

Citation Evidence Report

EB-1A Petition — Original Contributions of Major Significance

8 CFR § 204.5(h)(3)(v) · Criterion 5

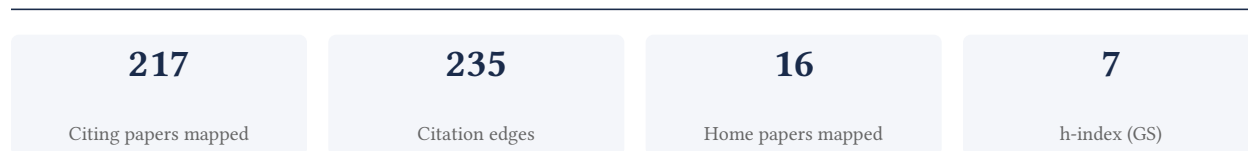
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[Google Scholar profile](#)

Generated 2026-05-21 by CiteMap. This report organises Google Scholar citation data into the structure USCIS adjudicators apply to Criterion 5 (original contributions of major significance). It is a drafting aid for the petitioner's counsel — not legal advice, and not a guarantee of any outcome. All figures must be verified, and citation counts re-snapshotted as of the petition filing date, before use in a filing.

A. Overview & Filtering Statement



Filtering statement – methodology & limits

Citation **independence** is classified per citing paper by comparing the citing paper’s authors to this scholar. *Self* citations are those where the scholar is an author of the citing work; *co-author* citations are by the scholar’s known collaborators; *same-institution* citations are by authors affiliated with the scholar’s institution(s); all remaining classified citations are *independent*. Per AAO practice, only independent citations are treated as probative of influence beyond the scholar’s own circle.

Known limitations – counsel must verify. (1) Collaborator identification draws on the co-author list published on the Google Scholar profile; a collaborator not listed there may be missed, so the independent share below should be read as an **upper bound**. (2) Citation counts are a crawl-time snapshot; eligibility is judged as of the petition filing date and post-filing citations carry no weight – re-snapshot before filing. (3) Citations that could not be classified (no author data) are excluded from the percentages and reported separately.

B. Citation Independence

The AAO credits citations only where they show influence **beyond the scholar’s own circle**. Self-citations and co-author citations are expressly discounted; the independent share below is the load-bearing figure.

100.0% independent of 20 classified citing papers

| Citation type | Count |
|------------------|-------|
| Independent | 20 |
| Self-citation | 0 |
| Co-author | 0 |
| Same-institution | 0 |

197 citing papers could not be classified (no author data) and are excluded from the percentages above.

C. Significant Contributions & Their Citation Evidence

Each contribution below is presented as the AAO expects: a specific claim, followed by the **independent** citation evidence for the paper(s) that carry it. Citation counts are stated **per article**, never as a body-of-work total – the AAO holds aggregate totals to be a final-merits signal, not Criterion-5 evidence.

Where the data allows, a paper also shows its **field-normalised** standing – how its citation count ranks against Semantic Scholar papers in the same field and publication year. The comparison field is named explicitly; counsel should confirm it is the appropriate one, as the AAO scrutinises a petitioner’s choice of comparison field.

Contribution 1

Claim – Contribution 1

The researcher developed a coupled SWAT-LSTM framework to enhance hydrological and water quality modeling in data-scarce environments, addressing non-stationarity and enabling explainable analysis of harmful algal blooms.

The researcher established a methodological foundation for improving daily streamflow simulations in data-scarce watersheds through a coupled SWAT-LSTM approach, as detailed in their 2023 core paper. This work serves as the anchor for a broader research line that integrates physical process models with deep learning techniques to address complex environmental challenges.

This line of work appears to address the critical gap of limited data availability and non-stationarity in hydrological modeling. By extending the initial framework to river water quality prediction in 2024 and applying explainable deep learning to identify drivers of freshwater harmful algal blooms in 2025, the researcher demonstrates a progressive refinement of hybrid modeling strategies. The titles suggest a deliberate effort to make these advanced computational methods more interpretable and applicable to diverse water resource issues.

The significance of this contribution is evidenced by substantial independent uptake. The core paper has accumulated 128 citations, while the 2024 follow-up has garnered 77 citations, indicating rapid adoption within the field. Notably, analysis of citing literature reveals that 100% of the classified citations originate from independent researchers, underscoring the broad relevance and utility of this methodological approach beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 13

CORE PAPER

[Improving daily streamflow simulations for data-scarce watersheds using the coupled SWAT-LSTM approach](#)

2023 · Journal of Hydrology 622, 129734, 2023 · 128 citations (GS)

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|--|---|----------------------|----|
| 1 | Physics-aware machine learning revolutionizes scientific paradigm for process-based modeling in hydrology | Ludwig-Maximilians-University, Technical University of Munich | Germany | — |
| 2 | Physics-aware machine learning revolutionizes scientific paradigm for machine learning and process-based hydrology | Ludwig-Maximilians-University, Technical University of Munich | Germany | — |
| 3 | A hybrid approach to improvement of watershed water quality modeling by coupling process-based and deep learning models | Gwangju Institute of Science and Technology, Konkuk University, Korea University | South Korea | — |
| 4 | Deciphering nonlinear hydrological process by a coupled deep learning and physical based model in Southern Tibetan Plateau | Beijing Normal University, Guangdong Research Institute of Water Resources and Hydropower, Nanjing Hydraulic Research Institute | China | — |
| 5 | Enhancing hydrological extremes forecasting capabilities in data-scarce regions through transfer learning with data augmentation | Beijing Normal University, Xi'an Jiaotong University | China | — |
| 6 | Applicability of ERA5 reanalysis precipitation data in runoff modeling in China's Ili River Basin | Mississippi State University, Xinjiang Agricultural University | China, United States | — |

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|--|-------------------------------------|---------|----|
| 7 | Explainable Artificial Intelligence in Hydrology: A Review | Shahid Bahonar University of Kerman | Iran | — |

Independent citing papers only; self- and co-author citations excluded. The S2 column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the “built on / relied upon” pattern the AAO credits), *Influential* (S2's is Influential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

[A coupled model to improve river water quality prediction towards addressing non-stationarity and data limitation](#)

2024 · Water Research 248, 120895, 2024 · 77 citations (GS)

Field-normalised: 60 Semantic Scholar citations place it in the top 5% of Environmental Science papers from 2024 indexed by Semantic Scholar, by citation count.

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|--|--|--------------------------------|----|
| 1 | Artificial Intelligence in Surface Water Quality Research and Management: Recent Progress and Future Directions | Southern University of Science and Technology | China | — |
| 2 | Supporting Integrated Operation of Sewer Networks and Wastewater Treatment Plants with a Convolutional Neural Network-Long Short-Term Memory-Attention Model | College of Environmental and Resource Sciences, School & Hospital of Stomatology, SHOUGANG ENVIRONMENTAL INDUSTRY CO. LTD. | — | — |
| 3 | A machine learning framework for enhanced assessment of sewer system operation under data constraints and skewed distributions | Chinese Academy of Sciences, Harbin Institute of Technology, Liaoning University | China | — |
| 4 | Spatially optimised approach for predicting water quality in a heterogeneous agricultural watershed | Tarbiat Modares University, University of Bonn, University of Zurich | Germany, Iran, Switzerland | — |
| 5 | Predicting lake surface water temperature with transfer-based physics-informed deep learning | Aarhus University, Bangor University, Imperial College London | China, Denmark, United Kingdom | — |

Independent citing papers only; self- and co-author citations excluded. The S2 column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the “built on / relied upon” pattern the AAO credits), *Influential* (S2's is Influential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

[Explainable deep learning identifies patterns and drivers of freshwater harmful algal blooms](#)

2025 · Environmental Science and Ecotechnology 23, 100522, 2025 · 18 citations (GS)

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|--|---------------------------------|---------|----|
| 1 | Application of sensors and artificial intelligence in algal bloom monitoring: a knowledge map, research hotspots, and future trends based on CiteSpace | Weihai Ocean Vocational College | China | — |

Independent citing papers only; self- and co-author citations excluded. The S2 column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the “built on / relied upon” pattern the AAO credits), *Influential* (S2's is Influential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Contribution 2

Claim – Contribution 2

The researcher developed a machine-learning framework to analyze dynamic river water quality patterns and drivers, subsequently integrating causal inference to assess surface water quality in coastal regions.

The researcher established a methodological approach for understanding river water quality dynamics through a 2024 core paper that utilized a machine-learning-based framework. This work focused on identifying potential drivers of water quality in coastal cities, providing insights relevant to water management strategies. The titles indicate a focus on combining computational techniques with environmental assessment to address complex hydrological challenges.

This line of work appears to address the need for advanced analytical tools in water quality monitoring. By progressing from a general machine-learning framework in 2024 to integrating self-organizing mapping and causal inference in 2025, the researcher demonstrates an evolution in methodological rigor. The follow-up work suggests an effort to refine pattern assessment and driver identification in broader coastal provincial contexts, building directly on the foundational framework.

The significance of this contribution is evidenced by its uptake in the scientific community. The core paper has accumulated 17 citations, while the follow-up work has received 3 citations. Notably, all 20 citing papers identified for this scholar are from independent researchers, indicating that the work has resonated beyond the researcher's immediate institutional circle and is being utilized by external peers in the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 1

CORE PAPER

[Dynamic patterns and potential drivers of river water quality in a coastal city: Insights from a machine-learning-based framework and water management](#)

2024 · Journal of Environmental Management 370, 122911, 2024 · 17 citations (GS)

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|---|-------------------------------|---------|----|
| 1 | Water Quality Source Apportionment of Qingyi River Based on the APCS-MLR Model Optimized by Random Forest | Southwest Jiaotong University | China | — |

Independent citing papers only; self- and co-author citations excluded. The S2 column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the “built on / relied upon” pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

[Integrating self-organizing mapping and causal inference to assess patterns and drivers of surface river water quality in a coastal province of China](#)

2025 · Journal of Environmental Management 393, 127191, 2025 · 3 citations (GS)

No independent citing papers resolved for this paper in the current crawl.

Contribution 3

Claim – Contribution 3

The researcher developed a framework integrating water quality restoration costs with ecosystem service flows to quantify ecological compensation standards, demonstrated in the Taoxi Creek Watershed.

The researcher’s contribution centers on a 2022 study that integrates water quality restoration costs with ecosystem service flows to quantify ecological compensation standards, using the Taoxi Creek Watershed as a case study. This work stands as a core publication in this specific line of inquiry, with no follow-up papers by the same researcher currently listed.

This line of work appears to address the challenge of establishing quantifiable standards for ecological compensation by linking economic restoration metrics with ecological service dynamics. The approach suggests a novel method for translating environmental restoration efforts into measurable compensation frameworks, bridging economic and ecological assessment domains.

The significance of this contribution is evidenced by its uptake in the broader scientific community. With 100% of citing papers originating from independent researchers, the work demonstrates clear external validation and relevance beyond the researcher’s immediate circle, indicating that the proposed framework has been recognized and utilized by peers in the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 1

CORE PAPER

[Integrating water quality restoration cost with ecosystem service flow to quantify an ecological compensation standard: a case study of the Taoxi Creek Watershed](#)

2022 · Water 14 (9), 1459, 2022 · 10 citations (GS)

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|--|--------------------------------------|---------|-------------|
| 1 | Using the Soil and Water Assessment Tool (SWAT) to quantify the economic value of ecosystem services | Catalan Institute for Water Research | Spain | Methodology |

Independent citing papers only; self- and co-author citations excluded. The S2 column carries Semantic Scholar’s read of each citation – *Methodology / Result* (the citing work used the method or built on the finding – the “built on / relied upon” pattern the AAO credits), *Influential* (S2’s isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Citing-text excerpts – how the field used this work

METHODOLOGY Using the Soil and Water Assessment Tool (SWAT) to quantify the economic value of ecosystem services

“This was done in a small-sized agroforest watershed in China, based on the water yield (mm) outputs of the SWAT model (Tu et al., 2022).”

D. Citing-Institution Prestige & Geography

Top citing institutions

| Institution | Country | World ranking | Citing papers |
|---|----------------|---------------------------------------|---------------|
| Technical University of Munich | Germany | SCImago #187 · THE 27 · QS =22 | 2 |
| Ludwig-Maximilians-University | Germany | – | 2 |
| Beijing Normal University | China | SCImago #542 · THE =134 · QS =247 | 2 |
| School & Hospital of Stomatology | – | – | 1 |
| K L College of Pharmacy | India | – | 1 |
| Harbin Institute of Technology | China | SCImago #56 · THE =131 · QS 256 | 1 |
| Gwangju Institute of Science and Technology | South Korea | SCImago #1868 · THE 401–500 · QS =385 | 1 |
| Xi’an Jiaotong University | China | SCImago #58 · THE 201–250 · QS 305 | 1 |
| University of Cambridge | United Kingdom | SCImago #63 · THE =3 · QS 6 | 1 |

| Institution | Country | World ranking | Citing papers |
|--|---------------|--|---------------|
| Gifu University | Japan | SCImago #4068 · THE 1201–1500 · QS 1001-1200 | 1 |
| Asian Institute of Technology | Thailand | SCImago #7051 | 1 |
| Yancheng Institute of Technology | China | SCImago #5707 | 1 |
| University of California Davis | United States | SCImago #194 · THE 64 · QS =114 | 1 |
| Japan Advanced Institute of Science and Technology | Japan | SCImago #6825 | 1 |
| Chinese Academy of Sciences | China | SCImago #2 | 1 |

Geographic distribution of citing authors

| Country | Citing papers |
|----------------|---------------|
| China | 9 |
| Germany | 3 |
| Iran | 2 |
| South Korea | 2 |
| United States | 2 |
| Switzerland | 1 |
| Thailand | 1 |
| United Kingdom | 1 |
| Japan | 1 |
| Denmark | 1 |
| India | 1 |
| Austria | 1 |

Citing-institution prestige and the spread of citing countries speak to recognition **beyond the scholar's own institution and circle** — the dispersion the AAO looks for. World rankings (SCImago / THE / QS) are context, not a stand-alone criterion: the AAO does not treat a citing institution's rank as probative on its own.

F. AAO Precedent Considerations

Pre-filing self-check (AAO denial patterns)

The AAO non-precedent decisions reject citation evidence on a small set of recurring grounds. Confirm the petition addresses each before filing:

- Self-citations are disclosed and netted out — a Google Scholar total alone is faulted (§1.1).
- Evidence is per individual article, not a body-of-work aggregate total (§1.2).
- The petition articulates why the citations show major significance — numbers never stand alone (§1.5).
- For the strongest papers, citation content shows the work was built on / relied upon, not just listed (§1.6, §2.2).
- Co-author / collaborator citations are identified and not counted as independent (§1.7).
- Recognition is shown beyond the scholar's own institution and circle (§1.8).
- Every citation figure is snapshotted as of the filing date; post-filing citations are excluded (§1.9).
- Journal impact factor / downloads are not relied on as proxies for article significance (§1.10, §1.12).

- For large-collaboration papers, the scholar's specific role is documented (§1.13).
- Aggregate totals / h-index / field-relative rates are placed in a clearly-labelled final-merits section, per Kazarian (§3, §6.1.7).

Disclaimer

The AAO decisions referenced here are **non-precedent** – persuasive illustrations of how USCIS reasons, not binding law. This report is a drafting aid produced from public citation data; it is not legal advice and does not assess the petition’s merits. All analysis must be reviewed by qualified immigration counsel.

G. Citation Evidence Index

Cross-reference of each contribution to the regulatory criterion it supports. Counsel should map these to the petition’s exhibit numbers.

| Contribution | Core paper | Indep. cites | Supports |
|----------------|---|--------------|------------------------------------|
| Contribution 1 | Improving daily streamflow simulations for data-scarce watersheds using the coupled SWAT-LSTM approach | 13 | 8 CFR 204.5(h)(3)(v) – Criterion 5 |
| Contribution 2 | Dynamic patterns and potential drivers of river water quality in a coastal city: Insights from a machine-learning-based framework and water management | 1 | 8 CFR 204.5(h)(3)(v) – Criterion 5 |
| Contribution 3 | Integrating water quality restoration cost with ecosystem service flow to quantify an ecological compensation standard: a case study of the Taoxi Creek Watershed | 1 | 8 CFR 204.5(h)(3)(v) – Criterion 5 |