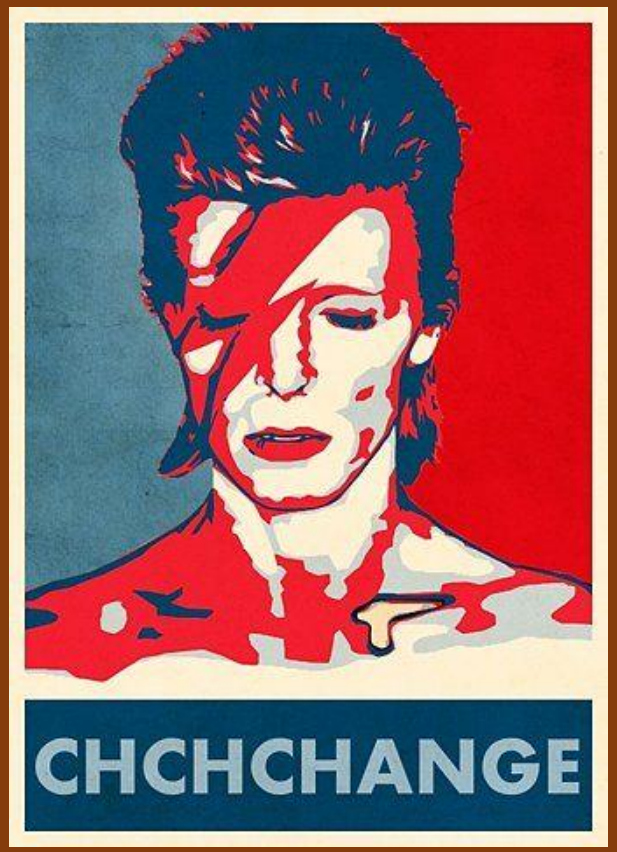
Tree Seed Centre Update

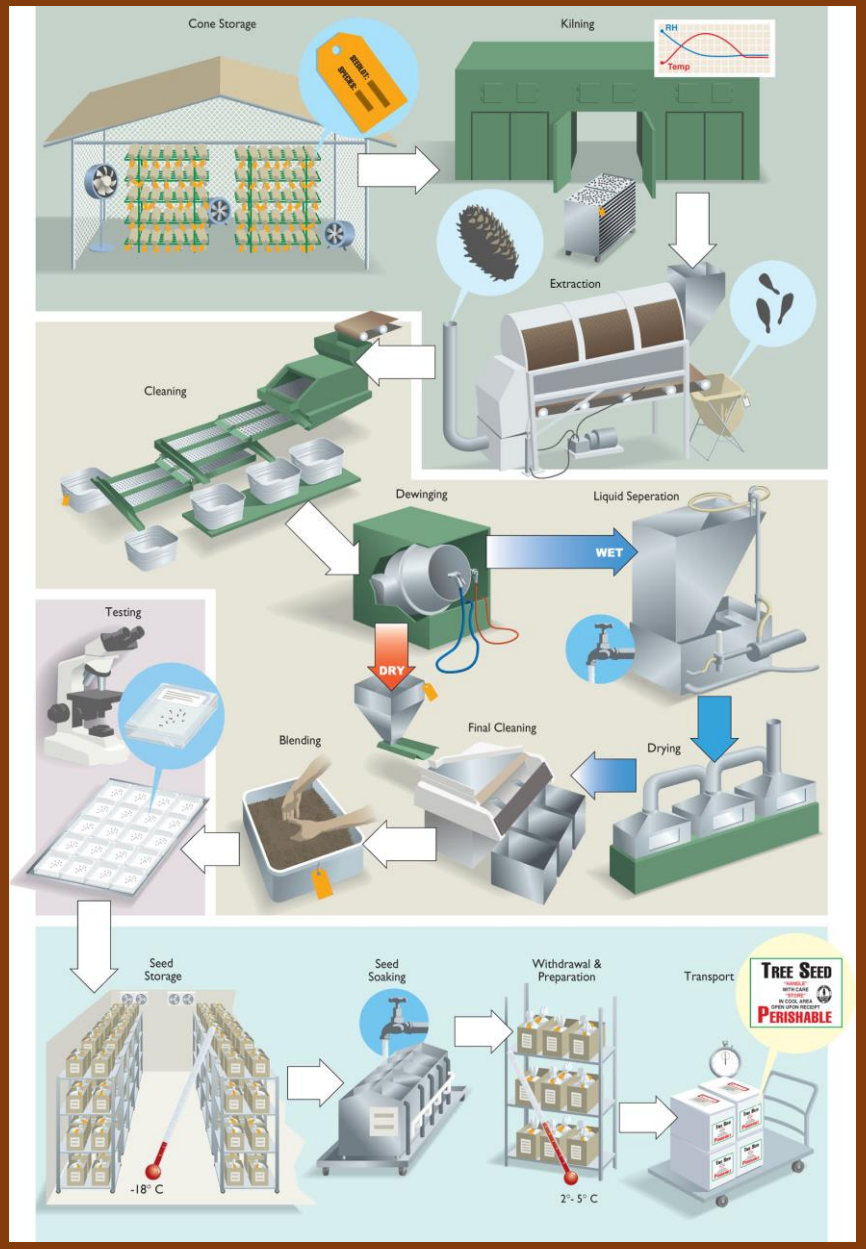
January 2023 ITAC Meeting
Dave Kolotelo



- Michael Postma will be retiring as TSC Manager after over 30 years of government service
- Michaels last day working is January 20th, 2023
- Process to hire a new TSC Manager is well underway
- New Premier (David Eby); New Minister of Forests (Bruce Roulston); New Parliamentary Secretary (Doug Routley); New Chief Forester (Shane Berg); New Deputy Chief Forester (Albert Nussbaum)
- Timber Harvesting Land Base⬇; Climate Change ++; Carbon market; Volume to Value Transition ….
- Fortunately some things don’t change = **TSC Mission**

Excellence in Cone and Seed services

Seed Handling System



Cone and Seed Processing

- Cone Processing
- Seed Processing

Testing

- Standard
- Quality Assurance

Inventory Management

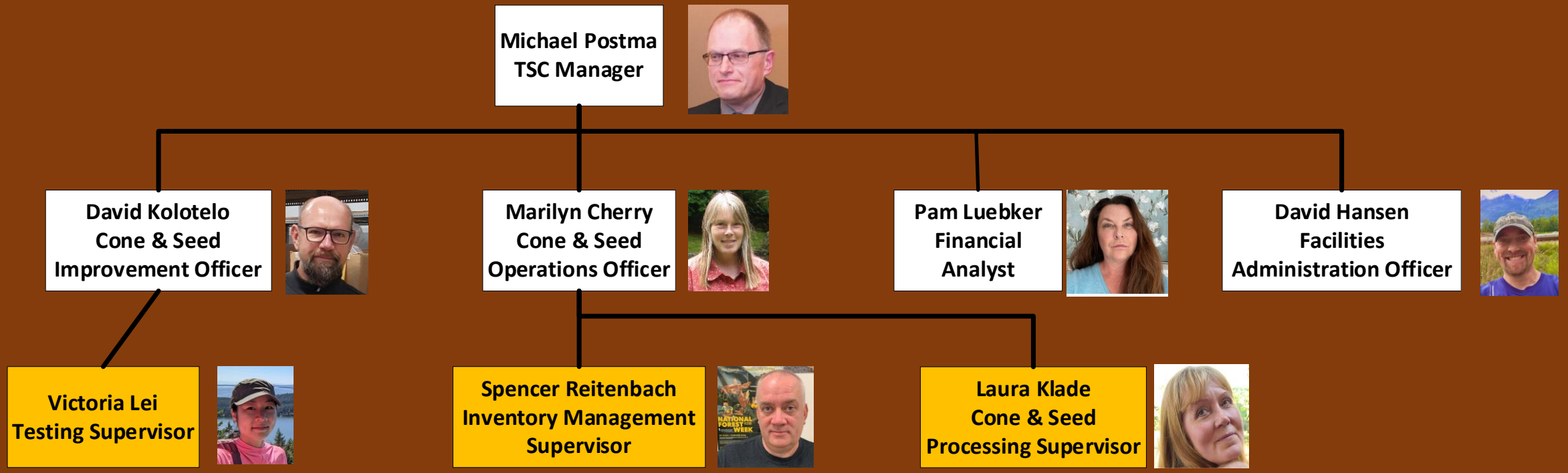
- Seedlot Registration
- Seed Storage & Withdrawal
- Stratification & Pelleting

Cone and Seed Improvement

- Research, Extension, Genetic Conservation

Facilities Management

Finance & Administration

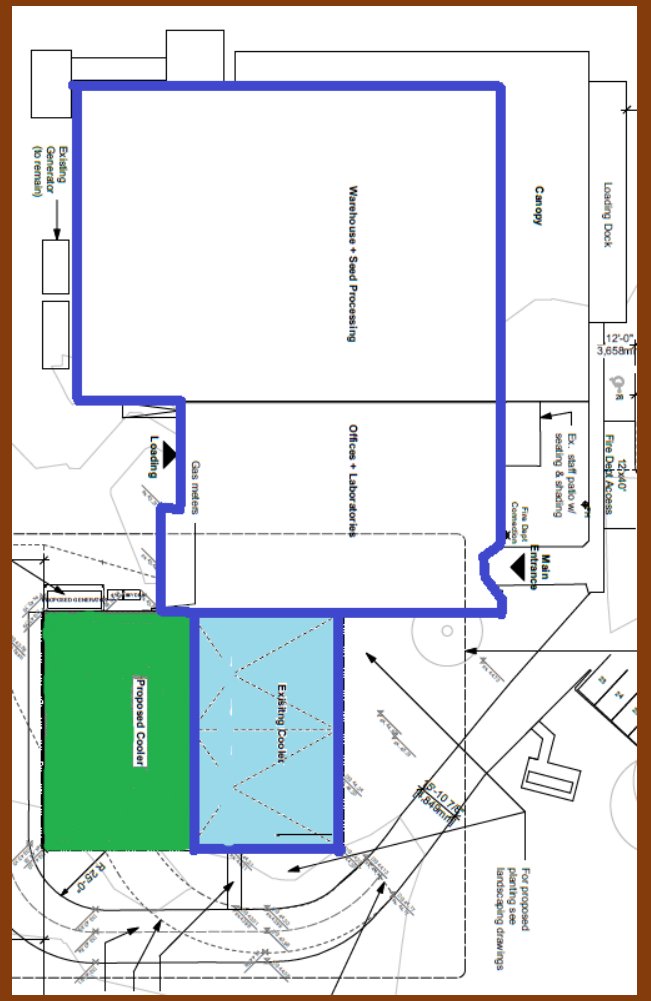


- 12 regular full-time staff members / 4-6 auxiliary employees
- 65th year as provincial Tree Seed Centre (since *1956-57*)
- "Excellence in Cone and Seed Services"
- Continuous improvement mentality
- "fix it if it can be improved, don't wait until it's broken", but also know when to leave it alone

CAPITAL Freezer Project

- Replace/duplicate existing freezer and cooler spaces
- Refurbishment not a sensible option (RISK to seed)

- Development Permit completed
- Engineering completed
- Class A (final) costing report in progress – Class B, C and D costing reports all completed
- Final Budget numbers and budget approvals in progress
- Building Permit in progress – expected Jan 2023
- Construction contract in progress



Cone and Seed Processing (CSP) $

- Large bumper crop, (75% BC seed orchard crops) we expect to be processing until June
- Pushbacks on Alberta cones (end of line) and whitebark pine cones (NO)
  - Both 'groups' need to further develop capabilities and capacity

2022 crop

- 8300 hl of cones (40 000 sacks) in 120 seedlots
- TSC storage capacity = 6600 sacks
- Produce 5800 kg of seed or 410 Million potential seedlings
- First sizable Abies seedlots for processing since 2009

CSP CHALLENGES:

- LABOUR – getting the right people and keeping them
- Equipment – BEVCO line for cone handling
- PITCH – Fdc / Fdi Pw Sx
- Highly dynamic/ variable cone crop estimates: impacts scheduling++

<u>'Newish' wild stand cone collectors</u>

- Client interim storage facilities / concerns with duration and weather (cold)
- Cone shipment scheduling and quantity *(400 sacks coming and 1000 show up !)*
- Cone sacks identification (really No tags at all????)
- Tree shake seed collections on tarps – huge amount of debris !!!

Inventory Management

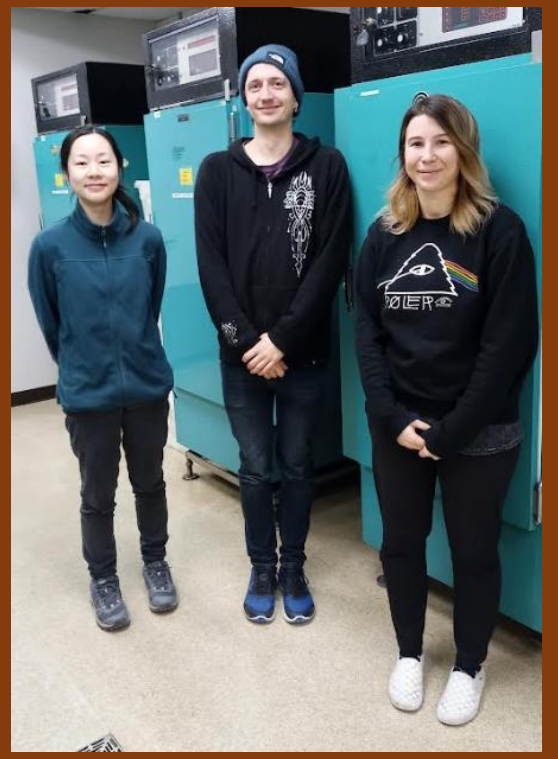
(Seedlot registration / seed storage/ withdrawal and stratification $/pelleting $)

- Increased seedlot registration requirements
- Steady seedling demand- expect ≈ 292 M seedlings

Challenges

- Employee turnover and training - LABOUR
- Timely registration information input (A & B) even with priority processed seedlots !!!!
- Timely Seedling request (SRQ) grams and sowing date updates – ***highly dynamic***
- Retesting GC results and out of tolerance tests (new seedlots) make gram assignments more difficult
- Sabina Donnelly on TA (assistance with some SRQ entry i.e. woodlot owners)
- Courier delivery delays during COVID

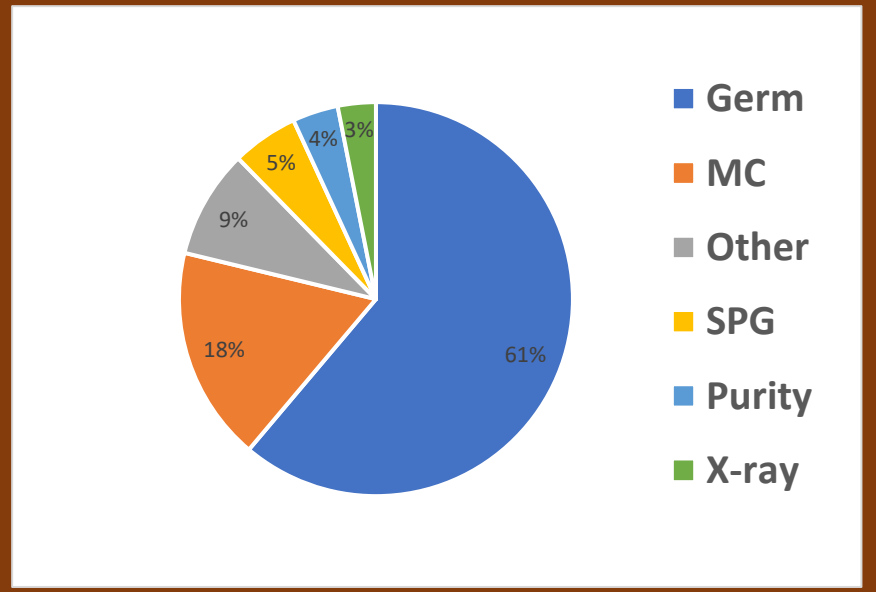
Testing



- New Testing Technician – Bendix Hollmann
- ≈ 75% Standard Testing : 25% Quality Assurance Testing
- QA Test examples – cone MC; unkilned seed MC; PAT; SRQ-QA

- X-ray analysis for determining seed viability estimates for PA

- Testing continues year round



Extended Stratification in SX

- Double tested 144 A-class seedlots with G10 (3 weeks) and G12 (6 weeks) stratification
- **60%** of seedlots have done better with G12; overall 0.8% increase
- G12 A-ranked seedlots account for 70% of Sx A-class grams
- Small increase in germination rate (PV) with G12 (0.2)
- Gains under optimal conditions are small, almost insignificant
- Larger gains expected when suboptimal germination conditions exist

Hydrogen Peroxide test in LW (GH1)

- **This is in addition to some testing adjustments (**
- Precedence / no other tests have a sanitation treatment
- Consistent increase in GC with treatment
- **Currently NOT the A-ranked test, useful for gram adjustments** (expectation with H_2O_2)
- Aligns with H2O2 practices at nursery – **or SHOULD**
- Ongoing work with LW seed pathology at UBC /CFS

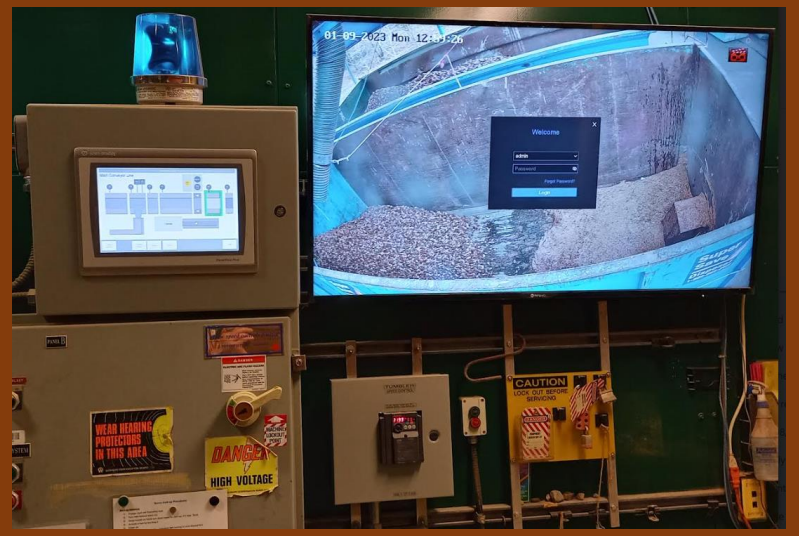
Fungal Work with UBC / CFS (TSC funded $25K)

1. Fusarium PCR Species Identification Tool
   - Development work/ calibration -- Service Pull (PHL) / vanishing classical expertise (plating/id)
   - Initial work mainly with Douglas-fir
   - Work on sample sizes/ calibration of techniques
   - Obtained isolates for in vitro pathogenicity testing of species identified isolates
   - Determines what species (3-5) can be put on the PCR multiplex tool

2. Metabarcoding in LW
   - Seed pathology issues in LW have impacted seed testing results
     - Clearly a seed pathology issue, large variability between replicates – retesting
     - Appears to be a testing issue, nursery feedback better than test results
     - What is the organism??
     - Both plating and molecular techniques were inconclusive (variable) and pointed to Fusarium and Alternaria spp.

Facilities – 2022 Key Items

1. Baghouse (air handling/cone removal) Upgrade
2. Boiler Replacement (35 yrs old / unsafe)
3. New Safety Ladders for roof access
4. Cone handling line (BEVCO) computer replacement and addition of touch screen controls
5. Camera system to check on product flow / machinery functioning



Tree Seed Working Group

Tree Seed Working Group
News Bulletin
Canadian Forest Genetics Association
l'Association canadienne de génétique forestière

Dave Kolotelo – Chair
Melissa Spearing - Editor

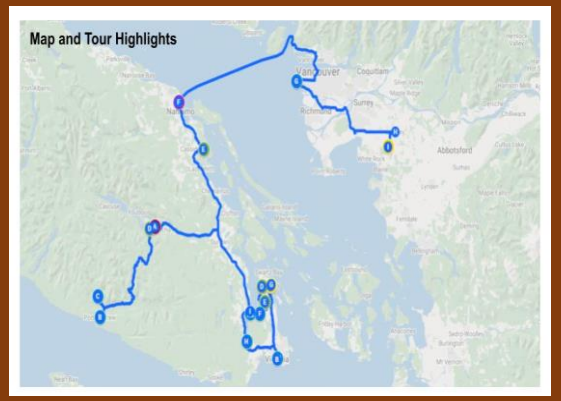
OBJECTIVES: To promote tree seed science and technology through:

1. Seed research from bud initiation to seed utilization
2. Identification of seed problems relating to tree improvement and forest management
3. The exchange of information on seed related problems
4. Advising on implementation practices

Next TSWG meeting on July 10, 2023 in Vernon in association with CFGA/WFGA conference

Challenges to our Future Tree Seed Supply (June 2022)

- Develop synergies -TSWG; ISTA; IUFRO; ISF; OECD
- 2 workshops (live + virtual)+ 3 days field tours
- Focus on cone & seed processing as a bottleneck
- https://cfga-acgf.com/2022/08/13/2022-challenges-to-our-future-tree-seed-supply



Genetic Conservation


Contents lists available at ScienceDirect

Global Ecology and Conservation

journal homepage: http://www.elsevier.com/locate/gecco

Original Research Article

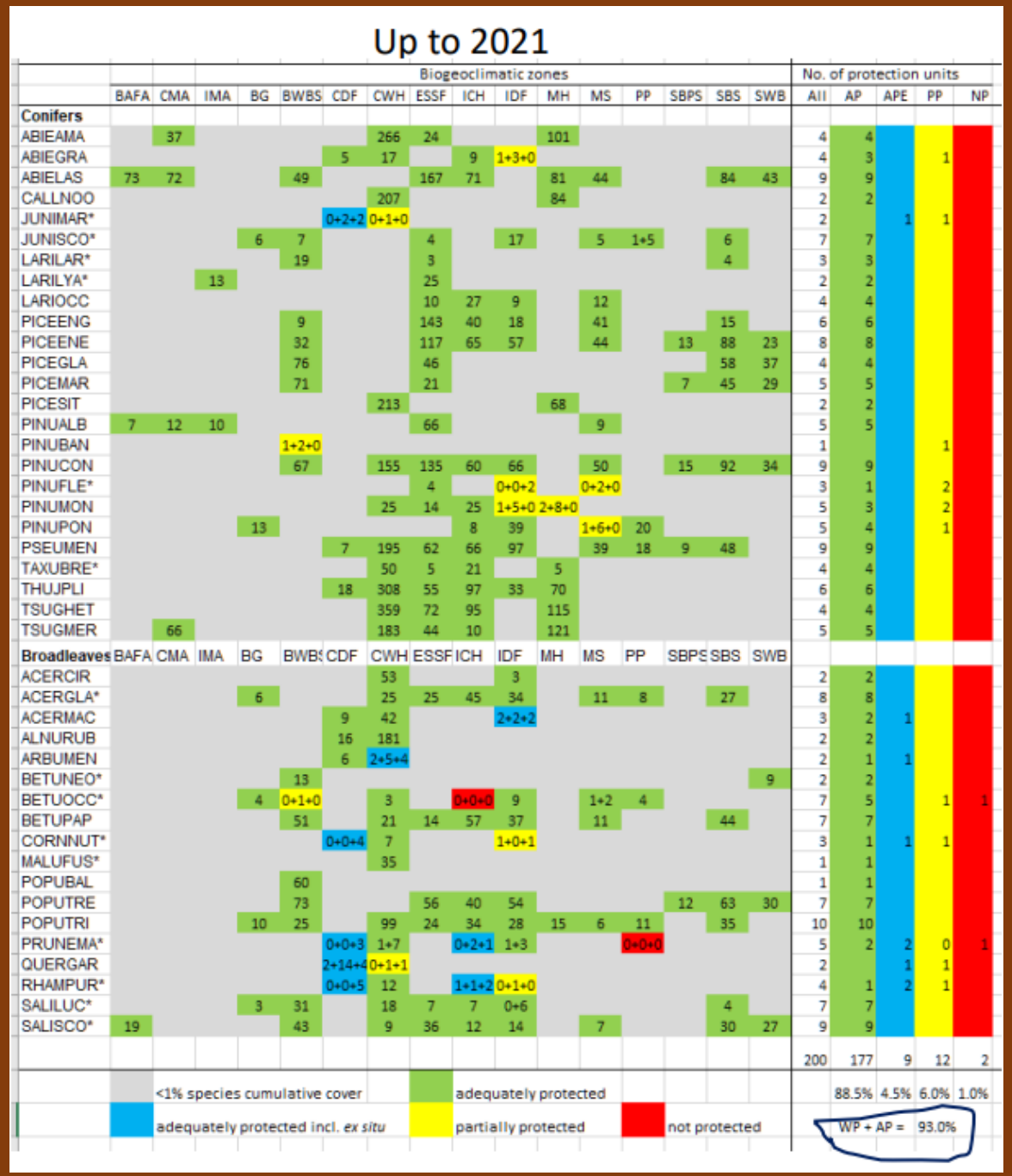
Conservation status of native tree species in British Columbia

Tongli Wang [a,*], Pia Smets [a], Christine Chourmouzis [a], Sally N. Aitken [a], Dave Kolotelo [b]

1. **Ex-situ seed collections of "non-commercial " species**
   - Priorities established through Tongli's Conservation Status report (2020)
     - *Next phase for Tongli is looking at Protected Areas with Climate Change*
   - Gaps in filling species* BEC zone matrix
     - Goal is 3 populations per BEC zone / each population is 20 parents, each 50 m apart
   - Redundant seedlots – new samples and supplying seed to National TSC
   - Ex-situ contract– need to repost on BCBID – spring 2023

2. **Management of whitebark pine (+ Limber pine) seed inventories**
   - Store and Manage individual seed collections for other owners to feed into blister rust screening / research & unregisterable seed (MC only)
   - Some x-ray analysis work performed on a cost recovery basis

Collectors/seed owners still need to find other facilities for seed processing and stratification !!



- Tongli Wang's analysis of protected areas (2021)
- 43 tree species
- Species*BEC zone matrix
- **93%** of the matrix cells are considered adequately protected
- What happens when a climate change lens is applied to protective areas?

Whitebark pine /(Limber pine)

- Registered Seedlots (Spencer managed)
  - **39 seedlots / 112.4 kg** in storage (estimated seed viability 1 to 91%)
  - No storage fees, but upon withdrawal there are handling fees, withdrawal and shipping fees ($34 for each seedling request)

- Individual Families / Non-registerable seed (Dave managed)
  - 988 individual families 92.7 kg of seed
    - Up to 2017 (mostly BC seed bank)- 596 families – 38 kg of seed
    - **2018** onwards (others) – 392 families – 54.7 kg of seed ***Dynamic inventory***
  - Same "withdrawal/shipping" fees apply to seed being used for restoration/reclamation work
  - Fees are waived for research requests (including blister rust screening)
  - Requesting agency must indicate research purpose
  - Original intent was for storage of seed for provincial genetic conservation seed bank, but clearly there were more needs and lack of facilities

Who else do we store whitebark pine seed for?

- Parks Canada
- BC Parks
- WPEF of Canada
- Nature Conservancy of Canada
- Bulkley Valley Research Centre
- Moody Trees
- Yellow Point Propagation Ltd.
- Michael Murray
- New Gold
- Teck
- TC Energy
- Coastal Gas Link