

Aquatic contaminants – pathways, health risks and management

CONPAT focuses on improving the sustainable use of aquatic resources and on securing the supplies. It establishes interdisciplinary links between water cycles, water contamination, risk assessment, risk communication, costs of mitigation actions and social effects.

Introduction

Ecosystem services provided by freshwaters are numerous. A key service is the provision of surface water and groundwater resources for drinking water production. Freshwaters are also necessary for food production (i.e. irrigation and fishing) and recreation. The same water resources may serve as recipients of municipal or industrial waste waters and are also impacted by diffuse loading from agriculture and settlement in the catchment area. Water safety is in great part based on protection of the source water, i.e. prevention of the access of pathogenic microbes or harmful chemicals to the water resources.

Though many harmful substances are removed from waste waters, several contaminants such as pathogenic microbes may remain in essential water resources. System-wide approaches for managing waterborne health risks are thus encouraged e.g. by “Water Safety Plans (WSP)”. The sources, paths and impacts of the contamination need to be identified before the attributed health risk can be managed. Thus, a holistic methodology for contaminant source tracking, environmental transport and fate assessment, effect assessment and management strategy development is needed.

CONPAT-project objective

CONPAT-consortium (Fig.1) aims to study the sources, behaviour and fate of microbial and chemical contaminants and model their transport in a water course. Subsequently, the effects of the contaminants to the human populations are assessed, and economic costs of the harmful effects and of mitigation of these effects are predicted. The overall objective is to create scientifically sound and socially responsive knowledge and tools for predictions and risk assessments regarding behaviour of contaminants and effects in water courses and in water supply systems. These predictions and assessments allow management responses to associated key pressure factors and drivers of change.

- Experimental work will focus on water quality changes at river Kokemäenjoki and artificial recharge of ground water (Fig.2).
- Pathogenic microbes and harmful chemicals (pharmaceuticals and sweeteners) will be determined.
- Mathematical models of the transport of microbes and chemicals in river until drinking water abstraction will be computed.
- Health risk assessment aims at quantification of harmful effects originating from microbes and chemicals.
- Economic models will cover the costs of health effects compared to the costs of mitigation actions.
- The risk attribution, communication and governance, will be studied. Concern assessment includes conceptual and empirical studies of expert and stakeholder views and media analyses on risks.



Figure 1. Conpat research consortium. Conpat research consortium held its opening seminar at 30-31st August 2012 and visited onsite at the Virttaankangas.

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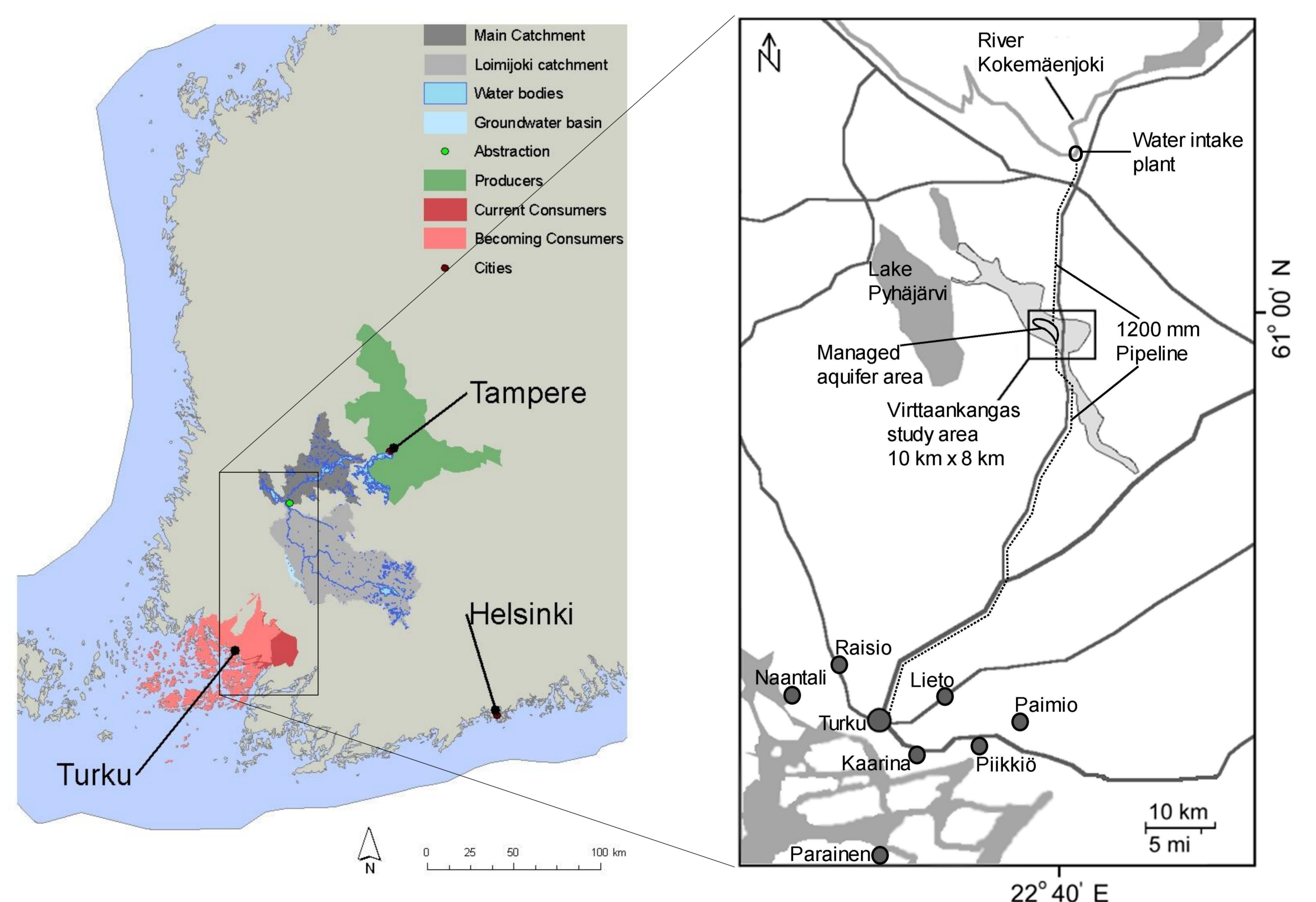


Figure 2. The study area consisting of the Kokemäenjoki water course downstream from Tampere and the artificial groundwater recharge area of Virttaankangas esker producing drinking water for Turku region.