



Food and Agriculture  
Organization of the  
United Nations



# Forest Genetic Resources Working Group

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USDA-Forest Service, Pacific Southwest  
Research Station

17 November 2021 - 19 November 2021  
Location: Virtual

# Forest Genetic Resources Working Group

Mission: To generate, share and disseminate knowledge that is crucial for the conservation and the sustainable use of North American forest genetic resources to the benefit of present and future generations



# Forest Genetic Resources Working Group

## Objectives:

- Promote the collection, exchange, and dissemination of information about forest genetic resources so that *in situ* and *ex situ* programs of conservation and sustainable use are based on sound scientific knowledge
  - Promote cooperation and coordinate research, conservation, training, and knowledge exchange among member countries on genetic resource conservation problems
  - Facilitate the international exchange of forest genetic resources
  - Encourage genetic improvement programs for important commercial forest species as a component of forest conservation and as a contribution to the economic welfare of North Americans
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# Members

Cuauhtémoc Sáenz-Romero  
J. Jesús Vargas Hernández  
Ramón Silva-Flores

Mexico

Sally Aitken  
Elizabeth Campbell  
Nathalie Isabel (nominated)

Canada

Kurt H. Johnsen  
Bryce Richardson  
Jessica Wright (chairperson)

USA



# Operating Strategy

- Meetings every 12-18 months
- Provide national reports to summarize forest genetic activities in each nation
- Identify tasks relevant to our objectives, assign members to a task group, and report on progress
- Occasionally provide information to BOA and agencies



# Last working group meeting

In person:

XXXIX meeting, 2018 October 7–12  
in Guadalajara, Mexico

- Met in conjunction with Expo Forestal in Guadalajara
- Conducted a symposium for attendees on “Forest Genetic Resources and Climate Change in North America”
- Field trip to southern Jalisco to see operational seed orchards, land use change, and restoration activities in the National Park Nevado de Colima

Virtual:  
2021 September 2



# Current tasks and achievements

**Task 58: Develop provisional climate-based seed zones for Mexico for contemporary and future climates**

- Done!

**Task 59: Expansion of the Seedlot Selection Tool to Mexico**

- Spanish translation in progress

**Task 60: Douglas-fir genomics: development of SNP array to assess climate and disease adaptation**

- SNP array developed, and data is being collected and analyzed

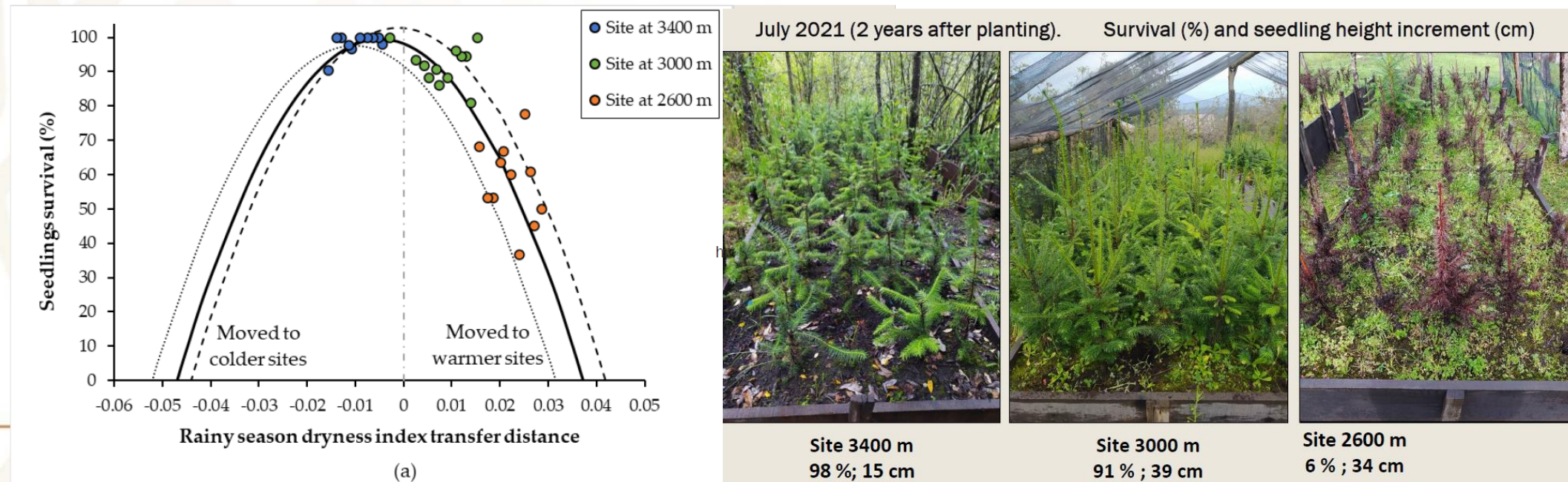
**Task 62: Scenario model linking landscape-level adaptation strategies and genetics with other broad-scale processes**

- Model developed and run for one geographic area, expansion to larger areas in progress
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# Current tasks and achievements

## Task 61: Reforestation guidelines for *Abies religiosa* and *Pinus pseudostrobus*

- Altitudinal reciprocal transplants of *A. religiosa* have been established. Demonstrated the need of a protective shade, either from shrubs as nurse plants or a shade-cloth
- La Niña conditions have caused extensive mortality due to drought.
- It is safe and recommended to shift upwards the seed sources 400 m up in elevation; moving downwards 400 m or + 1.9°C causes massive mortality





# Current tasks and achievements

Task 61: Reforestation guidelines for *Abies religiosa* and *Pinus pseudostrobus*

- Video of a new experiment testing establishment of *A. religiosa* up to 4000 m elevation (treeline, above the species elevational range)
- North American Forestry Commission funds were used to support the field planting

[Migración asistida de oyamel en el Nevado de Toluca, para compensar los efectos del cambio climático - YouTube](#)

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# Current tasks and achievements

## Task 61: Reforestation guidelines for *Abies religiosa* and *Pinus pseudostrobus*


### Ongoing work:

- Incorporating the transfer functions into the Seedlot Selection tool
- Continuing to measure seedlings



Article

### Reciprocal Common Garden Altitudinal Transplants Reveal Potential Negative Impacts of Climate Change on *Abies religiosa* Populations in the Monarch Butterfly Biosphere Reserve Overwintering Sites

Ana Laura Cruzado-Vargas <sup>1</sup>, Arnulfo Blanco-García <sup>2</sup>, Roberto Lindig-Cisneros <sup>3</sup>, Mariela Gómez-Romero <sup>2,4</sup>, Leonel Lopez-Toledo <sup>5</sup>, Erick de la Barrera <sup>3</sup> and Cuauhtémoc Sáenz-Romero <sup>5,\*</sup> 

*Ecological Applications*, 30(2), 2020, e02041  
© 2019 by the Ecological Society of America

Suitable climatic habitat changes for Mexican conifers along altitudinal gradients under climatic change scenarios

ERIKA GÓMEZ-PINEDA,<sup>1</sup> CUAUHTÉMOC SÁENZ-ROMERO,<sup>2,7</sup> JUAN MANUEL ORTEGA-RODRÍGUEZ,<sup>3</sup>  
ARNULFO BLANCO-GARCÍA,<sup>3</sup> XAVIER MADRIGAL-SÁNCHEZ,<sup>3</sup> ROBERTO LINDIG-CISNEROS,<sup>4</sup> LEONEL LOPEZ-TOLEDO,<sup>2</sup>  
MARTHA ELENA PEDRAZA-SANTOS,<sup>5</sup> AND GERALD E. REHFELDT<sup>6</sup>



# Current tasks and achievements

Task 64: Assisted migration for conservation and restoration - case studies from Mexico, US and Canada- Completed



Review

## Assisted Migration Field Tests in Canada and Mexico: Lessons, Limitations, and Challenges

Cuahtémoc Sáenz-Romero <sup>1,\*</sup>, Greg O'Neill <sup>2</sup>, Sally N. Aitken <sup>3</sup> and Roberto Lindig-Cisneros <sup>4</sup>

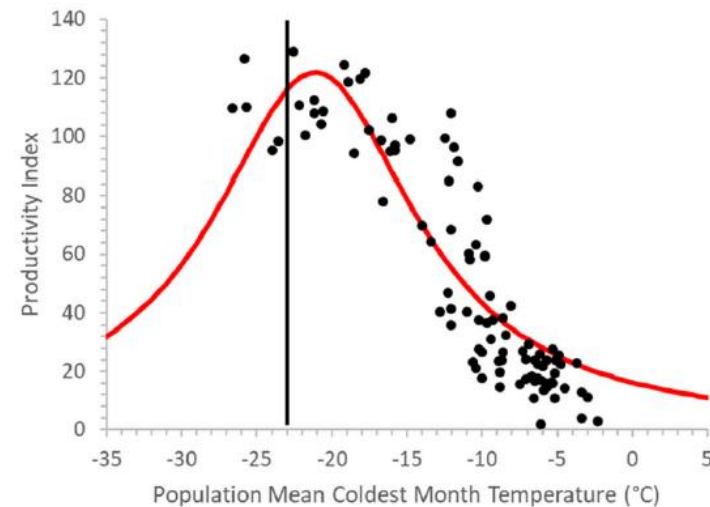


Figure 3. Genecology function for a provenance test site near the town of High Level, Alberta, showing that the most productive populations at the High Level site are those that originate from locations having a mean coldest month temperature (MCMT) approximately 3 °C warmer than the plantation. The vertical bar identifies the MCMT of High Level, Alberta (−23 °C).

# New tasks

## New Task 65: CAST- Climate adapted seed tool

Seed source transfer tool developed for California driven by climate with models derived from lodgepole pine and Douglas-fir provenance trials.

Jessica Wright, Cuauhtemoc Saenz-Romero.

## New Task 66: Tree ring data from common garden experiments

- Genetic basis of resilience to drought – tree ring data on western red cedar and Douglas-fir from provenance test has been analyzed
- Additional data for similar analyses is being gathered, including *Pinus patula* and *P. contorta*.

Elizabeth Campbell and J. Jesús Vargas Hernández

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# Impacts

- Increased awareness of the role of genetic diversity for the sustainable management of forest ecosystems and their resiliency
    - Guidelines and recommendations for specific actions for gene conservation and seed transfer
    - Publications, Symposia, workshops, training sessions
  - Increased awareness of climate change threats on forest genetic resources
    - Guidelines for assisted migration
    - Specific tools for resource managers and policy makers
    - Publications, Symposia
  - Information on North American forest genetic resources to international organizations
    - Contribute to FAO Report on Global Genetic Resources
    - Contribute to other Regional Networks on conservation of forest genetic resource (e.g., ConForGen, LAFORGEN, NAFGS)
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# Planned meetings

2022 June 17-21

- Following the first meeting of the North American Forest Genetics Society
- Start in Monterrey, California
- Field tour TBD



# Budget Requests

Task 61: Maintaining *Abies religiosa* seedlings for a provenance trial in the Monarch Biosphere Reserve

Requested \$4,000

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# Summary

- ❑ Successful working group – peer-reviewed research, proceedings, training sessions, study tours
  - ❑ Secrets to success:
    - - Continuity
    - Compatibility/collegiality
    - Cooperators
    - Communications (regular face-to-face meetings)
  - ❑ Continued success expected in our new and ongoing tasks
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**¡GRACIAS!**

