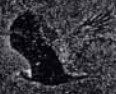
RAPTOR TECHNIQUES WORKSHOP

Raptor Monitoring Protocol

Golden Eagle

P.O. Box 2209 • Ramona, CA 92065 • Ph (760) 789-3992 • Fax (760) 789-0131

Monitoring Golden Eagles in the SDMSCP



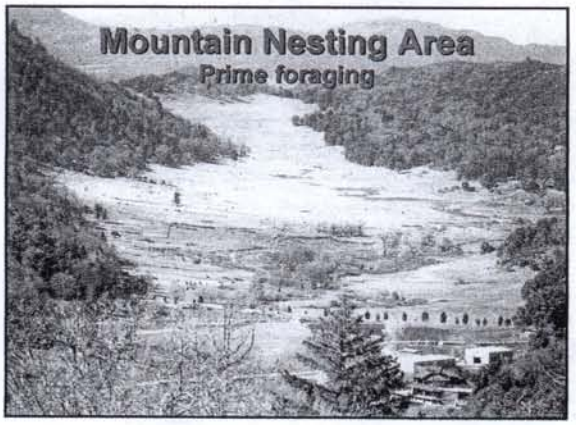
Wildlife Research Institute, Inc.
David Bittner, John Oakley,
Jim Hannan, Jeff Lincer
Leslie Nelson

Golden Eagles
Why they need special monitoring

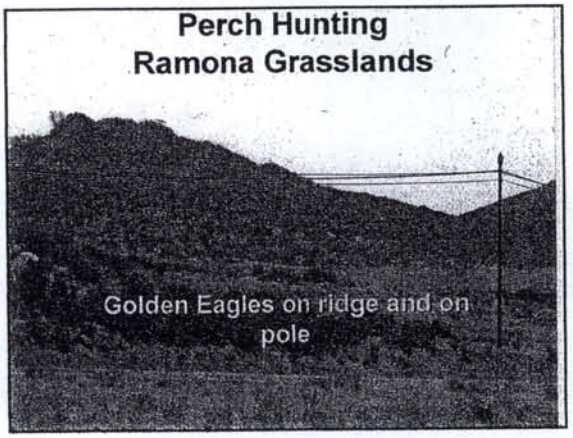
- Each territory covers multiple land jurisdictions
- They have huge territories (20-30 sq. mi.)
- They may not nest every year
- Observers need to have special observation skills
- They occur in remote areas and are not easily seen unless the observer is trained

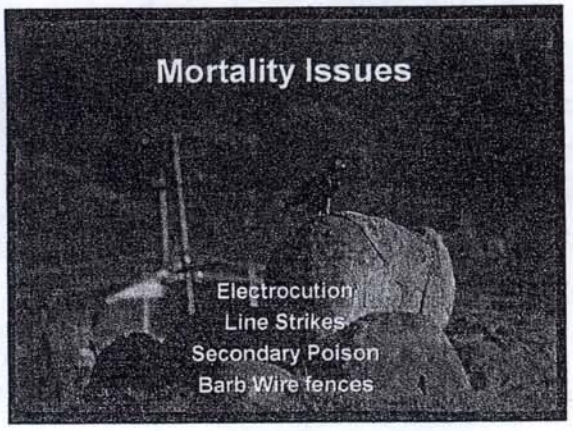
Big Bird, small profile

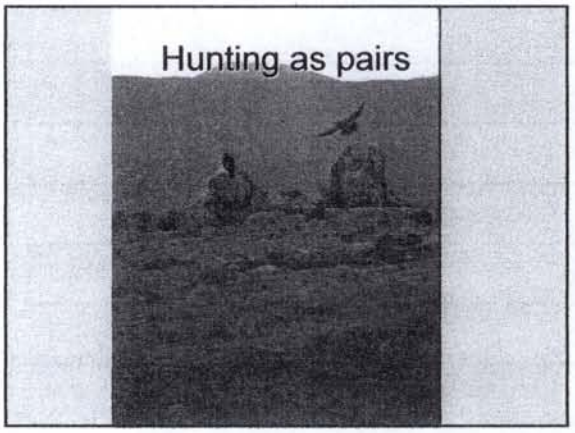
- Golden Eagles avoid human contact under most circumstances
- They will contour fly, away from approaching observers
- ½ mile seems to be the flight distance near nest sites
- People often assume they are other raptors or vultures

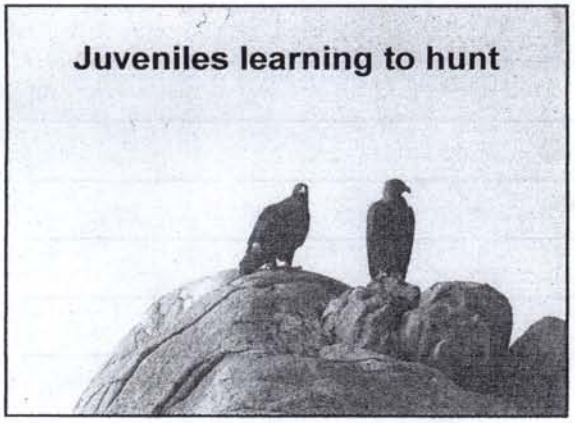


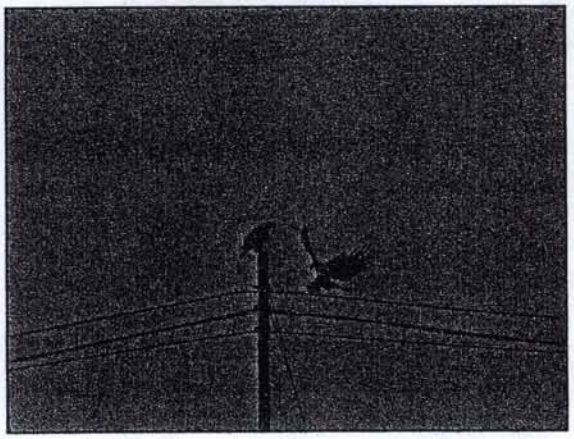

Hunting Techniques
Flying low against landscape and surprising prey
Technique is also used for human avoidance


Perch Hunting
Ramona Grasslands
Golden Eagles on ridge and on pole


Mortality Issues
Electrocution
Line Strikes
Secondary Poison
Barb Wire fences

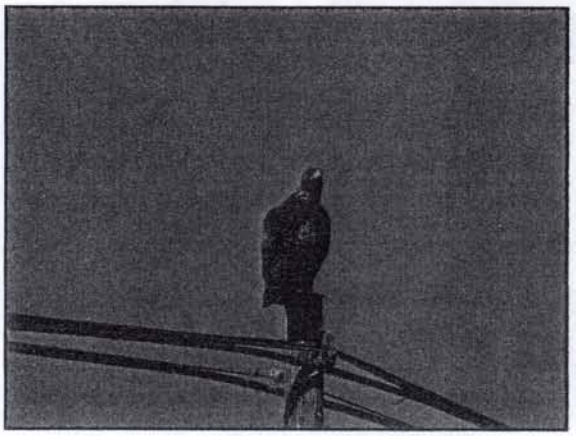

Hunting as pairs

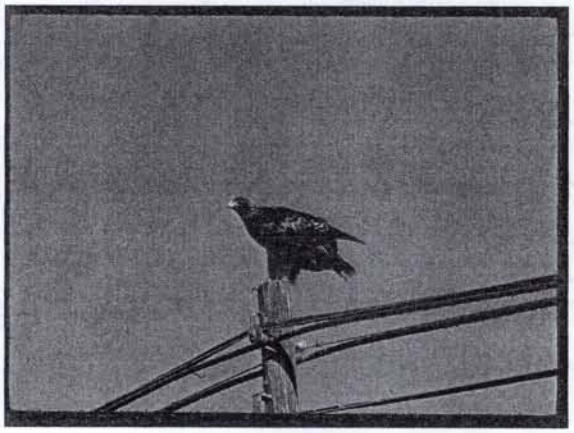

Juveniles learning to hunt

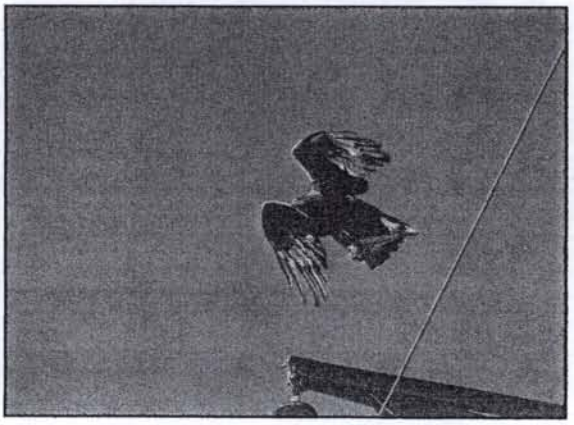


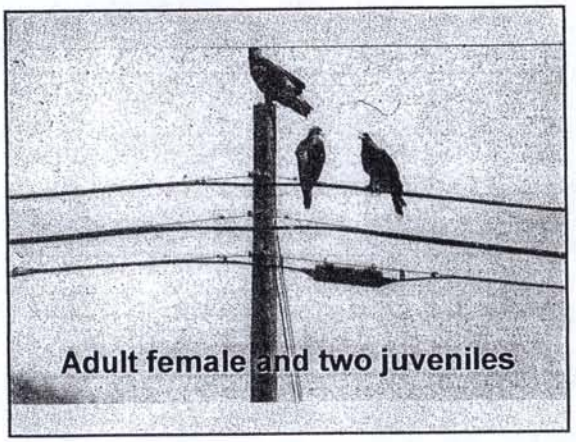

How much can they carry?

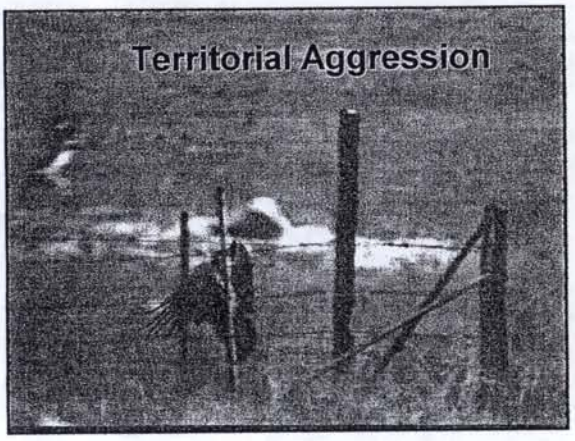

Electric carried from hanging
insulators prevents electrocution

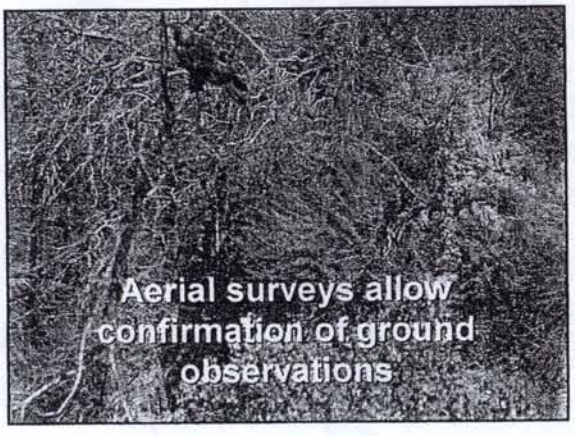


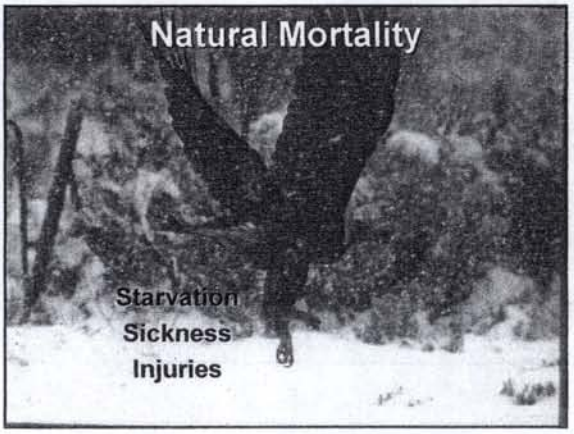


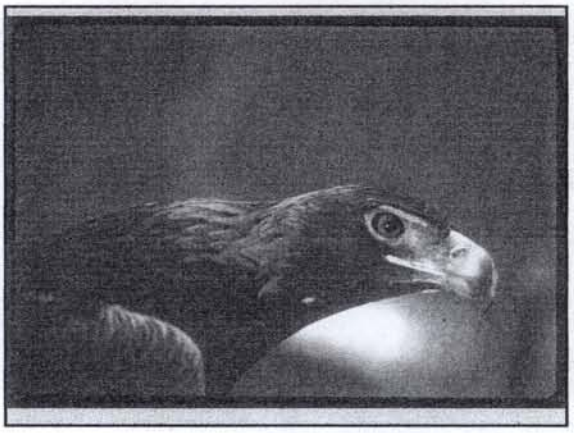



Adult female and two juveniles

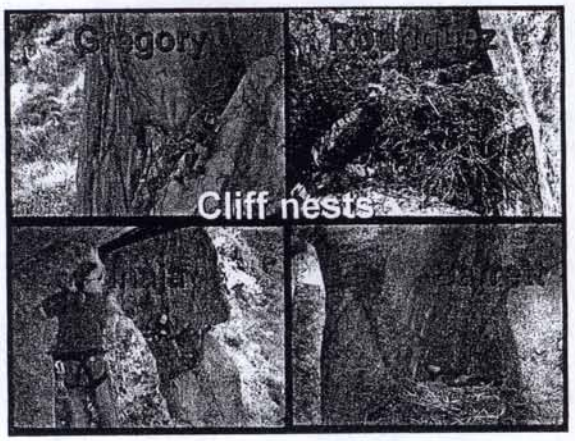

Territorial Aggression

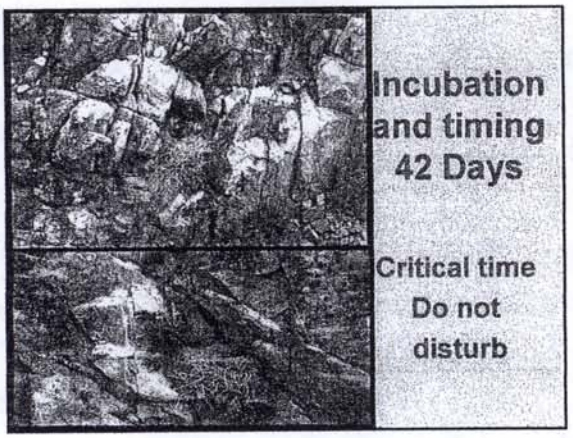

Aerial surveys allow confirmation of ground observations

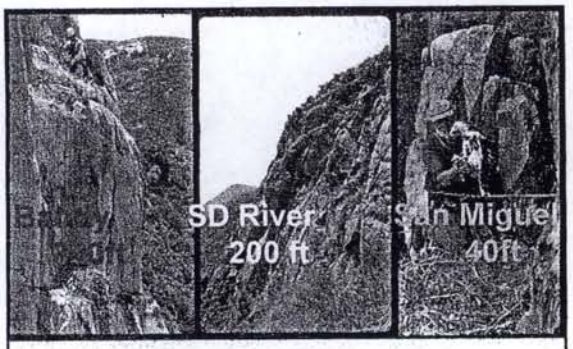

Natural Mortality
Starvation
Sickness
Injuries




Tree nests



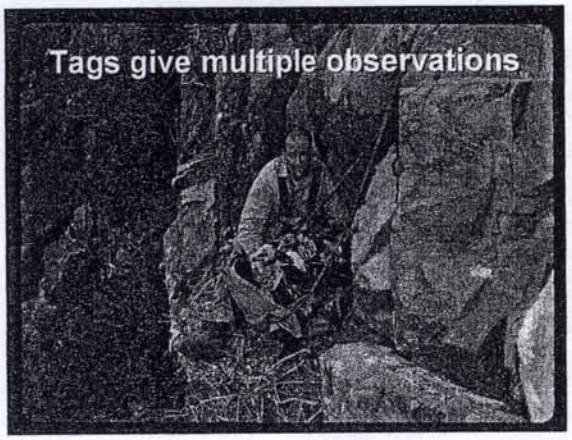


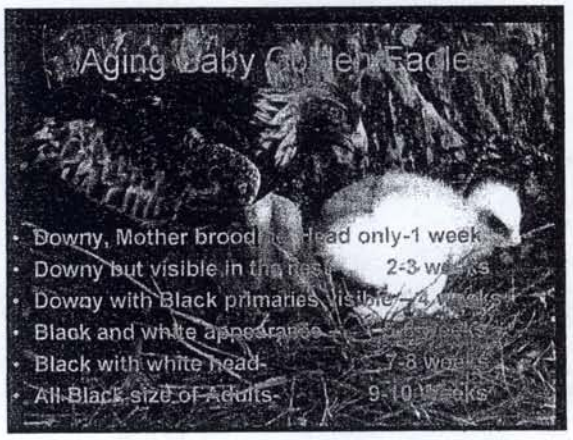


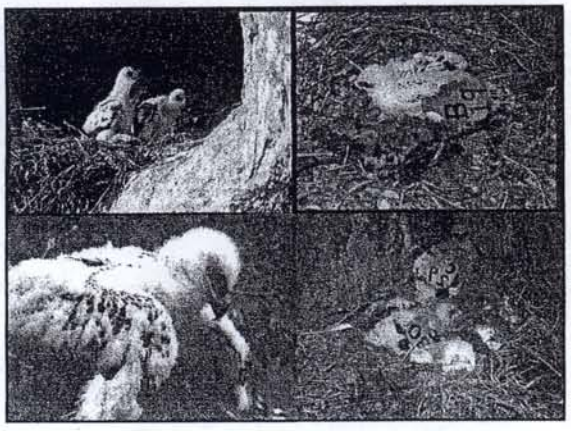
80% of SD County nests are on cliffs

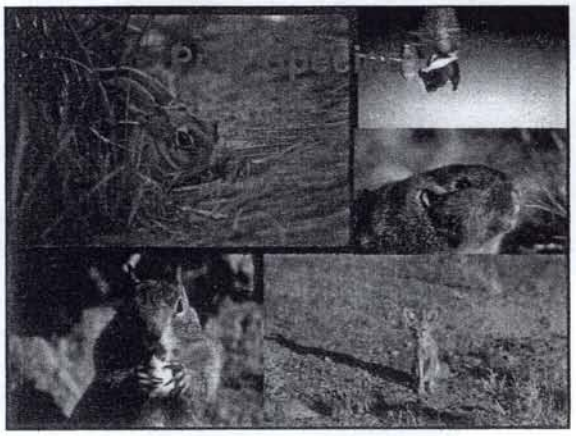

• Do not always use every year
• Alternate sites nearby
• Cliff nesters also use tree nests


Banding vs Tags vs Telemetry


Tags give multiple observations


Aging Baby Golden Eagle
Downy, Mother brood
ead only-1 week
Downy but visible in the nest
2-3 we
Downy with Black primaries visible
Black and white appearance
Black with white head-
7-8 wo
All Black size of Adults-
9-10





Fire and Golden Eagles

1st year can be devastating
2nd -3rd year habitat recovers
3-10 years habitat is good for hunting

RAPTOR TECHNIQUES WORKSHOP

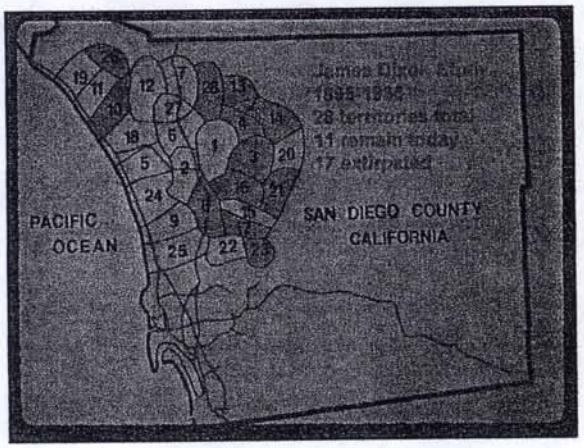
Raptor Monitoring Protocol

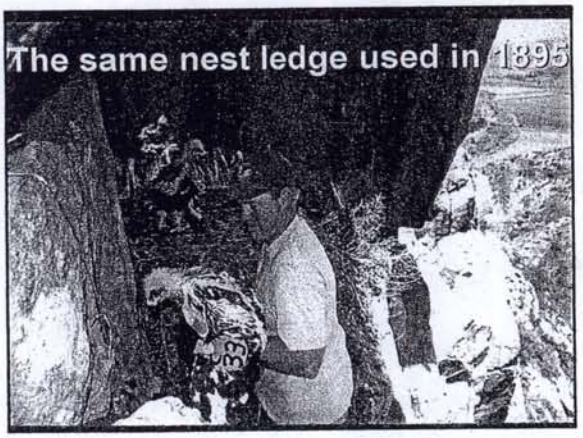
Golden Eagle Monitoring Techniques

P.O. Box 2209 • Ramona, CA 92065 • Ph (760) 789-3992 • Fax (760) 789-0131

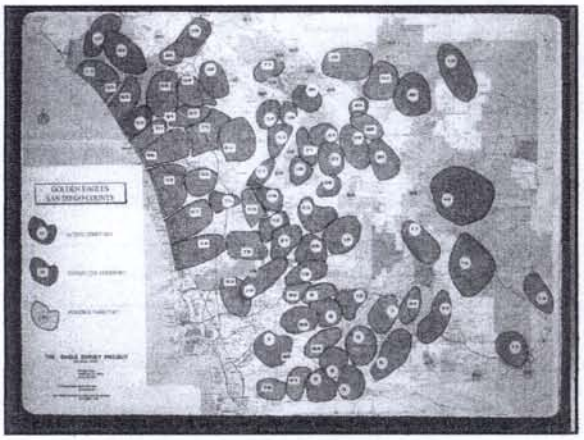
Monitoring Golden Eagles

Wildlife Research Institute, Inc.
David Bittner, John Oakley, Leslie Nelson,
James Hannan, Ph.D., Jeff Lincer, Ph.D.






Golden Eagles in San Diego's MSCP

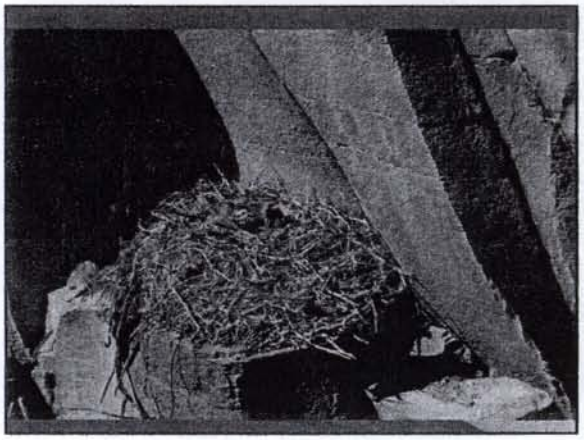



California
Mojave Desert Study Area
Golden Eagle Study Area
Mojave Desert
Pacific Ocean
San Diego Co.
Anza-Borrego Desert
Mexico

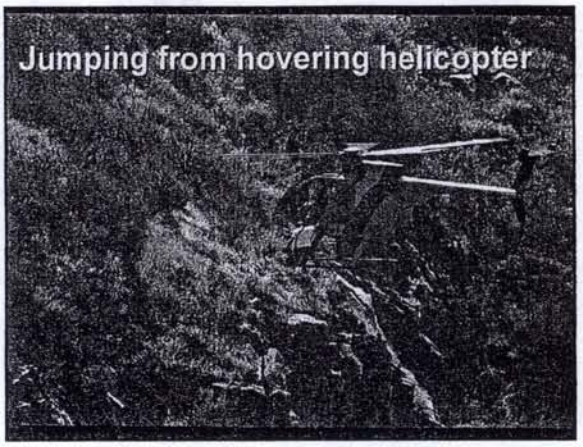
Techniques for Monitoring Golden Eagles

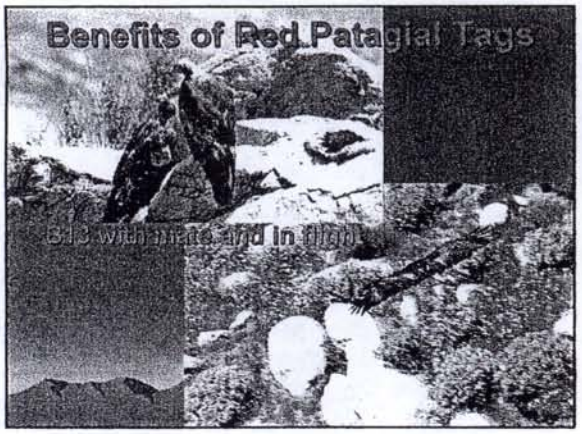
- Annual territory history
  (build a long term chronology)
- Scopes, 20-60X
- 4X4 Vehicles
- Trained Volunteers
- Helicopters
- Time in field Jan-May
- Banding, patagial tags and transmitters


Inaja
Bandy Canyon
Pechanga
Honor Camp

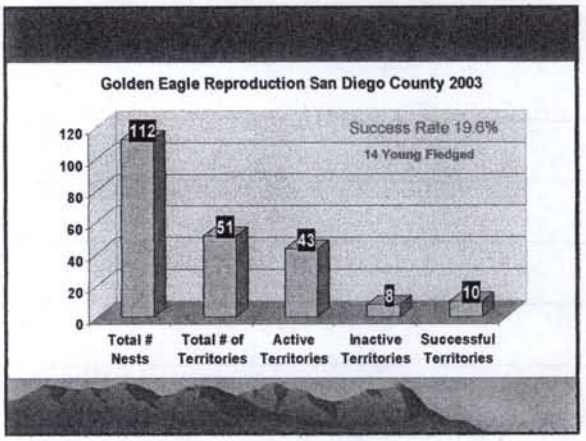



N6735

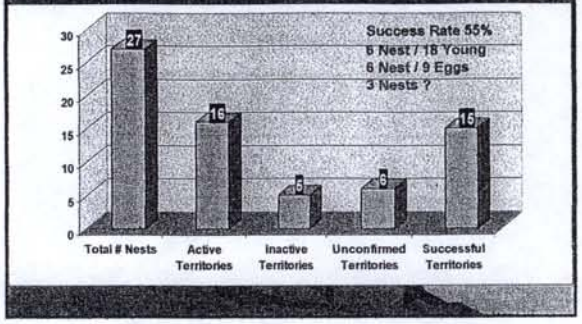

Jumping from hovering helicopter


Benefits of Red Patagial Tags

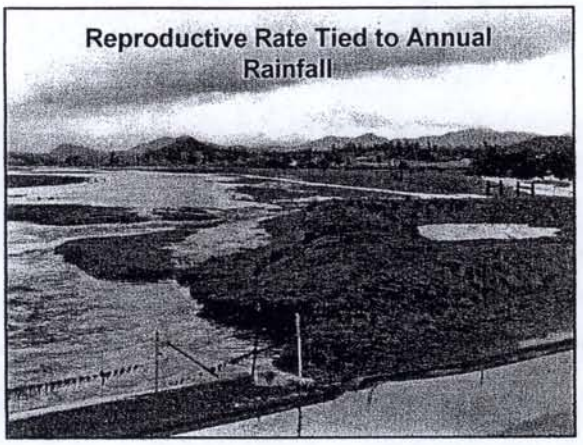

GOLDEN EAGLE
REPRODUCTION 2003
250
200
150
100
50
0
223
85
56
29
11
Success Rate 13%
15 Young Fledged
Total # Nests
Total # of Territories
Active Territories
Inactive Territories
Successful Territories

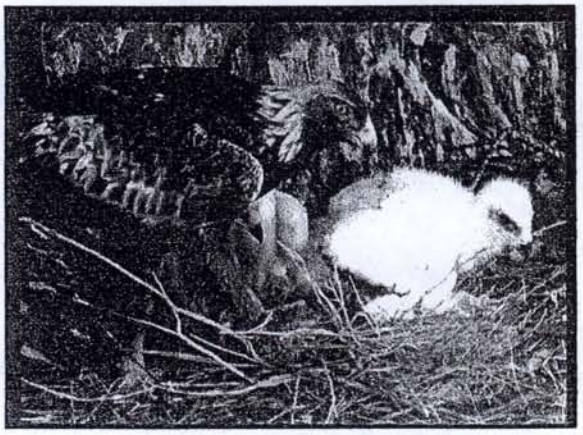

Golden Eagle Reproduction San Diego County 2003
120
100
80
60
40
20
0
112
51
43
8
10
Success Rate 19.6%
14 Young Fledged
Total # Nests
Total # of Territories
Active Territories
Inactive Territories
Successful Territories

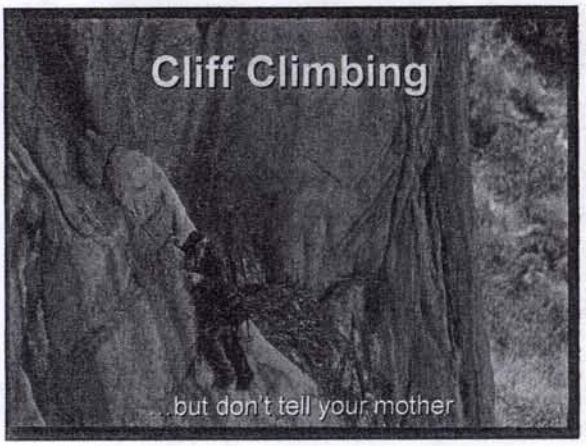
Prairie Falcon Reproduction In Golden Eagle Study Area 2003

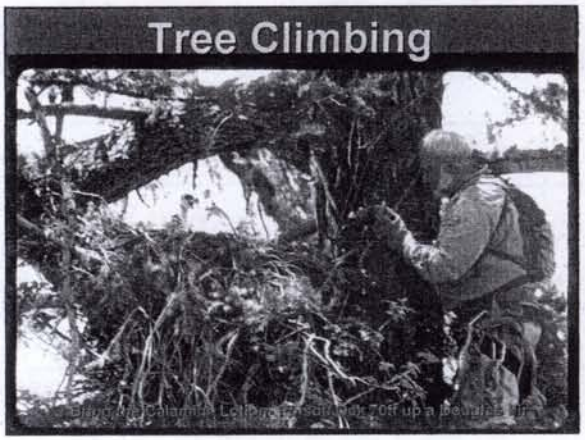


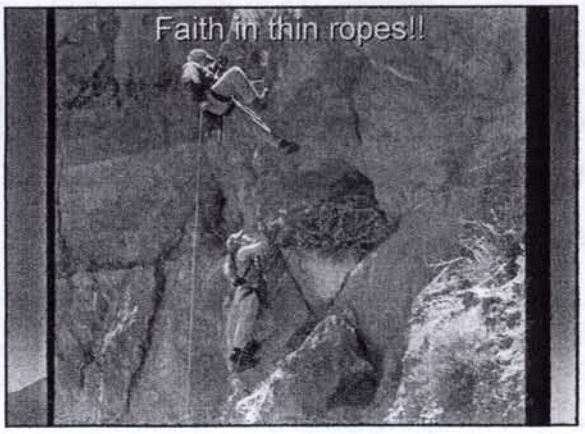
Reproductive Rate Tied to Annual Rainfall



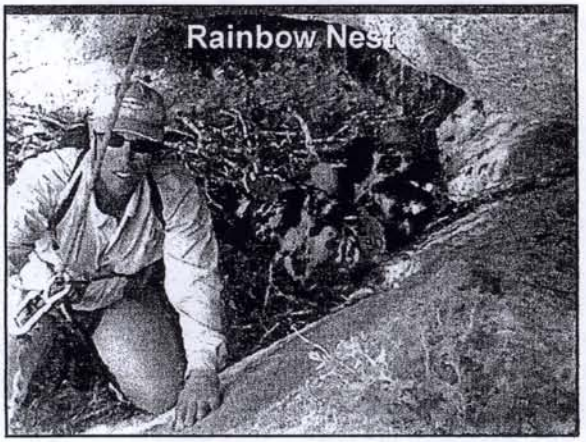


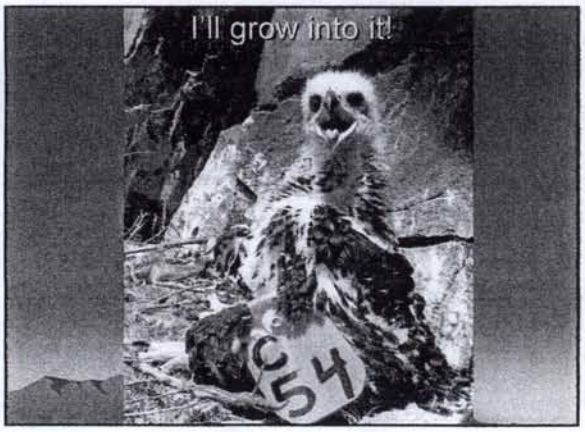

Cliff Climbing
. . .but don't tell your mother

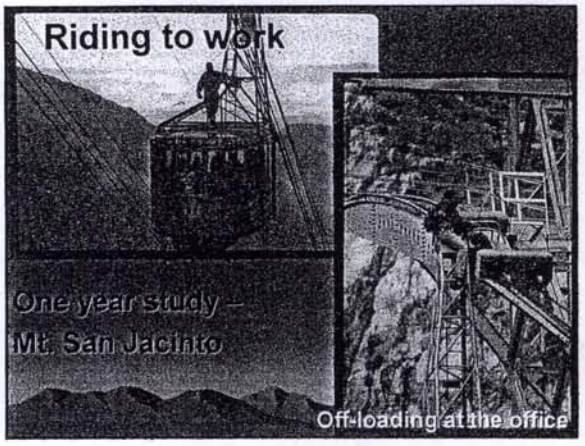

Tree Climbing

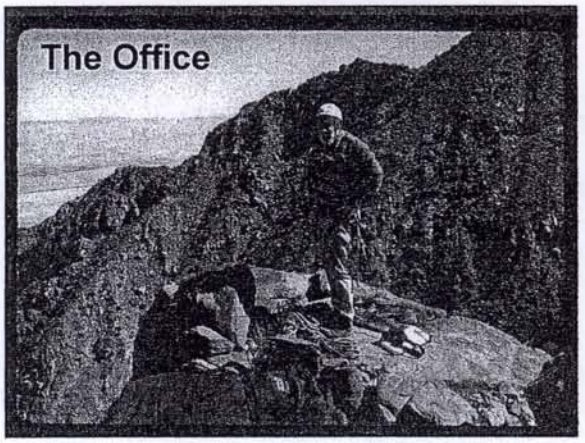

Faith in thin ropes!!

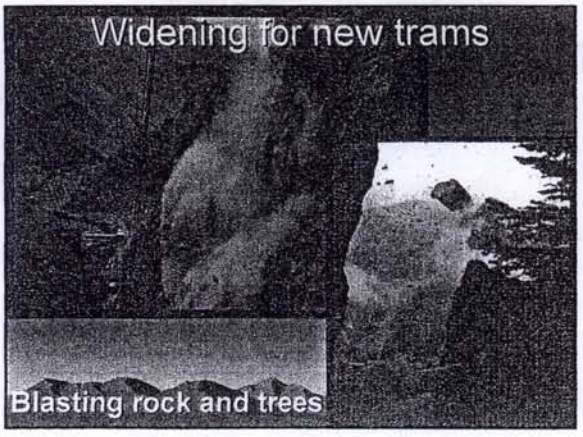

B
04


Rainbow Nest


I'll grow into it!
054


Riding to work
One year study –
Mt. San Jacinto
Off-loading at the office


The Office


Widening for new trams
Blasting rock and trees

S.D. Golden Eagle Facts

- 1.5 young per successful nest in San Diego County
- 12-50 % of pairs successfully nest per year depending on food and weather
- 50-88% of Golden Eagles may not nest annually
- 104 pairs nested in San Diego County prior to 1970
- 50 pairs of Golden Eagles remain in San Diego County in 2005
- Six (6) pairs of the 50 are in danger of extirpation


Longtailed weasel and jackrabbit
Meadowlark

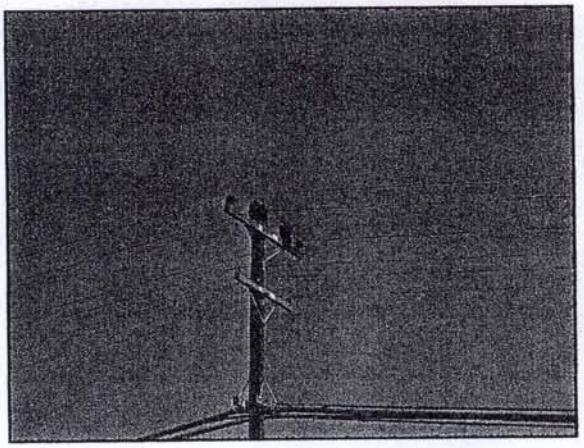

Food from one nest: jackrabbit,
raven and duck.

San Diego GE Emigration
(examples of band returns)

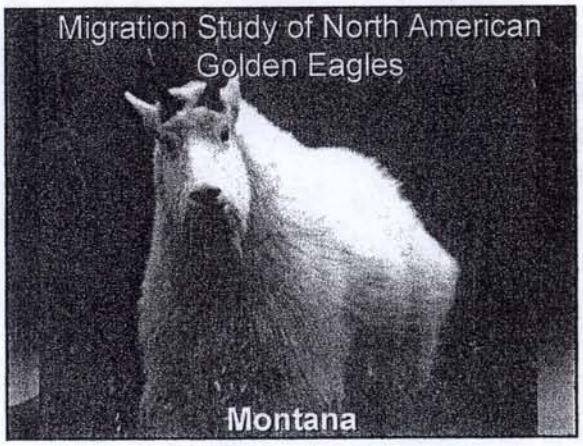
Where	ST	AGE	How encountered
San Miguel, El Alto	MX	HY	1200 Miles, Shot
Grand Canyon	AZ	HY	Flying thru Canyon
Prescott	AZ	HY	Flying
Riverside	CA	ATY	Nesting
Ventura	CA	HY	Killing and eating a cat
Mt Diablo	MX	ASY	Chasing CA Condors
Ramona	CA	ATY	Struck an electric line
Brawley	CA	HY	Electrocuted
Quitzura	CA	HY	Drowned
Pinnacles	CA	HY	Eating road killed deer
Idaho	ID	SY	Perished near a refuge
Apple Valley	CA	HY	Found retaining AZBSP banded then caught 8 mo later by Korean goose farmer killing a goose. Released again SD County
Palo Verde Valley	CA	SY	Electrocuted
Morena Valley	CA	ATY	Nesting
Gregory Mtn	CA	ATY	Nesting

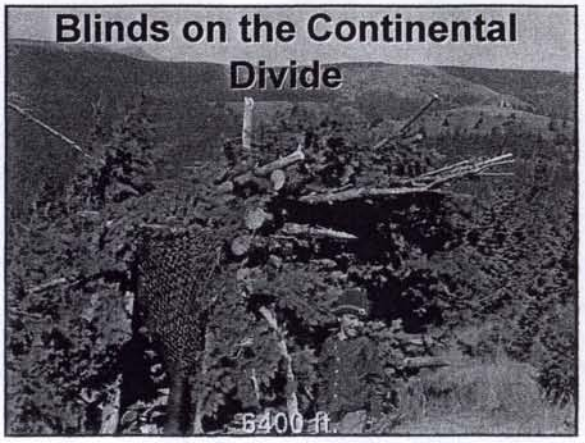
Mexican family who found and saved A-01 after she flew 1200 miles and was shot in the wing.

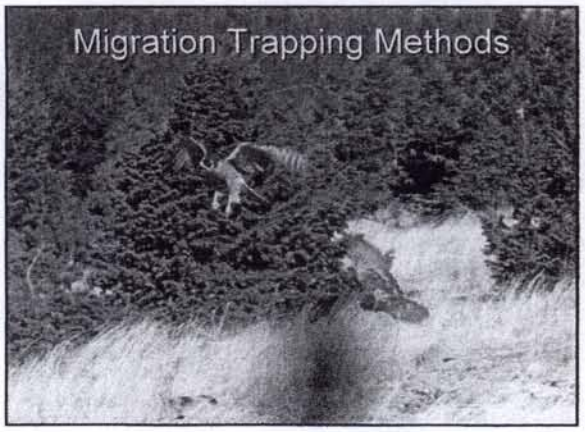

Golden Eagle Deaths
San Diego Environs
18
16
14
12
10
8
6
4
2
0
Electrocution
Pwr. Line Strike
Poisoned
Shot
Drowned
Starvation
Car Srikes
Barb Wire Fence
Killed by Eagle
Unknown

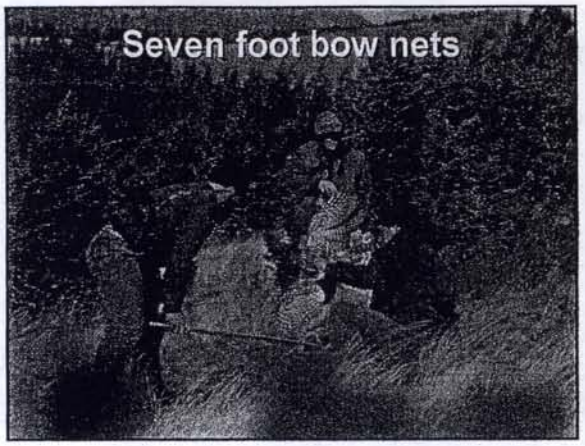


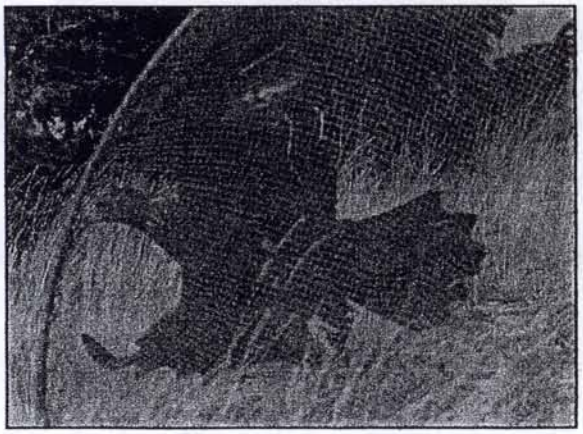

Poisoned Eaglet
Photo by J D Bittner


Migration Study of North American Golden Eagles
Montana


Blinds on the Continental Divide
6400 ft.


Migration Trapping Methods

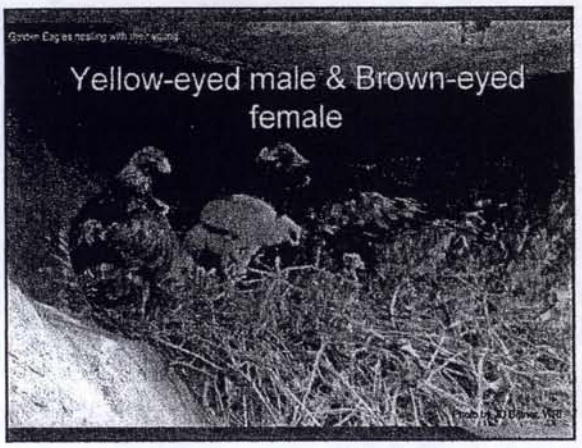

Seven foot bow nets



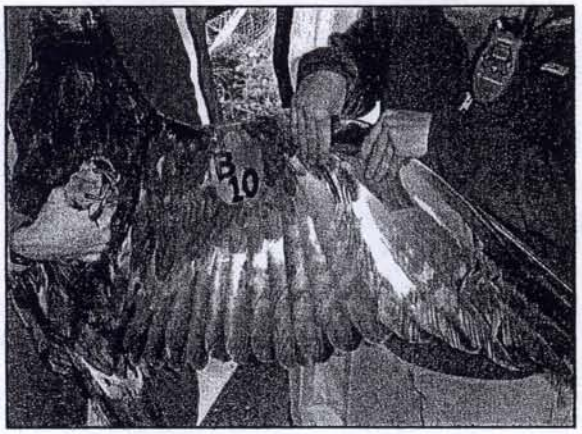

Typical Eye Color of N.A. Golden Eagles

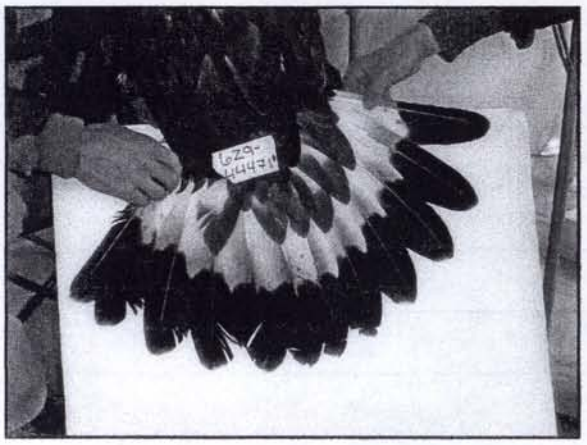

Yellow eyes in San Diego eagles
B-14 photographed from helicopter 2005


B-14 when banded in 1999

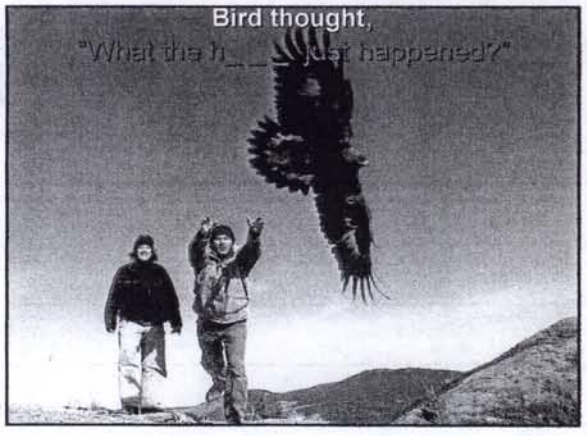

Yellow-eyed male & Brown-eyed female


629-
44465

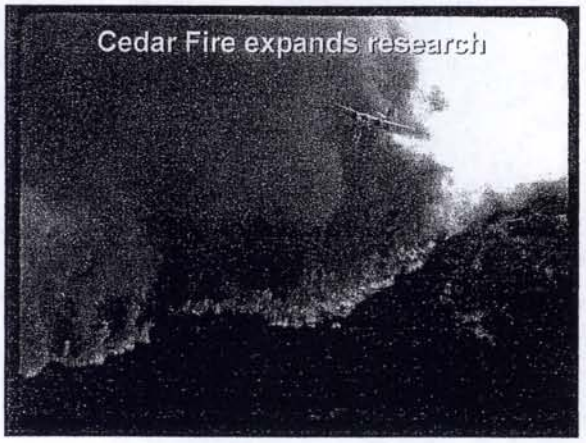

B10

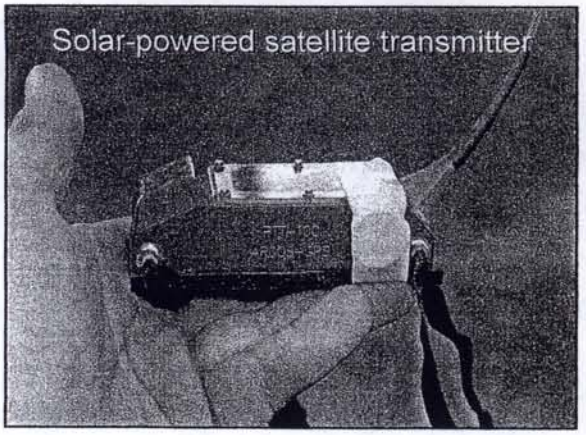

629-
44471

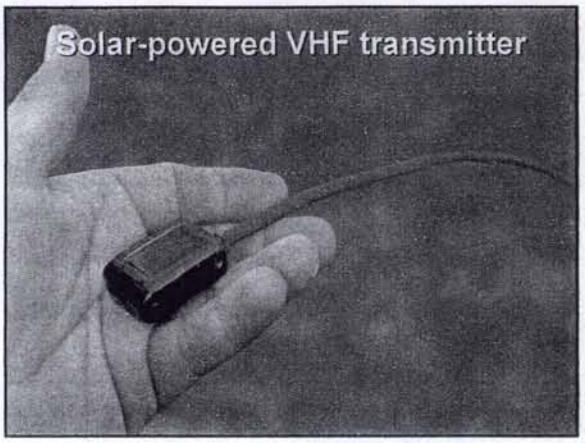

629-
44473

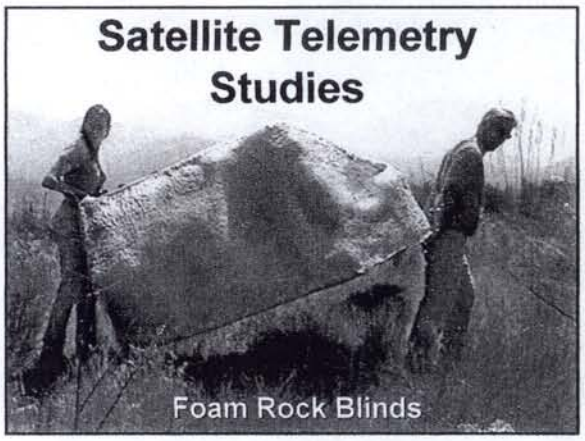

Bird thought,
"What the h__ just happened?"


Bird thought, "New jewelry but I didn't even get kissed!"

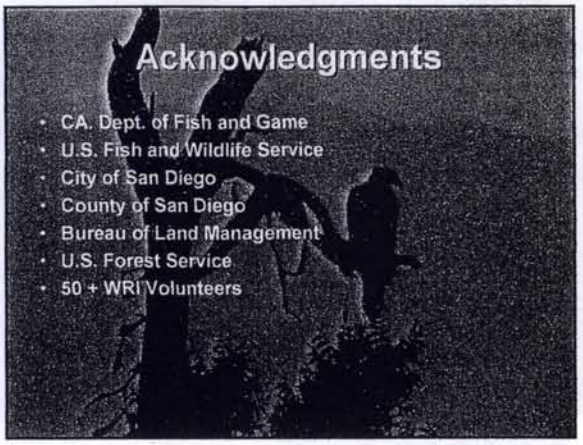

Cedar Fire expands research


Solar-powered satellite transmitter


Solar-powered VHF transmitter


Satellite Telemetry Studies
Foam Rock Blinds


Blind in position for new study


Acknowledgments
• CA. Dept. of Fish and Game
• U.S. Fish and Wildlife Service
• City of San Diego
• County of San Diego
• Bureau of Land Management
• U.S. Forest Service
• 50 + WRI Volunteers

RAPTOR TECHNIQUES WORKSHOP

Raptor Monitoring Protocol

Other Raptors

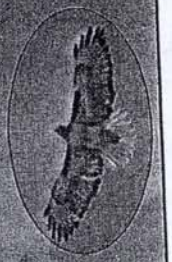
P.O. Box 2209 • Ramona, CA 92065 • Ph (760) 789-3992 • Fax (760) 789-0131

Raptor Monitoring Techniques

March 14 & 15, 2006

Wildlife Research Institute, Inc.

Ramona, California



ACKNOWLEDGEMENTS

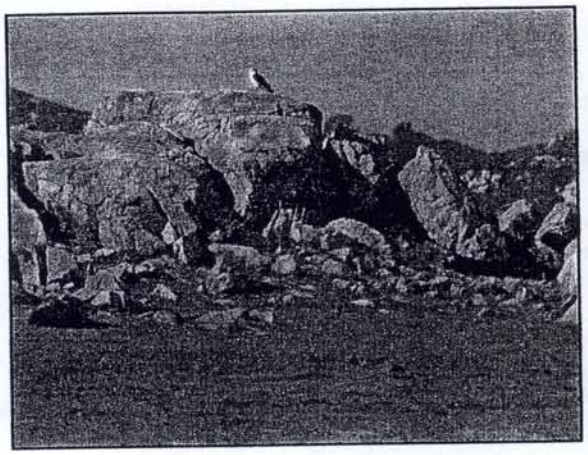
- CDFG NCCP Local Assistance
- City of San Diego
- San Diego Natural History Museum
- U.S. Fish and Wildlife Service
- State of California Department of Fish and Game
- USGS
- U.S. Forest Service
- Otay Lakes City Water Supply
- Hubbs-Sea World Research Institute
- Circle Wild Nature Center
- Sweetwater Authority
- USDA-APHIS-Wildlife Services
- Canadian Wildlife Service
- Palomar Audubon Society
- Pardee Homes
- Albion Environmental
- ERLTX Environmental Planning
- FRAW
- Dr. Iverson
- Participants in the Burrowing Owl Listserv
- Friends of the Swainson's Hawk
- Chugach Telecommunications & computers, Inc.
- U.S. Navy

J. B. Dixon, A.M. Ingersoll, Harry L. Heaton, Raymond Quigley, E.E. SeChrist, Maurice Burns, N. K. & B.P. Carpenter, and Ed N. Harrison, John Oakley, Jeff Wells, John Colton, Tom Scott, Chris Meador, Jim Hannan, Randy West, Dave Seals, Pete Bloom, Kate Shampaine, Geoff Rodgers, Jim Bryan, Craig Culver, Paul Jorgenson, and many others

BACKGROUND

- 582,000 acres
- 12 jurisdictions
- 43% San Diego County

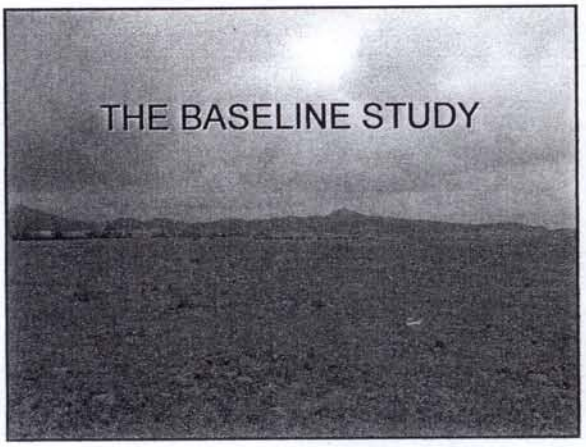
- Effective???
- Trends???
- Adaptive Management

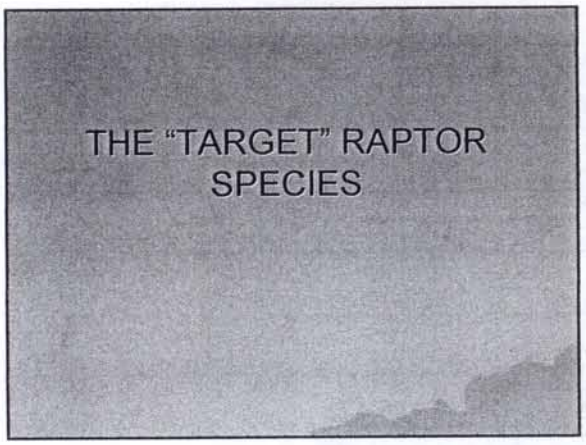


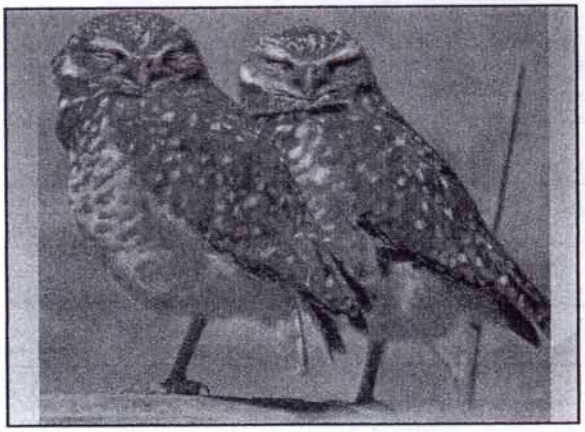
WHY RAPTORS?

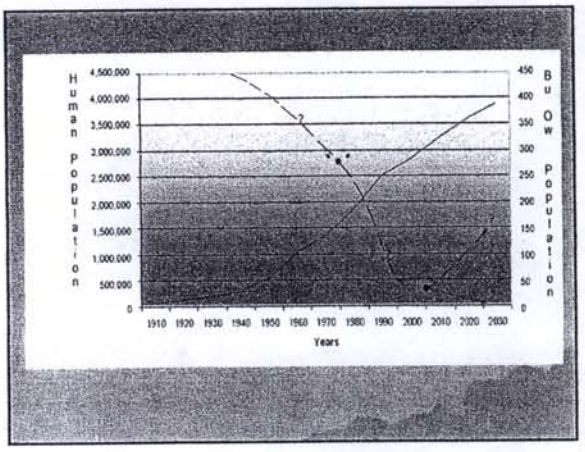
RAPTORS AS ENVIRONMENTAL MONITORS

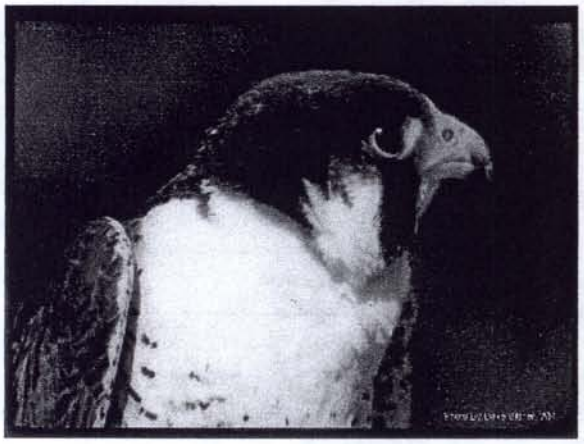
- Top Predators - reflect much of ecosystem's health
- Specialized – selectively hypersensitive to environmental changes
- Widespread - different raptor species associated with different food chains and habitats
- Result - Differential shifts in species composition/diversity reflect different environmental changes
- We have a valuable baseline – perspective on normal variation

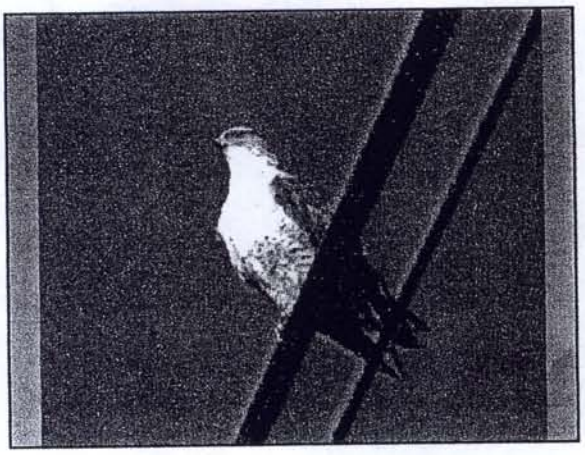

THE BASELINE STUDY

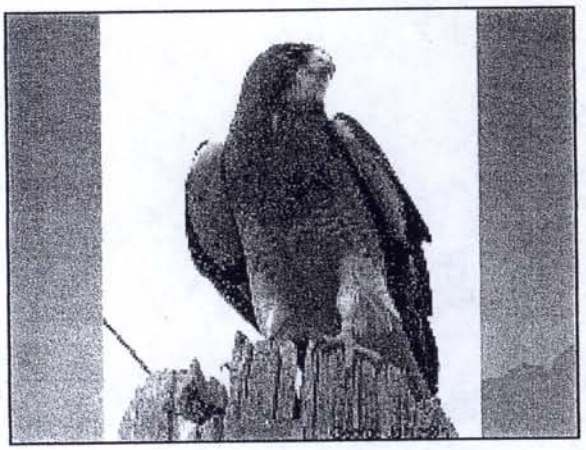

THE "TARGET" RAPTOR SPECIES




Human population
Bow population
Years
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
450
400
350
300
250
200
150
100
50
0
1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030





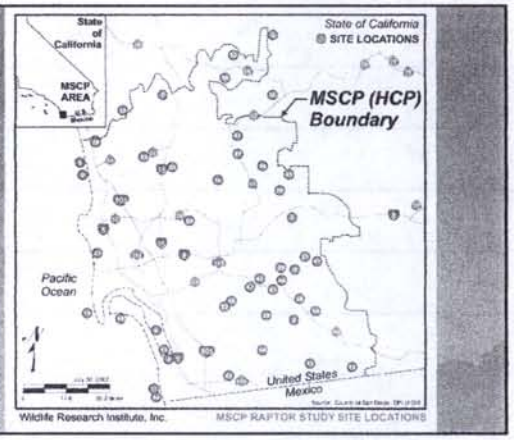


OBJECTIVES

- Determine sites for long-term monitoring
- Recommend monitoring protocol
- Identify future management needs, research, and resource enhancement opportunities

INITIAL QUESTIONS

- Frequency?
- Priority species?
- Protocol?
- Areas to be surveyed?

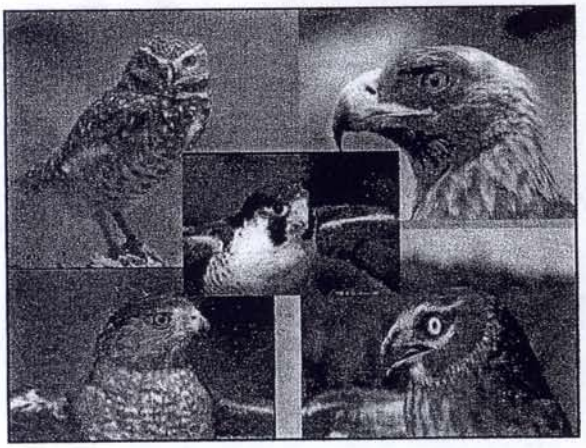


GENERAL METHODS

- 45 Study Sites
- Breeding
  - 3 Surveys/year (min.)
  - Timing variable
- Wintering
  - 3 Surveys/year (min.)
  - Dec.-Feb.

RESULTS OF 2001-2003 BREEDING SURVEYS

- 15 Raptor Species
- 5 of 8 Target Raptor Species



RAPTOR MONITORING PROTOCOL

The *Perfect* Monitoring Plan

- Representative of habitats and issues
- Inclusive of important species
- Responsive to MSCP monitoring objectives
- Consider logistics and safety
- **Able to detect change (vs.)**
- **Affordable**

ULTIMATE GOAL

- Evaluate *effectiveness* of MSCP

OBJECTIVES

- Document raptor conservation
- Document raptor population changes
- Clearly describe new biological data collected
- Evaluate impacts of land use changes
- Evaluate MSCP management activities
- Identify enforcement difficulties

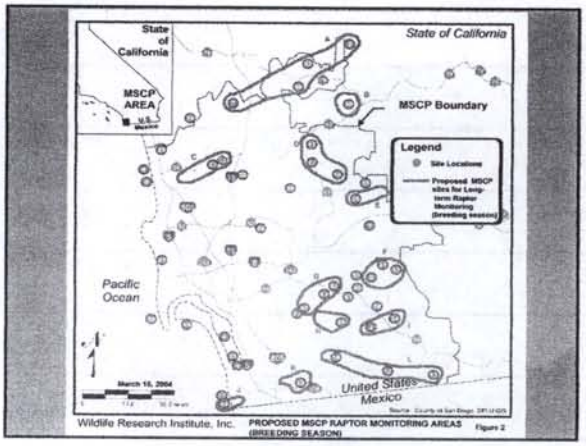
RECOMMENDED RAPTOR SURVEYS

- Breeding Season Survey
- Winter Survey
- Single Species (GE) Survey

Breeding and Wintering Surveys (See App. C)

- Timing (months/time of day)
- Equipment/Supplies
- Weather
- What to note/standardized acronyms
- Control numbering
- Enforcement/mgmt. issues
- Records mgmt.
- Data analysis

BREEDING SEASON



THE *IDEAL* SINGLE SPECIES 2-PHASED SURVEY (Steenhof 1987)

- 1st - "Activity Survey" (Fraser et al. 1983)
  - Count # of pairs associated with nesting territories
  - Count # eggs (if possible)
- 2nd – "Productivity Survey" (Fraser et al. 1983, Postupalsky 1983)
  - Count # successful pairs
  - Count # fledgling-aged young

GENERAL METHODS (Both Breeding and Wintering)

- Vehicle-based
- 2 Observers
- All raptors

BREEDING SEASON SURVEY

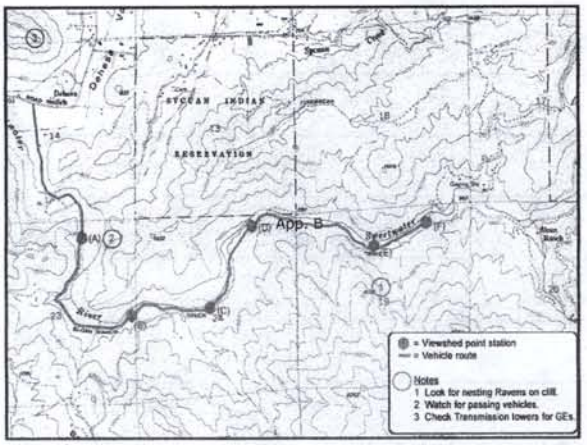
- 12 RMAs
- Roadside and viewshed approach
- Initial surveys 10-14 days apart
- Fine-tune later surveys
- 6 surveys (December-May)
- Initially 1x/3 years (for 3 cycles), then re-evaluate

BREEDING SEASON SURVEYS (See App. C)

- Timing (months/time of day)

BREEDING SEASON SURVEYS Approximate Dates

1. Late December
2. Mid-January
3. Mid-February
4. March
5. Mid-April
6. Mid-May

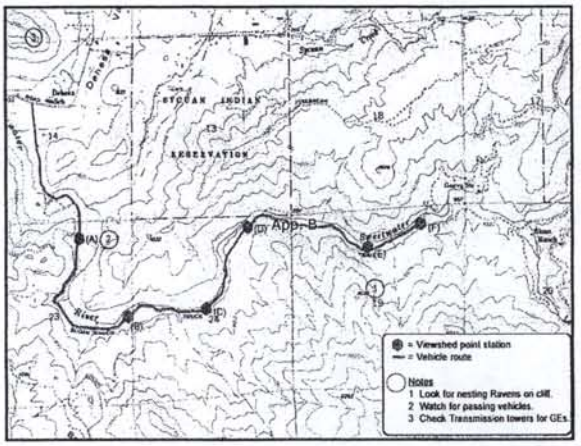


What to Note

- Sightings of all raptors and CRs
- Acronyms/Definitions (See App. C-2)
- Note specific location where 1st seen
- Age, sex, unusual plumage
- Bands (LM, RM, color/sequence)
- Patagial, etc. markers
- Movement (direction/speed)
- Avoid duplicate counting
- Courtship/nesting behavior
- Other behavior
- Other unique spp. & observations

What to Note

- Nest (value of winter observations)
  - Location
  - Tree species
  - Height (of tree and nest)
  - Dimensions of nest
  - Active? (fresh greenery, young, whitewash, adult presence, etc.)



What to Note

- Sightings of all raptors and CRs
- Acronyms/Definitions (See App. C-2)
- Note specific location where 1st seen
- Age, sex, unusual plumage
- Bands (LM, RM, color/sequence)
- Patagial, etc. markers
- Movement (direction/speed)
- Avoid duplicate counting
- Courtship/nesting behavior
- Other behavior
- Other unique spp. & observations

What to Note

- Nest (value of winter observations)
  - Location
  - Tree species
  - Height (of tree and nest)
  - Dimensions of nest
  - Active? (fresh greenery, young, whitewash, adult presence, etc.)

Control Numbering

- *Site-specific* number sets
- 2 Parts (Alpha-numeric)
  - Note Species (RT, CH, RS, BO, etc.)
  - Then sequence number for that species

- First bird—RT01
- Second bird—CR01
- Third bird—RT02
- Fourth bird—CH01
- Fifth bird—CH02
- Stick nest (Sp.?)—SN01

BREEDING SEASON SURVEYS (See App. C)

- Timing (months/time of day)
- Equipment/Supplies
- Weather
- What to note/standardized acronyms
- Control numbering
- **Enforcement/mgmt. issues**

Enforcement Issues

- Note issue
- Identify corrective action, if possible
- Report significant problems to PM/superior ASAP (w/in 24 hrs.)

BREEDING SEASON SURVEYS (See App. C)

- Timing (months/time of day)
- Equipment/Supplies
- Weather
- What to note/standardized acronyms
- Control numbering
- Enforcement/mgmt. issues
- **Records mgmt.**

Records Management

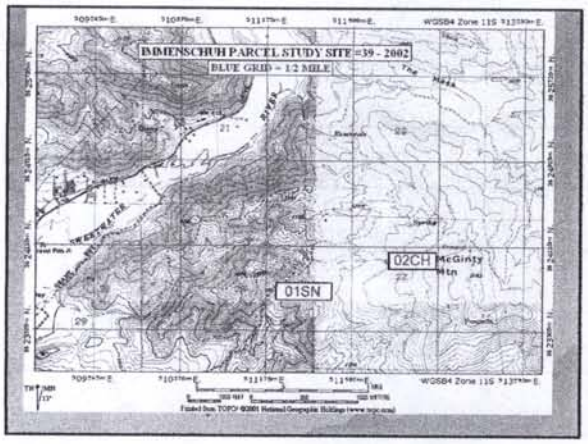
- Keep 2-holed punched field forms and maps *affixed* in individual Study Site Folders
- Keep Study Folders in secure file box
- Copy field forms and maps weekly
- Keep copies in a separate safe place

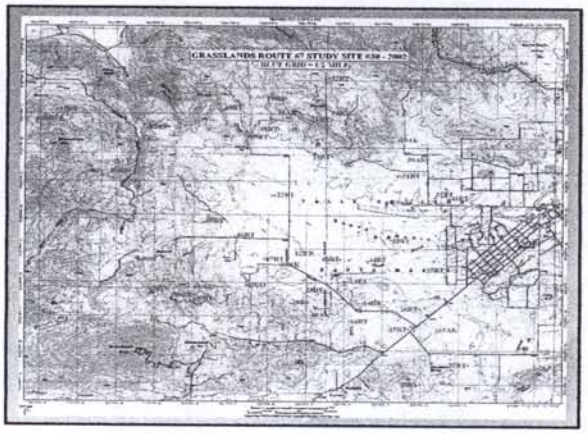
BREEDING SEASON SURVEYS (See App. C)

- Timing (months/time of day)
- Equipment/Supplies
- Weather
- What to note/standardized acronyms
- Control numbering
- Enforcement/mgmt. issues
- Records mgmt.
- **Data analysis**

Data Analysis

- Compare all data sheets/maps for a site
- Create a summary map, based on reasonable biological insight and assumptions
- Indicate nest location or assumed center of courtship/territorial behavior
- Provide CDFG/USFWS report/data copy





WINTER SEASON

RESULTS OF 2001-2003 Winter (Dec.-February) Surveys

- 20 Raptor Species
- 7 of 8 *Target* Raptor Species
- 819 Individuals (all raptors)
- 154 Individuals (target species)
- 334 Ravens

WINTER SEASON SURVEY GENERAL METHODS

- Vehicle-based
- 2 Observers
- All raptors

WINTER SEASON SURVEY

- Roadside census
- Established route
- Coastal focus
- Initially-1x/3 years (for 3 cycles), then re-evaluate
- 3 Surveys (December-Feb.)

"WINTER" SEASON SURVEY
Approximate Dates
(remember our latitude!)

1. Late December
2. Mid-to-late January
3. Mid-to-late February

What to Note

- Sightings of all raptors and CRs
- Acronyms/Definitions (See App. C-2)
- Note specific location where 1st seen
- Age, sex, unusual plumage
- Bands (LM, RM, color/sequence)
- Patagial, etc. markers
- Avoid duplicate counting
- Movement (direction/speed)
- Courtship/nesting behavior (GE, RT, GO, RS, WK)
- Other behavior/interesting observations

What to Note

- Nest (value of winter observations)
  - Location
  - Tree species
  - Height (of tree and nest)
  - Dimensions of nest
  - Active? (fresh greenery, young, whitewash, adult presence, etc.)

RAPTOR MONITORING-What's been learned?

- "Target Species" may be too limiting and may not reflect the broader issues
- Value of using an "umbrella" species, like the GE
- Consistency (data collection, etc.) *incredibly* important
- Consistent monitoring *abilities*
- Set qualifications/workshop standards


THANK YOU
MSCP Partners !

RAPTOR TECHNIQUES WORKSHOP

APPENDIX A

Participants

P.O. Box 2209 • Ramona, CA 92065 • Ph (760) 789-3992 • Fax (760) 789-0131

RAPTOR TECHNIQUES WORKSHOP

APPENDIX B

Raptor Bibliography

P.O. Box 2209 • Ramona, CA 92065 • Ph (760) 789-3992 • Fax (760) 789-0131

APPENDIX B

RAPTOR BIBLIOGRAPHY

Bald Eagle

Anderson, D.W. and J.J. Hickey. 1972. Eggshell changes in certain North American birds. Proc. Int. Ornithol. Congr. 15:514-540.

Buehler, D.A. 2000. Bald Eagle *Haliaeetus leucocephalus*. *In* The Birds of North America, No. 506. (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, D.C. 40 pp.

Buehler, D.A., T.J. Mersmann, J.D. Fraser, and J.K.D. Seegar. 1991. Effects of human activity on Bald Eagle distribution on the northern Chesapeake Bay. J. Wildl. Manage. 55(2):282-290.

California. Department of Fish and Game. 1980. Bald Eagle *Haliaeetus leucocephalus* At the Crossroads. 89-90 pp.

California. Department of Fish and Game. 1982. Bald Eagle. *Haliaeetus leucocephalus* California's Wildlife. 2:122 p.

Dawson, W.L. 1923. The Southern Bald Eagle. *In* The Birds of California, Vol. 3. South Moulton Company, San Diego, Calif. Student's ed. 1712-1717 pp.

Detrich, P.J., D.K. Garcelon. 1986. Criteria and habitat evaluation for Bald Eagle reintroduction in coastal California. The Resources Agency Department of Fish and Game. 1-32 pp.

Detrich, P. J. 1981. Historic range of breeding Bald Eagles in California. Unpubl. Report., Redding, California. California State University, Chico 17 pp.

Detrich, P.J. 1986. Status and distribution of the Bald Eagle in California. MS Thesis, California State University, Chico 112 pp.

Forbis, L.A., B. Johnston, A. M. Camarena, and D. McKinney. 1977. Bald Eagle-habitat management guidelines. U.S.D.A. Forest Service, California Region. 60 pp.

Gerrard, J.M. and G.R. Bortolotti. 1998. The Bald Eagle: haunts and habits of a wilderness monarch. Smithsonian Inst. Press, Washington, D.C.

Green, N. 1985. The Bald Eagle. Audubon Wildlife Report. 508-529 pp.

Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. *Pacific Coast Avifauna* 27:17, 106.

Harmata, A.R. 1993. Heavy metal and pesticide contamination of Bald and Golden Eagles in the western United States. Unpubl. USEPA, December 1993. 43 pp.

Hastings, B. and C. Comp. 1988. Midwinter Bald Eagle survey report. National Wildlife Federation, Washington, D.C., 1986-1988.

Henny, C.J. and R.G. Anthony. 1989. Bald Eagle And Osprey. Western Raptor Mgmt. Symposium and Workshop. 12:317.

Howell, A.H. and F.L. Jaques. 1932. Florida bird life. Florida Department of Game and Fresh Water Fish. 182-183 pp.

Institute for Wildlife Research. 1989. Midwinter Bald Eagle survey report. National Wildlife Federation, Washington, D.C.

Jacobson, S.L. 1987. Bald Eagle habitat capability model. [Second draft.]. Unpubl. Report. U.S. Forest Service, Shasta-Trinity National Forest, Redding, California. 35 pp.

Jones and Stokes Associates, 1982. Investigation of wintering Bald Eagles at Lake Mathews, Riverside County, California. Jones & Stokes, Inc., Sacramento, CA. (Prepared for the Metropolitan Water District of Southern California)

Jurek, R.M. 1979. Southern Bald Eagle. Job Progress Report. State of California The Resource Agency, Department of Fish and Game.

Jurek, R.M. 1982. Endangered, threatened and rare wildlife. Job Progress Report. State of California The Resource Agency, Department of Fish and Game.

Jurek, R.M. 1982. Endangered, threatened and rare wildlife. Job Final Report. State of California, The Resource Agency, Department of Fish and Game.

Jurek, R.M. 1988. Five year status report Bald Eagle. State of California The Resource Agency Department of Fish and Game. 1-15 pp.

Jurek, R.M. 1990. California Bald Eagle breeding population survey and trend, 1970-90. State of California, Dept. of Fish and Game. 16 pp.

Jurek, R.M., D.M. Hom, and C. Roberts 1986. California mid winter Bald Eagle survey. State of California, The Resource Agency, Department of Fish and Game. 4pp.

Knight, R.L. 1984. Responses of wintering Bald Eagles to boating activity. *J. Wildl. Manage.* 48(3): 999-1004 pp..

Lehman, R.N. 1979. A survey of selected habitat features of 95 Bald Eagle nest sites in California. Wildl. Management Branch Administrative Report 79-1:1-23

Lehman, R.N. 1981. Breeding status and management of Bald Eagles in California. State of California The Resources Agency, Department. of Fish and Game. 83-1:1-24

Lincer. J.L. 1981. "Bald Eagle Management at the Local Government Level." Paper presented at the 45th Annual Meeting of the Florida Academy of Sciences, April 30-May 2, Orlando, FL. *Florida Scientist*, 44 (1): 36-37.

Lincer, J.L. 1982. "Bald Eagle: Symbol of Symbols." Invited editorial for ENFO Newsletter (a publication of the Florida Conservation Foundation), Vol. 82, No. 3. Winter Park, FL.

Lincer, J.L. 1982. "Protecting Endangered Species at the Local Governmental Level." Paper presented at the 46th Annual Meeting of the Florida Academy of Sciences, April 22-24, DeLand, FL. *Florida Scientist*, 45(1): 40.

Lincer, J.L. (Consulting Editor). 1989. Raptor Habitat Management Under the U.S. Bureau of Land Management Multiple-Use Mandate by R.R. Olendorff *et al.* Raptor Research Report No. 8, Raptor Research Foundation, Inc. Allen Press. 80 pp.

Lincer, J.L., R.G. Brooks and B.L. Valla. 1991. "Managing Bald Eagles at the Local Level: A Prototypical Ordinance." Presented by J.L. Lincer at the Raptor Research Foundation Conference, November 6-9, Tulsa, OK.

Lincer, J.L., W.S. Clark and M. Le Franc. 1979. Working Bibliography of the Bald Eagle. A comprehensive guide to the literature on the bald eagle. 2,000 refs. 268 pages with permuted keyword sort for index. National Wildlife Federation, Washington, D.C.

Lincer, J.L., B. Millsap and G. Holder. 1988. "Bald Eagle Buffer Zones: Do They Work in Florida?" Presented at Raptor Research Foundation Annual Meeting, October 26-29, Minneapolis, MN.

McWilliams, S.R., J.P. Dunn, and D.G. Raveling. 1994. Predator-prey interactions between eagles and cackling Canada and Ross' Geese during winter in California. *Wilson Bull.* 106:272-288.

National Wildlife Federation. 1989. Proceedings of the Western Raptor Management Symposium and Workshop. National Wildlife Federation, Washington, D.C., Series No. 12. October 26-28, 1987, Boise, Idaho.

Simmons, T., S. K. Sherrod, M.W. Collopy and M. A. Jenkins. 1988. Restoring the Bald Eagle. *American Scientist* 76(3): 252-260.

Smith, B. 1989. Plan for Bald Eagles sought at Cachuma. Santa Barbara News Press (Santa Barbara, CA) (March 6):A1-A5.

Solomon, S. and T. Newlon. 1991. Living with eagles. Status report and recommendations. Northwest Renewable Resources Center. 9-47 pp.

Stalmaster, M.V. 1987. The Bald Eagle. Universe Books, New York.

Stalmaster, M.V. and J.R. Newman. 1978. Behavioral responses of wintering Bald Eagles to human activity. *J. Wildl. Manage*. 42(3): 506-513.

Steenhof, K. 1988. Identifying potential Bald Eagle nesting habitat; a review of the state of the art. pp. 31-59. *In* D. K. Garcelon and G. W. Roemer [eds.], Proceedings of the International Symposium on Raptor Reintroduction 1985. Institute for Wildlife Studies, Arcata, CA.

Steinhart, P. 1990. Bald Eagle. *Haliaeetus leucocephalus* California. Wildlife. heritage: threatened and endangered animals in the golden state California Department of Fish and Game. 15-17 pp.

Thompson, R.A. 1973. Bald Eagle nesting surveys in California. United States Fish and Wildlife Service. .48 pp.

U.S Fish and Wildlife. 1994. Federal Register. Reclassify the Bald Eagle from endangered to threatened in most of the lower 48 states. 59: 132.

Wood, P.B., D.A. Buehler, and M.A. Byrd. 1990. Raptor status report-Bald Eagle. *In*: Proceedings of the southeast raptor management symposium and workshop (B. Giron Pendleton, ed.). National Wildlife Federation. Washington, D.C. Pp. 13-21.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report – NCCP/MSCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

Burrowing Owl

Allaback, M., J. Barclay. 1994. Burrowing Owl *Speotyto (Athene) cunicularia* Reference Manual. Proceedings of Burrowing Owl consortium of August 1993.

Anderson, S.H., L.W. Ayers, J.A. Dechant, M.T. Green, W.H. Howe, S.L. Jones, D.S. Klute, D.K. Rosenberg, S.R. Sheffield, and T.S. Zimmerman. 2001. Status assessment and conservation plan for the western Burrowing Owl in the United States. Adminstrative Report. U.S. Department of Interior, Fish and Wildlife Service, Denver, CO.

Banuelos, G. 1997. The one-way door trap: an alternative trapping technique for Burrowing Owls. *J. Raptor Res.* 9:122-124.

Barclay, J., D. Plumpton and B. Walton 1998. (The California Burrowing Owl consortium) Burrowing Owl conservation in California: issues and challenges. Poster presented at Second International Burrowing Owl Symposium. The Raptor Research Foundation, Inc. Ogden, UT.

Benson, P.C. 1981. Large raptor electrocution and power pole utilization: a study in six western states. Ph.D. thesis, Brigham Young University, Provo, UT.

Bent, A.C. 1938. Life histories of North American birds of prey. U.S. Natl. Mus. Bull. No. 170.

Best, T.R. 1969. Habitat, annual cycle, and food of burrowing owls in southwestern New Mexico. M.S. Thesis, New Mexico State Univ., Las Cruces. 34pp.

Bloom, P.H. 1994. Ramona Airport Spring Raptor Census Report (*in* BFMA. 1997).

BFMA (Brian F. Mooney Associates). 1997. Ramona Airport, Airport Master Plan Improvements, Ramona, CA. Vol. 1. Prepared for the County of San Diego and the U.S. Department of Transportation. March.

Boggs, D.F. 1980. Respiratory adaptations of a burrow-dwelling bird to hypoxia and hypercarbia. Ph.D. thesis, University of Montana.

Buchanan, J.T. 1997. A spatial analysis of the Burrowing Owl (*Speotyto cunicularia*) population in Santa Clara County, California, using a geographic information system. pp. 90-96. In Biology and conservation of owls of the northern hemisphere; second international symposium. February 5-9, 1997. Winnipeg, Manitoba, Canada, (J.R. Duncan, D.H. Johnson, and T.H. Nicholls, eds.). U.S. Department of Agriculture. Forest Service. North Central Forest Experiment Station, St. Paul, MN.

Burrows, C.W. 1989. Diets of five species of desert owls. *Western Birds.* 20:1-10.

Butts, K.O. 1973. Life History and Habitat Requirements of Burrowing Owls in Western Oklahoma Master's Thesis. Oklahoma State University, Stillwater. 188 Pp.

CBOC (California Burrowing Owl Consortium). 1997. Burrowing Owl Survey Protocol and Mitigation Guidelines. *In* Lincer and Steenhof. 1997. The Burrowing Owl, its Biology and Management. *Raptor Res. Report* 9: Appendix B.

CDFG (California Department of Fish and Game). 1995. Staff Report on Burrowing Owl Mitigation. Memorandum to Division Chiefs and Regional Managers from C.F. Raysbrook, Interim Director, California Department of Fish and Game. October 17.

Clark, Greg. 2001. Burrowing Owl artificial next box project an Arizona partners in flight habitat substitution project. Website citation: www.mirror-pole.com/burr_owl/bur_owl1.html.

Clark, R.J., J.L. Lincer, and J.S. Clark. 1997. A Bibliography on the Burrowing Owl (*Speotyto cunicularia*). *In* The Burrowing Owl, Its Biology and Management. Proceedings of the First International Burrowing Owl Symposium. Raptor Research Reports No. 9:145-170.

Climpson, J.T. 1977. Feeding ecology and selected other aspects of the behavior and ecology of the Burrowing Owl (*Speotyto cunicularia*). M.S. thesis, Washington State University, Pullman, WA.

Colvée, Salvador. 1996. Ecologia alimentaria del Mochuelo de Hoyos (*Athene cunicularia*) en la Peninsula de Paraguana. MS. Dissertation. Universidad Simon Bolivar. 34 pp.

Coulombe, H.N. 1968. Energy exchange in the biology of the Western Burrowing Owl, *Speotyto cunicularia*. Ph.D. thesis. University of California at Los Angeles, CA.

Coulombe, H.N. 1971. Behavior and population ecology of the Burrowing Owl, *Speotyto cunicularia*, in the Imperial Valley of California. *Condor*. 73:162-176.

Delevoryas, P. 1997. Relocation of Burrowing Owls during courtship period. *In* Lincer and Steenhof (Eds.). 1997. The Burrowing Owl, its Biology and Management *Raptor Res. Reports*, 9:138-144.

DeSante, D.F., E.D. Ruhlen, S. L. Adamany, K.M. Burton, and S. Amin. 1997. A census of burrowing owls in Central California in 1991. *In* Lincer, J. L. and K. Steenhof. 1997. The Burrowing Owl, Its Biology and Management. *Raptor Research Report* Number 9:38-48.

DeSante, D.F., E.D. Ruhlen, and D.K. Rosenberg. 2002. Density and Abundance of Burrowing Owls in the agricultural matrix of the Imperial Valley, California. *Press, Studies in Avian Biology*. 9 pp.

Drost, C. A and R. C. McCluskey. 1992. Extirpation of alternative prey during a small rodent crash. *Oecologia* (Berlin) 92(2):301-304

Duxbury J.M. and G.L. Holroyd. 1995. A standardized, roadside Burrowing Owl survey technique. Canadian Wildlife Service, Environment Canada. Department of Renewable Resources. 7 pp.

Duxbury, J.M. and G.L. Holroyd. 1998. A Standardized, Roadside Burrowing Owl Survey Technique. Paper presented at The Second International Burrowing Owl Symposium held in conjunction with the 1998 Annual Raptor Research Foundation Meeting. 29-30 September. Ogden, UT.

Holroyd, G.L. and T.I. Wellicome. 1998. Report on the Burrowing Owl Conservation Workshop. Pages 612-615 *in* Duncan, J.R., D.H. Johnson and T.H. Nicholls (eds.). Biology and Conservation of Owls of the Northern Hemisphere, Second International Symposium, February 5-9, 1997, Winnipeg, Manitoba, Canada

EDAW. 2001. Wildlife Biological Technical Report for the East Otay Mesa Specific Plan Amendment Area, San Diego, California. Prepared for County of San Diego Department of Planning and Land Use. October.

Feeney, L.R. 1997. Burrowing Owl site tenacity associated with relocation efforts. *J. Raptor Res.* 9:132-137.

Gervais, J.A., D.K. Rosenberg, and R.G. Anthony. 2001. Burrowing Owl space use and pesticide exposure risk in an agricultural landscape. *J. Wildl. Manage*. 31 pp.

Green, G. A., R. E., Fitzner, R. G Anthony, L E Rogers. 1993. Comparative diets of burrowing owls in Oregon and Washington. *Northwest Science* 67(2): 88-93.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. Contribution from the Museum of Vertebrate Zoology of the University of California. Reprinted by Artemisia Press. Lee Vining, CA. 617 pp.

Haley, K.L. 2002. The role of food limitation and predation on reproductive success of Burrowing Owls in Southern California. (Thesis) submitted to Oregon State University. 47 pp.

Halverson, W.S. and A.C. Crabb. (Eds). 1994. Natural history and protection of Burrowing Owls. Proceedings of the Sixteenth Vertebrate Pest Conference. March 1-3, 1994. Santa Clara, California. Published at University of California, Davis. 83-86.

Haug, E.A. and A.B. Didiuk. 1981. Use of recorded calls to detect Burrowing Owls. *J. Field Ornithol*, 64(2):188-194.

Haug, E.A., B.A. Millsap, and M.S. Martell. 1993. Burrowing Owl (*Speotyto cunicularia*). *In* The Birds of North America, No. 61:2-20. (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, D.C.

HELIX Environmental Planning, Inc. 1999. San Diego Air Commerce Center at Brown Field Airport Master Plan Biological Assessment. United States Department of Transportation Federal Aviation Administration. 20 pp.

HELIX Environmental Planning, Inc. 2001. Draft EIR/EIS of Route 905. Prepared for Federal Highway Administration and Caltrans.

Hennings, L.T. 1970. Life history of the Burrowing Owl at the Oakland Airport, Alameda County, California. MS. Dissertation, University of California, Berkeley.

Henny, C.J. and L.J. Blus. 1981. Artificial burrows provide new insight into Burrowing Owl nesting biology. *Raptor Res.* 15:82-85.

Holroyd, G.L. and H. Trefry. 1998. Migration and winter biology of Burrowing Owls in the USA. *In* Second international Burrowing Owl symposium. The Raptor Research Foundation, Inc. 3 pp.

Holroyd, G.L., R. Rodriguez-Estrella, and S.R. Sheffield. 2001. Conservation of the Burrowing Owl in Western North America: issues, challenges, and recommendations. *J. Raptor Res.* 35(4):399-407.

Holyroyd, G.L. 1998. A Burrowing Owl conservation action plan – what should it contain? *In* Second international Burrowing Owl symposium. The Raptor Research Foundation, Inc. 5 pp.

Hunting, K. 1998. Mitigating impacts to Burrowing Owl populations: case studies in California. *In* Second international Burrowing Owl symposium. The Raptor Research Foundation, Inc. 4 pp.

James, P.C. and R.H.M. Espie. 1997. Current status of the Burrowing Owl in North America: an agency survey. *J. Raptor Res.* 9:3-5.

James, P.C., T.J. Ethier, and M.K. Toutloff. 1997. Parameters of a declining burrowing owl population in Saskatchewan. *In* Lincer and Steenhof (Eds.). 1997. The Burrowing Owl, its Biology and Management *Raptor Res. Reports*, 9:34-37.

Johnson, B.S. 1988. Viability of small populations of the burrowing owl. *Bull. Ecol. Soc. Amer.* Suppl. 69 (2):182.

Johnson, B.S. 1992. Effects of demography, mating patterns, and sociality on the population genetics and dynamics of the Burrowing Owl Athene cunicularia. Doctoral Dissertation. University of California, Davis.

Johnson, B.S. 1997. Characterization of population family genetics of the burrowing owl by DNA fingerprinting with pV47-2. *In* Lincer and Steenhof (Eds.). 1997. The Burrowing Owl, its Biology and Management *Raptor Res. Reports*, 9:58-63.

Landry, R.E. 1979. Growth and Development of the Burrowing Owl, *Athene Cunicularia*. Long Beach, California State University. MA Dissertation. 74 pp

Lehman, R.N., L.B. Carpenter, K. Steenhof, and M.N. Kochert. 1991. Assessing relative abundance and reproductive success of shrub steppe raptors. *J. Field Ornithol.* 69(2)244-256.

Lincer, J.L. 1997. Toward an action plan: *In* Lincer and Steenhof (Eds.). 1997. The Burrowing Owl, its Biology and Management *Raptor Res. Reports*, 9:5:11-13.

Lincer, J.L. and K. Steenhof (Eds.). 1997. The Burrowing Owl, its biology and management including the proceedings of the first international Burrowing Owl symposium. Raptor Res. Rep. 9:1-177.

Lincer, J.L., R.J. Clark and J.S. Clark. 1998. Toward an update on Clark, Lincer and Clark's bibliography on *Speotyto cunicularia.* Presented at the second international Burrowing Owl symposium, Ogden, Utah. September 29-30, 1998.

Lincer, J.L., R.J. Clark and J.S. Clark. 1998 Towards a Burrowing Owl bibliography. *In* Second international Burrowing Owl symposium. The Raptor Research Foundation, Inc. 2 pp.

Martell, M.S. 1991. Grassland owls. Pp. 96-104 in Proceedings of the Midwest raptor management symposium and workshop (B.G. Pendleton and D.L. Krahe, Eds.). National Wildlife Fed. Sci. Tech. Series, No. 15. Washington, D.C.

MacCracken, J.G., D.W. Uresk, and R.M. Hansen. 1985. Vegetation and soils of burrowing owl nest sites in Conata Basin, South Dakota. *Condor* 87:152-154.

Merkel, K.W. and D.A. Mayer. 2000. 1999 Maintenance and monitoring report for the artificially created burrows for the Burrowing Owl (*Speotyto cunicularia*) at the Otay Water District use area property, Chula Vista, California. Merkel & Associates, Inc. 99-046-01.

Millsap, B.A., M.I. Bellocq, and M. Mullenix. 1997. Overview of literature on the burrowing owl. *In* Lincer and Steenhof (Eds.). 1997. The Burrowing Owl, its Biology and Management *Raptor Res. Reports*, 9:6-10.

Ogden (Ogden Environmental and Energy Services Co.). 1992. Otay Ranch Raptor Management Study. Submitted to Otay Ranch Project Team, Chula Vista, California.

Ogden. 1996. Biological Monitoring for the Multiple Species Conservation Program. Prepared for the City of San Diego, California Department of Fish and Game, and U.S. Fish and Wildlife Service. Revised 25 April.

Palacios, E., D.W. Anderson, E. Mellink, and S. Gonzalez-Guzman. 2000. Distribution and abundance of Burrowing Owls on the peninsula and islands of Baja California. *Western Birds.* 31:89-99.

Poulin, R.G., T. Wellicome, R. Longmuir, and Dave Scobie. No date. Burrowing Owl nest box: construction and installation procedures. Saskatchewan Environment and Resource Management. Fish and Wildlife Branch.

Priest, J.E. 1997. Age identification of nestling Burrowing Owls. *J. Raptor Res.* 9:125-127.

Recon. 2001. Otay Mesa Generating Project Biological Resources Mitigation Implementation and Monitoring Plan. Prepared for Otay Mesa Generating Company. 5 September. (Note: 2002-2003 updates on burrowing owl distribution based on personal communications between Fred Edwards and David Mayer, CDFG.)

Raptor Research Foundation, Inc. 2001. The Second International Burrowing Owl Symposium. *J. Raptor Res.* 35(4): 269-417.

Rich, T. 1984. Monitoring burrowing owl populations: implications of burrow re-use. *Wildl. Soc. Bull.* 12:178-180.

Rosenberg, D.K. and K.L.Haley. 2000. The ecology of Burrowing Owls in the agroesystem of the Imperial Valley, California.. *In* Press, Studies in Avian Biology. 40 pp.

Rosier, J.R., N.A. Ronan, and D.K. Rosenberg. 2001. Breeding season survival and dispersal of Burrowing Owls in an extensive California grassland. *Review: Condor.* 16 pp.

Rowe, Matthew P. 1984. California ground squirrels and their burrow coinhabitants: communicatory coevolution between predators and prey. Ph.d. Dissertation. Davis, University of California. 110 pp

Sheffield, S.R. 1998. Conservation of the Burrowing Owl in north America: problems, issues, and solutions. *In* Second international Burrowing Owl symposium. The Raptor Research Foundation, Inc. 5 pp.

Smith, B.W. and J.R. Belthoff. 1998. Burrowing Owls and development: results of short-distance nest burrow relocations to avoid construction impacts. *In* Second international Burrowing Owl symposium. The Raptor Research Foundation, Inc. 4 pp.

Smith, B.W. and J.R. Belthoff. 1999. Ectoparasites on Burrowing Owls: Potential effects on nest-site reuse and growth, body condition, and survival of juveniles. *In* Raptor Research Foundation Annual Meeting. November 3-7, 1999, La Paz, Baja California Sur, Mexico 12 pp.

Smith, B.W. and J.R. Belthoff. 2001. Burrowing Owls and development: short-distance nest burrow relocation to minimize construction impacts. *The Journal of Raptor Research.* 35(4):385-391 pp.

Snyder, N.F.R. and J. Wiley. 1976. Sexual size dimorphism in hawks and owls of North America. *Ornithol. Monogr.* No. 20.

Takats, D.L., G.L. Holroyd, J.R. Duncan, K.M. Mazur, C.M. Francis, R.J. Cannings, and W. Harris. 1999. Canadian nocturnal owl monitoring. Proceedings of National Nocturnal owl Monitoring meeting in Winnipeg on September 27-28, 1999. 16 pp.

Thomsen, L. 1971. Behavior and ecology of Burrowing Owls on the Oakland Municipal Airport. *Condo.* 73:177-192.

Trulio, L. 1995. Passive relocation: a method to preserve Burrowing Owls on disturbed sites. *J. Field Ornithol.* 66(1):99-106.

Trulio, L. 1996. The western Burrowing Owl (*Speotyto cunicularia hypugaea*). BO Document Department of Geography and Environmental Studies, San Jose State University. 1-17 pp.

Trulio, L. 1997. Burrowing Owl demography and habitat use at two urban sites in Santa Clara County, California. *J. Raptor Res. Report.* 9:84-89.

Trulio, L. 1998. The Burrowing Owl as an indicator of CEQA effectiveness and environmental quality in the Silicon Valley. *In Environmental Monitor. 4-5 pp.*

Trulio, L. and D. Rosenberg. 1998. Research on the demographic characteristics of Burrowing Owl populations in California: a progress report. *In* Second international Burrowing Owl symposium. The Raptor Research Foundation, Inc. 3 pp.

U.S. Fish & Wildlife Service. 2001. Draft of Status assessment and conservation plan for the western Burrowing Owl in the United States. United States Department of the Interior, U.S. Fish & Wildlife. 145 pp.

Walton, B.J. 1998. Burrowing Owl – Can the Endangered Species Act help? Presented at Second International Burrowing Owl Symposium. The Raptor Research Foundation, Inc. Ogden, UT. 5 pp.

Wellicome, T.I. and G.L. Holroyd. 2001. The Second International Burrowing Owl Symposium: background and context. *J. Raptor Res.* 35(4): 269-273.

Wellicome, T.I. and R.G. Poulin. 1998. Can we manage reproductive output in Burrowing Owls by managing their prey? *In* Second international Burrowing Owl symposium. The Raptor Research Foundation, Inc. 4 pp.

Wellicome, T.I., G.L. Holroyd and H.E. Trefry. 1999. Are breeding populations of the Western Burrowning owl (*Athene cunicularis hypugaea*) declining throughout North America. *In* Raptor Research Foundation Annual Meeting. November 3-7, 1999, La Paz, Baja California Sur, Mexico. 13 pp.

Winchell, C. S. 1994. Natural history and protection of burrowing owls. Proceedings of the Vertebrate Pest Conference 16: 83-86.

Woollett, J.S. and M.G. van Hattem. 1999. Western burrowing owl demographic and biogeographic traits in a coastal range of central California. Presented at the Raptor Research Foundation Annual Meeting, 3-7 November 1999. La Paz, Baja, Mexico.

WRI (Wildlife Research Institute, Inc.). 2003. Burrowing Owl Surveys on City of San Diego Properties (for the period January 1, 2001 – March 24, 2003). Prepared for City of San Diego. 24 March.

WRI (Wildlife Research Institute, Inc.). 2005. Burrowing Owl Management and Monitoring Plan Lower Otay Lake Burrowing Owl Management Area. Prepared for City of San Diego. 31 March.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report – NCCP/MSCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

York, M.M., D.K. Rosenberg, and K.K. Sturm. 1997. Diet and food-niche breadth of Burrowing Owls (*Athene cunicularis*). U.S. Fish and Wildlife Service. 21 pp.

Zarn, M. 1974. Burrowing Owl, Report No. 11. Habitat management series for unique or endangered species. Bureau of Land Management, U.S. Department of the Interior, Denver, CO. 25 pp.

Cooper's Hawk

Anderson, D.W. and J.J. Hickey. 1972. Eggshell changes in certain North American birds. Proc. Int. Ornithol. Congr. 15:514-540.

Boal, C.W. and R.W. Mannan. 1998. Nest site selection by Cooper's hawks in an urban environment. *J. Wildl. Manage*. 62:864-871.

Brown, W.H. 1973. Winter population trends in Marsh, Cooper's and Sharp-shinned hawks. *Amer. Birds* 27:6-7.

California Wildlife. 1982. Cooper's hawk *Accipiter cooperii*. *California's Wildlife*. 2:128-129.

DeLong, J. and S.W. Hoffman. 1999. Differential autumn migration of Sharp-shinned and Cooper's Hawks in western North America. *Condor*. 101:674-678.

Iverson, G.C. and M.R. Fuller 1992. Area-occupied survey technique for nesting woodland raptors. Proceedings of the Midwest Raptor Management Symposium and Workshop. Woodland Raptor Surveys Institute for Wildlife Research. National Wildlife Federation Scientific and Technical Series No. 15:1-7.

Lincer, J.L. (Consulting Editor). 1989. Raptor Habitat Management Under the U.S. Bureau of Land Management Multiple-Use Mandate by R.R. Olendorff *et al*. Raptor Research Report No. 8, Raptor Research Foundation, Inc. Allen Press. 80 pp.

Lincer, J.L. and R.J. Clark. 1978. Organochlorine residues in raptor eggs in the Cayuga Lake Basin, New York. *New York Fish Game J.* 25:121-128.

Mosher, J.A. and M.R. Fuller. 1996. Surveying woodland hawks with broadcasts of great horned owl vocalizations. Reprinted from *Wildlife Society Bulletin.* 24(3):531-536.

Mosher, J.A., M.R. Fuller, and M. Kopeny. 1990. Surveying woodland raptors by broadcast of conspecific vocalizations. *J. Field Ornithol.*, 61(4):453-461.

Ogden (Ogden Environmental and Energy Services Co.). 1992. Otay Ranch Raptor Management Study. Submitted to Otay Ranch Project Team, Chula Vista, California.

Remsen, Jr., J.V. 1978. Bird Species of Special Concern in California. California Department of Fish and Game, State of California, The Resources Agency, Department of Fish and Game. Wildlife Mgmt. Branch, Admin. Report No. 78-1. Pp.:31-32.

Risebrough, R.W., R.W. Reiche, D.B. Peakall, S.G. Herman, and M.N. Kirven. 1968. Polychlorinated biphenyls in the global ecosystem. *Nature* 220:1098-1102.

Rosenfield, R.N., J. Bielefeldt, and R.K. Anderson. 1988. Effectiveness of broadcast calls for detecting breeding Cooper's Hawks. *Wildl. Soc. Bull. 16(2):210-212.*

Rosenfield, R.N. and J. Bielefeldt. 1993. Cooper's hawk *Accipiter cooperii.* . *In* The Birds of North America, No. 75 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, D.C. 24pp.

Rosenfield, R.N., J. Bielefeldt, and R.K. Anderson. 2000. Comparative breeding ecology of Cooper's Hawk in urban vs. exurban areas of southeastern Arizona. *J. Wildl. Manage.* 64(2):599-600.

Snyder, H.A and N.F.R. Snyder. 1974. Increased mortality of Cooper's hawks accustomed to man. *Condor.* 76:215-216.

Snyder, N.F.R., H.A. Snyder, J.L. Lincer, and R.T. Reynolds. 1973. Organochlorines, heavy metals and the biology of North American accipiters. *BioScience*, 23(5):300-305.

Walton, B.J., L.R. Mewaldt, and E.V. Johnson. 1976. Observations on Cooper's hawk (*Accipiter cooperii*) populations in California. 1972-1975. Unpubl. Rep. 12 pp.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring

Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report – NCCP/MSCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

Ferruginous Hawk

Atkinson, E.C. 1995. Survey and monitoring guidelines for Ferruginous Hawks in Montana. Raptor Research Center, Boise State University, Boise, Id. Unpubl. Rep. 42 pp.

Ayers, L.W. and S.H. Anderson. 1999. An aerial sightability model for estimating Ferruginous Hawk population size. *J. Wildl. Manage.* 63(1):85-97.

Bechard, M.J. and J.K. Schmutz. 1995. Ferruginous Hawk *Buteo regalis*. The Birds of North America. 172:1-20.

CDFG. 1991. Ferruginous Hawk *Buteo regalis*. Species of Special Concern, California Dept. of Fish and Game. Unpubl. Rep. 13 pp

Garrison, B.A. 1990. Trends in winter abundance and distribution of Ferruginous Hawks in California. *Trans. West. Sect. Wildl. Soc.* 26:51-56.

Lincer, J.L. (Consulting Editor). 1989. Raptor Habitat Management Under the U.S. Bureau of Land Management Multiple-Use Mandate by R.R. Olendorff *et al.* Raptor Research Report No. 8, Raptor Research Foundation, Inc. Allen Press. 80 pp.

Lehman, R.N., L.B. Carpenter, K. Steenhof, and M.N. Kochert. 1991. Assessing relative abundance and reproductive success of shrubsteppe raptors. *J. Field Ornithol.* 69(2)244-256.

McAnnis, D.M. 1990. Home range, activity budgets, and habitat use of Ferruginous Hawks (*Buteo regalis*) breeding in southwest Idaho. MS Thesis, Boise State University, Boise 81pp.

Moritsch, M.Q. 1985. Photographic guide for aging nestling Ferruginous Hawks. Unpubl. Rep. U.S. Bureau of Land Management, Boise, Idaho. 22 Pp.

Ogden (Ogden Environmental and Energy Services Co.). 1992. Otay Ranch Raptor Management Study. Submitted to Otay Ranch Project Team, Chula Vista, California.

Olendorff, R.R. 1993. Status, biology, and management of Ferruginous Hawks; a review. Raptor Res. And Tech. Asst. Center, Spec. Rep. U.S Dept. Interior, Bur. Land Manage., Boise, Id. 84 pp.

Steenhof, K. 1984. Use of an interspecific communal roost by wintering Ferruginous Hawks. *Wilson Bull.* 96:137-138.

Steenhof, K. and M.N. Kochert. 1985. Dietary shifts of sympatric buteos during a prey decline. *Oecologia* (Berlin) 66:6-16.

Tate, J. 1986. The Blue List for 1986. *Am. Birds* 40:227-236.

Tigner, J.R., M.W. Call and M.N. Kochert. 1996. Effectiveness of artificial nesting structures for Ferruginous Hawks in Wyoming. *In* Academic Press Ltd. 15:137-144

Woffinden, N.D. and J.R. Murphy. 1989. Decline of a Ferruginous Hawk population: a 20-year summary. *J. Wildl. Manage.* 53(4):1127-1132.

Woffinden, N.D. No date. A decade long extinction of a central Utah population of the Ferruginous Hawk *Buteo regalis*. Division of Natural Sciences, University of Pittsburgh, PA. Unpubl. Rep. 9 pp.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report – NCCP/MSCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

Golden Eagle

Anderson, D.W. and J.J. Hickey. 1972. Eggshell changes in certain North American birds. Proc. Int. Ornithol. Congr. 15:514-540.

Bittner, J.D. 1997. Golden Eagles in San Diego County. Presented at the Raptor Research Foundation Annual Meeting. Ogden, UT.

Bittner, J.D. and J. Oakley. 1999. Status of Golden Eagles in Southern California. Raptor Research Foundation Conference. Golden Eagle Symposium. November 2. La Paz, Baja California.

Bittner, J.D., J.L. Lincer, J. Oakley, Nick Muscolino, and J. Hannan. 2003. Golden Eagle reproduction in a drought period. Presented at Raptor Research Foundation's Annual Scientific Conference. September 2-7. Anchorage, AK.

Bloom, P. H. 1991. Status of the Golden Eagle population on Marine Corps Base Camp Pendleton. Unpubl. Rep. Santa Ana, California. 21 pp.

California. Department of Fish and Game. 1982. Golden Eagle *Aquila chrysaetos.* California's Wildlife. 2:142 p.

Collopy, M.W. 1983. A comparison of direct observations and collections of prey remains in determining the diet of Golden Eagles. *J. Wildl. Manage.* 47:360-368.

Collopy, M.W. 1983. Foraging behavior and success of Golden Eagles. *Auk* 100:747-749.

Collopy, M.W. 1986. Food consumption and growth energetics of nestling Golden Eagles. *Wilson Bull.* 98:445-458.

Collopy, M.W., and T.C. Edwards Jr. 1989. Territory size, activity budget, and role of undulating flight in nesting Golden Eagles. *J. Field Ornithol.* 60:43-51.

DeSmet, K.D. 1987. Status report on the Golden Eagle *Aquila chrysaetos.* Committee on the status of engangered wildlife in Canada, Ottawa, ON, Status assigned in 1982, reviewed in 1995. Unpubl. Rep.

Dixon, J.B. 1937. The Golden Eagle in San Diego County, California *The Condor.* 39(2)49-56.

Edwards, T.C., Jr., M.W. Collopy, K. Steenhof, and M.N. Kochert. 1988. Sex ratios of fledgling Golden Eagles. *Auk* 105:793-796.

Edwards, T.C., Jr., and M. N. Kochert. 1986. Use of body weight and length of footpad as predictors of sex in Golden Eagles. *J. Field Ornithol.* 57:317-319.

Harlow, D.L. and P.H. Bloom. 1989. Buteos and the Golden Eagle. *In* Western Raptor Management Symposium and Workshop. 102-110 pp.

Harmata, A.R. 1993. Heavy metal and pesticide contamination of Bald and Golden Eagles in the western United States. Unpubl. USEPA, December 1993. 43 pp.

Hinds, K.O. and H. de la Cueva. 1999. Habitat and competitive abilities of the Golden Eagle (*Aquila chrysaetos*), in Sierra San Pedro Martir, Baja California. *In* Raptor Research Foundation Annual Meeting, November 3-7. La Paz, Baja California Sur, Mexico. 20 pp.

Hoechlin, D.R. 1974. Behavioral ecology of nesting Golden Eagles (*Aquila chrysaetos*) in San Diego County. M.S. Thesis, San Diego State University, San Diego, California 113 pp.

Hunsicker, G.R. 1972. Nesting Behavior of the Golden Eagle, *Aeuila chrysaetos*, in San Diego County, California. M.S. Thesis, University of California Riverside 65 pp.

Kirk, D.A. 1996. Updated status report on the Golden Eagle *Aeuila chrysaetos.* Committee on the Status of Endangered Wildlife in Canada, Ottawa, Ontario, Canada, Status assigned in 1996.

Kochert, M. N. 1980. Golden Eagle reproduction and population changes in relation to jackrabbit cycles: Implications to eagle electrocutions. pp. 71-86. *In* R. P. Howard and J. F. Gore [eds.], A workshop on raptors and energy developments. U.S. Fish and Wildlife Service and the Idaho Chapter of the Wildlife Society, Boise, ID. (RRTAC Reprint #2)

Kochert, M.N. and K. Steenhof. 1999. Golden Eagles in the U.S. and Canada; status, trends conservation challenges. Raptor Res. Rep. 11:1-19. (In Review: Raptor Research Report No. 11. Proceedings of the Golden Eagle Symposium – La Paz, Mexico, 2 Nov. 99).

Kochert, M.N., K. Steenhof, L.B. Carpenter, and J.M. Marzluff. 1999. Effects of fire on Golden Eagle territory occupancy and reproductive success. *J. Wildl. Manage*. 63:773-780.

Kochert, M.N., K. Steenhof, C.L. McIntyre, and E.H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*). *In* The Birds of North America, No. 684 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, D.C.

Lederle, P.E., J.M. Mueller, and E.A. Holt. 2000. Raptor surveys in south central Nevada, 1991-95. *J. Raptor Res.* 34(2): 133-136.

Lincer, J.L. (Consulting Editor). 1989. Raptor Habitat Management Under the U.S. Bureau of Land Management Multiple-Use Mandate by R.R. Olendorff *et al.* Raptor Research Report No. 8, Raptor Research Foundation, Inc. Allen Press. 80 pp.

Lincer, J.L. and J.D. Bittner. 2002. Use of Raptors to Monitor HCPs. Poster presented at the AOU/Raptor Research Foundation, New Orleans, September 24-28.

Lincer, J.L., J.D. Bittner, N. Muscolino, and, L. Swartz. 2003. A Raptor Protocol for Monitoring HCPs. Paper presented at the Raptor Research Foundation's Annual Scientific Conference. September 2-7. Anchorage, AK.

Lockhart, J.M. and M.N. Kochert. 1978. Effects of visual markers and telemetry devices on the nesting success of Golden Eagles. Draft manuscript. 14 pp.

Marzluff, J.M., S.T. Knick, M.S. Vekasy, L.S. Schueck, and T.J. Zarriello. 1997. Spatial use and habitat selection of Golden Eagles in southwestern Idaho. *Auk* 114:673-687.

Marzluff, J.M., M.S. Vekasy, M.N. Kochert, and K. Steenhof. 1997. Productivity of Golden Eagles wearing backpack radiotransmitters. *J. Raptor Res.* 31:223-227.

Mosher, J.A. and C.M. White. 1976. Directional exposure of Golden Eagles nests. *Can. Field-Nat.* 90:356-359.

Murphy, J.R. 1977. Eagles and livestock-Some management considerations. pp. 307-314. *In* World Conference on Birds of Prey. Vienna, 1-3 October, 1975. Report of proceedings, (R.D. Chancellor, ed.) International Council for Bird Preservation, London.

Ogden (Ogden Environmental and Energy Services Co.). 1992. Otay Ranch Raptor Management Study. Submitted to Otay Ranch Project Team, Chula Vista, California.

Olendorff, R.R. 1975. Golden Eagle county, 1st ed. Alfred A. Knopf, Inc., New York.

Opdycke, J.D. 1993. Potential impacts to Golden Eagles on Iron Mountain, Ramona, San Diego County, California. Fish and Wildlife Service, Ecological Services. Unpubl. Rep. 3 pp.

Phillips, R.L., J.L. Cummings, and J.D. Berry. 1991. Responses of breeding Golden Eagles to relocation. *Wildl. Soc. Bull.* 19:430-434.

Remsen, J. V. 1978. *Bird species of special concern in California: an annotated list of declining or vulnerable bird species.* Nongame Wildlife Investigations, Wildlife Management Branch, California Department of Fish & Game. Administrative Report No. 78-1.

Remsen, V. 1980. *Bird Species of Special Concern in California.* California Department of Fish and Game, Sacramento, California, 54 pp.

Schlorff, R.W. 1986. Nongame Wildlife Investigations, Golden Eagle status review. Job Final Report. State of California, The Resource Agency, Department of Fish and Game. W-65-R-2:11.

Schueck, L.S., J.M. Marzluff, M. Vekasy, M.R. Fuller, T.J. Zarriello, and W.S. Seegar. 1995. Abstract: Migration routes and winter ranges of Golden Eagles. *J. Raptor Res.* 29:72-73.

Scott, T.A. 1982. Human impacts on the Golden Eagle population of San Diego County from 1928 to 1981 M.S. Thesis, San Diego State University, San Diego, California 101 pp.

Small, A. 1976. Development of Golden Eaglets in southern California. Western Birds. 7:137-152.

Snow, C. 1973. Habitat management series of unique or endangered species. Report No. 7. Bureau of Land Management, Denver, Colorado. 52 pp.

Spofford, W.R. 1969. Brief reports: The status of eagles. Problems of the Golden Eagles in North America. pp. 345-347. *In* Peregrine Falcon populations: their biology and decline, (J.J. Hickey, ed.). University of Wisconsin Press, Madison.

Steenhof, K., M.N. Kochert, and J.H. Doremus. 1983. Nesting of subadult Golden Eagles in southwestern Idaho. *Auk* 100:743-747.

Steenhof, K., M.N. Kochert, and T.L. McDonald. 1997. Interactive effects of prey and weather on Golden Eagle reproduction. *J. Anim. Ecol.* 66:350-362.

Thelander, C.G. 1974. Nesting territory utilization by Golden Eagles (*Aquila chrysaetos*) in interior Central Coast Ranges of California. Jones & Stokes Associates, Inc., Sacramento, CA.

Thelander, C.G. 1974. Nesting territory utilization by golden eagles in California during 1974. California Department of Fish and Game, Wildl. Manage. Branch, Admin. Report No. 74-7. 19pp.

Watson, J. 1997. The Golden Eagle. T & AD Poyser. London. 374 pp.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report – NCCP/MSCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report for NCCP/MSCP Raptor Monitoring Project (2001-2003); Golden Eagles of the San Diego MSCP Area. Prepared for California Department of Fish and Game. 31 March.

Northern Harrier

California. Department of Fish and Game. 1982. Northern Harrier *Circus cyaneus.* California's Wildlife. 2:124 p.

California. Department of Fish and Game. 1987. Job Final Report. Nongame Wildlife Investigations, Northern Harrier Breeding Survey, Job No. II-18. 6pp.

California Department of Fish and Game. 1990. California statewide wildlife habitat relationships system. Volume II: Birds, D. Zeiner, W. Laudenslayer, K. Mayer, and M. White (eds.). The Resource Agency, Sacramento. 731 pp.

Collopy, M.W. and K.L. Bildstein. 1987. Foraging behavior of Northern Harriers wintering in southeastern salt and freshwater marshes. *Auk.* 104:11-16.

Estep, J.A. 1986. Nongame Wildlife Investigations, Marsh hawk status survey. Job Progress Report. State of California, The Resource Agency, Department of Fish and Game. W-65-R-3:5.

Larsen, C.J. 1987. Nongame Wildlife Investigations, Northern Harrier breeding survey. Job Final Report. State of California, The Resource Agency, Department of Fish and Game. W-65-R-4:6.

Lederle, P.E., J.M. Mueller, and E.A. Holt. 2000. Raptor surveys in southcentral Nevada, 1991-95. *J. Raptor Res.* 34(2):133-136.

Lehman, R.N., L.B. Carpenter, K. Steenhof, and M.N. Kochert. 1991. Assessing relative abundance and reproductive success of shrubsteppe raptors. *J. Field Ornithol.* 69(2) 244-256.

Lincer, J.L. (Consulting Editor). 1989. Raptor Habitat Management Under the U.S. Bureau of Land Management Multiple-Use Mandate by R.R. Olendorff *et al.* Raptor Research Report No. 8, Raptor Research Foundation, Inc. Allen Press. 80 pp.

Macwhirter, R.B. and K.L. Bildstein. 1996. Northern Harrier *Circus cyaneus. In* The Birds of North America, No. 210 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, D.C.

Martin, J.W. 1987. Behavior and habitat use of breeding Northern Harriers in southwestern Idaho. *J. Raptor Res.* 21(2):57-66.

Nesbitt, S.A. 1985. Northern Harriers. *Eyas* 8(2) 28-29.

Ogden (Ogden Environmental and Energy Services Co.). 1992. Otay Ranch Raptor Management Study. Submitted to Otay Ranch Project Team, Chula Vista, California.

Preston, C.R. 1990. Distribution of raptor foraging in relation to prey biomass and habitat structure. *Condor.* 92:107-122.

Remsen, Jr., J.V. 1978. Bird Species of Special Concern in California. California Department of Fish and Game, Wildlife Mgmt. Branch, Admin. Report No. 78-1. 54 pp.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report – NCCP/MSCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

Peregrine Falcon

Anderson, D.W. and J.J. Hickey. 1972. Eggshell changes in certain North American birds. Proc. Int. Ornithol. Congr. 15:514-540.

Banks, R.C. 1969. Peregrine Falcon in Baja California and the Gulf of California, Peregrine Falcon populations: their biology and decline, (J. J. Hickey, ed.). University of Wisconsin Press, Madison. 81-91 pp.

Cade, T.J., J.L. Lincer, C.M. White, D.G. Roseneau and L.G. Swartz. 1971. DDE residues and eggshell changes in Alaskan falcons and hawks. *Science*, 172:955-957.

Cade, T, J. Enderson, C. Thelander, and C. White (Eds.). 1987. Peregrine Falcon Populations: Their Management and Recovery. Published by the Peregrine Fund, Inc.

California. Department of Fish and Game. 1980. American Peregrine Falcon *Falco peregrinus anatum. At the crossroads*. 91-92 pp.

California. Department of Fish and Game. 1982. Peregrine Falcon *Falco peregrinus.* California's Wildlife: 2:148 p.

Dawson, W.L. 1923. The Peregrine Falcon (*Falco peregrinus anatum*). Agency Review Draft. 24 pp.

Fuller, M.R., W.S. Seegar, and L.S. Schueck. 1998. Routes and travel rates of migrating Peregrine Falcons *Falco peregrinus* and Swainson's Hawks *Buteo swainsoni* in the western hemisphere. Journal of Avian Biology 29:433-440. (Proceedings: "Optimal Migration", Lund University, Lund, Sweden, November 5-8, 1997).

Fyfe, R., R.W. Risebrough, J.G. Monk, W.M. Jarman, D.W. Anderson, L.F. Kiff, J.L. Lincer, I.C.T. Nisbet, W. Walker II, and B.J. Walton. 1987. DDE, Productivity and Eggshell Thickness Relationships Within the Genus Falco. Chapter 33 *In* Peregrine Falcon Populations: Their Management and Recovery. Edited by T. Cade, J. Enderson, C. Thelander, C. White. Published by the Peregrine Fund, Inc.

Hays, L. and S. Grandberry. 1998. The Peregrine Falcon is back: babbit announces proposal to remove world's fastest bird from endangered species list. U.S. Fish and Wildlife Service, Carlsbad, California.

Hickey, J. J. (ed.). 1969. Peregrine Falcon populations: their biology and decline, University of Wisconsin Press, Madison.

Jurek, R.M. 1989. Five year status report-American Peregrine Falcon. State of California, The Resource Agency, Department of Fish and Game. 1-15 pp.

Lincer, J.L. 1975. The effects of dietary DDE on eggshell-thinning in the American kestrel: A comparison of the field situation and laboratory results. *J. Applied Ecol.*, 12(3): 781-793.

Lincer, J.L. (Consulting Editor). 1989. Raptor Habitat Management Under the U.S. Bureau of Land Management Multiple-Use Mandate by R.R. Olendorff *et al.* Raptor Research Report No. 8, Raptor Research Foundation, Inc. Allen Press. 80 pp.

McWilliams, S.R., J.P. Dunn, and D.G. Raveling. 1994. Predator-prey interactions between eagles and cackling Canada and Ross' geese during winter in California. *Wilson Bull.* 106:272-288.

Porter, R.D., A.M. Jenkins, M.N. Kirven, D.W. Anderson, and J.O. Keith. 1988. Status and reproductive performance of marine peregrines in Baja California and the Gulf of California, Mexico. *In* Peregrine Falcon populations: Their management and recovery, (T. J. Cade, J. H. Enderson, C. G. Thelander, and C. M. White, eds.). The Peregrine Fund, Inc., Boise, ID. 105-114 pp.

Smith, B. 1989. Plan for Bald Eagles sought at Cachuma. Santa Barbara News Press (Santa Barbara, CA) (March 6): A1, A5.

Steinhot, P. 1990. American Peregrine Falcon *Falco peregrinus anatum*. California Wildl. Heritage. Threatened and endangered animals in the golden state. Department of Fish and Game. 27-28.

Thelander, C.G. 1975. Distribution and reproductive success of Peregrine Falcons (*Falco peregrinus anatum*) in California-1975. State of Calif. Resour. Agency. Dept. Fish and Game. Wildl. Manag. Branch. Admin. Rep. No. 75-6. 12 pp.

Thelander, C.G. 1976. Distribution and reproductive success of Peregrine Falcons (*Falco peregrinus anatum*) in California during 1975 and 1976. State of Calif. Resour. Agency. Dept. Fish and Game. Wildl. Manag. Branch. Admin. Rep. No. 76-3. 13 pp.

Thelander, C.G. 1977. The breeding status of Peregrine Falcons in California. MA Thesis, San Jose State Univ., San Jose, California 112 pp.

Walton, B.J. 1981. Peregrine Falcon management in California - update for 1981. Unpubl. rep., Santa Cruz Predatory Bird Res. Group, Univ. of California, Santa Cruz. 58 pp.

Watson, J.F. 1981. Ecological characterization of the central and northern California coastal region. Volume II, Part 2. Species. Unpub. rep. FWS/OBS/46.2, October 1981. Prepared by Jones & Stokes Assoc., Inc., Sacramento, California. (Pages II-151 and II-152 only)

Wendt, A., G. Septon, and J. Moline. 1991. Juvenile urban-hacked Peregrine Falcons (*Falco peregrinus*). *J. Raptor Res.* 25:94-95.

Wootton, J.T., and D.A. Bell. 1992. A metapopulation model of the Peregrine Falcon in California: viability and management strategies. *Ecol. Appl.* 2(3):307-321.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report – NCCP/MSCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

Swainson's Hawk

Bloom, P.H. 1980. The status of the Swainson's Hawk in California. State of California, The Resource Agency, Department of Fish and Game. Bureau of Land Management, and Federal Aid in Wildlife Restoration, Project W-54-R-12. 42 pp.

California Department of Fish and Game. 1982. Swainson's Hawks *Buteo swainsoni.* California's Wildlife. 2:134 p.

California Department of Fish and Game 1988. Five year status report Swainson's Hawks *Buteo swainsoni*. Nongame Bird and Mammal Section, Wildlife Management Division, 1-9 pp.

California Department of Fish and Game. 1990. Mitigation criteria for Swainson's Hawks, Region 2, State of California. 2 pp.

California Department of Fish and Game. 1990. Mitigation guidelines for Swainson's Hawks *Buteo swainsoni* in the Central Valley of California. Region 2, State of California. 1-12 pp.

Cox, J.D. 1997. Surprised researchers find California hawks don't join in migration to Argentina. The San Diego Union-Tribune. Scripps-McClatchy Western Service.

Estep, J.A. 1989. Biology, movements, and habitat relationships of the Swainson's Hawk in the Central Valley of California, 1986-87. Wildlife Management Division, Nongame Bird and Mammal Section, State of California, The Resource Agency, Department of Fish and Game. 51 pp.

England, A.S., M.J. Bechard, and C. S. Houston. 1997. Swainson's Hawks *Buteo swainsoni. In* The Birds of North America, No. 265 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, D.C. 27 pp.

England, A.S., J.A. Estep, and W.R. Holt. 1995. Nest-site selection and reproductive performance of urban-nesting Swainson's Hawks in the Central Valley of California. *J. Raptor Res.* 29:179-186.

Fuller, M.R., W.S. Seegar, and L.S. Schueck. 1998. Routes and travel rates of migrating Peregrine Falcons *Falco peregrinus* and Swainson's Hawks *Buteo swainsoni* in the western hemisphere. Journal of Avian Biology 29:433-440. (Proceedings: "Optimal Migration", Lund University, Lund, Sweden, November 5-8, 1997).

Goldstein, D.L., and N.G. Smith. 1991. Short communications. *J. Raptor Res.* 25(3):87-88.

Hall, R.S. No date. Preliminary status report and notes on the breeding biology of the Swainson's Hawk in Northwest Arizona. *In* Press. 1-6 pp.

Lincer, J.L. (Consulting Editor). 1989. Raptor Habitat Management Under the U.S. Bureau of Land Management Multiple-Use Mandate by R.R. Olendorff *et al.* Raptor Research Report No. 8, Raptor Research Foundation, Inc. Allen Press. 80 pp.

Risebrough, R.W., R.W. Schlorff, P.H. Bloom, and E.E. Littrell. 1989. Investigations of the decline of Swainson's Hawk populations in California. *J. Raptor Res.* 23(3):63-71.

Schlorff, R.W. 1985. Diurnal raptor population monitoring program. Nongame Wildlife Program, State of California, Department of Fish and Game. W-65-R-2:24 pp.

Schlorff, R.W. and P.H. Bloom. 1980. Importance of Riparian systems to nesting Swainson's Hawks in the Central Valley of California. Nongame Wildlife Program, State of California, Department of Fish and Game. 13 pp.

Sharp,B. 1986. Management guidelines for the Swainson's Hawk. Region 1. U.S. Fish and Wildlife Service, Portland, Oregon. 1-28 pp.

Sharp, C.S. 1902. Nesting of Swainson Hawk. *Condor* 4:116-118.

Woodbridge, B. 1991. Habitat selection by nesting Swainson's Hawks: a hierarchical approach. M.S. Thesis. Oregon State University. 80 pp.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report – NCCP/MSCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

General and Raptor Management Literature

Anderson, D.E., G.J. Hongstad, and W.R. Myiton. 1985. Line transect analysis of raptor abundance along roads. *Wildl. Soc. Bull.* 13:533-539.

Avian Power Line Interaction Committee (APLIC). 1994. Mitigating bird collisions with power lines: the state of the art in 1994. Edison Electric Institute. Washington, D.C. 78pp.

Avian Power Line Interaction Committee (APLIC). 1996 Suggested Practices for Raptor protection on power Lines: State of the Art in 1996. Edison Electric Institute/Raptor Research Foundation. Washington, D.C.

Barrows, C.W. 1989. Diets of five species of desert owls. *Western Birds*. 20:1-10.

Bloom, P.H. 1985. Raptor movements in California. *In* M. Harwood [Ed.,], Proceedings of Hawk Migration Association of North America, North Wales, PA U.S.A. 313-324 pp.

Buckland, K.P., D.R. Anderson and J.L. Laake. 1981. Line transect estimation of bird population density using a Fourier series. *Stud. Avian Biol.* 6:466-482.

Buckland, S.T. 1987. On the variable circular plot method of estimating animal density. *Biometrics* 43:363-384.

Buckland, S.T., D.R. Anderson, K.P. Burnham, and J.L. Laake. 1993. Distance sampling: estimating abundance of biological populations. Chapman and Hall, London, U.K.

Clark, W.S. and B.K. Wheeler. 1987. A Field Guide to Hawks North America. Houghton Mifflin Company. Boston.

Everett, W.T. 1979. Threatened, declining and sensitive bird species in San Diego County. *Sketches* June.

Fuller, M.R. and J.A. Mosher. 1981. Methods of detecting and counting raptors: a review. *Stud. Avian Biol.* 6:235-246.

Gould, W. R., and M. R. Fuller. 1995. Survival and population size estimation in raptor studies: A comparison of two methods. *J. Raptor Res.* 29:256-264.

Iverson, G.C. and M.R. Fuller 1992. Area-occupied survey technique for nesting woodland raptors. Proceedings of the Midwest Raptor Management Symposium and Workshop. Woodland Rapt. Surv. Institute for Wildlife Research. National Wildlife Federation Scientific and Technical Series No. 15:1-7.

Kochert, M. N., K. Steenhof, and M. Q. Moritsch. 1983. Evaluation of patagial markers for raptors and ravens. *Wildl. Soc. Bull.* 11:271-281.

Johnsgard, P.A. 1990. Hawks, eagles & falcons of North America: biology and natural history. Smithsonian Institution Press, Washington , D.C.

Lehman, R. N., L. B. Carpenter, K. Steenhof, and M. N. Kochert. 1998. Assessing relative abundance and reproductive success of shrubsteppe raptors. *J. Field Ornithol.* 69:244-256.

Lincer, J.L. 1982. "Protecting Endangered Species at the Local Governmental Level." Paper presented at the 46th Annual Meeting of the Florida Academy of Sciences, April 22-24, DeLand, FL. *Florida Scientist*, 45(1): 40.

Lincer, J.L. 1983. "But Release Them to Where?" Raptor Research & Rehabilitation Program Newsletter, 4-(Winter). 1982-83:6-8.

Lincer, J.L. 1984. The Priority of Proper Habitat Management. The EYAS (a newsletter of the National Wildlife Federation's Raptor Information Center), Vol. 7.

Lincer, J.L. (Consulting Editor). 1989. Raptor Habitat Management Under the U.S. Bureau of Land Management Multiple-Use Mandate by R.R. Olendorff *et al.* Raptor Research Report No. 8, Raptor Research Foundation, Inc. Allen Press. 80 pp.

McDermott, F. 1999. Pacific continental flyway. *HMANA Hawk Migration Stud.* 25:24-32.

Mosher, J. A., and M. R. Fuller. 1996. Surveying woodland hawks with broadcasts of great horned owl vocalizations. *Wildl. Soc. Bull.* 24:531-536.

Myers, R.I.G. Morrison, P.Z. Antas, B.A. Harrington, T.E. Lovejoy, M. Sallaberry, S.E. Senner, and A. Tarrak. 1987. Conservation strategy for migratory species. *Am. Sci.* 75:18.

National Wildlife Federation. 1989. Proceedings of the western raptor management symposium and workshop. National Wildlife Federation, Washington, D.C., 320 pp.

Newton, I. 1979. Population ecology of raptors. Buteo Books, Vermillion, SD USA.

Ogden (Ogden Environmental and Energy Services Co.). 1992. Otay Ranch Raptor Management Study. Submitted to Otay Ranch Project Team, Chula Vista, California.

Olendorff, R.R., A.D. Miller, and R. N. Lehman. 1981. Suggested practices for raptor protection on power lines--the state-of-the-art in 1981. Raptor Res. Rep. No. 4. Raptor Research Foundation, Inc. St. Paul Minn. 111pp.

Reynolds, R.T., J.M. Scott, and R.A. Nussbaum. 1990. A variable circular-plot method for estimating bird numbers. *Condor* 82:309-313.

Schueck, L. S., M. R. Fuller, and W. S. Seegar. 1989. Falcons. pp. 71-80. *In* B. G. Pendleton, M. N. LeFranc Jr., M. B. Moss, C. E. Ruibal, M. A. Knighton, and D. L. Krahe [eds.], Proceedings of the northeast raptor management symposium and workshop. National Wildlife Ferderation, Washington, DC. May 16-16, 1988, Syracuse, N.Y. (Scientific and Technical Series; no.13)

Steenhof, K., and M.N. Kochert. 1982. An evaluation of methods used to estimate raptor nesting success. *J. Wildl. Manage*. 46:885-893.

Steenhof, K., and M.N. Kochert. 1985. Dietary shifts of sympatric buteos during a prey decline. *Oecologia* 66:6-16.

Steenhof, K., and M.N. Kochert. 1988. Dietary responses of three raptor species to changing prey densities in a natural environment. *J. Anim. Ecol.* 57:37-48.

Steenhof, K., M.N. Kochert, and J.A. Roppe. 1993. Nesting by raptors and common ravens on electrical transmission line towers. *J. Wildl. Manage*. 57:271-281.

Sutherland, W.J. 1996. Ecological census techniques. A handbook. Cambridge Univ. Press, Cambridge, U.K.

Tate, J., Jr. and D.J. Tate. 1982. The Blue List for 1982. *Am. Birds* 36:126-135.

Tate, J. 1986. The Blue List for 1986. *Am. Birds* 40:227-236.

Williams, R. D. and E.W. Colson. 1989. Raptor associations with linear rights-of-way. Pages 173-192 *in* B. G. Pendleton, ed. Proc. Western Raptor Management Symp. Natl. wildl. Fed. Scientific and Tech. Series No. 12. Washington, D.C.

Thiollay, J.-M. 1976. Les decomptes de rapaces le long des routes: essai de standardization. *Passer* 13:69-76.

Unitt, P. 1984. The Birds of San Diego County. San Diego Society of Natural History, Memoir 13. Luster Industries.

U.S. Department of the Interior. 1996. Effects of military training and fire in the Snake River Birds of Prey National Conservation Area. U.S. Geol. Survey, Biol. Res. Div., Snake River Field Station, Boise, ID, BLM/IDARNG Research Project Final Report.

WRI (Wildlife Research Institute, Inc.). 2002. Year 1 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2001). Prepared for California Department of Fish and Game. 30 July.

WRI (Wildlife Research Institute, Inc.). 2004. Year 2 Report for NCCP Raptor Monitoring Project (January 1 – December 31, 2002). Prepared for California Department of Fish and Game. 19 March.

WRI (Wildlife Research Institute, Inc.). 2005. Final Report for NCCP Raptor Monitoring Project (2001-2003). Prepared for California Department of Fish and Game. 31 March.

RAPTOR TECHNIQUES WORKSHOP

APPENDIX C

Raptor Monitoring Protocol

P.O. Box 2209 • Ramona, CA 92065 • Ph (760) 789-3992 • Fax (760) 789-0131

BACKGROUND

The Multiple Species Conservation Program (MSCP) is a comprehensive, long-term habitat conservation plan that addresses the needs of multiple species and the preservation of natural vegetation in San Diego County (County of San Diego 1997). The size and configuration of the preserve network is continually evolving but it may ultimately encompass approximately 172,000 acres. In order to determine if the MSCP or any management area, for that matter, is functioning correctly, a meaningful monitoring plan must be in place. A vast area, such as the MSCP, cannot be comprehensively monitored for any but a few species with very limited and specific habitat requirements. Raptor species will, therefore, be monitored using a reproducible sampling approach. Details of this approach are described below after reminding the reader of the ultimate monitoring objectives.

OBJECTIVES

The overall goal of the MSCP monitoring is to detect changes in habitat quality and population trends in those habitats and species covered by the MSCP (Ogden 1996). Specific objectives, as they relate to raptors, are as follows:

1. Document the protection of target species as specified in subarea plans and implementing agreements.
2. Document changes in preserved populations of covered species.
3. Describe new biological data collected.
4. Evaluate impacts of land uses and construction activities in and adjacent to the preserve.
5. Evaluate management activities and identify enforcement difficulties.

The purpose of this document is to provide guidance for consistency in the approach to surveying for raptors *during the breeding season and during the wintering period.* The below protocol is generic in nature but site-specific details, as to route, viewshed locations, and other important site features, are provided for each Raptor Monitoring Area (RMA) in Appendix C-1.

APPROACH

The following provides methodological details for the professional, with adequate raptor expertise, to conduct the breeding season and wintering period raptor monitoring in a consistent manner. The ability to detect trends (e.g., in raptor numbers, distribution, diversity, etc.) will be extremely important in order that adaptive management decisions be made in a timely manner. If trend analyses are to be interpretable, it is essential that the same locations within the preserve be monitored in a consistent manner. This would best be accomplished if the same individual or team monitored all locations, for all surveys.

ACRONYMS AND DEFINITIONS

Acronyms and definitions are attached (Appendix C-2). Use them consistently in order that there be continuity and clarity in all observations and record keeping.

SPECIES

Although all raptor species will be noted, there are eight MSCP, so-called "target," raptor species: Bald Eagle (BE), Burrowing Owl (BO), Cooper's Hawk (CH), Ferruginous Hawk (FH), Golden Eagle (GE), Northern Harrier (NH), American Peregrine Falcon (PF), and the Swainson's Hawk (SH). Although you will not, necessarily, be searching for the BO at the most desirable time of day (early morning/early evening), any observations of BO or any other raptor species should be documented. Raptors will be the focus of the surveys but any observed sensitive species (regardless of taxa), interesting road kill, unusual biological observation, breeding colony, bird roost site, or other unique resource should also be noted on the WRI "Field Datasheet" (Appendix C-3).

TIMING AND FREQUENCY OF SURVEYS

Although it is common for ornithologists to identify a specific time of year as the "breeding season," it is not possible to specify a timeframe, for our local raptors, that does not overlap with what is considered the wintering period. Because of the latitude of the MSCP, raptors are not restricted to a brief portion of the spring within which to breed. Many of our local raptors start breeding while other wintering and migrating raptors are still in the MSCP study area and environs. Therefore, the time of year that we call the "breeding season" could span December through August but varies considerably by species. Some GEs, for instance, can start nest building as early as December and still have nestlings in that nest as late as June. BOs, on the other hand, can start laying eggs in early April but fledge some young as late as August.

EQUIPMENT/SUPPLIES

Field vehicles should have 4WD capability if terrain requires. Binoculars, a camera, and a spotting scope of sufficient power for raptor observations are required. A magnification of 10X for binoculars and a range of approximately 20-60X for scopes are recommended. A cell phone may be very helpful in some locations, as could a set of "walkie-talkies" if more than one investigator will be in the field at the same time. Bring these survey guidelines, a copy of any authorization letters from resource agencies, any windshield placards (that indicates that you are under contract to conduct these surveys), local and project-generated site maps, and an adequate supply of "Transect Data Sheets" (Appendix C-3). To this, add your standard field equipment and supplies (field guides, hat, water, snacks, etc.). Although observers should be thoroughly familiar with all the local raptors, field guides that should be helpful include the Peterson guide, *Hawks* (Clark and Wheeler 1987) and the accompanying photographic guide (Wheeler and Clark 1999).

WEATHER

Monitoring should be conducted only during certain desirable weather conditions to maximize chances of documenting raptors. Inclement weather (rain, fog, winds greater than 20 mph, etc.) should be avoided. Occasional drizzle and winds up to 20 mph will not normally affect most raptor behavior. Observation in cold or wet weather should be done very carefully or completely discouraged. If an incubating bird is accidentally flushed during surveys, total nest failure could result for that season.

TIME OF DAY

The time of day, during which observations are made, is more important during the breeding season surveys than for the winter surveys (for most raptor species). Monitoring should take place from dawn through 1200, although professional experience may allow for some flexibility. Although BOs are not, necessarily, most active during this timeframe, you may note them and they should be documented as indicated below, as you would any raptor species. Since this is a crepuscular species, however, schedule sites that may support BOs for the early morning and/or early evening, whenever possible, to maximize chances of seeing this crepuscular species.

TWO TYPES OF OBSERVATIONS

Observations will be made two ways: (1) in vehicles, along established routes, and (2) at designated viewshed (i.e., observation) points. In addition, all reliable reports provided by interested individuals and cooperators will be verified and included in the data set but noted as "personal communications" with the appropriate documentation.

Vehicular Transects

Many of the breeding season raptor observations, and all those for the winter period, will be conducted from a vehicle. Therefore, vehicle speed will be an important variable. Speed will vary between road transects, depending on the road conditions, including traffic, and weather. That speed, however, should be consistent (year-to-year) for a particular transect in order that meaningful data comparisons can be made over time. Speed on a busy highway will have to be adequate to safely keep up with traffic. Some highway transects, that were deemed too dangerous, were removed from consideration. On a backcountry road, however, 10 mph may be the right speed. Safety should be the highest priority, and for that reason, an assistant to the driver is recommended to make observations and take notes, especially on busy roads.

Point/View shed Observations

Observation points have been established along some vehicle routes and at other desirable view shed locations for breeding season monitoring (see Appendix C-1). These will be especially important for riparian areas and inaccessible mountainous, and other, areas, where limited vehicle access prevents a reasonable survey of a RMA. At observation points along vehicle routes, a minimum of 10 minutes of actual observation is required. This means allowing whatever time is necessary to stop the vehicle in a safe, repeatable location, get out of the vehicle, and set up equipment (spotting scope, etc.) before starting the formal ten-minute observation (i.e., watching *and* listening). In situations where the observer is driving *through* the relevant habitat, a 5-minute observation period may be adequate. At some viewshed locations (like the top of a mountain), the observation time will be longer (perhaps 30 minutes). The most important issue here is that, once a viewing time period has been established for a particular RMA, it is maintained for consistency each year.

WHAT TO NOTE

All relevant data must be documented (see Transect Data Sheet, Appendix C-3). Sightings for *all* raptors will be documented. Note specific location of the raptor species *the first time it is observed* on each day of observation. Note age, sex, and any unusual plumage (if relevant) and

describe location(s) of any band(s) (metal right or metal left and sequence and numbers of any color bands), transmitter, or patagial wing markers. Avoid duplicate counts by noting unique characteristics of an individual and, when a bird is moving, its direction and relative speed. Record courtship and nesting behavior. If a nest is observed during the "winter" surveys, note its location on the topo map, what species of tree its in, height, size of nest, composition, and whether you consider it active. Indicate the basis for assumed activity (for instance, presence of an adult or pair near the nest, young, recent whitewash or greenery in /around nest).

CONTROL NUMBERING

Each control number for a study site and day of observation will be alphanumeric. For each species observed, the control number will start with the acronym for that species (see Appendix C-2) and be followed by "01." The following control numbers, for that species, will end with 02, 03, etc., in the sequence in which the observations take place. This number is entered on the field data sheet (with all of its associated observations) and on the topo survey map, on which is always placed the survey date and the name(s) of the biologist(s). For instance, if the first observation of the day, at Mission Trails Regional Park, is a RT (Red-tailed Hawk), the control number will be "RT01." The second RT will receive the control number "RT02." If the next observation were a Cooper's Hawk, it would be "CH01." It will simplify records if each Transect Data Sheet and topo map is only used for one day's observation at each site. However, there may be situations (such as when it takes more than one day to adequately survey a site or when it may lead to duplication or confusion later) when it makes sense to enter more than one day's information on the same data sheet/map. It may also be beneficial to have all the breeding data on one map which keeps the picture in front of the observer at all times. This allows the observer to see gaps for certain species and explore areas not previously covered. The most important objective is to make sure the record is clear as to the date of each observation/set of observations and the name of the investigator so that clarification can be sought, if necessary.

Raptor, and other, nests are often less visible later in the breeding season, when deciduous trees have regained their foliage. However, note any stick nests in the area as "SN" followed by the appropriate observation number. Indicate on the data sheet if you know or suspect what species it belongs to and why. When summarizing yearly data, it will be important to determine which nests are alternate nests of the same pair and which represent additional pairs/territories. Do not get close enough to potentially disturb any nests, without approval from the Project Manager (PM) and Management Unit administrator.

Keep careful track of miles driven and times spent during vehicle transects and point location observations. Deduct any miles/time not spent on monitoring. These details are very important in order to allow data to be normalized over both time and distance to properly analyze for trends. There may be situations when you will not be able to track mileage or the miles you track are complicated by circling back through a study area to recheck a nest to confirm nesting, etc. Just keep good records that can be interpreted by someone else.

ENFORCEMENT/MANAGEMENT ISSUES

Note any enforcement or management problems or opportunities. Suggest corrective action or adaptive management, as appropriate, to the PM. Report any significant enforcement problems to the PM as soon as possible, but no later than within 24 hours of the observation.

RECORDS MANAGEMENT

Management of records is extremely important. Two-hole punched field forms and computer-generated project topo maps must be kept in Study Site folders (in a hard plastic or other secure file box provided) unless being copied. Field forms and topo maps must be attached to the inside of the Study Site folders using the two-hole clips at the end of each field day. Unless other provisions are made, field record copying should be done no less frequently than once a week, during the active field season, with copies placed in the appropriate administration project file for security.

THE SURVEYS

Breeding Season

In some management units, where a fulltime knowledgeable biologist is on staff, daily observations may be made, thereby providing greater potential for trend detection. However, the objective of these guidelines is to conduct up to 6 surveys at each of 12 RMAs (Figure C-1) for the breeding season raptor monitoring, where the assemblage of species dictates the actual number of replicates. Many stick nests will be located during the winter when the deciduous trees have lost their leaves. The next best opportunity to survey will often be early in the breeding season (December through April) when the adult raptors are establishing their territories and courting. Note that each species has a chronology for these behaviors. Some (like the GE, RT, and RS) will start breeding-related behaviors in December or January, while others (like the CH) may not display until April. At this time, they are obvious and concentrating their activities around the likely, and alternative, nest sites. In order to adequately characterize the raptor species present throughout the breeding season, the initial surveys at each site should be separated by 10-14 days, if possible. Subsequent surveys should be scheduled based on the raptor species present and where they are in their reproductive cycle. There will be a period, during which one of the adults will be incubating eggs or sheltering young, while the other adult is off hunting. During this time, it will be difficult to document many raptors and fieldwork may not be the best use of your time for that RMA. The next logical time to concentrate on conducting breeding season surveys will be when the young have fledged but are still dependent on the adults for food. At this time, there is a lot of activity and an increased chance of spotting a family unit because of the increased number of individuals per territory and, in some cases, the young will call attention to themselves by begging and/or calling to the parents.

The following times are recommended for the (breeding season) Raptor Monitoring Program:

- Late-December
- Mid-January
- Mid-February
- March
- Mid-April
- Mid-May

There are 12 RMAs that will be surveyed (Table C-1).

TABLE C-1. MSCP Raptor Monitoring Areas (Breeding Season)

Area	Name	Study Sites* (original number(s)
A	San Pasqual	San Pasqual (36), Lk. Hodges (7), Boden Cyn. (2), Rockwood (32)
B	Ramona Grasslands	Ramona Grasslands (30)
C	Penasquitos Canyon	Penasquitos Canyon (33)
D	Iron Mountain Complex	Iron Mountain** (11), San Vicente ((16), Route 67 (27)
E	San Diego River	San Diego River (26)
F	Sloan Canyon	Sloan Canyon (31), McGinty Mtn. North (5), Sycuan Mtn. North (17)
G	Sweetwater River	Sweetwater Reservoir (45), Rcho. S.D. East (42), Rcho. S.D. West (43), San Miguel Mtn. North (23)
H	Proctor Valley	Proctor Valley (25), San Miguel Mtn. South (23), Upper Otay Lk.(14)
I	Rancho Jamul	Jamul Ranch (3), Hollenbeck Canyon (34)
J	Border Fields	Border Fields (44), Tijuana River (part)
K	Brown Field Complex	Brown Field (22), Otay River, Spring Cyn. (part), Dennery Cyn. (part)
L	Otay Mountain	Otay Mountain (12), Marron Valley (13), Lower Otay Lake (14)

* In some cases, only a portion of a study site is included because of access, visibility, or some other reason (see detailed maps, Appendix C-1, for details).
** Including Monte Vista Ranch.

Each study site is followed by a number, which corresponds to the original study site number that was assigned to it (WRI 2002, 2004).

Winter Surveys

In keeping with the timing of many "winter" surveys (e.g., County Bird Atlas), the MSCP winter raptor surveys will occur primarily from *mid-December through February*, with possible changes in response to changes in weather conditions (i.e., global warming, cycles, etc.). This "winter" time period is somewhat arbitrary and we are not suggesting that raptors observed during this period are, necessarily, only birds that have migrated in and are wintering within the MSCP and environs. Similarly, the winter visit by some species may extend before and/or after this timeframe. The FH, for instance, can arrive on its MSCP wintering grounds by mid-September and not leave until mid-March. Many of the birds that you observe will be the same ones that you document during the "breeding season" surveys. The objective is to conduct three (3) vehicle-based surveys, along the coastal route depicted by Figure C-2. In order to adequately characterize the raptor species present throughout the winter season, the three surveys should be conducted according to the following schedule:

- Late December
- Mid-to-late January
- Mid-to-late February

Raptor, and other, nests are often more visible in the winter, when deciduous trees have lost their foliage. Knowledge about nest and breeding pair locations will help the monitor separate wintering birds from resident pairs. When summarizing yearly data, it will also be important to determine which nests are alternate nests of the same pair and which represent additional pairs/territories. Note any raptor nests in the area and/or if any nesting behavior is observed. Do not approach any nests, without approval from the PM and Management Unit administrator.

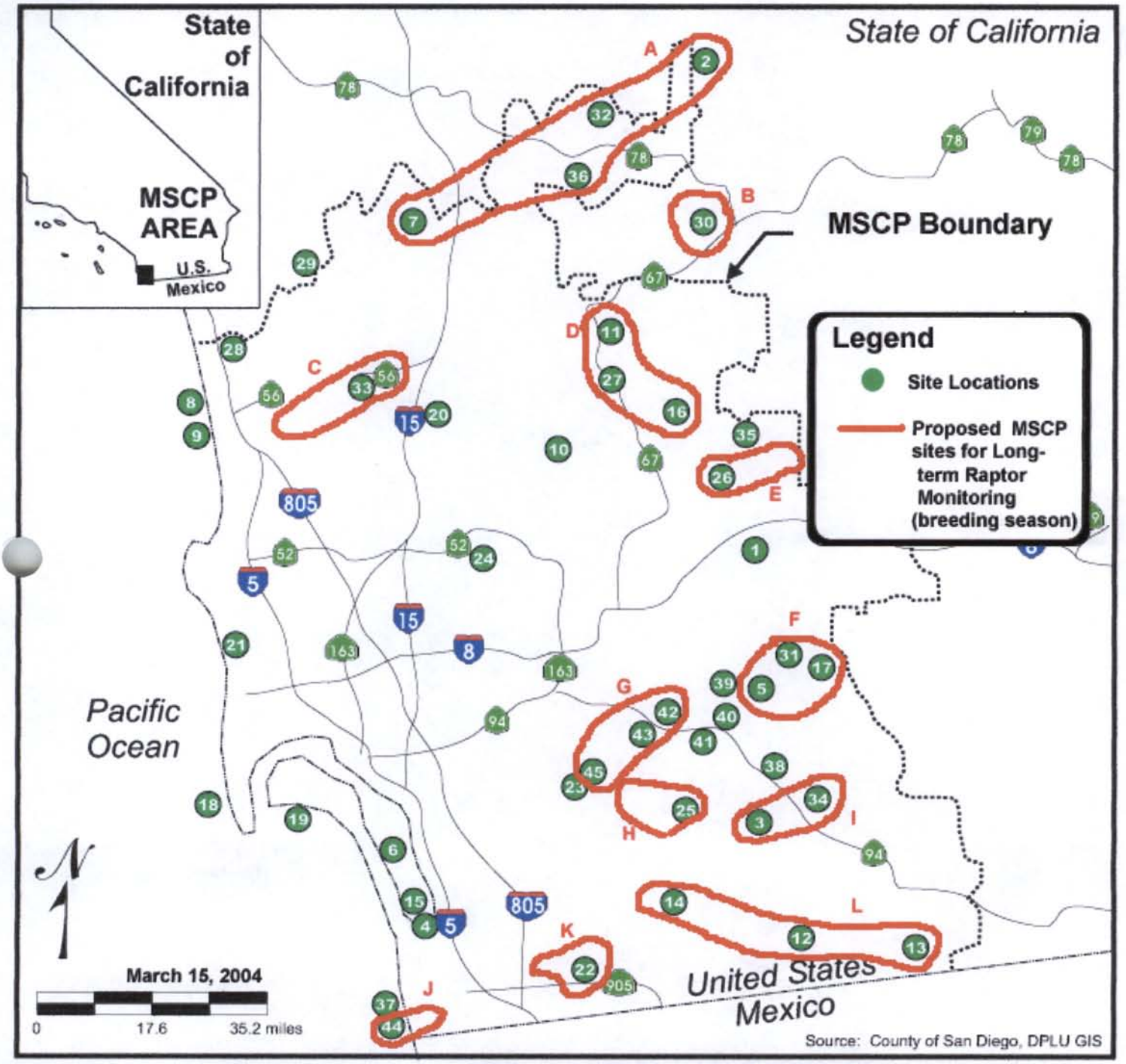
LITERATURE CITED

Clark, W.S. and B.K. Wheeler. 1987. Peterson Field Guides—Hawks. Houghton Mifflin Company. Boston.

County of San Diego. 1997. "Multiple Species Conservation Program", County of San Diego; Subarea Plan. Adopted by the Board of Supervisors October 22, 1997.

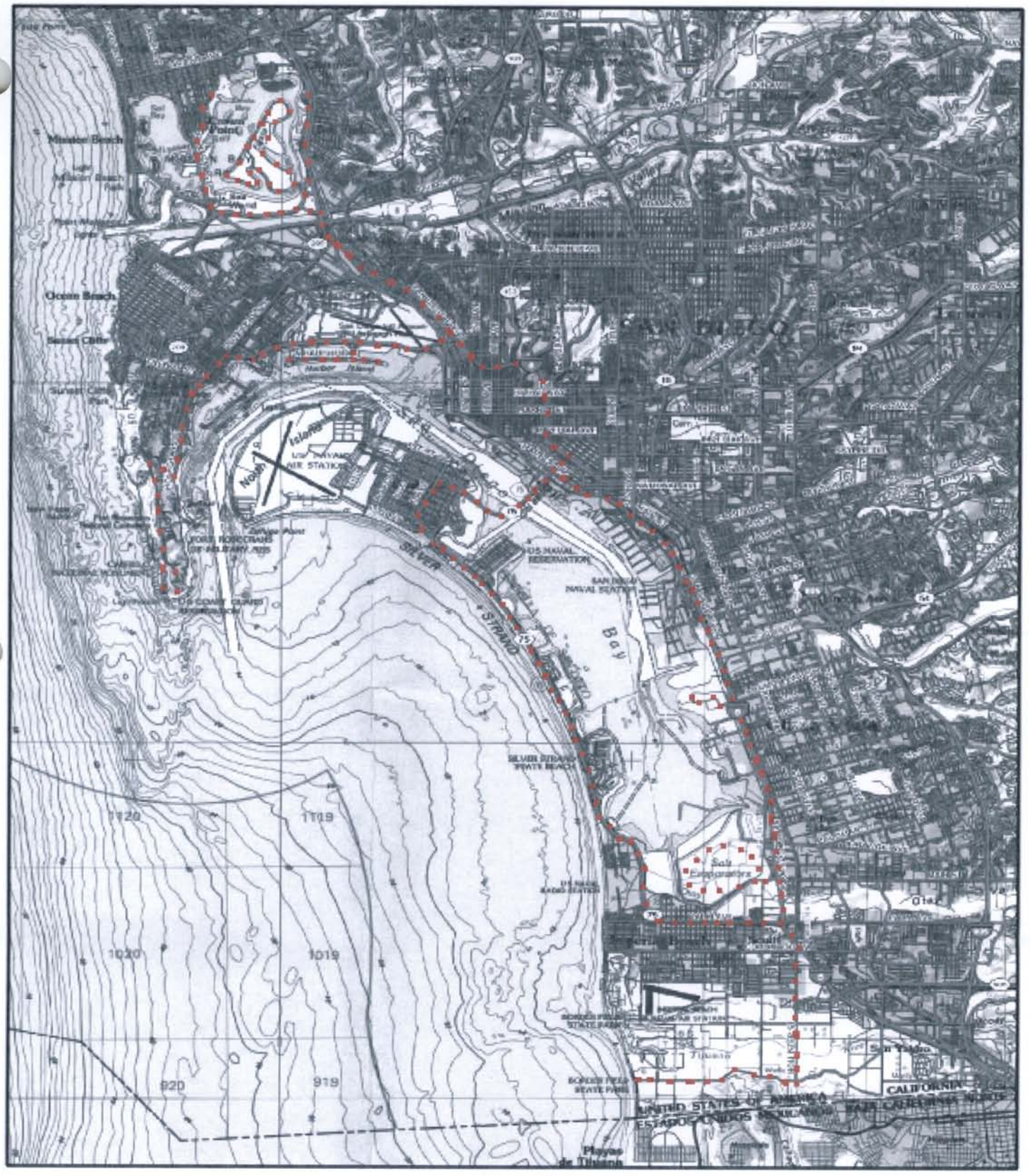
Ogden. 1996. "Biological Monitoring for the Multiple Species Conservation Program." Prepared for the City of San Diego, California Department of Fish and Game, and U.S. Fish and Wildlife Service. Revised April 25.

Wheeler, B.K and W.S. Clark 1999. A Photographic Guide to North American Raptors. Academic Press. San Diego.



Wildlife Research Institute, Inc.

PROPOSED MSCP RAPTOR MONITORING AREAS (BREEDING SEASON) **Figure C-1.**



N

0 0.5 1 2 3 Miles

Figure 3. Proposed MSCP Winter Raptor Monitoring Area

Recommended route

APPENDIX C-2
ACRONYMS AND DEFINITIONS

Raptor and Corvid Species

AC	American crow
AK	American kestrel
BE*	**BALD EAGLE**
BH	Black hawk
BR	Barn owl
BO*	**BURROWING OWL**
CH*	**COOPER'S HAWK**
CR	Common raven
FH*	**FERRUGINOUS HAWK**
GE*	**GOLDEN EAGLE**
GO	Great-horned owl
HH	Harris' hawk
LO	Long-eared owl
MR	Merlin
NH*	**NORTHERN HARRIER**
OS	Osprey
PF*	**PEREGRINE FALCON**
PR	Prairie falcon
RS	Red-shouldered hawk
RT	Red-tailed hawk
SE	Short-eared owl
SO	Screech owl
SS	Sharp-shinned hawk
SH*	**SWAINSON'S HAWK**
TV	Turkey vulture
UA	Unidentifiable accipiter
UB	Unidentifiable buteo
UF	Unidentifiable falcon
UR	Unidentifiable raptor
WK	White-tailed kite
WH	White-tailed hawk
ZH	Zone-tailed hawk

* MSCP target species.

Other Abbreviations

AB	Active burrow
Ad	Adult
CDFG	California Department of Fish and Game
CN	Cavity nest
F	Female
HY	Hatching year (when a bird is in its first year; i.e., the same calendar year as hatched).
Imm	Immature (a non-specific term that means "not adult").
M	Male
Mel	Melanistic (black/dark)
Ruf	Rufous/reddish
Sa	Sub adult (plumage that precedes adult plumage and appears much like it but with some characters that are not in adult plumage; used only for species, like the Golden Eagle, that can be distinguished at this age).
SN	Stick nest.
U	Unknown (e.g., unknown species, age, or sex).
USFWS	U.S. Fish and Wildlife Service

APPENDIX C-3

TRANSECT DATA SHEET

Wildlife Research Institute, Inc.					BIOLOGIST(S):
		TIME (24hr)	Start	Finish	(minus time out) = TOTAL TIME:
		TEMP (F):			OTHER WEATHER INFO.:
DATE:	PAGE __OF ___	CLOUD CVR (%):			TRANSECT MILEAGE BEGIN:
TRANSECT NAME & NUMBER:		WIND (mph):			TRANSECT MILEAGE END:
		VISIBILITY (mi):			SUBTRACT MILEAGE:
	#	PRECIP:			TRANSECT TOTAL MILEAGE:

	WAYPOINTS (Start/End Points of Transects, Road Names.etc.)	SPECIES	TIME DURATION	SEX	AGE	PAIR	PERCHING	HUNTING	FEEDING	COURTSHIP	SOARING	NESTING	COMMENTS, MILEAGE, TIME, ETC.
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													

COMMENTS: (USE REVERSE FOR DRAWINGS OR ADDITIONAL NOTES)