# Technical Guidance for NCA Authors:
# Risk Framing for Key Vulnerabilities
# Assessing Confidence Levels and Uncertainties

**Usage note:**

Author teams should follow the steps in Part A (Risk Framing) to describe the risks (consequences and likelihood) of key vulnerabilities. They should follow the steps in Part B (Confidence Levels and Uncertainties) for the 3-4 most important findings in their chapter. Risk framing is described here first, even though the guidance on confidence levels and uncertainties will apply to a broader range of findings, because authors have indicated it is easier to approach risk framing if they are presented in this order. You can use the guidelines in Part B to describe your level of confidence in an important finding even if you don't frame a conclusion in terms of risk as described in Part A.

## Part A: Risk Framing

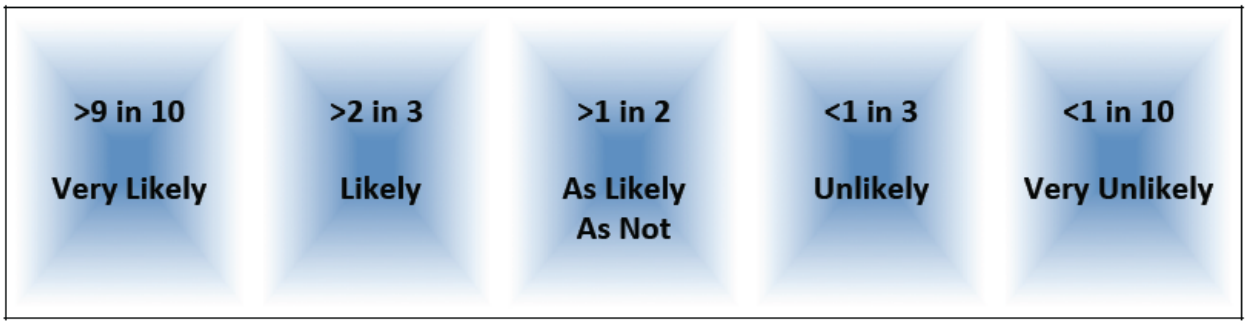
Some potential impacts could be of such high consequence for society that stakeholders consider them to be "key vulnerabilities" because of their magnitude, timing, persistence/irreversibility, limited potential for adaptation, distributional aspects, likelihood, or other attributes. For 1-2 of these high consequence impacts, please estimate the risk presented as clearly as possible. As indicated below, this involves (i) using a well-defined metric to describe the consequences of the impact (quantitatively, if possible) and (ii) using standardized terms/ranges to estimate the likelihood the impact will occur. Authors are encouraged to use the climate information provided in the relevant "trends and outlook" document in making these judgments.

1. Describe an impact that is a potential or existing source of societal concern.

2. Estimate the consequences of that impact (numerically if at all possible) for climate change associated with the B1 and A2 scenarios (as described in the relevant regional or national climate change "trends and outlook" document, or another source if you prefer).

- Define the metric of consequence (e.g., economic consequences, human health consequences, etc., …) and describe the rationale for approach selected.
- In defining the consequences, consider both the potential for adaptation, not just the magnitude of impacts associated with different climate futures.
- If possible, describe additional consequences that result from the interactions of climate-induced impacts with other stresses such as air/water pollution, land-use fragmentation, or biodiversity loss.

3. Using the climate information provided in the relevant regional or national climate change "trends and outlook" document (or another source, if you prefer), describe how likely it is that the consequence will materialize under climate change associated with the B1 and A2 scenario for the periods centered around 2035, 2055, and 2085. Use the following probability terms and ranges below. It is okay to use just the numerical ranges, but do not use the words alone since they have no standardized meaning.




4. Summarize this information and describe the criteria you have used to define this as a "key vulnerability".

**Pat B: Confidence Levels and Uncertainties**

Readers of the report wish to understand how confident lead authors are in the most important findings of their chapters. Follow these steps to carefully frame and assess your confidence in the 3-4 most important conclusions of your chapter (*a longer resource document for confidence and uncertainty characterization is also available for your use*.) These steps are relevant to a broad set of conclusions that address the topics identified in the Global Change Research Act, including advances in the state of knowledge since the 2009 report. Note that users of the report may wish to have even limited information because of the timing of a related decision or the importance of the issue, even if your confidence level is low.

1. Frame the issue or pose the question, keeping in mind one or more types of stakeholder decisions the information is intended to inform.

2. Rate the evidence base, evaluating the type, amount, quality, and consistency of evidence. Summarize the level of evidence as strong, moderate, suggestive, or inconclusive.

3. Considering the full gamut of evidence, formulate well-posed conclusions. For quantitative estimates, report a range in which you judge there is a 90 percent chance that the true value falls and then develop a "best estimate" if there is enough evidence to warrant it. Describe high consequence, low probability impacts that may fall outside the 90 percent range.

4. Identify key uncertainties and briefly describe the research, monitoring, etc., needed to improve the evidence.

5. Given the potential uses of the information identified in step 1, assess your confidence in the conclusion by considering (i) the quality of the evidence (from step 2) and (ii) the level of agreement among experts with relevant knowledge. Use the confidence rating and associated graphic below.

| Confidence Level | Example combinations of factors that could contribute to this confidence evaluation |
|---|---|
| High | Strong evidence (established theory, multiple sources, consistent results, well documented and accepted methods, etc.), high consensus |
| Medium High | Moderate evidence (several sources, some consistency, methods vary and/or documentation limited, etc.), medium consensus |
| Medium Low | Suggestive evidence (a few sources, limited consistency, models incomplete, methods emerging, etc.), competing schools of thought |
| Low | Inconclusive evidence (limited sources, extrapolations, inconsistent findings, poor documentation and/or methods not tested, etc.), disagreement or lack of opinions among experts |

6. If you wish to indicate how likely an outcome is, use the language and approach described in step 3 of the risk framing guidelines above.

7. Prepare a traceable account of a sentence to a paragraph in length that describes in simple language the main factors that support the conclusion and your level of confidence. If the conclusion is framed in terms of risk, confirm the criteria by which you have concluded that this represents a “key vulnerability” and provide a traceable account of your selection process.