



Research, Education, and Economics (REE)

National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board

National Genetic Resources Advisory Council (NGRAC) Annual Meeting

Tuesday, April 11th – Wednesday, April 12, 2023

USDA- Agricultural Research Service (ARS) National Laboratory for Genetic Resources Preservation
(NLGRP), Fort Collins, Colorado

CONTENTS

EXECUTIVE SUMMARY	3
TUESDAY, APRIL 11 (Meeting Day #1)	
<u>Part I: Welcome and Orientation</u>	
Introduction of Members and Other Attendees.....	4
Welcome and Introductions	4
<u>Part II: Old Business</u>	
NGRAC reports (4) Status	4
NPGS Strategic Plan status.....	4
NAREEE Operational/Personnel Updates	5
Council membership	
Status of current members	
Update on renewal and new applications.	
Nomination/renomination process	
<u>Part III: New Business</u>	5
<u>PART IV: NGRAC Presentations from NLGRP Staff</u>	5 -7
<u>Part V: NGRAC Operations</u>	7 – 9
<u>Part VI: Public Comment</u>	8
Adjournment	9
WEDNESDAY, APRIL 12 (Meeting Day #2)	



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PART I: Welcome and Introductions

Welcome of Members and Other Attendees10

Part II: Initiatives 10-13

Adjournment13

APPENDIX A: List of Meeting Attendees14



Research, Education, and Economics (REE)

National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board

National Genetic Resources Advisory Council (NGRAC) Annual Meeting

Tuesday, April 11th – Wednesday, April 12, 2023

USDA- Agricultural Research Service (ARS) National Laboratory for Genetic Resources Preservation
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EXECUTIVE SUMMARY

The National Genetic Resources Advisory Council (NGRAC), a permanent subcommittee of the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board, held an in-person and zoom Annual Meeting at the USDA - Agricultural Research Service (ARS) on the campus of the Colorado State University (CSU) on Tuesday, April 11th (Meeting #1 8:30 a.m. – 5:00 p.m. MT) and Wednesday, April 12, 2023 (Meeting #2, 8:30 a.m. – 10:20 a.m. MT). The NGRAC was established in 2012 and advises and makes recommendations to the Secretary of Agriculture and Director of the ARS National Genetic Resources Program (NGRP). NGRP acquires, characterizes, conserves, documents, and distributes to scientists germplasm of all life forms important for food and agricultural production. The NGRP Germplasm Resources Information Network (GRIN) documents these animals, microbial, and plant collections through informational pages, searchable databases, and links to USDA-ARS projects that curate the collections (<https://www.grin-global.org/>).

The main goal of Meeting Day #1 was for the NGRAC to hear presentations from National Laboratory for Genetic Resources Preservation (NGRLP) and Colorado State University (CSU) scientists on several subjects: seed and clonal crop preservation, global food production, and online training materials on plant genetic resources developed collaboratively by USDA-ARS and CSU scientists.

The main goal of Meeting Day #2 was for NGRAC Board to discuss and prioritize initiatives for future activities.



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TUESDAY, APRIL 11, 2023 (Meeting Day #1)

PART I: Welcome and Introductions

The NAREEE Board Executive Director/Designated Federal Officer (DFO) Kate Lewis opened the meeting with a welcome to the first in-person meeting post-COVID before asking those present to introduce themselves.

Guests introduced themselves. The NGRAC members present were James McFerson (Chair), Chad Dechow, David Butruille (zoom), Paul Gepts, Preston Hardison, Sarada Krishnan, Stephen Kresovich, Terrence Tiersch (zoom), Margaret Smith, and ex-officio member Peter Bretting (zoom). USDA-ARS staff members present were Christina Walters, Gayle Volk, Daren Harmel, Harvey Blackburn, Phil Purdy, Patrick Reeves, Ann Reilley. The external stakeholder guests present were Mike Gore (Cornell) and Stephane Trager (zoom - SAGE Communication).

After the guest's introductions there were special welcomes by ARS Associate Area Director Bryan Kaphammer, USDA-ARS Center Director Daren Harmel, and CSU Associate Dean of Research Jan Leach.

Part II: Old Business

DFO Lewis noted that a quorum has been met and is entitled to move forward with new business.

Chair McFerson asked DFO Lewis to give a status report on the four reports created by the NGRAC Board over the last two years. The Briefing Package is with the Secretary's Senior Advisor. DFO Lewis expects two possible next steps in the process: (1) The Secretary will send an acknowledgment of the reports; or, (2) DFO Lewis will be invited to a meeting regarding the reports.

Chair McFerson asked if there was any discussion or questions on this update and hearing none, he moved on to the National Plant Germplasm System (NPGS) update from Peter Bretting.

NPGS Strategic Plan Status



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Dr. Bretting shared good news that several members of ARS will brief a Senior Official on the NPGS Strategic Plan at the Office of Management and Budget this coming Thursday. The Secretary received “questions for the record” from the Senate Agricultural Committee specifically about the NPGS plan and ARS will respond with replies to the Secretary.

NAREEE Operational/Personnel Updates

Chair McFerson pivoted to DFO Lewis and asked for an update on personnel. DFO Lewis was pleased to formally welcome and introduce Michele Simmons, Program Support Coordinator, who is currently a temporary detailed employee, but who has accepted the position permanently. Ms. Simmons responded with a thank you.

Council Membership

DFO Lewis stated that a third of the Board members have to turnover every year by law. During Fiscal Year (FY) 2023 several members terms ended in September and Kate extended those Board members terms because of a lengthy delay in filling slots. DFO Lewis is now awaiting a response on the member slate for FY23 from the Secretary’s office. New applications have been received for FY24 beginning in October and the application period remains open for FY 2024 with the applications due by May. The applications can be found on the NAREEE Board website. DFO Lewis urged current Council members to submit their applications in a timely manner and contact her directly with any questions. Chair McFerson also asked Council members to recruit appropriate colleagues to consider applying. Dr. Kresovich provided a list of relevant scientific organizations that could be contacted to alert those constituencies of the opportunity.

Part III: New Business

Chair McFerson asked if anyone wanted to highlight meetings that other members wanted to note that would have been of interest:

- (1) NAREEE Board Meeting: June 6-7, 2023 in Washington, DC.
- (2) National Academy of Sciences on Native Seeds: Still taking written responses.
- (3) DIVSeek: Meeting is about managing data associated with genetic resource collections to be held at the end of June.



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PART IV: NGRAC Presentations from NLGRP Staff

Dr. Christina Walters, NLGRP Supervisory Plant Physiologist gave a presentation on the preservation of seeds and clonal germplasm, genomic tools to improve and access collection diversity, staffing changes, NLGRP seed and microbial holdings, and ARS research and curation activities. She also discussed initiatives for seed curation and research: (1) Reduce the time between receiving seeds and putting them at storage temperature; (2) Address issues of seed health in cryo-storage (What is currently stored? What should be stored? Does liquid nitrogen storage offer a benefit for the additional costs?); (3) Detect seed aging before viability declines; (4) Review standards and improve them for NPGS needs; (5) A new Application Interface (API) “SMILE” for NLGRP to input and retrieve data from GRIN.

Dr. Gayle Volk, NLGRP Plant Physiologist provided an overview on the NPGS. There are 606,119 accessions representing 2560 genera at 20 locations with a focus on U.S. agricultural/horticultural crops and their crop wild relatives. She went on to discuss securing non-seed collections; examples of cryopreservation research leading to implementation, dormant bud cryopreservation; cryopreserved clonal collections at NLGRP.; pollen cryopreservation; challenges for cryopreserving clonal collections; safeguarding plant genetic resources in the United States during global climate change; Plant Germplasm Operations Committee/Public Outreach Subcommittee activities; global crop conservation strategies; a bibliometric search to assess NPGS Impact; and GRIN-Global updates.

Dr. Harvey Blackburn, NLGRP Lead Scientist, National Animal Germplasm Program (NAGP) provided a background on the U.S. livestock sector, which is valued at \$150 billion per year (farm gate). He presented a graph comparing livestock production across the world. Dr. Blackburn also discussed the broad global influence of U. S. livestock industries. One prominent example is the export of around 31.6 million units of dairy semen to 117 countries. He explained the NAGP business model, NAGP objectives for collection development and interactions, impact of collection use, future activities and a project on assisted gene flow among endangered coral.

After the two presentations the group went on a tour of NLGRP facilities.

Presentations Continued:

Dr. Geoff Morris, Associate Professor, CSU Soil and Crop Science. Dr. Morris gave an overview on the Plant Genetic Resources CSU Online Course Series.

Course 1 Origins: Discover the origins of plant genetic resources, their domestication and diversification, their genetic and genomic properties, and their vital role in global



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food systems

Course 2 Conservation: Examine the role of genebanks in the global effort to conserve plant genetic resources. Explore each step from collection to storage, regeneration, and distribution

Course 3 Discovery: Learn how breeders overcome the challenges of unadapted germplasm, how novel traits and genetic variants are discovered, and how they get from genebank to plant breeders, then on to farmers and consumers. He presented on the courses key features as well as a call for help in recruiting new genebank scientists.

Dr. Volk .Developing training materials for Plant Genetic Resources Management and Use. With many NPGS staff members retiring there is a need for training content for current staff and future generations. The GRIN-U website is a vast resource for plant genetics and geneticists with 183 Posts, 91 Subscribers, 4100 unique users. There have been users from 112 different countries, and 28 countries have had at least 10 unique users. The website also has career resource, public e-books, videos, webinars and virtual tours.

Dr. Pat Byrne, Dr. Geoff Morris and Dr. Gayle Volk - Enhancing Educational Outcomes for Plant Genetic Resources Conservation and Use. Background: The Genetic Resources work group of the Plant Breeding Coordinating Committee recommended an analysis of the NPGS and its utility to plant breeders and this resulted in a 2018 review paper in Crop Science entitled “Sustaining the Future of Plant Breeding: The Critical Role of the USDA-ARS National Plant Germplasm System.” Among the recommendations in that paper: (1) Close the gaps in genebank collections, especially for crop wild relatives; (2) Increase efforts to phenotype and genotype accessions; (3) Pay increased attention to pre-breeding activities; (4) Improve training opportunities; (5) Expand outreach efforts to strengthen public support; (6) Increase efforts to phenotype and genotype accessions.

PART V: NGRAC Operations

- Review NGRAC Mission:
 - **Action Item:** Preston suggested that language should be added to reference Tribal participation; the Board was in full support of this suggestion.
 - There is room in the Council for people with microbial expertise

DFO Lewis reported that the USDA/NAREEE organizational activities are increasing. The priorities are membership and recruitment of Board members. USDA is accepting applications for membership on the Board starting in FY24 until May 31.



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The four NGRAC reports are getting closer to Secretarial review and acknowledgement.

Orientation program for new members to NGRAC. DFO Lewis pivoted to Stephanie Trager from SAGE to discuss the strategy of onboarding, member outreach and communication. SAGE Strategy: Onboarding package: (1) fact sheets (2) presentations (3) goals (4) history; help set expectations for members; documents are digital but can be printed. DFO Lewis indicated a Standards of Operation document was the only piece of documentation on how the committees do their business. DFO Lewis has been working with SAGE to develop clear guidance for committees and boards. DFO Lewis suggested that perhaps an ad hoc committee would look at the communication pieces and provide some vetting and believes that the heavy lifting has been done. Chair McFerson will take the lead on the review committee to represent the Council. The current drafts of onboarding materials can be sent for review Thursday.

The updated web site was discussed and it was suggested that the Crop Vulnerability Statements should be on the website.

Chair McFerson asked DFO Lewis to discuss Microsoft Teams. DFO Lewis indicated she had explored different collaborative methods for the Boards and the Executive Committees and USDA Information Technology Department suggested that Microsoft Teams might be best. DFO Lewis has attempted to utilize Teams with NAREEE board members and main but has faced numerous challenges in implementation. Chair McFerson has been working in the Teams environment and agreed there are significant challenges to wider implementation. Council members urged caution in introducing yet another digital communication system for its business.

PART VI: Public Comment

DFO Lewis was monitoring the meeting's attendance and on the lookout for any public comments being made in the chat. There were none. DFO Lewis presented a public comment that was submitted prior to the meeting from the Crop Science Society of America (CSSA) dated April 4, 2023. In that letter CSSA discussed: (1) plant breeding and crop improvement research lacks sufficient public support; (2) decreased on-farm diversity leads to less effort for vegetable and fruit crops adapted to many, smaller production areas with variable climates; and (3) any support for publicly funded plant breeding must include support for federal research and activities such as the NPGS.

Adjournment



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DFO Lewis opened the floor up to questions before adjourning for the day. The meeting was adjourned at 4:40 p.m.



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WEDNESDAY, APRIL 12, 2023 (Meeting Day #2)

PART I: Welcome and Introductions

Welcome of Members and Other Attendees

Chair McFerson started the meeting by welcoming those in the room and on zoom. He reminded the Council of the series of potential initiative members discussed prior to this in-person meeting.

PART II: Initiatives

1. International Issues and Indigenous Knowledge

Next steps: Aggregate and share documents with Council – *Please note that this section needs clarification that will be obtained at the next NGRAC meeting.*

- Cary Fowler (State Department) initiative – USAID, Crop Trust, USDA involvement (Kresovich)
- Dr. Bretting will share information at the next meeting May 2023 in Rome
- Genebank standards (Blackburn) US Country report development over next 18 months
- Digital sequence discussion awareness; Perhaps bring in the State Department point-of-contact
- Conservation initiatives on the aquatic side (Tiersch awareness)
- Rewilding; Systems and agro-ecology (McFerson) pigs, horses, sheep in Northern UK (Butruille)

Indigenous Knowledge (Hardison)

- Linkage with the Department of the Interior
- Montreal Global Biodiversity Framework just finalized
- Global multi-national benefit fund established
- Governance of funds and governance of databases issues need to be addressed
- High seas treaty just passed (will include microbials)
- Tiersch and Smith: what is possible role for the Council here? More discussion is needed because it is too early to make specific recommendations, but the Council should continue to learn about issues/actors here (Hardison, Bretting)
- Exploration of alignment among international actors
- Digital sequence information meeting happening soon
- 30-30 initiative global and US (Gepts). What is the council's role in advising USDA on this subject?



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**2. Germplasm management strategies/guidelines from discontinued programs
(Smith/Butruille)**

- Can we develop guidelines for public research institutions and the role for USDA in identifying and maintaining import germplasm collections?
- Recommendations for USDA consideration. Guidelines/grant provision consideration for USDA to assure valuable components collections don't get lost (Smith)
- NGRAC microbes report (key was potential loss)
- Duplication of animal germplasm suggestion is relevant here (Blackburn)
- NIFA/NSF colleagues – chat with them (plant side) on current situation
- Limited/focused effort / need assistance from the microbes side (Smith)

3. NGRAC position paper on crop vulnerability (Gepts)

Next steps: Dr. Krishnan has a draft, and she will resend it via email. Dr. Gepts is willing to assist with this project.

4. Crop Conservation Strategies and how to utilize them (Krishnan)

- No one entity has ownership, governance and leadership
- Funding issues (Volk)
- *Next steps:* how to implement. A question was asked about the role for Council recommendations.
- Plant Germplasm Operations Committee (PGOC) meeting intersection (McFerson)

5. Fastest paths for solutions to reach farmers/deployment (Butruille)

- The Council discussed the NGRAC mandate and its role in deployment.
- Chair McFerson indicated the importance of including other expertise from livestock side.
- *Next steps:* Dr. Butruille volunteered to lead effort.

6. NPGS Strategic Plan and USDA's/NGRAC's response (Kresovich)

- Caution about containing comments to the plant side (Tiersch)
- Development of intermediate documents (Gepts) -- would 29-page synopsis suffice?
- Important to recognize the difference between synopsis and Council's response (McFerson)



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7. Germplasm Impact Assessments (Krishnan)

- Shortage of economic analysis of aquatic germplasm (Tiersch)
- Availability of data/hard numbers (Blackburn)
- Investigate Agricultural Marketing Service and Economic Research Service (ERS) data availability
- Dr. Bretting working to establish new contacts in ERS
- PGOC meeting 6/12-6/13 (what do we want to communicate?)
- Full value assessment (not just economic) (Hardison) Different stakeholder response (tribal leader vs. livestock breeder)
- Need to communicate to policymakers that there are many values of germplasm collections
- Diverse values of genetic resources (including economic and cultural)

8. Communications and Outreach

- Germplasm Hall of Fame – compendium of various accessions (Gepts)
- One possible source of outreach is the GRIN website (Volk and Byrne)
- Broad genetics resources conferences; Oscar like recognition (Smith)
- World Food Prize – germplasm committee nominations for various forms of recognition (Butuille)
- NGRAC web page enhancements (Gepts)

Parking Lot Item

Duplicative/distributed storage for animal genetics (Tiersch).

Possible Projects / Next Steps / Possible Priority Order

The Council concluded with a series of potential initiatives. Dr. Tiersch emphasized the need for a “coalition of the willing” to pursue these activities and the potential to recruit expertise outside the NGRAC, which worked very well for the Council's Algal report.

1. Tribal report (Hardison, draft, July 2023)
2. CVS (Crop Vulnerability Statements)-Quad Report (McFerson, Smith, Krishnan)
3. Discontinued programs, all life forms (background data gathering work needed)
4. Deployment Strategy Position Paper, all life forms (Butruille can get ball rolling here,



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- will schedule meeting)
5. Refereed Publication on NPGS Strategic Plan (Gepts, will defer until NPGS Plan release)
 6. PGOC swat team visit/PBCC (Plant Breeding Coordinating Committee) outreach (McFerson, Kresovich, advisory committee, and CGC (Crop Germplasm Committee))
 7. Evaluation of differing values (economic, cultural, etc.) of genetic resources
 - a. Maybe start by developing factor list
 - b. Develop trial memo for USDA
 8. Outreach/Comms -- Gathering breeding success stories
 - a. NGRAC website improvement suggestions
 9. Other federal family Ex-Officio members (Tiersch, McFerson, Lewis -- NAREEE DFO)

After a group picture and a brief break DFO Lewis offered special thanks to ARS and CSU, specifically Daren Harmel, Joseph Duchene, Jennifer Kendall and Gayle Volk, all of whom went above and beyond to make sure that the NGRAC Annual meeting was a success.

DFO Lewis noted that there were no additional stakeholders attending the meeting and no public comment.

Concluding the discussion on initiatives, Council members agreed the list was long, but appropriate. In some cases, individual Council members have indicated a desire to lead an effort.

Dr. Gepts suggested the Council consider holding two face-to-face meetings annually. There is general agreement this should be pursued. Dr. Gepts moved to request DFO Lewis explore an option for two annual NGRAC meetings. Motion passed. Chair McFerson will work with DFO Lewis to assess logistics and budgetary requirements.

Adjournment

A motion was made and seconded to adjourn the meeting at 11:33 a.m.



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APPENDIX A: LIST OF MEETING ATTENDEES

MEETING DAY #1, Tuesday, April 11, 2023

NGRAC Members Present: James McFerson (Chair), Chad Dechow, David Butruille (zoom), Paul Gepts, Preston Hardison, Sarada Krishnan, Stephen Kresovich, Terrence Tiersch (zoom), and Margaret Smith

NAREEE Advisory Board Staff: Kate Lewis, Michelle Simmons (zoom)

USDA-ARS NLGRP Staff: Christina Walters, Gayle Volk, Daren Harmel, Harvey Blackburn, Phil Purdy, Patrick Reeves, Ann Reilley

Ex-Officio Present: Peter Bretting (zoom)

Colorado State University: Pat Byrne, Jan Leach, Jennifer Kendall, and Davina Rhodes

Other Guests: Mike Gore (Cornell), Stephane Trager (zoom - SAGE Communication)

MEETING DAY #2, Wednesday, April 12, 2023

NGRAC Members Present: James McFerson (Chair), Chad Dechow, David Butruille (zoom), Paul Gepts, Preston Hardison, Sarada Krishnan, Stephen Kresovich, Terrence Tiersch (zoom), Margaret Smith and Steven Kerns (zoom)

NAREEE Advisory Board Staff: Kate Lewis, Michelle Simmons (zoom)

USDA-ARS NLGRP Staff: Harvey Blackburn, Gayle Volk, Daren Harmel, Patrick Reeves, Ann Reilley, Phil Purdy and Chris Richards

Ex-Officio Present: Dr. Peter Bretting (zoom)

Colorado State University: Jennifer Kendall