Today’s Presentation

- Regions and APA’s One Water perspective
- National and state trends
- Case studies
- Recent Maine Efforts
- Observations
What are Regions?
Eco-Regions
“One Water” Perspective

- Integrated approach to water resource management
- Incorporating water into all aspects of the built environment
- Integrated, regional water planning
- Partnerships between water resource managers and land use planners

- New: Integrate strategies into water resource management to address impacts of climate change
# National Climate Trends – Sea Level Rise

**TABLE 1.1. LIKELIEST SCENARIOS FOR SEA LEVEL RISE TO 2100**

<table>
<thead>
<tr>
<th>Year</th>
<th>Very Likely Sea Level Rise Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>2030</td>
<td>0.3 – 0.6 feet</td>
</tr>
<tr>
<td>2050</td>
<td>0.5 – 1.2 feet</td>
</tr>
<tr>
<td>2100</td>
<td>1 – 4 feet</td>
</tr>
</tbody>
</table>

**Figure 2. Projected Sea Level Rise along the Contiguous U.S. Coastline in 2100**

Map shows projected relative (to land) sea level rise under the Reference scenario for select coastal counties in the contiguous U.S. Projections are based on global mean sea level rise in 2100 (56 inches), adjusted for local subsidence and uplift.

For more information, visit EPA’s “Climate Change in the United States: Benefits of Global Action” at www.epa.gov/climate.
Northeast – Increased Precipitation
SLR Impacts on Infrastructure
State Water Efficiency/Climate Resilience Scorecard
Case Studies

- Miami-Dade County, FL
- Cape Cod, MA
- State of Texas
- Minneapolis – St. Paul, MN
- San Diego County, CA
- State of Oregon
Miami-Dade County - Existing Setting

- Population ~2.7 million
- Tropical climate (~60 inches of rain per year)
- Average elevation ~6 feet above sea level
- Porous ground structure
- Rapid urbanization
Water and Climate Challenges

- Increased flooding
- Saltwater intrusion of aquifers
- Increased evaporation from surface water
- Change in rainfall patterns
- Hurricanes/tropical storms
One Water Challenges

- Patchwork of jurisdictions
- Absence of resiliency planning at state level
- Rapid growth
- Aging water and sewer infrastructure
Governance Structure

- South Florida Water Management District
  - Surface and subsurface water management
  - Massive flood control/water supply canal system
  - Multi-watershed/county jurisdiction (see image)

- Miami-Dade County
  - Water and Sewer (drinking water/wastewater)
  - Department of Environmental Resource Management (surface water quality)

- Municipalities (City of Miami, Miami Beach, etc.)

- Florida Department of Transportation
One Water Progress

- Southeast Florida Regional Compact on Climate Change
  - Coordinate resiliency planning between counties/municipalities

- Municipal resiliency agencies

- Land use planning/water management element
Green/Blue Infrastructure at Coastal Interface

- Mangrove restoration (flood mitigation/erosion control/water quality)
- Coral reef restoration (dissipation of wave energy/flood control)
- Retention ponds and similar features (flood control)
- Permeable pavement and novel urban design features to increase infiltration (flood control)
- Restoration of traditional Everglades water flow through Comprehensive Everglades Restoration Project (water quality, aquifer recharge, habitat restoration)
The Cape Cod Region

• 586 miles of shoreline
• 10 miles wide at widest point
• 215,000 year-round population, peak population doubles in summer months
• Coastal Plains and Atlantic Coastal Pine Barrens ecoregion
• Highly permeable sandy glacial deposits
Cape Cod’s Nitrogen Problem

- 15 towns – Home Rule state
- Almost 1,000 ponds
- 1 sole source aquifer
- 52 embayment watersheds
- 32 shared watersheds
- ~80% nitrogen that enters watersheds from septic systems
- 34 impaired watersheds require nitrogen reduction to meet water quality goals
What is the 208 Plan?

Clean Water Act Section 208

Cape Cod Commission was directed to update the 1978 Plan

The Commonwealth provided $3M to update the Plan
208 Plan Approach

- Diverse Technology + Multiple Solutions
- High Stakeholder Engagement
- Watershed based
- Adaptive Management, Pilot Projects, Progress Monitoring
Alternative Technologies & Tools

- Watershed MVP application assists officials and community members in creating most cost-effective and efficient solutions to Cape Cod’s wastewater problem
- Technologies matrix includes menu of options at different scales for nutrient management
- Many options are more resilient
Cape Cod’s Climate Challenges

- Anticipate only localized effects on water resources and infrastructure from SLR
- Increased shoreline erosion
- Increased height of storm surge and coastal flooding due to SLR
- Frequency and duration of severe storms
- Extreme summer heat events
- $9B worth of property in special flood hazard areas
Resilient Cape Cod

NOAA Coastal Resiliency Grant Program

- 3-Year, $780,000 grant awarded to CCC and partners
- Investigate environmental and socio-economic effects of local and regional coastal resiliency strategies
- Town of Barnstable pilot program
Adaptation Strategies Matrix

OPTIONS FOR BUILDING RESILIENCE
Collect and organize information on the spectrum of possible resilience strategies

DO NOTHING?  BEACH NOURISHMENT?  OFFSHORE REEFS?  COASTAL ARMORING?
Municipal Vulnerability Preparedness (MVP) Program

State and Local Partnership

Financial and Technical Resources to Address Critical Municipal Needs:

12,000+ culverts and small bridges needing replacement

300 high-hazard dams

1,100 municipally-owned coastal structures

96% DHCD housing developments to see 5.4° increase in max temperature by 2070
Three Years of MVP

MVP Designations
71% of the Commonwealth
249 communities

Action Grant Projects
FY 18: 37
FY 19: 36
FY 20: TBA

Total Awards
$17M+ in planning and action grants to date
San Diego County – Existing Setting
San Diego Region Report: Regional Climate Variability and Change

CHAPTER HIGHLIGHTS

- Temperature is projected to increase by 5°F to 10°F by the end of the 21st century.
- Heat wave frequency, intensity, and duration will increase.
- Precipitation will remain highly variable from year to year and decade to decade. Additionally, variability might be intensified with wetter winters, drier springs, and more frequent and severe droughts punctuated by more intense individual precipitation events.
- Altered precipitation regimes will impact ecosystems, water demand and supply, water quality and flooding emergencies.
- Wildfire risk will likely increase with warmer temperatures and a longer dry season.
- The risk for large catastrophic wildfires driven by Santa Ana wind events will also likely increase.
- Marine layer clouds can help to reduce the impacts of extreme temperature in coastal regions.
San Diego Region Report: Climate Impacts and Adaptation on San Diego Coast

CHAPTER HIGHLIGHTS

- Sea level is expected to rise approximately 1 ft by mid-21st century and 3 ft, or potentially higher, by 2100.
- Strongest factors driving high sea level events will be high tides combined with El Niño events and wind-driven waves.
- Increasing sea level will imperil existing infrastructure, buildings, and ecosystems with increasing frequency, especially in the second half of the 21st century.
- Sustained and improved observations in combination with physics-based modeling are needed to support adaptation.
Regional Water Quality Planning

- San Diego Regional Water Quality Control Board (State Agency)
- SD County MS4 Permit Copermittees:
  - County of San Diego
  - 18 cities
  - Others
- San Diego Basin Plan
- Water Quality Improvement Plans (WQIPs) for 11 Watershed Management Areas
Regional Habitat Conservation Planning

Four Primary Habitat Conservation Planning Areas:

- MSCP South – City of San Diego
- MHCP North County – SANDAG
- North County MSCP – County of San Diego
- East County MSCP – County of San Diego
Hazard Mitigation and Climate Change Adaptation Planning

Climate Change Adaptation and Resilience

Requirement Description:

In accordance with the requirements of SB 370, codified at Government Code section 65302(g)(4), climate change adaptation and resilience must be addressed in the safety element of all general plans in California. Specifically, “upon the next revision of a local hazard mitigation plan, adopted in accordance with the federal Disaster Mitigation Act of 2000 (Public Law 106-390), on or after January 1, 2017, or, if a local jurisdiction has not adopted a LHMP, beginning on or before January 1, 2022, the safety element shall be reviewed and updated as necessary to address climate adaptation and resiliency strategies applicable to the city or county. This review shall consider advice provided in the Office of Planning and Research’s General Plan Guidelines…” (Gov. Code § 65302(g)(4)). This section provides advice to support a jurisdiction’s compliance with the requirements of Government Code section 65302(g)(4).
Hazard Mitigation and Climate Change Adaptation Planning (Per SB 379)
Cross-Jurisdiction and Cross-Sector Issues

Source: [www.fema.gov/flood-after-fire](http://www.fema.gov/flood-after-fire)
Next Steps: Short-term Actions

- Outreach and Community Engagement

- Regional and Local Hazard Mitigation Planning

- Integrated Regional Water Management and Climate Resilience Planning
Longer-term Actions: Regional Greenprint Planning

What is a greenprint?

Strategic conservation plan or assessment tool that reveals the economic and social benefits that parks, open space, and working lands provide communities.

Source: www.greenprintlab.org
State of Maine

• 1st statewide climate adaptation plan adopted in 2010
  • We depend on natural systems
  • We need to work together at the right scales

• 2014 - 10% of CWSRF dedicated to:
  • Green infrastructure
  • Water/energy efficiency
  • Environmentally Innovative Activities
New Maine Climate Initiative

• Maine Climate Council established late 2019

• Interagency coordination effort led by Maine DEP

• Charged with developing a plan to meet state GHG reduction targets of 45% below 1990 levels by 2030 + 80% by 2050

• Maine Climate Adaptation Toolkit
City of Portland

- 2 – year effort being developed in concert with Maine DEP and USEPA
- Integrated water resources planning approach – considers climate change
- Stakeholder-driven process
- Benefits/performance-based approach to infrastructure investment
Observations

• Support state funding for regional/local resilience planning
• Incorporate SLR projections into infrastructure design
• Close the resilience gap through action on both mitigation and adaptation
• Tie comprehensive plans/hazard mitigation plans to capital planning
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srooney@tighebond.com