



The Western Section of The Wildlife Society and Wildlife Research Institute

Western Raptor Symposium February 8-9, 2011 Riverside, California



Symposium
Sponsors



February 8 – 05:10-05:25 pm Session: Raptor Biology

Golden Eagle Movements in Western North America

Dave Bittner and Chris Meador, Wildlife Research Institute, Inc., 18030 Highland Valley Road, Ramona CA 92065; (760) 789-3992; dbittner@wildlife-research.org

Scientists at the Wildlife Research Institute have been studying Golden Eagles since 1988 and have banded and tagged 421 Golden Eagles to study their movements, migration, life history, territory usage, and causes of mortality. From 1991-96, we placed 38 USFWS/USGS bands on nestling Golden Eagles. Beginning in 1997, and through 2010, we attached 383 patagial tags on Golden Eagles in California, New Mexico and Montana along with the leg bands. Out of these 383 patagial-tagged Golden Eagles, we fitted 109 with VHF transmitters and 30 others with satellite transmitters. This report is a current summary of the results of the returns, mortalities, and travels across the landscape of Western North America from 1991-2010. The project is ongoing. In 2009 and 2010, 48 and 40 Golden Eagles were tagged, respectively (some with satellite and/or VHF). Seventeen satellite, and approximately 50 VHF, transmitters are currently active and transmitting data from living eagles. The Golden Eagles have been tracked from the north slope of Alaska to La Paz, Baja California and Guadalajara, Mexico and many points in between.

The authors and institutions that have provided the following presentations are happy to share their information, data, and opinions. However, these are not, necessarily, peer-reviewed presentations and the potential to take something out of context also exists. In order to avoid that, you are requested to contact the respective lead author(s) before using specific information contained in any of the following papers. Once you have done that, the proper citation is: "[Author(s). Date. Title.] Presented at the Western Raptor Symposium. Jeffrey L. Lincer and David Bittner (Co-Chairs). Hosted by Wildlife Research Institute and The Wildlife Society, Western Section. Riverside Convention center, Riverside, California, USA. February 8-9, 2011

Golden Eagle Movements in Western North America



Dave Bittner, Chris Meador, Brittany Schlotfeldt, Renée Rivard, and Jeff Lincer



Wildlife Research Institute, Inc
18030 Highland Valley Rd, Ramona, CA 92065
(760)789-3992 dbittner@wildlife-research.org

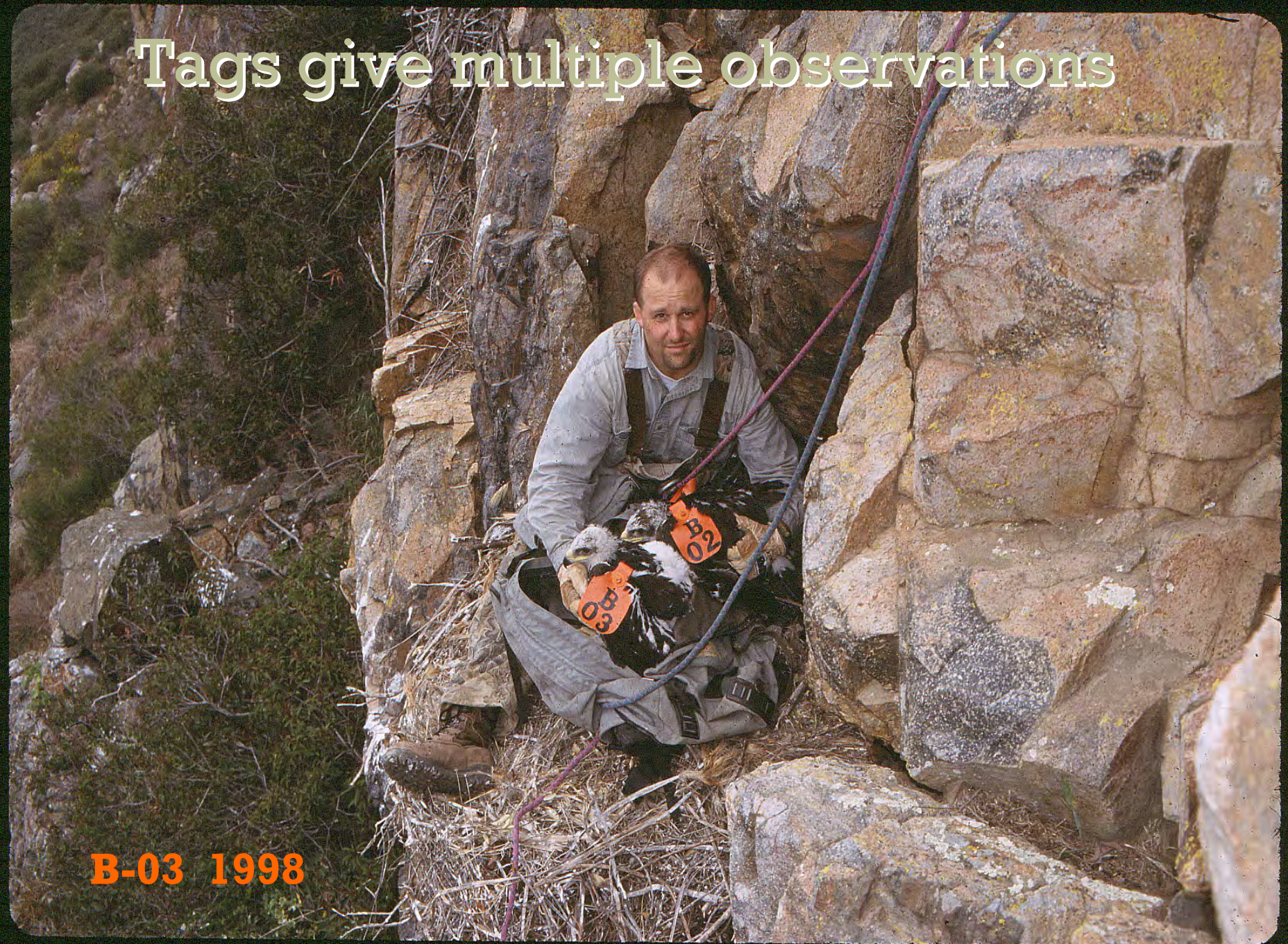


Banding vs. Tags vs. Telemetry



Can you read this band?

Tags give multiple observations



B-03 1998

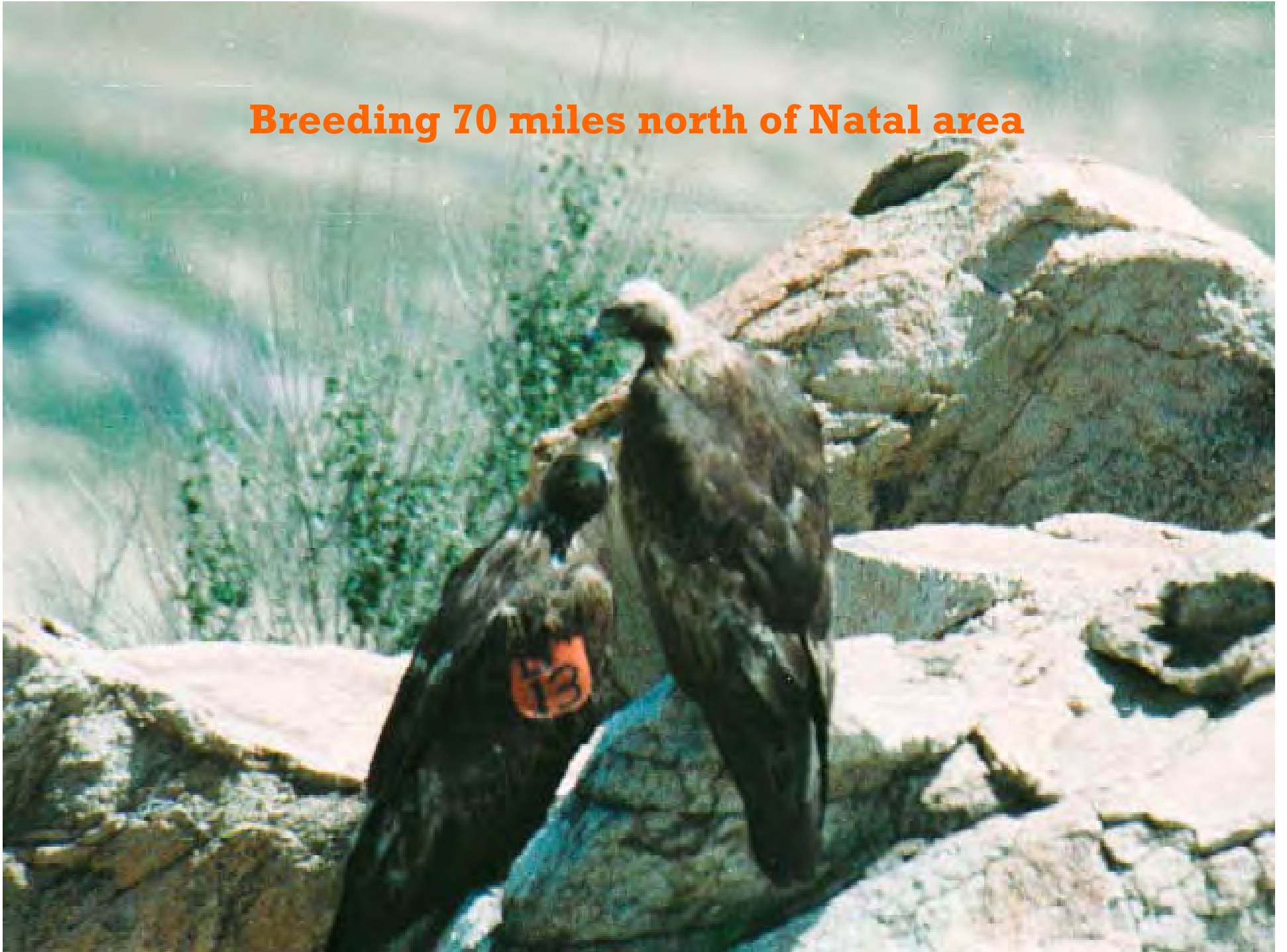
B-03 14 years later...where has she been?



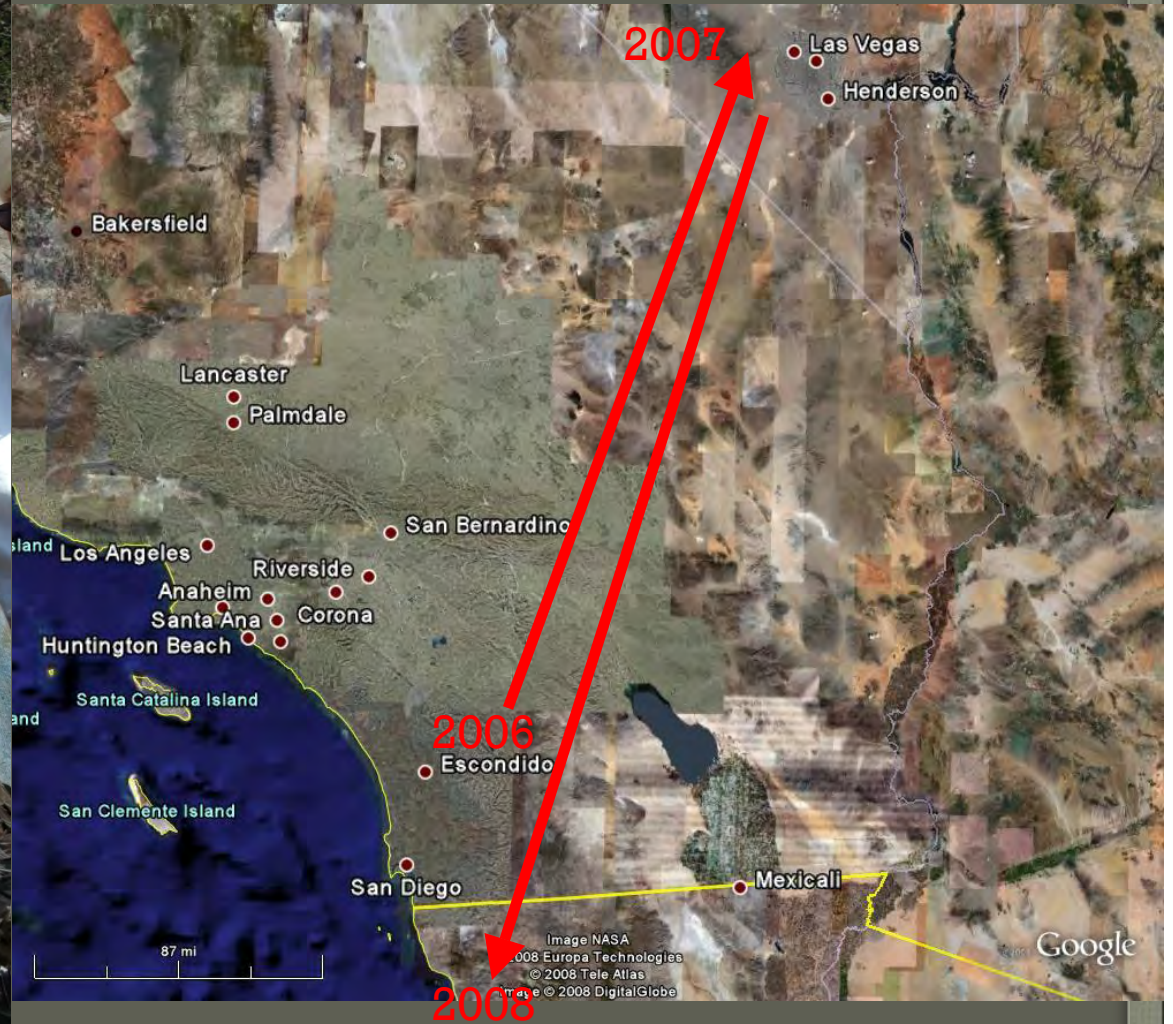
1998-2005 ???

2006-2010 Ad Breeder in SD County

Breeding 70 miles north of Natal area

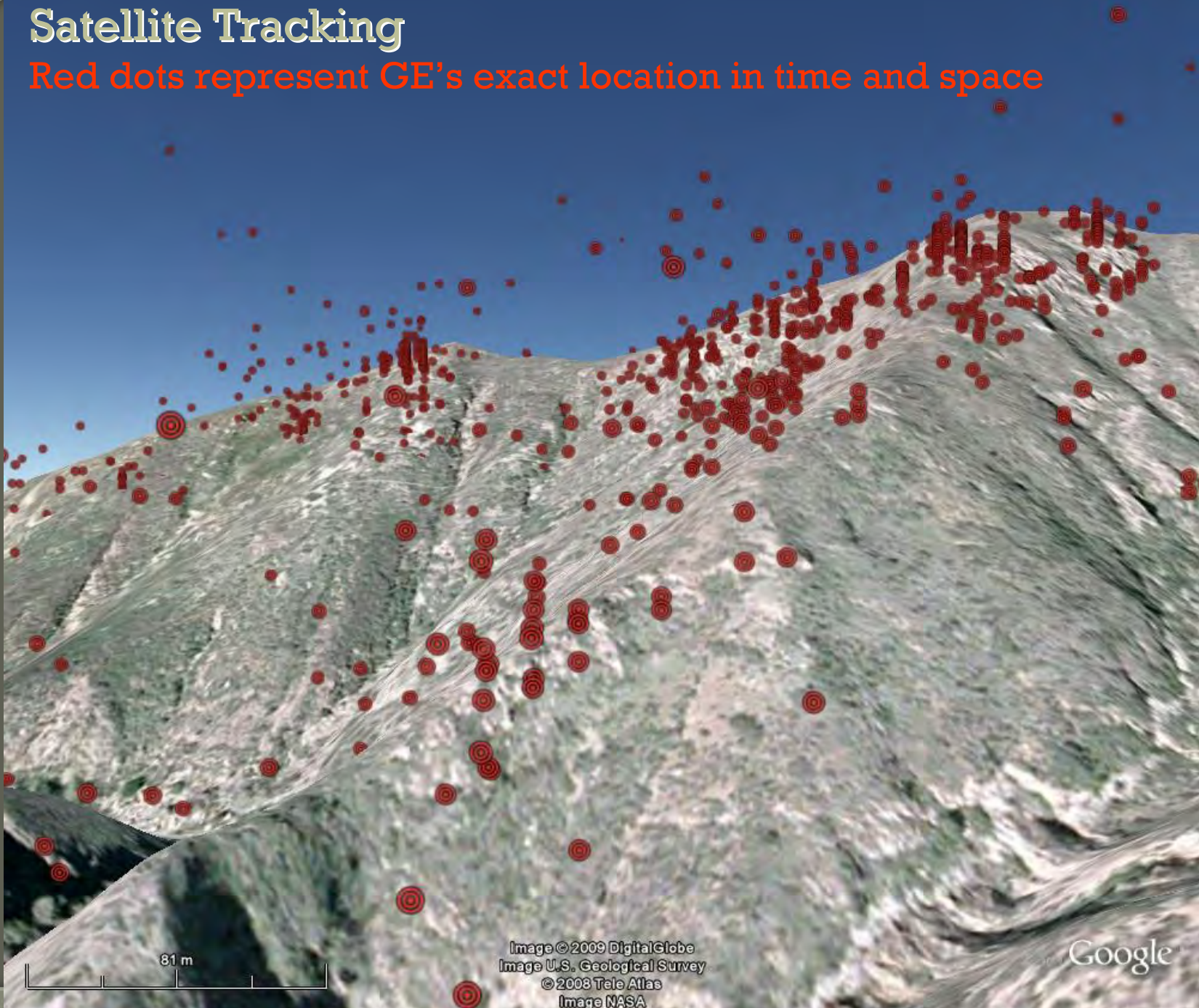


VHF Tracking



Satellite Tracking

Red dots represent GE's exact location in time and space



81 m

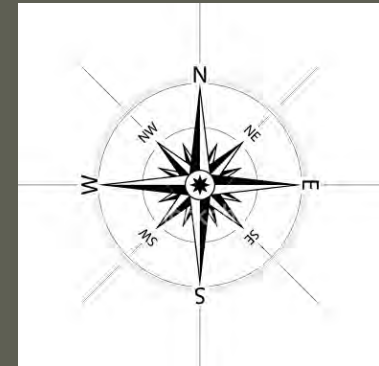
Image © 2009 DigitalGlobe
Image U.S. Geological Survey
© 2008 Tele Atlas
Image NASA

Google

How accurate are the satellite transmitters?

Lat/Long: +/- 18 meters

Altitude: +/- 22 meters



Speed: +/- 1 kilometer/hour

Course: +/- 1 degree

Returns on tags and bands alone

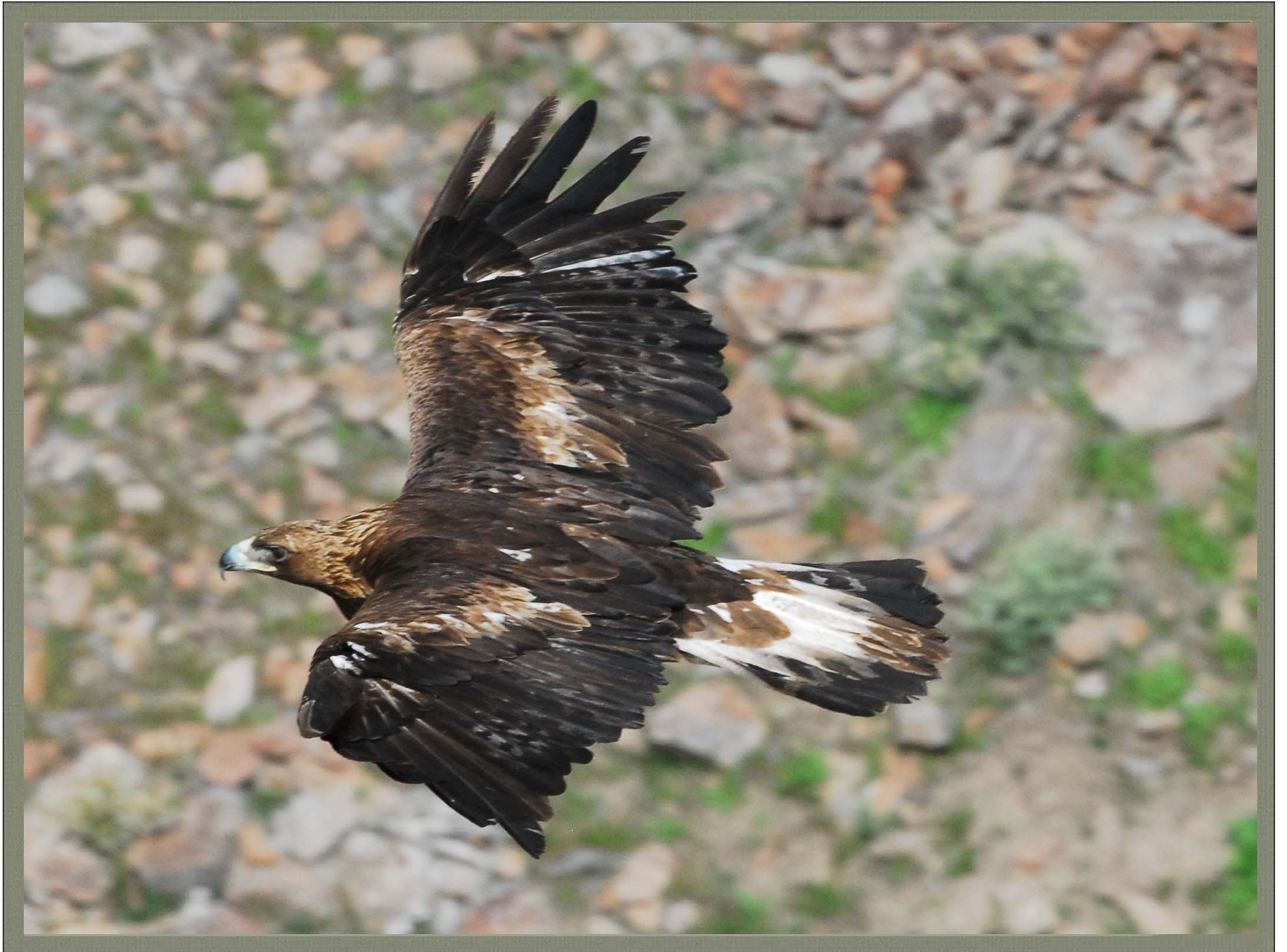
41 returns out of
381 total banded
and tagged

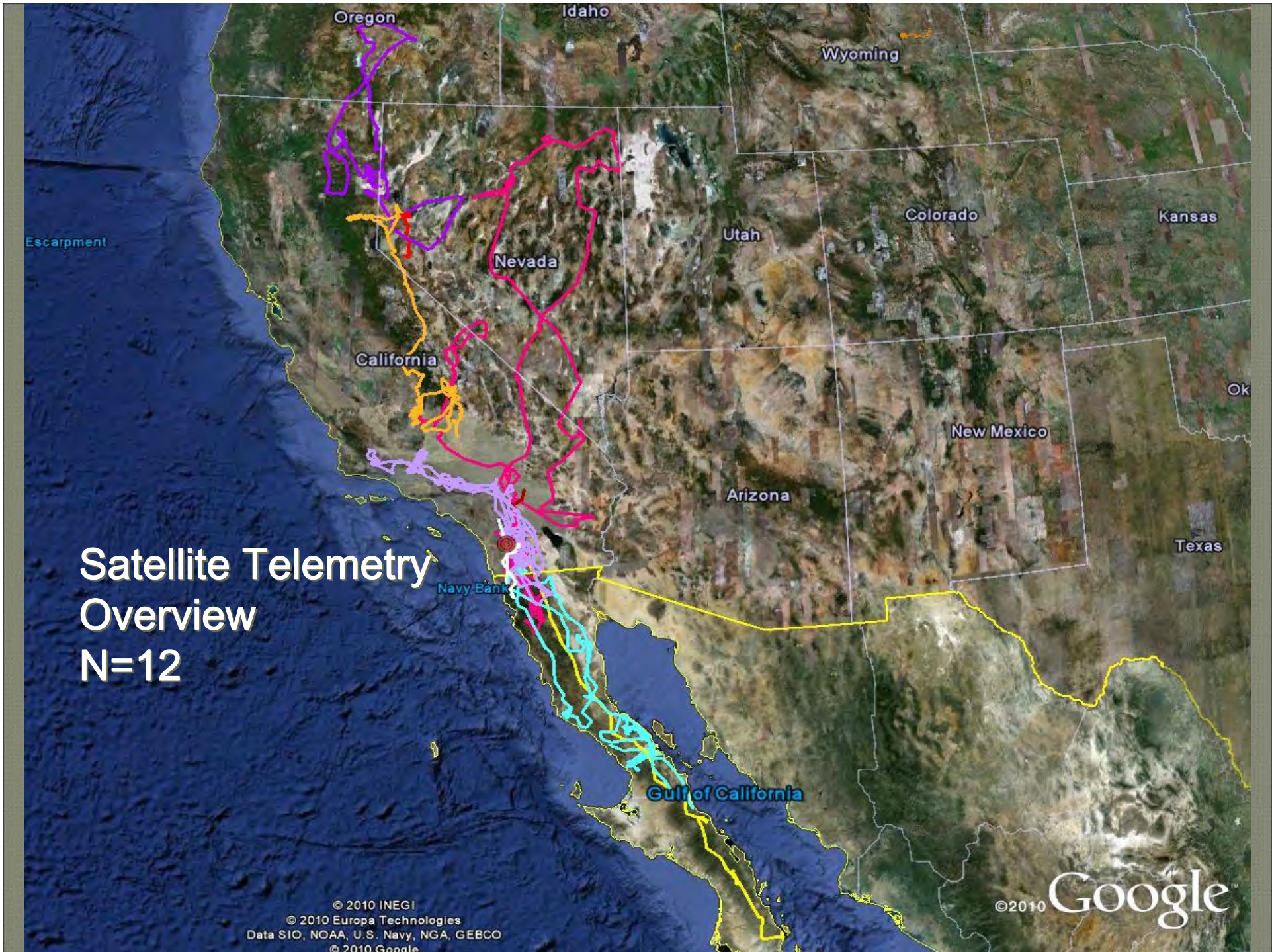
Knowledge of
eagle's movements =
mostly point A to point B



Banding in San Diego County







Satellite Telemetry Overview N=12

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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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San Diego County
Upland



Anza-Borrego Desert

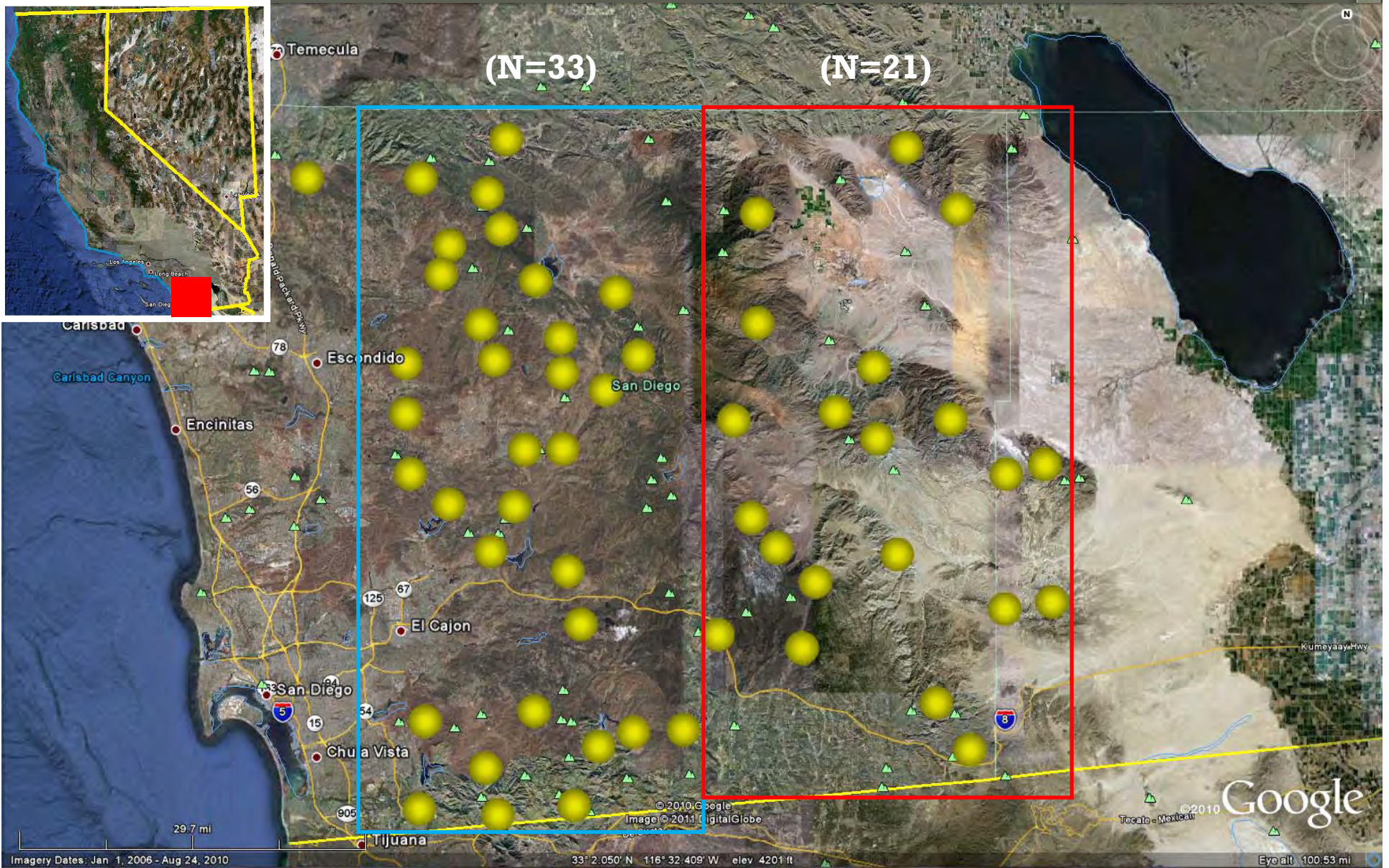
Southern California San Diego 1895 - 2011



GOEA
Territories
104 Total
46 Active

29
miles

Southern California San Diego & Anza-Borrego



Average territory area ~36 vs. 62 sq mi

29
miles

Satellite-Tagged Golden Eagles in San Diego



Six Golden Eagles
satellite-tagged in
San Diego County prior
to the 2010 season

Tagged on June 8th, 2007

Left natal area on October 26th, 2007

Traveled 658mi (1058.9km) in one month

Began transmitting as deceased on Nov 24th, 2007

Buckman Springs 2007 nestling

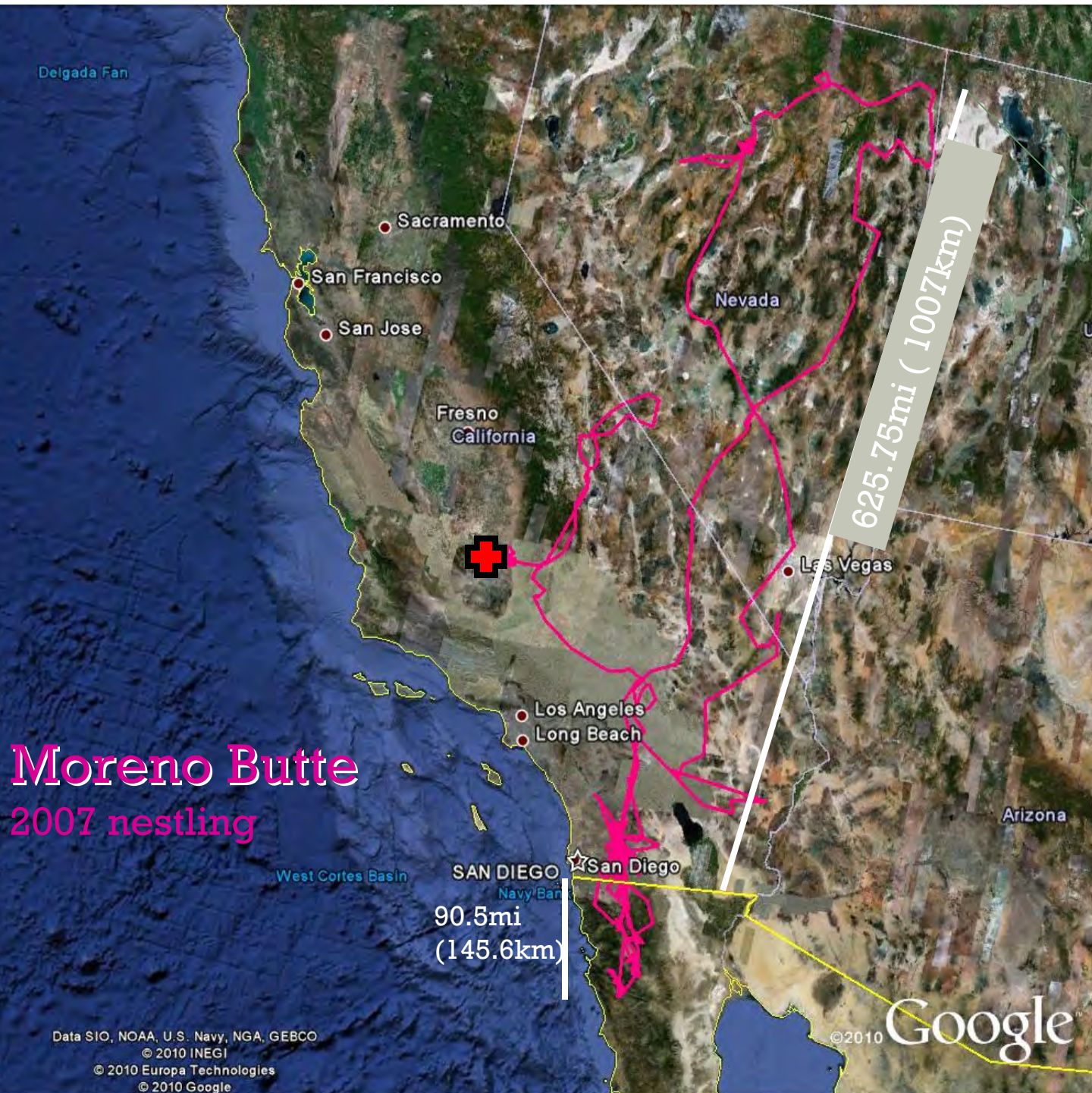


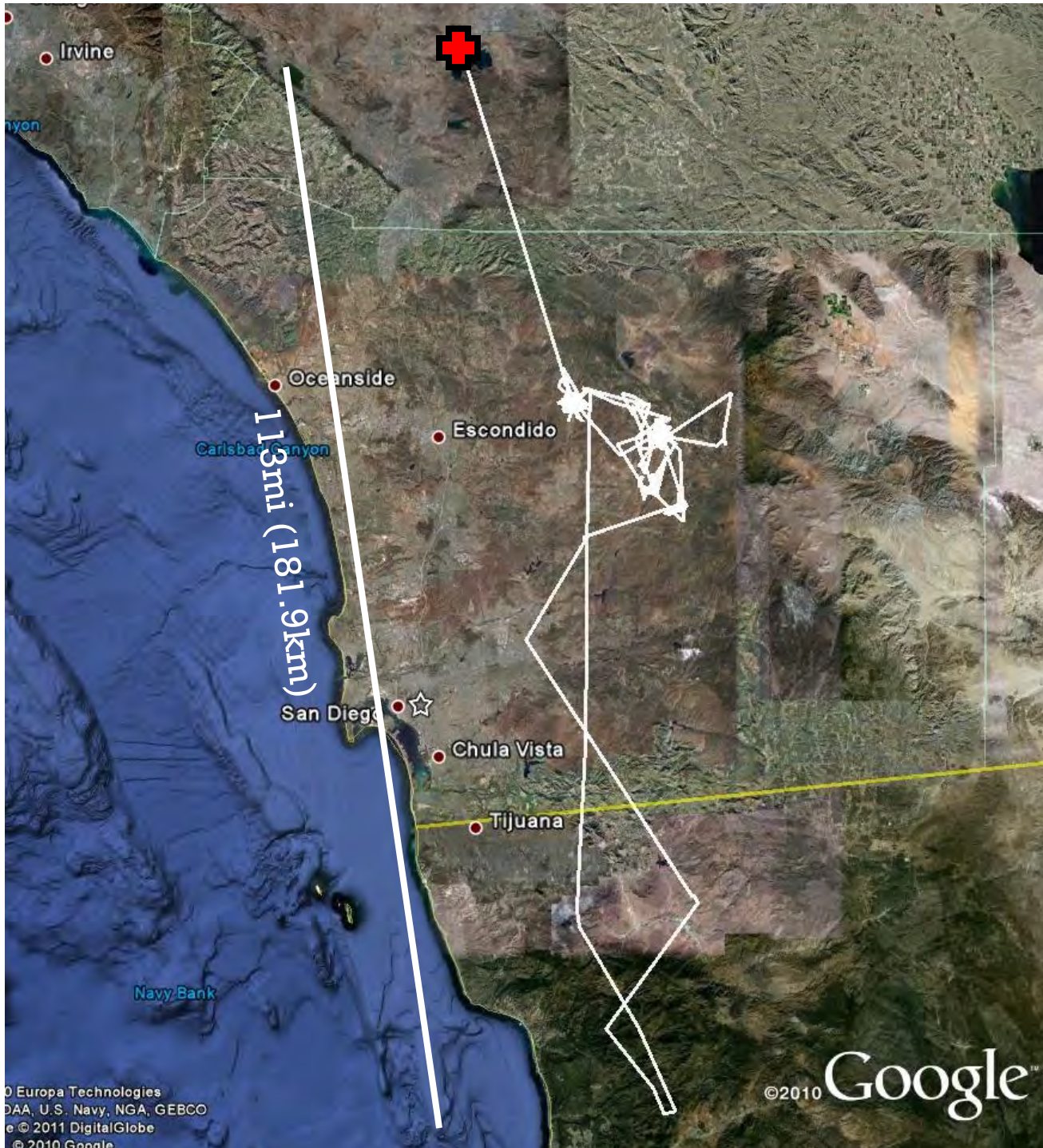
Tagged on June 9th,
2007

Left natal area on
Jan 13th, 2007

Traveled 90.5mi
(145.6km) South
before heading
North through
Nevada

Began transmitting
as deceased on Nov
29th, 2008 near
Bakersfield, CA





Pamo North

2007 nestling

Tagged on May 27th,
2007

Left natal area on
Nov 24th, 2007

Began transmitting
as deceased on
March 31st, 2008
near Hemet, CA



Last transmission on
April 1, 2008



7164 ft

© 2008 Tele Atlas
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Image © 2008 DigitalGlobe

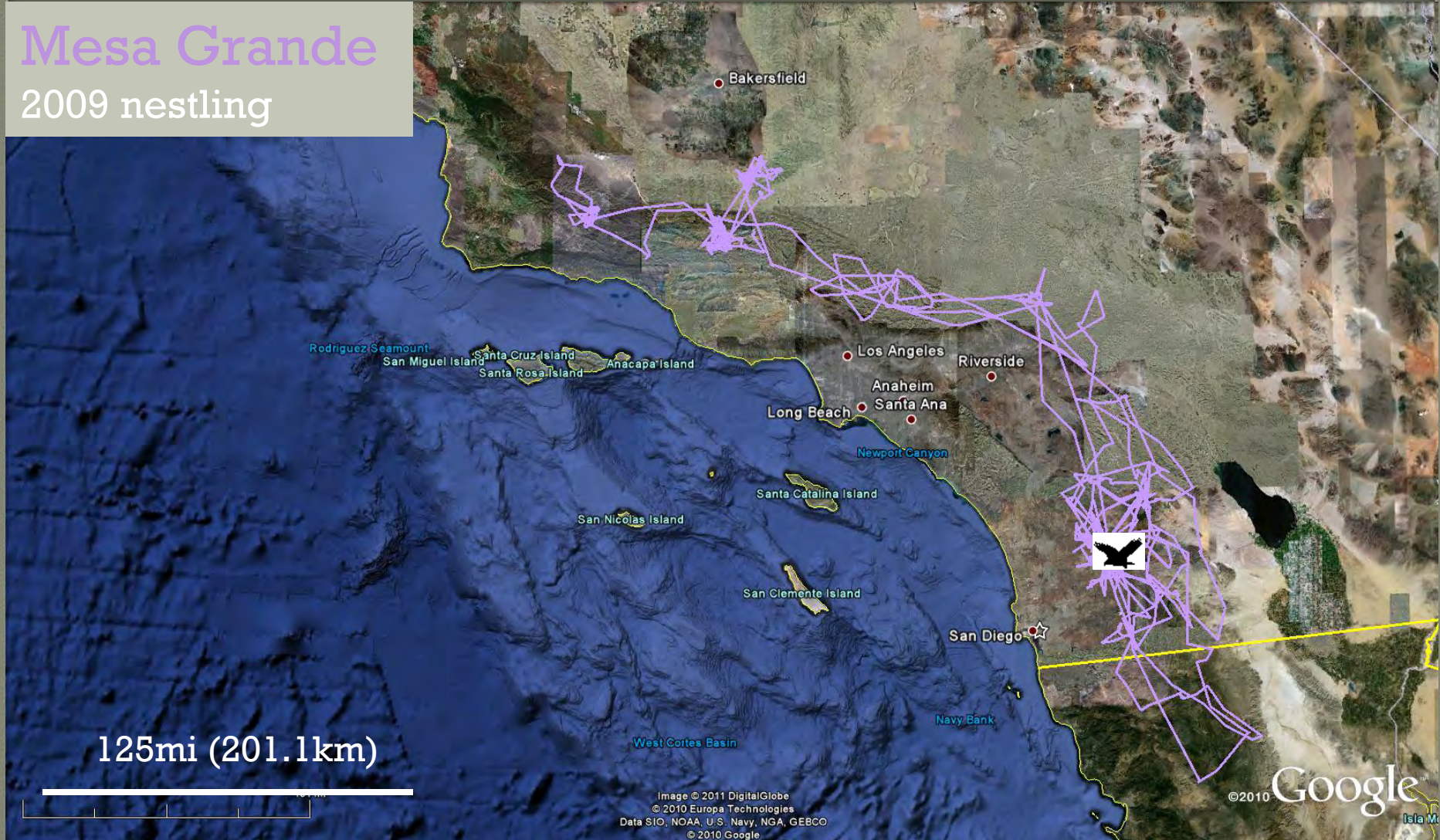
Google

Tagged on May 20th, 2009

Left natal area on Sept 30th, 2009

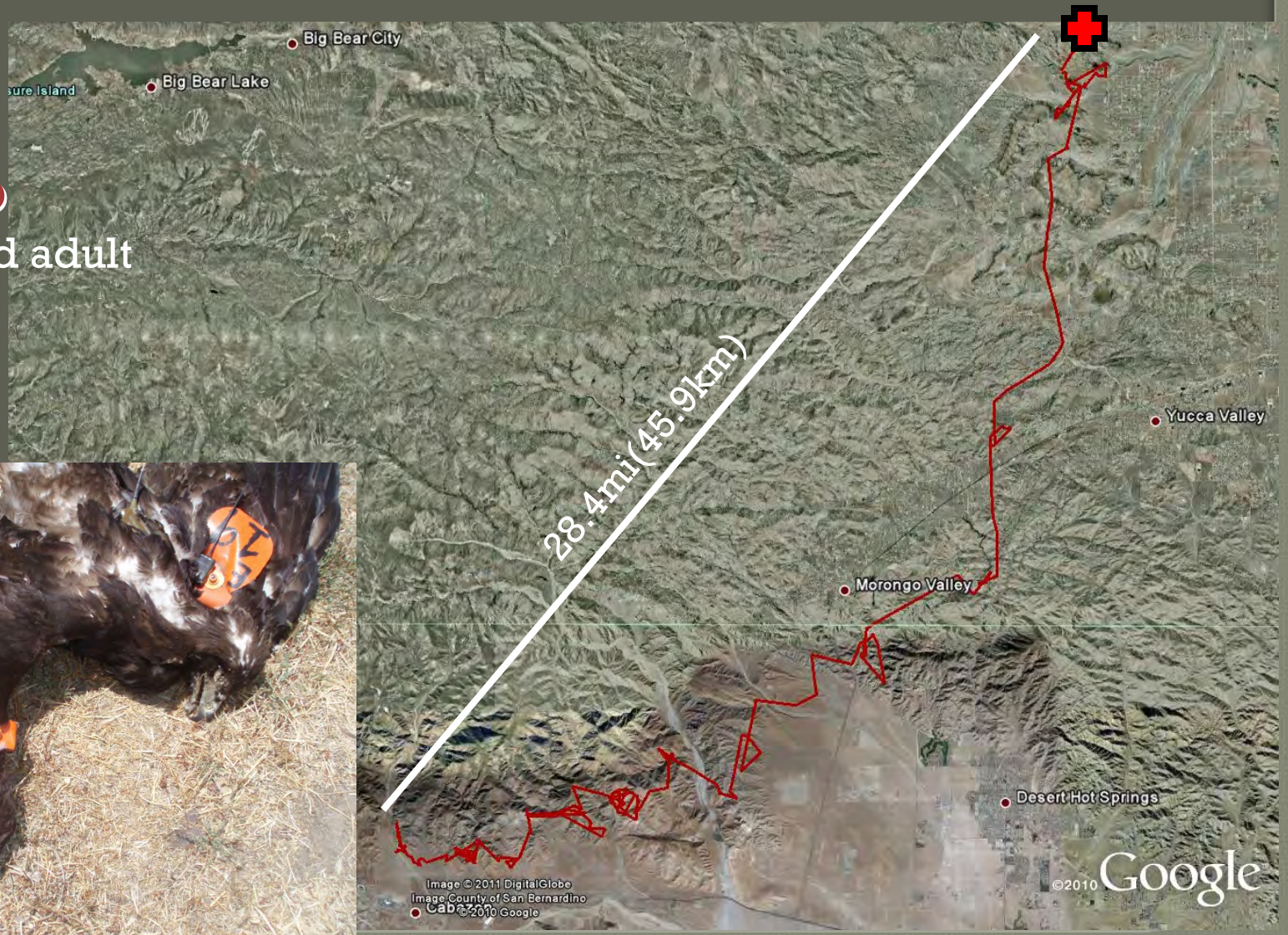
Traveled 251mi (403.9km) up to Santa Barbara before returning to the SD River Valley; currently 2mi(3.2km) from nest site

Mesa Grande 2009 nestling



Rehabilitated Golden Eagle was tagged and released on Feb 26th, 2010
Traveled 31.5mi(50.7km) northeast up the Morongo Valley
Began transmitting as deceased on April 12th, 2010

Morongo
Rehabilitated adult



9 primaries on one wing and 7 on the other wing were sheared evenly



Satellite-tagged Golden Eagle nestlings from 2010 Season

Six nestlings tagged in 2010:

1 young at Bandy Canyon

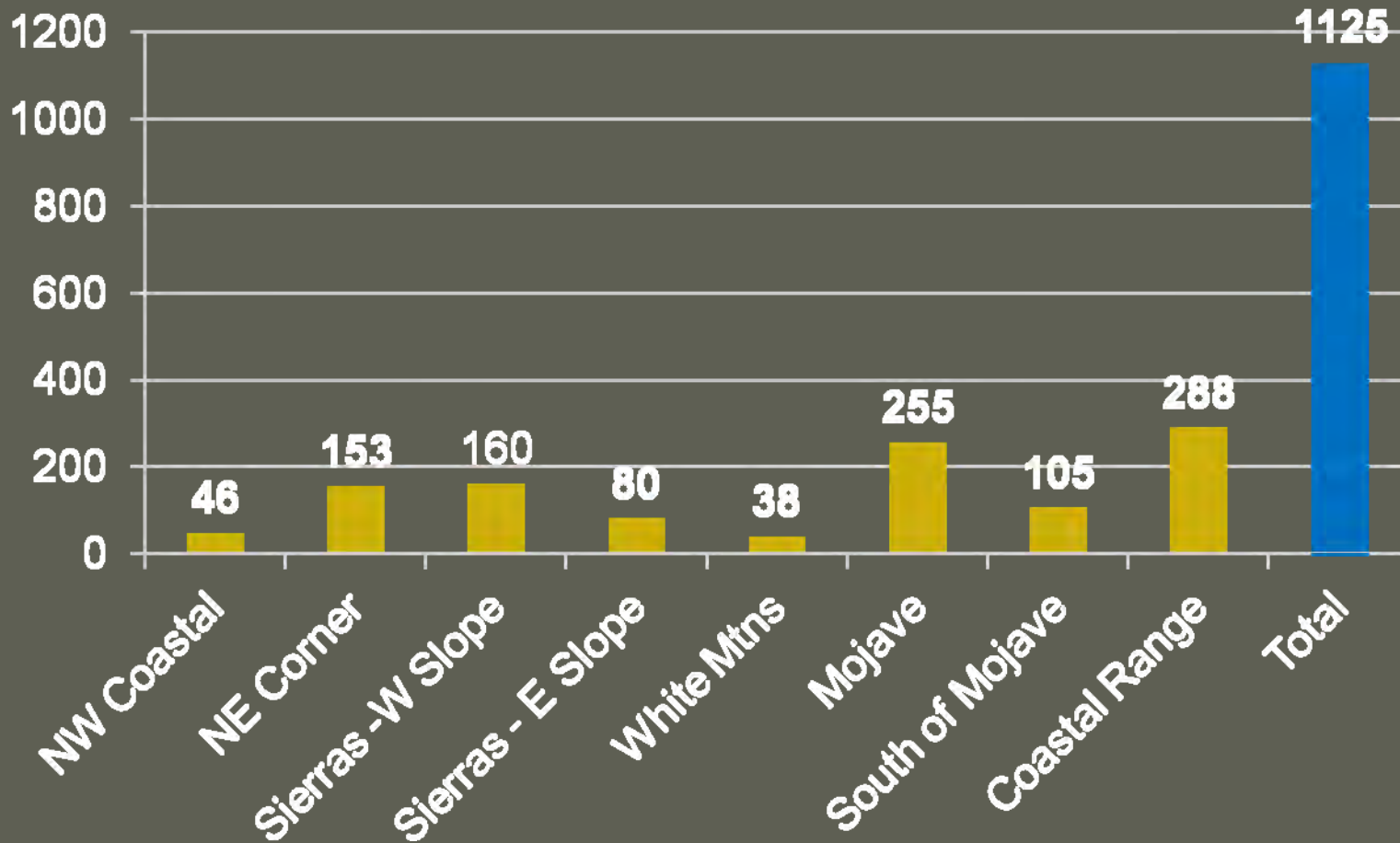
2 young at Moreno Butte (siblings)

2 young in Hay Canyon (siblings)

1 young at White Mtn



California GOEA Territory Estimates



Pah Rah Mtns

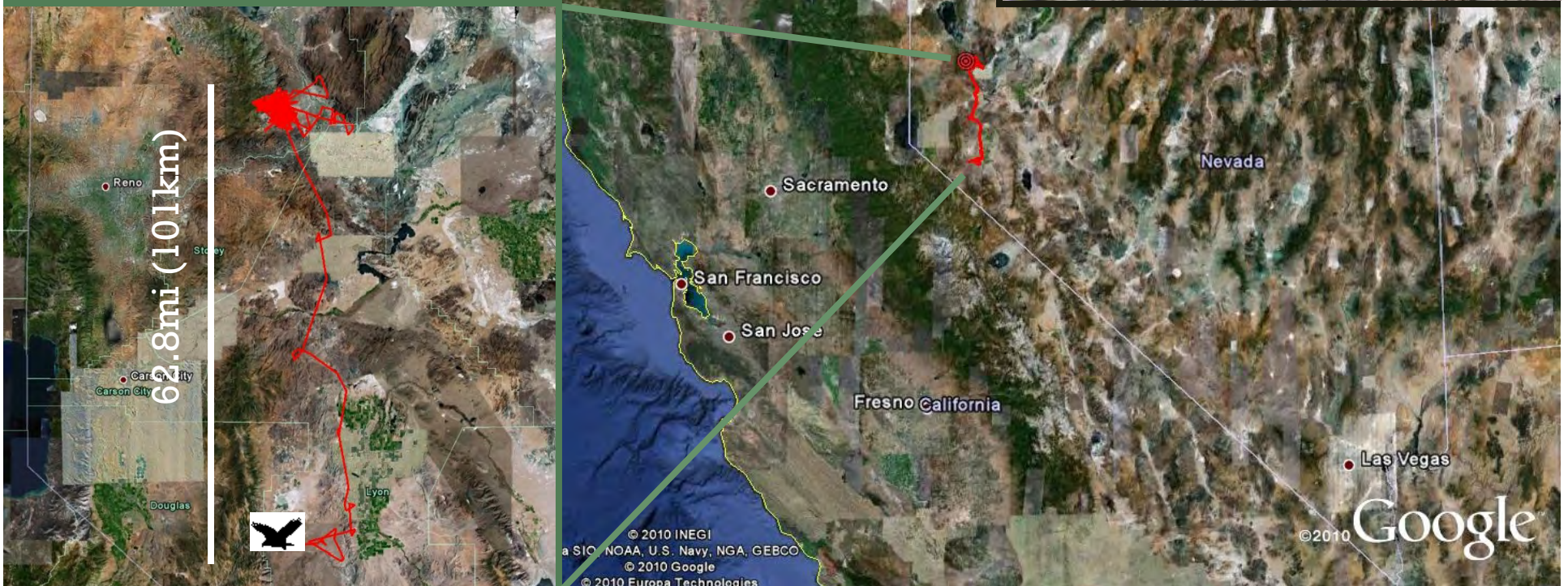


White Mountain Nestling

Tagged June 1st, 2010

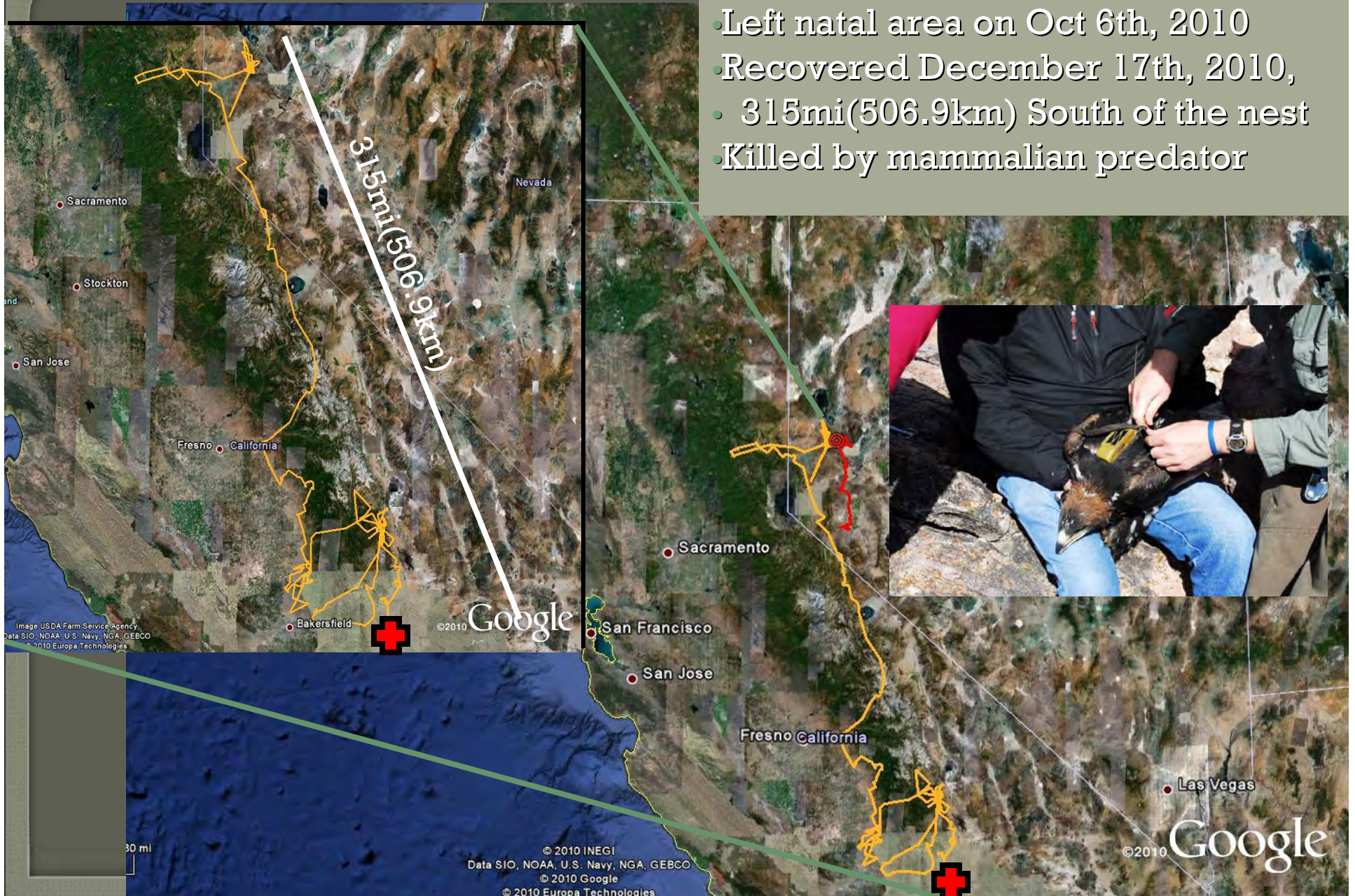
Left natal area on Jan 16th, 2011

Currently in an agricultural area in western NV



Hay Canyon Nestling #1

- Tagged on June 1st, 2010
- Left natal area on Oct 6th, 2010
- Recovered December 17th, 2010,
 - 315mi(506.9km) South of the nest
- Killed by mammalian predator



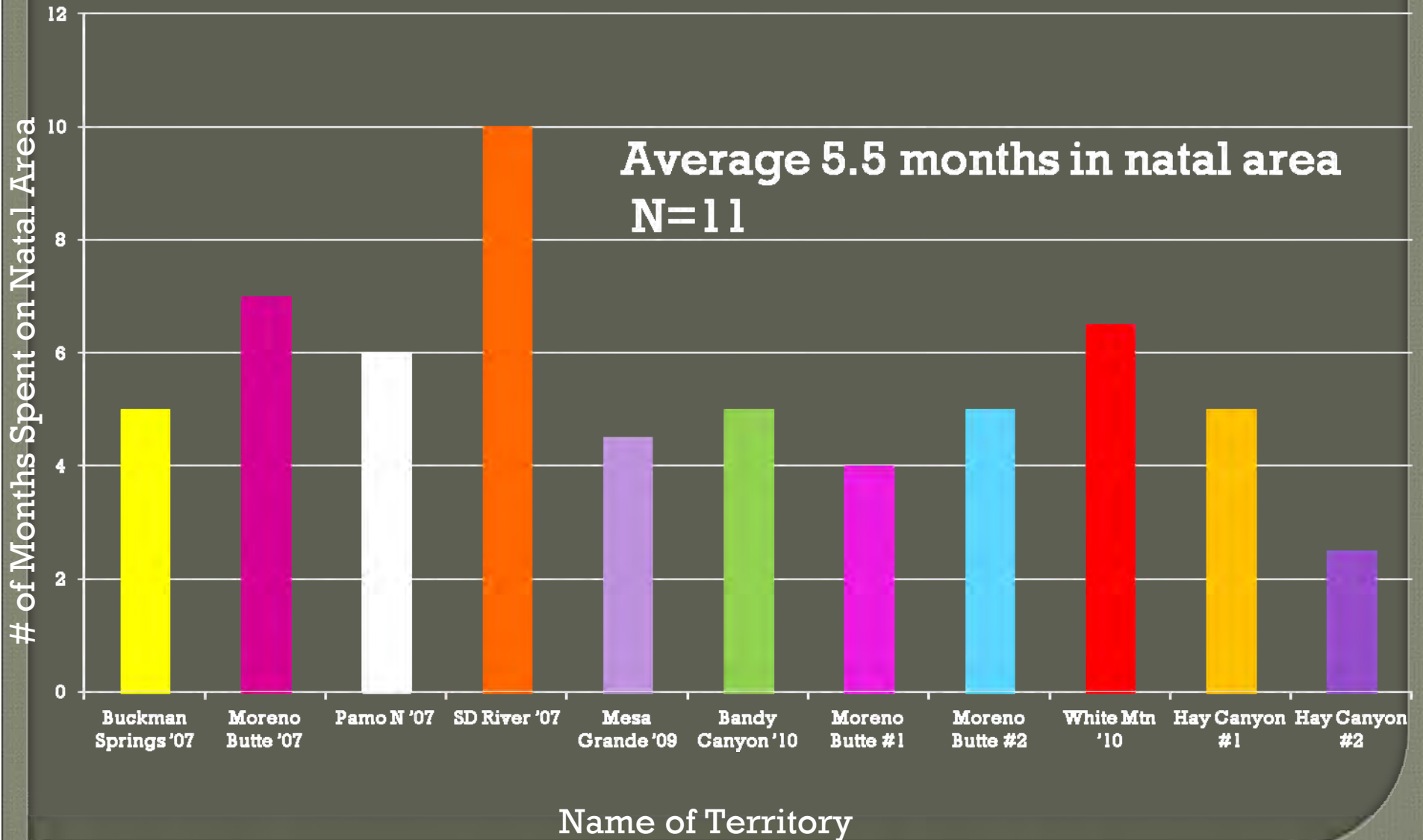
Hay Canyon Nestling #2

Nestling remained on natal area for only 2.5 months

Tagged on June 1st, 2010
Left natal area on August 11th, 2010
Currently 71.74mi (115.5km) northeast of nest



Comparison of time spent on natal area across territories



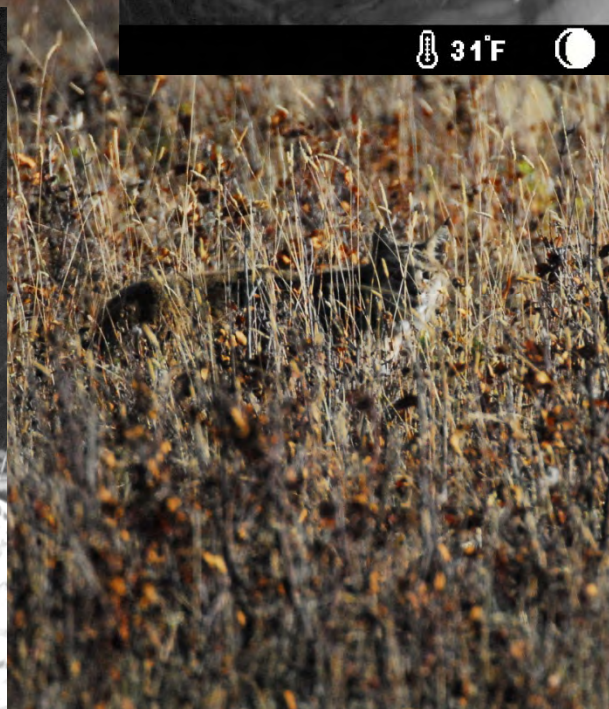
Migratory Golden Eagle Movement



Raptor Diversity



Trapping challenges



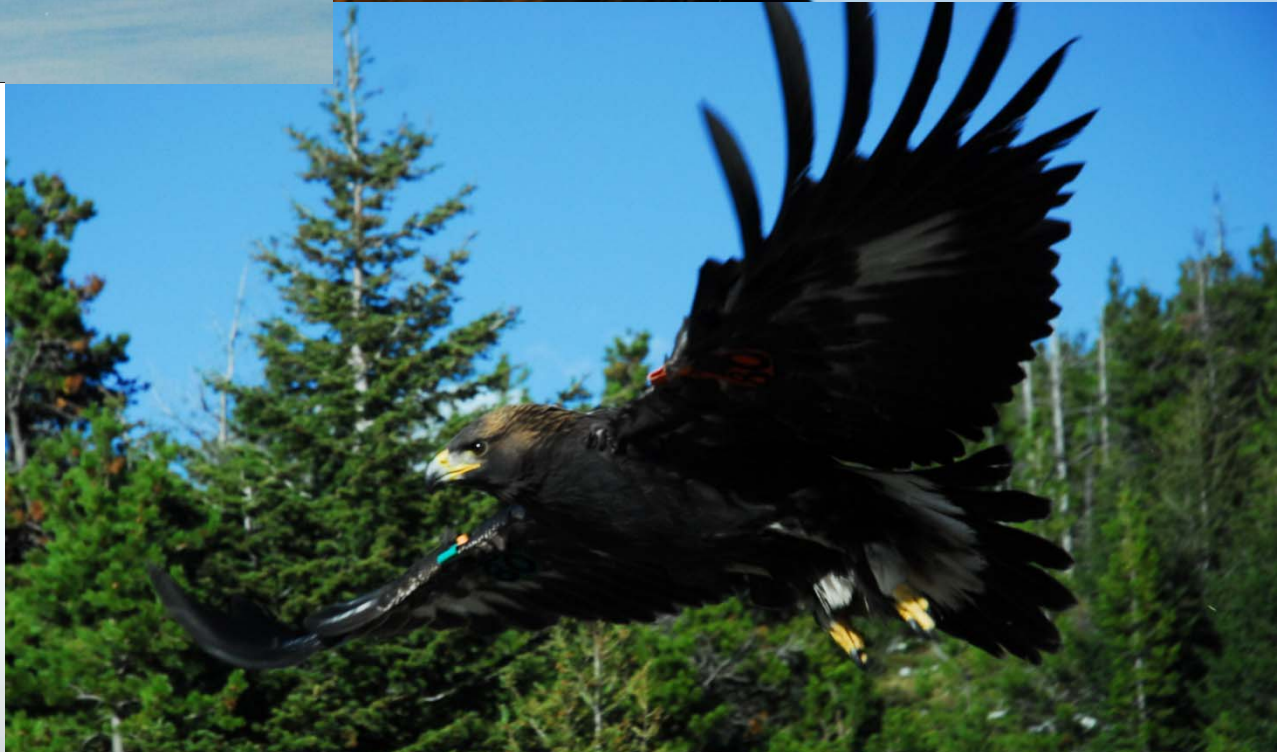
Banding and Tagging



Processing



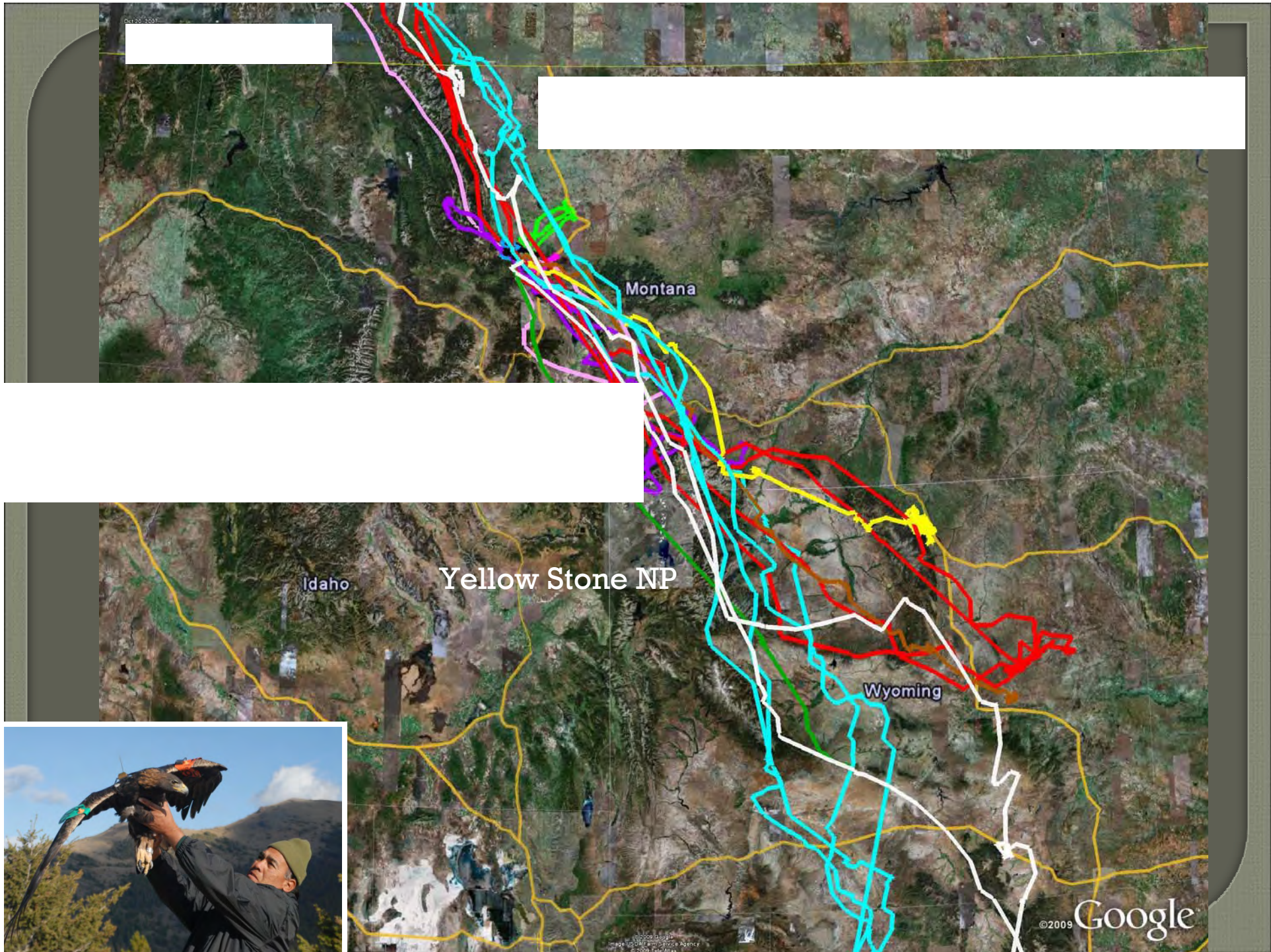
Release



Six in the Hand-None in the Bush







GE 90 Adult

*Returned to same
Winter and Spring
territories*

Fall 2007-Spring 2008

Fall 2008

Spring 2009

Fall 2009

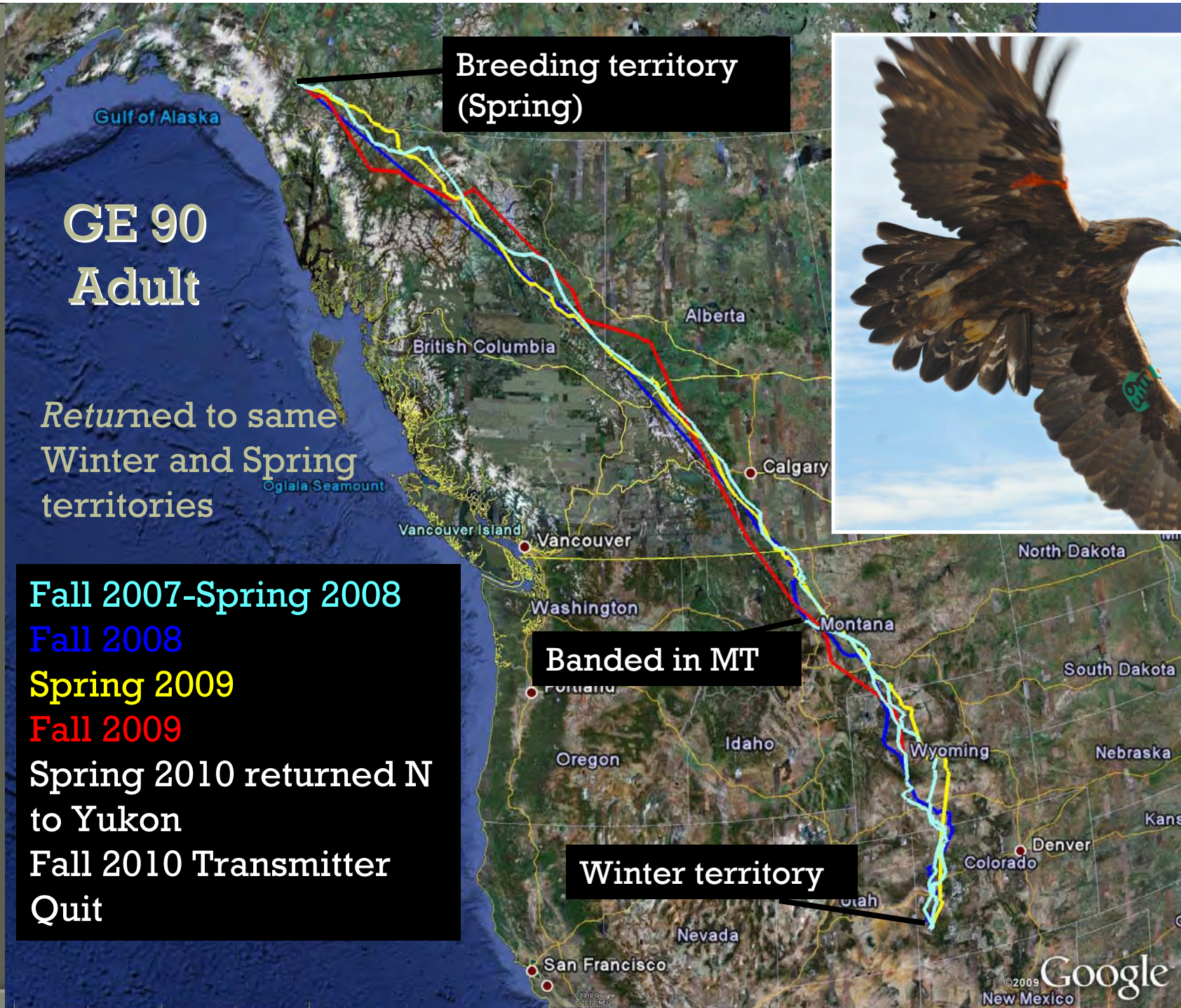
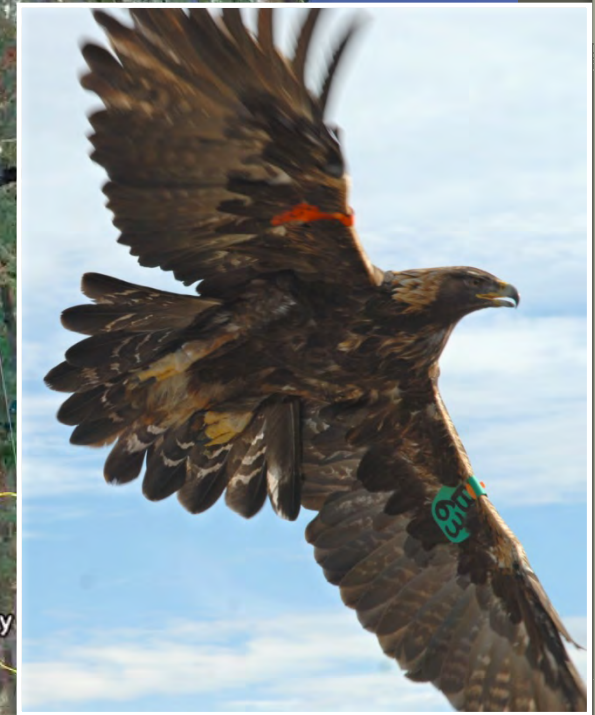
Spring 2010 returned N
to Yukon

Fall 2010 Transmitter
Quit

Breeding territory
(Spring)

Banded in MT

Winter territory



GE 90 Adult

Yukon Breeding Territory, CAN



Spring2008
Spring 2009

GE 93
Adult
2007-09

Returned to the same
Winter and Spring
territories



Long Distance Migrations

Last transmission

Last transmission

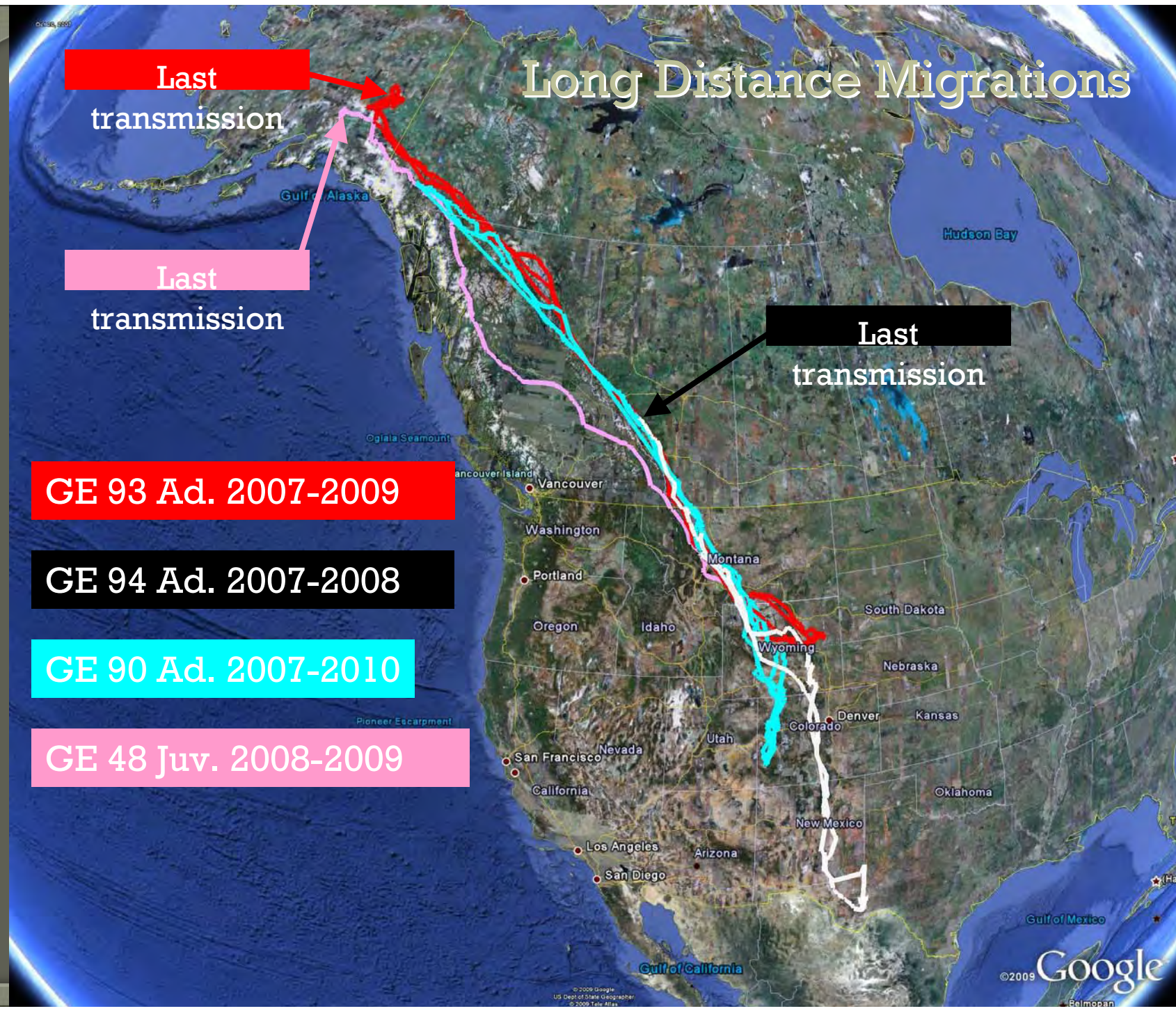
Last transmission

GE 93 Ad. 2007-2009

GE 94 Ad. 2007-2008

GE 90 Ad. 2007-2010

GE 48 Juv. 2008-2009



Acknowledgements

Cleveland National Forest
Bureau of Land Management
Tetra-tech
Black Tail Ranch, MT
Anza Borrego State Park
Morongo Indian Reservation
Helena National Forest