

# Plant and Animal Genetic Resources Preservation Unit (PAGRPU), Fort Collins



# PAGRPU Mission

To acquire, preserve, and evaluate genetic resources from plants, animals, microbes, aquatic organisms and insects; coordinate their availability, conservation, and utilization; and to provide optimum access to desirable genes and gene complexes.

# Center for Agricultural Resources Research (CARR)

- The mission of the CARR is to conduct research to ensure the security of agricultural resources in a changing climate.
- 5 units
  - Genetic resources, soil, water, rangelands & sugar beets



# Construction Inside and Out

- Three 4's:
  - Retirements
  - New hires
  - Technician/support vacancies
- Facility repairs
- Key Contacts
  - Seed receiving – Renee White
  - Seed requests – Tiffani Walker
  - Seed processing – Annette Miller



# PAGRPU Seed and Clonal Activities

- 82.3% - NPGS seed collection backed up
- 14% - NPGS clonal accessions cryopreserved
- 2.5% - NPGS collection occurring only at NCGRP
- Safety backup of non-NPGS germplasm
  - 7364 Plant Variety Protection voucher samples
  - 2654 *Journal of Plant Registration* voucher samples
  - 344,000 accessions "black-box" – CGIAR, Seed Savers Exchange, etc
  - Rare and Endangered species- Center for Plant Conservation
  - USFS, Indian Tribes (*Fraxinus*), special collections (i.e. McClintock's maize lines)

# PAGRPU Seed and Clonal Activities

- Received 8,859 accessions for back up
- Cryopreserved 589 accessions- mainly dormant buds
- 4869 initial germination tests and 3421 monitor tests
- Sent out 161 orders, comprising 1348 seed inventories.
- 19,000 accessions are ready to be shipped to Svalbard in October. ~20% of NPGS seed collection at Svalbard

# PAGRPU Seed and Clonal Research

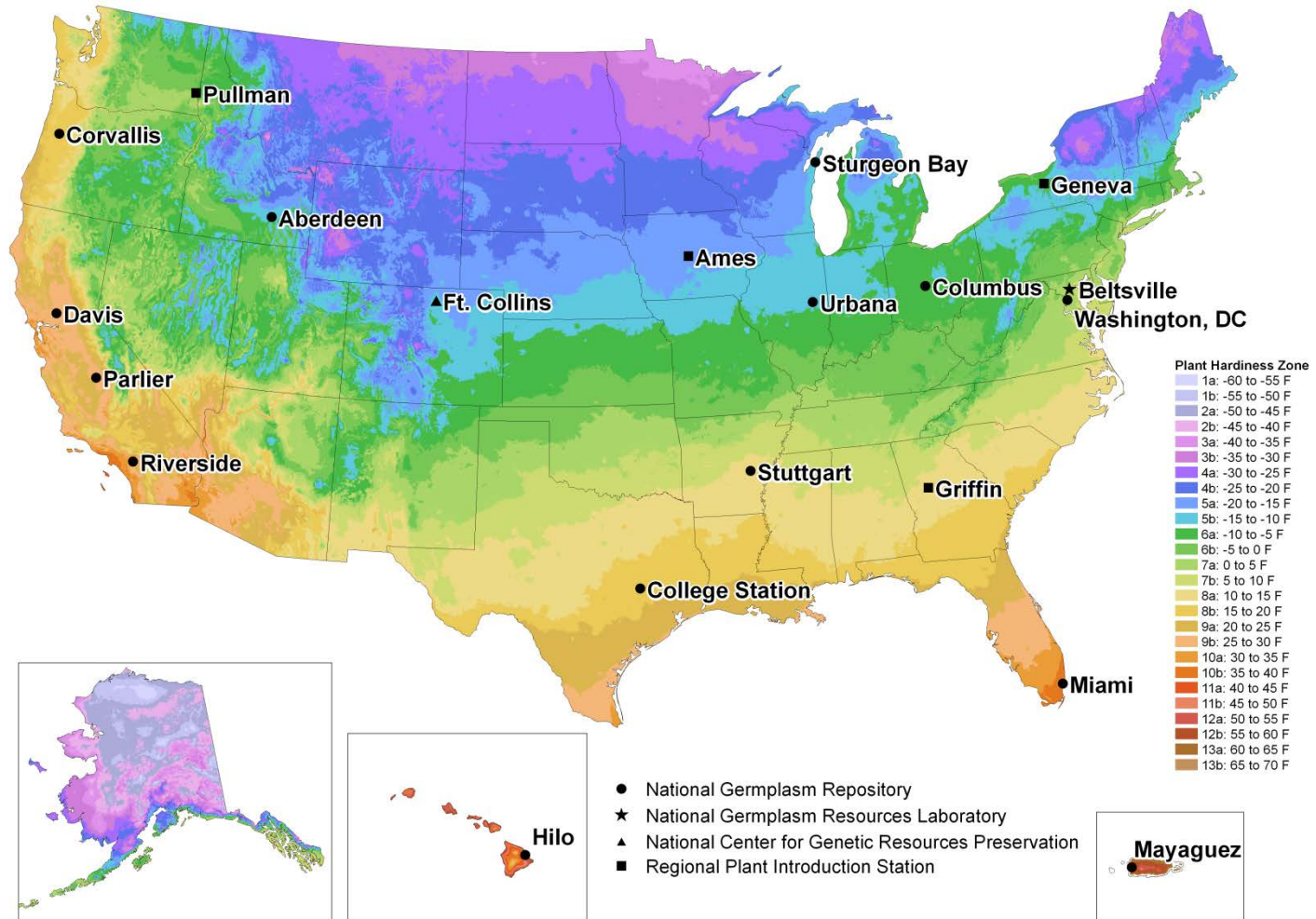
- Optimizing cryopreservation protocols for dormant bud preservation
- Comparing phenotypic characteristics for conventional or cryopreserved rye after 25 years of storage
- Gap analysis of US crop wild relatives

# The National Plant Germplasm System: 2016 Status, Prospects, and Challenges

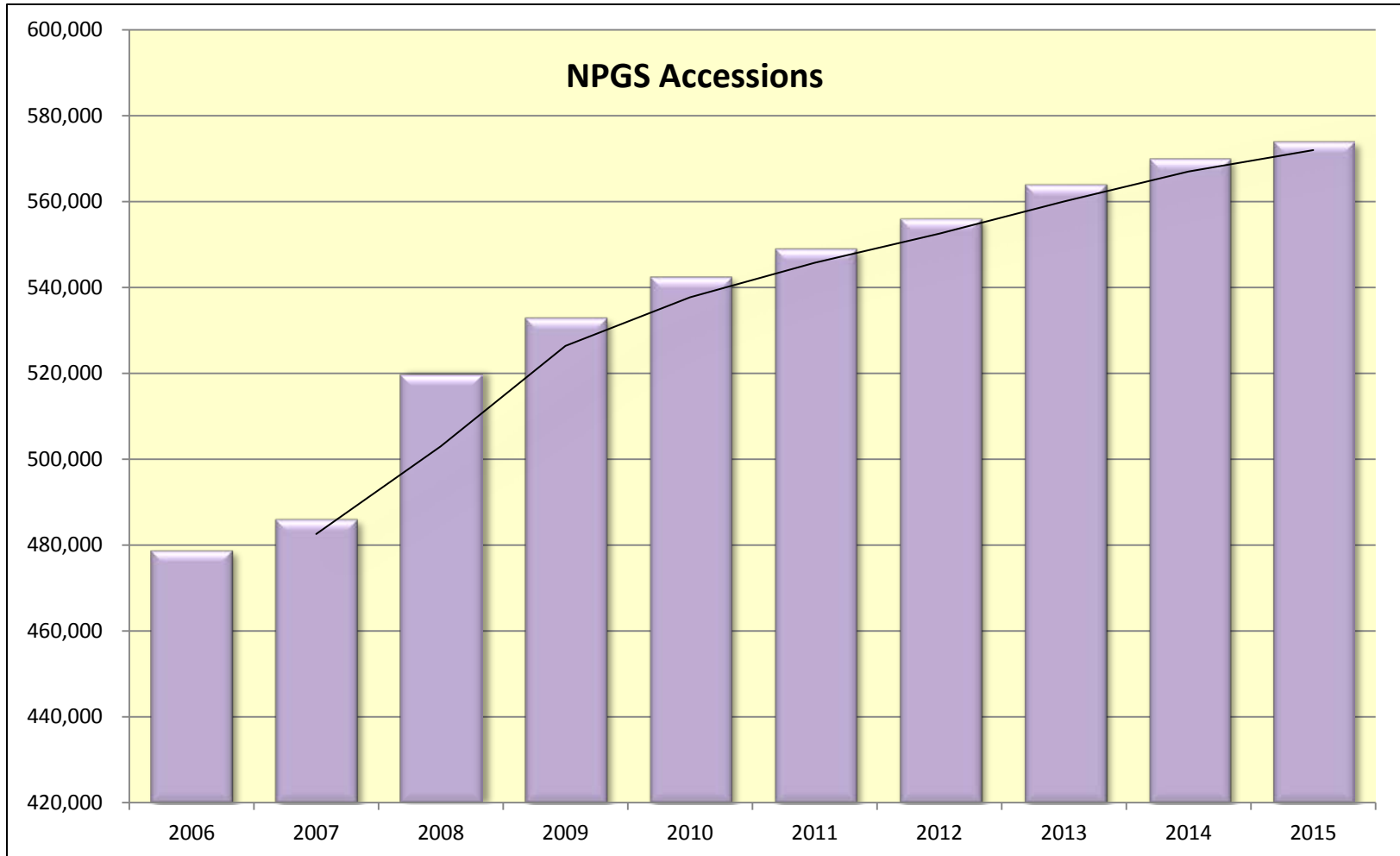
**Peter Bretting**  
**USDA/ARS Office of National Programs**  
**[Peter.bretting@ars.usda.gov](mailto:Peter.bretting@ars.usda.gov)**  
**1.301.504.5541**



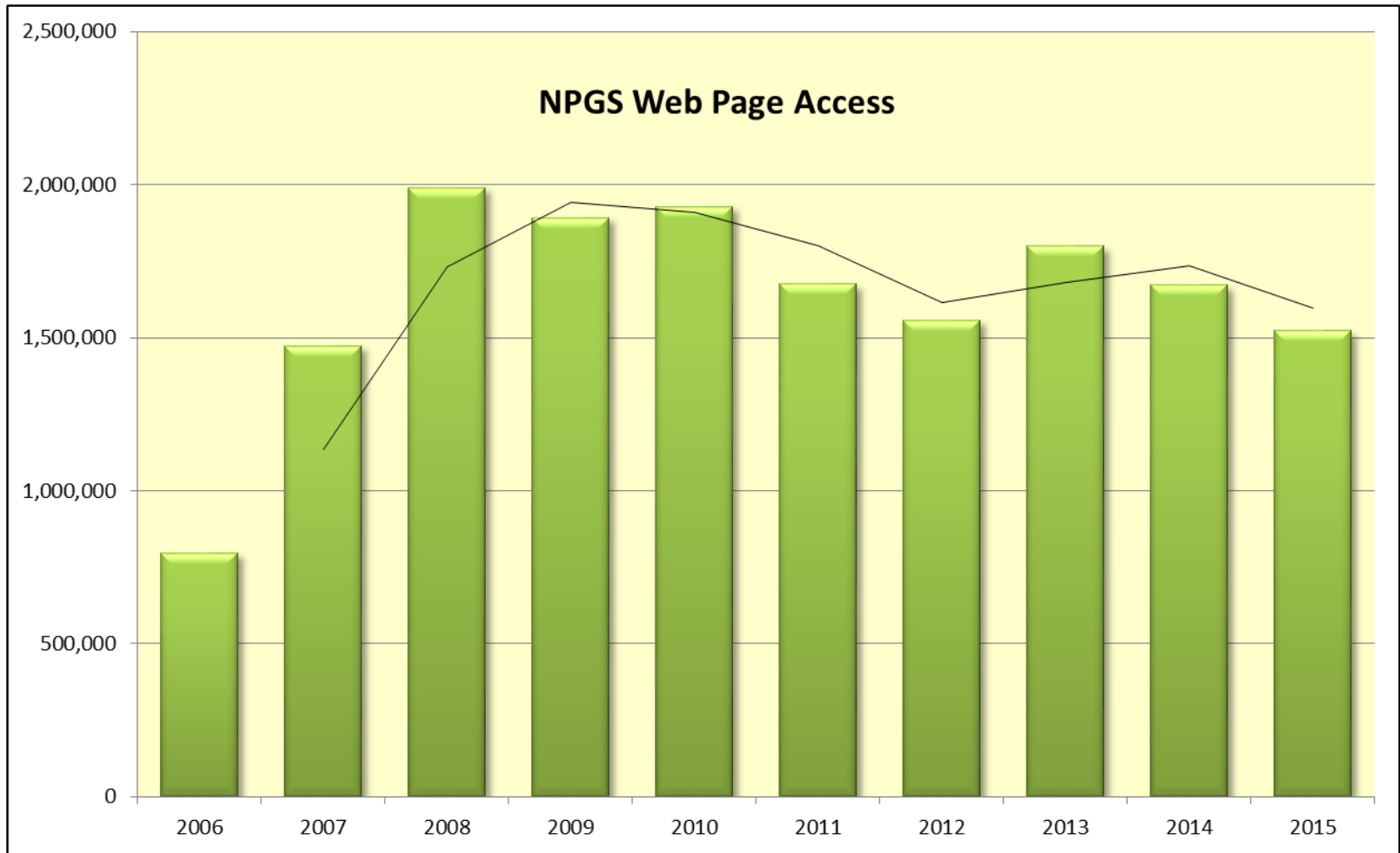
# USDA National Plant Germplasm System (NPGS)



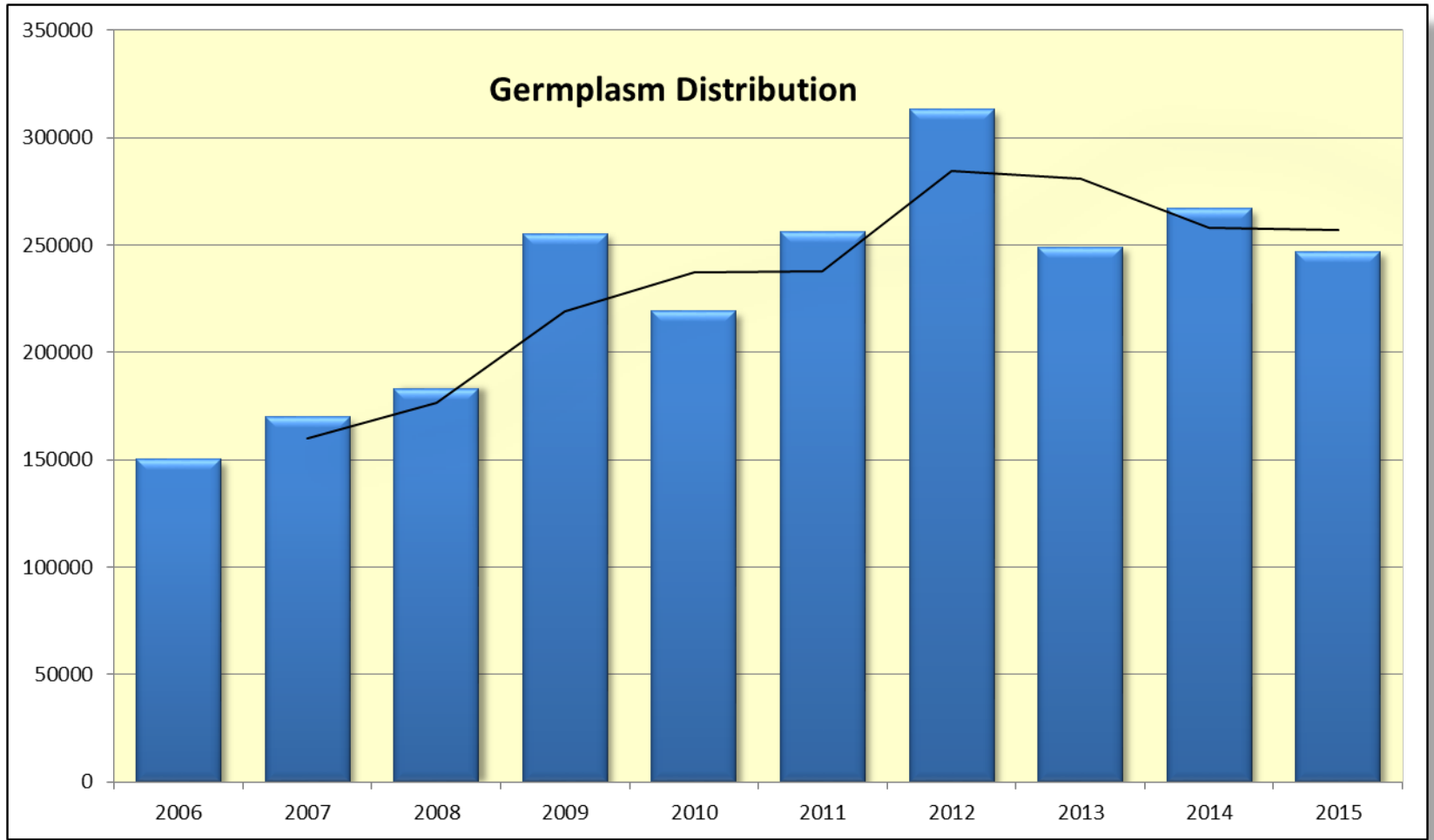
# NUMBER OF NPGS ACCESSIONS 2006-2015



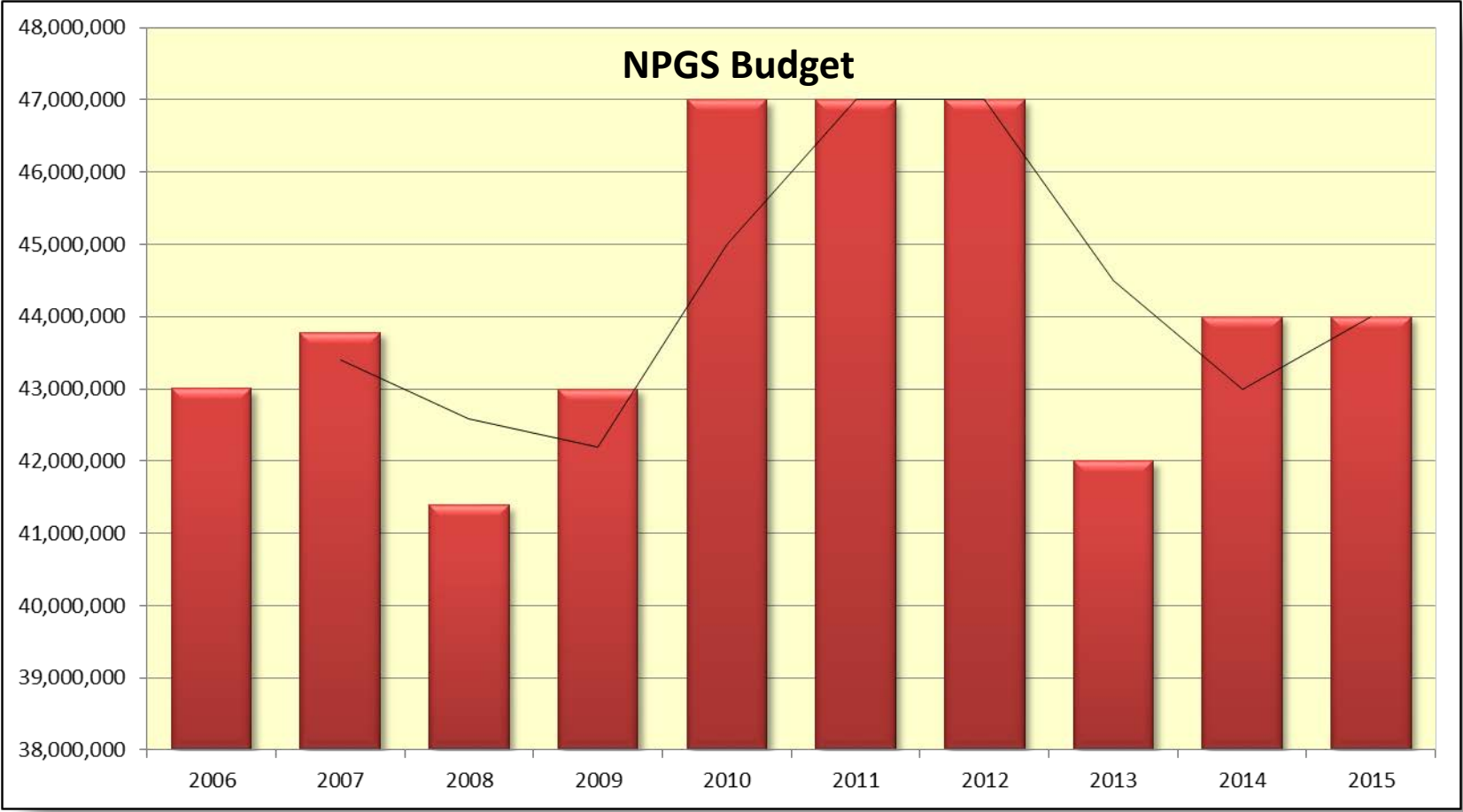
# DEMAND FOR NPGS INFORMATION 2006-2015



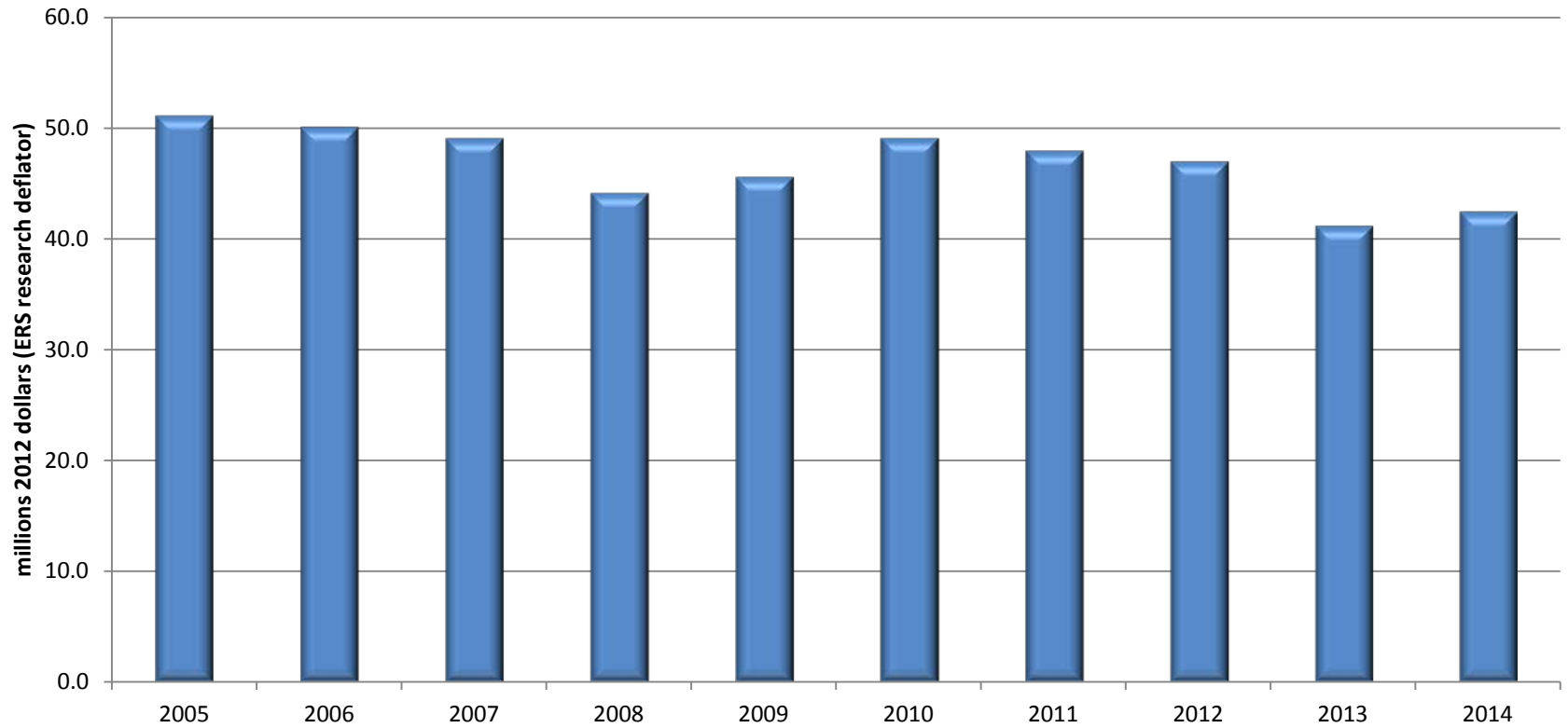
# DEMAND FOR NPGS GERMPLASM 2006-2015



# ARS NATIONAL PLANT GERMPLASM SYSTEM BUDGET 2006-2015



## Real ARS National Plant Germplasm System Budget, 2005-2014 converted to 2012 dollars with ERS research deflator



# Genetic Resource Management Priorities

- **Acquisition**
- **Maintenance**
- **Regeneration**
- **Documentation and Data Management**
- **Distribution**
- **Characterization**
- **Evaluation**
- **Enhancement**
- **Research in support of the preceding priorities**

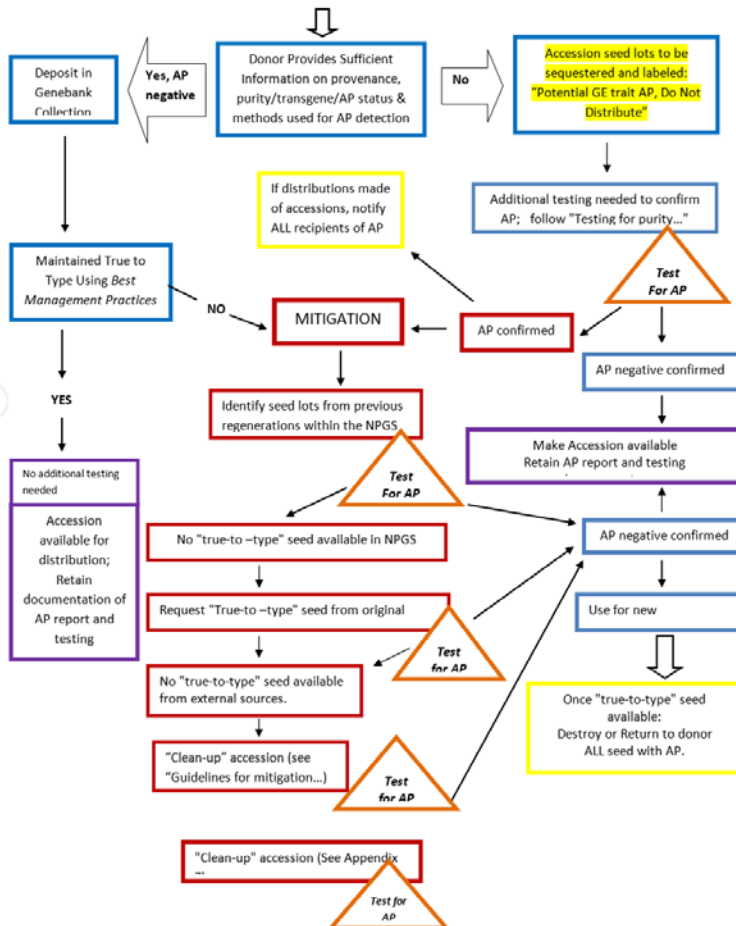
## Some key challenges that stretch the NPGS's resources

- **Managing and expanding the NPGS operational capacity and infrastructure to meet the increased demand for germplasm and associated information**
- **Fulfilling the demand for additional germplasm characterizations/evaluations**
- **Acquiring and conserving germplasm of crop wild relatives**
- **BMPs and procedures for managing accessions (and breeding stocks) with GE traits and the occurrence of adventitious presence (AP)**



# BMPs and procedures for managing accessions (and breeding stocks) with GE traits and the occurrence of adventitious presence (AP)

Figure 1: Decision tree and critical control points for assessing probability of and testing for AP in NPGS genebank accessions. Blue = processes for determining/confirming AP and maintaining true-to-type. Yellow = action needed. Orange = potential critical control points for AP testing. Red = processes associated with AP-positive findings and mitigation of AP. Purple = processes associated with AP-negative findings.



- **Written by ARS genebank curators, breeders, geneticists, statisticians, NPLs, and ADs.**
- **Reviewed by 100 + scientists—ARS, academic, private-sector, and regulatory agencies.**
- **Will be implemented in ARS soon; precise details TBD.**

# A key priority: Crop Vulnerability Statements (CVS)

- **Assessing crop genetic vulnerability and setting NPGS priorities accordingly.**
  - **Template for constructing crop vulnerability statements**
  - **Some CGC have published, or plan to publish, their CVS— e.g., Volk et al. 2014 The vulnerability of US apple (Malus) genetic resources. Genet. Resour. Crop Evol. DOI 10.1007/s10722-014-0194-2.**
  - **But, CVS need not be as formal as that. Web-style content is fine.**
  - **It's more important that the CVS be updated frequently; perhaps devote the first part of each CGC meeting to briefly reviewing and updating the CVS.**

# **NP 301 Retrospective Review and subsequent milestones**

- **Thanks for all the slides and information!**
- **Retrospective Review (external reviewers; webinar format) 27-28 June**
- **Customer/Stakeholder Workshop and ARS NP 301 Scientists Workshop in August; webinar format, dates TBD**
- **New NP 301 Action Plan developed in September/October**
- **PDRAMs written December-March, TBD by NP 301 subgroup**
- **New Project Plans due late April-late June, TBD by NP 301 subgroup**

# Personnel Changes

- Farewell and best wishes to Barbara Reed (NCGR-Corvallis), RC Johnson (WRPIS-Pullman) and Dan Barney (NCRPIS-Ames) for their retirements.
- Congratulations and best wishes to Richard Olsen, formerly lead scientist for the USNA-Washington, DC genebank project, on becoming the new Director, USNA.
- Best wishes to Brian Irish who moved from TARS-Mayagüez to WRPIS-Pullman/Prosser to be the new alfalfa and clover curator.
- Welcome and best wishes to Shyam Tallury, new peanut curator at SRPIS-Griffin; Claire Heinitz, new curator at NALPGR–Parlier; and Mary Lou Polek, the new RL for the NCGR-Riverside.

# FAO International Treaty (IT) on Plant Genetic Resources for Food and Agriculture and the Nagoya Protocol (NP) of the Convention on Biological Diversity (CBD)

- The IT is a legally-binding Treaty under the UN Food and Agriculture Organization.
- The objectives of the IT are:
  - the conservation and sustainable use of PGRFA (Plant Genetic Resources for Food and Agriculture) and
  - the fair and equitable sharing of the benefits arising out of their use.
  - The IT is in harmony with the CBD, and focused on sustainable agriculture and food security.
- The US signed (2002) but has not yet ratified the IT.
- Update: The Senate Committee on Foreign Relations held a hearing regarding US ratification on 19 May 2016. Further Senate action is awaited.

# Effects of the US ratifying and becoming a Party to the IT

- **US PGRFA users, both public and private-sector, would have guaranteed access to PGRFA from other nations and IARCs: if needed, international law would be a tool for asserting that right.**
- **Terms of access specified by the SMTA.**
- **US government obliged to provide PGRFA access to non-US users essentially via current NPGS practices, but accompanied by the SMTA.**
- **Terms of access to NPGS PGRFA would not change for US users.**

# Effects of the US ratifying and becoming a Party to the IT

- Thus, if the US were a Party to the IT, the NPGS would incur additional obligations for reporting, information-sharing and curation, but it is already fulfilling nearly all of those. Other public and private-sector PGRFA users would incur no additional obligations.
- As a Party, the US government could effectively represent US germplasm users at the IT's Governing Body, advance US priorities and interests, and strive to improve some aspects of the IT and the SMTA.

# The Nagoya Protocol (NP) of the Convention on Biological Diversity (CBD)

- **The CBD has these objectives:**
  - the conservation of biological diversity
  - the sustainable use of its components and
  - the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
- **US is not a CBD Party, so we cannot be a Party to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits Arising from their Utilization which will implement the CBD benefit-sharing objective.**
- **Benefit-sharing under the CBD:**
  - **Negotiated by providers and recipients (e.g., in contracts for exchanging genetic resources); in some cases national governments are involved.**
  - **In many nations, access and benefit-sharing (ABS) policies will be guided by the NP, which came into force in October 2014.**
  - **As always—but especially now-- GR users should obtain and maintain clear documentation for the terms under which GR were collected and utilized.**



# The Nagoya Protocol (NP) of the Convention on Biological Diversity (CBD)

- Access to genetic resources (GR) subject to prior-informed consent (PIC) of providing country.
- Benefits arising from GR use will be shared in a fair and equitable way based on mutually-agreed terms (MAT) between provider and recipient.
- Parties to the NP must ensure that GR is accessed according to PIC-MAT.
- The NP applies to all GR except those covered by other international agreements consistent with the CBD and NP, e.g., the IT.
- National implementation procedures are key to the NP's effects on GR access.
- See the CBD Access and Benefit-Sharing Clearinghouse for info: <https://absch.cbd.int/>

# NGRL Updates

## Staffing:

- New IT Specialist (Application Software) reports June 27, 2016.
- SY Botanist position (vice Garvey) should be advertised week of June 13<sup>th</sup>.
- Troy-Damion Hill, a long time IT Specialist in NGRL, died unexpectedly on June 1, 2016. He had been an IT Specialist in the Institute/Center Office since 2013 and was on detail to the U.S. National Arboretum at the time of his death.

# Communications:

- We have 4 internal NPGS email lists: Curators, Primaries, CGC Chairs, PGOOC:

[curators@ars-grin.gov](mailto:curators@ars-grin.gov)

[primaries@ars-grin.gov](mailto:primaries@ars-grin.gov)

[cgc-list@ars-grin.gov](mailto:cgc-list@ars-grin.gov)

[pgoc@ars-grin.gov](mailto:pgoc@ars-grin.gov)

- These are not in the ARS/Outlook address book because we maintain our own email server on GRIN. Feel free to use these email lists as needed.
- Please let me know when an individual (especially a new curator) needs to be added or deleted from the lists.
- We have one external/public access email for GRIN-Global comments:  
[feedback@ars-grin.gov](mailto:feedback@ars-grin.gov)
- PGOOC SharePoint site on the ARS SharePoint 2013 home page: repository for previous reports and meetings, NPGS maps, Seeds for Our Future folder, etc.

# Crop Germplasm Committees (CGC):

- 42 CGCs: Activity levels range from highly active to essentially dormant.
- Currently 18 chairs are USDA-ARS scientists, 19 are university affiliated, 4 are industry affiliated, and 1 is unfilled because CGC is dormant.
- There are Crop Vulnerability Statements posted for apple and leafy vegetables (lettuce, celery, spinach, chicory, endive), and an abbreviated one for maize.
- The CGC membership rosters are now posted as Excel documents on GRIN.
- Please inform ONP and NGRL when meetings are scheduled, as far in advance as feasible. Someone tries to attend as many as possible, mostly using webinar/teleconference options when available. We want to send a report always.
- We've conducted an annual virtual meeting of the CGC Chairs in Nov.-Dec. since 2011. It would be nice to schedule an in-person CGC Chairs meeting but funding and approval considerations make that difficult.

# Foreign Distribution Inspections/Phytosanitary Certificates through APHIS at BARC-Building 580

- We have used APHIS exclusively the past two years after MD Department of Agriculture increased fee to \$61/inspection, the same as the APHIS fee.
- Paul Ijams is currently the sole APHIS inspector and Jennifer Hawley Friedman is the sole NGRL (Pathways) employee who facilitates and assists with the process. Neither currently have back-ups.
- NGRL has been able to fully fund the inspections and shipments for the past two years, but that is largely because the vacant Garvey position has reduced salary and discretionary fund inputs needed for other priorities.
- A phytosanitary certificate is a requirement of the importing country. U.S. federal regulations do not require a phyto for exportation. It is not APHIS's responsibility to determine the requirements to ship material to a foreign country. It is the germplasm requestor's responsibility in consultation with their plant protection organization (PPO).

# Foreign Distribution Inspections/Phytosanitary Certificates through APHIS at BARC-Building 580

So far in fiscal year 2016 (since October 1):

- 390 shipments
- 27,266 accessions
- 57 foreign countries
- 77 orders were combined saving about \$3,000 in shipping costs
- Top 5 destinations by number of accessions:
  - China (30% of the total)
  - Japan
  - Germany
  - South Korea
  - Turkey