

# AG5 - Floods

## Geography Stage 6 – 8.2 Biophysical Interactions

<p><b>Principal focus</b></p> <p>The focus of this study is a geographical investigation of biophysical processes and how an understanding of these processes contributes to sustainable management.</p>	
<p><b>Outcomes</b></p> <p>P7 formulates a plan for active geographical inquiry</p> <p>P8 selects, organises and analyses relevant geographical information from a variety of sources</p> <p>P9 uses maps, graphs and statistics, photographs and field work to conduct geographical inquiries</p> <p>P10 applies mathematical ideas and techniques to analyses geographical data</p> <p>P11 communicates geographical information, ideas and issues using appropriate written and/or oral, cartographic and graphic forms</p>	
<p><b>Activity</b></p> <p>Examine historical aerial photographs to examine changes in built up areas in the catchment.</p> <p>Construct flow chart to show changes in catchment surfaces from natural to urbanised and the impact of the increase in the proportion of impervious surfaces.</p> <p>Cross section using topographic maps</p> <p>Vegetation transect and birds eye view map at Loyalty Rd Flood Basin – show plant distribution, weed invasion along creek line and flood zones upstream from wall.</p> <p>Photos of flooding in CBD</p> <p>Map 100 year flood lines in CBD pre flood basin and post flood basin</p> <p>Newspaper articles about flooding (short answer questions)</p> <p>Background reading from information sheets</p> <p><b>Field trip sites:</b></p> <p>Loyalty Road flood retention basin</p> <p>Wetlands at McCoy Park and Lancelot St</p>	<p><b>Content</b></p> <p>Students learn to:</p> <ul style="list-style-type: none"> <li>– investigate and communicate geographically</li> <li>– plan a field work activity to assess the impacts of floods</li> </ul> <p>Students learn about:</p> <ul style="list-style-type: none"> <li>– a case study investigating urban run-off and floods</li> </ul>



## Key questions

What are the effects of human impacts on the hydrology of the upper Parramatta River catchment?

## Background – Impact of Urbanisation

Urbanisation in the upper Parramatta River catchment has greatly increased the area of impervious surfaces (such as roads and roofs). This causes rainfall that previously infiltrated into soil or flowed off the catchment at a slow rate, to flow off the catchment quickly and in greater volumes.

Throughout the catchment, many small creeks have been replaced with piped and lined drainage systems. This causes additional increases in the rate at which stormwater is carried, increased flooding and erosion problems. The concentration of pollutants such as oil, grease, sediment and organic matter running off urban surfaces causes deterioration in the water quality downstream.

## How much stormwater runs off your school site?

This activity involves:

1. Map the proportions of impervious surfaces in your school grounds.
2. Calculating the volume of stormwater water running off from your school.
3. Developing strategies to reduce the run-off from the school grounds.

### 1. Map school surfaces

- a. Walk through the school grounds and identify the different kinds of surfaces (for example: rooves, paths, garden, lawn and sporting fields etc).
- b. Devise a system of symbols to represent these surfaces.
- c. Use a school map and graph paper to draw a detailed map of the various surfaces.
- d. Mark on the map any systems that your school has installed to reduce the area of impervious surfaces within the school grounds.
- e. Estimate the area of each surface type in square metres and the proportion of each surface type in the school grounds.
- f. Record your results in a table.

### 2. Estimate school stormwater runoff volume

- a. Use this information to classify your school surfaces in high, medium and low runoff surfaces.
- b. Estimate the volume of stormwater that would leave the school site in a storm that dropped 25mm of rain.  

$$(\% \text{ runoff} \times \text{surface area} \times \text{rainfall volume} = \text{mm stormwater volume generated by each surface type})$$
- c. Use tables and graphs to record the results of your field investigations.

### 3. Develop an action plan

How can your school reduce its flooding impact?

- a. As a class, brainstorm strategies to reduce the schools environmental impact on the local creek and upper Parramatta River catchment.
- b. Conduct research into Water Sensitive Urban Design (WSUD) to assist the development of a school action plan.
- c. Prepare a report and action plan.



- d. Organise a meeting with your school principal and school executive to report on the results of your investigations and present the ideas developed in your action plan.
- e. With the agreement of your school executive, it may be possible to extend your action plan to become a “Sustainable Design” school implementation plan.

## Resources and Links

### Water Sensitive Urban Design

- Upper Parramatta River Catchment Trust website [www.uprct.nsw.gov.au](http://www.uprct.nsw.gov.au) - click on “Sustainable Water”

### UPRCT Catchment Education Kit Information Sheets

- Water Sensitive Urban Design
- Hydrology Information
- Flooding Information
- ESD Information



