CMS Family Capacity Building Workshop

for African National Focal Points

What is migration?

29-31 October 2013,
Cape Town, South Africa

CNS Definition of migration

- “Migratory species” means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries.

However, this does not fit for all migratory species, i.e. those migrating within one country, whilst some species move predictably (e.g. according to rains), but not always cyclically.

The CMS definition has a biological background but it is formulated to meet policy and political criteria.

Terminology like *'cyclically'* and *'predictably'* have later been specified to ensure that, for instance, species with nomadic migration (not predictable or cyclical) also fall under the CMS.

Birds with irregular movement patterns:

- Bronze-winged Courser (photo: Adam Kennedy)
- Allen's Gallinule (photo: Ian Nason)

More simply:

- **Migratory species** are those that, during their lifecycles, perform regular movements between separate areas, usually linked to seasonal changes.
- **Migration**: The regular movement of animals between separate areas.

Common Cranes in Kazakhstan (photo: Albert Salemgareyev)

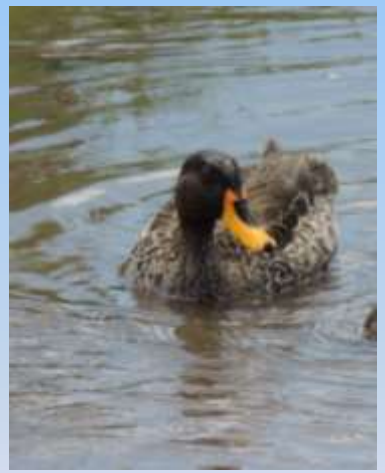
Migration as a widespread phenomenon: invertebrates

- **Invertebrates** such as butterflies
  - Monarch / North America
  - Atlanta / Africa-Europe

Migration as a widespread phenomenon: birds

Bird migration is present among **many groups**:

- **Waterbirds**, e.g. storks, flamingos, pelicans, ducks & geese, waders



Note that many bird species are NOT migratory, even not in arctic and alpine habitats.

Migration as a widespread phenomenon: birds

- Most **seabirds**, e.g. albatrosses, petrels, shearwaters, gannets, auks

Migration as a widespread phenomenon: birds

- **Raptors**, e.g. harriers, osprey, eagles, vultures, falcons, kestrels

Migration as a widespread phenomenon: birds

- **Passerine birds**

Migration as a widespread phenomenon: bats

- **Bats**
  - many species are relatively short distance migrants
  - some move in huge numbers

Migration as a widespread phenomenon: mammals

- **Terrestrial mammals**

- many species in Africa
- Antelopes & other herbivores, e.g. Serengeti-Masai Mara, South Sudan-Ethiopia
- Many trans-boundary movements of largely resident species

Migration as a widespread phenomenon:

- **Marine mammals**

  - whales, dolphins, seals, dugong, manatee

Migration as a widespread phenomenon:

- **Reptiles**

  - particularly marine turtles

Migration as a widespread phenomenon: fish

- **Fish** have various migration strategies:
  - oceanodromus: migration in sea
  - potamodromous: migration in freshwater
  - diadromous: migration between fresh & saltwater

Why being migratory?

It has important **ecological advantages**, such as:

- optimal use of availability of **shelter** and **habitat for breeding (**and for birds **moulting)** over a wider area

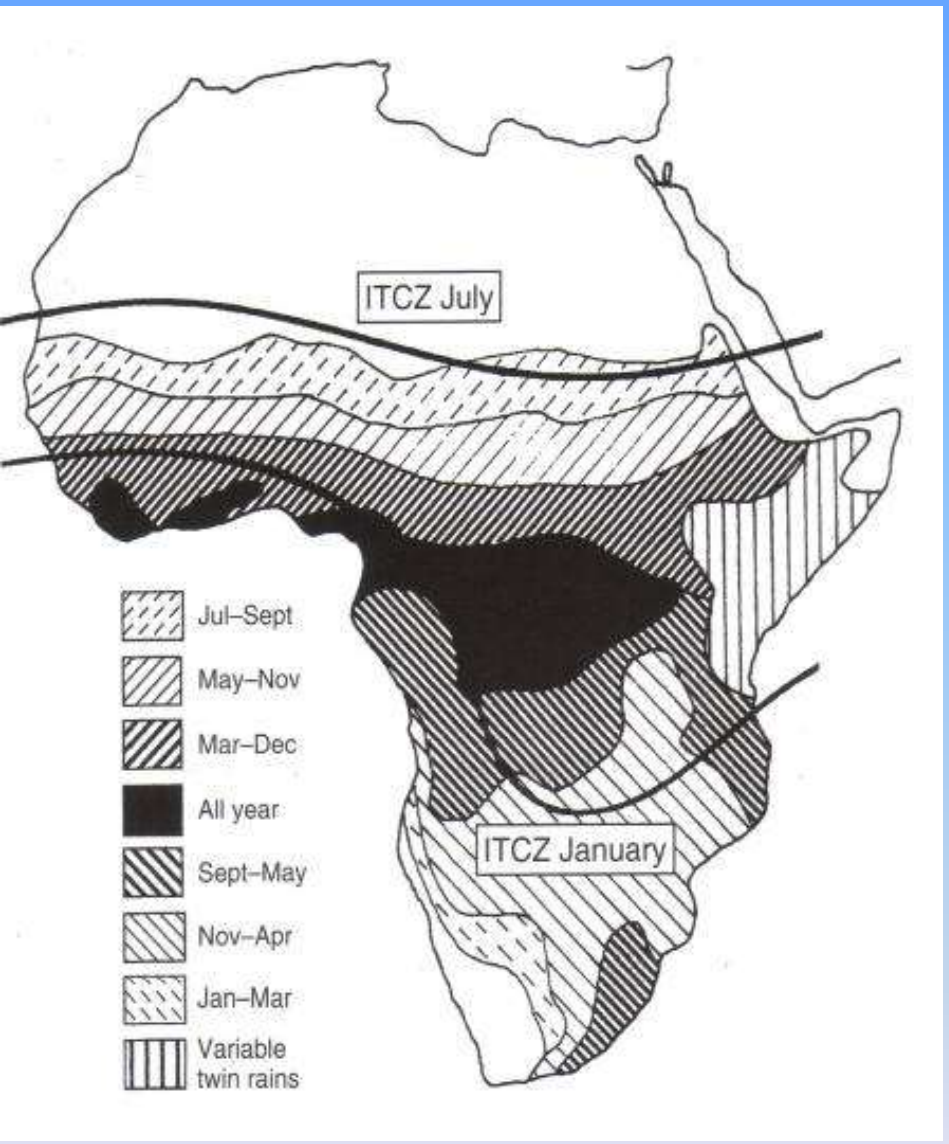
- optimal use of **food supplies** which differ in place and time, sometimes in a predictable way (i.e. ‘follow the young protein rich grass’, ‘follow the fish’)

- protection **against bad weather** conditions, drought, predators, parasites etc.

There are different origins of migration routes

East bank of the Nile, Sudan (photo: Tim Dodman)

- Glacial and interglacial periods have shaped most systems over long distances
- Often a migration route follows the route of colonization to new breeding areas; e.g. following the retreating ice cap
- Change of the ‘green Sahara’ to the present extensive desert influenced north-south migration, particularly for passerine birds



Main rainfall periods in sub-Saharan Africa (Jones 1995); Spur-winged Lapwing (photo: Tim Dodman)

Intra-African bird migration

- "The movement of birds within Africa and around its coastline according to local triggers and continental weather patterns, especially rainfall"

  (Dodman & Diagana 2005)

Migration routes are not static

- Climate change discussions and large scale habitat destruction should take this into account and learn from the recent geological history:

- Drainage of Iraqi marshlands most likely contributed to higher numbers of Palearctic-breeding ducks spending the northern winter in NE Africa.

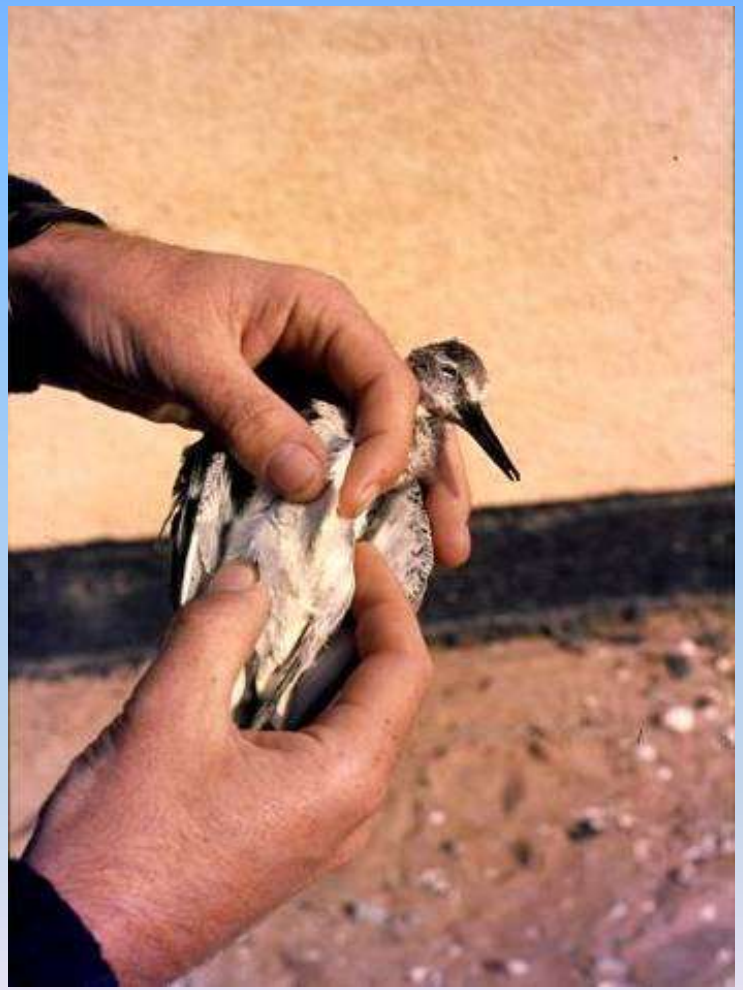
- Conservation consequences: areas presently less important can become of crucial importance.

- ‘No net loss of habitats’ is an important policy.

Distribution of leatherback turtles in the Atlantic

Energy requirements and adaptations of migratory birds

- Migration needs energy
- Physiological adaptation
  - fat accumulation
  - consuming part of muscles
  - reduce body weight by reducing size and weight of intestines, stomach etc.
- Morphological adaptation
  - Wing shape and flight
- Behavioural adaptation
  - Group formation
  - Migration routes

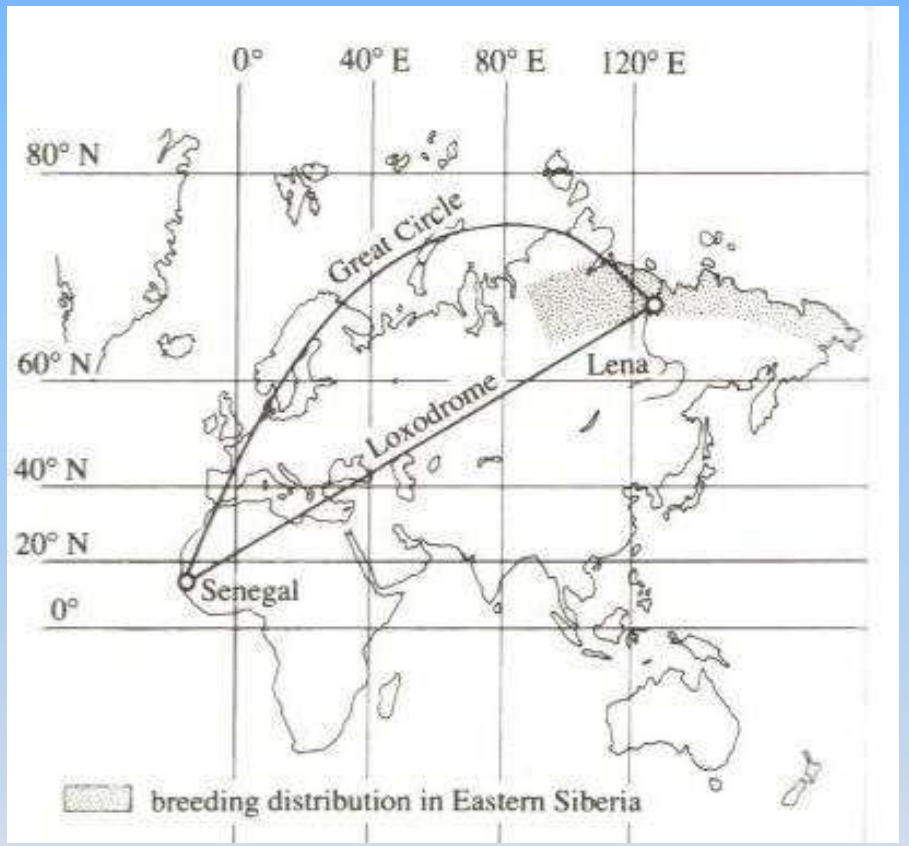


Navigation & orientation

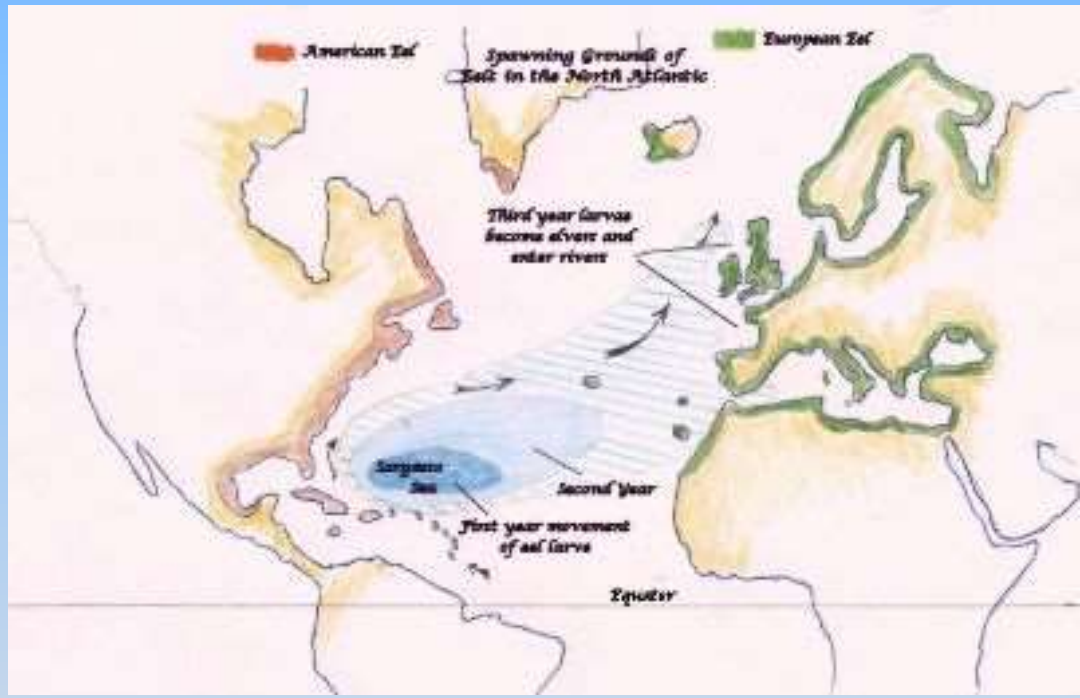
- Birds use a range of navigation & orientation techniques and clues to find their way.

- Navigation is ‘the art of getting there’; orientation is the direction taken. In ‘compass orientation’ birds find their way based on the position of the sun or stars or magnetic lines.

- Some birds learn migration methods by travelling in flocks



Eels: how do they do it?!



Weather

Weather can have a strong impact on migration

– Strong winds	Blown off course
– Fog	Become disoriented
– Intense heat	Use more energy for moving distances
– Snow & ice cover	Cold, food unavailable
– Drought	Dry, food shortage

- Weather can strongly influence the timing of migration.

Migration strategies

- **Technique**:

  e.g. Birds: how they fly – soaring or active flight

- **Travel schedules**:

  The way they cover distance and ‘refuel’

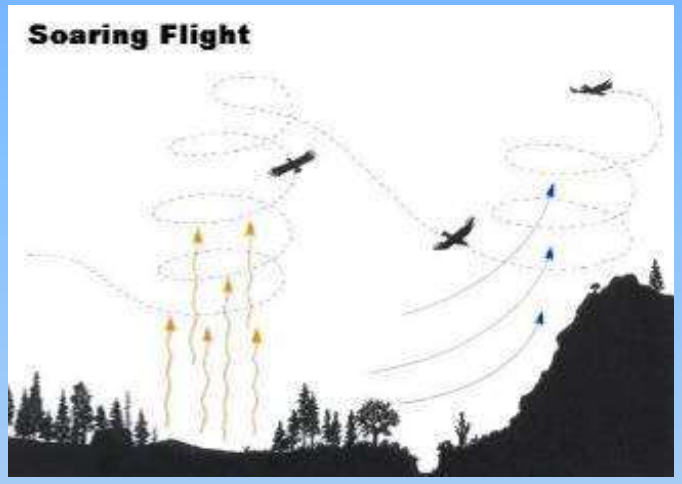
- **Strategies**:

  How migration takes place

Soaring flight

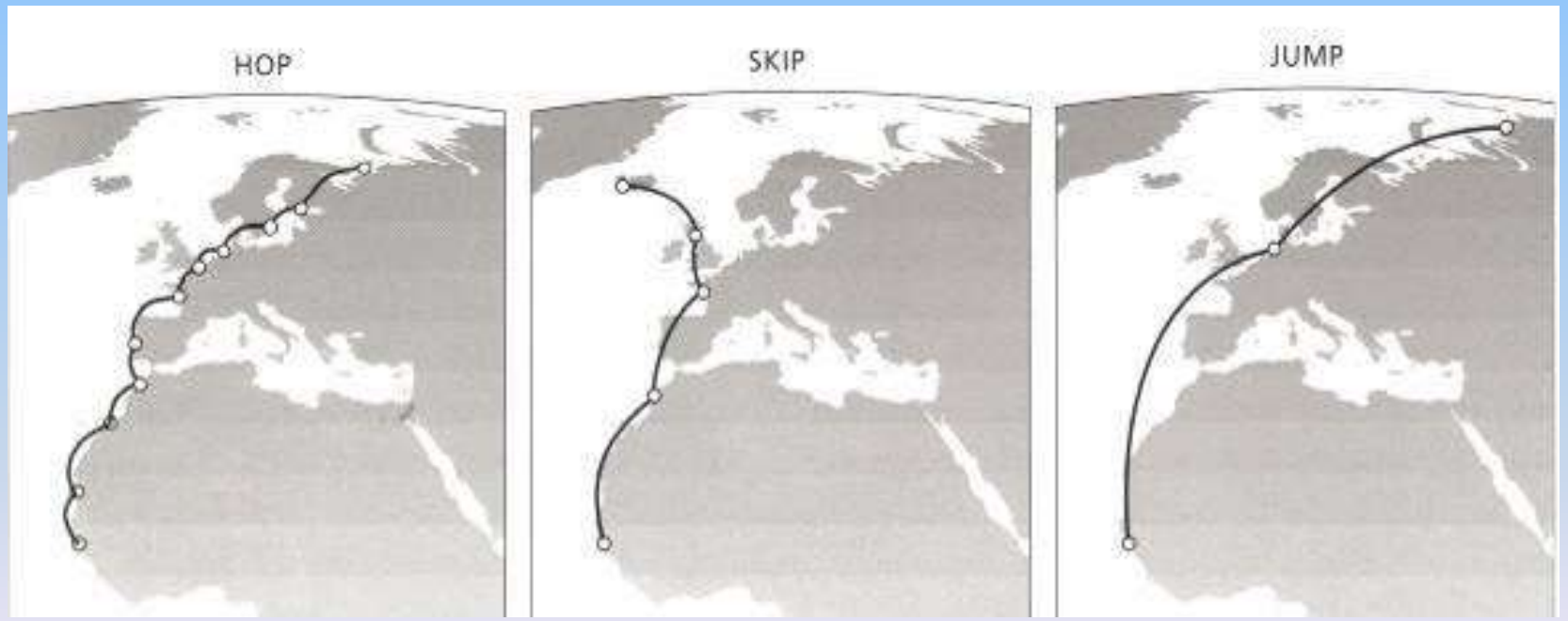
What are the implications of soaring flight?

- Migration is dependent on **weather** ⇨ protracted bad weather can be fatal
- **“Bottleneck” areas** ⇨ high vulnerability
- **Low manouverability** ⇨ high collision risk



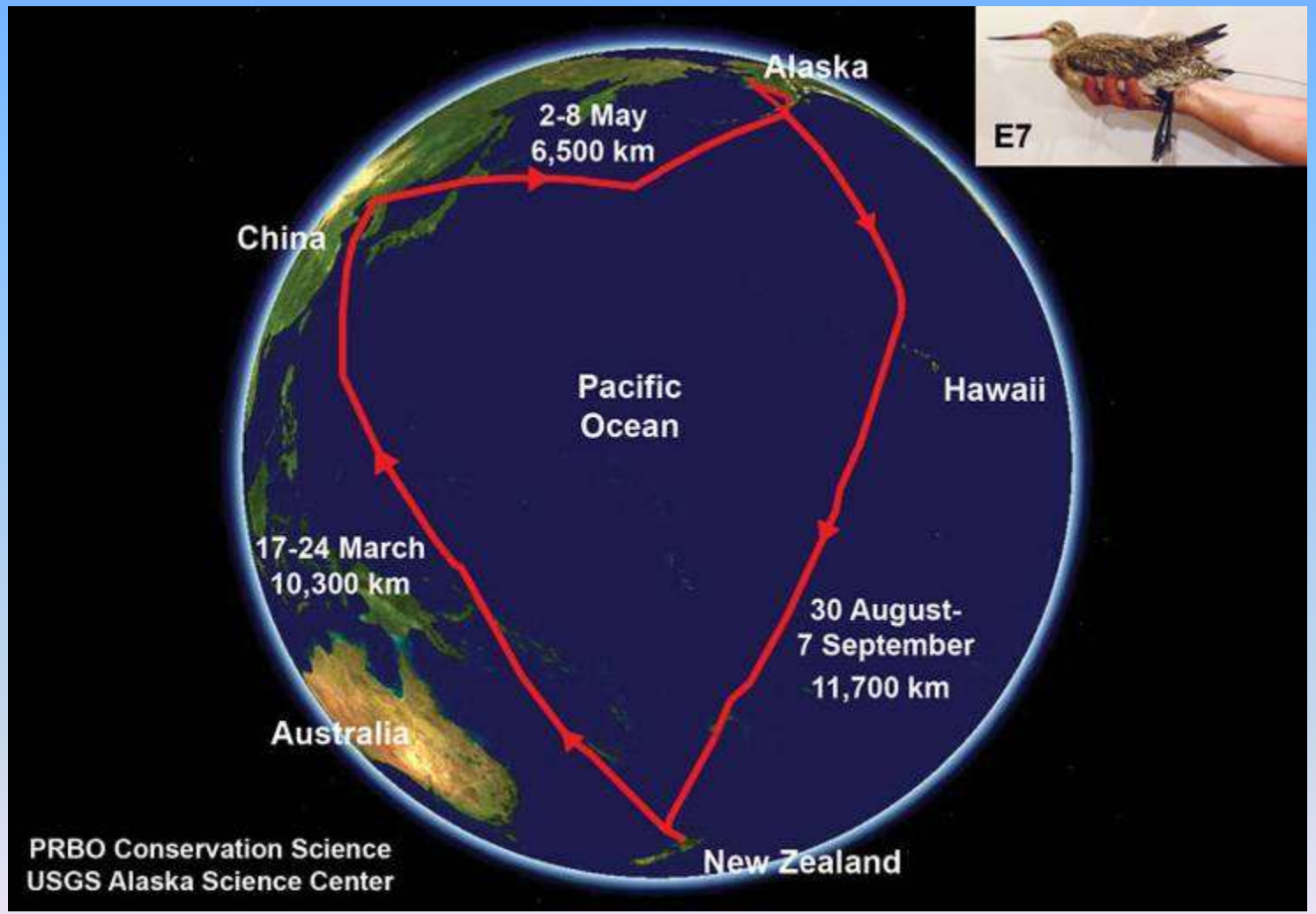
Travel schedules: How to cover distances?

- **Hop**: series of short flights, many stop-over sites (e.g. Ruddy Turnstone) ⇨ less risky, lower importance of individual sites
- **Skip**: intermediaries
- **Jump**: long distance flights between a few high-quality stop-over sites (Red Knot, Bar-tailed Godwit) ⇨ higher risk of failure



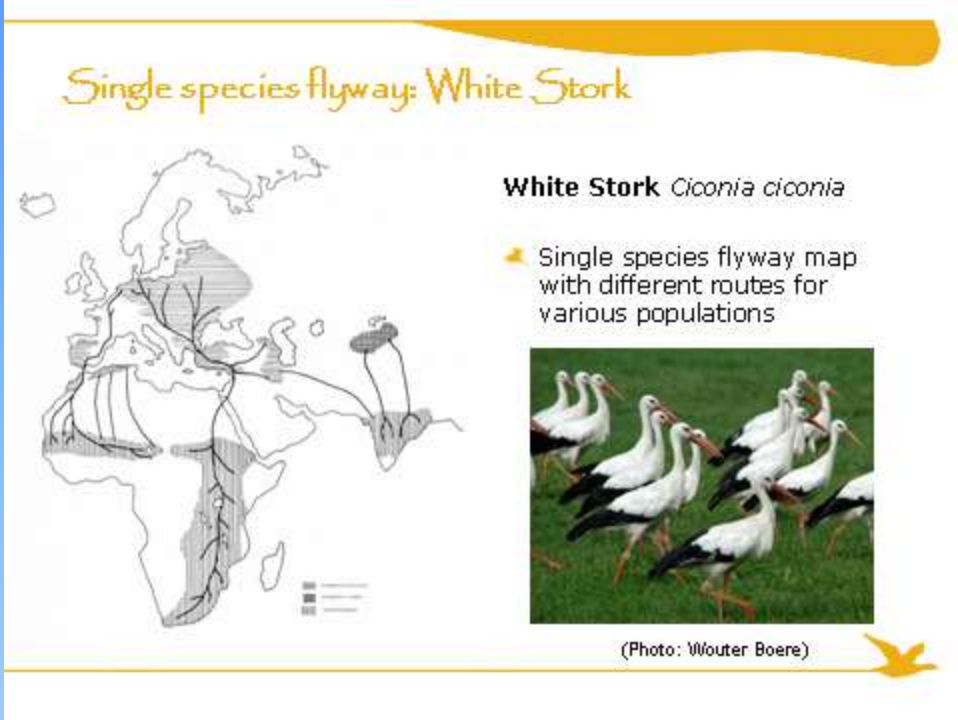
source: Piersma (1987)

‘Extreme jumping’
Satellite tagged Bar-tailed Godwit



Migration strategies: Birds

- Narrow-front migration
- Broad-front migration
- Loop migration
- Leapfrog migration
- Moult migration
- Nomadism
- Dispersal



Conservation status conclusions

- A species is likely to be **vulnerable** if it combines:
  - Restricted breeding area
  - Passes through bottleneck areas
  - Birds: Moulting all flight feathers
  - Long distance migrant with only a few stop-over sites
  - Specialised diet
  - Valuable harvest resource
  - Prone to specific threats

Exercise:
Draw a Migratory Route / Dessiner une route migratoire

- White Stork / Cigogne blanche
- Leatherback Turtle / Tortue luth
- Humpback Whale / Baleine a bosse
- Sooty Falcon / Faucon concolore