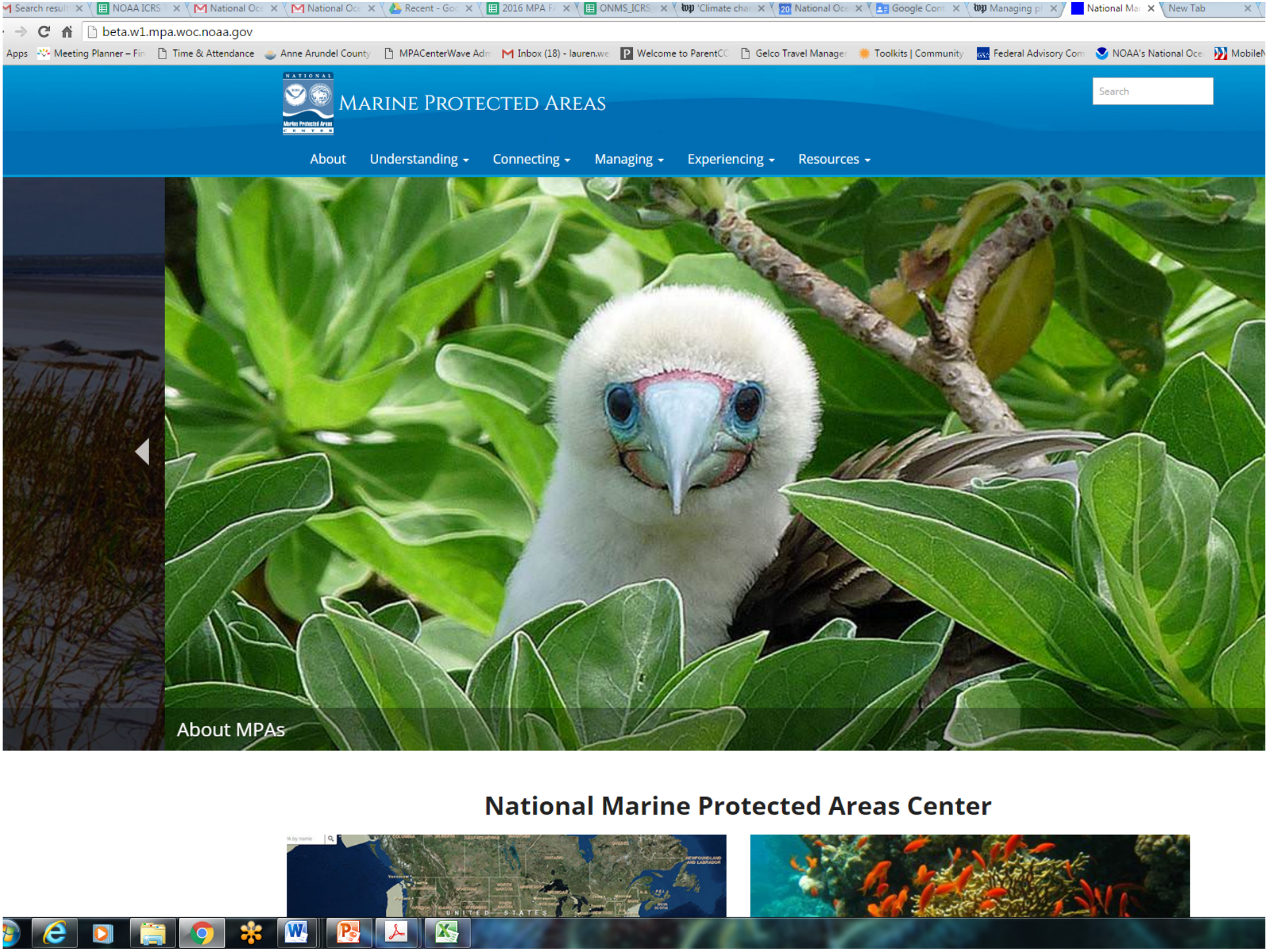
Marine Protected Areas Center Update

MPA Federal Advisory Committee
May 24, 2016

2016 – A Year of Transition

- Growing international role
  - Sister sites
  - World Conservation Congress
  - World Heritage
  - Biosphere Reserves
- Updated website
- Updating and communicating MPA Inventory
- Supporting climate change adaptation work
- ONMS Strategic Plan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MARINE PROTECTED AREAS
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National Marine Protected Areas Center

International Role – Sister Sites

- Long-term engagement to share and build MPA management capacity
  - Cuba
  - Mexico
  - Chile
  - Caribbean
  - Kiribati

Climate Change Adaptation

- Issue Profiles
- With Canada and Mexico – vulnerability assessments for West Coast MPAs

Climate Change Issue Profile:
SEA SURFACE TEMPERATURE

Climate Change and Rising Sea Surface Temper
What can people do to lessen impacts and how can m

Introduction

The warming of the earth's ocean waters is a major climate ch
that is already being experienced throughout the United State
oceans are warmer now than at any point in the last 50 years (
change is most obvious in the top layer of the ocean, which ha
warmer since the late 1800s. This top layer is now getting wan
of 0.2°F per decade.

Marine scientists across the U.S. are noting increased ocean te
in many regions. Pershing et al. (2015) reported that between
2013, the mean surface temperature of the Gulf of Maine – ex
Cape Cod to Cape Sable in Nova Scotia – rose 4 degrees F, with
impacts to fish, especially cod, and shifts in ocean currents. Mi
(2013) described how the record heat wave of 2012 affected c
ecosystems and economies along the coast of Maine, with exti
season and high landings of lobster brought about by warm wa
a price collapse received by fishermen at the dock, 70% below
2014, scientists at the National Oceanic and Atmospheric Adm
(NOAA) Fisheries Service noted that the Gulf of Alaska has not
warm for so long since record keeping began. Scientists associ
Bering Sea Project (2007-2012) have observed higher sea surfa
temperature, sightings of tropically-inclined fish species, salmo
to the sea and migrating up river at the earliest dates ever rec
juvenile salmon growing faster in the eastern Bering Sea, Gulf
and Aleutian Islands (Ashjian et al. 2012).

Marine protected areas (MPAs) can play an important role in a
impacts of climate change and working to build community re
controlling local non-climate change stressors such as water p
overfishing, and habitat destruction. As place-based and long-t
designations, MPAs provide the infrastructure to focus researc
engaging the local community through public education progr

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Climate Change Issue Profile:
SEA LEVEL RISE

Climate Change and Sea Level Rise:
What can marine protected areas do to lessen impacts?

Introduction

Sea level rise is a major climate change
impact that is already being
experienced in parts of the United
States, including many marine
protected areas (MPAs) along the
coast. MPAs can play an important
role in addressing the impacts of
climate change and building
community resilience. As special
places with long term protection, r
MPAs provide the infrastructure to
focus research and monitoring effo
of climate trends, provide protecti
against non-climate stressors, and
effectively engage the community
through public education programs
advisory groups, and onsite staff. F
refuges, national marine sanctuari
wildlife areas. While MPAs have le
disturbances (e.g., fishing, bottom
vulnerable to large scale disturban
with climate change (e.g., sea level
magnitude and frequency of storm

In areas where there is a high confi
many MPAs are taking proactive ac
surges that reach further inland. Re
Intervention (e.g., letting nature ta
or (3) Directed Transformation (e.g
necessary). A combination of actio
examples of the types of managem
consider.

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Climate Change Issue Profile:
OCEAN ACIDIFICATION

Climate Change and Ocean Acidification
What can people do to lessen impacts and how can marine protected areas help?

What is "ocean acidification" and what causes it?

Ocean acidification (OA) refers to a long term reduction in the pH of the ocean, caused primarily by uptake of CO_2 from the atmosphere and surrounding land and sediments (Figure 1) . The ocean acts as a carbon sink and stores a large percentage of the Earth's total carbon. CO_2 is transferred between the atmosphere and the ocean until the two reach equilibrium. The significant increase in atmospheric CO_2 over time has increased the number of hydrogen (H^+) ions in the water, causing pH to drop, becoming more acidic.

Most of us are familiar with the pH scale from our high school chemistry class, the higher numbers being the most basic (least acidic) and lower numbers being the most acidic (Figure 2). Until recently, oceanographers believed that rivers carried enough dissolved chemicals from rocks and sediments to the ocean to keep the ocean's pH stable (a term referred to as "buffering"). Today, excess atmospheric CO_2 is dissolving into the ocean so quickly that this natural buffering capacity hasn't been able to keep up, resulting in rapidly dropping pH in the ocean's waters. While OA has enormous implications for the health of ocean life, it is less readily observable than other climate related ocean stressors, such as rising sea level or sea surface temperature.

Figure 1. Pathways of the ocean's carbon cycle leading to changes in the ocean's acidity. (Source: NOAA PMEL) (http://www.pmel.noaa.gov/co2/story/Coastal+Carbon+Dynamics)

Figure 2. A pH scale identifying some basic and acidic examples. (Credit: Wikimedia Commons)

How is ocean acidification measured?

OA can be detected by measuring various aspects of the ocean carbon chemistry system with high precision and resolution. The NOAA Ocean Acidification Program has made important investments in OA monitoring throughout the country (Figure 3). *In-situ* sensors in the field or

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Office of National Marine Sanctuaries Strategic Plan

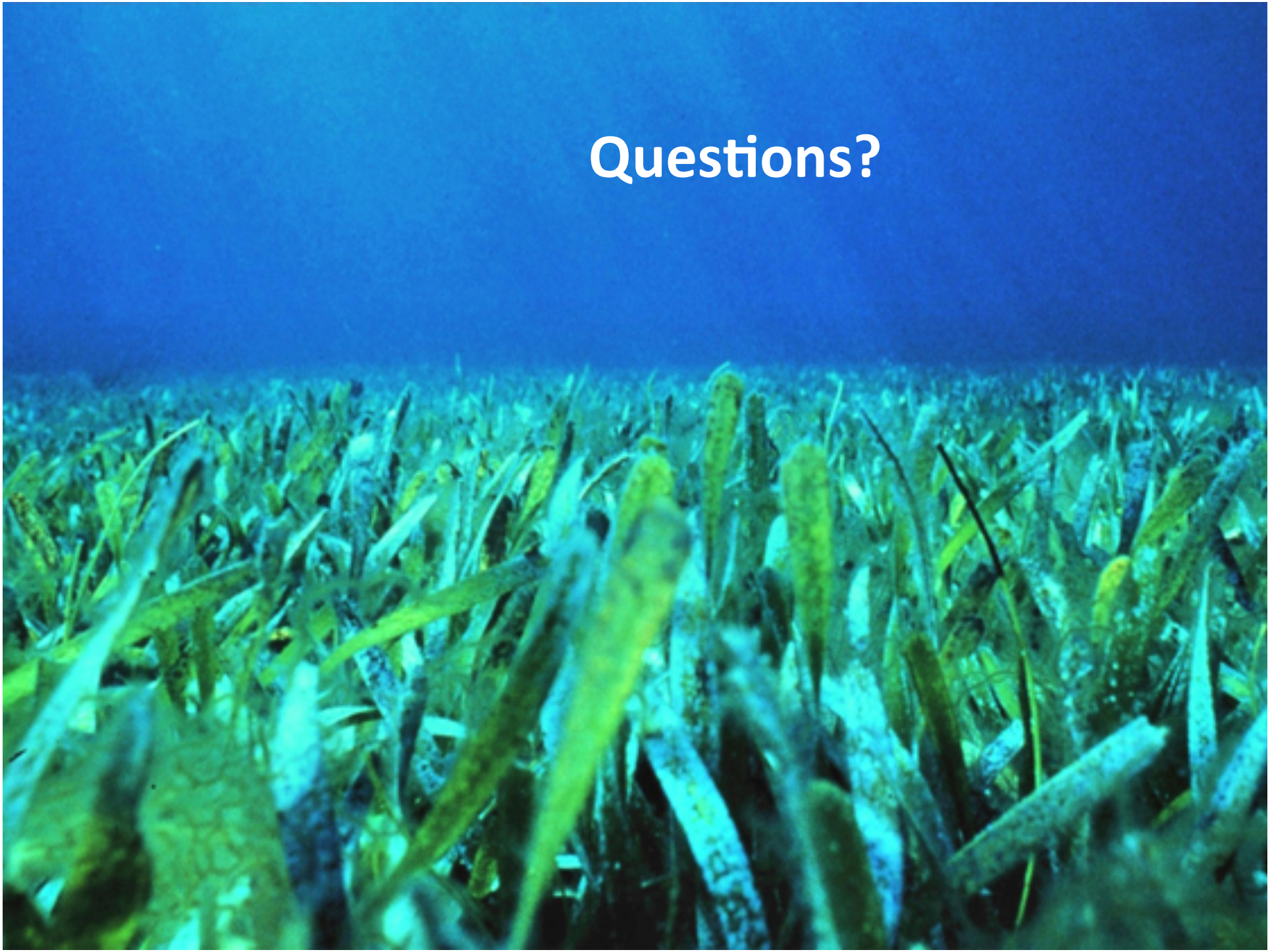
- Communicate our vision, mission and goals in clear compelling ways
- What are the drivers that will focus our work over the coming decade?
- Will guide program priorities, financial decision-making and human and capital investments.

NATIONAL MARINE SANCTUARIES

NATIONAL Marine Protected Areas CENTER

Strategic Direction for MPA Center

- Update Strategic Plan; 5 year outlook for Center
- Connect with and support plans for other MPA programs
- Identify issues for future MPA FAC guidance


Questions?

- http://beta.w1.mpa.woc.noaa.gov/