

Environmental impact assessments and their importance for ensuring water security

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Abstract. This article is devoted to the procedural institute of environmental expertise of water objects, which has relatively recently received a residence in the domestic legal proceedings. Restoration of certain places requires considerable time, carrying out expensive reanimation works. Predictive activity and elements of propaedeutics become an important track in preservation of environmental safety. Specialized knowledge is required to solve such objectives. Complexity of studying of water bodies, their connection with other resources makes the format of complex hydro-ecological expertise in demand. Representatives of natural and applied sciences are involved. As a result, we get synthetic conclusions, which can be used in evidence. Theory recognizes the importance of this type of analysis, but the methodological basis for it has not been properly developed. Practice articulates the need for such research. The introduction shows the complexity of organizing and conducting environmental expertise of water bodies, the scope of analytical and empirical objectives is outlined. In the course of the description of materials and methods of research, conclusions are formulated about the demand for a particular format of research, prospects for its use in proving criminal, administrative and civil cases. The idea about the difficulty of defining the expert objective in the assigned segment is substantiated, as there are no clear ideas about the possibilities of science in this special field. The methodological basis for the study of the highlighted moments is based on the combination of axiological aspects and systemic principles with the application of the activity trajectory. The methodological block reveals and substantiates the most effective means and ways of this kind of research for the purposes of identification and investigation of environmental crimes; consideration of civil law disputes related to water objects. The discussions formulate the problems of development of this type of expertise, with proposals to overcome them.

1 Introduction

Federal Law No. 73-FZ of 31.05.2001 “On State Forensic Expert Activity in the Russian Federation” secured the rejection of the monopoly of state institutions to conduct special research. Obviously, an expert who carries out his activities outside a particular organizational entity does not become less competent in a particular subject area. Expansion

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of the line of researchers at the expense of private experts made it possible to solve the set objectives more quickly, without reducing the quality level. However, at present there is a rejection of these democratic gains. Representatives of law enforcement agencies and the judicial system have initiated a return to previous approaches, justifying the thesis of priority for state expert institutions, in particular, for environmental expertise. In their opinion, this will provide additional guarantees of objectivity of research with simultaneous control over its conduct by the state.

The outlined revision of the pros and cons of the liberal paradigm should not turn into a campaign, with ill-considered and haphazard actions. The bearer of specialized knowledge in the field of ecology documents the level of his/her competence - educational, professional, expert. When evaluating the conclusion prepared by him, the above factors are easy for a competent subject to check.

Hydrological research often involves field visits, water sampling and analysis [7]. However, such skills are also possessed by private experts, as well as the appropriate equipment at their disposal.

The complication of economic activity by innovative technologies, the development of scientific possibilities, and the active introduction of artificial intelligence have led to the fact that integrated research has become the most popular [4]. Hydrobiological, hydrochemical, hydroecological, hydroengineering expertise is widespread with regard to water bodies [2]. In most cases, they are aimed at determining the amount of damage caused to a water body. For this purpose, there is a need to establish the point of effluent discharge; to resolve disputes in the use of coastal protection strips, water protection zone, determination of their boundaries.

One of the most dangerous environmental crimes is water pollution. Criminal liability for such acts is established by paper 250 of the Criminal Code of the Russian Federation. The composition is designed as material, that is, it requires the occurrence of harmful consequences, for the assessment of which the appointment of hydroecological expertise is required. Such research also makes it possible to establish a causal link between the pollution and the resulting damage. The situation is complicated by the lack of universal methods for assessing such damage. In addition, the long-term consequences of water pollution and the overall damage to the ecosystem in some cases cannot be calculated at all, as it is considered irreparable [1].

In the context of civil law disputes, complex hydro-land survey examinations are most often appointed, the objective of which includes, for instance, the determination of the area and coordinates of the coastal strip. This kind of research is needed to address the possibility of recognizing the ownership right of a private owner to a particular land plot, as there are a number of intractable conflicts at the intersection of land and water legislation.

Topics related to hydroecological expertise were considered in the works of M.M. Brinchuk, T.A. Bushuyeva, T.S. Volchetskaya, A.M. Zinin, Y.G. Korukhov, N.D. Kutuzova, N.P. Mailis, E.I. Mayorova, G.G. Omelyanyuk, S.A. Ruzmetov, E.R. Rossinskaya, A.I. Usov, A.P. Shlyakhov. Some points are reflected in educational and methodological literature. Most researchers prefer the format of journal publications; no fundamental monographs have been published in the field under consideration, and there is no notable dissertation research. The only exception, perhaps, is the work of O.A. Romanova "Legal protection of the legal protection of the rights of children. Romanova "Legal protection of surface waters from pollution in the Russian Federation".

It is well known that the first hydraulic structures existed in Ancient Egypt more than three thousand years ago. Dams were built there; the Nile channel was changed. Not always the construction was successful, there were mistakes and wrong calculations. However, this in itself indicates that the origins of environmental expertise are related to water bodies and the structures that were built on them.

Initially, special knowledge in this sphere was applied at the level of environmental audit, as there was a need to find out the amount of damage caused to the water area by the source of anthropogenic impact. Then the scope of their use was expanded by analyzing the evaluation and quality of various projects. The use of this content for evidentiary purposes became possible after the guiding clarifications contained in the Decisions of the Plenum of the Supreme Court of the Russian Federation from 21.12.20010 № 28 “On forensic expertise in criminal cases”, the Plenum of the Supreme Arbitration Court of the Russian Federation from 04.04.2014 № 23 “On some issues of practice of application of the legislation on expertise by arbitration courts”. An important step in this direction was the Order of the Ministry of Justice of the Russian Federation of December 27, 2012 № 237, in accordance with which forensic environmental expertise was defined as an independent type of research.

Hydroecological analysis is an applied type of the above general order. Its demand is associated with the fact that the negative impact on water resources has increased many times in recent years. With the help of specialized knowledge in this area it is possible to calculate the amount of damage caused, actual costs necessary for the restoration of affected locations [9]. It is reasonable for these purposes to apply the classical standards of damage assessment: income, cost and comparative. In most cases, the last one is used, for it the objects-analogues possessing the same properties and characteristics are selected, then they are compared with the desired one.

Reference to foreign experience shows that the USA and EU countries proceed from the axiom that damaged locations are subject to mandatory restoration to their original state. All costs associated with this are imposed on the cause of damage. At the same time, the work should be carried out in the shortest possible time and by acceptable means. The role of expertise is to accurately designate the full range of resuscitation measures for the sanitation of a water body.

The most productive methods of observation, description, comparison, modeling, experiments are used for hydroecological expertise. Digital technologies, mathematical approaches, in combination with chemical and biological investigations are actively used. The choice of the most effective method is determined by the expert objective, as each of the listed methods has certain advantages under specific inputs.

If an expert-ecologist chooses observation, it is necessary to make a correction for the selective nature of this procedure, and to take into account the influence of subjective factors related to the personality of the researcher on its result. It is about such individual qualities as attentiveness, concentration on the subject of analysis, ability to concentrate, to single out the main things. The specifics of the objects of studying should be taken into account. These are not only water bodies themselves, but also audio, video materials, documents, photographs, selected samples and specimens. Obviously, the effectiveness of the observation mechanism is influenced by the researcher's experience and focus on achieving results. With regard to hydroecological expertise, observation is not associated with the use of special equipment, it is based solely on the visualization operation, so the procedure is considered to be quite simple.

Here is a specific criminal case as an example. By the sentence of Krasnogorsk City Court of Moscow region dated 22.06.2018. N.A. was convicted under part 1 of article 250 of the Criminal Code of the Russian Federation. Being a plumber of sewage treatment facilities, he committed negligence, as a result of which there was a leakage of sewage water into a stream, with subsequent ingress into the river. According to the conclusion of the hydro-ecological expertise, chemical and toxicological research of water samples was conducted, which showed that practically untreated domestic and sewage water flows from the treatment facilities of Residential Complex “N” were discharged into the brook. The samples revealed high levels of ammonium nitrogen and phosphorus phosphates, significantly exceeding the established standards. Nitrification process was detected along the whole stream, which

resulted in hypoxia and fish death, direct intoxication with harmful substances. Experts have established the fact of discharge of untreated sewage, which along the creek bed got into the pond and then into the river, which is in direct connection with the death of fish. The total damage to aquatic biological resources amounted to more than one million rubles. The damage was assessed as substantial, restoration to the original state requires from three to five years. The court imposed a penalty in the form of a fine of fifty thousand rubles.

The research was of a comprehensive nature, with the participation of a chemist and an ichthyologist in addition to a specialist in hydroecology. The use of integrative special knowledge made it possible to unambiguously establish the cause of pollution of the water body, identifying the pathway by which harmful effluents entered the river; to calculate the amount of damage caused and to determine the time period required for self-recovery of the object to the original state.

This example confirms the complexity of this type of research, its labor-intensive, time-consuming nature, and the importance of the right combination of methods. It is obvious that the penalty imposed is disproportionate to the amount of damage caused to water bodies.

Unfortunately, this kind of abuse is also allowed by organizations. The Arbitration Court of the Samara Region considered the claim of the Administration of Togliatti, Samara Region, against the company "F". The latter was executing a municipal contract for the development of reclamation projects for industrial waste landfills near the automobile plant. These dumps were excavated by malefactors in search of recyclable materials. However, this organization not only failed to perform the necessary remediation works, but also, by poorly carrying out selective measures, created a threat of groundwater contamination.

In accordance with the conclusion of the environmental expertise, the protective layer of the landfill was damaged. Chemical wastes could have fallen into groundwater, which would have caused irreparable damage. The court of first instance satisfied the claims of the Administration, recovering from the defendant more than four hundred and forty-three million rubles. However, the company "F" in the appeal sought to change the decision, stating that only made the design, and the excavation of the dump was made by a subcontractor. This situation became a reason for attracting public attention. Eco-activists reasonably stated that the landfill in question was a dumping ground for waste from chemical enterprises, which was disposed of in violation of the established rules. On their initiative, an ecological expertise was conducted, which established that the situation at this landfill continues to be an emergency situation, and emergency measures are required. Harmful substances are dissolved in the groundwater near J.M. settlement, which flow into the nearby lakes, where mass fish kills are periodically observed. [1-9]

2 Materials and methods

As noted in the introduction, the objective of expanding the use of environmental impact assessments of water bodies in proving is currently being addressed. Here we face the problems of using mental-analytical modeling. In a particular case, an image of an object that existed before the harmful impact is created, which is compared with the actually existing one, that is, with traces of anthropogenic influence [3]. In essence, we are dealing with an ideal model. However, practice rarely provides ecologists with laboratory conditions. They have to take into account numerous factors, discounting the permissible error of research.

Studying damaged water areas involves taking water samples, which are subjected to subsequent analysis with elements of observation and description. This is especially important when assessing the condition of large water areas and establishing links between objects and their elements (as in the above example of a criminal case, where a stream, pond and river, where sewage runoff entered, were studied). Practice shows that quite often hydroecology experts have to resort to reconstruction. They create models, with simultaneous

full-scale restoration of the original state of the object of analysis [8]. Thus, there are also elements of experimentation. As a result, new knowledge about the object of research is always obtained.

Mathematical operations in this type of research, as well as in other environmental expertise, are applied with high productivity. As a rule, all computational processes and digital modeling are involved. The very determination of the amount of damage requires systematic calculations, with results analysis.

The most common in hydroecological expertise is considered a comparative approach, associated with the selection of objects-analogues, with the subsequent comparison of them with the desired. The theory allows both direct and indirect identification, with studying statistical materials. It is obvious that here subjective moments related to quantitative interpretation of estimated parameters of water bodies and selection of significant qualitative indicators are clearly expressed. Not only the consequences of already committed anthropogenic impact, but also the predicted threats of such impact are taken into account. Thus, the scale for comparison is formed by the expert himself, taking into account his experience and individual characteristics of objects. Even counting on his impartiality and competence, it is impossible to guarantee its flawlessness.

The income approach is practically not used for this type of research, except when it is necessary to assess damage to water locations leased or pledged. Of course, such relations are not established with respect to any water area, as their commercial use is not always allowed. Quite often the collected digital material is compared with a nearby land plot, for instance, when it comes to territories located in the coastal strip. Due to the inseparability of ecosystems, harm is caused to all types of natural resources, without exception. For example, if we are talking about groundwater, it is necessary to assess the damage that has been caused to the soil as well.

All the general rules that apply to any type of expertise apply to the type under consideration. Thus, according to the established expert practice, the number of objects-analogues is determined by the bearer of specialized knowledge himself, taking into account the objective set before him. The choice of the applied methodology is his exclusive prerogative. The prepared conclusion in form and content shall meet the established requirements. If the course and results of research are unclear, the expert may be called in for questioning. In the cases we have studied, we have not found a single case in which the investigator invited an expert. The courts resort to such a possibility, both on their own initiative and at the request of the parties. After such explanations, the defense, as a rule, asks to question a specialist in the same field, trying with his help to cast doubt on the research conducted and requesting the appointment of a repeat expert examination, with its referral to another person.

In parallel, lawyers actively use such a technique as providing reviews of hydroecological expertise. It should be noted that they do not resort to it during the investigation. The court treats such extra-procedural actions with sufficient caution. On the one hand, they are not prohibited by law. Moreover, the Supreme Court of the Russian Federation in a number of decisions speaks about the admissibility of their use. Secondly, there is an opinion that such reviews can be equated to the conclusions of specialists, since their content is of a reference and advisory nature. A significant disadvantage of this kind of documents is the complete absence of feedback. The expert who conducted the relevant expertise is not able to respond to the reviewer's comments. In our opinion, in such a situation we face a complex of ethical problems, as representatives of a single professional community take and defend diametrically opposite approaches to the same issue. It is extremely difficult in such a case to keep correctness and follow the rules of scientific discussion.

In theory, this kind of research is called adversarial expertise. The possibility for the defense to act as their customers has been repeatedly mentioned in the literature. However,

in this point there lies the vulnerability of this kind of analysis, since its bias cannot be excluded. The bias of the results is predetermined by the range of questions posed, which are formulated by the defense lawyer himself, guided solely by the interests of his client.

Criticizing the submission of such reviews in criminal cases, representatives of investigative structures note that in essence the defense, under the guise of such reviews, is trying to conduct its own alternative hydro-ecological expertise, appointing it in non-procedural forms. The legal community understands the prejudice of such materials. That is why it came forward with an initiative to give the defense lawyers the right to appoint their own expertise. We are not in favor of a parallel investigation, and here it will essentially be conducted by each of the opposing parties. It would seem that this approach corresponds to the adversarial principles of legal proceedings, which should be extended to the pre-trial stages of the process. However, in this case, the defense will be entrusted with functions that are not inherent to it, namely the investigation.

As a result, we have come to the following conclusions.

1. Environmental expertise of water bodies can be used for evidentiary purposes. They represent an independent type of this type of expertise. The production of such research is still rare. At the same time, there is a tendency that their use in legal proceedings, especially civil and administrative, is expanding. This type of research is used quite productively in criminal proceedings, which is confirmed by the materials of the investigative and judicial practice studied.

2. The legislator has clearly defined the forms of use of special knowledge, singling out as independent conclusions of a specialist and expert, and their testimony. Normative differentiation confirms their independent from each other evidentiary value. The conclusion of a specialist is associated with the conduct of experienced actions and consultative and reference support. The expert conducts full-fledged research and formulates reasonable conclusions based on their results.

3. Currently, the most demanded are complex environmental expertise, which is conducted at the intersection of related branches of scientific knowledge, for instance, hydroecological, biological-ecological, chemical-ecological, engineering-ecological [5].

4. The objective of such expert examinations is to determine the amount of damage from negative anthropogenic impact on water bodies. There are various methods of its calculation. The analysis of expert practice shows that income and cost methods are used exotically, because they are mounted with the peculiarities of this kind of locations. The most popular is the comparative approach, but its application requires the correct selection of objects-analogues (in this case, subjective factors that affect the quantitative and qualitative parameters of the line of comparison are not excluded).

In addition, hydroecological expertise determines the cost of restoring the affected water body to its original state, i.e. it solves the problem of ecoreconstruction. Due to the fact that the ecosystem as a whole suffers, the component approach is applied, when through the use of specialized knowledge establishes the cost of damage for each affected link, then the total damage is determined.

At the same time, the considered expertise can determine the possibility and value of the threat of harm to water objects [6]. Obviously, this kind of conclusion will be of a probabilistic nature.

5. Environmental expertise of water bodies is an extremely labor-intensive, time-consuming and complex format of research. Such methods as observation, description, comparison, experimentation and modeling are effectively used to conduct them. In the latter case there is a mental combination of ideal images and samples obtained in the course of expert examination or during the inspection of the scene.

6. It is inadmissible to replace the environmental expertise of water bodies with a review obtained by extra-procedural means. In connection with this circumstance, it has no

evidentiary value, but can be a strong argument to justify a petition for additional or repeated examination of the relevant type.

7. We are not in favor of the idea of restoring the monopoly of state institutions to conduct environmental impact assessments. Such possibility should be preserved for private experts, as they are also carriers of relevant specialized knowledge. The level of their competence is documented, and the investigator and the court have the right to verify these aspects.

8. We consider it permissible to conduct alternative environmental expertise to substantiate the arguments of the defense. At the same time, it should be taken into account that biased research cannot be ruled out. At the same time, we are categorically against granting defense lawyers the right to independently appoint such expert examinations, since this is in contradiction with the doctrine of procedural functions, according to which the defense is separated from the investigation.

3 Results and discussion

Based on the data obtained, we came to the opinion that in the current state of environmental expertise of water bodies there are a number of conflict points that need theoretical and practical discussion and subsequent normative resolution. Criminal proceedings are constantly becoming more complex, science-intensive and replenished with innovative technologies, which, of course, indicates the importance of the use of specialized knowledge in it. Environmental expertise of water objects is carried out in some criminal cases, the presented conclusions are evaluated along with other evidence and become the basis of verdicts.

In the course of sociological survey of students of Samara State University of Economics, studying in the direction of "Land management and cadastres" (bachelor's and master's degree), specialization "Legal support of national security", master's degree "Investigative, operational and investigative and other expert activities" the age group of 17 - 25 years old (first - third year of full-time education) was formed. Respondents (89%) stated that they were aware of the possibility of environmental expertise of water bodies in criminal, administrative and civil cases. 91% of respondents emphasized the importance of such research to determine the negative anthropogenic impact on natural objects. 83% of respondents explained that during their internship they participated in expert inspections and sampling for research; they familiarized themselves with the conclusion of hydroecological expertise.

67% of the survey participants are convinced of the need to expand studying this area of knowledge by introducing a special course "Fundamentals of Environmental Expertise".

23% of respondents consider themselves eco-activists, participated in various volunteer projects, including cleaning the shorelines of the region's rivers. In their opinion, in some cases a public (independent) expertise of water bodies is required, the results of which can become a reason to initiate criminal proceedings against those responsible for their pollution.

4 Conclusions

In conclusion, it should be noted that environmental impact assessments of water bodies represent an exceptionally demanded level of specialized knowledge, productively applied in proving in all types of legal proceedings. At the same time, some issues related to this kind of research continue to remain unresolved, demonstrating a wide range of opinions.

First, the optimal form of discussion in the sector under consideration is scientific and practical conferences, online participation is acceptable, field research with sampling. In the format of reports and abstracts, speakers demonstrate their approach to understanding the

landmark tracks of assigning and conducting environmental impact assessments of water resources. Two basic approaches are revealed here. Representatives of the first one call to return to the monopoly of state expert institutions to conduct this kind of research for evidentiary purposes. Supporters of the second are convinced that there is no reason to refuse the services of private experts, who are also carriers of specialized knowledge in a particular field. Subjects of proof have the possibility of independent assessment of the presented conclusions, with the expression of independent judgments on controversial issues.

Second, environmental expertise of water bodies is a complex field, with specific terminology, special methods. The latter should be verifiable by available methods; in case of doubts in their validity, additional and repeated expert examinations should be appointed.

Third, priority in this area is given to complex research, which is able at the intersection of related scientific branches, to give valid results and formulate clear conclusions.

Fourth, it is reasonable to involve in the educational process expert ecologists-hydrologists, who are able to bring innovative approaches and offer students topical topics for the preparation of environmental projects. It is recommended to introduce an elective discipline "Environmental expertise" into the curriculum for studying it not only by future lawyers, but also by specialists in land use and cadastral activity. On the basis of the Samara State University of Economics it is possible to create a Center for solving environmental problems, on the basis of which scientists - ecologists, economists and lawyers could conduct relevant complex expertise.

Fifth, alternative environmental expertise of water bodies, which is carried out at the initiative of the defense, is of certain interest. However, the subject of proof requires special caution in their legal assessment, as biased research cannot be ruled out.

Sixth, reviews on the conclusion of environmental expertise of the relevant locations, obtained out of procedure, have no evidentiary value. Ethically, they are not flawless, as they contain elements of professional incorrectness. A significant disadvantage is the lack of feedback between opponents, when the criticized is deprived of the possibility to respond and give arguments in support of his approach.

Seventh, there is no need to reject the positive developments in this area of specialized knowledge accumulated by domestic expertology of the Soviet period. Approaches of foreign researchers and normative approaches developed in different countries are subject to studying and comprehension for implementation in the national legislation.

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