NOAA CORAL REEF CONSERVATION PROGRAM

Climate Change Impacts Overview





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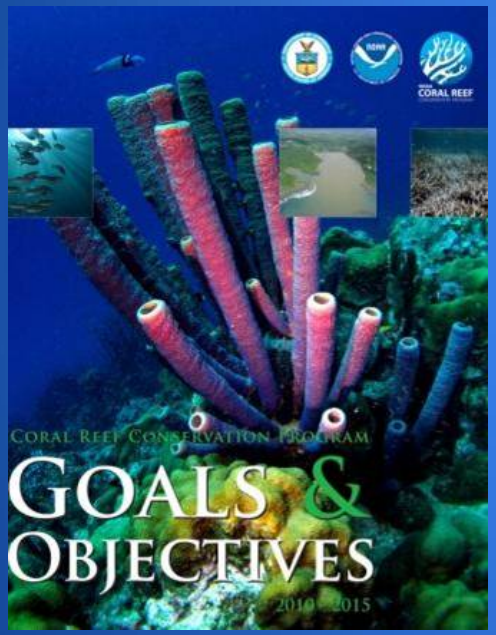

Climate Impacts:

4 Goals, 17 Objectives

1) Manage for Resilience
2) Address Risk and Vulnerability
3) Provide Forecasts and Projections
4) Intervene to Reduce Climate Stress and Impacts

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Performance Measures - tracking

- **C1 PM1 Number of new or enhanced tools implemented to improve management preparedness and response to climate change and ocean acidification (2010 on)**
- **C3 PM1 Number of new or enhanced tools implemented to improve management preparedness and response to climate change and ocean acidification (2010 on)**
- C2 PM1 Percent of CRCP management partners utilizing comprehensive climate risk and vulnerability assessments to inform their planning processes for coral reef management (2015) - NEW

Performance Measures – not tracking

- C2 PM2 Number of acres of coral reefs identified as resilient to climate change and effectively conserved
- C2 PM3 Percent of jurisdictional residents who are aware of climate change impacts to coral reefs
- C3 PM2 Accuracy of models and forecasts regarding climate change impacts to coral reefs
- C4 PM1 Number of intervention strategies developed to reduce climate change and ocean acidification impacts in priority coral reef areas

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Strategy and Implementation Plan

- Finalized December 2014
- Built on the Goals and Objective to direct investments to reduce the impacts of CC and OA
- Summarized progress to date and outlined exemplary next steps
  - Climate-smart conservation should underpin all activities
  - Set up guiding principles that confirmed objectives under Goal 1 and Goal 2 (esp. C2.4) as priority

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Objectives of Emphasis

- 1.1 Training Opportunities (‘10)
- 3.2 Model ecosystem response to CC and OA (‘11, ’ 12)
- 3.4 Translate climate forecasts/projections into useful products (‘11, ‘12)

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Objectives of Emphasis

- 2.1 Characterize physical/chemical changes (‘10, ‘11, ‘12, ‘13, ‘14)
- 2.2 Characterize ecosystem response to change (‘11, ‘12, ‘13, ‘14)
- **2.4 ID and protect potentially resilient areas (‘13, ’ 14, ‘15)**

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Types of Data: In-Water Physical/Chemical

- Ocean Acidification
- Carbonate Chemistry
- Coral Growth
- In situ SST
- Oceanographic and Meteorological Data

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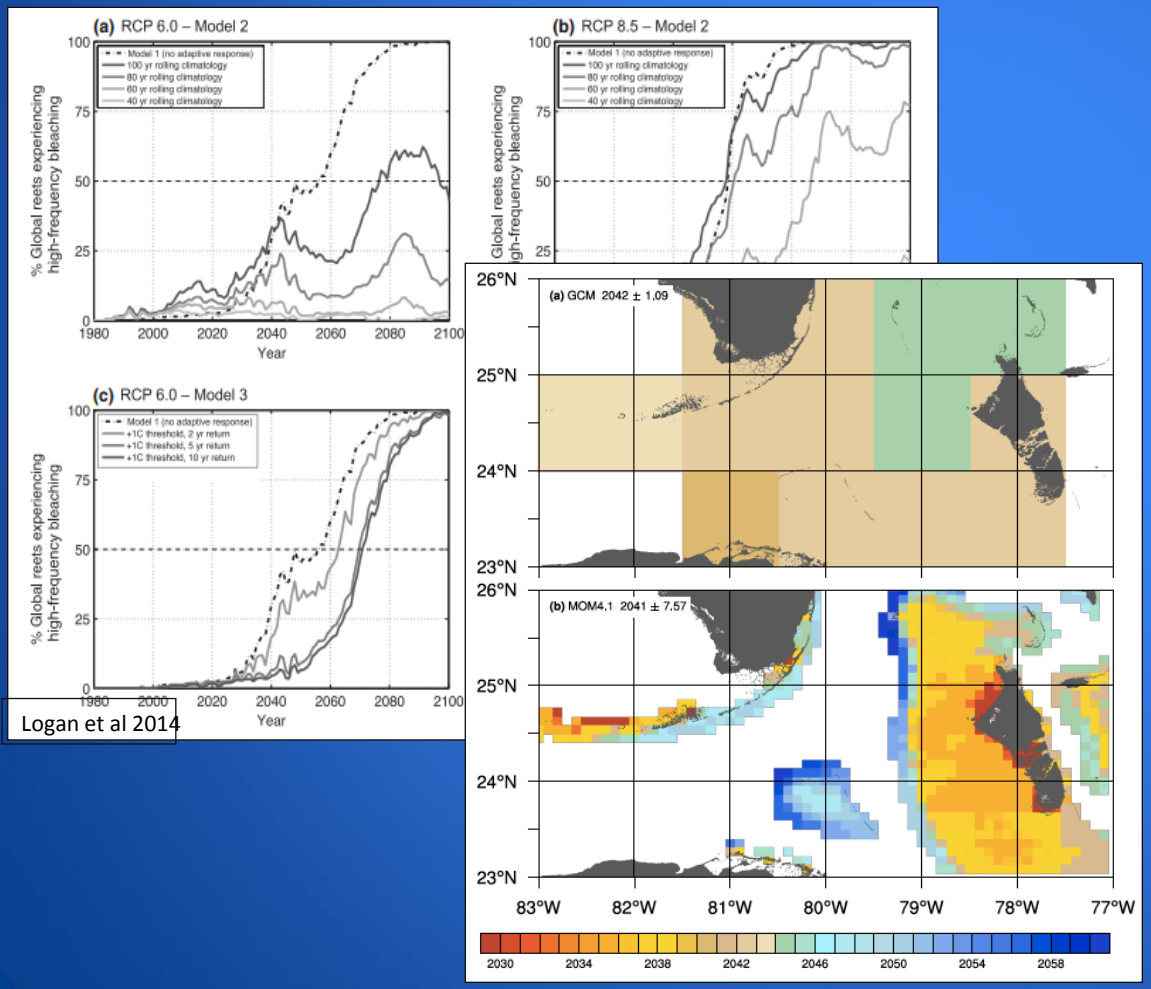
Types of Data: Modeling and Forecasting



Logan et al 2014

- Global Climate Model Downscaling (Statistical and Dynamical)
- Coral specific information

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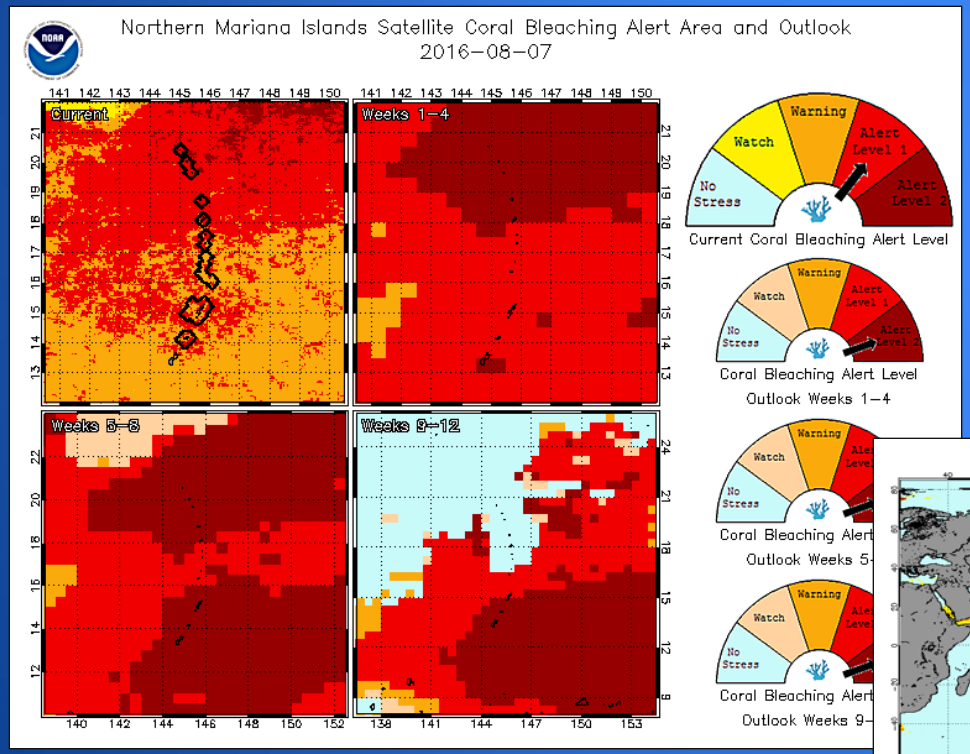
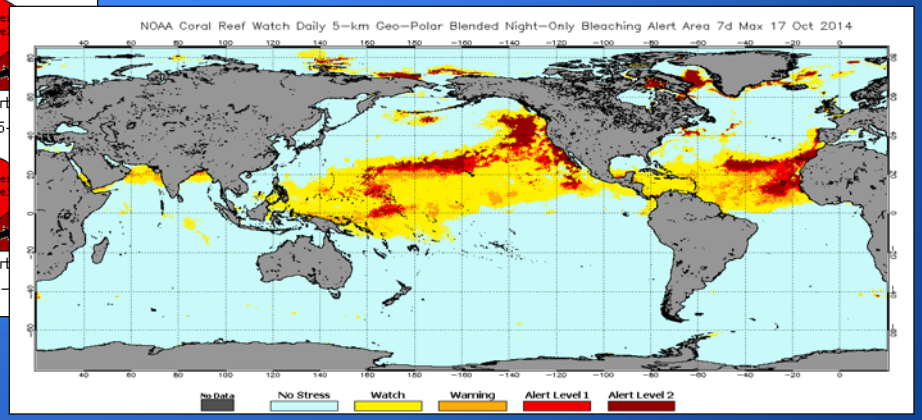
Types of Data: Modeling and Forecasting



- Coral Reef Watch SST Near-Real Time Product Suite and Seasonal Outlooks



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Types of Data: Inform Resilience Assessments

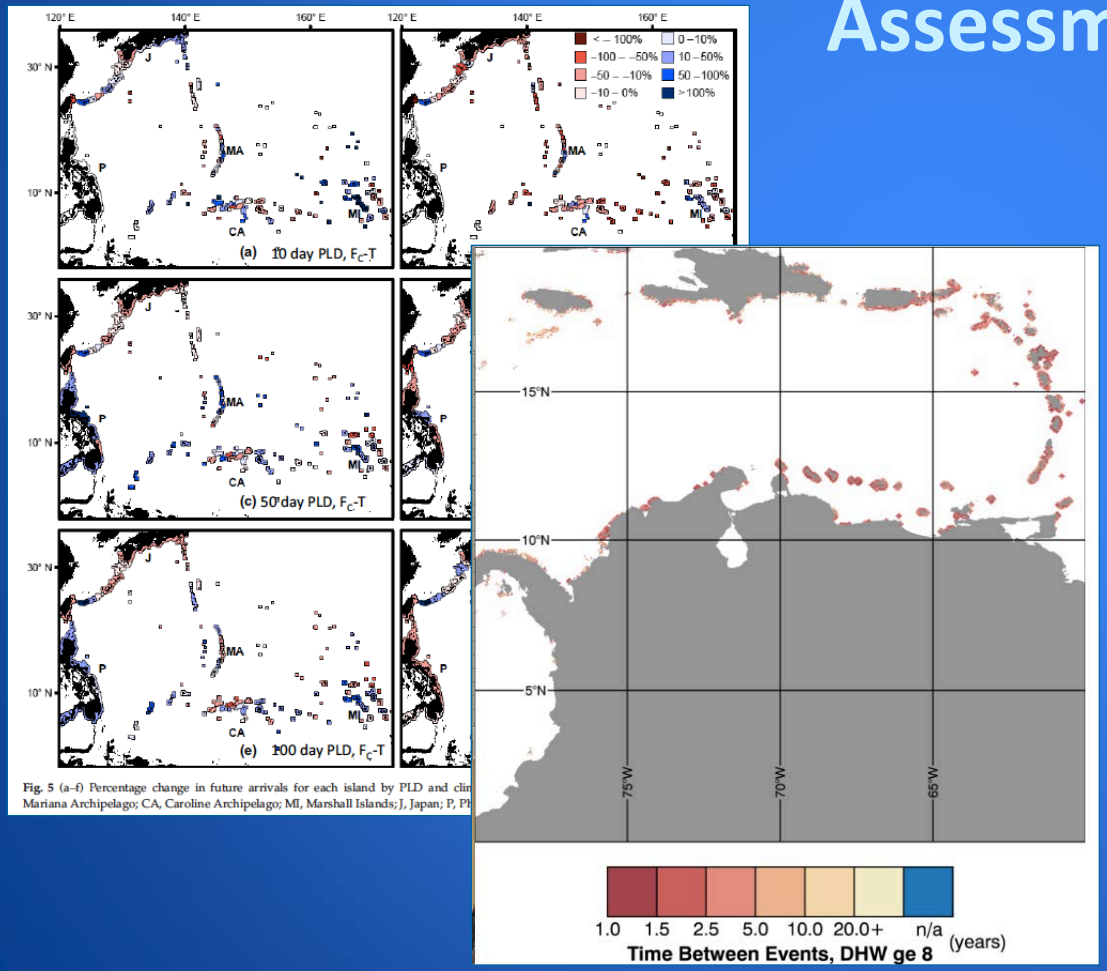

Fig. 5 (a–f) Percentage change in future arrivals for each island by PLD and clim
Mariana Archipelago; CA, Caroline Archipelago; MI, Marshall Islands; J, Japan; P, Ph

- Connectivity & Changes in Connectivity base on CC Projections
- Thermal Stress History

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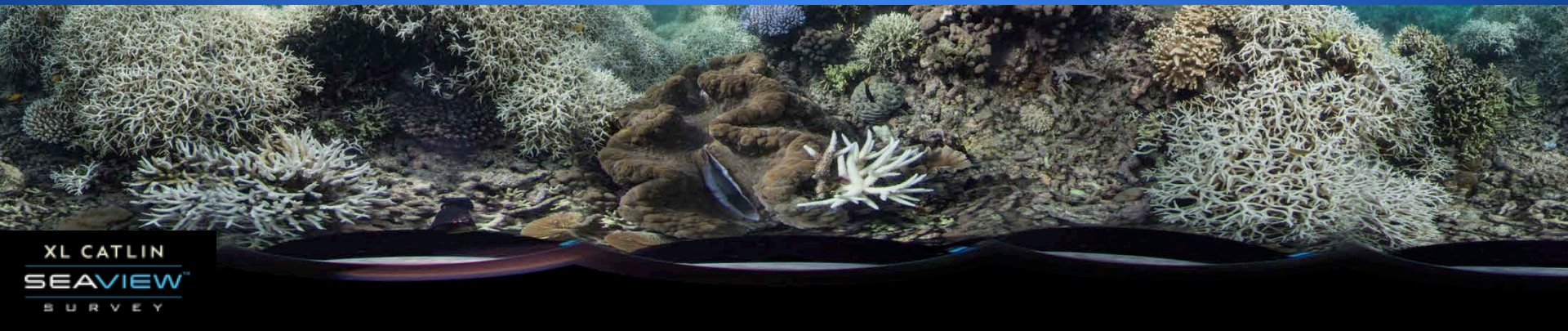
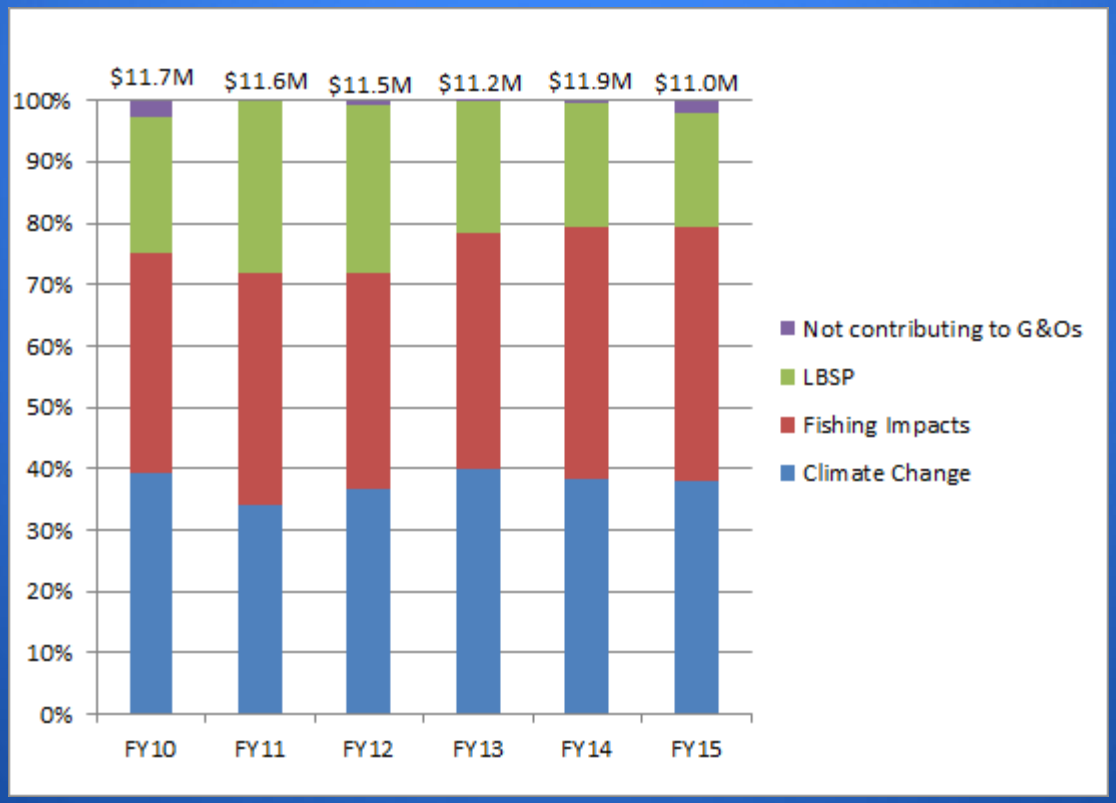
Uses/Highlights

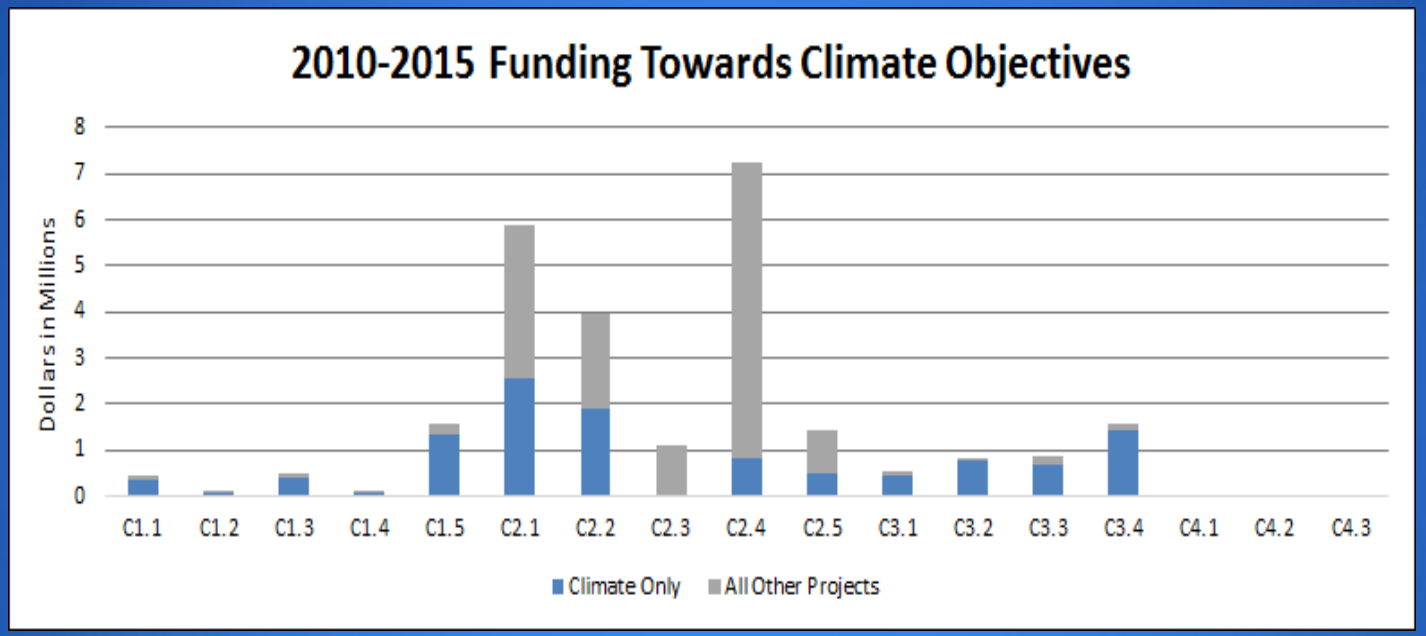
- Bleaching and other crisis response
- Climate adaptation planning exercises
- Layers of data for resilience assessment
- Layers of data to inform conservation decisions
- Information for site selection to inform restoration



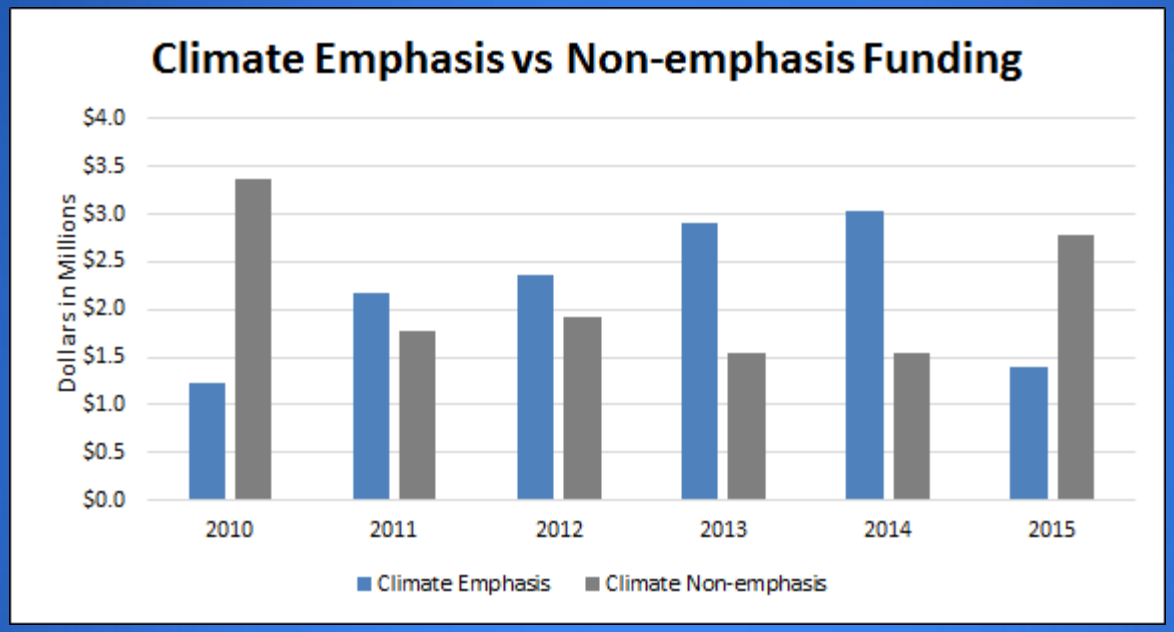
Internal Assessment Results

From FY10-15, investments contributing to addressing climate impacts were from ~$3.9-$4.6M annually, which was 33-39% of investments analyzed





- Largest investment in Goal 2, but much of that was still focused on baseline characterization, it was not until we 2013 we shifted to using that information C2.4.
- Significant contributions made through mapping and national monitoring investments, especially in objectives that require site characterization and layers of data to ID resilient areas. Indicates importance of mapping especially but also inflates climate total significantly.



- Dramatic shift in increased alignment between funding investments and objectives of emphasis in FY11 but a slip backwards in FY15
- Objectives of emphasis shifted over time as objectives were “completed”
- FY15 focused on one objective only – C2.4

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Lessons Learned

- Many of the climate portfolio successes were due to key people and informal, but strong partnerships and a willingness of our PIs to work together.
- Management partner involvement was key to the success of projects, but more info on upcoming management decisions would be helpful.
- Integrating climate information into management is not a one-off activity, it requires sustained funding to fully inform adaptive management.
- Completing data products is not enough, we must build management understanding and capacity to confidently use the information.
- Both federal and state management partners are requesting more, short and easily digestible products that summarize key results and can be used to communicate them with policy makers and the public.

Managers' Survey Results

- Remote sensing derived data, forecasts, and predictions received the highest ratings from respondents, as well as being the second-most selected category in respondents' "top five" list.
- Transport & Connectivity Data and Modeling - "More emphasis on this type of work to better understand the ecological dynamics in a system that then can be used to inform and adapt management decisions, particularly spatial management decisions."
- In-water Physical and Chemical Data, some good information but can make improvements to inform climate related decision support.

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Framing Questions

- Do our coral climate science activities meet critical management needs for climate information?
- Does the capacity exist to use the climate data information and is it in the correct format?
- Are there appropriate shifts in investment from existing activities to unmet needs?
- Are there climate activities that should be maintained at all cost?


Catlin SeaView Survey


Justin Marshall, Coral Watch