Ashburton Salt Project

About the environment: Fact sheet #6

HYDROLOGICAL PROCESSES

Experience growth.

Hydrological processes are the ways in which water cycles through the environment and include rain, evaporation, infiltration, surface water flow and groundwater flow. These processes contribute to nutrient cycles through ecosystems.

The Project is located within an area designated as a Nationally Important Wetland by the Australian Government. Understanding the hydrological processes of the area, particularly surface water and nutrient flows, is important for maintenance of the wetland areas.

WHAT ARE THE SURFACE WATER FLOWS IN THE PROJECT AREA?

The Project is located within the Ashburton River catchment. This catchment experiences an arid climate and high evaporation rates. Most surface water runoff occurs from January to March, with peak flows in February. After heavy rainfall (such as cyclones), creeks discharge over the coastal flats towards the coast, often following braided creeks. The braided creeks are created by natural erosion processes wearing away sand and sediment within the lowest points in the landscape and often occur in fan like patterns.

Preliminary information indicates surface water flows in the Project area are captured in overland creeks and basins to the east of the salt flats. Some of this surface water is lost via evaporation and infiltration, while some flows towards the coast and pools within the salt flats. The salt flats act as a large water collection basin during cyclonic rainfall.

WHAT LANDSCAPES INTERACT WITH SURFACE WATER IN THE PROJECT AREA?

There are three broad landscape types relevant to the project area - coastal fringe, mud flats and salt flats as described below.

Table 1: Landscape Units

Landscape Unit	Description	Project Interface
Coastal fringe	Coastal beaches and rocky promontories occur along the coastline - they lie between the ocean and the mud flats and are inundated by tidal flows from the ocean	Very limited project interface in the form of a jetty, access roads and pipes.
Mud flats	The mud flats lie upland of the coastal beaches and are periodically inundated by tidal flows from the ocean. They support two benthic habitats: algal mats (forming on the upper reaches which are only submerged by spring tidal flows - less than 3% of the time annually) and mangroves (growing on the low lying coastal fringing mud flat where they are flooded regularly, often twice daily).	Very limited project interface in the form of access roads and pipes.
Salt flats	The salt flats are inland of the mud flats, are not reached by tidal flows and do not support any flora, vegetation or fauna. They are dry for the most of the year and flood only due to rainfall during cyclonic events.	Majority of project is located on salt flats in the form of salt ponds and processing infrastructure.

WHAT SURFACE WATER NUTRIENT CYCLES ARE IN THE PROJECT AREA?

Nutrient cycling is how nutrients move from the environment into one or more living organisms, before being recycled back into the environment. There are three main nutrient cycling processes at work in the Project area.

Mangroves

Mangrove communities are recognised as one of the key communities which input nutrients into the coastal ecosystem of the Gulf. Mangroves cycle nitrogen, phosphorus, sulphur and carbon, which are fundamental for coastal productivity. These nutrients are exported into the coastal ecosystems via the food web, tidal flushing and surface water flows.

Algal Mats

Cyanobacterial algal mats also contribute nutrients to the coastal ecosystems. These mats take nitrogen out of the air, making it available to marine organisms that need nitrogen to grow. Nitrogen is exported into the coastal ecosystems via the food web, tidal flushing and surface water flows.

Creek Systems

Nitrogen and phosphorus are considered to be the key nutrients in creek systems due to their influence on biological activity in estuarine and marine environments. Sediments from the land contain nitrogen and phosphorus as a result of organic matter decaying and releasing nutrients back to the environment. Heavy rainfalls with surface runoff can mobilise these nutrients, carrying them into creeks where they are discharged into coastal ecosystems.

A study of the nutrient load within the Ashburton River system conducted for the Chevron Wheatstone project (approximately 30 km northeast of the Project) found that the levels of nitrogen and phosphorus were highly variable and closely reflect surface water flows. The Ashburton River system is too far north to significantly affect nutrient discharges into the ocean near the Project, but it provides an indication of the nutrient inputs from the smaller creek systems within the Project area.

HOW WILL K+S AVOID AND MINIMISE IMPACTS TO HYDROLOGICAL PROCESSES?

The Project has the flexibility to avoid and minimise environmental impacts by changing the project design as environmental studies are completed.

The project has been located predominantly on the salt flats which lack flora and fauna habitat to avoid impacting the key environmental values of the Nationally Important Wetland. These values are associated with migratory birds and their habitat such as the mangroves, beaches and tidal creek systems.

The salt ponds will be positioned so that there is an adequate buffer to the mangroves and algal mats. The Project is also being designed to minimise indirect impacts to mangroves and algal mats such as changes to tidal inundation and water quality changes.

Comprehensive studies and modelling will be undertaken to describe in detail the surface water and groundwater flows and nutrient pathways in the Project area.

The Project design will be engineered so that it does not significantly alter tidal inundation, surface water flows, groundwater flows or nutrient pathways.

The Project will be designed so that it does not significantly change the response of the environment to flooding events, thus preventing flow-on effects to the wetland and Exmouth Gulf ecosystems.

The salt ponds will be designed to minimise seepage and avoid impacts to groundwater quality and the surrounding environment.

K+S recognise that hydrological processes and associated nutrient cycles are important parts of the local environment and are committed to minimising any impacts to them.