Annex to:

EFSA AHAW Panel (EFSA Panel on Animal Health and Welfare), More S, Bøtner A, Butterworth A, Calistri A, Depner K, Edwards S, Garin-Bastuji B, Good M, Gortázar Schmidt C, Michel V, Miranda MA, Nielsen SS, Raj M, Sihvonen L, Spoolder H, Thulke H-H, Velarde A, Willeberg P, Winckler P, Baldinelli F, Broglia A, Dhollander S, Beltrán-Beck B, Kohnle L, Morgado J and Bicout D, 2017. Scientific Opinion on the assessment of listing and categorisation of animal diseases within the framework of the Animal Health Law (Regulation (EU) No 2016/429): West Nile fever (WNF). EFSA Journal 2017;15(8):4955, doi:10.2903/j.efsa.2017.4955

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Annex A – Mapped fact-sheet used in the individual judgement on West Nile Fever

Article 51
Question A(i)1
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Article 5

Question A(i)

Question A(i) scientific evidence indicate that the disease is transmissible Answer Y IN In a II		
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet
(a)(vi) the routes and speed of transmission of the disease between animals and, when relevant, between animals and humans	(a)(vi) 1 types of routes of transmission from animal to animal (horizontal, vertical)	Results of experimental trials on WNV transmission routes in wild birds are summarized in table a.vi.1-2. in the Table section. Mosquito bites are the usual source of WNV for mammals, reptiles and amphibians however in some animals; there is also evidence for transmission by other routes. Carnivorous mammals and reptiles (e.g., cats and alligators) can be infected by eating contaminated tissues. Direct transmission during close contact has also been reported in



	alligators, possibly via fecal shedding of virus. Chipmunks, squirrels and raccoons can also shed WNV in feces, oral secretions and/or urine. WNV has been found in the urine of experimentally infected hamsters, and in very small amounts in the oral and/or cloacal fluids of experimentally infected North American bullfrogs (<i>Rana catesbeiana</i>) and green iguanas (<i>Iguana iguana</i>). Transplacental transmission was reported in experimentally infected sheep and mice, as well as in a horse that was fatally infected with a lineage 1 virus in Africa, and aborted in the final stage of the disease. The epidemiological significance (if any) of mammalian, reptilian and amphibian hosts in the maintenance or amplification of WNV remains to be established.
(a)(vi) 2 routes of from ani humans indirect)	ransmission and humans. However, human infection from the exposure of conjunctival membranes (Fonseca et al., 2005) and/or percutaneous

Question A(ii)

Question A(ii) a Union	animal species are eit	ther susceptible to the disease or vectors and reservoirs thereof exist in the
	dicate if animal species	susceptible to the disease or vector or reservoir are present in the Union
Answer Y 🗆 N [
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet
(a)(i) animal	(a)(i) 1 naturally	Birds
		Order Anseriformes
concerned by		Family Anatidae: Wood Duck-Aix sponsa; Eurasian Wigeon-Anas penelope (c);
species	(a)(1) 1 haturally susceptible wildlife species	Order Anseriformes
		Family Columbidae: White-crowned Pigeon-Columba leucocephala; Rock Dove (Feral
		Pigeon)-Columba livia; Mauritius Pink Pigeon-Columba mayeri (c)(a); Common
		Ground-Dove-Columbina passerina; Eurasian Collared-Dove-Streptopelia decaocto; White-winged Dove-Zenaida asiatica; Mourning Dove-Zenaida macroura; Luzon
		Pigeon (Bleeding Heart Pigeon)-Gallicolumba luzonica (c)(a); Inca Dove-Columbina inca
		Order Coraciiformes
		Family Alcedinidae: Belted Kingfisher-Ceryle alcyon
		Order Cuculiformes



	Family Cuculidae: Yellow-billed Cuckoo-Coccyzus americanus Order Falconiformes
	Family Accipitridae: Cooper's Hawk-Accipiter cooperii; Northern Goshawk-Accipiter
	gentilis; Sharp-shinned Hawk-Accipiter striatus; Golden Eagle-Aquila chrysaetos; Red-
	tailed Hawk-Buteo jamaicensis; Rough-legged Hawk-Buteo lagopus (c); Red- shouldered Hawk-Buteo lineatus; Broad-winged Hawk-Buteo platypterus; Swainson's
	Hawk-Buteo swainsoni; Northern Harrier-Circus cyaneus; Swallow-tailed Kite-
	Elanoides forficatus; Bald Eagle-Haliaeetus leucocephalus; Mississippi Kite-Ictinia
	mississippiensis; Osprey-Pandion haliaetus; Harris' Hawk-Parabuteo unicinctus (c) Family Falconidae: Merlin-Falco columbarius; Prairie Falcon-Falco mexicanus;
	Peregrine Falcon-Falco peregrinus; American Kestrel-Falco sparverius
	Order Galliformes Family Numididae: Crested Guineafowl-Guttera pucherani (c)(a)
	Family Odontophoridae: Northern Bobwhite-Colinus virginianus
	Family Phasianidae: Chukar-Alectoris chukar (c)(a); Ruffed Grouse-Bonasa umbellus;
	Green Junglefowl-Gallus varius (c)(a); Impeyan (Himalayan) Pheasant (Monal)- Lophophorus impeyanus (c); Bulwer's Wattled Pheasant-Lophura bulweri (c)(a); Ring-
	necked Pheasant-Phasianus colchicus; Mount Peacock-Pheasant-Polypectron
	inopinatum (c)(a); Crested Partridge-Rollulus roulroul (c)(a); Blyth's Tragopan- Tragopan blythii (c); Argus Pheasant (unspecified)-various (c)(a); Greater Sage
	Grouse-Centrocerus urophasianus
	Order Gaviformes
	Family Caprimulgidae: Common Loon-Gavia immer Order Gruiformes
	Family Gruidae: Demoiselle Crane-Anthropoides virgo (c)(a); West African Crowned
	Crane-Balearica pavonina pavonina (a); Wattled Crane-Bugeranus carunculatus (c)(a); Whooping Crane-Grus americana (c)(a); Mississippi Sandhill Crane-Grus
	canadensis pulla (c); Red-crowned Crane-Grus japonensis (c)(a); Siberian Crane-Grus
	leucogeranus (c)(a); Hooded Crane-Grus monacha (c)(a); White-naped Crane-Grus vipio (c)(a); Black-necked Crane-Grus nigricollis (c)(a)
	Family Rallidae: Virginia Rail-Rallus limicola
	Order Musophagiformes
	Family Musophagidae: Lady Ross' Turaco (Plantain-Eater)-Musophaga rossae (c)(a) Order Passeriformes
	Family Bombycillidae: Cedar Waxwing-Bombycilla cedrorum
	Family Cardinalidae: Northern Cardinal-Cardinalis cardinalis; Blue Grosbeak-Guiraca caerulea(a); Rose-breasted Grosbeak-Pheucticus Iudovicianus; Dickcissel-Spiza
	americana
	Family Corvidae: Western Scrub-Jay-Aphelocoma californica; American Crow-Corvus brachyrhynchos; Common Raven-Corvus corax; Fish Crow-Corvus ossifragus; Blue
	Jay-Cyanocitta cristata; Steller's Jay-Cyanocitta stelleri; Black-billed Magpie-Pica
	hudsonia (c) Family Emberizidae: Song Sparrow-Melospiza melodia; Savannah Sparrow-
	Passerculus sandwichensis; Fox Sparrow-Passerella iliaca; Eastern Towhee-Pipilo
	erythrophthalmus; Field Sparrow-Spizella pusilla Family Estrildidae: Zebra Finch-Taeniophygia guttata (c)
	Family Fringillidae: American Goldfinch-Carduelis tristis; House Finch-Carpodacus
	mexicanus; Purple Finch-Carpodacus purpureus; Evening Grosbeak-Coccothraustes vespertinus; European Goldfinch-Carduelis carduelis (c)
	Family Hirundinidae: Barn Swallow-Hirundo rustica; Purple Martin-Progne subis; Tree
	Swallow-Tachycineta bicolor
	Family Icteridae: Red-Winged Blackbird-Agelaius phoeniceus; Rusty Blackbird- Euphagus carolinus; Brewer's Blackbird-Euphagus cyanocephalus; Baltimore Oriole-
	Icterus galbula; Brown-headed Cowbird-Molothrus ater; Boat-tailed Grackle-Quiscalus
	major; Great-tailed Grackle-Quiscalus mexicanus; Common Grackle-Quiscalus quiscula
	Family Laniidae: Loggerhead Shrike-Lanius ludovicianus
	Family Mimidae: Gray Catbird-Dumetella carolinensis; Northern Mockingbird-Mimus polyglottos; Brown Thrasher-Toxostoma rufum
	Family Paridae: Tufted Titmouse-Baeolophus bicolor; Varied Tit-Parus varius (c);
	Black-capped Chickadee-Poecile atricapilla; Carolina Chickadee-Poecile carolinensis Family Parulidae: Black-throated Blue Warbler-Dendroica caerulescens; Yellow-
	rumped Warbler-Dendroica coronate; Yellow Warbler-Dendroica petechial; Blackpoll
	Warbler-Dendroica striata; Common Yellowthroat-Geothlypis trichas; Kentucky
	Warbler-Oporornis formosus; Northern Parula-Parula Americana; Ovenbird-Seiurus aurocapillus; Northern Waterthrush-Seiurus noveboracensis; Nashville Warbler-
	Vermivora ruficapilla; Canada Warbler-Wilsonia Canadensis; Hooded Warbler-Wilsonia
	citrina Family Passeridae: House Sparrow-Passer domesticus
	Family Sylviidae: White-crested Laughingthrush-Garrulax leucolophus (c)(a)
	Family Sittadae: White-breasted Nuthatch-Sitta carolinensis Family Sturnidae: European Starling-Sturnus vulgaris



<pre>reminy intraliptage: remin langger intraliptage printiatum (c) reminy Turodytage: Carbona Wreat-Thystheurus studioxicanus; Winter Wreat- Family Turodicae: Versey-Cathanis tissescens: Hermit Thrush-Catharus gutuatus; Gray- cheeked Thrush-Catharus mutuatis; Eastern Bubbled-Siala stalis; American Robin-Turdus migratorius Family Tyrannidae: Trail's Flycatche-Empidonax traillijalnonm; Eastern Rhobin- Turdsh-Mylocicha muselina; Eastern Bubbled-Siala stalis; American Robin-Turdus migratorius Family Tyrannidae: Trail's Flycatche-Empidonax traillijalnonm; Eastern Rhobin- Tyrannus tyrannus Family Tyrannidae: MacA-whiskered Vireo-Vireo attiloquus; Warbling Vireo-Vireo Bandy Tyrannus contentials (c)(a); Family Phatencorandee; Double: ersted Comonant-Phateconcora varuus; Guany Comonant-Phateconcora bougainvillei (c) Order Piccinformes Family Pictae: Red-Paded Woodpecker-Metanerpes erythrocphalus; Downy Woodpecker-Piccides: Deat-Aeaded Woodpecker-Metanerpes erythrocphalus; Downy Woodpecker-Piccides: Deat-Boaled Grebb-Polilymbus podicaps Order Piccide: Contato (unspecified)-Cactus spp. (c); Coduatel-Nymphicus biolandicus (c) Family Patiscides: Red-Paded Woodpecker-Metanerpes erythrocphalus; Downy Woodpecker-Piccides pube.eccens; Yellow-bellide Sapsuker-Sphyrapicus varius Order Piccide: Contato (unspecified)-Cactus spp. (c); Coduatel-Nymphicus biolandicus (c) Family Patiscides: Red-Paded Woodpecker-Metanerpes erythrocphalus; C); Macaw (unspecified)-Ara spp. (c); Budgerigar-Metopsittacus undulatus (c); Lorikeet spp. Trichegliass spp. (c) Family Posticue-Piccide Grebe-Podilymbus podicaps Order Spheniscicous Family Spheniscicus humbodid (c) Family Posticulae: Fact-Paded Woodpecker-Metanerpes erythrocphalus; Cory Family Posticate: Red-Tookato (unspecified)-Cactus age Owl (Might Spage Owl-Statk setter) = Spheniscicous and the spheniscus demersus (c); Magelian Parguin-Spheniscus humbodid (c) Family Posticate end - Red-robin for the spheniscus demersus (c); Magelian Parguin-Spheniscus humbodid (c) Owl-Statk endor-Spheniscus humb</pre>		Farsily Theory wide as Dalas Tana any Theory wis a share way (a)
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Femily Turdide: Very-Catharus fuscescens; Hermit Thrush-Catharus gutualits; Grey- cheeked Trush-Catharus Imimus, Swainers Thrush-Catharus gutualits; Grey- cheeked Trush-Catharus (Eastern Bluebird-Sialis ailis); American Robin-Turdus migratorius Family Tyrannias: Traill's Fycatcher-Empidonas traillivalnorum; Eastern Mogbind- Tyrannus Iyrannus Black-whikkered Vireo-Vireo altiloquus; Warbling Vireo-Vireo rahus; Bed-level Vireo-Vireo Indivocus Order Pelceanformes Family Pelceanformes Family Pelceanformes Comorant-Phalacrocora auturs; Guany Comorant-Phalacrocora bougainvillei (c) Order Pelceanformes Family Pelceanformes Family Pelceanformes Family Pelceanformes Family Pelceanformes Family Pelceanformes Family Pelceanformes Family Pelceanformes Family Pelcie: Red-Pealled Grebe-Peel/nynbus policeps Order Pelcformes Family Policipedformes Family Stratadea: Red-rowed Parrot-Amazona viridigenalis (c): Macaw (unspecified)-Ara spp. (c): Budgerigar-Melopsittacus undulatus (c): Lorikeet spp. Tritcheglossis spp. (c) Order Spheniscico: Sumwhot On-Aagolius acadicus; Boroal Owi-Aegolius Family Stratadea: Red-rowed Parrot-Amazona viridigenalis (c): Macaw (unspecified)-Vara spp. (c): Budgerigar-Melopsittacus undulatus (c): Lorikeet Spp. Tritcheglossis spp. (c) Order Stratadea: There Dwi-Abor organianus; Strave Owi-Abor (c) Magelan Penguin-Spheniscus humbodit (c) Order Stratadia: Three North Abar (c) Amarous; Strave Owi-Abor Three Abbor virginanus; Strawy Owi-Yorke scandara (c); Easter Screech Owi-Abar Iama and Stratagle Of (Wilk) Eagle Owi-Bistric Aratina Gam Strath-Struthia Cathalia (C) Family Struthianificate Strath Order Abbor Virginanus; Straty Owi-Yorke Stratadea: Three North-Struthia Cathalia (C) Family Struthiani Gastrih-Struthian Gama (c) Family Struth		Family Troglodytidae: Carolina Wren-Thryothaurus ludovicianus; Winter Wren-
checked Thrush-Catharus minimus; Svainson's Thrush-Catharus utivulars, Wood Thrush-Mytochal mustelini; Eatern Bueberd-Sialia salis; American Robin-Tudus migratorius Family Viramidae: Traili's Flycatcher-Empidonax trailii/Jahorum; Eastern Phoebe- Sayornis phoebe; Solsson-tailed Flycatcher-Tynamus forficatus; Eastern Kingbird- Tyrannus Viramidae: Thraili's Flycatcher-Tynamus forficatus; Eastern Kingbird- Tyranis Vireonidae: Black-Whitekered Vireo-Vireo attitoquus; Warbling Vireo-Vireo gilvus; Re-Leque Vireo-Vireo ovaceus Order Pelecan/Forders Divecus Order Pelecan/Forders Divecus Order Pelecan/Forders Divecus Order Policipae/Hornes Family Picidae: Red-headed Woodpecker-Melanerpes erythrocephalis; Downy Woodpecker-Phoelies puberes; Yellow-Belled Sapsucker-Sphyrapicus varius Order Policipae/Hornes Family Picidae: Red-headed Woodpecker-Melanerpes erythrocephalis; Downy Woodpecker-Phoelies puberes; Yellow-Belled Sapsucker-Sphyrapicus varius Order Policipae/Hornes Family Schatcher: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (Inspecified)-Ara spp. (c); Budgergar-Melopsittacus undulutus (c); Lonkeet spp. Order Spheniscformes Family Spheniscformes Family Spheniscformes Family Spheniscformes Family Spheniscformes Family Spheniscformes Family Spheniscformes Family Spheniscformes Family Scheniscformes Family Scheniscformes F		Troglodytes troglodytes
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Family Tyramidae: Trail's Flycatcher-Emplohaes trailit/alhorum; Eastern Phoebe Sayoms phoebe; Scisoraliad Flycatcher-Tyramus forficitus; Eastern Kingbird- Tyramus byramus Family Vieonidae: Black-whiskered Vireo-Vireo alitolouus; Warbling Vireo-Vireo glitus; Red-eyed Vireo-Vireo alitolouus; Guanay Comorant-Phalacrocorab kouganivillei (c) Order Phelicanus codentials (c)(a); Family Phalacrocoraddee; Double-crested Comorant-Phalacrocora auritus; Guanay Comorant-Phalacrocorab couganivillei (c) Order Phelicanus Order Phelicanus Codentials (c)(a); Family Phalacrocorab couganivillei (c) Order Phelicanus Order Phelicanus Codentials; Colassi Comorant-Phalacrocora auritus; Guanay Comorant-Phalacrocorab couganivillei (c) Order Stratactformes Family Cacatudae: Cockatoo (unspecified)-Cacatua spp. (c); Cockatiel-Nymphicus hollandicus (c) Family Patitactiones Family Cacatudae: Cockatoe (Lockaso) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humbolitu (c)(a) Order Strigtformes Family SphenisCodea: Black-footed (Jackaso) Penguin-Spheniscus demersus (c); Magelian Cockator (c); Sototed Owi-Agaplus acaticus; Brand Owi-Agaplus sondiare (c); Easters Terech Owi-Obas site; Tawn Owi-Strix aurita; Norther Hawk Owi-Summus (C)(a) Order Strigtformes Family Struktionidae: Cartech Owi-Magelian saticus; C)(a) Family Struktionidae: Cartech Owi-Magelia acaticus; Brand Owi-Agaplus sondiare (c); Easter Strukting C)(a): Great Grey Owi-Strix nebulosa (c): Spotted Owi-Strix occidentials (c); Barred Owi-Strix varia; Norther Hawk Owi-Strukting C) Order Struktioniformes Family Struktionidae: Ostrich-Struktibia camelia (c)(Alpace (C))		
Soyonis Phoebe; Scissor-tailed Pkyatcher-Tyrannus forficatus; Eastern Kingbird- Tyrannus Tyrannus Family Vireonidae: Black-whiskered Vireo-Vireo atbloquus; Warbling Vireo-Vireo gliuts; Red-yed Vireo-Vireo olivaceus Order Pelccanide: American White Pelican-Pelecanus erythrorhynchos; Brown Pelican-Pelicanus occidentails (c)(a): Family Phalacrocoratidae; Dubble-rested Cormorar: Phalacrocorat urticus; Guanay Commont Phalacrocorat bugainvillel (c) Order Picitae: Red-headed Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Rodites pubsecens; Yellow-belled Sapuscker-Spiryrapicus vanus Order Picitae: Red-headed Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Rodites pubsecens; Yellow-belled Sapuscker-Spiryrapicus vanus Order Patitaciformes Family Castautae: Codatoo (unspecified)-Cacatua spp. (c); Cockatiel-Nymphicus hollandicus (c) Family Patitacidae: Red-crowned Parot-Amazona viridigenalis (c); Lorikeet spp. Tricheglosus spp. (c) Order Spheniscdes: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboldti (c)(a) Order Strigtformes Family Strigtformes Family Strigtformes Family Strigtformes Col; Short-eared Owl-Abis fammeus; Verreaux Sagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a) Great Horned Owl-Bugolius acadicus; Boreal Owl-Aegolius funereoux (c); Short-eared Owl-Abis fammeus; Verreaux Sagle Owl (Milky Eagle Owl-Strix nebulosa (c); Spatted Owl-Strix codentails (c); Barred Owl-Strik varia; Northern Hwark Owl-Samue Lanag glama (c); Alpaca (Suri)-Lama pacco (c) Family Struthoinformes Tramity Struthoi		5
Tyranus tyranus Family Vireonidae: Black-whiskered Vireo-Vireo altiloguus; Warbling Vireo-Vireo gilvus; Red-eyed Vireo-Vireo olivaceus Order Patelcanis Family Pelcanidae: American White Pelcan-Pelcanus erythrothynchos; Brown Pelican-Pelcanus cordentials (c)(a); Family Phalacorcoracidae; Double-crested Cormorant-Phalacrocorax auritus; Guanay Cormorant-Phalacrocora bougainvillei (c) Order Policipediae: Red-baeded Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Picolae publicescens; Yellow-Delled Sapsucker-Sphyrapicus varius Order Policipediae: Red-billed Grebe-Polilymbus policeps Order Patitaciformes Family Pattacidae: Cockato (unspecified)-Cacatua spp. (c); Cockatiel-Mymphicus hollandicus (c) Family Pattacidae: Red-crowned Parrot-Amazona vindigenalis (c); Macaw (unspecified)-An spp. (c); Budgerigan-Melopsitucaus unulaisus (c); Lonkeet spp. Tricheglaesis spp. (c); Sptot-eared Owl-Alao trainmeus; Nowy Owl-Nyctea condiaca (c); Eastern Screech Owl-Buo grinainus; Snowy Owl-Nyctea condiaca (c); Eastern Screech Owl-Buo grinainus; Reindeer-Rangffer Tamily Strubinoidae: Unit-Strub comelia (c) (a) Marmais Order Artiotactyla Family Bovidae: White-tailed Deer-Odocoleus Virginianus; Reindeer-Rangffer Tamily Eavidae: White-tailed Deer-Odocoleus Virginianus; Reindeer-Rangffer Tamily Suidae: Babrysa Babryousa (c)(a) Family Buodea: Unit-tailea Babrysa Babryousa (c)(a) Order Canivora Family Visid		
Family Virieonidae: Black-whistered Vireo-Vireo altiloguus; Warbling Vireo-Vireo altivecus Order Pelecanidie: American White Pelican-Pelecanus erythrorhynchos; Brown Pelican-Pelicanus occidentalis (c)(a); Family Phalacrocoracidae; Duble-crested Cormorant-Phalacrocora auritus; Guanay Comorant-Phalacrocora bugainvillel (c) Order Piciformes Family Picidae: Red-headed Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Picolidepublicares Family Picidae: Red-headed Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Picolidepublicae: Pach-billed Greber-Politymbus podiceps Order Picidae: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Budgerjagn-Melospittacus undulatus (c); Lorkeet sppTricheglossus spp. (c) Order Strigtformes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Denguin-Spheniscus humbodit (c) (c)a Order Strigtidae: Konthem Saw-whet Owi-Aegolus acadicus; Boreal Owi-Aegolus funereous (c); Short-cared Owi-Ako fammeus; Verreaux's Eagle Owi-Aegolus funereous (c); Short-cared Owi-Ako fammeus; Verreaux's Eagle Owi-Aegolus funereous (c); Short-cared Owi-Ako fammeus; Verreaux's Eagle Owi-Aegolus funereous (c); Short-cared Owi-Ako drainaus; Showy Owi-Arytea scandiaca (c): Eastern Screed Owi-Auto draine); Showy Owi-Arytea scandiaca (c): Eastern Screed Owi-Auto draine (c)(a) Order Strigtformes Family Strikticae: Baren Screed Owi-Auto draine (c)(a) Order Martine Content Dowi-Two alto Content Dowi-Auto draine (c)(a) Order Strigtformes Family Strikticae: Strikticae: Strikticae: Strikticae: Strikticae: Strikticae: Strikticae: Strikticae:		Sayornis phoebe; Scissor-tailed Flycatcher-Tyrannus forficatus; Eastern Kingbird-
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glivus; Red-eyed Vireo-Vireo olivaceus Order Pelecaniformes Family Pelecanidae: American White Pelican-Pelecanus erythrorhynchos; Brown Pelican-Piclanus cocidentis (C)(a); Family Phalacrocoracidae; Double-crested Cormorant-Phalacrocorax auritus; Guanay Cormorant-Phalacrocorax bougainvillei (c) Order Policipedia Family Picidae: Red-Paedied Woodpecker-Melanepes erythrocephalus; Downy Woodpecker-Picoides publicescens; Yellow-belled Sapaucker-Sphyrapicus varius Order Policipedia Family Policaetiae: Ped-obiled Grebe-Polilymbus podiceps Order Policipedia Family Policaetiae: Red-rowned Parot-Amazona wirdigenalis (c); Macaw (unspecified)-Va spp. (c); Budgerjar-Melopsittacus undulatus (c); Lorikeet spp Trichegliossus spp. (c) Order Spheniscicae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboldti (c)(a) Order Strigtformes Family Strigtae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius co(c); Short-aed Owl-Soft Ammeus; Verreaux: Sagle Owl (Milky Eagle Owl-Strix nebulosa (c); Spotted Owl-Strix asio; Tawny Owl-Strix auria; Northern Hawk Owl-Surran Julua (c) Family Struthoni/Gremes Family Struthoni/Greme Family Struthoni/Gremes Family Struthoni/Greme Family Neteridiae: Striped Struth-Melphilis Rephilis Family Melphate: Striped Struth-Melphilis Rephilis Family Neteridiae: Striped Struth-Melphilis Rephi		
inder Pelecanides: American White Pelican-Pelecanus erythrorhynchos; Brown Pelican-Pelicanus occidentalis (c)(a); Family Phalacrocorrades; Double-crested Cormoran-Phalacrocorra autrus; Guanay Cormorant-Phalacrocorra bungainvillei (c) Order Picformes Family Picklae: Red-headed Woodpecker-Melaerocorax bougainvillei (c) Order Picformes Family Podicipediformes Family Podicipediformes Family Podicipediformes Family Podicipediformes Family Podicipediformes Family Castuidae: Cockatoo (unspecified)-Cacatua spp. (c); Cockatel-Nymphicus holiand(cus (c) Family Policipediformes Family Posticaciones Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demensus (c); Magain Penguin-Spheniscus humbodit (c)(a) Order Strigformes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demensus (c); Mageilan Penguin-Spheniscus humbodit (c)(a) Order Strigformes Family Spheniscus humbodit (c)(a) Family Spheniscidae: Black-footed Out-Agoolius acadicus; Boreal Owi-Agoolius funereous (c); Shorte-Owi-Asin fammeus; Verreaux's Eagle Owi (Milky Eagle Owi)-Stirk oxidentalis (c); Bastern Screech Owi-Otsu asio, Tawny Owi-Stirk aluca(c); Greet Grey Owi-Stirk nebulsao (c); Spatted Owi-Stirk oxidentalis (c); Bared Owi-Hytota scandiae (c); Eastern Screech Owi-Otsu asio, Tawny Owi-Stirk aluca(c); Greet Grey Owi-Stirk nebulsao (c); Spatte Owi-Stirk oxidentalis (c); Bared Owi-Hytota aluca(c); Family Carcuidae: Martinal Gat-Oreannes americanus (c) Family Bovidae: Mountain Goat-Oreannes americanus (c) Pamily Socidae: Mountain Goat-Oreanne		
Family Pelicanidae: American White Pelican-Pelicanus erythrohynchos; Brown Pelican-Pelicanus occidentalis (c)(a); Family Phalacrocoratolae; Double-crested Cormorant-Phalacrocorax aurtus; Guanay Cormorant-Phalacrocorax bougainvillei (c) Order Policipediformes Pamily Policipedifae: Red-headed Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Piocides pubscens; Yellow-bellied Sapsucker-Sphyrapicus varius Order Policipedifae: Red-billed Grebe-Podilymbus podiceps Order Psitacidea: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet spp Trichegiossus spp. (c) Order Spheniscromes Family Spheniscide: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboldti (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asia fammeus; Veraux's Eagle Owl (Miky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nytcea scandiac (c); Easter Screech Owl-Ous asio; Tawny Owl-Strix aluco(c); Creat Grey Owl-Strix houlosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Xenzina Lula (c) Family Struitale: Barn Owl-Tyto alba Order Artiodacty1a Family Struithonidae: Ostrich-Struthio camelis (c)(a) Family Camelidae: Lama-Lama glama (c); Apaca (Suri)-Lama pacos (c) Family Camelidae: Strich-Struthio camelis (c)(a) Order Camivora Family Struthonidae: Barlyrous Ablayrous Ablayrous (c) Family Camelidae: Strike Falle Ablayrous (c) Family Camelidae: Barlyrous Ablayrous Ablayrous (c) Family Procyonidae: Red Panda-Ablurus fulgens (f)(a) Order Chiroptera Family Procyonidae: Red Panda-Ablurus fulgens (c)(a) Order Primata Family Scuridae: Grey Squirel-Scurus canglenensis; Fox Squirel-Scurus niger; Eastern Chipmuk-Tamias striatus Reptiles Order Crocodylia Family Scur		5 1 1
Pelican-Pelicanus occidentalis (c)(a); Family Phalacrocorade, Double-Crested Commora-Phalacrocora aurltus; Suanay Commont-Phalacrocorax bougainville (c) Order Piciformes Family Policipeelformes Family Policipeelformes Family Policipeelformes Family Policipeelformes Family Policipeelformes Family Policipeelformes Family Castulidae: Cockatoo (unspecified)-Cacatua spp. (c); Cockatel-Nymphicus hollandicus (c) Family Pelitaclformes Family Policipeelformes Family Policipeelformes Family Policipeelformes Family Policipeelformes Family Policipeelformes Family Policipeelformes Family Spheniscichae: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet spp. Tricheglossus spp. (c) Order Strigformes Family Spheniscichae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelan Penguin-Spheniscus humboldti (c)(a) Order Strigformes Family Spheniscichae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelan Penguin-Spheniscus humboldti (c)(a) Order Strigformes Family Spheniscichae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelan Penguin-Spheniscus humboldti (c)(a) Order Strigformes Family Spheniscichae: Black-footed Owl-Aboy ourl-Aegolius funcerous (c); Short-Gardet Owl-Aboy Strix oxidentalis (c); Barred Owl-Aboy Owl-Nyctae scandiaca (c); Eastern Screech Owl-Ostus asig: Tawny Owl-Strix aluca(c); Great Grey Owl-Strix nebulosa (c); Spotta Owl-Strix oxidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Suma Julia (c) Family Stathtionidee: Ostri-Strutho camelis (c)(a) Mammals Order Struthoniformes Family Stathtionidee: Strike Julia (c) Family Camelidee: Lama-Lama Jama Julia (c), Alpaca (Suri)-Lama pacos (c) Family Camelidee: Striped Sturk-Mephitis mephitis Family Stathties: Babrusa-Babryousa babryousa (c)(a) Order Camiora Family Vespertilonidee: Big Brown Bat-Eptesius fuscus; Little Brown Bat-Myotis lucifiqus Order Chiroptera Family Vespertilonidee: Big Brown Bat-Eptesius fuscus; Little Brown Bat-Myotis lucifiqus Ord		
Comorant-Phalacrocorax auritus; Guanay Cormorant-Phalacrocorax bougainvillei (c) Order Piciformes Family Picidae: Red-headed Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Picoide pubscens; Yellow-belled Sapsucker-Sphyrapicus varius Order Podicipediformes Family Coatuidae: Cockatoo (unspecified)-Cacatua spp. (c); Cockatiel-Nymphicus hollandicus (c) Family Pittacidae: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet spp Tricheglossus spp. (c) Order Spheniscformes Pamily Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboldt (c)(a) Order Strigformes Pamily Spridua: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Aiso fammeus; Vereaux's Eagle Owl (Milky Eagle Owl)-Eduo lactus(c)(a); Great Horned Owl-Bub owl-Strix auroc)(c); Brand Owl-Strix rabulosa (C); Spotted Owl-Strix ocidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surina ulula (c) Family Tokindiae: Bowl (C); Spotted Owl-Strix ocidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surina ulula (c) Family Struthonidice: Oxlich-Struthio camelis (c)(a) Mammals Order Struthioniformes Family Struthonide: Oxlich Ordenmos americanus (c) Family Cevidae: White-tailed Deer-Odocolleus virginianus; Reindeer-Rangifer tarmadus (c); Mile Deer-Odocolleus tugens fulgens fulgens (c)(a) Pamily Cevidae: White-taile Deer-Odocolleus virginianus; Reindeer-Rangifer tarmadus (c); Mile Deer-Odocolleus virginianus; Reindeer-Rangifer tar		
Crider Piciformes Family Picidae: Red-headed Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Picoides pubescens; Yellow-belled Sapsucker-Sphyrapicus varius Order Policipediformes Family Podicipediformes Family Podicipediformes Pamily Potitoder: Cockatoo (unspecified)-Cacatua spp. (c); Cockatiel-Nymphicus holiandicus (c) Family Psittaclformes Pamily Potitoder: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet spp Tricheglossus spp. (c) Order Strigformes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelan Penguin-Spheniscus humboldti (c)(a) Order Strigformes Family Strigdae: Korthern Saw-whet Owi-Aegolius acadicus; Boreal Owi-Aegolius funereous (c); Short-eared Owi-Abio fammeus; Vernaux's Eago Owi Aegolius candiaca (c); Eastern Screech Owi-Otus asio; Tawny Owi-Strix aluca(c); Great Grey Owi-Pstri hebulosa (c); Spotted Owi-Strix occidentalis (c); Barred Owi-Sptv aluca(c); Family Tytonidae: Barn Owi-Tyto alua Order Struthionformes Family Struthae: Barn Owi-Tyto alua Order Attributindie: Ostich-Struthio camelis (c)(a) Mammals Order Caruthood Strich-Struthio camelis (c)(a) Mammals Order Caruthood Strich-Struthio camelis (c)(a) Mammals Order Caruthood Struth-Struthio camelis (c)(a) Family Bovidae: Mourbain Goat-Oreamics americanus (c) Family Studiae: Babriusa-Babryousa babryousa (c)(a) Order Caruthood Family Gandiae: Timber Wolf-Caris lupus (c) Family Cardiae: Timber Wolf-Caris lupus (c) Family Procyonidae: Red Panda-Aliuus fulgens fulgens (c)(a) Aram Studiae: Babriusa-Babryousa babryousa (c)(a) Order Caruthood Family Procyonidae: Red Panda-Aliuus fulgens fulgens (c)(a) Order Caruthood Family Notidea: Barbary Macaque-Macaca sylvaus (c) Family Nespertilonidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifiqus Order Proisoadcyla Family Carcoditiae: Great Struthae: Adiaca sylvaus (c) Family Carcoditiae: Barbary Macaque-Macaca sylvaus (c) Fa		Pelican-Pelicanus occidentalis (c)(a); Family Phalacrocoracidae; Double-crested
Family Pictae: Red-headed Woodpecker-Melanerpse enthrocephalus; Downy Woodpecker-Picologe pubsecers; Yeldow-belled Sapsucker-Sphyrapicus varius Order Politopediformes Family Castulides: Red-crowned Partot-Amazona viridigenalis (c); Cockatiel-Nymphicus bollandicus (c) Family Psittadade: Red-crowned Partot-Amazona viridigenalis (c); Macaw (unspecified).Ara spp. (c) Udgerigar-Melopsittacus undulatus (c); Lorikeet spp Tricheglossis spp. (c) Order Spheniscformes Family Spheniscdormes Family Spheniscdormes Family Striglaer: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funceous (c); Short-eared Owl-Asio flammeus; Verreaux5 Eagle Owl (Milky Eagle Owl)-Bubo lactacus (c); Spotted Owl-Strix acidentials (c); Barred Owl-Aegolius funceous (c); Short-eared Owl-Asio flammeus; Verreaux5 Eagle Owl (Milky Eagle Owl)-Bubo lactacus (c); Spotted Owl-Strix acidentials (c); Barred Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix acidentials (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Struthioniformes Family Struthioniformes Family Struthioniformes Family Struthionide: Struth-Struthio alba Order Struthioniformes Family Bovidae: Montain Goat-Oreannos americanus (c) Family Bovidae: Montain Goat-Oreannos americanus (c) Family Gevidae: White-tailed Deer-Odocolieus virgininanus; Reindeer-Rangifer tarnadus (c); Mule		Cormorant-Phalacrocorax auritus; Guanay Cormorant-Phalacrocorax bougainvillei (c)
 Woodpecker-Picoides pubescens; Yellow-bellied Sapsucker-Sphyrapicus varius Order Policipediformes Family Podicipedidae: Pied-billed Grebe-Podilymbus podiceps Order Psittacidnes: Cockatoo (unspecified)-Cacatua spp. (c) ; Cockatiel-Nymphicus bollandicus (c) Family Eastucidae: Red-crowned Parrot-Amazona viridgenalis (c); Macaw (unspecified)-Ara spp. (c) Order Spheniscformes Family Spheniscida: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboidt (c)(a) Order Strigiformes Family Spheniscida: Black-footed (Vackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboidt (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eard Owl-Abio famineus; Shorwy Owl-Nytcea scandiaca (c): Eastern Screech Owl-Otsus asic; Tawny Owl-Strix alexic) (c) Great Grey Owl-Strix neulousa (c)'(c) Great Grey Owl-Strix neulousa (c)'(c) Great Grey Owl-Strix neulousa (c)'(c) Great Grey Owl-Strix ocidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Struthoindiae: Barn Owl-Tyto alba Order Artiodactyla Family Sovidae: Woutrain Goa-Oreannos americanus (c) Family Sovidae: Woutrain Goa-Oreannos americanus (c) Family Sudiae: Mountain Goa-Oreannos americanus (c) Family Sudiae: Babrusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Vasiediae: Edipada-Phoca vitulina (c) Family Vasiediae: Striped Sunuk-Mephitis mephitis Family Vasiediae: Red Panda-Alurus fulgens fulgens (c)(a) Family Procyonidae: Red Panda-Alurus fulgens fulgens (c)(a) Family Vencyonidae: Grep Striped Sunuk-Mephitis mephitis Family Vencyonidae: Grep Alphaca vitulina (c) Family Vencyonidae: Red Panda-Alurus fulg		Order Piciformes
 Woodpecker-Picoides pubescens; Yellow-bellied Sapsucker-Sphyrapicus varius Order Policipediformes Family Podicipedidae: Pied-billed Grebe-Podilymbus podiceps Order Psittacidnes: Cockatoo (unspecified)-Cacatua spp. (c) ; Cockatiel-Nymphicus bollandicus (c) Family Eastucidae: Red-crowned Parrot-Amazona viridgenalis (c); Macaw (unspecified)-Ara spp. (c) Order Spheniscformes Family Spheniscida: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboidt (c)(a) Order Strigiformes Family Spheniscida: Black-footed (Vackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboidt (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eard Owl-Abio famineus; Shorwy Owl-Nytcea scandiaca (c): Eastern Screech Owl-Otsus asic; Tawny Owl-Strix alexic) (c) Great Grey Owl-Strix neulousa (c)' (c) Great Grey Owl-Strix neulousa (c)' Short-eard Owl-Abio saic; Tawny Owl-Strix alexic) (c) Reat Grey Owl-Strix codentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Struthoindiae: Ostrich-Struthio camelis (c)(a) Order Artiodactyla Family Soudiae: Mountain Goat-Oreannos americanus (c) Family Sudiae: Mountain Goat-Oreannos americanus (c) Family Sudiae: Babrusa-Babryousa babryousa (c)(a) Order Carnivora Family Vasidiae: Striped Skunk-Mephitis mephitis Family Vasidiae: Striped Skunk-Mephitis mephitis Family Vasidiae: Red Panda-Alurus fulgers fulgens (c)(a) Family Vasidiae: Red Panda-Alurus fulgens fulgens (c)(a) Family Vasidiae: Barbor Scal-Phoca vitulina (c) Family Vasidiae: Red Panda-Alurus fulgens fulgens (c)(a) Family Vasidiae: Red Panda-Alurus fulgens fulgens (c)(a) Family Ve		Family Picidae: Red-headed Woodpecker-Melanerpes erythrocephalus: Downy
Order Podicipedifermes Family Carstuidae: Cockatoo (unspecified)-Cacatua spp. (c); Cockatiel-Nymphicus hollandicus (c); Lorikeet spp Tricheglosus spp. (c) Order Strittacidae: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Madgerigar-Melopsittacus undulatus (c); Lorikeet spp Tricheglosus spp. (c) Order Strigtformes Family Strigtae: Northern Saw-whet Owt-Aegolius acadicus; Boreal Owt-Aegolius funceous (c); Shorte-Carad Owt-Asio flammeus; Verreaux5 Eagle OWt (Milky Eagle Owt)-Bubo lacteux(c); Owt-Strix nebuloas (c); Shorte-Carad Owt-Asio flammeus; Verreaux5 Eagle OWt (Milky Eagle Owt)-Bubo lacteux(c); Owt-Strix nebuloas (c); Shorte-Carad Owt-Asio flammeus; Verreaux5 Eagle OWt (Milky Eagle Owt)-Bubo lacteux(c); Owt-Strix nebuloas (c); Shorte-Owt-Owt-Strix occidentalis (c); Barred Owt-Asio andiaca (c); Eastern Screech Owt-Strix occidentalis (c); Barred Owt-Strix varia; Northern Hawk Owt-Surina ulula (c) Family Struthonidae: Ostrich-Struthio camelis (c)(a) Mammais Order Artiodactyla Family Surdiae: White-Taield Deer-Odocolieus virgininanus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocolieus virgininanus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocolieus virgininanus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocolieus hempionus Family Candidae: Timber Wolf-Canis lupus (c) Family Vaudae: Babrinusa-Babryousa babryousa (c)(a) Order Chripptera Family Vencidae: Timber Wolf-Canis lupus (c) Family Procivatiae: Reg Panda Aliurus fulgens fulgens (c)(a) Order Chripptera		
Family Podicipeidiae: Piet-billed Grebe-Podilymbus podiceps Order PsittaciOremes Family Cacatuidae: Cockatoo (unspecified)-Cacatua spp. (c) ; Cockatiel-Nymphicus hollandicus (c) Family Psittacidae: Red-crowned Parrot-Amazona wirdigenalis (c); Macaw (unspecified)-Ara spp. (c) Order Spheniscformes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magelian Penguin-Spheniscus humboidti (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funerous (c); Short-eared Owl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lacteus(C)(a); Great Terms Scandica (c): Eastern Screech Owl-Orbus asio; Tanwy Owl-Strix alueo(c); Great Screy Owl-Strix neubulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk, Owl-Surnia ulula (c) Yorder Struthionidrae: Barn Owl-Tyto alba Order Artiodactyla Family Soudiae: Mountain Goat-Oreannos americanus (c) Family Carvidae: White-tialied Deer-Odocolieus wirgninianus; Reindeer-Rangifer tamadus (c); Mule Deer-Odocolieus hemionus Family Soudiae: Striped Stunus-Babyrousa babyrousa (c)(a) Order Carnivora Family Sudiae: Rei Pand-Alturus fulgers fulgers (c)(a) Family Sudiae: Babrusa-Babyrousa babyrousa (c)(a) Family Sudiae: Babrusa-Babyrousa babyrousa (c)(a) Family Sudiae: Babrusa-Babyrousa babyrousa (c)(a) Family Sudiae:		
Family Cacatulace: Cockato (unspecified)-Cacatua spp. (c); Cockatiel-Nymphicus hollandicus (c) Family Poittacidae: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet sppTricheglossus spp. (c) Order Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magaellan Penguin-Spheniscus humboldti (c)(a) Order Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Mageellan Penguin: Spheniscus humboldti (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asio finameus; Vereaux: Eagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surina ulula (c) Family Strigidae: Ban Owl-Tyto alba Order Struthioniformes Family Bovidae: Montain Goat-Oreannos americanus (c) Family Bovidae: White-faile Deer-Odcoolieus wirginianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odcoolieus hemionus Family Sudiae: Babirusa-Babyrousa babyrousa babyrousa (c)(a) Order Chriodactyla Family Canidae: Striped Skunk-Mephitis mephitis Family Rividae: Black Ber-Usus americanus(a) Order Chrioptera Family Rividae: Black Ber-Usus americanus(a) Order Chrioptera Family Rividae: Black Ber-Usus americanus(a) Order Chrioptera Family Rivisdae: Black Ber-Usus americanus(a) Order Chrioptera Family Rivisdae: Striged Sk		•
Family Caratuidae: Cockatoo (unspecified)-Cacatua spp. (c); Cockatiel-Nymphicus bollandicus (c) Family Psittacidae: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c) Order SphenisCormes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Penguin-Spheniscus humboldti (c)(a) Order Strigiformes Family Spiniscidae: Northern Saw-whet Owi-Aegolius acadicus; Boreal Owi-Aegolius acadicus; Vereaux's Eagle Owi (Milky Eagle Owi)-Subo lacteus(c)(a); Great Horned Owi-Bubo virginianus; Sonow Owi-Aegolius acadicus (c); Eastern Screech Owi-Strix activation (c); Great Grey Owi-Strix nebulosa (c); Sotted Owi-Strix outility eagle Owi)-Subo lacteus(c)(a); Great Horned Owi-Bubo virginianus; Sonow Owi-Myctea scandiaca (c); Eastern Screech Owi-Strix outility eagle Owi-Strix varia; Northern Hawk Owi-Surnia ulula (c) Family Struttionidae: Dstrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Camelidae: Ulman-tama glama (c); Alpaca (Suri)-Lama pacos (c) Family Camelidae: Striped Skun-Mephitis mephitis Family Suidae: Babriusa-Babryousa babryousa (c)(a) Order Carnivora Family Photidae: Striped Skun-Mephitis mephitis Family Procidae: Big Brona Halurus (r) Family Versidae: Big Brona Halurus (r) Family Procidae: Big Brona Halurus (r) Family Procidae: Striped Skun-Mephitis mephitis Family Procidae: Striped Skun-Mephitis mephitis		
hollandicus (c) Family Pisttaidae: Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet spp Tricheglossus spp. (c) Order Spheniscromes Family Spheniscudae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Megellan Penguin-Spheniscus humboldti (c)(a) Order Strigiformes Family Strigides: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asio flammeus; Verreaux/s Eagle Owl-Myctea scandiaca (c); Eastern Streech Owl-Otus asio; Tawny Owl-Strix aluca(c); Great Grey Owl-Strix nebulosa (c); Spotte-Horned Owl-Bubo virginianus; Snowy Owl-Myctea scandiaca (c); Eastern Streech Owl-Otus asio; Tawny Owl-Strix aluca(c); Great Grey Owl-Strix nebulosa (c); Spotte-Barb Owl-Totu asio; Tawny Owl-Strix aluca(c); Great Grey Owl-Strix nebulosa (c); Spotte-Barb Owl-Totu aba Order Struthioniformes Family Struthionidae: Striidn-Struthio camelis (c)(a) Mammals Order Artuidactyla Family Canidae: Ulmat-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Canidae: Ulmat-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Canidae: Timber Wolf-Canis lupus (c) Family Sudae: Babrusa-Babyrousa babyrousa babyrousa (c)(a) Order Chiroptera Family Venodae: Harbor Seal-Phoca vitulina (c) Family Procidae: Harbor Seal-Phoca vitulina (c) Family Procidae: Biak Bear-Jusu americanus(a) Order Chiroptera Family Riviace: Biak Bear-Jusu americanus(a) Order Proboscider Family Riviace: Biak Bear-Jusu americanus(a) Order Proboscider Family Carcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Rodentia Family Cercopithicdae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifiqus Order Proboscider Family Cercopithicdae: Big Brown Bat-Eptesicus fuscus; C)(a) Order Proboscidea Family Cercopithicdae: Big Brown Bat-Eptesicus fuscus; C)(a) Order Rodentia Family Sciuridae: Ring-tailed Lemura-Lemur catta (c) Order Rodentia Family Sciuridae: Gray Squirel-Sciurus carolinensis; Fox Squirrel-Sciurus n		
Family Psittacidae: Red-crowned Parrot-Amazona viridgenalis (c); Macaw (unspecified)-Ara spp. (c) Budgerigar-Melopsittacus undulatus (c); Lorikeet spp Tricheglossus spp. (c) Order Spheniscformes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Penguin-Spheniscus humboldit (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owi-Aegolius acadicus; Boreal Owi-Aegolius funereous (c); Short-eared Owi-Asio fammeus; Verreaux's Eagle Owi (Milky Eagle Owi)-Bubo lacteus(c)(a); Great Horned Owi-Bubo virginianus; Soncy Owi-Myctae scandica (c); Eastern Screech Owi-Otus asio; Tawny Owi-Strix aluco(c); Great Grey Owi-Strix nebulosa (c); Spotted Owi-Strix occidentalis (c); Barred Owi-Agolius condica (c); Eastern Screech Owi-Otus asio; Tawny Owi-Strix aluco(c); Great Grey Owi-Strix nebulosa (c); Spotted Owi-Strix occidentalis (c); Barred Owi-Strix varia; Northern Hawk Owi-Surnia ulula (c) Order Artiodactyla Family Struttionidae: Ostrich-Struthio camelis (c)(a) Mammalis Order Artiodactyla Family Sudiae: Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Sudiae: Striped Skunk-Mephitis mephitis Family Micutei: Striped Skunk-Mephitis mephitis Family VesyedTiendae: Striped Skunk-Mephitis mephitis Family Veside: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucfugus Order Perissodactyla Family Rincoccotidee: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Perissodactyla Family Rincoccotidee: Brahary Macaque-Macaca sylvanus (c) Family Rinco		
(unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet spp. Tricheglosus spp. (c) Order Spheniscformes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Penguin-Spheniscus humboldti (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lactus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nytce scandiaca (c); Eastern Screech Owl-Otus asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Tytonidae: Barn Owl-Tyto alba Order Struthioniformes Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Carvidae: Mountain Goat-Oreamnos americanus (c) Family Carvidae: Wountain Goat-Oreamnos americanus (c) Family Carvidae: Babrusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Suidae: Babrusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Phocidae: Striged Stunk-Mephitis mephitis Family Procyonidae: Striged Stunk-Mephitis mephitis Family Procyonidae: Bad Panda-Ailurus fulgens fulgens (c)(a) Family Procyonidae: Bad Panda-Ailurus fulgens fulgens (c)(a) Family Vursidae: Bad Read-Vursu americanus(a) Order Chrioptera Family Cercoptithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercoptithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercoptithcidae: Great Judian Rhinoceros-Rhinoceros unicornis (c)(a) Order Proboscidea Family Cercoptithcidae: Great Surged Strutus carolinensis; Fox Squirrel-Sclurus niger; Easter Chipmunk-Tamias striatus Reptiles Order Crocodylia Family Alligatoridae: American Alligator mississippiensis (c) Order Foquamata Family Validatoridae: American Alligator Anligator mississippiensis (c) Order Guamata Family Validatoridae: Crocodel Montor-Varanus salvadorii (c)(a)		hollandicus (c)
(unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet spp. Tricheglosus spp. (c) Order Spheniscformes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Penguin-Spheniscus humboldti (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lactus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nytce scandiaca (c); Eastern Screech Owl-Otus asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Tytonidae: Barn Owl-Tyto alba Order Struthioniformes Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Carvidae: Mountain Goat-Oreamnos americanus (c) Family Carvidae: Wountain Goat-Oreamnos americanus (c) Family Carvidae: Babrusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Suidae: Babrusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Phocidae: Striged Stunk-Mephitis mephitis Family Procyonidae: Striged Stunk-Mephitis mephitis Family Procyonidae: Bad Panda-Ailurus fulgens fulgens (c)(a) Family Procyonidae: Bad Panda-Ailurus fulgens fulgens (c)(a) Family Vursidae: Bad Read-Vursu americanus(a) Order Chrioptera Family Cercoptithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercoptithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercoptithcidae: Great Judian Rhinoceros-Rhinoceros unicornis (c)(a) Order Proboscidea Family Cercoptithcidae: Great Surged Strutus carolinensis; Fox Squirrel-Sclurus niger; Easter Chipmunk-Tamias striatus Reptiles Order Crocodylia Family Alligatoridae: American Alligator mississippiensis (c) Order Foquamata Family Validatoridae: American Alligator Anligator mississippiensis (c) Order Guamata Family Validatoridae: Crocodel Montor-Varanus salvadorii (c)(a)		Family Psittacidae: Red-crowned Parrot-Amazona viridigenalis (c): Macaw
Tricheglossus spp. (c) Order Spheniscformes Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Penguin-Spheniscus humboldt (C)(a) Order Strigformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funerous (c); Short-eared Owl-Asio fammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nyctea scandiaca (c); Eastern Screech Owl-Outs asio; Tawny Owl-Strix varia; Northern Hawk Owl-Suria ulual (c) Family Struthioniae: Barn Owl-Tyba alba Order Struthionifea: Barn Owl-Tyba alba Order Artiodactyla Family Southionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Southionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Carnivora Family Canidae: Milte-Tailed Deer-Odocolleus virginianus; Reindeer-Rangifer tamadus (c); Mule Deer-Odocolleus virginianus; Reindeer-Rangifer tamadus (c); Mule Deer-Odocolleus virginianus; Reindeer-Rangifer tamadus (c); Mule Deer-Odocolleus fuges fuges fuges (c)(a) Order Carnivora Family Sudicae: Rath Sale Ashurus talgues fuges fuges fuges (c)(a) Family Ganidae: Rath Pacial Autrus fuges fuges fuges (c)(a) Family Vespertilonidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Prinssodactyla Family		(unspecified)-Ara spn (c): Budgerigar-Melonsittacus undulatus (c): Lorikeet spn -
Order Spheniscidar: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Penguin-Spheniscus humboldti (c)(a) Order Strüglformes Family Strigldar: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lactus(c)(a); Great Horned Owl-Bubo virginianus; Showy Owl-Nytcea scandiaca (c); Eastern Screech Owl-Otus asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix rebuices (c); Short-eared Dwl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Struthionidse: (C); Short-eared Dwl-Atio Catentis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Struthionidse: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Exuthionidae: White-tailed Deer-Odocoileus virginianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Canidae: Timber Wolf-Canis lupus (c) Family Providae: Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Procidae: Babirusa-Babyrousa (c)(a) Order Canicae: Striped Stunk-Mephitis mephitis Family Procyonidae: Red Panda-Aliurus fulgens fulgens (c)(a) Family Procyonidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Prinsodactyla Family Cercopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercopithcidae: Great Jundian Rhinoceros		
Family Spheniscidae: Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Penguin-Spheniscus humboldti (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nyctea scandiaca (c); Eastern Screech Owl-Outs asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Struthionidae: Barn Owl-Tyto alba Order Struthionidae: Gstrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Camelidae: Llama-Lama glama (c); Alpaca (Sur)-Lama pacos (c) Family Camelidae: Llama-Lama glama (c); Alpaca (Sur)-Lama pacos (c) Family Camelidae: Babriusa-Babryousa babyrousa (c)(a) Order Canivora Family Canidae: Babriusa-Babryousa babyrousa (c)(a) Order Canivora Family Canidae: Timber Wolf-Canis lupus (c) Family Phocidae: Harbor Seal-Phoca vitulina (c) Family Phocidae: Harbor Seal-Phoca vitulina (c) Family Phocidae: Babriusa-Babryousa babyrousa (c)(a) Order Chrinoptera Family Phocidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Preissodactyla Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Proboscidae Family Cercopithcidae: Brabary Macaque-Macaca sylvanus (c) Family Ucercopithcidae: Brabary Macaque-Macaca sylvanus (c) Family Lephantidae: Indian (Asian) Elephant-Elephas maximus indicus (c)(a) Order Proboscidae Family Scluridae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipunk-Tamias striatus Reptiles Order Squamata Family Scluridae: Crocodilia Family Scluridae: Crocodilia Family Scluridae: Crocodilia Family Scluridae: Crocodilia Family Scluridae: Crocodilia Family Scluridae: Crocodile Montor-Varanus salvadorii (c)(a)		
Magellan Penguin-Spheniscus humboldti (c)(a) Order Strigiformes Family Strigidae: Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asio fiammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubb atteus(c)(a); Great Horned Owl-Bub or vignianus; Snowy Owl-Nytca scandiaca (c); Eastern Screech Owl-Otus asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix heulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Tytonidae: Barn Owl-Tyto alba Order Struthioniformes Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Struthionidae: Usma-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Carelidae: Ulama-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Carvidae: White-tailed Deer-Odocoleus vigninianus; Reindeer-Rangifer tarnadus (c), Mule Deer-Odocoleus kenionus Family Suidae: Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Procyonidae: Red Panda-Allruus fulgens fulgens (c)(a) Family Procyonidae: Red Panda-Allruus fulgens fulgens (c)(a) Family Vendeet: Harbor Sael-Phoca villuina (c) Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Prinsodactyla Family Cercopithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Proboscidea Family Cercopithcidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Proboscidea Family Cercopithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Proboscidea Family Cercopithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Robentia Family Sciuridae: Great Sujarrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tamias striatus Reptiles Order Cocodylia Family Alligatoridae: Ameri		•
Order Strigiformes Family Strigidae: Northern Saw-whet OM-Aegolius acadicus; Boreal OW-Aegolius funcreous (c); Short-eared OW-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nytctea scandiaca (c); Eastern Screech Owl-Otus asio; Tawny Owl-Strix alucio; Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Tytonidae: Barn Owl-Tyto alba Order Struthioniformes Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Camelidae: Huma-Lama glama (c); Alpaca (Sur)-Lama pacos (c) Family Camelidae: Lama-Lama glama (c); Alpaca (Sur)-Lama pacos (c) Family Camelidae: Suriousa-Babyrousa babyrousa (c)(a) Order Carnivora Family Procyonidae: Red Panda-Aliurus fulgens (c)(a) Family Procyonidae: Red Panda-Aliurus fulgens (c)(a) Family Procyonidae: Black Beac-Ursus americanus(a) Order Chrioptera Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Primsta Family Cercopithicae: Barbary Macaque-Macaca sylvanus (c) Family Cercopithicae: Barbary Macaque-Macaca sylvanus (c) Family Cercopithicae: Barbary Macaque-Macaca sylvanus indicus (c)(a) Order Primsta Family Scurindiae: Gray S		
Family Strijdae: Northern Saw-whet Owl-Aegolius cadicus; Boreal Owl-Aegolius funereous (c); Short-cared Owl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nyctea scandiaca (c); Eastern Screech Owl-Ostus asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surina iulua (c) Family Tytonidae: Barr Owl-Tyto alba Order Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Bovidae: Mountain Goat-Oreamnos americanus (c) Family Bovidae: Mountain Goat-Oreamnos americanus; (c) Family Carvidae: Mithe-tailed Deer-Odocoileus virgininianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus virginianus; Reindeer-Rangifer tarnadus (c) and perinduae: Striped Skunk-Mephitis mephitis Family Suidae: Babirusa-Babyrousa babyrousa (c)(a) Order Chrioptera Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat		Magellan Penguin-Spheniscus humboldti (c)(a)
Family Strijdae: Northern Saw-whet Owl-Aegolius cadicus; Boreal Owl-Aegolius funereous (c); Short-cared Owl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nyctea scandiaca (c); Eastern Screech Owl-Ostus asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surina iulua (c) Family Tytonidae: Barr Owl-Tyto alba Order Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Bovidae: Mountain Goat-Oreamnos americanus (c) Family Bovidae: Mountain Goat-Oreamnos americanus; (c) Family Carvidae: Mithe-tailed Deer-Odocoileus virgininianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus virginianus; Reindeer-Rangifer tarnadus (c) and perinduae: Striped Skunk-Mephitis mephitis Family Suidae: Babirusa-Babyrousa babyrousa (c)(a) Order Chrioptera Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat		Order Strigiformes
funerous (c); Shot-eared Owl-Asio flammeus; Vereaux's Eagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nyctea scandiaca (c); Eastern Screech Owl-Otus asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surin alula (c) Family Tytonidae: Barn Owl-Tyto alba Order Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Camelidae: Llama-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Carvidae: White-tailed Deer-Odocoileus virginianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Suidae: Babrirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Canidae: Timber Wolf-Canis lupus (c) Family Procyonidae: Red Panda-Ailurus fulgens (c)(a) Family Procyonidae: Red Panda-Ailurus fulgens (c)(a) Family Procyonidae: Back Bear-Ursus americanus(a) Order Chiroptera Family Prospertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Perissodactyla Family Carcopithcidae: Strigen Alexan Macaca sylvanus (c) Family Carcopithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Perissodactyla Family Carcopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Carcopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Carcopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Carcopithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Proboscidea Family Sciuridae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmurk-Tamias striatus Reptiles Order Rocodylia Family Varanidae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmurk-Tamias striatus Reptiles Order Squamata Family Varanidae: Crocodile Monitor-Varanus salvadorii (c)(a)		
Owl)-Bubo iacteus(c)(a); Great Horned Owl-Bubo virginianus; Snow Owl-Nycřas scandiaca (c); Eastern Screech Owl-Strix avor, Yany Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Tytonidae: Barr Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Bovidae: Montain Goat-Oreannos americanus (c) Family Bovidae: White-tailed Deer-Odocoileus virgininanus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus virginianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus virginianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus virginianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Croidae: Babirusa-Babyrousa babyrousa babyrousa (c)(a) Order Carnivora Family Mustelidae: Striped Skunk-Mephitis mephitis Family Visidae: Black Bear-Ursus americanus(a) Order Chiroptera Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Primsodactyla		
scandiaca (c): Eastern Screech Owl-Otus asio; Tawny Owl-Strix aluco(c): Great Grey Owl-Strix nebulosa (c): Spotted Owl-Strix occidentalis (c): Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family Tytonidae: Barn Owl-Tyto alba Order Struthioniformes Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Bovidae: Mountain Goat-Oreannos americanus (c) Family Cervidae: White-tailed Deer-Odocolleus virgininianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocolleus hemionus Family Carvidae: Bibrious Babyrousa (c)(a) Order Carnivora Family Mustelidae: Striped Skunk-Mephitis mephitis Family Phocidae: Harbor Seal-Phoca vitulina (c) Family Mustelidae: Striped Skunk-Mephitis mephitis Family Phocidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Perissodactyla Family Rhinocerotidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Perinata Family Rhinocerotidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Perinata Family Elephantidae: Indian (Asian) Elephant-Elephas maximus indicus (c)(a) Order Prohoscidea Family Elephantidae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tarnias striatus Reptiles Order Crocodylia Family Slouidae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tarnias striatus Reptiles Order Crocodylia Family Alligatoridae: American Alligator-Alligator mississippiensis (c) Order Squamata Family Varianidae: Crocodile Monitor-Varanus salvadorii (c)(a)		
Owi-Strix nebulosa (c); Spotted Owi-Strix occidentalis (c); Barred Owi-Strix varia; Northern Hawk Owi-Surina ulula (c) Family Tytonidae: Barn Owi-Tyto alba Order Struthionidae: Sam Owi-Tyto alba Order Artiodae: Jam Owi-Tyto alba Order Artiodae: Via Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodae: Ulama-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Sovidae: Mountain Goat-Oreamnos americanus (c) Family Cardei: White-tailed Deer-Odocolleus virgininanus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocolleus hemionus Family Suidae: Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Canidae: Timber Wolf-Canis lupus (c) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Order Chiroptera Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucfigus Order Perissodactyla Family Cercopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercopithcidae: Brabary Macaque-Macaca sylvanus (c) Family Cercopithcidae: Indian (Asian) Elephant-Elephas maximus indicus (c)(a) Order Proboscidae Family Elephantidae: Indian (Asian) Elephant-Elephas maximus indicus (c)(a)		
Northern Hawk Owl-Surnia ulula (c) Family Tytonidae: Barn Owl-Tyto alba Order Struthioniformes Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Bovidae: Mountain Goat-Oreannos americanus (c) Family Camelidae: Ulama-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Camelidae: White-tailed Deer-Odocoileus virgninianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Suidae: Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Canidae: Timber Wolf-Canis lupus (c) Family Mustelidae: Striped Skunk-Mephitis mephitis Family Phocidae: Harbor Seal-Phoca vitulina (c) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Family Procyonidae: Red Panda-Ailurus fulgens (c)(a) Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucífugus Order Chiroptera Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucífugus Order Perissodactyla Family Cercopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Elephantidae: Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Proboscidae Family Elephantidae: Indian (Asian) Elephant-Elephas maximus indicus (c)(a) Order Rodentia Family Sciuridae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tamias striatus Reptiles Order Crocodylia Family Varanidae: Crocodile Monitor-Varanus salvadorii (c)(a)		scandiaca (c); Eastern Screech Owi-Otus asio; Tawny Owi-Strix aluco(c); Great Grey
Family Tytonidae: Barn Owl-Tyto alba Order Struthioniformes Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Camelidae: Llama-Lama glama (c); Apaca (Sur)-Lama pacos (c) Family Camelidae: Llama-Lama glama (c); Apaca (Sur)-Lama pacos (c) Family Carevidae: White-tailed Deer-Odocoileus virgninianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Suidae: Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Canidiae: Timber Wolf-Canis lupus (c) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Order Chiroptera Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis lucifugus Order Perissodactyla Family Coropithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Primata Family Ceropithcidae: Barbary Macaque-Macaca sylvanus (c) Family Lemuridae: Ring-tailed Lemura-Lemur catta (c) Order Robentiae Grei Rodentia Family Sciuridae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tamias striatus Reptiles Order Crocodylia Family Vanidae: Gray Squirrel-Sciurus carolinensis; Fox Squir		
Order Struthioniformes Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Bovidae: Montain Goat-Oreamnos americanus (c) Family Camelidae: Llama-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Cervidae: White-tailed Deer-Odocoileus virgninianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Cervidae: White-tailed Deer-Odocoileus virgninianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Canidae: Timber Wolf-Canis lupus (c) Order Carnivora Family Vustelidae: Striped Skunk-Mephtits mephtits Family Phocidae: Harbor Seal-Phoca vitulina (c) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis Iucifiquys Order Perinsodat Family Cercopithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Prohoscidea Family Scuiridae: Ray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Family Scuiridae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tamias striatus Reptiles Order Crocodylia Family Alligatoridae: American Alligator-Alligator		Northern Hawk Owl-Surnia ulula (c)
Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Camelidae: Llama-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Carvidae: White-tailed Deer-Odocoileus virgninianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Suidae: Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Nustelidae: Timber Wolf-Canis lupus (c) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Family Vorsidae: Black Bear-Ursus americanus(a) Order Prinsodactyla Family Rhinocerotidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Primata Family Cercopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercopithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Primata Family Cercopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Elephantidae: Indian (Asian) Elephant-Elephas maximus indicus (c)(a) Order Rodentia Family Sciuridae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tamias striatus Reptiles Order Crocodylia Family Alligatoridae: American Alligator-Alligator mississippiensis (c) Order		Family Tytonidae: Barn Owl-Tyto alba
Family Struthionidae: Ostrich-Struthio camelis (c)(a) Mammals Order Artiodactyla Family Camelidae: Llama-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family Carvidae: White-tailed Deer-Odocoileus virgninianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus Family Suidae: Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora Family Nustelidae: Timber Wolf-Canis lupus (c) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Family Procyonidae: Red Panda-Ailurus fulgens fulgens (c)(a) Family Vorsidae: Black Bear-Ursus americanus(a) Order Prinsodactyla Family Rhinocerotidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Primata Family Cercopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Cercopithcidae: Great Indian Rhinoceros-Rhinoceros unicornis (c)(a) Order Primata Family Cercopithcidae: Barbary Macaque-Macaca sylvanus (c) Family Elephantidae: Indian (Asian) Elephant-Elephas maximus indicus (c)(a) Order Rodentia Family Sciuridae: Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tamias striatus Reptiles Order Crocodylia Family Alligatoridae: American Alligator-Alligator mississippiensis (c) Order		Order Struthioniformes
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	animal ticcup unlose followed by an (a) which denotes detectable active to the
() () -	animal tissue unless followed by an (a), which denotes detectable antibodies only have been reported (Source: USGS, National Wildlife Health Center (USGS, online)).
(a)(i) 2 naturally susceptible domestic species	Family Phasianidae: Domestic Chicken (Red Junglefowl)-Gallus gallus; Turkey (domestic and wild)- Meleagris gallopavo Family Anatidae: Mallard-Anas platyrhynchos; Domestic Goose-Anser chinensis (c)(a)
	Family Bovidae: Domestic Cattle-Bos Taurus; Domestic Gouse-Anser Chinerisis (C)(a) Family Bovidae: Domestic Cattle-Bos Taurus; Domestic (Suffolk) Sheep-Ovis aries Family Canidae: Domestic Dog-Canis familiaris Family Felidae: Domestic Cat (feral)-Felis catus
	Family Leporidae: Domestic Rabbit-Oryctolagus cuniculus Family Equidae: Domestic Horse-Equus equus przewalski caballus; Donkey-Equus asinus; Mule
 (a)(i) 3 experimentally susceptible wildlife species (a)(i) 4 experimentally susceptible demotion and its end of an angle 	West Nile virus causes disease in humans, horses, and several species of birds. Most infected individuals show few signs of illness, but some develop severe neurological illness which can be fatal. West Nile Virus has an extremely broad host range. It replicates in birds, reptiles, amphibians, mammals, mosquitoes and ticks. Besides equids, details of susceptible domestic mammalian species are summarized in table a.i. (1) while table a.i. (2) summarizes outcomes of experimental infections of West Nile virus assessed in wild birds.
domestic species (a)(i) 5 wild reservoir species	Birds, particularly passerine species (jays, finches, sparrows, and crows).
(a)(i) 6 domestic reservoir species	West Nile virus causes disease in humans, horses, and several species of birds. Most infected individuals show few signs of illness, but some develop severe neurological illness which can be fatal. West Nile Virus has an extremely broad host range. It replicates in birds, reptiles, amphibians, mammals, mosquitoes and ticks. Besides equids, details of susceptible mammalian species are summarized in table a.i.(1) while table a.i. (2) summarizes outcomes of experimental infections of West Nile virus assessed in wild birds.
	Outside US, clinical symptoms to WNV infection has been reported in a scarce number of avian species in course of outbreaks: domestic geese (<i>Anser anser domesticus</i>) and white storks (<i>Ciconia ciconia</i>) during the WNV epidemic in Israel (Malkinson et al., 2002), goshawks (<i>Accipiter gentilis</i>) in Hungary (Bakonyi et al., 2006), eurasian jays (<i>Garrulus glandarius</i>), little owl (<i>Athene noctua</i>), mallard (<i>Anas plathyrynchos</i>), common buzzard (<i>Buteo buteo</i>) in Italy (Monaco et al., 2015). However, mass mortality of highly susceptible species (such as corvids or other species) is less frequently observed in the Old than in the New World although some species, as the jackdaws (<i>Corvus monedula</i>) could potentially function as sentinel (Lim et al., 2014). Surveillance activities carried out in Italy where WNV is endemic since 2008, pointed out the high susceptibility to the viral infection of three species of
	synantropic wild birds, namely carrion crow (<i>Corvus corone</i>), magpie (<i>Pica pica</i>) and eurasian jay (<i>Garrulus glandarius</i>) which justifies their use as sentinel in endemic areas (Italian Ministry of Health, 2016). WNV has been associated with sporadic disease in small numbers of other species, including squirrels, chipmunks, bats, dogs, cats, white-tailed deer, reindeer, sheep, alpacas, dromedary camels, alligators and harbour seals during intense periods of local viral activity. Some species of mammals including squirrels (<i>Sciurus</i> sp.), eastern chipmunks (<i>Tamias striatus</i>) and eastern cottontail rabbits (<i>Sylvilagus floridanus</i>) may be capable of transmitting WNV to mosquitoes, although their importance as
	reservoir hosts is still uncertain. Among reptiles, clinical signs were mainly reported during outbreaks in alligators, although there is also a report of neurological signs associated with WNV infection in a crocodile monitor (<i>Varanus salvadori</i>) lizard. Some infections in garter snakes (<i>Thamnophis sirtalis</i>) experimentally inoculated with WNV were also fatal. Green iguanas (<i>Iguana iguana</i>) can be infected.
	Amphibians including lake frogs (<i>Rana ridibunda</i>) and North American bullfrogs (<i>Rana catesbeiana</i>) can also be infected with WNV. Some alligators (e.g., American alligators, <i>Alligator mississippiensis</i>) and frogs (e.g., <i>Rana ridibunda</i> in Russia) may develop viremia sufficient to infect mosquitoes. As with mammals, their importance as reservoir hosts is still uncertain.
	Based on preliminary research carried out in Italy and Spain, only few bird species seem to play a major role as blood donor for the mosquitoes (Munoz et al., 2012; Hamer et al., 2009; Roiz et al., 2012, Spedicato et al., 2015). Unfortunately, the reservoir competence for many European bird species is still unknown even though the persistence of WNV in infected birds have been assessed in some species through experimental trials.
	House finches and House sparrows experimentally inoculated showed persistent infection in spleen and kidney 28 weeks p.i. The virus was still detected by real time RT-PCR in the spleen of two House sparrows at 36 weeks p.i. However, viral isolation attempts were unsuccessful (Wheeler et al., 2012). In a previous work (Nemeth et al., 2009a), a higher number of organs were analyzed in WNV-infected House



sparrows, and viral RNA was detected in juvenile sparrows up to 65 days p.i in kidney and spleen, although infectious virus could be isolated at low titres only in one sparrow at 43 days p.i. Reisen and colleagues confirmed the persistent infection in five species of Passeriformes and in Common ground-dove (<i>Columbina passerina</i>)
detecting the virus in spleen and kidney, but also in lung at >6 weeks p.i.

Question A(iii)

Question A(iii) disea zoonotic character Answer Y N na	_	ects on animal health OR poses a risk to public health due to its
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet
(a)(ii) morbidity and mortality rates of the disease in animal populations	(a)(ii) 1 Prevalence/ incidence (a)(ii) 2 Case- morbidity rate (% clinically diseased animals out of infected ones) (a)(ii) 3 Case-fatality rate	Refer to table a.ii in the Table section
(a)(iii) zoonotic character of the disease	(a)(iii) 1 report of zoonotic human cases	 West Nile zoonotic transmission in known to be present in Europe since a long time: in the 1960s the virus emerged in southern France in the Camargue. Yet, the first large outbreak in humans was reported from Bucharest, Romania in 1996-1997. Since then, infection in humans and/or horses have been reported from the Czech Republic (1997), France (2000, 2003, 2004, 2006), Italy (1998, 2008, 2009), Hungary (2000-2009), Romania (1997-2001, 2003-2009), Spain (2004) and Portugal (2004). In 2010, the ecological parameters in Central European and Mediterranean countries were favorable for the transmission of WNV to humans. A human outbreak was reported from the Central Macedonia Region in northern Greece and human cases were reported from Romania, Hungary, Italy and Spain in August-September 2010. At the same time a large outbreak in humans was reported from Volgograd in Russia. Evidence of human cases have been in EU Countries have been listed in table b.ii.2 and a recent paper from the Italian Integrated WNV Surveillance Group (Rizzo et al., 2016) provide an example of geographical correlation between human and veterinary cases. For Figure 1 (Geographical distribution of West Nile neuroinvasive disease in horses (panel A) and humans (panel B), Italy 2008–2015 (Rizzo et al., 2016)) and Figure 2 (West Nile virus detections in the
(a)(iv) resistance to treatments, including antimicrobial	(a)(iv) 1 resistant strain to any treatment even at	veterinary and human surveillance by month, Italy, 2008–2015 (Rizzo et al., 2016)) see Figures section. Not applicable to WNV since there is no specific antiviral therapy
resistance (b)(ii) Impact of the disease on human health	laboratory level (b)(ii) 1 types of routes of transmission between animals and humans - see (a)(vi)2 (b)(ii) 2 Incidence of zoonotic cases	Refer to table b.ii.2 in the Table section
	(b)(ii) 3 Occasional or substantial? (b)(ii) 4 Epidemic or pandemic?	WNV transmission through blood transfusion and organ transplantation is able to sustain community-level outbreak West Nile virus is most commonly transmitted to humans by mosquitoes even though additional routes of human to human transmission have also been documented as blood transfusions, organ transplants, exposure in a laboratory setting or the transmission from the mother to baby during pregnancy, delivery, or breastfeeding. It is important to note that these methods of transmission represent a very small proportion of cases thus sufficient to evoke only a sporadic occurrence of the disease. Sporadic potential
	(b)(ii) 5 DALY	As for most arthropod-borne diseases causing fever syndromes worldwide, the cumulative impact of WNV on global disease burden has not been fully assessed. Evaluations should include both the severe forms of the disease and the milder clinical manifestations which may result in neurological and ophthalmologic complications (Carson et al., 2006). WNV has been recognized able to induce a wide range of post-infection, long-term sequelae



r		
(b)(iii) Impact of the	(b)(iii) 1 covority of	with the recovery of the affected patients within two years from the infection (Murray et al., 2008). However, a recent paper has emphasized that 40% of WNV affected patients continued to experience symptoms related to their WNV infection up to 8 years later demonstrating the health and economic impact of a result of prolonged recovery, continued morbidity, and related disability (Murray et al., 2014).
(b)(iii) Impact of the disease on animal welfare	(b)(iii) 1 severity of clinical signs at case level and related level and duration of impairment (c) 1 listed in	The incubation period for equine WN encephalitis following mosquito transmission is estimated to be 3–15 days. A fleeting viraemia of low virus titre precedes clinical onset (Bunning et al., 2002). WN viral encephalitis occurs in only a small per cent of infected horses; the majority of infected horses do not display clinical signs (Ostlund et al., 2000). The disease in horses is frequently characterised by mild to severe ataxia. Additionally, horses may exhibit weakness, muscle fasciculation and cranial nerve deficits (Cantile et al., 2000; Ostlund et al., 2000; 2001; Snook et al., 2001). Fever is an inconsistently recognised feature. Treatment is supportive and signs may resolve or progress to terminal recumbency. The mortality rate is approximately one in three clinically affected unvaccinated horses. Many species of birds can become infected with WNV; the clinical outcome of infection is variable. Some species appear resistant while others suffer fatal neurologic disease. Neurologic disease and death have been documented in domestic geses in Israel and Canada, and in many native and exotic zoo birds in the USA during the emergence of WNV (Steele et al., 2000). WND associated cases have been described in European wild birds (Bakonyi et al. 2006, Höfle et al. 2008, Jiménez-Clavero et al. 2008). In 2011 during the Sardinian WND outbreak neurological disease has been reported in 2 wild birds as Eurasian jays (<i>Garrulus glandarius</i>) with clinical signs characterised by drowsy, incapability of flying or walking properly, ruffle feathers, pectoral atrophy, and absence of the flight instinct. Lethargy, head tremors, drooping wings and inability to fly due to the flaccid paralysis of the wing muscles were described in an adult common buzzard. The legs were kept flexed and the bird was not able to stand up. The podal reflex was lost whereas both, the pupillary and corneal reflexes were still present, the animals died within 24 hours from the admission to a veterinary clinic. A little owl (<i>Athene noctua</i>), was bought
generate a crisis situation and its potential use in	OIE/CFSPH classification of pathogens	res, listed among the diseases from potential bioterrorist agents
bioterrorism	(c) 2 listed in the Encyclopedia of Bioterrorism Defense of Australia Group	No
	(c) 3 included in any other list of potential bio-agro-terrorism agents	Not reported



Question A(iv)

Question A(iv) diagnostic tools are available for the disease <u>Interpretation</u> : diagnostic tools are available for the disease in the Union Answer Y Question N Question A Question A		
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet
(a)(viii) existence of diagnostic and disease control tools	(a)(viii) 1 Existence of diagnostic tools	Viral nucleic acid and viral antigens can be demonstrated in tissues of infected animals by RT-PCR and immuno-histochemistry, respectively. Antibody can be identified in equine serum by IgM capture enzyme-linked immunosorbent assay (IgM capture ELISA), haemagglutination inhibition (HI), IgG ELISA, plaque reduction neutralisation (PRN) or virus neutralisation (VN). In some serological assays, antibody cross-reactions with related flaviviruses, such as St Louis encephalitis virus, Usutu virus, Japanese encephalitis virus, or tick-borne encephalitis (TBE) virus may be encountered. According to the OIE, the following tests are suitable methods for confirmation of clinical cases: Nested RT-PCR, Real time RT-PCR and IgM capture ELISA the first 2 tests are also suitable for identifying individual animal freedom from infection. The plaque reduction neutralisation and serum neutralisation tests are both suitable methods for detecting prevalence of infection, population freedom from infection and immune status in animals post vaccination (Table 1). Equine WNV-specific IgM antibodies are usually detectable from 7–10 days post- infection to 1–2 months post-infection. Most horses with WN encephalitis test positive in the IgM capture ELISA at the time that clinical signs are first observed. WNV neutralising antibodies are detectable in equine serum by 2 weeks post-infection and can persist for more than 1 year. Several PCR methods are available as commercial kits. In view of the continued evolution and possible emergence of new WNV strains, it is important that the designs of PCR tests are constantly monitored and updated when necessary. Within the EU, OIE reference laboratories exist in Italy.
	(a)(viii) 2 Existence of disease control tools	According to the OIE Terrestrial Animal Health Code (Chapter 8.18. West Nile fever) the following criteria define the occurrence of WN fever (WNF) in equids: a) WNV has been isolated from an animal that shows signs consistent with WNF; or b) viral antigen or viral ribonucleic acid (RNA) specific to WNV has been identified in samples from one or more animals that show clinical signs consistent with WNF, or that is epidemiologically linked to a confirmed or suspected outbreak of WNF; or c) antibodies to WNV have been identified in an unvaccinated animal that shows clinical signs consistent with WNF, or that is epidemiologically linked to a confirmed or suspected outbreak of WNF. In areas where the disease is endemic horses may be protected from the clinical signs by vaccination (refer to the table of the vaccines commercially available in EU -table d.ii.1). Control efforts are focused on mosquito abatement and repellents, although implementation of these strategies is difficult to achieve in many situations. Due to the low level viremia and lack of viral shedding, an infected horse appears to pose no direct risk to other animals, including humans, except for the manipulation of infected tissues during necropsy and laboratory handling. Therefore, apart from isolating the affected animal mainly for animal welfare reasons, no particular control measures apply. For the same reasons there are no trade restrictions for the importation of equines coming from WNF infected countries or zones although WNV infection in horses is a notifiable disease. In the infected areas strategies must be implemented to reduce the circulation of stagnant water, performance of adulticidal and larvicidal treatments) and to reduce the possibilities of contact between the vectors and receptive hosts (application of repellent, mosquito netting etc.). Among biocidal products, the use of pyrethrin (6%) and piperonyl butoxide (60%) by aerial spray indicated that the odds of infection after spraying were around 6 times higher in the untreated area

Question A(v)

Question A(v) the risk-mitigating measures and, where relevant, surveillance of the disease are effective and proportionate to the risks posed by the disease in the Union Answer Y Question A(v) the risks posed by the disease in the Union		
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet
(a)(viii) existence of diagnostic and disease control tools	(a)(viii) 1 Existence of diagnostic tools	Viral nucleic acid and viral antigens can be demonstrated in tissues of infected animals by RT-PCR and immuno-histochemistry, respectively. Antibody can be identified in equine serum by IgM capture enzyme-linked immunosorbent assay (IgM capture ELISA), haemagglutination inhibition (HI), IgG ELISA, plaque reduction neutralisation (PRN) or virus neutralisation (VN). In some



	(a)(viii) 2 Existence of disease control tools	 serological assays, antibody cross-reactions with related flaviviruses, such as St Louis encephalitis virus, Usutu virus, Japanese encephalitis virus, or tick-borne encephalitis (TBE) virus may be encountered. According to the OIE, the following tests are suitable methods for confirmation of clinical cases: Nested RT-PCR, Real time RT-PCR and IgM capture ELISA the first 2 tests are also suitable for identifying individual animal freedom from infection. The plaque reduction neutralisation and serum neutralisation tests are both suitable methods for detecting prevalence of infection, population freedom from infection and immune status in animals post vaccination (Table 1). Equine WNV-specific IgM antibodies are usually detectable from 7–10 days post-infection to 1–2 months post-infection. Most horses with WN encephalitis test positive in the IgM capture ELISA at the time that clinical signs are first observed. WNV neutralising antibodies are detectable in equine serum by 2 weeks post-infection and can persist for more than 1 year. Several PCR methods are available as commercial kits. In view of the continued evolution and possible emergence of new WNV strains, it is important that the designs of PCR tests are constantly monitored and updated when necessary. Within the EU, OIE reference laboratories exist in Italy. According to the OIE Terrestrial Animal Health Code (Chapter 8.18. West Nile fever) the following criteria define the occurrence of WN fever (WNF) in equids: a) WNV has been isolated from an animal that shows signs consistent with WNF, or that is epidemiologically linked to a confirmed or suspected outbreak of WNF; or c) antibodies to WNV have been identified in an unvaccinated animal that shows clinical signs consistent with WNF, or that is epidemiologically linked to a confirmed or suspected outbreak of WNF; In areas where the disease is endemic horses may be protected from the clinical signs by vaccination (refer to the tab
		been isolated from an animal that shows signs consistent with WNF; or b) viral
		from one or more animals that show clinical signs consistent with WNF, or that is
		protected from the clinical signs by vaccination (refer to the table of the vaccines commercially available in EU -table d.ii.1). Control efforts are focused on mosquito abatement and repellents, although implementation of these strategies is difficult to achieve in many situations. Due to the low level viremia and lack of viral shedding, an infected horse appears to pose no direct risk to other animals, including humans, except for the manipulation of infected tissues during necropsy and laboratory handling. Therefore, apart from isolating the affected animal mainly for animal welfare reasons, no particular control measures apply. For the same reasons there
(b)(ii)	(h)(ii) 6 Availahility of	In the infected areas strategies must be implemented to reduce the circulation of the virus through measures that modify the density of the vectors (reduction of stagnant water, performance of adulticidal and larvicidal treatments) and to reduce the possibilities of contact between the vectors and receptive hosts (application of repellent, mosquito netting etc.). Among biocidal products, the use of pyrethrin (6%) and piperonyl butoxide (60%) by aerial spray indicated that the odds of infection after spraying were around 6 times higher in the untreated area than in treated areas, and that the treatments successfully disrupted the WNV transmission cycle (Carney et al., 2008).
(b)(ii) Impact of the disease on human health	(b)(ii) 6 Availability of medical treatment and their effectiveness (therapeutic effect and any resistance)	There is no specific recommended treatment, other than supportive care, at present. Intensive care and mechanical ventilation may be required in some cases. Various therapies including interferon, antisense nucleotides and intravenous immunoglobulins (passive immunization) are being tested in clinical trials. While a few case reports suggest that some of these treatments may be promising, larger studies are still lacking. Screening for new drugs that may inhibit WNV is underway.
	(b)(ii) 7 Availability of vaccines and their effectiveness (reduced morbidity)	There are no vaccines available for human use in EU.



(d)(i) feasibility,	(d)(i) 1 officially/internationally				Purpose		
availability and effectiveness of diagnostic	recognised diagnostic tool, OIE certified	Method	Population freedom from infection	Individual animal freedom from infection	Confirmation of clinical cases	Prevalence of infection – surveillance	Immune status in individual animals or populations post- vaccination
tools and				Agent ide	ntification ¹		
capacities		Nested RT-PCR	-	++	++	_	_
		Real time RT-PCR	-	++	++	-	-
		Isolation in tissue culture	-	++	++	-	-
				Detection of in	imune response		
		IgM capture ELISA	-	-	++	-	-
		Plaque reduction neutralisation	++	-	+	++	++
		Serum neutralisation	++	-	+	++	++
		Immunohisto- chemistry	-	-	+	-	
		Key: +++ = recommended method; ++ = suitable method; + = may be used in some situations, but cost, reliability, or other factors severely limits its application; - = not appropriate for this purpose. Although not all of the tests listed as category +++ or ++ have undergone formal validation, their routine nature and the fact that they have been used widely without dubicus results, makes them acceptable. RT-PCR = reverse-transcriptase polymerase chain reaction; IgM = immunoglobin; ELISA = enzyme-linked immunosorbent assay. Table 1: Test methods available for the diagnosis of WNV and their purpose (Source: OIE, 2013).					
	(d)(i) 2 Se and Sp of	Refer to table d	.i. in the Tab	le section			
	diagnostic test (d)(i) 3 type of sample matrix to be tested						
(d)(ii) feasibility, availability and effectiveness of vaccination	(blood, tissue, etc.) (d)(ii) 1 types of vaccines available on the market (d)(ii) 2 availability / production capacity (per year) (d)(ii) 3 Field protection as reduced morbidity (reduced susceptibility to infection and/or to disease) (d)(ii) 4 Duration of protection (d)(ii) 5 Way of	WNV vaccines a	ipproved by I	EMA are listed	in table d.ii.1	in the Table	section
	(d)(II) 5 Way of administration						
(d)(iii) feasibility, availability and effectiveness of medical treatments	 (d)(iii) 1 types of drugs available on the market and/or allowed by the EU regulatory system (d)(iii) 2 availability / production capacity (per year) (d)(iii) 3 therapeutic effect in the field (effectiveness) (d)(iii) 4 Way of administration 						care, at present.
(d)(iv) feasibility, availability and effectiveness of biosecurity measures	 (d)(iv) 1 available biosecurity measures (d)(iv) 2 effectiveness of biosecurity measure (d)(iv) 3 feasibility of biosecurity measure 	animals are pre the viral transm spread the dis mosquitoes nor To minimize the advisable to use	sent should hission. Farm ease since , directly, to e possibilities e mosquito n	be focused or to farm move they are neit vertebrates in of contact be ets to avoid t	n fighting the ement of infe ther able to cluding huma etween the ve he vector ent	vectors, maj cted horses i transmit the ns. ectors and re rance in the	place where farm or responsible for s not effective to e virus to biting ceptive hosts it is stables as well as these substances



		has been detailed in the paragraph "use and potential residual of biocides or medical
		drugs in environmental compartments ".
		Personnel involved in field collection of samples should considered the use of repellants (i.e. 20-30% DEET) and other precautions for mosquito avoidance as wearing long sleeved shirts, full length trousers, socks, light coloured clothing, high boots.
(d)(v) feasibility, availability and effectiveness of restrictions on the movement of animals and products, as control measure	(d)(v) 1 available restriction movement measures (d)(v) 2 effectiveness of restriction of animal movement in preventing the between farm spread (d)(v) 3 feasibility of restriction of animal movement	No specific measures are mentioned in the EU legislation for WNV outbreak control.
(d)(vi) feasibility, availability and effectiveness of killing of animals	 (d)(vi) 1 available killing of animal measures (d)(vi) 2 effectiveness of killing animals (at farm level or within the farm) for reducing /stopping spread of the disease (d)(vi) 3 feasibility of killing animals 	No specific measures are mentioned in the EU legislation for WNV outbreak control.
(d)(vii) feasibility, availability and effectiveness of disposal of carcasses and other relevant animal by— products	(d)(vii) 1 disposal options available (d)(vii) 2 effectiveness of disposal option (d)(vii) 3 feasibility of disposal option	No specific measures are mentioned in the EU legislation for WNV outbreak control.

Question B(i)

Answer Y	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet
(a)(ii) morbidity and mortality rates of the disease in animal populations	 (a)(ii) 1 Prevalence/ Incidence (a)(ii) 2 Case-morbidity rate (% clinically diseased animals out of infected ones) (a)(ii) 3 Case-fatality rate 	Refer to table a.ii in the Table section
(a)(iii) zoonotic character of the disease	(a)(iii) 1 report of zoonotic human cases	West Nile zoonotic transmission in known to be present in Europe since a long time: in the 1960s the virus emerged in southern France in the Camargue. Yet, the first large outbreak in humans was reported from Bucharest, Romania in 1996-1997. Since then, infection in humans and/or horses have been reported from the Czech Republic (1997), France (2000, 2003, 2004, 2006), Italy (1998, 2008, 2009), Hungary (2000-2009), Romania (1997-2001, 2003-2009), Spain (2004) and Portugal (2004). In 2010, the ecological parameters in Central European and Mediterranean countries were favorable for the transmission of WNV to humans. A human outbreak was reported from the Central Macedonia Region in northern Greece and human cases were reported from Romania, Hungary, Italy and Spain in August-September 2010. At the same time a large outbreak in humans was reported from Volgograd in Russia.



		 Evidence of human cases have been in EU Countries have been listed in table b.ii.2 and a recent paper from the Italian Integrated WNV Surveillance Group (Rizzo et al., 2016) provide an example of geographical correlation between human and veterinary cases. For Figure 1 (Geographical distribution of West Nile neuroinvasive disease in horses (panel A) and humans (panel B), Italy 2008–2015 (Rizzo et al., 2016)) and Figure 2 (West Nile virus detections in the veterinary and human surveillance by month, Italy, 2008–2015 (Rizzo et al., 2016)) see Figures section.
(a)(iv) resistance to treatments, including antimicrobial resistance	(a)(iv) 1 resistant strain to any treatment even at laboratory level	Not applicable to WNV since there is no specific antiviral therapy
(b)(ii) Impact of the disease on human health	 (b)(ii) 1 types of routes of transmission between animals and humans - see (a)(vi)2 (b)(ii) 2 Incidence of zoonotic cases 	Refer to table b.ii.2 in the Table section
	(b)(ii) 3 Occasional or substantial?	WNV transmission through blood transfusion and organ transplantation is able to sustain community-level outbreak West Nile virus is most commonly transmitted to humans by mosquitoes even though additional routes of human to human transmission have also been documented as blood transfusions, organ transplants, exposure in a laboratory setting or the transmission from the mother to baby during pregnancy, delivery, or breastfeeding. It is important to note that these methods of transmission represent a very small proportion of cases thus sufficient to evoke only a sporadic occurrence of the disease.
	(b)(ii) 4 Epidemic or pandemic? (b)(ii) 5 DALY	Sporadic potential As for most arthropod-borne diseases causing fever syndromes worldwide, the cumulative impact of WNV on global disease burden has not been fully assessed. Evaluations should include both the severe forms of the disease
		assessed. Evaluations should include both the severe forms of the disease and the milder clinical manifestations which may result in neurological and ophthalmologic complications (Carson et al., 2006). WNV has been recognized able to induce a wide range of post-infection, long-term sequelae with the recovery of the affected patients within two years from the infection (Murray et al., 2008). However, a recent paper has emphasized that 40% of WNV affected patients continued to experience symptoms related to their WNV infection up to 8 years later demonstrating the health and economic impact of a result of prolonged recovery, continued morbidity, and related disability (Murray et al., 2014).

Question B(ii)

 Question B(ii) disease agent has developed resistance to treatments WHICH poses a significant danger to public and/or animal health in the Union?

 Interpretation: disease agent has developed resistance to treatments AND therefore poses a significant danger to public and/or animal health. If no treatment exists the answer should be na

 Answer Y _____ N ___ na ___

 Art. 7 criteria
 Art. 7 parameters

 (a)(iv) resistance to treatments, including antimicrobial resistance
 (a)(iv)1 list of any resistant strain to any treatment even at laboratory level

Question B(iii)

Question B(iii) disease causes or could cause a significant negative economic impact affecting agriculture or aquaculture production in the Union? Interpretation: disease and/or infection causes or could cause a significant negative economic impact affecting agriculture or aquaculture production in the Union if no intervention is in place Answer Y N				
Art. 7 criteria (a)(ii) morbidity and mortality rates of the disease in animal populations	Art. 7 parameters (a)(ii) 3 Case-fatality rate	Assessment of the Art. 7 parameters from the fact-sheet Refer to table a.ii. in the Table section		
(b)(i) the impact of the disease on agricultural and aquaculture	(b)(i) 1 Number of MSs where the disease is present	Since the beginning of the 2016 transmission season, the presence of WNV has been confirmed in MSs and neighbouring countries. As of 27 th October 2016, 205 human cases of West Nile fever have been		



production and other parts of the economy		reported in EU and 261 cases in neighbouring countries (Austria, Croatia, Cyprus, Egypt, Hungary, Italy, Israel, Portugal, Romania, Russian Federation, Serbia, Spain and Syrian Arab republic, Tunisia, Ukraine) (ECDC, 2016).
	(b)(i) 2 Proportion of production losses (%) by epidemic/endemic situation (milk, growth, semen, meat, etc.)	In European outbreaks WNV has not been associated to any mortality in domestic birds but has been limited to a few cases in wild birds (paragraph a.i). Outside EU, among poultry, young geese seem to be particularly susceptible to WNV, and have been affected in both Western and Eastern Hemispheres. In Israel, disease was reported in 3-8-week-old goslings, with morbidity and mortality rates of approximately 40%. During an outbreak in Canada, the mortality rate was 25% in 6- week-old goslings, but 15-month-old and 5-year-old geese seroconverted with no clinical signs. In experimental infections, up to 50–75% of geese may die. Ducks are not thought to be highly susceptible to WNV; however, an outbreak among captive lesser scaup (<i>Aythya affinis</i>) ducklings resulted in 70% mortality. During other outbreaks, the morbidity and mortality rates were 100% in Impeyan pheasants, and the mortality rate was 25% in chukar partridges. Similarly to geese, young partridges and pheasants seem to be more susceptible to disease. In contrast, both young and old chickens and turkeys are infected asymptomatically.

Question B(iv)

Question B(iv) disease has the potential to generate a crisis or the disease agent could be used for the purpose of bioterrorism Answer Y N n a					
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet			
(c) potential to generate a crisis situation and its potential use in bioterrorism	(c) 1 listed in OIE/CFSPH classification of pathogens	Yes, listed among the diseases from potential bioterrorist agents			
	(c) 2 listed in the Encyclopaedia of Bioterrorism Defense of Australia Group	No			
	(c) 3 included in any other list of potential bio-agro-terrorism agents	Not reported			

Question B(v)

biodiversity, of the	Question B(v) disease has or could have a significant negative impact on the environment, including biodiversity, of the Union Answer Y N N n a					
Art. 7 criteria	Art. 7	Assessment of the Art. 7 parameters from the fact-sheet				
(b)(iv) impact of the disease on biodiversity and the environment	b)(iv) 1 endangered wild species affected: listed species as in CITES and/or IUCN list (b)(iv) 2 mortality in wild species	Endangered wild species affected (CITES and/or IUCN) CITES (https://cites.org/sites/default/files/eng/app/2016/E-Appendices-2016-03- 10.pdf) Phoenicopteridae spp. (App. II) <i>Falco rusticolus</i> (App.I) <i>Falconiformes</i> spp. (App II) WNV outbreaks have been reported among domesticated geese in the Eastern Hemisphere, but generally there have been only sporadic reports of deaths in individual wild birds. It is uncertain whether this is related to the virulence of the viruses circulating in this region, host susceptibility, reduced transmission/ amplification or lack of surveillance. One recently introduced lineage 2 virus in Central Europe has affected significant numbers of wild and captive raptors. Species known to be susceptible to this isolate include sparrow hawks (<i>Accipiter nisus</i>), goshawks (<i>Accipiter gentilis</i>) and gyrfalcons (<i>Falco rusticolus</i>). The same virus was isolated from a dead collared dove (<i>Streptopelia decaocto</i>) in Italy, during an outbreak of mortality in collared doves and other species including blackbirds. Different lineages of the WNV have also been found occasionally in other dead birds including European robins (<i>Erithacus rubecula</i>), a raven (<i>Corvus corax</i>), common magpies (<i>Pica pica</i>), a Eurasian jay (<i>Garrulus glandarius</i>), house sparrows (<i>Passer domesticus</i>), a black redstart (<i>Phoenicurus ochruros</i>), a sedge warbler (<i>Acrocephalus schoenobaenus</i>) and a Savi's warbler (<i>Locustella</i> <i>luscinioides</i>).				
	(b)(iv) 3 capacity of the pathogen to persist in the environment and	WNV is scarcely resistant in the environment thus its capability to survive during the vector-free period and, eventually, become endemic is still unknown. Different mechanisms have been claimed to explain WNV persistence. The duration of viremia in some bird species has been experimentally demonstrated (refer to the				



	cause mortality in wildlife	paragraph "a.i - animal species concerned by the disease") as well as the chronic infection in birds with the persistence of WNV RNA within the organs (spleen, kidney, and lung) of several species of birds. To what extent the virus circulates in the bloodstream is difficult to say and may be influenced by stressful events as migration or mating. Also vertical transmission by <i>Culex</i> mosquitoes has been experimentally demonstrated in <i>Cx. tarsalis</i> (Reisen et al., 2006) as well as the overwintering of WNV demonstrated in in <i>Cx. pipiens</i> mosquitoes collected during the 2000 outbreak in New York city (Nasci et al., 2001).
(e)(iv) the impact of disease prevention and control measures, as regards the environment and biodiversity	(e)(iv) 2 Mortality in wild species	The main risk may be represented by the environmental residual of biocides which may interfere with ecology of wild species.

Article 9

Questions 1

<u>Instruction</u> to answer: The answer to the question 1CAq can be Y only for diseases affecting aquatic animal species, therefore do not assess this question for diseases affecting terrestrial animal species

do not assess this question for d						
Question 1A the disease is not present in the territory of the Union OR present only in exceptional cases						
(irregular introductions) OR present in only in a very limited part of the territory of the Union						
	Answer Y 🗆 N 🗆 na 🗆					
		part of the Union territory with an endemic character AND				
	ember States or zones	of the Union are free of the disease				
Answer Y 🗆 N 🗆 na 🗆						
Question 1C the disease is pr Answer Y	resent in the whole OR	part of the Union territory with an endemic character				
Question 1CAg several Memb	per States or zones of t	the Union are free of the disease				
Answer Y 🗆 N 🗆 na 🗆						
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet				
(b)(i) the impact of the disease	(b)(i) 1 Number of	Since the beginning of the 2016 transmission season, the presence				
on agricultural and aguaculture	MSs where the	of WNV has been confirmed in MSs and neighbouring countries. As				
production and other parts of	disease is present	of 27th October 2016, 205 human cases of West Nile fever have				
the economy		been reported in EU and 261 cases in neighbouring countries				
,		(Austria, Croatia, Cyprus, Egypt, Hungary, Italy, Israel, Portugal,				
		Romania, Russian Federation, Serbia, Spain and Syrian Arab				
		republic, Tunisia, Ukraine) (ECDC, 2016).				
(a)(vii) the absence or	(a)(vii) 1 Map of MSs	The geographic distribution of West Nile cases in Europe and in				
presence and distribution of	where the disease is	Mediterranean Basin from 2008 to 2016 shown in figure 3 (see				
the disease in the Union, and,	present	"Figures" section).				
where the disease is not	(a)(vii) 2 Type of					
present in the Union, the risk	epidemiological	West Nile virus introduction and circulation have been demonstrated				
of its introduction into the	occurrence	on multiple occasions in Southern Europe and Mediterranean basin				
Union		since 1960s when seropositive animals or virus isolates were				
		discovered in France, Portugal, and Cyprus (Filipe et al., 1969;				
		Joubert et al., 1970), with WNV activity having dramatically				
		increased over the last five years and spread to eastern territories				
		without previous WNV records. If migratory birds have been associated to the introduction of viral strains from endemic areas				
		(Calistri et al., 2010) the mechanism of virus persistence in animal				
		hosts in Europe leading to endemization of the disease is still				
		unknown. The circulation of WNV in Europe may occur silently for				
		several months, or even years, before a spill over event occurs and				
		viral circulation becoming evident.				
		In Europe, WNV has mainly been reported in central and south-				
		eastern Europe, regions in which WNV infections and virulence have				
		recently increased, and the implicated viruses have spread to new				
		areas, including Bulgaria and Greece in 2010, Albania and				
		Former Yugoslav Republic of Macedonia in 2011, and Croatia,				
		Serbia, and Kosovo in 2012. Accordingly, alarming outbreaks were				
		reported in several European countries in 2010; 261 confirmed				
		human cases, including 34 deaths, occurred in Greece, 57 cases and				
		five deaths occurred in Romania, and 480 cases and six deaths				
		occurred in Russia (Sirbu et al., 2011; Papa et al., 2010;				
		Onishchenko et al., 2011).				
		Sporadic occurrence of the disease has been reported in France				



	since 1962, when it first appeared in Camargue. In the same region the WNV was detected in 2000, 2004 and, after a ten-year period, in 2015 (Bahuon et al., 2016). In Italy WNV epidemics have been registered since 2008 (Savini et al., 2008) caused by genetically divergent isolates and, to date, North Eastern regions as well as Sardinia and Sicily are considered endemic even though the endemic areas are modified every year according to the results of the surveillance activities (Italian Ministry of Health, 2016).
(a)(vii) 3, 4, 5, 6, 7, 8, Risk of introduction (all related parameters)	Data not provided since the disease is already present in the Union.

Questions 2.1

Question 2.1A the disease is highly transmissible Answer: Y N N na		
	disease is moderately to hig	hly transmissible
Answer Y 🗆 N 🗆 na		
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet
(a)(vi) the routes and speed of transmission of the disease between animals and	(a)(vi) 3 Incidence between animals and, when relevant, between animals and humans (a)(vi) 4 Transmission rate	Not provided since literature search did not provide relevant results.
animals and, when relevant, between animals and humans	(a)(vi) 4 Transmission rate (beta) (from R ₀ and infectious period) between animals and, when relevant, between animals and humans	Transmission rate of West Nile Virus (WNV) infection between vector (mosquito) and avian population has been defined by using different mathematical models. Most of them included the disease basic reproduction number, R_0 , which provides key insights into disease outbreak and control. It represents the average number of secondary infections deriving from the introduction of an infected individual into a susceptible population. Quantitatively, it has a threshold value of 1: when $R_0 > 1$ a disease outbreak can occur, and when $R_0 < 1$ it will not. Qualitatively, the expression for R_0 indicates which elements of the disease system can be manipulated to reduce the chance of an outbreak. The first WNV model was presented by Thomas and Urena (2001) to investigate the effectivity of pesticide spraying to reduce mosquito populations and in succession human WNV encephalitis in New York city after the outbreak in late summer 1999. Another WNV model was presented by Wonham et al. (2004), who suggested a theoretical framework including the derivation of R_0 and developing a single-season susceptible-infectious-removed (SIR) model of WN cross-infection between birds and mosquitoes, incorporating specific features unique to WN ecology. They demonstrated that mosquito control decreases, but bird control increases the chance of an outbreak. A similar WNV model was presented in a further theoretical study by Cruz-Pacheco et al. (2005). Their numerical results comprise the influence of mosquito vertical transmission on the WNV dynamics and estimated R0 values for 8 bird species. The work also finds the basic reproductive number R_0 in terms of measurable epidemiological and demographic parameters. Because the different WNV models result in different R_0 estimates, Wonham et al. (2006) compared the models cited above with respect to their disease transmission term. An agestructured WNV model was applied to the WNV dynamics in Southern Europe and Western Africa by Durand et al. (2010). A common feature of all existi



	the mean values of R0 for the whole Italy (varied between 0.4 and 4.8,
	with values >1 from the end of May to the middle of September).

Question 2.2

Question 2.2AB there be possibilities of airborne or waterborne or vector-borne spread Interpretation: the disease or the infection can be transmitted via airborne or waterborne or vector-borne (mechanical or biological vector) spread Answer Y \square N \square na \square		
Art. 7 criteria (a)(vi) the routes and	Art. 7 parameters (a)(vi) 1 types of	Assessment of the Art. 7 parameters from the fact-sheet Results of experimental trials on WNV transmission routes in wild birds
speed of transmission of	routes of transmission	are summarized in table a.vi.1-2. in the Table section.
the disease between animals and, when relevant, between animals and humans	from animal to animal (horizontal, vertical)	Mosquito bites are the usual source of WNV for mammals, reptiles and amphibians however in some animals, there is also evidence for transmission by other routes. Carnivorous mammals and reptiles (e.g., cats and alligators) can be infected by eating contaminated tissues. Direct transmission during close contact has also been reported in alligators, possibly via fecal shedding of virus. Chipmunks, squirrels and raccoons can also shed WNV in feces, oral secretions and/or urine. WNV has been found in the urine of experimentally infected hamsters, and in very small amounts in the oral and/or cloacal fluids of experimentally infected North American bullfrogs (<i>Rana catesbeiana</i>) and green iguanas (<i>Iguana iguana</i>). Transplacental transmission was reported in experimentally infected sheep and mice, as well as in a horse that was fatally infected with a lineage 1 virus in Africa, and aborted in the final stage of the disease. The epidemiological significance (if any) of mammalian, reptilian and amphibian hosts in the maintenance or amplification of WNV remains to be established.

Question 2.3

economic importance Answer Y IN In a I			
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet	
(a)(i) animal species concerned by the disease	(a)(i) 1 naturally susceptible wildlife species	Birds Order Anseriformes Family Anatidae: Wood Duck-Aix sponsa; Eurasian Wigeon-Anas penelope (C); Bronze-winged Duck (Spectacled Duck)-Anas specularis (C); Canvasback-Aythya valisineria; Canada Goose-Branta Canadensis; Barnacle Goose-Branta leucopsis (C)(a); Emperor Goose-Chen canagica (C); Greater Magellan Goose (Andean Goose)- Chloephagapicta leucoptera (C)(a); Abyssinian Blue-winged Goose-Cyanochen cyanopterus (C)(a); Tundra Swan-Cygnus columbianus (C); Trumpeter Swan-Cygnus Cygnus buccinator (C)(a); Mute Swan-Cygnus olor; Rosybilled Duck-Netta peposaca (C)(a); Ruddy Duck-Oxyura jamaicensis Order Apodiformes Family Apodidae: Chinney Swift-Chaetura pelagica; Family Trochilidae; Ruby- throated Hummingbird-Archilochus colubris Order Caprimulgiformes Family <i>Dromaiidae</i> : Common Nighthawk-Chordeiles minor Order Casuariiformes Family Dromaiidae: Emu-Dromaius novaehollandiae (c) Order Charadriiformes Family Dromaiidae: Ruddy Turnstone-Arenaria interpres; Killdeer-Charadrius vociferous; Piping Plover-Charadrius melodus Family Laridae: Herring Gull-Larus argentatus; Laughing Gull-Larus atricilla; Ring- billed Gull-Larus delawarensis; Great Black-backed Gull-Larus marinus; Black Skimmer-Rhynchops niger; Grey Gull-Larus modestus (C)(a); Inca Tern-Larosterna inca (c)(a) Order Ciconiformes Family Ardeidae: Yellow-crowned Night-heron-Nyctanassa violacea (c); Black- crowned Night-heron-Nycticorax nycticorax (c); Great Blue Heron-Ardea Herodias; Green Heron-Butorides virescens; Least Bittern-Ixobrychus exilis Family Ciconiidae: Saddle-billed Stork-Ephippiorhynchos senegalensis (C)(a);Marabou Stork-Leptopilos crumeniferus (c)(a); Lesser Adjutant Stork-Leptoptilos javanicus (c)(a) Family <i>Phoenicopteridae</i> : Chilean Flamingo-Phoenicopterus chilensis (c); Greater	



Family <i>Threskiornithidae</i> : Scarlet Ibis-Eudocimus ruber (c); Waldrapp-Geronticus eremita (c)(a)
Order Columbiformes
Family Columbidae: White-crowned Pigeon-Columba leucocephala; Rock Dove (Feral
Pigeon)-Columba livia; Mauritius Pink Pigeon-Columba mayeri (c)(a); Common Ground-Dove-Columbina passerina; Eurasian Collared-Dove-Streptopelia decaocto;
White-winged Dove-Zenaida asiatica; Mourning Dove-Zenaida macroura; Luzon
Pigeon (Bleeding Heart Pigeon)-Gallicolumba luzonica (c)(a); Inca Dove-Columbina
inca Order Coraciiformes
Family <i>Alcedinidae</i> : Belted Kingfisher-Ceryle alcyon
Order Cuculiformes
Family <i>Cuculidae</i> : Yellow-billed Cuckoo-Coccyzus americanus Order Falconiformes
Family <i>Accipitridae</i> : Cooper's Hawk-Accipiter cooperii; Northern Goshawk-Accipiter
gentilis; Sharp-shinned Hawk-Accipiter striatus; Golden Eagle-Aquila chrysaetos; Red-
tailed Hawk-Buteo jamaicensis; Rough-legged Hawk-Buteo lagopus (c); Red-
shouldered Hawk-Buteo lineatus; Broad-winged Hawk-Buteo platypterus; Swainson's Hawk-Buteo swainsoni; Northern Harrier-Circus cyaneus; Swallow-tailed Kite-
Elanoides forficatus; Bald Eagle-Haliaeetus leucocephalus; Mississippi Kite-Ictinia
mississippiensis; Osprey-Pandion haliaetus; Harris' Hawk-Parabuteo unicinctus (c)
Family <i>Falconidae</i> : Merlin-Falco columbarius; Prairie Falcon-Falco mexicanus; Peregrine Falcon-Falco peregrinus; American Kestrel-Falco sparverius
Order Galliformes
Family Numididae: Crested Guineafowl-Guttera pucherani (c)(a)
Family <i>Odontophoridae</i> : Northern Bobwhite-Colinus virginianus
Family <i>Phasianidae</i> : Chukar-Alectoris chukar (c)(a); Ruffed Grouse-Bonasa umbellus; Green Junglefowl-Gallus varius (c)(a); Impeyan (Himalayan) Pheasant (Monal)-
Lophophorus impeyanus (c); Bulwer's Wattled Pheasant-Lophura bulweri (c)(a); Ring-
necked Pheasant-Phasianus colchicus; Mount Peacock-Pheasant-Polypectron
inopinatum (c)(a); Crested Partridge-Rollulus roulroul (c)(a); Blyth's Tragopan- Tragopan blythii (c); Argus Pheasant (unspecified)-various (c)(a); Greater Sage
Grouse-Centrocerus urophasianus
Order Gaviformes
Family <i>Caprimulgidae</i> : Common Loon-Gavia immer Order Gruiformes
Family <i>Gruidae</i> : Demoiselle Crane-Anthropoides virgo (c)(a); West African Crowned
Crane-Balearica pavonina pavonina (a); Wattled Crane-Bugeranus carunculatus
(c)(a); Whooping Crane-Grus americana (c)(a); Mississippi Sandhill Crane-Grus canadensis pulla (c); Red-crowned Crane-Grus japonensis (c)(a); Siberian Crane-Grus
leucogeranus (c)(a); Hooded Crane-Grus monacha (c)(a); White-naped Crane-Grus
vipio (c)(a); Black-necked Crane-Grus nigricollis (c)(a)
Family <i>Rallidae</i> : Virginia Rail-Rallus limicola Order Musophagiformes
Family <i>Musophagidae</i> : Lady Ross' Turaco (Plantain-Eater)-Musophaga rossae (c)(a)
Order Passeriformes
Family <i>Bombycillidae</i> : Cedar Waxwing-Bombycilla cedrorum Family <i>Cardinalidae</i> : Northern Cardinal-Cardinalis cardinalis; Blue Grosbeak-Guiraca
caerulea(a); Rose-breasted Grosbeak-Pheucticus Iudovicianus; Dickcissel-Spiza
americana
Family <i>Corvidae</i> : Western Scrub-Jay-Aphelocoma californica; American Crow-Corvus brachyrhynchos; Common Raven-Corvus corax; Fish Crow-Corvus ossifragus; Blue
Jay-Cyanocitta cristata; Steller's Jay-Cyanocitta stelleri; Black-billed Magpie-Pica
hudsonia (c)
Family Emberizidae: Song Sparrow-Melospiza melodia; Savannah Sparrow-
Passerculus sandwichensis; Fox Sparrow-Passerella iliaca; Eastern Towhee-Pipilo erythrophthalmus; Field Sparrow-Spizella pusilla
Family Estrildidae: Zebra Finch-Taeniophygia guttata (c)
Family <i>Fringillidae</i> : American Goldfinch-Carduelis tristis; House Finch-Carpodacus
mexicanus; Purple Finch-Carpodacus purpureus; Evening Grosbeak-Coccothraustes vespertinus; European Goldfinch-Carduelis carduelis (c)
Family Hirundinidae: Barn Swallow-Hirundo rustica; Purple Martin-Progne subis; Tree
Swallow-Tachycineta bicolor
Family <i>Icteridae</i> : Red-Winged Blackbird-Agelaius phoeniceus; Rusty Blackbird- Euphagus carolinus; Brewer's Blackbird-Euphagus cyanocephalus; Baltimore Oriole-
Icterus galbula; Brown-headed Cowbird-Molothrus ater; Boat-tailed Grackle-Quiscalus
major; Great-tailed Grackle-Quiscalus mexicanus; Common Grackle-Quiscalus
quiscula Family <i>Laniidae</i> : Loggerhead Shrike-Lanius Iudovicianus
Family <i>Mimidae</i> : Coggenead Sinke-Lands Indoviciands Family <i>Mimidae</i> : Gray Catbird-Dumetella carolinensis; Northern Mockingbird-Mimus
polyglottos; Brown Thrasher-Toxostoma rufum
Family <i>Paridae:</i> Tufted Titmouse-Baeolophus bicolor; Varied Tit-Parus varius (c);



	Black-capped Chickadee-Poecile atricapilla; Carolina Chickadee-Poecile carolinensis Family <i>Parulidae</i> : Black-throated Blue Warbler-Dendroica caerulescens; Yellow- rumped Warbler-Dendroica coronate; Yellow Warbler-Dendroica petechial; Blackpoll Warbler-Dendroica striata; Common Yellowthroat-Geothlypis trichas; Kentucky Warbler-Oporornis formosus; Northern Parula-Parula Americana; Ovenbird-Seiurus aurocapillus; Northern Waterthrush-Seiurus noveboracensis; Nashville Warbler- Vermivora ruficapilla; Canada Warbler-Wilsonia Canadensis; Hooded Warbler-Wilsonia citrina
	Family <i>Passeridae</i> : House Sparrow-Passer domesticus Family <i>Sylviidae</i> : White-crested Laughingthrush-Garrulax leucolophus (c)(a) Family <i>Sittadae</i> : White-breasted Nuthatch-Sitta carolinensis Family <i>Sturnidae</i> : European Starling-Sturnus vulgaris
	Family <i>Thraupidae</i> : Palm Tanager-Thraupis palmarum (c) Family <i>Troglodytidae</i> : Carolina Wren-Thryothaurus ludovicianus; Winter Wren- Troglodytes troglodytes
	Family <i>Turdidae</i> . Veery-Catharus fuscescens; Hermit Thrush-Catharus guttatus; Gray- cheeked Thrush-Catharus minimus; Swainson's Thrush-Catharus ustulatus; Wood Thrush-Hylocichla mustelina; Eastern Bluebird-Sialia sialis; American Robin-Turdus migratorius
	Family <i>Tyrannidae</i> : Traill's Flycatcher-Empidonax traillii/alnorum; Eastern Phoebe- Sayornis phoebe; Scissor-tailed Flycatcher-Tyrannus forficatus; Eastern Kingbird- Tyrannus tyrannus
	Family <i>Vireonidae</i> : Black-whiskered Vireo-Vireo altiloquus; Warbling Vireo-Vireo gilvus; Red-eyed Vireo-Vireo olivaceus
	Order Pelecaniformes Family <i>Pelecanidae</i> : American White Pelican-Pelecanus erythrorhynchos; Brown Pelican-Pelicanus occidentalis (c)(a); Family Phalacrocoracidae; Double-crested Cormorant-Phalacrocorax auritus; Guanay Cormorant-Phalacrocorax bougainvillei (c)
	Order Piciformes Family <i>Picidae</i> : Red-headed Woodpecker-Melanerpes erythrocephalus; Downy Woodpecker-Picoides pubescens; Yellow-bellied Sapsucker-Sphyrapicus varius Order Podicipediformes
	Family Podicipedidae: Pied-billed Grebe-Podilymbus podiceps
	Order Psittaciformes Family <i>Cacatuidae</i> : Cockatoo (unspecified)-Cacatua spp. (c) ; Cockatiel-Nymphicus hollandicus (c)
	Family <i>Psittacidae</i> : Red-crowned Parrot-Amazona viridigenalis (c); Macaw (unspecified)-Ara spp. (c); Budgerigar-Melopsittacus undulatus (c); Lorikeet spp Tricheglossus spp. (c)
	Order Spheniscformes Family <i>Spheniscidae</i> : Black-footed (Jackass) Penguin-Spheniscus demersus (c); Magellan Penguin-Spheniscus humboldti (c)(a) Order Strigiformes
	Family <i>Strigidae</i> : Northern Saw-whet Owl-Aegolius acadicus; Boreal Owl-Aegolius funereous (c); Short-eared Owl-Asio flammeus; Verreaux's Eagle Owl (Milky Eagle Owl)-Bubo lacteus(c)(a); Great Horned Owl-Bubo virginianus; Snowy Owl-Nyctea scandiaca (c); Eastern Screech Owl-Otus asio; Tawny Owl-Strix aluco(c); Great Grey Owl-Strix nebulosa (c); Spotted Owl-Strix occidentalis (c); Barred Owl-Strix varia; Northern Hawk Owl-Surnia ulula (c) Family <i>Tytonidae</i> : Barn Owl-Tyto alba
	Order Struthioniformes Family <i>Struthionidae</i> : Ostrich-Struthio camelis (c)(a)
	Mammals
	Order Artiodactyla Family <i>Bovidae</i> : Mountain Goat-Oreamnos americanus (c)
	Family <i>Camelidae</i> : Llama-Lama glama (c); Alpaca (Suri)-Lama pacos (c) Family <i>Cervidae</i> : White-tailed Deer-Odocoileus virgninianus; Reindeer-Rangifer tarnadus (c); Mule Deer-Odocoileus hemionus
	Family <i>Suidae</i> : Babirusa-Babyrousa babyrousa (c)(a) Order Carnivora
	Family <i>Canidae</i> : Timber Wolf-Canis lupus (c) Family <i>Mustelidae</i> : Striped Skunk-Mephitis mephitis
	Family <i>Phocidae</i> : Harbor Seal-Phoca vitulina (c) Family <i>Procyonidae</i> : Red Panda-Ailurus fulgens fulgens (c)(a) Family <i>Ursidae</i> : Black Bear-Ursus americanus(a)
	Order Chiroptera Family Vespertilionidae: Big Brown Bat-Eptesicus fuscus; Little Brown Bat-Myotis
	lucifugus Order Perissodactyla Family <i>Rhinocerotidae</i> : Great Indian Rhinoceros-Rhinoceros unicornis (c)(a)
	Order Primata Family <i>Cercopithcidae</i> : Barbary Macague-Macaca sylvanus (c)
	ranny cercopianciae: Darbary Macaque Macaca Syndhus (C)



I	
	Family <i>Lemuridae</i> : Ring-tailed Lemura-Lemur catta (c) Order Proboscidea
	Family <i>Elephantidae</i> : Indian (Asian) Elephant-Elephas maximus indicus (c)(a) Order Rodentia
	Family <i>Sciuridae</i> : Gray Squirrel-Sciurus carolinensis; Fox Squirrel-Sciurus niger; Eastern Chipmunk-Tamias striatus
	Reptiles Order Crocodylia
	Family <i>Alligatoridae</i> : American Alligator-Alligator mississippiensis (c) Order Squamata
	Family <i>Varanidae</i> : Crocodile Monitor-Varanus salvadorii (c)(a) (c) denotes either a captive or farmed animal(s). Virus or viral RNA was detected in animal tissue unless followed by an (a), which denotes detectable antibodies only have been reported (Source: USGS, National Wildlife Health Center).
(a)(i) 2 naturally susceptible	Family <i>Phasianidae</i> : Domestic Chicken (Red Junglefowl)-Gallus gallus; Turkey (domestic and wild)-
domestic species	Meleagris gallopavo Family <i>Anatidae</i> : Mallard-Anas platyrhynchos; Domestic Goose-Anser chinensis (c)(a) Family <i>Bovidae</i> : Domestic Cattle-Bos Taurus; Domestic (Suffolk) Sheep-Ovis aries Family <i>Canidae</i> : Domestic Dog-Canis familiaris
	Family <i>Felidae</i> : Domestic Cat (feral)-Felis catus Family <i>Leporidae</i> : Domestic Rabbit-Oryctolagus cuniculus
	Family <i>Equidae</i> : Domestic Horse-Equus equus przewalski caballus; Donkey-Equus asinus; Mule
 (a)(i) 3 experimentally susceptible wildlife species (a)(i) 4 experimentally susceptible demostic energies 	West Nile virus causes disease in humans, horses, and several species of birds. Most infected individuals show few signs of illness, but some develop severe neurological illness which can be fatal. West Nile Virus has an extremely broad host range. It replicates in birds, reptiles, amphibians, mammals, mosquitoes and ticks. Besides equids, details of susceptible domestic mammalian species are summarized in table a.i. (1) while table a.i. (2) summarizes outcomes of experimental infections of West Nile virus assessed in wild birds.
domestic species (a)(i) 5 wild reservoir species	Birds, particularly passerine species (jays, finches, sparrows, and crows).
(a)(i) 6 domestic reservoir species	West Nile virus causes disease in humans, horses, and several species of birds. Most infected individuals show few signs of illness, but some develop severe neurological illness which can be fatal. West Nile Virus has an extremely broad host range. It replicates in birds, reptiles, amphibians, mammals, mosquitoes and ticks. Besides equids, details of susceptible mammalian species are summarized in table a.i.(1) while table a.i. (2) summarizes outcomes of experimental infections of West Nile virus assessed in wild birds.
	Outside US, clinical symptoms to WNV infection has been reported in a scarce number of avian species in course of outbreaks: domestic geese (<i>Anser anser domesticus</i>) and white storks (<i>Ciconia ciconia</i>) during the WNV epidemic in Israel (Malkinson et al., 2002), goshawks (<i>Accipiter gentilis</i>) in Hungary (Bakonyi et al., 2006), eurasian jays (<i>Garrulus glandarius</i>), little owl (<i>Athene noctua</i>), mallard (<i>Anas plathyrynchos</i>), common buzzard (<i>Buteo buteo</i>) in Italy (Monaco et al., 2015). However, mass mortality of highly susceptible species (such as corvids or other species) is less frequently observed in the Old than in the New World although some species, as the jackdaws (<i>Corvus monedula</i>) could potentially function as sentinel
	(Lim et al., 2014). Surveillance activities carried out in Italy where WNV is endemic since 2008, pointed out the high susceptibility to the viral infection of three species of synantropic wild birds, namely carrion crow (<i>Corvus corone</i>), magpie (<i>Pica pica</i>) and eurasian jay (<i>Garrulus glandarius</i>) which justifies their use as sentinel in endemic areas (Italian Ministry of Health, 2016). WNV has been associated with sporadic disease in small numbers of other species,
	including squirrels, chipmunks, bats, dogs, cats, white-tailed deer, reindeer, sheep, alpacas, dromedary camels, alligators and harbour seals during intense periods of local viral activity. Some species of mammals including squirrels (<i>Sciurus</i> sp.), eastern chipmunks (<i>Tamias striatus</i>) and eastern cottontail rabbits (<i>Sylvilagus floridanus</i>) may be capable of transmitting WNV to mosquitoes, although their importance as reservoir hosts is still uncertain.
	Among reptiles, clinical signs were mainly reported during outbreaks in alligators, although there is also a report of neurological signs associated with WNV infection in a crocodile monitor (<i>Varanus salvadori</i>) lizard. Some infections in garter snakes (<i>Thamnophis sirtalis</i>) experimentally inoculated with WNV were also fatal. Green iguanas (<i>Iguana iguana</i>) can be infected. Amphibians including lake frogs (<i>Rana ridibunda</i>) and North American bullfrogs (<i>Rana catesbeiana</i>) can also be infected with WNV. Some alligators (e.g., American
	alligators, <i>Alligator mississippiensis</i>) and frogs (e.g., <i>Rana ridibunda</i> in Russia) may develop viremia sufficient to infect mosquitoes. As with mammals, their importance



as reservoir hosts is still uncertain.
Based on preliminary research carried out in Italy and Spain, only few bird species
seem to play a major role as blood donor for the mosquitoes (Munoz et al., 2012;
Hamer et al., 2009; Roiz et al., 2012, Spedicato et al., 2015). Unfortunately, the
reservoir competence for many European bird species is still unknown even though
the persistence of WNV in infected birds have been assessed in some species through
experimental trials.
House finches and House sparrows experimentally inoculated showed persistent
infection in spleen and kidney 28 weeks p.i. The virus was still detected by real time
RT-PCR in the spleen of two House sparrows at 36 weeks p.i. However, viral isolation
attempts were unsuccessful (Wheeler et al., 2012). In a previous work (Nemeth et
al., 2009), a higher number of organs were analyzed in WNV-infected House
sparrows, and viral RNA was detected in juvenile sparrows up to 65 days p.i in kidney
and spleen, although infectious virus could be isolated at low titres only in one
sparrow at 43 days p.i. Reisen and colleagues confirmed the persistent infection in
five species of Passeriformes and in Common ground-dove (<i>Columbina passerina</i>)
detecting the virus in spleen and kidney, but also in lung at >6 weeks p.i.

Questions 2.4

<u>Instruction</u> to answer: The answer to the question 2.4CAq can be Y only for diseases affecting aquatic animal species, therefore do not assess this guestion for diseases affecting terrestrial animal species

do not assess this question for diseases affecting terrestrial animal species			
Question 2.4A the disease may result in high morbidity and significant mortality rates			
Answer Y 🗆 N 🗆 na 🗆			
Question 2.4B the disease may result in high morbidity and in general low mortality			
	Answer Y N N na Question 2.4C the disease usually does not result in high morbidity and has negligible or no mortality AND often		
	fect of the disease is product		
Answer Y I N I na I			
		orbidity and usually low mortality AND often the most	
	e disease is production loss	orbitity and usually low mortality AND orten the most	
Answer Y I N I na I			
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet	
(a)(ii) morbidity and	(a)(ii) 1 Prevalence/	Refer to table a.ii in the Table section	
mortality rates of the	Incidence		
disease in animal	(a)(ii) 2 Case-morbidity rate		
populations	(a)(ii) 3 Case-fatality rate		
(b)(i) impact of the	(b)(i) 1 Number of MSs	Since the beginning of the 2016 transmission season, the presence of	
disease on agricultural	where the disease is present	WNV has been confirmed in MSs and neighbouring countries. As of	
and aquaculture		27 th October 2016, 205 human cases of West Nile fever have been	
production and other parts of the economy		reported in EU and 261 cases in neighbouring countries (Austria,	
parts of the economy		Croatia, Cyprus, Egypt, Hungary, Italy, Israel, Portugal, Romania, Russian Federation, Serbia, Spain and Syrian Arab republic, Tunisia,	
		Ukraine) (ECDC, 2016).	
	(b)(i) 2 Proportion of	In European outbreaks WNV has not been associated to any mortality	
	production losses (%) by	in domestic birds but has been limited to a few cases in wild birds	
	epidemic/endemic situation	(paragraph a.i).	
	(milk, growth, semen, meat,	Outside EU, among poultry, young geese seem to be particularly	
	etc.)	susceptible to WNV, and have been affected in both Western and	
		Eastern Hemispheres. In Israel, disease was reported in 3-8-week-old	
		goslings, with morbidity and mortality rates of approximately 40%.	
		During an outbreak in Canada, the mortality rate was 25% in 6-week-	
		old goslings, but 15-month-old and 5-year-old geese seroconverted	
		with no clinical signs. In experimental infections, up to 50–75% of geese may die. Ducks are not thought to be highly susceptible to	
		WNV; however, an outbreak among captive lesser scaup (Aythya	
		<i>affinis</i>) ducklings resulted in 70% mortality. During other outbreaks,	
		the morbidity and mortality rates were 100% in Impeyan pheasants,	
		and the mortality rate was 25% in chukar partridges. Similarly to	
		geese, young partridges and pheasants seem to be more susceptible	
		to disease. In contrast, both young and old chickens and turkeys are	
		infected asymptomatically.	

Questions 3

Question 3C the disease has a zoonotic potential with significant consequences for public health or possible significant threats to food safety

Answer Y 🗆 N 🗆 na 🗆

Question 3B the disease has a zoonotic potential with significant consequences on public health, including epidemic potential OR possible significant threats to food safety



Answer Y D N D na D Question 3A the disease has a zoonotic potential with significant consequences on public health, including epidemic or pandemic potential OR possible significant threats to food safety			
Answer Y	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet	
(a)(iii) zoonotic character of the disease	(a)(iii) 1 report of zoonotic human cases	West Nile zoonotic transmission in known to be present in Europe since a long time: in the 1960s the virus emerged in southerr France in the Camargue. Yet, the first large outbreak in humans was reported from Bucharest, Romania in 1996-1997. Since then infection in humans and/or horses have been reported from the Czech Republic (1997), France (2000, 2003, 2004, 2006), Italy (1998, 2008, 2009), Hungary (2000-2009), Romania (1997-2001 2003-2009), Spain (2004) and Portugal (2004). In 2010, the ecological parameters in Central European and Mediterranear countries were favorable for the transmission of WNV to humans. A human outbreak was reported from the Central Macedonia Regior in northern Greece and human cases were reported from Romania Hungary, Italy and Spain in August-September 2010. At the same time a large outbreak in humans was reported from Volgograd ir Russia. Evidence of human cases have been in EU Countries have beer listed in table b.ii.2 and a recent paper from the Italian Integrated WNV Surveillance Group (Rizzo et al., 2016) provide an example of geographical correlation between human and veterinary cases.	
		For Figure 1 (Geographical distribution of West Nile neuroinvasive disease in horses (panel A) and humans (panel B), Italy 2008–2015 (Rizzo et al., 2016)) and Figure 2 (West Nile virus detections in the veterinary and human surveillance by month, Italy, 2008–2015 (Rizzo et al., 2016)) see Figures section.	
(a)(vi) the routes and speed of transmission of the disease between animals and, when relevant, between	(a)(vi) 2 types of routes of transmission between animals and humans (direct and indirect including foodborne)	There is no evidence of natural direct transmission between vertebrates and humans. However, human infection from the exposure of conjunctival membranes (Fonseca et al., 2005) and/o percutaneous injury to the body fluids or tissues of WNV infected birds (CDC, 2002) has been described.	
animals and humans	(a)(vi) 3 Incidence between animals and, when relevant , between animals and humans	Not provided since literature search did not provide relevan results.	
	(a)(vi) 4 Transmission rate (beta) (from R ₀ and infectious period) between animals and, when relevant ,between animals and humans	Transmission rate of West Nile Virus (WNV) infection between vector (mosquito) and avian population has been defined by using different mathematical models. Most of them included the disease basic reproduction number, R_0 , which provides key insights inti- disease outbreak and control. It represents the average number of secondary infections deriving from the introduction of an infected individual into a susceptible population. Quantitatively, it has a threshold value of 1: when $R_0 > 1$ a disease outbreak can occur and when $R_0 < 1$ it will not. Qualitatively, the expression for R indicates which elements of the disease system can be manipulated to reduce the chance of an outbreak. The first WNV model wa presented by Thomas and Urena (2001) to investigate the effectivity of pesticide spraying to reduce mosquito populations and in succession human WNV encephalitis in New York city after the outbreak in late summer 1999. Another WNV model was presented by Wonham et al. (2004), who suggested a theoretical framewor including the derivation of R_0 and developing a single-seaso susceptible–infectious–removed (SIR) model of WN cross-infection between birds and mosquitoes, incorporating specific feature unique to WN ecology. They demonstrated that mosquito contro decreases, but bird control increases the chance of an outbreak. <i>J</i> similar WNV model was presented in a further theoretical study b Cruz-Pacheco et al. (2005). Their numerical results comprise the influence of mosquito vertical transmission on the WNV dynamic and estimated R0 values for 8 bird species. The work also finds the basic reproductive number R_0 in terms of measurable epidemiological and demographic parameters. Because the different WNV models result in different R_0 estimates, Wonham et al. (2006) compared the models cited above with respect to the disease transmission term. An age-structured WNV model was applied to the WNV dynamics in Southern Europe and Western Africa by Durand et al. (2010). A common feature of all existing	



		WNV models is that they are formulated with constant parameters. Therefore, they are not able to describe the observed seasonal cycles of WNV cases and, consequently, have not been compared or verified with surveillance data. To overcome the above mention shortcomings two different models have been proposed: Laperriere and colleagues (2011) proposed an epidemic model for the
		simulation of the WNV dynamics of birds, horses and humans in the Minneapolis metropolitan area (Minnesota, US) to describe the observed seasonal cycles of WNV cases, incorporating epidemiological, entomological, climatic and environmental information. In the EU context Calistri et al. (2014) adapted the model
		developed by Rubel et al. (2008) to explain the Austrian epidemics of a close WNV related flavivirus, the Usutu virus by including the vertical (transovarial) transmission rate (VTR) in mosquitoes. Aiming to define the period at major risk for human infection, a simulation of the seasonal dynamic of WNV transmission was proposed and risk maps defined according to the mean values of R0 for the whole Italy (varied between 0.4 and 4.8, with values >1
(b)(ii) Impact of the disease on human health	(b)(ii) 5 Disability-adjusted life year (DALY)	from the end of May to the middle of September). As for most arthropod-borne diseases causing fever syndromes worldwide, the cumulative impact of WNV on global disease burden has not been fully assessed. Evaluations should include both the severe forms of the disease and the milder clinical manifestations which may result in neurological and ophthalmologic complications (Carson et al., 2006). WNV has been recognized able to induce a wide range of post-infection, long-term sequelae with the recovery of the affected patients within two years from the infection (Murray et al., 2008). However, a recent paper has emphasized that 40% of WNV affected patients continued to experience symptoms related to their WNV infection up to 8 years later demonstrating the health and economic impact of a result of prolonged recovery, continued morbidity, and related disability (Murray et al., 2014).
	(b)(ii) 6 Availability of medical treatment and their effectiveness (therapeutical effect and any resistance)	There is no specific recommended treatment, other than supportive care, at present. Intensive care and mechanical ventilation may be required in some cases. Various therapies including interferon, antisense nucleotides and intravenous immunoglobulins (passive immunization) are being tested in clinical trials. While a few case reports suggest that some of these treatments may be promising, larger studies are still lacking. Screening for new drugs that may inhibit WNV is underway.
	(b)(ii) 7 Availability of vaccines and their effectiveness (reduced morbidity)	There are no vaccines available for human use in EU.
(c) potential to generate a crisis situation and its	(c) 1 listed in OIE/CFSPH classification of pathogens	Yes, listed among the diseases from potential bioterrorist agents
potential use in bioterrorism	(c) 2 listed in the Encyclopaedia of Bioterrorism Defense of Australia Group	No
	(c) 3 included in any other list of potential bio- agro- terrorism agents	Not reported

Questions 4

Question 4AB the disease in question has a significant impact on the economy of the Union, causing substantial costs, mainly related to its direct impact on the health and productivity of animals Interpretation: due to the substantial costs related to the disease's direct impact on the health and productivity of animals, the disease has a significant impact on the economy Answer Y 🗆 N 🗆 na 🗆 Question 4C the disease has a significant impact on the economy of the Union, mainly related to its direct impact on certain types of animal production systems Interpretation: due to its direct impact on certain types of animal production systems, the disease has a significant impact on the economy Answer Y 🗆 N 🗆 na 🗆 Art. 7 criteria Art. 7 parameters Assessment of the Art. 7 parameters from the fact-sheet (a)(ii) morbidity and (a)(ii) 1 Prevalence/ Refer to table a.ii. in the Table section mortality rates of the Incidence disease in animal (a)(ii) 2 Case-morbidity rate



populations	(% clinically diseased animals out of infected ones)	
	(a)(ii) 3 Case-fatality rate	
(b)(i) impact on agricultural and aquaculture production and other parts of the economy	(b)(i) 1 Number of MSs where the disease is present	Since the beginning of the 2016 transmission season, the presence of WNV has been confirmed in MSs and neighbouring countries. As of 27 th October 2016, 205 human cases of West Nile fever have been reported in EU and 261 cases in neighbouring countries (Austria, Croatia, Cyprus, Egypt, Hungary, Italy, Israel, Portugal, Romania, Russian Federation, Serbia, Spain and Syrian Arab republic, Tunisia, Ukraine) (ECDC, 2016).
	(b)(i) 2 Proportion of production losses (%) by epidemic/endemic situation (milk, growth, semen, meat, etc.)	In European outbreaks WNV has not been associated to any mortality in domestic birds but has been limited to a few cases in wild birds (paragraph a.i). Outside EU, among poultry, young geese seem to be particularly susceptible to WNV, and have been affected in both Western and Eastern Hemispheres. In Israel, disease was reported in 3-8-week-old goslings, with morbidity and mortality rates of approximately 40%. During an outbreak in Canada, the mortality rate was 25% in 6-week- old goslings, but 15-month-old and 5-year-old geese seroconverted with no clinical signs. In experimental infections, up to 50–75% of geese may die. Ducks are not thought to be highly susceptible to WNV; however, an outbreak among captive lesser scaup (<i>Aythya</i> <i>affinis</i>) ducklings resulted in 70% mortality. During other outbreaks, the morbidity and mortality rates were 100% in Impeyan pheasants, and the mortality rate was 25% in chukar partridges. Similarly to geese, young partridges and pheasants seem to be more susceptible to disease. In contrast, both young and old chickens and turkeys are infected asymptomatically.

Question 5a

-	ease has a significant impact on	on society, with in particular an impact on labour markets society with (as the most important but not the only one) an impact on
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet
(b)(i) impact on agricultural and aquaculture production and other parts of the economy	(b)(i) 1 Number of MSs where the disease is present	Since the beginning of the 2016 transmission season, the presence of WNV has been confirmed in MSs and neighbouring countries. As of 27 th October 2016, 205 human cases of West Nile fever have been reported in EU and 261 cases in neighbouring countries (Austria, Croatia, Cyprus, Egypt, Hungary, Italy, Israel, Portugal, Romania, Russian Federation, Serbia, Spain and Syrian Arab republic, Tunisia, Ukraine) (ECDC, 2016).
	(b)(i) 2 Proportion of production losses (%) by epidemic/endemic situation (milk, growth, semen, meat, etc.)	In European outbreaks WNV has not been associated to any mortality in domestic birds but has been limited to a few cases in wild birds (paragraph a.i). Outside EU, among poultry, young geese seem to be particularly susceptible to WNV, and have been affected in both Western and Eastern Hemispheres. In Israel, disease was reported in 3-8-week-old goslings, with morbidity and mortality rates of approximately 40%. During an outbreak in Canada, the mortality rate was 25% in 6-week- old goslings, but 15-month-old and 5-year-old geese seroconverted with no clinical signs. In experimental infections, up to 50–75% of geese may die. Ducks are not thought to be highly susceptible to WNV; however, an outbreak among captive lesser scaup (<i>Aythya</i> <i>affinis</i>) ducklings resulted in 70% mortality. During other outbreaks, the morbidity and mortality rates were 100% in Impeyan pheasants, and the mortality rate was 25% in chukar partridges. Similarly to geese, young partridges and pheasants seem to be more susceptible to disease. In contrast, both young and old chickens and turkeys are infected asymptomatically.

Question 5b

Question 5b the disease has a significant impact on animal welfare, by causing suffering to large numbers of animals Interpretation: due to the suffering of large numbers of animals caused by the disease, the disease has a significant impact on animal welfare Answer Y N						
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet				
(b)(iii) impact of the	(b)(iii) 1 severity of	The incubation period for equine WN encephalitis following mosquito				
		The incubation period for equine the encephance foroming module				



· · · · · ·		
disease on animal welfare	clinical signs at case level and related level and duration of impairment	transmission is estimated to be 3–15 days. A fleeting viraemia of low virus titre precedes clinical onset (Bunning et al., 2002). WN viral encephalitis occurs in only a small per cent of infected horses; the majority of infected horses do not display clinical signs (Ostlund et al., 2000). The disease in horses is frequently characterised by mild to severe ataxia. Additionally, horses may exhibit weakness, muscle fasciculation and cranial nerve deficits (Cantile et al., 2000; Ostlund et al., 2000; Nook et al., 2001). Fever is an inconsistently recognised feature. Treatment is supportive and signs may resolve or progress to terminal recumbency. The mortality rate is approximately one in three clinically affected unvaccinated horses. Many species of birds can become infected with WNV; the clinical outcome of infection is variable. Some species appear resistant while others suffer fatal neurologic disease. Neurologic disease and death have been doccumented in domestic geese in Israel and Canada, and in many native and exotic zoo birds in the USA during the emergence of WNV (Steele et al., 2000). WND associated cases have been described in European wild birds (Bakonyi et al. 2006, Höfle et al. 2008, Jiménez-Clavero et al. 2008). In 2011 during the Sardinian WND outbreak neurological disease has been reported in 2 wild birds as Eurasian jays (<i>Garrulus glandarius</i>) with clinical signs characterised by drowsy, incapability of flying or walking properly, ruffle feathers, pectoral atrophy, and absence of the flight instinct. Lethargy, head tremors, drooping wings and inability to fly due to the flaccid paralysis of the wing muscles were described in an adult common buzzard. The legs were kept flexed and the bird was not able to stand up. The podal reflex was lost whereas both, the uppillary and corneal reflexes were still present. The animals died within 24 hours from the admission to a veterinary clinic. A little owl (<i>Athene noctua</i>), was bought to a rehabilitation centre showing ataxia, incoordination, reluctance or
		the animal died (Monaco et al., 2015).
(a)(ii) morbidity and	(a)(ii) 2 Case-morbidity	Refer to table a.ii. in the Table section
mortality rates of	rate (% clinically	
the disease in	diseased animals out of	
animal populations	infected ones)	

Question 5c

Question 5c the disease has a significant impact on the environment, due to the direct impact of the disease OR due to the measures taken to control it Interpretation: due to the direct impact of the disease OR to the impact of the measures taken to control it, the disease has a significant impact on the environment Answer: Y 🗋 N 🗆 na 🗆 Art. 7 criteria Assessment of the Art. 7 parameters from the fact-sheet Art. 7 parameters Endangered wild species affected (CITES and/or IUCN) (b)(iv) impact of (b)(iv) 1 (https://cites.org/sites/default/files/eng/app/2016/E-Appendices-2016-03the disease on endangered wild CITES biodiversity and species affected: 10.pdf) Phoenicopteridae spp. (App. II) the environment listed species as in CITES and/or Falco rusticolus (App.I) IUCN list Aquila adalberti (App.I) Falconiformes spp. (App II) (b)(iv) 2 Mortality WNV outbreaks have been reported among domesticated geese in the Eastern in wild species Hemisphere, but generally there have been only sporadic reports of deaths in



		individual wild birds. It is uncertain whether this is related to the virulence of the viruses circulating in this region, host susceptibility, reduced transmission/ amplification or lack of surveillance. One recently introduced lineage 2 virus in Central Europe has affected significant numbers of wild and captive raptors. Species known to be susceptible to this isolate include sparrow hawks (<i>Accipiter nisus</i>), goshawks (<i>Accipiter gentilis</i>) and gyrfalcons (<i>Falco rusticolus</i>). The same virus was isolated from a dead collared dove (<i>Streptopelia decaocto</i>) in Italy, during an outbreak of mortality in collared doves and other species including blackbirds. Different lineages of the WNV have also been found occasionally in other dead birds including European robins (<i>Erithacus rubecula</i>), a raven (<i>Corvus corax</i>), common magpies (<i>Pica pica</i>), a Eurasian jay (<i>Garrulus glandarius</i>), house sparrows (<i>Passer domesticus</i>), a black redstart (<i>Phoenicurus ochruros</i>), a sedge warbler (<i>Acrocephalus schoenobaenus</i>) and a Savi's warbler (<i>Locustella luscinioides</i>).
(e)(iv) the impact of disease prevention and control measures	(e)(iv) 2 Mortality in wild species	The main risk may be represented by the environmental residual of biocides which may interfere with ecology of wild species.

Question 5d

Question 5d The disease has a significant impact on the long term on biodiversity or the protection of endangered species or breeds, including the possible disappearance or long-term damage to those species or breeds									
Interpretation: the damage of endance	Interpretation: the consequences of the impact of the disease can even lead to the possible disappearance or long-term damage of endangered species or breeds Answer Y N N n a								
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7 parameters from the fact-sheet							
(b)(iv) impact of the disease on biodiversity and the environment	(b)(iv) 1 endangered wild species affected: listed species as in CITES and/or IUCN list	Endangered wild species affected (CITES and/or IUCN) CITES (https://cites.org/sites/default/files/eng/app/2016/E-Appendices-2016-03- 10.pdf) Phoenicopteridae spp. (App. II) <i>Falco rusticolus</i> (App.I) <i>Aquila adalberti</i> (App.I) Falconiformes spp. (App II)							
	(b)(iv) 2 Mortality in wild species	WNV outbreaks have been reported among domesticated geese in the Eastern Hemisphere, but generally there have been only sporadic reports of deaths in individual wild birds. It is uncertain whether this is related to the virulence of the viruses circulating in this region, host susceptibility, reduced transmission/ amplification or lack of surveillance. One recently introduced lineage 2 virus in Central Europe has affected significant numbers of wild and captive raptors. Species known to be susceptible to this isolate include sparrow hawks (<i>Accipiter nisus</i>), goshawks (<i>Accipiter gentilis</i>) and gyrfalcons (<i>Falco rusticolus</i>). The same virus was isolated from a dead collared dove (<i>Streptopelia decaocto</i>) in Italy, during an outbreak of mortality in collared doves and other species including blackbirds. Different lineages of the WNV have also been found occasionally in other dead birds including European robins (<i>Erithacus rubecula</i>), a raven (<i>Corvus corax</i>), common magpies (<i>Pica pica</i>), a Eurasian jay (<i>Garrulus glandarius</i>), house sparrows (<i>Passer domesticus</i>), a black redstart (<i>Phoenicurus ochruros</i>), a sedge warbler (<i>Acrocephalus scheenobaenus</i>) and a Savi's warbler (<i>Locustella luscinioides</i>).							
	(b)(iv) 3 Capacity of the pathogen to persist in the environment and cause mortality in wildlife	WNV is scarcely resistant in the environment thus its capability to survive during the vector-free period and, eventually, become endemic is still unknown. Different mechanisms have been claimed to explain WNV persistence. The duration of viremia in some bird species has been experimentally demonstrated (refer to the paragraph "a.i - animal species concerned by the disease") as well as the chronic infection in birds with the persistence of WNV RNA within the organs (spleen, kidney, and lung) of several species of birds. To what extent the virus circulates in the bloodstream is difficult to say and may be influenced by stressful events as migration or mating. Also vertical transmission by <i>Culex</i> mosquitoes has been experimentally demonstrated in <i>Cx. tarsalis</i> (Reisen et al., 2006) as well as the overwintering of WNV demonstrated in in <i>Cx. pipiens</i> mosquitoes collected during the 2000 outbreak in New York city (Nasci et al., 2001).							

Question D

Question D The risk posed by the disease in measures concerning movements of anima Answer Y arrow N arrow na blacktright na b	n question can be effectively and prop Is and products in order to prevent or	
Art. 7 criteria	Art. 7 parameters	Assessment of the Art. 7



		parameters from the fact- sheet
(d)(v) feasibility, availability and effectiveness of restrictions on the movement of animals and	(d)(v) 1 available restriction movement measures	No specific measures are mentioned in the EU legislation for
products, as control measure	(d)(v) 2 effectiveness of restriction of animal movement in preventing the	WNV outbreak control.
	between farm spread	
	(d)(v) 3 feasibility of restriction of animal movement	

Tables

Table a. i (1).: Summary outcomes of systematic review of experimental infections with WNV (papers published up to January 2016).

2016). Spec ies	Refs	Number of animal groups ^A	Agent detection ^B	Observati clinical sig		Clinical sings (and number of groups in which	
			Min day	Max day	Min day	Max day	were reported)
Cats	(Austgen et al., 2004)	3 (19 animals)	Virus isolation from blood: 1 (0.5-3)	Virus isolation from blood: 7 (4.5-8)	1	6	No clinical signs observed (2), fever (1), depression/apathy (1)
							0 dead animals
Dogs	(Austgen et al., 2004; Karaca et al., 2005)	2 (19 animals)	Virus isolation from blood: 1.3 (0.5-2)	Virus isolation from blood: 5.3 (4.5-6)	1	1	No clinical signs observed (1), fever (1)
							0 dead animals
Hors es	(Bunning et al., 2002; Castillo- Olivares et al., 2011; Shirafuji et al., 2009)	4 (17 animals)	Virus isolation from blood (3 groups): 3(1-4)	Virus isolation from blood (3 groups): 6 (6-7)	6.5 (3-8)	10 (9-11)	No clinical signs observed (1), twitching/tremors (1), neurological signs (2), fever (1)
			PCR from blood (1 group): 3	PCR from blood (1 group): 7			1 dead animal in 1 group
Pigs	(Teehee et al., 2005)	2 (12 animals)	Virus isolation from blood: 1.5 (1.5- 4.5)	Virus isolation from blood: 5 (4.5-5)	Not reported		No clinical signs observed (1), not reported (1)
							0 dead animals
Rabb its	(Suen et al., 2015)	2 (27 animals)	Not reported		1	Not reported	No clinical signs observed (1), fever (1)
							0 dead animals
Shee p	(Barnard and Voges, 1986)	1 (2 animals)	Virus isolation from blood: 3	Virus isolation from blood: 11	3	3	Fever

A—All data were analysed at animal group level, reflecting the animal groups followed and reported in the individual references. Some references reported more than one animal group.

C—Min= first day (in dpi) in which clinical signs were observed in each whole animal group reported; Max= last day (in dpi) in which clinical signs were observed in each whole animal group reported. Min and Max were recorded individually for each animal group, and median (min-max) for each of those values were calculated from all group data (each group representing one observation, with no weighting based on the size of the animal groups). Contact transmission groups were not included in the summary.

B—Min= first day (in dpi) that pathogen/RNA was detected in a sample for each reported animal group; Max= last day (in dpi) that virus/RNA was detected in a sample for each reported animal group. Min and Max were recorded individually for each animal group, and median (min-max) for each of those values were calculated from all group data (each group representing one observation, with no weighting based on the size of the animal groups). Contact transmission groups were not included in the summary.



Order	Family	Species	Strain	Mortal ity	Vir emi a	Distrib ution	References
Passerif ormes	Turdidae	American robin (<i>Turdus migratorius</i>)	N Y	<20%	H	AM	(Komar et al., 2003; VanDalen et al., 2013)
		Swainson's thrush (<i>Catharus ustulatus</i>)	NY	<20%	М	AM	(Owen et al., 2006)
		Clay-colored thrush (<i>Turdus grayi</i>)	TEC/TAB	20- 50%/< 20%	Μ	AM	(Guerrero-Sánchez et al., 2011)
	Corvidae	Carrion crow (<i>Corvus</i> <i>corone</i>)	FR/ISR	20- 50%/> 50%	L	EUR/ASI A	(Dridi et al., 2013)
		American crow (<i>Corvus</i> brachyrhynchos)	NY/TEX/MEX	>50%	Н	АМ	(McLean et al., 2001; Komar et al., 2003; Brault et al., 2004; Weingartl et al., 2004; Kinney et al., 2006; Kipp et al., 2006; Brault et al., 2007; Brault et al., 2011; Nemeth et al., 2011)
			KEN/KUN	20- 50%/< 20%	м		
		Fish crow (<i>Corvus</i> ossifragus)	NY	>50%	Н	AM	(Komar et al., 2003; Kipp et al., 2006; Nemeth et al., 2011)
		Little raven (<i>Corvus mellori</i>)	NY	<20%	М	OCE	(Bingham et al., 2010)
			KUN	<20%	L		
		Hooded crow (<i>Corvus</i> cornix)	EGY	>50%	Н	EUR/ASI A/AFR	(Work et al., 1955)
		Western scrub-jay (<i>Aphelocoma californica</i>)	NY	>50%	Н	AM	(Reisen et al., 2005)
		Blue jay (<i>Cyanocitta</i> cristata)	NY	>50%	Н	AM	(Komar et al., 2003; Weingartl et al., 2004)
		Black-billed magpie (<i>Pica hudsonia</i>)	NY	>50%	Н	AM	(Komar et al., 2003
		Jungle crow (<i>Corvus</i> macrorhynchos)	NY	>50%	Н	ASIA	(Shirafuji et al., 2008)
	Passerid ae	House sparrow (<i>Passer</i> domesticus)	NY/CA/KEN/EGY/ TAB/TEC/SP/IT09	>50%	н	WORLD WIDE	(Work et al., 1955; Komar et al., 2003; Komar et al., 2005; Langevin et al., 2005; Reisen et al., 2005; Reisen et al., 2006; Nemeth et al., 2008; LaPointe et al., 2009; Nemeth et al., 2009; Brault et al., 2011; Guerrero-Sánchez et al., 2011; Wheeler et al., 2012; Del Amo et al., 2014)
			TEX/KUN/IT08	<20%	М		
			MEX	<20%	L		
		Cape sparrow (<i>Passer</i> melanurus)	SA*	Und	L	AFR	(McIntosh et al., 1969)
	Icteridae	Red-winged blackbird (<i>Agelaius phoeniceus</i>)	NY	<20%	M/L	AM	(Komar et al., 2003; Reisen and Hahn, 2007; Nemeth et al., 2009b)
		Brown-headed cowbird (<i>Molothrus ater</i>)	NY	<20%	L	AM	(Reisen et al., 2006; Reisen and Hahn, 2007)
		Brewer's blackbird (<i>Euphagus</i> <i>cyanocephalus</i>)	NY	<20%	H	AM	(Reisen et al., 2006; Reisen and Hahn, 2007)

Table a.i. (2): Summary outcomes of experimental infections of West Nile virus performed in wild birds (adapted from Perez-Ramirez et al., 2014).



		Tricolored blackbird	NY	<20%	Н	AM	(Reisen and Hahn, 2007)
		(<i>Agelaius tricolor</i>) Common grackle	NY	20-	Н	AM	(Komar et al., 2003)
		(Quiscalus quiscula)		50% >50%/	Н	AM	
		Great-tailed grackle (<i>Quiscalus mexicanus</i>)	TAB/TEC	>50%/ 20- 50%	Н	АМ	(Guerrero-Sánchez et al., 2011)
		Bay-winged cowbird (Agelaioides badius)	ARG	<20%	L	AM	(Diaz et al., 2011)
		Shiny cowbird (<i>Molothrus bonariensis</i>)	ARG	<20%	L	AM	(Diaz et al., 2011)
	Emberizi dae	Song sparrow (<i>Melospiza melodia</i>)	NY	<20%	М	AM	(Reisen and Fang, 2007)
		White-crowned sparrow(<i>Zonotrichia</i> <i>leucophrys</i>)	NY	Und	na	AM	(Reisen et al., 2006)
	Fringillid ae	Hawai'i 'amakihi (<i>Hemignathus virens</i>)	NY	20- 50%	Н	AM	(LaPointe et al., 2009)
		House finch (<i>Haemorhous</i> <i>mexicanus</i>)	NY	>50%	Н	AM	(Komar et al., 2003; Reisen et al., 2005; Fang and Reisen, 2006; Reisen et al., 2006)
	Ploceida e	African masked weaver (<i>Ploceus velatus</i>)	SA*	Und	М	AFR	(McIntosh et al., 1969)
		Red-billed quelea (<i>Quelea quelea</i>)	SA*	Und	L	AFR	(McIntosh et al., 1969)
		Red bishop (<i>Euplectes</i> orix)	SA*	Und	М	AFR	(McIntosh et al., 1969)
	Hirundin idae	Cliff swallow (<i>Petrochelidon</i> <i>pyrrhonota</i>)	NY	<20%	М	AM	(Oesterle et al., 2009; Oesterle et al., 2010)
	Mimidae	Gray catbird (<i>Dumetella carolinensis</i>)	NY	<20%	М	AM	(Owen et al., 2006)
		Northern mockingbird (<i>Mimus polyglottos</i>)	NY	<20%	Н	AM	(Komar et al., 2005)
	Sturnida e	European starling (<i>Sturnus vulgaris</i>)	NY	<20%	М	WORLD WIDE	(Komar et al., 2003; Reisen et al., 2006)
	Cardinali dae	Northern cardinal (<i>Cardinalis cardinalis</i>)	NY	<20%	Н	AM	(Komar et al., 2005; Owen et al., 2012)
	Paridae	Tufted titmouse (<i>Baeolophus bicolor</i>)	NY	>50%	Н	AM	(Kilpatrick et al., 2013)
	Troglody tidae	Carolina wren (<i>Thryothorus Iudovicianus</i>)	NY	20- 50%	Н	AM	(Kilpatrick et al., 2013)
Falconif ormes	Falconid ae	Gyrfalcon (<i>Falco</i> <i>rusticolus</i>)	AUS*	20- 50%	Н	AM/EUR/ AS	(Ziegler et al., 2013)
			NY	20- 50%	М		
		Hybrid falcon (<i>Falco</i> rusticolus x Falco cherrug)	NY	<20%	L	WORLD WIDE	(Busquets et al., 2012)
		American kestrel (<i>Falco sparverius</i>)	NY	<20%	Н	AM	(Komar et al., 2003; Nemeth et al., 2006a)
		Common kestrel (<i>Falco tinnunculus</i>)	EGY	<20%	L	EUR/AS/ AFR	(Work et al., 1955)
Accipitri formes	Accipitri dae	Red-tailed hawk (<i>Buteo jamaicensis</i>)	NY	<20%	Н	AM	(Nemeth et al., 2006a)
Strigifor mes	Tytonida e	Barn owl (<i>Tyto alba</i>)	NY	<20%	L	WORLD WIDE	(Nemeth et al., 2006a)
	Strigidae	Great horned owl (<i>Bubo virginianu</i> s)	NY	<20%	Н	AM	(Komar et al., 2003; Nemeth et al., 2006a)
		Eastern screech-owl (<i>Megascops asio</i>)	NY	>50%	Н	AM	(Nemeth et al., 2006a)
Gallifor mes	Odontop horidae	California quail (<i>Callipepla californica</i>)	NY	<20%	L	AM	(Reisen et al., 2005; Reisen et al., 2006)



		Gambel's quail (Callipepla gambelii)	NY	<20%	L	AM	(Reisen et al., 2006)
		Northern bobwhite (<i>Colinus virginianus</i>)	NY	<20%	L	AM	(Komar et al., 2003)
	Phasiani dae	Red-legged partridge (Alectoris rufa)	SP/MO	20- 50%/> 50%	Н	EUR	(Sotelo et al., 2011b)
			NY	>50%	L		(Escribano-Romero et al., 2013)
		Japanese quail (<i>Coturnix japonica</i>)	NY	<20%	L	WORLD WIDE	(Komar et al., 2003)
		Ring-necked pheasant (<i>Phasianus colchicus</i>)	NY	<20%	L	WORLD WIDE	(Komar et al., 2003)
		Greater sage-grouse (<i>Centrocercus</i> <i>urophasianus</i>)	NY	>50%	М	АМ	(Clark et al., 2006)
Pelecan iformes	Ardeidae	Rufous night-heron (<i>Nycticorax caledonicus</i>)	KUN	<20%	L	OCE	(Boyle et al., 1983b; Boyle et al., 1983a)
		Little egret (<i>Egretta garzetta</i>)	KUN	<20%	L	EUR/AS/ AFR/OC E	(Boyle et al., 1983a; Boyle et al., 1983b)
		Intermediate heron (<i>Mesophoyx intermedia</i>)	KUN	<20%	L	AFR/AS	(Boyle et al., 1983a; Boyle et al., 1983b)
		Cattle egret (<i>Bubulcus ibis</i>)	SA*/EGY	Und/<2 0%	L	WORLD WIDE	(Work et al., 1955; McIntosh et al., 1969)
	Threskio rnithidae	African sacred ibis (<i>Threskiornis</i> <i>aethiopicus</i>)	SA*	Und	L	AFR/AS	(McIntosh et al., 1969)
Columbi formes	Columbi dae	Rock pigeon (<i>Columba livia</i>)	SA*/NY/TEC/TAB	Und/<2 0%	L	WORLD WIDE	(McIntosh et al., 1969; Guerrero- Sánchez et al., 2011)
		Ring-necked dove (<i>Streptopelia capicola</i>)	SA*	Und	L	AFR	(McIntosh et al., 1969)
		Eurasian collared-dove (<i>Streptopelia decaocto</i>)	NY/CO	<20%/ <20%	М	AM/EUR/ AS/AFR	(Panella et al., 2013)
		Laughing dove (<i>Spilopelia senegalensis</i>)	SA*/EGY	Und/<2 0%	L	AFR/AS	(Work et al., 1955; McIntosh et al., 1969)
		Common ground-dove (<i>Columbina passerina</i>)	NY	Und	na	AM	(Reisen et al., 2006; Reisen et al., 2008)
		Mourning dove (<i>Zenaida macroura</i>)	NY	<20%	М	AM	(Komar et al., 2003; Reisen et al., 2005; Reisen et al., 2006)
		Picui ground-dove (<i>Columbina picui</i>)	ARG	<20%	М	AM	(Diaz et al., 2011)
Gruifor mes	Rallidae	American coot (<i>Fulica</i> americana)	NY	<20%	L	AM	(Komar et al., 2003)
		Crested coot (<i>Fulica</i> cristata)	SA*	Und	L	AFR/EUR	(McIntosh et al, 1969)
A	Gruidae	Sandhill crane (<i>Grus</i> <i>canadensis</i>)	NY	<20%	L	AM	(Olsen et al., 2009)
Anserif ormes	Anatidae	Common goose (Anser anser)	SA*	>50%	M	WORLD WIDE	(Banet-Noach et al., 2003)
		Canada goose (<i>Branta</i> <i>canadensis</i>)	NY	<20%	M	AM/EUR	(Komar et al., 2003)
		Mallard (<i>Anas</i> platyrhynchos)	NY SA*	<20%	Н	WORLD WIDE	(Komar et al., 2003)
		Yellow-billed duck(<i>Anas</i> undulata) Red-billed teal (<i>Anas</i>	SA*	Und Und	L	AFR AFR	(McIntosh et al, 1969) (McIntosh et al, 1969)
		<i>erythrorhyncha</i>) Southern pochard (<i>Netta</i>	SA*	Und	L	AFR	(McIntosh et al, 1969) (McIntosh et al, 1969)
	1	erythrophthalma)				AIN	(Komar et al., 2003)
Charadr	Charadri	Killdeer (Charadrius	NY	<20%	н	AI	(KOMALEIAL 2003)
Charadr iiformes	Charadri idae Laridae	Killdeer (<i>Charadrius</i> <i>vociferus</i>) Ring-billed gull (<i>Larus</i>	NY	<20%	H H	AM	(Komar et al., 2003) (Komar et al., 2003)



ormes	ае	(Myiopsitta monachus)					
		Budgerigar (<i>Melopsittacus undulatus</i>)	NY	<20%	L	OCE	(Komar et al., 2003)
Piciform es	Picidae	Northern flicker (<i>Colaptes auratus</i>)	NY	<20%	М	AM	(Komar et al., 2003)

CA: California 04; NY: New York 99; CO: Colorado 08; SA: South Africa; ARG: Argentina 06; EGY: Egypt; KUN: Kunjin; SP: Spain 07; MO: Morocco 03; AUS: Austria 09; MEX: Mexico 03; TEX: Texas 03; KEN: Kenya 3829; FR: France 00; ISR: Israel 98; TEC: Tecato (Mexico); TAB: Tabasco (Mexico); IT08: Italy 08; IT09: Italy 09. * Lineage 2.

Mortality:

L: Low viremia (mean peak viremia \leq 104 PFU/mL); **M**: Medium viremia (mean peak viremia 104-106 PFU/mL); **H**: High viremia (mean peak viremia > 106 PFU/mL); **n**: Data not available.

AFR: Africa; AM: America; AS: Asia; EUR: Europe; OCE: Oceania.

Und: Undetermined

Family	Reservoir	Sentinel	Notes
Turdidae	ND	Y	Intense viremia and clinical signs developed by infected birds
Corvidae	Potential	Y	Intense viremia and clinical signs developed by the infected birds with high mortality
Passeridae	Y	Y	Intense and long viremia and clinical signs developed by infected birds
Anatidae	-	Y	Intense viremia and clinical signs developed by infected birds
Columbidae	Y	-	Common ground-dove (Columbina passerina): WNV detection in spleen and kidney and lung at >6 weeks p.i
Frigillidae	Y	-	Persistant infection in house finches (Haemorhous mexicanus) House finches
Falconidae	-	Y	Intense viremia and clinical signs developed by infected birds
Phasianidae	-	Y	Viremia short and scarce, asymptomatic infection, detectable serological response
Laridae	-	Y	Intense viremia and clinical signs developed by infected birds
Strigidae		Y	Intense viremia and clinical signs developed by infected birds
Equidae	-	Y	Viremia short and scarce, development of clinical symptoms, detectable serological response
Canidae	-	Potential	Viremia short and scarce, rare development of clinical symptoms, detectable serological response . Potential use as sentinel in hurban areas
Felidae		Potential	Viremia short and scarce, rare development of clinical symptoms, detectable serological response . Potential use as sentinel in hurban areas
Cricetidae	Potential	-	Persistant infection and viral shedding

Table a.i 5-6: List of wild and domestic WNV reservoir/sentinel animal species Family Peservoir Sentinel Notes

Table a.ii: WNV morbidity and mortality rate in horses (2010-2016 EU outbreaks)

				Equid	s in outbrea	aks				
Country	Ye ar	N. outbrea ks	N. outbr eaks with clinica I sympt oms	N. hors es pres ent	N. total cases	N. horse s with sympt oms	Died/C ulled	Preval ence of total cases	Preval ence of clinica I cases	Leth ality
Italy	200 8	273	18	1941	563	32	5	29.01 %	1.65%	0.89 %
	200 9	137	32	1398	223	37	9	15.95 %	2.65%	24.32 %
	201 0	67	11	415	128	11	5	30.84 %	2.65%	45.45 %
	201 1	91	41	881	197	58	14	22.36 %	6.58%	24.14 %
	201 2	30	13	313	63	15	3	20.13 %	23.81 %	20.00 %



	201 3	35	11	308	50	12	1	16.23 %	24.00 %	8.33 %
	201 4	17	6	257	27	6	2	10.51 %	22.22 %	33.33 %
	201 5	26	6	302	30	6	5	9.93%	20.00 %	16.67 %
	201 6*	33	13	310	37	13	4	7.25%	35.14 %	10.81 %
Portugal	201 6	1	1	2	1	1	0	50%	50%	0%
	201 5	3	3	82	4	4	0	4.88%	4.88%	0%
	201 0	2	2	71	2	2	1	2.82%	2.82%	1%
Spain	201 1	5	Unkno wn	44	11	Unkno wn	1	25.00 %	Unkno wn	9%
	201 0	31	2	845	39	2	2	4.62%	0.24%	5%
France	201 5	35	26	262	49	34	5	18.70 %	12.98 %	0- 5,26 %
	200 6	4	1	63	4	1	1	6.35%	1.59%	25%
Croatia	201 4	1	0	2	1	0	0	50.00 %	0%	0%
	201 2	11	0	87	12	0	0	13.79 %	0%	0%
Greece	201 4	4	0	51	4	0	0	7.84%	0%	0%
	201 3	10	2	559	15	2	1	2.68%	0%	7%
	201 2	14	3	100	15	3	0	15.00 %	3.00%	0%
	201 1	17	0	374	23	0	1**	6.15%	0%	0%
	201 0	27	3	559	30	3	3	5.37%	1%	10%
Romania	201 0	3	Unkno wn	9	6	Unkno wn	0	66.67 %	Unkno wn	Unkn own
Former Yugoslav Republic of Macedonia	201 1	4	0	51	10	0	0	19.61 %	0%	0%
Bulgaria	201 0	2	0	118	8	0	0	6.78%	0%	0%

Source: Italian National information system; (OIE, online)

*2016 Italian data: updated to 14th October 2016

** death may have been the result of conditions other than West Nile virus infection (possible snake bite reported)

Table a.v.4.: Detailed outcomes of systematic review on survival time of WNV in different matrixes at different temperatures.

Matrix	Target	Species	Test	Temperature	Maximum detection
Mosquito	Nucleic acid	na	RT-PCR	4°, 20°, 70°C	14 days
Mosquito	virus	na	Culture	4°, 20°, 70°C	2 days

Table ii 2: Number of cases (confirmed and probable) of West Nile Disease in Europe and in Mediterranean Basin (updated to 2nd December 2016)

COUNTRY	YEAR	SPECIES	No. TOTAL CASES ¹	No. CONFIRMED CASES ²	SOURCE
Albania	2011	Human	2		(ECDC, online)
Algeria	2012	Human	1	1	(ECDC, online)
Austria	2016	Human	2	2	(ECDC, online)
	2015	Human	3	3	



	2014	Human	1	1	
Bosnia and Herzegovina	2014	Human	13	0	(ECDC, online)
	2013	Human	3	3	
Bulgaria	2016	Human	1	1	(ECDC, online)
	2015	Human	2	0	
Croatia	2016	Human	1	0	(ECDC, online)
	2013	Human	16	1	(ECDC, online)
	2012	Human	5	3	(ECDC, online)
	2013	Horses	-	12	(OIE, online)
Cyprus	2016	Human	1	1	(ECDC, online)
Egypt	2016	Human	1	1	(ECDC, online)
France	2015	Human	1	1	(ECDC, online)
Former Yugoslav Republic of	2013	Human	1		(ECDC, online)
Macedonia	2012	Human	6	1	
Greece	2014	Human	15	13	(HCDCP, online)
	2014	Horses	4	4	(OIE, online)
	2013	Human	86	58	(HCDCP, online)
	2013	Horses	-	15	(OIE, online)
	2012	Human	161	47	(HCDCP, online)
	2012	Horses	-	15	(OIE, online)
	2011	Human	101	-	(HCDCP, online)
	2011	Horses	23	-	(OIE, online)
	2010	Human	261	-	(HCDCP, online)
	2010	Horses	30	-	(OIE, online)
Hungary	2016	Human	39	16	(ECDC, online)
	2015	Human	18	13	(ECDC, online)
	2014	Human	11	3	(ECDC, online)
	2013	Human	31	6	(ECDC, online)
	2012	Human	12	7	(ECDC, online)
	2011	Human	3	-	(ECDC, online)
	2010	Human	3	-	(ECDC, online)
Israel	2016	Human	80	47	(ECDC, online)
	2015	Human	123	89	
	2014	Human	17	7	
	2013	Human	63	28	
	2012	Human	59	31	
	2011	Human	39	-	
Italy	2016	Human	71	71	(ISS, online)
	2016	Horses	51	51	(IZSAM, online)
	2015	Human	61	61	(ISS, online)
	2015	Horses	30	30	(IZSAM, online)
	2014	Human	24	24	(ISS, online)
	2014	Horses	27	27	(IZSAM, online)



	2013	Human	70	70	(ISS, online)
	2013	Horses	-	50	(IZSAM, online)
	2012	Human	50	39	(ISS, online)
	2012	Horses	-	63	(IZSAM, online)
	2011	Human	-	15	(ISS, online)
	2011	Horses	197	-	(IZSAM, online)
Kosovo	2012	Human	4	0	(ECDC, online)
Former Yugoslav Republic of	2011	Human	4	-	(ECDC, online)
Macedonia	2011	Horses	10	-	(OIE, online)
Montenegro	2013	Human	4	-	(ECDC, online)
	2012	Human	1	1	
Morocco	2010	Horses	25	-	(OIE, online)
Palestine	2014	Human	1	1	(ECDC, online)
	2012	Human	2	1	
Portugal	2016	Horses	1	1	(OIE, online)
	2015	Human	1	1	(ECDC, online)
	2015	Horses	4	4	(OIE, online)
Romania	2016	Human	93	80	(ECDC, online)
	2015	Human	18	18	(ECDC, online)
	2014	Human	23	22	(ECDC, online)
	2013	Human	24	22	(ECDC, online)
	2012	Human	14	13	(ECDC, online)
	2011	Human	11	-	(ECDC, online)
	2010	Human	52	-	(Sirbu et al., 2011)
	2010	Horses	6	-	(OIE, online)
Russian Federation	2016	Human	135	135	(ECDC, online)
	2015	Human	39	39	(ECDC, online)
	2014	Human	29	-	(ECDC, online)
	2013	Human	177	-	(ECDC, online)
	2012	Human	447	-	(ECDC, online)
	2011	Human	153	-	(ECDC, online)
	2010	Human	480	-	(Promed, online)
Serbia	2016	Human	41	41	(ECDC, online)
	2015	Human	28	28	
	2014	Human	76	56	
	2013	Human	302	200	
	2012	Human	70	41	
Spain	2016	Human	3	3	(Andalucia Ministry of Agriculture, online)
	2016	Horses	70	70	
	2015	Horses	18	18]
	2013	Horses	40	-]
	2011	Horses	12	-	
Syrian Arab Republic	2016	Human	2	1	(ECDC, online)



Tunisia	2016	Human	1	1	(ECDC, online)
	2015	Horses	1	1	(OIE, online)
	2013	Human	6	6	(ECDC, online)
	2012	Human	63	33	(ECDC, online)
	2011	Human	3	-	(ECDC, online)
Turkey	2014	Horses	1	1	(OIE, online)
	2011	Human	3	-	(ECDC, online)
	2010	Human	7	-	(ECDC, online)
Ukraine	2016	Human	1	0	(ECDC, online)
	2013	Human	1	-	
	2012	Human	12	-	
	2011	Human	8	-	

1. For EU countries, probable and confirmed cases, as per EU case definition

2. For EU countries, confirmed cases as per EU case definition http://ec.europa.eu/health/ph_threats/com/docs/1589_2008_en.pdf

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	2016) and	their effica	cy as emerg	ed from	n a systema	tic review	(updated to J	anuary 2016)				
	Table d.ii	.1: Vaccine	s authorized	l for cor	nmercializa	tion in the	EU by the Eu	ropean Medicine	s Agency	/ (updated i	n October	

					1		anuary 2016)			
Comme rcial name of vaccine	Type of vaccin e	Way admin	Dos es	Specie s for which author ized	Countr ies in which author ized	Manufac turer	Efficacy	Field protectio n	yearly availa bility/p roducti on capaci ty	Ref.
Proteq West Nile	West Nile recombi nant canaryp ox virus, vCP201 7 virus	Intramu scular		Horses	All EU	Merial	NA	NA	NA	
Equilis West Nile	inactiva ted chimaer ic flaviviru s strain YF-WN	Intramu scular		Horses	All EU	Intervet Internatio nal BV	NA	NA	NA	
Equip WNV (previo usly Duvaxy n WNV)	inactiva ted West Nile virus, strain VM-2	Intramu scular	2 dos es (21 day s apa rt)	Horses	All EU	Zoetis Belgium SA	Viruses could be isolated from 8 out of 10 non-vaccinated animals up to 14 days after challenge, but only 1 vaccinated animals. Sixty percent of the controls had to be euthanized after challenge compared to none of the vaccinates. From 10 non-vaccinated animals, all presented, up to 21 days after challenge, pyrexia, head tremors or muscle fasciculations, and anxiety, and 9 showed mild paresis. In controls these	Experim ental trial	NA	(Bowen et al., 2014)



				numbers were 2.2.6		
				numbers were 2,2,6 and 2, respectively		
				and 2, respectively		

NA: data not available

Table a.vi.1-2: Experimental data on WNV transmission in wild birds

Direct *	* ** tal al		Species	Notes	Reference			
С	Y	Y	NT	American crow (<i>Corvus</i> brachyrhynchos)		(Komar et al., 2003)		
С	Y	Y	NT	Blue jay (<i>Cyanocitta cristata</i>)		(Komar et al., 2003)		
С	Y	Y	NT	Black-billed magpie (<i>Pica hudsoni</i> a)		(Komar et al., 2003)		
С	Y	Y	NT	Ring- billed gull (<i>Larus</i> delawarensis)		(Komar et al., 2003)		
С	Y	Y	N	Chicken (<i>Gallus gallus domesticus</i>)	only 1 animal in 16 in contact hens	(Langevin et al., 2001)		
С	NT	Y	N	Domestic Geese (Anser anser domesticus)		(Swayne et al., 2001)		
С	NT		NT	Common goose (Anser anser domesticus)		(Banet-Noach et al., 2003)		
С	NT	Y	NT	Red-legged partridge (<i>Alectoris rufa</i>)		(Sotelo et al., 2011b)		
NT	Y	NT	NT	Canada Goose (<i>Branta</i> canadensis)		(Komar et al., 2003)		
Ν	Y	N	NT	Mallard (Anas platyrhynchos)		(Komar et al., 2003)		
0	Y	Y	NT	American Kestrel (<i>Falco sparverius</i>)		(Komar et al., 2003) (C); (Nemeth et al., 2006a) (O)		
N	Y	N	NT	Northern Bobwhite (<i>Colinus virginianus</i>)		(Komar et al., 2003)		
Ν	Y	N	NT	Japanese Quail (<i>Coturnix japonicus</i>)		(Komar et al., 2003)		
NT	Y	NT	NT	Ring-necked Pheasant (<i>Phasianus colchicus</i>)		(Komar et al., 2003)		
Ν	Y	N	NT	American Coot (<i>Fulica</i> americana)		(Komar et al., 2003)		
NT	Y	NT	NT	Killdeer (Charadrius vociferus)		(Komar et al., 2003)		
Ν	Y	N	NT	Mourning Dove (<i>Zenaida macroura</i>)		(Komar et al., 2003)		
Ν	Y	N	NT	Rock Dove (Columba livia)		(Komar et al., 2003)		
N	Y	N	NT	Monk Parakeet (<i>Myiopsitta monachus</i>)		(Komar et al., 2003)		
Ν	Y	N	NT	Budgerigar (<i>Melopsittacus</i> undulatus)		(Komar et al., 2003)		
0	Y	Y	NT	Great Horned Owl (<i>Bubo virginianus</i>)		(Komar et al., 2003) (C); (Nemeth et al., 2006a) (O)		
NT	Y	NT	NT	Northern Flicker (<i>Colaptes auratus</i>)		(Komar et al., 2003)		



Ν	Y	Ν	NT	Fish Crow (<i>Corvus ossifragus</i>) (Komar et al., 2	
Ν	Y	Ν	NT	American Robin (<i>Turdus</i> <i>migratorius</i>)	(Komar et al., 2003)
N	Y	N	NT	European Starling (<i>Sturnus</i> vulgaris)	(Komar et al., 2003)
NT	Y	NT	NT	Red-winged Blackbird (<i>Agelaius</i> phoeniceus)	(Komar et al., 2003)
Ν	Y	N	NT	Common Grackle (<i>Quiscalus quiscula</i>)	(Komar et al., 2003)
Ν	Y	N	NT	House Finch (<i>Carpodacus mexicanus</i>)	(Komar et al., 2003)
Ν	Y	N	NT	House Sparrow (<i>Passer</i> domesticus)	(Komar et al., 2003)
N	NT	N	NT	Red-tailed hawk (<i>Buteo jamaicensis</i>)	(Nemeth et al., 2006a)
N	NT	N	NT	Song sparrow (<i>Melopiza</i> melodia)	(Reisen and Fang, 2007)
0	NT	Y	NT	Eastern Screech Owls (<i>Megascops asio</i>)	(Nemeth et al., 2006b)

C: Contact transmission

O: oral transmission

N: no evidence of direct transmission

NT: not tested

** Mosquitoes-exposed

Table d.i.1: Test methods available for the diagnosis of WNV and their purpose.

Test	Target	Se	Sp	Matrix	Reference	Notes
NS1-antigen protein microarray	Antibodie s	95%	100%	Serum	(Cleton et al., in press)	differential diagnosis of flavivirus infections in horses
Real-time RT- PCR	Antigen	from 1,5 to 15 copies per reaction	100%	viral strains, human samples (cerebrospinal fluid, biopsies, serum and plasma) and mosquito pools	(Vázquez et al., 2016)	specificity evaluated using viral RNA from a panel of different flaviviruses and other encephalitic viruses belonging to several viral families
Real-time RT- PCR	Antigen	80 genome copies	100%	Viral strains Lineages 1 and 2	(Faggioni G, 2014)	specificity evaluated using TBE, Usutu, Dengue 1, Dengue 4, YF, JEV
SYBR Green I- based real-time RT-PCR	Antigen	20 copies	100%	Human serum/plasma	(Kumar et al., 2014)	specificity evaluated using DEN-1-4, JEV, YFV, SLEV
Antigen capture ELISA	Antigen	90%	98%	Human serum	(Saxena et al., 2013)	detection of NS1 antigen
Real-time RT- PCR	Antigen	10 copies	100%	Viral strains	(Barros et al., 2013)	detection and differentiation between WNV and JEV; specificity evaluated using DEN-1-4, JEV, YFV, ZIKAV, Ntaya, TBEV, USUV, Toscana, CHIKV
Real-time RT- PCR	Antigen	1.26 TCID50/ml for WNV-L1, 6.3 TCID50/ml for WNV-L2	100%	Tissue, feathers, oropharyngeal and cloacal swabs and blood from wild birds, samples from mice	(Del Amo et al., 2013)	detection and differentiation between WNV and USUV; specificity evaluated using SLEV, MVEV, JEV,



				infected experimentally		BAGV, DEN-1, TBEV, VEEV, VSV, AIV, EIV, NDV, AHS4
Competitive ELISA	Antibodie s	100%	wild birds: 79.5% compared to VNT	Sera from mammals and wild birds	(Sotelo et al., 2011a)	
			horses: 96.5% compared to VNT			
			South african mammals: 79.5% compared to HAI			
			giraffas: 67% compared to HAI			
IgM capture ELISA	Antibodie s	91.7%	99.2%	horse sera	(Long et al., 2006)	
Real-time RT- PCR	Antigen	2–4 genome copies of WNV	100%	Viral strains	(Eiden et al., 2010)	In OIE manual. For simultaneous detection and differentiation of WNV Lineage 1 and Lineage 2. Specificity evaluated using TBEV, YFV, JEV
Nested RT-PCR	Antigen	10-8.0/100 µL	ND	Equine brain, blood, and cerebrospinal fluid; avian brain tissues	(Johnson et al., 2001)	In OIE manual
Real-time RT- PCR	Antigen	0.1 PFU	100%	human serum, CSF, brain tissue, mosquito pools, and avian tissues	(Lanciotti et al., 2000)	In OIE manual. Specificity evaluated using DEN-2, JEV, YFV, SLEV, Lacrosse virus, Powassan virus, MVE, WEEV, EEEV

Table e.iv.1.: Biocidal products targeting <u>mosquito control (genus Culex)</u>, for which reports were found in a systematic review of available treatments against the vectors of vector borne infections (papers published up to January 2016).

Active substance	Ref	Intended use (route investigated in the study)	Study findings
Studies not targeti	ng any particular hos		•
deltamethrin	(Marcombe et al., 2011)	Fogging	Efficacy was assessed by monitoring mortality rates of naturally resistant and laboratory susceptible mosquitoes placed
		vehicle-mounted thermal foggers (1g/Ha)	in sentinel cages. Results showed high mortality rates of susceptible sentinel mosquitoes (64%) while resistant mosquitoes exhibited very low mortality (10%)
Studies focused on	vector control in hou	ising/ environment	
deltamethrin	(Akogbeto et al., 2010)	Indoor spraying	Deterrence rate[1]: Anopheles gambiae (31.25%, 24.75%, 30 and 60 dpt; Culex sp. and Mansonia sp. 30 dpt 46.15%).
		Huts were treated with insecticides. The absorption of the walls was 112 ml of insecticide per m^2 and that of the ceiling (polyethylene), the entry slits, and the door (painted metal) was in total 53.13 ml/m ² .	Exophily rate[2]: Anopheles gambiae (45.4%, 26.3%, 30 and 60 dpt; Culex sp. and Mansonia sp. 30 dpt 33.3%).



			Blood-feeding rate[3]: Anopheles gambiae (18.2%, 23.7%, 30 and 60 dpt; Culex sp. and Mansonia sp. 30 dpt, 14.3%).
			Immediate mortality[4]:
			Anopheles gambiae (32.7%,
			15.8%,30 and 60 dpt; Culex sp.
			and Mansonia sp. 30 dpt, 8.5%).
			Overall mortality[5]: Anopheles gambiae (72.7%, 31.6%, 30 and 60 dpt; Culex sp.
deltamethrin	(Badolo et al., 2014)	Treated mosquito nets	and Mansonia sp. 30 dpt, 21%). Mortality of mosquitoes was 90.5 (86- 94)% in unwashed nets (3 min exposure,
		Concentration of 55mg/m ²	24h-mortality), and remained above 90% after 5 washes. Average mortality after 10, 15 and 20 washes were 81 (75-86)%, 68.7 (63-75)% and 66.3 (60-72)%, respectively.
deltamethrin	(Dabire et al., 2006)	Treated mosquito nets	Mosquito entrance rate was 10-fold higher in control houses than in houses
		Concentrations of 25 mg/m ² and 2% w/w	with Long Lasting Impregnated Nets (LLINs) and there was no difference between the 2 tested net types. Among mosquitoes found in the houses, 36% were dead in LLIN houses compared to 0% in control houses. Blood feeding rate was 80% in control houses compared to 43% in LLIN houses. The type of net did not significantly impact any of these parameters.
deltamethrin	(Darriet et al., 2000)	Treated mosquito nets	The 24h mortality was 56% for <i>An</i>
		Concentration of 25 mg/m ²	<i>gambiae ss</i> females, and 45% for <i>Culex</i> <i>spp</i> females (compared to 4 and 6% in controls)
deltamethrin	(Moosa-Kazemi et al., 2007)	Treated mosquito nets	Recorded 24h-mortality was 100% even after 9 months.
deltamethrin	(Muller et al., 2002)	Concentrations of 25 mg/m ² Treated mosquito nets	Mortality of mosquitoes was 97% in
deitametiinii		Concentrations from 55 mg/m ²	washed nets, and reduced to 84%, 54% and 7% after 6, 12 and 18 months (with
		(unwashed) to 1.6 mg/m ² (18 months old and washed 3 times)	respective average of times washed of 1.1, 1.9 and 3)
deltamethrin	(Van Roey et al., 2014)	Treated mosquito nets	A positive control (commercial product PermaNet® 2.0, 55 mg a.i./m ²) was able
		Concentrations of 55 and 68 mg/m ²	to kill over 90% of mosquitoes (3 min exposure, 24h-mortality) for up to 30 months, while the observed mortality with the experimental product (Netprotect®, 68 mg a.i./m ²) was 85.7% after 12 months, and remained below 90%.
diflubenzuron	(Cetin et al., 2006)	Septic tank water treatment	Recorded adult inhibition for <i>Culex pipiens</i> was always 100% in the first 2 weeks, for all concentrations tested and remained at
		0.01, 0.02, and 0.03 mg (AI)/liter, using a 25% wettable powder or a 4% granular formulation in wastewater tank	all concentrations tested, and remained at 100% for up to 4 weeks with 30g/L, and 2 weeks with 10g/L.
lambda- cyhalothrin	(Okumu et al., 2012)	Indoor spraying	Mortality (24h mortality of <i>Anopheles arabiensis</i>) was 90% after 30 days but
		0.03 g/m ² sprayed on mud walls	reduced to 35% after 60 days.
lambda-	(Trout et al., 2007)	Outdoors Spraying	The reduction in Aedes albopictus in sites
cyhalothrin		Mist (concentration of 62.52ml/L) directly applied to vegetation in the backyard of houses, and other resting sites.	was of 89.5% compared to controls, and in laboratory bioassays exposing mosquitoes to treated leaves, mortality varies from 80% after 2 weeks, to 35% after 8 weeks. In contrast, <i>Culex spp.</i> was not reduced.



permethrin	(Rozendaal et al., 1989)	Treated mosquito nets Concentrations of 125-1000 mg/m ²	Cotton cloth impregnated with permethrin at a rate of 0.5 g/m ² killed all <i>An. darlingi</i> females exposed for 2 min, but after the material had been washed twice in soapy water the bioassay mortality fell to only 21.4%. Bioassays with <i>Culex</i> <i>quinquefasciatus Say</i> females showed that sprayed nets were less effective than nets impregnated by soaking (at equivalent dosages of 0.16-1.34 g/m ²)
permethrin Studies focused on	(Soleimani-Ahmadi et al., 2012) humans as the host si	Treated mosquito nets The nets were blended with 1000 mg a.i/m2 (2%, w/w), and final concentrations varied from 814 to 937 mg/m ² pecies (personal protection)	Mortality of mosquitoes was 100% in the first 90 days, 92.4% (88-97) after 5 months, and reduced to 81.6% (75-88) after 9 months, and 72.3% (65-79) after 12 months.
DEET	(Soonwera and Phasornkusolsill, 2015)	External use - topic/spray DEET 20% (w/w), 0.1mL applied on a 3 cm × 10 cm area on the ventral portion of the forearm	DEET was used as control when evaluating other (non-ECHA approved) substances. The formulation gave protection for up to 182 min, and 98.5% protection from bites of Aedes aegypti and <i>Culex quinquefasciatus</i>
DEET	(Gupta et al., 1987)	Treated clothes and topic applications of repellent, in different concentrations and combinations	The field trials were arranged in a four- way factorial design which compared fabric types, permethrin treatment and repellent treatments over a 14-hour test period. The repellent formulations and the permethrin-treated clothing used as one system provided better protection (81% mortality) than the repellent formulations or permethrin-treated clothing used separately.
DEET+permethrin	(Mani et al., 1991)	External use - soap containing 20% deet and 5% permethrin	Percentage repellency (reduction in biting rates) was 96% for <i>Culex vishnui</i> , 89.6% for Culex tritaeniorhynchus and 94.8% for <i>Culex pseudouishnui</i>
metofluthrin	(Dame et al., 2014)	"Clip-on" spatial repellent device 31.20%	Efficacy in reduction of <i>Anopheles</i> <i>quadrimaculatus</i> , in 2 study years, compared to control, were 16% and 8%); 19% and 8% for <i>Psorophora columbiae</i> and 69% for <i>Culex erraticus</i> . Total mosquito reduction was 13%.
Metofluthrin	(Revay et al., 2013)	External use Clip-On Metofluthrin (31.2%)	Biting on the arms of volunteers was reduced by 96.28% for <i>Ae. albopictus</i> , and by 94.94% for <i>Cx. pipiens</i> .

[1] percentage of reduction in the number of mosquitoes caught in treated hut relative to the number caught in the control hut [2] percentage of mosquitoes that have escaped the hut and have taken refuge in the veranda trap divided by the total number of mosquitoes collected in the hut

[3] percentage of blood fed mosquitoes collected divided by the total of mosquitoes collected in verandah and hut [4] percentage of dead mosquitoes collected in the morning compared to total mosquitoes collected in the hut [5] immediate mortality plus delayed mortality recorded after 24 h.



Figures

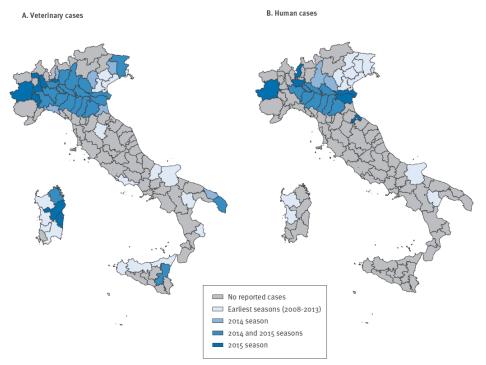


Figure 1: Geographical distribution of West Nile neuroinvasive disease in horses (panel A) and humans (panel B), Italy 2008–2015 (Rizzo et al., 2016) (http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=22580)

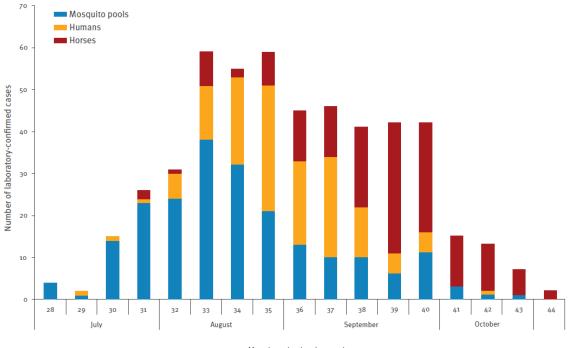




Figure 2: West Nile virus detections in the veterinary and human surveillance by month, Italy, 2008–2015 (Rizzo et al., 2016) (http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=22580)



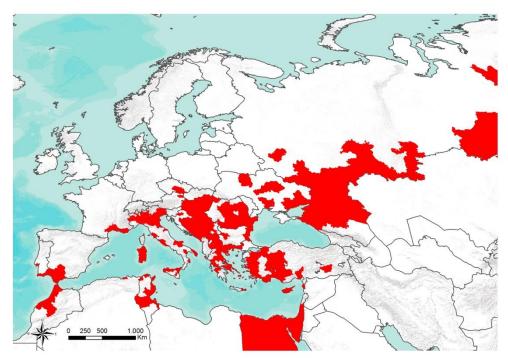


Figure 3: Geographic distribution of cases (confirmed and probable) of West Nile Disease in humans and animals (horses, wild birds, sentinel chickens, vectors) in Europe and in Mediterranean Basin (2008-2016) (source Arbozoonet: https://arbozoonet.izs.it/arbozoonet).