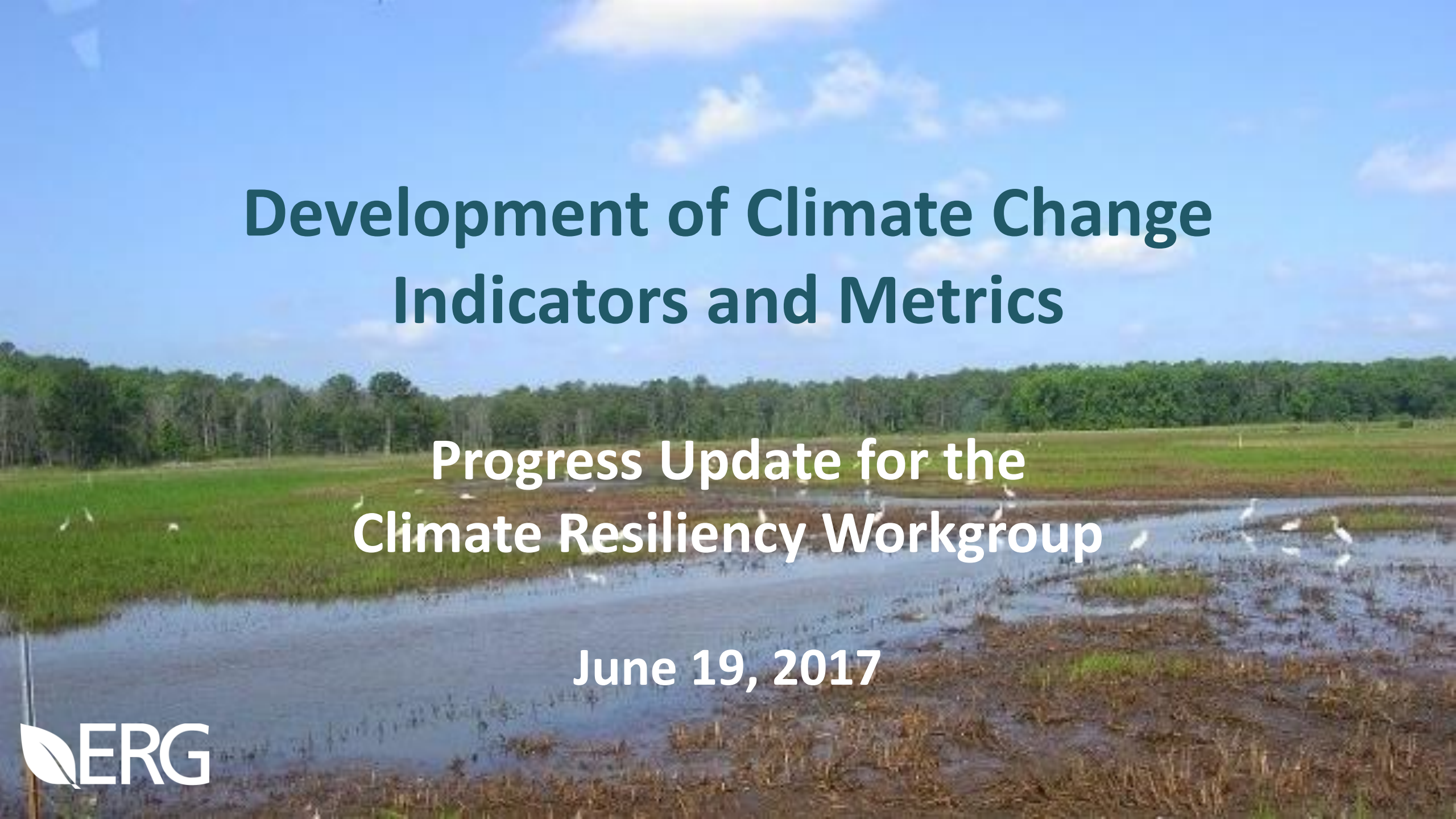

Development of Climate Change Indicators and Metrics

Progress Update for the Climate Resiliency Workgroup

June 19, 2017

ERG

Project Goals

- Develop a suite of climate-related indicators that can be used to track and analyze trends, impacts, and progress towards advancing “climate resiliency.”

- Specifically, be able to track progress towards the climate resiliency goal in the 2014 Watershed Agreement:
  - **Goal:** Increase the resiliency of the Chesapeake Bay watershed, including its living resources, habitats, public infrastructure, and communities, to withstand adverse impacts from changing environmental and climate conditions.
    - **Monitoring and Assessment Outcome**: Continually monitor and assess the trends and likely impacts of changing climatic and sea level conditions on the Chesapeake Bay ecosystem, including the effectiveness of restoration and protection policies, programs, and projects.
    - **Adaptation Outcome**: Continually pursue, design, and construct restoration and protection projects to enhance the resiliency of Bay and aquatic ecosystems from the impacts of coastal erosion, coastal flooding, more intense and more frequent storms, and sea level rise.

Indicator Development Process

Step	Timeframe
Establish framework (categories, definitions, criteria)	May 2017
Compile lists of potential indicators and data sources	May-June 2017
Evaluate candidate indicators against the criteria	June-July 2017
Gather feedback and prioritize candidate indicators	August-October 2017
Develop implementation plan	Dec. 2017-January 2018
Develop the top three to six indicators	March-April 2018
Compile final results	May-July 2018

Proposed Framework for This Project, Part 1

- Standard process for developing indicators

- Agreed-upon definition of “indicator”:
  - Numerical value derived from actual measurements
  - Trends over time represent or draw attention to underlying trends in the condition of the environment or measure progress towards a desirable state or condition

Proposed Framework for This Project, Part 2

Look for three types of indicators:

Physical climate trends

Ecological and societal impact

Programmatic progress towards resilience

Proposed Framework for This Project, Part 3

“Must-have” criteria:

- Relevant topic
- Cover the Chesapeake region
- Multiple years of data
- Actual observations
- Credible methods
- Data quality and integrity
- Objective
- Uncertainty must be known
- Transparent and reproducible
- Feasible to develop
- Peer-reviewed data*

“Nice-to-have” criteria:

- Fit with other indicators
- Many measurement sites
- Downscaled data
- Long-term records (30+ years)
- At least annual frequency
- Consistent methods
- Low uncertainty
- No major limitations
- Understandable by non-scientists

Lists Compiled to Date

- Indicator topics
  - A mix of known indicators, known data sets, and other topics that might or might not have data (TBD)
  - Streamlined version with topics sorted into bins
  - Master version with more details about known indicators and data sources
  - A “living matrix”

- Monitoring networks
  - Ongoing programs that can support indicators that continue to be tracked over time
  - Has informed the topic list
  - Later, will inform assessment of feasibility and data quality

Our Current Stage: Refining and Focusing the List

- 200+ topics; more could be added
- For efficiency, want to focus the list before the next few time-consuming steps:
  - Searching for details about data availability
  - Screening candidate indicators against the criteria
- Focus on topics that will add the most value as indicators
  - Within project scope

Request for Input Today

1. **Homework**
   - Initial thoughts on scoring exercise
   - Questions?

2. **“Top 10” exercise**
   - Each select 10 most useful topics in each bin
   - Keep project scope in mind (e.g., Watershed Agreement goals and outcomes)
   - Discuss results

3. **Additional topics?**
   - After reviewing the lists in detail, are there any other topics we should add?
   - Particularly type 3 (resilience) indicators?

Request for Input After Today

We will share an updated topic list, partially populated with more details (existing data sources and indicators) and narrowed to fewer rows based on today's input. For each row, we'll be interested in anything you can add in the following areas:

1. **Existing data sources** (beyond what's already noted)
2. **Existing indicators** (beyond what's already noted)
3. **Thoughts on data quality and indicator limitations**
4. **Better alternatives?**
5. **Other comments**

Process and Timeframe for Input

- Use the file that will be provided later this week
- Provide comments or additions in the Excel files
- Submit comments to Zoe Johnson
- Provide input by June 30

Indicator Development Process

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Comments or Questions?


Thank you!