

DAVID Y. IGE
GOVERNOR OF
HAWAII



**STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**Testimony of
SUZANNE D. CASE
Chairperson**

**Before the Senate Committees on
WATER AND LAND
and
AGRICULTURE AND ENVIRONMENT
and
GOVERNMENT OPERATIONS**

**Thursday, February 15, 2018
2:50 PM
State Capitol, Conference Room 224**

**In consideration of
SEANTE BILL 3068
RELATING TO CLIMATE CHANGE**

Senate Bill 3068 proposes to require all state and county agencies to implement the recommendations of the recently completed Hawaii Sea Level Rise Vulnerability and Adaptation Report. **The Department of Land and Natural Resources (Department) appreciates the intent of this measure, and offers the following comments.**

This measure takes recommendations from the Sea Level Rise Report and incorporates many of them verbatim into this measure, where they would become state and county laws. The Department has some reservations about incorporating recommendations of the Sea Level Rise Report verbatim into a new Act at this time. The Department did not envision the report being deployed rapidly through translation into broad directives.

State and county agencies need to perform a proper survey of their programs and assets, develop specific plans, and seek resources to implement adaptation measures that fit into their particular requirements, and within the realities of their particular communities.

One way to accomplish this would be through Act 32, Session Laws of Hawaii (SLH), 2017. Act 32, SLH 2017, established the Hawaii Climate Change Mitigation and Adaptation Commission (Climate Commission). The Climate Commission accepted the Sea Level Rise

Report in December 2017. The Climate Commission intends to establish working groups to grapple with climate adaptation challenges. The Department envisions a Sea Level Rise working group that will work with state and county agencies, the business community, and the public on efforts that must be undertaken to improve our resiliency in the face of sea level rise.

While the Department appreciates the Legislature's actions to implement the Sea Level Rise Report, the Department expects all the involved governmental agencies would like an opportunity to vet Sea Level Rise recommendations contained with the Sea Level Rise Report within a working group setting and then report back to the Legislature next session with targeted recommendations.

Thank you for the opportunity to comment on this measure.

DAVID Y. IGE
Governor

DOUGLAS CHIN
Acting Lieutenant Governor

LUIS P. SALAVERIA
Director

MARY ALICE EVANS
Deputy Director



LAND USE COMMISSION
Department of Business, Economic Development & Tourism
State of Hawai`i

DANIEL ORODENKER
Executive Officer

Bert K. Saruwatari
Planner
SCOTT A.K. DERRICKSON AICP
Planner

RILEY K. HAKODA
Chief Clerk/Planner

FRED A. TALON
Drafting Technician

Statement of
Daniel E. Orodenker
Executive Officer
Land Use Commission
Before the
Senate Committee on Water and Land
Senate Committee on Agriculture and Environment
Senate Committee on Government Operations
Thursday February 15, 2018
2:50 PM
State Capitol, Conference Room 224

In consideration of
SB 3068
RELATING TO CLIMATE CHANGE

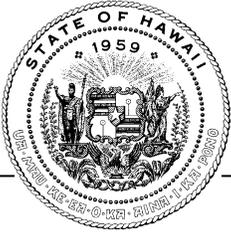
Chairs Rhoads, Gabbard, and Kim; Vice Chairs Gabbard, Riviere, and Ruderman; and members of the Committees on Water and Land; Agriculture and Environment; and, Government Operations:

The Land Use Commission supports the intent of SB 3068 in that it seeks to implement provisions of the Hawai`i Sea Level Vulnerability and Adaptation Report.

However, we are concerned that the provisions in Part V Section 12 with respect to the Land Use Commission ("LUC") are not consistent with our statutory framework.

The LUC is currently in the process of amending its administrative rules and will be considering changes to require applicants to address climate change and sea level rise in applications coming before the LUC.

Thank you for the opportunity to testify on this matter.



OFFICE OF PLANNING STATE OF HAWAII

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DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
DIRECTOR
OFFICE OF PLANNING

Statement of
LEO R. ASUNCION
Director, Office of Planning
before the
**SENATE COMMITTEES ON WATER AND LAND; AGRICULTURE AND
ENVIRONMENT; AND GOVERNMENT OPERATIONS**

Thursday, February 15, 2018
2:50 PM

State Capitol, Conference Room 224

in consideration of
SB 3068
RELATING TO CLIMATE CHANGE.

Chairs Rhoads, Gabbard, and Kim, Vice Chairs Gabbard, Riviere, and Ruderman, and Members of the Senate Committees on Water and Land, Agriculture and Environment, and Government Operations.

The Office of Planning (OP) respectfully offers comments on SB 3068, which implements the recommendations of the Hawaii Sea Level Rise Vulnerability and Adaptation Report (SLR Report) issued by the Hawaii Climate Change Mitigation and Adaptation Commission (Climate Commission) across multiple agencies and statutory frameworks, and makes appropriations.

OP notes that the SLR Report, at page ii, specifically states that the report “should be used strictly as a planning **reference** tool and **not for** permitting, or other **legal purposes**.” Emphasis added. The SLR Report additionally states, at page ii, that:

[t]he data, maps, and recommendations provided should be used only as a screening-level resource to support management decisions to address sea level rise. As with all remotely sensed data, all features should be verified with a site visit. The risk associated with use of the results is assumed by the user.

Therefore, the findings and data from the SLR Report should only provide a framework for sea level rise adaptation at this time and would be premature to mandate state and county agencies to use data and integrate recommendations from the SLR Report in their planning and inventory of lands.

We also note that the proposed amendments to Hawaii Revised Statutes (HRS) Chapter 225-M, found primarily on pages 15 through 20 of the measure, may not be implementable without providing the Office of Planning additional powers in its statutory purpose as set forth in HRS § 225M-1.

Lastly, while the Office of Planning appreciates the to-be-determined appropriation, however, it should be made provided that its does not replace or adversely impact the priorities indicated in the Executive Budget.

Thank you for the opportunity to comment on this measure.

OFFICE OF CLIMATE CHANGE, SUSTAINABILITY AND RESILIENCY

CITY AND COUNTY OF HONOLULU

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KIRK CALDWELL
MAYOR

JOSHUA W. STANBRO
EXECUTIVE DIRECTOR &
CHIEF RESILIENCE OFFICER

THURSDAY, FEBRUARY 15, 2018 2:50PM

STATE OF HAWAII
COMMITTEE ON WATER AND LAND
COMMITTEE ON AGRICULTURE AND ENVIRONMENT
COMMITTEE ON GOVERNMENT OPERATIONS

**TESTIMONY ON SENATE BILL 3068
A BILL RELATING TO CLIMATE CHANGE**

BY,

JOSHUA STANBRO
EXECUTIVE DIRECTOR & CHIEF RESILIENCE OFFICER
OFFICE OF CLIMATE CHANGE, SUSTAINABILITY AND RESILIENCY

Dear Chairs Rhoads, Gabbard, Kim and Committee Members:

The City and County of Honolulu (City) Office of Climate Change, Sustainability and Resiliency (CCSR) **supports the intent** of Senate Bill (SB) 3068, which strives to implement the recommendations of the 2017 Hawaii Sea Level Rise Vulnerability and Adaptation Report (SLR Report).

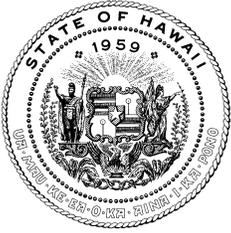
With respect to those parts of SB 3068 that touch upon or direct processes at the county level, the City has already begun to include sea level rise and other climate change considerations into its long range policy plans and hazard mitigation planning. We have also been requesting that climate change impacts be defined for major land use proposals. The City also established via City Charter our permanent office which has quickly built capacity to coordinate policies and departmental action to plan for and address climate change impacts including sea level rise. The existing frameworks for environmental review and planning and permitting facilitate the ability to consider climate change and sea level rise impacts and implement various recommendations of the 2017 SLR Report, and CCSR's City Charter mandate requires such integrated City actions and policies.

While we support the concept of proactive actions such as comprehensive regional market assessments, identification of priority redevelopment areas, and participation in the community rating system called for in this bill, we are concerned that

Chairs Rhoads, Gabbard, Kim and Committee Members
February 15, 2018
Page 2

this bill mandates City actions and reporting without funding to carry them out. These are not one-time costs, but reflect an ongoing commitment. These activities are not currently in the City's budget and we request that SB 3068 include permanent funding to assist the City and other counties in this work.

Thank you for the opportunity to testify.



OFFICE OF ENVIRONMENTAL QUALITY CONTROL

DEPARTMENT OF HEALTH | 235 South Beretania Street, Suite 702, Honolulu, HI 96813 | oeqchawaii@doh.hawaii.gov

DAVID Y. IGE
GOVERNOR

SCOTT GLENN
DIRECTOR

(808) 586-4185

Testimony of
SCOTT GLENN, Director

before the
**SENATE COMMITTEE ON WATER AND LAND,
SENATE COMMITTEE ON AGRICULTURE AND ENVIRONMENT, and
SENATE COMMITTEE ON GOVERNMENT OPERATIONS,**

Thursday, February 15, 2018
2:50 PM
State Capitol, Conference Room 224

in consideration of
**SENATE BILL 3068
RELATING TO CLIMATE CHANGE**

Chair Rhoads, Vice Chair Gabbard, and Members of the House Committee on Water and Land,
Chair Gabbard, Vice Chair Riviere, and Members of the House Committee on Agriculture and
Environment,

Chair Kim, Vice Chair Ruderman, and Members of the House Committee on Government
Operations,

The Office of Environmental Quality Control (OEQC) administers Chapter 343, Environmental Impact Statements (EIS), Hawai'i Revised Statutes (HRS). The purpose of the EIS law is to "establish a system of environmental review which ensures that environmental concerns are given appropriate consideration in decision making along with economic and technical considerations" (HRS § 343-1). Additionally, the OEQC serves "the Governor in an advisory capacity on all matters relating to environmental quality control," as directed in HRS § 341-3.

Senate Bill 3068 proposes to implement by statute the recommendations of the *Hawai'i Sea Level Rise Vulnerability and Adaptation Report* issued by the Hawai'i Climate Change Mitigation and Adaptation Commission and makes appropriations. Specific to the OEQC, SB 3068 proposes to amend Chapter 341, HRS to require the OEQC Director to issue specific guidance on sea level rise and climate change in the environmental review process.

The Environmental Council ("Council") promulgates administrative rules for the implementation of Chapter 343, HRS. The Council is currently undergoing rulemaking to update Hawai'i Administrative Rules (HAR) Chapter 11-200, Environmental Impact Statements. Since July 2017, the Council has released three working drafts of rules changes to gain stakeholder and public feedback. The Council is currently preparing a fourth draft.

After the Council released its third working draft in October 2017, the Hawai'i Climate Change Mitigation & Adaptation Commission ("Climate Commission") accepted the *Sea Level Rise Vulnerability & Adaptation Report* in December 2017. The report recommends that the OEQC issue specific guidance on addressing sea level rise in EAs and EISs modeled on federal guidance. The OEQC committed to the Climate Commission to prepare the requested guidance.

Furthermore, the Council is currently preparing language to incorporate climate change, including sea level rise, into its next draft version of the administrative rules. For the next draft, the Council is contemplating making the following revisions to the significance criteria:

"In determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected [~~consequences~~] impacts, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action shall be determined to have a significant effect on the environment if it is likely to

...

"~~[Affects]~~ Have a substantial adverse effect on or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters

....

"~~[Requires]~~ Require substantial energy consumption or emit substantial greenhouse gases."

Following the release of its next working draft, the Council will hold a public meeting, subject to Chapter 92, HRS, in March to vote on whether to request the Governor to approve the Council to conduct public hearings for rulemaking pursuant to Chapter 91, HRS.

While the Council is undertaking rulemaking specific to the issues of sea level rise and climate change, we respectfully request that the Legislature defer making amendments to Chapter 341, HRS. Following the conclusion of rulemaking, the OEQC will promulgate guidance on sea level rise and climate change in the environmental review process.

Thank you for the opportunity to testify on this measure.

SB-3068

Submitted on: 2/14/2018 12:00:03 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Melodie Aduja	Testifying on behalf of OCC Legislative Priorities Committee, Democratic Party of Hawaii	Support	No

Comments:

**PRESENTATION OF THE
OAHU COUNTY COMMITTEE ON LEGISLATIVE PRIORITIES
DEMOCRATIC PARTY OF HAWAII
TO THE COMMITTEE ON WATER AND LAND,
THE COMMITTEE ON AGRICULTURE AND ENVIRONMENT,
AND
THE COMMITTEE GOVERNMENT OPERATIONS
THE HOUSE OF REPRESENTATIVES
TWENTY-NINTH LEGISLATURE
REGULAR SESSION OF 2018
Thursday, February 15, 2018
2:50 p.m.**

Hawaii State Capitol, Conference Room 224

RE: Testimony in Support of HB 3068, RELATING TO CLIMATE CHANGE

To the Honorable Karl Rhoads, Chair; the Honorable Mike Gabbard, Vice-Chair and the Members of the Committee on Water and Land:

To the Honorable Mike Gabbard, Chair; the Honorable Gil Riviere, Vice-Chair and the Members of the Committee on Agriculture and Environment:

To the Honorable Donna Mercado Kim, Chair; the Honorable Russell E. Ruderman, Vice-Chair and the Members of the Committee on Government Operations:

Good afternoon. My name is Melodie Aduja. I serve as Chair of the Oahu County Committee ("OCC") Legislative Priorities Committee of the Democratic Party of Hawaii. Thank you for the opportunity to provide written testimony on Senate Bill No 3068 relating to State and Counties working toward Climate Change and Sea Level Rise Mitigation.

The OCC Legislative Priorities Committee is in favor of Senate Bill No. 3068 and supports its passage as climate change poses immediate and long-term threats to the State's economy, sustainability, security, and way of life as areas susceptible to sea level rise show impacts based on a 3.2-foot increase in sea level which is projected to occur by mid-century or earlier.

Senate Bill No.3068 is in accord with the Platform of the Democratic Party of Hawai'i ("DPH"), 2016, as it implements the recommendations of the Hawaii Sea Level Rise Vulnerability and Adaptation Report issued by the Hawaii Climate Change Mitigation and Adaptation Commission.

The Platform of the Democratic Party of Hawaii indicates that "[w]e know that climate change is a real threat to our islands and the world. We strongly urge our candidates and elected officials to take immediate action to mitigate and adapt to the consequences of climate change. This includes funding adaptation measures including coastal retreat, effective participation of indigenous peoples in climate change governance, and recognition that indigenous, local, and traditional ecological knowledge is key in climate change adaptation solutions." (Platform of the DPH, P. 8, 435-439 (2016)).

An excerpt from the 71 Page Senate Bill No.3068 provides as follows: The Hawaii Sea Level Rise Vulnerability and Adaptation Report makes the following recommendations for planning, management, and adaptation for hazards associated with the increasing sea level rise:

Responsibilities. (a) Each department and agency of the State shall:

(1) Review its existing policies, regulatory processes, and administrative rules to assess whether the department or agency's regulatory framework supports the smart redevelopment of urban areas as part of sea level rise adaptation planning; provided that the first review shall be completed no later than July 1, 2019, and subsequent reviews shall be conducted at least once every five years;

(2) Update capital improvement planning to:

(A) Incorporate sea level rise projections; and

(B) Prioritize infrastructure improvements for urban areas identified as priority redevelopment areas by the committee on sea level rise and managed retreat established pursuant to section 225M-A(d);

(3) Adopt a review and approval process to ensure that new developments and capital improvement projects with an expected lifespan of thirty years or more incorporate sea level rise in the development or project's design and siting. The State shall require:

(A) New developments and capital improvement programs to include an in-depth analysis of sea level rise impacts based on elevation, tolerance for risk, and lifetime of the structure; and

(B) Redevelopments within existing footprints to be dependent on established, resilient building design guidelines, or otherwise be subject to relocation to a more suitable area;

(4) Develop design standards for existing and proposed land uses that limit urban growth and increase flood resiliency within sea level rise exposure areas;

(5) Develop guidance for developers to assist with the integration of sea level rise in project design and encourage the use of best management practices for incorporating green and sustainable approaches in all stages of project development;

(6) If applicable, consider adopting rules or policies that encourage property owners at risk to coastal flooding to purchase flood insurance;

(7) Incorporate projected sea level rise into hazard mitigation plans;

(8) Adopt a statewide program that supports county participation in the building code effectiveness grading schedule program, administered by the International Organization for Standardization;

(9) Develop a pre-disaster recovery framework that incorporates opportunities to adapt to sea level rise through disaster recovery;

(10) Prioritize the preservation of coral reefs when taking actions that may affect the health of the coral reefs of the State; and

(11) Conduct an in-depth assessment of critical infrastructure that is at risk due to climate change and sea level rise, including critical infrastructure within sea level rise exposure areas. The assessment shall examine the vulnerability and evaluation of adaptation strategies for the infrastructure. The assessment shall consider the current condition of the infrastructure and the remaining years of useful life. The State shall use the data to prioritize investment to protect, retrofit, or relocate the infrastructure. The first

assessment shall be completed no later than July 1, 2018, and subsequent assessments shall be conducted at least once every five years.

Given that Senate Bill No. 3068 implements the recommendations of the Hawaii Sea Level Rise Vulnerability and Adaptation Report issued by the Hawaii Climate Change Mitigation and Adaptation Commission, it is the position of the OCC Legislative Priorities Committee to support this measure.

Thank you very much for your kind consideration.

Sincerely yours,

/s/ Melodie Aduja

Melodie Aduja, Chair, OCC Legislative Priorities Committee

Email: legislativepriorities@gmail.com, Tel.: (808) 258-8889

SB-3068

Submitted on: 2/12/2018 1:16:50 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Benton Kealii Pang, Ph.D.	Hawaiian Civic Club of Honolulu	Support	No

Comments:

This is a good bill to help us plan for a climate change future. Please pass SB3068.

SB-3068

Submitted on: 2/13/2018 11:19:31 AM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Joan Gannon	West Hawaii CHC	Support	No

Comments:

To: Committees WTL/ AEN/ GVO hearing on 2/15/18 room 224

From: Joan Gannon Chair of ProtectMarine Life Committee for Hawaii Island Dem Party

I support SB3068 regarding climate change. It is common sense to plan building and infrastructure maintenance so we can make good decisions about funds and logistics for development.

Thank You

SB-3068

Submitted on: 2/12/2018 8:00:09 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Bianca Isaki	KAHEA: The Hawaiian-Environmental Alliance	Support	No

Comments:

SB-3068

Submitted on: 2/12/2018 1:28:05 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Jennifer Milholen	Kokua Hawaii Foundation	Support	No

Comments:

SB-3068

Submitted on: 2/12/2018 1:40:21 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Jacqui Hoover	Hawaii Island Economic Development Board	Support	No

Comments:

SB-3068

Submitted on: 2/12/2018 1:49:53 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Elizabeth Bishop		Support	No

Comments:

SB-3068

Submitted on: 2/12/2018 4:09:47 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Margaret Maupin		Support	No

Comments:

SB-3068

Submitted on: 2/12/2018 6:30:32 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Lois Crozer		Support	No

Comments:

SB-3068

Submitted on: 2/12/2018 8:43:40 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Erica Scott	Cuddle Party	Support	No

Comments:

SB-3068

Submitted on: 2/13/2018 9:20:29 AM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Doug Fetterly		Support	No

Comments:

It's time we all do the right things for the community. Please vote yes.

SB-3068

Submitted on: 2/13/2018 9:36:42 AM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Richard Reed		Support	No

Comments:

This bill is essential to reducing the amount of taxpayer money that will be wasted trying to protect infrastructure from sea level rise and it provides for guidelines for private investment considerations. Each new study of sea level rise shows quicker effects. The time to change our planning is NOW. The NASA values shown below are very conservative.

[UNDERSTANDING SEA LEVEL](#)

Projections

- [Overview](#)
-
- [Climate Models](#)
-
- [Empirical Projections](#)

Empirical Projections

Projections of global sea level rise by 2100, the year upon which climate modelers typically focus, vary widely depending on [modeling](#) methods and on assumptions—the rate of increase in [greenhouse gas](#) emissions, for example, and especially how [ice sheets](#) will respond to warming air and ocean water. Recent projections range from 0.2 meters to 2.0 meters (0.66 to 6.6 feet) [[Melillo et al., 2014](#); see sections 13.5.1 and 13.5.2 of the 2013 IPCC report for detailed discussion].

The projections for the century ahead focus on the two largest contributors: [thermal expansion](#) of seawater and melting land ice. The consensus projections in the most recent [IPCC](#) report, called the Fifth Assessment or AR5, include dynamic changes in the great ice sheets—an improvement over the previous assessment, AR4, although much remains uncertain in the young field of ice sheet modeling [[Church et al., 2013](#)].

The latest assessment provides a range of projections for a variety of greenhouse gas emissions scenarios and associated [radiative forcing](#) (the energy injected into the climate system by the action of these gases). The four Representative Concentrated Pathway scenarios, or RCPs, rise from low to high emissions, each applied to CMIP 5 models to produce possible future sea-level changes.

AR5 expresses “medium confidence” in these projections, derived from [process-based](#) models—that is, attempts to simulate the mechanics and interactions of the factors driving sea level rise and land ice changes. But coupled [general circulation numerical models](#)—considered “process-based”—explain 90 percent of the observed sea level rise between 1971 and 2010, as well as that observed during a shorter period, 1993 to 2010 (see “By the Numbers”). This increases confidence that these models are reliable under present-day conditions, despite the fact that the models’ current rate of rise, 3.7 millimeters per year, is significantly higher than shown by observations. Since these coupled models do not include ice sheet instabilities, their projections very likely represent a “lower bound” for future sea level rise.

Process-based models project a rise of 0.26 to 0.55 meters, with a median value of 0.4, for the RCP 2.6 scenario, in which gas emissions decline after a peak, while carbon dioxide levels remain below 500 parts per million. For the RCP 8.5 scenario, with its higher concentrations of greenhouse gases and with carbon dioxide above 700 parts per million, the projected rise is 0.52 to 0.98 meters, with a median value of 0.6. [\[Church et al., 2013\]](#).

Ocean warming and ice-sheet losses are “very likely” to drive the rate of sea level rise higher in the 21st century than the rate measured from 1971 to 2010, according to AR5 [\[Church et al., 2013\]](#). For the 2081-2100 period, compared to 1986-2005, the report considers it likely, with medium confidence, that global mean sea-level rise will fall between five and 95 percent of the range projected by process-based models. Only the collapse of marine-based portions of the Antarctic ice sheet could drive sea level above these “likely” ranges, the authors concluded, and no more than a few tenths of a meter [\[Church et al., 2013\]](#).

And while the IPCC report acknowledges a newer, alternative approach known as [semi-empirical](#) modeling, its projections earn only “low confidence” from the IPCC [\[Church et al., 2013\]](#). The report’s authors could not evaluate the probability that semi-empirical models, or SEMs, would come true, and believed the scientific community lacked consensus on their reliability.

SEMs [\[Rahmstorf et al., 2012 and references therein\]](#) take a simple approach—a kind of shortcut—to simulating future sea level rise. Instead of trying to model the processes underlying sea level change, these models rely on sea-level changes observed in previous decades and their relationship to global temperature. Then they apply that same relationship to the century to come. The resulting projections tend to be significantly higher than those derived from process-based modeling.

An illustrative example can be found in a recent study contrasting the projections of process-based and semi-empirical models [\[Perrette et al., 2013\]](#). [Global mean sea level](#) rise from major sources—[thermal expansion](#), glaciers, and the Greenland and Antarctic ice sheets—total 0.42 meters by 2100 in the process based RCP 6.0 model, considered a mid-range, standard-type emission scenario. But updated with the semi-empirical approach, the same model yields a total of 0.86 meters, more than twice the process-based value.

For scenario RCP 2.6, the median projection of the SEMs is about 0.75 meters by century's end, and about one meter for scenario RCP 8.5. At the high end of the [confidence intervals](#) (95%), sea level reaches above 1.5 meters for the latter scenario, mostly based on the works of Rahmstorf and of Jevrejeva. Another study of modeling reliability, in which Rahmstorf et al. performed an extensive analysis of their SEMs [\[\[Rahmstorf et al., 2012\]](#), concluded that a rise of about one meter, produced by a warming of 1.8 degrees Celsius, represented a robust result, derived from published data and their model.

Since the publication of AR5, newer ice-sheet observations also are suggestive of the higher values for sea level rise. Measurements of [grounding line](#) retreat in West Antarctic glaciers, as we have seen [\[Rignot et al., 2014\]](#), yielded evidence of rapid retreat between 1992 and 2011. More importantly, the researchers did not find a “major bed obstacle that would prevent the glaciers from further retreat and draw down the entire [basin](#) [\[Rignot et al., 2014\]](#).” Bedrock along the [discharge](#) channels grows deeper in the inland direction, helping the grounding line move farther inland. A complementary study [\[Morlighem et al., 2014\]](#) found that the glacial valleys through which Greenland discharges ice to the ocean are deeper than previously believed, making them more vulnerable to melting by adjacent, warmer ocean waters.

SB-3068

Submitted on: 2/13/2018 10:22:52 AM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Maureen Datta		Support	No

Comments:

This bill is essential to reducing the amount of taxpayer money that will be wasted trying to protect infrastructure from sea level rise and it provides for guidelines for private investment considerations. Each new study of sea level rise shows quicker effects. The time to change our planning is NOW. The NASA values shown below are very conservative.

SB-3068

Submitted on: 2/13/2018 2:39:55 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Laura Gray		Support	No

Comments:

SB-3068

Submitted on: 2/14/2018 12:06:19 PM

Testimony for WTL on 2/15/2018 2:50:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Molly Mamaril	Individual	Support	No

Comments:

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com



February 15, 2018

KIRK CALDWELL, MAYOR

BRYAN P. ANDAYA, Chair
KAPUA SPROAT, Vice Chair
DAVID C. HULIHEE
KAY C. MATSUI
RAY C. SOON

ROSS S. SASAMURA, Ex-Officio
JADE T. BUTAY, Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer

The Honorable Karl Rhoads, Chair
and Members
Committee on Water and Land

The Honorable Mike Gabbard, Chair
and Members
Committee on Agriculture and Environment

The Honorable Donna Mercado Kim, Chair
and Members
Committee on Government Operations
The Senate
State Capitol, Room 224
Honolulu, Hawaii 96813

LATE

Dear Chair Rhoads, Chair Gabbard, Chair Kim and Members:

Subject: Senate Bill 3068, Relating to Climate Change

The Honolulu Board of Water Supply (BWS) supports Senate Bill (SB) 3068, relating to climate change, which establishes State and County responsibilities, reporting and funding for sea level rise adaptation.

BWS supports the recommendations of the Hawaii Sea Level Rise Vulnerability and Adaptation Report, dated December 2017, submitted by the Hawaii Climate Change Mitigation and Adaptation Commission. BWS is actively working with the City's Climate Change, Sustainability and Resiliency Office and participates in the City Resilience Team to plan for sea level rise.

The BWS recognizes sea level rise and coastal erosion will impact the water distribution system in low lying and coastal areas and adaptation measures need to be planned and implemented. The BWS has had difficulties repairing main breaks in water service areas such as Ala Wai Boulevard, Ala Moana Boulevard and Nimitz Highway due to high water table levels during high tide. The BWS anticipates sea level rise exacerbating this problem in the decades to come. As such, the BWS would like to be a part of future discussions as the State moves forward in sea level rise adaption planning.

Thank you for your consideration of our testimony in support of SB 3068.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer