River DETECTIVES

Teacher training 2022

Introduction to Salinity

- self-guided PD through this ppt base.

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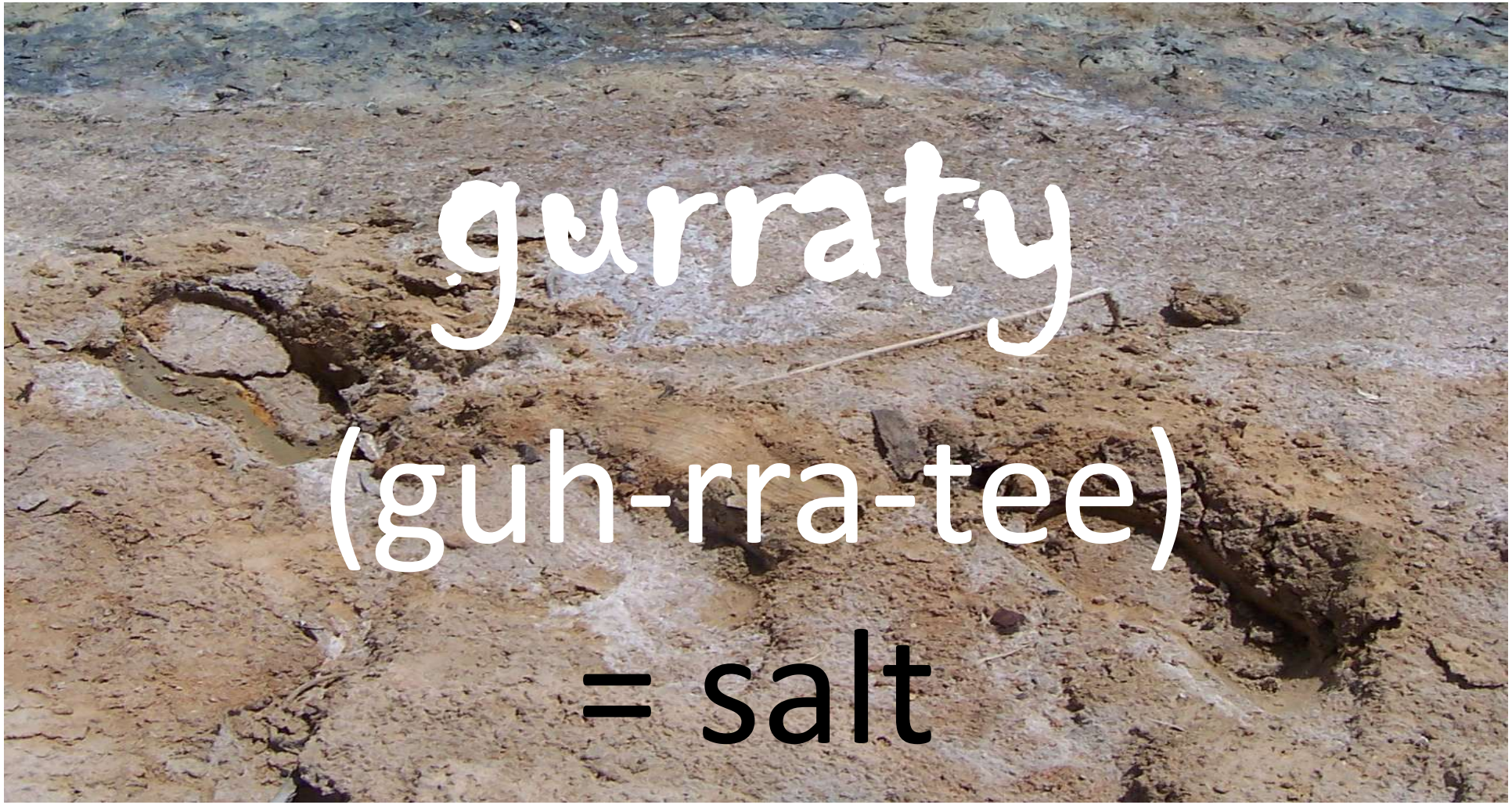
WATERWATCH Victoria
Communities Caring for Catchments

River DETECTIVES Community Partnership Program

Wimmera CMA

Wergaia language link



With thanks to the WCMA's Cobba Harrison, for sharing his knowledge of this word.

Overview of this salinity PD

This PD aims to provide RD teachers with an introductory or refresher knowledge about what salinity is and why it is so important that we focus on monitoring it in water.

Aims of this salinity PD

To aid RD teachers to:

- Experience an activity that demonstrates how much salt- *gurraty* is in different levels of salinity in water and cannot be seen, and remains after evaporation
- Practise the testing of salty water with their scans
- Become aware of the levels of salinity that can not be tolerated by different living things
- Use this to help students understand why salinity is the key test we do of water and especially test in May, (before winter rains typically lower the levels).
- Know the origin of salinity issues
- Become more aware of some of the resources on RDs Resource Bank webpage and how to access and use them.
- Be inspired to explore salt- *gurraty*, salinity and levels in the Wimmera more.

Contents of this salinity PD

This introduction to salinity ppt PD contains:

- Salinity background
  - Vocabulary
  - 2008 (Millennium Drought) Saltwatch map of water salinities in Victoria
- Activity to demonstrate the difference in water salinity levels:
  - Materials
  - Method
  - Results
- Salinity in the Wimmera's streams
- Activity to demonstrate salinity as a solid from water
  - Materials, method and results
  - Application of this demo to salt in soil
- Evaluation and feedback

Salinity background -literacy

For tens of thousands of years, salt was known as

'gurraty' (pronounced guh-rra-tee)

in Wergaia,

the language of the First Nations of the Wimmera.

Check you know the meaning of these English words:

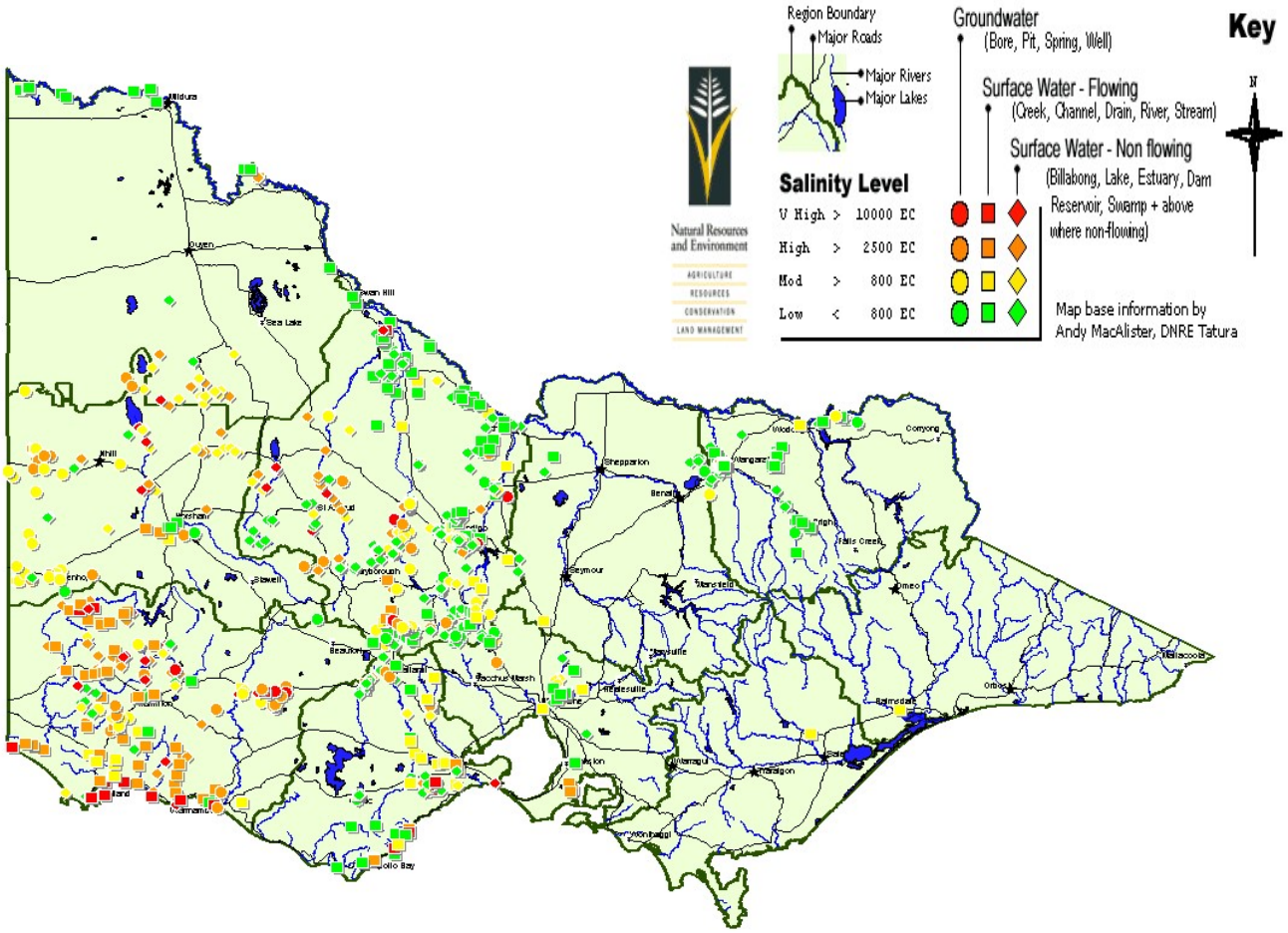
- salt
- salty
- saline
- salinity

Salinity background -2008

Saltwatch results 2008 (Millenium Drought)

In the western half of Victoria in 2008 (see map), what do you notice about the dots' colours?

Using the key for colours, what did this mean about stream salinities?



Salinity levels demo equip

This demonstration shows the amount of salt in water for different levels of salinity.

Collect:

2 plastic cups,
some salt – *gurraty* (as grains or table salt crystals),
some distilled water,
a salinity scan,
calibration solution at 1413 EC's,
a dry towel,
a cup measuring cup,
a plastic spoon for mixing,
something to record readings,
a salinity tolerance table*
and if you want a spoon for sample tasting if you want with each addition of salt – *gurraty* – do not drink, nor return it to the cup.

Note that the contents of these cup will be used for the second demonstration so do not throw out at the end.

* For example, « Salinity Scale » from the River Detectives , Resource River Bank at https://www.riverdetectives.net.au/wp-content/uploads/2020/04/Salinity-Scale.pdf

Salinity levels demo method

This demonstration shows the amount of salt in water for different levels of salinity.

Method:

1. Check the calibration of your salinity scan at 1413 EC's.
2. Put a cup of distilled water in each of the cups. Check the salinity is 0. Set up a table to record amount of salt - *gurraty* put in, salinity reading, and intolerances at this level.
3. Set one cup aside as 'rinsing water for the scan' . Put 1 grain/crystal of salt- *gurraty* in the other and stir to dissolve. Read the salinity with a scan. Record this and the amount of salt- *gurraty* put in. Rinse and dry your scan.
4. Add 2 more grains/crystals of salt- *gurraty* to the test water cup. Repeat step 3, noting that the amount of salt- *gurraty* put in this is cumulative, ie 3 grains/crystals at this stage.
5. Continue increasing the amount of salt put in and trying to create some of these levels: 300 EC's (rainwater) ; 800 EC's (no good for violets, our tongues can detect salt), 1200 EC's (no good for roses), 1600 EC's (WHO human drinking water limit); 2500 EC's (no good for fruit trees); 3000 EC's (no good for laying hens); 6500 EC's (saline water, no good for pigs); 8000 EC's (no good for horses); 16,000 EC's (too salty for frogs); 19,999 EC's (scan limit, almost too salty for sheep on dry feed).

Note that the contents of these cup will be used for the second demonstration so do not throw out at the end.

Salinity levels demo results

Observations that we hope you made:

- Different salinity levels can NOT be seen in water.
- Different living things have different levels of intolerances to salinity.
- Modifications could be made of this demonstration for use in a classroom to help students new to River Detectives understand the nature of salt- *gurraty* and why it is so important to know the salinity levels of water being used.

There is a class lesson plan based on this in the "Fresh and Salty Booklet" (Experiment One) at http://www.vic.waterwatch.org.au/resources/Fresh_and_Salty_teacher_resource_2015.pdf from the River Detectives website Resource River Bank - choose 'topics', then 'salinity'.

- I have provided you with a "Taste of Salt" poster (photo right), which has the four basic salinity classes and their implications on the panel on the left.
- The features on it show what sort of land use may contribute to worsening the salinity levels. Please explore it. It can be used as the basis for class activities like the one shown right.

Salinity in streams

Salinity is an issue for our Wimmera water places as water flows downstream taking the invisible salt with it and with more being added to it.

The **'Fresh and Salty Video'** depicts this. It can be found at https://www.youtube.com/embed/XdhbTEtneIw or on the Resource River Bank s section of the River Detectives website, under the topic 'salinity'. There is a resource booklet to go with it.

The last part of the Wimmera River flows through Jeparit. There are photos with a history of the very salty levels that the River here reached in the Millennium Drought in Part 3 of the following resource found in the Salinity topic of the Resource River Bank.

Geographic Concepts for a Floodplain and Catchment powerpoint slides

Want to know what some basic floodplain Geographic terms and concepts mean? Jeanie Clark from the Wimmera CMA put together the following three presentations to introduce the basic Geographic terms in a riverine landscape to teachers with little geographic training. Click on the links below to access each one. The slides could also be used with upper primary/secondary students. The Jeparit Showgrounds, Jeparit Primary School's Waterwatch/ River Detectives site, was used as a local example to describe:

- geographic features – of the site, the floodplain in which it sits and the catchment that it belongs to. Names and explains some river processes that create them.
- geographic terms – the nine basic concepts in Geography: location; distance; scale; region; distribution; movement; spatial association; spatial interaction; and spatial change over time.
- geographic changes over time – Follow the changes from 1996-2015 to see what happens to salinity, river height, erosion and vegetation changes through the Millenium Drought, return of flow, major flood and sustained levels at the site.

Jeanie is an ex-VCE Geography teacher and can be contacted through the Wimmera CMA for advice/support (time permitting).

Catchments, Fact sheet, Flora (plants), Guide/Activity booklet, Lower Secondary, Salinity, Teacher, Upper Primary, Upper Secondary, Water cycles, Waterways,
Wimmera CMA,

Salinity as a solid demo

Salinity is not just an issue for our water places. Water places sit on soil. Soils can suffer from salinity too.

This demonstration shows that salinity can be in a solid or liquid form thanks to evaporation.

Collect:
The two plastic cups from the first demonstration.

Method:
1 choose an undisturbed warm and if possible sunny position where the cups can be left for a couple of weeks.
2 Mark the level of the water on the outside of the cups, and then leave them
3 Allow the water to evaporate till only any salt- *gurraty* remains. (This will take a couple of weeks.) You may notice some salt- *gurraty* crystals start to develop on the sides of the cup as this takes place.

Observations that we hope you make:

- Salt- *gurraty* may not be visible until it is in solid form after the water has been fully evaporated from it. This is how salt- *gurraty* gets to be in soil from salty water.
- Modifications could be made of this demonstration for use in a classroom to help students new to River Detectives understand the nature of salt- *gurraty* and why it is so important to know the salinity levels of water being used.

Salinity in soil

Salinity is not just an issue for our water places. Water places sit on soil. Soils can suffer from salinity too, thanks to evaporation of salty water.

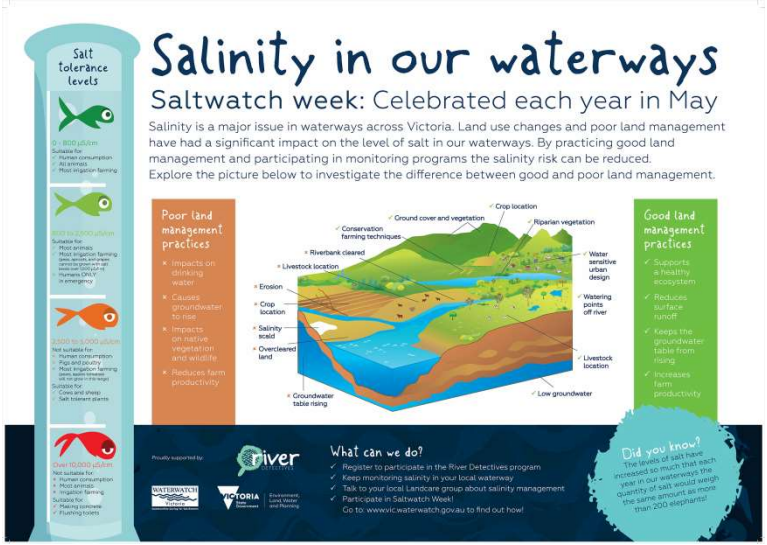
Salt- *gurraty* dissolves in water. It is no longer visible, but it has not gone. It can go anywhere that that water can go. Then, when the water evaporates, the salt- *gurraty* can be seen on the land. So salty water can kill – plants or creatures once their tolerance level is reached.

If you are not aware of the history and extent of salinity in Australia, the CSIRO "**Soil salinity in Australia**" video explains this. This video is found at https://www.youtube.com/watch?v=P4pX5W_WwU4 or from the *Resource River Bank* section of the *River Detectives* website.

More Resource River Bank 'salinity' topic resources:

From the *'salinity'* section of the *Resource River Bank* :

- '**Salinity photos**' of mainly land salinity
- '**Salinity – fact sheet**' that includes the damage soil salinity can bring.
- **Salinity in our Waterways Poster**' (right) showing good and bad land practises that affect salinity levels.



From the Wimmera CMA per RD coordinator J. Clark:

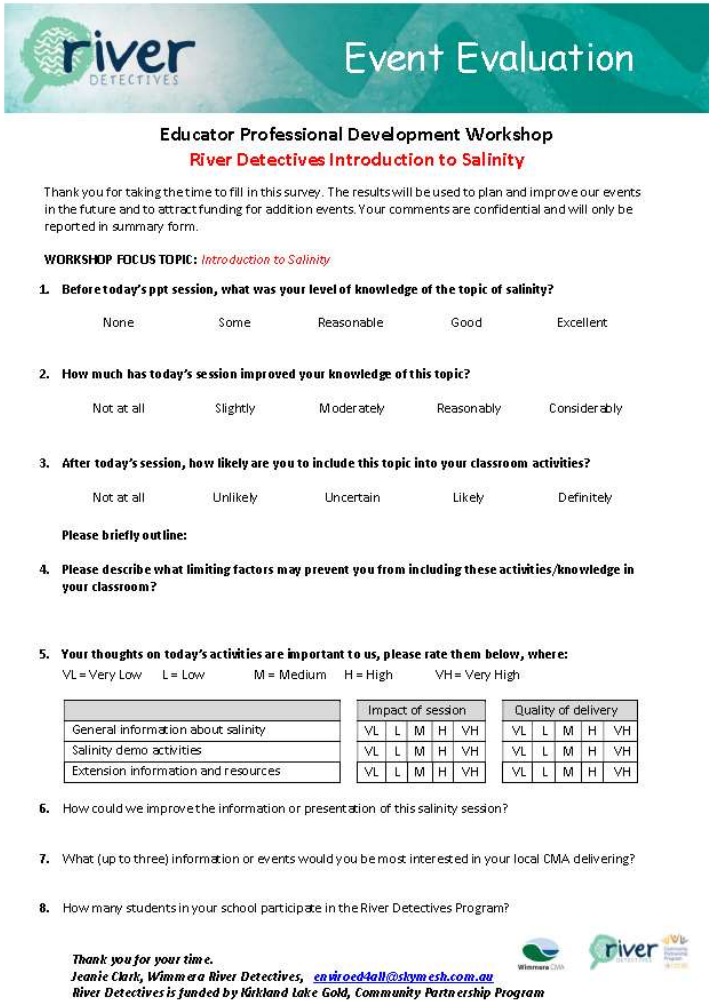
- **Living with Salinity in the Wimmera** booklet as a digital or hard copy.
- **Taste of Salt poster** (slide 10) .

Evaluation and Feedback

- **Feedback:** this helps us to improve ppts and sessions, the program and put proposals for future funding – ideas and suggestions are welcome!

- **Evaluation forms** (sample right) will be sent as a docx with this ppt PD. Please complete asap after viewing this ppt and return to me.

- Thank you. On my receipt of your evaluation form, a **PD certificate** will be sent to you.



river DETECTIVES Event Evaluation

Educator Professional Development Workshop

River Detectives Introduction to Salinity

Thank you for taking the time to fill in this survey. The results will be used to plan and improve our events in the future and to attract funding for addition events. Your comments are confidential and will only be reported in summary form.

WORKSHOP FOCUS TOPIC: *Introduction to Salinity*

1. **Before today's ppt session, what was your level of knowledge of the topic of salinity?**

   None Some Reasonable Good Excellent

2. **How much has today's session improved your knowledge of this topic?**

   Not at all Slightly Moderately Reasonably Considerably

3. **After today's session, how likely are you to include this topic into your classroom activities?**

   Not at all Unlikely Uncertain Likely Definitely

   Please briefly outline:

4. **Please describe what limiting factors may prevent you from including these activities/knowledge in your classroom?**

5. **Your thoughts on today's activities are important to us, please rate them below, where:**
   VL = Very Low L = Low M = Medium H = High VH = Very High

	Impact of session					Quality of delivery				
General information about salinity	VL	L	M	H	VH	VL	L	M	H	VH
Salinity demo activities	VL	L	M	H	VH	VL	L	M	H	VH
Extension information and resources	VL	L	M	H	VH	VL	L	M	H	VH

6. How could we improve the information or presentation of this salinity session?

7. What (up to three) information or events would you be most interested in your local CMA delivering?

8. How many students in your school participate in the River Detectives Program?

Thank you for your time.
Jeanie Clark, Wimmera River Detectives, enviroed4all@skymesh.com.au
River Detectives is funded by Kirkland Lake Gold, Community Partnership Program

Questions and Thank you

My contact details:

Jeanie Clark

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53941178 (answering machine always on)
Or text mob 0428 460 492

Congratulations, you have now complete this RD

“Introduction to salinity ppt PD”