

NON-NATIVE INVASIVE SPECIES (NNIS)

Key Points

- Approximately 109 acres of terrestrial non-native invasive species (NNIS) were treated, which is a significant increase from the eight acres treated in 2005. Treatments were, on average, 53 percent effective across the sites which, renders improvement.
- The total acres infested with terrestrial NNIS on the Superior National Forest (SNF) continued to increase to 2,072 acres in 2008.
- Monitoring showed that design criteria for minimizing weed spread were successful.
- NNIS monitoring on unclassified roads, decommissioned roads, rock outcrops, and midlevel project areas revealed small amounts of weed spread.
- Both new and existing aquatic NNIS populations on the SNF suggest an increasing rate of invasion.
- The number of lakes infested with rusty crayfish has increased each year since 2003 and it is likely that new infestations will be documented with increased surveys and monitoring.
- There were no aquatic NNIS populations contained or eradicated in 2008.

A. MONITORING AND EVALUATION

Forest Plan Direction

This monitoring was conducted to address Forest Plan Objective: O-WL-37 Reduce the spread of terrestrial or aquatic non-native invasive species that pose a risk to native ecosystems, Forest Plan Objective: O-WL-37 Reduce the spread of terrestrial or aquatic non-native invasive species that pose a risk to native ecosystems, Forest Plan Objective: O-WL-37 Reduce the spread of terrestrial or aquatic non-native invasive species that pose a risk to native ecosystems, Forest Plan Guideline: G-WL-23 During project implementation, reduce the spread of non-native invasive species, Forest Plan Operational Standard and Guideline: For non-native invasive plant occurrences: either re-locate skid trails, temporary roads, or landings if infested and use would be in growing season, OR treat (e.g. mow or pull) before use if use would be in growing season. Non-native invasive plant occurrences located within 50 feet of units would be treated before mechanical site preparation occurs, and to Use Integrated Pest Management to: a. Eradicate any populations of new invaders. b. Contain or eradicate populations of recent invaders. c. Limit the spread of widespread, established invaders within the planning area.

Monitoring Conducted

Occurrence

Approximately 2,072 acres of terrestrial Non Native Invasive Plants (NNIP) occur on the Superior National Forest (SNF). The majority of these infestations are orange and yellow hawkweeds and oxeye daisy, which occur along nearly every roadside. About 1,505 new infestations totaling 26 acres of NNIP were found during 2008 (Table 7.1). The highest risk species on the SNF include common buckthorn, leafy spurge, purple loosestrife, spotted knapweed, Canada thistle, Tartarian honeysuckle, garlic mustard, and goutweed.

Rusty crayfish are native to the Ohio River valley but are considered invasive in lakes in Minnesota and the SNF (Figure 7.1). Rusty crayfish are surveyed using modified, baited minnow traps; sites represent both newly sampled lakes and previously sampled lakes. Unlike spiny water flea, lakes with rusty crayfish are not reported as infested waters according to Minnesota Statutes; rather, their occurrence on the SNF is documented using an internal database.

Spiny water flea, an exotic zooplankton native to Europe, occurs in a number of lakes on the SNF (Figure 7.2). Sampling efforts include zooplankton tows in selected lakes to determine presence or absence. Several agencies collect invasive species monitoring data on the SNF including the Forest Service, Minnesota Department of Natural Resources (MN DNR), and the University of Minnesota, Duluth (UMD). These data are analyzed and published as infested water lists pursuant to the provisions of Minnesota Statutes (MN DNR 2007b).

Early Detection/Rapid Response

In 2008, twelve unclassified roads on the Tofte and Laurentian Ranger Districts were monitored for NNIP spread (Monitoring Project File). Most NNIP inventories have focused on National Forest System roads rather than unclassified roads, and the intent was to see if NNIP distribution was similar on unclassified roads. NNIP were present on seven of the twelve roads and twenty-eight NNIP sites totaling 0.5 acre were found.

NNIP monitoring was also conducted on decommissioned unclassified roads in the Nira Stewardship Project Area (Transportation chapter and Monitoring Project File). As expected, hawkweeds and oxeye daisy were detected on nearly all of the roads, and NNIP that are tracked in the SNF NNIP database were found on eight of 21 decommissioned roads.

Ten recent timber sale units were monitored to detect the amount of NNIP spread that occurred on rock-outcrops. Rock-outcrops are more vulnerable to NNIP infestation and the public has commented on this in recent Environmental Assessments (EA's). Six of the ten stands examined had some hawkweeds growing on rock-outcrops. Canada thistle or spotted knapweed was found in two of the stands, but they were associated with an old landing or old temporary road.

The Tracks and Toohey project areas were monitored for NNIP spread in 2008, where a large amount of NNIP spread had taken place since the last NNIP inventory (Table 7.2). No NNIP monitoring took place in 2008 at sites in the Boundary Waters Canoe Area Wilderness (BWCAW) adjacent to harvest units just outside the BWCAW. If such harvest units are implemented in the future they will be monitored for NNIP spread. However, during 2007 monitoring of older harvest units (three to five years old) within the Rusty Diamond area was completed to determine if NNIP species were expanding into the BWCAW.

Many of the infestations detected during the monitoring were treated with herbicide in 2008 (Control Measures section below). Early detection and treatment of these species will help reduce future spread of NNIP.

Operational Standards and Guidelines

This monitoring was completed to assess the success of Forest Plan operational standards and guidelines in controlling terrestrial NNIP spread during timber harvest. The SNF monitored a sample of 23 harvested stands treated under the Dunka Environmental Assessment (EA), Red Pine Thinning EA, Holmes-Chipmunk Environmental Impact Statement (EIS), and Virginia EIS (Monitoring Project File). Two-tenths of one acre of NNIP was found at 32 new infestation sites. New infestations were found in 10 of the 23 stands. The NNIP infestations occurred most frequently at landings or skid trails. Only occasionally did the infestations occur within the regenerating stands themselves. Although a high percentage of stands had new infestations caused by the timber harvest, the amount of new NNIP acres was still quite low. This implies the timber harvest NNIP spread mitigations were generally successful at reducing NNIP spread.

Control Measures

In 2008, 2062 NNIP infestations representing 109 acres were treated (Figure 7.3). NNIP that were targeted include: spotted knapweed, Canada thistle, bull thistle, Siberian peabush, St. Johnswort, Tatar honeysuckle, tansy, purple loosestrife, plumeless thistle, leafy spurge, oxeye daisy, and orange hawkweed. The majority of the treatments were herbicide application, but some hand-pulling and bio-controls (e.g. beetles that feed on purple loosestrife) were used as well.

The success of SNF NNIP control treatments was monitored in 2008. There were 843 treatment sites representing 61 acres visited. The average control at these sites was 53 percent (Monitoring Project File).

Evaluation and Conclusions

Occurrence

The total terrestrial infested area on the SNF has been slowly increasing (Table 7.2). This increase is due to a combination of enhanced inventories and discoveries as well as new infestations starting along travel corridors. Although it is not evident from Table 7.2, 2008 was the first year that the SNF removed NNIP sites from its database because they had been sprayed and eradicated. Overall, Forest Plan Direction is being met.

7.4 Non-Native Invasive Species (NNIS)

To date, spiny water flea has been observed in 10 lakes on the SNF including: Saganaga, Gunflint, Flour, Caribou, Pine, Greenwood, McFarland, and Devil Track in Cook County and Little Vermillion and Crane in St. Louis County (MN DNR 2007a). No new spiny water flea infestations were detected by Forest Service surveys in 2008. It is likely that additional infestations will be identified and verified with continued survey and monitoring efforts. Recent surveys and monitoring efforts by the Forest Service, MN DNR, and others indicate that the spiny water flea has continued to invade new lakes in northeastern Minnesota. This exotic zooplankton species has recently been reported to be expanding to other large, deep lakes that surround the initial invasion site of Saganaga Lake (Branstrator 2006). There is some evidence that successful introductions and range expansion in northeastern Minnesota may be controlled by local fish communities (Lindgren 2006) and lake habitat conditions (Branstrator 2006). There remains a concern that additional lakes within the BWCAW including those along the United States-Canadian border may become infested.

Rusty crayfish surveys began on the SNF in 2003 and the number of lakes infested with rusty crayfish has increased since surveys began. From 2003 to 2008, rusty crayfish were documented in 17, 17, 19, 25, 34, and 34 lakes, respectively. In 2008, nine lakes were sampled (five newly sampled lakes and four previously sampled in 2005) and none contained rusty crayfish. It is likely that new infestations will continue to be documented in the future with continued survey efforts.

The focus aquatic NNIS management has been on tracking existing infestations, education and awareness, and identifying aquatic habitats at risk to future NNIS establishment and expansion (Figure 7.4). Correspondingly, detection efforts are being focused within these susceptible habitats, particularly those adjacent to existing NNIS populations.

Early Detection/Rapid Response

The distribution of NNIP along unclassified roads is the same as that found along National Forest System roads. That is, small patches of NNIP occur along the road corridor, but they have not spread into undisturbed forested vegetation adjacent to the road. NNIP along decommissioned unclassified roads are expected to gradually be shaded out over time as the surrounding vegetation takes over the road.

Hawkweeds were detected on rock-outcrops in six of the 10 stands examined. In general, the hawkweeds were limited to just one or two rock-outcrops within each stand and were not widespread. NNIP were more commonly found on the old temporary road going into the stand or on old landings. Overall, rock-outcrops do appear more susceptible to NNIP, but harvest practices do not appear to be spreading NNIP rapidly.

For the Tracks and Toohey project areas, the SNF documented an increase in NNIP abundance, however the NNIP are confined to travel corridors and disturbed areas. Relative to the greater landscape, NNIP on the SNF still represent a small fraction of the vegetative cover, and Forest Plan direction is being met.

Operational Standards and Guidelines

Although nearly half of the harvested stands had new infestations caused by the timber harvest, the amount of new NNIP acres was still quite low. Two-tenths of one acre of NNIS was found in the 984 acres of harvested stands that were monitored. This indicates that the timber harvest NNIP spread operational standards and guidelines were successful at reducing NNIP spread.

Control Measures

Despite an increase in documented infestations since 2004, the treatment rate of increase is greater than the NNIS rate of increase (Figure 7.5). This, combined with the over 160 eradicated NNIP sites in the SNF database removed on the ground in 2008, suggest that the SNF is beginning to reduce NNIP impacts (Figure 7.6). However, there is room for improvement as the 53 percent control rate observed in 2008 needs to be raised in 2009. Incomplete spray coverage accounted for most of the lowered effectiveness and some sites were mowed after treatment but before monitoring so the SNF could not determine effectiveness of the treatment. However, overall Forest Plan direction is being met.

C. REFERENCES

- Branstrator, D.K., M.E. Brown, L.J. Shannon, M.T. Thabes, and K. Heimgartner. 2006. Range expansion of *Bythotrephes longimanus* in North America: Evaluating habitat characteristics in the spread of an exotic zooplankton. *Biological Invasions* (2006) 8:1367-1379.
- Lindgren, J.P. 2006. Impacts of the Exotic Zooplankton *Bythotrephes longimanus* on Island Reservoir. Minnesota Department of Natural Resources Section of Fisheries Completion Report Number F-29-R (P)-24, Area 220, Study 4. St. Paul, Minnesota. 47 pp.
- Minnesota Department of Natural Resources. 2007a. Designation of infested waters. Order Number INF-07-001. St. Paul, MN. 11 pp.
- Minnesota Department of Natural Resources. 2007b. Invasive species of aquatic plants and wild animals in Minnesota. Annual Report. St. Paul, MN. 145 pp.

7.6 Non-Native Invasive Species (NNIS)

Table 7.1. Non-native invasive plants (NNIP) infestation detected on the Superior National Forest in 2008.

Area	Sites	Acres
Tracks Midlevel	320	3.3
Toohey Midlevel	138	1.1
Post harvest stands	32	0.2
Unclassified roads	28	0.5
BAER (Cavity and Ham Lake, East Zone complex)	7	0.004
Sites found during NNIP treatments	980	20.8
Decommissioned roads = 8 of 21 roads had inventoried acres		

Table 7.2. The acres of non-native invasive plant (NNIP) infestation across the Superior National Forest from 2004 through 2008.

Year	2004	2005	2006	2007	2008
Acres of NNIP infestation	1850	2000	2025	2046	2072

Figure 7.1. Rusty crayfish. (Photo by Jason Butcher)



Figure 7.2. Spiny water flea. (Photo by Minnesota Department of Natural Resources)



Figure 7.3 Acres of non-native invasive plants (NNIP) treated on the Superior National Forest from 2005 through 2008.

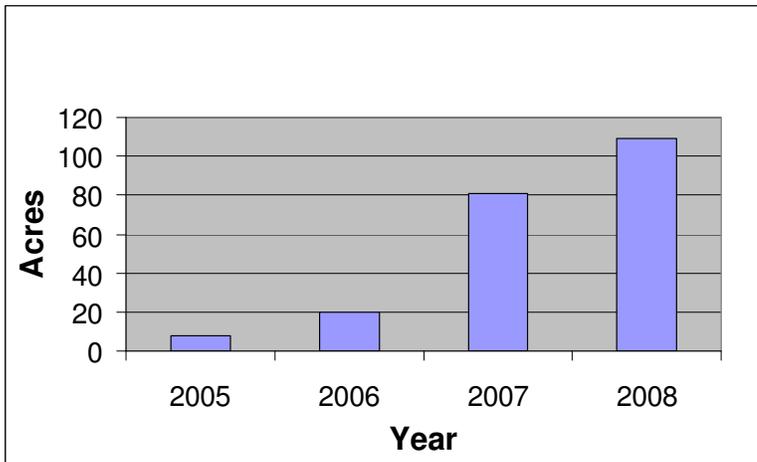


Figure 7.4. Stop Aquatic Hitchhikers Billboard 2008 Threat Campaign (Photo by Wildlife Forever)



7.8 Non-Native Invasive Species (NNIS)

Figure 7.5. Changes in the acres of non-native invasive species (NNIS) infestation and treatment on the Superior National Forest from 2004 through 2008.

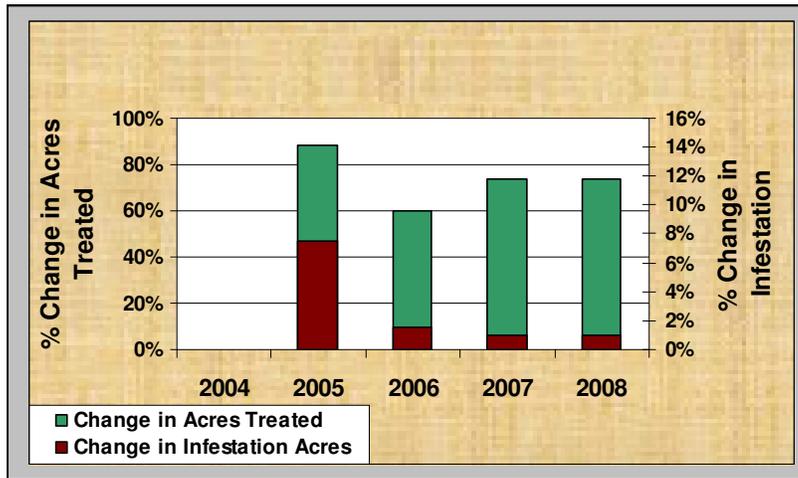


Figure 7.6. Left: Isabella Lake entry point in the Boundary Waters Canoe Area Wilderness (BWCAW), pre-treatment with dense spotted knapweed cover. Right: The same site after several years of treatment showing spotted knapweed replaced with native grass.

