Integrating Adaptive Capacity Assessments into Mitigation Planning

Kristen Gelino, AICP, CFM, ASFPM Annual Conference
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What We Will Cover

• What is adaptive capacity?
• Background on case study
• Framework for assessment
• Results of assessment
• Generalized lessons learned and areas for improvement
Mitigation and Adaptation

**Mitigation**

- **Climate Change**: Reduction of greenhouse gas sources and increase in greenhouse gas sinks
- **Hazard/Flood**: Efforts to reduce loss of life and property by lessening the impact of disasters

**Adaptation**

- Adjusting to climate change impacts
Adaptation

- Reducing exposure and vulnerability
- Implementing adaptation strategies and increasing adaptive capacity
- Transformational Change

Complexity and Difficulty Implementing

Source: Adapted from IPCC, 2014
Adaptive Capacity Defined

The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences (IPCC, 2014)
“Building adaptive capacity is crucial for effective selection and implementation of adaptation options.” (IPCC, 2014)

Increasing Adaptive Capacity is necessary, but not sufficient.
## Adaptive Capacity Determinants

<table>
<thead>
<tr>
<th>Determinants of Adaptive Capacity</th>
<th>Economic Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Technology</td>
</tr>
<tr>
<td>Infrastructure</td>
<td><strong>Caution – Emerging Field</strong></td>
</tr>
<tr>
<td>Institutions</td>
<td>Institutions</td>
</tr>
<tr>
<td>Equity</td>
<td>Equity</td>
</tr>
</tbody>
</table>

Background on Case Study

- **Santa Clara County, CA**
  - 16 city, town or county
  - 1 special purpose district
- **Contra Costa County, CA**
  - 15 city, town or county
  - 20 special purpose districts
Background on Case Study – Why California?

California Senate Bill 379 (SB-379)

• Requires the safety element of the General Plan to be reviewed and updated as necessary to address climate adaptation and resiliency strategies applicable to that city or county

• Required upon the next revision of the hazard mitigation plan (January 1, 2017)
Background on Case Study – SB 379

SB 379 Basic Requirements

• A **vulnerability assessment** that identifies the risks that climate change poses to the local jurisdiction

• A set of **adaptation and resilience goals, policies, and objectives**

• A set of **feasible implementation measures**
Framework for Assessment

1. Exposure
   - What climate change effects will a community experience?

2. Sensitivity
   - What aspects of a community (people, structures, and functions) will be affected?

3. Potential Impacts
   - How will climate change affect the points of sensitivity?

4. Adaptive Capacity
   - What is currently being done to address the impacts?

5. Risk & Onset
   - How likely are the impacts and how quickly will they occur?

6. Prioritize Adaptive Needs
   - Which impacts require actions to address them?

7. Identify Strategies
   - Which strategies should be pursued to address adaptation needs?

8. Evaluate & Prioritize
   - Which strategies should be implemented first?

9. Phase & Implement
   - How can the strategies be funded, staffed, and monitored?

Source: California Adaptation Planning Guide
Framework for Assessment

California Adaptation Planning Guide

1. Sensitivity
   - What aspects of a community (people, structures, and functions) will be affected?

2. Potential Impacts
   - How will climate change affect the points of sensitivity?

3. Adaptive Capacity
   - What is currently being done to address the impacts?

4. Risk & Onset
   - How likely are the impacts and how quickly will they occur?

5. Expose, Adapt, Implement
   - How can the strategies be funded, staffed, and monitored?

6. Evaluate & Prioritize
   - Which strategies should be implemented first?

7. Identity Strategies
   - Which strategies should be pursued to address adaptation needs?

8. Prioritize Adaptive Needs
   - Which impacts require actions to address them?

Hazard Mitigation Planning Process

1. Organize the Planning Process and Resources

2. Assess Risks

3. Develop a Mitigation Strategy

4. Adopt and Implement the Plan

Source: California Adaptation Planning Guide and FEMA 2017, Jenny Burmester
Framework for Assessment

Evaluate the community’s current ability to address the projected impacts

Source: California Adaptation Planning Guide
Framework for Assessment

Evaluate the community’s current ability to address the projected impacts

Enhanced Capability Assessment

Source: California Adaptation Planning Guide

Source: FEMA Local Mitigation Planning Guide
Framework for Assessment

Step 1
- Consider Impacts

Step 2
- Assess & Rate Criteria

Step 3
- Develop Strategies
Step 1 - Consider Impacts

<table>
<thead>
<tr>
<th>Primary Impact</th>
<th>Secondary Impact</th>
<th>Example Human and Natural System Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea level rise</td>
<td>Permanent inundation of previously dry land</td>
<td>• Loss of assets and tax base</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Loss of coastal habitat</td>
</tr>
<tr>
<td></td>
<td>Larger area impacted by extreme high tide</td>
<td>• More people and structures impacted by storms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased incidence of loss of utilities and lifeline systems</td>
</tr>
<tr>
<td></td>
<td>Increased coastal erosion</td>
<td>• Loss of assets and tax base</td>
</tr>
<tr>
<td></td>
<td>Saltwater intrusion into freshwater systems</td>
<td>• Decreased water supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ecosystem disruption</td>
</tr>
</tbody>
</table>
Step 1 - Consider Impacts

• Impacts on Hazards of Concern
  – How will climate change impact the **timing, frequency, location, duration, intensity**, etc.?  
  – How will climate change impacts change **exposure** and **vulnerability**?  
    • Population  
    • Property  
    • Critical Facilities  
    • Environment  
    • Economy
### Step 1 – Consider Impacts

The City of Richmond: 23 Residential structures and 1 Industrial structure in chronic 2030 (1 foot) SLR inundation areas.

<table>
<thead>
<tr>
<th></th>
<th>2030</th>
<th>2030</th>
<th>2100</th>
<th>2100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>City of Richmond</strong></td>
<td>12 inches</td>
<td>12 inches + 1% annual chance storm</td>
<td>66 inches</td>
<td>66 inches + 1% annual chance storm</td>
</tr>
</tbody>
</table>

*Map data source: Contra Costa County, California, 2019.*
Step 2 – Assess and Rate Criteria

Rate capacity as follows for 18 assessment criteria:
- **High**—The capacity exists and is in use
- **Medium**—The capacity may exist, but is not used or could use some improvement
- **Low**—The capacity does not exist or could use substantial improvement
- **Unsure**—Not enough information is known to assign a rating

<table>
<thead>
<tr>
<th>Adaptive Capacity</th>
<th>Technical Capacity</th>
<th>Implementation Capacity</th>
<th>Public Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• 6 questions</td>
<td>• 7 questions</td>
<td>• 5 questions</td>
</tr>
</tbody>
</table>
Results – Technical Capacity

<table>
<thead>
<tr>
<th>Technical Capacity</th>
<th>Total</th>
<th>Municipalities</th>
<th>Special Purpose Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>14%</td>
<td>10%</td>
<td>18%</td>
</tr>
<tr>
<td>Medium</td>
<td>32%</td>
<td>34%</td>
<td>29%</td>
</tr>
<tr>
<td>Low</td>
<td>54%</td>
<td>48%</td>
<td>61%</td>
</tr>
<tr>
<td>Unsure</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

- **High**
- **Medium**
- **Low**
- **Unsure**
Results – Technical Capacity

• More than half of all planning partners rated as low
  – Jurisdiction-level monitoring of climate change impacts
  – Technical resources to assess proposed strategies for feasibility and externalities

• Most likely to be rated as high
  – Jurisdiction-level understanding of potential climate change impacts
  – Jurisdiction-level capacity for development of greenhouse gas emissions inventory
Results – Implementation Capacity

- **High:**
  - Total: 14%
  - Municipalities: 20%
  - Special Purpose Districts: 6%

- **Medium:**
  - Total: 31%
  - Municipalities: 37%
  - Special Purpose Districts: 22%

- **Low:**
  - Total: 54%
  - Municipalities: 43%
  - Special Purpose Districts: 71%

- **Unsure:**
  - Total: 1%
  - Municipalities: 0%
  - Special Purpose Districts: 1%
Results – Implementation Capacity

• More than half of all planning partners rated as **low**
  – Identified **strategies for adaptation** to impacts
  – **Financial resources** devoted to climate change adaptation
  – **Local authority** over sectors likely to be negatively impacted

• Most likely to be rated as **high**
  – Identified strategies for **greenhouse gas mitigation** efforts
Results – Public Capacity

<table>
<thead>
<tr>
<th>Public Capacity</th>
<th>Total</th>
<th>Municipalities</th>
<th>Special Purpose Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>7%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>Medium</td>
<td>38%</td>
<td>38%</td>
<td>37%</td>
</tr>
<tr>
<td>Low</td>
<td>47%</td>
<td>42%</td>
<td>55%</td>
</tr>
<tr>
<td>Unsure</td>
<td>8%</td>
<td>11%</td>
<td>5%</td>
</tr>
</tbody>
</table>
Results – Public Capacity

• More than half of all planning partners rated as **low**
  – Local *economy’s* current capacity to adapt to climate impacts
  – Local *ecosystems’* capacity to adapt to climate impacts

• Most likely to be rated as **high**
  – Local residents *knowledge of and understanding* of climate risk

• Category with highest level of **unsure** rating
Step 3 – Develop Strategies

• Review your ratings
  – **High**: Think about how you can leverage this capacity to improve or enhance mitigation or continue to improve this capacity
  – **Medium**: Think of ways you could improve this rating
  – **Low**: Think of ways you could obtain this capacity or improve this rating
  – **Unsure**: Consider ways you could improve your understanding of this capacity
Step 3 – Develop Strategies

- Review Mitigation Best Practices Catalog
  - Hazard-specific strategies for each hazard of concern
  - General strategies to help build capacity to current and future risk
- Build collaborative relationships between regional entities and neighboring communities to promote complementary adaptation strategy development and regional approaches
- Conduct a climate impact assessment on specific community infrastructure
- Identify and pursue new sources of funding for mitigation and adaptation activities
• Uptake is slow so far
• Many potential reasons for this
  – New methodology (continue to improve)
  – Right people might not be at the table
  – Disaster events during plan development
  – This is a challenging concept with which everyone is struggling
• Need to provide more guidance on the extent to which strategies address potential impacts (is it enough? and if so, for how long?)
• Need to ensure issues of equity are being addressed
Generalized Lessons Learned

• Keep it Simple and Use Existing Resources
• Be Careful Merging Planning Processes
• Watch the Jargon
• Reach Out
• Revisit Often
• Mitigation Matters
Generalized Lessons Learned

Adaptation

- Reducing exposure and vulnerability
- Implementing adaptation strategies and increasing adaptive capacity
- Transformational Change

We are here
Generalized Lessons Learned

Adaptation

- Reducing exposure and vulnerability
- Implementing adaptation strategies and increasing adaptive capacity
- Transformational Change

Let’s work on moving here