**Southern Appalachian Spruce Restoration Initiative**

Annual Meeting Notes

*Tuesday, October 22, 2019*

Training Center at Bent Creek Experimental Forest

1577 Brevard Road

Asheville, NC 28806

**10:00 – 10:15 Welcome and introductions, and background (Kelly, Carol & Sue)**

- Kurt Johnson provided intro to Bent Creek Exptl Forest
- Attendees introduced themselves
- Sue provided overview of Fall 2018 meeting and March 2019 steering committee call
  - Fall 2018 Mtg. – brainstorming session on actions needed to advance spruce restoration focusing on 3 SASRI goals (Restore spruce appropriately, increase capacity, refine mapping) and how can individuals contribute; also prioritized actions; development of Sky Island teams – 7 teams – to organize and get spruce on the ground
  - March 2019 steering team call to discuss next steps
    - Decided to collectively focus on highest priority from each Goal -- 1) develop guidelines for different prescriptions 2) develop system to determine what is a good cone crop year, where and how to collect, checklist for how to be prepared to collect and 3) map priority areas; people can still work on other actions, but this is where we'll focus our collective effort
    - Stand up these SI teams: primary charge is for teams to get a restoration project going in other sky islands (pick low hanging fruit, can also ID other priority areas for future work)

**10:15-11:15 Project updates**

- Chris Kelly (NCWRC) – Update on past, current, and future projects
  - Unicois - 1800 seedlings planted in 2013 and 2015; currently managing weeds and broadleaves
  - Flat Laurel - 900 seedlings planted in 2017, additional 300 in 2019 (100 underplanted by the 2017 planting site and 200 in open areas for connectivity)
  - Graveyard Fields – planning and mapping next project
    - Encountered different conditions that will require different treatments to establish spruce (planting under hardwoods all the way to completely open spaces)
    - Pisgah plantations: Rachael Dickson enlisted Haywood Community College student to develop a plan for thinning a plantation (class project)
- Matt Drury (ATC) – What it looks like to make a project happen
  - Initial scouting trips to see Roan Mtn site with multiple partners
  - Multiple areas under consideration, most areas have poor live crown ratio; former cow pasture; densely stocked 80 years old with tiny bit of regen
  - Wants to establish a new age class to buffer against future climate change; could underplant, but spruce is known as a gap filler, so want to create some gaps in there
  - Can use a NEPA Categorical Exclusion for this work; Cherokee NF will do compliance; will cross state lines and Pisgah NF Richard T is on board
  - Daylighting trees on two sides to help with live crown ratio
  - Mark Ford (Virginia Tech) going to help with methodology for some studies looking at response of different live crown ratios and release vs non release seedlings; will later scale that up with CFLRP if it looks like promising research
  - Unaka needs full EA for the work because need to hack and squirt hardwoods, but in meantime some silviculture treatments may be possible
  - Mentioned ATC plates will allow for funding of small restoration projects

- Marquette Crockett (SAHC) – Used Cornell Land Trust Bird Conservation Initiative (small grant program for land trusts ($20K)) for restoration of 15 ac red spruce and 15 ac shortleaf pine; requires monitoring with eBird for 3 years
  - Haw Orchard Ridge: objectives related to connectivity; area selected with some spruce, but dominated by hardwoods
    - No seedling recruitment, potentially due to high ground cover; research opportunity to see best way to remove ground cover
    - Used Cornell funding to pay Wildwood Consulting to do hack and squirt to release 85 understory spruce trees. In some areas, beech die-off is serving as openings for spruce growth
    - Use Mark Ford and Jim Rentch's research as guide to release understory trees
    - Then plan to go back out to set up some plots: Controls, Scrapes, Scrape and Inject; 10-15 m along contour, 3-4 m wide; hardwoods killed in 10x3 area plus another few meters around plot perimeter
  - Mentioned other high elev parcel on Roan where she has seen beech die off gaps colonized by spruce
  - Seed collected from red spruce this fall, seed tests in spring, with seedlings in 2022
- Tom Blevins (USFS) – Big Wilson Creek project (Mt. Rogers and vicinity); elevation ~5000'
  - Eastern brook trout habitat improvement because of damage from horse trails; first phase to reduce sediment runoff, improve horse trails, protect headwaters/seeps; also NNIS control (autumn olive)
  - Was historically spruce forested; logged/burned
  - Project funded by USFWS and Eastern Brook Trout Joint Venture, Virginia Dept. Game and Inland Fish (DGIF); Blue Ridge Discovery Center also partner
  - Reworking grade of entries into creek, incorporation of limestone, erosion control structures, non-natives removed, etc.; installation of riparian exclusion fencing in Spring 2020
  - Collection of spruce cones from Whitetop Mountain occurred this fall (2019), being processed by Blue Ridge Discovery Center; Fraser fir seeds being grown as well; avenues for partnerships such as high schools (possibly horticulture classes will grow); Mt. Rogers Xmas Tree Growers Assoc- has fir seed source and expressed interest in propagating red spruce
  - Hope for 2,000 seedlings to be planted within the riparian zones in a couple of years
- Mark Endries (USFWS) – Spruce Mapping
  - Avl FO funded mapping and defining Southern App reference conditions with flex fund grant to help with recovery of Carolina northern flying squirrel
  - Mark Ford and Cordie Diggins to do some modeling of climate change impacts and spruce restoration priorities for Carolina northern flying squirrel (CNFS) recovery efforts
  - Current Spruce Unit (CSU) layer wasn't quite providing enough detail for what they were envisioning in providing a habitat model; wanted to model at finer scale of detail
  - Uses NAIP imagery (available online- flown once a year over US; 1m resolution; captured in late October, mid-Nov; 4 color bands, uses near infra-red) to classify spruce-fir forests
  - Plan to do this for entire So. Apps; so far he has done some drafts for Unaka, Roan, and Mt. Rogers/Whitetop
  - Healthy green veg shows up a red color; unhealthy shows up different color; enhances view of spruce areas vs others
  - Q – how can we see understory spruce/fir?; A – LIDAR and drones
  - Q – can distinguish from rhodo?; A – yes, they look different enough

**11:15-12:15 Planning: Propagation & Cone Collection aka GOAL 2 (Andy Whittier, Lauren Garcia Chance, & Rachael Dickson)**

Need to come up with a plan to figure out where the cones are and how to collect

- Andy Whittier – Seed/Cone collection

- Andy's protocol for objective of gene conservation: Visits sites in May/June to figure out where the cones are; plans for collection and permitting; collects from 10 trees per population and several hundred cones per tree; all cones kept individual by mother tree; doesn't collect from ground in order to know which tree the cones came from; if at all possible, stay away from planted trees; mid-September to Mid-October is ideal for collection
- May be able to modify protocol for different objectives: For gene conservation, use above guidelines; for propagation, collect cones from a broader area or even from the ground; collect from natural populations for both
- Population sizes can vary based on site/any natural breaks
- Population genetics study under works but some administrative issues
- Noted it was a good cone year on the Roan
- Some of Andy's seed can be used for other research questions

- <u>Lauren Garcia Chance – SHR red spruce</u>
  - Production methodology: seed collected by others and brought to SHR; stored in freezer for a couple of months; seed cleaned (fun winter task!) and then sown in large tray until roots established; moved to 2in Rootmaker; highest quality seedlings moved to 1-gallon Rootmaker; then go out for planting at restoration site; usually 12" or higher at this point; Rootmaker pot yields robust root system that doesn't wrap in a circle in bottom of pot
  - Showed heat map of current 1-gallon tree origin with numbers and current seed origin without numbers
  - SHR has lots seedlings from Great Balsams (468); decent amount for Black Mtns (371) and Plotts (433); very few from Roan (111); few from Unaka (288) and Smokies (281)
  - Don't have exact numbers for 2in, but easily attainable
  - Changes in production methodology are easily achievable as needed
  - Pricing schedule in the works
  - Hard for them to give seed quantities because hard to count; would like funding to buy a scale to measure their seed stock by weight
- <u>General discussion surrounding seed collection</u>
  - Need standard protocol to include established time to collect, seed collection processes, how to handle bumper crop years in general, and maybe need contingency plan for govt shutdowns in bumper crop years
  - First look in summer, initiate permits, collect cones, get to appropriate locations
  - Andy collecting from individual mother trees from natural pops; trees >100m apart, sometimes climbs, but most via methods from ground b/c easiest
  - Marquette: when you say pop, what do you mean scale wise? Andy: site dependent variable; if trees close together but large river between, then separate pops; miles of continuous trees consider those one pop
  - JJ: do we have any evidence that we should be doing this? Barb Crane sugg'd last year that we go ahead and mix; preserve genetic diversity by creating genetic diversity
  - New Barb (Matt Horning): pop genetics study in works in Calif; still more to do, analysis to be done soon; that study will give us more rigorous background as to whether these pops are genetically distinct
  - Liesl: What are our goals for seed collection? Gene conservation, reforestation, anything else that would influence how we track them?
  - GENE CONSERVATION vs OPERATIONAL REFORESTATION; keep separate on logistics scale; when study is finished, go ahead and start bulking
  - Rachael: come up with standard set of guidelines: when to go out and where to see how seed is developing; guidelines on how to collect. e.g., climbing or other; collect from tree that it came from if poss.; if from ground, the amount of seed in that cone is highly diminished at that point and might have insects; so best to avoid if there's an alternative way to collect

- Marquette- CASRI scale and implementation - they planted 5000-15000 seedlings per year; if you're going to look at landscape restoration, look at your project goals; can't get 1000 gallon pots to some remote sites; plug production discussion needed; 70-85% survival from fall plantings of plugs; she shared seed with CASRI folks to produce plugs; for landscape scale need to come up with bigger #s
- Kelly H: if we know Mt Rogers needs 10,000 seedlings, then SHR doesn't have the room to do that, so would have to look elsewhere; need to get on that train if thinking of large landscape scale plantings; that mortality rate isn't a big deal when you plant that many seedlings
- Chris S: could you package the SHR trees as bare root? That way you have the height and it's more transportable; no - these had lowest survival rate because too easy to damage the bare roots, esp if planted by volunteers
- Rachael D: look into state nursery producing plugs; Michael Cheek: if the need is there, they'll do custom growing orders
- Is direct seeding an option? No, CASRI tried and had 0 success; closest thing that SASRI currently planning is scarifying soil at SAHC and ATC projects at Roan
- Chris K noted approx trees/acre she planted; keep that in mind when you're assessing your tree needs; also note if your project area is suitable for gallon potted vs hike in plugs or vehicle hauls in gallon potted
- Need to know where to collect (where are the cones and who will secure the permits?) Idea: can sky island team do the cone availability assessment and send photos to Andy
- Liesl: do we know how far pollen travels in this species? Is seed from WV plantations contributing to pollinating the local NC trees??? Stay west of these plantings- like west of NC 215
- Eric: suggested gathering from warmest areas where trees are doing well; evidence that they're doing okay with warm weather
- JJ: epigenetically they're all going to shift and change a bit
- Matt: can make these decisions by looking at these collections for what info they provide; focus on areas where you have a shortage in the seed collections; SHR has very few from Roan, Unaka and no stock from Grayson/Highlands
- Rachael: how could permitting process be streamlined by USFS; letter from district ranger for SASRI members outlining expectations?; would probably have to be district by district or nf by nf
- JJ suggested MOU between SASRI and R8 in Atlanta to serve as a permit to cover SASRI member collectors; might want to put some limits on quantity (e.g., only collect during bumper crop years or a certain amount); Brittany: ok to collect if USFS getting it back, but not to sell
- Also some discussion about a broader MOU to help with funding applications and help give projects leverage (e.g., helpful if challenge cost share with region- if funding available, could dump $ in);
- Chris S: interested in info on how many to plant per acre; when is best time to release them; is there a target amount of seed she should collect; what is cost; best time to plant (fall)
- SHR does seed processing in house, by hand; collect them closed; leave them in brown bag on top of the warm top of a refrigerator; then shake cones in old coffee can to get remaining seeds out; pick out seeds with fat embryos (vs the flat ones)
- Andy: NCSU does it in their seed extractor; do we need a bigger scale approach - federal extractor to improve efficiency?
- Conner: noted different elevations of these project areas; have we attempted to collect at lower elevs in anticipation of climate change? Marquette: spruce isn't just moving up; it's moving to different aspects, down streams; don't just think up, think function; plant downstream corridors because cool, moist; good idea to collect from lower elevations; Andy tries from many elevations; Kurt 3200-6500ft elev collection
- SUE: wrap up:
    - Need for plugs for certain projects; Rachael will look in to on USFS side; Michael Cheek on NC St. Forest side

- Guidelines for Cone Collection - Carol check with CASRI to see if they have written guidance; if no info, then Andy take a stab regarding mother tree; Liesl said it would be helpful to know what a "bumper crop looks like"; maybe provide photos of a good cone crop with guidance
- MOU idea for cone collection permission on national forest; need team to work on this; R8 staff probably Janet Henchy, Earl Jackson; Matt Horning will provide some example languange
- Chris K has a simple datasheet for cone collection; fields include: bag # (brown paper bags), landowner, species name (spruce or fir), date, collector's name, state, county, mountain range, site name, nearest town, latitude, longitude, elevation, aspect, plants growing in association, advanced regeneration of spruce (yes or no) or of fir (yes or no); to this, we could add: collected off ground or from tree (if from tree, using what method), one mother tree or group collection, or other metadata; fill out one sheet per bag and staple to the bag

**Lunch and trip to seedling beds at Bent Creek**

**1:15-2:15 Preparing for mapping priority areas: break out session for Sky Island Teams aka GOAL 3 (Chris Kelly & Sue Cameron)**

Chris K- I like to think of this goal being about WHERE to do the restoration work and part of that is figuring out WHO is going to do the work; later, we'll talk about HOW to do the work

Questions to prompt discussion:
- WHO: Who might lead the team? Who should be on the team who isn't here?
- WHERE: Look at plotter map and circle some low-hanging fruit sites for restoration. Have any of you been to this site? Do you have info on this site, such as current condition of forest, past history, land owner, etc? If you have a specific interest in this site (beyond it having low spruce cover now vs historically), what is it (e.g., salamander habitat, s/f moss spider habitat, protecting headwater streams, northern flying squirrel habitat connectivity, improve forest health, conifers for red crossbills, etc.)?
- GETTING STARTED: What do teams need to get started? Were people able to come up with site(s)? What are next steps for teams? Plan future meeting or site visit? Get additional guidance or training?

Group discussion after sky island team breakout groups:

Black Mtns - [Liesl E, Michael C, Sue C, Gary P, Kendrick W, JJ A, Sharon B]
- "Well named. We feel a little in the dark"
- Interesting situation: mix of land ownership with giant parcel of private land with SAHC easement; logistics of approaching those folks- SAHC and land owner; adjacent state park land; access via a gravel road
- Also need in the Asheville Watershed (TNC easement); Michael C. says they would be open to this
- Need to do some archive digging; what is history of these stands - some planted, some not; task a student to work on and gather info from county libraries
- Also need quick/dirty survey of potential restoration areas (plant or release)
- Region should have a lot of potential volunteer groups (High Peaks, Maryland Community College, experiential school, Yancey Co. Highschool Ecoclub, Mt. Mitchell Friends Group?, Lees McCrae)
- Will need to meet again soon
- Need a leader (Gary and Kendrick later offered); Others to include: Josh Kelly, Rachael Dickson, Tara Anderson, others

Roan - [Marquette C, Matt D, Mark E, Andy W, Danica M, Sue F, Joe M, Chris S, Rebekah R, Travis B]
- 3 leaders (Matt, Rebecca R, and Marquette)
- Already have some projects going on that are low hanging fruit that revolved around giant spruce stand on Roan; expand it out into the hardwoods, plant, do some forest health
- Need NEPA, funding, reference conditions and to collect seed
- Tie in research

- Sites are in very different condition
- Talked about other partners: state forests in TN, Gary Kauffman
- Do site visits this fall to talk about what should happen at each spot

Great Balsams and Plotts - [Tara A, Chris K, Kelly H, Eric K, Johnny W, Jonathan M, Kurt J, Jacqui A, Lauren G (plus Rachael D)]
- 3 leaders: CK continue with Flat Laurel and Graveyard. Jonathan McCall - Silver GL. Johnny Wills- south of Parkway, wet camp, etc.
- Beech die off around Mt Hardy Gap to scout. TNC spot in Plotts need to scout
- Others to include: Adam Warwick TNC, David Perez USFS,____ SAHC
- Funding needed
- Steep terrain: Plant seed?
- Marquette says we need to study beech die off on larger scale
- Kurt says go for a big grant at NSF to study the questions about beech die offs. USFS can't typically get funds; Kurt help write a study, have partner submit and admin grant. SASRI apply as a group?

Grandfather Mtn [John C, Luke A, Sharon B]
- Didn't decide on a leader
- Reach out to TNC because they share the boundary all around and easement with TNC may affect what they can do on Grandfather Mtn Stewardship land; also get input from Chris Ulrey
- Luke and John C have explored the area the most
- Lots of seedlings and saplings; don't expect to need to plant
- What is end goal? Try to restore to historic range or restore corridors/connectivity
- Historic logging data needed
- Private person who contacted me and SHR interested in spruce

Grayson Highlands [Tom B, Carol C, Brittany P, Conner M]
- Carol continue to lead
- Most of this area is in USFS ownership, but also Grayson Highlands and a state forest; some private land, but not much
- See lots of natural regen, lots of young stuff coming up; need to figure out what areas truly need the work
- Seeing young spruce in stream drainages and in east and north facing slopes
- Biggest goal is to connect what they have
- Partners: App State Univ., Blue Ridge Discovery Center, Virginia Highlands Community College, Emory and Henry, Flatwoods State Forest, ATC, Grayson Highlands

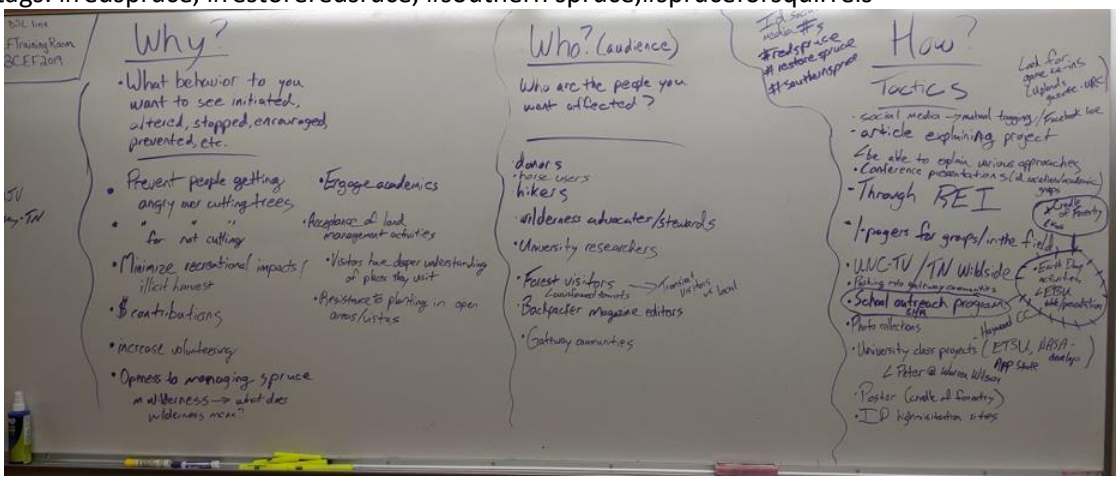
**2:30 – 3:30 Developing guidance: group discussion on spruce restoration prescriptions aka GOAL 1 (Chris Kelly & silviculturists)**
- Chris K: has flow chart of decision tree to help work through; sneak preview of a treatment booklet Jason Rodrigue is working on "Scenario Based Prescriptions"; 6 types of conditions; Chris ran through example of how to apply scenario-based prescriptions
- Broke in to groups to fill out worksheet - answer questions to describe site and start thinking about what have to work with and how they might go about restoring spruce/fir (scanned worksheets attached)

**3:30 – 4:00 Outreach opportunities (Gary Peeples) Add snapshot of white board. Why, who, and how?**
Who you communicate to will dictate how you communicate. What do we want to accomplish in our communications to stake holders?

- WHY: What behavior do you want to see initiated, altered, stopped, encouraged, prevented, etc?
    - Matt: prevent people from being angry with him when he cuts some trees

- Jonathan: prevent people from being angry with him for not cutting trees; where he's restoring spruce, he's not producing other forest products or habitat for game species
- Marquette: recreational impacts (e.g., cutting spruce for firewood)
- Lauren – fund forest restoration
- Conner- getting people open to the idea of planting spruce in wilderness
- Kurt: engage academics
- Acceptance of management
- Visitors have deeper understanding of places they visit

- WHO (audience): who are the people you want affected?
  - Donors
  - Hikers
  - Wilderness educators/stewards
  - University researchers
  - Forest visitors
  - Backpacker Magazine
  - Transient visitors vs locals
  - Hunters, Ruffed Grouse Society
  - Horseback riders - don't want open area planted and reforested
- HOW (tactics)?
  - Article explaining project - be able to explain various approaches
  - Through REI??
  - 1 pagers for groups/in the field
  - UNC-TV PBS specials TN Wildside
  - SHR: Outreach with elementary school students (TC Henderson Elementary)
  - Photo collections
  - University class projects (ETSU, NASA develop, App State, Peter Erb WWC)
  - SAHC: social media - mutual tagging
  - Poster for The Cradle of Forestry
  - Demo site signs at restored sites????
  - Upland Gazette WINC
  - Conferences
  - Forestry magazines
  - Daniel Boone- collaborative meetings on facebook live to talk about controversial projects; tune in live or watch later
- Do we need a committee to help facilitate this? How do we communicate better within SASRI? Angela SAHC, Jesse AMJU, Mallory Lindsey TN (social media star)
- Hashtags: #redspruce, #restoreredsruce, #southern spruce,#spruceforsquirrels



**SASRI FIELD TRIP**
**October 23, 2019**
**Flat Laurel Branch project area, Haywood County**

Stop 1: Underplanting beneath hardwoods
- Discussed release work
- Want to expand in to *Rubus* patches

Stop 2: Spruce plantation
- Michael C: this stand was established with standard plantation protocols, but no one returned to do the release work; Chris K: old files note lack of funds during WWII, Korean war that followed planting; now too densely stocked
- Thinning options: 1) drop (hard to do because of spacing; best option might be on edges; 2) limb branches on trees growing on plantation perimeter to let more light in (JW); 3) girdle; 4) climb and lop from top down (expensive)

Stop 3: Planting in openings
- Is it too wet here? Why hasn't it filled in with tall herbs and *Rubus*? Thin soils?
- Planted here to improve connectivity between NH stand to west (becoming more mixed via underplanting) and spruce plantation to east; tradeoff: opening useful for American woodcock, Appalachian cottontail, deer

Massif: Unaka Mtn

# Sky Island Teams - Discussion #1. What's on your island?

**Think about an area where you've considered restoring red spruce.**

1. How would you describe the existing conditions? Consider the examples below. Circle any of these that best describe the forest patch you'd like to restore.

1) Mature Forest (High forest canopy, trees of seed-bearing age)
   a. Red Spruce Plantation
   b. Northern Hardwood (mixed spruce)
   c. Mixed Red Spruce/ Fraser Fir
2) Open Conditions (lacking high forest canopy)
   a. Dense woody and herbaceous growth
   b. Open herbaceous conditions (i.e. edge of bald
   c. Patchy Tree Canopy (hardwood or conifer)
3) Other – please describe

2. Describe the overstory, midstory, and understory as best you can.

- List dominant *overstory* species (tree canopy): – Red oak, b-eye, Sugar map, basswood, beech, birch
- List some of the main *midstory* species: – Sparse hardwoods
- List some of the main *understory* species: – Spruce, str, maple, forbs, ferns

3. Is there spruce in the…

- Canopy- Yes or no?
- Midstory- Yes or no?
- Understory (seedlings, saplings)- Yes or no?

➔ For any of these you answered YES, would you describe it as sparse/scattered, well mixed, or dominant?

4. What is the approximate degree of canopy closure? (e.g., open, partly closed, closed, or a %)

Closed

5. Are there cone bearing spruce trees nearby? Yes or no? If yes, are they overhead or in a nearby patch/stand? Both

6. What vegetation in the understory or overstory is competing the most with spruce? (e.g., general things like shrubs or forbs or specifics like white snake root, Rhodo, *Rubus*)

Sugar maple, red oak (understory – lack of light, maybe not veg comp)

7. What do you know about the site's history? Was it logged? Did it burn?

Was logged, maybe burned?

8. What is your main management objective for this forest patch?

Regenerating next age class of spruce + release older spruce to canopy for cone production

Names _____

Names of the place(s) you discussed Unaka Mt.

## Sky Island Team Discussion #2. How can I restore spruce at this site?

Treatment discussion ideas. Can you think of any possible treatments?

1. If young spruce trees (seedlings and saplings) are absent or in short supply, do you have any ideas about what might have caused that?

   Not totally absent, but after "big cut" or fire they were outcompeted. Not a lot of seeds available + not making it to soil.

2. What are some options to establish a younger age class of seedlings?

   Scarification, canopy gaps for light

3. If planting, do you need to do anything to prepare the site for planting?

   Silvacultural treatments are the prep
   No other prep needed here (shrubs, etc)

4. If you are working in an open-canopy area, is there an opportunity to expand on a small patch of existing hardwood or conifer trees to create a larger future forest patch? How?

   N/A

5. What are some management options to help the existing spruce trees rise in to the canopy?

   Hack + Squirt, girdle

6. How do you access this site? (On foot, vehicle, etc?)

   Vehicle + foot

Massif: GBals Grave yard Fields 1 island top

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2) Open Conditions (lacking high forest canopy)
   a. Dense woody and herbaceous growth
   b. Open herbaceous conditions (i.e. edge of bald
   c. Patchy Tree Canopy (hardwood or conifer)
3) Other – please describe

Microstegium is @ Graveyard fields

2. Describe the overstory, midstory, and understory as best you can.

- List ~~dominant~~ *overstory* species (tree canopy): patchy birch, S. maple, hickory
- List some of the main *midstory* species: none
- List some of the main *understory* species: herb, rubus

3. Is there spruce in the…

- Canopy- Yes or no?
- Midstory- Yes or no?
- Understory (seedlings, saplings)- Yes or no?

➔ For any of these you answered YES, would you describe it as sparse/scattered, well mixed, or dominant?

4. What is the approximate degree of canopy closure? (e.g., open, partly closed, closed, or a %)

OPEN

5. Are there cone bearing spruce trees nearby? Yes or no? If yes, are they overhead or in a nearby patch/stand?

6. What vegetation in the understory or overstory is competing the most with spruce? (e.g., general things like shrubs or forbs or specifics like white snake root, Rhodo, *Rubus*)

TALL Summer herbs

7. What do you know about the site's history? Was it logged? Did it burn?

logged - burned

8. What is your main management objective for this forest patch?

Connectivity

Names _____

Names of the place(s) you discussed _____

Grt. Balsams

# Sky Island Teams - Discussion #1. What's on your island?

**Think about an area where you've considered restoring red spruce.**

1. How would you describe the existing conditions? Consider the examples below. Circle any of these that best describe the forest patch you'd like to restore.

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   b. Open herbaceous conditions (i.e. edge of bald
   c. Patchy Tree Canopy (hardwood or conifer)
3) Other – please describe

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2. Describe the overstory, midstory, and understory as best you can.

- List dominant *overstory* species (tree canopy): N/A → mature Rhodo
- List some of the main *midstory* species: N/A
- List some of the main *understory* species: NNIS

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3. Is there spruce in the…

- Canopy- Yes or no?
- Midstory- Yes or no? sparse
- Understory (seedlings, saplings)- Yes or no? v. sparse

➔ For any of these you answered YES, would you describe it as sparse/scattered, well mixed, or dominant?

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4. What is the approximate degree of canopy closure? (e.g., open, partly closed, closed, or a %)

m. closed Rhodo

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5. Are there cone bearing spruce trees nearby? Yes or no? If yes, are they overhead or in a nearby patch/stand?

X ? scout

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6. What vegetation in the understory or overstory is competing the most with spruce? (e.g., general things like shrubs or forbs or specifics like white snake root, Rhodo, *Rubus*)

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7. What do you know about the site's history? Was it logged? Did it burn? yes, burned

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8. What is your main management objective for this forest patch?

Provide habitat connectivity for N. flying squirrels

Names Tara Anderson, Jonathan McCall, Kelly Heldbrooks

Names of the place(s) you discussed Graveyard Fields - north side of fields

## Sky Island Team Discussion #2. How can I restore spruce at this site?

Treatment discussion ideas. Can you think of any possible treatments?

1. If young spruce trees (seedlings and saplings) are absent or in short supply, do you have any ideas about what might have caused that?

Intense fire event

2. What are some options to establish a younger age class of seedlings?

plant seedlings / 1 gallon pots

3. If planting, do you need to do anything to prepare the site for planting?

cut + remove rhododendron

4. If you are working in an open-canopy area, is there an opportunity to expand on a small patch of existing hardwood or conifer trees to create a larger future forest patch? How?

no

5. What are some management options to help the existing spruce trees rise in to the canopy?

Keep rhodo under control post-planting

6. How do you access this site? (On foot, vehicle, etc?)

Grandfather Mtn

# Sky Island Teams - Discussion #1. What's on your island?

**Think about an area where you've considered restoring red spruce.**

1. How would you describe the existing conditions? Consider the examples below. Circle any of these that best describe the forest patch you'd like to restore.

50/50

(1) Mature Forest (High forest canopy, trees of seed-bearing age)
   a. Red Spruce Plantation
   b. Northern Hardwood
   (c.) Mixed Red Spruce/ Fraser Fir
(2) Open Conditions (lacking high forest canopy)
   (a.) Dense woody and herbaceous growth
   b. Open herbaceous conditions (i.e. edge of bald
   c. Patchy Tree Canopy (hardwood or conifer)
3) Other – please describe

2. Describe the overstory, midstory, and understory as best you can.

- List dominant *overstory* species (tree canopy): Fir/Spruce/Birch
- List some of the main *midstory* species: Catawba Rhodo./some Mtn. Laurel/Striped Maple
- List some of the main *understory* species: herbs.

3. Is there spruce in the…

- Canopy-(Yes) or no? Sparse/scattered
- Midstory-(Yes) or no? Sparse/Scattered
- Understory (seedlings, saplings)-(Yes) or no? well mixed

➔ For any of these you answered YES, would you describe it as sparse/scattered, well mixed, or dominant?

4. What is the approximate degree of canopy closure? (e.g., open, partly closed, closed, or a %)

70-80% closed

5. Are there cone bearing spruce trees nearby? (Yes) or no? If yes, are they overhead or in a nearby patch/stand? overhead

6. What vegetation in the understory or overstory is competing the most with spruce? (e.g., general things like shrubs or forbs or specifics like white snake root, Rhodo, *Rubus*)

Understory = Rhodo, Rubus  Overstory - Fir & Birches

7. What do you know about the site's history? Was it logged? Did it burn?

logged; didn't burn

8. What is your main management objective for this forest patch?

Release understory for better spruce connectivity

Names John Caveny, Sharon Bischof, Michael Cheek

Names of the place(s) you discussed Black Rock Trail/Parking Area - Grandfather Mtn

## Sky Island Team Discussion #2. How can I restore spruce at this site?

Treatment discussion ideas. Can you think of any possible treatments?

1. If young spruce trees (seedlings and saplings) are absent or in short supply, do you have any ideas about what might have caused that?

N/A - but it would be canopy closure/lack of light to forest floor
- Possibly erosion of thin soil layer/

2. What are some options to establish a younger age class of seedlings?

- plant
- release existing
- germination from nearby

3. If planting, do you need to do anything to prepare the site for planting?

- soil map analysis; site clearing/thinning

4. If you are working in an open-canopy area, is there an opportunity to expand on a small patch of existing hardwood or conifer trees to create a larger future forest patch? How?

N/A

5. What are some management options to help the existing spruce trees rise in to the canopy?

release

6. How do you access this site? (On foot, vehicle, etc?)

vehicle to foot traffic (~0.25 acre)

Massif: Plott Bals.

# Sky Island Teams - Discussion #1. What's on your island?

**Think about an area where you've considered restoring red spruce.**

1. How would you describe the existing conditions? Consider the examples below. Circle any of these that best describe the forest patch you'd like to restore.

1) Mature Forest (High forest canopy, trees of seed-bearing age)
   a. Red Spruce Plantation
   b. Northern Hardwood w/ spruce
   c. Mixed Red Spruce/ Fraser Fir
2) Open Conditions (lacking high forest canopy)
   a. Dense woody and herbaceous growth
   b. Open herbaceous conditions (i.e. edge of bald
   c. Patchy Tree Canopy (hardwood or conifer)
3) Other – please describe

---

2. Describe the overstory, midstory, and understory as best you can.

- List dominant *overstory* species (tree canopy): mixed HWD - beech w/ spruce, oak, hickory
- List some of the main *midstory* species: beech, rhodo (scatt.), s
- List some of the main *understory* species: spruce, rhodo

---

3. Is there spruce in the…

- Canopy- (Yes) or no? mostly sparse w/ some dense groupings
- Midstory- (Yes) or no?
- Understory (seedlings, saplings)- (Yes) or no?

➔ For any of these you answered YES, would you describe it as sparse/scattered, well mixed, or dominant?

---

4. What is the approximate degree of canopy closure? (e.g., open, partly closed, closed, or a %) 80%

---

5. Are there cone bearing spruce trees nearby? Yes or no? If yes, are they overhead or in a nearby patch/stand? probable ?

---

6. What vegetation in the understory or overstory is competing the most with spruce? (e.g., general things like shrubs or forbs or specifics like white snake root, Rhodo, *Rubus*) Beech

---

7. What do you know about the site's history? Was it logged? Did it burn? old sheep pasture recent logging below

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8. What is your main management objective for this forest patch? Elk range w/ secondary NH nature preserve & general wildlife habitat

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Names Buck Knob - Silverboh

Names of the place(s) you discussed _____

## Sky Island Team Discussion #2. How can I restore spruce at this site?

Treatment discussion ideas. Can you think of any possible treatments?

1. If young spruce trees (seedlings and saplings) are absent or in short supply, do you have any ideas about what might have caused that?

old field/pasture

2. What are some options to establish a younger age class of seedlings?

release / understory plantings

3. If planting, do you need to do anything to prepare the site for planting?

NHP notification

4. If you are working in an open-canopy area, is there an opportunity to expand on a small patch of existing hardwood or conifer trees to create a larger future forest patch? How?

N/A

5. What are some management options to help the existing spruce trees rise in to the canopy?

release — how does burning affect seed germination? timing? late growing season burning?

6. How do you access this site? (On foot, vehicle, etc?)

Whitetop Mountain

# Sky Island Teams - Discussion #1. What's on your island?

**Think about an area where you've considered restoring red spruce.**

1. How would you describe the existing conditions? Consider the examples below. Circle any of these that best describe the forest patch you'd like to restore.

1) Mature Forest (High forest canopy, trees of seed-bearing age)
   a. Red Spruce Plantation
   b. Northern Hardwood
   c. Mixed Red Spruce/ Fraser Fir
2) Open Conditions (lacking high forest canopy)
   a. Dense woody and herbaceous growth
   b. Open herbaceous conditions (i.e. edge of bald
   c. Patchy Tree Canopy (hardwood or conifer)
3) Other – please describe

---

2. Describe the overstory, midstory, and understory as best you can.

- List dominant *overstory* species (tree canopy): Mixed Northern Hardwood - YB, SM,
- List some of the main *midstory* species: Red Spruce – Northern Hardwoods
- List some of the main *understory* species: Red Spruce - Mixed Herbaceous

---

3. Is there spruce in the...

Range of conditions throughout project area

- Canopy-(Yes) or no? Sparse
- Midstory-(Yes) or no? Mixed
- Understory (seedlings, saplings)-(Yes) or no? patches - striped maple, viburnum

➔ For any of these you answered YES, would you describe it as sparse/scattered, well mixed, or dominant?

---

4. What is the approximate degree of canopy closure? (e.g., open, partly closed, closed, or a %)

80 - 100% closure

---

5. Are there cone bearing spruce trees nearby? (Yes) or no? If yes, are they overhead or in a nearby patch/stand? Both

---

6. What vegetation in the understory or overstory is competing the most with spruce? (e.g., general things like shrubs or forbs or specifics like white snake root, Rhodo, *Rubus*)

Site visit required — overstory hardwoods competing

---

7. What do you know about the site's history? Was it logged? Did it burn?

Was not logged - southern pine beetle outbreak - small patches logged + grazed post 1930

---

8. What is your main management objective for this forest patch?

Habitat connectivity through spruce release in understory + midstory

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Names Conner McBane, Carol Croy

Names of the place(s) you discussed Whitetop Mountain

## Sky Island Team Discussion #2. How can I restore spruce at this site?

Treatment discussion ideas. Can you think of any possible treatments?

1. If young spruce trees (seedlings and saplings) are absent or in short supply, do you have any ideas about what might have caused that?

   Seedlings and saplings are present
   └ Northern hardwood encroachment

2. What are some options to establish a younger age class of seedlings?

   N/A

3. If planting, do you need to do anything to prepare the site for planting?

   N/A

4. If you are working in an open-canopy area, is there an opportunity to expand on a small patch of existing hardwood or conifer trees to create a larger future forest patch? How?

   N/A

5. What are some management options to help the existing spruce trees rise in to the canopy?

   Girdling overstory hardwoods to release understory + midstory spruce

6. How do you access this site? (On foot, vehicle, etc?)

   Driving along Whitetop Rd and hiking 1/4 mile

**GREAT BALSAMS**

# Sky Island Teams - Discussion #1.

**What's on your island? Think about an area where you've considered restoring red spruce.**

1. How would you describe the existing conditions? Consider the examples below. Circle any of these that best describe the forest patch you'd like to restore.

   1) Mature Forest (High forest canopy, trees of seed-bearing age)
      a. Red Spruce Plantation
      b. Northern Hardwood
      c. Mixed Red Spruce/ Fraser Fir
   2) Open Conditions (lacking high forest canopy)
      a. Dense woody and herbaceous growth
      b. Open herbaceous conditions (i.e. edge of bald
      c. Patchy Tree Canopy (hardwood or conifer)
   3) Other – please describe

2. List overstory species (tree canopy) here
   yellow birch, buckeye, sugar maple, some red spruce

3. List midstory species here
   Same as above, plus some Fraser fir + red maple, mountain maple, beech

4. List understory species here (or note if absent)
   patchy Rhodo. Mountain-striped maple. Patchy Rubus. Herbaceous.

5. Is there spruce in the canopy? Yes or no? but limited

6. Is there spruce in the midstory? Yes or no? " "

7. Is there spruce in the understory (seedlings, saplings)? Yes or no? but very little

8. What is the approximate percent canopy closure? (e.g., open, partly closed, closed, or a %)
   mostly closed (>90%)

9. Are there cone bearing spruce trees nearby? Yes or no?

10. What is the competing vegetation? (e.g., specifics like white snake root, Rhodo, *Rubus* or general things like shrubs or forbs)
    overstory: hardwoods such as birch, maple, buckeye
    understory: Rubus, Rhodo, some tall herbs

11. Do you know anything about the site's history?
    logged 1905-1920s. Burned 1925 & 1941.

12. What is your main management objective for this forest patch?
    Increase amount of spruce in the overstory.

Names CKelly

Names of the place(s) you discussed Flat Laurel

**Group Discussion #2. How can I restore spruce at this site?** Treatment discussion ideas. Can you think of any possible treatments?

1. If young spruce trees (seedlings and saplings) are absent or in short supply, do you have any ideas about what might have caused that?
   * biggest source of cones nearby is from WV stock.
   * soils lost during fires + erosion → maybe problem for germinating?
   * maybe seedlings crushed by hardwood leaf litter?
   * not enough light?
2. What are some options to establish a younger age class of seedlings?
   * plant
   * release existing wildlings.
   * germination from nearby seed source
3. If planting, do you need to do any site preparation to be able to plant?
   * no, except machete some paths through Rubus patches.
4. If you are working in an open-canopy area, is there an opportunity to expand on a small patch of existing hardwood or conifer trees to create a larger future forest patch? How?
   n/a
5. What are some management options to help the existing spruce trees rise in to the canopy?
   * Release by felling or girdling hardwoods.
6. How do you access this site? (On foot, vehicle, etc?)
   * Foot (trail)

Names CK

Names of the place(s) you discussed Flat Laurel

# Sky Island Teams - Discussion #1.

**GREAT BALSAMS 2**

**What's on your island? Think about an area where you've considered restoring red spruce.**

1. How would you describe the existing conditions? Consider the examples below. Circle any of these that best describe the forest patch you'd like to restore.

1) Mature Forest (High forest canopy, trees of seed-bearing age)
   a. Red Spruce Plantation
   b. Northern Hardwood
   c. Mixed Red Spruce/ Fraser Fir
2) Open Conditions (lacking high forest canopy)
   a. Dense woody and herbaceous growth
   b. Open herbaceous conditions (i.e. edge of bald
   c. Patchy Tree Canopy (hardwood or conifer)
3) Other – please describe

2. List dominant overstory species (tree canopy) here

none

3. List some of the main midstory species here

none

4. List some of the main understory species here (or note if absent)

white snake root, other herbs, Rubus

5. Is there spruce in the...

- Canopy- Yes or no?
- Midstory- Yes or no?
- Understory (seedlings, saplings)- Yes or no?

8. What is the approximate percent canopy closure? (e.g., open, partly closed, closed, or a %)

open

9. Are there cone bearing spruce trees nearby? Yes or no?

10. What vegetation in the understory or overstory is competing the most with spruce? (e.g., specifics like white snake root, Rhodo, *Rubus* or general things like shrubs or forbs)

white snake root, primarily. Some Rubus

11. What do you know about the site's history? Was it logged? Did it burn?

logged 1905-25. Burned 1925.

12. What is your main management objective for this forest patch?

Re-establish spruce/HW forest. Connect isolated forest patches for flying squirrel.

Names CK

Names of the place(s) you discussed Graveyard-west

**Group Discussion #2. How can I restore spruce at this site?** Treatment discussion ideas. Can you think of any possible treatments?

1. If young spruce trees (seedlings and saplings) are absent or in short supply, do you have any ideas about what might have caused that?
   * loss of soil after logging, fires, + erosion.
   * lack of nearby seed source.

2. What are some options to establish a younger age class of seedlings?
   * plant seedlings

3. If planting, do you need to do any site preparation to be able to plant?
   * might need to clear paths through thick veg (eg. w/machete or weedeater) in order to plant.

4. If you are working in an open-canopy area, is there an opportunity to expand on a small patch of existing hardwood or conifer trees to create a larger future forest patch? How?
   * yes. We could plant toward these patches of trees. They can be the kernel of a future forest patch.

5. What are some management options to help the existing spruce trees rise in to the canopy?

   n/a

6. How do you access this site? (On foot, vehicle, etc?)

   foot (trails)

Names CK

Names of the place(s) you discussed Graveyard - west end