

## Mon22-148

**Monitoring and assessment of compliance (non-compliance) of the actual location of the territory of individual cadastral land plots relative to the boundaries of the coastal protective strip of the Velykyi Kuyalnyk River**

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**SUMMARY**

The paper deals with analysis of the current state of land use within the coastal protection strips of the Velykyi Kuyalnyk River and adjacent cadastral land plots. The presents the results of the evaluation of the compliance (non-compliance) of the actual location of the territory of the selected 38 cadastral land plots relative to the corresponding borders of the coastal protection strips of the Velykyi Kuyalnyk River (in Berezovsky and Podolsky Districts in the Odesa region). As initial data, the results of own expedition surveys of the Velykyi Kuyalnyk River in 2018, official materials available on the site of the Public Cadastral Map of Ukraine in 2020-2021 and satellite images, which were made in the low-water period of the year. It was established that out of all the surveyed plots, only 1 cadastral land plots is outside the coastal protection strips. The obtained results make it possible to assess the potential for restoration of the reference (natural) hydromorphological state (meandering channel) of the Velykyi Kuyalnyk River on the investigated sites in accordance with the requirements of the Water Framework Directive 2000/60/EU and the modern Water Code of Ukraine with the aim of achieving a “good” ecological state.



## Introduction

The work presents the results of the evaluation of the compliance (non-compliance) of the actual location of the territory of the selected 38 cadastral land plots (between the villages of Konoplyane and Kozlovo, Berezovsky District; near the villages of Dolynske and Fedorivka, Podolsky District in the Odesa region) relative to the corresponding borders of the coastal protection strips (CPS) of the Velykyi Kuyalnyk River (V. Kuyalnyk). As initial data, the results of expedition surveys of the V. Kuyalnyk River, official materials available on the site of the Public Cadastral Map of Ukraine and satellite images (*Loboda et al., 2020*).

Analysis of the current state of land use within the CPS of the V. Kuyalnyk River and adjacent cadastral land plots provide an opportunity in the future to develop scientifically based recommendations on measures for balanced use and protection of water and reproduction of natural resources to achieve a “good” ecological state. This corresponds to European and international experience in the field of water policy, including the current Ukrainian state requirements for integrated water resources management according to the basin principle and Water Framework Directive (WFD) 2000/60/EC (*Directive, 2000*).

## Method and Theory

In 2018, Odesa State Environmental University was commissioned by the Department of Ecology and Natural Resources of the Odesa Regional State Administration (Agreement No. 10 dated 04.12.2018) to carry out scientific research, based on the results of which a report on scientific research work (SRW) was prepared (*Loboda et al., 2020*), in which, in particular, a description of the current state of V. Kuyalnyk River was presented and the facts of violations within the CPS of this river were given. Therefore, carrying out an assessment of the compliance (non-compliance) of the actual location of the territory of the specified cadastral land plots in relation to the CPS of V. Kuyalnyk River, was carried out using the results of the specified SWR and according to the data of its own additional research conducted in 2020-2021 (*Loboda et al., 2020; Hryb et al., 2021*).

According to article 88 of the Water Code of Ukraine (WCU), for small rivers (to which the V. Kuyalnyk River belongs), streams and small streams, the width of the CPS should be at least 25 m. It should be noted that if the steepness of the slope is more than three degrees (that is, the excess between two points of the slope is more than 0.05 m per 1 m of slope or 1.31 m per 25 m of slope), then the minimum width of the CPS is doubled and should be for small rivers, streams and small streams at least 50 m. In addition to the fact that Art. 80 (paragraph 7) of the WCU it is forbidden to provide land plots in the floodplains of small rivers for any construction (except for hydrotechnical, hydrometric and linear structures), as well as for horticulture and gardening.

In Art. 88 of the WCU it is indicated that CPS are installed along the banks of rivers and around reservoirs along the water cut in the low water period. It should be noted that this article of the WCU does not indicate the water level of the year (a year with a lot of water, a year with low water, an average year in terms of water level or its supply) in the low water period of which the position of the water cut necessary for the installation of CPS along the banks of the river is determined. However, in Art. 82 of the WCU states that the determination of the volume of flow regulation by artificial reservoirs for rivers of any size should be carried out taking into account the flow volume of a given river “in an estimated low-water year, which is observed once in twenty years”, i.e. in a very low-water year with P=95%. Taking this into account, the position of the water cut, necessary for establishing the width and limits of the CPS along the banks of this river, was determined for the boundary period in the estimated low-water year, which is observed once in twenty years with the assurance of P=95%.



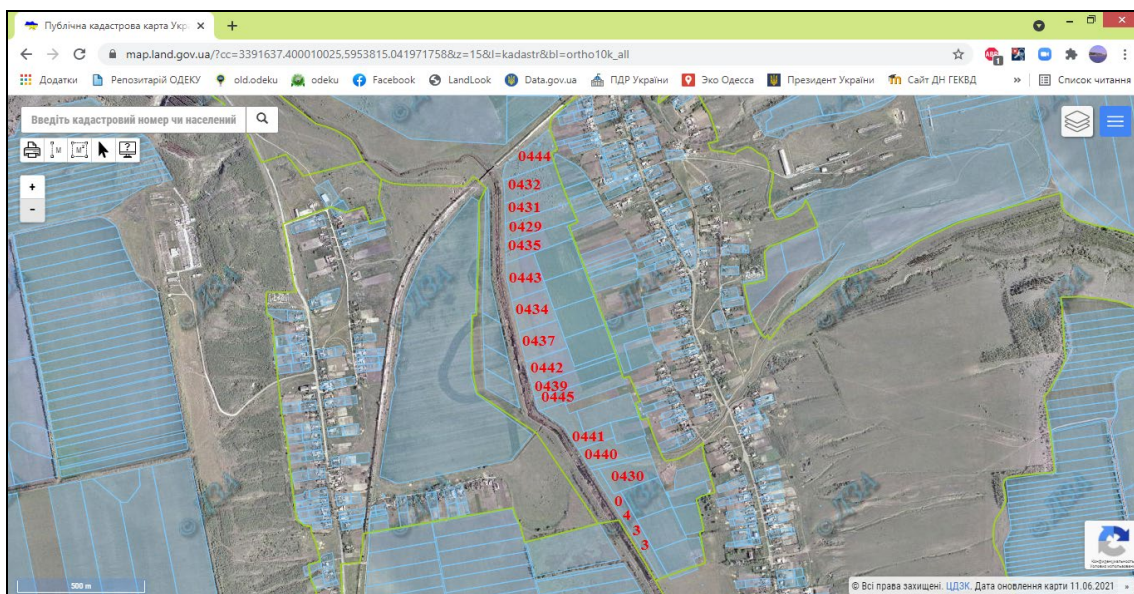
In connection with the fact that the bed of V. Kuyalnyk River in the low-water period of a very low-water year with a supply of  $P=95\%$  dries up even in natural conditions (there is no water in the riverbed), as well as the fact that the WCU does not specify how to determine the internal border of the CPS of rivers that dry up in the low-water period, measuring the width and borders of V. Kuyalnyk Rivers CPS was performed from the middle of its channel (usually, the line of the greatest depths), that is, when the inner border of the CPS coincides with the place where water disappears before the channel completely dries up.

The following is the information received regarding the compliance (non-compliance) of the actual location of the land plots, the cadastral numbers of which were indicated above, to the CPS of the V. Kuyalnyk River, established based on the results of the SRW survey of the course of this river in 2018 and its own additional research in 2020-2021 (Loboda *et al.*, 2020; Hryb *et al.*, 2021).

### Results of investigations

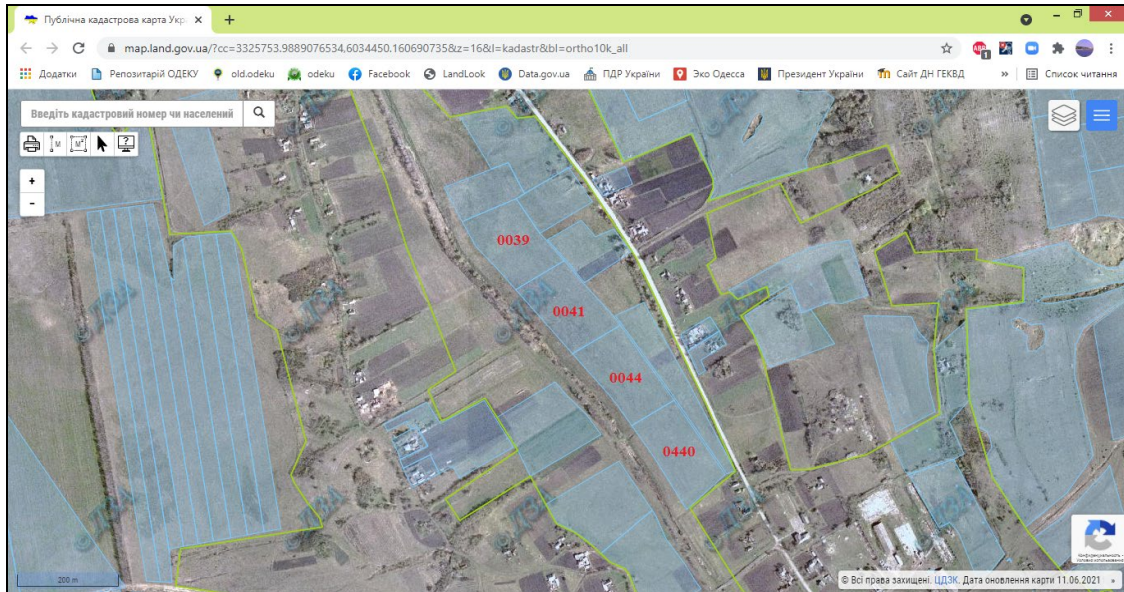
The paper presents the results of assessing the compliance (non-compliance) of the actual location of the land plots, the cadastral numbers of which are given below, to the borders of the CPS of V. Kuyalnyk River (Figures 1-3):

- between the villages of Konoplyane and Kozlove, Berezovsky district, Odesa region (cadastral numbers 5121882000:01:002:0444, 0432, 0431, 0429, 0435, 0443, 0434, 0437, 0442, 0439, 0445, 0441, 0440, 0433, 0430);
- near the village of Dolynske, Podilsky District, Odesa Region (cadastral numbers 5120281400:01:006:0039, 0041, 0044, 0440);
- near the village of Fedorivka, Podilsky District, Odesa Region (cadastral numbers 5122985600:01:003:1038, 1045, 1041, 1044, 1040, 1051, 1049, 1042, 1053, 1037, 1039, 0864, 0863, 0862, 0861, 0860, 08459, 10507).



**Figure 1** Screenshot from the public cadastral map of Ukraine with the location of the boundaries of land plots with cadastral numbers 5121882000:01:002:0444, 0432, 0431, 0429, 0435, 0443, 0434, 0437, 0442, 0439, 0445, 0441, 04340, 0430 between the villages of Konoplyane and Kozlove, Berezovsky district, Odesa region, adjacent to the left bank of the V. Kuyalnyk River





**Figure 2** Screenshot from the public cadastral map of Ukraine with the location of the borders of land plots with cadastral numbers 5120281400:01:006:0039, 0041, 0044, 0440 near the village of Dolynske Podilsky District, Odesa Region, adjacent to the left bank of the V. Kuyalnyk River



**Figure 3** Screenshot from the public cadastral map of Ukraine with the location of the borders of land plots with cadastral numbers 5122985600:01:003:1038, 1045, 1041, 1044, 1040, 1051, 1049, 1042, 1053, 1037, 1039, 0864, 0863, 0862, 0861, 0860, 0859, 1047, 1050 near the village of Fedorivka, Podilsky District, Odesa Region, adjacent to the banks of the V. Kuyalnyk River

Given that the steepness of the slopes of both banks of the V. Kuyalnyk River on sections adjacent to the boundaries of land plots with cadastral numbers 5121882000:01:002:0444, 0432, 0431, 0429, 0435, 0443, 0434, 0437, 0442, 0439, 0445, 0441, 0440, 0433, 0430 (between villages Konoplyane and Kozlove, Berezovsky district, Odesa region) and 5120281400:01:006:0039, 0041, 0044, 0440 (near the village of Dolynske, Podilsky district, Odesa region), as well as 5122985600:01:003:1038, 1045, 1041, 1044, 1040, 1051, 1049, 1042, 1053, 1037, 1039, 0864, 0863, 0862, 0861, 0860, 0859, 1047, 1050 (near the Fedorivka village of Podilsky district, Odessa region) exceeds three degrees, the minimum width of CPS along the banks of the river on these sections should be at least 50 m.



XVI International Scientific Conference “Monitoring of Geological Processes and Ecological Condition of the Environment”

15–18 November 2022, Kyiv, Ukraine

Distances from the boundaries of the specified land plots to the middle of the channel of the V. Kuyalnyk River in the low-water period of the year was determined with the help of appropriate online tools on the website of the Public Cadastral Map of Ukraine and in the Google Earth Pro program (using freely available high-quality satellite images, which were made in the low-water period of the year – September 1, 2013, September 23 and 30, 2019).

## Conclusions

As a result of the conducted research, the following results were obtained: **1** – it was established that out of all the surveyed plots, only 1 plot of land with cadastral number 5121882000:01:002:**0430** (between the villages of Konoplyane and Kozlove, Berezovsky district, Odessa region) is outside the CPS of the V. Kuyalnyk River; **2** – land plots with cadastral numbers 5121882000:01:002:**0444, 0432, 0431, 0429, 0435, 0443, 0434, 0437, 0442, 0439, 0445, 0441, 0440, 0433** between the villages of Konoplyane and Kozlove, Berezovsky district, Odessa region, as well as 5120281400:01:006:**0039, 0041, 0044, 0440** near the village of Dolynske, Podilsky District, Odessa Region are located partially within the CPS of the river; **3** – land plots with cadastral numbers 5122985600:01:003:**1038, 1045, 1041, 1044, 1040, 1051, 1049, 1042, 1053, 1037, 1039, 0864, 0863, 0862, 0861, 0860, 0859, 1047, 1050** near the village Fedorivka, Podilsky District, Odessa Region, are located entirely (land plot with cadastral number 5122985600:01:003:**1039**) or partially (all other land plots) within the CPS of V. Kuyalnyk River 50 m wide; **4** – almost all land plots near the village Fedorivka, Podilsky District, Odessa Region (with the exception of areas with numbers 5122985600:01:003:**0864, 0863** and **0862**) are partially even within the 25 m wide CPS, if the width of the CPS is determined without taking into account the fact that the steepness of the river banks is more than three degrees; **5** – the land plots with cadastral numbers 5122985600:01:003:**1038, 1045, 1041** and **1044** (except for those indicated in conclusions 3, 4) are partially located within the 25 m wide CPS of the right tributary (unnamed) of the V. Kuyalnyk River, provided that the width of the CPS of this tributary is determined without taking into account the fact that the steepness of its slopes may be more than three degrees; **6** – the obtained results make it possible to assess the potential for restoration of the reference (natural) hydromorphological state (meandering channel) of the V. Kuyalnyk River on the investigated sites in accordance with the requirements of the WFD 2000/60/EU and the modern WCU with the aim of achieving a “good” ecological state.

## References

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