SDOD from BIOSECO BPS practice. Examples from operating wind farms: case studies from around the Europe

Semiario sobre
Sistemas Shut Down on Demand
em Parques Eolicos

Aleksandra Szurlej-Kielańska

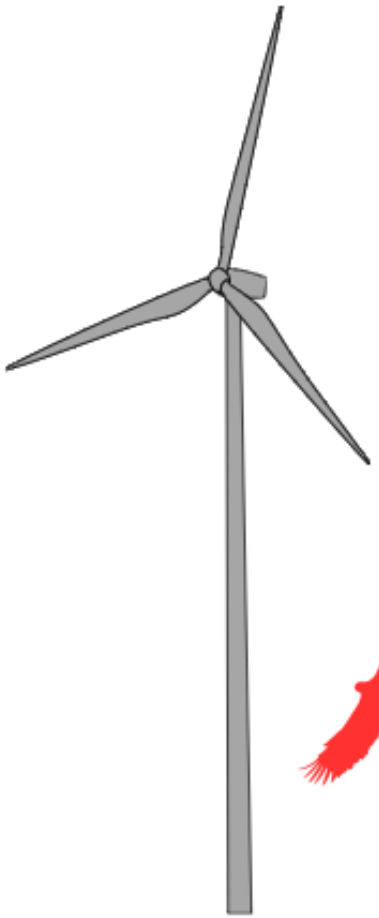
tactus

1. WHAT WE KNOW ABOUT BIRDS BEHAVIOUR NEAR THE TURBINES?
   – BASING ON CASE STUDIES FROM BPS SYSTEMS

2. REAL CASE STUDIES FROM AROUND THE EUROPE
   – REAL STOPS DEPENDS FROM THE LOCATION (SITE SPECIFIC, SPECIES SPECIFIC CONDITIONS)

3. CONCLUSSIONS – LESSONS TO BE LEARNT FOR FUTURE

WHAT WE KNOW ABOUT BIRDS BEHAVIOUR NEAR THE TURBINES?



Direct Collision Risk Zone

0,9 - 3,0 % all detected birds

Potential Collision Risk Zone

37,1 - 51,3% all detected birds

Safe Zone

90-97% all detected birds

88 m

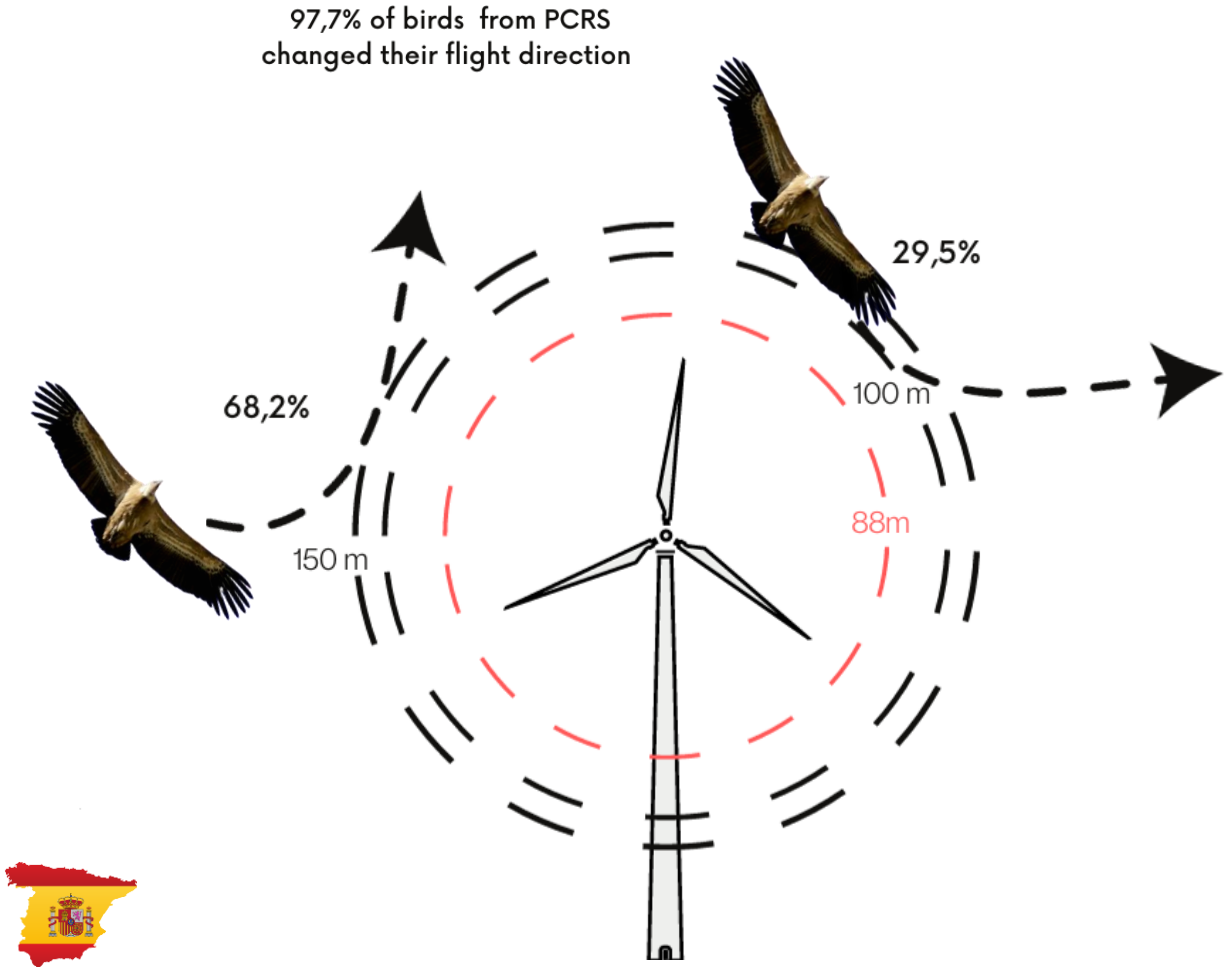
200 m

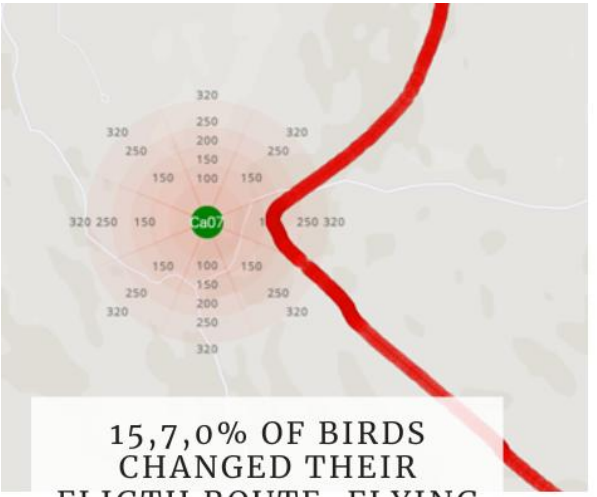
... up to 500 m

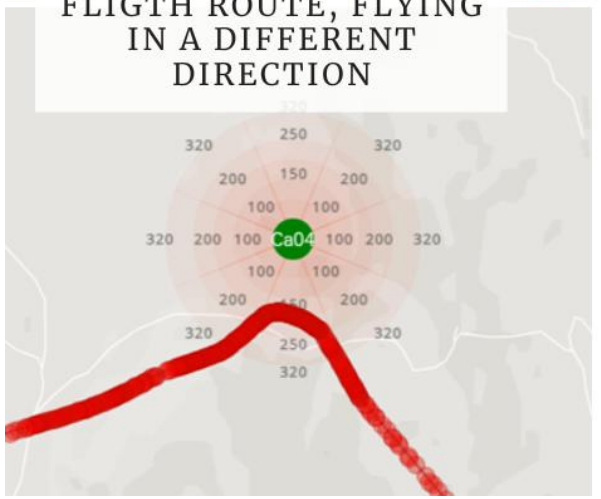
SUMMARIZED RESULTS BASING ON 2 ANALYSED CASE STUDY FROM FW IN N, SPAIN.
DCRS IS BASING ON ROTOR DIAMETER

WHAT WE KNOW ABOUT BIRDS BEHAVIOUR NEAR THE TURBINES?

RESULTS OF AUDIO AND STROBE SIGNALS OR JUST REACTION ON WT?
(PRESENTATION AT THE CWW CONFERENCE, CROATIA 2023)

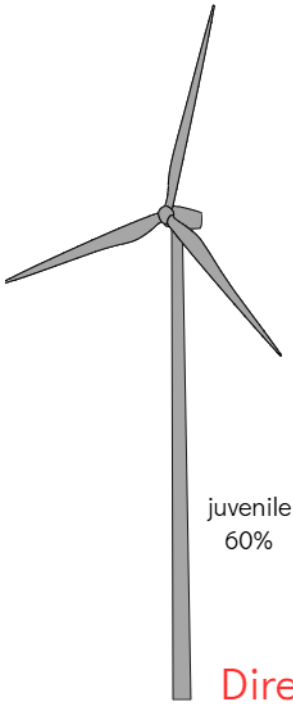






WHAT WE KNOW ABOUT BIRDS BEHAVIOUR NEAR THE TURBINES?

RESULTS OF ANALYSES OF WHITE TAILED EAGLE ACTIVITY (PRESENTATION AT THE WWRM CONFERENCE, USA 2024)

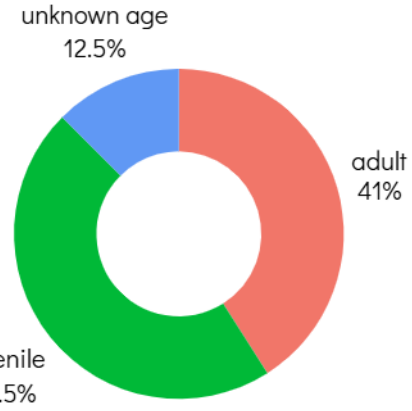


N = 10

Direct Collision Risk Zone

Grand Total = 328

N = 144

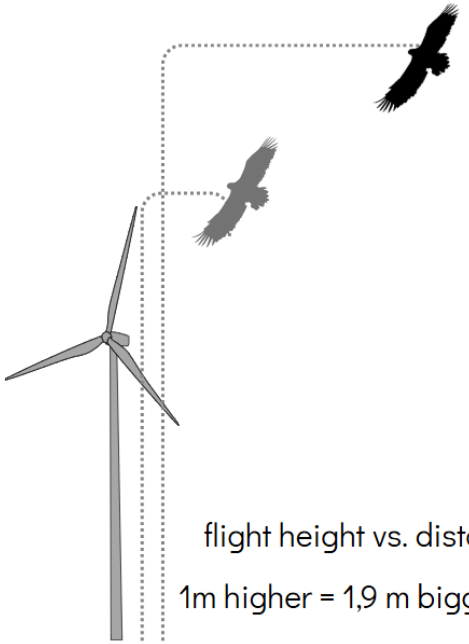


Potential Collision Risk Zone

Safe Zone

72 m

300 m



flight height vs. distance

1m higher = 1,9 m bigger distance

F-statistic = 244.2 (P<2.2E-16)

R^2 = 0.4598
adjusted R^2 = 0.4579
RSE = 164.5 on 287 df

MAIN PROBLEMS – REAL CASE STUDIES

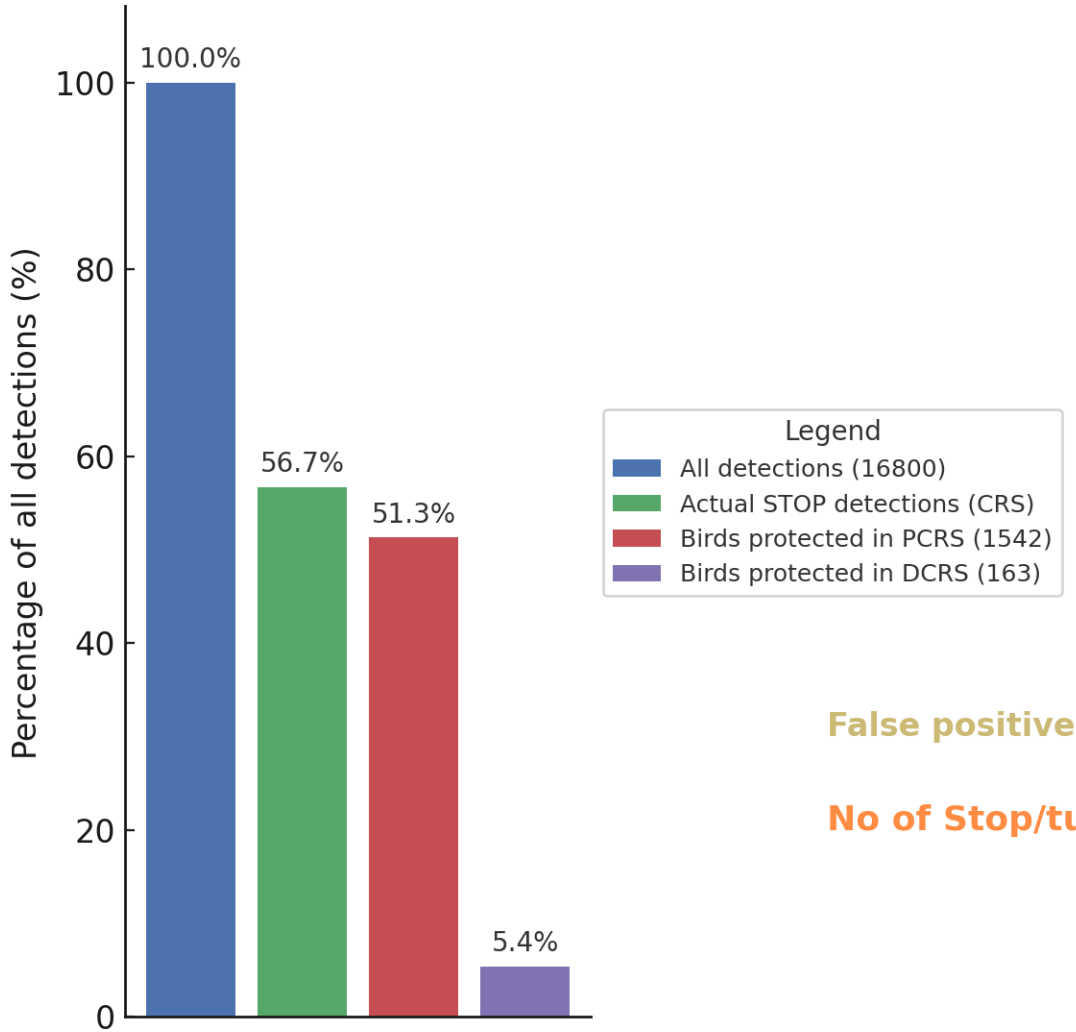
FLYING ROUTE BETWEEN BREADING

AND FEEDING AREAS,

BIRDS ARE FLYING AT HIGH ALTITUDES ,

IMPLEMENTING THE MINIMIZATION

DUE TO THE RECORDED MOTARTALITY



False positives: 0.7

No of Stop/turbine/day: 1.5

MAIN PROBLEMS – REAL CASE STUDIES

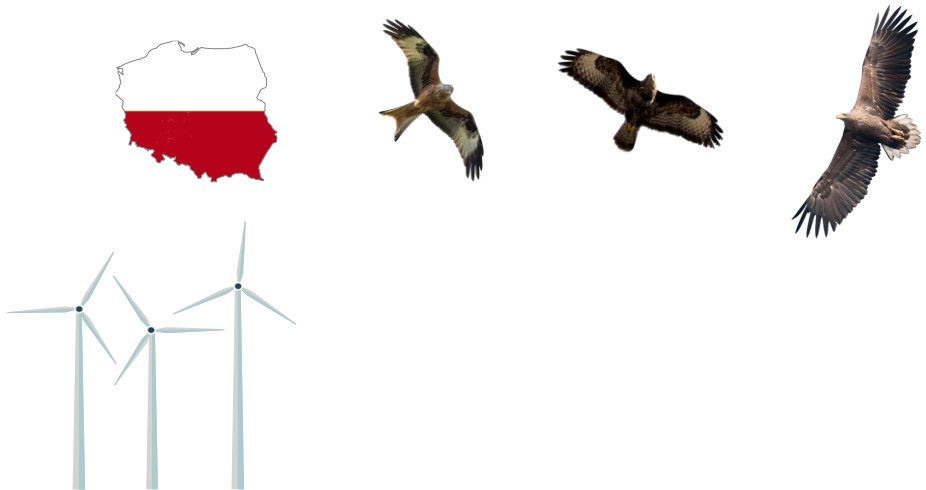
IMPORTANT BREADING AREA

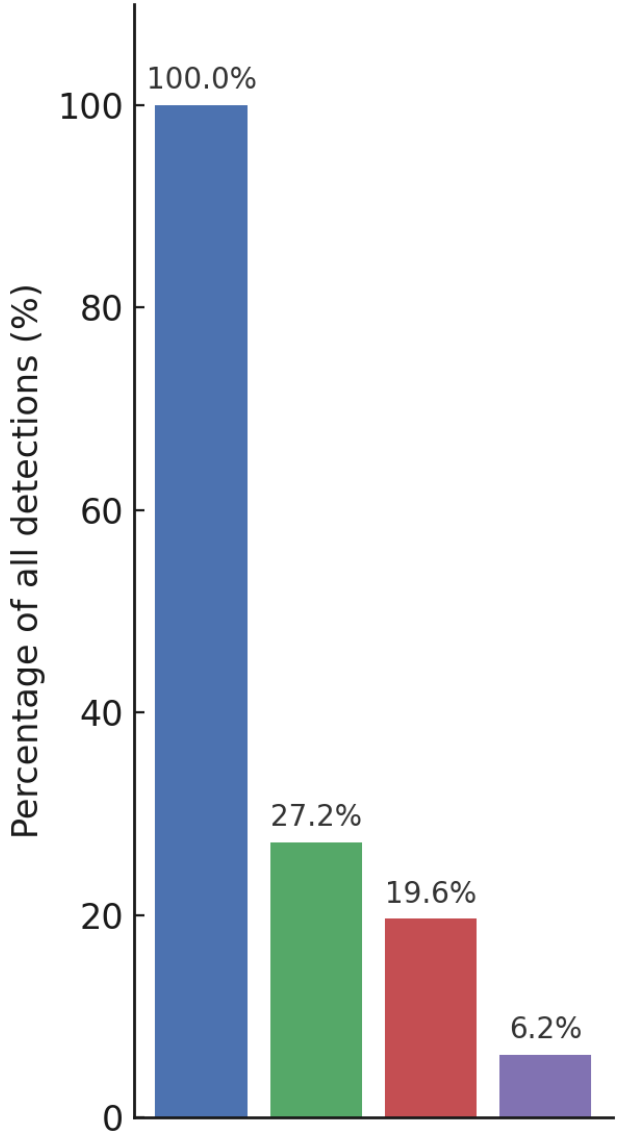
DIRECT FLYING ROUT:

BETWEEN BREADING AND FEEDING AREAS

IMPLEMENTING THE MINIMIZATION

DUE TO THE RECORDED MOTARTALITY





False positives: 0.95%

No of Stop/turbine/day: 12.3

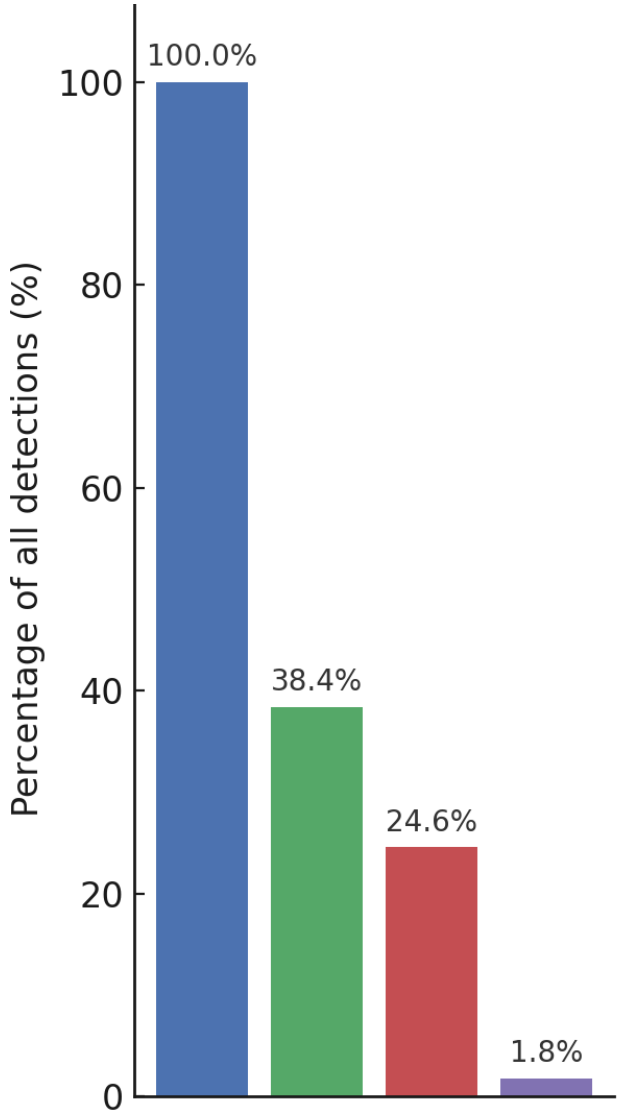
MAIN PROBLEMS – REAL CASE STUDIES

VERY IMPORTANT FLYING ROUTE

DURING MIGRATION PERIOD

IMPLEMENTING THE MINIMIZATION

DUE TO THE RECORDED MOTARTALITY



False positives: 0.02%

No of Stop/turbine/day: 13.8

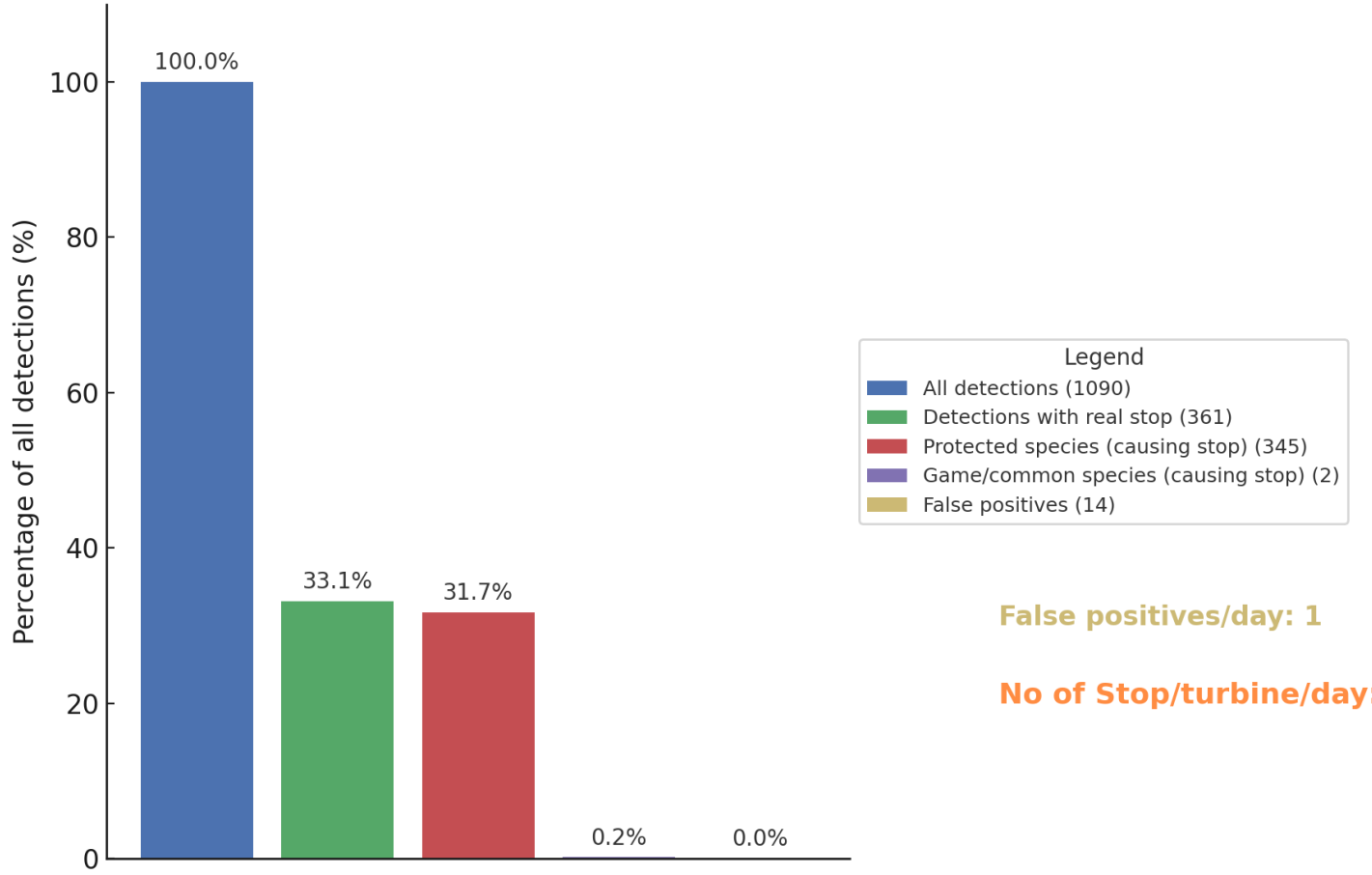
MAIN PROBLEMS – REAL CASE STUDIES

FEEDING AREA

FLYING ROUTE BETWEEN BREADING AND FEEDING AREAS,

IMPLEMENTING THE MINIMIZATION

DUE TO THE RECORDED MOTARTALITY



False positives/day: 1

No of Stop/turbine/day: 25.7

CONCLUSSIONS – LESSONS TO BE LEARNT FOR FUTURE

1. THE CASE STUDIES SHOW THAT THE NUMBER OF TURBINE STOPS AND DETECTION RATES STRONGLY DEPEND ON HOW BIRDS USE THE AREA — WHETHER IT IS A MIGRATION CORRIDOR, FEEDING GROUND, OR BREEDING AREA

2. THE FREQUENCY OF TURBINE STOPS RANGED FROM 1.5 TO 25.7 PER TURBINE PER DAY, INCREASING WITH THE INTENSITY OF BIRD ACTIVITY NEAR THE TURBINES

3. THE SHARE OF PROTECTED SPECIES (BIRDS DIRECTIVE) AMONG DETECTIONS LEADING TO STOPS VARIED BETWEEN 20–50%, CONFIRMING EFFECTIVE SPECIES PRIORITIZATION

4. COMMON OR HUNTABLE SPECIES REPRESENTED ONLY 0.2–6% OF STOPS, INDICATING A LOW RATE OF UNNECESSARY EXCLUSIONS

5. FALSE POSITIVES REMAINED VERY LOW (<1%), ENSURING MINIMAL IMPACT ON ENERGY PRODUCTION.

CONCLUSSIONS

1. PLAN TURBINES BASED ON BIRD ACTIVITY.
   FEEDING AND BREEDING AREAS REQUIRE SPECIAL ATTENTION OR MITIGATION SYSTEMS LIKE SDOD.

2. INTEGRATE REAL-TIME MONITORING.
   ADAPTIVE SYSTEMS EFFECTIVELY PROTECT BIRDS WHILE MAINTAINING ENERGY PRODUCTION.

3. USE DATA-DRIVEN SITE SELECTION.
   COMBINING ENVIRONMENTAL AND OPERATIONAL DATA SUPPORTS BALANCED DEVELOPMENT.

4. TECHNOLOGY ENABLES COEXISTENCE.
   LOW FALSE POSITIVES AND MINIMAL DOWNTIME PROVE WIND ENERGY AND BIODIVERSITY CAN COEXIST.