Adaptation design tool for ecosystem-based management: Coral reef application*

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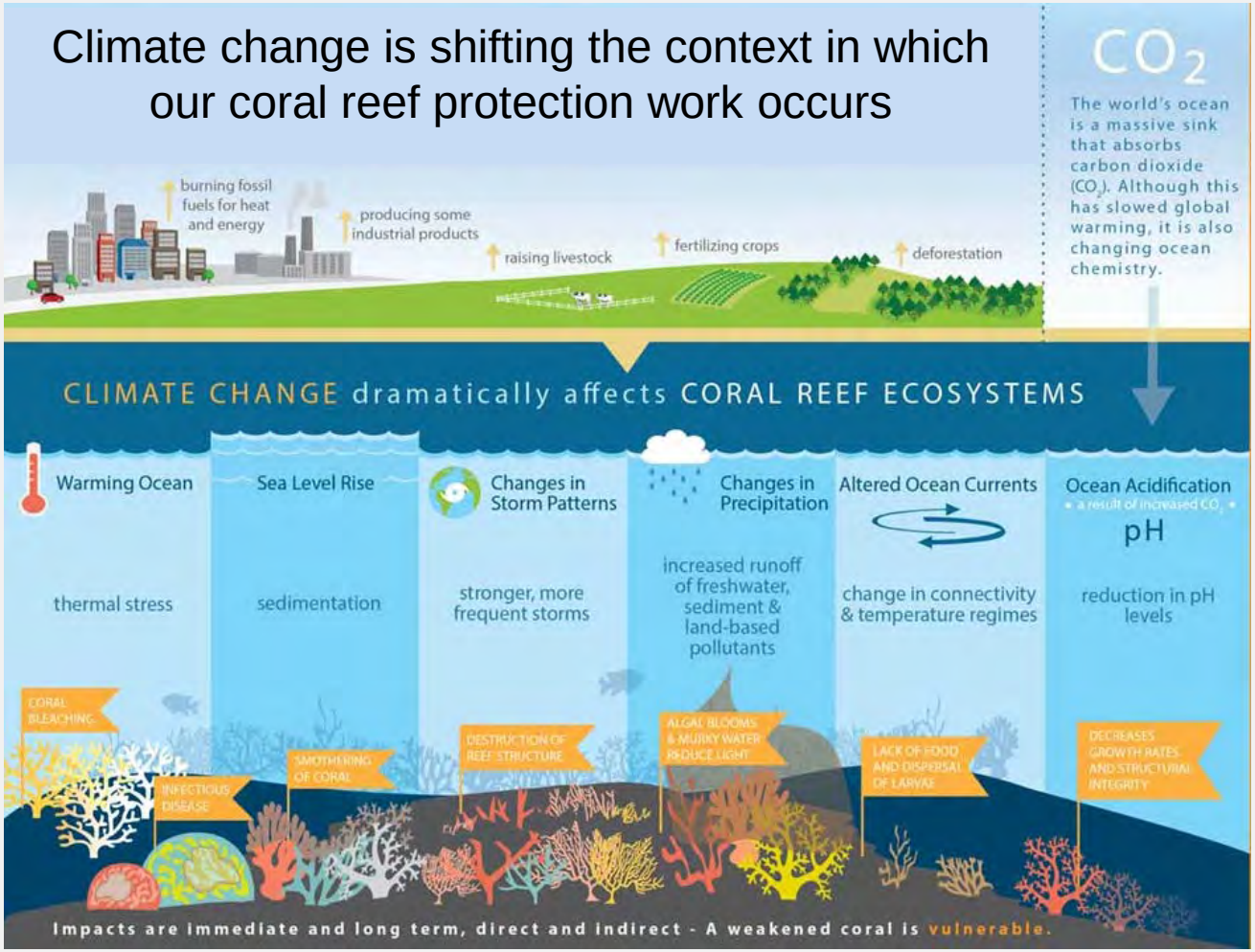
*The views expressed in this presentation are those of the authors and do not represent official policy of the US EPA or NOAA.

EPA United States Environmental Protection Agency

Origin: Collaborative Effort of the Climate Change Working Group of the Interagency U.S. Coral Reef Task Force

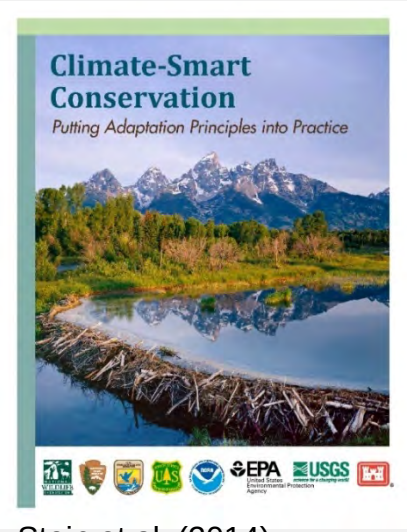
- Co-funded by EPA, NOAA, DOI
- Technical expertise from EPA, NOAA, DOI, The Nature Conservancy, Tetra Tech
- Partnering with practitioners/managers and scientists from 13+ Federal, State, Territory agencies, local and national NGOs, academia

Why is this important?

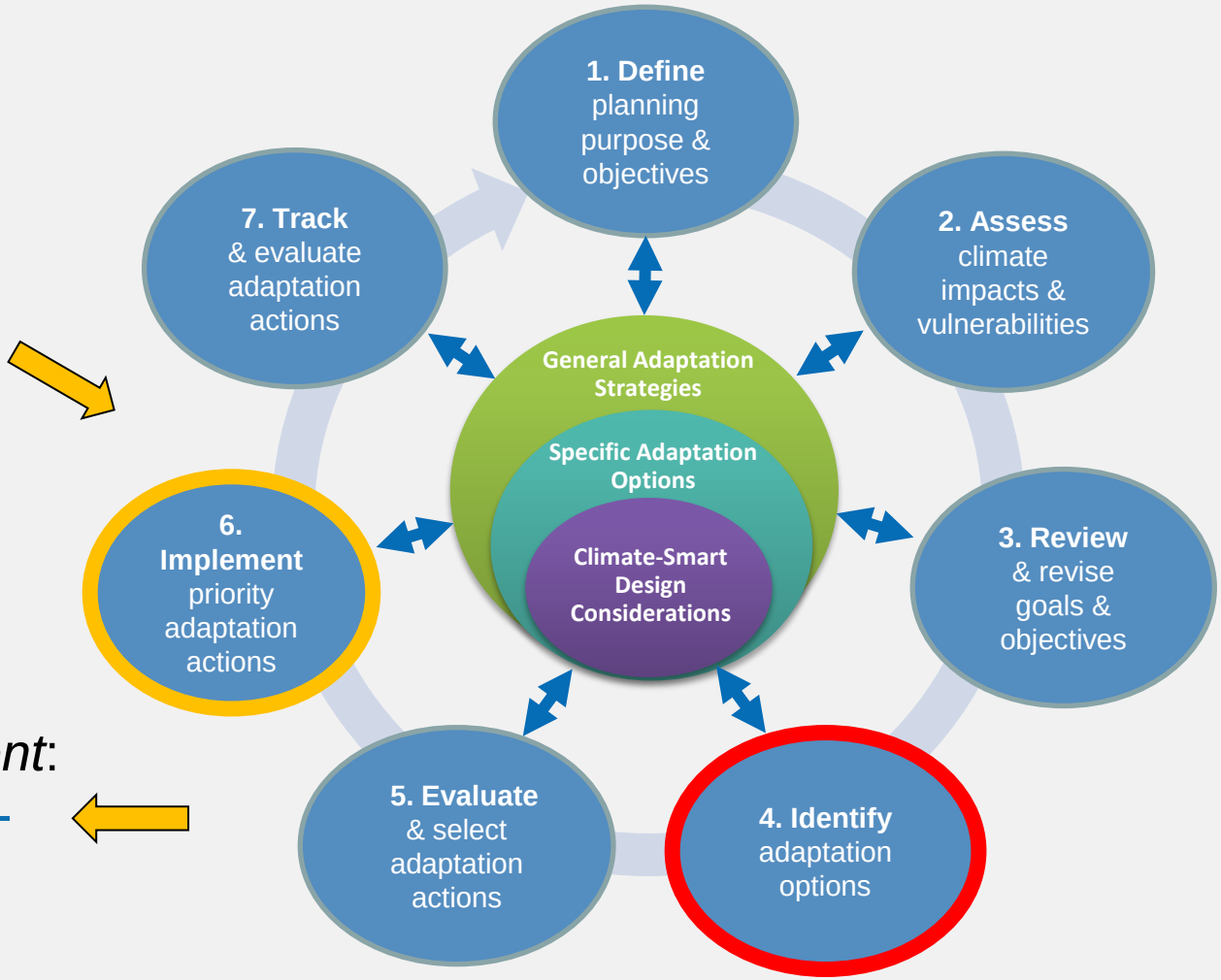


Source: CCAP user guide (https://www.coris.noaa.gov/activities/CCAP_design/)

Corals & Climate Adaptation Planning (CCAP) Framework



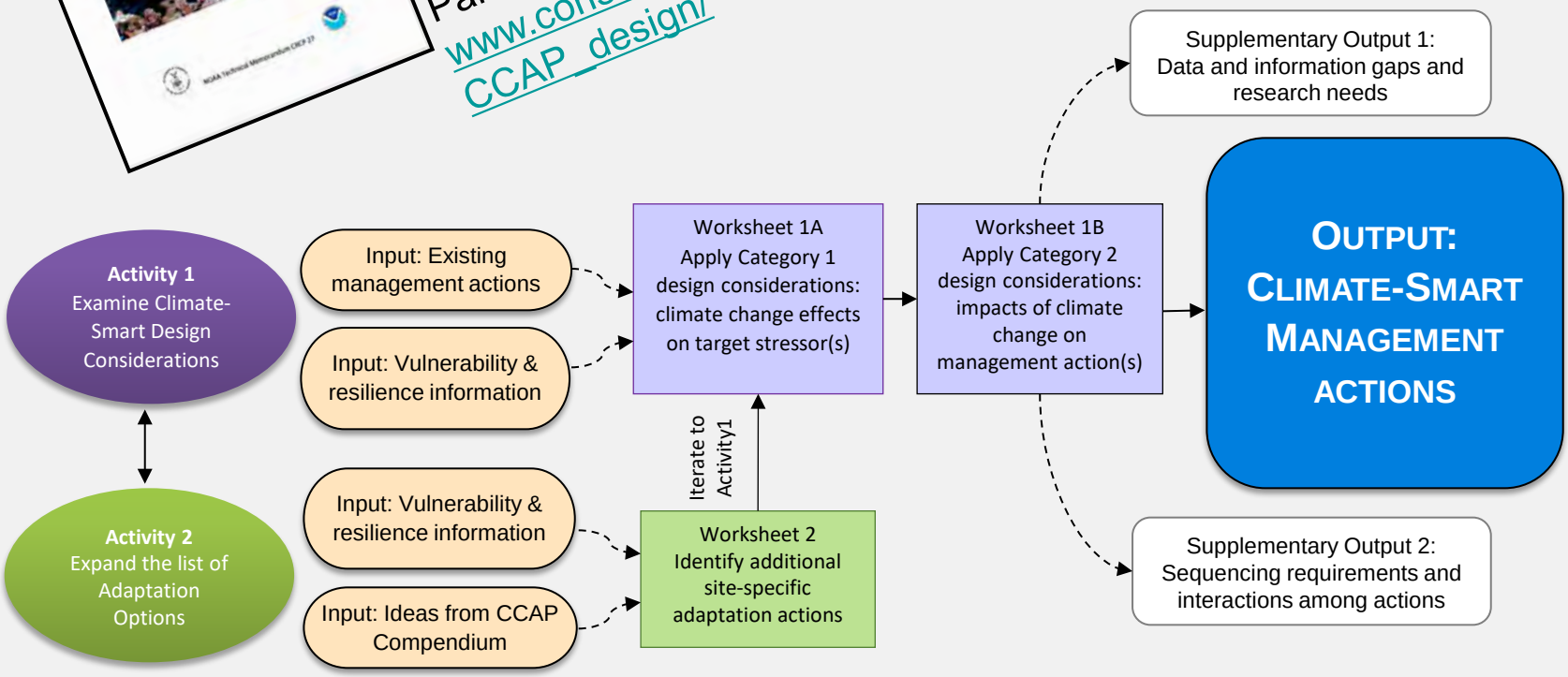
Stein et al. (2014)



West et al. (2017), *Environ. Management*: doi 10.1007/s00267-016-0774-3

CCAP Adaptation Design Tool: Breaking down a complex process

Parker et al. (2017)
www.coris.noaa.gov/activities/CCAP_design/



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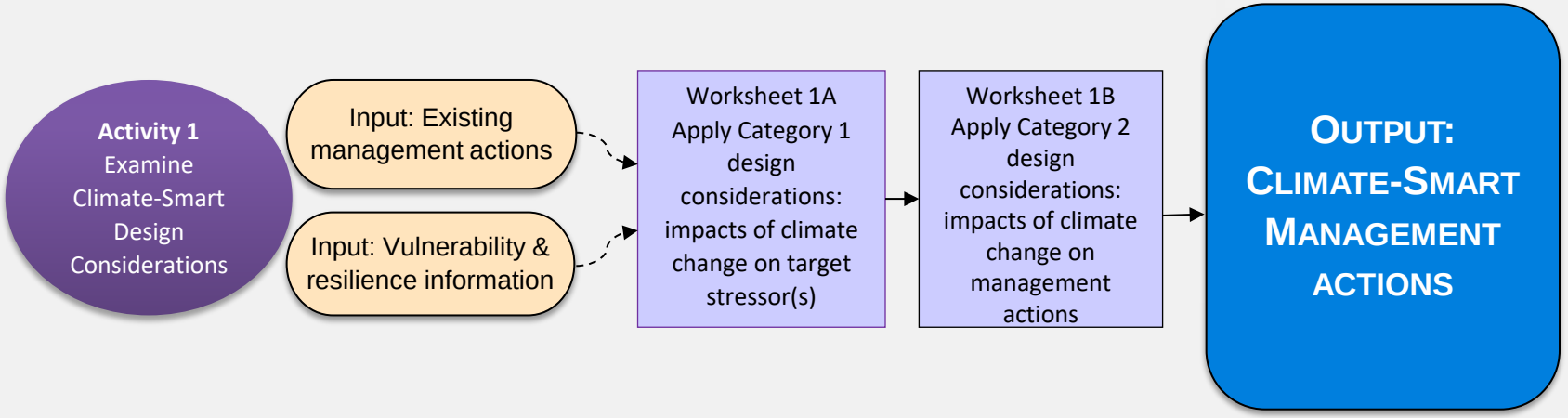
What does the tool do?

- Helps you apply climate-smart design to your management activities
- Supports brainstorming of additional adaptation activities that may be critically needed

- Generates insights on:
  - information gaps & research needs
  - synergies, conflicts & sequencing considerations

Focus on Activity 1: Examining climate-smart design considerations



Example: Install terraces to reduce sediment and nutrient loadings to reefs (West Maui)

Worksheet 1A

Category 1 design considerations: CC effects on target stressors

A1 Action number	A2 Existing Management Action	A3 Target Stressor(s)	A4 Climate change effects on stressors (direction, magnitude, mechanism, uncertainty)	A5 Timing of climate change effects	A6 Implications for metrics of success and how to measure them	A7 Notes
1	Install terraces adjacent to dirt roads in agricultural areas	Sediment and nutrient loads from runoff	Heavy rainfalls after dry periods will lead to increased runoff; changing seasonal patterns less understood (moderate magnitude, high uncertainty)	Longer dry periods already occurring, trends of increasing summer heavy rainfall events observed	Monitoring will have to be timed/located to catch effects of extreme events coupled with dry periods	More info needed on spatial patterns of drying and rainfall and location of worst erosion

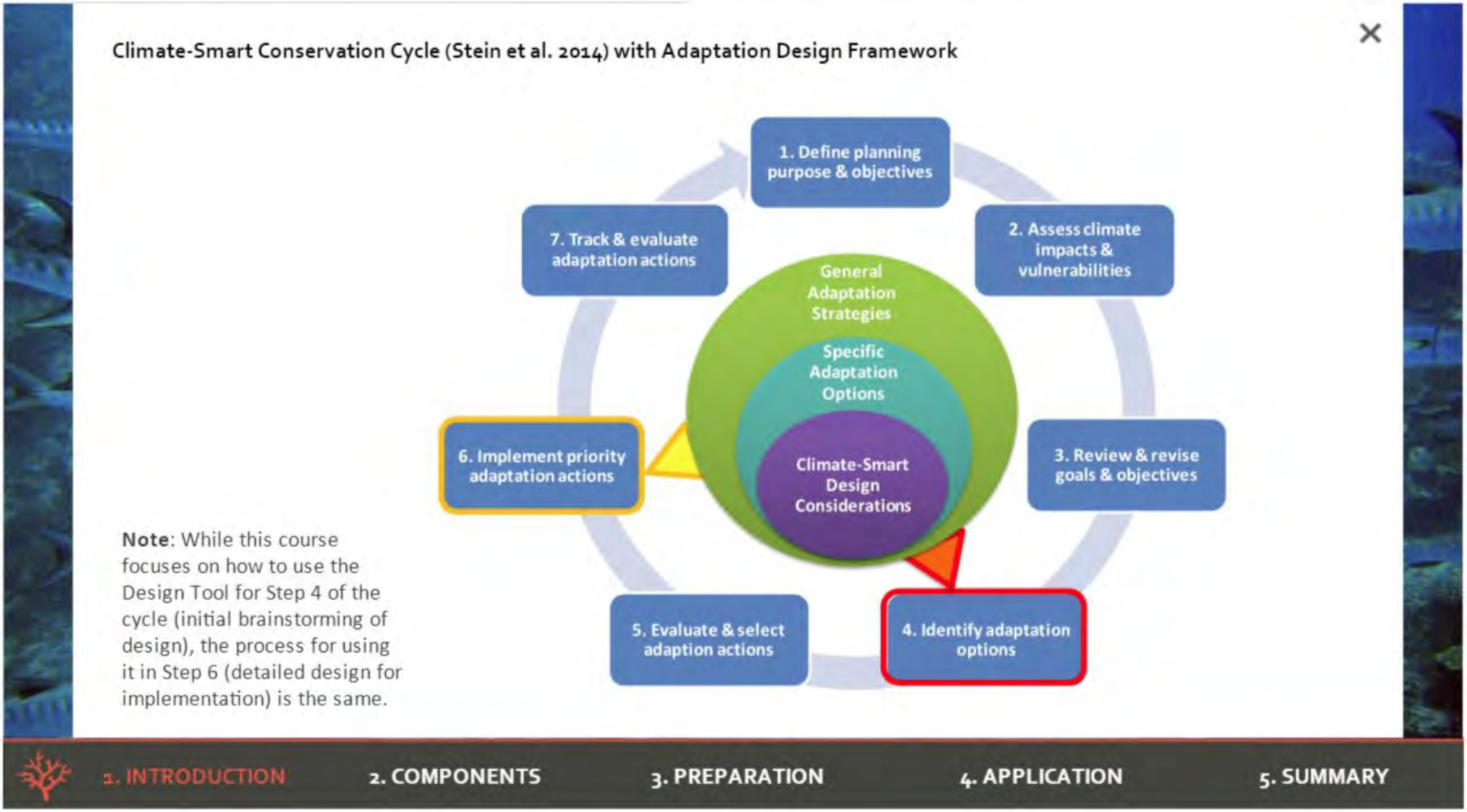
Example: Install terraces to reduce sediment and nutrient loadings to reefs (West Maui)

Worksheet 1B

Category 2 design considerations: CC effects on management actions

B1 Action number	B2 Existing Management Action	B3 Changes in effectiveness of action due to: climate impacts on target stressors	B4 Changes in effectiveness of action due to: climate impacts on management action	B5 Timeframe or constraint for using the action and implementation (e.g., urgency, longer or shorter term)	B6 Notes	B7 What changes are needed to adapt the action (place, time, design)	B8 Climate-Smart Management Action
1	Install terraces adjacent to dirt roads in agricultural areas	Heavy rainfall events following dry periods may overwhelm capacity of terraces	Terraces themselves could be destroyed by extreme events	Life of these practices is 5-10 yrs; need to plan ahead for strategic placement in combination with other actions	How heavy a rainfall event will destroy a standard terrace?	Need to adapt action spatially, design terraces to withstand extreme events	Install terraces resistant to extreme events adjacent to targeted roads

Online learning module hosted by The Nature Conservancy



https://www.conservationtraining.org/enrol/index.php?id=295

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Who has been using the tool?

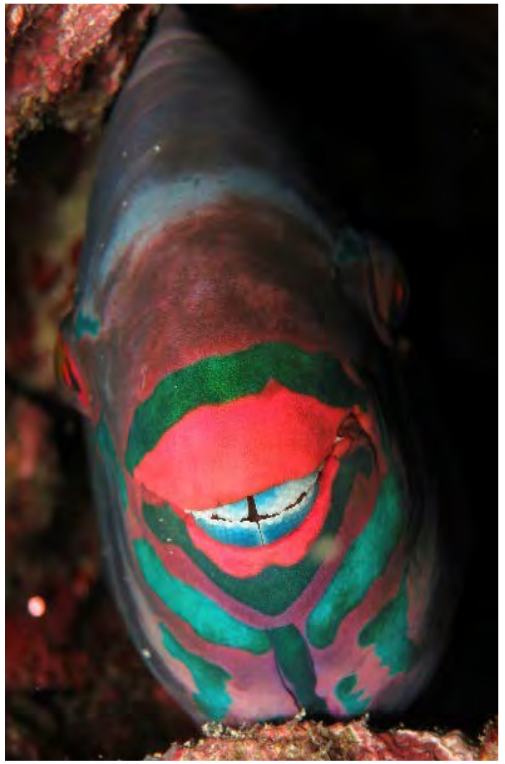
- West Maui, Hawai'i, R2R Initiative
- Guánica Bay, Puerto Rico, Watershed Management Initiative
- Florida Reef Resilience Program
- America Samoa, Coral Reef Advisory Group

&

- Chesapeake Bay Program (Pennsylvania, Maryland, District of Columbia, Virginia)

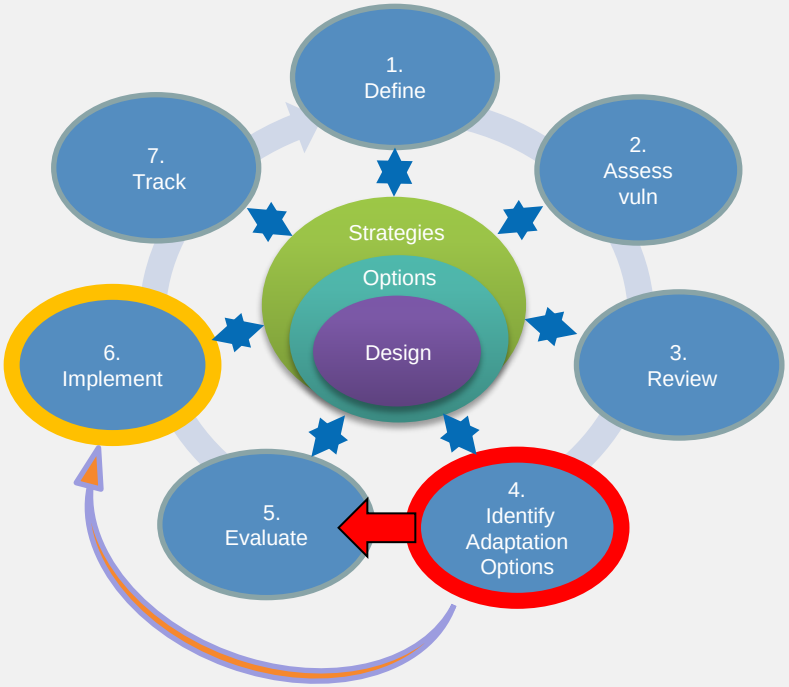
What is the value-added in using the tool?

- Structures and clarifies a complex thought process
- Provides transparency and credibility for decisions
- Looks at uncertainty without being paralyzed by it
- Supports consideration of spatial and temporal scales in planning
- Provides a practical basis for higher level strategic planning



West et al. 2018, *Environ. Management*: in press)

Next Steps for CCAP



- Methods for feeding tool outputs into structured decision making processes (**Evaluate** & select adaptation actions)
- Demonstration of how ‘deep cut’ tool results can flow into implementation planning (**Implement** priority actions)

Thank you

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Kitty Courtney (Tetra Tech)
Pat Bradley (Tetra Tech)
David Gibbs (ORISE Fellow, EPA)

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