



Programmatic Terms and Conditions (PTCs) for the Critical Zone Observatories (CZO) (NSF 12-575) Cooperative Agreement(s)

NSF 12-575: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf12575

1. Program Description

Critical Zone Observatories (CZOs) address pressing interdisciplinary scientific questions concerning geological, physical, chemical, and biological processes and their couplings that govern critical zone system dynamics. CZOs will individually and collectively, 1) measure and quantify the significant processes of the critical zone on appropriate time and space scales; 2) develop a unifying theoretical framework that integrates new understanding of coupled hydrological, geochemical, geomorphological, sedimentological and biological processes; and 3) develop, couple and validate system-level models to predict how the critical zone responds to external forces such as anthropogenic, climatic, and/or tectonic processes. Each observatory must contribute to strengthening the scientific basis for decision-making, particularly with regards to impacts on human health, human safety, ecosystem services and environmental function due to observed and predicted external forcings and changes in the critical zone.

The CZO must make available the field site(s) for use of other CZO awardees and by the broader critical zone community, as permitted by the land owners. Permission to gain access to the field site is to be based on balancing objective evaluation of the science that could be achieved against impacts on work by others. Arrangements would normally be between the outside PI and the CZO PI or observatory management, with guidance from the Advisory Board in situations with differences. The awardee agrees to help others gain permission to conduct research on observatory sites on public or private lands. The visiting project is expected to pay added costs to the observatory.

The CZO agrees to engage in a joint effort with other CZO awardees, visiting projects, and other relevant groups to develop practices of common measurements, data standardization and supporting metadata. The CZO will adhere to the EAR Data Policy (http://www.nsf.gov/geo/ear/2010EAR_data_policy_9_28_10.pdf) and the CZO Data Sharing Policy described in the criticalzone.org portal and make CZO-generated data accessible to all investigators at the site, other CZOs, and the broader community. Some specialized data may be embargoed for more than two years, by prior agreement between the Principal Investigator and the cognizant NSF Program Director or his/her designee. Data will be made accessible via the CZO web site, www.criticalzone.org. The CZO will also cooperate with the cross-CZO data management effort by:

- a. releasing datasets to the CZO integrated data management system (CZOData) using the standardized dataset formats, metadata and other conventions (when they are established) according to the CZO network data sharing agreement published in www.criticalzone.org;
- b. the participation of the CZO site data manager and a science team representative in the Information Management Committee of CZOData.

The CZO is required to participate in collaborative network activities facilitated by the CZO National Office (CZO-NO).

2. **Project Governance**

The Awardee will ensure that an efficient and effective overarching governing structure is in place throughout the award period to support all critical or significant project activities. Among the governing components of each CZO will be the Director, the Executive Committee, the Advisory Board, the CZO Network Implementation Group, and the CZO Network Steering Committee.

- a. The Awardee organization will accept the overall management and budgetary responsibility for the proposed CZO, and should develop financial and management plans that are able to respond to opportunities provided by scientific breakthroughs and unexpected events, without changing the overall scope of the project.
- b. **PI/Director:** The PI is the Director of the CZO. He or she will oversee all CZO activities, serve as the lead in terms of the overall administration and integration of the multidisciplinary research, education, and goals of the CZO and be the intellectual leader of the CZO. The CZO Director must have the capacity to develop and lead a multidisciplinary team for fulfilling the vision of the CZO. Key responsibilities include:
 - i. being the primary point of contact with NSF for all CZO related matters;
 - ii. coordinating research, education and outreach activities among all CZO participants and institutions;
 - iii. meeting frequently with the Executive Committee and researchers at the CZO to help them implement, assess, and achieve their goals, as well as overall CZO goals, and establish new goals when appropriate;
 - iv. strategic planning, establishing of yearly project goals and assessment milestones;
 - v. compiling and contributing data and information needed to assess scientific progress and administrative effectiveness of the CZO in achieving its strategic goals;

- vi. submitting annual reports at least 90 days before the end of each funding period (e.g. end of the third quarter); these should include a work plan and a detailed budget for the coming year;
 - vii. participating in NSF-initiated meetings and reviews conducted via telephone or site visit, as needed, during the course of the project;
 - viii. communicating with the cognizant NSF Program Director to provide notifications of Advisory Board meetings and updates on assessments of progress against specified goals;
 - ix. executing the EAR and CZO network's policies for data management and sharing;
 - x. representing, together with a Co-PI, the CZO in the CZO network implementation group by participating in monthly teleconferences and semi-annual face-to-face meetings held each Fall, and in conjunction with Spring annual CZO principal investigators meetings;
 - xi. working with NSF to select the membership of the CZO Network Steering Committee; and,
 - xii. being the primary point of contact with the CZO National Office for all CZO and network related matters.
- c. **The Executive Committee (EC):** The EC is a multidisciplinary governing body composed of the PI and three or more Co-PIs, representing the breadth of disciplines involved in the CZO project, including education and outreach. EC members have the management experience and qualifications to administer their component of the CZO, as well as the integration of components into the whole. The EC will aid the Director in making administrative decisions, governing the research programs, and overseeing the progress of the CZO as a whole. The EC will bring identified problems to the attention of the Director as necessary. The EC will be charged with management decisions concerning general operations and steering the CZO toward its goals. The EC will oversee the implementation of the CZO Management Plan, as stated in section 4.a, and training of postdocs, graduate students, undergraduate students, and other participants, volunteers and employees. The Director will prescribe duties to EC members as necessary. A member of the EC may replace or temporarily represent the Director, as necessary, and may be selected to represent the CZOs in the CZO Network Steering Committee. The EC will meet either face to face or virtually, at a minimum of once a month.
- d. **Advisory Board (AB):** The AB provides guidance and advice to the CZO on all activities on an annual basis. Members may be external or internal to the awardee institution but an appropriate balance should be maintained.
- e. **CZO Network Implementation Group (CZO-NIG):** The PI and a Co-PI of the CZO, along with the Director of the CZO-NO, will participate in the CZO-NIG. Among the goals of the CZO-NIG are to facilitate communication among CZOs. Communication will occur through monthly teleconferences and semi-annual face-to-face meetings held (1) each Fall, and (2) in conjunction with Spring annual PI meetings.

- f. **CZO Network Steering Committee (SC):** The CZO PI, through the CZO-NIG, may work with NSF to form a Steering Committee, which will be composed of a minimum of five independent, highly qualified scientists whose expertise crosses the spectrum represented at the CZOs. Initial and replacement members of the SC should be approved by the cognizant NSF Program Directors. The SC will periodically review individual CZOs and the CZO Network.

3. **Governing Requirements**

The awardee will ensure efficient and effective performance of all project responsibilities by the governing components through the award period. The PI will cooperate and coordinate with the cognizant NSF Program Director by:

- a. providing advance notification of all Advisory Board meetings;
- b. providing written copies of Advisory Board meeting agendas and meeting reports (within three weeks of the conclusion of each meeting);
- c. compiling and contributing data and information needed to assess scientific progress and administrative effectiveness of the CZO in achieving its strategic goals;
- d. submitting annual and interim reports in a timely manner and in a form agreed upon with NSF;
- e. participating in NSF-initiated reviews conducted via telephone or site visit, as needed, during the course of the project; and
- f. responding to guidance from NSF, the CZOData project, and the CZO-NO in working to interface productively with other CZO projects.

4. **Reporting Requirements**

The Awardee will provide ad hoc and regular reports as designated by the NSF cognizant Program Director with content, format, and submission timeline specified by the NSF cognizant Program Director. The Awardee will submit all required reports via FastLane using the appropriate reporting category; excel spreadsheets for specific accounting are to be provided offline; for any type of report not specifically mentioned in FastLane, the CZO will use the 'Interim Reporting' function.

The Awardee is required to develop and submit for approval by the cognizant NSF Program Director:

- a. **A CZO Management Plan (CZOMP):** The CZOMP will be prepared within the first 90 days of the effective date of the award. The CZOMP will contain sufficient milestones to allow the cognizant NSF Program Director to monitor progress being made and to determine if continued NSF support is warranted. Metrics will be

identified for reaching these milestones and such milestone/metrics shall be reported as an integral part on any report to NSF. The CZOMP will:

- i. be a management plan for the integrated CZO activities;
 - ii. present milestones, and process and performance metrics for the CZO;
 - iii. identify goals, strategies, plans, and metrics for engaging other CZOs and the broad community in the CZO research activities;
 - iv. identify goals, strategies, plans, and metrics for public outreach and education activities of the CZO, including broadening participation of underrepresented groups;
 - v. include a diagram to explain the organizational relationships and reporting structure among the key areas of responsibility;
 - vi. identify members of the CZO and explain their specific roles and areas of responsibility;
 - vii. identify responsibilities of the lead and partner institutions/organizations;
 - viii. explain the role of each key participant/component and explain the approach for integrating and managing all partners;
 - ix. describe the processes to be used to prioritize CZO activities, including significant changes to the plan and adaptations to accommodate opportunities and new advances;
 - x. describe the processes to select and integrate research projects with one another and with other CZO activities in the realm of both measurements and sample collection as well as modeling and model validation;
 - xi. describe the processes to allocate funds and equipment to CZO activities and among partners;
 - xii. include a Data Management Plan for the CZO;
 - xiii. outline succession plans for the CZO leadership team if it became necessary.
- b. **A common measurement and data model plan:** In consultation with other CZOs and the CZOData project, the CZO will develop plans for (1) common measurements and protocols and (2) common data model and ontology. The CZO agrees to submit these plans to the cognizant Program Director within the first 120 days of the effective date of the award and to provide updates in annual reports.
- c. **Annual Project Reports:** An annual project report is to be submitted each year at the end of the third quarter. Each annual report will describe activities undertaken during the previous year, any specific alterations or changes to the plan to be implemented, and will include:
- i. lists of CZO participants, including postdoctoral fellows, and undergraduate and graduate students, and summary of any changes to prior approved

personnel. Information will include demographic data and disciplinary background;

- ii. summary of status and results of research projects supported by the CZO and undertaken by participants, including web links to abstracts, theses, publications, and reports and products;
 - iii. summary of status and results of education and outreach activities supported by the CZO, including student training and post-doc mentoring, meetings and lectures, abstracts and other publications;
 - iv. summary of status and results of cross-CZO activities supported by the CZO, including working-group activities, data efforts, field and laboratory measurements, meetings and workshops, student training and post-doc mentoring, outreach, abstracts and other publications;
 - v. summary of status and results of activities supported by the CZO and initiated by the CZO-NO; including brief descriptions of activities hosted by the CZO;
 - vi. tabulation of defined performance metrics for the period and comparison with proposed goals;
 - vii. lists of all publications and products from activities within the past year, including categories for published, accepted, and submitted;
 - viii. an assessment of progress towards meeting the goals for engaging the broader community that are established in the CZOMP;
 - ix. summarized results of evaluation forms submitted by participants of supported activities;
 - x. information on any additional funding that impacts and/or overlaps the activities of the CZO, making clear the distinction between on-going research activities that are funded by other NSF awards, other agencies and/or organizations and the work done under the CZO award;
 - xi. unanticipated collaborations, research projects, and other endeavors enabled or stimulated by the CZO or CZO-NO;
 - xii. other impacts of the CZO activities, including local community engagement, and policy;
 - xiii. data management;
 - xiv. comparison of expenditures versus budget by program area/activity (with explanation of cost overruns), and indication of leveraging from other sources;
 - xv. a plan for remedial action where project milestones in the CZOMP have been significantly impacted;
 - xvi. problems likely to delay accomplishment of annual, strategic goals;
 - xvii. description of programmatic goals and objectives with specific activities/timetable to be accomplished in the upcoming year; and
 - xviii. projected budget with detailed justification that breaks down costs according to activity and includes individual budget subawards using the NSF Budget Form 1030 along with appropriate budget justifications (budget detail is to be provided offline in a spreadsheet).
- d. **Final Project Report:** Within 90 days following expiration of the award, a final project report must be submitted electronically via the NSF's Research.gov web site.

- e. **Project Publications and Reports:** NSF will receive copies of project-related publications, working group reports, and summary reports of evaluations and performance assessments. The CZO PI is requested to notify the NSF Program Director or his/her designee of forthcoming (accepted but not yet published) publications resulting from research and educational activities supported by this award, as well as to consult with the Program Director prior to issuing news press releases concerning these activities.

5. **Ongoing Project Management and Oversight**

The Awardee will ensure full commitment and cooperation among the governing structure components and all project staff during all NSF project management and oversight activities. The Awardee will ensure availability of all key institutional partners during any on-site review or reverse site visit as well as timely access to all project documentation.

- a. **Reviews:** NSF, via the CZO Network Steering Committee (SC), will conduct semi-annual reviews to determine the effectiveness of the CZO, individually and as part of the CZO network, and its value to the scientific community. One of these reviews may consist of a visit to the CZO institution and field site by NSF and the SC. The review will include synthesis of scientific results, progress in achieving goals, impact of education and outreach activities, and plans for future work. The SC will submit the review report to the PI and to the cognizant NSF Program Director and the PI should submit a response to the SC's report in an interim report within 30 days.

Between the end of the third year and the end of the fourth year of the award, a team of experts approved by NSF will evaluate the CZO's past performance and plans to continue for another five years. A report covering this review will provide information for the basis of the decision to either allow the submission of a renewal proposal or to terminate the CZO's project by the end of the five-year award period.

- b. **Notice of Termination of Award:** During each year of the project, NSF will evaluate the CZO to determine whether to continue to support its full operation, or to decrease funding in order to phase out NSF support. If a decision is made to phase out NSF support to the CZO, NSF will negotiate at least a six-month phase-out plan with the Awardee. The phase-out plan will give strong consideration to non-cancelable commitments made by the CZO prior to the decision to phase it out and to students and postdocs.
- c. Additional reviews may be conducted as required by NSF.