

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA
CURRICULUM VITAE

A. Personal Data

1. **Full Name (Surname first):** AKINDELE, Emmanuel Olusegun
(Surname) (Other Names)
2. **Date of Birth:** 22nd April, 1978
3. **Contact Details:**
 - (a) **Physical Address** House 72, Zone 4, Eleweran-Akile
Residential layout, Ede Road, Ile-Ife,
Osun State
 - (b) **E-mail addresses:** eoakindele@oauife.edu.ng;
eoakindele1@gmail.com
 - (c) **Mobile Phone Number:** 08036574615
+234 803 657 4615
4. **Nationality:** Nigerian
5. **State of Origin:** Osun
6. **Senatorial District:** Osun West
7. **Local Government Area:** Iwo
8. **Permanent Home Address:** 40A, Alaye Street, Laito Area, Iwo,
Osun State
9. **Marital Status:** Married
10. **Number of Children and their Ages:** (2) 12 and 7 years.
11. **Next of Kin:** Mrs. A. O. Akindele
12. **Contact Details of Next of Kin:**
 - (a) **Physical Address:** 1, Palm Crest Avenue, Ose Pataki,
Oke-Oniti Area, Osogbo
 - (b) **E-mail address:** jibakindele@gmail.com
 - (c) **Mobile Phone Number:** +234 806 307 5848
13. **Date of Assumption of Duty:** 1st April, 2015
14. **Rank/status of First Appointment:** Lecturer I
15. **Present Status:** Senior Lecturer
16. **Date of Last Promotion:** 01/10/2018
17. **Present Salary, Grade Level and Step:** CONUASS 5, Step 04
18. **Date of Confirmation of Appointment:** 18/09/2018
19. **Faculty/ Directorate:** Science
20. **Department/Unit:** Zoology

B. Educational Background

1. **Higher Educational Institutions Attended with Dates:**
 - (i) University of Ibadan, Ibadan, Nigeria 1997 – 2001
 - (ii) Obafemi Awolowo University, Ile-Ife, Nigeria 2004 – 2006
 - (iii) Obafemi Awolowo University, Ile-Ife, Nigeria 2008 – 2012
2. **Academic/ Professional Qualifications and Distinctions Obtained with Dates:**
 - (i) B.Sc. (Hons.) Zoology, Ibadan 2001
 - (ii) M.Sc. Zoology, Ife 2006
 - (iii) Ph.D. Zoology, Ife 2012
 - (iv) Cert. Tropical Ecology and Conservation, Trop. Biol. Association 2001
 - (v) Cert. Wildlife Conservation in West Africa, Earthwatch Institute 2003
 - (vi) Cert. Wildlife Hazard Assessment and Mitigation, USDA 2010
 - (vii) Cert. Wetland Conservation, Wageningen Univ. & Research,
the Netherlands 2018
3. **Other Distinctions and Awards with Dates:**

- (a) **Scholarship:** Tropical Biology Association scholarship to attend a field course on Tropical Ecology and Conservation at Makerere University Biological Field Station, Uganda, August 1-30, 2001.
- (b) **Fellowship:**
 - (i) Earthwatch Institute fellowship to participate in an ecological survey of GhanaHippo Sanctuary, February 2003.
 - (ii) Orange Knowledge-Netherlands Fellowship Programme for a certificate course on wetland conservation at Wageningen University and Research, the Netherlands, June 2018
 - (iii) German Academic Exchange Service (DAAD) visiting scholarship at Federal Institute of Hydrology, Koblenz, Germany, November 2018-January 2019.
- (c) **Research Grants:**
 - (i) British Ecological Society (Ecologists in Africa) Research Grants, EA20/1246 (May 2020).
- (d) **National Awards:**
 - (i) Science Communication Awards 2020 for being the Nigerian author who made the third most contributions to The Conversation Africa between 1 November 2019 and 31 October 2020.
- (e) **International Awards:** Nil

C. Work Experience with Dates:

1. **Previous Work Experience Outside the University System with Dates**

- (i) 2003-2004: Biology Teacher, Bishop Akinyele Grammar School, Oke-Are, Ibadan.
- (ii) 2006-2012: Wildlife Hazard Control Officer, Federal Airports Authority of Nigeria, Kano and Ilorin out-stations.

2. **Previous Work Experience in Other Universities**

- (i) 2012-2014: Lecturer II, Department of Biological Sciences, Bowen University, Iwo, Osun State.
- (ii) 2014-2015: Lecturer I, Department of Biological Sciences, Federal University, Ndufu-Alike, Ikwo, Ebonyi State.

3. **Work Experience in Obafemi Awolowo University:**

- (i) 1st April 2015-30th September 2018: Lecturer I, Department of Zoology, Obafemi Awolowo University, Ile-Ife.
- (ii) 1st October 2018 till date: Senior Lecturer, Department of Zoology, Obafemi Awolowo University, Ile-Ife.

4. **Courses Taught Within the Current Academic Session:**

Harmattan Semester:

- (i) ZOO 101: Introductory Zoology I (Taught in part)
- (ii) ZOO 103: Experimental Zoology I (practical) (Taught in part)
- (iii) ZOO 307: Limnology (Taught in part)
- (iv) ZOO 407: Environmental Conservation (Taught in part)
- (v) ZOO 413: Oceanography and Estuarine Biology (Taught in part)
- (vi) ZOO 611: Physical and Chemical Properties of Fresh Water (Taught in part)

Rain Semester:

- (i) ZOO 104: Experimental Zoology II (practical) (Taught in part)
- (ii) ZOO 304: Animal Ecology I (Taught in part)

- (iii) ZOO 400: Invertebrate Biology (Taught in part)
- (iv) ZOO 404: Animal Ecology II (Taught in part)
- (v) ZOO 612: Deposits and Suspended Particulate Matter in Limnology (Taught in part)
- (vi) ZOO 614: Productivity and Production in Aquatic Environment (Taught in part)
- (vii) ZOO 636: Aquatic Habitats, Insects and Pollution (Taught in part)

5. Graduate Student Supervision Within Current Session:

(a)

Reg. No.	Name	Title of Thesis	Stage
SCP16/17/H/ 1249	AYETIGBO Temitope Olumuyiwa	Comparison of ground water assessment some selected rural and urban areas of Ife- East Local Government Area	In progress

6. Current Undergraduate Supervision: 5

D. Membership of Professional Bodies

1. The Nigerian Field Society
2. Nigeria Tropical Biology Association
3. Zoological Society of Nigeria
4. International Society of Limnology
5. British Ecological Society

E. Publications

1. Thesis/Dissertation:

- (i) Somatic growth in African grasshopper, *Zonocerus variegatus*. (2001). B.Sc. Dissertation, University of Ibadan, Ibadan, Nigeria. 53 pp.
- (iii) Analysis of zooplankton fauna in relation to the hydrology and physico-chemical water quality of Opa Reservoir catchment basin in Ile-Ife, Osun State, Nigeria. (2006) M. Sc. Thesis, Obafemi Awolowo University, Ile-Ife, Nigeria. 177 pp.
- (iv) An ecological study of the water quality and zooplankton fauna of Tiga Lake, Kano, Nigeria. (2012). Ph.D. Thesis, Obafemi Awolowo University, Ile-Ife, Nigeria. 319 pp.

2. Books and Monographs (List in this order with dates, pages, reference and publisher):

- (i) **Authored:** Nil
- (ii) **Edited:** *Proceedings of the 6th Biennial Conference of the Nigerian Tropical Biology Association (NTBA)* Federal University Dutse, Jigawa State, Nigeria. **7th-11th April, 2019 (Eds. E.O. Akindele E.O. Akindele, J.B. Balogun, P.T. Apeverga and A.S. Ringim).**

3. Contribution to Books: Nil

4. Published Journal Articles (Numbered chronologically in the following format: surname, initials, Year published, Title of article, Journal, Volume, (No), First-Last page):

- (i) **Akindede, E. O.** and Adeniyi, I. F. (2013): Zooplankton composition and community structure in Lake Tiga, Kano, Nigeria. *African Journal of Aquatic Science* 38(3): 279-286. Taylor and Francis (United Kingdom).
- (ii) **Akindede, E. O.** (2013): Relationships between the physico-chemical water parameters and zooplankton fauna of Tiga Lake, Kano, Nigeria. *Bayero Journal of Pure and Applied Sciences*, 6(1): 95-100. DOI: <http://dx.doi.org/10.4314/bajopas.v6i1.20>. ISSN 2006-6996. (Nigeria)
- (iii) **Akindede, E. O.**, Adeniyi, I. F. and Indabawa, I. (2013): Spatio-temporal assessment and water quality characteristics of Lake Tiga, Kano, Nigeria. *Research Journal of Environmental and Earth Sciences*, 5(2): 67-77, 2013. ISSN: 2041-0484; e-ISSN: 2041-0492. (Iran).
- (iv) **Akindede, E. O.** and Adeniyi, I. F. (2013): A study of the physico-chemical water quality, hydrology and zooplankton fauna in Opa Reservoir catchment area, Ile-Ife, Nigeria. *African Journal of Environmental Science and Technology*, 7(5):192-203. DOI: 10.5897/AJEST2013.1444. ISSN 1996-0786. (Kenya).
- (v) **Akindede, E.O.** and Liadi A.A. (2014): Diversity and response of benthic macroinvertebrates to natural and induced environmental stresses in Aiba stream, Iwo, Southwest Nigeria. *West African Journal of Pure and Applied Ecology*, 22: 101-111. DOI: <http://www.ajol.info/index.php/wajae/article/view/108003>. ISSN 0855-4307. (Ghana).
- (vi) **Akindede, E. O.** and Adeniyi, I.F. (2014): Holomixis and stratification patterns of a Northern Nigerian Lake. *Journal of Aquatic Sciences*, 29(1): 23-29. ISSN 0189-8779. (Nigeria).
- (vii) **Akindede, E.O.**, Olutona, G.O. (2014): Water physico-chemistry and zooplankton fauna of Aiba Reservoir Headwater Streams, Iwo, Nigeria. *Journal of Ecosystem*, Volume 2014, Article ID 105405, 11 pages. <http://dx.doi.org/10.1155/2014/105405>. (India).
- (viii) **Akindede, E.O.**, Adu, B.W. and Ayandele, M.A. (2014): Hydrology and water quality characteristics of a stressed lotic freshwater system in Southwest Nigeria. *Tropical Freshwater Biology*, 23 (1): 1-19. DOI: <http://dx.doi.org/10.4314/tfb.v23i1.1>. (Nigeria).
- (ix) **Akindede, E.O.**, Olutona, G.O. (2015): Environmental variables and benthic macroinvertebrate assemblage in the headwater streams of an Afro-tropical reservoir. *Water and Environment Journal*, 29(4): 541-548. Wiley online; DOI: 10.1111/wej.12117. ISSN 1747-6585. (United Kingdom).
- (x) **Akindede, E. O.**, Adedapo, T. A., Olawoye, O. O., Olutona, G. O. and Adu, B. W. (2015): Preliminary limnological survey of Ori stream, Iwo, Osun State, Nigeria. *International Journal of Biological and Chemical Sciences* 9(1): 329-341. DOI: <http://ajol.info/index.php/ijbcs>. ISSN 1991-8631. (Cameroon).
- (xi) Adu, B. W., **Akindede, E. O.**, Obadofin, A. A. (2015): Composition and distribution of dragonflies and damselflies (Odonata: Insecta) in Iloyin Forest, Akure, Nigeria. *Ethiopian Journal of Environmental Studies*, 8(5): 517-529. DOI: <http://dx.doi.org/10.4314/ejesm.v8i5>. ISSN 1998-0507. (Ethiopia).
- (xii) **Akindede, E. O.** and Indabawa, I. I. (2015): A review of the effects of dams on the hydrology, water quality and invertebrate fauna of some Nigerian freshwaters. *The Zoologist*, 13: 28-35. ISSN 1596 972X. (Nigeria).
- (xiii) Adu, B. W., Ogbogu, S. S. and **Akindede, E. O.** (2016): Rapid survey of dragonflies (Insecta: Odonata) of Kribi Forest and Campo Ma'am National

- Park, Southern Cameroon. *Ethiopian Journal of Environmental Studies and Management* 9(3): 255-266. DOI: 10.4314/ejesm.v9i3.1. (Ethiopia).
- (xiv) Olutona, G.O., **Akindede, E. O.** and Ayanda, O. S. (2016): Sediment-associated trace and major metals in the headwaters of a tropical reservoir. *Chemistry and Ecology*, 32(7): 624-637. Taylor and Francis; DOI: <http://dx.doi.org/10.1080/02757540.2016.1171322>. ISSN 0275 7540. (United Kingdom).
- (xv) **Akindede, E. O.** and Olutona, G.O. (2017): Water quality and biodiversity of potamoplankton in an African sacred grove and world heritage site. *Zoology and Ecology*. Taylor and Francis; DOI.org/10.1080/21658005.2017.1357290. (United Kingdom).
- (xvi) **Akindede, E.O.**, Olutona, G.O., Oyeku, O.G. and Adeniyi, A.V. (2017): Assessment of two persistent bioaccumulative toxicants in the UNESCO protected river of Osun-Osogbo, Nigeria. *Ecological Processes* (2017) 6:30. Springer; DOI 10.1186/s13717-017-0097-1. (Germany)
- (xvii) Akinpelu, O.T., Adeniyi, I.F., Aduwo, A.I., Amoo, T.A., **Akindede, E.O.** (2019). Primary productivity of Ifewara Reservoir, Southwestern Nigeria. *Tropical Freshwater Biology*, 28 (2) (2019) 77- 89.
- (xviii) **Akindede, E.O.**, Ehlers, S.M., Koop, J.H.E. (2019). First empirical study of freshwater microplastics in West Africa using gastropods from Nigeria as bioindicators. *Limnologica* 78. DOI: 10.1016/j.limno.2019.125708
- (xix) **Akindede, E.O.**, Omisakin, O.D., Oni, O.A., Aliu, O.O., Omoniyi, G.E., Akinpelu, O.T. (2020). Heavy metal toxicity in the water column and benthic sediments of a degraded tropical stream. *Ecotoxicology and Environmental Safety* 190 (2020) 110153. DOI: 10.1016/j.ecoenv.2019.110153
- (xx) Aliu, O.O., **Akindede, E.O.**, Adeniyi, I.F. (2020). Biological assessment of the headwater rivers of Opa Reservoir, Ile-Ife, Nigeria, using ecological methods. *The Journal of Basic and Applied Zoology* (2020) 81:11. DOI: 10.1186/s41936-020-00151-5
- (xxi) **Akindede, E.O.**, Ehlers, S.M., Koop, J.H.E. (2020). Freshwater insects of different feeding guilds ingest microplastics in two Gulf of Guinea tributaries in Nigeria. *Environmental Science and Pollution Research*, 27:33373–33379. DOI: 10.1007/s11356-020-08763-8.
- (xxii) Aliu, O.O., **Akindede, E.O.**, Adeniyi, I.F. (2020). Potentially toxic metals record high contamination indices in three small African rivers. *International Journal of Energy and Water Resources*. DOI: 10.1007/s42108-020-00091-4
- (xxiii) **Akindede, E.O.**, Alimba, C.G. (2021). Plastic pollution threat in Africa: current status and implications for aquatic ecosystem health. *Environmental Science and Pollution Research*, 28:7636–7651. DOI: 10.1007/s11356-020-11736-6
- (xxiv) Holly, N., Naidoo, T., **Akindede, E.**, Nhiwatiwa, T., Fadare, O., Krause, S. (2021). Collaboration and infrastructure is needed to develop an African perspective on micro(nano)plastic pollution. *Environmental Research Letters*.

5. Edited and Refereed Conference Proceedings (Numbering continuous with 3(a) format; Surname, Initials, Title in: Proceedings....., Date, Venue, Publisher City, (pp):

- (i) **Akindede, E.O.** (2013): Downstream assessment of the zooplankton fauna and hydrology of Aiba stream, Iwo, Osun State, Nigeria. *Proceedings of the 4th Annual Conference of the Nigerian Tropical Biology Association (NTBA)/Developing Research among African Scientists (DRECA)*, University

of Lagos, Nigeria. 3rd-4th August, 2013. (Eds. S. O. Olajuyigbe, O. M. Coker and F. Olaleru), pp. 47-53.

- (xxii) Akindele, E.O., Adedapo, A.M., Adetayo, I.O., Amao, T.A., Akinpelu, O.T. (2019). **Biodiversity of Benthic Macroinvertebrates in the Protected Area of Osun River and Its Downstream Section, Osogbo, Nigeria.** *Proceedings of the 6th Biennial Conference of the Nigerian Tropical Biology Association (NTBA)* Federal University Dutse, Jigawa State, Nigeria. **7th-11th April, 2019.** (Eds. E.O. Akindele, J.B. Balogun, P.T. Apeverga and A.S. Ringim), pp. 249-256.

6. **Articles Accepted for Publication:** Nil

7. **Manuscript Submitted for Publication** (Format as in 4: separate numbering):

8. **Creative Work** (Arts, Exhibition, and Play production where applicable): Nil

9. **Technical Reports:** Nil

10. **Paper(s) and Work(s) in Progress:**

- (i) Community structures of benthic macroinvertebrates and conservation values of the freshwater systems in Erin-Ijesha Waterfalls, Osun State, and Ikogosi-Warm Spring, Ekiti State,

F. Professional Accomplishment:

- i. Blazed the trail on freshwater microplastics in West Africa.
- ii. First polymer identification of microplastics in any group of African invertebrates.
- iii. First record of microplastic ingestion in larval odonotans worldwide.

G. Conferences, Seminars and Workshops Attended with Dates:

- i. Training workshop on Research4Life and TEEAL Programmes for Nigeria at Bowen University, Iwo, Osun State. Sponsored by Cornell University's Albert R. Mann Library in partnership with Information Training and Outreach Centre for Africa, South Africa.
- ii. 4th Annual Conference of the Nigerian Tropical Biology Association at the University of Lagos, 3rd-4th August, 2016. Paper presentation by Akindele, E.O. titled 'Downstream assessment of zooplankton fauna and hydrology of Aiba stream, Iwo, Nigeria'.
- iii. 45th National Conference, Entomological Society of Nigeria at Obafemi Awolowo University, Ile Ife, October 2014. Paper presentation by Akindele, E.O. titled 'Ecological significance of lotic systems in the conservation of freshwater-associated insects in Nigeria'.
- iv. Seminar on 60 years of Hydrobiology/Limnology in Nigeria at Obafemi Awolowo University, Ile-Ife, December 2015. Paper presentation by Akindele, E.O. and Omoniyi, G.E. titled 'Riparian forest protection: a panacea to freshwater conservation in Nigeria'.
- v. Faculty of Science Biennial International Conference at Obafemi Awolowo University, Ile-Ife. September 2016.
- vi. Workshop on Sustainable Futures for Institutional Strengthening programme in OAU. Sponsored by the Association of Commonwealth Universities in Conjunction with the Central Office of Research, OAU. January 2018.
- vii. Symposium for European Freshwater Sciences at Zagreb, Croatia. Poster presentation by Ehlers S.M., Akindele, E.O. and Koop, J.H.E. titled 'First empirical study of freshwater microplastics in West Africa: a comparison with a European freshwater system', 30 June-5 July, 2019.
- viii. 35th Annual Meeting of the German Limnological Society. Poster presentation

by Ehlers S.M., Akindele, E.O. and Koop, J.H.E. titled 'First empirical study of freshwater microplastics in West Africa: a comparison with a European freshwater system', 23rd-27th September, 2019.

H. Current Research Activities

My current research activities focus on the conservation value assessment of freshwater ecosystems based on their invertebrate faunae and Community Conservation Index (CCI). I assess the conservation values of the systems based on factors such as naturalness of the basin, riparian corridor width/activities and hydrological modifications among others. Biototoxicity study also falls within the scope of my current research. Furthermore, I assess the biological availability of heavy metals in water columns, benthic sediments and also determine the biomagnification of such metals in dominant macroinvertebrate species, with a view to determining the health status of the systems. I am also currently involved in a collaborative and international research project (<https://glowabio.org/authors/people/>). The project is titled 'Global Freshwater Biodiversity', and is aimed at providing spatial freshwater biodiversity patterns of aquatic insect groups Ephemeroptera, Plecoptera, Trichoptera and Odonata (EPTO).

I. Current Relevant Information

1. Services Within the Department:

- (i) Secretary, Curriculum Development and Postgraduate Committee
- (ii) Member of the Field Trip, Excursion and Transport Committee
- (iii) Member, Seminar and Thesis Vetting Committee.
- (iv) Member, Internally Generated Revenue Committee

2. Services Within the Faculty:

- (i) Member, Faculty Board of Science
- (iii) Member, Faculty Postgraduate Committee
- (iii) Vetting of Postgraduate Students' Theses (Biological Sciences)

3. Services Within the University:

- (i) Staff Adviser, IGEM Campus Fellowship, Obafemi Awolowo University Chapter.

4. Services Outside the Obafemi Awolowo University:

- (i) Guest Speaker at 2016 Speech and Prize Giving Day of Roseful International High School, Osogbo, Osun State.
- (ii) Laboratory audit of EnvironQuest Nigeria Limited, Warri, Delta State, November 16-17, 2016.
- (iii) Reviewer of manuscripts for the Journal of Freshwater Ecology, Environmental Science and Pollution Research, Marine Pollution Bulletin, African Journal of Ecology and The Zoologist
- (iv) Editorial Board Member, Journal of Freshwater Ecology (Taylor and Francis Group), 2018-2023.
- (v) President, Nigeria Tropical Biology Association (2018-2020).
- (vi) House Fellowship Coordinator, Jubilee Baptist Church, Osogbo, Osun State (2018-2021).
- (vii) Project Committee member, School of Science Ile-Ife, 1995 Alumni Set (2019-2020).

J. Contributions to Knowledge

I hold the view that some freshwater systems need to be designated as freshwater protected areas (FPAs), to conserve freshwater biodiversity for future generations. To this end, my research interests include: conservation value assessment of freshwater systems; physico-chemical study of freshwater systems; invertebrate responses to environmental stressors and biotoxicity study of organic materials. My inspiration and passion for freshwater conservation emerged from my field experiences, most of which indicated that freshwater ecosystems are being severely stressed, with little or no attention from the stakeholders. With this in mind, I made copies of my published research papers available to the management (i.e. Hadejia Jama'are River Basin Development Authority) of Lake Tiga, which is one of Nigeria's deepest and most voluminous water bodies. This was to ensure that efforts were put in place to reverse impacts of desert encroachment and siltation on the lake. Prior to the study, detailed information on the limnology of the lake was very scarce and there had been no attempt to identify its zooplankton composition to specific levels. Paper E 4(i) gave the first species checklist of zooplankton composition of the lake and their community structure revealed a near-pristine condition of the lake. Papers E 4 (ii) & (iii) reported the physico-chemical water quality condition of the lake both horizontally and vertically, as well as the relationships of the water parameters on the lake's zooplankton. It was particularly stressed that the lake was gradually becoming silted up as a result of successive loading of the lake with allochthonous sediments over the years. Paper E 4 (vi) reported that the lake experiences a brief period of holomixis (overturn) between December and January and a prolonged stratification period between February and June. The implications of this on the nutrient dynamics and productivity of the lake were underscored. Papers E 4 (i, ii, iii & vi) did not only provide information on the lacustrine section of the lake but also on its riverine section (i.e. Rivers Kano and Duku).

On completion of my doctoral program, I conducted a research project on the headwater streams of a tropical reservoir (Aiba Reservoir) in Iwo, southwest Nigeria. This was against a background that negative anthropogenic impacts on lakes and reservoirs can be stemmed if adequate measures are put in place to ensure the ecological integrity of their headwaters. Prior to this study, there had been reports of rarity of cladocerans in Aiba Reservoir. The earlier finding was underscored by Paper E 4 (vii) which also reported the absence of cladocerans in the reservoir's headwater streams. Paper E 4 (ix) showed that only one of the headwater streams (i.e. Onikan Stream) could be considered to have a good health status based on macroinvertebrate composition. Bioavailability of heavy metals was also assessed in the two headwaters and reported by Paper E 4 (xiv). Concentrations of heavy metals were lower in the lower reaches of the streams, at the reservoir's inlet, which was an indication that concentrations could be higher in the reservoir where the sediments accumulate. Contamination assessment of all the metals investigated in this study showed that the metals had not reached pollution status in the two headwater streams, with the exception of Se. Paper E 4 (iv) also focused on assessing the water quality of Opa Reservoir's headwaters based on physico-chemical water parameters and zooplankton composition. One of the three headwaters (i.e. River Esinmirin) was particularly polluted based on the indices used.

The downstream section of Aiba Reservoir was also assessed for its ecological integrity in view of the fact that this section of the Aiba drainage basin was the most impacted by human activities. Paper E 4 (v) reported the occurrence of many pollution-tolerant macroinvertebrate fauna e.g. *Tubifex* sp., *Chironomus* sp. and members of the Families Stratyomidae and Syrphidae. Physico-chemical water condition of the stream also indicated a stressed lotic system and revealed that the stream fell short of the standard required for freshwater life. It

was suggested that urgent steps needed to be taken to mitigate the impacts of natural and man-induced stresses on the stream, and in order to safeguard the ecosystem and its surrounding terrestrial ecosystems, as contained in Paper E 4(ix). Paper E 4 (xviii) further established the stress condition of the stream by reporting the occurrence of zooplankton indicator species of eutrophication (*Chironomus* larva and Ceratopogonid larva).

Paper E 4 (x) gave a preliminary limnological information on the water quality, phytoplankton primary production, zooplankton secondary production and macroinvertebrate composition of Ori Stream, one of the tributaries of River Oba in Iwo, Osun State. Anthropogenic activities such as abattoir and domestic waste negatively were attributed to the poor physico-chemical and biological water quality of the stream at the upper reaches. However, it recovered from the pollution stress in the lower reaches before discharging into River Oba. Papers E 4 (xi & xiii) reported the dependence of dragonfly on freshwater systems and underscored the interconnectivity of freshwater and forest ecosystems in the conservation of aquatic insects. The physical nature of the water body and the riparian vegetation of each study site showed a direct relationship with composition and distribution of odonatan species. Paper E 4 (xii) reviewed the impacts of dams on the water quality, zooplankton and macroinvertebrate faunas of Lake Tiga and some other artificial lakes in Nigeria. The paper concluded that dams can be considered as conservation apparatus for water quality and freshwater invertebrates in spite of their short comings. It recommended that the continued significance of dams along a river course should however be periodically evaluated through environmental audits. It also recommended that dams should be decommissioned when necessary, in the overall interest of conserving freshwater biodiversity. Papers E 4 (xv-xvii) bridged the information gap on the UNESCO protected section of Osun River which hitherto had not been reported for its water quality, biodiversity of potamoplankton and macroinvertebrates as well as its ecotoxicology. Paper E 4 (xv) reported that water quality and plankton biodiversity values of the river were indicative of a healthy lotic freshwater system with high primary production. Phytoplankton biodiversity was particularly high with a very rare similar record for lotic systems in the region. Paper E 4 (xvi) gave an ecotoxicological account of the river based on its benthic sediment and the dominant gastropod species (i.e. *Melanoides tuberculata* and *Lanistes varicus*). Both metals recorded much lower values than their average concentrations in the Earth's crust as well as the recommended limits for freshwater life. Comparatively, *L. varicus* recorded higher bioaccumulation factor than *M. tuberculata*. Findings from this study suggest that both metals posed no toxicological risk to the freshwater system of Osun River. Concentrations of both metals in the sediments as well as their accumulation factors in both gastropod species were indicative of an unimpacted freshwater system. Paper E 4 (xvii) gave an account of the river's benthic macroinvertebrates, biological water quality and conservation value. Findings revealed that the stretch of the Osun River within the UNESCO World Heritage Site (WHS) was of high conservation value based on naturalness criteria, biodiversity of benthic macroinvertebrates and the river's total conservation score. Although the Osun Sacred Grove was originally designated as a WHS based on cultural property, the study further established that the grove is also distinctive based on natural property. In view of this and previous biodiversity studies on other aspects of the grove (e.g. flora and herpetofauna), it was recommended that the Osun Sacred Grove may be re-considered as a WHS based on mixed properties (i.e. cultural and natural properties). Copies of Papers E 4 (xv - xvii) have been submitted to the National Commission for Museums and Natural Monuments.

Signature.....

Date.....

STATEMENT OF CONTRIBUTIONS TO JOINT PUBLICATIONS

1. Paper 4 (i): Akindele, E. O. and Adeniyi, I. F. (2013): *African Journal of Aquatic Science*, 38(3): 279-286.

The field work, laboratory work, result interpretation and manuscript write-up were done by me as part of my Ph.D. research project under the supervision of Prof. I. F. Adeniyi.

Contribution: 70%

2. Paper 4 (ii): Akindele, E.O. (2013): *Bayero Journal of Pure and Applied Sciences*, 6(1): 95-100.

The field work, laboratory work, result interpretation and manuscript write-up were done by me as part of my Ph.D. research project.

Contribution: 100%

3. Paper 4 (iii): Akindele, E. O., Adeniyi, I. F. and Indabawa, I. (2013): *Research Journal of Environmental and Earth Sciences*, 5(2): 67-77.

Data collection, laboratory work and manuscript preparation were done by me.

Contribution: 60%

4. Paper 4 (iv): Akindele, E. O. and Adeniyi, I. F. (2013): *African Journal of Environmental Science and Technology*, 7(5):192-203.

The field work, laboratory work, data analysis and manuscript preparation were done by me.

Contribution: 70%

5. Paper 4 (v): Akindele, E.O. and Liadi, A.A. (2014): *West African Journal of Pure and Applied Ecology*, 22: 101-111.

Field work, laboratory analysis, data analysis and manuscript generation were done by me.

Contribution: 70%

6. Paper 4 (vi): Akindele, E. O. and Adeniyi, I. F. (2014): *Journal of Aquatic Sciences*, 29(1): 19-25.

Data collection, data analysis and generation of manuscript were done by me as a part publication of my Ph.D. research project.

Contribution: 70%

7. Paper 4 (vii): Akindele, E. O. and Olutona, G. O. (2014): *Journal of Ecosystem*, Volume 2014, Article ID 105405, 11 pages.

Field work, laboratory analysis and generation of manuscript were done by me.

Contribution: 65%

8. Paper 4 (viii): Akindele, E.O., Adu, B.W. and Ayandele, M.A. (2014): *Tropical Freshwater Biology*, 23 (1): 1-19.

Collection of samples, laboratory analysis and manuscript preparation were done by me.

Contribution: 60%

9. Paper 4 (ix): Akindele, E. O. and Olutona, G. O. (2015): *Water and Environment*, 29(4): 541-548.

Collection and analysis of samples, data analysis and manuscript preparation were done by me.

Contribution: 70%

10. Paper 4 (x): Akindele, E. O., Adedapo, T. A., Olawoye, O. O., Olutona, G. O. and Adu, B. W. (2015): *International Journal of Biological and Chemical Sciences* 9(1): 329-341.

Collection of samples and manuscript preparation were done by me.

Contribution: 40%

11. Paper 4 (xi): Adu, B. W., Akindele, E. O., Obadofin, A. A. (2015): *Ethiopian Journal of Environmental Studies*, 8(5): 517-529.

Literature search and part of the manuscript preparation were done by me.

Contribution: 30%

12. Paper 4 (xii): Akindele, E. O. and Indabawa, I. I. (2015): *The Zoologist*, 13: 28-35.

Literature search and manuscript preparation were done by me.

Contribution: 70%

13. Paper 4 (xiii): Adu, B. W., Ogbogu, S. S. and Akindele, E. O. (2016): *Ethiopian Journal of Environmental Studies and Management*, 9(3): 255-266.

Literature search and part of the manuscript preparation were done by me.

Contribution: 30%

14. Paper 4 (xiv): Olutona, G.O., Akindele, E. O. and Ayanda, O. S. (2016): *Chemistry and Ecology*, 32(7): 624-637.

The project design, field data collection, part of laboratory analysis and part of manuscript preparation were done by me.

Contribution: 40%

15. Paper 4 (xv): Akindele, E. O. and Olutona, G.O. (2017): *Zoology and Ecology*, 27(3-4): 292-303.

The project design, field data collection, part of laboratory analysis, data analysis and manuscript preparation were done by me.

Contribution: 70%

16. Paper 4 (xvi): Akindele, E.O., Olutona, G.O., Oyeku, O.G. and Adeniyi, A.V. (2017): *Ecological Processes* (2017) 6:30.

The project design, field data collection, data analysis and manuscript preparation were done by me.

Contribution: 50%

17. Paper 4 (xvii): Akindele, E. O., Adeniyi, A. V., Oyeku, O. G. and Adu, B. W. (2017). *African Journal of Ecology*. DOI:10.1111/aje.12482 (Wiley online).

The project design, field data collection, part of laboratory analysis, data analysis and manuscript preparation were done by me.

Contribution: 55%

18. Paper 4 (xvii): Akindele, E.O. (2013): *Proceedings of the 4th Annual Conference of the Nigerian Tropical Biology Association (NTBA)/Developing Research among African Scientists (DRECA)*, pp. 47-53.

Data collection, data analysis, result interpretation and manuscript preparation were all done by me.

Contribution: 100%

LIST OF PUBLICATIONS OF DR. E. O. AKINDELE

- (i) **Akindede, E. O.** and Adeniyi, I. F. (2013): Zooplankton composition and community structure in Lake Tiga, Kano, Nigeria. *African Journal of Aquatic Science*, 38(3): 279-286. (United Kingdom)
- (ii) **Akindede, E. O.** (2013): Relationships between the physico-chemical water parameters and zooplankton fauna of Tiga Lake, Kano, Nigeria. *Bayero Journal of Pure and Applied Sciences*, 6(1): 95-100. DOI: <http://dx.doi.org/10.4314/bajopas.v6i1.20>. ISSN 2006-6996. (Nigeria)
- (iii) **Akindede, E. O.,** Adeniyi, I. F. and Indabawa, I. (2013): Spatio-temporal assessment and water quality characteristics of Lake Tiga, Kano, Nigeria. *Research Journal of Environmental and Earth Sciences*, 5(2): 67-77, 2013. ISSN: 2041-0484; e-ISSN: 2041-0492. (Iran).
- (iv) **Akindede, E. O.** and Adeniyi, I. F. (2013): A study of the physico-chemical water quality, hydrology and zooplankton fauna in Opa Reservoir catchment area, Ile-Ife, Nigeria. *African Journal of Environmental Science and Technology*, 7(5):192-203. DOI: 10.5897/AJEST2013.1444. ISSN 1996-0786. (Kenya).
- (v) **Akindede, E.O.** and Liadi A.A. (2014): Diversity and response of benthic macroinvertebrates to natural and induced environmental stresses in Aiba stream, Iwo, Southwest Nigeria. *West African Journal of Pure and Applied Ecology*, 22: 101-111. (Ghana).
- (vi) **Akindede, E. O.** and Adeniyi, I.F. (2014): Holomixis and stratification patterns of a Northern Nigerian Lake. *Journal of Aquatic Sciences*, 29(1): 23-29. ISSN 0189-8779. (Nigeria).
- (vii) **Akindede, E.O.,** Olutona, G.O. (2014): Water Physico-chemistry and Zooplankton Fauna of Aiba Reservoir Headwater Streams, Iwo, Nigeria. *Journal of Ecosystem*, Volume 2014, Article ID 105405, 11 pages. <http://dx.doi.org/10.1155/2014/105405>. (India).
- (viii) **Akindede, E.O.,** Adu, B.W. and Ayandele, M.A. (2014): Hydrology and water quality characteristics of a stressed lotic freshwater system in Southwest Nigeria. *Tropical Freshwater Biology*, 23 (1): 1-19. DOI: <http://dx.doi.org/10.4314/tfb.v23i1.1>. (Nigeria).
- (ix) **Akindede, E.O.,** Olutona, G.O. (2015): Environmental variables and benthic macroinvertebrate assemblage in the headwater streams of an Afro-tropical reservoir. *Water and Environment*, 29(4): 541-548. Wiley online; DOI: 10.1111/wej.12117. ISSN 1747-6585. (United Kingdom).
- (x) **Akindede, E. O.,** Adedapo, T. A., Olawoye, O. O., Olutona, G. O. and Adu, B. W. (2015): Preliminary limnological survey of Ori stream, Iwo, Osun State, Nigeria. *International Journal of Biological and Chemical Sciences* 9(1): 329-341. DOI: <http://ajol.info/index.php/ijbcs>. ISSN 1991-8631. (Cameroon).

- (xi) Adu, B. W., **Akindede, E. O.**, Obadofin, A. A. (2015): Composition and distribution of dragonflies and damselflies (Odonata: Insecta) in Iloyin Forest, Akure, Nigeria. *Ethiopian Journal of Environmental Studies*, 8(5): 517-529. DOI: <http://dx.doi.org/10.4314/ejesm.v8i5>. ISSN 1998-0507. (Ethiopia).
- (xii) **Akindede, E. O.** and Indabawa, I. I. (2015): A review of the effects of dams on the hydrology, water quality and invertebrate fauna of some Nigerian freshwaters. *The Zoologist*, 13: 28-35. ISSN 1596 972X. (Nigeria).
- (xiii) Adu, B. W., Ogbogu, S. S. and Akindede, E. O. (2016): Rapid survey of Dragonflies (Insecta: Odonata) of Kribi forest and Campo Ma'am National Park, Southern Cameroon. *Ethiopian Journal of Environmental Studies and Management*, 9(3): 255-266. DOI: 10.4314/ejesm.v9i3.1. (Ethiopia).
- (xiv) Olutona, G.O., **Akindede, E. O.** and Ayanda, O. S. (2016): Sediment-associated trace and major metals in the headwaters of a tropical reservoir. *Chemistry and Ecology*, 32(7): 624-637. DOI: <http://dx.doi.org/10.1080/02757540.2016.1171322>. ISSN 0275 7540. (United Kingdom).
- (xv) **Akindede, E. O.** and Olutona, G.O. (2017): Water quality and biodiversity of potamoplankton in an African sacred grove and world heritage site. *Zoology and Ecology*, 27(3-4): 292-303. DOI.org/10.1080/21658005.2017.1357290. (United Kingdom).
- (xvi) **Akindede, E.O.**, Olutona, G.O., Oyeku, O.G. and Adeniyi, A.V. (2017): Assessment of two persistent bioaccumulative toxicants in the UNESCO protected river of Osun-Osogbo, Nigeria. *Ecological Processes* (2017) 6:30. DOI 10.1186/s13717-017-0097-1. (Germany).
- (xvii) **Akindede, E. O.**, Adeniyi, A. V., Oyeku, O. G. and Adu, B. W. (2017). Analysis of benthic macroinvertebrates, biological water quality and conservation value of a tropical river and UNESCO-Protected environment. *African Journal of Ecology*. DOI:10.1111/aje.12482 (United Kingdom).
- (xviii) **Akindede, E.O.** (2013): Downstream assessment of the zooplankton fauna and hydrology of Aiba stream, Iwo, Osun State, Nigeria. *Proceedings of the 4th Annual Conference of the Nigerian Tropical Biology Association (NTBA)/Developing Research among African Scientists (DRECA)*, University of Lagos, Nigeria. 3rd-4th August, 2013. (Eds. S. O. Olajuyigbe, O. M. Coker and F. Olaleru), pp. 47-53. (Nigeria)