

MINUTES

XXXIV Reunion of the Forest Genetic Resources Working Group

UN/FAO/North American Forest Commission

Quebec City, Canada, May 7-8, 2012

Minutes prepared by Brad St. Clair and Tannis Beardmore

Forest Genetic Resources Working Group Delegate members: J. Jesús Vargas Hernández (México), Javier López-Upton (México), Cuauhtémoc Sáenz Romero (México), Brad St. Clair (USA), Sally Aitken (Canada), Tannis Beardmore (Canada), Jean Beaulieu (Canada). Absent: Kurt Johnsen (USA).

Observers: Bryce Richardson (United States Forest Service (USFS) Rocky Mountain Research Station, USA), Nathalie Isabel (Natural Resources Canada (NRCan), Canadian Forest Service (CFS), Laurentian Forestry Centre), Judy Loo (Bioversity International, Italy), Cinthya Velarde (Dept. of Genebanks in the National Forestry Commission, CONAFOR, México).

May 7, 2012

Jean Beaulieu the current Forest Genetic Resource Working Group (FGRWG) chair called the meeting to order at the CFS's Laurentian Forestry Centre. A welcome by Normand Laflamme (Director of Planning and Development, NRCan, CFS, acting for Jacinthe Leclerc was provided to the group.

Introductions of delegate members and observers were made with each participant providing a brief summary of their work including updates on forest genetic resources-related research projects. Jesús Vargas Hernández was not present on the 7th due to a delay in his flight.

Member updates:

- Sally Aitken described her projects related to climate change and the use of assisted migration (AM) for conservation purposes. She is the author of a book on Conservation and the Genetics of Populations that will be available soon.
- Tannis Beardmore described her work pertaining to AM and her seed research activities.
- Brad St. Clair described his work pertaining to the management and conservation of forest tree populations, and the integration of genetics and silviculture.
- Jean Beaulieu described his work with the Canadian Wood Fiber Centre that pertains to association genetics and phylogeography (in collaboration with Jean Bousquet, Laval University). Jean noted that approximately 40% of his time is spent in management.
- Nathalie Isabel described her research interests including studies on the genomics of white spruce and poplar; hybrid zone, gene flow between exotics and native species and ecology of poplar species.

- Judy Loo discussed the forest genetic resources projects that she is coordinating globally through Bioversity International.
- Bryce Richardson discussed his work pertaining to quantitative genetics focusing on white pine blister rust and on shrub species.
- Cuauhtémoc Sáenz Romero described his work on climate change and AM.
- Javier López Upton described his work in breeding and seed research.
- Cinthya Velarde discussed her work for the National Forestry Commission.

Minutes from the last meeting at the Coweeta Experimental Forest, Otto, North Carolina, USA April 11-15, 2011 were adopted with no changes. Jean presented the schedule for the week and discussed logistics. He also presented the agenda for this meeting (Appendix A).

National Reports

National Reports were presented for the United States and Canada and, the National Report for Mexico was postponed until the next day since Jesús wasn't present. The United States' National Report was prepared and presented by Brad St. Clair. This report summarized the current status and new activities in four areas: climate change, genetic resources conservation, genomics and biotechnology, and tree improvement. See the report for details (Appendix B). It was identified that climate change is a major focus of much of the work. The USFS is in the process of producing a climate change adaptation plan. Activities are still on-going in universities but are declining.

The Canadian National Report was prepared by Sally Aitken, Tannis Beardmore and Jean Beaulieu and, was presented by Tannis Beardmore (Appendix C). Highlights of the report included an update on the economic downturn in 2011 which has had a strong impact on forest industry and research. Growth areas have been primarily in niche markets and emerging technologies.

Task Reports

Task 38 -- To maintain and update a page on the World Wide Web to broaden contacts and improve communication about the activities of the Forest Genetic Resources Working Group. Report by Jean Beaulieu

The web page was recently updated. Some links are not yet working, but these issues should be resolved. The link to Symposium on Climate Change will be fixed and files will be transferred from the NRCan server to the USFS server. Cuauhtémoc remarked that he has made some small changes to his presentation given at the meeting in Oaxaca and it needs to be updated. Brad again recommended that it would be valuable for everyone to post their most recent National Reports and Tannis suggested that we call them "Recent Activities" instead of "National Reports".

Task 44. To create a bibliography with abstracts of undergraduate and graduate dissertations on the genetics, ecology, and biogeography of Mexican woody and semi-woody species and the plant communities in which they occur, and make the information available on the Internet.

Report by Javier López-Upton.

Javier estimates that there are 200 documents in Spanish in the bibliography. These documents are theses which date back to the 1950's and approximately half the entries have a summary. Most theses present work on temperate tree species. Javier suggested that the summaries should probably be reviewed. He also presented an Excel spreadsheet with the following information for each thesis: year, title, keywords, and species. Jesús has funds for translations so the document would be available in Spanish and English. Jean recommended posting what they currently have, even if it is still in Spanish and not yet translated. Others agreed that that this would be useful. Jean asked Javier to send all the information to him and he will see that it is posted on the web site as soon as possible. To date, most of the keywords have been translated. Sally asked whether it would be possible to produce the same type of thesis list from Canadian and US universities. Brad replied that the thinking at the time of the initiation of the task was that Mexican theses were very inaccessible and this has not necessarily been the case for US and Canada. Given this, it was decided to prioritize Mexican theses in this task.

Cuahtémoc recommended that we carry this task for one or two more years, then consider it completed. He did not think it is necessary to continue to update the bibliography with new theses, since most Mexican universities are now making theses available on the internet. We should send all the available information to Jean, check the key words, and then post it on our web site. Cuahtémoc suggested that the author and title should be separated into two separate fields in the Excel file which would make it easier for searching.

Task 51. To review the literature and rate the vulnerability of forest genetic resources to climate change.

Report by Tannis Beardmore.

Tannis did a review of vulnerability assessments as part of her work on the Canadian assisted migration task force. The paper published 2012 in the Forestry Chronicle. This may be considered to be one product for the task. Sally noted that there is a lot of information in the literature, and suggested that we should present specific guidelines on how to evaluate vulnerability. Focus could be on *in situ* conservation and on vulnerability of rear-edge populations. The goal would be to provide guidelines on how to collect from vulnerable populations.

Sally just completed a literature review of genetic variation of central, marginal and peripheral populations. Peripheral populations had less genetic variation, but only slightly less. Disjunct populations have unique alleles and allelic combinations. Sally identified the importance to identify these latter populations. Data set has 1,000 populations and about 50 species, and considered a few different marker types.

Sally proposed a new task to "provide *ex situ* conservation guidelines for populations at greatest risk of extirpation due to climate change." This would include a review of criteria for determining tree species vulnerability. Sally will lead the task. Cuahtémoc would be representative for Mexico, and Brad would be a representative for the US. Judy would like to be kept informed of progress. Objectives would be: 1) review of vulnerability to climate change; 2) review of distribution of genetic variation; and 3) how best to capture the variation in *ex situ* collections. Sally will develop a draft outline of aspects to address and distribute this to task members.

Task 52. To mitigate the lack of trained personnel in Mexico's National Forest Genetic Resource Management Program by providing training courses and training visits in the areas of (a) seed collection and management, (b) nursery plant production, and (c) forest genetics and tree improvement, using

expertise within the FGRWG as well as that recruited from other sources in Canada, México, and the U.S.

It was decided to postpone discussion of this task until Jesús was present.

Task 53. To collect seeds from Coulter pine in the southernmost, most arid, extremes of its range to store for conservation and to use in tests of hypotheses concerning the species north-south dispersal during glacial and post-glacial periods.

There are still some funds were left in the grant from the National Geographic Society to collect the remaining seed of populations in Mexico. Seed has been collected from five populations and the plan is to collect cones in June. Four populations in California are still to be collected. Tom Ledig will send seed to Jean to look at genetic variation among and within populations. This task will remain open.

Task 54. To develop guidelines for assisted colonization of forest species and populations in response to climatic change.

A discussion was revisited on use of the terms assisted colonization versus assisted migration and no conclusion was reached.

Cuauhtémoc updated us on ideas of AM for *Picea martinezii*. He discussed current climatic niches of *P. martinezii* and for the year 2090. At the last meeting, he had discussed using *P. martinezii* to perhaps replace *Abies religiosa* in the monarch butterfly reserve. Cuauhtémoc proposed that high temperature and drought are impacting *Abies religiosa* and the monarch butterfly, with the tops of these trees exhibiting possible-climate related die back. Sally noted that this has also been observed in British Columbia with Western white cedar and Alaskan yellow cedar. Cuauhtémoc has gone to the reserve office to discuss this with reserve officials and their response was unfavorable. They replied that by law they cannot plant anything that is not local. He said that they are hesitant to do anything new. After talking to the director, he said that he would send Cuauhtémoc something; but Cuauhtémoc has not yet received a reply. Three weeks ago, he learned that the director had changed, which might impact his progress with this issue.

Judy remarked that she has heard of illegal logging in the reserve. Cuauhtémoc replied that there is variation in the management of this reserve and some of the activities are illegal. Cuauhtémoc showed figures of the predicted habitat of *Abies religiosa* which showed that there will be no habitat available within the reserve by 2090. He proposed to match the climate of 2030 at this time and then to match it to 2060. After 2060, the appropriate habitat would be on Popocatepetl. The primary question is what will the monarch butterflies do? There is uncertainty as to whether they will move to new locations with *A. religiosa*. They need a climate that is cool but not too cold so that ice forms on their wings. He suggested moving the population up 275 m to match the 2030 climate. Cuauhtémoc has a manuscript in preparation on the general topic of AM, "Climate change and ecological restoration: ensuring genetic adaptation to climate change". He reviewed the past activities towards this.

Judy provided background information on the thematic papers written for the FAO's State of the World's Forest Genetic Resources document that may be of assistance for the review Cuauhtémoc is preparing. There was a discussion on an AM task at the XXXII Reunion of the Forest Genetic Resources Working Group meeting in Oaxaca, México (November 23-27, 2009). In May 2011, Dennis Joyce said that he had a draft that he was working on related to this task. In Oct 2011 at the SER meeting in Merida, Judy and Everit Thomas invited Cuauhtémoc to submit a draft.

Judy said that Everit was working on the background thematic paper on the use of native species for restoration, and he thought he needed to discuss the issue of considering climate change. It was noted

that there is no consensus in Europe on the use of assisted colonization. Thus, no conclusions were made in the thematic study. Parts of Cuauhtémoc's writing have been incorporated into this thematic paper.

Sally mentioned that she is working on an invited review of AM issues for Annual Review of Ecology and Evolution. She said that the review discusses the issue of out breeding depression. Tom Ledig was going to write a review for this task, but has declined given that he has now retired. Jean recommended that this task will stay open.

Task 47. To publish a series of lecture notes on forest conservation genetics in Spanish and English.

The lecture notes are finished and published in electronic version available in Spanish. We should upload the notes to our FGRWG web site. Judy would also like to put a link to this in the Bioversity International web site. This task was closed.

Task 55. To study elevational and geographic variation in *Pinus patula* as an aid to defining seed zones and conservation of genetic resources in the state of Oaxaca.

Cuauhtémoc described work he did while on sabbatical with Jean. He grew populations at two different temperatures in growth chambers. Differences between the temperature treatments were small and not statistically significant. Populations from lower elevations grew more. He recommended three seed zones of 200 m widths, similar to the results from field tests. Further work will involve the publication of a paper on the field test results. This task will continue.

The business meeting was adjourned at 5 pm.

May 8, 2012

National Report

The national report for Mexico was presented by Jesús (Appendix D). This report was prepared primarily by Javier and Cuauhtémoc. Jesús noted that he gave up his administrative duties two months ago and is back in an academic position. The main activity described in the Mexico report is the preparation of the report for the State of the World's Forest Genetic Resource report for FAO. Workshops were organized in 2011 to gather information for this report and information was requested from multiple partners. Javier contacted about 100 people in different regions. Javier and others at the Colegio de Postgraduados en Ciencias Agrícolas were in charge of putting the information together. The report was sent to FAO in January 2012. The report will be useful in Mexico to help determine national program priorities. It was noted that there were more activities in *in situ* conservation than in *ex situ*. The FAO gave some financial support to help with the report. Judy mentioned that Mexico received funds largely because they acted quickly and were well organized.

Mexico has developed national standards for seed and seedling production and use through the efforts of CONAFOR. CONAFOR has programs for public funding for reforestation which allows them to set standards. People who receive funding must comply with the national standards. These standards are expected to be approved by June or July. Some points may be controversial, particularly with respect to greater restrictions on seed movement. These standards only apply to reforestation programs funded by CONAFOR. Cuauhtémoc described some of the difficulties with new rules that are being experienced by the Nuevo San Juan Parangaricutiro Native Indian Community in Michoacan. The community members are frustrated that despite being good stewards and doing what was recommended of them, they don't

quite meet some of the standards. Judy suggested that if the standards are still under review, it might be useful to request outside reviews.

National Center for Conservation of Genetic Resources in Jalisco is up and running. The president of Mexico recently dedicated the facility. It includes all organisms; forest trees are one of five areas. The centre is operated by INIFAP. All except forestry is coordinated by INIFAP; forestry is coordinated by CONAFOR. Samples are owned by the institutions and researchers who submit them to the Center. Technical support is provided and the centre will process and store the samples. Currently, there are no forest tree collections at the centre.

Public funding for forestry research is poor, down from about 65 projects ten years ago to 11 during the past four years (and no forest genetics projects). There has been a move towards technology transfer projects and fewer research projects.

State of the World's Forest Genetic Resources Report

This report was presented by Judy. Forest genetic resources is defined broadly since many nations rely on food crops from forest trees. The report will include seven chapters and will integrate information from nine thematic studies that complement the country reports. The approach taken is that it is a country-driven process. To date, 35 reports have come in and 15 countries have said that they will be submitting reports. Only about, a quarter of FAO member the countries will have reported. The FAO is currently working on synthesizing the country information and that from the thematic studies. One of the main goals is to have a realistic set of recommendations that will feed into the development of a Global Plan of Action for forest genetic resources.

Tannis described the process used in Canada to develop their report. The pan-Canadian group CONFORGEN was instrumental with regard to compiling the necessary information for the report. The reviews were extensive, and in total the report underwent 33 reviews, including 2 lawyers and 3 different departments. The report was submitted to FAO.

Jesús recognized Javier for coordinating the team responsible for producing the Mexican report. Report was 84 pages with an annex of 180 pages including a list of species (4,200 tree species). An important aspect of the report was training/education.

The United States report was prepared by Randy Johnson. Brad discussed the report. Given that there was not budget allocated for compiling the necessary information, Randy relied on previous reviews such as the US Forest Service's 2010 National Report on Sustainable Forest Services. The US report is currently under policy review.

Task Reports continued

Task 30. To evaluate the genetic structure of the Mexican pines as an aid to conservation and wise use.

Jesús contacted Tom Ledig to find out about the status of this task. Tom reported problems with analyzing the allozyme data. Sally agreed that allozyme methodologies have been superseded by new methodologies. Tom recommended closing the task with an understanding that there would be forthcoming publication and Jesús also recommended closing the task. Brad suggested that a summary of what was done could be produced. The task closed.

North American Forestry Commission's (NAFC) XXVI Commissionaires meeting

Working group members and observers participated in the Commissionaires meeting from 2 – 4 pm where the NAFC working groups were each presented a report on their respective activities. Jean Beaulieu as chair of the FGRWG presented on the group's accomplishments and activities. Following this meeting, the WG continued with the task reports.

Task Reports continued

Task 39. To coordinate a comprehensive study to clarify the evolutionary history, taxonomic relationships, genetic structure, and population ecology of the Mexican piñons and to work with local people to find biologically, socially, and economically acceptable options for conservation.

Jesus reported that there has not been much recent progress. There is uncertainty as to what to do with the information and in particular, what the practical recommendations will be and the implications of these recommendations. In addition, Eladijo is now the president of the university so does not have time to work on the task. Judy mentioned that conservation recommendations are still needed. *Pinus cembroides* is being planted in some places. Judy is hoping that *Pinus pinceana* would also be planted more widely. Jesús said that there is a problem with obtaining seed. Judy noted that much has been learned about the species with new populations being discovered. Bryce asked if there was any interest in climate envelope models to guide reforestation. Judy said that it could be done now and that there is reasonably good knowledge of the distribution of the species. Judy noted that it occurs in very xeric places, and may be at particular risk of climate change; she recommends *ex situ* collection. Bryce mentioned that he has interests in pinyon ecosystems of the southwest US. The task was closed.

Task 41. To aid in the conservation of spruce taxa endangered in Mexico and the southwestern United States by publicizing their plight to the public and by directing recommendations for the sustainable management of spruce ecosystems to the appropriate governmental agencies and national and international non-governmental organizations.

Jesús reported that what remains to be done for this task is to summarize conservation recommendations to the Mexican government. He presented two ideas: (1) close the task and leave the task of making recommendations to the Mexican delegation; and (2) produce a practical technological paper with management recommendations. It was decided to keep the task open until final recommendations are made and posted on the NAFC FGRWG web site and then submitted to CONAFOR.

Task 52. To mitigate the lack of trained personnel in Mexico's National Forest Genetic Resource Management Program by providing training courses and training visits in the areas of (a) seed collection and management, (b) nursery plant production, and (c) forest genetics and tree improvement, using expertise within the FGRWG as well as that recruited from other sources in Canada, México, and the U.S.

Jesús said that he has requested that CONAFOR identify technicians who should be trained. Probably nothing will happen this year until after the election and the new administration is in place. Jesus recommended keeping the task open for now. Jean mentioned that Dave Kolotelo (British Columbia Ministry of Forests, Lands and Natural Resource Operations) has been contacted and is willing to help. It was also recommended that Dale Simpson, manager of the CFS's Canadian National Tree Seed Centre could contribute to this task. Javier said that CONAFOR is considering hiring someone who would be responsible for this training. Tannis said that she developed a training presentation for UNDP four years ago, that might be of help. Jean said that all we can do at this time is to maintain the offer for training. The task remains open.

Task 44. To create a bibliography with abstracts of undergraduate and graduate dissertations on the genetics, ecology, and biogeography of Mexican woody and semi-woody species and the plant communities in which they occur, and make the information available on the Internet.

Jesús reported that Tom has had no time for translation of the bibliography into English. He has done some translation and he is willing to return the files. Jesús recommended that Javier ask Tom for the files. Tom suggested that 2.5K could allow for the scanning for the documents so they could be electronically captured.

Sally asked when the NAFC will let the working groups know about requests for funds. Rick Scott said the process is on the web site.

Other FRGWG business

There was some discussion of what counts as contributions to the working group. It was suggested that one or two members contributing to a relevant area that was applicable to more than one country could be considered as a working group contribution. Brad suggested that those tasks have to have more latitude and that members of the working group could refer to a piece of work that is related to the task but not a direct result of the task, especially if it is a paper. Jesús commented that it was important to acknowledge the group in a paper.

New tasks

Task 56. Develop *ex situ* conservation guidelines for species at most risk of extirpation from climate change. This task was discussed earlier. Members are Sally (chair), Brad, and Cuauhtémoc.

Other tasks were discussed but not decided upon, including:

- Task to collate information of country reports into a North America report. This could be accomplished initially by target a few key areas including developing a list of vulnerable species.
- Sally discussed a task on the genomics of spruce to look at relative levels of gene expression focusing on genes associated with biotic and abiotic stresses. Would need DNA samples from Mexican spruces. Jean will check and see whether he has seed or DNA and will send this to Sally. If this works then this could be added as a new task next year.
- Tannis discussed a task to look at rejuvenation procedures for stored seed for conservation purposes.

Recommendations to BOA:

Judy asked that NAFC support and encourages development of the FAO's Global Plan of Action as a follow-up to the FAO's State of the World's Forest Genetic Resources report. Tannis asked what kind of support would be beneficial. Judy said that written support is fine, although financial support would also be welcome.

Discussions about funding requests:

- Cuauhtémoc asked for \$2500 for seed collections of *Abies religiosa* to be used in common garden studies to look at adaptive variation. This would be support work in the Monarch Butterfly Biosphere Reserve which has the goal to find possible patterns of genetic differentiation among *A. religiosa* populations in order to develop assisted migration guidelines.

- The request was made for \$2500 to scan FGRWG archival information. There are two large boxes of files that could be scanned.
- Brad asked for \$2500 to look at climatic variation within current and future seed zones.

Future meetings:

Sally discussed possibility of holding next meeting as part of larger combined Canadian Forest genetics Association meeting in Whistler, British Columbia, 2013. The costs associated with attending this meeting could make it challenging for working group members to attend. Tom Ledig had offered to host the working group for the field trip part in California. This could be in 2014. Working group members were leaning towards having our next meeting in Guadalajara Mexico and a tour could be given of the new germplasm conservation centre. We need to wait for the new administration in Mexico in order to determine if there is support for this. The new government will be in power January 2013 and after this, a decision can be made with regard to support for the next meeting in Mexico. The decision was made to wait until the end of January and then to finalize the location of the 2013 meeting.

The FGRWG business meeting was concluded and adjourned by approximately 5 pm.