

Index

A

Abiotic factors, 474
Absolute viscosity, 17
Acute toxicity tests, 484
Ad-hoc procedures, 35
Aerial survey, 439
Aerobic microorganisms, 27
Airguns, 434
Akaïke information criterion (AIC), 540
Aliphatic pathway, 115
Americamysis bahia, 471
Anaerobic hydrocarbon degradation, 113
Anoplopoma fimbria, 471
Anthropogenic noise, 434
API, 16, 17, 87, 89–92
Aquatic toxicity data, 491, 492
Aquatic toxicology, 471
Archimedes number, 67
Artificial seawater, 71
Aryl-hydrocarbon receptor (AhR), 401, 500, 517
Asphaltenes, 16, 26, 92, 98
Atlantis ecosystem models, 570, 571
 biological drivers, 539, 541, 542
 cumulative effects, 537
 environmental drivers, 538, 539
 fisheries catch data, 556
 fishing mortality, 545
 functional groups, 542, 543, 555
 recovery time, 545
 relative biomass, 544, 546
 small pelagic, 543
GoM implementation, 538
growth rate, 557
hydrodynamic data, 555
hydrodynamic model, 537

irregular 3D polygon structure, 553, 555
irregular polygon structure, 537
Ixtoc 1, 554
mortality effects, 557
polygon geometry, 542
SGoM, 553
 structure and functioning, 553
Atmospheric pressure photoionization (APPI), 255–258
Atomization breakup, 46

B

Bacteroidetes, 111
Baffled flask dispersibility test, 164
Barataria Bay, 438, 439, 451
Bathymetry, 179
Bay of Campeche, 313–317, 320
Beaked whale, 432, 439–441, 447, 449–451, 454
Benthic foraminifera, 292, 293, 295
 Bulimina spp. and *Uvigerina* spp., 278
C-13 depletion, 278
carbon isotope composition, 383
description, 375
distribution, in the GoM, 375
DWH oil spill
 density, 376
 depletion, 377
 diversity, 376
 MOSSFA, 376
 oiled-flocculent flux, 376
 in pre-DWH intervals, 377
 resilience, 378, 379
 response, 377
 stable carbon isotopes, 378

- Benthic foraminifera (*cont.*)
 ecological impact, 278
 Ixtoc 1 oil spill
 density and diversity, 380
 MOSSFA, 379
 resilience, 382–383
 stable carbon isotopes, 382
 wellhead, 379
 long-term time-series studies, 383
 metrics, benthic ecosystem resilience, 383
 resilience, 279
 utility, 384
- Benthic foraminiferal calcite ($\delta^{13}\text{C}_{\text{CaCO}_3}$), 292
- Benthic impacts, 383
See also Benthic foraminifera
- Benzene, toluene, ethylbenzene and xylene (BTEX), 305–307, 309
 components, 127
 compounds, 126, 128, 130–133, 136
 concentration vs. time profiles, 128
 dissolved fraction, 134
 live and dead oil, 132
 partitioning, 126, 131, 132
- Bimodal distribution, 57, 58
- Biodegradation, 27, 256, 257, 259
 aerobic, 97
 alkanes and alkyl aromatics, 99
 asphaltenes, 98
 beached oil/oil dispersed, 15
 density, 98
 dispersed and dissolved oil, 96
 field samples, 97
 hydrocarbons in water column, 173, 174
 marine snow, in water phase and benthic zone, 307–309
 and oil weathering, 89
 PHC (*see* Petroleum hydrocarbon (PHC) biodegradation)
- Biodiversity, 357, 358, 362, 367
- Bioindicators, 375
- Biomarkers, 261, 262, 331, 332, 336, 337
- Biominalization, 383
- Bioturbation, 240, 242, 245, 246, 248, 249
- Blowout preventers (BOPs), 5, 6, 8, 20, 54–57, 76
- Blowout scenarios, 585
- Blowouts (deep oil)
 API, 16, 17
 aromatic group hydrocarbons, 16
 asphaltenes, 16
 bulk oil properties, 16–18
 characteristics, 16
 chemical surfactants, 18
 crude oil, 15, 16
 dead oil, 17
 density, 16, 17
 far-field fate, 21–23
 reservoir, 18–19
 resins, 16
 SARA, 16
 saturate group, 16
 subsurface release, 19–21
 surface shipping, 15
 viscosity (*see* Viscosity (oil))
 weathering processes, 15
- Bluefin tuna, 421, 422
- Bond number, 67
- Branched and isoprenoid tetraether (BIT)
 index, 294, 295
- Breakage rate, 53
- British Petroleum (BP), 20
- Brunt-Vaisala frequency, 21
- Bryde's whale, 432, 433, 439, 440
- Bulk oil properties, 16–18
- Buoyancy-driven processes, 67
- Buoyant plume, 19–21
- Buoyant velocity, 67
- Bureau of Ocean Energy Management (BOEM), 6, 358
- Bureau of Safety and Environmental Enforcement (BSEE), 6
- Burnout effect, 115
- Bycatch, 435, 453
- C**
- Capping stack, 176
- Carbon intensity distribution, 29, 31
- Carbon isotopic composition, 289
- Cardiomyocytes, 502
- Cardiotoxicity, 392, 501
- Catalase (CAT), 506
- Catch per unit effort (CPUE), 394
- C-13 depletion, 278
- Chemical Aquatic Fate and Effects (CAFE), 473
- Chemical dispersants, 91, 142
 biodegradation of oil, 305–307
 enhanced bioavailability and biodegradation, 304–305
 mechanisms, 303
 oxygen competition, 303–304
- Chemical dispersion
 benthic, 167
 calculation, 156
 C-IMAGE project, 156
 effectiveness, 165, 166
 oil qualities, 156

- oil slick elongation model (*see* Oil slick elongation model)
 - spill conditions, 156
 - surface oil, 156
 - water column, 166, 167
 - Chemical Response to Oil Spills: Ecological Effects Research Forum (CROSERF), 481, 482, 485, 488, 492, 493
 - Chemical surfactants, 18
 - Chemically enhanced water accommodated fractions (CEWAF), 471, 473, 474, 486, 487, 500, 501, 505, 506
 - Chemosynthetic, 469
 - C30-hopane normalized *n*-alkanes (C13–C30), 309
 - Chromatin immunoprecipitation (ChIP), 520
 - Chromosomal aberrations, 523
 - Chronology, 240, 241, 244
 - Chronostratigraphy, 319
 - C-IMAGE, 145, 156
 - Clay-oil flocculation, 198
 - Clean Water Act, 5
 - Coastal aquatic species, 471
 - Coastal oil residues, in southern GoM
 - Bay of Campeche, 329
 - marine system, 329
 - post-spill fate similarities, 330
 - surface oil slicks, 329
 - Coastal pollution, 375
 - Coastal Zone Color Scanner (CZCS), 330
 - Commercial fishing
 - average annual basis, 577
 - Gulf states model and Gulf counties model, 576
 - Gulf States Model and Gulf Counties Model, 576, 579
 - No Oil vs. Oil scenario, 575, 576, 579
 - Compressibility, 18, 19
 - Computational fluid dynamics (CFD)
 - approaches, 54, 79
 - Conceptual models, DWH oil spill, 347, 348
 - Condensed gas droplets, 141
 - Connectivity Modeling System (CMS), 177, 179, 180, 538, 570
 - application, 185, 188
 - biodegradation dynamics, 175
 - DSDs, 176
 - 4th order Runge-Kutta integration scheme, 175
 - half-life decay rate, 176
 - HYCOM, 176
 - NOGAPS, 177
 - numerical case studies, 177, 178
 - oil application, 175
 - oil distribution, 181
 - oil residue sedimentation, 185–188
 - output and post-processing variables, 178–179
 - post-processing algorithms, 175, 176
 - pseudo-components, 176
 - surface oil expression, 179–181
 - transport, 175
 - Coral reef, 470
 - Corexit 9500, 444, 482
 - Corexit 9527, 444
 - Corexit degradation, 303
 - Coupled near-field and far-field models, 145–150
 - Critical body burdens (CBB), 471
 - Critical nucleation radius, 32
 - Crude oils, 15, 16
 - Macondo, 202
 - oil-particle interactions, 198
 - physicochemical properties, 259
 - Cytochrome P450 (CYP), 504, 517, 518
 - Cytotoxicity, 444
- D**
- Darcy's law, 19
 - Dead oil, 17, 53, 56–58, 74, 127, 131, 132
 - Deep Gulf of Mexico Benthos (DGoMB), 364
 - Deep ocean communities, 469
 - Deep plumes, 109
 - Deep-sea
 - blowout, 171
 - physical properties of oil
 - bubble point, 31, 32
 - critical nucleation radius, 32
 - density and swelling, 33
 - diffusivity, 33
 - gas saturation, 32
 - IFT, 34, 35
 - live fluids, 31
 - viscosity, 33, 34
 - sediments, microbial community, 115, 116
 - Deep-sea corals, 357, 358, 360, 368
 - Deep-sea on DSD
 - BOPs, 56
 - dissolved gases, 56, 57
 - gaseous components, 56
 - phase changes, 57, 58
 - Deep-sea sediments, 286, 288, 289
 - DeepSpill, 7, 8, 47, 49
 - field experiment in deep sea, 49

- Deep-subsea spills
 - surface releases, 90–91
- Deep water drilling, 5
- Deepwater Horizon* (DWH) blowout
 - chronometers, for deposition, 239
 - critical approaches
 - multidisciplinary approach, 248
 - rapid response and collection, cores, 246
 - sampling resolution, 247–248
 - time-series, 247
 - duration, 238
 - FTICR-MS applications, 254 (*see also*
 - Fourier-transform ion cyclotron resonance-mass spectrometry (FTICR-MS))
 - origin, 236
 - preservation potential, in sedimentary record, 245
 - sedimentary impacts, 238
 - sedimentary response, 241
 - sedimentologically complex, 236
 - time series approach, 239
- Deepwater Horizon* (DWH) oil spill, 5–9, 14, 15, 17–22, 87, 90–93, 95, 96, 100, 126, 417, 419, 427, 481, 498, 521, 537, 587, 588
 - Atlantis ecosystem modelling, 537
 - biodiversity, 589
 - chemical dispersants, 303
 - cumulative release, 222
 - description, 202
 - dispersant application, 302
 - dispersants, 356
 - ecological impacts (*see* Ecological impacts, DWH oil spill)
 - effects, 552
 - expense, 588
 - experiments, 585
 - Gammaproteobacteria*, 304
 - human communities (*see* Human communities)
 - marine mammals (*see* Marine mammals)
 - marine snow, 207
 - mass accumulation rates, 223
 - megafauna (*see* Megafauna, GOM)
 - microbial response, 204
 - model-related efforts, 590
 - MOSSFA Workshop, 206
 - offshore oil and gas development, 345
 - post-DWH layer to pre-DWH, 224
 - research, 585, 586, 590
 - sea turtles (*see* Sea turtles)
 - site, 207
- Deep-water oil and gas spill, 8
- Deepwater oil spill, 141
- Deepwater oil well blowout, 140
- Deepwater plume, 110, 111
- Deepwater release, 141
- Degassing, 75, 80
- Degradation, oil and gasses
 - aromatic hydrocarbons, 97
 - asphaltenes, 98
 - concentration, 97
 - densities, PHC, 98, 99
 - ecological goal, 99
 - GoM, 97
 - hopanes, 98
 - live oil, 97
 - photooxidation, 99
 - plumes, 96
 - S/V, 97
 - TPH, 97
- Deionized water, 71
- Deposited oil, 114
- Diatomite, 200
- Dichloromethane, 129
- Diffusivity, 38, 39
- Dimensionless numbers, 52, 53
- Dispersants
 - advantages and limitations, 60
 - application, 130–131, 156, 162–164, 302
 - biodegradation, 109
 - chemical, 48, 92, 127, 164
 - (*see also* Chemical dispersion)
 - dosages, 161, 163
 - droplet sizes, 163
 - impact and effectiveness, 127
 - microbial community and biodegradation, 112
 - NET effect, 157
 - oil-water interfacial tension, 163, 164
 - oil-water system, 133
 - spill response method, 135
 - spraying, 161
- Dispersant-to-oil ratio (DOR), 48
- Dispersed oil, 109, 307
- Dispersibility factor, 158
- Dissolved gases, 56, 57, 75
- Dissolved organic matter (DOM)
 - with FTICR-MS, 259
 - groups of compounds, 259
- Dose-response calculations, 538
- DOSS (dioctyl sodium sulfosuccinate)
 - signature, 135
- Double bond equivalent (DBE), 28, 29, 31, 256, 261–263
- Drop formation processes, 46

- Drop size distributions (DSDs)
 - and bubble, 142
 - characteristics, 52, 171, 172
 - CMS, 146, 178
 - datasets, 50
 - deep sea (*see* Deep-sea on DSD)
 - DeepSpill, 47, 49
 - and development, 150
 - dispersed oil phase, 47
 - DWH blowout, 172, 177
 - energy dissipation metrics, 54–55
 - estimates, 178
 - experimental measurements, 50
 - far-field computations, 146
 - far-field fate, 22
 - in situ measurements, 47, 49, 50
 - mechanistic modelling, 53
 - oil concentrations, 176
 - oil fate and behavior, 21
 - peak, 177
 - pilot-scale jet experiments, 47, 48
 - profiles, 175
 - Rosin-Rammler distribution shapes, 172
 - scaling-based models, 52, 53
 - SSDI, 142, 176
 - stirrer cells, 48, 49
 - subsea oil discharge, 47
 - surface oil concentrations, 181
 - from TAMOC, 146
 - validity, 184
 - variations, 188
- Droplet breakup, 46, 53, 57, 58, 159
- Droplet formation
 - in deep-sea conditions, 172, 173
- Droplet OMAs, 200
- Droplet size, 159, 160, 163
- DWH aquatic toxicity data, synthesis, 487, 488
- DWH toxicity testing
 - aquatic toxicity data, 491
 - SSDs, 491
 - standard aquatic species, 491
- Dynamic viscosity, 17, 22, 68

- E**
- Early life stages (ELS)
 - cardiac development and functional effects, 500, 508
 - differences, sensitivity, 499, 500, 508
 - non cardiac developmental effects, 501
 - species-specific differences, sensitivity, 499
- EC50, 488
- Echolocation, 441, 445, 447, 448

- Ecological impacts, DWH oil spill
 - characteristic biological resources, 345
 - chronic impacts, 351
 - conceptual models, 347
 - injuries, mesophotic reefs, 349
 - Natural Resource Trustees, 345
 - NRDA process, 346
 - pathways of injury, 351
 - severity, 351
 - trustees, 347, 349
- Ecological oxidative stress, 509
- Economic indicators, 574
- Ecosystem-level effects, 9
- Ecotoxicology, deep ocean spills
 - aquatic species, 471, 472
 - chemosynthetic, 469
 - coastal environments, 470
 - deep ocean communities, 469
 - deep ocean environment, 475
 - DWH oil spill, 468
 - habitats and oceanographic zones, 467
 - hydrocarbon exposure, 467
 - offshore, 469, 470
 - subsea oil spill, 475
 - toxicity extrapolation approaches (*see* Toxicity extrapolation approaches)
- Electrospray ionization (ESI), 255, 256
- Ellipsoidal bubbles, 71
- Endangered Species Act, 5
- End-to-end ecosystem model, 553
- Energy cascade, 54
- Energy dissipation metrics
 - BOPs, 54
 - live oil, 54
 - near-field plume, 54
 - Reynolds number, 54
 - TDR (*see* Turbulence dissipation rate (TDR))
 - TKE (*see* Turbulent kinetic energy (TKE))
 - Weber number scaling, 54
- Enhanced dissolution, 305
- Entanglement, 434–436
- Entrainment events, 157
- Environmental oil fingerprinting, 318
- Eötvös number, 67
- EPA, 483, 486, 488
- Eukaryotes, 27
- Eukaryotic microbes, 203
- Experimental simulation, 127
- Extracellular polymeric substances (EPS), 303, 307
 - bacterial, 204
 - marine snow, 198
 - and oil degradation products, 204

Extrapolation, 50
Exxon Valdez, 96, 427
 Eyring's equation, 17

F

Far-field fate
 bimodal droplet distribution, 22
 DSDs, 22
 laminar breakup, 22
 non-spherical droplet, 22
 oil droplets, 21
 research community, 22
 spilled oil, 23
 Stokes law, 21
 subsurface oil droplets, 23
 surfactants, 22
 turbulence, 22
 turbulent breakup, 22
 water carries, 21

Far-field modelling
 biodegradation rates, 145
 CMS (*see* Connectivity Modeling System (CMS))
 composition and characteristics, 144
 DSDs, 171
 hindcast model, 171
 jet breakup, 142
 jet plume model, 171
 Lagrangian particles, 144
 mass balance, 145
 MOS, 145
 numerical modeling support, 172–175
 oil-CMS, 145
 oil dispersal, 141
 oil fate, 171
 oil reaches, 141
 physicochemical characteristics, 144
 plume, 142
 sub-grid-scale turbulent diffusion, 144
 3D, 171
 transport and biological processes, 140
 velocity, 144, 145

Fifth percentile HC (HC5), 473
 Fingerprinting, 337
 Fish biomass, 560, 565
 Fish guilds recovery, 553, 560
 Fish mortality, 565
 Fisheries, GOM, *see* GOM fisheries
 Fishing mortality, 537
 Flake OMAs, 200
 Flow regimes, 45, 46
 Focused beam reflectance method (FBRM), 49
 Foraminifera $\delta^{13}\text{C}$, 292, 293

Fossil fuels, 6
 Fourier-transform ion cyclotron resonance-mass spectrometry (FTICR-MS), 28, 229, 254, 294, 295, 321, 323, 332–335
 analytical space, 254, 255
 APPI, 255, 256
 complex organic mixtures analysis, 254
 DOM and oil spill assessments, 259–260
 ESI, 256
 ESI-FTICR-MS, 263
 in-reservoir biodegradation, 257
 marine oil snow associations, 262–264
 mass spectra, 255
 in positive-ion APPI, 257, 258
 RADAR, 260
 weathering processes, 256
 to WEOM, 262

Fundamental/semi-empirical methods, 173

G

Gammaproteobacteria, 111, 304
 Gas bubbles, 140, 141, 143–145
 characterization, 68
 ellipsoidal shape, 69
 formation force, 71
 Gray value distribution, 69
 high-pressure steel vessel, 69
 hydrate-coated, 70
 immobile interface, 68
 immobilization, 71
 initial shape deformations, 71
 methane, 69
 pressure, 69
 pure gas-liquid systems, 68
 regimes, 68
 rise velocity, 69
 surface-active substances, 68
 temperature, 69
 types of water, 70
 zigzag/helical rise path, 71

Gas chromatography, 255–258, 264
 Gas chromatography, coupled with tandem mass spectrometry (GC-MS/MS), 331–333
 Gas chromatography-mass spectrometry (GC-MS), 129–130
 Gas hydrates, 20, 77–79
 Gas-liquid equilibrium partitioning, 35
 Gas microbubbles, 57
 Gas saturation, 32, 36, 37
 Gas washing, 27
 GC/MS/MS-MRM, 287

- GC-MS amenable, 28
- Gene expression/transcriptomics
- AHR pathway, 517–520
 - miRNA, 519
 - molecular technology, 516
 - nervous system degeneration, 519
 - RNASeq, 516, 517
 - Tmt2*, 518
- Gene regulation/epigenetics
- biomarkers, exposure, 522
 - chromatin remodeling, 520
 - DNA modifications, 520
 - DWH oil spill, 521
 - environmental stimulus, 520
 - TCDD, 521
 - toxin/toxicant exposure, 521
 - transcriptional analysis, 521
- Generalized additive models (GAM), 395
- Genomic, 472, 476
- Glycerol dialkyl glycerol tetraethers (GDGTs), 294, 295
- GOM fisheries
- DWH, 416
 - landing, 415, 417–419
 - large marine ecosystem, 415
 - oil spills, 416
 - population, 426, 427
 - production, 415
 - red snapper, 419–421
 - Shrimp, 415, 423, 425, 426
 - tunas, 421–424
- Gravitational acceleration, 67
- Green Canyon, 438
- Green turtle, 433, 434, 436
- Gulf killifish, 504
- Gulf of Mexico (GoM), 89, 90, 271, 498, 537, 587–589
- fisheries (*see* GOM fisheries)
 - geological features, 356
 - MOSSFA event, 270
 - NGoM, 270
 - oceanic food webs, 356
- Gulf of Mexico Research Initiative (GoMRI), 9, 15
- Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), 130
- H**
- Habitat shifts
- artificial reef systems, 396
 - CPUE, 394
 - fish assemblages, 395
 - impacted vs. unimpacted sites, 395
 - species composition, 394
 - species rebounded, 396
- Hard-bottom communities, deep GoM biodiversity ecosystems, 357
- deep-water corals, 357
 - after DWH (2011–2014), 359–362
 - before DWH, 357–358
 - during DWH (2010), 358–359
 - hard grounds, 357
- Hawksbill, 433–435, 442
- Hayduk-Laudie formula, 38
- Hazard concentrations (HC), 473
- Helical rise path, 71
- Heteroatoms, 26
- High pressure
- deep-sea conditions, 127
 - and low-temperature conditions, 127
 - reservoir, 135
- High-frequency Acoustic Recording Package (HARP), 438, 445–452, 454
- High-performance liquid chromatography with an ultraviolet visible absorbance detector (HPLC-UV), 520
- High-pressure, 66, 69, 71–75, 78
- deep water conditions, 126
 - microbially mediated hydrocarbon degradation, 116–119
- High-pressure water tunnel (HPWT), 79
- Hindcast model, 171
- Histopathological techniques
- AHR, 401
 - glycogen-type vacuolar change, 404
 - offshore species, 401
 - pathological hepatic lesions, 403
 - preneoplastic lesions, 404
 - skin lesions, 401
 - skin ulceration, 402
 - spectrum alterations, 402
- Hockey-stick equations, 540, 541
- Hopanes, 98, 317, 320
- Hourglass-shaped glass tube, 72
- Human communities
- Atlantis ecosystem model, 570, 571
 - catch
 - commercial fishing, 571–573, 575
 - recreational fishing, 571, 574, 577
 - economic impacts
 - commercial fishing, 570, 575, 576
 - indicators, 574
 - multipliers, 574
 - recreational fishing, 570, 575, 578, 579
- Hydrocarbon compound, 91
- Hydrocarbon degraders, 115

Hydrocarbon-degrading bacteria, 113,
 118–120, 306, 307
 microorganisms, 116
 piezophiles, 116
 pure cultures, 119, 120
 seawater enrichments, 116–118
 sediments, 116–118
 sulfate-reducing bacteria, 116

Hydrocarbon multi-fraction approach, 175

Hydrocarbons (HC), 287–291

Hydrostatic pressure, 56

Hypothalamic-pituitary-gonadal axis (HPG axis), 507

Hypoxia, 436

I

Immunotoxicity, 397–401

IMPLAN[®] software, 573

In situ measurements, 47

Infauna, 356, 362, 364, 365

Initial shape deformations, 71, 79

Injuries, 348, 349, 351

In-situ measurements, 49, 60

Interfacial tension (IFT), 28, 32, 34, 35, 39, 46

Internal degassing, 73

International Commission for the
 Conservation of Atlantic Tunas
 (ICCAT), 421, 422

Interspecies Correlation Estimation (ICE), 473

Ixtoc 1, 7, 8, 90, 228, 416, 417, 419, 552–554
 age composition of guilds, 561
 condition factor, 564
 fish guild, 560, 564
 no oil vs. oil scenario, 563
 no-oil spill simulations, 560, 562
 no-spill scenario, 561
 oil concentration, 558, 559
 oil distribution, 563
 oil spill distribution, 558
 retrospective analyses, 586
 sedimentary records, from southern
 GoM, 228
 subsurface blowout, 586
 subsurface marine petroleum blowout, 223
 surface oil footprint, 559

Ixtoc 1 oil spill
 affected areas and sampling sites, 330
 blowout, 313
 depth profiles of parameters, 319
 extent and impacts, 314
 forensic investigations, 315
 oil and coastal oil residues
 FTICR-MS, 332–335

GC-MS/MS-MRM, 331–333
 weathering, post-DWH coastal oil
 residues, 335–336
 persistence of traces, 313
 in southern GoM (*see* Southern GoM,
 Ixtoc 1)
 subsea blowout, 313
 surface oil slicks, 329
 wellhead, 314

J

Jet break-up region, 20

Jet formation
 breakup, 46
 characteristic average diameter, 46
 different regimes, 45, 46
 drop formation processes, 46
 DSD (*see* Drop size distributions
 (DSDs))
 experimental result, 59
 flow regimes (*see* Flow regimes)
 hydrodynamics, 46
 IFT, 46
 oil drop formation, 45
 Rayleigh instability, 46
 Rosin-Rammler distribution, 47
 Sauter mean diameter, 46
 subsea dispersant injection, 60
 Tang's expression, 46
 unimodal size distribution, 47

Jet plume model, 171

K

Kaolin, 200

Kemp's ridley (*Lepidochelys kempii*), 433,
 435, 439, 442, 444, 452, 453

Kerogen, 27

Kinematic viscosity, 17

Kogia, 432, 439, 441, 445, 446, 448, 452

Kyoto Encyclopedia of Genes and Genomes
 (KEGG), 504

L

Lagrangian models, 53, 141

Laminar breakup, 22

Large Eddy Simulation (LES), 143

Larval abundance, 390, 392

Later life stages
 cardiac function, 501, 502
 swim performance, 502

LC50, 390, 484, 486, 488–490, 493, 587

- Leatherback, 433, 442
- Lethal concentrations (LCs), 485
- Lipid biomarkers, 294
- Lipid peroxidation (LPO), 506
- Liquefied natural gas (LNG), 49
- Liquid chromatography, 26
- Live fluids, 31
- Live oil, 31, 32, 48, 53–58, 66, 78, 97, 127, 131, 132, 136, 140, 141
- Live oil droplets, 140, 141
 - BOPs, 76
 - crude (LSC) oil, 76
 - decompression rates and temperatures, 75
 - definition, 73
 - degassing, 75
 - droplet volume, 73
 - DWH blowout, 76
 - gas-saturated, 73, 74
 - high-pressure, 73–75
 - internal degassing, 73
 - mean density, 73
 - methane density, 73
 - methane-saturated LSC, 76
 - nucleation barrier, 76
 - rise velocity, 73
 - supersaturation, 75
 - volume-equivalent droplet diameters, 75
- Loggerheads, 433
- Louisiana Sweet Crude (LSC) oil, 33–35, 37, 71, 72
- Low-molecular-weight hydrocarbons (LMWH), 552

- M**
- Macondo well (MW) oil, 313, 323
 - carbon intensity distribution, 29, 31
 - compound class distribution, 28, 30
 - DBE, 29, 31
 - FTICR-MS, 28
 - gas-to-oil ratio, 28
 - GC-MS amenable, 28
 - maturity assessment, 28, 29
 - nonpolar fraction, 29
 - pyrolic species, 29
 - RITT, 28
 - TLC-SARA, 28
 - viscosity, 28
- Macrofauna, 362
 - abundances, 364
 - bioindicators, 366
 - community, 364
 - in Gulf of Mexico deep-sea sediments, 363
 - and meiofauna, 366
 - nematodes and copepods, 364
 - taxa richness and diversity, 367
- Manganese (Mn)
 - benthic foraminifera, 278
 - double Mn peak, 275–276
 - geochemistry, 274–275
 - oxic sediments, 271
 - oxidation states, 271
 - oxide peaks, 279
 - pre-impact geochemistry, 272–273
 - redox chemistry, 271
 - redox cycle, 271
 - redox-sensitive metal profiles, 275
- Marine environment, 126, 416, 427
- Marine fish, 498
- Marine Mammal Protection Act, 5
- Marine mammals, 472
 - anthropogenic activity, 436
 - anthropogenic noise, 434
 - Barataria Bay, 451
 - Bryde's whale, 432
 - debris entanglement, 435
 - dispersants, 443, 444
 - GOM, 432
 - habitat and environmental degradation, 436
 - HARP, 445
 - Kogia*, 432
 - mortality events, 444
 - offshore surveys, 437
 - oil exposure, 440, 441
 - PAM, 438, 439, 451
 - ship strike, 436
 - shipping, 434
 - sperm whale, 432
 - trawls, 435
 - UMEs, 436, 444
 - vessel strikes, 434
 - visual survey, 453
- Marine oil-derived snow, 115
- Marine oil snow (MOS), 145, 167, 202
 - discoveries, 202
 - dispersants, on oil spills, 203
 - with DWH spill, 202
 - gravitational settling, 205
 - microhabitat and food web, 203–205
 - MOSSFA (*see* MOSSFA (Marine Oil Snow Sedimentation and Flocculent Accumulation))
 - mucus-rich, 204
 - oil into marine snow, 202
 - release of oil, 200, 202
 - resuspension, 204
 - sinking velocities, 205
- Marine oil spills, 5

- Marine Recreational Information Program (MRIP), 571
- Marine sediments, 114, 115, 319
- Marine snow, 94, 95
 - definitions, 198
 - ecological impacts, deep sea, 348
 - EPS, 198
 - OSAs/oil-SPM, 202
 - particles, 198
 - POM, 198
 - sediment cores, 349
 - TEP, 198
- Mass balance, 100, 101, 145, 158
- Mass spectrometry
 - FTICR-MS (*see* Fourier-transform ion cyclotron resonance-mass spectrometry (FTICR-MS))
 - tandem, 260
 - ultrahigh-resolution, 254, 259, 260, 262
- Mass transfer, 77–79
- Massive pressure drop, 57
- Mean droplet rise velocity, 159, 160
- Mechanistic modeling, 53
- Megafauna, GOM
 - anthropogenic noise, 434
 - bottlenose dolphins, 432
 - deepwater benthic oil, 453–454
 - direct harvest, 433
 - dispersants, 443
 - DWH oil spill, 440
 - habitat and environmental degradation, 436
 - leatherback, 433
 - loggerheads, 433
 - oil exposure, 440
 - population-level effects, oil spills, 437
- Meiofauna
 - abundances, 364
 - community, 362
 - DGoMB study, 364
 - and macrofauna, 368
 - NC ratio, 365
 - NGOMCSS study, 364
- Mesocosm-scale toxicity, 481
- Meteorologists, 21
- Methane, 69
- Methane oxidation rates, 111
- Methane-saturated system, 49
- Methanotrophs, 111
- Methylotrophs, 111
- Microbial community
 - in deep sea sediments, 115, 116
 - water column
 - Bacteroidetes*, 111
 - dispersants, 112
 - Gammaproteobacteria*, 111
 - hydrocarbon degradation, 112
 - methanotrophs, 111
 - methylotrophs, 111
 - microorganisms, 111
 - SSU rRNA gene sequence, 112
 - structure-function relationships, 112
- Microbially mediated hydrocarbon degradation
 - pure cultures, 119
 - seawater enrichments, 116–119
 - sediments, 116–119
- Microbiomes, 503, 504
- Microdroplets, 92
- Microevolutionary processes, 523
- MicroRNA (miRNA), 519
- Microtox® system, 367
- Minerals Management Service (MMS), 6
- Mississippi Canyon, 438, 441
- Mitigation measures, 590
- Model parameterization, 150
- Modified kaolin, 200
- Molecular oil composition
 - petroleum reservoir
 - accumulation, 27, 28
 - alteration, 27, 28
 - asphaltenes, 26
 - generation, 27, 28
 - heteroatoms, 26
 - liquid chromatography, 26
 - MW, 28–31
 - source dependence, 27, 28
- Monitoring, 286
- Montara H1, 91
- Montara oil spill, 7
- Moody equation, 18
- Morton number, 67
- MOSSFA (Marine Oil Snow Sedimentation and Flocculent Accumulation), 113, 286, 537, 539, 542, 544, 547
 - benthic foraminifera, 292
 - characteristics, sedimentary inputs, 223–225
 - components, 223
 - depositional mechanism, oiled sedimentation, 238
 - description, 206
 - DWH blowout, 248
 - EPS production, 307
 - extent, on the seafloor, 225–226
 - FTICR-MS characterization, 262
 - modeling, MOS formation, 208–211
 - MOSSFA Workshop, 206

- oil contaminated sediments, 238
- postdepositional processes, 226–228
- preservation, 207, 227–230
- regionally and temporally dependent factors, 223
- in sedimentary record, 223
- silt content, 245
- spatial gradients, 208
- Mother drop, 57
- Multiple molecular pathways, 508
- Multiple reaction monitoring mode (MRM), 331

- N**
- National Marine Fisheries Service (NMFS), 418, 571
- Natural dispersion, 156
- Natural gas bubbles, 66
- Natural Resource Damage Assessment (NRDA), 9, 90, 346, 348, 358, 481, 482, 492
- Near-field modelling
 - break-up models, 143
 - buoyant plume, 142
 - dissolution, 143
 - gas bubbles, 142
 - heat transfer, 143
 - integral models, 143
 - jet breakup, 142
 - live, 141
 - momentum-dominated jet break-up region, 143
 - oil droplets, 140, 142
 - petroleum, 141
 - physical models, 143
 - plume, 54, 140
 - simulation results, 144
 - thermodynamic calculations, 143
- Net Environmental Benefit Analysis (NEBA), 164
- Noise, 434
- Non-hydrocarbon compound, 91
- Non-hydrocarbon fractions, 26
- Non-spherical droplet, 22
- Nucleation barrier, 76
- Numerical modeling support, far-field
 - droplet formation, 172, 173
 - droplet mean diameter, 172
 - DSDs, 172
 - high-pressure and cold-temperature experiments, 172
 - hydrocarbons in water column, 173, 174
 - sediment analysis, 174–175

- O**
- Oceanographers, 21
- Offshore, 469, 470
 - platforms, 91
 - surveys, fish populations, 505
 - turtle surveys, 438
- Oil and gasses
 - chemical dispersion, 89
 - data collection, 87
 - deep-subsea spills, 90–91
 - degradation, 96–100
 - DWH spill, 87
 - environmental investigation, 87
 - ephemeral data, 87
 - GoM, 89, 90
 - mass balance, 100, 101
 - natural attenuation, 87
 - properties, 91–92
 - surface releases, 86
 - surface vs. subsurface release, 87–89
 - transport, 92–96
- Oil and methane, 290
- Oil-associated deposition, 286
- Oil-CMS, 145–150
- Oil concentration-driven degradation rates, 115
- Oil drop formation, 45
- Oil droplets, 71–73, 142
- Oil fate modeling, 171, 188
- Oil fingerprinting, 95
- Oil-gas charging, 128
- Oil-in-water emulsion, 48–49
- Oil jets, 19, 22
- Oil masses, 66
- Oil mineral aggregates (OMAs)
 - distinct types, 200
 - effectiveness, oil dispersion, 201
 - formation, 201
 - microaggregates, 198
 - sediment relocation, 201
 - temperature, 201
- Oil-particle aggregates (OPAs), 199, 202
- Oil-particle interactions, 198, 199
- Oil persistence, 201
- Oil plumes, 19, 20
- Oil Pollution Act (OPA), 6
- Oil residue sedimentation, 185
- Oil residues, 225, 226
- Oil-sediment aggregates (OSA), 199, 202
- Oil slick elongation model
 - characterization, 158
 - dispersant, 163, 164
 - dispersibility factor, 158
 - droplets reach, 157
 - entrainment events, 157

- Oil slick elongation model (*cont.*)
 - in situ observations, 158
 - initial slick size, 161, 162
 - mass balance, 158
 - mixing processes, 156, 157
 - oil layer thickness, 161
 - oil properties, 159, 160
 - parameters, 157
 - time-integrated length, 158, 160
 - volume fraction, 158
 - water surface, 157
 - wind speed, 162, 163
 - Oil spill research
 - diel vertical migrations, 589
 - oil and gas exploration, 585
 - relative toxicity, 586
 - use of dispersants, 586
 - Oil spills
 - analytical space, 255
 - behavior, 15
 - crude oil, 15
 - DWH blowout, 356, 358, 361, 365
 - forensic, 315, 317
 - FTICR-MS applications (*see* Fourier-transform ion cyclotron resonance-mass spectrometry (FTICR-MS))
 - macrofauna bioindicators, 366
 - MOSSFA, 280
 - response, 5
 - subsea reservoir, 19
 - subsurface, 19
 - Oil-suspended particulate matter aggregates (OSMAs), 199
 - Oil transport modeling, 171, 177, 181, 188
 - Oil transport prediction, 142, 150
 - Oil types, 159, 160, 163, 165
 - Oil-water interfacial surface tension, 18
 - Oil-water interfacial tension, 163, 164
 - Oil-water mixing, 128
 - Oil-water settling, 128
 - Oil-water systems, 126
 - Oil-water transition zone, 115
 - Omics data, 476
 - Open-source Lagrangian stochastic model, 538
 - Organic material (OM), 27
 - Organic-rich particulate matter, 94
 - Outer Continental Shelf Lands Act (OCSLA), 5
 - Outgassing, 48, 57, 58, 61
 - “Oxyhydrocarbon” products, 334, 336
- P**
- PAH degradation pathway, 115
 - Particulate organic matter (POM), 198
 - Partition device
 - BTEX concentration *vs.* time profiles, 128
 - deep-sea conditions, 127
 - oil/dispersant ratio, 129
 - pressures, 128
 - system segments, 128, 129
 - temperatures, 128
 - water samples, 129
 - Partition ratio, 126
 - Partitioning
 - alkylation, 131–133
 - biphasic equilibria, 131
 - BTEX (*see* Benzene, toluene, ethylbenzene and xylene (BTEX))
 - chemical dispersants, 127
 - chemical/physical, 126
 - dispersants, 135
 - environmental fate, 126
 - equilibrium ratio, water column, 133–135
 - experimental simulation, 127
 - pressure effects, 131–133
 - ratio calculations, 130, 131
 - ratios measured, dispersants, 131
 - shake flask technique, 127
 - submarine oil spill, 126–129
 - temperature, 131–133
 - Passive acoustic monitoring (PAM), 438, 439, 441, 445–452
 - PEMEX environmental monitoring program, 317
 - Permeability, 18, 19
 - Petroleum exposure, 472
 - Petroleum hydrocarbons (PHC)
 - biodegradation (*see* PHC biodegradation)
 - densities, 98, 99
 - Petroleum in marine sediments, 114, 115
 - Petroleum reservoir
 - molecular oil composition, 26–31
 - Phase changes, 57, 58
 - Phase Doppler Particle Analyzer (PDPA), 48
 - Phase equilibria modeling (gas-oil-water)
 - ad-hoc procedures, 35
 - bubble point, 36
 - density and swelling, 36, 37
 - diffusivity, 38, 39
 - gas saturation, 36, 37
 - gas-liquid equilibrium partitioning, 35
 - IFT, 39
 - petroleum compounds, 35
 - petroleum fluids, 34
 - properties, 35, 36
 - viscosity, 38
 - PHC biodegradation
 - biological communities, 108
 - deep plumes, 109

- DWH disaster, 108
 - environmental parameters, 108
 - fundamental gap, 110
 - gaseous, 109
 - high-pressure on microbially mediated
 - hydrocarbon degradation, 116–120
 - laboratory and field studies, 110
 - microbial communities, 108, 110
 - photosynthetic production, 108
 - sediments, 112–116
 - water column, 110–112
 - water depth, 108
 - Photooxidation, 99, 256
 - Physicochemical oil properties
 - deep ocean conditions
 - bubble point, 31, 32
 - critical nucleation radius, 32
 - density and swelling, 33
 - diffusivity, 33
 - gas saturation, 32
 - IFT, 34, 35
 - live fluids, 31
 - live oils, 31
 - viscosity, 33, 34
 - petroleum reservoir, 26–31
 - phase equilibria modeling, 34–39
 - Physics-based empirical correlation, 68
 - Piezophiles, 116
 - Pilot whale, 433, 439, 447
 - Pilot-scale jet experiments, 47, 48
 - Pink Shrimp, 423, 424, 426
 - Pinnipeds, 440
 - Planktonic ecosystems, 110
 - Plumes, 140, 142
 - buoyancy, 21
 - buoyant, 19–21
 - characteristic velocity, 21
 - gas and liquid droplets, 20
 - near-field, 54
 - oil, 20
 - Poly-aromatic hydrocarbons (PAHs), 135
 - Polychlorinated biphenyl compounds (PCB), 318, 319
 - Polycyclic aromatic hydrocarbons (PAHs), 93, 94, 113, 117, 287, 288, 290, 350, 351, 389, 454, 586
 - cardiovascular responses, 392
 - chronic PAH sources, 317
 - concentrations, 316
 - and DBT, 316
 - forensic potential, 316
 - and terpane, 323
 - toxic components, 389
 - toxicity testing, 389
 - and TPH measurements, 317
 - Population fitness, 390
 - Population genomics
 - AHR pathway, 524
 - chromosomal aberrations, 523
 - drift, 523
 - mutations, 523
 - organismal responses, oil exposure, 522, 523
 - selection, 524, 525
 - SNPs, 523
 - Porosities, 18
 - Predation mortality, 557, 565
 - Pressure drop on DSD, 57, 58
 - Probability density function (PDF), 178
 - Prokaryotes, 27, 203
 - Pseudo-bulk isotope techniques, 291
 - Pseudo-components, 146
 - Pulse-free gear pump, 48
 - Pure cultures, 119, 120
 - Pure gas-liquid systems, 68
 - PVT-SIM, 131
 - Pyrolic species, 29
- Q**
- Quantitative PCR (qPCR), 520
 - Quasi-isobaric live oil, 58
- R**
- Rachycentron canadum*, 502
 - Radioactive tracer ¹⁴C, 96
 - Radioisotope tracer, 174
 - Ramped pyrolysis, 291–292
 - Ramped PyrOx (RPO) carbon isotope analysis, 291, 292
 - Rayleigh instability, 46
 - Reactive oxygen species (ROS), 506
 - Recreational fishing
 - average annual basis, 578, 579
 - Gulf States Model and Gulf Counties Model, 578, 579
 - MRIP, 571
 - NMFS, 571
 - No Oil vs. Oil scenario, 577
 - Red snapper, 419, 420
 - Redox
 - Mn, in marine sediments, 271
 - Re, 271
 - sensitive metal profiles, 273
 - Redox-sensitive metals in, 279
 - Reduced glutathione (GSH), 506

- Research community, 22
 Reservoir (oil)
 compressibility, 18, 19
 Darcy's law, 19
 deep-sea conditions, 73–76
 live oil droplets, 73–76
 permeability, 18, 19
 porosities, 18
 rock structures, 18
 Resins, 26, 92
 Responsible parties, 346
 Reynolds number, 50, 67, 163, 175
 Rhenium (Re)
 benthic foraminifera, 278
 enrichment, 271, 273
 evolution, Re enrichment, 276–277
 geochemistry, 276
 redox-sensitive metals, 271
 in subsurface sediments, 280
 Ribosomal intergenetic spacer analysis (RISA), 504
 Rise velocity
 gas bubbles, 69
 methane bubbles, 69, 70
 oil droplets, 71–73
 physical properties, 66
 regime, 69
 single fluid particles, 66–68
 sphericity and terminal, 71
 swarm effects, 66
 thermodynamic properties, 66
 Riser Insertion Tube Tool (RITT), 28
 Risso's dolphin, 439, 441, 447, 449
 RNA-sequencing, 500, 501, 503, 505, 507
 Roffer's Ocean Fishing Forecasting System (ROFFS), 179, 180
 Rosin-Rammler distribution, 47
- S**
Sargassum, 433, 435, 442, 443, 452
 Satellite tags, 438, 439
 Saturates, 287
 Saturates, aromatics, resins and asphaltenes (SARA), 16
 Saturation pressure, 74
 Sauter mean diameter, 46
 Scaling-based models, 53
 Scaling law, 52, 53
 Science priorities, 585
 Sea turtles
 anthropogenic activity, 436, 437
 direct harvest, 434
 dispersants, 443, 444
 habitat and environmental degradation, 436
 Kemp's ridley, 439, 452, 453
 loggerhead, 433–435, 442, 453
 mortality events, 444
 nearshore species, 454
 nesting, 433–435, 439, 443
 offshore turtle surveys, 438
 offshore waters, 433
 oil exposure, 441, 443
 Sargassum, 435, 443
 satellite tags, 438
 ship strikes, 436
 shipping, 434
 trawls, 435
 vessel strikes, 434
 visual surveys, 437
 Seafloor, MOSSFA, 225, 226
 Sediment traps, 95
 Sedimentation
 approach/methods
 chronometers, for deposition, 239, 240
 texture and composition analyses, 240
 time-series approach, 239
 initial sedimentary response, post-event (2011–2012), 244
 MOSSFA (*see* MOSSFA (Marine Oil Snow Sedimentation and Flocculent Accumulation))
 preservation potential, 245
 sedimentary response and depositional pulse, 241–244
 stabilization/recovery, post-event (2013–2016), 245
 Sediment-oil agglomerates (SOA), 199
 Sediments
 Bay of Campeche, 313, 317
 DeSoto Canyon seafloor, 236
 macrofauna, 363, 366
 meiofauna, 362
 oil contaminated sediments, 238
 organisms, 362
 siliciclastic and carbonate, 239
 ²³⁴Th_{xs} and ²¹⁰Pb_{xs}, 239
 timing of sedimentation, 239
 toxicity, 366
 Sediments, PHC biodegradation
 anaerobic hydrocarbon degradation, 113
 anoxic zone, 113
 marine sediments, 114, 115
 mass transport, 113
 metabolic pathways, 113
 microbial community in deep sea sediments, 115, 116
 MOSSFA, 113

- oil concentration, 113
- oil degradation, 113, 114
- oil-saturated zones, 113
- oxygen, 113
- planktonic environments, 113
- and seawater enrichments, *ex situ* incubations, 116–119
- Sediment-to-water column ratio (K), 539
- SGoM model
 - features, 553
 - fisheries catch data, 556
 - functional groups, 555, 556
 - hydrographic data, 555
- Shake flask technique, 127
- Shallower spills, 91
- Ship strike, 436
- Short-lived radioisotopes, 239
- Shrimp fishery, 423
- Shrinking, 73
- Single fluid particles, 66–68
- Single nucleotide polymorphisms (SNPs), 523
- Single-phase jets, 54
- Sinking velocities, 205
- Sinuuous wave breakup, 45
- Skimming, 443
- Soft bottom habitats, deep GoM, 356
 - benthic invertebrates, 362
 - diversity of infauna, 362
 - during DWH, 365–367
 - after DWH, 367–368
 - before DWH, 363–365
 - macrofauna, 362, 363
 - meiofauna, 362, 363
- Solid OMAs, 200
- Southern GoM, Ixtoc 1
 - conventional petroleum fingerprinting
 - alkylated dibenzothiophenes and phenanthrenes, 321
 - FTICR-MS, 321–323
 - terpane signatures, 320
 - environmental oil fingerprinting, 318
 - geochronology, 318
 - hydrocarbon contamination, 315–317
 - PCB chronostratigraphy, 318, 319
 - petroleum constituents, sources of, 315
 - tandem organic geochemical and geochronological analyses, 318
- Southern Gulf of Mexico (SGoM), 553
- Southwest Research Institute (SwRI), 48
- Spatiotemporal 4th order Runga-Kutta scheme, 144
- Spawning, 419, 425, 426
- Species extrapolation, 473
- Species sensitivity distributions (SSDs), 472–474, 491
- Sperm whales, 432, 433, 439–441, 445, 446, 448, 450
- Spill Impact Mitigation Assessment (SIMA), 164
- Spotted dolphin, 432
- Spraying dispersants, 161
- SSU rRNA gene sequence, 112
- Stable isotopes, 289, 292
- Standard aquatic species, 491
- Standard toxicity testing, 482, 484
- Stenella*, 432, 439, 441, 447, 448
- Stirred-tank reactors, 52
- Stirrer cells, 48, 49
- Stokes' law, 21, 159
- Stranding, 436, 440, 442, 444
- Structure-dependent biodegradation, 115
- Sub-grid-scale turbulent diffusion, 144
- Sub-lethal effect concentrations (ECs), 485
- Sub-lethal effects, on oil-exposed fishes
 - diet and trophic level shifts, 392–394
 - growth rates, 392
 - habitat shifts (*see* Habitat shifts)
 - health effects, 397–401
 - histopathology (*see* Histopathological techniques)
 - immunosuppression, 397
 - immunotoxicity, 397–401
 - larval abundance, 390–392
 - population-level effects, 392
 - pre- and post-DWH, 393, 394
- Submarine oil spill, 126–129, 131, 135
- Sub-optimal natural dispersion, 166
- Sub-sea dispersant injection (SSDI), 48, 60, 142, 146, 149, 150
- Subsea oil spill, 183
- Sub-surface dispersant injection (SSDI), 173, 176–178, 188, 586, 588
 - vs.* small oil droplet formation, 8
 - and water column, 181–185
- Subsurface oil droplets, 23
- Subsurface release
 - blockage, 20
 - blowout, 19
 - BOPs, 20
 - BP, 20
 - gas hydrates, 20
 - hydrocarbons, 20
 - jet break-up region, 20
 - oil jets, 19
 - oil spilled, 19
 - physical/chemical characteristics, 20
 - plumes (*see* Plumes)

- Subsurface release (*cont.*)
 subsea pipeline/riser, 19
 types of accidents, 19
 water column, 19
 water/air stability, 21
- Superficial oil, 141
- Superoxide dismutase (SOD), 506
- Surface oil expression, 179–181
- Surface oiling, 469
- Surface releases, 86
 deep-subsea spills, 90–91
- Surface vs. subsurface release, 87–89
- Surficial microbial communities, 115
- Swarm effects, 66, 77–79
- Swiftia exserta*, 471
- T**
- Tang's expression, 46
- Temperature, 108–110, 112, 113, 117, 120
- Temperature-pressure space, 78
- Terpane signatures, 320
- 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), 521
- Texas A&M Oil spill Calculator (TAMOC), 142, 145–150
- Theory of particle aggregation, 211
- Three-dimensional computational fluid dynamics (CFD) models, 143
- Tithonian oil families, 320
- Total antioxidant capacity (TAC), 506
- Total petroleum hydrocarbons (TPH), 97, 316, 473, 474
- Tower Basin facility, 48
- Toxicity
 in benthic data, 366
 test exposure media, 484, 485
 test results, 485
 testing, 475, 485, 499
- Toxicity extrapolation approaches
 deep ocean species, sensitivity, 474
 SSD, 473, 474
 tools, 472, 473
- Toxicology
 DNA damage, 506, 507
 ELS (*see* Early life stage (ELS))
 immune system, fish
 CYP, 504
 IgM gene expression, 505
 innate and adaptive immunities, 504, 509
 Offshore surveys, 505
 RNA sequencing, 505
 microbiomes, 503, 504
 oxidative stress, 506, 507, 509
 reproduction, fish, 507
 sensory systems and behavior, impacts, 503
 gene expression, 503
 mahi-mahi, 503
 red drum, 502
 transcriptome profiling techniques, 507, 508
 xenobiotic response/oil detoxification, 508
- Trace metal, 272
- Traditional acute toxicity, 484
- Transcriptome profiling techniques, 507
- Transparent exopolymer particles (TEP), 198, 203, 210, 211
- Transport, oil and gasses
 aggregations, 93
 data collections, 93
 droplets, 93
 fingerprinting, 95
 GoM, 96
 high-energy release, 92
 marine snow, 94, 95
 organic-rich particulate matter, 94
 PAH, 93, 94
 radioactive tracer ¹⁴C, 96
 seafloor, 96
 sediment data, 95
 settling velocities, 95
 shallower/surface releases, 93
 turbulent expulsion, 92
 water column, 93
 weathering processes, 93
- Trawls, 434
- Trustees, 345–349, 351, 353
- T-type receptor 2 (*mnt2*), 518
- Turbulence
 and shear forces, 46
 characterize, 54
 TDR (*see* Turbulence dissipation rate (TDR))
- Turbulence dissipation rate (TDR), 54, 55, 60, 61, 172, 173
- Turbulent breakup, 22, 45, 46
- Turbulent kinetic energy (TKE), 54, 57, 58, 60
- U**
- Ultra-deep blowout, 8, 9
- Ultra-deep exploration, 6, 7
- Ultra-deep oil and gas, 5, 7
- Ultra-deep production, 5–7
- Ultra-deep waters, 7
- Unified droplet size model, 52
- Unimodal size distribution, 47
- Unusual mortality events (UMEs), 436, 444

V

VDROP-J, 53, 145
Video imaging systems, 50
Viscosity (oil), 26, 28, 32–34, 38, 159
 absolute, 17
 buoyant, 21
 dynamic, 17, 22
 and gas, 20
 and interfacial tension, 22
 kinematic, 17
 mass loss, 17
 Moody equation, 18
 sensitive to temperature change, 17
Visual survey, 437, 438, 453
Volatile liquid hydrocarbons (VLH), 552
Volume-equivalent diameter, 67
Volume-equivalent droplet diameters, 75

W

Water accommodated fractions (WAF), 471, 485–487, 499, 507
Water column, 89, 93
 biodegradation of hydrocarbons, 173, 174
 chemical dispersion, 166, 167
 equilibrium partitioning ratio, 133–135
 liquid and gaseous hydrocarbons
 biodegradation, 109–111

 microbial community, 111–112
 and SSDI effect, 181–185
Water extractable organic matter (WEOM), 262
Water-in-oil emulsion, 49
Water washing, 27
Waxy surface, 91
Weathered oil droplets, 141
Weathering, 15, 256, 259, 286, 287, 289
 APPI-P FTICR-MS analyses, 334
 beached DWH oil and coastal
 residues, 330
 DWH spill, 334
 GC-MS/MS-MRM analysis, 332
 in Isla Arenas mangroves, 334
 Ixtoc 1 spill, 332
 post-DWH coastal oil residues, 335–336
Weber number, 50, 163
White Shrimp, 423, 424, 426
Wind speed, 162, 163

X

Xenobiotic metabolism, 516

Z

Zigzag path, 71
Zooplankton, 205