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How Did the Czech Fishing Union Convince over 99% of Czech Recreational Anglers to Report Their Harvested Fish and Their Fishing Visits into Their Angling Logbooks?

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Abstract: This study summarizes the recommendations regarding how to set a recreational angling reporting system where over 99% of the anglers report their harvested fish and their fishing visits. We conducted 40 in-depth interviews with anglers and managers of fisheries, where we asked about the reporting of harvested fish and fishing visits and about compliance with reporting and fishing rules. We achieved the high reporting rate by implementing a mandatory reporting system using angling logbooks, where anglers must write down all harvested fish and all fishing visits. The anglers must return the filled in angling logbooks to continue angling legally. The compliance of anglers with the fishing rules is enforced through field inspections by angling guards. The Czech Fishing Union explains the reasoning behind the fishing rules through local angling organisations where the fishery managers know the anglers personally, arguing that if the anglers do not comply with the angling rules, there will be no fish left to catch in the future. Keeping anglers informed regarding any changes to angling rules is critical for maintaining trust. The effective reporting system requires mandatory angling logbooks, but the communication between the Fishing Union and their anglers is essential to ensure that anglers comply with the system.

Keywords: angling restriction; fishers' compliance; fishing regulation; sport fishing; sustainable angling

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1. Introduction

Freshwater ecosystems are one of the most endangered ecosystems in the world [1]. Their inhabitants, freshwater fish, are among the most endangered group of animals—50% of freshwater fish are threatened by extinction worldwide [2]. It is therefore important to identify and communicate how we can manage these ecosystems to make them sustainable. To do this, it is necessary to identify global threats to aquatic ecosystems. These include not only climate change, droughts, and pollution, but also recreational fishing and the consequent complex negative effects it brings to aquatic ecosystems and fish stocks [3].

Recreational fishing has a negative impact on fish stocks and, thus, the entire aquatic ecosystem. Overfishing and disturbances can lead to unsustainable interference with these ecosystems and a consequent decline in fish stocks [3]. Therefore, fishing needs to be regulated to create a sustainable human–river ecosystem that supports fish welfare, while it also retains other ecosystem functions such as fish production and recreational activities for the public [4]. However, to achieve this sustainable ecosystem, we need to introduce certain restrictions and regulations for anglers.

These regulations mainly concern the reduction in fish harvest rates so that immature fish are not harvested and have a chance to reproduce at least once before they are killed by anglers. It is also important to limit the number of fish harvested (bag limit) per angler per day to prevent overfishing [5]. In some cases, the catch-and-release fishing strategy is introduced [6]. This approach is becoming more common and popular among anglers [7]. Other restrictions cover limited fishing visits, restrictions on the daily fishing time, restrictions on the number of anglers per one hectare of a fishery, restriction on the

number of rods per angler, etc. [8,9]. These activities are beneficial for sustainable fisheries, but they are still limited to a small number of fisheries. In addition, the enforcement of such restrictions is relatively problematic because anglers usually outnumber the fishery managers many times over.

One of these problems is the still poorly functioning and insufficient monitoring of fish harvest numbers and fishing visits to the rivers and streams. The worldwide reporting of both fish harvest numbers and fishing visits is often either non-existent, anecdotal, or carried out alternatively—for example, by telephone surveys (CATI) with random anglers, whom the management asks what they have caught and how often they fish [10–12]. Results of the surveys are then extrapolated to the entire angler population in the surveyed country. However, few countries have a truly well-functioning system for reporting fish harvest rates and fishing visits [13]. However, the data on harvested fish and fishing pressure are key to the protection of fisheries, as overfishing and disturbance lead to excessive fish mortality that threatens fish stocks. If we want to protect the fish populations, we must be able to precisely estimate how many fish the anglers harvest and how many anglers perform fishing. Fortunately, the Czech Republic has a very sophisticated system for recording fish harvest rates and fishing visits, which we believe could be an example for those countries where a similar system has not yet been introduced [7]. This system makes it possible to obtain relatively reliable data on fish harvest rates and fishing pressure from more than 99% of anglers fishing in the whole region [13].

The aim of this study is to describe the specifics of the Czech fisheries' monitoring system, to explain why it works so well and what the examples of good and bad practice that we encountered during its implementation are. We want to describe the individual measures, explain why we have implemented them, and explain why they work. The study should serve as a kind of cookbook, describing the introduction of a functioning and effective system for monitoring of fish harvest rates and fishing visit rates. The target audience for this paper is foreign non-Czech fishery scientists and fishery managers who seek to learn more about a reliable system of monitoring of fish harvest rates and fishing visits.

2. Materials and Methods

2.1. Study Area

The study collected data across the whole Bohemian region, which covers 70% of the Czech Republic (52,065 km^2). In the Czech Republic, about 3% of the population engages in fishing, which results in 250,279 anglers visiting the studied streams and rivers 5,977,660 times per year (data from the year 2020) [14]. The number of anglers and fishing visits increased by 5% between 2000 and 2018 [7]. Altogether, 1200 angling guards perform field checks, making sure that anglers report proper information regarding fish harvest rates and fishing visits. The guards also enforce fishing restrictions and regulations. The number of guard checks was 297,615 in 2018, and this number has increased almost tenfold since 2000 [7].

There are 252 streams and rivers in the study area, which are further separated into 1216 individual fishing sites (stretches of streams and rivers) that are divided by a visible structure (a weir, a power plant, a dam, a bridge). The total area of the fishing sites is 35,096 hectares of streams and rivers, which are all smaller and medium-sized (0.2–4870 ha of surface area, with a median value of 15 ha). The streams and rivers are in the temperate zone and belong to the North Sea Basin, to the Black Sea Basin, or to the Baltic Sea Basin. They are located mostly in lowlands (200–600 m above sea level), cover a surface area of 900 km^2, are 3–250 m wide (the median value is 17 m), have mesotrophic or eutrophic nutrient levels, and have a fish biomass of 150–300 kg per hectare. The waters are dominated by cyprinid species, mainly roach *Rutilus rutilus*, bleak *Alburnus alburnus*, and European chub *Squalius cephalus* [7].

In total, 1,733,000 fish weighing 2781 tons were harvested in the streams and rivers of the Bohemian region in the year 2020 (Czech Fishing Union, unpubl. data). This number

is declining every year, and fell by 10% over the years 20002018 [7]. Anglers mostly harvested common carp *Cyprinus carpio* (80% by biomass), followed by other cyprinids (bream *Abramis brama*, European chub, vimba bream *Vimba vimba*, roach, and bleak—10% altogether), predatory fishes (European catfish *Silurus glanis*, northern pike *Esox lucius*, perch *Perca fluviatilis*, and pikeperch *Sander lucioperca*—5% altogether), salmonids (brown trout *Salmo trutta*, rainbow trout *Oncorhynchus mykiss*, and European grayling *Thymallus thymallus*—1% altogether), and the remaining 27 species of fish (4% altogether) [14].

2.2. Data Collection

We conducted one-hour-long personal in-depth interviews with 20 randomly selected fishery managers who are responsible for the fishery management of individual fishing sites (1–12 fishing sites per fishery manager). They restock fish, check the reporting of fish harvest rates and fishing visits, ensure that the streams and rivers are not littered and polluted, and communicate with current and potential anglers (potential anglers are people who do not fish yet but are thinking about starting). We contacted the managers by telephone in cooperation with the headquarters of the Czech Fishing Union. Two fishery managers refused to participate (allegedly, for time reasons), so we contacted 22 managers altogether to receive 20 interviews. The anonymized interviews took place according to a pre-prepared scenario from January to August 2021 (Table S1 in the Supplementary Materials).

We also participated in two meetings of the General Meeting of the Czech Fishing Union, where the topics regarding sustainable fishery management were discussed among the fisheries' managers (41 managers) and the top management of the Czech Fishing Union (the chairman, the executive, the main technician, and the head manager for fish stocking—four people altogether). The meetings were pre-scheduled and took place in the year 2021. We asked, within the framework of a broad discussion, what works in fishery management, what does not work, and what could be improved in the reporting and sustainable fishing system. In the discussion, every fishery manager was given a chance to express herself or himself regarding proper and sustainable fishery management. Then, the ideas and opinions on which most fishery managers were able to agree were selected (over 50% agreement on the idea or opinion).

Simultaneously, we performed one-hour-long informal personal interviews with twenty randomly selected anglers in twenty different randomly selected fishing sites. Anglers were addressed in the field while fishing (the author of this study and the interviewers are also licensed anglers). In order to obtain twenty interviews, the interviewers contacted thirty-eight anglers in total, because eighteen anglers refused to participate in the interview. The interviewers asked the anglers why they fish, whether they report harvested fish and fishing visits, whether they consider the reporting necessary or not, whether the reporting makes sense to them, what bothers them about reporting, what they would improve regarding the reporting, and what part of the reporting works well for them. At the same time, the interviewers asked what the anglers picture under the term "sustainable fishing" and how local fisheries could be improved to be more sustainable (an open-ended question). The anonymized interviews took place according to a pre-prepared scenario from January to August 2021 (Table S2 in the Supplementary Materials).

We analyzed the in-depth interviews in compliance with previously published papers that also described qualitative analysis of in-depth interviews with anglers and fishery managers [15–17].

Subsequently, we identified the key repeated topics from all interviews on which most anglers and fishery managers agreed (over 50% agreement). We have supplemented the results of this analysis with our experience as experts in recreational fisheries research. We also drew information from legal regulations and rules of sport fishing that were set by the Ministry of Agriculture, by the Ministry of the Environment, and by the Czech Fishing Union. In addition, we analyzed the local fishing regulations and restrictions that are effective on the 1216 local fishing sites. These rules were created by the managers from the previously mentioned 485 local angling organisations, and their goal is to set even stricter

fishing restrictions and regulations on heavily fished streams and rivers. We have created a unified set of recommendations that describes how the entire system of reporting on recreational fishing works in the Czech Republic, and how its components contribute to the fact that the Union has over 99% success in collecting fishing logbooks in which anglers report their harvested fish and their fishing visits [13]. Subsequently, for each component where examples were available, we provided information on examples of good and bad practice, i.e., which management practices worked and which did not work according to the opinions of the respondents.

2.3. Writing Style

Since the data collection and data analysis were the collective work of several research-support persons, the first-person plural form (e.g., "we analyzed") is used in the whole manuscript.

3. Results

3.1. Duties of Anglers

The first necessary step to reliably estimate the real fish harvest rates and real visit rates was to craft a sophisticated reporting system for the harvest rates and the visit rates. The system needed to be mandatory for all anglers, without exceptions. Firstly, we will describe what the anglers must do to enter this mandatory reporting system and to start legally fishing.

Before fishing, each angler must obtain two documents—(1) a fishing license and (2) a fishing permit. To receive the documents, the angler must first pass a fishing knowledge test. It consists of twenty questions focused on knowledge of fishing rules and permitted fishing techniques, knowledge of locally important fish species, and knowledge of fish biology and ecology. The anglers must recognize all important fish species according to a drawing (25 fish species: common carp *Cyprinus carpio*, tench *Tinca tinca*, bream *Abramis brama*, European chub *Squalius cephalus*, European perch *Perca fluviatilis*, barbel *Barbus barbus*, nase *Chondrostoma nasus*, vimba bream *Vimba vimba*, pike *Esox lucius*, pikeperch *Sander lucioperca*, European catfish *Silurus glanis*, European eel *Anguilla anguilla*, brown trout *Salmo trutta*, rainbow trout *Oncorhynchus mykiss*, grayling *Thymallus thymallus*, brook trout *Salvelinus fontinalis*, asp *Aspius aspius*, whitefish Coregonus *lavaretus*, common huchen *Hucho hucho*, grass carp *Ctenopharyngodon idella*, silver carp *Hypophthalmichthys molitrix*, Prusian carp *Carrasius gibelio*, ide *Leuciscus idus*, and burbot *Lota lota*), and they must know what fishing techniques are allowed, what legal angling size limits of individual fish species are, when the closed season starts and ends, etc. It is important to include the questions regarding the knowledge of fish biology and ecology in the test, as anglers who have biological and ecological knowledge generally have a more positive attitude towards fish welfare and will handle the caught fish more gently. The successful applicant must score over 50% (11 out of 20 questions correct) to receive the permit, otherwise she or he fails and must try again. This step is important to filter out the potential applicants who have almost no knowledge regarding angling, who do not care about fish welfare, who do not know the fishing rules and regulations, and who could negatively affect streams and rivers. At the same time, filtering out these people at the outset will save the fishing guards time during field inspections, so the guards can inspect more anglers a day. This is the first key measure that a fishery manager should take if she or he wants to discourage the dishonest anglers from fishing and thus increase the percentage of reported harvested fish and fishing visits. If the applicant passes this test, she or he will receive a fishing license after paying the fee of 5, 10, or 15 EURO, if she or he is under 15 years old, under 18 years old, or an adult (over 18 years old), respectively. This makes her or him officially an angler, but it is not enough to start fishing. Subsequently, she or he still must obtain the second document—the fishing permit. This permit costs 250 EURO and allows fishing in all fishing sites (35,096 ha). In comparison, the median salary in the Czech Republic in the year 2020 was 1650 EURO per month. This money allows fisheries managers to keep stocking all the fishing sites with

harvestable fish. It also finances the whole system of reporting (including the work staff) and finances the angling guards who oversee compliance with the rules in the field.

When the angler obtains the license and the permit, she or he can start legally fishing. However, the angler also has responsibilities when it comes to fishing. Each angler is obliged to record each fishing visit on the fishing permit upon arrival at the fishing site and before the start of fishing. This includes writing down the date of the visit, the name of the stream or river, and its official number. It is crucial to encourage the anglers to record the visit upon arriving at the fishing site (as opposed to at the end of fishing), because otherwise most anglers either forget to write down the visit or they are less motivated to do it afterwards. Similarly, fishermen must register any caught and kept fish immediately after catching it (unless it is released). Recording the fish immediately (as opposed to recording it after the fishing trip is over) again significantly increases the chances that most of the harvested fish will be reported. Retrospective or belated recording of fish caught did not prove to be very successful, as significantly fewer fish were reported this way than when they were recorded immediately.

Anglers must report all harvested fish and fishing visits into pre-prepared fishing logbooks (Table 1) and then summarize them into fishing summaries (Table 2).

Table 1. A report of all harvested fish and all fishing visits from one angler over one year.

Date	ID of Fishing Site	Species	Number	Weight [kg]	Size [cm]
1 July 2010	411 051	rainbow trout	1	2.2	61
1 July 2010	411 051	rainbow trout	1	2.3	78
2 July 2010	411 052	rainbow trout	1	2.4	52
8 July 2010	411 052	rainbow trout	1	2.5	36
16 August 2010	411 052	silver carp	1	9.4	105
17 August 2010	411 052	silver carp	1	1.8	88
24 September 2010	411 052	silver carp	1	3.5	63

Table 2. A summary of all harvested fish by number [n] and total biomass [kg] from one angler over one year.

ID of Fishing Site	Name of Fishing Site	Rainbow Trout [n]	Rainbow Trout [kg]	Silver Carp [n]	Silver Carp [kg]
411 041	Elbe 18	4	5.6	1	10.2
411 042	Elbe 19	3	2.8	1	5.8

These documents serve both as records for a possible angling guard field check of the angler, but mostly they serve as the main source of information for quantification of the harvested fish and the fishing visits. Each angler must keep submitting all harvested fish and all fishing visits into this summary throughout the whole year. Afterwards, the angler must submit this filled in summary by the end of January of the following year. The angler must pay a small fine when she or he loses the summary. The angler will then receive a new summary after she or he pays the fine. This fine should be set reasonably cheap because a high fee encourages the anglers to falsify the summary. However, the fee must exist to encourage anglers to be careful with the handling of the summary. Otherwise, if there is no fee, the anglers tend to lose the summary quite often, which invalidates collecting the data regarding the fish harvest rates and the fishing visit rates. The date of submission of the summary must come soon after the end of the season, it should be strictly set by the deadline, and it should be constant over time so that the anglers will remember it. If the angler does not submit the old summary, she or he will not receive a new one for the next year. At the same time, this new summary is a legally necessary document for the angler, without which she or he cannot legally fish. Setting a mandatory summary of harvested

fish and fishing visits reliably guarantees that over 99% of the anglers will return the old completed summary in exchange for a new one. In times when the obligation to return the summary was not directly connected with the exchange for a new one, the return rate of the summaries was below 10%, which basically invalidates collecting the fishery data.

However, reporting of harvested fish and fishing visits is not the only responsibility of anglers. Each angler must either work 10 h per year to help clean the streams and rivers from garbage, or the angler must pay CZK 1000 (40 EURO) annually as a compensation. This form of cooperation with the anglers has two advantages—either they help to clean the garbage in the fishing sites, or they contribute financially to the management of the local fisheries. When the streams and rivers are not littered, other anglers are more discouraged to start littering. Conversely, when anglers see littered streams or rivers, they tend to pile on more garbage. Some of the fishing sites are often used for other recreational activities such as swimming, canoeing, kayaking, rafting, and sunbathing. It is not possible to reliably find out who is responsible for the littering (anglers or other users), so anglers clean the litter for everybody.

Despite all efforts, however, it is not possible to convince all anglers of the need to report all harvested fish and all fishing visits, and there are many who violate these rules. That is why the Czech Fishing Union has hired the angling guards. Their task is to keep checking on the anglers in the field. The guards specifically check if anglers keep writing down their harvested fish and fishing visits, if the anglers comply with the angling restrictions and regulations, and if they comply with the use of the permitted fishing techniques. There are two types of angling guards—the amateur guards and the professional guards.

The amateur angling guards are recruited from anglers, while the professional guards are externally hired professionals who work under the Ministry of the Interior. The professional guards possess the legal status of an officer (i.e., with rights at the level of a police officer). The amateur guards have relatively few tools to punish a dishonest angler. Basically, the amateur guard has the authority to check on the angler but cannot intervene on her or his own—she or he must call in a professional angling guard (or a police officer) in case of rule breaking. Despite having few tools at their disposal, the amateur guards are important because of their high numbers: there are only 20 professional angling guards, but, altogether, there are 1218 amateur angling guards working on 38,000 hectares of streams and rivers. The amateur angling guards are compensated for their work based on their work effort. If the amateur guard performs a certain number of checks in the field, the guard receives a free annual fishing permit (which would otherwise cost 250 EURO). Each field check is noted in the summary of the checked angler, so the calculation of the numbers of checks performed by each angling guard is easy and disallows cheating. It is important to financially motivate the amateur guard to do their job. On the other hand, if the guard does not perform any field checks, he gets no free fishing permit, and the Czech Fishing Union saves money as there is no payment towards the inactive amateur angling guard.

The professional angling guards, on the other hand, spend 40 h per week (the whole working week) circling in the assigned fishing sites and checking on anglers. The fishing sites are pre-assigned to each individual angling guard so that all 20 guards have a non-overlapping area under their jurisdiction. Selected large fishing sites of national and international importance (e.g., the Lipno reservoir with a surface area of 4870 ha and visit rates of 100,000 anglers annually) are assigned so that one angling guard has jurisdiction over one fishing site. It is crucial that the professional angling guards can check angler compliance with the angling rules, confiscate illegally harvested fish and illegally used fishing gear, confiscate fishing permits of anglers who broke the fishing rules, impose fines on disobedient anglers, and hand over the disobedient anglers to the police for further investigation. In past times, when the professional angling guards did not exist (and there were only amateur angling guards), the anglers complied with the angling rules much less. This was because the coordination of the amateur angling guards with the police officers was slow or dysfunctional, and the anglers themselves knew about this

dysfunctional cooperation and, therefore, did not respect the amateur angling guards or the fishing rules in general. The amateur angling guards then stopped performing the most important role—the role of the prevention of fishing rule-breaking by anglers. The professional angling guard must also be financially rewarded with a salary comparable to that of a police officer, as she or he performs a similarly dangerous profession. The professional angling guards also cooperate with the police officers and the Water Police department, where joint night raids have proved their worth.

Although the reporting of harvested fish and fishing visits is set out in the Act on Fisheries, most of the administration and decision-making is in the hands of local angling organizations (which are similar to fishing clubs). There are 485 local angling organizations located in the region of Bohemia, each with its own management (5–20 people), its own responsibility for the sustainability of its entrusted fishing sites, and its own plan for the fish restocking of the entrusted fishing sites. These local angling organizations are supposed to bring together the local community of anglers who live and fish in the region. Here, anglers can obtain a fishing license and permit (after successfully completing the test), and they also submit the annul summaries here. It is crucial that the Czech Fishing Union has these local angling organizations and that the listed activities are performed locally, as opposed to central coordination. When the local angling organizations did not exist, the return rates of the filled angling summaries were significantly lower. It also meant a deterioration in the quality of the reported fishery data. At the same time, the local organizations provide the anglers with a list of fishing rules that apply in all areas throughout the whole of Bohemia. The organizations also communicate with local anglers, they answer their questions, and they hold regular angler-management meetings once a month. All anglers attend these meetings and can propose changes to the fishing rules and regulations, they can discuss the rules with the managers, and they can vote on local changes within the fishing rules. This involvement of the anglers in the decision-making process is crucial, as anglers feel responsible for fisheries management and for reporting their harvest rates and fishing visits. This is because they feel that they can change the local fisheries management and that their opinion matters. In the cases where anglers were not involved in the decision-making, they respected the rules significantly less. The occasional visit of the chief managers of the Czech Fishing Union to these organizations also helped, which adds a touch of significance to the meetings.

3.2. Fishery Management

The angling rules, restrictions, and regulations are a result of negotiations between the Ministry of Agriculture and the Czech Fishing Union. The Czech Fishing Union is composed of fisheries professionals (the president, the directorate, the advisory board, the control board, the secretariat, several commissions, and the eight regional branches) and fisheries amateurs (250,000 recreational anglers). Although the Ministry of Agriculture, as the district administrator, has the main say in which rules and restrictions must be obeyed, it cooperates intensively with the Czech Fishing Union on their settings. The rules are set by the Ministry of Agriculture after consultation with the Czech Fishing Union so that the Union can enforce them and, above all, so that the Union can clearly explain each specific rule and regulation to the anglers. If the anglers do not understand the rules or consider them too strict or otherwise meaningless, they stop following them and stop reporting the harvested fish caught or the angling visits. Therefore, the Czech Fishing Union keeps collecting ideas and suggestions regarding fishing rules from anglers at the above-mentioned meetings of local angling organizations. The Union then further interprets the ideas to the Ministry of the Agriculture. As a result, most of the rules come from the bottom up, i.e., from the anglers themselves. This guarantees a high level of compliance with the fishing rules and overall confidence of anglers in the reporting system of the harvest rates and fishing visit rates. In the past, there were fishing rules that were proposed from above (i.e., from the Ministry of the Agriculture) and were not pre-consulted with the anglers (or even with the leadership of the Czech Fishing Union). As a result, the

anglers did not comply with the rules very much, and with so many anglers and so few professional angling guards, their enforcement was too difficult. These rules had to be withdrawn because, not only did the anglers not follow them, but these complicated rules motivated the anglers to even start disregarding the other rules that they would normally comply with.

The Ministry of Agriculture leases the management of the fishing sites to the Czech Fishing Union. This management includes restocking fish in streams in rivers, especially when anglers harvest most of them during the year. This ensures that there are always fish available for angling throughout the whole year. It also includes keeping the ecosystems clean without garbage and pollution and maintaining the ecosystem in a good ecological state. At the same time, individual local angling organizations can tighten the fishing rules and restrictions in their entrusted fishing sites. This is an important and widely used privilege, as the local fishery managers know their entrusted streams and rivers better than the ministerial officials or the management of the Czech Fishing Union. Local managers have the best knowledge regarding local ecosystems, and they can set the most effective measures to protect fish stocks and the ecosystem. They also know how to best tighten the fishing rules to make fishing on their entrusted stream or river sustainable. If the fisheries management is centralized, the rules apply the same everywhere and no respect is given to local biotic and abiotic conditions. That results in some ecosystems being overfished while others are not being used to their full potential. The goal of the Czech Fishing Union is then to explain to anglers why the rules of some specific streams or rivers are stricter than others. This significantly increases the chances that the anglers will follow the angling rules and restrictions.

In addition to reporting harvested fish and fishing visits, the most important rules that the anglers must follow are fishing restrictions and regulations. These relate mainly to restrictions on fishing and visits to fishing sites. Let us briefly review through them all.

The first rule is to introduce a minimum legal angling size for all fish species that are commercially important or otherwise threatened. The aim is to allow fish to reproduce at least once before they are harvested. It is important that local organizations explain this restriction to anglers by saying that, if the fish are not protected by this restriction, anglers will harvest them all within a few years and there will be nothing left to cath. The argument that there will be no fish left in the ecosystem scores highly with anglers.

The second rule is to set daily angling hours and a closed season during the part of the year when the fish reproduce. Here, it is important to explain to anglers that non-stop angling for 24 h a day negatively affects fish populations, as the fish are disturbed both by angling and by the anglers themselves (even if they do not catch anything). The disturbance that follows angling activities prevents the fish from searching for food, reproducing, and seeking shelter. Angling over a 24 h period would create such fishing pressure that the fish stocks would disappear in a few years, and there would be nothing to catch. Similarly, it is important to inform the anglers that it is necessary not to disturb the fish by angling during the closed season, as this is the time when they reproduce. If the fishing pressure is too high during the spawning season, the fish will reproduce less intensively, and there will be nothing left to catch over the years to follow. Anglers take this argument seriously.

The third rule is to limit the number of harvested fish per day of fishing and per one angler. The maximum biomass of kept fish is set at 7 kg of fish. In the case of fish individuals, the anglers may keep a maximum of either two individual commercially important fish (e. g. common carp, northern pike, and European catfish) or three pieces of commercially unimportant fish (e.g., roach *Rutilus rutilus*, bleak *Alburnus alburnus*). Again, the restriction regarding the maximum daily biomass and the number of harvested fish needs to be explained to the anglers, arguing that the fish stocks are limited and restocking is not enough to meet their demand, so there would be nothing left to catch if this rule was omitted [2,5,13].

The fourth rule is to determine the permitted and banned angling techniques, the baits used, and the number of rods used by one angler. There are currently restrictions

of two rods per angler. Techniques that are harmful for the fish are banned. Here, it is necessary to explain to the anglers that the fish caught and released have a post-release mortality that is specific to the fishing technique used. By banning those fishing techniques that can seriously injure the caught fish, we can prevent unnecessary post-release mortality. Without this restriction, there would be much less left to catch in a few years.

The fifth rule is the handling of caught fish that are released back into the water. Here, the rules state the need to use gloves or at least wet hands, the need to use a landing net when catching, and the need to return the caught fish to the water immediately if the angler does not want to keep it. Here, the local angling organizations unleashed a key information campaign, aimed at local anglers, where they explained to the anglers that these rules are critical for gentle handling of the caught fish, which will significantly increase the chances of their survival after release. It is again critical to inform the anglers that if they do not use the prescribed handling rules, the fish populations will suffer and there will be much less fish left to catch in the following years. Given that most catch-and-release anglers are actively interested in fish welfare and fish stock sustainability, this explanatory strategy works.

We have addressed the need to communicate with the anglers and to explain every rule and restriction. Now, we will describe how it is accomplished. The local angling organisations communicate with their anglers locally. On top of that, there are seven regional branches of the Czech Fishing Union that communicate with the anglers regionally. The Union communicates with the anglers primarily through the official website and secondarily through social media (Facebook or Twitter). On the website, the Czech Fishing Union briefly lists all the fishing rules that the anglers must comply with. It is necessary not to put the whole legal document on the website, because such legal documents are rarely understandable for most people. At the same time, it is necessary to update a new version of the angling rules every year if these rules change, and to highlight what changes have occurred. It is important to inform the anglers about all changes in the fishing rules, such as the closure of a fishery due to poor conditions (drought, floods, fish poisoning). At the same time, the Union informs the anglers about fish stocking activities (where, when, how many fish, and what species were stocked). This information is key because it shows that the Union cares about their anglers and about the ecosystems, making sure that anglers will always have the chance to catch their favorite fish species. This increases the anglers' confidence that the Czech Fishing Union is doing its job well. If this is neglected, the anglers will not know about the changes and can inadvertently violate them.

Fish stocking is an important part of keeping the fisheries sustainable. Here, fish stocking is undertaken for two main reasons. Firstly, the large-sized and commercially important fish are stocked so anglers have something to catch. Secondly, small-sized native fish are stocked to bolster wild fish populations. Since these two components must be met, each local fisheries manager has a designated fish restocking plan for each of her or his managed streams and rivers. The manager should then comply with this restocking plan at all costs, which is then transparently demonstrated within the local organization to the local anglers so that they know that the local fishery manager takes good care of the fishing sites. Furthermore, it is necessary to explain to the anglers that, in addition to the stocking of trophy-sized common carps, such as *Cyprinus carpio*, and pikes, such as *Esox lucius*, it is also necessary to stock all kinds of fry fish, so that wild fish populations can be maintained and there is something to catch for the following years. This trust is key for the anglers to follow the rules of fishing in the restocked streams and rivers. At the same time, the Czech Fishing Union informs the anglers about the origin of stocked fish, which originate either from spawners from local streams or from local fishponds. The anglers mostly prefer to support the local fish producers, and they handle the fish more gently if they know that they were not commercially imported from other regions or other countries.

In addition to the fish stocking activities, the fishery managers are also contributing to saving the populations of the endangered fish species with conservation programs. Thus, for example, a project aimed at the conservation of the brown trout *Salmo trutta* and the

grayling *Thymallus thymallus* in small streams is under way, where the fishery managers banned or restricted angling and revitalized the trout streams to create better conditions for trout and grayling populations. There is also a project that aims to save the populations of crucian carp *Carassius carassius*, where the fisheries managers seek small lakes and look for the remaining genetically pure populations of the crucian carp as well as other suitable sites for their restocking. They use electrofishing surveys to assess local crucian carp populations and they analyze their genetic origin using DNA fin and scale analysis. It is important that these projects (and their results) are well communicated with the anglers, including photos. The anglers can then see that the fisheries managers are interested in the welfare of the fish species and are motivated to handle caught fish gently.

The Czech Fishing Union also cooperates with scientists on analyses of the sustainability of each fishery. Scientists analyze trends in fish harvest rates and fishing visit rates, identifying which types of fishing sites have the strongest fishing pressure. At the same time, the Czech Fishing Union has at its disposal a sociological analysis of anglers' attitudes to fishing and reporting, from which the fisheries managers learn why anglers do not comply with fishing rules and why they do not report harvested fish and fishing visits. They also learn what the Union or other stakeholders should do to encourage anglers to start respecting the fishing rules.

The recommendations are summarized in Table 3.

Table 3. List of recommendations of what anglers, angling guards, and fisheries managers from the Fishing Union must do to achieve high report rates of fish harvested and fishing trips in recreational angling and to support sustainable angling.

	Recommendations
(1) what anglers must do	pass a knowledge test get a fishing permit get a fishing license get an angling logbook write down each harvested fish write down each fishing trip return a filled in summary to receive a new one collect litter or pay a fee
(2) what angling guards must do	perform field inspections check if anglers write down all harvested fish and fishing trips confiscate illegally harvested fish fine anglers who fish illegally confiscate fishing permits and gear of illegal anglers
(3) what the fisheries managers from the Fishing Union must do	be in an agreement with other authorities in fisheries create local angling organisations that shelter local anglers provide a list of fishing rules to anglers update fishing rules when they change sustainably manage entrusted streams and rivers hand over and collect angling logbooks from anglers host seminars with anglers using local angling organisations let anglers vote on the changes to angling rules set bag limits, slot limits, daily hours, closed seasons, and allowed fishing techniques describe the reason behind each fishing rule to anglers communicate with anglers using social media and an official webpage keep stocking fish to rivers and streams advertise fish stocking on social media and webpages inform the anglers about the origin of stocked fish support fish conservation programmes and communicate the support with anglers analyse trends regarding fish harvest rates and fishing pressure analyse trends regarding the perceptions of anglers and their behaviour

4. Discussion

Firstly, this paper described how convincing over 99% of anglers to report harvested fish and fishing visits was achieved mainly by setting up mandatory reporting, together with explaining to anglers the need for this reporting, which is to support sustainable fisheries. The main argument was that, without this reporting system and without the angling rules and regulations, fish populations would decline and there would be much less fish to catch in the future. Secondly, this paper stated that sustainable fishing has been achieved through the introduction of strict angling restrictions and regulations, together with an explanation to the anglers of the need to comply with the fishing restrictions and regulations to save fish populations for future years.

The mandatory reporting of harvested fish and fishing visits turned out to be essential. Even if most anglers reported the harvested fish and the fishing visits on their own, we would otherwise still be missing the data from the anglers who do not report on their own. Furthermore, unfortunately, the non-compliant anglers tend to harvest more fish. Other studies also confirmed that the anglers who harvest the most fish are more likely to violate angling restrictions [18].

Although we managed to achieve a high rate on reporting the harvested fish and the fishing visits, we have not yet discovered whether the anglers report the harvested fish and the fishing visits correctly. Unfortunately, the fisheries' scientific literature still does not provide a correct estimate of the real fish harvest rates and fishing visits in any country [19]. Thus, the angling guards cannot reliably check on all anglers regarding their behaviour. In practice, this would be necessary for an effective reporting system. Other studies also pointed to the fact that anglers often break fishing rules when they are not supervised [20].

It should be added, however, that breaking the rules goes hand in hand with the lack of clear explanation of the importance of the angling rules to anglers. As soon as the anglers are informed that it is necessary to regulate angling to conserve fish populations for future angling, the level of compliance with the rule increases. Studies from other countries have also shown that if the anglers understand and agree with the angling restrictions and regulations, they are more likely to comply with them [21,22].

For this reason, a test of angling rules knowledge is important, which filters out the anglers without an interest in the biology, ecology, and welfare of fish. The idea is that an angler who is interested in fish biology and wildlife in general also has more knowledge regarding gentle fish handling, and will treat the caught fish more gently. This is also confirmed by studies from other countries, which described the positive correlations between the angler's perception of the wildlife and compliance with the fishing rules [23,24].

For this reason, it is necessary to involve anglers in the design of the fishing rules and restrictions. The anglers then feel that the rules have been designed by them and, therefore, they abide by them. Other studies from other countries have also shown that involving anglers in the decision process will increase their confidence in the system [25].

It is true that the fishing rules, regulations, and restrictions within the Czech Republic are relatively strict and quite complex, as they are often designed differently within individual fishing sites. Therefore, it is important that the changes to the rules are communicated by the management of the local angling organizations separately to the local anglers. In other countries, the fishing unions also have their own angling organizations or local angling clubs that explain the fishing rules to the anglers [26,27]. Given that foreign countries generally have less strict fishing restrictions than the Czech Republic, the involvement of anglers in the debate on the rules could have an even greater positive effect on their compliance with fishing rules in that country [28].

Checking for angler compliance with the fishing rules can be accomplished in different ways. In our study, the inspection was carried out directly in the field, for example, with the police inspecting drivers or inspectors inspecting the public transport passengers. In other countries, similar inspections of anglers are rare or almost non-existent [13]. It is true that the countries that do not have angling regulations may not need similar

inspections, however, having no angling rules is a worse concept than having angling rules without field inspections. Many anglers follow the rules because they see why the rules are important [29], and if no rules or regulations are set, then anglers will often think that there is no need to regulate fishing, and that they can harvest the fish limitlessly without endangering the fish populations [30]. However, since the freshwater fish species are generally threatened by fishing, the fishing rules are needed, which is why fishery managers are involved in the conservation programs for fish species.

The fact that the members of the Czech Fishing Union and the local fishery managers participate in the fish conservation programs is perceived very positively by the anglers and the public, and really helps to preserve fish stocks [31]. Similarly, Czech fisheries managers cooperate with foreign fisheries managers on the conservation of migratory fish species (e.g., the Atlantic salmon *Salmo salar* and the European eel *Anguilla anguilla*), and these projects occasionally help to sustain fish stocks, as well [32].

The main advantage of this study over studies from other countries is that this study builds its recommendations on fishery data that were collected directly from anglers in the field. In other countries, similar data are often collected by telephone surveys (CATI) among randomly selected anglers [10–12]. That is significantly less reliable information, because it is distorted by the fact that the anglers have a selective memory, which prohibits scientists from seeing the whole story [33]. However, both collection methods provide only soft or semi-soft data, and no hard evidence of harvested fish or fishing visits is available. Ideally, anglers would have to provide a proof of the harvested fishes and fishing visits (e.g., a photo) while being monitored at the same time. However, this method of reporting is not feasible in the current state of technology and the possibilities of the Czech Fishing Union. Previous studies performed similar monitoring only on a small sample of anglers, and the authors themselves admitted that it is not widely feasible [34,35].

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/su132313499/s1, Table S1: Scenario for the in-depth interviews with 20 selected anglers performed in the region of Bohemia from January to August 2021. The topics for the interviews were reporting of fish harvested and sustainable recreational angling, Table S2: Scenario for the in-depth interviews with 20 selected fishery managers performed in the region of Bohemia from January to August 2021. The topics for the interviews were reporting of fish harvested and sustainable recreational angling.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki of 1975 (https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/, accessed on 30 October 2021) and follows the Ethical codex (https://www.aapor.org/Standards-Ethics/AAPOR-Code-of-Ethics.aspx, accessed on 30 October 2021). The INESAN ethic review board does not require an additional ethics approval for such studies according to the ethical codex (https://inesan.eu/wp-content/uploads/2020/12/A_Eticky-kodex.pdf, accessed on 30 October 2021) because the institute holds a HRS4R HR Excellence in Research award (https://inesan.eu/en/hrs4r-2/, accessed on 30 October 2021). This award grants the highest level of ethical work carried by the researchers at this institute (https://www.euraxess.cz/jobs/hrs4r, accessed on 30 October 2021).

Informed Consent Statement: This study involved data collected from anonymous interviewees. All subjects gave their informed consent for inclusion before they participated in the study.

Data Availability Statement: The data used to support the findings of this study will be available from the corresponding author upon request. Since the data are owned by a third party, a consent will be needed from this party as well.

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