

PENNSYLVANIA CLIMATE CHANGE IMPACTS ASSESSMENT OUTLINE

The outline describes the major sections and content of the 2021 Impact Assessment (IA) update, including a risk-based approach. The report will be organized by climate risk and detail the likelihood and consequences of each climate risk. This will allow for a prioritization of risks and impacts that can directly inform the development of the CAP.

- Executive Summary
- Introduction
 - Purpose and objectives:
 - Purpose of the Impacts Assessment/Act 70
 - How Pennsylvania is being impacted by climate change
 - How environmental justice communities are impacted by climate change, as applicable
 - How the IA directly informs priority adaptation strategies in the CAP
 - Identification of relative timing and severity of impacts, along with the lead times needed for adaptation
 - Aligning with CAP focuses: environmental justice and equity, other co-benefits (e.g., social and environmental impacts listed in scope below)
 - Summary of updates relative to previous IAs
 - Using the best available science to inform the impacts assessment
 - Climate projections were updated to reflect latest available modeling
 - Benefits of transitioning to a risk-based impacts assessment approach
 - What will the transition look like?
 - High level overview of methodology (e.g., illustrate steps with process figure)
 - Benefits: Pennsylvania can then begin comparing relative timing and severity of expected impacts for a stronger tie-in to the Climate Action Plan (e.g., IA will identify priority adaptation needs for the CAP)
 - Scope
 - Climate hazards (final set TBD, but examples include increasing temperatures, heat waves, changes in precipitation patterns, flooding, water shortage, ecosystem shifts)
 - Focus areas: environmental justice and equity, human health, economy (including recreation and tourism and agriculture), forests, ecosystems, and wildlife
 - Geographic scale: statewide with discussion of regional variations (e.g., urban or rural, proximity to waterways), populations, industries, or other areas disproportionately affected
 - Timeframe for assessing impacts
- Expected Climate Changes in Pennsylvania
 - Provided updated mid-century and end of century climate projections for Pennsylvania over a range of emissions scenarios, based on latest available climate modeling

- Risk assessment will emphasize mid-century impacts, but comment on end of century impacts as it relates to long range infrastructure planning
 - Description of uncertainty associated with projections
 - Provide projections in key sector-relevant variables (e.g., extreme heat days, heating degree-days and cooling degree-days, growing degree-days)
 - Summary of Overall Climate Risks
 - Description of key take-away and overall risks
 - Summary of highest priority risks based on relative likelihood and consequence (e.g., overall risk by hazard, hazard/sector combinations with greatest likelihood and consequences)
 - Prioritized ranking of climate risks per consequence category
 - Overview of potential economic impacts and economic opportunities created by potential need for greenhouse gas mitigation strategies.
 - Climate Risk Profiles (by hazard)
 - For each profile (e.g., Extreme Heat):
 - Overview highlighting the consequences of greatest concern
 - Consequences by sector
 - Summary table of risk ratings and justification (e.g., likelihood by 2050 and consequences across categories) (see example under Supplementary Information on last page)
 - Likelihood summary
 - Overall state of science and expected timing of changes and consequences
 - Process for arriving at 2050 likelihood rating (on a scale of 1-5, Unlikely to Almost Certain)
 - Consequence summary
 - Summary and justification for ratings (overall, and for the following sectors) (on a scale of 1-5, from Minimal to Catastrophic):
 - Human health
 - Economy
 - Agriculture
 - Recreation and tourism
 - Other economic activity (e.g., energy sector)
 - Built infrastructure
 - Forest, ecosystems, and wildlife
 - Identification of specific geographies, populations, industries, or other areas disproportionately affected
 - Cost of inaction on a rough order of magnitude (high, medium, low)
 - Conclusions and Recommendations
 - Recap of overall findings
 - Recommended adaptation priorities
 - Identification of research gaps, if any, or recommendations for subsequent IA update
 - References

- Appendix A – Key Terms
- Appendix B - Risk Assessment Methodology
 - Introduction
 - Overview of overall risk assessment frameworks (e.g., ISO 31000)
 - Step 1: Establish the context
 - Step 2: Identify potential risks
 - Initial list of risks considered for the assessment (drawing from previous IA reports)
 - Prioritization process (reasonably likely to occur within mid-century timeframe, likely to result in potentially major or catastrophic consequences, have adequate information to conduct risk assessment)
 - Step 3: Analyze risks
 - Likelihood rating scale (TBD – example shown below)

Likelihood	Rating	Criteria for <u>Discrete</u> Climate Hazards	Criteria for <u>Ongoing</u> Climate Hazards
Almost certain	5	Event is expected to happen about once every two years or more frequently (i.e., annual chance $\geq 50\%$).	Event is almost certain to cross critical threshold.
Likely	4	Event is expected to happen about once every 3-10 years (i.e., $10\% \leq$ annual chance $< 50\%$).	Event is expected to cross critical threshold. It would be surprising if this did not happen.
Possible	3	Event is expected to happen about once every 11-50 years (i.e., $2\% \leq$ annual chance $< 10\%$).	Event is just as likely to cross critical threshold as not.
Unlikely	2	Event is expected to happen about once every 51-100 years (i.e., $1\% \leq$ annual chance $< 2\%$).	Event is not anticipated to cross critical threshold.
Rare	1	Event is expected to happen less than about once every 100 years (i.e., annual chance $< 1\%$).	Event is almost certain not to cross critical threshold.

- Consequence rating scale

Rating	Human Health	Economy: Agriculture	Economy: Recreation and Tourism	Economy: Other economic activity	Forests, ecosystems, and wildlife
Catastrophic (5)	TBD (e.g., # of people at risk)				
Major (4)					
Moderate (3)					
Minor (2)					
Insignificant (1)					

- Step 4: Evaluate risks
 - Risk rating matrix

Supplemental Information:

Hazard Risk Profile Summary Template			
Likelihood			
Current Rating	Rating	Justification	Confidence
Current	(1-5 rating)	1-2 sentence justification	(confidence level)
2020-2050			
Beyond 2050	(Comments on potential trends in the climate risk post-2050)		
Consequences			
Category	Rating	Justification	Confidence
Human health	(1-5 rating)	1-2 sentence justification	(confidence level)
Economy: Agriculture			
Economy: Recreation and tourism			
Economy: Other industries			
Forests, ecosystems, and wildlife			
Differential Impacts			
(comments on differential impacts to certain populations or areas in the Commonwealth)			
Potential Opportunities			
(comments on any potential economic opportunities)			
Overall Risk	Current	(Total risk score and rating)	(confidence level)
	Mid-century	(Total risk score and rating)	(confidence level)

