Eastern Invasives Management Network
Workshop # 3, March 2003

Hickory Nut Gorge, North Carolina

1. **State clearly what conditions (invasive species distribution, abundance, etc) would have to prevail to allow you to reduce (or maintain) the invasive species threat rating(s) on your conservation area to MEDIUM or LOW. For invasive species threats currently rated as VERY HIGH, state the conditions that would have to prevail in order for it to be rated one level lower – HIGH – when re-assessed. Use these condition statements to form objectives for your conservation area, and where possible, state these objectives in quantitative terms.**

**I find this somewhat hard to do without a survey and without knowing current levels of distribution and abundance, however, I'm going to go through the exercise using what I know of the landscape and the invasives in it.*

A decline in invasive species distribution and abundance would need to prevail in order to drop the invasive threat ratings from High and Very High to Medium or Low. The targets for HNG are community targets and they have been grouped into two groups: 1) Forest targets—Montane Oak-Hickory Forest; Rich Cove Forest; Montane Red Cedar-Woodland Forest; Carolina Hemlock Bluffs *(*I don't see the threat, the Hemlock Woolly Adelgid, to this community lessening because there is no good control for it yet*). 2) Granitic communities—Low Elevation Rocky Summit; Low Elevation Granitic Dome; Fissure/Talus Cave Systems.

Previously, the invasive threats to the targets were assessed and placed into three levels (see table). Our objectives for invasive species reduction are based on this table.

Forest targets:

Level I: We seek to reduce all known occurrences of Level I species of invasive plants to <5% relative cover in forested targets. So there are no infested areas of over 1 ha in the forests. We would also like to eradicate new infestations when found, if <1 ha in size.

Level II: We seek to reduce all Level II species of invasive plants to <5% relative cover in forested targets. So there are no infested areas of over 1 ha in the forests. We would also like to eradicate new infestations when found, if <1 ha in size. If eradication is not possible, we will determine a containment area size and seek to contain the species to this area (taking into consideration dispersal mechanisms) by removal techniques and by monitoring for new "outbreaks" or infestations from the contained site.

	Weed	Management Goal
Level I	*Ailanthus altissima/Tree-of-Heaven*	Eradicate in RCF, MOHF, MRCHW & granitic communities. Need to map.
	Paulownia tomentosa/Princess Tree	Eradicate on granitic communities; control in forests as found. Need to map.
	Microstegium viminieum/Japanese stilt grass	Control pop. found in undisturbed areas with no corridors. Keep out of RCF b/c of spring ephemerals.
		Need to map in undisturbed areas. No action on pop. along river and on roads.
Level II	*Celastrus orbiculata/Oriental bittersweet*	Control pop. found along river. Tolerate no spreading into forest. Vigilent watch. Control on Pack tract
	Pueraria lobata/Kudzu	Keep out! No Kudzu. Vigilent watch. Control population along river.
	Hedera helix/English Ivy	Keep out of RCF because of rare spring ephemerals. Control where found In RCF first, outliers second
	Wisteria sp./Wisteria	Control pop. found along river. Tolerate no spreading into forest.
	Lonicera japonica/Japanese honeysuckle	Keep BC pop. at or under current extent. Check RB pop. so it doesn't "break out".
	Rhubus phoenicolasius/Wineberry	Keep out of RCF because of rare spring ephemerals & off of boulders in RCF.
Level III	*Rosa multiflora/Multiflora rose*	Eradicate as found
	Ligustrum sinense/Privet	Eradicate as found
	Albizia julibrissin/Mimosa	Eradicate as found
	Miscanthus sinensis/Miscanthus	Eradicate as found
	Alliaria petiolata/Garlic Mustard	Eradicate as found & map as soon as discovered & continue to monitor
	Polygonam cuspidatum/Japanese knotweed	Eradicate as found & map as soon as discovered & continue to monitor
	Lythrum salicaria/Purple loosestrife	Eradicate as found & map as soon as discovered & continue to monitor

*Levels and individual invasives are arranged in decreasing order of threat

RCF=Rich Cove Forest
MOHF=Montane Oak-Hickory Forest
MRCHW=Montane Red Cedar-Hardwood Woodland
BC=Bat Cave preserve
RB=Rumbling Bald preserve

Level III: We seek to 100% eradicate any of the Level III species of invasive plants found in the forested targets. Currently, these species are found in low numbers and in few places (e.g. Privet, Multiflora Rose, Japanese Knotweed) or have not entered the gorge at all yet (e.g. Garlic Mustard, Purple Loosestrife).
Note: Eradication of all the occurring species should be attempted and if not possible, then a containment or control strategy should be developed. Eradication of the "soon to be" invaders, should be possible if early detection and rapid response techniques can be employed.

Granitic communities:
Level I: We seek to reduce all known occurrences of Level I species of invasive plants to <5% relative cover granitic community targets. So there are no infested areas of over 1 ha on the granitic communities. We would also like to eradicate new infestations when found, if <1 ha in size.
Level II: We seek to reduce all Level II species of invasive plants to <5% relative cover on granitic community targets. So there are no infested areas of over 1 ha granitic communities. We would also like to eradicate new infestations when found, if <1 ha in size. If eradication is not possible, we will determine a containment area size and seek to contain the species to this area (taking into consideration dispersal mechanisms) by removal techniques and by monitoring for new "outbreaks" or infestations from the contained site.
Level III: We seek to 100% eradicate any of the Level III species of invasive plants if found granitic community targets. Currently, these species have not been found on granitic communities but are found in low numbers and in few places in forested targets (e.g. Privet, Multiflora Rose, Japanese Knotweed) or have not entered the gorge at all yet (e.g. Garlic Mustard, Purple Loosestrife).
Note: Eradication of all the occurring species should be attempted and if not possible, then a containment or control strategy should be developed. Eradication of the "soon to be" invaders, should be possible if early detection and rapid response techniques can be employed.

2. **Since invasive species can move into your conservation area from outside you probably need to consider conditions in upstream areas, upwind areas or a buffer zone surrounding it. What area(s) beyond the bounds of your conservation area do you believe should be included when assessing invasive species threats?**

The areas beyond the bounds of our conservation area that should be included when assessing invasive species threats include three highways, two rivers and many tributaries and four adjacent municipalities. The western end of Hickory Nut Gorge contains the intersection of three highways and the intersection of two rivers (see map). Highway 74A comes from northwest

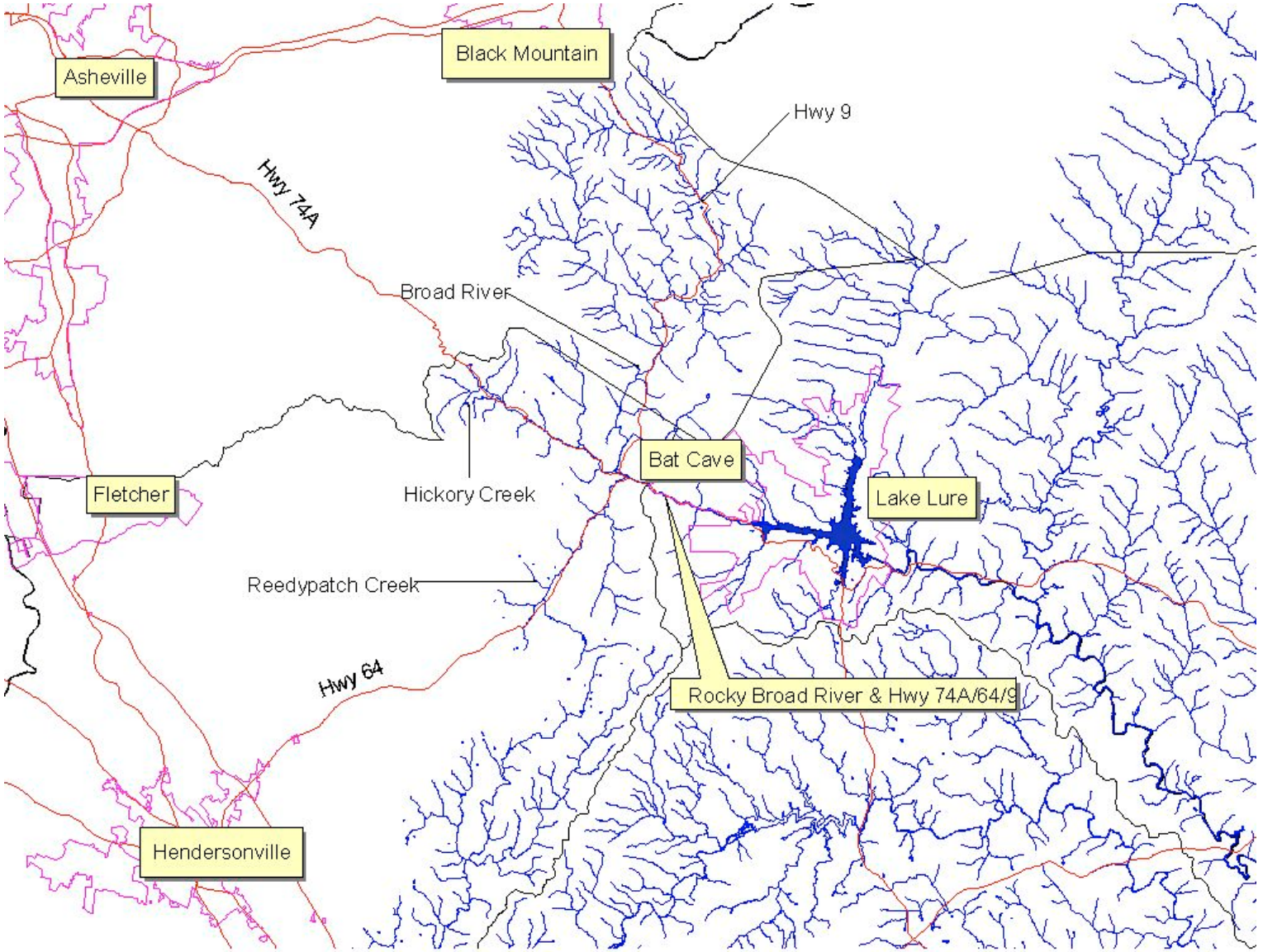
Asheville, to meet Highway 9 coming south from Black Mountain and also Highway 64 coming east from Hendersonville. Each highway is infested with invasives and will continue to be a corridor for them. Reedypatch Creek parallels Hwy 64, the Broad River parallels Hwy 9 and Hickory Creek parallels Hwy 74A. The waterways and highways all connect at the village of Bat Cave. The waters become the Rocky Broad River flowing through the gorge to Lake Lure and the highways become Hwy 64/74A/9 combination also to Lake Lure. Because of these highways and waterways, the gorge will always be inundated with invasives unless collaboration with DOT and local citizens can help control invasives along these pathways.

3. **Identify 3 to 5 strategies that will allow you to achieve the objective(s) you identified in question 1.**
    1. Strategy: Design and carry-out an invasive species survey in HNG with the aid of divisional scientist, Rob Sutter and TNC's WIST. At the end of the survey, we would know species distribution and abundance but also investigate factors that affect distribution to be able to predict future infestations or to find hidden infestations.
    2. Strategy: Prioritize current known infestations and organize weed hit teams to control infestations (working toward eradication, if possible).
    3. Strategy: Train volunteers in identification of new invaders so these can be identified quickly and responded to rapidly.
    4. Strategy: Educate local citizens through the use of flyers at the local native plant nursery on invasive plant identification and on the importance of native planting.

4. **Identify at least one way that you could measure (monitor) progress towards the objective(s) you identified in question 1. Be as specific as you can about the species, factor or indicator to be monitored and the kind of data (e.g. cover, density, concentration, total area covered, etc) to be gathered. For example, a sampling scheme designed to assess the relative cover of all invasive plants (as a "guild") in riparian areas along first and second order streams could help measure progress toward the sample objective given in question one. However, more information would be required for riparian areas along larger creeks and rivers.**

    **This is tough because I don't feel like I know what monitoring design or sampling scheme would be best. I need to rely on the divisional scientist or a professor to determine these.*

    1. Design and implement a monitoring schedule for the granitic communities that monitors percent cover of invasive species in designated plots on the granitic communities. Coordinate with climbing groups, local colleges and summer interns to monitor and measure progress toward each objective stated for each Level (I, II, III) of invasive plant.


Asheville
Black Mountain
Hwy 9
Hwy 74A
Broad River
Fletcher
Hickory Creek
Bat Cave
Lake Lure
Reedypatch Creek
Hwy 64
Rocky Broad River & Hwy 74A/64/9
Hendersonville

2. Determine which invasives are most detrimental to forest health (which I believe are all the Level I species, plus *Celastrus orbiculata*) and design a sampling scheme that monitors the percent coverage of this species in established plots or transects in the forest. Continue with control measures until percent cover is in accordance with objectives.