

## ANALYSIS OF CONSERVATION LITERACY OF PROSPECTIVE BIOLOGY TEACHERS AND EFFORTS TO IMPROVE IT THROUGH INTEGRATED CAMPUS PROGRAMS

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### ABSTRACT

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This study aims to describe the level of conservation literacy of prospective biology teachers. Data were obtained through a survey using a Likert-scale questionnaire with three main aspects (knowledge, attitudes, and skills). Respondents were seventh-semester students who completed the instrument online. The resulting data were then analyzed descriptively. The results showed that the knowledge aspect was classified as good, although participation in scientific forums was still low. The attitude aspect was categorized as very good, but discipline in energy conservation needs to be improved. The skills aspect was classified as good but needed strengthening through creative activities such as composting, ecobricks, and school conservation projects. The conservation action aspect was not optimal because the activities were still individual and simple, so support and training were needed to encourage collaborative involvement. The conclusion of this study confirms that the conservation literacy of prospective biology teachers is quite developed at the level of knowledge and attitudes, but is still limited in the implementation of concrete actions.

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## INTRODUCTION

Global environmental crises such as climate change, biodiversity loss, and habitat degradation continue to threaten the balance of Earth's ecosystems. These issues demand collective awareness and concrete action from various sectors, particularly in education. Education plays a strategic role in shaping a generation with environmental awareness and a commitment to nature conservation efforts (Aufa Gisti Pravitasari & Nursiwi Nugraheni, 2024; Milandi et al., 2025). Nationally, the commitment to sustainable development is reflected in the Sustainable Development Goals (SDGs), specifically Goal 4 on quality education and Goal 15 on life on land, which emphasizes the protection of terrestrial ecosystems and biodiversity (Annissa Nur Sofia & Nursiwi Nugraheni, 2024). This also aligns with the vision and mission of the Biology Education study program at the Faculty of Teacher Training and Education, University of Bengkulu, which focuses on the conservation of coastal biological resources and tropical rainforests.

Biology education holds a strategic position in fostering conservation literacy because it is directly related to the study of ecosystems and environmental sustainability. Prospective biology teachers are expected not only to understand biological concepts but also to be able to instill conservation values in future students. Efforts to improve student conservation literacy are carried out by developing learning based on local potential (Adi Pasah Kahar & Raudhatul Fadhillah, 2018) and developing conservation teaching materials (Fahmie Firmansyah et al., 2025). Conservation literacy encompasses three main aspects: knowledge of environmental issues, a caring attitude toward sustainability, and concrete actions in protecting and preserving the environment. These three aspects need to be developed in a balanced way so that prospective teachers have a comprehensive ecological awareness.

In reality, aspects of real conservation actions have not been carried out evenly by students. Many students understand the importance of conservation, but are not yet accustomed to applying conservative behaviors

in their daily lives (Widhiastuti et al., 2020). This is due to predominantly theoretical learning, limited field experience, and a lack of campus-based conservation activities that directly involve students.

To address this, a more contextual and applicable learning approach is needed, one of which is integrated campus learning. This approach combines academic activities, practicums (N.S.A. Putri et al., 2025), environmental projects, and the development of conservation areas both on and off campus (Aswin et al., 2021) as a unified learning experience. Through this integration, students have the opportunity to internalize conservation values through direct experience, collaborative work, and reflection on the impact of their activities. Thus, integrated campus learning can be an effective means of shaping the ecological character and social responsibility of prospective biology teachers.

Based on these conditions, this study focused on analyzing the level of conservation literacy of prospective biology teachers and formulating efforts to improve it through integrated campus learning. This study is important because there is still little research that comprehensively examines student conservation literacy with a campus-based improvement approach. Specifically, this study aims to describe conservation literacy based on knowledge, attitudes, and actions, and to identify effective strategies for fostering it within an integrated learning context on campus.

## METHODS

This study aims to describe the conservation literacy level of prospective biology teachers at the undergraduate level. A description of the research method is presented as follows:

The research was conducted online from September 15-30, 2025. The sample population consisted of students in the Biology Education Study Program, Faculty of Teacher Training and Education, University of Bengkulu, for the 2025/2026 academic year. Respondents were selected using purposive sampling, with the sample criteria being students who had completed their sixth semester. The sample size

was 78 students, consisting of 23 males and 55 females.

Data collection used a survey method with a closed-ended Likert-type questionnaire. The linked scale consisted of five categories that could be selected and adjusted according to the respondent's circumstances. The questionnaire was distributed online via Google Forms, accessible to respondents via laptops and smartphones. The aspects measured in conservation literacy were knowledge, skills, attitudes, and participation. Each aspect has five indicators that measure the conservation literacy of prospective student teachers.

In this study, the conservation literacy data analysis was conducted using descriptive qualitative-quantitative methods to present the data in percentage terms and provide meaningful insights. The percentage results from the questionnaire were analyzed using the following formula:  $P = F/n \times 100\%$

Note: P (Percentage), n (All Respondents), F (Frequency).

The results were then summarized using a 5-point Likert scale category table as follows:

Table 1. Likert Scale of Conservation Literacy Categories of Prospective Biology Teachers

Score	Catagories
5	Very Often
4	Often
3	Sometimes
2	Rarely
1	Never

## RESULT AND DISCUSSION

The results of data collection and discussion on the conservation literacy of prospective biology teachers and efforts to improve it are presented as follows: Based on the research objectives, the data presented represent conservation literacy with four aspects: attitude, knowledge, participation, and efforts to improve them. The knowledge aspect comprises understanding and activities to improve the concept of conservation literacy. The attitude aspect demonstrates sensitivity to the surrounding environment. The skills aspect

comprises expertise in carrying out activities that support conservation.

The analysis shows that prospective biology teachers' conservation knowledge is considered good. This is demonstrated by their activities such as seeking information, reading, and participating in conservation-related academic activities. In addition to independent study, conservation knowledge is also gained from courses such as Ecology, which cover in-depth topics. However, participation in conservation seminars and scientific forums still needs to be improved to ensure their knowledge is more focused and based on current scientific practices. The percentage of prospective biology teachers' conservation knowledge is shown in Figure 1.

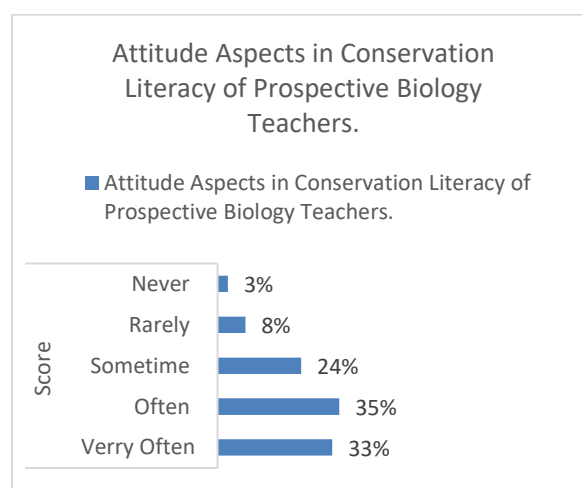


Figure 1. Percentage of Knowledge Aspects in Conservation Literacy of Prospective Biology Teachers.

The conservation knowledge of prospective biology teachers can be developed through lectures and a positive academic environment. Conservation concepts are taught through courses such as ecology and environmental science, which are also reinforced by practical activities. This provides a positive learning experience for prospective biology teachers, empowering them with conservation knowledge.

Practicals in courses like Ecology provide prospective teachers with real-world experiences with environmental conditions. Students can construct their knowledge through systematically structured practical materials. Therefore, the knowledge aspect of conservation literacy has received a very positive response.

Furthermore, efforts are still needed to improve conservation knowledge through scientific seminars. The low intensity of scientific seminars indicates that scientific seminars have not yet had an impact on improving conservation understanding among prospective biology teachers. This may be due to the limited number of scientific seminars.

The attitude aspect of conservation literacy among prospective biology teachers is very good. Students demonstrate a high sensitivity to environmental issues and a tendency to behave in an environmentally friendly manner. Most respondents stated that they often feel disturbed by environmental pollution and destruction. Plastic use has been reduced by bringing their own bags and drinking water bottles when engaging in outdoor activities.

However, attitudes regarding energy conservation remain weak. This is also demonstrated by Sembiring et al. (2024) who found that students' energy efficiency and awareness remain low in their daily lives. Therefore, activities to continuously improve the fundamentals of energy conservation are needed. Furthermore, students can serve as pioneers or role models in energy-saving practices (Harry Prasety et al., 2025). The percentage of conservation literacy attitudes among prospective biology teachers is shown in Figure 2.

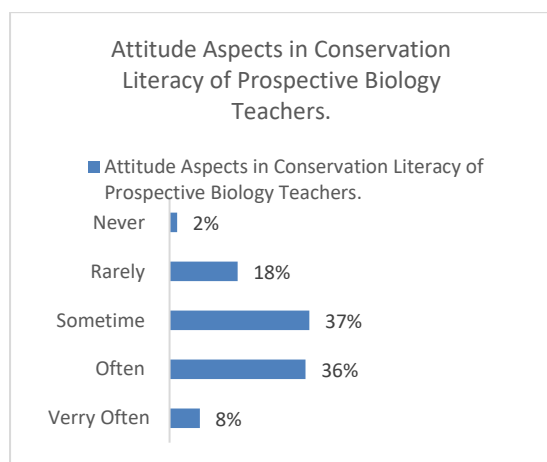


Figure 2. Percentage of Attitude Aspects in Conservation Literacy of Prospective Biology Teachers.

Attitude is an expression of knowledge and understanding of a concept. Prospective biology teachers' mastery of conservation concepts is demonstrated by their behavior in everyday life. This aligns with research showing that a person's knowledge influences their attitude (Indra Martias et al., 2022).

Regarding conservation literacy skills, some respondents already possess adequate conservation skills. This is indicated by conservation activities that have not been consistently implemented in their daily lives. The most frequently performed conservation activities include sorting waste according to its basic material characteristics (organic and inorganic) and observing flora and fauna biodiversity for learning.

Activities that are rarely performed include making compost and cultivating gardens around their homes. This indicates that prospective biology teachers lack the skills to make simple compost in their local environment. Furthermore, knowledge about compost, such as its odor and dirt, also negatively impacts students. Furthermore, other factors such as low compost use also play a role (Naudya Wulan Aprilianti et al., 2020). Furthermore, low skills include participating in conservation-themed research projects and competitions.

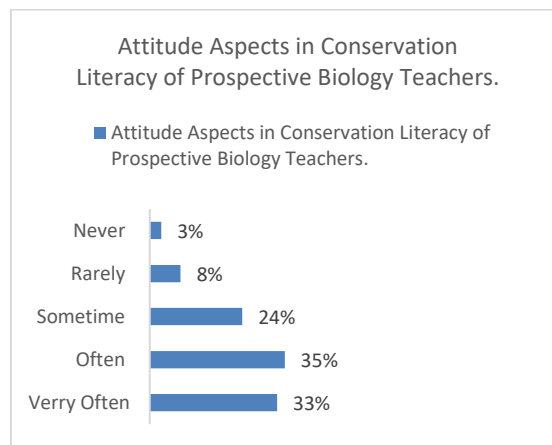


Figure 3. Percentage of Skills Aspects in Conservation Literacy of Prospective Biology Teachers.

Based on the analysis, only 2% of all respondents had not yet been involved in conservation activities. In general, the skills aspect of conservation literacy among prospective biology teachers is shown in Figure 3.

The conservation literacy of prospective biology teachers can be improved through integrated programs organized by various parties. Based on survey data, several activities were suggested by prospective teachers in each aspect (knowledge, attitudes, skills, and participation). Conservation knowledge can be improved by increasing the number of conservation seminars/workshops held by the campus and by collaborating with other agencies.

Attitudes are developed through a green lifestyle campaign in synergy with the entire campus community. Skills are enhanced through training on waste enhancement, such as composting, recycling, and utilizing hydroponic cultivation technology. Furthermore, prospective biology teachers' participation in conservation can be facilitated by organizing various conservation festivals, forming communities, and implementing campus greening programs. Complete data on efforts to improve the conservation literacy of prospective biology teachers is shown in Figure 4.

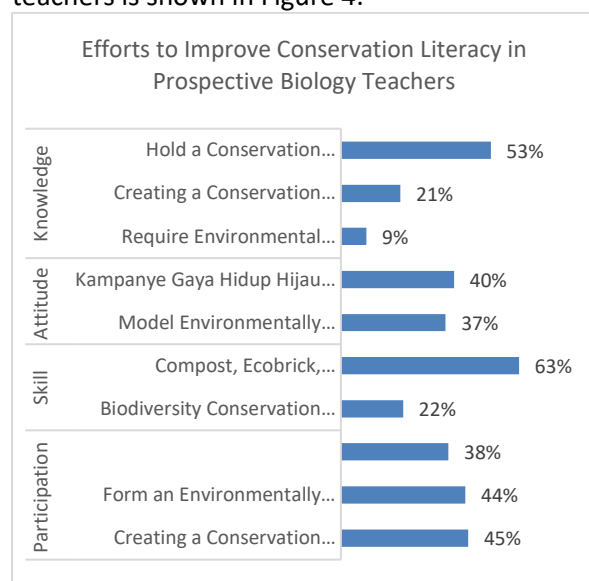


Figure 4. Efforts to Improve Conservation Literacy in Prospective Biology Teachers.

## CONCLUSION

The conservation literacy of prospective biology teachers is generally considered good across knowledge, attitudes, and skills. They demonstrate a high level of environmental awareness and a fairly good understanding of conservation, although participation in scientific

seminars and discipline in energy conservation still need improvement. Conservation skills have developed but need to be strengthened through creative activities such as composting, ecobrick making, and school conservation projects. Student conservation actions are still individual and simple, requiring encouragement to increase collaboration. Students are also more interested in practical and collaborative conservation literacy activities such as training, seminars, and conservation festivals.

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