



25 January 2019

Attn Ms Kathryn Cochrane
Senior Research Officer
Senate Finance and Public Administration Legislation Committee
Department of the Senate
Parliament House, Canberra

Via email only to fpa.sen@aph.gov.au,

Dear Ms Cochrane and Senate Finance and Public Administration Legislation Committee,

Senate Finance and Public Administration Legislation Committee: Inquiry into the Future Drought Fund Bill 2018 - submission by TALS Institute in response to your invitation

Thank you for the opportunity to make a submission to the Senate Finance and Public Administration Legislation Committee regarding the Future Drought Fund Bill 2019 (**'the Bill'**).

In our submission (annexed), we introduce our organisation, The Australian Landscape Science Institute (**'TALS Institute'**) and **recommend the establishment of a Drought Resilience Council** - set up as a function of the National Drought Agreement and aligned with its objectives and outcomes. We have provided some draft Terms of Reference, activities as well as some relevant definitions for the Drought Resilience Council.

Some existing State and Territory regulations and policies are impeding the creation of efficient and effective drought resilience programs. This can be addressed by the creation of the Drought Resilience Council with scientific and other expertise and the powers to inform and direct State and Territory Policy changes.

We envisage the Drought Resilience Council performing many of the functions outlined in the National Drought Agreement.

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The Drought Resilience Council will provide advice to the Department of Prime Minister and Cabinet, the Department of Agriculture and Water Resources and the Department of Environment and its equivalent State and Territory Departments, the Joint Agency Drought Taskforce and the State and Territory State Drought Coordinators, as well as the Agriculture Senior Officials Committee ('**AGSOC**') and the Agriculture Ministers Forum ('**AGMIN**').

For example, the Drought Resilience Council will advise the Agriculture Minister on the creation of the Drought Resilience Funding Plan referred to in section 31 of the Bill. It appears essential that this task is not left to the Agriculture Minister and his Department, but is assisted by an expert Drought Resilience Council with relevant scientific and other expertise.

Thank you for considering our submission and recommendations.

Please feel free to contact us if you have any questions.

Kind regards,

Beatrice Ludwig
Director and Secretary

Signed off by Cmr John Fry

Cmr John Fry
Director

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INQUIRY INTO THE FUTURE DROUGHT FUND BILL 2018

SUBMISSION BY THE AUSTRALIAN LANDSCAPE SCIENCE INSTITUTE TO SENATE FINANCE AND PUBLIC ADMINISTRATION LEGISLATION COMMITTEE

25 January 2019

A. The Australian Landscape Science Institute (“TALS Institute”)

Declaration by TALS Institute

We believe that Australia now has an unprecedented opportunity to adopt a ‘Whole Of Landscape’ restoration and management approach.

A new beginning for the Australian Landscape.

For many millions of years, the Australian landscape developed a highly productive and fully automated ecosystem, evolving a huge diversity of plants and animals that managed the landscape from catchment to estuary, with nearly 100% efficiency, despite enduring many cycles of extreme climatic conditions.

The ancient Australian landscape contains the blueprint we need for achieving the highest productivity.

TALS Institute’s vision is: By 2030, Australia’s catchment and watershed systems can be restored using a ‘Whole of Landscape’ Restoration and Management approach, working together with community to achieve maximum productivity, biodiversity and a moderated climate.

TALS Institute has been established to support the development of the ‘Whole of Landscape’ Restoration and Management sector in Australia. Our urgent priorities are to support:

1. the establishment of a ‘Whole of Landscape’ Advisory Panel (**‘the Advisory Panel’**), consisting of
 - a. Scientific Advisory
 - b. Practical Implementation Advisory
 - c. Policy Advisory
2. the roll-out of Education Programs
3. the activation of Community Projects

Once we have reached these milestones, Australia will be well on its way from drought to productivity.

B. 'Whole of Landscape' Advisory Panel ('the Advisory Panel')

The purpose of the Advisory Panel is to support:

- maximising farm productivity
- restoring ecosystem biodiversity
- hydrating landscapes
- eliminating erosion and salinity
- stimulating rural economies
- increasing rural employment

The Advisory Panel's activities are:

1. Scientific Advisory

- a. Defining the principles and practices of the 'Whole of Landscape' Science, including The Australian Landscape Science ('TALS') - a holistic, not reductionist, scientific approach;
- b. Studying and reporting of the 'Whole of Landscape' Science, including TALS;
- c. Further investigating and reporting on the functions and unique efficiencies, evolved by the Australian landscape over millions of years; and
- d. Extending and assessing current demonstration sites by comparison to the evidence already available in the landscape.

2. Practical Implementations Advisory

- a. Creating Best Practice solutions for 'Whole of Landscape' ('WOL') Restoration and Management;
- b. Writing reports about Best Practice, and making them publicly available;
- c. Advising Government and practitioners on Best Practice of Landscape Restoration and Management; and
- d. Monitoring of quality of 'Implementations'.

3. Policy Advisory

- a. Advising Government on Best Practice for 'Whole of Landscape' Restoration and Management;
- b. Drafting submissions and policies;
- c. Informing policy and funding guidelines for Government Departments at all levels

C. New Drought Resilience Council - based on concept of 'Whole of Landscape' Advisory Panel

If we are serious about seeking to make Australia drought and climate resilient, we believe it is essential that the Department of Agriculture and Water Resources as well as the Department of Environment, and its State and Territory counterparts, Councils as well as Local Land Services, farmers and land managers and Not for Profits such as Landcare and Bush Heritage, have access to sound and effective advice by an Advisory Board of independent experts, including scientific experts, who understand how Best Practice 'Whole of Landscape' Restoration and Management can moderate existing climate extremes (droughts, floods, bushfires) and thus increase farm productivity and profitability.

In our view, none of the existing Advisory Boards to the Department of Agriculture and Water Resources (see <https://www.directory.gov.au/portfolios/agriculture-and-water-resources>) and the Department of Environment (see <https://www.directory.gov.au/portfolios/environment-and-energy>) have the scope, ability or capacity, to provide the comprehensive and holistic advice required.

Recommendation 1: New Drought Resilience Council. We recommend that the WOL Advisory Panel (as described above) become an independent Advisory Board by the name of the 'Drought Resilience Council' ('DRC'), to the Department of Prime Minister and Cabinet, the Department of Agriculture and Water Resources and the Department of Environment and its equivalent State and Territory Departments, the Joint Agency Drought Taskforce and the State and Territory State Drought Coordinators, as well as the Agriculture Senior Officials Committee ('**AGSOC**') and the Agriculture Ministers Forum ('**AGMIN**').

Recommendation 2: Created by Act of Parliament. We propose that the Drought Resilience Council be created by a separate Act of Parliament as a matter of urgency prior to 1 July 2020, based on the draft sections outlined at D., below. (We are prepared to consider and provide further input as required by the Committee.)

Recommendation 3: Drought Resilience Council as part of the Future Drought Fund Act.

In addition to Recommendation 2 (if no separate Act of Parliament is made), we propose that the Drought Resilience Council is created as part of the Future Drought Fund Act. We propose the following amendments, or amendments with a similar effect, to the Bill.

D. Proposed amendments to the Bill

Part 1 - Preliminary

Section 4 - Simplified outline of this Act

In the first bullet point, add the following underlined words:

... This Act establishes the Future Drought Fund and the Drought Resilience Council ("the Council"), which will enhance the Commonwealth's ability to: ...

The Drought Resilience Council, is set up as a function of the National Drought Agreement and is aligned with its objectives and outcomes.

Section 5 - Definitions

Add words to the effect of the underlined words:

Ambassadors means people and organisations that promote the 'Whole of Landscape' Approach.

Associates means people and organisations that have already embraced the 'Whole of Landscape' Approach and will work collaboratively with TALS Institute and the Drought Resilience Council in restoring the Australian landscape by 2030.

Biodiversity means *"the variety of all living things; the different plants, animals and micro-organisms, the genetic information they contain and the ecosystems they form. Biodiversity is usually explored at three levels - genetic diversity, species diversity and ecosystem diversity. These three levels work together to create the complexity of life on Earth".* (see Australian Museum website - What is Biodiversity at <https://australianmuseum.net.au/what-is-biodiversity>)

Biodiversity Conservation Act NSW means the Biodiversity Conservation Act 2016 (NSW).

Contour Bank or **Contour** means a swale along contour of a landscape.

Council means the Drought Resilience Council created by the Act.

Ecological Succession means *"the process of change in the species structure of an ecological community over time. ... It is a phenomenon or process by which an ecological community undergoes more or less orderly and predictable changes following a disturbance or the initial colonisation of a new habitat".* (see Wikipedia at https://en.wikipedia.org/wiki/Ecological_succession)

EPBC Act means the Environment Protection and Biodiversity Conservation Act 1999 (Cth).

Evapotranspiration (or **EP**) means *"the sum of evaporation and plant transpiration from the Earth's land and ocean surface to the atmosphere. Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and waterbodies. Transpiration accounts for the movement of water within a plant and the subsequent loss of water as vapor through stomata in its leaves. Evapotranspiration is an important part of the water cycle. An element (such as a tree) that contributes to evapotranspiration can be called an evapotranspirator"*. (see Wikipedia at <https://en.wikipedia.org/wiki/Evapotranspiration>)

First Succession Plant means a plant Pioneer Species.

Implementations means Natural Infrastructure implementations such as Leaky Weirs and Contour Banks.

Leaky Weirs means a Natural Infrastructure Implementation, made from various materials such as rocks, logs, hardy plants and trees, that has the purpose of slowing the flow in streams and gullies and have sediment build up resulting. This results in the establishment of wetlands that increase biodiversity and filter (ie clean) the water. Eroded gullies fill up with earth and plants, and the water course is reconnected to the floodplains. (see also "Leaky Weirs hydrate a thirsty landscape, ABC, 6 July 2009: <http://education.abc.net.au/home#!/media/1249433/leaky-weirs-hydrate-a-thirsty-landscape>)

Natural Infrastructure means "strategically planned and managed network of **natural** lands, such as forests and wetlands, working landscapes, and other open spaces that conserves or enhances ecosystem values and functions and provides associated benefits to human populations" (see http://www.iwa-network.org/wp-content/uploads/2016/06/Natural-Infrastructure-in-the-Nexus_Final-Dialogue-Synthesis-Paper-2015.pdf)

Photosynthesis means *"a process used by plants and other organisms to convert light energy into chemical energy that can later be released to fuel the organisms' activities. This chemical energy is stored in carbohydrate molecules, such as sugars, which are synthesised from carbon dioxide and water... In most cases, oxygen is also released as a waste product"*. (see Wikipedia at <https://en.wikipedia.org/wiki/Photosynthesis>)

Pioneer Species means a *"hardy species which are the first to colonise previously biodiverse steady-state ecosystems. Some lichens grow on rocks without soil, so may be among the first of life forms, and break down the rocks into soil for plants. Since some uncolonised land may have thin, poor quality soils with few nutrients, pioneer species are often hardy plants with adaptations such as long roots, root nodes containing*

nitrogen-fixing bacteria, and leaves that employ transpiration". (see Wikipedia at https://en.wikipedia.org/wiki/Pioneer_species)

Plant means any plant.

Plant Functions means the functions of a specific plant, such as undertaking photosynthesis, capturing carbon, producing oxygen, fixing nitrogen, storing of water, pumping water, cooling the environment, evapotranspiration, creation of dew, contributing to small and large water cycle, loosening soil, capturing water run-off, being a pioneer species, fast-growing, providing free mulch, tolerating salt, tolerating nitrogen run-off, tolerating high pollution, fast repair of eroded creeks, bioremediation, providing habitat, medicinal, protecting soil, fire-retardant etc.

Stakeholders means all groups that have an interest in restoring Australia's landscape based on a 'Whole of Landscape' Restoration and Management Approach. Stakeholders include Universities, schools, NGOs, Government Departments, Local Councils, banks, insurances and other businesses, farmers and city folk who are concerned about water security and climate stability.

Stepped Diffusion Broadacre Hydroponics means the processes of landscape water management in the floodplain whereby water moves down from the higher country through a series of floodplain steps, diffusing through each floodplain and filling the ground with nutrient laden water which becomes available for plants to flourish (see Haikai Tane).

Succession means Ecological Succession.

TALS means The Australian Landscape Science.

TALS Institute means The Australian Landscape Science Institute Ltd ABN 73 629 817 241, a not for profit company limited by guarantee governed by the Corporation Act (Cth), set up to support 'Whole of Landscape' restoration and management.

TALS Principles means the basic principles of physics (regarding photosynthesis, hydrology, climate, water, gravity etc) as well as the principles that can be observed specifically in the old Australian landscape (prior to human interference).

The Australian Landscape Science or TALS means the science established based on 'Whole of Landscape' observations of The Australian Landscape and descriptions by Peter Andrews OAM, as well as scientific research by Prof Wilhelm Ripl, Prof Haikai Tane, Dr Ian Pakorný, Dr Michal Kravčík and many more, supporting these observations.

'Whole of Landscape' Approach or 'Whole of Landscape' Restoration and Management Approach or WOL Approach means an approach to restoring and managing Australia's landscapes based on observations by Peter Andrews OAM of the basic principles and functions of the Australian landscape, and practices developed by

Peter Andrews, over the past 40 years, including those at his living laboratories such as Tarwyn Park in the Bylong Valley, The Mulloon Institute at Bungendore NSW and other demonstration sites. The 'Whole of Landscape' Approach is based on holistic, not reductionist, thinking and science.

WOL means 'Whole of Landscape'.

Add words to the effect of the underlined words:

Part 1A - Drought Resilience Council

19A - Establishment of Drought Resilience Council

The Drought Resilience Council is established upon commencement of the Act.

19B - Purpose of the Drought Resilience Council

The Drought Resilience Council performs many of the functions outlined in the National Drought Agreement.

The purpose of the Drought Resilience Council ('the Council') is to define The Australian Landscape Science (TALS) Best Practice and to advise Government on its implementation, to support:

- a. maximising farm productivity
- b. restoring ecosystem biodiversity
- c. rehydrating landscapes
- d. managing erosion and salinity
- e. stimulating rural economies
- f. increasing rural employment

19C - Activities of the Drought Resilience Council

The Drought Resilient Council's activities are:

- a. Scientific advisory:
 - i. Reporting the principles and practices of the 'Whole of Landscape' Science, including The Australian Landscape Science ('TALS') - a holistic, not reductionist, scientific approach;
 - ii. Reporting of the 'Whole of Landscape' Science, including TALS;
 - iii. Further investigating and reporting on the functions and unique efficiencies, evolved by the Australian landscape over millions of years; and
 - iv. Extending and assessing current demonstration sites by comparison to the evidence already available in the landscape, ie assessing current examples that conform to ancient efficiencies;

- v. Considering the best results on current circumstances, as change evolves;
- b. Practical Implementations advisory:
 - i. Creating Best Practice solutions for 'Whole of Landscape' ('WOL') Restoration and Management;
 - ii. Writing reports about Best Practice solutions for WOL Restoration and Management, and making them publicly available;
 - iii. Advising Government and practitioners on Best Practice of Landscape Restoration and Management; and
 - iv. Monitoring of quality of 'Implementations' ('Whole of Landscape' Natural Infrastructure Implementers will be asked to report to the the Council so that Council can assess new installations and advise of Best Practice in the location.)
- c. Policy Advisory
- d. The Drought Resilience Advisory Council has the power to inform and direct State and Territory Policy changes. Its activities include:
 - i. Advising Government Departments at all levels, including the Department of Prime Minister and Cabinet, the Department of Agriculture and Water Resources and the Department of Environment and its equivalent State and Territory Departments, the Joint Agency Drought Taskforce and the State and Territory State Drought Coordinators, as well as the Agriculture Senior Officials Committee ('AGSOC') and the Agriculture Ministers Forum ('AGMIN');
 - ii. Advising Government on Best Practice for 'Whole of Landscape' Restoration and Management;
 - iii. Informing and/or drafting policy and funding guidelines for Government Departments at all levels;
 - iv. **Advising the Department of Agriculture and Water Resources and its Minister on the drafting of the Drought Resilience Funding Plan under the Act;**
 - v. Advising Government Departments at all levels on how to best amend Statutes and Statutory Instruments, including outdated Regulations and Policies that are no longer in line with current science and international obligations, and to allow for efficient and effective installation of Natural Infrastructure, such as:
 - 1. Review of provisions and definitions of "irrigation" versus "environmental flow" in the State and Territory Water Acts and Regulations - in light of Australia's obligations under the Biodiversity Convention and the Climate Change Convention;
 - 2. Review of the State and Territory Biosecurity Acts and Biosecurity Regulations in light of plants' functions and benefits in bioremediation and increase in biodiversity and fertility - in light of

Australia's obligations under the Biodiversity Convention and the
Climate Change Convention.

19D - Membership of Drought Resilience Council

- a. The Drought Resilience Council has a minimum of 3 and a maximum of 9 members with a scientific background and/or practical on-the-ground and/or relevant law and policy understanding of Infrastructure Implementation Experience and a thorough understanding of The Australian Landscape Science.
- b. There must be at least one member each with:
 - i. a scientific background and a thorough understanding of The Australian Landscape Science;
 - ii. practical on-the-ground Natural Infrastructure Implementation Experience and a thorough understanding of The Australian Landscape Science;
 - iii. understanding of current laws, regulations and policies impacting on effective and efficient implementation of Natural infrastructure.
- c. Anyone can nominate a member for the Drought Resilience Council by written communication to the Secretary of TALS Institute. An person can nominate himself or herself to be a member on the Drought Resilience Council.
- d. **Appointment and fees:** Members are appointed by TALS Institute ('the Appointor') on a part time contractual basis, and they are paid a contractor fee out of the Drought Future Fund for work completed as described in more detailed separate contractor agreements.
- e. **Duration of appointment:** Appointment is for the period of 1 year ending on 30 June, or the part of 1 year if appointed during the financial year. A member can be re-appointed for the period of another year.
- f. **Criteria for appointment:** When appointing a member to the Drought Resilience Council, the Appointor must take into account the following criteria (not all of which must be met):
 - i. Scientific qualifications and experience to date;
 - ii. On-the-ground Natural Infrastructure implementation experience;
 - iii. In-the-field experience (observing, measuring of landscape data, such as temperatures, moisture and biodiversity);
 - iv. Understanding of current laws, regulations and policies impacting on effective and efficient implementation of Natural infrastructure;
 - v. Solid understanding of basic concepts and principles of The Australian Landscape Science, such as:
 - 1. How Australia's landscape functions in general;
 - 2. How Australia's waterways are relevant for proper functioning of floodplains;
 - 3. How floodplains function;
 - 4. How plants and water can be used to make landscapes drought-resilience;

5. Creek and river restoration: How Natural Infrastructure, such as Leaky Weirs, Contour Banks and plants work;
 6. Natural flow of water ways;
 7. Photosynthesis;
 8. Stepped Diffusion Broadacre Hydroponics;
 9. The various of functions of plants, such as natural air-conditioning, natural pump, water storage, nutrient pump, mulch provider, stabiliser of river banks and land in general, carbon capture, oxygen producer;
 10. How water tables can be used to our advantage if properly managed;
 11. How salinity occurs in the landscape;
 12. How a salinity outbreak can be avoided, without lowering the water table;
 13. Basic weather science: cloud formation, dew as atmospheric moisture;
 14. Small water cycle;
 15. Large water cycle, including the Biotic Pump Theory
 16. The benefits of evapotranspiration;
 17. How erosion works, inc erosion of landscapes to the sea;
 18. Hydrology as the environmental production line;
 19. Biodiversity and its connection to health;
 20. Biodiversity on the ground and in the soil;
 21. Effective bushfire mitigation without back-burning;
 22. Cooling effect of different plant species;
 23. Hydration of landscapes.
- vi. **Conflict of interest:** A member of the Drought Resilience Council must disclose any vested interest in the result or any other real or perceived conflict of interest to the Secretary of TALS Institute and the Department of Agriculture and Water Resources, and the Department of Agriculture and Water Resources is to enter such a disclosure of interest in the 'Disclosure of Interest' Register.

19E - Meetings of Drought Resilience Council

- a. The Drought Resilience Council will meet once per month face to face or online, with additional face to face or online meetings as required.
- b. Chair: The members of the Drought Resilience Council appoint a Chair at their first meeting.

19F - Secretariat support to Drought Resilience Council

- a. Secretariat support is provided by TALS Institute, with funding from the Drought Future Fund.