



We anticipate securing pre-approval for a number of potential project manipulations. Please see the descriptions below.

Research Plants: We anticipate pre-approval for work with plant species that are native to the American West plus species that are native to west Texas. The source for native designation will be the USDA PLANTS database (<http://plants.usda.gov/java/>). We are defining the American West as the 11 contiguous western states (AZ, CA, CO, ID, MT, NV, NM, OR, UT, WA, WY). Additionally, for any weed species that currently occur on the SEGA garden site as determined by a pre-garden establishment vegetation survey conducted by an approved botanist, we will request to work with other populations of that species as long as they originated in the western states or west Texas. Species on invasive or noxious weed lists of Arizona, USDA, or National Forests in Arizona will be excluded if they are not on site. All other plant species will require special review (by SEGA) and permitting (by the landowner). Approval by SEGA does not excuse researchers from complying with applicable laws and regulations. We understand that there are concerns about the risks associated with moving plants across their known boundaries, especially for identified weed species. We will develop and incorporate sanitation measures into the SEGA common garden User Guide to insure that these risks are minimized. Examples of procedures are listed below:

- Routine non-research weed monitoring and removal in fenced garden parcels. This is a necessary practice in any garden experiment but will serve to reduce the possibility of gene introgression.
- Routine monitoring of a 30 m boundary around the perimeter of the common garden site to detect research plant escapees, and remove them if need be.
- Thorough clean-up and removal (e.g., bagging and incineration) of plants post-research study.
- Removal of pollen/seed producing structures for imported populations of invasive species or noxious weeds.

Pesticides and Herbicides: Although we discourage the use of chemical toxins, some use is allowed when deemed important to the experimental design or when other methods are deemed too costly or unlikely to be successful. We are trying to maintain a controlled environment with as few external factors as possible, which may have unintended short- and long-term legacy effects. Pesticides, herbicides, and fungicides approved by the Coconino National Forest EIS will be allowed by the landowner, but use will be reviewed by the SEGA Governing Board and Scientific Advisory Board.

Small enclosures and enclosures: Enclosures and enclosures for individual plants /plots are approved as long as they do not cause harm to other organisms or interfere with avian flight patterns (e.g., netting in which birds may become entrapped). Maintenance of enclosure and enclosure fencing, except fencing around the SEGA plots, is the responsibility of the individual researcher.

Heating: Heating experiments will be permitted where energy needs can be met. Other considerations include fire safety and potential impacts on other users. Because of the high energy demands of such experiments, users are advised that they will need to pay for their energy use and infrastructure needed to provide energy where such infrastructure is not already established.

Genetically Modified Organisms (GMOs): Planting or releasing of GMO organisms requires review on a case-by-case basis in consultation with the SEGA Governing Board, regulating agencies, and the landowner(s).

Soil and landscape material import: Importing soil from nearby areas in Arizona for the purposes of studying the effects of warming on soil organisms or controlling for soil effects in elevation treatments will be approved, unless prohibited by state and federal regulations. Soil and plants have to be free of disease causing organisms to the best possible knowledge of the researcher and reviewers. The import of soil for pre-approved study is limited to the minimum amount required by the approved experimental design. Any other soil movement will require review including the Scientific and Landowner/Manager Boards. Additional landscape and planting materials such as sand, cinder, gravel, mulch, or manure will be permitted to the extent that they are unlikely to cause weed problems on the site.

Soil Export: Removal of soil that is associated with root removal or will be used as controls for cross-SEGA garden soil treatments is pre-approved. Any volume of soil over 5 cu. yards will require review on a case-by-case basis in consultation with SEGA staff and the landowner(s).

Isotope use: The use of stable isotopes is permitted in consultation with the SEGA Governing Board. Radioactive isotope use requires review on a case-by-case basis in consultation with the SEGA Governing Board, Scientific Advisory Board, and the landowner(s).

Rain-out Shelters: The use of rain-out shelters is approved given that the design of the shelters does not cause harm to animal organisms, interfere with avian flight patterns (e.g., use of materials in which birds may become entrapped), or affect other experiments. Maintenance of the shelters is the responsibility of the researcher. Rainout shelters should be designed to withstand the rigors of weather at each specific site where they will be deployed.

The Southwest Experimental Garden Array (SEGA) anticipates securing pre-approval for the following potential project manipulations:

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botanist, we will request to work with other populations of that species as long as they originated in the western states or west Texas. Species on invasive or noxious weed lists of Arizona, USDA, or National Forests in Arizona will be excluded if they are not on site. All other plant species will require special review (by SEGA) and permitting (by the landowner). Approval by SEGA does not excuse researchers from complying with applicable laws and regulations. We understand that there are concerns about the risks associated with moving plants across their known boundaries, especially for identified weed species. We will develop and incorporate sanitation measures into the SEGA common garden User Guide to insure that these risks are minimized. Examples of procedures are listed below:

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Questions or additional information: Please contact the SEGA Project Manager, Amy Whipple, Amy.Whipple@nau.edu.