United States
Department of
Agriculture

Forest Service

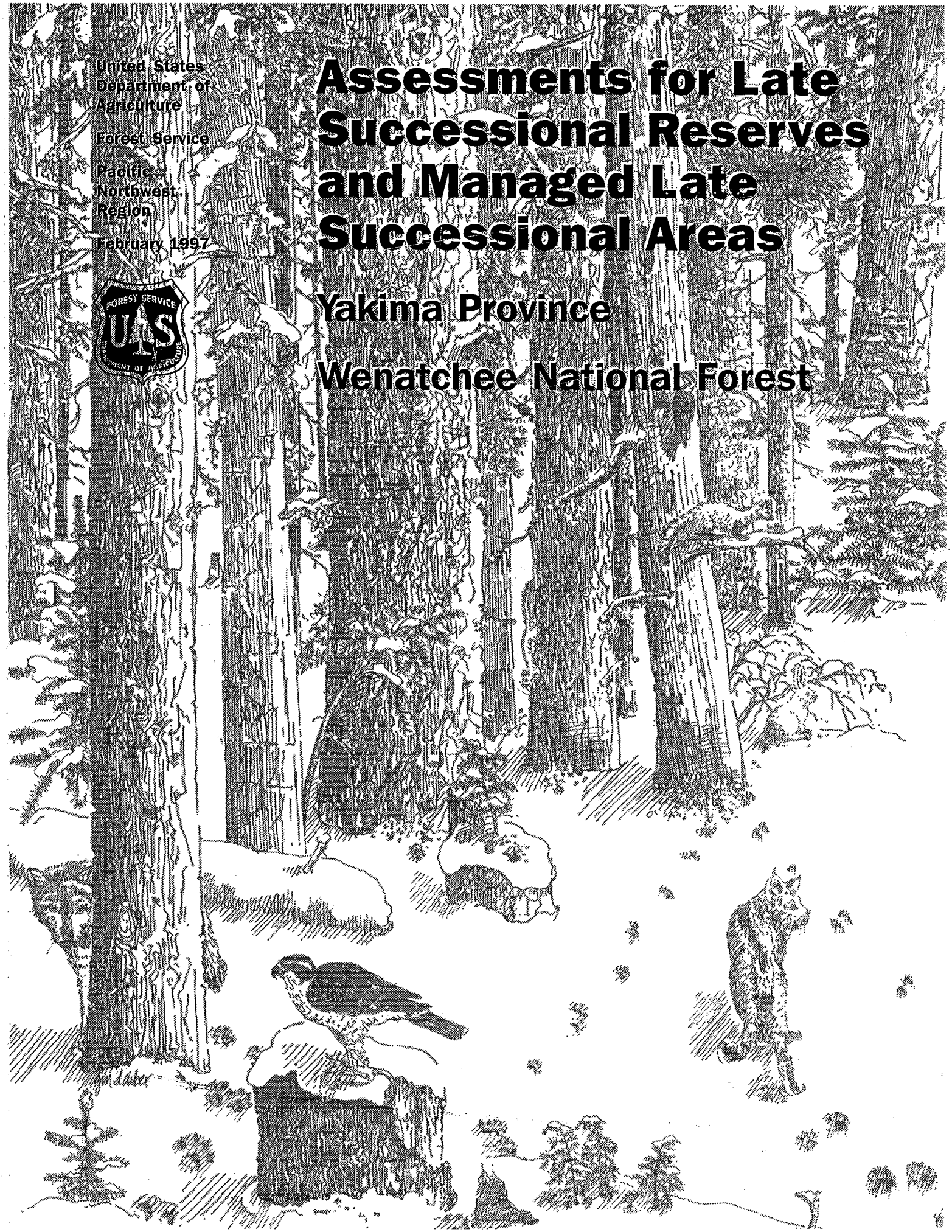
Pacific
Northwest
Region

February 1997

Assessments for Late Successional Reserves and Managed Late Successional Areas

Yakima Province

Wenatchee National Forest



Assessments for
Late Successional Reserves and
Managed Late Successional Areas

Yakima Province

Wenatchee National Forest

This document is a compilation of assessments for Late Successional Reserves and Managed Late Successional Areas on the Wenatchee National Forest located in the Yakima Province. Each chapter covers an individual LSR or MLSA or a combination of these areas, that because of their close geographical proximity and similarity of vegetation types, are grouped together in a single chapter.

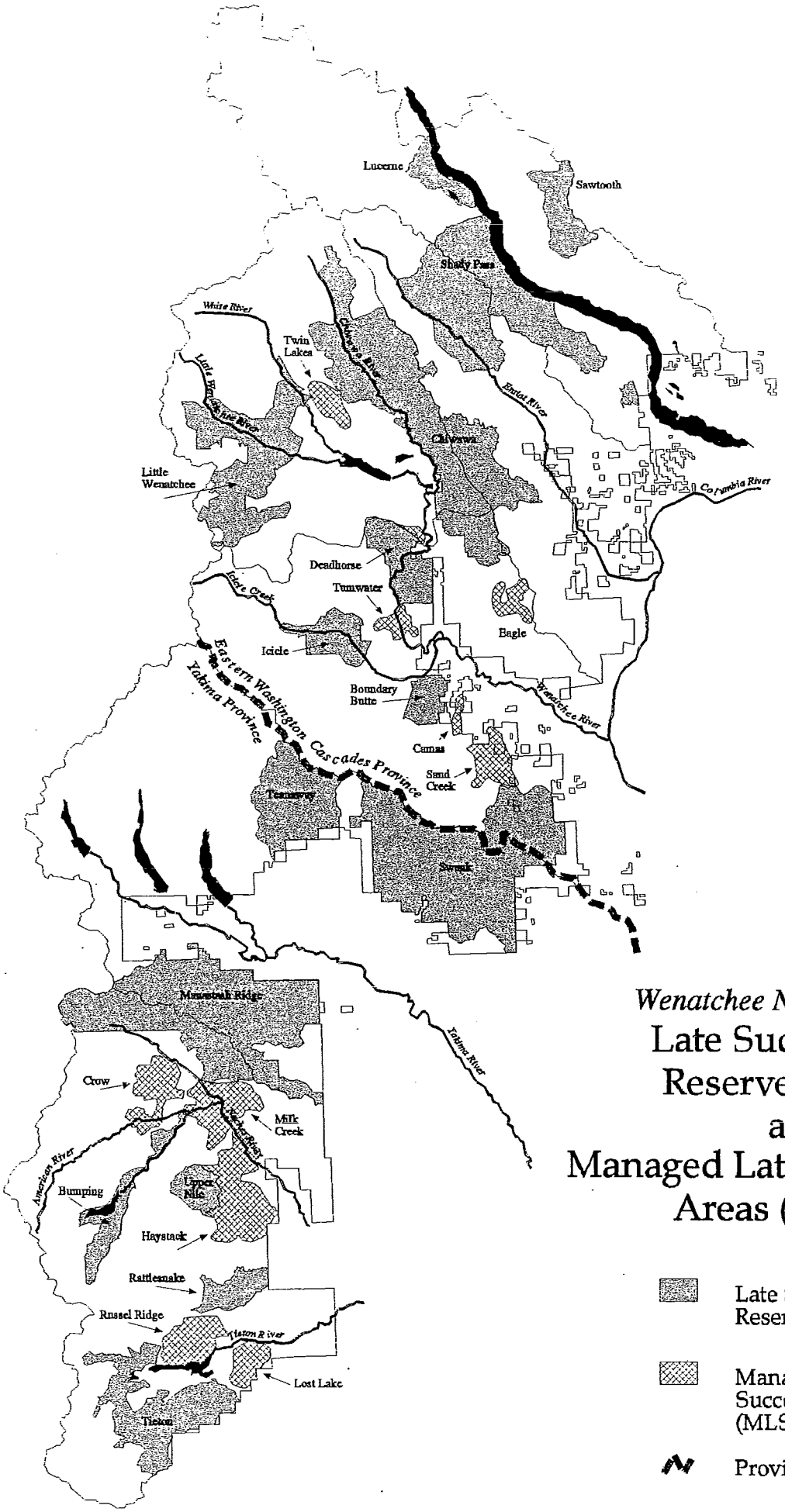
This document is one of three documents prepared on the Wenatchee National Forest to assess LSR/MLSAs as directed in the Northwest Forest Plan. A second document, the "Assessments for Late Successional Reserves and Managed Late Successional Area, Eastern Washington Cascades Province, Wenatchee National Forest" includes assessments for these areas that are located within the Eastern Washington Cascades Province. A third document, the "Forest-wide Assessment for Late Successional Reserves and Manaaged Late Successional Areas, Wenatchee National Forest" provides a Forest overview and a foundation for the processes and format used in the two LSR/MLSA province documents. For ease of reference these documents will be referred to as the "Eastern Washington Cascades Province", the "Yakima Province", and the "Forest-wide Assessment" throughout all three documents.

Each individual chapter in this document focuses on a particular LSR or MLSA (or grouping of these). The first section "A", provides a more specific description of unique resources or factors associated with this LSR than was presented in the general "forest-wide" chapters. Section "B" begins the analysis portion of this document assessing relationships between these LSR/MLSAs and neighboring LSR/MLSAs. Section "C" continues that analysis focusing on the individual LSR.

The subheadings in "B" and "C" follow the module sequence as shown on the "LSR Analysis Flow Chart" in Chapter VII of the WNFLMA and in Appendix 1 attached to this document.. A fire plan is also included at the end of Section "C" to provide more specific detail than that in the fire management plan included in the Chapter VII. Section D includes a table summarizing all of the ecologically derived projects identified from the analysis of each module completed in sections B" and "C".

It is important to note that the type of activities derived from these modules all strive to restore or maintain late successional habitat and species, as such these modules recommend "ecologically derived" projects. The social module, on the other hand, is designed to review projects that do not incorporate these restoration or maintenance objectives. The social module is designed to provide a "road map" to use when planning begins on a specific project that is derived from some social need such as building a new hiker or motorized trail, expanding a ski area, or widening a powerline right-of-way. Since the social module is not used to identify "ecologically derived" projects, the module is not included in this or any of the other individual LSR/MLSA chapters. The process for dealing with socially derived projects is detailed in "Social Module" in Appendix 1. The Assessment Team did complete a social module for the Three Creeks ORV Trail project

on the Entiat Ranger District to validate the module and provide an example of the format and the evaluation process. This module analysis is included in Appendix 1 which is incorporated into all three documents.



Wenatchee National Forest

Late Successional Reserves (LSR's) and Managed Late Successional Areas (MLSA's)

Late Successional Reserves (LSRs)

Managed Late Successional Areas (MLSAs)

Province boundary

Table of Contents

I. CROW MLSA AND BUMPING LSR **1**
A. GENERAL DESCRIPTION OF LSR 1
1. Vegetation *1*
2. Late Successional Associated Wildlife Species *3*
3. Human Uses *11*
B. ANALYSIS BETWEEN LSR/MLSAS 14
1. Sustainability *14*
2. Forest-Wide Northern Spotted Owl *15*
3. Connectivity (Plant, Wildlife, and Northern Spotted Owl) *15*
C. ANALYSIS WITHIN THE LSR 20
1. Unique Habitats And Species *20*
2. Plant Connectivity *29*
3. Wildlife Connectivity *29*
4. Disturbance Risk Analysis *31*
5. Northern Spotted Owl *32*
6. Aquatic *42*
7. Noxious Weeds *45*
8. Fire Management Plan *46*
D. RESTORATION OPPORTUNITIES AND POTENTIAL PROJECT SUMMARY 48

II. HAYSTACK MLSA AND UPPER NILE LSR **53**
A. GENERAL DESCRIPTION OF THE LSR AND MLSA 53
1. Vegetation Description *53*
2. Late Succesional Associated Wildlife Species *57*
3. Habitat Effectiveness *64*
4. Aquatic *64*
5. Human Uses *64*
B. ANALYSIS BETWEEN THE LSR/MLSA'S 65
1. Sustainability *65*
2. Northern Spotted Owl *66*
3. Connectivity (Plant, Wildlife and Northern Spotted Owl) *67*
C. ANALYSIS WITHIN LSR/MLSA 69
1. Unique Habitat and Species *69*
2. Connectivity (Plant and Wildlife) *74*
3. Disturbance Risk Analysis *76*
4. Northern Spotted Owl *80*
5. Aquatic *83*
6. Noxious Weeds *88*
7. Fire Management Plan *89*
D. RESTORATION OPPORTUNITIES AND POTENTIAL PROJECT SUMMARY 92

III. MANASTASH RIDGE LSR **97**
A. GENERAL DESCRIPTION OF LSR 97
1. Vegetation *97*
2. Late Successional Associated Wildlife Species *99*
3. Aquatic *107*
4. Human Uses *108*
B. ANALYSIS BETWEEN THE LSR 110
1. Sustainability *110*
2. Forest-Wide Northern Spotted Owl *111*

3. Connectivity (Plant & Wildlife) *114*
C. ANALYSIS WITHIN THE LSR 116
1. Unique Habitats And Species *116*
2. Connectivity (Plant and Wildlife) *121*
3. Disturbance Risk Analysis *122*
4. Northern Spotted Owl *125*
5. Aquatic *130*
6. Noxious Weeds *137*
7. Fire Management Plan *138*
D. RESTORATION OPPORTUNITIES AND POTENTIAL PROJECT SUMMARY 140

IV. MILK CREEK MLSA 147
A. GENERAL DESCRIPTION OF MLSA 147
1. Vegetation *147*
2. Late Successional Associated Wildlife Species *150*
3. Aquatic *156*
4. Human Uses *156*
B. ANALYSIS BETWEEN LSR/MLSA'S 158
1. Sustainability *158*
2. Northern Spotted Owl *159*
3. Connectivity (Plant, Wildlife and Northern Spotted Owl) *160*
C. ANALYSIS WITHIN LSR/MLSA 161
1. Unique Habitat and Species *161*
2. Connectivity (Plant and Wildlife) *166*
3. Disturbance Risk Analysis *167*
4. Northern Spotted Owl *169*
5. Aquatic *172*
6. Noxious Weeds *177*
7. Fire Management Plan *178*
D. RESTORATION OPPORTUNITIES AND POTENTIAL PROJECT SUMMARY 181

V. RATTLESNAKE LSR 187
A. GENERAL DESCRIPTION OF LSR 187
1. Vegetation *187*
2. Late Successional Associated Wildlife Species *189*
3. Human Uses *195*
B. ANALYSIS BETWEEN LSR/MLSAS 196
1. Sustainability *196*
2. Forest-Wide Northern Spotted Owl *198*
3. Connectivity (Plant, Wildlife and Northern Spotted Owl) *198*
C. ANALYSIS WITHIN THE LSR 201
1. Unique Habitats And Species *201*
2. Plant Connectivity *208*
3. Wildlife Connectivity *208*
4. Disturbance Risk Analysis *209*
5. Northern Spotted Owl *211*
6. Aquatic *219*
7. Noxious Weeds *221*
8. Fire Management Plan *221*
D. RESTORATION OPPORTUNITIES AND POTENTIAL PROJECT SUMMARY 224

VI. SWAUK LSR 227
A. GENERAL DESCRIPTION OF LSR 227
1. Vegetation *227*
2. Late Successional Associated Wildlife Species *233*

3. Aquatic *241*
4. Human Uses *242*
B. ANALYSIS BETWEEN LSR/MLSA'S 244
1. Sustainability *244*
2. Forest-wide Northern Spotted Owl *245*
3. Connectivity (Plant and Wildlife) *248*
C. ANALYSIS WITHIN LSR 249
1. Unique Habitat and Species *249*
2. Connectivity (Plant and Wildlife) *253*
3. Disturbance Risk Analysis *255*
4. Northern Spotted Owl *260*
5. Aquatic *264*
6. Noxious Weeds *268*
7. Fire Plan *268*
D. RESTORATION OPPORTUNITIES AND POTENTIAL PROJECT SUMMARY 271

VII. TEANAWAY LSR 275
A. GENERAL DESCRIPTION OF LSR 275
1. Vegetation *275*
2. Late Successional Associated Wildlife Species *278*
3. Human Uses *285*
B. ANALYSIS BETWEEN LSR/MLSAS 286
1. Sustainability *286*
2. Forest-Wide Northern Spotted Owl *288*
3. Connectivity (Plant, Wildlife and Northern Spotted Owl) *288*
C. ANALYSIS WITHIN THE LSR 291
1. Unique Habitats And Species *291*
2. Plant Connectivity *298*
3. Wildlife Connectivity *299*
4. Disturbance Risk Analysis *300*
5. Northern Spotted Owl *302*
6. Aquatic *309*
7. Noxious Weeds *312*
8. Fire Management Plan *313*
D. RESTORATION OPPORTUNITIES AND POTENTIAL PROJECT SUMMARY 315

VIII. TIETON LSR, RUSSELL RIDGE AND LOST LAKE MLSA 319
A. GENERAL DESCRIPTION OF LSR 319
1. Vegetation *319*
2. Late Successional Associated Wildlife Species *321*
3. Human Uses *334*
B. ANALYSIS BETWEEN LSR/MLSAS 338
1. Sustainability (Tieton LSR and Lost Lake MLSA) *338*
2. Sustainability (Russell Ridge MLSA) *340*
3. Forest-Wide Northern Spotted Owl *341*
4. Connectivity (Plant, Wildlife and Northern Spotted Owl) *342*
C. ANALYSIS WITHIN THE LSR 348
1. Unique Habitats And Species *348*
2. Plant Connectivity *361*
3. Wildlife Connectivity *362*
4. Disturbance Risk Analysis *364*
5. Northern Spotted Owl *367*
6. Aquatic *379*
7. Noxious Weeds *386*
8. Fire Management Plan *387*

D. RESTORATION OPPORTUNITIES AND POTENTIAL PROJECT SUMMARY 390

Table of Figures and Tables

TABLE I-1, SPOTTED OWL INFORMATION FOR BUMPING LSR AND CROW MLSA (1996 FIELD SEASON) 6
TABLE I-2, ACRES AT RISK AND IGNITION RISK, BUMPING LSR AND CROW MLSA. 14
TABLE I-3, CROW MLSA VASCULAR PLANT CONNECTIVITY 16
TABLE I-4, BUMPING LSR VASCULAR PLANT CONNECTIVITY 17
TABLE I-5, DISPERSION INDICES FOR THE CROW MLSA 17
TABLE I-6, DISPERSION INDICES FOR THE BUMPING LSR 18
TABLE I-7, CONNECTIVITY BETWEEN LSRS: SPOTTED OWL PAIRS IN LSRS AND MLSAS, AND CHUS GOALS ... 18
TABLE I-8, UNIQUE HABITATS OVERVIEW BY LSR/MLSA 20
TABLE I-9, UNIQUE HABITATS AND SPECIES, SITE SPECIFIC ANALYSIS 22
TABLE --I-10--, BUMPING LSR SNAG HABITAT QUALITY/LANDSCAPE SCALE 26
TABLE I-11, CROW MLSA, SNAG HABITAT QUALITY/LANDSCAPE SCALE 27
TABLE I-12, CONNECTIVITY RANKINGS FOR CROW MLSA 29
TABLE I-13, CONNECTIVITY RANKINGS FOR BUMPING LSR 30
TABLE I-14, DISTURBANCE MATRIX FOR BUMPING LSR / CROW MLSA 32
TABLE I-15, INDIVIDUAL LSR/MLSA SPOTTED OWL ANALYSIS AND OBJECTIVES 33
TABLE I-16, SPOTTED OWL HABITAT, POTENTIAL HABITAT, AND SUSTAINABLE HABITAT IN LSRS/MLSAS 36
TABLE I-17, SUITABLE SPOTTED HABITAT, BUMPING LSR/CROW MLSA (1996 S. OWL ACTIVITY CENTERS, APP 12A) 37
TABLE I-18, DISPERSAL HABITAT FOR SPOTTED OWLS IN BUMPING LSR/CROW MLSA (1996 S. OWL ACTIVITY CENTERS, APP 12A) 39
TABLE I-19, RESTORATION OPPORTUNITIES AND POTENTIAL PROJECTS, BUMPING LSR AND CROW MLSA. 49
TABLE II-1, SENSITIVE AND SURVEY AND MANAGE SPECIES IN HAYSTACK MLSA AND UPPER NILE LSR 56
TABLE II-2, SPOTTED OWL INFORMATION FOR UPPER NILE LSR & HAYSTACK MLSA 60
TABLE II-3, SUSTAINABILITY FOR HAYSTACK/UPPER NILE MLSA (ACREAGE AND PERCENT AT RISK) 66
TABLE 4, UPPER NILE/HAYSTACK -- VASCULAR PLANT CONNECTIVITY 67
TABLE II-5, DISPERSAL INDICES FOR HAYSTACK MLSA FOREST WIDE CONNECTIVITY MODULE. 68
TABLE II-6, HAYSTACK MLSA WILDLIFE CONNECTIVITY 75
TABLE II-7, DISTURBANCE MATRIX, HAYSTACK 77
TABLE II-8, DISTURBANCE MATRIX, UPPER NILE 78
TABLE II-9, SUITABLE SPOTTED OWL HABITAT, UPPER NILE AND HAYSTACK 81
TABLE II-10, RESTORATION OPPORTUNITIES AND POTENTIAL PROJECTS, HAYSTACK MLSA, UPPER NILE LSR . 92
TABLE III-1, SPOTTED OWL STATUS, HABITAT AND NESTING/ROOSTING/FORAGING HABITAT 103
TABLE III-2, SUSTAINABILITY FOR THE MANASTASH RIDGE LSR (ACREAGE AND PERCENT AT RISK) 110
TABLE III-3, SPOTTED OWL PAIR GOALS FOR "BIG 3" LSR'S WITH CHU'S 112
TABLE III-4, MANASTASH RIDGE LSR - SUITABLE SPOTTED OWL HABITAT 1.8 & 0.7 MILE RADIUS 112
TABLE III-5, MANASTASH RIDGE VASCULAR PLANT CONNECTIVITY 115
TABLE III-6, DISPERSAL INDICES FOR LOW, MODERATE, AND HIGH MOBILITY SPECIES FOR THE MANASTASH RIDGE LSR. 116
TABLE III-7, UNIQUE HABITATS AND SPECIES MODULE SUMMARY 118
TABLE III-8, SNAG HABITAT QUALITY/LANDSCAPE SCALE (PERCENTAGES IN BOLD INDICATE VALUES FOR MANASTASH RIDGE) 120
TABLE III-9, MANASTASH RIDGE LSR WILDLIFE CONNECTIVITY RANKINGS 122
TABLE III-10, DISTURBANCE MATRIX FOR MANASTASH RIDGE LSR 123
TABLE III-11, DISPERSAL AND SUITABLE SPOTTED OWL HABITAT BY OWNERSHIP IN MANASTASH RIDGE LSR (ACRES) 125
TABLE III-12, SPOTTED OWL HOME RANGE MANAGEMENT PROPOSALS TO MAINTAIN MANASTASH RIDGE LSR BY PRIORITY 126
TABLE III-13, RESTORATION OPPORTUNITIES AND POTENTIAL PROJECTS, MANASTASH RIDGE LSR 140
TABLE IV-1, SENSITIVE AND SURVEY AND MANAGE SPECIES IN THE MILK CREEK MLSA 149

TABLE IV-2, SPOTTED OWL INFORMATION FOR THE MILK CREEK MLSA 153
TABLE IV-3, RECREATION SITES, MILK CREEK MLSA 157
TABLE IV-4, TRAILS WITHIN MILK CREEK MLSA 157
TABLE IV-5, SUSTAINABILITY OF MILK CREEK MLSA (ACREAGE AND PERCENT AT RISK) 158
TABLE IV-6, WILDLIFE CONNECTIVITY, MILK CREEK MLSA 161
TABLE IV-7, DISTURBANCE MATRIX, MILK CREEK 168
TABLE IV-8, SUITABLE SPOTTED OWL HABITAT, MILK CREEK 170
TABLE IV-9, RESTORATION OPPORTUNITIES AND POTENTIAL PROJECTS, MILK CREEK MLSA 181
TABLE -?-V-1, SPOTTED OWL INFORMATION FOR RATTLESNAKE LSR (FROM 1996 FIELD SEASON) 192
TABLE V-2, ACRES AT RISK AND IGNITION RISK, RATTLESNAKE LSR. 196
TABLE V-3, RATTLESNAKE LSR VASCULAR PLANT CONNECTIVITY 199
TABLE V-4, DISPERSION INDICES FOR THE RATTLESNAKE MLSA 199
TABLE V-5, CONNECTIVITY BETWEEN LSRS: SPOTTED OWL PAIRS IN LSRS AND MLSAS AND CHUS GOALS .200
TABLE V-6, UNIQUE HABITATS OVERVIEW BY LSR/MLSA 201
TABLE V-7, UNIQUE HABITATS AND SPECIES, SITE SPECIFIC ANALYSIS 203
TABLE V-8, RATTLESNAKE LSR SNAG HABITAT QUALITY/LANDSCAPE SCALE 206
TABLE V-9, CONNECTIVITY RANKINGS FOR RATTLESNAKE LSR 208
TABLE V-10, DISTURBANCE MATRIX FOR RATTLESNAKE LSR 210
TABLE V-11, INDIVIDUAL LSR/MLSA SPOTTED OWL ANALYSIS AND OBJECTIVES FOR RATTLESNAKE LSR 211
TABLE V-12, SPOTTED OWL HABITAT, POTENTIAL HABITAT AND SUSTAINABLE HABITAT IN LSR/MLSAS. 214
TABLE V-13, SUITABLE SPOTTED OWL HABITAT, RATTLESNAKE LSR (1996 S. OWL ACTIVITY CENTERS, APPENDIX 12A) 216
TABLE V-14, DISPERSAL HABITAT FOR SPOTTED OWLS IN RATTLESNAKE LSR (1996 S. OWL ACTIVITY CENTERS, APPENDIX 12A) 216
TABLE V-15, RESTORATION OPPORTUNITIES AND POTENTIAL PROJECTS, RATTLESNAKE LSR. 224
TABLE VI-1, SENSITIVE AND SURVEY AND MANAGE SPECIES IN SWAUK LSR 230
TABLE VI-2, SPOTTED OWL STATUS AND HABITAT INFORMATION FOR THE SWAUK LSR 237
TABLE VI-3, ACRES AT RISK AND IGNITION RISK, SWAUK LSR 244
TABLE VI-4, SPOTTED OWL PAIR GOALS FOR "BIG 3" LSR'S WITH CHU'S 246
TABLE VI-5, DISPERSAL INDICES FOR THE SWAUK LSR FOREST WIDE CONNECTIVITY MODULE. 248
TABLE VI-6, SWAUK LSR CONNECTIVITY RANKINGS 253
TABLE VI-7, DISTURBANCE MATRIX, SWAUK LSR 257
TABLE VI-8, LIVE AND DEAD STRUCTURE IN SWAUK LSR 258
TABLE VI-9, SNAGS IN THE SWAUK LSR 259
TABLE VI-10, LOG DATA, SWAUK LSR 259
TABLE VI-11, STATUS INDIVIDUAL SPOTTED OWL HOME RANGES AND RESTORATION OPPORTUNITIES 261
TABLE VI-12, RESTORATION OPPORTUNITIES AND POTENTIAL PROJECTS, SWAUK LSR 271
TABLE VII-1, SENSITIVE AND SURVEY AND MANAGE SPECIES IN THE TEANAWAY LSR 277
TABLE VII-2, SPOTTED OWL INFORMATION FOR TEANAWAY LSR 281
TABLE VII-3, ACRES AT RISK AND IGNITION RISK, TEANAWAY LSR. 287
TABLE VII-4, TEANAWAY-- VASCULAR PLANT CONNECTIVITY 289
TABLE VII-5, DISPERSION INDICES FOR THE TEANAWAY LSR 290
TABLE VII-6, CONNECTIVITY BETWEEN LSRS: SPOTTED OWL PAIR GOALS FOR LSRS AND MLSAS, AND CHUS290
TABLE VII-7, UNIQUE HABITATS AND SPECIES MODULE SUMMARY 293
TABLE VII-8--, TEANAWAY LSR SNAG HABITAT QUALITY/LANDSCAPE SCALE 297
TABLE VII-9, CONNECTIVITY RANKINGS FOR TEANAWAY LSR 299
TABLE VII-10, DISTURBANCE MATRIX, TEANAWAY LSR 301
TABLE VII-11, SPOTTED OWL HABITAT, POTENTIAL HABITAT, AND SUSTAINABLE HABITAT IN LSRS/MLSAS:303
TABLE VII-12, SUITABLE OWL HABITAT, TEANAWAY LSR (1996 S. OWL ACTIVITY CENTERS, APP 12A) 305
TABLE VII-13, RESTORATION OPPORTUNITIES AND POTENTIAL PROJECTS, TEANAWAY LSR 315
TABLE VIII-1, SPOTTED OWL INFORMATION FOR TIETON LSR/LOST LAKE MLSA/RUSSELL RIDGE MLSA (1996 FIELD SEASON) 325
TABLE VIII-2, SPOTTED OWL STATUS AND HABITAT INFORMATION FOR THE RUSSEL RIDGE MLSA 333
TABLE VIII-3, ACRES AT RISK AND IGNITION RISK, TIETON LSR AND LOST LAKE MLSA. 339

TABLE VIII-4, ACRES AT RISK AND IGNITION RISK, RUSSELL RIDGE MLSA. 340
TABLE VIII-5, TIETON LSR VASCULAR PLANT CONNECTIVITY 343
TABLE VIII-6, LOST LAKE MLSA VASCULAR PLANT CONNECTIVITY 344
TABLE VIII-7, RUSSELL RIDGE MLSA VASCULAR PLANT CONNECTIVITY 345
TABLE VIII-8, DISPERSION INDICES FOR THE LOST LAKE MLSA 346
TABLE VIII-9, DISPERSION INDICES FOR THE TIETON LSR 346
TABLE VIII-10, DISPERSION INDICES FOR THE RUSSELL MLSA 346
TABLE VIII-11, CONNECTIVITY BETWEEN LSRS: SPOTTED OWL PAIRS IN LSRS AND MLSAS, AND CHU GOALS347
TABLE VIII-12, UNIQUE HABITATS OVERVIEW BY LSR/MLSA 349
TABLE VIII-13, UNIQUE HABITATS AND SPECIES MODULE SUMMARY 352
TABLE --VIII-14--, TIETON LSR SNAG HABITAT QUALITY/LANDSCAPE SCALE 358
TABLE VIII-15, LOST LAKE MLSA, SNAG HABITAT QUALITY/LANDSCAPE SCALE 359
TABLE VIII-16, RUSSELL RIDGE MLSA SNAG HABITAT QUALITY/LANDSCAPE SCALE 360
TABLE VIII-17, CONNECTIVITY RANKINGS FOR LOST LAKE MLSA 362
TABLE VIII-18, CONNECTIVITY RANKINGS FOR TIETON LSR 362
TABLE VIII-19, CONNECTIVITY RANKINGS FOR RUSSELL RIDGE MLSA 363
TABLE VIII-20, DISTURBANCE MATRIX FOR TIETON LSR / LOST LAKE MLSA 366
TABLE VIII-21, DISTURBANCE MATRIX FOR RUSSELL RIDGE MLSA 366
TABLE VIII-22, INDIVIDUAL LSR/MLSA SPOTTED OWL ANALYSIS AND OBJECTIVES: TIETON LSR/LOST LAKE MLSA/RUSSELL RIDGE MLSA 368
TABLE VIII-23, SPOTTED OWL HABITAT, POTENTIAL HABITAT, AND SUSTAINABLE HABITAT IN LSRS/MLSAS.371
TABLE VIII-24, SUITABLE SPOTTED OWL HABITAT, TIETON LSR/LOST LAKE MLSA/RUSSELL RIDGE MLSA (1996 S. OWL ACTIVITY CENTERS, APP 12A) 373
TABLE VIII-25, DISPERSAL HABITAT FOR SPOTTED OWLS IN TIETON LSR/LOST LAKE MLSA/RUSSELL RIDGE MLSA (1996 S. OWL ACTIVITY CENTERS, APP 12A) 375
TABLE VIII-26, RESTORATION OPPORTUNITIES AND POTENTIAL PROJECTS, TIETON LSR AND LOST LAKE AND RUSSELL RIDGE MLSAS 391

I. Crow MLSA and Bumping LSR

A. General Description of LSR

This portion of the document describes the vegetation, wildlife, aquatic resources and human uses associated with this LSR and MLSA.

1. Vegetation

This section describes the current condition of vegetation groups (see Chapter II, Vegetative Landscape) within the Crow MLSA and Bumping LSR. Data was derived by a combination of aerial photo interpretation, stand exam information, and field validation (see Chapter II, Vegetative Landscape). It should be noted that site specific information regarding vegetation structure and distribution will need to be updated as restoration projects are initiated. The vegetation layer developed for this analysis serves as a starting point only.

Information is provided below regarding each vegetation group. More detailed information relative to the Crow MLSA can be found in the Little Naches Watershed Assessment.

a) Dry Forest Group

Three percent (412 acres) of the Crow MLSA and two percent (296 acres) of the Bumping LSR consists of the dry forest group. Within this group in the Crow MLSA, 100 percent is mapped as high density (Appendix 4 and 5 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas"). Within the Bumping LSR, 56 percent (165 acres) is mapped as high density and 44 percent (132 acres) as low density.

In both the Crow MLSA and Bumping LSR the grand fir series comprises 100 percent of the dry forest group. Commonly, ponderosa pine and Douglas-fir exist as the overstory dominates. The understory vegetation most often consists of a grass/forb mix, generally dominated by *Calamogrostis rubesscens* and *Carex geyeri*. *Luina nardossama* and *Lupinus* spp. are generally well represented as a forb associates. Within these areas, the dry vegetation group is associated primarily with southerly aspects.

b) Moist Grand Fir Group/Mesic Western Hemlock

Approximately 67 percent (8,354 acres) of the Crow MLSA supports moist grand fir or mesic western hemlock plant communities. The majority, or 92 percent (7,661 acres) of this forest group is currently layered and/or mature (mid- to late-successional). Created openings comprise approximately six percent (495 acres) of this group (Appendix 5 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas"). The remaining approximate two percent is comprised of single-layered or partial cut stands. Relative to the Bumping LSR, 36 percent (5,402 acres) of the area supports moist grand fir or western hemlock plant associations. Approximately, 3,936 (73 percent) is mapped as layered and/or mature. Single-layered stands comprise 17 percent (929 acres) of the area, and partial cut stands , eight percent (433 acres). There are 104 acres (two percent) mapped as created openings in the Bumping LSR.

Within this forest group, at low and mid elevation within the Crow MLSA and Bumping LSR moist grand fir communities occur on southerly aspects, with western hemlock occupying the more northerly locations. Increasing elevation results in the development of the wet forest vegetation group

dominated by the silver fir and mountain hemlock series. Species composition in the moist grand fir and western hemlock types consists largely of, *Berberis nevadensis*, *Achlys triphylla*, *Clintonia uniflora*, *Linnaea borealis* and *Chimaphila umbellatta*. In gaps and more open areas within the forest, *Lupinus* and *Vaccinium* species become dominate understory associates.

c) Subalpine Fir Series

There is a minor component of the subalpine fir series in the Crow MLSA. The 11 acres (less than 1 percent), that are present are of layered and/or mature vegetation. This vegetation group was not mapped within the Bumping LSR.

d) Wet Forest Group

A large portion of the Crow MLSA and Bumping LSR consists of wet forest vegetation. Approximately 19 percent (2,421 acres) of the Crow MLSA and 50 percent (7,559 acres)of the Bumping LSR supports this vegetation type (Appendix 4 and 5 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas"). In the Crow MLSA, 82 percent (1,980 acres) is mapped as layered and/or mature, 15 percent as created openings, and three percent as riparian forest communities. Riparian forest is generally isolated along the American River. Relative to the Bumping LSR, 66 percent (4,964 acres) of the vegetation is mapped as layered and/or mature, 30 percent (2,267 acres)as single-layered, and three percent (250 acres) as riparian forest. Riparian forest is isolated along the Bumping River. Seventy-eight acres (1 percent) of this group is in created openings.

In the wet forest group, tree overstory composition is generally dominated by mountain hemlock, Pacific silver fir, and subalpine fir. Western larch, Douglas-fir, lodgepole pine, and whitepine are present as primary seral dominants. Undergrowth composition may vary from realtively lush and dense to scarce. The shrub component of these communities typically includes Rhododendron albaflorum, Rubus lassiococcus, Vaccinium spp., Ribes viscosissimum, Pyrola spp., Lutkea pectinata, and Xerophyllum tenax. Associate herbs include Luzula hitchocockii, Arnica latifolia, Achlys triphylla, Clintonia uniflora, and Polemonium pulcherrimum.

e) Non-Forest Vegetation

There are approximately 1,281 acres (10 percent of MLSA) of non-forest vegetation within the Crow MLSA. Included in this group are: talus (632 acres), bedrock (545 acres), dry meadow (81 acres), and deciduous forest (12 acres).

The Bumping LSR supports approximately 1,731 acres (12 percent) of non-forest vegetation. Included within this group are: water (1,475 acres), bedrock (187 acres), dry meadow (73 acres), talus (49 acres), grassland/shrubland (30 acres), wet meadow (9 acres), agricultural/residential (5 acres), and brushfield (3 acres).

f) Noxious Weeds

Portions of the Crow MLSA have been surveyed for noxious weed species that occur along roadsides and in areas previously harvested. High densities of *Centaurea diffusa* are present along roads, particularly along Highway 410. *Centaurea maculosa* is present adjacent to the MLSA, and has a high potential to expand into the MLSA. Other species within or threatening the Crow MLSA include *Chrysanthemum leucanthemum*, *Hypericum perforatum*, *Senecio jacobaea*, *Hypochoris radiata*, *Cirsium arvense*, and *Cirsium canadensis*. *Linaria dalmatiea* is abundant adjacent to the MLSA and has recently occupied limited areas within the MLSA. *Cystis scoparium* has been observed occasionally along Highway 410. Minimal noxious weed

inventory has been completed within the Bumping LSR . At the present time, no known noxious weed concentrations have been documented from the Bumping LSR. Surveys for species presence and extent should be completed in order to develop a noxious management plan for these areas (refer to Harrod 1994).

2. Late Successional Associated Wildlife Species

a) Introduction

In this chapter, information is presented about wildlife species that are associated with the late-successional habitats that are either present or would be managed for in the Bumping LSR and the Crow MLSA. A total of 80 species have been identified as being associated with these kinds of forest conditions and are present, unknown or suspected to occur within these areas. The list of these species can be found in Appendix 27 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas".

In addition to consideration for the groups of species associated with the various kinds of late-successional forests, individual species assessments were also conducted. These assessments were completed for all threatened, endangered, sensitive, species of concern (USFWS), management indicator, protection and buffer, and survey and manage species. Collectively this group of species is referred to as species of special status. What information is available about the status of these species within the Bumping LSR and Crow MLSA is summarized in this chapter. However, relatively little is known about a number of them.

Inventories or surveys have been conducted for only a few of the wildlife as shown in Appendix 27 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas". The most extensive of these were for the pileated woodpecker, tailed frog and spotted owls. Northern spotted owl inventories have been conducted on 100% of the suitable habitat within the Bumping LSR and the Crow MLSA.

b) Late Successional Species By Habitat Type

(1) Dry Forests

Two hundred and ninety six acres (2%) of the Bumping LSR and 412 acres (3%) of the Crow MLSA are composed of the dry forest vegetation group. Fire climax ponderosa pine forests historically dominated these areas and 49 wildlife species are associated with these forests.

Currently, 165 acres (56%) of Bumping LSR and 412 acres (100%) of Crow MLSA are in a successionally advanced condition. Bumping LSR has 132 acres (45%) that are in a low density condition and could be fire-climax.

Some species that are associated with the late successional or fire-climax conditions of these forests and that have special management status include: tailed frog, larch mountain salamander, northern goshawk, bald eagle, flammulated owl, pileated woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, northern flicker, chestnut backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, silver haired bat, fringed myotis, western big-eared bat, pallid bat, marten, and fisher.

Historically, only a minor portion of these areas provided the structures that are associated with suitable spotted owl habitat (Thomas et al. 1990, Buchanan et al. 1995). However, fire exclusion has allowed successional advancement for suitable spotted owl habitat to develop in some areas (Agee and Edmunds 1992, Buchanan et al. 1995). These areas are now being used by spotted owls, however

the risk of large scale disturbances causing large scale habitat loss is of major concern (Agee and Edmunds 1992, Buchanan et al. 1995, Gaines et al. in press). No known spotted owl activity centers occur in the Dry Forests.

(2) Moist Grand Fir Group

The Moist Grand Fir group covers about 5,402 acres (36%) of the Bumping LSR and 8,354 (67%) of the Crow MLSA. Historically, fire occurred less frequently than in the Dry and Mesic vegetation groups (refer to Chapter III), allowing successional advancement and complex habitat structure such as high crown closure, multilayering, and many snags and down logs. These conditions provide habitat for a wide array of wildlife species, including 73 species within the Bumping LSR and Crow MLSA.

Currently, about 3,936 acres (73%) of the Moist Grand Fir group in the Bumping LSR is in a late-successional condition and 7,661 acres (92%) of the Moist Grand Fir in the Crow MLSA is in a late-successional condition. In the absence of any major disturbance, it is expected that in 50 years 4,865 acres (90%), and in 100 years 5,395 acres (100%) of this habitat would be in a late-successional condition in the Bumping LSR. In the Crow MLSA it is expected that in 50 years 1,980 acres (82%), and in 100 years 2,350 acres (97%) would be in a late-successional condition, assuming no large scale disturbance.

Wildlife species associated with the late-successional conditions of this vegetation group and of special status include the northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascades frog, larch mountain salamander, warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten and fisher.

The Moist Grand Fir vegetation group is capable of providing structures that compose suitable spotted owl nesting, roosting, and foraging habitat while remaining within the range of historic variability.

(3) Wet Forest Group

The Wet Forest Group covers about 7,559 acres (50%) of the Bumping LSR and 2,421 (19%) of the Crow MLSA. Historically fire occurred relatively infrequently (refer to Chapter III) allowing for succession to result in complex forest structures such as high crown closure, multilayering, and high numbers of snags and down logs. These conditions provide habitat for about 54 species that are associated with the late-successional conditions of these forests.

Currently, 4,964 acres (66%) are in a late-successional condition in the Bumping LSR and 1,980 acres (82%) in the Crow MLSA are in a late-successional condition. In the absence of any large scale disturbances in 50 years 7,231 acres (96%) would be in a late-successional condition, and in 100 years 7,309 acres (97%) would be late-successional within the Bumping LSR. In the Crow MLSA it is expected that in 50 years 1,980 acres (82%), and in 100 years 2,350 acres (97%) would be in a late-successional condition, assuming no large scale disturbances.

Wildlife species that are associated with the late-successional conditions of this vegetation group and are of special status include northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed

woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascades frog, larch mountain salamander, Warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten, and fisher.

The Wet Forest Group is capable of providing structure that composes suitable spotted owl nesting, roosting and foraging habitat while remaining within the historic range of variability. Seven known spotted owl activity centers are located within this vegetation group in the Bumping LSR. Five spotted owl activity centers are located in the wet forest in the Crow MLSA.

(4) Subalpine Fir

Subalpine Fir covers about 11 acres (0 %) of the Crow MLSA. Historically, fire frequency was relatively low but when fires did occur they were of high intensity. The longer fire return interval allowed for successional advancement that resulted in complex habitat structure such as high canopy closure, high numbers of snags and down logs. Landscape pattern was historically highly variable with a mosaic of seral stages providing habitat for a variety of wildlife species. About 41 wildlife species within the LSR are associated with the late-successional conditions of these forests.

Currently, 11 acres (100%) of the Subalpine Fir forests are in a late-successional condition within the Crow MLSA.

Wildlife species that are associated with the late-successional forest in this vegetation group and have special status include the tailed frog, Cascades frog, larch mountain salamander, northern goshawk, bald eagle, northern spotted owl, great gray owl, pileated woodpecker, downy woodpecker, hairy woodpecker, black-backed woodpecker, three-toed woodpecker, Williamson's sapsucker, little willow flycatcher, olive-sided flycatcher, pygmy nuthatch, long-eared myotis, Yuma myotis, lynx, and marten.

Spotted owls occasionally use these forests, however, usually they only provide foraging habitat

c) Species Specific Information

The information presented in this section provides an overview of what is known about the species identified in Appendix 27 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas" as species of special status. Information is provided on a species by species basis whenever it is available.

(1) Endangered Or Threatened Wildlife Species

There are five wildlife species and one Critical Habitat Unit that are federally listed as Threatened or Endangered and could occur within the Bumping LSR and Crow MLSA. These include the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), northern spotted owl (*Strix occidentalis caurina*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*), marbled murrelet and portions of Critical Habitat Unit WA-15 for spotted owls.

(a) Bald Eagle and Peregrine Falcon

The bald eagle is known to occur in the Crow MLSA and is suspected to occur in the Bumping LSR. No habitat has been surveyed. It is known that peregrine falcons occur in the Crow MLSA and 10% of their habitat has been surveyed. They are suspected to occur in Bumping LSR and none of their habitat has been surveyed.

(b) Northern Spotted Owls

Overall, there are 9 pairs of spotted owls within the Bumping LSR/Crow MLSA. An additional 5 pairs are adjacent in Wilderness, bringing a total of 14 spotted owl pairs associated with these LSR/MLSAs. The Bumping LSR has 4 spotted owl activity centers, with an additional 4 sites that are immediately adjacent to the boundary, inside Wilderness. The Crow MLSA has 5 owl activity centers, with an additional 1 site inside Wilderness. Within the LSR/MLSA, 8 of the 9 spotted owl pairs have successfully reproduced young.

The Bumping LSR/Crow MLSA are primarily wetter forest types, (wet and moist forests). The Bumping LSR sets within the William O. Douglas Wilderness. The Crow MLSA includes portions of the Norse Peak and W.O. Douglas Wilderness areas. The wilderness habitat has contiguous forest structure, and is essential to the functioning of these LSR/MLSAs.

The Bumping LSR/Crow MLSA provides essential inter- and intra-provincial linkage for spotted owls. This connectivity is across the Cascade crest, and from north to south in the eastern Cascades. The Bumping LSR and Crow MLSA have strong population clusters, and adjoin contiguous low elevation wilderness habitat. These LSR/MLSAs are important to the range wide distribution for the northern spotted owl.

Within the Bumping LSR and Crow MLSA, 100% of the spotted owl habitat has been surveyed for spotted owls.

The estimated amount of habitat within a 1.8 mile radius of the activity centers is shown in Table I-1. Within the Bumping LSR and Crow MLSA, none of the spotted owl home ranges are below threshold acres of 2,663 acres nesting/roosting/foraging habitat within 1.8 miles radius and 500 acres of habitat within 0.7 miles radius. The Crow MLSA has 2 sites (SO854 and SO874) at threshold acreage, but below target acres of 3,994 acres per site. There are 7 of the 9 owl sites within the LSR/MLSA boundaries that are above target acreage's. Adjacent to the Bumping LSR, there is one Wilderness site, SO896, below threshold with less than 500 acres of habitat within 0.7 miles radius. See Appendix 12 "Spotted Owl Activity Centers, Reproductive Status and Habitat Availability" and 12a (owl sites from 1996 field data) from the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas".

Table I-1, Spotted Owl Information for Bumping LSR and Crow MLSA (1996 field season)

Spotted Owl Bumping	Repro Status[3]	Ownership[4]	Dry or Wetter Owl[5]	Threshold 6	Critical Habitat Unit (CHU)	Forest Interior ?[8]	Suitable Spotted Owl Habitat	Total Dispersal Habitat
SO803	PY	FS	Wetter	Optimum	WA-15	No	4,895 in 1.8mi 824 in 0.7mi	273 1.8mi
SO820	PY	FS	Wetter	Optimum	WA-15	Inside	4,357 in 1.8mi 796 in 0.7	250 1.8mi
SO823	PY	FS	Wetter	Optimum	WA-15	Inside	4,680 in 1.8mi. 782 in 0.7mi.	1,523 1.8 mi.
SO825[1]	P	FS	Wetter	Optimum	WA-15[7]	Inside	4,651 in 1.8mi 730 in 0.7mi.	1,499 1.8mi.
SO851[1]	PY	FS	Wetter	Optimum	WA-15[7]	Inside	5,473 in 1.8mi 841 in 0.7mi.	492 1.8mi

Spotted Owl Bumping	Repro Status[3]	Ownership[4]	Dry or Wetter Owl[5]	Threshold[6]	Critical Habitat Unit (CHU)	Forest Interior?[8]	Suitable Spotted Owl Habitat	Total Dispersal Habitat
SO860	P	FS	Wetter	Optimum	WA-15	Inside	4,880 in 1.8mi. 727 in 0.7mi.	1,125 1.8mi.
SO871[1]	P	FS	Wetter	At Threshold	WA-15[7]	Inside	3,501 in 1.8mi. 711 in 0.7mi.	1,183 1.8mi.
SO896[1]	P	FS	Wetter	Below Threshold	WA-15[7]	No	3,147 in 1.8mi 215 in 0.7 mi	1,945 1.8mi
Spotted Owl Crow	**Repro Status[3]**	**Ownership[4]**	**Dry or Wetter Owl[5]**	**Threshold[6]**	**Critical Habitat Unit (CHU)**	**Forest Interior?[8]**	**Suitable Spotted Owl Habitat**	**Total Dispersal Habitat**
SO805	PY	FS	Wetter	Optimum	None	Near	4,813 in 1.8mi. 824 in 0.7mi.	31 1.8 mi.
SO824	PY	FS	Wetter	Optimum	None	Near	4,407 in 1.8mi 775 in 0.7mi.	85 1.8mi.
SO852[1]	PY	FS	Wetter	Optimum	None	Near	4,079 in 1.8mi 641 in 0.7 mi	469 1.8 mi
SO854	PY	FS	Wetter	At Threshold	None	Inside	3,998 in 1.8mi 751 in 0.7mi.	487 1.8mi
SO874	PY	FS	Wetter	At Threshold	None	Near	3,961 in 1.8mi. 564 in 0.7mi.	255 1.8mi.
SO 886	PY	FS	Wetter	Optimum	None	Near	5,153 in 1.8mi. 698 in 0.7mi.	63 1.8mi.

[1] Activity Center is Near the LSR or MLSA, but not inside the LSR or MLSA **map boundary** (< 1/4 mile).

[3] RS = Residential Single; P = Pair; PY = Pair with Young, HS = Historic Single. Site based on **highest Reproductive occupancy**.

[4] FS = Forest Service; PVT = Private Ownership (**ownership** at activity center).

[5] If the majority of suitable spotted owl habitat in **0.7 mile circle** is dry or mesic forest groups, then it is a "dry" spotted owl. If the majority is wetter forest groups, then it is a "wetter" spotted owl..

[6] **Below Threshold**: < 2,663 total suitable spotted owl habitat acres in 1.8 mile circle **OR** < 500 total suitable spotted owl habitat acres in 0.7 mile circle.

At Threshold: 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

Optimum/Target: > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

[7] The activity center is within 1/2 mile of the CHU.

[8] **Inside** = activity center is at least 600' inside (forest interior) late successional habitat.

Near = activity center is inside late successional habitat that creates a forest interior.

[9] **Habitat** within 1.8 mile circle around activity center. Dry **dispersal habitat** includes vegetation codes 11, 13, and 52; **mesic dispersal** includes code 21; and **Wetter dispersal** includes codes 31, 35, 61, and 41.

[10] **Habitat** within 1.8 mile radius. Dry **suitable spotted owl habitat** includes vegetation code 12 where size/structure is multistory greater than 9" DBH; mesic Suitable includes code 22; and Wetter Suitable includes codes 32, 36, 62, 64, and 42 (see Appendix 2 GIS Veg Model & Appendix 3 Veg Photo Mapping Key of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas"). Use the highest quality habitat available.

[11] A larger circle than 1/3 mile radius will be used to develop **100 Acre Activity Center**, if there is less than 100 acres of suitable habitat.

(c) Critical Habitat Unit for Northern Spotted Owls

There is one spotted owl Critical Habitat Unit (CHU) WA-15, which overlaps onto the Bumping LSR. The CHU provides essential habitat for inter- and intra-provincial distribution, breeding and genetic interchange. They connect to habitat to the west across the Cascade crest, and to the north and south. This Bumping CHU WA-15 is important for range-wide distribution. There are no CHU in the Crow MLSA.

The Bumping CHU WA-15 completely covers the Bumping LSR. There is one small area outside the LSR, but inside the CHU (south of Cedar Springs, habitat for owl SO820). The CHU goal is to support 4+ pairs of owls (USFWS Memorandum, 1991). Currently there are 4 pairs within the CHU and 4 more pairs very close to the CHU boundary. See Table 1? "Spotted Owl Information", Table 2? "Connectivity Between LSRs: Spotted Owl Pairs in LSRs and MLSAs, and CHU Goals", Appendix 13: "LSR/MLSA S.Owl Acreage's", Appendix 12 & 12a "Spotted Owl Activity Centers etc.", and Appendix 34: "CHU Maps Wenatchee National Forest" of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas".

The Bumping CHU WA-15 was established to provide important connection with high quality habitat within and adjacent to the William O. Douglas Wilderness, to LSRs to the north (Manastash), east (Rattlesnake), south (Tieton), and west (Clear Fork Cowlitz on Gifford Pinchot NF and Greenwater/White River on Mount Baker-Snoqualmie NF). The Bumping CHU has strong population clusters in the sub-province and adjoins low elevation forested habitat in adjacent wilderness (USFWS Memorandum, 1991).

Connectivity is especially prevalent through adjacent wilderness habitat, as well as through the Crow MLSA, the Milk MLSA and Quartz Creek.

The Bumping CHU is in good condition towards meeting the spotted owl goals. The adjacent forested habitats of the W.O. Douglas and Norse Peak Wilderness areas are important for the functioning of the spotted owl habitat and inter/intra-provincial connectivity. Specifically South Fork Naches, Crow Creek, Bumping River, Deep Creek, North Fork Clear Creek, Indian Creek, and Rattlesnake Meadows.

In all LSR/MLSAs, except the Swauk LSR, Shady Pass LSR, Deadhorse LSR, Boundary Butte LSR, Tumwater MLSA and Sand MLSA, these reserves are predicted to provide the needs for spotted owl recovery over time (50+ years). They will also provide the function the CHUs were designated for. Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. These reserves function for connectivity and spotted owl home ranges. It is concluded that the LSR/MLSAs meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing.

(d) Grizzly Bear and Gray Wolf

No class 1 grizzly bear observations have been made within either of these areas (Almack et al. 1993). Grizzly bears are suspected to occur in Bumping LSR and Crow MLSA and none of their available habitat has been surveyed Gray wolves are suspected to occur within the Bumping LSR and Crow MLSA. No surveys have been conducted.

(e) Marbled Murrelet

The Crow MLSA has a small amount of marbled murrelet habitat within the 55 mile marine foraging zone. The habitat is 113 acres (1% of the MLSA), and is located on the very northwestern edge of the MLSA, between Sand Creek and Crow Creek (see Appendix 40 "Marbled Murrelet Habitat Chart and Habitat Map").

No surveys have been done in the Crow MLSA for marbled murrelets. Some surveys have been done on the Naches District, no marbled murrelets were located. One marbled murrelet detection has been recorded on the east side of the Crest near Snoqualmie Pass, in a portion of the Wenatchee National Forest administered by the Mount Baker-Snoqualmie National Forest. The best connectivity for marbled murrelet is in areas of high quality contiguous habitat. Connectivity from the Crow MLSA, is possible through the Norse Peak Wilderness. There are four lower quality, lower elevation passes that might provide nest structure for these marine birds. These include Green Pass, Naches Pass, Tacoma Pass and Windy Gap. Within the marine foraging zone, surveys will be conducted 2 years prior to projects. If any breeding sites are located, activities will be restricted within 1/2 mile of the site (NWFP C-10).

The Bumping LSR is outside of the 55 mile marine foraging zone for marbled murrelets.

(2) Sensitive Wildlife Species and Species of Concern

There are 15 wildlife species that are on the R6 Sensitive Species list or are USFWS species of concern that could occur within the Bumping LSR and Crow MLSA. These include the goshawk (*Accipiter gentilis*), willow flycatcher (*Empidonax trailii*), olive-sided flycatcher (*Contopus borealis*), tailed *frog (Ascaphus trueii*), spotted frog (*Rana pretiosa*), Cascade frog (*Rana cascadae*), Columbia pebblesnail (*Fluminicola columbiana*), long-legged myotis (*Myotis volans*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanoides*), Yuma myotis (*Myotis yumanensis*), Western big-eared bat (*Plecotus townsendii*), lynx (*Lynx canadensis*), fisher (*Martes pennanti*), and wolverine (*Gulo gulo*).

(a) Birds

The goshawk is known to occur in both areas. No surveys have been completed. It is suspected that the little willow flycatcher occurs in both areas. Surveys have been done on <5 % of habitat in Bumping LSR. The olive-sided flycatcher is suspected in Crow MLSA and known in Bumping LSR where surveys have been completed on <5 % of the available habitat.

(b) Amphibians

Surveys for amphibians have been completed on about 30% of the habitat within the Bumping LSR and 50% in the Crow MLSA. It is known that the tailed frog and Cascades frog occur and the spotted frog is suspected in both areas.

(c) Mollusks

No surveys for the Columbia pebblesnail have been conducted and it is unknown if they are present.

(d) Mammals

Surveys for bat species have been completed for <5 % of habitat in Crow MLSA. It is unknown or suspected that the long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis or the western big-eared bat occur in these areas.

Surveys for lynx, fisher and wolverine have not been conducted. Lynx and fisher suspected to occur in the Bumping LSR and the Crow MLSA. Wolverine are known to occur in Bumping LSR and suspected in Crow MLSA.

(3) Management Indicator Species

There are 12 wildlife species that are listed as management indicator species that occur or could occur within the Bumping LSR or the Crow MLSA. These species include the pileated woodpecker (Dryocopus pileatus), downy woodpecker (Picoides pubescens), hairy woodpecker (Picoides villosus), three-toed woodpecker (Picoides tridactylus), red-breasted sapsucker (Sphyrapicua ruber), Williamson's sapsucker (Sphyrapicua thyroideus), northern flicker (Colaptes auratus), ruffed grouse (Bonasa umbellus), mule deer (Odocoileus hemnionus), elk (Cervus elephus), beaver (Castor canadensis), and marten (Martes americana).

(4) Primary Cavity Excavators

No surveys for primary cavity excavators have been completed in Crow MLSA. In Bumping LSR 25 % of pileated woodpecker and <5 % of the remaining primary cavity excavators habitat has been surveyed. The downy woodpecker and red-breasted sapsucker are suspected in both areas. Williamson's woodpecker is suspected in Crow MLSA and known in Bumping LSR. The remaining primary cavity excavators are known to occur in both areas.

(a) Ruffed Grouse and Beaver

Surveys for the ruffed grouse have been completed on < 5% of the available habitat within the Bumping LSR and none in the Crow MLSA. They are known to occur in both areas. Surveys for beavers have not been completed on the available habitat in the Crow MLSA or the Bumping LSR and they are suspected to occur in both areas.

(b) Mule Deer, Elk

Surveys for mule deer and elk have not been completed and they are known to occur within both areas.

(c) Marten

It is known that marten occur in the Crow MLSA and the Bumping LSR. No surveys have been conducted.

(5) Survey And Manage, Protection And Buffer Species

There are eight species that do or could occur within the Bumping LSR or the Crow MLSA and are identified as survey and manage, or protection and buffer species. These include the great gray owl (Strix nebulosa), flammulated owl (Otis flammeolus), White-headed woodpecker (Picoides albolarvatus), black-backed woodpecker (Picoides arcticus), pygmy nuthatch (Sitta pygmaea), warty jumping slug (Hemphillia glandulosa), blue-gray tail-dropper (Prophysaon cerulean), and papillose tail-dropper (Prophysaon dubium).

(a) Birds

The great gray owl is suspected to occur in Crow MLSA and is unknown in Bumping LSR and surveys have not been completed. No surveys have been completed for the flammulated owl and it is unknown if they occur in Bumping LSR and suspected in Crow MLSA. Surveys for the white-headed

woodpecker, black-backed woodpecker, and pygmy nuthatch have not been completed in Crow MLSA. Less than 5% of habitat has been surveyed in Bumping LSR. The white-headed woodpecker is absent from Bumping LSR.

(b) Mollusks

It is unknown if the warty jumping slug, blue-gray tail-dropper, or papillose tail-dropper occur in the Bumping LSR and Crow MLSA. No surveys have been conducted.

(c) Habitat Effectiveness

Habitat effectiveness was measured using the current open road density and the amount of security habitat. The current open road density within the Bumping LSR is 2.1 mi./sq.mi. and the amount of area in security habitat is 26%. This information shows that habitat effectiveness is considered to be "low" (>2 mi./sq.mi.) relative to roads and "low" relative to security habitat (<50%). In the Crow MLSA the current open road density is 1.7 and the area within security habitat is 28%. This information shows that the habitat effectiveness relative to road density is "moderate" (between 1-2 mi./sq.mi.) and relative to security habitat is "low" (<50%). The long term management objective for LSR/MLSAs is to manage towards a "high" level of habitat effectiveness defined as >1mi./sq.mi. open road density and >70% security habitat.

3. Human Uses

a) Prehistoric and Historic Summary

(a) Bumping LSR

Like some other portions of the Naches Ranger District, there are mythological elements associated with features within this LSR. Most notable is a Yakama belief that Bumping Lake is haunted.

Based on lithic material and other sites found in the Bumping Lake area, this LSR did receive some degree of American Indian use. It was most likely associated with huckleberry gathering, gathering other plant foods and material (cedar bark), hunting and fishing.

Early historic activity in the area was associated with efforts to build the dam. This dam, completed in 1910, essentially doubled the size of Bumping Lake, adding irrigation capacity for the downstream agricultural areas. As part of the early dam construction efforts a road was constructed into the area in the early 1900's to transport construction supplies and workers.

In the early 1900's a number of recreation residences (privately owned recreation homes authorized by special use permit on National Forest lands) were constructed and use of these began.

There was some early mining activity in the area. Most notable was Copper City, that including housing and mill facilities for extracting and processing ore, near Deep Creek. This mining operation remained active until the 1940's only a few of the structures remain. Another area of early mining activity was Miner's Ridge.

Goose Prairie, a small community on private land, was another area of early settlement in this LSR.

Another historic feature of the area is the American River Ski Bowl located near the northeast end of Bumping Lake. This ski area was established in the 1930's with many of the facilities constructed by the Civilian Conservation Corps. Ski operations here continued until the 1950's. Today the facilities continue to be used by a variety of groups on a reservation basis.

b) Recreation

(1) Campgrounds

There are five campgrounds in the LSR: Soda Springs (26 campsites), Cougar Flat (12 campsites), Bumping Crossing (12 campsites), Bumping Lake (45 campsites) and Lower Bumping Lake (23campsites) campgrounds. The Lower Bumping is a new campground, replacing an older campground that was located near the dam and had to be removed during recent work to reinforce the dam. The Bumping Lake campground use is associated with recreation activities on the lake. The other campgrounds are more associated with use along the river. All of the campgrounds are quite popular and heavily used.

(a) Crow MLSA

Hells Crossing campground with 17 campsites is located in this MLSA. It experiences moderate use.

(2) Dispersed Camping

Dispersed camping occurs in both of these areas, the areas of more concentrated dispersed camping are discussed in the following sections.

(a) Bumping Lake LSR

There are numerous dispersed campsites in the river bottom area along the Bumping River and along the north shore of Bumping lake. Most of this use is associated with water related activities. This use is increasing rapidly.

The Granite Lake area is a popular dispersed use area, many of the campers come for the camping experience available here. Deep Creek trailhead experiences a lesser degree of dispersed camping, much of it associated with trail users.

(b) Crow MLSA

The Sand Creek area experiences considerable dispersed camping use, much of it associated with motorcyclists and 4 wheel drivers that use the nearby trails. This area does have a toilet. Some fall use occurs from hunters.

In the southern part of the MLSA along the Mather Memorial Parkway (Highway 410) dispersed camping is not allowed.

(3) Trails

(a) Bumping LSR

Although there are no Forest Service System motorized trails in this LSR there is some indication of increasing activity south of the lake by 4x4's, quads and motorcycles on user established routes.

There are 10 trailheads in this LSR that provide access to the American Ridge and Nelson Ridge and PCT in the William O. Douglas wilderness. These are very popular due to their central proximity to the wilderness.

(b) Crow MLSA

There is no motorized use in this south end of this LSR but there are a number of motorcycle trails in the northern leg. There are no formal system 4x4 driveways in the LSR however 4x4 use does occur on the Powerline Road.

(4) Winter Use

(a) Bumping LSR

There are some snowmobiling and cross country skiing activities within this LSR however there are no designated routes or no grooming operations.

(b) Crow MLSA

There is a snopark at Hell's Crossing in the MLSA that provides access to the Pleasant Valley Trail #999. This cross-country ski trail receives moderate use and is not groomed.

(5) Other Recreation

A variety ofother recreational uses occurs within this LSR and MLSA, these are listed in the bullet statements below:

(a) Bumping LSR

- Some hunting occurs within this LSR.
- Copper City is a historical attraction visited by some recreationists.
- Bicycling along the Bumping River Road is a popular activity.
- Bumping Lake is used for fishing, canoeing, water skiing, and pontoon boating. Recreation activities on the lake are moderate.
- An outfitter guide under permit near the northwest end of the lake offers horseback rides and pack trips in parts of the Bumping drainage.
- There are a number of recreation residences along the Bumping Lake road and Bumping Lake.
- The Goose Prairie community, on private land, has a bed and breakfast, restaurant,, grocery store and a few year round residences.
- The American River Ski Bowl is managed by the Forest Service under the Granger-Thye system on a reservation basis for a variety of group activities such as snowmobiler gatherings, weddings, etc.
- Bumping Lake Marina is operated under special use permit on National Forest lands. This facility provides a boat launch, boat docking area and campground.

(b) Crow MLSA

- Highway 410 is the congressionally designated Mather Memorial Parkway, an important recreation and scenic automobile route that experiences considerable use from those driving for pleasure.
- This MLSA experiences heavy use from elk hunters.
- The American River has been nominated for inclusion into the National Wild and Scenic River System.

c) Mining

(a) Bumping LSR

Historically this LSR had some mining activities associated with Miner's Ridge and Copper City. Presently there are no large scale, active mining operations.

(b) Crow MLSA

Some gold panning activities occur along the American River.

d) Social and Economic Considerations:

The recreational activities associated with Bumping Lake, camping, recreation residence occupancy, trail use, and hunting provide economic benefit to the local community, particularly those tourism related businesses located near Bumping Lake and at Goose Prairie.

B. Analysis Between LSR/MLSAs

1. Sustainability

a) Sustainability Analysis

The sustainability of LSRs/MLSAs across the Forest is displayed in the table below. The Bumping LSR and the Crow MLSA have very low amounts of at risk vegetation compared to other LSR/MLSAs on the Forest. Most of the forest within these two LSR/MLSAs consist of wet forest vegetation. For this reason, these are among the most sustainable LSR/MLSAs on the forest.

The following table shows a comparison of the acres at risk and the ignition risk determined in the Forest-wide sustainability analysis for the Bumping LSR and the Crow MLSA and their four neighboring LSR/MLSAs.

Table I-2, Acres at Risk and Ignition Risk, Bumping LSR and Crow MLSA.

LSR/MLSA	% of LSR/MLSA at Risk		% of LS Forest at Risk		Ignition Risk
	Acres	Pct.	Acres	Pct.	
Bumping	165ac	1%	165ac	2%	Moderate
Crow	412ac	3%	412ac	4%	Moderate
Manastash	38,858ac	37%	33,864ac	49%	Moderate
Milk	11,432ac	73%	8,513ac	100%	Moderate
Haystack	20,079ac	81%	16,154ac	100%	Moderate
Upper Nile	4,979ac	54%	4,589ac	73%	Moderate

When looking at sustainability issues between LSRs/MLSAs, the factor driving this analysis is the amount and location of at-risk vegetation between the Bumping LSR and the Crow MLSA and their four neighbors. In other words, identifying linkages in at-risk vegetation that would facilitate the spread of fire from one LSR/MLSA to another. A review of at-risk vegetation maps reveals that this linkage for the most part does not exist in any of these instances because of the wet forest plant communities surrounding these LSR/MLSAs. However, most of the wet vegetation in this area consists of mesic western Hemlock and moist grand fir that is in a successionally advanced condition and somewhat susceptible to stand replacement fire. This does present some risk to the LSR/MLSAs that are adjacent and downwind such as Milk, Haystack and Upper Nile.

(1) Implications

Both the Bumping LSR and the Crow MLSA are relatively sustainable in their current condition. They do have forest that are currently susceptible to stand replacement fire but not to the degree that some of the dry forests further to the east.

2. Forest-Wide Northern Spotted Owl

The Bumping LSR and Crow MLSA are not designated as one of the Forest's three large population cluster/source center LSRs, for the recovery of the spotted owl. The Bumping LSR and Crow MLSA are part of the smaller "local population" centers, which are linked to the meta-populations through dispersing individuals (see LSR/MLSA maps Chapter I, page 8 & 9, of the main document). The spotted owl is a Threatened species, with the recovery dependent on the implementation of the NWFP, especially in LSR/MLSAs (FSEIS Appendix G, Biological Opinion, 1994).

3. Connectivity (Plant, Wildlife, and Northern Spotted Owl)

a) Plant Connectivity

Connectivity can be addressed at several spatial scales when assessing an individual LSR. Connectivity of the LSR/MLSA network on the Wenatchee National Forest has been addressed above in the "Function of the LSR/MLSA Network" section of the "Late Successional Reserve and Managed Late Successional Area Assessment, Wenatchee National Forest". Connectivity specific to the Crow MLSA and Bumping LSR for vascular plants is analyzed from two perspectives here. Refer to the Forest-wide Assessment discussions for connectivity description for lichens, bryophytes, and fungi.

First, connectivity relative to the Crow MLSA can be viewed from how well habitat is connected to surrounding LSRs or MLSAs. In all dispersal classes, species associated with the dry forest vegetation group are dependent on vegetation between the Crow MLSA and the Manastash LSR for connectivity.. Between the Crow MLSA and the Milk MLSA, connectivity exists for the moderate and high dispersal classes but, is dependent upon the vegetation between for the low dispersal class. Connectivity between the Crow MLSA and Bumping LSR exists for the moderate and high dispersal classes but does not exist for the low dispersal class, This is primarily a result of the limited occurrence of this vegetation type in the Bumping LSR.

Relative to species associated with the moist grand fir/mesic hemlock vegetation group, connectivity is dependent on vegetation between the Crow MLSA and the Manastash LSR for all dispersal classes. Connectivity between the Crow MLSA and Milk MLSA exists for all dispersal classes. Connectivity between the Bumping LSR and the Crow MLSA exists for the moderate and high dispersal classes, and is dependent on the vegetation between them for the low dispersal class species.

Relative to species associated with the wet forest vegetation group, connectivity exists for the moderate and high dispersal classes and is dependent on the vegetation between the Crow MLSA and the Manastash LSR. No connectivity exists between the Milk MLSA and Crow MLSA for any dispersal class due to the lack of the wet forest type within the Milk MLSA. Relative to the Bumping LSR, the high dispersal class species are dependent on vegetation outside the LSR. No connectivity exists for the moderate and low dispersal classes due to the great distances as a result of the geographic location of this vegetation type on the landscape.

In general, few opportunities to improve habitat connectivity for vascular plant species associated with a particular forest vegetation group were identified as a results of this analysis. In the dry and wet vegetation groups, the lack of connectivity is a result of inherent landscape patterns. In the moist grand fir/mesic western hemlock vegetation group, maintenance of existing dispersal corridors and promotion of mature/late-successional vegetation may provide opportunities for improving connectivity.

(1) Crow MLSA Vascular Plant Connectivity

The following table presents the results of the connectivity analysis applied to the Crow MLSA. Comparisons are made between the Crow MLSA and the three neighboring LSR/MLSAs in terms of plant species being able to disperse from one LSR to the other. Determinations are made for each vegetation gorup common to the LSRs for each of 3 dispersal classes.

Table I-3, Crow MLSA Vascular Plant Connectivity

	Vegetation Group														
LSR/MLSA	**Dry/Mesic**			**Moist GF**			**Subalpine**			**Wet**			**Whitebark**		
Dispersal Class	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Bumping	N	Y	Y	D	Y	Y	A	A	A	N	N	D	A	A	A
Manastash	D	D	D	D	D	D	A	A	A	D	Y	Y	A	A	A
DM-9 (Milk)	D	Y	Y	Y	Y	Y	A	A	A	A	A	A	A	A	A

Dispersal Codes: Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Habitat Outside LSR/MLSA)

Dispersal Classes: 1=Capable of dispersing up to 1 mile; 2=Capable of dispersing up to 3 miles; 3=Capable of dispersing up to 5 miles.

First, connectivity relative to the Bumping LSR can be viewed from how well habitat is connected to surrounding LSRs or MLSAs. Connectivity between the Bumping LSR and the Crow MLSA has been described above and will not be discussed here. In the dry forest vegetation group, connectivity exists between the Bumping MLSA and the Milk MLSA for the moderate and high dispersal classes. For the low dispersal class species, connectivity is dependent upon vegetation outside the MLSA/LSR. No connectivity exists between the Bumping LSR and Haystack MLSA/Upper Nile LSR for any dispersal class. The lack of connectivity is a result of geographic location of the vegetation on the landscape. Species associated with the dry forest vegetation group are dependent on vegetation between the Crow MLSA and the Manastash LSR for all dispersal classes. Between the Crow MLSA and the Milk MLSA, connectivity exists for the moderate and high dispersal classes but, is dependent upon the vegetation between for the low dispersal class. Connectivity between the Crow MLSA and Bumping LSR exists for the moderate and high dispersal classes but does not exist for the low dispersal class, This is primarily a result of the limited occurrence of this vegetation type in the Bumping LSR.

Relative to species associated with the moist grand fir/mesic hemlock vegetation group, connectivity exists for all dispersal classes between Bumping LSR and Milk MLSA. Between the Bumping LSR and the Haystack MLSA/Upper Nile LSR, connectivity for the high dispersal class is dependent on vegetation between these areas. No connectivity exists for the low and moderate dispersal classes.

Relative to species associated with the wet forest vegetation group, no connectivity exists between the Milk MLSA and Bumping LSR for any dispersal class due to the lack of the wet forest type within the Milk MLSA. Relative to the Haystack MLSA/Upper Nile LSR, the high dispersal class species are dependent on vegetation outside of these areas. No connectivity exists for the moderate and low dispersal classes due to the great distances as a result of the geographic location of this vegetation type on the landscape.

In general, few opportunities to improve habitat connectivity for vascular plant species associated with a particular forest vegetation group were identified as a results of this analysis. In the dry and wet vegetation groups, the lack of connectivity is a result of inherent landscape patterns. In the moist grand fir/mesic western hemlock vegetation group, maintenance of existing dispersal corridors and

promotion of mature/late-successional vegetation may provide opportunities for improving connectivity.

(2) Bumping LSR Vascular Plant Connectivity

The following table presents the results of the connectivity analysis applied to the Bumping LSR. Comparisons are made between the Bumping LSR and the three neighboring LSR/MLSAs in terms of plant species being able to disperse from one LSR to the other. Determinations are made for each vegetation group common to the LSRs for each of 3 dispersal classes.

Table I-4, Bumping LSR Vascular Plant Connectivity

	Vegetation Group														
LSR/MLSA	**Dry/Mesic**			**Moist GF**			**Subalpine**			**Wet**			**Whitebark**		
Dispersal Class	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
DM-14 (Crow)	N	Y	Y	D	Y	Y	A	A	A	N	N	D	A	A	A
Up. Nile/Hay	N	N	N	N	N	D	A	A	A	N	N	D	A	A	A
DM-9 (Milk)	D	Y	Y	Y	Y	Y	A	A	A	A	A	A	A	A	A

Dispersal Codes: Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Habitat Outside LSR/MLSA)

Dispersal Classes: 1=Capable of dispersing up to 1 mile; 2=Capable of dispersing up to 3 miles; 3=Capable of dispersing up to 5 miles.

b) Wildlife Connectivity

Connectivity between late-successional patches is important to providing movement between patches, minimizing local extinctions, and reducing genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between the Crow MLSA and adjacent LSR/MLSAs the dispersion index was used (as described in Appendix 1). A total of three potential linkages were evaluated: Crow to Manastash Ridge LSR, Crow to Milk Creek MLSA, and Crow to Bumping LSR. The overall dispersion index for this LSR was 2.3.

Table I-5, Dispersion Indices for the Crow MLSA

Linkage	Distance (Miles)	High	Moderate	Low	Index
CR-Manastash Ridge	2.5	Yes	Yes	No	**2**
CR-Milk Creek	1	Yes	Yes	Yes	**3**
CR-Bumping	0.5	Yes	Yes	No	**2**
Overall					**2.3**

Connectivity between late-successional patches is important to providing movement between patches, minimizing local extinctions, and reducing genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between the Bumping LSR and adjacent LSR/MLSAs the dispersion index was used (as described in Appendix 1). A total of three potential linkages were evaluated: Bumping to Upper Nile LSR, Bumping to Milk Creek MLSA, and Bumping to Crow MLSA. The overall dispersion index for this LSR was 2.0.

Table I-6, Dispersion Indices for the Bumping LSR

Linkage	Distance (Miles)	High	Moderate	Low	Index
BU-Upper Nile	3	Yes	Yes	No	2
BU-Milk Creek	0	Yes	Yes	No	2
BU-Crow	0.5	Yes	Yes	No	2
Overall					**2.0**

c) Northern Spotted Owl Connectivity

The Bumping LSR/Crow MLSA includes spotted owl pairs, and cluster of pairs, for connectivity to the north and south, and to the east and west. This LSR and MLSA provides intra-and inter-provincial connectivity. The Bumping LSR encompass 96% of CHU WA-15 for spotted owls. CHUs were identified early in the recovery process for the northern spotted owls. The adjacent wilderness habitat is important to continue these linkages for spotted owls.

For final recovery of the northern spotted owl, smaller LSRs/MLSAs like these, contribute to the objective of occupied home ranges (See the following table). The CHUs in the Bumping LSR has a goal of 4+ pairs of spotted owls (it currently has 4 pairs of owls). The Crow MLSA does not have CHU goals, it currently has 5 pairs of spotted owls.

Table I-7, Connectivity Between LSRs: Spotted Owl Pairs in LSRs and MLSAs, and CHUs Goals

LSR or MLSA Status and Connectivity	S.Owl Pairs --1994, FSEIS Appendix G, Table G-3	Highest Occupancy and Reproductive Status, for Field Seasons 1995 ---- 1996		Number of Owl Pairs CHU Should Support, as per USFWS - CHU discussion.	
Greenwater/White River LSR 149 - MBS Forest	25 Pr	-	-	28 Pr	WA-34
Manastash RW 125	13 Pr	31 Pr + 2 RS	30 + 5[1] 11 Sites[2]	20+ Pr	WA-14 (20+pr) WA-34 (1+pr)
Milk DM9	--	3 Pr	3 sites	-- 35 ac of CHU	WA-15
Crow DM14	--	5 Pr	5 site+1[1]	--	NA
Bumping RW126	2 Pr	7 Pr	4 sites + 4[1]	4+ Pr	WA-15
Upper Nile RW127	2 Pr + 1 RS	1 Pr + 1 RS	2 sites	--	NA
Haystack DM10	--	7 Pr + 1 RS	8 sites	--	NA

LSR or MLSA Status and Connectivity	S.Owl Pairs --1994, FSEIS Appendix G, Table G-3	Highest Occupancy and Reproductive Status, for Field Seasons 1995 ---- 1996		Number of Owl Pairs CHU Should Support, as per USFWS - CHU discussion.	
Rattlesnake RW128	3 Pr	3 Pr	3 sites	2+ Pr	WA-16
Russell Rdg DM11	--	2 Pr	2 sites	--	NA
Tieton RW153	8 Pr	13 Pr	10 sites + 4 site[1]	6+ Pr	WA-17 WA-18
Lost Lake DM12	--	1 Pr	1 site	1 Pr	WA-17
Clear Fork/Cowlitz LSR - 152 Gifford Pinchot NF	23 Pairs + 1 RS	-	-	25+	WA-

[1] Spotted owl activity center within 1/4 mile of LSR/MLSA boundary.

[2] Spotted owl activity center on Private Land.

The Bumping LSR and Crow MLSA are situated in proximity to 9 other LSR/MLSAs. There is potential for dispersal to occur between the Bumping LSR/Crow MLSA and the following: Manastash LSR/Milk MLSA; Upper Nile LSR/Haystack MLSA; Rattlesnake LSR; Tieton LSR/Russell Ridge MLSA; Clear Fork Cowlitz LSR (GPNF); and Greenwater/White River LSR (MBSNF). Connectivity of particular importance is: within W.O. Douglas Wilderness (Bumping River, American Ridge, Indian Creek, Rattlesnake Meadows, upper Clear Creek); within Norse Peak Wilderness (Crow Creek, South Fork Naches Creek); and through the Milk MLSA to Manastash along Quartz Creek. See Forest Interior Map and Suitable Spotted Owl Habitat Maps.

The adjoining Wilderness Area habitat is important for all of these LSR/MLSA connections. Some matrix lands are important for connectivity between LSR/MLSAs. These connectivity corridors should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc. Outside the LSR/MLSA network, dispersal habitat is found in all land allocations, and will be provided mainly in Riparian Reserves, in Unmapped LSR's in Matrix and in AMA's, and in wilderness areas (NWFP 1994, ROD pg. 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).

(1) Restoration Opportunities And Potential Projects Between LSR/MLSAs

1. Monitor or provide connectivity between LSR/MLSAs, particularly: Crow Creek to S. Fork Naches (Norse Peak Wilderness); Quartz Creek; the upper Clear Creek; and Rattlesnake Meadows in the William O. Douglas Wilderness.

C. Analysis Within the LSR

1. Unique Habitats And Species

The following is the discussion and results of the Unique Habitat and Species module for the Bumping LSR/Crow MLSA. For more information see Unique Habitats Maps, Unique Habitats and Species Table (page 117-120 or Appendix __), Forest Interior Map and Tables (Appendix 19), Riparian Reserves Map, Road Density tables (Appendix 20). For process see Unique Habitats and Species Module in Appendix 1 for order, explanations and process of modules.

a) **Forest-wide Overview of Unique Habitats and Species**:
Unique Ecosystems Landscape Analysis

Each LSR/MLSA can be evaluated for biodiversity, connectivity and function. The LSR/MLSAs are compared Forest-wide for unique habitats and species abundance, connectivity and function (see Forest-wide Assessment Chapter VII, page 115-116). The Bumping LSR has some diverse habitat, very high amounts of riparian reserves, high amounts of Forest Interior, as well as having a high degree of connectivity. The Crow MLSA has diverse habitats, especially late successional forests.

The most unusual thing about these areas are the highest amounts of wet and riparian vegetation, wet late successional forest and the highest amount of Forest Interior on the Forest.

Forest-wide the Bumping LSR is in the group of high quality for connectivity and function, and moderate quality for unique habitats and species abundance. The Crow MLSA is high quality for unique habitat and species abundance, for connectivity and for function Table I-8 below describes some features of unique habitats and species analysis.

Table I-8, Unique Habitats Overview by LSR/MLSA

UNIQUE HABITATS	BUMPING LSR	CROW MLSA
Total Acreage in LSR/MLSA	14,898 acres	12,479 acres
Non-Forest Vegetation	12% (1,731 acres)	10% (1,281 acres)
Riparian Reserves	26% (3,947 acres) **	14% (1,709 acres)
Late Successional/Wetter	61% (9,149 acres) *	78% (9,712 acres) **
Dense Dry Forest or Dry Late-successional Forest	1% (165 acres)	3% (412 acres)
Forest Interior	48% (7,175 acres) **	28% (3,485 acres)*
Wildlife Species - Known L-S and PETS	48 species *	32 species
Plant Species - Known PETS, S&M, or L-S Associated species.	29 species	33 species *
Past Timber Harvest Activities	low amounts, 4+%	moderate amounts >11%
Security Habitat	Low amounts 26% (3,839 acres)	low amounts 28% (3,551 acres)

Open Road/Motorized Trail Density	moderate road/trail density, 1.98 miles per square mile	moderate road/trail density, 2.21 miles per square mile
Roads and Trails in Riparian Reserves	high road/trail density, 2.51 miles per square mile	high road/trail density, 2.42 miles per square mile

* high amounts Forest-wide, ** highest amounts on Forest,

The Bumping LSR/Crow MLSA are not within noted distribution centers of rarity and endemisim for animal and plant species, as per Columbia Basin Ecosystem Plan (Marcot et al, 1995 Draft). The Cedar Creek Potential Research Natural Area, is adjacent to the Bumping LSR. It is in the W.O.D. Wilderness and was noted in the WNF Plan for mixed old growth conifer/shrub in the Pacific silver fir series (Barten Creek may meet this need). There are no Special Interest Areas identified in the WNF Plan.

Identified areas of high abundance, connectivity and function for unique habitats and species within the Bumping/Crow LSR/ MLSAs are:

1. **BUMPING LSR:**
    - **Bumping to Indian and Rattlesnake**: Riparian Reserves, Wetlands, Talus, Forest Interior, Excellent Security Habitat, PETS Spp., Connectivity.
    - **Deep Creek/Bumping:** Forest Interior, Security Habitat, natural opening, wetlands, riparian reserves, spotted owls.
    - **Goose Prairie** - Meadows, wet lands, riparian reserves, Forest Interior, Talus.
    - **Rattlesnake Meadows/Strawberry Meadows** - Connectivity.
2. **CROW MLSA**:
    - **Fifes Ridge** - Talus, rock, riparian reserves, spotted owl, Forest Interior, mountain goats, Peregrine falcon.
    - **Pinus/Hell/Pine Needle** - Rock, Talus, riparian reserves, spotted owl, Security Habitat, Forest Interior.
    - **Crow/Sand** - riparian reserves, Forest Interior, Security Habitat, meadows, wetlands, spotted owl, talus, rock, marbled murrelet habitat.

- **Crow/Little Naches** - Connectivity to Manastash.

(1) Abundance and Ecological Diversity

Analysis for unique habitats and species abundance and ecological diversity includes acreage for unique plant and animal habitats, juxtaposition of habitats, availability of wilderness or areas of rarity, and known observations from the plant and animal species list. Compared to all the other LSR/MLSA's, the Bumping LSR is in the moderate amount and the Crow is in the high amount for providing high amounts of acreage and wide variety of plant communities and environments. See Forest-Wide LSR/MLSA Chapter VII pages 115-120, Unique Habitats and Species by LSR/MLSA.

(2) Connectivity for Unique Habitats and Species

Analysis for unique habitat connectivity includes the amount, percent and number of patches of late successional habitat, forest interior habitat patches, and the juxtaposition of wilderness and areas of rarity. This also includes past management activities. Compared to all the other LSR/MSLA's, the Bumping LSR/Crow MLSA have high quality connectivity in a landscape pattern for biological flow to sustain unique animal and plant communities.

(3) Process and Function of Unique Habitats and Species

Analysis for the function of habitats includes development and maintenance of unique ecosystems, including ecological values for unique species and populations. The plant and animal species list for known observations makes up a large part of this analysis, as well as proximity to wilderness and areas of rarity, which sustain habitat function. This also includes past management activities. The Bumping/Crow are in the higher amounts of function, with 2 wilderness areas surrounding the LSR and MLSA, as well as a Potential RNA. See Chapter VII, Forest-Wide Function of the Network for Unique Habitats and Species and Appendix 37 Forest-wide Unique Habitats and Species by LSR/MLSA.

b) Unique Habitats and Species Known Within MLSA

(1) Unique Habitats and Species Site Specific Analysis

The following is a summary of the Unique Habitats and Species Module for the Bumping LSR and Crow MLSA. For more information see Unique Habitats Map at the end of this chapter and Appendix 37, Forest Interior Map and Tables (Appendix 19), Riparian Reserves and Roading Map and Tables (Appendix 20), Late Successional Habitat (Appendix 4 and 5). For process see Unique Habitats and Species Module in Appendix 1 for order, explanations and process of modules.

Table I-9, Unique Habitats and Species, Site Specific Analysis

Habitats and Species	Bumping LSR	Crow MLSA
Riparian Reserves	Over-all 26% of LSR in riparian, very high amounts.	Over-all 11% of LSR in riparian, moderate amounts.
	Streams (3947 acres), Open water 9% (1375 acres), Wet Meadows (9 acres), and Seeps.	Streams (1326 acres), Open water (0 acres), Wet Meadows (0 acres), and Seeps.
Non-Forested Vegetation	Total of 12% (1731 acres) of LSR.	Total of 10% (1281 acres) of MLSA.
	Talus <1% (49 acres), Rock 1% (187 acres), Cliff 0% (0 acres).	Talus 5% (632 acres), Rock 4% (545 acres), Cliff 0% (0 acres).
	Subalpine Meadows 0%, Dry Meadows (73 acres),	Subalpine Meadows trace % (1 acres), Dry Meadows (81 acres),
	Natural Openings trace % (30	Natural Openings trace % (10.

Habitats and Species	Bumping LSR	Crow MLSA
	acres), Shrub/Brushfields trace% (3 acres)	acres), Shrub/Brushfields 0% (0 acres)
Unique Forest Groups	Forest Interior Patches 48% (7175 acres), highest amount on the Forest.	Forest Interior Patches 28% (3485 acres).
	Late Successional Forest (wetter) 61% (9149 acres), high amount on Forest.	Late Successional (wetter) 78% (9712 acres). Very high percentage.
	Deciduous Trees trace , Aspen, Willow, Black Cottonwood.	Deciduous Trees <1% (12 acres), Aspen, Black Cottonwood.
	Disjunct forest - edaphic lodgepole pine, western red cedar, Pacific yew.	Disjunct forest - Pacific yew, western red cedar
	Whitebark Pine/Subalpine Larch trace % (30 acres).	Whitebark Pine/Subalpine Larch 0 %,
	Snags/Logs high-moderate Quality from Landscape Level	Snags/Logs high-moderate Quality from Landscape Level
Animal - Species of Special Status and Late Successional Associated Species	48 Animal Species Known to Occur in LSR/MLSA	32 Animal Species Known to Occur in LSR/MLSA
Threatened, Endangered or Sensitive Species	4 Species: Spotted Owl, CHU, Bull Trout, Common Loon.	4 Species: Bald eagle, Spotted Owl, Peregrine falcon, Bulltrout.
	6 Species of Concern: Harlequin Duck, Goshawk, Wolverine, Olive sided flycatcher, Tailed frog, Cascade frog.	3 Species of Concern: Northern Goshawk, tailed frog, Cascades frog.
Survey & Manage and Protection Buffer	1 Species: Black-backed woodpecker.	1 Species: Flammulated owl
Management Indicator Species (WNF):	10 Species: Spotted Owl, Pileated Woodpecker, 3-toed woodpecker, Primary Cavity Excavators, Ruffed Grouse, Marten, Elk, Mule Deer, Mountain Goat, Cutthroat Trout.	12 Species: Bald eagle, Spotted Owl, Peregrine falcon, Pileated Woodpecker, 3-toed woodpecker, Primary Cavity Excavators, Marten, Elk, Mule Deer, Mountain Goat, Cutthroat Trout, Chinook Salmon.
Migratory Birds	7+ Species: along the streams, rivers, shrub fields, meadows. Common Merganser, Solitary vireo, winter wren, varied thrush,	1 + Species: along the streams, rivers, shrub fields, meadows. Townsend's warbler.

Habitats and Species	Bumping LSR	Crow MLSA
	Wilson's warbler, Townsend's warbler, Hammond's flycatcher.	
Other Late Successional Associated	10+ Species: Barred owl, pygmy owl, saw-whet owl, hairy woodpecker, Williamson's sapsucker, Vaux's swift, brown creeper, Northwest salamander, Long-toed salamander, red-backed vole.	7+ Species: Barred owl, Pygmy owl, sharp-shinned hawk, Hairy woodpecker, Northwest salamander, Long-toed salamander, flying squirrel.
Significant Fish Populations	Fish Species: Bull trout and Cutthroat in Deep Creek of Bumping.	Fish Species: Cutthroat in Crow Creek, Cutthroat in Quartz Creek.
Plants - Late Successional Associated Species and Species of Special Status		
PETS - Plants	0 species: need surveys.	1 species: *Carex interrupta.*
Survey & Manage and Protection and Buffer Plants	Fungi (0 species), Lichens (1 species *Ephromra ureli*), Vascular Plants (0 species) - need surveys.	Fungi (0 species), Lichens (0 species), Vascular Plants (0 species) - need surveys.
Other Plant Species.	0	State monitor species *Hemitomes congestum*
American Indian Uses	Traditional Use Sites: Travel routes up and down valley, lithic scatters.	Traditional Use Sites: camp sites along American River, Travel routes up and down valley, Lithic scatters.
	Vision Quest Sites: Potential vision quest in rock and off major ridges and peaks.	Vision Quest Sites: Potential vision quest in rock and off major ridges and peaks.
	Traditional Food Plants:.	Traditional Food Plants:.
	Food Gathering: fishing, elk and deer hunting.	Food Gathering: fishing, elk and deer hunting.

c) Bumping LSR & Crow MLSA Potential Treatments For Unique Habitats And Species:

- **MONITOR**:
  1. Validate vegetation mapping of unique habitats.
  2. Monitor Cedar Creek Potential RNA, review Barten Creek as an alternative.
  3. Validate unique habitats assumptions, determine guild species use.

4. Monitor, inventory and maintain high amounts of unique habitats and species (areas listed above);
5. Monitor and maintain connectivity corridors. Provide habitat for wide ranging species, that LSR/MLSAs are only a portion of their range, i.e. gray wolf, wolverine and lynx.
6. Survey & Manage prior to activities: Great Gray Owl, Larch Mt. Salamander, Lynx, Mollusks, fungi, lichen, bryophytes, vascular plants and other S&M or P&B species;.

- **WEEDS** (Knapweed, Toadflax, St. John's Wort, Tansy Ragwort, Oxeye Daisy, Scotch Broom, Canada Thistle, Mullein):

7. Hand pulling of tansy ragwort; pull as go Scotch broom; spray & bio control for toad flax; small population pulling & bio controls for knapweed.

- **ROADS**

8. Reduce roads in Forest Interior patches: Sand Creek, West Quartz Creek, and Deep Creek.
9. Reduce roads/trails/campgrounds in riparian reserves, and increase Security Habitat especially in Fifes Creek, Crow Creek, Sand Creek, West Quartz Creek, and Deep Creek.
10. Reduce roads and off road vehicles in mountain goat habitat.
11. Reduce roads and trails in unique habitats: meadows (especially Crow MLSA), talus, wetlands.
12. Reduce open road/motorized trail density.
13. Do road access plan to allow lynx travel/denning/foraging habitats.
14. Retain American Indian access to traditional use sites;

- **HABITAT IMPROVEMENT**

15. Accelerate old plantations towards late successional.
16. Dry meadow restoration and native species composition.
17. Use prescribed fire in ponderosa pine iwth low densitiy and large tree sizes in Crow MLSA.
18. Reduce encroaching trees in some subalpine meadows and shrub fields; where fire historically maintained them as meadows .
19. Reduce fragmentation of wet forest.
20. Use Prescribed Natural Fire for whitebark pine forests, shrub fields and subalpine meadows, in LSR/MLSAs and adjacent Wilderness areas.
21. Reduce impacts from elk herds, especially riparian reserves and areas to accelerate towards late-successional habitat.

- **PROTECT**
  22. Protect riparian areas from elk and cattle grazing, Quartz Creek & Crow Creek.
  23. Protect large trees and screen near cliffs, caves, meadows;
  24. Protect caves and cliff/caves for 250' around (roads/trails/cutting) to benefit bat species, mountain goats and peregrine falcon eyrie.
  25. Protect 300' around subalpine meadows. Buffer around meadows.
  26. Meet high end snag levels and spp
- **COORDINATE**
  27. Coordinate unique habitat management in Goose Prairie area for habitat diversity and for connectivity.
  28. Coordinate with Washington DFW, elk overgrazing meadows and riparian.
- **INTERPRET**
  29. Interpret values and protect/maintain unique habitats and species, especially along Highway corridor and within campgrounds and trailheads.

d) Snag/Log/Green Tree Recruitment Module

The following is the discussion and results of the Snag/Log/Green Tree Recruitment sub-set module of the Unique Habitats module for the Bumping LSR and the Crow MLSA This analysis revealed that both of the Bumping LSR and Crow MLSA have a high to medium degree of available snags and future green tree recruitment snags and logs. See Appendix 1, Unique Habitats module and Snag sub-module, for order, explanations and process of modules. Snag quality can be judged by a continual supply of tree structure in various stages of decay, size and species. This can be best provided in the moist and wet vegetation groups, areas with large amounts of late-successional habitat, areas with little fragmentation, areas with high amounts of forest interior, and areas with high functioning riparian reserves.

Table --I-10--, Bumping LSR Snag Habitat Quality/Landscape Scale

HIGH QUALITY ***	*MEDIUM QUALITY	LOW QUALITY
Moist & Wet Veg Groups **86%**	Subalpine Fir & Mesic Veg 0%	**Dry** & Whitebark Veg 2%
>60% LS (non-dry) Habitat **61% ***	15% - 60% LS Habitat	<15% LS Habitat 1%
80% - 100% LS (all) Habitat	40% - 80% LS/M Habitat **62%**	<40% LS/M Habitat
> 30% Forest Interior (non-dry) **48% ****	15% -29% Forest Int Non-dry	<15% Forest Interior Not Dry 0%
>10% Forest Interior Dry	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry **0%**
>16% in Riparian Reserves	10% to 16% Riparian	<10% in Rip Res

HIGH QUALITY ***	*MEDIUM QUALITY	LOW QUALITY
26%**	Reserves	
0 Mi/Sq Mi Any Rds in Rip Res	0 to 1 Mi/Sq Mi Rds in Rip Res	> 1 Mi/Sq Mi Rd Rip Res **2.51 mi/sq/mi**
< 1 Mi/Sq Mi Open Roads	1 Mi to 2.5 Mi/Sq Mi Roads **1.98 mi/sq/mi**	> 2.5 Mi/Sq Mi Roads
>70% Security Habitat	50% to 70% Security Habitat	<50% Security Habitat **26%**
>10% in Past Burns-snags available		<10% in Past Burns **<10%**
>50% Insect/Pathogens (see Insect/Disease Write Up) **> 50 %**	25% - 50% Insect/Pathogens	< 25% Insect/Pathogens
<10% Past CC Harvest **1%**	11% - 25% Past CC Harvest	>25% Past CC Harvest
<10% Past PC Harvest **3%**	11% - 50% Past PC Harvest	>50% Past PC Harvest

* indicates high values Forest-wide, ** indicates highest amounts on Forest.

(Percentages in bold indicate values for LSR) *** indicates overall rating for snag quality.

Table I-11, Crow MLSA, Snag Habitat Quality/Landscape Scale

HIGH QUALITY ***	*MEDIUM QUALITY	LOW QUALITY
Moist & Wet Veg Groups **86%**	**Subalpine Fir** & Mesic Veg Trace %	**Dry** & Whitebark Veg 3%
>60% LS (non-dry) Habitat **78% ****	15% - 60% LS Habitat	<15% LS Habitat
80% - 100% LS (all) Habitat **81%**	40% - 80% LS/M Habitat 60%	<40% LS/M Habitat
> 30% Forest Interior (non-dry)	15% -29% Forest Int Non-dry **28% ***	<15% Forest Interior Not Dry
>10% Forest Interior Dry	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry **0%**
>16% in Riparian Reserves	10% to 16% Riparian Reserves **11%**	<10% in Rip Res
0 Mi/Sq Mi Any Rds in Rip Res	0 to 1 Mi/Sq Mi Rds in Rip Res	> 1 Mi/Sq Mi Rd Rip Res **2.42 mi/sq/mi**
< 1 Mi/Sq Mi Open Roads	1 Mi to 2.5 Mi/Sq Mi Roads **2.21 mi/sq/mi**	> 2.5 Mi/Sq Mi Roads
>70% Security Habitat	50% to 70% Security Habitat	<50% Security Habitat **28%**
>10% in Past Burns-snags available		<10% in Past Burns **<10%**
>50% Insect/Pathogens (see Insect/Disease Write Up) **>50%**	25% - 50% Insect/Pathogens	< 25% Insect/Pathogens

HIGH QUALITY ***	*MEDIUM QUALITY	LOW QUALITY
<10% Past CC Harvest **7%**	11% - 25% Past CC Harvest	>25% Past CC Harvest
<10% Past PC Harvest	11% - 50% Past PC Harvest **11-50%**	>50% Past PC Harvest

* indicates high values Forest-wide, ** indicates highest amounts on Forest

(Percentages in bold indicate values for MLSA)

(1) Restoration Opportunities And Potential Projects For Snags/Logs

1. Reduce roads in Forest Interior patches: Sand Creek, West Quartz Creek, and Deep Creek.
2. Reduce roads/trails/campgrounds in riparian reserves, and increase Security Habitat especially in Fifes Creek, Crow Creek, Sand Creek, West Quartz Creek, and Deep Creek.
3. Accelerate old plantations towards late successional.
4. Monitor for snag dependent species, and snag longevity, especially in old plantations.
5. Complete snag analysis on 40 acre grid prior to any reduction of forest structure habitat. Retain snags at high end of range. Manage insects and disease at endemic levels.

e) Species with Special Status (Plant)

Within the Crow MLSA and Bumping LSR, there is potential habitat for a number of special status species, however, few surveys have been carried out to determine presence or absence. Surveys should be carried out in conjunction with restoration projects, as well as surveys independent of other activities. It is important that species ranges are known so that better estimates of species viability can be assessed. In addition, little is known about most rare species habitat and biological requirements, and inventories provide a first and necessary step in obtaining this information.

There is one Forest Service sensitive species and one Washington state monitor species within the Crow MLSA; *Carex interrupta* and *Hemitomes congestum*, respectively. Information regarding the biology or ecology of these species is limited, but some information is summarized here.

Carex interrupta is well documented from streambanks along the Little Naches and Naches Rivers. In general,. *Carex interrupta* typically occurs on along rocky, sandy streambanks and is generally associated with running water. *Hemitomes congestum* is typically supported in moist grand fir/mesic western hemlock communities. This species is sapraphitic on the roots of conifers and is most often associated with down wood in relatively shaded forest communities.

f) Survey and Manage Species (Plant)

There is a limited number of survey and manage plant species documented from the Crow MLSA (Appendix 7 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas"). No surveys have been conducted within the Bumping LSR. Several species are suspected to occur in both areas. (Appendix 7 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas"). The ROD provides standards and guidelines for survey and manage species, and these should be addressed within the Crow MLSA and Bumping LSR. An important point is that only very general surveys have been completed for non-vascular plants and projects should be initiated which carry out surveys which comply with current direction and survey protocol.

2. Plant Connectivity

Connectivity can also be addressed by analyzing the connectedness of habitats or species populations within the MLSA/LSR. Within the Crow MLSA and Bumping LSR, most forest groups are relatively well connected. Disjunct species populations result from inherent breaks or openings in the landscape. At this time, information is not available to complete this type of analysis for survey and manage species within the Crow MLSA and Bumping LSR.

3. Wildlife Connectivity

a) Wildlife Connectivity for the Crow MLSA

The following is a result of applying the "within LSR/MLSA connectivity assessment process" to the Crow MLSA.

Table I-12, Connectivity Rankings for Crow MLSA

Connectivity Variable	Dry	MGF	Wet	RR	Overall
% Late-success or Fire Climax	L	H	H	H	**H**
Open Road Density	L	M	M	L	**M**
Security Habitat	L	L	L	L	**L**
Forest Interior Roads	L	L	L	L	**L**
% Forest Interior*	L	L	L	L	**L**

Currently, the availability of habitat in a late-successional or fire-climax condition is high in all vegetation groups except the dry forests. Restoration projects that promote the development of fire-climax conditions would improve the connectivity in this forest group. The overall open road density and level of security habitat provides for a low to moderate level of connectivity. The current level of forest interior connectivity is considered to be low, as a result of habitat patches being fragmented by roads. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis. Site-specific analysis is also necessary to more adequately address connectivity for the less mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities

(a) Dry Forest Group

There is an opportunity to improve connectivity within the dry forest vegetation group through the implementation of thinning, prescribed fires, and road closures with associated revegetation.

(b) Moist Grand Fir, Wet Forest, Riparian Reserves

There is an opportunity to improve the connectivity within the moist grand fir, wet forest group, and riparian reserves by reducing the level of roads in the forest interior patches.

b) Wildlife Connectivity for the Bumping LSR

The following is a result of applying the "within LSR/MLSA connectivity assessment process" to the Bumping LSR.

Table I-13, Connectivity Rankings for Bumping LSR

Connectivity Variable	Dry	MGF	WET	RR	Overall
% Late-success or Fire Climax	M	H	M	M	**M**
Open Road Density	L	L	L	M	**L**
Security Habitat	L	L	L	M	**L**
Forest Interior Roads	L	L	L	L	**L**
% Forest Interior*	L	L	L	L	**L**

Currently, the availability of habitat in a late-successional or fire-climax condition is moderate in the dry forests, high in the moist grand fir, and moderate in the wet forests. Restoration projects that promote the development of fire-climax conditions would improve the connectivity in this forest group. The overall open road density and level of security habitat provides for a low level of connectivity. The current level of forest interior connectivity is considered to be low. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis. Site-specific analysis is also necessary to more adequately address connectivity for the less mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities

(a) Dry Forest Group

There is an opportunity to improve connectivity within the dry forest vegetation group through the implementation of thinning, prescribed fires, and road closures with associated revegetation.

(b) Moist Grand Fir, Wet Forest, Riparian Reserves

There is an opportunity to improve habitat connectivity within riparian reserves and interior forest patches by reducing the number of roads. This could include relocating roads or revegetating them to provide for connectivity for low mobility wildlife species. In addition, it may be possible to use silvicultural methods to promote the development of late-successional forest structures in areas not currently in a late-successional condition.

4. Disturbance Risk Analysis

The combined area encompassed by the Bumping LSR and Crow MLSA is 27,468 acres. Sixty-two percent of the Bumping LSR and 81% of the Crow MLSA contain late-successional forest; with 30% of the LSR (4,525 acres) and 65% of the MLSA (8,149 acres) in low sustainability composition/structure stand types. Half of the Bumping LSR and 19% of the Crow MLSA fall within the wet forest group. These reserves are more sustainable with respect to fire than many others on the forest. Although not at imminent risk to fires, both the LSR and MLSA are currently impacted by serious root disease problems that contribute to increased mortality and fuel buildups. *Phellinus weirii* and *Heterobasidion annosum* (laminated root rot and annosus root disease) are the two major pathogens involved. These root decay pathogens are seriously impacting vegetation in the mesic western hemlock and moist grand fir vegetation types. Annosus root disease is also found throughout the wet forest group, especially in stands dominated by mountain hemlock. These pathogens along with the dwarf mistletoe of western larch and white pine blister rust will eventually reduce the number of large, live trees within the reserves. While these disturbance agents actually increase late-

successional composition, they also can reduce structural complexity in some mid to late successional stands. In the Bumping LSR and Crow MLSA, mortality from root decay pathogens and fir engraver beetles is occurring at higher than endemic levels.

The two reserves have been heavily grazed by both domestic livestock and elk. At the turn of the century, grazing pressure was mainly from sheep and later cattle. Presently, most of the damage occurs from elk grazing, with past damage from livestock grazing continuing to exert an influence on successional trajectories in some meadows. Elk herds are kept at unnaturally high levels as a result of social pressures, especially from hunters. Elk herds are maintained throughout the winter at state feeding stations. Deer and elk grazing and browsing have eliminated the shrub component of stands in some areas. Many native grasses are being replaced by introduced species or noxious weeds. In addition, soil compaction associated with high grazing levels is changing forests from more mesic to drier types. This is particularly true where multiple harvests have occurred in flatter, drier portions of the reserves and in meadows, including higher elevation, wet meadows.

The Crow MLSA receives heavy use by ORV (off road vehicle) operators. This is especially true in some of the dry meadows. Drier portions of the reserves subject to continuous disturbance from ORVs are losing native vegetation to introduced species and noxious weeds.

The following information on insect activity in the Bumping LSR and Crow MLSA is from data collected during the aerial surveys conducted by Region 6 Insect and Disease Group. Light infestations or damage on less than 100 acres are not reported. Past insect data for these reserves extends back only to 1980.

- Mountain pine beetle (whitebark pine): 1995
- Mountain pine beetle (western white pine): 1981-84, 1986-93, 1995
- Western pine beetle: 1986, 1989
- Fir engraver: 1989, 1991
- Douglas-fir beetle: 1988-89

Susceptibility of the Bumping LSR and Crow MLSA to fires, insects, and pathogens is shown in Table I-14. Mortality from biotic disturbance agents will be greatest where host continuity across the landscape is high and where there is overlapping moderate to high risk among two or more disturbance agents that act synergistically. Risk associated with biotic disturbance agents generally elevates the risk of catastrophic fires by potentially increasing fuel levels; this is especially true in the dry forest vegetation group and in vegetation upslope from or surrounded by dry forests.

Table I-14, Disturbance Matrix for Bumping LSR / Crow MLSA

Veg Type		Dwarf Mistletoe		Root Disease									
	Fire	DF	WL	AROS	HEAN	PHWE	WPBR	WSB	DFB	FE	MPB	WPB	Total
10	L	L	-	M	M	M	-	L	L	L	L	L	L
11	M	M	L	M	M	M	-	M	L	L	L	L	M
12	H	H	L	M	M	H	-	H	H	H	L	H	H
13	H	H	L	H	H	H	-	H	M	H	M	H	H
30	M	M	M	M	M	M	H	L	L	L	-	L	M
31	M	M	M	M	M	M	H	L	L	M	M	L	M
32	H	H	H	L	H	H	H	H	M	H	M	M	H
33	H	H	H	M	H	H	H	H	M	H	M	M	H

Veg Type		Dwarf Mistletoe		Root Disease									
	Fire	DF	WL	AROS	HEAN	PHWE	WPBR	WSB	DFB	FE	MPB	WPB	Total
34	M	M	M	M	M	M	H	L	L	L	-	L	M
35	M	M	M	M	M	M	H	L	L	M	-	L	M
36	H	H	H	L	H	H	H	M	M	H	-	L	H
37	H	H	H	M	H	H	H	M	M	H	-	L	H
40	L	L	L	L	L	L	M	L	L	L	-	L	L
41	H	L	L	L	L	L	H	L	L	L	H	L	H
42	H	L	L	L	M	L	H	L	M	M	H	M	H
60	M	L	L	L	M	M	H	L	L	L	-	L	M
61	M	L	L	L	M	M	H	L	L	L	-	L	M
62	M	L	L	L	M	M	H	L	M	M	-	L	M
64	L	L	L	L	M	M	H	L	L	L	-	L	L
65	L	L	L	L	M	M	H	L	L	L	-	L	L
71	M	-	-	L	L	L	M	L	L	M	M	L	M

Key to Column Headings: PP = Ponderosa Pine, DF = Douglas-fir, WL = Western Larch, PIPO = Ponderosa Pine; PSME = Douglas-fir; LAOC = Western Larch; AROS = Armillaria root disease; HEAN = Annosus root disease; WPBR = White Pine Blister Rust; WSB = Western Spruce Budworm; DFB = Douglas-fir Beetle; MPB = Mountain Pine Beetle; WPB = Western Pine Beetle.

Key to Letters "-" = no risk = 0; "L" = low risk, "M" = moderate risk, "H" = high risk

Veg Type codes: refer to Appendix 3, in the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas, Wenatchee National Forest"

Opportunities exist in the Crow MLSA to improve conditions within past harvest units by thinning (PCT) and reducing amounts of root-rot susceptible species (true firs and hemlocks). In both the Bumping LSR and Crow MLSA,, commercial thinning in single-layer stands will accelerate transition to multiple canopy layers. Small group selection harvests in areas with root diseases can promote diversity with respect to age and size; these areas should be planted with early successional disease resistant species.

5. Northern Spotted Owl

The following is the discussion and results of the within LSR/MLSA Spotted Owl Module for the Bumping LSR/Crow MLSA. There are a total of 9 spotted owls in these 2 LSR/MLSAs, and an additional 5 more pairs adjacent to these reserves. The Bumping LSR and the Crow MLSA have primarily wetter forest habitat. The spotted owl module reviews the home range sites for spotted owls, the spotted owl pair goals for LSR/MLSAs, as well as connectivity within the LSR/MLSAs. . See Table 3 ?, "Individual LSR/MLSA Spotted Owl Analysis and Objectives", for home range acreage needs, pair goals and existing status of spotted owl pairs. Appendix 1 further describes the order, explanations and process of modules, specifically the "Northern Spotted Owl Module, Individual LSR/MLSA". Also see Suitable Spotted Owl/Dispersal Habitat and Activity Center map and tables, Forest Interior Map and tables, Riparian Reserve map and tables and Security Habitat map and tables.

Table I-15, Individual LSR/MLSA Spotted Owl Analysis and Objectives

WNF	LSR/MLSA	SPOTTED OWL	S.OWL	EXISTING	# OF

LSR & MLSA	IN DRY OR WETTER FOREST VEG		PAIR HOME RANGE ACREAGE FOR LSR OR MLSA			PAIRS to MAINTAIN EXISTING OR CHU GOALS?		S.OWL PAIRS LSR & MLSA	POTEN-TIAL, SUSTAIN-ABLE OWLS
	DRY LSR OR MLSA	**WET LSR OR MLSA**	**Thres-hold 2,663 acres per Pair**	**Ind Owl is Wet or Dry**	**Tar-get 3,994 acres per Pair**	**Main-tain Exist-ing # Pair**	**Meet CHU Goal # Pair**	**# Spotted Owl Pairs Known as of 1996 Field Season**	**# Pairs (2663a) Sustainable Based on Potential Wetter Habitat**
Bumping LSR		Wet			Yes		4+ Pairs	4 Pairs	5 Pairs Threshold (3 Pr Targ +Wildns)
Crow MLSA		Wet	Yes			5 Pair (+ wild)		5 Pairs	4 Pairs (plus Wildness)
Milk MLSA		Wet	Yes			3 Pair	CHU hab	3 Pairs	4 Pairs

LSRs and MLSAs are important for maintaining well distributed and well-connected spotted owl populations. The recovery of the federally Threatened northern spotted owl is highlighted in management strategies within LSRs and MLSAs (See Appendix 1 - Northern Spotted Owl Module, Individual LSR/MLSA). Protection and enhancement of habitat includes providing late successional and old growth forest ecosystems, and habitat for late successional forest related species, including the northern spotted owl (NWFP A-4, 1994). Spotted owl management strategies include:

- LSRs and MLSAs will meet the goals for the numbers of owl pairs within each LSR or MLSA (NWFP 1994 B-4; NWFP C-9; FSEIS Appendix G, Biological Opinion, 1994; USDI. 1992. Northern Spotted Owl Recovery Plan, and USFWS Memorandum, 1991);
- Each spotted owl's 100 acre Activity Center will have the best quality habitat established and retained;
- Each spotted owl's 500 acre Core Area will have the best quality habitat and habitat will be retained;
- Each spotted owl home range will meet threshold acreage's (2,663 acres) as a minimum. Wetter owl sites in LSRs well meet target or optimal habitat of 3,994 acres.;
- Sustainable/suitable spotted owl habitat outside home ranges will be maintained ;
- Dispersal habitat within and outside LSR/MLSA will be provided; (NWFP 1994, ROD pg. 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).
- Habitat conditions for long-term (> 50 years) sustainable nesting/roosting/foraging habitat will be improved (see DECs and DCs in Forest-wide document, Chapter III PP 87-95); and
- The risk of habitat loss and nest site loss will be reduced (NWFP 1994, C-12 to 16, C-26);

The Bumping LSR and Crow MLSA are primarily in wetter forest habitats (87% of Bumping LSR and 86% of the Crow MLSA).There are 4 spotted owl sites within Bumping LSR and 5 sites within the Crow MLSA. There is a totals of 9 spotted owl sites, of which all are on wetter forests. The Desired Condition for "wetter" spotted owl home ranges in LSRs is 60% of the 1.8 mile home range radius, which is 3,994 acres. There no dry owl sites in the LSR/MLSA. The Desired Condition for MLSA spotted owl pairs is 40% of the home range, which is 2,663 acres. See description of habitat in DECs and DCs, Chapter VII page 92-95. The Bumping LSR/Crow MLSA are wetter reserves, which will manage for spotted owl habitat, over risk and hazard reduction. The LSRs, in general, accept more risk from fire than does management in MLSAs. The MLSAs, in general, accept more risk from fire, than does management in Matrix.

The Bumping LSR/Crow MLSA together have 9 activity centers for spotted owls, with an additional 5 sites immediately adjacent in Wilderness. The description of the Bumping Critical Habitat Unit, noted the strong population cluster for the sub-province. These owl sites are also highly reproductive, 8 of the 9 sites within the LSR/MLSA have reproduced young. Counting all owl sites associated with these two LSR/MLSAs, 10 of 14 sites have reproduced young. There are three main cluster groups for these owls. One group is in the Deep Creek Bumping area (3 owl pairs). One cluster is in the Bumping Lake/Bumping River area (4 owl pairs, plus 3 adjacent pairs). The last group is clustered in the Crow/American River/Sand Creek areas (7 pairs). Clusters of owls provide better function for LSR and species recovery, than do isolated owl sites.

Though private and non-federal lands are sometimes within LSR/MLSA boundaries, they do not apply towards management for late-successional habitat. There is one private land parcel within the LSR/MLSA (Goose Prairie).

a) Suitable Spotted Owl Habitat

(1) Bumping LSR - Spotted Owl Habitat

The existing amount of nesting/roosting/foraging habitat within the Bumping LSR is 9,238 acres (62%) of spotted owl habitat. There are currently 4 pairs of spotted owls in this LSR. The existing habitat could support 3+ pairs of spotted owls at threshold acreage (2,663 acres/pair) or 2+ pairs at target amounts (3,994 acres/pair). See Table 4?, "Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs", which displays the potential number of owl pairs for the various scenarios. The LSR is predominately in the wet forest groups, with some moist forest. This wetter spotted owl habitat has a higher chance of Sustainability, than dry and mesic forest groups. There is 296 acres (2 %) dry forests, and no mesic forest groups in this LSR.

There is potential for spotted owl habitat to reach 13,126 acres (88%) in Bumping LSR. This includes only about 200 acres, that are currently in created opening or sapling/pole, which will grow into suitable spotted owl habitat in the next 50 to 120 years. These acreage's should be accelerated towards late successional habitat.

Sustainable spotted owl habitat could be 12,961 (86%) in the wet and moist forests. This habitat would be sustainable over time (50+ years). The LSR currently supports 4 pairs of spotted owls, with an additional 3 pairs in adjacent Wilderness. Over time, it could sustain 4.9 pairs of threshold acreage or 3.2 pairs of owls with target acreage (3,994 acres/pair). The CHU goal of this LSR is to support 4+ pairs, this is very likely.

Dispersal habitat (which may grow into foraging, roosting and nesting), covers 3,422 acres (23%) of the Bumping LSR. It is predominately in the wet and moist forest groups, with some mix of the others. (See Appendix 13 "Suitable Habitat Acreage's", Appendix 4 & 5 "Vegetation Acreage's", and

Suitable Spotted Owl Habitat Maps of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas"). The most contiguous and sustainable suitable spotted owl habitat in the LSR is from Copper Creek to Deep Creek to upper Bumping River (See Forest Interior Map and Suitable Spotted Owl Habitat Map). There is much dispersal habitat in the adjacent Wilderness area, dispersal habitat in these areas should be allowed to advance successionally, to provide added owl habitat.

Potential disruption to spotted owl habitat from risk of fire is low to moderate. This LSR has the highest amounts of contiguous forest (48% Forest Interior), of all the LSR/MLSAs on the Forest. The LSR appears to be functioning well towards spotted owl recovery.

Habitat analysis for the Bumping LSR/Crow MLSA is based on vegetation mapping, and a model of spotted owl habitat structure. The map and acreage's should be validated prior to project implementation.

This LSR/MLSA is part of the reserves that are predicted to provide the needs for spotted owl recovery over time (50+ years). Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. The reserves function for connectivity and spotted owl home ranges. With the exception of a few LSR/MLSAs that are not sustainable, it is concluded that the LSR/MLSA reserves on the Wenatchee National Forest meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing. (See Appendix 1, "Forest-wide Spotted Owl Module" and "Individual LSR/MLSA Spotted Owl Module")

(2) Crow MLSA - Spotted Owl Habitat

The existing amount of nesting/roosting/foraging habitat within the Crow MLSA is 9,950 acres (80%). This is the highest percentage of spotted owl habitat for any LSR/MLSA on the Forest. There are 5 pairs of spotted owls, and one additional immediately adjacent to the MLSA. The existing habitat could support 3+ pairs of spotted owls at threshold acreage. See Table 4?, "Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs". The MLSA is primarily in moist (67%) and wet (19%) forest types, with dry (3%) forests. The moist spotted owl habitat has a higher chance of Sustainability, than does the dry forest.

There is potential for spotted owl habitat to reach 11,198 acres (90%) in the Crow MLSA. This includes about 900 acres (7%), that are currently in created opening or sapling/pole, which could grow into suitable spotted owl habitat in the next 50 to 120 years. In the moist/wet forests, these acreage's should be accelerated towards late successional habitat.

Sustainable spotted owl habitat could be 10,786 (86%) in the wet and moist forests. This habitat would be sustainable over time (50+ years). The MLSA currently supports 5 pairs of spotted owls, with an additional owl pair immediately adjacent in the Wilderness. Over time it could sustain 4 pairs of owls with threshold acreage (2,663 acres/pair). The goal of this MLSA is to support 4 pairs; this is likely. Some of the MLSA is in within Wilderness.

Dispersal habitat covers only 381 acres (3%) of the Crow MLSA. It is predominately in moist forest group. (See Appendix 13 "Suitable Habitat Acreage's", Appendix 4 & 5 "Vegetation Acreage's", and Suitable Spotted Owl Habitat Maps of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas"). The most contiguous and sustainable suitable spotted owl habitat in the MLSA is in Crow Creek and Sand Creek area (See Forest Interior Map and Suitable Spotted Owl Habitat Map). The Norse Peak and W.O. Douglas Wilderness areas are adjacent to this MLSA. and provide habitat for connectivity.

Potential disruption to spotted owl habitat from risk of fire is moderate. This MLSA has some natural fragmentation, it has also been fragmented by past harvest activities. Forest Interior is 28%, moderate amounts compared to other Forest LSR/MLSAs. The MLSA appears to be functioning well towards spotted owl recovery.

Table I-16, Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs

LSR or MLSA	1996 Known Pairs & Singles	CHU S.Owl Pair Goals	Existing Suitable Spotted Owl Habitat			Potential Suitable Spotted Owl Habitat			Sustainable Suitable Spotted Owl Habitat			% Forest Interior
			Total Acres	Threshold Pairs	Target Pairs	Total Acres	Thres-hold Pair	Target Pair	Total Acres	Threshold Pair	Target Pair	
Crow DM14	5 sites +1[1] **WILDERNESS**	--	9950	3.7	NA	11198	4.2	NA	10786	4 +wild	NA	28%
Bumping RW126	4 sites + 4[1] **WILDERNESS**	4+ Pr	9238	3.5 Pairs	2.3 Pairs	13126	4.9 Pairs	3.3 Pairs	12961	4.9 Pairs	3.2 Pairs	48%

This LSR/MLSA is part of the reserves that are predicted to provide the needs for spotted owl recovery over time (50+ years). Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. The reserves function for connectivity and spotted owl home ranges. With the exception of a few LSR/MLSAs that are not sustainable, it is concluded that the LSR/MLSA reserves on the Wenatchee National Forest meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing. (See Appendix 1, "Forest-wide Spotted Owl Module" and "Individual LSR/MLSA Spotted Owl Module")

b) Spotted Owl Home Ranges

The goals for the Bumping LSR spotted owl home range is Target/Optimum habitat (3,994 acres within 1.8 miles radius). The goals for the Crow MLSA home range is Threshold (2,663 acres). Within the Bumping LSR/Crow MLSA there are 9 spotted owl activity centers, an additional 5 sites are outside, immediately adjacent in Wilderness.

The estimated amount of habitat within a 1.8 mile radius of the 14 activity centers is shown in Table 5? "Suitable Spotted Owl Habitat" below. There is one Wilderness owl (SO896) below threshold acreage, adjacent to the Bumping LSR. There are 2 owls (SO854 and SO874) at Threshold acreage, both within the Crow MLSA and meet MLSA acreage goals. The remaining 8 owls are at optimal levels, in the Bumping LSR and the Crow MLSA. Over-time it is expected that some owl sites may shift to more contiguous. Spotted owl habitat acreage needs to be validated and site centers monitored. Spotted owl habitat acreage should be re-evaluated, especially for owls: SO896, SO854 and SO874. It appears that spotted owls may use elliptical, rather than circular home ranges, especially those owls near Bumping Lake (SO896, SO871 as well as SO854)

The spotted owl below threshold (SO896 Bumping Lake) is not within the Bumping LSR, it is immediately adjacent in Wilderness habitat and should be monitored. All spotted owls within the Bumping LSR/Crow MLSA meet the goals for home range acreage's. Spotted owls could benefit from accelerating forests towards late-successional habitat. This should occur in wet/moist forest groups in dispersal habitat and in past harvest units. See Table 5? "Suitable Spotted Owl Habitat" for prioritization and restoration opportunities.

There are 3 sites that may be higher risk from fire outside the LSR/MLSA, they are SO820 (Cedar Springs). SO854 (Pine Needles CG) and SO874 (Hall Creek).

There is some dispersal habitat in most owl sites. See Table I-18.

The five spotted owl sites adjacent to the Bumping LSR/Crow MLSA (SO825, SO851, SO871, SO896, SO852) provide genetic interchange and are connected in clusters to interior owls. These adjacent sites should be monitored, it is possible that they may move nest sites into the LSR/MLSA, over time. The LSR/MLSA appear to be fully occupied by spotted owls..

For Forest Interior (contiguous forest blocks), the LSR/MLSA is among the highest on the Forest. The Forest Interior could be less fragmented over time, where it is not naturally fragmented habitat. Potential area for more contiguous habitat is near roads in the American River, West Quartz Creek, lower Crow Creek areas. There is potential to restore sustainable habitat in the wetter forest groups. Overtime, it is expected that higher quality and more sustainable habitat will be restored to the wetter LSR/MLSAs. The drier forests within the LSR/MLSAs will eventually be managed for other late-successional species.

The adjacent forested habitats of the Norse Peak and William O. Douglas Wilderness areas are important for the functioning of connectivity. Connectivity potential is in Crow Creek, Sand Creek, American River of NPW. And upper Bumping River, Deep Creek, Indian Creek, Rattlesnake Meadows in the WODW.

Table I-17, Suitable Spotted Habitat, Bumping LSR/Crow MLSA (1996 S. Owl Activity Centers, App 12a)

	SUITABLE SPOTTED OWL HABITAT[10]												Restore
LSR & MLSA	1.8 mile Circle Around Activity Center						0.7 mile Circle Around Activity Center						Opps & Priority
Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet	Total	* & #
BUMPING													
SO803 Goat Cr	276	0	4619			**4895**	53	0	771			**824**	**m**
SO820 Cedar Springs	68	0	3,988	19	282	**4,357**	17	0	779	0	0	**796**	**m,p #3**
SO823 Copper City	0	0	0	0	4,680	**4,680**	0	0	0	0	782	**782**	**m**
SO825[1] Deep Cr Wild	0	0	172	0	4,479	4,651	0	0	0	0	730	730	**m**
SO851[1] Sunrise Cr Wild	411	0	4,293	259	509	5,473	37	0	749	0	55	841	**m #4**

	SUITABLE SPOTTED OWL HABITAT[10]												Restore
LSR & MLSA	1.8 mile Circle Around Activity Center						0.7 mile Circle Around Activity Center						Opps & Priority
Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet	Total	* & #
SO860 Deep CG	0	0	0	0	4,880	**4,880**	0	0	0	0	727	**727**	**m**
SO871[1] Boulder Cr Wild	0	0	84	71	3,347	3,501	0	0	23	24	664	711	**m,a**
SO896[1] Bumping Lk Wild	0	0	1,777	338	1,033	3,147	0	0	153	30	32	215	**m,a #5**
CROW													
SO805 Crow W. Wild	0	0	898	118	3,797	**4,813**	0	0	51	21	752	**824**	**m**
SO824 W.Quartz	82	0	2,984	0	1,341	**4,407**	0	0	455	0	321	**775**	**m**
SO852[1] American Rdg Ski Bowl - wilderness	186	0	3,175	0	718	4,079	40	0	577	0	25	641	**m**
SO854 Pine Needle CG Wild	233	0	3,342	0	413	**3,988**	22	0	699	0	30	**751**	**m,a,p #2**
SO874 Hall Cr	278	0	2,724	23	936	**3,961**	137	0	399	0	28	**564**	**m,p,a #1**
SO886 Crow Cr East	0	0	4,921	0	232	**5,153**	0	0	698	0	0	**698**	**m**
Historical Owls													
Unknown													

1 **Owl Site adjacent to LSR/MLSA.** Less than 1400' from Boundary.

Below Threshold: < 2,663 ac suitable spotted owl habitat in 1.8 mi circle **OR** < 500 ac suitable spotted owl habitat in 0.7 mi circle.

At Threshold: 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

Optimum/Target: > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

10 **Dry suitable spotted owl habitat** includes vegetation code 12 where size/structure is multistory greater than 9" DBH;

mesic includes code 22; and

wetter includes:

Moist codes 32, 36,

SAF codes 42

Wet codes 62, 64.

* **Restoration Opportunities**: **M** = Monitor Habitat & Site; **P** = Protect Habitat From Risk; **A** = Accelerate Habitat Towards Nesting, roosting, Foraging; **C** = Coordinate Habitat and Site Management, or Acquire Habitat.

Table I-18, Dispersal Habitat for Spotted Owls in Bumping LSR/Crow MLSA (1996 S. Owl Activity Centers, App 12a)

LSR	Pair	Dispersal Habitat			
& MLSA	Status	Dry	Mesic	Wetter	
Spotted Owl		Acres	Acres	Acres	Total
Bumping					
SO803	PY	177	0	96	**273**
SO820	PY	68	0	182	**250**
SO823	PY	0	0	1,523	**1,523**
SO825[1]	P	0	0	1,499	**1,499**
SO851[1]	PY	57	0	435	**492**
SO860	P	0	0	1,125	**1,125**
SO871[1]	P	0	0	1,183	**1,183**
SO896[1]	P	0	0	1,945	**1,945**
Crow					
SO805	PY	0	0	31	**31**
SO824	PY	0	0	85	**85**
SO852[1]	PY	232	0	236	**469**
SO854	PY	251	0	236	**487**
SO874	PY	42	0	213	**255**
SO886	PY	0	0	63	**63**

1 Owl Site adjacent to LSR/MLSA. Less than 1400' from Boundary.

Habitat within 1.8 mile circle around activity center. Dry **dispersal habitat** includes vegetation codes 11, 13, and 52; **mesic dispersal** includes code 21; and **Wetter dispersal** includes codes 31, 35, 61, and 41.

c) Spotted Owl Dispersal And Connectivity

Currently, the Bumping LSR/Crow MLSA provides habitat for 9 pairs of owls, with an additional 5 pairs adjacent to the LSR/MLSA. The LSR/MLSAs can sustain 9+ pairs of owls over time, and provide genetic exchange within the Bumping LSR/Crow MLSA and between other LSRs and MLSAs. Nearly the whole LSR and MLSA are within occupied spotted owl home ranges. Possible connectivity monitoring would be in the lower Copper Creek area, the Bumping Crossing area, and areas north of Sand Creek.. The Sunrise Creek SO851 and Goat Creek SO803 owl habitats provide important linkages between two clusters.

The adjoining Wilderness Area habitat is extremely important for all of these LSR/MLSA connections. Some matrix lands are important for connectivity between LSR/MLSAs. These connectivity corridors and patches should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc.

During dispersal, nesting, roosting, foraging habitat is used, as well as habitat of lower quality (dispersal habitat). Dispersal habitat within the Bumping LSR is 23%, and Crow MLSA is 3%.

Dispersal habitat will grow up to be nesting/roosting/foraging for spotted owls. Habitat providing dispersal/connectivity corridors and patches within the LSR/MLSAs are scattered about (see Forest Interior map and Suitable Spotted Owl Habitat Map).

The function of dispersal/connectivity habitat for spotted owls depends on the amount and juxtaposition of late-successional, forest interior, and dispersal habitat. Late successional habitat is fairly abundant in the Bumping LSR, and is not highly fragmented, 61% of the LSR is in wetter forest late-successional habitat and 48% of the LSR is in Forest Interior. The Crow MLSA has very high amounts of wetter late successional forest (78%) and moderate amount of Forest Interior habitat at 28% of the MLSA. The high road densities (2.42 to 2.51 miles per square mile) and really low security habitat (26% Bumping and 28% Crow) effects connectivity, in that fragmentation usually occurs along roads, and snag reductions for road maintenance cumulatively effects habitat overtime.

Outside the LSR/MLSA network, dispersal habitat is found in all land allocations, and will be provided mainly in Riparian Reserves, in Unmapped LSR's in Matrix and in AMA's, and in wilderness areas (NWFP 1994, ROD pg. 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).

d) Restoration Opportunities And Potential Projects Within LSR/MLSA for Spotted Owls

- **Monitor Effectiveness**

1. Meet goals of the Bumping LSR of 4+ pairs, and Crow MLSA of 4 pairs of spotted owls. Monitor Activity Centers, Core Areas and Home Ranges.
2. Verify habitat acreage on site centers and habitat acreage of special concern owls: SO803, SO820, SO851, SO854, SO874, and SO896.
3. Monitor important connectivity owl sites: Sunrise Creek SO851 and Goat Creek SO803, connect habitat between clusters
4. Monitor 5 owl pairs, adjacent to LSR/MLSA (SO825, SO851, SO871, SO896, SO852). Do they provide genetic interchange? Will they select new nest sites within the LSR?
5. Monitor important connectivity between LSRs/MLSAs for effectiveness, especially Rattlesnake Meadows areas.
6. Monitor sites that have not been located and/or had surveys conducted in the past 5 years. Monitor historical owl sites.

- **Monitor Validity**

7. Validate monitor the vegetation mapping.
8. Spotted owl habitat acreage, needs to be validated.
9. Validate monitor the spotted owl habitat model, and owl acreage prior to project implementation.
10. Field verify habitat and activity center locations.
11. Validate the long-term the assumption that the LSR/MLSAs can sustainable habitat (moist forest groups) can support Bumping LSR 5 pairs of owls, and Crow MLSA 4 pairs of owls. The adjacent wilderness habitat is important to continue this linkage for spotted owls.

- **Monitor Implementation**

  12. Consider reconfigure spotted owl habitat home range, based on foraging pattern, rather than 1.8 mile circle, especially SO896, SO871 and SO854.

  13. During management proposals, use habitat quality/risk assessment analysis (Appendix 29 of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas") to help display best quality habitats and stands of highest risk to loss.

- **Protection**

  14. Some suitable owl habitat and owl sites (SO820, SO854, SO874) may be vulnerable to the risk of fire in dry forest types, and may need some fire risk protection, on habitat outside of LSR.

  15. Fuels reduction and hazard reduction occur outside N/R/F habitat in short term, shift emphasis after 50 years. Accept more risk from fire, manage at high end of spotted owl habitat DC in wet sites. 500 Acre core area protected, 100 acre activity center protected.

  16. High priority for protection of forest structure potential loss to root rot.

- **Maintain**

  17. The adjacent forested habitats of the Norse Peak and William O. Douglas Wilderness areas are important for the functioning of connectivity.

- **Habitat Improvement**

  18. See Table 5? "Suitable Spotted Owl Habitat" for prioritization and restoration opportunities. Prioritized sites are: #1 SO874 monitor, protect habitat and accelerate; #2 SO854, SO820. See list for additional.

  19. The spotted owls below threshold (SO896) are of highest priority to improve habitat, accelerate non-suitable habitat towards late successional.

  20. Potential habitat includes 900 acres, that are currently in created opening or sapling/pole which will grow into suitable spotted owl habitat in the next 50 to 120 years. These acreage's should be accelerated towards late successional habitat.

  21. Improve and accelerate N/R/F habitat in wet forest groups, to maintain number of spotted owl pairs. Accelerate dispersal habitat and old plantations:

     - Clear cuts in wet/moist vegetation groups predicted to be habitat in 100 years.
     - Pole sized stands in wet/moist will be habitat in 50 years.
     - Clearcuts in mesic/dry vegetation groups will be habitat in 120 years.
     - Pole sized stands in mesic/dry will be habitat in 70 years.

  22. Increase habitat effectiveness and connectivity by reducing open road density and revegetating road beds, especially in Forest Interior patches.

- **Coordinate**

  23. No projects identified.

6. Aquatic

The Bumping LSR and Crow MLSA include important fish habitat. The Bumping LSR includes much of the land bordering the Bumping River. The Crow MLSA includes lands within the Crow Creek watershed, a Little Naches River tributary, and the American River, a major tributary of the Bumping River. The confluence of the Bumping and Little Naches Rivers form the Naches River. Most of the remaining wild spring chinook production in the Yakima Basin is in the Naches subbasin and 40% of the wild summer steelhead within the Yakima are believed to be produced in the Naches subbasin (Dale Bambrick, Yakama Indian Nation, personnel communication). It has been determined that two separate stocks of spring chinook are found in the Naches Subbasin. The American River spring chinook are considered to be distinct stock from the other Naches subbasin spring chinook. The Bumping, Little Naches and American Rivers are considered Key watersheds in the Northwest Forest Plan. A number of amphibian species including the Cascade frog, western long-toed salamander, northwestern salamander, tailed frog, Pacific tree frog, rough-skinned newt and western toad are known to inhabit the Bumping LSR/Crow MLSA

a) Geomorphology

The Bumping LSR/Crow MLSA are located in the Naches Mountains subsection. The Naches Mountains are a mixture of basalt, pyroclastic material, sedimentary, crystalline and weak metamorphic bedrock. Several geomorphic process have been functioning creating a variety of landforms. Geomorphic processes include alpine glaciation, mass wasting, fluvial downcutting and volcanism. The principle landform within the Bumping LSR are the Glaciated Mountain Slope - Crystalline Bedrock landform with some Low Relief Glacial and Glacial Trough landforms. The Crow MLSA includes a little Glacial Trough, some Glaciated Mountain Slope - Crystalline Bedrock landform and primarily Glaciated Mountain Slope-Weak Metamorphic/Pyroclastic landform.

Unlike the glacial troughs where the glaciers carved U-shaped valleys and deposited till material on the slopes, alpine glaciers road over the Glaciated Mountain Slopes, modifying the slopes but not creating the extreme topographic expression of cirques and trough walls. Where the mountain slopes are composed of crystalline bedrock shallow soils have poor moisture holding capacity thus runoff is rapid. The rapid runoff in steep first order drainages could result in efficient sediment delivery, but a low drainage density and shallow soils reduces overall fine sediment delivery potential. Stream erosion through till material on the valley floor may be a significant, natural sediment source. Where the till material is plastered on valley slopes in association with incised drainages, debris flows and snow avalanches can be important source of coarse and fine sediment, and organic material to streams.

Within the Glaciated Mountain Slope landforms with weak metamorphic or pyroclastic bedrock, fine sediment is a greater concern. The metamorphic and pryoclastic material weathers quickly. This landform is fairly erosive with the fine textured susceptible to surface erosion, localized landslides or deep seated landslides, especially in the contact zone between fine material and more competent basalt or crystalline bedrock.

(1) Management Concerns due to Geomorphology

Within the Glaciated Mountain Slopes-Crystalline bedrock landform management will need to account for the occurrence of debris and snow avalanches, especially when locating roads. There is some Glacial Trough landform which contains glacial till. The till material holds and transports subsurface water well, helping regulate stream flows and temperatures. Roads should be located and designed to minimize or avoid capturing this subsurface flow. Bank vegetation may be important for bank stability where streams flow through relatively fine textures till material.

In the Weak Metamorphic/pyroclastic landforms surface erosion producing fine sediment becomes a management concern. Management activities need to avoid concentration of runoff as concentrated flows may produce localized landslides. Where streams flow through fine textured material, bank vegetation is important to prevent accelerated bank erosion.

b) Bumping Watershed

The Bumping River and its primary tributary the American River are within the Bumping LSR/Crow MLSA, both of these rivers are identified as key watersheds. All of the key salmonids are native to the watershed except summer chinook. Sockeye historically inhabited the watershed but were extirpated early in the 19th century with the construction of Bumping reservoir. Bumping reservoir was constructed to expand the natural Bumping Lake as part of irrigation development in the Yakima River. The dam has completely blocked anadromous fish access to the upper Bumping and isolated native trout populations. Stocking of non-native rainbow and brook trout in Bumping lake and non-native rainbow in the Bumping River below the dam has likely impacted native trout populations. Summer homes and recreation development, especially around the reservoir and downstream has had an impact on aquatic habitat. The Bumping and American Rivers are included on the Environmental Protection Agency 303(d) list of water quality limited waters due to temperature.

The American River is free flowing. Summer homes, highway construction and recreation use has likely had some impact on fish habitat in the American and stocking of non-native rainbow trout may have impacted native trout and steelhead populations. Much of the American River watershed however is contained within the William O. Douglas Wilderness and as such aquatic habitat on the watershed scale should be in good condition. The American River spring chinook are considered to be a distinct stock

Bumping River subwatersheds included within the Bumping LSR/Crow MLSA are; Deep, Bumping Lake, Lower Bumping, Lower American and a portion of the Upper American.

(1) Deep Subwatershed

The Deep subwatershed is considered significant for bull trout. Deep Creek is the primary spawning stream for the Bumping Lake bull trout population. While the population appears to be fairly stable, its chances for survival may be diminished because it is isolated above the dam and confined to one stream. Some bull trout are found in the mainstem Bumping above the lake but their numbers appear to be low. Brook trout are prevalent and several falls limits the available bull trout habitat. Westslope cutthroat are present as are redband/rainbow. Rainbow trout stocking has likely impacted the native cutthroat and redband population. Brook trout may have also displaced native trout. Anadromous fish are absent due to Bumping Dam.

(2) Bumping Lake Subwatershed

The subwatershed includes the lake and some surrounding lands which drain directly into the lake through small first and second order tributaries. The lake is considered significant for the adfluvial bull trout population (see Deep subwatershed). Anadromous fish are blocked by Bumping dam. Redband/rainbow and westslope cutthroat trout are considered present but stocking of non-native rainbow and brook trout has likely impacted the native trout population.

(3) Lower Bumping

Spring chinook salmon, summer steelhead, bull trout, redband/rainbow,and westslope cutthroat are present in the subwatershed. The spring chinook salmon are part of the Naches River stock. Whether the bull trout are resident in the lower Bumping, migrate to other portions of Naches drainage or

spawn in other tributary streams is not known. Native redband and westslope cutthroat populations have likely been impacted by the introduction of non-native rainbow.

(4) Lower and Upper American Subwatersheds

The Lower and Upper American are considered significant for spring chinook salmon as the American River is inhabited by a distinct spring chinook stock. Steelhead, redband/rainbow, westslope cutthroat and bull trout are present but population status is unknown. Past introductions of non-native rainbow trout may have impacted native trout populations. Bull trout are known to be present but in apparently low numbers. One area of concentrated spawning has recently been identified upstream of the LSR. Small tributary streams should be surveyed for native species presence and population status. The Headwaters American subwatershed, upstream of the LSR is significant for westslope cutthroat trout.

(5) Late Successional Management Implications

The Bumping River watershed supports important aquatic resources. Any vegetation management should have conservation of aquatic resources as an objective. Management activities in the Deep subwatershed should be designed to pose little to no risk to the significant bull population. If this isolated population is lost there is no adjacent population to refound it. Management activities in the American River need to protect the significant spring chinook population. The American River population is distinct thus may posses adaptations important to long term chinook population recovery efforts. The American may also be a good candidate for bull trout and westslope cutthroat and possibly steelhead recovery efforts. The best opportunities for active management of late successional habitat may be in the Lower Bumping and Bumping Lake subwatersheds. It may be possible to implement a wide range of vegetation management activities around the lake without a high risk to bull trout as the lake may provide somewhat of a buffer. The Lower Bumping may be a candidate for management activities designed to meet late successional habitat objectives and rehabilitate watershed conditions and aquatic habitat to support anadromous fish population recovery programs. Given the depressed status of the anadromous populations the level of risk any proposed activity poses to the fish will need to be carefully weighed against any long term benefits.

c) Little Naches Watershed

Two subwatersheds of the Little Naches are included within the Crow MLSA; Mainstem Little Naches, and Lower Crow. The Little Naches and Naches are identified as key watersheds. Timber harvest, highway construction and recreation have impacted aquatic habitat in the Little Naches watershed. Watershed and aquatic habitat restoration have been a recent management emphasis due to the importance of the watershed for anadromous fish recovery efforts. Crow creek and the Little naches are on the 303(d0 list of water quality limited waters for temperature.

(1) Mainstem Little Naches

The Mainstem Little Naches is considered significant for spring chinook salmon and summer steelhead. The populations of both species within the Naches subbasin are depressed so any significant subwatersheds are particularly important to anchor population recovery efforts. Westslope cutthroat and redband/rainbow trout are present. The degree to which past stocking of non-native rainbow and to a lessor degree brook trout have impacted the native trout populations is not known. The presence of steelhead may indicate that native redband and steelhead may have historically dominated cutthroat, at least in the Little Naches River, in this subwatershed. The Mainstem Little Naches however is located between two significant westslope cutthroat subwatersheds, Lower Crow and Quartz. Habitat needs to be provided within the Little Naches to maintain connectivity between

the two significant subwatersheds. Bull trout are considered to be present but the numbers appear to be very low.

(2) Lower Crow Subwatershed

Crow Creek is a tributary to the Little Naches. Other than a campground and some recreation use in the lower portions of the subwatershed aquatic habitat does not appear to have been greatly affected by human activity. Lower Crow is considered to be significant for westslope cutthroat trout due to an apparently healthy population although the genetic structure is not known. Chinook salmon and summer steelhead which would be part of the significant Mainstem Little Naches population rear in the lower reaches of Crow Creek. There may also be some steelhead spawning. Redband/rainbow are present. Bull trout are found in Lower Crow but population status is not known. There have been reports of a relatively strong bull trout population in the Upper Crow subwatershed. If these reports are true, given the sparse distirbution of bull trout in Naches Subbasin, the Crow Creek population could be considered significant.

(3) Late Successional Management Implications

Both the Mainstem Little Naches and Lower Crow Creek subwatersheds provide important aquatic habitat. Aquatic habitat should be a management emphasis in both subwatersheds, with aquatic habitat restoration a priority in the Little Naches and aquatic habitat conservation a priority in Lower Crow.

7. Noxious Weeds

Due to the limited extent of noxious weed occurrence in the Bumping LSR, the following discussion focuses on the Crow MLSA. Containment of existing populations and prevention of further spread is the recommended treatment in the Bumping LSR. Ten noxious weed species were identified to occur within or adjancent to the Crow MLSA. These species are discussed in priority order as identified by the noxious weed analysis module. There are no Class A weeds presently documented from this area. Class B-designate weeds include: *Linnaria dalmatica, Cytisus scoparius, Senecio jacobea, Hypochaeris radicata,* and *Chrysanthemum leucanthemum. Linnaria dalmatica* occurs adjacent to the Crow MLSA and is particularly severe in the Milk and Haystack MLSAs. Highway 410 provides the primary dispersal corridor for this species. Cross-country dispersal is likely also occurring via wildlife and forest visitor movement. The noxious weed analysis (Appendix 1) indicates control/eradication efforts for this species should focus on roadways, specifically, Highway 410 and F.S. Road 1902. *Senecio jacobae* occurs adjacent to the Crow MLSA and poses a potential threat of invasion into the MLSA (see Milk Creek MLSA). *Hypochaeris radicata* is limited in it's occurrence, generally associated with road shoulders at mid to high elevations where moisture is not limiting. A combination of hand pulling and herbicide spraying is recommended for control/eradication of this species. *Chrysanthemum luecanthemum* is known to occur as isolation patches in open areas in and along roadways. Control efforts for this species should focus on activities including hand pulling, hercides or a combination of these methods. *Cystis scoparius* is found occaissionally along Highway 410. Hand pulling of this species has been effective to date.

Centaurea diffusa is the only Class B weed identified in the Crow MLSA and is the second priority for treatment. It occurs primarily along roadways and waste places. Containment and prevention of further spread of this species should focus on major travelways such as Highway 410 and F.S. Road 1902.

Class C species present include *Hypericum perforatum, Cirsium vulgare,* and *Cirsium canadensis. Cirsium vulage* and *C. arvense* are widespread and are documented from areas with recent ground

disturbance, primarily areas previously harvested and/or heavily grazed by domestic livestock and wild ungulates. Containment and further spread of these species should focus on heavily used dispersed sites suchas Crow Creek and vicinity. *Hypericum perfoliatum* is limited in it's occurrence and is found as small isolated populations. Hand-pulling and spot hercide spraying or a combination of these methods should be used.

8. Fire Management Plan

a) Overview

This plan is intended to provide guidance for the management of fire in the Bumping LSR/Crow MLSA. It will supplement the Fire Management Plan for the Late-Successional Reserve System and will be incorporated into the Fire Management Action Plan for the Wenatchee National Forest.

The Sustainability and Disturbance modules for the vegetation groups have been described in a separate portion of this chapter. The intent of this plan is to provide adequate protection of the reserve. Management practices will be initiated to provide for the protection of the late-successional associated species and associated unique habitats. These management actions are expected to include the role of fire disturbance as an important process in the reserve.

b) Wildfire Prevention Actions

The following actions are site specific for the Bumping LSR/Crow MLSA. They are intended to supplement the actions outlined in the Fire Prevention Plan, which is intended to be implemented on a Forest-wide basis:

1. Initiate campfire restrictions, as warranted, during periods of high fire danger.
2. Implement road restrictions and closures, as warranted, during periods of high fire danger.
3. Emphasize cooperative fire prevention activities.
4. Utilize cooperative law enforcement agreements to emphasize the inspection of spark arrestor and exhaust systems.
5. Continue and improve fire prevention signing program on roads and trails included in, or adjacent to, the LSR/MLSA.
6. Emphasize contact with special interest groups (e.g., ORV groups, grazing permittees, summer home groups, organization camps, local user groups, and other special use permittees).
7. Emphasize fire prevention education for hunters.
8. Emphasize fire prevention and wildfire risk awareness education for the public.
9. Emphasize wildfire risk awareness education for home/landowners in urban/wildland interface areas (e.g., Pleasant Valley, Goose Prairie, and along Hwy. 410).
10. Seek opportunities to initiate hazard reduction actions around private lands (e.g., Pleasant Valley, Goose Prairie, along Hwy. 410, and Bumping Marina).
11. Initiate hazard reduction actions around developed and dispersed recreation sites, such as:
    - Jungle Creek Campground
    - Hells Crossing Campground
    - Cedar Springs Campground

- Soda Springs Campground
- Cougar Flat Campground
- Bumping Crossing Campground
- Bumping Campground
- Bumping Lake Campground
- Granite Lake Campground
- Deep Creek Campground
- ETC... (Additional sites may be added if overlooked)

12. As a hazard reduction measure emphasize fuel wood collection in designated areas around recreation use sites.
13. Initiate hazard reduction actions around Copper City historical site.
14. Initiate hazard reduction actions along roads.

c) Fire Management Actions Intended to Keep Fire from Spreading into the LSR/MLSA

The following methods are proposed to protect the LSR/MLSA from fires originating outside LSR/MLSA boundaries:

1. Maintain and manage existing fuel breaks.
2. Complete pre-attack planning process for the LSR/MLSA. Utilize natural fuel breaks when possible.
3. Maintain existing pre-attack facilities/agreements (e.g., water chances, helispots, fire camps, etc.): Seek opportunities for more.

d) Fire Detection

1. Aerial detection, after lightning episodes, will provide the primary detection resource for this LSR/MLSA.
2. Aerial detection may be supplemented with emergency staffing at Clemans Lookout, Miners Ridge Lookout, Little Bald Mountain Lookout, and Kaner Overview.
3. Emphasize fire reporting procedures (e.g., with local residents, Forest users, and cooperators).

e) Wildfire Suppression

1. Spotted owl activity centers are the highest priority for protection of resources (following the protection of human life). All wildfires in the 1.8 mile buffer will be suppressed at minimum acres.
2. Pre-planned dispatch cards for initial attack will be prepared for the LSR/MLSA area.
3. The Fire Situation Analysis or the Escaped Fire Situation Analysis process will be used to guide extended attack and large fire-suppression. Utilize pre-attack plans and materials.
4. Consideration for private land, late-successional habitat, and riparian reserves will take place during the development of fire suppression strategies and the implementation of fire suppression tactics.

5. Emphasize the protection of improvements (e.g., Copper City and other historic/cultural sites).
6. Protect known threatened and endangered species habitat from wildfire (i.e., plant or animal).
7. Where appropriate, fire suppression actions will be implemented on an interagency basis.

f) Vegetation and Fuels Management

1. Manage for a mosaic of age classes and structural conditions across the landscape to support late-successional habitat.
2. Manage to sustain dry forest types.
3. Manage for mesic sites with high density, multi-story refugia.
4. Strategic fuel manipulation to reduce the size and intensity of fires within, and adjacent to, the LSR/MLSA boundaries (e.g., pruning, thinning, and fuel breaks). Provide a change in the continuity/arrangement of, at risk, vegetation/fuels. Emphasis to utilize existing fuel treatment areas, natural openings, roads, ridgetops, etc. Priority area: the ridge between Devil Creek and Bumping River.
5. Suggested management tools to sustain, enhance, or produce the conditions for late-successional habitat and provide for wildfire hazard reduction may include: pruning, commercial and pre-commercial thinning, wood gathering, mechanical treatments, and prescribed fire.
6. Utilize vegetation and fuel treatment methods to facilitate meadow restoration projects.
7. Prevent the spread and/or introduction of noxious weeds.

g) Prescribed Fire Opportunities

1. Recognize the use of prescribed fire as a management tool in this LSR/MLSA and in areas adjacent to this LSR/MLSA.
2. Priority outcomes throughout the LSR/MLSA are to sustain, enhance, or produce the conditions for late-successional habitat and provide for wildfire hazard reduction.
3. The application of prescribed fire, where appropriate, to facilitate meadow restoration projects.
4. Projects should be of scale/location to enhance landscape-level diversity tied to inherent disturbance regimes.
5. Projects should attempt to minimize the risk of future catastrophic wildfires (those outside the range of inherent disturbance regimes with respect to size and/or severity).

h) Summary

Fire prevention, fire detection, wildfire suppression, vegetation and fuels management, and prescribed fire are all appropriate, integral elements of the overall management of this LSR/MLSA.

D. Restoration Opportunities and Potential Project Summary

Table I-19, Restoration Opportunities and Potential Projects, Bumping LSR and Crow MLSA.

Analysis Module	Restoration Opportunity	Potential Projects	Sched-ule[1]

Analysis Module	Restoration Opportunity	Potential Projects	Sched-ule[1]
Forest-Wide Sustain-ability	None Identified. Only minor amounts of at risk vegetation exists within these LSR/MLSAs	None Identified.	
Forest-Wide Spotted owl	Not Applicable. (Neither Bumping nor Crow are one of the 3 LSRs on the forest designated as a source population area.)	Not Applicable.	
Forest-Wide Connec-tivity	None Identified. Breaks in connectivity identified are inherent to the landscape.	None Identified	
Unique Habitats & Species	1) Reduce road densities in riparian reserves. (Fifes, West Crow, Sand West Quartz and Deep Creeks.	1)Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	2) Reduce road densities in Forest Interior. (Sand West Quartz and Deep Creeks.	2) Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	3) Retain whitebark pine forests and subalpine meadows.	3) Prescribed fire.	B
	4) Provide public with information regarding the unique habitats associated with Goose Prairie.	4) Interpret unique vegetation associated with Goose Prairie.	C
Connec-tivity Within the LSR	1) Promote the development of fire climax stands within the dry forest vegetation group.	1) Thin from below favoring ponderosa pine. Use prescribed fire where current fuel loading permit the attainment of objectives.	A
	2) Increase the amount of interior forest area within the LSR.	2) Close roads near interior forest an in dry forest areas as opportunities are identified through Access and Travel Management Planning.	B
	3) Improve the function of riparian reserves as connectivity corridors.	3) Close roads within riparian reserves as opportunities are identified through Access and	B

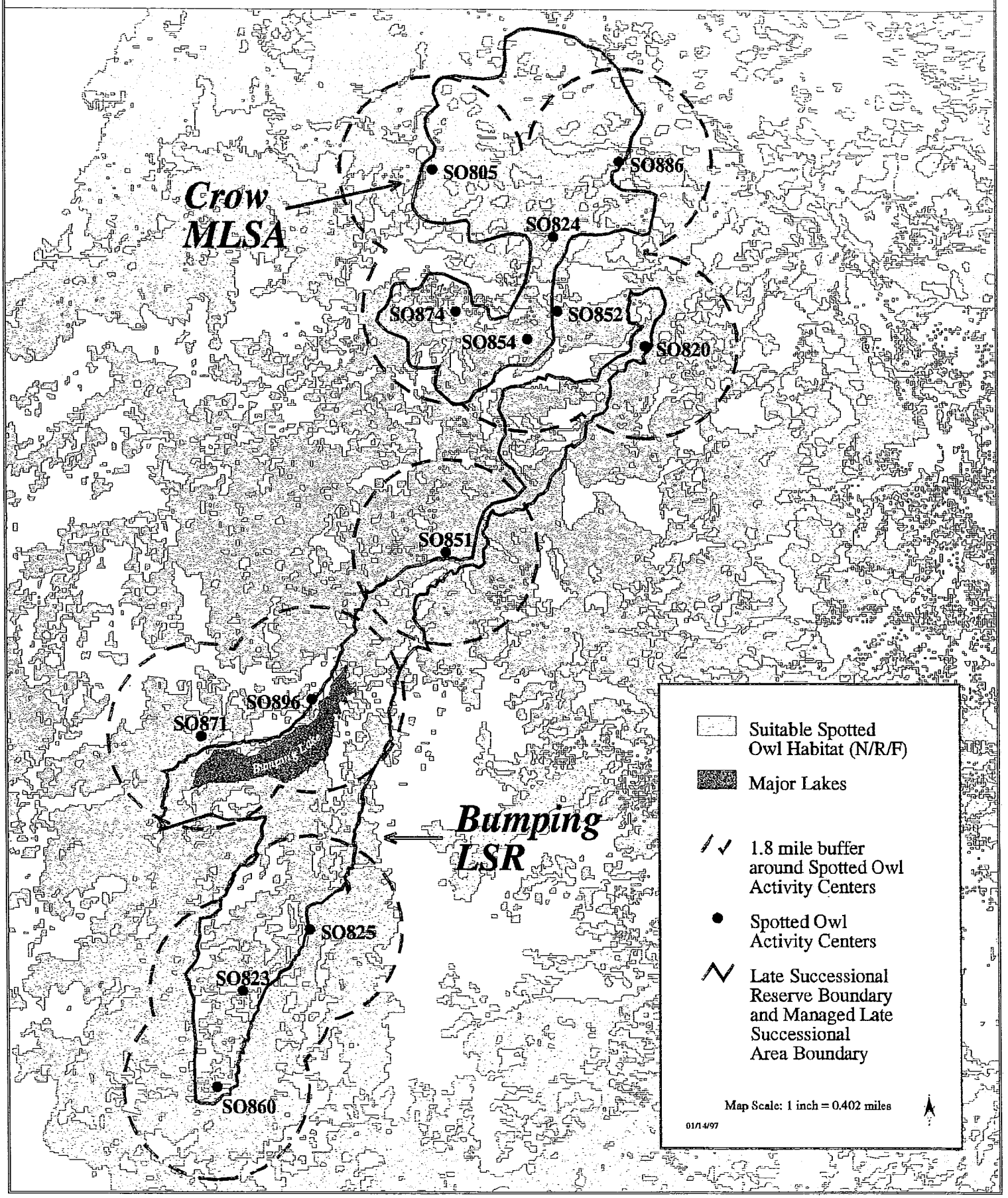
Analysis Module	Restoration Opportunity	Potential Projects	Sched-ule[1]
		Travel Management Planning.	
Distur-bance	1) Improve long term sustainability of previously harvested stands in the Crow MLSA.	1) Precommercial thinning reducing the amount of root rot susceptible species.	A
	2) Accelerate the development of multi-layered stands.	2) Commercial thinning in single layered stands. Small group selection harvests in root rot pocket areas to promote a diversity in age, size and species composition.	A
Spotted Owl	1) See Appendix 39, Northern Spotted Owl Nest Site Protection Within LSRs and MLSAs.		A
	2) Accelerate the development of suitable spotted owl habitat within the Crow MLSA.	2) Utilize Silvicultural activities that accelerate the development of multi-layered stands. Focus on single layered pole sized stands in moist grand fir, and wet forest groups.	C
	3) Obtain information on spotted owl locations.	3) Survey areas to 1994 spotted owl protocol.	B
Aquatic	1) See late successional habitat implications in Aquatic section.	1) Coordinate projects with the Mainstem Naches Watershed Assessment and with the Bumping Watershed Assessment when it is completed.	B
Noxious Weed	1) Limit the extend and spread of *Linnaria dalmatica, Cytisus scoparius, Senecio jacobea, Hypochaeris radicata, Chrysanthemum luecanthemum*, and *Centaurea difusa* within the Crow MLSA	1) Consider treatements such as hand pulling and herbicides to limit extent and spread.	A
	2) Increase knowledge regarding noxious weed presence in the Crow MLSA and Bumping LSR.	Survey MLSA and LSR for presence of noxious weeds.	C

Analysis Module	Restoration Opportunity	Potential Projects	Sched-ule[1]
Fire Plan	1) Protect LS values from loss due to wildfire	1) See fire plan for specific actions	

1 Implementation Schedule; (A) = within 1 year; (B) = within 3 years; (C) = within 5 years

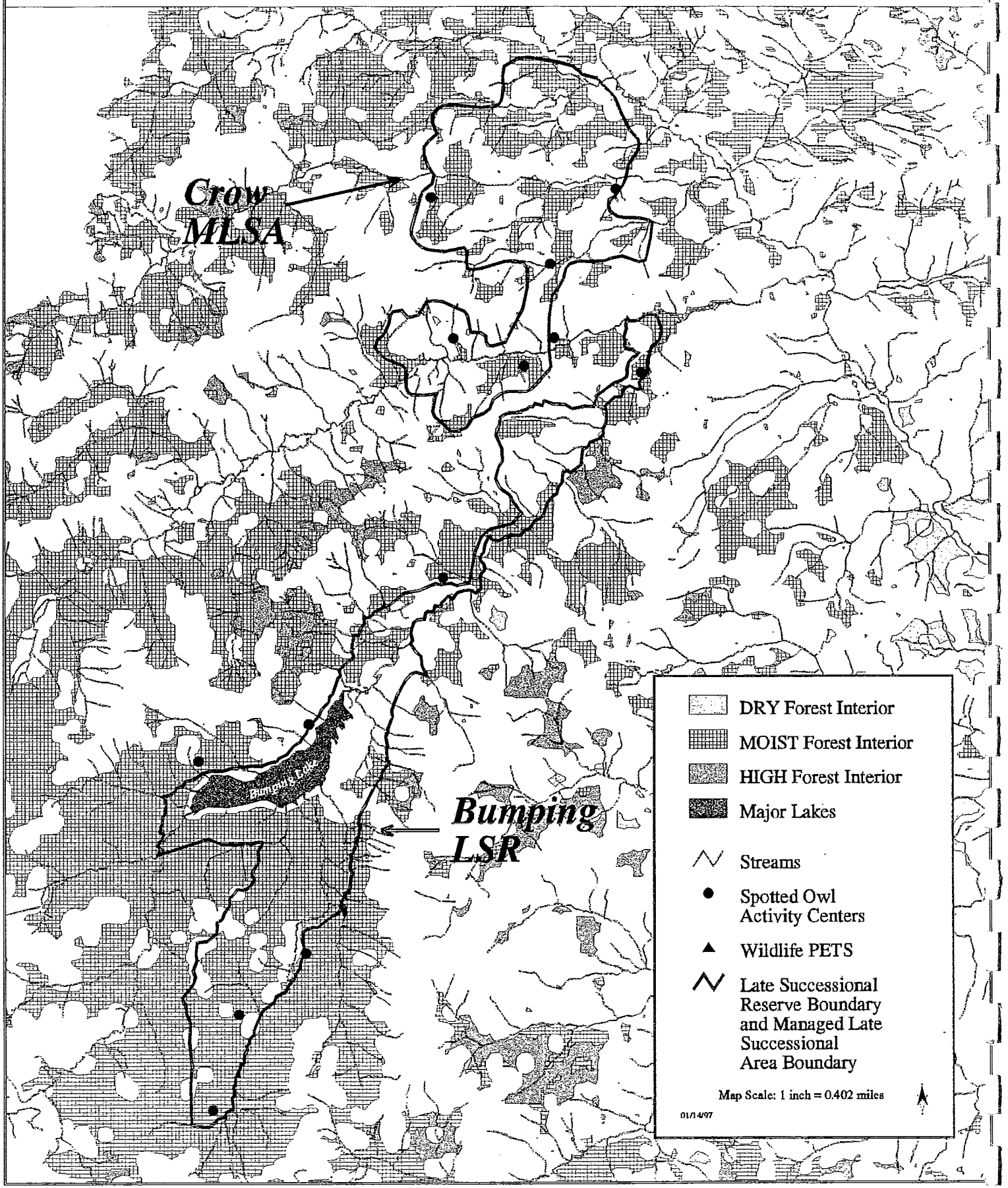
Bumping Late Successional Reserve and Crow Managed Late Successional Area

SUITABLE SPOTTED OWL HABITAT



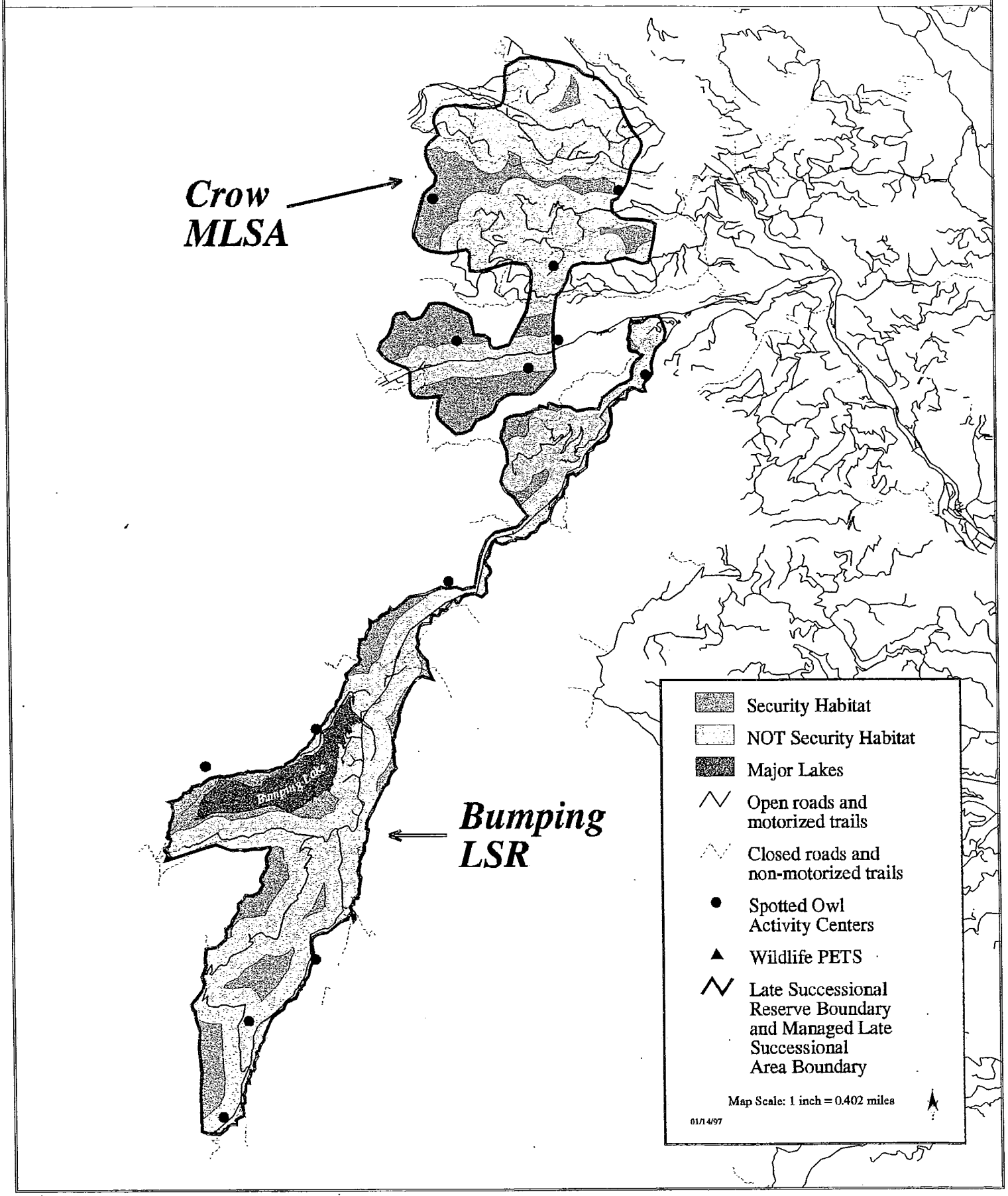
Bumping Late Successional Reserve and Crow Managed Late Successional Area

FOREST INTERIOR



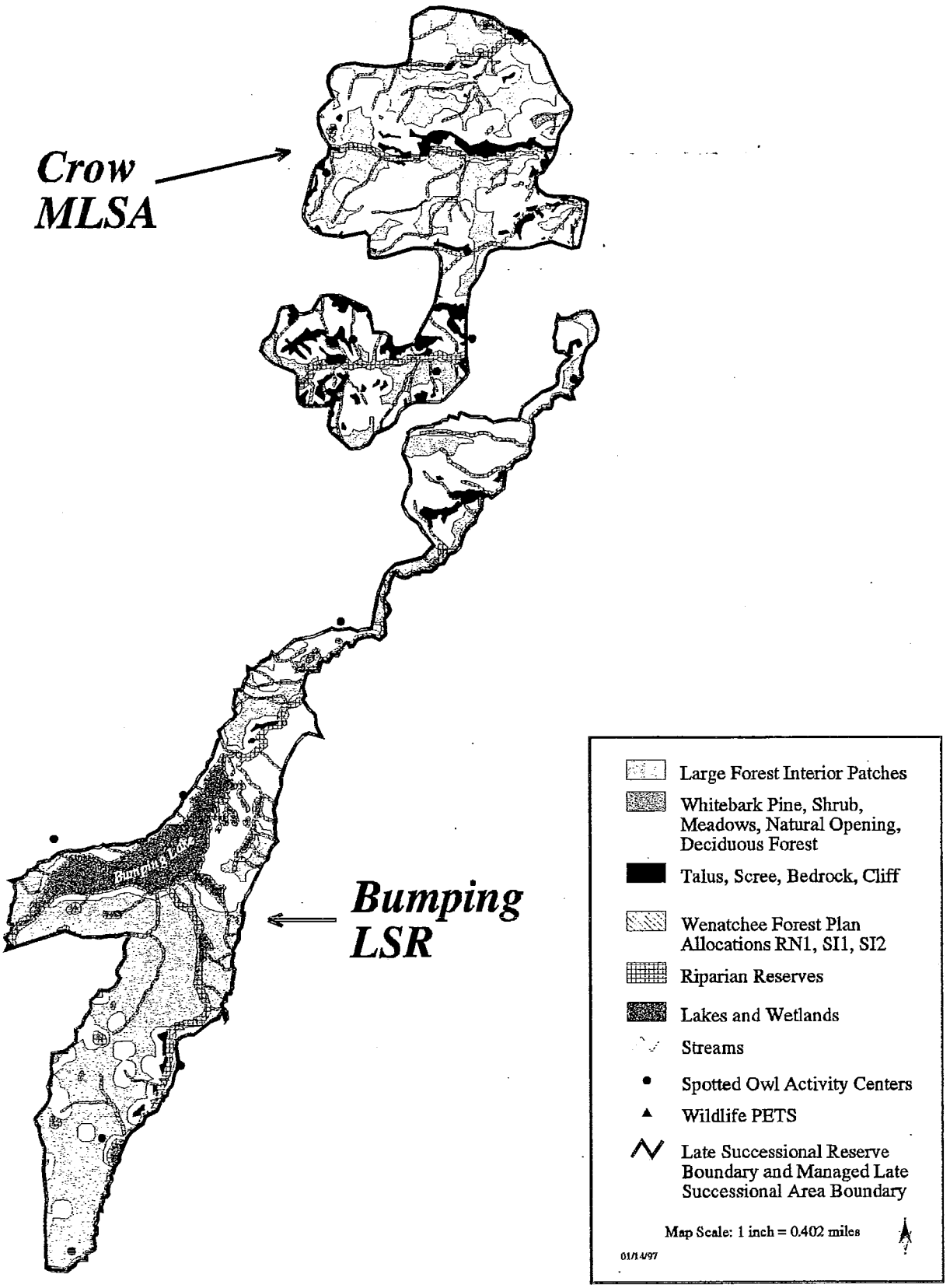
Bumping Late Successional Reserve and Crow Managed Late Successional Area

SECURITY HABITAT



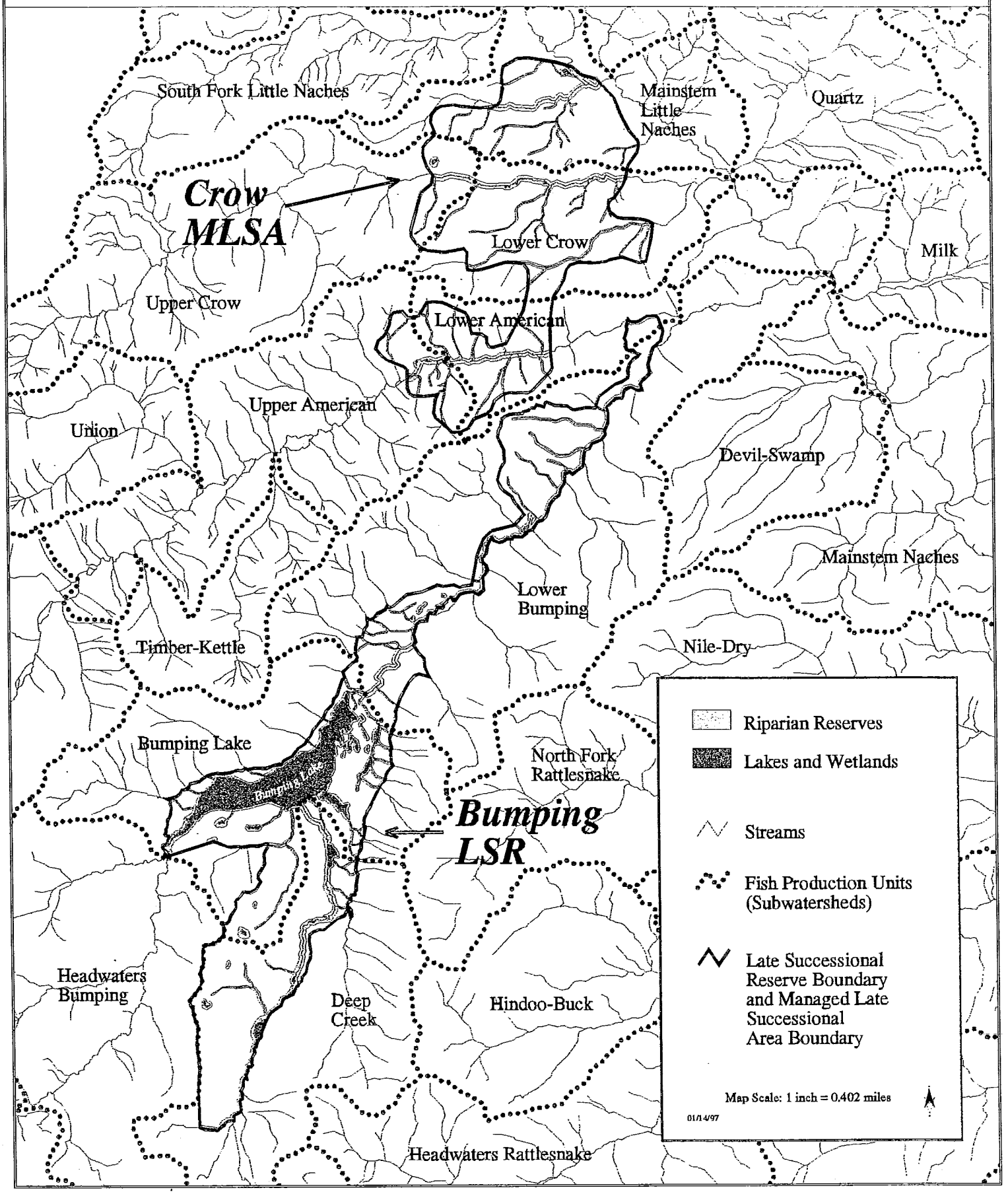
Bumping Late Successional Reserve and Crow Managed Late Successional Area

UNIQUE HABITATS



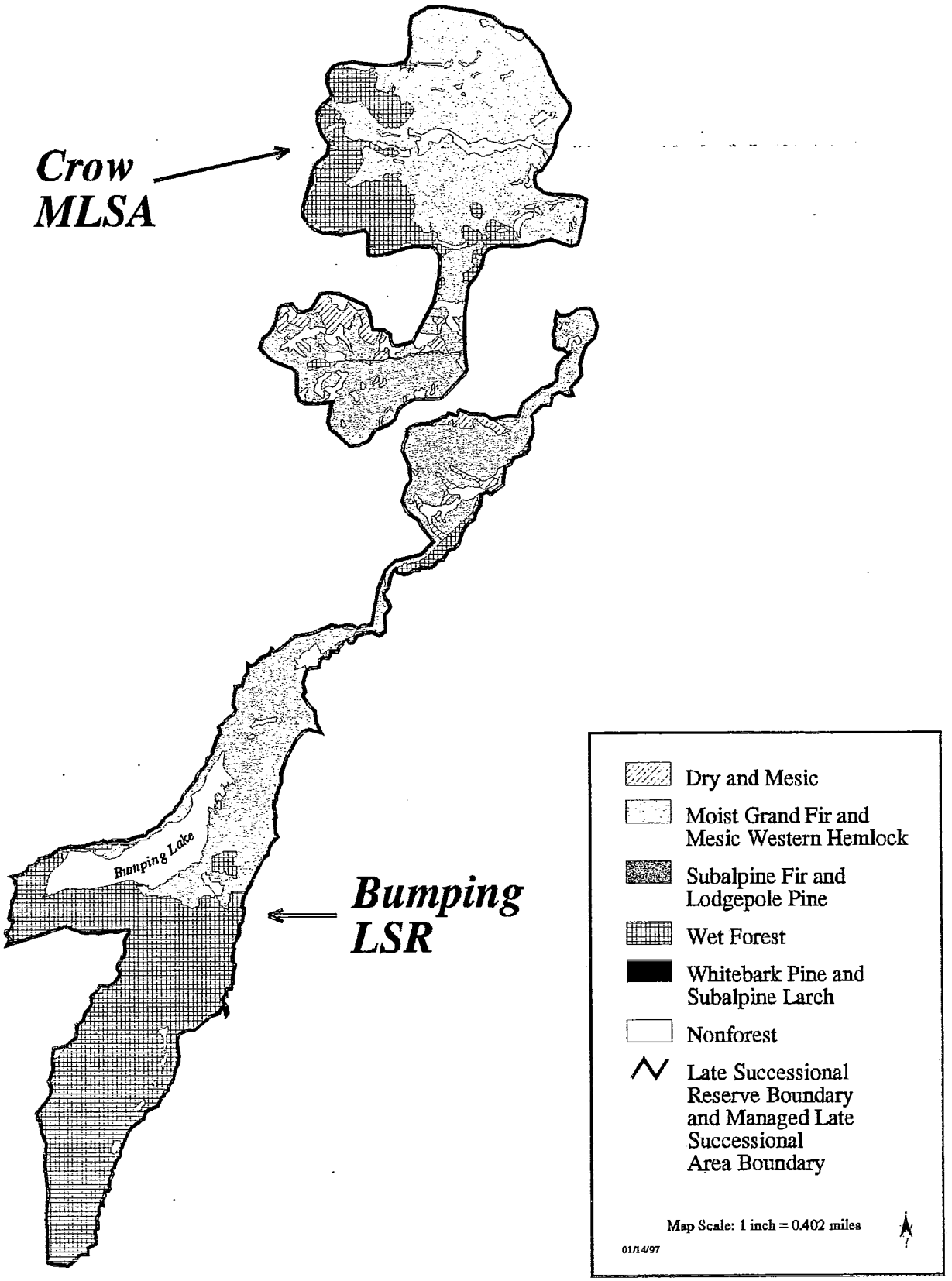
Bumping Late Successional Reserve and Crow Managed Late Successional Area

FISH PRODUCTION UNITS (SUBWATERSHEDS)



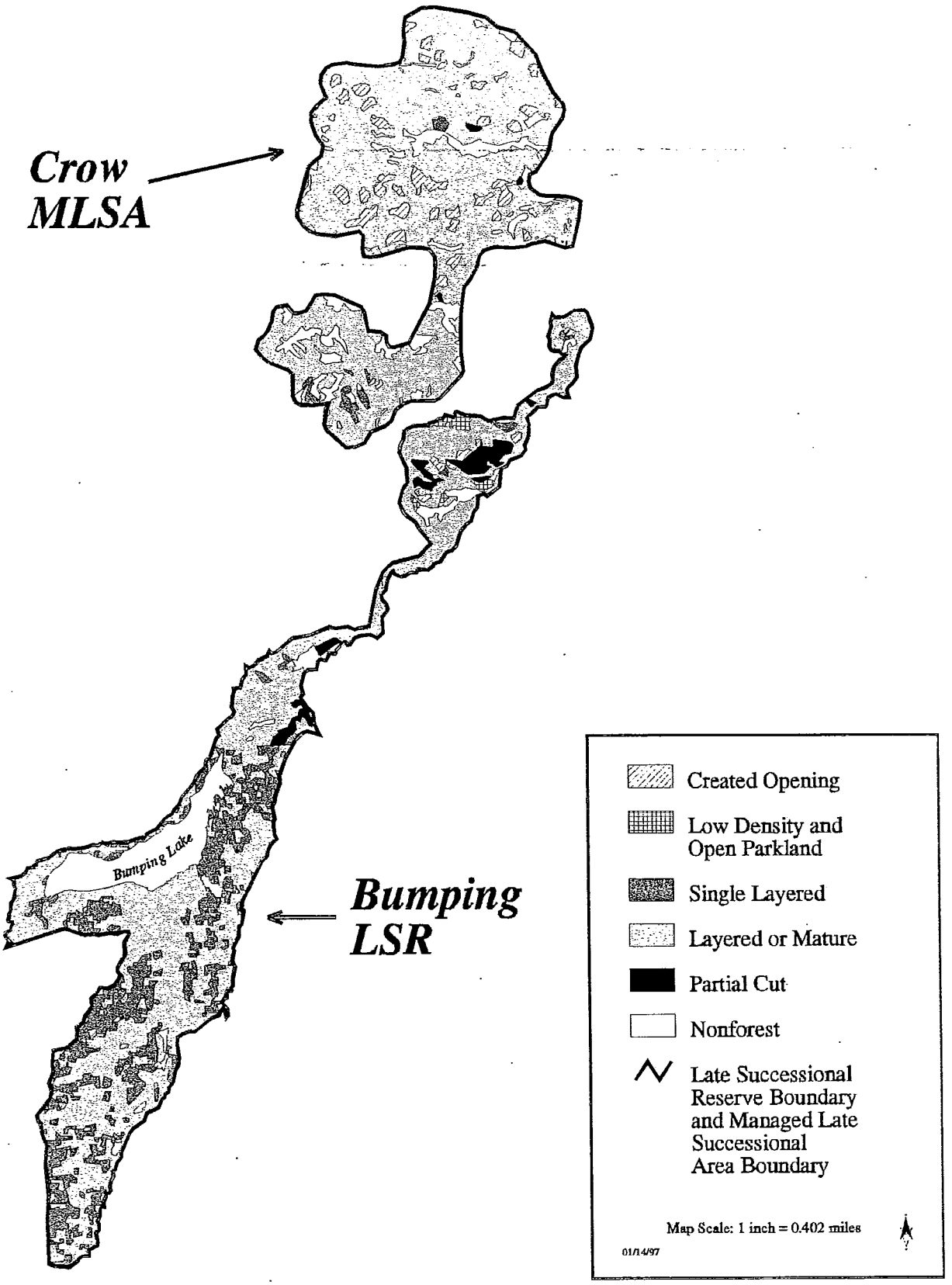
Bumping Late Successional Reserve and Crow Managed Late Successional Area

VEGETATION SERIES



Bumping Late Successional Reserve and Crow Managed Late Successional Area

VEGETATION STRUCTURE

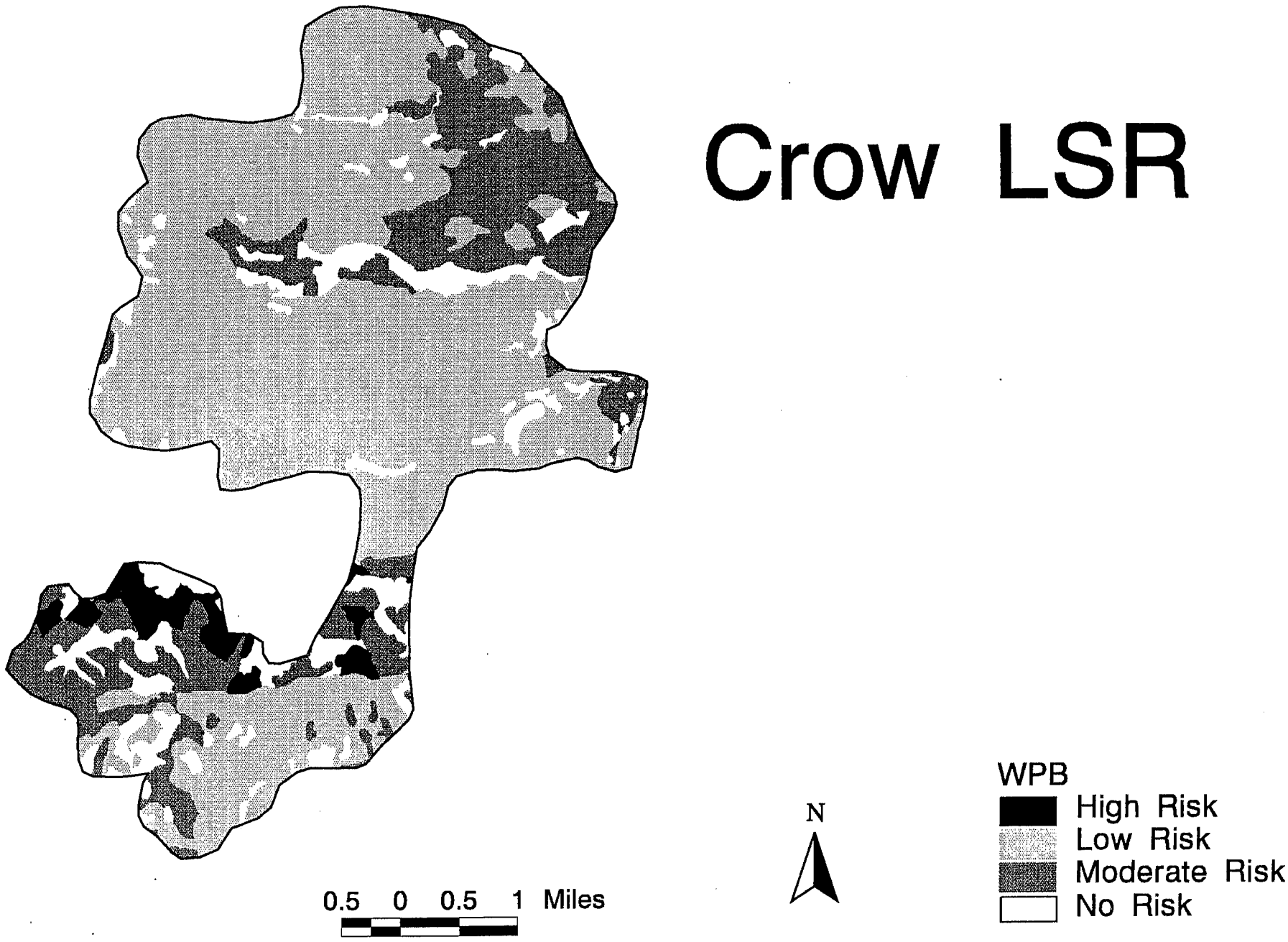


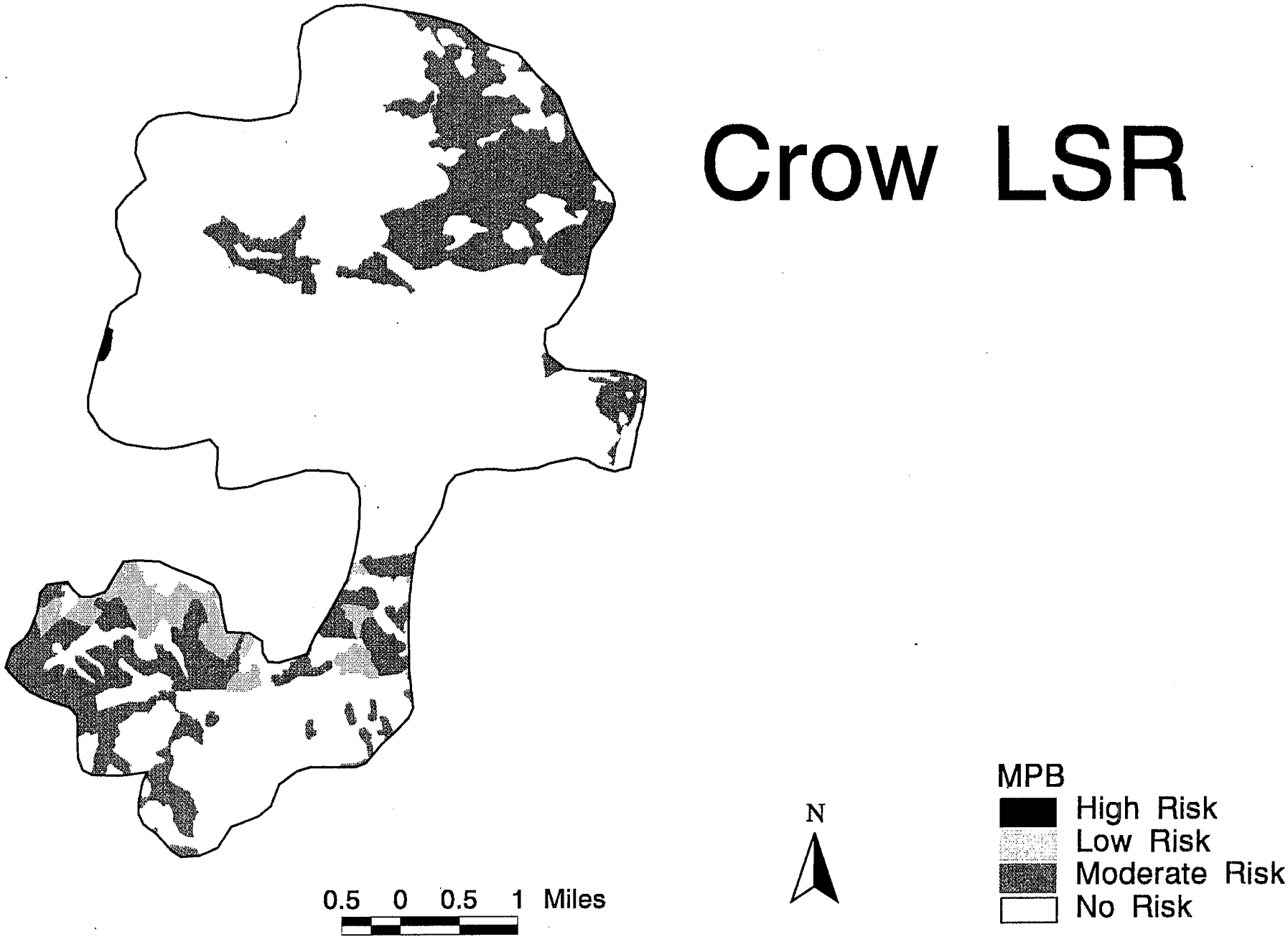
Crow LSR

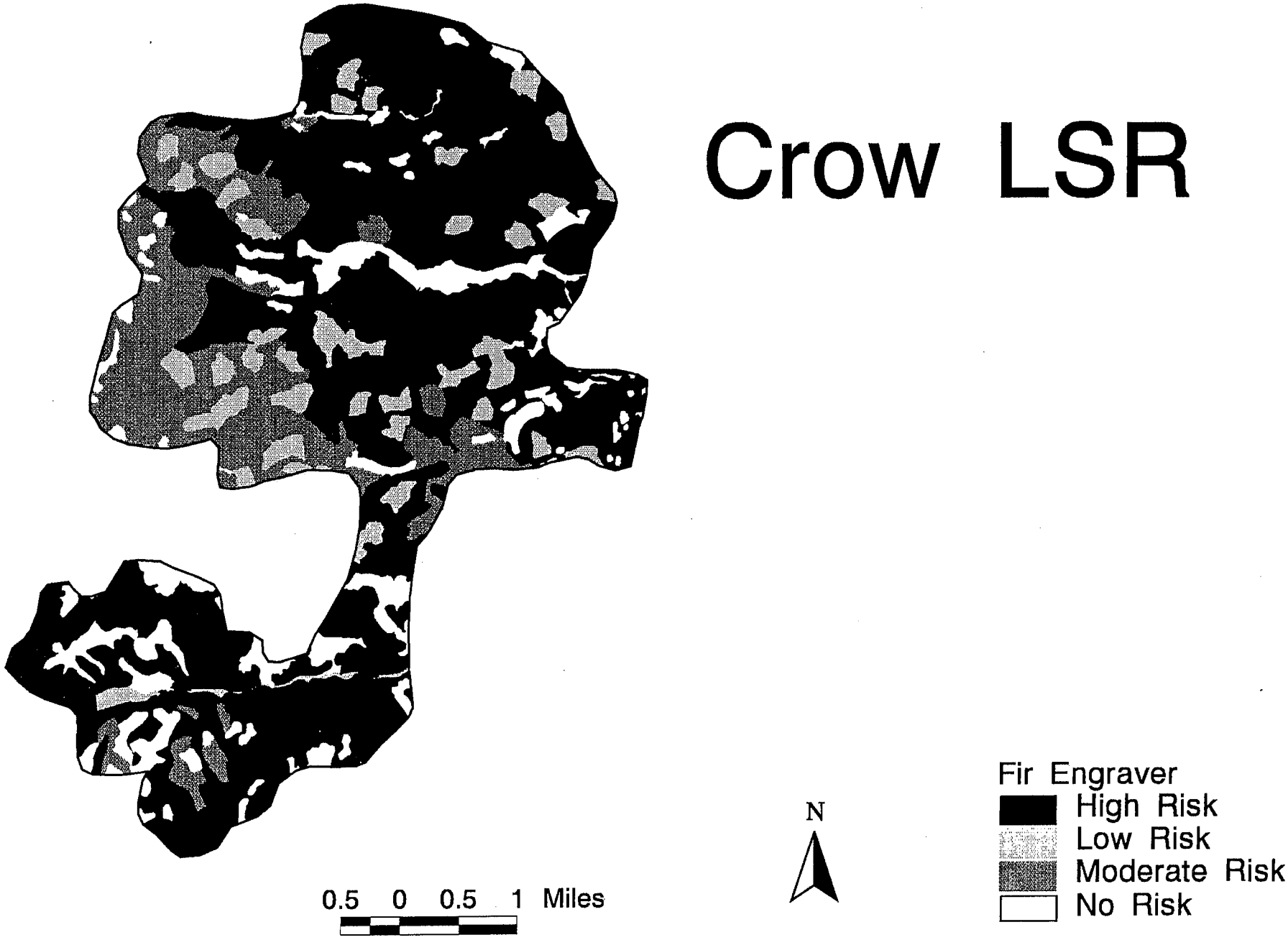
0.5 0 0.5 1 Miles

N

Total
- High Risk
- Low Risk
- Moderate Risk
- No Risk


Crow LSR
0.5 0 0.5 1 Miles
N
WPB
High Risk
Low Risk
Moderate Risk
No Risk


Crow LSR
MPB
High Risk
Low Risk
Moderate Risk
No Risk
N
0.5 0 0.5 1 Miles


Crow LSR
0.5 0 0.5 1 Miles
N
Fir Engraver
High Risk
Low Risk
Moderate Risk
No Risk

Crow LSR

0.5 0 0.5 1 Miles

N

DFB
- High Risk
- Low Risk
- Moderate Risk
- No Risk

Crow LSR

0.5 0 0.5 1 Miles

N

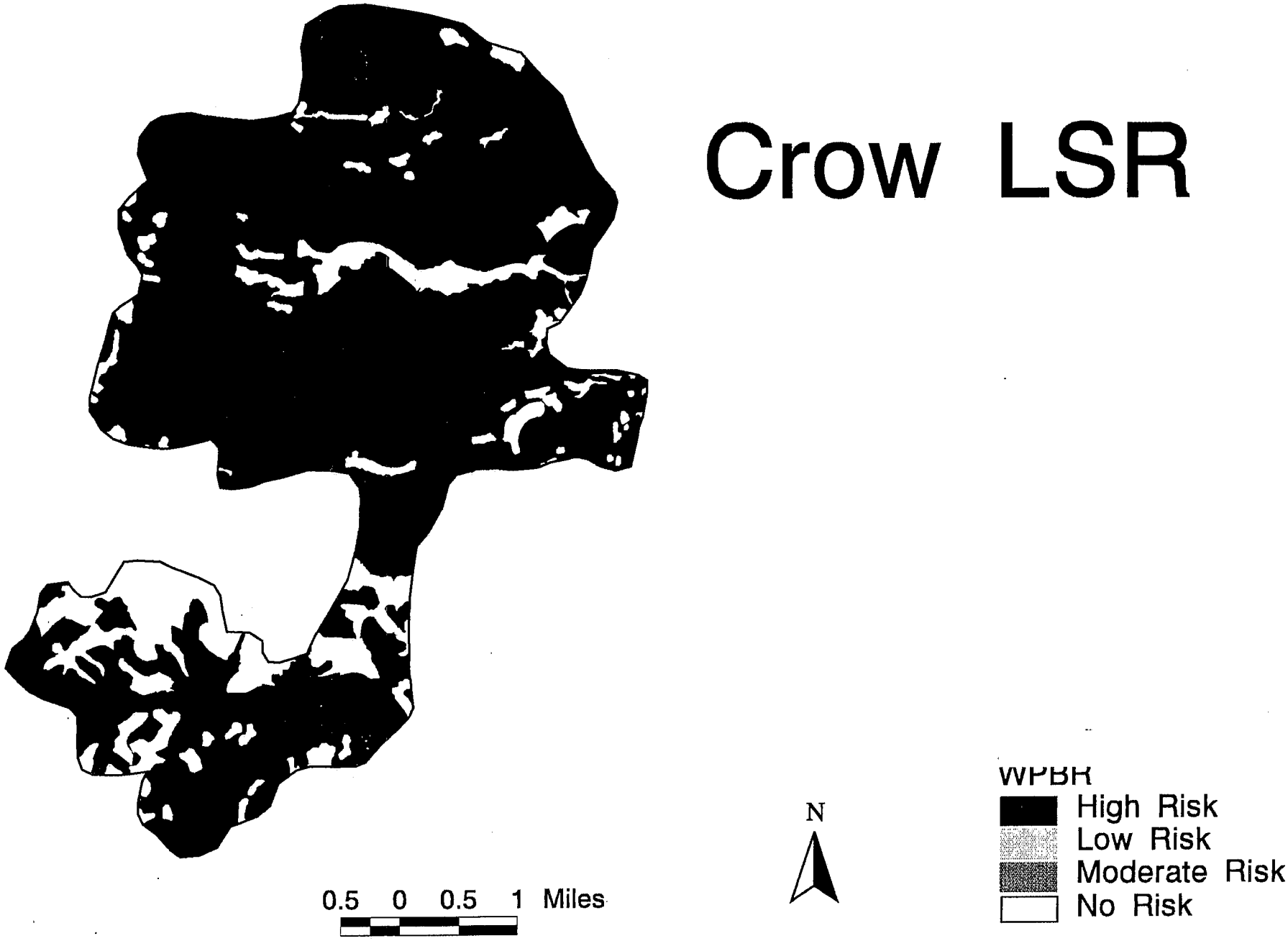
WSB
- High Risk
- Low Risk
- Moderate Risk
- No Risk

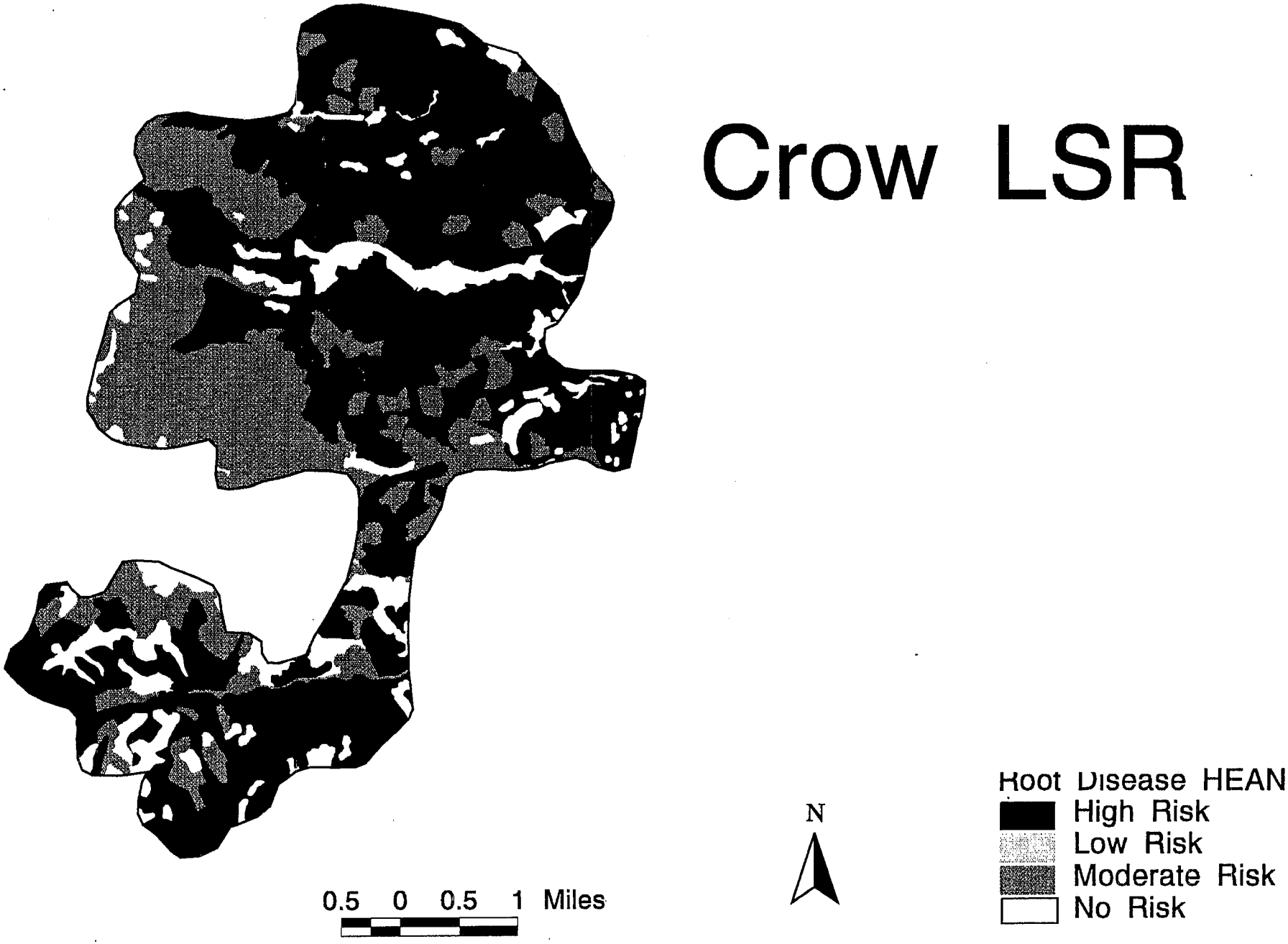
Crow LSR

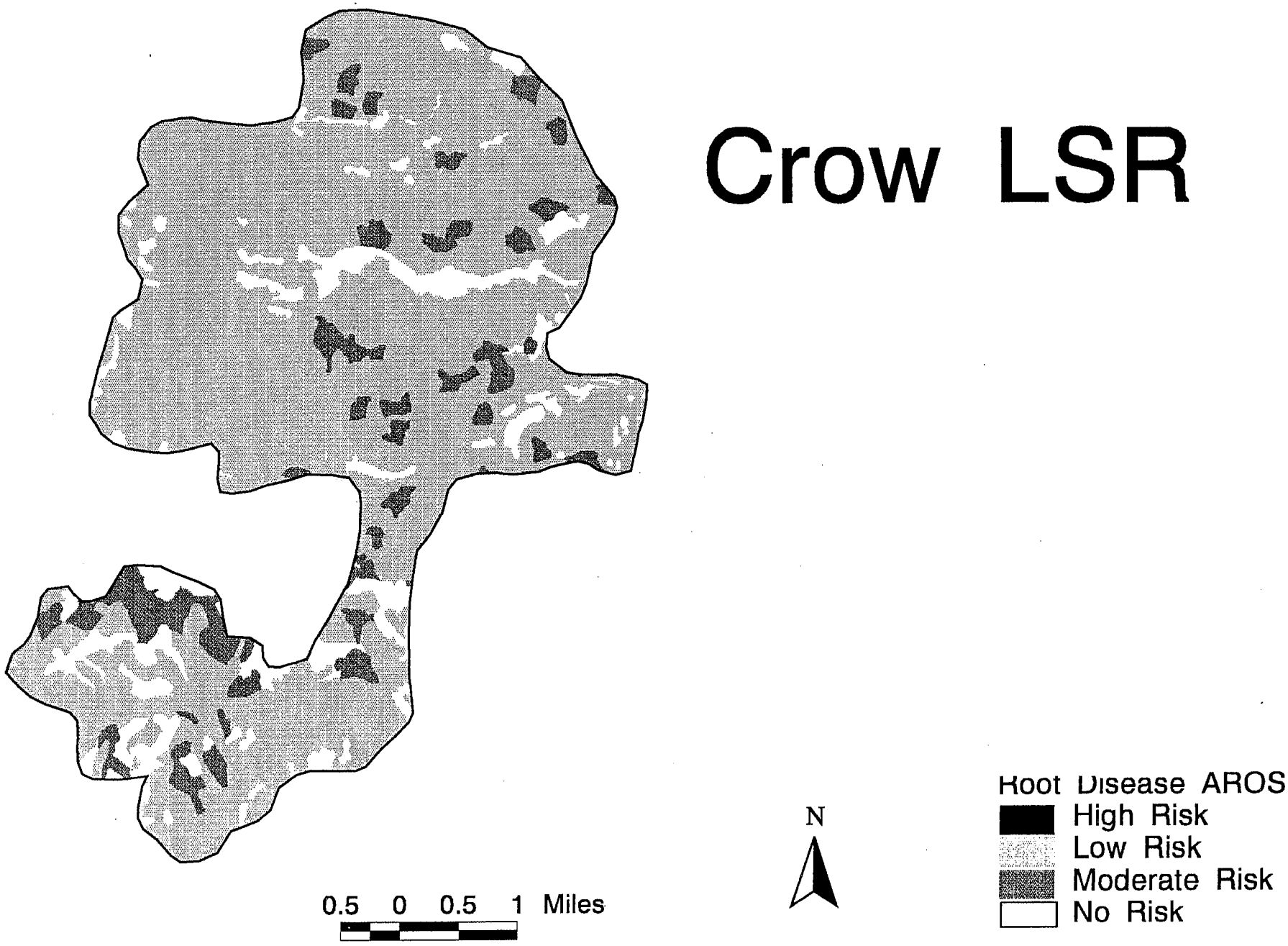
0.5 0 0.5 1 Miles

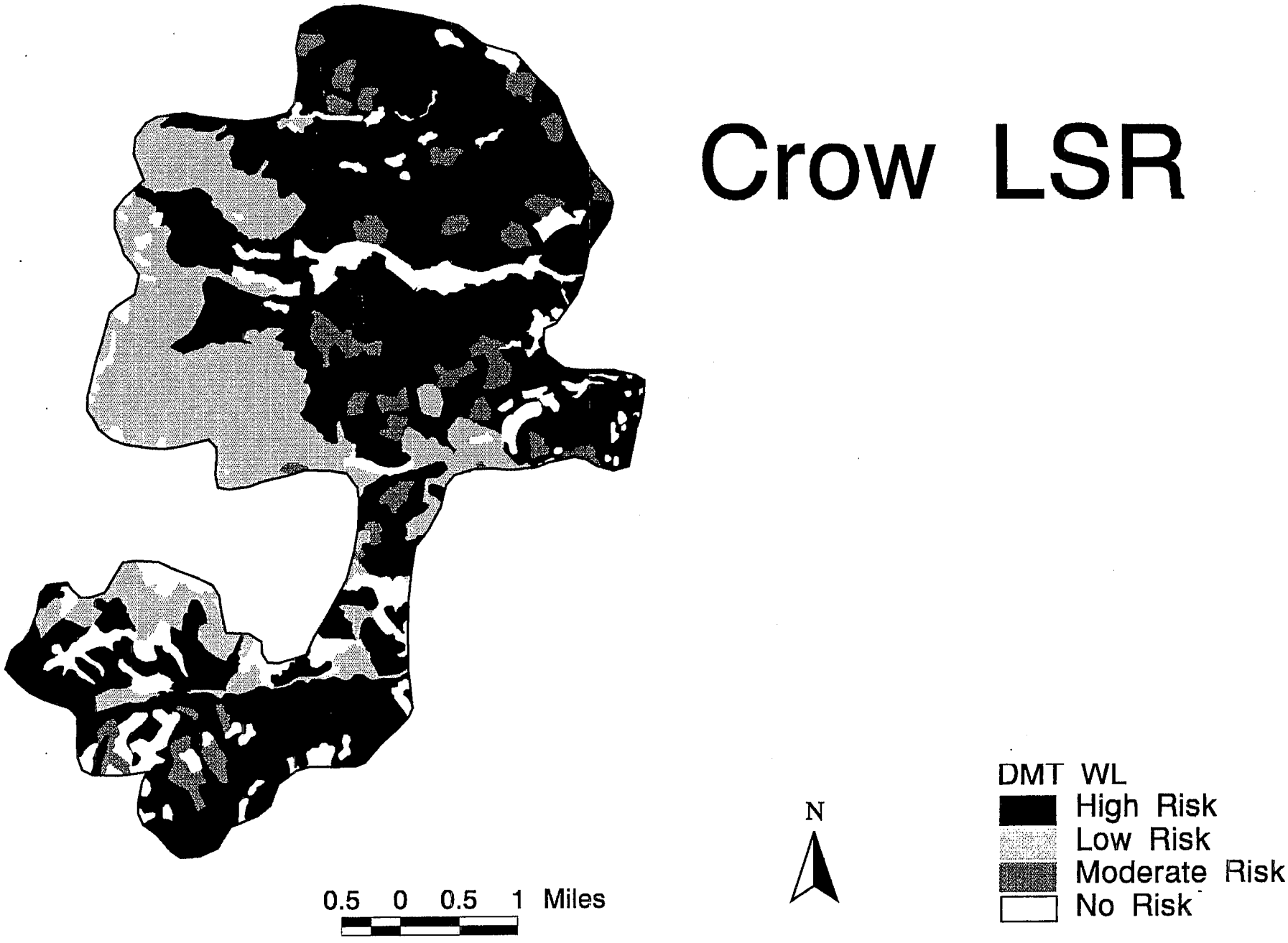
N

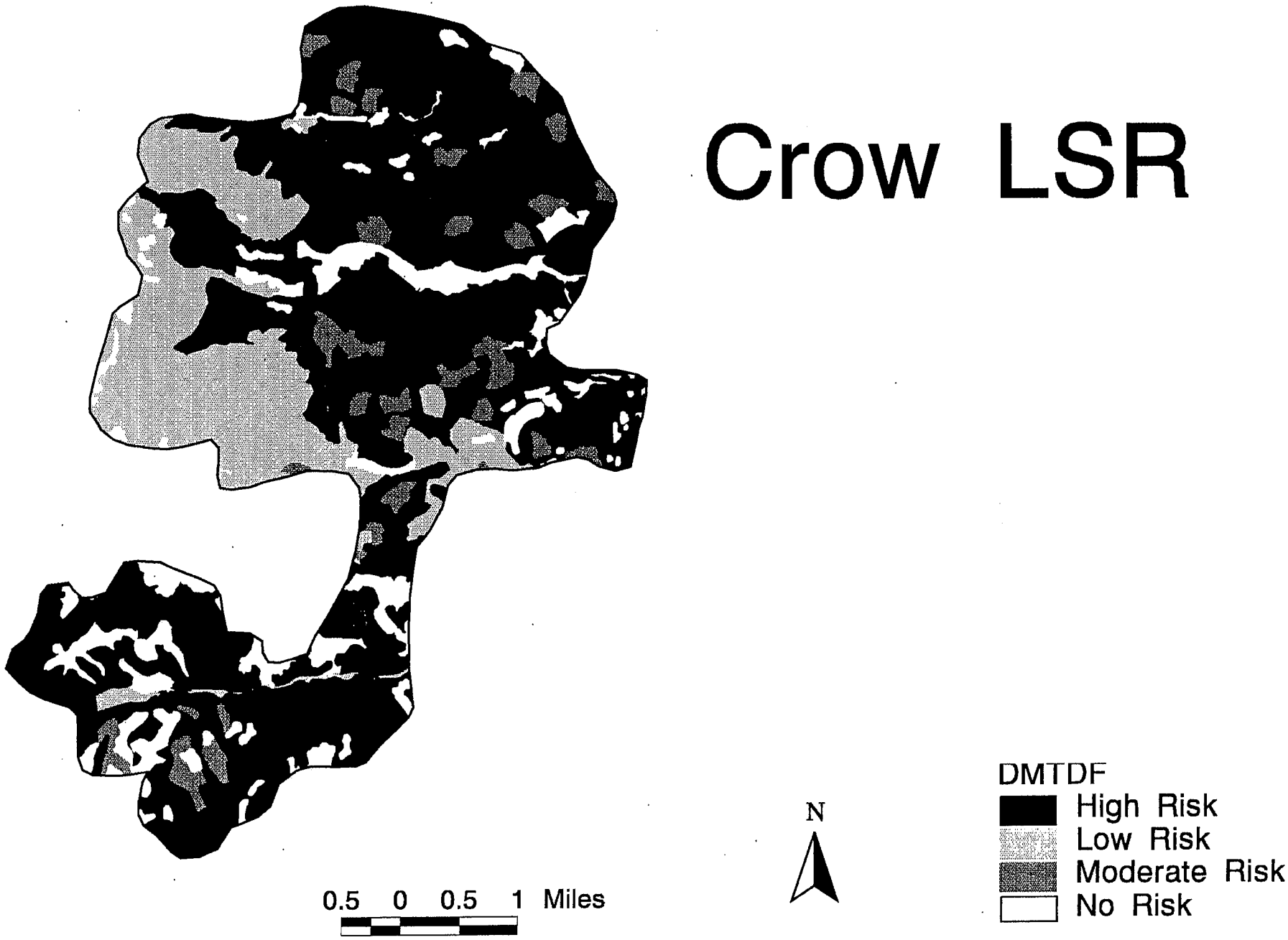
Root Disease PHWE
- High Risk
- Low Risk
- Moderate Risk
- No Risk


Crow LSR
0.5 0 0.5 1 Miles
N
WPBR
High Risk
Low Risk
Moderate Risk
No Risk


Crow LSR
Root Disease HEAN
High Risk
Low Risk
Moderate Risk
No Risk
N
0.5 0 0.5 1 Miles


Crow LSR
Root Disease AROS
High Risk
Low Risk
Moderate Risk
No Risk
N
0.5 0 0.5 1 Miles


Crow LSR
0.5 0 0.5 1 Miles
N
DMT WL
High Risk
Low Risk
Moderate Risk
No Risk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DMTDF
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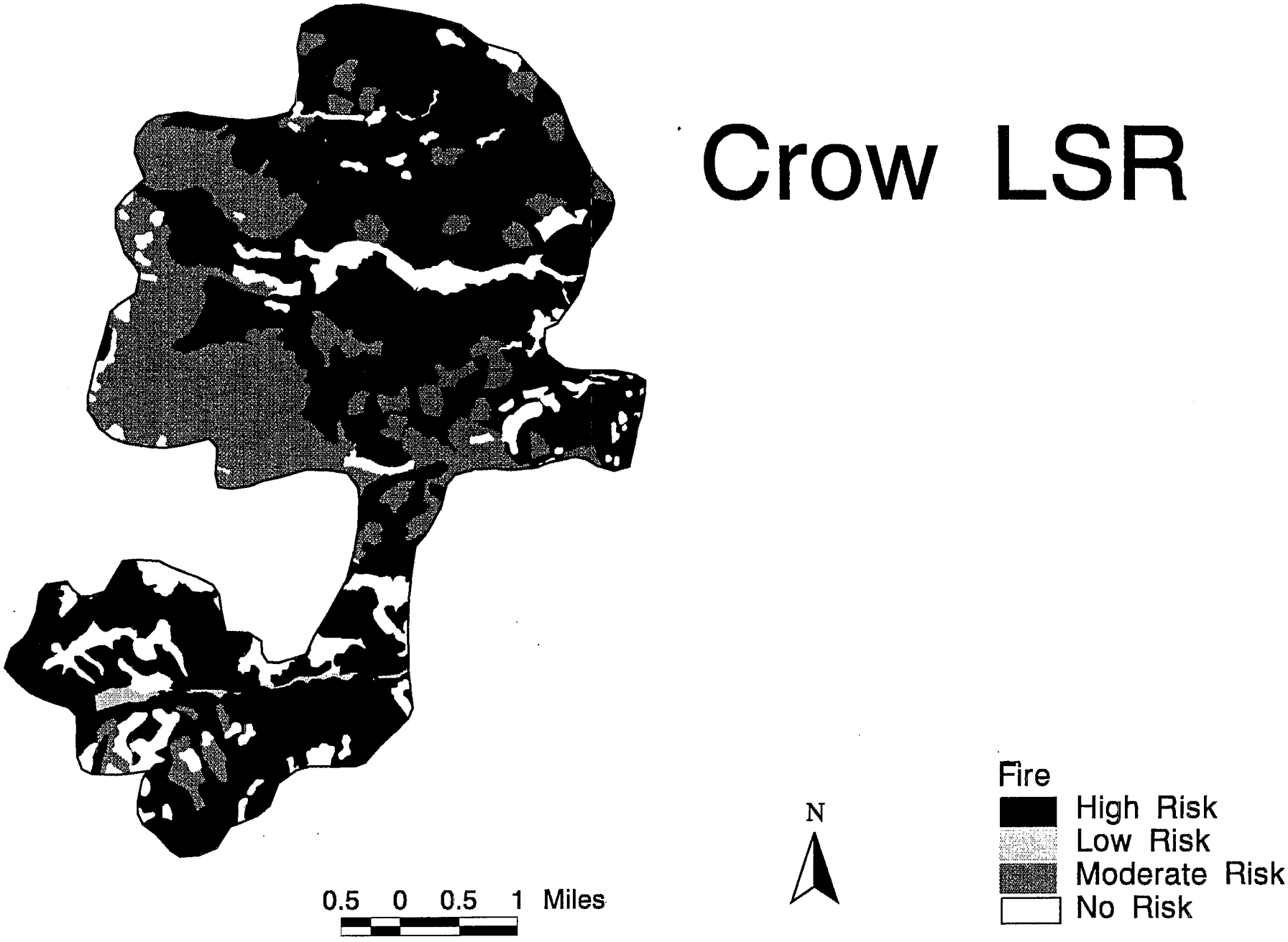
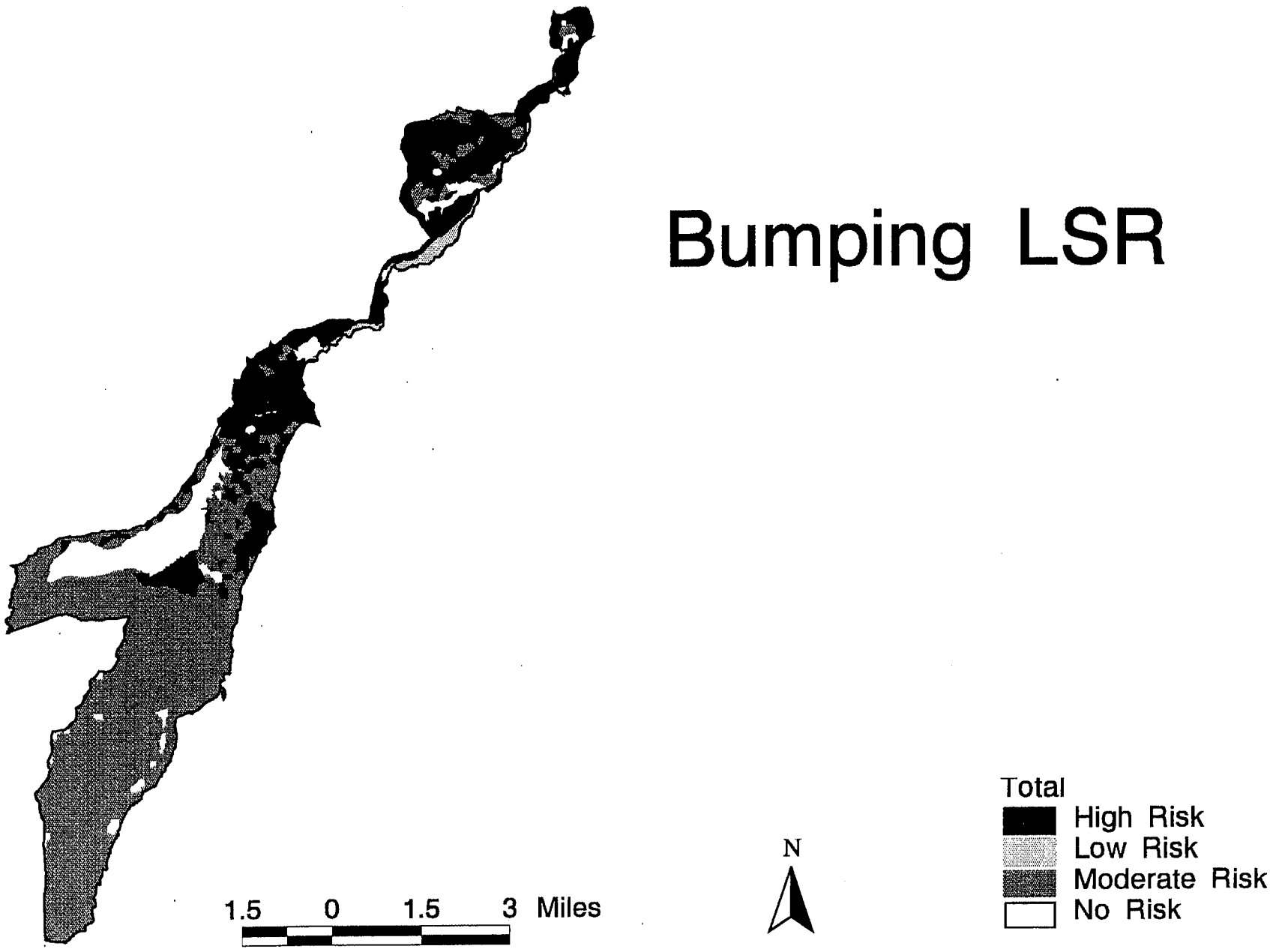
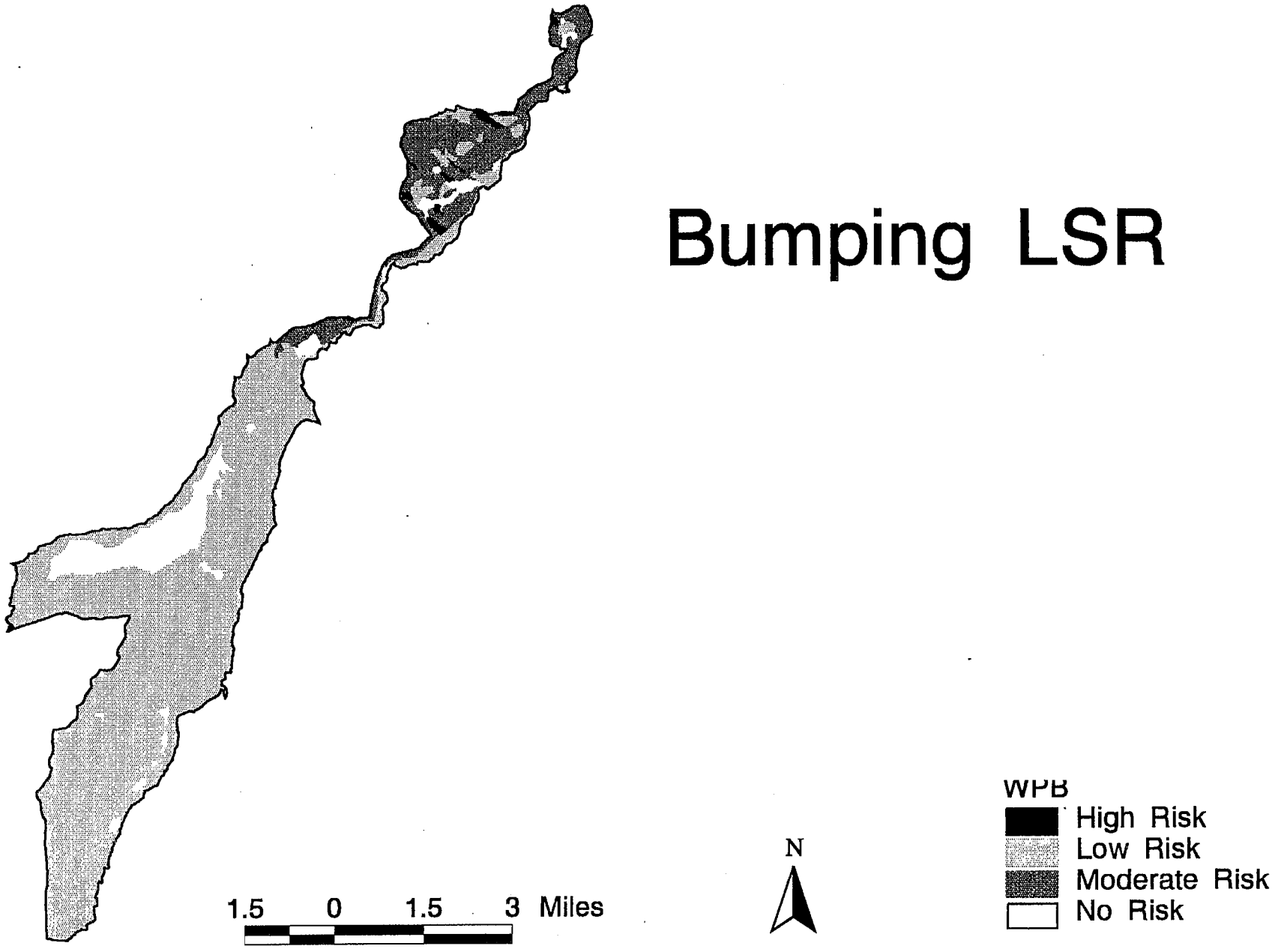
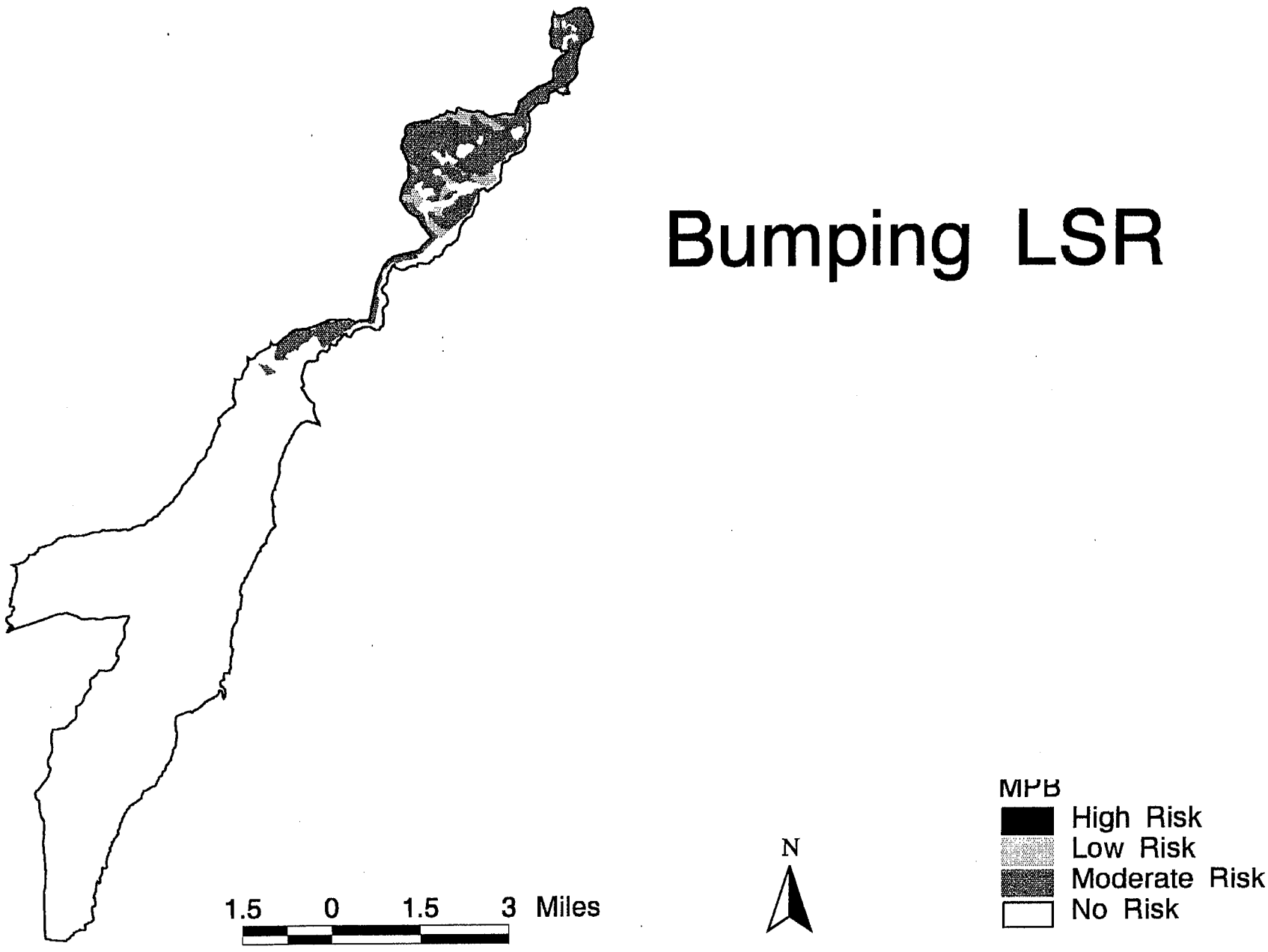
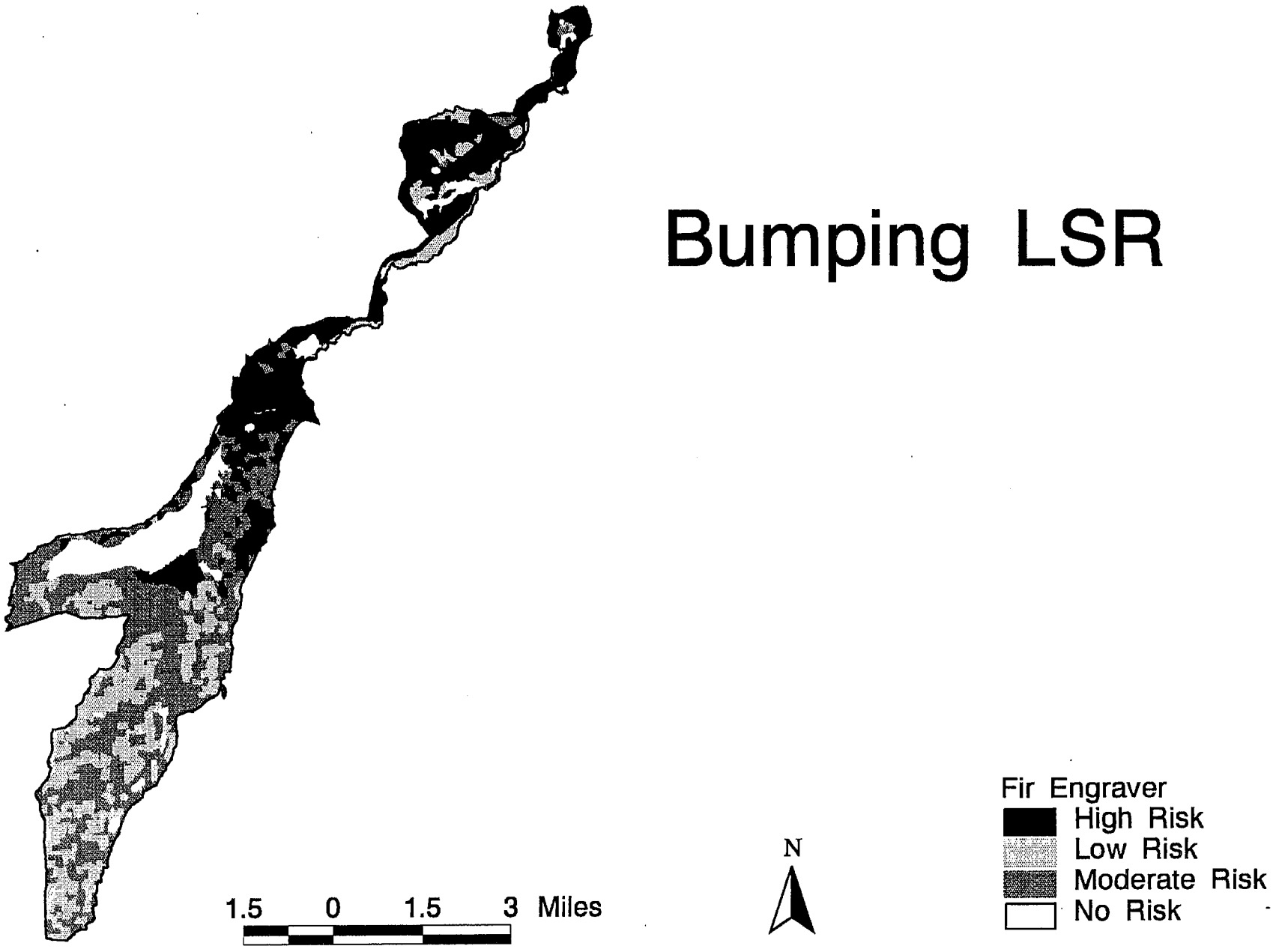
Low Risk
Moderate Risk
No Risk
N
0.5 0 0.5 1 Miles

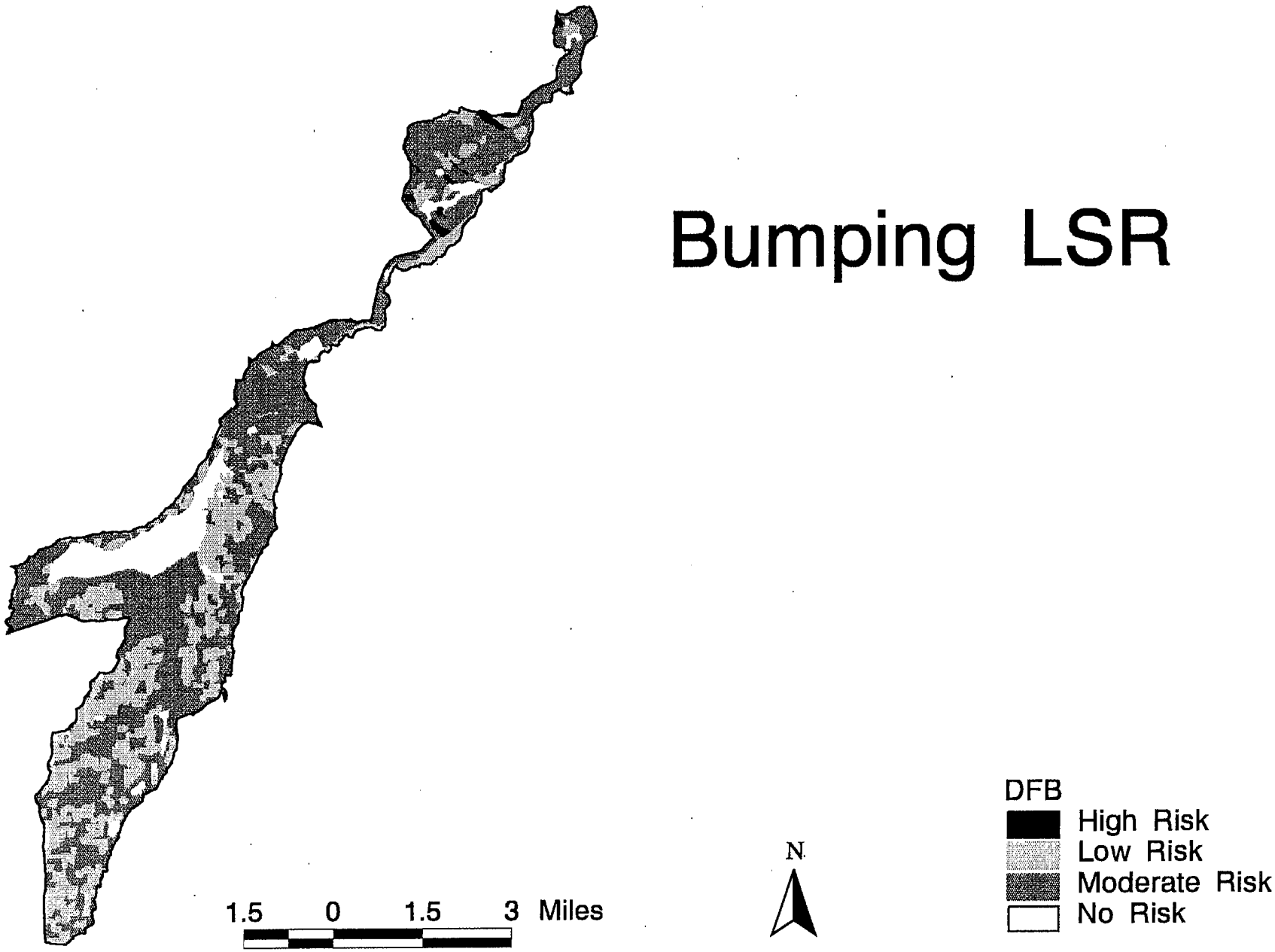

Crow LSR
0.5 0 0.5 1 Miles
N
Fire
High Risk
Low Risk
Moderate Risk
No Risk


Bumping LSR
Total
High Risk
Low Risk
Moderate Risk
No Risk
N
1.5 0 1.5 3 Miles


Bumping LSR
WPB
High Risk
Low Risk
Moderate Risk
No Risk
N
1.5 0 1.5 3 Miles


Bumping LSR
1.5 0 1.5 3 Miles
N
MPB
High Risk
Low Risk
Moderate Risk
No Risk


Bumping LSR
Fir Engraver
High Risk
Low Risk
Moderate Risk
No Risk
N
1.5 0 1.5 3 Miles


Bumping LSR
DFB
High Risk
Low Risk
Moderate Risk
No Risk
N
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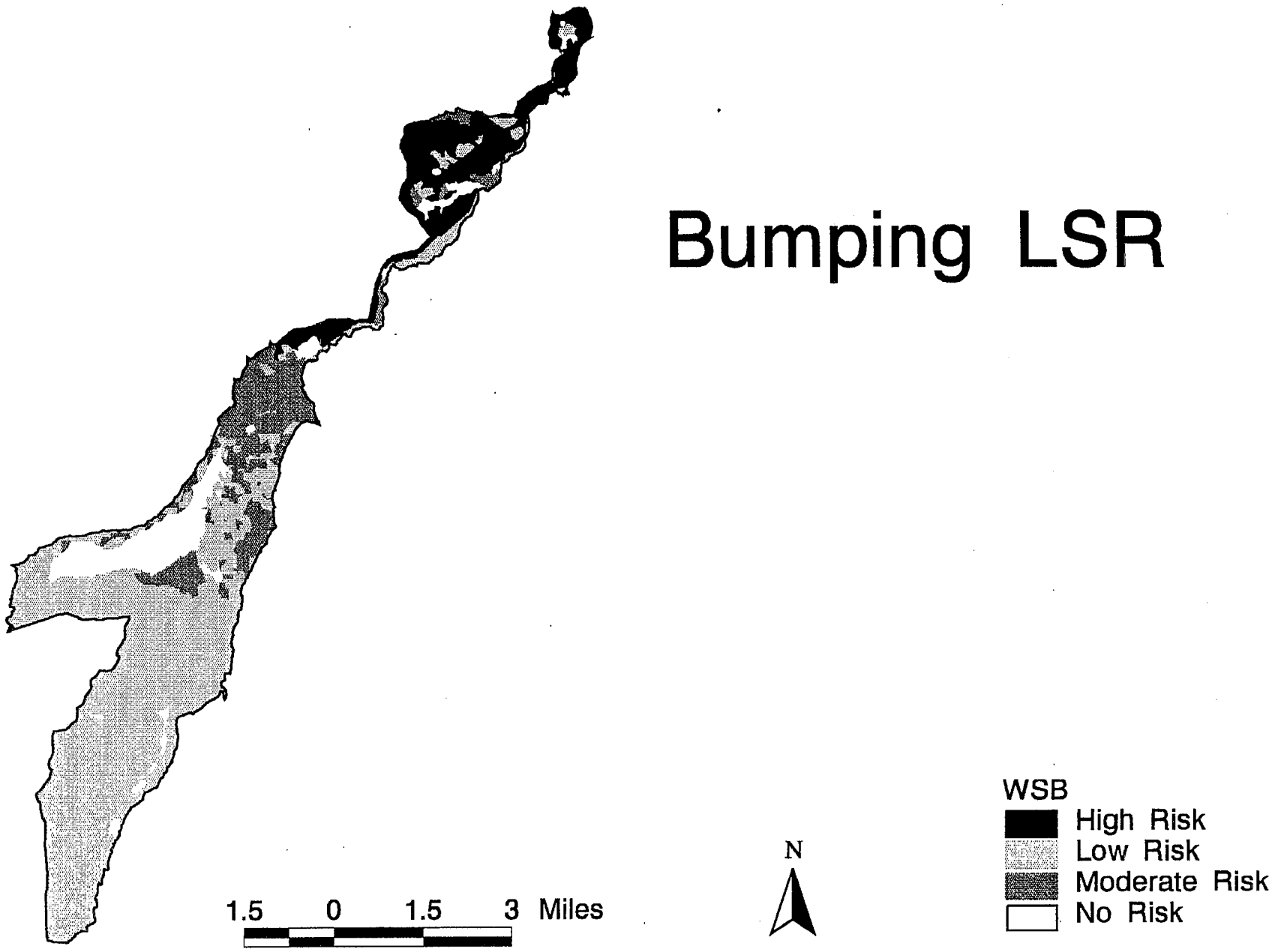
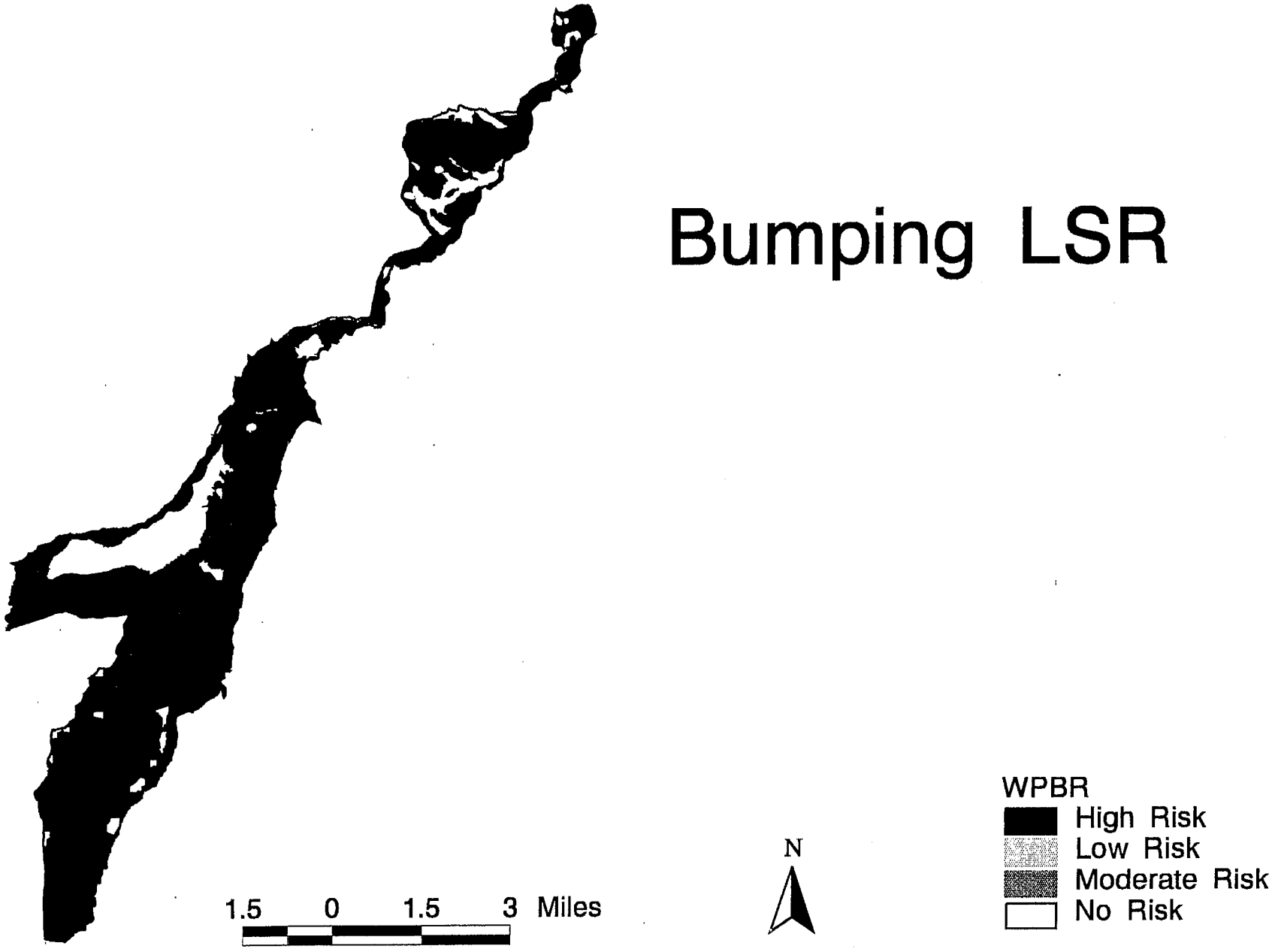
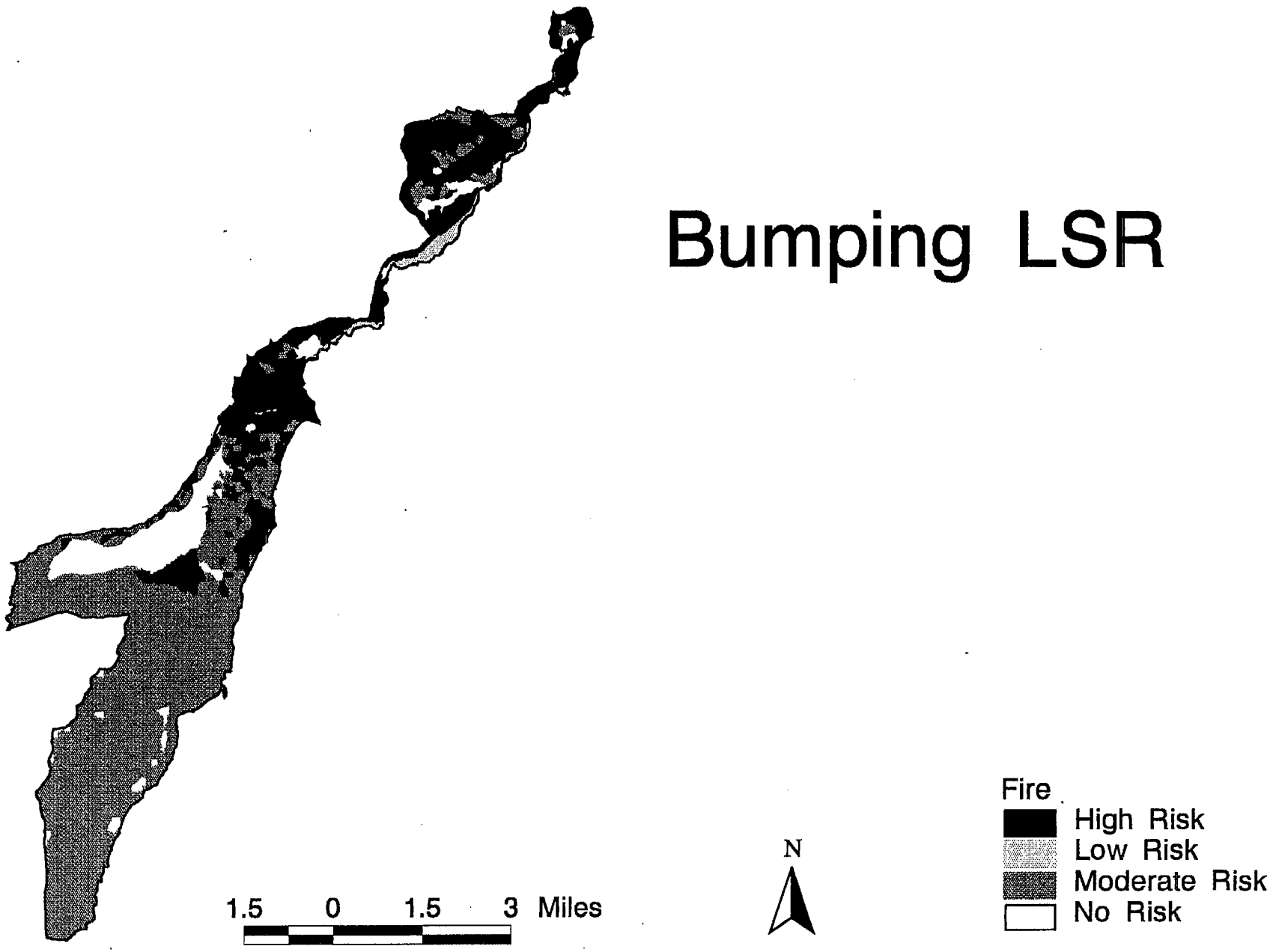
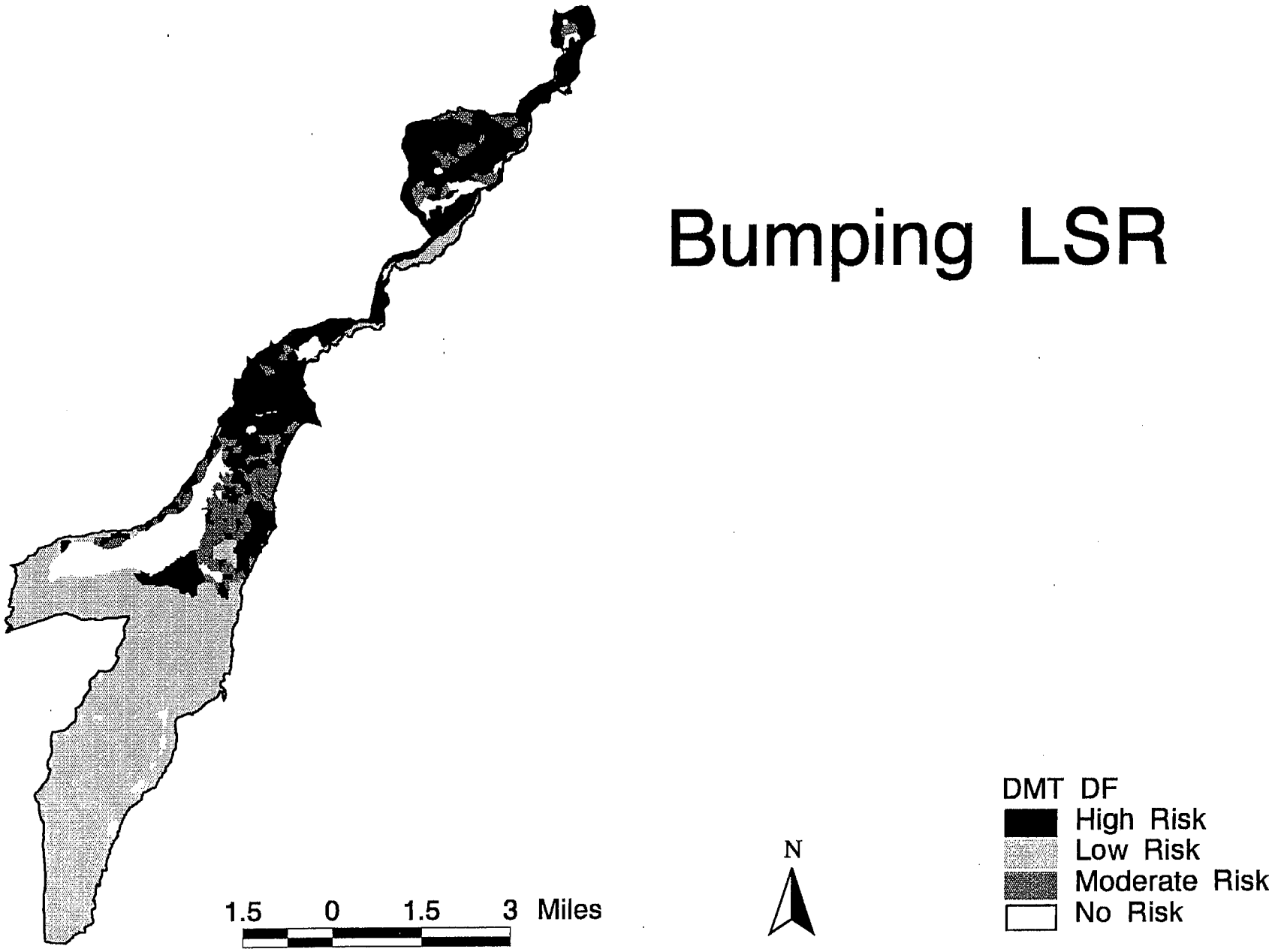
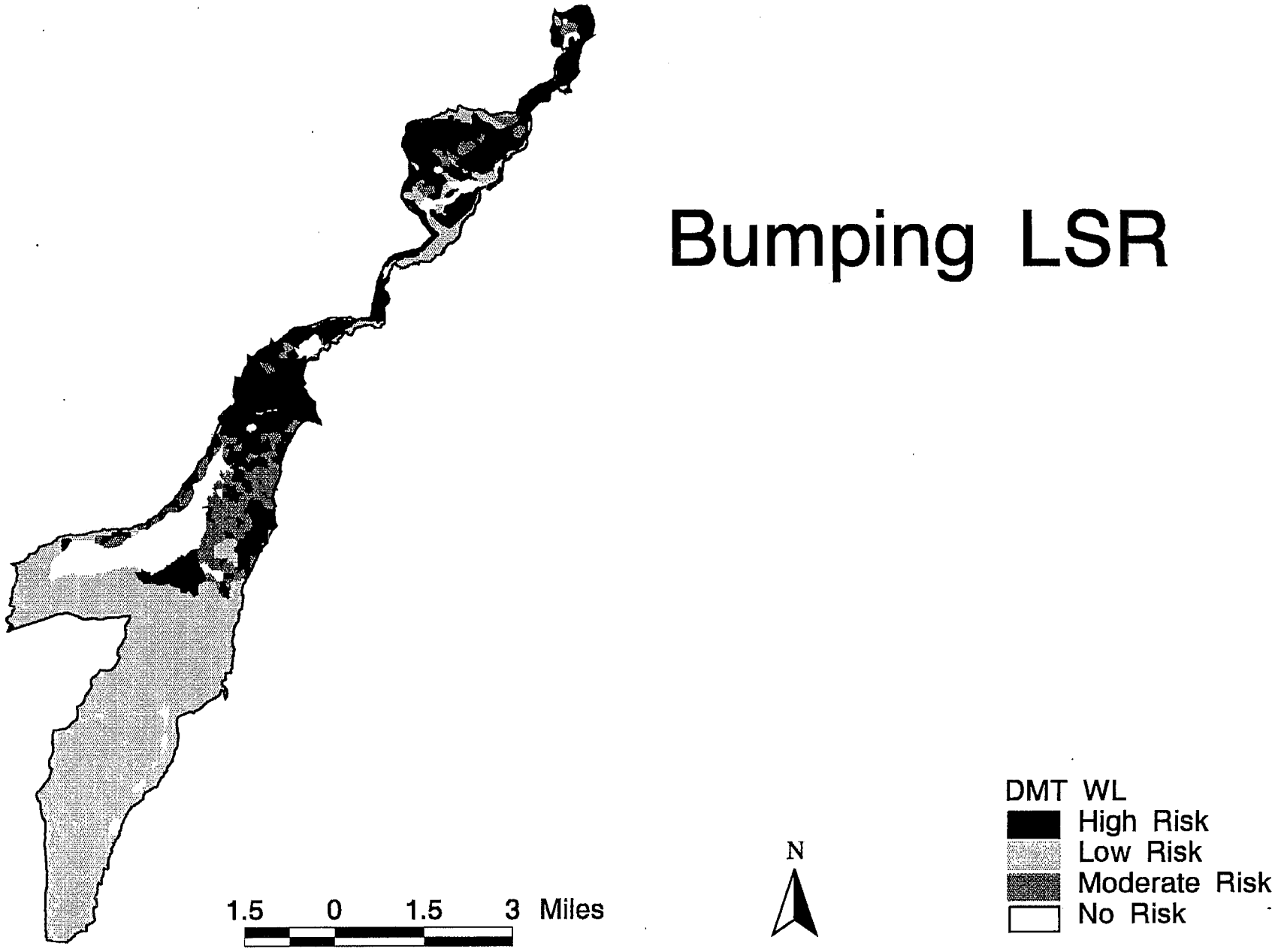
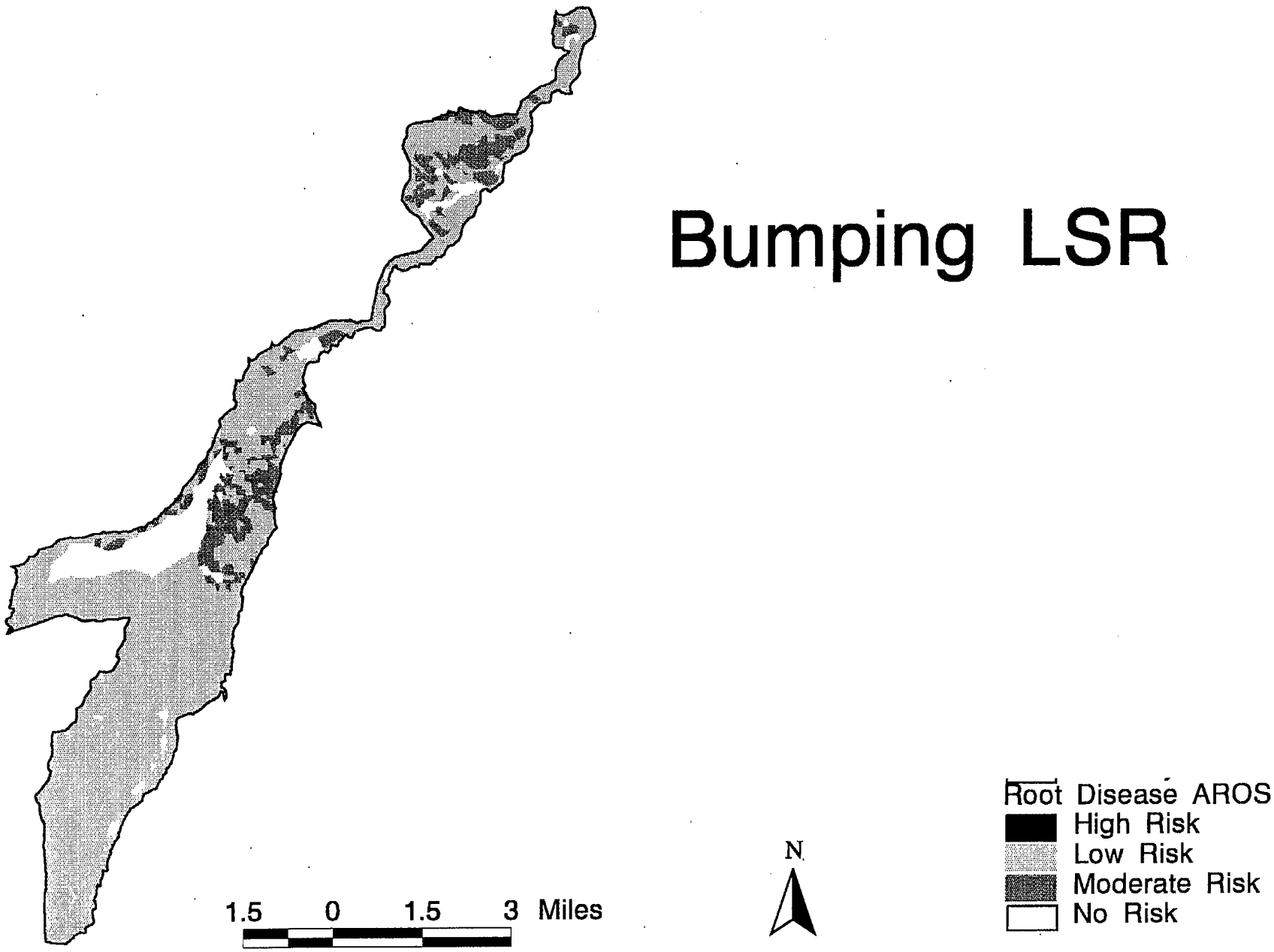

Bumping LSR
WSB
High Risk
Low Risk
Moderate Risk
No Risk
N
1.5 0 1.5 3 Miles

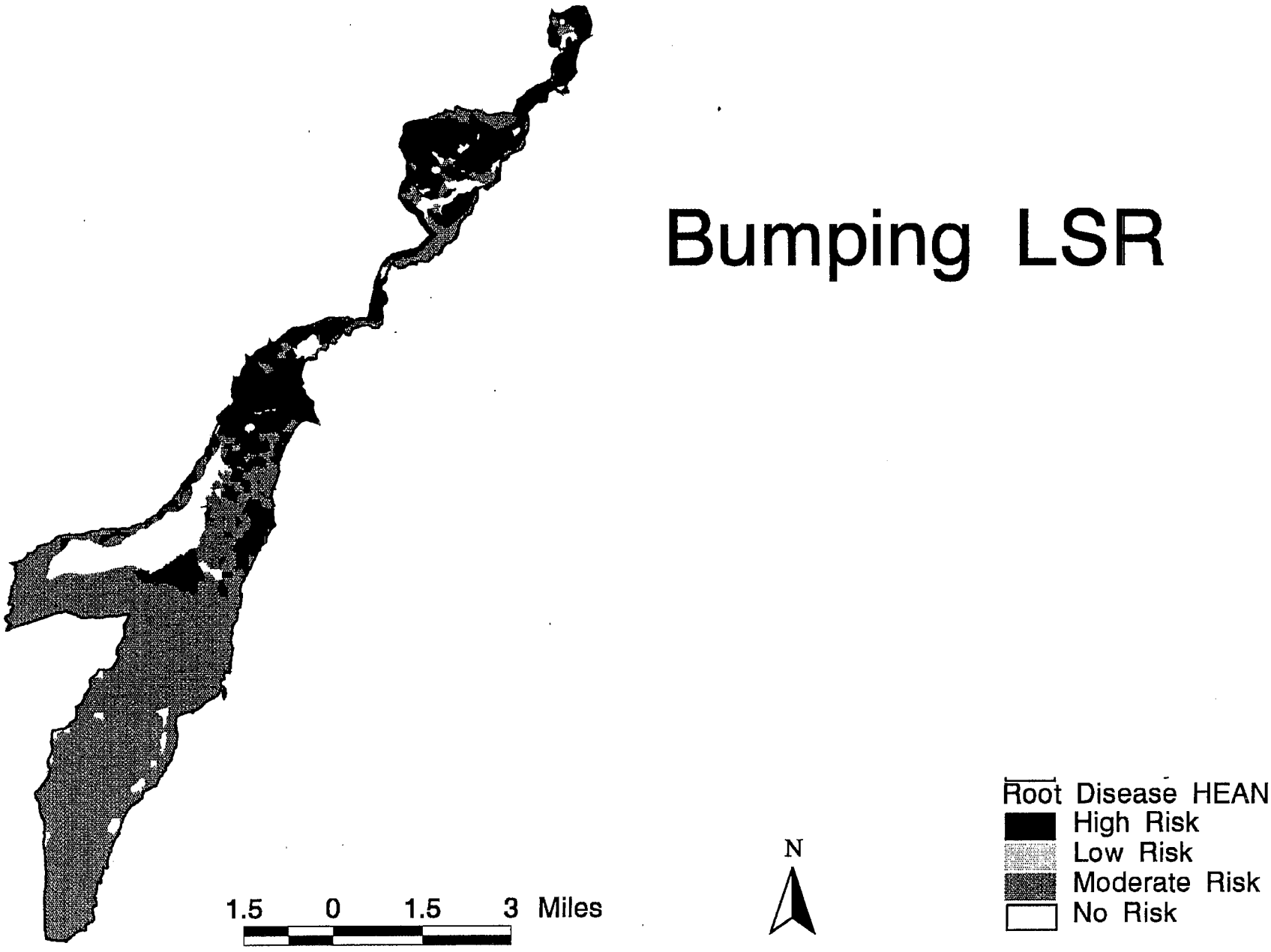

Bumping LSR
1.5 0 1.5 3 Miles
N
WPBR
High Risk
Low Risk
Moderate Risk
No Risk

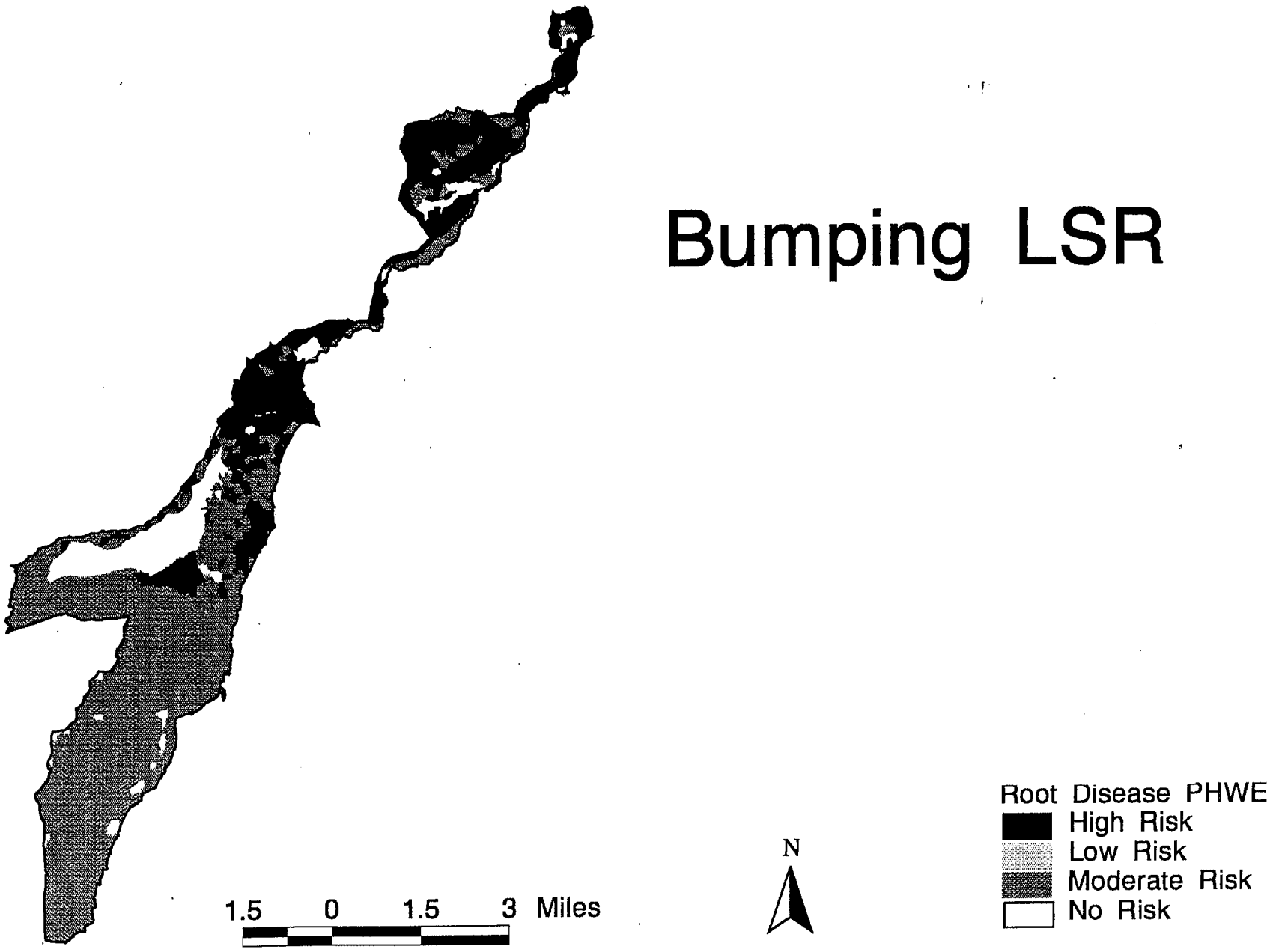

Bumping LSR
1.5 0 1.5 3 Miles
N
Fire
High Risk
Low Risk
Moderate Risk
No Risk


Bumping LSR
1.5 0 1.5 3 Miles
N
DMT DF
High Risk
Low Risk
Moderate Risk
No Risk


Bumping LSR
DMT WL
High Risk
Low Risk
Moderate Risk
No Risk
N
1.5 0 1.5 3 Miles


Bumping LSR
Root Disease AROS
High Risk
Low Risk
Moderate Risk
No Risk
N
1.5 0 1.5 3 Miles


Bumping LSR
Root Disease HEAN
High Risk
Low Risk
Moderate Risk
No Risk
N
1.5 0 1.5 3 Miles


Bumping LSR
Root Disease PHWE
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1.5 0 1.5 3 Miles