

Monitoring Questions

(1) Are Boundary Waters Canoe Area Wilderness (BWCAW) goals and objectives being met? (2) Are standards for indicators being exceeded? (3) Are standards and guidelines for each natural resource area, i.e.: soils, water, air quality, cultural resources, wildlife and social resources being met?

Monitoring Conducted

BWCAW Management Areas

To achieve management objectives for the BWCAW involving the preservation of the wilderness character, the wilderness has been divided into four management areas. The desired future conditions of both the physical and the social aspects of the resources differ slightly between management areas. This establishes a framework for managers that allow them to provide a range of wilderness opportunities for the public while maintaining the overall goals of preserving the natural ecosystem and protecting the integrity of the wilderness for future generations.

The four wilderness management areas and desired conditions are:

Pristine – The area provides a non-motorized pristine wilderness experience where human presence is almost nonexistent. Trails, portages, and campsites are not constructed or maintained. Leave no trace camping and travel techniques are stressed. Visitors will experience a high degree of freedom, challenge, and risk. Natural forces affect the ecosystem, ecological processes are not measurably affected by visitors, and impacts to the environment by humans are minimal. This area should provide outstanding opportunities for isolation, solitude, high degree of risk, challenge, self-reliance, and rarely encountering other visitors.

Primitive – The area provides visitors with a primitive non-motorized wilderness experience in an unmodified environment. These areas are generally off main travel routes for those that are seeking solitude and challenge, but do not wish to or are not capable of traveling to the pristine areas. Natural forces affect the ecosystem, ecological processes are slightly affected by visitors, and impacts to the environment are moderate where camping occurs and along portages. Impacts are apparent from year to year, and apparent to a moderate number of visitors. This area should provide outstanding opportunities for isolation and solitude, be relatively free from sight and sound of humans, present a high degree of risk, challenge, and self-reliance, and have a low frequency of encountering others.

Semi-Primitive Non-motorized - The area provides visitors with a semi-primitive non-motorized wilderness experience in a predominately unmodified environment. These areas are generally on main travel routes, where a visitor expects to encounter others more frequently, and solitude is not a high priority. A lesser degree of challenge, risk, and freedom is provided here. Natural forces affect the ecosystem, and natural conditions are moderately affected by visitors, and impacts to the environment are moderate where camping occurs and along portages. Impacts from visitors are noticeable and impacts persist from year to year to most visitors. Opportunities for isolation and solitude are moderate to low. The frequency of encountering others is moderate. Challenge and risk for this area are moderate to low.

Semi-Primitive Motorized - The area provides visitors with a semi-primitive motorized wilderness experience in a slightly modified natural environment. Motor lakes were designated in the 1978 BWCAW legislation. Visitors should expect to see a high number of boats with motors. The lakes are generally on the periphery of the Wilderness. Visitors will experience considerably less solitude, freedom and challenge. Natural forces affect the ecosystem, and natural conditions may be substantially affected by

visitors. Impacts to the environment often persist from year to year and are readily apparent to most visitors. Opportunities for isolation and solitude are low. The frequency of encountering others is moderate to high while traveling and moderate on campsites. Motorized watercrafts are permitted and will be noticeable along major travel routes and portages, and near major entry points. Challenge and risk for this area are moderate to low.

Monitoring Activities

The following monitoring activities were completed to assess the achievement of the desired conditions for the four wilderness management areas:

A. Monitoring questions for social conditions and land stewardship

1. Visitor Use
 - i. Use levels
 - ii. Travel Patterns
 - iii. Use Levels by time of year
 - iv. Average Party Size
 - v. Origin of Party
2. Compliance with Rules, Regulations reserving/issuing permits
 - vi. Cancellations
 - vii. Party Leader Names
 - viii. Alternates
 - ix. Entrance Date
 - x. Entrance Point
 - xi. Mode of Travel
3. No Show Rate for overnight and day use motor permits
4. Social Encounters – levels of crowding

B. Monitoring for campsite conditions

1. Shoreline disturbance
 - i. Compare campsite shoreline to adjacent shoreline
 - ii. Measure in lineal feet the amount of shoreline impacted by recreational use
 - iii. Measure all shoreline areas for each campsite
2. Campsite area
 - iv. Measure in square feet the total area impacted by recreational use
 - v. Define site perimeter by determining the point at which the density and species composition of the vegetation become equal to that of the surrounding area
 - vi. Exclude the islands of undisturbed vegetation and ledge rock within the campsite area
 - vii. Measure and include areas beyond the original perimeter such as satellite tent pad and firewood cutting areas
 - viii. Record unusual conditions that can be related to historical uses
3. Non-vegetated area
 - ix. Measure the campsite area that is devoid of ground vegetation due to the use of camp sites
 - x. Compare vegetative conditions on the campsite with natural conditions adjacent to the site
 - xi. Record the total area (s)
4. Exposed mineral soil
 - xii. Measure in square feet the non-vegetated areas where soil is bare, or with little or no litter cover
 - xiii. Record the total area (s)
5. Tree damage
 - xiv. Count the trees with a DBH of 2” or larger that have been damaged by recreation impacts

- xv. Record total number of and damaged trees within the campsite and associated areas
- xvi. Note type of damage
- 6. Root exposure
 - i. Count the trees with exposed roots resulting from recreation impact
 - ii. Compare to off-site non-impacted tree roots
 - iii. Record the number of trees with exposed roots
- 7. Trails
 - iv. Count the access and social trails leading to or away from the campsite
 - v. Record the number of trails
- 8. Erosion
 - vi. Monitoring categories levels:
 - 1. Campsites that have no erosion at the shoreline and negligible erosion on the campsite and access trails
 - 2. Campsites with erosion either on the campsite, access trails, or at the shoreline resulting in the loss of soils which is not pronounced
 - 3. Erosion which has become pronounced, resulting in access trails becoming gullied; the exposure of lighter colored subsurface soils or gravel on the site; or obvious loss of soil at the landing or along the shoreline
 - vii. Assign the applicable level (s)

Note: Monitoring may include Rapid Campsite Assessments and/or Monitoring for Maintenance needs. Limits for Acceptable Change monitoring data gathering techniques are currently not used unless there are campsite rehabilitation requirements changing the campsite condition due to reasons other than recreational use.

C. Monitoring for the 10-Year Wilderness Stewardship Challenge

As the Forest Service began to evaluate the stewardship efforts for wilderness on a national basis, it was found that in 2003, only 18 percent of the 406 wildernesses under Forest Service management were managed to a minimum stewardship level. That is why the Chief of the Forest Service adopted the “10-Year Wilderness Stewardship Challenge” (10YWSC) recommended by the Chief’s Wilderness Advisory Group. By adopting the 10YWSC, the Forest Service is renewing its commitment to wilderness by pledging to bring all 406 wildernesses administered up to a minimum level of stewardship within 10 years – as the 50th Anniversary of the Wilderness Act in 2014 is celebrated. This is an ambitious goal, which will require an interdisciplinary approach. Wilderness encompasses a myriad of resources that are integral to its whole, including recreation, heritage, air, water, soil, wildlife, fish, range, and fire.

A wilderness is considered to be managed to a minimum stewardship level when achieving a cumulative accomplishment level score of 60 or greater on the following 10 elements:

- (1) Direction exists in the Forest Plan that addresses the natural role of fire in wilderness and considers the full range of management responses.
- (2) The wilderness was successfully treated for non-native, invasive plants.
- (3) Monitoring of wilderness air quality values is conducted and a baseline is established for the wilderness.
- (4) Priority actions identified in a wilderness education plan are implemented.
- (5) The wilderness has adequate direction, monitoring, and management programs to protect opportunities for solitude or primitive and unconfined recreation.
- (6) The wilderness has a completed recreation site inventory.
- (7) Outfitter & guide operating plans exist for wilderness outfitters to model appropriate wilderness practices and incorporate appreciation for wilderness values in their interaction with clients and others.

- (8) The wilderness has adequate direction in the Forest Plan to prevent degradation of the wilderness resource.
- (9) The priority information needs for the wilderness have been addressed through field data collection, storage and analysis.
- (10) The wilderness has a baseline workforce in place.

Evaluations and Conclusions

A. Monitoring for social conditions and land stewardship.

Summaries for public contacts (see Table 1), training, and presentations (see Table 3) that portray the extent to which the SNF has reached out internally and externally to communicate messages that foster favorable land stewardship within the BWCAW are displayed below. Table 2 (Reservation Lottery) outlines visitor use patterns that help the SNF develop strategies to effectively communicate to the public. The following information does not evaluate how well 2006 accomplishments have achieved specific Forest Plan Decade 1 objectives or projected conditions but rather how well management has complied with the current Wilderness Management Plan which was affirmed through the 2004 Forest Plan.

Table 1. Public Contacts							
Public Contacts	LaCroix	Kawishiwi	Tofte & Isabella	Gunflint	Laurentian	Headquarters	Totals
Field Contacts	416	1,591	683	482	0	0	3,172
BWCAW Permits Issued at a F.S. Facility	550	6,312	2,885	3,104	182	489	13,522
BWCAW Video User Viewers	2,010	22,534	16,895	13,876	694	1,964	47,796

Table 2. BWCAW Reservation Lottery. 2003-2006 Statistics				
Total Number of Applications:	2003	2004	2005	2006
	7,667	7,087	7,490	8,132
Successful Applicants				
Day Use Motor	2,896	2,487	2,460	2,481
Day Use Motor – Canada	17	17	15	28
Overnight Motor	779	766	782	741
Overnight Paddle	3,407	3,221	3,085	3,300
Overnight Hiker	4	3	2	0
Total:	7,103	6,494	6,344	6,550
Denied Applicants				
Day Use Motor	470	492	1,063	1,455
Day Use Motor – Canada	4	6	8	9
Overnight Motor	54	52	52	90
Overnight Paddle	36	43	23	28
Total:	564	593	1,146	1,582
Method of Application				
Website	80%	84%	94%	95%
Mail	16%	14%	4%	3%
FAX	4%	2%	2%	2%
Note: (a) 98% of '06 lottery successful applicants received their 1 st choice. (b) 2% of '06 lottery successful applicants received alternate choices.				

Table 3. Training/Presentations/Surveys/Projects Necessary to Meet Land Stewardship Goals					
Item	LaCroix	Kawishiwi	Isabella & Tofte	Gunflint	Total
Training/Refreshers # of Employees					
Level II LE Refresher	4	12	15	7	38
Cross Cut Saw Refresher	7	54 volunteers	5	6	29
CPR/First Aid	10	23	5	7	45
BWCAW Permit Issuance	0	8	5	6	19
Public Presentations					
Moose Hunter Orientation	1	0	1	2	1
Leave No Trace Program (# of students)	757		2,000		2,757
Fire Safety Presentations		490 students, 28 classes			
Volunteer Group Hours		17,185 hours	3,840 hrs for EZ		21,025
Surveys/Inventories					
Heritage *surveys campsites & portages	6	11	10	10	37
* Monitoring both	13	21	15	16	65
* Latrine review	4	13	7	4	28
NNIS Weed Inventories	0	6.1 acres	4.69 for east zone		10.79 ac
Fire Program Support: 2 wildfires, public safety-wilderness res. advisors	0	6 rangers	5 rangers, 78 days	0	11 rangers
Repaired Bridges: 1. Snake Creek bridge 2. Perent	0	0	1 repaired, 2 removed	0	3
Winter Patrol Days	0	7	7	32	46
Law Enforcement – Forest-wide	*Warning Notice 14, Incident Report 564, Violation Notice 38 * Main incidents – motorized use, garbage, no permit, cans and bottles				

B. Monitoring for campsite conditions

Table 4 displays 2006 campsite conditions documented through campsite inspections and corrective actions or mitigation implemented to enhance visitor safety and travel and to restore or maintain resource conditions. These actions promote desired settings and behaviors necessary to promote land stewardship.

Table 4. Campsite Conditions					
Campsites	LaCroix	Kawishiwi	Isabella & Tofte	Gunflint	Total
Routine campsite maintenance	291	1,238	449	465	2,443
Latrines Dug	15	51	36	45	147
Latrines Reset	0	3	36	45	84
Fire Grates Replaced	0	9	1	4	14
Tent Pads Rebuilt	0	3	2	2	7
Campsite Erosion Control Projects	0	7	5	5	17
Tree Planted at Campsites	0	6	80	45	131
Trees					
Hazard Trees Felled	73	134	68	58	333
Trees Bucked	101	416	395	527	1,439
Trees Low-stumped	101	26	71	59	257
Portages					
Rods of Portages Brushed and Cleared	8,890	10,883	1,439	13,492	34,704

Miles of Hiking Trail Brushed and Cleared	21	26	26	60	133
Water Bars Cleaned	171	134	98	91	494
Water Bars Installed	21	5	11	10	47
Portage Tread Projects	2	7	1	2	12
Square Footage of New Boardwalk	270	0	0	0	270
Check Dams Installed	0	32	11	0	43
Culverts Installed	0	0	0	0	0
Gradient Dips Installed	0	0	0	0	0
Illegal Site Rehabilitation	0	3	0	0	3

C. Monitoring for the Ten-Year Wilderness Challenge

Each wilderness shall be measured against the accomplishment levels for all 10 primary output elements. A minimum cumulative score of “60” out of “100” must be achieved in order for a wilderness to be considered as meeting the “minimum stewardship level.” Currently, the SNF has a “57” for the 2006 season for the BWCAW. For each Element below, the SNF score is listed followed by a brief explanation of what the SNF is working on to fulfill the requirements of that Element. Refer to the previously mentioned Section C for discussion on the determination of scores.

Element 1 – Fire Plans

10 points. Implementation of the Forest Plan fire management direction is evaluated for effectiveness and modifications are made as needed.

Element 2 – Non-native, Invasive Plants (NNIS)

3 Points. A non-native, invasive species management plan has been prepared or direction is provided in the Forest Plan and includes direction for addressing invasives in wilderness. During the summer of 2006, the SNF had 2 GS-5 employees inventorying the Kawishiwi and LaCroix Districts.

Element 3 – Air Quality Values

10 Points. Monitor priority sensitive receptors for trends from baseline (other than IMPROVE visibility monitoring)

Element 4 – Wilderness Education Plans

4 Points. Develop wilderness education plan, or if existing, review and make necessary modifications.

Element 5 – Opportunities for Solitude

4 Points. Adequate direction sufficient to protect opportunities for solitude or primitive and unconfined recreation is included in the Forest Plan.

Element 6 – Recreation Site Inventory

4 Points. Recreation site inventories are conducted in highest priority areas within the times specified in the site inventory plan. Data must be accompanied by a documented site monitoring protocol. Recent data show a higher percentage of wilderness campsites as inventoried than previously known.

Element 7 – Outfitter and Guides

8 Points. Monitoring is conducted on at least 25% of outfitter and guides permittees to evaluate if they are implementing conditions related to wilderness values identified in their operating plans. The SNF had 2 GS-5 employees during the summer of 2006 using wilderness challenge funds to support outfitter and guide compliance on a large number of cooperators/outfitters this year.

Element 8 – Adequate Plan Standards

6 Points. Adequate direction exists in the Forest Plan or individual wilderness plan that has been formally incorporated into the Forest Plan.

Element 9 – Information Management

4 Points. Data collected from inventory and/or monitoring activities are entered into a database, or other suitable analytical tool (such as a spreadsheet), and analyses are conducted. The SNF has begun data entry into I-web for self-issue permits, and mandatory permit data is collected when permits are issued via the reservation system. The SNF also received wilderness challenge funding to pay an employee for an extra 4 weeks to enter visitor use data.

Element 10 – Baseline Workforce

4 Points. Unit meets 70% or more of the baseline workforce. According to the national complexity table, baseline funding for the BWCAW is 14.1 Full Time Equivalents (FTE’s). Funding in 2006 financed a workforce of 27 FTE’s or almost twice the baseline to manage the BWCAW. Over ½ of these funds came from the Recreation Enhancement Act (REA) Fee from our permit system. If REA funds were not available only 12.9 FTE’s or 91% of necessary baseline funding would be available. However, the BWCAW is still in need of more work - especially during winter.

Additional emphasis on NNIS (element #2) next fiscal year will elevate the Wilderness Challenge score above 60 in 2007.

Necessary Follow-up Actions and Management Recommendations

After reviewing monitoring findings, the Forest Interdisciplinary Team identified five Follow-up Actions to carry forward. A full list of Follow-up Actions and Management Recommendations are displayed in Appendices A and B.

- * Continue to monitor day and overnight use levels, travel patterns, and compliance with rules and regulations.
- * Continue to monitor and record motorized and mechanized use authorizations.
- * Continue to ensure the integrity of the permit and reservation system through Reserve America contract compliance, Forest Service staff training, visitor education, and monitoring of permit cancellations, party leader names, alternates, entrance dates, entrance points, and mode of travel as outlined in the Forest Plan.
- * Continue to monitor the no show rate for overnight and day use motor permits.
- * Continue to monitor the levels of crowding and changes in travel patterns, and how those levels and changes affect the visitor experience. Visitor experience will also be addressed in a 2007 Aldo Leopold Wilderness Research Institute Survey.

Collaborative Opportunities To Improve Efficiency And Quality Of Program

Partnerships

Contributions from partners helped the SNF complete wilderness projects and field tasks during 2006. These included campsite restoration and trash removal, visitor information and education contacts, trail and portage maintenance, winter user contacts via the sled dog program, heritage surveys, monitoring for solitude, inventorying NNIS weeds, and assisting with other wilderness ranger-type duties. Several grants were also pursued via the Friends of the Boundary Waters Wilderness, the National Forest Foundation and REI. These collaborations produced a NNIS booklet for the public, funded a volunteer dog sled visitor contact program through Outward Bound, and provided seed money to support the creation of “The Superior Volunteer Program” to provide wilderness volunteer support. See Table 5.

Table 5. Collaborative Opportunities	
Monitoring Driver	Follow-up Actions
<ul style="list-style-type: none"> ▪ Visitor Use Levels ▪ Wilderness Experience 	The SNF will continue to support, recruit, and collaborate with volunteer organizations and individual volunteers, and search for grants and other alternative funding.

Research

The SNF initiated, assisted, or approved six research projects associated with wilderness. This research will provide valuable information that the SNF and partners can use for wilderness management. Table 6 lists ongoing or completed research projects in the wilderness during 2006.

Table 6. Research	
Research	Researcher
Lake Water Quality Assessment	Minnesota Pollution Control Agency
Spruce Bud Worm Epidemics on SNFE	North Central Research Station, USFS
Reconstructing Climate from Tree Rings in Minnesota	University of Minnesota
Forest Inventory Analysis Plots	Minnesota DNR, National FIA
Impacts of Blowdown and Prescribed burns on Water Quality and Vegetation	Bard College
Blowdown Vegetation Succession	University of Minnesota

Summary Conclusion

- * Due to extra funding and newly created or enacted management plans, the Superior National Forest is at 57% of the wilderness stewardship level. The SNF plans to improve its stewardship level to above 60% after 2007 due to advances in Element 2 – Non-native, Invasive Plants.