Wastewater Management Decision Support Tool (WEMDST) User Manual

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1.1 Introduction

The Wastewater Management Decision Support Tool (WEMDST, the Tool) was developed within the Drin Corda project for enabling transboundary and integrated water management in the Drin catchment. It is designed to assist in the planning process of wastewater treatment in the catchment.

It enables the development of different scenarios for waste water treatment, considering:

- waste water treatment technology
- waste water treatment efficiency (secondary, tertiary)
- sludge management
- pollution load (population, industrial, tourism)
- city (agglomeration above 2.000 PE) or regional level

The results model pollution, hydrology and agglomeration data and display useful results:

- indicative investment and operation costs of waste water treatment process (on local or regional level)
- pollution decrease (environmental benefit) on the water quality of the Drin catchment

It is a free web-based tool.

1.2 WEMDST users

The WEMDST tool is a decision support tool with a primary focus on two main user groups:

- Local planners
- Regional planners

They involve:

- Waste water treatment (investment) process planners and related stakeholders on the national and regional level
- Municipalities and their strategic planning purposes; and as integral part of investment and management of future waste water processes (costs)
- Public utility operators (and their associations) in the Drin catchment

1.3 How to access the WEMDST

The WEMDST tool can be accessed at following URL:

http://wemdst.apps.vokas.si/

It is advisable to use the **latest Google Chrome browser** when login.

The Tool **requires authentication**. There's a registration button on the screen (see picture below).

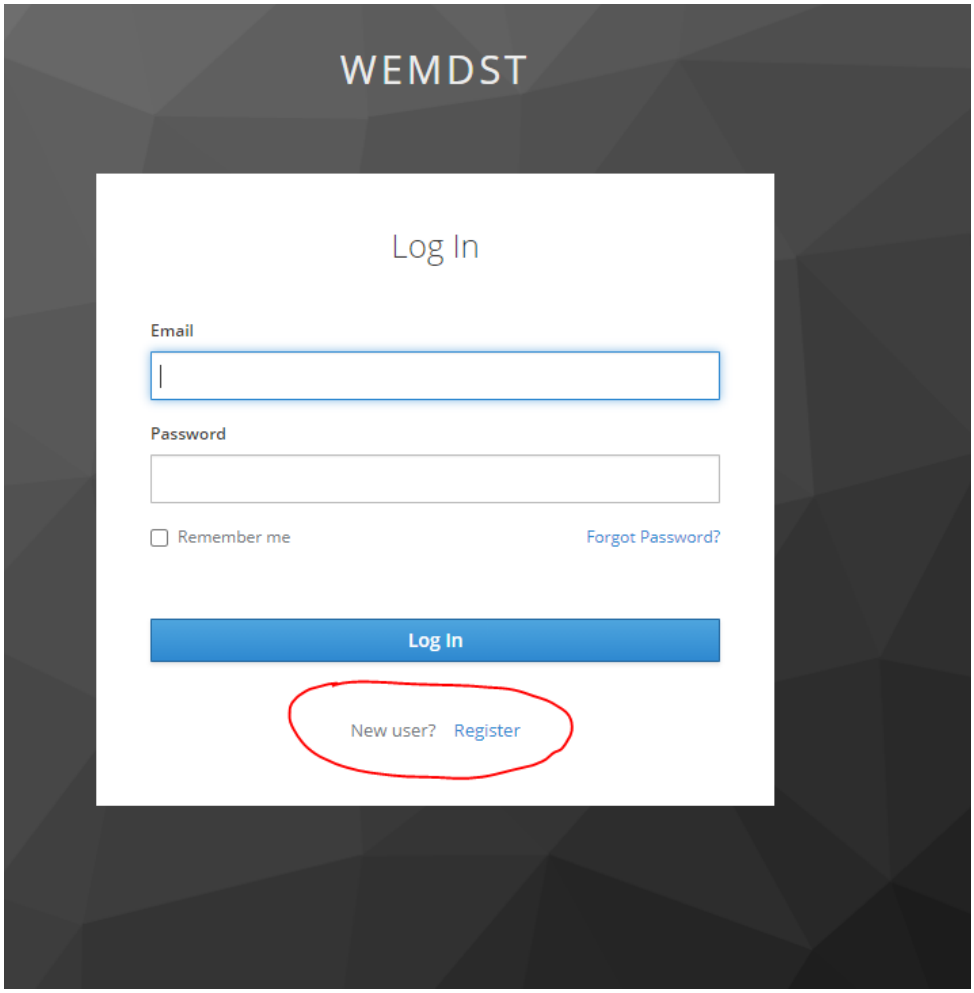

Figure 1: WEMDST tool log In

The following chapters instruct the users how to select possible choices offered to manage different waste water treatment scenarios.

1.4 River quality at current state – Baseline scenario

First screen of the WEMDST tool shows an interactive map where users can see the modelled concentrations of BOD5, P total and N total in the river bodies.

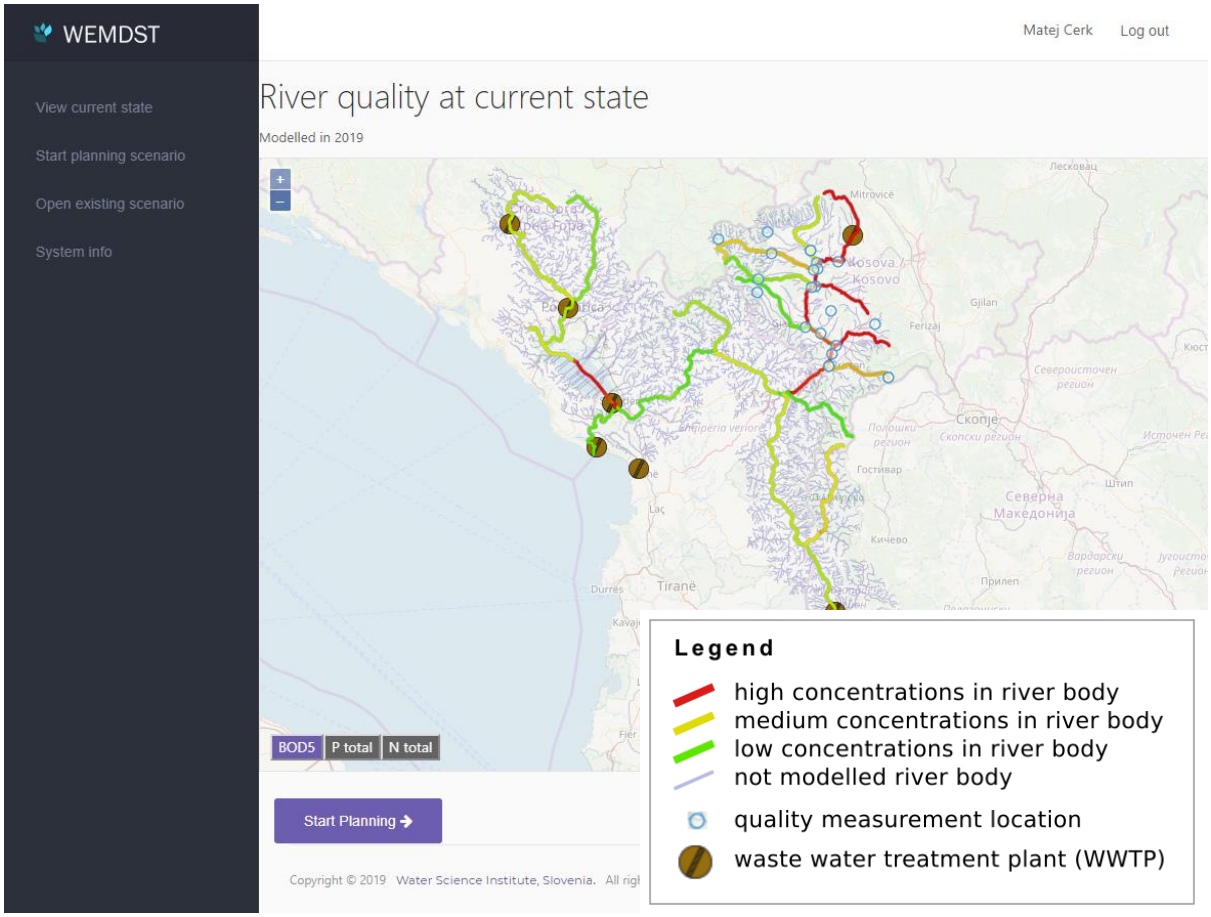

Figure 2: Main screen of the WEMDST, showing river quality at current state

User can switch preview of pollutant by clicking on one of the pollutant in the lower left corner of the map 

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By moving a mouse over modelled river section or quality measurement point additional info is displayed in top right corner of the screen.

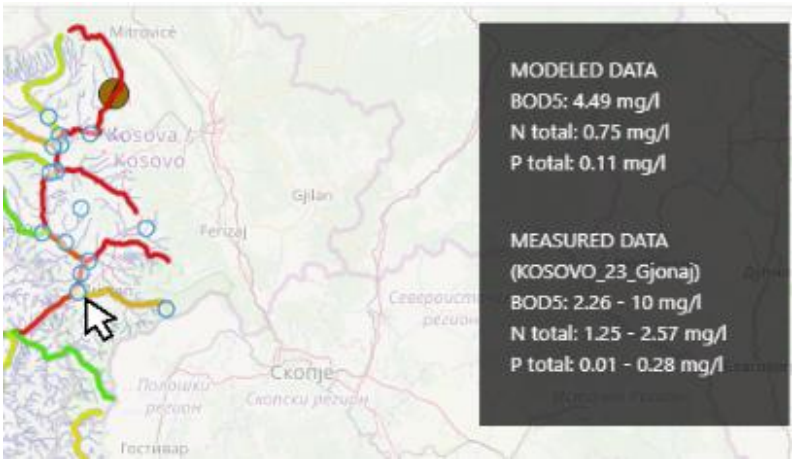
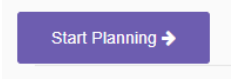


Figure 3: Modelled data in WEMDST tool

1.5 Start planning new WWTP for city planers

First you have to create new scenario by clicking 

button from the main screen. City planners should choose “City planners” option, where they will create scenario for their city (agglomeration). Please note that scenarios can only be created for agglomerations above 2.000 PE due to model limitations.

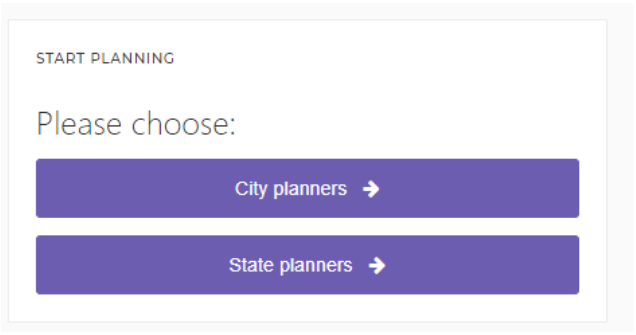


Figure 4: Creating new scenario

They can either start new scenario by filling the form:

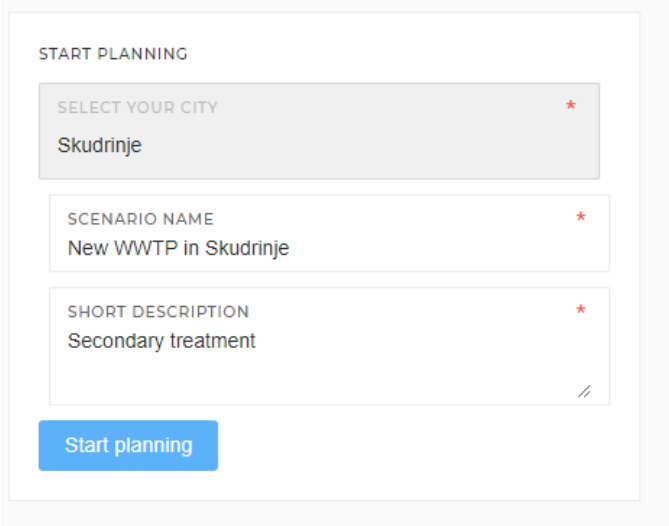


Figure 5: Creating new scenario – form

Or they can select a saved or pre-set scenario below the form:

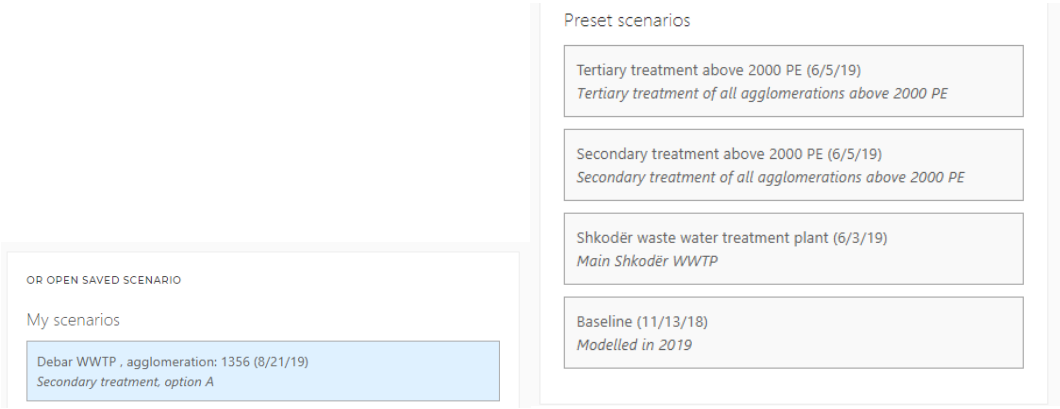


Figure 6: Creating new scenario – saved or present scenarios

On the following screen currently estimated loads from the agglomeration are presented. Maps are representing current and planned state and the chart below is representing the concentrations in the modelled river body.

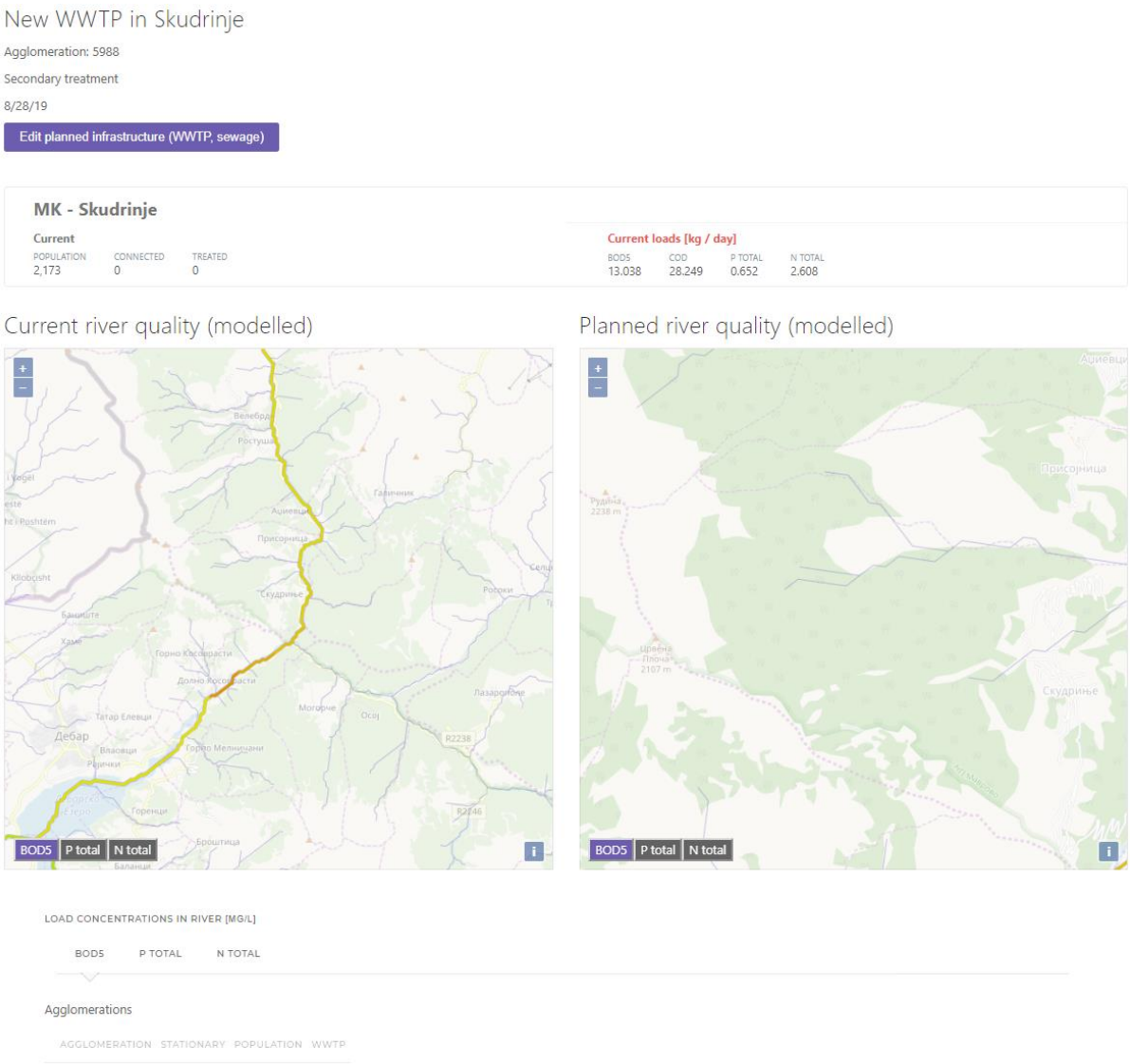


Figure 7: Current and planned state of river quality

To add planned infrastructure like WWTP or sewage canals click on a button “Edit planned infrastructure (WWTP, sewage)”.

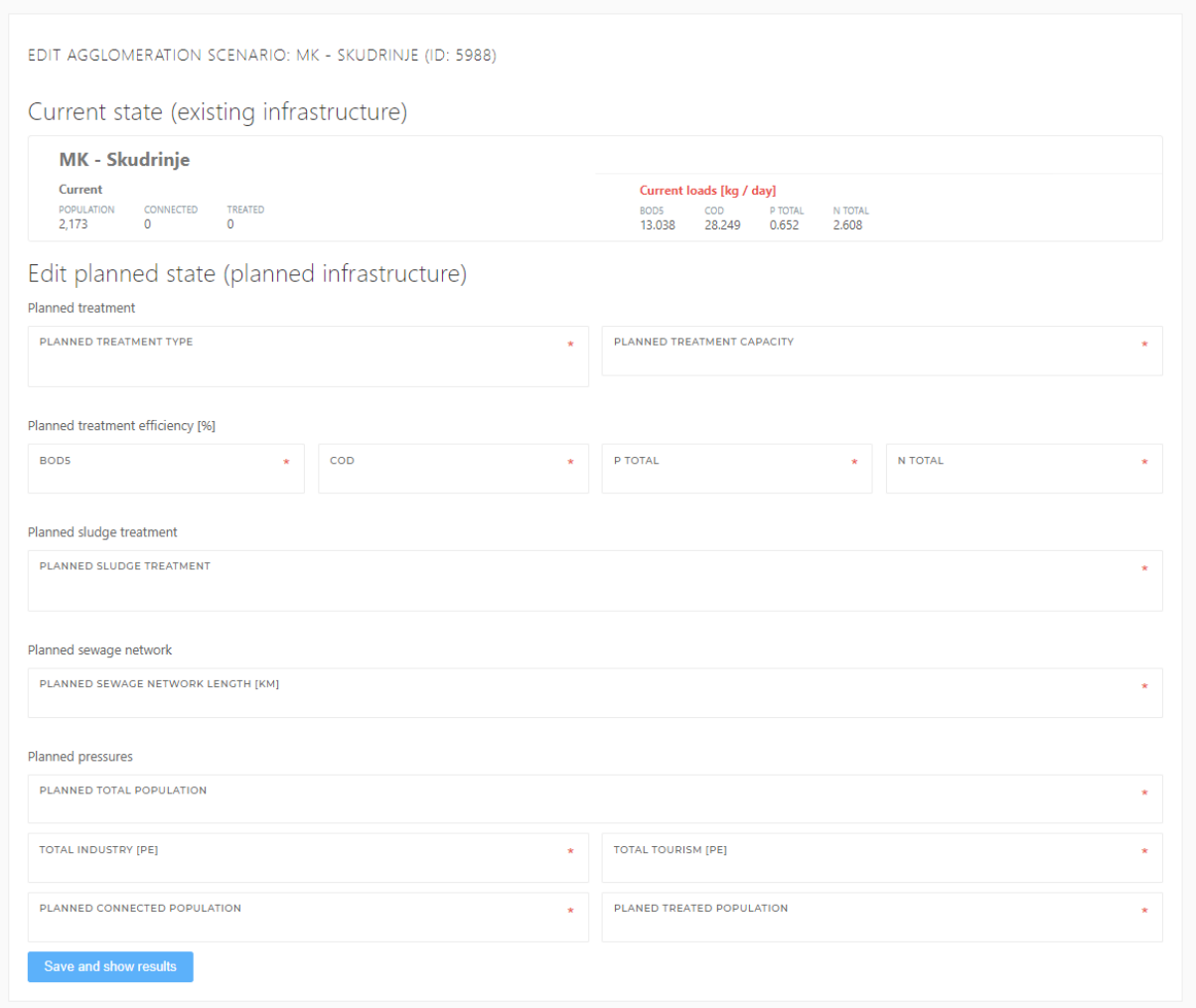


Figure 8: Edit planned infrastructure

When desired, new infrastructure can be added, the results are visualized. Please note, that some of the models behind need some time to compute, so the map and chart are updated within a minute.

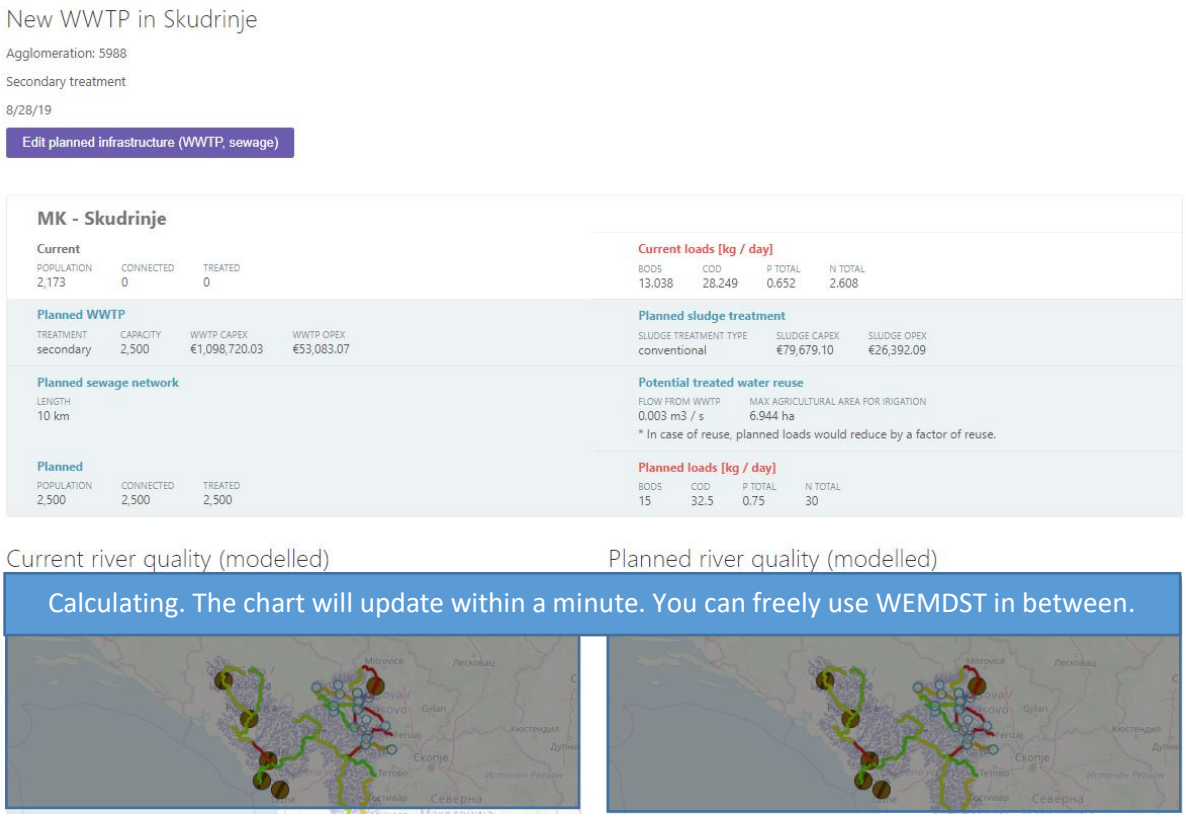


Figure 9: Results of added new infrastructure

1.6 Start planning new WWTPs for state planers

State planners can start planning or open existing scenarios in the same way as city planners (as referred to in the previous chapter) but have an overview of the whole catchment.

The scenario overview page shows the difference between the current and planned state in general and visualized on a map.

Below maps a list of all agglomerations above 2.000 PE are listed in 3 categories:

- List of treated agglomerations (having WWTP)
- List of agglomerations with sewage, but no treatment
- List of untreated agglomerations

Tertiary treatment above 2000 PE

Tertiary treatment of all agglomerations above 2000 PE

6/5/19

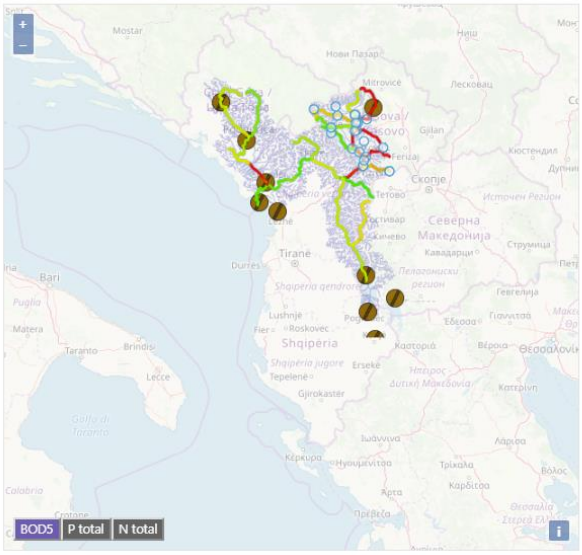
Overview

Total WWTP: 10 (2 new)

Total sewage: 10km (2km new)

Total WWTP: 10 (2 new)
Total sewage: 10km (2km new)
Total costs CAPEX, OPEX: wwtp, sewage, sludge treatment (CURRENT COSTS, NEW COSTS)

Current river quality (modelled)



Planned river quality (modelled)

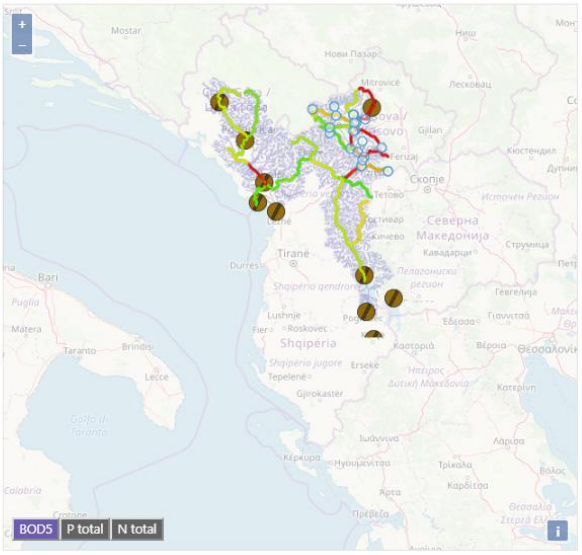


Figure 10: Scenario overview page

List of treated agglomerations

COUNTRY	NAME	POPULATION	PE	CONNECTED PE	TREATED PE	WWTP	CURRENT BOD5 (TO RIVER) KG/DAY	PREDICTED BOD5 (TO RIVER) KG/DAY	
ME	Podgorica	150,977	182,485	101,393	68,094	Podgorica WWTP	2,704.0 kg/day	N/A	Edit
ME	Nikšić	56,970	65,144	27,640	13,410	Niksic WTTP	1,110.2 kg/day	N/A	Edit
MK	Ohrid	42,473	42,473	42,473	42,473	Vranishta WWTP	254.8 kg/day	N/A	Edit
MK	Struga	24,117	24,117	24,117	24,117	Vranishta WWTP	144.7 kg/day	N/A	Edit
AL	Podgradec	19,584	19,584	19,584	19,584	Pogradec WWTP	117.5 kg/day	N/A	Edit
AL	Lezhë	15,510	15,510	15,510	15,510	Shengjin WWTP	93.1 kg/day	N/A	Edit
RS	Skenderaj	9,372	9,372	9,372	9,372	Lausa, Skendaraj/Srbica WWTP	56.2 kg/day	N/A	Edit

Figure 11: List of treated agglomerations

City planners can freely edit each agglomeration separately in order to achieve planned results. Editing of the single agglomerations can be started by clicking the “Edit” button from the agglomerations table. The procedure that follows is the same as for city planners described in previous chapters.

2 System info page

The system info page shows the current workload of the models installed on the servers behind the WEMDST tools. In order to achieve smooth user experience, there is an elaborate system of jobs and runners behind the scenes where mathematical models are being run when a user plans a scenario.

Runners

RUNNER	STATUS	TASK ID	SCENARIO ID	LAST SEEN
;dotnet;18376	RUNNING			2019-08-27T21:26:43.2430032+00:00
;dotnet;18180	RUNNING			2019-08-27T20:48:39.7392651+00:00
;dotnet;21288	IDLE			2019-08-27T20:56:02.4999701+00:00

Jobs

TASK ID	SCENARIO ID	CREATED	STARTED	FINISHED	DURATION	STATUS	WORKER ID
36f9a4ae-c7fb-4d91-b384-0ef5c7793321	2019-03-12T20:45:58.9966667+00:00					SUCCESS	;dotnet;22176
27bc7661-b120-4621-88fd-395d13271731	2019-08-21T13:55:35.0833333+00:00					CREATED	;dotnet;18180
609cce10-8f11-497d-86b5-85b4e0ef806f	2019-06-03T13:57:53.27+00:00					SUCCESS	;dotnet;12488
36f9a4ae-c7fb-4d91-b384-0ef5c7793321	2019-03-12T22:01:00.3133333+00:00					SUCCESS	;dotnet;43788
36f9a4ae-c7fb-4d91-b384-0ef5c7793321	2019-03-12T22:06:10.7566667+00:00					SUCCESS	;dotnet;43788
36f9a4ae-c7fb-4d91-b384-0ef5c7793321	2019-05-14T10:50:47.19+00:00					SUCCESS	;dotnet;24300
36f9a4ae-c7fb-4d91-b384-0ef5c7793321	2019-05-14T10:45:00.12+00:00					SUCCESS	;dotnet;24300
36f9a4ae-c7fb-4d91-b384-0ef5c7793321	2019-05-09T14:23:40.2833333+00:00					SUCCESS	;dotnet;24300
609cce10-8f11-497d-86b5-85b4e0ef806f	2019-06-06T20:31:07.1533333+00:00					SUCCESS	;dotnet;13320
36f9a4ae-c7fb-4d91-b384-0ef5c7793321	2019-05-14T12:38:57.1666667+00:00					SUCCESS	;dotnet;24300

Figure 12: System info page