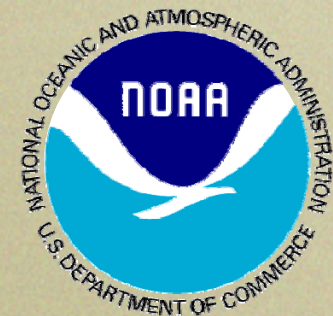


Caribbean spiny lobster (*Panulirus argus*)  
movement and population metrics at the  
Western Sambo Ecological Reserve  
(Florida USA)

Rodney Bertelsen, Kerry Maxwell, Tom Matthews, and John Hunt  
Florida Fish and Wildlife Conservation Commission



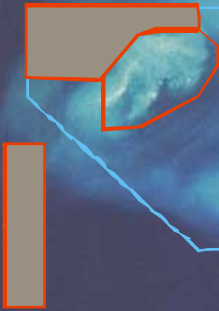
Ecological Reserves encompass large, contiguous, diverse habitats, in order to protect

and enhance natural spawning, nursery, and permanent-residence areas for the replenishment and genetic protection of fish and other marine life.

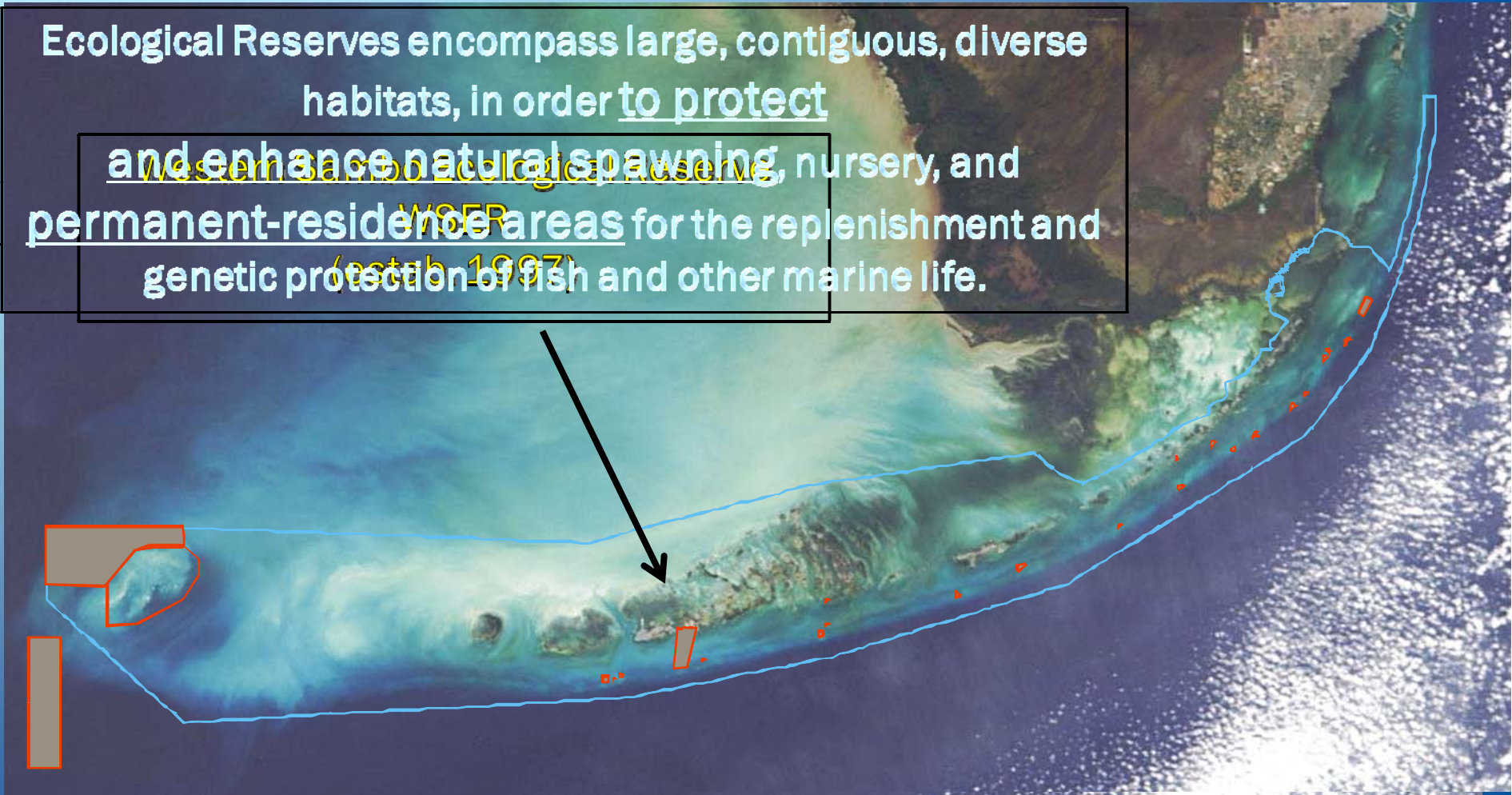
Western Samoa Ecological Reserve

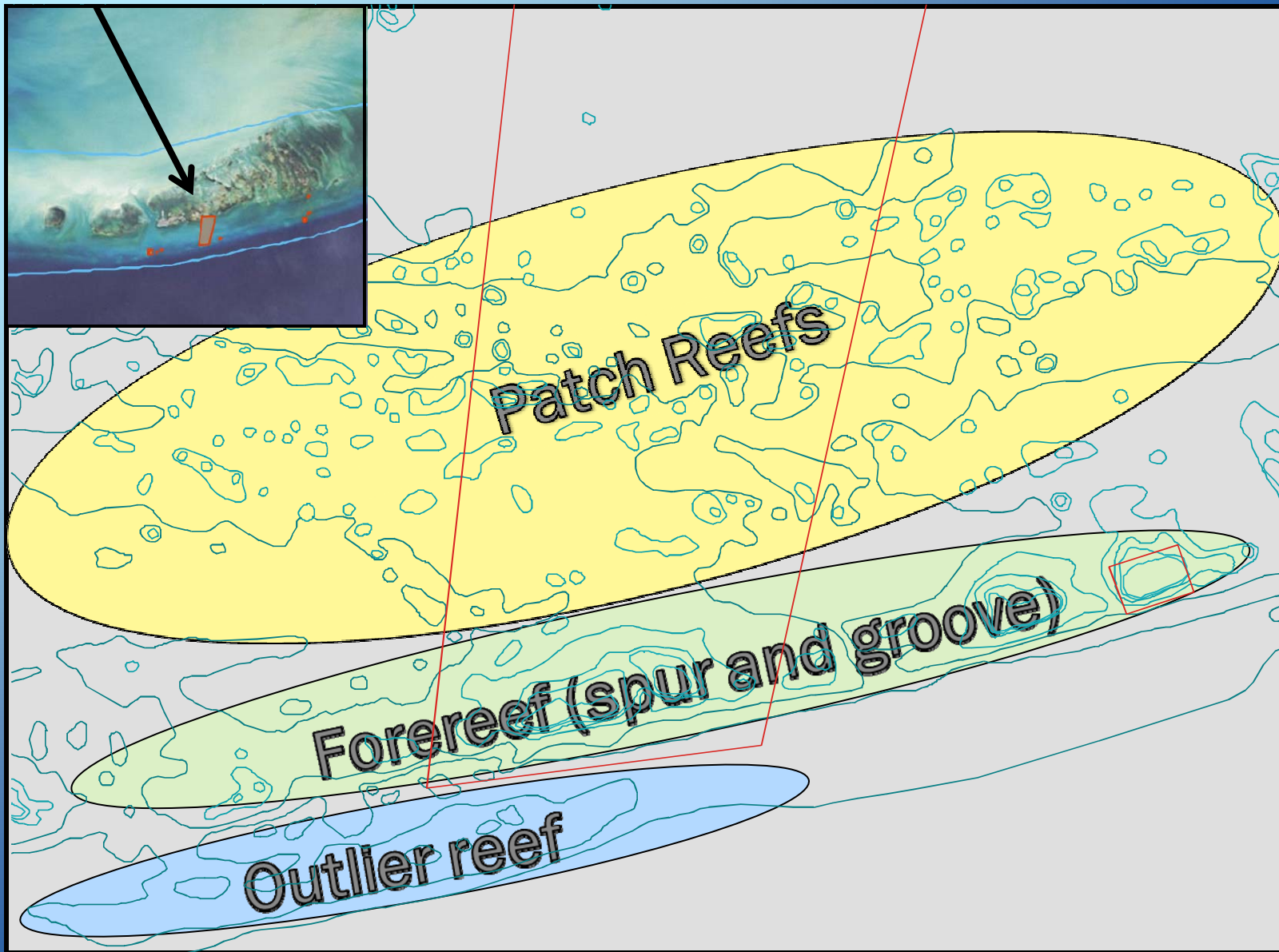
WSEER

(established 1997)



0 20 40 80 Kilometers





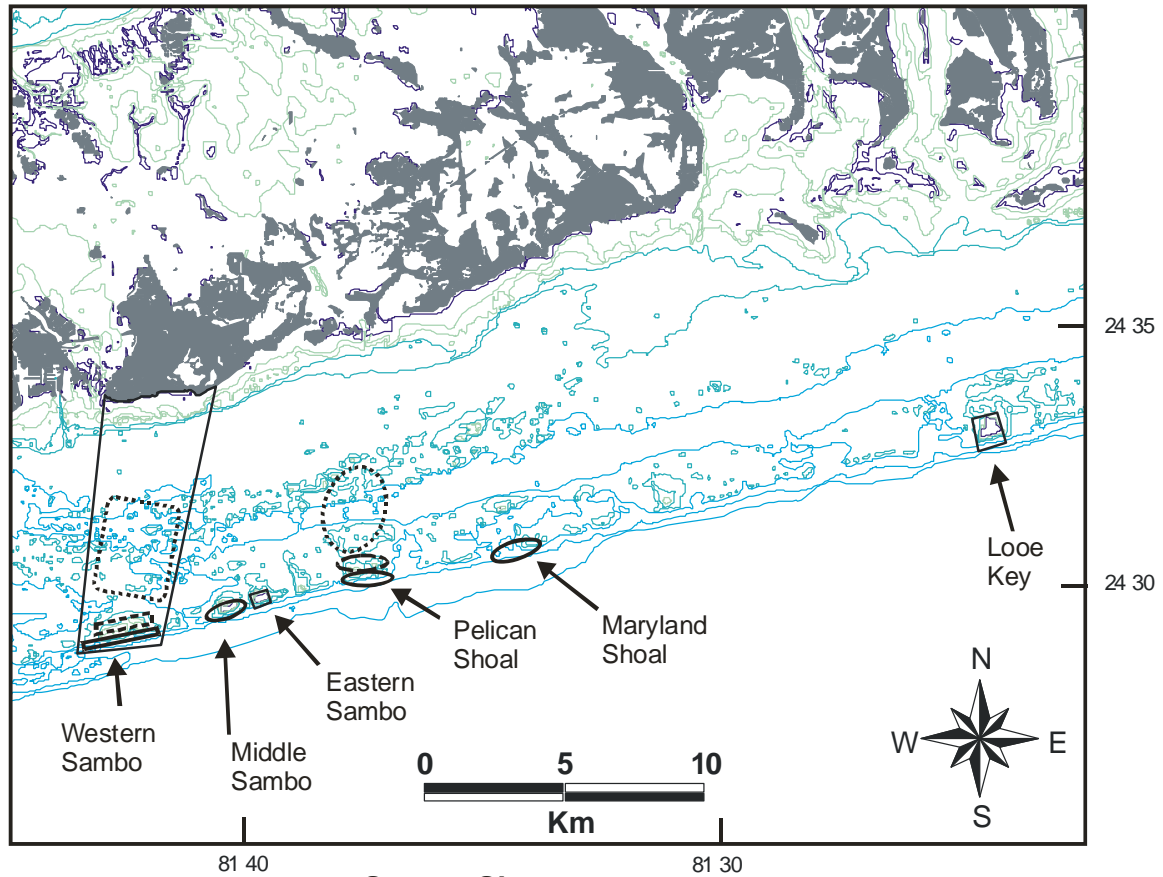
0 2 4 6 Kilometers

# Diver based surveys

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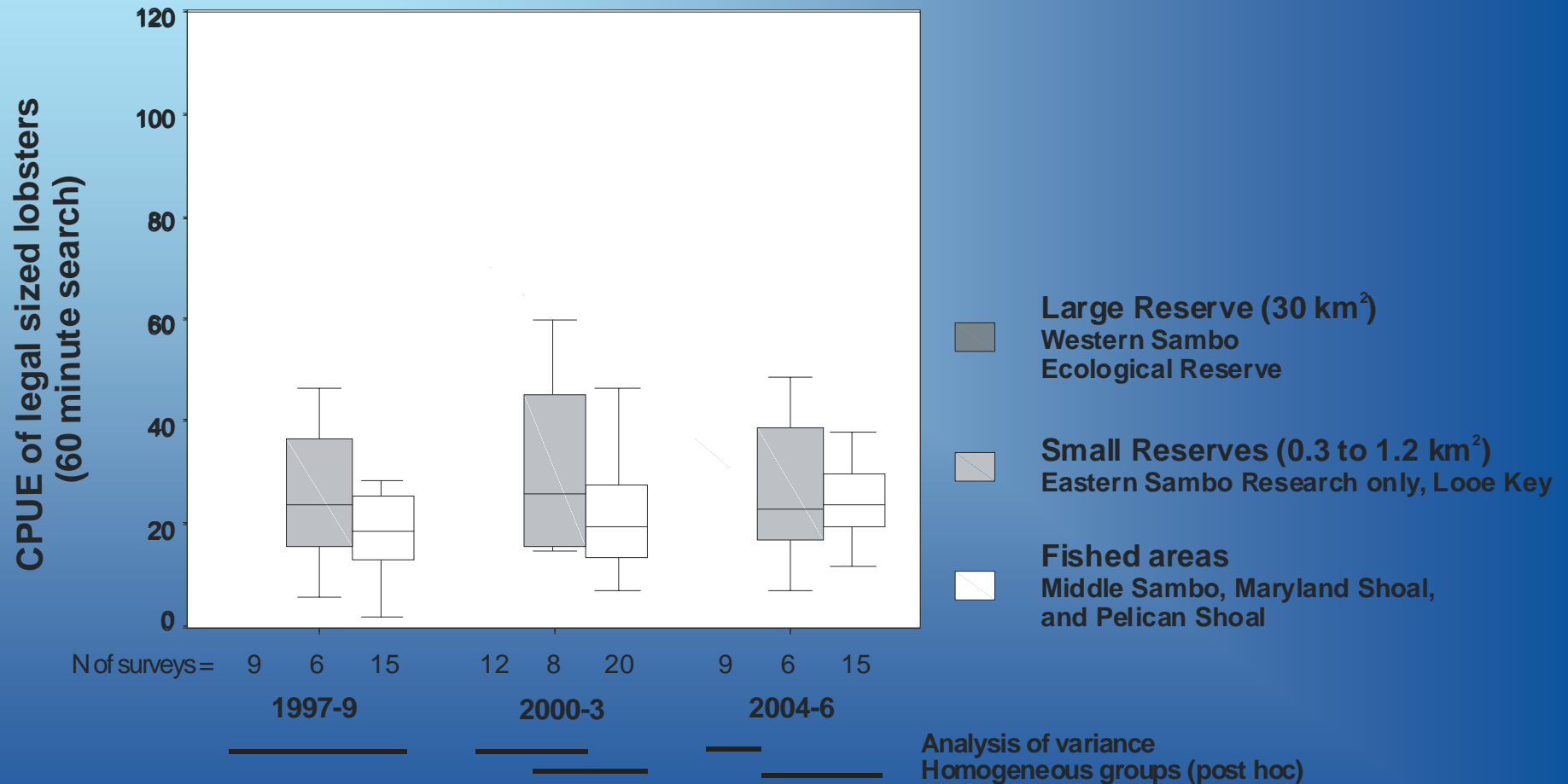
Principally conducted during the summer breeding season



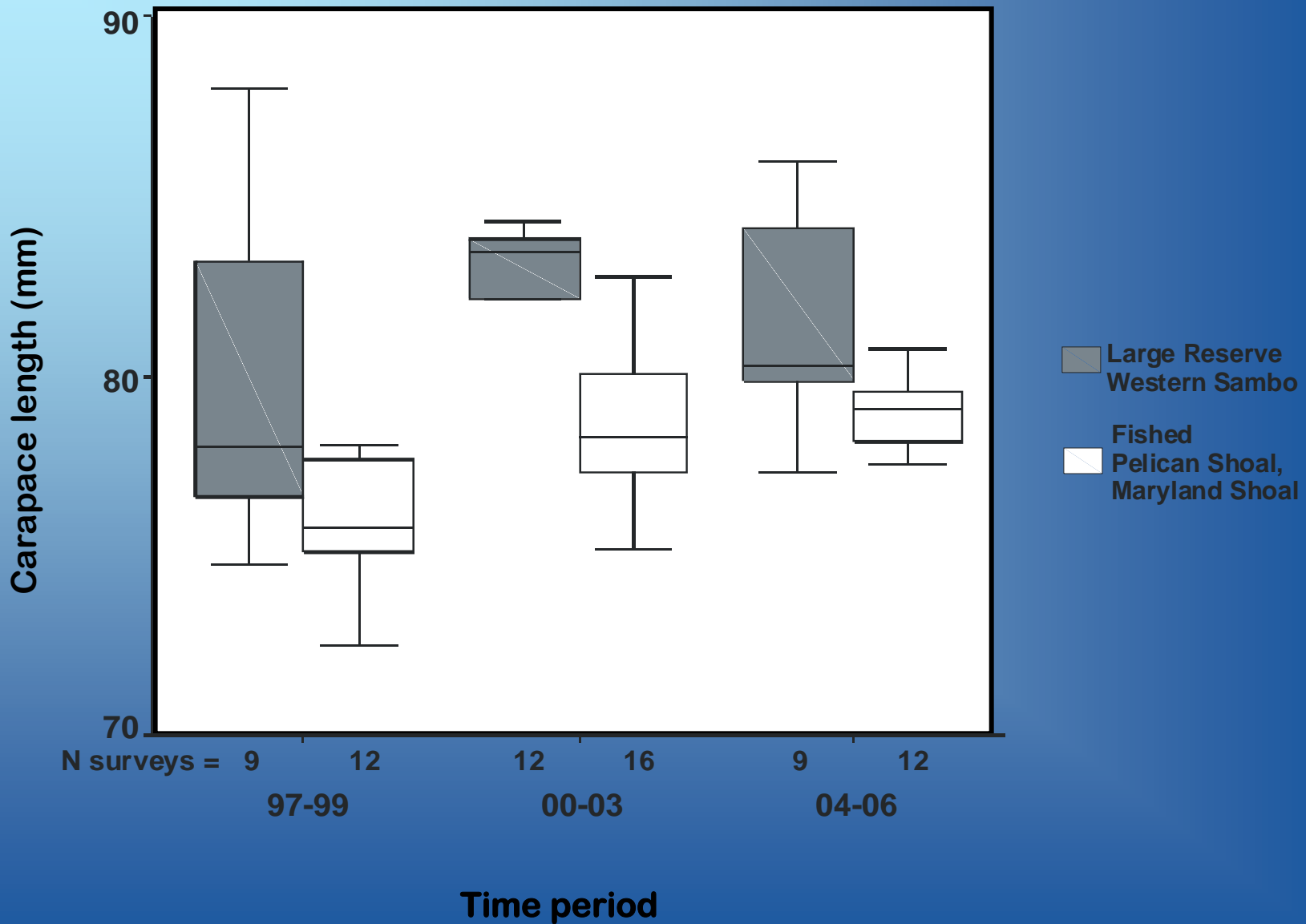
**Survey Sites**

Habitat	MPA	Fishery
Forereef	□	○
Backreef	▤	◌
Patch reef	▤	◌

**ABUNDANCE:** Legal sized lobsters became significantly more abundant in the large Western Sambo Ecological Reserve and not in the small reserves nor the fishery



# SIZE: Lobsters grew larger within the Western Sambo Ecological Reserve than in the fishery

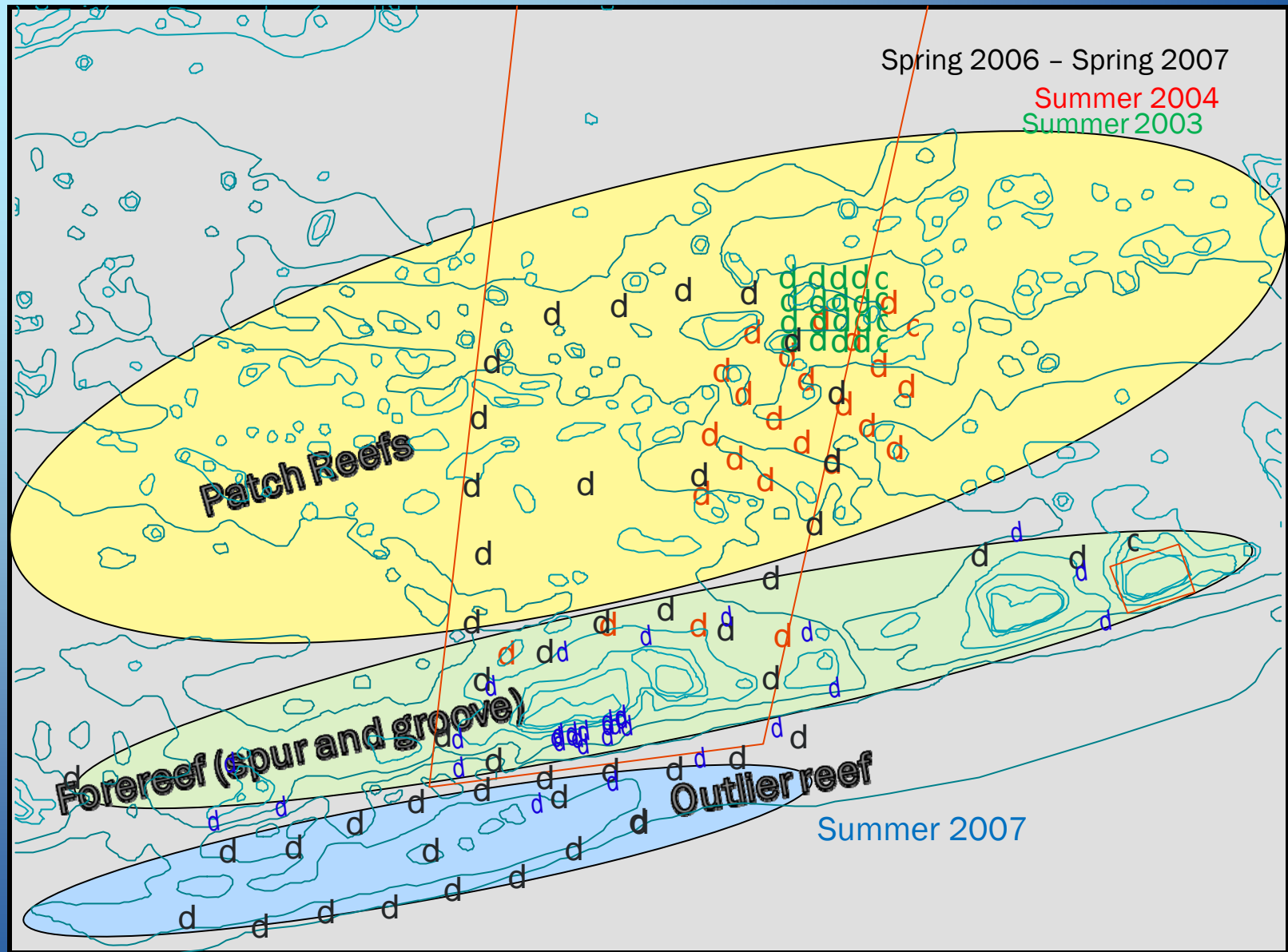


# Acoustic tracking

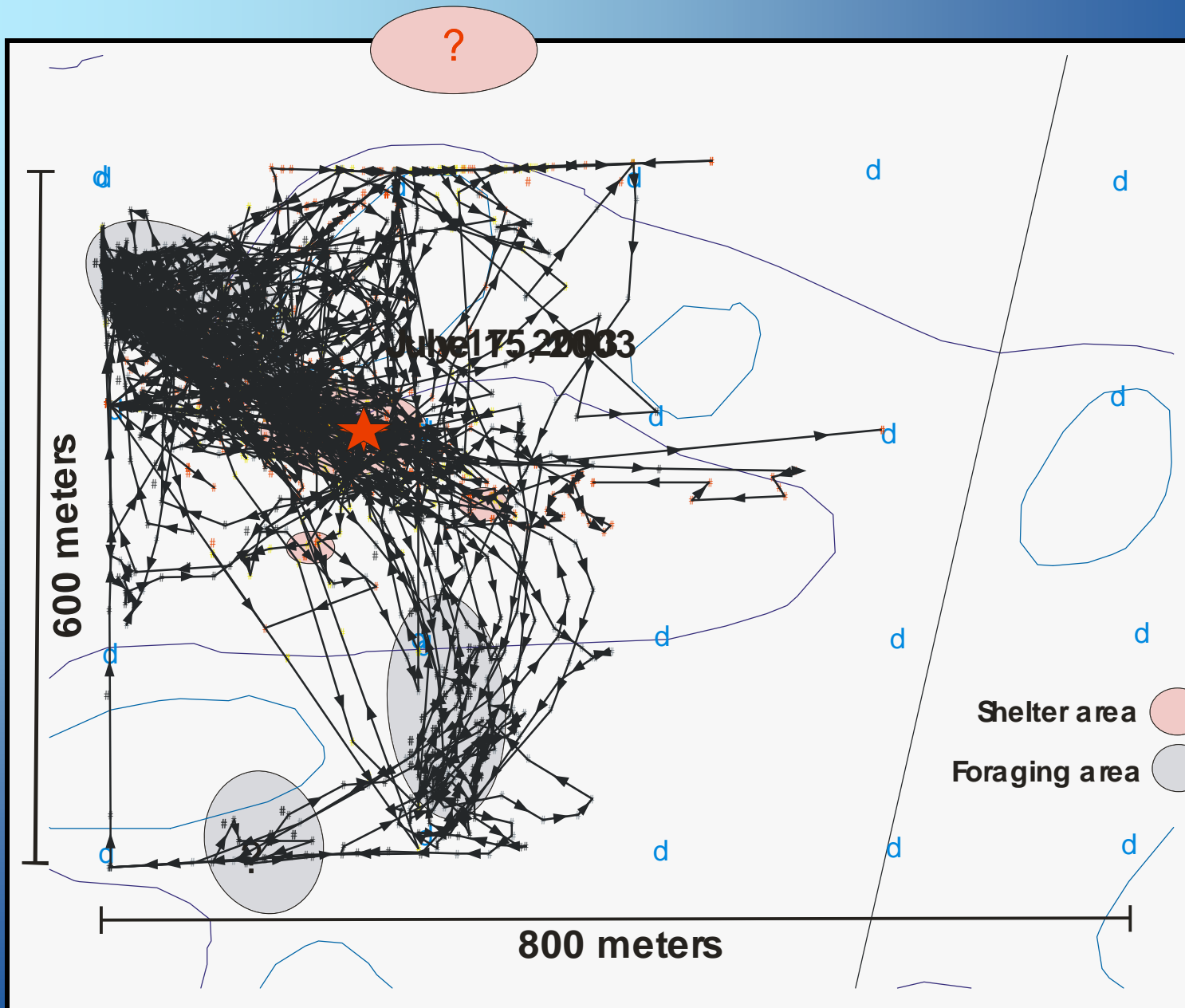
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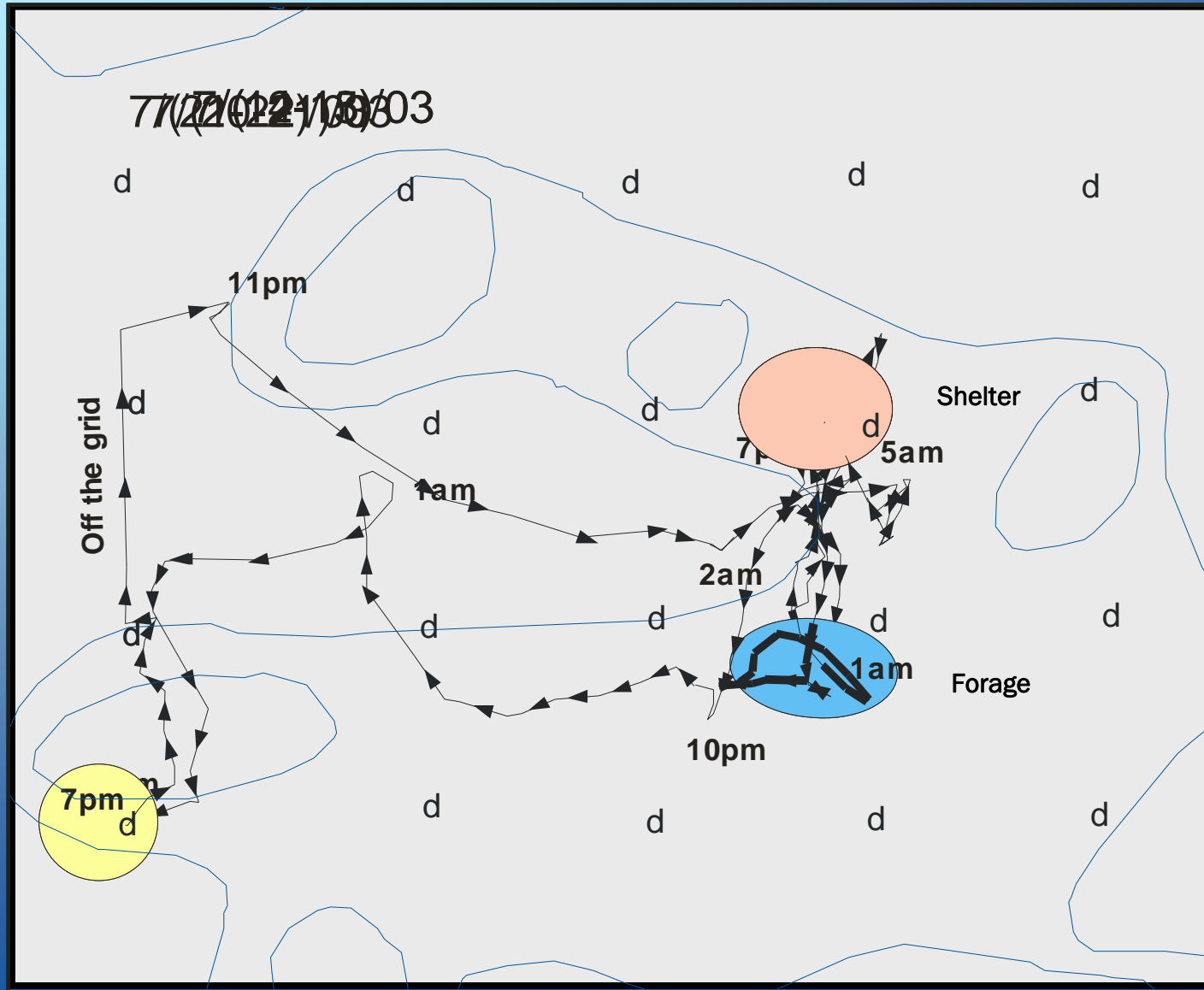




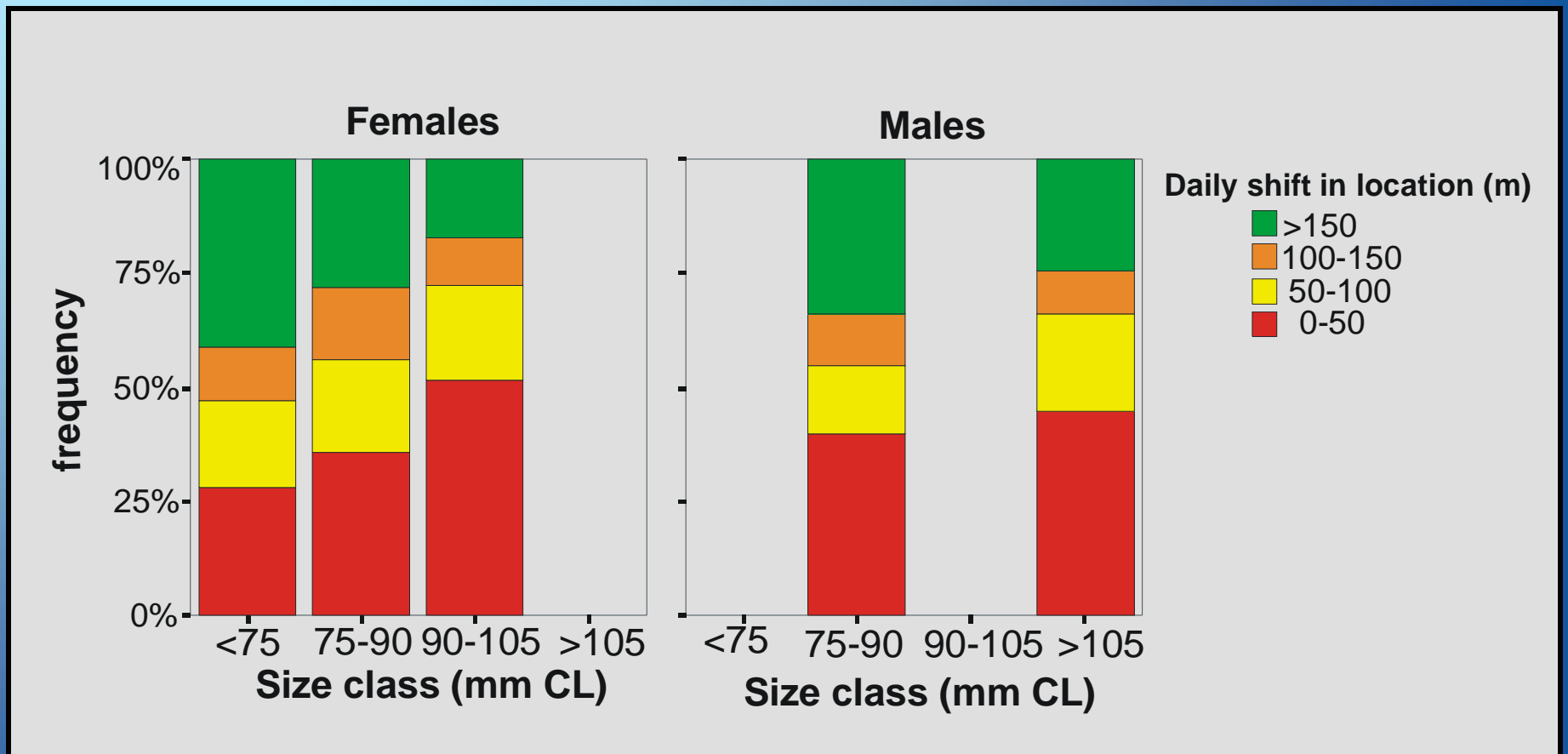
0 2 4 6 Kilometers



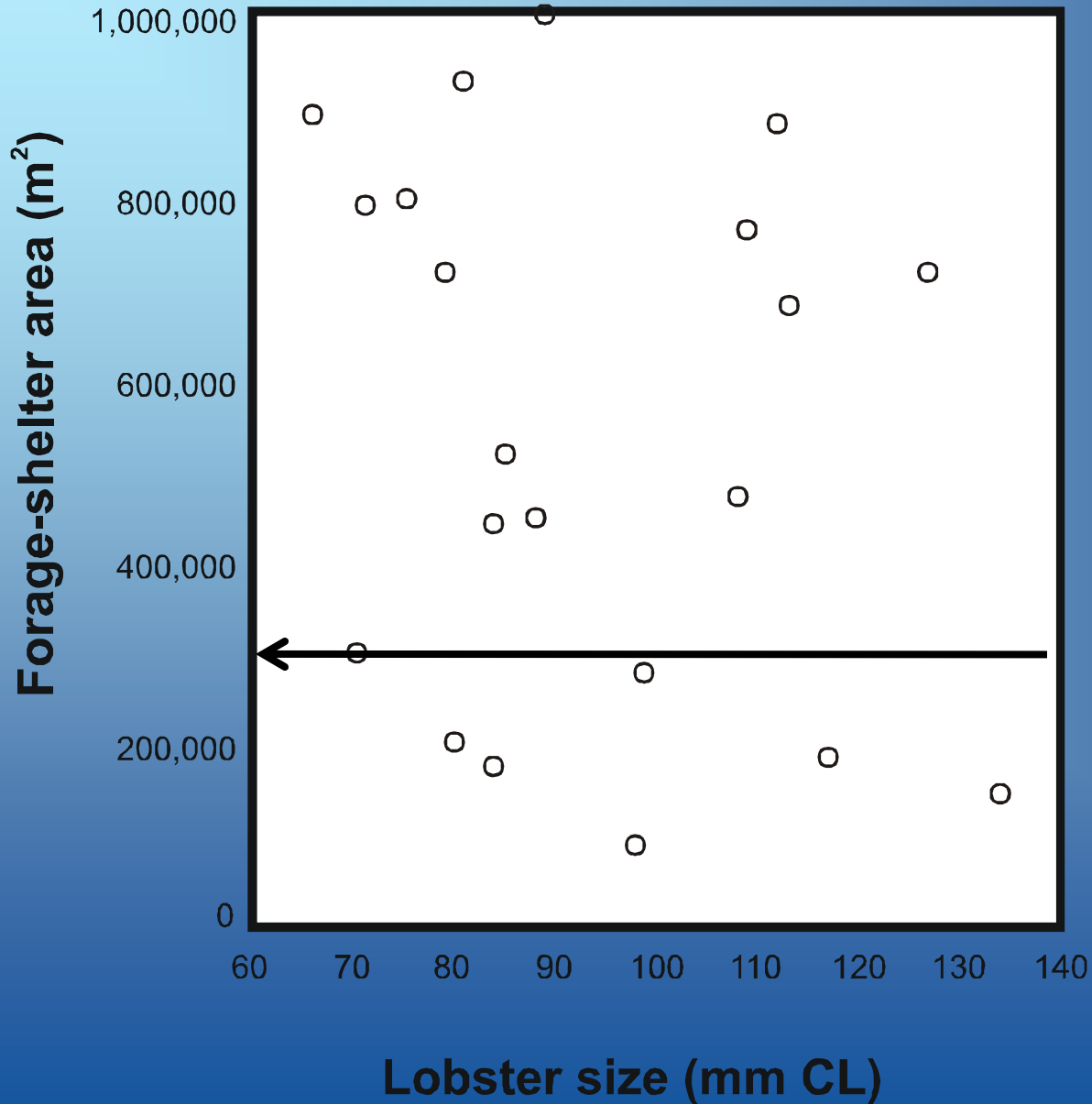
# Lobsters use multiple shelter-forage areas and have a highly accurate navigational capacity



A small lobster changes shelters more frequently than a large lobster



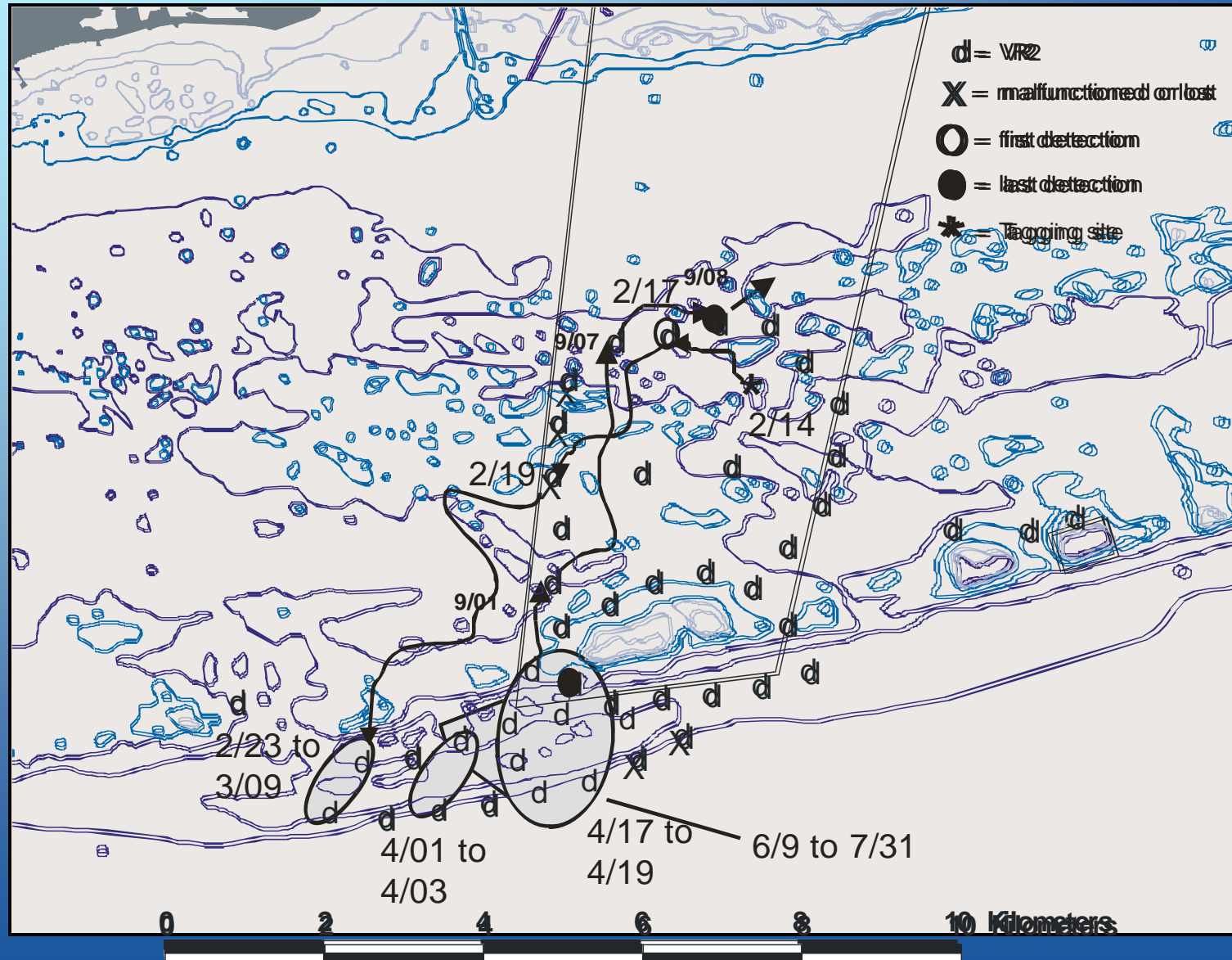
# Lobster size does not predict forage-shelter area



*1 Western Sambo ER =  
300 Eastern Sambo RO*

*Eastern Sambo  
Research Only size*

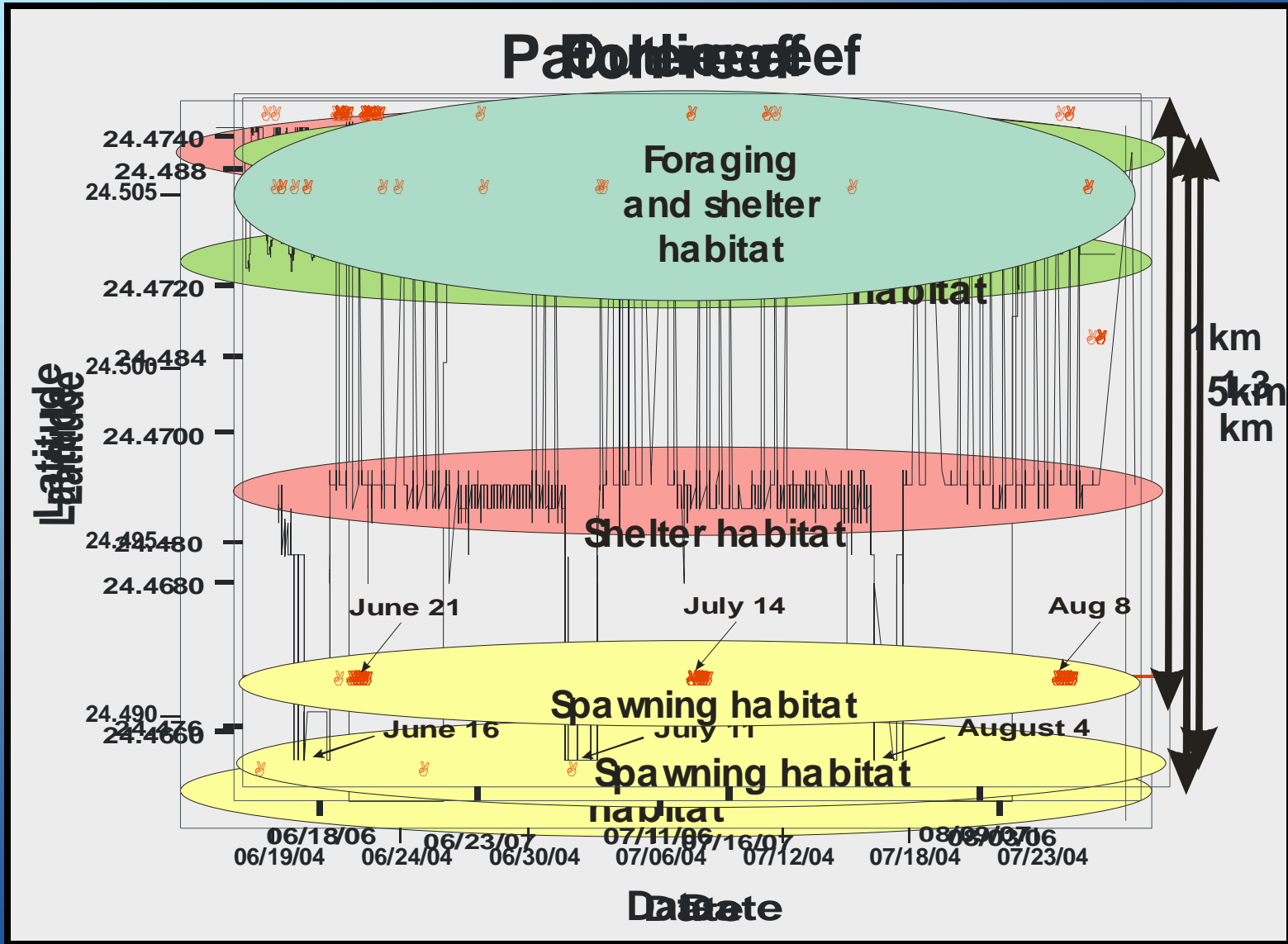
Nomadic movements are semi-permanent shifts between subregions that take days to complete.



**Another movement pattern: Only by reproductively active females  
(rapid nighttime southward departure followed by a return one week later)**

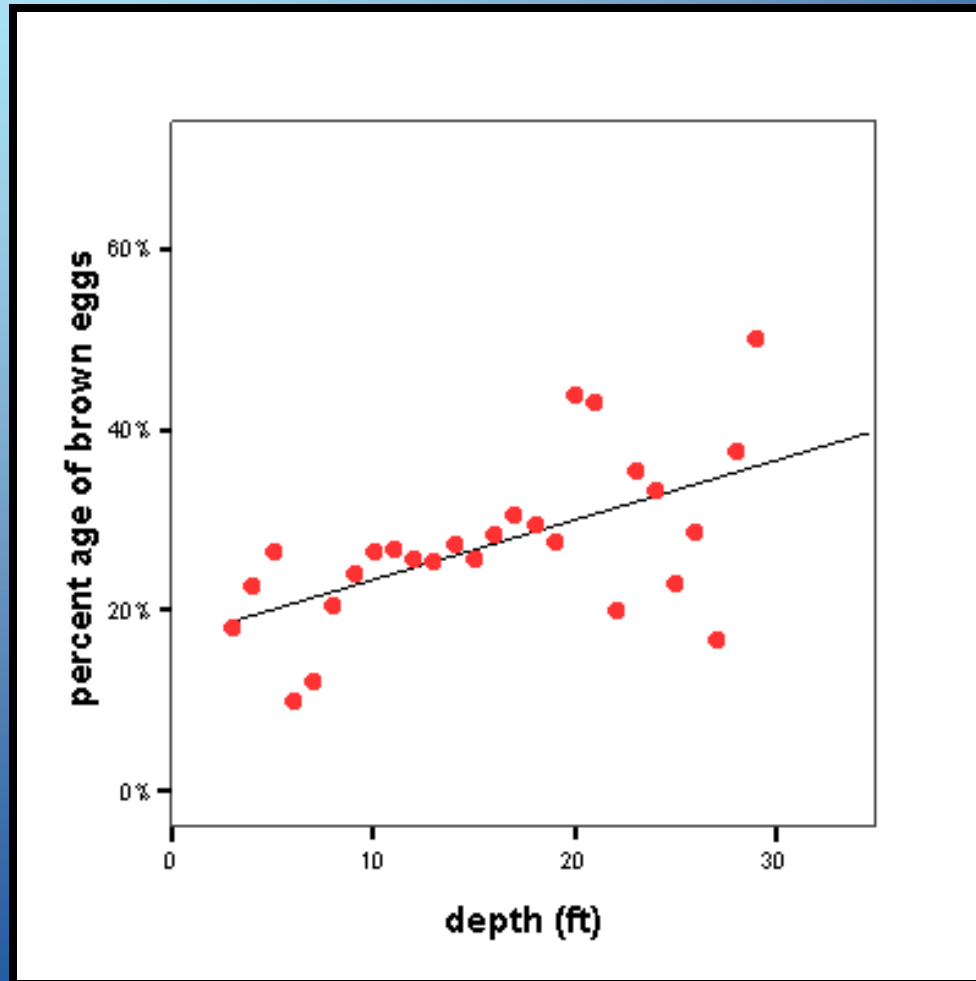


# Reproductive migrations occur throughout the WSER



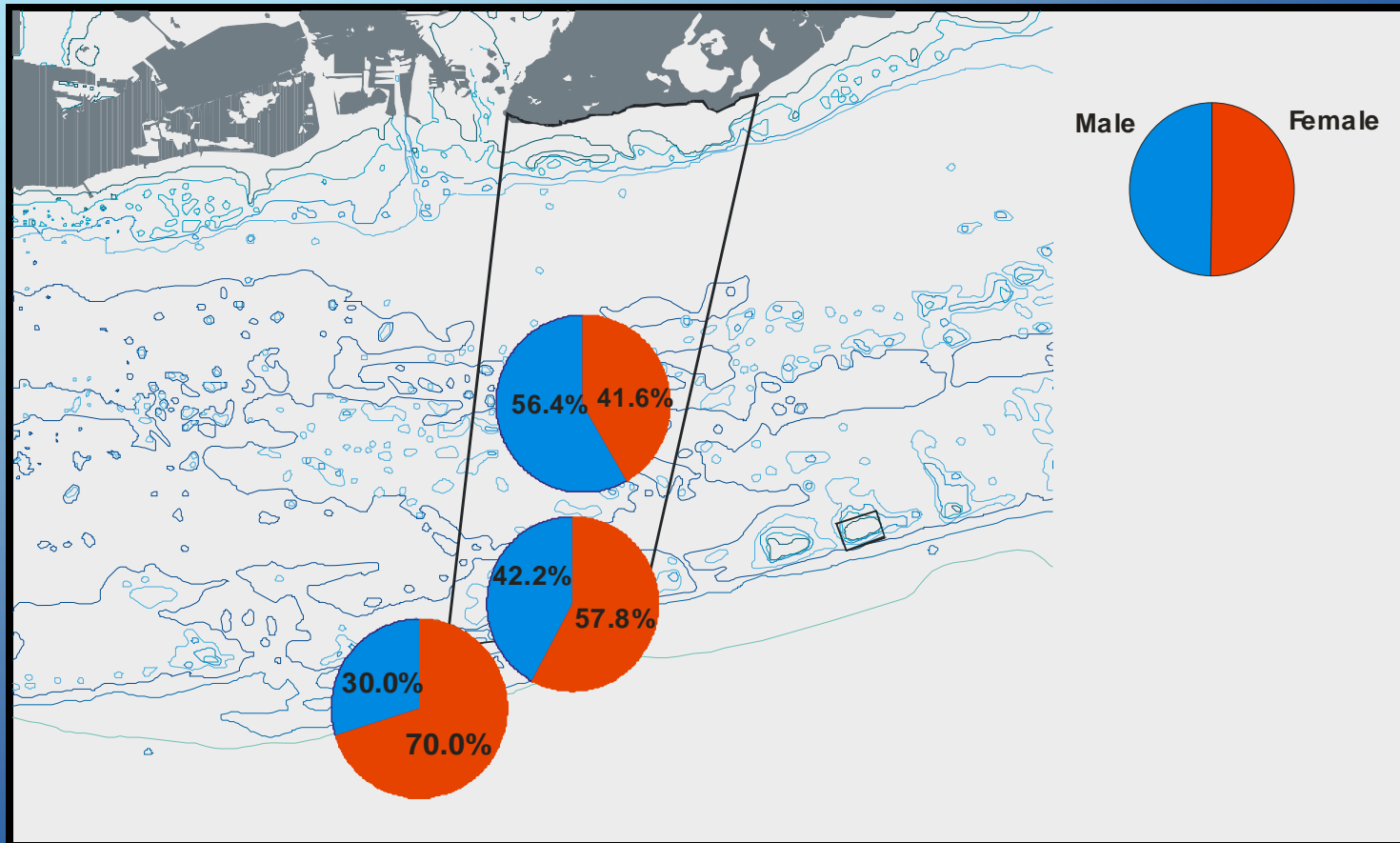


The frequency of brown (late stage) eggs increases with depth. Primary spawning grounds are deep off the forereef and deep outside the outlier reef

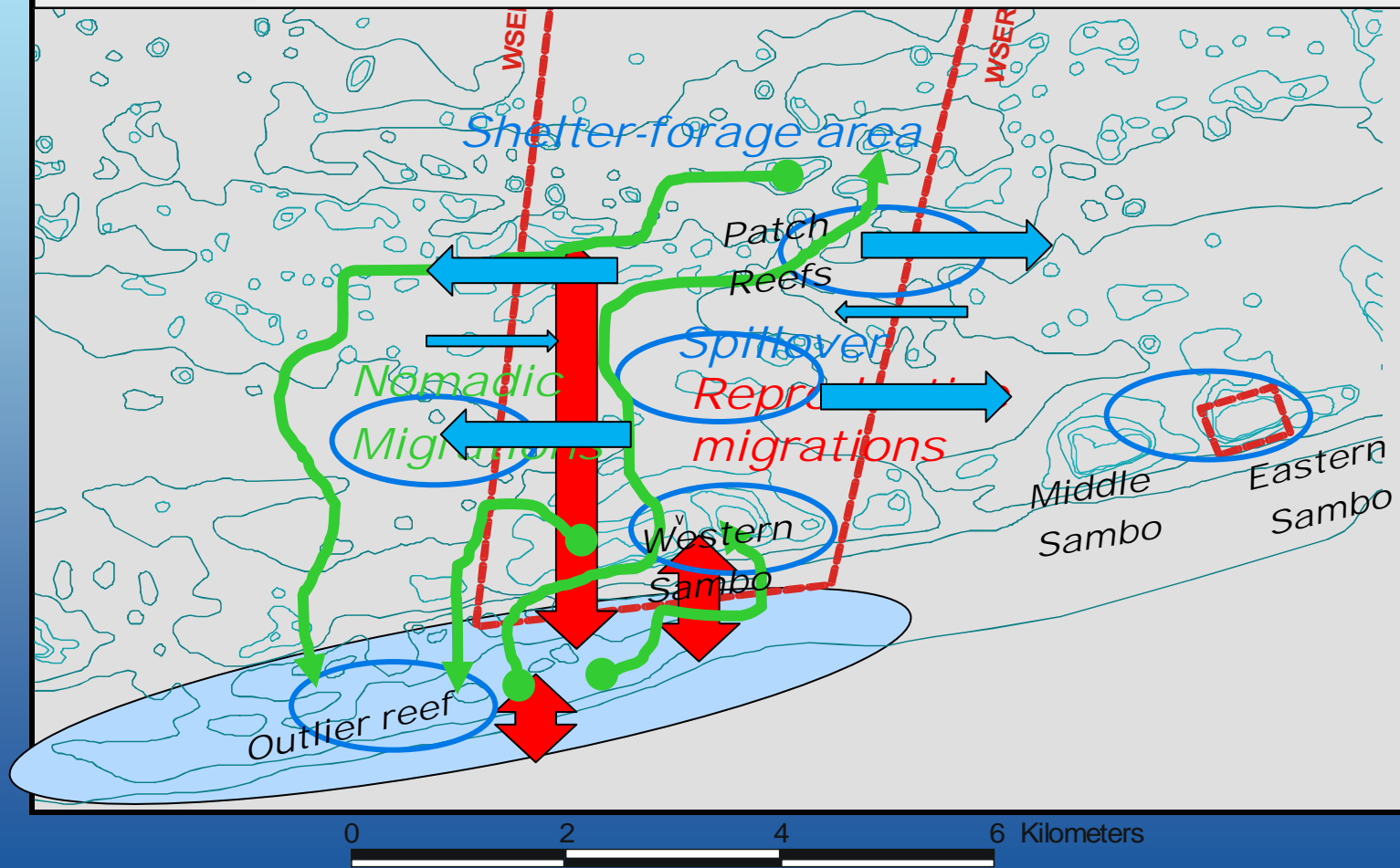


The summer surveys typically find more females offshore than inshore.  
This is due to the reproductive migrations of the females

2009 Surveys combined – sex ratios by subregion



Ecological Reserves encompass large, contiguous, diverse habitats, in order to protect and enhance natural spawning, nursery, and permanent-residence areas for the replenishment and genetic protection of fish and other marine life.



A historical map of the Florida Keys, showing the chain of islands from Key West to Key Largo. The map is titled 'MARTYRS ISLANDS' and includes various geographical features and labels. The text 'Thank you' is overlaid on the map in the center.

Thank you

P. Barbera, S. Braynard , C. Cox, A. Dahood, D. Eaken,  
M. Feeley, J. Giganti, M. Hoxie, C. Lewis, T. Matthews,  
K. Maxwell, K. Miller, R. Netro, B. Sharp, J. Simonds,  
and M.A. Tellier.

Also, the über-volunteer D. Hawtof  
and Brian

Large lobsters appear in Western Sambo after 1997 and then periodically appear in nearby sites such as Middle Sambo and Eastern Sambo

