Oil refinery in Anacortes.

Introduction

Human activities over the past 150 years have led to a changing climate in the 21st century.

By burning oil and coal and clearing land, we have embarked on an unprecedented experiment, launching the earth's climate system into unfamiliar territory. Looking at past and anticipated greenhouse gas emissions, scientists project significant changes in global average temperature, sea level and precipitation patterns. These changes will cascade through the world's ecosystems, affecting everything from coral reefs to polar ice caps and the people who depend on them.

> *"The ultimate amount of change that occurs depends on the total amount of greenhouse gases emitted now and into the future."*

What do these global changes mean for the climate in the Puget Sound region? The answers lie both in the future and in the past.

Looking into the future, we use simulation models to study changes in temperature, precipitation, sea level, snowpack and stream flow. We examine the implications for Puget Sound's circulation and water quality and for nearshore habitat and the organisms it supports.

We look to the past to evaluate how ecosystems have responded to climate fluctuations so that we can apply this knowledge to determining the consequences of future climate changes. While the past may not be a definitive guide to the future, this knowledge provides valuable lessons on how ecosystems function (or malfunction) when stressed. It is also important to recognize the influence of human activities on past responses to climate variation as future changes in climate will both shape and be shaped by the interaction of natural processes and human activities.

Looking into the past can also help us develop better management tools for the future. Climate-resilient resource management begins by considering how well current or proposed policies would perform when faced with the known climate of the historic record.

By crafting resource management policies resilient to both historic patterns of climate variability and future human-caused climate change, we can better prepare Puget Sound for an uncertain future.

The Puget Sound Basin

Figure 1: Map of the Puget Sound basin showing the main features and locations discussed in the text. Waters inside the red boundary eventually drain to Puget Sound.