



Experience

Tecnoceano is a consultancy established in 2005 which has been specialized in 3 coastal engineering areas: **hydrography**, **numerical coastal models** and **coastal engineering** (mainly **beach recovery**). Our state of the art equipment and software allows us to provide a high lever service with added value, such as optimization of the available resources and infrastructure. Thus, in all our project proposals we incorporate the project into the natural marine environment. All studies are based in a fundamental analysis which includes: statistical analysis of climate and ocean in-situ and base data, integrated with numerical hydro-morphodynamic models.

As Tecnoceano is not linked with third parties, neither contractors nor material manufacturers, making sure that our clients get the best cost/ benefit ratio, adapting the project to the unique necessities of each site.

Curriculum

2023

WAVE, TIDES, AND METEOROLOGIC MONITORING. Monitoring net in several places around the country. Wide experience monitoring wave and wind data in docens of hotels in Mexico.

NAUKA, NAYARIT. Waves measurement, current measurement, bathymetric and topographic surveys to generate wave simulation model, sediment transport simulation model and fuel spilled simulation model. Estuary protection project, Jetty bypass Project and dune golf course protection project.

XALA, JALISCO. Wave´s height, period and direction measurement to calculate rock size to build an artificial multiuse reef.

RITZ, RIVIERA MAYA. Wave´s height, period, and direction measurement with ADCP, to generate and calibrate a hurricane model. 3 conditions were simulated hurricane CAT 1, CAT 3 and CAT 5 to assess wave impact and flooding levels in Poseidon development.



POSEIDÓN, RIVIERA MAYA. Wave's height, period, and direction measurement with ADCP, to generate and calibrate a hurricane model. 3 conditions were simulated hurricane CAT 1, CAT 3 and CAT 5 to assess wave impact and flooding levels in Poseidon development.

ONE & ONLY MANDARINA, NAYARIT. Bathymetric survey to assess post hurricane damage, executive Project to rebuild it and volume calculation.

DOS BOCAS, TAB. Bathymetric survey and submarine cable detection using Sub Bottom Profiler.

2022

PETEMPICH, Q.ROO. Photogrammetry survey.

MANDARINA ROOSWOOD, NAYARIT. Estuary overflows into a marine canal, combined with an extreme waves numerical model to know the highest water level during a hurricane Cat1, Cat 3 and Cat 5, storm design elevation for beach villas was set, so these ones were safe in case of an extreme phenomenon. A wave numerical model in micro scale was included, materials definition and volumes to build the channels as well.

PUNTA BRAVA, Q.ROO. Topography and photogrammetry survey to define residential lots.

PUNTA PERFECTA, BCS. Hydrographic studies were performed such as, bathymetric and topographic surveys, as well as, waves measurement (height, period, direction), currents and tides to generate an extreme event wave numerical model to find out the maximum wave and tide levels. Suggestions about the construction were made in the final report.

GRAND VELAS RIVIERA MAYA, Q.ROO. Topographic survey on the beach in order to update the beach stabilization project.

HOLBOX, Q.ROO. Detailed bathymetry survey, benchmark link to the RGNA from INEGI Mexico, and referred to Mean Sea Level, strata measurement with Sub Bottom Profiler to evaluate the installation of power cable from the continent to Holbox Island.

PUNTA VENADO, PLAYA DEL CARMEN, Q.ROO. Hydrographic study to generate a project to improve and stabilize the beach in the area Punta Venado. Another studies included an ADCP installation at the bottom of the sea to measure waves (height, direction and period), currents and the development of a extreme wave numerical model considering hurricane CAT 1, Cat 3 and CAT 5.

XALACATEPEC, JAL. Multibeam bathymetric survey, strata survey with SBP and benchmark reference setting point referred to Mean Sea Level, were performed to generate a project to generate professional "surfing waves".

DOS BOCAS, TABASCO. Bathymetric survey and topography at the beach to receive a PEMEX pipeline.



CHEMUYIL, Q.ROO. Monitoring program to measure wave, wind, and rain condition to know conditions in situ and generate the reports to environment authorities. Artificial cove building supervision.

KANAI, Q.ROO. Installation of meteorological station and pressure sensor to monitor waves, wind, and rain in the area.

CASA NUEZ, IXTAPA, GRO. Hydrographic studies to generate a Project to modify the cove in casa Nuez and create an area protected from waves with a good water exchange.

LAS NIÑAS, BCS. Hydrographic studies including bathymetry, topography, wave measurement with ADCP, currents, and tides to generate a wave numerical modeling that evaluate extreme events such as hurricanes CAT 1, CAT 3 and CAT 5. Maximum waves and tides height were delivered to help the developer make good decisions.

COSTA PALMAS, BCS. Project supervision to recover and stabilize the beach in development Costa Palmas.

ISLA MUJERES, Q.ROO. ADCP set at the bottom of the sea closet o Isla Mujeres to measure wave´s height, period and direction, as well as current to evaluate an electrical power cable installation for the island.

2021

SIX SENSES, CAYO ROSARIO, BELICE. Bathymetric survey, current measurement, executive beach improvement project in combination with stilt houses. Coordination of work teams for mangrove management. Placement of meteorological station and pressure gauges to measure wind intensity, precipitation, wave height and tides.

SECRETS, RIVIERA MAYA, Q.ROO. Additional information to complement Environmental Impact Assessment.

HILTON, RIVIERA MAYA, Q.ROO. Emerging seasonal storm surge protection project.

DESALINATION PLANT, LOS CABOS, BCS. Bathymetric and topographic survey, placement of level bench referred to Medium Sea Level.

FIESTA AMERICANA CHEMIYIL, Q.ROO. Monitoring plan that includes placement of a weather station to measure precipitation, intensity and wind direction; placement of RBR type pressure gauges for wave and tide height measurement; placement of Current Profiler to measure height, period and wave direction in front of the property; measurement of coastal currents in summer and winter, detailed modeling of waves and currents to generate periodic reports of beach behavior and operation of a beach improvement project over the course of a year.

AMANKAYA, PUERTO MORELOS, Q.ROO. Location of sandbanks to exploit, estimation of the volume of sand on the banks, measurement of currents and waves on banks over a full lunar period, wave modeling on the banks to analyze their behavior.



NICHUPTÉ LAGOON CANCUN, Q.ROO. Bathymetric survey with single beam echosounder and RTK equipment, tidal measurement for infrastructure studies on the lagoon.

COMUNICACION CABLE IN PUERTO JUAREZ, Q.ROO. Bathymetric survey with multibeam system, beach topography and sub bottom strata measurement for submarine communications cable laying project, Exploratory dives, strata measurement and seabed under water video.

MAYAKOBA, RIVIERA MAYA, Q.ROO. Bathymetry, topography, revision and adaptation of beach stabilization project together with IIUNAM. Wave model and sediment transport.

COSTA PALMA, LOS CABOS, B.C.S. Placement of Acoustic Doppler Current Profiler to measure waves and currents to calibrate the model. Bathymetry of 7 km of shoreline to generate a new model and evaluate breakwater behavior.

Monitoring program that included training of development personnel to operate the weather station and send monthly information, placement, programming, and maintenance of RBR-type pressure gauges for ocean measurement versus development.

INTERNATIONAL COMUNICACION SUBMARINE CABLE, CANCUN, Q.ROO. Search for communications cable with the use of a magnetometer on the beach and seabed, measurement of cable burial along its trajectory up to 2 km offshore.

PLAYA ARCANO, ZIHUATANEJO, GUERRERO. Field visit and analysis to improve and protect the beach 'Arcano' from erosion.

MANDARINA ROSEWOOD, NAYARIT. Mathematical wave modeling to perform a risk analysis of the site including wave height by seasonal storm and extraordinary storm, as well as risk of flooding.

HARD ROCK CANCUN, Q.ROO. Bathymetry for ZOFEMAT processing and use of protection buoys.

KANAI, PUERTO MORELOS, Q.ROO. Implementation of a monitoring program through a meteorological station and a submersible pressure gauge to measure wave height.



2020

PUNTA BRAVA, RIVIERA MAYA, Q.ROO. Coastal topographic survey and photogrammetry to define lots and ZOFEMAT.

GRAND VELAS LOS CABOS, B.C.S. Official drawings generation for SCT permits.

DURANGO PRESA TRUCHAS, DURANGO. Bathymetric survey to calculate volume of water in the dam.

MAYAKOBA, RIVIERA MAYA, Q.ROO. Bathymetric and topographic survey on sand Banks for sand volume estimation. Topographic survey and photogrammetry on land for volume filling calculation.

FIESTA AMERICANA CHEMUYIL, Q.ROO. Building hybrid breakwater supervision, breakwaters made of concrete core and tetrapod armor to stabilize the beach. Supervision of beach nourishment with local sand.

LOS CABO, DESALINATION PLANT, B.C.S. Bathymetry, topography, reference point setting and sediment sample collection for tube construction at desalination plant.

SECRETS, RIVIERA MAYA, Q.ROO. height and direction for the waves with ADCP to calibrate the local model.

AMANKAYA, PUERTO MORELOS, Q.ROO. Bathymetry, coastal topography, local wave modeling for the design of a beach recovery and stabilization project. Photogrammetry with drone for site monitoring.

COSTA PALMA, BAJA CALIFORNIA SUR. Coastal protection project with sea dike, generation of plans and calculation memory.

MAYAKOBÁ, RIVIERA MAYA, Q.ROO. Seasonal storm surge analysis for dock design in coastal zone.

KANAI, RIVIERA MAYA, Q.ROO. Coastline topography and photogrammetry for tracking and monitoring.

MOXCHE, RIVIERA MAYA, Q.ROO. Single beam bathymetry, coastline topography, static and dynamic current measurement, granulometry analysis, generation of a mathematical simulation model of waves, sediment transport currents, executive project for beach recovery and stabilization, site photogrammetry, sandbar exploration and cubing.

MACAO, R.D. Feasibility study for the construction of a marina.

RIO MOCTEZUMA, TAMAZUNCHALE, S.L.P. Bathymetry, topography, Geophysical study of the river bottom, measurement of currents and water velocities, soil sampling and laboratory tests, modeling of sediment transport and flooding of the area of interest.

FIESTA AMERICANA CHEMUYIL, RIVIERA MAYA, Q.ROO. Supervision of marine work for the improvement and stabilization of the beach.



2019

PUNTA PÉRULA, BAHÍA DE CHAMELA, JALISCO. Waves and current measurement with ADCP to calibrate wave modeling. Wave, currents, tides and sediment transport modeling with DELF3D model.

KANAI, RIVIERA MAYA, Q.ROO. Topography and bathymetry survey to monitor beach evolution.

PUNTA VENADO, Q.ROO. Topographic survey and land delimitation.

HOLBOX, Q. ROO. Topography survey for ZOFEMAT verification.

PEDREGAL, LOS CABOS, B.C.S Review of coastal protection with T shape jetty's, bathymetry and wave modeling verification.

KANAI, RIVIERA MAYA, Q.ROO. Coastal line topographic survey for monitoring.

SOLIMAN, Q.ROO. SEMAR, SCT, ZOFEMAT permits procedures.

ALDORA, COZUMEL, Q.ROO. Topographic survey, currents, waves and tides measurements with ADCP. Wave, current and transport sediment modeling to support pier construction project.

PUERTO CANCÚN, Q.ROO. Navigation signal executive Project.

PUNTA VENADO, Q.ROO. ZOFEMAT verification topographic survey.

PUERTO CANCUN, Q.ROO. Stabilization and recovery beach construction job supervision.

GRAND VELAS RIVIERA MAYA, Q.ROO. Coastal Monitoring one-year program and execution including metrological station, currents, wave high, wave direction and tides, as well as beach behavior analysis.

ALDEA ZAMÁ, Q.ROO. Topographic survey to define perimeter and reference points setting.

PLAYA MUJERES, Q.ROO. Executive Project to signal wave breakers.

PUERTO CANCÚN, Q.ROO. Photogrammetry with drone to monitor coastal line behavior. Sand bank exploration to verify sand quality and sand volume to use in the Project to nourish the beach with sand.

COSTA PALMA, B.C.S. Wave mathematical modeling with hurricane conditions to determine maximum water levels.

CABO DEL SOL, B.C.S. Wave high, wave period, wave direction and currents measurement to calibrate wave and current mathematical models, as well as extraordinary storms.



EL PORVENIR, Q.ROO. Bathymetric and topographic survey, currents measurement with Acoustic Doppler Current Profiler (ADCP), recovery and stabilization beach project, search and exploration of sand banks to explode and use to nourish the beach.

UNICO KANTENAH, Q.ROO Bathymetric and topographic survey, Currents measurement with Acoustic Doppler Current Profiler (ADCP), recovery and stabilization beach project, search and exploration of sand banks to explode and use to nourish the beach.

FIESTA AMERICANA CHEMUYIL, Q.ROO. Currents measurement with Acoustic Doppler Current Profiler (ADCP) both static and dynamic to provide data to calibrate wave and currents mathematical modeling.

PEDREGAL, B.C.S. Topographic survey and generation of drawings.

KANAI, RIVIERA MAYA, Q.ROO. Photogrammetry and coastal behavior monitoring.

MADARINA ROSEWOOD, NAYARIT. Bathymetric and topographic survey, wave measurement and data analysis to generate a flooding modeling.

MONOBOYA, MANZANILLO, COL. Bathymetric survey, topography, Current Profile Measurement with ADCP, sediment samples extraction, and wave and current mathematical modeling to use in the Monobuoy design.

Big White, Playa del Carmen, Q.ROO. Topographic survey and drawings.

2018

PLAYA MUJERES, Q.ROO. Generation of monitoring program for SEMARNAT, bathymetry, topography and photogrammetry.

PALIYUES, RIVIERA MAYA, Q.ROO. Bathymetry, topography and project to generate artificial coves.

SIERRA DEL MAR, PUERTO VALLARTA, JAL. Generation of additional information for a beach recovery and stabilization project. Wave model generation.

FIESTA AMERICANA CHEMUYIL, Q.ROO. Modification of the artificial cove project to generate a safe swimming area.

AQUALIA, GUAYMAS. Measurement of sediment strata, bathymetry and exploration dives to evaluate the possible placement of a pipeline for a desalination plant.

GRAND VELAS RIVIERA MAYA, Q.ROO. One-year study to monitor waves, wind and shoreline behavior.



PORTO JACK PÁNAMA, PLAYA DEL CARMEN, Q.ROO. Bathymetry, topography, generation of beach recovery and stabilization project, plans, description and catalog of concepts.

SECRETS CAPRI, PLAYA DEL CARMEN, Q.ROO. Bathymetry, topography, generation of beach recovery and stabilization project, plans, description and catalog of concepts.

MAYAKOBA, RIVIERA MAYA, Q.ROO. Supervision of protection work, project modification.

SOLIMAN, RIVIERA MAYA, QUINTANA ROO. Topographic and bathymetric survey, measurement of currents statically and dynamically with ADCP, generation of mathematical models of waves, currents and sediment transport. Project generation of artificial coves with sand filling, search and measurement of exploitable sandbank for dumping sand on the beach and coves.

PUERTO CANCÚN, Q.ROO. Sandbank exploration with pneumatic probe and sampling for granulometry.

NISIBÓN, DOMINICAN REPUBLIC. Hydrographic data review, beach recovery and stabilization project generation, wave modeling in current state and with different breakwater options.

H10 UVERO ALTO, DOMINICAN REPUBLIC. Project supervision of 3 breakwaters built with '*bolsacreto*' for protection and stabilization of the beach.

COSTA PALMA, B.C.S. Bathymetric and topographic survey, wave, current and sediment transport simulation model for improvement and stabilization beach project.

UVERO ALTO TRANSAT, DOMINICAN REPUBLIC. Diagnosis and report to suggest a modification of an artificial beach Project using a break water.

GARZA BLANCA, PUERTO VALLARTA, JALISCO. Project modification according to environment authority's request (SEMARNAT) to make a project visually friendly with the surroundings. Wave current and sediment transport simulation models. Volumes and budget.

GRAND VELAS, QUINTANA ROO. Long term mathematical simulation models, including a CAT 2 and CAT 5 hurricane.

ARRECIFE EL MECO, QUINTANA ROO, ASSOCIATED NAUTICAL. Bathymetry survey with single beam echosounder, drawings and bottom profiles generation for El Meco snorkeling area.

EL CID, PUERTO MORELOS SISSYMA, QUINTANA ROO. Review of Project and hydrographic studies to generate an opinion about the feasibility of being approved by environment local authorities.

INFRAMUNDO MAYA, NATGEO, TULUM, QUINTANA ROO. Single beam survey in a flooded area in the middle of the jungle as part of a national geographic documentary film.

OCEAN BLUE AND SAND, DOMINICAN REPUBLIC. Technical recommendations to protect hotel facilities.



EISG, CANCUN, QUINTANA ROO. Topographic survey and photogrammetry.

PUERTO CANCUN LUXIMIA, QUINTANA ROO. Bathymetric survey on navigation channel using an inflatable boat.

MAYAKOBA, PLAYA DEL CARMEN. Supervision of contractors to make sure they build the beach recovery projects as it was made. Topographic follow up. Executive project to use artificial reefs made of concrete.

KANAI, RIVIERA MAYA, PLAYA DEL CARMEN. Supervision of contractors, correct building procedures, topographic monitoring, analysis of alternatives to choose artificial reefs, monitoring and problems solution of sand extraction, transport and beach nourishing.

2017

COSTA CANUVA, NAYARIT. Reviewing of jetty and marina project, assessment of design considerations, comments and suggestions.

GASODUCTO SICIM, TAMAULIPAS y VERACRUZ. Topographic and bathymetric survey on water areas such as lagoons and flooded areas where the pipe line will be installed.

LA VISTA, QUINTANA ROO. Project modification according to artificial reefs relocation, wave mathematical modeling, currents and sediment transport modeling, new volume calculation.

PLAYA MUJERES, QUINTANA ROO. Project modification according to environmental authority's requirements, new mathematical models generation, currents modeling and sediment transport modeling.

ISLA BLANCA, QUINTANA ROO. Mathematical simulation model with hurricane CAT 5 and CAT 2 to evaluate the construction of an avenue to connect the continental part of Isla Mujeres with Isla Blanca.

MAYAKOBA, PLAYA DEL CARMEN, QUINTANA ROO. Contractor's supervision, verification of correct procedures to build artificial reefs with bolsacreto, correct artificial dune building correct extraction, transport and deposit of sand from marine bank, photogrammetry and topography monitoring.

MAIN FERRY PIER, PLAYA DEL CARMEN. Multibeam system survey around over navigation areas to verify safety minimum depths.

SOLIMAN, PLAYA SENATOR, QUINTANA ROO. Topographic and bathymetric survey, current, wave height and tides measurement with Acoustic Doppler Current Profiler (ADCP), mathematical simulation model and executive project to build artificial bays with sand nourishment from a marine sand bank.



KANAI, RIVIERA MAYA, PLAYA DEL CARMEN. Supervision of contractors who built the break waters and dune as part of the beach recovery and stabilizing project. Topographic survey to monitor the coastal line.

GRAND VELAS RIVIERA MAYA, PLAYA DEL CARMEN, Q.ROO. One-year supervision to perform studies such as, measurement with Acoustic Doppler Current Profiler, tide meters, meteorological station installation at the hotel facilities to have local wind speed and precipitation, generation of new mathematical models calibrated with local measurements in order to study the area and think about solutions to stabilize the beach on the long term. Marine sand banks big enough to get sand to nourish the hotel beach.

PUERTO CANCUN, CANCUN, QUINTANA ROO. Bathymetric and topographic updating, volumes reviewing, projects changing to improve performance. Water, quality sampling.

COSTA CANUVA, NAYARIT. Project reviewing and report of technical opinion from the hydrodynamic point of view.

MANDARINA, PUERTO VALLARTA, JAL. Reviewing and change of break water level, mathematical wave simulation and analysis of benefits for the customer.

FIESTA AMERICANA CHEMUYIL, QUITNANA ROO. Answer to environment authority's requirements, additional information generation according to artificial Beach project.

GARZA BLANCA, PUERTO VALLARTA. Answer to environment authority's requirements, additional information generation according to Beach recovery project.

CREA, CANCUN, QUINTANA ROO. Executive project to build 3 break waters, topographic survey and mathematical modeling, scuba diving exploration to search marine sand banks and sampling.

LA ISLA II, QUINTANA ROO. Tides hydrographic study to determine the safe level to build structures in shopping mall over the lagoon.

GAS PIPELINE SOUTH OF TEZAS, TUXPAN ONSHORE, TAMPICO, TAMAULIPAS Y VERACRUZ. Bathymetry of flooded areas to complete LIDAR.

KANAI, PLAYA DEL CARMEN, Q.ROO. Photogrammetry to obtain georeferenced images and contractors supervision.

2016

DOS BOCAS, TABASCO. Photogrammetry to obtain georeferenced images and topographic survey over the pier area in Maritime Oil pier PEMEX.

FIESTA AMERICANA CHEMUYIL, QUINTANA ROO. Supervision to control building procedures and contractors evaluation.



PUERTO LAZARO CARDENAS, MICH. Hydrographic study with single beam echosounder to determine dredging volume, comparing with the minimum navigation channel design.

MARINE TERMINAL, PLAYA DEL CARMEN, Q.ROO. Survey with single beam echosounder in close area due to pier extension project.

HARD ROCK RIVIERA CANCUN, QUINTANA ROO. Mathematical simulation of hurricane CAT 3 and CAT 5 over property to be able to determine water levels due to tide and wave action.

GARZA BLANCA, PUERTO VALLARTA, JAL. Project modification due to hotel expansion. Wave and sediment transport modeling, volume estimation, budget, drawings and executive project.

VERACRUZ PNSAV, VERACRUZ. Survey with single beam sounder over the top of shallow reef crest and survey with multibeam system around reef crowns.

ISLA BLANCA, QUINTANA ROO. Topographic survey and drawings updating to generate a mathematical wave simulation model, flooding model, and erosion model to evaluate the sand bar dynamic between the sea and the Chacmucuc lagoon, in order to get the areas with higher risk along the axis of the avenue.

ECOPOWER MANZANILLO. Hydrographic studies to obtain bathymetry and Federal Zone limits (ZOFEMAT) to evaluate the feasibility to make an energy generation project (First stage).

CREA ECOPLADESA, QUINTANA ROO. Hydrographic studies to know the morphology and coastal dynamic to generate a coastal simulation model and project to build a break water to dissipate wave energy and promote sand accumulation in front of the property.

ZOELTRY PAAMUL, QUINTANA ROO. Hydrographic and topographic survey, marine sand banks search to generate a recovery and stabilizing beach project.

MAYAKOBA, SUPERVISION, QUINTANA ROO. Procedures control to build break waters, monitoring, quality assurance, log book following and reports.

2015

GRAND SIRENIS RESORT, QUINTANA ROO. Topographic and bathymetric survey, wave mathematical simulation, sediment transport simulation model and executive project to build artificial inlets and to widen beaches.

H10 UVERO ALTO, DOMINICAN REPUBLIC. Supervision of building procedures to make a break water to dissipate wave energy.

SIERRA DEL MAR, PUERTO VALLARTA, JAL. Bathymetric and topographic survey and mathematical wave simulation models to generate an artificial beach and design a break water.



VERACRUZ NATIONAL PARK. Digital elevation model generation, bathymetry and bottom classification survey (first stage). Hydrographic survey and depths verification, as well as, acoustic class identification around emerged reef and over shallow submerge reefs using an inflatable small boat (second stage).

PUERTO AVENTURAS, QUINTANA ROO. Executive project to create an artificial beach using artificial reefs and break water, current measurement calibrates mathematical simulation models.

SIRENIS HOTEL AND ISLA BLANCA. Water quality parameters measurement, such as, temperature, PH, salinity, dissolved oxygen, turbidity and chlorophyll.

TOPOGRAPHIC SURVEY IN PUERTO MORELOS, MAYAKOBA, LEONA VICARIO, PUNTA SAM. Topographic survey with optical system and RTK, topographic drawings and reference points processing to link with RGNA (official geodesic system in Mexico).

MARINE TERMINAL PUNTA LANGOSTA, COZUMEL, Q.ROO. Bathymetric survey and drawings generation to ensure the navigation depth is correct in front of the terminal.

HARD ROCK RIVIERA CANCUN, QUINTANA ROO. Generation of a mathematical simulation model to evaluate flooding levels in presence of extraordinary meteorological events. Bathymetric and topographic survey along 3.5 km and 2.5 km off shore. Topographic survey on golf course area and dune to generate a whole XYZ file which represents a big area with detail.

H10 UVERO ALTO, DOMINICAN REPUBLIC. Hydrographic studies, such as, topographic and bathymetric surveys, current measurement, marine sand bank search and measurement, beach recovery and stabilization project, mathematical simulation models with DELF3D software, drawings, volume calculations, building procedure description and concepts catalog. Supervision.

GRUPO STERA, HUATULCO. Field hydrographic studies and executive project to create an artificial beach using a break water. Dredge project and hydrodynamic mathematical simulation to evaluate different scenarios (first stage). Hurricane simulation model to determine maximum flooding levels and wave height.

PUERTO CANCUN, QUINTANA ROO. Hydrographic studies, such as, topographic and bathymetric surveys, current measurement, marine sand bank search and measurement, beach recovery and stabilization project, mathematical simulation models with DELF3D software, drawings, volume calculations, building procedure description and concepts catalog. Water quality evaluation with measurement in situ, using a multiparametric sounder.

FIESTA AMERICANA CHEMUYIL, QUINTANA ROO. Hydrographic studies to generate a hydro morphologic simulation model to create artificial stable beaches and protected bays with artificial reefs (first stage)

GRAND VELAS, CABO SAN LUCAS, B.C.S. Topographic survey along 2.5 km, bathymetric survey along 2.5 km by 1.2 km offshore with single beam echosounder, current measurement, wave height and tides with Acoustic Doppler Current Profiler static and dynamic. Sand samples collecting, exploring with scuba diving equipment, sand marine



banks search with low frequency echosounder, mathematical simulation model generation, and beach recovery and stabilization project.

PARADISUS, PLAYA DEL CARMEN, Q.ROO. Bathymetric and topographic surveys were carried out, as well as, sand samples collecting to generate wave and sediment transport simulation mathematical model and beach recovery and stabilization project.

2014

EL ANHELO BARRILES, B.C.S. Hydrographic studies were performed, such as, bathymetric and topographic survey, current measurement with Doppler profiler equipment (ADCP), mathematic models were generated with Delft3D software, sediment transport calculation and by pass project. Hurricane simulation mathematic models were also generated to determine hurricane wave and extraordinary tide levels (studies performed in alliance with National University of Mexico Engineering Institute).

LAS VISTA, PUERTO MORELOS, Q.ROO. Bathymetric and topographic survey were performed as well as current measurement, sand bank search, exploration and measurement with a low frequency sonar. An executive beach recovery project was made and hydrodynamic models were generated and performed to evaluate different protection alternatives.

PLAYA MUJERES, CANCUN, Q.ROO. Bathymetric and topographic survey were carried out, a hydrographic model was generated to know wave and sediment movement local conditions, several coastal protection configurations were proposed and modeled to finally reach the best option, which was described in an executive project and drawings, the solution involved the use of a sand bank to nourish the beach.

PUERTO CANCUN, Q.ROO. Risk analysis facing flooding and wave action. A numerical model was generated to model a hurricane CAT 5 hitting the coast line: wave action, precipitation and storm tide were considered. Maps of flooding, wave coastal impact and drainage after the storm were modeled and simulated.

HUAPANGO DAMP, TIMILPAN, EDO DE MEXICO. Bathymetry survey, drawings and dam capacity volume calculation.

MARINE CABO SAN LUCAS, B.C.S. Bathymetry survey, side scan survey and SCUBA diving exploration to identify damage and obstacles underwater after hurricane Odile pass.

UVERO ALTO, PUNTA CANA, DOMINICAN REPUBLIC. Topographic survey coordination, wave and sediment modelling using present conditions and then with several changes in morphology to improve the current artificial beach. Drawings, specifications and concepts catalog to improve the beach.

DEVELOPMENT 'LA MANDARINA', RIVIERA NAYARIT. Hydrographic studies, hydrodynamic and sediment modelling, complete project to recover and stabilize the beach building artificial reefs located parallel to shore line and nourishment with sand from a loan marine bank.



'ALEPH CONSULTORES', DOS BOCAS. ADCP (Acoustic Doppler Current Profiler) set on the bottom of a navigation channel, intensity and direction currents, height, period and direction waves and tide information was processed in a moon cycle.

'MINERA PEÑASQUITO', ZACATECAS. Damp bathymetric survey, damp's clear water volume determined and quality water parameters such as turbidity, PH, dissolved oxygen and salinity were obtained with a multi beam sensor.

HOTEL HYATT ZILARA, CANCUN, Q.ROO. Bathymetric survey and drawings for urban civil protection.

MANGROVES OF NICHUPTÉ, ANP CONANP, Q.ROO. Participation in workshop to rehabilitation and improvement of flooding zone drainage, invited by CONANP, important environment regulator organ from the government in Mexico

2013

'OFRENDAS SUBMARINAS', BAHIA DE MUJERES, Q.ROO. Hydrography studies, numerical simulation, products generation in order to achieve an Environmental Impact Assessment to build submarine cemetery by introducing sculptures and alcoves.

RIO PAPAGAYO, ACAPULCO. Bathymetric survey on the shoreline, river and deep waters right after hurricane Manuel.

PORTO REAL, PLAYA DEL CARMEN, Q.ROO. Topobathymetric survey, Stratigraphy and sediments analysis. Mathematical simulation of coastal dynamics, sediment dispersions. Feasibility analysis and planning for beach recovery project.

INE, PLAYA DEL CARMEN, Q.ROO. Topographic survey of verification sections to determine dune morphology.

HOTEL MOON PALACE, CANCUN, QUINTANA ROO. Bathymetric and Topographic surveys, sediments analysis. Coast Hydrodynamic, waves and sediment simulation for a recovery Project base on Reef Balls protection.

SCHLUMBERGER, PEMEX PORT, DOS BOCAS. Currents measurement with Acoustic Doppler Profiler (ADCP) along 4 lines in front of the port for future residual water movements.

PEMEX OIL PLATFORMS, ABKATUN-D ENLANCE LITTORAL. Currents measurement with Acoustic Doppler Profiler (ADCP), water temperature, salinity, PH, oxygen concentration, chlorophyll at different depths with a water quality device and the numeric modeling to determine direction and distance of dispersion of residual waters thrown into the water from oil platforms.

HOTEL FIESTA AMERICANA PUERTO VALLARTA SUITES. Topobathymetric survey, coastal modelling and executive Project modification for beach protection and recovery.

TULM, QUINTANA ROO (GRUPO SENATOR). Topography survey on the beach to determine the geoshape of the coast line.



GARZA BLANCA, PUERTO VALLARTA, JAL. Bathymetric survey of 300 Ha, Topography survey of 2.2 km of shoreline, currents and sediments hydrographic studies studios. Wave numeric modeling and sediment dispersion in current conditions and also with breakwater protections. Complete executive project of beach protection and recovery.

MAYAKOBA AND TRES RIOS, RIVIERA MAYA, QUINTANA ROO. Topobathymetric survey of 1050 ha, Hydrographic study of currents between Punta Bete and Punta Maroma. Executive Project of the protection and beach recovery.

HARD ROCK PUNTA CANA, DOMINICAN REPUBLIC. Current waves and sediments dispersion modeling. Waves and sediments dispersion with two breakwaters added, both in normal and storm conditions in the software Delft. Construction supervision of the two breakwaters.

2012

HARD ROCK HOTEL, RIVIERA MAYA, MEXICO. Topobathymetric Survey, currents and tides measurements, sediment sampling, hydrodynamic modelling to improve water flow dynamics and sediment stability in a system of 21 Ha of artificial coves and channels.

SABANCUY, CAMPECHE. Bathymetric survey on 135 Ha of the lagoon and 100 Ha of Sabancuy shoreline, sand volume calculation for beach recovery use and also the navigation channel dredge volume analysis.

XPICOB, CAMPECHE. Topobathymetric Survey on 420 Ha of sand banks, seabed sampling and sand volume calculation.

TARANGO DAM, MEXICO CITY. Topographic survey and sediment sampling. Executive project for basin dredging, confinement using geosynthetics and slope stabilization. Rain flooding and erosion computer simulations.

PROYECTO SAKURA, PUERTO MORELOS, Q.ROO. Feasibility and previous project for beach recovery, environmental analysis and wave simulation.

ISLA IXTAPA, GRO. Modeling of river flooding, executive Project for Riverside stabilization using gabions and concrete mats.

PUERTO CANCUN CONDOMINIUM, Q.ROO. Topobathymetric Survey, feasibility analysis and planning for beach recovery project.

2011

DESTINY XCARET, PLAYA DEL CARMEN. Sand Banks sampling and volume calculation. Executive project for the construction of artificial coves and beaches. Mathematical simulation of sand stability and dispersion. Multiple products for EIA.

CONFIDENTIAL MARINA, MEXICO. Topobathymetric survey of internal and external navigational channels (20 Km approx. length), Survey of groins and canal slopes. Bottom



sampling and identification, drawings, sections, dredging templates and volume calculations.

NOW JADE HOTEL, PUERTO MORELOS, Q.ROO. Bathymetric survey for artificial reef project.

CABLE AM1 ALCATEL, CANCUN, QUINTANA ROO. Bathymetric survey, wave, tide and currents measurement with Acoustic Doppler Profiler (ADCP), sediment sampling and granulometry analysis. Simulation of sediment dispersion for cable installation for Environmental Impact Assessment.

TRES MARES, PUERTO VALLARTA. Bathymetric survey, currents measurement with dye, Mathematical simulation of marina project to evaluate shoreline effects.

COUNTRY CLUB, CAMPECHE. Multiple hydrographic surveys, mathematical simulation for wave, currents, tides and morphology. Project for an artificial beach and marina for a 4,000 houses development.

2010

PARK TOWER, PUERTO VALLARTA. Bathymetric survey, currents measurement, sediment analysis, Wave modeling, Project for the construction of artificial beach and river control.

Hard Rock Hotel, Punta Cana, Dominican Republic. Topography and bathymetric survey of 7.6 km of coast, from Punta Macao to 'Punta Arena Gorda', sediment sampling and analysis, bottom type mapping, coastal dynamics simulation, executive Project for wave mitigation structures.

VALLARTA BAY, PUERTO VALLARTA, JAL. Topobathymetric survey for hotel project.

ISLA BLANCA, QUINTANA ROO. Setting of survey reference points with 2 band RTK units, Bathymetric survey of 30,000 Ha, From Chacmucuc lagoon to the north of Contoy Island. Stratigraphy and sediments analysis. Mathematical simulation of coastal dynamics, sediment dispersions. Wave and wind measurement with ADCP unit. Coastline evolution analysis, different products for environmental impact assessment.

SANCHEZ MAGALLANES, TABASCO. Topography and bathymetry survey in 3 Km shoreline, including jetties and estuary inlet.

2009

ISLA CORTES, ALTATA, SINALOA. Executive Project for artificial dune at private residence.

'ESPIRUTU SANTO' ISLAND, LA PAZ, B.C.S. Bathymetry, currents, seabed sampling and assessment of the marine park regulations for an underwater sculptures area.



FIESTA AMERICANA GRAND CORAL BEACH, CANCUN, Q.ROO. Tide analysis and Federal Zone survey with NOM 146.

COLONIA, YUCATAN, STAKING. Topographic survey and Georeferenced of 165 Ha for deeds.

2008

SHERATON, PUERTO VALLARTA. Hydrography, coastal topography, sediment analysis, coastal simulation model and executive project for beach recovery.

CARACOL SANDOS, PLAYA DEL CARMEN, Q.ROO. Topobathymetric Survey and volume calculation for cenote dredging.

H10 OCEAN MAYA, PLAYA DEL CARMEN, Q.ROO. Bathymetry, currents and sand borrow site analysis for Beach Project modification.

DOS BOCAS, TABASCO. Bathymetry and coastal survey for beach recovery project in 4km coastline for PEMEX.

'MISION OBISPADO' CANCUN. Topographic survey and lot limit staking of 42 Ha for house development using RTK.

HOTEL ARRECIFE, PUERTO MORELOS, Q.ROO. Hydrographic studies, sediment and beach profile analysis and beach recovery project.

KANAI, PLAYA DEL CARMEN, Q.ROO. Construction project and survey of 17 km of coastline for beach improvement.

MARRIOT MVCI, CANCUN. Bathymetric and topographic survey, sediment analysis for beach and dune protection project.

'LOS MEDANOS', IXTAPA. Hydrography, topography, sediment analysis, modelling and project for beach improvement. Vegetation, hydrogeology, EIA, seabed studies coordinator. 220 Ha project.

'MONTECRISTO', ZIHUATANEJO, GRO. Bathymetry and feasibility study for artificial beaches.

PLAYA CALETA, ISLA MUJERES. Hydrography, sand borrow site analysis, project and EIA for beach protection and dune restoration project.

'PORTO IXTAPA, GRO. Feasibility for construction of artificial beaches.

CHALACATEPEC, COSTA ALEGRE, JAL. Bathymetric and currents survey of 2750 Ha, 14 km Beach front, Static ADCP deployment for currents, waves and tides measurements. Beach profile topography.



DREAMS RIVIERA MAYA, PUERTO MORELOS, Q.ROO. Topobathymetric and project for artificial dune construction.

PUERTO CANCUN, QUINTANA ROO. Dredging control of navigational channel.

LORETO PARAISO, LORETO, B.C.S. Hydrography of 22,000 Ha, 24 km beachfront, ADCP vessel mounted for current profiling.

HOTEL GRAND VELAS RIVIERA MAYA, QUINTANA ROO. Topography, bathymetry, sediment study, marine modelling and construction project for beach and dune restoration using offshore parallel breakwaters.

CANCUN, QUINTANA ROO. Bathymetry and dive inspection of structures for government beach recovery project.

2007

COSTA MUJERES, QUINTANA ROO. Bathymetric survey and current profiling with ADCP (Acoustic current doppler profiler), mathematical modelling, sediment and seabed inspection of 6,700 Ha for EIA. Navigational channel survey and drawing. Hurricane incidence analysis. Net longshore sediment transport study.

HOTEL FIESTA AMERICANA CONDESA CANCUN, Q.ROO. Bathymetry and Surrey of beachfront.

HOTEL H10 PUERTO MORELOS, QUINTANA ROO. Bathymetry of 38 Ha, sediment and seabed analysis. Construction Project for a 120 m dock.

PUNTA GARROBO AND LAS POZAS, ZIHUATANEJO, GRO. Bathymetry of 260 Ha, currents study, stratigraphy, sand grain analysis and feasibility Project for artificial beaches.

PORTO IXTAPA, ZIHUATANEJO, GRO. Feasibility for the construction of salt water pools.

REAL DEL MAR, EL TIZATE, BAHIA DE BANDERAS, JAL. Statistical analysis of wave and tide incidence in front of the project site.

MARINE PARK COSTA OCCIDENTAL DE ISLA MUJERES, PUNTA CANCUN AND PUNTA NIZUC. Bathymetry, border identification, buoy marking and reef targeting of 9,000 hectares of the 3 parks.

HOTEL FISHERMEN'S VILLAGE II, PLAYA DEL CARMEN, Q.ROO. EIA for beach recovery project.

2006

SISTEMA SENTINEL PEMEX AT CD. DEL CARMEN, CAMP. Bathymetry, coastal modelling and project for beach protection.



ALCATEL, Playa del Carmen y Cozumel. Bathymetry, plans, sections and bottom identification of fiber optic cable laying.

EMERALD COVE, ANTIGUA, BWI. Bathymetry, sediment analysis and project for artificial beaches.

PORTA FORTUNA, PUNTA MITA, NAYARIT. Bathymetry and modelling for artificial beach and saltwater pools.

2005

HOTEL GALA ESMERALDA, PLAYA DEL CARMEN, Q.ROO. Project for beach recovery and EIA.

EMERGENT PROJECT FOR PROTECTION IN 'PLAYA DEL CARMEN', CANCUN. Coordination and lobbying for hotel association while performing emergency protection after hurricane Wilma.

HOTEL GRAN CARIBE REAL, CANCUN. Sea wall protection project.

ALDERNEY RENEWABLE ENERGY, CHANNEL ISLANDS, UK. Bathymetry, tidal currents profiling and energy assessment for underwater electrical generators.

2004 and previous.

HOTEL CARACOL VILLAGE, PLAYA DEL CARMEN. Construction project and lobbying for beach recovery project.

HOTEL DREAMS CAPRI (FORMERLY CAPRI CARIBE), PLAYA DEL CARMEN. Project and EIA for beach recovery project.

FIESTA AMERICANA PUERTO VALLARTA. Bathymetry, feasibility and project for beach recovery.

HOTEL FIESTA AMERICANA CORAL BEACH, CANCUN. Survey, original project and modifications for artificial beach construction.

SIERRA DE MAR, PUERTO VALLARTA. Field studies, feasibility, project and supervision of 3 artificial beaches.

LACOSA CONCRETE, VERACRUZ PORT. Supervision and report of underwater concrete pouring.

HOTEL H10 OCEAN MAYA (FORMERLY MANDARIN), PLAYA DEL CARMEN. Project, lobbying, EIA and follow up of beach recovery project.

HOTEL RIU CARIBE, CANCUN. Design, EIA, follow up and modifications of artificial beach project.



Sunset Club Lagoon, Cancun. Design and construction of dikes for land reclamation. Dredging for marina.

PLAYA MUJERES, CANCUN. Seagrass removal of 10,000 Ha.

LAGOON SYSTEM NICHUPTÉ BOJÓRQUEZ, CANCUN. Multiple bathy surveys for private properties.

PLAYACAR PHASE I, PLAYA DE CARMEN. Building of multiple beach structures for beach protection.

Viva Maya, Playa del Carmen: Design and construction of beach recovery project with sandtainers in 3 breakwaters.

PARAÍSO DE LA BONITA, PUERTO MORELOS. Design of project for beach improvement.

HOTEL WESTIN REGINA, CANCUN. Construction of 3 concrete offshore breakwaters for beach recovery.

DOLPHIN DISCOVERY, COZUMEL. Underwater construction supervision.

TAXCO, GUERRERO. Recovery of underwater pump in abandoned well shaft.

GOVERNMENT OF MICHOACÁN, URUAPAN. Inspection and explosives deployment in underwater bridge piling.

FERTIMEX, LÁZARO CÁRDENAS. Inspection and videography of underwater waste tube disposal system.

There are other multiple underwater small projects, such as inspection, photo and video, survey and topography.

The founder of Tecnoceano is Ernesto Gray, who has undertaken the design, field studies and lobbying of coastal projects for over 18 years throughout Mexico and in other countries, accumulating vast experience in beach recovery, supervision and ecosystem synergy.

A civil engineer with an MSc in Offshore Technology, he has been involved in a variety of marine projects, comprising hydrography, design, construction and supervision, with experience in the Yucatan Peninsula since 1992.

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