diversity

Article

Attitudes Toward Managing a Fish-Eating Predator, the Great Cormorant, in a Coastal Environment

Vasilios Liordos [1,*], Vasileios J. Kontsiotis [1], Georgios Karras [1], Christina Kyriakidou [1] and Georgios Karris [2]

[1] Department of Forest and Natural Environment Sciences, Democritus University of Thrace, P.O. Box 172, 66100 Drama, Greece; vkontsiotis@neclir.duth.gr (V.J.K.); giorgoskarras1993@gmail.com (G.K.); christinaghx@gmail.com (C.K.)
[2] Department of Environment, School of Environment, Ionian University, M. Minotou-Giannopoulou Str., 29100 Panagoula, Greece; gkarris@ionio.gr
* Correspondence: liordos@neclir.duth.gr

Abstract: The population of the continental race of the great cormorant (*Phalacrocorax carbo sinensis*) has significantly increased over the last few decades due to legal protection. This rise has led to intense conflicts with fishing interests because of the bird's fish-eating habits. Effective conflict management requires an understanding of public attitudes. We collected data through interviews with 260 residents (50 fishers and 210 members of the general public) to examine the endorsement and prioritization of strategies to manage great cormorants in a fishery in northern Greece. First, we asked respondents to state their endorsement of implementing each of six management strategies, with possible responses being "endorsed" or "not endorsed." Then, we asked them to select the one they would prioritize among the six strategies for implementation. The most endorsed management strategy among all residents was using nets to cover fish wintering channels (85.7%), followed by compensation for damage (66.7%), scaring devices (66.0%), destruction of breeding colonies (33.3%), taking no action (26.3%), and killing birds (20.7%). Taking no action was more endorsed by the general public, while scaring, colony destruction, and killing were more endorsed by fishers. Nets for cover were the most prioritized management strategy among all residents (47.3%), followed by compensation (29.3%), scaring (11.4%), taking no action (6.0%), colony destruction (4.0%), and killing (2.0%). Fishers prioritized nets for cover, colony destruction, and killing more than the general public, who prioritized taking no action, compensation, and scaring. These findings will be valuable for informing the management process of the great cormorant–fishery conflict.

Keywords: aquatic predator; attitudes; questionnaire survey; wildlife management; Phalacrocoracidae

check for updates

Academic Editor: Michael Wink

Received: 11 March 2025
Revised: 14 April 2025
Accepted: 22 April 2025
Published: 23 April 2025

Citation: Liordos, V.; Kontsiotis, V.J.; Karras, G.; Kyriakidou, C.; Karris, G. Attitudes Toward Managing a Fish-Eating Predator, the Great Cormorant, in a Coastal Environment. *Diversity* **2025**, *17*, 306. https://doi.org/10.3390/d17050306

1. Introduction

The great cormorant (*Phalacrocorax carbo*), hereafter referred to as cormorant, is a top aquatic predator specializing in fish [1]. It has a wide distribution, inhabiting all continents except South America and Antarctica [2], and its global population is currently increasing [3]. Cormorant populations experienced significant reductions or became extinct in many European countries during the 19th century [4]. Conservation measures initiated in the 1970s led to a gradual increase in the European cormorant population, which reached about 370,000 breeding pairs and 700,000 wintering individuals in the 2010s [5,6]. The growth in cormorant populations, along with their fish-eating habits, has caused conflicts with fishery interests across Europe [7,8]. The diet and foraging ecology of cormorants have been extensively studied, and numerous studies have estimated the potential damage to fisheries (e.g., [9–12]). In contrast, public attitudes toward the management of cormorants have not been thoroughly examined [13,14]. It is essential to incorporate human dimensions into conflict management plans, alongside studies of bird ecology and biology [15,16].

Cormorant predation may negatively affect the health and structure of fish populations, although interactions between cormorants and their prey are complex [17]. The impact can be significant in areas with high fish concentrations, such as stocked fishponds, aquaculture facilities, and wintering channels, because cormorants are opportunistic predators drawn by prey abundance [12,18–20]. This has resulted in complaints from fishery professionals and the implementation of management strategies to minimize economic losses [21]. Such strategies include compensation for economic losses, using netting and lines to deter bird landings, employing scaring devices, preventing breeding, and killing birds [22]. Compensation can be a bureaucratic process that is not always accessible, and it can be difficult to prove losses [23]. The use of scaring devices and covering smaller areas, like fishponds, aquaculture tanks, and wintering channels, with netting and wires can be costly but may prove effective [22,24]. However, birds may become accustomed to scaring devices and learn to navigate around netting and land between overhead lines [22,24,25]. Fish-eating birds, along with other non-target species, may collide with lines or become entangled in netting, resulting in injury or death. Proposals to eliminate gaps and enhance the visibility of gear have been suggested as measures to reduce fish losses and protect birds [25,26]. Culling cormorants has also proven effective locally, but achieving lasting results requires ongoing efforts across a broader area, as nearby cormorants will often resettle [27–30]. The endorsement and prioritization of management strategies vary among stakeholders. The general public typically favors taking no action and non-lethal methods, while stakeholders whose livelihoods are threatened, such as farmers, hunters, and fishers, often lean towards endorsing damage management strategies, including lethal ones [31–38].

Worldviews of nature and wildlife, especially the stewardship ethic and anthropocentric dominance worldviews, are important predictors of the endorsement of wildlife conservation and management strategies. The stewardship ethic worldview regards nature and wildlife with spiritual reverence and ethical concern, whereas the anthropocentric dominance worldview promotes human superiority and control over nature and wildlife [39]. The stewardship ethic worldview generally correlates with greater support for wildlife conservation and non-lethal methods, while the anthropocentric dominance worldview often aligns with support for hunting and lethal management strategies [40–44]. Demographic factors such as age, gender, and education frequently predict attitudes towards wildlife conservation and management [32,44,45]. Typically, younger individuals, females, and those with higher education levels support wildlife conservation and oppose lethal damage management strategies, while older individuals, males, and those with lower education levels tend to endorse all strategies, including lethal ones [32,44,46,47].

Following the European trend, the Greek population of the cormorant, belonging to the continental subspecies *P. c. sinensis*, has also risen, reaching approximately 7000 breeding pairs and 44,000 wintering individuals in the 2010s [6,48]. Significant fish losses have been reported in regions with commercial fisheries, causing substantial economic impacts for professional fishers [9,12,18,49]. This negative impact has fostered unfavorable attitudes toward cormorants and demands for state protection and support [18,50]. Understanding the endorsement and prioritization of wildlife management strategies among stakeholders is crucial for the success of any management plan [15,16]. Thus, this study aimed to identify the endorsement and prioritization of managing cormorants among key stakeholders, specifically the fishers of one of Greece's largest fishery communities, as well as the general public. Furthermore, we sought to investigate how worldviews of nature, such as the stewardship ethic and anthropocentric dominance, and demographic characteristics like age, gender, and education, might influence the endorsement of management strategies among both fishers and the general public. This information would enable state wildlife managers to make informed decisions about protecting fish stocks and the income of fishers.

2. Materials and Methods

2.1. Study Area

This study was carried out in the prefectures of Xanthi and Rhodope, Thrace, northern Greece (Figure 1), with a population of about 238,000 people, having 51.4% female/48.6% male and 27.1% higher and 72.9% lower education ratios [51]. Cormorants overwinter in the area's lakes and lagoons in considerable numbers, ranging from 1000 birds in October to over 10,000 birds in November–January [18,52]. The target species uses four major sites for roosting in the area [18] (Figure 1). The local fishery, one of the most productive in Greece, is run by the Vistonis Fishing Cooperative, which has 52 members. The fishery is managed through the use of permanent barrier fish traps and wintering channels. The annual catch in different lakes and lagoons ranges from 40 to 230 kg ha^{-1}, totaling between 600 and 700 tn [18]. Commercially important species include the flathead gray mullet (*Mugil cephalus*), golden gray mullet (*Chelon auratus*), thicklip gray mullet (*Chelon labrosus*), thinlip gray mullet (*Chelon ramada*), big-scale sand smelt (*Atherina boyeri*), European seabass (*Dicentrachus labrax*), gilthead seabream (*Sparus aurata*), and European eel (*Anguilla anguilla*).

Figure 1. Map of the study area indicating the location of the Vistonis Fishing Cooperative and the major roosts of the great cormorant [18].

2.2. Sampling Procedure

Face-to-face surveys with residents and fishers over 18 years old were conducted to collect data on the endorsement of strategies for managing cormorants. Prior to the survey, the questionnaire was tested for clarity and completion time (n = 10 residents, 7 fishers). We visited most neighborhoods in villages, towns, and cities within the study area to increase the representativeness of the survey. Each time, the fifth person encountered by the researcher (C.K.) was selected for participation in the survey. Fishers were contacted at the head office of the Vistonis Fishing Cooperative. Respondents completed the questionnaire independently (respondent-completed survey; [53]). The average time for questionnaire completion was estimated at 30 min.

2.3. Survey Questionnaire Design

The questionnaire comprised three sections. The first section included questions assessing the endorsement of six management strategies for reducing the impact of fish predation by cormorants: taking no action, providing compensation, using scaring devices, covering wintering channels with nets, destroying cormorant breeding colonies, and killing cormorants (see Table S1 for data). Possible responses were "endorsed" or "not endorsed". Respondents also indicated their most prioritized strategy among the six options.

In the second section of the questionnaire, respondents were asked about their stewardship ethic and anthropocentric dominance worldviews of nature using a six-item short version of the New Ecological Paradigm (Table 1, see Table S1 for data) [39]. Responses to the worldview statements were measured on a 5-point scale: "strongly disagree" (1), "disagree" (2), "neither" (3), "agree" (4), or "strongly agree" (5).

Table 1. Variables used for predicting endorsement and prioritization of great cormorant management strategies. Mean, SD, minimum, and maximum values are given separately for fishers (n = 50) and the general public (n = 210).

Variable	Definition	Occupation	Mean	SD	Min	Max
Stewardship ethic	Worldview dimension (1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, and 5 = strongly agree).	Fisher	4.248	0.807	1	5
		General public	4.595	0.704	1	5
Anthropocentric dominance	Worldview dimension (1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, and 5 = strongly agree).	Fisher	2.204	1.088	1	5
		General public	2.283	1.343	1	5
Perception of great cormorant population status	1 = it has increased and 0 = it is stable.	Fisher	0.667	0.474	0	1
		General public	0.205	0.404	0	1
Age	Years of age.	Fisher	48.922	13.524	25	80
		General public	46.757	16.570	18	89
Gender	1 = female and 0 = male (all fishers were male).	Fisher	0.000	0.000	0	0
		General public	0.514	0.501	0	1
Level of education	1 = higher and 0 = lower.	Fisher	0.122	0.329	0	1
		General public	0.271	0.446	0	1

The third section included sociodemographic questions regarding respondents' age (in years), gender (female or male), educational level (higher, university education; lower, elementary or high school education), and their perception of the cormorant population status in their area (it has increased or it is stable) (Table 1, see Table S1 for data).

2.4. Data Analysis

The variance inflation factor (VIF < 5) and Spearman correlation ($r_s < 0.7$) were utilized to assess multicollinearity among predictor variables. All VIFs were below 1.681, and correlations were under 0.491; therefore, all variables were included in the models.

The two worldviews were validated using confirmatory factor analysis. A Cronbach's alpha greater than 0.7 was used to assess if the statements included in the factors reliably measured the theoretical constructs [54]. Five indicators were used to assess model fit: $\chi^2/\text{df} \leq 3$, comparative fit index (CFI) ≤ 0.95, goodness-of-fit index (GFI) ≤ 0.90, normed fit index (NFI) ≤ 0.95, and root mean square residual (RMR) ≤ 0.08 [55].

Generalized linear models (binomial distribution with logit link function) were fitted to assess the effect of worldviews and sociodemographics on the endorsement of management strategies. Differences in endorsed and prioritized strategies among all respondents were assessed using the chi-squared goodness-of-fit test, while differences in prioritized strategies between fishers and the general public were examined with chi-squared contingency tables [56].

Generalized linear models and chi-squared tests were carried out using SPSS Statistics, and confirmatory factor analysis was performed with SPSS Amos statistical software (version 21.0, IBM Corp. (Armonk, NY, USA), 2012).

3. Results

3.1. Demographics and Worldviews

Information on the sample's demographic characteristics is given in Table 1, separately for fishers, who were all male, and the general public. The general public's gender ratio (51.0% female, 49.0% male) was not significantly different from the studied population's (51.4% female, 48.6% male; χ^2 = 0.002, df = 1, p = 0.906) [51]. The general public's educational level ratio (14.3% higher, 85.7%) was significantly different from the studied population's (27.1% higher, 72.9% lower; χ^2 = 27.777, df = 1, p < 0.001) [51].

Confirmatory factor analysis determined that the data fit well to the theoretical constructs for fishers (χ^2/df = 2.993, RMSEA = 0.040, NFI = 0.988, CFI = 0.995) (Table 2). Also, the internal consistency of fishers' stewardship ethic (α = 0.794) and anthropocentric dominance (α = 0.711) worldviews was acceptable.

Table 2. Reliability and confirmatory factor analysis (CFA) of fishers' (n = 50) worldview statements.

Worldview Statements	Mean [a]	SD	CFA	Reliability Analysis		
			Factor Loadings	Item Total Correlation	Alpha If Item Deleted	Cronbach's Alpha
Stewardship ethic						0.794
Humans must live in harmony with nature in order to survive.	4.657	0.544	0.653	0.643	0.781	
The balance of nature is very delicate and easily upset.	4.233	0.887	0.717	0.684	0.699	
When humans interfere with nature, it often produces disastrous consequences.	3.856	0.989	0.767	0.721	0.771	
Anthropocentric dominance						0.711
Humans have the right to modify the natural environment to suit their needs.	2.000	1.102	0.573	0.756	0.702	
Humankind was created to rule over the rest of nature.	2.156	1.059	0.731	0.555	0.693	
Plants and animals exist primarily to be used by humans.	2.456	1.103	0.766	0.613	0.645	

[a] Range: 1 (strongly disagree)–5 (strongly agree).

Confirmatory factor analysis determined that the data fit well to the theoretical constructs for the general public (χ^2/df = 2.997, RMSEA = 0.043, NFI = 0.975, CFI = 0.988) (Table 3). Also, the internal consistency of fishers' stewardship ethic (α = 0.788) and anthropocentric dominance (α = 0.737) worldviews was acceptable.

Table 3. Reliability and confirmatory factor analysis (CFA) of the general public's (n = 210) worldview statements.

Worldview Statements	Mean [a]	SD	CFA	Reliability Analysis		
			Factor Loadings	Item Total Correlation	Alpha If Item Deleted	Cronbach's Alpha
Stewardship ethic						0.788
Humans must live in harmony with nature in order to survive.	4.795	0.604	0.801	0.659	0.704	
The balance of nature is very delicate and easily upset.	4.629	0.638	0.771	0.719	0.692	
When humans interfere with nature, it often produces disastrous consequences.	4.362	0.871	0.675	0.685	0.770	
Anthropocentric dominance						0.737
Humans have the right to modify the natural environment to suit their needs.	2.086	1.321	0.658	0.666		
Humankind was created to rule over the rest of nature.	2.076	1.299	0.654	0.710		
Plants and animals exist primarily to be used by humans.	2.686	1.410	0.915	0.692		

[a] Range: 1 (strongly disagree)–5 (strongly agree).

3.2. Endorsement and Prioritization: Fishers Versus the General Public

Overall, the use of nets to cover fish wintering channels was the most endorsed management strategy (85.7%), followed by compensation for damage (66.7%) and use of scaring devices (66.0%), while killing birds (20.7%), taking no action (26.3%), and destroying breeding colonies (33.3%) were the least endorsed strategies (χ^2 = 210.733, df = 5, $p < 0.001$). Taking no action was more endorsed by the general public (mean 0.319 ± 0.032 SE) than by fishers (0.133 ± 0.041; $p = 0.001$) (Table 4, Figure 2). Scaring ($p < 0.001$), colony destruction ($p < 0.001$), and killing ($p < 0.001$) were more endorsed by fishers (0.911 ± 0.034, 0.733 ± 0.053, and 0.378 ± 0.058, respectively) than by the general public (0.552 ± 0.034, 0.162 ± 0.025, and 0.133 ± 0.024, respectively).

Table 4. Logistic regression models (odd ratios) of occupation's ability to predict the endorsement of strategies for managing fish predation by the great cormorant (n = 260).

	Occupation (Fisher)	Nagelkerke R^2
No action	0.328 **	0.058
Compensation	0.868	0.001
Cover	2.050	0.020
Scaring	8.306 ***	0.180
Colony destruction	14.235 ***	0.365
Killing	3.946 ***	0.108

** $p < 0.01$; *** $p < 0.001$.

The use of nets for cover was the most prioritized among the management strategies by the respondents (47.3%), followed by compensation (29.3%), while killing (2.0%), colony destruction (4.0%), and taking no action (6.0%) were the least prioritized strategies (χ^2 = 291.360, df = 5, $p < 0.001$) (Figure 3). Between groups, the use of nets for cover, colony destruction, and killing were more prioritized by fishers (54.4%, 5.6%, and 4.4%, respectively) than the general public (44.3%, 3.3%, and 1.0%, respectively), while taking no action, compensation, and scaring were more prioritized by the general public (7.6%, 30.5%, and 13.3%, respectively) than fishers (2.2%, 26.7%, and 6.7%, respectively) (χ^2 = 11.833, df = 5, $p = 0.037$).

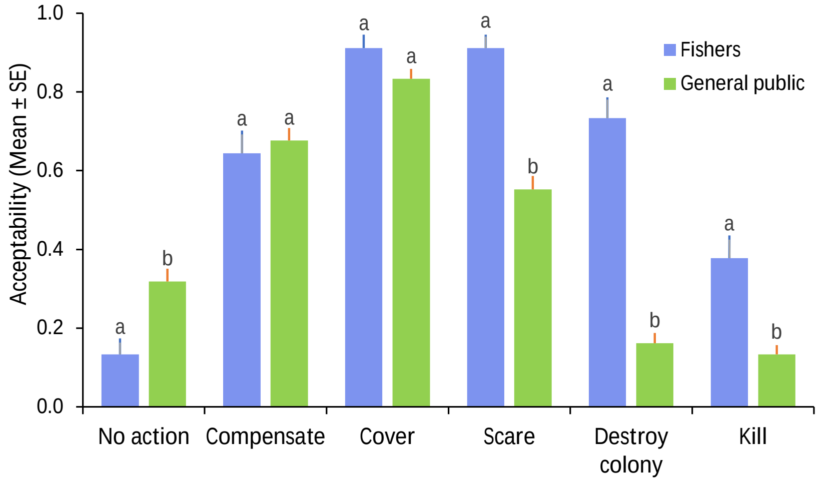

Figure 2. Endorsement (%) by fishers (n = 90) and the general public (n = 210) of strategies for managing fish predation by the great cormorant. Different letters between the two groups in each strategy denote a statistically significant difference (logistic regression; $p < 0.05$).

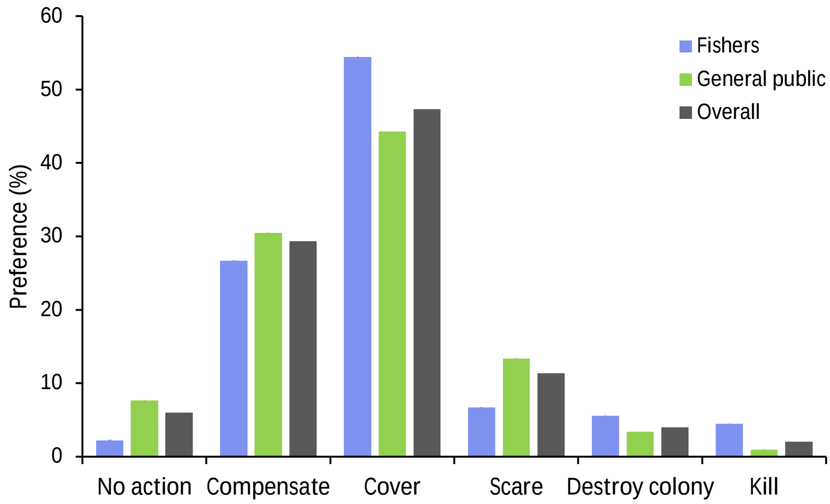

Figure 3. Prioritization by fishers (n = 50), the general public (n = 210), and overall (n = 260) of strategies for managing fish predation by the great cormorant.

3.3. Effects of Demographics and Worldviews on the General Public's Perceptions

Respondents, members of the general public group with a higher stewardship ethic, endorsed colony destruction ($p = 0.002$) and killing ($p = 0.027$) less than respondents with a lower stewardship ethic (Table 5). Respondents with higher anthropocentric dominance worldviews endorsed colony destruction ($p = 0.014$) and killing ($p = 0.007$) more and the use of nets for cover ($p = 0.011$) less than respondents with lower anthropocentric dominance worldviews. Respondents who believed that the local cormorant population had increased endorsed compensation ($p = 0.016$), scaring ($p = 0.023$), and colony destruction ($p < 0.001$) more and taking no action ($p = 0.030$) less than respondents who believed that the local cormorant population remained stable (Table 5, Figure 4a). Respondents with higher education endorsed the use of nets for cover more ($p = 0.003$) and colony destruction ($p = 0.038$) and killing ($p = 0.043$) less than respondents with lower education (Table 5, Figure 4c).

Table 5. Logistic regression models (odd ratios) predicting the general public's (n = 210) endorsement of strategies for managing fish predation by the great cormorant.

	Endorsed (%)	Stewardship Ethic	Anthropocentric Dominance	Population (Increased)	Age	Gender (Female)	Education (Higher)	Nagelkerke R^2
No action	31.9	0.911	1.091	0.317 *	1.008	0.827	0.622	0.089
Compensation	67.6	0.893	1.048	2.928 *	0.995	1.735	1.726	0.081
Cover	83.3	1.085	0.869 *	0.757	1.008	1.739	3.579 **	0.118
Scaring	55.2	0.852	1.002	1.964 *	0.997	0.769	1.367	0.068
Colony destruction	16.2	0.685 **	1.241 *	5.148 ***	1.000	1.77	0.248 *	0.251
Killing	13.3	0.780 *	1.329 **	1.733	0.986	0.663	0.255 *	0.171

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

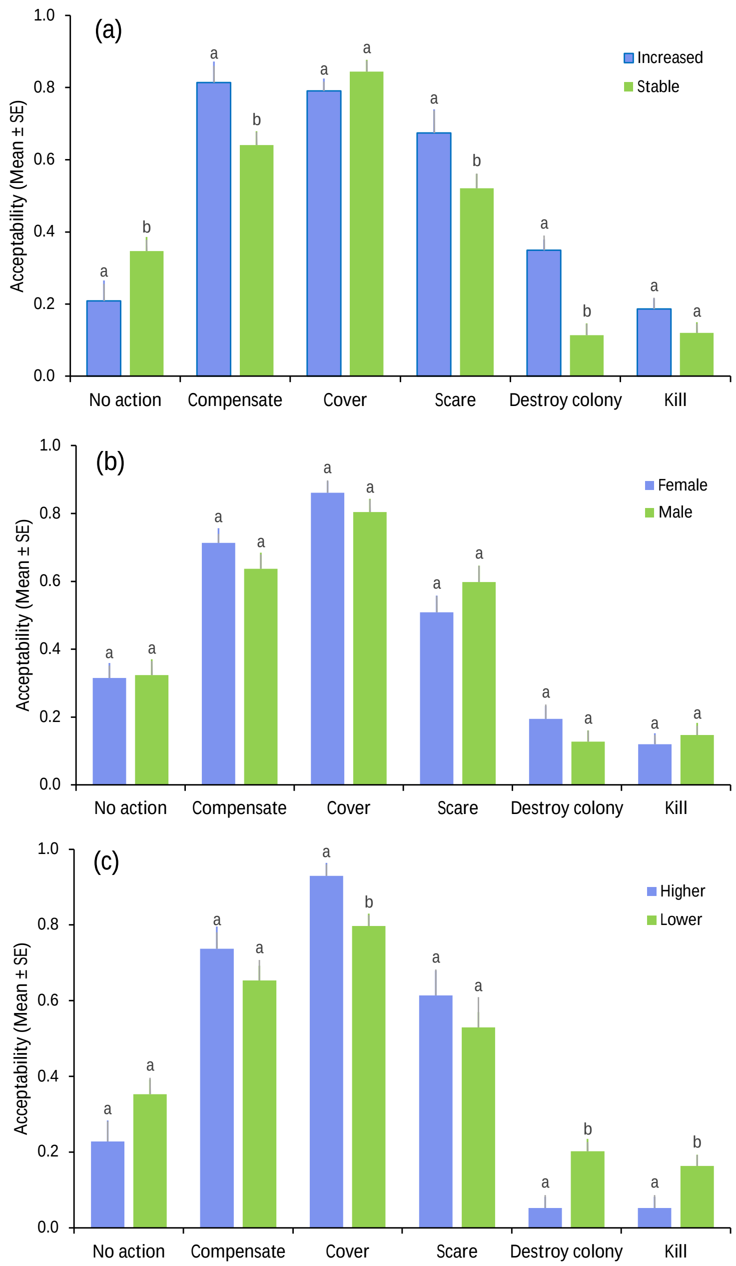

Figure 4. Effect of perceived population status (**a**), gender (**b**), and educational level (**c**) on the endorsement (mean ± SE) by the general public (n = 210) of strategies for managing fish predation by the great cormorant. Different letters between two groups in each strategy denote a statistically significant difference (logistic regression; $p < 0.05$).

3.4. Effects of Demographics and Worldviews on Fishers' Perceptions

Fishers with a higher stewardship ethic endorsed the use of nets for cover ($p = 0.018$) more and colony destruction ($p = 0.002$) and killing ($p = 0.027$) less than fishers with a lower stewardship ethic (Table 6). Fishers with higher anthropocentric dominance worldviews endorsed taking no action ($p = 0.020$), colony destruction ($p = 0.036$), and killing ($p = 0.005$) more than fishers with lower anthropocentric dominance worldviews. Fishers who believed that the local cormorant population had increased endorsed the use of nets for cover ($p = 0.014$), scaring ($p < 0.001$), colony destruction ($p < 0.001$), and killing ($p < 0.001$) more than fishers who believed that the local cormorant population remained stable (Table 6, Figure 5a). Respondents with higher education endorsed taking no action more ($p = 0.002$) and colony destruction ($p = 0.002$) and killing ($p = 0.039$) less than respondents with lower education (Table 6, Figure 5b).

Table 6. Logistic regression models (odd ratios) predicting fishers' (n = 50) endorsement of strategies for managing fish predation by the great cormorant.

	Endorsed (%)	Stewardship Ethic	Anthropocentric Dominance	Population (Increased)	Age	Education (Higher)	Nagelkerke R^2
No action	13.3	1.030	1.391 *	0.600	0.975	1.892 *	0.169
Compensation	64.4	1.177	1.028	0.972	0.976	0.524	0.056
Cover	91.1	1.338 *	0.985	2.016 *	0.976	0.241	0.194
Scaring	91.1	1.062	0.757	6.968 ***	0.989	0.268	0.268
Colony destruction	73.3	0.631 **	1.232 *	3.272 ***	0.994	0.075 **	0.359
Killing	37.8	0.716 *	1.320 **	6.197 ***	0.995	0.411 *	0.329

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

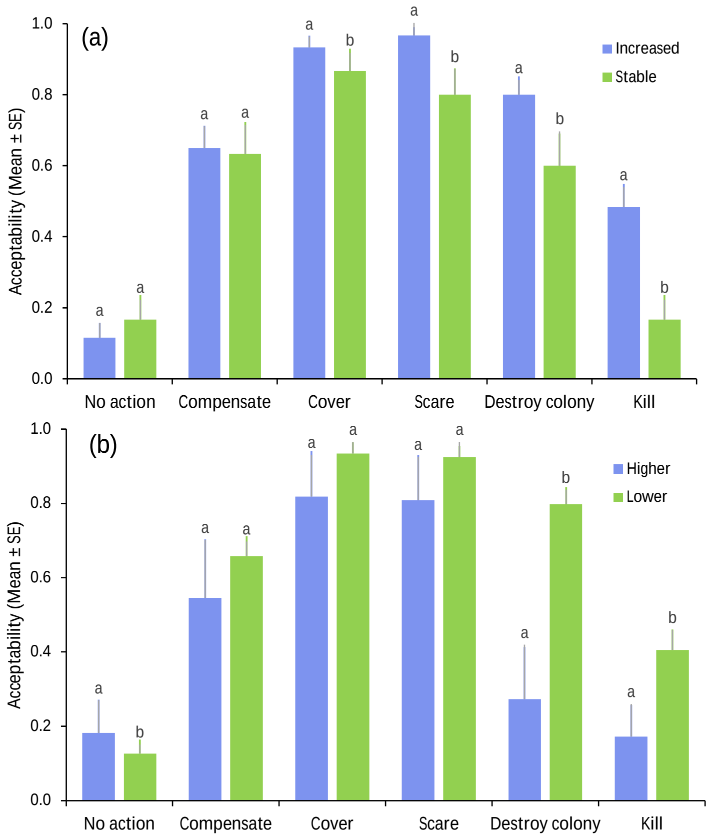

Figure 5. Effect of perceived population level (**a**) and educational level (**b**) on the endorsement (mean ± SE) by fishers (n = 50) of strategies for managing fish predation by the great cormorant. Different letters between two groups in each strategy denote a statistically significant difference (logistic regression; $p < 0.05$).

4. Discussion

The use of nets for covering wintering channels, compensation for economic losses, and scaring were the most endorsed strategies for managing cormorants. In contrast, taking no action and lethal strategies, including killing and colony destruction, were the least endorsed strategies, especially by the general public. Most respondents prioritized nets and compensation over lethal strategies. Previous studies have indicated that respondents generally favor non-lethal strategies while rejecting lethal ones [38,40–44]. In Greece, respondents endorsed non-lethal strategies and opposed taking no action and lethal strategies for managing corvids, European starlings (*Sturnus vulgaris*), coypus (*Myocastor coypu*), European badgers (*Meles meles*), wild boars (*Sus scrofa*), red foxes (*Vulpes vulpes*), and Eurasian otters (*Lutra lutra*) in scenarios involving the fouling of urban structures, crop destruction, livestock attacks, and game reduction [38,40,41]. Lethal strategies became more endorsed in life-threatening situations such as disease transmission [38,40,41].

Fishers endorsed scaring, colony destruction, and killing more than the general public, while the latter prioritized inaction more than fishers. Stakeholder groups impacted by wildlife activities often demand effective management solutions [31–38]. Additionally, stakeholders like farmers, hunters, and fishers tend to support both non-lethal and lethal strategies when their crops or game are threatened. Anglers and lakeshore homeowners expressed negative attitudes toward double-crested cormorants (*Nannopterum auritum*) and would likely endorse hazing of nesting birds, egg oiling, and state-sponsored shooting to reduce their numbers in Lake Champlain, U.S.A. [31]. In Italy, farmers endorsed both non-lethal and lethal strategies to mitigate wild boar damage to their crops [36]. In Wisconsin, black bear (*Ursus americanus*) hunters favored lethal strategies when gray wolves (*Canis lupus*) attacked their hunting dogs [57]. In Romania, farmers showed intolerance toward brown bears (*Ursus arctos*) damaging crops or threatening people and livestock, favoring either relocation or killing [58]. Greek farmers endorsed more than the general public both non-lethal and lethal strategies to decrease crop damage by European starlings, coypus, European badgers, and wild boars [32,35]. Likewise, Greek farmers endorsed more than the general public non-lethal and lethal strategies to reduce livestock attacks by red foxes, while Greek hunters endorsed more than the general public non-lethal and lethal strategies when red foxes reduced their game [34]. Professional fishers in Greece showed stronger support than the general public for lethal strategies when Eurasian otters reduced fish stocks [33].

Most fishers endorsed colony destruction strategies, and a significant number found it acceptable to kill cormorants. Fishers often experience substantial losses due to cormorants, which can lead to exaggerated perceptions of predation events [13,50,59]. Such experiences foster negative sentiments toward cormorants, driving calls for their eradication [13,31]. In response to these demands, licenses for culling cormorants have been issued in Europe and the U.S.A., although the effectiveness of culling remains under discussion [60,61]. Comparatively, egg oiling proves more cost-effective than culling in reducing fish consumption by double-crested cormorants [27], though effective management requires limiting bird dispersal from the controlled colonies [28]. A combination of culling and significant reductions in breeding success has led to decreased double-crested cormorant populations in the St. Lawrence River estuary, U.S.A. [62]. Intensive shooting in two Danish fjords during three hunting seasons successfully lowered bird numbers in that season but did not sustain population reductions in subsequent years [30]. In England, localized culling did not result in long-term changes in population sizes, whether on-site or nationwide [60]. Researchers have concluded that culling's impacts on cormorant populations are limited and recommend adopting a pan-European adaptive management plan to achieve significant outcomes [27–30]. However, reductions in bird numbers may not necessarily lead to fewer conflicts, suggesting management strategies should focus on minimizing damage rather than solely decreasing cormorant populations [29]. Although fishers in Vistonis could endorse lethal strategies, they did not prioritize them over non-lethal strategies, potentially viewing lethal strategies as ineffective for population control. Ethical considerations may also come into play. Batavia and Nelson [63] argued against lethal management due to its reliance on anthropocentrism, viewed as philosophically unsound and ethically questionable.

Netting and wiring strategies can be effective but come with limitations. Birds often learn to navigate between lines and may exploit gaps between nets and channel banks or through tears in the netting [24,25]. Additionally, fish-eating birds, alongside non-target species such as ospreys (*Pandion haliaetus*) and swallows (Hirundinidae sp.), can collide with overhead lines, resulting in injuries or fatalities [25]. Birds ensnared in nets may die or sustain injuries, with 327 found dead and 4575 discovered alive beneath nets at two Israeli fish farms, involving 31 species of both target (e.g., cormorant and gray heron) and non-target species (e.g., common moorhen (*Gallinula chloropus*), white stork (*Ciconia ciconia*), black stork (*Ciconia nigra*), and Eurasian hoopoe (*Upupa epops*)). Recommendations to reduce fish losses while minimizing injuries to both target and non-target species include using thick, dark-colored netting and wires, ensuring netting has a mesh size no larger than 5–7 mm, extending it onto land, and securing it properly. Regular maintenance to avoid openings, holes, and tears is also critical [25,26]. Scaring devices can be visual (e.g., scarecrows, flags, and strong or flashing lights) or acoustic (e.g., propane cannons, fireworks, and detonators) [24,64,65]. Nonetheless, cormorants quickly become accustomed to permanent scaring devices. Continuous human presence near fishponds has proven effective but is costly. The fishers of Vistonis have adopted netting along with irregular human patrols using noise-making devices as an effective strategy to deter cormorants from wintering channels. Unfortunately, they cannot maintain continuous patrols due to costs, and netting purchases and upkeep remain financially burdensome, preventing complete coverage of all channels. Therefore, although reduced, fish losses are still considerable.

Compensation is considered an important strategic tool for managing wildlife damage [23,33–35]. The state offers compensation for farmers' losses of livestock due to gray wolves and brown bears [66]. However, compensation to fishers for fish losses attributed to cormorants has not been predicted. Greek fishers consider compensation for economic losses crucial for their survival.

Respondents with higher stewardship ethic worldviews, both fishers and the general public, endorsed lethal strategies less than those with lower stewardship ethic worldviews. Conversely, respondents with higher anthropocentric dominance worldviews endorsed lethal strategies more than those with lower anthropocentric dominance worldviews. Previous studies have shown that individuals with a strong stewardship ethic prioritize animal welfare and favor non-lethal over lethal management strategies, whereas those with anthropocentric dominance worldviews are more utilitarian and readily endorse lethal management strategies [40–42]. Moreover, respondents, including both fishers and the general public, who believed that the cormorant population trend was positive were more in favor of both lethal and non-lethal management strategies than those who perceived the cormorant population as stable. Cormorant numbers have increased in Vistonis Lake and nearby lagoons (Hellenic Ornithological Society midwinter counts, IUCN Cormorant Specialist Group [6,18,48]). However, individuals may exaggerate bird populations, particularly fishers who observe birds flying overhead daily, attempting to steal their produce. Larger bird numbers correspond to increased predation rates and greater demand for control measures [13,31,50]. Respondents with higher education levels, both fishers and the general public, endorsed lethal methods less than those with lower educational backgrounds. Typically, individuals with higher education have better access to information sources, exhibit greater interest in nature and wildlife issues, and can therefore make more eco-friendly choices than less educated individuals [32,44,46,47].

5. Conclusions

Both fishers and the general public regard cormorant management as necessary, favoring non-lethal strategies such as netting to cover wintering channels, compensation for economic losses, and scaring devices. While fishers would endorse the reduction in the cormorant population through colony destruction and killing to a lesser extent, they would favor these lethal methods only if other, less invasive management strategies are unavailable. Currently, local fishers implement a combination of netting and irregular patrols to deter cormorants from wintering channels, achieving only partial success. This is primarily due to the high costs associated with fully developing and sustaining this management system. Providing financial aid for the purchase and maintenance of netting, along with compensation for economic losses from the state, presents the most suitable management plan for local fisheries, enabling fishers to sustain their livelihoods. Our findings inform a management plan that protects both fishers' incomes and cormorant populations, ensuring sustainability and endorsement within the local community.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/d17050306/s1. Table S1: Data collected during the survey for the endorsement and prioritization of great cormorant management strategies. See Tables 1–3 for codes and definitions.

Author Contributions: Conceptualization, V.L. and V.J.K.; investigation, C.K.; methodology, V.L., V.J.K., G.K. (Georgios Karras), C.K. and G.K. (Georgios Karris); software, V.L. and V.J.K.; validation, V.L., V.J.K. and G.K. (Georgios Karris); formal analysis, V.L., V.J.K. and G.K. (Georgios Karris); resources, V.L. and V.J.K.; data curation, V.L., V.J.K., G.K. (Georgios Karras), C.K. and G.K. (Georgios Karris); writing—original draft preparation, V.L.; writing—reviewing and editing, V.J.K., G.K. (Georgios Karras), C.K. and G.K. (Georgios Karris); visualization, V.L.; supervision, V.L. and V.J.K.; project administration, V.L. and V.J.K. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki. Ethical review and approval were waived for this study because of the following reasons: (a) oral consent was requested before the survey, and (b) information that could lead to personal information that could lead to identification was not recorded at any stage of the research, and respondent anonymity was thus secured. This study was deemed to cause no more than minimal risk.

Data Availability Statement: The data presented in this study are available in Supplementary Materials.

Acknowledgments: We thank the survey participants for sharing their time and opinions with us. We especially thank the late Stelios Balasis, president of the Vistonis Fishing Cooperative, for helping us interview the cooperative's fishers. We also thank three anonymous reviewers and the Academic Editor whose comments and suggestions helped greatly improve the manuscript.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Hatch, J.J.; Brown, K.M.; Hogan, G.G.; Morris, R.D.; Orta, J.; Garcia, E.; Jutglar, F.; Kirwan, G.M.; Boesman, P.F.D. Great Cormorant (*Phalacrocorax carbo*), version 1.0. In *Birds of the World*; Billerman, S.M., Ed.; Cornell Lab of Ornithology: Ithaca, NY, USA, 2020; Available online: https://birdsoftheworld.org/bow/species/grecor/cur/introduction (accessed on 25 February 2025).
2. BirdLife International. Species Factsheet: Great Cormorant Phalacrocorax carbo. 2018. Available online: https://datazone.birdlife.org/species/factsheet/great-cormorant-phalacrocorax-carbo (accessed on 5 February 2025).

3. BirdLife International. *Phalacrocorax carbo* (Amended Version of 2018 Assessment). The IUCN Red List of Threatened Species, 2019: E.T22696792A155523636. Available online: https://www.iucnredlist.org/species/22696792/155523636#amendment (accessed on 25 February 2025).
4. Lindell, L.; Mellin, M.; Musil, P.; Przybysz, J.; Zimmerman, H. Status and population development of breeding Cormorants *Phalacrocorax carbo sinensis* of the central European flyway. *Ardea* **1995**, *83*, 81–92.
5. Bregnballe, T.; Lynch, J.; Parz-Gollner, R.; Marion, L.; Volponi, S.; Paquet, J.-Y.; Carss, D.N.; van Eerden, M.R. (Eds.) *Breeding Numbers of Great Cormorants Phalacrocorax Carbo in the Western Palearctic, 2012–2013*; IUCN/Wetlands International Cormorant Research Group Report—Scientific Report from DCE—Danish Centre for Environment and Energy nr 99; Aarhus University: Aarhus, Denmark, 2014; Available online: http://dce2.au.dk/pub/SR99.pdf (accessed on 25 February 2025).
6. van Eerden, M.R.; Parz-Gollner, R.; Marion, L.; Bregnballe, T.; Paquet, J.-Y.; Volponi, S.; van Rijn, S.; Carss, D.N. Numbers of Great Cormorants *Phalacrocorax carbo* wintering in the western Palaearctic in January 2013. *Ardea* **2021**, *109*, 271–284. [CrossRef]
7. Carss, D.N. There must be some kind of way out of here: Towards 'reframing' European cormorant-fisheries conflicts. *Ardea* **2022**, *109*, 667–681. [CrossRef]
8. Keller, V.; Herrando, S.; Voříšek, P.; Franch, M.; Kipson, M.; Milanesi, P.; Martí, D.; Anton, M.; Klvăňová, A.; Kalyakin, M.V.; et al. *European Breeding Bird Atlas 2: Distribution, Abundance and Change*; European Bird Census Council & Lynx Edicions: Barcelona, Spain, 2020.
9. Liordos, V.; Goutner, V. Spatial patterns of winter diet of the great cormorant in coastal wetlands of Greece. *Waterbirds* **2007**, *30*, 103–111. [CrossRef]
10. Liordos, V.; Goutner, V. Habitat and temporal variation in diet of great cormorant nestlings in Greek colonies. *Waterbirds* **2008**, *31*, 424–437. [CrossRef]
11. Lyach, R. Do Cormorants and recreational anglers take fish of the same species and sizes? *Ardea* **2022**, *109*, 629–638. [CrossRef]
12. Katselis, G.; Konstas, S.; Moutopoulos, D.K. Estimation of fishery losses from great cormorants during the wintering period in Greek lagoons (Ionian Sea, W. Greece). *Sustainability* **2023**, *15*, 12007. [CrossRef]
13. Peeva, S.; Raichev, E.; Zhelyazkov, G. Fish producer's attitude to the most common fish-eating birds in Central Bulgaria. *Ecol. Balk.* **2017**, *9*, 1–5.
14. Vieite, B.; Braga, H.O.; Costa Neto, E.M.; Azeiteiro, U.M. Fishermen's knowledge and conservation attitudes: Focus on the great cormorant *Phalacrocorax carbo* (Linnaeus, 1758) in the Minho River, Portugal. *Aquat. Ecol.* **2022**, *56*, 667–684. [CrossRef]
15. Nordberg, K.; Salmi, P. Addressing the gap between participatory ideals and the reality of environmental management: The case of the cormorant population in Finland. *Environ. Policy Gov.* **2019**, *29*, 251–261. [CrossRef]
16. Marzano, M.; Carss, D.N.; Cheyne, I. Managing European cormorant-fisheries conflicts: Problems, practicalities and policy. *Fish. Manag. Ecol.* **2013**, *20*, 401–413. [CrossRef]
17. Ovegård, M.K.; Jepsen, N.; Bergenius, M.; Petersson, E. Cormorant predation effects on fish populations: A global meta-analysis. *Fish. Fish.* **2021**, *22*, 605–622. [CrossRef]
18. Panagiotopoulou, M.; Donth, S.J.; Christides, A. *Assessment of the Impacts of Great Cormorant Phalacrocorax Carbo Population Increase on the Fish Fauna of the Lagoons of the Nestos Delta, Vistonis, Ismaris National Park*; Phase C: Research Results; Nestos Delta, Vistonis, Ismaris National Park Management Body Report; Ismaris National Park Management: Nestos Delta, Vistonis, Greece, 2016.
19. Liordos, V.; Goutner, V. Diet of the great cormorant (*Phalacrocorax carbo* L. 1758) at two Greek colonies. *J. Biol. Res.* **2007**, *7*, 51–57.
20. Liordos, V.; Goutner, V. Sexual differences in the diet of great cormorants *Phalacrocorax carbo sinensis* wintering in Greece. *Eur. J. Wildl Res.* **2009**, *55*, 301–308. [CrossRef]
21. van Eerden, M.R.; Carss, D.N.; Munsterman, M.J. Sailing Down-Wind, a Breakwaters' Perspective on the Great Cormorant. *Ardea* **2022**, *109*, 265–269. [CrossRef]
22. Kirby, J.S.; Holmes, J.S.; Sellers, R.M. Cormorants Phalacrocorax carbo as fish predators: An appraisal of their conservation and management in Great Britain. *Biol. Conserv.* **1996**, *75*, 191–199. [CrossRef]
23. Kloskowski, J. Human–wildlife conflicts at pond fisheries in eastern Poland: Perceptions and management of wildlife damage. *Eur. J. Wildl. Res.* **2011**, *57*, 295–304. [CrossRef]
24. Moerbeek, D.J.; van Dobben, W.H.; Osieck, E.R.; Boere, G.C.; Bungenberg de Jong, C.M. Cormorant damage prevention at a fish farm in the Netherlands. *Biol. Conserv.* **1987**, *39*, 23–38. [CrossRef]
25. Ueckermann, E.; Spittler, H.; Graumann, F. Technische Maßnahmen zur Abwehr des Graureihers (*Ardea cinerea*) von Fischteichen und Fischzuchtanlagen. *Z. Jagdwiss.* **1981**, *27*, 271–282. [CrossRef]
26. Nemtzov, S.C.; Olsvig-Whittaker, L. The use of netting over fishponds as a hazard to waterbirds. *Waterbirds* **2003**, *26*, 416–423. [CrossRef]
27. McGregor, A.M.; Davis, C.L. Cost effectiveness of egg oiling versus culling for reducing fish consumption by double-crested cormorants in Lac La Biche, Alberta. *Waterbirds* **2012**, *35*, 66–76. [CrossRef]
28. Duerr, A.E.; Donovan, T.M.; Capen, D.E. Management-induced reproductive failure and breeding dispersal in double-crested cormorants on Lake Champlain. *J. Wildl. Manag.* **2007**, *71* (Suppl. S36), 2565–2574. [CrossRef]

29. Frederiksen, M.; Lebreton, J.-D.; Bregnballe, T. The interplay between culling and density-dependence in the great cormorant: A modelling approach. *J. Appl. Ecol.* **2011**, *38*, 617–627. [CrossRef]
30. Bregnballe, T.; Hyldgaard, A.M.; Clausen, K.K.; Carss, D.N. What does three years of hunting great cormorants, *Phalacrocorax carbo*, tell us? Shooting autumn-staging birds as a means of reducing numbers locally. *Pest. Manag. Sci.* **2015**, *71*, 173–179. [CrossRef]
31. Kuentzel, W.F.; Capen, D.E.; Richards, Z.L.; Higgins, B.R. Attitude strength and social acceptability of cormorant control programs on Lake Champlain. *J. Great Lakes Res.* **2012**, *38* (Suppl. S1), 141–149. [CrossRef]
32. Liordos, V.; Kontsiotis, V.J.; Georgari, M.; Baltzi, K.; Baltzi, I. Public acceptance of management methods under different human–wildlife conflict scenarios. *Sci. Total Environ.* **2017**, *579*, 685–693. [CrossRef]
33. Liordos, V.; Kontsiotis, V.J.; Nevolianis, C.; Nikolopoulou, C.E. Stakeholder preferences and consensus associated with managing an endangered aquatic predator: The Eurasian otter (*Lutra lutra*). *Hum. Dimens. Wildl.* **2019**, *24*, 446–462. [CrossRef]
34. Liordos, V.; Kontsiotis, V.J.; Emmanouilidou, F. Understanding stakeholder preferences for managing red foxes in different situations. *Ecol. Process.* **2020**, *9*, 20. [CrossRef]
35. Kontsiotis, V.J.; Vadikolios, G.; Liordos, V. Acceptability and consensus for the management of game and non-game crop raiders. *Wildl. Res.* **2020**, *47*, 296–308. [CrossRef]
36. Frank, B.; Monaco, A.; Bath, A.J. Beyond standard wildlife management: A pathway to encompass human dimension findings in wild boar management. *Eur. J. Wildl. Res.* **2015**, *61*, 723–730. [CrossRef]
37. Heneghan, M.D.; Morse, W.C. Acceptability of management actions and the potential for conflict following human-black bear encounters. *Soc. Nat. Resour.* **2019**, *32*, 434–451. [CrossRef]
38. Sponarski, C.C.; Vaske, J.J.; Bath, A.J. Differences in management action acceptability for coyotes in a National Park. *Wildl. Soc. Bull.* **2015**, *39*, 239–247. [CrossRef]
39. Knight, A.J. "Bats, snakes and spiders, Oh my!" How aesthetic and negativistic attitudes, and other concepts predict support for species protection. *J. Environ. Psychol.* **2008**, *28*, 94–103. [CrossRef]
40. Sijtsma, M.T.; Vaske, J.J.; Jacobs, M.H. Acceptability of lethal control of wildlife that damage agriculture in the Netherlands. *Soc. Nat. Resour.* **2012**, *25*, 1308–1323. [CrossRef]
41. Kontsiotis, V.J.; Triantafyllidis, A.; Telidis, S.; Eleftheriadou, I.; Liordos, V. The predictive ability of wildlife value orientations for mammal management varies with species conservation status and provenance. *Sustainability* **2021**, *13*, 11335. [CrossRef]
42. Glas, Z.E.; Getson, J.M.; Prokopy, L.S. Wildlife value orientations and their relationships with mid-size predator management. *Hum. Dimens. Wildl.* **2019**, *24*, 418–432. [CrossRef]
43. Keener-Eck, L.S.; Morzillo, A.T.; Christoffel, R.A. A comparison of wildlife value orientations and attitudes toward timber rattlesnakes (*Crotalus horridus*). *Hum. Dimens. Wildl.* **2020**, *25*, 47–61. [CrossRef]
44. Liordos, V.; Kontsiotis, V.J.; Anastasiadou, M.; Karavasias, E. Effects of attitudes and demography on public support for endangered species conservation. *Sci. Total Environ.* **2017**, *595*, 25–34. [CrossRef]
45. Martinis, A.; Kabassi, K.; Dimitriadou, C.; Karris, G. Pupils' environmental awareness of natural protected areas: The case of Zakynthos Island. *Appl. Environ. Educ. Commun.* **2018**, *17*, 106–123. [CrossRef]
46. Agee, J.D.; Miller, C.A. Factors contributing toward acceptance of lethal control of black bears in Central Georgia, USA. *Hum. Dimens. Wildl.* **2009**, *14*, 198–205. [CrossRef]
47. Akiba, H.; Miller, C.A.; Matsuda, H. Factors influencing public preference for raccoon eradication plan in Kanagawa, Japan. *Hum. Dimens. Wildl.* **2012**, *17*, 207–219. [CrossRef]
48. Kazantzidis, S. Status of the breeding population of great cormorants in Greece in 2012. In *Breeding Numbers of Great Cormorants Phalacrocorax Carbo in the Western Palearctic, 2012–2013*; Bregnballe, T., Lynch, J., Parz-Gollner, R., Marion, L., Volponi, S., Paquet, J.-Y., Carss, D.N., van Eerden, M.R., Eds.; IUCN-Wetlands International Cormorant Research Group Report; Scientific Report from DCE—Danish Centre for Environment and Energy, Aarhus University: Aarhus, Denmark, 2014; No. 99; pp. 117–120.
49. Dimitriou, E.; Kapareliotis, A.; Acovikiotis, K.; Pergantis, F.; Perifanos, M.; Tsagarakis, E. Injured fishes due to great cormorants' attacks at Bouka Lagoon. In *Proceedings of the 11th Pan Hellenic Ichthyologists Conference, Preveza, Greece, 10–13 April 2003*; Panhellenic Association of Ichthyologists: Athens, Greece, 2003; pp. 215–218, (In Greek with English Summary).
50. Liordos, V.; Zogaris, S.; Papandropoulos, D. Great cormorant *Phalacrocorax carbo* food and human perceptions at the Amvrakikos Gulf, western Greece. In *Proceedings 7th International Conference on Cormorants, Villeneuve, Switzerland, 23–26 November 2005*; van Eerden, M.R., van Rijn, S., Keller, V., Eds.; Wetlands International-IUCN Cormorant Research Group: Lelystad, The Netherlands, 2011; pp. 102–111.
51. ELSTAT. Hellenic Statistical Authority. Population Census 2021. (In Greek). Available online: https://www.statistics.gr/el/2021-census-res-pop-results (accessed on 5 February 2025).
52. Kazantzidis, S.; Panagiotopoulou, M.; Christidis, A.; Patetsini, E.; Donth, S. Wintering population and diet of Great Cormorant *Phalacrocorax carbo sinensis* at the Eastern Macedonia and Thrace National Park, Greece. *Cormorant Res. Group Bull.* **2015**, *8*, 39–41.
53. Vaske, J.J. *Survey Research and Analysis*, 2nd ed.; Venture: State College, PA, USA, 2019.

54. Nunnally, J.C.; Bernstein, I.H. *Psychometric Theory*, 3rd ed.; McGraw-Hill: New York, NY, USA, 1994.
55. Schreiber, J.B.; Nora, A.; Stage, F.K.; Barlow, E.A.; King, J. Reporting structural equation modeling and confirmatory factor analysis results: A review. *J. Educ. Res.* **2006**, *99*, 323–337. [CrossRef]
56. Hair, J.F.; Ortinau, D.J.; Harrison, D.E. *Essentials of Marketing Research*; McGraw-Hill: New York, NY, USA, 2010.
57. Naughton-Treves, L.; Grossberg, R.; Treves, A. Paying for tolerance: Rural citizens' attitudes toward wolf depredation and compensation. *Conserv. Biol.* **2003**, *17*, 1500–1511. [CrossRef]
58. Stăncioiu, P.T.; Dutcă, I.; Bălăcescu, M.C.; Ungurean, Ș.V. Coexistence with bears in Romania: A local community perspective. *Sustainability* **2019**, *11*, 7167. [CrossRef]
59. Daoutopoulos, G.A.; Pyrovetsi, M. Comparison of conservation attitudes among fishermen in three protected lakes in Greece. *J. Environ. Manage.* **1990**, *31*, 83–92. [CrossRef]
60. Chamberlain, D.E.; Austin, G.E.; Newson, S.E.; Johnston, A.; Burton, N.H.K. Licensed control does not reduce local cormorant *Phalacrocorax carbo* population size in winter. *J. Ornithol.* **2013**, *154*, 739–750. [CrossRef]
61. Parrott, D.; McKay, H.V.; Watola, G.V.; Bishop, J.D.; Langton, S. Effects of a short-term shooting program on nonbreeding cormorants at inland fisheries. *Wildl. Soc. Bull.* **2003**, *31*, 1092–1098.
62. Bédard, J.; Nadeau, A.; Lepage, M. Double-crested cormorant culling in the St. Lawrence river estuary. *Col. Waterbirds* **1995**, *18*, 78–85. [CrossRef]
63. Batavia, C.; Nelson, M.P. Ethical foundations for the lethal management of double-crested cormorants (*Phalocrocorax auritus*) in the Eastern United States: An Argument Analysis. *Waterbirds* **2018**, *41*, 198–207. [CrossRef]
64. Russell, I.; Broughton, B.; Keller, T.; Carss, D.N. *The INTERCAFE Cormorant Management Toolbox: Methods for Reducing Cormorant Problems at European Fisheries*; INTERCAFE COST Action 635 Final Report III; NERC/Centre for Ecology & Hydrology on Behalf of COST: Crowmarsh Gifford, UK, 2012.
65. Draulans, D. The effectiveness of attempts to reduce predation by fish-eating birds: A review. *Biol. Conserv.* **1987**, *41*, 219–232. [CrossRef]
66. ELGA (Greek Agricultural Insurance Organisation). Insurance and Financial Support. 2025. Available online: https://elga.gr/thesmiko-plaisio (accessed on 25 February 2025).