# United States Geological Survey

Earthquake Hazards Program
External Research Support
http://earthquake.usgs.gov/research/external


Proposals for Grants – Fiscal Year 2019
Program Announcement/Funding Opportunity G18AS00021

Closing Date: May 22, 2018

**PAPERWORK REDUCTION ACT STATEMENT**: The Paperwork Reduction Act says that the agency must tell you why we are collecting this information, how we will use it, and whether you have to give it to us. This information is being collected to determine the eligibility of the applicant and as a basis for approval or disapproval of the proposed research. The purpose of the program is to support research in earthquake hazards and earthquake prediction to provide earth science data and information essential to mitigate earthquake losses. Response to this request is required to obtain and retain a grant, under the Earthquake Hazards Reduction Act of 1977, Public Law 95-124. Public report burden for this collection is estimated to average 45 hours per grant application and 12 hours to prepare a final technical report. The OMB Control Number is 1028-0051 for this information collection; the expiration date is April 30, 2019. Direct comments regarding this collection of information may be sent to the Bureau Clearance Officer, U.S. Geological Survey, 12201 Sunrise Valley Drive, MS807, Reston VA 20192.

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**Highlights, Warnings, and Program Announcement Changes**

**USGS Earthquake Hazards Program External Research Support Announcement for Fiscal Year 2019**

**Grants.gov Subscription**

Principal Investigators (PIs) are urged to sign up for Grants.gov's subscription service to receive notices about the Earthquake Hazards Program grant funding opportunities and possible updates during the application period. Sign up is through the Grants.gov website; our CFDA number is 15.807.

**Research Priorities for Fiscal Year 2019** (see Attachment A)

Each submitted proposals must address applicable priority topic(s).

**Funds and Start Dates**

Applicants must indicate if the proposed start date is fixed or flexible based on the research activities of the proposal. See Section 3.

**Letters of Commitment and Letters of Support**

Read Section 6 and Section 11 carefully as requirements have changed.

**Award Terms and Conditions**

A data management plan is **required** for each proposal. See Attachment D.

It is the expectation of the USGS that Principal Investigators **will publish the results** of funded research in peer-reviewed scientific or technical journals. In addition, all source data and data products and computer codes **must be made readily available** within the public domain.

**DOI Secretarial Priorities**

Evaluation Criteria and Research Priorities have been updated to include Secretarial Priorities. See Section 5, Section 12 Item C1, and Appendix A.

**Questions?**

For Grants.gov issues, see: http://www.grants.gov/applicants/app_help_reso.jsp or http://www.usgs.gov/contracts/grants/grantsgov.html, contact Laura Mahoney, (703) 648-7344, lmahoney@usgs.gov

For Contracting Officer issues, contact Maggie Eastman, (703) 648-7366, mrussell@usgs.gov

For External Research Support Manager issues contact Jill Franks, (703) 648-6716, gd-erp-coordinator@usgs.gov

**Announcement G18AS00021**

The USGS Earthquake Hazards Program (EHP) issues this annual Announcement for assistance to support research in earthquake hazards, the physics of earthquakes, earthquake occurrence, and earthquake safety policy and address the Department of Interior's Secretarial priorities. This activity is authorized by the Earthquake Hazards Reduction Act of 1977 (Public Law 95-124, 42 U.S.C. 7701 et. seq.), as amended by Public Laws 101-614, 105-47, 106-503, and 108-360.

1. **Application Submission Closing Date: May 22, 2018, 6 pm Eastern Daylight Time**

2. **Electronic Application Requirement**

For the FY 2019 funding cycle all proposals shall be submitted electronically via Grants.gov (http://www.grants.gov). Hard/paper submissions will NOT be accepted. Electronic copies submitted via e-mail will NOT be accepted under any circumstances. All proposals must be submitted electronically through Grants.gov on or before:

**May 22, 2018, at 6 pm, Eastern Daylight Time**

**Please be aware that the electronic submission process requires first time users to register using an e-Authentication process. This registration process can be somewhat complex and can take up to 3 weeks to complete. Be advised that it is virtually impossible to begin the process of electronic submission for the first time if you start just a few days before the due date. If you are from a university, contact your Office of Sponsored Programs. They may already have completed the registration process and should work with you to submit the application.**

If you have any questions or problems with the registration process, or the completion of the application package, please contact the grants.gov help desk at 1-800-518-4726 or support@grants.gov

Briefly, when you submit a grant application package to Grants.gov, you will receive a confirmation screen as well as three additional emails over two business days from Grants.gov informing you of your application processing status:
1. Confirmation screen
2. Submission Receipt (with "Track My Application" link)
3. Submission Validation (or Rejection with Errors)
4. Agency Retrieval

CONFIRMATION: Submission Confirmation Screen.
After you submit your grant application package, a confirmation screen will appear on your computer screen. This screen confirms that you have submitted an application to Grants.gov.

NOTIFICATION 1: Submission Receipt Email
Within two business days after your application package has been received by the Grants.gov system, you will receive a submission receipt email which indicates that your submission has entered the Grants.gov system and is ready for validation. This email also contains a tracking number for use while tracking the status of the submission as well as a "Track My Application" link, to use to see the progress of your submission.

**NOTIFICATION 2: Submission Validation Receipt Email – This is the important one!**
After you receive the submission receipt email, the next email you will receive will be a message validating or rejecting your submitted application package with errors. The Grants.gov system is designed to check for technical errors within the submitted application package. Grants.gov does not review application content for award determination. Grants.gov will not post the application if there are errors. Failure to correct errors and submit by the date and time for closing shall not be a reason for accepting a late application.

NOTIFICATION 3: Grantor Agency Retrieval Email
Once your application package has passed validation it is delivered to the grantor for award determination and further approval. After the grantor has confirmed receipt of your application, you will be sent a **third and final email** from Grants.gov. The grantor may also assign your application package an agency specific tracking number for use within their internal system. IF YOU HAVE NOT RECEIVED THIS E-MAIL WITHIN FOUR DAYS OF THE CLOSING DATE, PLEASE CONTACT THE CONTRACTING OFFICER.

If you need help entering your proposal, you can reach the **Grants.gov Contact Center at:** 1-800-518-4726. Their hours of operation are Monday-Friday, 7:00 a.m. to 9:00 p.m., Eastern Time, and they are closed on Federal Holidays.

During the application period an applicant may submit a revised or corrected proposal through grants.gov. Include a cover letter as the first page of the proposal stating that the proposal is revised and indicating that the previous submittal is to be withdrawn from consideration. Such submissions must be completed by **May 22, 2018 at 6:00 pm Eastern Daylight Time**.

See Section 11, Application Preparation Instructions, which describes requirements for the proposal and other application components.

**Please allow sufficient time for the proposal to be submitted electronically through Grants.gov and allow time for possible computer delays. Applicants are strongly advised not to wait until the last minute for submission. A proposal received after the closing date and time will NOT be considered for award. If the USGS determines that a proposal will not be considered for award due to lateness, the applicant will be notified immediately.**

**3. Funds and Start Dates**

A maximum of $7 million will be available for support of research grants and cooperative agreements in FY2019. Based on awards in recent years, 70 to 100 new awards are funded each fiscal year. In general, grants do not exceed $100,000, with the majority of grants between $15,000 and $75,000, and the total for competitive grants of approximately $4 million. This estimate does not bind the USGS to a specified number of awards or to the amount of any award unless that amount is specified by statute or regulation. All projects must propose **start dates between January 1, 2019 and September 1, 2019**. Applicants **must** indicate if the proposed start date is **fixed or flexible** based on the research activities (field work, etc.) of the proposal.

**4. Application Requirements**

A. Proposals must be for a duration of either one or two years with a clearly stated objective for the requested term.
B. The majority, greater than 50 percent, of research activities must be conducted by the Applicant. The Applicant must retain administrative and technical control of project activities.
C. Proposals for geologic investigations shall be clearly oriented toward earthquake hazard research and assessment. Research Priorities are described in Attachment A.
D. USGS personnel are prohibited from assisting any organization in preparing its proposal for competitive funding under this Program Announcement.
E. Proposals to fund research in foreign countries will be considered only if the research is clearly oriented toward providing new knowledge or new techniques transferable to a U.S. seismogenic zone.
F. Proposals to fund research in foreign countries must be based on cooperation with scientific groups in the host countries, with host country personnel being used for operational functions, and host countries providing financial support for such personnel. Proposals involving foreign governments or foreign individuals may require additional coordination and approval by the U.S. Department of State.
G. Applications submitted by foreign organizations must be submitted in English and in U.S. dollars.

## 5. Research Priorities

The Research Priorities presented in Attachment A reflect the mission of the USGS Earthquake Hazards Program (EHP) and address the Department of Interior's Secretarial priorities. Applicants must review the high-priority targets listed in Attachment A for each region and topic in additional to the four major program elements described in Attachment A to determine if application is appropriate under this Program Announcement. Proposals **should** address both applicable program element(s) and priority topic(s).

The USGS EHP operates as an element of the four-agency National Earthquake Hazards Reduction Program, a partnership with the Federal Emergency Management Agency (FEMA), the National Institute of Standards and Technology (NIST), and the National Science Foundation (NSF) and authorized by the Earthquake Hazards Reduction Act of 1977 (Public Law 95-124, 42 U.S.C. 7701 et. seq.), as amended by Public Laws 101-614, 105-47, 106-503, and 108-360. Each of these agencies has established focus areas as defined by the cited Public Law and by past assistance and procurement activities; grant applications to the EHP must be for research or hazard assessment within the EHP's focus areas as described in Attachment A.

## 6. Collaborative Proposals

Two types of collaborative proposals are acceptable: Collaboration between two or more external organizations that are seeking funding from the USGS/EHP External Research Support and collaboration between an external organization seeking such funding and a USGS/EHP internal project. Collaborative proposals are **not** instances where persons from a second organization are hired as consultants or other contractual agreements to conduct work on behalf of the grant or cooperative agreement recipient.

Please note that collaborative research between a USGS internal project and external investigator(s) must be structured such that neither project could succeed without the other being funded. While many external research projects either directly or indirectly support or cooperate with ongoing internal USGS projects, these projects are **not** considered collaborative projects because their research objectives can be pursued with or without the existence of the internal USGS research.

A. For collaborative proposals that propose work by two or more separate institutions or organizations, each individual organization must accept responsibility for specific parts of the work proposed. A separate proposal must be submitted from each external organization involved in collaborative studies. Major sections of each proposal shall be **identical** and each proposal must clearly define the objectives to be performed by each organization, and each institution shall submit a **separate** budget, which clearly reflects their objectives and responsibilities.
B. Each Principal Investigator and his/her institution that is recommended for funding will receive a separate grant or cooperative agreement and shall accept financial responsibility for administering the grant and technical responsibility for submitted required technical reports.
C. Collaborative proposals must be clearly identified in the proposal title. The application title shall read "Proposal Title: Collaborative Research with First Institution name, and Second Institution name."
D. Recipient of collaborative awards must submit one Progress Report (for 2-year awards) and one Final Technical Report, incorporating the efforts of all collaborators.
E. USGS reserves the right to fund only some of the Applicants involved in a collaborative study.
F. In the case of collaborative proposals involving external organizations and USGS-EHP scientists, the external proposal **must include a letter of commitment** from the relevant internal USGS-EHP scientist(s) stating that the scientist(s) has included specific efforts in his/her agreed-upon internal work plan for the period of time of the proposal to EHP. The proposal to EHP and letter of commitment must fully describe the degree of collaboration and the relationship between the internal and external planned/proposed efforts. The letter(s) of commitment will be the last page(s) of the submitted proposal and will not count toward the 25-page limit.

**7. Two-year Proposals**

Most proposals are funded for one year; all work that can be completed in one year should be proposed as a one-year project. However, if the proposed work is such that two years are required to complete the research, then a two-year proposal is appropriate and should be submitted. Applicants should carefully consider their time commitments and request the required grant duration and funding to accomplish the project goals. The peer review panel may recommend funding only the first year of a two-year proposal when the proposed research is easily divided into two, one-year projects or when they feel that results from the first year's proposed work will need to be evaluated before a second year of research can be considered. Applicants should be sure to address the stipulations for two-year proposals in item 11, section F2.

The second year of funding of a two-year grant is contingent upon the availability of funds and satisfactory progress by the Recipient. Progress will be determined through technical review of a Progress Report by the External Research Support Manager and his or her agent. The Progress Report shall be submitted by the Recipient, in accordance with grant award Special Terms and Conditions (see Attachment D).

**8. Out-of-Cycle Awards**

The USGS may accept proposals outside of the normal competitive cycle under **very limited** circumstances:

A. Research proposals may be accepted and approved out-of-cycle (after the closing date) only in cases where there is compelling circumstance or emergency (*e.g.*, seismic event), which must be acted on before the next competitive review cycle. Proposers should contact the appropriate Regional or Topical Coordinator prior to submitting out-of-cycle proposals.
B. Congress mandates directed awards to support activities that evaluate earthquake hazards and losses. In this case, the USGS will solicit applications.

**9. Unsuitable Proposals**

The following proposals are ineligible for consideration under this Announcement:

A. Proposals for regional seismic monitoring or establishing Data Centers.
B. Proposals for long-term operation of geodetic networks or instruments.
C. Proposals from U.S. Government agencies or U.S. Government employees.
D. Proposals from Federally Funded Research and Development Centers (FFRDC).
E. Proposals in which there is a real or apparent conflict of interest.
F. Proposals principally involving the direct procurement of a product, equipment, or service.
G. Proposals having subcontracts for 50 percent or greater of total direct costs. (This requirement is based on the importance of the Principal Investigator (PI) as an evaluation factor; applicants may request a waiver [within their application] based on any unique circumstances within their proposal.)

**10. External Research Projects Previously Supported by the USGS EHP**

Lists of current and past supported projects may be obtained from the External Research Support web site: http://earthquake.usgs.gov/research/external

**11. Application Preparation Instructions**

Your electronic submission shall consist of forms SF-424, SF-424A, and SF-424B, plus the items described below. No additional documents or materials may be submitted. Failure to comply with the required application components listed below may result in the proposal being rejected. The USGS cannot request or receive supplemental or

replacement application components after the closing date/time under this Program Announcement.

To view complete forms instructions, please visit the Grants.gov Forms Repository at http://www.grants.gov/web/grants/forms.html

Items A through F as described below **shall be combined together into one document, in the order noted below**, and submitted through Grants.gov in either MS Word or PDF format. The application **shall not exceed 25 single-spaced pages** (including figures, tables, references, appendices, curriculum vitae, etc.), and the **type size shall not be smaller than 11 point**. All pages of the application shall be numbered. All text, figures, and tables shall be sized to fit on 8½" by 11" paper. The SF forms and letters of support/commitment do **not** count toward the 25-page limit. The application shall be in color as needed for review by peer review panel members.

In the Grants.gov forms, floating your mouse over a field will provide instructions for completing that field. You can also click on the Check Package for Errors button to check the entire application for validation errors (incomplete fields, etc.)

The application submitted through grants.gov as the Project Narrative Attachment Form (in MS Word or PDF format) shall be **assembled in the following order:**

A. Proposal Information Summary. This summary is mandatory for the Grants.gov submittal for each proposal. The same format, with ALL information as shown in Attachment B shall be included in each applicant's Grants.gov submittal. The two- or three-letter panel designation shall be indicated in Item 1. **If you do not submit this page, your proposal will be rejected**.
B. Abstract. The abstract shall be no longer than one single-spaced page. It shall include identification of the problem, a summary of the approach, project objectives, anticipated results, and the implications of the project results.
C. Table of Contents.
D. Budget Summary. The proposed budget shall be presented in two parts: a one-page summary, which shall be in the format shown in Attachment C. The detailed budget is described item E below.
E. Detailed Budget. The detailed proposed budget shall be keyed to the Budget Summary. Non-federal funds available to support the project may be reflected in the detailed budget or the SF 424, as appropriate.
For **two-year projects**: The Applicant shall provide summary information (see Attachment C) as well as a detailed budget for the second year. The SF 424 shall reflect both years.

The detailed budget **must** include the amount proposed for each of the following items in this order:

1) Salaries and wages. Identify individuals by name and position, estimated hours or percent of time, and the rate of compensation proposed. Include an explanation of the amounts included for projected increases if the rate of pay shown is higher than the current rate of pay. Identify each person with a objective in the project. Principal Investigator time should be limited with majority of salary for students. **Tuition** remission and other forms of compensation paid as, or in lieu of, wages to students performing necessary work are allowable provided that the tuition or other payments are reasonable compensation for the work performed and are conditioned explicitly upon the performance of the work. Tuition and/or tuition remission should be identified in this section of the budget.
2) Fringe benefits/labor overhead. Indicate the rates/amounts in conformance with normal accounting procedures. Explain what costs are covered in this category and the basis of the rate computations. Indicate whether rates are used for proposal purposes only or whether they are also fixed or provisional rates for billing purposes.
3) Equipment. Show the cost of all special-purpose equipment necessary for achieving the objectives of the project. "Special-purpose equipment" means scientific equipment having a useful life of more than 1 year and having an acquisition cost of $5,000 or more per item. Each item should be itemized and include a full justification and a dealer or manufacturer quote, if available. General-purpose equipment must be purchased from the applicant's operating funds. Title to non-expendable personal property

shall be vested solely with the Recipient. Under **no** circumstances shall property title be vested in a sub-tier recipient.

4) Supplies. Enter the cost for all tangible property. Include the cost of office, laboratory, computing, and field supplies separately. Provide detail on any specific item, which represents a significant portion of the proposed amount. If fabrication of equipment is proposed, list parts and materials required for each and show costs separately from the other items.
5) Services or consultants. Identify the objectives or problems for which such services would be used. List the contemplated sub-recipients by name (including consultants), the estimated amount of time required, and the quoted rate per day or hour. If known, state whether the consultant's rate is the same as she/he has received for similar services or under Government contracts or assistance awards. Note the restriction on sub-recipients efforts indicated in section 4. Application Requirements.
6) Radiocarbon or other dating. Include the **type of analyses, number of samples, cost per sample, and facility** likely to perform the analyses. If the dating is to be done at a national lab, include the full contact information for the contact at the lab.; a separate award will be made to the national lab, however, include the costs within the grant application budget.
7) Travel. State the purpose of the trip and **itemize** the estimated travel costs to show the number of trips required, the destinations, the number of people traveling, the per diem rates, the cost of transportation, and any miscellaneous expenses for each trip. **For travel requested to meetings or conferences, include a description of the benefit to the proposed project. Failure to provide this information may result in a determination of the cost as unallowable.** Calculations of other special transportation costs (such as charges for use of applicant-owned vehicles or vehicle rental costs) should also be shown.
8) Publication costs. Show the estimated cost of publishing the results of the research. Include costs of drafting or graphics, reproduction, page or illustration charges
9) Other direct costs. Itemize the different types of costs not included elsewhere; such as, shipping, telemetry, computing, and equipment-use charges, not specifically identified for other budget sections, above. Provide breakdowns showing how the cost was estimated; for example, computer time should show the type of computer, estimated time of use, and the established rates.
10) Total direct costs. Total items 1 through 9.
11) Indirect cost/general and administrative (G&A) cost. Show the proposed rate, cost base, and proposed amount for allowable indirect costs based on the cost principles applicable to the Applicant's organization. G&A should not be calculated for any tuition remission. If the Applicant has separate rates for recovery of labor overhead and G&A costs, each charge should be shown. Explain the distinction between items included in the two cost pools. The Applicant should propose rates for evaluation purposes, which they are also willing to establish as fixed or ceiling rates in any resulting award. NOTE: A copy of the indirect negotiated cost agreement with the Federal Government will be requested from all applicants recommended for an award. This request will be made at the time of recommendation notification. **Please note that in the absence of a negotiated cost agreement, the maximum indirect rate that may be charged is 10% (see Section 200.414(f) of the Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards).**
12) Amount proposed. Total items 10 and 11.
13) Applicant's contribution to Project Cost Total project cost.
14) Total Federal and non-Federal amounts, if any.

F. Proposal: The description of the proposed research shall consist of the following parts:

1) Significance of the project. In a separate paragraph of the proposal, discuss the specific problem addressed and its importance. Describe **the significant contribution the project will make to one or more of the Priority Topics under the 10 Research Areas in Attachment A. This description must be included.**
2) Project plan. Discuss the specific hypotheses or research questions, the conceptual framework or model to be used, as well as the data collection and analysis plans, and relationship with past studies. Plans should also include procedures to be used to insure objectivity and balance in the project. Include project milestones and related due dates for the proposed work and required reports (See

Attachment D, Sections 3 and 4). Time allocations, responsibilities for the project staff members, and level of effort for personnel **must** also be described separately for each year of the proposal; this is critical for two-year proposals.

3) Final report and dissemination. The USGS considers dissemination of research data and results to potential users of those results to be an integral and crucial aspect of projects it funds. Beyond the requirements for a final technical report, describe your plan for dissemination of project data and results and the planned users of those results that will result in the greatest possible benefit to earthquake hazards reduction. Include a data management plan stating where any data generated by the project will be archived and made available to other researchers.
4) Related efforts. Describe significant, related studies conducted by members of the research team and discuss any planned coordination with other workers in the field. Include descriptions of current and recent USGS/EHP External Research Support grants or cooperative agreements, the relationship of those to this proposal (if any), and relevant results from previous grants or cooperative agreements.
5) Project personnel and bibliography of directly related work. Provide curriculum vitae for all professional staff, summarizing education, experience, and the last five years' bibliographic information related to the proposed work; a length of one-page is recommended. Curriculum vitae for non-PI researchers who contribute significantly to the project **must** also be included.
6) Institutional qualifications. State the resources available at, and the relevant experience of, the institution. Resources include personnel, computer and library facilities, and ties to both sources of data and potential users of the results.
7) Current support and pending applications. List all sources of support (in addition to the proposed effort) to which the senior research members have committed a portion of their time for the period covered by the proposal. The information should account for 100 percent of the work time of each investigator and include titles, annual budget levels, period of the awards, and the person-months committed in each case. This section must also list research being considered by, or that will be submitted to, other possible sponsors. If identical or similar work is also proposed to another institution (e.g., National Science Foundation), an explanation of the relationship of such work to this proposal should be provided.

8) Past USGS-supported projects. List the total amount of funding per year for which support was provided by the USGS for previous work related to the proposed research effort, as well as the duration of each award (including no-cost extensions) and the total number of person-months committed by each Principal Investigator each year.
9) References.
10) Letters of Support. Letters of Support are useful for all proposals that include coordination with or participation by researchers at institutions other than those submitting the proposal. These letters do not count toward the 25-page limit. Such letters are **not** acceptable from USGS EHP scientists and **will be removed from consideration prior to proposal review.** Instead, **Letters of Commitment** are acceptable and useful from USGS EHP Scientists that are directly collaborating with the proposal submitters. **See Section 6, Collaborative Proposals** for requirements for writing appropriate letters of commitment from USGS EHP Scientists.

**12. Evaluation of Applications and Funding Decisions**

A. Proposals pertinent to one of the nine research areas will be evaluated by multi-disciplinary peer review panels. The panel members read all the proposals assigned to their panel prior to their meeting and at the panel meeting discuss each proposal according to the evaluation criteria. The four to seven panel members are scientists and engineers drawn from academia, Federal, State, local, and regional agencies, non-profit organizations, and private industry. In addition, one USGS member is often chosen for each panel. The panels

will evaluate the technical merit of the proposals especially in the context of development of an integrated program of investigations for that region with attention to the research priorities (see Attachment A). The peer review panel votes on each proposal based on the criteria in section C below; panel rankings are the principal determination of proposal success pending available funds. The panels include five regional panels, and four topical panels for engineering seismology and impacts, earthquake physics (with a sub-topic for induced seismicity), earthquake early warning, and the National panel focused on Research activities specific to the National Seismic Hazards Maps and to the National Earthquake Information Center (NEIC). Applicants **must indicate in the Proposal Information Summary (Attachment B)** the panel that is most appropriate for their proposal. Although it is required to indicate the panel when submitting a proposal, **the USGS Regional or Topical coordinator reserves the right to reassign proposals to a more appropriate panel as necessary.**

The panels and their designations are as follows:

| **Designation** | **Panel Name** |
|---|---|
| CEUS | Central and Eastern United States |
| EEW | Earthquake Early Warning Research |
| ESI | Engineering Seismology and Impacts |
| EP | Earthquake Physics Research |
| IS | Induced Seismicity (sub-topic of Earthquake Physics) |
| IMW | Intermountain West |
| NAT | National |
| NC | Northern California |
| PNA | Pacific Northwest and Alaska |
| SC | Southern California |

**Applications can be directed to only <u>one</u> panel**. If unsure of which panel is most appropriate, contact the applicable Regional or Topical coordinator (see Attachment A).

B. Following the peer panel reviews, the USGS will make funding decisions and will notify applicants of one of three possible decisions: the proposal has been recommended for funding at full or reduced levels of support, subject to appropriations; the proposal is being declined and will not be funded; or the proposal is on hold, and may be funded if sufficient funds become available during the fiscal year in question. The USGS intends to provide initial notifications to the institution and PI by the end of December. For proposals that are placed on hold, secondary notification regarding funding will be provided in or before the following February or when appropriations are known.

C. All proposals are considered in accordance with the criteria set forth below:

1) <u>Relevance and timeliness</u>. This factor considers the relevance and timeliness of the proposed research activities as they relate to the USGS Earthquake Hazards Program goals and address the Department of Interior's Secretarial priorities, including regional emphasis where appropriate (see Attachment A).
2) <u>Technical quality of the proposal</u>. This factor considers the scientific merit of the proposed approach and the probability of achieving positive results within the designated period.
3) <u>Competence and recent research performance of Principal Investigator (PI) and research team.</u> This factor considers the scientific and technical competence and recent research of the PI and team and the promptness with which the research results were disseminated to the scientific community from previous funding. This factor includes performance records and capability to provide the necessary facilities and support that will ensure satisfactory completion of the proposed work. This factor includes the timely publication of project results and data in peer-reviewed scientific and technical journals, the impact of the results, and whether reporting requirements from previous USGS awards have been satisfied.
4) <u>Appropriateness and reasonableness of the budget</u>. This factor considers whether the proposed budget is commensurate with the level of effort needed to accomplish the project objectives and whether the cost of the

project is reasonable relative to the value of the anticipated results.

D. The peer review panels make recommendations and provide advice by ranking proposals into priority groupings based on the scores related to the criteria described above. The results of the peer review will assist the USGS in making final award determinations under this Announcement.

**13. Rejection of Applications after Initial Review**

If an application does not meet all requirements specified in the Announcement, as determined by the Contracting Officer in consultation with the External Research Support Manager, the institution and principal investigator will be promptly notified that the proposal will not be reviewed indicating the reason for its rejection.

**14. Involvement of Federal Employees**

Federal employees, including USGS employees, are prohibited from serving in any capacity (paid or unpaid) on any application submitted under this Announcement; federal employees may not assist in the development of proposals. Proposals that have a real or apparent conflict of interest related to Federal employees will not be processed for evaluation. This does not prohibit cooperation or collaboration between USGS and non-USGS scientists once a grant or cooperative agreement is in place. Section 6 describes collaborative proposals.

**15. Award Terms and Conditions**

Award Recipients must comply with grant award Special Terms and Conditions (Attachment D) and Cost Principles, Audit, and Administrative Requirements (Attachment E). Submittal of an application constitutes the applicant's acceptance of these terms and conditions for inclusion in any award resulting from their application. Any concerns with the requirements of the Special Terms and Conditions shall be presented to the Contracting Officer at least three (3) days prior to the closing date of the Announcement. Please be aware of the following are additional conditions:

A. No pre-award costs are authorized.
B. No-Cost Extensions to the Project Period: No-cost extensions are discouraged. The USGS/EHP awards grants and cooperative agreements for research that extends or supplements the ongoing research within the USGS. The timely conduct of funded projects is of great importance to the achievement of the goals of the program. Applicants should consider their time commitments at the time of applying for a grant. Requests for no-cost extensions will be considered on a case-by-case basis. Applicants should supply documentation supporting their request for an extension, as described in Attachment D, Section 5.
C. Supplemental Funds: Increases in funds beyond the amount awarded are also discouraged. The peer review panels recommend funding at a rate commensurate with their judgment of the scientific merit of a proposal and their expert knowledge of the expenses likely to be incurred in the conduct of the research. The USGS is aware that the course of any research cannot always be predicted. However, the bulk of the funds available for grants and cooperative agreements are expended early in the fiscal year and little is retained for expenses beyond emergencies or special opportunities for the program. Requests for increased funding will be considered on a case-by-case basis. Applicants should supply documentation supporting their request for increased funding.
D. Dissemination of Results: When award recipients have completed their studies, a Final Technical Report must be submitted within 90 days; these reports will be posted at http://earthquake.usgs.gov/research/external. It is the expectation of the USGS that Principal Investigators will publish the results of funded research in peer-reviewed scientific or technical journals. In addition, all data products and computer codes must be made readily available within the public domain.

**16. Payment to Foreign Recipients**

The Department of the Interior requires all payments under financial assistance awards be made using the Department of the Treasury Automated Standard Application for Payments (ASAP) system. HOWEVER, ASAP

cannot make payments to foreign recipients. As such, payment to foreign recipients will be made by Treasury Check in U.S. funds upon receipt of properly prepared SF-270, “Request for Advance or Reimbursement”. Requests should be submitted on quarterly basis. Payments may be drawn in advance only as needed to meet immediate cash disbursement needs.

Foreign recipients are further advised that, although ASAP cannot handle foreign recipients, a waiver from use of ASAP **is** required. This waiver is processed by the USGS and no award may be issued until such time as the waiver is approved.

**USGS Earthquake Hazards Program Research Priorities for FY2019**

The USGS Earthquake Hazards Program (EHP) Research Priorities presented here reflect its mission within the National Earthquake Hazards Reduction Program (NEHRP) and address the Department of Interior's Secretarial priorities to protect our people reduce loss of lives and property from earthquakes and improve public safety and community resilience in the Nation.
Applicants should review the four major program elements described below and the priority research targets listed below for each region and topic. Proposed work should advance the science that underlies EHP products by posing and testing new hypotheses and/or developing novel data acquisition tools, analysis methods, and products. While proposed projects may involve collection of data and/or application of existing analysis methods, such activities should be in support of clearly stated research goals. Proposals focused on development of new products must demonstrate strong collaboration with intended users.

Element I. **National and regional earthquake hazards assessments.** The EHP publishes national and regional assessments of the expected degree of ground shaking over various time periods. These products, developed from research on earthquake locations, magnitudes, recurrence, and ground motions, are the basis of the seismic safety elements of building codes affecting construction nationwide. The EHP also prepares forecasts of future earthquake probabilities, as well as scenario ground motion maps of the expected shaking and ground deformation. These products support the development of cost-effective mitigation measures and practices in structure design, construction, and land use planning. The USGS is particularly interested in research that results in improvements to the National Seismic Hazard Model (NSHM), and to assessing earthquake hazards in large metropolitan areas. Models of seismic source, ground-motions, and site effects that may be directly incorporated into the NSHM are sought.

Element II. **Earthquake information, monitoring and notification.** The EHP supports efforts to improve the accuracy of algorithms and processes that provide information about earthquakes in near-real-time, including early warning, improved detection and location techniques, estimation of finite fault rupture extent, and refined seismic moment determinations. However, routine monitoring activities are evaluated and funded under a separate solicitation for seismic and geodetic network operations.

Element III. **Research on earthquake occurrence, physics, effects, impacts, and risks**. Earthquake impact and risk assessments help emergency managers, planners, and the public prepare for future earthquakes. With the goal of improving hazard assessments, earthquake forecasts, and earthquake monitoring products, the EHP supports applied research on earthquake processes and effects. This work is focused on multi-disciplinary observations, theory, experiments, and development of testable models of earthquake and tectonic processes and of earthquake effects (e.g., ground shaking, ground failure, and structural response).

Element IV. **Earthquake safety policy and communication.** The EHP produces data and information on earthquakes and related hazards, but the production of data and reports alone is not sufficient to reduce earthquake risk; the Program also takes an active role with the user community in the application and interpretation of Program results. Active engagement with our user community provides opportunities for dialogues on modifications to our existing products and new products that make our work and results more relevant and applicable. The EHP supports opportunities for engaging the user community at both the national and regional levels. **See Section 1 for earthquake safety policy and communication priorities common to all Research Areas. Proposals for research on earthquake safety policy and communication applicable to a specific area should be submitted to the relevant regional or topical Research Area.**

The above four Elements are integrated into ten Research Areas—five regional and three topical areas plus a National

category and an Induced Seismicity sub-topic**:**

1. Central and Eastern United States (CEUS): The United States east of the Rocky Mountains, including Puerto Rico and the U.S. Virgin Islands;
2. Engineering Seismology and Impacts (ESI): Basic and applied, geographically broad research on the natural effects of earthquakes, and their impacts to the built environment; geotechnical, civil and structural studies; and research and development tied to the National Earthquake Information Center (NEIC).
3. Earthquake Physics (EP): Basic and applied, geographically broad research on the physics of earthquakes;
4. Induced Seismicity (IS): A sub-topic of Earthquake Physics (EP), basic and applied research on the physics of induced earthquakes;
5. Earthquake Early Warning (EEW): Basic and applied research to improve the accuracy, reliability, and timeliness of earthquake early warning alerts generated by ShakeAlert;
6. Intermountain West (IMW): Seismically active regions of the Intermountain West;
7. National (NAT): Research applicable nationally, especially activities related to the National Seismic Hazard Model;
8. Northern California (NC): From Cape Mendocino to the central creeping section of the San Andreas fault and the adjacent Coast Ranges, with particular emphasis on the greater San Francisco Bay Area;
9. Pacific Northwest and Alaska (PNA): Washington, Oregon, California north of Cape Mendocino (Cascadia), and Alaska;
10. Southern California (SC): From the Carrizo Plain south to the international border with Mexico.

Please also note that the USGS has developed a blueprint for advancing science and resilience from subduction zone hazards entitled *Reducing Risk Where Tectonic Plates Collide – A Plan to Advance* ***Subduction Zone Science***. The new plan emphasizes scientific and technologic developments, improved hazard assessments, addressing stakeholder needs and maximizing capabilities through partnerships to reduce the risks posed by subduction zone events. The Plan focuses on three themes: (1) advancing observations and models of subduction zone processes, (2) quantifying natural hazards and risk and (3) forecasting and situational awareness. For each of these themes, the plan describes USGS accomplishments and current capabilities, discusses specific knowledge and capability gaps, describes scientific frontiers, and summarizes key questions, needed research, required investments and resulting products. The EHP encourages research proposals responsive to these themes. Please direct these proposals to the most appropriate regional or topical category.

Proposals for research on earthquake occurrence and effects applicable to a specific topic or region should be directed to the relevant topical or regional panel. Proposals addressing earthquake research that is national in scope, is in support of the National Seismic Hazard Model should be directed to the National (NAT) panel. Proposed research to improve algorithms and processes that provide information about earthquakes that are invariant to geography should be sent to Engineering Seismology and Impacts (ESI) panel. Proposals for research on foreign earthquakes should be directed to the panel for the U.S. region or topic that will most benefit from the study's knowledge or to where new techniques would be most transferable. **If uncertain, please contact one or more of the regional and/or topical coordinators to determine the most appropriate category.**

**Proposals submitted in response to this Program Announcement must indicate the regional or topical area that the proposed research addresses; if the proposal addresses a specific priority noted in this attachment it must also be indicated. Although it is required to indicate the regional or topical research area when submitting a proposal, upon initial review, the regional and topical coordinators reserve the right to move proposals to the most suitable Regional or Topical Research Area.**

Regional and topical coordinators are available to assist applicants by describing related work being done internally within the USGS, identifying existing relevant data sets, and helping applicants establish contacts with USGS researchers working in similar areas. Coordinators are listed below in the descriptions of the priorities for each panel.

Descriptions of USGS internal projects can be found at: http://earthquake.usgs.gov/research. It is **strongly recommended** that the applicant contact the appropriate regional or topical coordinator and other USGS points of

contact to learn whether the proposed work duplicates work being done internally, and how their proposed work can complement and help support the goals and objectives of internal efforts.

Applicants are encouraged to use seismic monitoring data, including structural monitoring data, from the Advanced National Seismic System (ANSS). Specific ANSS coordination priorities are included in several of the regional and topical priority areas, below.

The EHP strongly encourages proposals for collaborative research making use of the National Science Foundation's (NSF) *EarthScope* facilities or Natural Hazards Engineering Research Infrastructure (NHERI), as long as these proposals address EHP goals and objectives. Proposals for EarthScope- or NHERI-related projects that are not directly related to EHP goals and objectives should be directed to NSF. In particular, EHP does not tend to fund proposals related to ground remediation, engineering mitigation strategies, site- or material-specific geotechnical analyses, or elaborate structural modeling.

**Following are priority objectives for the EHP Program Elements for each regional and topical area. We emphasize that this listing of Priority Topics is not an exclusive listing of all potential research topics, and is not intended to discourage submission of proposals to accomplish other important objectives. We encourage discussions with the regional and topical coordinators before proposing work outside of these listed priorities.**

**1. Common Priority Topics for all Research Areas (CEUS, ESI, EP, EEW, IMW, NAT, NC, PNA, SC)**
Contact one of the Regional or Topical Coordinators to learn more about the status of internally supported projects or to discuss potential proposals.

Element IV. **Earthquake safety policy and communication.**

- Organize collaborative and educational workshops and community outreach on important problems in regional and local urban areas, such as: earthquake mitigation, preparedness, and resilience; community velocity models; defining priority faults for further study; fault setback planning, or similar.
- Improve and coordinate earthquake information websites as a comprehensive resource for education, and emergency management tools, for disseminating earthquake information, earthquake hazard products, and post-earthquake information.
- Engage user communities to assess the efficacy of existing earthquake products, and elicit their suggestions for improvements and new products.
- Develop new metrics and tools for conveying seismic hazard and increasing awareness to the general public and targeted user groups, such as emergency responders, public utilities, risk managers, decision makers, developers, and engineers.
- Develop approaches to provide earthquake hazard information needed for risk assessments, and earthquake mitigation and response planning to decision makers, emergency responders, and the public, particularly that cross local, state, and national boundaries and various levels of government.
- Communication, education and outreach to increase the awareness of earthquake early warning and to help ensure that appropriate actions are taken when warnings are received in the future.

**2. Priority Topics for Research in the Central and Eastern U.S. (CEUS)**
**Coordinator: Thomas Pratt, tpratt@usgs.gov**

Much of the research in the CEUS is used for refining seismic hazard estimates encapsulated in the National Seismic Hazard Model, which is used in the development of appropriate building codes and for emergency planning. Hazard assessments for the CEUS are based largely on the historical earthquake catalog and a few fault specific sources, so identifying and characterizing active faults that have hosted large earthquakes are high priorities. A second major priority is improving and reducing uncertainties in estimates of strong ground motions for the National Seismic Hazard Model, in particular for areas with extensive sediment layers such as the Atlantic Coastal Plain and Mississippi Embayment regions. A third major priority is to understand the causes of seismicity in this intraplate setting.

Contact the CEUS Coordinator to learn more about the status of internally supported projects or to discuss potential proposals. **Studies of CEUS earthquakes resulting from human activities such as wastewater injection should be directed to the EP panel (see Section 4.1).**

CEUS Element I. **Regional earthquake hazards assessments.**

- Assess the seismic potential of earthquake source zones in the CEUS using geological, paleoseismological, paleotsunami, seismological, and geophysical studies, and studies of historical accounts. New LiDAR data acquired in the New Madrid region and the Virginia epicentral area in 2012–2015 is publicly available to assist in these studies at OpenTopography.org (New Madrid) and at the USGS National Elevation Dataset site (http://viewer.nationalmap.gov/viewer/).
- Improve assessments of the earthquake potential of the Puerto Rico trench and Antilles subduction zone, and associated hazards to the U.S. Caribbean territories and Atlantic seaboard.
- Conduct reconnaissance studies of CEUS regions outside of known source zones to assess whether there is a history of strong ground shaking.
- For the epicentral region of the 1886 earthquake near Charleston, SC, and the New Madrid region that hosted the 1811-1812 earthquakes, priorities include identifying and characterizing the Quaternary faults and their earthquake history, and determining and describing the tectonic processes that cause earthquakes in these specific areas and not in adjacent, less seismically active areas.
- Reduce uncertainties in the interpretation of GPS data in regions with low rates of seismic strain accumulation, and use geodynamic modeling for assessment of earthquake-generation processes.
- Estimate tectonic earthquake source characteristics (including stress drop), calibrate seismic magnitude scales, and characterize wave propagation and attenuation including basin effects.
- Improve estimates of site response and liquefaction potential using field experiments and instrumental recordings of local earthquakes in the CEUS, or large intraplate earthquakes in analog regions.
- Constrain ground motion assessments at seismograph stations through site characterization studies of key seismic stations in the region.

CEUS Element III. **Research on earthquake occurrence, physics, and effects.**

- Develop physical models of long-term deformation in intraplate areas including both onshore and offshore areas of the CEUS. Proposals may address topics such as the causes of large earthquakes, regional migration of seismicity, and earthquake clustering.
- Systematically evaluate the temporal and spatial distributions of foreshocks and aftershocks of intraplate earthquakes to improve, for example, declustering of seismic catalogs and understanding of earthquake processes. Determine whether seismic areas represent aftershocks of larger prehistoric earthquakes.

CEUS Element IV. **Earthquake safety policy.** See Section 1.

**3. Priority Topics for Research on Engineering Seismology and Impacts (ESI)**
**Coordinator: David Wald, wald@usgs.gov; Eric Thompson, emthompson@usgs.gov**

The EHP supports basic and applied, geographically broad geotechnical, civil and structural studies into the ***effects*** of earthquakes on the natural environment, including ground deformation (liquefaction, landslides, lateral spreading), and related ***impacts*** to the built environment. Research and development related to the National Earthquake Information Center (NEIC) science, products, and earthquake information is welcome, but integrative efforts with USGS/NEIC operations should indicate to what the degree it has been coordinated or planned. Contact the ESI Coordinators to learn more about internally-supported projects, or to discuss potential proposals.

ESI Element I. **National and regional earthquake hazards assessments.**

- Improve predictive models of earthquake-triggered ground failures including landslides and liquefaction that can be characterized and employed at regional/global scales rather than site-specific material behavior studies. The EHP program encourages both the development of innovative new models and efforts to validate/refine existing models through comparison with macroseismic observations, case histories, and development of new inventories of earthquake-induced ground failure.
- Important issues for regional-scale models include the characterization and triggering influence of the most pertinent loading parameters ground failure (e.g., peak and frequency- and duration-dependent intensity measures), the use of susceptibility proxies for ground water table, grain size distribution, and rock strength.

ESI Element II. **Earthquake information, monitoring and notification.**

- The EHP supports efforts to improve algorithms and processes to provide information about earthquakes in near real time, including early warning, and the estimation of rupture extent (for example, the integration of multiple data sets in spatial/temporal finite fault rupture estimations, approaches to estimate uncertainties in fault rupture extent, etc.). Please note that all other monitoring and notification activities are evaluated and funded under a separate solicitation for seismic and geodetic network operations.
- In coordination with USGS personnel, develop new products and procedures that will allow the USGS to deliver more rapid and/or more accurate post-earthquake loss and risk information. Focus should be on shaking-induced casualties, building vulnerability, and loss estimation for domestic and worldwide events, as well as the impacts of secondary effects (including landslides, lateral spread, and liquefaction).

ESI Element III. **Research on earthquake occurrence, physics, ground motions, effects, impacts, and risks.**

- Improve predictive relationships between strong ground shaking and damage in buildings and other structures, including soil-structure interaction.
- Develop tools to use data from instrumented structures to predict earthquake response, monitor structural health, and assess the level of damage. Develop probabilistic methods to describe building performance in response to strong shaking**.** We encourage the use of data from ANSS instrumented structures (http://strongmotioncenter.org).
- Investigate other ground motion properties, including coherence and variability, spatial correlation structure, ground motion duration and other energy-related parameters, and the spatial cross correlation between different ground motion parameters as needed for engineering and loss analyses.

ESI Element IV. **Earthquake safety policy.** See Section 1.

**4. Priority Topics for Research on Earthquake Physics and Occurrence (EP)**
**Coordinator: Nicholas Beeler, nbeeler@usgs.gov**

Research priorities for Earthquake Physics and Induced Seismicity are considered by a combined panel with a sub-panel of supplemental reviewers, as needed and based on the required expertise. Priorities specific to each topic are listed separately below and applicants should direct their proposals to the most applicable topic (EP or IS).

Understanding earthquake phenomena and evaluating earthquake hazards requires research on the controlling processes. The EHP supports field, geophysical, seismological, laboratory, theoretical and numerical studies to address these needs and to contribute to improved hazard assessment and risk mitigation throughout the U.S. Contact the EP Coordinator to learn more about internally supported projects or to discuss potential proposals.

EP Element III. **Research on earthquake occurrence, physics, and effects.**

- Refine and evaluate existing models, compile observational data to test models, or develop and test new predictive models for earthquake occurrence, failure, time to failure, frequency-magnitude distributions, and clustering. Goals of such efforts could be developing and rigorously testing methods for Operational Earthquake Forecasting of aftershock probabilities or developing testable probabilistic or deterministic models for the earthquake cycle and recurrence. Validate and test such models within the Collaboratory for the Study of Earthquake Predictability (CSEP). Develop new methods for the testing and validation of these models and understanding the effects of changing catalogs and data uncertainties on the forecasts.
- Develop strategies for estimating time-dependent earthquake probabilities and the likelihood of strong shaking, accounting for time since the last event and to reflect complex phenomena such as non-uniform earthquake slip, earthquake clustering, fault interactions, transient deformation, cascading ruptures, and changeable or non-existent fault segment boundaries. Develop testable physical models and theory of multi-fault or multi-segment interactions, in particular addressing what factors control the location, occurrence time, and extent of large earthquake ruptures.
- Quantify processes controlling fault stress and strain accumulation, transfer, and release in both interplate and intraplate settings. Reconcile deformation rates inferred from geodetic, geologic, and seismic observations, and differences between depth of seismic rupture versus the "locking" depth based on geodetic or heat flow analysis, in particular whether large earthquakes rupture into areas that are apparently slipping steadily during the interseismic period. Better determine the origin, mechanisms and duration of post-earthquake deformation, including the relation of aftershocks and other triggered seismicity to deformation and pore fluid pressure in and below the seismogenic zone.
- Refine and test fault constitutive laws, over the earthquake cycle, through laboratory, field, and seismic observations, heat flow studies, and numerical modeling. Use samples, core cutting analyses, downhole measurements and monitoring results from fault-zone drilling projects, where relevant. Determine relations among fault properties, the dynamics of the earthquake source and ground motion.
- Develop theory, models, and make field and laboratory measurements of fault zone properties, including damage, permeability, dilatancy, localization, alteration, mineralogy, roughness, shear zone width, and evolution with accumulated offset and shear strain. Determine differences in the physical properties among plate boundary faults, smaller scale fault zones, faulting environments, and further establish the implications of fault zone age and total strain for seismicity, and fault and earthquake mechanics. Observe and evaluate post-mainshock changes in properties, using monitoring data, laboratory measurements on recovered core samples, active source studies, fault zone guided waves, borehole seismic networks, and other geophysical techniques.
- Conduct field and laboratory studies on mechanisms responsible for episodic tremor and slip (ETS). Determine the mechanical relation between ETS and other transient deformations and the occurrence of earthquakes, or provide information that constrain time-dependent earthquake probabilities. Research may include consideration of the brittle-ductile transition, frictional properties, and mineral reactions.
- Improve and implement long-term, fault system scale earthquake simulations (earthquake simulators) to understand predictability in complex fault networks over the range of observed earthquake magnitudes. Priority improvements in the physics of simulators include incorporating off-fault seismicity, dynamic weakening, off-fault viscoelasticity, elastic heterogeneity, ductile deformation in the lower crust and upper mantle and alternative loading schemes to “back-slip”. Produce synthetic earthquake catalogs; analyze synthetic catalogs for statistically significant patterns, predictability, clustering and triggering, and determine the statistical similarities (differences)

between simulated and real catalogs. Develop algorithms that can be applied in seismic hazard assessments and compare results with more traditional forecasting approaches.

EP Element IV. **Earthquake safety policy.** See Section 1.

**4.1 Priority Topics for Research on Induced Seismicity (IS)**
**Coordinator: Nicholas Beeler, nbeeler@usgs.gov**

Understanding earthquake phenomena and evaluating earthquake hazards requires research on the controlling processes and conditions, including anthropogenic influences. The EHP supports field, geophysical, seismologic, theoretical, numerical, and laboratory studies to address these needs and to contribute to improved hazard assessment and risk mitigation throughout the U.S. Contact the EP/IS Coordinator to learn more about internally supported projects or to discuss potential proposals.

IS Element III. **Research on earthquake occurrence, physics, and effects.**

- Using field, theoretical, or laboratory studies, or a combination of these approaches, develop and test methods for evaluating the degree to which human activities induce earthquakes. Of particular interest are analyses of data from field or laboratory experiments or analyses of existing case histories that yield novel insights regarding the relationships between the fluid injection or production activity and the resulting induced earthquakes.
- Develop methods of anticipating the magnitude distribution of induced earthquakes and their contribution to seismic hazard, on the basis of anthropogenic activities (e.g., injection or production rate, pressure, total volume), presence of nearby seismogenic faults, stress state, and formation properties (e.g., rheology, pore pressure).
- Develop improved methods to determine whether earthquakes are natural or induced.
- Test the feasibility of controlling earthquakes induced by an ongoing fluid injection activity so as to limit the seismic hazards posed by that operation.
- Analyze the effects of background tectonic activity by assessing, for instance, the likelihood that injection of wastewater near an active major fault will trigger a large-magnitude earthquake.
- Determine the role of pore fluid pressure in induced aseismic deformation, fault slip and seismicity.
- Develop forecasting models for induced seismicity, in particular those account for the statistical properties of induced seismicity, foreshock/aftershock behavior, clustering, etc.
- Develop methods to test forecasts of induced seismicity and its hazard, including induced seismicity hazard estimated in the USGS National Seismic Hazard Model and in the USGS one-year hazard forecast for 2018, where possible in conjunction with the Collaboratory for the Study of Earthquake Predictability (CSEP).
- Apply results from studies of earthquakes induced by anthropogenic activities to improve our understanding of natural earthquakes.
- Develop, utilize, and test numerical tools such as coupled geomechanical and dynamic rupture models to determine the physics of induced seismicity.
- Analyze strong ground motion from induced seismicity to develop or improve ground prediction equations.
- Conduct statistical, geological, and/or numerical modeling studies to explore whether there is an Mmax for induced seismicity that is different than Mmax for natural seismicity.

IS Element IV. **Earthquake safety policy.** See Section 1.

**5. Priority Topics for Earthquake Early Warning (EEW) Research**
**Coordinator: Annemarie Baltay, abaltay@usgs.gov (Acting)**

Earthquake early warning (EEW) systems aim to provide advance warning of specified earthquake ground motion levels to populations in order to mitigate losses. USGS is developing an operational earthquake early warning system for the west coast of the United States called ShakeAlert (https://earthquake.usgs.gov/research/earlywarning). The EHP encourages proposals for studies that clearly demonstrate how the proposed research can be applied to improve the accuracy, reliability, and timeliness of earthquake early warning alerts generated by ShakeAlert.
The EHP supports efforts focused on scientific research on the topics identified below. However, all other monitoring and notification activities are evaluated and funded under a separate solicitation for seismic and geodetic network operations. Furthermore, operationalization, testing and upkeep of established algorithms or methods as well as continuation of communications, education and outreach activities for ShakeAlert are also not supported under this Program Announcement.

EEW Element I. **National and regional earthquake hazards assessments.**
- Improve performance evaluation metrics used to assess the accuracy and timeliness of predicted ground motions issued by earthquake early warning systems, and assess the cost benefit for end-users in threshold-based applications.
- Holistic comparative assessment of earthquake early warning algorithm performance, in a theoretical or empirical framework.

EEW Element II. **Earthquake information, monitoring and notification.**
- Advance existing algorithms and processes, or develop novel techniques, to improve the timeliness and accuracy of predicted ground motions used to issue earthquake early warning alerts. Examples include algorithms that identify the finite fault extent, improve early magnitude or location estimates, estimate expected ground motions directly from observed ground motions, or real-time methods to estimate the probability that a fault rupture will continue or terminate.
- Improve methods used to combine source and/or ground motion information from multiple algorithms in order to generate a single, high-quality alert stream.
- Identify and assess novel, including lower-cost, instrumentation for use in earthquake early warning systems. Any proposal to use new instrumentation should clearly demonstrate the value in terms of improved (e.g. faster, more reliable) alerts, augmentation of existing network-based systems, or other considerations relative to existing real-time data streams used by ShakeAlert.

EEW Element III. **Research on earthquake occurrence, physics, effects, impacts, and risks**.
- Reduce uncertainties in ground motion predictions that demonstrates improved accuracy of earthquake early warning alerts, particularly in high-risk urban areas. This could include incorporation of real-time site response at ShakeAlert seismic stations, rapid source characterization (including stress drop), calibration of seismic magnitude scales, and characterization of wave propagation and attenuation, including basin effects.
- Improve the identification and classification of seismic phases in real-time to better discriminate earthquake signals versus noise, P-wave versus S-wave phases, local versus teleseismic earthquakes.
- Evaluate suitability of existing broadband synthetics for use in testing earthquake early warning systems, or develop new synthetics if appropriate ones do not exist. Synthetics of particular interest are scenarios for which there are no available ground motion recordings along the west coast of the US, including: isolated, large-magnitude scenario events, especially at close distances to population centers; and complex sequences of events including doublets, mainshock-aftershock sequences, and/or swarms.
- Develop uncertainty measures that are consistent across EEW algorithms. Develop methods that consider both the uncertainty in parameter estimates (shaking intensity) and the likelihood that an alert is a true earthquake.

EEW Element IV. **Earthquake safety policy and communication.**
- See Section 1.

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**6. Priority Topics for Intermountain West (IMW) Research**
**Coordinator: Ryan Gold, rgold@usgs.gov**

Priorities for research in the IMW focus on the collection of data that directly contributes to DOI's goal of "Protecting our people and the border." For example, data are used to update the U.S. National Seismic Hazard maps. High priority issues to be addressed in proposed work are listed below for each EHP program element, although other proposal topics will be considered.

IMW Element I. **Regional earthquake hazards assessments.**

- Conduct Quaternary geologic, geomorphic, and paleoseismic investigations to estimate the timing, recurrence, rupture lengths, and magnitudes of large prehistoric earthquakes on significant hazardous Quaternary faults in the IMW.
- Improve source models for IMW faults deemed priorities by each State (below). These studies could include investigations that determine late Quaternary slip rates, paleoseismic chronologies, earthquake recurrence, and segmentation of fault sources.
  **Nevada:** A list of fault studies recommended by the Nevada Bureau of Mines and Geology is available at: http://www.nbmg.unr.edu/_docs/Earthquakes/NBMG_priorities_NEHRP.pdf
  **Utah:** Priority faults deemed to need further study have been identified by the Utah Quaternary Fault Parameters Working Group (UQFPWG). An updated list of these priorities as defined by the UQFPWG is available at: https://geology.utah.gov/hazards/earthquakes-faults/utah-earthquake-working-groups/
  **Elsewhere in the IMW Region:** Priority faults are summarized in a workshop report at http://ugspub.nr.utah.gov/publications/misc_pubs/mp-15-5/mp-15-5_workshop.pdf

IMW Element II. **Earthquake information, monitoring, and notification.**

- The EHP supports efforts to improve algorithms and processes to provide information about earthquakes in near real time, including early warning, estimation of fault rupture extent, and refined seismic moment determinations. Please note that all other monitoring and notification activities are evaluated and funded under a separate solicitation for seismic and geodetic network operations.

IMW Element III. **Research on earthquake occurrence, physics, effects, impacts and risks.**

- Conduct studies that address scientific issues that are particularly important for understanding the potential hazard posed by IMW faults, including: Prehistoric earthquake correlation and fault rupture length; Fault structural segmentation versus rupture length; Long-term paleoseismic and slip histories; Fault scaling relations (e.g., between fault length and displacement), Empirical regressions on moment magnitude; Fault dip and the intersection of antithetic fault pairs; and Fault creep and afterslip.
- Collect geological, geophysical, and geotechnical data that develop and refine community velocity models in urban areas of the IMW region. Specific areas of interest include but are not limited to parts of the Wasatch Front, Utah outside of Salt Lake Valley; the Reno-Carson City urban corridor; and the Las Vegas urban area of Nevada. Appropriate data sets could include shear-wave velocities, density of near-surface units, attenuation measurements, basin geometry and structure, and mapping of subsurface faults and folds.
- Conduct research on the development and integration of seismic shear-wave velocities from multiple scales throughout the region, particularly the joint analysis of multi-scale datasets in urbanized sedimentary basins.
- Develop geological, geophysical, and geotechnical models to characterize the effects of basin geometry, near-surface geology, and structure on strong ground motions and site amplification.
- Conduct studies to develop or improve deformational models in the IMW region.
  - The possible relationship between injection of fluids in the subsurface and swarms of earthquakes is a topic of considerable recent scientific interest. **PIs interested in proposing work on this subject should consult the Earthquake Physics (EP) priority list; proposals should be directed to the EP panel.**

IMW Element IV. **Earthquake safety policy.** See Section 1.

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**7. Priority Topics for National Research (NAT)**
**Coordinators: Mark Petersen, mpetersen@usgs.gov, Morgan Moschetti, mmoschetti@usgs.gov**

Research topics should relate to the production and future directions of the National Seismic Hazard Model (NSHM). PIs are encouraged to contact the NAT Coordinator(s) to learn more about internally supported projects or to discuss potential proposals.

NAT Element I. **Research activities supporting the USGS National Seismic Hazards Model**.
***High-priority topics***

- Develop multi-period amplification factors, which can modify existing ground motion models, to account for basin effects in the central and eastern U.S.
- Develop methods and products that can be used to improve long-period (T>1 s) ground motion models (GMMs) for the western U.S. (e.g., 3D simulations, amplification factors, basin models). Proposals addressing improved GMMs for sedimentary basin sites in the urban areas of the western U.S. are of greatest interest (especially for Los Angeles, San Francisco Bay Area, and Seattle)
- Develop new earthquake rate forecasts for known faults in the western U.S. using combined geodetic and geologic inversions
- Develop and apply new methods for identifying dependent and independent earthquakes (i.e., declustering) for different types of earthquake sequences (e.g., tectonic sequences, swarms, induced earthquakes)
- Develop alternative seismic source or ground motion models for Alaska and Puerto Rico

***Priority topics***

- Develop earthquake rate forecasts (earthquake locations, magnitudes, rates) from various data types (e.g., earthquake catalogs, geological information, geodetic data) or using novel methods (e.g., earthquake simulators)
- Develop new or improve existing GMMs or other strategies for ground motion and macroseismic intensity estimation that can be used to improve the NSHM and to reduce uncertainty in ShakeMaps.
- Define or develop important data, methods, and models needed to improve ground-shaking hazards
- Define sedimentary basin geometry, depths, and shear-wave velocities across the U.S. in a consistent manner. Studies should be closely coordinated with internal USGS studies being done on this topic.
- With a focus on nationwide assessments, improve seismic hazard analyses for induced earthquakes. Examples may include the development of earthquake catalogs of potentially induced earthquakes for broad regions of the country, earthquake rupture forecasts, and models of ground motion shaking (e.g., GMMs).
- Define uncertainties in hazard input parameters (e.g., slip rates, magnitudes, recurrence, declustering) and equations (e.g., magnitude-area relationships, depth to the top of rupture) used in developing the uncertainty estimates for the U.S.
- Develop and/or apply procedures for testing the consistency of the hazard models with observations.

NAT Element IV. **Earthquake safety policy.** See Section 1.

**8. Priority Topics for Research in Northern California (NC)**
**Coordinator: Jack Boatwright, boat@usgs.gov**

The Northern California component of the EHP is charged with characterizing seismic hazard throughout Northern California. The primary area of concern is the urbanized San Francisco Bay region, extending from Monterey to Willits, and from the Central Valley to the Pacific Coast: this region bears more than 25% of the nation's annualized seismic risk. Research in Northern California outside this urbanized region is also encouraged. Contact the NC Coordinator to learn more about internally supported projects or to discuss potential proposals.

NC Element I. **Regional earthquake hazards assessment.**
Conduct paleoseismic and other geological investigations of the behavior and location of active faults in Northern California. Priorities:

- Update the Northern California fault set in the Community Fault Model;
- Improve earthquake recurrence and slip history of active faults (modest proposals for pilot studies of potential paleoseismic trench sites are encouraged);
- Utilize available LiDAR datasets to improve understanding of active fault processes and to refine estimates of slip in historic and prehistoric earthquakes.

Use crustal deformation measurements to constrain regional deformation rates, fault slip rates, fault creep, fault mechanics, strain transients, and stress evolution. Priorities:

- Estimate bounds for slip rates on the San Andreas, Calaveras, Hayward-Rodgers Creek, and Concord-Green Valley-Bartlett Springs fault systems;
- Evaluate models for strain transfer from the Calaveras and Greenville faults to the Concord, West Napa, and Green Valley faults;
- Develop methods to monitor and predict post-earthquake slip on faults.

Validate and improve community regional 3D geologic and seismic velocity models for the Bay Area and Northern California, with particular concern for the East Bay, Napa Valley, Livermore Valley, and the Sacramento Delta. Priorities:

- Compute long-period (T > 0.5-1 s) ground-motions incorporating 3-D structure and rupture effects for expected large earthquakes in the Bay Area;
- Characterize strong motion sites throughout Northern California, particularly stations that have recorded strong ground motion.

NC Element II. **Earthquake information, monitoring, and notification.**
Integrate and improve seismic monitoring efforts in Northern California. Priorities:

- Develop methods to access and present historical seismicity and repeating earthquakes in Northern California to enable recognition of anomalous or precursory behavior.

NC Element III. **Research on earthquake occurrence, physics, effects, impacts, and risks.**
Develop, refine, and test probabilistic models for earthquake rupture in Northern California, in coordination with the Uniform California Earthquake Rupture Forecast (UCERF). Priorities:

- Evaluate differences between geologic and geodetic strain rates used in assigning slip rates to faults and off-fault deformation fault models.

NC Element IV. **Earthquake safety policy.** See Section 1.

## 9. Priority Topics for Research in the Pacific Northwest and Alaska (PNA)

Research priorities for the Pacific Northwest and Alaska are considered by a combined panel, but priorities specific to each region are listed separately below.

### 9.1 Priority Topics for Research in the Pacific Northwest (PNA)
**Pacific Northwest Coordinator: Joan Gomberg, gomberg@usgs.gov**

Research proposed should advance understanding of earthquake-related processes by stating and testing new hypotheses and/or developing and employing novel data sets and analyses. Where appropriate, use of the following data sources is encouraged: 1) Advanced National and Canadian National Seismic Networks and strong motion networks in Cascadia; 2) the NSF-sponsored Cascadia Initiative onshore-offshore deployments; 3) EarthScope Plate Boundary Observatory GPS sites, strainmeters, tiltmeters, and strong motion sensors; 4) high-resolution LiDAR, InSAR, potential field, and other remote sensing data; 5) the Pacific Northwest Geodetic Array (PANGA) GPS stations and tiltmeters; and 6) the Ocean Networks Canada and Oceans Observatory Initiative off-shore cabled networks. Topics noted below should focus on the Cascadia subduction zone, although research elsewhere with clear relevance may also be proposed. Product development activities should demonstrate user involvement in product conception, implementation and evaluation. Contact the Pacific Northwest **External Grants Program** Coordinator to learn more about internally supported projects or to discuss potential proposals.

PNA Element I. **Regional earthquake hazards assessments**

- For plate-boundary earthquakes, clarify boundaries of the locked zone.
- Develop numerical, observationally validated, ground motion models applicable to hazard maps at urban scales, building codes, and long-term planning. Ground motion models for M8-9 Cascadia plate-interface earthquakes are needed to characterize likely long-duration and long-period motions.
- Investigate data sets that could help characterize heterogeneities on the plate interface, including regions that could generate high-frequency strong ground motions in Cascadia M8-9 earthquakes.
- Develop approaches and observational inputs for temporal and spatial earthquake forecasting, which account for potential differences among upper-plate, interplate and intraplate settings.
- For faults in the North American plate, improve estimates of sizes, recurrence intervals, and effects of past, late Quaternary earthquakes in the Puget Sound region, the Yakima fold and thrust belt, the Columbia Plateau, and Portland and Tualatin basins and vicinity.
- Improve the accuracy of megathrust earthquake recurrence estimates. Studies that combine evidence from both the onshore and offshore geologic records are particularly encouraged.
- Evaluate earthquake-induced ground failure potential, particularly in populated areas, transit corridors, and near bodies of water where landslides could generate hazardous local tsunamis.
- Quantify maximum magnitudes and probabilities of outer-rise and intraplate Cascadia earthquakes.

PNA Element II. **Earthquake information, monitoring, and notification.**

- Develop and test new approaches to integrating seismic and geodetic data and a priori information in monitoring operations, applicable to earthquake early warning, routine earthquake monitoring, tsunami warning, and slow slip detection and characterization.
- Improve existing 3D seismic velocity models of shallow crustal structure onshore and offshore, particularly for sedimentary basins beneath or near urban areas, with application to earthquake source and ground motion characterization.
- Develop new approaches and technologies for measuring seismic and aseismic deformation offshore.

PNA Element III. **Research on earthquake occurrence, physics, ground motions, and effects.**

- Improve estimates of fault-zone properties that may influence rupture area and fault slip. Quantify the relationship between slow slip events and earthquake potential.
- Evaluate potential interactions between interplate, intraplate, and upper-plate faults.
- Conduct studies of the transition from strike-slip to convergent boundaries (e.g., at the Mendocino Triple

Junction).

PNA Element IV. **Earthquake safety policy.** See Section 1.

**9.2 Priority Topics for Research in Alaska (PNA)**
**Alaska Coordinator: Peter Haeussler, pheuslr@usgs.gov**

USGS needs basic information to characterize the active earthquake sources in Alaska for use in updating the seismic hazard maps of Alaska. The EHP encourages proposals for studies that take advantage of the EarthScope's Transportable Array deployment. High priority issues to be addressed in proposed work are listed below for each program element, although other proposal topics will be considered. Contact the Alaska Coordinator to learn more about internally supported projects or to discuss potential proposals.

PNA Element I. **Regional earthquake hazards assessments.**

- Improve the paleoseismic and paleogeodetic record of large to great earthquakes and tsunamis along the Alaska-Aleutian megathrust, including assessing the persistence, or non-persistence of rupture boundaries, variability in slip distribution, and whether or not presently creeping sections of the megathrust have produced past great earthquakes.
- Perform lake paleoseismology research to assess the record of strong ground motions along the megathrust. Evaluate if lake sediments record historical earthquakes and events identified by coastal marsh paleoseismology and paleotsunami records.
- Conduct geodetic field studies and/or modeling of geodetic data to resolve plate coupling and the role of aseismic slip on the potential for, and/or recurrence time of, large earthquakes along the Alaska-Aleutian megathrust, or the Queen Charlotte Fault and across southeastern Alaska.
- Utilize geodetic and/or seismicity data to define the location, length, and nature of slow-slip events in Alaska, and particularly their relationship to downdip and updip limits of coseismic slip, or earthquake potential, along the Alaska-Aleutian megathrust.
- Develop methods and utilize geodetic data to estimate slip rates along faults or across regions that can be applied to seismic hazard analyses. Construct self-consistent models of crustal deformation that integrate seismic, geologic, and geodetic data from which hazard estimates can be derived.
- Improve the understanding of active faulting, historical seismicity, and the paleoseismic record of large earthquakes on major crustal faults in Alaska, including the Denali, Totschunda, Fairweather, Queen Charlotte, Castle Mountain, Tintina, and Kaltag faults, and on subsidiary and related faults such as the Northern Alaska Range Thrust System. In particular, increase knowledge of the Queen Charlotte-Fairweather fault system and its geologic structure and tsunami potential.
- Use high-precision hypocenter location methods and/or high-resoltion topographic datasets to identify the extent and geometry of unmapped faults in so-called seismic zones.
- Conduct offshore studies to understand the active faults, earthquake history, and seismic potential on and near major crustal faults in Alaska. Studies of offshore, potentially tsunami-generating, splay faults are particularly encouraged.
- Also, studies of proxies of strong ground shaking, such as turbidites or lakes is encouraged.

PNA Element II. **Earthquake information, monitoring, and notification.**

- Develop region-specific relationships for inferring seismic wave velocities from seismic or rock type data. Develop 3-D community seismic velocity models for Alaska that are validated against earthquake catalog data to support improving earthquake locations, simulating ground motions, determining source mechanisms, evaluating sedimentary basin ground motion amplification and the calculation of probabilistic hazard maps.

PNA Element III. **Research on earthquake occurrence, physics, ground motions, and effects.**

- Evaluate the potential interactions among subduction-zone faults, Benioff-zone faults, splay faults, and crustal faults and the impacts of such interactions on seismic hazard.
- Develop physical and statistical models that may be used in earthquake forecasts for the range of source types and

seismicity patterns in Alaska.

- Develop empirical or simulation-based ground motion models that incorporate three-dimensional seismic structure and consider a range of earthquake source scenarios and complexity.
- Improve ground motion models for subduction interface and deep intraslab earthquakes for use in the Alaska update of the National Seismic Hazard Model (see NAT priorities). Also, characterize site conditions at Advanced National Seismic System (ANSS) National Strong Motion Network stations outside of the Anchorage bowl for developing statewide ground motion prediction equations.

PNA Element IV. **Earthquake safety policy.** See Section 1.

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**10. Priority Topics for Research in Southern California (SC)**
**Coordinator: Kate Scharer, kscharer@usgs.gov**

Southern California is a region of complex geology containing large mountain ranges, deep sedimentary basins and numerous active faults. To better quantify the hazard from future earthquakes in this region, it is necessary to continue to improve our understanding of fault characterization, earthquake rupture properties and seismic wave propagation at local and regional distances using a combination of field observations, analysis of monitoring data, and modeling approaches. Research activities that utilize monitoring data from the regional seismic and geodetic networks are strongly encouraged. Contact the SC Coordinator to learn more about internally supported projects or to discuss potential proposals.

SC Element I. **Regional earthquake hazards assessment.**

- Determine the activity of faults using paleoseismology, geomorphology, and geologic mapping; integrate field observations with new and complimentary data such as LiDAR and high-resolution aerial photography and imaging.
- Develop and test ground motion simulation models with application to addressing seismic hazards in southern California.
- Develop regional models of active deformation and fault and earthquake interactions.
- Develop new, improved, or alternative models of 3D fault, seismic velocity and seismic attenuation structures. Integration of these models within the existing SCEC Community Fault and Velocity Models is encouraged.
- Develop methods for incorporating shallow physical properties (e.g. Vs30) into these 3D models.
- Develop, refine, and test probabilistic models for earthquake rupture using the tools and methods provided by the Uniform California Earthquake Rupture Forecast-3 (UCERF3) Report.

SC Element II. **Earthquake information, monitoring, and notification.**

- Use seismic data to determine earthquake source parameters and crustal structure and the state of stress in the crust, including further development and testing of 2- and 3-D structural models.
- Collaborate with the USGS and university-based seismic and geodetic networks to enhance tools needed for accurate and rapid portrayal of the severity and geographical distribution of strong ground shaking, surface rupture, and ground deformation.

SC Element III. **Research on earthquake occurrence, physics, effects, impacts and risks.**

- Explore, via dynamic rupture modeling or other approaches, the prospect for earthquake ruptures that involve multiple fault segments, stepovers or multiple distinct faults.
- Develop models to estimate variations in expected ground motions, accounting for local geological structure, topography, and soil-structure interaction.
- Develop methodologies to characterize earthquake ruptures for use in ground motion simulations. Approaches including multi-segment ruptures and/or complex fault geometries are encouraged.
- Use ground motion simulations and/or recordings of past earthquakes to quantify the expected level and distribution of shaking over a broad frequency range (e.g. 0-20 Hz) for future large earthquakes.
- Characterize the nature and behavior of fault segmentation and clarify the roles of seismic and aseismic processes; evaluate seismogenic thickness and/or the percentage of aseismic slip.
- Use crustal deformation measurements to constrain the regional deformation rates, fault slip rates, the role of fault creep, fault mechanics, strain transients, and models of stress evolution.

SC Element IV. **Earthquake safety policy.** See Section 1.

Attachment B

**USGS Earthquake Hazards Program Grant**
## Proposal Information Summary

Use the format below for the **required** Proposal Information Summary

| | | |
|---|---|---|
| 1. | Panel Designation: | Use the short letter code or panel name as listed in Section 12 & in Attachment A |
| 2. | Project Title: | If a collaborative proposal, the title of the proposal must appear as follows: **"Title of Proposal: Collaborative Research with First Institution Name, and Second Institution Name"**. |
| 3. | Principal Investigator(s): | (Name)(s) **List all PIs/Co-Is for the proposal here & all contact information**<br>(Institute/Organization Name)<br>(Street Address/P.O. Box)<br>(City, State, Zip Code)<br>(Telephone Number), (FAX Number), (E-mail Address) |
| 4. | Authorized Institutional Representative: | (Name)<br>(Institute/Organization Name)<br>(Organizational Unit)<br>(Street Address/P.O. Box)<br>(City, State, Zip Code)<br>(Telephone Number), (E-mail Address) |
| 5. | Amount Requested: | (List amount requested for Fiscal Year 2017 support)<br>(Two year projects: list requests for FY 2017 and 2017 separately) |
| 6. | Proposed Start Date: | (The date you would like to start work; between January 1, 2019 and September 1, 2019)<br>(The start date is: Fixed or Flexible) |
| 7. | Proposed Duration: | (12 or 24 months, No awards are issued for less than 12 months) |
| 8. | New Proposal | (If submitting a proposal for a project related to a current or recent USGS award, indicate the appropriate USGS award number and title) |
| 9. | Re-submittal Proposal | (Include title of previous proposal to USGS-EHP—the re-submitted proposal should identify changes made since original submission to USGS-EHP) |
| 10. | Has this proposal been submitted to any other organization for funding, if so, which? | (Note name(s) of agency, and program or division to which this proposal was submitted) |
| 11. | List any know CRADAs between the USGS and applicant | (List title of CRADA, name of USGS representative and program under which CRADA entered) |

## BUDGET SUMMARY [1]

Project Title:_____
Principal Investigator(s):_____
Proposed Start Date:
Proposed Completion Date:

| COST CATEGORY | Federal First Year | Federal Second Year[2] | TOTAL Both years[2] |
|---|---|---|---|
| 1. Salaries and Wages (list each person separately) | $ | $ | $ |
| | $ | $ | $ |
| Tuition/Tuition Remission | | | |
| **Total Salaries and Wages** | **$** | **$** | **$** |
| 2. Fringe Benefits/Labor Overhead | $ | $ | $ |
| 3. Equipment | $ | $ | $ |
| 4. Supplies | $ | $ | $ |
| 5. Services or Consultants | $ | $ | $ |
| 6. Radiocarbon or other Dating | $ | $ | $ |
| 7. Travel | $ | $ | $ |
| 8. Publication Costs | $ | $ | $ |
| 9. Other Direct Costs | $ | $ | $ |
| **10. Total Direct Costs (items 1 thru 9)** | **$** | **$** | **$** |
| 11. Indirect cost/General and Administrative (G&A) cost | $ | $ | $ |
| **12. Amount Proposed (items 10+11)** | **$** | **$** | **$** |
| 13. Applicant's contribution to Project Cost | $ | $ | $ |
| 14. Total Project Cost (Total of Federal and non-Federal amounts) | $ | $ | $ |

[1] **Use this format** for the required Budget Summary. The detailed budget **must** be keyed directly to the Budget Summary page.
[2] These Columns only for two-year projects

## Special Terms and Conditions

### 1. Acceptance

Acceptance of a Federal Financial Assistance award from the Department of the Interior (DOI) carries with it the responsibility to be aware of and comply with the terms and conditions of award. Acceptance is defined as the start of work, drawing down funds, or accepting the award by signature or electronic means. Awards are based on the application submitted to and approved by DOI and are subject to the terms and conditions incorporated either directly or by reference below.

### 2. Method of Payment

Payments under financial assistance awards must be made using the Department of the Treasury Automated Standard Application for Payments (ASAP) system (www.asap.gov).

a. The Recipient agrees that it has established or will establish an account with ASAP. USGS will initiate enrollment in ASAP. If the Recipient does not currently have an ASAP account, they must designate an individual (name, title, address, phone and e-mail) who will serve as the Point of Contact (POC). All recipients, including foreign entities, must have a DUNS number and a EIN/TIN number in order to receive payment.

b. With the award of each grant, a sub-account will be set up from which the Recipient can draw down funds. After recipients complete enrollment in ASAP and link their banking information to the USGS ALC (14080001), it may take 7-10 days for sub-accounts to be activated and for funds to be authorized for drawdown in ASAP.

c. Inquiries regarding payment should be directed to ASAP at 855-868-0151.

d. Payments may be drawn in advance only as needed to meet immediate cash disbursement needs.

*Payment to Foreign Recipients*

A waiver has been granted by the Associate Director for Administrative Policy and Services because this award involves payments to a foreign Recipient.

a) Payment will be made by wire transfer utilizing the International Treasury Services through Treasury upon receipt of a properly prepared SF 270, Request for Advance or Reimbursement. Foreign recipients are required to provide bank wiring instructions in order to facilitate payments. Submit the SF 270 form to the address specified in D.1. Requests should be submitted on a quarterly basis. Request for the entire award amount will be denied.

b) Payments may be drawn in advance only as needed to meet immediate cash disbursement needs.

### 3. Assistance Administrative Information

A. Contracting Officer

This Assistance Award will be administered by:

U.S. Geological Survey
Office of Acquisition and Grants
12201 Sunrise Valley Drive, MS205
Reston, VA 20192
Margaret Eastman, Contracting Officer
Phone: (703) 648-7366
E-mail: mrussell@usgs.gov

Written communications shall make reference to the Assistance Award number and shall be mailed (or emailed) to the above address.

B. Grants Program Manager

(1) The Grants Program Manager will work closely with the Principal Investigator to ensure that all technical requirements are being met. The Grants Program Manager's responsibilities include, but are not limited to, providing technical advice on the accomplishment of the proposal's objectives; reviewing the technical content of reports and the other information delivered to the USGS; determining the adequacy of technical reports; and conducting site visits, in coordination with the Regional Coordinator and the Contracting Officer, as frequently as practicable.

(2) The Grants Program Manager is Jill Franks, External Research Support Manager, U.S. Geological Survey, 905 National Center, 12201 Sunrise Valley Drive, Reston, VA 20192. The Grants Program Manager does not have the authority to issue any technical direction which constitutes an assignment of additional work outside the scope of the award; in any manner causes a change in the total cost or the time required for performance of the award; or change any of the terms, conditions, or general provisions of the award.

C. Regional Coordinator

(1) Regional Coordinators are in charge of conducting the peer review panels to evaluate both internal USGS and external research proposals in their region or area of expertise. A Regional Coordinator will work closely with the Grants Program Manager and the Principal Investigator to ensure coordination with other appropriate Principal Investigators and appropriate USGS project scientists working in the same region for overall conformance with USGS program goals and objectives within that region. The Regional Coordinator's responsibilities include, but are not limited to, providing technical advice on the accomplishment of the proposal's objectives; reviewing the technical content of reports and other information delivered to the USGS; determining the adequacy of the technical reports; and conducting site visits, in coordination with the Grants Program Manager and contract personnel, as frequently as practicable.

(2) The Regional Coordinator does not have the authority to issue any technical direction which constitutes an assignment of additional work outside the scope of the award; in any manner causes a change in the total cost or the time required for performance of the award; or changes any of the terms, conditions, or general provisions of the award.

**4. Dissemination of Results and Reporting Requirements**

The Grantee is strongly encouraged to disseminate research results promptly to the scientific community and appropriate professional organizations; local, state, regional and federal agencies; and the general public. It is the

expectation of the USGS that Grantees will publish the results of any funded project in peer-reviewed scientific or technical journals. In addition, all data products and computer codes must be made readily available to the public. In accordance with 43 CFR 12.936(a) and 2 CFR 200.315(b), the Federal Government is hereby granted a royalty-free, nonexclusive and irrevocable right to reproduce, publish, or otherwise use the work for Federal purposes, and to authorize others to do so.

Data generated as a part of work funded under this program must be made readily available; there is no provision for Grantees to have exclusive access to data for a proprietary period of time. In accordance with 43 CFR 12.936(a) and 2 CFR 200.315(b), the Federal Government is hereby granted the right to receive, reproduce, publish, or otherwise use all data developed as a result of this award in any manner and for any purpose, without limitation, and may authorize others to do the same for federal purposes. Any project funded under the Earthquake Hazards Program External Support shall fall under this clause. Should any questions arise, both the USGS Contracting Officer and the Recipient will determine which data fall in this category.

A Data Management Plan is required for all grants. The Data Management Plan should describe standards and intended actions for acquiring, processing, analyzing, preserving, publishing and other means of sharing data, and should describe data and metadata, identify how quality will be maintained, address how data will be backed up, and how data holdings will be secured. More information about Data Management can be found at http://www.usgs.gov/datamanagement/plan.php. The data management plan is often satisfied by specifying where data will be permanently stored (i.e. the IRIS DMC, electronic supplement to a journal paper), with the intention that the archived data set is complete enough to allow the work to be reproduced by others. The location of the archived data should be listed in all publications resulting from the work.

Grantees are subject to applicable regulations governing patents and inventions, including government-wide regulations issued by the Department of Commerce at 37 CFR part 401, ‘‘Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements.’’ Grantee agrees to disclose every subject invention which may be patentable or otherwise protectable within 60 days of the time that an inventing party reports such invention to the person(s) responsible for patent matters in the inventing organization. These disclosures should be in sufficient enough detail to enable a reviewer to make and use the invention. Grantees may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause, and 35 U.S.C. 203. With respect to any subject invention in which the Grantee retains title, the Federal Government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.

If Grantees enters into an Award with a contractor, consultant, grantee, or third-party collaborator to perform any portion of this Project, such Grantee shall notify all parties to the Project and provide information about the third party involvement within 7 days of engagement. The Grantee agrees that they will comply with and advise any contractors, consultants, or third party collaborators to comply with all applicable Executive Orders, statutes, and regulations related to this Award.

A. **Required reports/documents**. The Principal Investigator or Director, Sponsored Research Office is required to submit the following reports or documents:

| Report/ Document | No. of Copies and Method of Transmittal | Submit To | When Due |
|---|---|---|---|
| (1) | Adobe Acrobat PDF file as | Grants Program | Immediately following |

| | | | |
|---|---|---|---|
| Publication* | an email attachment (or 1 reprint if PDF not possible) | Manager | publication. **See Section 4.B(1).** |
| (2) Final Technical Report ** | Send Adobe Acrobat PDF file as an email attachment; Maximum size: 10 MB | Grants Program Manager | Within 90 calendar days after the end of the award project period **See details of formatting in section 4.B(2) below.** |
| (3) Annual Financial Reports, SF 425, Federal Financial Report | Electronic submission | USGS via Fedconnect (www.fedconnect.net) | See Section 4.B(3) |
| (4) Final SF 425 Federal Financial Report | Electronic submission | USGS via Fedconnect (www.fedconnect.net) | See Section 4.B(4) |

* Publication means any book, report, photograph, map, chart, or recording published or disseminated to the scientific community. Preprints of articles accepted for publications will be accepted as final reports.

** One Final Technical Report is to be submitted for each set of collaborative research grants with all PIs, Institutions, and grant numbers cited.

A. **Report preparation instructions**. The Recipient shall prepare the reports/documents in accordance with the following instructions:

(1) **All Publications and Final Technical Reports**.

(a) Acknowledgment of Support

Recipient is responsible for assuring that an acknowledgment of USGS support:

1. is made in any publication (including World Wide Web pages) of any material based on or developed under this Agreement, in the following terms:

   "This material is based upon work supported by the U.S. Geological Survey under Grant No. (*insert award number*)."

2. is orally acknowledged during all news media interviews, including popular media such as radio, television and news magazines.

(b) Disclaimer

Recipient is responsible for assuring that every publication of material (including World Wide Web pages) based on or developed under this Agreement, contains the following disclaimer:

"The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Geological Survey. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Geological Survey."

(c) Publication

Publication of the results of any project carried out under this assistance award is authorized in professional journals, trade magazines, or may be made by the USGS. Such manuscripts or publications submitted to journals or professional publications for publication shall be accompanied by the following notation:

"This manuscript is submitted for publication with the understanding that the United States Government is authorized to reproduce and distribute reprints for Governmental purposes."

(d) Copies for USGS

One copy of each article planned for publication shall be submitted to the USGS Project Officer simultaneously with its submission for publication. One reprint of each published article shall be submitted to the USGS Project Office immediately following publication.

Submit an Adobe Acrobat PDF file of publications to: gd-erp-coordinator@usgs.gov

(2) **Final Technical Report.** Final Technical Reports shall describe in detail the work performed and results obtained during the grant period. Final Technical Reports are due 90 days after the conclusion of the project period. Any information contained in a previously submitted progress report shall be repeated or restated in the Final Technical Report. Please note that one Final Technical Report is to be submitted for each set of collaborative research grants.

(a) Submit the Final Technical Report as an Adobe Acrobat PDF file with all figures, photographs, maps, and illustrations embedded, and all pages numbered. Submit the report as an e-mail attachment in PDF format to:

gd-erp-coordinator@usgs.gov

Maximum size; 10 MB

(b) Final Technical reports shall consist of the following sections:

(1) **Cover page** with the following information:
Award Number
Title. For collaborative projects the title should be in the form "Title: Collaborative Research with First Institution name, and Second Institution name."
Author(s) and Affiliation(s) with Address and zip code
Author's Telephone numbers, fax numbers and E-mail address
Term covered by the award (start and end dates)

(2) **Abstract**

(3) **Main body of the report**. The main body of the report and all illustrations and figures shall be single-spaced on 8 ½" x 11" paper.

(4) **Bibliography** of all publications resulting from the work performed under the award. One copy of each publication is required if the Recipient has not previously submitted them to the Grants Program Manager.

(5) **Acknowledgement of Support.** See Attachment D, Section 4, Part B. 1(a) for directions on acknowledgement requirements.

(3) **Annual Financial Reports.** The recipient will submit annual STANDARD FORM 425, FEDERAL FINANCIAL REPORT(S) for each individual USGS award. The SF-425 is available at - https://www.gsa.gov/portal/forms/download/149786. The SF-425 will be due ninety (90) calendar days after the grant year (i.e., 12 months after the approved effective date of the grant agreement and every 12

months thereafter until the expiration date of the grant agreement). USGS acknowledges that this annual reporting schedule may not always correspond with a specific budget period. The SF-425 must be submitted electronically through the FedConnect Message Center (www.fedconnect.net). If after 90 days, the recipient has not submitted a report, the recipient's account in ASAP will be placed in a manual review status until the report is submitted.

(4) **Final Financial Report**.

a. The recipient will liquidate all obligations incurred under the award and submit a final STANDARD FORM 425, FEDERAL FINANCIAL REPORT through FedConnect (www.fedconnect.net) no later than 90 calendar days after the grant completion date. The SF-425 is available at -https://www.gsa.gov/portal/forms/download/149786. Recipient will promptly return any unexpended federal cash advances or will complete a final draw from ASAP to obtain any remaining amounts due. Once 120 days has passed since the grant completion date, the ASAP subaccount for this award may be closed by USGS at any time.

b. Subsequent revision to the final SF 425 will be considered only as follows

(i) When the revision results in a balance due to the Government, the recipient must submit a revised final Federal Financial Report (SF 425) and refund the excess payment whenever the overcharge is discovered, no matter how long the lapse of time since the original due date of the report.

(ii) When the revision represents additional reimbursable costs claimed by the recipient, a revised final SF 425 may be submitted to the Contracting Officer with an explanation. If approved, the USGS will either request and pay a final invoice or reestablish the ASAP subaccount to permit the recipient to make a revised final draw. Any revised final report representing additional reimbursable amounts must be submitted no later than 1 year from the due date of the original report, i.e., 15 months following the agreement completion date. USGS will not accept any revised SF 425 covering additional expenditures after that date and will return any late request for additional payment to the recipient.

C. **Adherence to reporting requirements**. **A Recipient's failure to submit the required Final Technical Report and/or final financial report by the due dates noted above will likely result in delay or non-issuance of new awards. Failure to submit a Progress Report for multi-year awards will likely result in delayed renewal of funds.**

**5. Continuation Proposal for Second-Year Funding**

Required Continuation proposal documents. The Recipient, approved for two-year funding, shall submit the following documents for continued funding in year 2:

| Document | No. of Copies | Submit To | Due Date |
|---|---|---|---|
| Progress Report | Send Adobe Acrobat PDF file as an email attachment | Grants Program Manager | At least 60 calendar days prior to the end of the budget period. |

**Progress Report**. Recipients of two-year awards shall submit a report that summarizes the progress of the project

during the first funding period. Collaborative awardees should submit one report for all collaborators. Work that was proposed for the first year should have been completed in that year. **Please note** that Progress Report will not be published on the USGS website, so all research data described in a Progress Report must be repeated or restated in the Final Technical Report. Submit a Word or PDF file (maximum size: 10 MB) with embedded graphics as an E-mail attachment to:

**gd-erp-coordinator@usgs.gov**.

The subject of your email should be "**Progress Report - *insert your grant / project number here*"**.

**Format the Progress Report as follows:**

- Single spaced and formatted for 8 ½ x 11" paper
- Number all pages
- Embed figures in the Word or PDF file
- Place figure captions directly under figures
- 2 to 5 pages**.**

**At the top of the first page the heading should be centered and include:**

- Title of the project, as stated on the original proposal
- External Grant award number (see your award documents)
- Investigator(s) name(s)
- Institution
- Address
- Telephone number, FAX number, E-mail address, and website
- Term covered by the report.

**The body of the report should consist of the following**:

- Investigations undertaken
- Accomplishments to date
- Problems encountered
- Reports published
- Funding expended for the term covered by the report.

**6. <u>Adherence to Original Research Objective and Budget Estimate</u>**

A. Any commitments or expenditures incurred by the Recipient in excess of the funds provided by this award shall be the responsibility of the Recipient. Expenditures incurred prior to the effective date of this award cannot be charged against award funds.

B. The following requests for change **require advance written approval by the Contracting Officer shown on your award. Your request must be submitted to the Contracting Officer <u>at least 45 calendar days</u> prior to the requested effective date of the change:**

(1) Changes in the scope, objective, or key personnel referenced in the Recipient's proposal.

(2) Request for supplemental funds.

(3) Transfer of funds between direct cost categories when the cumulative amount of transfers during the project period exceeds 10 percent of the total award.

(4) Acquisition of nonexpendable personal property (equipment) not approved at time of award.

(5) Creation of any direct cost line item not approved at time of award.

(6) Any other significant change to the award.

(7) No-cost Extensions to the Project Period. **No cost extensions are discouraged**. The Earthquake Hazards Program (EHP) awards grants and cooperative agreements for research that extends or supplements ongoing research within the USGS. The timely conduct of funded projects is of great importance to the achievement of EHP goals. Applicants should consider their time commitments at the time of application for a grant. Requests for no cost extensions will be considered on a case-by-case basis. The USGS reserves the right to limit the length of time and number of no-cost extensions. Please note that no-cost extensions are not intended to be used merely for the purpose of expending unobligated balances. Applicants must supply documentation supporting their request for an extension.

The Recipient **shall include** in the request:

- the cause of the needed extension,
- a description of the remaining work to be completed,
- the proposed new end date, and
- the amount of funds remaining.

A request for an extension that is received by the Contracting Officer after the expiration date shall **not** be honored. Requests for no-cost extensions shall be submitted to the Contracting Officer **at least 45 days** before the grant end date.

C. The Contracting Officer will notify the Recipient in writing within 30 calendar days after receipt of the request for revision or adjustment whether the request has been approved.

**7. Government Furnished Property Or Property Authorized For Purchase**

The recipient shall comply with 2CFR Part 215, Section 215.34. Title to nonexpendable personal property acquired wholly or in part with Federal funds shall be vested in the Recipient unless otherwise specified in the award document. The Recipient shall retain control and maintain a property inventory of such property as long as there is a need for such property to accomplish the purpose of the project, whether or not the project continues to be supported by Federal funds. When there is no longer a need for such property to accomplish the purpose of the project, the Recipient shall use the property in connection with other Federal awards the Recipient has received. Under no circumstances shall title to such property be vested in a sub-tier recipient. Disposal of nonexpendable personal property shall be in accordance with the applicable OMB circular.

☐ (select this box if no GFP) There is no non-expendable personal property authorized on this grant/cooperative agreement.

☐ (select this box if GFP is provided) The following equipment will be vested with the recipient: (list equipment)

**8. Record Retention Period**

Unless a longer period is requested by the award, a Recipient shall retain all records for 3 years after the end of the project period for which it uses USGS award funds.

**9. Pre-agreement Costs**

Pre-agreement costs are not authorized under this program. Costs must be obligated during the project period.

**10. Seat Belt Provision (Executive Order 13043)**

Recipients of grants/cooperative agreements and/or sub-awards are encouraged to adopt and enforce on-the-job seat belt use policies and programs for their employees when operating company-owned, rented, or personally owned vehicles. These measures include, but are not limited to, conducing education, awareness, and other appropriated programs for their employees about the importance of wearing seat belts and the consequences of not wearing them.

**11. Federal Leadership on Reducing Text Messaging while Driving (Executive Order 13513)**

Recipients are encouraged to adopt and enforce policies that ban text messaging while driving, including conducting initiatives of the type described in section 3(a) of the order. (http://www.whitehouse.gov/the_press_office/Executive-Order-Federal-Leadership-on-Reducing-Text-Messaging-while-Driving/)

**12. Use of U.S. Flag Air Carriers** (49 USC Section 40118)

Any air transportation to, from, between or within a country other than the U.S. of persons or property, the expense of which will be paid in whole or in part by U.S Government funding, must be performed by, or under a code-sharing arrangement with, a U.S. flag air carrier if service provided by such a carrier is "available" (49 U.S.C. 40118, commonly referred to as the Fly America Act). Tickets (or documentation for electronic tickets) must identify the U.S. flag air carrier's designator code and flight number. See the Federal Travel Regulation §301-10.131 - §301-10.143 for definitions, exceptions, and documentation requirements. (See also Comp. Gen. Decision B-240956, dated September 25, 1991.)

**13. Trafficking in Persons (2 CFR Part 175)**

A. Provisions applicable to a recipient that is a private entity.

(i) You as the recipient, your employees, subrecipients under this award, and subrecipients' employees may not --

(a) Engage in severe forms of trafficking in persons during the period of time that the award is in effect;
(b) Procure a commercial sex act during the period of time that the award is in effect; or
(c) Use forced labor in the performance of the award or subawards under the award.

(ii) We as the Federal awarding agency may unilaterally terminate this award, without penalty, if you or a subrecipient that is a private entity --

(a) Is determined to have violated a prohibition in paragraph a.1 of this award term; or
(b) Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a.1 of this award term through conduct that is either --
1. Associated with performance under this award; or
2. Imputed to you or the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our agency at 43 CFR Part 42.

B. Provisions applicable to a recipient other than a private entitye. We as the Federal awarding agency may unilaterally terminate this award, without penalty, if a subrecipient that is a private entity --

(i) Is determined to have violated a prohibition in paragraph a.1 of this award term; or

(ii) Has an employee who is determined by the agency official authorized to terminate the award to have violated a

prohibition in paragraph a.1 of this award term through conduct that is either --

(a) Associated with performance under this award; or
(b) Imputed to you or the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our agency at 43 CFR Part 42.

C. Provisions applicable to any recipient.

(i) You must inform us immediately of any information you receive from any source alleging a violation of a prohibition in paragraph a.1 of this award term.

(ii) Our right to terminate unilaterally that is described in paragraph a.2 or b of this section:

(a) Implements section 106(g) of the Trafficking Victims Protection Act of 2000 (TVPA), as amended (22 U.S.C. 7104(g)), and

(b) Is in addition to all other remedies for noncompliance that are available to us under this award.
(iii) You must include the requirements of paragraph a.1 of this award term in any subaward you make to a private entity.

D. Definitions. For purposes of this award term:

(i) "Employee" means either:

(a) An individual employed by you or a subrecipient who is engaged in the performance of the project or program under this award; or

(b) Another person engaged in the performance of the project or program under this award and not compensated by you including, but not limited to, a volunteer or individual whose services are contributed by a third party as an in-kind contribution toward cost sharing or matching requirements.

(ii) "Forced labor" means labor obtained by any of the following methods: the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery.

(iii) "Private entity":

(a) Means any entity other than a State, local government, Indian tribe, or foreign public entity, as those terms are defined in 2 CFR 175.25.

(b) Includes:
1. A nonprofit organization, including any nonprofit institution of higher education, hospital, or tribal organization other than one included in the definition of Indian tribe at 2 CFR 175.25(b).
2. A for-profit organization.

(iv) Severe forms of trafficking in persons," "commercial sex act," and "coercion" have the meanings given at section 103 of the TVPA, as amended (22 U.S.C. 7102).

**14. <u>Reporting Subawards and Executive Compensation Information (2 CFR Part 170).</u>**

a. *Reporting of first-tier subawards.*

1. *Applicability.* Unless you are exempt as provided in paragraph d. of this award term, you must report each action that obligates $25,000 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5) for a subaward to an entity (see definitions in paragraph e. of this award term).

2. *Where and when to report.*

i. You must report each obligating action described in paragraph a.1. of this award term to *http://www.fsrs.gov.*

ii. For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)

3. *What to report.* You must report the information about each obligating action that the submission instructions posted at *http://www.fsrs.gov specify.*

b. *Reporting Total Compensation of Recipient Executives.*

1. *Applicability and what to report.* You must report total compensation for each of your five most highly compensated executives for the preceding completed fiscal year, if—

i. the total Federal funding authorized to date under this award is $25,000 or more;

ii. in the preceding fiscal year, you received—

(A) 80 percent or more of your annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

(B) $25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

iii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at *http://www.sec.gov/answers/execomp.htm.*)

2. *Where and when to report.* You must report executive total compensation described in paragraph b.1. of this award term:

i. As part of your registration profile at *https://www.sam.gov.*

ii. By the end of the month following the month in which this award is made, and annually thereafter.

c. *Reporting of Total Compensation of Subrecipient Executives.*

1. *Applicability and what to report.* Unless you are exempt as provided in paragraph d. of this award term, for each first-tier subrecipient under this award, you shall report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if—

i. in the subrecipient's preceding fiscal year, the subrecipient received—

(A) 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

(B) $25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and

ii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at *http://www.sec.gov/answers/execomp.htm.*)

2. *Where and when to report.* You must report subrecipient executive total compensation described in

paragraph c.1. of this award term:

i. To the recipient.

ii. By the end of the month following the month during which you make the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (*i.e.*, between October 1 and 31), you must report any required compensation information of the subrecipient by November 30 of that year.

d. *Exemptions*

If, in the previous tax year, you had gross income, from all sources, under $300,000, you are exempt from the requirements to report:

i. Subawards,

and

ii. The total compensation of the five most highly compensated executives of any subrecipient.

e. *Definitions.* For purposes of this award term:

1. *Entity* means all of the following, as defined in 2 CFR part 25:

i. A Governmental organization, which is a State, local government, or Indian tribe;

ii. A foreign public entity;

iii. A domestic or foreign nonprofit organization;

iv. A domestic or foreign for-profit organization;

v. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

2. *Executive* means officers, managing partners, or any other employees in management positions.

3. *Subaward:*

i. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

ii. The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see Sec. __ .210 of the attachment to OMB Circular A-133, "Audits of States, Local Governments, and Non-Profit Organizations").

iii. A subaward may be provided through any legal agreement, including an agreement that you or a subrecipient considers a contract.

4. *Subrecipient* means an entity that:

i. Receives a subaward from you (the recipient) under this award; and

ii. Is accountable to you for the use of the Federal funds provided by the subaward.

5. *Total compensation* means the cash and noncash dollar value earned by the executive during the recipient's or subrecipient's preceding fiscal year and includes the following (for more information see 17 CFR 229.402(c)(2)):

i. *Salary and bonus.*

ii. *Awards of stock, stock options, and stock appreciation rights.* Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.

iii. *Earnings for services under non-equity incentive plans.* This does not include group life, health, hospitalization or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.

iv. *Change in pension value.* This is the change in present value of defined benefit and actuarial pension plans.

v. *Above-market earnings on deferred compensation which is not tax-qualified.*

vi. Other compensation, if the aggregate value of all such other compensation (e.g. severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds $10,000.

**15. System of Award Management and Universal Identifier Requirements (2 CFR Part 25)**

a. *Requirement for System of Award Management*
Unless you are exempted from this requirement under 2 CFR 25.110, you as the recipient must maintain the currency of your information in the SAM until you submit the final financial report required under this award or receive the final payment, whichever is later. This requires that you review and update the information at least annually after the initial registration, and more frequently if required by changes in your information or another award term.

b. *Requirement for Unique Entity identifier Numbers*
If you are authorized to make subawards under this award, you:
1. Must notify potential subrecipients that no entity (*see* definition in paragraph C of this award term) may receive a subaward from you unless the entity has provided its unique entity identifier number to you.
2. May not make a subaward to an entity unless the entity has provided its DUNS number to you.

c. *Definitions*
For purposes of this award term:
1. *System of Award Management(SAM)* means the Federal repository into which an entity must provide information required for the conduct of business as a recipient. Additional information about registration procedures may be found at the SAM Internet site (currently at *http://www.sam.gov*).
2. *Unique entity identifier* means the identifier required for SAM registration to uniquely identify business entities.
3. *Entity*, as it is used in this award term, means all of the following, as defined at 2 CFR part 25, subpart C:

i. A Governmental organization, which is a State, local government, or Indian Tribe;
ii. A foreign public entity;
iii. A domestic or foreign nonprofit organization;
iv. A domestic or foreign for-profit organization; and
v. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

4. *Subaward:*
i. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.
ii. The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see 2 CFR 200.330).
iii. A subaward may be provided through any legal agreement, including an agreement that you consider a contract.
5. *Subrecipient* means an entity that:
i. Receives a subaward from you under this award; and
ii. Is accountable to you for the use of the Federal funds provided by the subaward.

**16. Prohibition on Members of Congress Making Contracts with Federal Government (41 USC Section 6306)**

No member of or delegate to the United States Congress or Resident Commissioner shall be admitted to any share or part of this award, or to any benefit that may arise therefrom; this provision shall not be construed to extend to an award made to a corporation for the public's general benefit.

**17. Enhancement of Recipient and Subrecipient Employee Whistleblower Protection (41 USC §4712)**

(a) This award, related subawards, and related contracts over the simplified acquisition threshold and all employees working on this award, related subawards, and related contracts over the simplified acquisition threshold are subject to the whistleblower rights and remedies established at 41 USC 4712.

(b) Recipients, their subrecipients, and their contractors awarded contracts over the simplified acquisition threshold related to this award, shall inform their employees in writing, in the predominant language of the workforce, of the employee whistleblower rights and protections under 41 USC 4712.

(c) The recipient shall insert this clause, including this paragraph (c), in all subawards and in contracts over the simplified acquisition threshold related to this award.

**18. Prohibition on Issuing Financial Assistance Awards to Entities that Require Certain Internal Confidentiality Agreements (P.L. 113-235)**

Section 743 of Division E, Title VII of the Consolidated and Further Continuing Resolution Appropriations Act of 2015 (Pub. L. 113-235) prohibits the use of funds appropriated or otherwise made available under that or any other Act for grants or cooperative agreements to an entity that requires employees or contractors of such entity seeking to report fraud, waste, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or contractors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a federal department or agency authorized to receive such information.

Recipients must not require their employees or contractors seeking to report fraud, waste, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or contractors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a federal department or agency authorized to receive such information.

Recipients must notify their employees or contractors that existing internal confidentiality agreements covered by this condition are no longer in effect.

**19. Patent Rights (37 CFR § 401.14)**

**Insert the following award term if the recipient is an individual, small business, non-profit organization, university or other institution of higher education. This award term does not apply to State, Local or Tribal governments or foreign entities.**

Unless otherwise provided in the Agreement, if this Agreement is for experimental, developmental, or research work, the following clause (implementing the Bayh-Dole Act, [35 U.S.C. § 200 et seq.]) shall apply. The recipient shall include this clause in all subawards for experimental, developmental, or research activities.

a. *Definitions*

1. INVENTION means any invention or discovery which is or may be patentable or otherwise protectable under Title 35 of the USC, to any novel variety of plant which is or may be protected under the Plant Variety Protection Act (7 U.S.C. § 2321 et seq.).
2. SUBJECT INVENTION means any invention of the recipient conceived or first actually reduced to practice in the performance of work under this Agreement, provided that in the case of a variety of plant, the date of determination (as defined in section 41(d)) must also occur during the period of performance.
3. PRACTICAL APPLICATION means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case,

under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

4. MADE when used in relation to any invention means the conception or first actual reduction to practice of such invention.
5. SMALL BUSINESS FIRM means a small business concern as defined at section 2 of Pub. L. 85–536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of this clause, the size standards for small business concerns involved in government procurement and subcontracting at 13 CFR 121.3–8 and 13 CFR 121.3–12, respectively, will be used.
6. NON-PROFIT ORGANIZATION means a domestic university or other institution of higher education or an organization of the type described in Section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. § 501(c)) and exempt from taxation under Section 501(a) of the Internal Revenue Code (26 U.S.C. § 501(a)) or any domestic non-profit scientific or educational organization qualified under a State non-profit organization statute. b. Allocation of Principal Rights The recipient may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this Patent Rights clause and 35 U.S.C. § 203. With respect to any subject invention in which the recipient retains title, the Federal Government shall have a non-exclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the U.S. the subject invention throughout the world. If the Agreement indicates it is subject to an identified international agreement or treaty, the U.S. Geological Survey (USGS) also has the right to direct the recipient to convey to any foreign participant such patent rights to subject inventions as are required to comply with that agreement or treaty.

b. *Allocation of Principal Rights*

1. The recipient may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this Patent Rights clause, including (2) below, and 35 U.S.C. § 203. With respect to any subject invention in which the recipient retains title, the Federal Government shall have a non-exclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the U.S. the subject invention throughout the world. If the Agreement indicates it is subject to an identified international agreement or treaty, the U.S. Geological Survey (USGS) also has the right to direct the recipient to convey to any foreign participant such patent rights to subject inventions as are required to comply with that agreement or treaty.

2. If the recipient performs services at a Government owned and operated laboratory or at a Government owned and recipient operated laboratory directed by the Government to fulfill the Government's obligations under a Cooperative Research and Development Agreement (CRADA) authorized by 15 U.S.C. 3710a, the Government may require the recipient to negotiate an agreement with the CRADA collaborating party or parties regarding the allocation of rights to any subject invention the recipient makes, solely or jointly, under the CRADA. The agreement shall be negotiated prior to the recipient undertaking the CRADA work or, with the permission of the Government, upon the identification of a subject invention. In the absence of such an agreement, the recipient agrees to grant the collaborating party or parties an option for a license in its inventions of the same scope and terms set forth in the CRADA for inventions made by the Government.

   If a known CRADA exists between the USGS and the recipient, include the CRADA as an attachment and include the following paragraph following b.2.:

   USGS has determined that use of alternate paragraph (b) in the preceding clause is required to meet USGS' obligations under (identify CRADA). This determination may be appealed in accordance with 37 CFR 401.4. Recipient agrees that the work performed under this Award is directed by USGS to meet the obligations under the CRADA. Recipient further agrees to grant licenses to the government and (insert additional CRADA partner names, if applicable) as necessary to meet USGS' obligations under the CRADA.

c. *Invention Disclosure, Election of Title and Filing of Patent Applications by Recipient*

1. The recipient will disclose each subject invention to USGS within two months after the inventor discloses it in writing to recipient personnel responsible for the administration of patent matters. The disclosure to USGS shall be in the form of a written report and shall identify the Agreement under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding of the nature, purpose, operation, and, to the extent known, the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention, whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication, at the time of disclosure. In addition, after disclosure to USGS, the recipient will promptly notify USGS of the acceptance of any manuscript describing the invention for publication, or of any on sale or public use planned by the recipient.
2. The recipient will elect in writing whether or not to retain title to any such invention by notifying USGS within two years of disclosure to USGS. However, in any case where publication, on sale, or public use has initiated the one-year statutory period wherein valid patent protection can still be obtained in the U.S., the period for election of title may be shortened by USGS to a date that is no more than 60 days prior to the end of the statutory period.
3. The recipient will file its initial patent application on an invention to which it elects to retain title within one year after election of title or, if earlier, prior to the end of any statutory period wherein valid patent protection can be obtained in the U.S. after a publication, on sale, or public use. The recipient will file patent applications in additional countries or international patent offices within either ten months of the corresponding initial patent application, or six months from the date when permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications when such filing has been prohibited by a Secrecy Order.

4. Requests for extension of the time for disclosure to USGS, election, and filing under subparagraphs 1., 2., and 3. may, at the discretion of USGS, be granted.

d. *Conditions When the Government May Obtain Title*

The recipient will convey to USGS, upon written request, title to any subject invention:

1. if the recipient fails to disclose or elect the subject invention within the times specified in paragraph c. above, or elects not to retain title, provided that USGS may only request title within 60 days after learning of the failure of the recipient to disclose or elect within the specified times;
2. in those countries in which the recipient fails to file patent applications within the times specified in paragraph c. above, but prior to its receipt of the written request of USGS, the recipient shall continue to retain title in that country; or in any country in which the recipient decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in a reexamination or opposition proceeding on, a patent on a subject invention.

e. *Minimum Rights to Recipient*

1. The recipient will retain a non-exclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the recipient fails to disclose the subject invention within the times specified in paragraph c. above. The recipient's license extends to its domestic subsidiaries and affiliates, if any, within the corporate structure of which the recipient is a party and includes the right to grant sublicenses of the same scope to the extent the recipient was legally obligated to do so at the time the Agreement was made. The license is transferable only with the approval of USGS except when transferred to the successor of that part of the recipient's business to which the invention pertains.
2. The recipient's domestic license may be revoked or modified by USGS to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR Part 404. This license will not be

revoked in that field of use or the geographical areas in which the recipient has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at discretion of USGS to the extent the recipient, its licensees, or its domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.

3. Before revocation or modification of the license, USGS will furnish the recipient a written notice of its intention to revoke or modify the license, and the recipient will be allowed thirty days (or such other time as may be authorized by USGS for good cause shown by the recipient) after the notice to show cause why the license should not be revoked or modified. The recipient has the right to appeal, in accordance with applicable regulations in 37 CFR Part 404 concerning the licensing of Government-owned inventions, any decision concerning the revocation or modification of its license.

f. *Recipient Action to Protect Government's Interest*

1. The recipient agrees to execute or to have executed and promptly deliver to USGS all instruments necessary to: (i) establish or confirm the rights the Government has throughout the world in those subject inventions for which the recipient retains title; and (ii) convey title to USGS when requested under paragraph d. above, and to enable the Government to obtain patent protection throughout the world in that subject invention.
2. The recipient agrees to require, by written agreement, its employees, other than clerical and non-technical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the recipient each subject invention made under this Agreement in order that the recipient can comply with the disclosure provisions of paragraph c. above, and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. The disclosure format should require, as a minimum, the information requested by paragraph c.1 above. The recipient shall instruct such employees through the employee agreements or other suitable educational programs on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.
3. The recipient will notify USGS of any decision not to continue prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than 30 days before the expiration of the response period required by the relevant patent office.
4. The recipient agrees to include, within the specification of any U.S. patent application and any patent issuing thereon covering a subject invention, the following statement: "This invention was made with Government support under (identify the Agreement) awarded by the U.S. Geological Survey. The Government has certain rights in this invention."
5. The recipient or its representative will complete, execute and forward to USGS a confirmation of a License to the U.S. Government and the page of a United States patent application that contains the Federal support clause within two months of filing any domestic or foreign patent application.

g. *Subcontracts*

1. The recipient will include this Patent Rights clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental or research work. The subcontractor will retain all rights provided for the recipient in this Patent Rights clause, and the recipient will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractors' subject inventions.
2. In the case of subcontracts, at any tier, when the prime award by USGS was a contract (but not a cooperative agreement), USGS, subcontractor, and contractor agree that the mutual obligations of the parties created by this Patent Rights clause constitute a contract between the subcontractor and the Foundation with respect to those matters covered by this Patent Rights clause.

h. *Reporting on Utilization of Subject Inventions*

The recipient agrees to submit on request periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the recipient or its licensees or assignees. Such reports shall include information regarding the status of development, date of first

commercial sale or use, gross royalties received by the recipient and such other data and information as USGS may reasonably specify. The recipient also agrees to provide additional reports in connection with any march-in proceeding undertaken by USGS in accordance with paragraph j. of this Patent Rights clause. As required by 35 U.S.C. § 202(c)(5), USGS agrees it will not disclose such information to persons outside the Government without the permission of the recipient.

i. *Preference for United States Industry*
Notwithstanding any other provision of this Patent Rights clause, the recipient agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject invention in the U.S. unless such person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the U.S. However, in individual cases, the requirement for such an agreement may be waived by USGS upon a showing by the recipient or its assignee that reasonable but unsuccessful efforts have been made to award licenses on similar terms to potential licensees that would be likely to manufacture substantially in the U.S. or that under the circumstances domestic manufacture is not commercially feasible.

j. *March-in Rights*
The recipient agrees that with respect to any subject invention in which it has acquired title, USGS has the right in accordance with procedures at 37 CFR § 401.6 and USGS regulations at 45 CFR § 650.13 to require the recipient, an assignee or exclusive licensee of a subject invention to grant a non-exclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances and if the recipient, assignee, or exclusive licensee refuses such a request, USGS has the right to grant such a license itself if USGS determines that:
1. such action is necessary because the recipient or assignee has not taken or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use;
2. such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the recipient, assignee, or their licensees;
3. such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the recipient, assignee, or licensee; or
4. such action is necessary because the agreement required by paragraph i. of this Patent Rights clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the U.S. is in breach of such agreement.

k. *Special Provisions for Agreements with Non-profit Organizations*
If the recipient is a nonprofit organization, it agrees that:
1. rights to a subject invention in the U.S. may not be assigned without the approval of USGS, except where such assignment is made to an organization which has as one of its primary functions the management of inventions, provided that such assignee will be subject to the same provisions as the recipient;
2. the recipient will share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (when USGS deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. § 202(e) and 37 CFR § 401.10;
3. the balance of any royalties or income earned by the recipient with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions, will be utilized for the support of scientific or engineering research or education; and
4. it will make efforts that are reasonable under the circumstances to attract licensees of subject inventions that are small business firms and that it will give preference to a small business firm if the recipient determines that the small business firm has a plan or proposal for marketing the invention which, if executed, is equally likely to bring the invention to practical application as any plans or proposals from applicants that are not small business firms; provided that the recipient is also satisfied that the small business firm has the capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the recipient. However, the recipient

agrees that the Secretary of Commerce may review the recipient's licensing program and decisions regarding small business applicants, and the recipient will negotiate changes to its licensing policies, procedures or practices with the Secretary when the Secretary's review discloses that the recipient could take reasonable steps to implement more effectively the requirements of this paragraph k.4.

l. *Communications*
All communications required by this Patent Rights clause must be submitted through Benjamin Henry, Technology Transfer Specialist, Office of Policy and Analysis (OPA), U.S. Geological Survey, Reston, VA 20192, (703) 648-4344, bhenry@usgs.gov.

**20. Research Integrity**

A. USGS requires that all grant or cooperative agreement recipient organizations adhere to the Federal Policy on Research Misconduct, Office of Science and Technology Policy, December 6, 2001, 65 Federal Register (FR) 76260, http://www.ostp.gov/html/001207_3.html. The Federal Policy on Research Misconduct outlines requirements for addressing allegations of research misconduct, including the investigation, adjudication, and appeal of allegations of research misconduct and the implementation of appropriate administrative actions.

B. The recipient must promptly notify the USGS Project Office when research misconduct that warrants an investigation pursuant to the Federal Policy on Research Misconduct is alleged.

**21. Access to Research Data**

A. By regulation (43 CFR 12.936), recipients that are institutions of higher education, hospitals, or non-profit organizations are required to release research data first produced in a project supported with Federal funds that are cited publicly and officially by a Federal agency in support of an action that has the force and effect of law (e.g., regulations and administrative orders). "Research data" is defined as the recorded factual material commonly accepted in the scientific community as necessary to validate research findings. It does not include preliminary analyses; drafts of scientific papers; plans for future research; peer reviews; communications with colleagues; physical objects (e.g., laboratory samples, audio or video tapes); trade secrets; commercial information; materials necessary to be held confidential by a researcher until publication in a peer-reviewed journal; information that is protected under the law (e.g., intellectual property); personnel and medical files and similar files, the disclosure of which would constitute an unwarranted invasion of personal privacy; or information that could be used to identify a particular person in a research study.

B. These requirements do not apply to commercial organizations or to research data produced by State or local governments. However, if a State or local governmental grantee contracts with an educational institution, hospital, or non-profit organization, and the contract results in covered research data, those data are subject to these disclosure requirements.

C. Requests for the release of research data subject to this policy are required to be made to USGS, which will handle them as FOIA requests under 43 CFR 2.25. If the data are publicly available, the requestor will be directed to the public source. Otherwise, the USGS Contracting Officer/Grants Officer, in consultation with the affected recipient and the PI, will handle the request. This policy also provides for assessment of a reasonable fee to cover recipient costs as well as (separately) the USGS costs of responding.

**22. Conflict of Interest**

The Recipient must establish safeguards to prohibit its employees and Subrecipients from using their positions for purposes that constitute or present the appearance of a personal or organizational conflict of interest. The Recipient is responsible for notifying the USGS Contracting Officer in writing of any actual or potential conflicts of interest that may arise during the life of this award. Conflicts of interest include any relationship or matter which might

place the Recipient or its employees in a position of conflict, real or apparent, between their responsibilities under the agreement and any other outside interests. Conflicts of interest may also include, but are not limited to, direct or indirect financial interests, close personal relationships, positions of trust in outside organizations, consideration of future employment arrangements with a different organization, or decision making affecting the award that would cause a reasonable person with knowledge of the relevant facts to question the impartiality of the Recipient and/or Recipient's employees and Sub-recipients in the matter.

The USGS Contracting Officer and the servicing Ethics Counselor will determine if a conflict of interest exists. If a conflict of interest exists, the USGS Contracting Officer will determine whether a mitigation plan is feasible. Mitigation plans must be approved by the USGS Contracting Officer in writing. Failure to resolve conflicts of interest in a manner that satisfies the government may be cause for termination of the award.

Failure to make required disclosures may result in any of the remedies described in 2 CFR § 200.338, Remedies for Noncompliance, including suspension or debarment (see also 2 CFR Part 180).

**23. Program Income**

A. The recipient will have no obligation to the Federal Government for program income earned from license fees and royalties for copyrighted material, in accordance with 43 CFR 12.924(h) (for A-110 recipients) or 43 CFR 12.65(e) (for A-102 recipients).

B. If a purpose of this award is to support a conference, symposium, or similar event, income related to that event will be deducted from total allowable costs to determine the net allowable costs before calculating the Government's share of reimbursable costs, as provided in 3 CFR 12.65(g)(1) (for A-102 recipients) or 43 CFR 12.924(b)(3) (for A-110 recipients).

C. If the recipient is an educational institution or nonprofit research organization, any other program income will be added to funds committed to the project by the Federal awarding agency and recipient and be used to further eligible project or program objectives, as described in 43 CFR 12.924(b)(1).

D. For all other types of recipients, any other program income will be deducted from total allowable costs to determine the net allowable costs before calculating the Government's share of reimbursable costs, as provided in 3 CFR 12.65(g)(1) (for A-102 recipients) or 43 CFR 12.924(b)(3) (for A-110 recipients).

## End of Special Terms and Conditions

## COST PRINCIPLES, AUDIT, AND ADMINISTRATIVE REQUIREMENTS

The Recipient shall be subject to the following regulations, which are incorporated herein by reference. Copies of these regulations can be obtained from the Internet at: *http://www.whitehouse.gov/omb/grants_docs*

Educational Institutions / State and Local Governments / Non-Profit Organizations

2 CFR Part 200, *Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards*, as implemented by the Department of the Interior in 2 CFR Part 1402 and 43 CFR Part 12.

Foreign Entities

- **Administrative Requirements**
  Foreign entities are subject to the requirements applicable to non-Federal entities in 2 CFR Part 200, Subparts A through D and:

  *Foreign public entities* are also subject to the requirements specific to States, with the following exceptions:

  - The State payment procedures in 200.305(a) do not apply. Foreign public entities must follow the payment procedures in 200.305(b).
  - The requirements in 200.321 "Contracting with small and minority businesses, women's business enterprises, and labor surplus area firms" do not apply.
  - The requirements in 200.322 "Procurement of recovered materials" do not apply.

  *Foreign non-profit organizations* (see definition in 2 CFR 200.70) are also subject to the requirements specific to non-profit organizations.

  *Foreign Institutions of Higher Education* (IHEs) (i.e., institutions located outside the United States that meet the definition in 20 US.C. 1001) are also subject to the requirements specific to IHEs.

- **Cost Principles**
  *Foreign for-profit entities* are subject to the cost principles in 48 CFR 1, Subpart 31.2.

  *Foreign hospitals* (i.e., a facility licensed as a hospital under the law of any foreign governmental entity or a facility operated as a hospital by a foreign public entity) are subject to the cost principles in 45 CFR Part 74, Appendix E.

  *All other foreign entities* are subject to the requirements applicable to non-Federal entities in 2 CFR Part 200, Subpart E.

  *Foreign public entities* are also subject to the requirements specific to States.

- **Indirect Cost Rate Negotiations**
  *Foreign IHEs*: Appendix III to Part 200—Indirect (F&A) Costs Identification and Assignment, and Rate Determination for IHEs. The U.S. Department of Health and Human Services (HHS) is the cognizant agency for indirect costs for foreign IHEs. Visit HHS' Cost Allocation Services website at https://rates.psc.gov/ for more information.

  *Foreign non-profit organizations*: Appendix IV to Part 200—Indirect (F&A) Costs Identification and Assignment, and Rate Determination for Nonprofit Organizations.

*Foreign public entities:* Appendix VII to Part 200—States and Local Government and Indian Tribe Indirect Cost Proposals.

*Foreign for-profit entities:* Contact the National Interior Business Center (IBC), Indirect Cost Services by telephone at (916) 566-7111 or by e-mail at: ics@ibc.doi.gov. Visit the IBC's Indirect Cost Services website at http://www.doi.gov/ibc/services/Indirect_Cost_Services/index.cfm for more information.

*Foreign hospitals:* 45 CFR Part 74, Appendix E—Principles for Determining Cost Applicable to Research and Development Under Grants and Contracts with Hospitals. HHS is the cognizant agency for indirect costs for foreign hospitals. Visit HHS' Cost Allocation Services website at https://rates.psc.gov/ for more information.

For-Profit Entities, Individuals, and Others Not Covered Above

- **Administrative Requirements**
  2 CFR Part 200, Subparts A through D, *Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards*

- **Cost Principles**
  48 CFR 1, Subpart 31.2, *Contracts with Commercial Organizations*

- **Indirect Cost Rate Negotiations**
  For information on indirect cost rate negotiations, contact the Interior Business Center (IBC) Indirect Cost Services Division by telephone at (916) 566-7111 or by e-mail at: ics@ibc.doi.gov. Visit the IBC Indirect Cost Services Division website at http://www.doi.gov/ibc/services/Indirect_Cost_Services/index.cfm for more information.

## II. ADDITIONAL REGULATIONS

This award is subject to the following additional Governmentwide regulations:

- 2 CFR 180, Governmentwide Debarment and Suspension (Nonprocurement)
- 2 CFR 182, Governmentwide Requirements for Drug-Free Workplace (Financial Assistance)

This award is subject to the following additional regulations of the U.S. Department of the Interior:

- 2 CFR Part 1400, Nonprocurement Debarment and Suspension
- 2 CFR Part 1401, Requirements for a Drug Free Workplace (Financial Assistance)
- 43 CFR Part 17, Nondiscrimination in Federally Assisted Programs of the Department of the Interior
- 43 CFR Part 18, New Restrictions on Lobbying
  - Submission of an application also represents the applicant's certification of the statements in 43 CFR Part 18, Appendix A, Certification Regarding Lobbying
- 43 CFR Part 41, Nondiscrimination on the Basis of Sex in Education Programs or Activities Receiving Federal Financial Assistance *[Applies only if this award provides assistance to an education program or student(s)]*