



**US Army Corps
of Engineers®**

Engineer Research and
Development Center

Facility

CRREL Greenhouse

Purpose

The [greenhouse](#) at ERDC's Cold Regions Research and Engineering Laboratory (CRREL) is used for germination and root-growth studies to support basic and field research in revegetation and phytoremediation. Recent cooperative work on revegetation of dredged materials with ERDC's Environmental Laboratory (EL) and military range design with ERDC's Construction Engineering Research Laboratory (CERL) are two examples of its joint benefit and potential for future projects.



CRREL Greenhouse.

Specifications

This new facility (completed 2004) quadruples the space of CRREL's former greenhouse/lab facility. It includes an 1800 sq ft tri-layer polyacrylic greenhouse with an R-value double that of glass. The greenhouse has centrally controlled radiant heating and a push-pull shade system with highly efficient heating and cooling capabilities. The facility also includes 2700 sq ft of office, lab, and storage space, housing equipment such as computerized root-imaging systems, a photosynthetic fluorescent/gas exchange system, environmentally controlled growth chambers (-5 to 60 °C and 0 to 90% humidity), and a temperature-controlled seed storage room. The greenhouse and laboratory facility helps support \$800,000 to \$1M in research funding every year.

Benefits

Customers will benefit from this energy-efficient structure that houses multiple resources under one roof and permits flexible use of the space to support several simultaneous projects. The cost savings can be passed on to customers, and the improved safety features will benefit all users of the greenhouse.

Success Stories

A multi-year plant-breeding project funded by BT25, Strategic Environmental Research and Development Program (SERDP), and Environmental Security Technology Certification Program (ESTCP) has increased training resiliency in 13 native and introduced western range-land grasses. Greenhouse studies were important in identifying

and selecting appropriate populations for the improved lines, and studies are continuing in the new greenhouse to gather data for the Plant Variety Protection process on those new lines that will be released as cultivars. This project was awarded the ERDC Research and Development Achievement Award in 2003 and was selected by SERDP as a success story in its presentation to Congress in 2001.

Root-growth studies have been a key factor in answering many land rehabilitation and contaminated soil problems; this work also led to the development of a new ecological-bridge concept of seeding mixtures to establish native plant stands that require no maintenance. Knowledge gained from these studies is being used to revegetate thousands of acres of cantonment and training areas in the eastern United States at Fort Drum and West Point, New York, and in the west at Fort Carson, Colorado; Camp Guernsey, Wyoming; and Yakima Training Center, Washington.

The U.S. Air Force funded a seedbank analysis study for slickspot peppergrass (*Lepidium papilliferum*), which was proposed to be listed as endangered by the Fish and Wildlife Service. Greenhouse viability studies on seeds collected in the soil provided supporting data that helped avoid the listing of this species, and thus helped the Air Force avoid a costly “work around” on its training lands in southwestern Idaho.

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