CLIMATE PREPAREDNESS AND RESILIENCE COMMUNITY OF PRACTICE (CPR CoP) CLIMATE ASSESSMENT AGENCY TECHNICAL REVIEW (ATR) AND POLICY AND LEGAL COMPLIANCE REVIEW (P&LCR) STANDARDS OF PRACTICE

2021

USACE CLIMATE PREPAREDNESS AND RESILIENCE

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1. Introduction

It is U.S. Army Corps of Engineers (USACE) policy to integrate climate change adaptation planning and actions into our missions, operations, programs, and projects. All Civil Works (CW) submittals require adequate review per the USACE policy (Engineer Regulation [ER] 1165-2-217, *Civil Works Review Policy*). Entrusted reviewers from the Climate Preparedness and Resilience (CPR) Community of Practice (CoP) ensure that the products developed by the PDT are technically correct and policy compliant. An effective CPR reviewer applies technical expertise to support the success of the project delivery team (PDT) and the completion of the product being developed. This document summarizes review requirements and best practices for both CPR Agency Technical Review (ATR) and Policy and Legal Compliance Review (P&LCR).

2. Summary USACE Review Structure

ER 1165-2-217, *Civil Works Review Policy*, (1 May 2021) establishes policy and procedures for USACE CW review. See Appendix A for a more detailed summary of USACE's review structure and policy.

2.1 Review Plan

All projects require a Project Review Plan (RP). The RP is drafted by the ATR Team Lead and identifies disciplines and individuals, to the extent possible, that will conduct the reviews. In addition to identifying the CPR ATR team member, the RP also lays out review expectations and a clear timeline for the review. The review timeline specifies the time allowable to make and resolve comments. Some RPs discuss P&LCRs, while others do not identify the PL&CR team composition.

2.2 District Quality Control Review

District Quality Control (DQC) is the backbone of USACE's quality process. All climate assessments must undergo DQC review. The DQC consists of an internal review process of basic science and engineering work. The DQC of the subject should include checking all CPR tool outputs (e.g., Nonstationarity Detection Tool output, Sea-Level Change Curve Calculator output), documentation, computations (e.g., data preprocessing, datum adjustments), and graphics. The DQC reviewer should also apply the relevant CPR review checklists (see Appendices E and F).

2.3 Agency Technical Review

An ATR is conducted to "ensure the quality and credibility of the government's scientific and technical information" (ER 1165-2-217). USACE personnel outside of a study's home district conduct ATRs on decision documents, and the ATR Team Lead manages the ATR process.

At the ATR kickoff meeting, the ATR Lead provides a draft version of the CPR assessment, as well as the overall study report to the CPR ATR team member. Supporting documentation and information requiring ATR may include relevant information from other Federal agencies, environmental compliance products, in-kind services provided by non-Federal sponsors, and Architect and Engineering Firm (A—E) products.

ATR occurs subsequent to the DQC review. DQC review comments, responses, and resolution must be provided to the ATR team member. As part of the ATR, DQC documentation is evaluated to ensure adequate performance of the DQC and that all substantive DQC concerns were addressed (ER 1165-2-217). If the climate assessment ATR team member is asked to review any products for which the DQC is incomplete, the ATR Team Lead should return those products to the PDT "with no action" and provide general guidance for revision.

2.4 Policy and Legal Compliance Review

Many USACE studies must undergo a P&LCR. As part of the P&LCR process, all decision documents are reviewed throughout the study process to confirm their compliance with law and policy (DPM 2019-01). P&LCR focuses on verifying compliance with Army policies; in particular, policies on analytical methods and the accuracy, interpretation, and presentation of findings in decision documents. The P&LC Review Manager (RM) manages the policy review for the project and tracks the review progress using Project Monitor.[1] Additionally, the RM coordinates any changes in P&LCR team membership. Typically, there are no kickoff meetings for the P&LCR; therefore the RM provides all information for the review (location of review documents, review points of contact [POCs], and other details of the review) to the P&LC reviewers. The P&LC reviewers are required to review milestone meeting materials and actively participate in all milestone meetings.

[1] Project Monitor is a P2-based HQ tool used to plan reviews, assign reviewers, and track the completion of product reviews, including milestones meetings. Detailed information on P&LCR team composition, RM roles and responsibilities, and Project Monitor are further described in DPM 2019-01 Policy and Legal Compliance Review.

2.5 Review Funding

Resources should be earmarked upfront to support the CPR assessment process and review. The PDT Project Manager (PM) is responsible for providing funds for ATR reviews. The ATR Team Lead should provide the reviewers with the scope of the study, the ATR charge, a list of DQC review POCs, and the expected length of documentation that will require review. Based on this information, the CPR ATR team member should request adequate funding to complete the review and provide the PM and ATR Lead with a financial POC, an organizational code, and a technical POC to facilitate the creation of a cross-labor code. The ATR Lead and reviewer should ensure that the cross-labor code is fully funded prior to the start of the review.

A P&LCR may or may not be General Engineering (GE) funded and thus may not require this information. In the event that the P&LC reviewer request comes from an organization outside of USACE Headquarters (HQ) or the major subordinate command (MSC), the organization may contact the Review Management Organization (RMO) or the CPR CoP Lead for information regarding funding.

2.6 Sequence and Timing of Reviews

Decision document reviews are milestone driven and managed by ATR Team Leads and P&LC RMs. DQC and ATR are conducted sequentially. ATR and P&LCR are conducted concurrently for most, but not all products. For feasibility studies, the ATR and P&LCR usually occur after the tentatively selected plan (TSP) milestone meeting. However, the timing and sequence of ATR and P&LCR are not always the same. Thus, it is sometimes difficult to predict review timing. The figure in Appendix B (ATR and P&LCR Flowchart) provides a general representation of project delivery and when to expect an ATR and P&LCR.

Reviews typically occur at stages of work where a product is available. Completion of ATR and P&LCR is required prior to the Agency Decision Milestone (ADM). The ADM presents a plan for decision-maker approval that best supports the agency's plan of action to address the water resource issue.

Following the ADM approval, both ATR and P&LCR teams have further responsibilities to review and ensure all comments are sufficiently addressed in the draft final feasibility study. This final backcheck is sequential and begins with the completion of the DQC review, followed by the close out of the ATR and subsequently, the P&LCR.

Throughout the duration of a study, unanticipated interruptions can occur that require alteration of the project schedule and delivery timeline. To remain cognizant of review timing and the duration of review, it is advisable to consult early and often with the appropriate review Leads for the review.

3. Content Requiring Climate Change Review

All designs and decisions having an extended decision time frame (i.e., not for short-term water management decisions) require climate assessments and consequently, CPR review. Routine, periodic updates of portions of documents unrelated to climate do not require climate assessments or reviews. However, if the project or study establishes a new or significantly changed standard operating or management procedure, then a climate assessment and subsequent review is required. Appendix C includes more detail related to when the CPR CoP requires a climate assessment. It also discusses climate assessment requirements specific to National Environmental Policy Act (NEPA) documentation.

For feasibility studies, detailed discussion of the climate change assessment will likely occur in a separate climate change appendix, or in the hydraulics and hydrology (H&H) engineering appendix, with summary discussions of the findings in the appropriate sections of the main feasibility report document. The residual risk from climate change discussion, a key element of the climate assessment, should be included in the description of the TSP in feasibility studies or in the plan description for other studies. The intent is to explicitly describe how project performance will be impacted by climate change and whether or not the project design takes these performance changes into account. This section informs the reader of future hazards so they have the option to take additional actions to reduce future harm from climate change.

The scope of the climate assessment review encompasses the portion of the report or analysis that pertains to the requirements laid out by the USACE's overarching climate adaptation policy. To comply with this USACE policy, PDTs must assess climate change impacts when a study involves inland hydrology, coastal analysis, and/or a boundary condition that may be impacted by changes to sea level or other changes to hydroclimatic conditions (e.g., flood frequency and intensity). NEPA documents and environmental compliance products must consider the impacts of the project on climate change. Thus, it is critical that climate change-related content within NEPA documentation be reviewed as part of the CPR DQC review, ATR, and P&LCR. (See Appendix D for a list of CPR-specific guidance.) The review should be conducted at an appropriate, scalable level based on the complexity, size, and level of risk associated with the product and project phase. The RM, CPR PDT member, ATR team member, and P&LCR team member should agree on the appropriate level of scaling as early as possible in the plan formulation process. Additional information on scaled reviews are located in ER 1165-2-217.

3.1 ECB 2018-14 Climate Assessment for Inland Hydrology

USACE requires an evaluation of the effects of climate change on inland hydrology using the framework laid out in Engineering and Construction Bulletin (ECB) 2018-14, *Guidance for Incorporating Climate Change Impact to Inland Hydrology in Civil Works Studies, Designs, and Projects*. This guidance provides a framework for assessing the vulnerability of a project or study area to hydroclimatic changes consistent with both risk-informed decision-making (RIDM) and USACE SMART planning guidance. The analysis required by ECB 2018-14 is not expected to alter the numerical results of the calculations made for other non-climate aspects of the required hydrologic/hydraulic analysis. However, the assessment required by ECB 2018-14 can inform the decision process.

ECB 2018-14 does not preclude the pursuit of a more in-depth analysis (e.g., application of site specific climate changed hydrology) for a study that has long-term, significant impacts; is large in scale/scope; or has a high level of risk associated with it. An ECB 2018-14 assessment still needs to be performed even when a more detailed assessment is desired and scoped with assistance and concurrence of CPR CoP Leads. The scope and scale of the inland hydrology climate assessment should mirror the scope and scale associated with the study it supports.

3.2 Climate Assessment for Sea Level Change

USACE requires an assessment of the direct and indirect impacts of changing sea level on project performance and stability as outlined in ER 1100-2-8162, *Incorporating Sea Level Change in Civil Works Programs,* and Engineer Pamphlet (EP) 1100-2-1, *Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation.* ECB 2018-14 further specifies that an evaluation of changing sea level should is necessary for all study extents including elevations less than 50 feet NAVD88.

Sea level change analysis is required for all USACE coastal activities (defined as those within the zone of tidal influence) and for all fluvial studies where backwater effects from sea level change at the downstream boundary could influence the water surface at the project site. USACE employs an envelope of future sea level conditions (represented by the three USACE sea level scenarios) to capture the uncertainty in the future rate of change. Consideration of sea level impacts may take several forms depending on the scale and consequences of the action. The analysis should determine the sensitivity of alternative plans and designs to changes in sea level and future datum changes, how this sensitivity affects project risk, and what measures should be implemented to adapt the selected plan and minimize adverse consequences while maximizing benefits.

3.3 In-Depth Assessments of Climate Change Impacts for Inland Hydrology

All more in-depth assessments of climate change conducted using projected, climate-changed hydrology in support of inland hydrologic analysis need written prior approval by the CPR Lead: Will Veatch (William.C.Veatch@usace.army.mil: Phone: 504-862-2858). CPR Lead approval is also required to present or apply output from a data source that has not previously been recommended or reviewed by the CPR CoP when that data is being used in support of the decision-making process. The decision to present results derived from an alternate, previously unapproved data source or to pursue a more in-depth assessment should be coordinated with the CPR CoP prior to the Alternatives Milestone Meeting (AMM).

3.4 Climate Assessment for Compound Events

When extreme climate-driven hydrological events occur either in close succession or simultaneously, the adverse impacts to the environment and infrastructure can be amplified beyond what would have occurred as a result of any one of the contributing events. The combination of these events is often referred to as a compound event. Accounting for adverse impacts related to compound hydrologic events in the existing or future, with and without project condition, is an essential consideration for coastal or riverine communities and their associated infrastructure. Consequently, it is the responsibility of the CPR project engineer and the CPR reviewers at a DQC, ATR, and P&LCR level to realize when these situations are present. Defining the threat compound events present to existing and planned infrastructure is critical to the CPR evaluation.

4. Timing of CPR Assessment/Review and Risk-Informed Decision Making

The CPR ATR team member and P&LC reviewer should be identified at the outset of the study, prior to the AMM. As part of the AMM presentation, the PDT should briefly discuss the primary hydroclimatic and/or coastal processes related to study area problems and opportunities. The PDT needs to indicate whether or not a sea level change assessment is necessary and whether the PDT is conducting a more in-depth hydrologic assessment of climate change using projected climate changed hydrometeorology. If a quantitative assessment of climate change's impacts on inland hydrology is being pursued, the PDT should discuss whether consultation with the CPR CoP Leads has occurred.

The CPR assessment, DQC, and ATR should be conducted at the earliest stage possible to incorporate the information into plan formulation and RIDM. This ensures that future without project conditions account for observed and expected changes in climate and sea level. Early engagement of the CPR reviewers is necessary to avoid or minimize any delays in completion of the study effort (see Figure 1).

The CPR assessment should help inform the decision-making process and thus needs to be conducted before alternatives are fully formulated or evaluated. The sea level change assessment is quantitative and can directly impact study design. The ECB 2018-14, inland hydrology assessment should be used to inform the decision-making process by identifying constraints, risks, and uncertainties associated with potential climate-changed, future conditions. The CPR assessments can highlight opportunities for the PDT and local study partners to build resilience to the effects of changing climate into water management plans and engineering designs.

To the extent practical, any reviews should not extend the schedule, but should be embedded in the development of the product. For a planning study, the CPR assessment should be included in all steps of the USACE risk-informed planning process. Consideration of potential climate change and/or sea level change impacts should also be evident in plan formulation, description of the recommended plan, and if necessary identified within the project risk register. It is very important that the CPR reviewer be familiar with the study schedule so they can attend and provide input at project milestone meetings early in plan formulation. Effective CPR inclusion at any stage of project planning and delivery is a shared responsibility of the CPR PDT member and both the ATR and P&LCR team members.

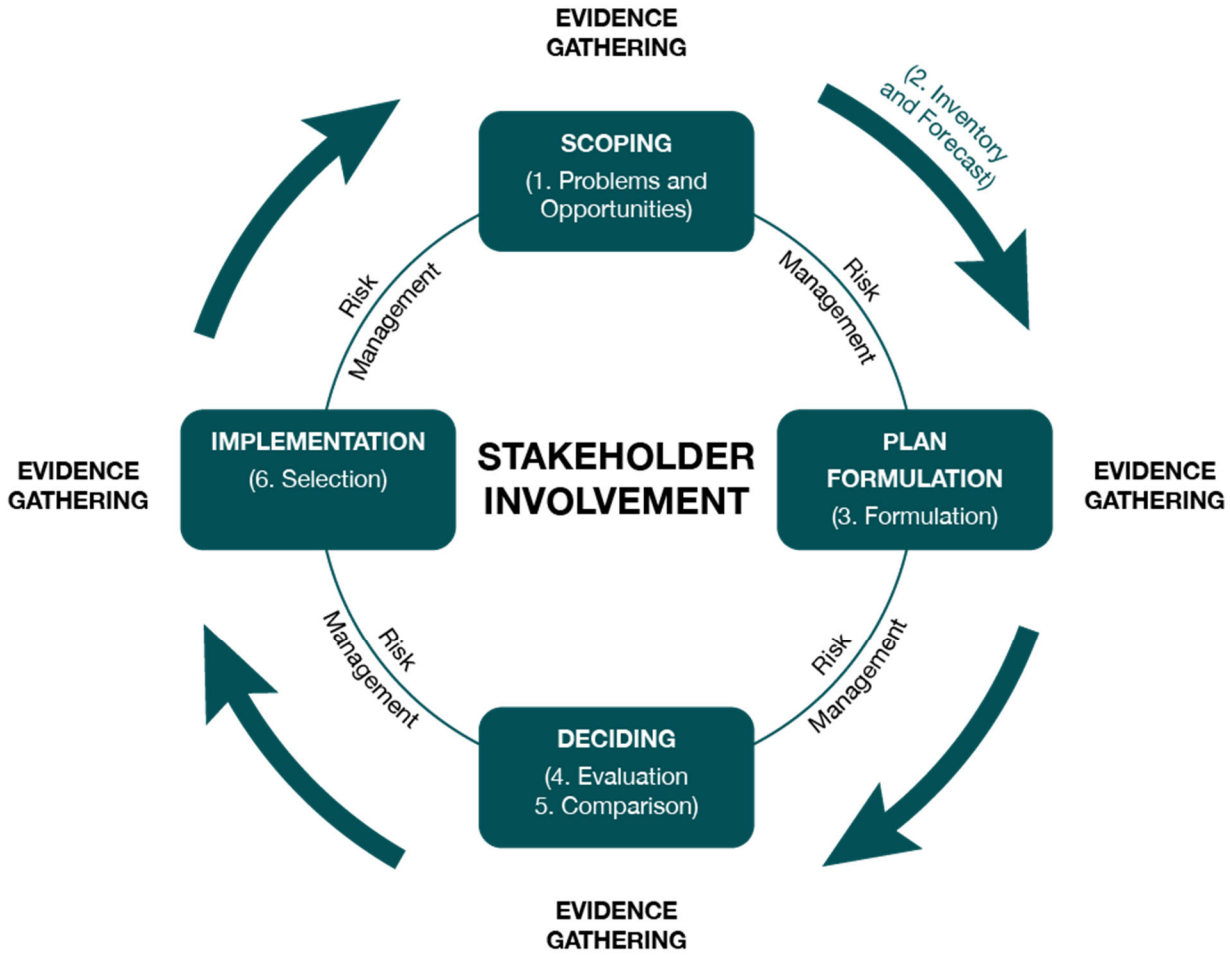


Figure 1. The USACE iterative, risk-informed planning process.

5. CPR Reviewer Engagement

The CPR CoP Lead is responsible for assigning CPR agency technical reviewers and P&LCR team members to projects. For ATRs, the RMO provides a request to the CPR CoP Lead to identify an ATR team member. The RMO can be either the MSC or a center of expertise. Upon assignment to the ATR team, either the CPR CoP Lead, ATR Team Lead, or Chief of the RMO notifies the CPR reviewer of their appointment. In coordination with the CPR CoP Lead, the MSC Chief of Planning and Policy in collaboration with the Chief of Office of Water Policy Review (OWPR) select the P&LCR team member from among qualified CPR policy reviewers. Before committing to being on an ATR or P&LC team, the reviewer must confirm they are available to complete that review.

6. In-Progress CPR Review (Optional/Recommended)

Prior to the completion of a substantial amount of work (<15%) on the climate assessment, the PDT should consider having an in-progress webinar with the CPR ATR team member to ensure the proposed approach to carrying out the climate assessment is technically sound and policy compliant. Appropriate PDT members and DQC reviewers should participate. During the webinar, the CPR ATR team member should provide an overview of CPR guidance relevant to the particular study, as well as an overview of lessons learned from previous ATRs.

The ATR team member should also make the PDT aware of resources available to generate the climate assessments. The CPR ATR team member should provide the web-based locations of all relevant USACE CPR tools and resources, as well as supporting documentation (user manuals, web-based training, etc.). The CPR ATR team member should provide the PDT and the DQC reviewer with the relevant CPR review checklists (see Appendices E and F).

7. Climate Review Team Member Qualifications

7.1 ATR Climate Review Team Qualifications

All CPR ATR team members must be certified in the USACE Engineers' Reviewer Command Training Plan (CTP) and Certification and Access Program (CERCAP) tool.

7.1.1 CTP CERCAP

To become certified, prospective reviewers must register and self-nominate in the CTP CERCAP tool. Within CERCAP there are two reviewer designations. A level 1 certification qualifies individuals to conduct ATRs of straightforward climate and sea level change assessments. A level 2 certification qualifies individuals to conduct ATRs of more complex assessments (e.g., compound event analysis, total water level assessments, and/or in-depth assessments of climate change impacts on inland hydrology). The reviewer registration process in CTP CERCAP involves the reviewer, their supervisor, and the HQ CPR CoP Lead. For the reviewer to be qualified to conduct reviews, their CERCAP certification must be current. See Appendix G for more details about the CPR reviewer certification process.

7.1.2 ATR Reviewer Qualifications for ER 1100-2-8162 and ECB 2018-14 Assessments

The current climate assessment guidance focuses on elements of analysis and design typically executed by the Hydraulics, Hydrology and Coastal Community of Practice (HH&C CoP). Being able to adequately review the application of ER 1100-2-8162 requires that the reviewer has expertise in CPR and a background in coastal processes, tidal datums, and coastal and hydraulic modeling. To tie the results of the ECB 2018-14 to the project decision-making process, reviewers should have expertise in inland hydraulics and hydrology (H&H) as it relates to the project or study.

Presently, the majority of the CPR ATR and P&LC reviewers have expertise in both HH&C and CPR. As the CPR CoP's guidance continues to evolve and standards of practice are developed specific to other CoPs within USACE, the CPR CoP will broaden its required review qualifications and cadre of reviewers to meet these needs.

To obtain certification as a Level 1 reviewer, CPR ATR team members must meet the following qualifications (the CPR CoP Lead can make exceptions on a case-by-case basis):

- Five years or more of related experience
- Active engagement in the CPR CoP via participation in the CoP's monthly webinar series
- Authorship of two or more climate assessments
- DQC review of two or more climate assessments
- Professional Engineer, Professional Hydrologist OR minimum M.S. in Hydrology, Engineering, Geology (sediment transport focus) Oceanography, or Meteorology OR PhD in a related field

To obtain certification as a Level 2 reviewer, CPR ATR team members must meet the following qualifications (the CPR CoP Lead can make exceptions on a case-by-case basis):

- Meets Level 1 requirements
- Seven years or more of related experience
- Subject matter expert (SME) as recognized by the CPR CoP Lead
- Five or more CPR ATRs completed

7.2 P&LCR Reviewer Qualifications

The review credentials for a CPR P&LCR team member are the same as for the CPR ATR team member and CERCAP certification is preferred. A P&LC reviewer needs to be highly experienced both as a CPR PDT member, DQC reviewer, and ATR team member. In addition to those qualifications identified for an ATR team member, the P&LC reviewer must shadow a senior CPR policy reviewer. This shadowing process promotes a better understanding of the unique perspective required for policy compliance review and ensures sufficient familiarity with USACE policies to certify that a study is policy compliant. The CPR CoP Lead confirms the necessary qualifications and member selection to conduct CPR P&LCR.

8. Climate Assessment Review Points of Contact

The Inland Hydrology and Coastal/Sea Level Change Review POCs serve as available resources for those conducting ATRs and P&LCRs of climate assessments. The review POCs also aid in the establishment of a series of consistent guidelines for conducting reviews. These SMEs can help answer questions related to the climate assessment review process, standards of practice, and questions related to CPR resources and guidance. The two POCs listed below will assist Dr. Kate White in supporting the overall CPR CoP review process. These representatives will also help to actively recruit and train certified climate assessment reviewers. Climate assessment review POCs are:

- **Inland Hydrology CPR CoP Climate Assessment Lead:** Chanel Mueller, PE
  St. Paul District Hydraulics and Hydrology Branch
  CPR Subject Matter Expert: Inland Hydrology
  (Email: Chanel.Mueller@usace.army.mil; Phone: 651-290-5610)
- **Coastal/Sea Level Change CPR CoP Assessment Lead:** Will Veatch, PH
  New Orleans District Hydraulics and Hydrology Branch
  Regional Technical Specialist for Climate Change Adaptation, Mississippi Valley Division
  (Email: William.C.Veatch@usace.army.mil; Phone: 504-862-2858)

9. Description of CPR ATR and P&LC Reviewer's Roles and Responsibilities

To support climate assessment DQC review, ATR, and P&LCR, the CPR CoP produces a series of review checklists. Note that while these checklists provide a baseline for review completeness, additional considerations may be appropriate depending on the project type and context. See Appendices E and F for copies of the checklists.

9.1 ATR Team Member Responsibilities

The CPR CoP's goals for the ATR are to ensure the evaluations conducted to assess the observed and expected impacts that changing climate has on our nation's water resources are technically correct and meet USACE CPR policy and guidance requirements. The ATR team member will identify and comment on assumptions that underlie the climate assessment analysis, the soundness of methods applied, and the application of climate assessment conclusions to decision making and/or design. The ATR should focus on bringing important issues to the attention of the decision makers. Review should be commensurate with project scope and funding provided. Comments should be limited to those required to ensure the adequacy of the climate assessment (issues identified with other aspects of the project should be called to the attention of the reviewer responsible for that aspect).

The climate change ATR team members should work through the ATR Team Review Lead to engage with the PDT throughout the duration of the study and be available as a technical resource. Engaging ATR team members early offers opportunities to save time and money by minimizing the potential for rework. However, care must be taken to ensure the independence of the ATR team from the production team. As noted previously, the CPR ATR team member is required to validate that DQC of the climate assessment was complete. The ATR team member should use the DQC checklists in Appendices E and F to verify the adequacy of the DQC review.

9.2 P&LC Reviewer Responsibilities

The CPR CoP's goal for the P&LCR is to ensure recommendations provided in decision documents and the supporting analyses and coordination are consistent with policy and law, and warrant approval or further recommendation to higher approval authority. The responsibility of the CPR P&LC reviewer is to confirm that a CPR assessment provided in the decision document is compliant with USACE CPR policy laid out in the published guidance. Governing policy for CPR includes the following guidance: ER 1100-2-8162 (June 2019) and ECB 2018-14 (September 2020). A list of guidance documents specific to assessing climate change impacts on sea level change and inland hydrology are included in Appendix D of this document. P&LC CPR reviewers should be active participants at all milestone meetings and in-progress reviews.

10. Review Logistics

10.1 Review Documentation

10.1.1 DrChecks[sm]

DrChecks[sm] is the official review documentation software for the continuity of the review record (see ER 1165-2-217). Use DrChecks[sm] to document all ATR comments, responses, and associated resolutions accomplished throughout the ATR process. Comments critical to the project's scope or of critical importance in terms of meeting USACE policy should be identified as such within DrChecks[sm].

10.1.2 Project Guidance Memorandum (PGM)

The Project Guidance Memorandum (PGM) is the official compilation of reviewer comments and PDT responses received during the P&LCR. The RM is the owner of the PGM and it is the RM's responsibility to properly format the PGM and coordinate with the review team members for comments, PDT members for responses to comments, and additional dialogue or actions that occur during the review that is necessary to resolve comments. The RM also oversees the development of the PGM for draft and final report reviews. The PDT is responsible for filling out discussion and response (including action taken) sections of the PGM.

10.2 Comment Structure

ATR and P&LCR comments must be substantive in nature and generated such that they comply with the four-part comment structure. The review comment should provide a clear path for comment resolution and the reviewer should provide the PDT member with the required resources to resolve the comment. The structure of the four-part comment and brief explanation of each part is as follows:

A. Concern
    a. Clearly state the issue
    b. Be specific enough to aid the PDT in understanding the concern
B. Basis for the concern
    a. Cite specific guidance and reason for concern
    b. Define why is this a problem
C. Significance of the concern
    a. Provide a rating of High, Medium, or Low
    b. Include logic for rating
D. Action needed to resolve the concern
    a. Clearly articulate the revision or other action needed to resolve the comment

Reviewers should make all editorial comments via track changes in Microsoft® Word files or within the body text of a PDF file using the review functionality in Adobe® Acrobat. Comments are then provided to the ATR Lead or RM for submittal to the PDT. When conducting a P&LCR, the focus should be on policy and legal compliance and not necessarily on technical accuracy. However, if issues of technical correctness are apparent, the P&LC team member should informally document the problem outside of the PGM and communicate their concerns to the CPR ATR team member and PDT via the P&LC RM. If a critical, technical issue is identified by the P&LC reviewer, the CPR CoP advises that the CPR ATR team member, CPR P&LC team member, and PDT discuss the issue and path to resolution via webinar. P&LC reviewers should also review the ATR certification report to ensure that CPR comments raised in ATR were in fact resolved as indicated by the PDT. Any changes listed as made in the ATR report but not actually reflected in the report should be called to the attention of the RM. Should the ATR be conducted concurrently with the P&LC review, the P&LC reviewer should follow-up upon ATR close-out to ensure that any technical issues identified during P&LC review and communicated to the ATR team member were addressed and that all ATR comments were resolved. Coordination between the P&LC team members and the RM should occur to ensure ATR quality assurance takes place.

10.3 Comment Resolution

Comment resolution should be a collaborative process between the ATR team member and/or P&LC reviewer and the PDT members. The reviewers and the PDT members should avoid multiple iterations of backcheck and response by discussing comments provided by the ATR and/or P&LC reviewer. In the event a dispute in the comment resolution process occurs and results in a disagreement and impasse between the PDT and CPR review team member, the "Dispute Resolution" process identified in ER 1165-2-217 needs to be immediately undertaken to minimize any impacts to the project delivery schedule. Any intractable issues related to comment resolution need to be brought to the attention of the CPR CoP Lead.

10.4 Review Closeout

If a review comment has been addressed to the reviewer's satisfaction, the reviewer should close out the comment and provide confirmation of resolution within the final version of the report. Note that it is not enough to simply state "the comment has been addressed;" instead, the reviewer should summarize exactly how the comment was addressed.

11. Post-Review Debriefing of CPR CoP Leadership

Two options are available for post-review debrief of CPR CoP leadership. The selected option is dependent on the degree of complexity or controversy associated with the project. Either the reviewer or the CPR CoP leadership may propose their preferred option, with the leadership holding authority to make the final selection.

- In most cases, it is enough to notify the CPR CoP leadership when the climate review (ATR and P&LCR) has been completed. This allows for CPR leadership to track progress and ensure that reviews are completed in a timely manner. Additionally, the notification provides the CoP Lead the opportunity to gage the availability of CPR experts for future review opportunities.

- For projects with particularly high visibility and/or controversy, the CPR CoP leadership may request to participate in in-progress reviews (IPRs) so that they are briefed on the details of the review comments and their resolution. Leadership may request inclusion of representatives from the HH&C CoP or other CoPs as appropriate. This may occur after completion of review closeout to ensure situational awareness on the part of the CPR CoP leadership or, in certain cases, may occur before closeout completion if the leadership prefers to provide recommendations related to the resolution of specific issues.

Appendix A: Civil Works Review Policy Summary

A.1. Introduction

USACE review processes are essential to confirming the planning analyses, optimization of design, project safety, reliability, and quality of the decision and products USACE provides to the Nation. This appendix includes a summary of important points from ER 1165-2-217, *Civil Works Review Policy* (1 May 2021) and other resources related to USACE's overall review policy and guidance. ER 1165-2-217 establishes policy and procedures for a comprehensive, accountable review strategy for Civil Works (CW) by providing a seamless lifecycle review process of all projects. This ER ensures the quality and credibility of USACE decisions, implementation, and other work products. It reinforces the idea that quality control and comprehensive review are equal to cost and schedule compliance. This regulation applies to all USACE HQ elements and all USACE commands having CW planning, engineering, design, construction, and operation and maintenance responsibilities.

A.2. USACE Review Structure

A.2.1. Review Plan

All projects require a Project Review Plan (RP). The RP is a District-owned and Major Subordinate Commands (MSC)-approved document that presents the endorsed and approved quality control strategy and ensures accountability. The RP includes levels of review required, review costs, and the review schedule for all project phases. The RP identifies disciplines and individuals, to the extent possible, that will be conducting the reviews.

A.2.2. Agency Technical Review

An Agency Technical Review (ATR) is required per ER 1165-2-217, *Civil Works Review Policy*. ATRs on planning decision documents are conducted by USACE personnel outside of a study's home district, and the ATR Team Lead is required to be from outside the home Division. Reviewers are chosen from the pool of certified reviewers in CTP CERCAP. The purpose of an ATR is to "ensure the quality and credibility of the government's scientific and technical information (ER 1165-2-217)." The ATR occurs subsequent to the DQC review. ATR ensures results and decisions are supported by the analyses presented in the decision document. As part of the ATR, DQC documentation is evaluated to ensure the DQC was adequately performed and that all substantive DQC concerns were addressed (ER 1165-2-217).

The ATR Team Lead provides directions for the review and is the central POC for providing review documents, review coordination, comment and response documentation, milestone meeting participation, comment issue resolution, and review certification. Responsibilities for ATR team members, financial POCs, other POCs, and project information are usually defined in a kickoff meeting. Detailed information on ATR team, ATR Lead roles and responsibilities, and ATR review are further described in ER 1165-2-217.

The ATR team member takes an active role in facilitating the resolution of comments. The ATR team member provides the PDT with clear direction on how to address review comments provided and is involved throughout the project lifecycle at an appropriate, scalable level based on the complexity, size, and level of risk associated with the overarching study. The ATR team member should also facilitate communication with other SMEs and provide relevant resources and references to aid in the resolution of comments. Engaging ATR team members early and reaching out to SMEs as appropriate offers opportunities to save time and money by minimizing unproductive design effort and rework. However, the ATR team must remain independent of the production team.

A.2.3. Independent External Peer Review

Smaller subsets of the projects, for which an ATR was completed, may also undergo one or both types (Type I or Type II) of review known as an Independent External Peer Review (IEPR). IEPR is the most independent level of review and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team of reviewers that are outside of USACE is warranted (ER 1165-2-217). Additional information regarding IEPR requirements can be obtained from ER 1165-2-217.

A.2.4. Policy and Legal Compliance Review

For many USACE studies, a P&LCR is required along with an ATR and DQC. Guidance governing P&LCR is summarized in Director's Policy Memorandum (DPM) CECW-P (FY2019-01), Subject: Policy and Legal Compliance Review. P&LCR is complementary to DQC and ATR and focused on ensuring analysis is consistent with Army policies, in particular those policies on analytical methods and the accuracy and presentation of findings in decision documents. All decision documents requiring approval at a USACE HQ level require P&LCR, which is conducted by a single team of policy and legal reviewers from the MSC, USACE HQ Office of Counsel (OC), and the OWPR.

Original P&LCR guidance allowed experts from other organizations within USACE to sit on these review teams. This has since come under scrutiny by the vertical team (the vertical team includes the district, RMO, MSC, and USACE HQ) and now limits the "other experts" sitting outside of an MSC, HQ OC, and OWPR to a few select disciplines, one of which is climate preparedness and resilience (CPR). These combined review teams are sometimes identified as one P&LCR team since documents in this category no longer undergo sequential review by both the MSC and HQ. The intent of combining reviewers from HQ and the MSC was to expedite the policy review process by essentially eliminating a redundant level of the review process.

A Review Manager (RM) is responsible for managing the P&LCR. The composition of the P&LCR team is tracked within the USACE Project Monitor[2], a centralized computer management tool. The RM coordinates any changes in P&LCR team membership and is responsible for ensuring P&LCR team information is in Project Monitor and kept up to date.

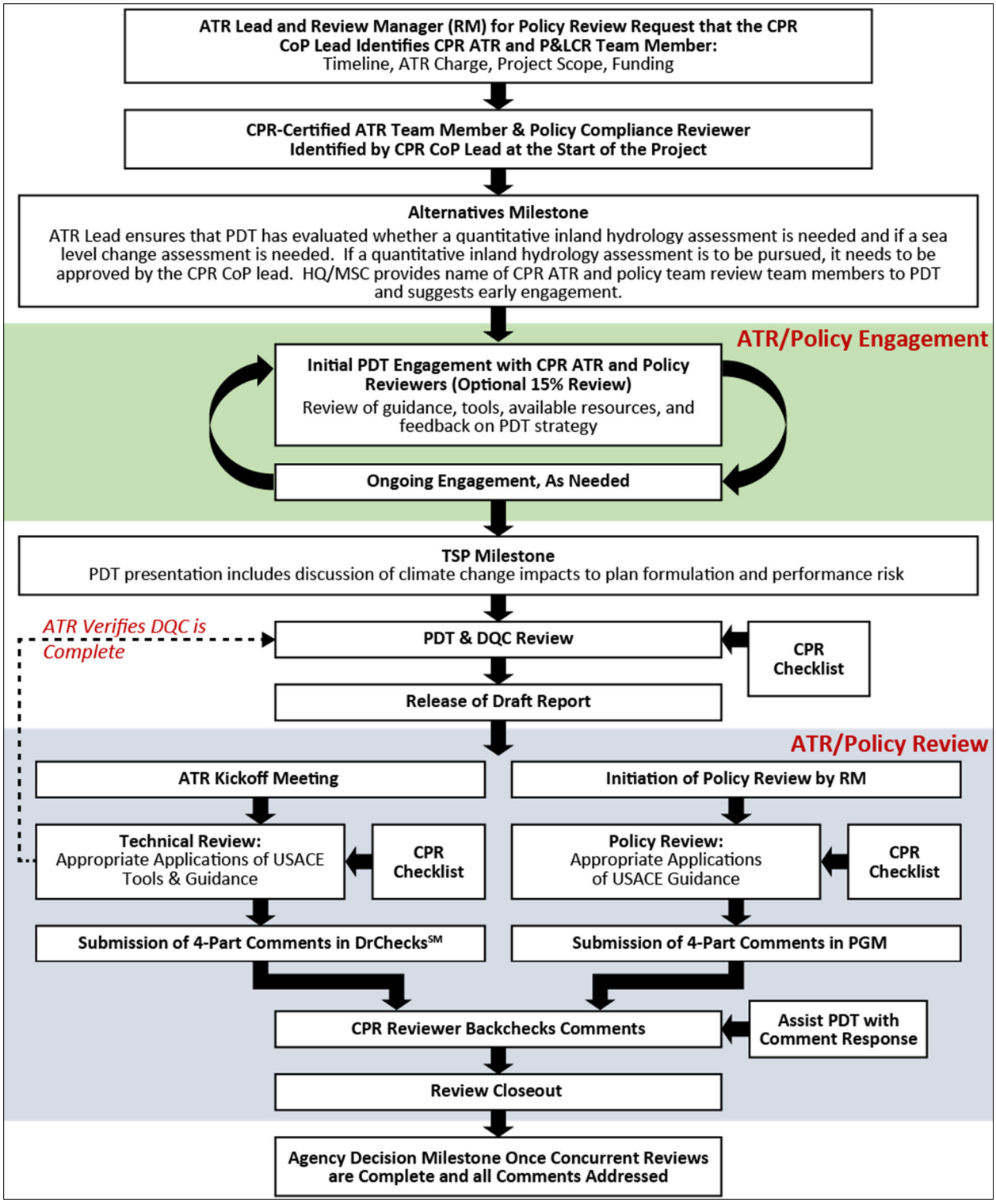
The reviewer assignments for decision documents requiring P&LCR are initiated with a request from the MSC Chief of Planning and Policy to all functional MSC Chiefs and outside organizations (as necessary). Each MSC functional chief is required to collaborate with their respective HQ technical counterpart to decide on a representative reviewer. Once reviewers are selected (from either HQ, MSC, or other organization as with the CPR reviewer), the MSC Chief of Planning and Policy and the Chief of Office of Water Policy Review (OWPR) collaborate and agree upon the final P&LCR team representatives. It is an additional responsibility of the Chief of OWPR to select a RM for the team. In cases where the MSC has no representative functional chief for CPR, the MSC Chief of Planning and Policy or the MSC CPR CoP Lead collaborates directly with the HQ CPR CoP Lead who assigns a CPR P&LCR team member to the project.

A.2.5. Review Timing

DQC, ATR, and IEPR occur sequentially. ATR and P&LCRs may occur sequentially or concurrently. At times, P&LCR also occurs concurrently with public review. It is important to recognize from the onset, that the division and requirements of technical and policy review for any discipline is not always well defined.

[2] Project Monitor is a P2-based HQ tool used to plan reviews, assign reviewers, and track the completion of product reviews, including milestones meetings. Detailed information on P&LCR team composition, RM roles and responsibilities, and Project Monitor are further described in DPM 2019-01 Policy and Legal Compliance Review.

Appendix B: General Climate Assessment ATR and P&LCR Flow



Appendix C: Applicability – USACE CPR Assessments

Any planning study that requires an assessment of future without project (FWOP) conditions must include an assessment of current and future climatic trends and conditions. Note that USACE policy and guidance, and consequently the need to generate a climate assessment, is still applicable even if the analysis being conducted is for a small-scale study, for a study that is being fully funded by clients (Economy Act), or for a previously authorized but unconstructed project that is being re-evaluated for adequacy in meeting current construction and engineering standards (Reevaluation Study).

It would be difficult to meet the planning requirements of effectiveness, efficiency, completeness, and acceptability without integrating observed, current, and reasonably foreseeable future climate change and variability in formulation, alternatives analysis, engineering design, construction, operations, maintenance, and de-authorization. Though planning typically uses a 50-year period of economic analysis, the minimum project service life considered in engineering analyses is 100 years for major infrastructure projects (ER 1110-2-8159, *Life Cycle Design and Performance*). As ER 1110-2-8159 notes, major CW projects can have an indefinite service life; hence, foreseeable conditions related to changing climate that impact project reliability and performance must be considered in design and operations and maintenance plans. There are several types of studies used by USACE to justify and execute the various missions of our organizations. Some examples of studies requiring a climate assessment include the following:

- Floodplain Management Studies (FPMS) projects
- Specifically Authorized Feasibility Studies
- Disposition Studies
- Water Reallocation Studies
- Dredged Material Management Studies
- Watershed Studies
- Some post-authorization studies such as Major Rehabilitation Reports
- Design documentation reports
- Floodplain assessment studies
- New or significant updates to a Water Control Manual
- Continuing Authorities Program (CAP) Studies
- National Environmental Policy Act (NEPA) compliance documents for projects that have service lives of 100 years at a minimum*

** The Council on Environmental Quality (CEQ) guidance on regulations implementing the procedural provisions of the NEPA were recently updated (Federal Register Volume 85, Number 137). In regard to consideration of climate change in NEPA documents according to the update, "agencies will consider predictable environmental trends in the geographic area in the baseline analysis of the affected environment, but not as an effect of the action considered for implementation." Within a year of the CEQ release, USACE along with the other Federal Agencies is being required to development agency-specific implementation guidance for the updated regulations. Any changes in review guidance for climate change in NEPA documents will be communicated to the CoP by the CPR CoP Lead* (**CPR CoP Lead:** Dr. Kate White, USACE Headquarters (Kathleen.D.White@usace.army.mil; Phone: 202-761-4163).

Appendix D: List of Climate Preparedness and Resilience Specific Guidance

Inland Hydrology:

- **ECB 2018-14**: *Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects* (2020), which replaced ECB 2016-25 and ECB 2014-10
- **ETL 1110-2-3**: *Guidance for Detection of Nonstationarities in Annual Maximum Discharges* (April 2017)
- **ETL 1100-2-4**: *Developing Paleoflood Information for Flood Frequency Analysis* (September 2020)

Coastal/Sea Level Change:

- **ER 1105-2-100** (Appendix K): *Planning Guidance Notebook* (April 2000)
- **ER 1100-2-8162**: *Incorporating Sea Level Changes in Civil Works Programs* (June 2019)
- **EP 1100-2-1**: *Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation* (June 2019)
- **ECB 2018-3**: *Using Non-NOAA Tide Gauge Records for Computing Relative Sea Level Change* (Feb 2018)

Additional important guidance provided within the following documents:

- **ER 1110-2-8160**: *Policies for Referencing Project Elevation Grades to Nationwide Vertical Datums* (March 2009)
- **EM 1110-2-6056**: S*tandards and Procedures for Referencing Project Elevation Grades to Nationwide Vertical Datums* (December 2010)
- **ER 1110-2-8159**: *Life Cycle Design and Performance* (October 1997)
- **ER 1110-2-1150**: *Engineering and Design for Civil Works Projects* (August 1999)
- **ECB 2018-2:** *Implementation of Resilience Principles in the Engineering & Construction Community of Practice* (Jan 2018)
- **EP 1100-1-3:** *USACE Sustainability: Definition and Concepts Guide* (July 2018)

Appendix E: Inland Hydrology Climate Assessment Review Checklist

General				Notes
	DQC	ATR	P&LC	
Are the ECB 2018-14 Phase I, 2, and 3 requirements addressed?	☐	☐	☐	
Is the climate assessment length commensurate with the scale of the project/decision/plan being assessed?	☐			
Is the overall study purpose and its proposed alternatives (e.g., channel improvement, detention, pump station for wetland restoration) clearly identified? Are all impacted USACE business lines clearly identified?	☐	☐	☐	*USACE Business Lines include flood risk reduction, ecosystem restoration, recreation, regulatory, navigation, hydropower, water supply, and emergency management.*
Does the assessment address how climate change will impact the future hydrometeorology of the study area and what impact this could have on the decisions being made or alternatives being considered?	☐	☐	☐	*How will climate change impact future (without project) conditions?*
Are relevant USACE guidance documents and tools correctly referenced?	☐	☐	☐	
If the Climate Change Assessment is an appendix, is it referenced and summarized in the main report? Is content consistent?	☐	☐	☐	*Climate Assessment should be in a separate section noted in the Table of Contents*
For in-depth assessments using climate changed hydrometeorology, was preapproval received from the CPR CoP Leads?	☐	☐	☐	*For more in-depth analysis, an expanded DQC and ATR is required.*
Was the DQC review adequate and have all issues been resolved?		☐		
If the project falls below 50 feet NAVD88, is Relative Sea Level Change (RSLC)considered?	☐	☐	☐	
Search Main Report and Relevant Appendices for "climate or climate change." Is the message delivered consistent and correct throughout?	☐	☐	☐	*Check for consistency with the ECB 2018-14 assessment.*
Literature Review				**Notes**
Are the 2015 USACE literature synthesis and the 4th National Climate Assessment referenced?	☐	☐		
Does the literature review cover changes in both observed and projected hydrometeorological data (including temperature, precipitation, hydrology, and seasonality)?	☐	☐	☐	*DQC should look for contradictions and inconsistencies, covering temperature, precipitation, hydrology, and seasonality.*
Are references included in the literature review from reputable sources (scientific journal articles, science agencies, academia)?	☐	☐	☐	*Ensure that projected results reported on are based on an ensemble of Global Climate Model (GCM) model outputs.*

Is there a discussion of current climate and trends observed specific to the project area (sub-watershed/state scale)?	☐	☐	☐	*e.g., NOAA state climate assessments, statistical analysis of watershed-specific precipitation and temperature timeseries.*
Context/Data Analysis				**Notes**
	DQC	ATR	P&LC	
Are the hydrometeorological variables selected (e.g., precipitation, temperature, streamflow, seasonality) for analysis relevant to the study and its proposed alternatives or planning objectives (e.g., channel improvement, detention, pump station for wetland restoration, operating improvement)?	☐	☐	☐	
Are the effects of regulation within the study area clearly identified?	☐			
Is an appropriate number of long-term streamflow gage sites in the study area and nearby surrounding area identified for analysis and subsequently described?	☐			*Number of gages selected for analysis should be commensurate with project scale, purpose, and spatial extent.*
Are data quality issues discussed? Is missing or discontinuous data identified?	☐			
Does the climate assessment include some discussion of what might be causing trends in the observed hydrology (land use changes, regulation, climate change, natural climate variability)?	☐	☐		
Trends and Nonstationarities in Observed Data				**Notes**
Are hydrometeorological variables relevant to the study purpose analyzed for an appropriate number of locations given study scale and purpose?	☐	☐	☐	*Long-term gages should be used.*
Do the datasets being analyzed have >30 years of record and are they continuous? If data is preprocessed/aggregated, is missing data accounted for correctly?	☐			*When aggregating from daily to annual, be wary of missing data.*
If available, were nonstationarity tests applied to naturalized/unregulated streamflow record or a pristine gage site?	☐			
Is monotonic trend analysis and nonstationarity analysis applied to the entire record and presented correctly?	☐	☐		*DQC should verify tool output at all locations.*
Are “strong” nonstationarities identified as described in ETL 1100-2-3 (consensus, robust, magnitude)?	☐	☐		
Are monotonic trends analyzed within subsets of data >10 years in length before and after detected, strong nonstationarities?	☐	☐		*DQC should verify tool output at all locations.*

Is there some discussion related to the threshold selected for significance for the p-value?	☐	☐		*Typically p<0.05.*
Are only statistically significant trends displayed and discussed (p-value <0.05)? A result of no trend is significant and needs to be discussed.	☐	☐		*Figures do not need to be displayed for no trend/no nonstationarity cases.*
Projected Climate Changed Hydrology: CHAT Tool				**Notes**
	DQC	ATR	P&LC	
Are figures including results displayed and is the output correct?	☐	☐	☐	*DQC should verify tool output at all locations.*
Are the p-values associated with the trends in observed and projected maximum streamflow data discussed?	☐	☐		*DQC should verify tool output at all locations.*
Are the uncertainties associated with projected hydrology briefly discussed?	☐	☐		
Are only statistically significant trends displayed and discussed (p-value <0.05)? A result of no trend is significant and needs to be discussed.	☐	☐		*Trendline figure does not need to be displayed for no trend cases.*
Is it noted that the annual maximum monthly projected hydrology is representative of the unregulated condition?	☐			
Is there some discussion related to the threshold selected for significance for the p-value?	☐	☐		*Typically p<0.05.*
Is the hindcast vs. projected period correctly described?	☐	☐		*Both are modeled outputs.*
Vulnerability Assessment (VA)				**Notes**
Have all the appropriate business lines been evaluated and presented in the results?	☐	☐	☐	*DQC should verify that output is correct in VA Tool.*
Is sufficient context provided related to results interpretation (tool inputs, uncertainty, significance of WET vs. DRY subsets, defines indicator variables, etc.)?	☐	☐		
Does the assessment note if national standard settings are applied or if they have been modified, how so? Is a mask applied?	☐			
Does the write-up indicate the primary indicator variable(s) and how the VA score changes with subset/epoch analyzed?	☐	☐		
Does the VA write-up make it clear that this is a screening level assessment of vulnerability?	☐	☐	☐	*If a HUC04 isn't flagged as vulnerable, this doesn't mean it's not impacted by climate change.*

Compound Events				**Notes**
	DQC	ATR	P&LC	
If compound or cascading events are a significant source of hazard at a project site, has this been identified and discussed within the assessment? *Example of a cascading event is a heavy precipitation event following a wildfire, resulting in high sedimentation loads.* *(Example of a compound event is flooding from a large, slow-moving tropical storm plus tidal impacts and surge, combined with heavy overland precipitation.)*	☐	☐		*Source of compound events and primary contributors; climate change has the potential to bring about an increase in the number of compound and cascading events resulting from combinations of concurrent or successive events. Example of a compound event is flooding from a large, slow-moving tropical storm with surge across multiple tidal cycles combined with very heavy precipitation.*
Have the damages to the infrastructure resulting from the compound hydrological events been described?	☐	☐		*Consistent with example in ECB 2018-14.*
Conclusion/Results Interpretation				**Notes**
Does the conclusion adequately summarize the results of the assessment and how climate change may impact the study area and proposed project features or management decisions being made?	☐	☐		*This should be discussed in both the appendix and main report.*
Does the assessment include a table (risk matrix) characterizing residual risk due to climate change as per ECB 2018-14? Is the table summarized or also included in the Main Report?	☐	☐	☐	*Consistent with example in ECB 2018-14.*
Does the conclusion discuss how climate change should be considered and how resilience measures could be incorporated into planning, the design, and/or decision-making process?	☐	☐	☐	*This should be discussed in both the appendix and main report.*

Appendix F: Coastal/Sea Level Change Climate Assessment DQC Review Checklist

General/Formulation				Notes
	DQC	ATR	P&LC	
Are relevant USACE guidance documents and tools correctly referenced?	☐	☐	☐	
If the RSLC Assessment is in an appendix, is it referenced and summarized in the main report, including table and figures?	☐	☐	☐	
Larger system context is described, including related projects with shared objectives outside the project boundary.	☐			
Thresholds, triggers, or other controlling/governing weak links in the project are identified, where failure of these elements would represent the first/most likely cause of project failure or change to alternate adaptation pathway.	☐	☐		
Was the DQC review adequate and have all issues been resolved?		☐		
Is an appropriate forecast period adopted for analysis?	☐	☐	☐	*Usually equivalent to project lifespan; for major infrastructure typically 100 years.*
Tidal Gage Selection and Datum Compliance				**Notes**
Project datums are tied to appropriate, maintained National Spatial Reference System (NSRS) datum (NAVD88, MLLW, etc.) per ER 1100-2-8160.	☐	☐	☐	*Future sea level change and total water level values should be reported in NAVD88 or a local datum.*
Project datums match sea level scenarios (shifted to match MSL 1992) or relative sea level change is applied correctly from project start year to future years.	☐	☐		
Statistics and means computed from project gages are shifted from midpoint of analysis period to match start date of project and/or sea level scenarios.	☐	☐		*DQC should verify shift.*
If a regional sea level scenario is chosen, local land movement is partitioned correctly from the regional rate rather than the global eustatic rate.	☐	☐		*DQC should verify computed rate.*
The tidal gage selected for analysis is as close as possible to study area or downstream boundary of model used to assess the impacts of RSLC. The tide gage has greater than 30 years of data. If no nearby gage is available, data from the nearest site is transferred appropriately.	☐	☐		*DQC should verify record length, location, and any computations used to adjust available gage data.*

The observed rate of sea level change at the selected gage is clearly communicated including its 95% confidence interval.	☐			*Potential source:* ***https://tidesandcurrents.noaa.gov*** ***Optional****: Correct comparison to the global mean sea level rise rate.*
A figure is included that illustrates the datums for the tidal gage used for analysis.	☐			*Potential source:* ***https://tidesandcurrents.noaa.gov***
Comparison of RSLC Scenarios and Screening of Alternatives				**Notes**
Number of RSLC scenarios analyzed is appropriate as defined in ER 1100-2-8162 par 6.d.	☐	☐	☐	
If Option (2) is (par. 6.d.) chosen requiring an assessment of multiple scenarios, but budget or schedule would not allow analysis of all alternatives under all scenarios, alternative justification for selection of TSP is given, and is satisfactory with respect to sensitivity of the results.	☐	☐	☐	
USACE sea level change scenarios are extracted and analyzed correctly using the USACE Sea-Level Change Calculator. Results are presented appropriately.	☐	☐		*DQC should verify tool output; sea level scenario chart with critical elevations and dates is provided.*
Sea Level Tracker plot is provided, showing observed changes and inter- and intra-annual variability in water levels as compared to mean sea level scenarios.	☐	☐		*DQC should verify tool output and ensure consistent rate of sea level rise is assumed for Low Projection. For project locations where the Sea Level Tracker results are showing greater variability for which the upper end exceeds the intermediate sea level change projection, caution should be applied to the appropriate selection and analysis of a reduced set of sea level change curves.*
Has project area been adequately defined in order to assess the 100-year adaptation horizon under the high sea level change curve?	☐	☐	☐	
RSLC Scenarios are modeled correctly for Alternatives being analyzed (if applicable).	☐			
Risks associated with lack of data or modeling (if any) are documented.	☐	☐		
Is the base tidal hydrograph (Year 0) being used appropriately conservative?	☐	☐		*Ensure a high-tide condition like HHW or a King Tide is analyzed. Adjust for things like ENSO effects. DQC should verify base hydrograph composition.*

Full range of water levels/flows relevant to the project or decision being made are considered in conjunction with RSLC.	☐			
Total water levels (sea level plus surge, tide, waves, etc.) are computed appropriately and shifted in time and space as needed with amplification factors for nonlinearities as appropriate.	☐	☐		*DQC will verify computations.*
Sea Level Impacts to Project Performance Risk				**Notes**
	DQC	ATR	P&LC	
Direct and indirect impacts of changing sea level are addressed.	☐			
At minimum, provide inundation map or extent of upstream impacts of RSLC for the high sea level scenario at the end of the project's lifecycle (usually year +100) in conjunction with the water level/flow of interest for the project. Ensure that the implications of the future inundated extents are tied to future impacts (including critical infrastructure).	☐	☐		*DQC verifies that the map is produced correctly. Ensure that the map does not just plot the MSL extent. Project exposure will include extreme surge, etc.*
"When, not if" description of range of dates when project impacts could occur for the range of scenarios clearly states when any critical infrastructure may be affected.	☐	☐	☐	
Potential project failure modes related to water levels impacted by changing sea level are described.	☐	☐		
(Optional) Performance timetable is provided showing annual exceedence probability (AEP) of critical elevations as affected by sea level change over time.	☐	☐		
Critical elevations for project non-performance and stability are identified, with thresholds shown on cross-section and plan view illustrations for representative project elements.	☐	☐		*Figures should illustrate elevation and extent of future impacts from sea level change and total water levels.*
Compound Hydrological Events				**Notes**
Do compound hydrological events occur at the project site?	☐	☐		
Has the source of the compound hydrological events and the source contributions to the event been described?	☐	☐	☐	
Have the damages to the infrastructure resulting from the compound hydrological events been described?	☐	☐	☐	

Adaptation Pathways				Notes
	DQC	ATR	P&LC	
Have future impact areas accurately been identified incorporating sea level change and other water level components and are those estimates correctly attributed to the year of impact, including to critical infrastructure and systems?	☐	☐	☐	
Adaptation strategy (anticipatory, adaptive, or reactive) is specified and justified.	☐	☐	☐	
For each threshold or trigger elevation of mean sea level leading to project non-performance or instability, one or more adaptation options is provided.	☐	☐	☐	
Each adaptation action has an associated lead time for budgeting, construction, etc.	☐	☐		
Funding mechanisms for future adaptation actions (if any) are identified.	☐	☐		
Alternative pathways of action are provided, if appropriate, with rationale for selecting among alternatives.	☐	☐		
Resilient or specifically adaptable project elements are identified (if any). Conversely, if a project element is not adaptable, identify those also and explain what the expected plan will be.	☐	☐		
For each adaptation action, the magnitude and mechanism by which the action extends the period of project performance is described.	☐	☐		
For each adaptation action, the resulting project robustness and/or adaptability to sea level change post-action is described.	☐	☐	☐	
Has the residual risk under future hydrodynamics and sea level change been discussed and quantified, where possible, over the 100-year adaptation horizon without adaptation action and after each adaptation action is implemented?	☐	☐	☐	*Follow guidelines in ER 1105-2-101*
In the description of the TSP/plan, project resiliencies described. Describe implementation of resilient features (if any).	☐	☐	☐	*Project Resilience is defined as the capability to prepare, absorb, recover and adapt to disturbance (such as loading condition exceeding design).*
If significant future risk of failure or non-performance exists, does the report identify alternative actions that will need to be taken or quantify expected impacts and system responses?	☐	☐	☐	

Appendix G: Process for Becoming a Certified Climate Preparedness and Resilience (CPR) Agency Technical Review (ATR) or P&LC Reviewer

The USACE reviewer Certification and Access Program (CERCAP) is the system of record for the nomination, review, and certification of ATR reviewers. CERCAP responds to the USACE HQ's request for a centralized repository of certified ATR reviewers.

The Deputy Commanding General for Civil and Emergency Operations (DCG-CEO) Memorandum, *Civil Works Response to the Engineer Inspector General "Inspection of USACE Civil Works Review Processes,"* dated 22 August 2012, section 3(d) directs USACE to "… Complete vetting of qualified ATR leaders and reviewers." ER 1165-2-217 requires all ATR reviewers be selected from CERCAP.

CERCAP consolidates the self-nomination process, supervisor review, resume storage, CoP certification, and search requirements for becoming a certified climate assessment reviewer into one location. CERCAP provides an efficient tool to rapidly enumerate validated certified climate assessment ATR reviewers.

Qualifications for becoming a CPR CoP certified reviewer include experience conducting CPR assessments, familiarity with the currently accepted science of climate variability and change as it relates to engineering, and active participation in the CPR CoP (participate in monthly climate adaptation calls, etc.). When applying for certification in CERCAP, a current resume indicating the experience the nominee has in the CPR CoP is required.

Steps to Becoming CERCAP Certified (in brief)

Step 1: Access the USACE Command Training Plan Certification and Access Program (CTP-CERCAP at: https://maps.crrel.usace.army.mil/apexcrrel/f?p=121 and use your Common Access Card (CAC) to sign in.

- Internet Explorer – use "Authentication Certificate"
- Chrome – use "Smart Card Login"

Step 2: Fill out your Account information (input Division, District, Pay Grade, Community of Practice, etc.)

Step 3: Fill in your Resume. Make sure your resume supports your qualifications as a Level 1 and/or Level 2 CPR reviewer. You can also append a word document-based resume in the "Files" option under the "Account" header. This is to augment the information you provided manually in the CERCAP Resume section(s). When uploading, ensure the "Latest Resume" box is checked.

Step 4: Under the CERCAP header, navigate to the Nominations lower level tab. Nominate yourself as a CPR reviewer within the "Area of Expertise (AoE)" text box. The AoEs available correspond to the CoP you entered under the Account tab. There are multiple options under Climate Preparedness and Resilience. Select all AoE(s) that apply. The most common AoEs are in **bold**.

CPR AoEs:

- Biosequestration
- **Climate Hydrology Impacts and Adaptation**
- **Climate Impacted Compound Hydrologic and Costal**
- Climate Impacted Heat
- Climate Impacted Wildfire
- Climate Mitigation Integrated with Adaptation
- **Coastal Climate Impacts and Adaptation**
- **Sea Level Change, Datum, Subsidence**

Step 5: Complete the Questionnaire for the CPR AoE. You will then see that your application shows "Status: Submit" in the central "Comments" column. If you click on the "Status" hyperlink, you will bring up the CERCAP History page displaying current Approval status.

Step 6: After the nomination is submitted, it goes to the District Level for Engineering and Construction (E&C) Approval. District Level E&C Approval is generally provided by your District's "District CPR CoP Delegate." Note, if a Delegate has not yet been identified by your District, someone must be approved by the CPR CoP Lead (Dr. Kate White) at HQ. Each District should give some consideration to who that delegate is. Generally, the Delegate should be the supervisor for the majority of the climate professionals within the District.

Step 7: After receiving District Level E&C Approval, the recommendation is then automatically forwarded to the CPR CoP Lead (Dr. Kate White) at HQ for final approval.

For Steps 6 and 7, please send your District CPR CoP Delegate and the CPR CoP Lead an email when your nomination is ready for their approval. Continue to check the status and follow up until approval is received.

For more detailed instruction, please see the *U.S. Army Corps of Engineers (USACE) Command Training Plan Certification and Access Program (CTP-CERCAP) User Manual* (2020).

If you run into any problems with CERCAP, please contact Chris Westbrook, USACE HQ (email: Christopher.H.Westbrook@usace.army.mil; Phone: 202-761-7584) and one of the Climate Assessment Review POCs for Agency Technical Review: Chanel Mueller (Chanel.Mueller@usace.army.mil, Phone: 651-555-0224) or Will Veatch (William.C.Veatch@usace.army.mil, Phone: 504-862-2858).