



WPI



# Utilizing Satellite Data to Model Water Surface Changes in the Văcărești Wetlands

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*Ananya Gopalan, Katherine Jones, Tia Mehta, Douglas Moore*

# Presentation Outline

**1. COLLABORATOR**

**2. MOTIVATION**

**3. GOAL**

**STATEMENT**

**4. OBJECTIVES &**

**METHODS**

# The Văcărești Nature Park (VNP)



**ABANDONED HYDROTECHNICAL  
RESERVOIR (1989)**



**FLOURISHING NATURE PARK  
(2016)**

# Collaborator: Văcărești Nature Park Association (VNPA)



[8]

# Collaborator: Văcărești Nature Park Association (VNPA)



[9]

# Motivation



## DROUGHT IN EASTERN EUROPE

Drought has been affecting Eastern Europe since 2017

## NATIONAL AGENCY FOR PROTECTED NATURAL AREAS

Replaced environmental NGO's in maintaining nature protected areas (2018)

## REDUCED WATER LEVELS/SURFACE AREA

The lack of funding and low volunteer engagement hinders the VNPA's efforts to maintain the park

# Goal Statement

**DEVELOP PREDICTIVE  
MODELS OF THE VĂCĂREȘTI  
WETLANDS WITH  
GEOGRAPHIC INFORMATION  
SYSTEM SOFTWARE THAT  
WILL ASSIST THE VNPA IN  
SHOWING POLICYMAKERS  
OF THE IMPORTANCE OF  
INCREASING WATER  
SURFACE AREA.**

# Stakeholders

## BUCHAREST COMMUNITY



[9]

## POLICYMAKERS



[10]

## VĂCĂREȘTI NATURE PARK ASSOCIATION



[11]

# Objective 1:

Understand how declining water surface area will affect plant and animal ecosystems in the park.



## INTERVIEW ECOLOGY SPECIALISTS

Future changes for  
wetland ecosystems

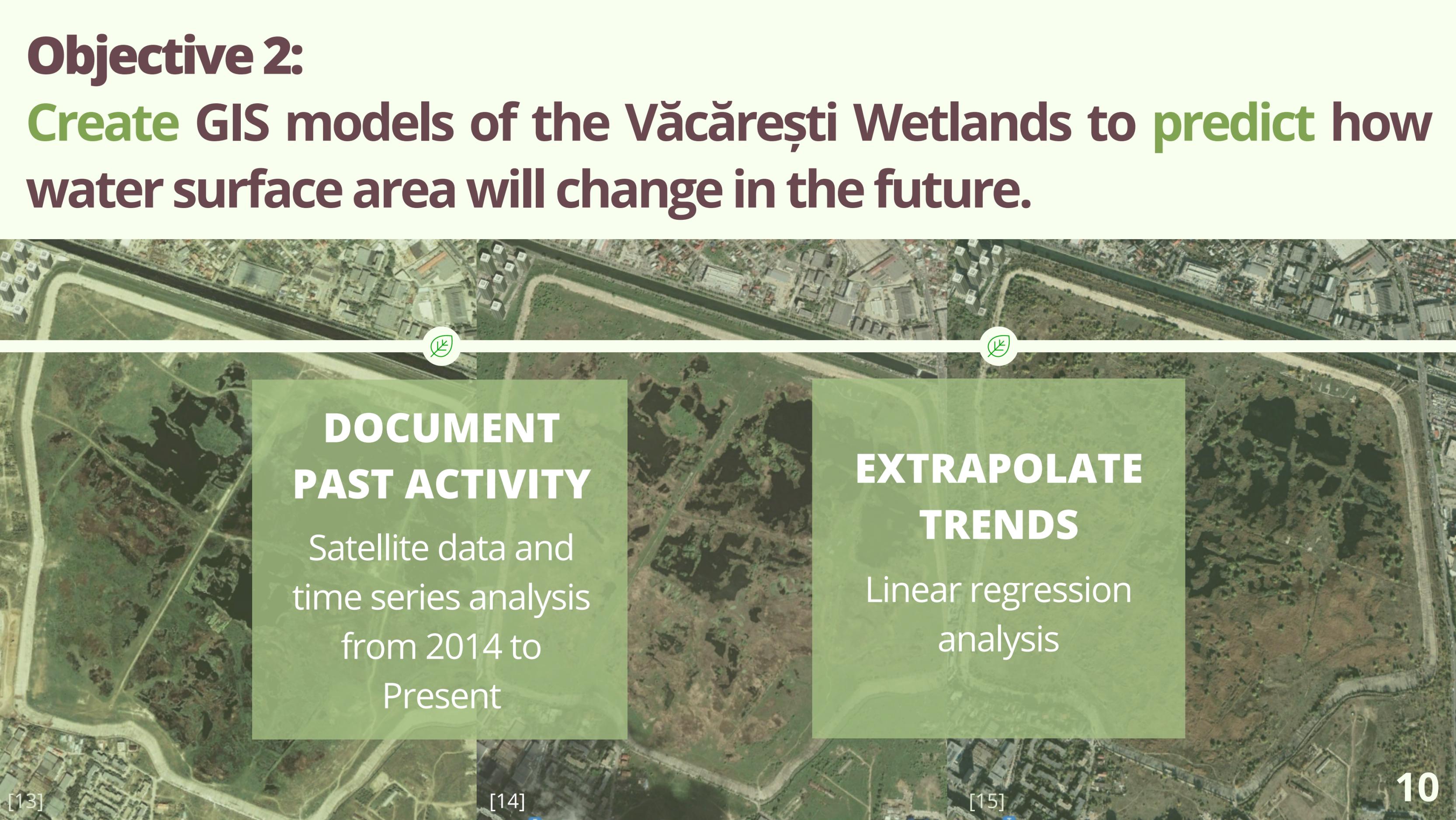


## INTERVIEW VNPA STAFF

Firsthand witnesses  
to changes in the  
park

## Objective 2:

**Create** GIS models of the Văcărești Wetlands to **predict** how water surface area will change in the future.



**DOCUMENT  
PAST ACTIVITY**

Satellite data and  
time series analysis  
from 2014 to  
Present

**EXTRAPOLATE  
TRENDS**

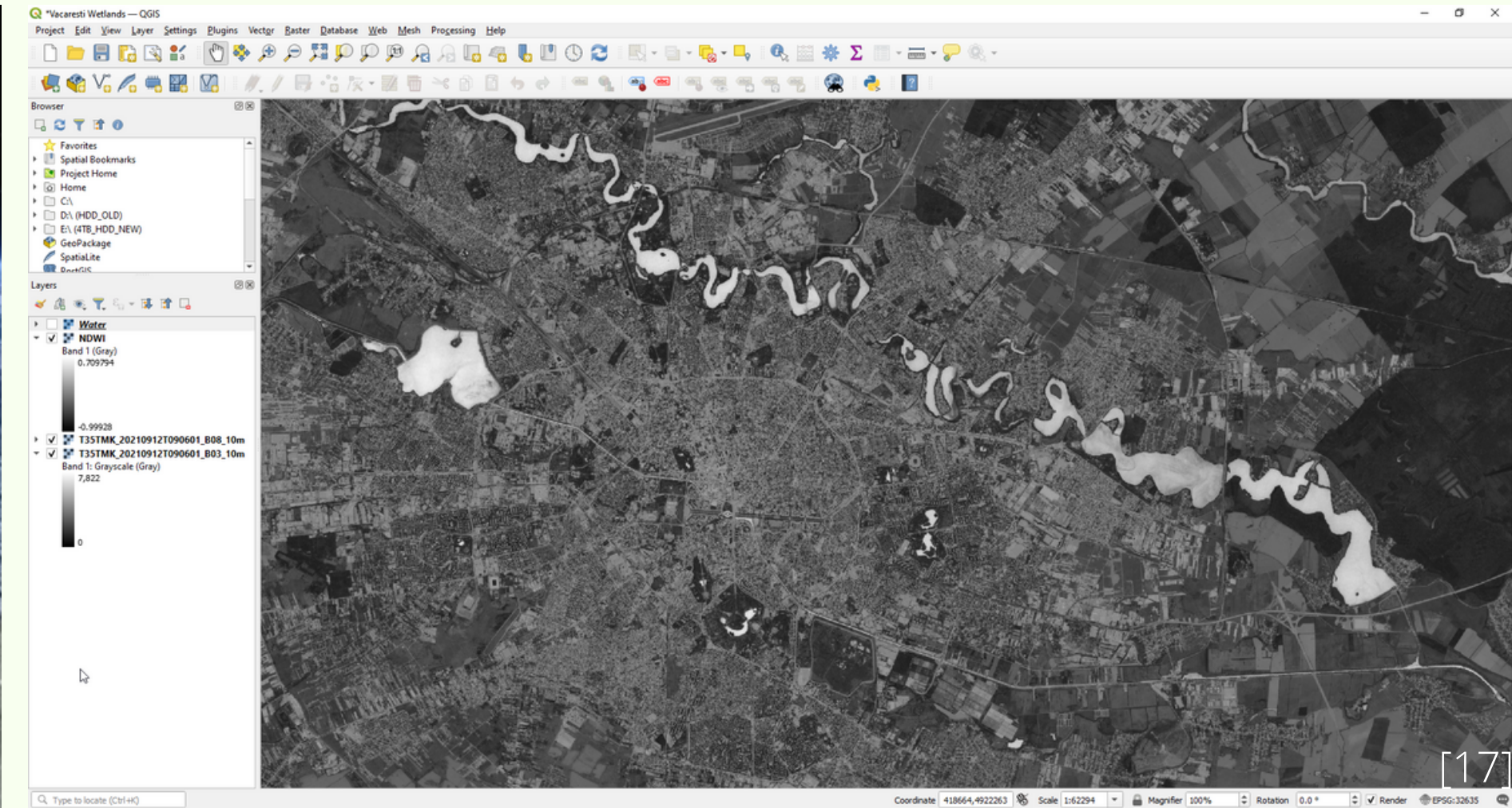
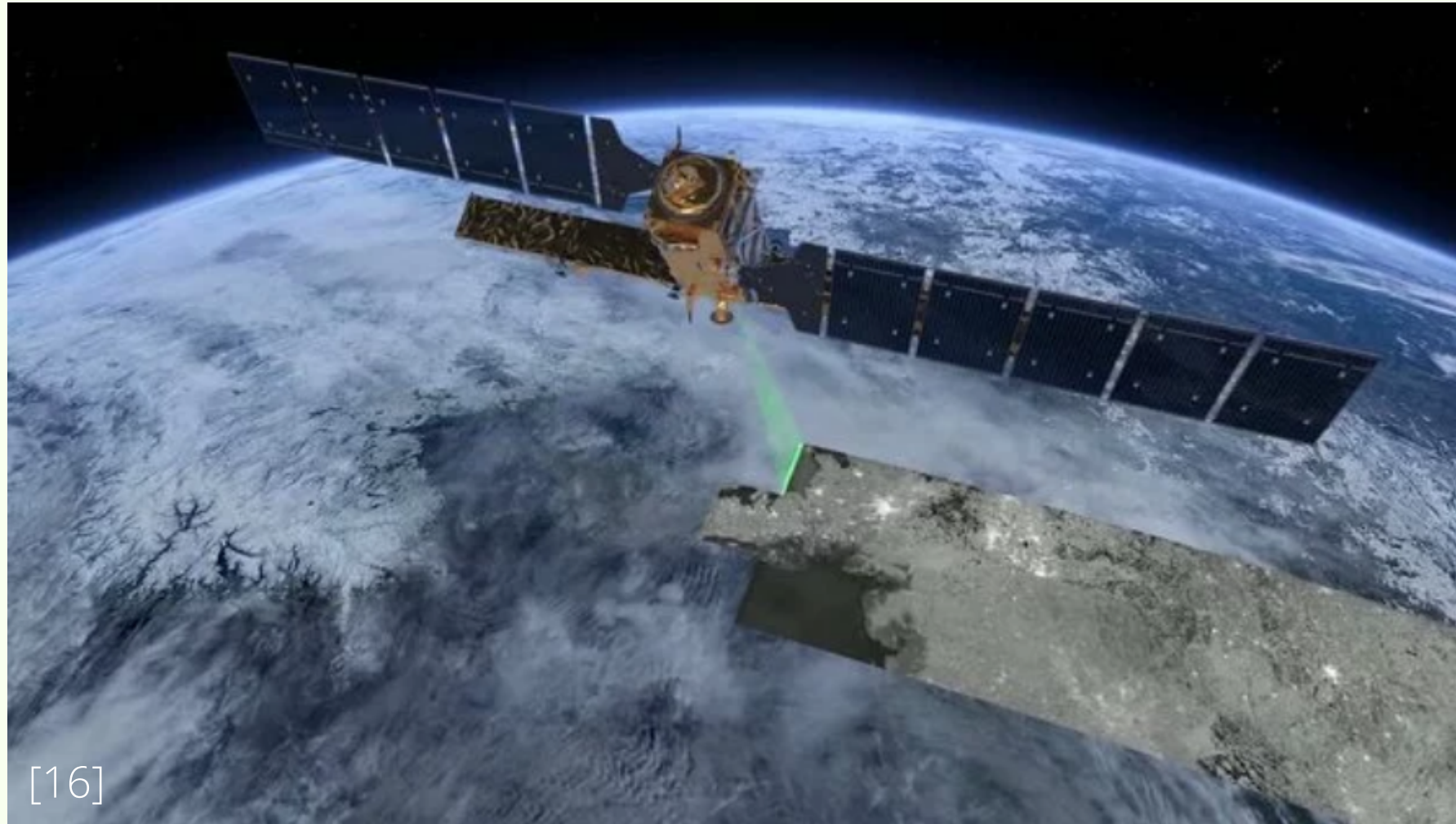
Linear regression  
analysis

## Objective 2:

Create GIS models of the Văcărești Wetlands to predict how water surface area will change in the future.



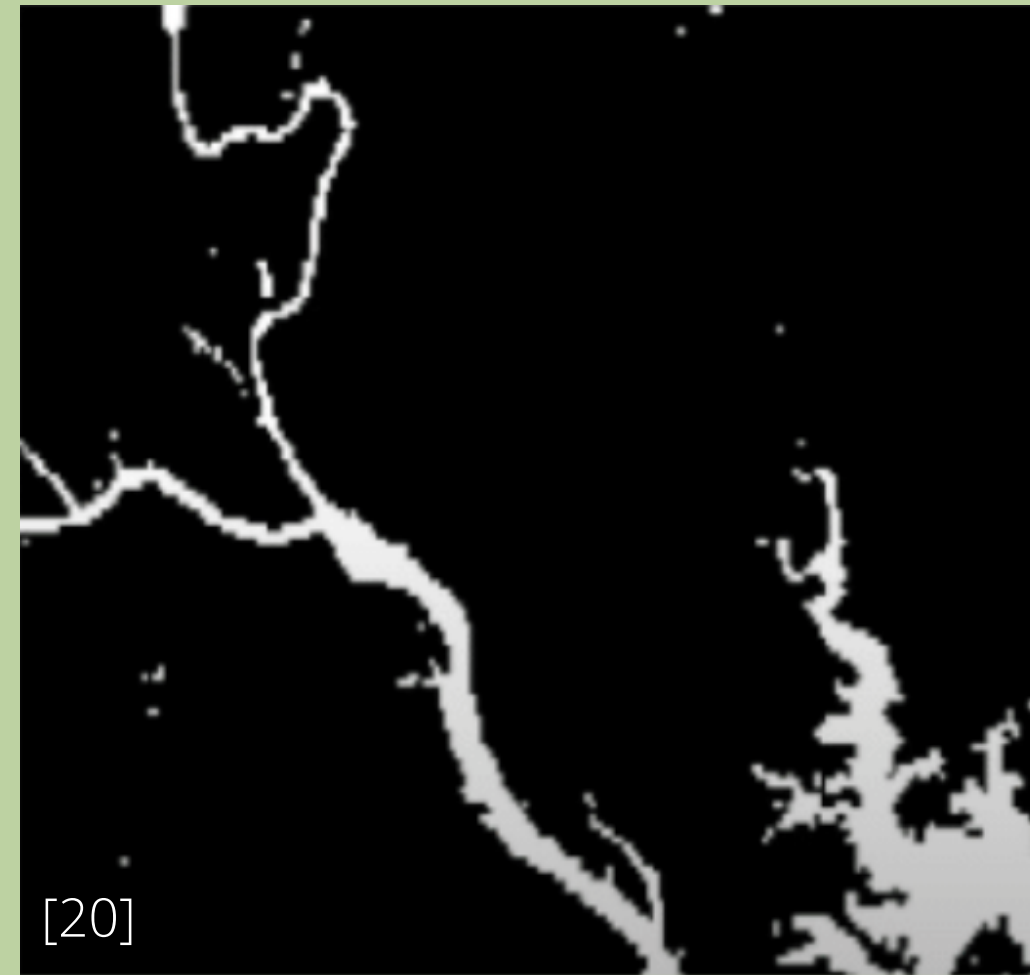
# Geographic Information System (GIS) Software



# Normalized Difference Water Index (NDWI)



**SATELLITE  
IMAGE**



**NDWI-PROCESSED  
IMAGE**

## Objective 3:

**Present** findings to the VNPA for their **use** on social media sites to attract **government attention**.



### COMPILE RESEARCH

Assemble results  
into a technical  
document



### PRESENTATION

Create a  
presentation that  
will be accessible to  
the public

# Conclusion



# Acknowledgements



**PROFESSOR ROBERT KINICKI**

*Project Advisor*



**PROFESSOR  
ALTHEA DANIELSKI**

*Project Advisor*



**DAN BARBULESCU**

*Collaborator*

# Image Credits

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- [2]: [https://parcnaturalvacaresti.ro/wp-content/uploads/2021/01/Brotacel\\_rasaritean\\_Hyla\\_orientalis\\_.jpg](https://parcnaturalvacaresti.ro/wp-content/uploads/2021/01/Brotacel_rasaritean_Hyla_orientalis_.jpg)
- [3]: [file:///C:/Users/DougM/Zotero/storage/GGXK7277/Andrei\\_Birsan\\_Vacaresti\\_1989\\_web.html](file:///C:/Users/DougM/Zotero/storage/GGXK7277/Andrei_Birsan_Vacaresti_1989_web.html)
- [4]: [https://en.wikipedia.org/wiki/V%C4%83c%C4%83re%C8%99ti\\_Nature\\_Park](https://en.wikipedia.org/wiki/V%C4%83c%C4%83re%C8%99ti_Nature_Park)
- [5]: [https://s.wsj.net/public/resources/images/OB-RA162\\_danube\\_G\\_20111215112341.jpg](https://s.wsj.net/public/resources/images/OB-RA162_danube_G_20111215112341.jpg)
- [6]: <https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcT06mV7gvPhM2X43RjuMcmocuNk5rPJyNRjVHcVQLGDxtV4eVhKr4a2V6oWTq51gXX9KhU&usqp=CAU>
- [7]: [https://cdn.romania-insider.com/cdn/ff/h3ON4CbaVrb2vxL9X0UDlil9sx1u8TTWusv8xbYqT8E/1628848842/public/styles/article\\_large\\_image/public/featured\\_images/Romanian-PM-Dacian-Ciolos-picking-up-garbage-in-Bucharests-Vacaresti-Natural-Park.jpg](https://cdn.romania-insider.com/cdn/ff/h3ON4CbaVrb2vxL9X0UDlil9sx1u8TTWusv8xbYqT8E/1628848842/public/styles/article_large_image/public/featured_images/Romanian-PM-Dacian-Ciolos-picking-up-garbage-in-Bucharests-Vacaresti-Natural-Park.jpg)
- [8]: <https://business.facebook.com/parculnaturalvacaresti/photos/4818932648172048>
- [9]: [https://parcnaturalvacaresti.ro/wp-content/uploads/2021/02/retina-LOGO\\_pv\\_white\\_GREEN\\_3.png](https://parcnaturalvacaresti.ro/wp-content/uploads/2021/02/retina-LOGO_pv_white_GREEN_3.png)
- [10]: <https://parcnaturalvacaresti.ro/wp-content/uploads/2021/01/1-articol-pe-vale.jpg>
- [11]: <https://www.romania-insider.com/bucharests-vacaresti-lake-natural-park>
- [12]: <https://parcnaturalvacaresti.ro/biodiversitate/>
- [13, 14, 15]: Google earth pro historical imagery
- [16]: [https://www.esa.int/var/esa/storage/images/esa\\_multimedia/videos/2014/03/copernicus/14335170-2-eng-GB/Copernicus\\_large.jpg](https://www.esa.int/var/esa/storage/images/esa_multimedia/videos/2014/03/copernicus/14335170-2-eng-GB/Copernicus_large.jpg)
- [17]: Satellite image imported into QGIS (self generated)
- [18]: <https://www.copernicus.eu/themes/custom/copernicus/logo.svg>
- [19, 20]: <https://www.youtube.com/c/GeoGuru1>
- [21]: <http://www.worldrecordacademy.com/biggest/img/RomanianParliament.jpg>
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# Multumesc!

*Questions?*