



Office of the **Queensland Chief Scientist**

Progress report **2020–21**

This report highlights the progress of the
Queensland Chief Scientist and the
Office of the Queensland Chief Scientist
over the last financial year.



**Queensland
Government**

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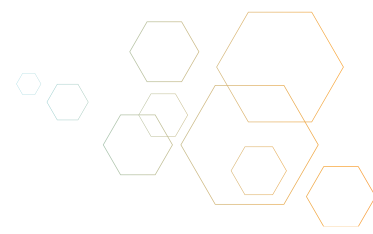
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Queensland Chief Scientist Professor Hugh Possingham

Professor Hugh Possingham has a distinguished career developing mathematical and economic tools for solving nature conservation problems.

He was Director of the Australian Research Council's Centre of Excellence for Environmental Decisions, as well as the Australian Government's Threatened Species Recovery Hub.

Professor Possingham is the former Chief Scientist at The Nature Conservancy, a global conservation organisation with 400 scientists and 4000 staff, that has protected more than 40 million hectares of land and thousands of kilometres of rivers worldwide.

His expertise in mathematics and ecology has enabled Professor Possingham to undertake initiatives that integrate ecological, social, and economic factors.

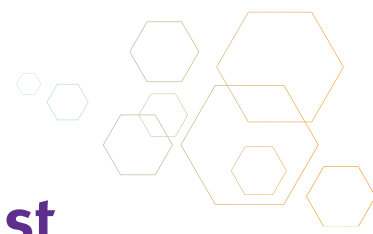
His team's Marxan software for conservation planning, is described as 'the most significant contribution to conservation biology to emerge from Australia's research community' (Eureka Prize, 2009).

He was elected a Fellow of the Australian Academy of Science in 2005 and a Foreign Associate of the US National Academy of Sciences in 2016.

Professor Possingham was appointed as the Queensland Chief Scientist in September 2020.



'Science engagement, participation and innovation are the best ways we can increase health, wealth, equity, sustainability, liveability and prosperity.'



Office of the Queensland Chief Scientist

The Office of the Queensland Chief Scientist contributes to building a state that values science and recognises the impacts it can have through:

- leading science engagement, promotion and strategy as well as provision of evidence-based scientific advice to government
- promoting Queensland's science and research capabilities
- engaging with communities, including students, to raise general scientific knowledge and awareness to enable Queenslanders make informed decisions
- engaging with the science community and industry to identify opportunities for collaboration and innovation.

The office supports the Queensland Chief Scientist to provide scientific advice to help shape government policy. He advocates collaboration between scientists, industry and government and promotes scientific literacy to nurture interest in STEM.

The Office of the Queensland Chief scientist contributes to a state that values science and recognises the impact it can have on developing solutions to societal challenges.

Engaging Queenslanders in science strategy

The Engaging Queenslanders in science strategy 2021–24, incorporates both the inaugural Engaging Queenslanders in science and Queensland citizen science strategies.

There is continuity in the goals and programs from the earlier strategy to the current refresh, including a strong focus on citizen science and an increase in STEM participation by expanding its scope from school years to tertiary education and career pathways.

The refreshed strategy builds on community engagement through strengthening the Partner Up Queensland program, now incorporating a Regional Science Network to increase participation in science and engagement with scientists, particularly outside South East Queensland.

The strategy is informed by recommendations from an evaluation undertaken as part of a review of Advance Queensland programs, and the findings of an independent survey commissioned in 2021 (Queenslanders' Perceptions and Attitudes to Science Research Report).

The independent research found the Engaging Queensland in science strategy 2016–20 programs contribute positively to increasing engagement and participation in science.

Our vision for 2021–24: *An engaged and informed Queensland that values science, critical thinking and evidence-based decision making in everyday life.*

Our goals:

1. Increase student participation in STEM subjects and promote STEM careers
2. Increase community participation in citizen science to grow scientific literacy and contribute to scientific discovery
3. Increase awareness of Queensland's great science and grow opportunities for engagement with scientists.

The latest in a series of independent surveys of 1200 Queenslanders right across the state and representing ages from 18 up found:

75% believe studying science will enable a broad range of job prospects, up from 68% in 2018

81% of parents would encourage their child to study science subjects in high school, up from 78% in 2018

72% of parents would encourage their child to consider a science-based career, up from 59% in 2018

83% believe science is critical for the Queensland economy, up from 72% in 2018

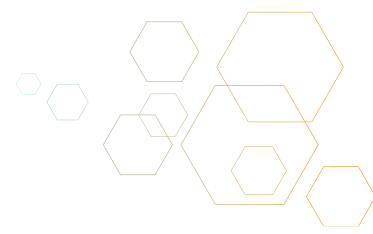
79% of Queenslanders believe scientific development has had a positive impact on society, down from 80% in 2018

44% of Queenslanders surveyed who have heard of citizen science have participated in an activity (equating to 10% of Queenslanders, up from 4% in 2018)

21% of Queenslanders could name a Queensland scientist or scientific discovery, down from 25% in 2018

60% of Queenslanders are interested in science, down from 68% in 2018

46% believe there is not enough news or information about science available in the media and online, down from 51% in 2018.



The Engaging Queenslanders in science strategy 2021–24 was socialised with Queensland’s young people through the Office for Youth Queensland e-Hub engagement portal. A total of 2257 page views were recorded, and 108 surveys submitted (the highest engagement numbers of any project posted on the portal). The survey included questions about awareness of the strategy, science in general, and science as a career pathway.

- 74 respondents described science as ‘exciting’ and ‘fun’
- 62 were ‘very interested’ in science
- 106 identified science as having a significant positive impact on society
- 26 respondents had attended a science event in the last year.

The strategy is promoted through our website, newsletter and social media channels alongside achievements of grant recipients.

In 2020–21, the number of site users for the Office of the Queensland Chief website increased by around 38% (189,915 new users). There was also a 32% increase in website sessions and a 25% increase in page views.

The *What’s happening in Queensland science* newsletter is published monthly and has 630 subscribers.

QldScience Facebook analytics 2020–21			
Total reach	Total engaged users	Total new followers	Total number of posts
359,303	11,535	1096	255



1. Queensland Citizen Science Grants

In the 2020 round, 23 recipients were each awarded a grant of up to \$30,000. More than \$630,000 in funding was committed over 3 years to increase citizen science participation.

The projects encompass a variety of topics, including native animals such as sawfish, birds and platypus, monitoring water and air quality, researching fungi, and 'BioBlitz' activities (a 24–48 hour census survey of living things at a set location).

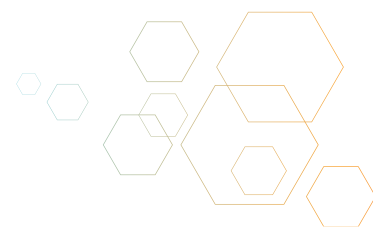
Watergum's 2020 Gold Coast Bioblitz project attracted over 350 citizen scientists conducting 47 BioBlitz surveys which identified 645 species, including four new species unknown to science, and three species known to science but never before found in the Gold Coast area.

Queenslanders are encouraged to become volunteer citizen scientists and help on these important research projects, either in person or online.

Citizen scientists gather more data than what would be possible by one scientist alone, and often covering wider geographic areas. They also gain scientific and critical thinking skills through immersion in science.



© Watergum



2. Citizen Science Month

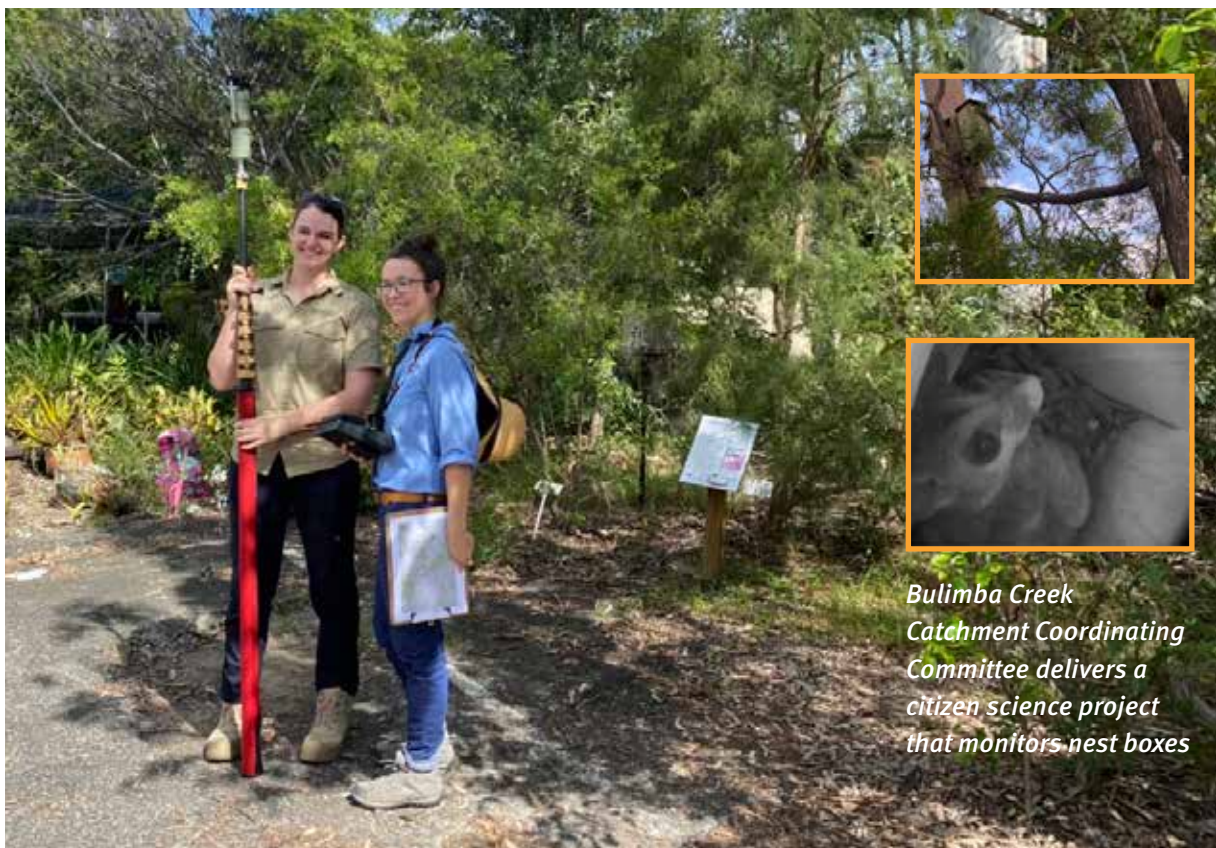
Global Citizen Science Month occurs every April. To celebrate, our office installed a new Queensland science display in the foyers of 400 George Street and 1 William Street. It housed a screen playing videos of some of the 2019 Queensland Citizen Science Grant recipients speaking about their projects. It also housed rotating cubes with different citizen science projects and calls to action.

Thirty-two citizen science posts promoted grant recipients on both the Queensland Science and Queensland Environment Facebook channels, reaching more than 251,000 people.

The Honourable Meaghan Scanlon, Minister for Science and Youth Affairs, promoted citizen science via her Instagram account following a visit to grant recipient Bulimba Creek Catchment Coordinating Committee on 29 April 2021 to see the fauna nest boxes they install and monitor in native bushland.

3. Embedding citizen science in the curriculum

Under the Queensland citizen science strategy, our office is developing a teacher toolkit to encourage citizen science in the classroom, and is working with the Queensland Curriculum and Assessment Authority to include citizen science activities in the applied syllabuses for senior students.



Bulimba Creek Catchment Coordinating Committee delivers a citizen science project that monitors nest boxes

4. Engaging Science Grants

The 2019–20 round (delivered primarily in the 2020–21 financial year) had 20 projects share almost \$200,000 to inspire, educate and engage Queenslanders with science themed events and programs.

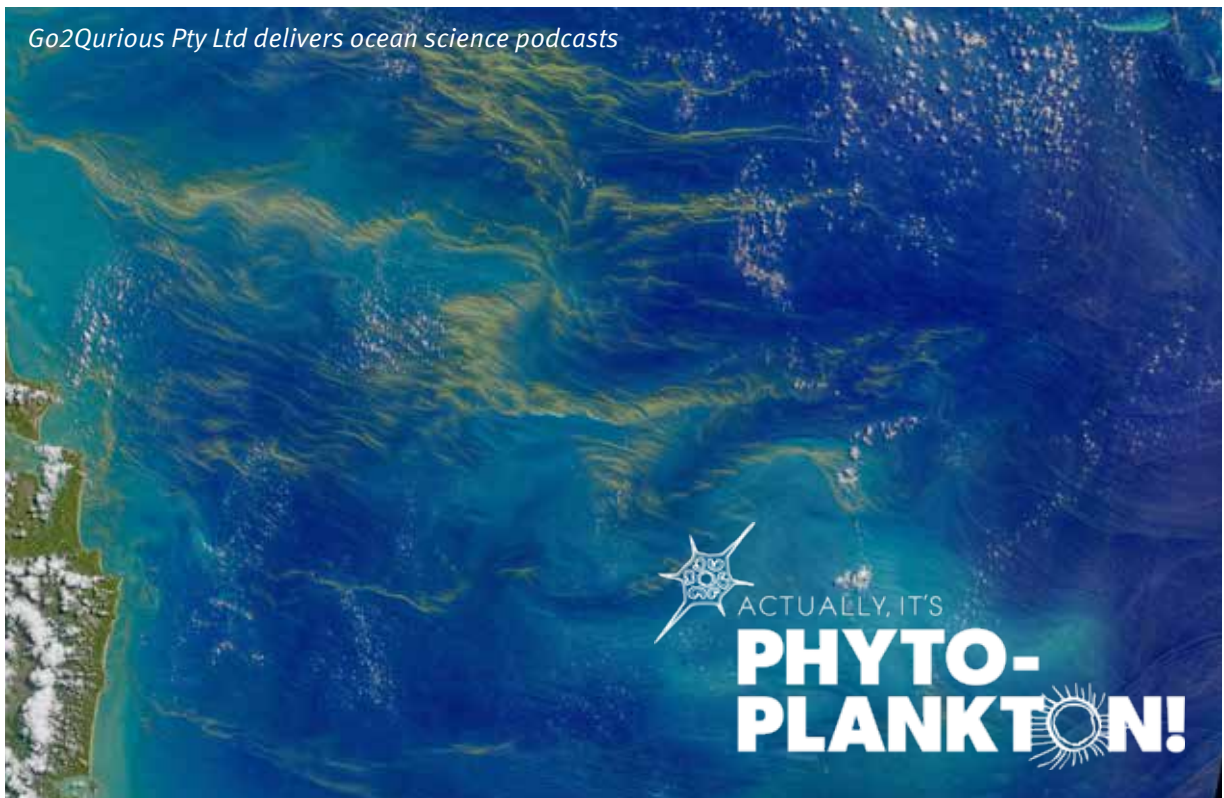
COVID-19 restrictions resulted in 16 of the 20 recipients extending their project time frames to deliver activities in the 2020/21 financial year, with 13 of those complementing their projects in this time period and the remaining seven to finish in the 2021/22 financial year.

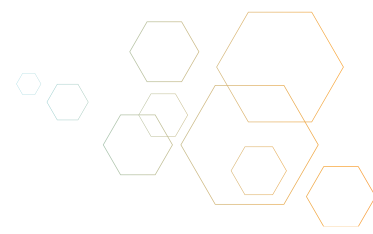
Whilst COVID-19 impacted project delivery, recipients quickly adapted from in-person gatherings to virtual events. Notable examples are ‘Actually, it’s Phytoplankton!: Ocean Ecology’, and ‘NASA’s PACE Mission’ projects.

The producers Go2Qurious pivoted to deliver a podcast series with interviews and discussions with scientists and oceanographers as well as NASA engineers. The podcasts were downloaded more than 1000 times in the first four months.

Engaging Science Grants, the STEM Roadmap by the Office of the Queensland Chief Scientist along with the Department of Education’s various editions of the STEM Strategy contributed to an overall improvement in participation in at least five STEM subjects, including Maths B, Maths C, Biology, Chemistry and Physics.

Go2Qurious Pty Ltd delivers ocean science podcasts





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5. Partner Up Queensland Regional Science and Innovation Network

Establishing a Partner Up Queensland (PUQ) Regional Science and Innovation Network will benefit communities outside South East Queensland by having a strong focus on enabling local engagement and connection between science, innovation and industry.

Each region is responsible for identifying local science and innovation stakeholders and creating an engagement network to promote collaborative efforts for science- and innovation-based activities and events. They will also promote citizen science opportunities and act as a gateway for locals seeking scientific support or advice.

This development builds on the existing Partner Up Queensland program and on the national Inspiring Australia strategy and the implementation of programs under that strategy in Queensland.

6. Queensland Chief Scientist travels to regional Queensland

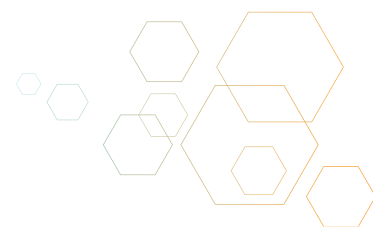
The Queensland Chief Scientist is travelling to multiple regional locations across Queensland to build relationships with stakeholders and promote the value of science.

During these visits he discusses opportunities to create deeper, more enhanced connections between citizen science projects, general community, researchers, and others, to encourage greater involvement in science related events. All regional travel consists of meetings with universities, research centres, citizen science groups, natural resource management groups, regional councils, schools, and other relevant community groups. Workshops and presentations may also be delivered depending on the region and delegation in attendance, with themes relevant to the local area.

A recent success is the involvement of James Cook University, through the Director of Research, in the development of a Partner Up Queensland event held in Townsville in May 2021.

Queensland Chief Scientist Professor Hugh Possingham hears from Professor Emma Jackson from CQUniversity about her seagrass restoration citizen science project © Queensland Government





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7. Sustainability and Science Showcase

Our office partnered with CitySmart to deliver a Sustainability and Science Showcase in June 2021. The free community event attracted over 3500 people to engage with the latest research and learn actions to promote sustainability. A panel of scientists and community sustainability experts delivered three information sessions with at least 80 people attending. The sessions were live streamed and recorded. There were 21 exhibitors displaying research, citizen science projects or sustainable practices for households. Our interactive display about the United Nations Sustainable Development Goals was popular, and 120 people pledged to take a particular constructive action to be more sustainable.

Prior to the event, the office was interviewed by the Brisbane Times, and department social media channels reached more than 63,000 people. In addition, many exhibitors, speakers, and partners promoted the event through their channels. The event coincided with the Sustainability Research and Innovation Congress 2021 (SRI2021) held between 12–15 June 2021. This inaugural global congress was brought to Brisbane by the former Queensland Chief Scientist, Professor Paul Bertsch, and (virtually) attracted people from 110 countries.

8. National Science Week

National Science Week 2020 provided unique and unforeseen challenges due to COVID-19, the greatest being uncertainty surrounding community gatherings, school visits and travel restrictions. Despite this, the office worked with partner organisations and schools to deliver a range of virtual activities, interviewing five Queensland scientists with diverse backgrounds and skills to highlight the variety of pathways from an interest in STEM subjects.

Our videos included:

- Dr Kirstin Morris, a sports scientist from the Queensland Academy of Sport
- Professor Tamara Davies AM, an astrophysicist from The University of Queensland
- Dr Matt Smith, a forensic fire investigator with The Queensland Fire and Emergency Services
- Katharine Robertson, a marine biologist from the Department of Environment and Science
- Professor Ryan Ko, a cyber security expert from The University of Queensland.

The interviewees discussed their careers and what skills, and traits scientists need. Total online views for all five videos are more than 8200.

Students at Moreton Bay College received a visit from an Engaging Science Grant recipient to explore and demonstrate how science is changing the nature of manufacturing. The recipient, Fabricated Frame, is using seaweed to create bioplastics for use in 3D printers.

A new activity book was launched during National Science Week 2020. It contained a range of experiments, colouring-in and word puzzles that were designed by Queensland's leading professionals working in STEM fields.



Mrs McCallum speaking about seaweed biofabrication to create bio-plastics, the Fourth Industrial Revolution, and the importance of transdisciplinary research

9. Flying Scientists

The office continued the partnership with Wonder of Science to deliver the Flying Scientists engagement program. As visits to regional locations were limited, the Flying Scientists created a series of videos explaining their fields of study with fun experiments to try at home. Since the program commenced in 2016, 46 scientists have met with more than 20,000 students and local community members.

Flying Scientists also held virtual events with students online in regional schools, including:

- Happy Valley State School, Happy Valley
- Emerald State School, Emerald
- Cairns School of Distance Education, Cairns
- St Brendan’s College, Yeppoon
- Spinifex State College, Mt Isa.

Flying Scientists virtual engagement 2020				
Virtual visits to schools	YouTube videos produced	Flying Scientists involved	People reached	Video views
6	6	12	3686	745

The events were promoted on Twitter, Facebook, Instagram and LinkedIn and received 7800 twitter impressions during the events. The 2021 Flying Scientists program included a visit to Emerald in March and Airlie Beach in May, with a total of 166 attendees.



10. Queensland Women in STEM Prize

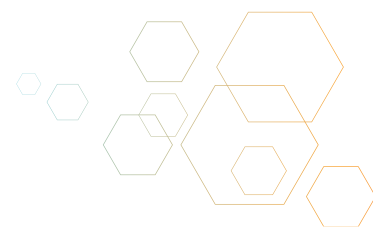
In 2020, three professional development bursaries were awarded to Queensland women working in STEM as part of the annual Queensland Women in STEM Prize. The Prize is delivered in partnership with the Queensland Museum Network, and the Office for Women. Since 2016, it has attracted hundreds of applicants and significant mainstream and social media coverage. BHP Foundation supported the prize for two years through the Aboriginal and Torres Strait Islander Jury Award.

In 2020 three winners were chosen from 48 applicants. Social media coverage on the Queensland Science Facebook channel reached almost 35,000.

The 2021 program attracted 42 applications with winners announced in July 2021.



People's Choice Award winner Denuja Karunakaran and Jury Award winner Samantha Nixon



11. Tall Poppy Science Awards

Our office delivers the annual Queensland Tall Poppy Science Awards in partnership with the Australian Institute of Policy and Science (AIPS) to promote leaders within Queensland science. The awards recognise and celebrate researchers who demonstrate scientific excellence combined with a unique passion for science communication, which can inspire young people to enter STEM study and careers.

The event was held in August 2020, with Dr Celine Frere from the University of the Sunshine Coast named the 2020 Queensland Tall Poppy Scientist of the Year. Nine other researchers were acknowledged with a Tall Poppy Science Award.

All entrants delivered a one-minute filmed pitch on the research and communication activities that led them to be short listed.

Leading up to, and after the event, the office collaborates with university communications teams to profile their winning researchers and incorporate winners in further STEM educational and promotional campaigns throughout the year (National Science Week and Flying Scientists).



The 2020 Queensland Young Tall Poppy Science Award winners who attended the event

12. Bird walks

The Queensland Chief Scientist, Professor Possingham has led seven bird walks since January 2021. He shares his love of birds and expert knowledge with communities—both keen birdwatchers as well as novices—taking them for an hour’s walk, listening for bird calls, and describing the local species and their unique behaviour.

Professor Possingham has led bird walks as part of the World Science Festival at Bulimba Creek catchment and in Townsville, as well as walks in Gladstone, Rockhampton, South Bank (Brisbane) and Emerald. By engaging with local communities, the Queensland Chief Scientist is inspiring people to participate in science and to learn about the world around us.

The bird walk on 27 March 2021 for World Science Festival Brisbane was sold out. Anecdotal evidence from Queensland Museum staff and the Bulimba Creek Catchment Coordinating Committee indicated it was one of the most successful events during the festival this year.



Deputy Vice-Chancellors of Research **roundtable**

This year the Deputy Vice-Chancellors of Research from Queensland's nine major research universities met on three occasions to hear from experts and discuss solutions for a range of issues impacting the sector, including:

- the COVID-19 pandemic, funding constraints and the limited mobility of higher degree students and international researchers
- funding opportunities to universities via the Modern Manufacturing Initiative, especially via the Manufacturing Collaboration Stream and associated roadmaps for sectors identified as National Manufacturing Priorities
- opportunities for collaboration with relevant external partners, such as the Trusted Autonomous Systems Defence CRC, the Queensland Artificial Intelligence Hub, and Fulbright Australia.

Chaired by the Queensland Chief Scientist and hosted by our office, the roundtable facilitates coordinated strategy development and collaboration, and commitment on issues important to science and innovation in Queensland.

Minister Scanlon attended the 17 March meeting and acknowledged the difficulties faced by universities due to the pandemic. She reiterated the importance of science to Queensland, the need for strong skills in science for our future workforce, and the need for greater participation in activities, subjects and careers relating to STEM.

Directors of Research **meetings**

The Directors of Research from Queensland universities meet regularly, usually a week after the Deputy Vice-Chancellors of Research roundtable. Chaired by the Director of the Office of the Queensland Chief Scientist, the meetings provide a conduit for information about Queensland and Australian government funding and program initiatives.

Strategic visualisation tool

This collaborative project mapped more than 300 research centres, institutes, facilities, research hospitals, and innovation precincts across Queensland, resulting in an interactive tool that links to the Queensland Science Capability Directory. It helps users understand how the state's research strengths and capabilities are focussed on the seven knowledge intensive industries of the future.

These are:

- advanced food and agriculture
- advanced manufacturing, advance materials and biomanufacturing
- next generation aerospace, defence and transport technologies
- biomedical, and personalised and preventive healthcare
- smart mining, exploration and extraction
- sustainable energy
- sustainable natural and managed ecosystems, and the built environment.

It also highlights how the facilities work together and identifies those that are complementary and those that are distinctive. Marketing collateral developed for the project included promotional videos (two and six minutes) and a two-page flyer developed for each sector.

This project was supported by the Department of State Development and Trade and Investment Queensland which use these tools to attract innovative businesses to the state.





Queensland's scientific collection policy

Queensland's rich biological, geographic and cultural diversity is unique and underpins potential insights to solving our biggest challenges, with more than four million scientific objects housed in nine scientific collections.

An overarching scientific collections policy, developed in collaboration with a reference group representing each collection, provides greater clarity and purpose about important emerging trends and opportunities, community awareness and perceptions, curation protocols, and the need to maximise overall impact.

Four options for strategic alignment to support future funding opportunities and sustainable operations were determined to be:

- making informed decisions based on value, cost and impact
- strategically aligning expertise, storage and methodologies
- incorporating sustainable funding models
- increasing availability, including sample digitisation and inclusion on digital platforms such as the Atlas of Living Australia.



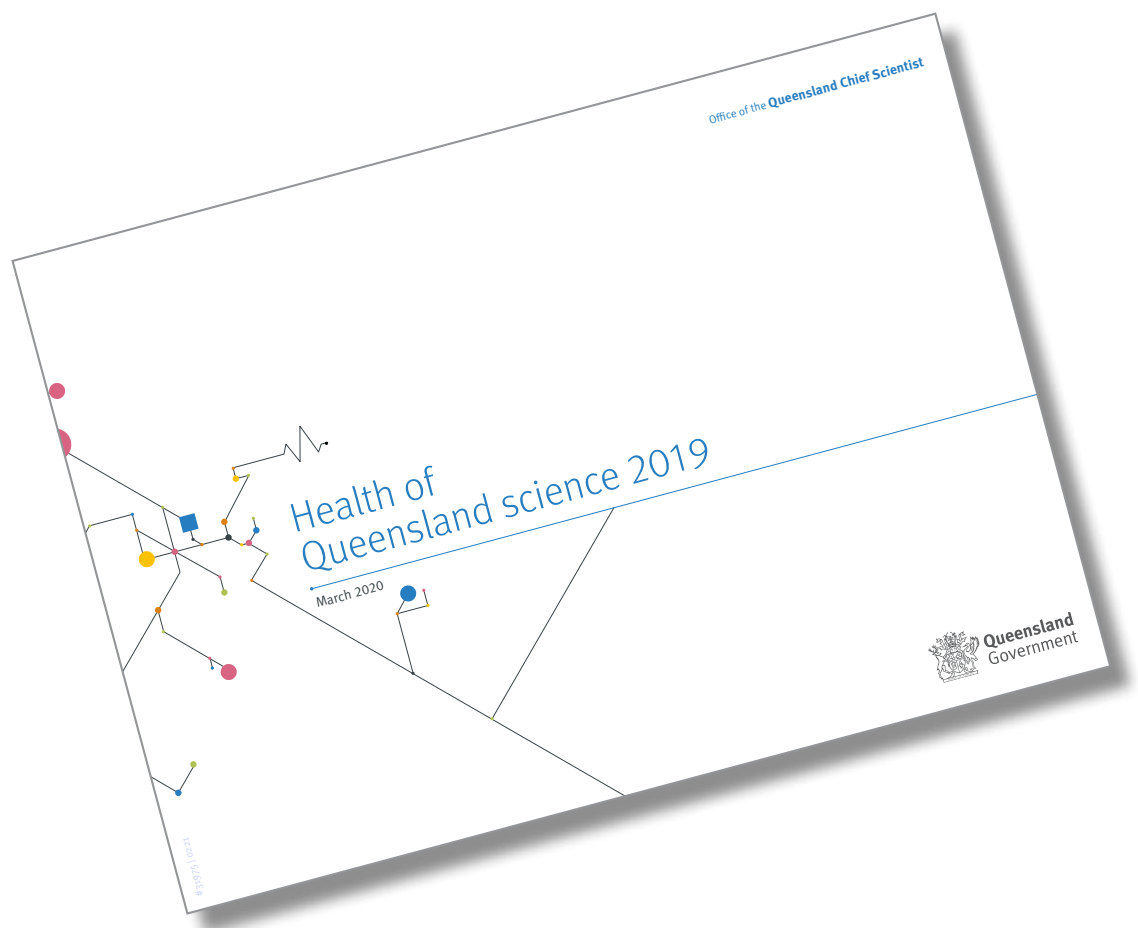
Health of Queensland science report

The Health of Queensland science 2019 is the fourth in a series compiled by our office. It highlights the importance of knowledge driven by science in the community and overall economy.

The key principles of good science—curiosity, the rigorous testing of ideas, problem-solving, the importance of verifiable evidence, reflection, partnerships, honesty and objectivity—can apply to all aspects of our lives, from the way we do business to the way we look to tackle the big issues of our times, such as global climate change, food and water security, and recapturing biodiversity and repairing ecosystems.

Key recommendations based on these findings are:

- to grow Queensland’s STEM knowledgeable community
- build a diverse and inclusive STEM student participation and workforce
- prepare STEM graduates for transition to Industry 4.0.





Research and development expenditure report

The Queensland Government research and development (R&D) expenditure report is a longitudinal measure of Queensland Government investment in R&D since 2004. Findings are published annually on the Office of the Queensland Chief Scientist website.

To be R&D, work needs to:


- produce new knowledge
- create new knowledge
- have a systematic methodology and progression (happens in stages)
- deliver an uncertain outcome
- be transferable or reproducible.

Findings from the 2019–20 report show total R&D expenditure at \$380 million, \$30 million more than the previous year. Queensland Health and the Department of Agriculture and Fisheries were the two agencies with the highest expenditure, at \$125 million and \$95 million respectively.




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