

Range-wide Patterns of Natal and Breeding Dispersal in the Streaked Horned Lark



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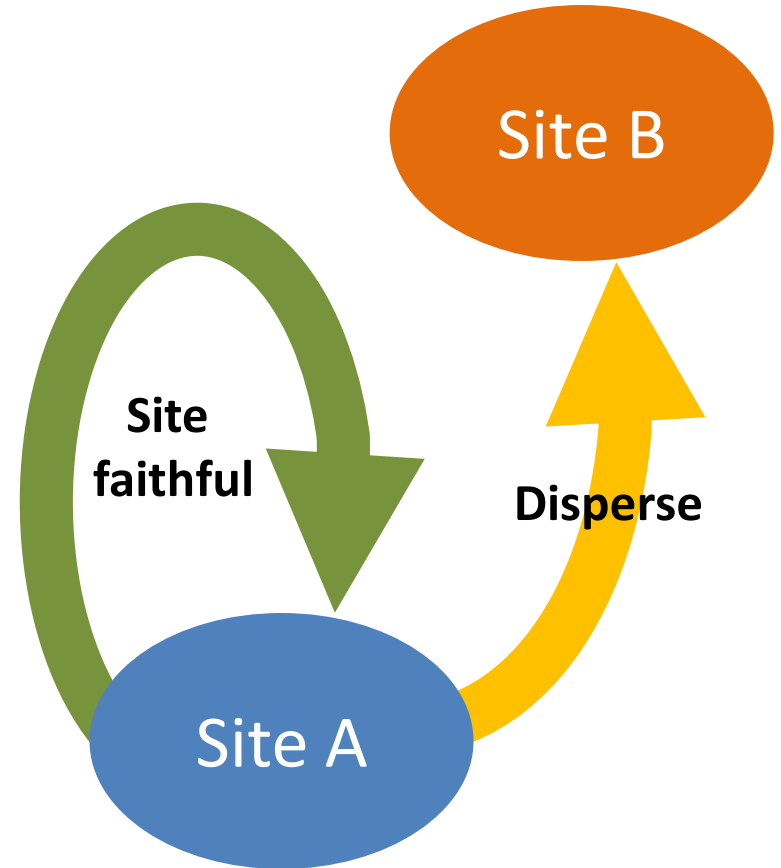
- Joint Base Lewis-McChord
 - Fish and Wildlife
 - Airfield and Training Area Managers
- Field Biologists
 - Jermaine Treadwell, Tim Leque, Adam Martin
 - Mark Hohey, and too many others to mention
- Olympia Airport, Dennis Vassar & Rudy Rudolph
- Sanderson Airfield, Brandon Palmer



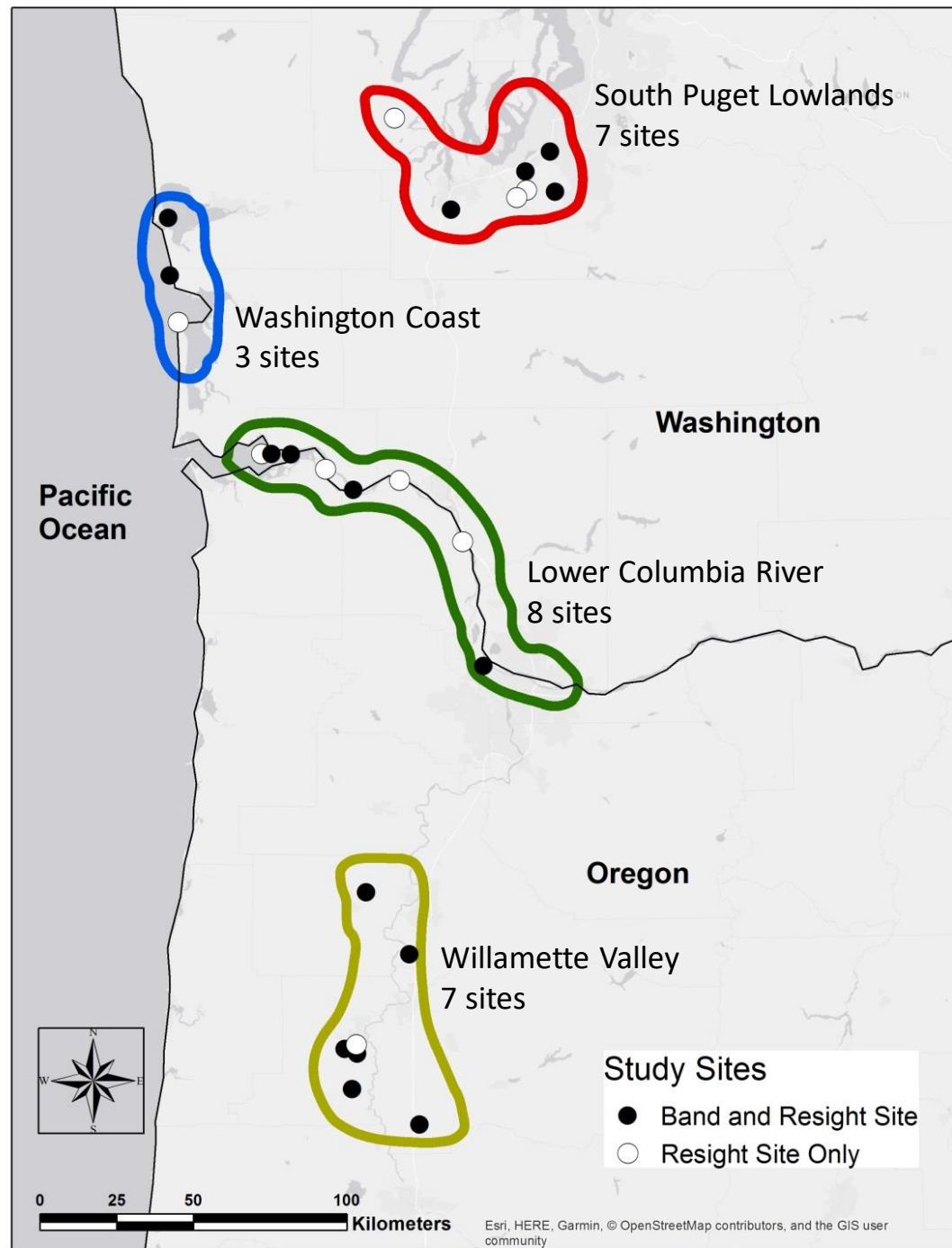
Movement Definitions



- Breeding Dispersal (Adults)
 - Subsequent movement between or within sites **after** breeding
- Natal Dispersal
 - Any movement of 1st year breeding birds, **the following year after they were hatched**



Study Sites 2002-2016



Mark-resight Methods

- Color-banded juveniles & adults
- Resight surveys
 - 15 April – 15 July
- Data Analysis
 - Proportion faithful vs. dispersed
 - Within and Inter-region
 - Dispersal distance
 - Nest to nest
 - Centroids to centroid





Sample Size



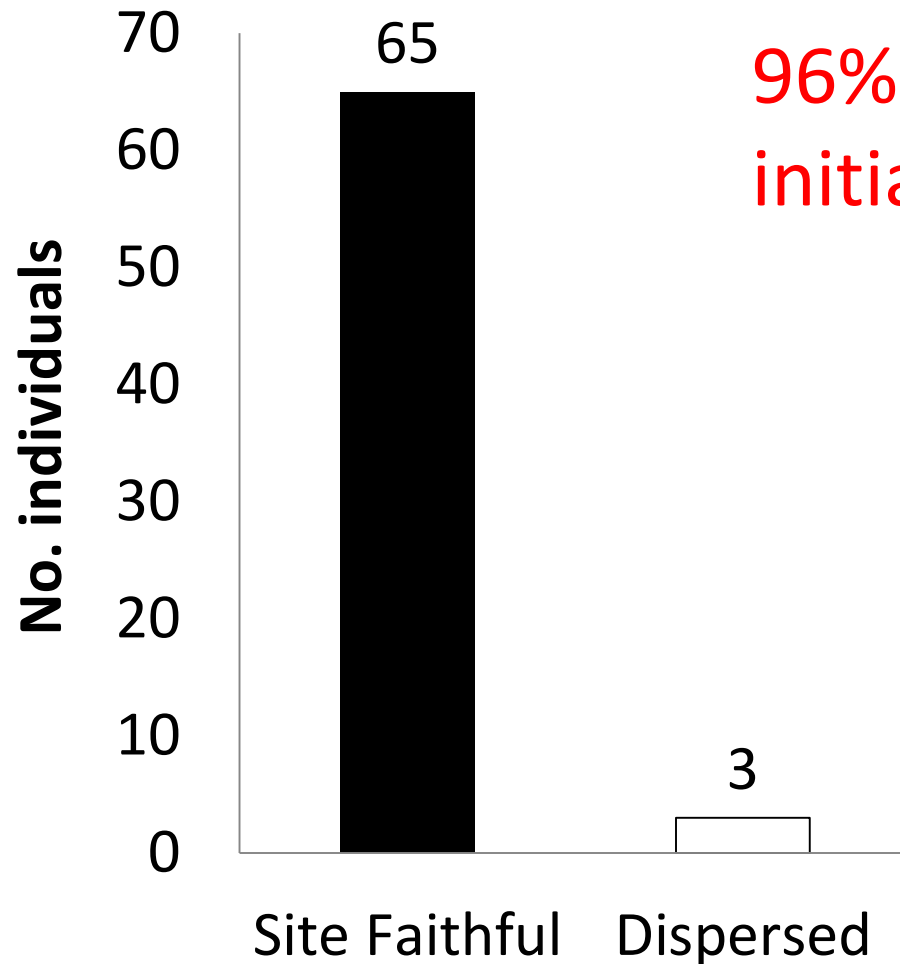
- 1,352 marked individuals, 2002 – 2015

Region	#Band Sites	No. Marked	Mark Period	Resight Period
S. Puget Lowlands	4	474	2002-15	2002-16
Willamette Valley	6	792	2007-15	2009-15
Washington Coast	2	31	2004-05	2004-07
Lower Col. River	4	55	2004-05	2004-07
	16	1,352		

- 151 first-year birds resighted
- 68 adults resighted

Breeding Dispersal:

Adults are strongly site-faithful



96% returned to
initial breeding site



Site Faithful Breeding Dispersal

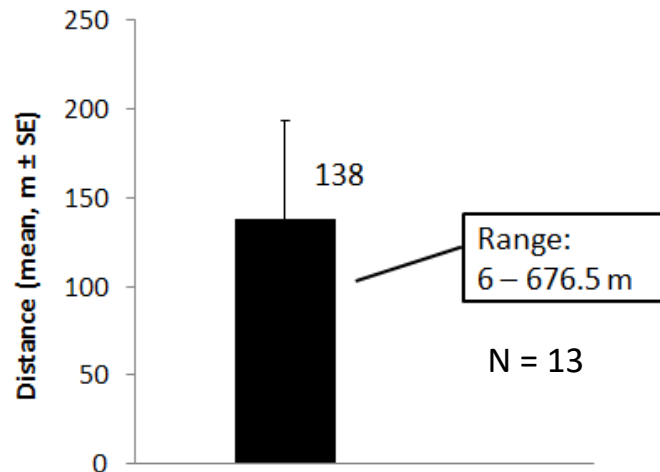
Nest Sites by Year
for male **Streaked
Horned Lark**

BS:PR

Year

- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017

Range 26 – 143 m

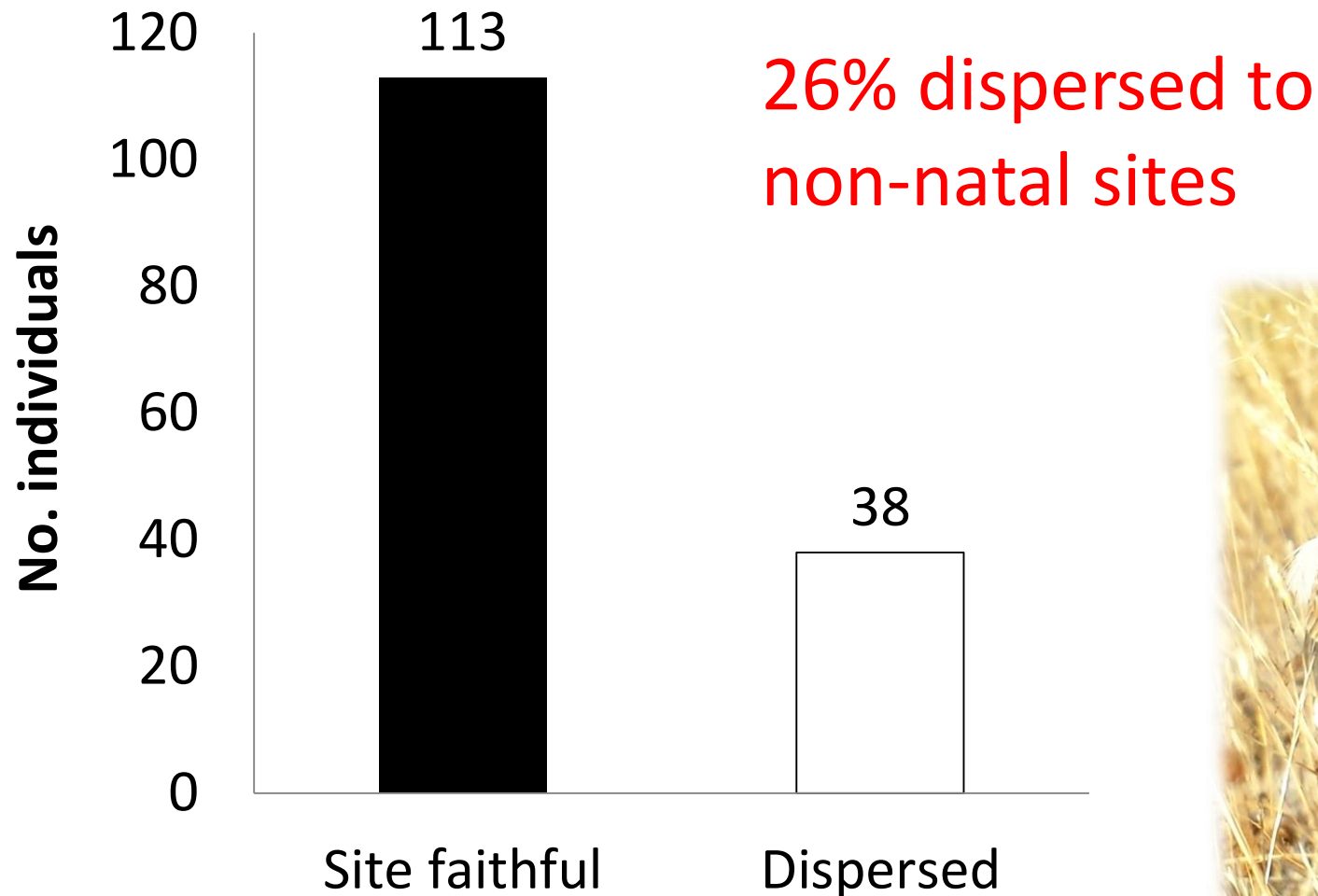


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



0 75 150 300 Meters

Natal Dispersal: 1st year breeding larks were more prone to disperse



Natal Dispersal

Inter-regional Movements

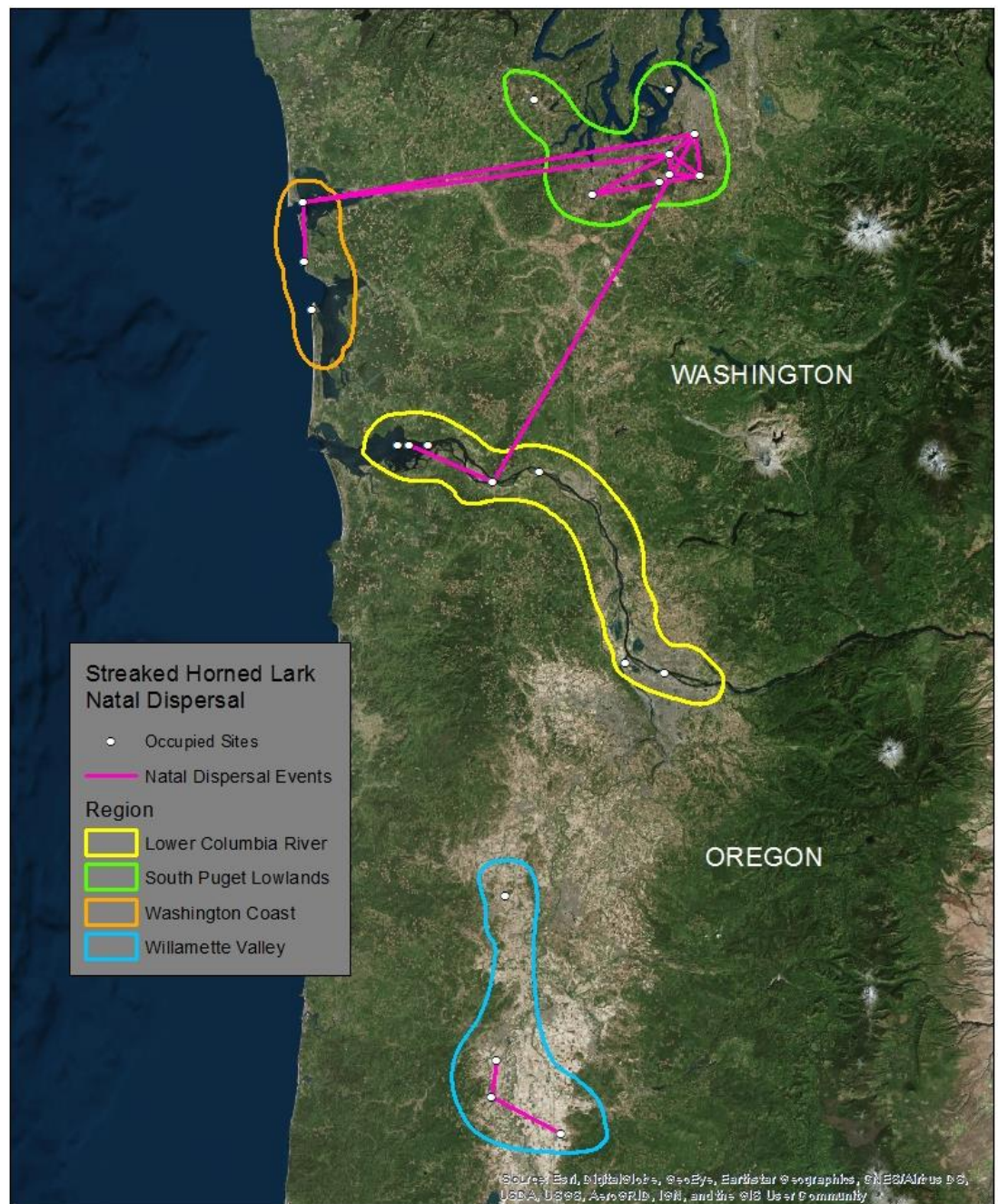
3 of 38 dispersal events

1st year breeders
1 female, 2 male

F, MAFB to WHIS = 127.5 km

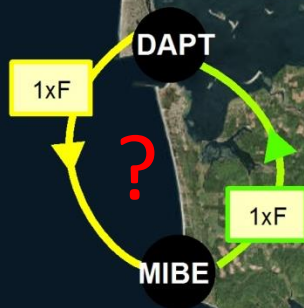
M, GAAF to DAPT = 117.4 km

M, MAFB to DAPT = 126.3 km



0 20 40 80 120 160 200 Kilometers

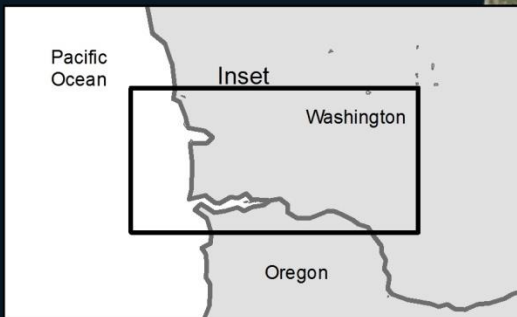




LEDB

Natal Dispersal: WA Coast & Columbia River

Coast: 18.9 km (2)
River: 29.1 km (1)



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Natal Dispersal Willamette Valley



BASL

ANWR

No movement

No movement

3xM, 2xF

CVO

FIN

1xU

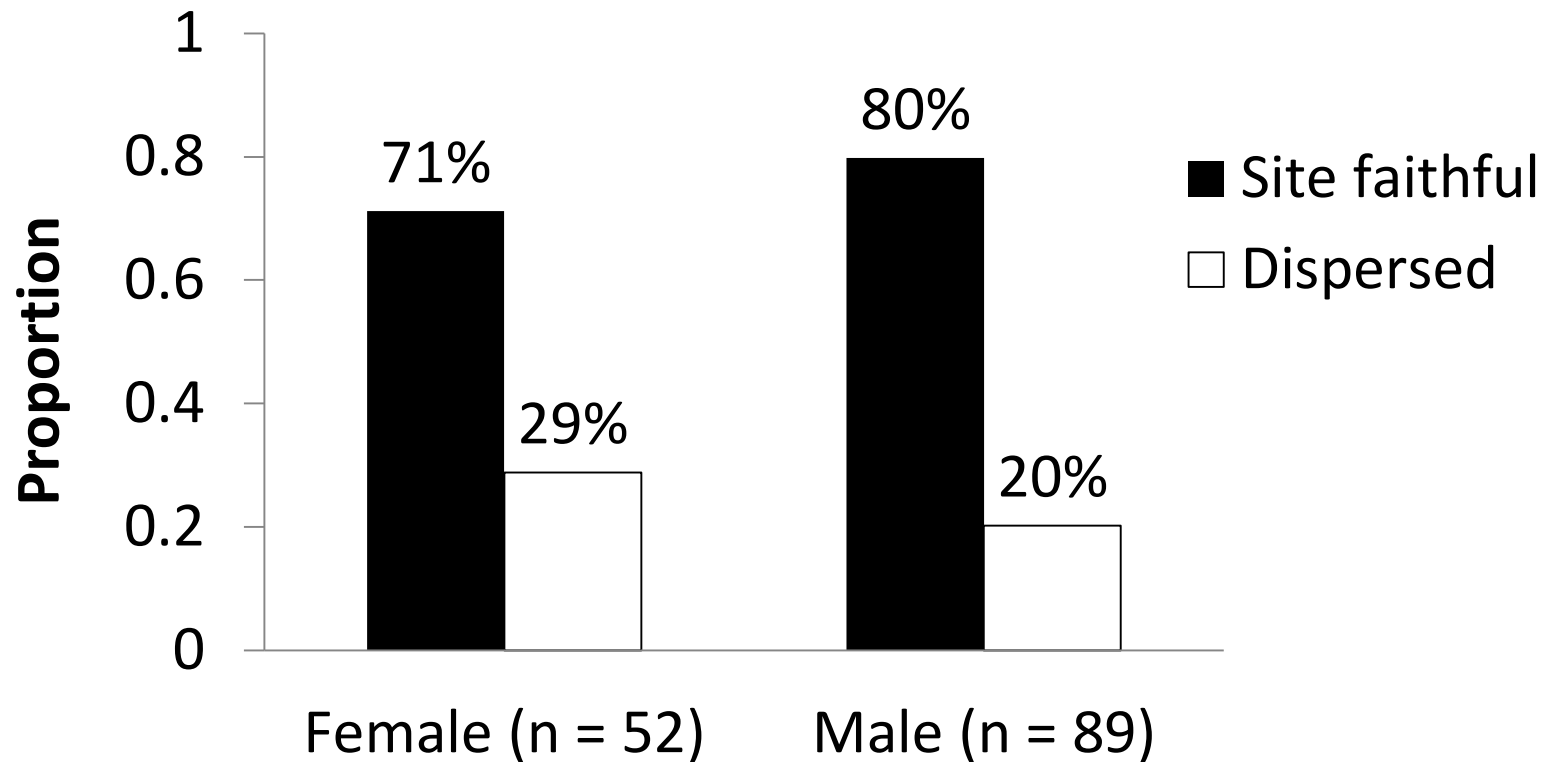
MDAC

6 events
Range: 11.7 – 24.9 km



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Natal Dispersal: 1st year adult females more prone to disperse than males



Natal Dispersal:

Summary of among-site Dispersal Distances

Natal Region	# Among-site Dispersal Events			
	0-10km	10-20km	20-30km	>30km
Puget Lowlands	3	19	2	5*
Willamette Valley		5	1	
Columbia River			1	
Washington Coast		2		
Total	3	26	4	5

* Includes 3 inter-region events to WA Coast (2) and Columbia River (1)

Summary

Breeding dispersal

- Extremely site faithful
- No inter-regional movement

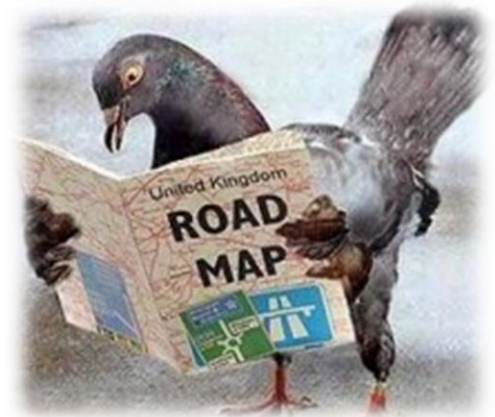
Natal dispersal

- Dispersal is **NOT** uncommon
 - More females than males
 - Most within 10-20 km
- Inter-regional movement is rare

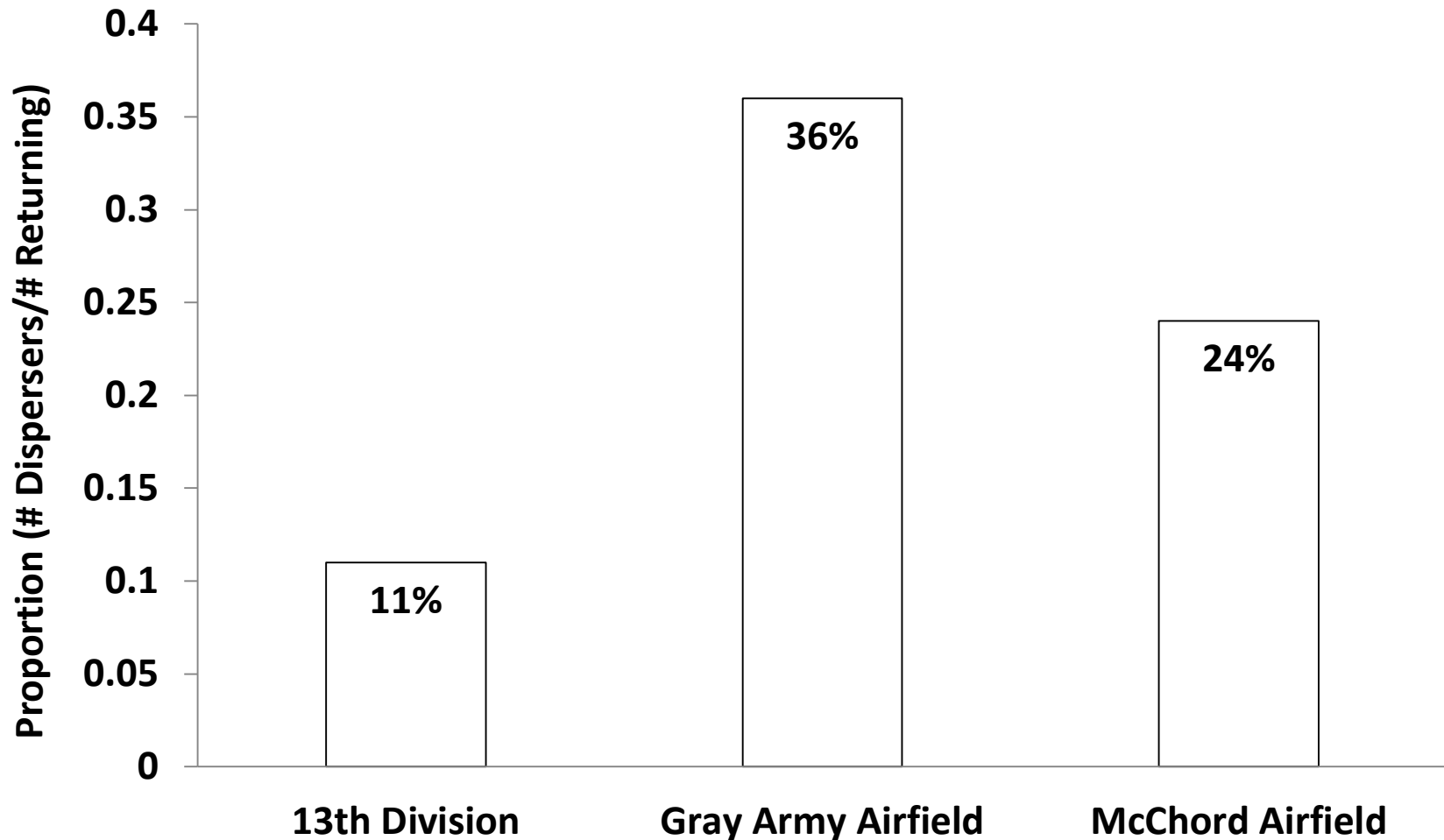


What Does This Mean For Lark Recovery?

- Extant sites are important
- Birds can move on their own
 - Ought to be able to disperse to suitable sites
- Next Steps
 - Puget Lowlands
 - Understand why sites are not colonized
 - WA Coast and Columbia River
 - Mark-resight more larks
 - Willamette Valley
 - Standardize resight surveys



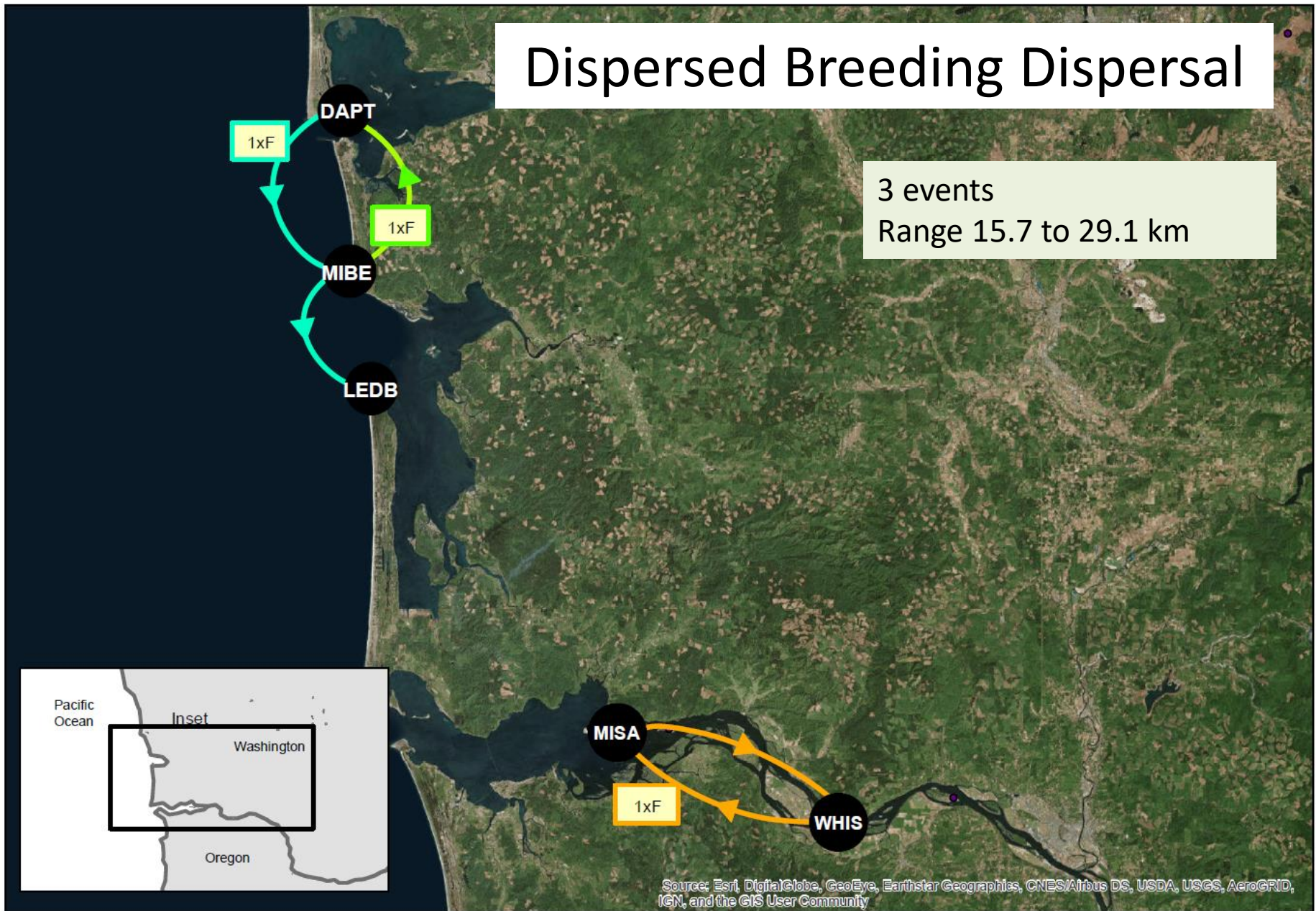
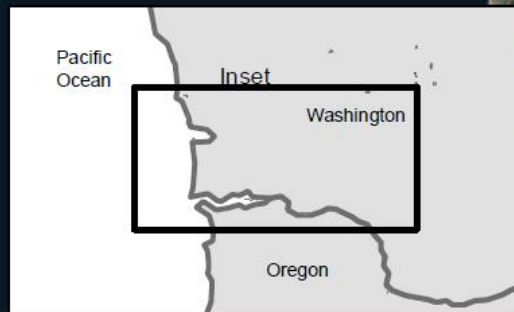
Proportion of natal dispersal on JBLM (2011 – 2017)



Dispersed Breeding Dispersal

3 events

Range 15.7 to 29.1 km



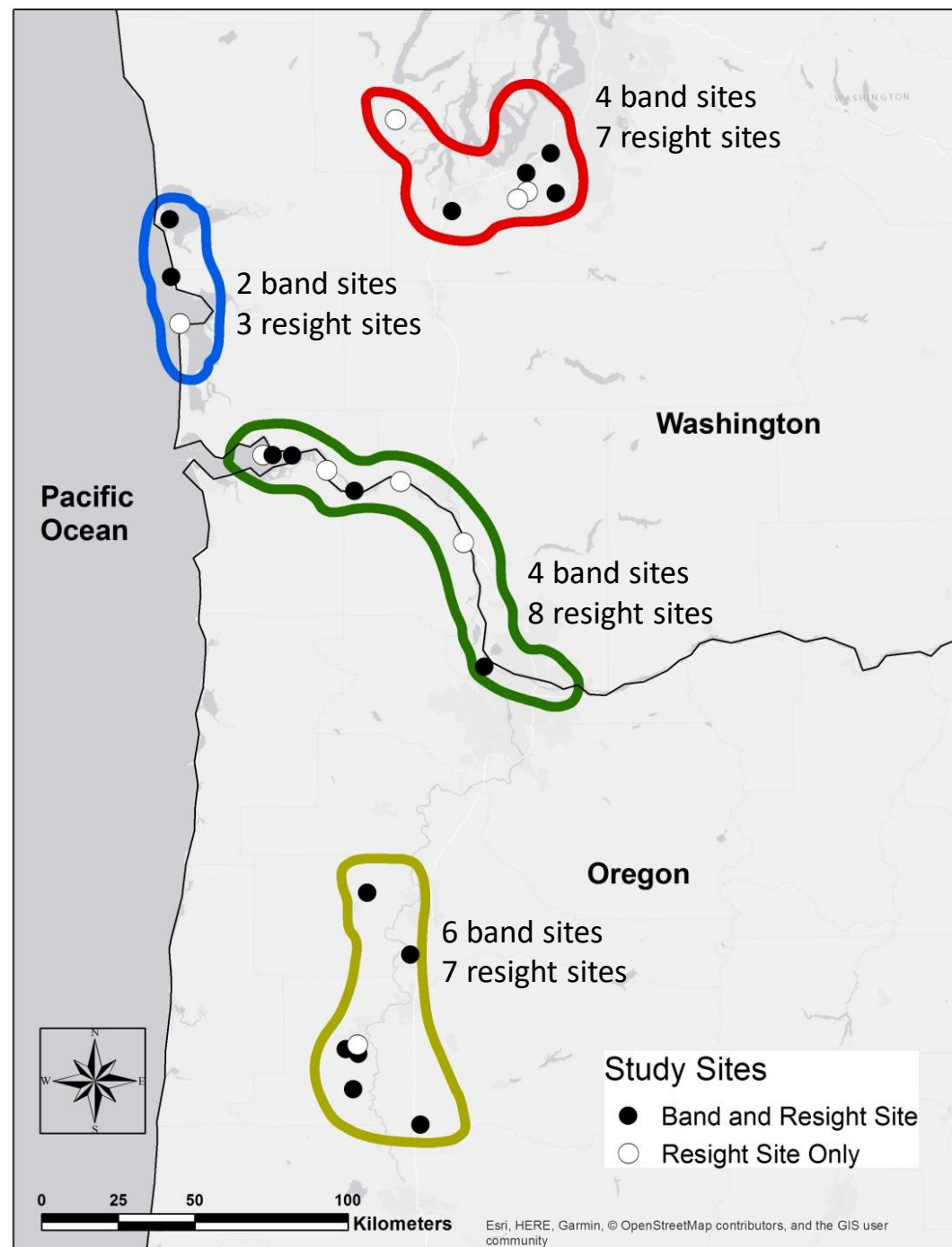
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



0 12.5 25 50 75 100 Kilometers

Marked Larks by Site and Region

Region	Site	# Banded
Washington Coast	DAPT	20
	MIBE	11
	Total	31
South Puget Lowlands	13DIV	183
	GAAF	144
	MAFB	119
	OA	28
	Total	474
Columbia River	MISA	3
	PRSA	2
	RG	4
	WHIS	46
	Total	55
Willamette Valley	ANWR	5
	BASL	18
	CVO	448
	EMW	5
	FIN	193
	MDAC	85
	WV	38
	Total	792



Natal & Breeding Dispersal: Site Faithful

