WSP E&I Canada Limited

Digital Environment

Resilient solutions for an uncertain future

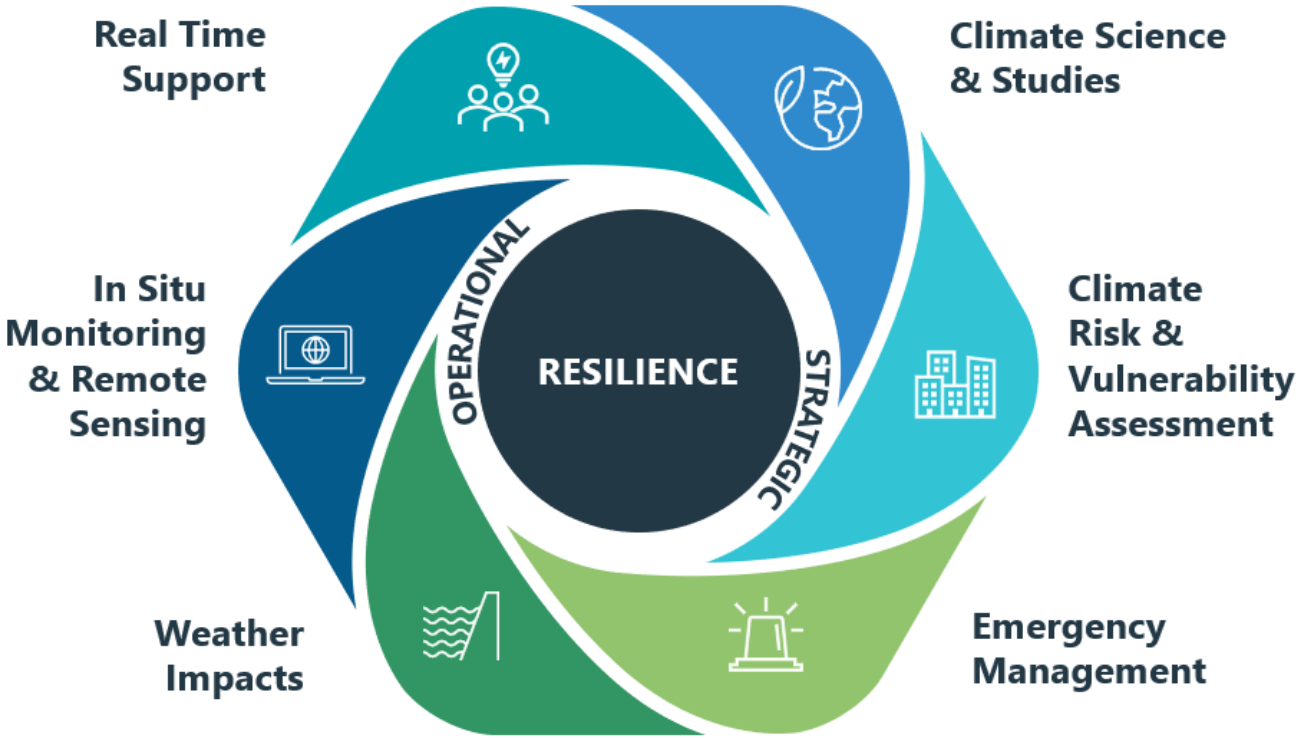
Climate Risk and Adaptation. Weather Forecasting. Emergency Response.
Oceanographic Modelling. Operations Analysis.
Remote Sensing. Instrumentation.
Software Development.

Helping our clients make better decisions, faster

WSP's Digital Environment team is comprised of technology-centric solution providers – engineers, data scientists, technologists, meteorologists, oceanographers, software developers, and other professionals – who are focused on providing science-based and data-driven intelligence that allows clients to effectively prepare for and respond to climate risks and other operational challenges.

We understand that preparing for a resilient future does not mean responding to a one-time crisis or rebuilding after a setback. It means **continuously anticipating and adapting** to long term trends. Inherent in that, is a recognition that accurate and timely information about the world around us is critical. To make well-informed decisions, quickly and confidently, our clients rely on Wood's Digital Environment team to distill complex data into actionable insight.

Distilling complex data into actionable insight



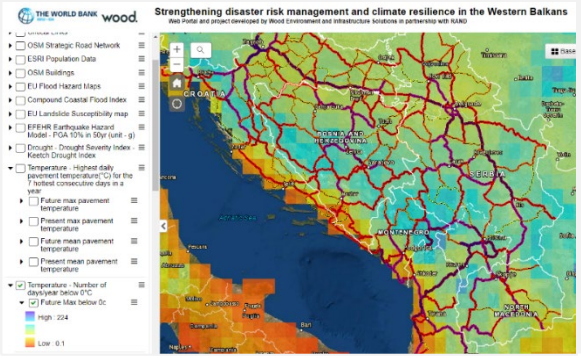
Digital solutions and software development: Many of our resilience solutions rely on Digital Environment's integrated cloud-based infrastructure. Our team of software developers build, maintain, and continuously improve our digital pipelines, tools, and services, all of which are integral to our clients' operations and our own.

Climate Risk, Impacts, and Response

Climate Risk & Vulnerability Assessments: We provide internationally recognized Climate Resilience services for our clients across a range of sectors and geographies.

Digital Environment is integrated into WSP's global resilience network, a dedicated multi-disciplinary and international team of experts. Our collective services are comprehensive, cohesive, client-focused and reflect our commitment to excellence in all that we do. We use industry-leading, proven qualitative and quantitative tools and techniques to support engagement and deliver innovative solutions for projects, sites, supply chains, companies, investors, government agencies, multinational corporations, and geographic areas. We provide clients with direct access to a range of world-class experts in areas that focus on:

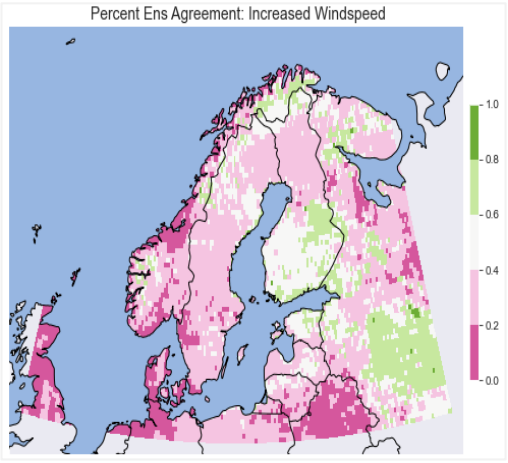
- Climate change vulnerability assessments
- Probabilistic risk and hazard assessments
- Stakeholder engagement and training
- GIS and Spatial Hazard Mapping
- Climate Change Adaptation and Resiliency Engineering
- Sea level rise, marine and coastal hazard assessment
- Risk-Based Decision Making, Cost Benefit Analysis



Climate Science & Studies: We offer a wide range of custom climate change modelling and analysis services.

Our experts have practical knowledge of the industrial applicability of state-of-the-art climate modelling and analysis techniques. Our analyses often reveal where a small investment or change in strategy in the near term can prevent large remediation and operational costs in the future. WSP brings experience in the following aspects of climatology and climate change analysis:

- Climate change scenario planning and downscaling
- Climate analysis for hydrometeorological and marine variables
- Climate variability and trend quantification
- Extreme events investigation and return period analysis
- Representation and communication of climate uncertainty
- Identification of existing and potential future climatological risks
- Geospatial assessment and representation of climate risk
- Identification and acquisition of global and regional climate model projections



Emergency Management is based on the fundamental principles of mitigation, preparedness, response, recovery, and prevention. Our emergency management professionals provide EM planning and audits, command team training, exercises and simulations, operations center design and setup, command assessments, as well as business continuity and emergency software solutions.

Weather, Marine, and Aviation Forecasting

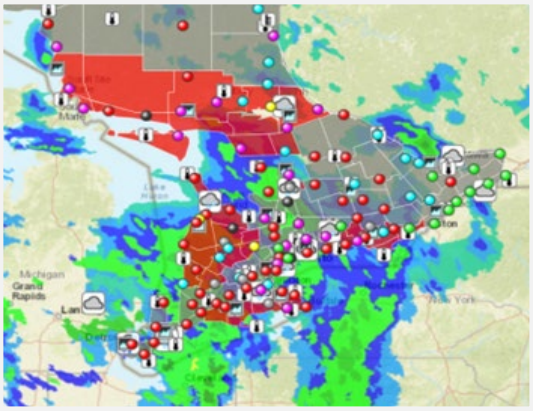
Weather Impacts: Digital Environment provides weather forecasting and support for terrestrial, marine, and aviation clients. **24/7 Anywhere in the world.**

An international team of professional meteorologists, a cloud-based digital infrastructure, and automated data pipeline are at the core of our weather business. Our team serves clients in transportation, energy, asset management, insurance, construction, supply chain management, government, and emergency response.

- 24/7 weather desk consultation and mobile app support
- Forecast product delivery via web portal, email, or web app
- Severe weather forecasting & alerts
- Road Weather Information Systems (RWIS)
- Polling, curating, and displaying real-time observation data
- Regional & local area forecasts
- Transportation route forecasts
- Maintenance Decision Support Systems (MDSS)

Marine & Aviation forecasting and alerting services:

- An expert focus on critical variables
    - Marine: winds, seas, fog
    - Aviation: pressure, ceilings, temperature, humidity, stability, winds
- Helicopter flight-planning forecasts
- Extended (10-Day) forecasts for strategic planning
- Forecasts involving complex coastal topography and land/sea interactions
- Shipping and towing route forecasts
- Vessel motion prediction
- Automated, digital, observing for remote locations reporting real-time sensor and camera data
- Site specific aviation forecasts, including Terminal Aviation Forecasts (TAFs)
- Regional aviation weather depictions and warnings
- Tropical and Extratropical System Tracking forecasts

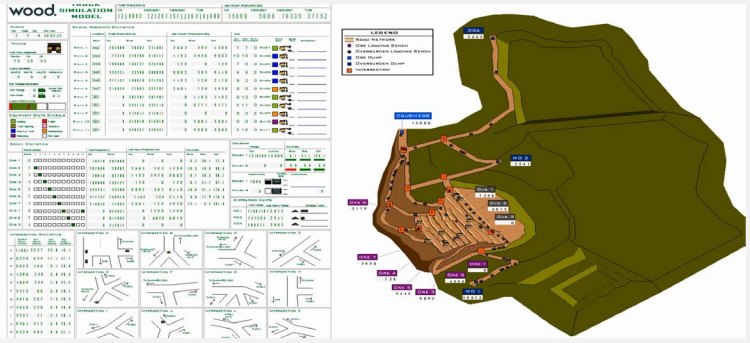


Complex Systems Modelling

Industrial & Mining: Operations Analysis is the study of operational systems with the aim of identifying opportunities for improvement.

Industrial activity often comprises a complex network of equipment, personnel, operational considerations, and logistics. Understanding how all of these factors interact with one another over time can be difficult without the use of advanced tools. Our team has built comprehensive static and dynamic models for a wide range of industrial applications, from mining and oil & gas, to logistics, transportation, and food storage. Expertise includes:

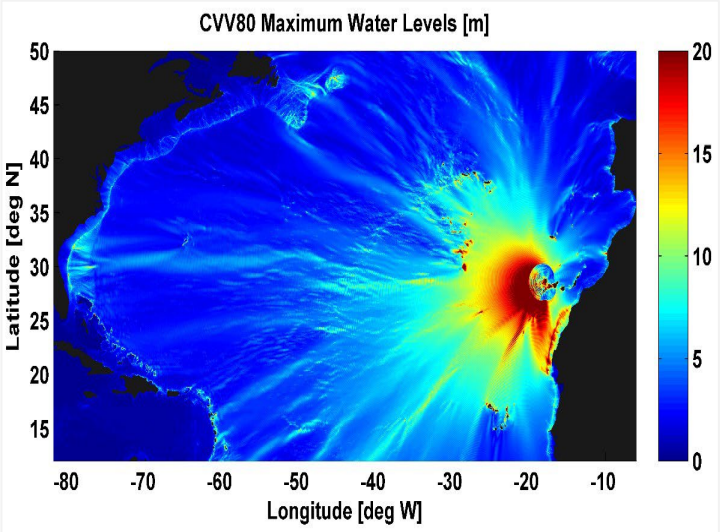
- Discrete-event simulation modelling
- Data mining, data science, and big data
- Industrial engineering
- Inventory Control & Logistics
- Mathematical modeling & mathematical optimization
- Probability and statistics
- Queuing Theory
- Transportation forecasting models
- Stochastic processes
- Supply chain management



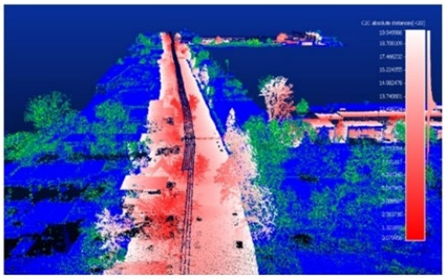
Oceanography, Coastal, & Aquatic: Proven global experience in applying the latest scientific and computational methods to serve and support our clients' requirements**.**

Our team focuses on hydrodynamic modelling studies in support of coastal and marine clients, including high-stakes projects in nuclear and petrochemical industries as well as high-profile work for international governments. Key marine and aquatic services include:

- Hydrodynamic flow and wave modelling
- Thermal and effluent plume dispersion and zone of influence modelling
- Assessment of intake and outfall effectiveness and potential recirculation effects
- Modelling of sediment transport and coastal morphology
- Erosional and depositional effects of coastal infrastructure
- Environmental impact assessment of sediment dredging and disposal operations
- Tsunami modelling due to earthquakes and landslides
- Oil spill and contaminant pathways modelling
- Current and wave climate measurements and hindcasting
- Monitoring and modelling of water quality characteristics
- Derivation of environmental design criteria to support engineering and management decisions



Measuring, Monitoring, and Machine Learning



Remote Sensing: Our team employs remotely sensed datasets along with advanced machine learning techniques to provide real-time, frequent, and cost-effective solutions to various projects while minimizing labour, safety risks, and accessibility issues.

Key services provided include:

- High-resolution land cover and land use (e.g., wetland, cropland, aquatic vegetation) mapping
- 3D mapping using multispectral and LiDAR datasets
- 3D mapping of an object (e.g., archeological sites) using photogrammetric methods
- Big geodata processing for large-scale classifications
- Condition assessment using hyperspectral remote sensing data
- Change analyses using multi-temporal geospatial data
- Drone multispectral and LiDAR data collection and analyzing
- Air quality monitoring using satellite data
- Contamination assessment using spectral analyses of remotely sensed data
- Landslide and terrain stability analysis using Interferometric Synthetic Aperture RADAR
- Power and transmission line monitoring using high-resolution LiDAR point cloud data
- Flood risk assessment using multi-source remote sensing datasets
- Meteorological variables (e.g., fog, wind, and cloud) estimation using meteorological satellite datasets
- Ocean parameters (e.g., ocean current, ocean wave, sea ice, iceberg) estimation using multi-source satellite data
- Hydrology and water resource management (e.g., drought monitoring, water quality monitoring, and watershed mapping) using remote sensing data

Instrumentation & Monitoring: We have extensive experience in designing, assembling, installing, and managing networks of data gathering instruments and measurement control applications in the field. Most systems automatically read instrument data and distribute to end-client systems via cloud-based quality control systems.

WSP provides complete oceanographic and meteorological instrumented data monitoring services, including:

- Design of monitoring systems
- Instrument procurement and installation
- Buoy deployment, maintenance, and recovery
- Data acquisition, management, and monitoring
- Data quality control, modelling, and analysis
- System integration with database and web hosting services

Our team creates and manages networks of field instrumentation such as buoys deployed in the ocean, roadside weather stations or piezometers measuring water levels in wells. WSP's instrumentation and monitoring services are often combined with forecasting and risk management systems to provide client-based end-to-end solutions.

Key Specialty Contacts

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WSP Statistics

55,000 employees

$7.9B net revenue

Areas of Expertise

- Resilience
- Digital & technology-centric solutions
- Climate science & studies
- Climate risk & vulnerability assessments
- Emergency management
- Operations analysis
- Oceanography, coastal, & aquatic modelling
- Remote sensing
- Instrumentation & monitoring
- Weather, marine, & aviation forecasting

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