THE 2003 ANNUAL REPORT OF THE MONITORING AVIAN PRODUCTIVITY AND SURVIVORSHIP (MAPS) PROGRAM IN REGION SIX OF THE USDA FOREST SERVICE

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Introduction

Since 1989, The Institute for Bird Populations has been coordinating the Monitoring Avian Productivity and Survivorship (MAPS) Program, a cooperative effort among public and private agencies and individual bird banders in North America, to operate a continent-wide network of over 500 constant-effort mist-netting and banding stations. MAPS was designed to provide critically needed information on the vital rates (productivity or birth rate, and survivorship or death rate) of landbirds that is crucial for efforts to identify demographic causes of the severe and sometimes accelerating population declines documented (Robbins et al. 1989, Terborgh 1989, Peterjohn et al.1999) for many species of North American landbirds (DeSante 1992, DeSante et al. 1995, 1999, 2001). Such data on vital rates are also critically needed in efforts to identify management strategies to reverse such population declines (DeSante 1995, DeSante and Rosenberg 1998).

MAPS is organized to fulfill three tiers of goals and objectives, monitoring, research, and management:

The specific **monitoring** goals of MAPS are to provide, for over 100 target species, including Neotropical-wintering migrants, temperate-wintering migrants, and permanent residents: (a) annual indices of adult population size and post-fledging productivity from data on the numbers and proportions of young and adult birds captured; and (b) annual estimates of adult population size, adult survival rates, proportions of residents, and recruitment into the adult population from modified Cormack- Jolly-Seber analyses of mark-recapture data on adult birds.

The specific **research** goals of MAPS are to identify and describe: (a) temporal and spatial patterns in these demographic indices and estimates at a variety of spatial scales ranging from the local landscape to the entire continent; and (b) relationships between these patterns and ecological characteristics of the target species, population trends of the target species, station-specific and landscape-level habitat characteristics, and spatially-explicit weather variables.

The specific **management** goals of MAPS are to use these patterns and relationships, at the appropriate spatial scales, to: (a) identify thresholds and trigger points to notify appropriate agencies and organizations of the need for further research and/or management actions; (b) determine the proximate demographic cause(s) of population change; (c) suggest management actions and conservation strategies to reverse population declines and maintain stable or increasing populations; and (d) evaluate the effectiveness of the management actions and conservation strategies actually implemented through an adaptive management framework.

All of these monitoring, research, and management goals are in agreement with the USDA Forest Service's Partners-in-Flight strategy and with the Forest Service=s own avian monitoring efforts. Moreover, because birds are excellent indicators of the health of ecological systems, they can serve as a sensitive barometer of the overall effectiveness of efforts to maintain the biodiversity and ecological integrity of National Forests. Accordingly, the MAPS program was initiated National Forests beginning in 1992 and soon became one of the focus projects of the

USDA Forest Service Partners-in-Flight program. It was expected that information from the MAPS program would be capable of aiding research and management efforts on these National Forests to protect and enhance the forest's avifauna and ecological integrity, while allowing them to fulfill their multi-use purposes.

The MAPS Program was initiated in Region 6 in 1992, with six stations being established in each of six national forests (Mt. Baker/Snoqualmie, Wenatchee, Umatilla, Willamette, Siuslaw, and Fremont). Within each forest, an effort was made to establish two or three stations in more heavily managed landscapes, two or three stations in less heavily managed landscapes of the same forest type, and perhaps one or two additional stations in other forest types of high or unique importance to landbird populations. The overall goal of the initial establishment of the MAPS program in Region 6 was to provide high quality information on the demographics of landbirds on the forests that could be used to aid research and management efforts on national forests in the Region to protect and enhance the forests= avifauna and ecological integrity.
With the completion of ten years of data collection during the summer of 2001 and the submission of the ensuing report (DeSante *et al.* 2002b), this initial goal was accomplished.

The second objective is to provide for a comprehensive analysis of the ten years of demographic data (plus data obtained during the summers of 2002 and 2003) as a function of station-specific and landscape-level habitat characteristics and spatially explicit weather data. Important analytical techniques have been developed and evaluated to accomplish these latter analyses, and funding has been secured through a challenge grant from the National Fish and Wildlife Foundation (federal share supplied by the USDA Forest Service) to achieve this second objective. Completing these analyses during 2003 and early 2004 is now an immediate objective.

The ultimate objective of the MAPS Program on National Forests such as those in Region 6 is to identify generalized management guidelines and formulate specific management actions that can be implemented on National Forests and elsewhere to reverse the population declines of target landbird species and to maintain the populations of stable or increasing species. The identification and formulation of these management guidelines and actions is to be achieved by modeling the vital rates (productivity and survivorship) of the various landbird species as a function of landscape-level habitat characteristics and spatially explicit weather variables. Our goal is to identify relationships between productivity (and survivorship for permanent resident species) and these habitat and weather variables. These management strategies will involve efforts to modify the habitat from characteristics associated with low productivity to characteristics associated with high productivity (for species for which low productivity is driving the population decline). Our goal is to begin implementing these management strategies on Region 6 forests in 2004.

The implementation strategy for these guidelines includes the establishment of new MAPS stations to monitor their effectiveness, the discontinuing of an equal number of old stations, and the continued operation of others of the old stations to serve as controls for the new management stations. In this way, the total number of stations operated has remained the same (e.g., six stations are still being run at each Region-6 location although original stations were dropped and

new stations were added in each location in 2003).

A complete summary of the results of the MAPS Program in Region-6 National Forests from 1992-2001 was presented by DeSante et al. (2002b). This report briefly updates that earlier report and documents the operation of the 36 MAPS stations on six Region-6 National Forests during the 2003 breeding season.

Methods

Thirty-six MAPS stations were operated in 2003 on Region-6 National Forests, in the same locations where they were first established in 1992. They were operated in accordance with the highly standardized banding protocols established by The Institute for Bird Populations for use by the MAPS Program throughout North America and spelled out in detail in the MAPS Manual (DeSante et al. 2002a). On each day of operation each year, one 12-m long, 30-mm mesh, 4-tier nylon mist net was erected at each of ten fixed mist-netting sites within the interior eight ha of each 20-ha station. These ten nets at each station were operated for six morning hours per day (beginning at local sunrise), and for one day in each of seven or eight consecutive 10-day periods between May 21 and August 8. The operation of stations occurred on schedule in each of the ten-day periods and was carried out by Institute for Bird Populations biologists and interns (mentioned by name in the Acknowledgments).

With few exceptions, all birds captured during the course of the study were identified to species, age, and sex and, if unbanded, were banded with USGS/BRD numbered aluminum bands. Birds were released immediately upon capture and before being banded or processed if situations arose where bird safety would be comprised. The following data were taken on all birds captured, including recaptures, according to MAPS guidelines using standardized codes and forms:

(1) capture code (newly banded, recaptured, band changed, unbanded);
(2) band number;
(3) species;
(4) age and how aged;
(5) sex (if possible) and how sexed (if applicable);
(6) extent of skull pneumaticization;
(7) breeding condition of adults (i.e., extent of cloacal protuberance or brood patch);
(8) extent of juvenal plumage in young birds;
(9) extent of body and flight-feather molt;
(10) extent of primary-feather wear;
(11) wing chord;
(12) fat class and weight;
(13) date and time of capture (net-run time); and
(14) station and net site where captured.

Effort data (i.e., the number and timing of net-hours on each day of operation) were also collected in a standardized manner. In order to allow constant-effort comparisons of data to be

made, the times of opening and closing the array of mist nets and of beginning each net check were recorded to the nearest ten minutes. The breeding (summer residency) status (confirmed breeder, likely breeder, non-breeder) of each species seen, heard, or captured at each MAPS station on each day of operation was recorded using techniques similar to those employed for breeding bird atlas projects.

The computer entry, proofing, and verification of all banding, effort, and breeding status data were completed by IBP biologists using specially designed data entry, verification, and editing programs. The critical data for each banding record (capture code, band number, species, age, sex, date, capture time, station, and net number) were proofed by hand against the raw data and any computer-entry errors were corrected. All banding data were then run through a series of verification programs as follows:

(1) Clean-up programs to check the validity of all codes entered and the ranges of all numerical data;
(2) Cross-check programs to compare station, date, and net fields from the banding data with those from the effort and breeding status data;
(3) Cross-check programs to compare species, age, and sex determinations against degree of skull pneumaticization, breeding condition (extent of cloacal protuberance and brood patch), and extent of body and flight-feather molt, primary-feather wear, and juvenal plumage;
(4) Screening programs which allow identification of unusual or duplicate band numbers or unusual band sizes for each species; and
(5) Verification programs to screen banding and recapture data from all years of operation for inconsistent species, age, or sex determinations for each band number.

Any discrepancies or suspicious data identified by any of these programs were examined manually and corrected if necessary. Wing chord, weight, fat content, date and station of capture, and any pertinent notes were used as supplementary information for the correct determination of species, age, and sex in all of these verification processes.

The proofed, verified, and corrected banding data from each year were then run through a series of analysis programs that calculated for each species and for all species pooled at each station and for all stations pooled on each forest:

(1) the numbers of newly banded birds, recaptured birds, and birds released unbanded;
(2) the numbers and capture rates (per 600 net-hours) of first captures (in each year) for individual adult and young birds; and
(3) the proportion of young in the catch.

Following the procedures pioneered by the British Trust for Ornithology (BTO) in their CES Scheme (Peach et al. 1996), the number of adult birds captured was used as an index of adult population size, and the proportion of young in the catch was used as an index of post-fledging

productivity. No other analyses were conducted on these data other than the analyses of relationships between 1992-2001 productivity indices and landscape-level habitat characteristics and weather variables that were conducted as part of the efforts to identify and formulate management guidelines and actions for reversing population declines of the target species. A similar analysis was recently completed for DoD Military Installations (Nott *et al.* 2003) and the full results of these analyses for Region-6 National Forests, currently being conducted, will be published in 2004.

RESULTS

MOUNT BAKER/SNOQUALMIE NATIONAL FOREST, WASHINGTON

Within Mt. Baker/Snoqualmie National Forest, the six stations are located (from highest to lowest elevation) as follows: (1) The Monte Cristo Lake station at 610 m; (2) the Perry Creek station at 512 m; (3) the Bench Thin station at 354 m; (4) the Frog Lake station at 317 m; (5) the Beaver Lake station at 299 m; and (6) the Murphy Creek station at 244 m. All stations have been in operation every year since 1992 except the Bench Thin station, which was established in 1993. All stations are on the Darrington Ranger District. Table 1 details the habitats and the 2003 operation of the Mt. Baker stations.

A total of 2357.3 net-hours was accumulated at the six MAPS stations operated on Mt. Baker National Forest in 2003 (Table 1). Of these, 1889.0 net-hours could be compared with data from 2002 in a constant-effort manner.

Indices of Adult Population Size and Post-fledging Productivity

The 2003 capture summary of the numbers of newly-banded, unbanded, and recaptured birds at Mt. Baker National Forest is presented for each species at each of the six stations individually in Table 2 and for all stations combined in Table 4. A total of 638 captures of 30 species was recorded during the summer of 2003. Newly banded birds comprised 50.5% of the total captures. As in past years, the greatest number of total captures (128) was recorded at the Monte Cristo Lake station and the smallest number of total captures (82) was recorded at the Perry Creek station. The highest species richness occurred at Monte Cristo Lake (19 species) whereas the lowest species richness occurred at Frog Lake and Beaver Lake (13 species each).

The capture rates (per 600 net-hours) of individual adult and young birds and the percentage of young in the catch are presented for each species and for all species pooled at each station (Table 3) and for all stations combined (Table 4). We present capture rates (captures per 600 net-hours) of adults and young in this table so that the data can be compared among stations which, because of the vagaries of weather and accidental net damage, can differ from one another in effort expended (see Table 1). These capture indices indicate that the total adult population size in 2003 was greatest at Beaver Lake, followed in descending order by Monte Cristo Lake, Murphy Creek, Frog Lake, Bench Thin, and Perry Creek. The capture rate of young (Table 3) of all species pooled at each station in 2003 was highest at Bench Thin and lowest at Frog Lake.

The index of productivity at the stations in 2003 (Table 3), i.e., the proportion of young in the catch, was highest at Bench Thin (0.29), followed by Perry Creek (0.25), Monte Cristo Lake (0.21), Beaver Lake (0.16), and Frog Lake and Murphy Creek (0.09 each).

Among individual species, Swainson's Thrush was by far the most frequently captured species, followed in descending order by Rufous Hummingbird, Song Sparrow, American Robin, Winter Wren, Chestnut-backed Chickadee, and MacGillivray=s Warbler (Table 4). Overall, the most abundant breeding species at the six Mt. Baker MAPS stations in 2003, in decreasing order, were Swainson's Thrush, American Robin, Song Sparrow, Chestnut-backed Chickadee, Winter Wren, and MacGillivray's Warbler (Table 4; the number of individual adult Rufous Hummingbirds captured could not be determined since the birds were not banded). The following is a list of the common breeding species (captured at a rate of at least 6.0 adults per 600 net-hours), in decreasing order, at each station in 2003:

Monte Cristo Lake
Swainson's Thrush
Song Sparrow
Warbling Vireo
American Robin

Frog Lake
Swainson's Thrush
American Robin
Winter Wren
Chestnut-backed Chickadee
Varied Thrush

Perry Creek
Swainson's Thrush
American Robin

Bench Thin
Swainson's Thrush
MacGillivray's Warbler
Chestnut-backed Chickadee
Winter Wren
Spotted Towhee
Dark-eyed Junco

Beaver Lake
Swainson=s Thrush
American Robin
Song Sparrow
Red-breasted Sapsucker

Murphy Creek
Swainson's Thrush
American Robin
Chestnut-backed Chickadee
Winter Wren

WENATCHEE NATIONAL FOREST, WASHINGTON

Within Wenatchee National Forest, the six stations are located (from highest to lowest elevation) as follows: (1) The Two Point station at 1512 m; (2) the Deep Creek station at 1195 m; (3) the Pleasant Valley station at 1000 m; (4) the Timothy Meadow station at 951 m; (5) the Quartz Creek 2 station at 853 m; and (6) the Rattlesnake Spring station at 817 m. The Quartz Creek 2 station was established in 1993 to replace the original Quartz Creek station which was discontinued after 1992 because of heavy human interference and a history of vandalism. The Quartz Creek 2 station is very close to the original Quartz Creek station but is located farther from the Quartz Creek campground. All stations are on the Naches Ranger District. See Table 5 for a summary of the habitats and 2003 operation of these stations.

A total of 2164.0 net-hours was accumulated at the six MAPS stations operated in Wenatchee National Forest in 2003 (Table 5). Of these, 1774.0 net-hours could be compared with data from 2002 in a constant-effort manner.

Indices of Adult Population Size and Post-fledging Productivity

The 2003 capture summary of the numbers of newly-banded, unbanded, and recaptured birds at Wenatchee National Forest is presented for each species at each of the six stations individually in Table 6 and for all stations combined in Table 8. A total of 2043 captures of 58 species was recorded during the summer of 2003. Newly banded birds comprised 70.8% of the total captures. The greatest number of total captures (590) was recorded at the Deep Creek station and the smallest number of total captures (143) was recorded at the Timothy Meadow station. The highest species richness (36 species) occurred at Two Point and Quartz Creek 2 and the lowest species richness (24 species) occurred at Timothy Meadow.

The capture rates (per 600 net-hours) of individual adult and young birds and the percentage of young in the catch are presented for each species and for all species pooled at each station (Table 7) and for all stations combined (Table 8). We present capture rates (captures per 600 net- hours) of adults and young in this table so that the data can be compared among stations which, because of the vagaries of weather and accidental net damage, can differ from one another in effort expended (see Table 5). These capture indices indicate that the total adult population size in 2003 was greatest at Deep Creek, followed in descending order by Quartz Creek 2, Pleasant Valley, Rattlesnake Spring, Two Point, and Timothy Meadow. The capture rate of young of all species pooled at each station in 2003 was also highest at Deep Creek and lowest at Timothy Meadow. The index of productivity at the stations in 2003, i.e., the proportion of young in the catch, was highest at Two Point (0.57), followed by Deep Creek (0.55), Quartz Creek 2 (0.39), Pleasant Valley (0.36), Timothy Meadow (0.32), and Rattlesnake Springs (0.29).

Among individual species, Pine Siskin was the most frequently captured species, followed by Evening Grosbeak, Dark-eyed Junco, MacGillivray's Warbler, Townsend's Warbler, Rufous Hummingbird, Song Sparrow, Lincoln's Sparrow, and Nashville Warbler (Table 8). Overall, the most abundant breeding species at the six Wenatchee MAPS stations in 2003, in decreasing order, were Evening Grosbeak, Pine Siskin, Dark-eyed Junco, MacGillivray=s Warbler, Townsend=s Warbler, Lincoln=s Sparrow, Song Sparrow, Chipping Sparrow, American Robin, and Yellow-rumped Warbler (Table 8; numbers of adult Rufous Hummingbirds captured could not be determined since these birds were not banded). The following is a list of the common breeding species (captured at a rate of more than 6.0 adults per 600 net-hours), in decreasing order, at each station in 2003:

Two Point	**Deep Creek**	**Pleasant Valley**
MacGillivray=s Warbler	Pine Siskin	Dark-eyed Junco
Dark-eyed Junco	Townsend's Warbler	Pine Siskin
Warbling Vireo	Lincoln's Sparrow	Chestnut-backed Chickadee
Hermit Thrush	Dark-eyed Junco	Yellow-rumped Warbler
Lazuli Bunting	Chestnut-backed Chickadee	American Robin
American Robin	Song Sparrow	Chipping Sparrow

Lincoln's Sparrow
Pine Siskin

Rattlesnake Springs
Dark-eyed Junco
MacGillivray's Warbler
Dusky Flycatcher
Western Tanager
Warbling Vireo
Nashville Warbler
Hammond's Flycatcher
Chipping Sparrow
Cassin's Vireo
Yellow-rumped Warbler
Orange-crowned Warbler

Quartz Creek 2
Pine Siskin
MacGillivray's Warbler
Song Sparrow
Western Wood-Pewee
Warbling Vireo
Yellow Warbler
Dusky Flycatcher
Dark-eyed Junco
American Robin
Yellow-rumped Warbler
Black-headed Grosbeak
Cassin's Finch
Golden-crowned Kinglet
Townsend's Warbler
Western Tanager

Timothy Meadow
Lincoln's Sparrow
Dark-eyed Junco
Chipping Sparrow
Song Sparrow
Pine Siskin
Townsend's Warbler
American Robin

UMATILLA NATIONAL FOREST, OREGON

Within Umatilla National Forest, the six stations are located (from highest to lowest elevation) as follows: (1) The Buzzard Creek station at 1524 m; (2) the Buck Mountain Meadow station at 1378 m; (3) the Coyote Ridge station at 1341 m; (4) the Fry Meadow station at 1280 m; (5) the Brock Meadow station at 1244 m; and (6) the Phillips Creek station at 975 m. All stations were established in 1992 and are located on the Walla Ranger District. See Table 9 for a summary of the habitats and 2003 operation of these stations.

A total of 2199.2 net-hours was accumulated at the six MAPS stations operated in Umatilla National Forest in 2003 (Table 9). Of these, 2036.2 net-hours could be compared with data from 2002 in a constant-effort manner.

Indices of Adult Population Size and Post-fledging Productivity
The 2003 capture summary of the numbers of newly-banded, unbanded, and recaptured birds at Umatilla National Forest is presented for each species at each of the six stations individually in Table 10 and for all stations combined in Table 12. A total of 1443 captures of 45 species was recorded during the summer of 2003. Newly banded birds comprised 74.8% of the total captures. The greatest number of total captures (613) was recorded at the Buck Mountain Meadow station and the smallest number of total captures (100) was recorded at the Phillip=s Creek station. Species richness was greatest at Brock Mountain (32 species) and lowest at Fry Meadow (23 species).

The capture rates (per 600 net-hours) of individual adult and young birds and the percentage of young in the catch are presented for each species and for all species pooled at each station (Table 11) and for all stations combined (Table 12). We present capture rates (captures per 600 net-hours) of adults and young in this table so that the data can be compared among stations which, because of the vagaries of weather and accidental net damage, can differ from one another

in effort expended (see Table 9). These capture indices indicate that the total adult population size in 2003 was greatest at Buck Mountain Meadow, followed in descending order by Brock Meadow, Fry Meadow, Buzzard Creek, Coyote Ridge, and Phillips Creek. The capture rate of young of all species pooled was also highest at Buck Mountain Meadow and lowest at Phillips Creek. Productivity, i.e., the proportion of young in the catch, was highest at Buck Mountain Meadow (0.65) followed by Buzzard Creek (0.64), Coyote Ridge (0.43), Brock Meadow (0.35), Phillips Creek (0.19), and Fry Meadow ().15).

Among individual species, Golden-crowned Kinglet was the most frequently captured, followed by MacGillivray=s Warbler, Townsend=s Warbler, Ruby-crowned Kinglet, Dark-eyed Junco, Yellow-rumped Warbler, Orange-crowned Warbler, and Swainson=s Thrush (Table 12). Overall, the most abundant breeding species at the six Umatilla MAPS stations in 2003, in decreasing order, were MacGillivray's Warbler, Ruby-crowned Kinglet, Golden-crowned Kinglet, Townsend=s Warbler, Swainson's Thrush, Pine Siskin, Lincoln=s Sparrow, and Dark-eyed Junco (Table 12). The following is a list of the common breeding species (captured at a rate of at least 6.0 adults per 600 net-hours), in decreasing order, at each station in 2003:

Buzzard Creek
Townsend's Warbler
Dark-eyed Junco
Chipping Sparrow
Warbling Vireo
Hermit Thrush

Fry Meadow
Ruby-crowned Kinglet
Golden-crowned Kinglet
Lincoln's Sparrow
Dark-eyed Junco
Pine Siskin
Swainson's Thrush
Townsend's Warbler
MacGillivray's Warbler
Warbling Vireo

Buck Mountain Meadow
Golden-crowned Kinglet
Pine Siskin
Townsend=s Warbler
Chipping Sparrow
Ruby-crowned Kinglet
Yellow-rumped Warbler
Lazuli Bunting
Swainson's Thrush
Lincoln's Sparrow
Wilson's Warbler
Hammond's Flycatcher
Dark-eyed Junco
Fox Sparrow

Phillips Creek
MacGillivray's Warbler
Swainson's Thrush
American Robin
Orange-crowned Warbler

Coyote Ridge
MacGillivray's Warbler
Orange-crowned Warbler
Swainson's Thrush
Yellow-rumped Warbler
Townsend's Warbler

Brock Meadow
MacGillivray's Warbler
"Traill's" Flycatcher
Wilson's Warbler
Lincoln's Sparrow
Swainson's Thrush
Song Sparrow
Ruby-crowned Kinglet
Townsend's Warbler
Lazuli Bunting
Warbling Vireo
Mountain Chickadee
Yellow-rumped Warbler

WILLAMETTE NATIONAL FOREST, OREGON

Within Willamette National Forest, the six stations are located (from highest to lowest elevation) as follows: (1) the Clearcut station at 1292 m; (2) the Fingerboard Prairie station at 1195 m; (3) the Ikenick station at 1006 m; (4) the Brock Creek station at 792 m; (5) the Major Prairie station

at 701 m; and (6) the Strube Flat station at 488 m. The Clearcut, Brock Creek, and Major Prairie stations are on the Oakridge Ranger District; Fingerboard Prairie and Ikenick are on the McKenzie Ranger District; and Strube Flat is on the Blue River Ranger District. See Table 13 for details of the habitats and 2003 operation of these stations.

A total of 2732.5 net-hours was accumulated at the six MAPS stations operated in Willamette National Forest in 2003 (Table 13). Of these, 2487.8 net-hours could be compared with data from 2002 in a constant-effort manner.

Indices of Adult Population Size and Post-fledging Productivity

The 2003 capture summary of the numbers of newly-banded, unbanded, and recaptured birds at Willamette National Forest is presented for each species at each of the six stations individually in Table 14 and for all stations combined in Table 16. A total of 1101 captures of 42 species was recorded during the summer of 2003. Newly banded birds comprised 56.0% of the total captures. The greatest number of total captures (273) was recorded at the Fingerboard Prairie station and the smallest number of total captures (74) was recorded at the Strube Flat station. The greatest species richness (30 species) occurred at Ikenick and the lowest (10 species) occurred at Strube Flat.

The capture rates (per 600 net-hours) of individual adult and young birds and the percentage of young in the catch are presented for each species and for all species pooled at each station (Table 15) and for all stations combined (Table 16). We present capture rates (captures per 600 net-hours) of adults and young in this table so that the data can be compared among stations which, because of the vagaries of weather and accidental net damage, can differ from one another in effort expended (see Table 13). These capture indices indicate that the total adult population size in 2003 was greatest at Fingerboard Prairie, followed in descending order by Ikenick, Clearcut, Major Prairie, Brock Creek, and Strube Flat. The capture rate of young of all species pooled at each station in 2003 was highest at Ikenick and lowest at Strube Flat. The index of productivity observed at the Willamette stations in 2003, i.e., the proportion of young in the catch, was highest at Clearcut and Ikenick (0.35), followed by Brock Creek (0.33), Fingerboard Prairie (0.32), Major Prairie (0.24), and Strube Flat (0.12).

Among individual species, Swainson=s Thrush was the most frequently captured, followed by Dark-eyed Junco, Orange-crowned Warbler, MacGillivray's Warbler, Rufous Hummingbird, Common Yellowthroat, Song Sparrow, Wilson's Warbler, and Hermit Warbler (Table 16). Overall, the most abundant breeding species at the six Willamette MAPS stations in 2003, in decreasing order, were Swainson's Thrush, Dark-eyed Junco, MacGillivray's, Hermit Orange-crowned, and Wilson's warblers, Common Yellowthroat, Hammond's Flycatcher, and Chestnut-backed Chickadee (Table 16; the number of individual adult Rufous Hummingbirds captured could not be determined since the birds were not banded). The following is a list of the common breeding species (captured at a rate of at least 6.0 adults per 600 net-hours), in decreasing order, at each station in 2003:

Clearcut
Swainson's Thrush
Dark-eyed Junco
MacGillivray's Warbler
Wilson's Warbler
Orange-crowned Warbler

Major Prairie
Swainson's Thrush
MacGillivray's Warbler
Hermit Warbler
Hammond's Flycatcher
Dark-eyed Junco
Chestnut-backed Chickadee
Song Sparrow

Fingerboard Prairie
Swainson's Thrush
Dark-eyed Junco
Orange-crowned Warbler
Wilson's Warbler
Hermit Warbler
Golden-crowned Kinglet
MacGillivray's Warbler
Chestnut-backed Chickadee

Brock Creek
Swainson's Thrush
Chestnut-backed Chickadee
Hermit Warbler
MacGillivray's Warbler
American Robin

Ickenick
Common Yellowthroat
Song Sparrow
"Traill's" Flycatcher
Dark-eyed Junco
Lincoln's Sparrow
Yellow Warbler
Yellow-rumped Warbler
Hammond's Flycatcher

Strube Flat
Swainson's Thrush
American Robin

SIUSLAW NATIONAL FOREST, OREGON

Within Siuslaw National Forest, the six stations are located (from highest to lowest elevation) as follows: (1) the Mary's Peak station at 274 m; (2) the Cougar Creek station at 259 m; (3) the Crab Creek station at 219 m; (4) the Homestead station at 207 m; (5) the Beaver Ridge station at 158 m; and (6) the Salvation Meadow station at 122 m. Salvation Meadow was established in 1993 to replace the 1992 Nettle Creek station which, because of its extremely rugged terrain, was too difficult to operate. All stations are on the Alsea Ranger District. See Table 17 for details on the habitats and 2003 operation of these stations.

A total of 2676.2 net-hours was accumulated at the six MAPS stations operated in Siuslaw National Forest in 2003 (Table 17). Of these, 2590.8 net-hours could be compared with data from 2002 in a constant-effort manner.

Indices of Adult Population Size and Post-fledging Productivity
The 2003 capture summary of the numbers of newly-banded, unbanded, and recaptured birds at Siuslaw National Forest is presented for each species at each of the six stations individually in Table 18 and for all stations combined in Table 20. A total of 877 captures of 25 species was recorded during the summer of 2003. Newly banded birds comprised 44.8% of the total captures. The greatest number of total captures (221) was recorded at the Salvation Meadow station and the smallest number of total captures (95) was recorded at the Mary=s Peak station. The greatest species richness (15 species) was recorded at Cougar Creek and Homestead stations and the lowest species richness (11 species) was recorded at Crab Creek.

The capture rates (per 600 net-hours) of individual adult and young birds and the percentage of young in the catch are presented for each species and for all species pooled at each station (Table

19) and for all stations combined (Table 20). We present capture rates (captures per 600 net-hours) of adults and young in this table so that the data can be compared among stations which, because of the vagaries of weather and accidental net damage, can differ from one another in effort expended (see Table 17). These capture indices indicate that the total adult population size in 2003 was greatest at Salvation Meadow, followed by Cougar Creek, Beaver Ridge, Homestead, Crab Creek, and Mary's Peak. The capture rate of young of all species pooled at each station in 2003 was highest at Salvation Meadow and lowest at Crab Creek. The index of productivity at the Siuslaw stations in 2003, i.e., the proportion of young in the catch, was highest at Cougar Creek (0.24) followed by Salvation Meadow (0.20), Mary's Peak (0.18), Homestead and Beaver Ridge (0.13), and Crab Creek (0.06).

Among individual species, Swainson's Thrush was the most frequently captured species by far, followed by Wilson's Warbler, Winter Wren, AWestern≅ Flycatcher, Chestnut-backed Chickadee, and Rufous Hummingbird (Table 20). Overall, the most abundant breeding species at the six Siuslaw MAPS stations in 2003, in decreasing order, were Swainson's Thrush, Wilson's Warbler, Winter Wren, AWestern≅ Flycatcher, Chestnut-backed Chickadee, and Hermit Warbler (Table 20; the number of individual adult Rufous Hummingbirds captured could not be determined since the birds were not banded). The following is a list of the common breeding species (captured at a rate of at least 6.0 adults per 600 net-hours), in decreasing order, at each station in 2003:

Mary's Peak	**Cougar Creek**	**Homestead**
Swainson=s Thrush	Swainson's Thrush	Swainson's Thrush
"Western" Flycatcher	Wilson's Warbler	Wilson's Warbler
Winter Wren	Winter Wren	"Western" Flycatcher
Wilson=s Warbler	Chestnut-backed Chickadee	Winter Wren
Beaver Ridge	**Crab Creek**	**Salvation Meadow**
Swainson=s Thrush	Swainson=s Thrush	Swainson=s Thrush
Wilson=s Warbler	Winter Wren	Wilson's Warbler
Winter Wren		AWestern≅ Flycatcher

FREMONT NATIONAL FOREST, OREGON

Within Fremont National Forest, the six stations are located (from highest to lowest elevation) as follows: (1) The Sycan River station at 2003 m; (2) the Deadhorse station at 1944 m; (3) the Cold Creek station at 1926 m; (4) the Augur Creek station at 1847 m; (5) the Swamp Creek station at 1658 m; and (6) the Island station at 1628 m. All stations are on the Paisley Ranger District. See Table 21 for details on the habitats and 2003 operation of these stations.

A total of 2251.7 net-hours was accumulated at the six MAPS stations operated in Fremont National Forest in 2003 (Table 21). Of these, 1846.8 net-hours could be compared with data from 2002 in a constant-effort manner.

Indices of Adult Population Size and Post-fledging Productivity

The 2003 capture summary of the numbers of newly-banded, unbanded, and recaptured birds at Fremont National Forest is presented for each species at each of the six stations individually in Table 22 and for all stations combined in Table 24. A total of 1207 captures of 45 species was recorded during the summer of 2003. Newly banded birds comprised 65.9% of the total captures. The greatest number of total captures (365) was recorded at the Deadhorse station and the smallest number of total captures (96) was recorded at the Swamp Creek station. Species richness was highest at Augur Creek (30 species) and lowest at Cold Creek and Swamp Creek (20 species each).

The capture rates (per 600 net-hours) of individual adult and young birds and the percentage of young in the catch are presented for each species and for all species pooled at each station (Table 23) and for all stations combined (Table 24). We present capture rates (captures per 600 net-hours) of adults and young in this table so that the data can be compared among stations which, because of the vagaries of weather and accidental net damage, can differ from one another in effort expended (see Table 21). These capture indices indicate that the total adult population size in 2003 was greatest at Deadhorse, followed in descending order by Sycan River, Augur Creek, Island, Cold Creek, and Swamp Creek. The capture rate of young of all species pooled at each station in 2003 was also highest at Deadhorse and lowest at Swamp Creek. Productivity at the Fremont stations in 2003, i.e., the proportion of young in the catch, was highest at Sycan River (0.45), followed by Deadhorse (0.36), Augur Creek (0.30), Island (0.29), Cold Creek (0.26), and Swamp Creek (0.25).

Among individual species, Dark-eyed Junco was the most frequently captured species, followed by Orange-crowned Warbler, MacGillivray's Warbler, American Robin, White-crowned Sparrow, Warbling Vireo, Yellow-rumped Warbler, Mountain Chickadee, Rufous Hummingbird, and Red-breasted Sapsucker (Table 24). Overall, the most abundant breeding species at the six Fremont MAPS stations in 2003, in decreasing order, were Dark-eyed Junco, Warbling Vireo, American Robin, Yellow-rumped Warbler, MacGillivray=s Warbler, Orange-crowned Warbler, Dusky Flycatcher, Mountain Chickadee, Lincoln=s Sparrow, Red-breasted Sapsucker, and Brown Creeper (Table 24). The following is a list of the common breeding species (captured at a rate of at least 6.0 adults per 600 net-hours), in decreasing order, at each station in 2003:

Sycan River
MacGillivray's Warbler
Orange-crowned Warbler
Lincoln's Sparrow
Dark-eyed Junco
Dusky Flycatcher
White-crowned Sparrow
Yellow-rumped Warbler
Red-breasted Sapsucker
Warbling Vireo

Deadhorse
Warbling Vireo
Orange-crowned Warbler
Dusky Flycatcher
American Robin
Yellow-rumped Warbler
MacGillivray's Warbler
Western Wood-Pewee
Red-breasted Sapsucker
Mountain Chickadee

Cold Creek
Dark-eyed Junco
Mountain Chickadee
Brown Creeper
Lincoln's Sparrow
Warbling Vireo

Augur Creek
Warbling Vireo
Dark-eyed Junco

American Robin

Swamp Creek
Dark-eyed Junco
"Western" Flycatcher
American Robin
Yellow-rumped Warbler
MacGillivray's Warbler

Dark-eyed Junco
Lincoln's Sparrow
White-crowned Sparrow
Brewer's Sparrow
Cassin's Finch

Island
Dark-eyed Junco
American Robin
Yellow-rumped Warbler
Brown Creeper
Mountain Chickadee

American Robin
Mountain Chickadee
MacGillivray's Warbler
"Western" Flycatcher
Yellow-rumped Warbler
Red-breasted Nuthatch
Western Tanager

Conclusions

Populations of many species of landbirds on six national forests in Region 6 declined substantially and often significantly between 1992 and 2001. The decline for all species pooled over all six national forests was a substantial -1.5% per year. Declines were most pronounced on Siuslaw, Willamette, and especially, Umatilla National Forest where avian populations have declined by nearly 50% since 1992. Productivity also declined on Region 6 national forests during this period, and annual variations in productivity appear to be an important factor in causing annual variations in population trends for many declining species in the Region. For many species, especially Neotropical-wintering migrants, the trend in global climate during the 1990's, as characterized by the El Niño/Southern Oscillation, appears to have caused the decreasing trends in productivity which, in turn, have likely contributed to the population declines. For most declining species, however, low overall productivity (regardless of the productivity trend) or low average survival rates (or both), that are unrelated to climate, appear to provide the major cause(s) of the population declines. We suspect that the ultimate environmental cause for these deficient vital rates, especially low productivity, relates to habitat loss and/or degradation.

The population declines in landbirds that we have documented on Region Six national forests, especially those that can be shown to be caused by low productivity on the breeding grounds, are potentially within the ability of the U.S. Forest Service to correct. As mentioned above, a second objective of the MAPS program on Region-6 National Forests is to provide for a comprehensive analysis of the ten years of demographic data (plus data obtained during the summers of 2002 and 2003) as a function of station-specific and landscape-level habitat characteristics and spatially explicit weather data. These analyses are currently being undertaken, to identify generalized management guidelines and formulate specific management actions that can be implemented on National Forests and elsewhere to reverse the population declines of target landbird species and to maintain the populations of stable or increasing species. Our goal with these analyses is to identify relationships between productivity (and survivorship for permanent resident species) and these habitat and weather variables. These management strategies will involve efforts to modify the habitat from characteristics associated with low productivity to characteristics associated with high productivity (for species for which low productivity is driving the population decline). A similar analysis was recently completed for DoD Military Installations (Nott *et al.* 2003) and the full results of these analyses for Region-6 National Forests, currently being conducted, will be published in 2004. We will begin implementing these management strategies on Region 6 forests in 2004.

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[DAVE, CHK FOLLOWING FROM 2001 REPORT:]

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