REMOVED FOREVER GIAO AN II HYDROPOWER PROJECT WHICH WILL BE BUILD IN UP-STREAM OF WATERSHED FOREST AROUND HEPA

GIAO AN II HYDROPOWER PROJECT

INCONSISTENT WITH PROVISIONS OF SIX PROMULGATED LAWS,

FAILS TO DELIVER ECONOMIC EFFICIENCY,

DOES NOT CONTRIBUTE POSITIVELY TO NATIONAL SUSTAINABLE DEVELOPMENT,

ERADICATES BIODIVERSITY OF WATERSHED ECOSYSTEMS,

DESTROYS BORDER WATERSHED NATURAL RESOURCES,

DISRUPTS TOPOGRAPHY, WATER FLOW, AND PROTECTIVE FUNCTIONS OF WATERSHED,

ELIMINATES ECOLOGICAL SAFETY CORRIDOR FOR MIGRATORY SPECIES DURING BREEDING SEASON

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By Founder Tran Thi Lanh

Center of Human Ecological Study of Highland (CHESH)

Hanoi, 29 September 2025

PART A: BACKGROUND AND RECOMMENDATIONS

BACKGROUND

The Giao An II hydropower project has been proposed three times (the first in 2007, the second in 2017, and the third in 2025), though none of the three proposals received consensus from the local community, forest owners, or the local authorities. The reason is because the project failed to publicly, transparently, and professionally demonstrate its socio-economic effectiveness and provide reliable solution to serious risks concerning terrain, natural flow, species habitats, rare genetic resources listed in the Vietnam and International Red Data Books, livelihoods, economy, culture, and landscape of affected residents (directly and indirectly) by the hydropower plant. Added to that, the project development procedures failed to comply with the regulations set forth in six Laws and their Decrees passed through three Vietnam National Assembly terms, namely: (1) Law on Biodiversity 20/2008/QH12; (2) Forest Law 16/2017/QH14; (3) Law on Environmental Protection 78/2020/QH15; (4) Law on Implementation of Grassroots Democracy 10/2022/QH15; (5) Law on Water Resources 28/2023/QH15; and (6) Land Law 31/2024/QH15.

The Giao An II hydropower project has not given special consideration to national orientation towards sustainable development an interests of the entire population living within the border watershed of the Ngan Pho River. This is a unique watershed originating from Ba Mu Peak at an elevation of 1,357 meters above sea level. The spiritual Ba Mu Peak is known as the cradle from which all species were born, and spread along the water systems to the great Mother Rivers[1] and ultimately to the ocean. Ba Mu Peak is considered the center of the East-West ecosystems of Central Vietnam (Laos and Vietnam).

The Giao An II hydropower plant is projected to be built in the heart of the Rao An Stream - the focal point of the disrupted water flow - is a habitat for numerous rare species. Scientific studies have recorded 18 species listed in both Vietnam and international Red Data Books, 8 endangered species, and 4 species strictly prohibited from exploitation. This watershed is a vital ecological corridor for seasonal migratory species such as fish, birds, storks, aquatic turtles, and amphibians. The deployment of the Giao An II hydropower plant construction will pose a risk of permanent loss to this unique, endemic ecosystem.

Beyond its biodiversity value, the Ngan Pho River watershed serves a crucial function as a border watershed protection forest, regulating floods and supplying water for daily life and production for all downstream communities. Evidence has shown that flooding occurs annually with increasing frequency, and the floods are becoming faster and more intense. The Giao An II hydropower project, with its design and technology that divert the flow from above, penetrating the mountain (a brutal and merciless intervention into the geological structure and soil integrity), is a direct cause of increasing flash floods and landslides during the rainy season and water scarcity during the dry season. This directly impacts the survival of aquatic species in the riverbed, the vegetation along the banks, and, most notably, the daily livelihoods, community economy, spiritual cultural values, and ecotourism potential for residents across the entire watershed.

RECOMMENDATIONS:

1. Do not approve the Environmental Impact Assessment (EIA) report for the Giao An II hydropower project at any level of authority.
2. Permanently remove the Giao An II hydropower project from the Ha Tinh provincial hydropower development plan.
3. Prioritize the conservation of rare genetic resources of biodiversity, which have been recorded in the Vietnamese and international Red Data Books, and are currently recovering and returning to this area and the North of the Truong Son mountain range as well.

[1] Ba Mu Peak is the source of two great river systems:
Water flows from Ba Mu Peak into Khe Song, Khe An Bun, and Rao An, connecting with the Ngan Pho River, merging with the Ngan Sau River, flowing into the La River, joining with Ca River and finally reaching the Lam River, then flowing to the great sea gates of Cua Hoi and Cua Lo (Vietnam);
It also flows into the watershed stream of Sekong River, into Mekong River, flows back to Southern Laos, down to Cambodia, and eventually flows into the Mekong Delta River in the south-western Vietnam and then flows into the ocean.

4. Promote a mechanism for co-management of cross-border watershed ecosystem among forest owners, with commune/village-level government acting as representative state management agencies. This will contribute to creating safe, proactive, and sustainable ecological livelihoods and community economy across the entire border region.
5. Gradually establish and develop spaces for nurturing seeds of rare natural forest trees under mother trees, managed by forest owners holding Land Use Rights Certificates (Red Books). Promote a movement to replace acacia trees (10% of acacia per year) with native forest species that have large biomass reserves and high carbon storage capacity, thereby enhancing CO2 absorption and fulfilling the NetZero 2050 commitment of the Government of Vietnam at COP 26.
6. Support forest owners in building up models for landscape ecological experience, community-based tourism, and extra-curricular training for primary, secondary, and high school students, and other members of society who have a desire to connect with nature. Encourage the practice of greenhouse gas emission reduction behaviors through youth and student movements to green public areas and village roads, accompanying with the government to face with new challenges of climate change and the depletion of natural forests spreading from the entire watershed to the dry land areas covered with acacia along the central region of Vietnam.
7. Establish a watershed biosphere[2] based on co-management among forest owners, under the supervision and engagement of local authorities, and the direction and assessment of the provincial government.

PART B: PRELIMINARY INFORMATION ON THE GIAO AN II HYDROPOWER PROJECT

I. GENERAL INTRODUCTION

Capacity: 13.6 MW (categorized as a grade III hydropower plant)
Investor: Giao An II Hydropower Company
Consulting unit: TKC Energy construction consulting joint stock Company
Location: The Rao An Stream of the Ngan Pho River watershed in Son Kim 1 and Son Kim 2 communes, Ha Tinh province.
It is a hydropower facility utilizing a pressure tunnel to harness the potential energy difference of the water flow between the diversion dam site and the power plant site.

[2] Ba Mu Watershed Forest UNESCO BIOSPHERE (UNESCO standards of the Federal Republic of German) takes people as the center of the biosphere reserve.

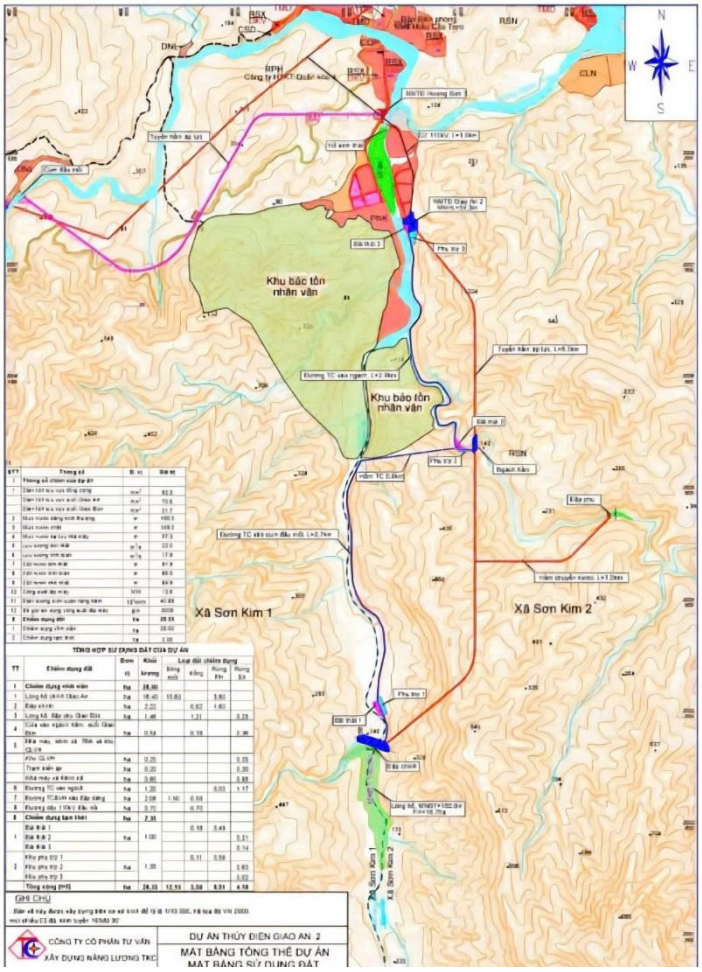

Figure 1: Giao An II hydropower project master planning

II. PROJECT KEY PARAMETERS

1) Reservoir

Normal water level (NWL): 148m

Dead storage level (DWL): 142m

Total storage capacity (V total): 1.44×10^6 m3

Dead storage capacity (V dead): 0.76×10^6 m3

Usable storage capacity (V usable): 0.68×10^6 m3

Reservoir surface area at NWL: 13.34 hectares

2) Power plant

Horizontal-axis Francis turbine

Design flow rate: 17.9 m3/s

Design head: 86m

Installed capacity: 13.6 MW

Annual energy output (EO): 40.88×10^6 kWh

Annual operating hours at installed capacity: 3,006hours/year

3) Number of generating units: 2

Substation and transmission line

Substation voltage: 6.3/110 kV

Transmission line: 110 kV-2 ×AC185

Total investment (after- tax): VND 515.18 billion

Total land occupancy area: 25.29 hectares

Main pressure tunnel: L=5.2km

Water transfer tunnel from Giao Bun auxiliary dam: 1.3 km

Access road to main structure/ headworks: L=2.7km

Access road to auxiliary dam: L= 2.8 km

PART C: COMPARATIVE REVIEW OF THE GIAO AN II HYDROPOWER PROJECT AND RELEVANT LAWS

I. VIOLATION OF LEGAL PROCEDURES AND REGULATIONS

In this document, and based on the extremely brief presentation by the Giao An II Hydropower Company's representative on the morning of 20 September 2025 at the Son Kim 1 Commune People's Committee headquarter, Official Letter 5579/UBND-KT2 from the Chief of Office of the Ha Tinh Provincial People's Committee to relevant departments, Official Letter 4817/STC-DNĐT of the Deputy Director of the Department of Finance advising relevant agencies, and Decision 1682/QĐ-TTg/28/12/2024 by the Deputy Prime Minister Bui Thanh Son, we would like to present our official opinion as a forest owner with our lawful and sacred duty in the border area of Cau Treo International Border Gate, as follows:

Firstly, we respectfully request the leadership of the Ha Tinh Provincial People's Committee to remove the Giao An II hydropower project from the Supplementary Power Master Plan 2012-2030, with a vision to 2050, specified in Decision 1682/QĐ-TT dated 28 December 2024 due to its violation of numerous articles and clauses stated in the following Laws and guiding Decrees:

1. **Law on Environmental Protection 72/2020/QH14 dated 17 October 2020**

Article 2: Subject of application[3]

Article 4: Principles of environmental protection[4]

Article 5: Clauses 1, 3, 10, and 11

Article 7: Clause 3

Article 8: Clause 1. Point b and Clause 2. Point b

Article 10: Clauses 1, 6, and 7

Article 20: Clause 1. Point a.

Article 28: Clause 1. Point c and Clause 4. Points b, c, d, and đ.

Article 34: Prohibition of implementing projects that cause irreversible negative impacts on protected areas.

2. **Law on Biodiversity 20/2008/QH12**

Article 5: Clauses 1, 3, 4, and 5

Article 7[5]: Clauses 2 and 9

3. **Law on Water Resources 28/2023/QH15: Article 8**[6]

4. **Forest Law 16/2017/QH14**

Article 3: Rules[7] of forestry operations

Article 5: Forest classification[8]

Article 8: Forest owners

Article 10: Rules and bases for preparing forestry planning[9]

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[3] The Giao An II Hydropower Company has failed to comply with the project proposal development procedures: 1) Failure to conduct impact surveys: The company did not conduct a survey and study of the affected entities before preparing the proposal and submitting it to the competent authorities, in violation of the legal sequence outlined by the Law; 2) Misinterpretation of planning decision: Decision 1682/QĐ-TTg dated 28 December 2024 is merely a decision to supplement the names of national power projects in the planning. It does not mean that all the projects named in the supplementary plan must be implemented. The public announcement of project names in the supplementary plan does not grant the supreme right to compel provinces to implement the project if that construction does not enhance natural resource value, fails to deliver economic, social, and environmental benefits to the local residents, does not contribute to national sustainable development goals, and violates a series of provisions of multiple laws. Such a project cannot be considered approved by the Government. The Giao An II hydropower project runs contrary to the goal of comprehensive development; 3) Exclusion of key stakeholder, the Center of Human Ecological Study of Highland (CHESH), which is the forest owner located at the central point of the project area, from consultation and feedback.

[4] Environmental protection must adhere to biodiversity conservation and be consistent with the ecosystem carrying capacity.

[5] The construction of works and the exploitation of resources that cause the degradation of the ecosystem within the protected area are strictly prohibited.

[6] The depletion of water sources and the alteration of the watershed's flow are strictly prohibited.

[7] The company drafting the project proposal to build the Giao An II Hydropower plant failed to respect the rights of forest owners.

[8] The planned project intends to occupy an area of border natural forest designated as critical protection forest. This area serves a crucial function in biodiversity conservation as mandated by the Law on Biodiversity, the Land Law, the Forest Law, and the Law on Science and Technology. However, the project does not comply with the regulations set forth in these laws.

[9] The proposed project does not adhere to the principles of public disclosure and obtaining feedback from the forest owners who would be directly and indirectly affected.

Article 12: Preparation, comments, assessment, approval and adjustment of national forest planning

Article 14: Rules for forest allocation, lease, repurposing[10] and withdrawal from forest owners

5. **Land Law 31/2024/QH15**

   Article 11: Prohibited acts[11] in the field of land

   Article 23: Citizen's rights to land[12]

6. **Decree 08/2022/NĐ-CP. Article 28[13]**

7. **Violation of the Law on Implementation of Grassroot-level Democracy (10/2022/QH15)[14]**

Secondly, the authority to appraise and approve environmental impact assessment (EIA) reports is stipulated in the Law on Environmental Protection 72/2020/QH14, effective from 1 January 2022. According to Appendix III of Decree 08/2022/ND-CP, environmental impact assessment (EIA) reports for projects within nature reserves, national parks, relics, Ramsar sites, and biosphere reserves are under the authority of appraisal and approval of the Ministry of Natural Resources and Environment, currently the Ministry of Agriculture and Environment. Projects in the watershed that involve natural forest in border areas are also subject to appraisal and approval at the ministerial level.

✔ *Therefore, the EIA report for the Giao An II Hydropower project is not within the appraisal and approval authority of the Ha Tinh Provincial People's Committee.*

II. MAJOR POTENTIAL ENVIRONMENTAL IMPACTS

1. Depletion of natural flow

From the moment the project becomes operational, the natural flow of the Rao An Stream will be regulated on daily basis for most of the year. Water will be stored in a small-capacity diversion dam reservoir primarily during hours of low electricity demand (mainly at night), and then released through a pressure tunnel to drive turbines for power generation during peak demand hours.

[10] The Giao An II Hydropower Company does not implement the regulations stipulated in the aforementioned Laws.
[11] The Giao An II Hydropower Company failed to conduct transactions with the forest owner who is the legal land user as defined by the Land Law.
[12] The company violated the rights and obligations of the forest owner (as the owner is responsible for any positive or negative impacts on the forest and land).
[13] If the project has adverse impacts on the environment and biodiversity, and runs contrary to sustainable development, the competent approving authority must reject the approval of the Environmental Impact Assessment (EIA) report.
[14] The implementation of grassroots democracy is a mechanism to promote the people's right to mastery, enabling citizens, cadres, civil servants, public employees, and workers to access information, express their will, aspirations, and opinion through discussion, participation, decision-making, and inspection, supervision of local issues as prescribed by the Constitution and the Law (Law on the Implementation of Grassroots Democracy 10/2022/QH15)

The section of the Rao An Stream from the diversion dam to the hydropower plant's discharge gate is approximately 5,000[15] meters long, with an average streambed width of about 50 meters. This corresponds to a total streambed area of 250,000 m² (5,000 m x 50 m) or 25 hectares, which is expected to remain mostly dry throughout the year. This stream section receives negligible mid-section inflow (there are no small streams flowing into this section of the stream, except for the natural flow from Ba Mu Peak to Khe An Bun into the Rao An Stream).

Particularly during the dry season, the approximately 5-km section of the Rao An Stream that runs through the "Ngan Pho River Watershed Biodiversity Conservation Area," with a streambed area of over 20 hectares, can be expected to be a dead stream section if reliable measures are not implemented to maintain a minimum flow regime[16] or an appropriate environmental flow.

In this case, it would be purely fictional for any rationale or 'magic spell' from an EIA[17] report to claim the creation of a safe flow.

According to the Ha Tinh Provincial Department of Agriculture and Rural Development, the operation of hydropower plants, especially during the dry season, must always ensure that the water flow released downstream is maintained at pre-construction levels. This is to guarantee the minimum flow for the downstream area, as stipulated in Articles 15, 16, 17, 18, 19, and 20 of Circular 03/2024/TT-BTNMT dated 16 May 2024 of the Ministry of Natural Resources and Environment (MONRE).

To maintain this minimum flow, it is essential to thoroughly understand the specific characteristics of the Rao An Stream watershed. This section of the stream was originally a rocky stream bed[18] since the 2000s due to excessive forest exploitation. In mid-2002, the "Ngan Pho River Watershed Biodiversity Conservation Area" was established under the Decision 1230/QD/UB-NL3 dated June 5, 2002 of the Ha Tinh Provincial People's Committee. After 23 years of conservation, protection, enrichment, and development of the natural forest, the stream now has flowing water. Water retention capacity has reached 16 million liters per hectare of forest per year (based on a research result from the Faculty of Water Resources Engineering, Thuy Loi University, 2024). *Refer to the link below*:

https://co2justice.org/upload/files/%C4%90%C3%81NH%20GI%C3%81%20T%C3%80I%20NGUY%C3%8AN%20N%C6%AF%E1%BB%9AC%20S%C3%94NG%20NG%C3%80N%20PH%E1%BB%90%20V%C3%80%20KHU%20V%E1%BB%B0C%20HEPA-1.pdf.

The biomass stock of regenerated forest following exhaustive logging has also shown steady growth.

The forest carbon stock in above-ground biomass, when converted to CO2, reaches 501 tons per hectare per year (based on a empirical research result on carbon stock in above-ground biomass of

[15] In this document, we have not yet calculated or precisely measured the potential losses caused by the project because the Company has not officially disclosed the project proposal) and has not officially announced the project proposal at the construction site as required by law.

[16] The minimum flow rate of 7 cubic meters of water per second, as argued by the Company, is impractical and unscientific because with such a regulated minimum flow, there will be no water to seep into the gravel and sand layers, i.e. the river will become dead year-round, except during mountain downpours, flash floods, and accompanying natural disasters that result from the replacement of natural forests and the forced elevation of the terrain to create the potential energy for the project.

[17] Environmental Impact Assessment

[18] The streambed become rocky due to the over-exploitation of forest, and the water has been getting less and less since the 2000s.

tropical rainforests in North-Central Vietnam by the Social Policy Ecology Research Institute (SPERI). *Refer to the link below*:

https://co2justice.org/upload/files/Final_%2025_09_2024_%20%E1%BB%A8ng%20d%E1%BB%A5ng%20v%C3%A0%20so%20s%C3%A1nh%20c%C3%A1c%20ph%C6%B0%C6%A1ng%20ph%C3%A1p%20t%C3%ADnh%20tr%E1%BB%AF%20l%C6%B0%E1%BB%A3ng%20Carbon%20(sinh%20kh%E1%BB%91i%20tr%C3%AAn%20m%E1%BA%B7t%20%C4%91%E1%BA%A5t)%20r%E1%BB%ABng%20m%C6%B0a%20nhi%E1%BB%87t%20%C4%91%E1%BB%9Bi%20V%C3%B9ng%20B%E1%BA%AFc%20Trung%20B%E1%BB%99,%20Vi%E1%BB%87t%20nam%20(2).pdf).

The process of system planning and detailed design for forest types and methods of under-canopy cultivation (Mother's skin) has taken place over the past 23 years in the Ngan Pho River Watershed Biodiversity Conservation Area – the gateway and guardian for the entire watershed covering more than 30,000 hectares of natural forest extending to Ba Mu Peak, which has been and is currently undergoing revitalization. The ecological corridor for numerous species are gradually returning here, ensuring the conservation and enrichment of endangered biodiversity genetic resources.

The progress in protecting the flora, fauna, and microbial communities in this area is the result of "watershed co-management," built upon a sacred, unified, resolute, and responsible mandate among multi-stakeholders such as: The Conservation Area, the border guard force of Cau Treo international border gate, the People's Committee of Son Kim commune (before its division), the People's police force of Son Kim commune and Tay Son town, the Ngan Pho River Protection Forest Management Board, Huong Son Forestry and Services one member limited Company, the Son Kim commune strong team, the former Huong Son District People's Committee and its departments, and the leadership of Ha Tinh Provincial People's Committee.

The stream, once exhausted, is now "smiling" again. Hundreds of genetic resources of flora and fauna once thought to be permanently lost are now returning to their old habitat[19]. *(See details in Appendix 1 and 2)*.

2. Degradation of rare genetic resources that are recovering

1. Research report on biodiversity in the Ngan Pho River watershed and the Northern Truong Son Mountain Range, published by the Vietnam National University and the Center for Natural Resources and Environmental Studies (CRES) in 2005.
2. Research report on biodiversity in the Ngan Pho River Watershed Biodiversity Conservation Area, published by the Forest Inventory and Planning Institute (FIPI) of the North Central Region in 2010.
3. Ethnobotanical research report, co-published by the Center of Human Ecological Study in Highland (CHESH) and the Social Policy and Ecology Research Institute (SPERI) in 2012.

[19] Originally one of the cradles of biodiversity in Indochina (Flora of Indochina - Balansa, early 20th century)

4. Research on "Topsoil health through agroecological application models" in the Ngan Pho River Watershed Biodiversity Conservation Area, jointly conducted by SPERI, CHESH, and intern Hanna Henkel from Humboldt University of Berlin in 2018.
5. Research on water reserves in the Ngan Pho River Watershed Biodiversity Conservation Area, published by Dr. Nguyen Thi Thu Nga, Faculty of Water Resources Engineering, Thuy Loi University in 2024.
6. Assessment of forest biomass stock, biodiversity, and soil health, co-published by the CHESH and SPERI in 2023.
7. Empirical research on "Carbon stock in above-ground biomass of tropical rainforests in North-Central Vietnam", co-published by SPERI, CHESH, Professor Goelteboth Friedhelm (NatureLife-International – NLI), Bao Huy (2012) formula, and Tran Thi Lanh in 2024.

3. Disruption of flow intensity at the center of convergence zone of aquatic species in the breeding season

The hydropower plant with the pressure tunnel will draw water from the watershed and redirect it through the tunnel, which will reverse the flow intensity in the stream. This action will cause the flow from Khe An Bun to Rao An Stream to accelerate flood intensity during the rainy season and lead to water loss in the dry season. The section of Khe An Bun, Khe Song, and Rao An Stream is the center of the ecological corridor for the interaction of many aquatic organisms, especially endangered fish species[20] listed in the Vietnam Red Data Book. *(See details in Annex 2).*

4. Reduced aquatic biodiversity

When the water flow is cut, water temperature, dissolved oxygen content, and sediment levels change. Aquatic organisms (fish, shrimp, aquatic insects) decline to the point of extinction, leading to the loss of a food source for birds and mammals, and affecting the entire food chain through the entire watershed.

5. Gradual die-off of the vegetation on the east and west banks (river banks)

The water flow maintains the moisture and alluvium for the streamside vegetation. When this stability is lost, riparian forests are at risk of degradation, leading to the loss of an "ecological corridor" - an interacting space for species within the conservation area, between the conservation area and the critical protection forest, and among the critical protection forests of the entire watershed extending out to the Cua Hoi and Cua Lo sea gates[21].

6. Risk of terrain change and increased mountain slides, landslides

The construction of the pressure tunnel, by its very nature, disrupts the vertical stratigraphic structure, breaks the strength cohesion between soil layers, disturbs underground water veins, and increases surface flow pressure. This process leads to terrain displacement, landslides, and subsidence in stream

[20] Local names: Cá Mát vàng ((Golden Semilabeo), Cá Chày đất (Earth Barbel - *Spinibarbus hollandi*), Cá Chình Hoa (Marbled Eel)
[21] Details as per Appendix 2: Anguilla marmorata (Quoy & Gaimard, 1824). Common name: Cá Chình hoa. (Marbled Eel). Local Name: Cá Lệch (Eel-like fish)

sections shaped by steep topography and altered flow patterns along the east - west corridor. This not only negatively impacts the environment but also poses potential risks of earthquake[22], causing insecurity for surrounding communities and the entire downstream area. The risks of earthquakes, landslides, "dead river", and a series of cascading consequences on community security, livelihoods, and local economy, as well as the value attributes of natural resources that have been sustaining the residents, the river, and the socio-economic and environmental well-being, and pride of Ha Tinh province in particular and the nation in general – have they been transparently assessed and publicly disclosed?

As a forest owner with the mission of a security guard, a border volunteer, and fulfilling the most sacred duty of a Vietnamese citizen under to the Constitution), we strongly request that the Giao An II Hydropower Company, all relevant investors and consulting firms for this project to provide official, public disclosure and justification before the project has been signed and sealed by any competent authority appears, as stipulated by law.

7. Impacts on the livelihood security of downstream residents

The local households here primarily rely on the seasonal products from the natural forest and the river. The mountains, forests, and streams of the Ngan Pho River watershed are the very breath of all residents and living creatures in this area. The economic benefits brought by the Giao An II hydropower plant cannot compensate for the losses of the forest and river to the people, nature, and the nation as a whole. The price to pay is the permanent disappearance of hundreds of plant and animal species and the complete disruption of the natural balance that has long governed the watershed's ecosystem.

8. Disruption of the cultivation calendar for tens of thousands of households

The Rao An Stream, located at the Ngan Pho River watershed, serves as the only source of water for domestic use, agricultural production, and the spiritual cultural life of local residents. The drastic decline in water flow, depleted stream beds, and increasingly rapid and intense flood not only devastate the natural ecosystem and aquatic life of the river but also leave local people living in fear during periods of heavy rain and flooding. In the dry season, they face shortages of water for daily use and farming, particularly under the influence of the southwest Lao wind, which also increases the risk of forest fires.

9. Blocking promising community-based eco-tourism potential

In recent years, children, the elderly, and visitors from many places have flocked here during hot summer days. The river quietly carries water from Ba Mu Peak through streams and creeks, creating a tranquil ecological landscape. With its third submission, the Giao An II hydropower project is once again threatening the peace of the residents, who have worked tirelessly to protect and preserve the forest, who have already been living in fear for nearly two decades caused by the Huong Son 1 and 2 hydropower plants.

[22] Has the Giao An II Hydropower Company and other investors publicly disclosed the sufficiently effective and reliable solution to these potential damages?

Now, as the hope of becoming a community-based eco-tourism destination just has glimmered, the people's fragile trust is once again on the brink of collapse[23].

Can the Giao An II hydropower project, its investors and consulting firms ever compensate for these losses?

10. Conflict between "corporate interests" and "conservation of national resource attributes

The Giao An II hydropower project poses critical challenges:

First, the company's persistent reckless (driven by greed, anger, and delusion), at any cost and in disregard of both the law of nature and legal procedures since 2007, to secure its narrow self-interests sustained since 2007, 2017, and now into 2025;

Second, the nation's sustainable development goals;

Third, the protection of fish species listed in the Vietnam Red Data Book in the Khe Song, Rao An Stream, and Song Con, etc. watersheds;

Fourth, the material and spiritual well-being of the local residents throughout the entire watershed.

This conflict could undermine people's trust and pose a risk of recurrence of social evils in the border region.

The alteration of the hydrological regime is the root cause of numerous environmental disasters[24] and adverse impacts on the instinctive habitat[25] and migration of species. The ecological consequences caused by the Giao An II hydropower project are permanently irreversible!

It is known that the local people and authorities here are enthusiastically working to establish the region as a medicinal agriculture zone named after the land that nurtured and inspired the famous founder of the Vietnam traditional medicine Le Huu Trac. The Giao An II hydropower project threaten to shatter the aspiration derived from these rivers, mountains, and their residents.

The Giao An II hydropower project can never fully compensate for the permanent loss of the resource attributes of the mountains, forests, rivers, and streams in this area; energy, intellect, spiritual and material values, convertible into monetary terms on a fair market basis, of the local community and forest owners, as mandated by law.

The hydrological system stretching from Ba Mu Peak down to the East Sea forms an interconnected ecological corridor[26] for pioneering and endemic[27] aquatic species, from streams to the ocean. Water serves as the vital medium for biochemical exchange that sustains life of all organisms and humans

[23] People here had been in a crisis of confidence from 2007 to 2017. Currently, people are trusting the leadership of the Party and the Government. In the case of Giao An II Hydropower Plant, the people's confidence continues to be shaken and is in crisis.
[24] It is possible to cause an earthquake.
[25] Cá Mát vàng (Golden Semilabeo) and cá Chày (Barbel), the two species listed in the Vietnam and International Red Data Books are recorded at Khe Song and Rao An Streams in the heart of the Ngan Pho River Watershed Biodiversity Conservation Area.
[26] Rao An, Khe Song, Rao Mac, Song Con are a system of rivers that join with Ngan Sau River and flow into La River, join with Ca River and flow into Lam River, and flow out to the sea of Cua Hoi, Cua Lo.
[27] Details as per Appendix 2 for fish species in the Red Book (Cá chình lai - Hybrid eel, Chình hoa - Marbled eel, cá chày - Barbel)

across the entire watershed. Disrupting this natural bio-geochemincal process would inevitably result in unforeseen post-hydropower consequences.

11. Biodiversity degradation in Son Kim 1 and Son Kim 2 communes

According to the comprehensive research results of the project titled "Survey of biodiversity in the North Truong Son biodiversity conservation project area" (in the former Huong Son district, Ha Tinh province) published in 2005 by the Hanoi National University, Center for Natural Resources and Environmental Studies (CRES): Son Kim 1, Son Kim 2, and Son Hong communes of Ha Tinh province are located in an area of very high biodiversity and significant national and international importance, especially for species facing extinction along the Northern Truong Son range, in the border region between Vietnam and Laos.

Detailed information on the biodiversity of the North Truong Son region, including Son Kim 1 and Son Kim 2 communes, Ha Tinh province is per Appendix 1.

Detailed information on rare species as per Appendix 2.

12. Impact of land encroachment on watershed protection forest

The Giao An II hydropower project will encroach upon natural forest space (clear-cutting) to establish an access road system for the construction components including 1) headworks; 2) pressure tunnel; 3) auxiliary dam area; 4) water diversion tunnel from the auxiliary dam reservoir; 5) hydropower plant facility downstream; 6) water transport construction route; 7) road system for transporting excavated soil and rock to disposal sites; 8) space occupied by the disposal sites[28]; 9) interconnecting roads between storage areas; 10) road to the workers' temporary camp area; 11) space for establishing the workers' temporary camp; 12) space for constructing the hydropower operation area; 13) road to the operation center; 14) space for water supply to the living area of workers and operation center's management; 15) kitchen and food processing area; 16) sanitation, washing, and drying area; 17) construction vehicle parking lot; 18) circulation and large truck passing space; 19) construction materials area; 20) materials guard house… The total land area encroached upon for the construction of all the project components listed above, the occupied land area, and the clear-cut natural forest area cannot possibly be only 25 hectares.

The direct impacts of mechanical disruption, noise, dust, oil and grease discharge into the river, and the excavation process in the mountains and forests are environmental impact assessment (EIA) indicators that must be clearly and publicly disclosed. Merely the components listed above already strips away the peace of all living things throughout the entire watershed.

The overall return in real value for the economy, society, environment, safety, and sustainability provided by the Giao An II hydropower project cannot compensate for the energy, time, and administrative procedures expended by the relevant government departments for consultation and

[28] Pollution of upstream waste, occupation of waste space, waste treatment day and night?

review across all three submissions (all three have been rejected) from National Assembly terms 12, 14, and 15, all of which contained violations of the six issued laws – this represents a series of waste[29].

According to the investor's revised investment report[30] for the Giao An II hydropower project, the occupied forest area is 14.05 hectares of natural forest, which includes 9.87 hectares of protection forest and 4.18 hectares of production forest. Currently, the information and data reported in the environmental resource status assessment prior to construction lack transparency and professionalism. Based on the overall land use plan for the project in Figure 1 presented by the company's representative on the morning of 20 September 2025 at the Son Kim 1 Commune People's Committee headquarter, a preliminary estimation of the land area permanently and temporarily occupied, when fully accounted for as listed above, will certainly amount to no less than hundreds of hectares of water surface and natural forest. This entire area is within the critical protection forest zone of the upstream watershed, a geological structure that is harsh and vulnerable (proven by historical flash floods). This constitutes a very negative and serious impact on the watershed protective function with two missions: protecting water resources and protecting the entire watershed natural forests against flash floods, landslides, and erosion. The Ngan Pho River watershed is characterized by rapid, sudden floods and quickly rising water levels. The historical floods have left behind severe damages not only to people and rare flora and fauna living within the watershed but also affected residents in the downstream of the La and Lam rivers all the way to the ocean.

The opinion of the Ha Tinh Department of Agriculture and Environment as stated in the Official Letter 4817/STC-DNĐT dated 17 July 2025, submitted by the Department of Finance to the Ha Tinh Provincial People's Committee regarding the handling the proposal of the Giao An hydropower JSC, specifies that: *"When implementing the project, the investor shall be required to complete the necessary dossiers and procedures for converting forest use purpose to other purposes and to carry out replacement afforestation in accordance with the provisions of the Forest Law; Decree 91/2024/NĐ-CP dated 18 July 2024 of the Government on amending and supplementing several articles of Decree 156/2018/NĐ-CP; Official Document 2608/SNNMT-QLĐĐ dated 6 June 2025; Government's Official Letter dated 16 November 2018; Circular 25/2022/TT-BNNPTNT dated 30 December 2022 on replacement afforestation when converting forest use purpose to other purposes; Circular 22/2023/TT-BNNPTNT dated 15 December 2023 of the Ministry of Agriculture and Rural Development on amending and supplementing several articles of forestry-related Circulars"*.

What can we see from these documents? These opinions are merely reflect the formal administrative language used in legal management documents. The Official Letter 4817/STC-DNĐT isolates the nature and content of the law, specifically Articles 3, 5, 8, 10, 12 and 14 of the Forest Law 16/2017/QH14 to justify that the proposition of "replacement afforestation" for over 10 hectares of natural protection forest. However, this appears delusory for the following reasons: 1) The actual clear-cut natural forest area for the project cannot be 10 hectares. The area to be replaced is far greater than that stated in the project proposal. It clearly shows that the figure is not true. The argument in

[29] Fighting agaist waste is the Party strategic goal
[30] Huong Son hydropower plant

the aforementioned document is formulaic[31]; 2) Where can forestry land be found to plant trees to replace the critical protective function when the forest land is already owned and the owners have rights guaranteed by the Constitution and Law; 3) Forest owners have statutory duties and responsibilities defined by law; 5) What specific species of natural forest trees have been clear-cut? 6) How many species have been clear-cut? 7) What is the age of each species? 8) Is his EIA done by AI? 9) What is the legal status and authority level of the EIA? 10) What is the legal background of the individual or organization conducting the EIA? All of this information must be disclosed publicly and transparently so that citizens, as rightful forest owners, can understand, contribute opinions, and provide feedback to the Giao An II Hydropower Company, other investors, functional agencies, and share with the affected communities. 11) After how many years will the newly planted forest be able to fulfill the same critical protective function? 12) The commitments regarding appraisal, measurement, planning, supervision, and approval of the EIA[32] for replacement afforestation at this site must be made public so that the local people, authorities, and the affected forest owners can exercise their statutory right to supervision.

13. Negative impacts on the habitat of recovering rare animal species

The results of the biodiversity survey of flora and fauna in Son Kim 1, Son Kim 2, and two neighboring communes in the former Huong Son district, Ha Tinh province, are as the following table:

Summary of the flora and fauna distribution by commune [1]

Group of organisms	Son Kim 1	Son Kim 2	Son Hong	Son Tay	Entire area
Plants	1298 (94%)	1352 (98%)	1209 (88%)	1054 (76%)	1381 (100%)
Mammals	63 (74%)	46 (54%)	60 (71%)	39 (46%)	85 (100%)
Birds	162 (75%)	144 (66%)	182 (84%)	81 (37%)	217 (100%)
Amphibians – Reptiles	26 (38%)	32 (47%)	22 (32%)	34 (50%)	68 (100%)
Fish	55 (68%)	50 (62%)	52 (64%)	44 (54%)	81 (100%)

Note: The figures represent the number of species distributed by commune, and the percentage indicates the ratio of species in that commune compared to the entire project area..

Due to the appropriation of natural forested land and construction activities that cause erosion, landslides, and pollution of soil, water, and noise at all stages of the hydropower plant construction, the flora and fauna species have been severely reduced (if not completely eliminated). This does not

[31] There are no on-site indicators and practical, logical opinions of a project that goes into construction and occupies land, clear-cuts natural forests, and wipes out species diversity within the project territory and neighboring ecosystems of the watershed
[32] Environmental Impact Assessment

account for the fact that construction workers are highly likely to trap and hunt rare birds and animals for weekend relaxation while carrying out the work. Experience shows that during the construction of the road leading to the Cau Treo International Border Gate, workers arbitrarily went deep into the forest to hunt rare animals (such as flying squirrels) for their drinks - the fact that no local resident has dared to bring to light.

14. Impact on amphibian and reptile biodiversity

According to research results by CRES [1], there are 22 species in Son Hong commune, 26 species in Son Kim 1 commune, 32 species in Son Kim 2 commune, and 34 species in Son Tay commune, with specific distribution characteristics as detailed in Appendix 2.

Comparing with the published documents, there are 24 rare species (3 amphibian species, 4 lizard species, 8 snake species, and 8 turtle species) in the communes of Son Kim 1, Son Kim 2, and other communes in the Ngan Pho River watershed

Specifically, this includes 18 species listed in the Vietnam Red Data Book (2 species at R - Rare (Endangered); 7 species at T - Threatened; 8 species at V - Vulnerable (likely to be threatened with extinction); and 1 species at E - Endangered (currently threatened with extinction); 10 species in the IUCN Red List (1 species at LR - Lower Risk, 5 species at EN - Endangered , 2 species at CR - Critically Endangered , and 2 species at VU - Vulnerable); and 11 species under Decree 48/ND-CP (4 species at IB - Strictly prohibited from exploitation and use; 7 species at IIB - Restricted from exploitation and use) [1]

Amphibian and reptile species are likely distributed throughout the entire project area. However, their density will be higher in areas with sufficient water sources, such as streamsides, especially along the sections of Khe An Bun and Khe Song connecting to Rao An Stream which runs through the Ngan Pho River Watershed Biodiversity Conservation Area.

Therefore, when this stream section dries up (if not “dead stream section”), the existence and development of the rare species listed in the Red Books[33] here, including rare and extremely rare species facing extinction warnings, will be threatened.

The above analysis indicates that the project will have the severe and irreversible impacts on the biodiversity of amphibian and reptile species.

15. Negative impacts on fish biodiversity

According to [1], 81 fish species, belonging to 56 genera and 20 families, have been found in the Rao An Stream area – the planned location for the Giao An II hydropower plant. This includes 15 new species in the Northern Truong Son area and 28 new species in the Ngan Pho River watershed. This result demonstrates the rich species composition of fish in the Rao An Stream watershed, with 55 species in Son Kim 1 commune and 50 species in Son Kim 2 commune.

Regarding conservation value, according to the CRES’s assessment, the stream sections running through the Ngan Pho River Watershed Biodiversity Conservation Area and across the entire Ngan

[33] Details in Annex 2

Pho River watershed contain 4 rare species out of a total of 33 inland fish species recorded in the Vietnam Red Data Book (2000), even including *Anguilla cf. japonica*. One species is classified at E, two - V, and one - R.

For all fish species including the aforementioned rare ones, to survive and develop, natural flow, water storage and discharge, water quality, and quality of the natural forest are three prerequisites. The water must ensure both stable flow and a consistent food chain that infiltrates from the forest canopy, through the forest floor, down to the riverbed, streams, and permeates the soil solution layer. The natural flow and the water circulation process specific to the terrain create the confluence points essential for fish migration and breeding seasons, and act as a natural filter against sudden pollution spikes. All fish species, especially migratory fish, cannot survive and develop in rivers and streams if: the flow is brutally and mechanically intervened; the flow is artificially regulated; the flow is depleted during the dry season; the flow is excessively strong during flash floods; and the flow regime is deformed. These factors cannot be substituted by any compensation arguments for any hydropower project globally, not just in the case of the Giao An II Hydropower Company, its investors, and consulting partners. The pollution of water and artificialization of the natural flow of the watershed, which is part of creation, cannot be replaced by compensation from any investor.

The investor - the Giao An II Hydropower Company, proposes:

- To change the power transmission route from an open channel and exposed pressure pipe to a closed, underground water tunnel.
- The headworks structure will be a reinforced concrete diversion dam on a rock foundation.
- To add a downstream retention dam with a threshold elevation of 57m.

With the proposed option above, the stream section connecting from the An Bun junction, branching off to Khe Song, and merging into Rao An Stream that runs through the Ngan Pho River Watershed Biodiversity Conservation Area, will suffer water loss (if not "dead stream" which would halt the metabolic process of the strongly recovering river life). The Giao An II Hydropower will cause water depletion during the dry season and accelerate flow and flash floods during the rainy season, effectively erasing the rare flora and fauna that have been recovering for over two decades. Is compensation the solution? How much is enough?

According to the company's argument, the headworks of the power plant is the diversion dam. It means that if the downstream diversion dam is constructed, it will impede the swimming, migration, and interaction rights of the rare fish species that are currently recovering thanks to the natural and peaceful flow in accordance with the watershed's principles.

16. Negative impacts on ecological livelihoods and community economy:

Local residents, not only in Son Kim 1 and Son Kim 2 communes but also in all downstream communes, rely on the river water source. The degradation of the watershed and river ecosystem simultaneously imposes severe negative impacts on the community livelihoods, specifically:

a. Decline in main income sources

The villages along the rivers and streams primarily rely on netting, fishing, and catching shrimps, fish, eels, and river crabs as their main nutritional source. When water sources decrease and become polluted, the ecosystem is disrupted, leading to a sharp decline in aquatic yield, resulting in a drastic drop in income, severely disrupting the daily lives of tens of thousands of households.

b. Loss of ecological and environmental livelihood support services

The natural ecosystem provides various livelihood services, such as water purification, flood regulation, and the natural deposition of alluvium after each rainy season without disturbance, contributing to alluvium enrichment and engaging in the crop and agricultural production chain for the entire region. When these services degrade, the nutritional security provided by the watershed ecosystem to the residents will be severely affected.

c. Increased living costs

The local traditional cultural scenes of buffaloes wallowing in the downstream river and children bathing in the upstream areas will gradually disappear. The seemingly insignificant daily livelihoods of the people will be severely disrupted, affecting not only humans but also the local buffaloes and livestock.

d. Increased risk of natural disasters and losses

Loss of forest and ecosystem degradation → increased risks of landslides, droughts, saltwater intrusion, and flooding → destructing crops, infrastructure, and housing → pushing the community into more vulnerable condition.

17. Loss of traditional cultural identity

When traditional livelihoods are disrupted, the young generation becomes disoriented and is forced to migrate for sustenance. This not only causes economic instability but also leads to the loss of community cohesion, eroding traditional trades and the communal culture of the area. The forest environment degrades, the river flow is broken, and the aquatic ecosystems, along with the food chains for both organisms and humans, are severely disrupted. This demonstrates that an approval of this project will directly affect the watershed of water systems, not only completely destroying the natural resource attributes but also threatening the spiritual well-being and material security of a large community, including beneficial species.

18. Negative impacts on Suoi Nuoc Sot tourist area

In the Official Letter 4817/STC-DNĐT dated 17 July 2025 [2], the Management Board of the Ha Tinh provincial economic zone highlighted: *"The investor shall be required to fully update the legal documents, and at the same time, conduct a supplementary environmental impact assessment to comprehensively consider all potential arising issues. In addition, specific solutions for forest protection and a commitment to ensure the safe and effective operation of the project must be proposed..."*.

The Giao An II hydropower plant theoretically occupies 25.9 hectares of land classified as natural forest and critical border protection forest (the watershed's core). Given the increasingly evident

climate change, the rise in extreme weather, and the frequent and erratic storms and floods, reducing the area of natural forest that serves a critical protective function in transporting water through the mountain (geological structure) in a watershed with a very specific terrain structure, where the soil layers are unstable and the soil cohesion (CEC[34]+ and AEC[35]) is still weak (in the period of soil health recovery), will easily make the entire watershed vulnerable. The Giao An II Hydropower Company's argument *"digging a tunnel through the mountain to install a pipeline from the upstream to create potential energy for the generator"* is supposedly rational.

This directly threatens the natural structure of the terrain, increasing the risk of mountain slides, landslides, and the potential for earthquakes, which possibly leads to accidents for the entire ecosystem, the peaceful home to rare flora and fauna, and leaves behind consequences that are hard to be overcome.

The Giao An II Hydropower Company has continued pursuing this project since 2007, even knowing that the benefits are too marginal while the cost is the irreversible negative impacts to the nature, the people, and the whole nation, which is a heartless.

The representative of the Giao An II Hydropower Company argues: *"The Company will maintain the minimum water flow of 0.7 cubic meters per second as regulated"*. In the watershed with the sandy soil structure and steep terrain, this will lead to severe water depletion, silt and sand deposition, and the filling of the stream bed, effectively destroying life in a river section of about 5 km. This river section is, furthermore, an important ecological destination for the migration and breeding season of fish[36], birds, storks, snakes, turtles, and amphibians, not to mention the plant species dispersed by wind and carried by the flow. This will ultimately put an end to all lives along the river, its banks, and the neighboring ecosystem within the complete integrity of the watershed. It completely voids the plan of the province and downstream communes which are silently striving towards a community-based eco-tourism interface that has already become a popular destination over the past years. The magnificent natural landscape in the Ngan Pho River watershed and Ba Mu Peak (the sacred cradle of all living beings according to the spiritual legend) will no longer exist for short-term benefits, scarifying at the cost of the very Essence – Energy - Spirit of this entire watershed.

The Company argues: *"The project will supplement a downstream dam of the power plant with a threshold elevation of 57.0 m, creating a tourist landscape, forming a reservoir with a surface area of about 8.1 hectares, ensuring activities for recreation and stream bathing for the people in the project area"*. This really is an insensitive, naive, stereotypical and childish attempt to generate excitement.

In reality, there have already been enough hydropower projects causing unspeakable consequences. The year 2025 marks the beginning of streamlining and light governance of no-forbidden zones and no exceptions. Difficult matters must be consulted with the people. The people are the ears and eyes of the Government. The communities living in every watershed are the foundational fortress of the nation. Upon the people's opinion and feedback, the Giao An II hydropower project had been rejected

[34] Cation Exchectanging Capacity +
[35] Anion Exchectanging Capacity -
[36] Listed in Vietnamese and International Read Books

upon twice submissions (2007 and 2017). Yet, for the third time, in 2025, even after having gone through three National Assembly terms (12th, 14th, and 15th) with 6 promulgated Laws and a series of guiding Decrees logical and strictly regulating types of projects and investors, the Giao An II hydropower project is still being resubmitted.

Despite of being aware of the non-consensus from both the local people and authorities, and of the awareness and accountability of the forest owners, the Giao An II hydropower project, in its third submission (old wine in new bottle), shows its failure to recognize that it is a proposal that wastes time, depletes the energy of government officials, burdens local authorities, and, crucially, creates confusion among the affected population. This behavior constitutes an act of waste, whether intentional or not, especially in the context of anti-waste being a special priority goal of the government.

How can the Giao An II Hydropower Company propose the compensation solutions when the project will:

- Disrupt the continuity of the natural flow and landscape of the entire watershed?
- Hinder flood drainage, leading to landslides?
- Cause sediment and silt deposition and water pollution?
- Hinder the movement of fish and aquatic organisms, especially migratory species?
- Threaten the biodiversity of rare genetic resources?
- Endanger the lives and production activities of the local people in case of unforeseen incidents?
- Fail to comply with the national sustainable development?
- Fail to enhance the natural resource attributes of the watershed?
- Fail to increase the socio-economic benefits for the residents?

The project also proposes the construction of a "regulating reservoir[37]" downstream to serve recreational purposes for the project area's residents is intellectually deficient, as analyzed above.

PART D: RECOMMENDATIONS AND CONCLUSION

I. RECOMMENDATIONS

1. Do not approve the Environmental Impact Assessment report for the Giao An II hydropower project at any decision-making level.
2. Remove the Giao An II hydropower project from the hydropower plants development master plan of the Ha Tinh province.
3. Stop all intentions and plans for building small and medium-sized hydropower plants in the Ngan Pho River watershed, which originates from Ba Mu Peak, Thep Waterfall, An Bun Junction, and Rao An Stream. This is critical because the valuable and rare genetic resources already identified and listed in the Vietnam and World's Red Data Books are

[37] Will the artificial regulating reservoir compensate for the loss of migratory ecological corridor of aquatic species?

currently recovering. (The Huong Son Hydropower 1 and 2 plants are more than enough for the watershed residents and forest owners to suffer the fear from flood seasons causing irreversible losses of natural forest trees).

4. Prioritize development and expansion of biodiversity conservation space, and enrichment of rare species currently at risk of extinction.
5. Develop community-based ecological landscape tourism, raise awareness and uphold respectful behaviors towards watershed ecosystems and rivers through increased experiential income.
6. Develop local native tree varieties and medicinal plants under the natural forest canopy, enhance landscapes and increase forest products for experiential and tourism purposes.
7. Plan inter-forest trails and promote the health benefits of "Forest Sauna/Steaming" from trekking in the forest, making it a sustainable development strategy for the province.
8. Foster cooperation among forest owners, communities, inter-villages, and inter-communes to establish models for nursing and planting native trees. This aims to increase natural forest biomass, enhance water retention in the watershed, increase the carbon storage capacity of forest trees, convert to CO2 emission absorption, and design a process for measuring and calculating carbon stock. This effort will raise awareness among forest owners regarding the skills and knowledge in converting carbon storage from forest protection into carbon credits, actively contributing to a domestic supply for corporations, ensuring sufficient credits to offset emissions required for exported goods under international trade regulations. Surplus credits remaining after compensation will be sold by domestic corporations for profits, which will then be reinvested back into the natural forest biomass sinks of national watersheds, continually creating a natural CO2-absorbing ecological engine based on the principle of nature.
9. Systematize the database of native forest trees and their carbon sequestration potential through direct involvement of forest owners. This will help the forest owners clearly see that a single valuable native tree is like an ATM. Accordingly, annually, emitters deposit money, and forest owners withdraw it through carbon credits (one ton of CO2-e equals to one carbon credit). One generated carbon credit creates an annual income for the people. By that way, natural forests are strictly protected, livelihoods of forest residents are secured, biodiversity genetic resources are conserved and developed, water sources continuously increase, the air becomes cleaner, the watershed landscape prospers, tourism and experience activities become more vibrant, the natural air conditioning system is increasingly utilized.

II. CONCLUSIONS

The Giao An II hydropower project causes too many adverse impacts on the natural environment, biodiversity, water resources, and the livelihoods of residents across the entire watershed. The consequences are potentially irreversible for both nature and the local people. The project violates numerous provisions stipulated by Laws.

The decision not to approve the project is in compliance with the current legal regulations and in line with the national sustainable development strategy.

PART E: REFERENCES

1. Consolidated report on biodiversity survey of the biodiversity conservation project area in the Northern Truong Son Mountain Range (Huong Son District, Ha Tinh Province) by the Center for Natural Resources and Environmental Studies (CRES), Vietnam National University, Hanoi, led by Prof. Dr. Sc. Truong Quang Hoc, implemented by Dr. Tran Dinh Nghia, Dr. Vo Thanh Son, and others in 2005.
2. Report on biodiversity research in the Ngan Pho River Watershed Biodiversity Conservation Area, published by the sub-Institute for Forest Inventory and Planning (FIPI) of North Central Vietnam, 2010.
3. Report on the results of ethnobotanical research in the Ngan Pho River Watershed Biodiversity Conservation Area, by Tran Thi Lanh, Vu Van Can, Cory White, Le Hong Giang, Vang Sin Min, 2015.
4. Report on the results of research on "Topsoil health through various agroecological applications" in the Ngan Pho River Watershed Biodiversity Conservation Area, conducted by SPERI, CHESH, and intern Hanna Henkel from Humboldt University of Berlin, 2018.
5. Assessment of forest biomass stock, biodiversity, and soil health, co-published by CHESH and SPERI, 2023.
6. Research on water resources in the Ngan Pho River Watershed Biodiversity Conservation Area, published by Dr. Nguyen Thi Thu Nga from Faculty of Water Resources Engineering, Thuy Loi University, 2024.
7. Pilot empirical research on "Carbon stock in above-ground biomass of tropical rainforests in North-Central Vietnam", co-published by SPERI, CHESH, Professor Goelteboth Friedhelm (NatureLife-International – NLI), using the of Bao Huy (2012) Formula, and Tran Thi Lanh, 2024.
8. Decision 1682/QĐ-TTg dated 28 October 2024 signed by Deputy Prime Minister Bui Thanh Son.
9. Official Letter 5579/UBND-KT2 from the Ha Tinh Provincial People's Committee to relevant departments and agencies for guidance and consultation.
10. Official Letter 4817/STC-DNĐT dated 17 July 2025 from the Ha Tinh Department of Finance, providing recommendations on the proposed project by Giao An II Hydropower Joint Stock Company.

ANNEXES

ANNEX 1

BIODIVERSITY OF FISH IN THE NORTHERN TRUONG SON REGION, INCLUDING SON KIM 1 AND SON KIM 2 COMMUNES, HA TINH PROVINCE

(Excerpt from the consolidated report on biodiversity survey of the biodiversity conservation project area in the Northern Truong Son Mountain Range (Huong Son District, Ha Tinh Province) by the Center for Natural Resources and Environmental Studies (CRES), Vietnam National University, Hanoi, led by Prof. Dr. Sc. Truong Quang Hoc, and implemented by Dr. Tran Dinh Nghia, Dr. Vo Thanh Son, and others in 2005).

The results show that 81 fish species, belonging to 20 families and 56 genera have been identified in the Northern Truong Son biodiversity project area. Among these, 77 species are native fish, and only cá Sặc bướm (Three Spot Gourami - *Trichogaster trichopterus)*, Rô phi vằn (Nile Tilapia - *Oreocromis niloticus)*, and Rô phi đen (Mozambique Tilapia - *Oreocromis mossambicus)* are migratory species, but they are now found in the wild in relatively high numbers. Among the 81 species, specimens have been collected for 80 species. Only cá Chình hoa (Marbled Eel - *Anguilla marmorata)* specimen could not be collected and has only been recorded through interviews. 79 species have directly been collected from their habitat, while only 2 species have been bought from local markets instead of direct collection. These are cá Rô đồng (Climbing Perch - *Anabas testudineus)* and cá Chình (Eel - *Anguilla cf. japonica)*.

The family with the largest number of species is Cyprinidae, with 26 genera (accounting for 46.4% of total genera) and 36 species (accounting for 44.4% of total species), followed by Cobitidae with 4 genera (7.1%) and 11 species (13.5%). There are 4 families, each having 2 genera, including Eleotridae with 4 species, and the other families with 3 species: Bagridae, Gobiidae, and Belontidae. The remaining families include 5 families, each with 1-2 genera and 2 species; and the other 9 families, each with only 1 species, are: Notopteridae, Claridae, Synbranchidae, Mastacembelidae, Anabantidae, Gerridae, Mugilidae, Adrianichthydae, and Bothidae.

Among the 81 species recorded in the project area, 5 species still have taxonomic issues that require further detailed analysis, as they could potentially be new species to science: *Anguilla* cf. *japonica, Toxabramis* cf. *hotayensis, Hemibarbus* cf. *umbrifer, Schistura sp.* and *Spinibarbus sp.*
If *Anguilla cf. japonica* is not a new species but indeed the Japanese Eel *(Anguilla japonica)*, this would be also a significant finding. This species was recorded in Vietnam by Chevey in 1937, who reported catching single specimen in the Red River. After Chevey's report, no other researcher has encountered this species in Vietnam. During the 2003 meeting of the ichthyologists compiling the Vietnam Red Data Book, the group agreed to remove this species from the list, believing it to be extinct in the country. If it is indeed *Anguilla japonica*, we have rediscovered it after 69 years of absence.

Among the 81 species, 15 species have been recorded in the Northern Truong Son for the first time. They are: *Anguilla cf. japonica, Toxabramis cf. hotayensis, Hemibarbus umbrifer, Microphysogobio yunnanensis, Acheilognathus barbatulus, Rhodeus vietnamensis, Puntius brevis, Varicorhinus lepturus, Neolissochilus blanci, Xenocypris davidi, Cobitis sinensis, Schistura bifurca, Oreoglanis delacour, Oryzias sinensis, and Trichogaster trichopterus.*

For the Northern Truong Son Biodiversity project area in Huong Son district, in addition to the 15 species new to both Northern Truong Son and Huong Son, 13 other species have been recorded here for the first time: *Notopterus notopterus, Onychostoma laticeps, O. microcorpus, Pseudobagrus virgatus, Yaoshanicus normalis, Rasborinus formosa, Microphysogobio labeoides, Silurus asotus, Glyptosternon pallozonum, Rhinogobius hadropterus, Eleotris melanosoma, Siniperca chuatsi, and Macropodus opercularis.*

Distribution of Amphibian and Reptile species by commune and habitat within the Giao An II project area [1]

Scientific name	*Vietnamese name*	*Commune*				*Habitat*				
		SK1	*SK2*	*ST*	*SH*	*RTN*	*RTS*	*SS*	*DC*	*ĐCT*
Amphibia	**Lớp Lưỡng cư**									
Ecaudata	**Bộ Không đuôi**									
Bufonidae	**1. Họ Cóc**									
Bufo galeatus	Cóc rừng		+			+	+			
Bufo melanostictus	Cóc nhà	+	+	+	+				+	+
Ranidae	**2. Họ Ếch**									
Hoplobatrachus rugulosus	Ếch đồng	+	+	+	+			+	+	
Limnonectes limnochectaris	Ngóe	+	+	+	+		+	+	+	+
Limnonectes kuhlii	Ếch trơn	+	+	+	+	+	+	+		
Occidozyga leavis	Cóc nước nhẵn		+				+			
Occidozyga lima	Cóc nước sần		+	+			+			
Paa verrucospinosa	Ếch gai sần	+						+		
Rana andersoni	Chàng andecsơn	+	+					+		
Rana attigua	Ếch atigua	+	+					+		
Rana chectapaensis	Chàng Sa Pa		+					+		
Rana guentheri	Chẫu chuộc	+	+	+	+		+	+	+	
Rana johnsi	Ếch Jônsi	+						+		
Rana livida	Ếch xanh		+	+				+		
Rana maosonensis	Chàng mẫu sơn		+					+		

Rana nigrovittata	Ếch suối	+	+	+	+			+		
Rana sauteri	Hiu hiu			+				+		
Rana taipehensis	Chàng Đài Bắc	+							+	
Rhectacophoridae	**3. Họ Ếch cây**									
Polypedates leucomystax	Chẫu chàng	+	+	+	+		+	+	+	
Rhectacophorus nigropalmatus	Ếch cây chăn đen	+	+			+		+		
Microhylidae	**4. Họ Nhái bầu**									
Kaloula pulchra	Ếnh ương			+					+	
Microhyla butleri	Nhái bầu bút lơ	+					+			+
Microhyla heymonsi	Nhái bầu hây môn	+		+						+
Microhyla ornata	Nhái bầu hoa		+	+						+
Microhyla pulchra	Nhái bầu văn			+	+				+	+
Reptilia	**Lớp Bò sát**									
Squamata	**Bộ Có vảy**									
Gekkonidae	**5. Họ Tắc kè**									
Gekko gecko	Tắc kè			+	+	+	+			
Hemidactylus frenatus	Thạch sùng đuôi sần	+		+	+				+	
Agamidae	**6. Họ Nhông**									
Acanthosaura lepidogaster	Ô rô vảy			+	+		+			
Calotes versicolor	Nhông xanh		+		+		+			
Calotes mystaceus	Nhông xám						+			
Draco maculatus	Thằn lằn bay đốm		+		+	+				
Physignathus cocincinus	Rồng đất	+	+	+	+	+		+		
Scincidae	**7. Họ Thằn lằn bóng**									
Mabuya longicaudata	Thằn lằn bóng đuôi dài	+	+		+				+	
Mabuya multifasciata	Thằn lằn bóng đốm	+								+
Varanidae	**8. Họ Kỳ đà**									
Varanus salvator	Kỳ đà hoa		+	+	+	+		+		
Colubridae	**9. Họ Rắn Nước**									
Ahectaetulla prasina	Rắn roi thường		+					+		

Amphiesma stolata	Rắn sãi thường					+				
Boiga multomaculata	Rắn rào đốm			+	+		+			
Dendrelaphis pictus	Rắn leo cây	+						+		
Elaphe radiata	Rắn sọc dưa	+		+					+	
Enhydris plumbea	Rắn bổng chì			+						+
Oligodon chinensis	Rắn khiếm Trung Quốc						+			
Oligodon cinerius	Rắn khiếm xám						+			
Oligodon cyclurus	Rắn khiếm đuôi vòng					+				
Ptyas korros	Rắn ráo	+		+					+	
Ptyas mucosus	Rắn ráo trâu	+		+						+
Rhectabdophis chrysagus	Rắn hoa cỏ vàng	+								+
Rhectabdophis subminiatus	Rắn hoa cỏ nhỏ	+								+
Sibinophis collaris	Rắn rồng cổ đen						+			
Sinonatrix percarinata	Rắn nước văn đen				+			+		
Xenochrophis piscator	Rắn nước			+			+		+	
Xenopeltidae	**10. Họ Rắn nùng nục**									
Xenopeltis unicolor	Rắn mống				+		+			
Elapidae	**11. Họ Rắn hổ**									
Bungarus fasciatus	Rắn cạp nong			+						+
Bungarus multicinctus	Rắn cạp nia Bắc			+						+
Naja naja	Rắn hổ mang						+			
Ophiophectagus hectannah	Rắn hổ chúa	+		+	+		+			
Viperidae	**12. Họ Rắn lục**									
Trimeresurus albolabris	Rắn lục mép trắng					+				
Boidae	**13. Họ Trăn**									
Python molurus	Trăn đất		+	+		+	+			
Testudinata	**Bộ Rùa**									
Platysternidae	**14. Họ Rùa đầu to**									
Platysternum megacephectalum	Rùa đầu to		+			+		+		
Emydidae	**15. Họ Rùa đầm**									

Cistoclemmys galbinifrons	Rùa hộp trán vàng			+	+	+	+			
Cuora trifasciata	Rùa hộp ba vạch		+			+		+		
Geoemysda tcheponensis	Rùa đất Sêpôn		+	+		+		+		
Pyxidea mouhoti	Rùa sa nhân		+		+	+				
Sacalia quadriocellata	Rùa bốn mắt			+		+		+		
Testudinidae	**16. Họ Rùa núi**									
Indotestudo elongata	Rùa núi vàng		+			+				
Manouria impressa	Rùa núi viền		+			+				
Trionychidae	**17. Họ Ba ba**									
Palea steindachneri	Ba ba gai		+	+		+		+		
Pelodiscus sinensis	Ba ba trơn		+	+		+		+		
Total		26	32	34	22	21	22	26	13	13

Notes: Commune: SH: Son Hong; SK 1: Son Kim 1; SK 2: Son Kim 2; ST: Son Tay
Habitat: RTN: Natural forest; RTS: Secondary forest; SS: River, stream; DC: Residential area-; ĐCT: Cultivation land

ANNEX 2

INFORMATION OF RARE FISH SPECIES

***Anguilla japonica* Temminck & Schlegel, 1846.** Vietnamese name: Cá Chình Nhật (Japanese Eel). Local Name: Cá Chình (Eel)

1. *Distribution:* This species is distributed in Thanh Tri (Red River). This time, it was found in the Con River (Huong Son). Globally, it is distributed in Japan, China, and Korea. Biological characteristics: Its diet consists of invertebrates and fish. In September, the mother eels living in freshwater migrate to the deep sea to lay eggs. The eggs hatch into leptocephalus larvae, which drift to river estuaries via ocean currents and waves, where they live and then migrate upstream.

2. *Habitat and ecology*: Depending on the life stage, female eels can live in both freshwater and seawater. When young, they live in the sea, and when they mature, they migrate to live in caves and holes along the riverbanks. Conversely, male eels only inhabit the estuarine area.

3. *Value:* The flesh is very delicious, with high commercial and export value. It is a valuable species that is farmed in Japan and China. It is very rare and has been listed in the Vietnam Red Data Book (2000) under category E (Endangered).

***Onychostoma laticeps* Gunther, 1896.** Vietnamese name: cá Sỉnh gai (spiny eel). Local name: cá Mát vàng. Thai ethnic name: Pa khẻnh lương

1. *Distribution:* This species inhabits rivers and streams within the Red River, Ky Cung, Ma,

and Lam River systems. It is also found in the Tra Khuc River (Quang Ngai Province), which may represent the lowest southern distribution of this species (Nguyen Van Hao & Ngo Si Van, 2001).

In the Ngan Pho River Watershed Biodiversity Conservation Area, Huong Son District, the species is recorded in Khe Song (coordinates: 48Q 0518798 - UTM 2053163) and Rao An Stream (coordinates: 48 Q 0523590 - UTM 2034721). This species is also very rare here, with only two individuals observed so far.

2. *Biological Characteristics:* This is a medium-sized fish. The largest individuals can reach up to 2 kg. The species prefers fast-flowing waters in the rivers' upstream. The spiny eel feeds on decomposed organic matter and attached algae, and occasionally consumes small invertebrates. Sexual maturity is reached at around two years of age. Spawning occurs from December of the previous year to February of the following year. The spawning grounds are believed to be rocky areas in the river's midstream. (Vietnam Red Data Book of Animals, 2000).

3. *Value:* The flesh is very tasty. The species has a relatively high yield in mountainous regions. It is listed in the Vietnam Red Data Book of Animals (2000) under the category V (Vulnerable).

***Spinibarbus hollandi* Oshima, 1919.** (In the Vietnam Red Data Book, listed as *Spinibarbus caldwelli (Nichols, 1925).* Vietnamese name: cá Chày đất. Local name: cá Lấu. Thai ethnic name: Pa tết

1. *Distribution:* This species is distributed in rivers and streams of the Red River, Thai Binh, Ma, Lam, Thu Bon, and Tra Khuc river systems (Nguyen Van Hao & Ngo Si Van, 2001). Globally, it is also found in China (Vietnam Read Data Book of Animals, 2000).

Within the Ngan Pho River Watershed Biodiversity Conservation Area, Huong Son District, the species has been recorded at the coordinates 48Q 0529839 - UTM 2038634; in the Con River - at 48Q 0518821 - UTM 2053168 and 48Q 0519208 - UTM 2053330; in the Rao Mac Stream - at 48Q 0519555 - UTM 2044523, 48Q 0518815 - UTM 2044597, and 48Q 519519 - UTM 2045070.

2. *Biological characteristics:* This is a medium-sized fish species, inhabiting midwater layers of streams and the midstream to upstream of rivers. It is omnivorous, feeding on aquatic invertebrates, small fish, and higher plants. The species reaches sexual maturity at two years of age. Spawning occurs from December of the previous year to February of the following year. Spawning grounds are in fast-flowing waters with sandy and gravelly bottoms (Vietnam Red Data Book of Animals, 2000).

3. *Value:* The species has tasty flesh and provides a considerable yield in some regions. It has been listed in the Vietnam Red Data Book of Animals (2000) under the category V (Vulnerable).

***Anguilla marmorata* (Quoy & Gaimard, 1824).** Common Name: Cá Chình hoa (Marbled Eel). Local Name: Cá Lệch (Eel-like fish)

1. *Distribution*:

In Vietnam: Distributed from the Ca River to freshwater rivers, streams, and lakes that connect to rivers or the sea in Central and Southern Vietnam.

Globally: A very widely distributed species. It is found in both tropical and temperate regions of the Pacific and Indian Oceans.

In Huong Son: The Marbled Eels are observed in the Con River. Locals reported salvaging a dead individual floating in this area during the flood in 2002. Locals also catch many individuals in Khe Xi Loi, Rao Mac, etc.

Biological Characteristics: The fish is large. Typically, individuals are 50 cm – 70 cm long corresponding to a weight of 0.6 kg to 1.5 kg. Larger individuals can be over 1 m long, weighing 7 kg to 30 kg. The fish lives in the upstream of large rivers and streams, and in freshwater lagoons and lakes that open to the river or the sea. They inhabit deep, natural burrows and caves.

The Marbled Eel is a ferocious fish. Its natural diet includes invertebrates, small fish, frogs and toads, crustaceans, and mollusks. The fish lives in freshwater but migrates to the sea[38] for spawning when mature during the spawning season. In Vietnam, the migratory spawning occurs annually from August to December, corresponding to the rainy and storm season of each region. Eels spawn offshore; their larvae are leptocephalus (leaf-shaped). Carried by ocean currents and waves, they drift to the coast. After metamorphosis, they transform from the leptocephalus shape to cylindrical shape, and migrate into freshwater. A single female can lay millions of eggs.

2. *Value:* Eel meat is very delicious and is a valuable delicacy. The natural yield is continuously declining due to overfishing. It has been listed in the Vietnam Red Data Book 2000, under the category R (Rare).

The role of fish fauna in the ecosystem and local communities of the affected area

Four fish species have been recorded in the Vietnam Red Data Book of Animals. However, the Japanese eel *Anguilla cf. japonica* has particularly high conservation value. The species, once thought to be extinct in Vietnam, has now been rediscovered in the Ngan Pho River watershed. Developing a conservation strategy for this species is therefore of urgent importance.

In addition to the direct conservation significance of rare and valuable fish species listed above, fish also contribute to the overall biodiversity of the region, as they are integral components of the food web and serve as prey for many other animals. For instance, they are food sources for bird species belonging to the order *Ciconiiformes* (storks and herons), the family *Alcedinidae* (kingfishers), many fish-eating mammals such as otters of the family Mustelidae, and fish-eating reptiles such as Monitor

[38] The biological interaction among aquatic species from Ba Mu Peak to the great sea gates of Cua Hoi and Cua Lo, passing through the Ngan Pho River, merging with the Ngan Sau River, flowing into the La River, then joining the Ca River and finally reaching the Lam River forms an ecological corridor for fish species currently facing extinction warnings, as analyzed earlier in this document.

lizards (*Agamidae*) and water snakes (*Colubridae*), among others.

Wild animal meat, including fish, is considered a preferred delicacy and is often served in specialty restaurants catering to tourists and local consumers. Therefore, effective measures to conserve and enhance natural fish stocks would indirectly contribute to the conservation of terrestrial wildlife—such as mammals, birds, amphibians, and reptiles—since increased fish availability would encourage people to fish (which is easier than hunting other vertebrates) for consumption, thereby reducing hunting pressure on rare terrestrial species.

Within the region, Bỗng fish species (*Spinibarbus denticulatus)* has been found in the Con River. This large herbivorous fish can reach a weight of 5–10 kg per individual and feeds on higher aquatic plants, which are abundant locally. Thus, it has strong potential as an aquaculture species. Its diet is similar to that of the grass carp (*Ctenopharyngodon idellus*), but it has advantages such as better-tasting meat and stronger resistance to diseases, though it grows more slowly. Artificial breeding of this species has already been successfully achieved in Vietnam.

Another species, Chày đất (*Spinibarbus hollandi)*, has been listed in the Vietnam Red Data Book (2000), but it is still found in moderate numbers in the Rao An Stream. In addition to its relatively large size, this species has attractive colors and tends to move in schools. During the dry season, when the water is clear, they can easily be observed, making them a potential attraction for ecotourism activities.

Assessment of fish species abundance and density

The current fish fauna of Huong Son District is not poor in terms of species composition, and with continued surveys, the total number of species is expected to exceed the current count of 81. However, based on the observations of fish caught by local fishermen and sold at the two main market of Tay Son Center Market and Pho Chau Market, as well as on the results of our own field sampling, it appears that the natural fish yield in this area is relatively low.

Species with relatively large populations include Chạch suối (Stream Loach - *Nemachilus pulcher)*, Chạch đá (Stone Loach - *Schistura fasciolata),* Bống đá khe (Rock Goby - *Rhinogobius leavelli)*, Cá cá Cháo (Chinese Minnow - *Opsariichthys bidens)*, cá Đục Ngộ (Short Barbel - *Hemibarbus medius)*, cá Đục trắng (White Barbel - *Squalidus chankaensis)*, cá Đòng đong (Semifasciolated Minnow - *Ca poeta semifasciolata)*, Chạch suối đỏ (Red Stream Loach - *Schistura fasciolata)*, and Chạch hoa (Spotted Loach - *Cobitis taenia)*. However, individuals of these species are generally small in size. Only a few medium-sized species with relatively higher abundance are recorded, such as cá Thẻo (Striped Catfish - *Silurus cochinchinensis)*, Bống suối đầu ngắn (Short-headed Stream Goby - *Percottus chankaensis)*, and Chạch sông (River Loach - *Mastacembelus armatus).*

Large-sized fish species are rare, only cá Chép (Carp - *Cyprinus carpio)* and cá Chày (Barbel - (*Squaliobarbus curriculus*) have been occasionally observed, and even these were caught in small numbers and of limited size. Although several streams share similar habitats with those found in Pu Mat National Park, where fish abundance is high, Huong Son shows much lower densities. Notably, cá Mát *(Onychostoma gerlachi)*, which dominates in Pu Mat, is seldom observed here.

Among the surveyed sites, only Khe Sinh and Khe Van exhibited relatively rich species composition and higher population density. These areas has yielded the most abundant fish catches.

In summary, four species recorded in the Vietnam Red Data Book (2000) have been identified in this area: *Anguilla japonica* (Endangered – E), *Onychostoma laticeps* (Vulnerable – V), *Spinibarbus hollandi* (Vulnerable – V), and *Anguilla marmorata* (Rare – R). However, populations of these species remain extremely low and are at risk of extinction, except for *Spinibarbus hollandi*.