RAPTOR MIGRATION STUDIES AT CHELAN RIDGE, WASHINGTON: FALL 2002 SEASON SUMMARY



HawkWatch International Salt Lake City, Utah





Okanogan and Wenatchee National Forests Winthrop, Washington

PROJECT SITE

The Chelan Ridge project site is located approximately 13 miles (21 km) north-northwest of the village of Chelan on the Chelan County / Okanogan County and Okanogan National Forest / Wenatchee National Forest borders (48°01'12.8"N, 120°05'38.4"W). The count site sits at an elevation of 5.675 feet (1.729 m) and provides a 360° view of the surrounding landscape. The view to the south extends across Lake Chelan and into the Wenatchee National Forest. The view to the west follows the ridgeline (known as Cooper



Ridge) and extends into the Sawtooth Wilderness. The view to the north extends across the Methow Valley and into the Pasayten Wilderness. The view to the east extends across the Columbia River and the Waterville Plateau. In 2001, two trapping and banding stations were located approximately 1 and 1.5 mi (1.5 and 2.4 km) southeast of the hawkwatch site along the southwestern flanks of Cooper Ridge.

To reach the site from Interstate 97, take State Route 153 approximately 6.5 mi NW of Pateros, then take Black Canyon Rd. (USFS Road 4010) W for 9 miles until it ends, then take USFS Road 8020 SE for 3.5 mi to the project parking area (look for interpretive sign).



INTRODUCTION

The Chelan Ridge Raptor Migration Project in north-central Washington is an ongoing effort to monitor long-term trends in populations of raptors using this north Cascades migratory flyway. HawkWatch International (HWI), in partnership with the USDA Forest Service, Okanogan and Wenatchee National Forests (OWNF), initiated standardized counts of the autumn raptor migration through this region in 1997, with full-season counts commencing in 1998. The Falcon Research Group joined the project in 1998 and coordinated a trapping and banding program during 1999 and 2000; however, HWI took over coordination of the banding program in 2001. A Memorandum of Understanding (MOU) was finalized in February 2001 to formally recognize and solidify this important new partnership. This MOU established a general framework for OWNF and HWI to work together to conserve raptors, learn about migration, and educate and involve people.

The Forest Service is a public natural resource management agency dedicated to enhancing wildlife habitat and conserving wildlife species over all the lands in its jurisdiction. HawkWatch International is a 501(c)(3) non-profit corporation based in Salt Lake City, Utah, whose mission is to monitor and protect hawks, eagles, other birds of prey, and their environments through research, education, and conservation. The core component of HWI's research program involves long-term monitoring of raptor migrations at a diverse network of sites across North America (currently 16 project sites in 10 states and Mexico).

The Forest Service and HWI have entered into a partnership at the Chelan Ridge Raptor Migration Project because working together provides positive benefits to our organizations, the birds, and the people we reach. Both parties recognize common goals for the enhancement of raptor conservation. It is our intent to work as partners and each contribute to the project according to our individual skills and strengths. We agree that by working together to refine ideas, combine resources, and leverage funds, we will maximize benefits for raptor conservation and for the public we serve.





WHY MONITOR RAPTOR MIGRATIONS?

Raptors feed atop food pyramids, inhabit most ecosystems, occupy large home ranges, and are sensitive to environmental contamination and other human disturbances. Therefore, they serve as important biological indicators of ecosystem health. Moreover, due to the remoteness and widespread distribution of most raptor populations, migration counts likely represent the most cost-effective and efficient method for monitoring the regional status and trends of multiple raptor species. The intensive counting and banding operations also provide valuable information about breeding and wintering distributions, migratory routes, migratory behavior, population demographics, mortality factors and longevity, morphometric variation, molt sequences and timing, and health assessments. This information enables us to better understand the life histories, ecology, status, and conservation needs of raptor populations in North America. Migration studies also offer unique opportunities for the public to learn about raptors and the natural environment.

FLIGHT SUMMARY

	COUNTS		RAPTORS / 100 HOURS		
-	Average 1998–2001	2002	Average 1998–2001	2002	
Observation hours	458.0	491.3			
Turkey Vulture	23	46	5.0	9.4	
Osprey	48	57	10.1	11.6	
Northern Harrier	129	148	28.5	30.1	
Sharp-shinned Hawk	952	937	210.1	190.7	
Cooper's Hawk	219	234	48.7	47.6	
Northern Goshawk	33	22	7.2	4.5	
Unidentified accipiter	240	144	53.9	29.3	
Broad-winged Hawk	6	9	1.3	1.8	
Swainson's Hawk	7	7	1.5	1.4	
Red-tailed Hawk	315	386	67.2	78.6	
Ferruginous Hawk	<1	0	0.0	0.0	
Rough-legged Hawk	31	45	6.4	9.2	
Unidentified buteo	97	82	20.6	16.7	
Golden Eagle	119	135	25.2	27.5	
Bald Eagle	7	8	1.3	1.6	
Unidentified eagle	3	0	0.7	0.0	
American Kestrel	80	68	18.2	13.8	
Merlin	38	38	8.7	7.7	
Prairie Falcon	7	6	1.5	1.2	
Peregrine Falcon	4	9	0.8	1.8	
Unidentified falcon	11	6	2.5	1.2	
Unidentified raptor	152	178	34.4	36.2	
TOTAL	2,439	2,565	535.8	522.1	

AUTUMN RAPTOR MIGRATION COUNTS AND PASSAGE RATES

HWI observers Mark Leavens and Teresa Lorenz, assisted by a variety of other crewmembers and volunteers, worked diligently from 25 August to 25 October to record the 2002 migration past Chelan Ridge. Compared to the previous four seasons, the 2002 flight included an average

array of species (see flight composition chart), but above average counts and passage rates for nine species (see count table). Counts reached record highs for Turkey Vultures and Broadwinged Hawks.

The above-average overall flight volume at Chelan this season contrasted markedly with a record-low overall count at HWI's other Cascade Mountains site at Bonney Butte near Mt. Hood, Oregon. In fact, across HWI's network of western sites, the fall 2002 season



Observation site

revealed a variety of such stark contrasts.

The above-average overall count at Chelan Ridge was an exception, but both very low and at least average counts occurred within all three of the major western flyways (Pacific Coast, Intermountain, and Rocky Mountain). We suspect that many of the low counts continue a pattern of declines caused by the prolonged and widespread drought that as affected much of the West since 1998. The severity of the drought has been less pronounced in the far northwest. Thus, the fact that the Chelan site draws



proportionately more birds from this region may explain why the count at this site showed comparatively strong flights in 2002 compared to most other HWI sites farther south and east.

Annual variation in age ratios documented by autumn migration counts presumably reflects variation in nesting success and juvenile recruitment within source populations. In 2002 at Chelan, 7 of 9 species for which comparisons were possible showed average to above-average immature : adult ratios due to higher than usual abundance of young birds. This suggests that most species achieved decent nesting success and juvenile recruitment in the northern Pacific Northwest in 2002. In contrast, for the same 9 species at Bonney Butte, the abundance of both juvenile and adult birds was generally well below average and 5 of the 9 species showed below-average age ratios. Although we know (through subsequent recaptures and satellite tracking) that some birds' migration routes pass through both sites, the stark differences in the 2002 count results suggest that the overall source populations for the two sites may be distinctly different.

Weather Effects Lead to Adjustment of Seasonal Duration.—Each field season at Chelan has featured different weather. We originally set out to run the count through the end of October; however, more often than not, early snow has necessitated abandoning the site around the end of



the third week of October. Thus, in 2002 (and henceforth), we shifted the planned observation period slightly to run from 23 August through 25 October.

Seasonal Timing.—The combined-species median passage date (date by which 50% of the flight had passed) of 20 September was an insignificant 2 days earlier than the 1998–2001 average; however, the seasonal distribution of

activity showed an unusually large peak between 11–15 September and unusually low activity between 26–30 September (see seasonal timing chart). Three days of rain and snow produced the lull in activity during the latter period, but reasons for the earlier peak (which involved primarily small accipiters and falcons) were less apparent. Only 6 of 16 species showed median passage dates that differed significantly from the relevant averages and there was little consistency in pattern across species. Age and sex-specific data also revealed no consistent patterns.

BANDING SUMMARY

AUTUMN RAPTOR MIGRATION CAPTURE TOTALS, RATES, AND SUCCESSES

	CAPTURE TOTAL		Captures / 100 stn. hrs.		CAPTURE SUCCESS ¹	
	2001	2002	2001	2002	2001	2002
Trapping days	44	54				
Station hours	612.8	837.3				
Northern Harrier	10	13	1.6	1.6	14.3	5.1
Sharp-shinned Hawk	341	459	55.7	54.8	47.9	25.5
Cooper's Hawk	107	127	17.5	15.2	58.8	29.8
Northern Goshawk	12	13	2.0	1.6	81.3	51.0
Red-tailed Hawk	22	29	3.6	3.5	0.0	0.0
Rough-legged Hawk	1	2	0.2	0.2	0.0	0.0
Golden Eagle	2	0	0.3	0.0	8.5	3.8
American Kestrel	8	10	1.3	1.2	0.0	0.0
Merlin	17	21	2.8	2.5	11.8	1.9
Prairie Falcon	3	4	0.5	0.5	0.0	0.6
Peregrine Falcon	2	0	0.3	0.0	0.0	0.0
All species	525	678	85.7	81.0	11.2	7.4

¹ Number of birds captured / number of birds observed * 100, with birds identified only to the generic group level (i.e., unknown accipiter, buteo, falcon, or eagle) allocated to relevant species in proportion to their occurrence.

The second season of HWI-coordinated trapping and banding yielded almost 30% more captures than in 2001 (see table above). Management factors contributing to this success included increased effort, further improvements to station design, and most importantly a great crew led by returning onsite project coordinator Bob Davies. Bob was ably assisted by full-time banders Luke Caldwell and Ben Johnson, Forest Service associates Kent Woodruff and Dan Harrington, Washington Department of Fish and Wildlife (WDFW) associate Jim Watson and his son, and several other local volunteers.



Bob Davies at south trapping blind

The 2002 capture total of 678 birds included record-high totals for 8 of the 9 species captured. Highlights included two relatively uncommon Rough-legged Hawks and a juvenile Red-tailed Hawk that was previously banded at Bonney Butte, Oregon 13 days earlier! This was one of two Bonney Butte Red-tailed Hawks for which HWI documented northward movements after banding in 2002. The 2002 Chelan effort raises the total number of diurnal raptors captured at the site to 1,622 (including those captured by the Falcon Research Group in 1999 and 2000). The species captured most frequently in 2002 were the Sharp-shinned Hawk (68% of captures), Cooper's Hawk (19%), Red-tailed Hawk (4%), and Merlin (3%). All other species each accounted for <2% of the total.

Band Returns.—Thus far, six of the birds HWI banded during fall 2001 at Chelan have been encountered again elsewhere. As discussed in last year's report, five of these returns occurred during fall 2001. The sixth return involved an adult Red-tailed Hawk that was found dead in south-central British Columbia a year later. In addition, as of February 2003, HWI had received one preliminary report of an encounter with a Sharp-shinned Hawk banded in 2002; however, we are still awaiting a full report from the Bird Banding Lab to determine this birds fate.

Satellite Tracking.—In 2002, HWI crews succeeded in outfitting two more Red-tailed Hawks and four more Northern Goshawks with satellite transmitters. In addition, WDFW associate Jim Watson outfitted two Cooper's Hawks with units he acquired. As of February 2003, both of the

Red-tailed Hawks were still alive and well, one wintering in the Central Valley of California and the other in central Oregon. Unfortunately, however, all of

the accipiters had died by mid-January 2003, with both Cooper's Hawks and one goshawk down before the end of the fall migration season. One of the Cooper's Hawks traveled all the way to Flagstaff, Arizona before perishing, and one of the goshawks had wandered southeast to near Winnemucca, Nevada before its signal ceased. The remaining goshawks stayed within northern Washington, two to the north and one to the west of the project site (see



figure below). This continues a pattern of high mortality for the young goshawks that HWI has outfitted thus far, which may be related to drought effects.

We had hoped to also outfit two Golden Eagles and a third Red-tailed Hawk in 2002, but failed to capture any eagles (always a rare catch) or other suitable adult Red-tailed Hawks.

Complete tracking summaries and maps for the Red-tailed Hawks and Northern Goshawks outfitted in 2002 can be viewed at http://www.hawkwatch.org, along with final reports on the fate of birds outfitted in 2001.

Identifying Migrant Origins through Stable Isotope Analyses.—For the first time in 2002, HWI contributed feather samples from Red-tailed Hawks and Northern Goshawks captured at Chelan to two Boise State University graduate student studies designed to use analyses of stable-isotope ratios to identify migrant origins. This cutting-edge technique uses known geographic patterns of variation in the distribution of heavy and light isotopes of primarily hydrogen to determine the

approximate latitudinal origins of migrants. Variation in precipitation patterns contributes to distinct patterns of variation in the ratios of heavy and light hydrogen isotopes across the landscape, and these isotope signatures are incorporated in the growing feathers of young birds. Thus, feathers can be collected from juvenile migrants, the isotope ratios in the feathers determined, and then each bird's signature can be compared against the known distribution of isotope-ratios across the landscape to identify the approximate latitudinal origins of each migrant.

The resolution of the analyses is rather coarse scale, but for broad-ranging species allows researchers to determine whether migrants derive primarily from, for example, northern, central or southern segments of the species' range. This technique has already yielded valuable insight concerning the origins and migration ecology (relative passage timing of different subpopulations) of migrants sampled at HWI migration project sites in Florida (see figure to right) and New Mexico. Moreover, compared to complimentary satellite-telemetry studies, the stable-isotope technique can be applied to any size bird. In 2002, HWI collected feathers for the red-tail and goshawk



Stable hydrogen isotope analysis identifying approximate latitudinal origins of migrant Cooper's Hawks sampled in the Florida Keys

(Meehan et al. 2001. Condor 103:11-20)

studies at all of its banding project sites in the West, and we anxiously await the results of the pending analyses.



Bob Davies shows off telemetered Red-tailed Hawk

2002 crewmembers, from left to right: Teresa Lorenz, Mark Leavens, Luke Caldwell, Eric Dinkel, and Ben Vang-Johnson

OUTREACH

Our plans for another excellent year of on-site educational outreach were largely thwarted by an ever-present, smoldering wildfire that precluded access to the project site by anyone other than crewmembers trained in fire safety until the last two weeks of the season. Thus, unfortunately relatively few outside individuals were able to visit the site in 2002. Nevertheless, during the last two weeks, 3 school groups and 36 other individuals visited the site, with most getting to experience birds in the hand. With little on-site education occurring through most of the season, education specialist Eric Dinkel instead turned his attention to preparing new educational displays for the site and dedicated considerable time doing programs at schools in the region (work supported by a grant from the North Central Washington Community Foundation). In all, he visited 14 schools and reached 1,040 kids with his programs. Of special interest is the fact that he, with the help of OWNF Coordinator Kent Woodruff, initiated a program whereby kids in several schools were provided with data that allowed them to track the movements of our satellite telemetry birds.



Extracting captured hawk at north blind



View from south blind



Teresa Lorenz ready to release young goshawk



Classroom education by Eric Dinkel



Mark Leavens scanning the skies

PLANS FOR 2003

We will likely have at least six more satellite transmitters to deploy at Chelan Ridge in 2003 (a combination of undeployed and recovered/refurbished 2002 units). Thus, our tracking of Chelan migrants will continue at least into 2004, with hopes of acquiring more funding for additional new units in 2004. Continued deployments through fall 2004 will be necessary to produce sample sizes sufficient for robust analyses of route and territory fidelity. WDFW associate Jim Watson also may continue to deploy satellite transmitters at Chelan to further augment our collective knowledge of the migration ecology of Chelan migrants.

HWI also hopes to expand its involvement in stable-isotope research in 2003, with a substantial grant proposal pending at the National Fish and Wildlife Foundation. If this grant is funded, it would enable us to significantly augment on-going investigations of western Sharp-shinned Hawks, begin investigational sampling and analyses of western Cooper's Hawks, and begin comprehensive sampling of western American Kestrels. Sampling for these species would occur at all western migration banding sites, including Chelan Ridge. We will also likely seek to collect additional Red-tailed Hawk and Northern Goshawk feathers for the aforementioned graduate studies.

Otherwise, we anticipate another full-fledged count, banding, and an education project at Chelan in 2003, hopefully without having to deal with wildfires this time!

FUNDERS

Okanogan and Wenatchee National Forests U.S. Fish and Wildlife Service, Wenatchee Field Office Washington Dept. of Fish and Wildlife, Volunteer Cooperative Fish and Wildlife Program National Fish and Wildlife Foundation M. J. Murdock Charitable Trust PacifiCorp Foundation Mountaineers Foundation North Central Washington Community Foundation Kittitas Audubon Society HawkWatch International members

OBSERVERS

Mark Leavens Eric Dinkel Loni Beyer

Teresa Lorenz Dan Harrington **Richard Hendrick**

EDUCATORS

Eric Dinkel Dan Harrington Kent Woodruff

BANDERS

Bob Davies Ben Vang-Johnson Jesse Watson Dennis Ryan Loni Beyer Teresa Lorenz Kent Woodruff

Luke Caldwell Jim Watson Eric Dinkel Cindy Willis Dan Harrington Mark Leavens

Megan Massone

INTERNS

Tannis Thorlakson

OTHER SUPPORT

Mallory Lenz - OWNF Chelan RD Marsh Haskins - OWNF Chelan RD Bob Sheehan - OWNF Chelan RD John Newcom - OWNF Methow Vallev RD John Rohrer - OWNF Methow Valley RD **OWNF Winthrop Visitor Center staff OWNF** Twisp Office staff Brad Martin – lure birds

Heartfelt thanks to all who helped make



HUN Science Director