

### 3 Categorical Tables

This table represents the information sorted by Category regardless of region:

ID	Workshop	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
171	Alaska	Archaeology	Shipwrecks including, pre WWII, WWII and Later Human Sites	Location and characterization of site; documentation of artifacts; document effects on ecosystems and food chain	Western Aleutian Islands; Kiska Island; Duke Island (SE AK); Attu Island; SE Alaska; Lynn Canal	Standard Package; archive searching; special equipment for artifacts - lab facilities for preservation & stabilization; human diving	Standard Partners; Museums; Salvage Organization; State Historic Preservation Office
175	Alaska	Archaeology	Archaeological Information on Human Migration	Location and characterization ancient villages; Document migration routes; Document ice records	Fairweather Ground	Standard Package; archive searching; special equipment for artifacts - lab facilities for preservation & stabilization; human diving; very high resolution side scan (w/ backscatter data)	Standard Partners; Museums; Salvage Organization; State Historic Preservation Office
55	Caribbean	Archaeology	Distribution and nature of submerged archaeological resources	For shipwrecks; prehistoric sites; and submerged historical sites determine nature of site and date it	Pan-Caribbean; Mona passage; Southern Bahamas; Florida Keys; Reef areas in general since lots of shipwrecks occur there	Standard Package; Standard diving and archaeological techniques; Historical records; Develop ability to properly core and chemically characterize site; GIS to make successful and broad range availability	Standard Partners; National Endowment for the Humanities; NGO's; private and corporate partners; affinity groups; Discovery Channel; Florida State University; MIT; TAMU; William and Mary; University of Bahamas; Smithsonian
80	Caribbean	Archaeology	Exploration in Time	Review historical records; Examine trading patterns; Utilize Genetic Resources; How were the islands colonized?; How people have used (socio economic; cultural) the oceans in past and how has it affected present condition?; Where are we heading?	Pan-Caribbean	Standard archaeological techniques; ethnographic data; Zoological techniques	Standard Partners
69	Caribbean	Archaeology	Nautical charts from 15th century on - digitize and look at technology and scale to provide historical record ; look at evolution of technology	database - compile current info and map uncharted areas to add to knowledge	US coastal-wide; make this proposal driven to determine 'where'?	mapping tools and technologies	Standard Partners
274	Great Lakes	Archaeology	Cultural resources; Paleo Archeology of basin and human interactions -	Identify shipwrecks; Submerged shorelines; Paleolake lines; ID sites; location; archaeological documentation	All the Great Lakes basin wide; Green Bay; Saginaw Bay - Deep Water; Nearshore Karst features; Straits of Mackinaw Island; Submerged river mouths; Paleolake levels	Standard Package; Sea Water Systems; predictive modeling; side-scan sonar; Better/ Faster multi-beam systems	Standard Partners

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281	Great Lakes	Archaeology	Archaeological Survey & Documentation	Location; documentation; evolution of marine technology; 19th century; effects on biology (good time measurement); influence of currents; also look at known wreck sites; Broad based survey; then document important sites; Search for existing data then document sites (model storm data)	Throughout Great Lakes; deep water; Lake Michigan; Thunder Bay (already have resources) Lake Champlain; Lake Superior; Death's Door; ports; Keweenaw Peninsula; Nearshore Karst features; Straits of Mackinaw I; submerged river mouths; paleolake levels	Standard Package; Technical divers; acoustic/laser vision system; magnetometer; modeling Lake level studies and Interactive (w/ public) cameras; ROVs; multi-beam; subbottom profilers; magnetometer; LIDAR; deep diving cold water diving; active acoustics; moored sensors & instrumentation; time lapse video; divers (SCUBA); reef design	East Carolina University, museums, historical societies, industry, philanthropy, Thunder Bay National Marine Sanctuaries, Office of Naval Research; Smithsonian; academia (Anthro), Native American groups; University of Waterloo, Fish & Wildlife Service, tourism, recreational divers, University of Windsor
15	Gulf of Mexico	Archaeology	Archaeological sites of historical significance	Location and dynamics of archaeological sites of historical significance and cultural sites; wrecks; submerged structures; inventory and characterize what's there; record of sea level change	Candidate sites resulting from prior surveys; edge of Shelf; Bright Banks	Standard Package; Acoustic mapping; single/multibeam; sub/ROVs; AWOIS; video; samples; sub-bottom profiler; SCUBA; sidescan; magnetometers	Standard Partners
113	Hawaii	Archaeology	Understanding population from geological records	Study fossil records; population over geologic time	Kaneohe Bay	Standard Package	Standard Partners
114	Hawaii	Archaeology	Extinct species (fossil reefs)	Study carbonate samples; date; taxonomy	Deeper the better; NW HI; Emperor Seamount chain; Kure and other seamounts up the chain	Standard Package	Standard Partners

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117	Hawaii	Archaeology	Submerged archaeological sites	Near-shore low impact visual survey - Targeted historical research; archives; non-invasive documentation; Mid-water remote sensing - documentation to narrow down to select survey areas; groundtruth targets; Deep water - survey targeted areas then groundtruth	Kure Island - one of most significant wrecks in Hawaii - Naval Historical Center probably interested in this site; protected zone off Pearl Harbor - several subs there - historic landing sites; Nihoa Island and Necker Island; wider Pacific; US Insular Pacific; Hawaiian Islands - Oahu; big island Hawaii; Kure; Pearl Harbor; Midway; Lanai (shipwreck beach); Midway atoll environs (aircraft); Alenuinui channel between Hawaii and Maui; dumping grounds SW of Barber's Point Oahu; Historic defensive zone outside Pearl Harbor entrance; Areas near shore to Lahaina; Honolulu Harbor; Hilo Bay; Midway atool environs (aircraft); Alenuinui channel between Hawaii and Maui; dumping grounds SW of Barber's Point Oahu; Historic defensive zone outside Pearl Harbor entrance; Areas near shore to Lahaina; Honolulu Harbor; Hilo Bay; Waialua Bay	Small vessels; side scan sonar; magnetometer; technical and advanced diving; aerial survey or remote sensing; technology dependent on location and type of wreck - later excavation; conservation; and display - need conservation facilities; microbial technologies; microchip technology	Standard plus the following: National Geographic, Discovery Channel, DOI, State Historic Preservation Division, Hawaii Historical Foundation, Hawaii Community Foundation, Bishop Museum, CMAR, other small NGO's, Smithsonian
140	Hawaii	Archaeology	Natural history of Hawaiian Islands;	Geological controls on marine biota	Hawaiian archipelago; surrounding pelagic waters; NW Hawaii - French Frigate Shoals; SE Hawaii - Big Island	Standard Package; airborne hyperspectral surveys; ground truthing; multi-platforms; mobile observatories	Standard Partners; JAMSTEC;
183	North Atlantic	Archaeology	Regional Archaeological Assessment; Cultural Resources, Chronology Site I.D.	Distribution of Wrecks; Structures; Aircraft; Items of cultural impact; Dump sites Identify all cultural resources with in a region. Characterization of Biological / Geological / Chemical	Regional Assessment Sampling strategy needed (sites with a range of maritime landscapes; Regulation	Standard Package; High Resolution Survey – SUBS / ROVs / AUV's; magnetic Acoustic sensors	USA Core of Engineers; State Governments; Academia; Aquariums; Not For Profit Entities; Science Education; USCG; Navy; Commercial
187	North Atlantic	Archaeology	Character of Deep Water Archaeological sites	wrecks; structures; cultural resources; Priority to older targets; local biota	Target identified by broader area of survey - Virginia Capes;	Standard Package; Deep water sub's ROV's / AUV's / Imagery & Video; remote manipulator; magnetic	Standard Partners

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204	North Atlantic	Archaeology	Shipwrecks (5-10K off New England)	Location; ID & characterize	Close to shore; fishing banks (Georges Banks; Jeffrey's Ledge; Gulf of Maine; shipping lanes - close to shore; "right down the list"	Standard Package; Magnetometer; archival technologies;	Standard Partners
205	North Atlantic	Archaeology	Submerged Prehistoric Sites	Location; ID & characterize; which are still intact; paleogeography; paleo communities; paleo biological assemblages	Shallower than 120m isobaths; near major drainages; coastal embayment; areas of intense fishing activity	Standard Package; Geologic mapping; coring; sub-bottom profiling; side-scan; magnetometer; AUV; Also local knowledge	Standard Partners
222	North Atlantic	Archaeology	Shipwreck Aggregation Sites	Not well documented	Nantucket Shoals; Hatteras; Graveyard of Atlantic; Stellwagen Bank; Boston Harbor entrance; Long Island Sound; Buzzards Bay; Narragansett Bay; entrance to Chesapeake Bay; outer Cape Cod; Casco Bay; & New York Harbor	Standard Package	Standard Partners
305	South Atlantic	Archaeology	Submerged cultural resources	Document status of wrecks; recently uncovered by storms; etc. using systematic surveys or target submersible historical shipping lanes; sites know in historical records; sub-bottom formation identification of targets; consistent survey of coastline areas out to EEZ	Hatteras to Keys; USVI	Standard Package; AUVs; photo mosaics; video imagery; multi-beam; side-scan sonar; magnetometer; airborne LIDAR; integrating sensing collection systems and positioning system; real-time video linked to shore	Standard Partners
237	West Coast	Archaeology	Ships (shipwreck) of importance.	Mapping habitat; multidisciplinary effort; chemo/bio/geo	Workshop results and historical records. Determine location. Luckenbach (San Francisco); Montebello (off Cambria) possible tar issue; Pack Baronesc (entrance of Santa Barbara Channel) bulk cargo of copper sulfate.	Standard Package; Mapping technology; chemical analysis; shipwreck integrity tools	Standard Partners
238	West Coast	Archaeology	Marine Archaeology/ Human Habitat	Historical records/archives; traditional knowledge; pick sites; document & remove; Map (paleo shoreline); pick sites; doc & remove; Look at mapping info from other missions then go to sites; Develop strategy on where to look; location; photo documentation; controlled removal; habitat; climate	Develop strategy on where to look; Channel Islands; 140 m below sea level (old coastal level); Santa Barbara Channel; Baja California	Standard Package: High Resolution Imaging; Side-Scan; Magnetometer; removal technology tools; laser imaging; saturation diving; Mapping of shorelines; light subbottom profiling; laser linescan technologies to direct sampling; coring technologies	Insurance industry; EPA; Coast Guard; ONMS; DOS; DOD; states; National Geographic; Discovery; Salvage Industry; (Ole Varmer - NOAA NOS Shipwreck Attorney)

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239	West Coast	Archaeology	Use of pelagic and benthic environments by economically/ecologically important species; by Rare Species	Life history; migration patterns; habitat; population; distribution and abundance; environmental properties; Track location of critter; Beacon to uniquely ID individual; Attach critter cam; fronts/eddies - use remote sensing to ID areas; Listen and observe sounds; LIDAR to monitor; observe; track fish	Basin wide; continental shelf; oceanic; existing protected areas; also see offshore productivity list; fronts and eddies	Standard Package; Satellite tag; data storage tags; satellite remote sensing (benthic and passive); acoustics (passive and active); genetic tools; aircraft; human observation; CODAR; Tag tech Critter cam; LIDAR	Standard Partners; NPS; Military; biogeochemistry academic community; international partners; Stanford Hopkins Marine Station; Census for Marine Life; Moss Landing Marine Laboratory; Packard Foundation
293	Great Lakes	Artificial Habitats	Artificial Reefs	Recruitment; deterioration of cultural material; environmental effect; new vs. used; lab	Artificial reef sites e.g. not too much fishing or commercial activity	Standard Package; Moored sensors & instrumentation; time lapse video; divers (SCUBA); reef design; Active acoustics;	Standard Partners; industry; DNR; University of Waterloo; Fish & Wildlife Service; tourism; recreational divers; University of Windsor
41	Gulf of Mexico	Artificial Habitats	Offshore man-made structures	Zoogeography of man-made offshore structures - oil and gas structures with time-based observations (depth is a very important component; systematic approach); oil and gas structures; Sargassum mat time-based observations at rigs (modeling; observe before and after mats pass rigs); taxonomy; diversity; distribution	Shelf and deep water; intertidal and subtidal structures	Standard package; Largely diving and ROV's; GIS commercial equipment to collect species from rigs; need industrial strength samplers; low tech recruitment plates; SCUBA; imaging; standard sampling techniques; modeling	Recreational fishing communities; big non-profits such as TNC; WWF; Ocean Conservancy; media; BBC; Discovery Channel; academic institutions; industry; National Geographic; standard; high potential for industrial partners;
160	Alaska	Benthic Environment	Relationship of Benthic Features and Essential Fish Habitats	Catalogue the distribution and abundance of the types of species that are in the mesopelagic zone; document the benthic habitats that support important ecosystem components including fish and rare or special species and essential fish habitats	Continental shelf; Gulf of Alaska; Bering Sea; Chukchi Sea; shelf edge and basin of Gulf of Alaska	Standard Package; bottom profiling technologies; optics; satellites; nets; tagging; underwater visual technology; PSATS	Standard Partners; Fishing industry
275	Great Lakes	Benthic Environment	Benthic Communities "Things that live between the rocks" - Limited sampling of difficult areas; Deep Reef systems; out crop reefs; Identify & characterize interaction, effects of exotics, impact of fisheries, compare w/ oceans, food web	Limited sampling of difficult areas; Deep Reef systems; out crop reefs; Identify & characterize interaction; effects of exotics; impact of fisheries; compare w/ oceans; food web	National & International; Large Lake Areas; Lake Superior; compare with Chesapeake Bay and Gulf of Maine	Miniaturized exploration / sampling techniques; Fiber optics & Subs; ROV's; AUV's; Dynamic Positioning Systems or ROV's / AUV's capabilities Small cameras & fiber optics; sucking mechanisms; Different type of new technologies for sampling techniques for heterogeneous area; Sensors have ability to describe the physical substrate in 3 dimension sense; long term video observation platform time lapse cameras	Standard Partners, Camera Manufacturers; Scripps, industry (esp. finances - power plants, fishing, fishing support), boating industry, Sea a Grant Extension (outreach & funding), Jason Project

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283	Great Lakes	Benthic Environment	Benthic Communities	ID & characterize interaction; effects of exotics; impact of fisheries; compare w/ oceans; food web	Lake Superior; compare with Chesapeake Bay and Gulf of Maine	Standard Package; ROVs; Subs; sampling; AUVs; Acoustic scanner; long term video observation platform & time lapse cameras	Standard Partners, Scripps, industry (esp. finances - power plants, fishing, fishing support), boating industry, Sea Grant Extension (outreach & funding), Jason Project
25	Gulf of Mexico	Benthic Environment	Biology in deep benthos	Exploring the deep benthos for biological communities; genomic mapping - non-traditional; cataloging for biotechnology; inventory and characterize live bottom communities; deep Gulf of Mexico is most heavily studied soft bottom in world; sampling; trawls; subs; genetics; Gulf is a marginal basin - distinct zoogeographic province; mapping identifies hard surfaces - can't trawl or box core; so photo; ROV's; subs; geology important; non-chemosynthetic hard bottom poorly studied; looking for topographic highs; lithohierms; lophilia mounds; sink holes - topographic lows - have lots of fish and corals associated with them	Deep Gulf - start at around 200m	Standard Package; Box cores; trawls; subs; standard sampling; trapping; molecular tech; genetic; mapping; development of new technologies that are cost-effective; photographic surveys; ROV's (limited with currents); subs; 3-D/4-D seismic; need better sampling technologies and photographic video gear; correlating arrays; photographic monitoring; in-situ or repeat visits; chemical monitoring; census of organisms with surveys; vertical hydrophone arrays already in Gulf - can hook up with Gulf of Mexico Research Consortium	MMS; NSF; standard funding structure; FMRI; Sea Grant; Mexico; Cuba; Census of marine life; NIH
132	Hawaii	Benthic Environment	Infaunal organisms	Taxonomy; Sediment ecology	Compare Northwestern Hawaii to others down chain; different depths; soft bottom	Standard Package; Sampling; multi-beam; coring;	Standard Partners
135	Hawaii	Benthic Environment	Characterization of bottom habitats	Broad scale characterization; Match fish species to bottom characteristics; Collect ground truth with deep tow side scan sonar; Seafloor sediments characteristics; Bottom currents	Samoa; Mariana's Islands	Standard Package; ROVs fly through canyon fishing; swath; deep tow; remote sensing of shallow areas; acoustic surveys	Navy; WHOI; University of Hawaii Mapping

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190	North Atlantic	Benthic Environment	Knowledge of Deep Benthic Community	Characterize; Biology; Geology; Bottom Interactions; Ecology Dynamics; Deep Cold Corals; Investigate by using Class I/II Vessel w/Acoustic Mapping; Dive Capability (ROV / AUV / Submersible) w/ Imagery / Video & Sampling Equipment (Not Only ROV / AUV / Sub); Multi-beam; ADCP; Precise Position System; Outreach Capability; Education Component - Fixed Sensors; Sensor Arrays & Mobile Sensors; Space-Base Remote Sensing	Topographic feature of interest	Standard Package; Deep Submersibles; observations; AUV's; Acoustics Imaging; chemical Sampling Techniques	Standard Partners
215	North Atlantic	Benthic Environment	Abyssal Plain	Not well documented	South of Oceanographer & east of Norfolk Canyon	Standard Package	Standard Partners
256	West Coast	Benthic Environment	Deep sea floor	Knowledge of the deep sea floor; surveys via AUVs; sweeping water column; detailed survey then expand; biosphere at seafloor; benthic community; crust & microbial communities; i.e. all deep sea floor communities	Bottom mixed layer to sea floor; deep water North Pacific on coast	Standard Package; Image recognition and software; HDTV & holographic; improving control systems for ROVs - adapt to situations; software development; flow cytometers for microbe levels (refinement in technologies); higher flow sampling for midwater communities; navigation; nested acoustics techniques; continuous capability; capturing particle flux; long-term & long-standing observatories; coring; genomics on a chip	Standard
336	West Coast	Benthic Environment	Benthic Invertebrates	Abundance of species occupying sub-tidal rock substrates in Washington and Oregon, especially benthic invertebrates	Rock substrates in Washington and Oregon	Standard Package	Standard Partners
78	Caribbean	Boundary Fluxes - Air/Sea	Air/Sea Interactions on the small scale	Document the biological; chemical; and physical processes of the air/sea interface in high resolution over a small area	Caribbean - hurricane source; pan-Caribbean in highly dynamic regions	Develop new sensors to document air/sea interactions on a small scale	Standard Partners

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271	Great Lakes	Boundary Fluxes - Air/Sea	Linkage in the atmospheric forcing function	Forcing functions in atmosphere; Air/Sea interaction for the exchange of gas mass constitutes; Across all lakes; temperature; current; wind speed; barometric pressure; real time chemical composition (monitor 5 places in one of the large lakes; see how lake responded over two years and choose detailed location and study eddies and zooplankton modeling); Application for marine boundary levels influences; Different processes to study and couple to ocean processes cores and eddy's (rings)	Ten largest lakes in the world; Lake Michigan (start where there are problems); need to be strategically positioned; Lake Champlain; Yellowstone Lake then translate atmosphere studies techniques for application into the ocean environment	Standard Package; Buoys; ADCPs; various sensors; mass spectrometer; wireless comms; real-time web access; instrumented moorings; drift buoys; instrument arrays; acoustic imaging; sediment traps New Measurement techniques (RADAR or LIDAR)	Standard Partners
294	Great Lakes	Boundary Fluxes - Air/Sea	How climate varies in space & time	Climate Change on Timescales of Decades to Millennium	African Rift Lakes; other large lakes of tectonic origin	Drilling; Heave compensation and dynamic position or deep water anchoring	Standard Partners
3	Gulf of Mexico	Boundary Fluxes - Air/Sea	Air/sea interactions	Understanding impact of significant weather (hurricanes; tropical cyclogenesis) on deep ocean; characterize ocean under severe weather and ocean bottom in real-time	Tropical storm tracks in Gulf	Video; acoustic mapping; hydrophones; chem./bio sensors; AUV range capability; AUV stationed underwater - "wake up"; time lapse imagery; video; sector scan sonar; hydrophones; ADCP; chemical sensors; acoustic biomass; phosphorescence sensors; genomic probe; optical spectrometer; nutrient sensors; data link; offshore meteorology; satellite data; data buoys; ocean observing systems	NWS (HRD); USN; NMS; NMFS; energy companies; insurance industry; vertical array (ADCP; CTD)
143	Hawaii	Boundary Fluxes - Air/Sea	Climate Change	Feedback of ocean change on biota-through observation approach time series with El Niño events; determine impacts on equatorial Pacific biological pump; long term; carbon fluxes in thermocline	Equatorial Pacific S. America; Galapagos; Toca Tao Arrays	Genetic sampling; satellite (remote sensing); mass spectrometer; sediment traps/cameras; fluorescent signal of phytoplankton species	Standard partners
101	Caribbean	Boundary Fluxes - Basins	Impact of Fresh H2O runoff & Suspended/Dissolved "stuff"	Identify and quantify impact of Fresh H2O runoff & Suspended/Dissolved "stuff"	All Coastal Regions		Standard Partners
288	Great Lakes	Boundary Fluxes - Basins	Carbon Cycling in Lakes; primary productivity, Carbon accumulation, Carbon consumption, compare among lakes	Carbon cycling; primary productivity; Carbon accumulation; Carbon consumption; compare among lakes	Lake Superior; Lake Michigan vs. other lakes	Standard Package; AUVs; primary prod techniques; sediment traps	Standard Partners

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94	Caribbean	Boundary Fluxes - Water Mass	Dynamics of interaction between water masses		Florida Straits; VI - Anegada Passage; loop current production to Florida Straits	Standard Package	Standard Partners
52	Caribbean	Corals - Deep Water	Distribution and status of deep water coral reefs and fish stocks	Collection information on the distribution; taxonomy; abundance; condition; diversity; and size of deep corals and fish stocks;	PR; dry Tortugas; VI; Lang Bank; Shelf bank and wall at VI and PR; Nevassa Island; Columbian Banks; Florida Straits; South end of Cuba; Marquesas; Lots of Places - beyond >20m	Standard Package; remote sensing; technical diving; optics; radio tagging; GIS	Standard Partners; Equipment manufacturers; other commercial operators such as major oil companies; Mineral Management Service (MMS)
27	Gulf of Mexico	Corals - Deep Water	Distribution and status of deep water corals	Diversity; health; size/class distribution; taxonomy	Lophilia Banks - deep coral banks in outer continental shelf - Biosca Knoll; Southern Gulf of Mexico - Sigsbee Knoll and Challenger Knoll	Standard Package; Subs; Alvin or deep ROV	Standard Partners
195	North Atlantic	Corals - Deep Water	Knowledge of Deep and or Cold water Corals	Deep Cold Corals; Investigate by using Class I/II Vessel w/Acoustic Mapping; Dive Capability (ROV / AUV / Submersible) w/ Imagery / Video & Sampling Equipment (Not Only ROV / AUV / Sub); Multi-beam; ADCP; Precise Position System; Outreach Capability; Education Component Biodiversity; Distribution habitat - Fixed Sensors; Sensor Arrays & Mobile Sensors; Space - Base Remote Sensing	Bear Seamount; Oceanographer Canyon; Lydonia Canyon; Nova Scotia & New Brunswick	Standard Package; Magnetic Sensors; Sub-Bottom Profilers; Chemical Sensors; "Tailored" AUV Designed for Archeological Assessment; Sub/ ROV's/ AUV's Video Imagery;	Standard Partners
325	South Atlantic	Corals - Deep water	Deep sea coral mounts (oculina and lophilia)	Map associated fauna; area; extent; size of mounds; new species	400-600m depths; Blake Plateau - Cape Fear to Bahamas	Subs; sonar; sampling technology	Standard Partners
236	West Coast	Corals - Deep Water	Deep water corals	Locate; map; characterize and ID; assessment of threats - existing and emerging; other species supported by habitat	Rocky bottom areas; low sedimentation rates; high currents - below trawl depth. 1-2 KM priority. Monterey Canyon; Astoria Canyon Flanks of seamounts (see above).	Standard Package; Deep camera tows; further development of laser technology; lowlight cameras in rough terrain; slow moving steady AUVs	Standard Partners
53	Caribbean	Corals - Shallow Water	Health and assessment of shallow water coral reefs	"Norms" (coral; fish; biomass) of condition for comparison; One time assessment	Pan-Caribbean shallow water; Marquesas; Tortugas Bank; Islamorada Humps; Riley's Hump	Visual technologies such as SCUBA; hyperspectral techniques; aerial photography; develop new diagnostic or early warning technologies - molecular level technologies; remote sensing	Standard Partners; tourism agencies; hotels; hospitality agencies; private foundations;
40	Gulf of Mexico	Corals - Shallow Water	Turbid water coral communities	Presence and distribution; morphology	Northern Gulf region; MS River region	Food chain analysis; light meters and other monitoring equipment; water chemistry	Standard Partners

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170	Alaska	Currents & Water Masses	Circulation Survey	Document subsurface currents;	Western Alaska; Nome; Bering Sea; Chukchi Sea	Standard Package; moorings; remote sensing	Standard Partners
181	Alaska	Currents & Water Masses	Need data and information on large-scale circulation and variability of Beaufort Gyre	Explore largest freshwater reservoir	Beaufort Sea / Arctic Ocean	Standard Package; remote sensing; autonomous platforms; ice-going vessels; moorings	Standard Partners; Canadian Government (Earth Science Sector)
272	Great Lakes	Currents & Water Masses	Discover new bio / geo /chemical pathways (distribution in the physical sense)	Identify pathways for compounds	Least likely place	Indicator compounds exploration; measurement systems; Platforms for opportunities; Next generation of "FLIP"; Smart Sensors; Swath vessel; Remote Sensing; Super Computer	Navy, Energy Industry, Marine Transportation; National Weather Service; Canadians
279	Great Lakes	Currents & Water Masses	Coupling of Modeling and Measurements; Sample strategy/ bio / currents / Atmosphere models - Models can drive questions researchers to answers	Areas of gradients (where do you put the resources) at biologically dynamic areas	Identification models to lead to examples (NASA sulfur model)	Using cruise ships and instruments (Car Ferry towing instruments) Acoustics; sampling water; Image shadow image analysis; microwave radar on bow of ship to measure surface roughness; small scale of hyperspectral imaging; Environmental Tracers; Miniaturized exploration / sampling techniques; Fibre optics & Subs; ROVs; AUV's; Dynamic Positioning Systems or ROV's / AUV's capabilities	WHOI, Harbor Branch; NGS
285	Great Lakes	Currents & Water Masses	Mesoscale Eddies - frequencies & importance; Current flow patterns, eddies, mixing process, impact on bio, frequency & importance to ecosystems productivity, chem props	Current flow patterns; eddies; mixing process; impact on bio; frequency & importance to ecosystems productivity; chem props	Lake Superior; other Great Lakes; Yellowstone Lake	Standard Package; Current meters; satellites; ADCP moorings; Instrumented moorings; drift buoys; ADCPs; instrument arrays; acoustic imaging; sediment traps	Standard Partners, University of Toronto, Oregon State University, Scripps, WHOI,
5	Gulf of Mexico	Currents & Water Masses	Loop currents and circulation	Interaction between loop currents; related circulation features & fisheries; and hydrate stability; impact on ecosystems and habitats; relationship between ocean properties and hydrates/beds; HAB formation	Yucatan Channel; shelf break along northern & eastern Gulf; loop current and depth <3km; commercial lease tracts	Standard Package; Hyperspectral sensors; ROVs/AUVs (mobility); HDTV; CTDs & hydrophones; vertical array sensors; data link; remote sensing or utilizing vessel (standard package) or fixed sensors & arrays or data mining; fixed & vessel-based ADCPs; tomography; "tailored" AUV; cameras; and sampling tools; sensors for ID nutrients; drifters; profiler floats	Standard Partners; NWS; energy industries
6	Gulf of Mexico	Currents & Water Masses	Gulf currents on offshore structures	Understanding of Gulf currents on offshore structures; impact on engineering and DESIGN; partnership with platforms	Northern Gulf; energy exploration areas	Instrumented platform; deployed and fixed current meters; drifters; profiler floats	Standard Partners

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110	Hawaii	Currents & Water Masses	Current patterns and gyres and how they are changing	Food production; marine debris deposits; how do they change and how are they affected? (larval transport)	HI Archipelago - large system focus	Satellites; Time observations; Floating instruments; Physical oceanography; Molecular techniques to look at long-term dispersal patterns	Standard Partners
111	Hawaii	Currents & Water Masses	Internal waves	Physical oceanography; Internal tides	Sea mounts - 2002 proposal sites	ADCP; long-term moorings	Standard Partners
193	North Atlantic	Currents & Water Masses	Knowledge of physical & biological processes near fronts; Eddies, Warm and cold rings	Intersections between layers; Relationships to biota; Air-Sea Patterns / Interactions Impact of bottom boundary; Archeological Application; Magnetic Sensors; Data Mining; Bottom mapping & characterization capability; New sampling protocols; Multi Line Arrays and Multi Sensor Arrays	Gulf Stream; Labrador; Gulf of Maine; Long Island Sound	Standard Package; Remote Sensing; Fixed Sensors; Sensor Arrays; AUV's; Archeological Application; Magnetic Sensors; Data Mining; Bottom mapping & characterization capability; New sampling protocols; Multi Line Arrays and Multi Sensor Arrays	Sea Grant Program; Aquariums (Maritime Aquariums @ Norwalk; Mystic, National Baltimore & New England...)
306	South Atlantic	Currents & Water Masses	Mapping currents and eddies and their connection to vertical and horizontal components	ID circulation; temperature discontinuities; current velocities; pH levels	Gulf Stream to inlets	Satellites for SST; drifters; buoys; ADCP; AUVs	Standard Partners
324	South Atlantic	Currents & Water Masses	Exploring Stream and Florida Gulf Current	ID; characterize; map; habitat assessment/map; life history/reproductive biology/evolution of life history strategies of fishes; moored current meters at multiple depths; sediment traps; release drifters regularly from position on the sea floor and use satellites to track them; release drifters regularly from position on the sea floor and use satellites to track them	Blake Plateau - deep; under Gulf Stream/Florida Current; lots of new species found there; difficult access; Portales Terrace - lots of fish habitat; unexplored regions; other significant deep regions in Florida Straits; Miami Terrace;	Standard package; high current subs; ROV's; side scan; multi-beam; seismic tech; ADCP; moored instruments; sediment traps; neutrally buoyant sediment traps; NEW TECH: develop baited fishing gear - automatic release fishing gear such as magnesium links that dissolve - needs to get to bottom quickly and do it's job of fishing or photographing and then pops up to the surface when done; AVHRR (SST); SeaWiFS (ocean color); satellites	Standard Partners; NWS (especially moored); recreation community; fishing; boat industry
159	Alaska	Ecosystem	Bering Sea Fish Habitats (McConnaughey)	Use Bathymetry to understand sediments and habitat; Use hydrography for better understand of tidal data; Understand temporal nature of biology	Gaps in data of Bering Sea - Bristol Bay	Standard Package; Ships of opportunity; interferometric side scan sonar (true swath bathymetry and true backscatter)	Standard Partners; commercial partners; fishing industry
344	Alaska	Ecosystem	Alaska Workshop	Comparison of transects across the eastern, central, and western Aleutians	Aleutians	Standard Package;	Standard Partners;

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119	Hawaii	Ecosystem	Identifying ecologically critical habitats	Temporal / spatial observations; mapping; then direct observations; diversity; location; substrate type; visual information; reflected imagery; community structure; Locating critical habitats with critter cam (Animal borne camera) system; Use existing and historical information	Intermediate depth regions; wide range of depths - mostly moderate depths to deeper depths; NW HI Islands - 2002 sites as specified in 2002 proposals; US Pacific Insular Islands; Guam; Samoa; CNMI	Standard Package plus; ADCP; current meters; multi-beam; Same as tagging technologies; archival capability	Standard partners plus outreach partners, fishermen, National Geographic, Discovery Channel; recreational divers
147	Alaska	Ecosystem - Abrupt Topography	Fjords of southeast and south central Alaska	Contrast recent glaciated landscapes to more stable and tidewater to non-estuaries; Compare tidewater glacial vs. nonglacial; Document substrates for habitat mapping; Detect species distributions; Determine some of physical and biological effects of deglaciation. They have complex oceanographic regimes and teasing out would be good.	Glacier Bay; Prince William Sound; Icy Bay; Substrates for habitat mapping; especially the deep and dynamic fjords (Hooge)	Standard Package; CTD; divers; ships of opportunity; HDTV; Remote Sensing Satellite (ASTER; LANDSAT 7)	Standard Partners; Cruise lines
152	Alaska	Ecosystem - Abrupt Topography	Aleutian Trench	Inventory and document geology (improved mapping) and habitats esp. corals and methane seeps; document these trophic systems; Identify new species	From start to very end of Aleutian Chain	Standard Package; Coring; deep vehicle capabilities; high pressure samplers; deep tow; rock dredging	Standard Partners; JAMSTEC
153	Alaska	Ecosystem - Abrupt Topography	Aleutian Arc	Examine the structural arc; Examine substrates and patterns of coral distribution; Document hydrothermal venting and volcanism; Document biodiversity; biology; and oceanography	Region between the islands and north of the Arc. (abyssal plain); From southern boundaries of the platforms; north to abyssal plain of the Bering Sea	Standard Package; water column methane sniffing; AUVs for mapping broad shallow areas of continental shelf (Much better than using surface ship. MBARI has developed vibracoring system which could be adapted for this project); CODAR	Standard Partners; Russia
154	Alaska	Ecosystem - Abrupt Topography	Canyons	Document rate of the consumption of the physical plate; geochemistry; sediment transport; and volcanism; Examine biology of area; and hot springs seeps; Examine these very interconnected physical systems; Inventory and document geology (improved mapping);	Southeast Alaska; Aleutians; Deep Canyons in Aleutian Fore Arc (POC - Phillip Rigby and Gene Yogodzinski); Bogoslov; near sub volcanoes; Bering Sea Canyon; Kodiak Seamount	Standard Package; submersible (7000 m) technology that allows you to hold station in strong current; trawls; nets; visualization techniques; physical oceanography tools	Standard Partners
168	Alaska	Ecosystem - Abrupt Topography	Submarine Seamounts	Document evolution of seamounts; circulation; and currents.; Document these ecosystems esp. in the deep water	South central Gulf of Alaska (Gulf of Alaska Seamount Province) e.g. Pratt-Welker Chain; Patton Murray Chain; South of the trench (e.g. Adak Island; Central Aleutians; Atka Island)	Standard Package; new technology (e.g. video to speed up processing); HDTV	Standard Partners; MBARI; Navy

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84	Caribbean	Ecosystem - Abrupt Topography	Impacts of Underwater topography (Sea mounts, pinnacles, reef edges)		warm water environments; banks; shelf edge	Standard Package	Standard Partners
86	Caribbean	Ecosystem - Abrupt Topography	Understanding the ecology and oceanography of Florida Straits	Examine source H2O currents; pollutants; nutrients; and plankton	Florida Straits; VI; Puerto Rico	Standard Package; airborne LIDAR; hyper-/multi-spectral optics (species ID); tracking of tagged fish; human diving technologies; wide bandwidth communications (via LEO SAT); drifters; probes; instrument arrays; fixed ADCP	Standard Partners; state & local agencies; SFOMC; RSMAS; local labs; INS; CIA (DESC); customs; NOPP; OCEAN.US
92	Caribbean	Ecosystem - Abrupt Topography	Trenches	Exploration in trench region to understand the interactions between abyssal depths and shelf waters (including abiotic/biotic constituents)	Puerto Rico Trench and surrounding area	Standard Package; deep submersible; deep ROV/AUV (multipurpose); surface deployed sampling/analysis devices (cost saving versus deep dive); low light optics; communications	Standard Partners
22	Gulf of Mexico	Ecosystem - Abrupt Topography	Cayman Trough	Mapping; plume prospecting; inventory and characterize	Cayman Trough just outside Gulf	CTD's; multibeam	Standard Partners
29	Gulf of Mexico	Ecosystem - Abrupt Topography	Lithoherms	Map; identify and characterize; geology	Between Bahamas and Florida	Standard Package; ROV; towed vehicles; AUV's; subs; geophysical technology	Standard Partners
30	Gulf of Mexico	Ecosystem - Abrupt Topography	Topographic areas with biological communities	Time observation of topographic areas; revisiting topographic features that have significant biological communities; change in bathymetry; time lapse data	Florida Gulf and Keys; Pinnacles off MS/Alabama; Northwest Gulf; Mexico	Time lapse video to observe activity	Standard Partners
34	Gulf of Mexico	Ecosystem - Abrupt Topography	Canyon systems	River-like structures at bottom; microbial communities; geochemical; origin; effects	Orca Basins; smaller brine pools elsewhere; Gulf; MS Canyon	Standard Package; Innovative microbial techniques; sampling techniques; chemical sensors; point sampling with ROV's and subs	Standard Partners
219	North Atlantic	Ecosystem - Abrupt Topography	Gravel Cobble Bottom - continuous features vs. discrete	Not well documented	Corsair; Oceanographer; & Hydrographer Canyons; Stellwagen & Georges Bank; Great South Channel; Jeffrey's Ledge	Standard Package;	Standard Partners

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231	West Coast	Ecosystem - Abrupt Topography	Banks; Fracture Zones; Subduction Zones; Canyons; Sea Mounts	Mapping; subsurface information; sub bottom profiling; biosampling; currents; temperature; chemical description; cores to sample the microbial activity	Cordell Banks; Tanner/Cortez Bank; Oregon Bank complex; Southern California Border Banks; Mendocino; Molokai; Canyons: Big Sur Canyon Complex; Pt Conception complex; Juan de Fuca; Rogue Canyon; Eel River Canyon; Quinalt Canyon; Santa Cruz Canyon; So American canyons (re: strike slip transition); Davidson; Guide; and Pioneer Seamounts; and Gumdrip and Taney Seamounts; Brown Bear and Cobb Seamounts; Bowie Seamount Chain	Chemical sniffers; NMR; genetic fingerprinting; acoustic mapping; long term chemical sampling (e.g. OsmoSamplers)	Standard Partners
251	West Coast	Ecosystem - Abrupt Topography	Biological oasis hot spots	Close in seamounts then remote seamounts; survey triage of hot spots; different tactics for each hot spot; discover; inventory biota; explore; identify processes; find new areas	Seamounts; canyons; upwelling; ocean frontal zones; river plumes; seafloor hydrothermal vents	Standard Package; Imaging - HDTV & holographic; nested acoustics techniques; continuous capability; capturing particle flux; long-term & long-standing observatories; coring; genomic on a chip; generation of sampling technology (give 100x more data) ; genetic markers on AUVs; remote sensing technology on AUV; real time capability; chemical sensor; PSATS; electronic tags; <20 microns technology very important; anecdotal fisherman reports; "Ready 5" capability	Fishing industry (Russians; etc.); MMS
59	Caribbean	Ecosystem - Banks & Basins	Deep basins	Document biogeography and taxonomy; Document physical; chemical; geological; and sediment characteristics	Caribbean basins (4); PR trench	Standard Package; dredging; visual; trawling; trapping; coring.	Standard Partners
109	Hawaii	Ecosystem - Banks & Basins	Banks	Survey; map; ground truthing; sampling; direct observations; ID and characterize organisms as well as features	Penguin Banks; NW HI Banks	Standard Package; genomic technologies; coring; molecular techniques; video live feeds for outreach; Hugo at Loihi volcano; dating technologies	Standard Partners, HUGO, telephone companies, outreach partners, National Geographic, Discovery Channel, drug companies, MMS
213	North Atlantic	Ecosystem - Banks & Basins	Banks	Not well documented	Stellwagen & Georges Bank; Nantucket Shoals; Tillies & Browns Banks; Banquero & Emerald Banks	Standard Package	Standard Partners

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319	South Atlantic	Ecosystem - Banks & Basins	Bahama Banks	Explore mechanisms behind whitening events; sea level studies; geology; karst studies; low standing reefs; archaeology - shipwrecks; reef studies; coral bleaching; carbonate production; reef sampling/coring for sea level and paleoclimate studies; highly migratory species; fisheries oceanography; many habitats to observe different regions; using ships; satellites; satellite based; remote sensing; satellite telemetry; critter behavior; sea level data; sediment traps; water column sampling	Tongue of the ocean (TOTO); Florida Straits; Exumas (island chain)	Standard Package; coring; sediment traps; water column sampling; 3-D seismic; LIDAR; cameras; ABLOS (a boat load of stuff); SCUBA; Aquarius and other habitats; remote sensing;	Standard Partners; CMRC (Caribbean Marine Research Center) at Lee Stocking Island; San Salvador; education partners; Bahamas government
108	Hawaii	Ecosystem - Basins & Banks	Solution Basins	Survey; map; ground truthing; sampling; direct observations; ID and characterize organisms as well as features	Off Maui	Standard Package; genomic technologies; coring; molecular techniques; video live feeds for outreach; Hugo at Loihi volcano; dating technologies	Standard partners, HUGO, telephone companies, outreach partners, National Geographic, Discovery Channel, drug companies, MMS
214	North Atlantic	Ecosystem - Basins & Banks	Basins	Not well documented	East & west Tillies Basin; Georges; Jordan; Wilkinson & Stellwagen Basins	Standard Package;	Standard Partners
217	North Atlantic	Ecosystem - Basins & Banks	Gravel Windows - sediment disturbed & gravel exposed	Not well documented	Stellwagen Basin	Standard Package;	Standard Partners
221	North Atlantic	Ecosystem - Basins & Banks	Glacial Scoured Areas	Not well documented	Northeast Stellwagen Bank; Jordan Basin	Standard Package;	Standard Partners
14	Gulf of Mexico	Ecosystem - Canyons	Characterize canyon processes	Sediment fluxes; turbidity flow; erosion; chemistry; upwelling	Mississippi Canyon; Desoto Canyon; Green Canyon	Standard Package; ROVs/AUVs/subs; video; sampling	Standard Partners
106	Hawaii	Ecosystem - Canyons	Submarine canyons	Survey; map; ground truthing; sampling; direct observations; ID and characterize organisms as well as features; carbon cycling; areas of high productivity; ID and characterize communities; maps	Kaneohe Canyons; Haleiwa Canyon; Waimea Canyon	Standard Package; genomic technologies; coring; molecular techniques; video live feeds for outreach; Hugo at Loihi volcano; Dating technologies; Bait deployment	Standard Partners, HUGO, telephone companies, outreach partners, National Geographic, Discovery Channel, drug companies, MMS
192	North Atlantic	Ecosystem - Canyons	Knowledge of Submarine Canyons	Transport mechanism; Habitat Diversity; Sediment Transport; nutrient transport	Continental Margin; Hudson Canyon; Lydonia Canyon; Varied Geomorphology; Gradient of Human influence	Standard Package; Acoustic Mapping; Non-Destructive Investigations; Robotic Manipulation; Sub-Bottom Profiling; Tools for Sample & Artifact Recovery; Interpretation Tools; Spectral Analysis Tools; Data Mining; Laser Line Scan; Critter Cams	Standard Partners

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211	North Atlantic	Ecosystem - Canyons	Submarine Canyons	Not well documented	All major canyons e.g. Georges Bank canyons and mid-Atlantic canyons e.g. Oceanographer; Veatch; Baltimore; Norfolk; and Wilmington Canyons; Pueblo village communities and the canyon axis; boulder fields; slip stone outcrops	Standard Package;	Standard Partners
316	South Atlantic	Ecosystem - Canyons	Explore canyons and holes	Map; characterize; ID; turbidity transport; mineral exploration; gas and groundwater seeps	Hatteras; Carolina sea trough; Desoto canyon; the Point off Cape Hatteras; Red Snapper Sink Hole - off Jacksonville	Standard Package; Subs; tech diving; sonar; seismic; side-scan; multi-beam bathymetry	Standard Partners
254	West Coast	Ecosystem - Canyons	Canyon systems; gullies (physical; chemical; biology systems)	Hyperpicnal flows; observing systems for long term; investigate submarine rock flows; turbidity currents; internal waves; bridge from shelf to deep sea; develop proxies of variability over time in sediments	West coast; Big Sur Canyon Complex	Standard Package; Forward scatter acoustic techniques; equipment survivability cabling systems; need hardened sensors; "instrumented rock"; long-term instruments that can survive in the canyon environments; temporal exploration; physical ocean modeling	Cable companies; USACE; CSO
57	Caribbean	Ecosystem - Caves	Biodiversity and ecology of marine caves	Characterize and Identify biota using molecular genetics; Map; Determine chemical; geological; biochemical; and physical characterization; geology; Examine for archaeological significance	Bermuda; Bahamas; Yucatan; Greater Caribbean	Standard Package; traditional sensors; satellite photos; technical diving; GIS mapping; cave cam; drilling; data processing and visualization tools; Remote Samplers; coring; smaller tools (bore hole size)	Standard Partners; pharmaceutical industry; biotech; medical manufacturers; equipment manufacturers; USDA; cosmetic companies; NIH; Sea Grant; NCNPR; SIO; Smithsonian; commercial operators such as charter boats; cave divers; fishermen; hunters; taxonomist
220	North Atlantic	Ecosystem - Channels	Channels	Not well documented	Great South Channel; Northern Channel	Standard Package	Standard Partners
151	Alaska	Ecosystem - Extreme Environment - Sea Ice	Characterize and explore extreme environments	Characterize and explore high salinity and low temp environments	Bering Basin / Arctic Ocean	Standard Package; extreme cold technology; biochemical genetic screening; tagging; remote sensing; ice breaker ships; Thermal Imaging; Nation Technical Means; Aircraft; acoustic monitoring	Standard Partners; <b>Industry</b> ; Navy; US/Canadian/Russian Coast Guard; NSF; Arctic Logistics; BASC (Barrow Arctic Science Contort); VECCO Corp.
162	Alaska	Ecosystem - Extreme Environment - Sea Ice	Seasonal(winter) exploration	Biological; geological; cryosphere; biological and physical oceanography;	Continental Shelf spawning area; Bering Sea (Bristol Bay; northern Bering Sea e.g. along the ice edge; central Arctic Basin; whole ice edge); Cook Inlet (issue - other organizations working on it).	Standard Package; extreme cold technology; biochemical genetic screening; tagging; remote sensing; ice breaker ships; Thermal Imaging; Nation Technical Means; Aircraft; acoustic monitoring; full blown submarines	Standard Partners; <b>Industry</b> ; Navy; US/Canadian/Russian Coast Guard; NSF; Arctic Logistics; BASC (Barrow Arctic Science Contort); VECCO Corp.

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163	Alaska	Ecosystem - Extreme Environment - Sea Ice	Sea Ice	Document biology and physical processes going on; Ballena studies; Increased fetch (expanded open ocean). Document change in migration patterns; What is the role of sea ice cover in structuring the marine ecosystem; how does this vary with latitude of the	Nearshore reefs e.g. Camden Bay. Along Arctic barrier islands. Some of the Bering Sea Islands for coastal erosion. Beaufort Sea; Chukchi Sea; Bering Sea	Standard Package; extreme cold technology; biochemical genetic screening; tagging; remote sensing; ice breaker ships; Thermal Imaging; Nation Technical Means; Aircraft; acoustic monitoring; Vessels of opportunity; ice-going vessel; ice moorings; autonomous platforms	Standard Partners; <b>Industry</b> ; Navy; US/Canadian/Russian Coast Guard; NSF; Arctic Logistics; BASC (Barrow Arctic Science Contort); VECO Corp.
177	Alaska	Ecosystem - Extreme Environment - Sea Ice	Wintertime Trophic Food Web	Identify and catalogue the trophic webs that support birds and mammals in the wintertime; look at what physical processes impact their system; what zooplankton are available for species dependent on their food type; document water column biology (zooplankton)	South Bering Sea; Aleutian Islands (wintertime)	Standard Package; extreme cold technology; biochemical genetic screening; tagging; remote sensing; ice breaker ships; Thermal Imaging; Nation Technical Means; Aircraft; acoustic monitoring; biophysical moorings (winter); new sampling technologies under hi	Standard Partners; <b>Industry</b> ; Navy; US/Canadian/Russian Coast Guard; NSF; Arctic Logistics; BASC (Barrow Arctic Science Contort); VECO Corp.
58	Caribbean	Ecosystem - Extreme Environment - Sea Ice	Find new vents and seeps (includes fresh water seeps)	Document biogeography and taxonomy; Document physical; chemical; geological; and sediment characteristics	Fresh water communities as well as marine; brine pools; Cayman trench; PR trench; any seismically active area	Standard Package; deployment of platforms that stay in place for long term monitoring; thermal mapping; salinity measurements; technical diving (?) in some of the shallower vents	Standard Partners; pharmaceutical industry; biotech; medical manufacturers; equipment manufacturers; USDA; cosmetic companies; NIH; Sea Grant; NCNPR; SIO; Smithsonian; commercial operators such as charter boats, fishermen, hunters; taxonomists;
343	Alaska	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Hydrothermal Vents	Locate isolated biologic communities and sea floor mineral masses	Ingenstrem Depressions; Prochoda (sp) scaorp and related basins; many of the pull-apart basin located along the volcanic line west of Kiska	Standard Package;	Standard Partners;
340	Caribbean	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Kick'em Jenny Volcano	Fully document this active volcano, which is likely to be the next Caribbean island	Kick'em Jenny Volcano (Approximately 4 miles north of Grenada)	Standard Package;	Standard Partners

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1	Gulf of Mexico	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Hydrates and cold seeps/vents; sediment flows and biota	Understanding the relationship between hydrates and cold seeps/vents and between sediment flows and biota (including microbes) and brine pools; discover new species and processes; understand relationships	Hydrate stability zone; 300m - <-3km; northern Gulf; Campeche Banks and Bay; commercial tracts	Standard Package; 3km capable ROV; synthetic aperture sonar; laser line scanner; pressurized hydrate cores; optical spectrometers; mass spectrometers; HDTV; heat flow sensors; resistivity sensors; reusable biosensors; vertical arrays; resistivity sensors; sea-floor probes; geophones; time lapse imaging; AUV "garage"; data recovery technologies; Vessel (standard package) + high resolution seismic; Fixed sensors; Existing data mining - data bases; Remote sensing - surface expression; AUV; sub; sampling; video; moored application	Standard Partners; NAVO; NRL; energy companies
21	Gulf of Mexico	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Chemosynthetic communities	(Subsurface - down several km); oil seeps and vent communities; inventory and characterize; isolated ridge system; new biota; larger geographic context; subsurface 3-D seismic surveys; biogeography (sample); locate plumes	Cayman Trough - major area to explore - lots of unexplored oil seeps; Southern Gulf; Barbados; Trinidad; West Africa - have some taxonomic affinities to those in Gulf of Mexico	Satellite images; oil data; sampling technologies; coring; access industry datasets; chemical sniffers; spectrometers; isotopic work; microbiology; molecular tools; sampling technologies; plume prospecting - do multibeam and then use sensors to look for plumes; standard package; geophysical tools; microbiologists; ecologists; molecular science; towed vehicles; subs; AUV's; look at new technologies	NOAA - PMEL; NSF - Ridge Project; National Geographic; SLOAN Foundation; International interest; NGO's; USGS; Universities; Mexico; EEZ states; WHOI; HBOI; NSF; MMS; DOE; NASA; ONR; Industry pharmacology; oil and gas; biotech; Mexico
43	Gulf of Mexico	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Montserrat	Hydrothermal activity	Montserrat	Standard Package	Standard Partners
46	Gulf of Mexico	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Neuston	Identify and characterize	Sites of persistency of oil slicks; Bush Hill - Northern Gulf	Satellite; sampling	Standard Partners
308	South Atlantic	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Map dead and living muscle & clam communities associated with seeps	Compare with subsurface; ID survey	Blake Ridge	Multi-beam; coring; sub; gas hydrate sensors	Standard Partners
341	South Atlantic	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Heat Flow Measurements	Heat flow measurements on the ocean floor extending hundreds of kilometers normal to, and on either side of, rapidly spreading ridge axes (or hot spots)	Ocean wide near spreading ridge axes or hot spots		

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241	West Coast	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Microinvertebrate assessments	Microinvertebrate assessments e.g. kelp forest assemblages and soft habitat; microbial ocean; assemblages; interactions; predator/prey relationship	California kelp forests; soft benthic habitats out to 60' (20-60' water depth)	Fiber optics; basic archaeological sampling; species identification	Standard Partners
242	West Coast	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Microbial	In situ sampling and genomic identification & chem; particle counter for small particles - size fractions; cameras - is there a good proportionality ratio that is pretty universal; Microbial assemblages; characterization; taxonomy; role they're playing in larger ecology; bio/geo/chemical processes; bioactive compounds	Could go anywhere and make fundamental discoveries i.e. polar oceans; polluted and non polluted locations to compare microbial assemblages; Throughout water column including the substrate	Moorings; smaller vessels; genomic; chemical analysis tools; In situ genetic sampling;	Biomedical industry; EPA; Fish and Game; local and state health departments; Surfriders
243	West Coast	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	Seeps	Mapping; subsurface information; sub bottom profiling; biosampling; currents; temperature; chemical description; cores to sample the microbial activity	Between Heceta Bank and Hydrate Ridge; along alluvial (sp?) washout of Monterey Canyon.	Chemical sniffers; NMR; genetic fingerprinting; acoustic mapping; long term chemical sampling (e.g. OsmoSamplers)	Standard Partners
244	West Coast	Ecosystem - Extreme Environments - Vents, Seeps, & Volcanoes	High Temperature Hydrothermal Environments	Relatedness	West coast of North and South America (fragments of the Farallon Plate) - interaction of a ridge with a continental margin); opportunity to look thru genetic mutations; how long ago were things isolated?	ROV sampling tools; physical oceanographic sensors; Larval sampling tools	Standard Partners
303	South Atlantic	Ecosystem - General	Primary & secondary fish production; understanding geochemical processes	Collect water column; physical data; use satellite imagery; collection of mid/bottom biologics; net and bottom sampling; connecting bio/chem/geo technologies and processes; eddy processes; ID drivers of production; Lagrangian perspective; food web	Charleston Gyre	CTD; automated sensors; automated ship - compiling/integrating ; management of data; real-time continuous data collection; "conducting cable"; collecting satellite data - SST; SeaWiFS; ARGOS; transmit broadband data; multidisciplinary ship time; drifters	Standard Partners
245	West Coast	Ecosystem - General	Chemistry; Physics; Geology	Biogeographic cycling; inputs/outputs cycling	Needs to be done in the context of the other Needs identified	In situ chemical sensors; satellite data; remote sensing;	Standard Partners
291	Great Lakes	Ecosystem - Karst / Ring Depressions	Karst Features in Lake Huron (sinkholes);	Spatial coverage; depth; dimensions; biology; chemistry; local flow pattern	Central Lake Huron	Standard Package; Miniaturized exploration / sampling techniques; Fibre optics & Subs; ROVs; AUV's; Dynamic Positioning Systems or ROV's / AUV's capabilities; mass spectrometer	Standard Partners

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292	Great Lakes	Ecosystem - Karst / Ring Depressions	Ring Depressions (400-500 m across; 20-30m deep);	How they formed; influence on distribution of benthic communities; sediments; contaminants; local flow patterns; why not in other lakes	Lake Superior	Standard Package; Seismic reflection profiling; ROVs; Sediment coring; Subs	Standard Partners
267	Great Lakes	Ecosystem - Lakes	Lake Biodiversity;	Bio / Geo / chemical processes; origin of Lakes; Origin of species (Evolutionary processes); Community structures & compositions; Species Diversity - looking for new species; (3 African Great Lakes); Rapid Assessment survey; Collection of long term Sediment cores; Geo-thermal Vents Systems; Describe landscape census; Looking for midwater scatters; Multi-beam survey; Physical Ocean Sampling; Natural History Survey	Bia Kal Lake; African Rift Lakes; Lake Nicaragua; Great Bear; Great Slave Lake; Titikacica Lake; Yellowstone	Standard Package; ROVs / AUV / SCUBA / Submersibles / Hyperspectral Remote Sensors; In-Situ Sensor (Long Term); Small Vessel for Estuaries; Digital Imagery; High Frequency Mid-Level Acoustic Census	USGS; Country of Lake; Smithsonian; UNEP, UNGEF (United Nations); Developing Nations Organizations; DOI, USGS BRG; Museums
277	Great Lakes	Ecosystem - Lakes	Recharge of the all component parts Lake systems;	Use of streams for spawning; Ecosystems approach to water quality; Examine revival of species; Pollutants	Test cases in South East Wisconsin; Collaborative efforts Canada other International entities	Standard Package; Miniaturized exploration / sampling techniques; Fiber optics & Subs; ROVs; AUV's; Dynamic Positioning Systems or ROV's / AUV's capabilities; Modeling technologies; Maintenance of USGS gauge stations; Broad scale monitoring	WHOI, Harbor Branch; NGS
290	Great Lakes	Ecosystem - Seamounts / Ridges	North/South Ridges in Lake Superior;	Origin controversy; distribution of sediment & benthic communities; distribution of fish; influence of bottom currents	Lake Superior (Eastern half); Northern Lake Michigan; Eastern Lake Huron; Bering Sea	Standard Package; Mapping; ROVs; Subs; AUVs; sampling; moorings (ADCP)	Standard Partners
107	Hawaii	Ecosystem - Seamounts / Ridges	Seamounts	Locating unknown seamounts; Identify and characterize communities; Identify new species; Altimetry mapping comparisons; Geoid products; Deep seamount biomass understanding; survey; map; ground truthing; sampling; direct observations with moored stations & deep dives; verifying location; sampling; mapping; deep scattering layer over hydro plumes	Northwestern Hawaii to start comparing altimetry w/ navigation charts; West Mounts; Neckeridge; Hawaiian Islands; Musician Seamounts and then look outside to examine dispersal; evolution; many seamounts have no names; Emperor Seamounts	Standard Package; genomic technologies; coring; molecular techniques; video live feeds for outreach; Hugo at Loihi volcano; dating technologies; better altimetry sensors and data processing; improved spatial coverage; altimetry maps; swath bathymetry; gravity survey; fishing boat watching	Standard Partners, HUGO, telephone companies, outreach partners, National Geographic, Discovery Channel, drug companies, MMS; NESDIS; NASA; Navy
186	North Atlantic	Ecosystem - Seamounts / Ridges	Knowledge of impact of Seamounts on ocean dynamics; Also other abrupt topography	Ocean Currents; Ecosystems; Biogeography; Biodiversity	Bear Mount; New England Seamount chain; Mid Atlantic Ridge; Cashes Ledge; other small features	Standard Package; Sub/ ROV's/ AUV's Video Imagery; Sampling Systems; Acoustic Mapping	Standard Partners

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210	North Atlantic	Ecosystem - Seamounts / Ridges	Seamounts	Systematic documentation	All seamounts e.g. New England seamount chain	Standard Package;	Standard Partners
166	Alaska	Ecosystem - Shorelines to Ledges	Intertidal Zones	Document biodiversity and taxonomy; Identify and characterize; Document archaeology.	Aleutian Islands; Islands in Gulf of Alaska e.g. Shumagins; Kodiak Island Group; Alaskan Peninsula	Standard Package; Via helicopters from ships and Alaska Peninsula; standard biological sampling; LIDAR; acoustic monitoring	Standard Partners; Cruise lines
63	Caribbean	Ecosystem - Shorelines to Ledges	Status of fish stocks and habitat on the Islamorada Hump	Collect information on distribution; taxonomy; abundance; condition; and diversity	Islamorada Hump; Florida Keys	Standard Package; advanced diving; passive acoustics	Standard Partners
85	Caribbean	Ecosystem - Shorelines to Ledges	Knowledge of fisheries habitats	Scope and variability of tropic productivity in reef systems	20-200m	Standard Package; develop acoustic techniques for classification (benthic; reef; and water column organisms); airborne LIDAR; hyper-/multi-spectral optics (species ID); tracking of tagged fish; human diving technologies	Standard Partners; congressional mandate; state & regional; territorial agencies & councils; sport fishing; commercial fisheries; private industry (Ocean Fishing Forecasting Industry); FL Marine Labs (HBOI, MOTE); RSMAS
16	Gulf of Mexico	Ecosystem - Shorelines to Ledges	Mississippi River outflow on habitats	Understand the impacts of Mississippi River outflow on habitats; ecosystems (and secondary fresh water input); Determine river influence on Gulf systems; bio/geo/chem; frontal zones	Flower Garden Banks to FL Keys	Standard Package; Physical sampling; hyperspectral; video/HDTV; towed geo/chem/bio sensors; mass spectrometers; geo/chem/bio sensors; nutrient sensors; sensor arrays; fixed sensors; AUVs; remote sensing; ROVs; drifters; vessel	Standard Partners; NMFS; NASA; USN; NOS; Commercial fishing; sport fishing; EPA; states; NMS; USACE
35	Gulf of Mexico	Ecosystem - Shorelines to Ledges	Shoreline erosion	Subsidence in LA; Gulf of Mexico; erosion rates; habitat loss; sedimentation; storm surge impacts; salt water intrusion; habitat loss; impact; invasive species; impacts on infrastructure	Gulf of Mexico; TX; Alabama; coastal LA	Remote sensing; aerial photo; satellite imagery; maps	Standard Partners
182	North Atlantic	Ecosystem - Shorelines to Ledges	Knowledge of Near Shore environments	Inventory; characterize Measure; habitats; bathymetry; Bio/Geo/Chem of shallow water processes near fronts - colds corals; Archeology; Characterization of Biological / Geological / Chemical	Coastal New England	Shallow water mapping; Sediments; Remote Sensing; in Turbid water; Small vessels; Autonomous Vehicles; Aircraft Archeological Application; Magnetic Sensors; Data Mining; Bottom mapping & characterization capability; New sampling protocols; Multi Line Arrays and Multi Sensor Arrays	USA Core of Engineers; State Governments; Academia; Aquariums; Not For Profit Entities; Science Education; USCG; Navy; Commercial
212	North Atlantic	Ecosystem - Shorelines to Ledges	Ledges	Not well documented	Jeffries Ledge; southern Cashes Ledge; Fippennies; Platts; all along the coast of Maine e.g. smaller coastal ledges	Standard Package;	Standard Partners

ID	Workshop	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
304	South Atlantic	Ecosystem - Shorelines to Ledges	Connectivity of habitats on shelf and edge of shelf; trophodynamic study	ID connected habitats; extent of spawning areas; inventory of habitats and communities; connection between reefs; sample; determine source; track history of fish; follow biologics to determine behavior; tagging studies; molecular data analysis	Marine Protected Areas; Hatteras to Texas	Spectral technologies; PSATS/conventional tagging; chemical tools	Standard Partners
315	South Atlantic	Ecosystem - Shorelines to Ledges	Inner shelf	Surficial geology; bathymetry; sediment distribution; biota; habitat distribution; potential fish habitats; groundwater discharge; relationships between biology and geology; physical oceanography - water mass characteristics; invasive species; harmful algal blooms	Grays Reef; Georgia coast; Florida coast; SE NC coast least studied; SC coast	Standard Package;	SCUBA; multi-beam; side-scan; chirp; ROV's; seismic; satellite; LIDAR; vibracore; SUB; AUV; basic bottom sampling; moored arrays; multispectral platforms
318	South Atlantic	Ecosystem - Shorelines to Ledges	The Point	Extend baseline info; why is it so productive?; map	Just off Hatteras	Subs; mapping; sediment traps	Standard Partners
229	West Coast	Ecosystem - Shorelines to Ledges	Continental Shelf	Benthic; Marine Protected Area; proposed Marine Protected Areas; cables; then go observe; general baseline mapping (high resolution); habitat substrate; geo/bio/chem; current; temperature; ID and characterize	West Coast; existing protected areas; proposed Marine Protected Area cable routes; heavily trawled areas; areas of heavy coastal/urban development. Same locations as above. Also untouched areas.	Standard Package - multi-beam; bioacoustics tech; ADCP; seismic profiling; remote sensing; observatory approach; Standard regular remote sampling techniques; temporal/seasonal sampling tools. Higher resolution remote sampling; processing/visualization tools	Standard Partners; states; sanctuaries; NOS; NOAA hydrographic program
252	West Coast	Ecosystem - Shorelines to Ledges	Nearshore habitat; Archaeological paleoclimate area	Habitat on nearshore (shelf and slope); Archaeological paleoclimate area; targeted anthropogenic impacts; high definition visual surveys; look for arch. sites of previous civilization; look for deeper wrecks; understanding of flows of chemicals; fisheries; understanding biological hot spots; sediment transport; physical; current flow interactions; discover history influences; understanding margin marine boundary layer	0-1000m depth; 0-100m transport	Standard Package; Sidescan; magnetometers; sub-bottom profiling; laser line scan; ranging system; geochemical measuring systems; geology system (porosity); sediment transport system (suspension); generation of sampling technology (give 100x more data); genetic markers on AUVs; remote sensing technology on AUV; etc; real time capability; chemical sensor	Cultural resource organizations; Navy (NAVO); oil companies; museums; NGOs; National Cultural Archival Org; States Historical Preservation; tribes/islanders; ecotourism
157	Alaska	Ecosystem - Slopes	Continental Rise and the Outer Continental Shelf, right down to the Abyssal Floor Plain	Document biological communities and geologic history; Examine this record of continental climate	Arc of the Gulf; Gulf of Alaska continental margin; Bering Sea; e.g. at the base of the margin cutting the canyons	Standard Package; Suite of geological and biological sampling devices; backscatter data; seismic reflection	Standard Partners; Various Commercial Partners

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200	North Atlantic	Ecosystem - Slopes	Study Transitional Areas Between Biogeographic Areas & Shelf Slope Regions	Species distribution and ranges; species dynamics; tropic interaction; invasive; patterns	Georges Bank; Cape Hatteras; 350m isobaths; any biogeographic breaks	Standard Package; Standard Tools	Standard Partners
216	North Atlantic	Ecosystem - Slopes	Slopes (600 to 4000 ft)	Not well documented	Slopes adjacent to ID canyons or seamounts	Standard Package;	Standard Partners
302	South Atlantic	Ecosystem - Slopes	Shelf to slope transition area; complex habitats - reefs (outer shelf), deep coral banks, canyons	Survey bottom; physical sampling of water column dynamics; biological survey; sampling structural data; describing wreck structure; wood samples from wrecks; corrosion analysis; sampling substrates; subsurface geology; site stabilization; covering and uncovering of wrecks; observe new species; species interactions/behavior ; habitat utilization; network of sensors; multidiscipline surveys; fisheries; ID community structures; (Assume already have good bathymetric data); characterize content of entire water column (*planned comprehensive surveys); *staged multiyear plan ; generate time line	Hatteras to Texas	Standard package 1,2,3; magnetometer; sidescan; sub-bottom profiler; flow thru system; HDTV; subs in strong currents; remote sensing of Gulf Stream; HDTV cameras; photo mosaic; multiple cameras/sensors - fiber optic technology	Standard Partners
317	South Atlantic	Ecosystem - Slopes	Explore shelf break - upper slope	Mapping; characterize; ID; intercomparisons; moored arrays; satellite; airborne; LIDAR; drifters; shelf edge; reefs; hard bottoms; paleoshorelines; spawning locations; sand resources; sediment traps; broad based exploration survey; expansion of MARMAP monitoring (fisheries monitoring program funded by NMFS to SC); habitat based observation; turbidity transport; mineral exploration; gas and groundwater seeps; dedicated estuarine coastal vessel for education and training of next generation of oceanographers to establish monitoring program of data and sample collection - potentially re -outfit Ferrell for this purpose	S. Atlantic Bight; oculina banks; compare among . . .Cape Canaveral; Hatteras Slope; S.Carolina-Georgia border	Standard package; habitat; SCUBA; moored (similar to LEO); ROV observation satellite; airborne; sediment traps; coring; MOCNESS funnel; seismic; Subs; tech diving; ROV's; AUV's; moored arrays; multi-beam; side-scan; seismic; chirp	Standard Partners; oil industry; ocean tech companies; DOD
144	Hawaii	Ecosystem - Trenches	Trenches	Tonga Trench; deep dive mapping; gas hydrates	Mariana's Trench; Tonga Trench	Extreme deep diving for ROVs; sampling tech	JAMSTEC; NSF - Margins

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138	Hawaii	Ecosystems - Arc	Gaps in exploration in past of arcs	Standard plume techniques at Tonga Kermadec; less than 2% been explored; location of chemical fluxes and plumes; biota; volumetric; geologic signatures; tracing ocean circulation; sensing water column	Euphotic zone in Tonga Kermadec Arc	Standard Package: Airborne remote sensing surveys; XBTS; high precision; standard package; tow-yo	PMEL; GNS; JAMSTEC; NSF - ridge program; American Samoa; NMFS; NMS
270	Great Lakes	Episodic Events	Integrating in discoveries with accountability Need, Basic research with applied science; Event driven Storms, Surface and Benthic storms; Distribution of nutrients, biomass & current influences	Distribution of nutrients; biomass & current influences	Costal Harbor Estuaries	Moorings (Long Term); High frequency surface radar (CODAR); ADCP's; Development of ecological observatories with (beyond normal sensors); New engineering - adaptive sampling instrument (What; When);	Standard Partners
13	Gulf of Mexico	Episodic Events	Loop and related currents to HAB formation	Understanding of relationship of loop and related currents to HAB formation and other species that are not normally seen; discover mechanisms of transport that leads to formation and distribution	West FL shelf; Yucatan Straits (source); E. Texas; northern Gulf	Remote sensing; towed arrays; ROV/AUVs; sampling; drifters (SVP); HDTV	Standard Partners
36	Gulf of Mexico	Episodic Events	Hypoxia phenomenon	Origin; effects	Gulf of Mexico dead zone; look at all river mouths	Collect standard oceanographic parameters	Standard Partners
207	North Atlantic	Episodic Events	Observing Episodic Events & Rare Species e.g. storm, blooms	Short-term events - frequency; strength; intensity; impact; magnitude; compare & contrast	Marine Protected Areas; abrupt bottom topography; areas representative of a range of topographies e.g. ledge vs. flat bottom; e.g. Gulf of Maine; marine mammal habitat;	Camera; observation technology	Standard Partners
253	West Coast	Episodic Events	Plate scale to mesoscale	Plate scale to mesoscale observatory; long-term understanding of episodic events; gyre scale; absorption of CO2; needs thorough mapping effort; collaborative effort; new ways to do oceanography; understanding fluid flux productivity of subduction zones; sources of interplanetary life	Observe 50-70km	Large logistics; huge communications requirements; fiber optic observatory	Telecommunication industry; oil/gas industry; Canada; Germany; etc.
278	Great Lakes	Extreme Environments - Sea Ice	Charactering ecosystems and other systems;	Ice Dynamics Surveys sampling; systematic surveys; Four dimension; Hydrothermal systems; long term sediment records; rates of change; Seasonal Ice covered areas	Deep Basin to shallow water volumes; Winter in Great Lakes	Molecular systematics genetics (method to measure diversity); Environmental Tracers; Miniaturized exploration / sampling techniques; Fiber optics & Subs; ROV's; AUV's; Dynamic Positioning Systems or ROV's / AUV's capabilities	WHOI, Harbor Branch; NGS

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287	Great Lakes	Extreme Environments - Vents, Seeps & Volcanoes	High Resolution Spatial & Temporal Zooplankton Measurement over space & time, classification	High resolution zooplankton measurement over space & time; classification	Compare Lake Superior and southern Lake Michigan; 10 largest lakes in the world; Yellowstone Lake	Bigger faster vessels (stationed in Lake Superior); optical plankton counter; towed vehicles; AUVs w/ zooplankton counter; in-situ genetic tech; video image classification tech	Standard Partners
296	Great Lakes	Extreme Environments - Vents, Seeps & Volcanoes	Hydrothermal Features in Lake Systems;	Chemistry; microbiology; nutrient dynamics;	Crater Lake; Yellowstone Park lakes; African Lakes e.g. Tanganyika; Baikal	Miniaturized exploration / sampling techniques; Fiber optics & Subs; ROVs; AUV's; Dynamic Positioning Systems or ROV's / AUV's capabilities	Standard Partners
298	Great Lakes	Extreme Environments - Vents, Seeps & Volcanoes	Seeps/ Non-Oxygen Environments - Endemic species, evolution in isolation, interlake comparisons, genetics in large time scales	Endemic species; evolution in isolation; interlake comparisons; genetics in large time scales	North shore of Lake Superior; bays; nearshore; upper peninsula Superior; Ashland Port urban environment	Standard package	Standard Partners
120	Hawaii	Extreme Environments - Vents, Seeps & Volcanoes	Formation of biofilm/microbial mat in extreme environments	Diversity; members of consortia; genome mapping; discovery of new antibiotics; chemistry of the environment	Loihi hydrothermal vent; New Zealand; Mariana's Trench; any extreme environment	Coring technology; Genomic; protein chemistry; microchip; confocal microscopy; develop portable confocal for ship use; small gc/ms; subs and other collection vehicles	Standard Partners
122	Hawaii	Extreme Environments - Vents, Seeps & Volcanoes	Active volcanism	General mapping; Access naval data; Airborne geochemical; Seismic; Passive acoustics; track plumes and trace elements from plumes from air; set up listening arrays; locate features using mapping technology	Am. Samoa; New Zealand; Japan; CNMI; Guam-throughout Pacific	Standard package plus remote sensing; thermal technology; magnetometers; seismology; acoustic technology; mapping technology; passive acoustic arrays; live feed for outreach	Standard partners, Navy, National Geographic, Discovery Channel, deep sea mining community, New Zealand, Japan, Island Nations, Indonesia, Australia, maritime industry, biotech, minerals
133	Hawaii	Extreme Environments - Vents, Seeps & Volcanoes	Understand the Pacific Ocean regarding the origin of life (vent communities, any optimal environments, etc) - A. Funnel (including Tow-Yos)	Interaction between geology; biota; circulation area to target (Tow-Yos - sampling in vertical)	Loihi - volcano; hot spot; Juan de Fuca; cold seeps; Back Arc Basins (Guam; Samoa; Lau)	Standard Package; specific sampling; HDTV; digital camera systems; sampling and incubation systems for culturing organisms	JAMSTEC, University of Washington, PMEL, NASA, GNS, COMB (Center of Marine Biology at Maryland)
142	Hawaii	Extreme Environments - Vents, Seeps & Volcanoes	Sample and map new hot spots; fundamental understanding	Investigate Loihi; Samoa; Louisville Ridge; sampling deep mantle plume; sample volcanic edifice edge of seafloor	Samoa; Loihi	Standard Package; ocean bottom observatories; SOSUS; Sonobuoys Ocean Bottom Seismometer; Acoustic	SOSUS; Isla - Infra Sound Lab (U.N.); bring back Hugo; USGS (Hawaii Volcano); GNS
198	North Atlantic	Extreme Environments - Vents, Seeps & Volcanoes	Chemosynthetic communities (subsurface - down several km); hydrate vents, seeps and vent communities	inventory and characterize; isolated ridge system; new biota; larger geographic context; physical & chemical systems	Mid-Atlantic Ridge	Standard Package; multi-beam geophysical techniques; sampling techniques; satellite imaging; towed vehicles; subs; AUV's look at new technologies	Standard Partners
199	North Atlantic	Extreme Environments - Vents, Seeps & Volcanoes	Knowledge of micro-organisms in the deep sub-bottom	Sea floor Biosphere	Deep water	Standard Package; Deep sampling technology; Ocean Drilling Program	Standard Partners
148	Alaska	Geology & Geomorphology	Documenting climate variability (Molnia)	500 million year record of global climate; Need to examine it to look for variability	Molnia	Standard Package; High resolution geophysics; Coring	Standard Partners; Various Commercial Partners

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149	Alaska	Geology & Geomorphology	Glaciers (Molnia)	How did the glaciers existing in the Bering Sea change over time?; Explore environment created and released by retreating or advancing glaciers; Identify and characterize these environments	Gulf of Alaska continental shelf between Cook Inlet to Canadian Border; southeast Alaska; Glacier Bay	Standard Package; High resolution geophysics	Standard Partners; Various Commercial Partners
165	Alaska	Geology & Geomorphology	Plate Boundary- Strike Slip System	Map and perform water column survey; identify and characterize biota;	icy strait - Canadian border to Alek River; South of Icy Strait; Fairweather Fault; Yakutat Terrain	Standard Package; basic surveying tools	Standard Partners; Canadian Government (Earth Science Sector); Petroleum Corporations
66	Caribbean	Geology & Geomorphology	Sea floor sediments Holocene (last 10,000 yrs)	What are they? How thick are they and what events do they record?	Florida deep water below 30 meters; VI; PR;	Standard Package; Standard geological sampling; acoustics; develop new technologies - lasers; etc	Standard Partners
9	Gulf of Mexico	Geology & Geomorphology	Bottom boundary dynamics	Understanding of distribution and process details of fluid and gas expulsions; carbonate formations; and seismic activity; knowledge of bottom boundary dynamics	Slope waters <3km; E. Texas to W FL slope; Continental slope; deep water; shelf; Mexico; Cuba; Florida Keys; Florida Gulf	Standard Package; Seismometers; ROVs/subs; video; sampling; map 3-D seismic data; high resolution data	Standard Partners
11	Gulf of Mexico	Geology & Geomorphology	Knowledge of sub-bottom characteristics	Morphology; composition; dynamics	Slope waters <3km	Standard Package; Acoustic sounders (high resolution; seismic); vertical arrays; AUVs	Standard Partners
24	Gulf of Mexico	Geology & Geomorphology	Rivers of warm; dense brine	Heat flow measurements; mapping; origin; effects	Sigsbee Escarpment; Orca Basin	Observations; mapping technologies; CTD; acoustics	Standard Partners
39	Gulf of Mexico	Geology & Geomorphology	Slope stability studies	Debris floats; gas; slopes; faults; gas hydrates; mud flows; inventory and characterization; date features	Continental slope; Mobile West; Florida escarpment; Sigsbee Escarpment	Standard Package; Geotechnical; sidescan sonar; dating techniques; sampling; core samples; high resolution geophysics; multi-beam; sub-bottom systems	Standard Partners
45	Gulf of Mexico	Geology & Geomorphology	Mega-furrows	Origin; physical characterization over time; size; shape; currents	Found between 5-7;000 feet - base of the Sigsbee Escarpment	High resolution bathymetry; geotechnical technologies	Standard Partners
112	Hawaii	Geology & Geomorphology	Paleoshorelines	Sea level information such as history; finding wave notches; ledges; other geomorphological features; lava tubes and marine caves - biology	HI Archipelago (focus in NW and main islands - Midway; Oahu; Necker; main island; Brooks; Lisianski)	Coring technology; Advanced diving; Subs and other vehicles; Multi-beam for mapping; Animal borne instrumentation	Standard Partners
196	North Atlantic	Geology & Geomorphology	Knowledge of Physical Processes related to geomorphology	Mass-gravity movement; Turbidity flows; Hydrate beds; slope instability; chemical analysis	US Continental Margin; Hudson Canyon region;	Standard Package; Sub/ROV/AUV Imagery; Seismic Survey; MCS; Acoustic Mapping	Standard Partners
218	North Atlantic	Geology & Geomorphology	Protected Paleo Shorelines	Not well documented	South of Long Island & Nantucket; Gulf of Maine; Weymouth	Standard Package;	Standard Partners

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314	South Atlantic	Geology & Geomorphology	Mapping paleoshorelines and relict reefs (tend to be fish habitats)	Map; ID; characterize; develop baselines for geology; biology; water quality	Reefs; W. Florida shelf; Keys; shorelines everywhere - shelf edge; Bahamas	Standard Package; Bottom sampling; multi-beam; subs; side scan; seismic tech; chirp sonar	Standard Partners
158	Alaska	High Resolution Bathymetry	Mapping	Collect hydrographic; bathymetric and tidal data - mean low and high water; Document navigation hazards; and biota	Western and northern Alaska; Bristol Bay; Arctic Basin; Bering Sea; Bering Strait; Bering Sea (data gaps areas); North of Sag River; entire shoreline of Beaufort Sea; Cape Lisbourne	Standard Package; tide gauges; Backscatter processing; fathometers in shallow water; LIDAR	Standard Partners
273	Great Lakes	High Resolution Bathymetry	High Resolution mapping of Great Lakes - Survey of bottom of Great Lakes - Shallow water mapping; Extension of Coastal Estuaries & Wetlands; Understanding substrates to particle size; Near shore fossil coral reefs (Chicago and similar environments); east-end of Lake Superior; Mid-Lake Reefs; Mid-Lake ridge through Lake Huron; Lake Champlain	Surveys; Mapping; multi-beam	Lake Superior; Lake Michigan; all the lakes; Yellowstone Lake (done this year); Crater Lake; African Lakes and other large Lakes	Standard Package; Use of UNOLS w/multi-beam; Sub-bottom profiling; using side scanning sonar; Seismic survey; Hyperspectral Imaging from Aircraft; Laser Line Scan; Acoustic mapping; magnetometer; subbottom profiler; ROVs/Subs; Sub-bottom profiling;	National Oceanographic Service; Army Core of Engineers; USGS; Power Industry Energy; museums
289	Great Lakes	High Resolution Bathymetry	Mapping	Mapping; multi-beam	Lake Superior; Lake Michigan; all the lakes; Yellowstone Lake (done this year); Crater Lake; African Lakes	Standard Package; Acoustic mapping; magnetometer; subbottom profiler; ROVs/Subs	Standard Partners
19	Gulf of Mexico	High Resolution Bathymetry	Mapping of the Gulf	Bathymetry	Slopes; shelf regions; western Gulf off Texas coast - East Breaks area; Eastern Gulf; all of Western Florida; 4 reserves closed to fishing - 2 in Tortugas and 2 in West Florida; Northwest Gulf; partner with Mexico to map Yucatan	Standard Package; Multi-beam; subs for ground truthing; utilize backscatter data; standard package; NOAA database; map; select sites; dives - selectively target between topographic features; subs; AUV's; ROV's; intellectual mapping; time series data	Oil and gas industry; MMS; NMFS; seismic companies (SELL); HARTE marine institute; other existing efforts; USGS; Naval Oceanographic service; sea map; GOMP (EPA); academia; NGO's
20	Gulf of Mexico	High Resolution Bathymetry	Mapping between known topographic features	Mapping; inventory and characterization	All over shelf	Mapping technologies; sampling; ROV's; subs; sidescan; towed systems	Standard Partners
127	Hawaii	High Resolution Bathymetry	Charting of seamounts and banks	Mapping with more sophisticated technology	All submerged banks; particularly those that can't be seen through aerial photography; Northwestern Hawaii at 25-100 fathoms	Standard Package with multi-beam	Standard Partners
173	Alaska	Human Impacts	Hazard Dumps	Determine location and chemistry of material; Characterize these sites	Aleutians	Standard Package; hazard sampling techniques; underwater moorings	Standard Partners

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95	Caribbean	Human Impacts	Impacts of Pollution	Anthropogenic impacts on marine mammals and their habitats from ships; blast fishing; Military Ops; Energy Refineries and energy conversion activities	Puerto Rico (super-port); Bahamas; St. Croix; Florida current; deep trenches	SOSUS; deployed arrays; ship surveys; systematic observations	Standard Partners
10	Gulf of Mexico	Human Impacts	Potential threat site location	Location of site of potential threat to the environment and processes near the sites; wrecks; marine debris; dump sites; abandoned platforms	Suspected debris sites; dump zones; wrecks	Standard Package; Sampling (bio/chem/physical); coring; video; acoustic mapper; radiological sensor; networked AUVs; AWOIS; time lapse imagery; video; sector scan sonar; hydrophones; ADCP; chemical sensors; acoustic biomass; phosphorescence sensors; genomic probe; optical spectrometer; nutrient sensors; data link; single/multi-beam; sub/ROVs; AWOIS; samples; data mining (data bases); fixed sensors and arrays	EPA; NMS; State Governments; NOS (HAZMAT); media?
32	Gulf of Mexico	Human Impacts	Anthropogenic noise	Monitoring natural (biological and geological) and anthropogenic noise; effects of human induced noises on biota; natural noise	MS Delta where whales are located; human built platforms; protected regions; essential habitats	Acoustic technologies; new technologies	Standard Partners
116	Hawaii	Human Impacts	Pollution and marine pathogens	Use pathogen count as a marker	Event driven; Kaneohe Bay; Pearl Harbor; sewage outfall	Molecular biology techniques; genomic	Standard Partners
131	Hawaii	Human Impacts	Safe nuclear waste disposal site				Standard Partners
141	Hawaii	Human Impacts	Understanding biomagnification of pollutants and toxins in the marine food web (similar to large pelagic)	Reef fishes; quantifying toxins	Kona coast; Ecuador; Peru; Alaska	Tracer technologies; genetic markers; sampling and ID tools; stable isotopes will vary; stable isotopes; fatty acid analysis; modeling	Standard Partners; EPA;
197	North Atlantic	Human Impacts	Knowledge of impact of Fishing on Ocean Regions	Health of Benthic Habitat; Census of Marine Life; Archeological Impacts; History of technology;	Grand Banks; Georges Bank; Gulf of Maine; Area where fisheries are expanding into;	Standard Package; Sub/ ROV's/ AUV's Video Imagery; Sampling Systems; Acoustic Mapping	Standard Partners
161	Alaska	Marine Conservation	Essential Fish Habitat	Map and inventory benthic habitats to gain knowledge and understanding impacts of essential fish habitats; candidate areas of protection	Pribiloff Canyons; between Aleutians and shelf break	Standard Package	Standard Partners; fishing industry

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4	Gulf of Mexico	Marine Conservation	Marine Protected Areas	Characterize "deep" Marine Protected Areas (including deep reefs); Identify candidate Marine Protected Areas; Location & dynamics of archaeological sites of historical significance through the use of: vessel (standard package); data mining; manned observatory; fixed sensors and arrays; ID biota that needs protection; habitat characterization	Existing Marine Protected Areas (3 W. FL shelf); Flower Garden Banks; Green Canyon; Mississippi Canyon; Desoto Canyon; PSBL Yucatan Channel	Sub/ROV; deep diving capabilities; manned observatory (human habitat); fixed sensors; AUV; good video; acoustic mapping (single/multi-beam); HDTV; synthetic aperture sonar; laser line scanner; data mining technologies; deep water capability; time lapse imagery; data link	Energy companies; NURC; NMFS; Universities; USN; NIH; state governments; commercial fisheries; sport fishing
321	South Atlantic	Marine Conservation	South Atlantic Fisheries Management Council (SAFMC)	Map; ID; characterize; develop baselines for geology; biology; water quality; determining potential recreational interests; oceanographic parameters; putting areas on map for proposed marine reserve areas - politically driven; need to explore these regions to ID whether these are appropriate reserve areas biologically; ecologically; etc.	SAFMC has maps; deeper ones off N. and S. Carolina; Georgia; Florida; Gulf of Mexico	Multi-beam; AUV; ROV; subs; tech diving; permanently mounted instrument arrays	Standard Partners
322	South Atlantic	Marine Conservation	Recruitment and spillover mechanisms in MPA networks	Oceanographic parameters/processes; info on spawning; eggs; larvae spillover and transport mechanisms; behavior of early life history stages that effect recruitment	Region-wide; spawning locations; paleoshoreline ridges such as Pulley Ridge; Dry Tortugas; Marine Protected Area's and adjacent areas; Charleston Bump	Nanotechnology; AUV (WHOI); multi-beam; subs; satellite tags on spawning fish; drifters; moored arrays	Standard Partners
323	South Atlantic	Marine Conservation	Oculina Banks	What is effect of closure?; 10 yr limit on no fishing; ID; characterize recruitment and spillover mechanisms; artificial reef impact; comparison with existing baseline studies	S. Atlantic Bight	Subs; ROV's; tech diving; multi-beam; moored arrays; side-scan sonar; chirp	Standard Partners
178	Alaska	Marine Microorganisms	Microbes in the Bering and Chukchi Sea	Microbiology and micro-zooplankton sampling; What are the abundant and important microbes and micro-zooplankton of the Bering and Chukchi Sea; Gain knowledge of ecosystem health; Understand long-term variability	Chukchi Sea; Bering Sea	Standard Package; specialized sampling and growth chambers; microscopy	Standard Partners
179	Alaska	Marine Microorganisms	Microscopic Interfaces	Explore unknown micro- / nano-environment; Characterize it including Information on microscopic interfaces of chemistry; microbiology (liquid-solid interface)	shelf; shallow water	Standard Package; micro sampling; micro- and nano-technologies	Standard Partners

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70	Caribbean	Marine Microorganisms	Microorganisms	Knowledge of the diversity; abundance; function; behavior; and identity of marine microorganisms; Impact on Ecosystems and human & habitat health	Water; sediments; organisms; wide range of depths and areas; reefs	Genomics; micro-arrays; conversion of molecular data to signals; real-time remote analysis genomics; new culture techniques	Standard Partners; NIH; Public Health Service; Pharmaceutical Industries; global climate community; reinsurance & insurance industry; Japan; Russia; France; WHOI (ALVIN); energy industries
115	Hawaii	Marine Microorganisms	Marine parasite lifecycles	Documenting parasites; life cycle; primary and secondary hosts	Compare regions to look for pollution relationships; Northwest Hawaii	Fishing; sampling technology; subs; genomic; histopathology; specimen collection	Standard Partners
129	Hawaii	Marine Microorganisms	Marine viruses	What are the effects on carbon and phosphorus cycling?	Oahu; Station Aloha (permanent sampling site - mooring)	Water sampling, virology, bacteriology, molecular biology techniques	Standard Partners
330	South Atlantic	Marine Microorganisms	Chemosynthetic communities	Subsurface - down several km; oil seeps and vent communities; inventory and characterize; isolated ridge system; new biota; larger geographic context	Blake Ridge; Gulf of Mexico	Standard Package; Multi-beam; geophysical techniques; sampling techniques; satellite imaging; towed vehicles; subs; AUV's; look at new technologies	Standard Partners
180	Alaska	Marine Organisms	Where do high latitude organisms go to spend winter	Support for designation of critical habitats	Polynas - St. Lawrence; Sereniki; St. Matthew	Standard Package; biological and physical tools; benthic sampling; ice breakers; remote sensing; aircraft	Standard Partners; Industry; Navy; US/Canadian/Russian Coast Guard; Native Communities; NSF; Arctic Logistics; BASC (Barrow Arctic Science Contort); VECO Corp.
56	Caribbean	Marine Organisms	All taxa biodiversity inventory	Species inventory; Identify chemical characteristics; Discover and inventory new living resources (non-fishery) with commercial potential	Florida Straits; deep water habitats in Caribbean; location where there is already a lot of information such as Florida Keys or Salt River Canyon in St. Croix (long-term hydrolab mission)	Standard Package; tech diving; develop new sampling tools (new probes; sensors; samplers (miniaturized)) and new tools to keep samples alive (high pressure; low temp containers); taxonomic expertise	Standard Partners; pharmaceutical industry; biotech; medical manufacturers; equipment manufacturers; USDA; cosmetic companies; NIH; Sea Grant; NCNPR; SIO; Smithsonian; commercial operators such as charter boats, fishermen, hunters; taxonomists; many universities
60	Caribbean	Marine Organisms	Learn status and habitats of spawning aggregations of fish	Document distribution; taxonomy; abundance; condition; and life history; Mechanisms underlying Fish aggregations including pelagic and benthic areas	VI; Nevassa Islands; Columbian Banks (joint treaty); VI; Puerto Rico; Bahamas; Florida Straits; Mexico; Belize; closed areas and Marine Protected Area's	Standard Package; optical technologies; visual observations; technologies that work at night; rebreathers/mixed gas; radio tagging	Standard Partners
77	Caribbean	Marine Organisms	Distribution of marine geographic endemics	Document taxonomy; distribution; and life history	Start at geographically distinct areas such as Florida Keys and compare to US VI	Sampling techniques; molecular genetic techniques	Standard Partners
79	Caribbean	Marine Organisms	Deep Diving and Long Range Marine Mammals	Observe visual behavior; environment; and habitat through use of all senses	Wherever they go!; Several Caribbean wintering ground basins; nursery areas; feeding grounds	Design new technologies - non-invasive and otherwise that follow these mammals	Standard Partners

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98	Caribbean	Marine Organisms	Connection of separated populations (esp. fish)	How Habitats impact each other	Throughout Caribbean		Standard Partners
102	Caribbean	Marine Organisms	Linkage between marine mammals & food source/distribution (includes vertical migrates)			Migrating instruments	Standard Partners
269	Great Lakes	Marine Organisms	Populations in flux; Biological Transitions Zones;	Linkages of rivers estuaries and basin; Use of streams for spawning; Ecosystems approach to water quality; Examine revival of species; Pollutants; Identify organisms transitions zones; zebra mussel migrations; mapping of systems; transportation of organic and inorganic; Identify organisms transitions zones; zebra mussel migrations; mapping of systems	Green Can Reef; Coastal areas; sea grasses; mangroves; Florida Bay	Time Lapse; Acoustic imaging of sediment layers; microscopic level	Standard Partners
284	Great Lakes	Marine Organisms	Abyssal Fish (> 50m)	Life history; impact of invasive species; spawning (where & how especially in winter season); character displacement behavior	Upper Great Lakes; Superior; Huron; Michigan; eastern basin of Lake Erie	Standard Package; ROVs; AUVs; time lapse camera systems planted on bottom in strategic locations; Subs; Acoustic scanner; long term video observation platform / time lapse cameras	Standard Partners, Scripps, industry (esp. finances - power plants, fishing, fishing support), boating industry, Sea Grant Extension (outreach & funding), Jason Project
295	Great Lakes	Marine Organisms	How Animals use Vision & Light to Orient Themselves in the Water;	Visible communication	Deep water; shallows; freshwater vs. saltwater	Standard Package; photon cameras	Standard Partners
297	Great Lakes	Marine Organisms	Evolutionary Biology; Endemic species, evolution in isolation, interlake comparisons, genetics in large time scales	Endemic species; evolution in isolation; interlake comparisons; genetics in large time scales	Lake Victoria; Lake Malawi; other African lakes; Lake Baikal; compare w/ Great Lakes	Genetic tech; microbiology techniques; capture techniques	Standard Partners
12	Gulf of Mexico	Marine Organisms	Distribution and migration patterns of mega fauna	Understanding distribution and migration patterns of marine mammals; Charismatic mega fauna (whales; manta rays; sea turtles; dolphins; whale sharks; etc); response to anthropogenic impacts (noise; other pollution); location; reproduction; general life history questions; genetics	Migration routes; commercial lease tracts (1km contour and loop current events); Gulf shelf; specific topographic features associated with them; man-made platforms	Satellites; various tagging equipment and tech (pop-up; etc); smaller vessels; genetics; endocrinology; biochemistry; Standard package - largely diving and ROV's; GIS commercial equipment to collect species from rigs; need industrial strength samplers; photo equip; ROV's; subs; in-situ cameras; motion sensor cameras; time-lapse cameras; acoustic tags; fixed hydrophones; sensor arrays; tagging; imaging; acoustic; hydroacoustic	Recreational fishing communities; big non-profits such as TNC; WWF; Ocean Conservancy; media; BBC; Discovery Channel; academic institutions; industry

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26	Gulf of Mexico	Marine Organisms	Genetic connectivity of Gulf ecosystems	Biodiversity; genomic mapping	Upstream and downstream of productive fishery areas – Marine Protected Area's; Keys; Banks; major eddy systems	Genetic technology; plankton tows; traditional sampling techniques; ROV's and subs; deep water collection	Standard Partners
42	Gulf of Mexico	Marine Organisms	Exotic invasive species	Where do they come from?; how did they get here?; where are they successful or not successful?; impact; taxonomy; genetics	Everywhere from coast to far offshore regions	Standard sampling; genetics; taxonomy; modeling	Standard Partners
44	Gulf of Mexico	Marine Organisms	Cross Gulf migratory birds	Migratory birds - songbirds; contribute to database	Western Gulf mainly; Cuba to Florida	Visual observations; radar	Standard Partners
118	Hawaii	Marine Organisms	Animal distribution patterns	Opportunistic (fisheries) Adults only tagging through existing operations such as fishing industry; Targeted Adult tagging - mark-recapture of marine mammals; photo identification; Track over time with tags and acoustic moorings; Genomics (can be part of tagging and/or tracking); collect tissue and analyze; Otolith elemental fingerprinting - collect specimens through HI Arch. and analyze; Larval distribution patterns - collect and identify samples	HI Archipelago (Hoomalu and Mau regions - have at least one site in each region; also big island site); specific relationship between main HI and NW HI and between Johnston Atoll to S. Japan; island to island; bank to bank relationships	Standard Package; RAPT system for tracking; tags; cameras; tracking devices; genomic; develop new faster genomic technologies to be used on ships; current meters; ADCP; molecular techniques to identify larvae; aerial survey; digital ID tools; fingerprinting technology; plankton tows	Standard Partners; plus fishermen - recreational and commercial
121	Hawaii	Marine Organisms	New species/records inventory	Identify new species through existing expeditions recording abundance and diversity; taxonomy; going to areas and habitats that are not well documented	NW HI (2002 proposal sites) - far islands such as Kure and beyond where there have been no subs thus far; get close to N Pacific transition zone; US Insular surveys; maybe look at some equatorial areas for comparison	Standard Package; Plus molecular and genomic techniques; Coring technology; Advanced diving; Subs and other vehicles; Multi-beam for mapping; Animal borne instrumentation	Standard Partners plus fishermen, Smithsonian, New Species Consortium, Sloan Foundation, National Geographic, Discovery Channel, Packard Foundation
128	Hawaii	Marine Organisms	Coelacanth, giant squid, megamouth (obscure, unknown critters)	Location; habitats?; Population distribution; Abundance; Genetics; Images	Indonesia (coelacanth); HI; California (Pacific) (megamouth); New Zealand (giant squid)	Standard Package; Imaging; Subs; ROV's	Standard Partners
134	Hawaii	Marine Organisms	Marine biodiversity - inventory from Hawaii Islands - Deep Marine (>200m - ~6500m or beyond)	Along and around Hawaiian Ridge & link investigators to coordinate discovery	NW Hawaiian Islands to compare species; deep ocean areas	Standard Package; Observatories at depth; deep ocean sampling instruments; low light cameras; video; acoustics; AUVs; deep submersible; ROVs; benthic observatories; in-situ observatories; self cleaning camera lenses; critter camera technology; rugged low light cameras	Standard Partners; JAMSTEC; ONR; National Geographic; NMFS; US Fish & wildlife services

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139	Hawaii	Marine Organisms	Understand habitat of large pelagic animals	Migration corridors; use of ocean; vertical movements - targeted & observational commercial/research vessels for tagging; satellite data comparisons for behavior patterns; acoustic subsurface surveys (foraging) by attaching instruments to animals - movements; fronts; eddies; interaction with benthos; linking foraging with physical environment	Central Pacific (around Hawaii); coastal Kona (Big Island); ship of opportunity; Hawaiian Ridge	Standard Package; Critter camera technology; satellite archival tags; ARGOS; remote sensing; acoustic surveys; instrument research technologies attached to animals	Standard Partners; Fishery council; Hawaii Long Line Assoc; National Fish & Wildlife; National Geographic; NIWA (New Zealand); CSIRO (Australia); SPREP (South Pacific Regional Environment Program)
188	North Atlantic	Marine Organisms	Distribution of migration & abundance of Large, highly mobile biota	Marine Mammals; Giant Squid; Other Unknown species; Large Deep water Sharks;	Beyond Continental margin	Survey Technique; Tagging & Tracking; Acoustic Imaging; AUV's Imaging	Standard Partners
194	North Atlantic	Marine Organisms	Distribution migration & abundance of Gelatinous plankton	Pelagic Plankton; Vertical migration patterns	Seamounts; Canyons; Along Shelf margin	Sampling Technology; AUV's	Standard Partners
201	North Atlantic	Marine Organisms	Ecosystem Engineers and foundation species (corals, tile fish)	Abundance; location; diversity; new species; establish patterns; Expertise in Taxonomy of Marine Resources; Education; Career Field; Available Pool of Experts	For corals: shelf break; canyons; edges of basins; seamounts; deep and inaccessible; For Mussels: Grand Manan Basin; upper slope environment	Standard Package; Plus time series observations; National & International Standards; Collections Management; Scholarship Programs; Training in Fieldwork for Applicable Disciplines; Sponsoring Existing Entities with Expertise; Expert system can help enable; Graduate Fellowship Programs; Establish Positions (FTE's) for Populations by Existing Professionals; Service Academies; Establish Accommodating University Polices; Establish separate; Collaborative Institute	Standard Partners; Educational Institutions: Sea Grant (?); Museums; Non-Profits
203	North Atlantic	Marine Organisms	Novel Feeding Relationships		Coastal regions near algal beds; offshore basins; depositional environment; marine mammal hotspots	Sampling & stable isotope analyses for food pathways; remote sensors for marine mammals; Critter Cam	Standard Partners
208	North Atlantic	Marine Organisms	Observing Rare Species	For fish & marine mammals: migratory & threatened species e.g. location of bottleneck dolphins; unusual spawning; general behavior	Marine Protected Areas; fish aggregation areas e.g. Stellwagen Bank; ledges; fishing grounds; plane used by marine animals	Cameras; observation technology	Standard Partners

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320	South Atlantic	Marine Organisms	Expanding fisheries (exploitation of new species)	Establish fishery dependent sampling & fishery independent sampling baseline information such as growth rates; reproduction; etc.; getting samples from landings reproduction; etc.; conducting independent surveys to get better estimates of abundance; life history; reproduction; growth rates; all base-line information; education effort	Opportunistic; region-wide	Standard Package; baited traps; trawling; standard package; MOCNESS	Standard partners; SAFMC; industry associations such as Coastal Conservation Association and other sport fishing clubs; commercial fishing associations; REEF Environmental Education Association; PADI; NMFS
327	South Atlantic	Marine Organisms	Seasonality of upwelling and associated spawning and larval distribution	Map locations of upwelling and gyres; measure productivity; sample plankton; measure vertical flux to sea floor; physical/chemical water column characteristics	N. of Cape Canaveral; N. of Charleston Bump - semi-permanent gyres; also smaller ones but don't know much about them - unknown areas	Data buoys; moored arrays; satellite; plankton sampling; sediment traps; standard oceanographic sampling - CTD; ADCP; fluorometry	Standard Partners
257	West Coast	Marine Organisms	Pelagic animal movement and orientation	How animals find guideposts in the open ocean; animals as ocean explorers; how the populations succeed; behavior patterns; interactions with ocean structures; use of habitat; range and navigation	Basin scale Pacific Ocean; eastern North Pacific Ocean; entire water column	Pop-Up Satellite Archival Transmitters(PSATS); archival tags; acoustic network tracking; active acoustic tracking; ARGOS; imaging systems	University; electronics industry; Census of Marine Life; fishermen (recreational & commercial); conservation groups
88	Caribbean	Ocean Resources - Bioprospecting	Application of new micro/macro organisms on drug discoveries & other industrial products	Biotechnology	Deep reefs; vent; seeps	Standard Package	Standard Partners
202	North Atlantic	Ocean Resources - Bioprospecting	Bioprospecting	Biotech industry	Areas of high diversity; abrupt topo changes; deep within our region and tropical;	Bioprospecting technology; standard sampling technology that capture and keep specimen alive	Standard Partners
328	South Atlantic	Ocean Resources - Bioprospecting	Bioprospecting	Charleston Bump (mg); Blake Plateau (gas hydrates; sand); inner shelf; collect samples of marine organisms; water samples; sediment samples; collect DNA from marine organisms	Any of regions/projects stated above - opportunistic	Standard Package; Rock dredging; sand collecting tech; standard package; seismic; sub-bottom profilers; bioprospecting tools; subs; ROV's; low tech shipboard sampling such as trawls and dredges; genomic tech; molecular tech	Standard partners; biotech; CDC; local governments
176	Alaska	Ocean Resources - Energy & Minerals	Gas Hydrates	Document interaction w/ ocean; Identify and characterize communities associated with them; Map distribution and location; Assess VAMP (Velocity AMplitude) Structures.	Deep Gulf of Alaska; Beaufort; North Slope; Chukchi; Wrangall Island; Bering Sea Basin	Standard Package; Seismic profiling; sniffers;	Standard Partners

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2	Gulf of Mexico	Ocean Resources - Energy & Minerals	Gas hydrates	Understanding and determination of location and volume of hydrate resources; classification; chemistry	300m -3km (maybe more) depths; emphasize below 1000m (E. Texas to W. Florida); EEZ; outcroppings; arctic	Acoustic mapping; ROVs; sampling systems; video; sub; AUVs; sensors for gas analysis	Standard Partners
17	Gulf of Mexico	Ocean Resources - Energy & Minerals	Location of new mineral resource deposits	Shell; sand	EEZ	Core samples; ROVs/AUVs	Standard Partners
18	Gulf of Mexico	Ocean Resources - Energy & Minerals	Ocean renewable resources	Ability to generate energy from ocean renewable resources (currents; vents); detailed baseline knowledge of candidate currents/locations	Candidate bathymetry near loop and related currents; vent locations	Instrumented platform; deployed and fixed current meters; drifters; profilant floats	Standard Partners
126	Hawaii	Ocean Resources - Energy & Minerals	Mineral resources	Location; Composition	Johnston sea mount; other sea mounts	Standard Package; multi-beam	Standard Partners
184	North Atlantic	Ocean Resources - Energy & Minerals	Knowledge of Gas Hydrates Provinces	Process of Gas Hydrates potential resources Effects of gases on chemosynthetic communities; Climate Impacts; Slope Quality	US EEZ; Hudson Canyon Region; (fiber Optic Hub)	Submersibles ROV's Sampling Methods	Standard Partners
209	North Atlantic	Ocean Resources - Energy & Minerals	Non Biological Resources (note: this should not be the focus of OE)	Minerals; oil & gas; hydrates; location; occurrence; stability; mixed aggregate	U.S. EEZ	Archive data	Standard Partners
307	South Atlantic	Ocean Resources - Energy & Minerals	Discovery of deep sea minerals, deep sea biota	Surveys - subsurface; ocean drilling programs	Blake Plateau	Standard Package	Standard Partners
329	South Atlantic	Ocean Resources - Energy & Minerals	Mineral prospecting	Charleston Bump (mg); Blake Plateau (gas hydrates; sand); inner shelf; manganese nodules; phosphorites; gas hydrates; sand resources for beach nourishment; heavy metals	Near-shore regions; Region-wide; off Hatteras; Charleston Bump; Blake Plateau; Blake Ridge	Standard Package; Multi-beam; Chirp sonar; seismic; ROV's; subs; bottom sampling; corers; grabs; dredges; side scan; rock dredging; sand collecting tech; seismic; sub-bottom profilers; bioprospecting tools	Standard partners; biotech; CDC; local governments
258	West Coast	Ocean Resources - Energy & Minerals	Crustal processes	Hydrates; fluids (seawater and gases); Crustal processes that affect fluid flow; determination of location and volume of hydrate resources; classification; chemistry; fluid flow; subduction zone; hydrothermal processes; microbial populations and dynamics; fluid pressure and quantification of flow	300m -3km (maybe more) depths; emphasize below 1000m; EEZ; outcroppings; plate scale; active seeps; middle of plates	Standard Package; Acoustic mapping; higher resolution chemical sensors	Standard Partners

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268	Great Lakes	Pelagic Environment	Pelagic Habitat - Ecosystem Behavior's; Both physical systems and Benthic Landscape; Identifying boundary fluxes; Identify microscale of physical / chemical processes; eddies & fronts; Data mining & modeling; Intensify systems in time and space scale; Global loss of biological diversity (loss of taxonomy and systematics skills) Human Technologies to resurrect core competence and Knowledge, people & technological interface needed to continue the skills (greater diversity in program - mainly older / white males)	Intensify systems in time and space scale; Global loss of biological diversity (loss of taxonomy and systematics skills) Human Technologies to resurrect core competence and Knowledge, people & technological interface needed to continue the skills (greater diversity in program - mainly older / white males)	Biological hot-spots (Benthic & Pelagic Water Columns)	Sensors & Criter Cams - PSATS; Zoo Cam's; Fish Cam's; Buoy Networks; or an upward looking devices to monitor water column; Dockable AUV's; Recycle Oil Rigg's on Mid-Lake Ridge; Long Term Observatory	Satellite - National Weather Service; Gas & Electric Industry; Coast Guard; Navy & Army Core of Engineers; NSF, DOI, USGS; Insurance Companies
276	Great Lakes	Pelagic Environment	Constant monitoring of Pelagic community - Buoy Networks, or an upward looking devices to monitor water column	Buoy Networks; or an upward looking devices to monitor water column	Lake Michigan for comparison of Older transects	Miniaturized exploration / sampling techniques; Fiber optics & Subs; ROV's; AUV's; Dynamic Positioning Systems or ROV's / AUV's capabilities; More Adaptive sensors following events	WHOI, Harbor Branch; NGS
280	Great Lakes	Pelagic Environment	Life in one cubic meter of water; Seasonal change, species change, ID & characterize, transition rates, feeding rates, all of the rates	Seasonal change; species change; ID & characterize; transition rates; feeding rates; all of the rates	Contrast temperate vs. tropical; nearshore fresh vs. salt; contrast different parameters	Holography; acoustic Doppler; DNS; fluid simulation; IR laser scan (need low Reynolds# on machine); micro-chemical sensors; AUV's; ROV's; subs; sampling; neutrally buoyant chemostats; low impact; low Reynolds #; new tech	John Hopkins, URI
38	Gulf of Mexico	Pelagic Environment	Mid-water exploration	Characterization of organisms	Gulf; off mouth of MS river - resident population of sperm whales over 1,000m line so there must be a resident population of giant squid; Straits of Yucatan and Straits of Florida - Gulf connections	Moch-ness; imagery; sensing; new technologies	Standard Partners
189	North Atlantic	Pelagic Environment	Deep Pelagic Realm	Characterize; Biology Dynamics	Sea Mount & Canyons Along the Continental shelf Greater 1000 meter & meso	Standard Package; Deep Submersibles; observations on a broader scale; AUV's; Acoustics Imaging; chem; Bio Sensor	Standard Partners
206	North Atlantic	Pelagic Environment	Pelagic Realm - surface to deep sea	What's there? Species diversity issues; location; ID and characterize; function; what's there to exploit & conserve; patterns	Beyond shelf break e.g. Oceanographer Canyon and south	Standard Package; Submersibles; ROV's; acoustics; sampling tools to collect gelatinous organisms	Standard Partners

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326	South Atlantic	Pelagic Environment	Shelf-wide water column oceanographic studies (physical, biological, chemical)	What causes harmful algal blooms; circulation; nutrient distributions; nutrient flux; mixing; recruitment dynamics; jellyfish (sea nettles); water column sampling; time-series monitoring and collecting water samples; monitor as event occurs	Region-wide; N. Carolina; Onslow Bay	Standard Package; moored arrays; upgrading and expanding the SABSOON network; ADCP; permanently moored data buoys; drifting sediment traps (vertex style); satellite imagery; drifters; general oceanographic sampling - CTD; ADF; water sampling	Standard Partners
230	West Coast	Pelagic Environment	Midwater	Species diversity; ID and characterize; food web; link between upper water and benthic water; how the midwater functions in this role; evolutionary relationships; geographic relationships; connectivity	Gross global sampling (have some info on Japan and Monterey Bay)	Standard Package; Suction samplers; insulated compartment; observation & tracking technology; large samplers (new tech); collection tech; AUVs that follow; critters (new tech); Genetic tools; ROVs for filming; sampling and observing behavior; HDTV video very useful; establishing strobe frame photography at some time series sites to get understanding of change of abundance	Standard Partners; HBOI; Canadian ROPOS; MBARI; JAMSTEC (Japan); National Geographic Society; Discovery; MBA; aquaria
250	West Coast	Pelagic Environment	Deep sea water column	Knowledge of the deep sea water column (largest biomass on planet); biota - what organisms exist (distribution; abundance; dynamics)	Bottom mixed layer to sea floor; deep water North Pacific on coast	Standard Package; Image recognition and software; improving control systems for ROVs - adapt to situations; software development; flow cytometers for microbe levels (refinement in technologies); higher flow sampling for midwater communities; nested acoustics techniques; continuous capability; capturing particle flux; genomic on a chip	Standard partners
255	West Coast	Pelagic Environment	Euphotic zone productivity	Productivity of ocean in euphotic zone; understanding life stages of organisms; discover new members; <20 microns (includes viruses; parasites); spatial structures (scales); need balance equation	Euphotic zone; Central Gyre; Monterey Bay	Standard Package; New genetic methods; new techniques for energy flow thru life form systems; genetic probes; active fluorescence; in-situ visualization; observation techniques	Standard Partners; Russia; Poland; agriculture companies; commercial fisheries; remote sensing (NASA)
167	Alaska	Sound in the Ocean	Characterize naturally occurring sounds	Listen to seismic acoustics; fauna acoustics; Marine mammals; and fish; Use acoustics to determine migration paths	Aleutians; SE Alaska; Aleutian Arc; Bering Sea	Hydrophones; observing system(s);	Standard Partners
123	Hawaii	Sound in the Ocean	Ocean acoustics		Hawaii Archipelago (Northwestern and main Hawaii mapping); Guam; CNMI; Am. Samoa; deeper areas	Sonar - active and passive; use subs and other vehicles for in-situ measurements; archival measurements	Standard Partners