



FAST DANUBE

***Technical Assistance for Revising and Complementing the Feasibility Study
Regarding the Improvement of Navigation Conditions on the Romanian-Bulgarian Common Sector of the Danube and
Complementary Studies***



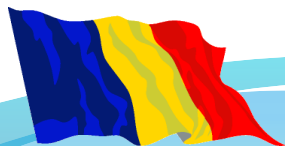
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<i>Time</i>	<i>Topic</i>	<i>Responsible</i>
09:00 – 09:30	<i>Registration / Coffee</i>	<i>All</i>
WORKSHOP ON «Options Appraisal / Selection for FAST DANUBE project»		
09.30 – 9:45	Introduction: <ul style="list-style-type: none"> – Welcome – H&S moment – Project status 	Mr. Dan TARARA Mr. Romeo SOARE
09.45 – 11.00	Session 1: <ul style="list-style-type: none"> – Initial option preferences, morphological (Prof Colin Thorne via skype) – Revised options modelling / engineering / CBA – Environmental studies – Q&A 	Mr. Paul RAYNER Mr. Damian DEBSKI Ms. Roxana DORNEANU Ms. Charlotte HANDY
11.00 – 11.30	<i>Coffee break</i>	
11.30 – 13.00	Session 2: <ul style="list-style-type: none"> – Multi-criteria analysis: introductory session 	Mr. Dan TARARA Mr. Paul RAYNER Ms. Roxana DORNEANU Ms. Charlotte HANDY
13.00 – 13.45	<i>Lunch</i>	
13.45 – 15.30	Session 3: <ul style="list-style-type: none"> – Multi-criteria analysis: interactive session 	Mr. Dan TARARA Mr. Paul RAYNER Ms. Roxana DORNEANU Ms. Charlotte HANDY
15.30 – 16.00	Session 4: <ul style="list-style-type: none"> – Consensus view on long term sustainable options 	
16.00	Closing statement	Mr. Romeo SOARE



Modelling work in progress

- Detailed review of performance of low level structures and how simulated in model
- Review of initial options model results and identification of improvements to options
- Re-testing of refined options for 4 critical locations (Bechet, Corabia, Belene, Popina)
- Initial morphological modelling to help understand benefits and impacts



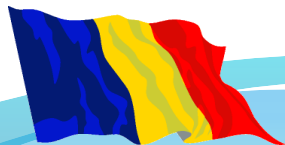
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Modelling work in progress

- Review of representation of low level structures in MIKE21 FM 2D model
 - Two main methods available:
 - i) “Dike” structure (sub-grid module calculating flow over a line representing the structure)
 - ii) Simple representation of structure in model bathymetry
- Review of hydraulic methods, published experimental data, current practices
- Sensitivity testing



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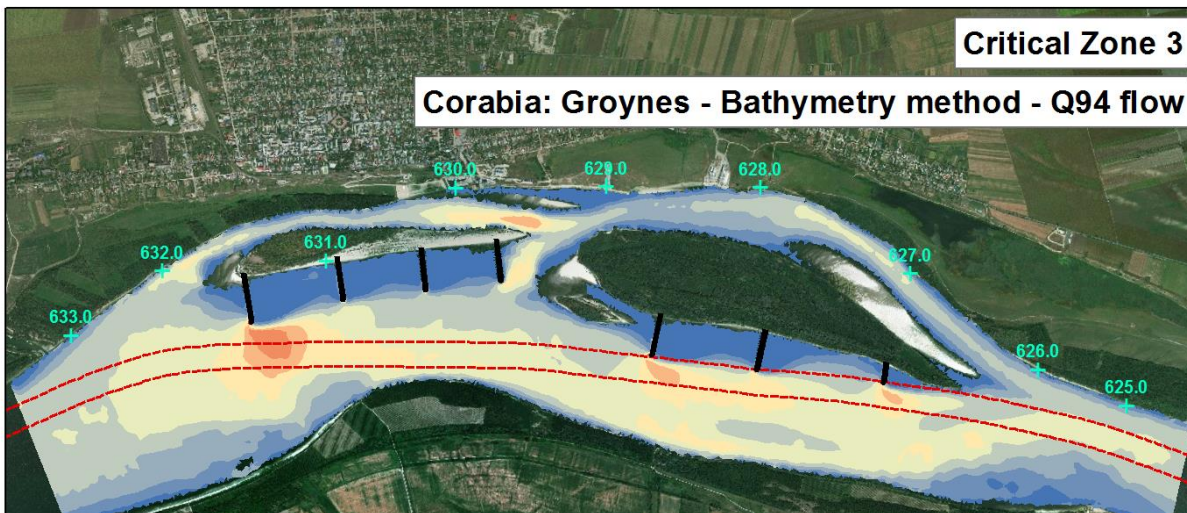




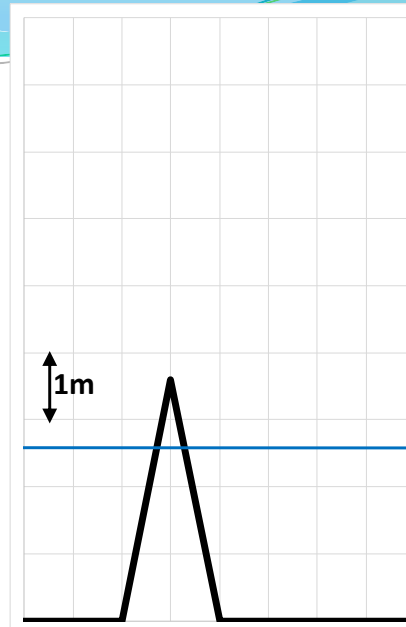
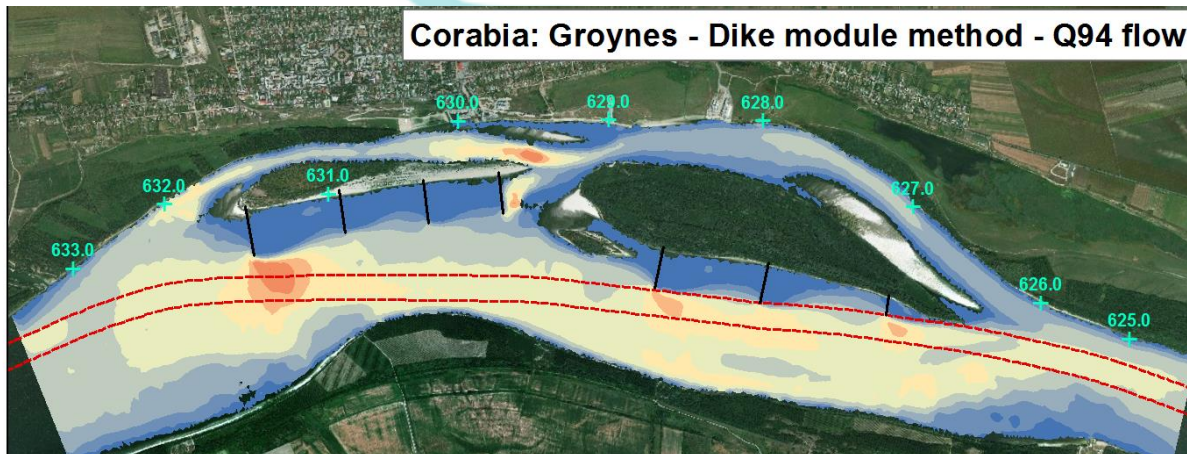
Modelling

Critical Zone 3

Corabia: Groynes - Bathymetry method - Q94 flow



Corabia: Groynes - Dike module method - Q94 flow



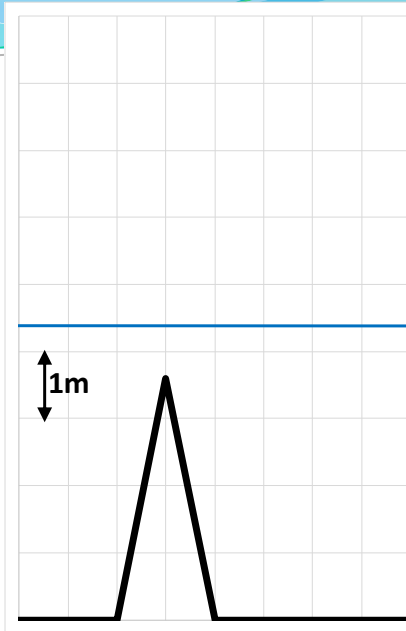
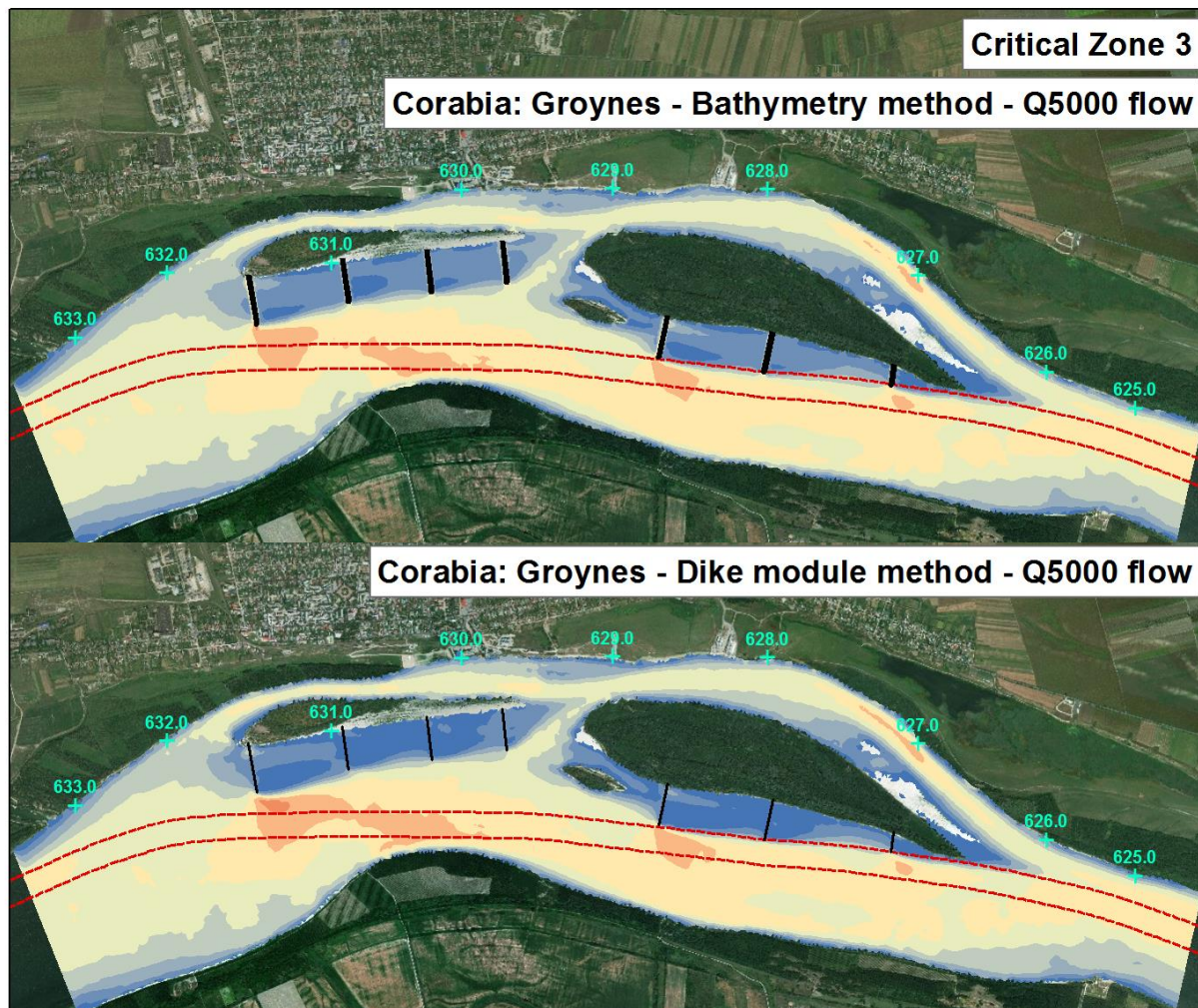
Legend

- + KM marker
- Current fairway
- Velocity (m/s)**
- 0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1
- 1 - 1.2
- 1.2 - 1.4
- 1.4 - 1.6
- 1.6 - 1.8
- 1.8 - 2





Modelling



Legend

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- Velocity (m/s)**
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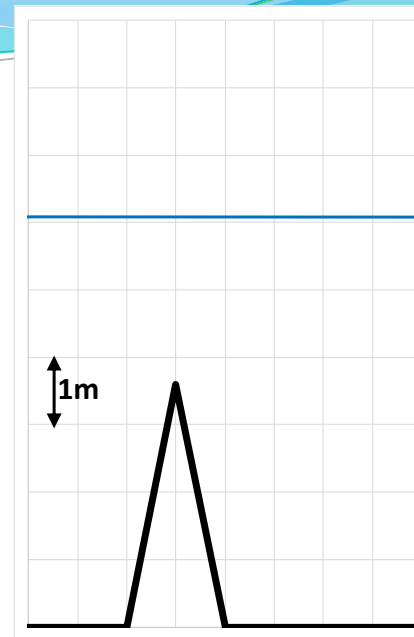
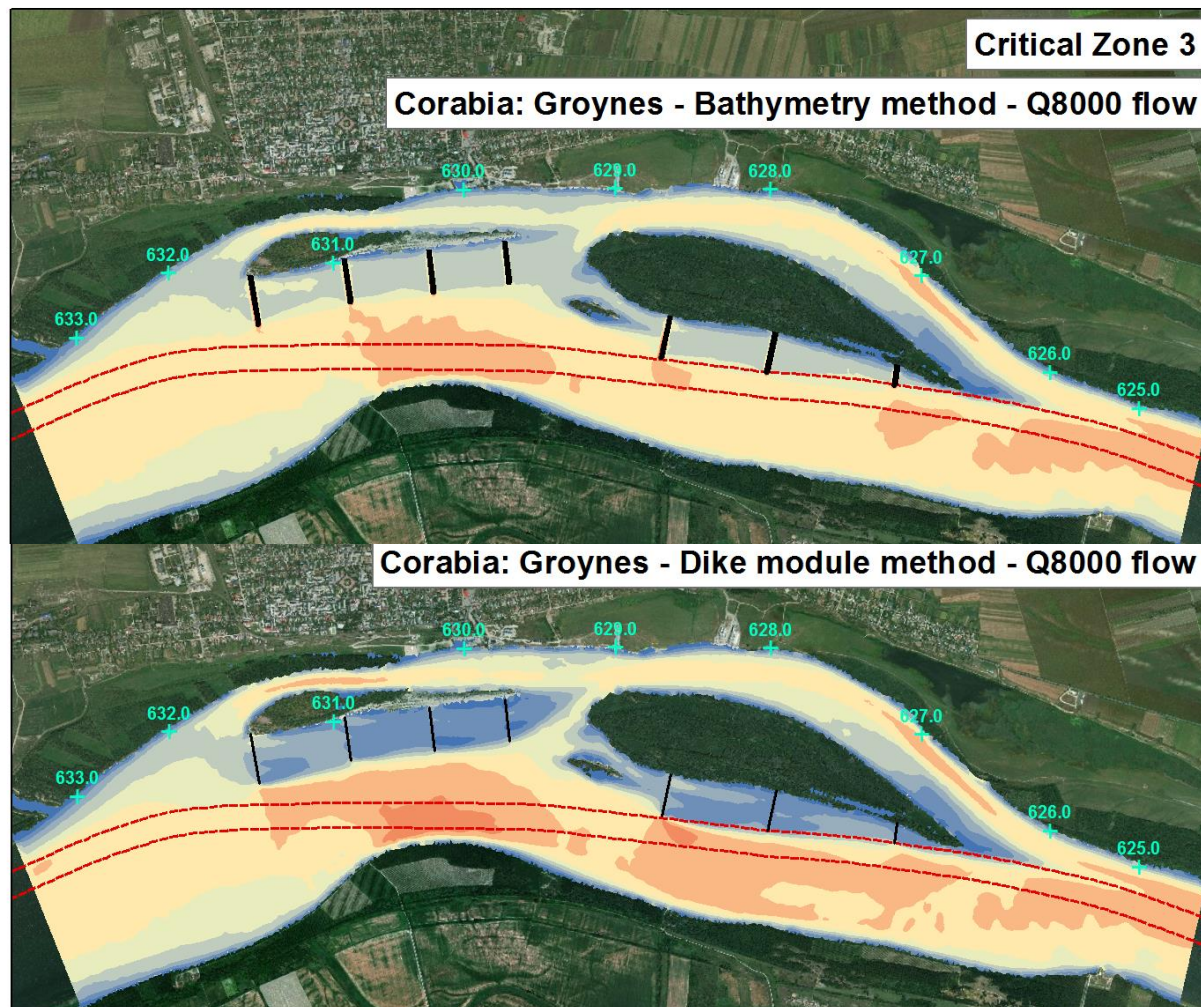


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Modelling



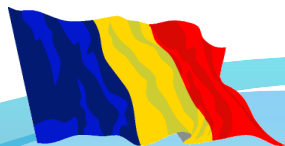
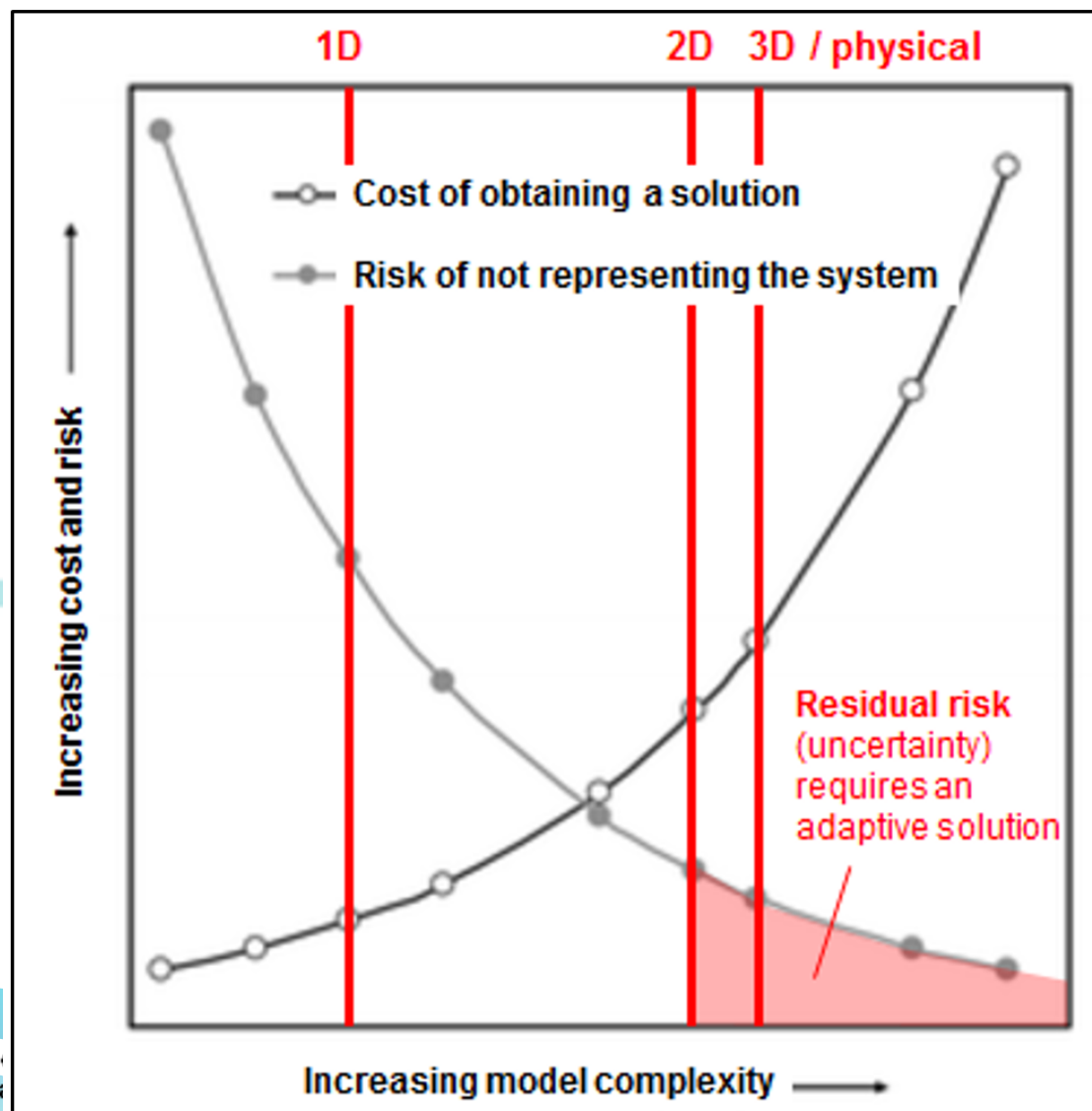
Legend

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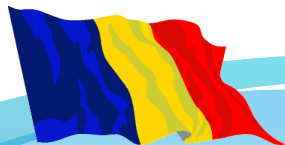
- Sensitivity of MCA results to uncertainty in model results needs to be considered
- Options to reduce uncertainty (if needed)
 - Further refinement of 2D models
 - 3D models





Modelling

- Review of initial options model results and identification of improvements to options
- Focus on 4 locations where interventions likely to be beneficial
- Consider
 - Velocity distribution
 - Size of structures
 - Feedback from stakeholders



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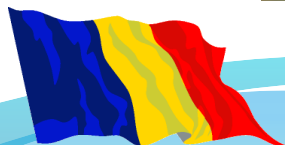
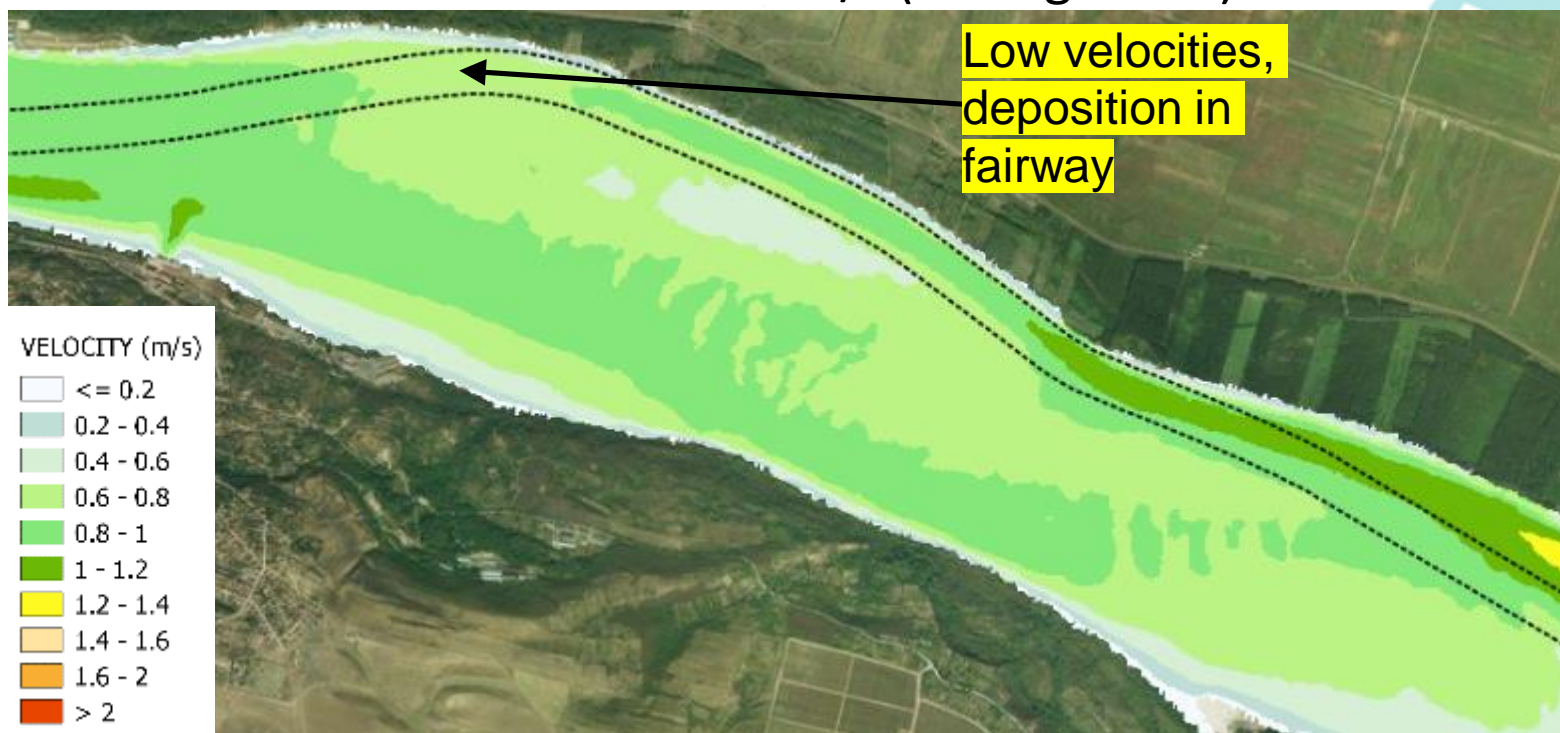




Modelling

- Example – Bechet

Baseline - Velocities 5000m³/s (average flow)



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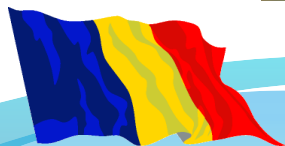
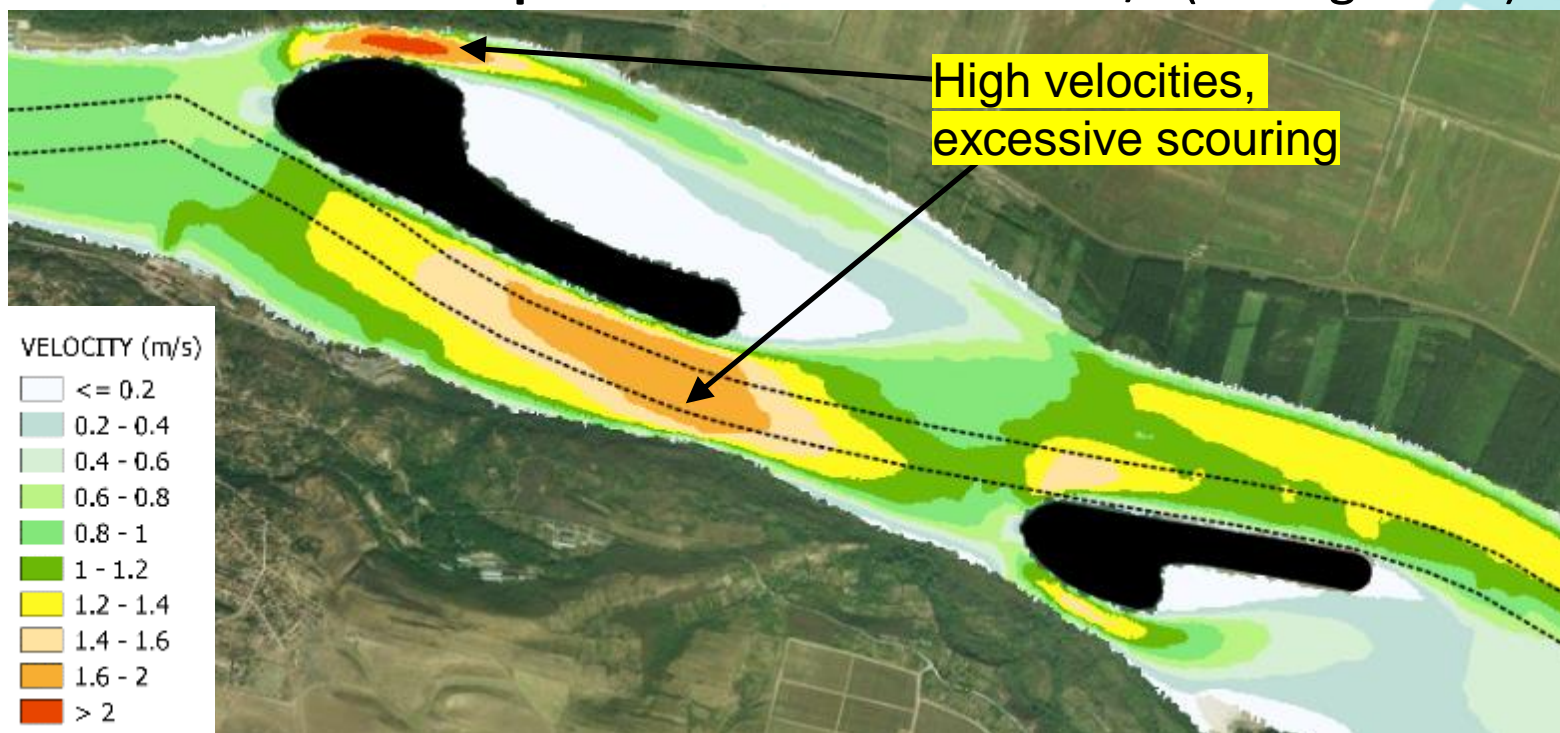




Modelling

- Example – Bechet

Initial Islands Option - Velocities 5000m³/s (average flow)



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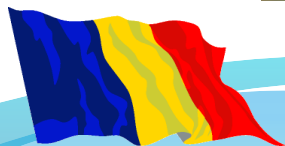
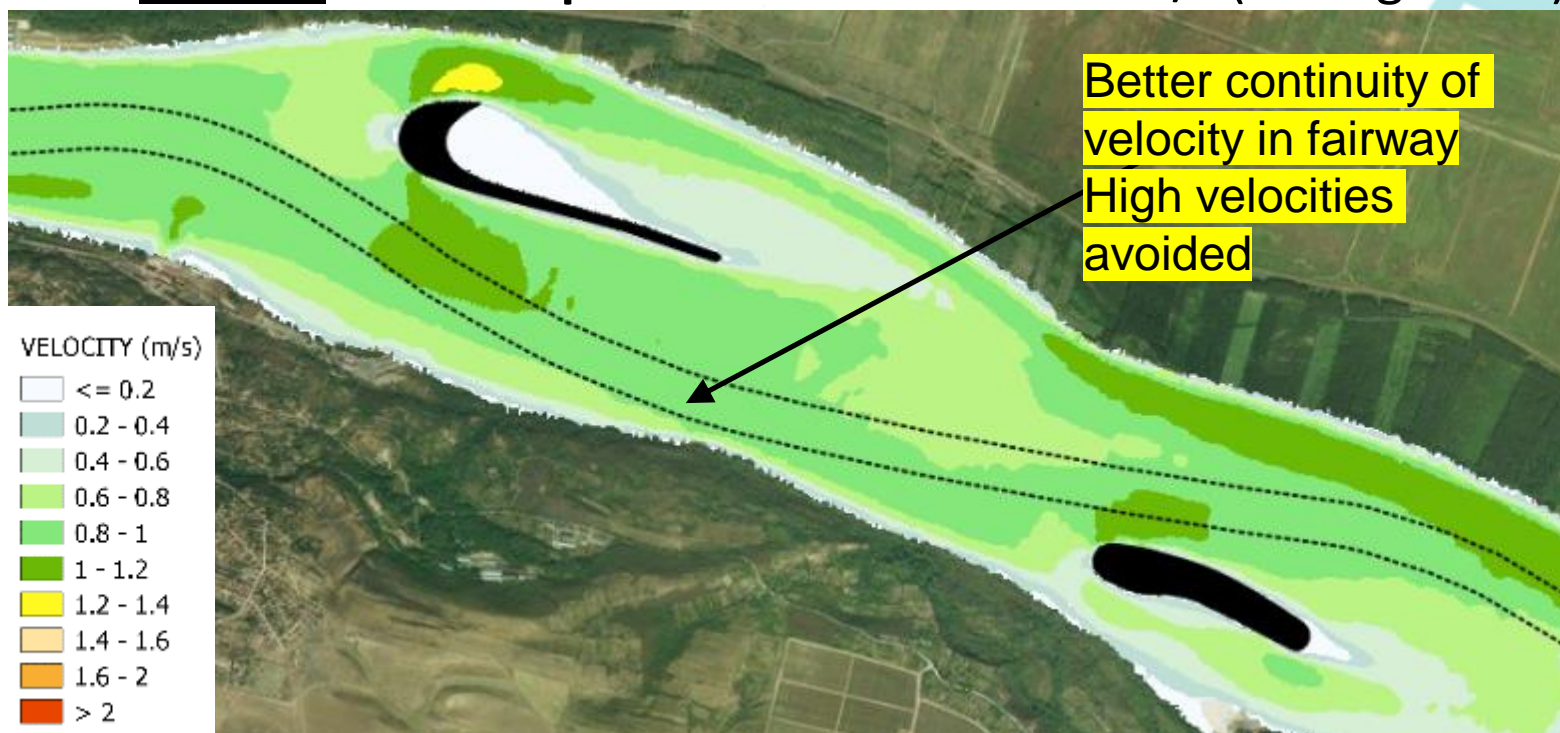




Modelling

- Example – Bechet

Refined Islands Option - Velocities 5000m³/s (average flow)



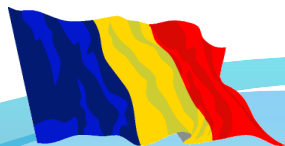
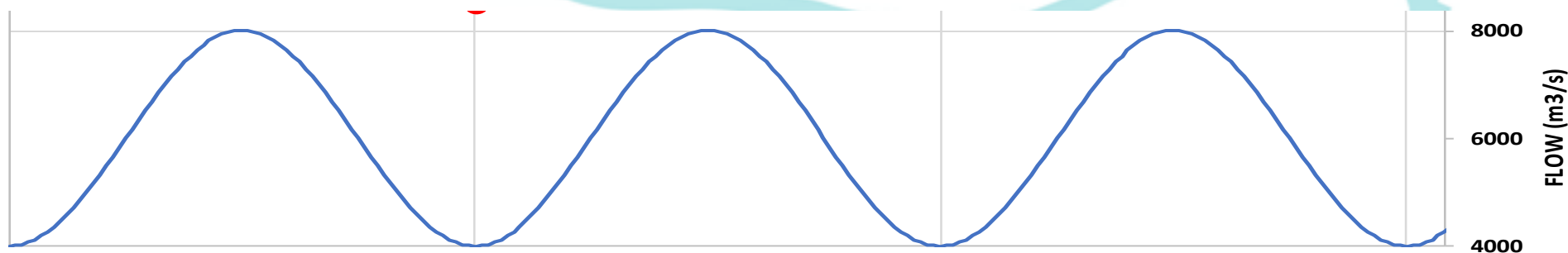
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Modelling

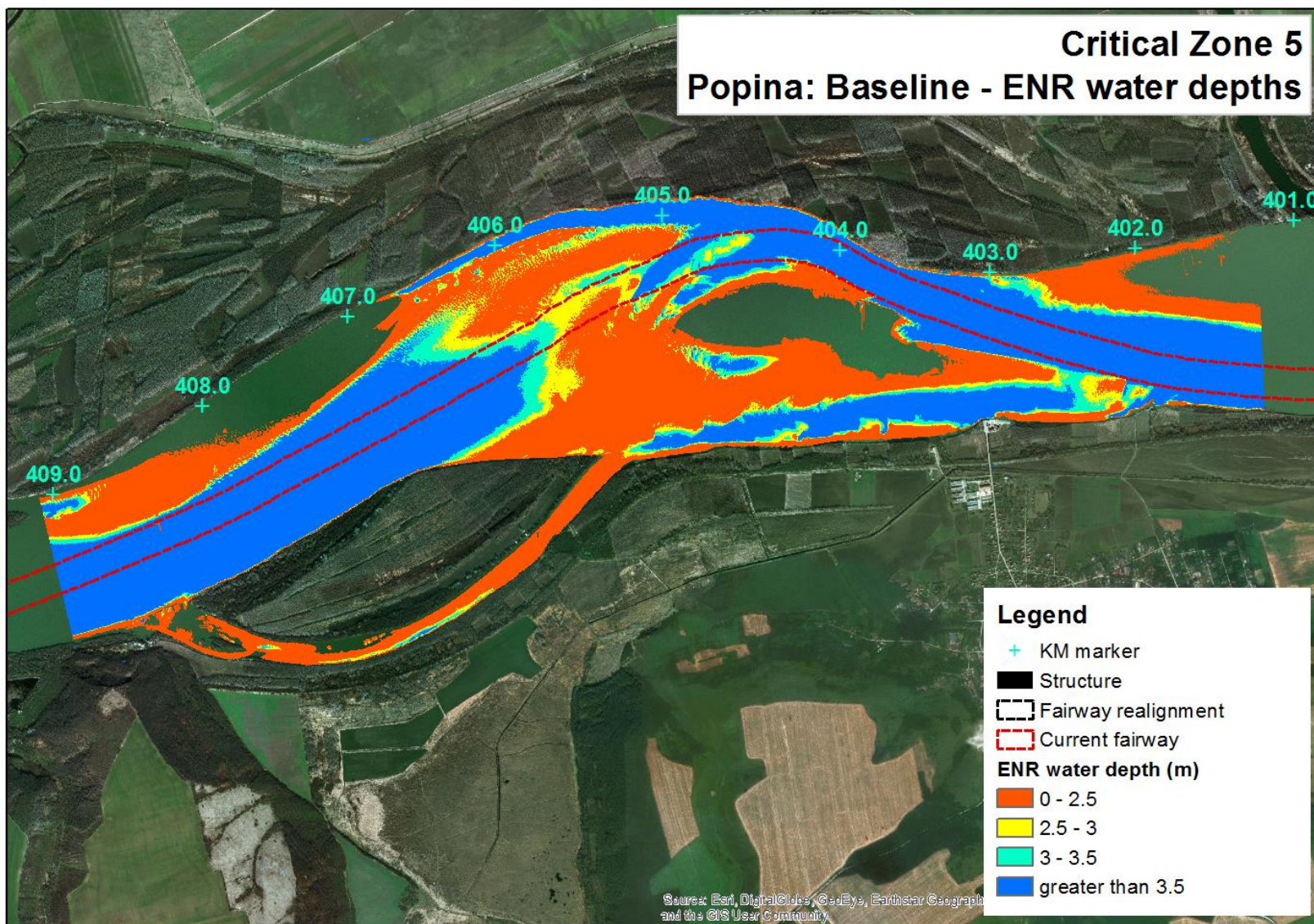
- Morphological simulations:
 - Simulate 3No “dominant discharge” (8000m³/s) flow hydrographs
- Example : Popina
 - Compare “Dredge existing fairway” with “Realigned fairway and island”



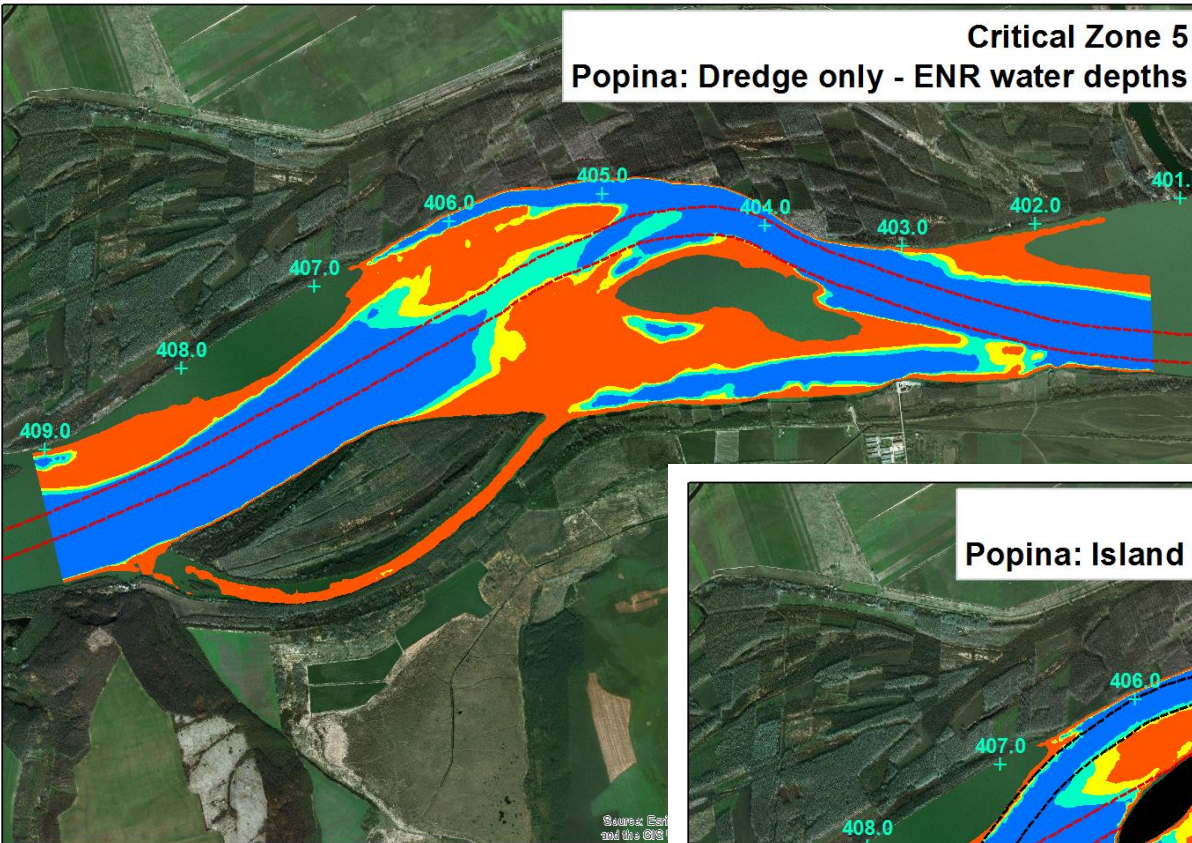
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Critical Zone 5 Popina: Baseline - ENR water depths

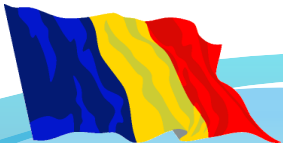
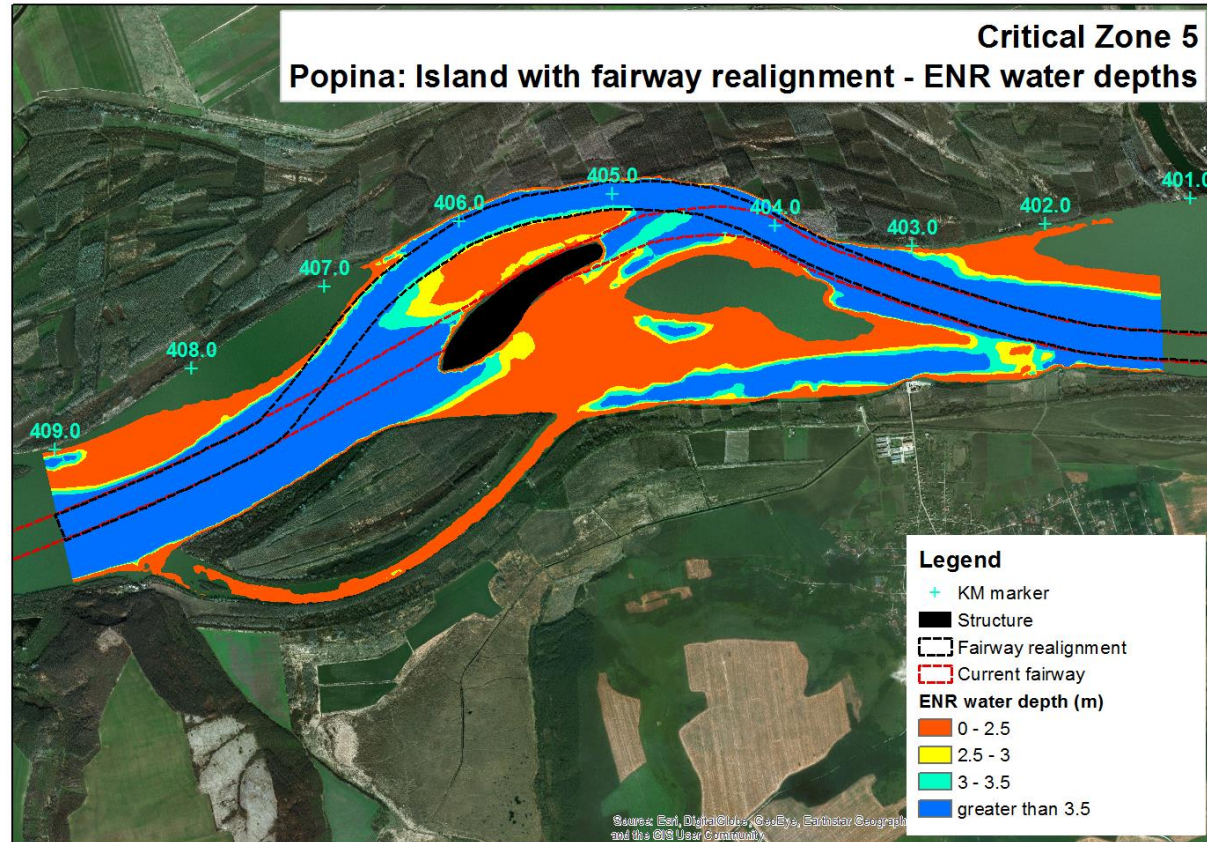


Critical Zone 5
Popina: Dredge only - ENR water depths

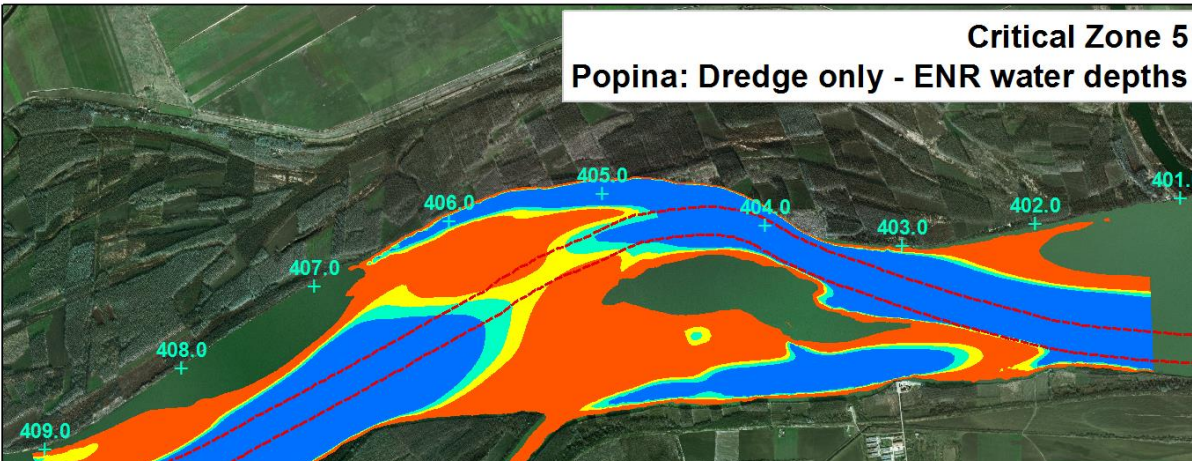


INITIAL STATE

Critical Zone 5
Popina: Island with fairway realignment - ENR water depths

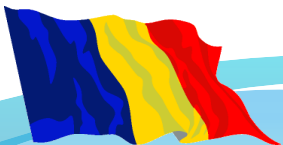
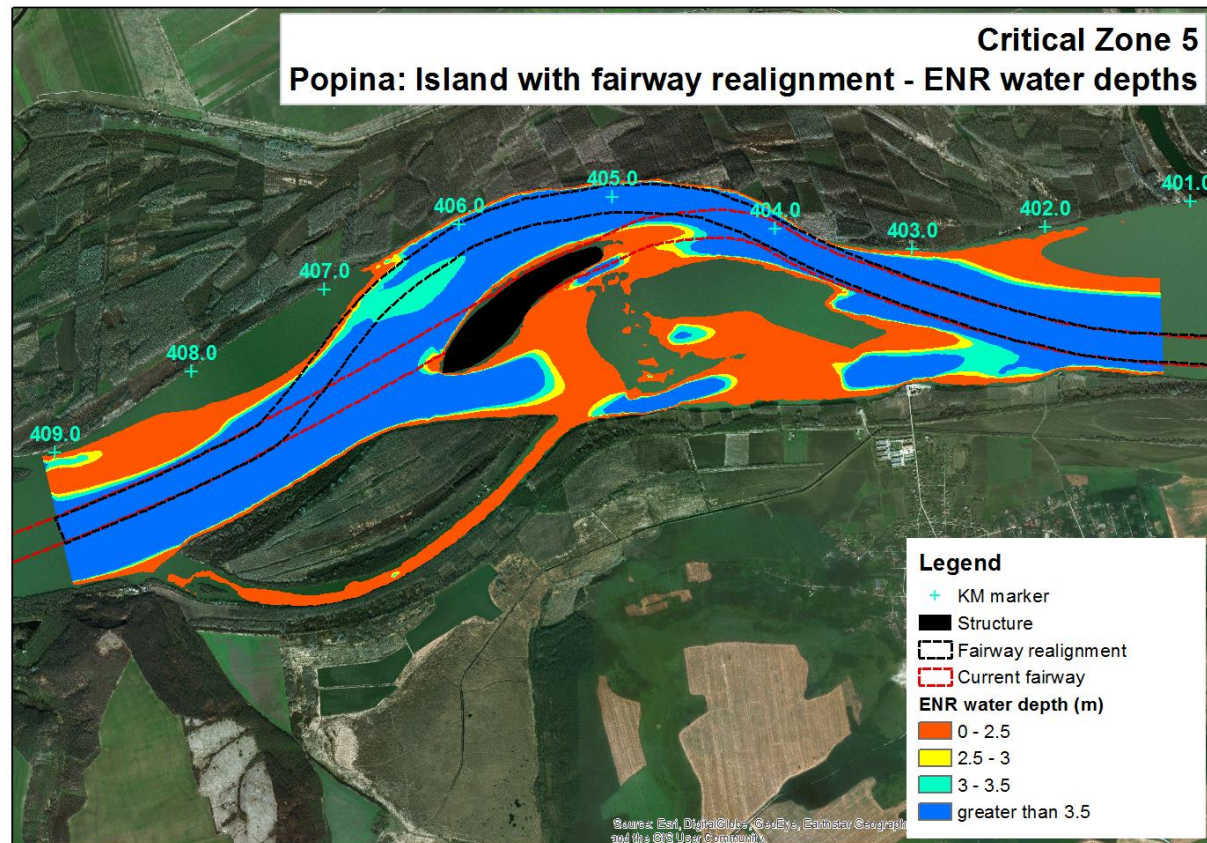


Critical Zone 5
Popina: Dredge only - ENR water depths

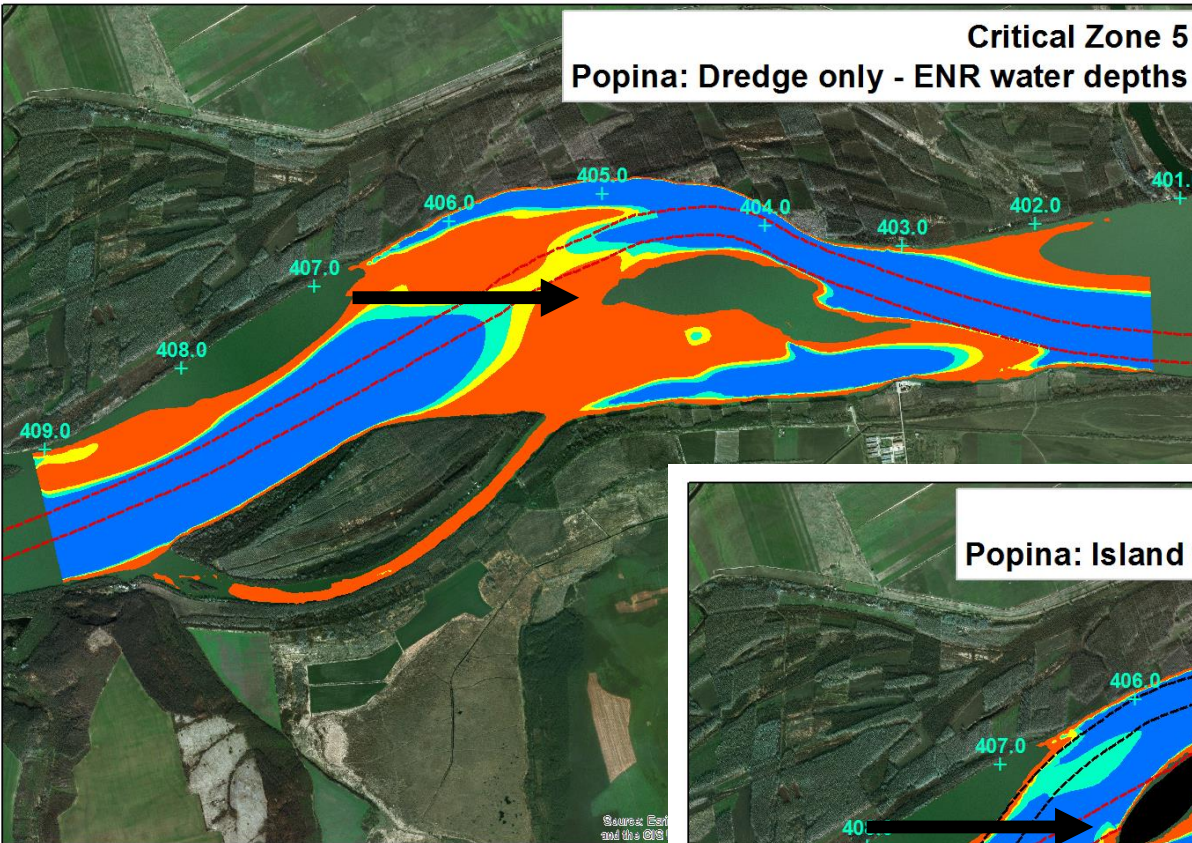


END STATE

Critical Zone 5
Popina: Island with fairway realignment - ENR water depths

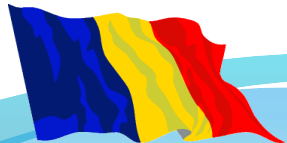
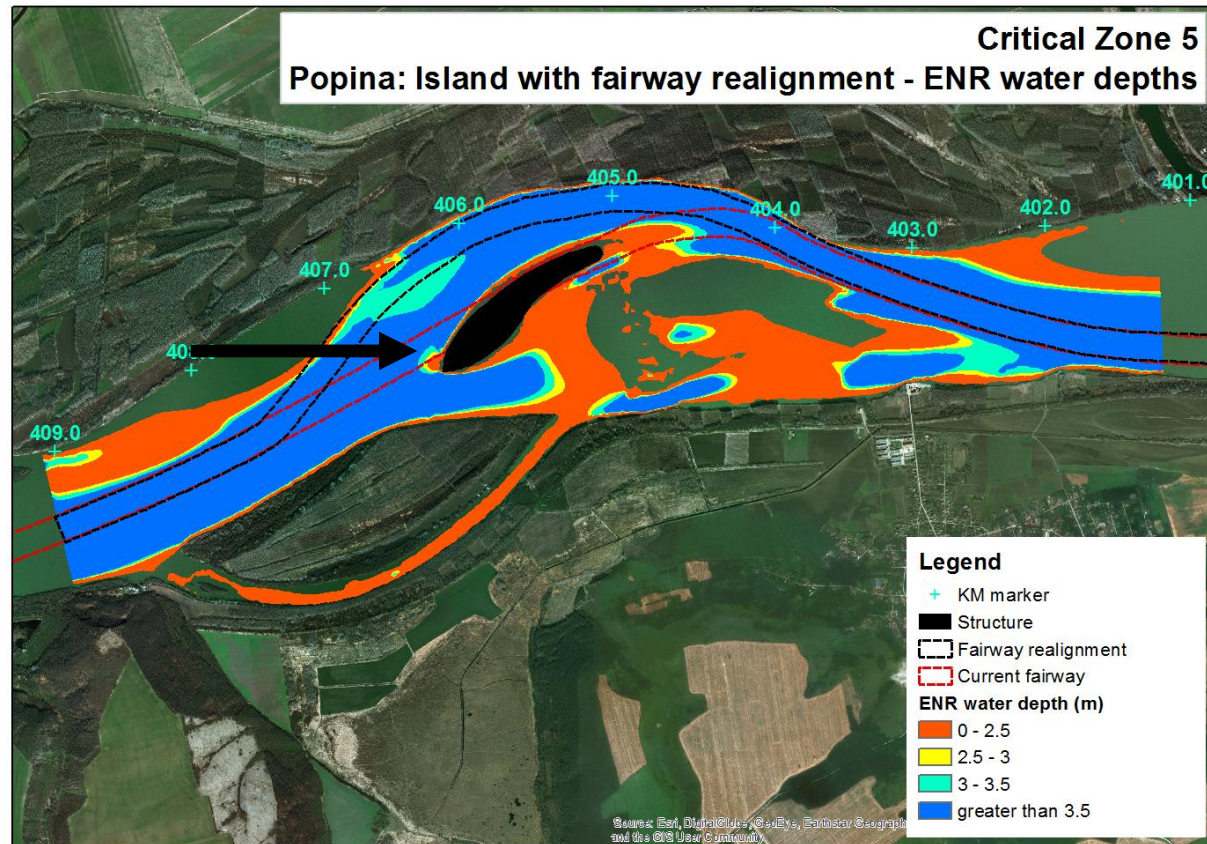


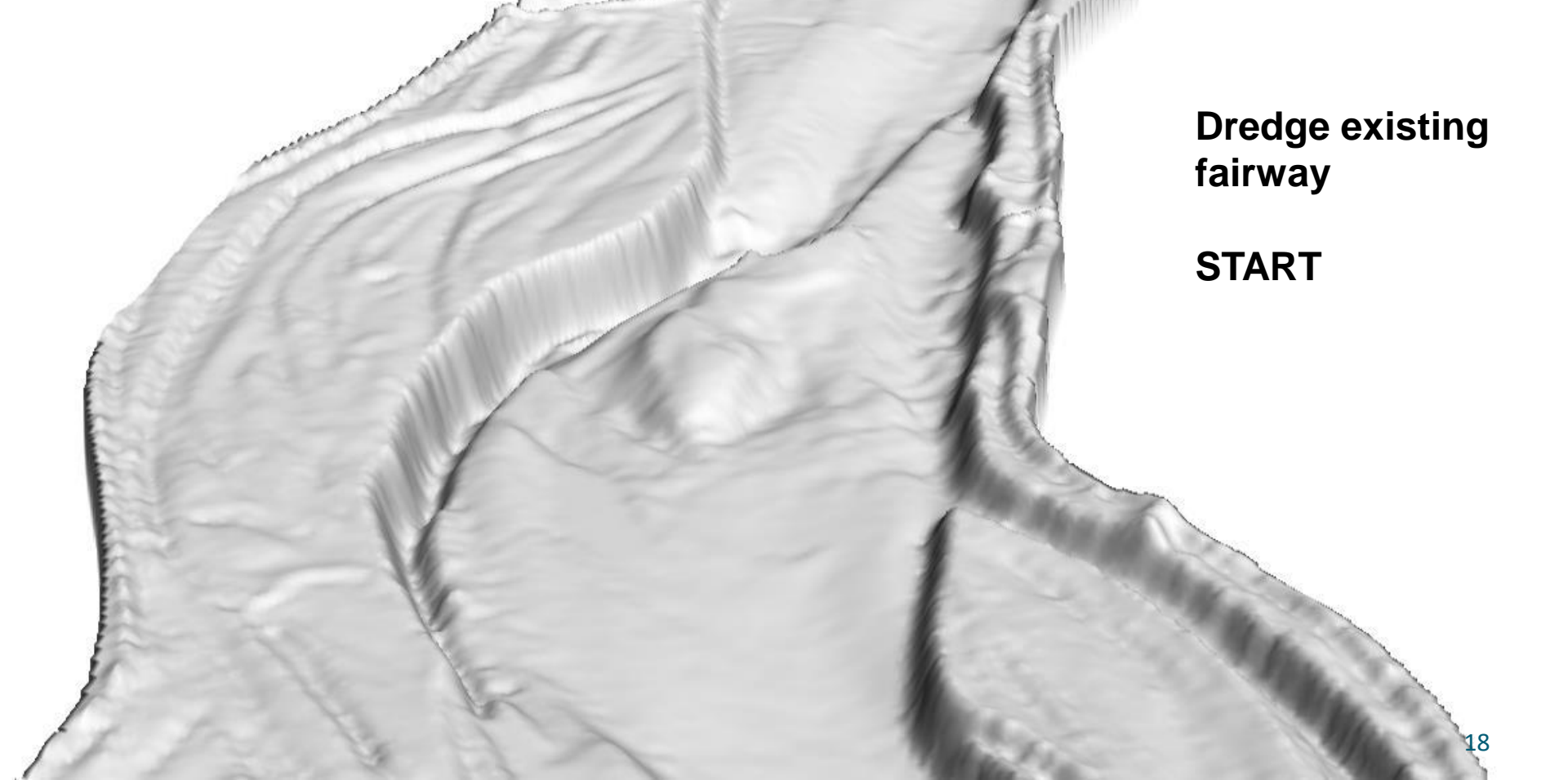
Critical Zone 5
Popina: Dredge only - ENR water depths



END STATE

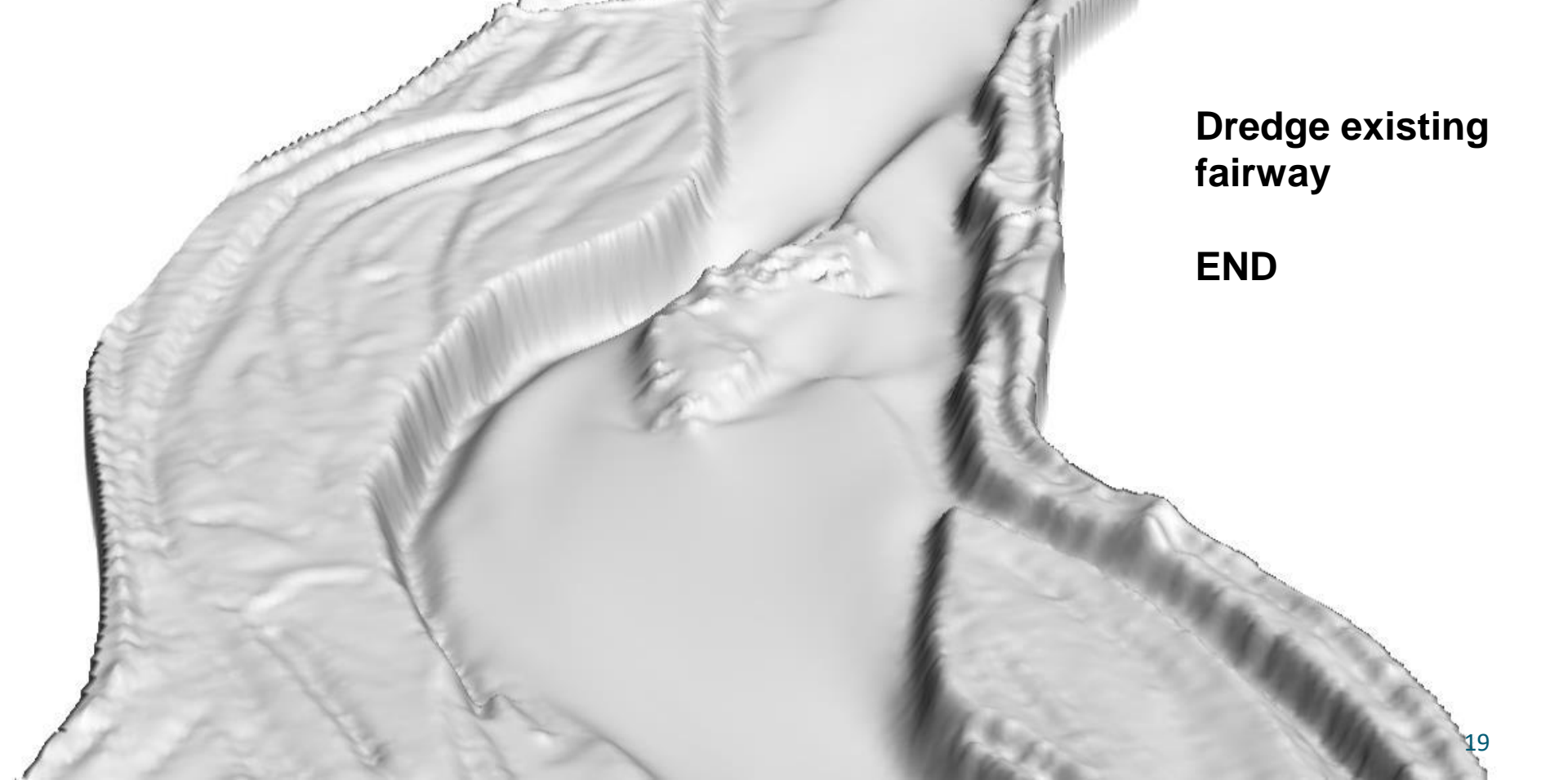
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Popina: Island with fairway realignment - ENR water depths





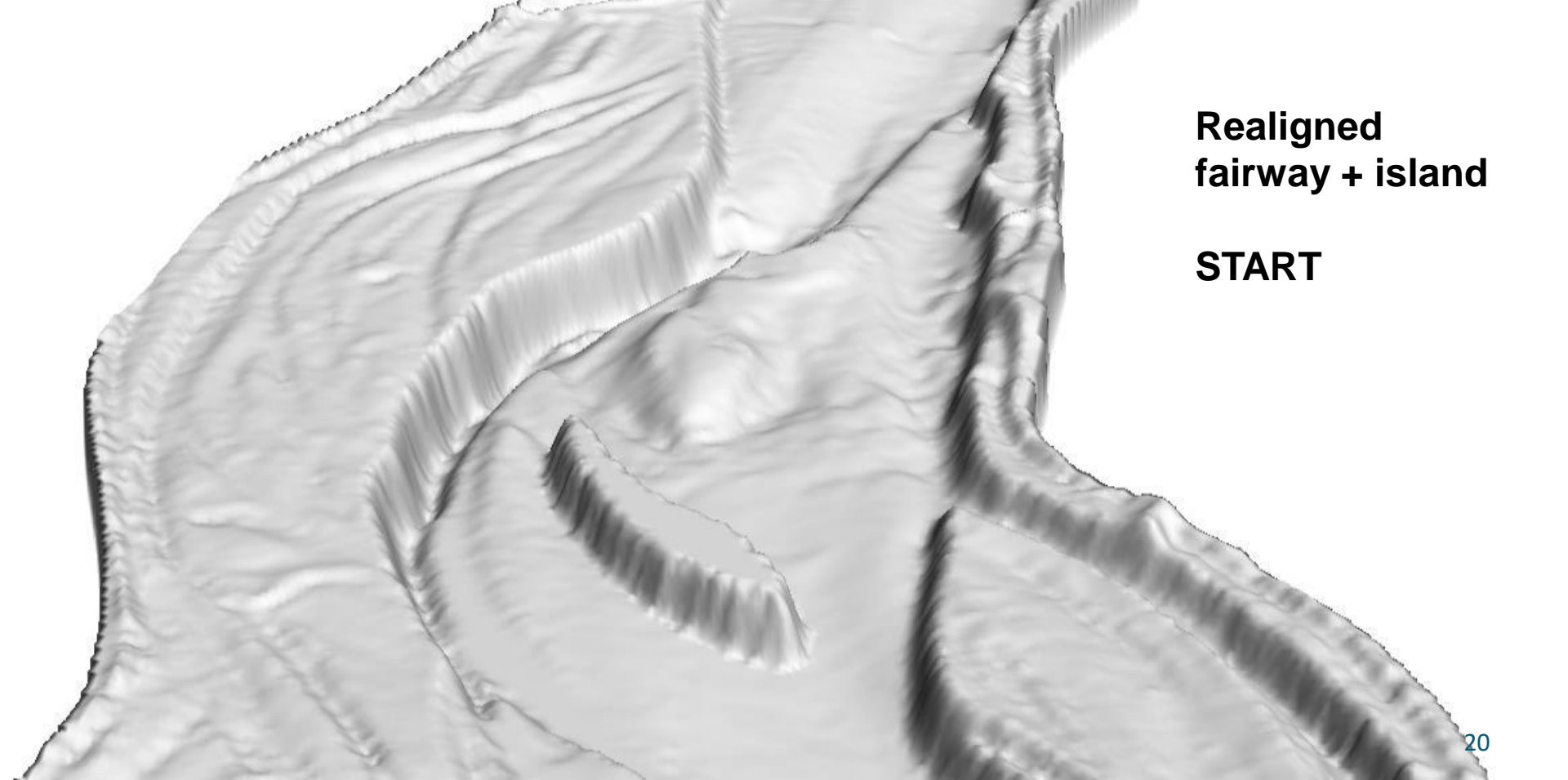
**Dredge existing
fairway**

START



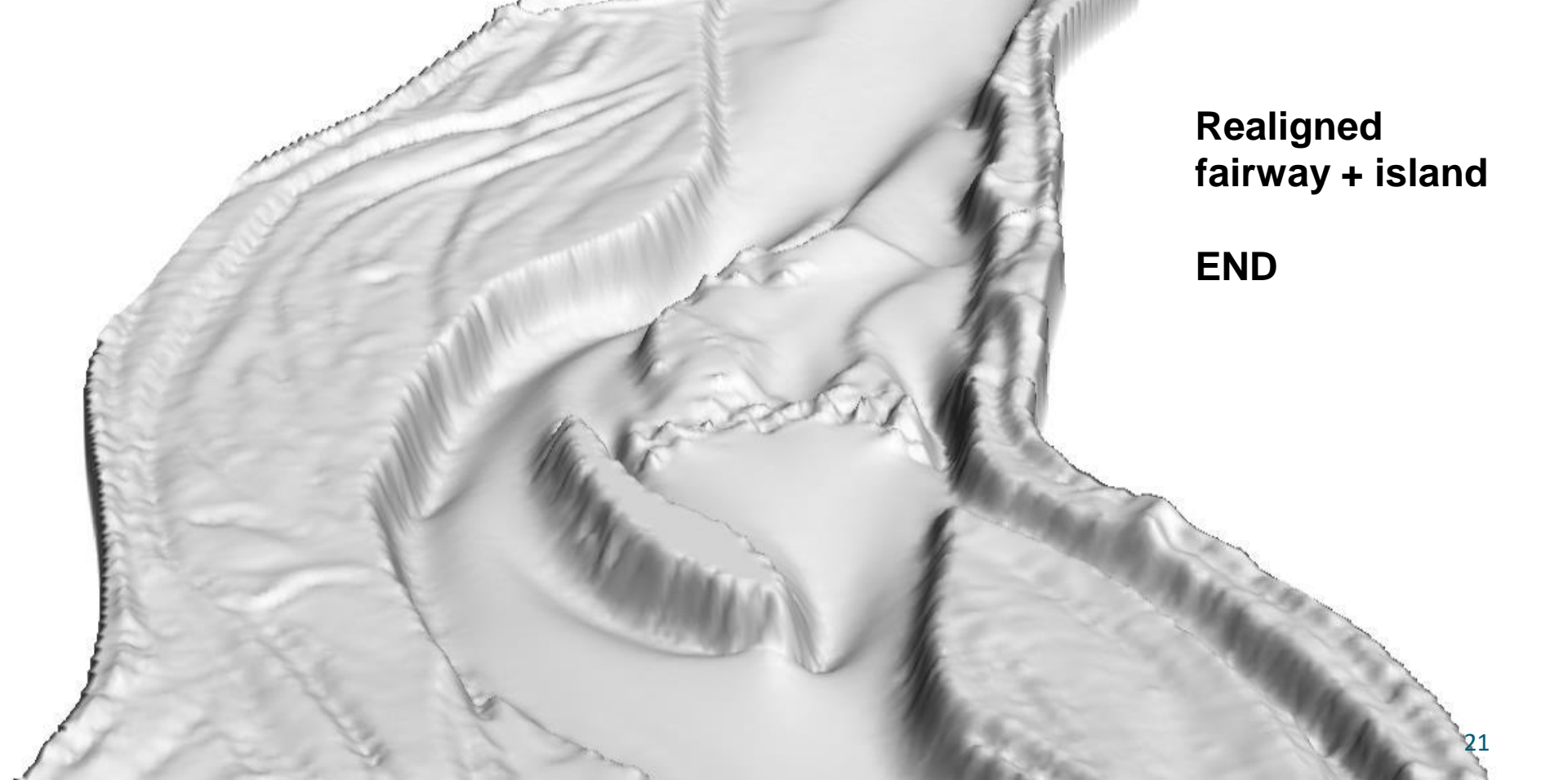
**Dredge existing
fairway**

END



**Realigned
fairway + island**

START



**Realigned
fairway + island**

END

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