



How can wetland creation and restoration be managed without risking nuisance and disease from mosquitoes?

Frances Hawkes

Natural Resources Institute, University of Greenwich

Valuing Nature Conference 28 October 2019

www.wetlandlife.org

@wetlandlife

#wetlandlife



Public Health
England



UNIVERSITY of
GREENWICH

NRI | Natural Resources Institute



BUG SURGE Brits warned of mosquito invasion this week as Hurricane Dorian sparks 25C heatwave

UK disease WARNING: Aggressive tiger mosquitoes to invade UK bringing dengue fever & Zika

SWARMS of highly aggressive mosquitoes threaten to descend on Britain this summer bringing a risk of dengue fever, West Nile virus and zika outbreaks to the UK.

By NATHAN RAD
PUBLISHED: 11:16, Fri, May 11, 2018 | UPDATED: 15:51, Fri, May 11, 2018

SHARE f TWEET in G+ P



UK disease warning: Mosquitoes will descend on Britain this summer

Mosquito misery as wet and hot weather creates 'perfect storm' for bites

Damp spells and high temperatures are ideal conditions for the insect pests

By Ben Reid & Alan Weston
12:20, 29 AUG 2019

Enter your postcode for local news and info Enter your postcode Go In Your Area



HOME > NEWS > SCIENCE

Plague of mosquitos carrying deadly diseases is headed for Britain, scientists warn

Rising temperatures caused by climate change will make the damp British climate perfect for the disease-carrying insects



A mosquito Photo: Alamy

Climate change could cause malaria to spread across UK

EXCLUSIVE Experts predict an onslaught of biting and stinging insects this summer making it the "worst ever"

SHARE f TWEET in G+ P 6 COMMENTS By Nada Farhoud
21:59, 28 MAY 2019 UPDATED 22:04, 28 MAY 2019



ADVERTISEMENT

IPHONE 11 IM BESTEN NETZ EINZIGARTIG ZUSAMMEN

Das Beste NETZ

iPhone 11

ERLEBEN, WAS VERBIRGT

Quiz

Erin Cuthbert plays which sport?

Swimming

Tennis

powered by INSTIGATOR

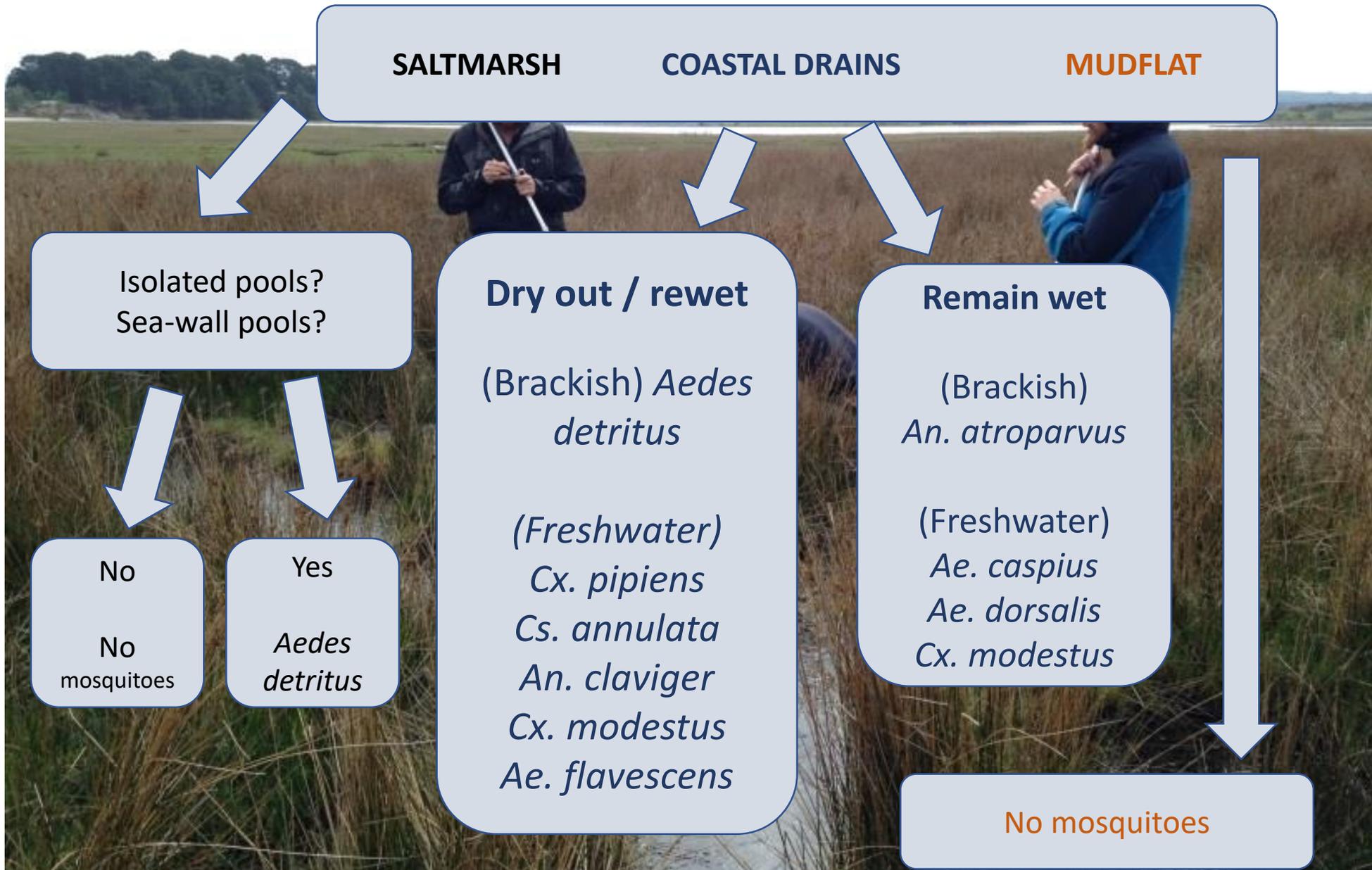
insticator uses cookies, by

Killer mosquito invasion reaches the UK as bugs travel to Britain from Europe

The insects, which have arrived in Kent, can spread potentially deadly diseases and have already caused problems across Europe



Dangerous: Asian Tiger Mosquito (Image: Roger Ertijal)



SALTMARSH

COASTAL DRAINS

MUDFLAT

Isolated pools?
Sea-wall pools?

No

No
mosquitoes

Yes

Aedes detritus

Dry out / rewet

(Brackish) *Aedes detritus*

(Freshwater)

Cx. pipiens
Cs. annulata
An. claviger
Cx. modestus
Ae. flavescens

Remain wet

(Brackish)
An. atroparvus

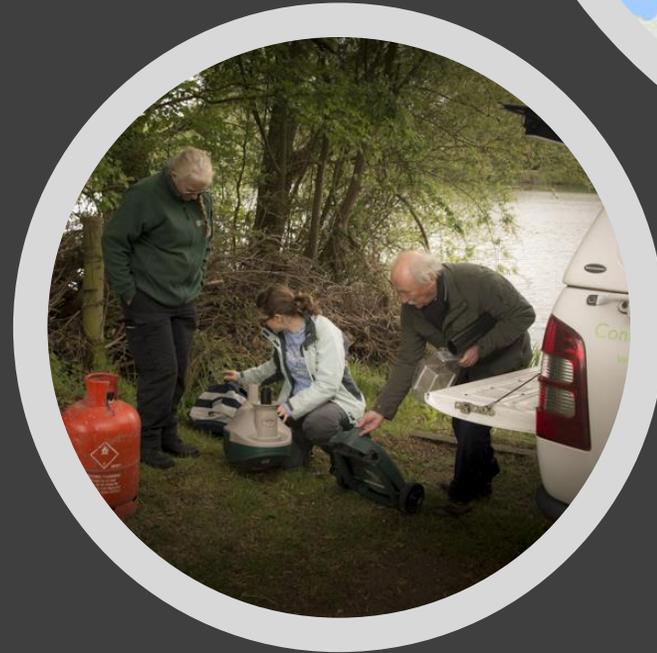
(Freshwater)

Ae. caspius
Ae. dorsalis
Cx. modestus

No mosquitoes

Mosquito sampling and habitat classifications

- 12 diverse English wetlands representing urban, coastal, arable reversion and wet woodland wetland habitats
- Two adult traps per site, run four nights a week every other week May to October
- Larval sampling in accessible aquatic habitats, in May, July and September
- Aquatic habitats codified according to characteristics relevant to mosquito ecology plus BTO scheme





Key findings from Entomology

- >39,000 adult mosquitoes collected and identified
- 19 of the 35+ British mosquito species represented
- The trap with the greatest catch in one seasons produced 11,228 mosquitoes
- The trap with the fewest produced only 5 mosquitoes

Alkborough

Coastal

- The most prolific site was Alkborough, dominated by *Aedes caspius* (>12,000!), which are associated with coastal marsh, flooded grass and estuarine river flooding habitats
- This species is a nuisance-biter in coastal areas; however the remote location likely limits impacts of this species on humans.
- Known to transmit Rift Valley fever virus in Egypt.

Somerset

Inland arable reversion

- Somerset Levels had the next greatest abundance, dominated by ***Aedes cantans/ Aedes annulipes*** (>7,000), both serious nuisance-biters of a broad range of mammals including humans and livestock.
- Likely the cause of documented local biting nuisance, but not considered a primary vector.
- They rely on periodic drying and re-wetting; managing water levels or regrading bank profiles to keep pools and ditches wet could inhibit egg hatching.

Bedford

Urban

- Bedford had a moderate to low number of mosquitoes, but the joint highest number of species recorded, including the rare *Culiseta subochrea*; well-managed urban blue/green space can be highly biodiverse.
- We found <400 *Anopheles claviger*, which is one of the most common species and will bite humans; but these were detected in an area where cattle – their preferred hosts – were allowed to graze and public access was limited.
- There were 10x more mosquitoes in conservation areas (514) vs amenity areas (52).

Take home message

- Very low numbers of known biting species were detected in our study sites, alongside diverse array of non-nuisance species.
- Mosquito species were found everywhere we expected, but overall low biting risk across many wetland types.
- Given seasonal distributions of biting species it seems likely that any nuisance issues will be highly localised and generally limited in duration.

Impact

- Developing a handbook for wetland manage and those planning wetland creation, expansion and restoration and setting policy around public health and the environment.
- Includes an algorithm for identifying mosquito species associated with specific habitat characteristics.
- Evidence base to guide wetland management, respond to public concern, advocate for wetlands and use in possible future emergency public health responses.

DITCHES

Remain wet year round

- ***Cq. richiardii*** (particularly if there is marginal & emergent vegetation)
- ***An. maculipennis*** (prefers sunlit ditches)
- ***Culex modestus*** (only in endemic areas of SE England)
- ***Cx. pipiens*** (part. nutrient rich, low biodiversity)
- ***An. claviger***

Dry out / rewetting events

In ditches that silt up (require slubbing) or dry during drought:

- ***Cx. pipiens***
- ***Cs. annulata***
- ***An. claviger***

Acknowledgements

Thanks to all the staff who helped at our study sites:

- All private landowners
- Bedford Borough Council
- Hampshire & Isle of Wight Wildlife Trust
- Natural England
- North Lincolnshire Council
- RSPB
- WWT
- Wyre Forest District Council
- The ento team at PHE and NRI
- The wetlandLIFE team
- The Valuing Nature Programme
- Harrison Lambert, Katy James and Dr Anthony Abbott for field assistance

