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International Single Species Action Plan for the Conservation of the Dalmatian Pelican *Pelecanus crispus*

Convention on the Conservation of
Migratory Species of Wild Animals (CMS)

Agreement on the Conservation of
African-Eurasian Migratory Waterbirds (AEWA)

Council directive 2009/147/EC on the conservation of
wild birds (Birds Directive) of the
European Union (EU)

East Asian-Australasian Flyway Partnership (EAAFP)

Draft International Single Species Action Plan for the Conservation of the Dalmatian Pelican

Pelecanus crispus

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With a special contribution from
Wetlands International

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EuroSAP (LIFE14 PRE/UK/000002) LIFE preparatory project, coordinated by BirdLife International and co-financed by the European Commission Directorate General for the Environment, and the UNEP/AEWA Secretariat, through a grant by the Ministry of the Environment and Protection of Land and Sea of Italy

Adopting Frameworks:
Convention on the Conservation of Migratory Species of Wild Animals (CMS)
Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)
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The East Asian flyway population contribution was added after the conclusion of the Kerkini workshop and was coordinated regionally by Taej Mundkur (Wetlands International) and Doug Watkins (Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences).

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Photo cover
Dalmatian Pelican (*Pelecanus crispus)* © G. Catsadorakis / SPP

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Contents

List of acronyms/abbreviations

AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
AF	Afghanistan
AL	Albania
AR	Armenia
AZ	Azerbaijan
BG	Bulgaria
CN	China
CMS	Convention on the Conservation of Migratory Species
DP	Dalmatian Pelican
EA	East Asia
EAAFP	East-Asian-Australasian Flyway Partnership
GE	Georgia
GR	Greece
HOS	Hellenic Ornithological Society
IN	India
IR	Iran, Islamic Republic of
IQ	Iraq
ISSAP	International Single Species Action Plan
KZ	Kazakhstan
ME	Montenegro
MK	FYR Macedonia
MN	Mongolia
PK	Pakistan
RO	Romania
RU	Russian Federation
SEE	South-Eastern Europe
TM	Turkmenistan
TR	Turkey
UA	Ukraine
UZ	Uzbekistan
WA	Western Asia

1. BASIC DATA

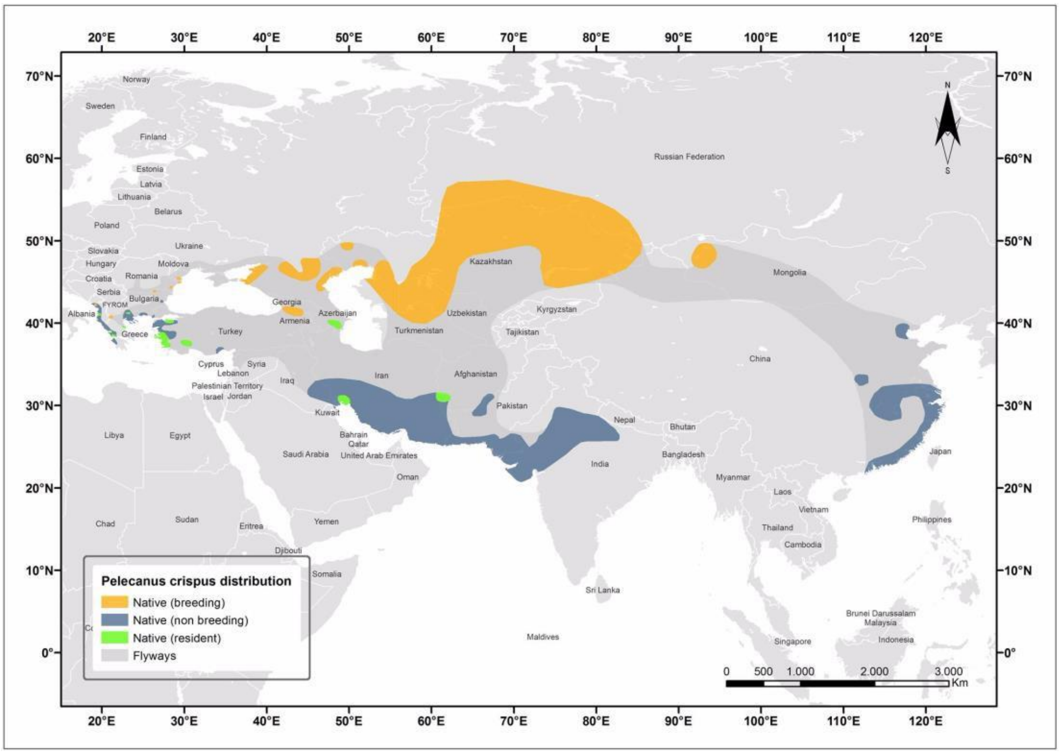
1.1 Species and populations covered by the Plan

The Dalmatian Pelican (*Pelecanus crispus*) populations of the world fall within three flyways:

- South-Eastern Europe (SEE): the Black Sea – Mediterranean flyway which includes the short-distance migrating populations of SE Europe
- Western Asia (WA): the purely migratory populations of the W and SW Asia flyway, which breed mainly in Russia and Kazakhstan and spend the non-breeding period mainly in Iran, Pakistan and India
- East Asia (EA): the East Asia flyway, which breed in Mongolia and spend the non-breeding period in China.

1.2 List and map of Principal Range States[1]

Map 1: Breeding and non-breeding distribution as well as flyway routes of the Dalmatian Pelican (Source: Modified and updated from BirdLife International, 2017)



[1] Each Contracting Party to AEWA is equally responsible under the Agreement for all the AEWA species/populations they host as per the obligations set out in the AEWA legal text. All the countries which host a specific species (whether in small or large numbers) are considered Range States for that species. The identification of Principle Range States in AEWA Action Plans, is an approach used to prioritize coordinated international conservation efforts to those countries considered to be crucial for ensuring the favourable conservation status of the species/population in question.

It should be noted that, under no circumstances does the identification of Principle Range States in AEWA International Species Action Plans, diminish the legal obligations of potential remaining Range States which are Contracting Parties to AEWA to equally ensure the adequate protection and conservation of the species/populations in question, including through implementation of relevant actions from the respective Species Action Plan

Principal Range States: (B=breeding states, W=wintering states, M=migration states): Albania (B-W), Azerbaijan (W-M), Bulgaria (B-W-M), China (W-M), Georgia (B-W-M), Greece (B-W), India (W), Islamic Republic of Iran (W), Kazakhstan (B), Mongolia (B), Montenegro (B-W), Pakistan (W-M), Romania (B-W-M), Russian Federation (B-W-M), Turkey (B), Ukraine (B), Uzbekistan (W-M).

Many hundreds of birds breeding in the Greek part of the Lake Lesser Prespa (largest Dalmatian pelican colony on Earth) use the part of the trans-boundary Lake Prespa belonging to the FYR of Macedonia to feed, but this country is not considered as a PRS. Similar situations may occur in transboundary waterbodies in other parts of its range.

Range States hosting breeding and/or non-breeding numbers below the 1% of the biogeographic population threshold as identified during the action- or management-planning process: Afghanistan, Armenia, FYR of Macedonia, Iraq, Kyrgyzstan, Moldova, Tajikistan and Turkmenistan.

1.3 Global, Regional and sub-regional Red List status

On 1/10/2017 the species was downgraded to “Near Threatened” (BirdLife International. 2017. *Pelecanus crispus*. The IUCN Red List of Threatened Species 2017: e.T22697599A119401118.http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T22697599A119401118.en. Downloaded on 21 December 2017. In 2016 the species had been was classified as ‘Vulnerable’ in the global IUCN Red List (A2c,e; A3c,e; A4c,e; version 3.1, The IUCN Red List of Threatened Species. Version 2016-1.<www.iucnredlist.org>. Downloaded on 28 August 2016). In 2000-2004 it had been classified as ‘Low Risk / Conservation Dependent’ when such a category existed.

In the European Red List Assessment of 2015 the species was downgraded from ‘Vulnerable’ to ‘Least Concern’. The same holds for the EU27 Regional Assessment (BirdLife International 2015. European Red List Assessment *Pelecanus crispus*; downloaded from http://datazone.birdlife.org/userfiles/file/Species/erlob/summarypdfs/22697599_pelecanus_crispus.pdf

However, the East Asian population is continuing to decline and is considered to be Critically Endangered (Gombobaatar & Monks 2011) and may be extinct within a few decades.

Table 1. National Red List status of the Dalmatian Pelican in the Principal Range States.

Country /Territory	National Red List Status	Reference
Albania	«Critically Endangered»	Ministry of Environment. 2013. The Red List of the Flora and Fauna of Albania. Order No. 1280, dated 20.11.2013.

Azerbaijan	«Category and status II.1» Sensitive species, limited in numbers.	Red Data Book of the Republic of Azerbaijan. Rare and endangered animal species. 2nd edition. 2016. Ministry of Ecology and Natural Resources of Azerbaijan Republic, Institute of Zoology, National Academy of Science. 518 p.
Bulgaria	«Critically Endangered»; criterion B1a+B2a+D	Golemanski, V. (ed.). 2011. Red Data Book of the Republic of Bulgaria, vol. 2, Animals. BAS-MOEW, Sofia. Available at: http://e-ecodb.bas.bg/rdb/en/vol2/;
China	«2nd Level»	Chinese National Important Protected Wildlife List. 2000.
Georgia	«Endangered»	Georgian Red List. Georgian Legislative Herald N19 01.07. 2003.
Greece	«Vulnerable»; criterion D2	Legakis, A. & P. Maragou (eds). 2009. The Red Data Book of the Threatened Fauna of Greece. Hellenic Zoological Society, Athens. Available at: https://www.wwf.gr/images/pdfs/red-book-intro.pdf
India	«Protected»	Protected under the Indian Wildlife (Protection) Act, 1972, Government of India.
I.R. Iran	«Endangered»	Game and Fish Law.
Iraq	«Protected»	General environmental legislation stands, however there is no law or regulation dedicated to the protection of birds in general or this species in particular in Iraq.
Kazakhstan	«Category II» (abundant, but quickly declining and may reach Category I)	[Red Data Book of the Republic of Kazakhstan] (2008/2010) (in Kazakhi).
Mongolia	«Critically Endangered»	Gombobaatar & Monks (compilers). 2011. Regional Red List Series. Vol. 7. Birds. Zoological Society of London, National University of Mongolia and Mongolian Ornithological Society (in English and Mongolian). Shiirevdamba, T., Y. Adiya & E. Ganbol (eds). 2013. Mongolian Red Book. Ministry of Environment and Green Development of Mongolia, Ulaanbaatar.
Montenegro	«Protected»	No National Red List of birds exists. Dalmatian pelican is officially protected by the Decision on Protected Species of Flora and Fauna, page 23. Official Gazette link: (http://www.sluzbenilist.me/PravniAktDetalji.aspx?tag=%7B43FC514F-EA49-4B25-82C8-FAE638FECB23%7D)
Romania	«Critically Endangered»	Botnariuc, N. & V. Tatole (eds). 2005. [Red Book of Romania's vertebrates] .“Cartea roşie a vertebratelor din România”. Editura Academiei Române şi Muzeul Naţional Istorie. Naturală “Grigore Antipa”, Bucharest (in Romanian). Protected by: • The Government Emergency Ordinance No. 57/2007 on

		the regime of protected natural habitats, conservation of natural habitats of flora and fauna approved with amendments by Law No. 49/2011 as amended and supplemented. • The Law No. 89/2000 authorizing the ratification of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)
Russian Federation	«Declining» Category 2	[The Red Data Book of Russia] (in Russian).
Pakistan	«Protected»	Sindh Wildlife Protection Ordinance 1972 (Schedule II) and Balochistan Province Wildlife Protection Act 1974 (Schedule III)
Turkey	Breeding: «Vulnerable» (A3c; D1) Wintering: «Vulnerable» (A3a)	Kılıç, D. T. & Eken, G. 2004. Update of Important Bird Areas of Turkey [Türkiye'nin Önemli Kuş Alanları, 2004 Güncellemesi], Doğa Derneği, Ankara.
Ukraine	«Endangered»	[The Red Data Book of Ukraine]. (In Ukrainian). Accessible at: http://redbook-ua.org/item/pelecanus-crispus-bruch/

In almost all countries where Dalmatian Pelicans occur they enjoy full protection from every kind of harmful human activity, to adults, fledged birds, chicks and the nesting sites. In Russia there is no clear protection from disturbance, while only in Iraq the species is totally unprotected, since there are no specific protection laws for any bird species. In the majority of countries where it occurs, regardless of its protection status, it would benefit from strengthened law enforcement.

1.4 International legal status (as applicable, with regard to geographic range of the species/population in question).

Legal instrument	CMS	CITES	AEWA	Bern Convention	EU Birds Directive*
Listing	Appendix I & II	Appendix I	Column A, Categories 1a, 1b & 1c	Appendix II	Annex I

**Council directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive)*

As the Dalmatian Pelican is listed in Annex I of the Birds Directive, the species should be subject of special conservation measures concerning its habitats in order to ensure survival and reproduction in its area of distribution. EU Member States should classify in particular the most suitable territories in number and size as Special Protection Areas for the conservation of the species.

Member States shall also take the requisite measures to establish a general system of protection for the Dalmatian Pelican, prohibiting in particular deliberate killing or capture by any method or keeping birds; deliberate destruction of, or damage to, species nests and eggs or removal of nests, taking eggs in the wild and keeping these eggs even if empty; deliberate disturbance particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive. Derogations from these provisions may be possible in the absence of other satisfactory solutions, for particular reasons, specified in the Directive.

2. FRAMEWORK FOR ACTION

2.1 Goal

Downlist the Dalmatian Pelican to the "Least Concern" category of the IUCN Red List and from Column A, Category 1 of the AEWA Table 1".

2.2 Purpose

- South-Eastern Europe (SEE): Keep the increasing trend, achieve 10% increase of population size and establish 3-4 new colonies
- Western Asia (WA): Establish better knowledge on the population size, trend and distribution while preventing decline in the population from the currently estimated size
- Eastern Asia (EA): Establish better knowledge on the distribution and population size, understand the causes of decline and stop and reverse the decline of the population.

Table 2: Framework for Action. Two character ISO 3166 codes for countries used (see page 7)

KEY

Priority:

E: Essential

H: High

M: Medium

L: Low

Time scales:

Immediate (I): launched within the next year.

Short (S): launched within the next 3 years.

Medium (M): launched within the next 5 years.

Long (L): launched within the next >5 years.

Ongoing (O): currently being implemented and should continue

Rolling (R): to be implemented perpetually (any action above from immediate to ongoing can be also qualified as rolling)

Direct problem	***Objective 1: Increase the survival of birds***				
	Result	**Action**	**Priority**	**Time scale**	**Organisations responsible**
Reduced (adult) survival	Result 1.1. Illegal killing is minimised	1.1.1. Strengthen enforcement of legislation regarding trade of body parts and derivatives Applicable to: PK, IN, ME,	Critical (MN) High (CN) Low (PK,	Immediate-Rolling	Environment Authorities

		MN, CN, IR	IN, ME, IR)		
		1.1.2. Increase awareness amongst local population Applicable to: PK, IN, KZ, RU, IR, MN, CN, AZ, GE, RO	Critical (MN, CN), Low (All but MN & CN)	Immediate-Rolling (MN, CN) High (RO) Short-Rolling (All but MN & CN)	NGOs and environment authorities
		1.1.3. Increase awareness of and provide training to relevant departments to enforce regulations on illegal international trade Applicable to: KZ, RU, MN, CN	Critical (MN, CN) Low (KZ, RU)	Immediate-Rolling (MN, CN) Short-Rolling (KZ, RU)	Environment authorities
		1.1.4. Increase awareness of local administrations regarding regulations on illegal killing Applicable to: PK, TM, MN, CN, RU, AZ, GE	Critical (MN, CN) Medium (PK) Low (All other)	Immediate-Rolling (MN, CN) Short-Rolling (All other)	Environment authorities
		1.1.5. Strengthen enforcement of regulations regarding illegal killing Applicable to: PK, IN, KZ, RU, IR, GR, AL, BG, TR, AZ, MN, CN, GE	Critical (MN) High (CN) Low (All but MN & CN)	Immediate-Rolling	Environment authorities
Human-pelican conflicts		1.1.6. Promote the use of and implement deterring methods for pelicans at fish farms or other fishing locations Applicable to: GR, RO, RU, AZ, CN, IR, ME	High (CN) Low (All but CN)	Immediate (CN) Medium (All but CN)	Environment authorities and agriculture authorities
		1.1.7. Increase awareness amongst the hunting community Applicable to: BG, TM,	Low	Medium	Environment authorities and hunting organisations

		UZ, IR, AZ, GE			
Power line collision	Result 1.2 Mortality on power lines is minimised	1.2.1. Assess the presence, magnitude and impact of power lines on DP Applicable to: ALL	High (MN & CN) Medium (All but MN and CN)	Immediate	Environment authorities and research institutes
		1.2.2. Following the results of the assessment (1.2.1) undertake mitigation measures at selected sites Applicable to: countries – as necessary	High (All)	Immediate (MN & CN) Medium (All but MN & CN)	Environment authorities
		1.2.3. Undertake review of domestic legislation and regulations with respect to avoiding and mitigating bird mortality on power lines Applicable to: countries – as necessary	High (MN & CN) Medium (All but MN & CN)	Immediate (MN & CN) Medium (All but MN & CN)	Environment authorities
		1.2.4. Based on the outcomes of the review, undertake adjustment of domestic legislation as needed to accommodate legislative requirements for avoidance and mitigation Applicable to: countries – as necessary	High (MN & CN) Medium (All but MN &CN)	Immediate (MN & CN) Long (All but MN & CN)	Environment and energy authorities
		1.2.5. Respond to potential negative impacts from powerlines using Ramsar's Avoid-Minimise-Compensate planning framework[2] Applicable to: ALL	Medium	Short / Rolling	Environment and planning agencies; energy authorities
Windfarm collision	Result 1.3 Mortality from	1.3.1. Monitor and estimate the impact of existing	Medium	Immediate	Environment authorities

[2] For details, see Gardner *et al*. 2013 (available online at http://ramsar.rgis.ch/bn/bn3.pdf)

	windfarms is assessed and minimised	windfarms on DP Applicable to: BG, PK, GR, TR, AZ, IR, RO	Low (IR)		and research institutes
		1.3.2. Establish and implement robust windfarm planning process at national level following international guidelines, such as adopted under CMS and AEWA Applicable to: BG, PK, IN, GR, IR, ME, AL, TR, AZ, MN, CN, GE	Critical (CN) Medium (All but CN)	Immediate (CN) Short (All but CN)	Environment and energy authorities
		1.3.3. Based on the results of the monitoring under Action 1.3.1. take appropriate measures to mitigate or avoid the impact as necessary Applicable to: BG, PK, IN, GR, IR, ME, AL, TR, AZ, MN, CN, GE	High (CN) Medium (All but CN)	Immediate (CN) Medium (All but CN,MN)	Environment and energy authorities
		1.3.4. Respond to potential negative impacts from windfarms using Ramsar's Avoid-Minimise-Compensate planning framework[3] Applicable to: ALL	Medium	Short / Rolling	Environment and planning agencies; energy authorities
Depleted fish stocks	Result 1.4. Fish stocks recover in sites where previously have been depleted	1.4.1. Establish and implement water management regimes that are favourable for DP Applicable to: BG, TR, IR, AL, ME	Medium	Short - Medium	Environment and energy authorities
		1.4.2. Establish and implement community or government initiatives as appropriate for fish stock recovery and sustainable use	Critical (ME) High (MN) Medium	Short	Environment Authorities &Agricultura l authorities

[3] For details, see Gardner *et al.* 2013 (available online at http://ramsar.rgis.ch/bn/bn3.pdf)

		Applicable to: BG, IN, KZ, PK, RU, IR, AL, RO, ME, MN.	(All but ME, MN)		
		1.4.3. Respond to potential negative impacts from unfavourable water management regimes using Ramsar's Avoid-Minimise-Compensate planning framework[4] Applicable to: ALL	Medium	Short - Rolling	Environment and planning agencies
Avian influenza	Result 1.5. Risk of avian influenza transmission is minimised	1.5.1. Establish and enforce strict biosafety measures on poultry farms, slaughterhouses and fish farms following international guidelines Applicable to: ALL	Medium	Immediate - Rolling	Environment Authorities and veterinary services
		1.5.2. Increase awareness amongst hunters and local communities at DP sites regarding avian influenza transmission prevention Applicable to: ALL	Medium	Immediate	Environment Authorities and veterinary services
Cyanotoxins	Result 1.6. The risk of cyanotoxin poisoning is minimised	1.6.1. Reduce frequency and intensity of blue-green algae blooms by establishing and implementing nutrient pollution reduction plans at site levels Applicable to: ALL	Medium	Medium	Environment Authorities and site management bodies
Botulism	Result 1.7. The risk of die-offs due to botulism is minimised	*Actions 1.4.1. and 1.6.1. will contribute to achieving this result*			
By-catch in fishing gear	Result 1.8. The risk of by-catch in fishing	1.8.1 Strengthen enforcement of regulations regarding illegal fishing	High (MN) Low (All	Immediate - Rolling	Site management bodies,

[4] For details, see Gardner *et al*. 2013 (available online at http://ramsar.rgis.ch/bn/bn3.pdf)

	gear is minimised	practices Applicable to: ME, IR, BG, PK, IN, KZ, AZ, MN, GE	but MN)		fisheries inspectorates
Human disturbance (at roost sites and feeding areas)	Result 1.9. Disturbance at roost sites is minimised	1.9.1. Establish and enforce safety distances around roost sites, where necessary and feasible. Applicable to: BG, TR, ME, IR, KZ, RU, AL, MN, CN, GE	Critical (MN) High (CN) Medium (All but MN, CN)	Immediate - Rolling Short (CN)	Site management bodies
		1.9.2. Create suitable roost sites where missing Applicable to: as applicable to Range States	High (MN, CN) Medium (All but MN, CN)	Short (MN, CN) Immediate (All but MN, CN)	Environment Authorities, site management bodies and research institutes
		1.9.3. Raise awareness amongst fishermen, hunters shepherds and tourism professionals Applicable to: BG, TR, ME, IR, KZ, RU, AL, MN, CN, GE, RO	High Medium (BG, RO)	Immediate - Rolling	Environment authorities and site management bodies
Direct problem	***Objective 2: Increase the reproduction output***				
Human disturbance (at colonies)	Result 2.1 Human disturbance at breeding colonies is minimised and as much as possible avoided	2.1.1. Protect all breeding sites under domestic legislation Applicable to: UA, RU, TR, MN, GE	Critical (MN) High (All but MN)	Immediate (MN) Short (All but MN)	Environment authorities
		2.1.2. Enforce strict control and prevent access to colonies during the breeding season Applicable to: ALL breeding range states	Critical (MN) High (All but MN)	Immediate - Rolling	Environment authorities and site management bodies
		2.1.3. Establish and implement standard methods and protocol for colony	Critical (MN)	Immediate - Rolling	AEWA Dalmatian Pelican

		monitoring in order to, among others, avoid un-necessary disturbance Applicable to: ALL breed-ing range states	High (All but MN)		International Working Group (AEWA DP IWG) and SEA
Flooding of colonies	Result 2.2 The risk of flooding is minimised	2.2.1. Place floating rafts or provide extra nest material at sites with high risk of frequent flooding Applicable to: as necessary	Critical (MN) Medium (All but MN)	Immediate - Rolling	Environment authorities and site management bodies
		Action 1.4.1. will also contribute to achieving this result			
Predation of eggs and chicks	Result 2.3 Predation of eggs and chicks is minimised	2.3.1. Establish control programmes for alien invasive predators at DP sites Applicable to: RO, RU, BG, MN, UA, ME	Critical (MN) Medium (ME) Low (All but MN)	Immediate (MN) Medium (ME) Short - Rolling (All but MN)	Environment authorities and site management bodies
		2.3.2. Establish control programmes for cattle (MN) and for stray dogs (TR) at DP sites Applicable to: TR, MN, ME, GE	Critical (MN) Low (TR, ME, GE)	Immediate-Rolling (MN) Short - Rolling (TR) Long - Rolling (ME)	Ministry of Forestry - NPA
		2.3.3. Provide artificial breeding substrate (platforms or rafts) or full fencing around colonies at sites with frequent incidents of predation by native mammalian predators Applicable to: countries as necessary	Critical (MN) Medium (All but MN)	Immediate - Rolling	Environment authorities and site management bodies
		Actions 2.1.1 and 2.1.3. will also contribute to achieving this result			

Reedbed fires	Result 2.4 Reedbed fires do not impact DP colonies	2.4.1. Strictly enforce ban on reedbed fires at DP sites Applicable to: ALL relevant breeding range states	Critical (MN) Medium (All but MN)	Immediate - Rolling	Agricultural authorities and forest authorities
		2.4.2. Create fire breaks around DP colonies at sites with frequent incidents or risk of fires Applicable to: ALL relevant breeding range states	Critical (MN) Medium (All but MN) Low (ME)	Immediate - Rolling (All but ME) Long - Rolling (ME)	Site management bodies
		2.4.3. Increase awareness amongst various wetland users (shepherds, hunters, fishermen, farmers) and local communities Applicable to: ALL relevant breeding RS	Critical (MN) High (All but MN)	Immediate - Rolling	Environment authorities and site management bodies
Lack of sufficient or suitable breeding substrate	Result 2.5 The increase and expansion of the DP population size and area of occupancy is not limited by lack of suitable breeding substrate	2.5.1. Establish and/or maintain sufficient number of artificial breeding substrate with appropriate design at sites where is necessary and appropriate Applicable to: countries as necessary	Critical (MN) Medium (All but MN)	Immediate - Rolling	Site management bodies
		2.5.2. Compile, disseminate and update as necessary guidelines on artificial nesting structures Applicable to: Internationally	Medium	Immediate - Rolling	AEWA DP IWG
Destruction of eggs and chicks by humans	Result 2.6 Destruction of eggs and chicks by humans is avoided	*Actions 2.1.2 will contribute to achieving this result* Applicable to: GR, KZ	Medium	Immediate - Rolling	Site-management bodies
Illegal collection of eggs and	Result 2.7 Illegal collection of	*Actions 2.1.2 will contribute to achieving this result*	Medium	Immediate - Rolling	Site-management bodies

chicks	eggs and chicks is prevented	Applicable to: ME			
Mortality at breeding platforms and rafts	Result 2.8 Mortality caused by artificial nesting structures is minimised	2.8.1. Replace unsuitable platforms causing accidents with better designed Applicable to: TR, MN	Medium (MN) Low (TR)	Immediate	NPA
Direct problem	***Objective 3: Prevent further habitat loss and degradation***				
Unfavourable water management, urbanization and infrastructure development, land use change, unfavourable site management, droughts, pollution, spread of alien invasive plants and fish	Result 3.1 No important DP sites throughout the flyways are subject to land use change, unfavourable water management, urbanisation and infrastructure development, pollution, impact of invasive alien plants and fish and unfavourable management practices	3.1.1. Designate all important DP sites as protected areas under domestic legislation Applicable to: CN, BG, MN, IR, GE	Critical (MN) Medium (IR) High (All others)	Immediate(MN) Medium (IR) Short (All others)	Environment authorities
		3.1.2. Develop and implement integrated management plans at the important DP sites taking into account DP conservation needs Applicable to: All	High	Medium - Rolling	Environment authorities,site management bodies and research institutes
		3.1.3. Respond to potential negative impacts from unfavourable water management regimes, urbanisation and infrastructure development using Ramsar's Avoid-Minimise-Compensate planning framework[5] Applicable to: ALL	Medium	Short - Rolling	Environment and planning agencies
Direct problem	***Objective 4: Obtain knowledge and insights to inform planning of crucial conservation measures***				
Existence of knowledge gaps and needs	Result 4.1: Breeding distribution of the EA and WA populations is known	4.1.1. Organise land and aerial surveys	Critical (all WA and EA breeding Range States)	Immediate	NGOs, SEAs, research institutes, environment authorities and universities

[5] For details, see Gardner *et al*. 2013 (available online at http://ramsar.rgis.ch/bn/bn3.pdf)

	Result 4.2: Population size and trends of all populations is known	4.2.1. Organise and carry out land and aerial census	Critical (all WA and EA Range States) High (All SEE Range States)	Rolling	NGOs and environment authorities and research institutes
	Result 4.3: All basic migration and movements routes and phenology are traced to detail	4.3.1. Ringing with plastic & metal rings and satellite transmitter (GPS) studies	Critical (MN, CN) High (all WA Range States)	Short	NGOs and research institutes
	Result 4.4: Winter ecology is better understood	4.4.1. Study movements, diet, roosting behaviour, competition for food and impact of weather in winter.	Critical (CN) High (All but CN)	Medium	Universities, NGOs, environment authorities and research institutes
	Result 4.5: Metapopulatio ns are delineated	4.5.1. Genetic structure/diversity and gene flow study of WA and SEE populations	Critical (WA population) High (SEE population)	Medium	Universities, environment authorities and research institutes
	Result 4.6: Survival likelihoods of each population are determined	4.6.1. Population modelling of WA and SEE populations	High (SEE population) Medium (WA population)	Medium	Universities, environment authorities and research institutes
	Result 4.7: Impact of windfarms is determined	4.7.1. Study the impact of windfarms on DP at key bottleneck areas and close to key breeding sites	Medium (SEE Range States)	Short	NGOs, environment authorities and research institutes
	Result 4.8: Impact of powerlines is determined	4.8.1. Study to locate key mortality hot-spots and assess overall impacts on populations	High (SEE Range States)	Immediate	NGOs, environment authorities and research institutes
	Result 4.9: Impact of diseases and parasites is determined	4.9.1. Study to assess impacts of diseases on populations	Low (SEE Range States)	Medium	Veterinary services, environment authorities and research institutes
	Result 4.10: Impact of heavy metals is determined	4.10.1. Comparative study of heavy metal concentrations in living and dead DPs	Low	Long	Veterinary services, environment authorities and research

					institutes
	Result 4.11: Impact of interspecific relations is determined	4.11.1. Assess competition for nesting space between DP and GWP	Medium (SEE Range States) Low (WA Range States)	Short	Universities, environment authorities and research institutes
		4.11.2. Assess competition for nesting space between DP and Great Cormorant	Medium (SEE Range States) High (EA Range States)	Short	Universities, environment authorities and research institutes
		4.11.3. Assess competition for food between DP and other species of pelican.	Medium (WA Range States)	Short	Universities, environment authorities and research institutes

Annex 1. BIOLOGICAL ASSESSMENT

Annex 1.1 Distribution throughout the annual cycle

The Dalmatian Pelican occurs in the northern hemisphere, from Montenegro and Albania in the west to the coastline of E-SE China in the east and in the central Omsk district of Russia to the north, down to E India close to Mumbai in the south (Map 1). During the past 30 years the species has been recorded to breed in: Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Iran, Kazakhstan, Mongolia, Montenegro, Romania, Russia, Turkey, Turkmenistan, Ukraine and Uzbekistan. It starts to breed in late January (Balkans) up to mid-May (Mongolia) usually in colonies of up to 400 pairs. Adults form monogamous pair bonds of annual duration. They depart from the colonies between the end of July and September, although a few remain until November. Gregarious during the winter, often occur in large flocks and forage singly or communally in small groups, alone or with other species.

Annex 1.2 Habitat requirements

The species occurs mainly at inland, freshwater wetlands (lakes, inland estuaries, dam-lakes) but also at coastal lagoons, shallow marine waters, river deltas and estuaries (del Hoyo *et al.* 1992, Crivelli *et al.* 1997). It nests on small islands or on semi-floating clumps of dense emergent macrophytes such as *Phragmites* reeds (Crivelli 1994; Peja *et al.* 1996; Crivelli *et al*. 1997), always in places surrounded by water or deep mud. A few breed in Mediterranean coastal lagoons (Peja *et al.* 1996). The species makes use of habitats surrounding its breeding sites for feeding (Nelson 2005) and/or may travel up to <100 km to feed.

On migration, large lakes form important stop-over sites (Nelson 2005) but can stop at a large variety of small to large wetlands, both natural and artificial. It typically winters on jheels and lagoons in India, and ice-free lakes and coastal wetlands in Europe (del Hoyo *et al.* 1992) and coastal areas of Oman and Caspian Sea and the Persian Gulf in Iran, and eastern coastal areas of China. A crucial habitat requirement for a site to be used at all by pelicans is the existence of proper resting and roosting sites (Crivelli pers. comm.) such as islands and low sand or mud bars free of vegetation.

Nests usually are up to 1m high and 0.6-1.0m in diameter, they usually consist of a pile of reeds and stems of other aquatic macrophytes and are mostly in synchronised groups. The Dalmatian Pelican feeds almost entirely on fish.

Annex 1.3 Survival and productivity

Egg-laying generally occurs within 10 days after arrival. The birds lay a clutch of two eggs (range 1-4) and the average clutch size is 1.8. Incubation lasts 31–33 days and fledging takes 11–12 weeks (Crivelli *et al*. 1991, Crivelli *et al*. 1998). The main mortality during breeding occurs at the egg stage (Crivelli 1987); hatching success varies from 35 to 70% (Crivelli *et al*. 1998). The DP can easily rear two chicks and fledging success in a well-protected colony is over one chick per nest, up to a recorded maximum of 1.34 (Catsadorakis *et al*. 1996). With the present state of knowledge of the population dynamics of pelicans it would appear that a success rate of 0.8 chicks per nest should be at least sufficient to keep the population stable. A success rate of over one chick per nest should ensure an increasing population (Crivelli 1987). The annual survival rates for the populations of Prespa and Amvrakikos, Greece, were estimated at 0.57 – 0.65 for juveniles and 0.87 – 0.95 for older individuals (Doxa *et al*. 2006, Doxa *et al*. 2010)

Annex 1.4 Population size and trend

The breeding population of the Dalmatia Pelican in the world is currently estimated at 7,347-8,993 pairs, roughly corresponding to c. 27,000 individuals (this ISSAP). The SEE breeding population is estimated at 2,831-3,094 pairs, the W Asian at 4,501-5,870 pairs and the E Asian at 10-20 pairs. The size of the breeding population in Russia, Bulgaria, Ukraine and Montenegro is characterised as fluctuating, in Greece, Turkey, Albania and Kazakhstan as increasing, and in Romania as stable. Non-breeding population estimates during the breeding season are not available apart from Greece and SE Europe where recent censuses show that the number of non-breeders present is very low and certainly less than 5% of the overall numbers of adult birds present (Alexandrou *et al*. 2016)

IWC data show that for the period 2010-2015 at least 6,500 individuals over-winter annually in SEE. In India and Pakistan there were 1,718-4,898 individuals counted during AWC in 2010-2012 and in China (wintering sites of the E Asian population) no more than 2 individuals (Mundkur *et al*. 2017), but up to 112 have been observed in November 2013 (China Coastal Waterbird Census, provided by Vivian Fu). Wintering numbers in countries such as Russia, Kazakhstan, Iran, Azerbaijan, Georgia, fluctuate hugely, depending on the degree birds are forced to move to southern sites by prevailing weather conditions. For example, up to 8.585 and 9.997 individuals have been counted to overwinter in Iran in January 2008 and 2017 respectively (Hamid Amini pers.com.).

Increasing trends have been estimated for the wintering populations of the Black Sea and Mediterranean flyway for the period 2000-2012, with a “Reasonable” trend quality (Wetlands International 2018). Similarly, increasing trends were also estimated for the SW & S Asia flyway for the period 1988-2015, albeit with “Poor” trend quality (Wetlands International 2018).

Table 2: Population size and trend by country

Country	Minimum Breeding numbers (pairs)	Maximum Breeding numbers (pairs)	Quality of data	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality of data	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations)	Quality of data	Year(s) of the estimate	Migrating or non-breeding population trend in the last 10 years
Albania	51	53	Good (observed)	2016	Increasing	Good (observed)	82-253	Good (observed)	2004-2014	
Bulgaria	70	120	Good (observed)	2011-2016	Stable	Good (observed)	600-1800	Good (observed)	2010-2015	Slight increase
Georgia	10?	40?	Medium (inferred)	2011-2015	Stable	Medium (inferred)	300-500	Medium (estimated)	2011-2015	
Greece	1914	1918	Good (observed)	2015	Increasing	Good (observed)	1702-3513	Good (observed)	2006-2015	
Kazakhstan**	3000	3200	Medium (estimated)	2003-2010	Increasing	Medium (estimated)	150 - 500	Medium (estimated)	2006-2016	
Mongolia[@]	15	25	Medium (estimated)	2013-2016	Decreasing	Medium (estimated)				
Montenegro	20	55	Good (observed)	2011-2015	Increasing	Good (observed)	8-104	Good (observed)	2005-2016	
Romania	300	350	Good (observed)	2009-2016	Stable	Good (observed)	100/308-634/800	Good (observed)	2006-2016	

Country	Minimum Breeding numbers (pairs)	Maximum Breeding numbers (pairs)	Quality of data	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality of data	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations)	Quality of data	Year(s) of the estimate	Migrating or non-breeding population trend in the last 10 years
Russia#	1500	2667	Medium (estimated)	2006-2015	Increasing	Medium (inferred)	5000*	Medium (estimated)	2006-2016	
Turkey	450	520	Good (observed)	2016	Increasing	Good (observed)	800-2631	Good (observed)	2007-2014	
Ukraine	0	32	Good (observed)	2009-2015	Stable	Medium (estimated)	150-200	Medium (estimated)	2004-2006	
Uzbekistan	1	3	Poor (suspected)	2000-2010	NA	NA	218-901[1]	Good (observed)	2003-2005	
Azerbaijan							304-2759	Good (observed	2009-2015	
China@							70-130	Medium (estimated)	2006-2016	Decreasing
Iran	0	0	Good (observed)	2010-2016	NA	NA	3639-9.997	Good (observed)	2008-2017	Increasing
Pakistan							1191-4533	Good (observed	2010-2012	
India							250-5000	Good (observed	2007-2016	

Country	Minimum Breeding numbers (pairs)	Maximum Breeding numbers (pairs)	Quality of data	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality of data	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations)	Quality of data	Year(s) of the estimate	Migrating or non-breeding population trend in the last 10 years
TOTAL	**7347**	**8993**								

Source:
** Zhatkanbayev, A. 2012. [Fauna of Kazakhstan] (In Kazakh) and A. Zhatkanbayev, pers. comm.
# Dinkevich 2008, V. Tarasov pers. comm., Christopoulou pers. comm., Y. Lokhman pers. comm., S.A. Soloviev pers. comm.
* very uncertain number
@ Batbayar, N., C. Lei, T. Mundkur and D. Watkins, 2017. Answers to Questionnaire on the Status of Dalmatian pelican in Mongolia and China.
1 Solokha, A. 2006. Results from the International Waterbird Census in Central Asia and the Caucasus 2003-2005. Wetlands International.

Notes on Quality:
Good (Observed)= based on reliable or representative quantitative data derived from complete counts or comprehensive measurements.
Good (Estimated)= based on reliable or representative quantitative data derived from sampling or interpolation.
Medium (Estimated)= based on incomplete quantitative data derived from sampling or interpolation.
Medium (Inferred)= based on incomplete or poor quantitative data derived from indirect evidence.
Poor (Suspected)= based on no quantitative data, but guesses derived from circumstantial evidence.

Annex 2: PROBLEM ANALYSIS

Annex 2.1 General overview

Lists of threats relating to Dalmatian Pelican were initially compiled through the responses to questionnaires for the development of the Status Report received from Albania, Armenia, Azerbaijan, Bulgaria, FYR of Macedonia, Georgia, Greece, India, Iran, Iraq, Kazakhstan, Montenegro, Pakistan, Romania, Russia, Turkey, Ukraine and were later supplemented with the responses by China and Mongolia (Table 3).

Following the compilation of the Status Report and during the AEWA Single Species Action Planning Workshop for the Conservation of the Dalmatian Pelican, a preliminary problem analysis, including the development of a preliminary problem tree (Figures 2a, 2b and 2c), was compiled which identified the following three major stresses through which threats operate:

- Reduced adult survival
- Reduced reproductive output, and
- Habitat loss and degradation

These stresses were identified in all three flyway populations and were associated to various threats presented in the problem trees below. After the workshop, the problem trees were supplemented with information relating to Mongolia and China.

It should be noted that mainly due to the huge difference in population size between the EA flyway (a few dozens of individuals) and the other two flyways (a few thousands of individuals each) ranking of the importance and urgency of threats in the East Asian population gets unavoidably “biased” in order to reflect this scale difference. For example, in the EA flyway the loss of even one individual or one nest or one nesting island can be considered of critical importance to this minute and dwindling population in contrast to the other two.

THREAT LIST	RU	KZ	AZ	GE	GR	TR	ME	AL	BG	RO	UA	IR	IN	PK	MN	CN
Drainage & habitat degradation	C	M	H	M	L	M	M	M	L	C	M	H	H	C	C	C
Disturbance, nest destruction, persecution	L	C	H	H	M	L	H	C	H	H	H	L	NA	H	H	H
Collision with power lines	NA	NA	M	L	L	L	L	L	H	H	M	L	H	H	M	M
Climate change-droughts	NA	L	M	H	M	C	L	M	L	L	M	L	M	NA	?	?
Heavy metals	L	M	M	L	L	L	?	L	M	M	M	L	M	M	M	M
Flooding due to high waters	M	NA	NA	NA	L	H	H	L	NA	H		NA	NA	NA	NA	NA
Fish depletion	NA	?	NA	NA	NA	L	NA	NA	L	NA	H	NA	NA	NA	NA	H
Competiiton with Great Cormorant	H	L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	?	NA
Avian influenza	NA	NA	NA	NA	H	NA	NA	NA	H	H	NA	NA	NA	NA	?	?
Cyanotoxins	NA	NA	NA	NA	M	NA	NA	NA	L	NA	NA	NA	NA	NA	NA	NA
Erosion of nesting islands	NA	NA	NA	NA	?	C	NA	?	NA	NA	NA	NA	NA	NA	NA	NA
Vandalism	NA	H	NA	NA	NA	NA	M	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pollution of waters	NA	NA	NA	NA	NA	NA	NA	NA	?	NA	?	NA	NA	NA	NA	H
Wind parks	NA	NA	NA	NA	NA	?	NA	NA	?	M	NA	NA	NA	NA	NA	M
Reedbed fires	NA	L	NA	NA	L	NA	NA	NA	L	NA	NA	NA	NA	NA	NA	NA
Mortality in fishing gear	NA	NA	M	NA	NA	NA	NA	NA	L	NA	NA	NA	NA	NA	NA	H
Capture for commerse	NA	NA	NA	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3: Summary of the threats identified in each Principal Range State and their respective severity.
C= Critical, H= High, M= Medium, L= Low, NA = Not Applicable, ? = Probable.

Dalmatian Pelicans face a number of threats of a more global character, such as avian influenza, effects of climate change acting through droughts and extreme weather events, and a combination of high nutrient inputs to wetlands favouring anoxic conditions.

The Dalmatian Pelican had remained out of the list of species affected by **avian influenza**, until the spring of 2015, when for the first time hundreds died massively apparently from avian influenza in Bulgaria, Romania and western Russia.

Mass die-offs from **cyanotoxins** or/and **botulism** have been observed over the last twenty years in SEE, where large breeding populations of pelicans occur, so events are more traceable than in other sites with lower pelican numbers. They are both directly or indirectly connected to inappropriate water management (regimes) and eutrophication of water bodies (high amounts of nutrient inputs/nutrient pollution) leading to plankton (and especially blue- green algae) blooms, which in turn lead to anoxic conditions. It is well established that the trend in shallow waterbodies in the Mediterranean area is towards increasing eutrophic status and instances of anoxia, so in combination with the ongoing climate change it is expected to increase in the future. Hardly any information is available for both threats in the other two flyways.

Extreme weather events such as sudden, extremely harsh winter conditions during winter or migration may also cause high adult mortality. Extreme weather phenomena will be more frequent in the future due to the ongoing climate change. It has been already observed that especially late cold spells (with snow, blizzards and persistently low temperatures mainly in February, March and April) may heavily affect birds that have already laid eggs and incubate. If cold spells last more than a week these may force incubating birds to abandon their eggs. Although birds most probably return and re-lay later, however a large part of the breeding investment is spent and this certainly lowers breeding success which in general is higher for the early birds. There is little quantitative information on the geographical occurrence of this threat.

Another more general issue which is long term and difficult to assess is the **temporal mismatch between breeding season and food availability.** This is caused by the differential effect of climate change upon some wintering and breeding sites of the migratory Dalmatian Pelican populations. Mild winters encourage earlier migration and earlier initiation of laying in some nesting sites occurring in higher latitudes or altitudes. However, it has already been shown that at those sites spring temperatures and conditions are not that advanced and fish are not available to pelicans very early in the season. This may thus create serious problems to breeders which are unable to ensure adequate food and may lead to breeding failures. Finally, **drought** is a natural phenomenon which generally reduces the qualities of individual wetlands as DP habitats. Occurrence of droughts depend upon natural stochasticity, but ongoing climate change favours their frequency and severity.

Annex 2.2 Threats relating to reduced adult survival

The following threats were related to reduced adult survival. They might be separated into direct and indirect causes leading to low survival. Direct causes follow in order of decreasing importance, however there are major differences in threat ranking between the three flyways.

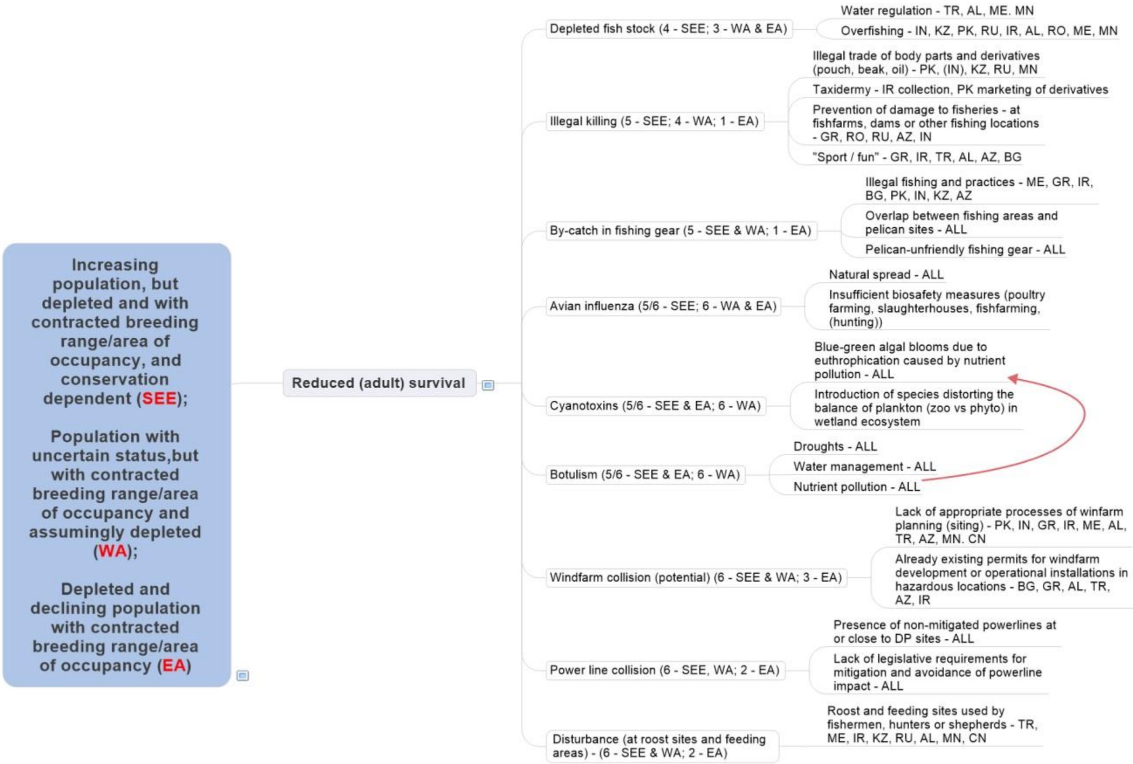


Figure 2b: Problem tree relating to reduced adult survival.

Illegal killing

Despite being an iconic symbol for wetlands and most of its habitats being fully protected almost everywhere, there is still high incidence of illegal killing of Dalmatian Pelicans, mainly by shooting. Unpublished data from the SPP (Alexandrou & Catsadorakis, unpubl. data) show that 1 out of 10 birds found dead or injured between 2012 and 2017 within Greece and very close to its borders, had shots in their bodies. As pelicans are practically unmistakable, in SE Europe all shooting seems to be deliberate but its motives are either unclear or attributed to averting damage caused to fisheries. In several Asian countries killing is associated clearly to illegal trade of body parts and derivatives (pouch, beak, "oil") as well as taxidermy. In Mongolia and at least parts of Kazakhstan killing is associated with obtaining the upper beak to be used as a horse-scraper and prices are very high since it is probably a symbol of wealth.
→ ***Significance: Critical for EA, Low for WA and Local for SEE***

By-catch in fishing gear

This is caused either through the simultaneous presence of birds and fishermen in the same fishing locations, the use of illegal fishing practices or the use of unsuitable fishing gear. In Burgas Lakes and Studen Kladenetz reservoir in Bulgaria, there are a few records of direct mortality due to entanglement in fishing nets. One individual marked with transmitter in Greece was found dead in Turkey due to entanglement in fishing gear. In E Asia the threat has been ranked Critical but there is scarcity of relevant information, though in Mongolia fishing is scarce and is not recorded as a threatening activity in the Yellow Sea coast of China by Melville *et al*. (2016).

→ Significance: Critical for EA, Local for SEE and WA

Power line collisions

All available evidence indicates that collision with power lines may be quite an important threat for the SEE flyway, due to much higher network density in the region. Yet, much work should be done to identify all high-risk points for collision and take measures. In contrast, it seems that this threat is of much lower importance for the WA flyways due to scarcity of power lines, vastness of wetlands and milder relief. For the highly threatened EA population this threat can be of great significance.

→ Significance: Unknown for SEE, WA and High for EA

Impacts of wind parks

Impact might be either displacement (diversion from optimal flying routes) or/and mortality from collisions. This is still considered a potential threat since, so far, there is insufficient data on the impact of windfarms on DP. However, since wind parks are built or are planned close to important breeding, staging and wintering sites for the DP, at least in SEE, some kind of long-term monitoring should be ensured. There might be a lack of appropriate processes for windfarm siting in countries outside the EU, while in EU Member States processes exist but do not necessarily ensure long-term monitoring of the issue.

→ Significance: Local/Unknown for SEE and EA and unknown for WA

Indirect causes include:

Depleted fish –stocks and disturbance at roost sites and feeding areas.

These are both threats that will cause exclusion of DP from a number of wetlands either due to low densities of prey or due to unavailability of prey caused by disturbance at feeding sites. Repeated disturbance at roosting sites will force DP not to use the site anymore. Neither of these two indirect causes contributes to higher adult mortality, but in the long term they may lead either to lower reproduction or indirectly to lower survival rates or even shift in distribution. Depleted fish-stocks have been attributed to overfishing or/and to water management.

→ Significance: Local/Unknown for SEE and EA and Unknown for WA

Annex 2.3 Threats relating to reduced reproduction output

Reduced reproduction output in the DP can be a result of:

1. Fewer birds breeding than those able to
2. Low hatching success caused by egg trampling by the birds themselves, eggs being thrown out of nests, abandoned nests and eggs due to various reasons including disturbance, panic, extreme weather events, wildfires and predation.
3. Low fledging success due to chick mortality related to reasons as above, but also avian influenza, cyanotoxins and botulism and other epizootics.
4. Skipping of breeding attempts.

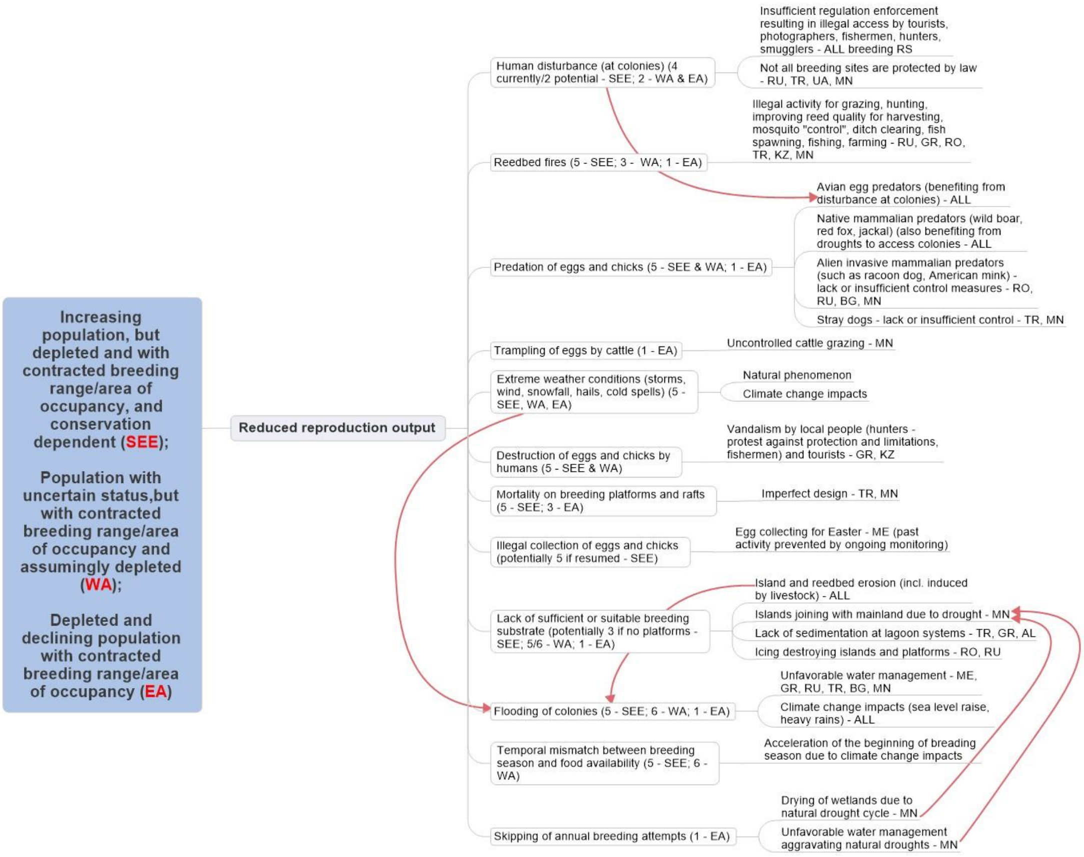


Figure 2a: Problem tree relating to reduced reproduction output

Human disturbance at colonies is considered among the severest threats to DP breeding success. It is often caused by harassment aiming to force pelicans out of the area. It is also caused unintentionally by people wishing to see or photograph colonies close-up. In other cases, fishermen trying to force great cormorants out of the wetlands, disturb pelican colonies which are used by cormorants as resting sites. In addition, disturbance is caused by illegal hunting and movement of speedboats close to nesting islands. Often disturbers are not aware of the negative impacts they cause to pelican breeding success. All such kinds of disturbance may seriously disrupt the breeding effectiveness of pelicans and may even result to the total abandonment of whole colonies or the complete skipping of a breeding season. Repeated low levels of breeding success will be inadequate for the maintenance of the population and will eventually lead to population decline. This is especially true in the case of exposed and accessible colonies. Disturbance is higher in sites where there is a lack of guarding or/and enforcement of appropriate regulations but also because in some range states not all colonies are protected by law.
→ ***Significance: Low currently/High potentially for SEE, High for WA and EA***

Reed bed fires

In many cases DP colonies lie within or at the margins of reed bed areas which catch fire either through natural causes (rarely) or more often by humans for a variety of reasons, such

as to create grazing areas, hunting, improvement of reed quality for harvesting, mosquito control and also clearing of ditches in order to enhance fish spawning and fish farming.
→ Significance: Local for SEE, Medium for WA, Critical for EA

Predation of eggs and chicks
Inappropriate nesting sites, accessible by land will also allow the occasional predation of eggs and chicks by natural predators such as wild boar, red fox, jackal or invasive species (such as racoon dog and American mink) as well as stray dogs. Avian predators include mainly magpies and gulls but these may have access to chicks and eggs only when adults are away from nests due to disturbance (see Human disturbance at colonies above).
→ Significance: Critical for EA, Local for SEE & WA

Trampling of eggs by cattle
This is noted to occur only in Mongolia where a few known large islands used by DP for nesting become accessible by cattle during ice cover in winter and when in spring they still remain there occasionally or potentially trampling pelican nests and eggs.
→ Significance: Critical for EA

Destruction of eggs & chicks by humans
In a few range states, reduced breeding performance is still caused via destruction of eggs and chicks by humans, an act of vandalism, vengeance, or effort to scare away breeding pelicans.
→ Significance: Local for SEE & WA

Mortality at artificial nesting structures
Chick mortality occurs also in a few cases due to imperfect design and construction of artificial nesting structures. Particularly, chicks may fall in the water from raised platforms and especially when these are located at a large height above water level they are either injured or die of starvation since they cannot be fed by their parents. Often ramps that would allow chicks to climb back to the platform after they have fallen were not anticipated. Additionally, when floating rafts are used by too many birds this may cause it to submerge and many low and peripheral nests could be flooded.
→ Significance: Medium for EA and Local for SEE

Illegal collection of eggs and chicks
This threat occurs only in a few wetlands with low levels of patrolling and/or guarding against environmental crimes so that it becomes possible to collect eggs and chicks illegally, in order to supply egg collections or zoos with DP chicks.
→ Significance: potentially Local if resumed for SEE

Lack of sufficient or suitable nesting substrate
Lack of adequate nesting substrate and lack of suitable nesting substrate are similar but produce very different effects on populations. Lack of adequate substrate allows breeding of only some pairs but prevents population growth that will suit the overall habitat. Lack of suitable substrate means that there is no breeding at all or repeated skipping of breeding attempts. The increasing frequency and severity of droughts may affect both, since islands

become connected to land and either prevent breeding or allow access to terrestrial predators that lower breeding success. Human uses of water that do not reserve sufficient quantities for wildlife aggravate the effects of drought by increasing its severity and frequency. Erosion and degradation of nesting islands may be caused by the birds themselves, weather phenomena and are aggravated by greater than optimal numbers of birds and by extreme weather events. Other causes include the use of inappropriate breeding sites by birds, either due to the lack of suitable nesting substrate, or to the flooding of colonies caused by natural or man-made factors and extreme weather conditions (storms, sudden increase of water level caused by deluges or heavy snow melts, water management, etc.). Ice will degrade artificial nesting structures often more rapidly than natural islands. Higher erosion rates are caused by inadequate supplementation with sediments, mainly due to human interventions in places higher up from the water basins.

→ Significance: Critical for EA, if no platforms potentially Local for SEE, Local/Unknown for WA

Flooding of colonies

Often natural islands hosting colonies become flooded by suddenly rising water levels. These unnaturally high water levels may be due to reservoir or wetland management by humans for reasons other than conservation or to extreme weather events (e.g. deluges) which over the last few years are becoming more frequent due to climate change. At a catchment level these events might be aggravated by changes within the drainage basin related to thinning of vegetation cover, management favouring surface outflow, erosion, etc.

→ Significance: Critical for EA, Local for SEE, Unknown for WA

Annex 2.4 Threats relating to habitat loss and degradation

These threats refer both to the more general matter of the loss and degradation of wetlands as habitats for waterbirds, DP included, as well as to the more specific issues of the loss and degradation of the particular places pelicans nest, rest and feed within the wetlands they occur.

Unfavourable water management

Water management in many wetlands, even if these are protected areas or reserves, is often unfavourable to DP, this meaning that water management decisions are governed mainly or exclusively by other needs such as irrigation, industry, fisheries, flood control, etc., which in turn is exacerbated by the lack of awareness and understanding of the needs of DPs and the impact of mis-management on DP habitats. Harmful decisions for water management are seriously affected by the increasing droughts resulting from global climate change.

→ Significance: Low for SEE and WA, Medium for EA.

Land use change /Urbanisation & infrastructure development

Wetlands are still drained and converted to other land uses, mainly farmland, but also for development of infrastructure for industrial expansion, housing and unsustainable tourism. In China it seems that there are high rates of reclamation of tidal flats for agriculture, industrial and urban development. Expansion of industry, market places and shopping centres are part of the problem.

→ ***Significance: Local for SEE, Medium/Low for WA and High for EA***

Unfavourable/lacking site management

Due mainly to incompetence, in some managed/protected areas there are unfavourable management choices and decisions or complete lack of management which both may lead to degradation of DP habitats. In some cases there is excessive infrastructure development, excessive afforestation of catchments and lack of management, which might prove crucial for the conservation of DPs.

→ ***Significance: Low for SEE and WA, High for EA.***

Alien plants and fish

Many wetlands in which DP nest, stage over, rest or feed have been invaded by alien plants and fish and the phenomenon is on the increase. In many cases, alien plants and fish disrupt the functions of wetlands they settle, mainly through severe changes in vegetation and competition with native species, and DP may be affected through alterations of their nesting, resting and feeding habitats and the abundance of their prey.

→ ***Significance: Unknown for SEE and WA, High for EA.***

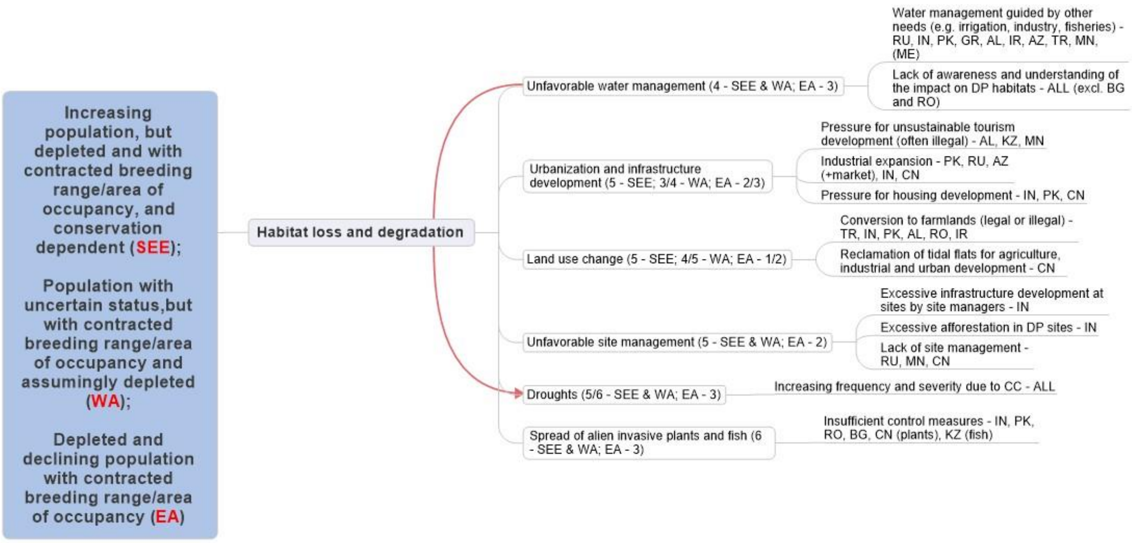


Figure 2c: Problem tree relating to habitat loss and degradation

Annex 2.5 Knowledge gaps and needs

Breeding distribution of the Western Asian and particularly the East Asian populations

Although the DP may be considered a relatively well studied species, there are still important gaps in the knowledge of its ecology and life traits that partly undermine effective decision making for its conservation. The most important gap has to do with the distribution of the breeding sites of the depleted and small East Asian population in Mongolia which may also shift from year to year. Unless we obtain a clear picture of this fundamental piece of information no effective conservation measures can be planned and implemented. In addition, it is clear from the collected data that in Russia and Kazakhstan which together hold 50-80% of the DP's global population we are far from knowing the exact annual breeding distribution of the species. It is not however unlikely that this info exits but only in Russian, Kazakh or other language, thus hardly accessible to the English speaking world. In that case a concerted translation effort must be made or rather the creation of a mechanism, most likely in an international NGO such as BirdLife or Wetlands International, which will ensure this info is made available in the English language and to the IUCN Pelican Specialist Group. Nevertheless, it is apparent that a higher degree of networking and information compilation and exchange is needed between people working for pelicans in these two countries and the international pelican community. It is emphasised that due to the vastness of the areas and the difficulties in access censuses from aircrafts seem to be the most appropriate method.

Population size and trends

It has been stressed in many parts of this document that the most crucial gap in our knowledge for the global status of the species, relates to the lack of regular information about the population size and trends especially of the populations in the WA flyway, where the bulk of the global numbers occurs. The large size of the range areas, difficulties in accessibility and limited resources are the main hindrances in achieving this. It is suggested that an effort is made so that at least once every five years there is a country wide survey and census, most likely both from land and air.

Migration and movements

In order to understand the population dynamics and trends of populations and especially of the WA population, there is among others a need to establish which are the locations of the winter quarters of each of the main breeding populations of the Western Asian flyway as well as their exact migration routes and to what extent their movements and migrations to the southern wintering sites are governed by weather and climate change effects. This knowledge will give us the ability to identify and tackle threats faced by these birds during their migration trips.

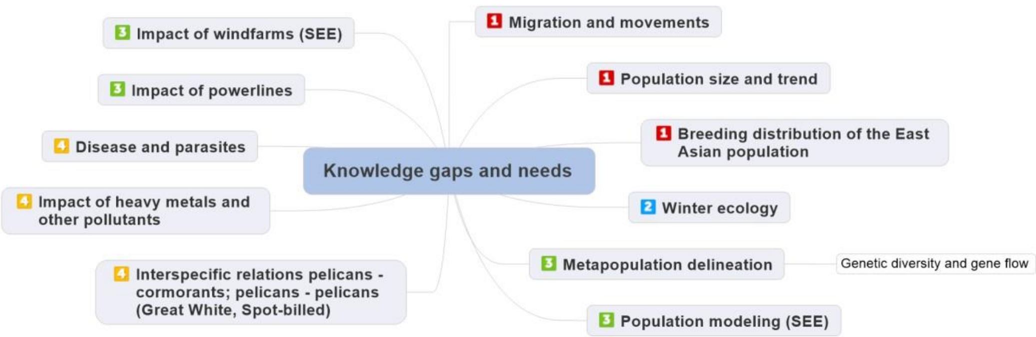


Figure 2d: Problem tree relating to knowledge gaps

Winter ecology

The winter ecology of the species is also much less studied than its breeding ecology across its distribution. For example, the actual impact of DP on fish farms and other fishing locations has not been assessed so far. Also it is considered crucial to study the interspecific and intraspecific relations of these birds in winter, their diets in key sites and the threats they face. Regarding the highly threatened EA population it is emphasised that the possible patterns in distribution and movements along the Chinese coastal provinces have not been studied as well as those in inland wetlands along the Yangtze valley.

Population modelling

In SE Europe there is satisfactory monitoring of population sizes and trends at almost all colonies but still overall population modelling is lacking which would shed light to the dynamics of the several sub-populations and offer predictions about MVPs, survival probabilities under different scenarios, a vital piece of information especially for the many small colonies existing in SEE Europe.

Metapopulation structure

Although there is some limited understanding of the metapopulation structure on SE Europe, based upon past ringing projects, this is lacking in the case of the W Asian flyway. As this knowledge may only derive from genetic analyses there is much research to be done on the genetic diversity and the gene flow of the species. These data will allow evaluating all crucial information about the possible existence of discrete phylogenetic units of high conservation value.

Interspecific relations

Additionally, the interspecific interactions between DP and other sympatric species of pelicans, such as the Great White and the Spot-billed, as well as the various species of cormorant, are not sufficiently understood (but see Catsadorakis *et al*. 1996, Doxa *et al*. 2012). There is much significant understanding to be sought on issues such as competition for food and nesting space, the indirect effects of persecution of cormorants to pelicans, communal feeding and its importance, etc.

Impact of powerlines

Although repeatedly identified as a main cause of mortality for DP especially in SE Europe, there are extremely few monitoring data (cf. Crivelli *et al*. 1988) on the impact of powerlines and its geographical dimension.

Impact of windfarms

So far, there are only a few monitoring data on the impact of windfarms on the species, referring to some bottleneck areas along the west coast of the Black Sea in Bulgaria, which are not very alarming. However, focused monitoring should be planned and carried out in areas such as the previous one, or other areas close to key breeding or staging sites for the species.

Impact of heavy metals

There is still limited knowledge on the real magnitude of the effects of heavy metals and other pollutants. A few studies examined the content of pelican eggs in chlorinated hydrocarbons (Fossi *et al*. 1984, Crivelli *et al*. 1989, Albanis *et al*. 1995, Crivelli 1996) in the Danube delta and in two wetlands in Greece. To shed light on both issues, a very systematic effort should be done to analyse large numbers of samples and compile data from large areas.

Impact of disease and parasites

Diseases and epizootics, such as botulism, cyanotoxins and avian influenza have taken heavy tolls in DP deaths especially during the last years, however, they still remain poorly studied and reported. Additionally, when high mortality is taking place necropsies often reveal heavy infestations from internal parasites such as various species of nematodes, however, besides taxonomical work hardly any studies have dealt with the effect these parasite loads may have on the mortality rates of the DPs as well as their probable role on the ecology and performance of the birds.

Annex 3: JUSTIFICATION OF CONSERVATION and/or MANAGEMENT OBJECTIVES

Annex 3.1 Business-as-usual scenario (no recovery or control measures taken)

At least in SE Europe, where most wetlands are directly affected by human management of all kinds, the DP is a totally management-dependent waterbird. This is mainly due to the conspicuousness of these large, whitish birds themselves but most importantly, that of their colonies. Due to this conspicuousness DP are vulnerable to disturbance and persecution at their feeding, resting and –most importantly- nesting sites, which can be easily located and thus easily harmed. In the absence of disturbance, especially at their breeding colonies, DPs are able to increase quickly and maintain vigorous populations. Otherwise, and in addition to their having very specific nesting habitat requirements, they are not able to withstand continuous and systematic disturbance and persecution and then their populations will equally easily plummet.

After the year 2000 the big picture observed is the following: In SE Europe most populations are located in protected areas to a lesser or greater extent. In contrast to previous decades this has led to an impressive reduction of disturbance at colonies and has allowed most populations to increase or stabilise, benefitting also from new colonies launched through the contribution of successful source-colonies such as Prespa in Greece. However, in this part of the world there are many very small –sized colonies, especially at coastal areas which still suffer from a variety of factors and they are even now dwindling (e.g. Messolonghi GR, Amvrakikos GR, Skadar ME, Karavasta AL, Gediz delta TR, various Ukrainian colonies). If no measures are taken within the next 25 years, some of these colonies will continue to shrink, some will fluctuate hugely in reaction to conditions of specific years and some will become extinct.

Currently there are conservation and protection measures applied in many colonies in SE Europe, especially aimed at keeping disturbance to a minimum and enhancing nesting habitats. If these measures are no longer applied then it is absolutely certain that even big- sized colonies (such as those of Prespa, Kerkini and Karla/GR) would start to decline rapidly. This would not be the case for colonies occurring in remote and less accessible sites, even in protected areas such as the Danube delta. They could suffer from large fluctuations, but they would probably maintain a safe minimum population size.

In the Central and West Asian populations conditions are not so clear. Limiting factors for populations are either not known at all or known insufficiently. There is no clear picture whether all colonies in Russia and Kazakhstan have been identified. In addition, their trends and reactions to pressures are also unknown. In comparison to their status described in the '70s, '80s and early '90s (Crivelli 1994), there appears to be a substantial increase in the overall breeding population numbers. However, the exact spatial changes of the geographical range of these colonies are poorly known and the real degree and frequency of human disturbance cannot be assessed in an objective way. There is reliable information that some colonies are entirely free of disturbance and some others suffer heavily from it, either regularly or only occasionally and in a stochastic manner. It seems that colonies existing in and around large wetlands or wetland systems lying at the southern and drier parts of Western

Asian countries (Kazakhstan, Iran, Uzbekistan, Turkmenistan) and which are considered traditional for DP nesting, are being abandoned and new sites are being colonised further north. We can easily hypothesize that the ongoing climate change has had an important effect on this shift, both through the negative effects on the hydrological regimes of southern wetlands and through milder winters and springs that have allowed the colonisation of northern sites. But this has not been systematically researched and available evidence is of a circumstantial and speculative nature based only on indications.

According to all available knowledge the DPs that breed in Mongolia constitute a discrete subpopulation which breeds in the Great Lakes Basin of Western Mongolia and overwinters at the wetlands of the E and SE coast of China down to Hong-Kong. It remains uncertain whether birds breeding in the extreme easternmost wetlands of Kazakhstan (around 48º.56 N and 84º.70 E, region of Lakes Zayzan and Markakol) migrate and over winter east with those of Mongolia or south with the rest of the Kazakhstani populations.

Precise knowledge on the actual present status of DP in Mongolia is rather poor. In the past there have been some good efforts to compile all available published information from observations/records of DP in Mongolia and China during the breeding, migration and wintering period (Shi *et al*. 2008 and Gombobaatar & Monks 2011). There are also some good summaries of available information and compilation of records from projects in some years (Barter *et al*. 2005, Batbayar 2005, Batbayar *et al*. 2007). The most updated information for this population was provided in the frame of this project (Mundkur *et al*. 2017 and Batbayar *et al*. 2007). In summary, the DP is protected by national legislation in Mongolia from killing, nest destruction and disturbance, while in China protection covers only killing. There are no recent conservation measures applied anywhere. There is an unofficial DP working group in Mongolia but not in China. There is some effort by NGOs in Mongolia to work targeted on DP but no real monitoring programs in the country or in the PAs specifically targeted to this species, which is monitored within general waterbird monitoring schemes. Almost 100% of the population in Mongolia are met within IBAs or/and Ramsar Sites or/and EAAFP Flyway Network Sites or/and PAs under the national law, whilst the respective percentage is ca. 50% of the population in China (source: Batbayar, N., C. Lei,
T. Mundkur and D. Watkins, 2017. Answers to Questionnaire on the Status of Dalmatian pelican in Mongolia and China. Unpublished draft report to AEWA Secretariat and EAAFP Secretariat. Answers to the questionnaire for the Review of the Status of the Dalmatian Pelican *Pelecanus crispus* in the East Asian Flyway).

If no further measures are taken to understand and try to counter the reasons that have led this particular population to shrink, it is in dire risk of extinction in the next few decades.

Annex 3.2 Action Plan implementation scenario

During the last decade it has already been shown that the implementation of conservation measures has led to the substantial increase both of colony size and productivity in small colonies. This is mainly achieved through minimizing anthropogenic mortality causes and ensuring less varying breeding success. It is crucial to ensure continuation of guarding for many small, especially coastal, colonies across SE Europe. A good example is the 4-year conservation project “Wetland Management and Dalmatian Pelican Conservation in the

Mediterranean Basin" (implemented by Noé Conservation and funded by MAVA and CEPF) in the two small colonies of Karavasta Lagoon, Albania and Lake Skadar, Montenegro. Disturbance was minimised, engagement of the local societies and authorities was enhanced and artificial nesting platforms were provided. As a result the former colony almost doubled in size from 19-29 pairs in 1998-2012 to 31-52 pairs in 2013-2017 (T. Bino, pers. comm.) while the latter colony increased from 0-22 pairs in 1990-2012 to 31-53 pairs in 2013-2017 (A. Vizi, pers. comm.). It is concluded that the continuation of these and similar measures would easily permit these small colonies to recover to sizes recorded some decades ago, i.e. 225 pairs in the sixties (T. Bino, pers. comm.). Furthermore, in Greece the two colonies situated in coastal lagoons (Amvrakikos and Messolonghi wetlands) which together constitute 10-11% of the total number of breeding pairs in the country (approx. 2000 pairs) also suffer heavily from disturbance which results in very low breeding success over consecutive years. Effective guarding against disturbance would easily permit these colonies to double their size within a period of 10-20 years. The observed increase of DP populations in SE Europe is clearly the result of conservation and management efforts applied in almost all sites hosting DP during breeding, migration and wintering. It is imperative that these conservation management efforts are maintained in order to maintain their favourable results. Only during the last 7 years there have been 3 new colonies established without any human intervention in Greece (SPP, unpublished data), two in Romania (M. Marinov jr., pers. comm.) and one in Bulgaria (BSPB, unpublished data) after the installation of an artificial nesting structure. These colonies could not survive in the absence of specific conservation and management measures, particularly guarding and monitoring.

The case of the W Asian populations is a different one, as most but not all colonies are situated in remote and inaccessible sites. We do not have a clear picture of the reasons which have led to the increase of the breeding populations in Russia and Kazakhstan. Thus, in order to be able to anticipate what will be the effects of the ISSAP implementation on these populations it is first considered essential to establish a standardized monitoring system which will provide reliable data about size, distribution and ecological traits of most, if not all, of these populations. This is not an easy task due to the vastness of these countries, the inaccessibility of DP wetlands, limited resources and low availability of ornithologists. It therefore must be the primary target of the ISSAP in these countries.

The same situation holds for the Mongolian population, however since this is at the brink of extinction, it is crucial and urgent to be given priority and act as quickly as possible to avert its extinction. Before, or at least in parallel with, any kind of conservation measures are implemented in both Mongolia and China, there is an imminent need to first locate and identify all nesting sites of the species in Mongolia and all wintering sites in China. Following this, a concerted effort should be made to tag birds, preferably with satellite transmitters and track them for as long as possible in order to shed more light to their migration routes and the hazards they meet during migration. Since the large decline of this population has taken place a while ago in the '90s and 2000s, a multi-disciplinary study should be undertaken to shed light to the reasons underlining this dramatic decline, by combining biological, social and environmental data. This is badly needed because the reasons of decline are not yet clear despite significant efforts so far. The results of these two initiatives will provide identification of the reasons of decline and promote effective conservation measures.

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