

EcoAdapt™
Meeting the challenges of climate change

Including Climate Change in Planning & Beyond

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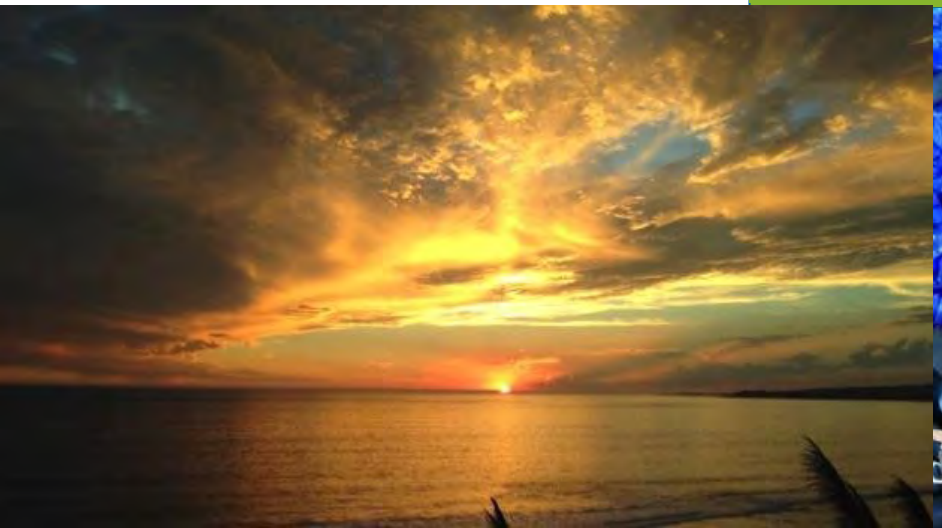
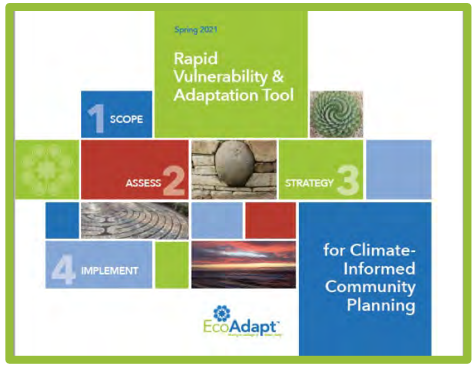


How to use the tools presented in the workshop



Use the Rapid Vulnerability & Adaptation Tool (RVAT) to:

Evaluate overall vulnerability and develop adaptation options for:

- County Operations
- Topics
- Agencies

Identify Climate Vulnerabilities to the tasks being undertaken → **Develop possible Solutions** to reduce these Vul… → …& feasible → **…mplement Solutions,** monitor their efficacy, modify as needed.

Not just for the County! Anyone, any organization or any coalition can use these to support climate savvy decision making

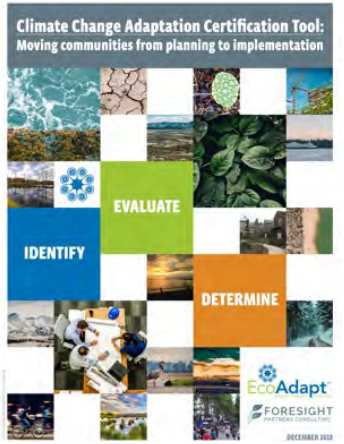
Make the RVAT part of … pdates to create climate-informed guiding documents

Use the Clima… …e Adaptation Certification (CCAC) to:

Evaluate an individual decision or compare decisions such as:

- Permits
- Capital Expenditures
- Policy change

Identify Climate Risk Factor for a specific decision/project → **Evaluate climate** impact on decision/project → **Make a determination** of how to proceed



Make the CCAC part of daily planning processes to mainstream a climate lens in decision making

Homework


Climate Change Adaptation Certification Tool:
Moving communities from planning to implementation
EVALUATE
IDENTIFY
DETERMINE
EcoAdapt
FORESIGHT
DECEMBER 2018

A sampling of CCAC homework

Elevation of an historic building along a scenic county road

County road widening to alleviate traffic congestion

Beach access road creation

43rd Avenue Bridge Replacement over South Relief Canal

Moving stormwater from the current canal system westward to St. John's River Basin

Egret Marsh Stormwater Park (stormwater management and species protection)

Sebastian Inlet Shoreline Stabilization

Sebastian River Improvement District drainage outfall structure conversion

Stormwater master plan the City of Vero Beach

Stormwater retention area (Indian River & Royal Palm Blvds) to prevent flooding

A sampling of CCAC homework

Elevation of an historic building along a scenic county road

- How long to do you want to continue to preserve the building?

County road widening to alleviate traffic congestion

- Will widening a road lead to more greenhouse gas emissions? Should we look to reduce congestion by decreasing vehicle trips?

Beach access road creation

- Does building roads to beaches increase the impact of sea level rise through soil compaction?

43rd Avenue Bridge Replacement over South Relief Canal

- Does access to the bridge also need replacement and redesign given climate impacts (especially flooding and sea level rise)?

Moving stormwater from the current canal system westward to St. John's River Basin

- How might water quality be affected by this decision in both systems?

Egret Marsh Stormwater Park (stormwater management and species protection)

Sebastian Inlet Shoreline Stabilization

Sebastian River Improvement District drainage outfall structure conversion

Stormwater master plan the City of Vero Beach

Stormwater retention area (Indian River & Royal Palm Blvds) to prevent flooding

A sampling of CCAC homework

Stormwater master plan the City of Vero Beach. (Great use of maps & data!)

Step 1: Climate Risk Factors

precipitation, sea level rise Temperature, Population Changes, Greenhouse Gas Emissions

Step 2: Evaluation of Climate Impacts

Flood & sea level rise: in known flood zone, and project to experience 40-92" of SLR
Stormwater: Need hydrological models to better understand
Basic utilities: Project could benefit utilities reliability
Reliable power sources: Many systems work on gravity but some pumps that would be vulnerable.
Wildfire: Stormwater impoundment could be beneficial for firefighting if strategically placed.
Ocean health: should consider how SWMP water quality improvements could help ameliorate acidification

Step 3 Determination:

Proponent assessment: A SWMP is being used to plan for future capital improvements and operations and maintenance initiatives of the City for stormwater flood protection and water quality improvements.
Staff Assessment: Climate Change adjustments could be included in project design to mitigate future expenses.
Project redesigned to reduce risk and approved:
Risk can be mitigated through the following redesigns and considerations:

- Adjust tailwater and precipitation models based on climate change predictions in stormwater modeling efforts.
- Prioritize future improvements on areas that provide the most 'bang for the buck'. Consider retreat or alternatives to providing flood protection to areas that are cost prohibitive.
- Consider alternative water supply or other mutually beneficial tie ins with stormwater modeling efforts.

A sampling of CCAC homework

43rd Avenue Bridge Replacement over South Relief Canal

Step 1: Climate Risk Factors

Precipitation, Temperature, Sea Level Rise, Slope Stability, Population Changes, Greenhouse Gas Emissions

Step 2: Evaluation of Climate Impacts

Flood and sea level rise: Bridge vulnerable to being overtopped and/or bank eroded
Stormwater: new roadway includes design for water retention, possible risk of invasive species proliferation
Landslide: Risk of bank erosion
Transportation: new structure supports multimodal transportation (which older version did not)
Ocean health: more acidic ocean water could shorten bridge structure lifespan
Wildfire: increased invasive species could increase fire risk
Population change: project could accommodate future growth, but that could cause new congestion

Step 3 Determination

Staff assessment: Project has been assessed under current/future conditions (NOAA SLOSH) and stormwater event modeling. The project provides for substantial improvements over existing conditions; within the budgetary and ROW limits. It also offers substantial improvements to roadway capacity based on the needs identified by population growth estimates.
Project approved as proposed: Project has been designed within the limits of the site and addresses necessary mitigation of future risks as applicable. But….ideas shared in the assessment:

- Raise bridge clearance, armoring to protect bank, chlorine resistant concrete or increase cover thickness
- Invasive species eradication? Use vegetation to protect bank rather than armoring?

A sampling of CCAC homework

Sebastian River Improvement District drainage outfall structure conversion (Gate △)

Step 1: Climate Risk Factors

Precipitation, Temperature, Sea Level Rise Population Changes

Step 2: Evaluation of Climate Impacts

Flood: project could improve water quality

Sea level rise: may result in more flooding if upstream inputs are not held back in new developments

Transportation: could support transit functionality

Step 3 Determination

Proponent assessment: The water quality benefits outweigh the negatives. Future water storage areas can be constructed to offset flooding concerns.

Staff assessment: As a condition of approval, revisit the design storm used to design on-site storage every 10 years. Currently the design storm is a 9.2 " - 24 hour storm. Maybe revise to 11"- 24 hour storm if weather patterns indicate

Project approved with condition: The District will monitor the rainfall intensity frequency records and adjust the permit criteria accordingly.

A sampling of CCAC homework

Elevation of an historic building along a scenic county road

Step 1: Climate change risk factors

Precipitation, temperature, sea level rise, vegetation changes, greenhouse gas emissions

Step 2: Evaluation of Climate Impact

Flood: Project located in a FEMA flood zone.

Sea Level Rise: NOAA high SLR scenario is 3' of inundation. Would need to elevate structure and road.

Stormwater: Structure survival may require resizing stormwater pipes to accommodate tidal influence & run-off

Landslide: Road susceptible to erosion and wash-out due to precipitation and coastal vegetation changes.

Utilities and Power: No water required but sewer access is. Underground power lines may be inundated.

Transportation: Project already located on road that accommodates bikes & pedestrians→ reduced GHG emissions

Step 3: Determination:

Proponent assessment: Elevating the structure and access roads will be necessary as will maintenance

Determination:

Modify for approval.

Develop elevation and stormwater plan not only for current inundation risk but for 100 year SLR and storm intensity change projections. Include use of green infrastructure to ameliorate flood conditions and reduce erosion whenever possible rather than hardening.

A sampling of CCAC homework

County road widening to alleviate traffic congestion and increase speed (fictional)

Step 1: Climate Risk Factors

Precipitation, Temperature, vegetation change, slope stability Population Changes, Greenhouse Gas Emissions

Step 2: Evaluation of Climate Impacts

Flood: adjacent to a flood zone

Stormwater: Susceptible to flooding in a large rain event

Transportation: will increase traffic flow between local communities, not likely to support non-motorized transit

Wildfire: not likely but the project is adjacent to a wildlife preserve (could veg change increase fire risk?)

Population change: Project being built to address increasing population. Will result in more car traffic= more emissions.

Step 3 Determination:

Proponent assessment: project will address traffic concerns in region and offer alternative emergency routes

Staff assessment: Roadway vulnerable to flooding and will increase traffic which may increase greenhouse gas emissions. Construction project and local warming from larger road bed could increase invasive and increase fire risk.

Project redesigned and approved:

- Co-design road (materials, shape) with surrounding vegetation to reduce standing water during rain events and prevent invasive species introduction, include off-road non-motorized transit path to support alternative transit options.

A sampling of CCAC homework

Egret Marsh Stormwater Park (stormwater management and species protection)

Step 1: Climate change risk factors

Precipitation, temperature, vegetation changes, slope stability, greenhouse gas emissions

Could inflow be affected by **population change** or outflow by **sea level rise**?

Step 2 Evaluation of Climate Impacts:

Flood: Project in "area of minimal flood hazard" Is this projected to change in the future?

Hydrological conditions: Drought could effect system function and habitat quality, pumps maintain flow.

Reliable power sources: Relies on FPL, can use generators for limited time

Wildfire: Would fire effect system function?

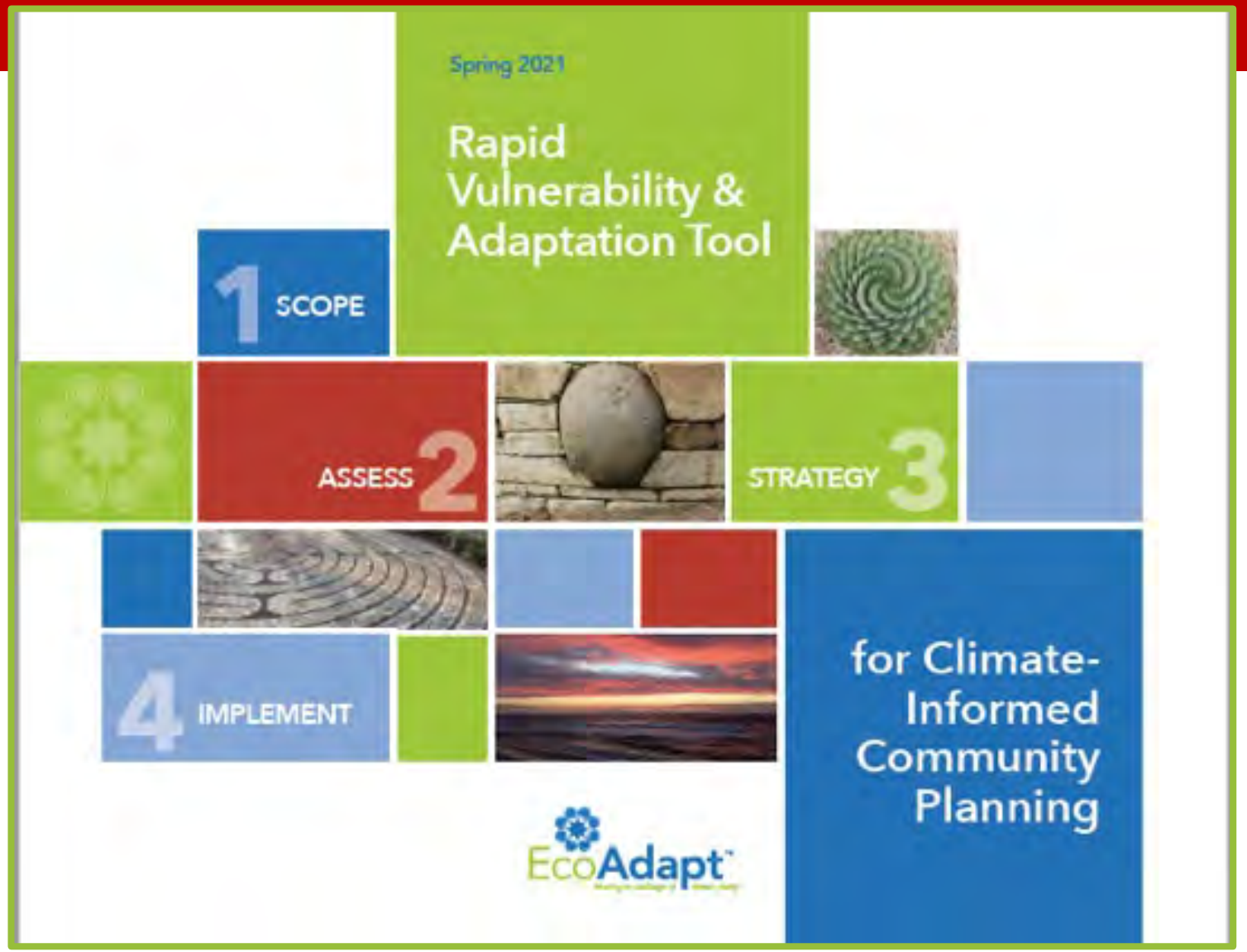
Population change: Will it be sufficient to meet needs if population increases or function if population decreases?

Step 3 Determination

Proponent assessment: Project should incorporate onsite renewable generation option for 24/7 power.

Determination: **What do you think?**

Workshop Application



How to use the results & process of this workshop

Implement solutions developed in the RVAT and the techniques used in the workshop to adapt.

Transportation

Roadways (secondary, highways), bridges, transit, maintenance & replacement, railways and crossings, access to health care, transportation planning (people distribution, development, open space)

Key questions

- Will future climatic conditions prevent existing or proposed infrastructure from working as expected?
- How will changing precipitation patterns and/or increasing temperatures affect function or use?
- Would changes in vegetation (loss of present composition, introduction of invasive species) impact transportation system use or function?
- What mechanisms exist to address the climate vulnerabilities we've identified in our current transportation system (infrastructure, use, maintenance)?
- Does our community prioritize mass transit or non-motorized transit as a means of reducing greenhouse gas emissions?

How to use the results & process of this workshop

Conservation Lands & Parks

Non-agricultural, publicly-managed lands--state parks, county parks, municipal parks, stormwater parks (e.g., Spoonbill Marsh)

Key questions

- Will future climatic conditions prevent conservation lands and parks from functioning or being used by people or nature as desired?
- How will changing precipitation patterns and/or increasing temperatures affect function or use?
- Would changes in vegetation (loss of present composition, introduction of invasive species) impact conservation lands or parks?
- Will target species still be able to benefit from conservation lands under future conditions?
- What new species are expected to move into the region? What will they require?
- How will sea level rise affect access to or function of conservation land and parks?
- Will new lands be needed to meet current desired functions?

How to use the results & process of this workshop

Utilities

Water, wastewater, stormwater & some broadband (not addressing electric or gas utilities)

Key questions

- Will future climatic conditions prevent existing or proposed water infrastructure from working as expected?
- How will changing precipitation patterns affect function (e.g., capacity, effectiveness)?
- How will increasing temperatures affect demand?
- Would changes in vegetation (loss of present composition, introduction of invasive species) impact water management system use or function?
- What mechanisms exist to address the climate vulnerabilities we've identified in our current water management systems (infrastructure, use, maintenance)?
- What will be the implications for water quality and what can we do about it? Can TMDLs still be met under future precipitation conditions?

Example:

"The St. Johns River Water Management District is an environmental regulatory agency of the state of Florida whose work is focused on ensuring a long-term supply of drinking water, and to protect and restore the health of water bodies in the district's 18 counties in northeast and east-central Florida."

How to use the results & process of this workshop

Consider creating a Climate Guiding Principle

Reduce greenhouse gas emissions and increase county climate resilience

- **Mitigation**: Participate with state, regional and local partners to reduce greenhouse gas emissions consistent with the 1990 benchmark and identified future year targets, educate the public about climate change and incentivize local activities including land use patterns and building practices that reduce greenhouse gas emissions.
- **Adaptation**: Minimize or ameliorate the impacts of climate change on our county and associated ecosystems through climate-informed policies, programs and development regulations.
- **Evaluate** the climate vulnerabilities and implications of County actions and **identify** policies that alleviate those vulnerabilities. Consider the effects of shifting conditions (e.g., changing rainfall patterns, increasing temperatures, sea level rise, more extreme weather events) and the effects they cause (flooding, altered vegetation, property damage, changing water demands, economic and population shifts).

Other Resources at your disposal

SOUTHEAST FLORIDA REGIONAL COMPACT CLIMATE CHANGE

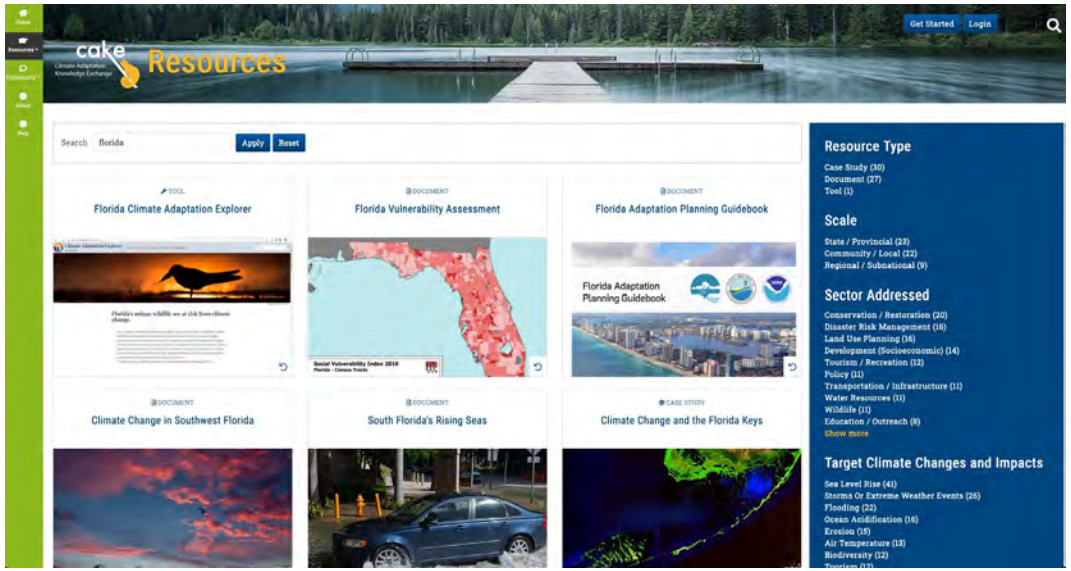
13th Annual Climate Leadership Summit

Seizing the Moment, Together

December 9-10, 2021

Join Us Virtually

Adaptation sessions both days



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