Water Research AUSTRALIA

echidna

MILESTONE REPORT 4
PROJECT 1166

Developing a Global Risk-based Tool for Prioritising Contaminants of Emerging Concern (CEC) for the Water Industry: Options for secure hosting and maintenance



waterra.com.au

Developing a Global Risk-based Tool for Prioritising Contaminants of Emerging Concern (CEC) for the Water Industry: Options for secure hosting and maintenance

AUTHOR/S

Peta Neale
Griffith University

Steve Melvin
Griffith University

Fred Leusch
Griffith University

WATERRA RESEARCH MANAGER

Marty Hancock
Research Manager

DATE OF PUBLICATION

2026

FUNDING CONTRIBUTOR

Water Research AUSTRALIA

echidna

Global Water Research Coalition

About WaterRA

Water Research Australia is the leading independent, member-driven hub that turns collaboration into impact—advancing research, translating insights, and building capability across Australia's water sector. Our purpose is simple: help our members solve the sector's most pressing challenges—together. We do this in ways that are simple, effective, and deliver great value research outcomes for our members and the communities they serve. Founded in the CRC for Water Quality & Treatment in 1995, we've maintained an unbroken focus on member-based research and measurable impact, turning collective intent into shared solutions for a resilient, safe, and sustainable water future.

For more information visit www.waterra.com.au

About ECHIDNA

ECHIDNA (Emerging Contaminants for International Decision Analysis) is a science-based decision support tool developed to help the water industry assess and manage risks associated with contaminants of emerging concern (CECs). With hundreds of thousands of chemicals in use globally, many detected in water sources, ECHIDNA provides a consistent, evidence-based framework for informed decision-making. Developed through a WaterRA-supported initiative led by Griffith University, ECHIDNA is widely used across Australia and internationally, with ongoing collaboration ensuring the tool continues to evolve and support the sector in responding to emerging risks and maintaining confidence in water quality and safety.

For more information visit www.waterra.com.au/echidna

Developing a Global Risk-based Tool for Prioritising Contaminants of Emerging Concern (CEC) for the Water Industry: Options for secure hosting and maintenance

Milestone Report 4

ISBN: 978-1-921732-44-7 Project number: 1166

Citation

Water Research Australia 2026, Developing a Global Risk-based Tool for Prioritizing Contaminants of Emerging Concern (CEC) for the Water Industry: Options for secure hosting and maintenance, Water Research Australia Limited, Adelaide.

Date of publication

October 2026

Publisher

Water Research Australia Limited
250 Victoria Square, Adelaide SA 5000
ABN: 32 127 974 261
www.waterra.com.au
research@waterra.com.au

© Water Research Australia Limited 2026

This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of it may be reproduced for any purpose without written permission from the publisher. Requests and inquiries concerning reproduction rights should be directed to the publisher.

WaterRA and individual contributors are not responsible for the outcomes of any actions taken on the basis of information in this research report, nor for any errors or omissions. WaterRA and individual contributors disclaim all and any liability to any person in respect of anything, and the consequences of anything, done or omitted to be done by a person in reliance upon the whole or any part of this research report. This research report does not purport to be a comprehensive statement and analysis of its subject matter, and if further expert advice is required; the services of a competent professional should be sought.

Contents

Contents ii
Tables ii
1 Introduction 1
2 Options for secure hosting 2
3 Ongoing maintenance considerations 4
3.1. Software and coding updates 4
3.2. Content updates 4
4 Funding sources 8
5 Next Steps 9

Tables

Table 1. Hosting options for ECHIDNA. 3
Table 2. Content update schedule options. 5
Table 3. List of ECHIDNA user-raised "tickets" from 2022-2025. 6
Table 4. Funding options. 8

1 Introduction

The objective of Milestone 4 is to identify hosting options that consider aspects such as cybersecurity, open/closed access and efficiency of operation. Identification of a preferred interim and long-term hosting option is a prerequisite for Stage 2.

2
Options for secure hosting

Hosting ECHIDNA requires a webserver running up-to-date instances of MySQL and php and to deliver the ECHIDNA data as webpages. MySQL (www.mysql.com/) is an open-source relational database management system to store ECHIDNA's data, while php (www.php.net/) is an open-source server-side scripting language used to dynamically deliver the content of ECHIDNA on webpages.

Cybersecurity is enforced through secure php coding to prevent code injection attacks, as well as timely security updates to the software required to run the servers. In addition, the data in ECHIDNA itself is backed up remotely so no data would be lost in the event of a database hack.

ECHIDNA is currently hosted through a shared hosting subscription with a large service provider (Bluehost, www.bluehost.com/) with server farms across the world. This set up reduces the costs associated with hosting ECHIDNA, though it comes with less control than other options. There are several other options to host ECHIDNA, ranging from shared and cloud hosting to dedicated servers (Table 1), and each option comes with pros and cons, as well as varying maintenance and costs. All options listed below have a typical uptime (time the server is online) of 99.9% or more.



Table 1. Hosting options for ECHIDNA.

Hosting type	Description	Pros	Cons	Example	Ongoing maintenance	Typical monthly cost (in USD)*
Shared hosting	Multiple websites share the same server resources	Affordable, easy to set up, good for small sites	Limited performance and customisation, slower if other sites use heavy resources	Bluehost, HostGator, SiteGround	Low	$3-15
Cloud hosting	Site runs on a cluster of servers in the cloud	Highly scalable, reliable, pay-as-you-go pricing	Can get expensive with high traffic	AWC, Microsoft Azure, Google Cloud	Moderate	$5-100+ (usage based)
Virtual Private Server (VPS)	A physical server is divided into virtual servers, giving more control	Better performance, more customisation, scalable	Requires some technical knowledge	DigitalOcean, Linode, Vultr	Moderate	$6-40
Dedicated server (rent)	Renting an entire physical server	Full control, high performance, suitable for large sites	Expensive, requires server management skills	Liquid Web, InMotion Hosting	High	$100-300+
Dedicated server (in house)	Host on physical hardware we own and from our own network	Full control, high performance, suitable for large sites, high set up cost	Expensive, requires server management skills and ongoing IT support		High	$10 + hardware + IT manager

* Costs exclude domain registration (~USD20/y)

Our recommendation: The shared hosting model is the cheapest and lowest maintenance option, and the trade-off in performance and customisation are not an issue for ECHIDNA which runs on streamlined and lightweight php/MySQL code and currently experiences modest traffic.



3 Ongoing maintenance considerations

Regular maintenance is required to ensure that ECHIDNA remains up to date. This includes both coding updates to ensure that security software updates (particularly to php and MySQL) do not negatively affect functionality as well as content updates to ensure that the information provided to users is up to date.

3.1. Software and coding updates

To ensure the integrity and security of the server, regular updates are applied to software required to run the server and deliver the content online. This includes updates to the server software itself (operating system, web server software), as well as the database software (MySQL) and the php interpreter. When updates are forced through to patch a newly identified security issue, some functions can become either deprecated or require modifications. The frequency of these updates is unpredictable, as they are driven by security patches, and can have a significant impact on the function of ECHIDNA if its code is not updated to ensure compatibility with the updated version. The developers of ECHIDNA have been careful to avoid relying on exotic functions, instead using well-established functions. This has meant that only two relatively minor code updates have been required over the past 5 years in response to a php software version update. This requires ongoing engagement with the software developer to ensure they are able to patch any issues as they arise but has not required a significant time commitment (as noted, the two code updates over the past 5 years have required less than a day to fix).

Upgrades in ECHIDNA to develop new functionalities would also fall in this category of "coding update" and require more significant time investment depending on the complexity of the new functionality. These can be budgeted and costed as needed.

3.2. Content updates

A more significant ongoing time commitment is required to ensure that the information presented in ECHIDNA remains up to date. As of Nov 2025, there are 265,545 individual data points. Ensuring the accuracy of this data is becoming increasingly demanding. This includes ensuring any updated guideline values are included, as well as capturing any new toxicity, removal and occurrence data. This type of update could be conducted on a biannual to annual basis, or more regularly on an ongoing basis, depending on available funding. The options, and rough indicative costs, are provided in below (Table 2).

Table 2. Content update schedule options.

Content update schedule	Description	Pros	Cons	Rough estimate of cost per year (USD)
Ongoing	Content is systematically updated on an ongoing basis, by a staff employed to work on ECHIDNA (either part or full time) and review information in all sections (regulation, PBT screening, toxicity, occurrence, removal, etc) on a sequential basis, as well as horizon scanning of regulatory and review documents for new chemicals	Information in ECHIDNA is constantly updated	Most expensive	$100,000 – 200,000 (depending on part-time or full time appointment)
On a biannual basis	Content is updated every 6 month, following a defined methodology (e.g., horizon scanning of regulatory and review documents, including of new chemicals and updating of identified new information)	Keeps ECHIDNA information regularly updated and newly identified CEC are included	Systematically reviewing the full content is out of scope	$30,000 – 40,000
On an annual basis	Content is updated every year, following a defined methodology (e.g., horizon scanning of regulatory and review documents, including of new chemicals and updating of identified new information)	Keeps ECHIDNA information mostly updated and newly identified CEC are included	Systematically reviewing the full content is out of scope	$15,000 – 20,000
Ad hoc (when funding is available)	Content is updated as funding is available to support a staff, following a defined methodology (e.g., horizon scanning of regulatory and review documents, including of new chemicals and updating of identified new information)	Keeps ECHIDNA information somewhat up-to-date and newly identified CEC are included when possible	Dependent on funding calls, systematically reviewing the full content is out of scope	$10,000 – 30,000+ (depending on depth of update)
No future updating	The information in ECHIDNA is no longer updated	Minimal costs	The information in ECHIDNA becomes outdated and incorrect, and ECHIDNA loses its relevance	$100 - 200

Further, users of ECHIDNA have the option to submit user requests, such as new chemical entries or system requests. These need to be dealt with in a timely manner. To date, only a handful of user requests have been received and responded to (Table 3). With an increasing user base, it is possible that these types of requests will increase in the future, but it is not expected to be a major workload from previous experience.



Table 3. List of ECHIDNA user-raised "tickets" from 2022-2025.

Date	User query	Action
23/2/2022	Wanting to check that that HEPA 2019 PFAS National Environmental Management Plan information on limits was included. Would also be great to be able to search for all PFAS, PHOS parameters	Responded to user pointing out the PFAS category in list of compound classes.
2/3/2022	Would it be possible to add this chemcial to the database C9H6Cl6O3S 0000959-98-8 a-Endosulfan. It appear to differ from "endosulfan" and has been identified has a high risk substance in some recent work by EPA Victoria	Technical endosulfan already included in ECHIDNA. Technical, alpha and beta endosulfan have the same predicted fate and toxicity. There is a lot of experimental data for technical endosulfan, but much less for alpha and beta endosulfan. From the limited dataset, they seem reasonably similar in toxicity, with technical endosulfan and alpha endosulfan roughly equal and slightly more toxic than beta endosulfan. We are therefore keeping "technical endosulfan" in ECHIDNA.
11/10/2023	Hi, I would like to suggest: Novaluron apvma.gov.au/sites/default/files/publication/20971-prs-novaluron-15-november-final.pdf Cylindrospermopsin (I note a "cyanotoxins" entry includes a CYN GV) Deoxycylindrospermopsin Lyngbyatoxin A	These 4 chemicals added to ECHIDNA Nov 2023. Novaluron PBT group 3. Cylindrospermopsin PBT group 6. Deoxycylindrospermopsin PBT group 4. Lyngbyatoxin A PBT group 3.
13/6/2024	Procymidone - fungicide often used in viticulture with potential for endocrine disruption and acute toxicity	Procymidone added to ECHIDNA Jun 2024 (PBT group 6).
10/10/2024	Just saw a new media release from DAF regarding the suspension of this chemical by the APVMA. See link below for more info. [refers to chlorthal-dimethyl]	Listing under "APVMA" removed for chlorthal-dimethyl (but left FSANZ as it is still listed there for now). Also added the following note for this chemical: In October 2024, the APVMA immediately cancelled the registration and use of all products containing chlorthal-dimethyl. The APVMA's assessment found there was an immediate risk to human health, primarily to unborn babies via maternal exposure.
5/7/2025	https://www.bbc.com/news/articles/cm2yjxxvx08o trifluoroacetic acid as a by-product of refrigerants and pesticides. Could be classified as a PFAS compound but is not by UA EPA. There is no known GV at the moment but some evidence of health impacts.	TFA added to ECHIDNA Jul 2025 (PBT group 4).

25/8/2025	ADWG for selenium is 4 ug/L	Updated in major update from Sep 2025.
8/9/2025	WHO GDWQs (4th Ed. inc 1st & 2nd addenda) provide a guideline for trichloroethene of 0.008 mg/L https://iris.who.int/bitstream/handle/10665/352532/9789240045064-eng.pdf?sequence=1&isAllowed=y#page=548	Updated in major update from Sep 2025.
9/9/2025	Synonym: Bentazon https://pubchem.ncbi.nlm.nih.gov/compound/Bentazon	Bentazon (spelled Bentazone in ADWG) was already in ECHIDNA, as PBT Group 6.
10/9/2025	Cannot find a NZ DWS: https://www.legislation.govt.nz/regulation/public/2022/0168/latest/whole.html Unless this is being considered for Trichloroethene, which has a guideline of 0.03mg/L *although this guideline appears to be used in Trichloroethylene	Trichloroethene and trichloroethylene are the same chemical. The data in ECHIDNA at the time was for the 2018 version of the NZDWG, and has been updated in major update from Sep 2025 to latest NZDWG.
21/9/2025	Dimetylphthalate Dimethyl phthalate -currently missing 'h' from the name https://www.industrialchemicals.gov.au/sites/default/files/PEC37-Dimethyl-phthalate-DMP.pdf	Corrected Oct 2025.
23/9/2025	Synonym: PFBA Would be great to add the typical acronyms for all of the PFAS to the synonums	Added a slew of acronyms for several PFAS Oct 2025.

4 Funding sources

There are several options to fund ECHIDNA longer term, including via an annual budget provided by institutional users (e.g., water industry, research partnership) or a fee for individual users (Table 4). Each of these options are pros and cons, and the ultimate decision on future funding models needs to consider these carefully.

Table 4. Funding options.

Source of funds	Description	Pros	Cons
Research collaborative	Water RA or GWRC contribute the funds, either from operations or from member funds	Centralise, reliable source of funds	Burden of funding falls on Water RA or GWRC
Water utilities and environmental regulators	Individual water utilities and/or environmental regulators are approached to provide funding to keep ECHIDNA going	Distributed funding across the industry, resilient source of funds	Industry and/or regulators may not have available funds; withdrawal of a major partner could affect viability
Individual users of ECHIDNA	Users of ECHIDNA pay a small fee to access the database	ECHIDNA currently has 496 registered members. If each were to pay $100 per year, this would fund a biannual update. If each were to pay $200, it would fund a part-time staff for ongoing maintenance	It is unlikely that all 496 users are frequent users, and thus willing to pay for access. It is unclear how many are regular users, although traffic analysis suggests from 630-1070 site visits per month (most from the US, Japan, India, China and Australia)

5
Next Steps

ECHIDNA is providing a unique and much needed tool to manage contaminants of emerging concern in water, including understanding risk, mitigation options, and regulatory requirements. Ongoing hosting costs are minimal, but maintaining the currency of the information in ECHIDNA requires ongoing investment. Several options are described in this paper as a starting point for discussion on a future funding model with the Project Advisory Committee