CONTENTS

LIST OF AUTHORS ...................................................... v

SYMPOSIUM OVERVIEW

Introduction ......................................................... 1
   William M. Block, Michael L. Morrison, and M. Hildegard Reiser

RESEARCH APPROACHES AND MANAGEMENT CONCEPTS

Northern Goshawk ecology: effects of scale and levels of biological organization ............ John J. Keane and Michael L. Morrison 3
Assessment of Goshawk nest area habitat using stand density index .................. Robert J. Lilieholm, James N. Long, and Susan Patla 18
A photographic and behavioral guide to aging nestling Northern Goshawks ............ Clint W. Boal 32
Influence of site quality and stand density on Goshawk habitat in southwestern forests ........ Richard L. Bassett, Douglas A. Boyce, Jr., M. Hildegard Reiser, Russell T. Graham, and Richard T. Reynolds 41

RESOURCE ECOLOGY

Macrohabitat selection by nesting Northern Goshawks: implications for managing eastern forests ....... Thomas Bosakowski and Robert Speiser 46
Large-area Goshawk habitat modeling in Dixie National Forest using vegetation and elevation data ........ Carl Johansson, Perry J. Hardin, and Clayton M. White 50
Habitat use by breeding male Northern Goshawks in northern Arizona ............ Donald J. Bright-Smith and R. William Mannan 58
Home ranges and habitats of Northern Goshawks in eastern California ............ Christina D. Hargis, Clinton McCarthy, and Richard D. Perloff 66
Post-fledging areas in Northern Goshawk home ranges .................. Patricia L. Kennedy, Johanna M. Ward, George A. Rinker, and James A. Gessaman 75
Territory occupancy and habitat patch size of Northern Goshawks in the southern Cascades of California .................. Brian Woodbridge and Phillip J. Detrich 83
Density and productivity of Northern Goshawks: implications for monitoring and management ....... Stephen DeStefano, Sonya K. Daw, Steven M. Desimone, and E. Charles Meslow 88
Nesting habitat of Accipiter hawks: is body size a consistent predictor of nest habitat characteristics? ........ Melissa S. Siders and Patricia L. Kennedy 92
Northern Goshawk diets in ponderosa pine forests on the Kaibab Plateau ........ Clint W. Boal and R. William Mannan 97
POPULATION ECOLOGY

Breeding biology of Northern Goshawks in northeastern Oregon .......... Evelyn L. Bull and Janet E. Hohmann 103
Approaches to investigating food limitation hypotheses in raptor populations: an example using the Northern Goshawk .......... Johanna M. Ward and Patricia L. Kennedy 114
Breeding ecology of the Northern Goshawk in high-elevation aspen forests of northern Nevada .......... James V. Younk and Marc J. Bechard 119
Population responses of Northern Goshawks to the 10-year cycle in numbers of snowshoe hares .......... Frank I. Doyle and James M. N. Smith 122
Territory fidelity, mate fidelity, and movements of color-marked Northern Goshawks in the southern Cascades of California .......... Phillip J. Detrich and Brian Woodbridge 130
Survival of Northern Goshawks in the southern Cascades of California .......... Stephen DeStefano, Brian Woodbridge, and Phillip J. Detrich 133
LIST OF AUTHORS

RICHARD L. BASSETT
USDA Forest Service
Southwestern Region
517 Gold Ave., SW
Albuquerque, NM 87102

MARC J. BECHARD
Raptor Research and Technical Assistance Center
Department of Biology
Boise State University
Boise, ID 83725

WILLIAM M. BLOCK
USDA Forest Service
Rocky Mountain Forest and Range Experiment Station
2500 S. Pine Knoll Dr.
Flagstaff, AZ 86001

CLINT W. BOAL
School of Renewable Natural Resources
University of Arizona
Tucson, AZ 85721

THOMAS BOSAKOWSKI
Department of Biological Sciences
Rutgers University
Newark, NJ 07102
(present address:
Beak Environmental Consultants
12931 NE 126 Pl.
Kirkland, WA 98034)

DOUGLAS A. BOYCE, JR.
USDA Forest Service
Southwestern Region
517 Gold Ave., SW
Albuquerque, NM 87102

DONALD J. BRIGHT-SMITH
School of Renewable Natural Resources
University of Arizona
Tucson, AZ 85721
(present address:
Department of Zoology
Duke University
Durham, NC 27708-0325)

EVELYN L. BULL
Pacific Northwest Research Station
1401 Gekler Lane
La Grande, OR 97850

SONYA K. DAW
Oregon Cooperative Wildlife Research Unit
Nash 104
Oregon State University
Corvallis, OR 97331

STEVEN M. DESIMONE
Oregon Cooperative Wildlife Research Unit
Nash 104
Oregon State University
Corvallis, OR 97331

STEPHEN DESTEFANO
Oregon Cooperative Wildlife Research Unit
Nash 104
Oregon State University
Corvallis, OR 97331

PHILLIP J. DETRICH
US Fish and Wildlife Service
Rm. E-1803
2800 Cottage Way
Sacramento, CA 95825

FRANK I. DOYLE
Kluane Lake Research Station
Mile 1054
Alaska Highway
Yukon Y1A 3V4

JAMES A. GESSAMAN
Department of Biology
Utah State University
Logan, UT 84322

RUSSELL T. GRAHAM
USDA Forest Service
Intermountain Research Station
1221 South Main
Moscow, ID 83843

PERRY J. HARDIN
Department of Geography
690 SWKT
Brigham Young University
Provo, UT 84602

CHRISTINA D. HARGIS
Department of Fisheries and Wildlife
Utah State University
Logan, UT 84322-5210
(present address:
USDA Forest Service
Intermountain Research Station
860 N. 1200 E.
Logan, UT 84321)

JANET E. HOHMANN
Pacific Northwest Research Station
1401 Gekler Lane
La Grande, OR 97850

CARL JOHANSSON
Department of Zoology
574 WDB
Brigham Young University
Provo, UT 84602