![C:\Documents and Settings\greeki\Local Settings\Temporary Internet Files\Content.IE5\R9IIKPKR\MC900039365[1].wmf]()Water Quality Testing

One of the reasons the Urrbrae wetland was established was to control local flooding by capturing stormwater and run off from the surrounding areas but this run off can bring with it contaminants that pollute the wetland.

*What sort of contaminants might enter the wetland in the stormwater or run off?*

However, another reason the wetland was built was to clean up the stormwater that eventually washes out to sea so some of these contaminants can be removed.

*Name 3 ways in which the wetland cleans up the water that moves through it.*

**Your task today is to investigate the water quality at different locations around the wetland and then use your results to decide if the wetland is actually cleaning up the water as it is meant to.**

**Water Quality Factors**

Below is a table that describes the factors you will be testing today. For each factor there is a description of what it is, why it is important and what a healthy range for the Urrbrae wetland is.

|  |  |  |  |
| --- | --- | --- | --- |
| **Factor** | **What is it?** | **Why is it important?** | **What’s healthy?** |
| Turbidity | A measure of water clarity. e.g the amount of solid, insoluble particles suspended in the water  | High turbidity means ‘dirty’ water where the solid particles block the light and plants/algae can die | >15cm or 75JTU’s |
| Phos-phates | Salts needed in small amounts for growth. Commonly found in rocks & soils but also in animal wastes & fertilisers | When plants/algae die they are broken down by bacteria that use O2. High PO4 levels cause excess plant/algae growth which ‘chokes’ the water & depletes O2 | 0 – 0.8mg/L is clean, >1.8mg/L is extremely polluted |
| Nitrates | Similar to phosphates – found naturally & help support life | Similar affect to phosphates. Also NO3 can stimulate algae that forms a film on the water surface & blocks light | 0 – 3.8mg/L is clean, >7mg/L is extremely polluted |
| Salinity | Measure of hundreds of different chemicals that are dissolved in the water & occur naturally | Organisms require small amounts to function properly but large amounts can lead to death | <800ECU(0.8 on salinity meter) |
| Temp-erature | All organisms will survive within a certain temperature range but it varies from one organism to another | Temperatures outside the optimum range can kill organisms & extreme temperatures can affect chemicals e.g Large temp changes = 🡫 O2 levels | 10-30oC |
| Oxygen | O2 is dissolved in the water & is vital for most wetland organisms to survive | Low levels kill organisms & can be a sign of other problems e.g high NO3 levels | 4-7mg/L is OK but >7mg/L is better |
| pH | A measure of how acidic or alkaline the water is | Extreme pH can kill organisms. If pH is too low the water is acidic, if it is too high it is alkaline | 6.5 - 8 |

** Method**

1. Collect approximately 250mL of water from the Cross Rd inlet, the Kitchener St Inlet and the outlet in the bottles provided. **ALL your samples MUST be collected from a SAFE location such as a sturdy bank. DO NOT CLIMB over the structures at these sites to collect your samples.**
2. Bring the samples back to the learning centre and then use the instructions provided to test for the 7 factors described on the previous page.
	* N.B Some results may be provided for you depending on conditions.
3. Record your results in the table below.
4. Collect a sample of tap water and repeat steps 2 & 3.



  **Results**

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| **Factor** | **Inlets** | **The Outlet** | **Tap Water** |
| **Cross Rd** | **Kitchener St** |
| **Turbidity (cm)** |  |  |  |  |
| **Turbidity (JTU)** |  |  |  |  |
| **Phosphates (mg/L)** |  |  |  |  |
| **Nitrates (mg/L)** |  |  |  |  |
| **Salinity (ECU)**x reading by 1000 |  |  |  |  |
| **Temperature (oC)** |  |  |  |  |
| **Oxygen (mg/L)** |  |  |  |  |
| **pH** |  |  |  |  |

**Describe the differences between the two inlets:**

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**Describe the differences between the water entering the wetland and the water leaving the wetland:**

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**Describe the differences between the water leaving the wetland and tap water**

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**Conclusions**

Based on your results, do you think the wetland is cleaning up the water? Discuss the water quality at each of the 3 locations and use specific examples from your results to justify your response.

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**Questions**

(select the ones relevant to your class and then delete the rest or feel free to add in your own)

* The Cross Rd inlet brings water into the wetland mainly from roads and footpaths while the Kitchener St inlet brings in water that is largely from people’s gardens and the Urrbrae farm. Use this information to help explain the similarities and differences you saw between the water qualities of these two sites in your results.
* List the main differences you observed between the water at the two inlets and the water at the outlet. For each one explain why you think the difference exists and what physical or biological processes may be at work to help create these differences.
* On the first page of this task the ‘healthy’ levels for each factor are described. Given this information do you think our wetland is healthy? Explain your answer by referring to specific results you obtained.
* What differences existed between the tap water and the water at the outlet? Are these differences the reasons why we can’t drink the wetland water or are there others?
* What were the main problems you encountered with the methods you were using to test water quality? How could you overcome these problems?
* Why is it important to monitor the quality of the water in waterways such as the Urrbrae Wetland?
* Water quality testing is very important in many different areas. How do you think we could make out testing methods more accurate to give us more reliable results?
* Describe other methods you could use to investigate water quality. They can be direct or indirect methods but try to explain what each one would tell you about water quality.
* Many of the factors you tested today can be linked together. Pick 2 or 3 that are linked then describe what affect they have on each other and explain how this could affect the organisms that occupy the wetland.
* The Urrbrae farm often uses fertilisers that contain phosphates and nitrates to help improve production. These are stored safely away from the Wetland because if they weren’t they could leak into our water. Describe what would happen to the plants/algae, oxygen levels and aquatic life in the wetland if this were to happen.