

## **Appendix 2. Criteria for judging persistence of West Virginia northern flying squirrel monitoring sites.**

For this PDM plan, persistence is defined as continuing captures of WVNFS over multiple generations at previously documented known sites throughout the historic range. A known site is defined as a site where at least one WVNFS was detected prior to delisting. There is overlap between known sites and sites demonstrating persistence. Sites demonstrating persistence are a subset of the known sites.

### **BASELINE PERIOD**

To establish the pre-delisting baseline data on persistence in Table 1 of this PDM Plan, the following criteria were applied to 60 sites that had been monitored multiple times across at least a 5-year period (corresponding to 3 generations). While sites monitored across shorter time spans do demonstrate short-term occupancy, they do not demonstrate persistence across multiple generations.

#### Criteria providing sufficient evidence of persistence:

Multiple captures ( $\geq 2$  WVNFS) across multiple years ( $\geq 3$  years of captures). Examples: site #s 2, 68, 78.

Captures of single WVNFS across  $\geq 2$  years, and at least one year of capture of multiple ( $\geq 2$ ) WVNFS. Examples: site #s 5, 47, 80.

Repeated captures ( $\geq 3$  times) of a single WVNFS/year where the time span between first and last capture is  $\geq 5$  years. Examples: site #s site 24, 70.

#### Criteria providing insufficient evidence of persistence:

A capture of one or more WVNFS during a single year and no detections since then. Examples: site #s 103, 106.

A capture of one WVNFS during 2 consecutive years and no detections since. Example: site #66.

Repeated captures ( $\geq 3$  times) of a single WVNFS where the time span from first to last capture is  $< 5$  years. (No examples available.)

## **THE PDM PERIOD**

### **Known Sites**

During the PDM period, the focus will be on revisiting a random sample of the 107 known sites where WVNFS have been documented in the past (including the 50 sites determined to be persistent during the baseline period). Sites will be distributed across all 7 core areas (Table 4). Only previously known occupied sites that have been monitored across at least a 5-year period (including the time preceding delisting) will be used for calculating persistence rates.

The West Virginia Division of Natural Resources will visit known sites annually until WVNFS occupancy is detected and the site meets the persistence criteria for known sites below, or 5 years elapses without an observation. If there is no detection of WVNFS in 5 years, or persistence criteria have not been met in 5 years, then that site will be categorized as not meeting persistence criteria, and another randomly selected site will be monitored.

The Monongahela National Forest will focus its efforts on a few sites centered primarily in the Cheat Mountain core area, but will sample these sites more intensively during the PDM period in an ancillary effort to determine population trend. The same persistence criteria for known sites will apply to the Forest's efforts, except the Forest will continue to visit a site after persistence has been confirmed, as part of its efforts, above and beyond Endangered Species Act post-delisting monitoring, to meeting National Forest Management Act responsibilities.

Monitoring efforts by other parties at other sites will round out this effort as funding allows (e.g. Canaan Valley National Wildlife Refuge, George Washington National Forest, and various private lands). The same persistence criteria will be applied to these sites, but participants may continue to monitor these sites after persistence criteria have been met.

### Criteria for Known Sites with Previously Documented Persistence

For sites that were determined to be persistent during baseline (n = 50 sites), a single capture of WVNFS at that site during the PDM period will be adequate to demonstrate continued persistence at that site, and the site does not need to be monitored further for confirming post-delisting persistence.

### Criteria for Known Sites without Previously Documented Persistence

For sites where WVNFS were documented during the baseline period but were not monitored across at least 5 years (n = 47 sites), or were monitored across at least 5 years but there was insufficient evidence of persistence (n = 10 sites), the same criteria will apply as were used to determine the baseline. Pre-delisting captures will be considered towards meeting the total requirements.

## **New Sites**

Although the focus of PDM monitoring will be directed at sites where WVNFS have been documented in the past, captures may be documented at some new trapping or nestbox sites. These new sites will not be included in calculations of persistence at previously documented known sites. However, should the persistence threshold be reached or exceeded, then new locations that meet the persistence criteria will be considered when evaluating the significance of the event and developing an appropriate response. For example, it would be important to consider whether the number and distribution of newly found persistent sites compensates for a reduction in persistence among previously known sites during the PDM period.

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 2  
**COUNTY:** Randolph

**SITE NAME:** Stuart Knob  
**QUADRANGLE:** Bowden

**GENERAL LOCATION:** 7.75 miles E of Elkins, E of Bickle Knob

**HISTORIC DATA (Captures prior to 1985):** 3 (2 males and 1 female) caught with snap-traps, 3900 ft., 15 June 1951

**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE				TOTAL	RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.		
1985	4	-	2	4	-	-	2	6	
1986	10	7	1	11	6	-	1	18	18
1987	2	3	-	3	2	-	-	5	3
1990	-	-	2	2	-	-	-	2	
1994	-	2	-	2	-	-	-	2	
1995	3	-	-	3	-	-	-	3	1
1996	1	-	-	-	1	-	-	1	
1997	-	2	-	2	-	-	-	2	
1998	3	1	-	4	-	-	-	4	
1999	1	1	1	3	-	-	-	3	1
2001	4	7	-	9	2	-	-	11	1
2003	-	1	-	1	-	-	-	1	
2004	-	1	-	1	-	-	-	1	

**TOTAL CAPTURES 1985 TO PRESENT:** 59

**GENERAL HABITAT DESCRIPTION:** Area interspersed with boulders. Overstory: red spruce, yellow birch, hemlock, red maple. Understory: red spruce, rhododendron, yellow birch, hemlock. Ground: moss spp., red spruce.

**RANGE IN ELEVATION:** 3,840 ft. to 3,965 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Yes

**COMMENTS:** Ridgetop strewn with rocks and boulders. Boxes were not inspected in 1988 or 1989.



**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 5  
**COUNTY:** Randolph

**SITE NAME:** Head of Gandy Creek  
**QUADRANGLE:** Spruce Knob

**GENERAL LOCATION:** 4.5 miles SW of Spruce Knob

**HISTORIC DATA (Captures prior to 1985):** None

**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1988	-	-	1	1	-	-	-	1	
1993	1	-	-	1	-	-	-	1	
2006	1	2	3	1	2	3	-	6	

**TOTAL CAPTURES 1985 TO PRESENT:** 8

**GENERAL HABITAT DESCRIPTION:** Red spruce forest; floor damp to wet.

**RANGE IN ELEVATION:** 3,840 ft. to 3,885 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Unknown

**COMMENTS:**

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 17  
**COUNTY:** Pocahontas

**SITE NAME:** Rocky Run  
**QUADRANGLE:** Cass

**GENERAL LOCATION:** 3.25 miles NW of Bald Knob Lookout Tower

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1989	-	1	-	1	-	-	-	1	

**TOTAL CAPTURES 1985 TO PRESENT:** 1

**GENERAL HABITAT DESCRIPTION:** Dense spruce stand. Overstory: red spruce (>90%), yellow birch. Understory: red spruce, yellow birch, red maple. Ground: red spruce, moss spp. Very open.

**RANGE IN ELEVATION:** 3,875 ft. to 3,885 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** No

**COMMENTS:** Pregnant female (?). Area approximately 500 feet from site clearcut shortly after capture.

*Boxes installed 1988, checked 1989-1993.*

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 24  
**COUNTY:** Pocahontas

**SITE NAME:** Big Spruce – Day Run  
**QUADRANGLE:** Woodrow

**GENERAL LOCATION:** 0.75 miles ESE of Big Spruce Knob

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1989	-	1	-	1	-	-	-	1	
1994	1	-	-	1	-	-	-	1	
1997	1	-	-	1	-	-	-	1	
1999	-	1	-	1	-	-	-	1	

**TOTAL CAPTURES 1985 TO PRESENT:** 4

**GENERAL HABITAT DESCRIPTION:** Ground cover sparse with 50% spruce overstory.  
Overstory: eastern hemlock, red spruce, red maple. Understory: red spruce, eastern hemlock, striped maple. Ground: moss spp. fern spp.

**RANGE IN ELEVATION:** 3,810 ft. to 4,080 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Unknown

**COMMENTS:** Stand thinned in 1988.

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 47  
**COUNTY:** Randolph

**SITE NAME:** McGowen Mountain  
**QUADRANGLE:** Bowden

**GENERAL LOCATION:** S of Parsons in Fernow Experimental Forest, along FR 324/701.  
Boxes run parallel to McGowen Mountain Trail

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1991	4	1	-	5	-	-	-	5	
1997	-	1	-	1	-	-	-	1	
2000	1	2	-	3	-	-	-	3	

**TOTAL CAPTURES 1985 TO PRESENT:** 9

**GENERAL HABITAT DESCRIPTION:** Overstory (%): spruce (42), maple (26), birch (21), black cherry (6). Understory (%): spruce (24), rhododendron (68). Ground (%): fern spp. (4), moss spp. (36), boulders (12).

**RANGE IN ELEVATION:** 3,420 ft. to 3,720 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Yes

**COMMENTS:** Ridgetop site. Lower end is northern hardwood with abundant black cherry; upper end has spruce – rhododendron with large boulders.

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 66  
**COUNTY:** Pocahontas

**SITE NAME:** Flat Ridge South  
**QUADRANGLE:** Sharp Knob

**GENERAL LOCATION:** 3 miles SSE of Sharp Knob Lookout Tower

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1992	-	1	-	1	-	-	-	1	
1993	1	-	-	1	-	-	-	1	

**TOTAL CAPTURES 1985 TO PRESENT:** 2

**GENERAL HABITAT DESCRIPTION:** Overstory (%): red spruce, yellow birch, American beech. Understory (%): rhododendron, red spruce, yellow birch, striped maple. Ground (%): moss spp., rocks.

**RANGE IN ELEVATION:** 4,250 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** No

**COMMENTS:**

*Checked 1990 - 2001  
every year*

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 68

**SITE NAME:** The Divide

**COUNTY:** Randolph

**QUADRANGLE:** Sinks of Gandy/Spruce Knob

**GENERAL LOCATION:** 3.6 miles S of Osceola

**HISTORIC DATA (Captures prior to 1985):** None

**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1993	1	-	1	2	-	-	-	2	
2005	2	1	-	3	-	-	-	3	
2006	3	3	3	1	5	3	-	9	2

**TOTAL CAPTURES 1985 TO PRESENT:** 14

**GENERAL HABITAT DESCRIPTION:** Overstory (%): red spruce (50), American beech (45), red maple (5). Understory (%): red spruce (100). Ground (%): American beech, red spruce, fern spp., lily spp.

**RANGE IN ELEVATION:** 3,900 ft. to 4,100 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Yes

**COMMENTS:**

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 70  
**COUNTY:** Tucker

**SITE NAME:** Canaan Loop Road – CNG Right-of-Way  
**QUADRANGLE:** Blackwater Falls

**GENERAL LOCATION:** 2.2 miles SW of Canaan Heights

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1993	-	1	-	1	-	-	-	1	
1994	-	-	-	-	-	-	-	-	1
1995	-	1	-	1	-	-	-	1	
1997	-	1	-	1	-	-	-	1	
2005	1	-	-	1	-	-	-	1	

**TOTAL CAPTURES 1985 TO PRESENT:** 4

**GENERAL HABITAT DESCRIPTION:** Overstory (%): red spruce (70), sugar maple (20), Norway spruce (10). Understory (%): red spruce (100). Ground (%):

**RANGE IN ELEVATION:** 3,685 ft. to 3,720 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Yes

**COMMENTS:** 1993 – First capture in Canaan Valley.

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 78  
**COUNTY:** Tucker

**SITE NAME:** Blackwater Canyon (UTSWLR)  
**QUADRANGLE:** Mozark Mountain

**GENERAL LOCATION:** 1.8 miles SW of Blackwater Falls State Park

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1994	1	-	3	1	-	3	-	4	
1996	1	1	2	2	-	2	-	4	
1997	3	2	2	5	-	2	-	7	
1999	1	-	-	1	-	-	-	1	
2000	5	4	-	5	4	-	-	9	1
2004	1	-	-	1	-	-	-	1	

**TOTAL CAPTURES 1985 TO PRESENT:** 26

**GENERAL HABITAT DESCRIPTION:** Overstory (%): red spruce (50), eastern hemlock (40), red maple (10). Understory (%): T. canadensis (100), R. maximum. Ground (%):

**RANGE IN ELEVATION:** 2,280 ft. to 3,150 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Unknown

**COMMENTS:** Renamed fall 2001, and will be referred to as Blackwater Canyon in all future references.

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 80  
**COUNTY:** Tucker

**SITE NAME:** Canaan Heights  
**QUADRANGLE:** Blackwater Falls

**GENERAL LOCATION:** 0.5 miles W of Canaan Heights

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
1994	1	-	-	-	1	-	-	1	
1997	-	1	-	1	-	-	-	1	
2000	-	1	-	1	-	-	-	1	
2001	-	1	-	1	-	-	-	1	
2005	1	1	-	2	-	-	-	2	
2006	1	1	4	1	-	4	1	6	

**TOTAL CAPTURES 1985 TO PRESENT:** 12

**GENERAL HABITAT DESCRIPTION:** Overstory (%): red spruce (40), birch (30), maple (30).  
Understory (%): red spruce (90), mountain holly (10). Ground (%): fern spp.,  
Lycopodium.

**RANGE IN ELEVATION:** 3,680 ft. to 3,800 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Unknown

**COMMENTS:**

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 103  
**COUNTY:** Randolph

**SITE NAME:** Otter Creek Cabin  
**QUADRANGLE:** Harman

**GENERAL LOCATION:** 5 miles north of Wymer

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
2004	1	-	-	1	-	-	-	1	

**TOTAL CAPTURES 1985 TO PRESENT:** 1

**GENERAL HABITAT DESCRIPTION:** Overstory (%): T. canadensis (35), F. Americana (30), A. rubrum (15), P. serotina (10), B. alleghaniensis (9), P. rubens (1). Understory (%): B. alleghaniensis (60), T. canadensis (30), A. rubrum (10).

**RANGE IN ELEVATION:** 2,320 ft. to 2,450 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Unknown

**COMMENTS:**

*Boxes installed 2001, checked 2002-2006.*

**WEST VIRGINIA NORTHERN FLYING SQUIRREL  
SITE SUMMARY SHEET**

**SITE NO.:** 106  
**COUNTY:** Randolph

**SITE NAME:** Buck Knob (KSF)  
**QUADRANGLE:** Adolph

**GENERAL LOCATION:** Approximately 5.45 miles SSW of Blue Rock

**HISTORIC DATA (Captures prior to 1985):** None  
**RECENT DATA (Captures 1985 to present):**

YEAR	SEX			AGE					RECAPTURE
	M	F	UNK.	AD.	JUV.	NEST.	UNK.	TOTAL	
2006	1	2	-	1	-	2	-	3	

**TOTAL CAPTURES 1985 TO PRESENT:** 3

**GENERAL HABITAT DESCRIPTION:** Overstory (%): *P. rubens* (45), *A. rubrum* (20), *T. canadensis* (4), *F. grandifolia* (1). Understory (%): *P. rubens* (400), *F. grandifolia* (30), *A. rubrum* (20), *T. canadensis* (10). Ground: *Gramma* spp.

**RANGE IN ELEVATION:** 3,540 ft.

**SOUTHERN FLYING SQUIRRELS PRESENT:** Unknown

**COMMENTS:**