Malama Kai hekili Herbivore Fisheries Management Area (KHFMA). a, monitoring, and observation/voluntary compliance.	2011 Eco tour certification program Hawaii Ecotourism Association pilots Eco tour certification program. 2011 CI Hawaii Fish Trust Program estab- lished TCI partners with local fishing communities, businesses, non-profit organizations and the State of Hawaii to facilitate the sustainable management of Hawaii's nearshore fisheries. 2011 2011 Hawaii-Palau Exchange	Ala) Day Use Kauai an ma Kai F 2012 Day-use Buo 2012 Ka'anapali Makai Watch pilots onl servation and Incident Report Formonia 0nline access to reporting of natural resource rules violation 2012 t 2012 Launch of CORAL project to support hotel's implementation of water reuse in West Maui 2012 TNC coord process for TNC coord TNC coord	ations, enhancing public involvement. Iature Conservancy role as, public/private part-
ent duct ge	H H H H H H H H H H H H H H H H H H H	Aquatic Invasive Species Aanagement Plan (LAS) de- eloped The goal of the Aquatic Invasive Species Manage- ment Plan is to enhance coordination of current management efforts and to identify gaps. D03 Tisheries Local Action Strate- gy Hawaii (FLASH) and Steer- ng Committee Established The Fisheries Local Action Strategy's Steering Committee envisions a Hawaii with a healthy nearshore marine environment that is maintained through effective management for the benefit and appreciation of present and future generations. D03 The Fisheries Local Action Strategy's Steering Committee envisions a Hawaii with a healthy nearshore marine environment that is maintained through effective management for the benefit and appreciation of present and future generations.	20 L S	managing local environmental heritage. Under the Hawa 2005 Updated Pelekane Bay Water- shed Management Plan Developed by the Mauna Kea SWCD The Pelekane Bay watershed was identified in Hawaii's Unified Watershed Assessment as a Category I water- shed: that is, one of the state's watersheds in most urgen need of restoration. SLand-Based Pollution Threats to unction and health by reducing land-based pollution.	<pre>ities from around Hawaii to increase their effectiveness in fawaii Community Stewardship Network.</pre>	P a 2007 Climate Change and Marine Dise oped	2008 - 2009 PIMPAC conducted socio-econor at Hookena and provided follow-u PIMPAC provides support to area based management effo 1 attendee from CCN using Hookena as site to do SEM-P and the set of	reforts in the region. A-P assessment and monitoring	2010 Mauna Kea Watershed Management	 2011 South Kohala Conservation Action Plan Goals established for a restored, healthy, abundant, and resilient South Kohala coastal system that is cared for and cherished by an island community and guided by the values and traditions of South Kohala 2011 Hawaii's second Ocean Resources 	 Volumes 1 and 2 of the Wahikuli-Honokowai Watershed M ment Plan have been finalized, incorporating the feedback a gestions from community and partner reviewers of the draf released in 2012. 2012 Watershed Coordinator hired for W 	letedManage- ck and sug- raft versions2013Strategy Implementation ProjectsFunding for first implementation projects - road repair project and post fire restoration plan project, plus bioretention basin (rain garden)West
											105	
And the sanctuary of th	<section-header><section-header><section-header><section-header><text><text><text><section-header><text><text></text></text></section-header></text></text></text></section-header></section-header></section-header></section-header>	Islanc launc Lack A cross- in partn private a Land an	A Living Reef Gives Our slands Life campaign aunched (supported by ack of Awareness LAS) A cross-section of community organizations, in partnership with a consortium of public and private agencies — including the Department of Land and Natural Resources — are involved in the "Living Reef" outreach program.	 was developed Coral reefs in the Main Hawaiian Islands are under increulation, and thriving marine tourism industry 2005 State of Hawaii established the Normal State of Hawaii established the Normal State State	increasing strain from recreational use as Hawaii's resident pop- e NWHI Marine Refuge as in the NWHI to fishing (3 mile zone around all islands except 5 Marine Refuge designated in established in Hawaii. This Marine Refuge and the per-	KWP authored a watershed management plan which defin preserving its biological, cultural, and economic resources	efined actions for addressing threats to the watershed while	le	10-Year Strategic Plan Developed by Malama Kai Foundation under contract to DLNR Today there is a statewide system of about 220 day-use moorings around the Main Hawaiian Islands. Photom H	2011 Mai'ula'ula Watershed Plan completed Focus on addressing existing sources of polluted runoff and threats to w radation of the watershed resources as projected land use changes occur 2011 Hawaii Coral Reef Strategy: Priorities for Hawaiian Islands The U.S. Coral Reef Task Force designates the West Maui Watershed as the The U.S. Coral Reef Task Force designates the Ka'anapali – Kahekili area tive as a priority watershed partnership	to watershed health and preventing further deg- ccur. Or Management in the Main	
	Trail established and interpretation of traditional Native Hawaiian culture and le trail corridor full of cultural and historical significance.		T O	2005 The Northwestern Hawaiian Islar operations' plan was approved A thirty-day public comment period resulted in some m		ent stablish- Jonu-	replenishment areas on Maul and O and with the	2009 Kahekili is declared an Herbivore F (KHFMA) All take of herbivorous fishes and urchins is now prohibited				
 13178. Created the NWHI Coral Reef Ecosystem Reservation 2000 Coral Reef Conservation Act To create a national coral reef action strategy 2000 	on the conservation of the NWHI and issues Executive Order eserve, which protects Hawaiian cultural and religious uses 2001 2001 2001 2001 Stony coral and live rock rules amended to remove the word 'in- tentional' These rules were now able to be applied to damage to reefs from boats, anchors, etc.	roductively mature) 2004 Restri	104 Restrictions on fishing for crabs an Legislature made it illegal to take any female spiny lobster, k	er, kona crab, and samoan crab		²⁰⁰⁷ EPA reviewed the county of Maui' mits	ui's West Maui injection well per-	the U.S. Coral Reef Task Force	^{ards.} Is for Marine Tourism approved by		2012 Maui County is sued by an enviror tal defense group representing 5 k groups in Maui Freshwater seeps just offshore of Kahekili are accused to no ter quality standards of the Clean Water Act due to wastewa Lahaina injection wells operated by Maui County. 2012 Legislative Climate Change Priority	local not meet wa- ewater from
farms), making it the first state to pass such legislation 2000 Beach Act	merged lands and state waters for open ocean aquaculture (fish on 2001 Proposed creation of 14th National Marine sanctuary The process to designate the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve as the nation's 14th waters across the nation – established bacteria standards, proto- National Marine sanctuary began		004 Crab and lobster fishing restriction Legislature made it illegal to take any female spiny lobster, k	ONS heightened er, kona crab, and somoan crab	DOJ, EPA, HI DOH, Kauai County	2007 Gill net restrictions	areas around O'ahu. Gillnet fishing restrictions imposed on	n 2	2010 Review of the Hawaii EIS Law Wind energy EIS (Environmental Impact Statement) prepared by Dept. 2010, 2011 Working to reduce use of injection wells	ept. of Energy	Guidelines included in Hawaii Revi Statutes Chapter 226 The climate change adaptation priority guidelines are intend pare the state for climate change impacts.	vised
 S- A longlining fishing vessel (the F/V Van Loi) ran agrou Kaua'i. Portions of the vessel still remain atop the reef. One example that illustrates the problems associated w 2000 Landslide and muddy discharge 	ground on a fringing reef directly adjacent to the shoreline of eef. Oil, debris and fishing gear spread across hotel beach. d with abandoned wreckage on coral reefs				2008 International Year of the Reef Events coordinated statewide through many organizations	ns and agencies			Working to reduce use of injection wells The Maui County Wastewater Community Working Group completes on provided numerous suggestions to the county to help reduce/eliminate to ed wastewater and to increase the use of recycled water for irrigation	es one year of monthly working meetings and ate the use of injection wells to dispose of treat-		Funding provided through a partnership among Department of Land and Natural Resources (DLNR), CI, and the Harold K.L. Castle Foun- dation (HKL Castle)

sugar cane, which is a major water polluter - however, with A Kauai landowner who caused a catastrophic mudslide on November 26, 2001, which destroyed a rare coral reef

nd polluted a pristine bay at Pilaa, Kauai, must pay a \$4 million fine to the state, according to the Hawaii Interme- Bleaching Event in the NWHI diate Court of Appeals.

The occurrence of two episodes of mass bleaching over a period of three calendar years lends credence to predictions that the frequency of bleaching events will increase.

Ala Wai/Beachwalk sewage spill A spill of up to 800 gallons of untreated wastewater into the Ala Wai Canal occurred in the switchover to the Beachwalk wastewater emergency bypass system.

Tsunami Events in Hawaii Japanese tsunami waves hit Hawaii