

Water Resources and Climate Change Adaptation in Hawai'i: Adaptive Tools in the Current Law and Policy Framework

2012



CENTER FOR
ISLAND CLIMATE
ADAPTATION & POLICY



UNIVERSITY of HAWAII at MĀNOA
WILLIAM S. RICHARDSON
SCHOOL OF LAW

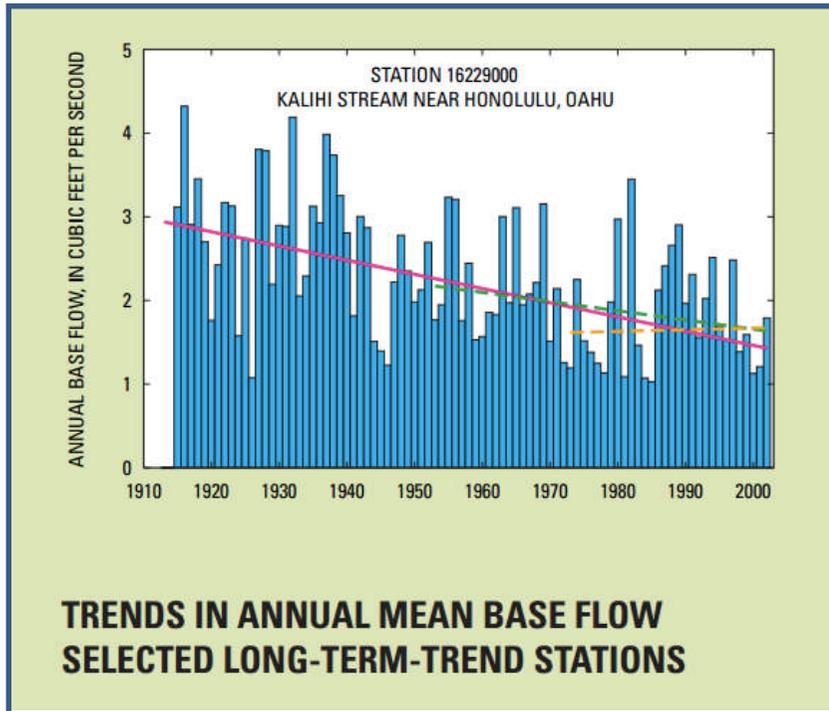
“Prudent water resource planning should consider the long-term impacts of global climate change and how this could affect Hawaii’s water supplies”

- State of Hawai‘i Commission on Water Resource Management, 2008

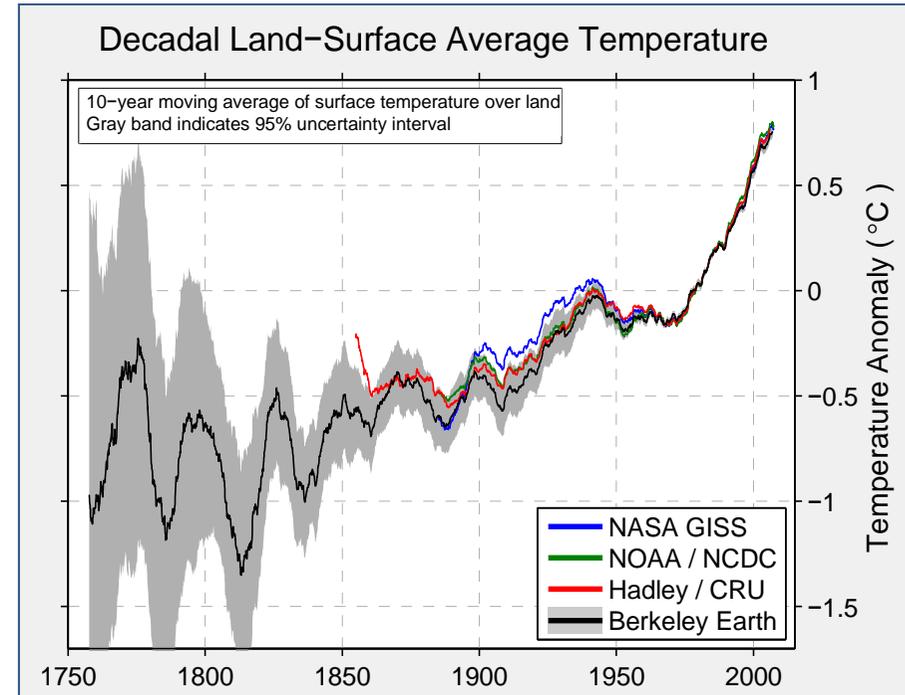
“Investing in the protection of fresh water sources must be the highest priority for Hawaii’s public leaders and the Department of Land and Natural Resources.”

- Gov. Neil Abercrombie, 2011

Why “Adaptation”?



Oki, D.S., 2004, Trends in Streamflow Characteristics in Hawaii, 1913-2003 (2004), <http://pubs.usgs.gov/fs/2004/3104/#pdf>



Muller et al., Berkeley Earth Surface Temperature (2012), <http://berkeleyearth.org/pdf/decadal-comparison.pdf>



Four Adaptive Elements

Adaptation recognizes uncertainty, and addresses it with these elements:

- 1 Forward-looking
- 2 Flexible
- 3 Integrated
- 4 Iterative



Hawai'i
Constitution

Public Trust Doctrine

Precautionary Principle

Water Code and Water Commission



Haw. Water
Plan

Land Use Regulation
and Planning

Watershed
Protection

Recycling and
Conservation

County Water
Supply

Haw. Dep't of
Health

Haw. Dep't
Agric.

Individual, Business,
and Gov't Water

Sample Adaptive Mandates



“**Protect**” water resources for the benefit of “**present and future generations.**”



“Establish procedures for regulating **all uses of Hawaii’s water resources.**”



“**Must conform to changing needs and conditions.**”



“**Continuing study**” of salt-water intrusion.



1 Forward-looking 2 Flexible 3 Integrated 4 Iterative





Policy & Planning Tools

Hawai'i Water Plan

- (1) Climate scenario planning
- (2) Update regularly
- (3) Integrate land use planning with water availability
- (4) O'ahu watershed management planning
- (5) Conservation and recycling plans

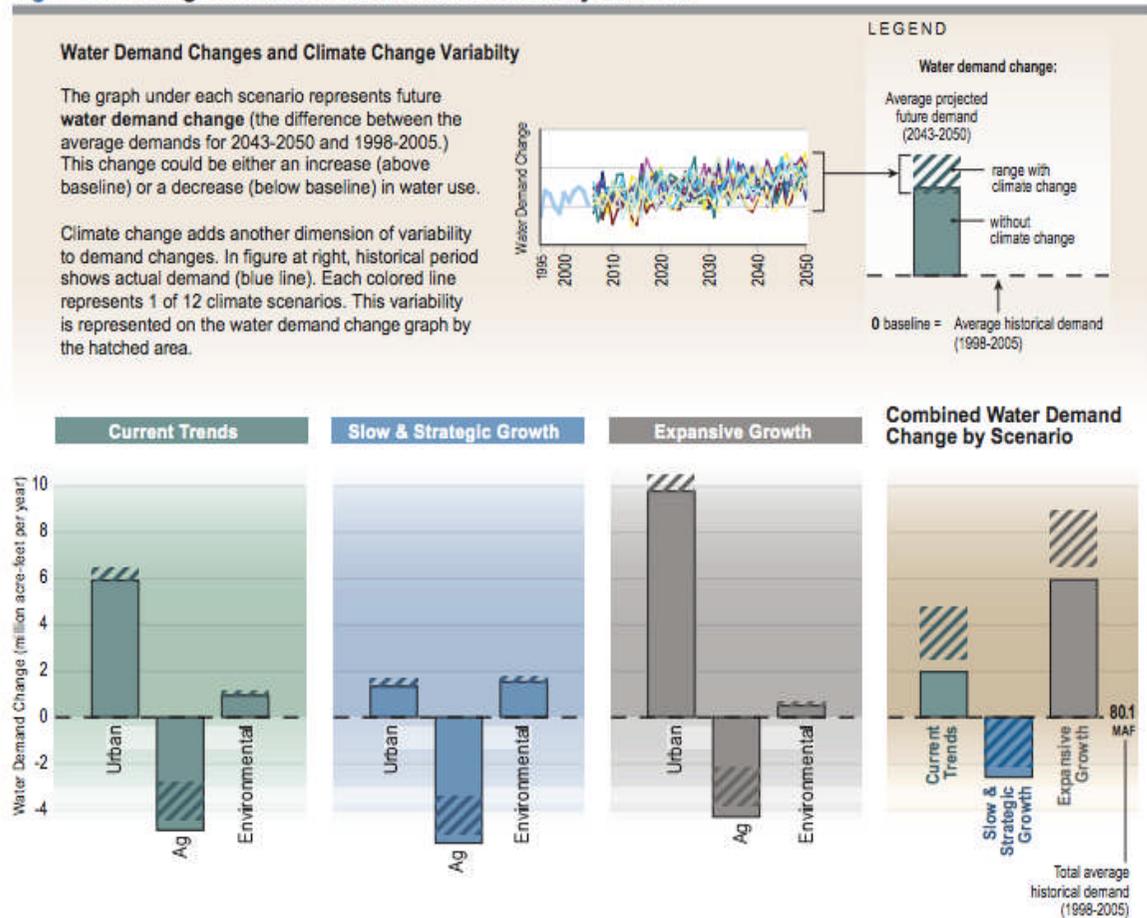
 Forward-looking  Flexible  Integrated  Iterative



Climate scenario planning



Figure 5-6 Change in future statewide water demand by scenario



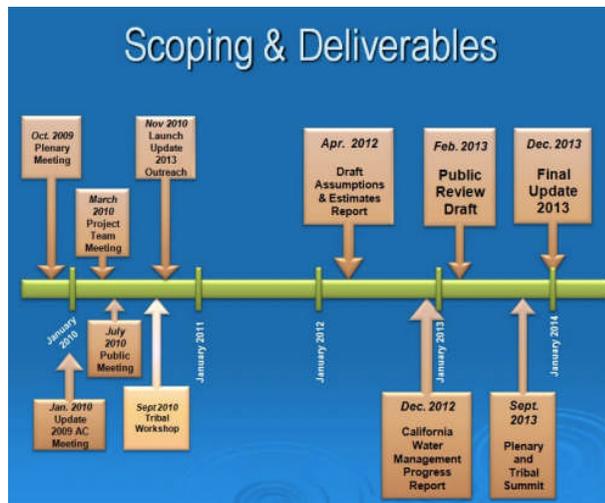
- 1
- Forward-looking
- 2
- Flexible
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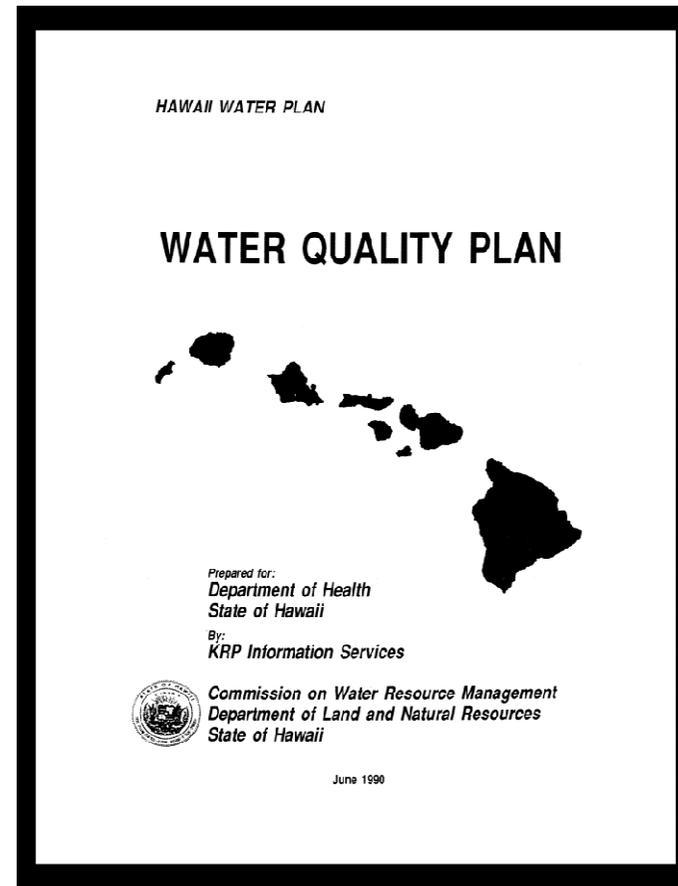
Regular updates



California Water Plan Update 2013



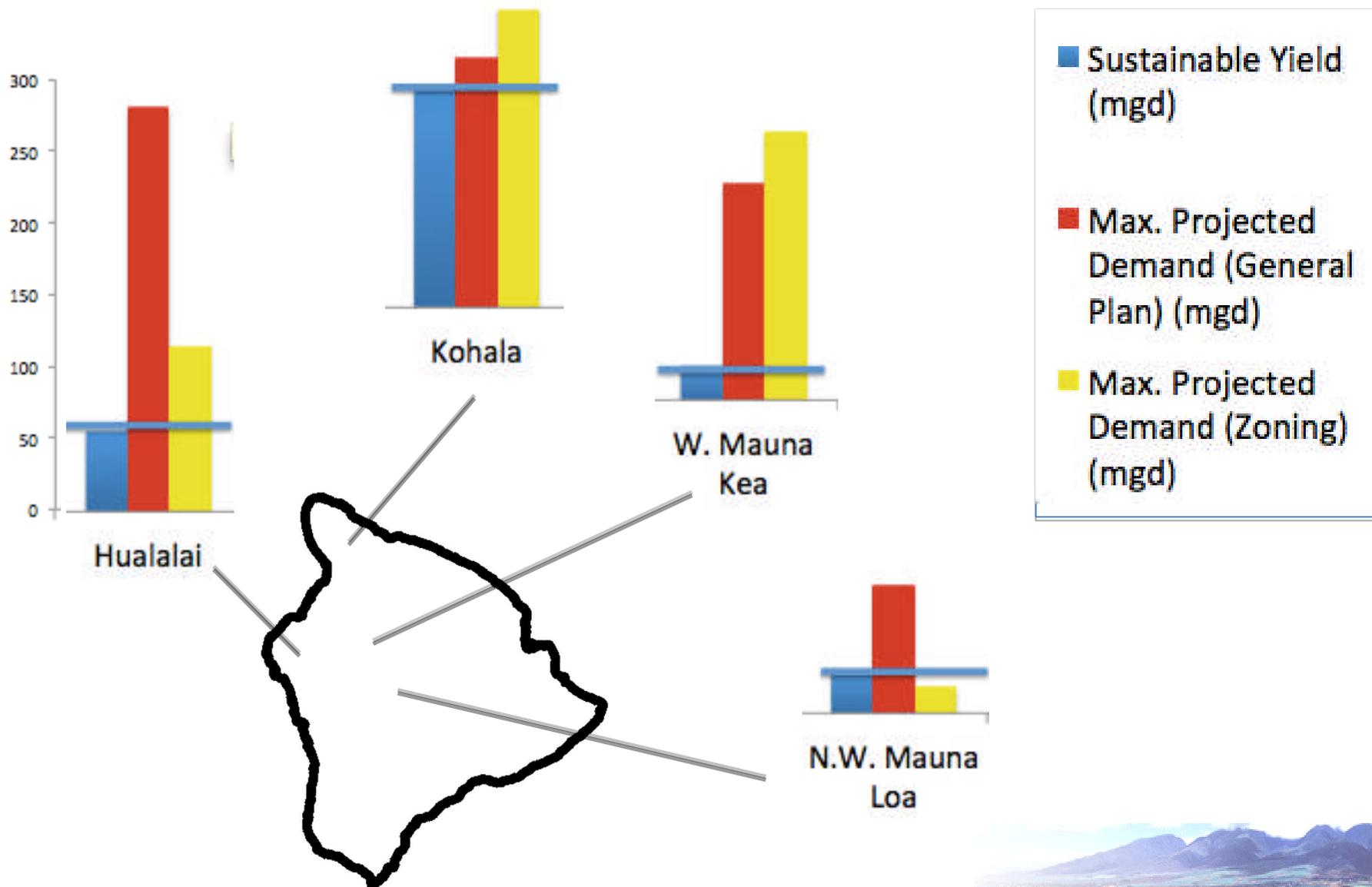
1990



- 1 Forward-looking
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Adaptive Land Use Planning



Adaptive Land Use Planning



Maui Water Availability Policy?
M.C.C. § 14.12.040

“No subdivision shall be approved, unless . . . the director shall provide written verification of a **long term, reliable** supply of water.”

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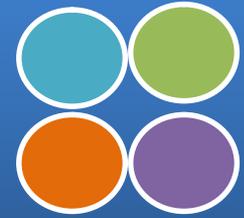


Regulatory Tools

- (6) Climate-conscious “clearly sustainable yield” and instream flow standards
- (7) Enforce water use monitoring and reporting
- (8) Expand designated water management areas
- (9) Adaptive permitting, e.g. water use, well-construction, stream diversion



Climate-Conscious Sustainable Yield and Instream Flow



“Maximum Sustainable Yield” vs.

“Clearly Sustainable Yield”

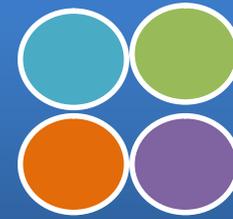
Maui WUDP 2009 update:

“The mass flow analyses are based on **historical stream flows** for the Iao and Waihee streams. No specific consideration is made regarding trends in drought severity or frequency or anticipated climate change. The analyses **could be revised based on specific assumptions** regarding future stream flows.”

1 Forward-looking 2 Flexible 3 Integrated 4 Iterative

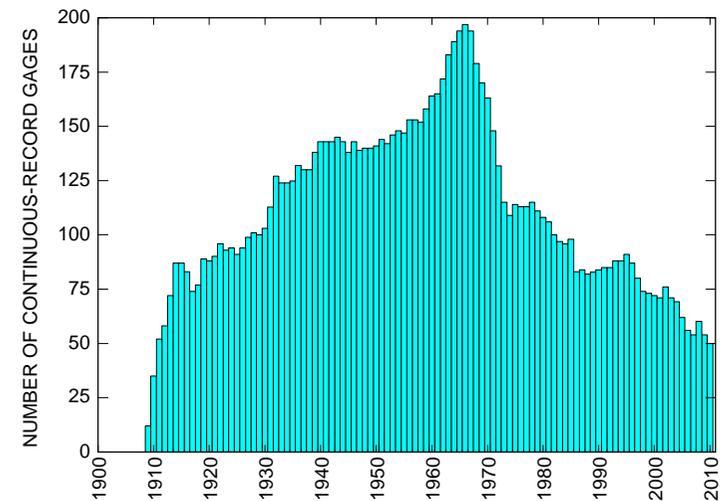


Adaptive Permitting



For example:

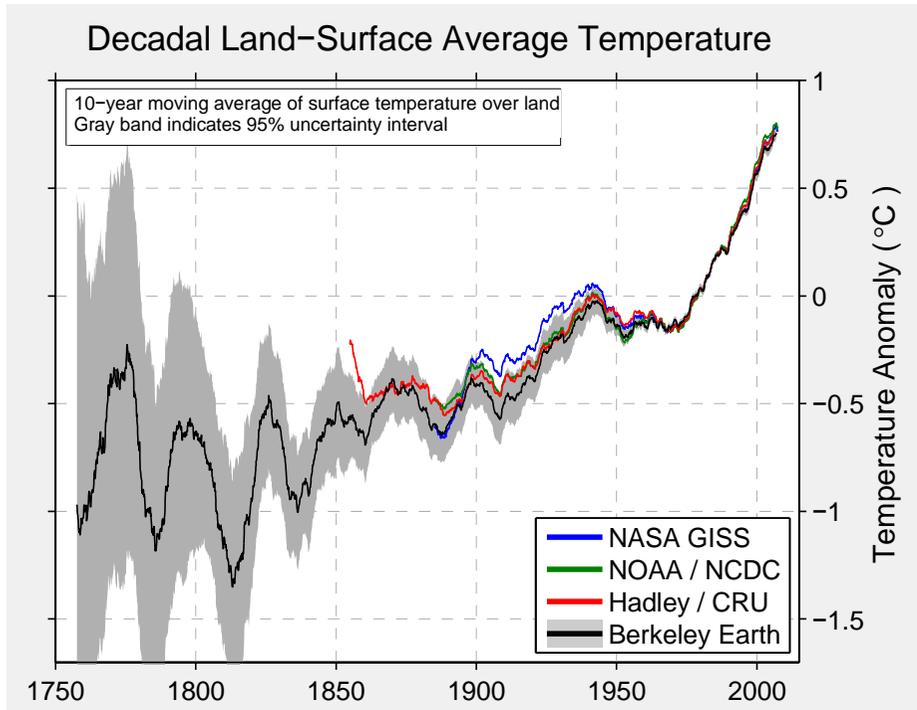
- Compliance inspections and fee?
- Living permit model?
- Gauges as a standard permit condition?
- Deep monitor wells?



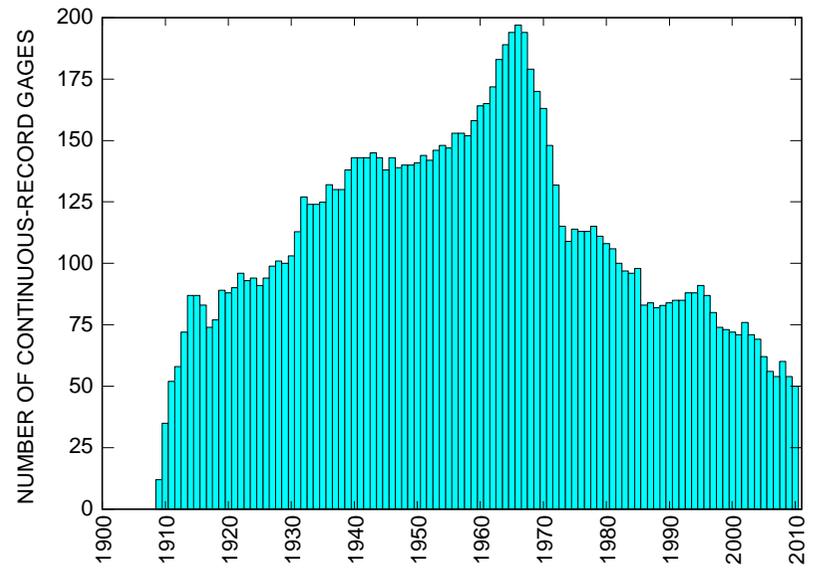
U.S.G.S. 2010

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Muller et al., Berkeley Earth Surface Temperature (2012), <http://berkeleyearth.org/pdf/decadal-comparison.pdf>



U.S.G.S. 2010





Market-Based Tools

- (10) Green building / Hawai'i Energy Plan model
- (11) Tie Water Commission fees more closely to the cost of regulation
- (12) Public goods charge / property tax model



Water Commission Fees



Flat \$25 application fee

vs.

Tiered fees, tied to quantity of water impacted, and cost of watershed protection necessary to protect the resource

1 Forward-looking 2 Flexible 3 Integrated 4 Iterative



Public Goods Charge



Promote Water-Conscious Infrastructure

Why Energy Efficiency is Important
 Making your household energy efficient not only reduces your own cost of electricity, it also helps our state economy become more independent from the world's oil situation. As a result, it makes you part of a community wide effort to realize energy savings, keep Hawaii businesses viable, create jobs, and improve the economy.

Cash Incentives
 Hawaii Energy's cash incentives help you invest in energy efficient equipment for your home. These installations quickly pay for themselves and the savings keep coming year after year. Here are just a few examples:

SOLAR WATER HEATING
 Your home's largest energy consumer is the electric water heater. When you switch to a solar water heater, you save about 35% on your utility bill. What's more, with Hawaii Energy's rebate, state and federal tax credits, and reduction in electricity use, you can save nearly 70% on the system purchase price in the first year.

\$750 REBATE

ENERGY STAR® REFRIGERATOR PROGRAMS
 If your refrigerator is more than 20 years old, it can be 2-3 times more expensive to operate than a new ENERGY STAR model.

\$125 TRADE IN FOR ENERGY EFFICIENT REFRIGERATOR INCENTIVE **\$50** ENERGY STAR REBATE ON PURCHASE OF \$600 OR LESS **\$65** MAHI AND HAWAII REFRIGERATOR INCENTIVE **\$25** OAHU/BRIDGES/ PEELE ISLANDS REFRIGERATOR INCENTIVE

ENERGY STAR CEILING FANS
 Ceiling fans create a gentle breeze that provides cooling comfort on those hot days. These fans use 90% less power than a small window air conditioner to operate. Adding ceiling fans to stay cool is a really cool way to save energy!

\$40 REBATE

COMPACT FLUORESCENT LAMPS
 ENERGY STAR Compact Fluorescent Lamps (CFLs) use 75% less energy to produce the same amount of light as old-fashioned light bulbs. Get a \$1 instant rebate per lamp when purchased at a participating retailer. Switching to CFLs is a quick and easy way to start saving energy and money.

\$1 PER CFL

This is Just the Beginning...
 Hawaii Energy has other easy and simple ways for you to save energy in your home. To save you a little time and energy, visit us at www.HawaiiEnergy.com, or call us at 537-5577 or on the neighbor islands, toll free, at 1-877-231-8222.

We appreciate both your interest and participation in reducing our dependency on oil to keep our island lifestyle.

Hawaii Energy
 FOUR CORNER SUSTAINABLE ENERGY PROGRAM

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THE GREEN MACHINE

.5 gallons per lb. or less on light soil **SAVE WATER. SAVE ENERGY. SAVE SOME "GREEN".**
.75 gallons per lb. on heavy soil (one heavy soil)
Highest quality wash available (wash like an Ellite)
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Built in U.S.A.

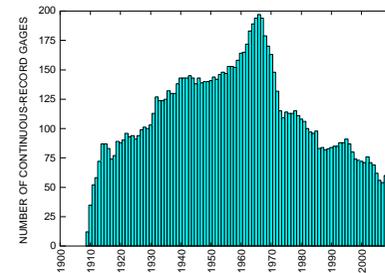
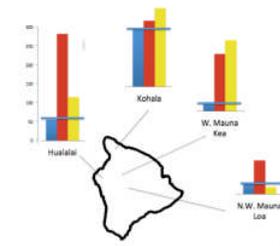
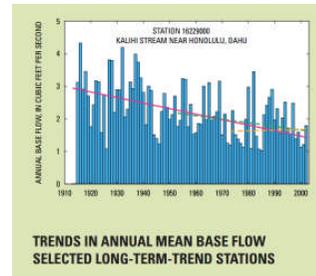
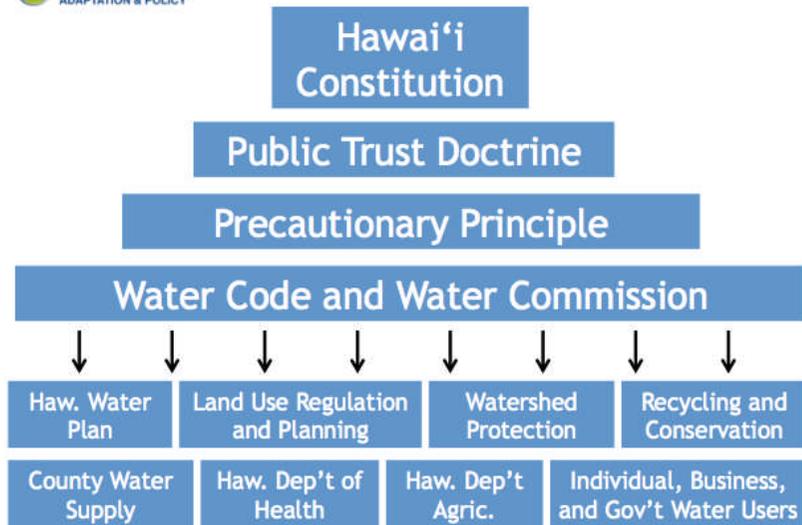
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Final Thoughts



The Water Commission is empowered to “consider, protect, and advance public rights at **every stage of the planning and decisionmaking process.**”