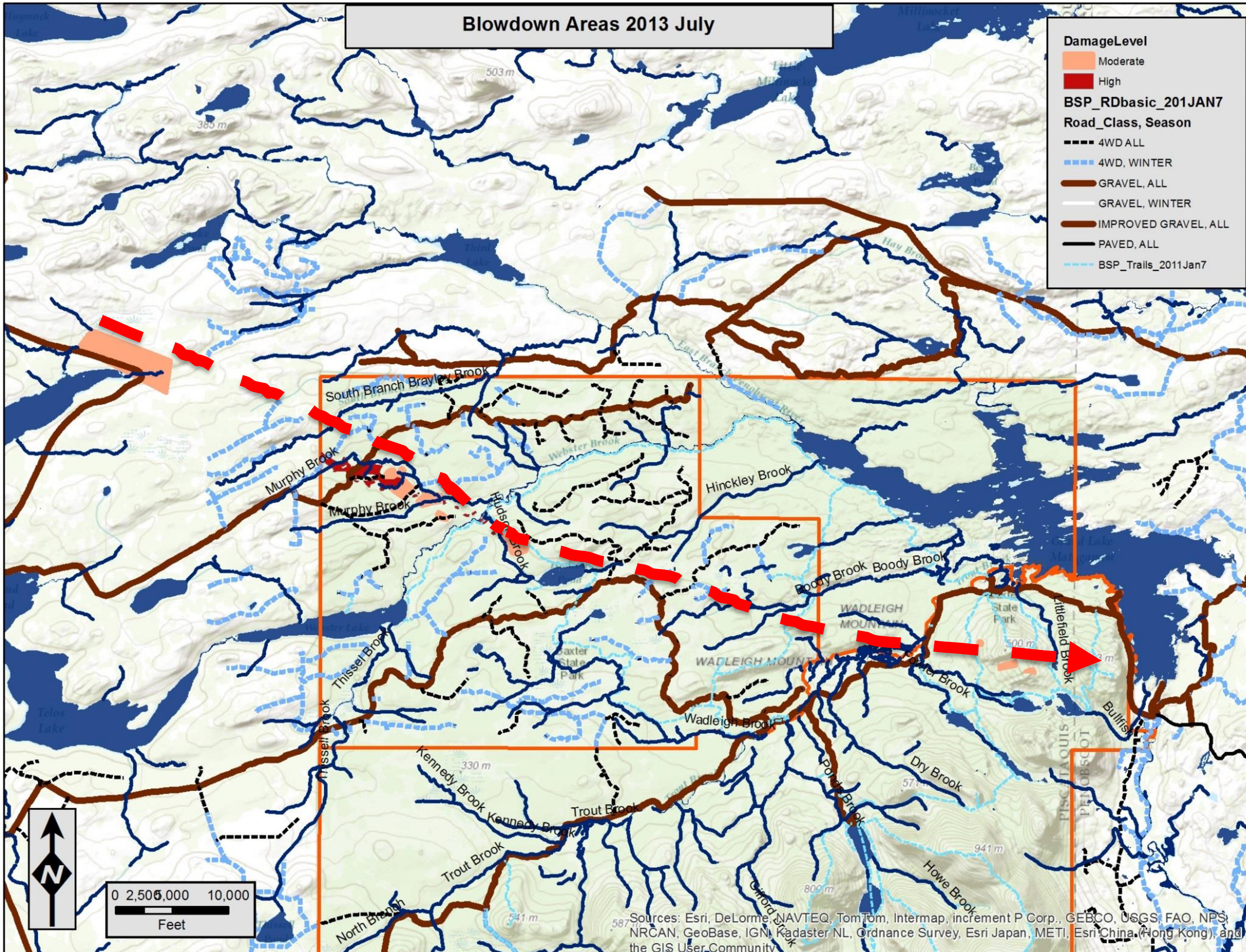
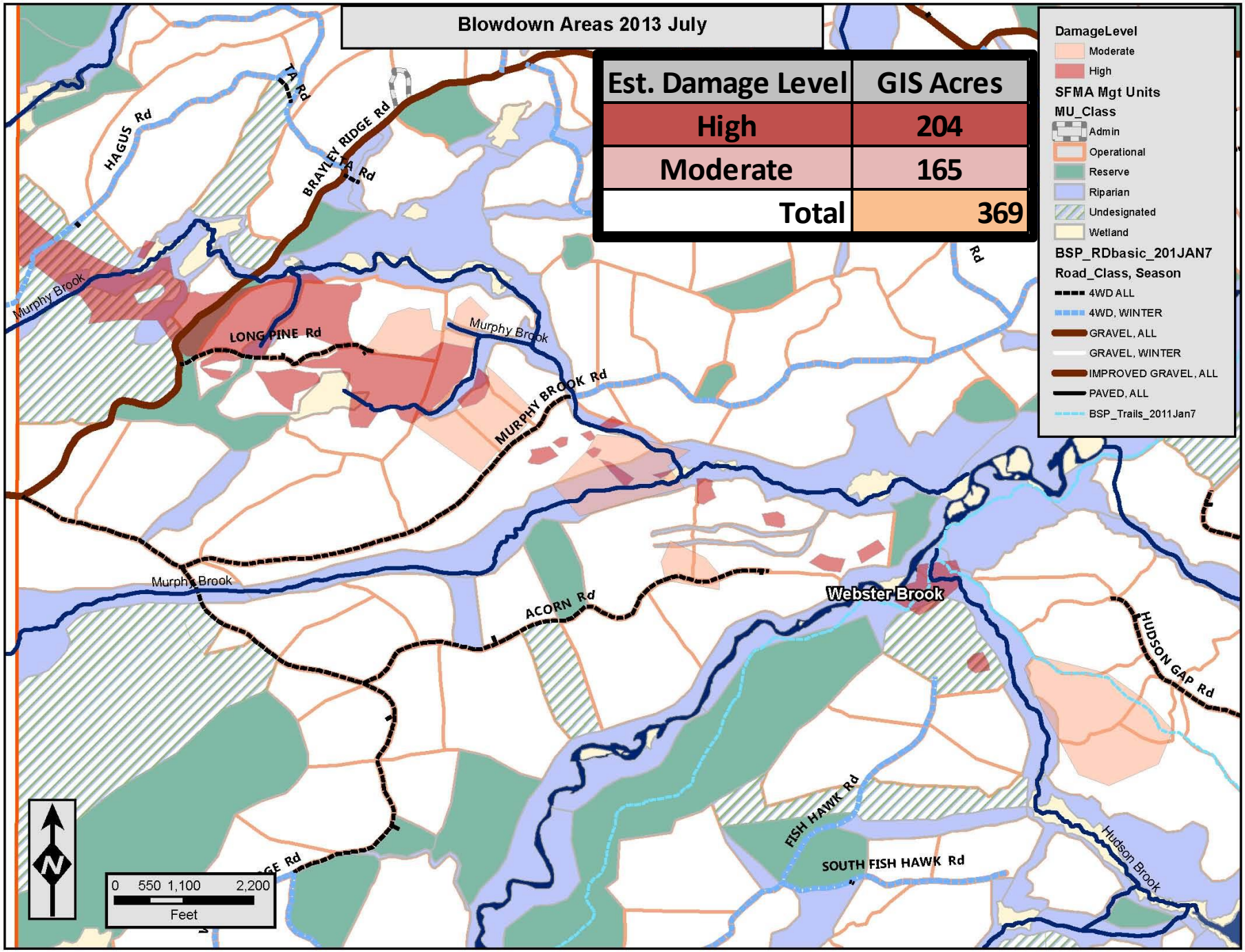
Severe Windstorm Damage

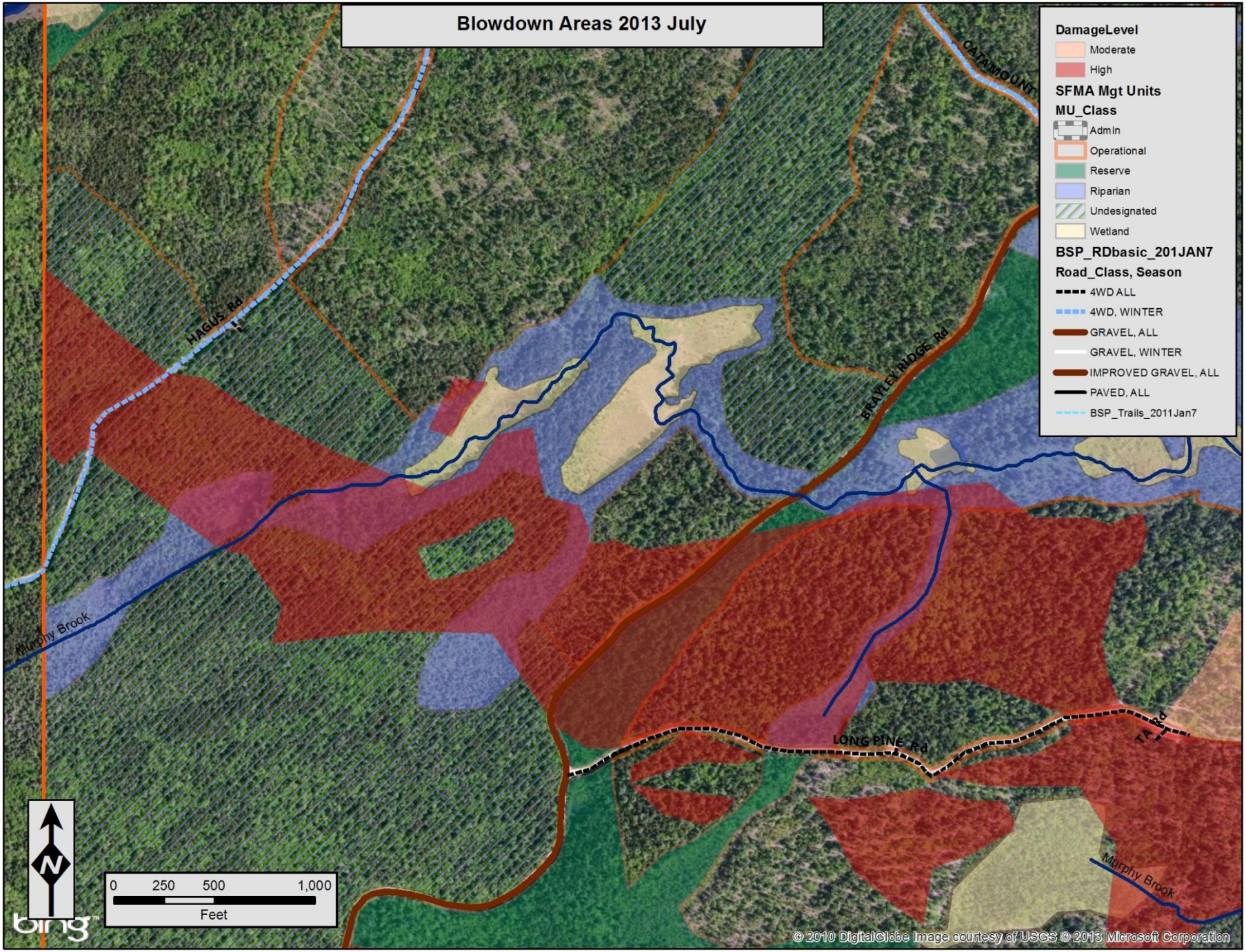
Baxter State Park
Scientific Forest Management Area
Event Date: July 19, 2013 1400hr

Photos and Maps by BSP Staff and Katahdin Air Service



Blowdown Areas 2013 July
DamageLevel
Moderate
High
BSP_RDbasic_201JAN7
Road_Class, Season
4WD ALL
4WD, WINTER
GRAVEL, ALL
GRAVEL, WINTER
IMPROVED GRAVEL, ALL
PAVED, ALL
BSP_Trails_2011Jan7
South Branch Brayley Brook
Murphy Brook
Murphy Brook
Hudson Brook
Hinckley Brook
Boody Brook
Boody Brook
WADLEIGH MOUNTAIN
WADLEIGH MOUNTAIN
Baxter State Park
State Park
Littlefield Brook
Foster Brook
Bullfrog
Thissel Brook
Thissel Brook
Wadleigh Brook
Kennedy Brook
Kennedy Brook
Trout Brook
Trout Brook
Dry Brook
Pond Brook
Howe Brook
Gifford Brook
North Branch
PISCATAQUIS
PENOBSCOT
503 m
385 m
330 m
941 m
800 m
541 m
587 m
0 2,500 5,000 10,000
Feet
N
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

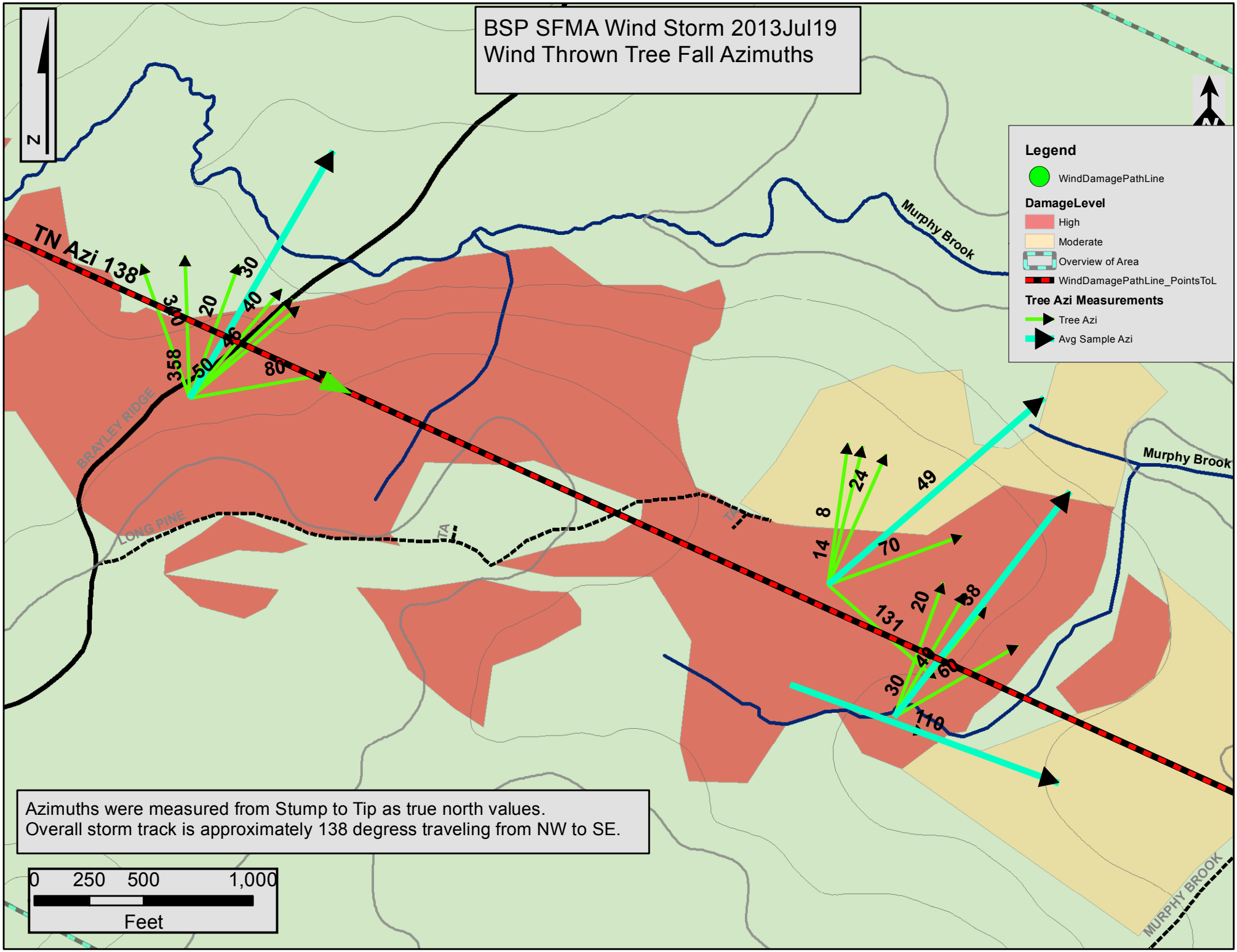

Blowdown Areas 2013 July
Est. Damage Level
GIS Acres
High
204
Moderate
165
Total
369
DamageLevel
Moderate
High
SFMA Mgt Units
MU_Class
Admin
Operational
Reserve
Riparian
Undesignated
Wetland
BSP_RDbasic_201JAN7
Road_Class, Season
4WD ALL
4WD, WINTER
GRAVEL, ALL
GRAVEL, WINTER
IMPROVED GRAVEL, ALL
PAVED, ALL
BSP_Trails_2011Jan7
HAGUS Rd
BRAYLEY RIDGE Rd
LONG PINE Rd
MURPHY BROOK Rd
ACORN Rd
FISH HAWK Rd
SOUTH FISH HAWK Rd
HUDSON GAP Rd
Murphy Brook
Webster Brook
Hudson Brook
N
0 550 1,100 2,200
Feet


Blowdown Areas 2013 July
DamageLevel
Moderate
High
SFMA Mgt Units
MU_Class
Admin
Operational
Reserve
Riparian
Undesignated
Wetland
BSP_RDbasic_201JAN7
Road_Class, Season
4WD ALL
4WD, WINTER
GRAVEL, ALL
GRAVEL, WINTER
IMPROVED GRAVEL, ALL
PAVED, ALL
BSP_Trails_2011Jan7
CATAMOUNT
HAGUS Rd
BRAYLEY RIDGE Rd
Murphy Brook
LONG PINE Rd
TAY Rd
Murphy Brook
N
0 250 500 1,000
Feet
bing
© 2010 DigitalGlobe Image courtesy of USGS © 2013 Microsoft Corporation


T North Aprx
Brayley Brk
Hagus Rd
Brayley Ridge Rd
BPL Boundary
Murphy Brk
SFMA Boundary


T North Aprx
Murphy Brk
Brayley Ridge Rd
Long Pine Rd

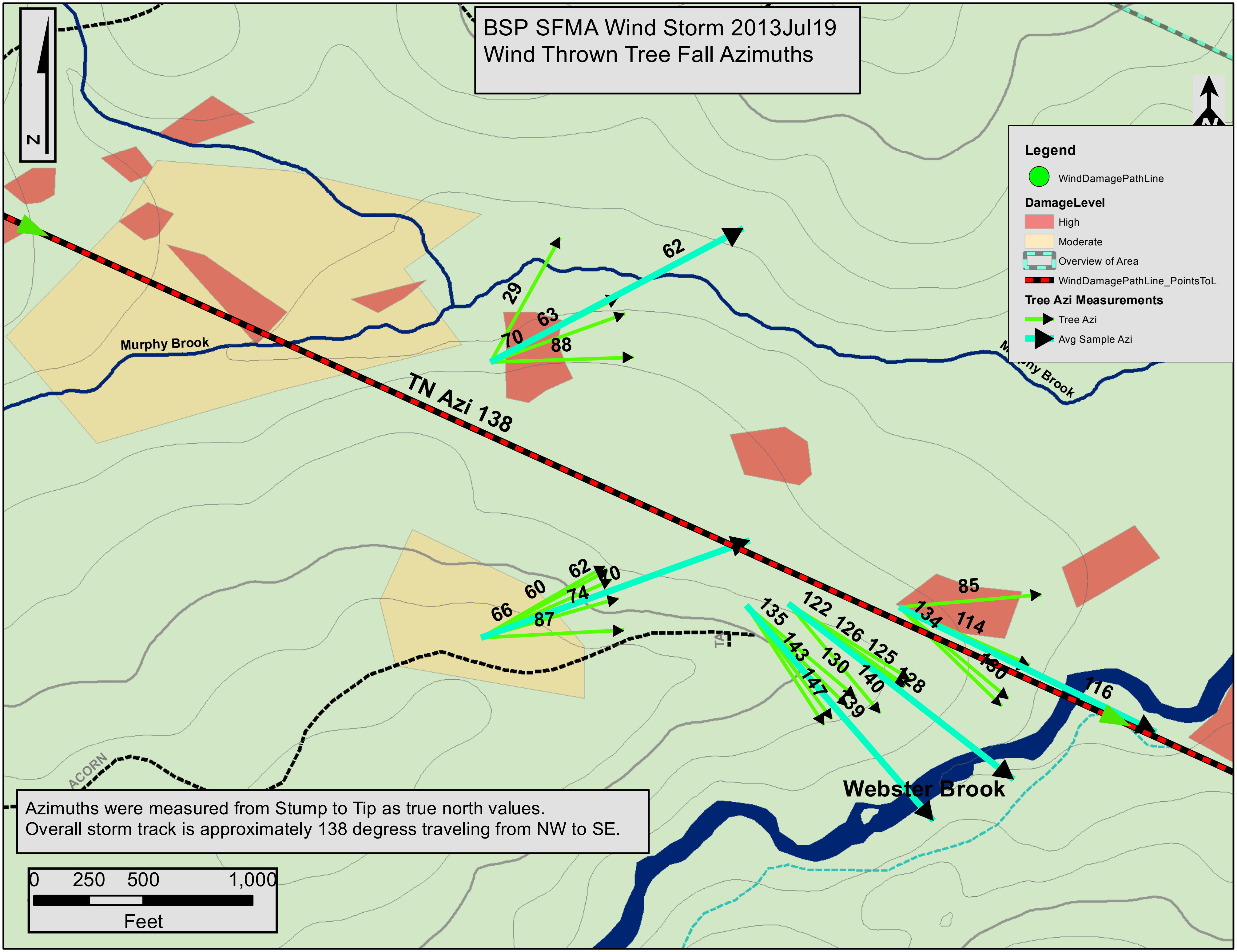

Photo by: Jim Hamlin

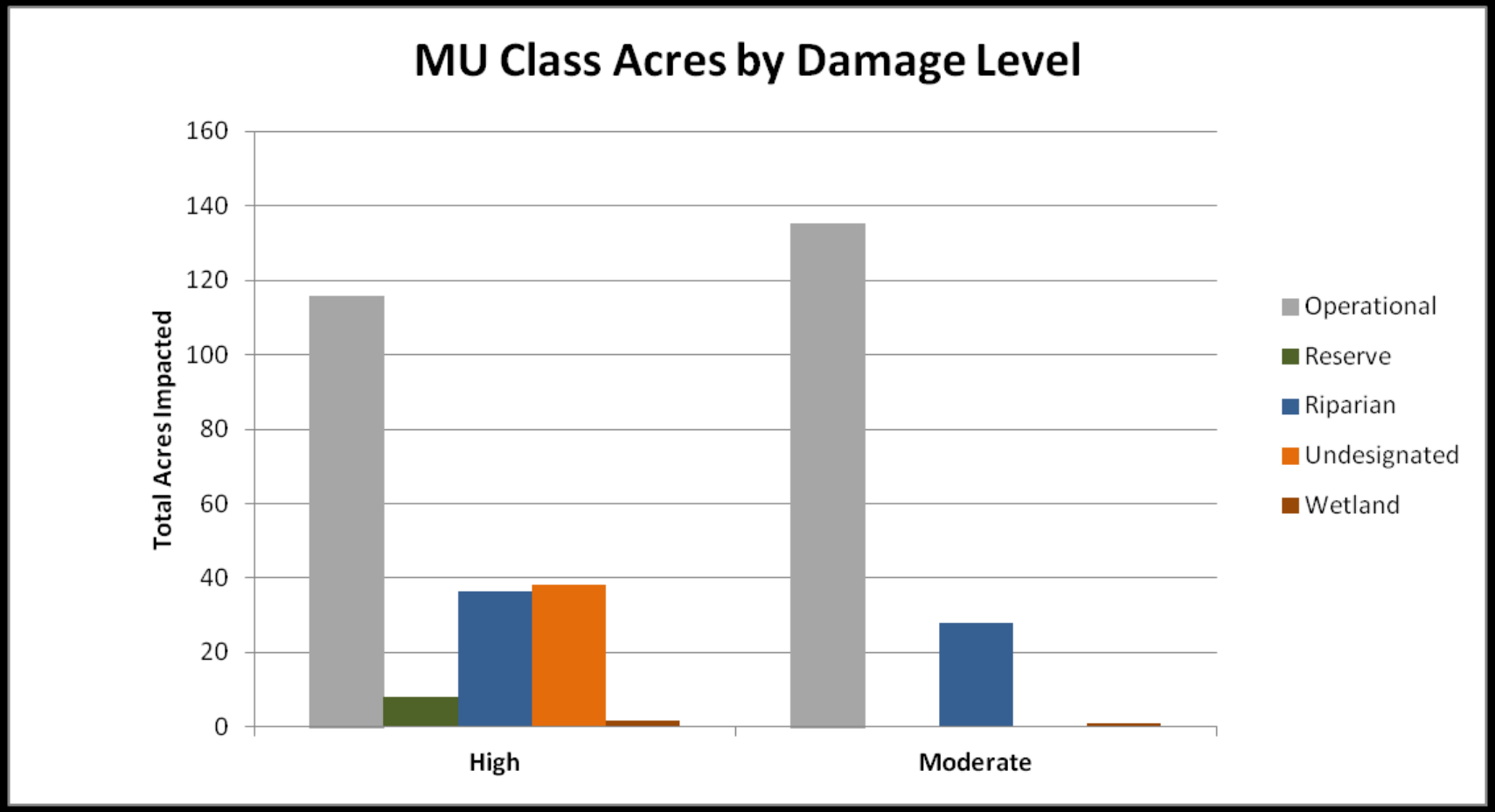

BSP SFMA Wind Storm 2013Jul19
Wind Thrown Tree Fall Azimuths
N
Legend
WindDamagePathLine
DamageLevel
High
Moderate
Overview of Area
WindDamagePathLine_PointsToL
Tree Azi Measurements
Tree Azi
Avg Sample Azi
TN Azi 138
Murphy Brook
BRAYLEY RIDGE
LONG PINE
MURPHY BROOK
340
20
30
40
46
358
50
80
8
24
49
14
70
131
20
38
30
60
110
Azimuths were measured from Stump to Tip as true north values.
Overall storm track is approximately 138 degress traveling from NW to SE.
0 250 500 1,000
Feet


T North Aprx
Murphy Brk
Long Pine Rd
Murphy Brk Rd

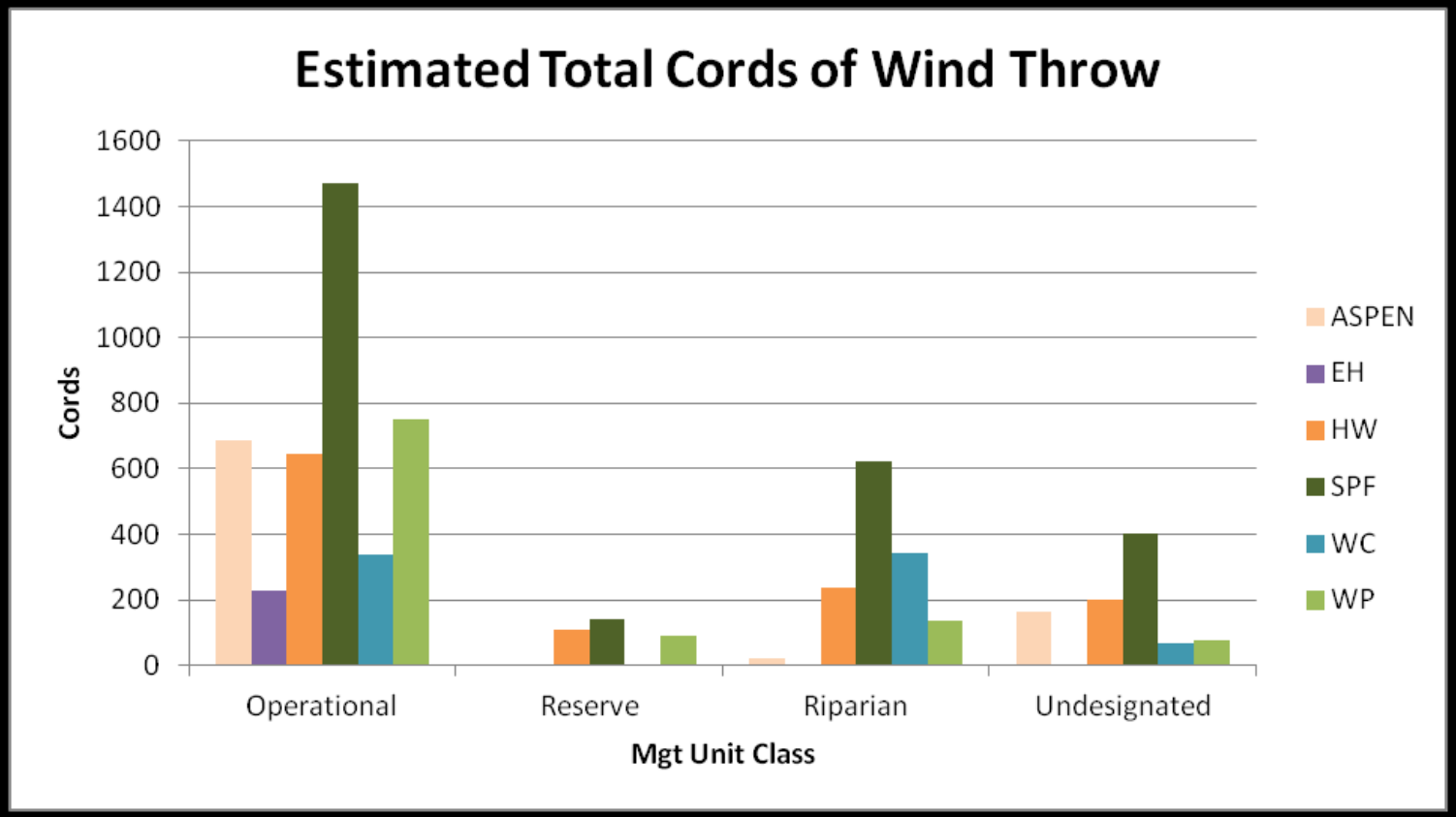

T North Aprx
Murphy Brook
Acorn Rd
Webster Stream


P 3


BSP SFMA Wind Storm 2013Jul19
Wind Thrown Tree Fall Azimuths
Legend
WindDamagePathLine
DamageLevel
High
Moderate
Overview of Area
WindDamagePathLine_PointsToL
Tree Azi Measurements
Tree Azi
Avg Sample Azi
Murphy Brook
Murphy Brook
TN Azi 138
Webster Brook
ACORN
62
29
63
70
88
62
70
60
74
66
87
85
135
122
126
125
128
143
130
140
147
139
134
114
130
116
Azimuths were measured from Stump to Tip as true north values.
Overall storm track is approximately 138 degress traveling from NW to SE.
0
250
500
1,000
Feet
N



ImpactedGISAc	Column La					
Row Labels	**Operational**	**Reserve**	**Riparian**	**Undesignated**	**Wetland**	**Grand Total**
High	116	8	36	38	2	200
Moderate	135		28		1	164
Grand Total	**251**	**8**	**64**	**38**	**3**	**365**



Sum of TotalCordmu_D	Colu						
Row Labels	**ASPEN**	**EH**	**HW**	**SPF**	**WC**	**WP**	**Grand Total**
Operational	686	228	643	1471	337	752	**4116**
Reserve			107	141		89	**338**
Riparian	23		239	621	344	137	**1363**
Undesignated	162		198	404	68	76	**908**
Grand Total	**870**	**228**	**1187**	**2637**	**749**	**1054**	**6726**

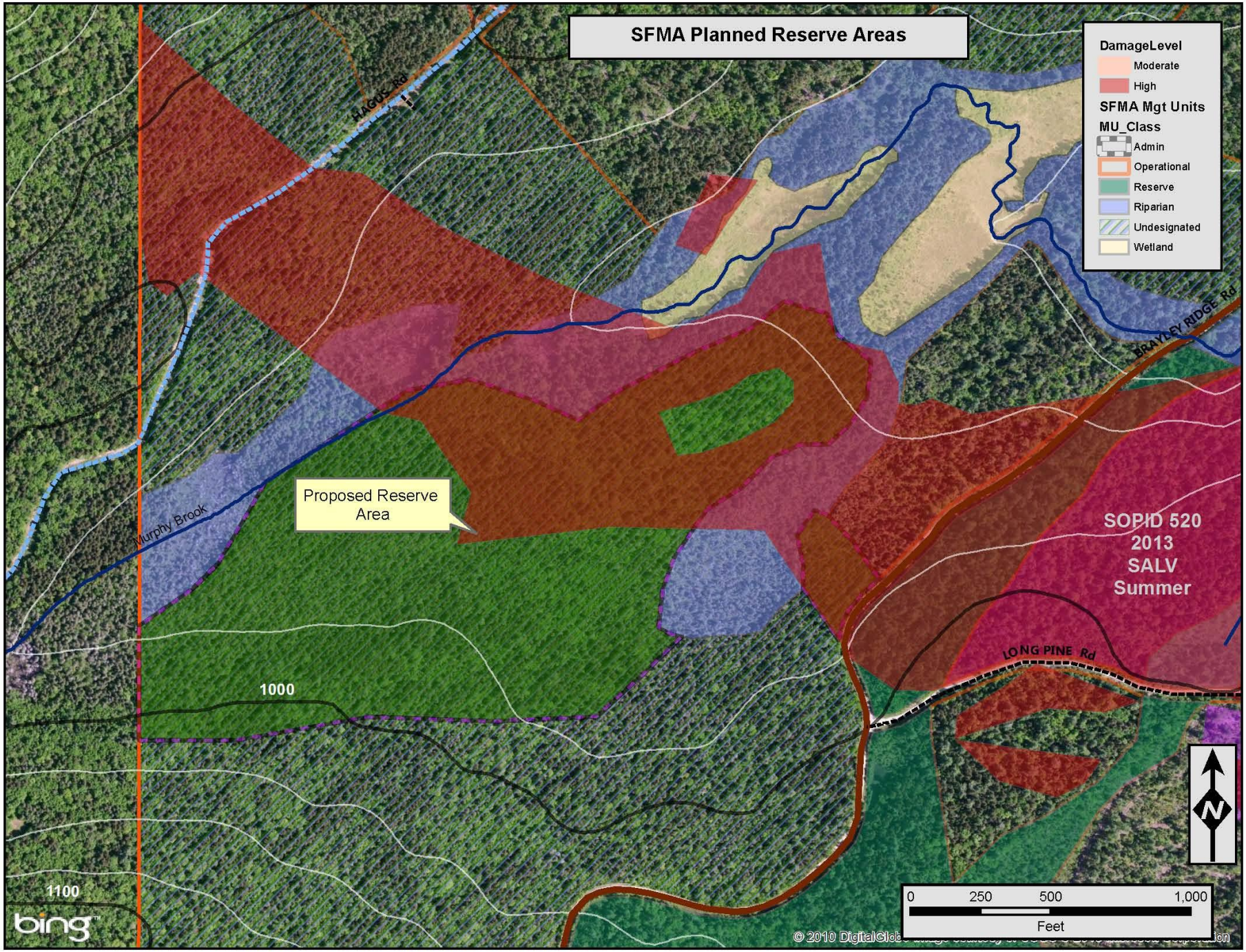

SFMA Planned Reserve Areas
DamageLevel
Moderate
High
SFMA Mgt Units
MU_Class
Admin
Operational
Reserve
Riparian
Undesignated
Wetland
HAGUE Rd
BRADLEY RIDGE Rd
Murphy Brook
Proposed Reserve Area
SOPID 520
2013
SALV
Summer
LONG PINE Rd
1000
1100
N
0
250
500
1,000
Feet
bing


Photo by: Jim Hamlin


P 1

Post Event Monitoring Activities

Key Questions to Answer About Post Disturbance Monitoring:

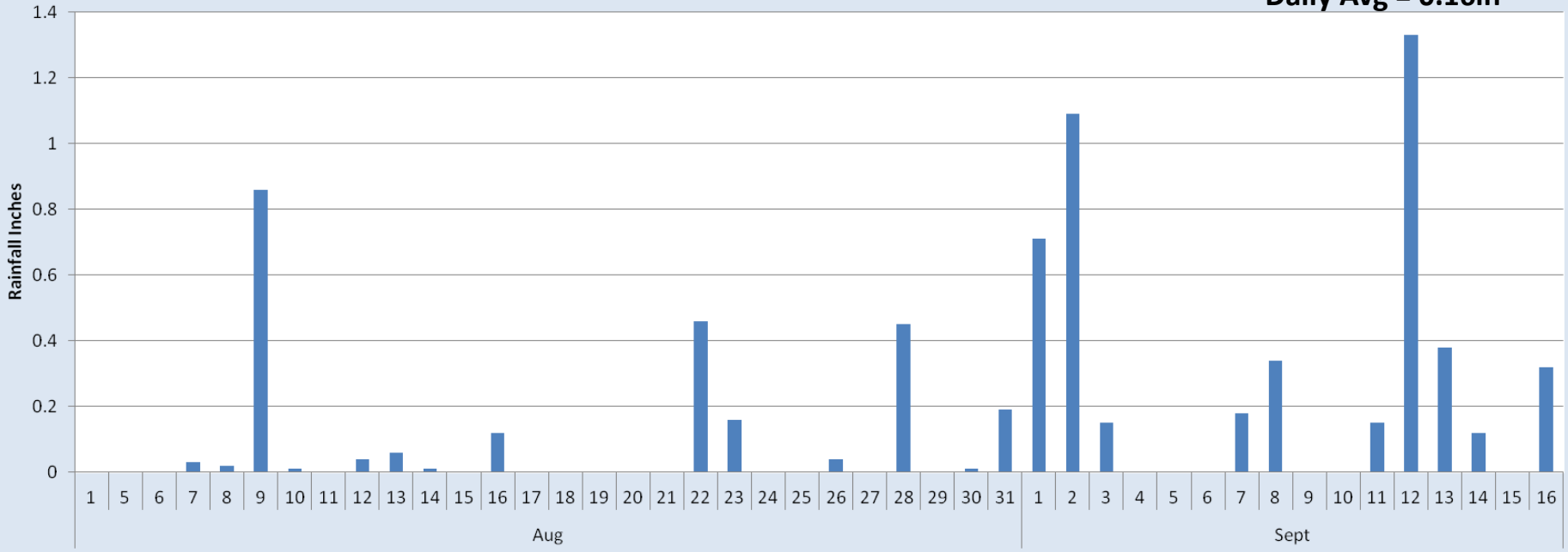
- What is the goal of monitoring system (research or demonstration)?
- How to distribute plots (systematic or random)?
- Plot sizes and transect type?
- What data to collect?
- Include moderate damage areas in plots?
- Photo plots (how many, where)?
- How to best utilize/integrate with existing CFI network?

Proposed Monitoring Plot Design			
	Salvaged	No Salvage	Control
Softwood	3	3	3
Mixedwood	3	3	3

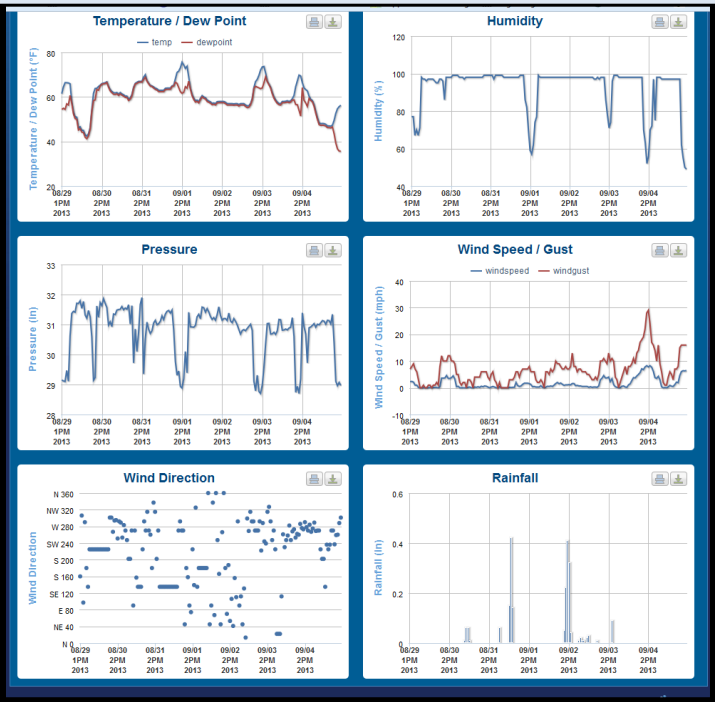
New Plots	12
Existing Plots	6
Total Plots Utilized	18

Daily Rainfall SFMA Hemlock Camps WS

Total Rainfall: 7.23in
Daily Avg = 0.16in



MFS Staff conducting station installation



Protocols for Harvest Following Natural Disturbance

General Protocols

- The disturbance threshold necessary to trigger an unscheduled harvest will be determined by operational considerations such as economics and adjacency. At a minimum, the Resource Manager and SFMA staff will evaluate disturbed areas to determine if harvest entry is warranted.

- As with SFMA management generally, silvicultural considerations will guide the development of operational specifications for any harvest after disturbance. *(Note: this was previously connected to bullet statement above.)*

- Excepting rare and unanticipated situations, all harvesting will be carried out with the same considerations of site sensitivity and regeneration protection, as are all SFMA harvests. Maintaining our FSC certification will be an integral part of any post-disturbance operations, just as it is on a regular basis. *(Note: this was previously the second para.)*

- In the event that regeneration is significantly damaged (or eliminated to below contemporary MFS standards) all available means of regeneration will be considered. Natural regeneration from residual overstory trees, suckering or coppicing, will be preferred. If it is deemed that the overstory will be unproductive or that any given site is in danger of colonization by non-tree species, planting will be considered. Artificial regeneration will be with native species and, whenever possible, with seedlings of local provenance. Establishing reasonable species diversity in the developing stand, including existing regeneration and a reasonable expectation of ensuing natural regeneration, will be considered.

- In the event that a disturbance is widespread enough to warrant post-disturbance harvest priorities, they will be developed based on the following considerations:
    - areas where responsive action may prevent additional damage to the Park or loss of timber or other resources
    - highest quality / most valuable timber
    - areas within the timber classification
    - areas of highest damage intensity, accessibility or harvest productivity.

Retention Thresholds

The following matrices outline *minimum* retention targets based on management classification and disturbance agent. Areas will not be entered automatically after every natural disturbance. Should a post-disturbance harvest take place, these targets are intended to maintain certain attributes that will contribute to the structural - and hence ecological – diversity of the developing stand.

MANAGEMENT DESIGNATION: TIMBER

DISTURBANCE TYPE: *WIND*

Management focus: long-term timber management

These areas are under active timber management. Retention targets for standing dead and down dead stems are identified as part of the management process.

DISTURBANCE SCALE	DESCRIPTION	HARVEST ENTRY?	MAXIMUM VOLUME HARVESTED	MINIMUM VOLUME RETAINED	EQUIPMENT	SEASONAL RESTRICTIONS
LIGHT	10% or less merchantable BA damaged	YES	standing: 100% of non-recoverable down: 100%	standing: 4 TPA w/ 2 TPA > 10" diameter down: 0% salvage volume	hand crew or processor - all wood forwarded, exc. possibly during winter months	Landform dependent
MODERATE	11-25% merchantable BA damaged	YES	standing:100% of non-recoverable down: 70%	standing: 4 TPA w/ 2 TPA > 10" diameter down: 0% salvage volume	hand crew or processor - all wood forwarded, exc. possibly during winter months	Landform dependent
HEAVY	25 - 50% merchantable BA damaged	YES	standing: 95% of non-recoverable down: 95%	standing: 4 TPA > 12" standing dead down: 5% orig stocking (>12")	hand crew or processor - all wood forwarded, exc. possibly during winter months	Landform dependent
SEVERE	> 50% merchantable BA damaged	YES	standing: 95% of non-recoverable down: 95%	standing: 4 TPA > 12" standing dead down: 5% orig stocking (>12")	hand crew or processor - all wood forwarded, exc. possibly during winter months	Landform dependent

Damage criteria: tipped >45 degrees;
broken > 10% from top
bole split or cracked
obvious root-rack
crown > 50% dead

These areas are under active timber management. Targets for retention of dead standing and dead down stems are identified as part of the management process.

Reference: Biodiversity in the Forests of Maine - Guidelines for Land Management, Foss, Flatebo, Pelletier, p 31

MANAGEMENT DESIGNATION: RIPARIAN

DISTURBANCE TYPE: *WIND*

Management focus: protection of water quality, streambank and streamside structure, wildlife corridors, late successional habitat

These areas border lakes, ponds, streams, bogs, and swamps within the SFMA. SFMA management does not include these areas in timber harvest calculations, but salvage harvests are appropriate when such activity does not impede the development of multi-layered forest structure.

DISTURBANCE SCALE	DESCRIPTION	HARVEST ENTRY?	MINIMUM RETENTION TARGETs	EQUIPMENT	SEASONAL RESTRICTIONS
LIGHT	10% or less merchantable BA damaged	Situation dependent	standing: 100% down: 4 TPA > 10" dbh	hand crew or processor - all wood forwarded, exc. possibly during winter months	Landform dependent
MODERATE	11-25% merchantable BA damaged	Situation dependent	standing: 100% down: 6 TPA > 10" dbh	hand crew or processor - all wood forwarded, exc. possibly during winter months	Landform dependent
HEAVY	25 - 50% merchantable BA damaged	YES	standing: 100% down: 6 TPA > 10" dbh	hand crew or processor - all wood forwarded, exc. possibly during winter months	Landform dependent
SEVERE	> 50% merchantable BA damaged	YES	standing: 100% down: 6 TPA > 10" dbh	hand crew or processor - all wood forwarded, exc. possibly during winter months	Landform dependent

Damage criteria: tipped >45 degrees;
broken > 10% from top
bole split or cracked
obvious root-rack
crown >50% dead

♣ Except as needed for trails and access.

MANAGEMENT DESIGNATION: ECOLOGICAL RESERVE

DISTURBANCE TYPE: *WIND*

Management focus: retain landscape or watershed scale area with intact ecosystem(s).

DISTURBANCE SCALE	DESCRIPTION	HARVEST ENTRY?	MAXIMUM VOLUME HARVESTED	MINIMUM VOLUME RETAINED	EQUIPMENT	SEASONAL RESTRICTIONS
LIGHT	10% or less merchantable BA damaged	N0	standing: 0 down: 0	standing: 100 down: 100		
MODERATE	11-25% merchantable BA damaged	N0	standing: 0 down: 0	standing: 100 down: 100		
HEAVY	25 - 50% merchantable BA damaged	N0	standing: 0 down: 0	standing: 100 down: 100		
SEVERE	> 50% merchantable BA damaged	NO	standing: 0% down: 0	standing: 100 down: 100		

Damage criteria: : tipped >45 degrees;
broken > 10% from top
bole split or cracked
obvious root-rack

These areas represent features, sites, structures that collectively form distinctive and/or rare ecosystems.

SFMA Prescription Descriptions for Silvicultural Operations in 2013.
***See MU data table for detailed statistics about SOPID/MUID.**

Operation Sequence: 3
SOPID: 520 MUID 4002 Season: Summer Treatment Code: SALV
Salvage Treatment post wind damage (harvest of downed trees after wind storm).
Objective: Capture merchantable timber that has been downed by a severe wind event.

Treatment Details:

MU History: Softwood dominated stand of spruce, fir, and white pine. MU was treated in 1989 with SW establishment treatment and then a SWEXTD in winter 2013.

Silviculture: Following major wind storm significant timber, in excess of 80% of the original stocking, has been blow down and is to be harvested. Current stand condition mirrors that of a SWOSR treatment except that the overstory to be harvested is on the ground rather than overhead.
Harvest should target: **1.** Trees with merchantable volume that have been downed by the heavy winds.
****Protect** advance regeneration where present.
Next commercial entry likely in 30-50 years.

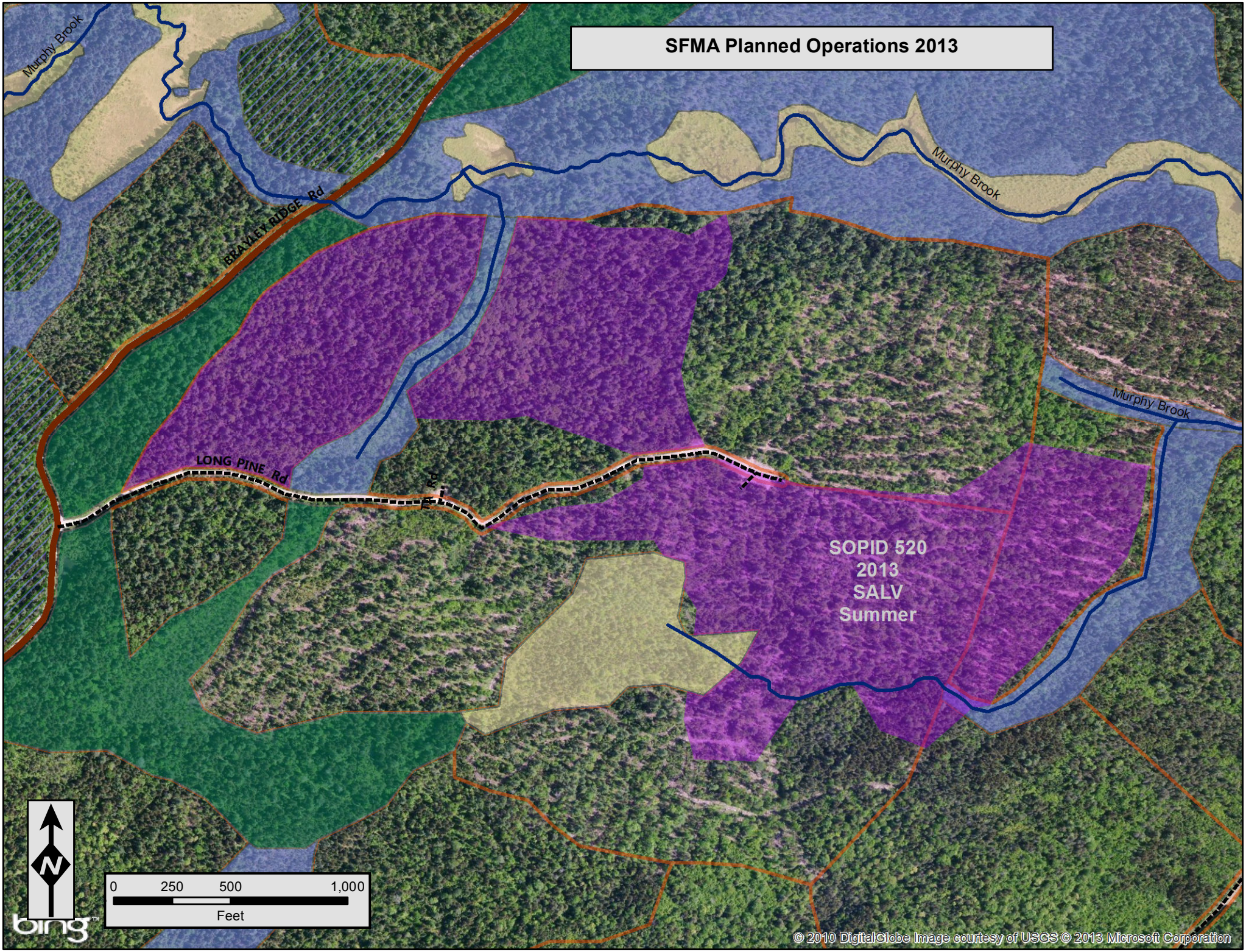
***Special Considerations:** MU has flowing stream in center marked as reserve area. A hardwood pocket of sugar maple exists to the east of this stream this area was blown down and should be salvaged with care to protect sensitive soil conditions.

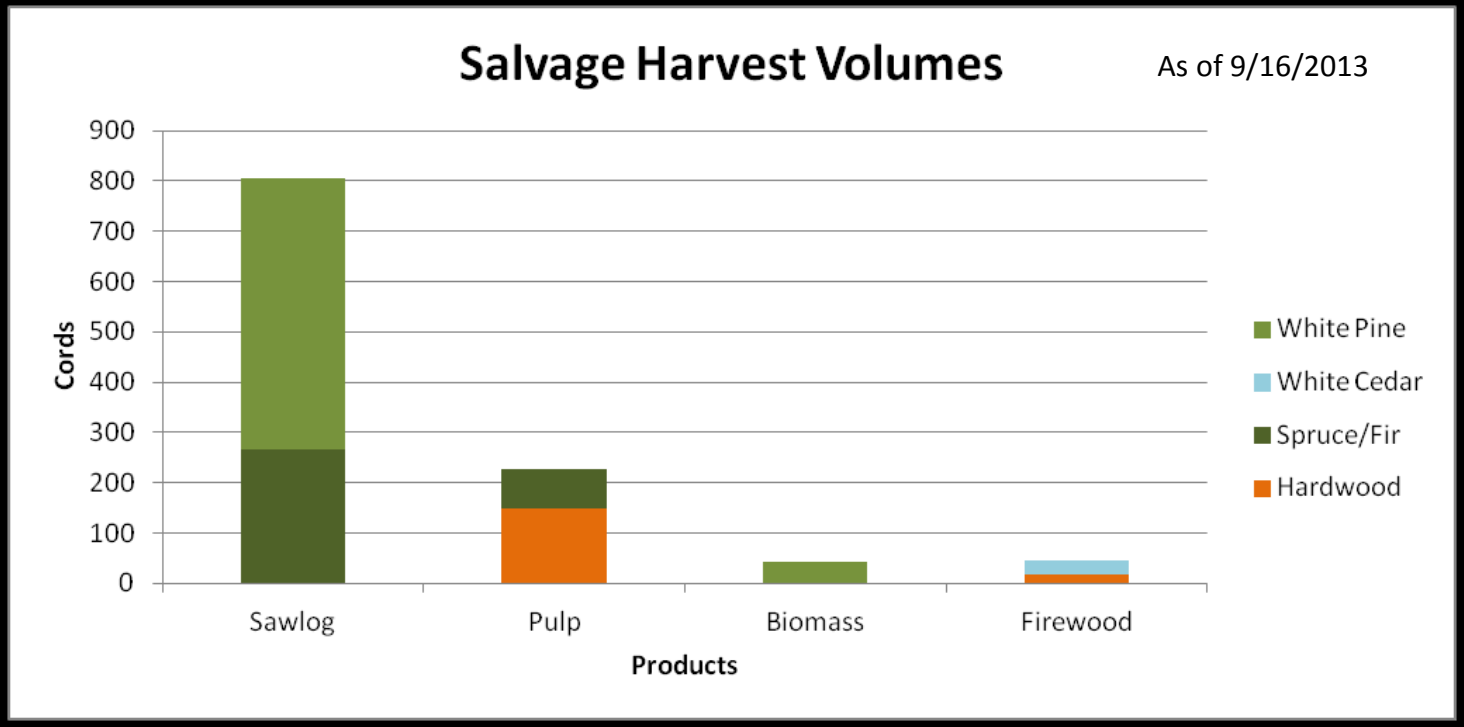
Layout: MU boundaries have been flagged in orange or in **BLUE** along RMZ, these ribbon are likely hard to find, using the GPS lines will suffice for line delineation in most cases. Operator should use best judgment when encountering wet areas that have not been flagged to avoid rutting.
Harvest Trails: Trails should be spaced at maximum distance to permit equipment reaches covering entire MU, ideal spacing is **60ft or greater**. *Trails have **not** been flagged in advance. Travel on existing harvest trails where feasible and obvious, otherwise establish new trails as appropriate to minimize residual stand damage and area in trails.

Retention:

Given the blow down situation, **ALL STANDING** trees **dead or alive** should retained. Retention trees will provide: wildlife habitat, biodiversity structure, and crop tree seed sources into the future. General goal is to retain approximately **5 live** trees per acre (200ft X 200ft) of a range of species larger than 12" with 1 tree larger than 18". White pine, hemlock, and hardwood greater than 24" make good retention candidates. For biodiversity and wildlife habitat reasons **retain all standing dead trees** where **operator safety** allows.

***At a minimum retain large down wood amounts equal to 3 logs per acre greater than 12 inches in diameter and 6 feet or greater in length. This will likely happen by default as some wood will not be salvageable, but if not operator should attempt to meet this goal by leaving wood on the ground.**

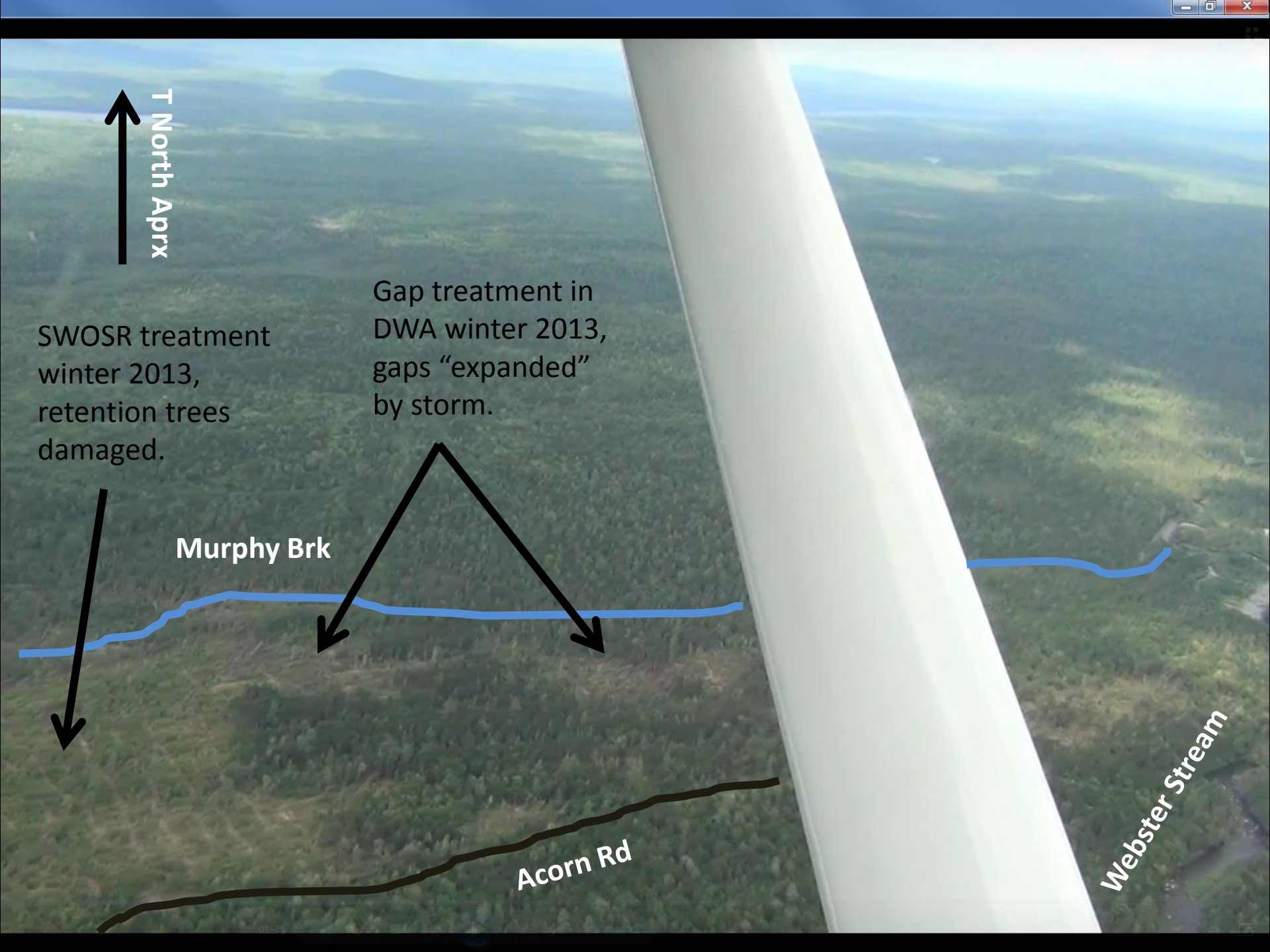

SFMA Planned Operations 2013
Murphy Brook
Murphy Brook
Murphy Brook
BRAVLEY RIDGE Rd
LONG PINE Rd
Rd
SOPID 520
2013
SALV
Summer
N
0 250 500 1,000
Feet
bing
© 2010 DigitalGlobe Image courtesy of USGS © 2013 Microsoft Corporation

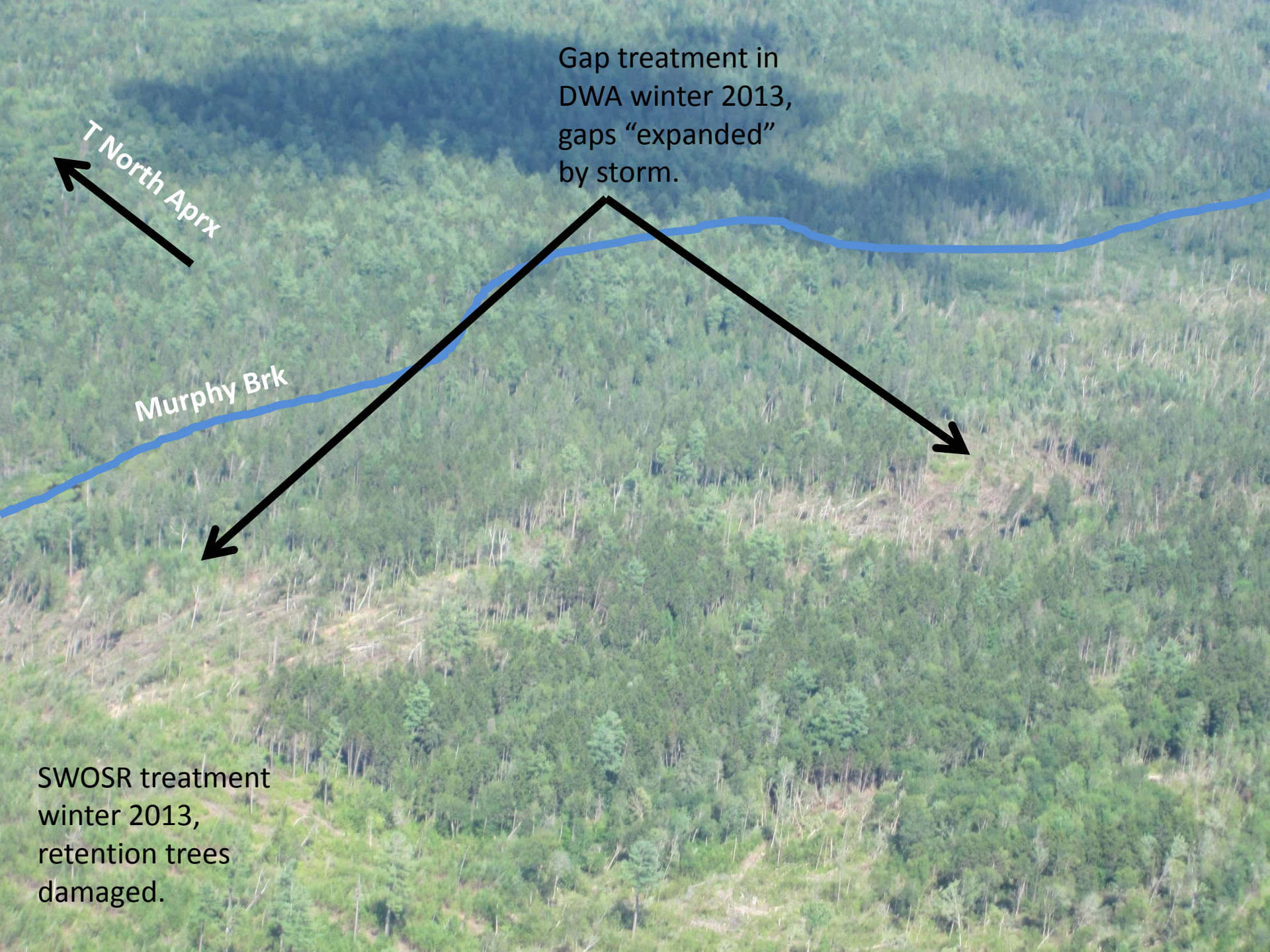


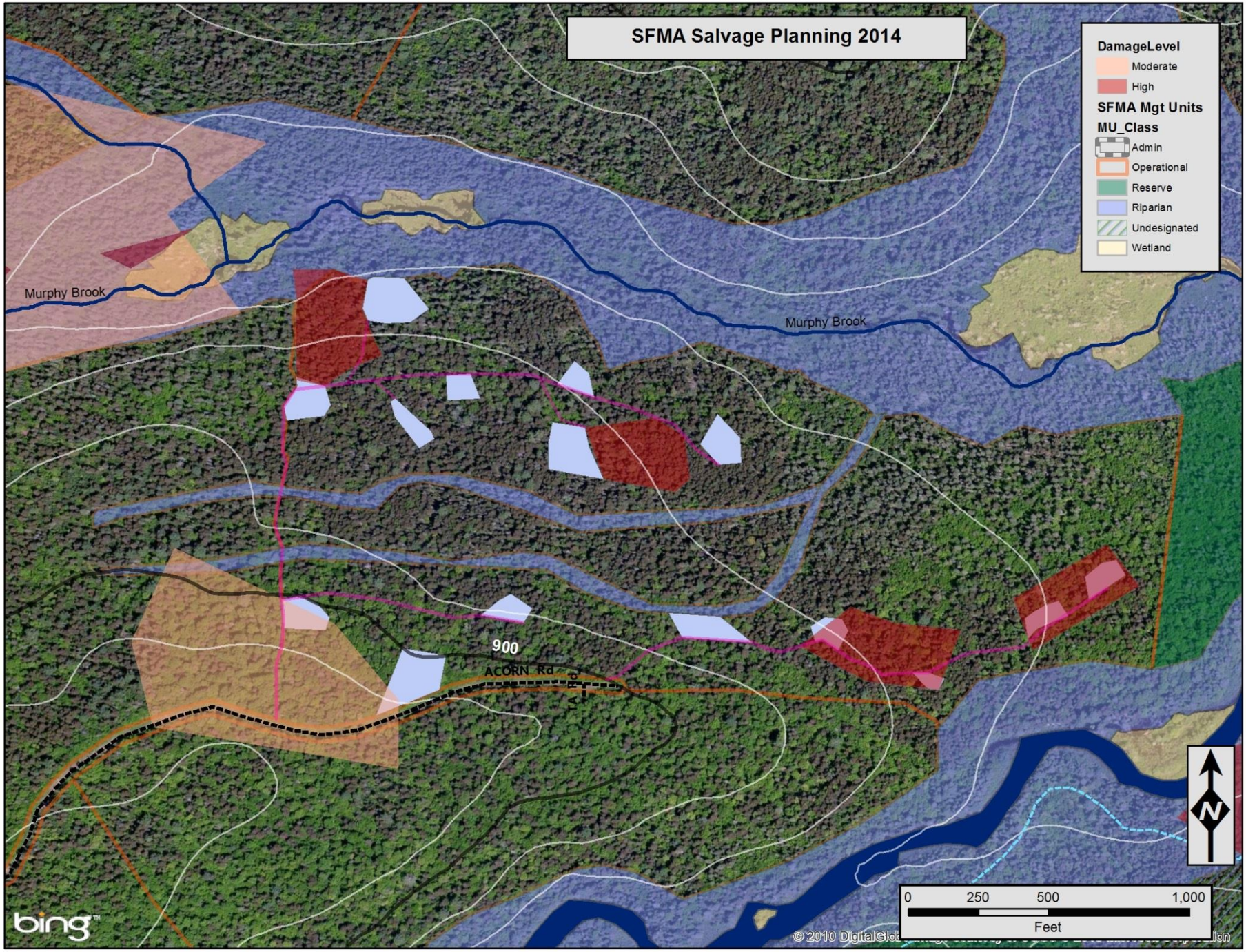
Sum of Cords	Column L				
Row Labels	Hardwood	Spruce/Fir	White Cedar	White Pine	Grand Total
Sawlog		267		540	806
Pulp	148	79			227
Biomass				44	44
Firewood	17		30		47
Grand Total	**165**	**345**	**30**	**583**	**1124**

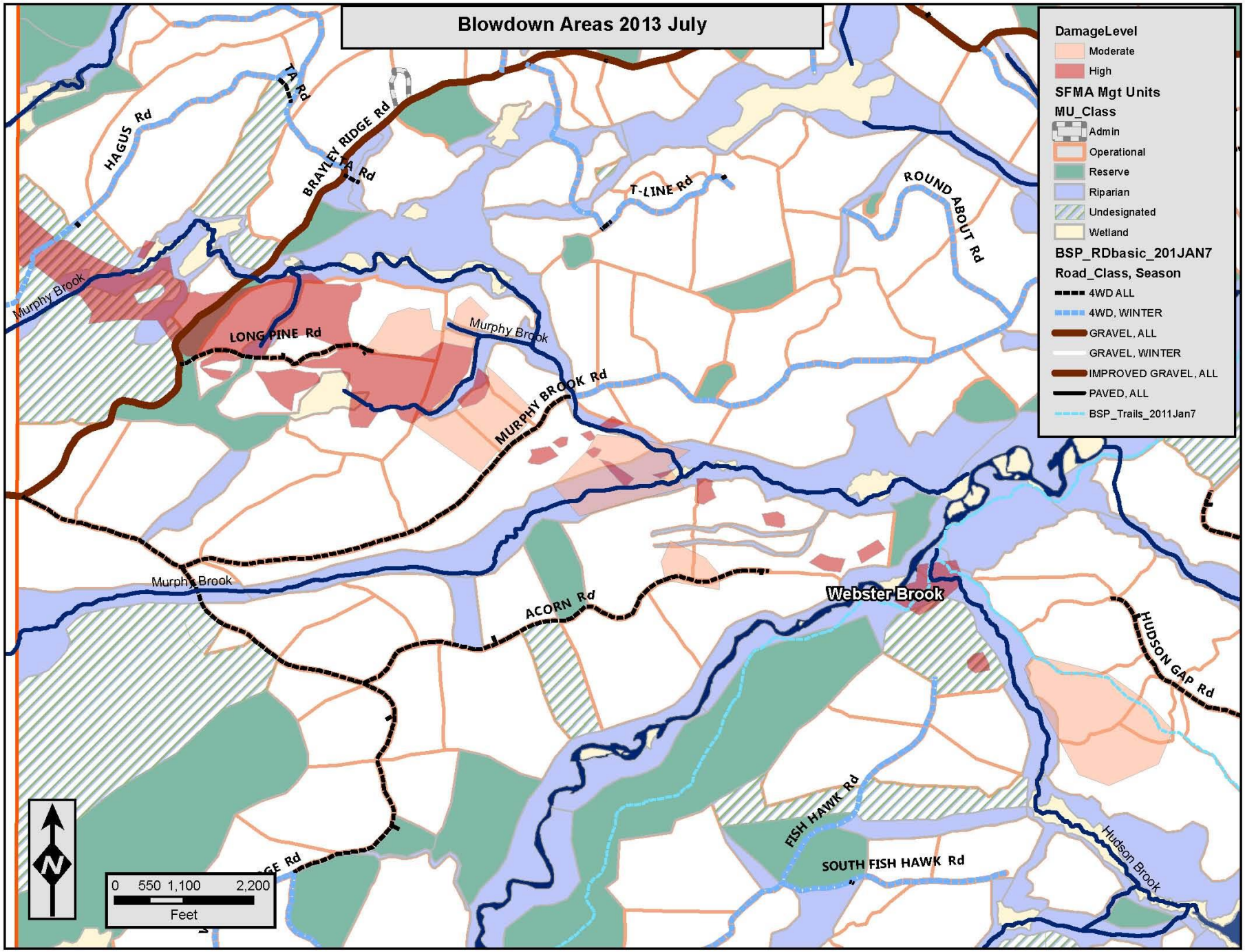
Estimated Volume in Harvest Unit

Sum of TotalCordmu_D	Colum					
Row Labels	ASPEN	HW	SPF	WC	WP	Grand Total
Operational	12	121	236	42	437	**848**
Grand Total	**12**	**121**	**236**	**42**	**437**	**848**


T North Aprx
SWOSR treatment winter 2013, retention trees damaged.
Gap treatment in DWA winter 2013, gaps “expanded” by storm.
Murphy Brk
Acorn Rd
Webster Stream


Gap treatment in DWA winter 2013, gaps “expanded” by storm.
T North Aprx
Murphy Brk
SWOSR treatment winter 2013, retention trees damaged.


SFMA Salvage Planning 2014
DamageLevel
Moderate
High
SFMA Mgt Units
MU_Class
Admin
Operational
Reserve
Riparian
Undesignated
Wetland
Murphy Brook
Murphy Brook
900
ACORN Rd
TA Rd
N
0
250
500
1,000
Feet
bing
© 2010 DigitalGlo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High
SFMA Mgt Units
MU_Class
Admin
Operational
Reserve
Riparian
Undesignated
Wetland
BSP_RDbasic_201JAN7
Road_Class, Season
4WD ALL
4WD, WINTER
GRAVEL, ALL
GRAVEL, WINTER
IMPROVED GRAVEL, ALL
PAVED, ALL
BSP_Trails_2011Jan7
HAGUS Rd
BRAYLEY RIDGE Rd
T-LINE Rd
ROUND ABOUT Rd
Murphy Brook
LONG PINE Rd
MURPHY BROOK Rd
ACORN Rd
Webster Brook
HUDSON GAP Rd
FISH HAWK Rd
SOUTH FISH HAWK Rd
Hudson Brook
N
0 550 1,100 2,200
Feet