NOAA CORAL REEF CONSERVATION PROGRAM

Adaptation Design Tool for Natural Resource Management*

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EPA United States Environmental Protection Agency

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

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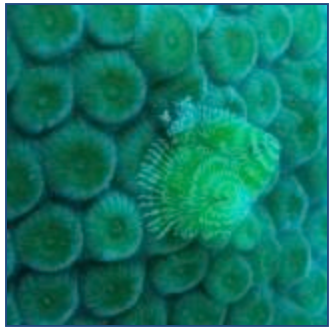
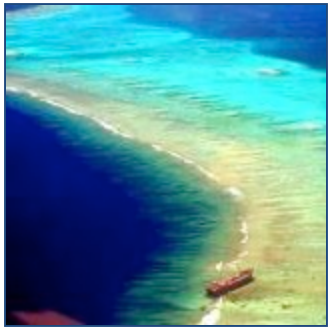
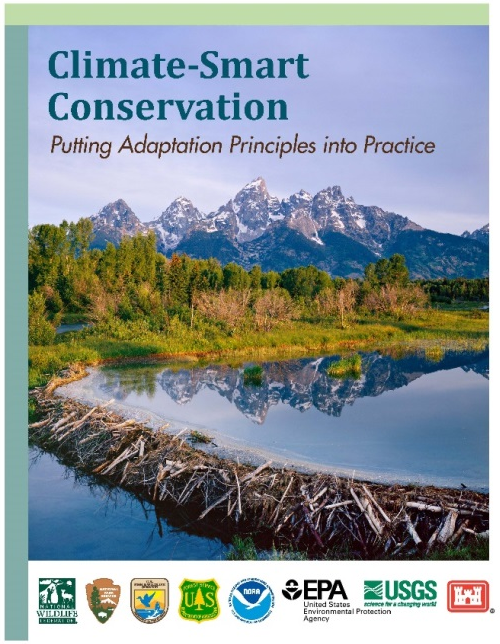




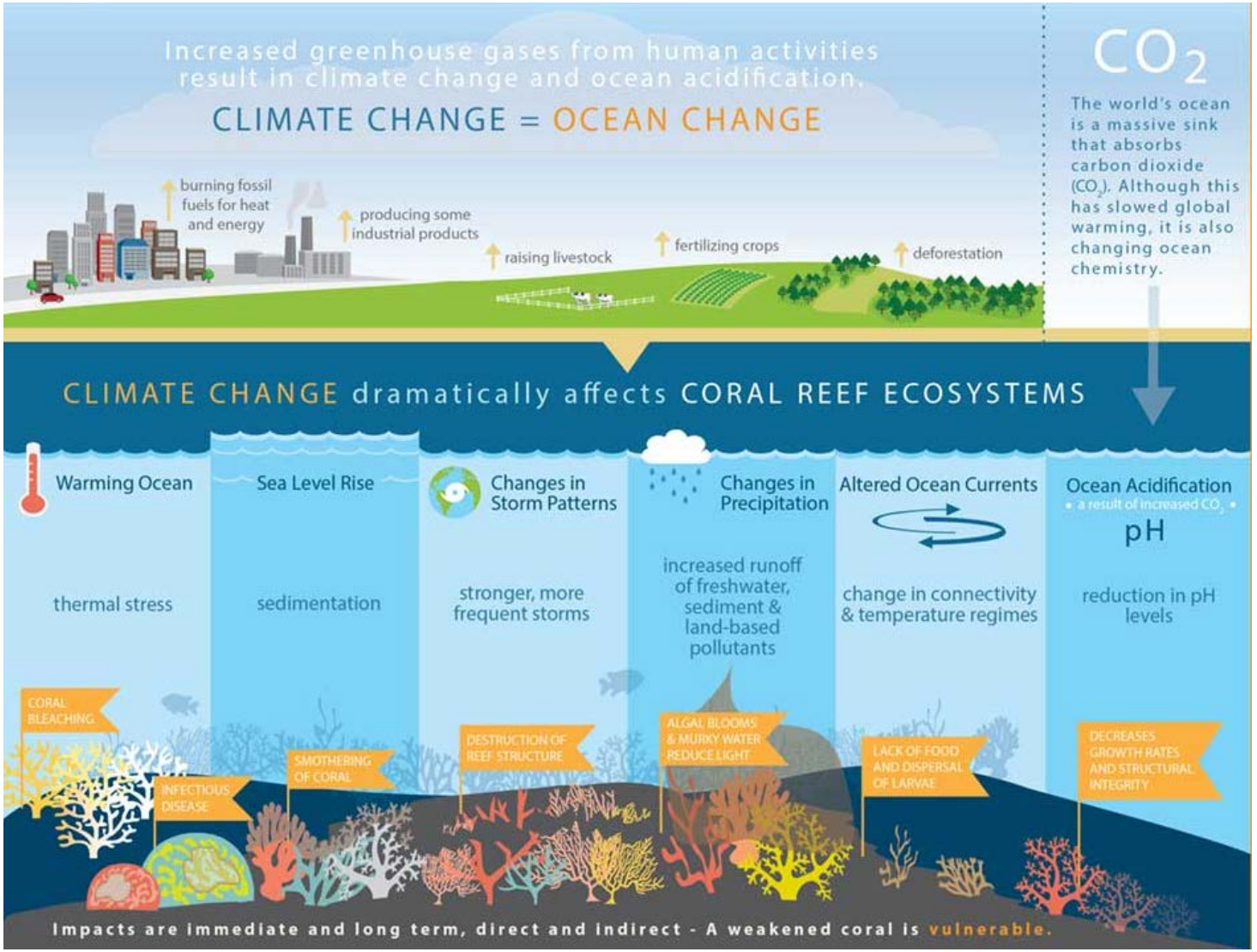
A Collaborative Effort of the Climate Change Working Group of the Interagency U.S. Coral Reef Task Force



Goal: tailor and test Climate-Smart adaptation planning principles specifically for coral reef management, building on recent advancements in vulnerability and resilience assessment methods

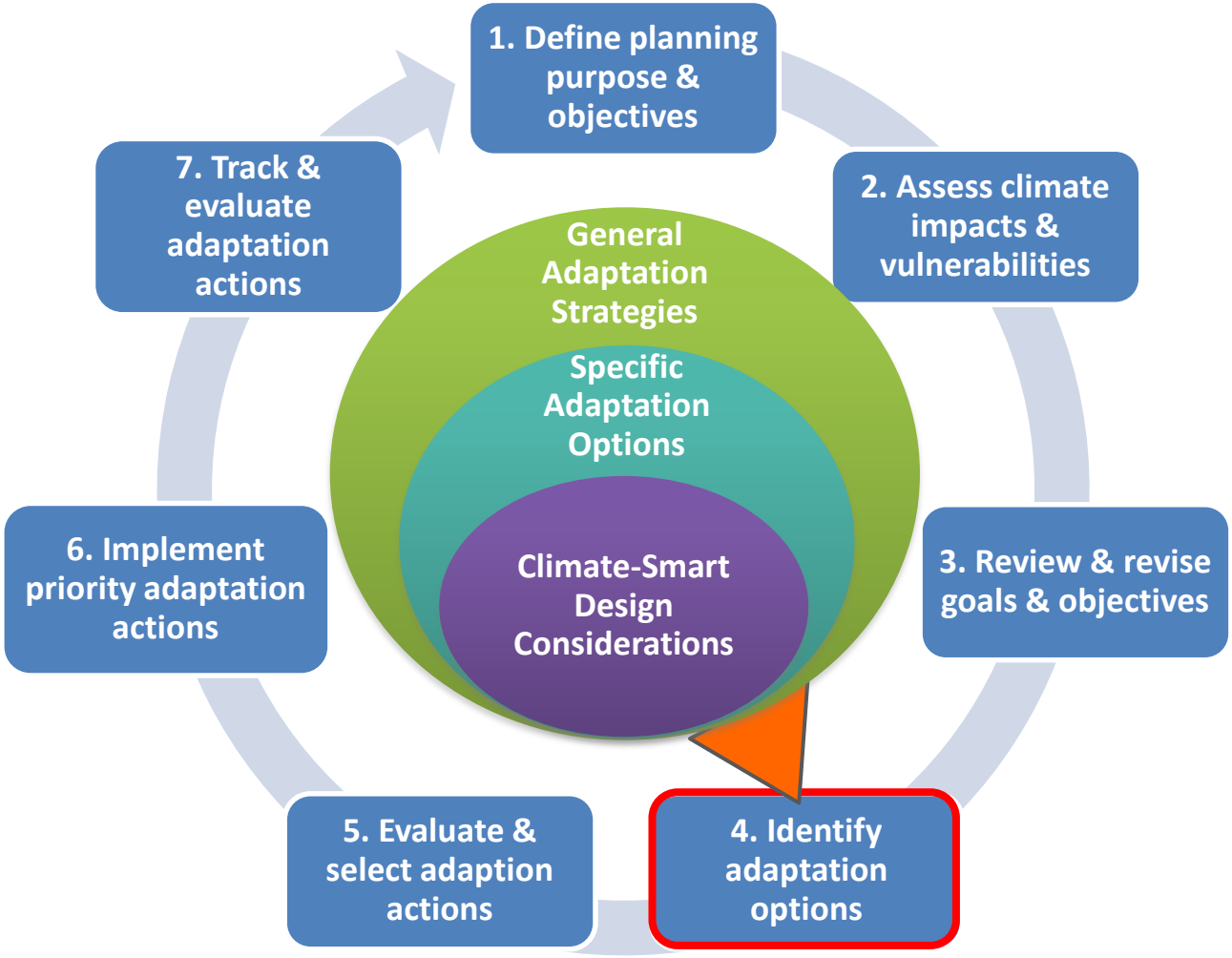
West et al. (2016), *Environmental Management*: doi 10.1007/s00267-016-0774-3

Climate Change Effects on the Biogeochemical Environment of Coral Reefs



Adapted from NOAA (http://oceanservice.noaa.gov/facts/coralreef-climate.html)

Climate-Smart Cycle with Adaptation Design Framework

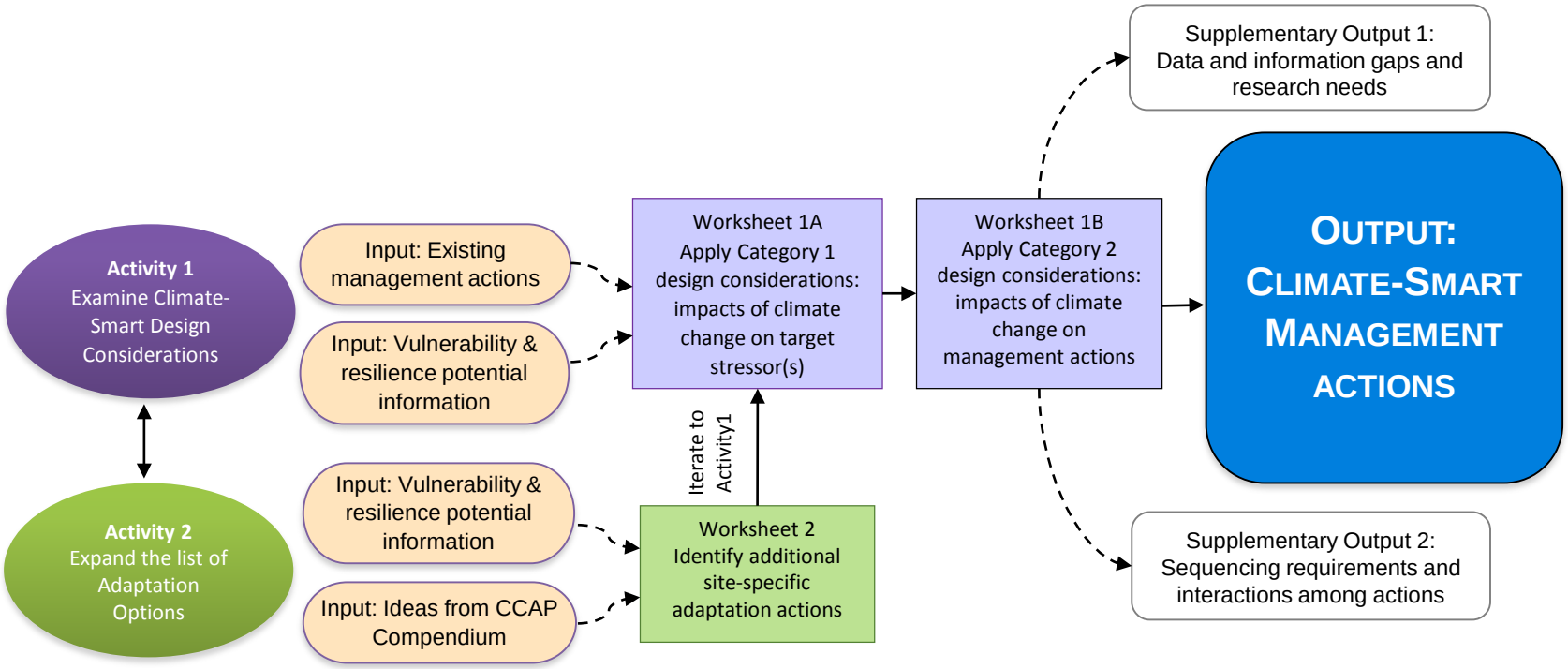


Rules for Climate-Smart Design

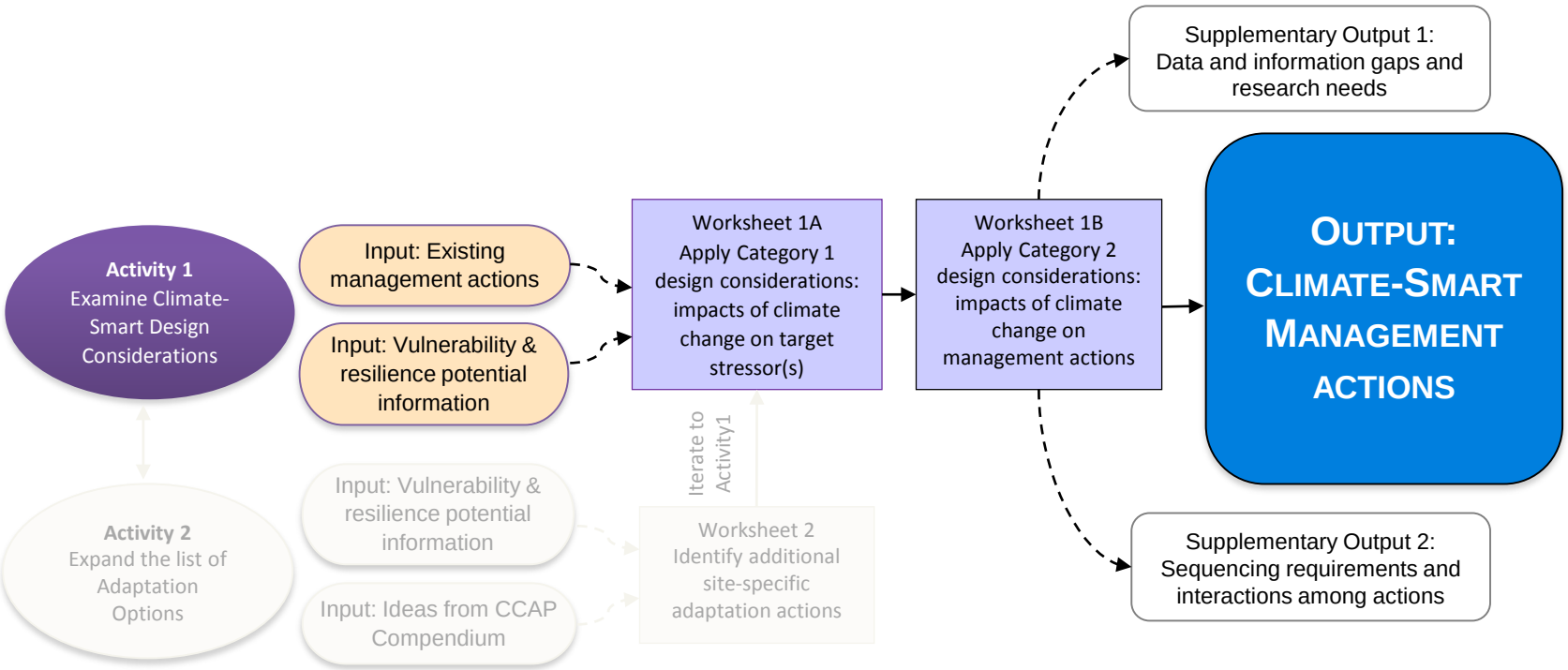
Two categories of design considerations are required:

- How will climate change directly or indirectly affect how the stressor of concern impacts the system?
- What are the implications for the functionality of the management action, and how will it need to be adjusted (in terms of location, timing or structural design)?

CCAP Adaptation Design Tool: Flow Chart of Activities



Focus for Today



Activity 1: Examine Climate-Smart Design Considerations

Worksheet 1A

Category 1 design considerations: CC effects on target stressors

A1 Action number	A2 Existing Management Action	A3 Stressor(s) of Concern	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	Sediment/ nutrients	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

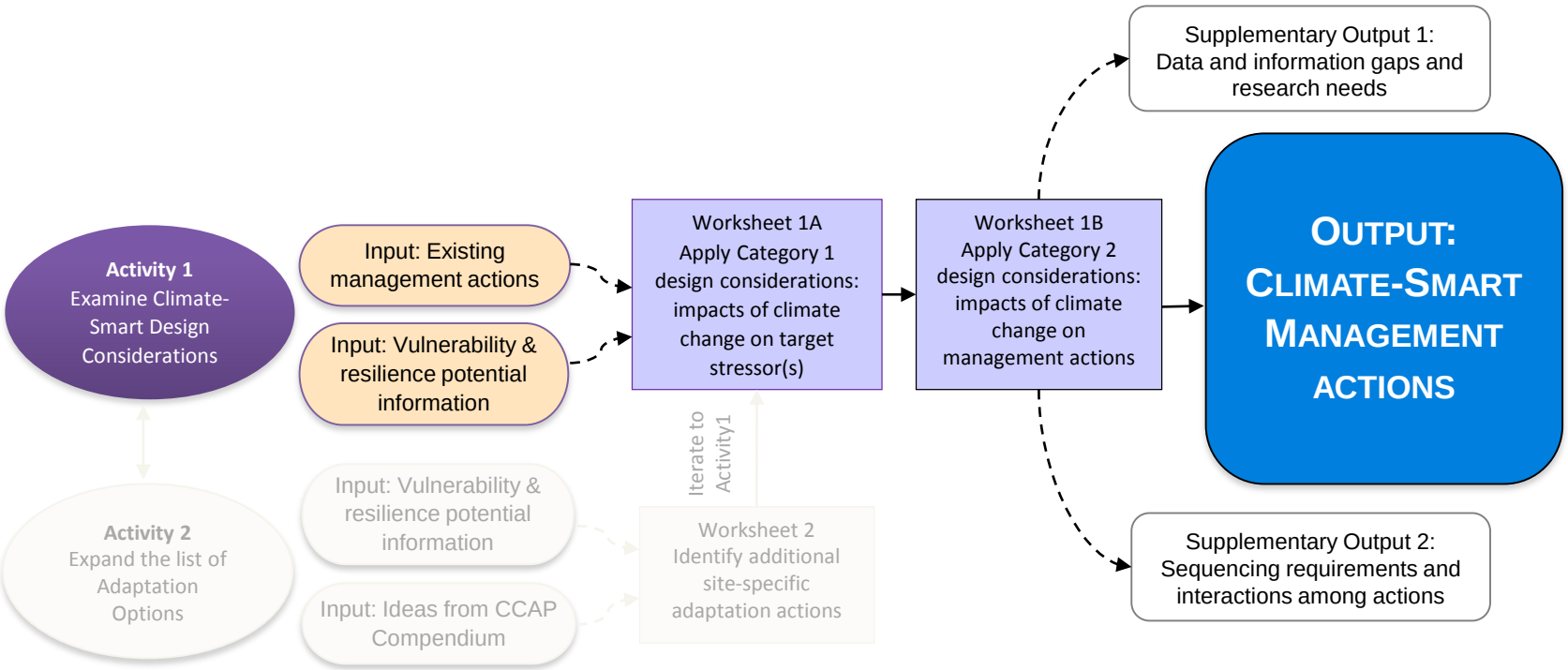
Activity 1: Examine Climate-Smart Design Considerations

Worksheet 1B

Category 2 design considerations: CC effects on management actions

B1 Action number	B2 Existing Manage-ment Action	B3 Changes in effectiveness of action due to: climate impacts on stressors	B4 Changes in effectiveness of action due to: climate impacts on management action	B5 Timeframe or constraint for using the action (e.g., urgency, longer or shorter term)	B6 What changes are needed to adapt the action (place, time, design)	B7 Climate-Smart Management Action	B8 Notes
1	Install terraces adjacent to dirt roads	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	Need to adapt action spatially, design terraces to withstand extreme events	Install terraces resistant to extreme events adjacent to targeted roads	How heavy a rainfall event will destroy a standard terrace?

Focus for Today



Supplementary Output 2: Sequencing and Interactions Among Actions

SO 2

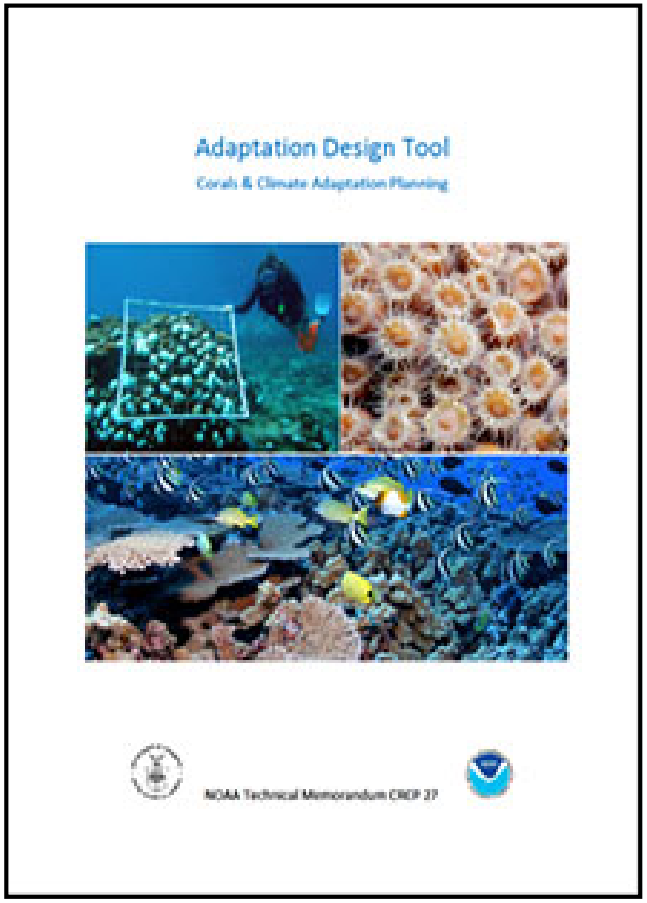
Analyze sequencing and interactions among actions

1 Action number	2 Existing Management Action (Original)	3 Climate-Smart Management Action	4 Interactions (interdependency, redundancy, conflict, + synergy)	5 Sequencing (overlap requirements, prerequisites, temporal implementation)	6 Notes
1	Install terraces adjacent to dirt roads	Install terraces resistant to extreme events adjacent to targeted roads	Interdependency: needs to be additive with water bars for success Redundancy: mutually exclusive with water basins Conflict: *?* + Synergy: with treatments and standards for dirt roads	Lifetime of terrace is 5-10 yrs; what is lifetime of water bars? Need to plan ahead for strategic placement coordinated with simultaneous installation of water bars	Terraces alone might not be able to do the job without water bars. Or even if they could in theory, they might be too expensive, but together with cheaper water bars, could fewer terraces still be effective?

Adaptation Design Tool User Guide (2017)

- Worksheets, instructions, examples
- Advice on how to use the tool
- Appendix of resources & lessons learned

Under Construction for August 2017: Online learning module hosted by TNC!



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

Try it!

Worksheets 1A & 1B (60 minutes)

- Study the vulnerability overview
- Review the completed example action provided
- Work on filling out the action that has not been completed
- It is okay to move back and forth between worksheets!
- Be prepared to report out in full-group discussion

**A facilitator will be available to answer questions and prompt discussion*

Discussion

Full group discussion (20 minutes)

Feedback

- *How did it go?*
- *Can you see how the type of information coming out of this tool could be useful to you?*
- *Suggested improvements for using the tool?*

Next steps

- *How might the tool be applicable to your planning process?*
- *Did you gain any new insights through exploration of the tool?*