

WINTERING RAPTORS OF THE GREAT BASIN
Oases in the High Desert: *Census and Banding Study 1985-2011*



Professor Ian Newton with Adult Male Rough-legged Hawk, Fillmore, Utah, January 3, 2011

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INTRODUCTION

Since 1985, Principal Investigator (PI) Al Hinde has conducted a roadside census and banding study of wintering raptors in the Great Basin. Initially, this project was limited to northeastern Nevada and was intended to augment knowledge of regional raptor ecology derived from HawkWatch International's (HWI) long-term migration study in the Goshute Mountains of northeastern Nevada (on-going annually since 1983; Hoffman and Smith 2003; Smith and Neal 2008a). By 1989, further exploration throughout Utah and Nevada had revealed eight major concentration areas for wintering raptors, with each roughly 50-square-mile area consistently containing 100–200+ individuals of 19 species (14 diurnal and 5 owl species). One such area, Lovelock, Nevada, on December 12, 1992, contained a previously undocumented communal roost of 200+ buteos (150 Rough-legged Hawks [*Buteo lagopus*], 50 Ferruginous Hawks [*B. regalis*]), some Red-tailed Hawks [*B. jamaicensis*], Great Horned Owls (*Bubo virginianus*), and Barn Owls (*Tyto alba*). Continuing each January, with field assistance from experienced HWI raptor biologists, other ornithologists, and local and state wildlife officials, Mr. Hinde focused on these eight areas, including the Lovelock roost. All sites have continued to sustain similar large numbers of wintering raptors each year. The Lovelock roost routinely contained dozens of mixed-species buteos in the past; it is still used, to a lesser extent, by Ferruginous and Rough-legged Hawks. Another roost, of 25+ Ferruginous Hawks, was discovered December 2009–January 2010 in Fillmore-Pahvant Valley, Utah, and contained the same number this past January.

This long-term study suggests that these areas are among the most significant winter ranges for raptors in western North America, and the censuses provide a means of monitoring population changes in relation to habitat, land-use, and climatic changes in the study regions. The capture and banding of 403 raptors (12 species) over the course of the study—including 116 Rough-legged Hawks, the focal species—also has yielded morphometric, genetic, and photographic data that have been used in several other studies and publications. Following the 2006/2007 season, the project contributed feather and saliva samples to two studies, one examining endocrine disruptors and the other comparing Harlan's Hawks (*B. jamaicensis harlani*) with other subspecies of Red-tailed Hawks. In addition, as following the past four winter field seasons, the project contributed feather samples to another study examining toxins, pollutants, and heavy metals in raptors. Each of the three buteos analyzed thus far show mercury concentrations below the level above which adverse effects are predicted; however, one Harlan's Hawk showed a much higher concentration than the others.

This report summarizes the results of winter 2010/2011 roadside census and banding activities conducted in seven of the nine primary, known concentration areas in Utah and Nevada, with supplementary information derived from three other areas in the two states.

2010/2011 Project Highlights.

- **Mr. Hinde was privileged to be joined in the field in December and January by the renowned raptor biologist Professor Ian Newton from the UK.**
- **This winter, after 25 years of conducting this annual study with just one or two assistants, HawkWatch International recruited 17 volunteers, who conducted comparison counts in Utah into March. It is hoped they will continue to expand the**

study with at least monthly counts in Utah and potentially Nevada with the aid of local volunteers and organizations. Including HawkWatch International staff, veterans, and these volunteers, a total of 26 people assisted with this project in the field this winter.

- Of special note this winter, in Lovelock, Nevada, a record 312 raptors were counted, the highest number ever recorded in any of the study areas. This count included the highest number of Northern Harriers (65) recorded anywhere in this study, eclipsing their previous high count (34) also here in 2003/2004.**
- After the known multi-species roost in Lovelock, Nevada, a second roost of just Ferruginous Hawks (25+) was discovered in Flowell-Pahvant Valley, Utah, in December/January 2009/2010. This past 15 December 2010 this second roost contained 21+ Ferruginous Hawks.**
- The highest number of raptors recorded in Fillmore, Utah (261), was observed during the comparison count of 15-17 December 2010.**
- The albino Red-tailed Hawk (pictured on the cover of the 2008/2009 report and banded on 27 December 2008) was rediscovered 3 miles north of the banding site in Smith Valley, western Nevada on 16 January 2011.**

METHODS

ROADSIDE CENSUS

The crew conducted roadside counts of wintering raptors in 10 different areas of Utah and Nevada between 30 December 2010 and 29 January 2011. Surveys encompassed seven of the nine areas known from previous surveys to be major concentration areas for wintering raptors, and three areas considered of secondary importance (Figures 1 & 2). Comparison counts of the Fillmore-Pahvant Valley, Utah, were conducted 15-17 December 2010 and 22-23 January 2011; of Nephi, Utah, 15 February 2011; of Snowville, Utah, 13 February 2011 and 13 March 2011; and of Eureka, Nevada, 18 January 2011. (Table 1) In the past, the nine areas of major concentration typically have each supported in excess of 100 wintering raptors. These areas consist of agricultural (primarily alfalfa) and pasture lands at elevations between ~1,200–1,800 m (4,000–6,000 ft) above mean sea level (amsl). Most of the areas are well-defined valleys, roughly 125 sq km (50 sq mi) in extent and enclosed by mountains ranging in height from 1,500–3,000 m (5,000–10,000 ft) amsl. Exceptions include the Fallon, Nevada, and Fillmore, Utah, areas bordered by mountains to the east but desert scrub to the west. Nevertheless, similar combinations of agricultural, pasture, and natural grassland/woodland habitats are bounded by the mountains and low desert, and form similarly distinct survey areas (Figures 1 & 2).

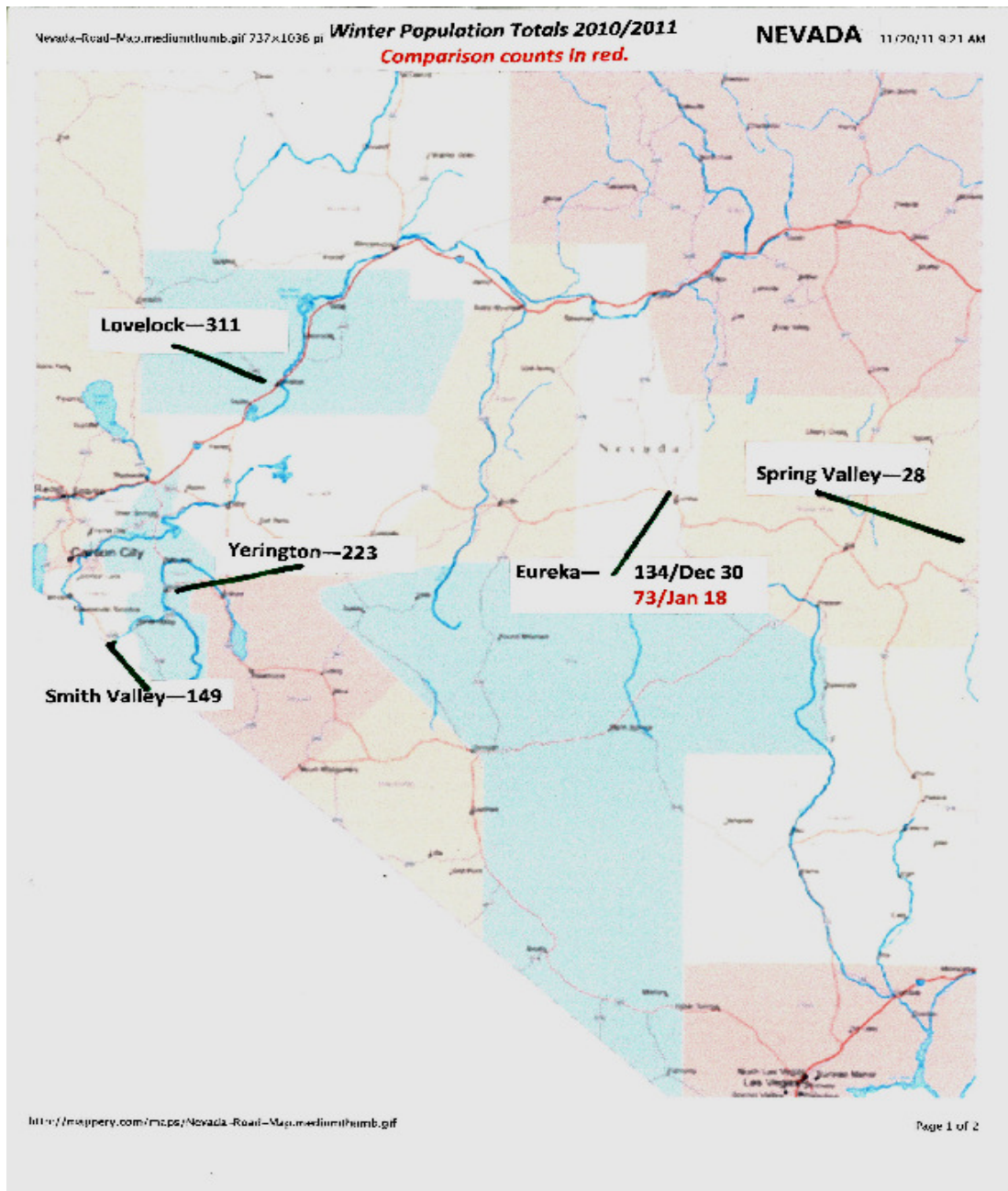


Figure 1. Winter raptor survey areas in Nevada, with numbers indicating total combined-species counts from winter 2010/2011.

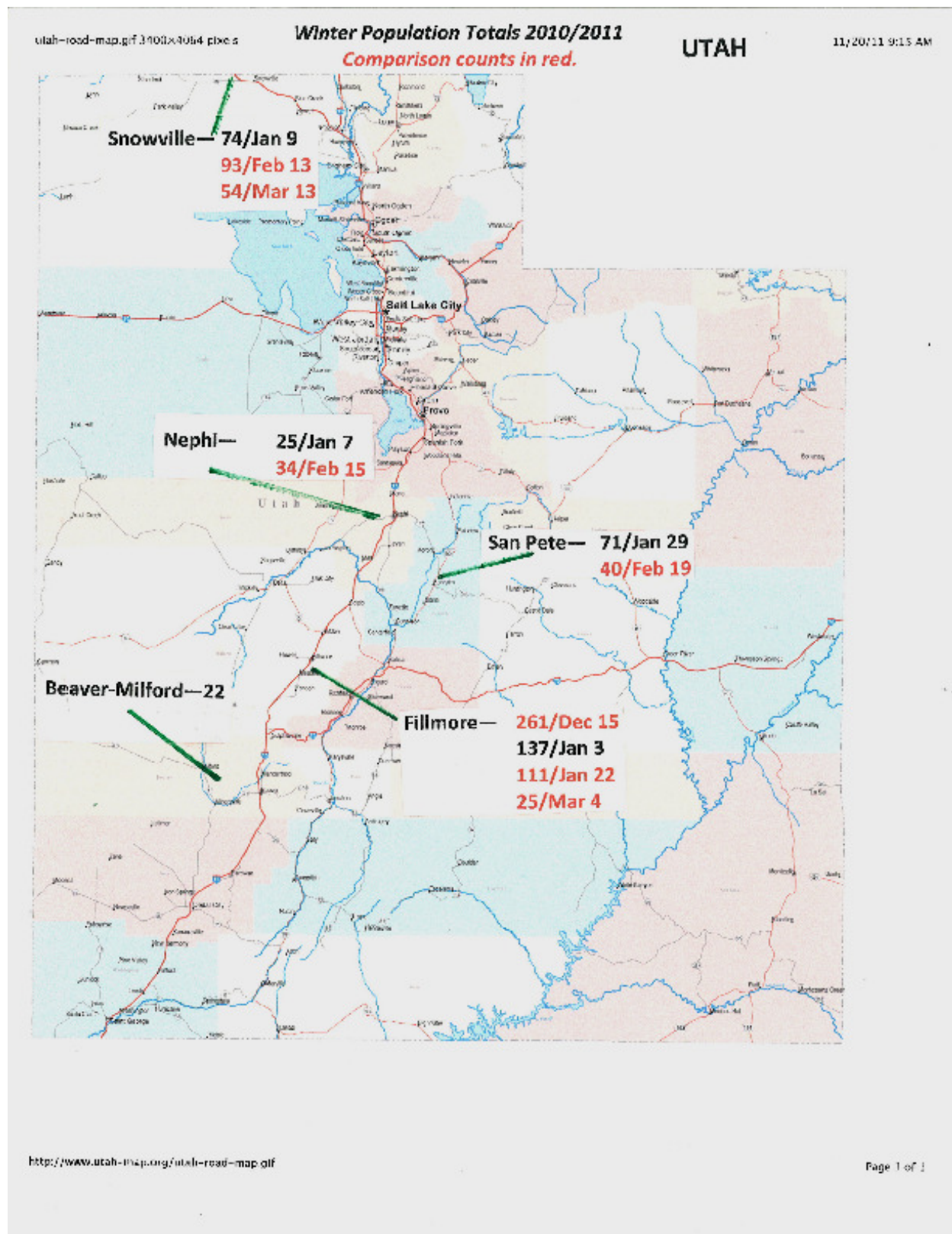


Figure 2. Winter raptor survey areas in Utah, with numbers indicating total combined-species counts from winter 2010/2011.

Eureka and Lovelock, Nevada, as well as Fillmore, Utah, each required two-and-a-half days to survey. Yerington-Mason Valley, Nevada, required two days to survey. Survey crews typically included three, but occasionally two, experienced observers. The PI participated in all surveys conducted between 30 December 2010 and 29 January 2011. Professor Ian Newton participated in Nevada and Utah, 30 December – 8 January 2011, as did LeRoy Fink of Burley, Idaho, in Nevada, 9-19 January 2011.

Comparison counts in Utah of the Fillmore-Pahvant Valley were conducted 15-17 December 2010, 22-23 January 2011, and 3 March 2011; of Nephi, 15 February 2011; of Snowville, 13 February, and 13 March 2011; and of San Pete Valley, 19 February 2011. The comparison counts of Eureka, Nevada, were conducted 18 January 2011. (Table 1)

The 15-17 December 2010 count was conducted by Dr. Markus Mika, Science Director of HawkWatch International and Jeff Johnson, Las Vegas, Nevada. In addition, Dr. Mika participated in the 22 January 2011 count. The other comparison counts in Utah were conducted by HawkWatch International staff and volunteer citizen scientists, 14 of whom also conducted the San Pete Valley count on 29 January 2011.

Surveyors tallied observed raptors while traveling in a slow-moving vehicle on established paved and dirt roads along designated routes defined in previous years. All efforts provided as complete a census as possible of wintering raptors in the proscribed survey areas. Similar to the past seven annual surveys, surveyors recorded UTM coordinates with a handheld GPS receiver (accuracy $\pm 3\text{--}5$ m) on roads at locations perpendicular to all raptor sightings, with the perpendicular distance of the raptor from the road also estimated in meters. Surveyors recorded all visually detected raptors, taking care to avoid double counting of mobile individuals.

TRAPPING AND BANDING (TABLE 4)

During all surveys, crews also simultaneously sought to trap and band selected raptors using bal-chatri traps with hamsters as lures. Trapping efforts focused on Rough-legged Hawks, the project's target species, and secondarily on Ferruginous Hawks and Harlan's Hawks. Opportunistic trapping of other subspecies of Red-tailed Hawks and species such as the Prairie Falcon (*Falco mexicanus*) also occurred.

We banded all captured raptors with uniquely numbered U.S. Geological Survey – National Bird Banding Laboratory aluminum leg bands, recorded the wing chord and mass of each bird, and collected feather samples from all birds. In addition, we took photographs of all Rough-legged, Hawks, Ferruginous Hawks, and raptors with unusual plumage.

To minimize census disturbance, we typically limited all trapping attempts to five minutes, beyond which time capture success decreases sharply anyway. We sometimes made exceptions for unusual birds, such as dark-morph buteos, Prairie Falcons, and owls.

RESULTS AND SHORT-TERM TRENDS

ANNUAL ROADSIDE CENSUS (NOT INCLUDING COMPARISON COUNTS)

During the 2010/2011 winter surveys, the crews tallied 1172 raptors of 16 species across the 10 major and secondary concentration areas and routes in Nevada and Utah (Table 1). With data for all surveys combined, the most commonly encountered species was the Red-tailed Hawk (472, 40%), followed by Northern Harriers, *Circus cyaneus* (143, 12%); the Rough-legged Hawk (134, 11%); American Kestrel, *Falco sparverius* (119, 10%); Ferruginous Hawk (90, 8%); Golden Eagle, *Aquila chrysaetos* (57, 5%); Prairie Falcon, *Falco mexicanus* (52, 4%); Bald Eagle, *Haliaeetus leucocephalus* (38, 3%).

During the past four years, Yerington, Nevada, and Fillmore, Utah, contained the greatest populations of wintering raptors, but this year Lovelock, Nevada, regained the prominence it previously held for 20 years, with the highest numbers (311) ever found in any of these study areas. Lovelock regained this prominence supported with the highest numbers ever recorded anywhere of Northern Harriers (65), and Prairie Falcons (14), and near record highs for Lovelock of American Kestrels (28) and Red-tailed Hawks (145).

Also in western Nevada, 100 miles south of Lovelock, there were record numbers for Yerington, Mason Valley—of Northern Harriers (24), Red-tailed Hawks (136), Prairie Falcons (13) and near-records for American Kestrels (39). Smith Valley, south of Yerington, also contained its highest recorded number of Northern Harriers (28), Red-tailed Hawks (81), and American Kestrels (24). In central Nevada, Eureka-Diamond Valley, equaled its record-high number of Northern Harriers (21).

The remarkable number of Northern Harriers (138) counted throughout Nevada contrast with Utah to the east, where only 5 were seen (just 1 in Fillmore).

Rough-legged Hawks, the target species of this project, present in lower numbers in the major concentration areas this winter, were more abundant further north in Snowville, Utah, on the Idaho border, where the comparison count of 13 February 2011 totaled a record-high (93), including at least 56 Rough-legged Hawks. Also, north of the study area, large numbers of Rough-legged Hawks (259) were reported on 1 January 2011, during the Christmas count in Howe, southern Idaho, north of the study area, indicating that these birds had remained farther north than usual.

In Fillmore-Pahvant Valley, the major wintering area for raptors in Utah, a record-high count of 261 raptors was observed during the 15-17 December 2010 comparison count. Ferruginous Hawks and Rough-legged Hawks reported in high numbers in this count, decreased—Ferruginous Hawks by approximately 50%, and Rough-legged Hawks by approximately 70%—seventeen days later, during the 5 January 2011 census.

Nevada Highlights

Lovelock (311 birds). Contained the highest number of raptors recorded anywhere in the 25-year history of these Great Basin winter surveys. This distinction was achieved with the second-highest count of Red-tailed Hawks (145) (149 also here in 2004/5) and with the remarkable number of Northern Harriers (65), almost doubling the previous high count (34) also here in 2003/4.

Ferruginous Hawks (22) and American Kestrels (28) were also present in greater than average numbers. The Prairie Falcon total (14) was also a record high in the project history; they have usually been more numerous here than elsewhere. The winter roost on Reservation Road contained more birds (44), mostly Ferruginous Hawks, then Rough-legged Hawks, than it has since 2003/4. For the past six years, Yerington, Nevada, and Fillmore, Utah, contained more raptors, but Lovelock now regains its previous prominence with this record total (311).

Yerington (221). We found a record number of raptors for the location in Yerington as well. As expected, it contained the greatest number of American Kestrels (39) and the second highest count for this species here or anywhere. Also, there were record high counts for the location of Red-tailed Hawks (136), Prairie Falcons (13) and Northern Harriers (24). Yerington is similar in species composition and record highs to Lovelock, which is 100 miles to the north. However, Ferruginous Hawks and Rough-legged Hawks, usually present here in small numbers, were not seen for the first time.

Smith Valley (149). As with Lovelock and Yerington above, Smith Valley's second-highest count (this year) also contained record-high numbers of Red-tailed Hawks (81), Northern Harriers (28), Prairie Falcons (4), and a local record high number of American Kestrels (24). As with Yerington, Rough-legged Hawks were absent here and only 3 Ferruginous Hawks were seen. The leucistic Red-tailed Hawk captured here 27 December 2008 was seen 16 January 2011, three miles north of the capture site, paired with another adult Red-tailed Hawk.

Eureka, (134). With just a moderate count for all species, as usual Eureka contained the highest number of Rough-legged Hawks in the entire study area (58)—although on 13 February, Snowville, Utah, contained similar numbers of Rough-legged Hawks (56). See **Utah Highlights** below.

Spring Valley, (28). This secondary route, north of Rte. 50 along the eastern border of Nevada and Utah, contained the highest number of raptors seen here in past surveys.

Table 1. Winter (2010/2011) survey dates, annual raptor counts, and comparison counts by species in 10 concentration areas in Nevada and Utah. Comparison counts are in red.

SURVEY AREA	DATES	NH ¹	SS	CH	RT	HH	FH	RL	UB	GE	BE	UE	AK	ML	PR	PG	UF	GO	SO	LO	BO	UR	TOTAL
NEVADA																							
Diamond Valley/Eureka, Eureka Co.	12/30-1/1/11	21			18		7	58	10	3			5	1	7		4						134
(Diamond Valley/Eureka Eureka Co. ²)	1/18/11	8	1		10		3	36	3	3			7		2								73
Spring Valley, White Pine Co.	1/2/11				4			10	1	9					4								28
Lovelock area, Pershing Co.	1/11-13/11	65	3	1	145		24	14	6	7			28	1	14		2				1		311
Yerington-Mason Valley, Lyon Co.	1/14-15/11	24	3	1	136				3	2			39		13								221
Smith Valley, Lyon Co.	1/16/11	28		1	81		3		1		2		24	2	4	1						2	149
Subtotal		138	6	3	384		34	82	21	21	2		96	4	42	1	6				1	2	843

¹ NH = Northern Harrier; SS = Sharp-shinned Hawk (*Accipiter striatus*); CH = Cooper's Hawk (*A. cooperii*); RT = Red-tailed Hawk; HH = Harlan's Red-tailed Hawk; FH = Ferruginous Hawk; RL = Rough-legged Hawk; UB = unknown buteo; GE = Golden Eagle (*Aquila chrysaetos*), BE = Bald Eagle; UE = unknown eagle; AK = American Kestrel; ML = Merlin (*Falco columbarius*); PR = Prairie Falcon; PG= Peregrine Falcon (*Falco peregrinus*); GO = Great Horned Owl; SO = Short-eared Owl (*Asio flammeus*); LO = Long-eared Owl (*Asio otus*); BO = Barn Owl (*Tyto alba*); UR= unknown raptor.

² Comparison counts for Nevada and Utah (in red) are **not** included in subtotals or grand totals.

SURVEY AREA	TABLE 1 (CONTINUED)	DATES	NH ¹	SS	CH	RT	HH	FH	RL	UB	GE	BE	UE	AK	ML	PR	PG	UF	GO	SO	LO	BO	UR	TOTAL
UTAH																								
Pahvant Valley comparison count		12/15-12/17/10	22			76		58	42	13	12	18		8	2	9								261
Pahvant Valley (Fillmore/Holden), Millard Co.		1/3-1/5/11	1		2	46	1	37	16	8	7	3		10	1	3				1		1		137
		1/22-1/23/11	5			36	1	24	8	12	2	11		5	1	4			1				1	111
		3/4/11	1			9		4	2		3			2		1							3	25
Beaver/Milford area, Beaver Co.		1/6/11	3			8		1			4	4	1	1										22
Nephi, Juab Co. ²		1/7/11	1			11		3	7	1				2										25
		2/15/11				13		2	3	5		2	2	6					1					34
Snowville, Box Elder Co.		1/9/11				6		15	26	19	2			3		3								74
		2/13/11	4			6		4	56	16		4	1	2										93
		3/13/11	2			22		2	14	3				4		2			5					54
San Pete Valley, San Pete Co.		1/29/11				17			3	2	7	29		7		5			1					71
		2/19/11	1	1		13			1	2	4	6		3		1			1				7	40
(Utah) subtotal			5		2	88	1	56	52	30	20	36	1	23	1	11			1	1		1		329
Species Totals (Nevada and Utah)			143	6	5	472	1	190	134	51	41	38	1	119	5	53	1		7	1		2	2	
TOTAL (Nevada and Utah): 1172																								

¹ NH = Northern Harrier; SS = Sharp-shinned Hawk (*Accipiter striatus*); CH = Cooper's Hawk (*A. cooperii*); RT = Red-tailed Hawk; HH = Harlan's Red-tailed Hawk; FH = Ferruginous Hawk; RL = Rough-legged Hawk; UB = unknown buteo; GE = Golden Eagle (*Aquila chrysaetos*), BE = Bald Eagle; UE = unknown eagle; AK = American Kestrel; ML = Merlin (*Falco columbarius*); PR = Prairie Falcon; PG= Peregrine Falcon (*Falco peregrinus*); GO = Great Horned Owl; SO = Short-eared Owl (*Asio flammeus*); LO = Long-eared Owl (*Asio otus*); BO = Barn Owl (*Tyto alba*); UR= unknown raptor.

² Survey vehicle stuck in snow on 1/7/11; only southern half of survey complete.

Table 2. Raptor counts by species in selected Nevada concentration areas during the past eight winters.

	SPECIES ¹																						
	NH	SS	CH	RT	HH	FH	RL	RS	UB	GE	BE	UE	AK	ML	PR	UF	GO	LO	SO	BO	UO	UR	TOTAL
Lovelock																							
2010/2011	65	3	1	145		24	14		6	7			28	1	14		2			1			311
2009/2010	22			82		5	11		13				23		9	1	3					1	170
2008/2009	20			69	1	5	21		10				17		10		2						155
2007/2008	19	0	0	58	0	5	14	0	9	0	0	0	12	0	7	0	6	1	0	0	0	0	131
2006/2007	20	0	0	80	0	10	17	0	15	0	0	0	21	0	6	0	3	0	0	1	0	1	174
2005/2006	20	0	0	84	0	9	9	0	7	0	0	0	10	0	10	0	5	0	0	0	0	3	154
2004/2005	4	0	0	149	0	30	11	0	19	0	1	0	7	0	13	0	9	0	0	0	0	0	247
2003/2004	34	0	0	130	1	22	22	0	20	3	0	0	31	0	13	0	9	0	0	0	0	3	288
Mason Valley																							
2010/2011	24	3	1	136					3	2			39		13								221
2009/2010	no count																						
2008/2009	18	1	2	97		12	16		18				31	1	5		1					2	204
2007/2008	9	1	0	88	0	5	9	0	10	0	0	0	14	3	6	0	4	0	0	0	0	5	154
2006/2007	22	1	1	92	0	5	3	0	12	3	1	0	34	1	12	0	0	0	1	1	0	1	191
2005/2006	15	0	1	105	0	9	0	0	14	3	0	0	42	0	4	0	1	0	0	0	0	3	197
2004/2005	11	0	0	86	0	3	0	0	4	3	0	0	23	0	3	0	1	0	0	0	0	0	131
2003/2004	11	1	0	55	0	2	1	0	9	0	0	0	25	0	4	0	0	0	0	0	0	2	110
Smith Valley																							
2010/2011	28		1	81		3			1		2		24	2	4	(1)*						2	149*
2009/2010	no count																						
2008/2009	10			56		4	15		15	6			4	1	1								112
2007/2008	0	0	0	34	0	0	7	0	5	3	0	0	1	0	4	0	0	0	0	0	0	1	55
2006/2007	18	0	1	81	0	11	3		16	2	4	1	16	1	7	0	2		0	0	0	1	164
2005/2006	no count																						
2004/2005	7	0	0	35	0	1	0	0	16	5	3	0	15	0	2	2	2	0	0	0	0	1	89
2003/2004	7	0	0	27	0	4	5	0	0	2	4	0	5	0	4	0	0	0	0	0	0	0	58
Diamond Valley																							
2010/2011	21			18		7	58		10	3			5	1	7		4						134
2009/2010	3		1	11		1	73		5				5	1	1		2						103
2008/2009				8		2	94		8	4	1		1		3		4						125
2007/2008	0	0	0	2	0	0	18	0	4	2	0	0	0	0	1	0	2	0	0	0	0	0	29
2006/2007	1	0	1	17	0	9	94	0	3	4	0	0	0	0	5	0	3	0	3	0	0	0	140
2005/2006	22	0	1	27	0	14	72	0	47	5	0	0	2	0	10	0	0	0	0	0	0	3	200
2004/2005	5	0	0	7	0	2	50	0	14	5	0	0	0	0	1	0	0	0	0	0	0	1	86
2003/2004	0	0	0	0	0	1	26	0	1	1	0	0	0	0	1	0	1	0	0	0	0	1	32

Table 2
Nevada
(continued)

Fallon

2010/2011	no count																						
2009/2010	no count																						
2008/2009	6	39				2	5				20				3	1					3	79	
2007/2008	9	1	2	68	1	1	7	1	4	1	1	0	18	0	6	0	0	0	0	0	1	0	121
2006/2007	17	0	1	56	0	1	1	0	4	1	0	0	31	0	1	0	0	0	0	0	0	0	113
2005/2006	6	0	0	35	0	2	1	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	49
2004/2005	7	1	0	20	0	1	0	0	0	1	0	0	13	0	2	0	0	0	0	0	0	0	45
2003/2004	5	0	0	33	0	2	2	0	1	0	1	0	10	0	2	0	3	0	0	0	0	0	59

(*Total includes 1 Peregrine Falcon seen in Smith Valley, the only Peregrine ever sighted in these winter studies.)

¹ NH = Northern Harrier; SS = Sharp-shinned Hawk; CH = Cooper's Hawk; RT = Red-tailed Hawk; HH = Harlan's Red-tailed Hawk; FH = Ferruginous Hawk, RL = Rough-legged Hawk; RS = Red-shouldered Hawk; UB = unknown buteo; GE = Golden Eagle; BE = Bald Eagle; UE = unknown eagle; AK = American Kestrel; ML = Merlin; PR = Prairie Falcon; UF = unknown falcon (**also includes 1 PG, Peregrine Falcon**); GO = Great Horned Owl; LO = Long-eared Owl; SO = Short-eared Owl; BO = Barn Owl; UO = unknown owl; UR = unknown raptor.

Utah Highlights

Fillmore-Pahvant Valley (137). This average count, 3-5 January 2011, demonstrates the value of comparison counts, as, seventeen days earlier—15-17 December 2010—Dr. Mika and Jeff Johnson, a veteran of these surveys, counted the highest ever total here (261). This included 58 Ferruginous Hawks and a record here of Red-tailed Hawks (76). The roost of 25+ Ferruginous Hawks in SE Flowell, discovered last year, contained 21+ this year.

Snowville (74). This 20-mile-long route west from Snowville, parallel to the Idaho border and typically an area of secondary importance, surprised last year with its highest count (58) and this year an even higher record count (74), elevating this area into prominence, second to Fillmore. However, for the first time, second and third comparison counts were conducted here 13 February 2011 and 13 March 2011, and an even higher total was recorded 13 February (93), including 56 Rough-legged Hawks.

San Pete Valley (71). As in many past counts, San Pete contained the greatest number of Bald Eagles, but the highlight here was the presence of 14 citizen scientist volunteers recruited by HawkWatch International, who joined us in a training-orientation survey (see Acknowledgements). Many of these volunteers conducted further comparison counts in Utah of Snowville, Nephi, Fillmore, and the San Pete Valley in February and March 2011.

Nephi (25). This survey with Professor Newton was terminated half-way through, when the survey vehicle became stuck in snow. A second comparison count conducted 15 February revealed 34 birds.

Beaver-Minersville, Milford (22). This secondary route contained the lowest number recorded here in the last eight years (and in memory since 1989).

Table 3. Raptor counts by species in selected Utah concentration areas during the past eight winters.

	SPECIES ¹																			TOTAL
	NH	SS	CH	RT	HH	FH	RL	UB	GE	BE	UE	AK	ML	PR	UF	GO	SO	BO	UR	
Pahvant Valley																				
2010/2011	1		2	46	1	37	16	8	7	3		10	1	3			1	1		137
2009/2010	7	2		57	3	45	24	14	8	29		17	1	4						211
2008/2009				54	1	8	21	6	5	29		9	2	5						140
2007/2008	12	0	0	42	1	13	45	14	2	7	2	10	0	7	0	10	0	0	0	165
2006/2007	0	0	0	40	2	5	13	0	6	8	1	5	1	2	0	0	1	0	3	87
2005/2006	29	0	0	40	0	57	16	18	8	6	0	15	0	7	0	0	0	0	0	199
2004/2005	4	1	0	67	0	16	13	9	5	6	0	5	0	0	1	3	1	0	0	131
2003/2004	8	0	0	48	0	13	17	16	2	5	0	8	0	3	0	2	0	0	0	105
San Pete Valley																				
2010/2011				17			3	2	7	29		7		5		1				71
2009/2010		no count																		
2008/2009	2			9	1	1	7	2	2	35	2	7		3						71
2007/2008	0	0	0	7	0	0	3	1	3	17	1	1	1	0	0	0	0	0	0	34
2006/2007	0	0	1	28	0	0	1	1	7	23	1	3	1	5	0	0	0	0	0	71
2005/2006	9	1	0	44	0	6	2	1	8	47	0	14	0	2	0	0	0	0	0	134
2004/2005		species-specific records unavailable																		25
2003/2004	2	0	0	15	0	0	9	10	6	38	0	5	0	0	0	0	0	0	0	85
Nephi																				
2010/2011*	1			11		3	7	1				2								25
2009/2010		no count																		
2008/2009	3			11			1			4		5	1	1					1	27
2007/2008	1	0	0	9	1	2	17	2	1	11	0	4	0	2	0	0	0	0	0	50
2006/2007	1	0	0	11	0	3	8	5	1	6	0	5	0	0	0	0	0	1	0	41
2005/2006	20	0	0	24	0	4	8	6	1	2	0	9	0	3	1	0	0	0	2	81
2004/2005	6	1	0	28	0	3	7	2	4	4	0	8	0	2	0	0	0	0	0	65
2003/2004	14	0	0	19	0	4	8	4	0	1	0	4	0	0	0	0	0	0	1	52

¹ NH = Northern Harrier; SS = Sharp-shinned Hawk; CH = Cooper's Hawk; UA = unknown accipiter; RT = Red-tailed Hawk; HH = Harlan's Red-tailed Hawk; FH = Ferruginous Hawk, RL = Rough-legged Hawk; UB = unknown buteo; GE = Golden Eagle, BE = Bald Eagle; UE = unknown eagle; AK = American Kestrel; ML = Merlin; PR = Prairie Falcon; UF = unknown falcon; GO = Great Horned Owl; SO = Short-eared Owl; BO = Barn Owl.

*Half count completed; survey vehicle stuck in snow. Only southern half of survey completed.

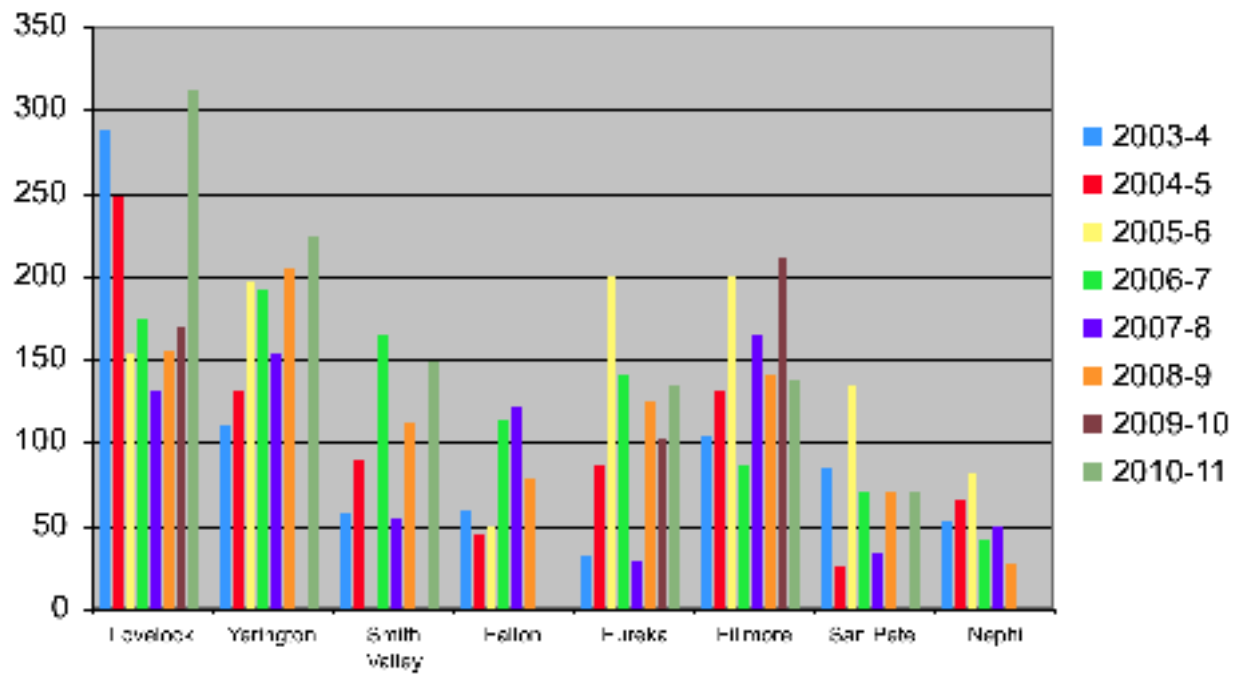


Figure 3. Total raptor counts in selected, major Nevada and Utah concentration areas during the past eight winters.

Species Trends (Figure 4-8)

Red-tailed Hawks. (Figure 4) Following the lowest counts of Red-tailed Hawks in most areas in 2007/2008, and then increases in most areas in 2008/2009 and January 2010, this past January 2011 their population surged to record and near-record highs in three areas of western Nevada—Lovelock, Yerington, and Smith Valley.

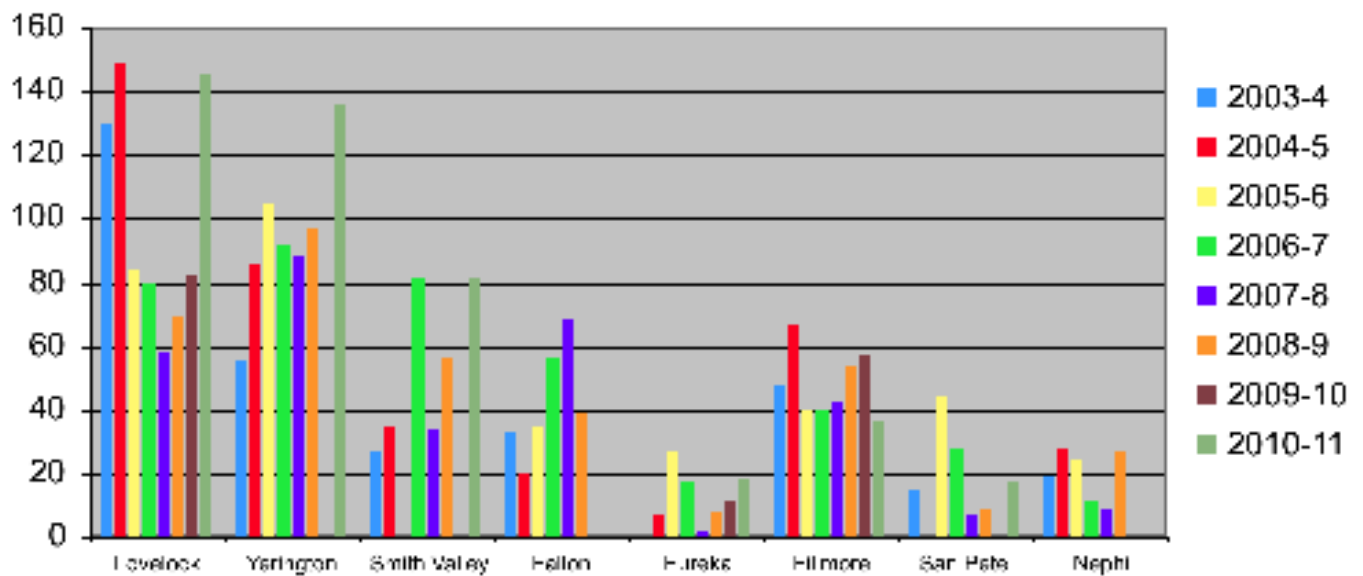


Figure 4. Eight-year count trends for Red-tailed Hawks in eight major winter concentration areas in Utah and Nevada.

Rough-legged Hawks. (Figure 5) While in most areas their numbers were the lowest in three or four years, and absent in Yerington and Smith Valley, western Nevada, record-highs were recorded in Snowville (56), northern Utah, (Table 1), and significantly in the 1 January 2011 Christmas bird count in Howe, southern Idaho, north of the study areas, where a record 259+ Rough-legged Hawks were reported. As usual, Eureka, Nevada, contained the highest number recorded in the survey areas (57).

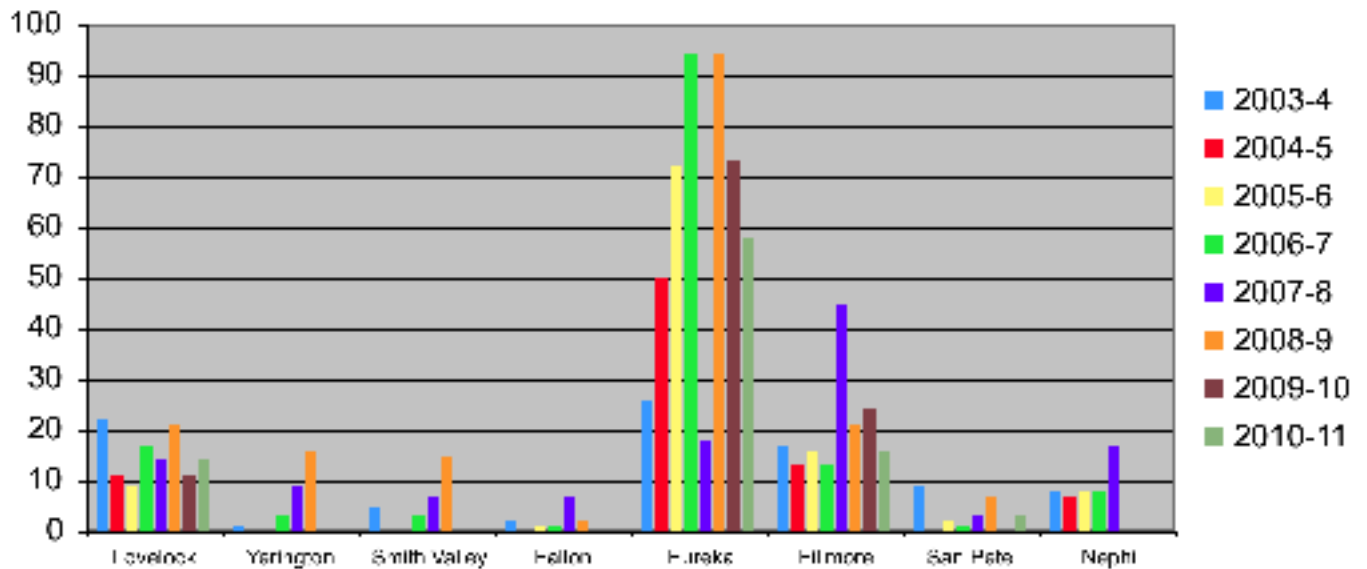


Figure 5. Eight-year count trends for Rough-legged Hawks in eight major winter concentration areas in Utah and Nevada.

Ferruginous Hawks. (Figure 6) Although Lovelock, Nevada, saw the highest numbers of Ferruginous Hawks since 2004/2005, further south in Yerington they were absent. Fillmore, Utah, contained 37, but during the comparison count 17 days earlier, 58 were counted.

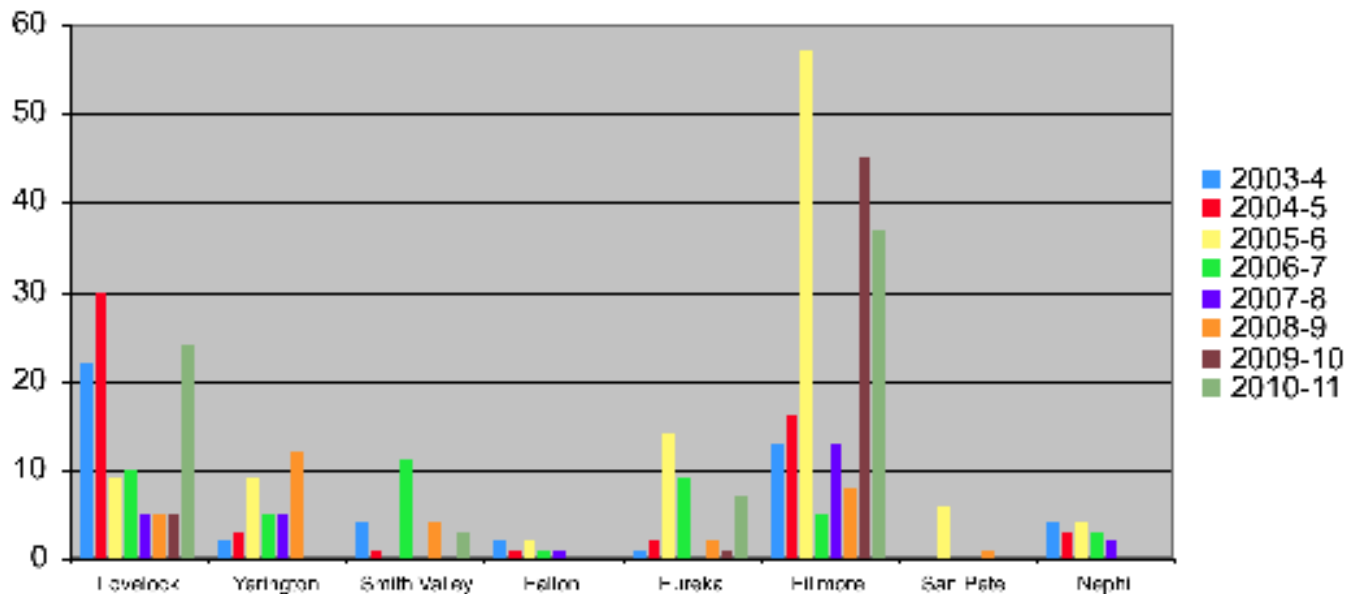


Figure 6. Eight-year count trends for Ferruginous Hawks in eight major winter concentration areas in Utah and Nevada.

Northern Harriers. (Figure 7) Remarkable numbers and record highs were present in Nevada—Eureka, Smith Valley, Yerington, and especially Lovelock, where the highest total ever (65) was recorded. In contrast to the east in Utah, only 5 were found (just 1 in Fillmore).

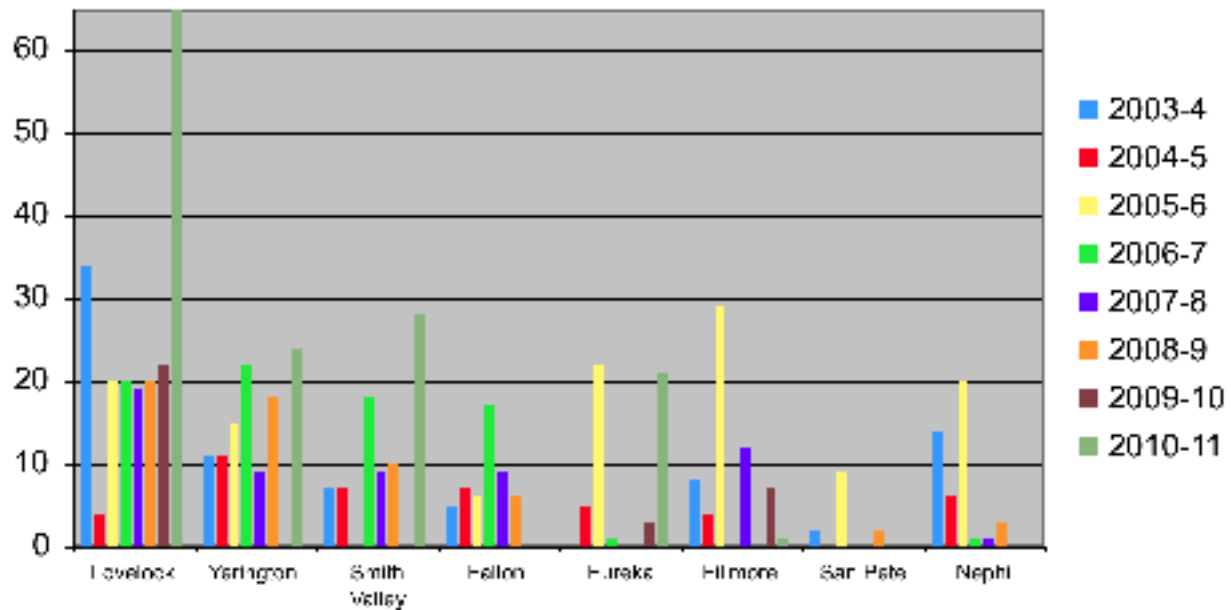


Figure 7. Eight-year count trends for Northern Harriers in eight major winter concentration areas in Utah and Nevada.

American Kestrels. (Figure 8) As with Red-tailed Hawks and Northern Harriers, record and near-record highs of America Kestrels were found in western Nevada.

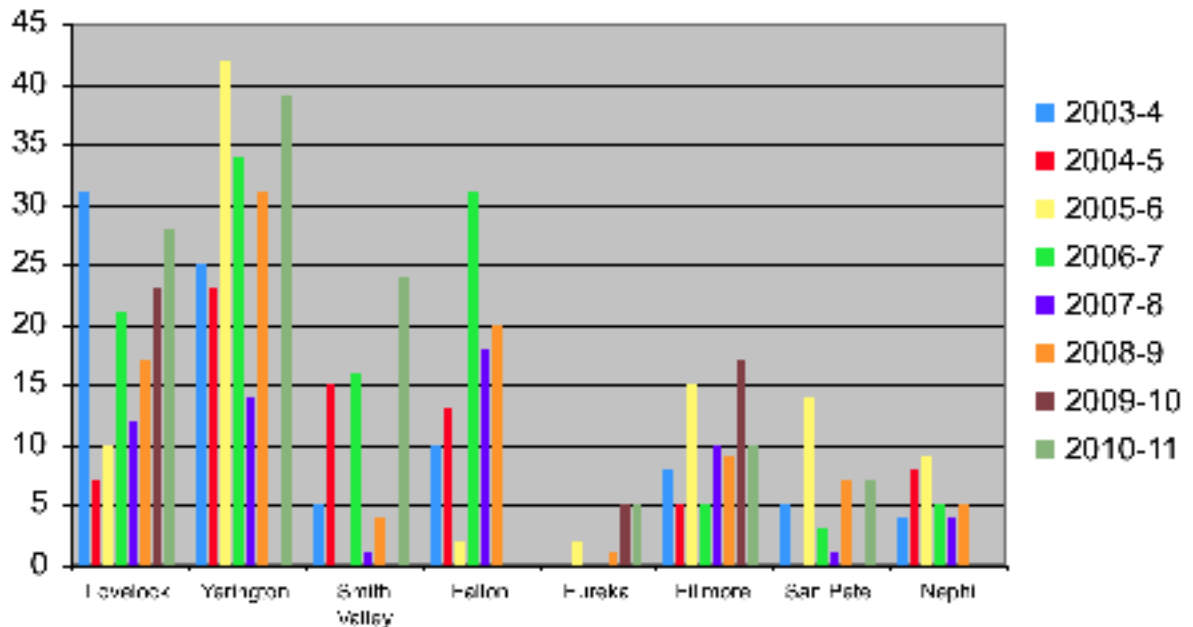


Figure 8. Eight-year count trends for American Kestrels in eight major winter concentration areas in Utah and Nevada.

Prairie Falcons. Record-high numbers were seen in western Nevada.

Golden Eagles. A record number (7) for Lovelock, Nevada, were present and elsewhere were relatively stable.

Bald Eagles. As usual the highest counts were in Utah, in the San Pete Valley.

Owls. Great-horned Owls were few in number. Two Barn Owls were seen— one in Flowell, Utah, competitively interacting over prey with the only Short-eared Owl seen.

Roost Dynamics in Lovelock, Nevada, and Flowell, Fillmore-Pahvant Valley, Utah

Following identification in 1989 of the Lovelock, Nevada area as the most substantial wintering area for raptors in the Great Basin until 2005/2006, we have monitored since 1991 a unique multi-species communal roost located in a 2-ha (5-acre) grove of cottonwood trees ~4.8 km (3 mi) south of town on Reservation Road. This grove of trees apparently has not been altered nor has there been any apparent change in agricultural practices near the grove in the past 21 years. Rough-legged Hawks and Ferruginous Hawks most commonly use the roost, with Red-tailed Hawks and Great Horned Owls less common. The number of birds documented at the roost in a given winter has ranged as high as 200+ individuals in 1992/1993, also the winter with the highest census total for the area to date (300+), to none in 2007/2008 – for the first time since its discovery in 1989 – when the census total for this area was at its lowest (Table 2).

As the total number of birds in the valley increased over two consecutive years (from 131 in 2007/2008 to 155 in 2008/2009 and then 170 in 2009/2010), the winter roost increased as well. No birds occupied the roost in 2007/2008; nine raptors were observed in 2008/2009; 11 raptors in 2009/2010.

This year with the record-high total of 311 in the area on 12 January 2011, the roost increased to 44+ birds, mostly Ferruginous Hawks and then Rough-legged Hawks, the highest number in six years. As usual, the birds occupying the roost increase and decrease proportionately to the valley population. Also as usual Ferruginous Hawks use the same two or three trees with Rough-legged Hawks flanking them in adjacent trees.

In Utah, the roost of 25+ Ferruginous Hawks—discovered January 2010 in Flowell, part of the Fillmore-Pahvant Valley study area—contained 21+ Ferruginous Hawks this past 15 December 2010 and 12 Ferruginous Hawks twenty-one days later on 5 January 2011.



Al Hinde with Adult Ferruginous Hawk, Diamond Valley, Eureka, Nevada 12/31/10

TRAPPING AND BANDING

We captured 10 raptors of five species between 30 December 2010 and 23 January 2011.

Table 4. Raptors banded during winter 2010/2011 in Utah and Nevada.

SPECIES	AGE ¹	SEX:			COMMENT
		<u>M</u>	<u>F</u>	<u>U</u>	
Rough-legged Hawk	ASY	1			Cover photo with Professor Ian Newton
Subtotal		1			= 1
Ferruginous Hawk	AHY			1	--1442 grams, the heaviest
	SY			1	of 22 Ferruginous Hawks banded in the survey
Subtotal					= 2
Red-tailed Hawk	ATY			1	
	ASY			1	
	SY			2	
Subtotal				4	= 4
Prairie Falcon	HY		1		
	SY	1			
Subtotal					= 2
American Kestrel	AHY	1			= 1
Subtotal					= 1
TOTAL		3	1	6	= 10

¹ HY = hatch year; SY = second year; AHY = after hatch year; ASY = after second year; TY = third year; ATY = after third year.

COLLECTION OF BIOLOGICAL SAMPLES

We collected feather samples from all birds captured this winter. These samples were provided to Chris DeSorbo of the BioDiversity Research Institute in Gorham, Maine, to facilitate his study of contaminants (toxins and heavy metals, especially mercury and lead) in raptors. Feather samples provided in the past to Mike Schindlinger of Lesley University in Cambridge, Massachusetts, to facilitate his ongoing study of endocrine disruptors in birds will now be archived by the BioDiversity Research Institute for future examination. Pending available funding, the BioDiversity Research Institute are holding these samples for broader analyses (i.e., a full metal scan). Last year, blood swabs were sent by BRI to Buffalo State for consideration in ongoing genetic research.

Among three birds analyzed thus far for contaminants, the mercury levels in a Rough-legged Hawk (0.608 ppm), a Ferruginous Hawk (0.175 ppm), and a Harlan's Hawk (4.514 ppm) were below the level above which adverse effects are predicted. But note the much higher concentration in the Harlan's Hawk.

This year, BRI plans to send their biologist Rick Gray to assist with further collections of these samples.

Regurgitated raptor pellets were collected from Lovelock, Nevada, January 2011, were provided to Professor Gwilyn S. Jones, mammalogist in the Department of Biology, Northeastern University, for analysis to determine prey species. His initial analysis of these determined some contained Montane Voles (*Microtus montanus*). We await further analysis and expect to collect more pellets this coming winter from Lovelock and other areas.

DISCUSSION AND CONCLUSION

These oases in the high desert, refuges for upwards of 1,000 wintering raptors, are worthy of more attention than our annual visits. To monitor these winter populations more accurately, a monthly if not weekly winter census would undoubtedly be more effective than our one-time visits each winter.

For the past eight winters these standardized counts have been conducted from late December through January. Before then, greater trapping and banding success in the colder months of January, than in November or December, determined this operational period. However, the recent comparison counts earlier in the season, in Eureka, Nevada 6 December 2008 and Fillmore, Utah, 6 November 2009 and 15 December 2010, revealed much greater and record numbers of Rough-legged Hawks in Eureka and Fillmore, and of Ferruginous Hawks in Fillmore. (Table 1)

The PI and project veterans plan to continue the standardized census from late December through January as usual, but the value of being in the field earlier is evident.

Last winter HWI recruited and utilized up to 14 “citizen scientist” volunteers who conducted several useful comparison counts in Utah. They will continue to operate in Utah this winter. However, as noted above, additional earlier surveys in Nevada, with its greater wintering raptor populations would be of great interest and value. To this end, we hope to expand the Nevada counts and encourage others to conduct an earlier census, especially in Lovelock and Eureka, Nevada.

Ken Wright of Vancouver, Canada, and a veteran of Fillmore counts, hopes to conduct GIS mapping surveys of raptors, permitting analysis of clustering patterns, roost sites, and habitat use to enhance understanding of winter raptor abundance and spatial distribution in the Great Basin.

The increased interest in the collection of biological samples, and early evidence of elevated mercury levels in one of the three biological samples analyzed so far, demonstrates the potential and increasing value of the capture and banding of these birds.

The census work of the past eight years has increased in scope and importance to the project; now the “citizen scientist” census in Utah will allow the PI to focus once again on earlier primary objectives—trapping, possible color banding, satellite telemetry as well as the collection of biological samples for heavy metal contaminant and isotope analysis. As mentioned above, the BioDiversity Research Institute wish to continue their association with the PI, who is a consultant for BRI, in the collection and analysis of samples.

This has been a long-term study. Although the PI has entirely funded this project in past years, more recently, as costs became prohibitive, critical financial support was obtained from the Harvard Nuttall Ornithological Club, and last year from HawkWatch International. The standardized counts were conceived as part of a ten-year minimum study – to date, eight have been completed and continued support will determine whether comprehensive or limited surveys are possible.



HawkWatch International crew and “Citizen Scientists” San Pete Valley, Utah, 1/29/11

ACKNOWLEDGMENTS

The PI enjoyed the company of Professor Ian Newton and the distinction of working with him in the field for ten days in Nevada and Utah. Generous support from HawkWatch International funded half of the project costs, allowing us to survey ten major and secondary concentration areas in Utah and Nevada last winter. Thanks also to Caroline Goldman, Executive Director, and Dr. Markus Mika, Science Director of HWI, for providing for the visit of Professor Ian Newton from the UK and arranging the excellent venue at Westminster College, Salt Lake City, 9 January 2011 for his outstanding presentation on migration.

An exceptional number, at least 26 people, helped conduct the banding and census expeditions this past winter; in Nevada, with the PI for ten days, LeRoy Fink of Burley, Idaho, for his fifth season, provided invaluable support and experience; Phil Magasich, veteran of these surveys since 1991, and his friend Maureen, joined us in Smith Valley. Thanks to the DS Land and Livestock Ranch and the Nevada Nile Ranch, Lovelock, Nevada, for allowing us access to their huge ranches there.

In Utah, Dr. Mika and Jeff Johnson, of Las Vegas, Nevada, survey veteran since 1992, conducted the record-high census (261), 15 December 2010 in Fillmore. Dr. Mika and HWI staff Shawn Hawks and Nikki Price recruited and guided the following volunteers in the field: Kay Millar, Mike Shaw, Teresa Ely, Eric Peterson, Holly Peterson, Kelsey Holzman, Kate Parker, Bryce Robinson, Paul Watkins, Scott McKay, Bill Christy, Alice de Anguera, Mitch, and Liz Larsen. Joanne Stoddard, Salt Lake City, raptor rehabilitator, joined the PI on 24 January 2011 for a survey in Cedar Valley; Dr. Jimmy Parrish, Utah Division of Wildlife, supplied color bands; and Dr. Jeff Smith, former Conservation Science Director of HawkWatch International, should be remembered for his support of the project for the previous seven years. Last but not least, thanks to Art and Deb Sandack of Salt Lake City, Utah, for their longtime support and friendship.

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FINANCIAL REPORT

<u>Expense</u>	<u>Amount</u>
Airfare (Boston – Salt Lake City – Boston)	\$ 738.00
Vehicle Rental (12/24/10—1/9/11 and 1/18/11—1/29/11)	906.00
Fuel	1,048.00
Lodging for PI (12/24/11—1/30/11); and Professor Newton (12/28-1/9/11) and Leroy Fink (1/10-1/18/11)	1,749.00
Meals for PI (12/24/11—1/30/11); and Professor Newton (12/28-1/9/11) and Leroy Fink (1/10-1/18/11)	1,120.00
<u>Materials and animals</u>	<u>185.00</u>
TOTAL	\$5,746.00