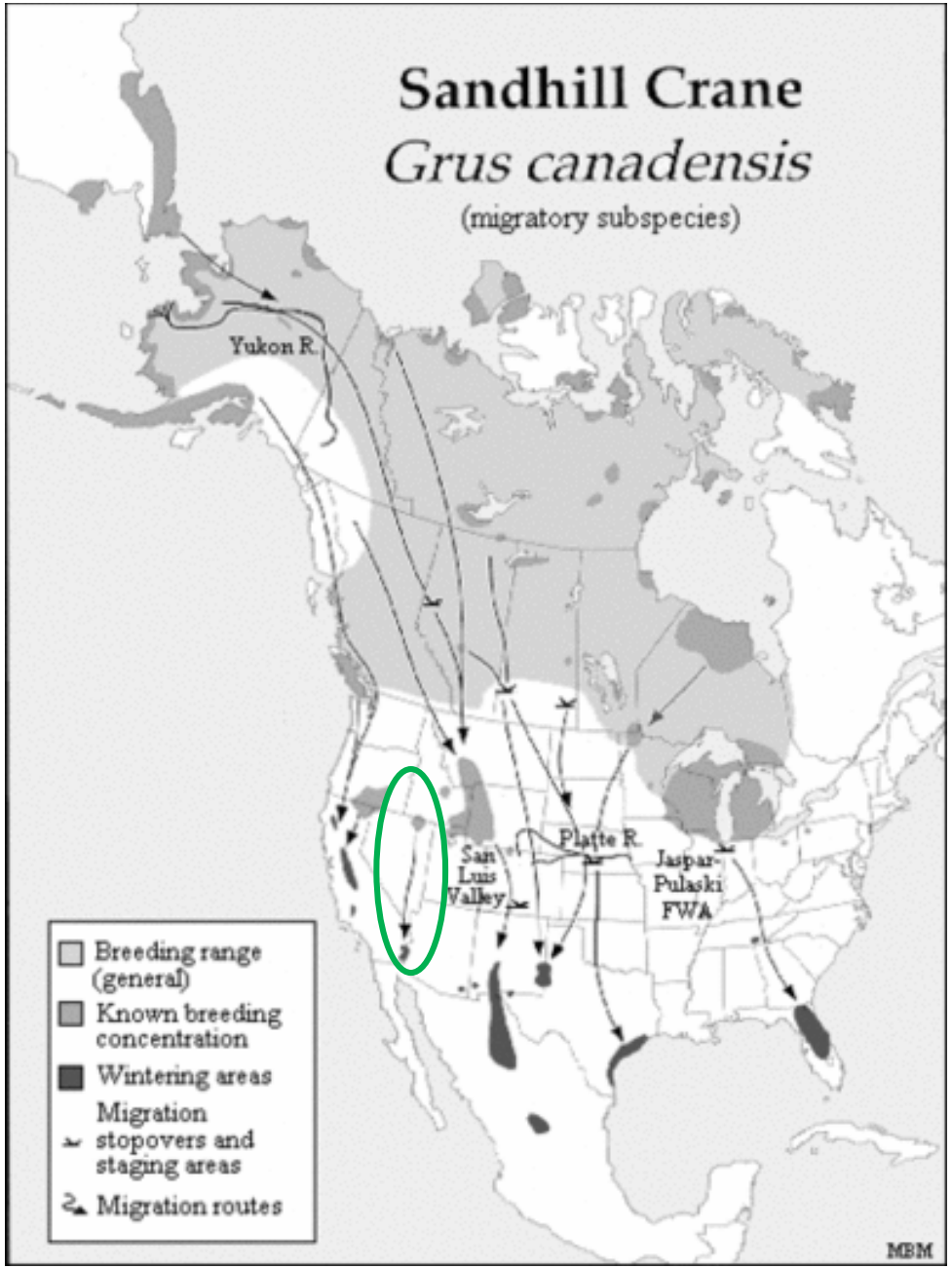
Migratory Ecology of the Lower Colorado River Population of Sandhill Cranes

Courtenay Conring
Dr. Daniel Collins
Dr. Blake Grisham
Dr. Warren Conway



Introduction

- Migratory subspecies:
  - greater, lesser, and Canadian
- Non-migratory subspecies:
  - Florida, Mississippi, and Cuban
- The nine populations:
  - Cuban (CP)
  - Florida (FP)
  - Eastern (EP)
  - Mississippi (MP)
  - Mid-Continent (MCP)
  - Rocky Mountain (RMP)
  - Lower Colorado River Valley (LCRVP)
  - Central Valley (CVP)
  - Pacific Coast (PCP)

Introduction

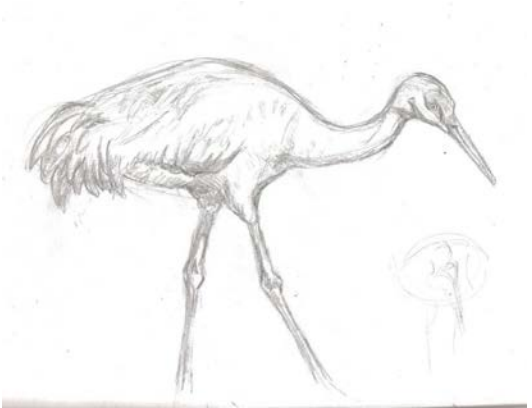
- LCRVP smallest of migratory populations (~3,000)
- Lowest recruitment rate (~4.8%)
- Known breeding range: NE Nevada, SW Idaho
- Known wintering range: LCRV, Gila River, Imperial Valley, Baja CA in Mexico
- Known habitat types used:
  - Crops
  - Hay
  - Wet meadows
  - Wetlands
  - Rivers
- Lack of standardized surveys- discrepancies concerning breeding distribution

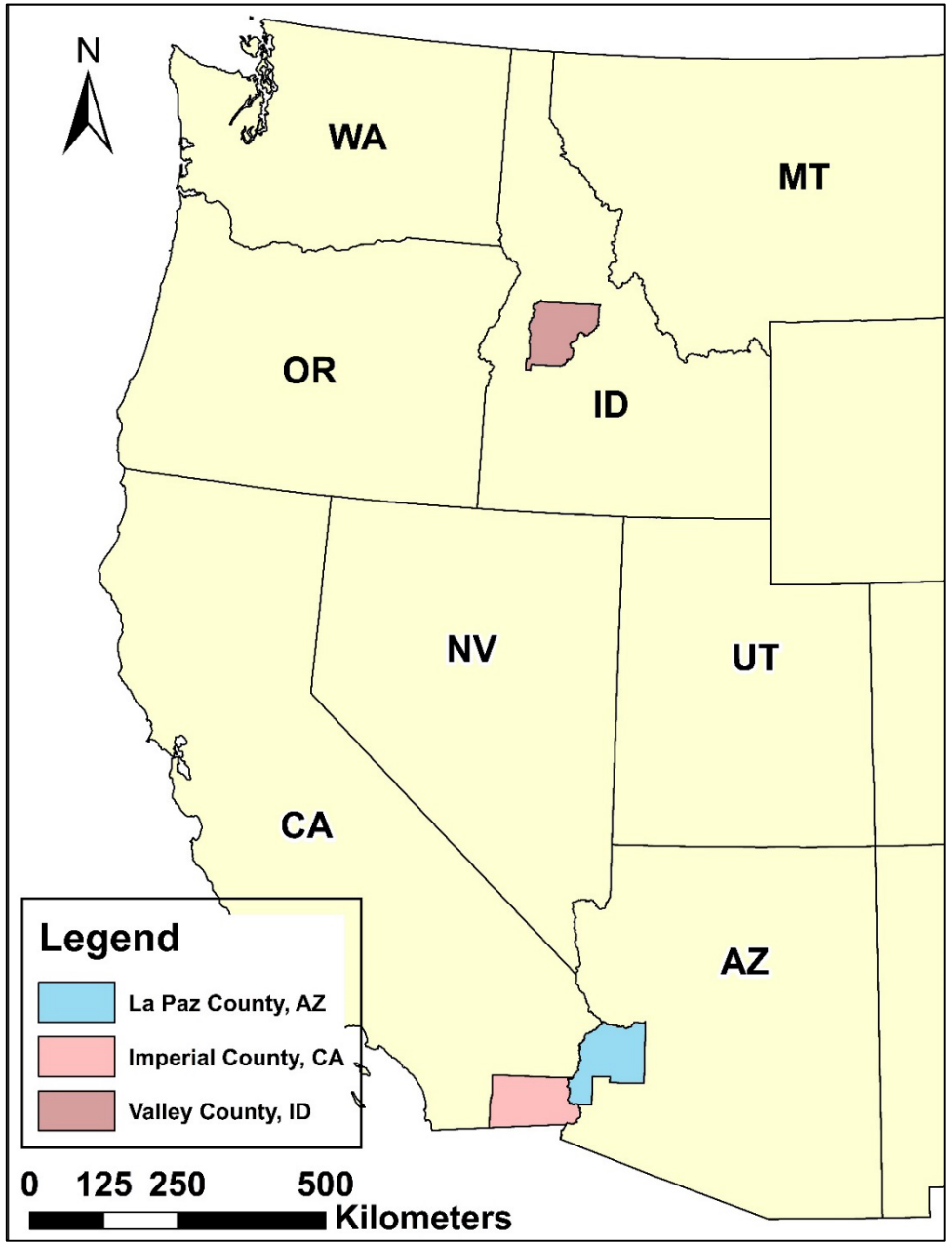
Background/Justification

- AFWA Migratory Shore and Upland Game Bird (MSUGB) Task Force ranked priorities for sandhill cranes (2009)
  - 3rd priority- information needs for sandhill crane populations in the West
- Research priorities for LCRVP
  - Define winter movements
  - Identify habitat needs and new breeding ranges
  - Habitat selection and use during spring migration
  - Information on intermixing crane breeding populations
  - Future winter needs given climate change

Study Areas

- Winter
  - Lower Colorado River Valley (LCRV)- La Paz Co., AZ & Imperial Co., CA
  - Imperial Valley- Imperial Co., CA
- Summer
  - Long Valley- Valley Co., ID





- Chapter 1- Space Use
- Chapter 2- Habitat Selection
- Chapter 3- Migratory Connectivity and New Summer Areas
- Chapter 4- Management Implications

Chapter 3: Identification of Migratory Connectivity and Summering Areas for the LCRVP

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MSUGB priorities

- Identify habitat needs and new breeding ranges
- Habitat selection and use during spring migration
- Information on intermixing crane breeding populations

Objectives

1. Map migration corridors of the LCRVP
2. Identify areas of migratory importance (AMIs)
3. Delineate summer areas outside of the known LCRVP breeding distribution

Chapter 3 Methods: Mapping Migration Corridors

- Brownian bridge movement model
  - Output: the probability of an animal occurring in an area over a defined time interval (migration event) (Horne et al. 2007)
- Calculated a 95% confidence contour for each tagged crane to represent their migration corridors using the Brownian bridge movement model, “BBMM” R Package
- In ArcMap 10.2:
  - Merged all corridors from all migration events to map a general migration corridor

Spring 2014 n= 14, Spring 2015 n= 10

Fall 2014 n= 9

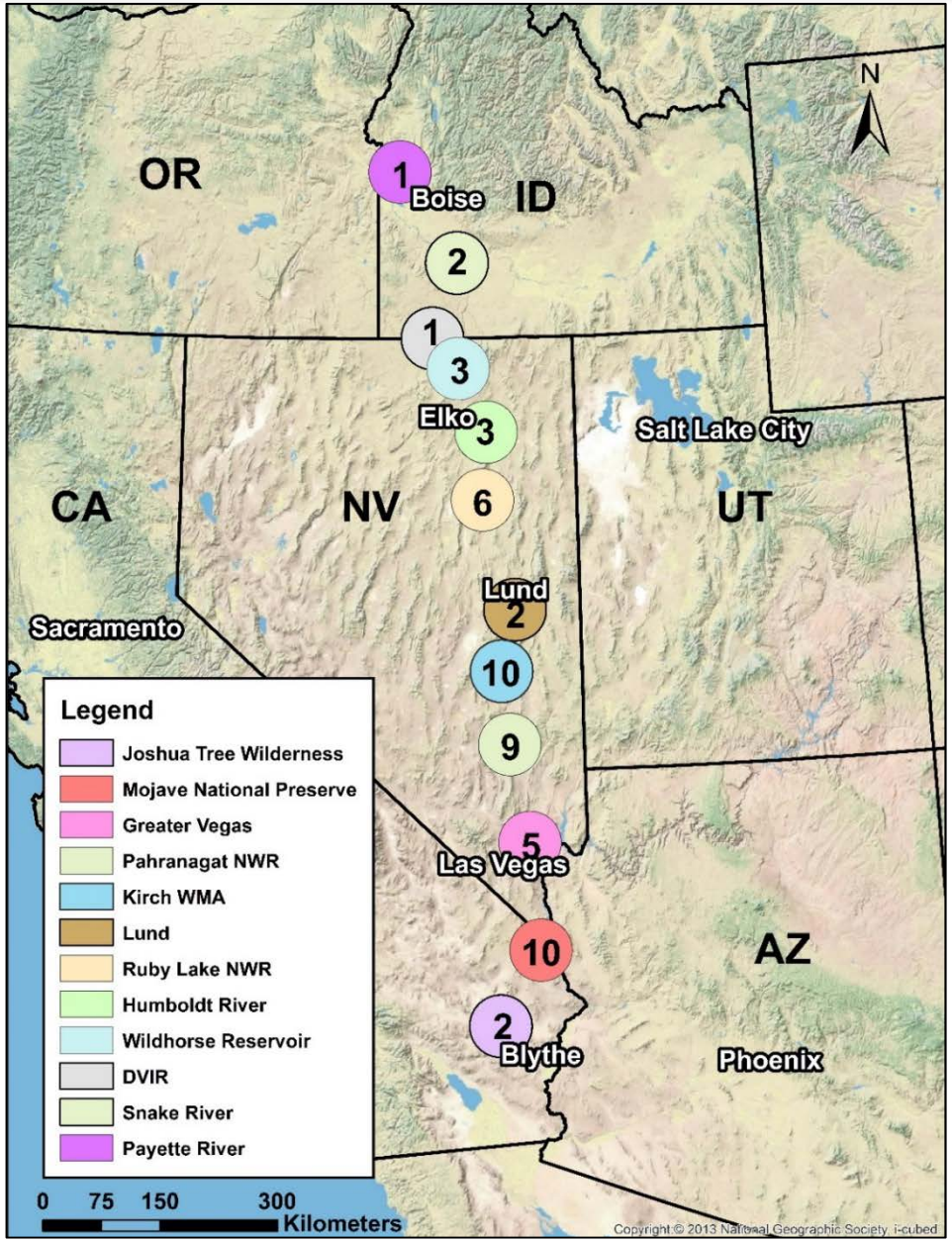
N
OR
ID
Boise
Salt Lake City
Elko
NV
UT
Sacramento
Lund
CA
Las Vegas
AZ
Phoenix
Blythe
Legend
LCRVP Migration Corridor
0 75 150 300
Kilometers

Chapter 3 Methods: Identifying AMIs

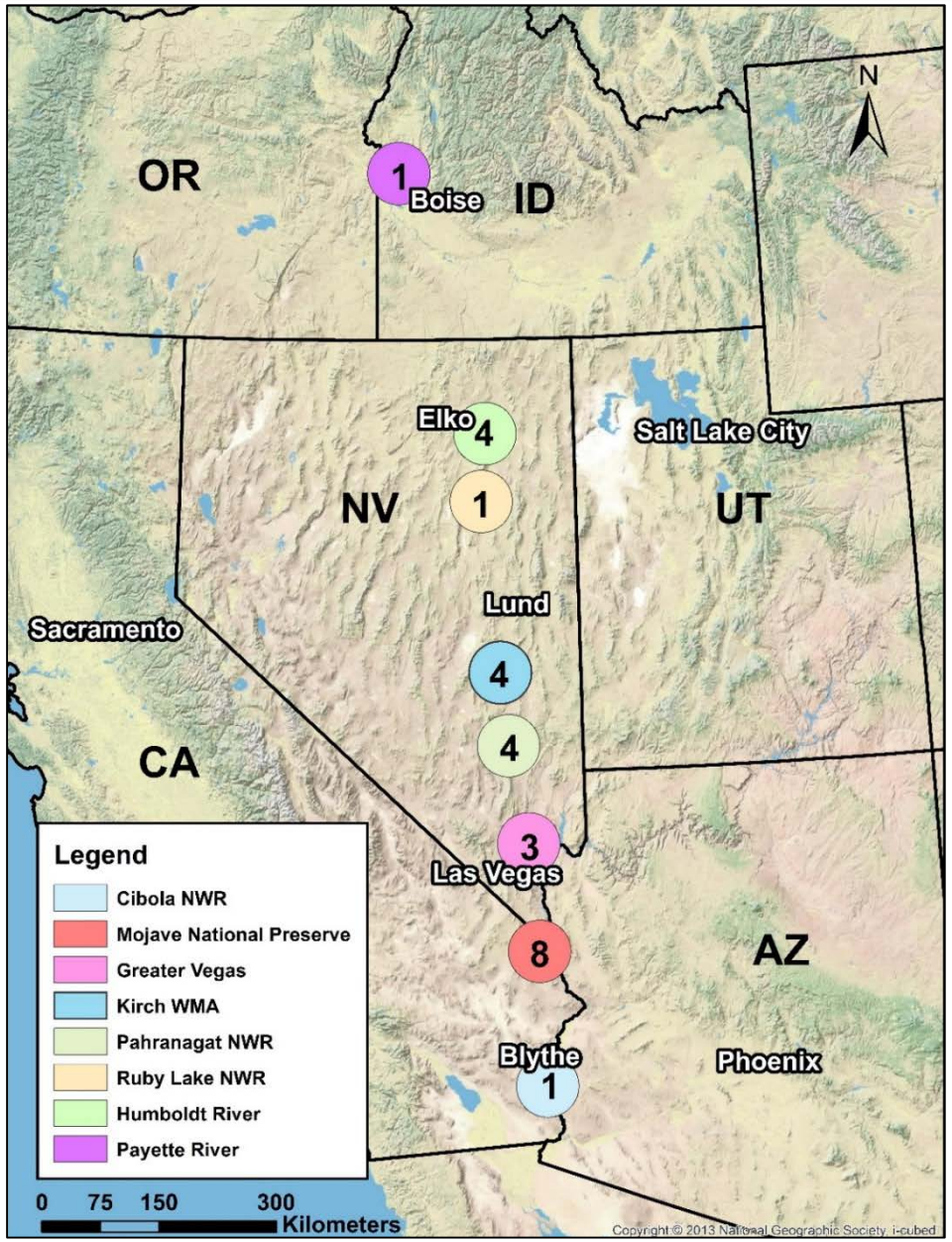
- What are AMIs?

Areas that have served as a stopping or resting location for a crane during a migratory event

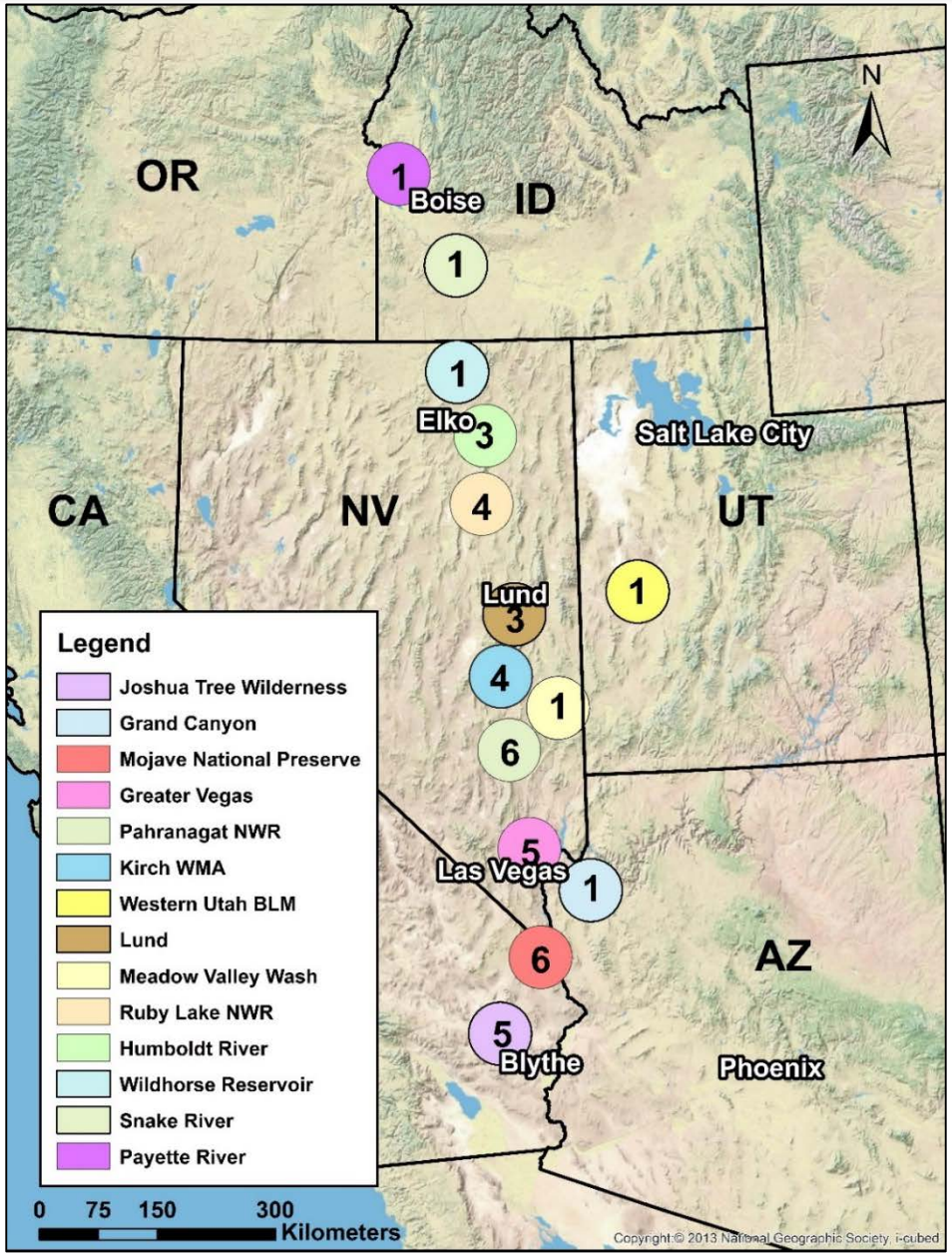
- All migratory locations that fell within the borders of the 75% confidence contours were classified into one of 16 AMIs
- Many locations were close (within 40 km) to each other, when this occurred we picked the central location within each cluster of locations (more than one) to represent that area and added a 40 km buffer to each central location to represent the AMIs that included all locations in that given area
- AMIs were labeled based on a flagship locality within them



Spring 2014 n= 14



Fall 2014 n= 9



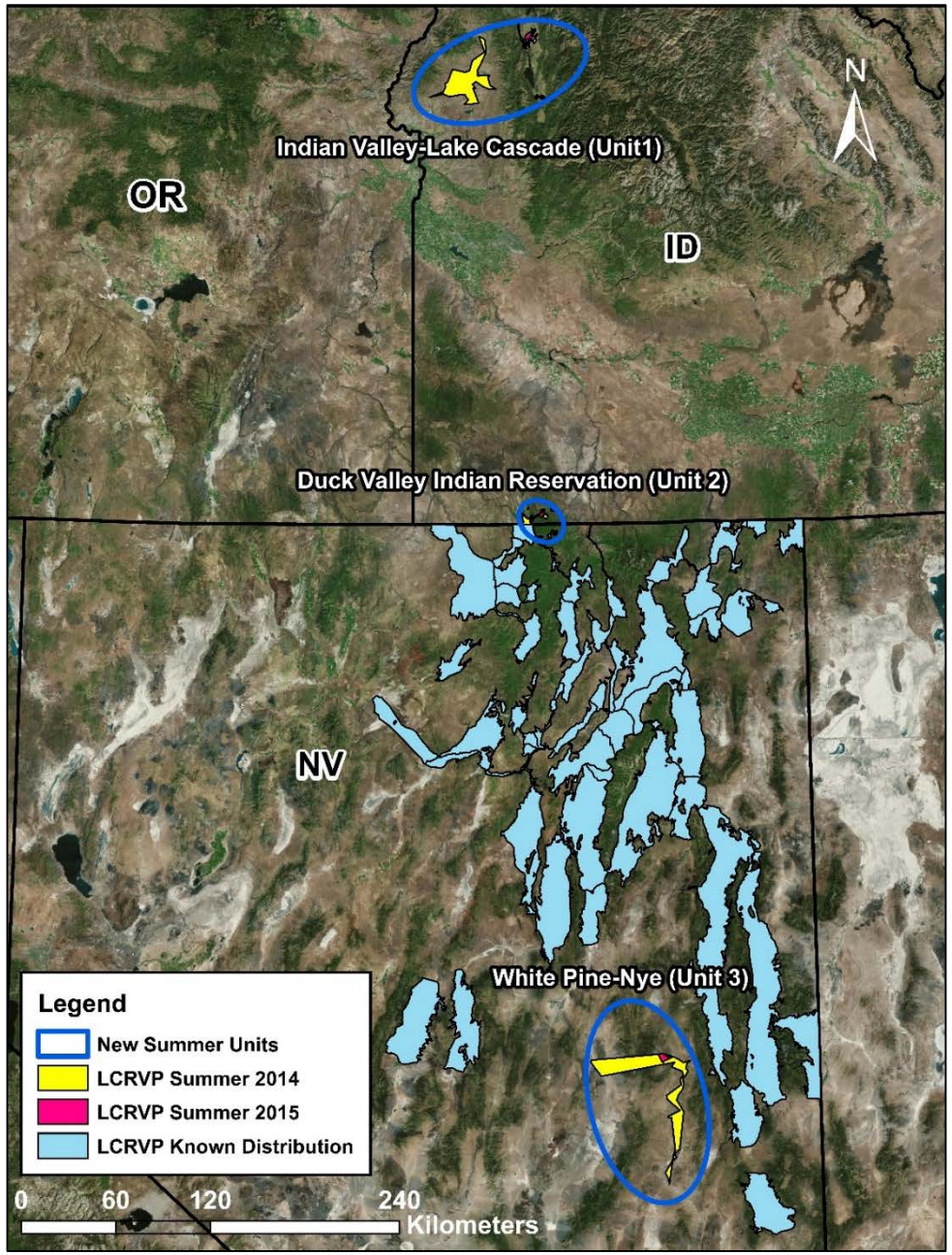
Spring 2015 n= 9

Chapter 3 Methods: Delineating New Summer Areas

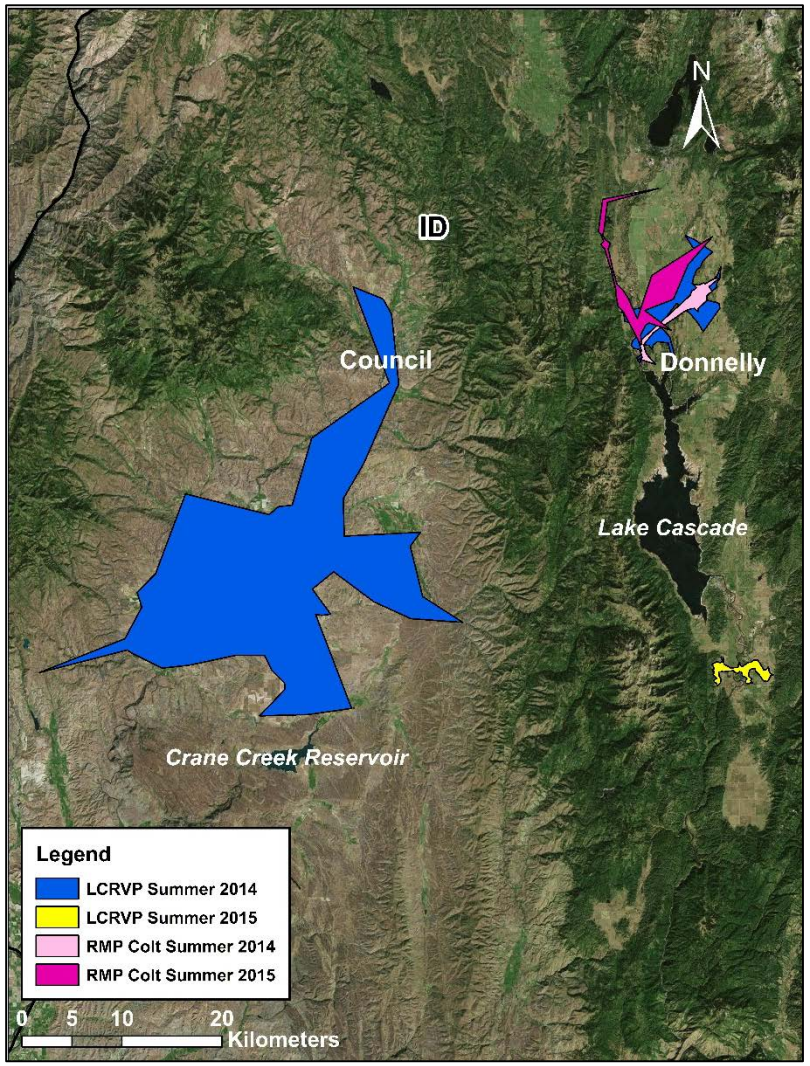
"Summer areas" because we were unable to confirm a breeding pair, colt, or nest at any sites aside from the Idaho location where we trapped a colt (Collins et al. 2016)

In ArcMap 10.2:

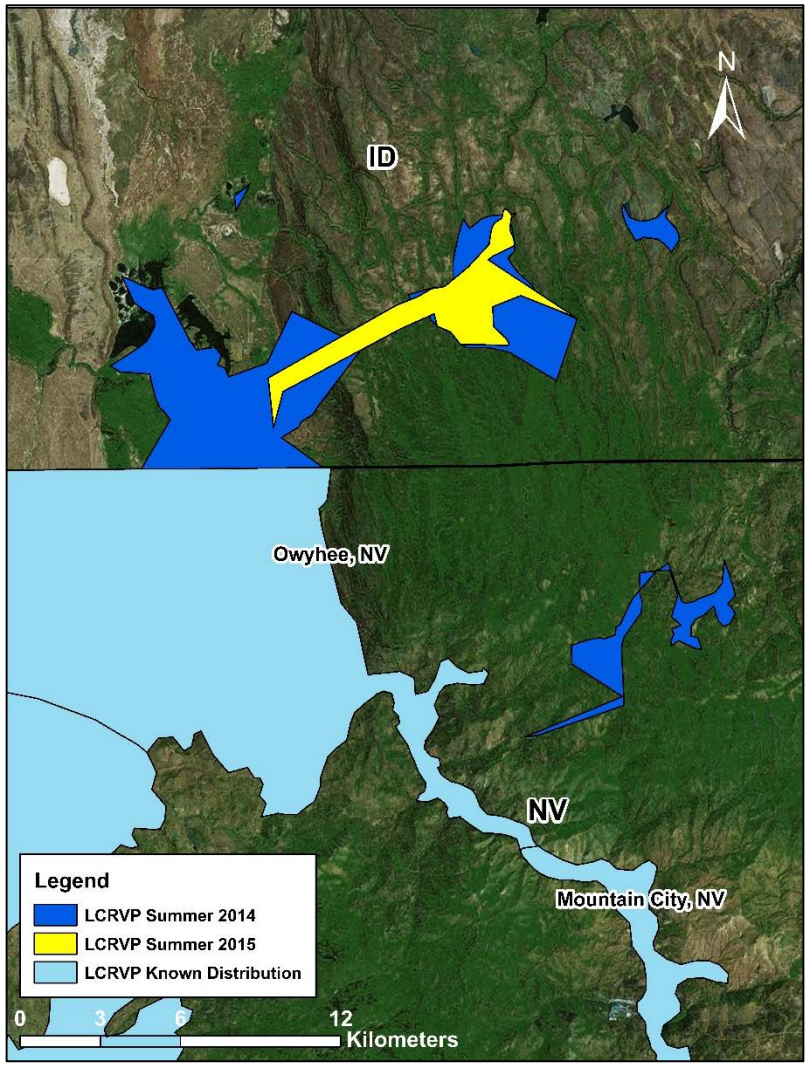
- Overlaid the known LCRVP breeding distribution shapefile with the PTT locations from the 2014 and 2015 summer seasons
- Outlined any areas that fell outside the boundaries of the known LCRVP breeding distribution shapefile
- Classified the new summer areas into units


Indian Valley-Lake Cascade (Unit1)
OR
ID
N
Duck Valley Indian Reservation (Unit 2)
NV
White Pine-Nye (Unit 3)
Legend
New Summer Units
LCRVP Summer 2014
LCRVP Summer 2015
LCRVP Known Distribution
0
60
120
240
Kilometers

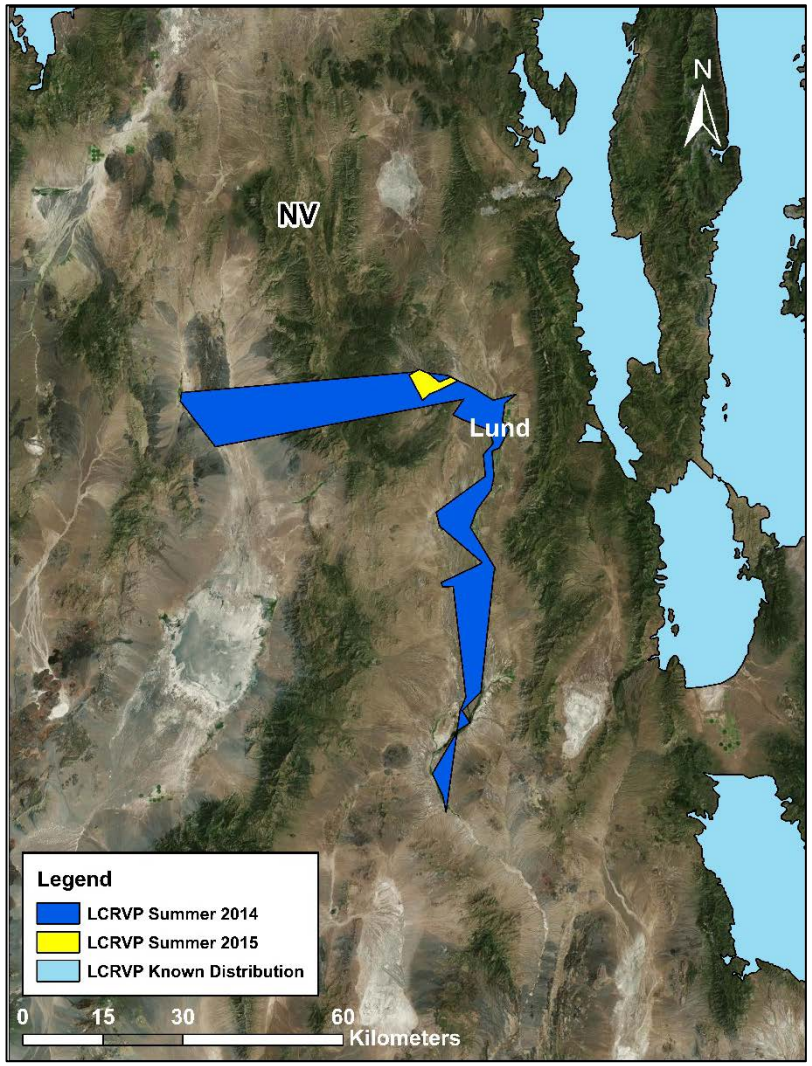
Indian Valley-Lake Cascade Unit

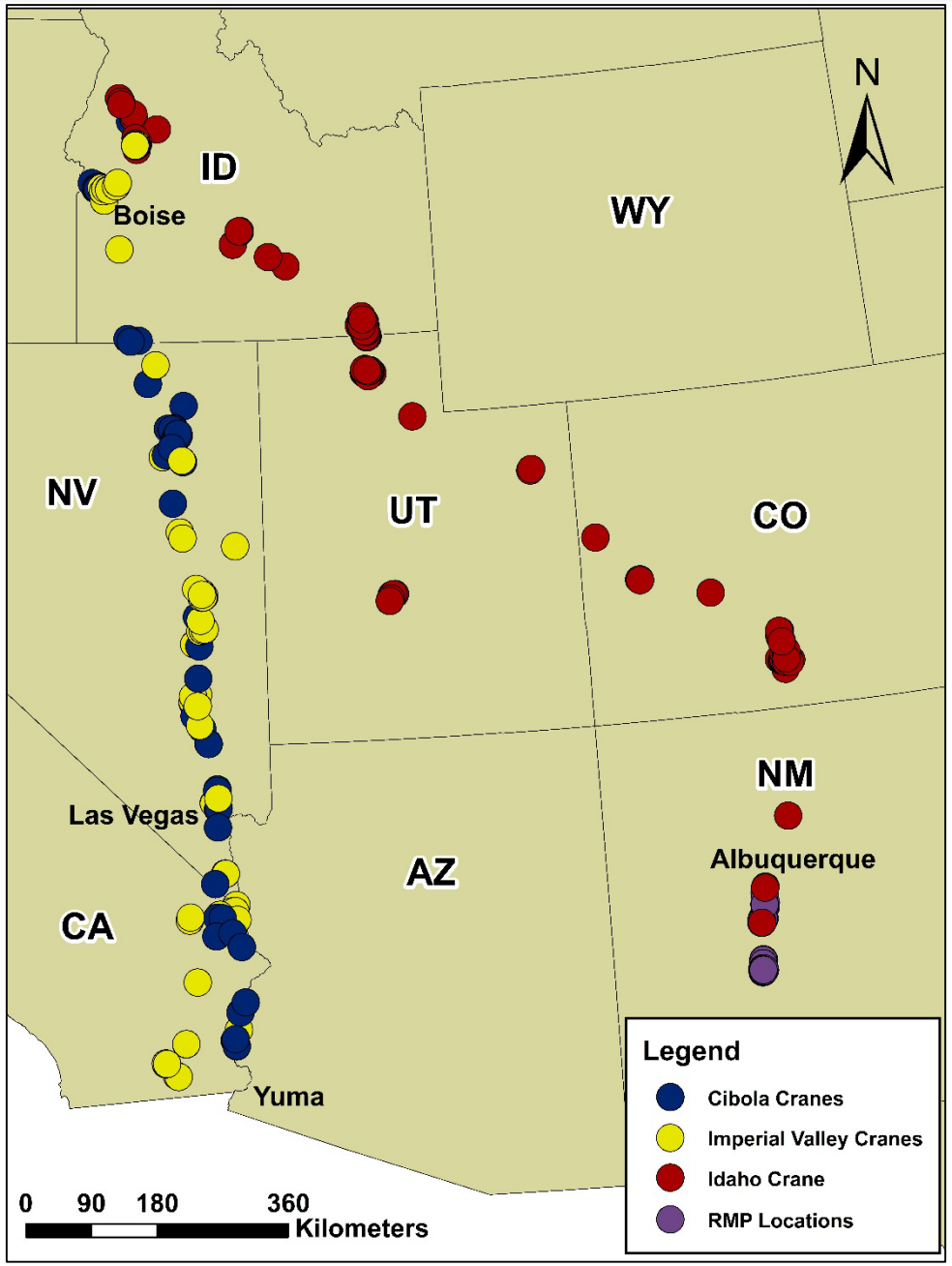


Duck Valley Indian Reservation Unit



White Pine-Nye Unit




N
ID
Boise
WY
NV
UT
CO
NM
Albuquerque
Las Vegas
AZ
CA
Yuma
Legend
Cibola Cranes
Imperial Valley Cranes
Idaho Crane
RMP Locations
0 90 180 360
Kilometers

Discussion

- 9 AMIs are on public land, one is DVIR, and spring fed water sources were a common trend
- New summer areas, the colt, and known distribution of other western populations are evidence that intermingling may occur or population delineations need to be re-evaluated for management

Chapter 4: Management Implications for Chapter 3

- 9 AMIs and corridors used by LCRVP were on public lands
- We defined 3 new breeding units
- Increasing demand and potential for renewable energy
- Potential harvest management issues

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